FINAL ACQUISITION REPORT

For the

MARIE
3D MARINE SEISMIC SURVEY

Conducted by

APACHE ENERGY LIMITED

In The Exploration Licence Area

VIC/P42, GIPPSLAND BASIN
VICTORIA

SURVEY START DATE 4th March 2007
SURVEY COMPLETION DATE 4th April 2007

Compiled by
Bob Luff
Stephen Burt

1 INTRODUCTION

1.1 OBJECTIVES

Apache Energy Limited contracted WesternGeco (A) Pty Ltd to carry out a high quality 3D seismic survey of some 504.017 full fold square kilometres over the Marie 3D survey area. The location is in the VIC/P42 block, Gippsland Basin, Victoria, Australia.

The seismic survey vessel was the M/V Western Trident with Offshore Marine Services (OMS) providing the marine crew. WesternGeco (A) Pty Ltd supplied the seismic personnel, data processing and logistics.

Seismic operations were supervised by Bob Luff of Enquest.
Navigation positioning operations were supervised by Stephen Burt of Enquest.
Marine Mammal activity was monitored by Chris Surman, under contract to Apache Energy.

1.2 SURVEY PARAMETRES

The following is a summary of the survey parameters:

Survey type	: 3D
Client	: Apache Energy Limited
Survey name	: Marie 3D MSS
SP interval	: 18.75m
Source	: 2 x 3147 in³. Bolt guns
Streamer Length	: 8 x 4000 metres
Groups	: 8 x 320
Positioning	
Primary	: Cnav (Inmarsat 109 East)
Secondary	: Veripos (Inmarsat IOR)
Tertiary	: Trinav GPS 2.6 (Inmarsat IOR)
Water depth	: 40m to 70m
Number of sail lines	: 74
Survey surface area	: 504.017km³
Contractor	: WesternGeco (A) Pty Ltd
Vessel	: M/V Western Trident
Client Representation	: Enquest Pty. Limited

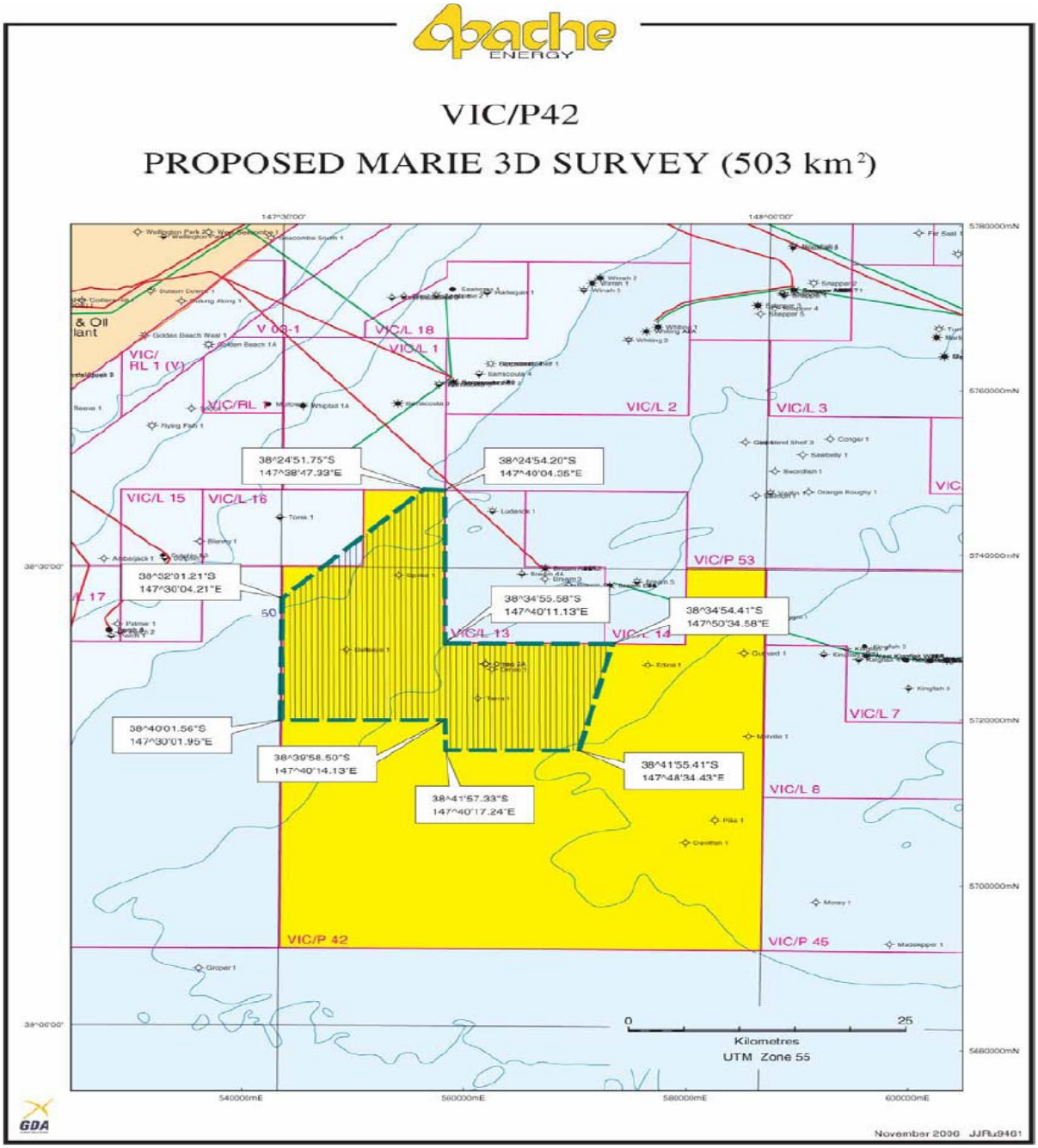
1.3 ACQUISITION PARAMETERS

Recording System	: Triacq V / MSX 2.1
Number of Channels	: 8 x 320
Record Length	: 6000ms
Sample Interval	: 2ms
Low Cut Filter	: 2Hz @ 12db/octave
High Cut Filter	: 206Hz @ 264dB/Oct
Tape Format	: SEG-D 8036, Rev 2
Digital Filter	: Zero phase
Energy Source Type	: Bolt 1900llx and 1500ll
Total Capacity	: 2 x 3147 cubic inches
Number of Arrays	: 2
Number of sub-arrays	: 3
Array Length	: 15.0m
Sub Array Separation	: 8.0m
Total Number of Guns	: 24
Capacity of each Sub-Array	: 1049 in^3
Typical Output	: 82.7 bar/metres pk-pk
Primary / bubble ratio	: 18.1
Pressure	: 2000psi
Depth	: 7.0 metres
Shot Interval	: 18.75 metres
Number Of Groups	: 8 x 320
Group Length	: 17.75 metres
Group Interval	: 12.5 metres
Group Sensitivity	: 20.0v/ bar
Hydrophones per Group	: 16 in parallel connection (8 per 6.25m base group)
Streamer depth	: 8 metres +/- 1.0m
Typical Noise	: 6.0 to 12.0 microbars
Offset (In-line)	: 236.0m
Nav Ref.-Cent. Source	: 361.9m
Primary Navigation	: Cnav
Secondary Navigation	: Veripos
Integrated Navigation System	: TRINAV 3.01
Coverage Binning System	: TRINAV 3.01
Echo Sounder	: Simrad EA500, 18/200 kHz

1.4 LOCATION MAP

COVERAGE POLYGON (GEOGRAPHIC):

38 40 01.563 S 147 30 01.955 E
38 39 58.498 S 147 40 14.134 E
38 41 57.332 S 147 40 17.243 E
38 41 55.407 S 147 48 34.431 E
38 34 54.413 S 147 50 34.576 E
38 34 55.580 S 147 40 11.132 E
38 24 54.399 S 147 40 10.524 E
38 24 51.751 S 147 38 47.335 E
38 32 01.205 S 147 30 04.215 E



1.5 LINE CO-ORDINATES

Line	Shot	Latitude	Longitude	Easting	Northing	Metres
1008	1189	38 40 01.67S	147 30 09.71E	543732.9	5720041.3	15206.3
	2000	38 31 48.35S	147 30 12.02E	543872.0	5735247.0	
1024	1189	38 40 01.72S	147 30 26.27E	544132.9	5720037.7	15637.5
	2023	38 31 34.40S	147 30 28.61E	544275.9	5735674.5	
1040	1190	38 40 01.16S	147 30 42.82E	544533.0	5720052.8	16031.3
	2045	38 31 21.07S	147 30 45.19E	544679.6	5736083.4	
1056	1190	38 40 01.20S	147 30 59.37E	544933.0	5720049.1	16031.3
	2068	38 31 07.12S	147 31 01.77E	545083.6	5736510.9	
1072	1190	38 40 01.25S	147 31 15.93E	545333.0	5720045.5	16875.0
	2090	38 30 53.79S	147 31 18.35E	545487.3	5736919.8	
1088	1190	38 40 01.29S	147 31 32.48E	545733.0	5720041.8	17287.5
	2112	38 30 40.45S	147 31 34.92E	545891.1	5737328.6	
1104	1190	38 40 01.34S	147 31 49.03E	546133.0	5720038.1	17718.8
	2135	38 30 26.50S	147 31 51.50E	546295.0	5737756.2	
1120	1191	38 40 00.77S	147 32 05.58E	546533.1	5720053.2	18112.6
	2157	38 30 13.16S	147 32 08.07E	546698.8	5738165.0	
1136	1191	38 40 00.81S	147 32 22.14E	546933.1	5720049.6	18543.8
	2180	38 29 59.21S	147 32 24.64E	547102.7	5738592.6	
1152	1191	38 40 00.86S	147 32 38.69E	547333.1	5720045.9	18956.3
	2202	38 29 45.87S	147 32 41.21E	547506.4	5739001.4	
1168	1191	38 40 00.90S	147 32 55.24E	547733.1	5720042.3	19368.7
	2224	38 29 32.53S	147 32 57.78E	547910.2	5739410.2	
1184	1191	38 40 00.94S	147 33 11.79E	548133.0	5720038.6	19800.0
	2247	38 29 18.58S	147 33 14.34E	548314.1	5739837.8	
1200	1192	38 40 00.37S	147 33 28.35E	548533.2	5720053.7	20193.7
	2269	38 29 05.24S	147 33 30.91E	548717.9	5740246.6	
1216	1192	38 40 00.41S	147 33 44.90E	548933.2	5720050.0	20625.1
	2292	38 28 51.29S	147 33 47.47E	549121.8	5740674.2	
1232	1192	38 40 00.45S	147 34 01.45E	549333.2	5720046.4	21037.5
	2314	38 28 37.95S	147 34 04.03E	549525.6	5741083.0	
1248	1192	38 40 00.49S	147 34 18.00E	549733.2	5720042.7	21450.0
	2336	38 28 24.60S	147 34 20.59E	549929.3	5741491.8	
1264	1192	38 40 00.52S	147 34 34.55E	550133.1	5720039.1	21881.2
	2359	38 28 10.65S	147 34 37.15E	550333.2	5741919.4	
1280	1193	38 39 59.95S	147 34 51.11E	550533.3	5720054.2	22274.9
	2381	38 27 57.30S	147 34 53.70E	550737.0	5742328.2	
1296	1193	38 39 59.99S	147 35 07.66E	550933.3	5720050.5	22706.2
	2404	38 27 43.35S	147 35 10.26E	551140.9	5742755.8	
1312	1193	38 40 00.02S	147 35 24.21E	551333.3	5720046.8	23118.8
	2426	38 27 30.00S	147 35 26.81E	551544.7	5743164.6	
1328	1193	38 40 00.06S	147 35 40.76E	551733.2	5720043.2	23550.0
	2449	38 27 16.05S	147 35 43.36E	551948.6	5743592.2	

Line	Shot	Latitude	Longitude	Easting	Northing	Metres
1344	1193	38 40 00.09S	147 35 57.31E	552133.2	5720039.5	23962.5
	2471	38 27 02.70S	147 35 59.91E	552352.4	5744001.0	
1360	1194	38 39 59.52S	147 36 13.87E	552533.4	5744409.8	24356.2
	2493	38 26 49.35S	147 36 16.46E	552756.1	5744409.8	
1376	1194	38 39 59.55S	147 36 30.42E	552933.4	5720051.0	24787.4
	2516	38 26 35.39S	147 36 33.00E	553160.1	5744837.4	
1392	1194	38 39 59.58S	147 36 46.97E	553333.3	5720047.3	25200.0
	2538	38 26 22.04S	147 36 49.55E	553563.8	5745246.2	
1408	1194	38 39 59.61S	147 37 03.52E	553733.3	5720043.6	25631.3
	2561	38 26 08.08S	147 37 06.09E	553967.7	5745673.8	
1424	1194	38 39 59.65S	147 37 20.07E	554133.3	5720040.0	26043.7
	2583	38 25 54.73S	147 37 22.63E	554371.5	5746082.6	
1449	1195	38 39 59.07S	147 37 36.63E	554533.5	5720055.1	26437.5
	2605	38 25 41.38S	147 37 39.17E	554775.2	5746491.5	
1456	1195	38 39 59.10S	147 37 53.18E	554933.5	5720051.4	26868.7
	2628	38 25 27.42S	147 37 55.70E	555179.2	5746919.0	
1472	1195	38 39 59.13S	147 38 09.73E	555333.4	5720047.8	27281.2
	2650	38 25 14.06S	147 38 12.24E	555582.9	5747327.9	
1488	1195	38 39 59.15S	147 38 26.28E	555733.4	5720044.1	27712.5
	2673	38 25 00.10S	147 38 28.77E	555986.9	5747755.4	
1504	1195	38 39 59.18S	147 38 42.83E	556133.4	5720040.4	28125.1
	2695	38 24 46.75S	147 38 45.30E	556390.6	5748164.3	
1520	1195	38 39 59.21S	147 38 59.39E	556533.4	5720036.8	27956.3
	2686	38 24 52.25S	147 39 01.78E	556789.1	5747991.9	
1536	1196	38 39 58.63S	147 39 15.94E	556933.5	5720051.9	27918.8
	2685	38 24 52.89S	147 39 18.28E	557188.9	5747969.5	
1552	1196	38 39 58.65S	147 39 32.49E	557333.5	5720048.2	27900.0
	2684	38 24 53.52S	147 39 34.77E	557588.7	5747947.0	
1568	1196	38 39 58.68S	147 39 49.04E	557733.5	5720044.6	27900.0
	2684	38 24 53.55S	147 39 51.26E	557988.7	5747943.4	
1584	1196	38 39 58.70S	147 40 05.59E	558133.5	5720040.9	27881.3
	2683	38 24 54.18S	147 40 07.75E	558388.5	5747921.0	
1600	1001	38 41 57.34S	147 40 21.87E	558500.0	5716381.1	12993.8
	1694	38 34 55.80S	147 40 22.85E	558618.9	5729374.4	
1616	1001	38 41 57.36S	147 40 38.43E	558900.0	5716377.5	12993.7
	1694	38 34 55.83S	147 40 39.38E	559018.9	5729370.7	
1632	1001	38 41 57.39S	147 40 54.99E	559300.0	5716373.8	13012.5
	1695	38 34 55.24S	147 40 55.91E	559419.0	5729385.8	
1648	1001	38 41 57.41S	147 41 11.55E	559700.0	5716370.2	13012.4
	1695	38 34 55.26S	147 41 12.44E	559819.0	5729382.1	
1664	1002	38 41 56.82S	147 41 28.11E	560100.1	5716385.3	12993.7
	1695	38 34 55.28S	14741 28.98E	560219.0	5729378.5	
1680	1002	38 41 56.84S	147 41 44.67E	560500.1	5716381.6	12993.7
	1695	38 34 55.31S	147 41 45.51E	560619.0	5729374.8	

Line	Shot	Latitude	Longitude	Easting	Northing	Metres
1696	1002	38 41 56.86S	147 42 01.23E	560900.1	5716377.9	12993.8
	1695	38 34 55.33S	147 42 02.04E	561018.9	5729371.2	
1712	1002	38 41 56.88S	147 42 17.79E	561300.1	5716374.3	12993.7
	1695	38 34 55.34S	147 42 18.57E	561418.9	5729367.5	
1728	1002	38 41 56.90S	147 42 34.35E	561700.1	5716370.6	12993.7
	1695	38 34 55.36S	147 42 35.11E	561818.9	5729363.8	
1744	1002	38 41 56.92S	147 42 50.91E	562100.1	5716367.0	12993.7
	1695	38 34 55.38S	147 42 51.64E	562218.9	5729360.2	
1760	1002	38 41 56.93S	147 43 07.46E	562500.0	5716363.3	12993.7
	1695	38 34 55.40S	147 43 08.17E	562618.9	5729356.5	
1776	1002	38 41 56.95S	147 43 24.02E	562900.0	5716359.7	12993.7
	1695	38 34 55.42S	147 43 24.70E	563018.9	5729352.9	
1792	1003	38 41 56.36S	147 43 40.58E	563300.2	5716374.7	12975.0
	1695	38 34 55.43S	147 43 41.23E	563418.8	5729349.2	
1808	1003	38 41 56.37S	147 43 57.14E	563700.2	5716371.1	12974.9
	1695	38 34 55.45S	147 43 57.77E	563818.8	5729345.5	
1824	1003	38 41 56.39S	147 44 13.70E	564100.1	5716367.4	12975.0
	1695	38 34 55.46S	147 44 14.30E	564218.8	5729341.9	
1840	1003	38 41 56.40S	147 44 30.26E	564500.1	5716363.8	12974.9
	1695	38 34 55.48S	147 44 30.83E	564618.8	5729338.2	
1856	1003	38 41 56.41S	147 44 46.82E	564900.1	5716360.1	12993.7
	1696	38 34 54.88S	147 44 47.36E	565018.9	5729353.3	
1872	1003	38 41 56.43S	147 45 03.38E	565300.1	5716356.5	12993.7
	1696	38 34 54.89S	147 45 03.89E	565418.9	5729349.7	
1888	1003	38 41 56.44S	147 45 19.94E	565700.1	5716352.8	12993.7
	1696	38 34 54.91S	147 45 36.50E	566100.1	5716349.1	
1904	1003	38 41 56.45S	147 45 36.50E	566100.1	5716349.1	12993.7
	1696	38 34 54.92S	147 45 36.96E	566218.9	5729342.3	
1920	1004	38 41 55.85S	147 45 53.06E	566500.2	5716364.2	12975.0
	1696	38 34 54.93S	147 45 53.49E	566618.9	5729338.7	
1936	1004	38 41 55.86S	147 46 09.62E	566900.2	5716360.6	12974.9
	1696	38 34 54.94S	147 46 10.02E	567018.9	5729335.0	
1952	1004	38 41 55.87S	147 46 26.17E	567300.2	5716356.9	12975.0
	1696	38 34 54.95S	147 46 26.55E	567418.8	5729331.4	
1968	1004	38 41 55.88S	147 46 42.73E	567700.2	5716353.3	12974.9
	1696	38 34 54.96S	147 46 43.09E	567818.8	5729327.7	
1984	1004	38 41 55.89S	147 46 59.29E	568100.1	5716349.6	12975.0
	1696	38 34 54.97S	147 46 59.62E	568218.8	5729324.1	
2000	1004	38 41 55.90S	147 47 15.85E	568500.1	5716345.9	12975.0
	1696	38 34 54.97S	147 47 16.15E	568618.8	5729320.4	
2016	1004	38 41 55.90S	147 47 32.41E	568900.1	5716342.3	12974.9
	1696	38 34 54.98S	147 47 32.68E	569018.8	5729316.7	
2032	1004	38 41 55.91S	147 47 48.97E	569300.1	5716338.6	12975.0
	1696	38 34 54.99S	147 47 49.21E	569418.8	5729313.1	

Line	Shot	Latitude	Longitude	Easting	Northing	Metres
2048	1005	38 41 55.31S	147 48 05.53E	569700.3	5716353.7	12956.2
	1696	38 34 54.99S	147 48 05.75E	569818.7	5729309.4	
2064	1005	38 41 55.31S	147 48 22.09E	570100.2	5716350.1	12956.2
	1696	38 34 55.00S	147 48 22.28E	570218.7	5729305.8	
2080	981	38 42 09.91S	147 48 38.64E	570496.1	5715896.4	13406.3
	1696	38 34 55.00S	147 48 38.81E	570912.4	5717673.9	
2096	1076	38 41 12.13S	147 48 55.22E	570912.4	5717673.9	11643.8
	1697	38 34 54.40S	147 48 55.34E	571018.9	5729317.2	
2112	1172	38 40 13.74S	147 49 11.79E	571328.8	5719470.2	9843.7
	1697	38 34 54.40S	147 49 11.87E	571418.8	5729313.5	
2128	1267	38 39 15.96S	147 49 28.35E	571745.1	5721247.7	8062.5
	1697	38 34 54.40S	147 49 28.41E	571818.8	5729309.9	
2144	1363	38 38 17.57S	147 49 44.91E	572161.5	5723044.0	6262.5
	1697	38 34 54.41S	147 49 44.94E	572218.8	5729306.2	
2160	1458	38 37 19.78S	147 50 01.46E	572577.8	5724821.5	4481.5
	1697	38 34 54.41S	147 50 01.47E	572618.8	5729302.6	
2176	1553	38 36 22.00S	147 50 18.00E	572994.1	5726599.0	2700.0
	1697	38 34 54.41S	147 50 18.00E	573018.8	5729298.9	

2 SYNOPSIS

2.1 OVERVIEW

The survey consisted of 74 pre-plotted lines with a total of 504.000 full fold square kilometres over the Marie 3D survey area located offshore Sale, Victoria in the Gippsland Basin. A final total of 1296.84375 full fold kilometres of surface coverage equivalent to 509.251875 full fold square kilometres were recorded.

The vessel used was the M/V Western Trident, which is a purpose built vessel owned by WesternGeco. Weather conditions and one cetacean sighting played a major part in the amount of Standby time incurred. Several cold fronts passed through the area during the course of the survey causing production to be halted until they had passed. The streamers, recording system and navigation performed satisfactorily. When weather conditions permitted the workboat was used for any streamer work, reducing down time appreciably.

The vessel arrived in the survey area and commenced the streamer deployment at 13:52 on the 4th of March. The streamers were fully deployed by 08:30 on the 10th of March. The newly installed gun arrays were deployed and tested. Some teething problems were encountered with the set up and operation of the new systems that had been recently installed during the dry dock in Singapore. Several test lines were run prior to production commencing to ensure that all the new systems were communicating with each other. Production commenced with line GAP07A1008P008 but this line was scratched due to the weather conditions shortly after the start. The weather eased the following morning and production was resumed at 04:06 on the 12th of March. Problems with the set up of the new recording system caused a few system hang ups which required the system to be rebooted during the line. The ensuing holes were reacquired at a later date. Problems were also encountered with the Trinav 3.01 navigation system which caused the processing of the recorded lines to be delayed. These problems were not fully resolved until the 13th of March and this meant that the line processing was several days behind production. To help overcome this problem an extra navigator was brought out to the vessel.

Streamer 8 was experiencing leakage on the bird communication line and this was causing intermittent compass and depth drop outs. The workboat was launched on the 13tth of March to work on this problem and while this fault finding was being carried out production continued with only seven streamers being recorded and charged for sequences 19 & 20. The fault was eventually found to be astern of the tail terminator module. Tailbuoy 8 was disconnected at the tail swivel section and the intermittent bird line drop out disappeared.

The MSX recording system hang up problem was fixed on the 15th of March following input from Western Geco's support department. The SCSI connection from the Seisnet 1 machine to the MSX was disconnected and the recording system was run on the Seisnet 0 machine. Since these changes were made there have been no further problems with the recording system.
Production was halted at the start of sequence 25 on the 15th of March due to a Humpback whale sighting as per the Cetacean observation procedures. The vessel continued down the line and resumed production when the whale had cleared the area.

On the 16th of March, monowing 1 had control problems which caused the wing to act erratically. The problem was leakage on the boom angle indicator which activated a software lock in the control unit and the crew could not adjust the wing angle. This resulted in low separation between streamers 1 & 2 during sequence 28. Only 14 cmps were charged and a downtime adjustment for the faulty wing was made in the following line change. A software patch that overrode the faulty boom angle lock was used to control the wing again.

Rough sea conditions on the 17th of March caused loss of streamer control during the line change following sequence 30 and also increased the streamer tension which resulted in more noticeable bird line drop outs in streamer 4. Gun array 2 was recovered to investigate a small air leak which was showing up on the near field hydrophone display.

The OMS Pioneer was brought alongside in the morning of the 18th of March to deliver 380 cubic metres of fuel and take off the Trident's rubbish skips. The work boat was launched on two occasions to change faulty sections on streamer 7 (14A) and streamer 5 (15A). The workboat also tracked down the intermittent bird line drop out on streamer 4. The fault was found to be after the tail terminator module, the tailbuoy was disconnected from streamer 4 and the bird line fault was cured.

Production switched back to the prime line race track in the western swath on completion of the reshoots of sequences 15, 20 & 25 on the 19th of March.

The work boat was launched twice on the 20th of March to perform a video inspection of the front end towing set up and to change out a bad section (10A) on streamer 4. All the monowings and towing harnesses were found to be in good order. The work boat crew also performed a TSDip after changing the section. The acoustic pingers were moved to the tail gun position on arrays 1 and 6 in order to improve the gun acoustic ranges. The timing of the Sonardyne scan for the gun ranges was brought forward to be before the shot to help improved the gun ranges.

The workboat was launched in the morning of the 21st of March to change out a bad section (19A) on streamer 4. Production then switched from prime to infill in order to clean up the western swath before moving over to the eastern swath.

The good weather conditions continued on the 22nd of March and the workboat was launched to change out a bad section (20B) on streamer 4. The last of the major reshoots and infill lines were acquired in the western swath before production switched to prime lines in the eastern swath.

Production was halted at 09:52 hrs on the 24th of March as a cold front moved through the survey area and resumed with line GAP07A1680A068 at 03:56 on the 25th of March. A problem with the Trinav system during sequence 95 caused gaps in the GPS data. This data was recovered from the backup system after the Trinav was rebooted during the line change. Recording continued unabated until another cold front passed through the area and stopped production on the 30th of March.

A crew change for seismic personnel was conducted by helicopter on the 1st of April. On the 2nd of April the OMS Pioneer came alongside to load provision and spares. Sections and equipment for repair were off loaded while production continued.

On the 3rd of April, a total of 7 hrs of technical downtime was logged in three separate line changes to compensate for those lines acquired with less than 4.5 knots water speed during the survey. This figure was agreed between WesternGeco and Apache.

The workboat was launched again on the 4th of April to change two acoustic units and a bird. An attempt to get Tailbuoy GPS on streamer 8 working again failed. The last infill line was aborted due to a whale sighting a few kilometres into the line. By the time production could be resumed it was too close to the end of line to get any of the required coverage. Jim Ross of Apache Energy was consulted and it was decided that the survey was to be considered complete at 14:00 on the 4th of April.The vessel then commenced a transit to the Elver 3D survey area with the trailing gear still deployed.

2.2 SURVEY PRODUCTION BY LINE

Seq	Line	Dir	FCSP	LCSP	KM	KMFF	CMP	SQKMFF
009	**GAP07A1008B009**	**180**	**2000**	**1082**	**17.23125**	**15.22500**	**275.70000**	**6.090000**
010	GAP07A1296P010	000	1193	2511	24.73125	22.72500	395.70000	9.090000
011	**GAP07A1024P011**	**180**	**2023**	**810**	**22.76250**	**15.65625**	**364.20000**	**6.262500**
012	GAP07A1312P012	000	1193	2533	25.14375	23.13750	402.30000	9.255000
013	GAP07A1040P013	180	2045	646	26.25000	16.05000	420.00000	6.420000
014	GAP07A1328P014	000	1193	2556	25.57500	23.56875	409.20000	9.427500
015	GAP07A1056P015	180	2068	1420	12.16875	12.16875	194.70000	4.867500
016	GAP07A1344P016	000	1455	2789	25.03125	19.06875	400.50000	7.627500
017	GAP07A1072P017	180	2090	1668	7.93125	7.93125	126.90000	3.172500
017	GAP07A1072P017	180	1667	721	17.75625	8.96250	284.10000	3.585000
018	GAP07A1360P018	000	1194	1939	13.98750	13.98750	223.80000	5.595000
019	GAP07A1088P019	180	2112	774	25.10625	17.30625	351.48750	6.057188
020	GAP07A1376P020	000	1194	3008	34.03125	24.80625	476.43750	8.682187
021	GAP07A1104P021	180	2135	1029	20.75625	17.73750	332.10000	7.095000
022	GAP07A1392P022	000	1194	2645	27.22500	25.21875	435.60000	10.087500
023	GAP07A1120P023	180	2157	827	24.95625	18.13125	399.30000	7.252500
024	GAP07A1408P024	000	1194	2668	27.65625	25.65000	442.50000	10.260000
025	GAP07A1136P025	180	1899	1044	16.05000	13.29375	256.80000	5.317500
026	GAP07A1424P026	000	1194	1675	9.03750	9.03750	144.60000	3.615000
026	GAP07A1424P026	000	1676	3716	38.26875	17.02500	612.30000	6.810000
027	GAP07A1152027	180	2202	542	31.14375	18.97500	498.30000	7.590000
028	GAP07A1440P028	000	1195	2712	28.46250	26.45625	398.47500	9.259688
029	GAP07A1168P029	180	2224	570	31.03125	19.38750	496.50000	7.755000
030	GAP07A1456P030	000	1195	2674	27.75000	26.88750	444.00000	10.755000
030	GAP07A1456P030	000	2675	3264	11.06250	0.00000	177.00000	0.000000
031	GAP07A1184P031	180	2247	591	31.06875	19.81875	497.10000	7.927500
032	GAP07A1472P032	000	1195	3017	34.18125	27.30000	546.90000	10.920000
033	GAP07A1200P033	180	2269	600	31.31250	20.21250	501.00000	8.085000
034	GAP07A1488P034	000	1195	2764	29.43750	27.73125	471.00000	11.092500
034	GAP07A1488P034	000	2795	3384	11.06250	0.00000	177.00000	0.000000
035	GAP07A1216P035	180	2292	614	31.48125	20.64375	503.70000	8.257500
036	GAP07A1504P036	000	1195	3032	34.46250	28.14375	551.40000	11.257500
037	GAP07A1232P037	180	2284	1085	22.50000	20.49375	360.00000	8.197500
038	GAP07A1520P038	000	1195	2793	29.98125	27.97500	479.70000	11.190000
039	GAP07A1248P039	180	2336	846	27.95625	21.46875	447.30000	8.587500
042	GAP07A1136A042	180	2180	1670	9.58125	5.26875	153.30000	2.107500
043	GAP07A1056A043	180	1419	575	15.84375	4.31250	253.50000	1.725000
044	GAP07A1536A044	000	1196	3031	34.42500	27.93750	550.80000	11.175000
045	GAP07A1264P045	180	2359	965	26.15625	21.90000	418.50000	8.760000
046	GAP07A1552P046	000	1196	3021	34.23750	27.91875	547.80000	11.167500
047	GAP07A1280P047	180	2381	896	27.86250	22.29375	445.80000	8.917500
048	GAP07A1568P048	000	1196	2791	29.92500	27.91875	478.80000	11.167500
049	GAP07A1088A049	180	2342	2113	4.31250	0.00000	69.00000	0.000000
049	GAP07A1088A049	180	2112	1190	17.30625	17.30625	34.61250	0.865313
050	GAP07A1584P050	000	1196	3255	38.62500	27.90000	618.00000	11.160000
051	GAP07A1024A051	180	2253	2024	4.31250	0.00000	69.00000	0.000000
054	GAP07A1360A054	000	1194	1684	9.20625	4.89375	147.30000	1.957500
054	GAP07A1360A054	000	1940	2775	15.67500	10.38750	250.80000	4.155000
057	GAP07A1600P057	180	1694	547	21.52500	13.01250	344.40000	5.205000
058	GAP07A1904P058	000	1003	2257	23.53125	13.01250	376.50000	5.205000
059	GAP07A1616P059	180	1694	408	24.13125	13.01250	386.10000	5.205000
060	GAP07A1920P060	000	1004	2257	23.51250	12.99375	376.20000	5.197500
061	GAP07A1632P061	180	1695	665	19.33125	13.03125	309.30000	5.212500

Seq	Line	Dir	FCSP	LCSP	KM	KMFF	CMP	SQKMFF
062	GAP07A1936P062	000	1005	2260	23.55000	12.97500	376.80000	5.190000
063	GAP07A1648P063	180	1695	420	23.92500	13.03125	382.80000	5.212500
064	GAP07A1952P064	000	1004	2240	23.19375	12.99375	371.10000	5.197500
065	GAP07A1664P065	180	1695	428	23.77500	13.01250	380.40000	5.205000
066	GAP07A1968P066	000	1004	2234	23.08125	12.99375	369.30000	5.197500
068	GAP07A1680A068	180	1695	450	23.36250	13.01250	373.80000	5.205000
069	GAP07A1984P069	000	1004	2210	22.63125	12.99375	362.10000	5.197500
070	GAP07A1696P070	180	1695	440	23.55000	13.01250	376.80000	5.205000
071	GAP07A2000P071	000	1004	2220	22.81875	12.99375	365.10000	5.197500
072	GAP07A1712P072	180	1695	463	23.11875	13.01250	369.90000	5.205000
073	GAP07A2016P073	000	1004	1477	8.88750	8.88750	142.20000	3.555000
073	GAP07A2016P073	000	1478	2255	14.58750	4.10625	233.40000	1.642500
074	GAP07A1728P074	180	1695	452	23.32500	13.01250	373.20000	5.205000
075	GAP07A2032P075	000	1004	2246	23.30625	12.99375	372.90000	5.197500
076	GAP07A1744P076	180	1695	462	23.13750	13.01250	370.20000	5.205000
077	GAP07A2048P077	000	1005	2246	23.28750	12.97500	372.60000	5.190000
078	GAP07A1760P078	180	1695	480	22.80000	13.01250	364.80000	5.205000
079	GAP07A2064P079	000	1005	2240	23.17500	12.97500	370.80000	5.190000
080	GAP07A1776P080	180	1695	580	20.92500	13.01250	334.80000	5.205000
081	GAP07A2080P081	000	981	2262	24.03750	13.42500	384.60000	5.370000
082	GAP07A1792P082	180	1695	696	18.75000	12.99375	300.00000	5.197500
083	GAP07A2096P083	000	1076	2220	21.46875	11.66250	343.50000	4.665000
084	GAP07A1808P084	180	1695	488	22.65000	12.99375	362.40000	5.197500
085	GAP07A2112P085	000	1172	2200	19.29375	9.86250	308.70000	3.945000
086	GAP07A1824P086	180	1695	483	22.74375	12.99375	363.90000	5.197500
087	GAP07A2128P087	000	1267	2215	17.79375	8.08125	284.70000	3.232500
088	GAP07A1840P088	180	1695	724	18.22500	12.99375	291.60000	5.197500
089	GAP07A2144P089	000	1363	2230	16.27500	6.28125	260.40000	2.512500
090	GAP07A1856P090	180	1696	450	23.38125	13.01250	374.10000	5.205000
091	GAP07A2160P091	000	1458	2240	14.68125	4.50000	234.90000	1.800000
092	GAP07A1872P092	180	1696	969	13.65000	13.01250	218.40000	5.205000
092	GAP07A1872P092	180	968	420	10.29375	0.00000	164.70000	0.000000
093	GAP07A2176P093	000	1553	2236	12.82500	2.71875	205.20000	1.087500
094	GAP07A1888P094	180	1696	696	18.76875	13.01250	300.30000	5.205000

2.3 SURVEY INFILL PRODUCTION BY LINE

Seq	Line	Dir	FCSP	LCSP	KM	KMFF	CMP	SQKMFF
052	GAP07A1376B052	000	1699	2623	17.34375	15.33750	277.50000	6.135000
055	GAP07A1280J055	180	2381	896	27.86250	22.29375	445.80000	8.917500
056	GAP07A1424J056	000	1194	2690	28.06875	26.06250	449.10000	10.425000
095	GAP07A2048J095	000	1005	2033	19.29375	12.97500	308.70000	5.190000
096	GAP07A1728J096	180	1695	895	15.01875	13.01250	240.30000	5.205000
097	GAP07A2000J097	000	1004	1926	17.30625	12.99375	276.90000	5.197500
098	GAP07A1680J098	180	1695	974	13.53750	9.97500	216.60000	3.990000
098	GAP07A1680J098	000	1163	1010	2.88750	2.88750	46.20000	1.155000
100	GAP07A1760J100	180	1695	650	19.61250	13.01250	313.80000	5.205000
102	GAP07A1616J102	180	1694	694	18.76875	13.01250	300.30000	5.205000
103	GAP07A1936J103	000	1004	2300	24.31875	12.99375	389.10000	5.197500
104	GAP07A1600J104	180	1694	580	20.90625	13.01250	334.50000	5.205000
105	GAP07A2128J105	000	1267	2200	17.51250	8.08125	280.20000	3.232500
106	GAP07A1872J106	180	1696	716	18.39375	13.01250	294.30000	5.205000
107	GAP07A1904J107	000	1150	1754	11.34375	10.25625	181.50000	4.102500
107	GAP07A1904J107	000	1755	1935	3.39375	0.00000	54.30000	0.000000
108	GAP07A1312J108	000	1990	2533	10.20000	8.19375	163.20000	3.277500

Seq	Line	Dir	FCSP	LCSP	KM	KMFF	CMP	SQKMFF
109	GAP07A1056J109	180	2068	1083	18.48750	16.48125	295.80000	6.592500
110	GAP07A1424K110	000	1275	2690	26.55000	24.54375	424.80000	9.817500
111	GAP07A1216J111	180	2090	1085	18.86250	16.85625	301.80000	6.742500
112	GAP07A1520J112	000	1195	2125	17.45625	17.45625	279.30000	6.982500
112	GAP07A1520J112	000	2126	2793	12.52500	10.51875	200.40000	4.207500
113	GAP07A1264J113	180	2359	1085	23.90625	21.90000	382.50000	8.760000
114	GAP07A1488J114	000	1195	2420	22.98750	22.98750	367.80000	9.195000
115	GAP07A1088J115	180	2000	1083	17.21250	15.20625	275.40000	6.082500
116	GAP07A1376J116	000	1194	1623	8.06250	8.06250	129.00000	3.225000
117	GAP07A1808J117	180	1693	896	14.96250	12.95625	239.40000	5.182500
118	GAP07A2096J118	000	1076	1804	13.66875	11.66250	218.70000	4.665000
119	GAP07A1712J119	180	1600	895	13.23750	11.23125	211.80000	4.492500
120	GAP07A2160J120	000	1458	1804	6.50625	4.50000	104.10000	1.800000
121	GAP07A1648J121	180	1600	1470	2.45625	2.45625	39.30000	0.982500

2.4 SURVEY TOTAL

Total Survey Production - Prime

KM	KMFF	CMP	SQKMFF
1925.32500	1296.84375	30387.71250	509.251875

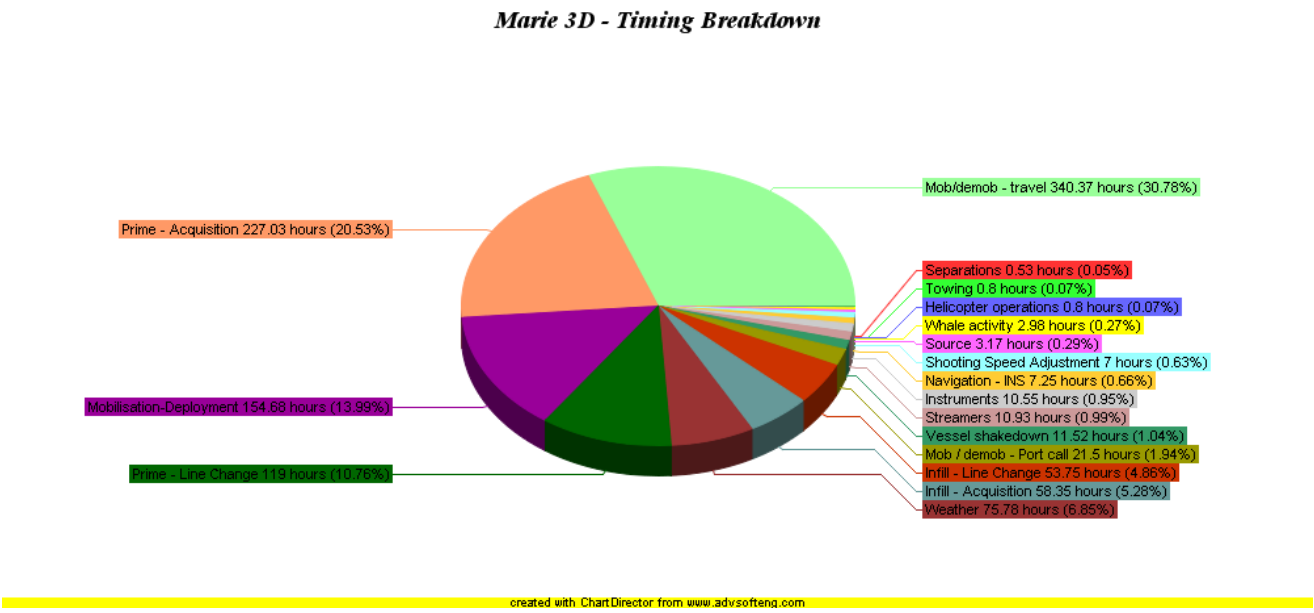
Total Survey Production - Infill

KM	KMFF	CMP	SQKMFF
502.65000	403.93125	8042.40000	161.572500

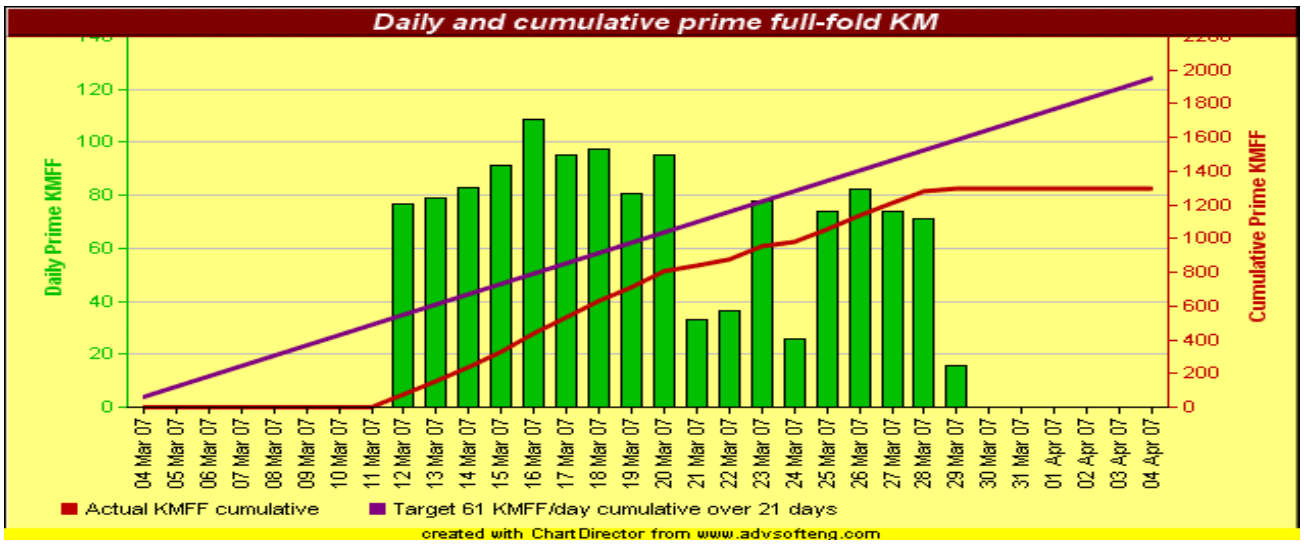
2.5 3D STATISTICAL SUMMARY

Code	Description	Duration
01	Prime - Acquisition	227.03
02	Prime - Line Change	119.00
03	Infill - Acquisition	58.35
04	Infill - Line Change	53.75
10	Weather	75.78
23	Whale activity	2.98
30	Source	3.17
32	Streamers	10.93
33	Navigation - INS	7.25
35	Instruments	10.55
37	Separations	0.53
38	Towing	0.80
40	Shooting Speed Adjustment	7.00
41	Helicopter operations	0.80
50	Mob / demob - Port call	21.50
51	Mob/demob - travel	340.37
52	Mobilisation-Deployment	154.68
55	Vessel shakedown	11.52

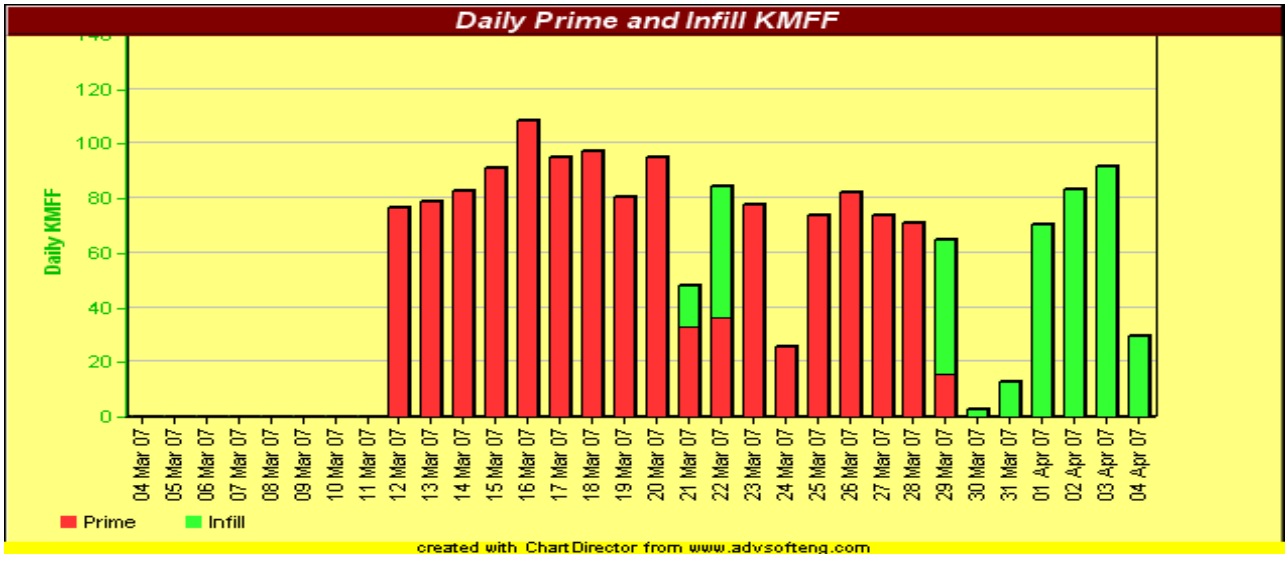
Total Survey Timing = 1,106.000 Hours



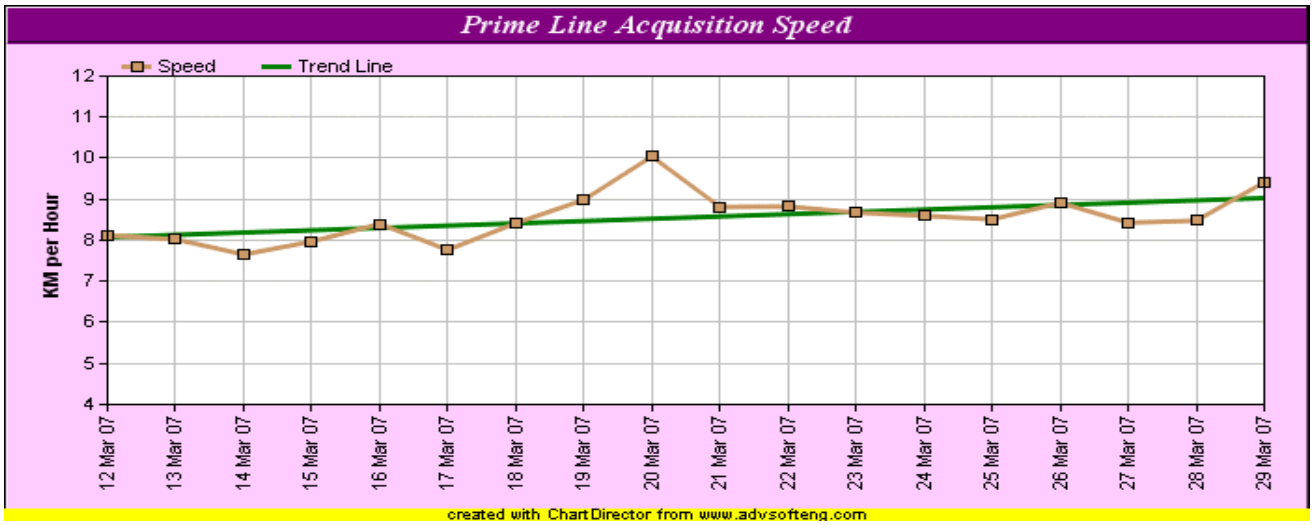
3D Daily and Cumulative Full Fold Kilometres



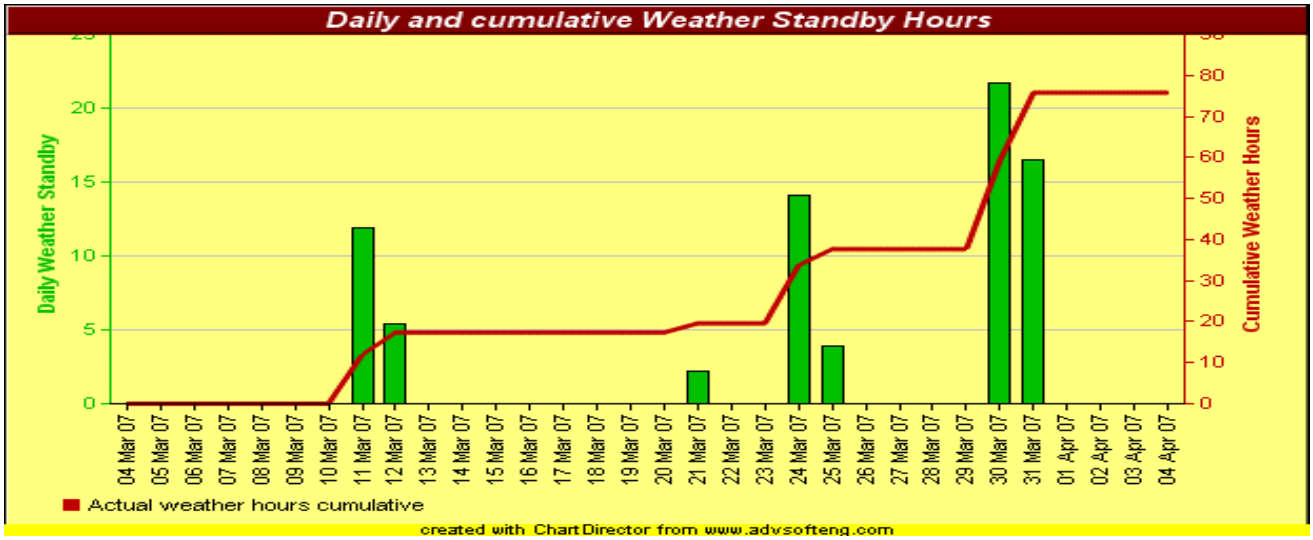
3D Daily Prime and Infill



3D Acquisition Speed



Marie 3D Weather Standby



2.6 TECHNICAL SUMMARY

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

Recording Instruments

For this survey the Western Trident was fitted with 8 Thompson Marconi Sentry digital solid streamers interfaced to the TRILOGY acquisition system. The TRILOGY Information Manager (TIM) has a primary purpose of providing a data exchange mechanism between all of the TRILOGY subsystems. The data exchange focuses on making the important information from each TRILOGY subsystem accessible to other systems or applications reducing redundancy and manual procedures. The primary TIM user interface is called LINDA (Line Data Analyser), which allows the user to browse and edit the information stored in the database, generate reports and manage recording media.

The TRILOGY subsystem components are TRINAV, TRIACQ, TRISOR, OMEGA and Supervision. These provide a comprehensive array of real time on screen displays, showing:
TRIACQ

- RMS analysis of seismic data which includes, Trace RMS analysis, shot average, dynamic line average, relative sensitivity and relative source amplitude.
- SEG-D header analysis which includes Water depth, vessel speed, source pressure, source timing delay, bird depths etc.

Omega2 processing system

- Brute stack plot, Near Trace plots, FK plots etc (displayed with Seisview visualization tool in the Omega system).
- CMS values

.
A full set of daily tests was automatically carried out each day showing the recording system and streamer were within contract specification. The system generally operated faultlessly but a problem with the Seisnet1 SCSI caused a few problems with system hang ups at the start of the survey meant. A total of 10.55 hours were lost the recording instruments during the survey.

Observer's reports were automatically generated using LINDA. 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.

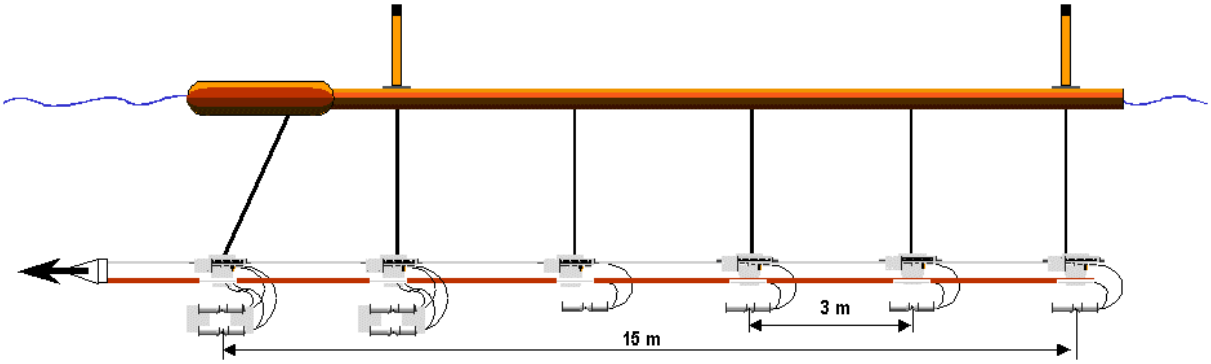
Streamer

The Thompson Marconi Sentry digital solid streamers worked very well with only few minor teething problems at the start of the survey. Several sections were replaced for bad traces during the initial deployment and a few were replaced by utilising the workboat once production had commenced.

Streamer depths were maintained at 8 metres. Noise levels on the data were monitored closely during QC processing. A problem with bird line leakage caused drop outs early in the survey resulting in 10.93 hours of downtime being attributed to the streamers during the survey.

Energy Source

The energy source utilised for this survey consisted of two WesternGeco 3147 in³ arrays, fired alternately. Each array is composed of identically tuned Bolt gun sub-arrays operating at 2000 psi air pressure. The signature produced by the array composed of three sub-arrays has the same shape as that produced by a single sub-array while the overall acoustic output of the array is determined by the number of sub-arrays employed.



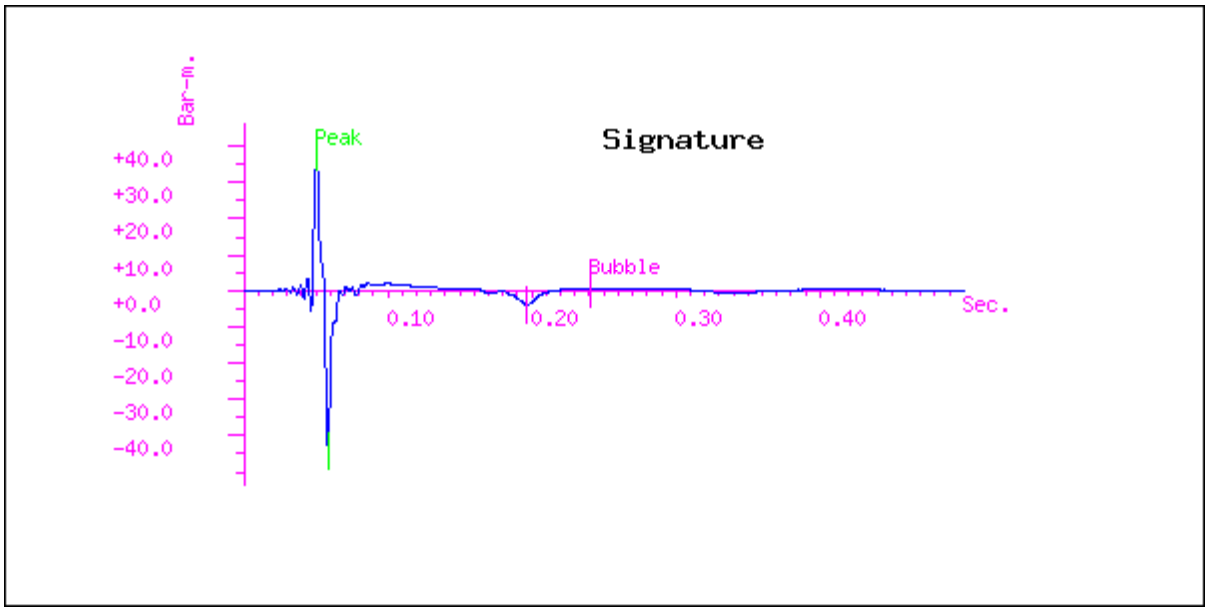
As indicated in the diagram, the sub-array is composed of six tuning elements; two 2-gun clusters and four single guns. The clusters have their component guns arranged in a fixed side-by-side fashion with the distance between the gun ports set to maximise the bubble suppression effects of clustered guns. A near-field hydrophone is mounted about 1 m above each gun station (one phone is used per cluster), one depth transducer per position is mounted on the gun's ultrabox, and a high pressure transducer is mounted at the aft end of the subarray to monitor high pressure air supply. All the data from these sensors are transmitted to the vessel for input into the onboard systems and recording to tape.

The drop out spec was generated by WesternGeco. A total of 3.17 hours were lost to the source arrays, and another 1.33 hours were lost due to towing hardware for the survey. The 3147 in³ array was used throughout the survey with only occasional low volume shots when single guns failed to operate. A rigorous maintenance schedule was maintained on the array strings and individual elements were replaced at the specified time regardless of their performance.

The Western Trident has three LMF compressors with a capacity of 6600 SCFM. One compressor maintained air pressure with the other two normally being rotated through to allow maintenance to be carried out. No downtime was recorded due to the compressors.

Figure 1 3147 in³ Gun Array Far Field Signature

Peak to peak. in bar-m	Zero to peak in bar-m	Primary to bubble (calculated peak to peak)	Bubble period to first peak (s.)
82.7	38.2	18.1	0.1905



Band-pass filter: n4-003-200L.flt

Figure 2 Amplitude spectrum

Amplitude spectrum. Units are db. relative to 1 microPascal / Hz. at 1m.

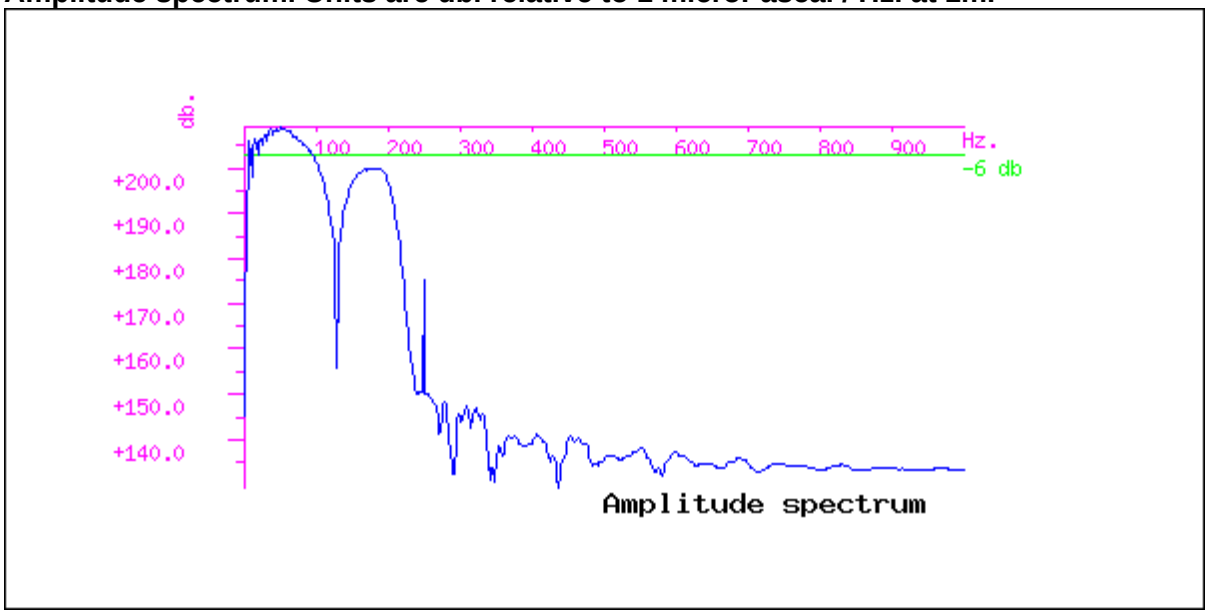
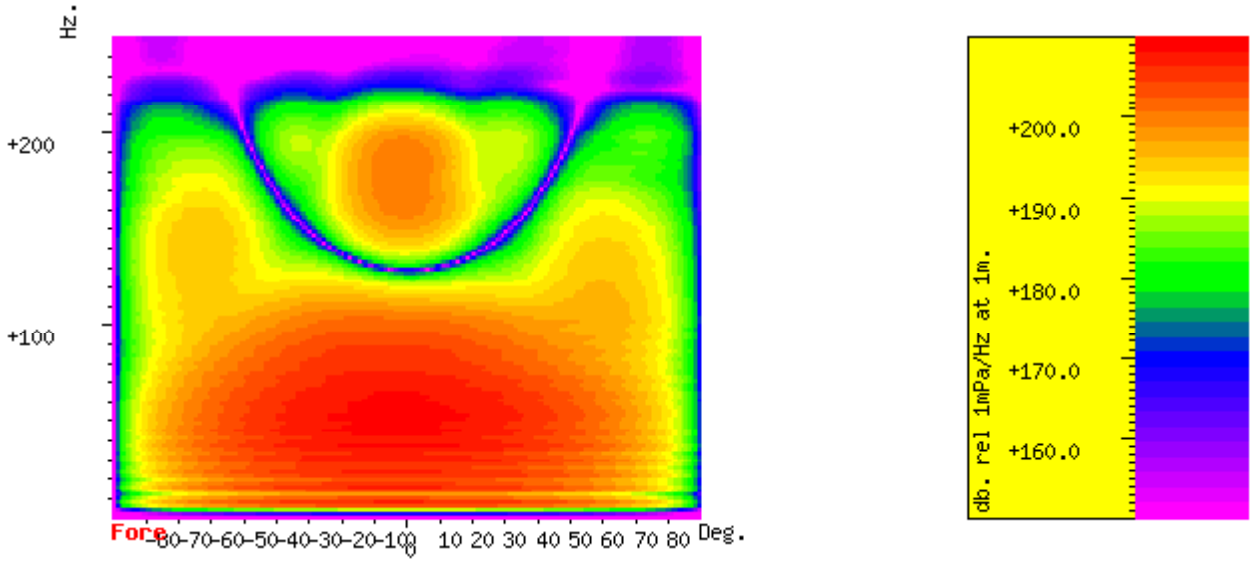
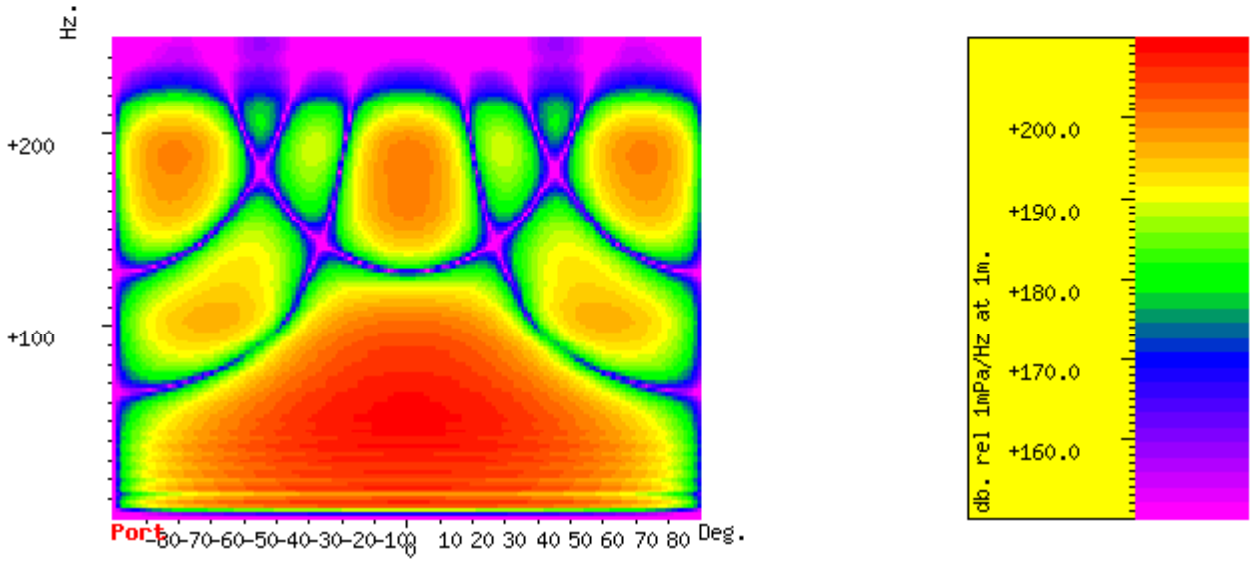


Figure 3 Source Directivity Plots

Inline directivity, bearing = 0 degrees



Crossline directivity, bearing = 90 degrees



SEISMIC SPECIFICATIONS

Main Particulars

Streamers	Thompson Marconi, Sentry/Guardian Solid streamer
Tow Points	16
Sub Arrays	6

Energy Systems

Gun Controller (Type & Manufacturer)	Source Synchronizer System (SSS), Input/Output Trisor 1.5.1 WesternGeco
Guns (Manufacturer, Type & Capacities)	Bolt 1500LL and 1900 LL (30cu in to 660 cu in)
Nominal Source Pressure	2000 psi
Pressure Release	Electro-magnetic solenoid.
Sensor Return	Bolt pressure drop sensor
Timing Resolution	0.1ms
Source	1 x 8 guns, various volumes. Max 4 arrays per side
Total Compressor Capacity	6600 SCFM
Compressors (Manufacturer & Capacity)	3 x LMF Compressors
Near Field Phone (Manufacturer & Type)	WesternGeco 6 per array
Far Field Phone (Manufacturer & Type)	NA
Depth Indicators	WesternGeco 6 per array

Streamer System

Streamer (Manufacturer & Type)	Thompson Marconi, Sentry Solid Streamer
Streamer Deflector Type	Monowing MKI and MKII
Section Breaking Strength (Typical)	60 kN
Typical Towed-streamer Stress	1000-1818 kg
Streamer Capacity (Max)	
Sentry Solid Streamer	72,000m
Streamers vs. Length (Max)	
Sentry Solid Streamer	10 x 6,000m
Streamer Spread (Max Configuration)	1050m 8 x 150m x 6000m using 6 x Monowing
Streamer Control Device (Manufacturer & Type)	DigiCourse, 5011
Recording System (Manufacturer & Type)	Input/Output MSX 24A Input/Output MSX with WesternGeco TRIACQ 5 front end

Recording System

Format	3-byte SEG-D, 8036 rev 2
Media	IBM 3590E tape (20GIG)
Device	6 x 3590e IBM tape drives
Other Systems	MSX version 2.0111 with WesternGeco TRIACQ 5.3304 front end
Single & Multi-trace Plotter (Manufacturer & Type)	OYO, GS624
System	Triacq QC 3.0 WesternGeco
Software	Triacq QC
Hardware	Sun V880
System	Multi Node PC Cluster Processing System
Software	Linux Redhat 9 Omega 2.0.3.3
Hardware	3 x Dell Precision workstation 650.

Hardware (continued)	2 x INTEL SR2300 2U tape servers. 10 x IBM 3590e tape drives. 4 x Jaguar 3592e tape drives. 3 x INTEL SR2300 2U Oracle servers. 16 x IBM x330 IU processing nodes. 4.5 Tbytes total hard disk space. OYO GS-636 Thermal Plotter. OYO GS-624 Thermal Plotter. HP DesignJet 650C.

Navigation Systems

Instrument Room Gyrocompass (Manufacturer & Type)	Sperry, MK227
Source Positioning System (Manufacturer & Type)	Seatex, Seatrack 330
Global Positioning System (GPS) Receivers (Manufacturer & Type)	2 x Veripos Ultra Systems 1 x C & C Technologies C-Nav. 1 x C-Nav Receiver. Dual frequency. 1 x Novatel OGM3 Receiver. Dual frequency. 1 x Posnet – SARGAS Dual Frequency. 1 x Posnet – Stand Alone. 1 x TriNav GPS 1 x Trimble MS750 Receiver. Dual frequency. 3 x Trimble 4000SSE Receiver. Dual frequency.
DGPS QC System (Manufacturer & Type)	WesternGeco TRINAV 3.0
Integrated Navigation System (Manufacturer & Type)	WesternGeco TRINAV 3.0
3-D Quality Control System (Manufacturer & Type)	WesternGeco TRINAV 3.0
3-D Binning System	TRINAV 3.0 2 x Sun Blade 150 Workstation 2 x Sun Blade 1500 Workstation 2 x Sun Fire 440 Workstation
Tail Buoy (TB)	
Buoy (Manufacturer & Type)	WesternGeco T98
TB Navigation (Manufacturer & Type)	WesternGeco, Seatrack 220 GPS Unit
Onboard TB Positioning (Manufacturer & Type)	Seatrack
Ultra-short Baseline (USBL) Acoustic Positioning System (Manufacturer & Type)	NA
Acoustic Positioning System (Manufacturer & Type)	Sonardyne SIPS 2
Current Profiler (Manufacturer, Type & Frequency)	RDI, ADCP, 1.5MHz
Temperature/Salinity Dip Profiler (Manufacturer & Type)	1 x Sippican, Sippican 1 x Valeport, Mk600
Echo Sounder (Manufacturer & Type)	Simrad, EA500
Transducer Frequency & Theoretical Range	1 x 18 kHz to 8100m, 1 x 200 kHz to 740m
Transducer Draft	-7.42m

2.6 VESSEL

The M/V Western Trident is a purpose built vessel for seismic operations and is one of the largest vessels in the WesternGeco fleet. She was delivered in November 1999. The vessel has carried out many complex 3D surveys in various locations worldwide. She is capable of towing 12 x 6,000m TMS Sentry Solid streamers with a maximum separation of 1,200m when using the Monowings. The vessel is built to DNV+1A1 ICE-1A, EO Helideck classification and to the satisfaction of the rules and regulations of SOLAS 1974. International load line requirements are according to international load line convention of 1966.

The vessel has been well maintained over the years and is kept in a tidy and presentable condition. There are adequate numbers of showers and toilets available and the stewards worked hard to keep cabins and amenities clean. Offshore Marine Services in Australia supplied the marine crew. All seismic personnel were from various countries and contracted to WesternGeco.

The instrument room is large and well laid out with plenty of working space for all personnel. The arrays and streamer deployment area's are on separate decks with extra storage available on the top deck. The work areas are spacious with plenty of safe working space for both array mechanics and streamer handling. There are two workboats, which are situated, midship on either side of the vessel.

The galley and mess areas are clean, well laid out and maintained. House keeping on the whole was very good. Crew entertainment is provided by a well-equipped gymnasium and sauna, as well as a spacious video room and a separate day room. Communications are through Vsat and Inmarsat. The client has the option of an office close to the instrument room with network connections, phone, printer and a computer if required or may have the same set up installed in his cabin if he so desires.

Vessel Specifications

Ships Name	Western Trident
Call Sign	3FE09 (Three, Foxtrot, Echo Zero, Nine)
International Maritime Org. (Imo) No.	9187502
Owner	Seismic Shipping INC
Previous Name	N/A
Flag State & Port Of Registry	Panama, Panama
Panama Official No.	27927-Pext-2
Date Of Build	1-Mar-99
Yard No. And Type Of Vessel	Build 241, Type UT
Yard Built	Ulstein Shipyard, Ulsteinvik, Norway
Date Converted / Power Upgraded	11/2003 Monowing upgrade
Yard Converted	BMV Bergen
Classification Society And Class	DNV, +1A1, EO, HELDK, ICE-C
Class Id No.	20519
Classification Machinery System	PMS, CMS
Class Approved Maintenance System	TM-Master, Windows based
International Safety Management, (Ism) Code Compliance	DNV SMC. Valid until 05-Oct-11
Safe Manning Certificate (Minimum)	No.M3026 (10 crew)

Principal Particulars

Gross Tonnage (Grt)	8369
(Grt) National & International	8369
Gross Tonnage (Grt) Suez Canal	8862.6
Net. Reg.Ton (Nrt) Panama Canal	n/a
(Nrt) National & International	2511
Net. Reg. Ton (Nrt) Suez Canal	6913.12
Lightship Displacement	4667
Dead Weight	4568
Length Over All (Loa)	92.50m
Length Between Perpendiculars	80.10m
Breadth (Moulded)	23.00m
Breadth (Extreme)	25.00m
Depth (Moulded)	9.00m
Draft (Max)	7.30m (Summer)
Draft (Mean)	6.40m (Design)
Air Draft (To Higest Antenna)	32.70m (Summer draft)
Helicopter Deck Rating	Sikorsky S-92 / 11.0t Max
Helicopter Deck Diameter (D-Value)	22.80m
Helicopter Deck Markings Standard	CAA / CAP437 / BHAB

Capacities and Endurance's

Cable / Towpoints / Subarrays	TMS Solid / 16 Tow Points / 10 Sub arrays
Bollard Pull	142t x 100% power
Fresh Water Capacity	446 M^3
Fresh Water Maker Production	2 x 12 tons / 24 Hrs.
Potable Water System	Evaporators, 2 x Alfa Laval De-Salt.
Fuel Capacity, All Tanks Topped	3526 M^3
Fuel, Useful For 100 % Consumption	3286 M^3
Fuel Type	Gas oil
Fuel Tank Heating	N/A
Lub. Oil, Engine Oil (M^3)	30 M^3
CYLINDER OIL, HP COMPRESSORS (M^3)	7 M^3 cylinder oil, 7 M^3 screw compressor oil.
CABLE OIL, KEROSENE (Clean/Dirty)	11 M^3 clean / 7 M^3 dirty
BALLAST, SEA WATER (M^3)	3150 M^3
Speed, Transit, Max. In Calm Sea	15 Knots
Speed, Transit Economy, Ditto	12 Knots
Consumption Of Fuel , Full Speed	36 M^3 / 24 Hrs
Consumption Of Fuel, Economy Speed	26 M^3 / 24 Hrs
Operational Endurance	86 Days (+4 days safety)
Endurance Of Fuel During Survey	85 days, operating with 10 streamers
Consumption Of Fuel In Port	3 M^3 / 24 Hrs
Safety Equipment Certificate	70 Persons

Bridge Navigation Equipment

Radar No 1	FURUNO FAR 2835S (s-band)
Radar No 2	FURUNO FAR 2825 (x-band)
Radar No 3	N/A
Ecdis	Maris 9000
Gyro Compass	SIMRAD RGC 11
Auto Pilot	SIMRAD AP9 Mk3 / SJS500 Joystick/Autotrack System
Gps Receiver	2 x FURUNO GP 150
Speed Log	BEN ANTHEA Electro. Mag. Furuno DS-80 Doppler Log with bridge wing repeaters
Echo Sounder	SKIPPER GDS 101
Radio's, Vhf, GMDSS*, Type 1	3 x SAILOR RT 5022 VHF / DSC
Radio's, Vhf, GMDSS*, Type 2	3 x NAVICO AXIS 250 (portable)
Radio's, Vhf	8 x MOTOROLA GP340 (portable)
Radio's, Uhf	1 x Motorola GM 300 BASE STATION
12 x Motorola GM 328 (Portable)	
Radio Direction Finder	N/A
Weather Facsimile	FURUNO DFAX-208 Mk2
Navtex Receiver	McMURDO NAV 7
Ups, Power Supply To All GMDSS Radio's	FN Electro Converter/Charger with lead acid battery back up.
Helideck Monitoring System	SEATEX HMS 100.

Communication Equipment, Compliant With GMDSS Requirements

Radio Station Licence No.	06-11-2003/1 Panama
Class / Corr. Category	A1, A2, A3. GMDSS
Ship / Air Craft Radio	JOTRON TR-6101 (fixed) + 2 x Dittel FSG 5
Helicopter Beacon	SAC DS410 (410 KHz. I.D. 'T R I D')
Automatic Identification System (AIS)	SAAB 24 AIS CLASS A TRANSPONDER
Transmitter / Receiver, Main (Mf)	SKANTI TRP 9000
Transmitter / Receiver, Reserve (Mf)	N/A
Transmitter / Receiver, Main (Vhf)	3 x SAILOR RT 5022 VHF, DSC
Transmitter / Receiver, Main (Dsc)	SKANTI DSC9000 MF/HF DSC CONTROLLER/RECEIVER
Ais. Automatic Idemtification System	SAAB R4 AIS TRANSPONDER SYSTEM
Radio, Portable, VHF	8 x MOTOROLA GP340
4 x MOTOROLA GP300	
Booster Unit For Portable Radio (Uhf)	N/A
Emergency Radio Beacon (Epirb)	JOTRON TRON 40S 406/121.5 MHz SERIAL 130AD14503 JOTRON TRON 40S 406/121.5 MHz SERIAL 01406247
Radar Transponder	2 x JOTRON TRON SART 9 GHz
Radio, Lifeboat, Vhf	3 x NAVICO AXIS 250 (portable)

Satellite Communications

MMSI Number	357 270 000
Inmarsat Type B	NERA SATURN B. Tel:335 726 910 Fax:335 726 911 Data9600: 335 726 912
Inmarsat Type C	2 x SKANTI CAPSAT 435 726 910 and 920
V-Sat Uk	44-207 576 6870
V-Sat Usa	1-713 296 5370
Telefax Machine	USE IMARSAT B LINE
Internal E-Mail & Pc-Network	Eudora, Ethernet
E-Mail Address To Vessel	captain@trident.vessel.int.slb.com

Safety Equipment Crew

Lifeboat Type / Capacity/ No. Of Boats	2 x Norsafe 70 Pers each.
Engine, Lifeboat	Sabb type 4L 186 LB
Liferafts Type /Capacity	Viking, 4 x 25 Pers and 2 x 20 Pers.+ 1 MOB raft x 6 Pax
Number Of Life Rafts	6 rafts total. + 1 MOB
Lifejackets Nos.	142 (Seamaster-1983)
Survival Suits, Thermo Insulated	70 (Koppernaes)
Working Suits, Thermo Insulated	30 x 'Mustang' + 10 'Aqua' Dry suits.
Man Overboard Boat (Mob) Type	Norsafe Magnum, 7.5 mtr.
Engine, Mob And Speed Of Boat	Yanmar 4LH-STE 4 Cyl. Turbo. Appr. 25 knots
Waterjet And Gear Drive, Mob	Hamilton 212 water jet, ZF Hurth gear, HSW 630
Work Boats	2 x 25 FOOT NORPOWER WORKBOATS
Engine Work Boat And Speed	NOGVA/CUMMINS type 6BT5.9M 210HP 15Kn

Fixed Fire Extinguisher System

Engine Room	Inergen, Zenith Electro. 103 pcs. Bottles w/volume 50 ltr Pressure: 300 bar
Separator Room	N/A
Incinerator Room / Galley Ducting	Inc. Room: Inergen. / Galley: CO^2
Tape Store	Inergen, Zenith Electro
Cable Store	N/A
Steamer Winch Room	Streamers covered by fixed water fog system.
Helicopter Deck	AFFF 3%. Two Unitor FJM 80 foam monitors
Paint Store	Fixed water fog system.
Chemical Store	N/A
Main Foam Pump, Afff Foam Mixture	7.5 M^3/h, 11 Bar, Grundfoss CR8-100/9. 3% mix.
Main Fire Pump	1xAllweiler NB 40-200/01/194, 50 M^3/h @ 7 Bar. 1xAllweiler NAM 80-250/01/208, 170M^3/h @ 8 Bar
Water Spray Pumps For Streamers	2xAllweiler NAM 125-315/01/326, 240M^3/h@ 5 Bar
Emergency Fire Pump	1xAllweiler NB 40-200/01/189, 40 M^3/h at 7 Bar.
Fire Detection Monitoring System	1 x SERVOTEKNIK BMS-904

Hull Outfitting

Anchor	Maker: ABB Zamech Ltd. Type: SPEC 4320 1 x 4340 Kgs + 1 x 4320 Kgs
Windlass	1 x Ulstein Brattvaag BFM 22U.050, low pressure hydraulic (40 Bar)
Mooring Winches	N/A
Capstan No 1	2 x ODIM Type: 3M3117/OCF801 (Gun deck)
Capstan No 2	N/A
Decks Crane 1, Capacity/Reach/Location	1 x Norlift GPFO 250 0814, D-deck Port, frame 36. Max. lift 8 tons
Decks Crane 2, Capacity/Reach/Location	1 x Norlift GPFO 250 0814, D-deck Stbd, frame 36 Max. lift 8 tons
Decks Crane 3, Capacity/Reach/Location	HYDRALIFT 1, KMCV 1400-6T (10M) RB600.
Decks Crane 4, Capacity/Reach/Location	N/A
Anti Rolling Damping System	Ulstein Passive Stabilisation System Tk.No.8 Roll Reduction Frd 398 M^3 Tk.No.37 Roll Reduction Aft 312 M^3
Heeling Tanks, Volume And Fuel/Fw/Sw	SWB Tanks No 6 & 7 Total capacity 382m3 & 392m3
BUNKER CONNECTIONS, Locations	1 x forecastledeck centre, frame 117, 2 x main deck Stbd. and port side, frame 57.
BUNKER CONNECTIONS, Type(S)	1 x 4" pipes w. standard flanges on forecastle deck, 2 x 7" with std. flange on main deck. One fitted with 3" camlock female.
BUNKER HOSE Length & Dimension	N/A
Crew Accommodation, No Of Bunks	64 bunks
Single Berths Cabins	21
Double Berths Cabins	20
Client Cabins, Single Berths	3
Business Conference And Training Rm	A -deck
Sauna And Fitness Room	A -deck

International Oil Pollution Prevention (IOPP) Equipment

Incinerator, Sludge And Waste Oil	Teamtec-Golar, OGS400C, 65 ltr IMO sludge/h. Max 400 ltrs solid waste / charge.
Bilge / Oily Water Separator	World Water Systems, 2500 OCD, 2.5 M^3/h, through 15 ppm unit.
Oily Water / Sludge Holding Tanks Cap.	Bilge W.tank:14 M^3. Sludge/waste tk's.: 22 M^3
Sewage Disposal Plant	Hamworthy Super Trident, ST6A. Macerate, biological plant w. chem. Dosage facility. Max. flow 15 M^3/24 Hrs. BOD5 6 Kg's/ 24 Hrs.
Oil Spill Absorbent / Damage Control	2 x Set Oil Spill Kit inc. sorbent booms/pads, granules & dispersant.

Machinery Equipment

Air Source, Hp Compressors	3 x LMF 57/138 - 207 - E60, 1 x LMF off-line compressor, V17/5518-E60, 75 cfm.
Air Capacity, Each And Total (Cfm)	3 x 2000 cfm, total 6000 cfm
Hp Compressor Drive Motors	3 x ABB motors, AMA450 L6L BAFMH, 1 MW, voltage / freq. Controlled.
Main Engine Or Electric Prop. Motors	2 x Bergen Diesel BRM9, 5400 BHP (3975 Kw Ea)
Auxiliary Engines (Generator Drive)	2 x Caterpillar 3516STD 1.4 MW each. 440V 60Hz
Redundancy Propulsion, Az-Thruster	N/A
Vessels Total Brake Hp / Kw For Prop.	10800 BHP, 7900 KW.
Main Engines, Power Supply	N/A
Propeller Type, Main Propulsion	2 x 4 blade CPP in nozzle, diam. 4.2 mtr, 125 rpm
Propeller and Thruster Control	Ulstein-Liaaen electro / hydraulic control.
Propeller Blade, Spare	N/A
Generators / Alternators	2 x A.van Kaick shaft gen's, DSG 114 M1-6W, 440V, 60 Hz, 3000 KVA each
El. Power, Useful, Out From M.S.Board	> 7000 KW
Ups Power To Instrument Room	1 x Siemens UPS Masterguard S5280, 73 KVA, 15 min. battery back-up.
Power Supply Instr.Room Back -Up	1 x Siemens UPS Masterguard S5280, 73 KVA, 15 min. battery back-up.
Emergency & Harbour Gen. Engine	1 x Caterpillar 3406 DITA, 345 KW
Emergency & Harbour Generator	1 x Caterpillar SR4-3450, 315 KW, 440V, 60 Hz
Fuel Back-Up System For Aux. Eng.	N/A
Cooling System For Aux. Engines	Independent FW cooling. 2 x Sondex FW/SW coolers
Bow Thruster	Ulstein-Liaaen 800 TV, 1.1 MW, 440Volt, 60 Hz.
Stern Thruster	N/A
Fresh Water Generator (Fwg)	2 x Alfa Laval De-Salt. 12 T/24hrs each
Boiler, Exhaust Gas & Oil Fired	1 x Pyro E 1130, 406 KW
Steering Gear	2 x Ulstein Tenfjord, type SR662

HSE

Full compliance with SOLAS, Marpol 73/78 and other relevant maritime and industrial standards, **E&P Forum and IAGC requirements**

Hospital and medical facilities	2 beds with trauma equipment and NMD/WHO medicine chest
Environmental management	Marpol 73/78
Waste segregation onboard	Biodegradable, incinerated, or stored for onshore disposal
Refuelling at sea procedures	In place

2.7 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 QUEST 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 reels are covered by a foam deluge system. 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 once a trip.

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. A Medic was onboard and medical advice was on hand through International SOS in Sydney and Singapore.

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. There was also a fully qualified paramedic onboard.

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 and general housekeeping was very good.

HSE Details for Survey

Incidents/Accidents		Exposure Hours	
Type	**Cumulative**	**Group**	**Cumulative**
Fatality	0	Client	1228
Lost Time Incident	0	Maritime	12894
Medical Treatment Case	0	Seismic	19034
First Aid Case	1	3rd Party	7982
Restricted Work Case	0		
Material Loss or Damage	0		
Environmental Incident/Damage	0		
Near Miss	0		
Hazard	0		
Unsafe Act	0		
Total Incidents	**1**	**Total Hours**	**41138**
		Total Man Days	**1714.08333333**

Activity	Cumulative
Safety Drills	3
Safety Meetings	1
Boat Launches	12
Boat Transfers	2
Toolbox Meetings	93
Helicopter Landings	6
Safety Audit - Internal	0
Safety Audit - External	0

Comments

Date	Comments
10 Mar 07	The helicopter crew change for the Digicourse technician and seismic personnel was carried out.
13 Mar 07	IP turned around after launching the workboat and hit top of head on the Port davit as he walked away. IP was not wearing hardhat at the time. After noticing blood on hand, IP reported to the Medic ASAP. The workboat was launched 3 times for streamer maintenance.
14 Mar 07	The workboat was launched twice for streamer maintenance.
15 Mar 07	A fire drill was conducted at 11:00.
17 Mar 07	A fire and medivac drill was held in the afternoon simulating a fire in the cable repair shop and the medivac of an injured crewmember. Emergency contact numbers were also checked and found to be in order.
18 Mar 07	The workboat was launched twice for streamer maintenance. The OMS Pioneer came alongside to transfer fuel and take off rubbish skips.
20 Mar 07	The workboat was launched twice for streamer maintenance.
21 Mar 07	The workboat was launched for streamer maintenance.
22 Mar 07	The workboat was launched for streamer maintenance.
24 Mar 07	An ISPS drill was conducted at 12:45.
26 Mar 07	A helicopter landed late afternoon to bring out one joining seismic crew member for an extended handover and taking off one seismic crew member who was leaving early due to family commitments.
27 Mar 07	The Lady Roula departed for Lakes Entrance for re-supply at 22:05.
29 Mar 07	A general safety meeting was conducted at 13:00.
01 Apr 07	A helicopter crew change was conducted for the seismic crew.
02 Apr 07	A general muster and fire drill was conducted at 12:45. The OMS Pioneer was alongside between 10:26 & 15:40 for re-supply.
04 Apr 07	The workboat was launched for streamer maintenance.

2.8 RECOMMENDATIONS & CONCLUSION

- The vessel had just been in dry dock in Singapore for installation of a complete new recording system, gun arrays and new version of Trinav prior to the survey. This caused a few problems with people not being fully up to speed on the new systems. Although, Field Support personnel did sail from Singapore, it would have been more beneficial for them to have stayed onboard until the survey was underway and any teething problems had been rectified.
- The overall appearance of the vessel is very good and should be commended.
- The overall OH&S performance delivered by both the Marine and Seismic crews went a long way to maintaining a safe and comfortable work environment.
- Constructive use of Medic (first aid course, safety instruction)

The over all performance of the seismic crew was excellent, the level of expertise of the senior seismic crew members was above average but there were quite a few new personnel who still require further training although their 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 with close cooperation during drills.

3 NAVIGATION

3.1 OVERVIEW

The positioning objectives were to navigate the vessel safely, steer the defined “steered point the centre of sources” and determine all receiver group coordinates within the required tolerances, correctly co-register these coordinates with seismic records and to achieve the required coverage criteria for the 3D marine seismic survey.

This survey was acquired, recorded and processed onboard using the WGS84 Datum, with all mapping and final reporting carried out using Universal Transverse Mercator (UTM), Zone 55S (147° East) projection. Client approved geodetic and transformation facts are appended in Appendix *.*: Geodetic Parameters.

Western-Geco provided three independent DGPS systems, CNAV, Subsea7-Veripos and TRINAV 3 using a combination of Veripos and CNAV solutions. CNAV and Veripos systems had an independent GPS receiver and antenna.

CNAV and VERIPOS DGPS positioning systems computed the vessel DGPS position and also combined to compute the rGPS float and gun tracking system through TRINAV GPS VERSION 3.0.1. The in-sea rGPS units were Seatrack pods incorporated with Ashtech GPS receiver card.

TRINAV 3.01 (Integrated Navigation System) provided the real-time vessel positioning, survey line selection and navigation management. Real-time coverage was displayed on the same system binning, and also available in offline mode for accessing the coverage for infill selection.

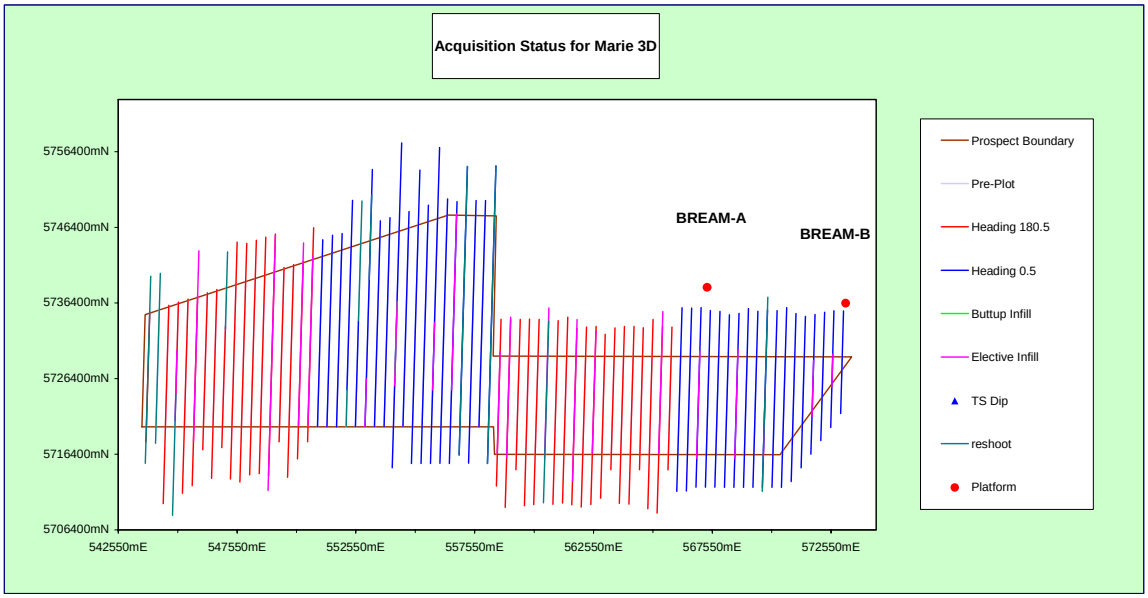
Sonardyne SIPS-2 was used for positioning the streamer acoustic networks. The front and tail acoustic networks were co-positioned by Seatrack rGPS mounted on each gun-float, tailbuoy and 2 outer gun strings. One (1) intermediate mid-streamer acoustic network enhanced and aided in streamer modelling and monitoring of streamer separation.

Streamer modelling and depth control was by DigiCourse 5011 series depth controller and compass ”birds”. Bathymetry data was acquired using the Simrad EA-500 echo sounder and the water velocity profile measured using a Veleport Vessel steering was complemented with a Litton C Plath SR180 gyrocompass and the Robtrack autopilot system.

During online acquisition, most of the positioning and navigation systems were operated from a series of terminals and monitors fitted within the prominent navigation console in a newly well set out instrument room. Post-processing was also carried out using TRINAV 3.

3.2 METHODOLOGY

Owing to its shape, the prospect was divided into 4 swaths please refer to the diagram below. Lines shot on the outer edge of the western were shot to the south and to the north on the outer edge of the eastern swathe. This arrangement allowed for turns of approximate 3.5km radius which was optimal for the vessel towing an 8 by 4km streamer configuration. Data was collected during the run-in and run-out whenever feasible but not on the apex of the turns.



The steered point was the centre of the source which was approximately 330m astern of the vessel reference point. Run-ins were set at 5.5km in both directions. This was the optimal run-in to ensure that the active parts of the streamers were straight as the stack built up, whilst maintaining minimal line change time.

The maximum / minimum speed over the ground was 5.1/3.6 knots and the average speed over the ground used was 4.65 knots.

Shot-point interval was 18.75m and the average shot time was 7.89 seconds. The navigators were instructed to steer the centre of sources the infill was acquired at the end of the survey and amounted to 31.59%. Steering on the centre of source was to allow future surveys to be shot over the same point in 4C or 4D mode.

3.3 SOURCE AND STREAMER GEOMETRY

3.3.1 Streamer Separations

For the major part of the survey, the source and streamer geometry was very consistent falling within 10% of the nominal separations, with only a few isolated lines recorded where an individual streamer separation dropped outside the 10% specification. . A mono wing problem on Sequence 028 resulted in an average separation between S1 – S2 of only 37m but it was corrected during the line change. Streamer shape was very consistent (with the exception of sequence 028 front end separations were within contractual tolerance. Over the period of the survey, the outer streamer separation averaged 685m (616 - 726m) thereby maintaining the expected coverage as outlined in the table below:

Front-end streamer Separations

	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	1 to 7
MIN	37.33	99.95	86.53	79.70	93.05	95.80	83.91	615.5
AVG	**98.58**	**104.16**	**94.71**	**90.27**	**98.52**	**98.93**	**98.70**	**685.2**
MAX	135.52	106.81	98.82	101.68	101.25	101.11	116.58	726.6

Source separation was not as good and averaged 44.6m (41.4 - 48.3m) but was generally within specification as given in the table below:

Source Separations

	1 to 2
MIN	41.4
AVG	44.6
MAX	48.3

Tail end separations were generally good as given in the following tables:

Mid streamer Separations

	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8
MIN	35.55	82.72	71.77	76.63	90.84	60.23	87.72
AVG	**97.28**	**102.81**	**90.71**	**92.33**	**104.93**	**85.45**	**104.91**
MAX	137.38	114.62	105.60	113.91	120.36	99.12	129.34

Tail-end streamer Separations

	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	1 to 7
MIN	49.10	61.86	66.73	70.30	82.16	51.23	81.98	600.48
AVG	**108.82**	**90.57**	**89.86**	**91.62**	**111.81**	**82.85**	**106.78**	**681.31**
MAX	145.90	107.33	116.15	118.82	138.65	101.06	137.50	756.05

Any deficiency in the coverage of the far offset groups was compensated for by the use of an expanded bin grid that increased the cross line width of the far bin to 100m a list of the binning parameters are given below in Binning and Coverage section. Despite the good streamer shaping the infill was larger than normal as the centre of source was used to steer the prime lines as outlined above.

The centre source to near group offset (streamers 4 and 5) averaged 240m which is longer than the planned figure of 150m; the geometry of the spread meant this was the optimal value.

Vessel to Centre of Source	327m
Vessel to Centre of First Group	563m
CFG – Centre of Source (Seismic Offset)	224m

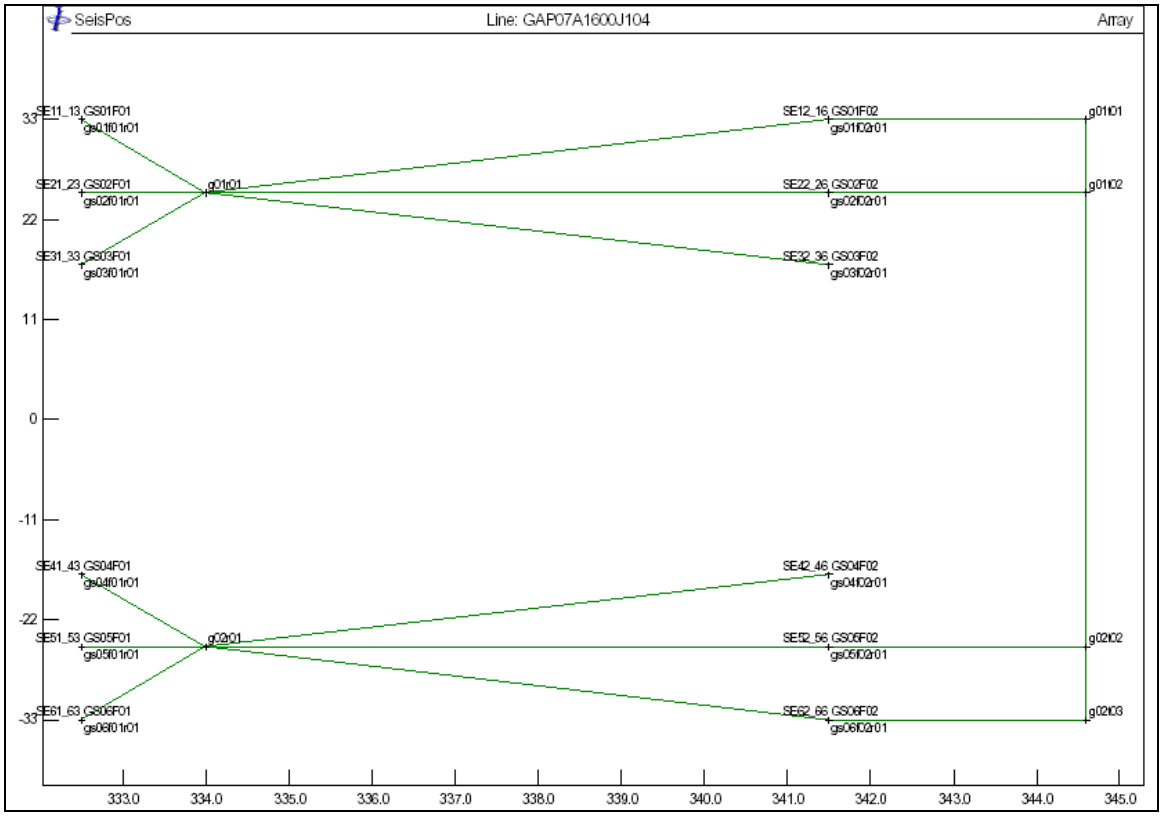
3.3.2 Sub array separations

Sub array offsets were good as given in the table below:

Source Separations

	1-2	2-3	4-5	5-6
MIN	8.1	7.0	7.6	7.2
AVG	9.2	7.7	7.9	7.6
MAX	10.3	8.2	8.3	8.0

The pods are located on the outer and centre gun strings please refer to the diagram below:



Graphical statistics of source and streamer geometry are presented in Appendix * – Quality Control Plots

3.3.3 Streamer misclosures and rotations

Streamer misclosures

The along line misclosures were generally very low and consistent, indicating that the streamer used were of the correct length and that the streamer definition data parameters entering into TRINAV and the stretch factor used by the mathematical model set input in TRINAV were also correct.

Elongation

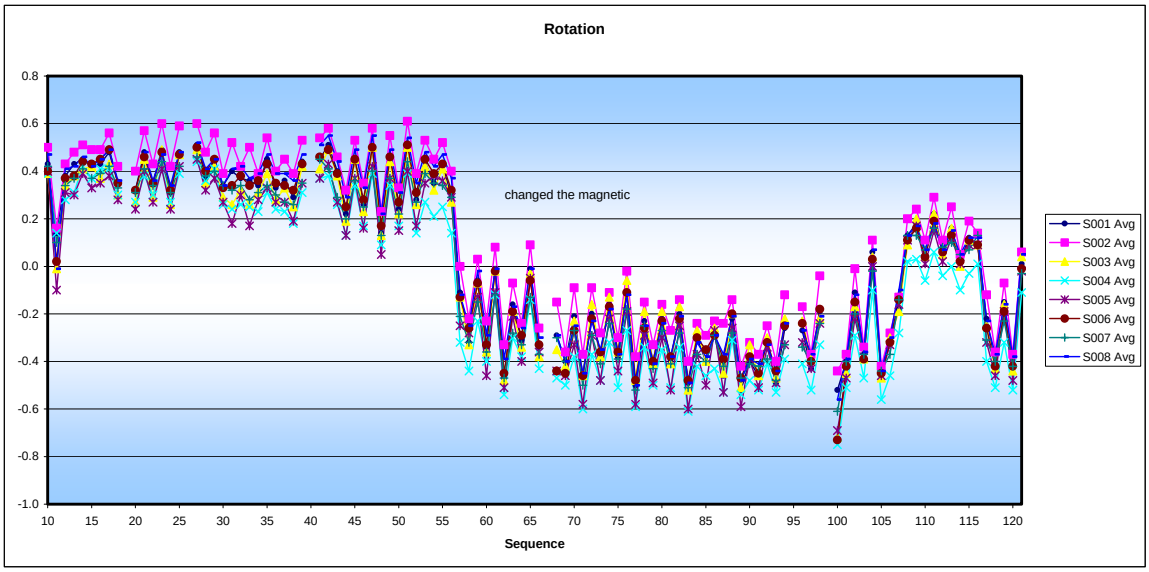
	S1	S2	S3	S4	S5	S6	S7	S8
MIN	-5.17	-5.50	-5.40	-5.53	-4.61	-5.08	-5.47	-3.66
AVG	-1.95	-2.36	-2.59	-2.51	-2.15	-2.24	-2.54	-1.01
MAX	0.99	0.50	0.31	0.42	0.32	-0.05	-0.25	1.36

Streamer Rotation

The observed rotations ranged from 0.6° to -0.7° and the average for the prospect was calculated to be -0.00° however the average value is misleading as given in the plot below:

Streamer rotations

	S1	S2	S3	S4	S5	S6	S7	S8
MIN	-0.52	-0.44	-0.72	-0.75	-0.69	-0.73	-0.61	-0.56
AVG	0.02	0.10	0.00	-0.09	-0.05	0.02	-0.02	0.04
MAX	0.51	0.61	0.50	0.44	0.45	0.51	0.46	0.55



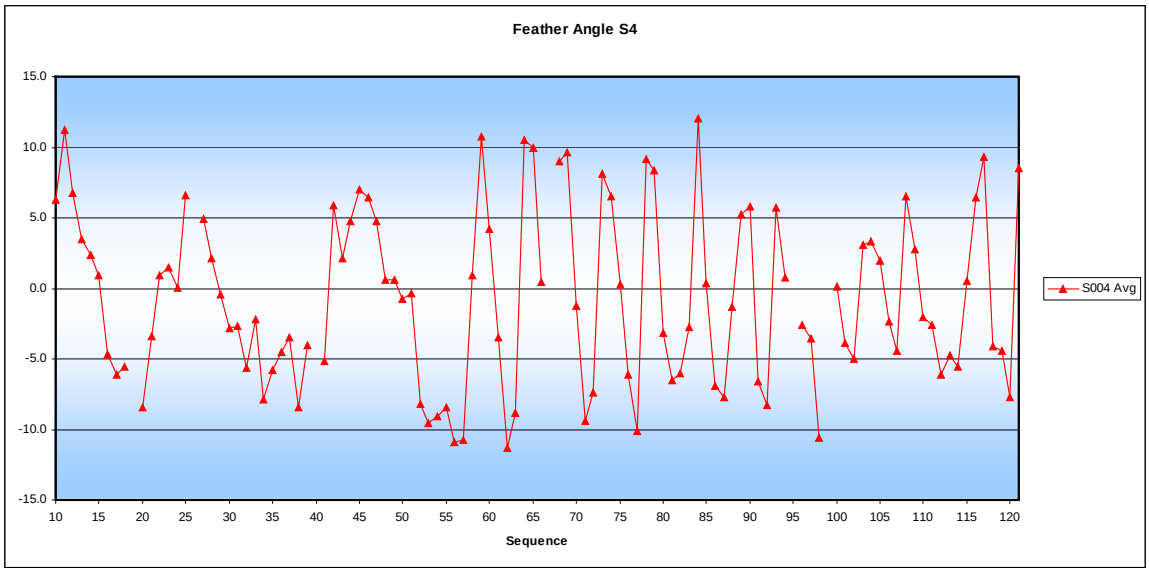
The change of the magnetic declination on sequence 57 improved the rotations and on hindsight this should have been changed earlier. However having 6 active tailbuoys does mean the rotation misclosures is academic as the misclosures from the compasses are tied into the tailbuoy which are corrected in processing and online.

3.3.4 Tides, Currents and Feather

Overall the local currents were generally small in a 020 degree direction and consequently caused no major problems in feather matching. However on occasions the current direction and strength would change causing some large dynamic movements of the streamers in particular during the run-in and run-outs. Changes in the weather conditions will undoubtedly have had the main influence on the local currents. Feather angles for S4 are given below:

	S1	S2	S3	S4	S5	S6	S7	S8
MIN	-11.8	-12.0	-11.4	-11.3	-11.3	-11.4	-11.2	-11.1
AVG	-0.8	-1.0	-0.8	-0.7	-0.7	-0.9	-0.7	-0.7
MAX	11.7	11.7	11.8	12.1	11.7	11.6	11.7	11.6

The feather for the survey generally ranged from between 0 and +/-12° as given in the plot below:



3.3.5 Binning and Coverage

TRINAV Binning System

The On-Line and Off-Line data bases remained separated. The system operated by the navigators was run on an SUN Fire V440 work stations. The on line TRINAV system was configured to accept source and receiver positioning data from the TRINAV system in real time. It then displayed this information in a series of plots which were used to steer the vessel to achieve optimum coverage.

The final P1/90 data was copied across, via the Ethernet, to the off-line TRINAV where it was added to a database of accepted positional data. The off line system was used to generate plots of bin coverage from this database, with colour coded GIF files generated from the various displays for transmission via the Internet to Supervision for the client.

One advantage of this system was the ability to change parameters during the survey. The grouping of the streamers could be altered, the required percentages of hits in any bin could be changed, flexi-binning applied, and lines added or rejected from the coverage plots at any time without causing any major problems. Once the database was amended, then the revised coverage plots could be compiled. The scale of these coverage plots could be varied in order that the coverage could be examined in detail, making decisions on infill far simpler. A reasonable amount of flexi-binning was allowed on the survey. A tapered liner expansion was used during this survey and the parameters are given in the table below:

Binning Parameters	Streamer Segments			
	Nears	Near / Mids	Far / Mids	Far
Nominal Fold Coverage	16 fold	16 fold	16 fold	16 fold
Flex Binning Technique	Linear taper	Linear taper	Linear taper	Linear taper
Static Bin Width	25 metres	25 metres	25 metres	25 metres
Flex at beginning of Segment	50.00%	112.50%	175.00%	237.50%
Flex at end of Segment	112.50%	175.00%	237.50%	300.00%
Near Trace Bin Width (Flexed)	37.50 metres	53.125 metres	68.75 metres	84.375 metres
Far Trace Bin Width (Flexed)	53.125 metres	68.75 metres	84.375 metres	100.00 metres

Coverage Parameters (with Flex applied)		
	Coverage (%)	Minimum Fold
Near trace coverage	90%	14
Near-Mid trace coverage	90%	14
Near-Far trace coverage	90%	14
Far trace coverage	90%	14
Total		56

A full set of coverage displays (Flex applied and Non Flex) are located on the CD called Appendix Coverage Plots.

The vessel was steered to the centre of source. The binning grid was configured correctly with the parameters detailed in the Appendix Positioning Parameters.

The Marie 3D prospect was comprehensively covered to within specification with an overall infill percentage recorded as 31.59%. The infill percentage was high as the coverage was based on the centre of source and not the cable, as is the norm.

3.3.6 Calibrations

The last independent static verification of the positioning equipment was carried out by Thales (Singapore) 19th May 2002. Equipment verified was DGPS, rGPS and gyros, all were verified to be well within normal tolerances. Other verifications had been carried out by WG since. Standard checks and verifications are part of the ongoing work as procedures are in place to replace dockside static verifications.

DGPS

A health check was made on the prime DGPS system's at the Loyang Dock in Singapore on the 5th April 2005 with using a Total Station from pre-defined geodetic control relative to the WGS-84 datum. Resulting C-O's were better than 0.5m.

rGPS

Re-radiation checks were made on transit to the survey area. The results were deemed acceptable.

Acoustics

Verification of the acoustic pods was achieved in post processing by comparing the Observed ranges against the nominal (known) ranges on selected inline baselines in the network. In addition this verification also confirmed that the velocity of propagation computed from the TS-dips were correct.

Streamer Compasses

No pre or post survey calibrations of the streamer compasses were performed, as the manufacturer does not recommend this is necessary. Bias checks were performed on a line-by-line basis during the survey to confirm the integrity of the compasses.

Gyro

The previous static Calibration was made on the 25th June 2005 at Pusan, South Korea.

The C-O differences between each direction shot were all within tolerance and the readings were considered good.

A static calibration was not deemed necessary for this survey as the gyro is continually monitored against GPS.

Echosounder

A lead-line verification of the draught was made prior to the survey in Singapore which confirmed the draught and validity of the echo sounder reading. Several TS-Dips were performed during this survey and they were all very close to historical data from the US Navy.

3.4 PERFORMANCE APPRAISAL

3.4.1 DGPS Systems

Throughout the survey excellent reliability and accuracy was observed with the DGPS solutions used. Comparisons were <5m for most of the survey. The two prime systems CNAV and Veripos proved reliable the former being the more consistent. TriGPS was the least reliable network solution and was disabled for sections of lines when the comparisons were > 2m.

The following systems were made available:

Software	Diff. corrections	Diff. corr. delivery	Supplier
CNAV	CNAV	Inmarsat L	C&C Technologies
Veripos-Ultra	SUBSEA 7	Spotbeam	SUBSEA 7
TriGPS	SUBSEA 7 & CNAV	Spotbeam	SUBSEA 7 & C&C

The vessel used a cocktail of available systems for positioning that were input into the Prime Estimator; a bad system was automatically or manually taken out of the solution. CNAV was considered prime positioning system for this survey.

Veripos and the prime CNAV system were set to the 3D positioning mode for the entire survey. The final computations of the Geoid - Spheroid separations were from the inbuilt EGM96 model. TriGPS was set to height aiding using 3.389m derived from the IGRF-10 Data Model based on the centre of the block.

QC of the DGPS systems was basic and included PDOP, HDOP, the Number of satellites in view and the Spheroid heights. Graphs of the above were produced after each line from TRINAV in addition data was extracted from the P2-94 files. PDOP values were consistently higher for CNAV and the number of satellites in view was always greater in the VERIPOS system.

WG, providing two totally independent sources of corrections and a multitude of different processors of this data, along with a TRINAV GPS integrity monitor located in Sale that ensured vessel positioning was always of a high standard.

The integrity monitor essentially worked as a tail buoy located in Sale where the received pseudo ranges were transmitted to the vessel, real-time, via VSAT. The location of the monitor station was known and the computed location was compared with the known location. Normally the c-o was less than 1m for this project.

CNAV

Supplied by the American company, C & C Technology uses a “global” network of reference stations to track all GPS satellites in orbit around the world and send the raw GPS signal measurements back to a “Network Processing Hub” (NPH). The NPH then calculates and models in real time all of the individual GPS satellite Orbital Corrections and also the individual GPS satellite clock offset values (from the broadcast ephemeredes – IODE). These corrections are then transmitted to the mobile user via geostationary communication satellites (description taken from the C-NAV Operations Manual).

The advantage to the CNAV approach is theoretically that, since corrections are related to individual satellites and not reference stations, the user's distance from a reference station is no longer a factor in positioning quality.

CNAV has traditionally performed very well and is in the author's opinion an excellent system. CNAV was designated the 'Primary' GPS system. A stand-alone QC system is available from C&C Technologies to access the quality of the GPS on a line by line basis but was not made available for this survey.

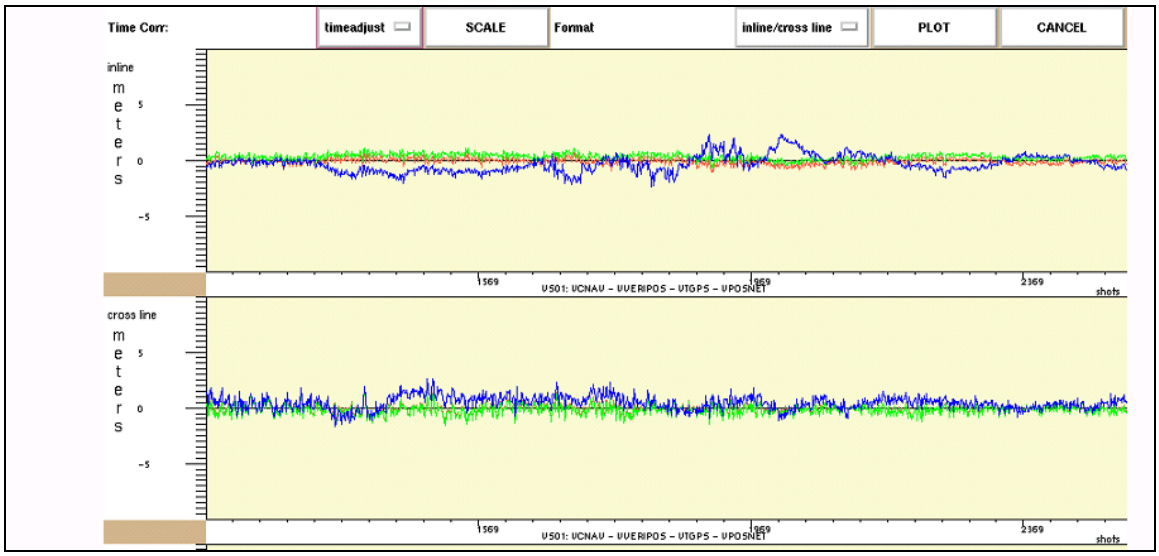
Veripos

Veripos is a similar system to the Furgo Multifix network system and performed very well. Several local reference dual frequency reference stations were utilised for this system. Stations used on this survey are given on the CD.

TriGPS

TriGPS is a proprietary WG network solution and it was the least stable of the three systems. TRINAV utilised a combination of the CNAV and the Veripos solutions.

The following plot was typical of the differences noted during this survey.



TRIGPS
CNAV
VERIPOS

The above differences are considered good and the DGPS positioning met the positioning specifications throughout this survey.

3.4.2 In-water Systems

rGPS

rGPS positioning system used was Seatrack, provided by Kongsberg with their 220 type pods were placed on the tailbuoys and 330 type pods placed on the gun strings. A few position jumps in individual buoy positions were observed, but these jumps were small and easily detected and did not result in any shot point edits as the data was adequately interpolated. Noise levels did increase during periods of poor sea conditions but were acceptable. Individual units on the gun strings failed occasionally, these were replaced when feasible. With the exception of the following the tailbuoy outages the tailbuoys proved reliable throughout the survey. TB4 and TB8 were inactive for the majority of the survey as the stic cables on these buoys were causing leakage along streamers 4 and 8. Outer front starboard gun pod and TB07 were both inactive from the start of the survey until Sequence 25 and 19 respectively. The aforementioned outages did not affect the quality of the final dataset due to the redundancy of units deployed.

With the exception of the above outages the performance of all the rGPS pods was excellent during this survey in particular to the gun strings on which the network was almost totally reliant for the absolute positioning of the sources.

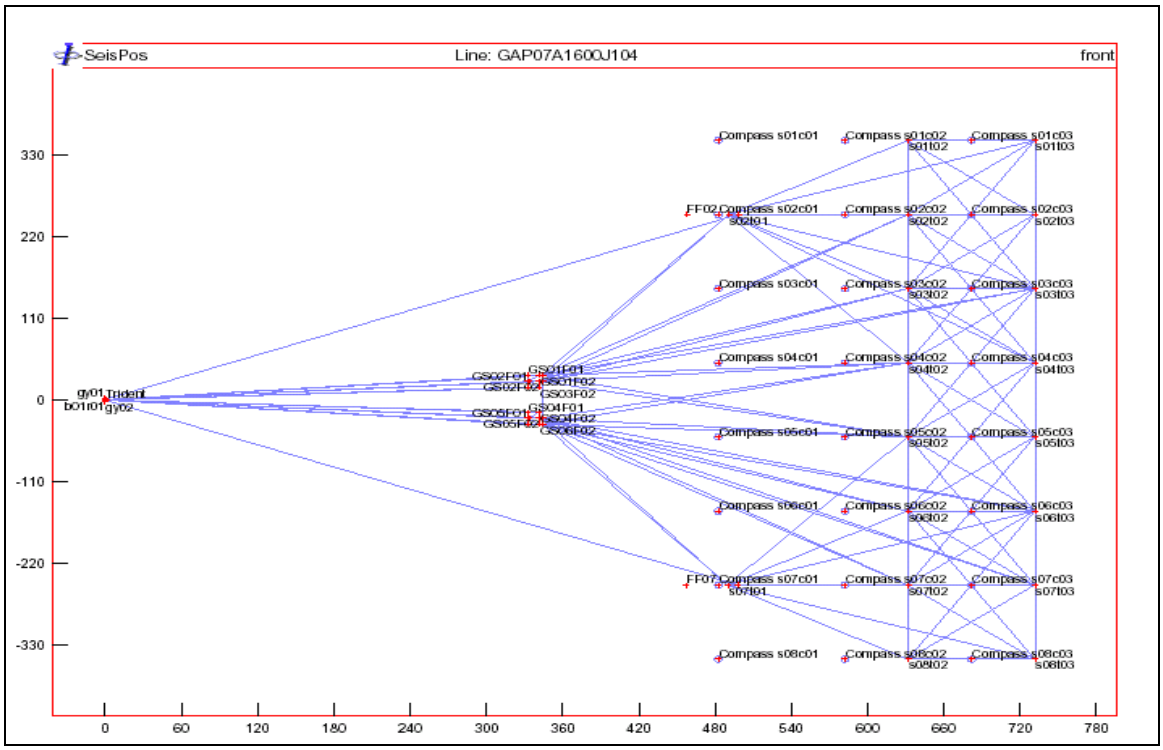
Acoustics

Sonardyne's SIPS 2 acoustic system was used. The placement of the acoustic units on the streamer was fairly conventional and he units were located as follows:

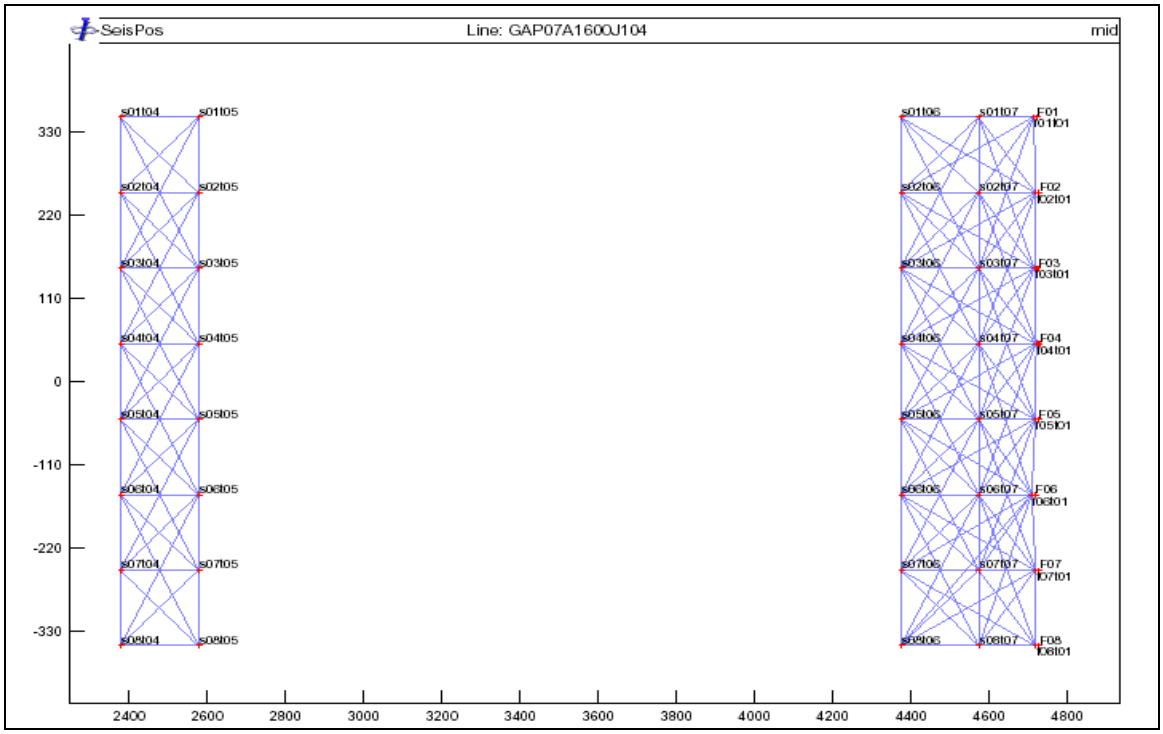
Network	Number of Pingers
Starboard Front Float	Positioned in front of streamer 2
Port Front Float	Positioned in front of streamer 7
Front	2 per streamer
Mid	2 per streamer
Tail	2 per streamer plus 1 tail buoy
Source	1 unit each on outer and centre gun strings

Please refer to the following diagrams:

FRONT NETWORK



MID and TAIL NETWORKS



The poor performance of the gun acoustic ranges from the start of the survey up until sequence 048 was the biggest concern with few active ranges. As mentioned in the previous section the positioning of the sources was reliant on the rGPS pods. Fortunately the performance of the rGPS pods (2 per string) was good during this period and the positioning specifications were maintained. Following modifications to the towing arrangements and gun timing the acoustic ranges from the gun pods finally improved following sequence 048. A list of the modifications and changes to the gun acoustics can be found in Survey Definition Changes in Appendix ***. Please note the remainder of acoustic ranges from sequences 010 to 048 was good other than the standard inner streamer head ranges between S4 and S5 these being degraded by prop wash and gun noise.

Poor sea conditions during the survey did not unduly affect the performance of the acoustics as the cables were set at 8m. Poor sea conditions did result in mid pod S5T5 remaining inactive for longer periods than normal as it proved to dangerous to launch the workboat. A list of inactive pods during this survey can be found in the Marie Map database on the CD. Those outages that did occur did not degrade the network due to the redundancy within it and the positioning specifications were always adhered to.

Sea-bed reflections were evident during this survey in the shallower water depths but generally only affected the inline ranges and were easily detected in processing.

Leakage along S4 from the start of the survey until sequence 037 did cause some outages but there was always enough data for processing. Leakage to S8 also caused some outages but again there was always enough data to process the lines.

Data for the speed of sound in water was collected through a Valeport temperature salinity probe drop and calculation of the surface velocity via known inline acoustic ranges within the network. The latter option was seen to agree reasonably well with the values derived from the Valeport sensor. Measurements from the US Naval site agreed with the various drops made during this survey.

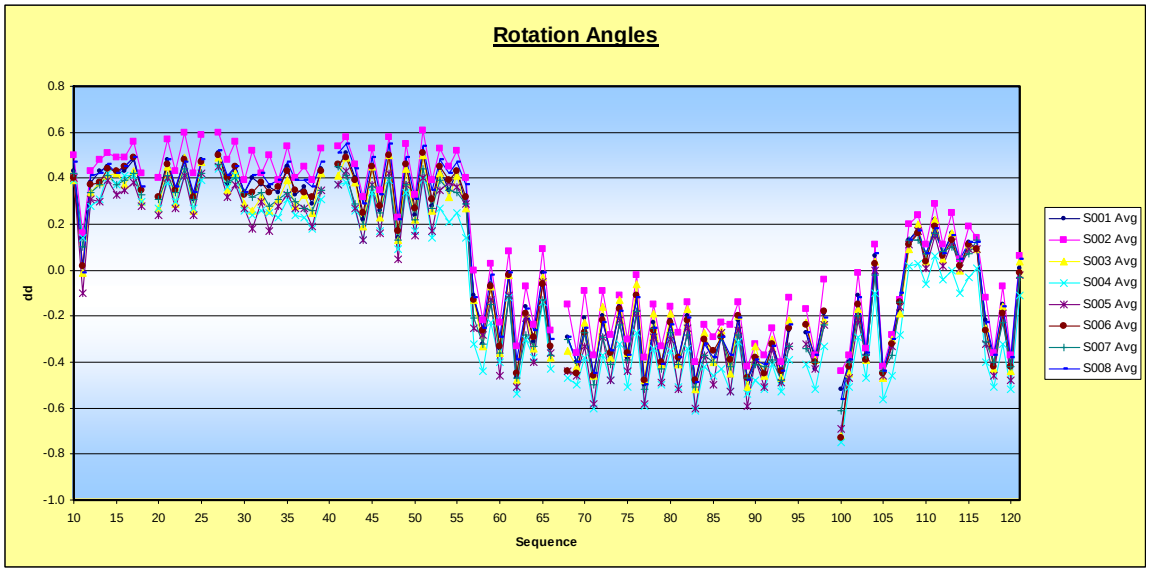
The propagation velocities used for the acoustics during this survey was:
Sequence 001 to 056, 1517.95m/s
Sequence 057 to 121, 1518.63m/s

Streamer compasses

Digicourse model 5011 Digibird Compass Units were used for streamer depth measurement, depth control and magnetic heading measurement. Eighteen units were mounted on each streamer and the distances along the cable and between each bird are given below:

Bird	Bird No	Dist	Delta
1	3	87.7	
2	4	-12.1	-99.8
3	5	-111.9	-99.8
4	6	-311.5	-199.6
5	7	-511.1	-199.6
6	8	-710.7	-199.6
7	9	-1010.1	-299.4
8	10	-1309.5	-299.4
9	11	-1608.9	-299.4
10	12	-1908.3	-299.4
11	13	-2207.7	-299.4
12	14	-2507.1	-299.4
13	15	-2806.5	-299.4
14	16	-3105.9	-299.4
15	17	-3405.3	-299.4
16	18	-3704.7	-299.4
17	19	-3904.3	-199.6
18	20	-4004.1	-99.8

Streamer rotations throughout the survey were slightly higher than normal despite changing the magnetic declination from the IGRF2000 model value of 13.075° to the modified value of 12.825° prior to Sequence 057. The graph below plots the rotation values throughout the survey.



The TRINAV and SeisPos processing software carries out a "dynamic calibration" of compasses on an ongoing basis and generates a compass calibration report for each line. The Navigation Representatives reviewed these after each sequence.

The compass data quality was generally good for the majority of the survey and when sea conditions did increase the compasses were always acceptable at the 8m streamer depths

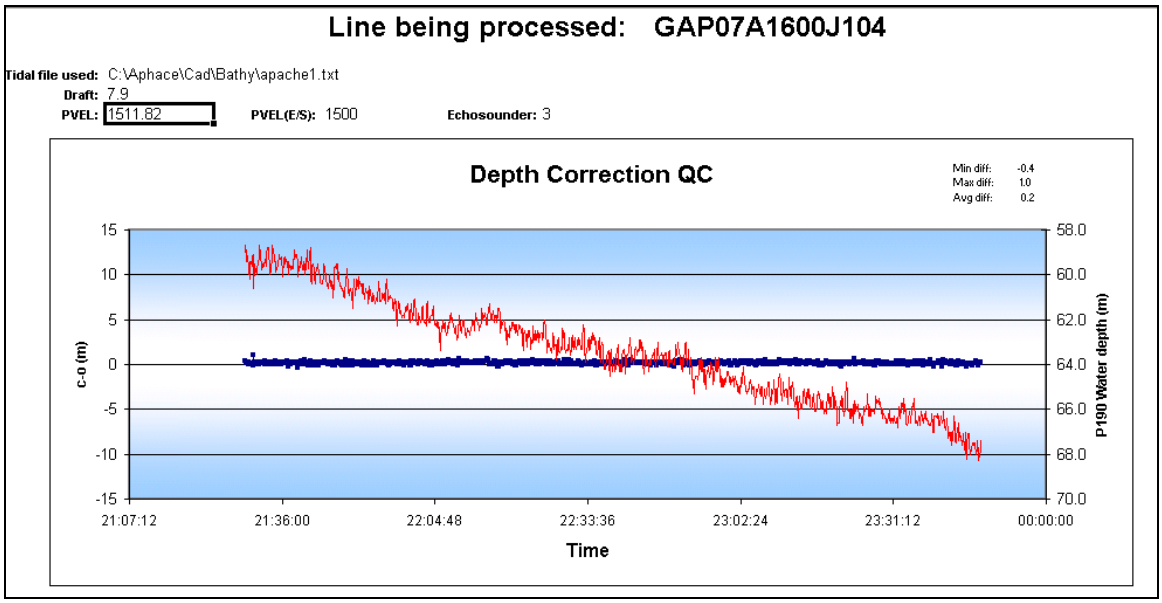
Gyrocompasses

Two Litton C Plath SR180 gyrocompasses were available and designated as Gyros 1 and 2; gyro 2 was less reliable and was made inactive in processing on most lines. Gyro 1 performed well throughout the survey. Comparisons to an rGPS baseline onboard (WG's RT Calib) agreed reasonably with the gyro data. The main purpose for the gyros was to facilitate antenna offset computations and the position of the echo-sounder. All antennas were within 1.0m from each other so any gyro error would only have a small effect on positioning any errors gyro on the echo sounder position would also be negligible over a 46m offset.

Echo-sounder

The echo sounder, a Simrad EA 500 with a 200 kHz transducer was set to 0 m draft correction and a fixed propagation velocity of 1500 m/s to provide raw data to P294 data records. In addition 18 and 38 kHz transducers were available but as the vessel was operating in water depths of < 100m the 200 kHz transducer was the best option.

Depths recorded in the P190 files were all draught, velocity and tidal corrected to MSL. A standard draught correction of -7.9 m was used during this survey. No pitch and roll corrections were made to the final data set. Confirmation of the reduced soundings was made after each line. The following plot is typical of the results noted during this survey:



The water depths varied from about 50m to 70m in the Marie Survey.

Propagation velocity used for water depth computations for this survey was:

Sequence 001 to 056, 1515.02m/s 09-May-07
Sequence 057 to 121, 1511.82m/s 20-May-07

3.4.3 Onboard Processing

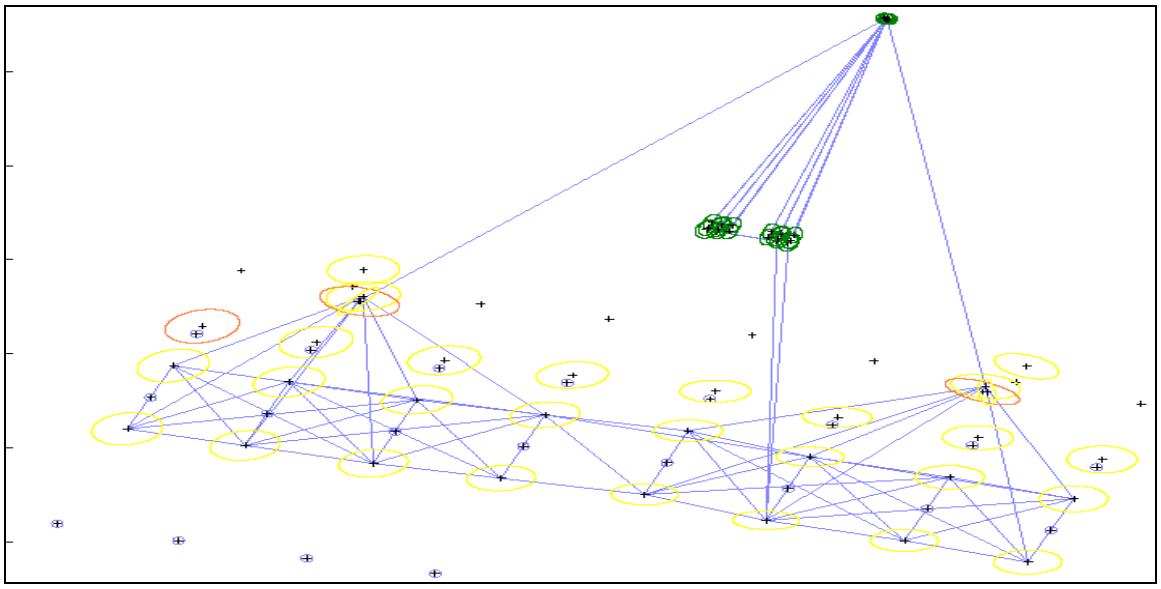
WG performed their routine onboard processing using their UNIX based fully integrated TRINAV navigation system. Following processing, data were exported in UKOOA P190 format. The production of final P190 tapes was usually completed within 4-8 hours of the completion of line but as outlined below the initial lines were delayed due to problems understanding the newly installed TriNav system

Prior to the start of the survey the contractor upgraded the navigation systems from TriNav 2.6 to Trinav 3.1 the latter being used ideally to resolve Q networks and not conventional networks as the case on the Western Trident. Including in this upgrade is the processing system which initially caused many problems as none of the crew was experienced in using the new system. Processing at one stage was some 30 lines behind production which caused problems with binning decisions ashore and onboard. Set-up problems were noted at the start of the survey including the survey editor and parameter inputs guidance was sort from Oslo but due to the time difference delays were inevitable. Processing techniques were also different as new routines were added to the new system. Problems with processing were finally resolved after around 10 days into the survey and on hindsight a field engineer should of be placed on the crew at the start of the survey.

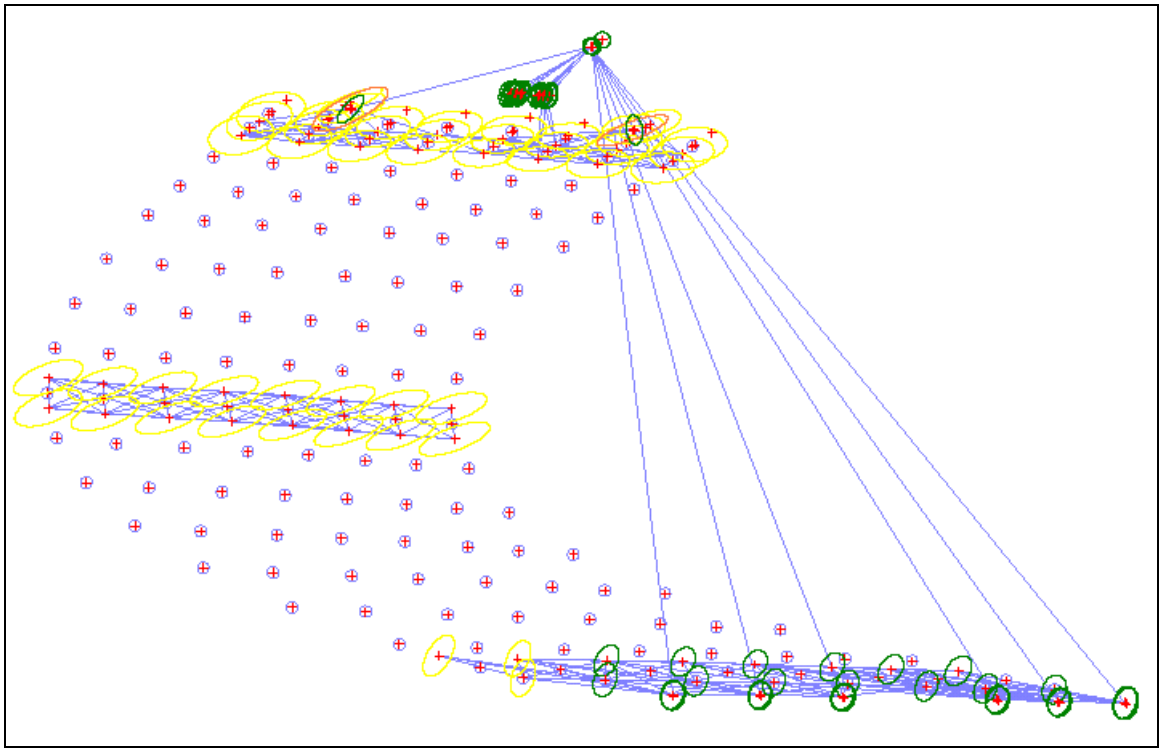
TRINAV was used to post process the navigation data and P190 and P294 files were produced. Processing was performed by a survey crew member; final quality control was made by the navigation shift leader or the Chief Navigator before passing on the P294 and P190 files to the client navigation representative for confirmation of the processing.

Acoustic ranges from the gun strings proved to be the most troublesome in post-processing at the start of the survey as none of the port ranges were active. Fortunately TriNav can compute the source positions as a separate network using the rGPS pods; however this is not the case in most systems. In the event Apache did require the data to be reprocessed suggest all the source data should be processed alone as a separate network and process the remaining network as one. Comparisons with SeisPos were bad throughout the traces if the source nodes remained as the network in SeisPos is solved as one as indeed most processing systems are. In addition a number of acoustic ranges were made inactive throughout the survey including the crossed brace ranges astern of the guns due to excessive noise from the propeller wash. Inclusion of the head-buoys at the front of the network did strengthen the network and gave added redundancy but would suggest the inclusion of another 2 could head buoys to offset any potential problems with gun ranges and to improve the geometry of the network.

The following plot is typical of the front networks from the start of the survey:



Lines shot in the run-in and run-outs proved more difficult to process, the following plot is typical of the network shaping during such periods:



Comparisons between SeisPos and TriNav were higher than normal on the line run-in and run-outs averaging around 10m however this was thought to be acceptable considering the amount of movement along the cables. Comparisons along the pre-plots sections of the lines were always good.

Noted some errors in times and shot point for the start and end of line details from the observer logs due to confusion in shooting in the line changes the corrected times and shot points are given in the Marie Map database on the CD. Noted busts in the bathymetry at the start of the survey but this were corrected and no further problems were evident. As mentioned above line change comparisons were poor at times the contractor was made aware of the differences from the start of the survey.

Statistics extracted from TRINAV after each line did indicate that the positioning specifications were being met during this survey please refer to the Marie database on the CD. In conclusion TRINAV finally proved acceptable but the use of a system designed for a completely different type of survey does appear odd; the arrival of Trinav 4 is eagerly awaited as this should resolve some of the problems encountered on this survey according to the contractor.

External Positioning Quality Control

Positioning was considered acceptable after carrying out the following QC procedures:

1) Import of the PAC file into the project database and subsequent analysis of this.
2) Analysis of the contractor QC files/plots.
3) Import and verification of the P190 data set.
4) Graphical and numeric QC of the P190 data using SeisPos.
5) Processing of P294 data and comparison of resulting "System" data with contractor P190.
6) Inspection of P294 and P190 configuration.
7) P190 and P294 file and header checks.
8) Data frequency, detecting missing data.
9) Vessel, tail buoy, source, receiver and cmp position and spacing.
10) Acoustic, compass, gyro, echo sounder and GPS data inspection.
11) Source sequencing.
12) Compass heading and depth bias checks.
13) Real-time vessel, streamer (individual receiver locations) source and observation modeling.
14) Check of water depth correction in P190 data.

Post-processed QC statistics were obtained from the contractors PAC file and relevant statistics were extracted and graphed to plot trends in the data please refer to the Cd. Comparisons between SeisPos and Trinav are included in the processing appendix.

3.4.4 Survey Personnel

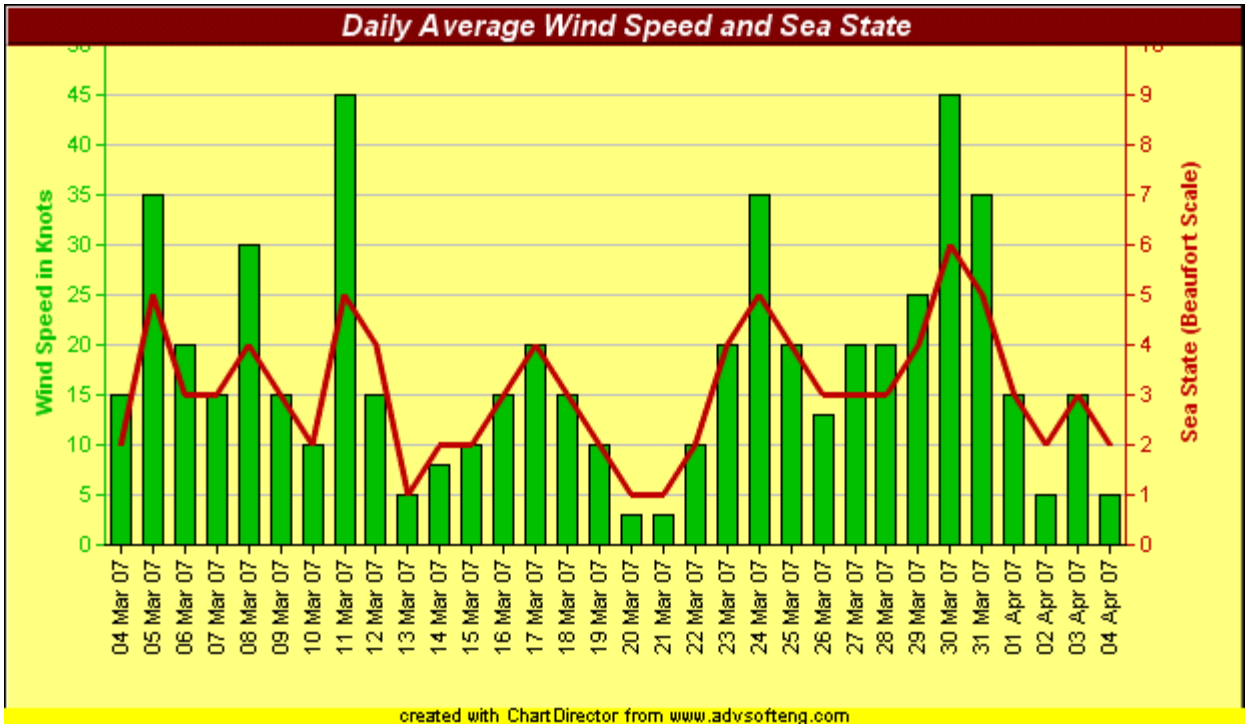
Despite and obvious lack of experience with the new Trinav system both crews performed professionally and were always cooperative. They were receptive to suggestions and requests, providing anything asked for in good time. They also performed a very good QC of the data giving very little to be desired as there were very few sequences returned for reprocessing. The navigation shift leader from the initial crew remained onboard until the 16th April and his inclusion benefited the new crew working on the newly installed Trinav 3 system.

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. Wind direction and weather forecasts were also down loaded from the Bureau of Meteorology Weather Service. Further information such as tidal movements were available the admiralty pilot for the area.

This is an area of intense weather conditions with a predominant south east swell throughout the year driven by strong low-pressure systems in the southern ocean. Swell height averaged between 1.0 and 3.0 metres with wind strength varying between 5 to 20 knots. There were occasions when swells exceeded 4.0 metres and wind strength was >40.0 knots. The weather in this area should be considered volatile and hard to accurately predict at any time.



4.2 TIDES, CURRENT AND FEATHER

The survey is being conducted during March and April where the offshore wave conditions are much more variable. Prevailing winds are south westerly, with wave heights of 3 to 5 metres, increasing to 6- 8 metres as storm fronts move into the area from the west. Prevailing Streamer feather angles remained well within contract specifications for the entire survey.

4.3 NAVIGATION HAZARDS

The survey was conducted in relatively open waters of around 30 to 60 metres depth to the east of Sale, Victoria. The survey area is located near regular shipping lanes however 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 WesternGeco, in line with Apache's own environmental concerns and the contract requirements. Survey operations were carried out under procedures designed to minimise any environmental impact at all times.

Off shore refuelling was conducted once during the survey without any problems being encountered. Great care was taken to follow International Maritime Regulations with regard to the disposal of garbage and waste. The Western Trident is 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

The survey was carried out outside of the known whale migration period. All watch keepers were instructed to keep watch for any Cetaceans. A dedicated MMO was engaged for the survey and has submitted a separate report for the survey. One line sequence was interrupted due a cetacean sighting and this was completed at a later date. For more information please refer to the MMO report.

On all lines, the acoustic energy source was gradually brought up to maximum capacity over a 30-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.

4.6 FISHING

Fishing activity was low in the area. The Western Trident broadcast the position and intent during the day. A navigation broadcast requesting all vessels to give the Western Trident a 4-mile clearance was broadcast at 6 hourly intervals.

4.7 CORAL REEFS

There are no reefs shown in the survey area. The vessel operated in water depths ranging from 20 to 50 metres with the streamers towed at a depth of 8 metres and the source arrays at 7 metres. No physical damage was caused in the survey area.

4.8 CONCLUSION

The Western Trident 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 sewage waste, which fell within MARPOL guidelines.

5 INSTRUMENT TESTS

The Daily tests consist of 6 files, which were recorded to Tape. The Tests can be run either manually or from the default scripts on the MSX recording system.

These tests were as follows:

File 1: T13, 0dB, 15.625Hz Sine Wave
File 2: T2, 0dB, 15.625Hz Sine Wave, No Hydrophones. Spec: DRD +/- 4%, THD < 0.0005%
File 3: T2, -60dB, 15.625Hz Sine Wave, No Hydrophones. Spec: DRD +/- 4%, THD < 0.5%
File 4: T5, Pre-Amp Input Shorted, No Hydrophones. Spec: Noise < 2.9uV (-114dB FS)
File 5: T6, Impulse, No Hydrophones. Spec: Spectral Response +/- 10%, Amplitude Difference.

Before the beginning of the survey a complete set of instrument tests was performed.
The Monthly tests consist of 26 files, which were recorded to Tape

These tests were as follows:

File 1000: T13, Dummy File
File 1001: T13, Special Bit Pattern, All Ones
File 1002: T13, Special Bit Pattern, 50/50
File 1003: T13, Special Bit Pattern, All Zeros
File 1004: T13, 0dB, 15.625Hz Sine Wave
Files 1005/1015: T2, 15.625Hz Sine Wave, stepped 0dB through to –100dB, No Phone connected.
File 1016: T5, Pre-Amp Input Shorted, No Hydrophones. Spec: Noise <2.6uV (-114dB FS), No Phone connected.
File 1017: T10, Common Mode, +4dB, 15.625 Hz Sine Wave, Phones connected.
File 1018: T6, Impulse, No Hydrophones. Spec: Spectral Response =/- 7% Amplitude difference.

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

February 17th 2007

Start	Category	Comment
12:00	MO	Alongside at Loyang Singapore.
21:00	MO	Depart Loyang for anchorage to obtain customs and immigration clearance.

February 18th 2007

Start	Category	Comment
00:00	MO	Transit to Geraldton.

February 19th 2007

Start	Category	Comment
00:00	MO	In transit to Geraldton.

February 20th 2007

Start	Category	Comment
00:00	MO	In transit to Geraldton.

February 21st 2007

Start	Category	Comment
00:00	MO	In transit to Geraldton.

February 22nd 2007

Start	Category	Comment
00:00	MO	In transit to Geraldton.

February 23rd 2007

Start	Category	Comment
00:00	MO	In transit to Geraldton.

February 24th 2007

Start	Category	Comment
00:00	MO	In transit to Geraldton.

February 25th 2007

Start	Category	Comment
00:00	MO	In transit to Geraldton.
13:00	MO	Alongside in Geraldton for crew change and re-supply.
22:30	MO	In transit to the survey area.

February 26th 2007

Start	Category	Comment
00:00	MO	In transit to the survey area.

February 27th 2007

Start	Category	Comment
00:00	MO	In transit to the survey area.

February 28th 2007

Start	Category	Comment
00:00	MO	In transit to the survey area.

March 1st 2007

Start	Category	Comment

00:00	MO	In transit to the survey area.

March 2nd 2007

Start	Category	Comment
00:00	MO	In transit to the survey area.

March 3rd 2007

Start	Category	Comment
00:00	MO	In transit to the survey area.

March 4th 2007

Start	Category	Comment
00:00	MO	In transit to the survey area.
13:52	MO	Commenced streamer deployment starting with streamer #8.

March 5th 2007

Start	Category	Comment
00:00	MO	Continue the streamer deployment.

March 6th 2007

Start	Category	Comment
00:00	MO	Continue the streamer deployment.

March 7th 2007

Start	Category	Comment
00:00	MO	Continue the streamer deployment.

March 8th 2007

Start	Category	Comment
00:00	MO	Continue the streamer deployment.

March 9th 2007

Start	Category	Comment
00:00	MO	Continue the streamer deployment.

March 10th 2007

Start	Category	Comment
00:00	MO	Continue the streamer deployment.
08:30	MO	Deploy the gun strings.
21:20	MO	In recording mode to test the new systems.
21:50	MO	Run in to the first production line.

March 11th 2007

Start	Category	Comment
00:00	MO	Run in to the first production line.
00:33	MO	Recording line GAP07A1008P002 but rejected and marked as Do not process due to incorrect settings in Trinav after upgrade in dry dock.
01:40	MO	Test line to check settings in Trinav after dry dock upgrade.
02:30	MO	Test line to check settings in Trinav after dry dock upgrade.
03:30	MO	Test line to check settings in Trinav after dry dock upgrade.
04:30	MO	Test line to check settings in Trinav after dry dock upgrade.
07:35	MO	Test line to check settings in Trinav after dry dock upgrade.
12:04	SB	Recording line GAP07A1008A008 but terminated and marked as Do not process

		due to the weather conditions causing erratic steering and poor streamer control.
13:20	SB	Circle due to weather causing erratic steering and poor streamer control.

March 12th 2007

Start	Category	Comment
00:00	SB	Circle due to weather causing erratic steering and poor streamer control.
04:06	SB	Recording line GAP07A1008B009. Original line was rejected due to weather.
06:15	SB	Nominal line change.
08:45	SB	Extended line change due to the weather conditions.
10:04	SB	Recording line GAP07A1296P010.
13:01	SB	Line change.
15:29	SB	Recording line GAP07A1024P011.
18:16	SB	Line change.
20:07	SB	Recording line GAP07A1312P012.
23:18	SB	Line change.

March 13th 2007

Start	Category	Comment
00:00	SB	Line change.
02:10	SB	Recording line GAP07A1040P013.
05:27	SB	Line change.
06:57	SB	Recording line GAP07A1328P014.
09:58	SB	Line change.
12:27	SB	Recording line GAP07A1056P015. Line terminated early due to an air leak on array #4.
13:54	DT	Circle due to an air leak on gun array #4. Hole in air line near cluster #2.
17:04	DT	Start of line GAP07A1344P016. Recording delayed due to a problem with the recording system.
17:46	SB	Recording line GAP07A1344P016. FGSP 1455 due to problem with the recording system.
21:05	SB	Line change.
22:59	SB	Recording line GAP07A1072P017. In progress at midnight.

March 14th 2007

Start	Category	Comment
00:00	SB	Recording line GAP07A1072P017.
02:13	SB	Line change.
03:56	SB	Recording line GAP07A1360P018. Line terminated early due to a MSX system hang-up.
05:36	DT	Circle due to a MSX recording system hang-up.
09:25	SB	Recording line GAP07A1088P019. Streamer #8 not used during this line due to fault finding for an intermittent bird line dropout problem.
12:39	SB	Line change.
13:46	DT	Downtime adjustment to compensate for shooting with 7 streamers. Workboat changing out section 3B and fault finding the intermittent bird line dropout fault.
14:23	SB	Recording line GAP07A1376P020. Streamer #8 not used during this line due to fault finding for an intermittent bird line dropout problem.

19:26	SB	Line change.
20:05	DT	Downtime adjustment to compensate for shooting with 7 streamers. Workboat fault finding the intermittent bird line dropout fault.
20:54	SB	Recording line GAP07A1104P021.
23:19	SB	Line change.

March 15th 2007

Start	Category	Comment
00:00	SB	Line change.
01:21	SB	Recording line GAP07A1392P022.
04:50	SB	Line change.
07:52	SB	Recording line GAP07A1120P023.
10:46	SB	Line change.
12:28	SB	Recording line GAP07A1408P024.
15:45	SB	Line change.
17:58	SB	Recording on the run in to line GAP07A1136P025 but terminated and scrapped due to whale activity within the 3Km restriction zone.
19:04	SB	Recording line GAP07A1136P025. Line started late due to whale activity. FGSP 1899.
20:52	SB	Line change.
22:18	SB	Recording on the run in to line GAP07A1424P026. SP's 934-1193 recorded.
22:56	SB	Recording line GAP07A1424P026.

March 16th 2007

Start	Category	Comment
00:00	SB	Recording line GAP07A1424P026.
03:33	SB	Line change.
04:10	SB	Recording on the run in to line GAP07A1152P027. SP's 2482-2203 recorded.
04:52	SB	Recording line GAP07A1152027.
07:56	SB	Line change.
09:32	SB	Recording line GAP07A1440P028.
12:50	SB	Line change.
14:20	DT	Downtime adjustment to compensate for shooting with 7 streamers. Unable to control monowing #1 which resulted in low separation between streamers 1 & 2 (60m).
14:52	SB	Recording on the run in to line GAP07A1168P029. SP's 2484-2225 recorded.
15:27	SB	Recording line GAP07A1168P029.
18:46	SB	Line change.
19:52	SB	Recording on the run in to line GAP07A1456P030. SP's 965-1194 recorded.
20:28	SB	Recording line GAP07A1456P030. In progress at midnight.

March 17th 2007

Start	Category	Comment
00:00	SB	Recording line GAP07A1456P030.
00:49	SB	Line change.
02:02	SB	Recording on the run in to line GAP07A1184P031. SP's 2507-2248 recorded.

02:44	SB	Recording line GAP07A1184P031.
06:13	SB	Line change.
07:18	SB	Recording on the run in to line GAP07A1472P032. SP's 935-1194 recorded.
07:51	SB	Recording line GAP07A1472P032.
11:09	SB	Line change.
13:52	SB	Recording on the run in to line GAP07A1200P033. SP's 2529-2270 recorded.
14:34	SB	Recording line GAP07A1200P033.
17:58	SB	Line change.
19:18	SB	Recording on the run in to line GAP07A1488P034. SP's 965-1194 recorded.
19:41	SB	Recording line GAP07A1488P034. In progress at midnight.

March 18th 2007

Start	Category	Comment
00:00	SB	Recording line GAP07A1488P034.
00:54	SB	Line change.
01:54	SB	Recording on the run in to line GAP07A1216P035. SP's 2532-2293 recorded.
02:27	SB	Recording line GAP07A1216P035.
05:48	SB	Line change.
06:51	SB	Recording on the run in to line GAP07A1504P036. SP's 965-1194 recorded.
07:20	SB	Recording line GAP07A1504P036.
10:47	SB	Line change.
13:59	SB	Recording line GAP07A1232P037.
16:30	SB	Line change.
18:13	SB	Recording on the run in to line GAP07A1520P038. SP's 965-1194 recorded.
18:42	SB	Recording line GAP07A1520P038.
22:21	SB	Line change.

March 19th 2007

Start	Category	Comment
00:00	SB	Line change.
00:51	SB	Recording line GAP07A1248P039.
04:09	SB	Line change.
05:36	DT	Recording line GAP07A1536P040 but terminated and marked as Do Not Process due to navigation instrument crash.
08:45	DT	Recording re-shoot portion of line GAP07A1376A041 which was due to a MSX system hang-up.
09:30	DT	Line change after re-shoot due to a MSX system hang-up.
10:40	SB	Recording on the run in to line GAP07A1136A042. SP's 2410-2181 recorded.
11:08	SB	Recording line GAP07A1136A042.
11:42	SB	Line change after re-shoot portion of line GAP07A1136A042 due to whale activity.
12:44	SB	Recording line GAP07A1056A043. Original line was terminated early due to an air leak.
14:29	SB	Line change.
15:41	SB	Recording line GAP07A1536A044. The first attempt at this line (seq40)was

		scratched due to a Trinav instruments hang-up.
19:29	SB	Line change.
21:08	SB	Recording line GAP07A1264P045.
23:56	SB	Line change.

March 20th 2007

Start	Category	Comment
00:00	SB	Line change.
01:25	SB	Recording on the run in to line GAP07A1552P046. SP's 966-1195 recorded.
01:56	SB	Recording line GAP07A1552P046.
05:13	SB	Line change.
07:44	SB	Recording on the run in to line GAP07A1280P047. SP's 2571-2382 recorded.
08:10	SB	Recording line GAP07A1280P047.
10:51	SB	Line change.
13:17	SB	Recording line GAP07A1568P048.
16:39	SB	Line change.
19:41	SB	Recording on the run in to line GAP07A1088A049. SP's 2342-2113 recorded.
20:11	SB	Recording re-shoot portion of line GAP07A1088A049. Streamer #8 was edited out of the coverage in seq 19 because of compass & acoustic data drop outs caused by a faulty tailbuoy STIC cable. The prime segment of this re-shoot is to make up the 2 cmp km not charged in seq 19. The speed for this segment is incorrect.
20:43	DT	Adjustment to allow for the 2 cmp lines not recorded during sequence 19 due to a streamer problem. SP's 1189-1083 were recorded.
22:18	DT	Line change after a re-shoot due to a streamer problem.

March 21st 2007

Start	Category	Comment
00:00	DT	Line change after a re-shoot due to a streamer problem.
00:31	SB	Recording on the run in to line GAP07A1584P050. SP's 966-1195 recorded.
01:02	SB	Recording line GAP07A1584P050.
04:51	SB	Line change.
07:21	SB	Recording on the run in to line GAP07A1024A051. SP's 2253-2024 recorded.
07:54	DT	Reshoot of seq 11 which has already been charged in full. Streamer #8 was edited out for all of seq 11 due to bad compass & acoustic data caused by a faulty STIC cable.
09:54	DT	Line change after re-shoot of seq 11 which had streamer #8 edited out due to bad compass & acoustic data caused by a faulty STIC cable.
12:24	DT	Recording line GAP07A1376B052 which is a re-shoot of sequence 20 for Seisnet recording hang up this was previously charged in seq 20. SP's 1194-1698 recorded.
13:36	SB	Recording infill line GAP07A1376B052.
15:39	SB	Line change following infill.
17:54	SB	Recording line GAP07A1008A053 which is a re-shoot of sequence 9 due to weather, & Seisnet problems. Sequence 9 was previously charged.
20:08	DT	Recording line GAP07A1008A053 which is a re-shoot of sequence 9 due to

		weather, & Seisnet problems. Sequence 9 was previously charged.
20:59	DT	Line change after re-shoot for Streamer 8 compass data drop out.
22:22	SB	Recording on the run in to line GAP07A1360A054. SP's 964-1193 recorded.
22:52	SB	Recording line GAP07A1360A054. This segment is recorded as part of line GAP07A1360A054 but is actually a re-shoot of seq 16 (line 1344).
23:24	DT	Recording line GAP07A1360A054. This segment is a re-shoot of sequence 18 which has previously been charged.

March 22nd 2007

Start	Category	Comment
00:00	DT	Recording line GAP07A1360A054. This segment is a re-shoot of sequence 18 which has previously been charged.
00:24	SB	Recording line GAP07A1360A054.
01:38	SB	Recording in the turn after line GAP07A1360A054. Sp's 2601-2775 recorded.
02:17	SB	Line change.
04:48	SB	Recording on the run in to infill line GAP07A1280J055. SP's 2571-2382 recorded.
05:12	SB	Recording infill line GAP07A1280J055.
08:10	SB	Line change.
11:13	SB	Recording infill line GAP07A1424J056.
14:49	SB	Line change.
16:53	DT	Adjustment in lieu of a re-shoot for 2 cmps in seq 28. Control to monowing #1 was lost resulting in low separation between streamers 1 & 2 during seq 28.
17:41	SB	Recording on the run in to line GAP07A1600P057. SP's 1924-1695 recorded.
18:10	SB	Recording line GAP07A1600P057.
19:54	SB	Recording in the turn after line GAP07A1600P057. Sp's 893-777 recorded.
20:09	SB	Line change.
21:21	SB	Recording on the run in to line GAP07A1904P058. SP's 773-1002 recorded.
21:49	SB	Recording line GAP07A1904P058.
23:25	SB	Recording in the turn after line GAP07A1904P058. Sp's 1804-2027 recorded.
23:53	SB	Line change.

March 23rd 2007

Start	Category	Comment
00:00	SB	Line change.
00:57	SB	Recording on the run in to line GAP07A1616P059. SP's 1924-1695 recorded.
01:27	SB	Recording line GAP07A1616P059.
03:05	SB	Recording in the turn after line GAP07A1616P059. Sp's 893-638 recorded.
03:39	SB	Line change.
04:56	SB	Recording on the run in to line GAP07A1920P060. SP's 774-1003 recorded.
05:26	SB	Recording line GAP07A1920P060.
07:04	SB	Recording in the turn after line GAP07A1920P060. Sp's 1804-2026 recorded.
07:34	SB	Line change.
08:46	SB	Recording on the run in to line GAP07A1632P061. SP's 1924-1696 recorded.
09:17	SB	Recording line GAP07A1632P061.
11:01	SB	Line change.

13:10	SB	Recording on the run in to line GAP07A1936P062. SP's 774-1004 recorded.
13:34	SB	Recording line GAP07A1936P062.
15:35	SB	Recording in the turn after line GAP07A1936P062. Sp's 1804-2030 recorded.
16:09	SB	Line change.
17:14	SB	Recording on the run in to line GAP07A1648P063. SP's 1925-1696 recorded.
17:42	SB	Recording line GAP07A1648P063.
19:26	SB	Recording in the turn after line GAP07A1648P063. Sp's 893-650 recorded.
19:59	SB	Line change.
20:57	SB	Recording on the run in to line GAP07A1952P064. SP's 774-1003 recorded.
21:26	SB	Recording line GAP07A1952P064.
23:04	SB	Recording in the turn after line GAP07A1952P064. Sp's 1804-2010 recorded.
23:30	SB	Line change.

March 24th 2007

Start	Category	Comment
00:00	SB	Line change.
00:47	SB	Recording on the run in to line GAP07A1664P065. SP's 1925-1696 recorded.
01:19	SB	Recording line GAP07A1664P065.
03:00	SB	Recording in the turn after line GAP07A1664P065. Sp's 894-658 recorded.
03:34	SB	Line change.
04:52	SB	Recording on the run in to line GAP07A1968P066. SP's 774-1003 recorded.
05:23	SB	Recording line GAP07A1968P066.
07:04	SB	Recording in the turn after line GAP07A1968P066. Sp's 1804-2004 recorded.
07:32	SB	Line change.
09:52	SB	Recording on the run in to line GAP07A1680P067 but rejected due to the weather conditions causing loss of streamer control.
10:12	SB	Weather conditions causing loss of streamer control.

March 25th 2007

Start	Category	Comment
00:00	SB	Weather conditions causing loss of streamer control.
03:56	SB	Recording on the run in to line GAP07A1680A068. SP's 1925-1696 recorded.
04:25	SB	Recording line GAP07A1680A068. Original line was scrapped due to weather.
06:04	SB	Recording in the turn after line GAP07A1680A068. Sp's 894-680 recorded.
06:30	SB	Line change.
07:38	SB	Recording on the run in to line GAP07A1984P069. SP's 774-1003 recorded.
08:08	SB	Recording line GAP07A1984P069.
09:47	SB	Recording in the turn after line GAP07A1984P069. Sp's 1804-1980 recorded.
10:11	SB	Line change.
11:23	SB	Recording on the run in to line GAP07A1696P070. SP's 1915-1696 recorded.
11:52	SB	Recording line GAP07A1696P070.
13:34	SB	Recording in the turn after line GAP07A1696P070. Sp's 894-660 recorded.
14:06	SB	Line change.
15:16	SB	Recording on the run in to line GAP07A2000P071. SP's 774-1003 recorded.

15:51	SB	Recording line GAP07A2000P071.
17:39	SB	Recording in the turn after line GAP07A2000P071. Sp's 1804-1990 recorded.
18:04	SB	Line change.
19:05	SB	Recording on the run in to line GAP07A1712P072. SP's 1890-1694 recorded.
19:29	SB	Recording line GAP07A1712P072.
21:10	SB	Recording in the turn after line GAP07A1712P072. Sp's 894-660 recorded.
21:41	SB	Line change.
22:37	SB	Recording on the run in to line GAP07A2016P073. SP's 774-1003 recorded.
23:04	SB	Recording line GAP07A2016P073. In progress at midnight.

March 26th 2007

Start	Category	Comment
00:00	SB	Recording line GAP07A2016P073.
00:40	SB	Recording in the turn after line GAP07A2106P073. Sp's 1804-2025 recorded.
01:06	SB	Line change.
02:10	SB	Recording on the run in to line GAP07A1728P074. SP's 1890-1696 recorded.
02:35	SB	Recording line GAP07A1728P074.
04:15	SB	Recording in the turn after line GAP07A1728P074. Sp's 894-647 recorded.
04:49	SB	Line change.
05:55	SB	Recording on the run in to line GAP07A2032P075. SP's 774-1003 recorded.
06:28	SB	Recording line GAP07A2032P075.
08:16	SB	Recording in the turn after line GAP07A2032P075. Sp's 1804-2016 recorded.
08:47	SB	Line change.
09:54	SB	Recording on the run in to line GAP07A1744P076. SP's 1875-1696 recorded.
10:18	SB	Recording line GAP07A1744P076.
12:02	SB	Recording in the turn after line GAP07A1744P076. Sp's 894-642 recorded.
12:36	SB	Line change.
13:35	SB	Recording on the run in to line GAP07A2048P077. SP's 775-1004 recorded.
14:06	SB	Recording line GAP07A2048P077.
15:54	SB	Recording in the turn after line GAP07A2048P077. Sp's 1804-2016 recorded.
16:22	SB	Line change.
17:16	SB	Recording on the run in to line GAP07A1760P078. SP's 1875-1696 recorded.
17:38	SB	Recording line GAP07A1760P078.
19:14	SB	Recording in the turn after line GAP07A1760P078. Sp's 894-660 recorded.
19:43	SB	Line change.
20:50	SB	Recording on the run in to line GAP07A2064P079. SP's 775-1004 recorded.
21:20	SB	Recording line GAP07A2064P079.
23:03	SB	Recording in the turn after line GAP07A2064P079. Sp's 1804-2010 recorded.
23:31	SB	Line change.

March 27th 2007

Start	Category	Comment
00:00	SB	Line change.
00:45	SB	Recording on the run in to line GAP07A1776P080. SP's 1820-1696 recorded.

01:01	SB	Recording line GAP07A1776P080.
02:43	SB	Recording in the turn after line GAP07A1776P080. Sp's 894-705 recorded.
03:07	SB	Line change.
04:51	SB	Recording on the run in to line GAP07A2080P081. SP's 751-980 recorded.
05:23	SB	Recording line GAP07A2080P081.
07:12	SB	Recording in the turn after line GAP07A2080P081. Sp's 1804-2032 recorded.
07:43	SB	Line change.
08:45	SB	Recording on the run in to line GAP07A1792P082. SP's 1895-1696 recorded.
09:10	SB	Recording line GAP07A1792P082.
10:49	SB	Line change.
12:36	SB	Recording on the run in to line GAP07A2096P083. SP's 846-1075 recorded.
13:04	SB	Recording line GAP07A2096P083.
14:34	SB	Recording in the turn after line GAP07A2096P083. Sp's 1805-1990 recorded.
14:58	SB	Line change.
16:00	SB	Recording on the run in to line GAP07A1808P084. SP's 1875-1696 recorded.
16:23	SB	Recording line GAP07A1808P084.
18:00	SB	Recording in the turn after line GAP07A1808P084. Sp's 895-668 recorded.
18:32	SB	Line change.
19:52	SB	Recording on the run in to line GAP07A2112P085. SP's 942-1171 recorded.
20:29	SB	Recording line GAP07A2112P085.
22:07	SB	Recording in the turn after line GAP07A2112P085. Sp's 1805-1970 recorded.
22:32	SB	Line change.
23:47	SB	Recording on the run in to line GAP07A1824P086. SP's 1875-1781 recorded. In progress at midnight.

March 28th 2007

Start	Category	Comment
00:00	SB	Recording on the run in to line GAP07A1824P086. SP's 1780-1696 recorded.
00:11	SB	Recording line GAP07A1824P086.
01:56	SB	Recording in the turn after line GAP07A1824P086. Sp's 895-663 recorded.
02:28	SB	Line change.
03:48	SB	Recording on the run in to line GAP07A2128P087. SP's 1037-1266 recorded.
04:20	SB	Recording line GAP07A2128P087.
05:31	SB	Recording in the turn after line GAP07A2128P087. Sp's 1805-1985 recorded.
05:56	SB	Line change.
07:02	SB	Recording on the run in to line GAP07A1840P088. SP's 1867-1696 recorded.
07:23	SB	Recording line GAP07A1840P088.
09:00	SB	Line change.
11:27	SB	Recording on the run in to line GAP07A2144P089. SP's 1133-1362 recorded.
11:55	SB	Recording line GAP07A2144P089.
12:48	SB	Recording in the turn after line GAP07A2144P089. Sp's 1805-2000 recorded.
13:15	SB	Line change.
14:24	SB	Recording on the run in to line GAP07A1856P090. SP's 1876-1697 recorded.

14:50	SB	Recording line GAP07A1856P090.
16:31	SB	Recording in the turn after line GAP07A1856P090. Sp's 895-630 recorded.
17:09	SB	Line change.
19:03	SB	Recording on the run in to line GAP07A2160P091. SP's 1228-1457 recorded.
19:37	SB	Recording line GAP07A2160P091.
20:26	SB	Recording in the turn after line GAP07A2160P091. Sp's 1805-2010 recorded.
20:56	SB	Line change.
22:03	SB	Recording on the run in to line GAP07A1872P092. SP's 1876-1697 recorded.
22:25	SB	Recording line GAP07A1872P092. In progress at midnight.

March 29th 2007

Start	Category	Comment
00:00	SB	Recording line GAP07A1872P092.
00:10	SB	Recording in the turn after line GAP07A1872P092. Sp's 895-600 recorded.
00:48	SB	Line change.
02:25	SB	Recording on the run in to line GAP07A2176P093. SP's 1326-1552 recorded.
02:52	SB	Recording line GAP07A2176P093.
03:23	SB	Recording in the turn after line GAP07A2176P093. Sp's 1805-2009 recorded.
03:50	SB	Line change.
04:55	SB	Recording on the run in to line GAP07A1888P094. SP's 1896-1697 recorded.
05:26	SB	Recording line GAP07A1888P094.
07:09	SB	Line change.
10:31	SB	Recording on the run in to line GAP07A2048J095. SP's 775-1004 recorded.
10:59	SB	Recording infill line GAP07A2048J095.
12:35	SB	Line change.
14:43	SB	Recording infill line GAP07A1728J096.
16:32	SB	Line change.
18:16	SB	Recording on the run in to line GAP07A2000J097. SP's 774-1003 recorded.
18:47	SB	Recording infill line GAP07A2000J097.
20:16	SB	Line change.
22:13	SB	Recording on the run in to line GAP07A1680J098. SP's 1885-1696 recorded.
22:40	SB	Recording infill line GAP07A1680J098.

March 30th 2007

Start	Category	Comment
00:00	SB	Recording infill line GAP07A1680J098.
00:24	SB	Line change.
02:20	SB	Recording line GAP07A1936J099 but terminated and marked as Do not process due to the weather conditions causing poor streamer control.
02:50	SB	Downtime due to the weather conditions causing poor streamer control.

March 31st 2007

Start	Category	Comment
00:00	SB	Downtime due to the weather conditions causing poor streamer control.
16:28	SB	Recording on the run in to line GAP07A1760J100. SP's 1875-1696 recorded.

16:53	SB	Recording infill line GAP07A1760J100.
18:41	SB	Recording in the turn after line GAP07A1760J100. Sp's 894-830 recorded.
18:49	SB	Line change.
20:31	DT	Recording on the run in to line GAP07A2048A101. SP's 775-1004 recorded. Reshoot of sequence 95 which was scratched due to a Trinav GPS crash. This sequence has been charged previously.
21:01	DT	Recording line GAP07A2048A101. Reshoot of sequence 95 which was scratched due to a Trinav GPS crash. This sequence has been charged previously.
22:39	DT	Recording in the turn after line GAP07A2048A101. Sp's 1804-2105 recorded. Reshoot of sequence 95 which was scratched due to a Trinav GPS crash. This sequence has been charged previously.
23:19	DT	Line change after the reshoot of sequence 95 which was due to a Trinav GPS crash.

April 1st 2007

Start	Category	Comment
00:00	DT	Line change after the reshoot of sequence 95 which was due to a Trinav GPS crash.
00:37	SB	Recording on the run in to line GAP07A1616J102. SP's 1894-1695 recorded.
01:03	SB	Recording infill line GAP07A1616J102.
02:42	SB	Line change.
04:31	SB	Recording on the run in to line GAP07A1936J103. SP's 774-1003 recorded.
05:00	SB	Recording infill line GAP07A1936J103.
06:38	SB	Recording in the turn after line GAP07A1936J103. Sp's 1804-2070 recorded.
07:12	SB	Line change.
08:29	SB	Recording on the run in to line GAP07A1600J104. SP's 1924-1695 recorded.
08:58	SB	Recording infill line GAP07A1600J104.
10:36	SB	Recording in the turn after line GAP07A1600J104. Sp's 893-810 recorded.
10:47	SB	Line change.
12:47	SB	Extended line change for helicopter crew change.
13:35	SB	Recording on the run in to line GAP07A2128J105. SP's 1037-1266 recorded.
14:04	SB	Recording infill line GAP07A2128J105.
15:10	SB	Recording in the turn after line GAP07A2128J105. Sp's 1805-1970 recorded.
15:33	SB	Line change.
16:59	SB	Recording on the run in to line GAP07A1872J106. SP's 1876-1697 recorded.
17:23	SB	Recording infill line GAP07A1872J106.
19:06	SB	Line change.
22:37	SB	Recording infill line GAP07A1904J107.

April 2nd 2007

Start	Category	Comment
00:00	SB	Recording infill line GAP07A1904J107.
00:06	SB	Recording in the turn after line GAP07A1904J107. Sp's 1804-1935 recorded.
00:24	SB	Line change.
03:40	SB	Recording infill line GAP07A1312J108.
04:48	SB	Line change.

07:06	SB	Recording infill line GAP07A1056J109.
09:12	SB	Line change.
11:42	SB	Recording infill line GAP07A1424K110.
14:47	SB	Line change.
17:28	SB	Recording infill line GAP07A1216J111.
19:40	SB	Line change.
21:53	SB	Recording infill line GAP07A1520J112. In progress at midnight.

April 3rd 2007

Start	Category	Comment
00:00	SB	Recording infill line GAP07A1520J112.
01:29	SB	Line change.
03:39	SB	Recording infill line GAP07A1264J113.
06:22	SB	Line change.
08:22	SB	Recording infill line GAP07A1488J114.
11:01	DT	1st part of technical downtime adjustment to compensate for slow shooting speed.
13:54	SB	Recording infill line GAP07A1088J115.
15:47	DT	2nd part of technical downtime adjustment to compensate for slow shooting speed.
17:50	SB	Recording infill line GAP07A1376J116.
18:43	DT	Recording infill line GAP07A1376J116. This line combines infill with reshoots of sequences 16 & 22. SP's 1624-1655 Sequence 22 due to MSX problem. SP's 1992-2013 Sequence 16 due to MSX problem.
19:36	DT	3rd part of technical downtime adjustment to compensate for slow shooting speed.
21:40	SB	Line change.
22:00	SB	Recording infill line GAP07A1808J117.
23:38	SB	Line change.

April 4th 2007

Start	Category	Comment
00:00	SB	Line change.
01:49	SB	Recording infill line GAP07A2096J118.
03:25	SB	Line change.
05:43	SB	Recording infill line GAP07A1712J119.
07:13	SB	Line change.
09:46	SB	Recording infill line GAP07A2160J120.
10:31	SB	Line change.
12:54	SB	Recording infill line GAP07A1648J121. Terminated early due to whale activity.
13:09	SB	Downtime due to whale activity within the 3km restriction zone.

7 MEASUREMENTS

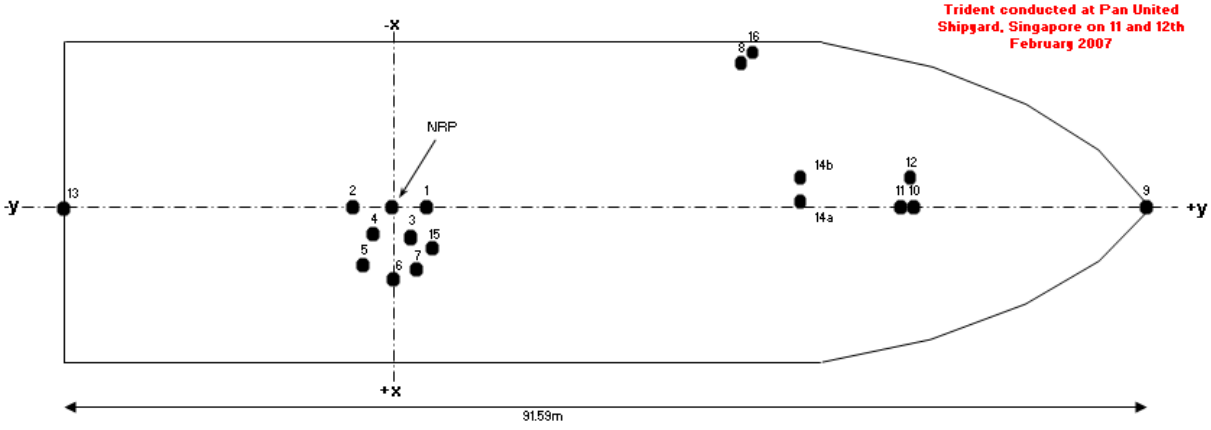
7.1 GPS ANTENNA POSITION

Antenna Offsets

Loc	Antenna/function	Y(m)	X(m)	Z(m)	Rx Type	Antenna	SYSTEM
		Along	Across	Above			
NRP	Reference Point	0.00	0.00	24.39			
1	TRINAV GPS	0.48	0.00	24.50	Novatel dual frequency		TRINAV GPS 2.6
2	POSNET-1	-0.53	0.00	24.51	Trimble 4000 DS		WesternGeco Posnet Version 1.81, RTCM via CNAV RTG
3	Veripos FWD	0.20	0.31	24.58	Topcon		Veripos Spotbeam
4	Veripos AFT	-0.20	0.34	24.51	Topcon		Veripos Imarsat
5	CNAV-1	-0.36	0.69	24.49	CNAV		C & C Technologies CNAV
6	CNAV-2	0.00	1.10	24.54	CNAV		C & C Technologies CNAV
7	Veripos Spotbeam	0.39	0.98	25.00	Spot, L-Band Decoder		Spotbeam RTCM Corrections
8	rtCalib Antenna	17.67	-11.31	22.27	Leica MX9400		TRINAV GPS 2.6
9	Bow Helideck	63.68	0.00	10.28	For X,Y Only		Bow Helideck
10	ECHO. 18 kHz	46.88	0.23	-7.93	Echosounder		Simrad EA500.
11	ECHO. 200 kHz	46.28	0.25	-7.93	Echosounder		Simrad EA500.
12	ECHO, 38 kHz	46.89	-0.85	-7.94	Echosounder		Simrad EA500.
13	STERN Stmr deck	-27.91	0.00	13.32	For X,Y Only		Stern Helideck
14a	ADCP Stbd	28.71	-0.26	-7.91	RDI		Current Meter
14b	ADCP Port	28.71	-0.58	-7.91	RDI		Current Meter
15	Water Speed Log	0.39	0.45	-7.64	S80		Speed Log
16	Mid ship TF load line	17.98	-11.48	0.00	Datum Value for Z=0 only		Z=0 vertical ref point at Tropical Fresh Water Load Line

Positive heights are above the Tropical Fresh Water load line.

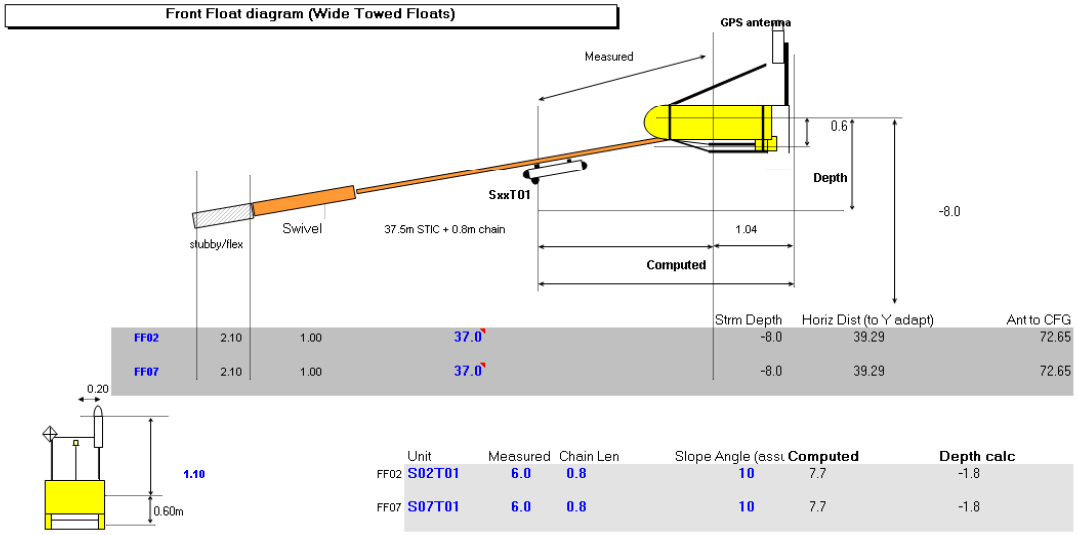
Data from Vessel Offset Measurement results for MV Trident conducted at Pan United Shipyard, Singapore on 11 and 12th February 2007



WesternGeco	Client: Apache Energy Limited	Date from	01-Mar-07
	Area: Gippsland Basin - Marie 3D	to	16-Mar-07
	Job # 9605	to	032

All dimensions in metres. Not to Scale.

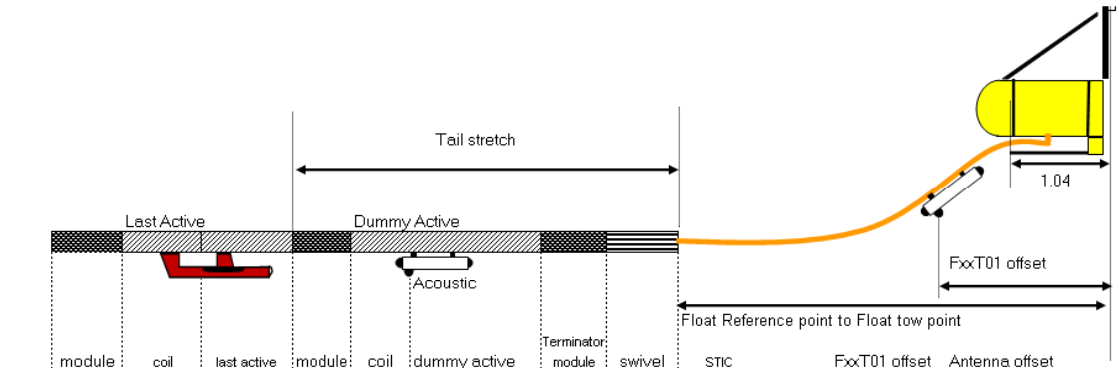
7.2 OFFSET DIAGRAM & TOWING DIMENSIONS



					Strm Depth	Horiz Dist (to Y adept)	Ant to CFG
FF02	2.10	1.00	37.0		-8.0	39.29	72.65
FF07	2.10	1.00	37.0		-8.0	39.29	72.65

	Unit	Measured	Chain Len	Slope Angle (assu	Computed	Depth calc
FF02	S02T01	6.0	0.8	10	7.7	-1.8
FF07	S07T01	6.0	0.8	10	7.7	-1.8

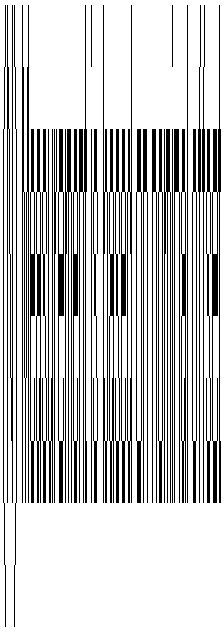
Client:	**Apache Energy Limited**
Area:	**Gippsland Basin - Marie 3D**
Vessel:	**Western Trident**
Job #	**9605**
Date from	01-Mar-07
to	16-Mar-07
Seq. from	001
to	032
EnteredBy:	
Checked By :	



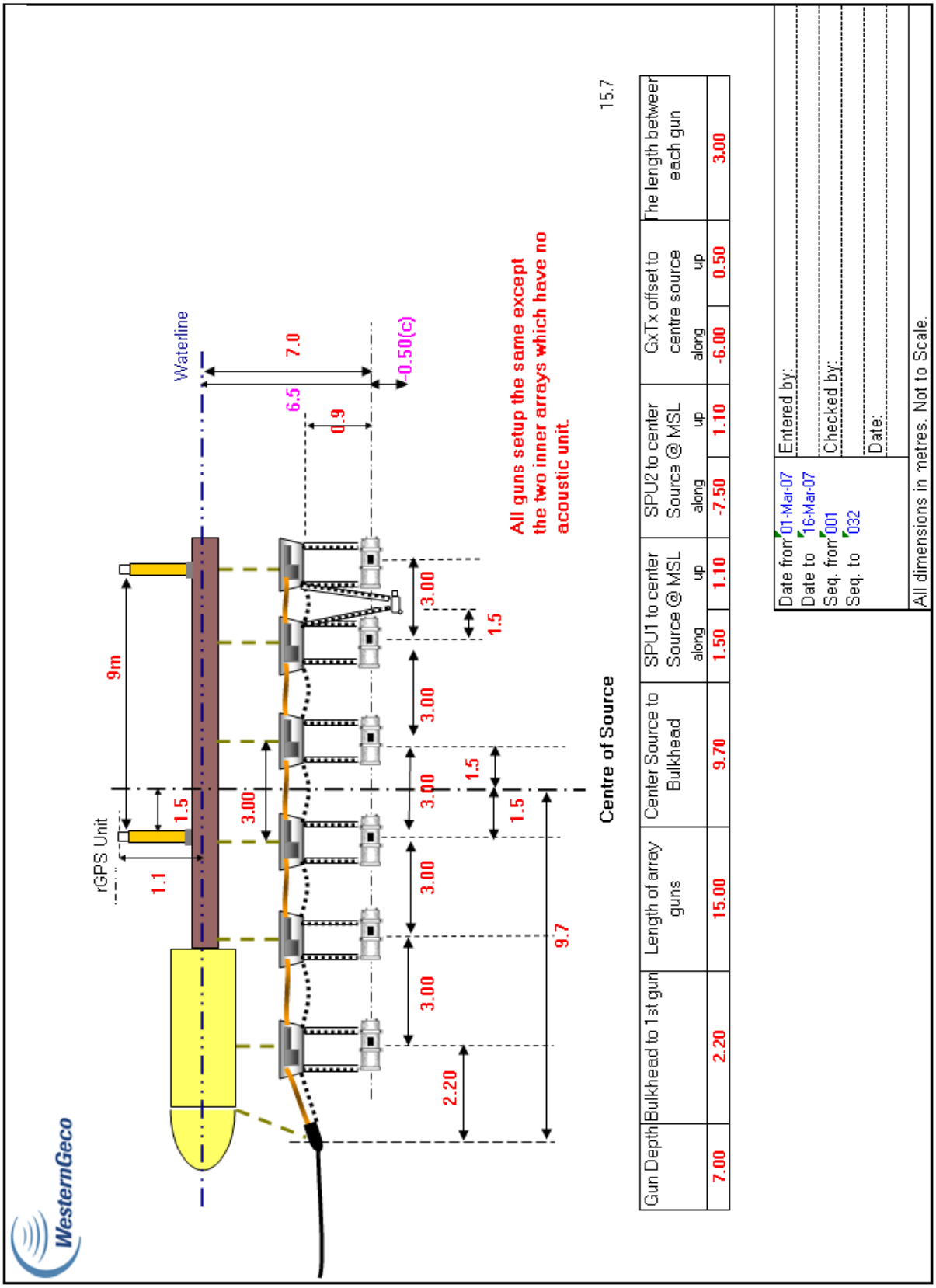
	module	coil	last active	module	coil	dummy active	Terminator module	swivel	STIC	FxxT01 offset	Antenna offset
1	0.31	-24.25	99.49	0.31	-24.25	99.49	0.31	1.00	71.00	8.6	1.04
2	0.31	-24.25	99.49	0.31	-24.25	99.49	0.31	1.00	76.00	8.6	1.04
3	0.31	-24.25	99.49	0.31	-24.25	99.49	0.31	1.00	73.00	8.6	1.04
4	0.31	-24.25	99.49	0.31	-24.25	99.49	0.31	1.00	77.00	8.6	1.04
5	0.31	-24.25	99.49	0.31	-24.25	99.49	0.31	1.00	75.00	8.6	1.04
6	0.31	-24.25	99.49	0.31	-24.25	99.49	0.31	1.00	66.00	8.6	1.04
7	0.31	-24.25	99.49	0.31	-24.25	99.49	0.31	1.00	76.00	8.6	1.04
8	0.31	-24.25	99.49	0.31	-24.25	99.49	0.31	1.00	76.00	8.6	1.04

Tail Stretch = 101.11

Client:	**Apache Energy Limited**
Area:	**Gippsland Basin - Marie 3D**
Vessel:	**Western Trident**
Job #	**9605**
Date from	01-Mar-07
to	16-Mar-07
Seq. from	001
to	032
EnteredBy:	
Checked By :	

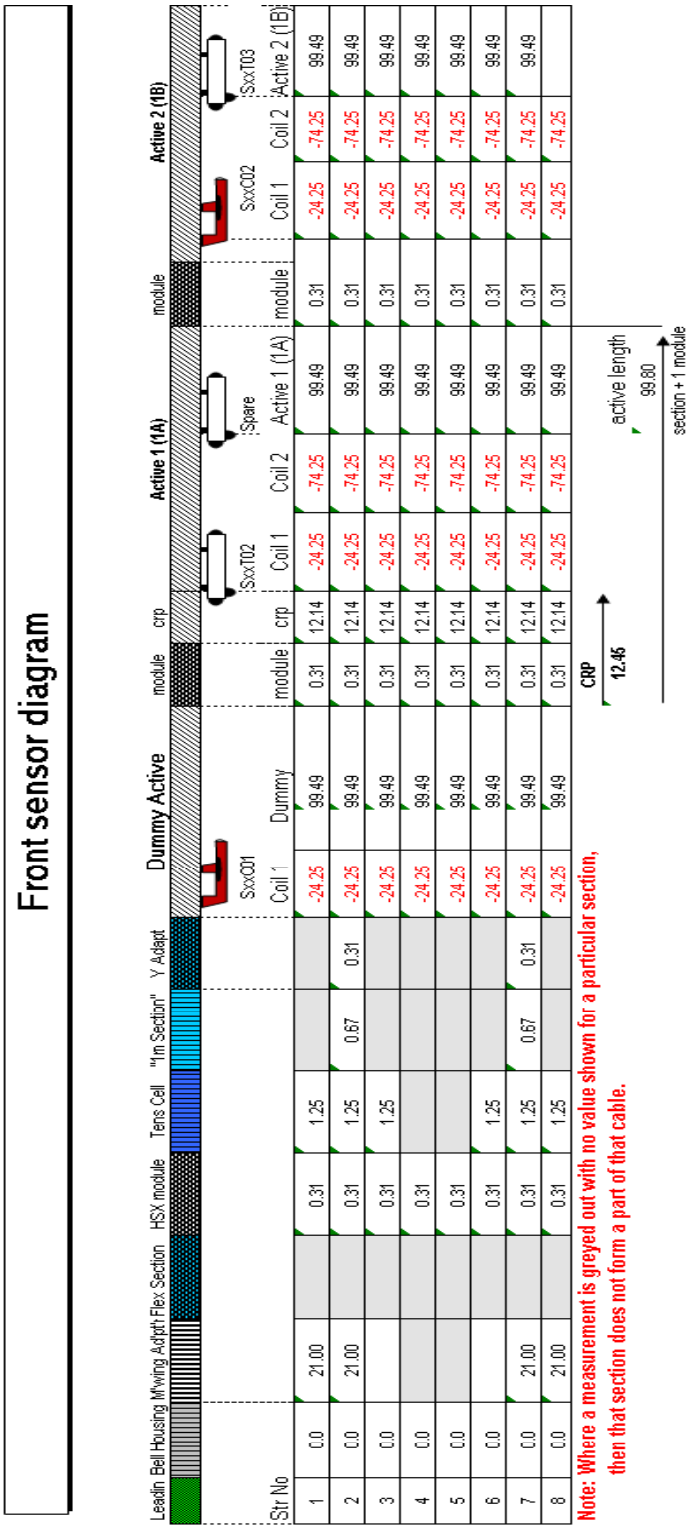


7.3 ARRAY TOWING SYSTEM & CONFIGURATION

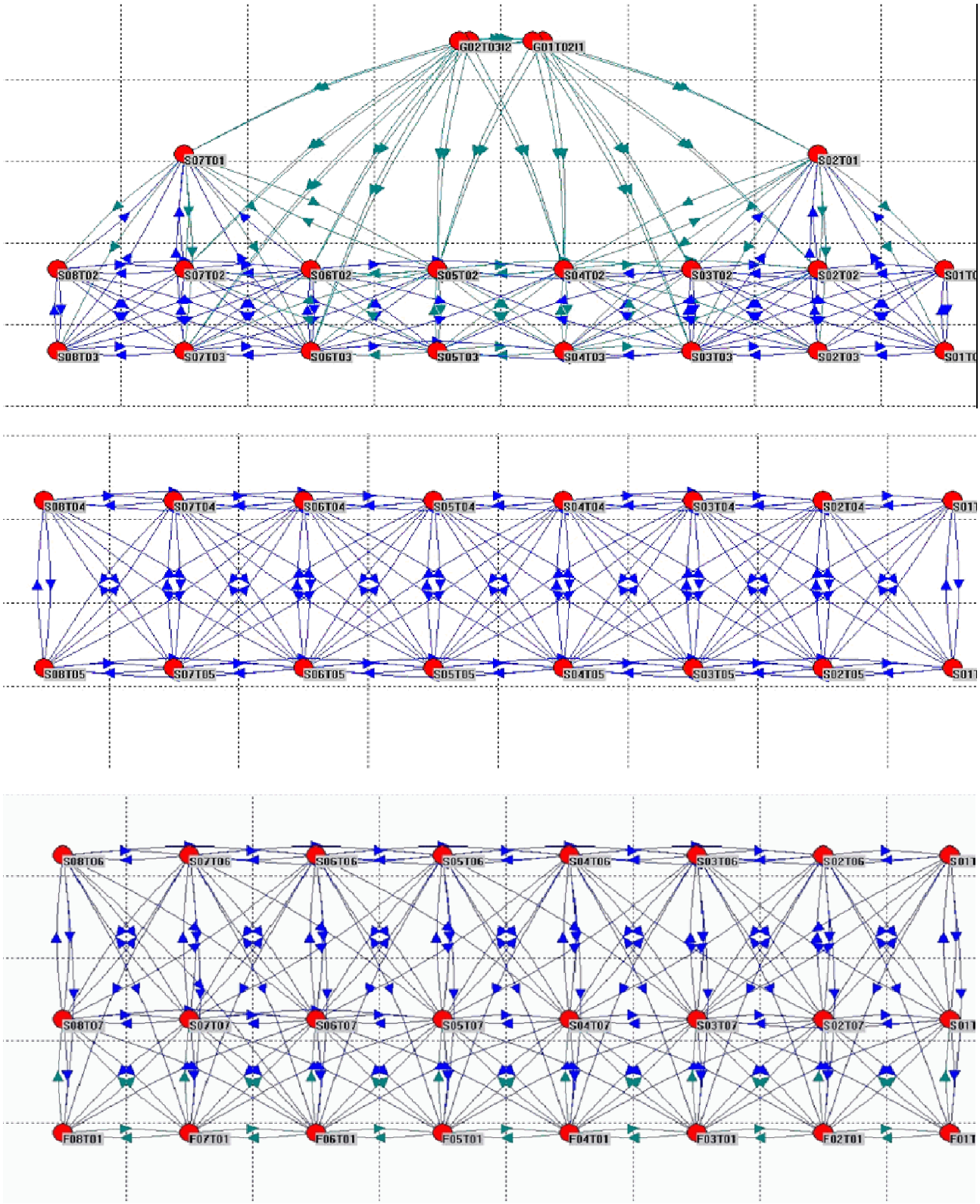


Gun Depth	Bulkhead to 1st gun	Length of array guns	Center Source to Bulkhead	SPU1 to center Source @ MSL along	SPU1 to center Source @ MSL up	SPU2 to center Source @ MSL along	SPU2 to center Source @ MSL up	GxTx offset to centre source along	GxTx offset to centre source up	The length between each gun
7.00	2.20	15.00	9.70	1.50	1.10	-7.50	1.10	-6.00	0.50	3.00

7.4 STREAMER CONFIGURATION DIAGRAM



7.5 ACOUSTIC NETWORK



8 APPENDICES

8.1 WESTERNGECO CONVENTIONS AND TERMINOLOGY

Glossary:

Active : Active streamer section

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

Trilogy : 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

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

TRINAV : Real Time navigation system

OMEGA : Seismic processing system

TRIACQ : Seismic recording system

TRISOR : Digital energy source timing system

TRINAV : Navigation QC system

TIM : Trilogy Information Manager

8.2 LINE AND SHOT POINT NUMBER CONVENTION

Line/Job prefix: GAP07A.

Sail Line Format: Sail line numbers had the format : GAP07Axxxxyyzzz, where:

GAP = Apache survey identifier
07 = Year of acquisition
A = Marie 3D identifier
xxxx = Sail line number
yy = P, Primary, A, Reshoot or J, Infill
zzz = sequence number

Shot Point numbers : Incremented to the North Decremented to the South.

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	: Common map point
SQKMFF	: Square Kilometres Full Fold
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 ECHOSOUNDER CALIBRATION

Echo Sounder Check (In Port)

Vessel:	Western Trident	**Date :**	17/02/2007
Client:	Apache Energy Limited	**Check started (GMT):**	11:33
Job no.	9605	**Check ended (GMT):**	11:37
Location:	Loyang, Singapore	**E/S draught:**	6.76 m
E/S type:	Simrad EA500	**Vertical offset keel to E/S:**	0.00 m
Serial no:	4139	**Bridge E/S reading**	N/A

Observed				
Draught (m)			Lead Line Depth (m)	
Bow	Mid-ships	Stern	Stbd (1)	Port (2)
6.60	7.20	7.80	10.10	10.30
Draught at E/S		**6.76**	LL Depth at E/S	**10.20**

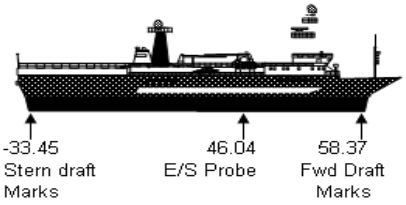
Echo Sounder Readings	
Freq 2 (m) 38	Freq 3 (m) 200kHz
2.04	2.17
2.04	2.17
2.05	2.16
2.06	2.18
2.06	2.18
2.05	**2.17**
-0.50	-0.50
6.76	6.76
9.31	**9.43**

Average =
+ vertical offset keel to E/S transducer
+ draught (keel to sea surface)
Total water depth (m)

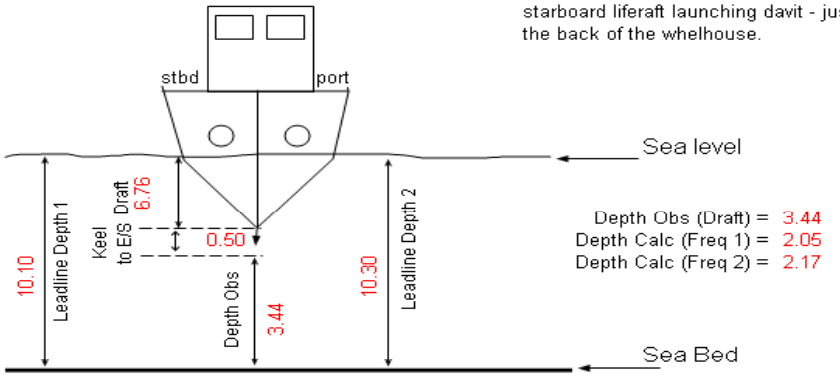
Observed - Echo Sounder = **0.89 m** Freq 2
Observed - Echo Sounder = **0.77 m** Freq 3

*Too Shallow for 18KHz transducer

Sounder Settings Check:	Factory Defaults (from manual)	Check ✓
RangeA	xx.xx	
Absorption coefficient	3 dB/Km	✓
Transmit power	2000 W	✓
Transducer Depth	0.00	✓
Speed of sound	1500 m/s	✓
two way beam angle	-17 dB	✓
Transducer gain	25.01 dB	
Sample distance	0.25	✓



Offsets above are relative to VRP
Echosounder probe is directly below the starboard liferaft launching davit - just behind the back of the whelhouse.



Depth Obs (Draft) = 3.44
Depth Calc (Freq 1) = 2.05
Depth Calc (Freq 2) = 2.17

Method: The echo-sounder was tuned to the first return, without draught correction and speed of sound at 1500metres/second. Echo-sounder data was set to log to computer disc. The mid-ship draught marks of the ship were noted along with time. Measuring stations were established on the weather deck, at the ships bulwark, port and starboard, approximately 1.0 metre forward of the main mast (just aft of the sixth porthole counted aft from forward). A weighted steel tape measure was used to establish the distance to sea level and then to seabed level. The mid-ship draught mark was checked again along with the time. The echo sounder reading was taken as the mean reading between the time of draught observations.

Results and Conclusion: Given the limitations of the methodology, the differences between the measured and calculated depths are acceptable.

8.5 ASSOCIATED FILES ON CD ROM

The accompanying CD-ROM includes this report as well as a number of supporting documents as shown below.

Production Logs
- Enquest Daily Reports
- WesternGeco Party Chief Daily Reports

Observers Logs
- WesternGeco Observers Line Logs
- Data Transmittals

Navigation Logs
- Navigation Daily Logs
- Coverage
- Mapping
- Network
- Offsets
- Positioning
- Processing
- Parameters

Survey Documents

Safety Reports

MMO Reports