

FINAL SURVEY REPORT



CGGVeritas



VESSEL: M/V PACIFIC TITAN

- Marine 2D & High Resolution SEISMIC REFLECTION METHOD ACQUISITION -

LOCATION	:	AUSTRALIA
AREA	:	BASS BASIN - AUSTRALIA
SURVEY	:	T/37P AND T/38P
CLIENT	:	CUE ENERGY RESOURCES LIMITED
DURATION	:	17 th March 2008 - 18 th April 2008
C.G.G.V. SURVEY N°	:	501 11 89 07 06 00 (JOB N°: 6374)
CONTRACT N°	:	859832



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1. Survey Information and Objectives

Cue Energy Resources Ltd has agreed to enter into a service contract for the purpose of acquisition of a marine seismic 2D survey. of approximately 100 km and 120 km respectively from the nearest point of Victoria on the mainland; and 100 km from the north coast of Tasmania.

The survey was located within the block T/37P and T/38P was called the Molson 2D Marine Seismic Survey.

Water depth in the survey area was relative flat. Water depth around 80m over the survey area .

The seismic acquisition was performed by CGGVeritas using the survey vessel Pacific Titan, owned by Swire Pacific Offshore.

Source volume was 3040 cubic inches at a depth of 6 m.

Streamer length 6000 m, towed at a depth of 8 m.

Recording length 6 sec.

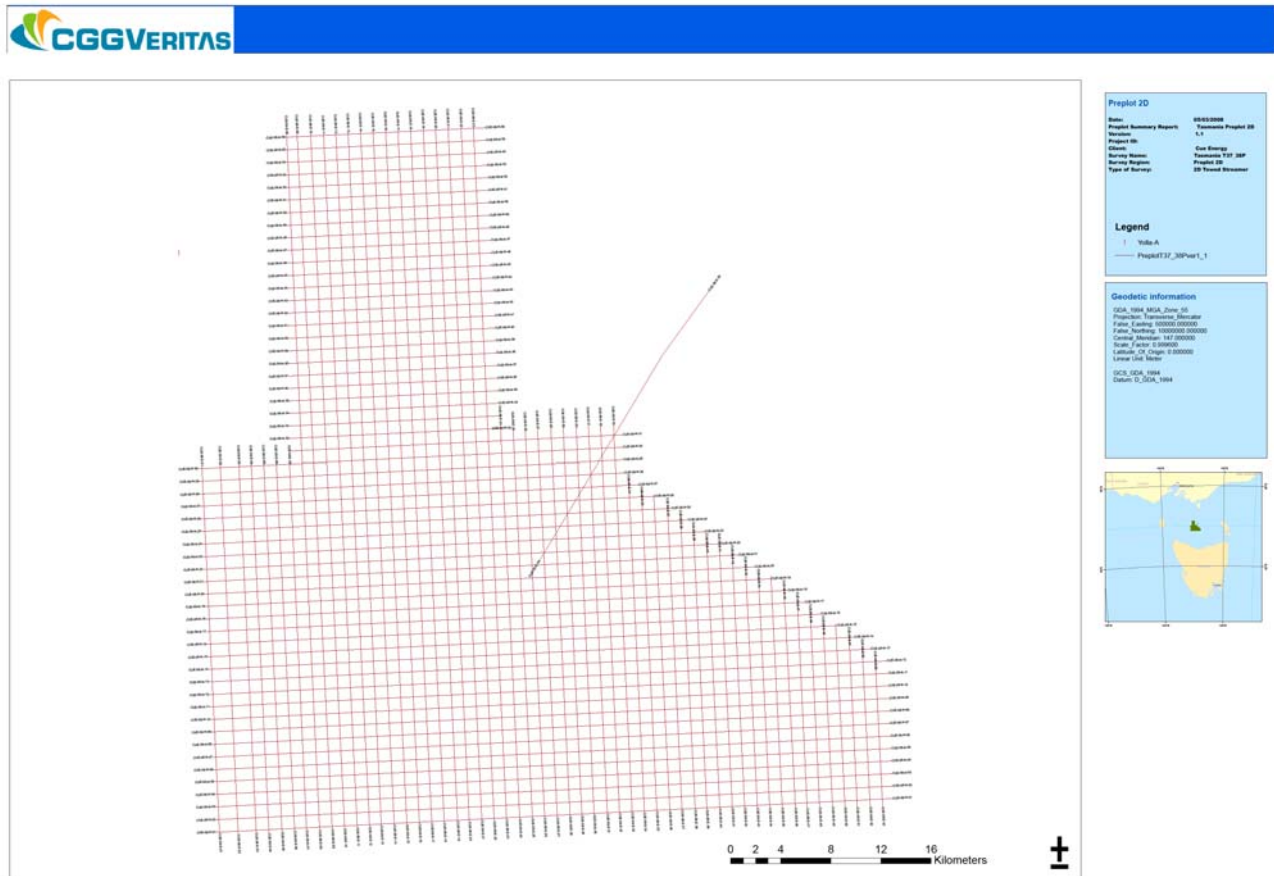
Chargeable production started on the 17th March at 05:17 (16th March at 18:17 GMT) and completed the 18th April at 13:33 (02:33 GMT)

All lines were pre-fixed with VCUE08. A survey sequence number was used as the last 3 characters in the name, unique for each line in the survey. Sequence number started from 001 and field tapes started at 1.

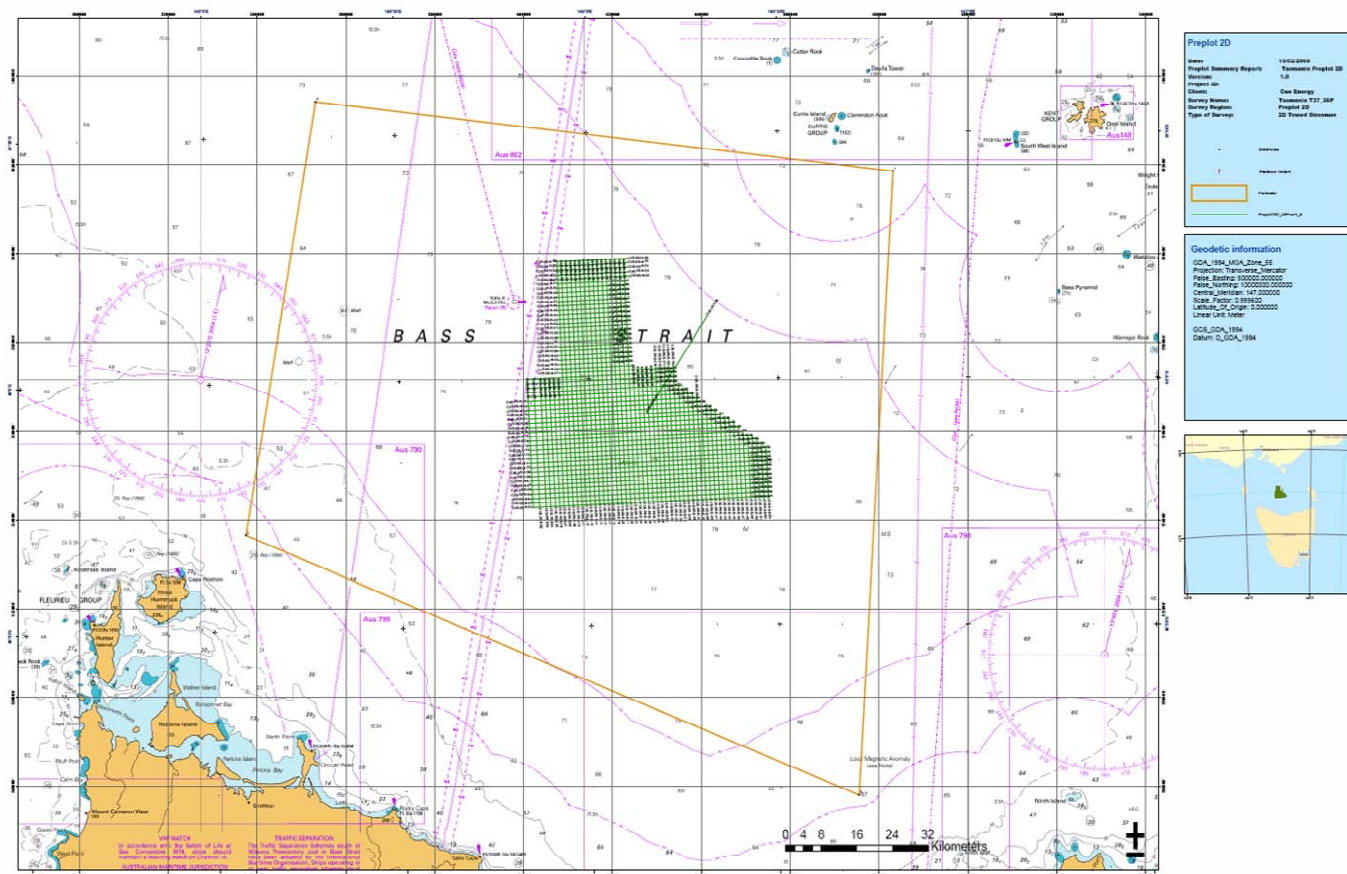
Upon survey completion, Pacific Titan departed the area to transit to the 3D Oil survey just to the East of the prospect.

2. Survey Area

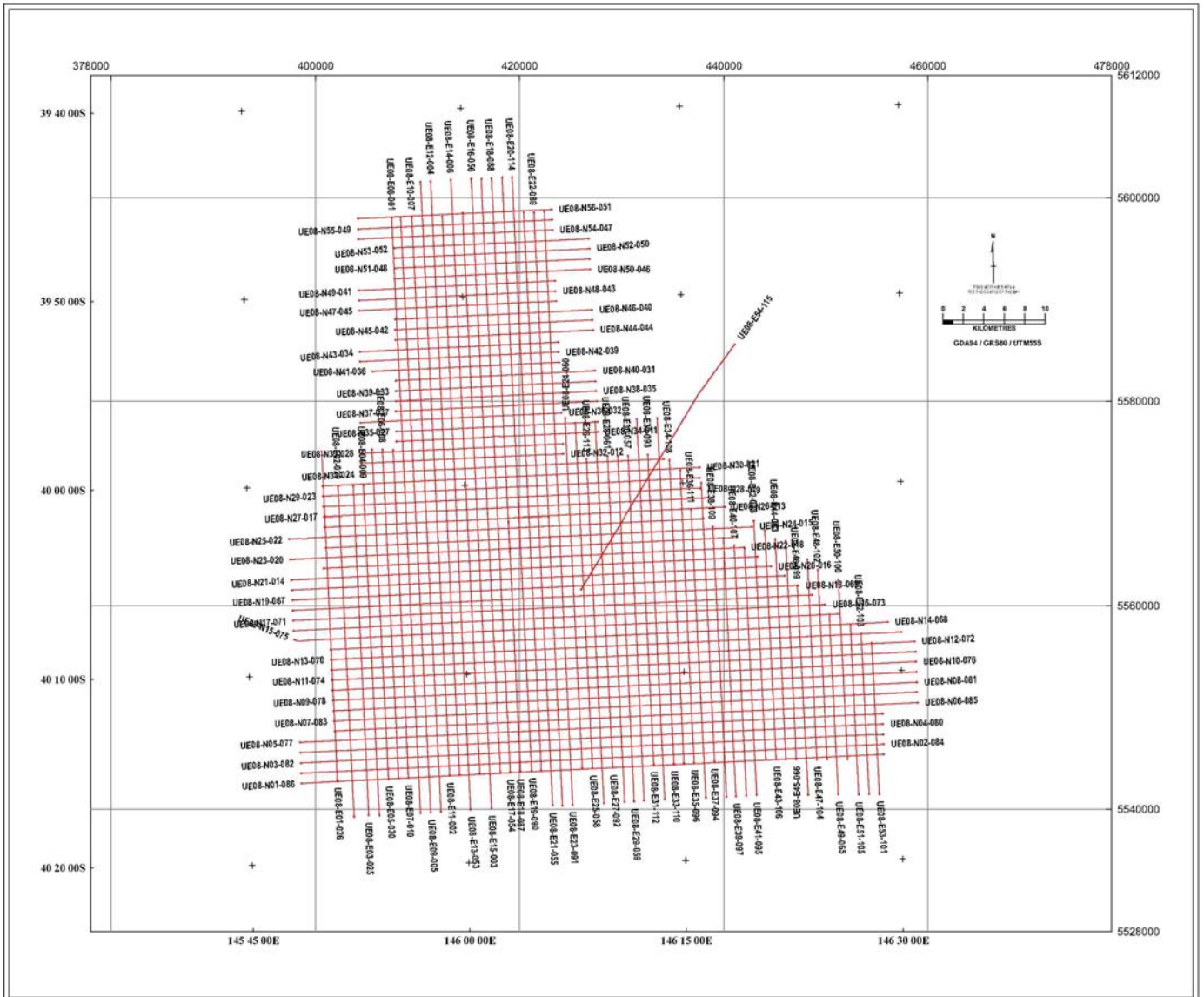
2.1. T/37P and T/38P CUEBASS 2D Preplot



2.2. Survey Map.



2.3. Postplot Map.



3. Contract Work Order

CONTRACT

Client: Cue Energy
Vessel(s): Pacific Titan
Job number: 6734
Bid number:
Client contract number/ref:
Name: 2008 CUEBASS 2D Survey
Area: Bass Strait, -Australia
Type of survey: 2D Towed streamer
Area or total km's: 3660.00
Line heading: Variable
Number of lines: 110
Line Length: Variable
Acquisition method: 2D Single Streamer, Single Source
Estimated start date (yyyy-mm-dd): 23 March 08, 2008
Estimated duration: 30 days

STREAMER

Type of streamer: Sercel Seal, digital streamer, Solid Streamer
Number of streamers: 1
Separation: N/A
Streamer length: 6000 metres.
Number of channels: 480
Group interval: 12.5 metres
Streamer depth and tolerance: 8 metres +/-1 metre
Water depth: 70 to 90 metres

RECORDING

Instrument type: Sercel SealSercel Seal
Record length: 6 seconds.
Sample rate: 2 milliseconds
Recording filter, Hi-cut: 206Hz @ 276dB/Oct
Recording filter, Low-cut: Analog (built in) 3Hz @ 6dB/Oct, Digital Low-Cut:IN(effectively4.7Hz)
Filter type: Butterworth
Pre-amplifier gain: 0dB, (1600mV)
Tape format: SEGD 8058
Recording media: IBM 3590
Tape copy: 2 data sets of Field Tapes to be delivered

SOURCE

Source type:	Bolt Long Life, Tuned array
Source controller:	Seamap Gunlink 2000
Number of sources:	1
Volume per source:	3040 cu in
Source depth and tolerance:	6 metres +/- 1.0 metres
Source pressure and tolerance:	2000 psi +/- 10%
Source length:	15 metres
Number of sub-arrays per source:	3
Sub-array separation:	10 metres
Flip/flop:	N/A
Shot point interval per shot:	25 metres
Shot point location:	
Near fields to be recorded?	Yes
Source firing specifications:	+/- 1.2 milliseconds

4. Vessel Description

4.1. Vessel Specifications – Pacific Titan

M/V Pacific Titan is capable of doing both 2D and 3D seismic data acquisition work. For 2D work the vessel can tow 12 000 meters streamers. For 3D seismic work the vessel can do dual source/dual streamer (2X6000m) operation providing high quality 2D and 3D seismic data for the industry. Features include a SEAL-24 system configurable for multiple streamers. Options include real-time seismic processing, acoustic source positioning, and acoustic streamer positioning and onboard navigation. The following are general specifications for the vessel and seismic equipment on board.



Vessel Information

Description: 6,400 BHP Seismic Survey Vessel
Classification: A1 (E) Seismic Research
AMS ACCU
Built: Japan, 1982,
Conversion later in Seattle
Flag: Singapore
Call Sign: 9V5935
IMO No. : 8208385

Dimensions

Length, overall: 64.5 m
Length BP: 55.2 m
Breadth, moulded: 18.5 m
Depth, moulded: 6.0 m
Summer Draft: 5.18 m
GRT: 3211.0
NRT: 963.0

Machinery

Main engines: 4 x 1,600 BHP, 6Z-ST Total 6,400
BHP Propellers in Kort Nozzles
420 BHP Yanmar 6LAAL-DTN 5
Bow Thruster: tones thrust, CP propeller
Rudders: Trailing Flap
Generator: 3 x 280 kW Yanmar 6LAAL-DTN
Speed: 4 x engines,
Max: 12.0 kts/14 tons/day
Service: 10 kts/10 tons/day
2 x engines: 9.0 kts/9 tons/day

Electronics

Radar: Furuno FR 1505 Mk III ARPA
Secondary Radar: Furuno FR 1510 Mk III
GPS: Furuno GP 30
Echo Sounder: Simrad ED-162 and Simrad EA 600
Communications: G.M.D.S.S. Skanti SSB, VHF,
Inmarsat C 456304540 /
456304550
Weather Fax: Furuno 207
Satcom B: NERA Inmarsat phone/fax
Tel (870) 356 304 510
Vsat: Instrumentroom +47 51 40 76 11
Party Chief +47 51 40 76 12
Chiefs office +47 51 40 76 13
Bridge/Fax +47 51 40 76 14
High Speed data link: NERA Inmarsat system:
Tel (870) 356 304 510

Miscellaneous:

Fire monitoring and detection to all work areas
USCG approved sewage treatment plant.
Incinerator, macerator and compactor.
Six man inflatable Man-overboard boat on quick release
davit
LSA equipment for 45 persons excluding survival suits.
Foam deluge system covering streamer winches, streamer
storage reels and helideck.
P.A. System
Stainless steel gun deck.
Helideck rated for Bell 212 or equivalent with lights.
FRC: 21 feet Nor Power.

4.2. Seismic Particulars

4.2.1. Streamer and Sensors Details

Item	Description	Type	Amount	Remark
Streamer	24 bit, digital distributed electronic	Sercel solid SEAL	Up to 12 km active	64 mm diameter
Depth Control	Digicourse	5011	22	Located every 300 m along the streamer
Buoyancy		Foam		
Retrievers	Concorde	500	7	1 every 900 meters
Streamer skin	Polyurethane	Solid		3.5 mm thickness
Hydrophones	Sercel Radial	Piezoelectric		Sercel 12-element radial
Section Length	150 m			
Section diameter	64 mm			
Lead-in	Sercel	Armoured	350 m.	
Group Length	12.5 m			
No of hydrophones per group	8	Sercel 12 element radial.		790 nF Group capacitance 21.5 V/Bar sensitivity
Max number of channels	2000			12.5 m @ 2ms
Telemetry data link	Dual twisted quartet	AWG 22		
Aux. Data link	4 twisted pair	AWG 22		
Power lines	Dual	AWG 14		
Connectors	28 points	AWG 16		

4.2.2. Recording System Details

Item	Description	Type	Amount	Remark
Acquisition	SEAL V 5.0	Sercel	1	Max 10 000 channels
Format	SEG D Vs1	De-multiplexed		
Recording	IBM via Argus	IBM computer	4	3590 cartridges
Computer	Sun	Blade 2000	2	
Bird Controller		Digicourse	22	
Graphic user I/F	Unix/Seapro	X11 Ultra 5		Sercel
Terminal	Sun	21"	2	
Sampling				1/4, 1/2, 1, 2, 4 ms
Aux channels			36	Max 255
Plotter	24"	Veritas	1	On-line
Printer	A4			Label
Printer	A4			Logs, tests etc.
Network	Ethernet	Twisted pair		Category 5 TCP/IP
Argus Raid	Intel Xeon	Raid drive		Data storage/Backup

4.2.3. Seismic QC Details

Item	Description	Type	Amount	Remark
Online Qc	SEAPRO QC Vs 4.0	Sercel	1	Online seismic QC, fully Integrated with recording system.
Offline Qc	ProMAX	Landmark	1	Brute stacks, etc
Plotter	24"	Veritas	1	
Computer	Supermicro	Dual Xeon 3.2Ghz	1	
Terminals		21"	2	
Graphic user interface	Linux	RedHat		
Remote	X terminal			Sat. link
Network	Ethernet	Twisted pair		Category 5 TCP/IP
Product options		High resolution seismic record display. Pre-filtering of seismic data. Attribute calculation First break picking. Signal to noise ratio. Seismic trace energy. Noise level. Seismic trace frequency analysis. Single trace displays. Attribute db generation		

4.2.4. Navigation Details

Item	Description	Type	Amount	Remark
Navigation online	Concept Systems	Spectra		
Navigation offline	FGPS	Seispos		
Work Stations	PC workstations	Shuttle	2	
Network	Ethernet	Twisted pair		Category 5 TCP/IP
PC workstation	Sony	Shuttle		
Printer	HP	Laser		Network to 12"
Compasses	Digicourse	5011	22	Every 300 meter along the streamer + more in the front and tail end.
Streamer positioning	RGPS	Geotrack 220	1	Tracks
Source Positioning	RGPS	Geotrack 320	3	1 on each sub-array.
Acoustics	N/A			
Data logging	UKOOA	P2/94 P1/90		3590, CD-Rom, Online hard disk
Echo Sounder	Simrad	EA600		12 KHz & 200 KHz
Gyro	Simrad HS 50			GPS Gyro
Autopilot	Robertson	AP9 Mk III		
Steering	RobTrack	STS500		
Helmsman Steering display	Spectra	Sony Shuttle	1	Located on the bridge

4.2.5. Source and Mechanical Department Details

Item	Description	Type	Amount	Remark
Acoustic source	Long Life	Bolt		6 acoustic positions per sub-array 8 sources per sub-array
Hanging Plates	Multiwave design	Multiwave		
Chambers	40 – 300 cu. inch.			
Cluster	8-ea clusters	Bolt		3 clusters on the outmost sub-arrays, 2 on the centre sub-array
Near field hydrophones	2540	I/O		3 per sub-array
Depth/pressure Sensors	2527B	I/O		3 per sub-array
Source	Varying configuration	Multiwave / Bolt	Single /dual	Typical: 90-110bar output
Compressors	Frick	TDSB 355	3	Capacity 3 x 2000 cu.ft/min
	Aerial	JGA4	3	
	Caterpillar	Prime mover	3	1 for ea. set of Frick/Aerial
Source controller	Gunlink 2000	Seamap		32 guns, expandable
Solenoid Power Supply	Gunlink 2000	Seamap		25 ms fire pulse width
Deflector	Multiwave	6 foils	2	
Gun Winches	Single	Odim remote ctrl.	5	Slip-ring, Air
Streamer winches	Single	Odim remote ctrl.	4	Each 9000 m (50 mm)
Spooling Device	Marine Project Development	Linear	4	Spooling on each streamer winch individually
Tow Points	Odim	Flexible	4	
Winch Control	Odim		2	

5. List of Key Personnel

5.1. Onboard Personnel

POSITION	Crew 1
Party Chief	Sigurd Østerud
Captain	Theodore Strockyj
Chief Engineer	Carl Sayers
Chief Observer	Allan Beatie
Shift Leader Observer	Jun Lamabas
Chief Navigator	Paul Stafford
Shift Leader Navigation	Christopher Hernandez
Chief Mechanic	Roger Steffensen
Shift Leader Mechanic	Ronaldo Morales
QC leader	Steffi Schwarz
Client Representative	William Lloyd

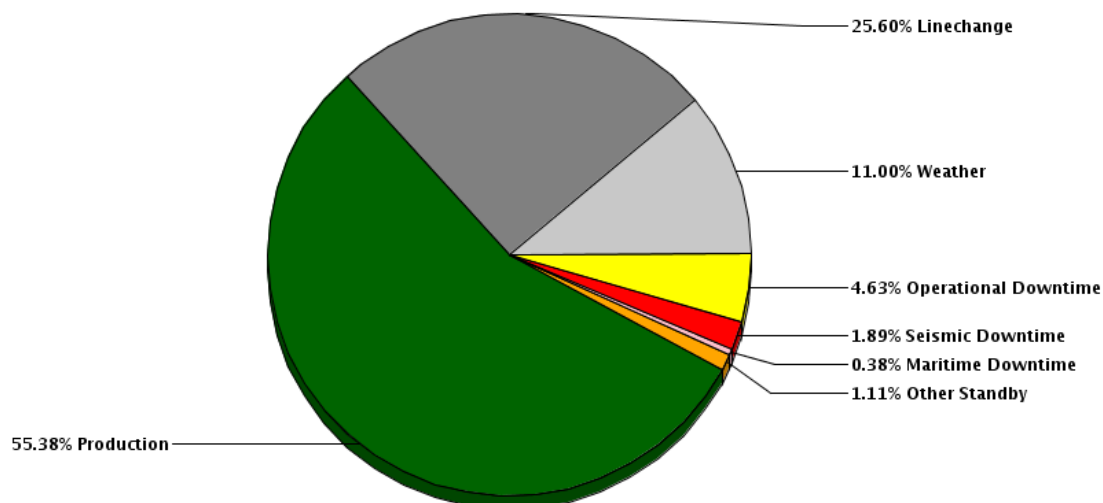
POSITION	Crew 2
Party Chief	Haydn Brook
Captain	Bruce Wallis
Chief Engineer	Thomas Broughton
Chief Observer	Tyrone Hackett
Shift Leader Observer	Slawomir Korybalski
Chief Navigator	Steven Ryan
Shift Leader Navigation	Donald Hutchings
Chief Mechanic	Ralph Bennett
Shift Leader Mechanic	Regis Derrien
Client Representative	William Lloyd

5.2. Office Support Personnel

POSITION	NAME
Vice President Operation	Christian Brige
Operation Manager	Serge Laigre
Instrument Manager	Joar Vestrheim
Navigation Manager	Rafael Bouraly
Mechanic Manager	Steinar Hovland
QC support	Christophe Massacand

6. Field Information and Observations

6.1. Time Statistics



Time Distribution

M/V Pacific Titan Client:(6734) Seboa - Group Shoot - Australia Survey: 550 11 89 07 06 00 Area: 2D (Project SEBOA)
Date: 16.3.2008 - 18.04.2008



CHARGE CODES											Hidden downtime			
ACTIVITY		14	15	21	22	24	25	27	C CGG Time	Tc corr	Total hours	%	RC hrs	RB hrs
Linechange														
LChnom	Linechange, nominal				204.75						204.75	25.60%		
TOTAL					204.75						204.75	25.60%		
Operational downtime														
Supcix	Support, crew change								37.05		37.05	4.63%		
TOTAL									37.05		37.05	4.63%		
Production														
PROD2D	Production 2D Line	9.45	396.28								405.73	50.74%		
PRORUN	Production Runout	1.35	35.73								37.08	4.64%		
TOTAL		10.80	432.02								442.82	55.38%		
Standby Environment														
ENVoth	Environmental, other			1.00							1.00	0.13%		
TOTAL				1.00							1.00	0.13%		
Standby Other														
STodcl	Standby on clients request					1.48	3.73	2.67			7.88	0.99%		
TOTAL						1.48	3.73	2.67			7.88	0.99%		
Standby Weather														
WEasea	Weather/sea/swell (standby at sea)			14.38			31.62				46.00	5.75%		
WEport	Weather/sea/swell (standby in port)			42.00							42.00	5.25%		
TOTAL				56.38			31.62				88.00	11.00%		
TD MAR Equipment														
MAecom	Maritime, equipment, compressor									3.07	3.07	0.38%		
TOTAL										3.07	3.07	0.38%		
TD MEC Backdeck														
MEbhpa	Mechanical, backdeck, HP air systems												0.25	
TOTAL													0.25	
TD MEC Source														
MEsair	Mechanical, source, array airline									0.50	0.50	0.06%		
MEsele	Mechanical, source, array electrical line									0.25	0.25	0.03%		
MEsgun	Mechanical, source, gun									3.73	3.73	0.47%		

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Time Distribution

M/V Pacific Titan Client:(6734) Seboa - Group Shoot - Australia Survey: 550 11 89 07 06 00 Area: 2D (Project SEBOA)
Date: 16.3.2008 - 18.04.2008



MEshar	Mechanical, source, array hardware										4.05	4.05	0.51%		
MEsen	Mechanical, source, sensor										0.75	0.75	0.09%		
MEsol	Mechanical, source, solenoid										2.83	2.83	0.35%		
TOTAL											12.12	12.12	1.52%		

TD REC Onboard system

REoerr	Recording, onboard, procedural error										2.98	2.98	0.37%		
TOTAL											2.98	2.98	0.37%		

TOTAL	10.80	432.02	57.38	204.75	1.48	35.35	2.67	37.05	18.17	759.67	100.00%		0.25
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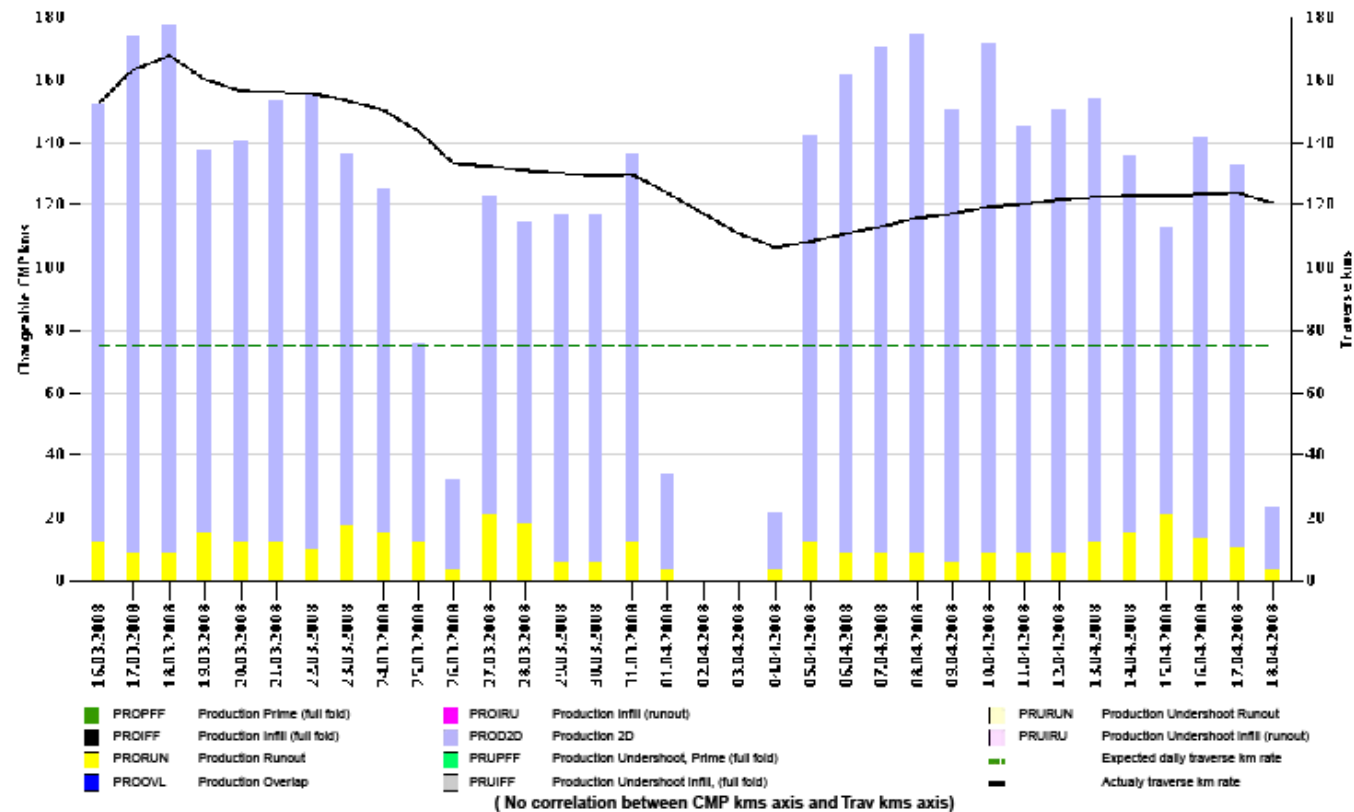
Charge codes in use

14	TAP Oil 2D and runout
15	Cue Energy 2D and runout
21	Chargeable standby
22	Chargeable linechange
24	Standby under 12 hrs TAP
25	Standby under 12 hrs Cue
27	Standby under 12 hrs 3D Oil
Tc	CGG Technical Downtime Corrective
C	CGG Time

6.2. Production Statistics TAP Oil part of Group Shoot

Production Summary

M/V Pacific Titan Client: (6734) Seboa - Group Shoot - Australia Survey: 550 11 89 07 06 00 Area: 2D (Project SEBOA)
Date: 16.03.2008 - 18.04.2008



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6.3. Production-Log



Production Log: Cue Energy - Survey T37/38P
M/V Pacific Titan (6734) Seboa - Group Shoot - Australia Area: 2D (Project SEBOA)
Date: 16.03.2008 Survey: 550 11 89 07 06 00

Date	Line	Time	Total Time	Dir	FSP	LSP	TOT SPS	Chargeable CMP kms	Primary	Secondary	Comments	Standby per instance	Date (Local)	Time (Local)	Time (Local)
16-Mar-08		17:00 - 18:17	1.28						Technical D/T	Inter-move	Standby on clients request, inter prospect transit time charged to Cue Energy		17-Mar-08	04:00	05:17
16-Mar-08	VCUE08-E08-001	18:17 - 00:00	5.72	177	3220	1068	2153	53.825	Recording	Production	Production 2D Line		17-Mar-08	05:17	11:00
17-Mar-08	VCUE08-E08-001	00:00 - 00:11	0.18	177	1067	1001	67	1.675	Recording	Production	Production 2D Line		17-Mar-08	11:00	11:11
17-Mar-08	VCUE08-E08-001	00:11 - 00:30	0.32	177	1000	881	120	3	Recording	Production	Production Runout		17-Mar-08	11:11	11:30
17-Mar-08		00:30 - 02:03	1.65						Line Change	Linechange	Linechange, nominal		17-Mar-08	11:30	13:03
17-Mar-08	VCUE08-E11-002	02:03 - 08:18	6.25	357	1001	3213	2213	55.325	Recording	Production	Production 2D Line		17-Mar-08	13:03	19:18
17-Mar-08	VCUE08-E11-002	08:18 - 08:39	0.35	357	3214	3333	120	3	Recording	Production	Production Runout		17-Mar-08	19:18	19:39
17-Mar-08		08:39 - 10:17	1.63						Line Change	Linechange	Linechange, nominal		17-Mar-08	19:39	21:17
17-Mar-08	VCUE08-E15-003	10:17 - 16:06	5.82	177	3211	1001	2211	55.275	Recording	Production	Production 2D Line		17 & 18-Mar-08	21:17	03:06
17-Mar-08	VCUE08-E15-003	16:06 - 16:25	0.32	177	1000	881	120	3	Recording	Production	Production Runout		18-Mar-08	03:06	03:25
17-Mar-08		16:25 - 18:16	1.85						Line Change	Linechange	Linechange, nominal		18-Mar-08	03:25	05:16
17-Mar-08	VCUE08-E12-004	18:16 - 00:00	5.73	357	1001	3092	2092	52.3	Recording	Production	Production 2D Line		18-Mar-08	05:16	11:00
18-Mar-08	VCUE08-E12-004	00:00 - 00:18	0.30	357	3093	3213	121	3.025	Recording	Production	Production 2D Line		18-Mar-08	11:00	11:18
18-Mar-08	VCUE08-E12-004	00:18 - 00:38	0.33	357	3214	3333	120	3	Recording	Production	Production Runout		18-Mar-08	11:18	11:38
18-Mar-08		00:38 - 02:22	1.73						Line Change	Linechange	Linechange, nominal		18-Mar-08	11:38	13:22
18-Mar-08	VCUE08-E09-005	02:22 - 08:26	6.07	177	3221	1001	2221	55.525	Recording	Production	Production 2D Line		18-Mar-08	13:22	19:26
18-Mar-08	VCUE08-E09-005	08:26 - 08:46	0.33	177	1000	881	120	3	Recording	Production	Production Runout		18-Mar-08	19:26	19:46
18-Mar-08		08:46 - 10:30	1.73						Line Change	Linechange	Linechange, nominal		18-Mar-08	19:46	21:30
18-Mar-08	VCUE08-E14-006	10:30 - 16:19	5.82	357	1001	3213	2213	55.325	Recording	Production	Production 2D Line		18 & 19-Mar-08	21:30	03:19
18-Mar-08	VCUE08-E14-006	16:19 - 18:39	0.33	357	3214	3333	120	3	Recording	Production	Production Runout		19-Mar-08	03:19	03:39
18-Mar-08		18:39 - 19:21	1.70						Line Change	Linechange	Linechange, nominal		19-Mar-08	03:39	05:21
18-Mar-08	VCUE08-E10-007	18:21 - 00:00	5.65	177	3217	1046	2172	54.3	Recording	Production	Production 2D Line		19-Mar-08	05:21	11:00
19-Mar-08	VCUE08-E10-007	00:00 - 00:07	0.12	177	1045	1001	45	1.125	Recording	Production	Production 2D Line		19-Mar-08	11:00	11:07
19-Mar-08	VCUE08-E10-007	00:07 - 00:27	0.33	177	1000	881	120	3	Recording	Production	Production Runout		19-Mar-08	11:07	11:27
19-Mar-08		00:27 - 02:06	1.65						Line Change	Linechange	Linechange, nominal		19-Mar-08	11:27	13:06
19-Mar-08	VCUE08-E06-008	02:06 - 05:12	3.10	357	1001	2171	1171	29.275	Recording	Production	Production 2D Line		19-Mar-08	13:06	16:12
19-Mar-08	VCUE08-E06-008	05:12 - 05:31	0.32	357	2172	2291	120	3	Recording	Production	Production Runout		19-Mar-08	16:12	16:31
19-Mar-08		05:31 - 07:41	2.17						Line Change	Linechange	Linechange, nominal		19-Mar-08	16:31	18:41
19-Mar-08	VCUE08-E04-009	07:41 - 10:49	3.13	177	2177	1001	1177	29.425	Recording	Production	Production 2D Line		19-Mar-08	18:41	21:49
19-Mar-08	VCUE08-E04-009	10:49 - 11:09	0.33	177	1000	881	120	3	Recording	Production	Production Runout		19-Mar-08	21:49	22:09
19-Mar-08		11:09 - 12:52	1.72						Line Change	Linechange	Linechange, nominal		19-Mar-08	22:09	23:52
19-Mar-08	VCUE08-E07-010	12:52 - 15:55	3.05	357	1001	2169	1169	29.225	Recording	Production	Production 2D Line		19 & 20-Mar-08	23:52	02:55
19-Mar-08	VCUE08-E07-010	15:55 - 16:14	0.32	357	2170	2289	120	3	Recording	Production	Production Runout		20-Mar-08	02:55	03:14
19-Mar-08		16:14 - 18:26	2.20						Line Change	Linechange	Linechange, nominal		20-Mar-08	03:14	05:26
19-Mar-08	VCUE08-N34-011	18:26 - 20:07	1.68	87	1001	1671	671	16.775	Recording	Production	Production 2D Line		20-Mar-08	05:26	07:07
19-Mar-08	VCUE08-N34-011	20:07 - 20:26	0.32	87	1672	1791	120	3	Recording	Production	Production Runout		20-Mar-08	07:07	07:26
19-Mar-08		20:26 - 22:09	1.72						Line Change	Linechange	Linechange, nominal		20-Mar-08	07:26	09:09
19-Mar-08	VCUE08-N32-012	22:09 - 00:00	1.85	267	1675	1012	664	16.6	Recording	Production	Production 2D Line		20-Mar-08	09:09	11:00
20-Mar-08	VCUE08-N32-012	00:00 - 00:01	0.02	267	1011	1001	11	0.275	Recording	Production	Production 2D Line		20-Mar-08	11:00	11:01
20-Mar-08	VCUE08-N32-012	00:01 - 00:21	0.33	267	1000	881	120	3	Recording	Production	Production Runout		20-Mar-08	11:01	11:21
20-Mar-08		00:21 - 02:51	2.50						Line Change	Linechange	Linechange, nominal		20-Mar-08	11:21	13:51
20-Mar-08	VCUE08-N26-013	02:51 - 06:40	3.82	87	1001	2453	1453	36.325	Recording	Production	Production 2D Line		20-Mar-08	13:51	17:40
20-Mar-08	VCUE08-N26-013	06:40 - 06:59	0.32	87	2454	2573	120	3	Recording	Production	Production Runout		20-Mar-08	17:40	17:59
20-Mar-08		06:59 - 09:31	2.53						Line Change	Linechange	Linechange, nominal		20-Mar-08	17:59	20:31
20-Mar-08	VCUE08-N21-014	09:31 - 14:03	4.63	267	2712	1001	1712	42.8	Recording	Production	Production 2D Line		20 & 21-Mar-08	20:31	01:09
20-Mar-08	VCUE08-N21-014	14:03 - 14:28	0.32	267	1000	881	120	3	Recording	Production	Production Runout		21-Mar-08	01:09	01:28
20-Mar-08		14:28 - 16:23	1.92						Line Change	Linechange	Linechange, nominal		21-Mar-08	01:28	03:23
20-Mar-08	VCUE08-N24-015	16:23 - 20:25	4.03	87	1001	2555	1555	38.875	Recording	Production	Production 2D Line		21-Mar-08	03:23	07:25
20-Mar-08	VCUE08-N24-015	20:25 - 20:44	0.32	87	2556	2675	120	3	Recording	Production	Production Runout		21-Mar-08	07:25	07:44
20-Mar-08		20:44 - 22:56	2.20						Line Change	Linechange	Linechange, nominal		21-Mar-08	07:44	09:56
20-Mar-08	VCUE08-N20-016	22:56 - 00:00	1.07	267	2762	2357	406	10.15	Recording	Production	Production 2D Line		21-Mar-08	09:56	11:00
21-Mar-08	VCUE08-N20-016	00:00 - 03:30	3.50	267	2356	1001	1356	33.9	Recording	Production	Production 2D Line		21-Mar-08	11:00	14:30
21-Mar-08	VCUE08-N20-016	03:30 - 03:48	0.30	267	1000	881	120	3	Recording	Production	Production Runout		21-Mar-08	14:30	14:48
21-Mar-08		03:48 - 05:38	1.83						Line Change	Linechange	Linechange, nominal		21-Mar-08	14:48	16:38
21-Mar-08	VCUE08-N27-017	05:38 - 09:25	3.78	87	1001	2402	1402	35.05	Recording	Production	Production 2D Line		21-Mar-08	16:38	20:25
21-Mar-08	VCUE08-N27-017	09:25 - 09:44	0.32	87	2403	2522	120	3	Recording	Production	Production Runout		21-Mar-08	20:25	20:44
21-Mar-08		09:44 - 12:11	2.45						Line Change	Linechange	Linechange, nominal		21-Mar-08	20:44	23:11
21-Mar-08	VCUE08-N22-018	12:11 - 16:16	4.08	267	2659	1130	1530	38.25	Recording	Production	Production 2D Line		21 & 22-Mar-08	23:11	03:16
21-Mar-08	VCUE08-N22-018	16:16 - 16:35	0.32	267	1129	1100	120	3	Recording	Production	Production Runout, Line runout aborted early due to airleak on gun string 2. Line considered complete.		22-Mar-08	03:16	03:35
21-Mar-08		16:35 - 19:16	2.68						Line Change	Linechange	Linechange, nominal		22-Mar-08	03:35	06:16
21-Mar-08	VCUE08-N28-019	19:16 - 22:56	3.67	87	1001	2360	1360	34	Recording	Production	Production 2D Line		22-Mar-08	06:16	09:56
21-Mar-08	VCUE08-N28-019	22:56 - 23:17	0.35	267	2361	2480	120	3	Recording	Production	Production Runout		22-Mar-08	09:56	10:17
21-Mar-08		23:17 - 00:00	0.72						Line Change	Linechange	Linechange, nominal		22-Mar-08	10:17	11:00
22-Mar-08		00:00 - 01:39	1.65						Line Change	Linechange	Linechange, nominal		22-Mar-08	11:00	12:39
22-Mar-08	VCUE08-N23-020	01:39 - 05:50	4.23	267	2607	1001	1607	40.175	Recording	Production	Production 2D Line		22-Mar-08	12:39	16:53
22-Mar-08	VCUE08-N23-020	05:53 - 06:13	0.33	267	1000	881	120	3	Recording	Production	Production Runout		22-Mar-08	16:53	17:13
22-Mar-08		06:13 - 08:06	1.88						Line Change	Linechange	Linechange, nominal		22-Mar-08	17:13	19:06
22-Mar-08	VCUE08-N30-021	08:06 - 11:45	3.65	87	1001	2361	1361	34.025	Recording	Production	Production 2D Line		22-Mar-08	19:06	22:45
22-Mar-08	VCUE08-N30-021	11:45 - 12:05	0.32	87	2362	2481	120	3	Recording	Production	Production Runout		22-Mar-08	22:45	23:05
22-Mar-08		12:05 - 14:07	2.03						Line Change	Linechange	Linechange, nominal		22 & 23-Mar-08	23:05	01:07
22-Mar-08	VCUE08-N25-022	14:07 - 18:08	4.02	267	2506	1001	1506	37.65	Recording	Production	Production 2D Line		23-Mar-08	01:07	05:08
22-Mar-08	VCUE08-N25-022	18:08 - 18:27	0.32	267	1000	881	120	3	Recording	Production	Production Runout		22-Mar-08	05:08	05:27
22-Mar-08		18:27 - 20:11	1.73						Line Change	Linechange	Linechange, nominal		22-Mar-08	05:27	07:11
22-Mar-08	VCUE08-N29-023	20:11 - 23:55	3.73	87	1001	2369	1369	33.975	Recording	Production	Production 2D Line		22-Mar-08	07:11	10:55
22-Mar-08	VCUE08-N29-023	23:55 - 00:00	0.08	87	2360	2385	26	0.65	Recording	Production	Production Runout		22-Mar-08	10:55	11:00
23-Mar-08	VCUE08-N29-023	00:00 - 00:15	0.25	87	2386	2479	94	2.35	Recording	Production	Production Runout		23-Mar-08	11:00	11:15
23-Mar-08		00:15 - 02:10	1.92						Line Change	Linechange	Linechange, nominal		23-Mar-08	11:15	13:10
23-Mar-08	VCUE08-N31-024	02:10 - 05:00	2.83	267	2067	1001	1067	26.675	Recording	Production	Production 2D Line		23-Mar-08	13:10	16:00
23-Mar-08	VCUE08-N31-024	05:00 - 05:19	0.32	267	1000	881	120	3	Recording	Production	Production Runout		23-Mar-08	16:00	16:19
23-Mar-08		05:19 - 07:30	2.18						Line Change	Linechange	Linechange, nominal		23-Mar-08	16:19	18:30
23-Mar-08	VCUE08-E03-025	07:30 - 10:39	3.13	177	2176	1001	1176	29.4	Recording	Production	Production 2D Line		23-Mar-08	18:30	21:39
23-Mar-08	VCUE08-E03-025	10:39 - 10:57	0.32	177	1000	881	120	3	Recording	Production	Production Runout		23-Mar-08	21:39	21:57
23-Mar-08		10:57 - 12:36	1.65						Line Change	Linechange	Linechange, nominal				

24-Mar-08		17:56 - 18:11	0.25							Technical D/T	MEC	Mechanical, source, sensor, extended line change to fix sensor problem.		25-Mar-08	04:56	05:11
24-Mar-08		18:11 - 20:15	2.07							Line Change	Linechange	Linechange, nominal		25-Mar-08	05:11	07:15
24-Mar-08	VCUE08-N39-033	20:15 - 21:57	1.70	87	1001	1665	665	16.625		Recording	Production	Production 2D Line		25-Mar-08	07:15	08:57
24-Mar-08	VCUE08-N39-033	21:57 - 22:16	0.32	87	1666	1785	120	3		Recording	Production	Production Runout		25-Mar-08	08:57	09:16
24-Mar-08		22:16 - 23:52	1.60							Line Change	Linechange	Linechange, nominal		25-Mar-08	09:16	10:52
24-Mar-08	VCUE08-N43-034	23:52 - 00:00	0.13	267	1659	1614	46	1.15		Recording	Production	Production 2D Line		25-Mar-08	10:52	11:00
25-Mar-08	VCUE08-N43-034	00:00 - 01:43	1.72	267	1613	1001	613	15.325		Recording	Production	Production 2D Line		25-Mar-08	11:00	12:43
25-Mar-08	VCUE08-N43-034	01:43 - 02:04	0.35	267	1000	881	120	3		Recording	Production	Production Runout		25-Mar-08	12:43	13:04
25-Mar-08		02:04 - 03:43	1.65							Line Change	Linechange	Linechange, nominal		25-Mar-08	13:04	14:43
25-Mar-08	VCUE08-N38-035	03:43 - 05:28	1.75	87	1001	1666	666	16.65		Recording	Production	Production 2D Line		25-Mar-08	14:43	16:28
25-Mar-08	VCUE08-N38-035	05:28 - 05:47	0.32	87	1667	1786	120	3		Recording	Production	Production Runout		25-Mar-08	16:28	16:47
25-Mar-08		05:47 - 07:28	1.68							Line Change	Linechange	Linechange, nominal		25-Mar-08	16:47	18:28
25-Mar-08	VCUE08-N41-036	07:28 - 09:26	1.97	267	1663	1080	584	14.6		Recording	Production	Production 2D Line		25-Mar-08	18:28	20:26
25-Mar-08	VCUE08-N41-036	09:26 - 09:32	0.10	267	1079	960	120	3		Recording	Production	Production Runout, Aborted early due to pressure problems. Considered complete.		25-Mar-08	20:26	20:32
25-Mar-08		09:32 - 10:02	0.50							Technical D/T	MEC	Mechanical, source, array airline		25-Mar-08	20:32	21:02
25-Mar-08		10:02 - 11:34	1.53							Line Change	Linechange	Linechange, nominal		25-Mar-08	21:02	22:34
25-Mar-08	VCUE08-N37-037	11:34 - 13:17	1.72	87	1001	1670	670	16.75		Recording	Production	Production 2D Line		25 & 26-Mar-08	22:34	00:17
25-Mar-08	VCUE08-N37-037	13:17 - 13:35	0.30	87	1671	1790	120	3		Recording	Production	Production Runout		26-Mar-08	00:17	00:35
25-Mar-08		13:35 - 15:37	2.03							Line Change	Linechange	Linechange, nominal		26-Mar-08	00:35	02:37
25-Mar-08	VCUE08-N42-038	15:37 - 16:37	1.00	267	1660	1385	276			Regional D/T	Standby	NTBP due to: Environmental, other:line aborted(NTBP) due to weather, high winds and large swell.	1st instance	26-Mar-08	02:37	03:37
25-Mar-08		16:37 - 00:00	7.38							Regional D/T	Standby	Weather/sea/swell (standby at sea) we went on weather standby after trying north south heading and found not possible.		26-Mar-08	03:37	11:00
26-Mar-08		00:00 - 04:37	4.62							Regional D/T	Standby	Weather/sea/swell (standby at sea) (First 12 hours stanby charged to CUE)		26-Mar-08	11:00	15:37
26-Mar-08		04:37 - 19:00	14.38							Regional D/T	Standby	Weather/sea/swell (standby at sea), Diring this time we retrieved the gear and redeployed (fixed the tailbuoy RGPS)		26 & 27-Mar-08	15:37	06:00
26-Mar-08	VCUE08-N42-039	19:00 - 20:45	1.75	267	1660	1001	660	16.5		Recording	Production	Production 2D Line		27-Mar-08	06:00	07:45
26-Mar-08	VCUE08-N42-039	20:45 - 21:03	0.30	267	1000	881	120	3		Recording	Production	Production Runout		27-Mar-08	07:45	08:03
26-Mar-08		21:03 - 22:37	1.57							Line Change	Linechange	Linechange, nominal		27-Mar-08	08:03	09:37
26-Mar-08	VCUE08-N46-040	22:37 - 00:00	1.38	87	1001	1502	502	12.55		Recording	Production	Production 2D Line		27-Mar-08	09:37	11:00
27-Mar-08	VCUE08-N46-040	00:00 - 00:25	0.42	87	1503	1655	153	3.825		Recording	Production	Production 2D Line		27-Mar-08	11:00	11:25
27-Mar-08	VCUE08-N46-040	00:25 - 00:46	0.35	87	1656	1775	120	3		Recording	Production	Production Runout		27-Mar-08	11:25	11:46
27-Mar-08		00:46 - 02:34	1.80							Line Change	Linechange	Linechange, nominal		27-Mar-08	11:46	13:34
27-Mar-08	VCUE08-N49-041	02:34 - 04:16	1.70	267	1651	1001	651	16.275		Recording	Production	Production 2D Line		27-Mar-08	13:34	15:16
27-Mar-08	VCUE08-N49-041	04:16 - 04:36	0.33	267	1000	881	120	3		Recording	Production	Production Runout		27-Mar-08	15:16	15:36
27-Mar-08		04:36 - 05:56	1.33							Line Change	Linechange	Linechange, nominal		27-Mar-08	15:36	16:56
27-Mar-08	VCUE08-N45-042	05:56 - 07:41	1.75	87	1001	1654	654	16.35		Recording	Production	Production 2D Line		27-Mar-08	16:56	18:41
27-Mar-08	VCUE08-N45-042	07:41 - 08:00	0.32	87	1655	1774	120	3		Recording	Production	Production Runout		27-Mar-08	18:41	19:00
27-Mar-08		08:00 - 08:30	0.50							Technical D/T	MEC	Mechanical, source, sensor, gun 1-7		27-Mar-08	19:00	19:30
27-Mar-08		08:30 - 10:08	1.63							Line Change	Linechange	Linechange, nominal		27-Mar-08	19:30	21:08
27-Mar-08	VCUE08-N48-043	10:08 - 11:53	1.75	267	1651	1001	651	16.275		Recording	Production	Production 2D Line		27-Mar-08	21:08	22:53
27-Mar-08	VCUE08-N48-043	11:53 - 12:12	0.32	267	1000	881	120	3		Recording	Production	Production Runout		27-Mar-08	22:53	23:12
27-Mar-08		12:12 - 13:35	1.38							Line Change	Linechange	Linechange, nominal		27 & 28-Mar-08	23:12	00:35
27-Mar-08	VCUE08-N44-044	13:35 - 15:24	1.82	87	1001	1657	657	16.425		Recording	Production	Production 2D Line		28-Mar-08	00:35	02:24
27-Mar-08	VCUE08-N44-044	15:24 - 15:43	0.32	87	1658	1777	120	3		Recording	Production	Production Runout		28-Mar-08	02:24	02:43
27-Mar-08		15:43 - 17:17	1.57							Line Change	Linechange	Linechange, nominal		28-Mar-08	02:43	04:17
27-Mar-08	VCUE08-N47-045	17:17 - 18:56	1.65	267	1654	1001	654	16.35		Recording	Production	Production 2D Line		28-Mar-08	04:17	05:56
27-Mar-08	VCUE08-N47-045	18:56 - 19:14	0.30	267	1000	881	120	3		Recording	Production	Production Runout		28-Mar-08	05:56	06:14
27-Mar-08		19:14 - 20:43	1.48							Line Change	Linechange	Linechange, nominal		28-Mar-08	06:14	07:43
27-Mar-08	VCUE08-N50-046	20:43 - 22:33	1.83	87	1001	1648	648	16.2		Recording	Production	Production 2D Line		28-Mar-08	07:43	09:33
27-Mar-08	VCUE08-N50-046	22:33 - 22:53	0.33	87	1649	1768	120	3		Recording	Production	Production Runout		28-Mar-08	09:33	09:53
27-Mar-08		22:53 - 00:00	1.12							Line Change	Linechange	Linechange, nominal		28-Mar-08	09:53	11:00
28-Mar-08		00:00 - 00:23	0.38							Line Change	Linechange	Linechange, nominal		28-Mar-08	11:00	11:23
28-Mar-08	VCUE08-N54-047	00:23 - 02:03	1.67	267	1643	1001	643	16.075		Recording	Production	Production 2D Line		28-Mar-08	11:23	13:03
28-Mar-08	VCUE08-N54-047	02:03 - 02:22	0.32	267	1000	881	120	3		Recording	Production	Production Runout		28-Mar-08	13:03	13:22
28-Mar-08		02:22 - 03:58	1.60							Line Change	Linechange	Linechange, nominal		28-Mar-08	13:22	14:58
28-Mar-08	VCUE08-N51-048	03:58 - 05:44	1.77	87	1001	1646	646	16.15		Recording	Production	Production 2D Line		28-Mar-08	14:58	16:44
28-Mar-08	VCUE08-N51-048	05:44 - 06:04	0.33	0	1647	1766	120	3		Recording	Production	Production Runout		28-Mar-08	16:44	17:04
28-Mar-08		06:04 - 07:40	1.60							Line Change	Linechange	Linechange, nominal		28-Mar-08	17:04	18:40
28-Mar-08	VCUE08-N55-049	07:40 - 09:24	1.73	267	1642	1001	642	16.05		Recording	Production	Production 2D Line		28-Mar-08	18:40	20:24
28-Mar-08	VCUE08-N55-049	09:24 - 09:43	0.32	267	1000	881	120	3		Recording	Production	Production Runout		28-Mar-08	20:24	20:43
28-Mar-08		09:43 - 11:19	1.60							Line Change	Linechange	Linechange, nominal		28-Mar-08	20:43	22:19
28-Mar-08	VCUE08-N52-050	11:19 - 13:04	1.75	87	1001	1646	646	16.15		Recording	Production	Production 2D Line		28 & 29-Mar-08	22:19	00:04
28-Mar-08	VCUE08-N52-050	13:04 - 13:24	0.33	87	1647	1766	120	3		Recording	Production	Production Runout		29-Mar-08	00:04	00:24
28-Mar-08		13:24 - 15:02	1.63							Line Change	Linechange	Linechange, nominal		29-Mar-08	00:24	02:02
28-Mar-08	VCUE08-N56-051	15:02 - 16:44	1.70	267	1641	1001	641	16.025		Recording	Production	Production 2D Line		29-Mar-08	02:02	03:44
28-Mar-08	VCUE08-N56-051	16:44 - 17:03	0.32	267	1000	881	120	3		Recording	Production	Production Runout		29-Mar-08	03:44	04:03
28-Mar-08		17:03 - 18:37	1.57							Line Change	Linechange	Linechange, nominal		29-Mar-08	04:03	05:37
28-Mar-08	VCUE08-N53-052	18:37 - 20:22	1.75	87	1001	1643	643	16.075		Recording	Production	Production 2D Line		29-Mar-08	05:37	07:22
28-Mar-08	VCUE08-N53-052	20:22 - 20:41	0.32	87	1644	1763	120	3		Recording	Production	Production Runout		29-Mar-08	07:22	07:41
28-Mar-08		20:41 - 23:41	3.00							Line Change	Linechange	Linechange, nominal		29-Mar-08	07:41	10:41
28-Mar-08		23:41 - 00:00	0.32							Regional D/T	Standby	Weather/sea/swell (standby at sea), First part of 12 hours charged to CUE	2nd instance	29-Mar-08	10:41	11:00
29-Mar-08		00:00 - 08:59	8.98							Regional D/T	Standby	Weather/sea/swell (standby at sea)		29-Mar-08	11:00	19:59
29-Mar-08	VCUE08-E13-053	08:59 - 14:47	5.80	177	3212	1001	2212	55.3		Recording	Production	Production 2D Line		29 & 30-Mar-08	19:59	01:47
29-Mar-08	VCUE08-E13-053	14:47 - 15:06	0.32	177	1000	881	120	3		Recording	Production	Production Runout		30-Mar-08	01:47	02:06
29-Mar-08		15:06 - 16:56	1.83							Line Change	Linechange	Linechange, nominal		30-Mar-08	02:06	03:56
29-Mar-08	VCUE08-E17-054	16:56 - 23:05	6.15	357	1001	3213	2213	55.325		Recording	Production	Production 2D Line		30-Mar-08	03:56	10:05
29-Mar-08	VCUE08-E17-054	23:05 - 23:24	0.32	357	3214	3333	120	3		Recording	Production	Production Runout		30-Mar-08	10:05	10:24
29-Mar-08		23:24 - 00:00	0.60							Line Change	Linechange	Linechange, nominal		30-Mar-08	10:24	11:00
30-Mar-08		00:00 - 01:07	1.12							Line Change	Linechange	Linechange, nominal		30-Mar-08	11:00	12:07
30-Mar-08	VCUE08-E21-055	01:07 - 06:54	5.78	177	3211	1001	2211	55.275		Recording	Production	Production 2D Line		30-Mar-08	12:07	17:54
30-Mar-08	VCUE08-E21-055	06:54 - 07:13	0.32	177	1000	881	120	3		Recording	Production	Production Runout		30-Mar-08	17:54	18:13
30-Mar-08		07:13 - 09:03	1.83							Line Change	Linechange	Linechange, nominal		30-Mar-08	18:13	20:03
30-Mar-08	VCUE08-E16-056	09:03 - 15:07	6.07	357	1001	3213	2213	55.325		Recording	Production	Production 2D Line		30 & 31-Mar-08	20:03	02:07
30-Mar-08	VCUE08-E16-056	15:07 - 15:28	0.35	357	3214	3333	120	3		Recording	Production	Production Runout		31-Mar-08	02:07	02:28

Production Log: Cue Energy - Survey T37/38P
M/V Pacific Titan (6734) Seboa - Group Shoot - Australia Area: 2D (Project SEBOA)
Date: 01.04.2008 Survey: 550 11 89 07 06 00

Date	Line	Time	Total Time	Dir	FSP	LSP	TOI SPs	Chargeable CMP hrs	Primary	Secondary	Comments	Standby per Instance	Date (Local)	Time (Local)	Time (Local)
01-Apr-08		00:00 - 00:57	0.95						Line Change	Linechange	Linechange, nominal		01-Apr-08	11:00	11:57
01-Apr-08	VCUE08-E28-061	00:57 - 04:14	3.28	177	2239	1001	1239	30.975	Recording	Production	Production 2D Line		01-Apr-08	11:57	15:14
01-Apr-08	VCUE08-E28-061	04:14 - 04:32	0.30	177	1000	881	120	3	Recording	Production	Production Runout		01-Apr-08	15:14	15:32
01-Apr-08		04:32 - 00:00	19.47						Technical D/T	Oper DT	Support, crew change, pick up gear and head for crew change in Bernie, Tasmania.		01 & 02-Apr-08	15:32	11:00
02-Apr-08		00:00 - 06:00	6.00						Technical D/T	Oper DT	Support, crew change		02-Apr-08	11:00	17:00
02-Apr-08		06:00 - 00:00	18.00						Regional D/T	Standby	Weather/sea/swell (standby in port)	1st Instance	02 & 03-Apr-08	17:00	11:00
03-Apr-08		00:00 - 00:00	24.00						Regional D/T	Standby	Weather/sea/swell (standby in port)		03 & 04-Apr-08	11:00	11:00
04-Apr-08		00:00 - 02:00	2.00						Technical D/T	Oper DT	Support, crew change		04-Apr-08	11:00	13:00
04-Apr-08		02:00 - 11:35	9.58						Technical D/T	Oper DT	Support, crew change		04-Apr-08	13:00	22:35
04-Apr-08		11:35 - 13:23	1.80						Line Change	Linechange	Linechange, nominal		04 & 05-Apr-08	22:35	00:23
04-Apr-08		13:23 - 13:29	0.10						Technical D/T	MAR	NTBP due to: Maritime, equipment, compressor.		05-Apr-08	00:23	00:29
04-Apr-08	VCUE08-E44-062	13:29 - 16:27	2.97	357	1001	1031	31		Technical D/T	MAR	Maritime, equipment, compressor		05-Apr-08	00:29	03:27
04-Apr-08	VCUE08-E44-063	16:27 - 18:33	2.10	357	1001	1747	747	18.675	Recording	Production	Production 2D Line		05-Apr-08	03:27	05:33
04-Apr-08	VCUE08-E44-063	18:33 - 18:53	0.33	357	1748	1867	120	3	Recording	Production	Production Runout		05-Apr-08	05:33	05:53
04-Apr-08		18:53 - 20:59	2.10						Line Change	Linechange	Linechange, nominal		05-Apr-08	05:53	07:59
04-Apr-08	VCUE08-E49-064	20:59 - 21:08	0.15	177	1589	1535	55		Technical D/T	REC	NTBP due to: Recording, onboard, procedural error.		05-Apr-08	07:59	08:08
04-Apr-08		21:08 - 23:58	2.83						Technical D/T	REC	Recording, onboard, procedural error		05-Apr-08	08:08	10:58
04-Apr-08		23:58 - 00:00	0.03						Technical D/T	MEC	Mechanical, source, solenoid: Circling around again		05-Apr-08	10:58	11:00
05-Apr-08		00:00 - 02:48	2.80						Technical D/T	MEC	Mechanical, source, solenoid		05-Apr-08	11:00	13:48
05-Apr-08	VCUE08-E49-065	02:48 - 04:29	1.68	177	1589	1001	589	14.725	Recording	Production	Production 2D Line		05-Apr-08	13:48	15:29
05-Apr-08	VCUE08-E49-065	04:29 - 04:49	0.33	177	1000	881	120	3	Recording	Production	Production Runout		05-Apr-08	15:29	15:49
05-Apr-08		04:49 - 06:36	1.78						Line Change	Linechange	Linechange, nominal		05-Apr-08	15:49	17:36
05-Apr-08	VCUE08-E45-066	06:36 - 08:37	2.02	357	1001	1740	740	18.5	Recording	Production	Production 2D Line		05-Apr-08	17:36	19:37
05-Apr-08	VCUE08-E45-066	08:37 - 08:57	0.33	357	1741	1860	120	3	Recording	Production	Production Runout		05-Apr-08	19:37	19:57
05-Apr-08		08:57 - 11:10	2.22						Line Change	Linechange	Linechange, nominal		05-Apr-08	19:57	22:10
05-Apr-08	VCUE08-N19-067	11:10 - 15:50	4.67	267	2813	1001	1813	45.325	Recording	Production	Production 2D Line		05 & 06-Apr-08	22:10	02:50
05-Apr-08	VCUE08-N19-067	15:50 - 16:08	0.30	267	1000	881	120	3	Recording	Production	Production Runout (Local time change (-1 hour))		06-Apr-08	02:50	02:08 00
05-Apr-08		16:08 - 17:45	1.62						Line Change	Linechange	Linechange, nominal		06-Apr-08	02:08	03:45
05-Apr-08	VCUE08-N14-068	17:45 - 23:15	5.50	87	1001	3068	2068	51.7	Recording	Production	Production 2D Line		06-Apr-08	03:45	09:15
05-Apr-08	VCUE08-N14-068	23:15 - 23:35	0.33	87	3069	3188	120	3	Recording	Production	Production Runout		06-Apr-08	09:15	09:35
05-Apr-08		23:35 - 00:00	0.42						Line Change	Linechange	Linechange, nominal		06-Apr-08	09:35	10:00
06-Apr-08		00:00 - 01:15	1.25						Line Change	Linechange	Linechange, nominal		06-Apr-08	10:00	11:15
06-Apr-08	VCUE08-N18-069	01:15 - 06:14	4.98	267	2864	1001	1864	46.6	Recording	Production	Production 2D Line		06-Apr-08	11:15	16:14
06-Apr-08	VCUE08-N18-069	06:14 - 06:34	0.33	267	1000	881	120	3	Recording	Production	Production Runout		06-Apr-08	16:14	16:34
06-Apr-08		06:34 - 08:15	1.68						Line Change	Linechange	Linechange, nominal		06-Apr-08	16:34	18:15
06-Apr-08	VCUE08-N13-070	08:15 - 14:07	5.87	87	1001	3118	2118	52.95	Recording	Production	Production 2D Line		06 & 07-Apr-08	18:15	00:07
06-Apr-08	VCUE08-N13-070	14:07 - 14:27	0.33	87	3119	3238	120	3	Recording	Production	Production Runout		07-Apr-08	00:07	00:27
06-Apr-08		14:27 - 16:05	1.63						Line Change	Linechange	Linechange, nominal		07-Apr-08	00:27	02:05
06-Apr-08	VCUE08-N17-071	16:05 - 21:11	5.10	267	2916	1001	1916	47.9	Recording	Production	Production 2D Line		07-Apr-08	02:05	07:11
06-Apr-08	VCUE08-N17-071	21:11 - 21:32	0.35	267	1000	881	120	3	Recording	Production	Production Runout		07-Apr-08	07:11	07:32
06-Apr-08		21:32 - 23:24	1.87						Line Change	Linechange	Linechange, nominal		07-Apr-08	07:32	09:24
06-Apr-08	VCUE08-N12-072	23:24 - 00:00	0.60	87	1001	1204	204	5.1	Recording	Production	Production 2D Line		07-Apr-08	09:24	10:00
07-Apr-08	VCUE08-N12-072	00:00 - 05:36	5.60	87	1205	3170	1966	49.15	Recording	Production	Production 2D Line		07-Apr-08	10:00	15:36
07-Apr-08	VCUE08-N12-072	05:36 - 05:56	0.33	87	3171	3290	120	3	Recording	Production	Production Runout		07-Apr-08	15:36	15:56
07-Apr-08		05:56 - 07:51	1.92						Line Change	Linechange	Linechange, nominal		07-Apr-08	15:56	17:51
07-Apr-08	VCUE08-N16-073	07:51 - 13:13	5.37	267	2966	1001	1966	49.15	Recording	Production	Production 2D Line		07 & 08-Apr-08	17:51	23:13
07-Apr-08	VCUE08-N16-073	13:13 - 13:32	0.32	267	1000	881	120	3	Recording	Production	Production Runout		08-Apr-08	23:13	23:32
07-Apr-08		13:32 - 15:20	1.80						Line Change	Linechange	Linechange, nominal		08-Apr-08	23:32	01:20
07-Apr-08	VCUE08-N11-074	15:20 - 21:19	5.98	87	1001	3173	2173	54.325	Recording	Production	Production 2D Line		08-Apr-08	01:20	07:19
07-Apr-08	VCUE08-N11-074	21:19 - 21:38	0.32	87	3174	3293	120	3	Recording	Production	Production Runout		08-Apr-08	07:19	07:38
07-Apr-08		21:38 - 23:05	1.45						Line Change	Linechange	Linechange, nominal		08-Apr-08	07:38	09:05
07-Apr-08	VCUE08-N15-075	23:05 - 00:00	0.92	267	3016	2670	347	8.675	Recording	Production	Production 2D Line		08-Apr-08	09:05	10:00
08-Apr-08	VCUE08-N15-075	00:00 - 04:22	4.37	267	2669	1001	1669	41.725	Recording	Production	Production 2D Line		08-Apr-08	10:00	14:22
08-Apr-08	VCUE08-N15-075	04:22 - 04:41	0.32	267	1000	881	120	3	Recording	Production	Production Runout		08-Apr-08	14:22	14:41
08-Apr-08		04:41 - 06:28	1.78						Line Change	Linechange	Linechange, nominal		08-Apr-08	14:41	16:28
08-Apr-08	VCUE08-N10-076	06:28 - 12:25	5.95	87	1001	3171	2171	54.275	Recording	Production	Production 2D Line		08-Apr-08	16:28	22:25
08-Apr-08	VCUE08-N10-076	12:25 - 12:46	0.35	87	3172	3291	120	3	Recording	Production	Production Runout		08-Apr-08	22:25	22:46
00-Apr-00		12:46 - 14:24	1.63						Line Change	Linechange	Linechange, nominal		00 & 09-Apr-00	22:46	00:24
08-Apr-08	VCUE08-N05-077	14:24 - 20:08	5.73	267	3167	1001	2167	54.175	Recording	Production	Production 2D Line		09-Apr-08	00:24	06:08
08-Apr-08	VCUE08-N05-077	20:08 - 20:27	0.32	267	1000	881	120	3	Recording	Production	Production Runout		09-Apr-08	06:08	06:27
08-Apr-08		20:27 - 22:16	1.82						Line Change	Linechange	Linechange, nominal		09-Apr-08	06:27	08:16
08-Apr-08	VCUE08-N09-078	22:16 - 00:00	1.73	87	1001	1624	624	15.6	Recording	Production	Production 2D Line		09-Apr-08	08:16	10:00
09-Apr-08	VCUE08-N09-078	00:00 - 04:13	4.22	87	1625	3171	1547	38.675	Recording	Production	Production 2D Line		09-Apr-08	10:00	14:13
09-Apr-08	VCUE08-N09-078	04:13 - 04:33	0.33	87	3172	3291	120	3	Recording	Production	Production Runout		09-Apr-08	14:13	14:33
09-Apr-08		04:33 - 06:30	1.95						Line Change	Linechange	Linechange, nominal		09-Apr-08	14:33	16:30
09-Apr-08	VCUE08-N04-079	06:30 - 06:45	0.25	267	3166	3097	70		Technical D/T	MEC	Mechanical, source, array electrical line: Extended Line change		09-Apr-08	16:30	16:45
09-Apr-08		06:45 - 06:57	0.20						Technical D/T	MEC	NTBP due to: Mechanical, source, array hardware.		09-Apr-08	16:45	16:57
09-Apr-08		06:57 - 10:33	3.60						Technical D/T	MEC	Mechanical, source, array hardware		09-Apr-08	16:57	20:33
09-Apr-08	VCUE08-N04-080	10:33 - 16:21	5.80	267	3166	1001	2166	54.15	Recording	Production	Production 2D Line		09 & 10-Apr-08	20:33	02:21
09-Apr-08	VCUE08-N04-080	16:21 - 16:40	0.32	267	1000	881	120	3	Recording	Production	Production Runout		10-Apr-08	02:21	02:40
09-Apr-08		16:40 - 18:21	1.68						Line Change	Linechange	Linechange, nominal		10-Apr-08	02:40	04:21
09-Apr-08	VCUE08-N08-081	18:21 - 00:00	5.65	87	1001	3047	2047	51.175	Recording	Production	Production 2D Line		10-Apr-08	04:21	10:00
10-Apr-08	VCUE08-N08-081	00:00 - 00:20	0.33	87	3048	3171	124	3.1	Recording	Production	Production 2D Line		10-Apr-08	10:00	10:20
10-Apr-08	VCUE08-N08-081	00:20 - 00:39	0.32	87	3172	3291	120	3	Recording	Production	Production Runout		10-Apr-08	10:20	10:39
10-Apr-08		00:39 - 02:16	1.62						Line Change	Linechange	Linechange, nominal		10-Apr-08	10:39	12:16
10-Apr-08	VCUE08-N03-082	02:16 - 08:05	5.82	267	3166	1001	2166	54.15	Recording	Production	Production 2D Line		10-Apr-08	12:16	18:05
10-Apr-08	VCUE08-N03-082	08:05 - 08:24	0.32	267	1000	881	120	3	Recording	Production	Production Runout		10-Apr-08	18:05	18:24
10-Apr-08		08:24 - 10:21	1.95						Line Change	Linechange	Linechange, nominal		10-Apr-08	18:24	20:21
10-Apr-08	VCUE08-N07-083	10:21 - 16:29	6.13	87	1001	3167	2167	54.175	Recording	Production	Production 2D Line		10 & 11-Apr-08	20:21	02:29
10-Apr-08	VCUE08-N07-083	16:29 - 16:50	0.35	87	3168	3287	120	3	Recording	Production	Production Runout		11-Apr-08	02:29	02:50
10-Apr-08		16:50 - 18:26	1.60						Line Change	Linechange	Linechange, nominal		11-Apr-08	02:50	04:26
10-Apr-08	VCUE08-N02-084	18:26 - 00:00	5.57	267	3166	1130	2037	50.925	Recording	Production	Production 2D Line		11-Apr-08	04:26	10:00
11-Apr-08	VCUE08-N02-084	00:00 - 00:21	0.35	84	1129	1001	129	3.225	Recording	Production					

11-Apr-08	VCUE08-E18-088	23:45 - 00:00	0.25	357	1866	1985	120		Technical D/T	MEC	Mechanical, source, array hardware: Circling due to air leak		12-Apr-08	09:45	10:00
12-Apr-08		00:00 - 03:22	3.37						Technical D/T	MEC	Mechanical, source, gun		12-Apr-08	10:00	13:22
12-Apr-08		03:22 - 03:44	0.37						Technical D/T	MEC	Overlap due to: Mechanical, source, gun:		12-Apr-08	13:22	13:44
12-Apr-08	VCUE08-E18-088	03:44 - 07:16	3.53	357	1986	3213	1228	30.7	Recording	Production	Production 2D Line		12-Apr-08	13:44	17:16
12-Apr-08	VCUE08-E18-088	07:16 - 07:36	0.33	357	3214	3333	120	3	Recording	Production	Production Runout		12-Apr-08	17:16	17:36
12-Apr-08		07:36 - 09:28	1.87						Line Change	Linechange	Linechange, nominal		12-Apr-08	17:36	19:28
12-Apr-08	VCUE08-E22-089	09:28 - 15:32	6.07	177	3213	1001	2213	55.325	Recording	Production	Production 2D Line		12 & 13-Apr-08	19:28	01:32
12-Apr-08	VCUE08-E22-089	15:32 - 15:51	0.32	357	1000	881	120	3	Recording	Production	Production Runout		13-Apr-08	01:32	01:51
12-Apr-08		15:51 - 17:40	1.82						Line Change	Linechange	Linechange, nominal		13-Apr-08	01:51	03:40
12-Apr-08	VCUE08-E19-090	17:40 - 22:11	4.52	357	1001	2658	1658	41.45	Recording	Production	Production 2D Line		13-Apr-08	03:40	08:11
12-Apr-08	VCUE08-E19-090	22:11 - 23:40	1.48	357	2659	3213	555	13.875	Recording	Production	Production 2D Line		13-Apr-08	08:11	09:40
12-Apr-08	VCUE08-E19-090	23:40 - 23:59	0.32	357	3214	3333	120	3	Recording	Production	Production Runout		13-Apr-08	09:40	09:59
12-Apr-08		23:59 - 00:00	0.02						Line Change	Linechange	Linechange, nominal		13-Apr-08	09:59	10:00
13-Apr-08		00:00 - 01:46	1.77						Line Change	Linechange	Linechange, nominal		13-Apr-08	10:00	11:46
13-Apr-08	VCUE08-E23-091	01:46 - 07:46	6.00	177	3211	1001	2211	55.275	Recording	Production	Production 2D Line		13-Apr-08	11:46	17:46
13-Apr-08	VCUE08-E23-091	07:46 - 08:05	0.32	177	1000	881	120	3	Recording	Production	Production Runout		13-Apr-08	17:46	18:05
13-Apr-08		08:05 - 09:48	1.72						Line Change	Linechange	Linechange, nominal		13-Apr-08	18:05	19:48
13-Apr-08	VCUE08-E27-092	09:48 - 13:07	3.32	357	1001	2239	1239	30.975	Recording	Production	Production 2D Line		13 & 14-Apr-08	19:48	23:07
13-Apr-08	VCUE08-E27-092	13:07 - 13:27	0.33	357	2240	2359	120	3	Recording	Production	Production Runout		14-Apr-08	23:07	23:27
13-Apr-08		13:27 - 15:07	1.67						Line Change	Linechange	Linechange, nominal		14-Apr-08	23:27	01:07
13-Apr-08	VCUE08-E32-093	15:07 - 18:19	3.20	177	2235	1001	1235	30.875	Recording	Production	Production 2D Line		14-Apr-08	01:07	04:19
13-Apr-08	VCUE08-E32-093	18:19 - 18:38	0.32	177	1000	881	120	3	Recording	Production	Production Runout		14-Apr-08	04:19	04:38
13-Apr-08		18:38 - 20:19	1.68						Line Change	Linechange	Linechange, nominal		14-Apr-08	04:38	06:19
13-Apr-08	VCUE08-E37-094	20:19 - 22:57	2.63	357	1001	1974	974	24.35	Recording	Production	Production 2D Line		14-Apr-08	06:19	08:57
13-Apr-08	VCUE08-E37-094	22:57 - 23:17	0.33	357	1975	2094	120	3	Recording	Production	Production Runout		14-Apr-08	08:57	09:17
13-Apr-08		23:17 - 00:00	0.72						Line Change	Linechange	Linechange, nominal		14-Apr-08	09:17	10:00
14-Apr-08		00:00 - 00:50	0.83						Line Change	Linechange	Linechange, nominal		14-Apr-08	10:00	10:50
14-Apr-08	VCUE08-E41-095	00:50 - 03:13	2.38	177	1852	1001	852	21.3	Recording	Production	Production 2D Line		14-Apr-08	10:50	13:13
14-Apr-08	VCUE08-E41-095	03:13 - 03:32	0.32	177	1000	881	120	3	Recording	Production	Production Runout		14-Apr-08	13:13	13:32
14-Apr-08		03:32 - 05:19	1.78						Line Change	Linechange	Linechange, nominal		14-Apr-08	13:32	15:19
14-Apr-08	VCUE08-E35-096	05:19 - 08:14	2.92	357	1001	2029	1029	25.725	Recording	Production	Production 2D Line		14-Apr-08	15:19	18:14
14-Apr-08	VCUE08-E35-096	08:14 - 08:35	0.35	357	2030	2149	120	3	Recording	Production	Production Runout		14-Apr-08	18:14	18:35
14-Apr-08		08:35 - 10:07	1.53						Line Change	Linechange	Linechange, nominal		14-Apr-08	18:35	20:07
14-Apr-08	VCUE08-E39-097	10:07 - 12:36	2.48	177	1897	1001	897	22.425	Recording	Production	Production 2D Line		14-Apr-08	20:07	22:36
14-Apr-08	VCUE08-E39-097	12:36 - 12:56	0.33	177	1000	881	120	3	Recording	Production	Production Runout		14-Apr-08	22:36	22:56
14-Apr-08		12:56 - 14:38	1.70						Line Change	Linechange	Linechange, nominal		14 & 15-Apr-08	22:56	00:38
14-Apr-08	VCUE08-E42-098	14:38 - 16:57	2.32	357	1001	1819	819	20.475	Recording	Production	Production 2D Line		15-Apr-08	00:38	02:57
14-Apr-08	VCUE08-E42-098	16:57 - 17:18	0.35	357	1820	1939	120	3	Recording	Production	Production Runout		15-Apr-08	02:57	03:18
14-Apr-08		17:18 - 18:45	1.45						Line Change	Linechange	Linechange, nominal		15-Apr-08	03:18	04:45
14-Apr-08	VCUE08-E46-099	18:45 - 20:37	1.87	177	1702	1001	702	17.55	Recording	Production	Production 2D Line		15-Apr-08	04:45	06:37
14-Apr-08	VCUE08-E46-099	20:37 - 20:57	0.33	177	1000	881	120	3	Recording	Production	Production Runout		15-Apr-08	06:37	06:57
14-Apr-08		20:57 - 22:37	1.67						Line Change	Linechange	Linechange, nominal		15-Apr-08	06:57	08:37
14-Apr-08	VCUE08-E50-100	22:37 - 00:00	1.38	357	1001	1531	531	13.275	Recording	Production	Production 2D Line		15-Apr-08	08:37	10:00
15-Apr-08	VCUE08-E50-100	00:00 - 00:08	0.13	357	1532	1586	55	1.375	Recording	Production	Production 2D Line		15-Apr-08	10:00	10:08
15-Apr-08	VCUE08-E50-100	00:08 - 00:27	0.32	357	1587	1706	120	3	Recording	Production	Production Runout		15-Apr-08	10:08	10:27
15-Apr-08		00:27 - 02:18	1.85						Line Change	Linechange	Linechange, nominal		15-Apr-08	10:27	12:18
15-Apr-08	VCUE08-E53-101	02:18 - 03:36	1.30	177	1476	1001	476	11.9	Recording	Production	Production 2D Line		15-Apr-08	12:18	13:36
15-Apr-08	VCUE08-E53-101	03:36 - 03:55	0.32	177	1000	881	120	3	Recording	Production	Production Runout		15-Apr-08	13:36	13:55
15-Apr-08		03:55 - 05:37	1.70						Line Change	Linechange	Linechange, nominal		15-Apr-08	13:55	15:37
15-Apr-08	VCUE08-E48-102	05:37 - 07:26	1.82	357	1001	1627	627	15.675	Recording	Production	Production 2D Line		15-Apr-08	15:37	17:26
15-Apr-08	VCUE08-E48-102	07:26 - 07:47	0.35	357	1628	1747	120	3	Recording	Production	Production Runout		15-Apr-08	17:26	17:47
15-Apr-08		07:47 - 09:31	1.73						Line Change	Linechange	Linechange, nominal		15-Apr-08	17:47	19:31
15-Apr-08	VCUE08-E52-103	09:31 - 10:56	1.42	177	1512	1001	512	12.8	Recording	Production	Production 2D Line		15-Apr-08	19:31	20:56
15-Apr-08	VCUE08-E52-103	10:56 - 11:16	0.33	177	1000	881	120	3	Recording	Production	Production Runout		15-Apr-08	20:56	21:16
15-Apr-08		11:16 - 12:59	1.72						Line Change	Linechange	Linechange, nominal		15-Apr-08	21:16	22:59
15-Apr-08	VCUE08-E47-104	12:59 - 14:49	1.83	357	1001	1669	669	16.725	Recording	Production	Production 2D Line		15 & 16-Apr-08	22:59	00:49
15-Apr-08	VCUE08-E47-104	14:49 - 15:09	0.33	357	1670	1789	120	3	Recording	Production	Production Runout		16-Apr-08	00:49	01:09
15-Apr-08		15:09 - 16:38	1.48						Line Change	Linechange	Linechange, nominal		16-Apr-08	01:09	02:38
15-Apr-08	VCUE08-E51-105	16:38 - 18:07	1.48	177	1550	1001	550	13.75	Recording	Production	Production 2D Line		16-Apr-08	02:38	04:07
15-Apr-08	VCUE08-E51-105	18:07 - 18:26	0.32	177	1000	881	120	3	Recording	Production	Production Runout		16-Apr-08	04:07	04:26
15-Apr-08		18:26 - 20:22	1.93						Line Change	Linechange	Linechange, nominal		16-Apr-08	04:26	06:22
15-Apr-08	VCUE08-E43-106	20:22 - 22:34	2.20	357	1001	1781	781	19.525	Recording	Production	Production 2D Line		16-Apr-08	06:22	08:34
15-Apr-08	VCUE08-E43-106	22:34 - 22:54	0.33	357	1782	1901	120	3	Recording	Production	Production Runout		16-Apr-08	08:34	08:54
15-Apr-08		22:54 - 00:00	1.10						Line Change	Linechange	Linechange, nominal		16-Apr-08	08:54	10:00
16-Apr-08		00:00 - 00:49	0.82						Line Change	Linechange	Linechange, nominal		16-Apr-08	10:00	10:49
16-Apr-08	VCUE08-E40-107	00:49 - 03:16	2.45	177	1866	1001	866	21.65	Recording	Production	Production 2D Line		16-Apr-08	10:49	13:16
16-Apr-08	VCUE08-E40-107	03:16 - 03:37	0.35	177	1000	881	120	3	Recording	Production	Production Runout		16-Apr-08	13:16	13:37
16-Apr-08		03:37 - 05:35	1.97						Line Change	Linechange	Linechange, nominal		16-Apr-08	13:37	15:35
16-Apr-08	VCUE08-E34-108	05:35 - 08:38	3.05	357	1001	2071	1071	26.775	Recording	Production	Production 2D Line		16-Apr-08	15:35	18:38
16-Apr-08	VCUE08-E34-108	08:38 - 08:59	0.35	357	2072	2191	120	3	Recording	Production	Production Runout		16-Apr-08	18:38	18:59
16-Apr-08		08:59 - 10:35	1.60						Line Change	Linechange	Linechange, nominal		16-Apr-08	18:59	20:35
16-Apr-08	VCUE08-E38-109	10:35 - 13:16	2.68	177	1942	1001	942	23.55	Recording	Production	Production 2D Line		16 & 17-Apr-08	20:35	23:16
16-Apr-08	VCUE08-E38-109	13:16 - 13:37	0.35	177	1000	881	120	3	Recording	Production	Production Runout		17-Apr-08	23:16	23:37
16-Apr-08		13:37 - 15:19	1.70						Line Change	Linechange	Linechange, nominal		17-Apr-08	23:37	01:19
16-Apr-08	VCUE08-E33-110	15:19 - 18:50	3.52	357	1001	2237	1237	30.925	Recording	Production	Production 2D Line		17-Apr-08	01:19	04:50
16-Apr-08	VCUE08-E33-110	18:50 - 19:12	0.37	357	2238	2357	120	3	Recording	Production	Production Runout		17-Apr-08	04:50	05:12
16-Apr-08		19:12 - 21:03	1.85						Line Change	Linechange	Linechange, nominal		17-Apr-08	05:12	07:03
16-Apr-08	VCUE08-E36-111	21:03 - 23:49	2.77	177	2011	1001	1011	25.275	Recording	Production	Production 2D Line		17-Apr-08	07:03	09:49
16-Apr-08	VCUE08-E36-111	23:49 - 00:00	0.18	177	1000	937	64	1.6	Recording	Production	Production Runout		17-Apr-08	09:49	10:00
17-Apr-08	VCUE08-E36-111	00:00 - 00:09	0.15	177	936	881	56	1.4	Recording	Production	Production Runout		17-Apr-08	10:00	10:09
17-Apr-08		00:09 - 01:49	1.67						Line Change	Linechange	Linechange, nominal		17-Apr-08	10:09	11:49
17-Apr-08	VCUE08-E31-112	01:49 - 05:10	3.35	357	1001	2238	1238	30.95	Recording	Production	Production 2D Line		17-Apr-08	11:49	15:10
17-Apr-08	VCUE08-E31-112	05:10 - 05:30	0.33	357	2239	2358	120	3	Recording	Production	Production Runout		17-Apr-08	15:10	15:30
17-Apr-08		05:30 - 07:13	1.72						Line Change	Linechange	Linechange, nominal		17-Apr-08	15:30	17:13
17-Apr-08	VCUE08-E26-113	07:13 - 10:38	3.42	177	2										

6.4. Daily Summary

All daily logs are in GMT time.

Fri, 18 Apr 2008, week 16

96.225 km total km acquired today.

23.075 km acquired for CUE Energy

Cue Energy survey completed today. On completion of Cue Energy the vessel then proceeded to 3D Oil prospect. Along the way all gun arrays recovered for maintenance on the HP air system. The paravane was brought to the stern of the vessel to check to check for any twists in the chain. Paravane looked fine.

No Tailbuoy GPS position part way through Seq 003 due to GPS not charging.

Extended line change after sequence 001 due to repairs on the door.

Midnight fuel balance 729.612 cubic M, Consumed 13.1 cubic M

HSE

Total personnel onboard: 34 (16 Maritime, 16 Seismic, 2 client)

17 x toolbox meetings (8 x Dept. Handovers, 2 x gun deployment, 2 x gun recovery, 2 x door retrieval, 2 x door deployment, 1 x HP manifold fittings requiring tightening)

3 x Observation cards

1 x Fire drill

2 x MSV (PC-HP manifold tightening - Bringing in para vane to check for twists in chain)

1 x JSA for working on HP air manifold

Thu, 17 Apr 2008, week 16

132.85 km acquired today, another good day production.

Long line change to Seq 115 due to prospect layout. Currently on the last line for CUE Energy.

Gun sting 2 and 3 onboard during the day for general maintenance

Midnight fuel balance 742.712 cubic M, Consumed 13.7 cubic M

HSE

Total personnel onboard: 34 (16 Maritime, 16 Seismic, 2 client)

10 x toolbox meetings (8 x Dept. Handovers, 1 x gun deployment, 1 x gun recovery)

0 x Observation cards

Wed, 16 Apr 2008, week 16

141.775 km acquired today, steady days production. Weather remains ok, the outlook looks fair.

Gun string 3 onboard on completion of Seq 107 due to gun 3-1 being disable d/t autofiring.

Gun sting 1 onboard on completion of Seq 108 for general maintenance

Midnight fuel balance 756.412 cubic M, Consumed 13.6 cubic M

HSE

Total personnel onboard: 34 (16 Maritime, 16 Seismic, 2 client)

12 x toolbox meetings (8 x Dept. Handovers, 2 x gun deployment, 2 x gun recovery)

1 x Observation cards

Tue, 15 Apr 2008, week 16

112.75 km acquired today, steady days production. Weather remains favorable, and the outlook also looks very good.

Gun string 1 and 3 recovered during the day for maintenance.

Midnight fuel balance 770.012 cubic M, Consumed 13.8 cubic M

HSE

Total personnel onboard: 34 (16 Maritime, 16 Seismic, 2 client)

12 x toolbox meetings (8 x Dept. Handovers, 2 x gun deployment, 2 x gun recovery)

2 x Observation cards

Mon, 14 Apr 2008, week 16

135.75 km acquired today, steady days production. Daily total less than previous days due to shorter survey lines.

During the line change from Seq 96 to 97 navigation changed output of V1G3 from SPM1 to SPM2.
Offsets have been noted (now on forward antenna)
Midnight fuel balance 783.812 cubic M, Consumed 13.7 cubic M
HSE
Total personnel onboard: 34 (16 Maritime, 16 Seismic, 2 client)
8 x toolbox meetings (8 x Dept. Handovers)
0 x Observation cards

Sun, 13 Apr 2008, week 16

153.5 km acquired today, steady days production
Array 3 recovered once for maintenance on gun 8.
Midnight fuel balance 797.512 cubic M, Consumed 13.9 cubic M
HSE
Total personnel onboard: 34 (16 Maritime, 16 Seismic, 2 client)
10 x toolbox meetings (8 x Dept. Handovers, 1 x gun deployment, 1 x gun recovery)
3 x Observation cards

Sat, 12 Apr 2008, week 15

150.35 km acquired today, 16.8km of which is on hold.
Vessel started production early morning after circling for a air leak on Gun Sub array No.1.
Weather outlook looks good for the next few days.
Seq 88 is a continuation of line VCUE08-E18-087 after gun problems on Seq 87.
Seq 90, Auxiliary channels not recorded on seal from SP 2659. Reboot of SEAL at EOL fixed the issue. SP2659 to EOL on hold
Midnight fuel balance 811.412 cubic M, Consumed 14.8 cubic M
HSE
Total personnel onboard: 34 (16 Maritime, 16 Seismic, 2 client)
11 x toolbox meetings (8 x Dept. Handovers, 2 x gun deployment, 1 x gun recovery)
Version 2: Seq 90 of Hold, line accepted. Line complete.

Fri, 11 Apr 2008, week 15

145.2 km acquired today. East west lines complete, long line change to resume North South lines.
Circle late in the day due to a air leak on Array 1.
Gun arrays recovered twice today for general Maintenance, and once for necessary repairs (3 times in total)
Midnight fuel balance 826.212 cubic M, Consumed 15 cubic M
HSE
Total personnel onboard: 34 (16 Maritime, 16 Seismic, 2 client)
13 x toolbox meetings (8 x Dept. Handovers, 2 x gun deployment, 3 x gun recovery)
1 x CSV
1 x MSV
3 x department meetings
1 x committee meeting
1 x Observation card

Thu, 10 Apr 2008, week 15

171.35 km acquired today. Goods days production
Midnight fuel balance 841.212 cubic M, Consumed 13.9 cubic M
HSE
Total personnel onboard: 34 (16 Maritime, 16 Seismic, 2 client)
12 x toolbox meetings (8 x Dept. Handovers, 2 x gun deployment, 2 x gun recovery)
1 x fire drill
4 x cross audits (PC and CHNAV)
6 x observation cards

Wed, 09 Apr 2008, week 15

150 km acquired today. Weather is currently very good on prospect.
Smooth run ended today with a few issues. Still a good days production though.
1. Extended line change after Seq 78 due to necessary gun maintenance. Pig tail needed replacement.

2. Vessel circled soon after starting Seq 079 due to a air leak on array 2. Flange for the top housing needed to be replaced.

3. During Seq 080, 29 shots recorded with no raw GPS. 29 shots to switch over to spare SPM

Midnight fuel balance 855.112 cubic M, Consumed 14.8 cubic M

HSE

Total personnel onboard: 34 (16 Maritime, 16 Seismic, 2 client)

12 x toolbox meetings (8 x Dept. Handovers, 2 x gun deployment, 2 x gun recovery)

3 x Observation card

Tue, 08 Apr 2008, week 15

174.775km acquired today. Another good day's production.

Midnight fuel balance 869.912. cubic M, Consumed 14.8 cubic M

HSE

Total personnel onboard: 34 (16 Maritime, 16 Seismic, 2 client)

8 x toolbox meetings (8 x Dept. Handovers)

3 x Observation card

1 x Cross Audit

1 x action point removed RAP list

Mon, 07 Apr 2008, week 15

Another good days production. Weather has started to increase but is still good for the area.

Midnight fuel balance 884.712. cubic M, Consumed 13.5 cubic M

HSE

Total personnel onboard: 34 (16 Maritime, 16 Seismic, 2 client)

10 x toolbox meetings (8 x Dept. Handovers, 1 x gun deployment, 1 x gun recovery)

4 x Observation card

1 x MSV

1 x action point added RAP list

Sun, 06 Apr 2008, week 15

Sound days production on East West lines. Weather remains favorable

Vessel WSP reduced during Seq 69 from 5.3knots to 5.1knots due to the paravane sinking. Once at 5.1knots paravane came back to the surface.

Gun array 2 onboard for repairs after Seq 071.

Midnight fuel balance 898.212 cubic M, Consumed 15.1 cubic M

HSE

Total personnel onboard: 34 (16 Maritime, 16 Seismic, 2 client)

10 x toolbox meetings (8 x Dept. Handovers, 1 x gun deployment, 1 x gun recovery)

1 x Observation card

Sat, 05 Apr 2008, week 14

Production much better than yesterday, weather during the day had decreased and after 2 North South lines, East West lines are acquired. Sea conditions at present are

extremely good for the area which is due to a high pressure system in the area.

Midnight fuel balance 913.312 cubic M, Consumed 13.7 cubic M

HSE

Total personnel onboard: 34 (16 Maritime, 16 Seismic, 2 client)

9 x toolbox meetings (8 x Dept. Handovers, 1 x gun deployment)

1 x Observation card

Fri, 04 Apr 2008, week 14

Vessel departed for the survey area at 02:00.

Streamer deployment was delayed due to Cetacean guidelines for night time operation.

First seq after crew change is terminated due to a valve sticking open on the compressor (3rd stage) therefore could not maintain air pressure.

Seq 63 terminated early into the line due to gun 7 autofiring. This is logged as observer downtime as they did not realize they could disable a further gun and remain in spec (this has now been rectified).

Array 1 recovered whilst the vessel circled (Gun 7). After deployment of array 1, gun 7 was still autofiring, vessel circled again to recover array 1. This extended downtime is logged under Gun Mechanics.

Midnight fuel balance 927.012 cubic M, Consumed 4.870 cubic M

HSE

Total personnel onboard: 34 (16 Maritime, 16 Seismic, 2 client)

15 x toolbox meetings (8 x Dept. Handovers, 1 x deploying streamer, 3 x gun deployment, 3 x gun recovery)

1 x Observation card

Version 2. ROB fuel changed

Version 3. Wx standby removed, nominal line change added 1.8 hours before first line.

Thu, 03 Apr 2008, week 14

Vessel remained in port for the day due to weather conditions on prospect. Strong to Gale force winds was forecasted on survey location.

At 04:00, meeting with Client, PC, Master to discuss weather on prospect. It was a consensus to re-evaluated at 21:00. At 21:00 it was decided good to sail.

Vessel is due to sail at 02:00 due pilot unavailability any earlier.

Midnight fuel balance 931.882 cubic M, Consumed 1.601 cubic M

HSE

Total personnel onboard: 34 (16 Maritime, 16 Seismic, 2 client)

8 x toolbox meetings (8 x Dept. Handovers)

1 x Abandon ship drill

1 x ISPS drill

3 x marine inductions

Version 2, ROB fuel changed.

Wed, 02 Apr 2008, week 14

After crew change was considered complete the vessel went down for weather for the remainder of the day due to inclement weather on prospect.

Will re-evaluate sailing time at 05:00 tomorrow.

19.5m3 of sludge offloaded

Midnight fuel balance 933.483 cubic M, Consumed 4.867 cubic M, Received 400.763

HSE

Total personnel onboard: 34 (16 Maritime, 16 Seismic, 2 client)

8 x toolbox meetings (8 x Dept. Handovers)

3 x MSV (VOM)

1 x Must Haves (VOM)

2 x Observation Cards

Version 2, fuel figures changed.

Tue, 01 Apr 2008, week 14

One line completed today before recovering gear for crew change.

Vessel currently in Bernie for Crew change.

Weather forecast is strong winds over the 24 hours. Vessel is on 30minutes notice to leave the port if the seas pick up in harbour. If the seas do not pick up in harbour the vessel will remain alongside until the front has passed.

Midnight fuel balance 537.587 cubic M, Consumed 14.5 cubic M

HSE

Total personnel onboard: 35 (16 Maritime, 17 Seismic, 2 client)

8 x toolbox meetings (8 x Dept. Handovers)

2 x Observation Cards

Version 2. 2hrs LCHnom removed on completion off Seq 061

12

Mon, 31 Mar 2008, week 14

Good production with 136 km today. We had steady production today in fairly large swell from abeam. Winds and seas gradually abated throughout the day from 35 to 15 knots.

We expect to continue production until around 17:00 Local time before preparing for recovery and crew change.

Midnight fuel balance 551.587 cubic M, Consumed 14.5 cubic M

HSE

Total personnel onboard: 35 (16 Maritime, 17 Seismic, 2 client)

8 x toolbox meetings (8 x Dept. Handovers)
3 x JSA (Close Pass, Heavy weather, Power shut down Instr. room)
1 x CSV (Galley)
1 x MSV (Ship Walk around with Capt and HSE)
2 x Observation Cards
ver 2 Added 10 minute extended line change after seq 57 due to weather.
Ver 3, line number for Seq 060 altered (previous E28, change to E24)

Sun, 30 Mar 2008, week 14

117 km again today. Production continued in the North-South headings. Weather is rough but shooting in the trough and data looks good. Weather gradually increased and we ended the day standing by for weather. Wind 35-45 knots and 4-6 m swell from the West. At the end of the day it was starting to come down again and we expect to start production after midnight GMT.

Midnight fuel balance 566.087 cubic M, Consumed 15.0 cubic M

HSE

Total personnel onboard: 35 (16 Maritime, 17 Seismic, 2 client)

8 x toolbox meetings (8 x Dept. Handovers)

0 x Observation card

Sat, 29 Mar 2008, week 13

117 km today. We started off the day standing by for weather. The conditions improved enough that we were able to start line production in the North-South headings. This was in spite of 4m swell from the West SW. We had good production throughout most of the day after 08:59 GMT. Another front expected to cross over mid day tomorrow GMT.

Midnight fuel balance 581.087 cubic M, Consumed 12.16 cubic M

HSE

Total personnel onboard: 35 (16 Maritime, 17 Seismic, 2 client)

10 x toolbox meetings (8 x Dept. Handovers 1 x gun deployment, 1 x door deployment)

1 x Observation card

Fri, 28 Mar 2008, week 13

114 km today. We had good production throughout most of the day but as weather front hit the wind and seas shut us down at the end of line N53 (seq 52). We brought on the guns and door just in time. 1 hour later would have been too late. Very rough at end of day GMT. Expect to be down for weather until mid day monday by current prognosis. Waiting on weather.

Midnight fuel balance 593.247 cubic M, Consumed 14.3 cubic M

HSE

Total personnel onboard: 35 (16 Maritime, 17 Seismic, 2 client)

11 x toolbox meetings (8 x Dept. Handovers 2 x gun recovery, 1 x door recovery)

2 x JSA

1 x Observation card

1 x Crew safety meeting

4 x dept. safety meetings

2 x Observation Cards

Vers3 Changed the runout on seq 47 to "runout" from 2D production

Thu, 27 Mar 2008, week 13

Good production with 123 km today. We had steady production today, with only one extended line change by 0.5 hours to fix a gun sensor problem.

Had one delayed full power gun ramp up due to whale sighting. Also one 5 km run-in due to proximity of rig.

Midnight fuel balance 607.547 cubic M, Consumed 14.0 cubic M

HSE

Total personnel onboard: 35 (16 Maritime, 17 Seismic, 2 client)

10 x toolbox meetings (8 x Dept. Handovers, 1x gun recovery, 1 x gun deploy))

1 x Dept. crossaudit (workboat deck)

2 x drills (Life boat muster, ISPS drill)

0 x Observation Cards

Wed, 26 Mar 2008, week 13

Only 32 km today. Day started off on standby for weather. All gear was onboard at 01:05 GMT. Winds died down to 25 knots around 07:00 GMT and we started to deploy the streamer shortly thereafter. At 11:31 GMT weather still too rough to deploy door (21 knot winds and 3-4 m choppy swell and seas) Weather calmed steadily thereafter and production started at 19:00 GMT in a easterly direction on line N42. A new and stronger weather front is approaching and should hit us tomorrow evening.

Midnight fuel balance 621.547 cubic M, Consumed 14.5 cubic M

HSE

Total personnel onboard: 35 (16 Maritime, 17 Seismic, 2 client)

13 x toolbox meetings (8 x Dept. Handovers 1 x streamer recovery, 1 x door recovery, 1 x streamer deploy, 1x door deploy, 1 x gun deploy))

0 x Observation Cards

Vers2 Changed the weather standby to include the first 12 hour charged to CUE.

Tue, 25 Mar 2008, week 13

Only 75 km today. We had to cut seq 36 short due to pressure problems (air leak). This line was considered complete as it was on the runout shots. We had an extended line change to repair this. We had to stop for weather at 16:37 GMT during line 42. It was NTBP'd. Winds upto 40 knots and seas built up to 4-5m. We tried to look at shooting in the Southerly direction and then decided to pick up the gear. All gear onboard just after midnight GMT. Waiting on weather.

Midnight fuel balance 636.047 cubic M, Consumed 14.5 cubic M

HSE

Total personnel onboard: 35 (16 Maritime, 17 Seismic, 2 client)

11 x toolbox meetings (8 x Dept. Handovers 2 x gun recovery, 1 x gun deploy)

1 x OFI (Difficulty with MGC address book)

1 x Crew safety meeting

4 x dept. safety meetings

2 x Observation Cards

Vers2 Changed the first 12 hours of weather standby to CUE

Mon, 24 Mar 2008, week 13

125 km today. Production a little less today due to shooting shorter lines and one extended line change due to gun problem. Very good weather and great data quality.

We had one incident with electrical plug found slightly melted in clothes wash room. Report sent to office.

Midnight fuel balance 650.547 cubic M, Consumed 14.5 cubic M

HSE

Total personnel onboard: 35 (16 Maritime, 17 Seismic, 2 client)

10 x toolbox meetings (8 x Dept. Handovers 1 x gun recovery, 1 x gun deploy)

1 x incident (electrical plug melted in clothes wash room)

Sun, 23 Mar 2008, week 13

136 km today. Production continued smoothly today in good conditions.

Midnight fuel balance 665.047 cubic M, Consumed 16.244 cubic M

HSE

Total personnel onboard: 35 (16 Maritime, 17 Seismic, 2 client)

8 x toolbox meetings (8 x Dept. Handovers)

1 x Medical demonstration

1 x Dept Xaudit

4 x Observation cards

Sat, 22 Mar 2008, week 12

155 km today. Today we lost the active Tailbuoy data. The charging seems to have failed. We could not see the Tailbuoy on the radar due to low feather, seas and a blind spot behind the ships mast. Since all streamer compasses are good, weather is good, shooting 2D, and reliable positioning can be processed without the Tailbuoy data, we continued with production. We will change out the Tailbuoy combi-box at first reasonable opportunity (ie, weather downtime or crew change). There was some swell burst noise

on some sequences today, more so when shooting the westward heading. Another weather front edge is passing over shortly.

Midnight fuel balance 681.291 cubic M, Consumed 14.5 cubic M

HSE

Total personnel onboard: 35 (16 Maritime, 17 Seismic, 2 client)

10 x toolbox meetings (8 x Dept. Handovers, 1 x gun recovery, 1 x gun deployment)

11 x Observation cards

Fri, 21 Mar 2008, week 12

153 km today. We had quite a lot of swell noise on seq 13 as winds were up to 40 knots and 3 m swell. It was decided to continue shooting on seq 14 as the wind began to drop as we approached the runin and the swell noise appeared better in this direction. The weather came down quite quickly during this line and the streamer was raised to 8m for seq 15.

Midnight fuel balance 695.791 cubic M, Consumed 16.094 cubic M

HSE

Total personnel onboard: 35 (16 Maritime, 17 Seismic, 2 client)

8 x toolbox meetings (8 x Dept. Handovers)

0 x FMM Training

1 x PRM meeting

ver2 changed charge code on run-out seq 19

8 x Observation cards

Thu, 20 Mar 2008, week 12

140 km today. 40 knot winds caused swell to build during the day and the streamer had to be set at 9m for sequences 13 and 14. We continued shooting the east-west lines today.

A new High pressure system is approaching and should give us more days of good weather.

Midnight fuel balance 711.885 cubic M, Consumed 14.5 cubic M

HSE

Total personnel onboard: 35 (16 Maritime, 17 Seismic, 2 client)

8 x toolbox meetings (8 x Dept. Handovers)

0 x FMM Training (Disposal at sea practices)

0 x Observation cards

3 x cross audits

1 x OFI Robtrack improvement with better gyro

2 x drills Fire, MOB

Wed, 19 Mar 2008, week 12

137 km today. The data shows strong multiple resonance energy on the records due to very hard bottom with strong refractions. We started shooting the east-west lines today.

We had one incident on line VCUE08-N34-011 when Robtrack locked up. We went 60m offline. This was quickly corrected.

Calm weather most of the day with wind and seas building a bit towards the end of the day. Front supposed to pass over us this evening local. No affects seen on the data.

Midnight fuel balance 726.385 cubic M, Consumed 14.5 cubic M

HSE

Total personnel onboard: 35 (16 Maritime, 17 Seismic, 2 client)

10 x toolbox meetings (8 x Dept. Handovers, 1 x gun recovery, 1 x gun deployment)

2 x FMM Training (Disposal at sea practices)

0 x Observation cards

1 x Incident (Robtrack / GPS gyro locked up)

Tue, 18 Mar 2008, week 12

177 km today. Long North South lines contributing to good daily production. The data shows strong multiple resonance energy on the records due to very hard bottom with strong refractions. Seas a bit more lumpy as a front passes over, does not significantly affect the data.

Midnight fuel balance 740.885 cubic M, Consumed 14.5 cubic M

HSE

Total personnel onboard: 35 (16 Maritime, 17 Seismic, 2 client)

8 x toolbox meetings (8 x Dept. Handovers)

2 x FMM Training (Safe Navigation practices)
1 x MSV (Barrier placement on gun bundle)
ver2 added 2 FMM training sessions to HSE stats.
3 x Observation cards

Mon, 17 Mar 2008, week 12

Really good production day with 174 km. Long North South lines contributing to good daily production. The data shows strong multiple resonance energy on the records due to very hard bottom. We have had another day of great weather. We are looking into some predictive decon gates on the QC system for help in producing some better stacks and velocities.

Midnight fuel balance 755.385 cubic M, Consumed 14.0 cubic M
HSE

Total personnel onboard: 35 (16 Maritime, 17 Seismic, 2 client)

8 x toolbox meetings (8 x Dept. Handovers)

0 x FMM Training

0 x CSV

4 x Observation cards

ver2 changed charge code on runout of seq1 to CUE

Sun, 16 Mar 2008, week 12

Really good production day with 152 km. We finished off the TAP Oil survey and at 18:17 GMT began acquisition on the Cue Energy prospect. We have had another day of extremely good weather. This actually may contribute to stronger multiples on the data, which will be a big issue for processing.

Midnight fuel balance 769.385 cubic M, Consumed 17.5 cubic M
HSE

Total personnel onboard: 35 (16 Maritime, 17 Seismic, 2 client)

10 x toolbox meetings (8 x Dept. Handovers, 1 x gun recovery, 1 x gun deployment)

2 x FMM Training

1 x CSV (recovery and deployment of guns)

1 x Observation cards

1 x PRM meeting today

ver2 changed end of inter-prospect transit from 17:01 to 17:00

6.5. Field Information and Encountered Problems

6.5.1. Obstructions / Installations in the Field

Yollar A platform is to the North East of the prospect. A 5km run in was used as to remain clear of the exclusion zone.

6.5.2. Traffic / Shipping Lanes

There was daily commercial shipping traffic through the prospect area observed during the duration of the survey. No problems encountered and all ships communicated and cooperated nicely with us.

6.5.3. Fishing Activity

No fishing activity noticed throughout the survey.

6.5.4. Seismic Interference and Time Share

No seismic interference was observed during the survey.

6.5.5. Environmental Obstacles

1 delayed full power gun ramp up due to a whale sighting. No lost time recorded. Generally the seas conditions were favourable however production ceased on a few occasions due to low air pressure systems passing over the prospect causing strong winds and inclement sea conditions.

6.5.6. Operational Observations

Had a few technical stops and one crew change during the survey which equated to approximately 7% of the survey duration.

Otherwise, things went very good for the production during the survey. Good weather and low feather angles on streamer provided excellent quality data.

7. HSE Summary

No environment incidents during the survey.

Prior to all safety critical operations, i.e. deploying and recovery of seismic equipment, a "Toolbox Meeting" was held to verify and eliminate any hazards related to the operation.

Each operation has its own dedicated procedures, laid down in the CGGVeritas QHSE system and these were carefully followed throughout the survey.

We did have 2 Incidents during the survey.

UNA – Unsafe act

MAA – Material accident

UNA: ROB TRACK failed to keep line heading and the vessel started to drift off.

MAA: Burnt electrical plug connected to the power supply in the laundry room.

HSE summary stats from 16th March to 18th Apr 08

		Total man-days for Master Vessel			
Marine	544			induction tour seismic	0
CGG	544	1173		induction tour marine	3
Sub Contract	34	Total Exposure hrs		HSE Committee Meeting	1
Client	51	28152		HSE Crew Meeting	1
	0	Total man-days for chase		Department Meeting	7
	0	0		PRM	2
	0	0			
	0	Total Chase Exposure hrs		OGP_FMM HSE training	9
	0	0			
	0	0		Small Boat Sortie	0
Total Exposure hrs All		28152		External Audits	0
				Xdepartment Audit	10
				New open action	1
				Action Closed	2
				CSV	3
				MSV	10
				NC	1
				OFI	2
				JSA:	4
				Observation_cards	68
				Tool Box meetings:	340
				Drills	8
				Incident	2

Fuel Figures Breakdown

Vessels	End of week R.O.B.	Fuel used	Fuel bunkered
Pacific Titan	681.291	445.036	400.763
	0	0	0
	0	0	0
	0	0	0
	0	0	0
	0	0	0
	0	0	0
	total ROB	total used	total bunkered

7.1. Observation Cards during the Survey

Safety Observation Card Register M/V Pacific Titan			<div>Deficient PPE</div> <div>Negative attitude towards HSE rule</div> <div>Deficient maintenance</div> <div>Sharp parts / cutting tools</div> <div>Deficient equipment</div> <div>Poorly designed equipment</div> <div>Deficient means of communication</div> <div>Training deficiency</div> <div>Deficient information</div> <div>Working at height / aloft</div> <div>Slippery surfaces / tripping hazards</div> <div>Lifting / Handling</div> <div>Small boat sorties</div> <div>Deficient housekeeping</div> <div>Misc. Transport</div> <div>Hygiene</div> <div>Other</div>																			
Card #	Date	Short Description	Action Taken or Recommendation																Action By	APL		
1	16-Mar-08	Suggestion, have a introduction brochure for all new comers							X									HSE let this person down by not providing the already in place new crewmembers booklet.	Hsea		x	
2	16-Mar-08	Chair needs improving for the process dept						X										Suggest to get typist chair for better postion for the operator	Processing		x	
3	16-Mar-08	Not everyone aware of expiry dates for medicals, offshore courses											X					Make a short text document with all expiry information for general information, Information passed to all departments	Hsea		x	
4	16-Mar-08	Rubbish outside the elctrical shack															X	Needs to be placed in a bin	Hsea		x	
5	16-Mar-08	Light in need of repair or moving away from behind gun bundle1						X										Inform Ch Eng	Ch/Eng		o	
6	18-Mar-08	Acetylene bottles that were heavily rusted on the bottoms were not removed from the vessel in Singapore. A Hazard.															X	Inform Ch Eng, Booked to leave the vessel to return to BOC	Hsea		o	
7	18-Mar-08	Cigeratte smoke smell still persists on upper deck in cabin 13																The cabin occuperer has investigated possible smell via the aircon from the outside but disagees with this suggestion, will place notices up to warn personnel of danger of smoking in cabin.Unable to confirm smell exist.	Ch/Eng		x	
8	18-Mar-08	Galley floor very slipery at dinner time due to water returning back up the drainage plugs															X	Suggested to place a rubber backed mat down at meal times to Ch Steward so crew can gather food safely, but still posses a hazard to cooks in there work area	Ch/Eng		x	
9	21-Mar-08	No water in cabin																Due to refitting new pump on water system as old one broke, disruption on the water supply was unavoidable	Ch/Eng		x	
10	21-Mar-08	No hot water available in galley																Due to refitting new pump on water system as old one broke, disruption on the water supply was unavoidable	Ch/Eng		x	
11	21-Mar-08	water in showers is rust coloured																Due to refitting new pump on water system as old one broke, disruption on the water supply was unavoidable	Ch/Eng		x	
12	21-Mar-08	Saltwater in the hot water system																Due to refitting new pump on water system as old one broke, disruption on the water supply was unavoidable	Ch/Eng		x	
13	21-Mar-08	Person wearing correct PPE with a safety harness but did not have it attached whilst working at height																Explained danger to worker who then understood the situation better and attached himself onto a secure point	Hsea		x	
14	21-Mar-08	Barrier beside aircon unit loose on top deck							X									Retighten barrier	Hsea		X	
15	21-Mar-08	Light fitting behind gun reel 1 needs disconnecting, ref card 1008						X										Remove light fitting	Ch/Eng		o	
16	21-Mar-08	Lip at top of the stairs leading onto the helideck from the streamer deck can be cut away to reduce the extreme height of the first step							X									Cut lip away if agreed by Swires management to prevent tips and falls. Not agreed so closed out SCM 32.	Ship Managers		x	
17	22-Mar-08	No sign warning personnel of sudden start up of the small compressor on the streamer deck																Place new sign indicating sudden start up of machine	Hsea		x	
18	22-Mar-08	Warning sign hanging off the bulkhead on the starboard streamer deck.																Repair signage	Hsea		x	
19	22-Mar-08	MOB button location not made clear at aft of streamer deck, Starboard																Make the MOB button more obvious	Hsea		x	
20	22-Mar-08	Rust on hydraulic pipework on controls for the boom winch				X												Inform Gun mechs to paint or grease parts to prevent further deterioration	Source		x	
21	22-Mar-08	No flammable sign attached to the Kero tanks on the streamer deck																Place new sign indicating flammable liquid	Hsea		x	

O: Open / X: Closed

22	22-Mar-08	Extreme corrosion on the fire pipe located between the gun reels on the streamer deck		X														Captain aware of the situation	Ch/Officer			o
23	22-Mar-08	Cage door not fully secure for high pressure cage on gun deck					X											Inform Gun mechs to realign door	Source			X
24	22-Mar-08	Ref 998, broken bracket underneath the bottom step in the Starboard boarding zone, ref card 998					X											Informed the captain and shown the chief officer	Ch/Officer			o
25	22-Mar-08	Broken bracket that should be holding one of the vent pipes behind the steps on the starboard boarding zone area					X											Informed the captain and shown the chief officer	Ch/Eng			o
26	22-Mar-08	Missing light cover inside marine tool store				X												Inform the chief officer	Ch/Officer			o
27	22-Mar-08	Gunner was working recovering the guns and stepped over the red line without fall arrester attached	X															Spoke with person concerned and reminded them of importants of attaching the fall arrester	Hsea			X
28	23-Mar-08	Question for survival suits, will a too big survival suit cause problems being used.						X										Explained that different sizes are available for varying body shapes, when collecting the survival suit from the box, check to see that it does not contain an extra large survival suit.	Hsea			x
29	23-Mar-08	Bathroom flooded, personnel to inform bridge of any unusual situation					X											Better communications for all crew members	Hsea			x
30	23-Mar-08	Silver fish spotted in the galley													X			Ask the chief steward to spray area	Hsea			x
31	23-Mar-08	Shower head broken in top accomadation bathrooms					X											Replaced shower head	Hsea			x
32	25-Mar-08	Burnt electrical plug found connected to the washing machine					X											Removed plug from the socket and reported to the bridge, try to find what caused this plug to fail	Hsea			X
33	25-Mar-08	Soiled toilet paper left in waste paper basket													X			Consider change words on sign	Hsea			x
34	28-Mar-08	Light flickering in cabin 13				X												Replaced bulb	Hsea			x
35	29-Mar-08	Mosquito observed onboard, possible more around																If Insect are onboard then spray measure may be necessary, consulted with medic this is a harmless version, will monitor the situation	Hsea			
36	30-Mar-08	Windscreen wiper on bridge window is not working					X								X			Fix at earliest opportunity	Ch/Officer			o
37	31-Mar-08	CCTV monitor is too small for observation					X											Place order in for larger screen for better vision for bridge crew	Ship Managers			x
38	2-Apr-08	Aerosol cans arrived last crew change left on the floor of cabin 21.												X				Re interate in PC handovers to store aerosal cans in correct area	Party Chief			x
39	2-Apr-08	Appears No attempt to store supplies that arrived previous crew change (observers - Nav) just left on the deck of cabin 21.													X			Re interate in PC handovers for both crews to try and store items and not leave on deck.	Party Chief			x
40	4-Apr-08	Step ladders and combobox tied to access ladder to the loft in the Bird Shack making use of climbing the ladder unsafe.													X			Removed step ladders and combobox and stored in a better place	Recording			x
41	5-Apr-08	reel movement alarms too loud heard in accommodation keeping/waking personnel asleep																Alarm Volume to be addressed				o
42	6-Apr-08	Poor wiring of 12 volt fan an in PC cabin.					X											Removed Fan.	Party Chief			x
43	7-Apr-08	Appears HSE info in PC handovers on Haydns swing are not detailed enough.					X											Start Separate Handover Notes for HSE.	Party Chief			x
44	7-Apr-08	Both stern MOB alarms on Streamer deck failed to sound MOB alarm and disable guns					X											Fix at earliest opportunity. Tested again OK.	Recording			x
45	7-Apr-08	Investigate if Gun link should come up with Miss-fire or just a status error when MOB alarm is activated. New software version installed.								X								Investigate	Recording			x
46	7-Apr-08	Update procedure for MOB alarm testing to inform Bridge of test results					X											Update.	Party Chief			x
47	8-Apr-08	Basketball ring on helideck moving about in rough weather could become safety hazard.													X			Extra tie downs used to support basketball ring	Positioning			x
48	8-Apr-08	Small oil patch in Tailbuoy stowage area on cable deck possible slip hazzard.									X							Oil patch cleaned up	Positioning			x
49	8-Apr-08	Once again the safety line for the work boat is connect to the davit lifting ring handles instead of the load bearing lifting ring.					X											Put back to correct position and will be placed in HSE handovers	Party Chief			x
50	9-Apr-08	Replacing SRD rebuild kits could be a possible hazard, need clarification on how to rebuild safely when onboard.								X								CHOBs to investigate correct method.	Recording			o
51	10-Apr-08	Rowing machin in gym is moving across floor when in use and could cause personnel injury.									X							Non slip pads placed under rowing machine legs.	Positioning			x
52	10-Apr-08	Safety signage for door at top of stairs found laying on one of the steps. Could be a trip hazzard.									X							Signage placed back in position with new adhesive.	Positioning			x
53	11-Apr-08	Communication between Gun deck and Instrument room is poor. Vintor system does not work fixing the vintor may not be the answer.						X										HOD and PC to discuss solution	Party Chief			o
54	11-Apr-08	Bandages on gun deck are out of date					X											Informed medic	Medic			x
55	11-Apr-08	No life ring port side aft gun deck.																Life ring Stbd side fwd, ask Captain what the plan is.	Party Chief			x

[illegible]

8. Shipment List

Proforma invoice nr.	Job#	Description	Receiver	Destination
PT-2008-029	6374	Cue Energy Res. T37/38P Primary (Seq 59 - 115)	WesternGeco, Perth	Australia
PT-2008-030	6374	Cue Energy Res. T37/38P Copy (Seq 1 - 115)	WesternGeco, Perth	Australia

9. Crew Lists



Monday, March 17, 2008

Crew List for MV Pacific Titan



	Department	Name	Title	Date Of Birth	Nationality	Passport Number	Expiry Date
1	Seismic	Sigurd Osterud	Party Chief	15-Oct-61	Norwegian	20761184	24-Feb-15
2	Seismic	Jun Marcelino Lumabas	S/L Observer	31-Oct-80	Filipino	ZZ229544	29-Jun-12
3	Seismic	Dervin Arenal Victorio	Observer	23-Oct-80	Filipino	QQ0522130	14-Oct-10
4	Seismic	Paul Stafford	Ch Navigator	05-May-70	British	099024130	24-Apr-12
5	Seismic	Ronaldo Maravilla Morales	S/L Mechanic	22-Mar-59	Filipino	ZZ145454	18-May-10
6	Seismic	Reynaldo Poud Vega	Mechanic	17-Sep-62	Filipino	UU0385562	19-Dec-11
7	Seismic	Victor Neoda Satago	Mechanic	05-Aug-68	Filipino	LL308971	05-Aug-08
8	Seismic	Jose Naldoza Peralta	Mechanic	01-Jun-50	Filipino	SS0035761	01-Dec-10
9	Seismic	Dennis Paras Aquino	Geophy	02-Aug-79	Filipino	NN0348967	14-Jul-09
10	Seismic	Dennis Basallaje Maranon	Observer	22-Sep-77	Filipino	QQ0076201	17-Mar-10
11	Seismic	Christopher Ibasco Hernandez	Navigator	05-Dec-83	Filipino	SS0131590	08-Dec-10
12	Seismic	Roberto Obras Sibayan	Doctor	13-May-65	Filipino	TT0947029	23-Oct-11
13	Seismic	Allan Beattie	Observer	23-Mar-65	British	93105388	03-Dec-13
14	Seismic	Richard Sykes	HSE Advisor	18-Jun-66	British	761103260	28-Feb-16
15	Seismic	Roger Steffensen	Ch. Mech	06-Aug-53	Norwegian	25245636	11-Apr-16
16	Seismic	Clement Le Du	Navigator	23-Mar-77	French	03TE 59624	28-Jan-14
17	Seismic	Steffi Schwarz	Chief Geo	02-Apr-73	Australian	M2598263	09-Feb-15
18	Seismic	William Lloyd	Client		Australian	E 1022292	14-Mar-15
19	client	Carol Dawn Sutherland	MMO	28-Aug-63	New Zealand	AB718594	11-Aug-10
20	Marine	Theodore Strocky	Captain	15-Sep-50	Australian	M5129759	05-Sep-16
21	Marine	Carl Sayers	Chief Engineer	24-May-49	New Zealand	AA647005	14-Mar-13
22	Marine	Shan Mudiyansele	Comp Mech	01-May-63	SRI Lankan	M1858320	31-Mar-09
23	Marine	James Riley	Chief Officer	11-Nov-80	Australian	L7347221	26-Apr-09
24	Marine	Hemaka Dissanayake	2nd Mate	26-Feb-72	New Zealander	EA888314	29-Oct-12
25	Marine	Alexander Ivanoff	1st Engineer	05-Dec-60	Australian	M5216687	22-Nov-15
26	Marine	Alexander Saldanha	2nd Engineer	04-Mar-64	Australian	M1239195	12-Feb-14
27	Marine	Kerin Ross	G.P.	06-Jul-46	Australian	L7195273	08-Feb-09
28	Marine	Chris Pitman	G.P.	16-Nov-48	New Zealander	AA500827	18-Jun-12
29	Marine	Michael Howard	G.P.	29-Jul-73	Australian	M7562140	01-Oct-17
30	Marine	John Mason	G.P.	17-May-47	Australian	E 7592880	30-Aug-12
31	Marine	Donald Crawford	Chief Stwd	13-Apr-46	Australian	M5345157	21-Jul-16
32	Marine	Graeme Scott	Stwd	09-Jul-56	Australian	M1975283	26-Nov-14
33	Marine	Christopher Milne	Ch Cook	03-Apr-61	Australian	M5791813	01-Apr-16
34	Marine	Anthony Raines	Cook	07-Mar-54	Australian	M1656991	19-Jul-14
35	Marine	Peter Brown	Comp mech	26-Jun-62	Australian		



Swire Pacific Offshore



Pacific Titan Crew List

Date: 2nd. April 2008

No	Name	Rank	D.O.B.	Citizen	Passport no.	Exp.date
1	Bruce Wallis	Captain	24.08.53	Australian	L8924123	25.01.11
2	Raymond Smith	Chief Officer	23.04.61	Australian	M6763702	17.04.17
3	William Shelley	2nd Mate	26.02.72	Australian	E3022159	
4	Tommy Boughton	Chief Engineer	30.03.55	Australian	M7065567	01.06.17
5	Peter Caple	1st Engineer	02.05.65	Australian	E3052135	16.10.17
6	P.Golatk	2nd Engineer	25.06.59	Indian	B5713039	02.08.11
7	C.Herangi	G.P.	04.08.56	New Zealander	AA390623	28.05.12
8	K.Robertson	G.P.	10.06.48	Australian	M6535274	15.11.16
9	Bjorn Thomasson	G.P.	11.10.52	New Zealander	AA528860	
10	Lionel Hall	G.P.	03.01.58	Australian	M5337014	22.05.16
11	Jamie Dent	Chief Stwd	21.09.61	Australian	L89494325	22.05.10
12	Bruce Maher	Stwd	05.03.53	Australian	L3042947	29.11.11
13	David Ferrier	Chief Cook	12.03.58	Australian	M5091479	11.04.16
14	Nathan Bartlett	2nd. Cook	01.05.80	Australian	M1664811	28.10.14
15	Kenneth Stephens	Comp. Mech	17.09.51	Australian	M1851206	27.09.14
16	David Billington	Comp. Mech	09.11.49	Australian	M2858580	30.06.15
CGG VERITAS GEOPHYSICAL						
17	Haydn Brook	Party Chief	10.07.73	Australian	E1024451	10.03.15
18	Tyrone Hackett	Chief Observer	19.12.71	Canadian	BD106336	16.06.10
19	John Shannon Gracey	Observer	18.07.59	British	039872219	27.10.10
20	Steven Ryan	Ch Nav	10.08.81	Australian	M5358989	04.01.12
21	Ralph Bennett	Chief Mechanic	26.03.58	British	102069928	18.12.10
22	Regis Derrien	SL Mechanic	15.02.69	French	02YD55942	06.08.12
23	William Agcaoili	SL Mechanic	18.11.51	Filipino	ZZ206521	29.11.11
24	Paulo Goncalves	Mechanic	07.09.71	French	05AT81090	14.02.16
25	Ivar Almhjell	Mechanic	24.01.75	Norwegian	26128623	06.08.17
26	Aleil Aliman	Medic	08.03.75	Filipino	SS0907185	06.04.11
27	Ingvild Bostad	Observer	04.02.79	Norwegian	20874534	09.05.15
28	Tommy Timenes	Chief Field-Geo	02.09.73	Norwegian	26335444	23.08.08
29	Isabelle Nicolas	Field Geo.	16.05.79	Filipino	ZZ213750	22.01.12
30	Jared Smith	Navigator	03.03.78	New Zealander	F017116	16.05.10
31	Donald Hutchings	SL Navigator	16.03.59	Canadian	BD106848	18.08.12
32	Slavomir Korybalski	SL Observer	01.03.75	Polish	AT8339985	30.08.17
33	William Lloyd	Client Rep	21.10.48	Australian	E1022292	14.03.15
34	Debbie Glasgow	MMO	25.11.57	New Zealand	N466526	01.12.08

10.2. Streamer System Description

Streamer System Parameters	
Number of Streamers	1
Type of Streamer	Seal Solid
Streamer Length	6000m
Number of channels	480
Groups per Section (150 m)	12
Group Intervals	12.5 m (no overlap)
Active Group Array Length	12.5 m
Outside Diameter	55 mm
Solid Streamer Material	Outer 3.5mm Polypropylene
Normal maximum towing tension	55.6kN Ultimate breaking at 278kN
Connectors (Pins)	28
Channels per Module	60 at 2 ms
Data Transmission Link	Dual twisted Quad AWG 22
Power	+/- 360 V DC
Leakage	30 mA differential circuit breaker
Near Offset (centre source – centre near group)	145m nominal
Streamer Depth	8m +/- 1.0m
Number of Front 50 m Stretch Sections	2 (85 mm diameter)
Number of Tail 50 m Stretch Sections	1 (50 mm diameter)
Number of Compasses per Streamer	23 (within digibirds)
Number of Depth Sensors per Streamer	23 (within digibirds)

Trace allocation	Near	Far	Aux
Streamer 1	1	480	
Auxiliary (in AXCU)			a1 – a30

Hydrophone Parameters	
Hydrophone Specification	Sercel 12 element radial
No of Channels per Section	12
No of Hydrophones per Channel	8 in parallel
Active Length of Channel	12.5m
Channel Centre Spacing	12.5 m under a 1000daN load
Hydrophone Spacing	1.78m
Low Frequency Cut	3 Hz
Nominal Sensitivity, without electronics @ 1 bar @ 20°C	20 V/bar
Nominal Hydrophone Sensitivity	21.5 v/bar
Capacitance per Group	790 nF +/-10% at 22°C
Minimum Leakage Resistor	500 Mohm under 50 V

10.3. Streamer Layout

6000m

Item	Position	S/N	RDU	Bird Collar	SRD Collar	Trace N.O	Weights
DCXU		696502					
Slip ring							
PORT AFT REEL							
Lead-in		n/a					
SHS		1350					
HAU		124					
HESE		1861			13489		10
HESE		1665	1	15797			10
HESA		1332					
SSAS	01	30497	2	34113	12090	1-12	6
SSAS	02	30362	3	29978		13-24	2
SSAS	03	30552	4	30495		25-36	5
SSAS	04	30613				37-48	3
SSAS	05	30352	5	30672	13491	49-60	3
LAUM	01	775					
SSAS	06	30522				61-72	5
SSAS	07	30529	6	27772		73-84	3
SSAS	08	30251				85-96	5
SSAS	09	30531	7	29983		97-108	5
SSAS	10	30515				109-120	2
LAUM	02	513					
SSAS	11	30394	8	40854	12083	121-132	4
SSAS	12	30521				133-144	3
SSAS	13	30136	9	30256		145-156	4
SSAS	14	30578				157-168	7
SSAS	15	30553	10	29096		169-180	4
LAUM	03	515					
SSAS	16	30504				181-192	5
SSAS	17	30447	11	30334	13493	193-204	3
SSAS	18	30160				205-216	4
SSAS	19	30454	12	15076		217-228	4
SSAS	20	30572				229-240	4
LAUM	04	731					
SSAS	21	30508	13	30246		241-252	6
SSAS	22	30495				253-264	3
SSAS	23	30494	14	30137	13490	265-276	7
SSAS	24	30249				277-288	5
SSAS	25	30443	15	31507		289-300	2
LAUM	05	737					
SSAS	26	30152				301-312	2
SSAS	27	30571	16	31053		313-324	5
SSAS	28	30567				325-336	4
SSAS	29	30557	17	22740	13492	337-348	4
SSAS	30	30502				349-360	3
LAUM	06	734					
SSAS	31	30582	18	30329		361-372	4
SSAS	32	30583				373-384	3
SSAS	33	30576	19	30511		385-396	2
SSAS	34	30569				397-408	5
SSAS	35	30574	20	30674	36201	409-420	4
LAUM	07	908					
SSAS	36	30584				421-432	4
SSAS	37	30581	21	31120		433-444	5
SSAS	38	30590				445-456	3
SSAS	39	30580	22	40035	36206	457-468	4
SSAS	40	30588	23	30359		469-480	4
TAPU	01	104					
TES	01	1703					
Tailbuoy	01						

11. Source Configuration

11.1. Source System Description

Source Parameters	
Source Controller	Gunlink 2000
Number of Sources	1
Number of Sub-Arrays (Strings) per Source	3
Array Length	14.7m
Sub-Array Separation	10m
Source Width	20m
Source Separation	n/a
Source Volume	3040 Cubic inches
Number of Hydrophones per String	6
Number of Depth Transducers per String	3
Number of Pressure Transducers per String	1
Number of Guns per String	Strings 1 & 3 = 9 / String 2 = 8
Number of Clusters per String	Strings 1 & 3 = 3 / String 2 = 2
Airgun Type	Bolt, 1500 & 1900 Long Life
Operating Pressure	2000 PSI
Depth of Guns	6.0 m +/- 1.0m
Peak to Peak Amplitude	96.8barm
Primary to Bubble Ratio	22.9

Gun Controller Description

The Gunlink 2000 Seismic Source Control and Acquisition System is the first phase of Seamap's range of new generation seismic gun controller systems.

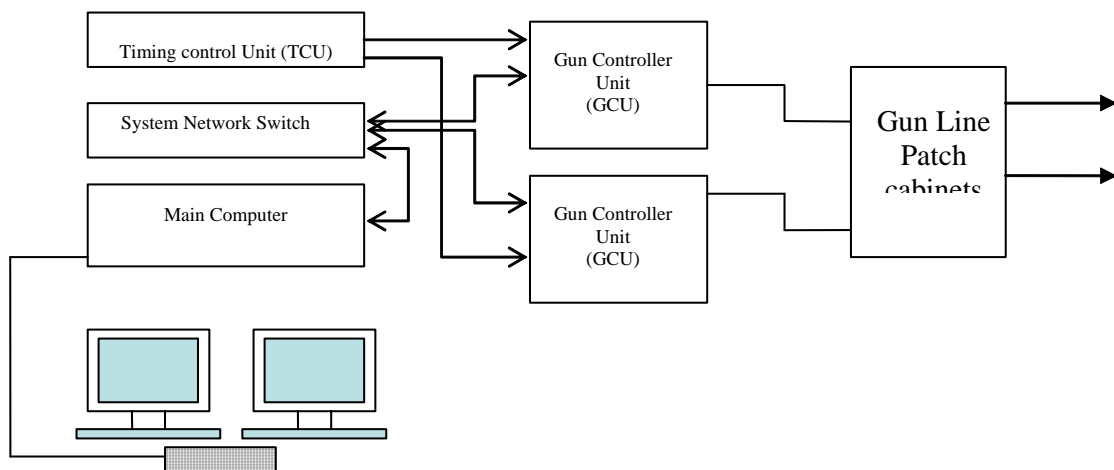
The system uses the latest high speed micro processors to provide onboard firing control and sensor timing monitoring, continuous monitoring of near field phones and interrogation of depth and pressure sensors.

In addition the system monitors the voltage and current of the firing pulses applied to the gun solenoids allowing the user to monitor variations in the performance of the guns and improve maintenance schedules.

An innovated Graphical User Interface (GUI) makes use of the latest advances in software design to provide the operator with maximum information on the operation and performance of the system without the clutter of text.

An internal database maintains records of all system statistics and the data can be accessed via the in built web server using standard web browser programs.

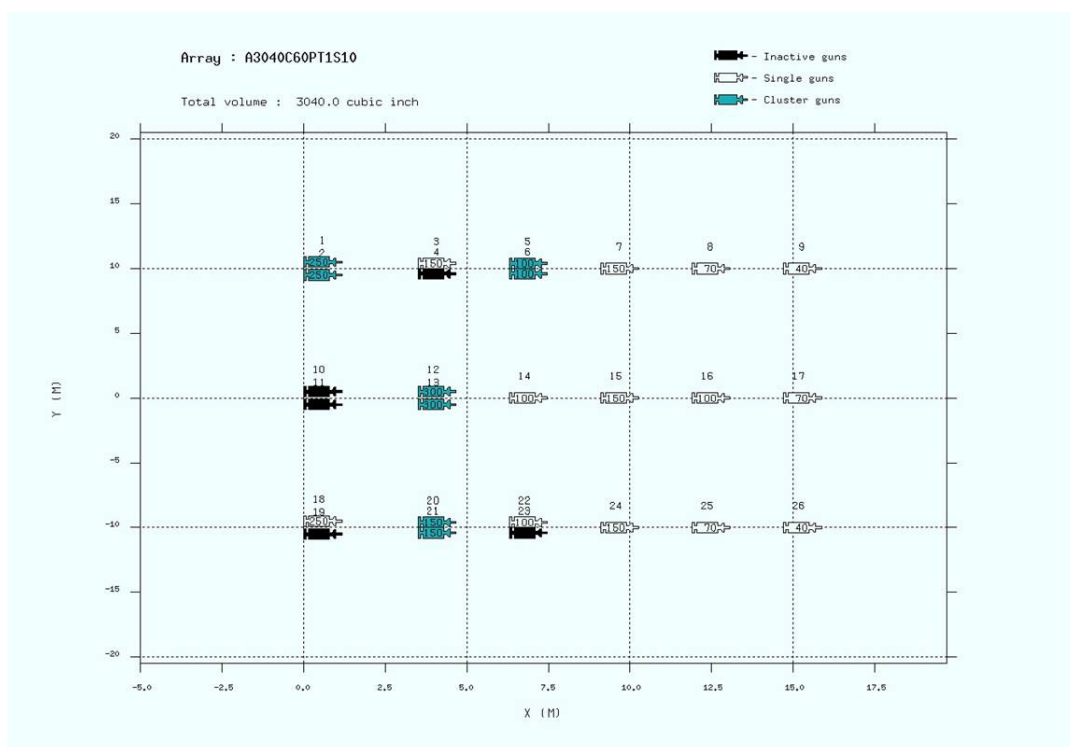
To further reduce operator fatigue, the system draws the operator's attention to gun misfires, auto-fires and other faults by use of voice alerts issued from the system speakers.



11.1.1. Gun Controller Specifications

Channels available	
Monitored Variables	Gun Fire time Near field Hydrophone Data Depth Sensor value Gun air pressure Value Solenoid coil current
Controlled Variables	Gun Fire time Gun Firing pulse length and Voltage
System Timing	0.01 ms
Fire Detect Window	120 ms
Synchronization Mode	Automatic
Fire Detect Method	Sensor
Fire Time Pick Method	Peak detect
Near Field Hydrophone S.I.	0.1 ms
Near Field Hydrophone Res.	16 Bit
Software	Version 2.5.2

11.1.2. Source Layout



11.1.3. Array Listing

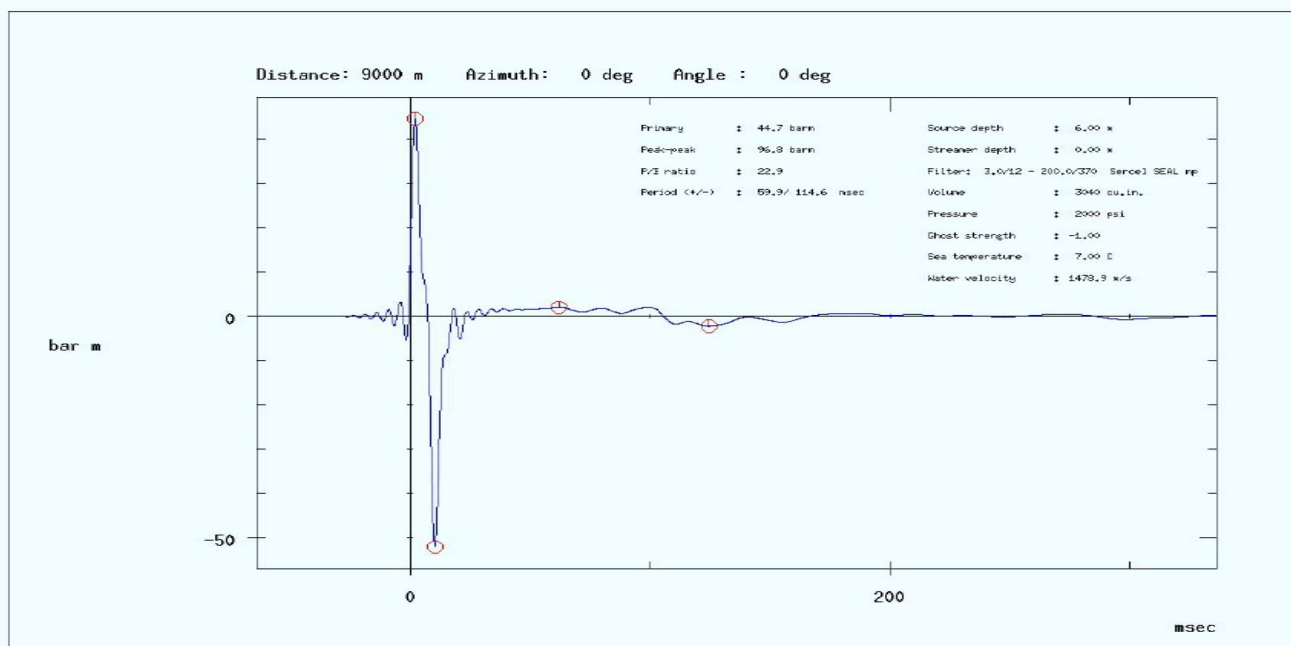
Total active volume: 3040 in³

Nominal pressure 2000 psi.

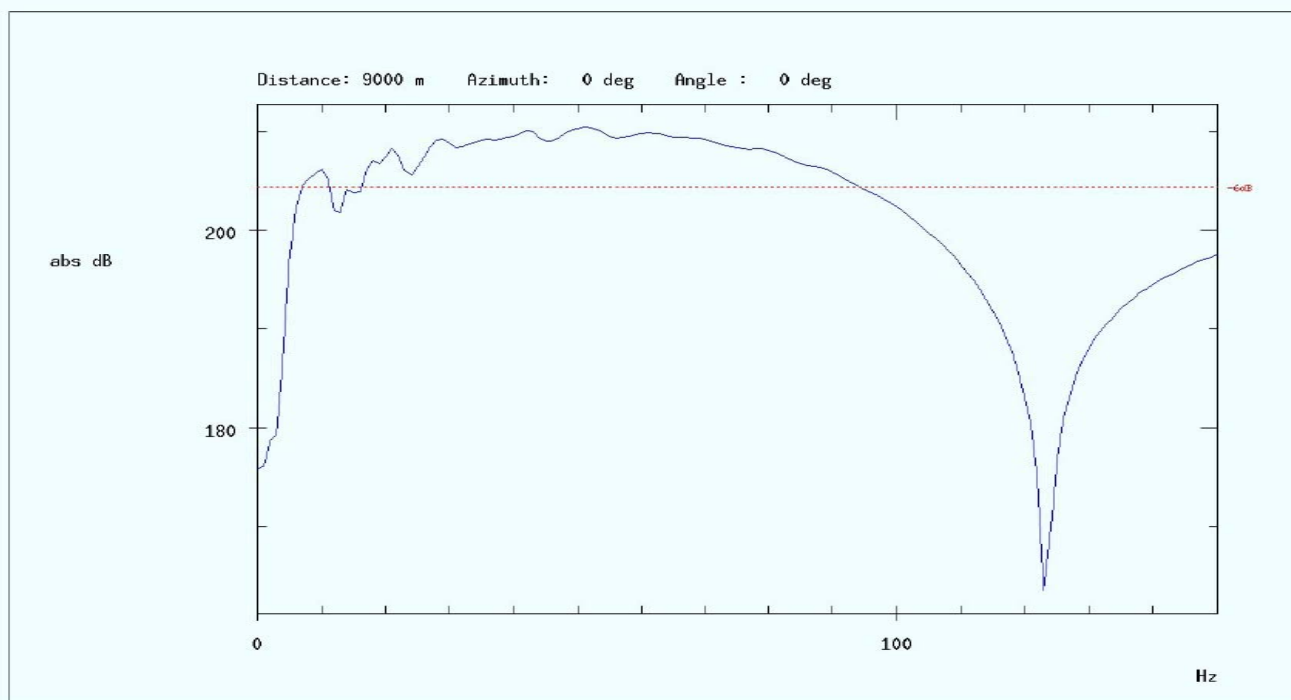
GUN#	GUN TYPE	Dist X (m)	Dist Y (m)	Dist Z (m)	Volume	Active / Spare	Sub-array#
1	1500LL	0	10.5	6	250	Active	1
2	1500LL	0	9.5	6	250	Active	1
3	1900LLX	3.5	10.5	6	150	Active	1
4	1900LLX	3.5	9.5	6	150	Spare	1
5	1900LLX	6.3	10.5	6	100	Active	1
6	1900LLX	6.3	9.5	6	100	Active	1
7	1900LLX	9.1	10	6	150	Active	1
8	1900LLX	11.9	10	6	70	Active	1
9	1900LLX	14.7	10	6	40	Active	1
10	1500LL	0	0.5	6	300	Spare	2
11	1500LL	0	-0.5	6	300	Spare	2
12	1500LL	3.5	0.5	6	300	Active	2
13	1500LL	3.5	-0.5	6	300	Active	2
14	1900LLX	6.3	0	6	100	Active	2
15	1900LLX	9.1	0	6	150	Active	2
16	1900LLX	11.9	0	6	100	Active	2
17	1900LLX	14.7	0	6	70	Active	2
18	1500LL	0	-9.5	6	250	Active	3
19	1500LL	0	-10.5	6	250	Spare	3
20	1900LLX	3.5	-9.5	6	150	Active	3
21	1900LLX	3.5	-10.5	6	150	Active	3
22	1900LLX	6.3	-9.5	6	100	Active	3
23	1900LLX	6.3	-10.5	6	100	Spare	3
24	1900LLX	9.1	-10	6	150	Active	3
25	1900LLX	11.9	-10	6	70	Active	3
26	1900LLX	14.7	-10	6	40	Active	3

11.2. 3040 Cu-Inch Pulse Response and Spectrum at 6m.

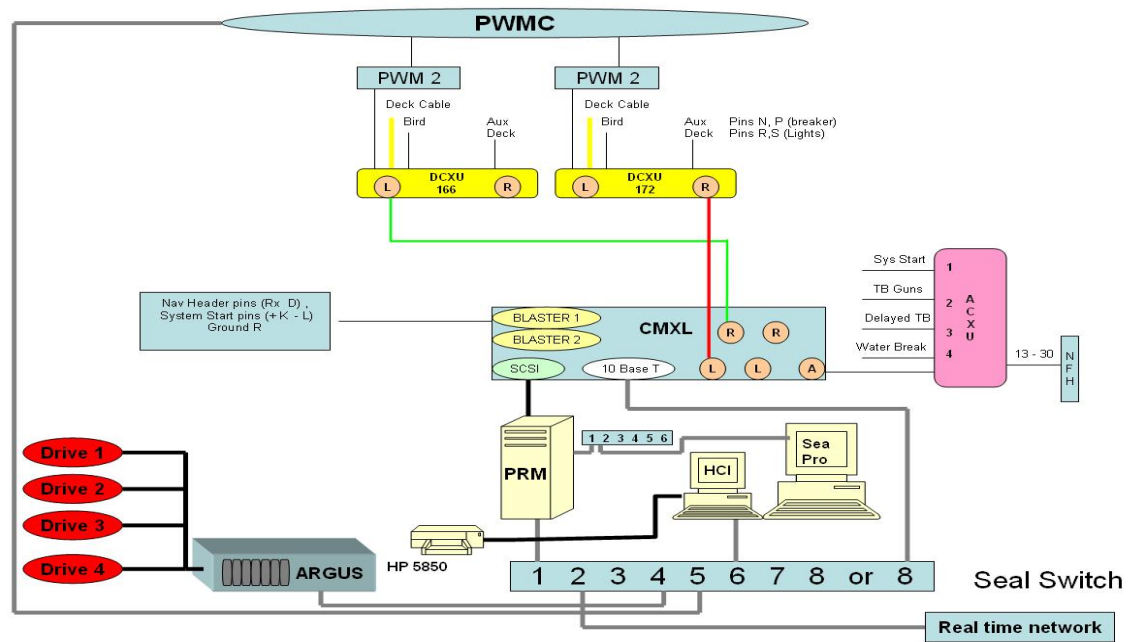
Far-field signature of array : A3040C60TT1S10



Amplitude spectrum of far-field signature of array : A3040C60TT1S10



12. Instrumentation Room System Diagram



13. Navigation and Positioning System Description

13.1. System Configuration

13.1.1. Navigation Hardware and Software

System	Hardware (Type and Serial No.)	Software version
CONCEPT Spectra	RTN μ (30/207P & 30/208P)	Spectra 10.9.01.10
	IBM E Server Workstations	Red Hat ELWS3.6
External Header	N/A	Labo Header
Acoustic System	N/A	
TS-meter	Saiv AS STD/CTD model SD 204	
Echo sounder	Simrad EA600	

13.1.2. System Timing

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

An additional trigger was issued from spectra 450 milliseconds after time zero, this was sent to the recording system as a timing verification. The trigger was 5 milliseconds in duration.

13.2. Survey Positioning Method Used

This survey was carried out using CGGVeritas standard mode of operation for single streamer/single source surveys.

Positioning of the vessel was by 3 Single/Dual frequency differential GPS systems using a delivery of differential correction data in RTCM 104 format and recorded in the P2/94 files.

The sources were positioned relative to the vessel using a network consisting of rGPS units mounted on sub-arrays 1, 2 and 3.

The centre near group of the streamer was positioned by a combination of compass heading units and nominal offsets from the vessel.

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

The streamer shape was modelled by 23 Digicourse series 5011 combined streamer depth control and magnetic compass units on the streamer.

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

13.3. Surface Positioning

13.3.1. Vessel Navigation

Summary

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

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

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

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

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

Differential Correction Systems:

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

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

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

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

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

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

➤ Further information is given in Appendix 1.

Although Selective Availability was turned off in May 2000 differential corrections are still required to provide a high quality continuous vessel position. Less frequent updates are required however.

13.3.2. Float Navigation

Source and Tailbuoy surface navigation was provided by Seatex Seatrack relative GPS. The in-sea units incorporated a GPS receiver and interfacing for direct data transmission of the raw satellite pseudo-range data via UHF link to the vessel.

On board the vessel, the raw pseudo-range data from the float unit was matched with simultaneously received data at the vessel's GPS receiver to compute a vector describing the location of the float unit relative to the vessel from which the float position was derived. Relative positioning CEP was better than 2 m.

13.4. Streamer and Source Positioning

13.4.1. Streamer Compasses

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

Compass Sampling Rate	=	2 second
Averaging constant	=	14 seconds

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

13.4.2. Gyro Compass

The gyrocompass used during the survey was:

Gyro 1	- Simrad HS50 GPS
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Second gyro was for standby purposes only. This gyro was overhauled prior to the survey and was installed back in place without dual sided calibration.

Gyro 2	- Tokyo Keiki MK.ES
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The gyro correction values as computed during the mobilisation calibration were as follows:

Gyro 1	- plus 1.35 degrees
Gyro 2	- plus 2.20 degrees

13.5. Auxilliary Navigation Sensors

13.5.1. Echo Sounder

The echo sounder speed of sound was set to 1500 m/s. A draught correction of zero was entered in the echo sounder. For sequence 1 the 12khz transducer was set to master however due to the depths encountered, from sequence 2 onwards the 200 kHz transducer was set to master.

14. Survey Pre-plots

14.1. Geodetics

Satellite/Survey Datum

Datum Name: GDA94
Spheroid Name: GRS80
Semi Major Axis: 6378137.0
Inverse Flattening: 298.2572236

Projection Type: Universal Transverse Mercator 55° S
Origin Longitude: 147.000E
Origin Latitude: 0000.00N
False Easting: 500,000.00E
False Northing: 10,000,000.00N

No transformation from WGS 84 to GDA94

14.2. Preplot

H0100Survey Area Tasmania T37_38P
H0101General Survey Details Preplot 2D
H0200Date of Survey N/A
H0201Date of Issue 05 Mar 2008
H0202Tape Version P1/90
H0203Line Prefix
H0300Client Cue Energy
H0400Geophysical Contractor CGGVeritas
H0500Positioning Contractor CGGVeritas
H0600Position Processing CGGVeritas
H0800Co-ordinate Location Preplot Sail Line Locations
H1100Receiver Groups per Shot 0
H1400Surveyed Datum GDA94 GRS80 6378137.000 298.2572221
H1401Transformation to WGS84 0.0 0.0 0.0 0.000 0.000 0.000 0.0000000
H1500Post Plot Datum N/A
H1501Transformation to WGS84 N/A
H1600Transformation H14 to H15 N/A
H1700Vertical Datum SL Echo Sounder
H1800Projection Type 2Universal Transverse Mercator
H1900Projection Zone 55S
H2000Grid Units 1Meters 1.000000000000
H2001Height Units 1Meters 1.000000000000
H2002Angular Units 1Degrees
H2200Long of Cent Meridian 1470000.000E
H2301Grid Origin 0000000.000N1470000.000E
H2302Grid Coords at Origin 00500000.00E10000000.00N
H2401Scale Factor 0.9996000000
H2402Lat/Long of Scale Factor 0000000.000N1470000.000E
H2600SHOT POINT INTERVAL 25.00 m
H2600LINE GENERATION MODE Great Circle
H2600NUMBER OF 2D LINES 110
H2600TOTAL 2D LINE LENGTH 3660.00 kilometres
H2600AVG. LINE LENGTH 33.27 kilometres
H2600

H2600 Line Details

H2600

H2600 Format is:

H2600 LINENAME(A12) SEGMENT(I2) FSP(I6) LSP(I6) AZIMUTH(F7.3) LENGTH(F8.1)

H2600

H2600	CUE-08-E-01	1	1001	2173	357.979	029300.0
H2600	CUE-08-E-02	1	1001	2179	357.932	029450.0
H2600	CUE-08-E-03	1	1001	2176	358.019	029375.0
H2600	CUE-08-E-04	1	1001	2177	357.933	029400.0
H2600	CUE-08-E-05	1	1001	2174	357.840	029325.0
H2600	CUE-08-E-06	1	1001	2171	357.823	029250.0
H2600	CUE-08-E-07	1	1001	2169	358.026	029200.0
H2600	CUE-08-E-08	1	1001	3220	357.950	055475.0
H2600	CUE-08-E-09	1	1001	3221	357.760	055500.0
H2600	CUE-08-E-10	1	1001	3217	357.854	055400.0
H2600	CUE-08-E-11	1	1001	3213	357.859	055300.0
H2600	CUE-08-E-12	1	1001	3213	357.851	055300.0
H2600	CUE-08-E-13	1	1001	3212	357.896	055275.0
H2600	CUE-08-E-14	1	1001	3213	357.836	055300.0
H2600	CUE-08-E-15	1	1001	3211	357.826	055250.0
H2600	CUE-08-E-16	1	1001	3213	357.821	055300.0
H2600	CUE-08-E-17	1	1001	3213	357.813	055300.0
H2600	CUE-08-E-18	1	1001	3213	357.806	055300.0
H2600	CUE-08-E-19	1	1001	3213	357.744	055300.0
H2600	CUE-08-E-20	1	1001	3213	357.791	055300.0
H2600	CUE-08-E-21	1	1001	3211	357.781	055250.0
H2600	CUE-08-E-22	1	1001	3213	357.829	055300.0
H2600	CUE-08-E-23	1	1001	3211	357.820	055250.0
H2600	CUE-08-E-24	1	1001	2257	357.742	031400.0
H2600	CUE-08-E-25	1	1001	2237	357.688	030900.0
H2600	CUE-08-E-26	1	1001	2234	357.673	030825.0
H2600	CUE-08-E-27	1	1001	2239	357.603	030950.0
H2600	CUE-08-E-28	1	1001	2239	357.671	030950.0
H2600	CUE-08-E-29	1	1001	2238	357.756	030925.0
H2600	CUE-08-E-30	1	1001	2236	357.857	030875.0
H2600	CUE-08-E-31	1	1001	2238	357.683	030925.0
H2600	CUE-08-E-32	1	1001	2235	357.670	030850.0
H2600	CUE-08-E-33	1	1001	2237	357.723	030900.0
H2600	CUE-08-E-34	1	1001	2071	357.743	026750.0
H2600	CUE-08-E-35	1	1001	2029	357.719	025700.0
H2600	CUE-08-E-36	1	1001	2011	357.546	025250.0
H2600	CUE-08-E-37	1	1001	1974	357.725	024325.0
H2600	CUE-08-E-38	1	1001	1942	357.560	023525.0
H2600	CUE-08-E-39	1	1001	1897	357.668	022400.0
H2600	CUE-08-E-40	1	1001	1866	357.625	021625.0
H2600	CUE-08-E-41	1	1001	1852	357.571	021275.0
H2600	CUE-08-E-42	1	1001	1819	357.593	020450.0
H2600	CUE-08-E-43	1	1001	1781	357.594	019500.0
H2600	CUE-08-E-44	1	1001	1747	357.617	018650.0
H2600	CUE-08-E-45	1	1001	1740	357.598	018475.0
H2600	CUE-08-E-46	1	1001	1702	357.381	017525.0
H2600	CUE-08-E-47	1	1001	1669	357.678	016700.0
H2600	CUE-08-E-48	1	1001	1627	357.627	015650.0
H2600	CUE-08-E-49	1	1001	1589	357.436	014700.0
H2600	CUE-08-E-50	1	1001	1586	357.417	014625.0
H2600	CUE-08-E-51	1	1001	1550	357.608	013725.0
H2600	CUE-08-E-52	1	1001	1512	357.479	012775.0
H2600	CUE-08-E-53	1	1001	1476	357.432	011875.0
H2600	CUE-08-E-54	1	1001	1255	216.435	006350.0
H2600	CUE-08-E-54	2	1255	2016	211.485	019025.0

H2600	CUE-08-N-01	1	1001	3166	087.902	054125.0
H2600	CUE-08-N-02	1	1001	3167	087.906	054150.0
H2600	CUE-08-N-03	1	1001	3166	087.939	054125.0
H2600	CUE-08-N-04	1	1001	3166	087.917	054125.0
H2600	CUE-08-N-05	1	1001	3167	087.940	054150.0
H2600	CUE-08-N-06	1	1001	3168	087.905	054175.0
H2600	CUE-08-N-07	1	1001	3167	087.886	054150.0
H2600	CUE-08-N-08	1	1001	3171	087.918	054250.0
H2600	CUE-08-N-09	1	1001	3171	087.928	054250.0
H2600	CUE-08-N-10	1	1001	3171	087.901	054250.0
H2600	CUE-08-N-11	1	1001	3173	087.913	054300.0
H2600	CUE-08-N-12	1	1001	3170	087.904	054225.0
H2600	CUE-08-N-13	1	1001	3118	087.915	052925.0
H2600	CUE-08-N-14	1	1001	3068	087.898	051675.0
H2600	CUE-08-N-15	1	1001	3016	087.910	050375.0
H2600	CUE-08-N-16	1	1001	2966	087.938	049125.0
H2600	CUE-08-N-17	1	1001	2916	087.929	047875.0
H2600	CUE-08-N-18	1	1001	2864	087.932	046575.0
H2600	CUE-08-N-19	1	1001	2813	087.946	045300.0
H2600	CUE-08-N-20	1	1001	2762	087.926	044025.0
H2600	CUE-08-N-21	1	1001	2712	087.875	042775.0
H2600	CUE-08-N-22	1	1001	2659	087.910	041450.0
H2600	CUE-08-N-23	1	1001	2607	087.886	040150.0
H2600	CUE-08-N-24	1	1001	2555	087.919	038850.0
H2600	CUE-08-N-25	1	1001	2506	087.946	037625.0
H2600	CUE-08-N-26	1	1001	2453	087.902	036300.0
H2600	CUE-08-N-27	1	1001	2402	087.947	035025.0
H2600	CUE-08-N-28	1	1001	2360	087.891	033975.0
H2600	CUE-08-N-29	1	1001	2359	087.919	033950.0
H2600	CUE-08-N-30	1	1001	2361	087.924	034000.0
H2600	CUE-08-N-31	1	1001	2067	087.912	026650.0
H2600	CUE-08-N-32	1	1001	1675	087.965	016850.0
H2600	CUE-08-N-33	1	1001	1675	087.907	016850.0
H2600	CUE-08-N-34	1	1001	1671	087.951	016750.0
H2600	CUE-08-N-35	1	1001	1670	087.882	016725.0
H2600	CUE-08-N-36	1	1001	1670	087.883	016725.0
H2600	CUE-08-N-37	1	1001	1670	087.818	016725.0
H2600	CUE-08-N-38	1	1001	1666	087.801	016625.0
H2600	CUE-08-N-39	1	1001	1665	087.861	016600.0
H2600	CUE-08-N-40	1	1001	1663	087.851	016550.0
H2600	CUE-08-N-41	1	1001	1663	087.916	016550.0
H2600	CUE-08-N-42	1	1001	1660	087.904	016475.0
H2600	CUE-08-N-43	1	1001	1659	087.898	016450.0
H2600	CUE-08-N-44	1	1001	1657	087.825	016400.0
H2600	CUE-08-N-45	1	1001	1654	087.815	016325.0
H2600	CUE-08-N-46	1	1001	1655	087.815	016350.0
H2600	CUE-08-N-47	1	1001	1654	087.875	016325.0
H2600	CUE-08-N-48	1	1001	1651	087.929	016250.0
H2600	CUE-08-N-49	1	1001	1651	087.859	016250.0
H2600	CUE-08-N-50	1	1001	1648	087.849	016175.0
H2600	CUE-08-N-51	1	1001	1646	087.907	016125.0
H2600	CUE-08-N-52	1	1001	1646	087.903	016125.0
H2600	CUE-08-N-53	1	1001	1643	087.955	016050.0
H2600	CUE-08-N-54	1	1001	1643	087.959	016050.0
H2600	CUE-08-N-55	1	1001	1642	087.952	016025.0
H2600	CUE-08-N-56	1	1001	1641	087.952	016000.0
H2600						
VCUE-08-E-01			1001401541.15S1455058.15E	402167.05542591.0		
VCUE-08-E-01			2173395951.79S1455014.59E	400755.15571848.7		
VCUE-08-E-02			1001401544.40S1455201.22E	403658.05542510.0		

VCUE-08-E-02	2179395950.20S1455116.43E 402220.85571916.5
VCUE-08-E-03	1001401540.58S1455302.16E 405096.05542646.0
VCUE-08-E-03	2176395948.76S1455219.35E 403712.45571979.9
VCUE-08-E-04	1001401541.61S1455345.41E 406118.05542627.0
VCUE-08-E-04	2177395949.04S1455300.71E 404693.25571983.9
VCUE-08-E-05	1001401538.79S1455429.65E 407162.05542727.0
VCUE-08-E-05	2174395948.70S1455343.06E 405697.45572006.8
VCUE-08-E-06	1001401536.56S1455512.19E 408166.05542808.0
VCUE-08-E-06	2171395948.91S1455425.34E 406700.15572012.6
VCUE-08-E-07	1001401536.06S1455552.63E 409121.05542835.0
VCUE-08-E-07	2169395949.91S1455510.24E 407765.05571994.8
VCUE-08-E-08	1001401535.27S1455636.63E 410160.05542872.0
VCUE-08-E-08	3220394537.78S1455513.27E 407519.55598267.6
VCUE-08-E-09	1001401534.03S1455719.45E 411171.05542922.0
VCUE-08-E-09	3221394535.96S1455548.30E 408352.45598333.7
VCUE-08-E-10	1001401531.39S1455801.23E 412157.05543015.0
VCUE-08-E-10	3217394536.45S1455634.07E 409441.55598331.7
VCUE-08-E-11	1001401529.66S1455843.80E 413162.05543080.0
VCUE-08-E-11	3213394537.95S1455717.00E 410463.65598297.3
VCUE-08-E-12	1001401528.11S1455925.56E 414148.05543139.0
VCUE-08-E-12	3213394536.41S1455758.45E 411449.35598356.1
VCUE-08-E-13	1001401525.83S1460005.14E 415082.05543220.0
VCUE-08-E-13	3212394534.89S1455839.90E 412435.05598414.5
VCUE-08-E-14	1001401524.33S1460049.10E 416120.05543278.0
VCUE-08-E-14	3213394532.64S1455921.40E 413421.75598494.9
VCUE-08-E-15	1001401523.00S1460131.75E 417127.05543330.0
VCUE-08-E-15	3211394532.95S1460003.71E 414428.65598496.8
VCUE-08-E-16	1001401521.67S1460214.10E 418127.05543382.0
VCUE-08-E-16	3213394530.00S1460045.78E 415428.75598598.7
VCUE-08-E-17	1001401522.01S1460255.83E 419113.05543382.0
VCUE-08-E-17	3213394530.36S1460127.17E 416413.75598598.5
VCUE-08-E-18	1001401520.67S1460338.14E 420112.05543434.0
VCUE-08-E-18	3213394529.03S1460209.21E 417413.75598650.5
VCUE-08-E-19	1001401517.70S1460423.39E 421180.05543537.0
VCUE-08-E-19	3213394526.12S1460251.96E 418429.95598750.8
VCUE-08-E-20	1001401518.01S1460502.93E 422114.05543537.0
VCUE-08-E-20	3213394526.38S1460333.39E 419415.75598753.3
VCUE-08-E-21	1001401514.97S1460545.30E 423114.05543641.0
VCUE-08-E-21	3211394524.98S1460415.43E 420415.65598807.1
VCUE-08-E-22	1001401516.98S1460627.01E 424100.05543589.0
VCUE-08-E-22	3213394525.31S1460459.00E 421452.65598807.5
VCUE-08-E-23	1001401513.93S1460708.91E 425089.05543693.0
VCUE-08-E-23	3211394523.89S1460540.62E 422442.55598861.4
VCUE-08-E-24	1001401511.93S1460753.47E 426141.05543765.0
VCUE-08-E-24	2257395814.68S1460701.35E 424598.25575116.7
VCUE-08-E-25	1001401510.92S1460836.45E 427156.05543806.0
VCUE-08-E-25	2237395829.91S1460743.93E 425612.85574657.1
VCUE-08-E-26	1001401509.93S1460917.69E 428130.05543846.0
VCUE-08-E-26	2234395831.35S1460824.96E 426586.55574622.0
VCUE-08-E-27	1001401510.24S1461000.65E 429145.05543846.0
VCUE-08-E-27	2239395827.66S1460906.11E 427561.55574745.0
VCUE-08-E-28	1001401506.59S1461043.62E 430159.05543968.0
VCUE-08-E-28	2239395823.97S1460950.62E 428616.35574869.0
VCUE-08-E-29	1001401504.93S1461123.60E 431103.05544028.0
VCUE-08-E-29	2238395823.05S1461032.57E 429611.15574906.5
VCUE-08-E-30	1001401503.23S1461204.85E 432077.05544089.0
VCUE-08-E-30	2236395822.91S1461116.19E 430645.95574920.2
VCUE-08-E-31	1001401501.57S1461249.95E 433142.05544150.0
VCUE-08-E-31	2238395819.74S1461157.26E 431619.15575026.8
VCUE-08-E-32	1001401459.87S1461331.20E 434116.05544211.0

VCUE-08-E-32	2235395820.48S1461238.34E 432593.85575012.8
VCUE-08-E-33	1001401459.17S1461413.70E 435120.05544241.0
VCUE-08-E-33	2237395818.13S1461321.96E 433627.85575094.2
VCUE-08-E-34	1001401458.44S1461454.94E 436094.05544272.0
VCUE-08-E-34	2071400031.83S1461410.52E 434815.05570982.1
VCUE-08-E-35	1001401456.83S1461537.24E 437093.05544330.0
VCUE-08-E-35	2029400104.25S1461454.10E 435856.85569991.2
VCUE-08-E-36	1001401455.49S1461621.07E 438128.05544380.0
VCUE-08-E-36	2011400117.59S1461535.47E 436840.75569588.3
VCUE-08-E-37	1001401453.28S1461702.02E 439095.05544456.0
VCUE-08-E-37	1974400145.24S1461621.30E 437934.15568744.7
VCUE-08-E-38	1001401452.74S1461746.89E 440155.05544481.0
VCUE-08-E-38	1942400210.71S1461704.64E 438967.85567967.7
VCUE-08-E-39	1001401452.17S1461826.39E 441088.05544506.0
VCUE-08-E-39	1897400246.53S1461747.93E 440002.35566871.7
VCUE-08-E-40	1001401449.96S1461909.84E 442114.05544582.0
VCUE-08-E-40	1866400309.45S1461832.04E 441053.05566173.2
VCUE-08-E-41	1001401448.59S1461952.56E 443123.05544632.0
VCUE-08-E-41	1852400319.44S1461914.52E 442061.85565872.9
VCUE-08-E-42	1001401447.98S1462034.22E 444107.05544658.0
VCUE-08-E-42	1819400345.55S1461957.98E 443097.65565075.7
VCUE-08-E-43	1001401448.22S1462116.92E 445116.05544658.0
VCUE-08-E-43	1781400416.56S1462042.37E 444156.15564127.3
VCUE-08-E-44	1001401448.45S1462158.57E 446100.05544658.0
VCUE-08-E-44	1747400444.32S1462125.84E 445191.85563279.1
VCUE-08-E-45	1001401448.78S1462241.15E 447106.05544655.0
VCUE-08-E-45	1740400450.32S1462208.47E 446202.85563101.2
VCUE-08-E-46	1001401449.02S1462325.63E 448157.05544655.0
VCUE-08-E-46	1702400521.43S1462251.83E 447236.45562149.4
VCUE-08-E-47	1001401450.46S1462405.36E 449096.05544617.0
VCUE-08-E-47	1669400549.47S1462336.79E 448307.15561292.2
VCUE-08-E-48	1001401448.83S1462447.53E 450092.05544674.0
VCUE-08-E-48	1627400621.87S1462420.17E 449340.95560300.2
VCUE-08-E-49	1001401447.85S1462531.27E 451125.05544711.0
VCUE-08-E-49	1589400651.73S1462503.49E 450372.65559386.3
VCUE-08-E-50	1001401448.67S1462613.38E 452120.05544692.0
VCUE-08-E-50	1586400654.99S1462545.54E 451368.65559292.2
VCUE-08-E-51	1001401448.87S1462654.68E 453096.05544692.0
VCUE-08-E-51	1550400724.27S1462630.49E 452438.35558396.1
VCUE-08-E-52	1001401447.84S1462738.42E 454129.05544730.0
VCUE-08-E-52	1512400754.06S1462714.69E 453489.95557484.2
VCUE-08-E-53	1001401448.04S1462820.57E 455125.05544730.0
VCUE-08-E-53	1476400823.42S1462758.10E 454522.85556585.3
VCUE-08-E-54	1001395233.43S1461847.11E 441259.05585785.0
VCUE-08-E-54	1255395519.04S1461608.30E 437528.45580649.2
VCUE-08-E-54	2016400404.85S1460908.99E 427728.95564349.8
VCUE-08-N-01	1001401537.95S1455046.52E 401891.05542686.0
VCUE-08-N-01	3166401427.43S1462854.86E 455931.35545370.1
VCUE-08-N-02	1001401505.64S1455045.67E 401858.05543682.0
VCUE-08-N-02	3167401355.21S1462854.77E 455923.45546363.5
VCUE-08-N-03	1001401432.40S1455045.39E 401838.05544707.0
VCUE-08-N-03	3166401323.01S1462853.18E 455880.05547356.2
VCUE-08-N-04	1001401400.24S1455044.25E 401798.05545698.0
VCUE-08-N-04	3166401250.19S1462851.69E 455839.05548367.6
VCUE-08-N-05	1001401327.38S1455042.82E 401751.05546711.0
VCUE-08-N-05	3167401217.99S1462851.05E 455818.05549360.5
VCUE-08-N-06	1001401256.27S1455039.66E 401664.05547669.0
VCUE-08-N-06	3168401145.76S1462848.60E 455754.35550353.7
VCUE-08-N-07	1001401224.02S1455038.01E 401612.05548663.0
VCUE-08-N-07	3167401112.97S1462845.56E 455676.45551364.4

VCUE-08-N-08	1001401150.94S1455035.57E	401541.05549682.0
VCUE-08-N-08	3171401040.75S1462847.09E	455706.85552358.0
VCUE-08-N-09	1001401118.43S1455033.97E	401490.05550684.0
VCUE-08-N-09	3171401008.53S1462845.20E	455656.25553351.3
VCUE-08-N-10	1001401046.46S1455031.72E	401424.05551669.0
VCUE-08-N-10	3171400935.75S1462842.61E	455589.05554361.4
VCUE-08-N-11	1001401013.95S1455029.90E	401368.05552671.0
VCUE-08-N-11	3173400903.52S1462842.62E	455583.55555355.1
VCUE-08-N-12	1001400941.86S1455028.59E	401324.05553660.0
VCUE-08-N-12	3170400831.26S1462837.82E	455464.25556349.0
VCUE-08-N-13	1001400908.94S1455028.81E	401316.05554675.0
VCUE-08-N-13	3118400800.51S1462742.90E	454158.85557289.3
VCUE-08-N-14	1001400836.68S1455026.48E	401248.05555669.0
VCUE-08-N-14	3068400729.53S1462647.51E	452842.05558236.6
VCUE-08-N-15	1001400804.26S1455024.75E	401194.05556668.0
VCUE-08-N-15	3016400659.27S1462550.66E	451490.65559161.0
VCUE-08-N-16	1001400731.54S1455022.31E	401123.05557676.0
VCUE-08-N-16	2966400629.07S1462455.25E	450172.85560083.5
VCUE-08-N-17	1001400659.20S1455021.42E	401089.05558673.0
VCUE-08-N-17	2916400558.20S1462401.35E	448890.45561026.8
VCUE-08-N-18	1001400626.52S1455020.04E	401043.05559680.0
VCUE-08-N-18	2864400527.39S1462304.87E	447546.55561967.8
VCUE-08-N-19	1001400553.98S1455018.86E	401002.05560683.0
VCUE-08-N-19	2813400456.97S1462209.68E	446233.15562896.5
VCUE-08-N-20	1001400521.92S1455017.08E	400947.05561671.0
VCUE-08-N-20	2762400426.12S1462113.87E	444904.35563838.1
VCUE-08-N-21	1001400450.01S1455014.79E	400880.05562654.0
VCUE-08-N-21	2712400354.68S1462018.57E	443587.45564797.6
VCUE-08-N-22	1001400418.21S1455013.43E	400835.05563634.0
VCUE-08-N-22	2659400325.53S1461921.17E	442220.85565686.3
VCUE-08-N-23	1001400345.38S1455012.22E	400793.05564646.0
VCUE-08-N-23	2607400253.93S1461824.90E	440880.05566650.4
VCUE-08-N-24	1001400312.49S1455012.02E	400775.05565660.0
VCUE-08-N-24	2555400223.54S1461729.72E	439565.25567577.0
VCUE-08-N-25	1001400239.63S1455008.70E	400683.05566672.0
VCUE-08-N-25	2506400152.90S1461634.59E	438251.05568511.3
VCUE-08-N-26	1001400207.13S1455008.49E	400665.05567674.0
VCUE-08-N-26	2453400121.23S1461538.29E	436908.75569476.5
VCUE-08-N-27	1001400134.46S1455007.53E	400629.05568681.0
VCUE-08-N-27	2402400051.17S1461443.46E	435601.15570392.6
VCUE-08-N-28	1001400103.13S1455004.98E	400556.05569646.0
VCUE-08-N-28	2360400020.13S1461356.43E	434478.05571339.9
VCUE-08-N-29	1001400030.04S1455003.98E	400519.05570666.0
VCUE-08-N-29	2359395947.63S1461354.22E	434416.95572341.6
VCUE-08-N-30	1001395957.55S1455001.50E	400447.05571667.0
VCUE-08-N-30	2361395915.16S1461353.66E	434395.05573342.4
VCUE-08-N-31	1001395916.07S1455510.05E	407748.05573038.0
VCUE-08-N-31	2067395843.08S1461352.46E	434358.05574331.4
VCUE-08-N-32	1001395843.60S1455509.01E	407711.05574039.0
VCUE-08-N-32	1675395823.60S1460658.64E	424536.65574841.1
VCUE-08-N-33	1001395811.68S1455508.75E	407693.05575023.0
VCUE-08-N-33	1675395751.13S1460658.26E	424517.85575842.0
VCUE-08-N-34	1001395738.64S1455510.03E	407711.05576042.0
VCUE-08-N-34	1671395718.62S1460655.26E	424436.65576843.5
VCUE-08-N-35	1001395706.76S1455510.53E	407711.05577025.0
VCUE-08-N-35	1670395646.13S1460654.58E	424410.65577845.2
VCUE-08-N-36	1001395634.25S1455508.77E	407657.05578027.0
VCUE-08-N-36	1670395613.62S1460652.73E	424356.65578847.0
VCUE-08-N-37	1001395602.36S1455508.47E	407638.05579010.0
VCUE-08-N-37	1670395541.12S1460652.30E	424336.75579849.0

VCUE-08-N-38	1001395529.91S1455509.78E 407657.05580011.0
VCUE-08-N-38	1666395508.64S1460649.31E 424255.65580849.6
VCUE-08-N-39	1001395457.40S1455509.49E 407638.05581013.0
VCUE-08-N-39	1665395436.73S1460647.90E 424212.55581833.1
VCUE-08-N-40	1001395424.94S1455510.00E 407638.05582014.0
VCUE-08-N-40	1663395404.24S1460646.21E 424162.55582834.4
VCUE-08-N-41	1001395351.98S1455509.76E 407620.05583030.0
VCUE-08-N-41	1663395331.89S1460645.91E 424145.45583831.5
VCUE-08-N-42	1001395319.52S1455510.27E 407620.05584031.0
VCUE-08-N-42	1660395259.41S1460643.17E 424070.35584832.4
VCUE-08-N-43	1001395247.64S1455510.77E 407620.05585014.0
VCUE-08-N-43	1659395227.50S1460642.53E 424045.35585815.9
VCUE-08-N-44	1001395215.14S1455510.52E 407602.05586016.0
VCUE-08-N-44	1657395154.39S1460640.05E 423976.35586836.2
VCUE-08-N-45	1001395142.67S1455510.27E 407584.05587017.0
VCUE-08-N-45	1654395121.93S1460636.56E 423883.35587836.2
VCUE-08-N-46	1001395110.19S1455509.23E 407547.05588018.0
VCUE-08-N-46	1655395049.42S1460636.47E 423871.35588838.5
VCUE-08-N-47	1001395037.12S1455509.74E 407547.05589038.0
VCUE-08-N-47	1654395016.93S1460635.88E 423847.25589840.0
VCUE-08-N-48	1001395004.65S1455509.50E 407529.05590039.0
VCUE-08-N-48	1651394945.05S1460632.41E 423755.05590822.1
VCUE-08-N-49	1001394932.66S1455509.24E 407511.05591025.0
VCUE-08-N-49	1651394912.42S1460632.03E 423736.15591828.0
VCUE-08-N-50	1001394900.17S1455510.51E 407529.05592027.0
VCUE-08-N-50	1648394839.94S1460630.06E 423679.15592828.9
VCUE-08-N-51	1001394827.09S1455510.27E 407511.05593047.0
VCUE-08-N-51	1646394807.45S1460627.65E 423611.95593830.1
VCUE-08-N-52	1001394754.62S1455510.78E 407511.05594048.0
VCUE-08-N-52	1646394734.95S1460628.07E 423611.95594832.1
VCUE-08-N-53	1001394722.15S1455510.53E 407493.05595049.0
VCUE-08-N-53	1643394703.04S1460624.61E 423519.75595815.0
VCUE-08-N-54	1001394649.64S1455509.48E 407456.05596051.0
VCUE-08-N-54	1643394630.56S1460623.47E 423482.75596816.0
VCUE-08-N-55	1001394617.17S1455509.23E 407438.05597052.0
VCUE-08-N-55	1642394558.06S1460622.09E 423439.75597817.7
VCUE-08-N-56	1001394544.67S1455508.98E 407420.05598054.0
VCUE-08-N-56	1641394525.59S1460620.70E 423396.75598818.4

15. Navigation Systems Verification and Monitoring

15.1. Gyro Monitoring

Dockside verification was performed in Balikpapan, Indonesia over 07-08th August 2007. An additional 1 sided calibration took place in Singapore on February 2008

- **The gyro verification results are in Appendix 3**

15.2. GPS Monitoring

Health checks onshore were carried out to verify that the installation was satisfactorily operational (data reception, transmission, processing and Logging were verified) and that operational settings were correct. Each system used, including duplicates was verified.

- **The onshore Health Check results are in Appendix 3**

15.3. RGPS Health Checks

The last RGPS verifications were held at Loyang Shipyard and onboard using a zero base line technique.

Previously verifications took place at Semayang Wharf, Balikpapan, Indonesia over the 07-08th of August 2007.

- **The onshore Health Check results are in Appendix 3**

16. Navigation Processing

16.1. The FGPS Seispos System

SeisPos is an off-line navigation QC and post-processing system for 2D and 3D streamer surveys supplied by Fast Geophysical Processing Services. It runs under various Windows operating systems and has a graphical front end. A relational database management system is used for data storage. SeisPos is capable of automatic filtering and gating of the observations in addition to manual editing, before new adjustments are calculated. There is a comprehensive set of QC tools available such as graphical plots of any node or observation parameters and combinations of these, comparison of online and processed P1/90.

16.2. First Line Test data

A first-break analysis was performed during the first line and to confirm the nominal offsets for the front end of the streamer. An offset shot test line was also performed after any streamer re-deployment.

16.3. Initial QC

Initial QC consisted of on-line monitoring of the systems and of producing an end of line QC report utilising the Spectra QCN (Quality Control Node). The report was generated as a PDF document. If any discrepancies were found, they would be further investigated and any problems were noted in the navigation line-logs.

The report included comparisons between the systems, plots of network reliability, SMA (Semi Major Axis), MDE (Mean Detectable Error) and TS-plots of compasses, depths and source separation.

16.4. Post-processing Flow

The lines were post processed using CGGVeritas standard 3D processing flow consisting of the following stages:

- Import P2/94 to database and check for header changes.
- Check for missing shots and perform shot edits.
- Update a-priori SD's and magnetic declination if required.
- Pre-process data applying standard gating and filtering, hand-edit any remaining observation spikes.
- Compass calibration and bias check.
- Network adjustment
- Processing QC report generation.
- Export final P1/90
- QC of final P1/90
- Comparison of online and final P1/90

16.5. Final QC

Final QC was performed during the post processing and consisted of checking the various reports and plots generated by SeisPos, checking consistency of logs and P1/90 QC and comparison. Any discrepancy was noted in the processing log.

16.6. Water Depth Processing

The recorded water depth data was corrected for vessel draught, speed of sound and finally the data was tidally corrected using a tide file supplied from the client. All three corrections were carried out in post-processing. A set of tidally corrected P1's is delivered along with a set of uncorrected P1's.

17. Observations

17.1. Navigation Summary

All systems performed well throughout the survey. Each systems performance is described in further detail below.

17.1.1. DGPS Systems-

Occasional drop out of data generated by SPM 2. SPM 1 remained stable throughout the survey and thus always provided 2 solutions. Due to dropouts in SPM 2 becoming more frequent around seq #86, SPM 1 was fed into Multifix DGPS system replacing the feed of SPM 2. This meant an adjustment to Multifix antenna offsets was required.

Once SPM2 was observed to be stable it was fed back into the Multifix software starting seq #97.

17.1.2. Echo Sounder

Both transducers worked well throughout the survey. As stated above the 12kHz was utilised for sequence 1, however due to the consistent shallow water depth the 200kHz was used for sequence 2 onwards.

17.1.3. Gyro

The primary and secondary gyro performed well during the survey.

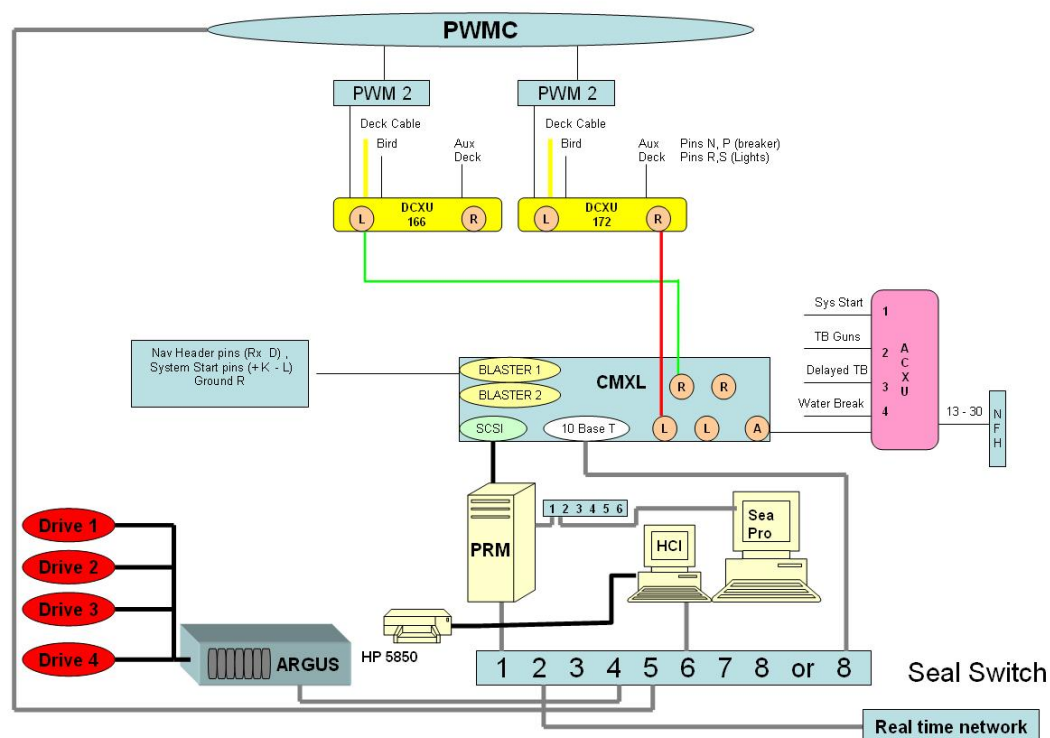
17.1.4. RGPS

All RGPS systems performed well throughout the survey.

17.2. Processing and QC Summary

No problems recorded

18. Instrumentation and QC System Description



Unit Type	Manufacturer	Software version
Recording	Sercel Seal	Version 5.1.14
Argus	Profocus: Raid disk and data management	Version 4.0
Tape drives	IBM 3590E	
Plotter	Versatech 24inch	
Onboard QC	Seal Seapro QC and ARGUS QC	Version 4.0
Source Controller	Seamap Gunlink 2000	Version 2.5.2
Auxiliary Systems	48 channel (Sercel AXCU)	
Bird Controller	Digicourse DMU + PC	Sys 3v01
Bird Type	Digicourse 5011E	Sys 3v01

19. Instrumentation and QC tests

19.1. Start-up tests

Before the beginning of the survey started, and after the streamer was deployed, a complete set of instrument/sensors tests were performed.

These tests were as follows:

Instrument tests

- 1 Harmonic distortion
- 2 System noise
- 3 Common mode rejection ratio
- 4 Gain error/ phase error
- 5 Cross talk

Sensor tests

- 6 Hydrophone capacitance
- 7 LF cut-off
- 8 Leakage resistance

At the start of the survey a complete set of instrument tests were performed and sent to the processing centre together with the seismic data. The results of the Start of Job Instrument/Sensor tests were: Channels 91 & 337 failing Capacitance, Channel 242 failing Hydrophone Leakage.

19.2. Additional client tests

Polarity tests were carried out at the start of contract and verified on Promax. Channel 59 had polarity reversed.

19.3. Daily Instrument and Sensor tests

The daily instrument and sensor tests consisted of the same 8 tests which were used to verify the Seal and Streamers performance at the start and throughout the contract. Results were printed out daily and also recorded to tape at start-up, interim monthly and end of contract. These tests were run daily to confirm that the Seal recording system and streamer performance were in specification.

The series of tests results showed the recording system to be in specification throughout the survey. The overall system performance was stable throughout the survey with test performance repeatable from day to day.

19.3.1. Seal tests performed daily

The following page shows the tests performed daily and their results.

Instrument tests

- 1 Harmonic distortion
- 2 System noise
- 3 Common mode rejection ratio
- 4 Gain error/ phase error
- 5 Cross talk

Sensor tests

- 6 Hydrophone capacitance
- 7 LF cut-off
- 8 Leakage resistance

19.3.2. Seal system and streamer test results

Streamer 1

Date Local	System tests						Sensor tests			Remarks
	HD	Sys noise	CMRR	Gain err	X talk odd	X talk even	Cap	LF cut-off	Leakage	
16-Mar-08	ok	ok	ok	ok	ok	ok	2	0	1	Ch. 91 & 337 failed capacitance. Ch. 242 failed leakage.
17-Mar-08	ok	ok	ok	ok	ok	ok	2	0	1	Ch. 91 & 337 failed capacitance. Ch. 242 failed leakage.
18-Mar-08	ok	ok	ok	ok	ok	ok	2	0	1	Ch. 91 & 337 failed capacitance. Ch. 242 failed leakage.
19-Mar-08	ok	ok	ok	ok	ok	ok	2	0	1	Ch. 91 & 337 failed capacitance. Ch. 242 failed leakage.
20-Mar-08	ok	ok	ok	ok	ok	ok	2	0	1	Ch. 91 & 337 failed capacitance. Ch. 242 failed leakage.
21-Mar-08	ok	ok	ok	ok	ok	ok	2	0	1	Ch. 91 & 337 failed capacitance. Ch. 242 failed leakage.
22-Mar-08	ok	ok	ok	ok	ok	ok	2	0	1	Ch. 91 & 337 failed capacitance. Ch. 242 failed leakage.
23-Mar-08	ok	ok	ok	ok	ok	ok	2	0	1	Ch. 91 & 337 failed capacitance. Ch. 242 failed leakage.
24-Mar-08	ok	ok	ok	ok	ok	ok	2	0	1	Ch. 91 & 337 failed capacitance. Ch. 242 failed leakage.
25-Mar-08	ok	ok	ok	ok	ok	ok	2	0	1	Ch. 91 & 337 failed capacitance. Ch. 242 failed leakage.
26-Mar-08	ok	ok	ok	ok	ok	ok	2	0	1	Ch. 91 & 337 failed capacitance. Ch. 242 failed leakage.
27-Mar-08	ok	ok	ok	ok	ok	ok	1	0	1	Ch. 337 failed capacitance. Ch. 242 failed leakage.
28-Mar-08	ok	ok	ok	ok	ok	ok	2	0	1	Ch. 209 & 337 failed capacitance. Ch. 242 failed leakage.
29-Mar-08	ok	ok	ok	ok	ok	ok	2	0	1	Ch. 209 & 337 failed capacitance. Ch. 242 failed leakage.
30-Mar-08	ok	ok	ok	ok	ok	ok	2	0	1	Ch. 209 & 337 failed capacitance. Ch. 242 failed leakage.
31-Mar-08	ok	ok	ok	ok	ok	ok	1	0	1	Ch. 337 failed capacitance. Ch. 242 failed leakage.
01-Apr-08	ok	ok	ok	ok	ok	ok	1	0	1	Ch. 337 failed capacitance. Ch. 242 failed leakage.
02-Apr-08										No daily test due to being alongside for crew change in Burnie, Tasmania
03-Apr-08										No daily test due to being alongside in Burnie, Tasmania due to weather
04-Apr-08	ok	ok	ok	ok	ok	ok	2	0	1	Chs. 91 & 337 failed capacitance. Ch. 242 failed leakage.
05-Apr-08	ok	ok	ok	ok	ok	ok	2	0	1	Chs. 91 & 337 failed capacitance. Ch. 242 failed leakage.
06-Apr-08	ok	ok	ok	ok	ok	ok	2	0	2	Chs. 91 & 337 failed capacitance. Ch. 242 & 252 failed leakage.
07-Apr-08	ok	ok	ok	ok	ok	ok	2	0	2	Chs. 91 & 337 failed capacitance. Ch. 242 & 252 failed leakage.
08-Apr-08	ok	ok	ok	ok	ok	ok	2	1	3	Chs. 91 & 337 failed capacitance. Ch. 452 failed Cutoff, Ch. 242, 252 & 452 failed leakage.
09-Apr-08	ok	ok	ok	ok	ok	ok	2	1	3	Chs. 91 & 337 failed capacitance. Ch. 452 failed Cutoff, Ch. 242, 252 & 452 failed leakage.
10-Apr-08	ok	ok	ok	ok	ok	ok	2	1	3	Chs. 91 & 337 failed capacitance. Ch. 452 failed Cutoff, Ch. 242, 252 & 452 failed leakage.
11-Apr-08	ok	ok	ok	ok	ok	ok	2	1	3	Chs. 91 & 337 failed capacitance. Ch. 452 failed Cutoff, Ch. 242, 252 & 452 failed leakage.
12-Apr-08	ok	ok	ok	ok	ok	ok	2	1	3	Chs. 91 & 337 failed capacitance. Ch. 452 failed Cutoff, Ch. 242, 252 & 452 failed leakage.
13-Apr-08	ok	ok	ok	ok	ok	ok	2	1	3	Chs. 91 & 337 failed capacitance. Ch. 452 failed Cutoff, Ch. 242, 252 & 452 failed leakage.
14-Apr-08	ok	ok	ok	ok	ok	ok	2	1	3	Chs. 132 & 337 failed capacitance. Ch. 452 failed Cutoff, Ch. 242, 252 & 452 failed leakage.
15-Apr-08	ok	ok	ok	ok	ok	ok	2	1	3	Chs. 91 & 337 failed capacitance. Ch. 452 failed Cutoff, Ch. 242, 252 & 452 failed leakage.
16-Apr-08	ok	ok	ok	ok	ok	ok	3	1	3	Chs. 91, 132 & 337 failed capacitance. Ch. 452 failed Cutoff, Ch. 242, 252 & 452 failed leakage.
17-Apr-08	ok	ok	ok	ok	ok	ok	3	1	3	Chs. 91, 132 & 337 failed capacitance. Ch. 452 failed Cutoff, Ch. 242, 252 & 452 failed leakage.
18-Apr-08	ok	ok	ok	ok	ok	ok	3	1	3	Chs. 91, 132 & 337 failed capacitance. Ch. 452 failed Cutoff, Ch. 242, 252 & 452 failed leakage.

2.3.3. End of job test

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

Instrument tests

- 1 Harmonic distortion
- 2 System noise
- 3 Common mode rejection ratio

- 4 Gain error/ phase error
- 5 Cross talk

Sensor tests

- 6 Hydrophone capacitance
- 7 LF cut-off
- 8 Leakage resistance

The SOJ, Interim Monthly and EOJ tests listed above were recorded to tape, and sent to the processing centre together with the Seismic data.

The result of the End of Job Instrument/Sensor tests were: Channels 91, 132 & 337 failed Capacitance. Channel 452 failed Cut-off and Channels 242, 252 & 452 failed Leakage.

The overall Seal and Solid streamer system performance was stable and repeatable throughout the survey.

19.3.3. QC Processes

Seismic Observer QC displays


Seal system QC displays showing shot records and rms residual noise were used to monitor seismic data shot by shot. RMS levels were colour scaled to give good visual assessments to the operator of sea swell and ship noise effects on the streamer.

QC products and processing sequence


A Promax system was in use during the survey to further monitor the quality of the Seismic data, and to produce Gathers, Brute and Raw stacks.


19.3.4. Production tape logs


Client	Cue Energy Resources	 BOX 1 Vessel M/V Pacific Titan						
Area	South East Basin, Offshore Australia							
Survey	2D, T37/38P							
Job #	6374							
Date	Line Name	Tape	Seq	FF	LF	FSP	LSP	Comments
16 March 2008	VCUE08-E08-001	1	1	979	2526	981	1695	SOL
16 March 2008	VCUE08-E08-001	2	1	2527	3341	1694	881	EOL
17 March 2008	VCUE08-E11-002	3	2	979	2526	981	2527	SOL
17 March 2008	VCUE08-E11-002	4	2	2527	3333	2528	3333	EOL
17 March 2008	VCUE08-E15-003	5	3	979	2526	3231	1686	SOL
17 March 2008	VCUE08-E15-003	6	3	2527	3332	1695	881	EOL
17 March 2008	VCUE08-E12-004	7	4	979	2526	981	2526	SOL
17 March 2008	VCUE08-E12-004	8	4	2527	3334	2527	3333	EOL
18 March 2008	VCUE08-E09-005	9	5	979	2526	3241	1696	SOL
18 March 2008	VCUE08-E09-005	10	5	2527	3342	1695	881	EOL
18 March 2008	VCUE08-E14-006	11	6	979	2526	981	2526	SOL
18 March 2008	VCUE08-E14-006	12	6	2527	3334	2527	3333	EOL
18 March 2008	VCUE08-E10-007	13	7	979	2526	3237	1693	SOL
18 March 2008	VCUE08-E10-007	14	7	2527	3309	1692	881	EOL
19 March 2008	VCUE08-E06-008	15	8	979	2292	981	2291	SOL/EOL
19 March 2008	VCUE08-E04-009	16	9	979	2298	2197	881	SOL/EOL
19 March 2008	VCUE08-E07-010	17	10	979	2290	981	2289	SOL/EOL
19 March 2008	VCUE08-N34-011	18	11	979	1792	981	1791	SOL/EOL
19 March 2008	VCUE08-N32-012	19	12	979	1796	1695	881	SOL/EOL
20 March 2008	VCUE08-N26-013	20	13	979	2526	981	2526	SOL
20 March 2008	VCUE08-N26-013	21	13	2527	2574	2527	2573	EOL
20 March 2008	VCUE08-N21-014	22	14	979	2526	2732	1187	SOL
20 March 2008	VCUE08-N21-014	23	14	2527	2833	1186	881	EOL
20 March 2008	VCUE08-N24-015	24	15	979	2526	981	2525	SOL
20 March 2008	VCUE08-N24-015	25	15	2527	2677	2526	2675	EOL
20 March 2008	VCUE08-N20-016	26	16	979	2526	2782	1237	SOL
20 March 2008	VCUE08-N20-016	27	16	2527	2883	1236	881	EOL
21 March 2008	VCUE08-N27-017	28	17	979	2523	981	2522	SOL/EOL
21 March 2008	VCUE08-N22-018	29	18	979	2526	2679	1134	SOL
21 March 2008	VCUE08-N22-018	30	18	2527	2673	1133	1010	EOL

Client	Cue Energy Resources	 BOX 2 Vessel M/V Pacific Titan						
Area	South East Basin, Offshore Australia							
Survey	2D, T37/38P							
Job #	6374							
Date	Line Name	Tape	Seq	FF	LF	FSP	LSP	Comments
21 March 2008	VCUE08-N28-019	31	19	979	2481	981	2480	SOL/EOL
22 March 2008	VCUE08-N23-020	32	20	979	2526	2627	1082	SOL
22 March 2008	VCUE08-N23-020	33	20	2527	2728	1081	881	EOL
22 March 2008	VCUE08-N30-021	34	21	979	2482	981	2481	SOL/EOL
22 March 2008	VCUE08-N25-022	35	22	979	2526	2526	981	SOL
22 March 2008	VCUE08-N25-022	36	22	2527	2627	980	881	EOL
22 March 2008	VCUE08-N29-023	37	23	979	2480	981	2479	SOL/EOL
23 March 2008	VCUE08-N31-024	38	24	979	2188	2087	881	SOL/EOL
23 March 2008	VCUE08-E03-025	39	25	979	2297	2196	881	SOL/EOL
23 March 2008	VCUE08-E01-026	40	26	979	2294	981	2293	SOL/EOL
23 March 2008	VCUE08-E35-027	41	27	979	1791	981	1790	SOL/EOL
23 March 2008	VCUE08-N33-028	42	28	979	1796	1695	881	SOL/EOL
24 March 2008	VCUE08-E02-029	43	29	979	2300	2199	881	SOL/EOL
24 March 2008	VCUE08-E05-030	44	30	979	2295	981	2294	SOL/EOL
24 March 2008	VCUE08-N40-031	45	31	979	1784	981	1783	SOL/EOL
24 March 2008	VCUE08-N36-032	46	32	979	1791	1690	881	SOL/EOL
24 March 2008	VCUE08-N39-033	47	33	979	1786	981	1785	SOL/EOL
24 March 2008	VCUE08-N43-034	48	34	979	1780	1679	881	SOL/EOL
25 March 2008	VCUE08-N38-035	49	35	979	1787	981	1786	SOL/EOL
25 March 2008	VCUE08-N41-036	50	36	979	1784	1683	881	SOL/EOL
25 March 2008	VCUE08-N37-037	51	37	979	1791	981	1790	SOL/EOL
25 March 2008	VCUE08-N42-038	52	38	979	1277	1680	1385	NTBP
26 March 2008	VCUE08-N42-039	53	39	979	1781	1680	881	SOL/EOL
26 March 2008	VCUE08-N46-040	54	40	979	1776	981	1775	SOL/EOL
27 March 2008	VCUE08-N49-041	55	41	979	1772	1671	881	SOL/EOL
27 March 2008	VCUE08-N45-042	56	42	979	1775	981	1774	SOL/EOL
27 March 2008	VCUE08-N48-043	57	43	979	1772	1671	881	SOL/EOL
27 March 2008	VCUE08-N44-044	58	44	979	1778	981	1777	SOL/EOL
27 March 2008	VCUE08-N47-045	59	45	979	1775	1674	881	SOL/EOL
27 March 2008	VCUE08-N50-046	60	46	979	1769	981	1768	SOL/EOL

Client	Cue Energy Resources	 BOX 3 Vessel M/V Pacific Titan							
Area	South East Basin, Offshore Australia								
Survey	2D, T37/38P								
Job #	6374								
Date	Line Name	Tape	Seq	FF	LF	FSP	LSP	Comments	
28 March 2008	VCUE08-N54-047	61	47	979	1764	1663	881	SOL/EOL	
28 March 2008	VCUE08-N51-048	62	48	979	1767	1662	881	SOL/EOL	
28 March 2008	VCUE08-N55-049	63	49	979	1763	1662	881	SOL/EOL	
28 March 2008	VCUE08-N52-050	64	50	979	1767	1661	881	SOL/EOL	
28 March 2008	VCUE08-N56-051	65	51	979	1762	1661	881	SOL/EOL	
28 March 2008	VCUE08-N53-052	66	52	979	1764	1661	881	SOL/EOL	
29 March 2008	VCUE08-E13-053	67	53	979	2526	3232	1687	SOL	
29 March 2008	VCUE08-E13-053	68	53	2527	3333	1686	881	EOL	
29 March 2008	VCUE08-E17-054	69	54	979	2526	981	2526	SOL	
29 March 2008	VCUE08-E17-054	70	54	2527	3334	2527	3333	EOL	
30 March 2008	VCUE08-E21-055	71	55	979	2526	3231	1686	SOL	
30 March 2008	VCUE08-E21-055	72	55	2527	3332	1685	881	EOL	
30 March 2008	VCUE08-E16-056	73	56	979	2526	981	2526	SOL	
30 March 2008	VCUE08-E16-056	74	56	2527	3334	2527	3333	EOL	
31 March 2008	VCUE08-E30-057	75	57	979	2357	2256	881	SOL/EOL	
31 March 2008	VCUE08-E25-058	76	58	979	2358	981	2357	SOL/EOL	

Client	Cue Energy Resources	 BOX 4 Vessel M/V Pacific Titan							
Area	South East Basin, Offshore Australia								
Survey	2D, T37/38P								
Job #	6374								
Date	Line Name	Tape	Seq	FF	LF	FSP	LSP	Comments	
31 March 2008	VCUE08-E29-059	77	59	979	2359	2258	881	SOL / EOL	
31 March 2008	VCUE08-E24-060	78	60	979	2378	981	2377	SOL / EOL	
01 April 2008	VCUE08-E28-061	79	61	979	2360	2259	881	SOL / EOL	
04 April 2008	VCUE08-E44-062	80	62	979	1031	981	1031	NTBP	
04 April 2008	VCUE08-E44-063	81	63	979	1868	981	1867	SOL / EOL	
04 April 2008	VCUE08-E49-064	82	64	979	1056	1609	1534	NTBP	
05 April 2008	VCUE08-E49-065	83	65	979	1710	1608	881	SOL / EOL	
05 April 2008	VCUE08-E45-066	84	66	979	1861	981	1860	SOL / EOL	
05 April 2008	VCUE08-N19-067	85	67	979	2526	2833	1288	SOL	
05 April 2008	VCUE08-N19-067	86	67	2527	2934	1287	881	EOL	
05 April 2008	VCUE08-N14-068	87	68	979	2526	981	2526	SOL	
05 April 2008	VCUE08-N14-068	88	68	2527	3189	2527	3188	EOL	
06 April 2008	VCUE08-N18-069	89	69	979	2526	2884	1339	SOL	
06 April 2008	VCUE08-N18-069	90	69	2527	2985	1338	881	EOL	
06 April 2008	VCUE08-N13-070	91	70	979	2526	981	2526	SOL	
06 April 2008	VCUE08-N13-070	92	70	2527	3239	2527	3238	EOL	
06 April 2008	VCUE08-N17-071	93	71	979	2526	2936	1391	SOL	
06 April 2008	VCUE08-N17-071	94	71	2527	3037	1390	881	EOL	
06 April 2008	VCUE08-N12-072	95	72	979	2526	981	2526	SOL	
07 April 2008	VCUE08-N12-072	96	72	2527	3291	2527	3290	EOL	
07 April 2008	VCUE08-N16-073	97	73	979	2526	2986	1441	SOL	
07 April 2008	VCUE08-N16-073	98	73	2527	3087	1440	881	EOL	
07 April 2008	VCUE08-N11-074	99	74	979	2526	981	2526	SOL	
07 April 2008	VCUE08-N11-074	100	74	2527	3294	2527	3293	EOL	
07 April 2008	VCUE08-N15-075	101	75	979	2526	3036	1491	SOL	
08 April 2008	VCUE08-N15-075	102	75	2527	3137	1490	881	EOL	
08 April 2008	VCUE08-N10-076	103	76	979	2526	981	2526	SOL	
08 April 2008	VCUE08-N10-076	104	76	2527	3292	2527	3291	EOL	
08 April 2008	VCUE08-N05-077	105	77	979	2526	3187	1642	SOL	
08 April 2008	VCUE08-N05-077	106	77	2527	3288	1641	881	EOL	

Client	Cue Energy Resources	 BOX 5							
Area	South East Basin, Offshore Australia	Vessel M/V Pacific Titan							
Survey	2D, T37/38P								
Job #	6374								
Date	Line Name	Tape	Seq	FF	LF	FSP	LSP	Comments	
08 April 2008	VCUE08-N09-078	107	78	979	2526	981	2526	SOL	
09 April 2008	VCUE08-N09-078	108	78	2527	3292	2527	3291	EOL	
09 April 2008	VCUE08-N04-079	109	79	979	1097	3186	3071	NTBP	
09 April 2008	VCUE08-N04-080	110	80	979	2526	3186	1641	SOL	
09 April 2008	VCUE08-N04-080	111	80	2527	3287	1640	881	EOL	
09 April 2008	VCUE08-N08-081	112	81	979	2526	981	2526	SOL	
09 April 2008	VCUE08-N08-081	113	81	2527	3292	2527	3291	EOL	
10 April 2008	VCUE08-N03-082	114	82	979	2526	3186	1641	SOL	
10 April 2008	VCUE08-N03-082	115	82	2527	3287	1640	881	EOL	
10 April 2008	VCUE08-N07-083	116	83	979	2526	981	2526	SOL	
10 April 2008	VCUE08-N07-083	117	83	2527	3288	2527	3287	EOL	
10 April 2008	VCUE08-N02-084	118	84	979	2526	3187	1642	SOL	
10 April 2008	VCUE08-N02-084	119	84	2527	3288	1641	881	EOL	
11 April 2008	VCUE08-N06-085	120	85	979	2526	981	2526	SOL	
11 April 2008	VCUE08-N06-085	121	85	2527	3289	2527	3288	EOL	
11 April 2008	VCUE08-N01-086	122	86	979	2526	3186	1641	SOL	
11 April 2008	VCUE08-N01-086	123	86	2527	3287	1640	881	EOL	
11 April 2008	VCUE08-E18-087	124	87	979	2057	981	2056	SOL/incomplete	
12 April 2008	VCUE08-E18-088	125	88	1844	3334	1846	3333	SOL/EOL	
12 April 2008	VCUE08-E22-089	126	89	979	2526	3233	1688	SOL	
12 April 2008	VCUE08-E22-089	127	89	2527	3334	1687	881	EOL	
12 April 2008	VCUE08-E19-090	128	90	979	2526	981	2527	SOL	
12 April 2008	VCUE08-E19-090	129	90	2527	3332	2528	3333	EOL	
13 April 2008	VCUE08-E23-091	130	91	979	2526	3231	1686	SOL	
13 April 2008	VCUE08-E23-091	131	91	2527	3332	1685	881	EOL	
13 April 2008	VCUE08-E27-092	132	92	979	2360	981	2359	SOL/EOL	
13 April 2008	VCUE08-E32-093	133	93	979	2356	2255	881	SOL/EOL	
13 April 2008	VCUE08-E37-094	134	94	979	2095	981	2094	SOL/EOL	
14 April 2008	VCUE08-E41-095	135	95	979	1973	1872	881	SOL/EOL	
14 April 2008	VCUE08-E35-096	136	96	979	2150	981	2149	SOL/EOL	

Client	Cue Energy Resources							BOX 6	
Area	South East Basin, Offshore Australia							Vessel M/V Pacific Titan	
Survey	2D, T37/38P								
Job #	6374								
Date	Line Name	Tape	Seq	FF	LF	FSP	LSP	Comments	
14 April 2008	VCUE08-E39-097	137	97	979	2018	1917	881	SOL/EOL	
14 April 2008	VCUE08-E42-098	138	98	979	1940	981	1939	SOL/EOL	
14 April 2008	VCUE08-E46-099	139	99	979	1823	1722	881	SOL/EOL	
14 April 2008	VCUE08-E50-100	140	100	979	1707	981	1706	SOL/EOL	
15 April 2008	VCUE08-E53-101	141	101	979	1597	1496	881	SOL/EOL	
15 April 2008	VCUE08-E48-102	142	102	979	1748	981	1747	SOL/EOL	
15 April 2008	VCUE08-E52-103	143	103	979	1633	1532	881	SOL/EOL	
15 April 2008	VCUE08-E47-104	144	104	979	1790	981	1789	SOL/EOL	
15 April 2008	VCUE08-E51-105	145	105	979	1671	1570	881	SOL/EOL	
15 April 2008	VCUE08-E43-106	146	106	979	1902	981	1901	SOL/EOL	
16 April 2008	VCUE08-E40-107	147	107	979	1987	1886	881	SOL/EOL	
16 April 2008	VCUE08-E34-108	148	108	979	2192	981	2191	SOL/EOL	
16 April 2008	VCUE08-E38-109	149	109	979	2063	1962	881	SOL/EOL	
16 April 2008	VCUE08-E33-110	150	110	979	2358	981	2357	SOL/EOL	
16 April 2008	VCUE08-E36-111	151	111	979	2132	2031	881	SOL/EOL	
17 April 2008	VCUE08-E31-112	152	112	979	2359	981	2358	SOL/EOL	
17 April 2008	VCUE08-E26-113	153	113	979	2355	2254	881	SOL/EOL	
17 April 2008	VCUE08-E20-114	154	114	979	2526	981	2526	SOL	
17 April 2008	VCUE08-E20-114	155	114	2527	3334	2527	3333	EOL	
17 April 2008	VCUE08-E54-115	156	115	979	2137	981	2136	SOL/EOL	
18 April 2008	SOJ-E0J-TEST	157		1	12			Tests passed	
END OF JOB									

20. Onboard QC Personnel and System

20.1. Onboard QC Processing Geophysicists

17 th March to 2 nd April 2008 Geophysicist	Steffi Schwarz	CGGVeritas,	Chief	Field
	Dennis Jerome Aquino	CGGVeritas,	Field Geophysicist	
2 nd to 18 th April 2008 Geophysicist	Tommy Timenes	CGGVeritas,	Chief	Field
Field Geophysicist	Isabel Adjani Nicolas	CGGVeritas,	Field Geophysicist	

20.2. Onshore QC Processing Support

Ronny Tømmerbakke	Support Geophysicist
Cathrine Myrmehl	Support Geophysicist
Christophe Massacand	Chief Operations Geophysicist

20.3. Seismic Processing Hardware Description

Machines	:	1 x Supermicro, built on SC833T-R760 Chassis (Dual Core Xenon 2x3.2GHz CPU, 8Gb RAM)
		1 x Win XP SP2 PC
Hard Disk Drive	:	1.6Tb Disk
Monitors	:	4 x 19in LCD Monitors
Tape Drives	:	2 x IBM 3590 tape drives
Plotter	:	1 x Isys V24 24in Thermal Plotter (B&W)

20.4. Seismic Processing Software Description

Processing software	:	ProMAX 2D version 2003.12.1.1
Operating System	:	LINUX Red Hat Enterprise WS 3.0 Update 6
Plotting software	:	ZehPlot Express 4.7.0

21. Acquisition Quality Control

21.1. Introduction

This report provides a summary of the steps taken for the onboard seismic data QC for this survey. Information important for the onshore processing of this data is either contained within this document, or its location is referenced.

The SEBOA survey is comprised of several 2D seismic surveys for the SEBOA consortium (Santos, 3D Oil, Bass Straits Oil Company, Cue Energy Resources, Eagle Bay Resources, Exoil and Tap Oil). The survey sites are located offshore South East Basin and Bass Strait Basin in Australia and cover around 10,900 km.

This report covers the CUE survey of blocks T37P and T38P.

Acquisition parameters for the project are the following:

- 1 Streamer x 6000m
- Single source
- 25 m SP interval
- 6 seconds record length

21.2. QC Processing Objectives

The main objective of the onboard QC processing was to identify problems associated with the data acquisition and recording. This included the assessment of noise in the data on a line by line basis in order to give an overall impression of the data quality.

Various QC methods, including RMS noise displays, single and multi-trace displays, gun hydrophone channels and stacks were used to assess compliance with various acceptance criteria and to isolate any other acquisition issues.

The general aim of the QC processing was not to attenuate noise but to show the data as it was recorded, or how it would be presented to the processing centre.

A brute stack was produced for every line with minimal processing to enable a thorough QC of the data onboard. In addition to brute stack processing, gun hydrophone channels were checked to QC the performance of the source, near trace and Shot vs. Channel RMS displays were generated and examined to identify any noise problems.

21.3. Parameter Testing

Parameter testing consisted of choosing suitable parameters on the first sequence, along with NMO mutes, and post stack scaling for the displays, and checking that these parameters remained appropriate throughout the survey. Testing was kept to a minimum due to the high acquisition rate and resulting workload.

After initial cable deployment and after each subsequent redeployment, a near-offset test was performed using the gun closest to the centre of the source to ascertain the actual distance from the source to the centre of the first receiver group.

21.4. QC Processing Sequence

Data was recorded by the Observer department in duplicate onto 3590 tape cartridges (10Gb capacity). One 'primary' tape set and one 'copy' tape sets were generated. Upon completion of a line, the 'original' (or 'primary') tape was read to confirm the integrity of the data on tape. All SEG-D data on the primary tape was extracted and written to the ProMAX system disk. A listing of the field files (FFID), shot point numbers (SP) and number of channels was printed to clearly identify any lost shots or shots with missing navigation headers.

The data included 480 seismic channels and 30 auxiliary channels (-1 to -30). Informative auxiliary channels are Aux1 - System Start, Aux2 - Time Break, Aux4 - Water break, Aux13 to Aux30 - Gun Near Field Hydrophones. Also recorded were the start of line (SOL) and end of line (EOL) noise records.

Seismic data, noise records and auxiliary channels were input with a record length of 6000ms, and a 2ms sample interval was used in the acquisition. The cable length was 6000 meters with hydrophone group separation of 12.5 meters, and shot points were recorded at 25m intervals.

A bulk shift static correction was applied to the data to correct for the 50ms instrument delay of the recording system.

For QC purposes a nominal 2D geometry was applied to all the seismic trace data. The resulting offset / CDP binning information calculated was then loaded into the seismic trace headers. The data was re-sampled from 2 ms to 4 ms using a minimum phase, high fidelity anti-alias filter applied prior to resample. Further data reduction involved 2-to-1 Marine Trace Decimation after differential NMO, which increased the receiver spacing from 12.5 to 25 meters.

To balance the amplitudes of the shot record, true amplitude recovery using a spherical divergence correction was used and applied to the whole shot record, based on a brute velocity function picked for the area. Band pass filtering (Ormsby 6-8-90-120) was also applied to the data, prior to NMO and stacking.

Water bottom picks were automatically generated and manually QC'ed for the near channel.

Trace editing involved killing any bad traces or shots based on Observer log comments and results of the QC.

21.5. Velocity Analysis

Velocities were picked for every line at a 4 km interval using ProMAX interactive velocity analysis package. This comprised of a semblance display with RMS stacking velocity graph and interval velocity graph, CDP super gather panel and function stack panels.

To improve the signal to noise ratio, super gathers were formed by combining 15 adjacent CDP gathers. Stack panels were created from these 15 CDPs using 31 functions varying +/- 35% from the regional velocity function of the first two sequences. Thereafter, the velocity functions of the nearest adjacent line shot in the same direction, were used as a guide.

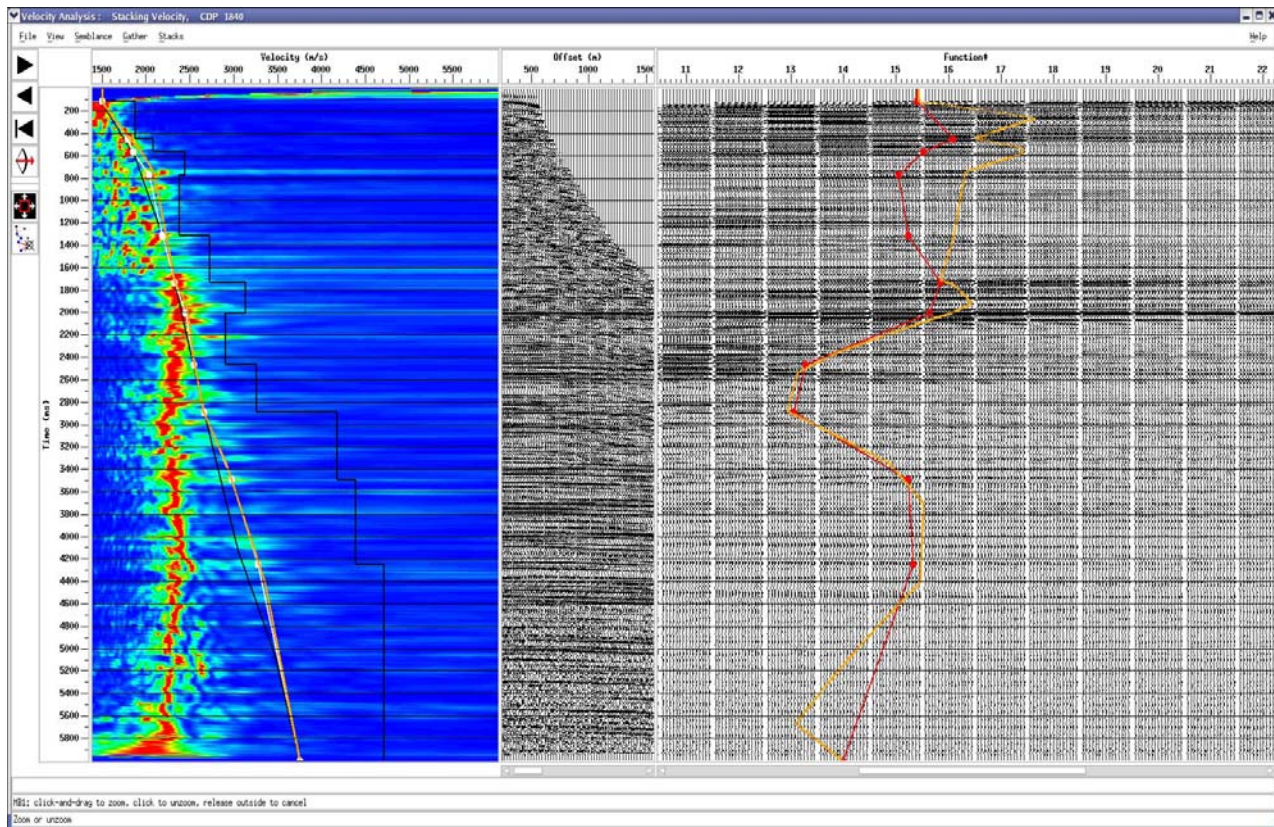


Figure 21-1: Velocity analysis for sequence 072. Graphical user interface with semblance, super-CDP gather and function stacks.

To speed up the on-screen velocity picking procedure, the velocity analysis displays were pre-computed. Normal move-out was applied to the gather to check that the events were lining up well. NMO corrected gathers were also displayed onscreen: both, at and between velocity locations, for further verification.

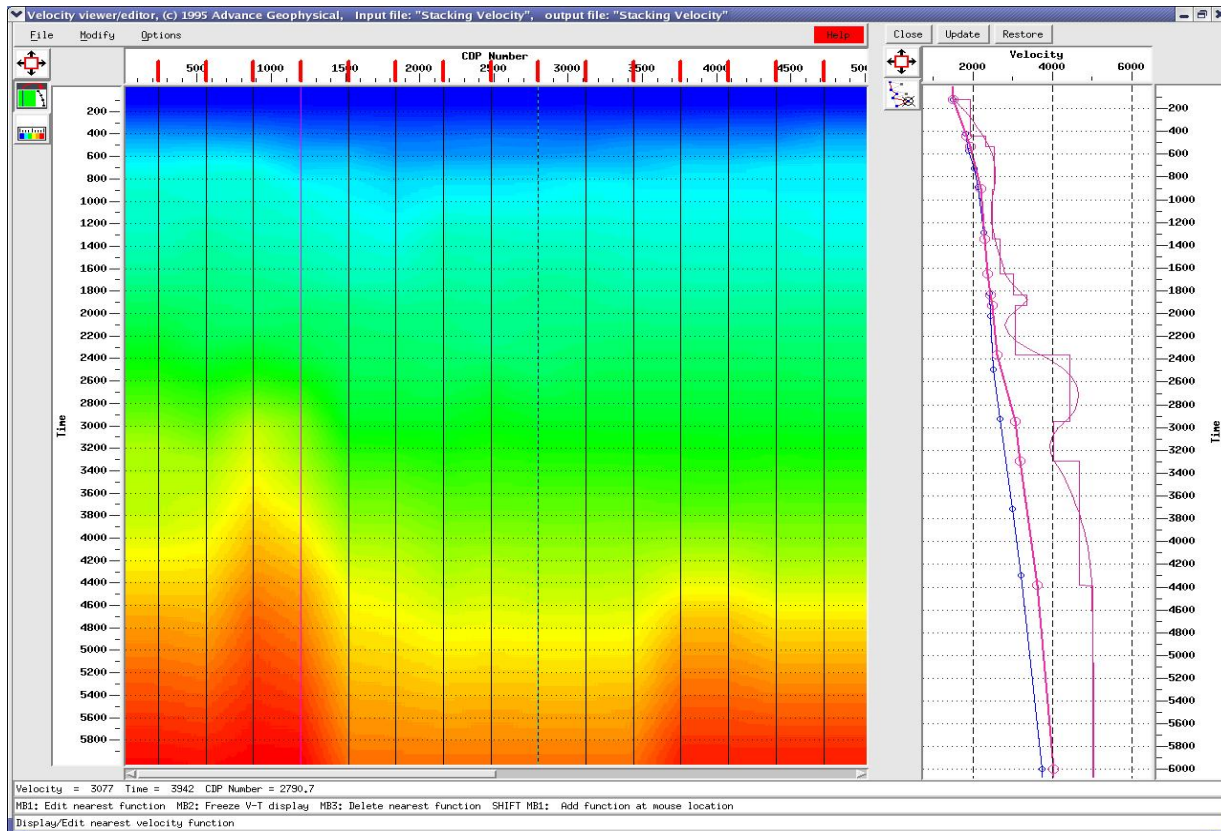


Figure 21.2: Velocity QC for sequence 072 using the Velocity Viewer/Point Editor to check for any errant picks.

Velocity table for each sequence was exported to ASCII format.

21.6. Brute Stack

Brute stacks were produced as soon as possible after each line and presented to the onboard client to assess the noise impact on the data.

A straight mean vertical stack algorithm was used for CDP stacking, with a root power scalar for normalization of 0.5. A bulk shift static correction was applied post-stack to correct for the gun and cable depths. Filtering was limited to a 6-8-90-120 Hz Ormsby band-pass filter. The raw brute stacks were captured to jpg and plotted to paper.

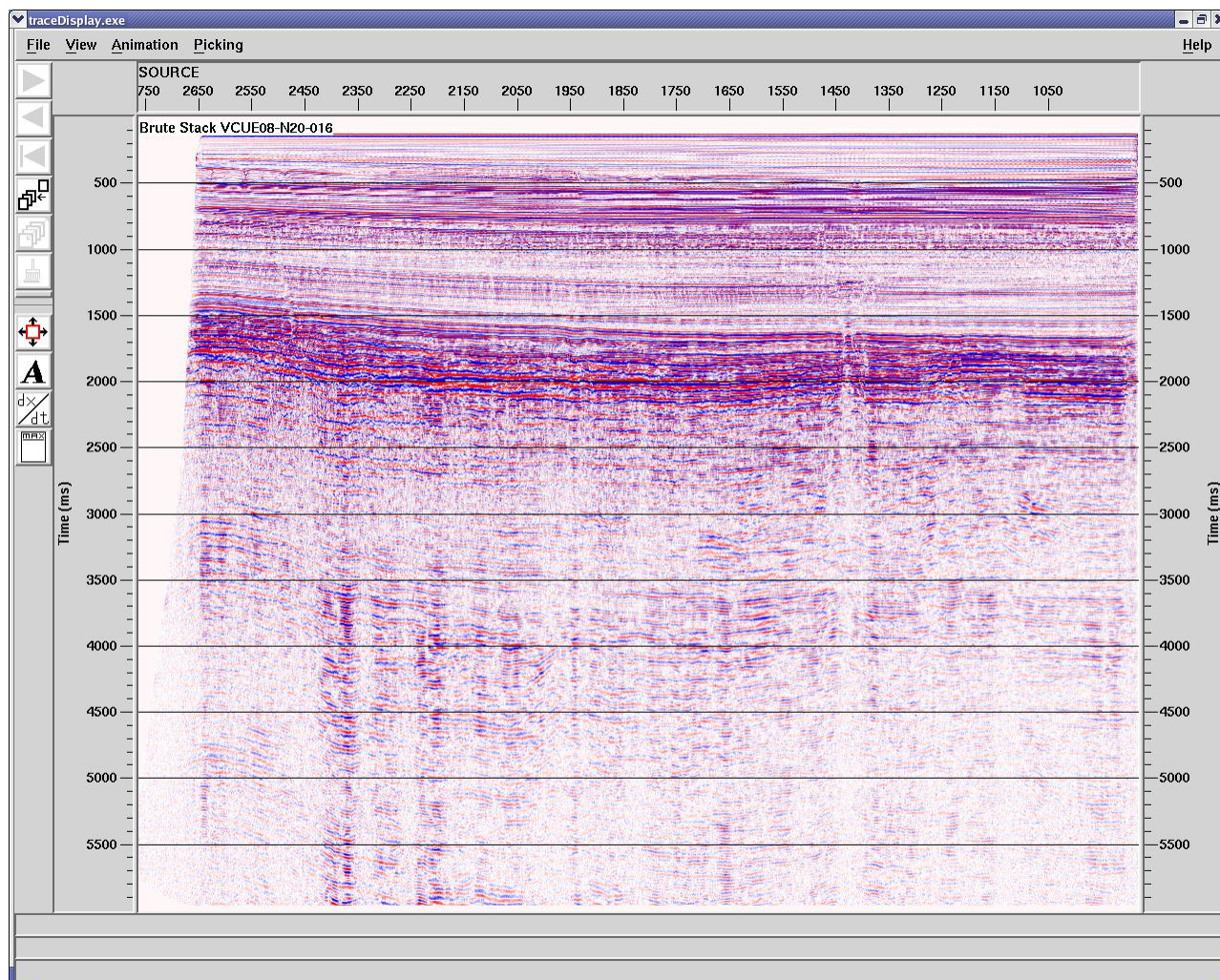


Figure 21-3: Brute stack for sequence 016. Note string ringing.

21.7. QC Workflows

This section describes the quality control steps that were taken. This acquisition QC allows for the onboard processors to find, log and analyse any potential problems with data acquisition. These were done in conjunction with the other onboard departments so as to maintain the highest possible standards of acquisition.

The onboard QC workflows include a full set of quality controls used to detect seismic and positioning problems.

STEP	DETAILS	QC PROCEDURE/PRODUCT
Reformat to ProMAX internal format	Input full length record - 6000ms, 480 channels + 30 auxiliary channels	Check Job Listing for FFID/Shot numbering, Gun Seq, Main headers. Check for missing data
Noise Record	Start And End Of Line. Ambient RMS Calculation	Check screen display and noise level Screen capture SOL & EOL records
Noise History	Append Noise Calculation to History	Screen capture Noise History – single display for entire project
Raw Shots Display	Every 1025m, 480 channels 6000ms	Check Channel Edits Check Data Quality
Auxiliary Channel QC	Create Aux Channel Gathers Vertical Stack Gun Hydrophones for each Gun string	QC of Aux Channels Check for autofires, gun timing, air leaks
Near Trace Display	Select First Channel and Display	Check record length, data quality Screen capture
Shot vs Chan RMS Analysis	<ul style="list-style-type: none"> Ormsby, Zero Phase, 4-8-90-120 Hz BPF applied. 2 Windows: 50-500ms & 5450-5950ms. Shot by shot Average Noise Calculation. 	Check levels against job specs Check for bad channels Screen capture for both displays
RMS History	Calculate Average for Sequence and append to RMS History File	Screen capture RMS History – single display for entire project
Trace Decimation Flow	<ul style="list-style-type: none"> Input Raw Shots Apply Shot and Channel Edits based on Observer Logs and QC -50ms static shift for Instrument Filter Delay Ormsby, Minimum Phase, 4-8-90-120 Hz Band Pass Filter Apply 2D Nominal Marine Geometry 	
Decimated shot display	Every 1250 m shot display on screen	Check shots
Velocity Analysis	Every 4 km, Semblance, Gathers, Variable Velocity Percentage Stack Panels	Pick velocities every 4km
Velocity QC	Start ProMAX Interactive Velocity QC and Editing tool.	Check velocity Field for Spikes and Picking errors. Display as Interval Velocities for additional QC
NMO gathers	Every 2km NMO CMP gathers on screen	Check moveout of primaries.

STEP	DETAILS	QC PROCEDURE/ PRODUCT
Export Vels	Export Velocity Table to ASCII	Save ASCII Vel file
Stack RMS Flow	Calculate water column RMS value for posting on top of the stack	
Shot Stack Flow	Calculate average RMS level of each shot over entire line, measured within a 5450-5950 window. Post in ProMAX database	QC for anomalous values Screen capture
Channel Stack Flow	Calculate average RMS level of each channel over entire line, measured within a 5450-5950 window. Post in ProMAX database	QC for anomalous values Screen capture
Stack Flow	<ul style="list-style-type: none"> Input Decimated Shots Sort to CMP order Moveout with picked Velocity Field Surgical NMO mute 1/sqrt(n) fold compensated stack Apply Gun and Cable Statics 1/tv² amplitude recovery Ormsby, Minimum Phase, 4-8-90-120 Hz Band Pass Filter 	Check quality of stack Check completeness of Stack and corresponding SPs, FFIDs and CDPs Screen capture
Stack Plot	Time Variable Amplitude Compensation	QC of stack
SEG-Y stack	Write to SEG-Y & QC	Save deliverable file
Nav Merge QC	Merge lead trace of each cable with P190. Calculate direct arrival time and display over Seismic Near Trace Gather.	Check that predicted Direct Arrival Time closely follows the seismic data. Check that all traces have merged successfully. End of Job

21.8. Noise Record and Channel RMS graph

The noise records were recorded at the start and end of every line, and displayed for QC. Channel RMS values were computed for all 480 channels over the entire record for noise analysis, and graphed above the display. For every sequence the noise record at SOL and EOL was displayed on screen and archived to GIF format.

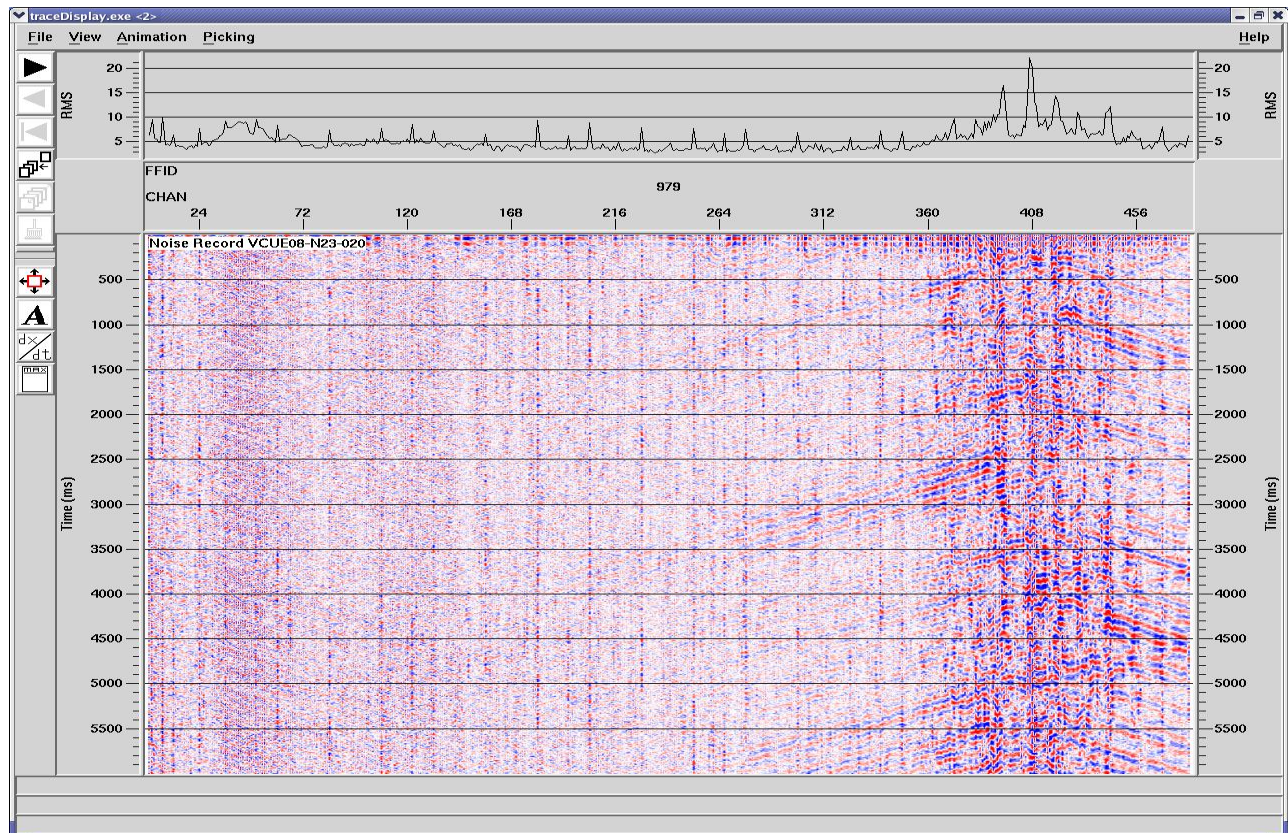


Figure 21-4: Example Noise Record with Channel RMS levels annotated, sequence 020. Note slightly noisy bird channels, and bend noise towards the tail of the streamer.

For each noise record a noise analysis is performed. The average ambient noise encountered in the noise records is recorded in the QC log.

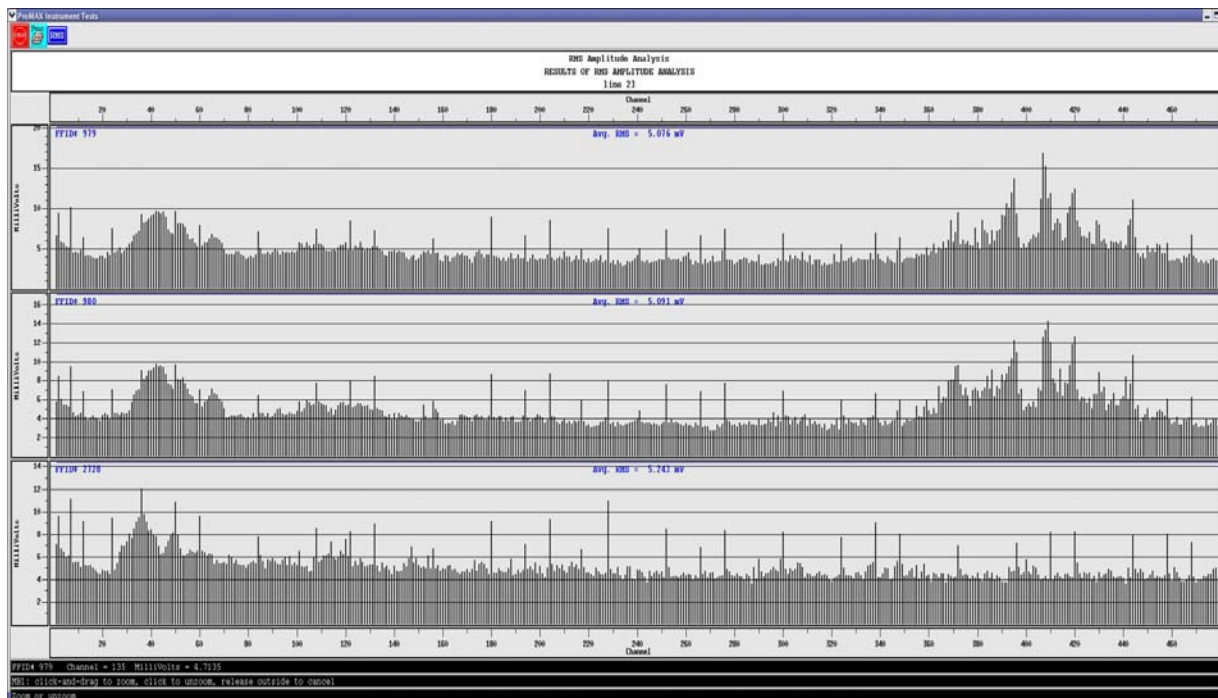


Figure 21-5: Example of analysis of Noise Records for sequence 020. Average Ambient RMS: 5.1 μ b. Tail end of cable still in turn during the SOL.

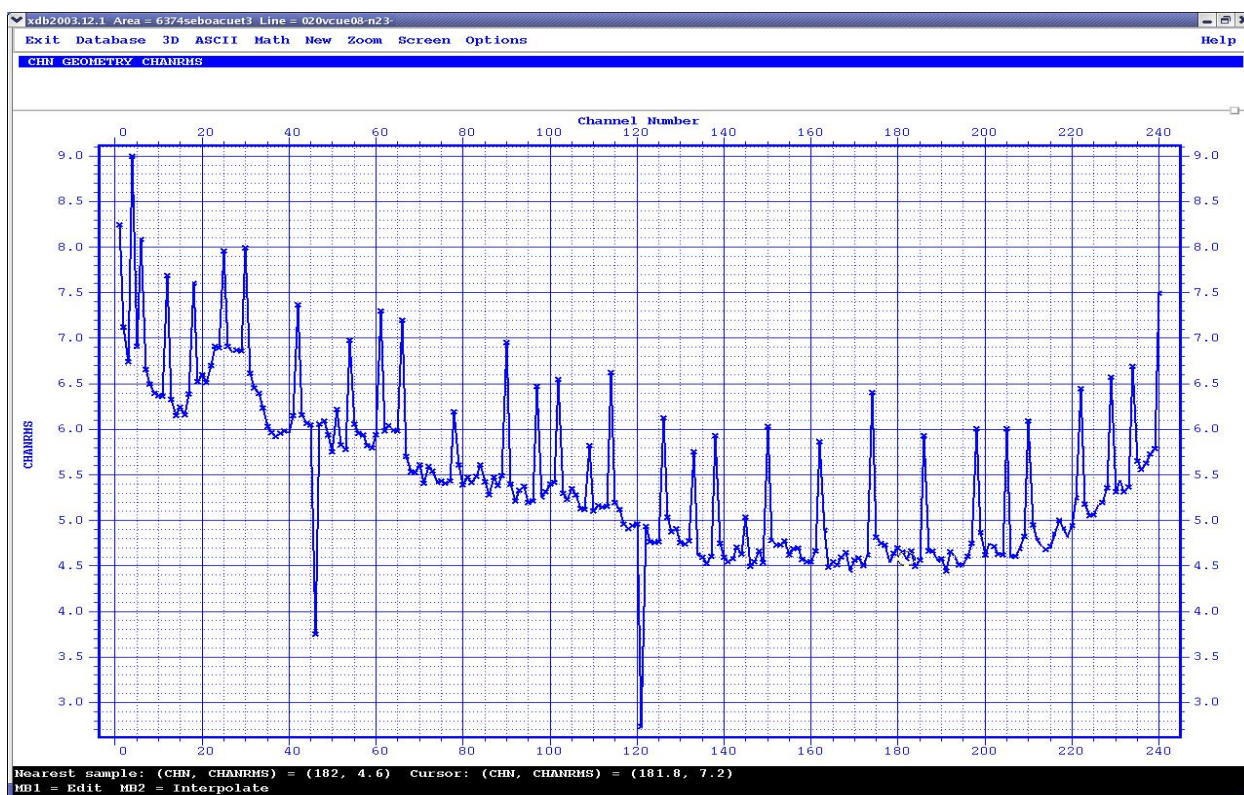


Figure 21-6: Channel stack sequence 020. The display computes the average RMS of the last 500ms of each channel and writes it to database.

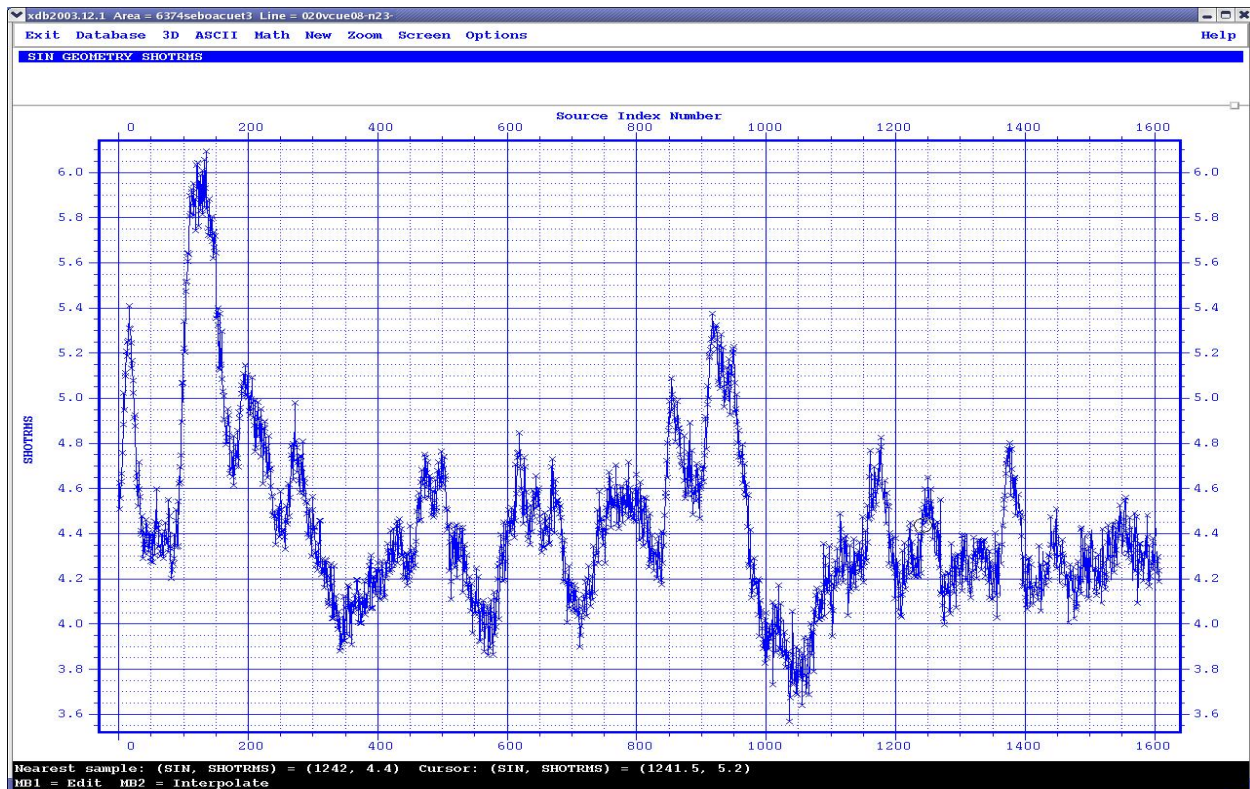


Figure 21-7: Shot stack sequence 020. The display computes the average RMS of the last 500ms of each shot and writes it to database.

21.9. Ambient noise - Shoot Vs Channel RMS Display

Colour displays of Shot vs. Channel RMS values were produced for the whole cable for every line to assess the ambient noise level and the channel quality. Raw data with a sample rate of 1 ms was used to calculate the RMS values for every channel on every shot.

RMS values were calculated from two windows, a shallow window of 50-500ms at the start of the record, and a deep window of 5450-5950ms at the end of the record. RMS values from all channels were averaged for each shot. They were displayed on the graph.

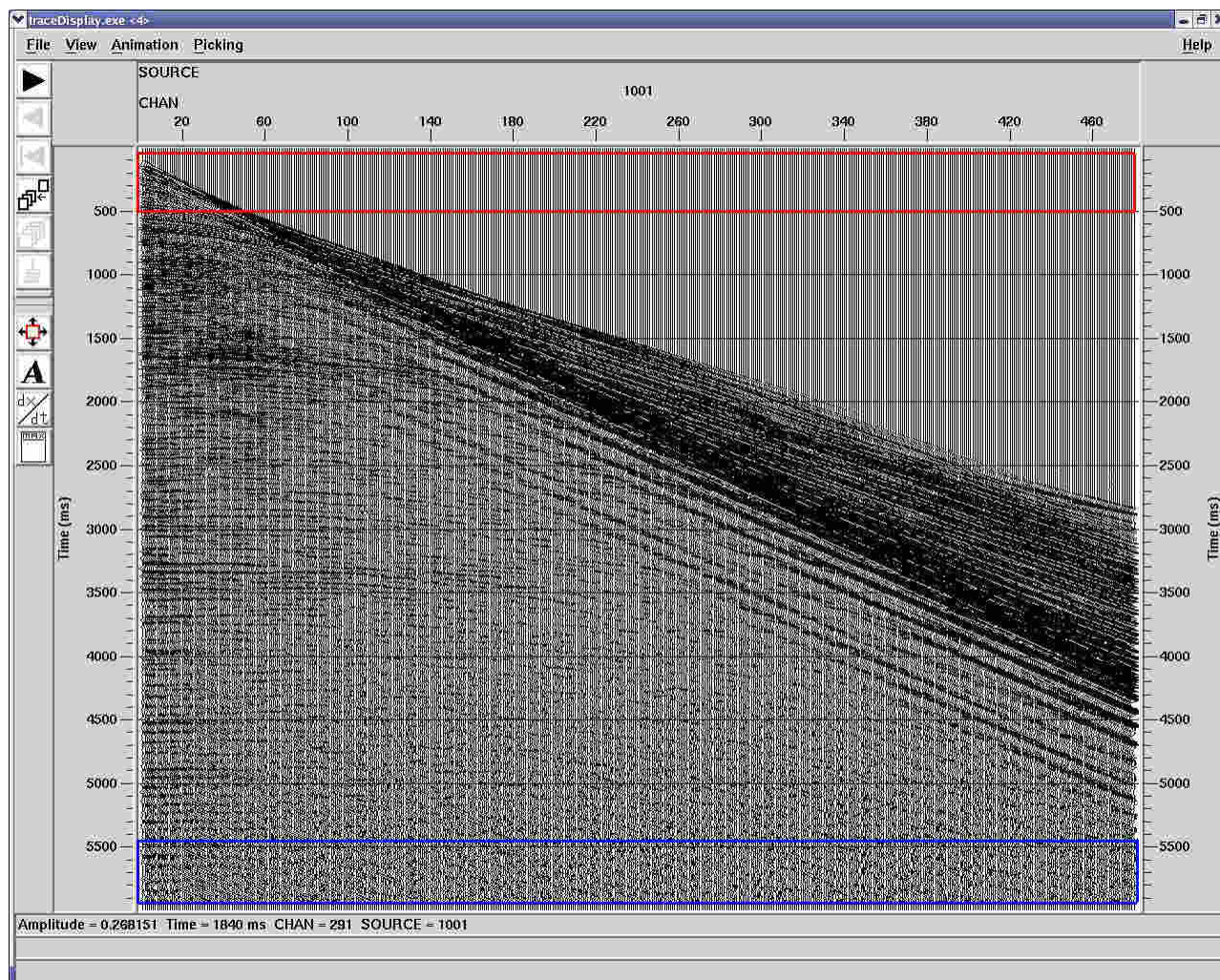


Figure 21-8: Shot gather with shallow and deep RMS analysis windows annotated.

For all RMS computations a scaling factor of 46.5 was used to convert from millivolts to microbars, the instrument sensitivity being 21.5 Volts/Bar.

The shallow and deep colour RMS displays were viewed on screen, and screen images were then saved as JPG files. The displays were used to show noise trends along the line such as swell noise, noisy/bad channels, bird noise, cable tug, front end noise, cable strikes, auto-fires and misfires, multiple interference, etc. Noisy channels could be clearly identified and deteriorating channels could be spotted using this display. The on screen analysis also allowed the exact shot and channel location of any noise trend to be located and investigated. All suspicious shots were then examined in the raw shot display to find and edit noisy shot records.

The shallow window was overdriven for the first 50 channels and the deep window was overdriven from time to time, as can be seen on the plot below (red bar at top of display). This is due to the water depth of the survey area, and the impossibility of finding an adequate water column window at the top of the trace, free from the seismic impulse. Therefore it was impossible to determine average values of ambient noise from the rms displays.

At the end of the survey a composite display was created showing average RMS values per channel on a sequence-by-sequence basis.

ASCII format files of the ambient RMS can be found on the Deliverables CD as well as the QC log for the survey area.

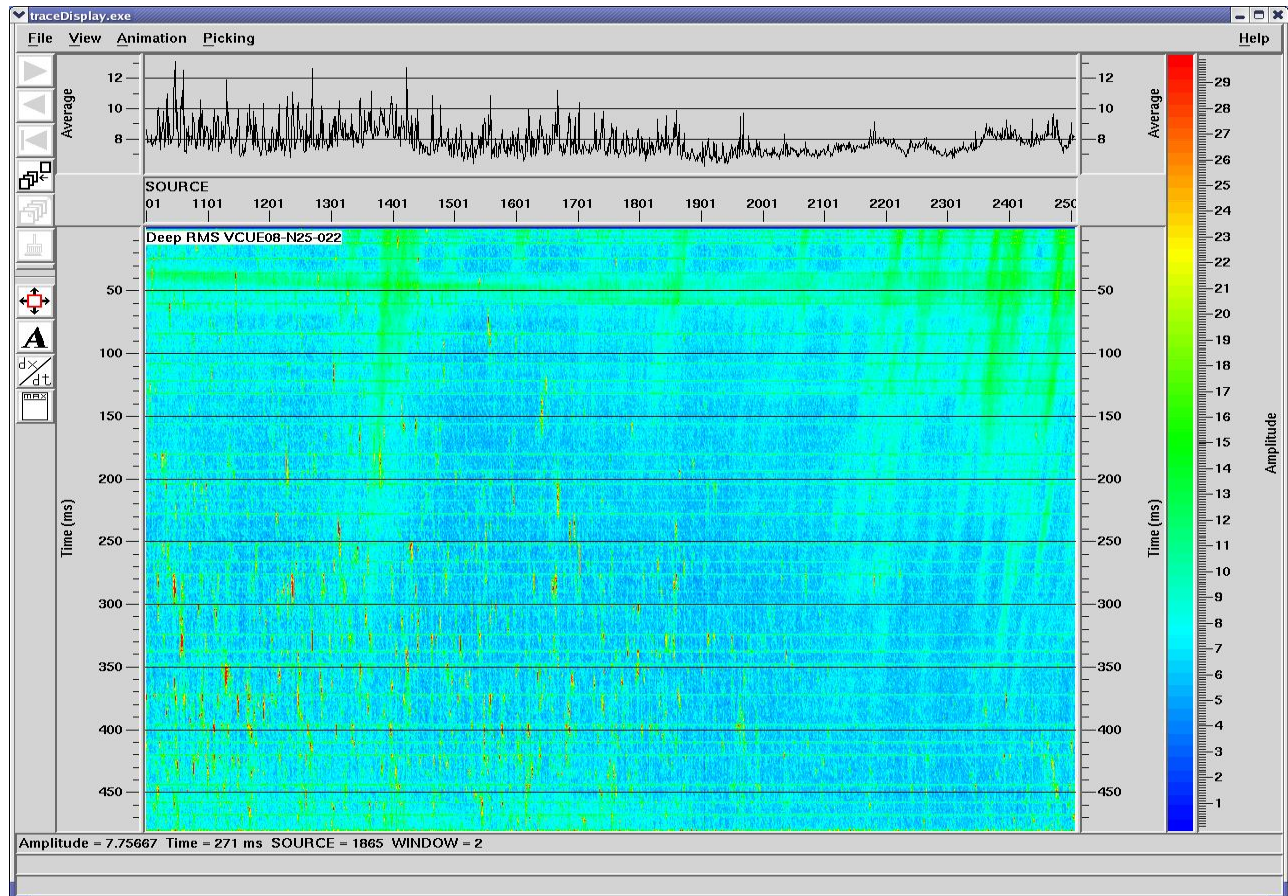


Figure 21-9: Deep RMS window for sequence 022. Note some swell bursts and noise on channels 25-40.

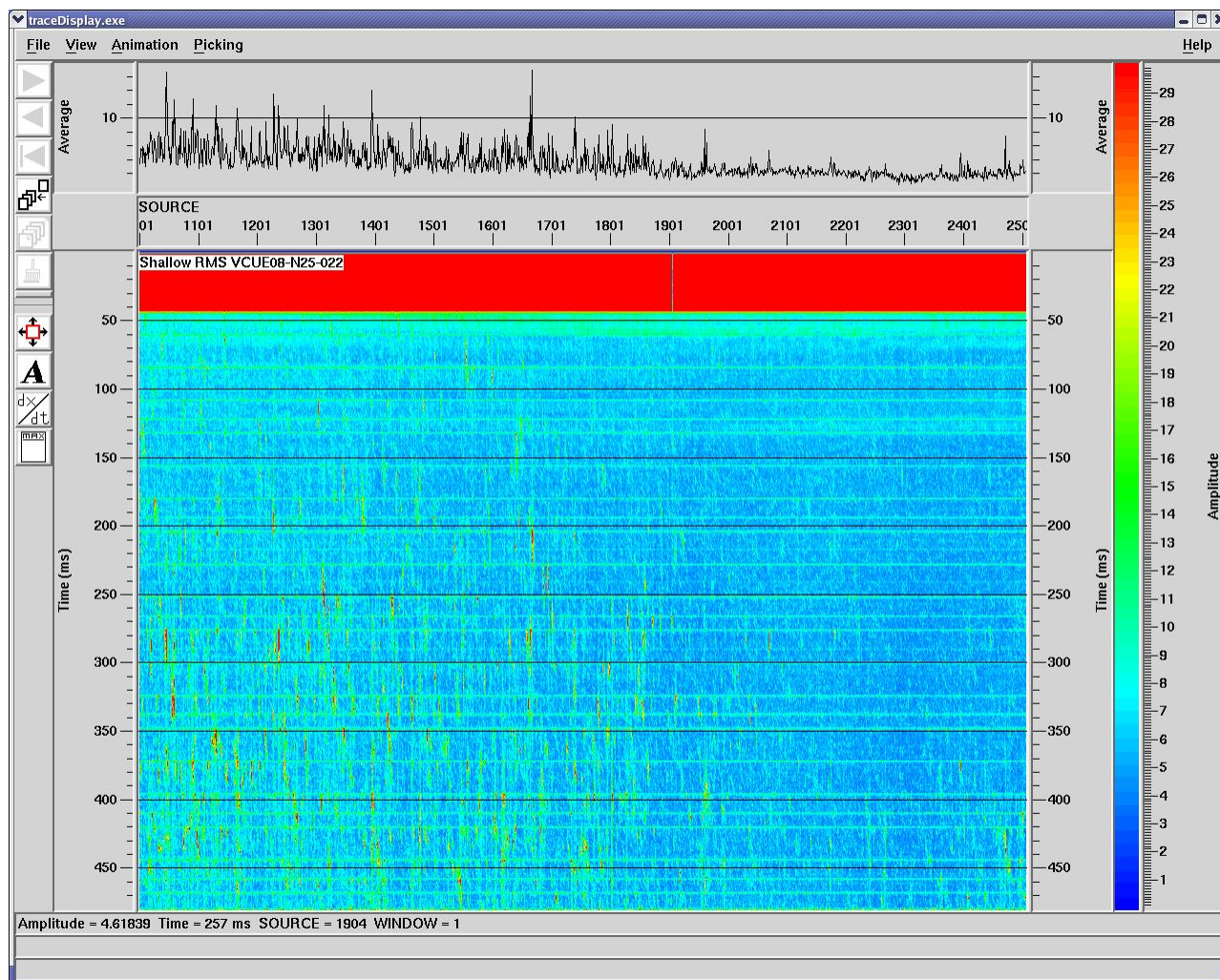


Figure 21-10: Examples of Shallow rms window QC from sequence 022. The first 50 channels are dominated by direct arrival energy. Some swell noise is evident.

21.10. Near Trace Display

The near traces were displayed on screen for every line in order to quickly determine any possible errors with acquisition, e.g. gun volume changes, bad records, time-break problems and any auto-fires not reported by the recording system. The near traces also provided a good indication of the geological conditions, including strength of the water bottom multiples, residual seismic multiple energy and swell noise contamination.

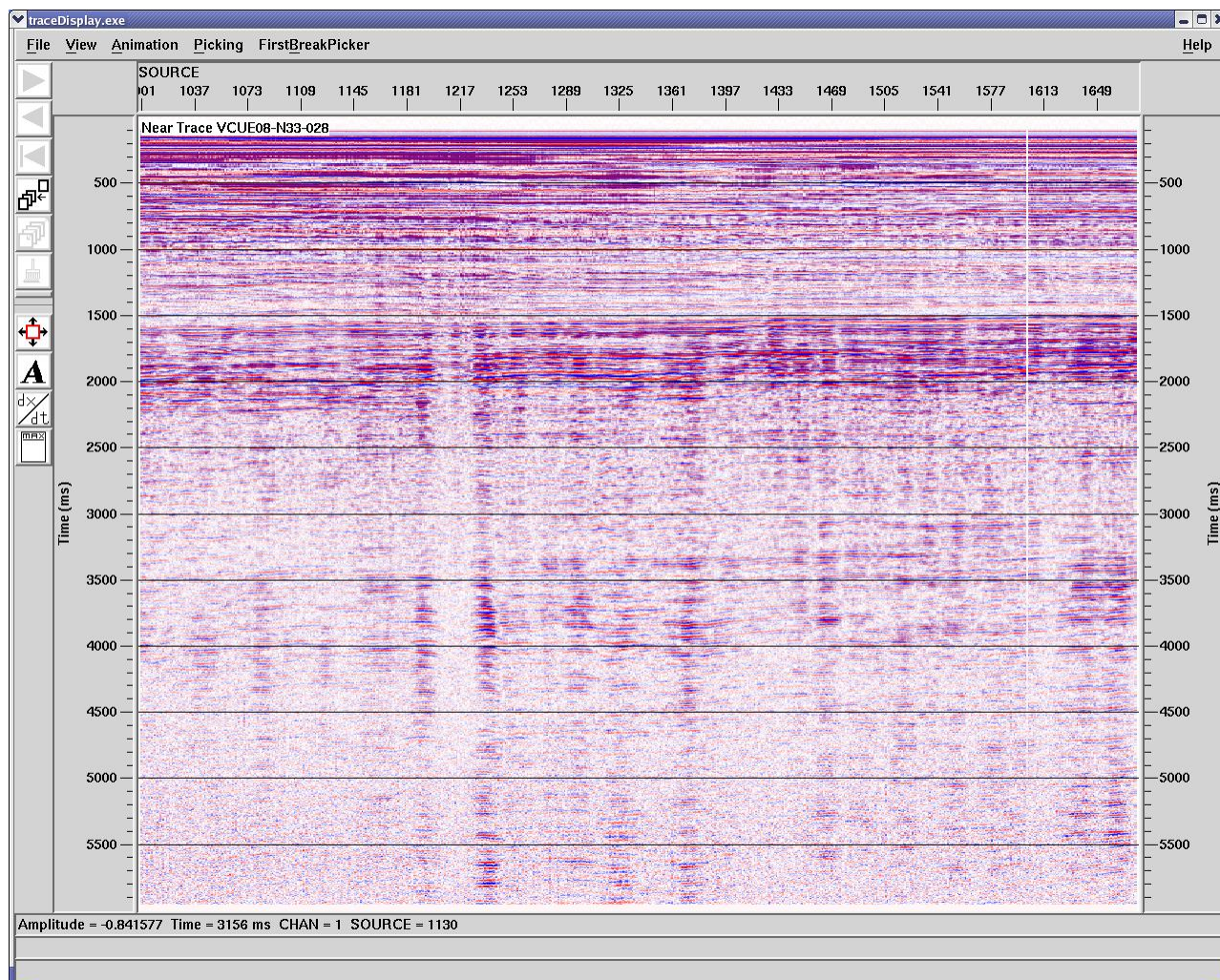


Figure 21-11: Near trace display, sequence 028. Note missed SP 1602.

21.11. Auxiliary Channel QC

The 30 auxiliary channels (-1 to -30) loaded during the SEG-D read, were separated from the 480 data channels, stored in a separate data file, and used for on screen analysis. These records consisted of the time break, the water break, and 6 near-field hydrophones for each of the 3 sub-arrays.

Time break and water break channels were displayed as a single trace display on screen. The first 500ms from all 6 hydrophones within each sub-array were stacked vertically and displayed in order to evaluate the performance of the guns. This proved useful in distinguishing genuine gun problems from noise on the trace. The auxiliary channel displays were used to locate air leaks and autofires.

Hydrophones 20 and 21 (gun string 2) were dead for all sequences.

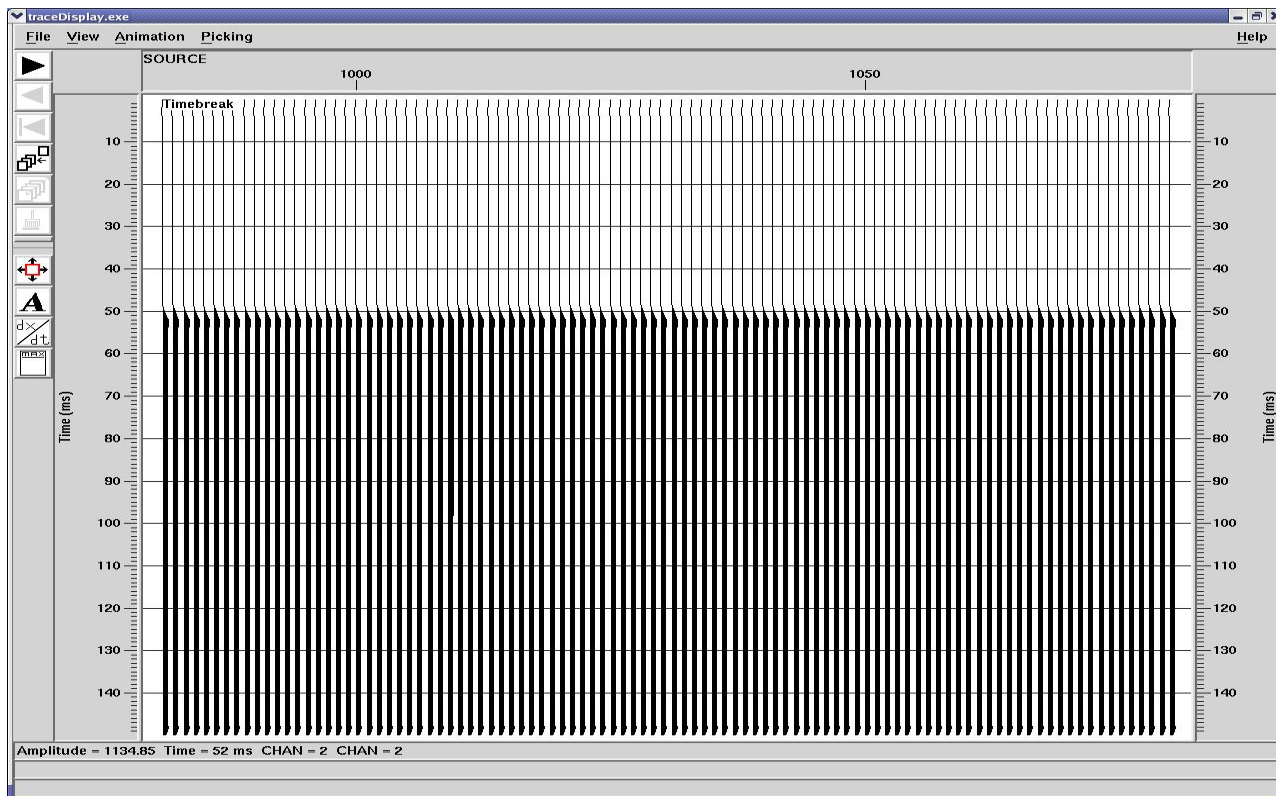


Figure 21-12: Timebreak QC (Auxiliary channel 1).

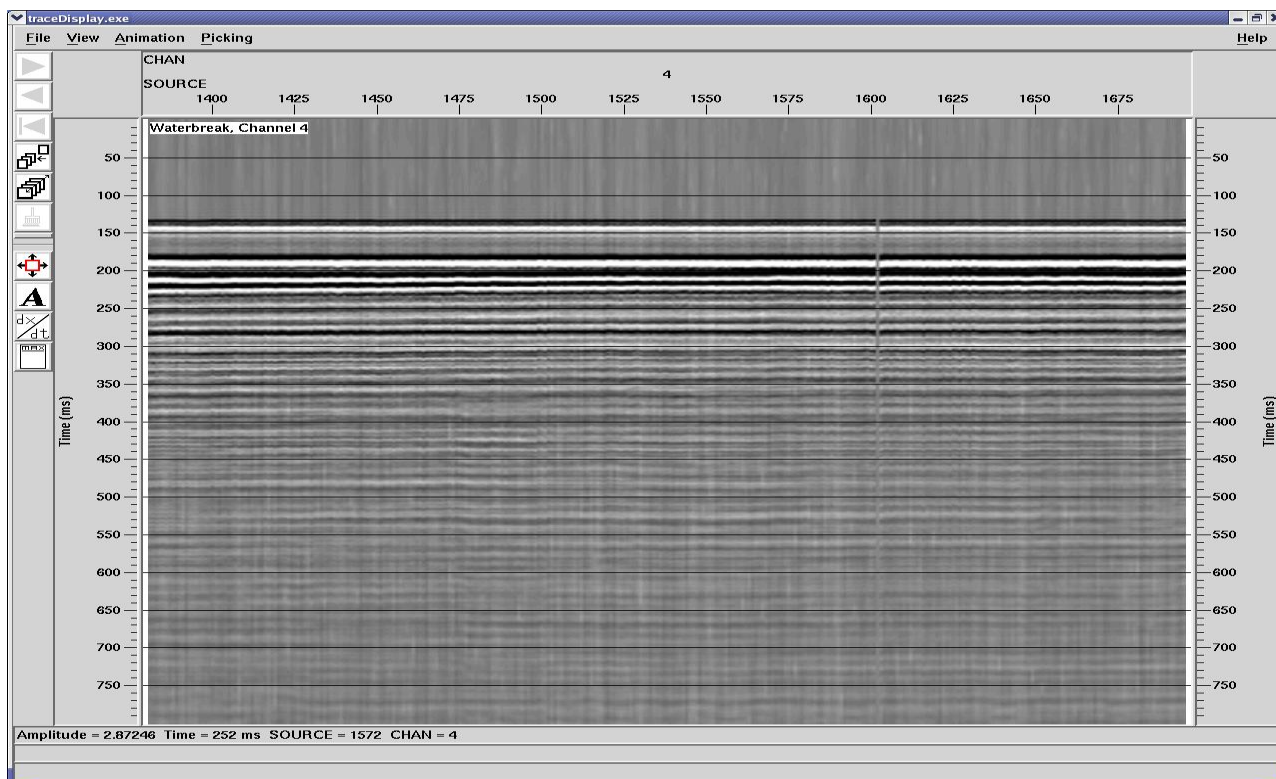


Figure 21-13: Waterbreak hydrophone QC (Auxiliary channel 4). Note missed SP 1602.

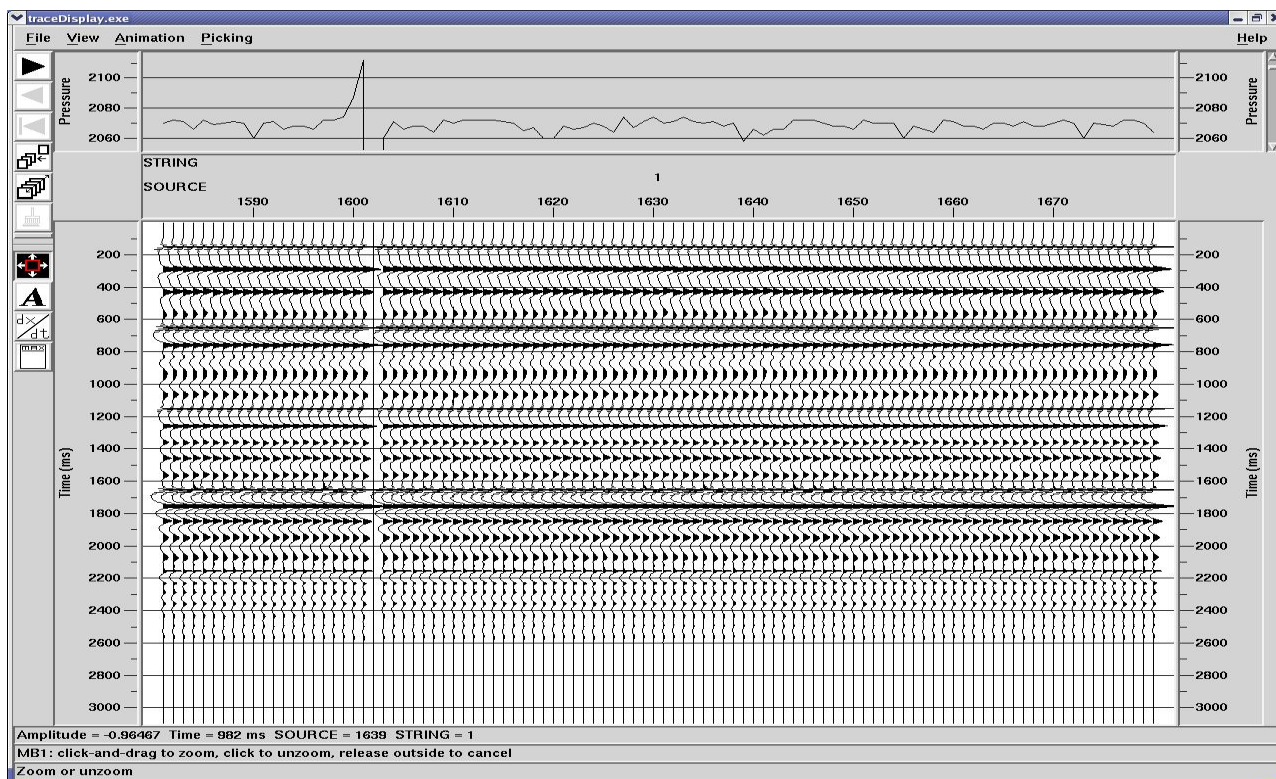


Figure 21-14: QC of vertically stacked near field hydrophones 1 to 6 on gunstring 1 (Auxiliary channels 13 to 18). Note annotation of gun pressures, dead hydrophone 6 and missed SP 1602.

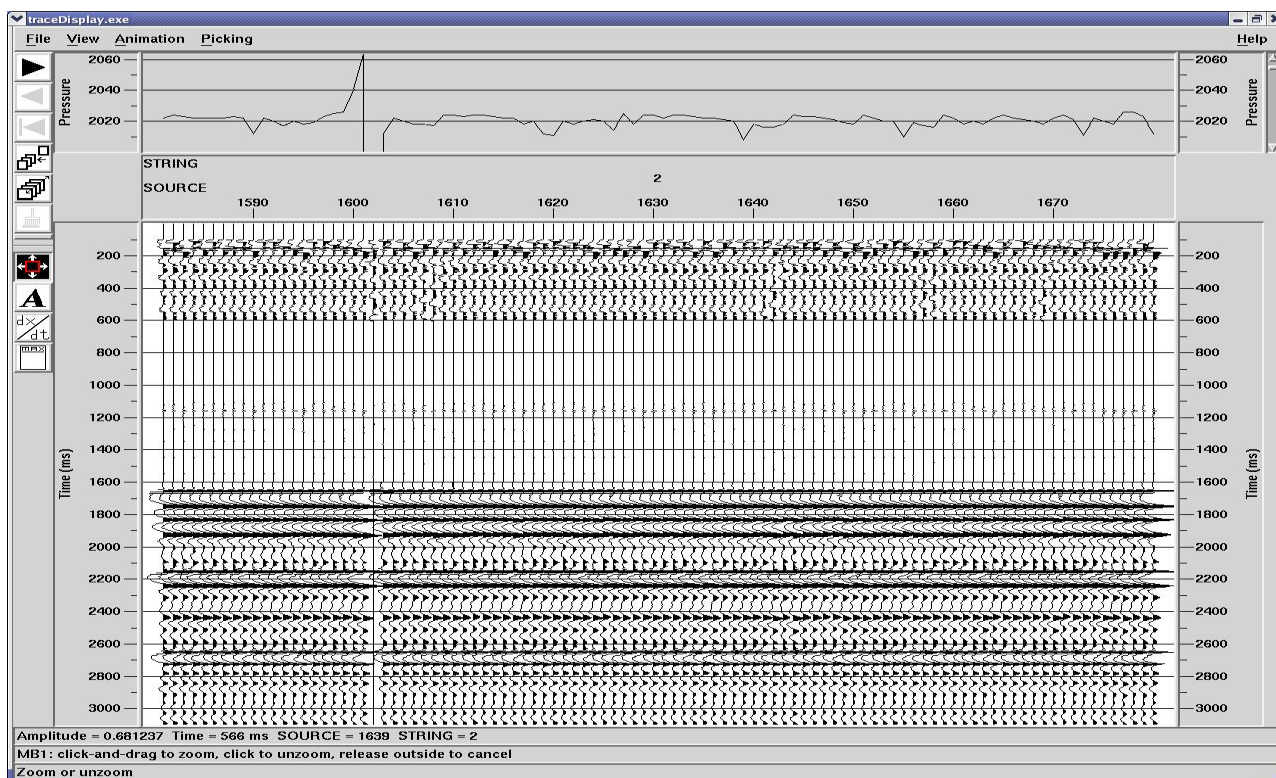


Figure 21-15: QC of vertically stacked near field hydrophones 1 to 6 on gunstring 2 (Auxiliary channels 19 to 24). Note annotation of gun pressures, dead hydrophones 2 and 3 and missed SP 1602.

21.12. Shot Record Displays

Shot records were band pass filtered (Ormsby 6-8-90-120) and balanced with a true amplitude gain recovery. They were displayed every 500m for each line.

Additional records were also examined on screen if an issue with acquisition was suspected, such as noise, residual seismic energy or auto-fires. The colour RMS displays were frequently used to pinpoint bad/suspicious shots, the shot gathers of which were subsequently investigated onscreen.

Consistently noisy channels were also identified on the raw shot displays, and cross checked against the Observer Logs, which were modified if necessary.

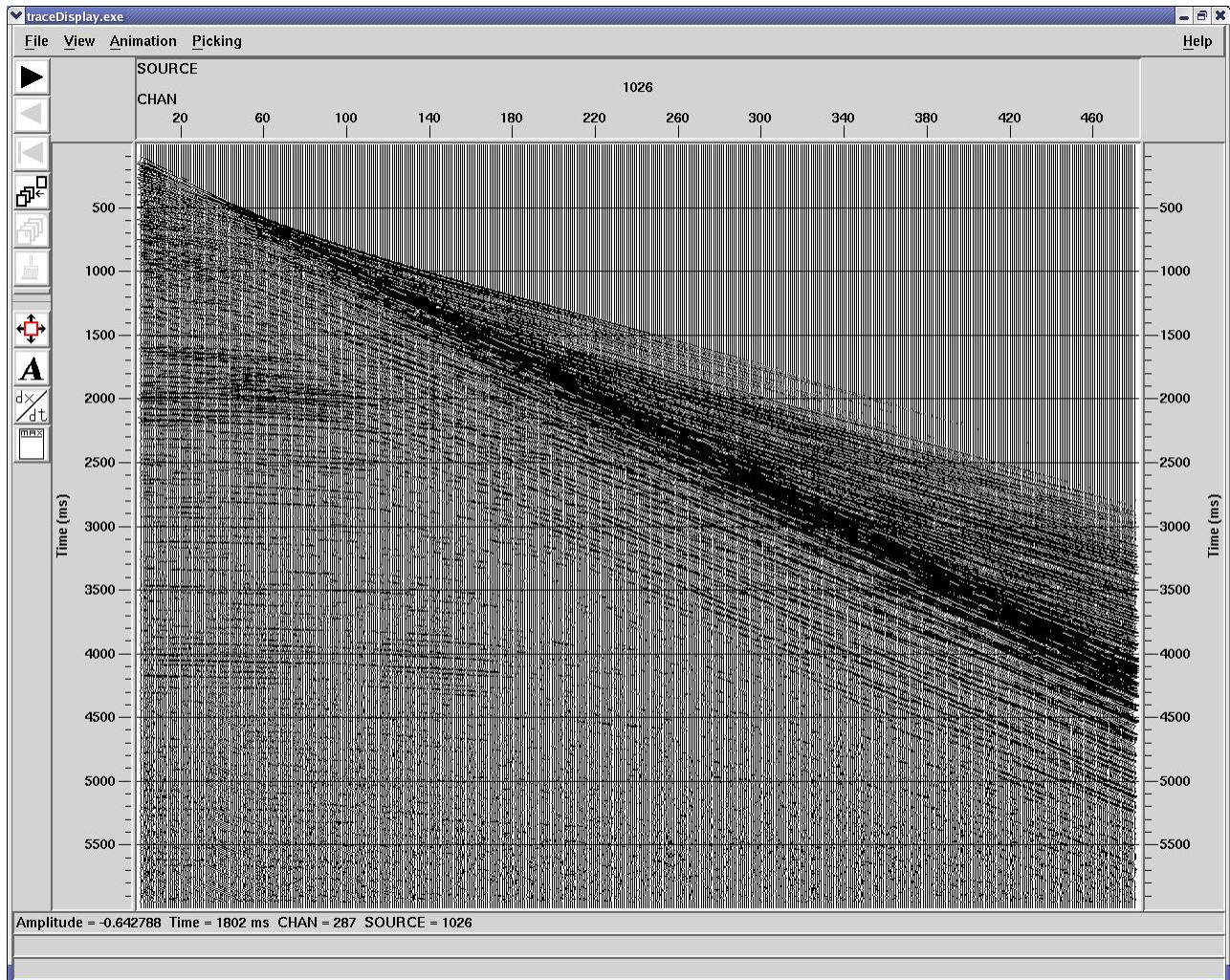


Figure 21-16: Raw shots display on SP 1026 of sequence 028. Note “mudroll”, “ringing” and refraction multiples on the longer offsets.

21.13. Navigation Processing

In order to QC the navigation data, the final processed P190 navigation files were merged with the near traces for each line. The predicted first break time was computed using the water velocity. This was displayed overlaid on the near trace as seen below (in red), to enable QC of the consistency between the predicted and the recorded first breaks.

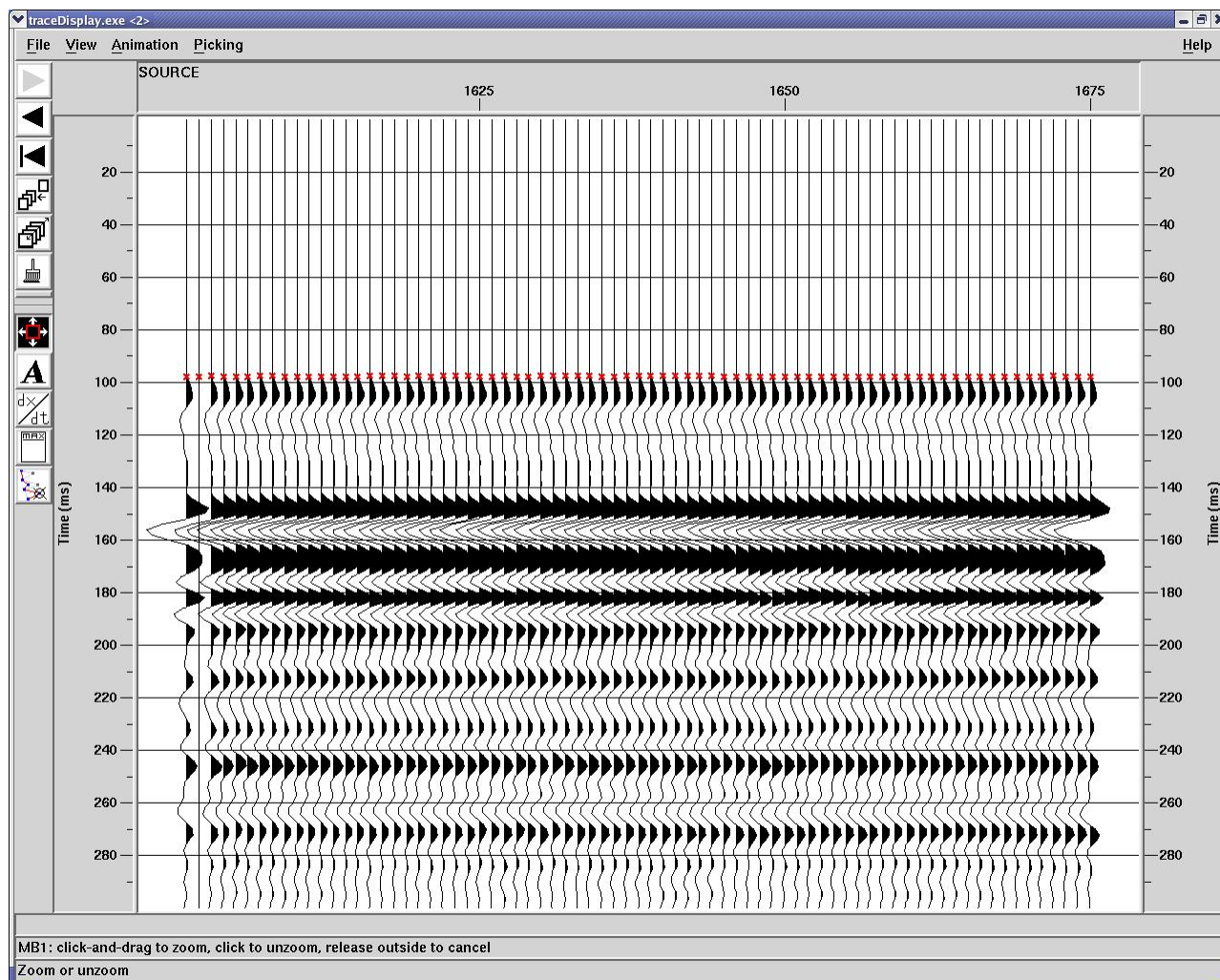


Figure 21-17: Navigation QC display.

22. Encountered problems

22.1. Propeller Noise

Channels 25 to 40 showed recurring coherent noise. The noise is affecting less than 10% of traces and has a maximum amplitude of 5-10 μ B. The most likely cause of this noise are waterbottom reverberations of the propeller impulse.

An investigational F-K filter effectively removes this noise with minimal data loss. More thorough testing and a meticulous surgical design of an F-K filter could further optimize noise removal and minimize data loss and introduction of artifacts.

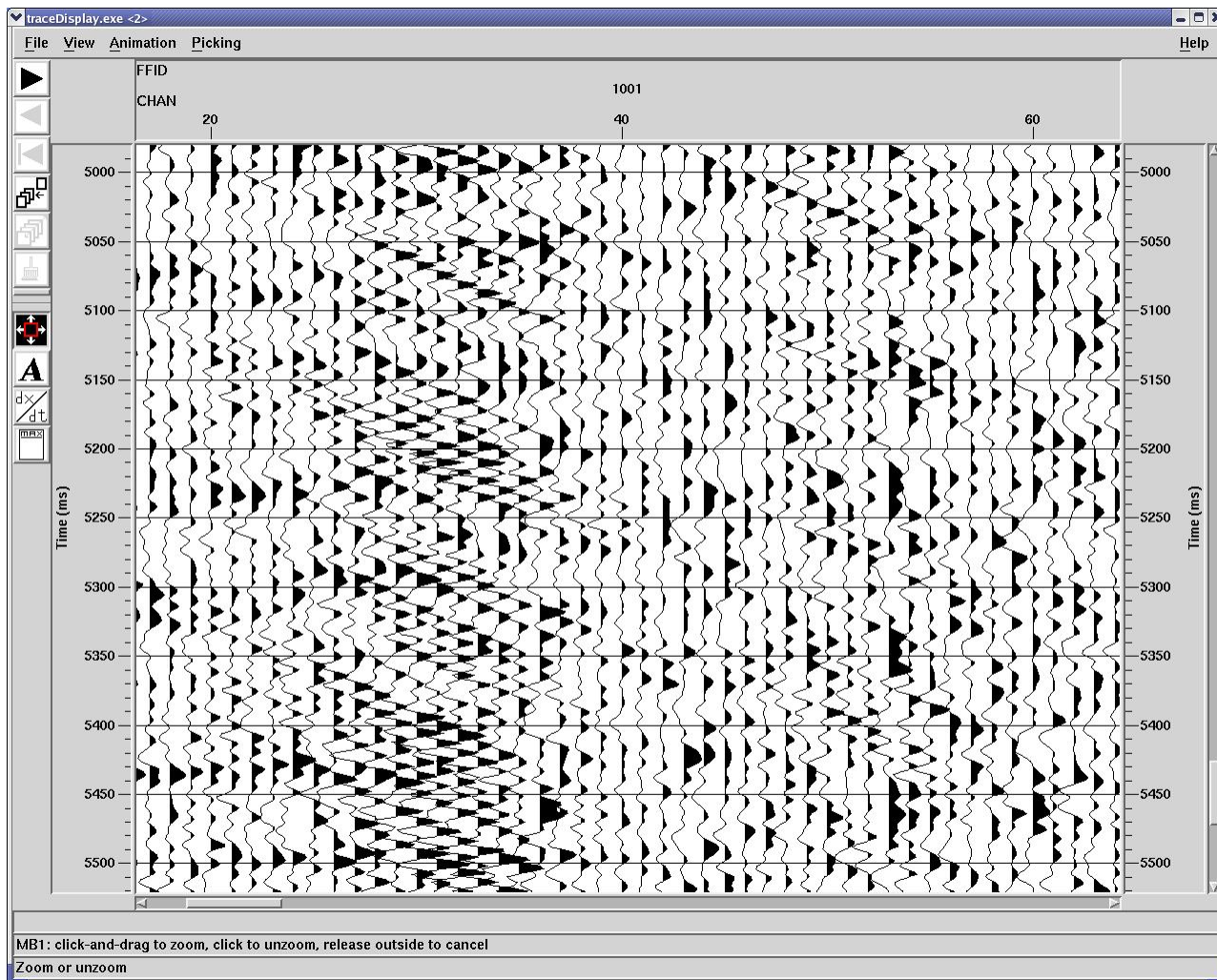


Figure 22-1: Raw shot, zoomed in on the propeller noise. Note the coherent character of the noise.

The following graphs show a noise record with annotated RMS and a Deep RMS window to further highlight the characteristics of the propeller noise.

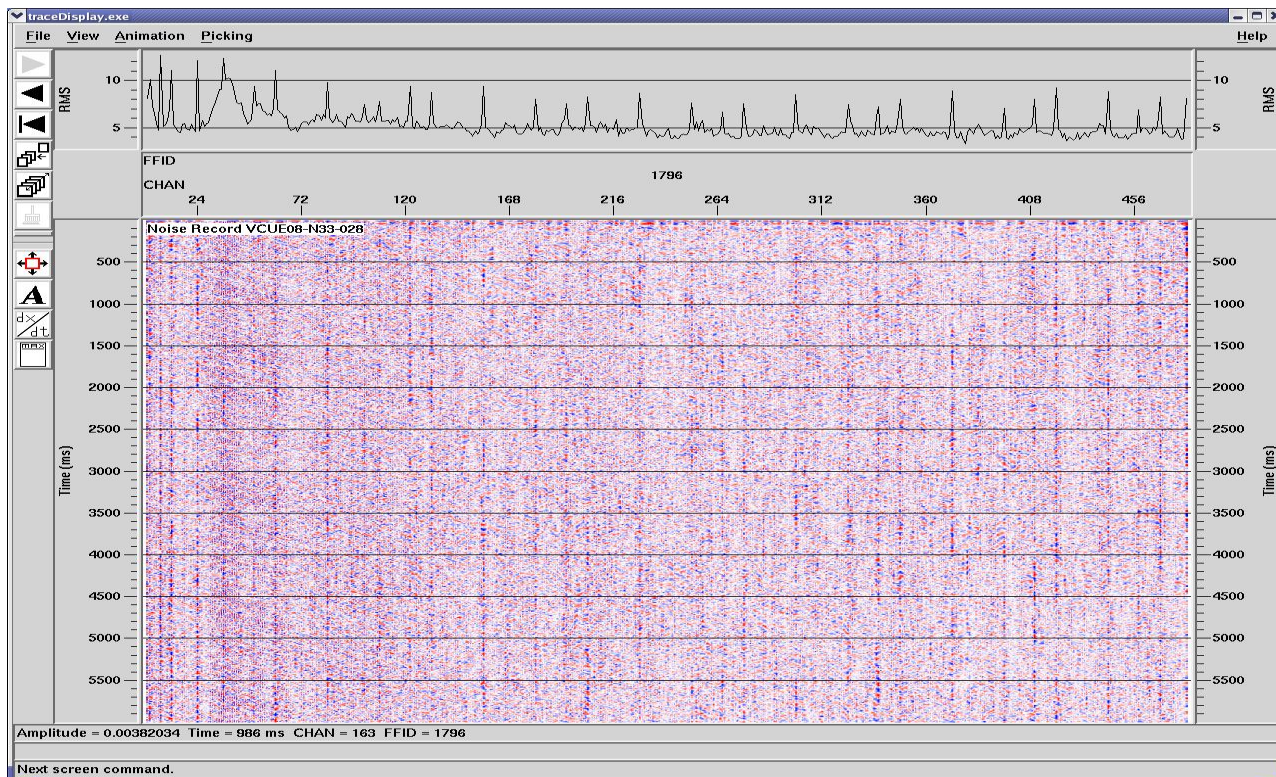


Figure 22-2: SOL noise record for sequence 028 with annotated RMS graph on top of the record. Note propeller noise of 8-10 μ B on channels 25 to 40.

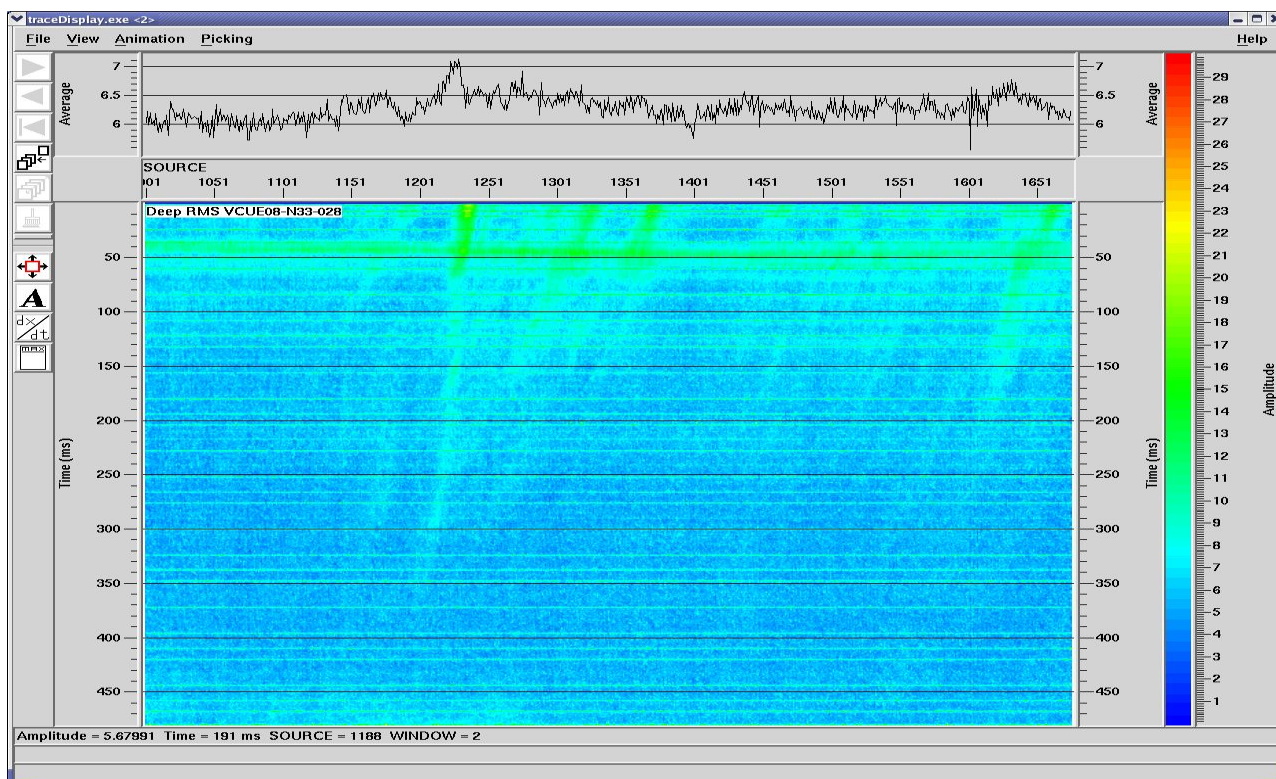


Figure 22-3: Deep RMS window for sequence 028. Note noise on channels 25 to 40.

The following graphs show raw and F-K filtered SOL noise records and shot records and their respective spectral analysis. All screenshots have been taken with exaggerated gain to better illuminate the propeller noise.

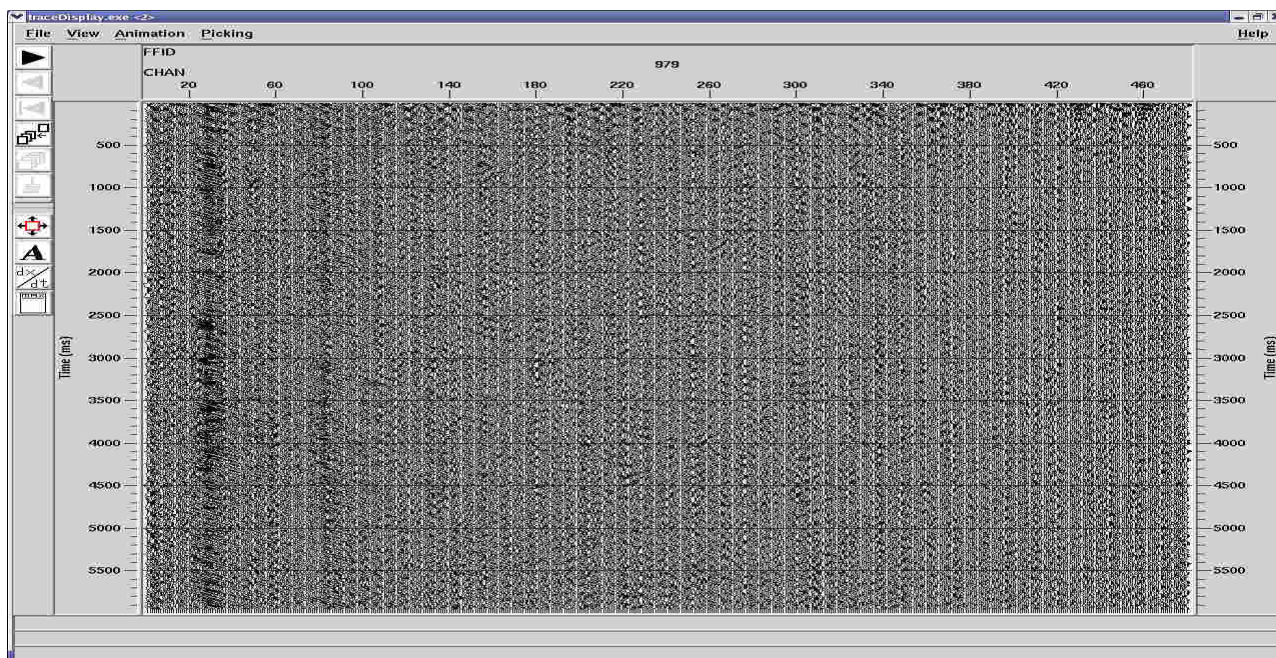


Figure 22-4: Raw SOL noise record.

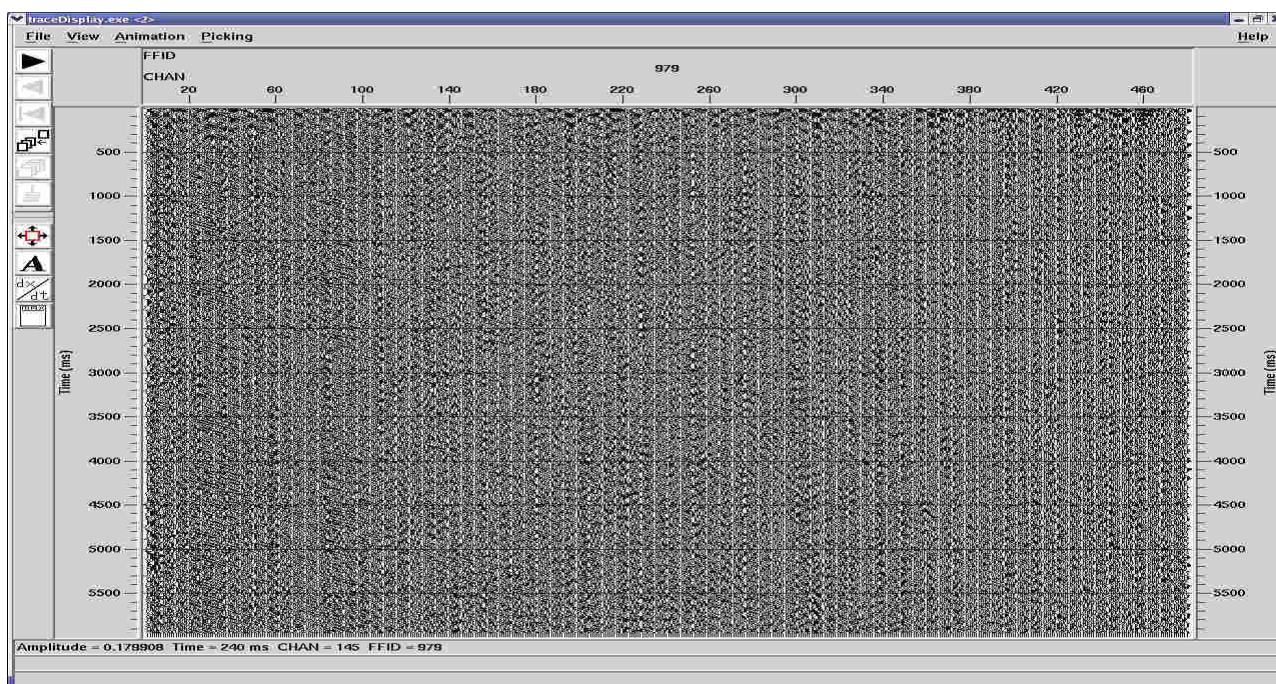


Figure 22-5: F-K filtered SOL noise record.

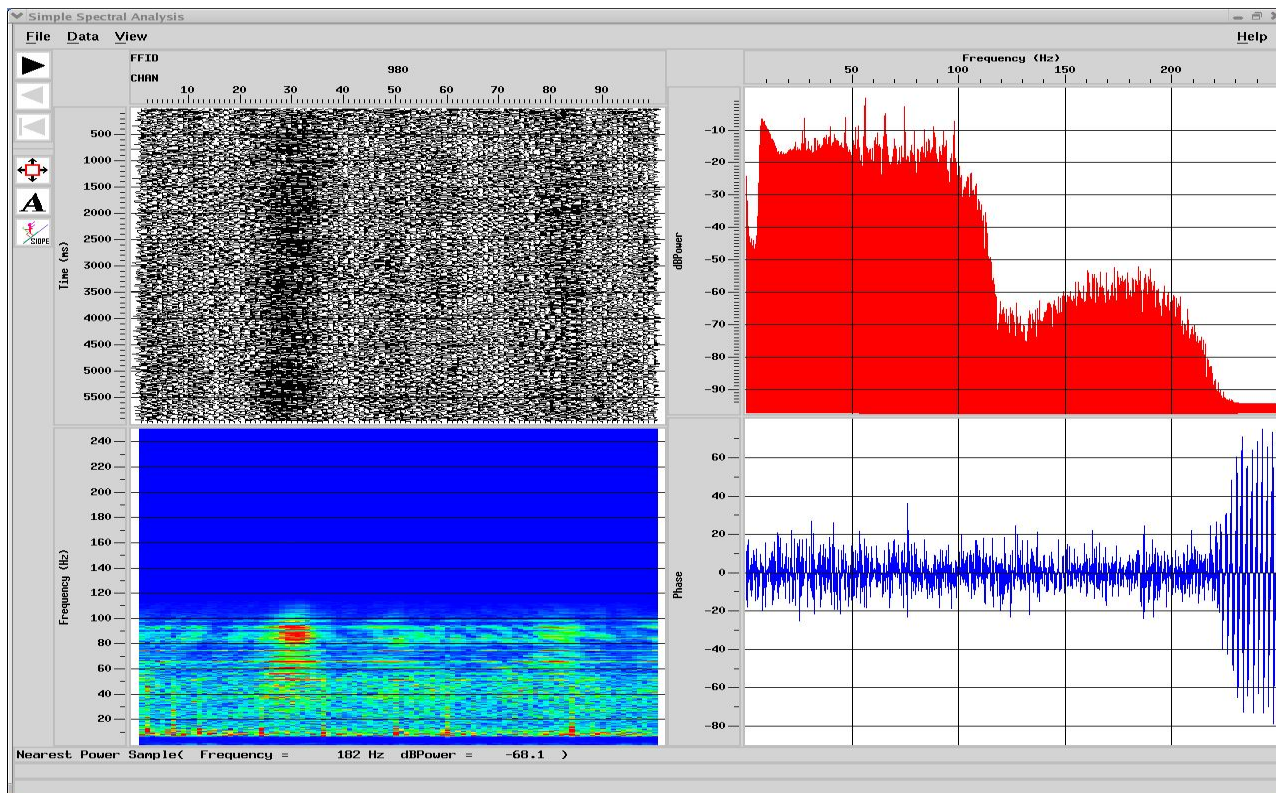


Figure 22-6: Spectral Analysis of raw SOL noise record.

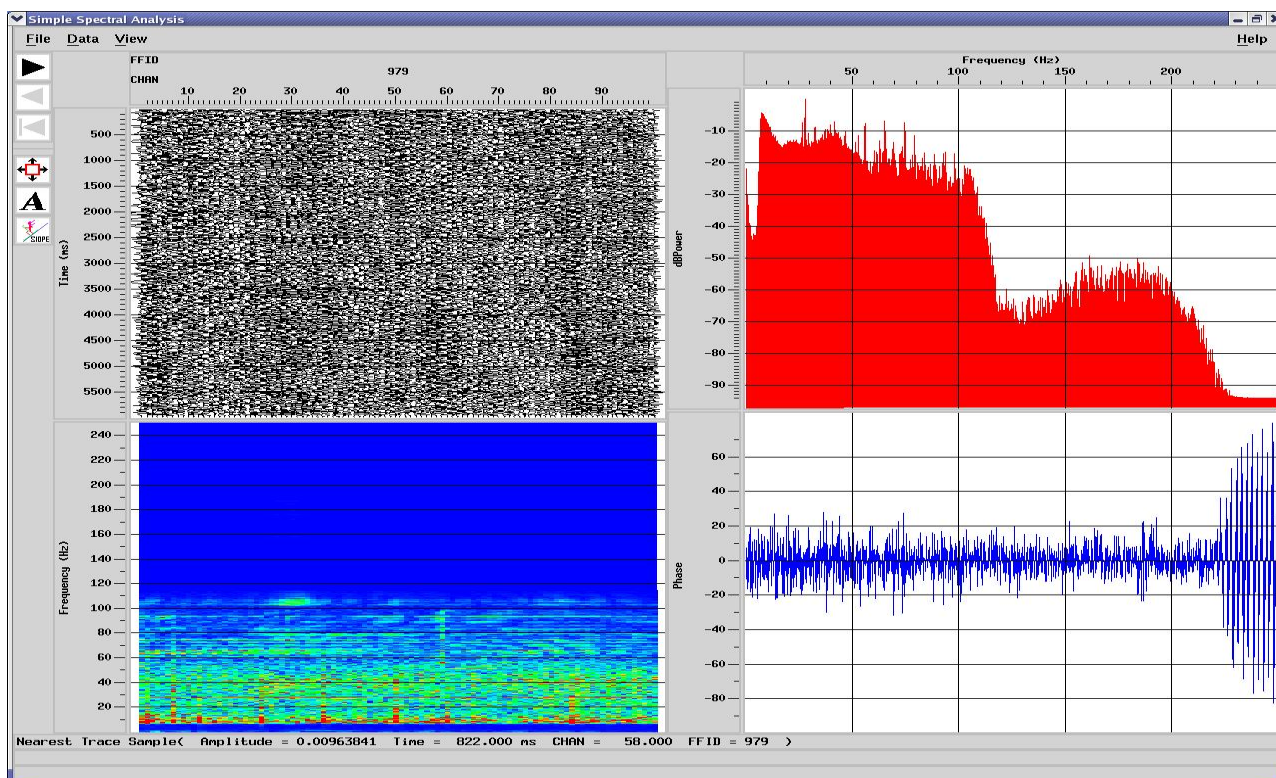


Figure 22-7: Spectral Analysis of F-K filtered SOL noise record.

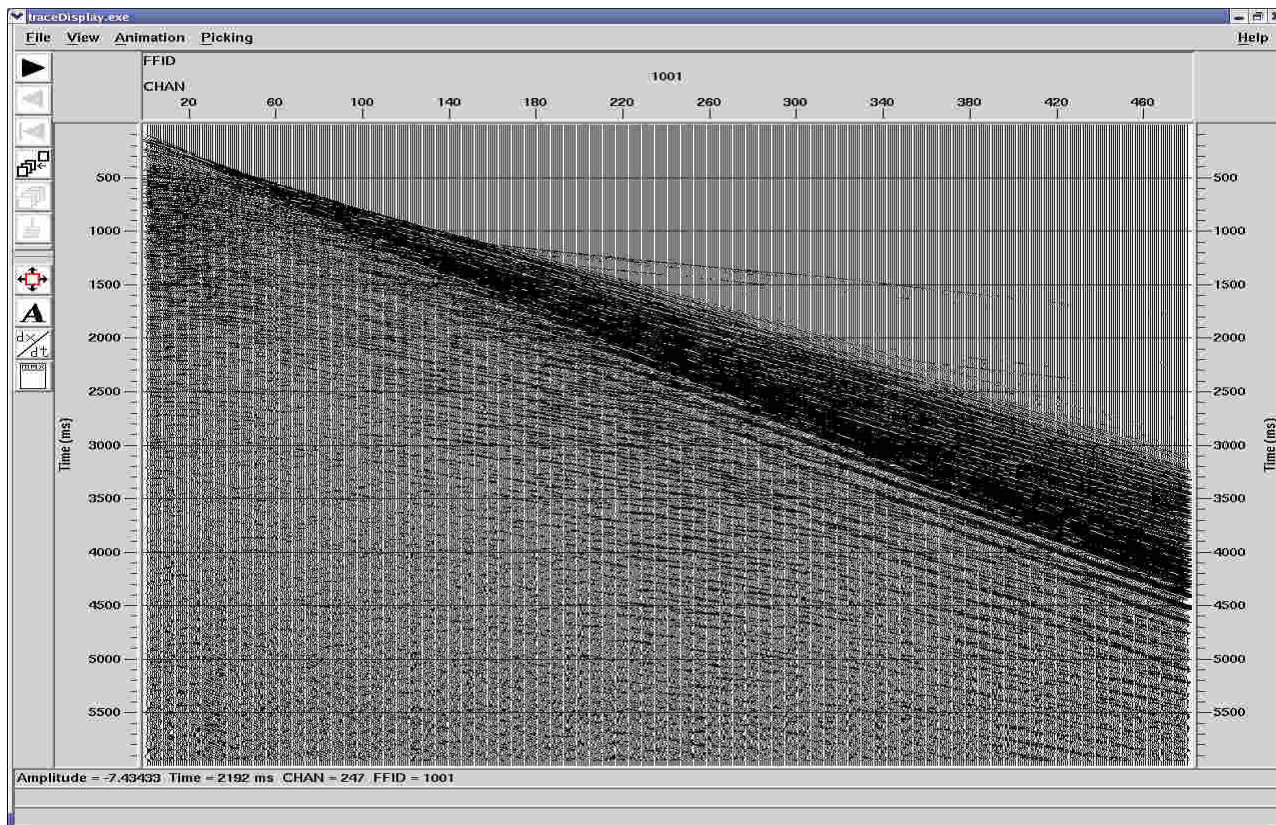


Figure 22-8: Raw Shot. Propeller noise visible, but for the most part drowned out by data.

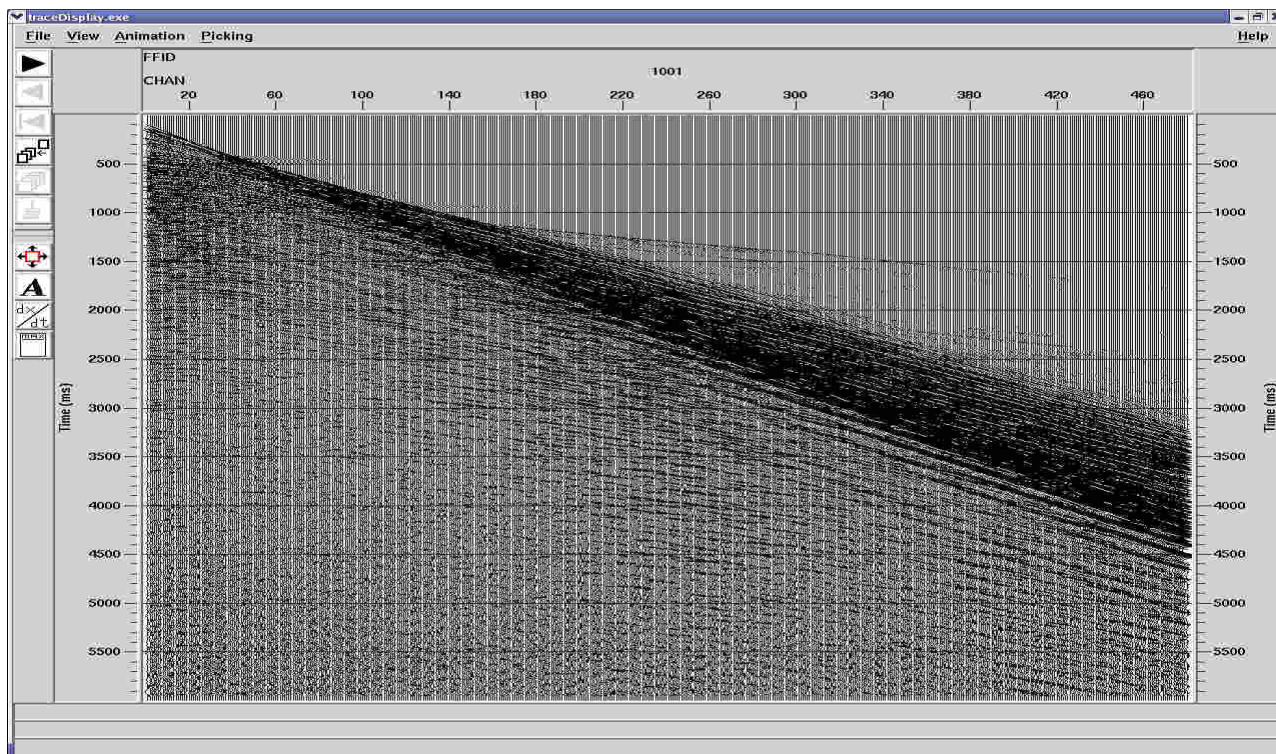


Figure 22-9: F-K filtered shot. Propeller noise mostly removed.

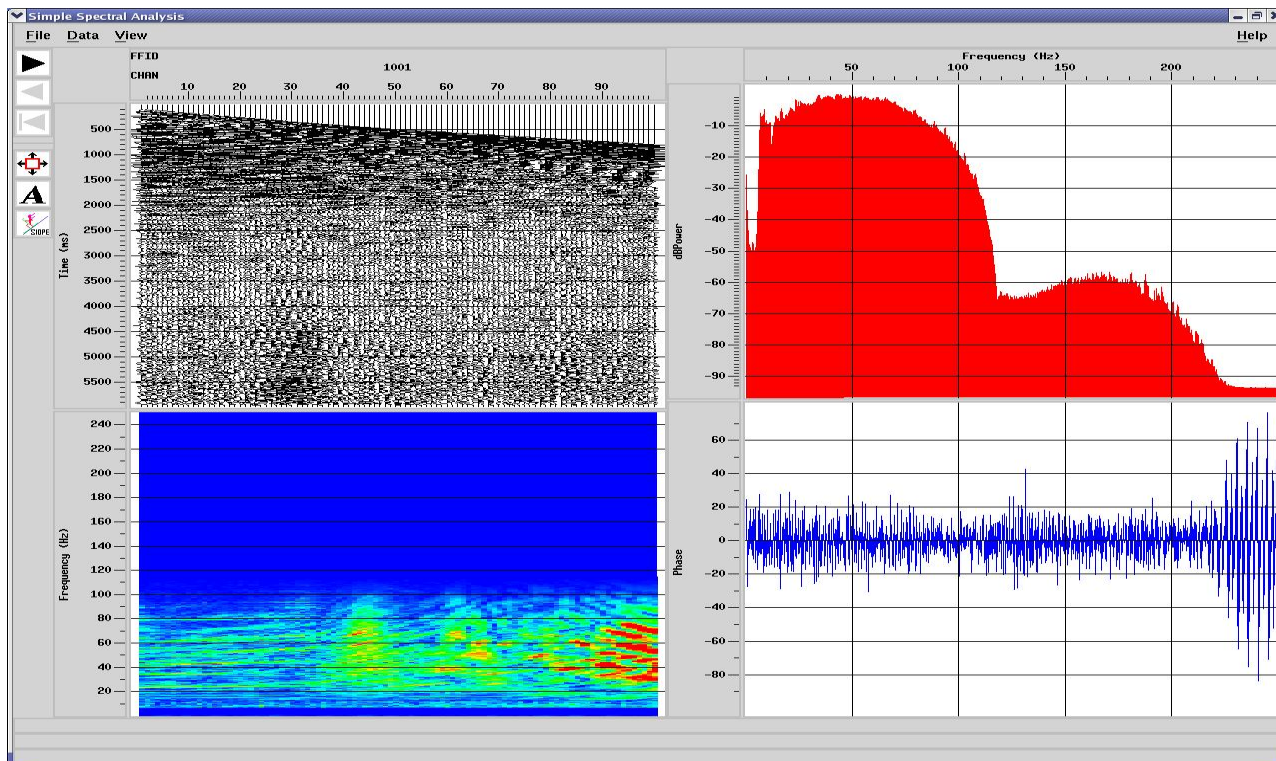


Figure 22-10: Spectral Analysis of raw shot.

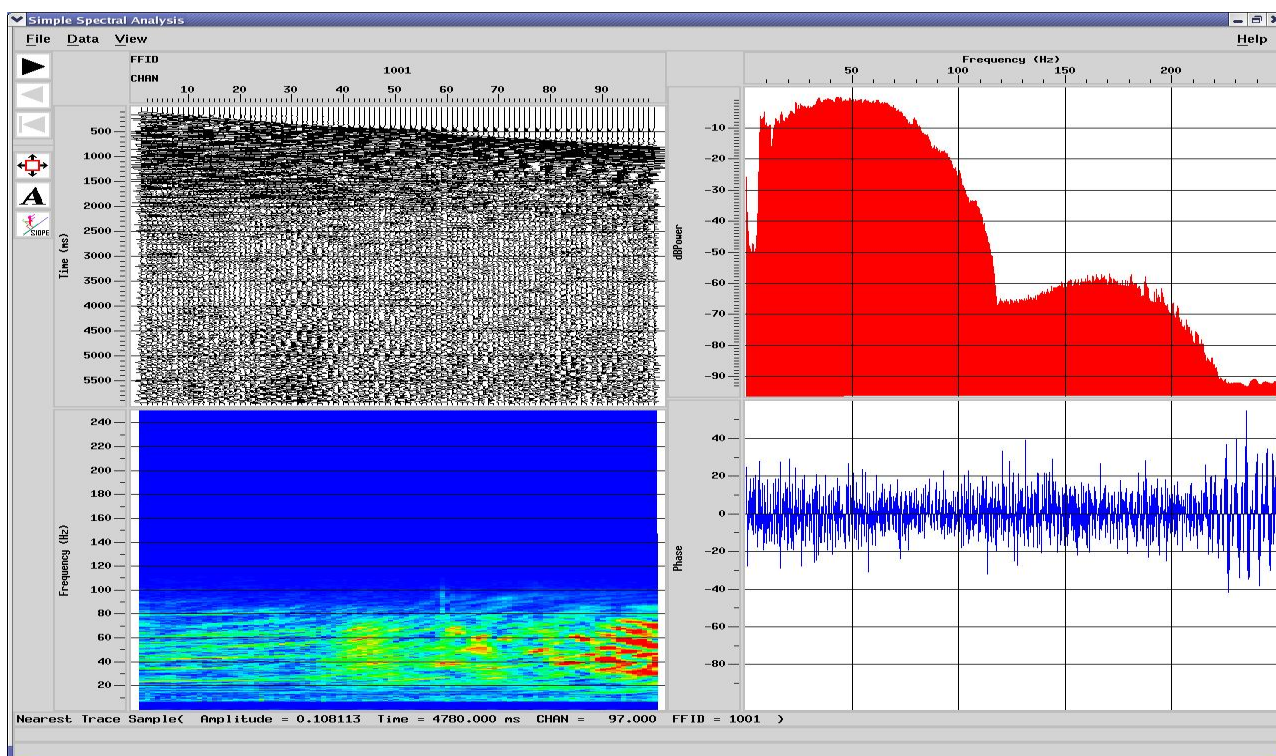


Figure 22-11: Spectral Analysis of F-K filtered shot.

22.2. Loss of Tailbuoy Positioning

From sequence 20 onwards there was no Tailbuoy data available, and navigation processing was performed based solely on compass data. To quantify the impact of the loss of the Tailbuoy data, the following test was run for sequence 015, where Tailbuoy data was still available.

The far trace arrival times were calculated from navigation-derived offsets and displayed as an overlay over the seismic data. This process was performed first on positioning data that included both Tailbuoy positions and compass bearings (red graph in figure below). The process was then repeated on positioning data that included no Tailbuoy positions but compass bearings only (blue graph in figure below). Subsequently the absolute difference of the two values was calculated (graph on top of figure below). The error was found to be less than 2ms, i.e. less than the seismic sampling interval.

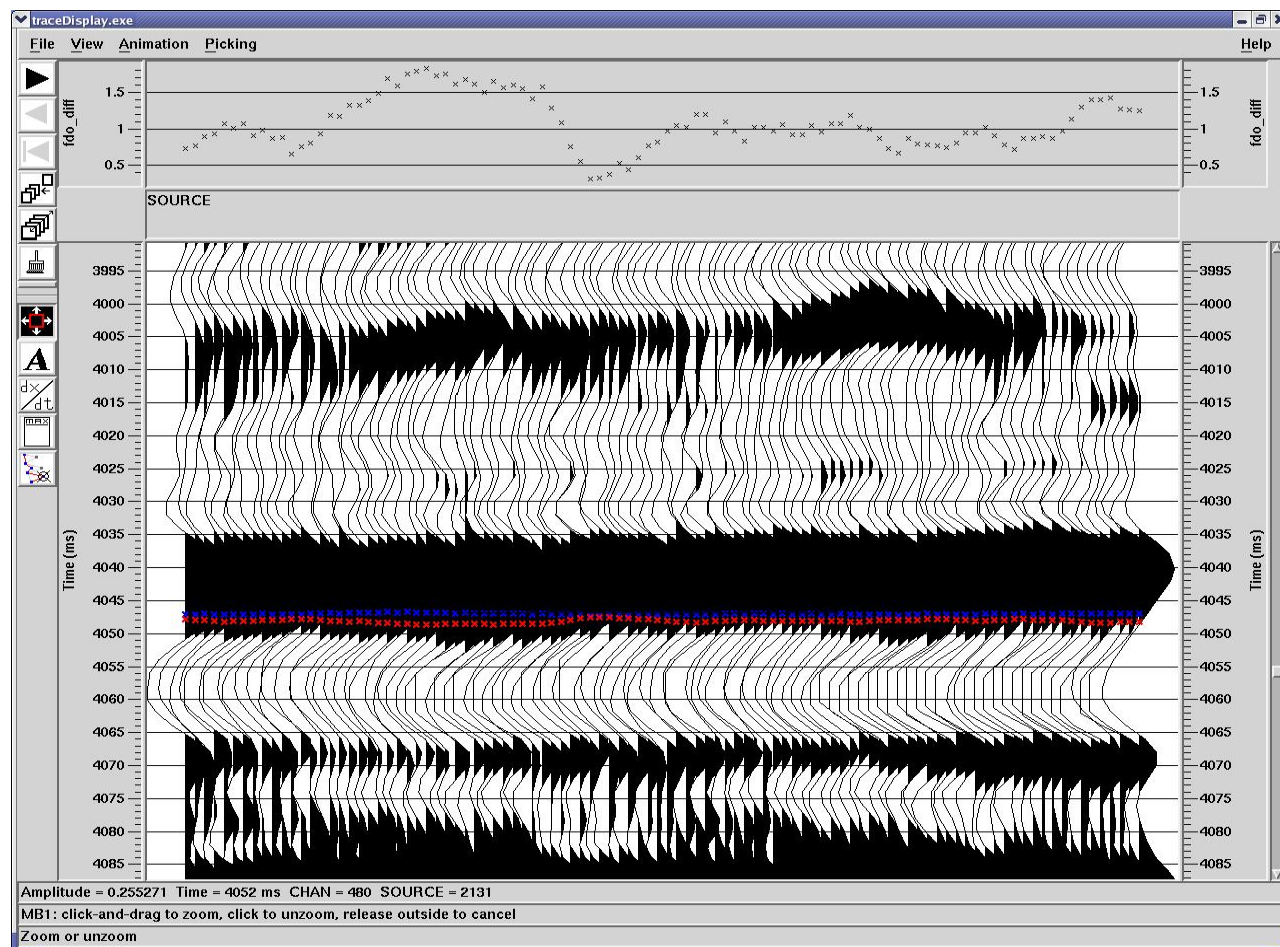


Figure 22-12: Far trace arrival time (FTAR) overlayed on seismic data for sequence 015.

Red Graph: FTAR derived from positioning data that included tailbuoy positions and compass bearings.

Blue Graph: FTAR derived from positioning data that included compass bearings only.

Graph on top of the section: Absolute difference of the two FTAR values. Note, the difference is consistently less than the seismic sampling interval.

22.3. Swell noise

Weather conditions over the survey period were varied. In general, the weather was good, with swell heights less than 2m. Swell bursts were seen on the raw shot records, typically affecting less than 10% of the traces, usually at a level below 25ub. Because of the high fold of coverage, this noise invariably stacked out, even with no noise attenuation processes applied to the data.

Sequence 38 was NTBP due to heavy swell. Sequences 013 and 014 were shot during swell heights of 3m and contained strong swell noise. At its peak, the swell bursts affected about 30% of the traces and stacked occasionally within the prospect's target area of 2seconds.

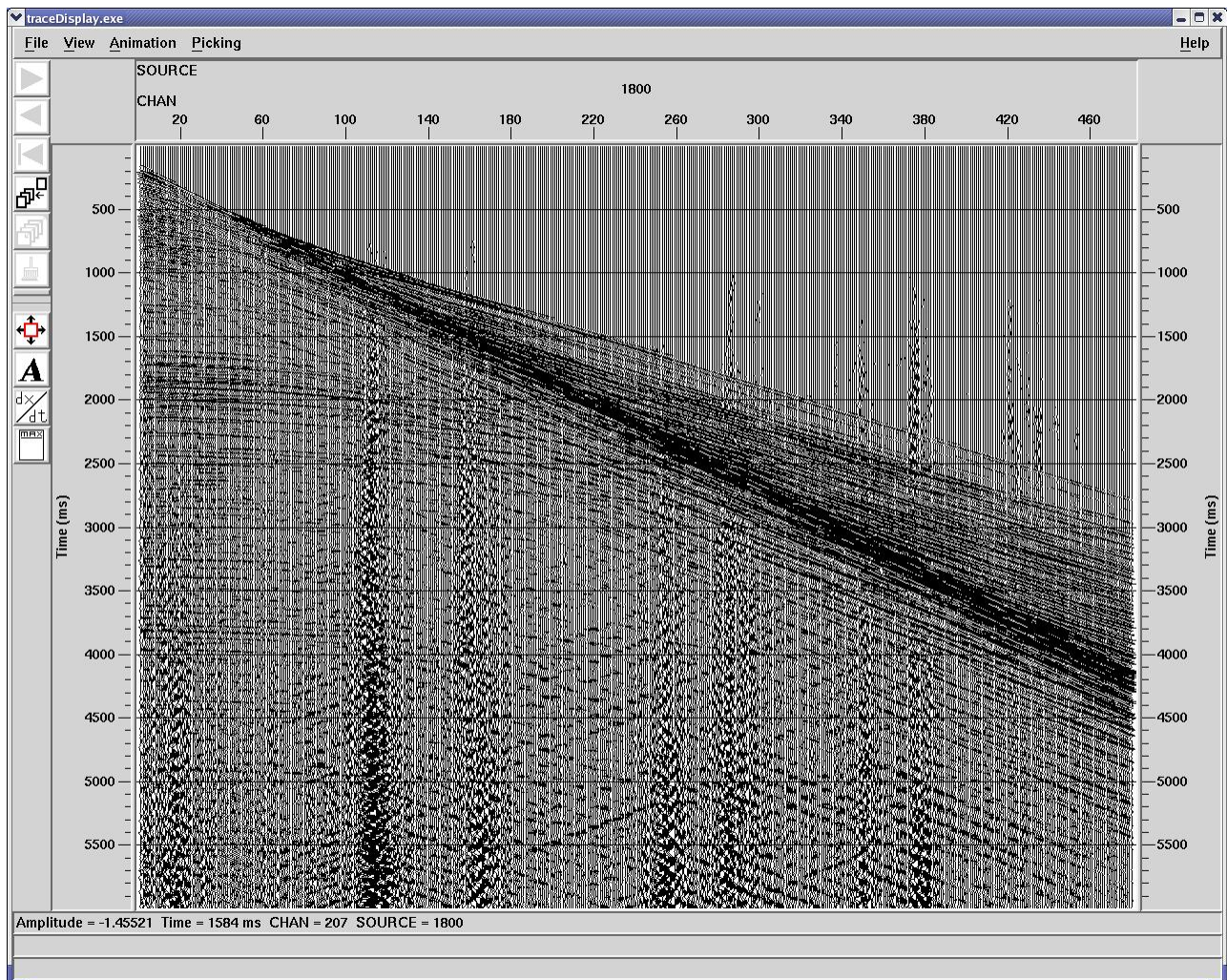


Figure 22-13: Shot gather of SP 1800 for sequence 013. Swell noise affecting approximately 25% of traces is evident.

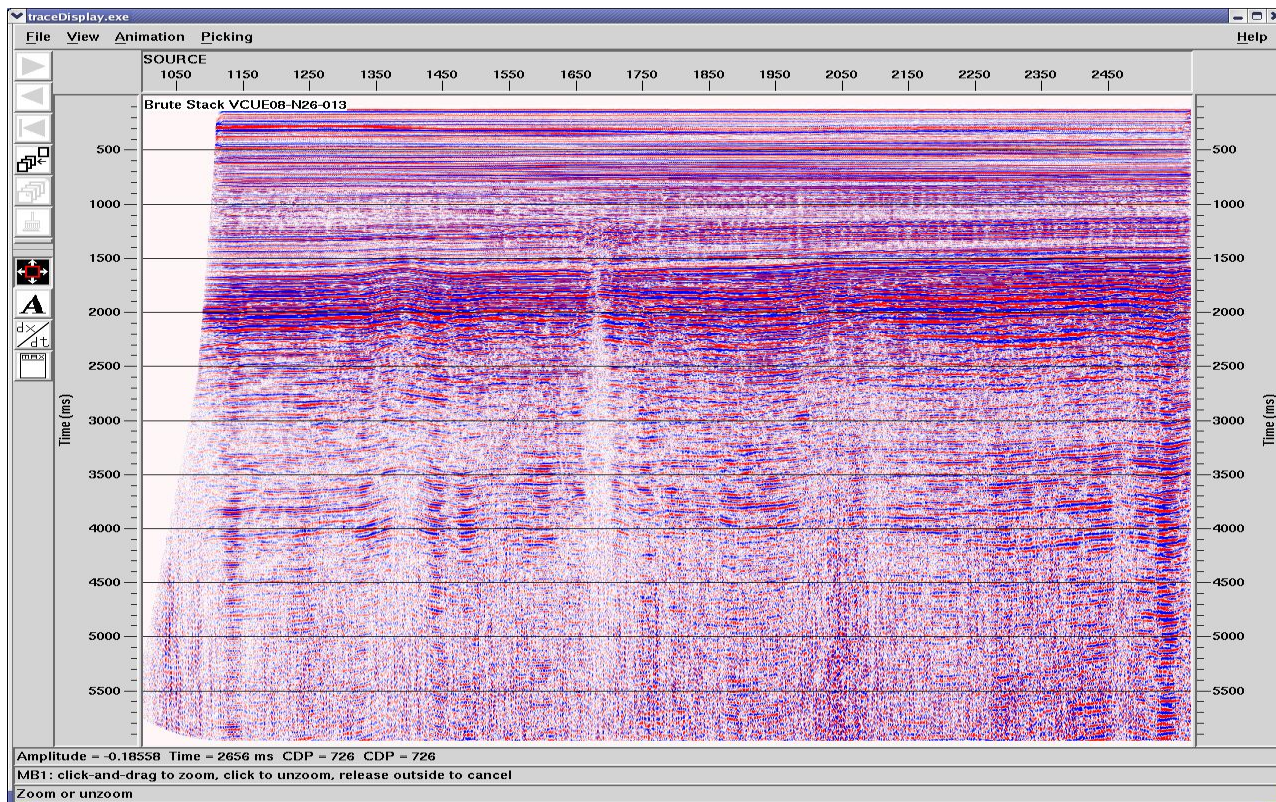


Figure 22-14: Brute stack for sequence 013. Bottom third of stack affected by swell noise, some bursts reaching into target area.

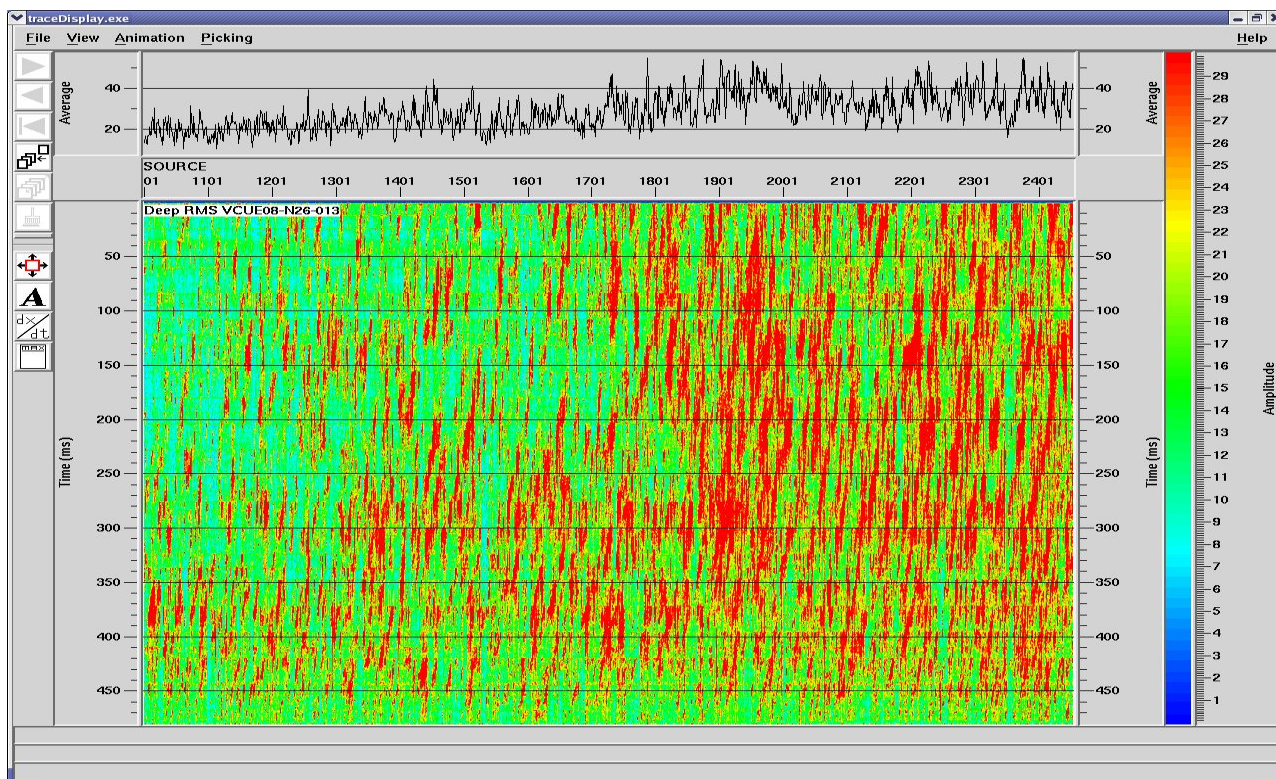


Figure 22-15: Deep window shot vs. channel RMS for sequence 013.

22.4. Autofires/Misfires

Overall, the guns performed well during the period of acquisition. Processing QC confirmed the guns' performance. Autofires misfires and air pressures were closely monitored. Occasionally gunlink flagged shots with incomplete or missing headers as autofires, which was closely investigated to ensure correctness. Gun delta errors, missing headers etc were marked both in the Observer Logs and in the QC logs.

The QC procedures in place to check for autofires and other gun problems are described in section 21.11.

Seq	Line	Bad Shots: MSP - missed SP (not fired); REC - not recorded SP or bad due to recording system; GAF - gun autofire; GTE - gun timing error >1.5ms; NOR - noise on record out of specs; NAV - nav error or missing nav header; SE - spread error
1	VCUE08-E08-001	NO HEADER: 3121,2220 MSP: 2895
2	VCUE08-E11-002	NO HEADER: 1106,1171,2306,2509,2714,3277, MSP: 1597,1709,3243,3319 NOR 1431 (cable strike)
3	VCUE08-E15-003	NO HEADER: 3137,2104,1845 MSP: 2257,1850
4	VCUE08-E12-004	NO HEADER: 1165,1205,2800,2937 MSP: 2134
5	VCUE08-E09-005	NO HEADER: 1931,1242,1161
6	VCUE08-E14-006	NO HEADER: 1282,1659,3163 MSP: 2773
7	VCUE08-E10-007	NO HEADER: 2710,2494,2496,1945,1601,1345
8	VCUE08-E06-008	NO HEADER: 1055,1096,1828,1925,1966,1969,2024,2191,2241
9	VCUE08-E04-009	NO HEADER: 1055,1096,1828,1925,1966,1969,2024,2191,2242
10	VCUE08-E07-010	NO HEADER: 1160,1843
11	VCUE08-N34-011	NONE
12	VCUE08-N32-012	NONE
13	VCUE08-N26-013	NO HEADER: 1911 MSP: 1524,2269
14	VCUE08-N21-014	NO HEADER: 2333,2285,2167,2112,1224 MSP: 2576,1903
15	VCUE08-N24-015	NO HEADER: 1541,1620 MSP: 2017,2093
16	VCUE08-N20-016	NO HEADER: 2669
17	VCUE08-N27-017	MSP: 2298
18	VCUE08-N22-018	NO HEADER: 1466,1194
19	VCUE08-N28-019	NO HEADER: 1060,1315,1821,1929
20	VCUE08-N23-020	NO HEADER: 1602
21	VCUE08-N30-021	NO HEADER: 1923, 1968, MSP: 1067, 2325
22	VCUE08-N25-022	NO HEADER: 2034,2031,1927,1873,1154 MSP: 1906
23	VCUE08-N29-023	NO HEADER: 1513,2036 MSP: 2030
24	VCUE08-N31-024	NO HEADER:1915
25	VCUE08-E03-025	MSP: 1906,1702
26	VCUE08-E01-026	NO HEADER: 1012, MSP: 1995
27	VCUE08-N35-027	NO HEADER: 1330
28	VCUE08-N33-028	MSP: 1602, NO HEADER: 1377,1132
29	VCUE08-E02-029	MSP: 2125,1334, NO HEADER: 1398,1142
30	VCUE08-E05-030	NONE
31	VCUE08-N40-031	NO HEADER: 1164,1199 NO FIRE (GUN 1-7): 1420,1421,1432,1434
32	VCUE08-N36-032	NO HEADER: 1493
33	VCUE08-N39-033	NO HEADER: 1158 MSP: 1209
34	VCUE08-N43-034	MSP: 1210, 1175
35	VCUE08-N38-035	NONE
36	VCUE08-N41-036	NONE

Figure 22-16: Shot edits section of the QC log listing bad shots.

22.5. Turn noise

On occasion the streamer was still in turn when the SOL noise files were recorded, due to the line run-in being constrained by safe navigation areas, with associated noise up to 150ub. This did not affect the chargeable SPs, only the noise records. Notes regarding the sequences affected can be found in the QC logs.

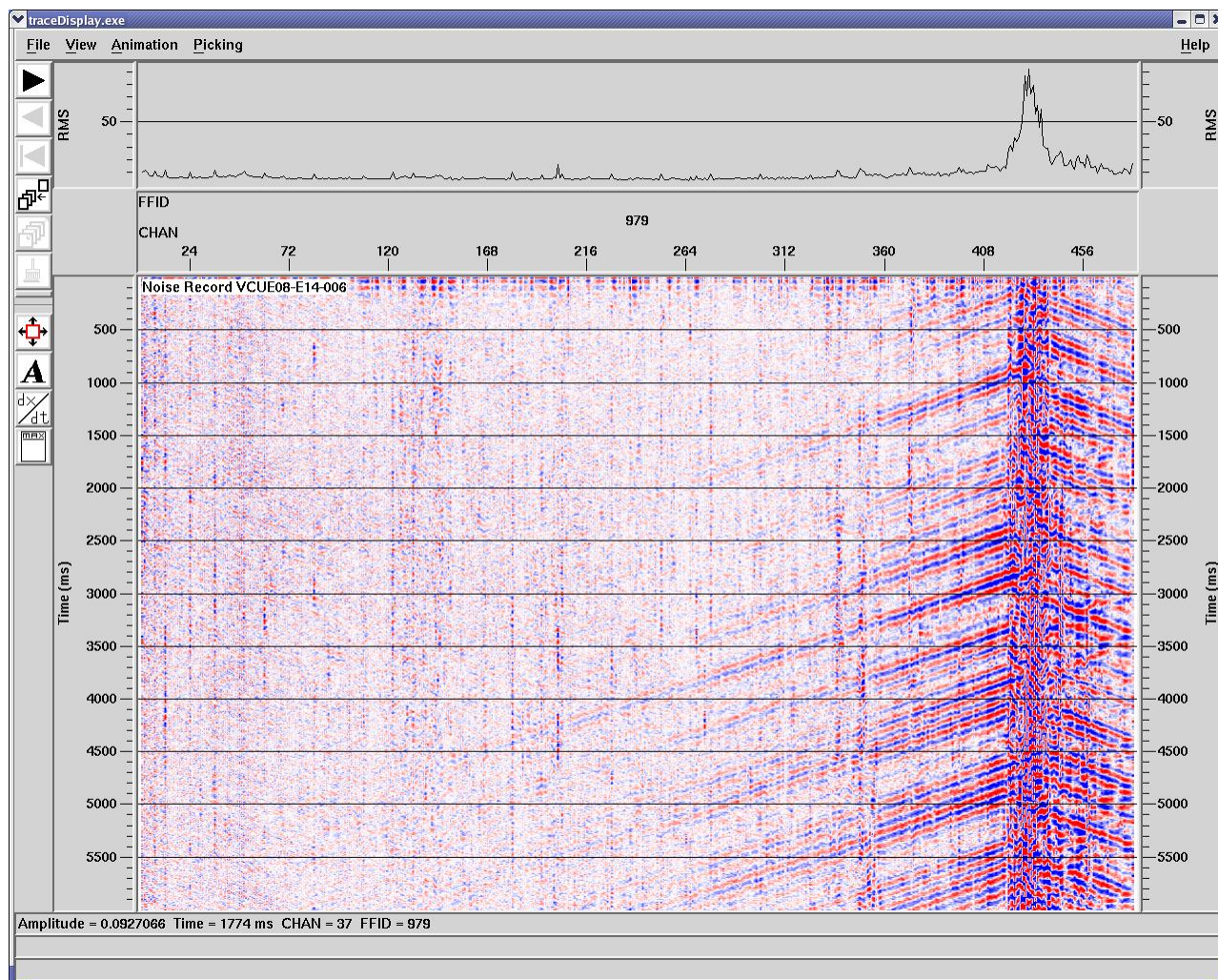


Figure 22-17: SOL noise display of sequence 006. Streamer still in turn while SOL noise records were taken.

22.6. Spiky Channels

The number of bad channels did not exceed 1.7% for the entire survey. No channel was particularly spiky.

reversed polarity
 fails instrumentation tests
 noisy
 spiking

for more detailed info, see OBSERVER LINE LOGS

seq	channel														Q	%
001	59	91					242			337					4	0.8
002	59	91					242			337					4	0.8
003	59	91					242			337					4	0.8
004	59	91					242			337					4	0.8
005	59	91					242			337					4	0.8
006	59	91				202	242			337					5	1.0
007	59	91				202	242			337					5	1.0
008	59	91				202	242			337					5	1.0
009	59	91				202	242			337					5	1.0
010	59	91				202	242			337					5	1.0
011	59	91					242			337					4	0.8
012	59	91					242			337					4	0.8
013	59	91					242			337					4	0.8
014	59	91					242			337					4	0.8
015	59	91					242			337					4	0.8
016	59	91					242			337					4	0.8
017	59	91					242			337					4	0.8
018	59	91					242			337					4	0.8
019	59	91					242			337					4	0.8
020	59	91					242			337					4	0.8
021	59	91					242			337					4	0.8
022	59	91					242			337					4	0.8
023	59	91					242			337					4	0.8
024	59	91					242			337					4	0.8
025	59	91					242			337					4	0.8
026	59	91					242			337					4	0.8
027	59	91					242			337					4	0.8
028	59	91					242			337					4	0.8
029	59	91					242			337					4	0.8
030	59	91					242			337					4	0.8
031	59	91					242			337					4	0.8
032	59	91					242			337					4	0.8
033	59	91					242			337					4	0.8
034	59	91					242			337					4	0.8
035	59	91					242			337					4	0.8
036	59	91					242			337					4	0.8

Figure 22-18: Channel edits section of QC log listing of bad channels (noted from observer logs).

22.7. Noise history display

The following display shows the noise record history for all sequences, calculated from the SOL and EOL noise files.

All channels for each noise record have been stacked together to a single trace, and these average channel values are annotated above the display.

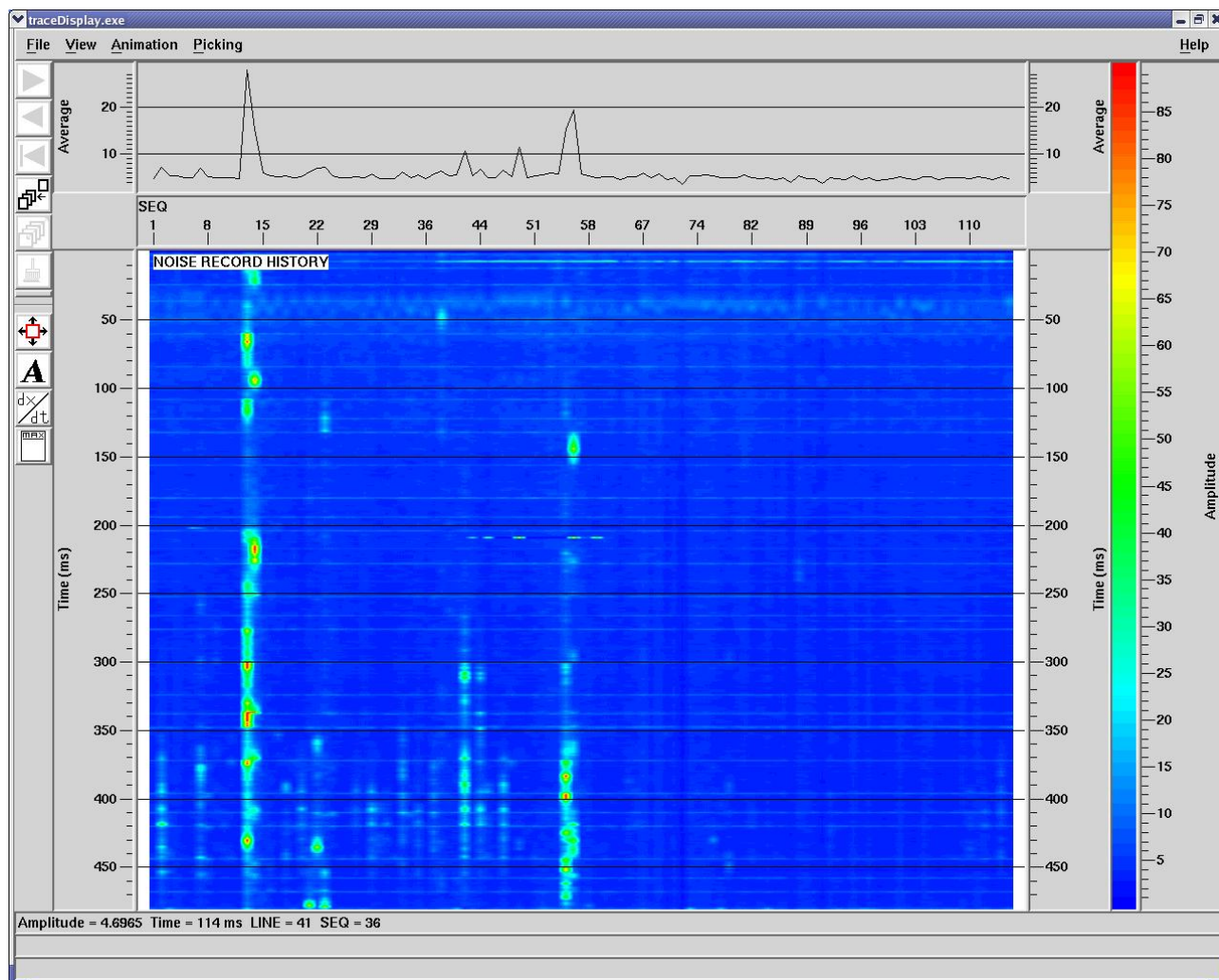


Figure 22-19 : Noise history display for sequences 001 to 115.

22.8. RMS history displays

The following display shows the line average RMS for each individual channel on the streamer for Sequences 001 to 115, calculated from the shallow RMS window at 50 to 500 ms.

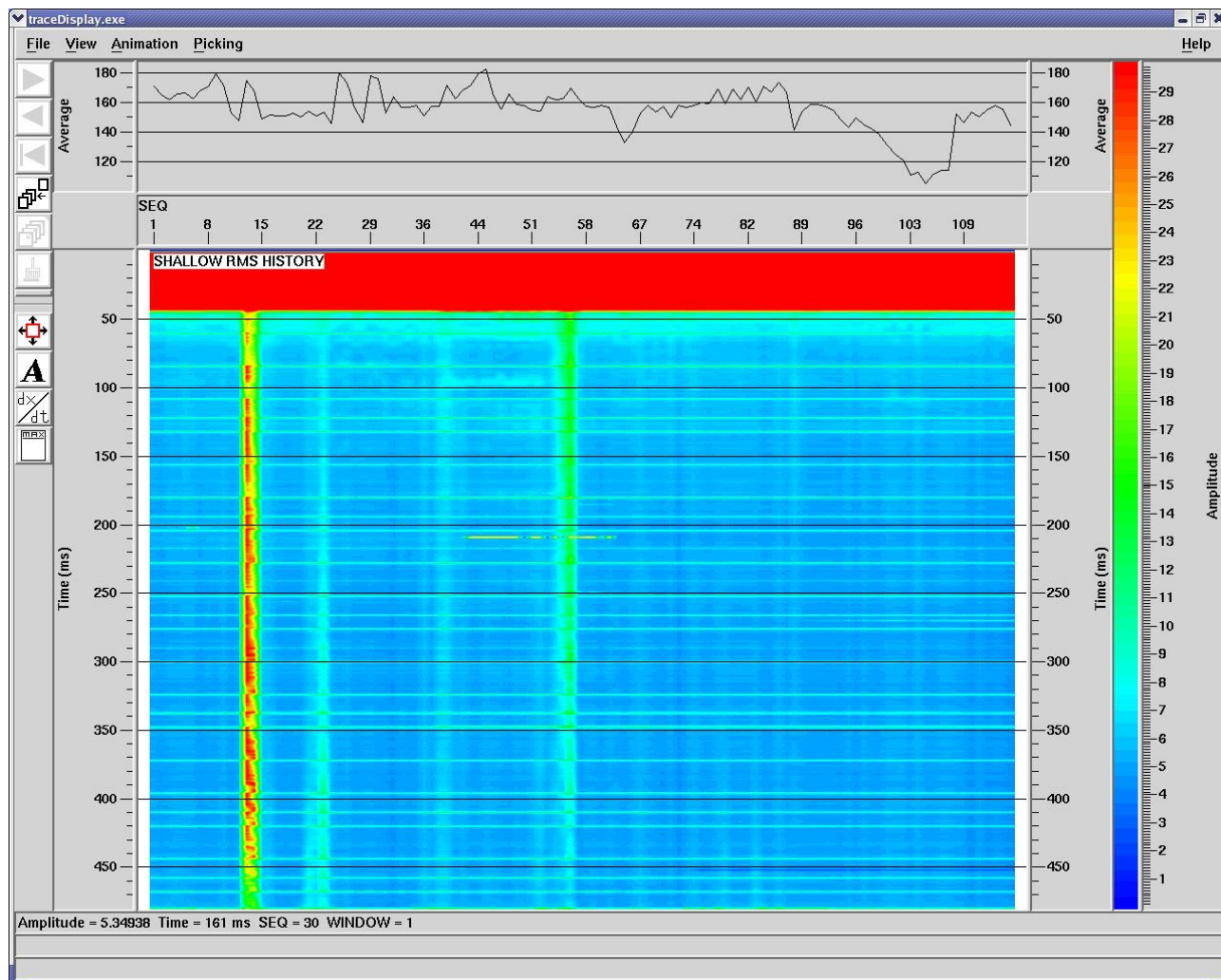


Figure 22-20: Shallow RMS history display for sequences 001 to 115. Notice that the first 50 channels are dominated by direct arrival energy.

The following display shows the line average RMS for each individual channel on the streamer for Sequences 001 to 115, calculated from the deep RMS window at 5450 to 5950 ms

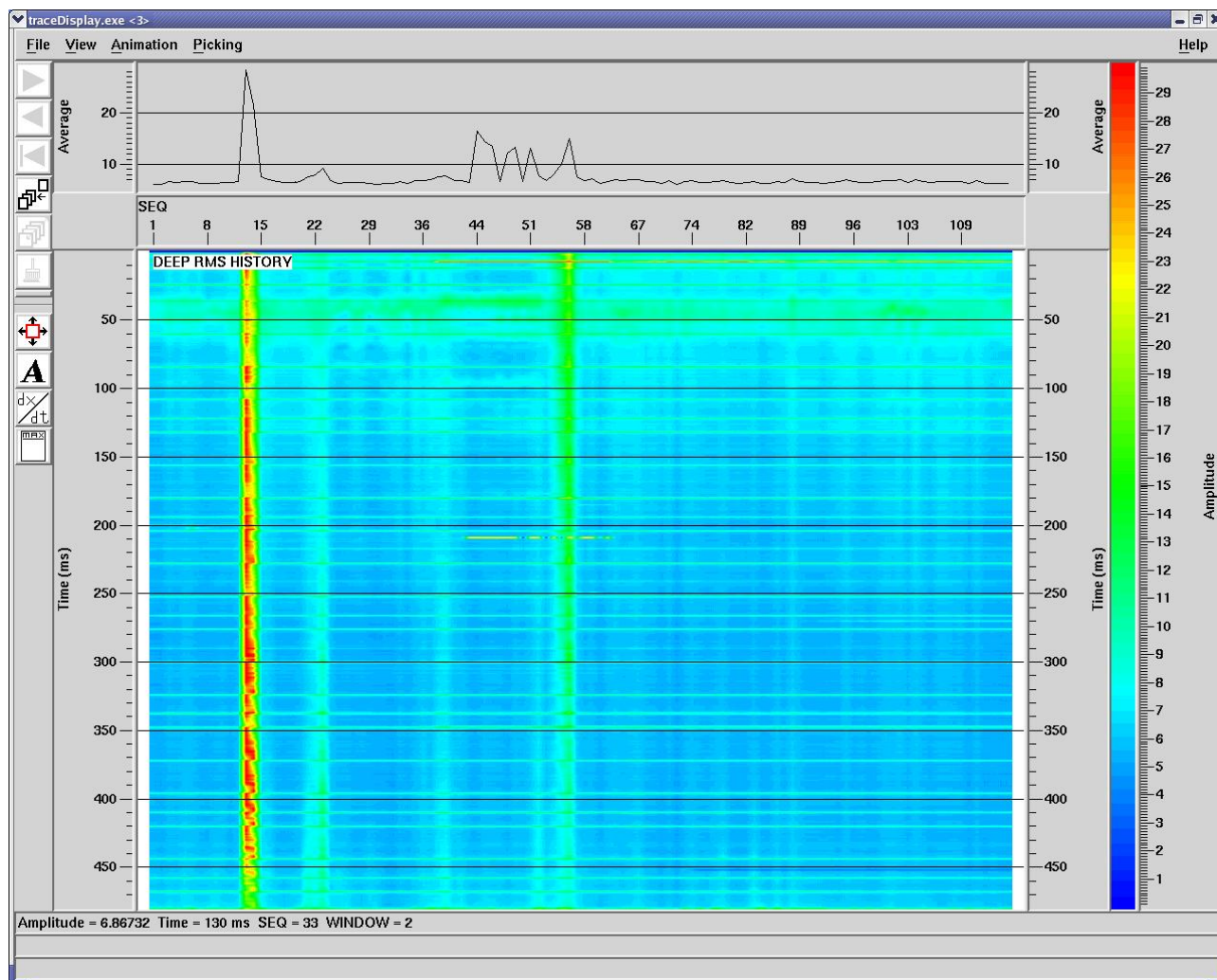


Figure 22-21 Deep RMS history display for sequences 001 to 115. Note strong swell noise on sequences 13 and 14, and slightly increased ambient noise for sequence 24, and noise on channels 25-40.

23. Conclusion

Overall the data recorded on this survey was of good quality, helped by good acquisition conditions with low extraneous noise levels, except for some periods of heavy swell noise.

A total of 115 sequences were shot, mostly of good quality. The number of bad channels did not exceed 1.7% for the entire survey.

Some swell noise was evident, although mostly of low amplitude and affecting few traces. It was efficiently dealt with by swell noise attenuation processing. Only in three instances were the brute stacks significantly affected.

The brute stacks showed good data quality and contained dipping surfaces, diffractions and multiples and good evidence of the captured geology including anticline structures and faulting planes.

Signal penetration was good for the top half of the record, but poor beyond this, probably as a result of the high reflectivity of the intermediate layers. Strong multiples were observed.

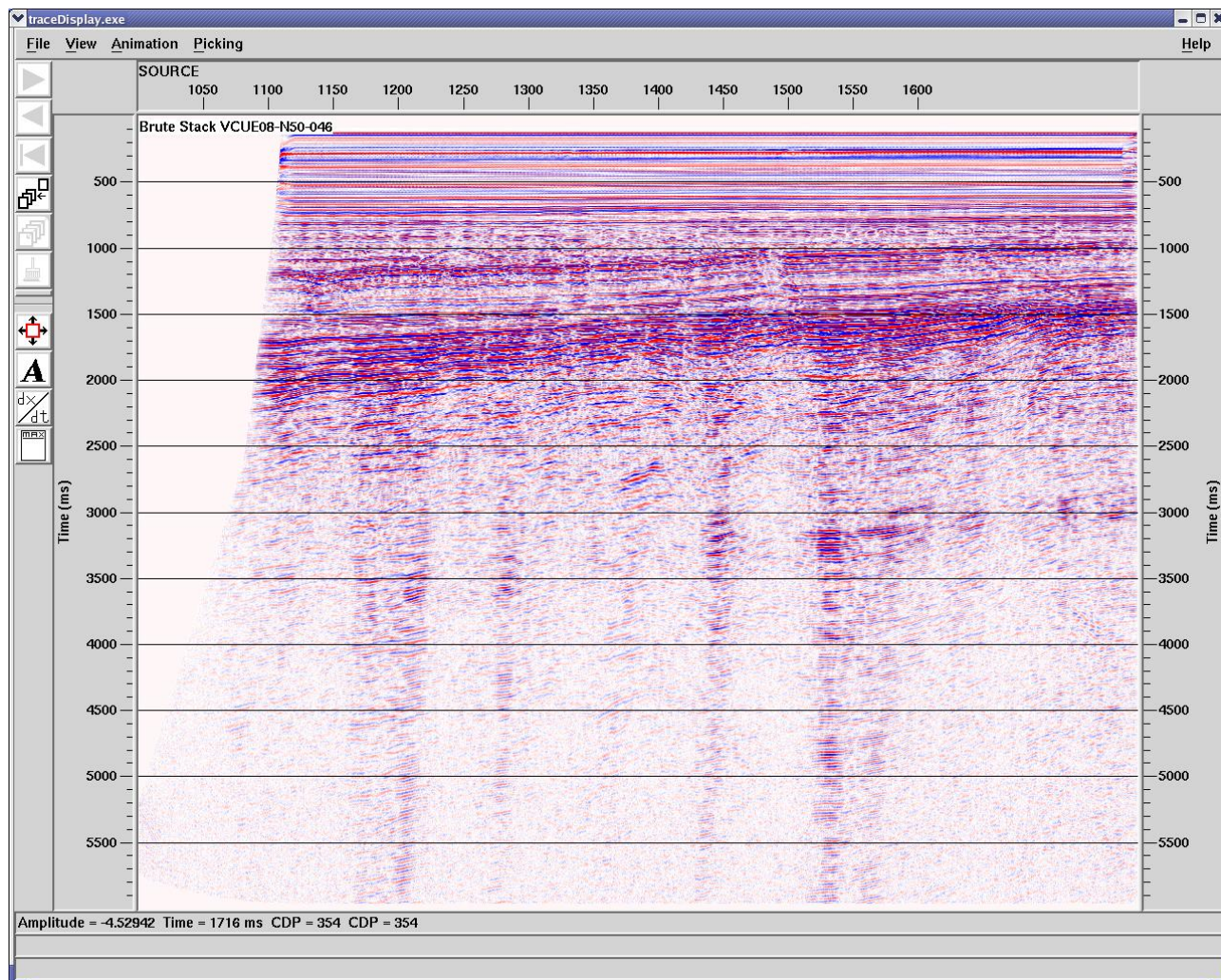


Figure 23-1: Brute stack of sequence 046.

A QC log in Excel format detailing quality control analysis of each line was delivered to the client at the completion of the survey.

Seq	Line	SHOTS	STACK
1	VCUE08-E08-001	Av. Ambient RMS: 5.1µb, strong ringing at EOL	Good clean stack
2	VCUE08-E11-002	Av. Ambient RMS: 6.2µb, strong ringing at SOL, cable strike on channel 266 SP 1431	Good clean stack
3	VCUE08-E15-003	Av. Ambient RMS: 5.4µb, strong ringing at EOL	Good clean stack
4	VCUE08-E12-004	Av. Ambient RMS: 5.2µb, strong ringing at SOL	Good clean stack
5	VCUE08-E09-005	Av. Ambient RMS: 5.3µb, strong ringing at EOL	Good clean stack
6	VCUE08-E14-006	Av. Ambient RMS: 5.2µb, strong ringing at SOL. Tail end of cable still in turn during SOL.	Good clean stack
7	VCUE08-E10-007	Av. Ambient RMS: 6.5µb, strong ringing at EOL. Tail end of cable still in turn during SOL.	Good clean stack
8	VCUE08-E06-008	Av. Ambient RMS: 5.4µb	Good clean stack
9	VCUE08-E04-009	Av. Ambient RMS: 5.2µb	Good clean stack
10	VCUE08-E07-010	Av. Ambient RMS: 5.3µb. Ringing at SOL.	Good clean stack
11	VCUE08-N34-011	Av. Ambient RMS: 5.0µb. Some swell at front of streamer.	Stack mostly unaffected by swell
12	VCUE08-N32-012	Av. Ambient RMS: 5.0µb. Some swell at front of streamer.	Some swell bursts affecting stack.
13	VCUE08-N26-013	Av. Ambient RMS: 25.6 µb. Strong swell bursts on SOL and EOL noise records and throughout whole line.	Bottom third of stack affected by swell noise, some bursts reaching into target area.
14	VCUE08-N21-014	Av. Ambient RMS: 12.2 µb. Strong swell bursts on SOL, but decreases in intensity towards EOL.	Bottom third of stack affected by swell noise, reaching up to 2.0sec near SOL.
15	VCUE08-N24-015	Av. Ambient RMS: 6.2µb	Stack mostly unaffected by swell
16	VCUE08-N20-016	Av. Ambient RMS: 5.6µb	Good clean stack
17	VCUE08-N27-017	Av. Ambient RMS: 5.3µb	Good clean stack
18	VCUE08-N22-018	Av. Ambient RMS: 5.4µb	Good clean stack
19	VCUE08-N28-019	Av. Ambient RMS: 5.1µb	Stack mostly unaffected by swell
20	VCUE08-N23-020	Av. Ambient RMS: 5.1µb. Tail end of cable still in turn during SOL.	Stack mostly unaffected by swell
21	VCUE08-N30-021	Av. Ambient RMS: 5.9µb. Only the very tail end of cable still in turn during SOL.	Stack mostly unaffected by swell
22	VCUE08-N25-022	Av. Ambient RMS: 6.6µb. Tail end of cable still in turn during SOL.	Stack mostly unaffected by swell
23	VCUE08-N29-023	Av. Ambient RMS: 7.0µb. Tail end of cable still in turn during SOL.	Stack mostly unaffected by swell
24	VCUE08-N31-024	Av. Ambient RMS: 5.4µb. Swell increasing towards EOL.	Some swell bursts affecting stack.
25	VCUE08-E03-025	Av. Ambient RMS: 5.2µb.	Good clean stack
26	VCUE08-E01-026	Av. Ambient RMS: 5.2µb.	Good clean stack
27	VCUE08-N35-027	Av. Ambient RMS: 5.3µb. Tail end of cable still in turn during SOL.	Good clean stack
28	VCUE08-N33-028	Av. Ambient RMS: 5.2µb.	Good clean stack
29	VCUE08-E02-029	Av. Ambient RMS: 5.6µb. Tail end of cable still in turn during SOL.	Fairly clean stack.
30	VCUE08-E05-030	Av. Ambient RMS: 4.7µb. Tail end of cable still in turn during SOL.	Good clean stack
31	VCUE08-N40-031	Av. Ambient RMS: 5.1µb	Good clean stack
32	VCUE08-N36-032	Av. Ambient RMS: 4.4µb	Good clean stack
33	VCUE08-N39-033	Av. Ambient RMS: 6.0µb. Tail end of cable still in turn during SOL.	Good clean stack
34	VCUE08-N43-034	Av. Ambient RMS: 5.1µb.	Good clean stack
35	VCUE08-N38-035	Av. Ambient RMS: 5.4µb. Tail end of cable still in turn during SOL.	Good clean stack
36	VCUE08-N41-036	Av. Ambient RMS: 4.6µb	Good clean stack

Figure 23-2: Quality section of QC log.

24. Appendices

24.1. SEG Y Brute Stack Headers

The following SEG Y Stacks EBDIC header template was used. Items marked in bold differ from line to line.

C 1 CLIENT: SEBOA CONSORTIUM COMPANY: CGG VERITAS
C 2 SURVEY: GROUP SHOOT 2D AREA: EAST BASIN, OFFSHORE AUSTRALIA
C 3 VCUE08-N04-080 SP: 3166-881 CDP: 1-4810
C 4 DATA TRACES/STREAMER: 480 AUXILIARY TRACES/RECORD: 30
C 5 SAMPLE RATE: 2MS RECORD LENGTH: 6000ms
C 6 RECORDING FORMAT: SEG-D 8058 REV 100 FILTERS: DIGITAL LOW CUT: ON
C 7 ANALOG LOW CUT: 3 HZ 6 DB/OCTAVE HIGH CUT: 200 HZ 370 DB/OCTAVE
C 8 STREAMER: SERCEL SEAL SOLID ACTIVE LENGTH: 6000 M
C 9 GROUP INTERVAL: 12.5 M DEPTH: 8 M
C10 SOURCE TYPE: BOLT AIRGUN VOLUME: 2130 CU IN
C11 NO OF SUB ARRAY/SOURCE: 3 SUB ARRAY SEPARATION: 10 M
C12 ARRAY PRESSURE: 2000 PSI ARRAY DEPTH: 6 M
C13
C14 SEG Y HEADER BYTES
C15 Water Depth 185-188
C16 Line Number 189-192
C17 Cable 193-194
C18 Gun Sequence 195-196
C19
C20 SP ANNOTATED AT NEAR TRACE CDP
C21
C22 PROCESSING:
C23
C24 REFORMAT - SEG D TO PROMAX FORMAT
C25 INSTRUMENT DELAY -50ms
C26 SHOT AND CHANNEL EDITS BASED ON OBSERVER LOGS
C27 BANDPASS FILTER, ORMSBY 6-8-90-120 HZ
C28 RESAMPLE 2ms TO 4ms. HIGH FIDELITY ANTIALIAS FILTER
C29 TRACE DECIMATION, 2:1, USING SINGLE NMO FUNCTION
C30 TAR - T**2 CORRECTION
C31 NMO, VELOCITIES PICKED AT 4 KM INTERVALS
C32 CDP STACK, STRAIGHT MEAN SQUARE ROOT NORMALIZATION
C33 GUN & CABLE STATIC 9ms
C34
C35 CDP INTERVAL 12.5 METRES
C36
C37
C38 APRIL 2008

24.2. Shipment

QC deliverables were included in the Primary and Copy Tape Shipments. The following QC products were shipped to the client at the end of the survey:

Shipment No: PT-2008-025

Date: 2nd. April 2008

Contents cover Sequences: 1 to 58

1 x DVD containing QC Log File (MS Excel), Stack files (SEGY format), various QC screen displays (JPG format), velocities (ASCII format) and ambient noise (ASCII format) files.

Shipped to:

Nigel Seymour
DP Manager
WesternGeco
Level 5 St. Georges Terrace
Perth 6000
WA, Australia

Shipment No: PT-2008-029

Date: 07th May 2008

Contents cover Sequences: 59 to 115

1 x DVD containing QC Log File (MS Excel), Stack files (SEGY format), various QC screen displays (JPG format), velocities (ASCII format) and ambient noise (ASCII format) files.

Shipped to:

Nigel Seymour
DP Manager
WesternGeco
Level 5 St. Georges Terrace
Perth 6000
WA, Australia

24.3. QC Line log

A QC log was maintained for the duration of the project to keep track of the workflows being run, shot edits, problems encountered and any processing comments. This log file has been written to DVD, and was included in the final data shipment to the client.

Appendix 1 Navigation Systems & Diagrams

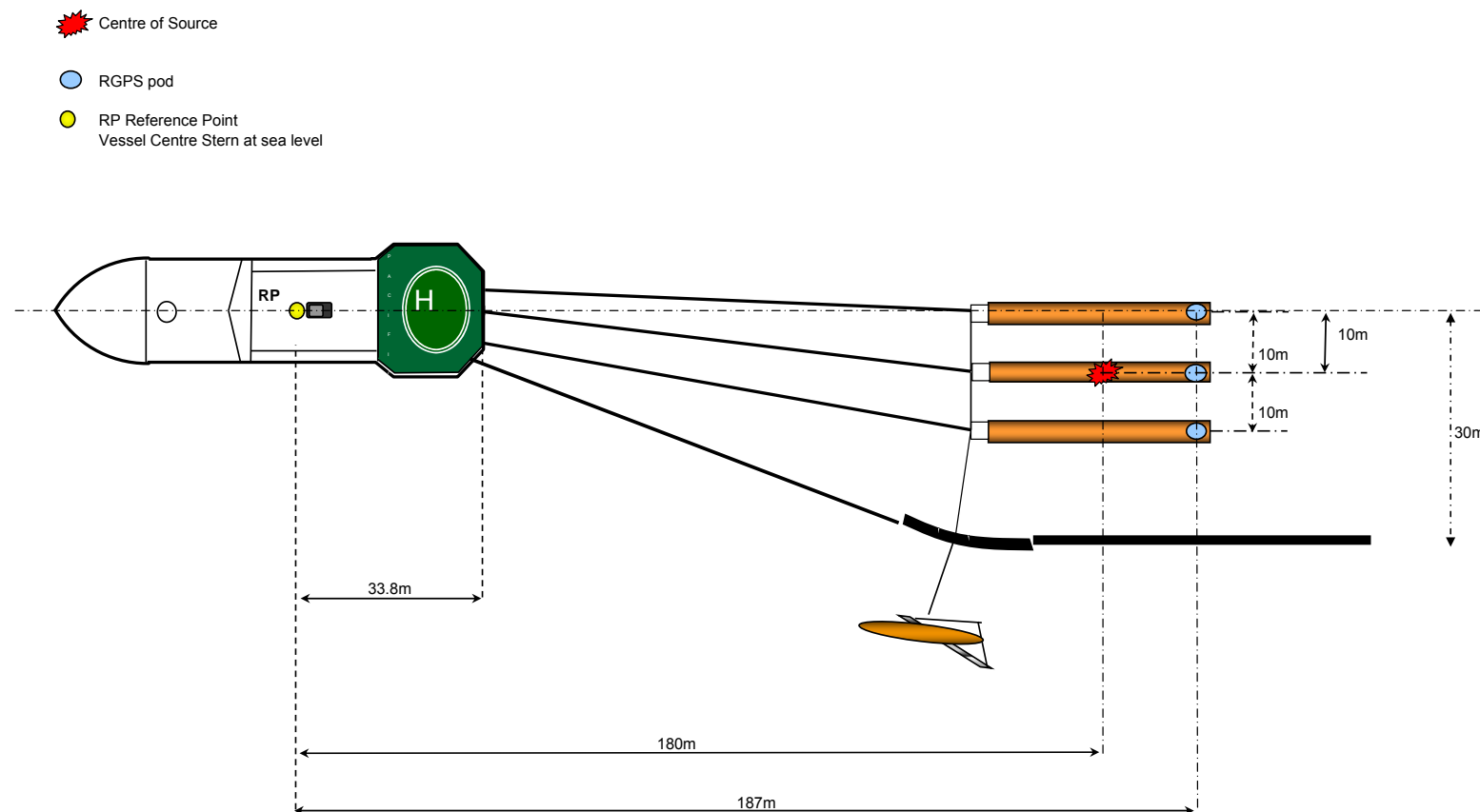
DGPS Reference Stations

WGS84				
Ref. St. Name	No.	Latitude	Longitude	Height (m)
Brisbane	275	027° 28' 38.488"S	153° 01' 37.352 "E	93.14
Bathurst	336	033° 25' 46.879"S	149° 34' 01.969"E	756.66
Ceduna	355	032° 07' 03.049" S	133°41'22.851 " E	7.27
Corbar	316	031° 29' 57.430"S	145° 50' 20.346 "E	270.17
Melbourne	385	037° 47' 59.264" S	144° 57' 39.311" E	67.33

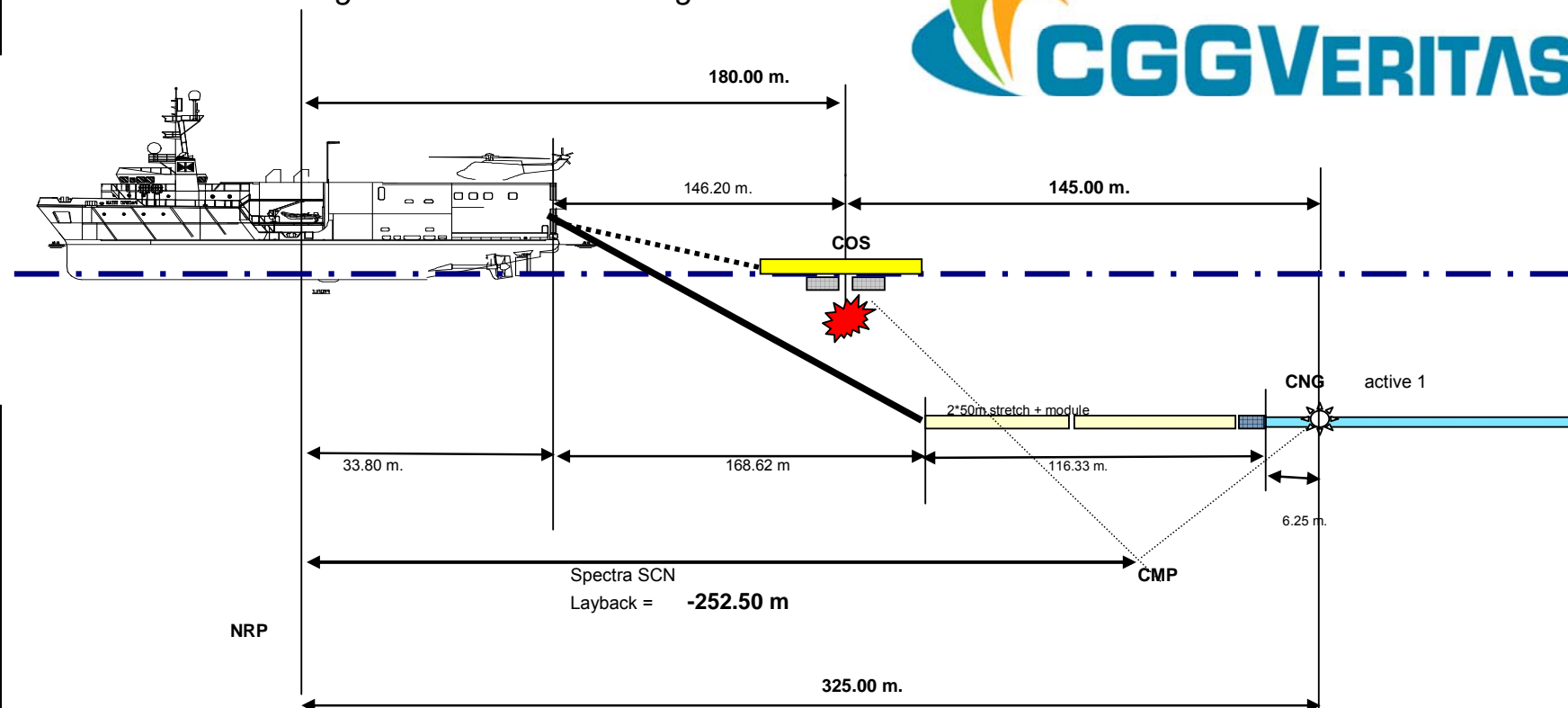
DGPS Reference Guide

<i>Spectra Name</i>	<i>GPS Feed</i>	<i>Position Type</i>
V1G1	SPM1	SPM 5.16 XP
V1G2	SPM2	SPM 5.16 HP
V1G3	SPM2	Mulifix 5 XP
V1G4	SPM2	SPM 5.16 XP
V1G5	SPM1	SPM 5.16 HP

Pacific Titan General Towing arrangement



M/V Pacific Titan Towing Dimensions/Offset Diagram

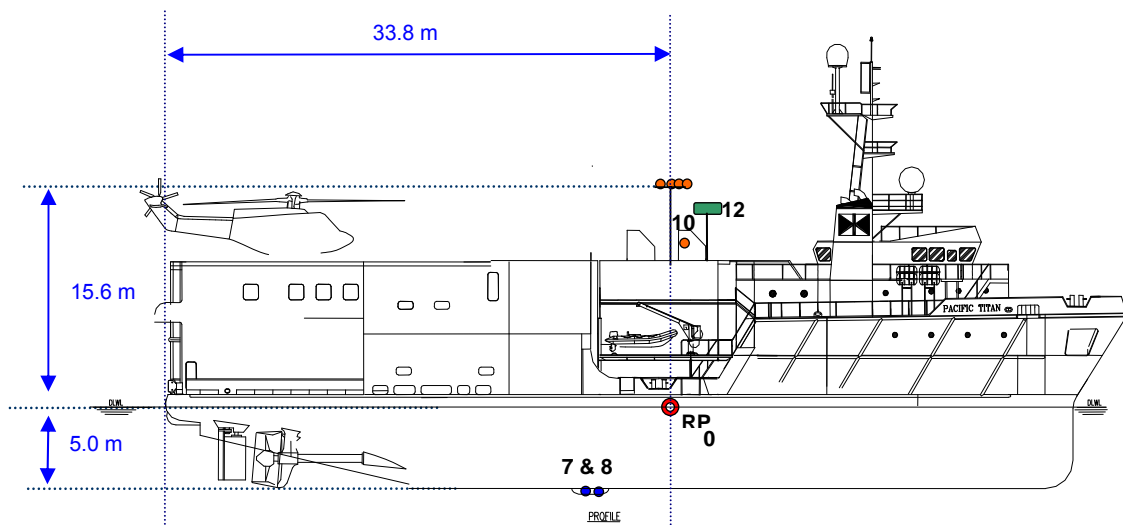


Principal Distances:		Principal Offsets:		Used as:
NRP-Stern	33.80 m.	COS-CNG	145.00 m.	
Stern-COS	146.20 m.	NRP-CMP	-252.50 m	Spectra SCN Layback
Stern-CNG	291.20 m.			
NRP-COS	180.00 m.	NRP-CNG	325.00 m.	Offset from NRP

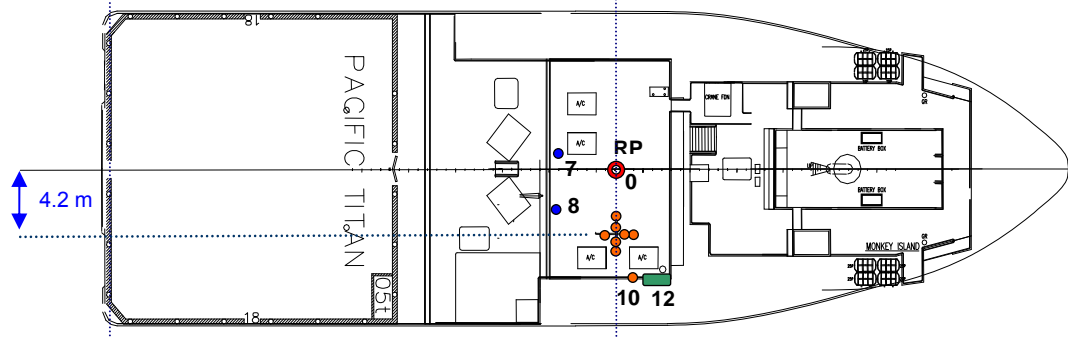
Centre near group derived from Seal manuals = 6.25m from coupling

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

Antenna Offsets

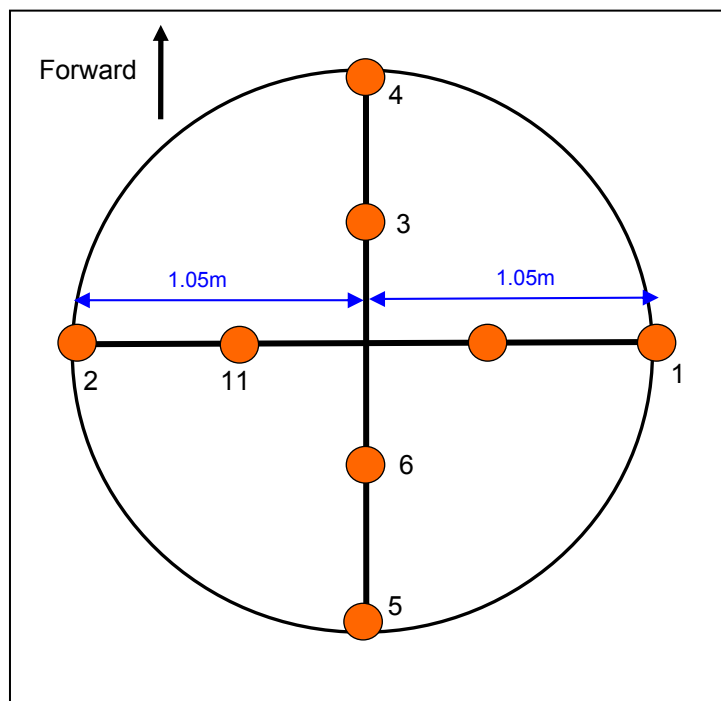


See following page for detail of antenna mast



No	Spectra ID	X	Y	Z	Description	Cable Id
0	V1	0	0	0	Vessel ref point	
		0	-33.8	0	Vessel centre Stern from ref point	
1	V1G1,V1G5	5.25	0	15.6	SPM1 XP,HP. Alison 940D	2 Red Rings
2		3.15	0	15.6	Alison 940D	5 Red Rings
3					motorola UHF Radio antenna	
4	V1G2, V1G3, V1G4	4.2	1.05	15.6	SPM2 XP,HP Multifix. Alison 940D	3 Red Rings
5					Seatex Yagi VCU, UHF antenna	4 Red Rings
6					Seatex Omni VCU, UHF antenna	1 Red Ring
7	V1E1	-1.3	-5.8	-5	Simrad EA 600, 200kHz tranceducer	
8	V1E2	1.5	-6.1	-5	Simrad EA 600, 12kHz tranceducer	
9	Speedlan					
10	Runt 1				Trimble Bullet	
11					sailor VHF Antenna	2 Green Rings
12	V1GY1				Simrad GPS Gyro	

Detail of Antenna Mast



Appendix 2 Navigation Processing Log



Navigation Processing Log

Client: CUE Energy Resources

Job: 6374

Area: T37 / 38P

Line Name	Seq	FOSP	FCSP	LSP	LOSP	Line Status	Processing Comments
VCUE08-E08-001	1		3220	881		Complete	WARNING: shot 3121 No E33 record WARNING: shot 2895 No E33 record WARNING: shot 2220 No E33 record WARNING: shot 940 No E33 record
VCUE08-E11-002	2		1001	3333		Complete	WARNING: shot 1106 No E33 record WARNING: shot 1171 No E33 record WARNING: shot 1597 No E33 record WARNING: shot 1709 No E33 record WARNING: shot 2306 No E33 record WARNING: shot 2509 No E33 record WARNING: shot 2714 No E33 record WARNING: shot 3243 No E33 record WARNING: shot 3277 No E33 record WARNING: shot 3320 No E33 record
VCUE08-E15-003	3		3211	881		Complete	WARNING: shot 3137 No E33 record WARNING: shot 2257 No E33 record WARNING: shot 2104 No E33 record WARNING: shot 1850 No E33 record WARNING: shot 1845 No E33 record WARNING: shot 917 No E33 record
VCUE08-E12-004	4		1001	3333		Complete	WARNING: shot 1165 No E33 record WARNING: shot 1205 No E33 record WARNING: shot 2134 No E33 record WARNING: shot 2800 No E33 record WARNING: shot 2937 No E33 record
VCUE08-E09-005	5		3221	881		Complete	WARNING: shot 1931 No E33 record WARNING: shot 1242 No E33 record WARNING: shot 1161 No E33 record

VCUE08-E14-006	6	1001	3333	Complete	WARNING: shot 1282 No E33 record WARNING: shot 1659 No E33 record WARNING: shot 2773 No E33 record WARNING: shot 3163 No E33 record KO'd DGPS system 2 and 4. 1,3 and 5 all good
VCUE08-E10-007	7	3217	881	Complete	WARNING: shot 2710 No E33 record WARNING: shot 2494 No E33 record WARNING: shot 2436 No E33 record WARNING: shot 1945 No E33 record WARNING: shot 1601 No E33 record WARNING: shot 1345 No E33 record
VCUE08-E06-008	8	1001	2291	Complete	WARNING: shot 1055 No E33 record WARNING: shot 1096 No E33 record WARNING: shot 1762 No E33 record WARNING: shot 1828 No E33 record WARNING: shot 1925 No E33 record WARNING: shot 1966 No E33 record WARNING: shot 1969 No E33 record WARNING: shot 2024 No E33 record WARNING: shot 2191 No E33 record WARNING: shot 2241 No E33 record
VCUE08-E04-009	9	2177	881	Complete	WARNING: shot 2132 No E33 record WARNING: shot 1492 No E33 record
VCUE08-E07-010	10	1001	2289	Complete	WARNING: shot 981 No E33 record WARNING: shot 1160 No E33 record WARNING: shot 1843 No E33 record
VCUE08-N34-011	11	1001	1791	Complete	
VCUE08-N32-012	12	1675	881	Complete	
VCUE08-N26-013	13	1001	2573	Complete	WARNING: shot 1524 No E33 record WARNING: shot 1911 No E33 record WARNING: shot 2269 No E33 record

VCUE08-N21-014	14	2712	881	Complete	WARNING: shot 2576 No E33 record WARNING: shot 2333 No E33 record WARNING: shot 2285 No E33 record WARNING: shot 2167 No E33 record WARNING: shot 2112 No E33 record WARNING: shot 1903 No E33 record WARNING: shot 1224 No E33 record DGPS systems 2,3,4 rejected in processing d/t spiky data
VCUE08-N24-015	15	1001	2675	Complete	WARNING: shot 1541 No E33 record WARNING: shot 1620 No E33 record WARNING: shot 2017 No E33 record WARNING: shot 2093 No E33 record
VCUE08-N20-016	16	2762	881	Complete	WARNING: shot 2669 No E33 record WARNING: shot 920 No E33 record DGPS systems 2,3 rejected in processing d/t spiky data
VCUE08-N27-017	17	1001	2522	Complete	
VCUE08-N22-018	18	2659	1010	Complete	WARNING: shot 2660 No E33 record WARNING: shot 1466 No E33 record WARNING: shot 1194 No E33 record
VCUE08-N28-019	19	1001	2480	Complete	WARNING: shot 1060 No E33 record WARNING: shot 1315 No E33 record WARNING: shot 1821 No E33 record WARNING: shot 1929 No E33 record
VCUE08-N23-020	20	2607	881	Complete	WARNING: shot 1602 No E33 record
VCUE08-N30-021	21	1001	2481	Complete	WARNING: shot 996 No E33 record WARNING: shot 1067 No E33 record WARNING: shot 1923 No E33 record WARNING: shot 1968 No E33 record WARNING: shot 2325 No E33 record

VCUE08-N25-022	22	2506	881	Complete	WARNING: shot 2034 No E33 record WARNING: shot 2031 No E33 record WARNING: shot 1927 No E33 record WARNING: shot 1906 No E33 record WARNING: shot 1873 No E33 record WARNING: shot 1154 No E33 record
VCUE08-N29-023	23	1001	2479	Complete	WARNING: shot 1513 No E33 record WARNING: shot 2030 No E33 record WARNING: shot 2036 No E33 record
VCUE08-N31-024	24	2067	881	Complete	WARNING: shot 1915 No E33 record WARNING: shot 997 No E33 record
VCUE08-E03-025	25	2176	881	Complete	WARNING: shot 1906 No E33 record WARNING: shot 1702 No E33 record DGPS systems 2,3 rejected in processing d/t spiky data
VCUE08-E01-026	26	1001	2293	Complete	WARNING: shot 1012 No E33 record WARNING: shot 1985 No E33 record
VCUE08-N35-027	27	1001	1790	Complete	WARNING: shot 1330 No E33 record
VCUE08-N33-028	28	1675	881	Complete	WARNING: shot 1602 No E33 record WARNING: shot 1377 No E33 record WARNING: shot 1132 No E33 record
VCUE08-E02-029	29	2179	881	Complete	WARNING: shot 2125 No E33 record WARNING: shot 1398 No E33 record WARNING: shot 1334 No E33 record WARNING: shot 1142 No E33 record
VCUE08-E05-030	30	1001	2294	Complete	DGPS systems 2,3 rejected in processing d/t spiky data
VCUE08-N40-031	31	1001	1783	Complete	WARNING: shot 1164 No E33 record WARNING: shot 1199 No E33 record
VCUE08-N36-032	32	1670	881	Complete	WARNING: shot 1493 No E33 record

VCUE08-N39-033	33	1001	1785	Complete	WARNING: shot 1158 No E33 record WARNING: shot 1209 No E33 record WARNING: shot 1774 No E33 record
VCUE08-N43-034	34	1659	881	Complete	WARNING: shot 1210 No E33 record WARNING: shot 1175 No E33 record
VCUE08-N38-035	35	1001	1786	Complete	
VCUE08-N41-036	36	1663	931	Complete	
VCUE08-N37-037	37	1001	1790	Complete	WARNING: shot 1531 No E33 record WARNING: shot 1666 No E33 record WARNING: shot 1688 No E33 record
VCUE08-N42-038	38	1660	1385	NTBP	
VCUE08-N42-039	39	1660	881	Complete	Rejected systems 1,2,3 and 4
VCUE08-N46-040	40	1001	1775	Complete	WARNING: shot 1522 No E33 record
VCUE08-N49-041	41	1651	881	Complete	WARNING: shot 1556 No E33 record WARNING: shot 1096 No E33 record WARNING: shot 1093 No E33 record
VCUE08-N45-042	42	1001	1774	Complete	WARNING: shot 983 No E33 record WARNING: shot 1005 No E33 record WARNING: shot 1130 No E33 record WARNING: shot 1152 No E33 record WARNING: shot 1384 No E33 record Rejected system 3
VCUE08-N48-043	43	1651	881	Complete	WARNING: shot 1574 No E33 record WARNING: shot 1553 No E33 record
VCUE08-N44-044	44	1001	1777	Complete	
VCUE08-N47-045	45	1654	881	Complete	WARNING: shot 1674 No E33 record GPS Gyro compass lost output SP 1379 to 1367. Using back up
VCUE08-N50-046	46	1001	1768	Complete	
VCUE08-N54-047	47	1643	881	Complete	WARNING: shot 1005 No E33 record
VCUE08-N51-048	48	1001	1766	Complete	
VCUE08-N55-049	49	1642	881	Complete	WARNING: shot 1099 No E33 record WARNING: shot 939 No E33 record

VCUE08-N52-050	50	1001	1766	Complete	WARNING: shot 1011 No E33 record WARNING: shot 1245 No E33 record
VCUE08-N56-051	51	1641	881	Complete	WARNING: shot 1285 No E33 record
VCUE08-N53-052	52	1001	1763	Complete	WARNING: shot 1065 No E33 record
VCUE08-E13-053	53	3212	881	Complete	WARNING: shot 2775 No E33 record WARNING: shot 1168 No E33 record WARNING: shot 1078 No E33 record WARNING: shot 1073 No E33 record WARNING: shot 1050 No E33 record
VCUE08-E17-054	54	1001	3333	Complete	WARNING: shot 1460 No E33 record WARNING: shot 1917 No E33 record WARNING: shot 2395 No E33 record
VCUE08-E21-055	55	3211	881	Complete	WARNING: shot 2812 No E33 record WARNING: shot 1171 No E33 record WARNING: shot 968 No E33 record
VCUE08-E16-056	56	1001	3333	Complete	WARNING: shot 1413 No E33 record WARNING: shot 1602 No E33 record WARNING: shot 1694 No E33 record WARNING: shot 1945 No E33 record WARNING: shot 2095 No E33 record WARNING: shot 2233 No E33 record
VCUE08-E30-057	57	2236	881	Complete	WARNING: shot 2244 No E33 record WARNING: shot 1033 No E33 record
VCUE08-E25-058	58	1001	2357	Complete	WARNING: shot 1472 No E33 record WARNING: shot 1501 No E33 record WARNING: shot 1636 No E33 record WARNING: shot 1813 No E33 record WARNING: shot 2159 No E33 record

VCUE08-E29-059	59	2238	881	Complete	WARNING: shot 1888 No E33 record WARNING: shot 1662 No E33 record WARNING: shot 1609 No E33 record WARNING: shot 1331 No E33 record
VCUE08-E24-060	60	1001	2377	Complete	WARNING: shot 1291 No E33 record WARNING: shot 1360 No E33 record DGPS 1 rejected
VCUE08-E28-061	61	2239	881	Complete	WARNING: shot 2191 No E33 record WARNING: shot 1002 No E33 record
VCUE08-E44-062	62	1001	1867	NTBP	
VCUE08-E44-063	63	1001	1867	Complete	Knocked out V1G4 and V1G1 Averaging filter of 45 secs used on compasses
VCUE08-E49-064	64	1589	881	NTBP	
VCUE08-E49-065	65	1589	881	Complete	No E33 records for Sp's 1609,1497,1490 Averaging filter of 45 secs used on compasses S1C2 and S1C20 failed compass bias
VCUE08-E45-066	66	1001	1860	Complete	No E33 records for Sp's 1131,1423,1475,1746 S1C20 failed compass bias
VCUE08-N19-067	67	2813	881	Complete	No E33 records for sp,s 2648,2622,1309,1261,1255
VCUE08-N14-068	68	1001	3188	Complete	S1C20 Rejected d/t bias No E33 Record for Sps 1097,1963
VCUE08-N18-069	69	2864	881	Complete	No E33 records for sp,s 1812,1236 S1C20 failed compass bias
VCUE08-N13-070	70	1001	3238	Complete	No E33 Records for sps 1974,2444,3032,3227
VCUE08-N17-071	71	2916	881	Complete	No E33 Records for sps 2914,2633,1893,1125
VCUE08-N12-072	72	1001	3290	Complete	No E33 records 1231,1403,1474,2182,2529,2820, 3135,3157 S1C2 and S1C20 failed compass bias V1G1,V1G2,V1G3,V1G4, rejected due to high unit variance
VCUE08-N16-073	73	2966	881	Complete	Knocked out V1G2,V1G4,V1G3 d/t light UV No E33 records 1864,1494,1424,1150,923 Adjusted compass filters to 45 gate 75
VCUE08-N11-074	74	1001	3293	Complete	

VCUE08-N15-075	75	3016	881	Complete	No E33 records for sps 22691,2429,2288,1662 S1C2 and S1C20 failed compass bais Knocked out V1G2,V1G4,V1G3 d/t high UV High UV at EOL due to vessel verring offline	
VCUE08-N10-076	76	1001	3291	Complete	No E33 records for sps 2161,3127,3166	
VCUE08-N05-077	77	3167	881	Complete	Knocked out V1G2 Bad geometry from SP 1822-1806 Robtrack drifting off course near Sp 2100 No E33 records for sps 2253,1676,1275	
VCUE08-N09-078	78	1001	3291	Complete	No E33 records for sps 1859,1956,2853 Knocked out V1G2, d/t high UV	
VCUE08-N04-079	79	3166	881	NTBP		
VCUE08-N04-080	80	3166	881	Complete	Global rejected V1G3,V1G2,V1G4 and RGP52 d/t high UV No Raw GPS recorded to P2 sp's 2918-2889 No E33 record for Sps 2462,2150,2048,1799,1675,1411, 1387,1378,975,960	
VCUE08-N08-081	81	1001	3291	Complete	Global rejected V1G3,V1G2,V1G4 . No E33 record for Sps 1311,1461,1896,2209,2708	
VCUE08-N03-082	82	3166	881	Complete	No E33 Records for 2883,2734,1908,1553 S1C20 failed compass bais Knocked out V1G2,V1G4,V1G3 d/t high UV	
VCUE08-N07-083	83	1001	3287	Complete		
VCUE08-N02-084	84	3167	881	Complete	S1C20,S1C8 and S1C2 failed compass bais Knocked out V1G2,V1G4,V1G3 d/t high UV	
VCUE08-N06-085	85	1001	3288	Complete	No E33 Records for 1004,1204,1360,2413,2441 S1C2 failed compass bais	
VCUE08-N01-086	86	3166	881	Complete	S1C20,S1C8 and S1C2 , S1C9 failed compass bais Knocked out V1G2,V1G4,V1G3 d/t drop out causing high UV UV .5 near sp 2851 d/t change in speed causing change in gun seps.	
VCUE08-E18-087	87	1001	1985	Incomplete	Line aborted at Sp LGSP 1985 d/t air leak on array 1 Knocked out V1G2,V1G4 d/t drop out causing high UV	
VCUE08-E18-088	88	1866	1986	3333	Complete	No E33 Records for 1925,1955,2035,2074 S1C2 failed compass bais

VCUE08-E22-089	89	3213	881	Complete	No E33 Records for 2686,2384,2204,1766,1760 Compass bias on S1C2, S1C8 and S1C20
VCUE08-E19-090	90	1001	3333	Complete	Knocked out V1G2, V1G4 d/t to spike Compass bias S1C2, S1C20 No E33 record for Shots 1652,2388,2444,2592,2610,2709, 3005,3311
VCUE08-E23-091	91	3211	881	Complete	No E33 records for Sps 1906,1868,1358 S1C20 failed compass bias
VCUE08-E27-092	92	1001	2359	Complete	No E33 Records for Sps 1416,2080,2242 Compass bias S1C20
VCUE08-E32-093	93	2235	881	Complete	Global rejected V1R1-G1R1 Increased Sd on V1R2-G1R2 to 3 Global rejected V1G1 d/t spike in UV
VCUE08-E37-094	94	1001	2094	Complete	Global rejected V1R1-G1R5 due to lack of satellites Increased SD on V1R2-G1R6 to 3 No E33 records for Sps 1447,1799,2002 S1C20 Failed compass Bias
VCUE08-E41-095	95	1852	881	Complete	No E33 records for Sps 1485,1163 S1C2, S1C20 failed compass bias
VCUE08-E35-096	96	1001	2149		No E33 records for Sps 1368,1991 S1C2, S1C20 failed compass bias V1R2 G1R6 and V1R2 G1R6B rejected d/t high UV
VCUE08-E39-097	97	1897	881	Complete	No E33 records for Sps 1507 S1C20 failed compass bias V1R2 G1R6 and V1R2 G1R6B rejected d/t high UV V1G2-V1G3-V1G4 Global rejected d/t UF Spikes V1R1- G1R5 SD increased to 3m
VCUE08-E42-098	98	1001	1939	Complete	No E33 records for Sps 1305,1558 S1C20 failed compass bias V1R2-G1R6 -Global rejected d/t UF V1R1- G1R1,V1R1-G1R5,V1R2- G1R2 SD increased to 3m d/t High UV
VCUE08-E46-099	99	1702	881	Complete	G1R5, G1R6 range StdDev to 3 from 2 S1C20 failed compass bias
VCUE08-E50-100	100	1001	1706	Complete	No E33 records for Sps 1005,1058,1122 S1C2, S1C20 failed compass bias G1R5, G1R6 range StdDev to 3 from 2 Knocked out V1G2,V1G3, V1G4 d/t drop outs early in line

VCUE08-E53-101	101	1476	881	Complete	No E33 records for Sps 1192 S1C20 rejected G1R5, G1R6 range StdDev to 3 from 2
VCUE08-E48-102	102	1001	1747	Complete	No E33 records for Sps 1418,1617 S1C2 failed compass bias S1C20 rejected G1R5, G1R6 range StdDev to 3 from 2
VCUE08-E52-103	103	1512	881	Complete	No E33 records for Sps 1507,1387,997 S1C2, S1C9 failed compass bias S1C20 rejected Knocked out V1G2,V1G3, V1G4 d/t dropout in middle of the line G1R5, G1R6 range StdDev to 3 from 2
VCUE08-E47-104	104	1001	1789	Complete	No E33 records for Sps 1596,1638,1699,1774 S1C2 failed compass bias S1C20 rejected G1R5, G1R6 range StdDev to 3 from 2
VCUE08-E51-105	105	1550	881	Complete	No E33 records for Sps 1489,1371,1356 S1C2,S1C9 failed compass bias S1C20 rejected G1R3, G1R4 range StdDev to 3 from 2
VCUE08-E43-106	106	1001	1901	Complete	No E33 records for Sps 1546,1732 S1C2, failed compass bias S1C20 rejected G1R5, G1R6 range StdDev to 3 from 2 UV high d/t bad gps spikes high HDOP
VCUE08-E40-107	107	1866	881	Complete	No E33 records for Sp 1501 S1C9 failed compass bias S1C20 rejected
VCUE08-E34-108	108	1001	2191	Complete	No E33 records for Sp 1971 S1C2, S1C20 failed compass bias V1G2,V1G3, V1G4 d/t dropouts during line G1R5, G1R6 range StdDev to 2.5 from 2
VCUE08-E38-109	109	1942	881	Complete	S1C2 and S1C20 failed compass Bias G1R5, G1R6 range StdDev to 2.5 from 2
VCUE08-E33-110	110	1001	2357	Complete	S1C2 and S1C20 failed compass Bias No E33 Record for Sp 1171,2218
VCUE08-E36-111	111	2011	881	Complete	S1C8 and S1C20 failed compass Bias No E33 Record for Sp 2026 Rejected V1G1 d/t splike from XP drop out

VCUE08-E31-112	112	1001	2358	Complete	No E33 Record for Sp's 1284, 1780 S1C2 and S1C20 failed compass Bias
VCUE08-E26-113	113	2234	881	Complete	No E33 Record for Sp's 1312, 1152, 974, 952 S1C9, S1C8, S1C2 failed compass Bias Rejected V1G2 and V4G4 d/t spike from SPM2 drop out G1R5, G1R6 range StdDev to 3 from 2 d/t jump in range at Sp1292
VCUE08-E20-114	114	1001	3333	Complete	No E33 records for Sps 1025, 1698, 2139 and 2832 Compass bias on S1C20
VCUE08-E54-115	115	1001	2136	Complete	*****DogLeg @ shot point 1255 ***** No E33 Record for Sp's 1063, 1399 S1C2 and S1C20 failed compass Bias Line shot incrementing instead of decrementing

Appendix 3 Calibrations and tests

Summary of Results for the Singapore Calibration Feb 2008-03-08

INTRODUCTION

Subsea 7 (Singapore) Pte Ltd was appointed by CGG Veritas to carry out the following services for their vessel, MV Pacific Titan at Loyang Jetty, Singapore on 6 & 11 February, 2008:

- Gyro Calibration
- DGPS System's Verification
- Tail Buoy System's Verification

The results are summarized as follow:

a) Gyro Calibration – 6 February 2008

Heading @ 134 deg		
System	C-O	Std Dev
Gyro AD 100	0.27 deg	0.05
Gyro HS 50	1.40 deg	0.35

b) DGPS System's verification – 6 February 2008

Easting			Northing	
System	C-O	Std Dev	C-O	Std Dev
SPM1 XP	-0.57	0.05	-0.16	0.05
SPM2 HP	1.29	0.11	-0.14	0.05

c) DGPS' System's verification (re-carried out) – 11 Feb 2008

Easting			Northing	
System	C-O	Std Dev	C-O	Std Dev
DG V XP EXP	-0.48	0.03	0.26	0.04
SPM1 XP	-0.31	0.02	-0.06	0.01
SPM1 HP	0.47	0.05	-0.30	0.05
SPM2 XP	-0.50	0.05	0.28	0.05
SPM2 HP	1.26	0.09	-0.23	0.06

d) Tailbuoy System's verification – 6 Feb 2008

Easting			Northing	
TB SERIAL #	C-O	Std Dev	C-O	Std Dev
1314	-0.70	0.73	-2.70	0.65
1411	-2.72	2.10	-0.27	1.34
2320	-1.67	1.13	-0.67	0.93
0869	-1.04	1.20	-0.17	0.93
1511	-1.23	1.49	-1.04	1.53
1320	-2.61	1.12	1.22	1.08

PROJECT DETAILS Client: CGG Veritas – Asia Pacific
9 Serangoon North Ave. 5
CGGVeritas Hub
Singapore 554531
Tel: +65 6723 5630
Fax: +65 6723 5552
Cell: +65 9186 3619

Contractor : Subsea 7 (Singapore) Pte Ltd
No 39 Tampines Street 92,
#02-00 2E Capital Building
Singapore 528883
Tel (Direct): +(65)-6785 4396 (Ext. 101) Tel (Mobile): +(65)-9146
1432 and
+(60) 12 7238452 Fax: +(65)-6260 4465

Project :
Gyro Calibration
DGPS System's Verification
Tail Buoy System's Verification
Vessel : MV Pacific Titan
Location : Laying Jetty, Singapore
Equipment : Nikon DTM-552 Total station
Personnel : Rolando Paguio (Surveyor)
Rostam Rosli
Date : 6 & 11 February 2008

3. SURVEY PROCEDURES

Survey origin at Loyang Jetty, Singapore

Three geodetic control stations were established on 21 December 2006 by Subsea7 (Singapore) Pte Ltd for the purpose of carrying out survey works for the vessel berthed at Loyang Jetty, Singapore .

The stations are:

Station	Easting	Northing	EL	Description
S1	385 112.540	152 940.435	4.694	nail
S2	385 104.607	152 963.277	4.714	nail
S3	385 082.549	153 024.532	4.676	nail

These stations were identified on the ground and their relative bearings and distances were checked prior to usage.

Current Survey

For this calibration, temporary stations TS1 and TS2 were established. TS1 was used as instrument station for carrying out DGPS/Tail Buoy system's verification while TS2 was used as instrument station for Gyro calibration on 6th Feb 2008.

Coordinates of stations TS1 and TS2 are as follow:

Station	Easting	Northing
TS1	385 108.610	152 951.442
TS2	385 105.024	152 959.150

Calibration Preliminaries

Prior to the calibration, the following were carried out:

- All mooring lines were tightened
- There was no heavy loading on the vessel
- The surveyor's time piece was synchronized with the vessel computer time
- All C-O were removed from the vessel's computers (i.e. logged raw data only)
- Advised the navigators to log onto the correct differential stations
- Advised the navigators to monitor the vessel's data when calibration is on-going

3.1 PRISM INSTALLATION

On 6th February 2008, the vessel's heading was 250°. At this direction, Gyro calibration, DGPS/Tail Buoy system's verification were carried out.

For gyro calibration, the bow and stern reflector was set up at the foremost part of the bow and stern of the vessel. Reflectors were also set up at SPM1 XP and SPM2 HP antennas for DGPS system's verification.

3.2 CALIBRATION/VERIFICATION PROCEDURES

Gyro Calibration

For Gyro calibration at 250° heading, total station was set up at temporary station TS2, and S3 was used as reference station. Grid bearings and horizontal distances were observed to the reflectors set up at the bow and stern of the vessel.

Simultaneously, a 3-second interval readings were being logged from the vessel's gyro while observations from total station were being carried out.

DGPS System's Verification

The total station was set up at temporary station TS1, and S3 was used as reference station. Grid bearings and horizontal distances were observed to the prism set up at SPM1 XP and SPM2 HP antennas.

3-second interval readings were then logged from the vessel while observations from total station were being carried out.

On 11th of February 2008, DGPS systems verifications were re-carried out. Same procedure was applied, but observations were done at different instrument station and reference bearing such as S2 and S3. Positions from XP EXP, SPM1 XP, SPM1 HP, SPM2 XP and SPM2 HP were simultaneously logged from the vessel while reflectors set up at DGPS antennas were being observed.

Tailbuoy System's Verification

Tail Buoy system's verification was carried out simultaneously with the DGPS verification. A known position was established using total station and from this position, 6 x rDGPS pods were set up and ranges and bearings relative to SPM1 XP antenna were logged at 3-second interval.

4. GEODETIC PARAMETERS

The survey work was computed based on the following geodetic and projection system.

Geodetic Reference System

Datum	WGS 84
Spheroid	WGS 84
Semi-major axis	6 378 137.0000 metres
Semi-minor axis	6 356 752.3142 metres
Inverse flattening	298.257 223 563 metres
Eccentricity	0.006 694 380

Projection Parameters

Grid	Universal Transverse Mercator (UTM)
Projection type	Transverse Mercator
Central Meridian	105° E
Latitude of origin	0° (Equator)
False Easting	500 000 metres
False Northing	0 metres
Scale factor on CM	0.9996

5. RESULTS

Gyro Calibration

The grid bearings derived from the observation of bow and stern reflectors were converted to true bearings. These were then compared with the ship's print out for AD 100 and HS 50 gyros to obtain the C-O corrections for 250° heading of the vessel.

The convergence at Station TS2 and S3 was computed to be minus 0.03 deg.

True Bearing = Grid Bearing Minus 0.03 °

All observed distances were converted to grid distances. The scale factor used was 0.9998798.

DGPS System's Verification

The observed grid bearings and distances from the reflectors set up at DGPS antennas were converted to easting and northing. These computed coordinates were then compared to the vessel's XP EXP, SPM1 XP, SPM1 HP, SPM2 XP and SPM2 HP easting and northing print outs to derive the C-O corrections.

Tailbuoy System's Verification

The observed ranges and bearings relative to SPM1 XP antenna were converted to easting and northing. The mean coordinates of each rDGPS pod were then compared to known established position to derive the C-O corrections for easting and northing.

Calibration undertaken in Balikpapan, Indonesia

FUGRO SURVEY AS

Report on Gyro Calibration, Tailbuoys and DGPS Verification on M.V. Pacific Titan
At Semayang Wharf, Balikpapan, Indonesia



1. ABSTRACT

Fugro Survey Pte Ltd through its subsidiary in Indonesia, PT Fugro Indonesia was contracted by Fugro Survey AS to carry out the following services for their survey vessel MV Pacific Titan at Semayang Wharf, Balikpapan, Indonesia on 07 up to 08th August 2007.

- DGPS System Verification
- Gyro Calibration
- Tail Buoys Verification

All co-ordinates quoted within this report are in metres and referred to WGS 1984 Spheroid and Datum

1.1 Summary of Results

The results are summarized and tabulated as follows:

a) DGPS System Verification

System	Easting (m)		Northing (m)	
	C - O	Std Dev.	C - O	Std Dev.
Port GPS Antenna	-1.4	0.4	1.6	0.2
Stbd GPS Antenna (Primary)	-1.4	0.4	1.6	0.1

b) Gyro Calibration

Cal. #	Heading	Gyro 1 HS 50		Gyro 2 AD 100	
		C - O	Std Dev.	C - O	Std Dev.
August 7	15.3	1.1	0.8	2.2	0.2
August 8	191.9	1.6	0.8	2.2	0.6
Mean		1.35	0.8	2.2	0.4

c) Tail Buoys System Verification

System	Degrees °		Distance (m)	
	Mean	Std Dev.	Mean	Std Dev.
Pod1260	3.19	1.76	-0.55	2.10
Pod1314	1.49	1.08	2.05	1.05
Pod1411	1.45	4.32	-1.96	0.98
Pod1503	-3.68	3.34	0.73	1.22
Pod1511	-0.56	4.07	1.91	2.85
Pod1518	0.82	0.33	0.32	0.38
Pod1575	1.33	1.69	1.14	0.71
Pod2041	-0.11	2.28	2.00	1.89



2. PROJECT DETAILS

Client : Fugro Survey AS
Contractor : FUGRO SURVEY Pte. Ltd.
Project : Gyro Calibration, DGPS System and Tail Buoys Verification
Vessel/ Barge : MV Pacific Titan
Location : Semayang Wharf, Balikpapan, Indonesia
Equipment : Total Station – Sokkia SET4B
Personnel : Anto Sinaga (Surveyor)
Bambang Setiawan (Surveyor)
Date : 07th – 08th August 2007

3. SURVEY PROCEDURES

3.1 Survey Stations

There are 2 reference survey station (2 numbers with WGS 1984 coordinates system) at Semayang Wharf Balikpapan, Indonesia. They are FUGRO 3 and FUGRO 4 ([Refer to Appendix A](#)). This point must be transferred due to far away from vessel. We make 2 help point near the vessel (P2 and P4) so that we could be shot prism on the vessel easily. P4 was used as instrument set-up location and P2 as the backsight (prism target). Details position of reference point and help point above as follows:

No.	Point_Name	Coordinates			
		Geodetic Coordinates		Grid Coordinates	
		Latitude	Longitude	Easting (m)	Northing (m)
1	FUGRO 3	01°16'14.2952 S	116°48'24.2996 E	478501.312	9859555.337
2	FUGRO 4	01°16'13.6253 S	116°48'24.9706 E	478522.046	9859575.907
3	P2	01°16'21.3263 S	116°48'19.9359 E	478366.480	9859339.450
4	P4	01°16'23.5496 S	116°48'19.7757 E	478361.536	9859271.189

3.2 Position of Target Prism

On board the barge, four prisms were installed with masking tape, one at port GPS Antenna, one at starboard GPS Antenna (DGPS system and tailbuoys verification), and two at along starboard side of the vessel (Gyro calibration). The starboard GPS antenna was used as primary GPS antenna.

3.3 Calibration Procedures

The DGPS verification checks and gyro calibrations were conducted in difference time. The Total Station was set up at P4 and referenced to P2 as backsight ([Refer to Appendix C](#)). Range and bearing measurements were observed to the prisms installed on board the barge, same survey procedure was used for both gyro calibration and DGPS verification checks. At the same times, DGPS antenna positions and the gyro readings were logged by vessel chief navigator.



4. GEODETIC PARAMETERS

The survey work was defined and computed in the following Geodetic and Projection system:

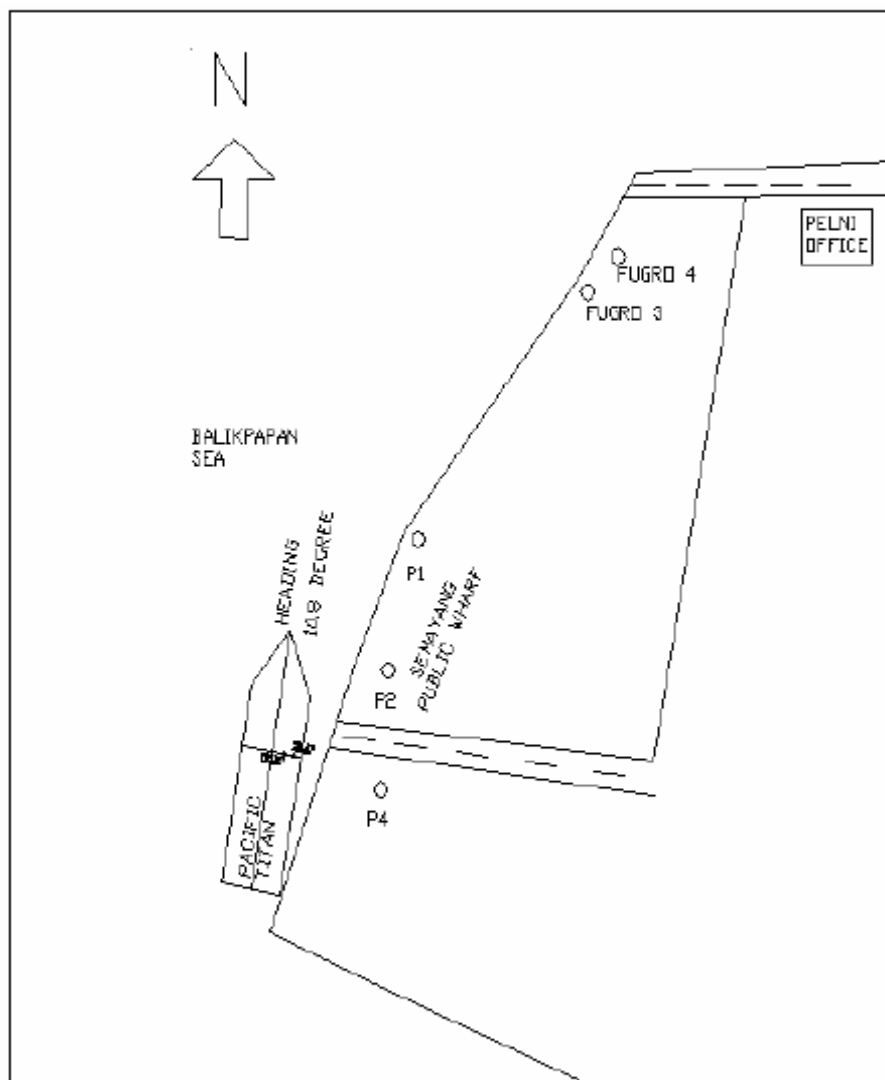
Global Positioning System Geodetic Parameters	
Spheroid:	World Geodetic System 1984
Datum:	World Geodetic System 1984
Semi major axis:	a = 6 378 137.000 m
Inverse Flattening:	$1/f = 298.257\ 223\ 563$
Project Projection Parameters	
Grid Projection:	Universal Transverse Mercator
UTM Zone:	50 S
Central Meridian:	117° 00' 00" E
Latitude of Origin:	0° 00' 00" N
False Easting:	500 000 m
False Northing:	0 m
Scale factor on Central Meridian:	0.9996
Units:	metre

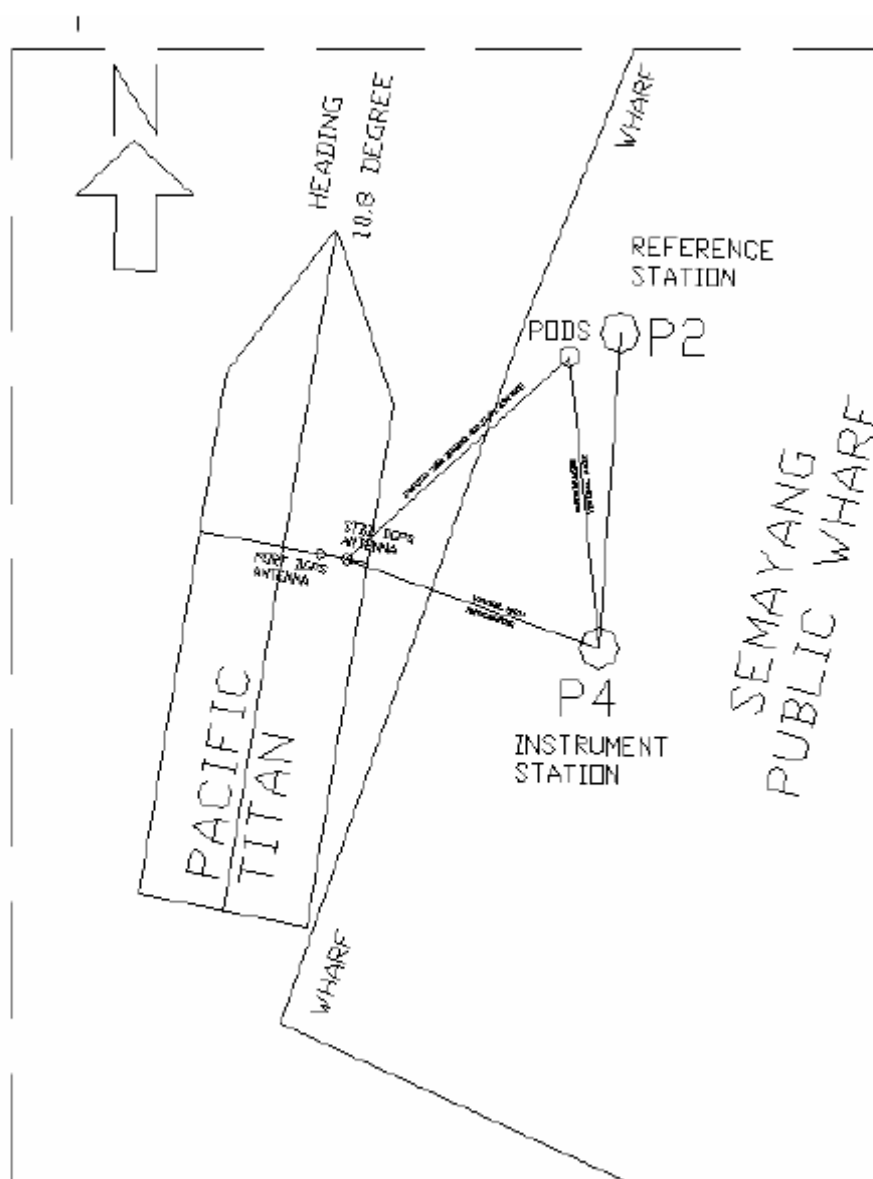
FUGRO SURVEY AS

Report on Gyro Calibration, Tailsbuys and DGPS Verification on M.V. Pacific Titan
At Semayang Wharf, Balikpapan, Indonesia



C FIELD DIAGRAM





Appendix 4 Hydrographical Data Graph

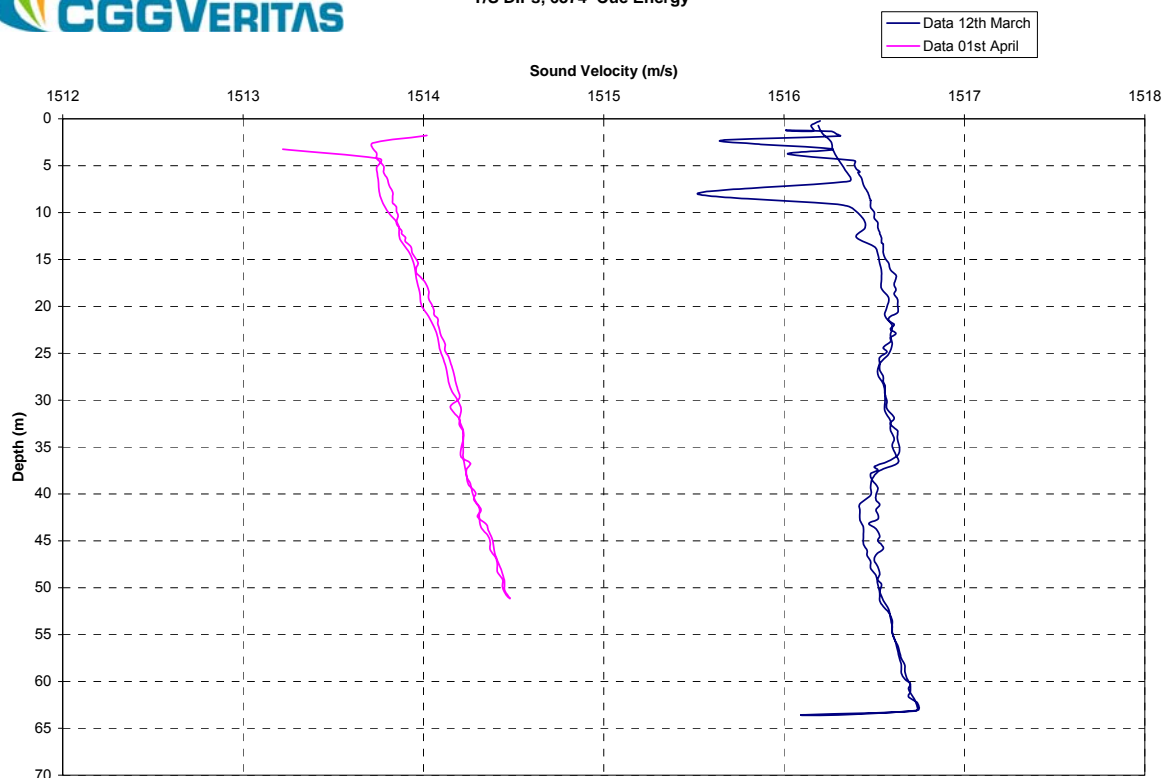
Conductivity, pressure and temperature profiles are gathered using a (TS) Dips. Data and location information are included in the Supporting Documents section of the CDROM.

Data from the Temperature and Salinity (TS) Dips are used to verify the water speed, which is continuously measured while recording data. Two TS Dip measurements were taken during the survey.

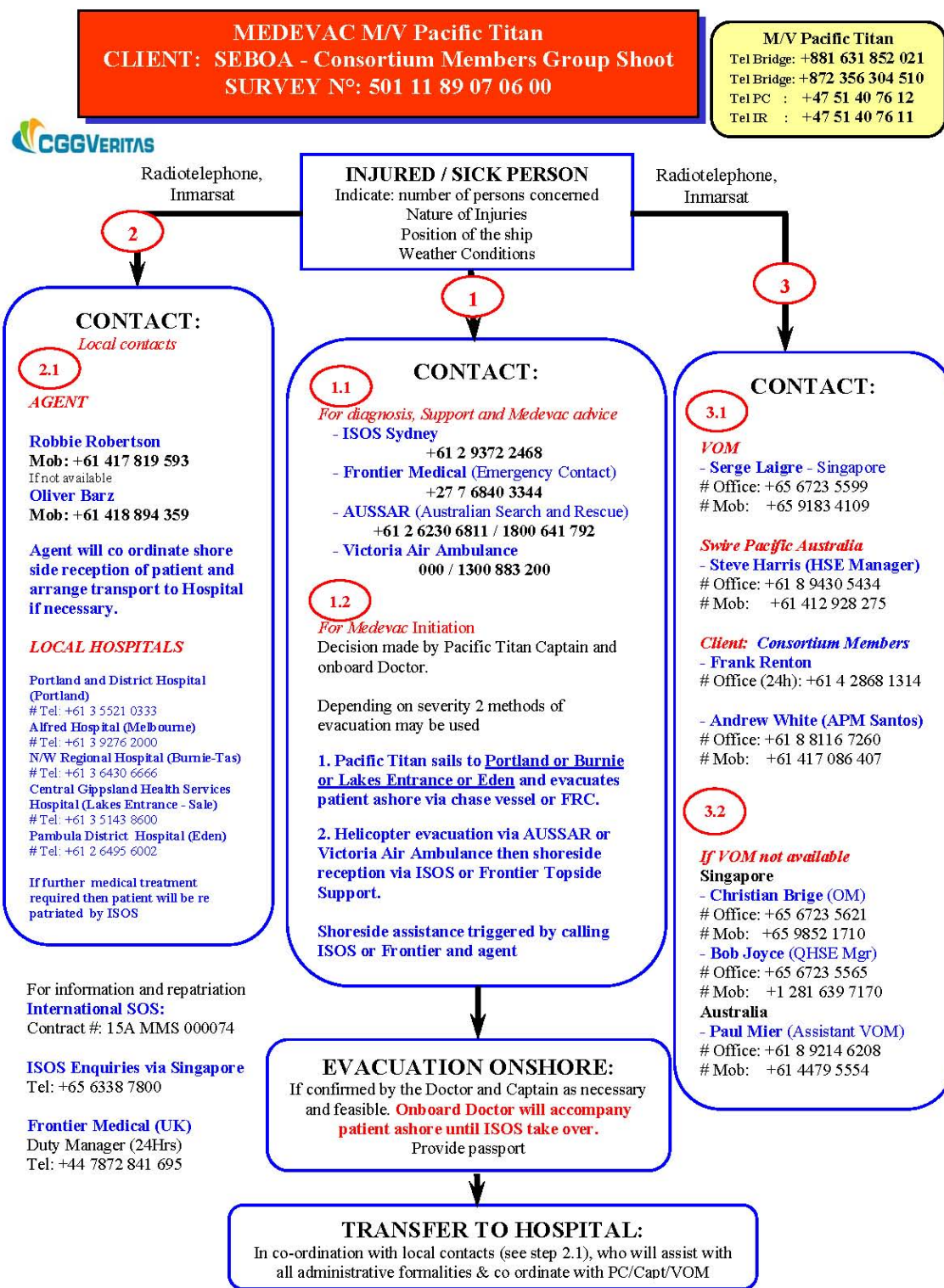
Position		Position	
Lat	040° 01' 01" S	Lat	040° 18' 39" S
Long	145° 21' 21" E	Long	146° 05' 01" E
Date:		Date:	
12th March 2008		01st April 2008	
Time:		Time:	
20:15 GMT		09:27 GMT	
07:15 Local Time		20:17 Local Time	
1516.50 Mean Velocity on deploy		1514.19 Mean Velocity on deploy	
1516.51 Mean Velocity on recovery		1514.03 Mean Velocity on recovery	
1516.51 <u>Mean Velocity</u>		1514.11 <u>Mean Velocity</u>	



T/S DIPS, 6374 Cue Energy



Appendix 5 Medevac Plan



M/V Pacific Titan
 Created by: S. Laigre 22nd March 2008 V1.3

Medevac SEBOA-Group Shoot Australia

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Onshore									
Police		Police Emergency Police Non urgent		Phone: 0 Phone: 131 444					
Ambulance		Ambulance Emergency Air Ambulance (Victoria)		Phone: 0 Phone: +61 3 9945 9911					
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