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Woodside Energy Ltd  
Job No : 1999-35D-EH  
Investigator 2D  
Victoria, Australia  
Single Cable / Single Source

# **WESTERN PRIDE Party 140**

## **2D PARAMETER REPORT**



Western Geophysical



<b>CLIENT</b>	<b>: Woodside Energy Ltd</b>
<b>SURVEY</b>	<b>: Investigator 2D</b>
<b>AREA</b>	<b>: Bass Straits, Victoria, Australia</b>
<b>JOB #</b>	<b>: 1999-035D-EH</b>
<b>DATE</b>	<b>: 4th April - 5th April 2000</b>
<b>SEQUENCES</b>	<b>: 148-152 : Single Cable Configuration</b>

# GENERAL SURVEY PARAMETERS



**Woodside Energy Ltd.**  
**Investigator 2D**  
**Bass Straits, Victoria, Australia**  
**1999-35D-EH**

**Recording System:**  
(MSX/CRS)

L.C. Filter 2 Hz @ 12 dB/Oct  
H:C. Filter 206 Hz @ 264 dB/Oct.  
Record Length 6144 ms  
Sample Rate 2 ms

**Seismic Cable:**  
(TMS Solid Streamer)

Number of cables 1  
Number of channels 368  
Cable length 4600 m  
Group Interval 12.5 m (centre to centre)  
Depth 6 m (+/- 1 m)

**Sources:**

Number of sources 1 Array  
Source type Tuned Air Gun Array  
Volume 2250 cu.in.  
Pressure 2000 p.s.l. (+/- 150 p.s.l.)  
Depth 5 m (+/- 0.5 m)  
Shot Point Interval 25 m

**Configuration:**

Inline Source to Near Group 195 m

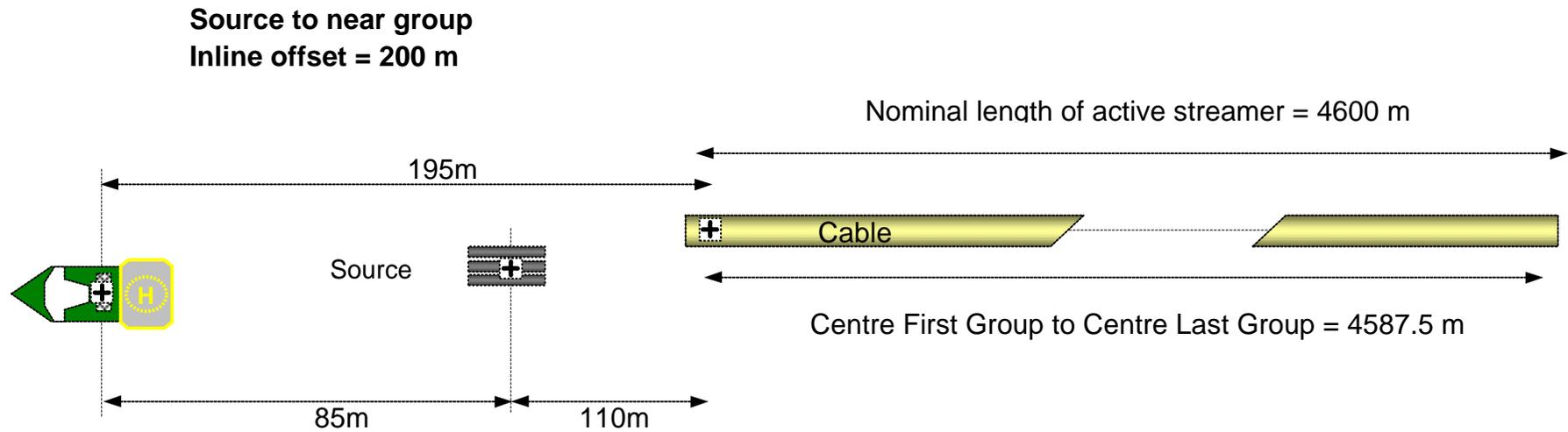
**Vessel Positioning:**

System #1 Racal Multifix Differential GPS  
System #2 Fugro MRdGPS Differential GPS  
QC System QPS Muliref Differential GPS

**Onboard Processing:**

Seismic Processing Omega (Ver 1.8.0)  
Navigation Processing Unavchk (Ver 1.9.6)

# NOMINAL CONFIGURATION



- +** Reference Point  
**NRP** Primary GPS vessel antenna at M.S.L.  
**CRP** Centre of near group  
**COS** Centre of Source

# NOMINAL CMP COVERAGE

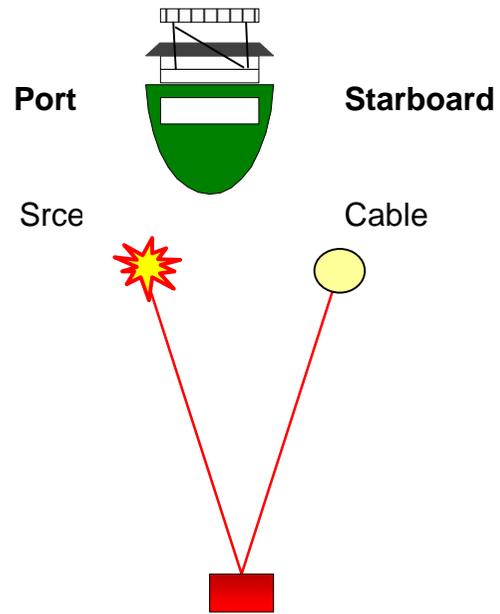


Diagram shows vessel from astern (pointing in to page)

-  Acquired CMP line
-  Source
-  Streamer
-  Raypath from source

Shotpoint Interval = 25 m

# GEODETIC PARAMETERS



## Geodetic Parameters

**Local Datum** AGD84  
Spheroid Australian National Spheroid  
Semi-major axis 6378160.000  
1/flattening 298.25

**Satellite Datum** WGS 84  
Spheroid WGS 84  
Semi-major axis 6378137.000  
1/flattening 298.257224

## **Datum Shift**

Shift Parameters From WGS 84 to Local Datum

Dx = +116.0      Rx = -0.23      arc sec\*  
Dy = +50.47      Ry = -0.39      arc sec\*  
Dz = -141.69      Rz = -0.344      arc sec\*

Scale factor= -0.0983 ppm      \*as entered in Spectra

## Binning Parameters

### **Binning Systems**

Online real-time binning

Spectra

Ver 7.6.5

### **Mapping Projection**

Origin of Latitude 000° 00' 00.00" N  
Origin of Longitude 141° 00' 00.00" E  
False Northing 10,000,000.0 m  
False Easting 500,000.0 m  
Central Meridian 141° 00' 00.00" E  
Scale factor at CM 0.9996  
Grid Units Metres

### **Vertical Datum**

Mean Sea level

# RECORDING SYSTEM PARAMETERS



Recording System  
System Version

**I/O Systems MSX**  
Version 2.0

Tape Interface System  
System Version

**Western Geophysicals CRS (Continuous Recording System)**  
3.0.2

MSX Record length  
CRS Record length  
Sample rate  
Time break  
Low Cut Filter  
High Cut Filter  
Multishot Acquisition

6.0 Binary Seconds (6144 ms)  
6.0 Binary Seconds (6144 ms)  
2 ms  
Co-incident with digital start  
2 Hz @ 12 dB/Oct.  
206 Hz @ 264 dB/Oct.  
Not used

Recorded data format  
Trace polarity  
Recording media type

8058 SEG D - DMX  
positive pressure = negative number on tape = negative pulse on plot  
3M 3590 cartridge tapes

Number of Channels  
Channel set 1 (368 channels)  
Channel set 2 (4 channels)  
Channel set 4 (1 channel)  
Channel set 5 (1 channel)  
Channel set 6-9 (1 channel each)  
Channel set 10-17 (1 channel each)  
Channel set 18 (1 channel)  
Channel set 19 (64 channels at 512 ms)

368 seismic + 16 auxiliaries  
Seismic data  
Waterbreaks  
Recording System Start  
Combined Timebreak  
Array Timebreak  
Spare  
Sample Count  
Gun signature

Real Time Data QC  
Camera Recorder

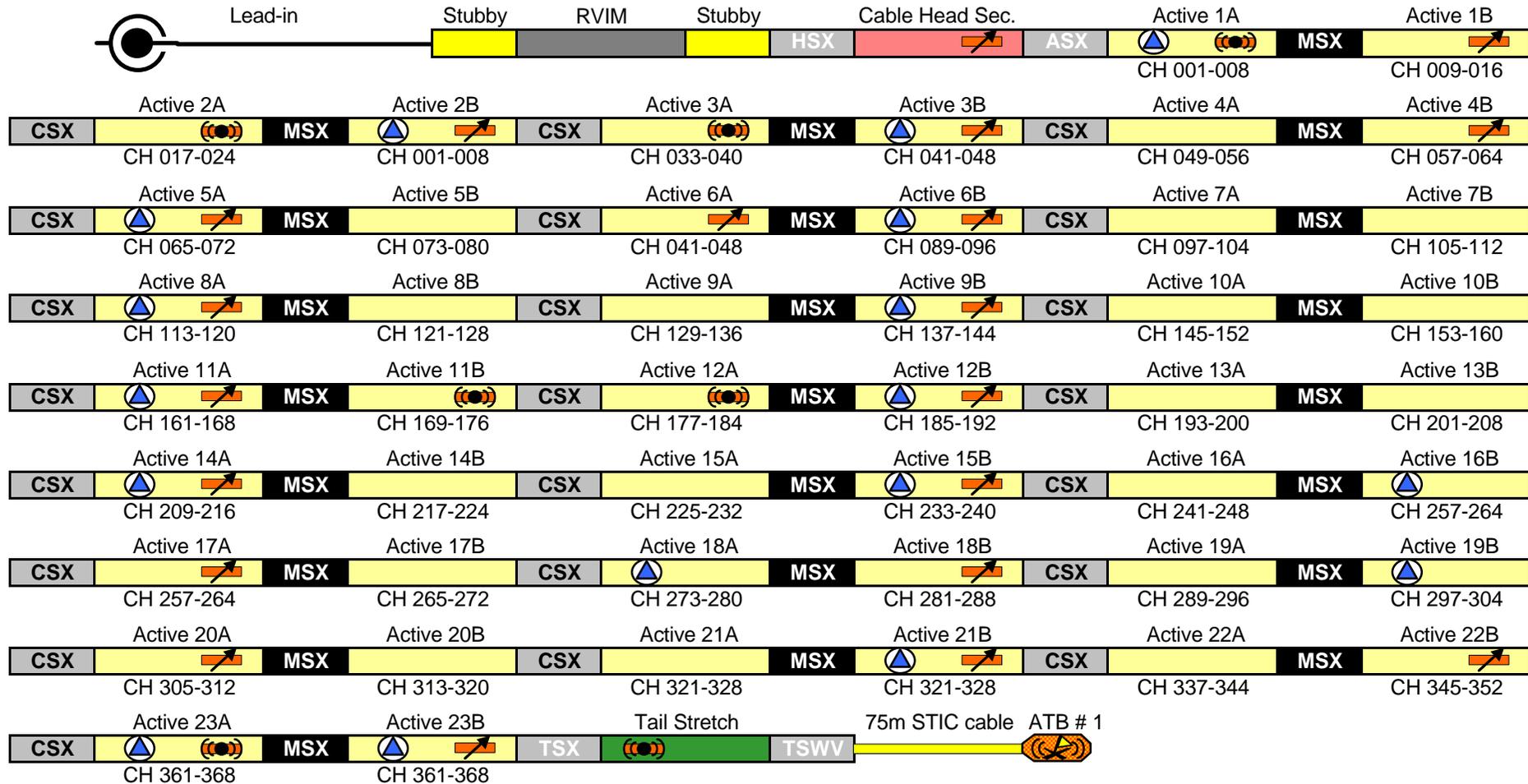
SeisView  
Enhanced Visualisation Processor (EVP)

# STREAMER PARAMETERS



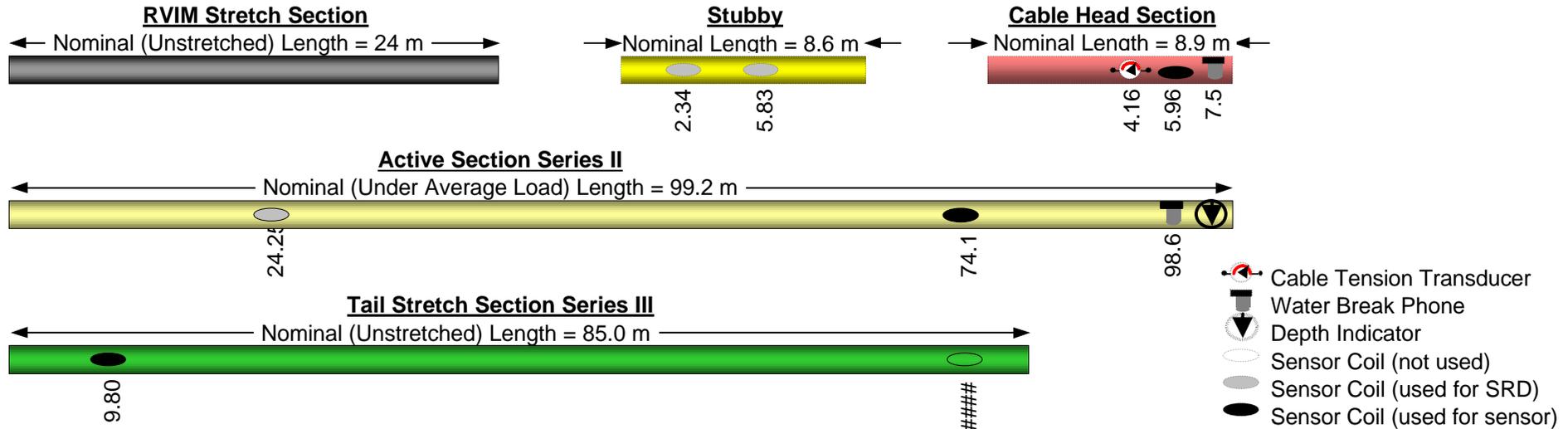
Streamer Type	<b>Thompson Marconi Sonar Solid Streamer</b>	
Number of Streamers	1	
Group Length	17.55 m	
Nominal Group Interval	12.5 m (12.45 m in Spectra / P294 for stretch calculation)	
Streamer Length	4600 m	
Streamer Depth	6.0 m +/- 1.0 m	
Number of Groups	368	
Number of Groups per Module	16 (group interval 12.5 m)	
Number of Groups per Section	8 (group interval 12.5 m)	
Streamer Sensitivity	14 V/Bar	
Hydrophone type	Piezo-electric Ceramic	
Number of Hydrophones per Group	14 (group interval 12.5 m)	
Trace numbering in SEG-D data	Near Group each cable =1	Far Group each cable = 368
Trace numbering in P1/90 data	Near Group Cable #1 = 1	Far Group Cable #1 = 368
Compasses/Levellers	Input/Output Pro2000 Combined Compass/Birds	
Streamer Positioning	Input/Output Pro2000 Acoustics, Input/Output Pro2000 Compasses POSNET remote rGPS targets on each tailbuoy	

# CABLE LAYOUT

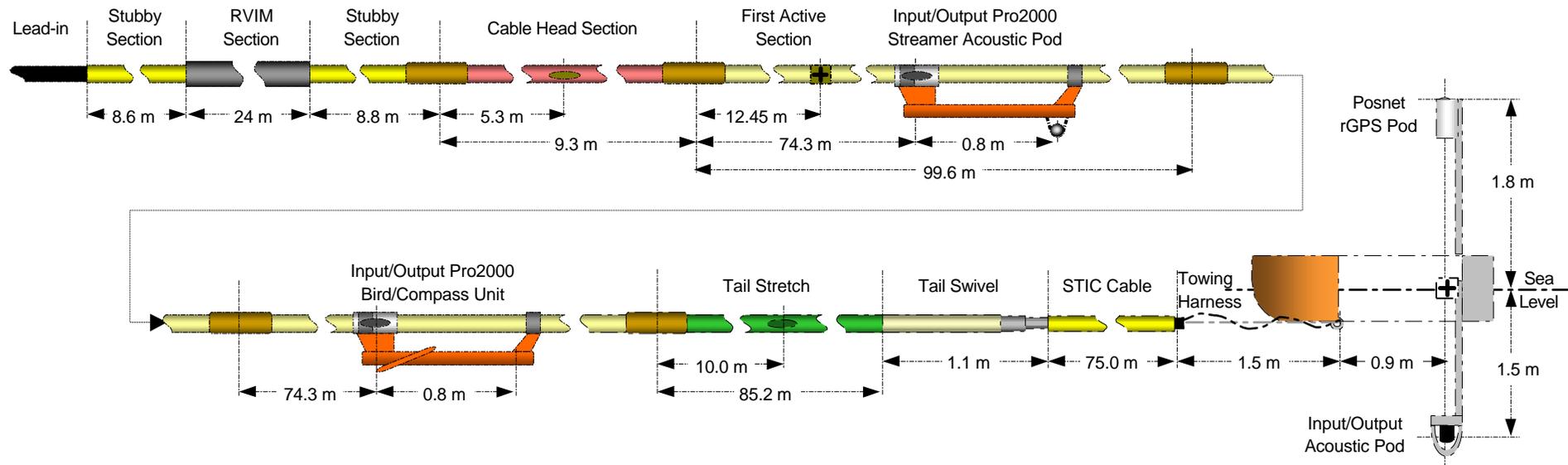


- |                    |                      |                            |                           |
|--------------------|----------------------|----------------------------|---------------------------|
| Stretch Section    | Streamer Module      | Auxilliary Streamer Module | Compass/ Bird             |
| Cable Head Section | Connector Module     | Tail Streamer Module       | Acoustic Pod              |
| Active Section     | Head Streamer Module | Tail Swivel                | rGPS/Acoustic Tailbuoy    |
|                    |                      |                            | Streamer Retrieval Device |

# CABLE COMPONENT NOMINAL OFFSETS



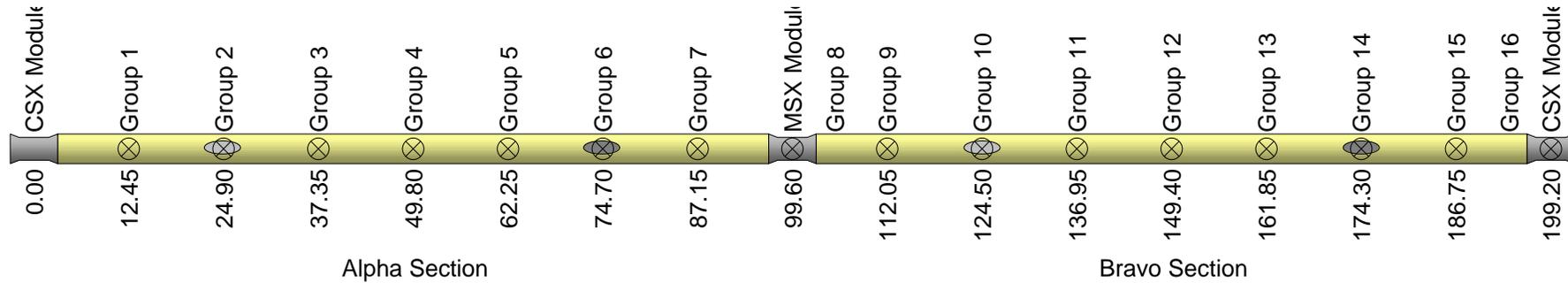
**NB** Modules are approximately 0.4 m long and are not included in the measurements given above



# GROUP AND HYDROPHONE LOCATIONS

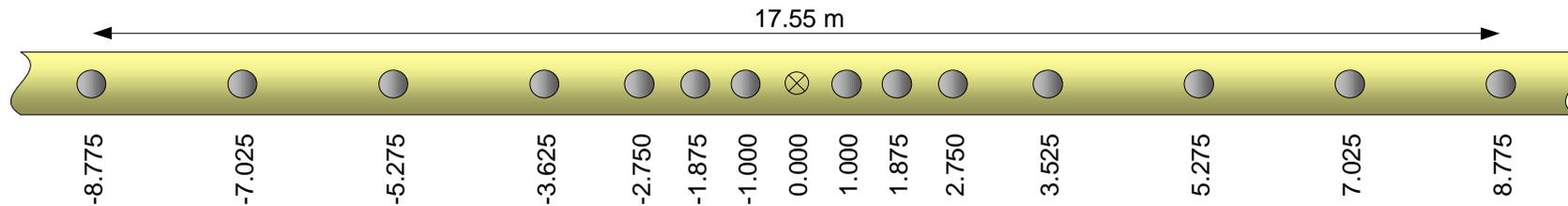


## Active Section Assembly And Receiver Group Locations



- Sensor Coil (not used)
- ◐ Sensor Coil (used for SRD)
- Sensor Coil (used for sensor)
- ⊗ Location of group centre

## Receiver Group Hydrophone Locations



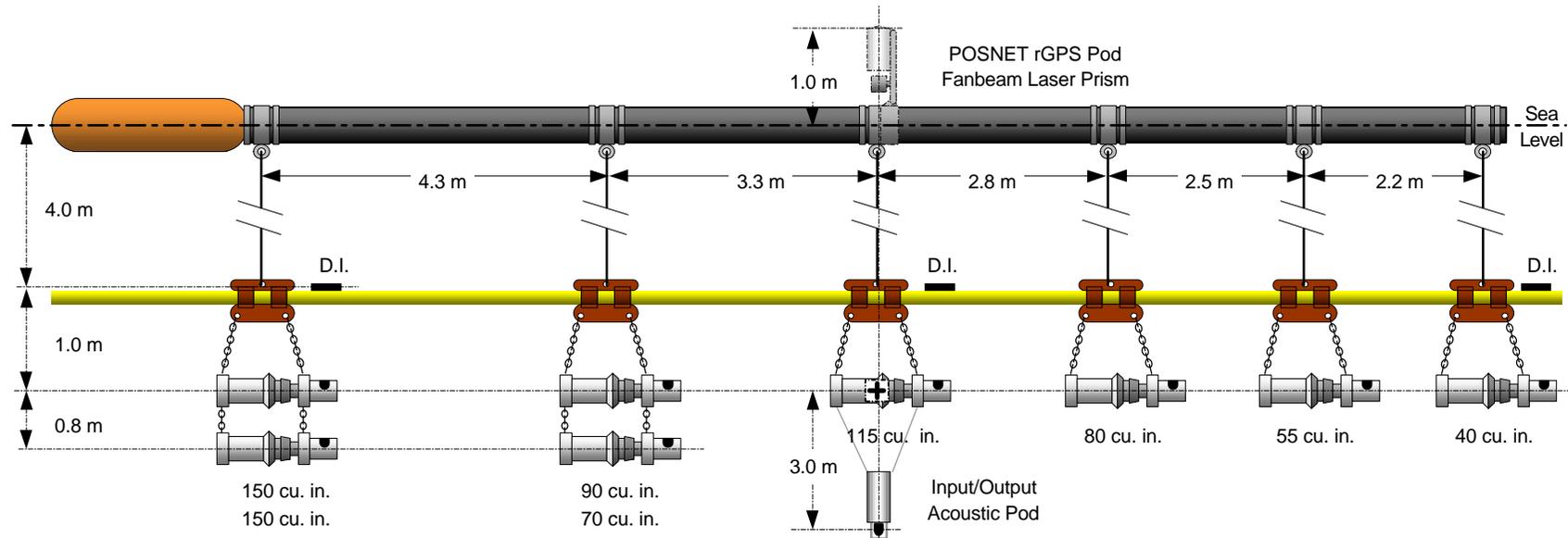
- ⊗ Location of group centre
- Hydrophone

# ENERGY SOURCE PARAMETERS

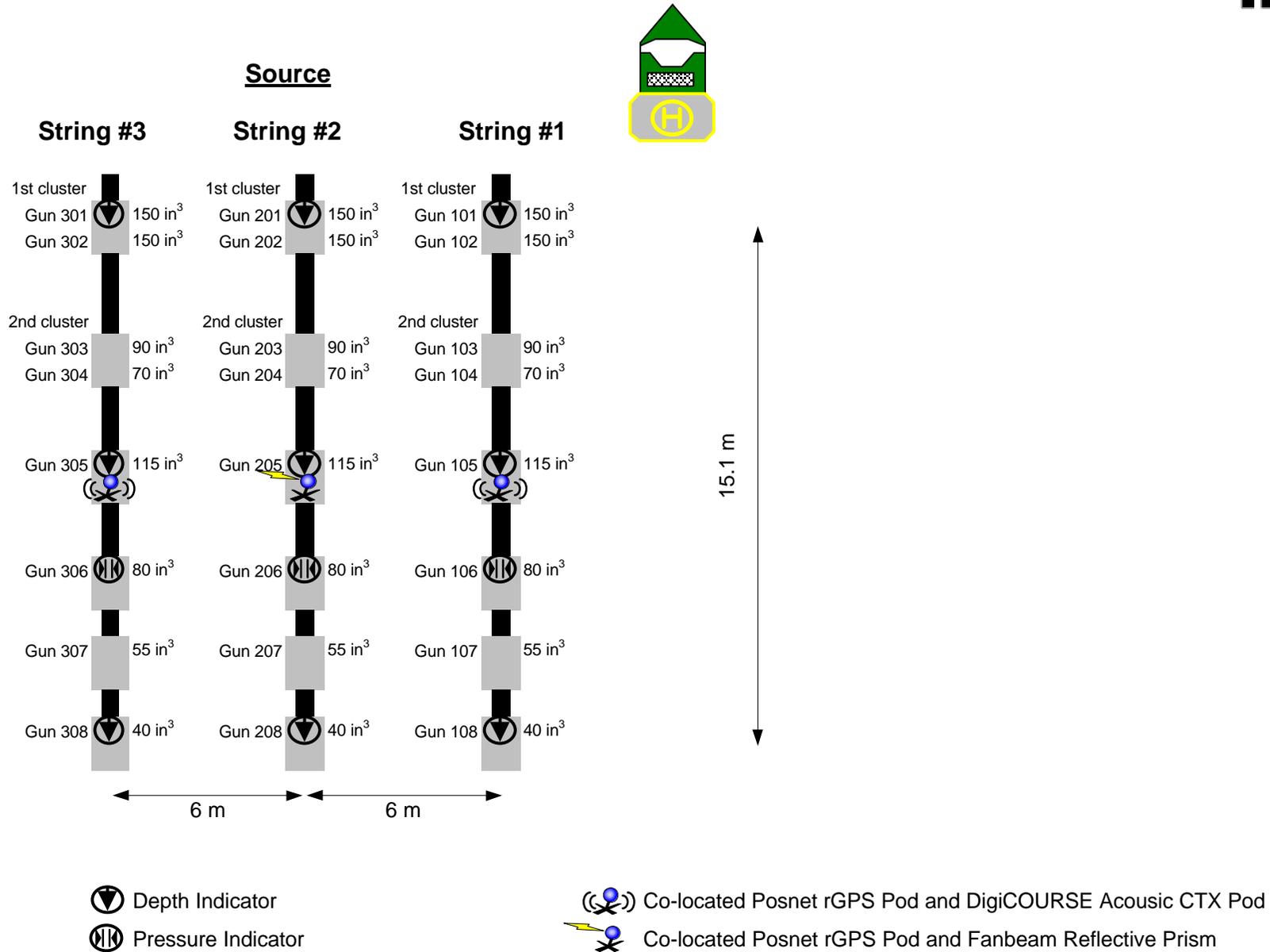


Energy Source Type	Tuned Air Gun Array	Gun depth	5 (±0.5) m
Air Gun Type	Sleeve Gun II	Gun Depth Monitoring	SSS OCM (Ver 1.7 with Y2K patch)
Number of Arrays	1	Gun Synchronisation	± 1 ms
Pop Interval	25 m	Gun Synch. System	SSS OCM (Ver 1.7 with Y2K patch)
Pressure	2000 (±150) p.s.i.	Number of Sub-Arrays	3 per array
Volume	2250 cu.in.	Sub Array Separation	6 m
Source Output	74.1 bar-m (peak to trough 3-128 Hz)	Sub Array Length	15.1 m
Bubble ratio	40.7 bar-m (0 to peak)	Number Of Guns per Array	24
	17.3:1	Near field hydrophone	1 phone per gun element (6 per sub array)

Source Positioning      Input/Output Pro2000 Acoustics; POSNET rGPS and Fanbeam laser reflective headbuoys



# ENERGY SOURCE LAYOUT



# NAVIGATION SYSTEM PARAMETERS



<b>Data Acquisition System</b>	Spectra Integrated Navigation System RTNU (Real Time Navigation Unit)	Ver 7.6.5 Ver 7.6.5 (ILC)	
<b>Vessel Positioning</b>	Primary System Secondary System QC System Other System	Racal Multifix Differential GPS Fugro MRdGPS Differential GPS QPS Muliref Differential GPS Posnet Differential GPS	Ver 2.10 Ver 2.04.01 Ver 2.42 Ver 1.57
<b>Source/Streamer Positioning</b>	Acoustic Systems Ranging Systems  Compass Systems	DigiCOURSE Acoustic System Posnet Relative GPS MDL Fanbeam Laser Ranging Unit Input/Output Pro2000 Compasses	Pro2000 Ver 1.57 Ver 1.59 Pro2000
<b>Other Systems</b>	Backup Gyrocompass Primary Gyrocompass Test Pseudo Gyro Prime Fathometer Backup Fathometer	Sperry Mk227 (Gyro #1) Sperry Mk227 (Gyro #2) Posnet rGPS (Gyro #3) Simrad EA-500 18 kHz Xducer Echotrac DF3200 Mk II	C-O = +0.45° C-O = -0.04° C-O = -0.04° No draught correction in sensor* No draught correction in sensor† Xducer depth = *5.94, †5.0
<b>Magnetic declination</b>	+11.103	(From IGRF95 model; 25-Dec-99; Average of 9 corners of Survey Area)	
<b>Geoidal Undulation</b>	-2.624	(From OSU91A model; Average of 9 corners of Survey Area)	
<b>Processing Systems</b>	Real-time processing Post line processing	Spectra Unavchk	Ver 7.6.5 Ver 1.9.6

NB : All C-Os are entered in the Spectra Spread Configuration. All data output by the sensors is raw, with no C-O applied.

# P2/94 HEADER NODE NAMING CONVENTION



Each sensor is referenced to a platform. The following Alpha numeric codes are used to refer to the platform

Vessel	<b>V#</b>	<i>where # is replaced by an identifying number</i>
Gun Array	<b>G##</b>	<i>where ## is replaced by an identifying number incrementing from stbd to port</i>
Streamer	<b>S##</b>	<i>where ## is replaced by an identifying number incrementing from stbd to port</i>
Tailbuoy	<b>T##</b>	<i>where ## is replaced by an identifying number incrementing from stbd to port</i>

The sensors are identified by the platform, then by the system type, and finally by an identifying number

Acoustic	<b>T##</b>	<i>where ## is replaced by an identifying number incrementing from front to back</i>
dGPS	<b>G#</b>	<i>where # is replaced by an identifying number incrementing from front to back</i>
Echosounder	<b>E#</b>	<i>where # is replaced by an identifying number incrementing from front to back</i>
Gun String	<b>S#</b>	<i>where # is replaced by an identifying number incrementing from front to back</i>
Gyro	<b>GY#</b>	<i>where # is replaced by an identifying number incrementing from front to back</i>
Laser	<b>L#</b>	<i>where # is replaced by an identifying number incrementing from front to back</i>
Pitch/Roll	<b>PR#</b>	<i>where # is replaced by an identifying number incrementing from front to back</i>
rGPS	<b>R##</b>	<i>where ## is replaced by an identifying number incrementing from front to back</i>
Water Speed	<b>WS#</b>	<i>where # is replaced by an identifying number incrementing from front to back</i>
Velocimeter	<b>V#</b>	<i>where # is replaced by an identifying number incrementing from front to back</i>
User Defined	<b>UD##</b>	<i>where ## is replaced by an identifying number incrementing from front to back</i>

For example T04R01 refers to the rGPS sensor on tailbuoy 4

Exceptions are the compass and depth sensors on the streamers. These are referenced by the following convention

**VC##** *where V is replaced by the vessel number, C by the streamer number, and ## by an identifying number incrementing from front to back*

For example 1608 refers to the 8th compass/depth sensor on vessel 1, cable 6

## VESSEL AND ANTENNAE OFFSETS



	Fore (+)	Stbd (+)	Height (+)
Navigation Reference Point (NRP V1) [ Primary GPS Antenna at sea level ]	0.00	0.00	0.00
Primary GPS Antenna (V1G1-5)	0.00	0.00	20.29
rGPS Antenna (P2/94 offset, V1R01)	0.00	0.00	0.00* (20.29)
Fanbeam Laser Head (V1L1)	0.00	0.00	18.73
Primarty (Simrad) Fathometer	10.71	1.59	-5.94
Backup (EchoTrac) Fathometer	-3.90	-8.90	-5.00
Input/Output Hull Acoustic Xducer (V1T01)	-1.51	0.34	-5.60
Gyrocompass 1 (V1GY1)	-3.30	-1.80	-1.80
Gyrocompass 2 (V1GY2) (Primary)	-3.30	0.60	-1.80

NB : All offsets are in metres and are referenced to the NRP

\* Posnet antenna heights are all set to MSL in Spectra as the ranges are slant corrected within the Posnet system

## TAILBUOY OFFSETS

Cable	Tailbuoy ID	TRP Distance from CRP		Tailbuoy Sensor Offsets from TRP			
		Fore (+)	Height (+)	Acoustic ID	Height (+)	rGPS ID	Height (+)
S01	T01	-4732.85	6.00	S01T08	-1.50	T01R01	0.00* (1.80)

NB : All offsets are in metres and are referenced to the CRP (centre near group) or TRP (tailbuoy antenna at MSL)

\* Posnet antenna heights are all set to MSL in Spectra as the ranges are slant corrected within the Posnet system

# STREAMER POSITIONING SENSOR OFFSETS



## Streamer Acoustic Sensors

ID #	Fore (+)
S01T01	-62.67
S01T02	-261.87
S01T03	-461.07
S01T04	-2154.27
S01T05	-2253.87
S01T06	-4445.07
S01T07	-4579.95

## Streamer Compass Sensors

ID #	Fore (+)
1101	+15.65
1102	-162.27
1103	-361.47
1104	-560.67
1105	-859.47
1106	-1158.27
1107	-1457.07
1108	-1755.87
1109	-2054.67
1110	-2353.47
1111	-2652.27
1112	-2951.07
1113	-3249.87
1114	-3548.67
1115	-3847.47
1116	-4146.27
1117	-4345.47
1118	-4544.67

NB : All offsets are in metres and are relative to the Cable Reference Point (CRP) which is the centre of the first group.  
Inline (fore is +ve) offsets only are given as all other offsets are zero.

# SOURCE POSITIONING SENSOR OFFSETS



<b>SOURCE</b>				
<b>Stbd (Inner) String</b>				
	<b>ID #</b>	<b>Fore (+)</b>	<b>Stbd (+)</b>	<b>Up (+)</b>
<b>Acoustic</b>	G01T01	0.00	6.00	-3.00
<b>rGPS</b>	G01R01	0.00	6.00	5.00* (6.0)
<b>Fanbeam</b>	N/A			
<b>Fore D.I.</b>	601	6.60	6.00	1.00
<b>Mid D.I.</b>	605	-1.00	6.00	1.00
<b>Aft D.I.</b>	608	-8.50	6.00	1.00
<b>Centre String</b>				
	<b>ID #</b>	<b>Fore (+)</b>	<b>Stbd (+)</b>	<b>Up (+)</b>
<b>Acoustic</b>	N/A			
<b>rGPS</b>	G01R02	0.00	0.00	5.00* (6.0)
<b>Fanbeam</b>	G01L01	0.00	0.00	5.50
<b>Fore D.I.</b>	701	6.60	0.00	1.00
<b>Mid D.I.</b>	705	-1.00	0.00	1.00
<b>Aft D.I.</b>	708	-8.50	0.00	1.00
<b>Port (Outer) String</b>				
	<b>ID #</b>	<b>Fore (+)</b>	<b>Stbd (+)</b>	<b>Up (+)</b>
<b>Acoustic</b>	G01T02	0.00	-6.00	-3.00
<b>rGPS</b>	G01R03	0.00	-6.00	5.00* (6.0)
<b>Fanbeam</b>	N/A			
<b>Fore D.I.</b>	801	6.60	-6.00	1.00
<b>Mid D.I.</b>	805	-1.00	-6.00	1.00
<b>Aft D.I.</b>	808	-8.50	-6.00	1.00

NB. Source offsets are in metres and are relative to the geometric centre of source (COS)

\* Posnet antenna heights are all set to MSL in Spectra as the ranges are slant corrected within the Posnet system

# PARAMETER CHANGES



## VELOCITY OF SOUND

Velocity of sound in water was determined from Temperature/Salinity (TS) Dips taken periodically throughout the survey :

The depths output to the P1/90 were scaled within the Unavchk processing system using the following values :

Seq 141-147      1514 m/s      Average of complete water column on 02-Apr-2000

## POSITIONING SENSOR OFFSET CHANGES

None

## TOWING CONFIGURATION CHANGES

None