501001

MRC9409029-MET

T/RL1

BASS BASIN, TASMANIA

1994 YOLLA 3D

SEISMIC SURVEY

FINAL REPORT

PART A - DATA ACQUISITION

AND PROCESSING

OR_402

501002

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1 INTRODUCTION

The Yolla condensate field is situated in Retention Licence T/RL1 in the Tasmanian portion of the Bass Basin (Figure 1). The discovery well, Yolla 1, was completed on 11 October 1985.

In October 1993 Joint Venture approval was obtained to conduct a 3D seismic survey over the field and possible extensions. A 3D seismic survey is designed to provide continuous coverage over an area so that the close spacing of common depth points in all directions will enable full migration of seismic data and hence accurate imaging of structure, faults and stratigraphy. In practice a marine seismic boat with multiple streamers and sources is employed to record multiple cdp (sub-surface) lines with each pass. For the Yolla 3D Seismic Survey Western Geophysical using the vessel "MV Western Atlas" was contracted by SAGASCO Resources to conduct the survey. The vessel towed three streamers and two airgun sources and hence acquired six sub-surface lines 25 metres apart with each boat pass.

The objectives of the 3D survey included the following items:

- Accurate reserves mapping
- Location of appraisal drilling sites
- Mapping of subtle fault trends
- Mapping of Miocene volcanics to improve depth conversion
- Mapping of possible extensions to south and northeast
- Mapping of plays onlapping and below deep extrusive volcanics

The data processing was conducted by Digital Exploration Ltd in Brisbane.

The T/RL1 Joint Venture is operated by SAGASCO Resources Limited and the interest levels are listed below.

SAGASCO Resources Ltd	53.8615%	(Operator)
GFE Resources Ltd	16.6915%	
Galveston Mining Corp Pty Ltd	14.0%	
Cultus Petroleum NL	10.447%	
Petroz NL	5.0%	

2 ACQUISITION

The acquisition parameters for the survey are summarised in Table 1, and fully listed in the Western Geophysical Final Operations Report (Appendix 3).

Austral Geophysical Consultants were contracted by SAGASCO Resources to supervise and report on the data acquisition operations performed by the MV Western Atlas. The Yolla 3D Field Supervision Report (Appendix 2) should be referred to in conjunction with the Western Geophysical report.

The seismic data and positioning data were independently monitored and quality controlled using two systems. Odergaard and Danneskiold-Samsoe supplied a Ramesses real time seismic processing system and Austral Geophysical Consultants

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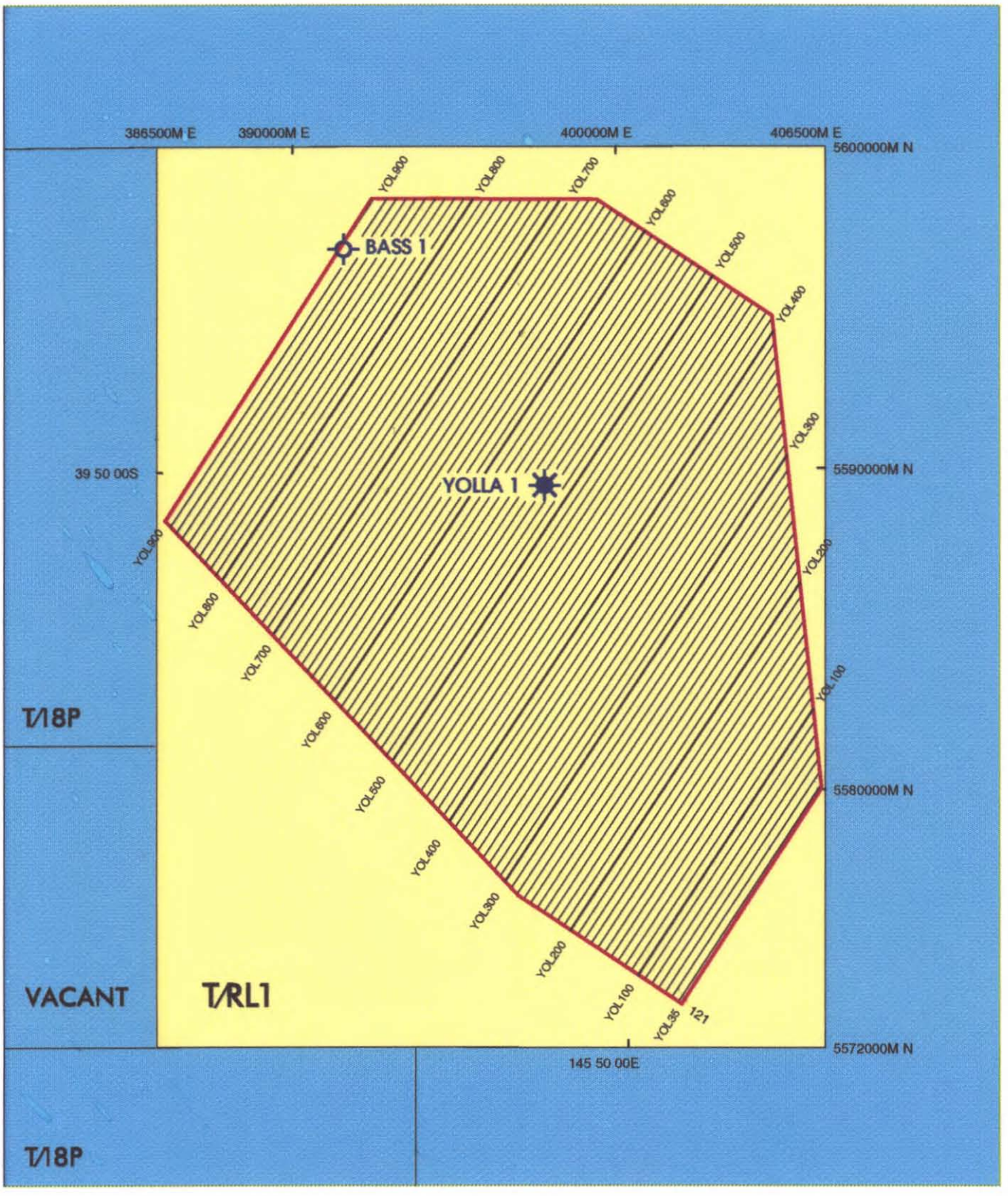
SAGASCO RESOURCES



LOCATION MAP

AREA OF 3D SEISMIC SURVEY

5 cm

1:150000

0 7

KILOMETRES

T/RL1 BASS BASIN

LOCATION MAP 1994 YOLLA 3D MARINE SEISMIC SURVEY

No.13342.0795 Fig. 1

supplied an Acumen real time positioning data processing system. Argo was used as the prime navigation system. The Argo chain was supplied, maintained and operated by Western Geophysical Company with three base stations situated on the northern Tasmanian coast and one on King Island. A Multifix DGPS, supplied and serviced by Racal Australia, was used as the secondary navigation system. Racal also supplied the DGPS Skypod tail buoy positioning system as well.

A concise listing of the field tapes is contained in Appendix 1.

The vessel left Portland on 19 January 1994, however the survey did not commence until 5 February due to delays during the setup phase.

The contractor performed well achieving an average of 240.5 processable kilometres per day. The survey was completed with 162 hours of chargeable down time due to bad weather.

There were no lost time injuries or environmental incidents experienced during the survey.

TABLE 1

Yolla 3D Seismic Survey Acquisition Summary

Start date	5 February 1994
End date	16 March 1994
Total days	40
Weather %	17%
Area	260 sq km
Total line length	13779 km
Prime line length	11750 km
Infill line length	2029 km
Infill %	17%

Acquisition System

Contractor	Western Geophysical
Vessel	MV Western Atlas
WG-24 Marine Data Acquisition System	
Primary navigation	ARGO (4 Base Stations)
Secondary n+C51 avig	Racal Multifix (DGPS)

Source Parameters

Dual	Airgun arrays, Alternate firing
Capacity	2700 cu.in.
Depth	6 m
Shot interval	25 m

Streamer Parameters

Type	WG-24 Digital technology
Configuration	Triple Streamer
Channels	240 per streamer (720 Total)
Length	3000 m
Depth	10 m
Ground interval	12.5 m

CDP Parameters

Line spacing	25 m
Trace spacing	6.25 m
Sample rate	2 ms
Record length	6 secs
Nominal fold	30
Low cut filter	6hz/18 dB per octave
High cut filter	188hz/156 dB per octave

Recorded data format

SEG D Demultiplexed, Code 8024

Media	IBM 3480 cartridges
Density	38000 bpi

3 PROCESSING

3.1 Yolla Processing and Results

The Yolla 3D Seismic Survey was processed by Digicon's Brisbane Centre between April and August of 1994. It was supervised by S Jestico with remote assistance from Chris Denchfield, Digicon's UK 3D Marine Processing Supervisor.

Processing parameter tests were mainly carried out on three sail lines YOL-00259, YOL-00499, YOL-00679. Line YOL-00499 intersects Yolla 1 well which afforded synthetic comparisons during deconvolution and demultiple testing. Various migration tests were performed on data volume subsets for three dimensional optimisation. Details of tests can be found in the Processor's report (Appendix 7).

Special attention was given to:

1) The FK filter design
2) Deconvolution processing
3) Demultiple technique - Fk versus Radon
4) Migration velocity field
5) Migration algorithm

The final processing sequence can be summarised as follows:

* Resample to 4ms
* Shot Domain FK Velocity Filter, Cut=2000m/s
* Two to One Adjacent Trace Summation
* Spherical Divergence Correction
* Designature Deconvolution to Zero Phase
* Gapped (48ms) Predictive Deconvolution
* One km Velocity Analysis
* FK Multiple Attenuation
* Half km Velocity Analysis
* Tidal Static Correction
* Trace Excursion
* Inner and Outer Trace Mute
* Kirchhoff 3D DMO Stack
* De-Checker Trace Mix (0-700ms)
* One-Pass Omega-X 3D Migration
* Time Variant Filter
* Trace Equalisation

SAGASCO monitored the processing results at intermediate stages and inspected all the velocity interpretations. A near trace volume was loaded at SAGASCO's office. This was useful for Quality Control of tidal statics corrections. It also allowed SAGASCO to assess dips and directions of fault events and diffraction energy prior to migration.

The final seismic image quality of this survey was good for Bass Basin data.

Remnants of multiples are a problem below the Eastern-View Coal Measures. Radon demultiple tests gave only slight improvement of FK domain demultiple which could not be justified against extra cost at that time.

Three dimensional migration enhanced the sharpness of the seismic image in comparison to previous 2D data despite being 30 fold.

Areas of tertiary volcanics caused problems in the survey to the north east of Yolla 1 well. The rapid lateral variation in velocity and thickness in several extrusive piles caused distortion of the moveout hyperbola and problems for time migration. This resulted in areas of stack disruption, erratic NMO velocities and poorer migration. A prestack depth migration project to address these problems was commenced soon after completion of the main processing.

3.2 Magnetic Tapes

The following data stages were archived on exabyte tapes at 5Gb density in a SEGY format.

1) DMO-stack - raw
2) DMO-stack - filtered and scaled
3) Migration - raw

4) Migration - filtered and scaled
5) GATHERS - gathers without DMO in CDP order

Stacking velocity information was provided on a DOS diskette. The migration velocity field was similarly supplied.

3.3 Contractor Performance

The contractor installed new seismic processing hardware and software and moved office during the recording of this survey. These factor were assessed at the time of evaluating tenders. As it turned out, there were many weeks delays caused at several stages of process while getting new programs to work. Equally there were advantages afforded by the improved capacity of the new system. Delays were quickly overcome. Many testing iterations (especially migration) were able to be run because of extra speed.

Digicon completed the processing project approximately two weeks after the scheduled date. This was not considered as excessive for a project of this size. As the operator was satisfied with genuine efforts to catch up time when delays occurred getting new software to work, penalties were not applied to the contractor. Parameter testing effort was not compromised by time constraints. The operator recognises extra personal effort put in by processing staff, S Jestico and his team, and their overseas support people.

The operator would recommend the processing contractor for future 3D processing should their tender be favourable.

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APPENDIX 1

FIELD TAPE LISTING

This appendix comprises a listing of seismic line, field tape and shotpoint ranges.

YOLLA 3D SEISMIC SURVEY - FIELD TAPE LISTING

LINE	SP	SP	TAPE	TAPE	BOX	DATE	COMMENT
YOL00013	307	32	1	15	1	05/02/94	SOL-EOL
YOL00205	110 205 597	204 596 621	16 21 41	20 40 42	1 2 3	05/02/94	SOL-CONT CONT-CONT CONT-EOL
YOL00055	358	32	43	59	3	06/02/94	SOL-EOL
YOL00247	0 116 520	0 519 672	60 61 81	60 80 89	3 4 5	06/02/94	SOL-CONT CONT-CONT CONT-EOL
YOL00019	314 100	101 32	90 101	100 104	5 6	06/02/94	SOL-CONT CONT-EOL
YOL00211	0 339	338 628	105 121	120 135	6 7	06/02/94	SOL-CONT CONT-EOL
YOL00061	0 331	332 32	136 141	140 155	7 8	06/02/94	SOL-CONT CONT-EOL
YOL00253	0 185 585	184 584 675	156 161 181	160 180 185	8 9 10	06/02/94	SOL-CONT CONT-CONT CONT-EOL
YOL00025	321	32	186	200	10	06/02/94	SOL-EOL
YOL00199	110 505	504 613	201 221	220 226	11 12	07/02/94	SOL-CONT CONT-EOL
YOL00067	373 98	99 32	227 241	240 244	12 13	07/02/94	SOL-CONT CONT-EOL
YOL00259	116 432	431 687	245 261	260 273	13 14	07/02/94	SOL-CONT CONT-EOL
YOL00049	351	32	274	290	17	11/02/94	SOL-EOL
YOL00217	110 165 565	164 564 635	291 294 314	293 313 317	17 18 19	11/02/94	SOL-CONT CONT-CONT CONT-EOL
YOL00031	529	32	318	333	19	11/02/94	SOL-EOL
YOL00265	117 512	511 694	334 354	353 363	20 21	11/02/94	SOL-CONT CONT-EOL
YOL00073	380 184	185 32	364 374	373 381	21 22	11/02/94	SOL-CONT CONT-EOL
YOL00193	110 344	343 606	382 394	393 407	22 23	12/02/94	SOL-CONT CONT-EOL
YOL00037	336 221	222 32	408 414	413 423	23 24	12/02/94	SOL-CONT CONT-EOL

LINE	SP	SP	TAPE	TAPE	BOX	DATE	COMMENT
YOL00271	119 296 644	295 643 702	424 434 454	433 453 456	24 25 26	12/02/94	SOL-CONT CONT-CONT CONT-EOL
YOL00079	388 54	55 32	457 474	473 475	26 27	12/02/94	SOL-CONT CONT-EOL
YOL00223	110 465	464 643	476 494	493 502	27 28	12/02/94	SOL-CONT CONT-EOL
YOL00007	299 86	87 32	503 514	513 516	28 29	12/02/94	SOL-CONT CONT-EOL
YOL00229	110 445	444 650	517 534	533 544	29 30	12/02/94	SOL-CONT CONT-EOL
YOL00001	292 117	116 32	545 554	553 558	30 31	12/02/94	SOL-CONT CONT-EOL
YOL00277	120 415	414 709	559 574	573 588	31 32	12/02/94	SOL-CONT CONT-EOL
00589-00590	NO DATA						
YOL00241	0 185 585	184 584 665	591 594 614	593 613 618	32 33 34	14/02/94	SOL-CONT CONT-CONT CONT-EOL
YOL00085	395 107	108 32	619 634	633 637	34 35	14/02/94	SOL-CONT CONT-EOL
YOL00313	128 419	418 753	638 654	653 670	35 36	14/02/94	SOL-CONT CONT-EOL
YOL00043	344 289	290 32	671 674	673 686	36 37	14/02/94	SOL-CONT CONT-EOL
YOL00235	110 245 638	244 637 657	687 694 714	693 713 714	37 38 39	14/02/94	SOL-CONT CONT-CONT CONT-EOL
00715	NO DATA						
YOL00121	0 79	80 32	716 734	733 736	39 40	15/02/94	SOL-CONT CONT-EOL
YOL00307	127 463	462 485	737 754	753 755	40 41	15/02/94	SOL-CONT CONT-EOL
YOL10307	486	745	756	769	41	15/02/94	SOL-EOL
YOL00127	447 370	371 32	770 774	773 790	41 42	15/02/94	SOL-CONT CONT-EOL
YOL00301	126 181	180 555	791 794	793 813	42 43	15/02/94	SOL-CONT CONT-CONT
000798	NO DATA						
YOL00301	556	739	814	823	44	15/02/94	CONT-EOL
00824-00828	NO DATA						

LINE	SP	SP	TAPE	TAPE	BOX	DATE	COMMENT
YOL00283	122 217 602	216 601 717	829 834 854	833 853 859	44 45 46	15/02/94	SOL-CONT CONT-CONT CONT-EOL
YOL00187	520 243	244 32	860 874	873 884	46 47	15/02/94	SOL-CONT CONT-EOL
YOL00289	123 298 698	297 697 724	885 894 914	893 913 915	47 48 49	15/02/94	SOL-CONT CONT-CONT CONT-EOL
YOL00115	432 77	78 32	916 934	933 936	49 50	16/02/94	SOL-CONT CONT-EOL
YOL00295	124 460	459 731	937 954	953 968	50 51	16/02/94	SOL-CONT CONT-EOL
YOL00091	403 309	310 185	969 974	973 980	51 52	16/02/94	SOL-CONT CONT-EOL
YOL00181	513 259	260 32	981 994	993 1005	52 53	17/02/94	SOL-CONT CONT-EOL
YOL00337	134 289 689	288 688 783	1006 1014 1034	1013 1033 1038	53 54 55	18/02/94	SOL-CONT CONT-CONT CONT-EOL
YOL00109	425 131	132 31	1039 1054	1053 1059	55 56	18/02/94	SOL-CONT CONT-EOL
YOL00319	130 406	405 761	1060 1074	1073 1091	56 57	18/02/94	SOL-CONT CONT-EOL
YOL00157	484 449 58	450 59 32	1092 1094 1114	1093 1113 1115	57 58 59	18/02/94	SOL-CONT CONT-CONT CONT-EOL
YOL00331	133 467	466 606	1116 1134	1133 1140	59 60	18/02/94	SOL-CONT CONT-EOL
001141-001144	NO DATA						
YOL00325	131 300 690	299 689 768	1145 1154 1174	1153 1173 1177	60 61 62	18/02/94	SOL-CONT CONT-CONT CONT-EOL
YOL00097	410 95	96 32	1178 1194	1193 1197	62 63	18/02/94	SOL-CONT CONT-EOL
YOL00343	135 450	449 593	1198 1214	1213 1222	63 64	18/02/94	SOL-CONT CONT-EOL
001219	NO DATA						
YOL00151	476 261	262 32	1223 1234	1233 1245	64 65	19/02/94	SOL-CONT CONT-EOL
YOL00349	137 292 678	291 677 799	1246 1254 1274	1253 1273 1280	65 66 67	19/02/94	SOL-CONT CONT-CONT CONT-EOL

LINE	SP	SP	TAPE	TAPE	BOX	DATE	COMMENT
YOL00103	417 171	172 32	1281 1294	1293 1300	67 68	19/02/94	SOL-CONT CONT-EOL
YOL00379	144 400 786	399 785 829	1301 1314 1334	1313 1333 1336	68 69 70	19/02/94	SOL-CONT CONT-CONT CONT-EOL
YOL00163	491 202	203 32	1337 1354	1353 1364	70 71	19/02/94	SOL-CONT CONT-EOL
YOL00355	138 316	313 805	1365 1374	1373 1398	71 72	20/02/94	SOL-CONT CONT-EOL
YOL00373	142	0	1399	1412	73	20/02/94	SOL-CONT
001413	NO DATA						
	404 755	754 827	1414 1434	1433 1437	74 75	20/02/94	CONT-CONT CONT-EOL
YOL00133	454 151	152 32	1438 1454	1453 1460	75 76	20/02/94	SOL-CONT CONT-EOL
YOL00367	141 382 782	381 781 820	1461 1474 1494	1473 1493 1495	76 77 78	20/02/94	SOL-CONT CONT-CONT CONT-EOL
YOL00139	461 106	107 32	1496 1514	1513 1517	78 79	20/02/94	SOL-CONT CONT-EOL
YOL00361	140 455	454 813	1518 1534	1533 1551	79 80	21/02/94	SOL-CONT CONT-EOL
YOL00145	469 434 34	435 35 32	1552 1554 1574	1553 1573 1574	80 81 83	21/02/94	SOL-CONT CONT-CONT CONT-EOL
YOL00385	145 520	519 829	1575 1594	1593 1609	82 83	21/02/94	SOL-CONT CONT-EOL
YOL00169	498 419	420 92	1610 1614	1613 1633	83 84	21/02/94	SOL-CONT CONT-CONT
001621 & 001625	NO DATA						
	91	32	1634	1636	85	21/02/94	CONT-EOL
YOL10331	500	776	1637	1651	85	21/02/94	SOL-EOL
YOL00175	506 289	290 32	1652 1664	1663 1677	85 86	21/02/94	SOL-CONT CONT-EOL
YOL00415	152 266 648	265 647 829	1678 1684 1704	1683 1703 1713	86 87 88	21/02/94	SOL-CONT CONT-CONT CONT-EOL
YOL00727	689 494	495 149	1714 1724	1723 1741	88 89	22/02/94	SDOL-CONT CONT-EOL
YOL00475	167 0	201 781	1742 1744	1743 1773	89 90	22/02/94	SOL-CONT CONT-CONT

LINE	SP	SP	TAPE	TAPE	BOX	DATE	COMMENT
001744	NO DATA						
	782	829	1774	1776	91	22/02/94	CONT-EOL
YOL00667	728 193	194 135	1777 1804	1803 1806	91 92	22/02/94	SOL-CONT CONT-EOL
YOL00391	147 596	595 829	1807 1834	1833 1847	92 93	22/02/94	SOL-CONT CONT-EOL
YOL00721	693 396	397 148	1848 1864	1863 1876	93 94	22/02/94	SOL-CONT CONT-EOL
YOL00421	154 468	467 829	1877 1894	1893 1913	94 95	22/02/94	SOL-CONT CONT-EOL
YOL00673	724 526	527 136	1914 1924	1923 1943	95 96	23/02/94	SOL-CONT CONT-EOL
YOL00481	168 363	362 829	1944 1954	1953 1978	96 97	23/02/94	SOL-CONT CONT-EOL
YOL00715	697 602	603 146	1979 1984	1983 2006	97 98	23/02/94	SOL-CONT CONT-EOL
YOL00427	155 290	289 829	2007 2014	2013 2043	98 99	23/02/94	SOL-CONT CONT-EOL
YOL00679	720	486	2044	2055	100	23/02/94	SOL-EOL
YOL00487	170 325	324 684	2056 2064	2063 2083	100 101	23/02/94	SOL-CONT CONT-CONT
002067 & 002071	NO DATA						
	685	829	2084	2091	102	23/02/94	CONT-EOL
YOL00679	720 485	486 138	2092 2104	2103 2121	102 103	23/02/94	SOL-CONT CONT-EOL
YOL00433	137 192 592	191 591 829	2122 2124 2144	2123 2143 2155	103 104 105	24/02/94	SOL-CONT CONT-CONT CONT-EOL
YOL00733	685 530	531 150	2156 2164	2163 2183	105 106	24/02/94	SOL-CONT CONT-EOL
YOL00493	171 567	566 829	2184 2204	2203 2217	107 108	24/02/94	SOL-CONT CONT-EOL
YOL00685	716 601 201	602 202 139	2218 2224 2244	2223 2243 2247	108 109 110	24/02/94	SOL-CONT CONT-CONT CONT-EOL
YOL00397	148 463	462 829	2248 2264	2263 2283	110 111	24/02/94	SOL-CONT CONT-EOL
YOL00709	701 305	306 145	2284 2304	2303 2312	112 113	24/02/94	SOL-CONT CONT-EOL
YOL00409	151 367	366 746	2313 2324	2323 2343	113 114	24/02/94	SOL-CONT CONT-CONT

LINE	SP	SP	TAPE	TAPE	BOX	DATE	COMMENT
002328	NO DATA						
	747	829	2344	2348	115	24/02/94	CONT-EOL
YOL00691	712 421	422 141	2349 2364	2363 2378	115 116	25/02/94	SOL-CONT CONT-EOL
YOL00499	173 267 667	266 666 829	2379 2384 2404	2383 2403 2412	116 117 118	25/02/94	SOL-CONT CONT-CONT CONT-EOL
YOL00751	673 458	459 155	2413 2424	2423 2439	118 119	25/02/94	SOL-CONT CONT-EOL
YOL00451	161 229 617	228 616 829	2440 2444 2464	2443 2463 2474	119 120 121	25/02/94	SOL-CONT CONT-CONT CONT-EOL
YOL00697	709 534	535 150	2475 2484	2483 2503	121 122	25/02/94	SOL-CONT CONT-EOL
YOL00469	165 560	559 829	2504 2524	2523 2537	123 124	25/02/94	SOL-CONT CONT-EOL
YOL00661	732 617 217	618 218 133	2538 2544 2564	2543 2563 2568	124 125 126	25/02/94	SOL-CONT CONT-CONT CONT-EOL
YOL00403	149 444	443 818	2569 2584	2583 2603	126 127	26/02/94	SOL-CONT CONT-CONT
002599	NO DATA						
	819	829	2604	2604	128	26/02/94	CONT-EOL
YOL00703	705 330	331 143	2605 2624	2623 2634	128 129	25/02/94	SOL-CONT CONT-EOL
002632	NO DATA						
YOL00775	657 502	503 160	2635 2643	2642 2660	129 130	26/02/94	SOL-CONT CONT-EOL
YOL00445	160 216 616	215 615 829	2661 2664 2684	2663 2683 2694	130 131 132	27/02/94	SOL-CONT CONT-CONT CONT-EOL
002701	NO DATA						
YOL00739	681 543	544 152	2695 2704	2703 2723	132 133	27/02/94	SOL-CONT CONT-EOL
YOL00463	164 558	557 829	2724 2744	2743 2759	134 135	27/02/94	SOL-CONT CONT-EOL
YOL00535	181 536	535 829	2786 2804	2803 2818	137 138	02/03/94	SOL-CONT CONT-EOL
YOL00781	653 558	559 162	2819 2824	2823 2843	138 139	02/03/94	SOL-CONT CONT-EOL

LINE	SP	SP	TAPE	TAPE	BOX	DATE	COMMENT
YOL00505	174 569	568 829	2844 2864	2863 2877	140 141	02/03/94	SOL-CONT CONT-EOL
YOL00847	609 494	495 178	2878 2884	2883 2899	141 142	03/03/94	SOL-CONT CONT-EOL
YOL00511	175 250 650	249 649 829	2900 2904 2924	2903 2923 2933	142 143 144	03/03/94	SOL-CONT CONT-CONT CONT-EOL
YOL00745	677 482	483 153	2934 2944	2943 2960	144 145	03/03/94	SOL-CONT CONT-EOL
YOL00457	162 217 617	216 616 829	2961 2964 2984	2963 2983 2994	145 146 147	03/03/94	SOL-CONT CONT-CONT CONT-EOL
YOL00769	661 486	487 159	2995 3004	3003 3020	147 148	03/03/94	SOL-CONT CONT-EOL
YOL00565	188 243 643	242 642 829	3021 3024 3044	3023 3043 3053	148 149 150	04/03/94	SOL-CONT CONT-CONT CONT-EOL
YOL00655	735 537 137	538 138 132	3054 3064 3084	3063 3083 3084	150 151 152	04/03/94	SOL-CONT CONT-CONT CONT-EOL
YOL00529	180 555	554 829	3085 3104	3103 3117	152 153	04/03/94	SOL-CONT CONT-EOL
YOL00763	665 550	551 158	3118 3124	3123 3143	153 154	04/03/94	SOL-CONT CONT-EOL
YOL00439	158 553	552 829	3144 3164	3163 3177	155 156	04/03/94	SOL-CONT CONT-EOL
YOL00757	669 554 176	555 177 156	3178 3184 3204	3183 3203 3205	156 157 158	04/03/94	SOL-CONT CONT-CONT CONT-EOL
YOL00541	183 538	537 829	3206 3224	3223 3238	158 159	04/03/94	SOL-CONT CONT-EOL
YOL00805	637 542	543 183	3239 3244	3243 3263	159 160	05/03/94	SOL-CONT CONT-CONT
003255 & 003261	NO DATA						
	182	168	3264	3264	161	05/03/94	CONT-EOL
YOL00571	190 565	564 829	3265 3284	3283 3297	161 162	05/03/94	SOL-CONT CONT-EOL
YOL00787	649 534	535 163	3298 3304	3303 3322	162 163	05/03/94	SOL-CONT CONT-EOL
YOL00523	178 193 593	192 592 829	3323 3324 3344	3323 3343 3355	163 164 165	05/03/94	SOL-CONT CONT-CONT CONT-EOL

LINE	SP	SP	TAPE	TAPE	BOX	DATE	COMMENT
YOL00517	177 190 550	189 549 829	3365 3366 3384	3365 3383 3398	165 166 167	06/03/94	SOL-CONT CONT-CONT CONT-EOL
003386	NO DATA						
YOL00799	641 546	547 166	3399 3404	3403 3422	167 168	06/03/94	SOL-CONT CONT-EOL
YOL00559	187 202 602	201 601 829	3423 3424 3444	3423 3443 3455	168 169 170	06/03/94	SOL-CONT CONT-CONT CONT-EOL
YOL00793	645 490	491 165	3456 3464	3463 3480	170 171	06/03/94	SOL-CONT CONT-EOL
YOL00547	184 239 639	238 638 829	3481 3484 3504	3483 3503 3513	171 172 173	07/03/94	SOL-CONT CONT-CONT CONT-EOL
YOL00811	614 417	418 169	3514 3524	3523 3536	173 174	07/03/94	SOL-CONT CONT-EOL
YOL00595	196 331 731	330 730 829	3537 3544 3564	3543 3563 3568	174 175 176	07/03/94	SOL-CONT CONT-CONT CONT-EOL
YOL00853	605 310	311 179	3569 3584	3583 3590	176 177	07/03/94	SOL-CONT CONT-EOL
YOL00589	194 449	448 829	3591 3604	3603 3623	177 178	07/03/94	SOL-CONT CONT-EOL
YOL00817	629 255	256 170	3624 3644	3643 3648	179 180	07/03/94	SOL-CONT CONT-EOL
YOL00601	197 491	490 829	3649 3664	3663 3681	180 181	07/03/94	SOL-CONT CONT-EOL
003678	NO DATA						
YOL00841	613 578 178	579 179 172	3682 3684 3704	3683 3703 3704	181 182 183	07/03/94	SOL-CONT CONT-CONT CONT-EOL
YOL00553	186 561	560 829	3705 3724	3723 3737	183 184	08/03/94	SOL-CONT CONT-EOL
YOL00649	740 625 225	626 226 131	3738 3744 3764	3743 3763 3768	184 185 186	08/03/94	SOL-CONT CONT-CONT CONT-EOL
YOL00607	198 493	492 829	3769 3784	3783 3800	186 187	08/03/94	SOL-CONT CONT-EOL
YOL00859	601 547	548 188	3801 3804	3803 3822	187 188	08/03/94	SOL-CONT CONT-EOL
YOL00583	193 608	607 829	3823 3844	3843 3855	189 190	08/03/94	SOL-CONT CONT-EOL

LINE	SP	SP	TAPE	TAPE	BOX	DATE	COMMENT
YOL00643	744 620	622 256	3856 3864	3863 3883	190 191	08/03/94	SOL-CONT CONT-CONT
003870	NO DATA						
	255	129	3884	3890	192	08/03/94	CONT-EOL
YOL00613	200 455	454 829	3891 3904	3903 3922	192 193	08/03/94	SOL-CONT CONT-EOL
YOL00823	625 610 210	611 211 172	3923 3924 3944	3923 3943 3945	193 194 195	09/03/94	SOL-CONT CONT-CONT CONT-EOL
YOL00577	191 546	545 829	3946 3964	3963 3978	195 196	09/03/94	SOL-CONT CONT-EOL
YOL00835	617 522	523 175	3979 3984	3983 4001	196 197	09/03/94	SOL-CONT CONT-EOL
YOL00619	201 236 636	235 635 829	4002 4004 4024	4003 4023 4033	197 198 199	09/03/94	SOL-CONT CONT-CONT CONT-EOL
YOL00829	621 426	427 173	4034 4044	4043 4057	199 200	09/03/94	SOL-CONT CONT-EOL
YOL00631	204 318 720	317 719 829	4058 4064 4084	4063 4083 4089	200 201 202	09/03/94	SOL-CONT CONT-CONT CONT-EOL
YOL00637	748 471	472 128	4090 4104	4103 4121	202 203	09/03/94	SOL-CONT CONT-EOL
YOL00625	203 237 637	236 636 829	4122 4124 4144	4123 4143 4153	203 204 205	10/03/94	SOL-CONT CONT-CONT CONT-EOL
YOL01187	510 312	313 40	4154 4164	4163 4177	205 206	10/03/94	SOL-CONT CONT-EOL
YOL01367	150 267 667	266 666 810	4178 4184 4204	4183 4203 4211	206 207 208	10/03/94	SOL-CONT CONT-CONT CONT-EOL
YOL01133	410 173	174 40	4212 4224	4223 4230	208 209	10/03/94	SOL-CONT CONT-EOL
YOL01145	400 145	146 38	4231 4244	4243 4249	209 210	10/03/94	SOL-CONT CONT-EOL
YOL01349	140	370	4250	4262	210	10/03/94	SOL-EOL
YOL10343	594 609	608 790	4263 4264	4263 4273	210 211	10/03/94	SOL-CONT CONT-EOL
YOL01067	340 146	147 40	4274 4284	4283 4289	211 212	10/03/94	SOL-CONT CONT-EOL
YOL01343	140 415	414 780	4290 4304	4303 4322	212 213	11/03/94	SOL-CONT CONT-EOL

LINE	SP	SP	TAPE	TAPE	BOX	DATE	COMMENT
YOL01469	175 190 590	189 589 820	4323 4324 4344	4323 4343 4355	213 214 215	12/03/94	SOL-CONT CONT-CONT CONT-EOL
YOL0115	420 265	266 80	4356 4364	4363 4373	215 216	12/03/94	SOL-CONT CONT-EOL
YOL10319	301	380	4374	4378	216	12/03/94	SOL-EOL
YOL10091	184 90	91 32	4379 4384	4383 4387	216 217	12/03/94	SOL-CONT CONT-EOL
YOL01421	300 615	614 825	4388 4404	4403 4414	217 218	12/03/94	SOL-CONT CONT-EOL
YOL01055	358 183	184 40	4415 4424	4423 4431	218 219	13/03/94	SOL-CONT CONT-EOL
YOL01451	170 405 805	404 804 820	4432 4444 4464	4443 4463 4464	219 220 221	13/03/94	SOL-CONT CONT-CONT CONT-EOL
YOL10109	406	374	4465	4466	221	13/03/94	SOL-EOL
YOL01085	184	40	4467	4474	221	13/03/94	SOL-EOL
YOL01439	170 345	344 545	4475 4484	4483 4494	221 222	13/03/94	SOL-CONT CONT-EOL
YOL01679	450 275	276 140	4495 4504	4503 4510	222 223	13/03/94	SOL-CONT CONT-EOL
YOL01487	170 425 816	424 815 820	4511 4524 4544	4523 4543 4544	223 224 225	13/03/94	SOL-CONT CONT-CONT CONT-EOL
YOL01517	177 552	551 820	4545 4564	4563 4577	225 226	14/03/94	SOL-CONT CONT-EOL
YOL01739	681 567 167	568 168 160	4578 4584 4604	4583 4603 4604	226 227 228	14/03/94	SOL-CONT CONT-CONT CONT-EOL
YOL01637	206 581	580 820	4605 4624	4623 4635	228 229	14/03/94	SOL-CONT CONT-EOL
YOL01709	701 561 161	562 162 155	4636 4644 4664	4643 4663 4664	229 230 231	14/03/94	SOL-CONT CONT-CONT CONT-EOL
YOL01499	173 532	531 820	4665 4684	4683 4699	231 232	15/03/94	SOL-CONT CONT-EOL
004697	NO DATA						
YOL01667	720 646 246	647 247 175	4700 4704 4724	4703 4723 4727	232 233 234	15/03/94	SOL-CONT CONT-CONT CONT-EOL
YOL01835	260 575	574 620	4728 4744	4743 4746	234 235	15/03/94	SOL-CONT CONT-EOL

LINE	SP	SP	TAPE	TAPE	BOX	DATE	COMMENT
004747	NO DATA						
004763	NO DATA						
YOL01751	0 256	0 160	4748 4764	4762 4768	235 236	15/03/94	SOL-CONT CONT-EOL
YOL01595	335 621	620 820	4769 4784	4783 4793	236 237	15/03/94	SOL-CONT CONT-EOL
YOL01685	680 485	486 145	4794 4804	4803 4821	237 238	15/03/94	SOL-CONT CONT-EOL
YOL01817	385 419	418 695	4822 4824	4823 4837	238 239	15/03/94	SOL-CONT CONT-EOL
YOL01649	735 620	621 365	4838 4844	4843 4856	239 240	15/03/94	SOL-CONT CONT-EOL
YOL01661	605 470	471 140	4857 4864	4863 4880	240 241	16/03/94	SOL-CONT CONT-EOL

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APPENDIX 2

FIELD SUPERVISION REPORT

AUSTRAL GEOPHYSICAL CONSULTANTS

501022

FIELD SUPERVISION REPORT

FOR

SAGASCO RESOURCES Ltd.

PROJECT

YOLLA 1
1994 MARINE 3D SEISMIC SURVEY

PERMIT AREA : T/RL1
BASS BASIN - BASS STRAIT

DATES : January 19 to March 16 1994

CONTRACTOR : WESTERN GEOPHYSICAL COMPANY

VESSEL : M.V. WESTERN ATLAS

AUTHORS :
Frank Renton
Matt Ulvr-Green
Rod Waldron

AUSTRAL GEOPHYSICAL CONSULTANTS Pty. Ltd.

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1 INTRODUCTION

1.1 GENERAL

This report covers the marine seismic data acquisition operation conducted by Sagasco Resources Ltd. in the offshore exploration permit area T/RL1. The permit area is located in the Bass Strait, off the southern coast of Victoria. Survey operations covered in this document were conducted between January 19 and March 17, 1994.

The survey, titled the Yolla 1, Marine 3d Seismic Survey encompassed 3D coverage of 250 square kilometres of the sea bed. Data collection techniques involved the use of triple streamer cables and dual air gun energy sources, optimally spaced to provide coverage on six sub-surface CMP lines, with 25 metre separation, during the course of one sail line.

Western Geophysical Company was chosen as the contractor to carry out the survey operations. They supplied the survey vessel M.V. Western Atlas, its' crew and equipment for the data acquisition phase of the survey.

Austral Geophysical Consultants Pty. Ltd. supervised and reported on the data acquisition operations and monitored data quality during the survey.

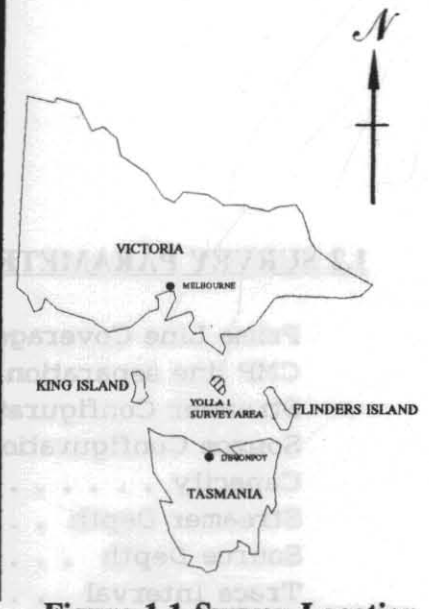


Figure 1.1 Survey Location Diagram

Argo was used as the prime navigation system. The Argo chain was supplied, maintained and operated by Western Geophysical Company.

A Multifix DGPS system was employed as the secondary navigation System. Racal Survey provided the Multifix DGPS and Skypod DGPS tail buoy positioning systems. RACAL maintained the systems during the course of the survey but had no personnel present on the survey vessel.

Digicourse Ltd. were the manufacturers of the Digicourse 5000 Series compass/depth controllers used on the streamers for the survey. The acoustic network employed to measure cable separation was manufactured by Digicourse Ltd. Both systems were owned, supplied and operated by Western Geophysical Company.

The seismic and positioning data were both completely independently monitored and quality controlled using two systems. ØDEGAARD & DANNESKIOLD-SAMSØE, supplied a Ramesses real-time seismic processing system. A single velocity function was supplied by the client. Austral Geophysical Consultants supplied the ACUMEN real time positioning data processing system developed by The QSEA Company. Both of these systems were operated by Austral personnel for the duration of the survey.

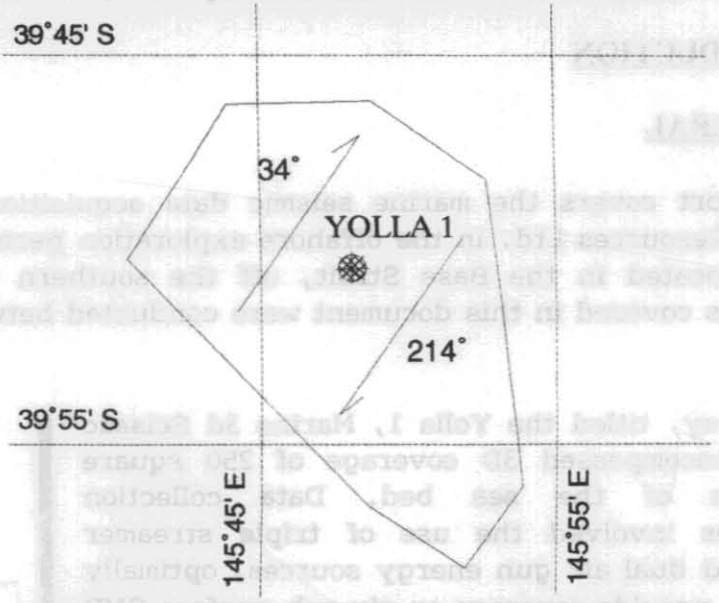


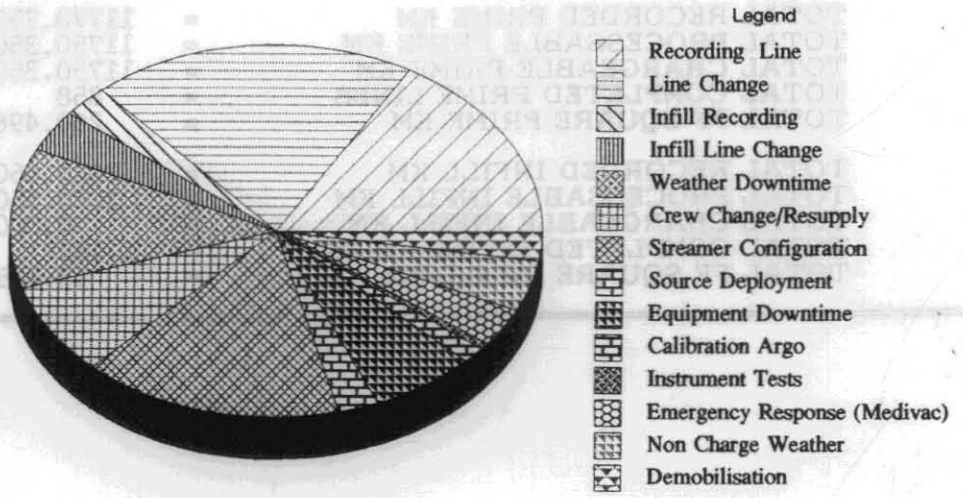
Figure 1.2 Survey Block and Line layout

1.2 SURVEY PARAMETERS

Prime Line Coverage	250 square kilometres
CMP line separation	25 metres
Streamer Configuration	Triple 240 Trace, 3000 metres length
Source Configuration	Dual Airgun Arrays, alternate firing
Capacity	2700 cubic inches
Streamer Depth	10 metres
Source Depth	6 metres
Trace Interval	12.5 metres
Shotpoint Interval	25.0 metres
Nominal Fold	30
Sample Rate	2 milliseconds
Record Length	6 seconds
Low Cut Filter	6 Hz/18 dB per octave
High Cut Filter	188 Hz/156 dB per octave
Recorded Data Format	SEG D Demultiplexed, Code 8024
Recording Density	38000 bpi

5 cm

1.3 SURVEY STATISTICS



CUMULATIVE SURVEY STATISTICS

ACTIVITY DESCRIPTION	HOURS	SURVEY %
RECORDING LINE	221.366	16.10%
LINE CHANGE	261.485	19.02%
INFILL RECORDING	37.568	2.73%
INFILL LINE CHANGE	48.232	3.51%
TRAVEL	36.417	2.65%
WEATHER DOWNTIME	161.965	11.78%
PORT CALL FOR RESUPPLY/CREW CHANGE	106.101	7.72%
STREAMER CONFIGURATION AND DEPLOYMENT	207.451	15.09%
SOURCE CONFIGURATION AND DEPLOYMENT	35.083	2.55%
CALIBRATION, ARGO NAVIGATION SYSTEM	15.166	1.10%
DOWNTIME, ARGO NAVIGATION SYSTEM FAILURE	41.200	3.00%
DOWNTIME, DGPS NAVIGATION SYSTEM FAILURE	2.500	0.18%
DOWNTIME, ENERGY SOURCE FAILURE	2.950	0.21%
DOWNTIME, VESSEL EQUIPMENT FAILURE	9.233	0.67%
DOWNTIME, TRAILING GEAR EQUIPMENT FAILURE	27.966	2.03%
CALIBRATION OF ANCILLARY SYSTEMS	1.967	0.14%
INSTRUMENT TESTS	12.250	0.89%
MAINTENANCE OF TRAILING GEAR	16.533	1.20%
EMERGENCY RESPONSE PROCEDURES	38.367	2.79%
NON CHARGEABLE WEATHER	65.417	4.76%
MOBILISATION / DEMOBILISATION	25.783	1.88%
TOTAL	1375.000	

TOTAL KM RECORDED	=	13799.4000
TOTAL PROCESSABLE KM	=	13779.0000
TOTAL CHARGEABLE KM	=	11750.3500
TOTAL SURFACE KM	=	2296.5000
AVERAGE PROCESSABLE KM/DAY	=	240.5062
TOTAL CHARGEABLE HRS	=	247.765
TOTAL WEATHER HOURS	=	161.965
TOTAL RECORDED PRIME KM	=	11770.7500
TOTAL PROCESSABLE PRIME KM	=	11750.3500
TOTAL CHARGEABLE PRIME KM	=	11750.3500
TOTAL COMPLETED PRIME LINES	=	858
TOTAL FF SQUARE PRIME KM	=	260.4962
TOTAL RECORDED INFILL KM	=	2028.6500
TOTAL PROCESSABLE INFILL KM	=	2028.6500
TOTAL CHARGEABLE INFILL KM	=	0.0000
TOTAL COMPLETED INFILL LINES	=	181
TOTAL FF SQUARE INFILL KM	=	43.9288

2 SURVEY ACTIVITIES

2.1 SURVEY DIARY

18 January 1994

00:00 AUSTRAL PERSONNEL TRAVEL TO PORTLAND
17:30 Matthew Ulvr-Green arrives from Melbourne, checks into the Richmond Henty.

20:00 Frank Renton and Roger Loweth arrive from Melbourne and check into the Richmond Henty.

19 January 1994

00:00 VESSEL UNDERWAY TO PORTLAND
Sagasco and Austral personnel awaiting the arrival of the survey vessel in Portland.
07:25 Acumen system hardware collected from the freight forwarder.
07:40 Pre-survey meeting between Sagasco personnel and Austral.
08:00 PORT CALL FOR RESUPPLY
09:35 Sagasco and Austral personnel arrive on board the survey vessel.
10:00 Acumen hardware loaded on board.
13:00 General introduction meeting held for the crew, followed by discussion of operational details and contract specifications between client and contractor.
15:08 SHIPS MAGNETIC COMPASS CALIBRATION
Compass adjusted, pilot departed.
15:30 Begin adjusting the ship's magnetic compass.
16:45 Completed the magnetic compass calibration adjustment.
17:00 Acumen system operational.
17:06 TRAVEL TO ARGO CALIBRATION POINT

20 January 1994

00:00 TRAVEL TO KING IS. TO TRANSFER ØDEGAARD ENGINEER
09:30 TRAVEL TO SURVEY AREA
Harry Moller, Ramesses engineer, dropped off at Grassie dock, King Island. All GPS receivers on board, not receiving any satellite data. Problem believed to be external.
11:15 All ARGO stations operational and being received.
13:00 A safety meeting was conducted, followed by a general muster. All personnel were present and participated. All new members to the crew were shown the safety features of the vessel, and given a guide tour of the vessel.

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14:00 The GPS problem was still being investigated, with confirmation from shore-side stations that GPS satellites were being received. Vessels in the vicinity were checked and were receiving satellite information. All six receivers onboard are still not receiving data.

15:00 DOWNTIME, WORKING TO RESOLVE DGPS FAILURE.

15:05 GPS units briefly receiving satellite data. Problem unknown, investigating.

17:30 CONTINUE TO SLOWLY TRAVEL TO CENTRE OF PROSPECT
DGPS problems found to be result of broken shield connection on antenna cable at Skypod GPS antenna.

20:00 CALIBRATION, ARGO NAVIGATION SYSTEM
Start the first calibration run on heading of 033°, contractor using Direct injection as reference position.

20:11 Lost differential corrections after failure of data link, calibration data recording stopped.

20:23 Recovered the differential correction data link, restarting the calibration with run on heading of 213°.

20:43 Completed calibration run on heading of 213°, with the following indicated partial lane corrections,

Station	Partial	SD
Argo 1	+0.32	0.01
Argo 2	-0.53	0.02
Argo 3	-0.41	0.02
Argo 4	-0.35	0.01

21:15 Completed calibration run on heading of 303° with the following results

Station	Partial	SD
Argo 1	+0.31	0.02
Argo 2	-0.55	0.01
Argo 3	-0.41	0.02
Argo 4	-0.32	0.04

21:53 Completed calibration run on a heading of 033° with the following results

Station	Partial	SD
Argo 1	+0.31	0.02
Argo 2	-0.49	0.02
Argo 3	-0.40	0.03
Argo 4	-0.34	0.04

22:25 Completed final calibration run on a heading of 123°, with the following results,

Station	Partial	SD
Argo 1	+0.33	0.03
Argo 2	-0.53	0.02
Argo 3	-0.43	0.04
Argo 4	-0.37	0.07

22:30 Mean values for partial lane corrections calculated as follows

Station	Partial	SD
Argo 1	+0.32	0.020
Argo 2	-0.52	0.018
Argo 3	-0.41	0.025
Argo 4	-0.34	0.040

Acumen computed partial lane corrections using integrated system solution as follows, Argo 1 0.32, Argo 2 -0.52, Argo 3 -0.39, Argo 4 -0.32. Vessel heading south to cut baselines.

23:20 To maintain similar convention added one lane to Argo 1 and changed the partial correction to -0.68.

21 January 1994

00:00 CALIBRATION, ARGO NAVIGATION SYSTEM

01:53 Argo baseline Naracoopa/Croppies Point commenced @ heading 199°, C-O value obtained 14 m.

03:53 Argo baseline Naracoopa/Point Sorell commenced @ heading of 213°, C-O value obtained 14 m.

04:49 Argo baseline North Point/Croppies Point commenced @ heading of 185°, C-O value obtained 14 m.

06:26 Argo baseline Naracoopa/Point Sorell commenced @ heading of 33°, C-O obtained 17m.

06:48 Argo baseline North Point/Croppies Point commenced @ heading of 5°, C-O obtained 14 m.

08:50 Argo baseline Naracoopa/Croppies Point @ 19°, C-O obtained 13 m.

09:08 BASELINES COMPLETED, RETURN TO SURVEY AREA

10:00 Base station at North Point shut down to replace antenna isolator.

11:10 STREAMER CONFIGURATION AND DEPLOYMENT
Start to deploy the port streamer, #3, from the port aft streamer reel.

13:40 Argo station North Point back on the air, started to record data on Acumen to verify partial lane corrections. Asked for sample to be taken on Wisdom.

17:00 Terminated the observations on Argo partials with the following results

System	C-Os	Argo 1	Argo 2	Argo 3	Argo 4	Samples
Acumen	0.02	0.02	-0.04	-0.06	633	
Wisdom	0.04	0.03	-0.04	-0.07	2273	

17:50 Problems with the Argo mobile station, antenna detuning. Personnel start working on the problem.

21:40 Argo system back operational after cleaning earth connections at antenna.

22:20 Start another sample of Argo residuals, on both Acumen and Wisdom systems, to confirm partials.

22 January 1994

00:00 DEPLOYING AND CONFIGURING PORT STREAMER
01:30 Terminated the observations on Argo partials with the following results

System C-Os	Argo 1	Argo 2	Argo 3	Argo 4	Samples
Acumen	-0.04	-0.04	-0.06	-0.05	512
Wisdom	-0.03	-0.04	-0.08	-0.08	1993

04:25 Port streamer deployed, checking cable for problems.
04:40 Leakage evident on streamer. Turn to a heading of 34° to check cable level.
07:30 Retrieving streamer to leadin bell housing to trouble-shoot leakage problem.
09:00 Commence Argo partial comparison between Wisdom and Acumen.
10:30 Leakage found to be a damaged `O' ring at leadin head.
11:40 Start recovery of the port streamer to work on tailbuoy and balance.
12:30 Completed another set of observations on Argo residuals,

System C-Os	Argo 1	Argo 2	Argo 3	Argo 4	Samples
Acumen	-0.07	-0.04	-0.04	-0.05	799
Wisdom	-0.10	-0.07	-0.04	-0.04	N/A

13:00 Port streamer fully recovered, working on the tail buoy acoustics.
15:20 Redeploying the port streamer again, adjusting balance.
18:15 Port streamer fully deployed, tests show cable errors and power leakage.
20:30 Start to recover port streamer again to find source of problems.
21:25 Leakage and error faults found to be at modules 5 and 7, cleared by cleaning module connectors.
22:45 Port streamer onboard, preparing to deploy the centre streamer.
23:00 After recording several samples of Argo residuals over the past 36 hours, the partial lane corrections have been adjusted to the following values,

Station	Argo 1	Argo 2	Argo 3	Argo 4
Partial	-0.751	-0.589	-0.473	-0.393

These will now be observed and related to weather to see how propagation changes.

23 January 1994

00:00 CENTRE STREAMER CONFIGURATION AND DEPLOYMENT
02:00 Commenced deployment of the centre streamer.
05:45 Problems experience with section 15A, no bird communications and leadin problems being experienced.
08:00 The MARS system was tested and calibrated.
09:12 Argo partials monitored with the following results.

System C-O's	Argo 1	Argo 2	Argo 3	Argo 4
Wisdom	0.05	0.04	0.01	0.01

10:45 Trouble-shooting at the head of section 5A.
15:00 Cable deployed to front stretches. Cleaning connector to eradicate transmission line faults.
18:14 Argo partial calibration check completed with the following results

System C-O's	Argo 1	Argo 2	Argo 3	Argo 4
Wisdom	-0.06	-0.06	-0.07	-0.03

19:00 Cable fully deployed and running tests checking balance.
21:00 Deploying entire lead-in to take-up slack on reel.
22:00 Mark Donnison fell off ladder injuring left arm, suspected break.
23:00 RETRIEVE STREAMER FOR MEDIVAC
Commence retrieving centre streamer in preparation for run to Burnie, to transfer injured observer.

24 January 1994

00:00 RETRIEVING STREAMER FOR MEDIVAC
00:20 VESSEL TRANSFER TO BURNIE FOR MEDIVAC
Mark Donisson and Max Crane taken to hospital for medical reasons.
03:38 Baseline 1-4 crossed @ 190° resulting in a C-O of -6 m. Observations made at 9 knots.
05:00 Acumen system suffered total power loss due to faulty power supply terminal, the problem was rectified by 10:00hrs.
05:47 Baseline 2-4 crossed at 190° resulting in a C-O of -1 m. Observations made at 8.7 knots.
06:25 Baseline 1-3 crossed at 190° resulting in a C-O of -4 m. Observations made at 8.5 knots.
07:02 Baseline 1-4 crossed at 190° resulting in a C-O of 2 m. Observations made at 8.4 knots.
07:55 Pilot taken onboard for entry into Burnie.
08:33 VESSEL ALONGSIDE IN BURNIE
Mark Donnison and Max Crane taken for medical attention.
11:10 DEPART BURNIE, TRAVEL TO STREAMER DEPLOYMENT POINT
Vessel departed port without Mark Donnison and also without the second steward, Max Crane who has been declared medically unfit to sail again at this time.
11:57 Start observations on baseline Argo 2 to Argo 3.
12:31 Start observations on baseline Argo 1 to Argo 3.
12:52 Start observations on baseline Argo 2 to Argo 4.
13:00 Safety meeting held for all heads of department on board. Major subject of discussion and planning were the recommendations from a recent internal audit held.
13:45 First meeting of accident investigation committee meeting held in captain's cabin. Those present included Bill Williams, Win Simonton, Frank Renton, the captain Martyn Currie and Matt Sussmilch a witness to the accident.
14:42 Start observations on baseline Argo 1 to Argo 4.
14:45 Results of all baseline cuts

System C-O	Argo 1	Argo 2	Argo 3	Argo 4
Wisdom	+11.00	-1.00	-2.00	-4.00
Acumen	+10.34	+1.36	+0.50	-3.30

15:30 CENTRE STREAMER CONFIGURATION AND DEPLOYMENT
Starting to deploy the centre streamer again to rectify remaining faults and improve the balance at the same time.

501035

17:30 Argo ranges seen to be significantly different, suspect a failure of the phase lock loop system. Contractor working to rectify the fault. ALU and RPU changed out, with connection to antenna cleaned, no success.
22:25 Seismic crew working to solve transmission problems on centre streamer. All tests indicate shipside problem.

25 January 1994

00:00 CENTRE STREAMER CONFIGURATION AND DEPLOYMENT
02:15 Centre streamer fully deployed, monitoring cable depths and transmission errors.
05:05 Argo system operational, however all four stations are out by 0.3-0.4 lanes when compared to DGPS. Waiting on daylight hours for a recalibration and check against DGPS.
05:50 The X-cable pinger and 3.5 KHz phone in streamer cable #2, were tested and found to be functional.
07:30 Commence retrieving the centre streamer.
10:00 Centre streamer fully recovered.
11:20 STARBOARD STREAMER CONFIGURATION AND DEPLOYMENT
12:27 After morning's observations, all Argo ranges corrected by -0.40 in the RPU. Continue observations of range residuals.
13:42 Returned RPU calibrations to zero and inserted new C-O corrections in the Wisdom and Acumen software. Resume range residual observations.
16:50 Streamer deployed to head but problems occurring appear to be in the water, start recovery.
18:30 Station Argo 4, Croppies Point back on the air after maintenance.
19:40 Working around streamer module to try to isolate source of faults.
21:00 Streamer work halted due to problems experience in fitting new head lead-in section. To fit the replacement lead-in section, the streamer reel needed to be modified by cutting a new hole into the reel and then refitting new lead-in plug.
21:05 Completed cut of the Argo 1-4 baseline. Results noisy with C-O of 7.88 metres. Unable to go further south with streamer out at request of the co-ordinator.
22:51 Cutting operations complete, continue with lead-in installation.
23:36 Completed second pass at Argo baseline 1-4, resulting in a C-O of 3m from Wisdom and 2.6m from Acumen. The baseline crossing was a lot less noisy on the second pass.

26 January 1994

00:00 STARBOARD STREAMER DEPLOYMENT AND CONFIGURATION
01:00 Observations of the Argo system indicate a drifting of the ranges, coincidental with the Argo antenna tuning which is also presently drifting.
04:00 Starboard streamer testing good, commence redeployment of streamer.
04:30 The two SSTS hydrophones tap tested and found to be operational.
05:05 Starboard streamer fully deployed, checking balance and electrics.

07:00 Argo powered down to check antenna loading coil, found to have condensation within unit, requiring cleaning and repairing.

07:45 Found scrapes and cuts on the antenna loading coil, possible water intrusion on the coils. The coil was replaced with a spare, after repairing a small cut on the rubber seal of the coil.

08:30 The Argo antenna was placed back together again. Commence retrieval of the starboard streamer, having completed the necessary checks to the streamer.

09:10 The Argo system was returned to operational status, with no C-O changes made. The system remains under question, until either a recalibration or baseline crossing check can be performed.

10:45 DOWNTIME, ARGO NAVIGATION SYSTEM FAILURE
The starboard tailbuoy was retrieved after streamer work to the starboard cable was completed. A calibration check is to be made on the Argo system to verify the system. Start transit to the centre of the survey area.

12:00 Dropping Argo antenna mast to work on Argo problems at the ALU and antenna. After discussions with contractor's shore personnel, crew advised to use a propagation velocity of 299650 Km/sec and that the licensed frequency is 1648.1 KHz. New values entered into Acumen and Wisdom.

22:15 Completed first set of observations at a heading of 214°, at a position of 39°50.9'S, 145°49.6'E.
Results

System Res./SD	Argo 1	Argo 2	Argo 3	Argo 4
Acumen	+0.217/0.71	-0.001/0.80	-0.045/1.26	-0.054/1.65
Wisdom	+0.220/0.91	+0.010/1.82	-0.020/1.82	-0.030/2.73

22:30 Completed a second set of observations of the Argo residuals at a heading of 124°, at position 39°50' S, 145°50' E.
Results

System Res./SDs	Argo 1	Argo 2	Argo 3	Argo 4
Acumen	0.148/0.69	-0.048/1.14	-0.119/1.09	-0.130/1.16
Wisdom	0.140/1.81	-0.030/1.81	-0.080/1.81	-0.090/1.81

22:54 Completed a third set of observations of the Argo residuals at heading of 034°, at position 39°50'S, 145°50'E.
Results

System Res./SDs	Argo 1	Argo 2	Argo 3	Argo 4
Acumen	+0.183/0.48	-0.062/0.79	-0.101/0.75	-0.083/1.17
Wisdom	+0.190/0.90	-0.030/0.09	-0.070/0.90	-0.050/0.90

23:20 Completed the fourth set of observations on the Argo residuals, position remains the same and heading is 304°
Results

System Res./SDs	Argo 1	Argo 2	Argo 3	Argo 4
Acumen	+0.202/0.88	-0.057/0.84	-0.133/0.53	-0.146/1.21
Wisdom	+0.250/1.80	-0.010/0.90	-0.110/0.90	-0.130/1.80

Taking the mean from all four observations gives

System	Argo 1	Argo 2	Argo 3	Argo 4
Wisdom	+0.20	-0.02	-0.07	-0.08
Acumen	+0.19	-0.04	-0.10	-0.10

C-Os based on Wisdom values entered into both Acumen and Wisdom systems.

23:50 TS Dip completed resulting in a velocity of 1512 m/s.

27 January 1994

00:00 ARGO BASELINE CALIBRATION CHECK
Underway to cut Argo baselines.

03:45 Completed baseline Naracoopa and Croppies Point at a heading of 199°, resulting in a C-O of +17 metres.

05:44 Completed baseline Naracoopa and Point Sorell at 214°, resulting in a C-O of +18m.

06:02 Completed baseline Naracoopa and Point Sorell at 34°, resulting in a C-O of +21m.

07:46 Completed the Naracoopa and Croppies Point baseline on a heading of 19°, resulting in a C-O of +19m. A further partial check is to be made on site. Weather conditions could have been a cause of the above C-O values, and therefore should be validated by the partial check.

08:00 It was noted that the Naracoopa base station residual increased in value as the vessel moved away from the prospect area, and decreased as the vessel returned to the prospect area. Similar, but minor increases in residuals were noted on the other three stations but not to the same degree as Naracoopa.

09:45 The Argo system was switched to standby to remove the phase loop cable from the mast.

10:53 STATIC CALIBRATION OF ARGO IN SURVEY LOCATION
Back in survey block, start observations of Argo residuals on fixed headings.

11:08 Completed first set of observations of residuals on a heading of 304°
Results

System Res/SD	Argo 1	Argo 2	Argo 3	Argo 4
Acumen	+0.25/0.01	+0.01/0.01	-0.07/0.01	-0.11/0.01
Wisdom	+0.27/0.01	+0.04/0.01	-0.04/0.01	-0.08/0.01

11:32 Completed second set of observations at heading of 214°
Results

System Res./SD	Argo 1	Argo 2	Argo 3	Argo 4
Acumen	+0.25/0.01	-0.00/0.01	-0.05/0.01	-0.08/0.01
Wisdom	+0.27/0.01	+0.03/0.01	-0.01/0.01	-0.04/0.01

11:54 Completed third set of observations of the Argo residuals at a heading of 124°.
Results

System Res./SD	Argo 1	Argo 2	Argo 3	Argo 4
Acumen	+0.24/0.70	-0.01/1.36	-0.06/0.99	-0.10/0.72
Wisdom	+0.23/0.90	+0.02/0.90	-0.02/0.90	-0.07/0.90

12:35 Completed the fourth set of observations for the Argo residuals
Results

System Res/SD	Argo 1	Argo 2	Argo 3	Argo 4
Acumen	+0.20/1.17	-0.05/1.41	-0.06/0.90	-0.07/0.72
Wisdom	+0.24/1.80	-0.03/0.90	-0.01/0.90	-0.03/1.80

Taking the mean from all observations gives the following

System	Argo 1	Argo 2	Argo 3	Argo 4
Wisdom	+0.25	+0.02	-0.02	-0.06
Acumen	+0.24	-0.01	-0.06	-0.09

C-Os based on an average of Wisdom values from last night and today been entered into both Acumen and Wisdom systems as follows

Argo 1	Argo 2	Argo 3	Argo 4
-0.23	0.00	0.05	0.07

12:45 STARBOARD STREAMER CONFIGURATION AND DEPLOYMENT
Start to deploy the spare streamer to recover stretch section from the head of the streamer.
14:25 Spare streamer deployed to head, removing the head stretch and section to use as spares for the three operational streamers.
15:20 Start to recover the spare streamer.
16:30 Spare streamer recovered, preparing to deploy streamer 1.
17:00 Start to deploy the starboard streamer 1.
19:45 Streamer head module replaced on streamer 1.
20:15 Lead in deployed, starting to test streamer.
21:15 Recovering streamer 1 after seeing data spikes on data, and depth controller 1 not responding.
22:20 Streamer in to the cable head module, cleaning connections and testing. Indicators suggest section 11B bad causing problems.
22:40 Preparing to recover streamer to replace section 11B after monitoring the streamer balance.

28 January 1994

00:00 STARBOARD STREAMER CONFIGURATION AND DEPLOYMENT
01:00 Commenced retrieving the starboard streamer to 11B section to repair the MRU.
03:03 Section 11B successfully changed out.
06:40 Starboard streamer fully deployed.
07:30 Power failure in instrument room, resulting loss of power to all instrumentation.
08:00 Instrument room fully powered up again.
08:10 The starboard streamer was fully deployed out onto the vane to check tow and balance. Unable to see the MARS targets on the vane.
08:55 The SSTS pingers have been deployed to test the starboard streamer acoustic positioning.
09:25 SSTS pingers retrieved after successful acoustics test.
09:45 Errors on modules 13 & 15 necessitate the recovery of the starboard streamer for repairs, commence recovery operations.
11:30 Lead-in bypassed on starboard streamer in an attempt to determine fault on streamer.
13:00 Naracoopa base station down for maintenance check.
13:40 Base station back up and running.
14:00 Skypod tapped into the Multifix GPS receiver. The Skypod offset to the NRP changed to the same as Multifix. Unable to run Multifix and direct injection at the same time.
15:00 Configuring streamer to run with one head stretch after failure of the second stretch section.

16:30 Contractor is strongly suspicious of the lead as the cause of the leakage seen on streamer. No more spare leadins available.
18:00 Lead in bell housing found to be the cause of the leakage. Unit opened dried out and being seal with 3M Scotch Cast.
19:15 Direct injection now out of the navigation system, with the receiver being used for the Skypod.
20:30 Melbourne differential reference station now operation, but not being used.
22:55 Lead-in bell housing sealed and cable connected. Testing of the connection revealed parity errors, investigating problem.
23:20 Lead-in cleaned and reconnected, and now tests good.

29 January 1994

00:00 STARBOARD STREAMER DEPLOYMENT AND CONFIGURATION
02:15 Starboard streamer out on roller for test. The tailbuoy Skypod is only being received when tailbuoy speed is above 4 knots, ie presently running on generator power.
04:15 Retrieving starboard streamer to 5B, due to failed MRU in section 5A.
07:00 Cable deployed back out on roller after repairing faulty section.
08:25 Starboard streamer fully deployed out onto vane for full set of semi monthly tests.
08:30 SEMI MONTHLY INSTRUMENT TESTS ON STARBOARD CABLE
14:45 PORT STREAMER CONFIGURATION AND DEPLOYMENT
Instrument tests complete on the starboard streamer, start deployment of the port streamer.
16:45 Changing out section 15B because of skin damage.
17:30 Changing out section 14B because of skin damage.
19:45 Skypod ranges to tailbuoy 1 have been noisy for most of the afternoon and evening.
20:30 Removing the head stretch from the streamer to remain consistent with the port streamer.
23:15 Streamer deployed to vane.
24:00 Vessel in turn watching streamer balance and preparing to run instrument tests on port streamer.

30 January 1994

00:00 STARBOARD AND PORT STREAMER CONFIGURATION
00:20 Retrieving starboard streamer to head section to re-ballast.
03:25 The streamer separation was measured using SSTS and found to be 205 metres. The lay-back for the starboard streamer is 281 metres and 286 metres for the port cable.
03:45 Commence preparations for the deployment of the gun strings for offset check with SSTS.
05:15 SOURCE CONFIGURATION CHECK WITH SSTS/LASER
The port source was prepared for a check on the SSTS offsets for the system configuration.

05:45 Commence deploying port gun arrays.
09:30 All port gun arrays fully deployed, ready for testing.
10:30 Port source check nearly completed after gun positions altered.
10:50 Testing completed on the port source, commence preparation to deploy and test the starboard source arrays.
12:00 Continue to work on adjusting and measuring gun string geometry.
13:00 A general muster followed by a fire drill were conducted, with a simulated casualty on the back deck. The new fire control muster was put to the test during this drill.
14:45 Multifix system down, reference stations erratic. GPS raw position seems to be good.
18:00 Continue measuring and adjusting offsets to the gun strings.
19:30 Wisdom system halt, clear and reload.
20:35 Second Wisdom NIU sourced system halt.
21:00 Port gun paravane crossed over cable tow wire, recovering all gun strings before starting to work to untangle.
22:20 All gun strings recovered and tow wires untangled.
22:30 All gun vanes on board.

31 January 1994

00:00 SOURCE CONFIGURATION AND DEPLOYMENT
All guns onboard, commence turning to fair seas.
00:20 Commenced recovery of guns in preparation for retrieval of streamers.
01:00 STREAMER RE-BALLAST AND DEPLOYMENT
01:30 SSTS pingers retrieved.
02:05 Turn complete with streamers running straight, commence retrieving vanes and streamers.
05:15 NON CHARGEABLE WEATHER DOWNTIME
Streamers onboard waiting for weather to ease. Tailbuoy number 1 on the starboard streamer found to have battery voltage of 5.6 volts and this was probably the reason for the poor performance of the Skypod unit.
06:00 Weather force 6-7 from the East, with rough seas with swell up to 4 metres.
07:15 Vessel remaining on site, down for weather. New batteries installed in the tailbuoys.
12:00 Two generators installed on each tailbuoy to ensure sufficient power is supplied to the batteries in the tailbuoys.
12:40 Vessel turned to west and heading for King Island. Wind is blowing 20-30 knots from the west with moderately rough seas slowly but steadily moderating.
14:40 Vessel turned around again to a reciprocal heading. Contractor very undecided as to what to do.
18:00 Contractor preparing to deploy the port streamer.
18:30 Contractor changes plan again, decides not to lay cable. Wind still blowing 25-30 knots but seas moderate with little or no swell.
23:00 Contractor still standing by for an improvement in the weather, wind 25-30 knots from the east, pitch and roll less than 3 degrees with heave measured on the fathometer as less than 2 metres.

1 February 1994

00:00 NON CHARGEABLE WEATHER
Deploying the port streamer.
00:40 Preparing to deploy the port streamer. Weather conditions thought to be safe, by contractor for redeployment.
00:55 STREAMER CONFIGURATION AND DEPLOYMENT
04:20 Port streamer fully deployed out onto vane.
05:00 Commence deployment of the starboard streamer.
08:30 Starboard streamer fully deployed onto vane. Checking SSTS for cable separation.
08:43 Wisdom reloaded after system halt.
09:13 Unable to successfully see good Digicourse acoustic networking between streamers, on Acumen system. Assume that cause is due to Digicourse set up, with windowing problems on acoustic returns; receiving compass data for both streamers.
10:00 Starboard cable recovered, oil added to the head stretch and redeployed to the vane again.
10:15 SOURCE CONFIGURATION AND DEPLOYMENT
Start to deploy gun strings for geometry measurement and adjustments.
12:00 SSTS seems unable to provide an accurate solution to source positioning because of poorly calibrated gun and pinger depth transducers.
12:22 Port gun strings deployed to position with SSTS.
13:00 Multifix computer found to have timing problem. No spare after last night's accident with the desktop Compaq.
14:41 Argo 3 master for chain, to allow station 2 to clean connectors.
14:48 Starboard gun strings deployed and being positioned using SSTS.
16:55 Several problems found with SSTS, recovering all gun strings and SSTS depth transducers for calibration.
18:00 Station 2 back on the air as master.
19:00 New Multifix software downloaded from Singapore but to no avail, still suffering from the same timing fault.
21:45 After further effort checking data transmission paths within the Multifix system, the system resumed operation with data which if anything looks quieter than before. Will monitor the signal quality to verify performance.
22:30 CENTRE STREAMER CONFIGURATION AND DEPLOYMENT
Start deployment of the centre streamer, tailbuoy launched.

2 February 1994

00:00 CENTRE STREAMER CONFIGURATION AND DEPLOYMENT
Centre streamer back in position after reeling in to avoid tangle of crossed tailbuoys. Starting a set of semimonthly tests on all streamers.
02:50 Centre streamer deployed out onto roller. Tests good, however it appears as if the centre streamer is crossed over the port streamer. Both port and starboard streamers have been sunk and the centre streamer raised in an attempt to uncross the streamers.
05:30 Tailbuoys still crossed. Instrument tests being run on the centre streamer.

06:00 RUNNING A SET OF SEMI MONTHLY TESTS
Centre streamer fully deployed after partial recovery to avoid tailbuoy tangle.
07:30 Multifix not running, investigating the reason why.
08:00 Changing out the Multifix and Skypod Trimble receivers in an attempt to resolve the clock timing problem in Racal's system.
08:25 SSTS pingers deployed, for tests on streamers.
10:00 Start to lay the gun strings in deteriorating weather.
10:50 Weather conditions deteriorating still, contractor recovering source again.
11:30 All gun strings recovered and on board.
12:00 VESSEL NOW STANDING BY FOR WEATHER
Instrument tests continuing. Vessel now standing by for an improvement in weather and sea conditions.
21:30 Contractor's technical staff complete their tests on the WG24 system. Start to recover the streamers. No improvement in the weather but no deterioration either. Forecast is still for about 24 hours of the same weather and sea conditions.
22:20 Starboard vane winch wire broke during recovery operations.

3 February 1994

00:00 NON CHARGEABLE WEATHER
00:35 Both tailbuoys secured onboard. Commence travel to King Island.
06:30 Vessel now heading for the west coast of King Island and Currie harbour.
10:30 GMU wired to take two pingers as inputs.
12:00 NON CHARGEABLE WEATHER
On station about 0.75 nautical mile off Currie Harbour preparing to launch zodiac for shore run to collect spares and mail.
12:18 Zodiac launched and away with two personnel on board. Significant shortcomings in contractor's procedures with respect to safety. Spare zodiac not inflated and standing by with crew, no quick release line, no utilisation of survival suits.
13:00 Zodiac returned from King Island with spares, made fast on board. Survey vessel preparing to steam back to the prospect area.
21:00 102 kilometres from the survey area, proceeding at 5 knots back towards the prospect. Weather/sea conditions have marginally improved since afternoon.

4 February 1994

00:00 VESSEL RETURNING TO PROSPECT
04:30 Vessel back on prospect, waiting on weather.
06:00 Weather conditions moderating with wind from SE at 22-33 knots, rough seas with swell 2.5-3 metres.
08:00 Argo residuals gradually becoming excessive throughout morning, possible Argo calibration drift.
08:30 Weather conditions moderating with wind from ESE at 15-20 knots and moderate seas with swell 1-2 metres.

08:55 Port tailbuoy switched on in readiness for deployment. Skypod receiver being received.
09:45 STREAMER CONFIGURATION AND DEPLOYMENT
11:10 Argo system retuned, the residuals are slightly better; will monitor the system.
11:35 Argo system calibration seen to be drifting, switched off and then on to reacquire timing. Phase lock loop is making no appreciable difference to the calibration i.e. removal of the loop circuit does nothing to residuals.
12:30 Carried out a visual check on all antenna connections and ground wires, phase loop cables removed and sprayed out before reconnection.
14:45 Still working to eliminate leakage at the tail of streamer, no appreciable amount of streamer deployed as yet.
15:30 Changed out the mobile RPU and retuned to higher values, then start observations on residuals.
18:00 Port streamer out to section 4A which has been replaced, continue deployment.
19:00 Port streamer fully deployed taking down to working depth and testing balance.
20:30 Port paravane deployed.
21:15 Port streamer deployed to paravane.
22:20 Start deployment of the starboard streamer.

5 February 1994

00:00 STREAMER CONFIGURATION AND DEPLOYMENT
01:40 Port streamer fully deployed out onto the port vane. Testing streamer while preparing centre streamer for deployment,
03:00 All cables tested good commence deploying the centre streamer.
05:00 Centre streamer fully deployed, commence testing on system.
05:20 Centre streamer retrieved to head stretch to re-ballast.
05:45 Centre streamer redeployed out onto tow position.
06:40 SOURCE CONFIGURATION AND DEPLOYMENT
07:00 Argo residuals less than 5 metres, after retuning. Ground cable on RPU re-terminated, phase loop tuning better, resulting in better Argo tuning. Running full set of daily tests on streamers.
7:25 SSTS pingers placed in the water.
09:10 Melbourne reference station off the air.
09:45 FINAL CHECKS ON STREAMER AND INSTRUMENTS
10:35 Cross cable SSTS problem resolved with the reassignment of SSTS receivers. Receivers are now on streamers 2 and 3 , with pinger on streamer 1.
11:15 Commence turn back to prospect to attempt first line.
13:52 RUN IN TO LINE YOL00013
14:00 Resume reception of differentials from Melbourne Multifix reference station.
15:52 UNABLE TO START LINE, WISDOM HALT, CIRCLING
Wisdom halted on final approach to start of line, exact cause unknown as yet.
19:53 RECORDING LINE YOL-00013
20:39 LINE CHANGE
22:23 RECORDING LINE YOL-00205

23:51 LINE CHANGE

6 February 1994

00:00 LINE CHANGE
Line change consider excessive.
03:44 RECORDING LINE YOL-00055
04:39 LINE CHANGE
LRS-100 gun controller being repaired, boards being tested for faults.
06:30 RECORDING LINE YOL-00247
Channel 113 on the starboard and centre streamers were spiking throughout the line.
08:09 LINE CHANGE
10:39 RECORDING LINE YOL-00019
11:27 LINE CHANGE
13:18 RECORDING LINE YOL-00211
14:46 LINE CHANGE
16:25 RECORDING LINE YOL-00061
17:21 LINE CHANGE
19:01 RECORDING LINE YOL-253
20:36 LINE CHANGE
22:48 RECORDING LINE YOL-00025
23:38 LINE CHANGE

7 February 1994

00:00 LINE CHANGE
01:21 RECORDING LINE YOL-00199
Starboard gun array firing on the odd shots.
02:44 LINE CHANGE
04:14 RECORDING LINE YOL-00067
05:10 LINE CHANGE
06:43 RECORDING LINE YOL-00259
08:18 RETRIEVE TRAILING GEAR AND TRANSIT TO PORTLAND
10:00 All gun arrays on deck and secured. Commence preparations for the retrieval of the streamers.
13:45 All streamers on board, start transit to Portland for port call and resupply.

8 February 1994

00:00 TRANSIT TO PORTLAND FOR CREW CHANGE
10:30 Pilot on board, ready for entrance into Portland.
11:00 Vessel alongside Portland fuelling wharf. Commence bunkering and loading of stores.
13:00 Meet with Stewart Thirwell to discuss the operational problems and status.
14:00 Roger Loweth departed for Melbourne.

19:00 Rod Waldron arrived from Melbourne, and commenced handover with Frank Renton.

9 February 1994

00:00 PORT CALL FOR RESUPPLY/CREW CHANGE
07:00 Frank Renton departed Portland for Melbourne.
12:15 Vessel departed Portland for survey area.
13:00 Safety meeting held in mess room. All crew members were present. Contractors commitment to safety was re-iterated for the benefit of new crew members. After the safety meeting joining crew were taken on a safety orientation tour of the vessel.

10 February 1994

00:00 VESSEL RETURNING TO PROSPECT
06:00 Tailbuoys fully checked out ready for deployment. Argo checked, for position quality, residuals less than 5 metres.
06:15 DEPLOYMENT OF STREAMERS
08:00 The Skypod antenna was remeasured and found to be 16.4 metres, this was entered into Wisdom.
09:00 Port streamer fully deployed into the water, presently testing on the roller. Problems with the SSTS system being experienced; 6 dB gain increments not functioning.
09:10 Experiencing problems in testing the port streamer, problem thought to be onboard.
10:45 Fault found to be, the SDI board which was subsequently changed out. A problem was then discovered at section 5B.
11:00 SSTS transducers lowered, ready for use.
11:30 Recovering port cable to repair fault at section 5B.
15:30 Port cable deployed after changing section 5B. Testing cable.
16:00 Deploying stbd streamer cable.
20:00 Starboard streamer fully deployed on paravane.
21:30 Starboard streamer test OK. Start deploying centre streamer cable.

11 February 1994

00:00 DEPLOYING STREAMER
01:30 Centre streamer deployed out onto tow.
03:45 New cable head section installed on the centre streamer after spiking noted on the streamer after SSTS pinger was transmitting.
04:55 Centre streamer deployed out onto tow.
06:00 Commence deploying gun strings.
10:00 Gun strings fully deployed, heading for line.
11:16 RECORDING LINE YOL-00049
12:09 LINE CHANGE

13:51 RECORDING LINE YOL-00217
15:19 LINE CHANGE
16:56 RECORDING LINE YOL-00031
18:50 LINE CHANGE
19:29 RECORDING LINE YOL-00265
Random swell noise starting to become evident on cables due to worsening weather. Noise is completely random and of short duration so is not compromising data quality to any extent.
21:05 LINE CHANGE
22:46 RECORDING LINE YOL-OOO73
23:46 LINE CHANGE

12 February 1994

00:00 LINE CHANGE
01:21 RECORDING LINE YOL-00193
02:48 LINE CHANGE
04:14 RECORDING LINE YOL-00037
05:05 LINE CHANGE
Weather moderating, sea conditions decreasing.
06:44 RECORDING LINE YOL-00271
08:26 LINE CHANGE
10:01 RECORDING LINE YOL-00079
10:59 LINE CHANGE
12:35 RECORDING LINE YOL-00223
14:08 LINE CHANGE
15:50 RECORDING LINE YOL-00007
16:35 LINE CHANGE
18:21 RECORDING LINE YOL-00229
19:52 LINE CHANGE
21:26 RECORDING LINE YOL-00001
22:11 LINE CHANGE

13 February 1994

00:00 RECORDING LINE YOL-00277
SSTS data inoperative from SP 640 to EOL due to broken rope on the starboard pinger. There is adequate networking from the laser and Digicourse acoustics systems for front end positioning.
01:44 LINE CHANGE
03:23 Starboard pinger repaired, found broken swivel.
03:30 WEATHER DOWNTIME
Attempt at line aborted due to weather conditions. Port SSTS pinger rope parted during turn onto line. Turned fair seas to recover and repair pinger. Unable to control streamer balance in rough seas.
04:00 Weather Easterly at 20-25 knots, with sea/swell 2-3 metres.

06:00 Weather conditions are force 5-6 from the East, with seas of 2-3 metres. Streamers riding at 15 metre depths, swell occasionally surfacing streamers.
06:45 Port pinger redeployed, having fixed swivel.
07:00 Pingers retrieved from water, waiting on weather.
07:40 Retrieving gun arrays on board until weather moderates. Forecast indicates a general degrading of conditions over the next 48 hours.
08:00 Sea and swell 2-3 metres, with 20-30 knot Easterly wind.
08:30 Argo phase loop down to 55. All stations out by 0.1-0.2 lanes. Argo powered down and back up, no improvement.
08:45 Gun arrays and paravanes on board, for safety reasons.
11:00 Noise test taken in shooting direction, at 10 metre depth, average noise 6 µBars. Making preparations for deployment of gun strings.
12:30 Weather ESE Force 6, rough seas, 2-2.5 metre swell. Further noise tests with cables at production depths and on line headings confirm noise levels good. Start deploying gun arrays. Wind and seas have swung to the south east. Line direction across the face of the swell making it possible to work.
15:15 Gun arrays deployed, start deploying SSTS pingers.
15:20 SSTS pingers deployed.
16:30 Weather SE force 6, rough seas, 3-3.5 metre swell. Heading towards line.
17:00 DOWNTIME, ARGO NAVIGATION SYSTEM FAILURE
Argo system not operational. Antenna system shorted out and no signals being received. Aborted attempt to get onto line and turning fair seas to work on Argo antenna. Dismounted Argo antenna and cleaned all connections to eliminate leakage short to ground.
19:40 Cleared leakage short from Argo antenna and antenna remounted.
19:50 Argo signals being received after cleaning connections. Heading into survey area to check calibration of Argo.

14 February 1994

00:00 DOWNTIME, ARGO NAVIGATION SYSTEM FAILURE
01:29 Completed Argo cal at heading of 034°, resulting in the following.

System C-O's/SD	Argo 1	Argo 2	Argo 3	Argo 4
Acumen	-0.40/0.01	-0.08/0.01	-0.10/0.01	-0.09/0.01
Wisdom	-0.43/0.01	-0.11/0.01	-0.12/0.01	-0.11/0.01

02:14 Commence second Argo calibration run at heading of 214°.
02:21 Argo calibration terminated due to a failure of instrument room power.
02:50 Power in the instrument room back on.

05:21 Completed Argo calibration #2, at heading of 214° resulting in

System C-O's/SD	Argo 1	Argo 2	Argo 3	Argo 4
Wisdom	-0.43/0.01	-0.12/0.01	-0.13/0.01	-0.13/0.02
Acumen	-0.40/0.01	-0.08/0.01	-0.10/0.01	-0.11/0.02

The values eventually applied in the Wisdom, and similarly in the Acumen area:

-0.43	-0.12	-0.13	-0.12

08:12 RECORDING LINE YOL-00241
Line started at SP 129 due to gun misfires, also a block edit occurred during the line between SP 585-604 due to a badly recorded tape.
09:43 LINE CHANGE
10:30 Argo signals good and stable. During previous line Argo tracking well, so swapped to Argo as prime positioning system.
11:34 RECORDING LINE YOL-00085
Argo used as primary positioning system.
12:35 LINE CHANGE
14:14 RECORDING LINE YOL-00313
16:01 LINE CHANGE
17:56 RECORDING LINE YOL-00043
18:50 LINE CHANGE
20:27 RECORDING LINE YOL-00235
21:57 LINE CHANGE
23:02 RECORDING LINE YOL-00121

15 February 1994

00:00 RECORDING LINE YOL-00121
Line recorded using Multifix as primary navigation source.
00:09 LINE CHANGE
01:48 RECORDING LINE YOL-00307
Line recorded using Argo as primary navigation source. Line aborted early due to power failure in instrument room, LGSP 485.
02:51 RECORDING ROOM POWER FAILURE
Due to a power failure in the recording room, line YOL-00307 was terminated early. Power failure similar time frame to previous day's failure.
03:31 Power back up and running, continue with line change, circling to complete line YOL-307.
06:08 RECORDING LINE YOL-10307
Resumed line YOL-00307, line number changed to YOL-10307 to designate reshoot/repeat of prime line.
06:50 LINE CHANGE
08:23 RECORDING LINE YOL-00127
09:33 LINE CHANGE
Navigation personnel trying to resolve the problems with tailbuoys. Problem believed to be the number of satellites enabled on the Skypod system.
11:27 RECORDING LINE YOL-00301
13:10 LINE CHANGE

14:56 DOWNTIME, VESSEL EQUIPMENT FAILURE ATTEMPT AT LINE
Recording was in progress on line YOL-00091 when the clean power to the instrument room failed and all instruments shut down. Only two kilometres of data was recorded so all data for the line was scratched and the vessel circled off line.
15:13 DOWNTIME, VESSEL EQUIPMENT FAILURE
Vessel circling after loss of power to the instrument room.
15:30 Instrument power restored to recording room. Powering up instruments.
17:36 RECORDING LINE YOL-00283
19:15 LINE CHANGE
20:49 RECORDING LINE YOL-00187
Line recorded with Multifix as primary navigation, due to erratic signals from Argo system.
22:10 LINE CHANGE
23:42 RECORDING LINE YOL-00289

16 February 1994

00:00 RECORDING LINE YOL-00289
Multifix used as primary navigation system throughout this line.
01:26 LINE CHANGE
03:00 RECORDING LINE YOL-00115
Argo system used as primary navigation system.
04:09 LINE CHANGE
05:47 RECORDING LINE YOL-00295
Streamer noise levels high, due to sea conditions. Ramesses stack section looks acceptable, for recorded noise levels. Vessel recording lines in troughs.
07:30 LINE CHANGE
09:14 RECORDING LINE YOL-00091
Line terminated early as centre streamer cable surfacing due to sea conditions. LGSP 185. Unable to control cable balance in worsening sea conditions. Standing by for weather conditions to improve. Streamer compasses and acoustics noted as having above average SD's.
10:01 WEATHER DOWNTIME
Winds of 35-40 knots gusting to 50 knots causing rough seas and swells of 3-4 metres. Circling near survey area waiting for weather to moderate.
10:45 Centre streamer back down at level. Streamer depths lowered to 15 metres to avoid damage in worsening sea conditions.
12:25 Start picking up gun arrays to avoid damage in rough seas.
13:50 Guns on board.
18:00 Weather conditions: NW wind at force 6, 2.5-3 metre rough seas.
23:59 Weather: Wind W at 45 knots, with rough seas 3-4 metre swells.

17 February 1994

00:00 WEATHER DOWNTIME
03:30 Weather from the West at force 7, with rough seas, 2-3 metres.
06:30 Westerly weather at force 6, rough seas slowly easing.
07:00 Harmonics test performed on streamers, as part of daily tests, has identified three faulty channels. Channels 8 on the centre streamer, and 95,96 on the port streamer have failed the T3 harmonics test.
08:20 Commence deploying gun strings, weather easing, from the West at force 5, with moderate seas and 2 metre swell.
10:30 Gun arrays fully deployed.
11:32 WEATHER DOWNTIME - ATTEMPT LINE YOL-00337 ABORT
Line was attempted, but aborted due to centre streamer surfacing on final turn. Unable to return cable to depth, circling from opposite direction. Centre cable possibly slightly incorrect in ballasting, resulting surfacing problem.
14:44 WEATHER DOWNTIME - ATTEMPT LINE YOL-00097 ABORT
An attempt was made to record line on a heading of 214°. High winds and rough seas caused the attempt to be aborted soon after the start of the line. Balance on all cables was uncontrollable and noise levels were excessive. All data for the line was scratched.
Winds of 25-30 knots, rough seas with a swell of 2-3 metres.
17:55 WEATHER DOWNTIME - ATTEMPT LINE YOL 00319 ABORT
An attempt to record line YOL-00319 on a heading of 034° was aborted on the run in due to weather conditions. Cable balance on all cables was uncontrollable in rough seas and a swell of 2-3 metres.
Wind SW at force 6, rough seas 2-3 metre swell.
21:37 RECORDING LINE YOL-00181
Tailbuoy acoustics inoperative, with starboard and port tailbuoys GPS responding well.
22:57 LINE CHANGE

18 February 1994

00:00 LINE CHANGE
01:13 RECORDING LINE YOL-00337
Tailbuoy acoustics inoperative throughout line.
03:01 LINE CHANGE
05:06 RECORDING LINE YOL-00109
A source block edit occurred on this line with SP 406-374 being edited due to starboard gun array misfires. The port array fired correctly during this period.
06:14 LINE CHANGE
08:02 RECORDING LINE YOL-00319
The centre streamer surfaced during the line resulting a block edit between SP 300-380. Argo was used as the primary navigation system for this line.
09:46 LINE CHANGE

11:34 Lost differential correction data from Multifix system, presently navigating on Argo. No up link from Adelaide or Sydney.
11:38 RECORDING LINE YOL-00157
Multifix DGPS differential data not being received. Telecom land line problems stopping relay of data to uplink station. Argo used as prime nav positioning system.
12:52 LINE CHANGE
13:00 Fire drill and muster held.
13:23 Differential data for Multifix DGPS back on the air and being received.
14:52 RECORDING LINE YOL-00331
Recording on line stopped early due to rough weather causing cable balance to become unstable. Cables #2 & #3 starting to surface in centre in rough seas. Last good shot point on line 499. Winds force 5-6 rough seas 2-3 metre swell. Cable #2 segment edit from shot point 133 to 210, tail sections on surface. Primary navigation system changed from Argo to Multifix at SP 221, due to the instability of the Argo system.
16:17 WEATHER DOWNTIME
Circling to attempt a line on a bearing of 214°.
18:00 Winds force 6 rough seas 3-4 metre swell.
18:23 Attempted to record line YOL-00163 at 214°. Line aborted and all data scratched due to excessive noise and cable balance problems in rough seas. Running to attempt a line in the opposite direction.
22:10 RECORDING LINE YOL-00325
Multifix used as prime positioning system.
23:59 LINE CHANGE

19 February 1994

00:00 LINE CHANGE
01:49 RECORDING LINE YOL-00097
Argo used as primary positioning system.
02:50 LINE CHANGE
04:48 RECORDING LINE YOL-00343
The line was terminated early due to gun array volumes below specification, LGSP is 593. At SP 502 navigation system changed to Multifix prime.
06:15 LINE CHANGE
07:31 Changed back to Argo as prime positioning system.
08:12 RECORDING LINE YOL-00151
09:27 LINE CHANGE
11:27 RECORDING LINE YOL-00349
13:20 LINE CHANGE EXTENDED FOR GUN WORK.
16:03 RECORDING LINE YOL-00103
17:07 LINE CHANGE
19:19 RECORDING LINE YOL-00379
21:15 LINE CHANGE
23:22 RECORDING LINE YOL-00163

20 February 1994

00:00 RECORDING LINE YOL-00163
Using Multifix as primary navigation source. Multiple tape errors experienced during line; QC's checking tapes for data integrity.
00:39 LINE CHANGE
02:37 RECORDING LINE YOL-00355
03:27 Argo base 4 dropped a lane.
04:33 LINE CHANGE
05:30 Informed of Sequence 8, line YOL-00253 incorrectly numbered first shot. Original first SP number was 110, should be 115; correct distance travelled, positions correct.
05:40 DOWNTIME - PORT PULLAVANE TOW HARNESS BROKEN
A chain on the port streamer pullavane broken. The vane was towing sideways as a result. Commence retrieving guns to repair.
06:34 Argo base 4 dropped a lane.
07:00 Guns onboard, unable to retrieve vane assembly due to main winch wire jammed.
07:50 Guns and vane onboard prepare to retrieve port streamer pullavane.
08:40 Port streamer pullavane on board, a broken chain on the tow harness was responsible for the pullavane fault.
09:45 Commence deploying pullavane, having repaired the broken chain. The Mars target was not repaired due to inability to weld safely in present sea conditions.
10:30 Port cable deployed on pullavane and under tow. Turning towards line and preparing to deploy gun arrays.
14:29 RECORDING LINE YOL-00373
Using Argo as primary positioning system.
16:28 LINE CHANGE
18:15 RECORDING LINE YOL-00133
Multifix used as primary positioning system from shot point 140 as Argo ranges unstable.
19:26 LINE CHANGE
21:11 RECORDING LINE YOL-00367
23:07 LINE CHANGE

21 February 1994

00:00 LINE CHANGE
00:52 RECORDING LINE YOL-00139
Multifix used as positioning source.
02:05 LINE CHANGE
03:58 RECORDING LINE YOL-00361
Ramesses indicating a 3 µBar difference in power output per shot, between port and starboard gun arrays, on all streamers. QC's investigating the possible cause of this fault.
05:51 LINE CHANGE

07:36 RECORDING LINE YOL-00145
Vessel navigating on Argo as prime navigation source.
08:52 LINE CHANGE
10:47 RECORDING LINE YOL-00385
11:00 A first report of accident was submitted by Richard Libke, who injured his ankle while jogging around the helideck, no time was lost as a result of the injury.
12:40 LINE CHANGE
14:23 RECORDING LINE YOL-00169
15:40 LINE CHANGE
17:52 RECORDING LINE YOL-10331
Completion of line stopped for weather on 18/2/94.
18:38 LINE CHANGE
19:57 RECORDING LINE YOL-00175
21:20 LINE CHANGE
23:13 RECORDING LINE YOL-00415

22 February 1994

00:00 RECORDING LINE YOL-00415
Multifix used throughout this line due to noisy Argo signals.
01:06 LINE CHANGE
03:09 RECORDING LINE YOL-00727
04:41 LINE CHANGE
Harmonic tests indicate channel #8 on centre streamer, now passing daily tests. Channel #8 now enabled, for next line.
06:35 RECORDING LINE YOL-00475
Digicourse acoustic pod 16 now erratic, due to failing batteries.
08:23 LINE CHANGE
10:04 RECORDING LINE YOL-00667
11:39 LINE CHANGE
12:20 Argo base 3 to master station, for repairs to base 2.
12:25 Base 2 set to standby while checking station.
12:35 Base 2 now back up on the air and running.
13:34 RECORDING LINE YOL-00391
15:26 LINE CHANGE
15:38 Base station 2 now set back to master station.
17:18 RECORDING LINE YOL-00721
18:52 LINE CHANGE
20:43 RECORDING LINE YOL-00421
22:36 LINE CHANGE

23 February 1994

00:00 LINE CHANGE
00:30 RECORDING LINE YOL-00673
Multifix used for prime positioning system.
02:07 LINE CHANGE
03:50 RECORDING LINE YOL-00481
Numerous missed shots as a result of tape deck hangup.
05:42 LINE CHANGE
07:13 RECORDING LINE YOL-00715
08:43 LINE CHANGE
10:35 Base station 2 down, changing out RPU and running station tests.
11:11 Base station 2 back on the air. A new RPU was installed, station back as master.
11:18 RECORDING LINE YOL-00427
13:07 LINE CHANGE
14:49 DOWNTIME, VESSEL EQUIPMENT FAILURE - AIR CON
An attempt at line YOL-00679 was aborted soon after the start of line. Airconditioning to the recording room failed causing an overheating problem with the instruments. Intermittent time break failures were occurring on line and the 4% misfire limit was exceed. All data for the line was scratched.
15:29 DOWNTIME, VESSEL EQUIPMENT FAILURE - AIR CON
Circling while waiting for recording room air conditioning to be repaired.
18:06 RECORDING LINE YOL-00487
19:57 LINE CHANGE
21:33 RECORDING LINE YOL-00679
23:10 LINE CHANGE
Changing SSTS phone on string 7.
23:40 Added 2 lanes to base 4.

24 February 1994

00:00 LINE CHANGE
New C-O's applied to Argo base stations. New C-O's are #1 -0.36 ; #2 -0.09 ; #3 -0.07 ; #4 -0.05 lanes. these have been applied in the Acumen system.
01:15 RECORDING LINE YOL-00433
Multifix used throughout line due to noisy Argo signals.
03:01 LINE CHANGE
04:04 Argo signals stable, now being used as primary positioning system.
05:03 RECORDING LINE YOL-00733
Argo is being used as primary positioning system.
06:33 LINE CHANGE
08:19 RECORDING LINE YOL-00493
Multifix used as prime system, throughout the line.
10:03 LINE CHANGE
11:33 RECORDING LINE YOL-00685
13:07 LINE CHANGE
15:19 RECORDING LINE YOL-00397

17:15 LINE CHANGE
19:10 RECORDING LINE YOL-00709
20:45 LINE CHANGE
22:26 Argo signals becoming noisy, switched to Multifix as primary positioning system.
22:55 RECORDING LINE YOL-00409

25 February 1994

00:00 RECORDING LINE YOL-00409
00:49 LINE CHANGE
02:38 RECORDING LINE YOL-00691
04:16 LINE CHANGE
06:05 Argo signals stable. Using Argo as primary positioning system.
06:06 RECORDING LINE YOL-00499
Cargo vessel passing ahead of Atlas causing minor screw noise, back ground noise levels increased by 2-3 µBars.
07:57 LINE CHANGE
09:29 RECORDING LINE YOL-00751
10:50 LINE CHANGE
12:43 RECORDING LINE YOL-00451
13:00 Abandoned ship drill. All crew not on work duties attended.
14:36 LINE CHANGE
16:15 RECORDING LINE YOL-00697
Line was stopped nine shot from the end of line due to a program freeze on the Wisdom II navigation system. As only nine shots were missed the line is considered complete.
The MARS ranging system was not operating during the line as the ranging head aboard the vessel was dismantled to allow a medivac helicopter to land on the helideck. The MARS ranging unit is mounted on the after edge of the helideck and would be in the way of any helicopters landing.
17:49 LINE CHANGE
18:00 A helicopter arrived aboard the vessel to medivac the third engineer ashore. The engineer was suffering from a boil on the buttocks and swelling of the groin. A medical and accident report is included in section 5.5 of this report.
18:12 Helicopter departed for shore with medivac engineer. Westerns field service engineer Dan Posey and instrument supervisor Tommy Trotter departed with the helicopter as well.
19:51 RECORDING LINE YOL-00469
21:42 LINE CHANGE
23:23 RECORDING LINE YOL-00661

26 February 1994

00:00 RECORDING LINE YOL-00661
Prime positioning system changed from Argo to Multifix due to noisy Argo signals.
01:03 LINE CHANGE
02:57 RECORDING LINE YOL-00403
Multifix changed to prime positioning system at SP 220 due to noisy Argo signals.
04:48 LINE CHANGE
05:10 Informed by Racal London that Skypod should be run in filtered output mode. The could explain the erratic data observed on tailbuoys.
06:34 RECORDING LINE YOL-00703
08:06 MAINTENANCE OF TRAILING GEAR
With weather conditions being very calm it was decided to take the opportunity to try and activate the acoustic pods on the tail buoys. The vessels' work boat was prepared to carry out the work. These pods had been down for several days and sea conditions had not allowed the launch of the work boat with reasonable safety.
08:20 Zodiac away for tailbuoy repairs. Replaced acoustic pod #24 on port streamer. The power/data cables to the port and centre tailbuoys were repaired. Pods 18 and 25 now operational. The repair crew were unable to fix the power/data cable to acoustic pod 11, due to severed cable.
11:05 The zodiac team returned to mother ship and secured onboard. Cable tests show Streamer module #1 dead in port cable. Start retrieving gun arrays in preparation for picking up cable.
13:30 Guns on board, picking up port paravane and head of port cable.
16:15 Port cable deployed. Changed streamer module #1, tests show cable good. Start deploying gun arrays.
17:45 Gun arrays deployed, heading for line.
18:52 Tail buoys crossed on cable, sending skiff to untangle buoys.
20:08 Work boats secured on board. Cables still crossed.
20:30 Recovered port gun arrays. Turning to port to try and untangle cables.
21:20 Cable untangled, start deploying port guns.

27 February 1994

00:00 MAINTENANCE OF TRAILING GEAR
00:38 RECORDING LINE YOL-00775
Multifix used throughout line due to noisy Argo signals.
02:00 LINE CHANGE
04:04 RECORDING LINE YOL-00445
Multifix used as prime positioning system.
05:56 LINE CHANGE
07:37 RECORDING LINE YOL-00739
Argo used as primary positioning system.
09:07 LINE CHANGE
10:58 RECORDING LINE YOL-00463

12:45 LINE CHANGE
13:00 Safety committee meeting held to discuss general safety concerns onboard.
14:34 WEATHER DOWNTIME - ATTEMPTED LINE YOL-00769
An attempt was made to record the line, but worsening weather conditions caused problems with cable balance and noise levels throughout the line. All data for the line was scrapped due to noise levels, cable balance and excessive screw noise from the vessel trying to pull hard into rough seas.
16:03 WEATHER DOWNTIME - WAITING FOR WEATHER TO MODERATE
16:50 The paravane for the starboard gun array broke loose and was lost. Starboard gun strings towing in a tangle behind vessel. Start picking up all trailing equipment.
17:55 All gun arrays on board. Start picking up cables.
21:20 Cables on board. Lost starboard tail buoy during pick up. Trying to recover tail buoy.
23:10 Recovered drifting tail buoy. Lost GPS Skypod off the tail buoy. Heading back to the fix position where gun paravane was lost to look for paravane. Weather conditions were bad at the end of the day. Winds of 30+ knots, rough seas and a swell of three metres. Vessel was searching for lost gun array paravane.

28 February 1994

00:00 WEATHER DOWNTIME - SEARCHING FOR LOST PARAVANE
While standing by waiting for weather to moderate the vessel was searching for the gun paravane that was lost the previous day.
00:35 All Argo stations reading 0.3-0.4 lanes short. Phase loop reading 85.
00:45 Argo powered down to investigate source of lane problems. It was noted that there is intermittent continuity on the phase loop.
00:45 Commence search for gun pullavane.
02:00 Weather conditions experienced, were rough seas at 20-30 knot SW wind.
08:00 Sea conditions rough, with winds from SW at 30 knots, and slowly increasing.
08:15 EMERGENCY RESPONSE PROCEDURES - MEDIVAC TO BURNIE
While enroute to Burnie, maintenance was being carried out on all cable acoustic pods, compasses and tail buoys.
08:15 Search abandoned for missing gun pullavane, commence transit to Burnie for medivac transfer of Tom Koleske. ETA Burnie 1600 hrs. Full report for medivac included in section 5.5 of this report.
12:30 In sheltered waters, start working on ARGO phase loop problem. Dropped Argo mast and cleaned all connectors.
14:30 Argo operational, phase loop problem cleared.
15:30 Pilot boat from Burnie alongside. Unable to transfer sick crew member as pilot boat too low in water. Underway to Burnie docks for transfer.
16:09 Alongside dock in Burnie. Seismic personnel Tom Koleske disembarked for medical treatment.
16:15 Departed Burnie for survey area after disembarking sick crew member.
17:00 Transferring spare paravane from upper deck storage to gun deck in sheltered waters.
19:00 Transfer of paravane completed. Underway to survey area, crossing base lines enroute.

20:40 Crossing Argo baseline #1 Naracoopa - #3 Point Sorell
Results:-

WISDOM II	Fit 13 metres long.
	Raw 9 metres long
	Filter 8 metres long
ACUMEN	Computed 243140
	Observed 243154
	Diff 13.6m Long

21:31 Crossing base #2 North Point - Croppies Point
Result:-

WISDOM II	Fit 9 metres long
	Raw 2 metres long
	Filter 0 metres long
ACUMEN	Computed 197907
	Observed 197913
	Diff 6.6m long

1 March 1994

00:00 EMERGENCY RESPONSE PROCEDURES- RETURN TO PROSPECT
00:06 Commence baseline #3.
00:15 Completed baseline #3 Naracoopa - Croppies Point.
Result:-

Wisdom II	Fit	13 metres long
	Raw	11 metres long
	Filtered	11 metres long.
Acumen	Computed	311949 metres
	Observed	311960 metres
	Diff	11 metres long

00:16 Commence heading towards prospect, for cable deployment.
02:00 WEATHER DOWNTIME - DEPLOYING CABLES.
The vessel arrived back in the survey area and started to deploy the cables. Weather conditions were improving and the time taken to deploy the trailing equipment was logged as weather downtime. This was done as the trailing equipment was originally recovered due to bad weather conditions.
04:30 Section 6B changed out on the port streamer to repair groups 95 & 96 that were dead during previous period of production. Streamer tests good, continue deploying.
06:40 Port streamer fully deployed out on vane.
07:05 Commence deploying the starboard streamer.
11:20 Starboard streamer fully deployed out on pullavane. Waiting on the repair of the centre tailbuoy, which is presently inoperative.
13:00 Centre tail buoy Skypod operational. Start deploying centre cable.
17:55 Centre cable deployed on paravane. Section 1B changed to fix group 8 that was bad during previous period of production. Running tests on all cables.

18:05 All cables test good. Start deploying gun arrays.
19:30 Starboard gun arrays deployed on paravane. Start deploying port gun arrays.
21:20 Port gun array deployed. Turning towards line.

2 March 1994

00:00 WEATHER DOWNTIME - HEADING TO LINE YOL-00535
02:49 RECORDING LINE YOL-00535
Argo used as prime positioning system. All streamer groups operational.
04:40 LINE CHANGE
06:13 RECORDING LINE YOL-00781
Argo used as prime system. Channel 9 on centre streamer showing bad on Ramesses system; WG24 system indicating good, edited from records.
07:38 LINE CHANGE
09:29 RECORDING LINE YOL-00505
11:15 LINE CHANGE
12:28 DOWNTIME, TRAILING GEAR EQUIPMENT FAILURE
On the run in to line the paravane that was lost on 28/2/94 was sighted. The attempt at line was aborted and preparations made to retrieve the paravane. The paravane had to be retrieved as it was a hazard to navigation and to the survey operations.
12:36 Start retrieving gun arrays to recover paravane.
13:25 Guns aboard. Work boat away to try and tow paravane to vessel.
13:55 Work boat unable to tow paravane. Returning to vessel.
14:40 Work boat away to attach lifting strops and lights to paravane.
15:25 Work boat returned and secured aboard vessel. Turning fair seas to recover cables.
16:00 Start recovering cables.
18:30 Cables aboard. Returning to location of paravane to recover same.
19:30 Work boat away to assist in recovery of paravane. Vessel manoeuvring to recover paravane.
20:15 Paravane recovered and secured on board. Work boat secured aboard.
20:25 Commence deploying starboard cable.
22:50 Starboard cable fully deployed and under tow on paravane. Start deploying port cable.

3 March 1994

00:00 DOWNTIME, TRAILING GEAR EQUIPMENT FAILURE
01:10 Port streamer fully deployed out on vane.
01:55 Commence deploying centre streamer.
04:00 Changing out section 1A, in an attempt to rectify the failing channel 9 problem.
04:55 The centre streamer is fully deployed.
05:05 Commence deploying gun arrays.

07:15 Guns fully deployed, heading for line. Only one tailbuoy presently working, navigators working on receiving other tailbuoys. Acoustic network at tail end good.
07:37 RECORDING LINE YOL-00847
Argo used as prime positioning system. Tailbuoy 1 and 2 inactive due to no response. Channel 9 on centre streamer noted as having low frequency amplitude distortion, detected by Ramesses.
08:50 LINE CHANGE
10:42 RECORDING LINE YOL-00511
12:27 LINE CHANGE
14:07 RECORDING LINE YOL-00745
15:37 LINE CHANGE
16:30 Skypod UHF antenna changed out, in an attempt to rectify tailbuoy problem.
17:41 RECORDING LINE YOL-00457
19:24 LINE CHANGE
21:15 RECORDING LINE YOL-00769
Argo used as prime positioning system.
22:39 LINE CHANGE

4 March 1994

00:00 LINE CHANGE
00:45 RECORDING LINE YOL-00565
Argo used as prime location system.
02:31 LINE CHANGE
04:20 RECORDING LINE YOL-00655
05:59 LINE CHANGE
07:38 RECORDING LINE YOL-00529
09:21 LINE CHANGE
10:58 RECORDING LINE YOL-00763
12:18 LINE CHANGE
13:00 Safety meeting conducted, with general safety and committee meeting minutes discussed. All non-essential personnel present.
14:22 RECORDING LINE YOL-00439
16:12 LINE CHANGE
17:56 RECORDING LINE YOL-00757
19:22 LINE CHANGE
Argo becoming noisy switched to MULTIFIX as prime positioning system.
21:02 RECORDING LINE YOL-00541
Multifix used as prime positioning system throughout line.
22:48 LINE CHANGE

5 March 1994

00:00 LINE CHANGE
00:30 RECORDING LINE YOL-00805
Multifix used as primary positioning system for majority of line.
01:50 LINE CHANGE
03:25 Argo signals stable, now used as prime positioning system.
03:42 RECORDING LINE YOL-00571
SSTS noisy, sufficient acoustic systems to hold network in place.
05:27 LINE CHANGE
07:01 RECORDING LINE YOL-00787
08:25 LINE CHANGE
10:19 RECORDING LINE YOL-00523
12:09 LINE CHANGE
13:52 WEATHER DOWNTIME - ATTEMPTED LINE YOL-00811
The attempt at line on a bearing of 214° was aborted on the run in to line due to adverse weather conditions. Noise levels on the cables were high at 10 µBar, cable balance was unstable and the SSTS was intermittent. Rough seas and a large swell were on the bow of the vessel. Running to attempt a line in the opposite direction.
17:35 WEATHER DOWNTIME - ATTEMPTED LINE YOL-00457
An attempt at line on a bearing of 034° was aborted on the run in due to rough seas causing excessive cable noise. Winds 30-35 knots, rough seas and a 3.5 metre swell.
22:05 Aborted attempt at line YOL-00811 on a bearing of 214°. Rough seas causing excessive noise on cables. Winds 30-35 knots, rough seas and a swell of 3.5-4.0 metres.
23:59 All clocks set back by 1 hour to comply with daylight saving.

6 March 1994

00:00 WEATHER DOWNTIME
01:23 WEATHER DOWNTIME ATTEMPTED LINE YOL-00559
The line was attempted, due to reasonable noise levels on streamers, but was aborted, due to excessive SSTS positioning, a block edit for guns (2 km), flip flop miss match. All data was scratched for this line attempt. Line heading for this attempt was 034°.
01:52 WEATHER DOWNTIME ATTEMPTED LINE YOL-00793
Line run in aborted due to excessive seas, average noise approximately 15 µBars.
02:00 Weather conditions: Rough seas with wind from SW at force 6-7, and swells of 3-4 metres.
05:15 WEATHER DOWNTIME
09:24 RECORDING LINE YOL-00517
Argo used as prime positioning system throughout this line.
11:12 LINE CHANGE
13:16 RECORDING LINE YOL-00799
14:36 LINE CHANGE

16:52 RECORDING LINE YOL-00559
SSTS acoustic ranges noisy due to sea conditions. Ranges stable enough to give good positioning fixes. Digicourse computer failure caused loss of compass and acoustic data between shot points 758-764. Computer rebooted and good data from shot point 764 for rest of line.
18:35 LINE CHANGE
20:30 RECORDING LINE YOL-00793
Argo becoming noisy, changed to Multifix as prime positioning system at shot point 596.
21:51 LINE CHANGE

7 March 1994

00:00 LINE CHANGE
00:04 RECORDING LINE YOL-00547
Argo used throughout line as prime positioning system.
01:53 LINE CHANGE
03:47 RECORDING LINE YOL-00811
Line commenced at SP 614 due to Wisdom hangup (Preplot shots 633-615 missed). Source firing in flip-flop mode, ie. starboard guns firing on odd shots.
05:01 LINE CHANGE
06:43 RECORDING LINE YOL-00595
08:29 LINE CHANGE
10:00 RECORDING LINE YOL-00853
11:10 LINE CHANGE
13:07 RECORDING LINE YOL-00589
14:51 LINE CHANGE
16:20 RECORDING LINE YOL-00817
Shot point 433, Argo signals becoming noisy showing in line jumps. Switched to Multifix as prime positioning system.
17:36 LINE CHANGE
19:24 RECORDING LINE YOL-00601
21:12 LINE CHANGE
22:42 RECORDING LINE YOL-00841
Starboard gun array, had an extra 150 in^3. gun enabled from SOL-SP 196, producing a 1.2 µBar nett power increase in signal response (Ramesses). This portion of the line was accepted. Argo used as prime positioning system throughout the line.
23:56 LINE CHANGE

8 March 1994

00:00 LINE CHANGE
01:03 RECORDING LINE YOL-00553
Argo used as prime positioning system until SP 299, changed to Multifix.
03:48 LINE CHANGE
05:16 Argo signals stable, now being used as primary positioning system.
05:23 RECORDING LINE YOL-00649
Argo used as primary positioning system.
07:04 LINE CHANGE
08:42 RECORDING LINE YOL-00607
Argo used as primary positioning system throughout line.
10:26 LINE CHANGE
11:58 RECORDING LINE YOL-00859
Line finished 9 shot points early due to WISDOM system program crash. Line is considered complete.
13:05 LINE CHANGE
15:06 RECORDING LINE YOL-00583
16:54 LINE CHANGE
18:35 RECORDING LINE YOL-00643
Shot point 566, Argo signals becoming unstable, switched to Multifix as primary positioning system for remainder of line.
Fourteen random shots missed during line due to problems with the WG-24 recording system tape decks. Percentage missed shots less than 0.2%.
20:21 LINE CHANGE
22:09 RECORDING LINE YOL-00613
23:49 LINE CHANGE

9 March 1994

00:00 LINE CHANGE
01:15 RECORDING LINE YOL-00823
Multifix used for the entire line.
02:33 LINE CHANGE
04:23 RECORDING LINE YOL-00577
Multifix used as primary positioning system.
06:09 LINE CHANGE
07:42 RECORDING LINE YOL-00835
08:54 LINE CHANGE
10:52 RECORDING LINE YOL-00619
12:38 LINE CHANGE
14:25 RECORDING LINE YOL-00829
15:39 LINE CHANGE
15:44 Argo signals becoming noisy, switched to Multifix as primary positioning system.
17:19 RECORDING LINE YOL-00631
Shot points 204 to 233 edited due to incorrect record length of four seconds.
19:04 LINE CHANGE

501064

21:06 RECORDING LINE YOL-00637
Multifix used as prime positioning system.
22:52 LINE CHANGE

10 March 1994

00:00 LINE CHANGE
00:45 RECORDING LINE YOL-00625
Multifix used as prime positioning system. This line is the last prime line acquisition for the prospect.
02:29 LINE CHANGE
04:36 INFILL RECORDING YOL-01187
This is an infill line for segment 2,3,4 gathers for original line YOL-00187. Argo used as prime navigation source.
05:53 INFILL LINE CHANGE
07:39 INFILL RECORDING YOL-01367
This is an infill line of segment 2,3,4 gathers, for line YOL-00367.
09:32 INFILL LINE CHANGE
10:00 It has been noted that since 09/03/94 higher then normal Argo residuals have been seen. Calibration statistics have been gathered, since sequence 143, but with the move to the Eastern portion of the block, further observations will be required, before applying new calibration figures..
11:29 INFILL RECORDING LINE YOL-01133
Infill line recorded for segment 3,4 gathers on CMP line 133.
12:31 INFILL LINE CHANGE
14:19 WEATHER DOWNTIME ATTEMPTED INFILL LINE YOL-01349
An attempt at infill line YOL-01349 was aborted at the start of line due to cable noise and balance problems caused by adverse weather conditions. Noise levels were up to 12 µBars and the balance of the cables was unstable with the port cable trying to surface. All data for the line was scratched. Winds were force 5 with a moderate sea, however a long swell of 3 metres was the source of the cable problems.
15:34 Attempted to record reshoot line YOL-10343, but attempt was aborted at the start of line due to weather conditions.
17:04 INFILL RECORDING LINE YOL-01145
Infill line recorded for segment 2,3,4 gathers on CMP lines 145, 146.
18:05 INFILL LINE CHANGE
19:51 INFILL RECORDING LINE YOL-01349
Infill line recorded for segment 2,3,4 gathers on CMP lines 349, 350, 351.
20:27 LINE CHANGE
21:02 RECORDING LINE YOL-10343 (RESHOOT EDITED LINE)
Reshoot of block edits on CMP line 344, 345, 346, 347, 348.
21:33 INFILL LINE CHANGE
23:40 INFILL RECORDING LINE YOL-01067
Recording infill line for segment 3,4 gathers on CMP lines 00071, 00072.
A suite of WG-24 semi-monthly tests was run during the day. The tests passed the on board analysis.

11 March 1994

00:00 INFILL RECORDING LINE YOL-01067
This line was shot as infill, for segment 3,4 gathers on Original CMP lines 71,72. Line recorded with Multifix as positioning system.
00:32 INFILL LINE CHANGE
02:23 INFILL RECORDING LINE YOL-01343
Multifix in use for entire line. This line shot as infill for segment 2,3,4 gathers on CMP lines 341,342,343.
04:07 INFILL LINE CHANGE
05:30 WEATHER DOWNTIME ATTEMPTED LINE YOL-01115
Line attempt aborted due to excessive sea conditions. Sea at the time were force 6 with SW wind and 2-3 metre swell.
06:38 WEATHER DOWNTIME ATTEMPTED LINE YOL-10091
Line aborted on run in due to excessive sea conditions. Weather from SW at force 7 with swell of 3-3.5 metres.
07:10 Commence recovery of gun strings.
08:00 WEATHER DOWNTIME - WAITING FOR WEATHER TO MODERATE
12:00 Weather SSW force 6, rough seas and three metre swell.
13:00 Emergency fire drill. Concluded at 13:20 hrs. A simulated fire in the galley, with the second steward missing was tested.
18:00 Weather SW @ force 5, rough seas and 3 metre swell. Start deploying gun strings.
18:23 Starboard gun strings deployed.
21:15 Weather SW force 6, rough seas and 3.5 metre swell. Recover the starboard gun strings.

12 March 1994

00:00 WEATHER DOWNTIME
03:15 Commence deploying guns. Weather easing.
04:44 All guns fully deployed. Heading for line YOL-01469. Weather easing with wind from SE at force 5, with moderate-rough seas, and 2.5 metre swell.
07:12 INFILL RECORDING LINE YOL-01469
Multifix was used as the prime positioning system throughout this line. The line was shot for segment 2,3,4 gathers on CMPs 472,473,474.
09:02 INFILL LINE CHANGE
11:15 INFILL RECORDING LINE YOL-01115
Line was recorded for gathers of segments 2,3 & 4 on CMP lines YOL-00119 & 00120.
12:09 LINE CHANGE
13:36 RECORDING LINE YOL-10319
Reshoot of a segment edit on line YOL-00319 for CMP line 321 and 322. Shot point 300 was supposed to be the first shot of the reshoot, but an incorrect entry by the navigators resulted in this shot being missed. Shot point 301 was the first shot recorded on the reshoot line.
13:49 LINE CHANGE

15:23 RECORDING LINE YOL-10091
The line was a reshoot of a block edit on line YOL-00091 for CMP lines 00091, 00092, 00093, 00094, 00095, 00096. A large feather angle did not help the coverage with only segments 1 & 2 achieving full cover. Segments 3 & 4 did not achieve full coverage on the last three CMP lines in swath.
15:49 INFILL LINE CHANGE
17:32 INFILL RECORDING LINE YOL-01421
Infill line recorded for segment 3,4 gathers on CMP lines 421,422.
18:56 INFILL LINE CHANGE
20:58 WEATHER DOWNTIME
Attempt at infill line YOL-01055 was aborted on the run in to the line due to adverse weather conditions. Winds of 30 knots gusting to 40 knots from the south west were causing rough seas and a large swell of 3.5 metres.

13 March 1994

00:00 WEATHER DOWNTIME
02:56 INFILL RECORDING LINE YOL-01055
The line was shot as an infill line, for segment 2,3,4 gathers on CMPs 58,59,60. Line shot using Multifix.
03:50 INFILL LINE CHANGE
05:48 INFILL RECORDING LINE YOL-01451
The line was shot as infill, for segment 2,3,4 gathers on CMP lines 451,452,453,454.
07:34 LINE CHANGE
09:30 RECORDING LINE YOL-10109
Argo used for positioning system. This line was a reshoot line for the original 109 edited due to a starboard gun array misfire block edit between SP 406-374 on the 18/02/94.
09:36 INFILL LINE CHANGE
10:07 INFILL RECORDING LINE YOL-01085
Line shot with Argo as positioning system. Line was steered along sail line course of 85, but was a sail line 91 segment 3,4 gather for the reshoot attempted on the 12/03.
10:31 INFILL LINE CHANGE
12:19 INFILL RECORDING LINE YOL-01439
Infill line for segments 3 & 4 gathers on CMP line 444.
13:21 INFILL LINE CHANGE
15:08 INFILL RECORDING LINE YOL-01679
Infill line recorded for segments 3,4 gathers on CMP line 681,682.
16:00 INFILL LINE CHANGE
17:40 INFILL RECORDING LINE YOL-01487
Infill line for segment 2,3,4 gathers on CMP lines 491,492,493.
Argo signals becoming noisy at shot point 754. Switched to Multifix as primary positioning system for rest of line.
19:21 INFILL LINE CHANGE

21:00 WEATHER DOWNTIME - ABORT ATTEMPT AT LINE YOL-01667
An attempt to record infill line YOL-01667 was aborted on the run in due to excessive cable noise caused by rough sea and a large swell. Winds were 35-40 knots with rough seas and 3.5 metre swell.
23:00 Weather conditions worsening. Start picking up gun arrays to avoid damage to them in the rough seas.

14 March 1994

00:00 WEATHER DOWNTIME
Weather at start of day, was wind from SW at force 7, with rough seas and 3 metre swell.
06:00 Weather abating, with winds of force 5 from SSW with moderate to rough conditions and 2 metre swell.
07:00 All gun deployed, heading for line. Acoustic pod #9 not responding at tail end of streamer #1.
07:32 ABORTED RUN IN AIR LEAK ON GUNS
Line run in aborted due to air leak on gun strings. Circling on line to fix gun string #3.
10:29 INFILL RECORDING LINE YOL-01517
Infill line for segment 2,3,4 gathers on CMP lines 517,518,519.
10:30 During a telephone conversation between Matt Ulvr-Green of Austral and Doug Roberts of SAGASCO, it was agreed that the two infill lines in the north west area of the survey block could be acquired in the opposite direction to their original acquisition. This action was taken to limit the amount of travel between lines.
12:00 A first report of injury was submitted for Brett Higgins, who injured his left hand while deploying guns, on the 2nd of March. No visible bruising or broken skin was noted, nor did it affect his use of the hand. A few days after the incident he notice numbness in his fingers and lower fore arm. Medical treatment will be sought at the next port call.
12:18 INFILL LINE CHANGE
14:06 INFILL RECORDING INFILL LINE YOL-01739
Infill line recorded for segment 2,3,4 gathers on CMP lines 742,743,744.
15:34 INFILL LINE CHANGE
17:11 INFILL RECORDING LINE YOL-01637
Recorded as infill line for segment 2,3,4 gathers on CMP lines 635,636,637,638. Lines 637 and 638 were acquired in the opposite direction of the original sail line recording. This was caused by the seam between two shooting directions of the block running between CMP lines 636 and 637.
Reshoot data for lines 631,632,633,634,635,636 were also acquired at the start of the line between shot points 204 and 232. Only partial recovery was achieved as the vessel could not swing far enough across the lines without missing infill on the other lines, which was the primary target of the recording pass.
18:54 INFILL LINE CHANGE
20:25 Argo signals becoming noisy, switched to Multifix as primary positioning system.

20:37 INFILL RECORDING LINE YOL-01709
Multifix primary positioning system for line.
Infill line recorded for seg 2,3,4 gathers on CMP lines 713,714.
22:13 INFILL LINE CHANGE

15 March 1994

00:00 INFILL LINE CHANGE
00:06 INFILL RECORDING LINE YOL-01499
The line was shot using Multifix. This was an infill line for the original sail line 499, for segments 2,3,4 on CMP lines 503,504,505.
01:59 INFILL LINE CHANGE
03:40 INFILL RECORDING LINE YOL-01667
Line shot using ARGO, and acquired as infill for segments 3,4 on CMP lines 668 and 669.
04:00 Second steward Andy Richman, dislocated his shoulder. Medical advice was sought, and advised by doctor for transfer off vessel. Administered morphine for the shoulder area.
05:13 INFILL LINE CHANGE
06:00 EMERGENCY RESPONSE PROCEDURES - MEDIVAC
The vessel turned off the run-in to line YOL-01595, to ensure correct direction for helicopter transfer. Second steward Andy Richman due to be transfer for medical reasons.
06:20 MARS dismantled in preparation for chopper arrival.
06:40 Vessel advised of chopper arrival at 0715 hrs.
07:34 Helicopter onboard.
07:59 Helicopter departed with Andrew Richmond. Commence turning back towards line.
08:00 Contacted SAGASCO (Stewart Thirwell) to inform him of the medivac operation being performed.
10:00 Acoustic pod 6 failed on the starboard streamer, no 2 way ranging from this unit. SSTS and laser ranging, combined with one way ranging from pod 6 sufficient networking at front end. The following lines require fill from two CMPs, therefore port and centre streamers will be steered to acquire the majority infill to favour the starboard networking problem.
10:07 INFILL RECORDING LINE YOL-01835
Infill line recorded for segment 2,3,4 gathers on CMP lines 834,835,836.
Recording was in the opposite direction of original sail line, as per the agreement reached via a telephone conversation with Doug Roberts of SAGASCO on 14/3/94.
11:06 INFILL LINE CHANGE
12:47 INFILL RECORDING LINE YOL-01751
Infill line recorded for segment 3,4 gathers on CMP lines 751,752.
13:55 INFILL LINE CHANGE
15:12 INFILL RECORDING LINE YOL-01595
Infill line recorded for segment 2,3,4 gathers on CMP line 595,596,597.
16:32 INFILL LINE CHANGE

18:19 INFILL RECORDING LINE YOL-01685
Infill line recorded for segment 3 and 4 gathers on CMP lines 687 and 688.
19:51 INFILL LINE CHANGE
20:57 INFILL RECORDING LINE YOL-01817
Infill line recorded for segment 2,3,4 gathers on CMP lines 821 and 822. Line was recorded in the opposite direction to original sail line as per agreement with Doug Roberts of SAGASCO during a telephone conversation of 14/3/94.
21:49 INFILL LINE CHANGE
23:51 INFILL RECORDING LINE YOL-01649

16 March 1994

00:00 INFILL RECORDING LINE YOL-01649
Line shot using Argo, for segment 3,4 gathers on CMP lines 653,654.
00:55 INFILL LINE CHANGE
03:48 INFILL RECORDING LINE YOL-01661
The line was recorded with a combination of Argo and Multifix systems. The infill line was for segments 3,4 on CMP lines 661,662.
05:13 DEMOBILISATION - END OF YOLLA SURVEY
This concludes the Yolla 1 survey, with all lines gathered. Commence retrieving trailing gear for run to baselines then port.
05:20 Start retrieving gun arrays.
06:52 Gun arrays and paravanes on board. Turning fair seas to retrieve cables.
09:00 Start retrieving cables and cable paravanes.
11:10 Cables on board. Underway to Burnie for crew change and preparation for Rocky Cape 2D survey.
15:29 Crossing baseline between stations 1 and 4. Base line crossing results:-

Acumen Results		Wisdom results	
Calculated	311949	Calculated	311949
Observed	311958	Observed	311958
C-O	9m	C-O	9m

17:54 Crossing base line between stations 2 and 4. Base line crossing results:-

Acumen results		Wisdom Results	
Calculated	197907	Calculated	197907
Observed	197913	Observed	197913
C-O	6m	C-O	6m

18:37 Crossing base line between stations 1 and 3. Base line crossing results:-

Acumen		Wisdom	
Calculated	243140	Calculated	243139
Observed	243151	Observed	243152
C-O	11m	C-O	13m

19:29 Base line crossing between base stations 2 and 3. Base line crossing results:-

Acumen		Wisdom	
Calculated	116291	Calculated	116291
Observed	116299	Observed	116300
C-O	8m	C-O	9m

19:45 Finished with Argo base stations. Released stations from net.
20:40 Vessel at anchor off Burnie, waiting for daylight, to enter port.

17 March 1994

00:00 DEMOBILISATION - END OF YOLLA 1 SURVEY
Vessel anchored off the port of Burnie waiting for daylight to enter port.
06:00 DEMOBILISATION - END OF YOLLA 1 SURVEY
Pilot aboard, moving alongside dock in Burnie.
07:00 NON-SURVEY RELATED ACTIVITIES
Vessel alongside in Burnie preparing for Rocky Cape 2D survey. All activities for Rocky Cape survey to be reported as a separate survey report.

2.2 PERFORMANCE AND CONCLUSIONS

VESSEL

The M.V. Western Atlas proved to be an excellent work platform for the collection of seismic data. The vessel is very well laid out to accommodate the seismic equipment and the working areas are very spacious. The accommodation and amenities provided for the crew are of a very high standard.

The engineering side of the vessel performed with reliability and there were only three incidents of lost time caused by a failure to the vessels equipment. Two of these occurred when the circuit breaker on the recording room power supply panel tripped. The loss of power to the instruments caused a circle on both occasions. The cause of this was traced to poor design and installation of the circuit breaker box and this will be rectified during the vessels next refit.

The third incident of vessel equipment failure was the airconditioning to the instrument room. This caused overheating problems with the instruments and forced a circle until the airconditioning was repaired.

SAFETY DISCUSSION

The safety standard of the vessel was very good during the period that it was employed on the SAGASCO survey. Regular safety drills were carried out and safety meetings held throughout the survey. Safety equipment was maintained and kept in good repair by the deck crew under the supervision of the chief mate.

The crews attitude towards safety though adequate was sometimes rather blase', with some crew members taking the attitude that safety drills and meetings were more a nuisance than a necessity. This attitude could be rectified by a more direct hands on approach towards safety by the contractor. Though the contractor maintains a safety department there is very little hands on dealings with the vessel's crew. Safety policy is set by the contractors safety department, but safety policy aboard the vessel is generally under the control of the captain and co-ordinator who at times have conflicting ideas. This causes confusion among the crew members, particularly after a crew change when different personnel try to implement different safety policies.

The contractors safety director generally visits the vessel during port calls, but does *NOT* ride the vessel to give direction to the crew on safety policy. This is the time that the safety director should be available to set policy, as the working environment at sea is entirely different to a set of preconceived ideas that are formulated ashore, and only by experiencing these conditions first hand can safety policy be formulated by trained personnel.

Marine crew personnel are trained in safety to the standard required by the DOT to obtain their seaman or officers ratings. Seismic personnel undergo a training scheme aimed at the offshore oil exploration environment at various training centres around Asia. This training includes firefighting techniques, survival at sea and the helicopter HUET course. Refresher courses are taken every two years, and in this area the contractors safety policy is excellent.

Several medivac procedures were carried out during the survey and these are detailed in section 5.5 of this report. Two of the medivac procedures were necessitated by illness while the others were necessary due to injuries.

WEATHER & CURRENTS

Weather conditions were generally good for the Bass Strait area with a total of 162 hours of chargeable downtime and 65.4 hours of non chargeable down time being accrued. These hours reflect 11.8% and 4.8% of the total survey time respectively.

Most of the downtime occurred whenever a weather front moved through the survey area. Once the weather front had passed through the area, sea conditions calmed down appreciably and swell noise on the cables dropped to acceptable levels. Seas to 2.5 metre swells and moderate seas were generally considered as workable, with any swells higher than 3.0 metres and rough seas generating too much noise on the cables, or causing cable balance problems and stopping production.

During the set up phase of the survey some concern was expressed on the reluctance of the contractor to deploy trailing equipment during periods of marginal weather conditions. This resulted in lost time on January 31 while waiting for the weather to moderate. Though, it is the contractors responsibility to protect his trailing equipment from damage caused by extremely rough sea conditions, it was felt by the SAGASCO QC that the contractor was being over cautious. It was the QC's opinion that the contractor could have started to deploy the trailing equipment twelve hours sooner, as soon as the weather had started to moderate. The period in question did not have any bearing on the charging for the contract as it was during the start up phase of the survey. The concern was that the same situation would arise when weather downtime was chargeable, thereby incurring unnecessary cost to SAGASCO.

Once the survey was started this situation did not occur again. This was due in part to a change of co-ordinators during the crew change of February 8, and partly because weather conditions did not make it necessary to recover the trailing equipment until February 27 when very rough sea conditions caused a paravane to break loose from the starboard gun arrays. All trailing equipment was recovered to sort out the tangled gun arrays caused by the loss of separation when the paravane broke loose and to search for the missing paravane. A medivac situation on February 28 and not weather conditions delayed the deployment of the trailing equipment for almost 18 hours.

After production had commenced and during periods of rough weather the gun arrays would be recovered to prevent further damage, such as the incident on Feb 27. The cables would be lowered to 15 metres to reduce the affect of the swell and minimise any damage that might occur.

Currents did not cause any problems during the survey. Feather angles were excellent with the majority of lines recorded with feather angles of less than 2°. Rarely did the feather angle exceed this figure and then only went as high as 5°. At no time did the feather angle cause stoppage of data acquisition.

RECORDING INSTRUMENTS

The WG24 set of instruments are state of the art for seismic acquisition and they proved this by their reliability through out the course of the survey. There was not any lost time due to instrument failure, though there were some edited segments of lines mainly due to tape deck problems. These edited segments were minor and in areas of the survey that did not require reshooting, such as on the edge of the survey block. Data quality was excellent and the display of the data for QC purposes was very good.

The seismic QC side of the instruments did give problems at various times throughout the survey, due mainly to software faults causing hang ups in the system. This did not interfere with the data collection as the QC functions of the system are not vital to the WG24 data collection functions. Data quality during these periods could be verified by playing back and displaying the affected portion of data during the following line change.

STREAMER

Pullavane jerk, noted at front-end of port and starboard streamers were evident throughout the prospect. The cause of this was the use of one stretch section between the pullavane and first group, thereby not providing enough dampening between the pullavane motion and the front of the cable. The initial setup used two stretch sections per streamer, but due to Western's world wide shortage of spares, the vessel could only employ one section per streamer. This affected the first ten to twenty groups of the cable and had a very low frequency.

The streamer ballasting, was set from the start of the job, and in general was fairly good. The centre streamer was notably more unreliable due to positive balance near the centre of the streamer. This was rectified on Feb 26 during trailing gear maintenance and from that point on was quite reasonable.

Section failure was minimal, with the only notable failure was that of section 8 on the port streamer and channel nine on the centre streamer. These failures appeared after a period of weather down time. They were repaired during the cable pick up on March 1. There after the only section failure was a low amplitude problem in section 9 of the port streamer. All other groups in the cable performed without any problems.

ENERGY SOURCE

The LLP air guns used on the western atlas proved to be a very reliable energy source. Though 2.9 hours of production were lost due to the failure of the energy source this amounted to only 0.21% of the survey total and is an infinitesimal amount when taken in the context of the survey. The cause of the failure was a broken fitting on a gun and not a fault in the gun design or the maintenance performed on the gun arrays. The gun crews were all very experienced and kept the maintenance to the energy source up to the very highest standards.

NAVIGATION SYSTEMS

MULTIFIX

The Multifix system performed well, with the exception of the system failure on 18th of February, when the land line up link failed due to an OTC problem.

Melbourne base station was mobilised by Racal, at the beginning of the survey, and was used, in conjunction with Adelaide and Sydney, for the entire survey.

The pseudo range corrections were generally below 1 metre, and all stations were within three metres of the derived position.

There were no periods of down-time attributed to the Multifix system, whether due to hardware or satellite availability. PDOP and satellite numbers were within contractual specifications.

ARGO

The initial installation on vessel needs to be questioned due to the problems that resulted in the initial phase of the survey. The calibration figures derived from the comparison of the system with that of Multifix, on the centre of prospect does not allow for the full effects of propagation, which can be experienced on during the survey. A calibration of individual base stations against a system such as Miniranger, can determine the exact velocity function for each station, and thus a velocity function can be used to adjust for conditions when propagation changes, such as weather pattern changes.

Fortunately minimal down-time was attributed to the ARGO system, due to the backup Multifix system. Of the down-time incurred, most of this was because of the vessel installation, bad earthing and poor condition of equipment. Regular antenna maintenance and cleaning (soot) also aided in better performance of the system.

Baseline checks performed indicated the correct setting of the system velocities and propagation factors. The final calibration figures applied, on the 24th of February were the most true and correct, for the survey.

The initial placement of the base stations also needs to be addressed as a station could have been placed on the Victorian shore to provide better ARGO velocity determinations. The station locations inherently generated velocity errors, which could have been alleviated with the use of the above station configuration.

SHOTPOINT SPACING

The shot spacing was generally within a few centimetres of 25 metres when averaging along a whole line. The standard deviation observed for the mean of those values varied between 0.8 and 2 metres. The variation seen is directly related to the reliability of the positioning systems used and is smoothed both in Acumen and the Wisdom systems.

MARS LASER SYSTEM

The Mars system performed reasonably well, however the primary problem with the system resulted from the poor configuration of the remote reflectors. The contractor used single target reflectors, which with their proximity to the water usually resulted in the reflector filling with water. A better configuration of reflectors needs to be examined, possible multiple reflectors in a rotary arrangement, as used by other contractors.

Conditions of fog, resulted in the failure of the system, along with rough sea conditions resulting in the reflectors becoming immersed in water.

DIGICOURSE SYSTEM

Compasses

The performance of the compasses was generally very good with compass standard deviation often below 1 metre. All compass/birds conformed to compass specifications, with those failing the initial calibration listed in the Appendix B.
The only degradation seen, was the depth keeping reliability due to reduced battery charge, something that all birds suffer from.

The magnetic declination used by Acumen was 12.4°, with the contractor deriving a magnetic declination for the individual streamers between 12.32° and 12.49°, from the observed cable rotations to tailbuoys.

Acoustic

The acoustics performed very well, with all acoustics communicating with good two way ranging, one-way ranging was also used. Signal quality degraded with increasing sea conditions.

Acoustics pod sixteen, was the only real problematic unit, intermittently failing as battery life decreased in the unit. Numerous pods were tried in its place and the main problem was believed to be an intermittent receiver coil in the streamer section.

The front end acoustics performed well with intermittent signal path response usually because of vessel propeller wash. This was most noticeable on lines with high vessel crab, and was generally seen on the SSTS system as well.

SKYPOD TAILBUOYS

The SKYPOD tailbuoys, when operational, generally performed well. The prospect was recorded with a minimum of one tailbuoy, with sufficient tail-end acoustics to ensure redundancy in positioning.

The system used RACAL SKYPOD equipment mounted on WGC tailbuoy platforms. Problems with battery failure on the tailbuoys, was overcome by the addition of an extra generator on each tailbuoy. The problem with frequency assignment for the data transfer to the vessel needs to be addressed, with the final deployment of the tailbuoys, resulting in only one operational tailbuoy, because of the above problem.

The onboard SYKPOD computer was incorrectly set, with the data output in unfiltered format. This was not a great problem, with processing performing the necessary smoothing to make the data usable. The problem was corrected from information received from RACAL London office, on the 26th of February.

The SKYPOD system uses satellite positioning data to derive range and bearing information from the vessel, during periods of unstable satellite coverage, a similar performance was seen from the tailbuoys.

FATHOMETER DISCUSSION

The fathometer under went a calibration check, while alongside in Portland on the 19th of January 1994. The results of this test can be found in Appendix B (pre-survey navigation checks) of this report. The fathometer performed to within manufacturers specifications.

All lines were gathered, with paper data recordings produced for the lines.

The seabed was generally flat and featureless, with average depths between 78 metres and 81 metres, over the entire prospect area.

WISDOM-II SYSTEM

The Wisdom system performed well, with the exception of isolated system crashes. Fortunately these crashes happened at either the end of line or on the run-in to lines, and as a consequence minimal shots were missed.

Wisdom generated reference position, in comparison to the generated position of the Acumen system was within 5 metres. Any position errors incurred, were as a result of when Acumen received the closure from the Wisdom system and generated the position.

SSTS-II SYSTEM

The SSTS system performed well, with minimal loss of data. Signal quality degraded during excessive sea conditions, with background noise and propeller wash reducing the ray paths of the system. The acoustic/laser networking at the front-end, provided redundancy in acoustic paths for the entire system and as such, no time was lost due to SSTS.

The nature of the seabed also aided the performance of the system, due to the flat topography of the area.

P190 COMPARISONS

Comparisons were carried out for all lines with both P1/90 and Binning files being examined. The results obtained for both systems suggest a close correlation, with the front-end differences proven to be less than 2.5-3 metres at the source and near groups, and 5-7.5 metres at the far groups, both very acceptable levels of agreement.

These values degraded slightly with excess noise generated on all systems due to weather conditions, but remained fairly accurate throughout the survey.

The contractor was capable of processing to P190 files at the same rate at which data is acquired.

RAMESSES SYSTEM

The Ramesses system was initially interfaced to the WG24 while in port on the 19th of January, and was later deemed as operational on the 20th of January by the Ramesses technician. The system remained unused until the 5th of February, due to the streamer setup. From this point on the system remained unusable due to system crashes that persisted through until the 15th of February. It was due to the efforts of the crew on board, under Ødegaard direction, that the problem was eventually solved.

The Ramesses system was used for the remaining period of the survey, with stacked sections being produced for 98% of the lines. Noise and signal response for each line was examined, and saved to tape.

3 MISCELLANEOUS

3.1 WEATHER

Weather forecasting was received via coastal radio stations on a standard set of radio frequencies. In addition to this forecast a synoptic weather map was received on the ships weather facsimile on an irregular basis (generally 12 hour intervals). This was supplied by the bureau of meteorology on a standard set of facsimile radio frequencies. A daily weather forecast was received aboard the vessel from the Bureau of Meteorology, Victorian branch under an arrangement with SAGASCO Resources Ltd.

Table #3.1, below, may assist in the interpretation of wind and sea conditions which are given in Beaufort Scale values in the tables that follow as well as on the Q.A. Line Logs.

TABLE 3.1 BEAUFORT WIND AND SEA SCALES

WIND SCALE

Beaufort #	Descriptive Term	Mean Wind Speed Knots - m/sec	Probable Wave Height in Metres
0	Calm	< 1 - 0-0.2	
1	Light Air	1-3 - 0.3-1.5	0.1
2	Light Breeze	4-6 - 1.6-3.3	0.2
3	Gentle Breeze	7-10 - 3.4-5.4	0.6
4	Moderate Breeze	11-16 - 5.5-7.9	1-1.5
5	Fresh Breeze	17-21 - 8.0-10.7	2-2.5
6	Strong Breeze	22-27 - 10.8-13.8	3-4
7	Near Gale	28-33 - 13.9-17.1	4-5.5
8	Gale	34-40 - 17.2-20.7	5.5-7.5
9	Strong Gale	41-47 - 20.8-24.4	7-10
10	Storm	48-55 - 24.5-28.4	9-12.5
11	Violent Storm	56-63 - 28.5-32.6	11.5-16
12	Hurricane	64 + - 32.7 +	14

SEA STATE

	SEA	SWELL	VISIBILITY
0	Glassy	No Swell	>27 Miles
1	Rippled	Very Slight	11 Miles
2	Wavelets	Slight	5.4 Miles
3	Slight	Low	2.2 Miles
4	Moderate	Moderate	1.1 Miles
5	Rough	Fairly Heavy	0.5 Miles
6	Very Rough	Heavy	0.3 Miles
7	High	Very Heavy	0.1 Miles
8	Very High	Phenomenal	0.03 Miles
9	Phenomenal		>0.03Miles

The following weather observations were logged in the ship's daily log by the Master or Mates on watch at the time, at twelve hourly intervals. The period covered is from the first to the last day of production.

WEATHER DETAILS
DIR = WIND DIRECTION. WS = WIND SPEED IN KNOTS.
SEA STATE. C=CALM, S=SLIGHT, M=MODERATE, R=ROUGH, VR=VERY ROUGH, ER=EXTREMELY ROUGH (CYCLONIC)
SWELL = SWELL HEIGHT IN METRES. BARO = BAROMETER READING.

DATE	TIME	DIR	WS	SEA	SWELL	BARO	TIME	DIR	WS	SEA	SWELL	BARO
20/1/94	12:00	ESE	10-15	M	1.5	1012	24:00	SW	10-15	M	1.5	1009
21/1/94	12:00	W	15-25	M	3	1015	24:00	W	20-25	R	3	1022
22/1/94	12:00	SW	5	S	0.5	1026	24:00	NW	5	S	0.5	1025
23/1/94	12:00	SW	5-10	S	0.5	1025	24:00	NE	5	S	0.5	1026
24/1/94	12:00	SE	10-15	S	0.5	1024	24:00	SSE	5	S	0.5	1022
25/1/94	12:00	ESE	10-15	S	1.0	1022	24:00	ESE	15-25	M/R	1.5	1017
26/1/94	12:00	NE	20-25	M	2.0	1013	24:00	W	25-30	M	2.5	1013
27/1/94	12:00	WSW	20-25	M/R	2.5	1029	24:00	SSW	30-35	R	3.0	1032
28/1/94	12:00	SW	10-15	S	1.5	1028	24:00	-	0-5	C	0.0	1028
29/1/94	12:00	SW	20-25	M	2.0	1025	24:00	NW	10-15	S	1.0	1025
30/1/94	12:00	SE	25-40	R	3.0	1027	24:00	E	25-40	VR	3.5	1028
31/1/94	12:00	ESE	25-40	VR	3.0	1026	24:00	E	20-25	R	3.0	1023
1/2/94	12:00	S	15-20	S	1.0	1022	24:00	NE	10-15	S	1.0	1024
2/2/94	12:00	E	28-40	R	3-4	1026	24:00	E	28-40	VR	4.5	1025
3/2/94	12:00	E	28-33	S/M	2-3	1023	24:00	ESE	28-33	R	2-4	1020
4/2/94	12:00	SE	17-21	M	2.5	1019	24:00	ESE	22-27	M/R	2.5	1017
5/2/94	12:00	SE	10-15	S	1.0	1018	24:00	E	10-15	S	1.0	1018
6/2/94	12:00	E	5-10	S	1.0	1019	24:00	WSW	22-25	M	2.0	1019
7/2/94	12:00	W	10-15	S/M	2.0	1023	24:00	-	0-5	C	0.5	1023
8/2/94	IN PORT CREW CHANGE RESUPPLY											
9/2/94	12:00	SW	5	M	1.5	1019	24:00	5-10	SW	M	2.0	1018
10/2/94	12:00	E	5-10	S	0.5	1014	24:00	SW	10-20	S/M	2.0	1017
11/2/94	12:00	SW	17-21	M	2.0	1018	24:00	SW	11-16	M	2.0	1028
12/2/94	12:00	E	5	S	1.0	1024	24:00	E	17-21	M	2.0	1027
13/2/94	12:00	SE	22-27	R	3.0	1026	24:00	SE	22-27	R	3.0	1020
14/2/94	12:00	ESE	10-20	M	2.0	1020	24:00	ESE	5-10	S/M	1.5	1016
15/2/94	12:00	NW	11-16	S/M	2.0	1013	24:00	NW	11-16	M	2.0	1015
16/2/94	12:00	WNW	28-33	R	3.0	1013	24:00	W	34-40	R	3.0	1018
17/2/94	12:00	SW	17-21	M	2.0	1021	24:00	WSW	22-27	M/R	2-3	1024
18/2/94	12:00	SW	17-21	M	1-2	1026	24:00	SW	17-21	M	1-2	1028
19/2/94	12:00	E	17-21	M	1-2	1032	24:00	SE	11-16	M	1-2	1012
20/2/94	12:00	ENE	17-21	M	2-3	1032	24:00	ENE	22-33	M/R	3-4	1027
21/2/94	12:00	NE	17-21	M	2	1024	24:00	ENE	17-27	M/R	2-3	1019
22/2/94	12:00	NW	7-10	S	1	1018	24:00	WSW	11-16	M	1.5	1020
23/2/94	12:00	W	7-10	S	0.5	1024	24:00	SW	7-10	S	0.5	1021
24/2/94	12:00	SSW	7-10	M	0.5	1022	24:00	SW	7-10	S	0.5	1022
25/2/94	12:00	SE	7-10	S	0.5	1022	24:00	VAR	5	S	0.5	1021
26/2/94	12:00	NE	5	S	0.5	1016	24:00	NE	5	S	0.5	1013
27/2/94	12:00	SW	17-21	M	2	1010	24:00	SSW	28-33	R	4	1016
28/2/94	12:00	SW	5	M/R	2.5	1024	24:00	SW	4	S	1.0	1025
1/3/94	12:00	SSW	2-3	S	1.0	1026	24:00	SW	4	S/M	1.5	1024
2/3/94	12:00	SW	3-4	S	1.0	1024	24:00	WSW	4	S/M	1.5	1022
3/3/94	12:00	WSW	5	M	2.0	1021	24:00	SW	4-5	M	2.0	1022

WEATHER DETAILS
DIR = WIND DIRECTION. WS = WIND SPEED IN KNOTS.
SEA STATE. C=CALM, S=SLIGHT, M=MODERATE, R=ROUGH, VR=VERY ROUGH, ER=EXTREMELY ROUGH (CYCLONIC)
SWELL = SWELL HEIGHT IN METRES. BARO = BAROMETER READING.

DATE	TIME	DIR	WS	SEA	SWELL	BARO	TIME	DIR	WS	SEA	SWELL	BARO
4/3/94	12:00	-	1	C	0.5	1021	24:00	WNW	5	M	2.0	1018
5/3/94	12:00	SW	5-6	M/R	3.0	1020	24:00	SW	7	R	3.0	1020
6/3/94	12:00	SW	4-5	M	2.5	1021	24:00	SW	5-6	M/R	2.5	1026
7/3/94	12:00	E	2-3	S	1.5	1027	24:00	SE	2	S	1.5	1029
8/3/94	12:00	SE	2	S	1.0	1029	24:00	SE	3	S	1.0	1027
9/3/94	12:00	SE	5	M	1.5	1024	24:00	ESE	5	M	2.0	1023
10/3/94	12:00	SE	5	M	2.5	1020	24:00	SW	5	M	2.5	1021
11/3/94	12:00	SW	7	R	3.0	1025	24:00	SE	6	M	2.5	1031
12/3/94	12:00	S	6	M	2.5	1032	24:00	SW	6	R	3.0	1028
13/3/94	12:00	SW	4	M	2.5	1025	24:00	SW	7	R	3.5	1023
14/3/94	12:00	SW	5	M	2.5	1023	24:00	SW	5	M	2.5	1021
15/3/94	12:00	W	3	S	2.5	1021	24:00	SW	5	M	2.5	1021
16/3/94	12:00	SW	6	R	3.0	1024						
17/3/94	End of Survey											

3.2 TIDES

The tide tables which follow are for Stanley (Circular Head) on the north coast of Tasmania. This is the nearest tidal station to the survey area, approximately 110 kilometres south of the centre of the survey area. The Geographical location of the tide station is:-

Latitude 40° 46' South
Longitude 145° 18' East

The tide predictions in the table have been calculated using a British Hydrographic department computer program called Tidecalc.

Time Zone GMT +10.00 hours.

DATE	TIME	HEIGHT (M)	TIME	HEIGHT (M)	TIME	HEIGHT (M)	TIME	HEIGHT (M)
19/1/94	04:41	3.5	11:18	0.91	17:14	3.31	23:27	1.08
20/1/94	05:17	3.51	11:56	0.88	17:54	3.32		
21/1/94	00:06	1.12	05:55	3.50	12:36	0.88	18:37	3.32
22/1/94	00:48	1.17	06:37	3.46	13:18	0.90	19:22	3.30
23/1/94	01:34	1.25	07:20	3.39	14:03	0.94	20:09	3.26
24/1/94	02:22	1.34	08:06	3.31	14:51	0.98	20:59	3.22
25/1/94	03:13	1.42	08:55	3.25	15:43	0.99	21:51	3.21
26/1/94	04:08	1.45	09:47	3.24	16:40	0.96	22:48	3.24
27/1/94	05:09	1.41	10:44	3.27	17:43	0.89	23:48	3.32
28/1/94	06:14	1.29	11:47	3.34	18:45	0.79		

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DATE	TIME	HEIGHT (M)	TIME	HEIGHT (M)	TIME	HEIGHT (M)	TIME	HEIGHT (M)
29/1/94	00:48	3.44	07:15	1.12	12:54	3.44	19:42	0.70
30/1/94	01:44	3.56	08:11	0.94	13:58	3.53	20:36	0.66
31/1/94	02:35	3.65	09:04	0.78	14:56	3.59	21:29	0.68
1/2/94	03:25	3.69	09:57	0.67	15:52	3.61	22:21	0.76
2/2/94	04:13	3.68	10:48	0.62	16:45	3.58	23:12	0.87
3/2/94	05:00	3.62	11:40	0.61	17:38	3.52		
4/2/94	00:04	1.00	05:45	3.54	12:30	0.65	18:29	3.44
5/2/94	00:53	1.14	06:30	3.45	13:19	0.72	19:18	3.35
6/2/94	01:42	1.26	07:17	3.36	14:08	0.81	20:07	3.26
7/2/94	02:31	1.36	08:06	3.27	14:59	0.90	20:59	3.19
8/2/94	03:26	1.43	09:00	3.19	15:56	0.96	21:56	3.14
9/2/94	04:28	1.44	10:02	3.13	17:00	0.99	23:01	3.13
10/2/94	05:36	1.39	11:13	3.12	18:04	0.98		
11/2/94	00:08	3.18	06:39	1.28	12:25	3.16	19:01	0.96
12/2/94	01:03	3.24	07:32	1.17	13:23	3.22	19:50	0.96
13/2/94	01:49	3.29	08:17	1.07	14:11	3.25	20:32	0.99
14/2/94	02:27	3.32	08:57	1.01	14:52	3.27	21:10	1.03
15/2/94	03:01	3.34	09:34	0.96	15:30	3.29	21:46	1.06
16/2/94	03:34	3.37	10:09	0.91	16:07	3.32	22:22	1.07
17/2/94	04:09	3.42	10:44	0.86	16:44	3.36	22:58	1.06
18/2/94	04:45	3.45	11:22	0.82	17:23	3.40	23:37	1.05
19/2/94	05:24	3.47	12:01	0.80	18:03	3.41		
20/2/94	00:18	1.07	06:04	3.45	12:41	0.82	18:45	3.39
21/2/94	00:59	1.13	06:46	3.41	13:24	0.85	19:30	3.34
22/2/94	01:44	1.20	07:30	3.36	14:10	0.90	20:17	3.29
23/2/94	02:31	1.27	08:18	3.32	15:01	0.93	21:08	3.26
24/2/94	03:24	1.30	09:12	3.30	15:58	0.94	22:03	3.26
25/2/94	04:25	1.26	10:11	3.33	17:03	0.92	23:03	3.32
26/2/94	05:34	1.15	11:19	3.39	18:13	0.85		
27/2/94	00:08	3.42	06:44	0.96	12:33	3.49	19:19	0.77
28/2/94	01:12	3.54	07:47	0.75	13:42	3.62	20:18	0.70
1/3/94	02:10	3.64	08:43	0.56	14:44	3.72	21:13	0.69
2/3/94	03:04	3.69	09:37	0.44	15:41	3.75	22:07	0.72
3/3/94	03:56	3.68	10:31	0.40	16:35	3.73	23:00	0.80

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DATE	TIME	HEIGHT (M)	TIME	HEIGHT (M)	TIME	HEIGHT (M)	TIME	HEIGHT (M)
4/3/94	04:46	3.63	11:23	0.43	17:27	3.65	23:52	0.90
5/3/94	05:35	3.54	12:15	0.52	18:17	3.54		
6/3/94	00:42	1.01	06:22	3.44	13:04	0.64	19:04	3.41
7/3/94	01:30	1.12	07:09	3.33	13:52	0.78	19:49	3.29
8/3/94	02:17	1.22	07:56	3.22	14:40	0.93	20:36	3.18
9/3/94	03:06	1.30	08:47	3.12	15:32	1.05	21:25	3.09
10/3/94	04:02	1.35	09:44	3.05	16:30	1.15	22:21	3.04
11/3/94	05:05	1.34	10:50	3.02	17:33	1.19	23:24	3.04
12/3/94	06:09	1.27	12:02	3.05	18:33	1.20		
13/3/94	00:23	3.07	07:02	1.17	13:02	3.11	19:23	1.19
14/3/94	01:11	3.11	07:48	1.08	13:48	3.18	20:06	1.19
15/3/94	01:51	3.15	08:26	1.01	14:28	3.24	20:44	1.18
16/3/94	02:26	3.19	09:02	0.95	15:04	3.29	21:20	1.16

3.3 NAVIGATION HAZARDS

There were no natural navigation hazards in the area. The water depth over the entire survey area was 80 metres and did not vary more than two or three metres either side of this depth.

3.4 EXTERNAL INTERFERENCE

There was no external seismic interference encountered during the course of the survey. Shipping and fishing movements in the area were non existent.

3.5 COMMUNICATIONS

Communications were by facsimile transmitted via the vessels Marisat terminal. If necessary telephone communications via the Marisat terminal were available. A mobile phone was available, but did not always work due to the range to the nearest transmitting cell.

3.6 SCOUTING OPERATIONS

Scouting operations were not required for this survey. There were not any natural or man made hazards in the area that required scouting.

4 PERSONNEL:

4.1.1 SEISMIC CREW PERSONNEL

Period: 19 January 1994 to 9 February 1994

Designation	Name
Co-ordinators	B. Williams
	H. Hume
Asst Co-ordinators	W. Simonton
	B. Bromwich
Technicians	K. Roberts
	G. Knight
Observers	M. Whetton
	M. Sussmilch
	J. Miears
	M. Donnison (departed 24/01)
	M. Cunningham
	A. Norris
Navigators	S. Elliot
	H. McMenamin
	T. Koleske
	A. Evans
	N. Meyers
	W. Maxted
Gun Mechanics	P. Cobby
	S. French
	B. Degenstein
	D. Orton
	B. Purcell
	G. Simpson
Compressor Mechanics	A. Powell
	D. Hill
Geophysical QC Personnel	S. Meltcalfre
	G. Nicolson
	M. Friend
	J. Vietch
Instrument Supervisor	G. Butler
Western Technical Support	D. Posey
	D. Roche
Digicourse Technical Support	G. Cohen
SAGASCO Representative	F. Renton (Austral)
	M. Ulvr-Green (Austral)
	Roger Loweth (QSEA)
Navigation Contractor	B. Slevin (Racal)

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Period: 9 February 1994 to 16 March 1994

Designation	Name
Co-ordinators	D. Chow
	H. Hume
Technicians	K. Roberts
	E. Dale
Observers	M. Whetton
	M. Sussmilch
	B. Vernon
	M. Donnison
	D. Coutts
	D. Lindley
Navigators	S. Elliot
	B. Cole
	T. Koleske (departed 28/02)
	R. Libke
	W. Maxted
Gun Mechanics	T. Means
	B. Higgins
	B. Degenstein
	A. Mohamed
	B. Purcell
	G. Simpson
Compressor Mechanics	G. Hieb
	D. Hill
Geophysical QC Personnel	S. Meltcalfre
	G. Nicolson
	M. Friend
	E. Carlson
	S. Harper
	J. Hedges
Instrument Supervisor	T. Trotter (departed 25/02)
Western Technical Support	D. Posey (departed 25/02)
Western Safety Officer	L. Cowin
Western Mechanic	T. Legge
SAGASCO Representative	M. Ulvr-Green (Austral)
	Rod Waldron (Austral)

4.1.2 MARINE CREW PERSONNEL

Period: 19 January 1994 to 9 February 1994

Master	M. Currie
Chief Mate	K. Cleggett
Second Mate	B. Payne
Chief Engineer	J. Mclean
Second Engineer	R. Egan
Third Engineer	Y. Sang Lee
Able Seaman	D. Lutey
Able Seaman	L. Turner
Able Seaman	M. Lombardo
Able Seaman	F. Ball
Cook	G. Cant
Cook	G. Zalmastra
Steward	R. Ward
Steward	M. Crane (departed 24/01)

Period: 9 February 1994 to 16 March 1994

Master	J. Jones
Chief Mate	T. Dwyer
Second Mate	K. Turner
Chief Engineer	G. Robson
Second Engineer	R. Fenton
Third Engineer	G. Maynard (departed 25/02)
Able Seaman	G. Oskam
Able Seaman	R. Myers
Able Seaman	R. Honey
Able Seaman	A. Sarris
Cook	T. Langdon
Cook	B. Munro
Steward	E. Kennedy
Steward	A. Richman

5 VESSEL AND SAFETY

5.1 VESSEL SPECIFICATIONS

Vessel Name	:	M.V. Western Atlas
Registry	:	Panama
Home Port	:	Panama
Owner	:	Western Sea Services, Panama
Operator	:	Western Geophysical Company.
Trade	:	Foreign Going Seismic Exploration.
Survey Register	:	ABS
Australian Status	:	Imported (Temporary).
Call Sign	:	HP 4862
Official Number	:	18058-88
Length Over All	:	80.8 metres
Beam	:	17.9 metres
Draft	:	4.3 metres
Load Line	:	Panamanian
Gross Tonnage	:	1577 tonnes
Net Tonnage	:	1017 tonnes
Displacement Full	:	4394.65 tonnes
Displacement Light	:	3000.0 tonnes
Built By	:	Ulstein Shipyard, Norway
Converted By	:	Bludworth Bond Shipyard, Galveston, Texas
Conversion Year	:	1988
Main Engines	:	2 X Nohab Polars 1300 HP.
Propellers	:	2 x CPP variable pitch.
Bow Thruster	:	2 x 800 HP, CPP electric driven.
Stern Thruster	:	2 x 500 HP, CPP electric driven.
Generators	:	Ships Power 2 x Nohab Diesel Driven, 1250 KW Nohab Alternators.
Fuel Capacity	:	1300 tonnes
Fuel Consumption	:	21,000 Litres/24 Hrs
Potable Water	:	322,000 litres
Watermaker Capacity	:	10 Tonnes/24 Hrs
Endurance	:	40 days Full Power, 20% Reserve.
Speed	:	12 Knots
Berths	:	63 plus 3 in hospital.
Radars	:	1 x Decca RMS 1200-C 1 x Kelvin Hughes HR 3000R

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Ship's Fathometer	:	Simrad EA 200
Auto Pilot	:	Anschutz, Keil.
Gyro Compass	:	Sperry Mk 23 Mod. 4.
Helicopter Landing Site	:	18.3 x 18.3 Metres.
Helicopter Rating	:	S76, 212, and Super Puma Helicopters.

Communication Equipment

Marisat	:	JRC JHE-45A Mk II voice, telex, fax.
Radios	:	Dancom HF 1200 SSB
		ICOM IC-M200 SSB
		Robertson 100X VHF
		ICOM IC-MSS VHF
		Regency Polaris NC7200 VHF
		Skanti SSB TRP5000
		ICOM IC-M700TY MF/HF
		JRC-NCH-700 MF/HF
		2 x Sailor compact VHF RT 2048
		Collins 250S Aircraft VHF AM
		Spilsburry Communications LWX-100A Helicopter Homing Beacon.

5.2 VESSEL SAFETY

5.2.1 FIRE FIGHTING SYSTEMS

Fire Detection

A Kidde Automated KDR-1000 Fire Alarm System is installed on the vessel. This system is fitted throughout the vessel with the central control panel located on the bridge. The detection system consists of 133 photo electric smoke detectors, eight ionisation and six thermal detectors, supplemented by 11 "Break glass/Push button" manual alarms, that are situated throughout the ship. Smoke detectors are fitted in all closed areas including accommodation and recreation areas, recording room, engine room, compressor room, propulsion room/workshop and tank tops. These are combined in higher risk areas with thermal detectors. The central alarm control panel is located on the vessel bridge.

There are 12 general alarm bells and nine Klaxon fire alarm sirens around the ship which, when sounded, are audible throughout the vessel, including areas of high noise level such as the engine room and propulsion room. The engine and propulsion rooms are equipped with an air horn siren and halon alarms.

Fire Fighting Devices

There are five fixed automatic systems in high risk areas- Halon systems are installed in the engine room, compressor room/workshop, recording room, paint locker and the incinerator room.

The helicopter landing deck is protected by two foam branch monitors situated above the recording room overlooking the heliport, each with a capacity of 25 c. metres/hour. The monitors are supplemented by a spare foam tank, two 50kg. powder extinguisher (trolley mounted) and two 9kg. CO2 extinguishers. Additional cutting and prying equipment is located at the adjacent fire station behind the recording room and immediately forward of the helideck.

The vessel is equipped with eight breathing apparatus situated in three fire station areas; the engine room (main deck) , the shelter deck and the new forecastle deck behind the recording room. There are seven rechargeable spare breathing apparatus bottles, with the recharging unit situated in the shelter deck fire station. The vessel is equipped with eight fire suits and two leader suits, these being dispersed through out the three fire stations, along with general equipment such as fire axe, safety rope and safety flashlight.

Fire Protection	:	2 Leader suits 8 Fire suits
Breathing Apparatus	:	8 Scott Pack BA sets 7 spare bottles.

Fire Extinguishers	:	45 x 4.5 Kg Dry Chemical Powder 2x50 Kg Dry Chemical Powder (on wheels) 8 x 9.0 Kg Dry Chemical Powder 15 x 5.5 Kg B.C.F. (Halon) 3 x 6.8 Kg CO2 4 x 9.0 Ltr Foam 2 x 9.0 Kg Lithx.
Fixed Halon Systems	:	1180 Lbs. Engine Room. 2330 Lbs. Compressor Room. 794 Lbs. Recording Room. 33 Lbs. Incinerator Room. 33 Lbs. Paint Locker.
Fire Hoses	:	18 Hoses with Jet Spray Nozzles. Valve keys available in all fire hose boxes.
Fire Hydrants	:	13 On Deck. 5 in Machinery Spaces 2 Foam Branch Monitors for Helideck.
Main Fire Pumps	:	2 Fire/Ballast pumps electrically driven, located in engine room.
Emergency Fire Pump	:	Capacity = 25 CU Metres/Hour Make = Mohn Power = Petter Diesel Engine Location = Port Side Aft in Compressor Room.
Fire Axes	:	6 Fire Axes Throughout Alleyways. 3 Fire Hatchets Throughout Alleyways.
Smoke/Fire Detectors	:	1 in every Cabin, Alleyway, Messroom, and Work Areas.
Alarm Bells/Klaxon Sirens	:	12 Throughout Vessel
Fire Blankets	:	1 Outside Galley 1 Spare in Safety Equipment Locker
Fixed Foam Systems	:	Cable Deck over cable reels. Also on Helideck through Foam Branch Monitors.
Emergency Lighting	:	24 VDC System in Throughout Vessel.

Emergency start/stop of fire pumps, fuel oil pumps, main engines and vents are controlled from the bridge. Remote closure of fuel oil valves and watertight doors is controlled from the store on the shelter deck.

5.2.2 LIFESAVING EQUIPMENT

Life boats and Man overboard rescue boats

The vessel is equipped with two Jorgensen & Vik totally enclosed self-righting, 30 man, powered lifeboats and two 5 metre Zodiac inflatables that are used for M.O.B. and work boats.

The lifeboats are designed to be launched from the davits normally from the deck, or in an emergency, without ships power manually from within the lifeboat. Moulded in one piece from fire retardant fibreglass, each boat has a double skinned hull, enclosing polyurethane foam for buoyancy, and is powered by a 2 cylinder SAAB diesel engine. Each lifeboat is fully equipped with emergency supplies of food and drinking water, radio and signalling equipment, including a radio, and basic first aid kits.

A Zodiac Mark V heavy duty inflatable launch is maintained in a ready to use condition for Man Over Board rescue work. The Zodiac is powered by a 36 horsepower diesel out board motor and is usually crewed by two to three people. It is capable of carrying up 15 people if necessary and measures 5.8 metres in length. Diesel outboards are used on the Zodiac as they are able to use the vessels' diesel supply as fuel and this eliminates the need to carry and store petrol as would be the case with the more common 2 stroke petrol out board motors. This is an added safety bonus in itself. However there is a disadvantage with the diesel out board, and that is the speed of the launch through the water. Diesel out boards are slower then their petrol driven cousins and the launch could not genuinely be described as a fast rescue vessel.

A second Zodiac is available as a back up rescue vessel and is powered by a 27 HP diesel outboard motor and is slightly slower than the first Zodiac due to the difference in engine power. This vessel is normally used as a working craft however, in an emergency it can be mobilised as a second rescue vessel.

Liferafts

There are six self-inflating 20 man Viking liferafts, and two 10 man Viking liferafts, situated on the new bridge deck, four on each side of the vessel, each liferaft is attached to the deck by a hydrostatic releases as per Solas requirements. Designed to be thrown from the deck, or to float free should the vessel sink, the rafts inflate when an attached rope is jerked with sufficient force -as when thrown from the deck or floating free from a sinking ship.

A further one man self-inflating "Jon Buoy" liferaft is located at the stern of the vessel on the core decking aft railing of the gun deck. Similar in operation but small and fast in deployment they are situated for an immediate response should a crew member lose footing and fall overboard during gun or cable operations at the stern of the vessel.

5.2.2.1 MAN OVERBOARD

Rescue Craft	:	Inflatable Zodiac Mark V, Fitted with 36 HP yanmar diesel outboard motor.
Backup Rescue Craft	:	Inflatable Zodiac Mark V, Fitted with 27 HP Yanmar Outboard Motor.
Life Rings	:	19 Total, 5 with Light Floats, 3 with Smoke and Light, 3 with Smoke, and 8 with Buoyant Lines.
MOB Life Raft	:	1 x Single man JON BUOY mounted on cable deck railings near cable reel controls.
Line Throwing Rocket	:	4 x Schermuly Speed Line.
Search Lights	:	2 x Vero Beam Search Lights Mounted on monkey island fore and aft.

5.2.2.2 EVACUATION

Life Boats	:	2 x Jorgensen Vik A/S Fully enclosed lifeboats. 30 Man capacity each. Fully equipped with emergency supplies to SOLAS requirements.
Liferafts	:	2 x 10 Man Viking Inflatable Liferafts 6 x 20 Man Viking Inflatable Life Rafts All fitted with hydrostatic release
Emergency Position Indicating Radio Beacons (EPIRB's)	:	8 One In each life raft, 2 in wheelhouse 2 on Bridge Deck Aft, 2, One in Each Life Boat 1 on Monkey Island with Hydrostatic Release.
Life Jackets	:	Total = 121. 59 @ 1 per Berth plus 50 additional in float free boxes with Hydrostatic Release. 3 in Wheelhouse, 3 in Engine Control Room, 3 in Compressor Room, 3 in Steering Flat.
Aldis Lamp	:	1 x 12 VDC plug in.
Survival/Immersion Suits	:	13 Immersion Suits, contained in a float free cabinet aft of wheelhouse.
Emergency Radio	:	2 x Skanti TRP (1 in each lifeboat).
Pyrotechnics	:	12 x Red Parachute Flares in Wheelhouse.

5.2.3 FIRST AID

Five first aid kits are located in various work areas throughout the vessel. One each is located in the ships hospital, galley, recording room, gun shack and engine room. In addition eyewash stations are located forward on the gun deck, port cable deck, starboard cable deck and in the engine room.

There are two trauma packs, situated in the wheelhouse which are mobilised to the scene of an accident. Four stretchers are stationed throughout the vessel and a resuscitation unit is kept in the hospital.

5.2.4 GENERAL SAFETY EQUIPMENT

Safety Boots	:	Issued to All Seismic Crew Members, Mandatory Use in all Work Areas.
Work Life Vests	:	Available and mandatory on all back deck work areas and on gun deck. Vests are stowed on back deck. Also used in Rescue boat and Work boat.
Safety Harnesses	:	Available as required. Mandatory when working Above Deck or Outside Safety Rails.
Hard Hats	:	Issued to all crew members. Mandatory when using crane or working on gun deck.
Ear Protectors	:	Available Where Applicable, Mandatory on Back Deck When Airgun Warning Light Is On or when air pressure is being released. Also in machinery spaces.
Eye Protection	:	Available where applicable. Mandatory when using cutting tools or power tools

5.3 SAFETY MEETING MINUTES

The following listings are the minutes from the safety meetings held during this survey.

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20 January — At 13:00 a safety meeting was conducted, followed by a general muster. All personnel were present and participated. All new members to the crew were shown the safety features of the vessel, and given a guide tour of the vessel.

Safety Meeting and Emergency Muster

Date	20-January-1994
Time	13:00 / 13:45
Location	Day room / muster area
Conducted by	Safety officer
Attendance	All vessel compliment

Topics of the safety meeting:

aa: Housekeeping

1) Separating rubbish / burnable from non-burnables:

   Although this area has improved, there still seems to be a problem in the area of keeping burnables and non-burnables separated into the proper bins. The crew was informed that bins for non-burnable items would be placed in each living accommodation area to help ease the problem.

2) Vessel safety guards / tools / ladders / etc:

   This area of housekeeping has also improved, but that the above listed items, especially the safety guards around areas of the cable decks needed more attention. It was noted that many of these guards were in disrepair, but steps were at present underway to effect repairs and that these repairs should be completed by the 09-Feb-94 port call.

3) A better effort in the storage of tools, especially ladders, and the clearing of walk ways, etc. Was needed. A better method to store ladders should be in place by the 09-Feb-94 port call.

BB: Back deck smoking policy:

1) It was noted that in the recent audit undertaken aboard the Atlas that there was no clear demarkation for the smoking and non-smoking areas on the back deck. To this end the following has been put into effect as of 20-Jan-94: NO smoking areas include:

   a) On the gun deck from the forward gun reels aft.
   b) Any area of the cable decks, port and starboard.
   c) On the Cairo deck from the cable bin aft to area of the steps leading to the cable decks.

   Designated smoking areas include:

   a) On the Cairo deck from the area of the steps leading to the cable decks aft.
   b) On the gun deck from the exit to the mess area aft to the forward most portion of the gun reels, not to include the bird room, paint locker or storage area for the gas cutting cylinders.

CC: Back deck hard hat areas:

1) As of 20-Jan-94 the hard hat areas include:

   a) All areas aft of the gun reels on the gun deck.
   b) All areas of the core deck.

2) It is also noted that hard hats are to be worn during any operation described in the safety contract ie SSTS deployment, crane op's, etc.

DD: Safety Library:

1) As of 20-Jan-94, a library of safety manuals, notices, meetings and contracts will be set up in the day room.

2) The crew was notified that for every job a new safety contract would be added to the library and that they should at least skim through it and initial and date they had done so. This will aid in all crew members understanding of safety policy and areas of safety which are not normally considered in safety.

At the conclusion of the safety meeting an emergency muster was conducted. The alarm was sounded and all crew reported to the muster area where a head count was conducted. After all crew had been accounted for the chief mate noted to the crew that due to the difference in climate it was essential that suitable clothing be worn in case of an emergency. He also gave a brief run down on the steps to be followed in the event of having to abandon ship.

Note: Prior to the drill the crew was informed to bring all life jackets from their cabins in the event of having to abandon ship, by the captain. He noted that although there were enough life jackets at the muster stations to accommodate the crew it was better to have more than not enough. It was also noted that crew on watch should go directly to the muster area.

Meeting and drill concluded at 13:45.

A tour of the vessel was conducted by the safety officer for all members on the vessel who had just boarded on 19-Jan-94 in Portland, Australia.

Committee Meeting

Date:	24-January-1994
Time:	13:00 / 14:00
Location:	Bridge
Attendance:	Department Heads
Conducted by:	Safety Officer

Topics before the committee:

AA) Discussion of the audit preformed on the vessel by Western supervisory personnel and the organisation of a system to control the up grading of our present position.

BB) Sagasco contract safety plan.

CC) Meal hours aboard the vessel.

DD) Accident occurring to Mark Donnison on 23-Jan-94.

EE) Disposal system for non-burnable items.

The meeting was opened at 13:00 by Safety Officer Winn Simonton.

The first topic for discussion was the audit done on the Atlas by Western supervisory personnel.

1) A large number of items were found to be in need of attention.

2) To this end a 'safety improvement control list' was initiated. This list was set up to allow the vessel crew to be able to see the problems that exist, designates a department or person responsible for taking the corrective action, shows an estimated date for the problem to be corrected and shows a date when the problem has actually been corrected and approved as safe.

3) The list will have safety items added and deleted as their needs arise and is to be posted through-out the vessel.

The Sagasco contract Safety Plan was the next item up.

1) It was noted that the plan appears to be written for another vessel.

2) The areas of greatest concern were that of the retrieval and deployment of trailing gear, although it was noted that many parts to the plan were in error as to operations aboard the Atlas.

3) The committee decided to use the plan as a guide, but to actually use the safety plans and methods set up for the Atlas.

4) It was also noted that this problem will be forwarded to Geoff Woods so the appropriate corrections could be made.

Meal hours aboard the vessel.

1) A discussion as to adjusting the meal hours aboard the vessel was brought forth by the cook.

2) It was decided that this item concerns the entire crew and should be a topic in the next general safety meeting.

Accident occurring to observer Mark Donnison on 23-Jan-94.

1) Due to this accident occurring so recently, the proper investigation had not taken place as of this meeting.

2) The basic facts of the accident were stated and it was noted that a full investigation was to take place at the conclusion of the committee meeting with all results both being posted and discussed at the next general Safety Meeting to be held on 29-Jan-94.

Disposal of non-burnables produced aboard the Atlas.

1) A problem of having enough storage area for the amount of non-burnables produced aboard was brought to the committees attention.

2) It was decided to re-install the net/scaffolding arrangement which had been in use prior to the vessel being placed on the hook in Singapore.

As there was no further business brought to the committees attention, the meeting was adjourned at 14:00.

Safety Meeting

Date:	29-January-1994
Time:	13:00 / 13:50
Location:	Day room
Conducted by:	Safety Officer
Attendance:	All vessel compliment
Exception:	Techs running WG24 cable tests

Topics of the safety meeting:

AA: Accident occurring 23-January-1994 to Mark Donnison:

1) A synopsis of the setups taken and what occurred was stated.

2) Discussion was opened pointing out that the main safety factor aboard the vessel is to use one's head and to have "tool box" type meetings prior to any operation. The main point was to try and change our way of thinking from time being the most important factor to one of safety being the most important.

3) Ideas were fielded to come up with a safer way to handle the problem of dealing with the loops which sometimes arise with cable handling. Some of these are as follows:

   a) To make the reels them selves totally off limits as far as having to climb on top.

   b) Installing some sort of convex mirror to enable crew attempting to unravel the cable to be able to view the top with out actually needing to climb the reel. Other suggestions were made and we are now trying to find the most effective ones to utilise and implement.

BB: The new drug and alcohol policy received on 28-January-1994 was covered:

1) The crew was informed that a copy of this fax from C. Toles had been placed in the ships safety library reports book and that it was necessary that all personnel read it.

2) The main points of the fax were read to the crew during the meeting.

CC: The new projects list was pointed out:

1) The safety improvement control list was brought to the crews attention.

2) The crew was informed of it basic purpose and that any suggestions they had on areas needing attention could be forwarded to the Safety Officer who in turn would add the to the list.

DD: Meal hours:

1) As per the cooks request during the Committee Meeting held on 24-January-1994 the dinner meal hours were discussed.

2) It was agreed that the evening meal hours would be changed from 17:30-18:30 hrs. to 17:00-18:00 hrs.

EE: Non-burnables disposal bins:

1) It was passed along to the crew that each accommodation level now had bins installed strictly for non-burnable items to aid in their disposal.

2) It was found that the crew was more likely to dispose of these type items if the disposal area was more accessible.

FF: The new muster / fire team list:

1) Captain Martyn Currie read through the general set-up of the list and gave a basic idea of how it is to operate.

2) Members selected to be on fire teams were asked to stay after the meeting to go over their duties.

3) The crew was informed that on 30-January-1994 at 13:00 a fire drill would take place to run through the new operations and to find any faults in the system.

GG: The crew was complimented as to their cooperation in observing the smoking areas and the wearing of safety equipment necessary to perform their daily tasks.

Meeting was adjourned at 13:50.

Safety Meeting

Date:	05-February-1994
Time:	13:00 / 13:20
Location:	Day room
Conducted by:	Safety Officer
Attendance:	All vessel compliment
Exception:	Necessary crew for operations

Topics of the safety meeting:

AA Have any near miss accidents / unsafe acts / unsafe areas been noted and need discussion ?

1) It was noted that there was no stand-by zodiac or crew ready to be deployed to aid the zodiac used when at King Island.

   a) In the future a second zodiac and crew will be on stand-by for immediate launch. This will also be added to the launch portion of our vessel safety plan for zodiacs.

2) During the recovery of the cables on 02-Feb-94 d/t weather, life jackets were not worn by all crew on cable decks in an area which necessitated that they be worn.

   a) Life jackets or Mustang suits will be used by crew in exposed areas of the cable deck in the future during times when the weather makes it necessary.

BB Problem areas with the new fire muster list which may have been encountered during the drill on 30-Jan-94.

1) Vent teams were not sure of the roll or area to which the were to report.

   a) The Ch. Engineer will meet with the vent team and clarify the roll they are to play.

   b) Vent teams are to check in at the muster area and then stand-by behind the bridge with the 1st-aid team.

2) It was mentioned that a key be placed in a box with a glass front on the outside of the hospital so it can be accessed in an emergency. As it stands now there is only one key which is in the possession of the captain who would be busy or possibly injured during an emergency.

3) The B.A. Control board can not be located and a new one needs to be made. The marine crew is to make a new board.

CC General discussion items brought forth.

1) The leaking area of the stbd SSTS boom hydraulics was mentioned again as a hazardous area. It was also noted that the area needed to be policed more regularly to replace the oil absorbent material. The navigation department agreed to check this area more often.

2) Due to the policy in the Sagasco contract of not being able to smoke in "all interior areas of the vessel" the problem of crew going outside after on break after showering and wearing flip flops has arisen. It is policy not to wear shoes which do not completely cover ones feet while outside of the living area and/or work area. It was agreed however to allow crew to go no further than the boatswain locker while wearing flip flops until this contract is completed and the smoking room can begin to be used.

3) It was pointed out that the fire blanket from the galley was used in the recording room during the conversion to the 24 system because of welding and that the blanket was not replaced or mention of it being used made. It has now been replaced and a new one ordered.

4) The main pull station for Halon in the galley is located in the store area and would be hard to get to if a fire occurred. There is another pull station near the exit to the galley. The problem is that a pin is placed on the main station and it is unclear whether this pin must be removed for the remote station to operate. The chief engineer is to investigate this problem and instructions for operation are to be made and posted.

5) The SSTS rams are now installed and operational but, the gate valves must be fully closed after the rams are pulled up anytime they are not in use.

6) The location of the fire extinguisher in the paint locker needs to be changed from inside the locker to outside the locker door. The marine crew has ordered the brackets needed and will move this extinguisher. It was also mentioned that anytime an extinguisher is moved for use on a fire watch that it be replaced after the time a job has been stopped whether or not the job is complete.

7) The compressor mechanics pointed out that the boxes used for Digicourse equipment were in need of better storage and a path cleared so they can get to the compressor equipment located in this area of the port store room.

8) The gun department and others asked that all tools taken for use from any area are to be returned in the same condition they were when taken.

9) A request was made to ask when this division will be looking into having the break equal to the time worked (time for time). It was mentioned that with all the new safety concerns that this point be included as it has direct bearing on crew safety and performance.

10) The crew was informed of additions to the safety book in the library in the and asked to review this book periodically. Additions have also been made to our safety improvement list and the crew was asked if they had noted any areas which needed attention not on the list.

Meeting was adjourned at 13:20

SAFETY MEETING

Date: 9 February 1994
Time: 13:00-13:15hrs.
Location: Day Room
Conducted By: Lyall Cowin

Topics of the safety meeting.

This meeting was held soon after sailing from Portland after a crew change. Some of the crew were new to the vessel and there are some new health and safety policies required by the client, SAGASCO.

Key personnel were introduced at the meeting.

Smoking

The SAGASCO occupational and safety policy for this contract requires that there be NO smoking in all interior areas of the vessel. All personnel are to go outside to smoke. The meeting was advised of the non smoking areas outside the accommodation. All these areas are marked by signs.

Hard Hats

The meeting was advised that the gun deck aft of the gun reels is a hard hat area and also the coredeck. The cable decks port and starboard are exempted. Some spare hard hats will be placed in the cabinet in the passage way aft of the recording room.

Fire and Emergency Crews

All personnel are to familiarise themselves with their duties on the station bill and to check their lifeboat number.

All personnel joining the vessel for the first time were asked to muster in the recording room after the meeting for a safety orientation tour of the vessel.

Garbage

The need to separate garbage into burnable and non burnable lots was explained. Aerosol cans are especially not to be included in burnable garbage, there is a separate bin for aerosols near the bosuns store.

There being no further business to discuss the meeting was closed at 13:15 hrs.

Signed

Captain Client Rep (SAGASCO).

Coordinator Safety officer

P116 WESTERN ATLAS.
REPORT OF SAFETY COMMITTEE MEETING.

Date: 27-feb-94
Time: 1300 hrs.
Location: recreation room.
The vessel was in production in Bass Strait for Sagasco on the Yolla 3D prospect.

Persons attending the meeting were.

Dicky Chow.	Senior coord. Chairman.		
John Jones.	Master	Steven Elliot.	Nav.
Brady Degenstein.	Guns.	Hamish Hume.	Coord.
Rick Honey.	AB.	Dave Hill.	Comp.Mech.
George Robson.	Ch.Eng	Tim Legge.	Mechanic
Lyall Cowin.	Safety officer. Secretary.	Matt Sussmilch.	Obs.
Kevin Roberts.	Tech.		

The minutes of the previous safety committee meeting held on 24-jan-94 were read out.

Dicky Chow asked for clarification of the present policy on stocking of first aid kits. The previous master wanted to treat all injuries no matter how small and to be informed of all illnesses and to this end, certain items were not being stocked in the first-aid boxes, such as pain relief for headaches and flu capsules. It is felt that the crew should not have to go to a ships officer for items like pain relief for headaches and that these should be stocked in first aid kits. The committee agreed that these items should be stocked in the first aid cabinets. A list of contents required for first aid kits will be produced and displayed on each cabinet.

Action marine crew/safety officer.

Dicky Chow informed the meeting that gates have been fitted to the walkways by the cable reels and the walkways are not to be used except for maintenance. If maintenance or repair is to be carried out, the coordinator and senior observer must be informed and signs will have to be displayed on reel controls to notate that someone is working on the cable reels.

Lyall Cowin gave the meeting a description of Richard Libke's accident. He twisted his ankle while running on the helideck due to a moment of inattention while looking at his watch. Personnel at the meeting were asked to tell people in their departments not to run on the heli-deck in rough sea conditions and to pay attention at all times where they are going if they do run.

Rick Honey asked if the hydraulic oil leak on the starboard pinger boom could be repaired. It is causing a slipping hazard on the deck and has to be constantly cleaned up. Parts have been ordered, the status of these will be investigated.

Action comp. Mech.

He also asked about the seat belts in the lifeboats and access to storage on top of freezers. The seat belts in the lifeboats do not fit very well when a person is strapped into them. Marine crew will investigate if they are fitted correctly.
The stewards asked about access to items stowed on top of the freezers. In the near future this area is to be a no storage area for safety reasons and alternative storage will be found, probably in the port store.

Tim Legge asked if the doors by the compressor/generator stacks served a useful purpose as repairs has to be carried out on them. The chief engineer said there must be a barrier between intake vents and engine exhausts.

Dave Hill asked that the zodiac procedures be posted to remind people of the correct procedures for launching and recovery of zodiacs, especially with regard to attaching the tag line to the crane hook and the zodiac.

Action, safety officer. This will also be raised at the next crew safety meeting.

Brady Degenstein advised that when the MARS system was being removed during preparation for helo operations the heli-deck guard rails were down, this procedure will be carried out before the guard rails are lowered in future.

Action Q.C/navigators.

John Jones asked if anyone knew if arrangements had been made to have the patch on the starboard lifeboat hull looked at during a port call by a fibre glass repairer. There is no information available at the moment, inquiries will be made.

Action marine crew/safety officer.

The fire control and emergency action plan that has recently been implemented on the vessel was discussed at length by the meeting.

The plan has been implemented as requested by management. The committee feels that the procedure itself is good but some changes need to be made to the way it is executed.

The main concern of all committee members is that there are too many people leaving the safety of the muster area to carry out tasks in various parts of the ship. Two members of the crew who have had experience of a serious fire at sea said that it would not be possible to go below decks in a fire situation without a B.A. set and it would not be possible for the chief mate and the second mate to account for such a large number of people in a smoke filled vessel.

The committee decided that a plan using the same procedure with less people actually going to the scene of the fire in the first instance. Some of the teams can remain at the muster area until called for. Some of the team may be able to perform two tasks, for example the 2nd and 3rd B.A. Teams could be used for boundary cooling while they are waiting for the 1st team to come out and will have to be used in this capacity anyway if there is too much smoke in the vessel. These changes will be adopted for the next drill.

The 2nd engineer should be available in the engine room for repairs and damage control instead of preparing life boats.
Signed

Master _____ Client rep. _____

Coord. _____ Safety officer. _____

R/V WESTERN ATLAS P116
REPORT OF SAFETY MEETING.

Date: 4-Mar-94
Time: 13:00 hrs.
Location: T.V. Room Western Atlas.
Conducted by: Lyall Cowin.

The vessel was in production on the Yolla 3D prospect for Sagasco in Bass Strait.

The minutes of the previous meeting held on 9-Feb-94 were read out.
The minutes of the safety committee meeting held on 27-Feb-94 were read out and explained to the meeting.

The main item for discussion at this meeting was the fire and emergency control team procedure which has been changed slightly. The new procedure was explained to the crew and copies of the procedure will be posted around the vessel. There will be a fire drill held next week.

The helicopter fire and rescue teams have been changed to come into line with the C.S.P. The new procedure requires less people to be exposed on the upper deck during helicopter operations. Copies of these teams are displayed on the notice boards.

The top of the freezers and dry store on the gun deck has now been made a no storage area for safety reasons, stores that have been kept there will now be stored in the port store above the gun shack.

The accident involving a sprained ankle while running on the heli-deck was discussed, the crew were advised to take care when exercising and that anyone injuring themselves would be asked to refrain from running on the heli-deck. The crew were told that no one is to run around the heli-deck during rough sea conditions.

The wearing of safety equipment such as boots and hard hats in areas where these are required was discussed, the safety procedures set out in the contract safety plan require that this equipment be used, all personnel should follow safety procedures, if in doubt there is a copy available in the coordinators office or they should consult the coordinators or the safety officer.
Personnel who consistently fail to wear safety equipment or follow procedures will have a counselling session arranged for them with the Supervisor or Party Manager.

The meeting was advised of a memo from Geoff Wood on 22-Feb-94 regarding a small boat incident in which 3 men ended up in the water.
The zodiac procedures are to be strictly adhered to especially with regard to radio checks, the bridge must be informed when the zodiac is leaving the vessel and the zodiac must not leave until the bridge has acknowledged the call. If the zodiac is to cross the bow of the ship the operator must inform the bridge of his intention and pass at least 200 metres ahead. If the zodiac crosses the bow too close it cannot be seen from the bridge.

Survival suits are to be carried in the zodiac while we are operating in Bass Strait, one should be carried for each person. They are stored in the aft seismic store.

A zodiac crew will be assigned from each shift. These crews will man the zodiac for all work and rescue tasks while they are on shift, an operator will also be assigned to the standby zodiac, the crew of this will be drawn from other seismic crew on shift. This list will be displayed on the notice boards and the ships bill will be amended.

Operators of zodiacs are to check that fuel is pumped up into the motor before starting by squeezing the bulb in the fuel line this is important if the motor has not been run for a long time.

The gates that have been installed by the walkways beside the port and starboard cable reels are to be kept closed at all times these walkways are a no go area at all times except for maintenance. The gates to the forward core decking area where the cable paravane winches are located are to be kept closed at all times while the paravanes are deployed. While the paravanes are deployed this is a no go area.

First aid kits will be stocked with pain relief and some other medicines, the crew were asked not to take more than they need for immediate use from the cabinets.

A suggestion was made that all heavy items shipped to the vessel have the weight of the item engraved or stamped on them, this is because some items of equipment onboard such as pullavanes do not have weights available and it is not known for sure at what radius the crane can safely lift them.

A question was asked about the availability of design specifications and safe working loads on all winches and booms used to lift pullavanes. This will be investigated.

Navigators were warned about the danger of entering the aft transducer hatch, this space must be well ventilated before anyone enters and there must be a second person to keep a watch on the person going into the space.

The oxygen cylinder in the emergency pack outside the hospital has lost some pressure this means it has either leaked or been tampered with, this oxygen is for emergency use only and anyone seen using it for any other purpose should be reported.

There being no further business to discuss, the meeting was closed at 13:15 hrs.
Signed.

Master._____ Client rep. Sagasco._____

Coord. _____ Safety officer. _____

5.4 MUSTER, FIRE AND MOB DRILLS

Extracts taken from the safety officers files.

1st January 1994

Re: Fire & Emergency Response Plan

During a recent in-house safety audit of this vessel, an item found wanting was a practical, practicable response plan for fire and other emergencies. As I offered to formulate such a plan for the vessel and have now done so, I respectfully forward the following proposal for your information and consideration of approval.

I would suggest that the program be instituted forthwith for a trial period of several months with a view to assessing any major discrepancies that might be seen to exist, with a view to producing a quality end product.

Taking Shipboard fire as the first of a number of potential emergency situations, it would seem appropriate to explore the issues within the following criteria:-

a) Prevention
b) Detection and reporting
c) Combat and control

Both a & b have been the subject of many publications, some of which are available aboard as excellent references, and I see no point in reinventing the wheel. My area of expertise and experience is in devising attack plans or combat systems adaptable to the marine shipboard environment.

As the vessels Master, I have an inherent duty of care to the vessel and its crew. I am also vicariously liable for the actions of my officers and crew acting, as they are, under my direction.

W.G.C. are just the same position with their onboard employees and it is, therefore, in everyone's interests to devise a system which minimises dangers in a naturally dangerous situation.

Simplicity, clarity, and workability are, therefore the essential ingredients, it is with these essentials in mind that I propose the program as follows:-

Firstly, this system is for those fires that are not able to be simply contained by the discoverer ie a fire blanket on a burning vat; a lid on a burning rubbish bin; an extinguisher on a small electrical fire. This system is designed to address fires that do or may threaten the safety of the vessel and its personnel.

It is important to eliminate confusion and toward that end, a single set of signals announcing all emergencies should be used.

Upon hearing either of or both those signals, all personnel should proceed forthwith to the muster area. They should ensure their name is checked off with the muster controller, prior to proceeding to their assigned task, so that the Master is aware of any missing personnel who may be injured or compromised. (This vessel is not so large that any point on it cannot be reached by a fast walk in under a minute.)

On receipt of a fire warning, the Master is immediately summoned to the Bridge, and he will immediately dispatch the Chief Officer to the fire scene to assess and report by radio.

From that time onward, it is merely a case of putting into place the various teams formed to fulfil the various functions required to deal with the several aspects common to all fire situations onboard any vessel.

Attack Preparation:

An Attack Preparation Team of three men under the command of the second mate will report to the Chief Mate at the Fire scene and under the directions of the Second Mate, they will bring up the necessary attack equipment and deploy it ready for use. Where the Chief Mate sees no imminent danger to the preparation team, they can get to work and commence an attack on the fire.

Breathing Apparatus:

A B.A. Team consisting of a B.A. Controller, three units of two B.A. operatives, and five B.A. dressers will assemble at the B.A. Station.

The Controller will set up his monitor board upon which he will record the unit operators' names, the time in the pressures of their sets, the location they are working and the time they are due out. He will be responsible for sending in a replacement unit and ensuring the first unit has safely returned.

The dressers will "Dress-In" the unit members and ensure the proper safety tests and checks are carried out, and the equipment is adjusted and functioning properly before dispatching them to the fire scene. The dressers will also be responsible for stripping down, cleaning, and setting up used B.A. sets for further use by the units.

Once dressed in, the B.A. primary attack unit will report to the Chief Mate who will direct them to take over from the preparation team and advance the attack on the fire face. The Prep Team will fall into support of the B.A. Unit, supplying hose etc as required.

The Primary Attack Unit will remain at the fire face no longer than 15 minutes before being relieved by the Second attack Unit; and the Second Unit no longer than 15 minutes until relieved by the Primary Unit who will have had some 30 minutes to rest and recover.

Peripheral Cooling:

Yet another fire Team under the direction of the 2nd Mate is the Peripheral Cooling Team. They will deploy their gear as directed and bring water cooling to bear on bulkheads, deckheads etc to prevent radiation of the fire or to douse the B.A. Teams and, if necessary supply them with spray protection, cover their retreat.

On this vessel, we can afford some five Team members.

Vent Control:

The effective and efficient closure of vents and fans, where necessary, can be an essential element of fire control, and toward that end, a team of four personnel are allocated that responsibility. Having been briefed in training by the Chief Engineer, they will be advised at the time of a fire which vents are to be closed and will be on hand to respond as and when required.

Lifeboat Clearance:

In any Shipboard Fire, the possibility of eventual evacuation must be considered, and toward that end a team of four, under the charge of the second engineer will clear both lifeboats for launching, deploy painters, and check that engines start. The boats are then ready for immediate use.

In addition, personnel are delegated to prepare extra food, water, and blankets if this can be done without jeopardising their safety by entering the accommodation, and take them to the boats to supplement on board rations.

First Aid:

A First Aid Team consisting of four personnel will standby ready with emergency packs, resuscitation equipment, and stretchers to respond to and assist any injured personnel clear of the Fire Ops area to a safe place where treatment can be rendered.

When reporting to Muster, essential team members, ie Prep and B.A. Teams have their names Red Tagged on the Muster List and the Muster Controller (usually a Coordinator) will give preference to those names on hearing the call "Red Tag, Bloggs, B.A. Team!"

Even after having attended the Muster, the Team member must ensure his Team Leader is aware of his presence to ensure his arrival is acknowledged.

Such is the basic system. It is essentially simplistic; it allows for easy team identification and specialised training on a separate team unit basis. It allows for an easy combination of team efforts to attack a fire situation in a logical sequential system. People can get to know what they do in a fire; how they do it, where and with whom they do it: they can become part of a Team within a Team. Training as a separate Team Unit alleviates the usual boredom of drills and encourages a sense of purpose; it distracts active minds from becoming fearful of consequences and prevents panic; it provides a methodology through which an efficient system can be built and maintained: and the results can be extremely impressive, especially to Clients.

As no doubt reported, this system was walked through on the last fire drill, after a briefing of teams prior to the event. Some minor challenges were experienced and they have been addressed. In the main, the personnel involved were quick to see the advantages and raised constructive questions and suggested solutions.

Naturally, there is always some sceptical resistance to change of any kind and some comments stating a preference for the Old System were made; the obvious rejoinder to that was, "Oh, and what system was that, exactly?"

I put this proposal forward in the good faith that it will at least form a basis upon which to build a safe and efficient system to effectively combat any fire aboard this vessel and I suggest such a system could very easily be suitably standardised so as to be commonly implemented throughout your fleet. I would further suggest that any constructive comment which might supplement or compliment or improve the system should be entertained, providing it is applied unilaterally throughout.

If such is the case, W.G.C. employees can move from ship to ship and expect to become part of an existing and familiar system. Foreign or outsider Masters and Mates will merely be instructed to implement the current policy thus maintaining continuity.

The other emergency situations, namely man overboard, collision, and abandon ship, have not been specifically dealt with here as they have been temporarily covered in the current on-board Muster List as amended and forwarded. I will make them subject to separate systems analysis should you so desire.

Respectfully forwarded for your information and if appropriate your early approval for adoption aboard this vessel, as policy, prior to crew change on 9th February 1994. Please find attached the current onboard Fire and Muster lists and Fire Team Dispersal.

Capt M. R. CURRIE

REPORT OF ABANDON SHIP DRILL

Date 10 February 1994
Time 13:00 hrs.

The alarm was sounded at 13:00 hrs, all available crew mustered at their muster stations for a head count. The vessel was laying cable at the time and personnel involved were not required to muster.

The chief mate told all personnel at the muster that if there is a fire or man over board emergency, they will be told when they arrive at the muster area, and after their names have been checked off they are then to proceed to their emergency station. All personnel are to familiarise themselves with their allotted tasks on the station bill.

The drill was concluded at 13:10 hrs.

Signed

Captain Client Rep (Sagasco)

Coordinator Safety Officer

R/V WESTERN ATLAS
P116
REPORT OF FIRE DRILL.

Date: 18-Feb-94
Time: 13:00 hrs.
Conducted by: Tony Dwyer/Kevin Turner.

The purpose of this drill was to familiarise the crew with the new fire and emergency procedure which has recently been put in place on this vessel and explain to each person what their duties are in the event of a fire or emergency situation.

When the alarm was sounded all available crew who were not required on shift mustered at their muster stations where a head count was taken.

When all personnel were accounted for the chief mate, Tony Dwyer explained to the crew how the system will operate.

The teams were then walked through the procedure they would have to follow in the event of a fire by members of the marine crew and their tasks were explained to them.

Having a walk through instead of a simulated fire was considered necessary by the master because of confusion amongst the crew over what the exact procedure is. The next fire drill will be a simulated fire And all personnel should then know exactly what is required of them.

Problems encountered.

It is felt by senior marine and seismic crew that there are too many people in the fire and emergency teams. There are 30 people in the teams who have to go to various parts of the vessel to do things or get equipment. It will be impossible to account for all personnel once they have left the muster area to go to their emergency stations especially if there is a lot of smoke causing reduced visibility and the potential for people to be overcome by smoke.

Advice will be sought on modifying the system so that many of the people will standby at the muster station and only go to the fire area if called for.

The drill was concluded at 13:35 hrs.

Signed

Master. _____ Client rep. Sagasco. _____

Coordinator _____ Safety officer. _____

P116
M/V WESTERN ATLAS

REPORT OF ABANDON SHIP DRILL.

Date: 25-feb-94
Time: 1300 hrs.
Conducted by: Chief Mate and Second Mate.

An abandon ship drill was held on this date. The purpose of the drill was to get all personnel at the muster to get into the life boats and to familiarise themselves with boarding procedures and equipment inside the boat.

The vessel was in production at the time.

After the alarm was sounded all crew not required on shift mustered at the muster stations and donned life jackets.

When a head count had been taken and all crew were accounted for the personnel at the muster station boarded their respective lifeboats and strapped themselves in. The motors of both lifeboats were then started and run up by the engineers.

The chief mate and the second mate then explained to the personnel in their respective boats what equipment is carried, where it is stowed, how to use it and what the procedure is for launching and getting away from the ship.

The drill was concluded at 13:20 hours.

Signed.

Master._____ Client rep. Sagasco._____

Coord. _____ Safety officer. _____

M/V WESTERN ATLAS.
REPORT OF FIRE DRILL.

Date: 11-march-1994
Time: 13:00 hrs.
Conducted by: Chief Mate Tony Dwyer, 2nd Mate Kevin Turner.

The vessel was on the Yolla 3D seismic survey in Bass Strait for Sagasco.

The general alarm was sounded at 13:00 hrs, all personnel not required on shift reported to the muster stations.

Personnel at the muster were informed that the reason for the alarm was a fire in the galley. B.A. Teams and dressers went to the fire team muster station at the main fire store after having their names checked off at the muster station.

When the head count was completed, the 2nd steward was found to be missing. This was reported to the bridge and the chief mate at the fire scene.

It was reported from the fire scene that the 1st B.A. Team had found the 2nd steward in the galley, that he was unconscious and the first aid team was required with a stretcher. It was reported at 13:08 hrs. That the fire was under control.

The crew were dismissed from emergency stations at 13:15 hrs.

POINTS ARISING FROM THE DRILL.

1. The muster clipboards need to have a copy of the fire team sheet attached so the coordinators can account for people who leave the muster station for the fire scene.

2. A few people were unsure of what team they were in and where to go. All personnel must read the fire control and emergency action plan. If they do not understand their task they must ask someone. this will be explained to the crew at the next safety meeting. The crew will be asked for suggestions for better communication of what their duties are and the procedures to be followed.

3. The first aid team walked into the fire on their way to the fire team muster station. All personnel leaving the muster area to go to the fire scene must find out where the fire scene is so they can plan their route. the coordinators will make sure all personnel at the muster are told at the start of the muster where the fire is. Personnel at the muster must make some effort on their own part to find out what is going on and take some interest.

4. The engineers should go to the engine room and report to the bridge and muster area by radio, they are required to perform tasks immediately if there is a fire. previously the engineer on watch was required to report to the muster area. The bridge will have to inform the engine room that the alarm is for a fire.

5. There are still too many people at the fire scene. 1 B.A. Team will remain at the muster station and the number of dressers will be reduced to 2. The vent teams will be reduced to 2 people, if the vents are engulfed in smoke the B.A. Teams will have to perform this task. previously both coordinators were in the vent teams, they will now remain at the muster station in charge of personnel and communications.

6. **Equipment**. All the B.A. Sets will be due for inspection in may 1994.

   The compressor for filling B.A. Cylinders is electrically driven, in the event of a power failure caused by the fire we would not be able to fill cylinders.

   The compressor is also in an area where it would get smoke in the air intake.

   A portable diesel compressor would be more suitable. advice on this will be sought from management.

   The chief engineer recommended that the main electrical distribution panel be colour coded by areas for isolating electricity in the event of a fire.

   One of the fire hoses used could not be connected to another hose to reach into the galley because the couplings were incompatible, this has been replaced.

Signed.

Master. _____ Client rep. Sagasco. _____

Coord. _____ Safety officer. _____

NB: Pages 96 to 129 inclusive - REMOVED

6 SEISMIC RECORDING SYSTEM

6.1 SEISMIC RECORDING SYSTEM SPECIFICATIONS

Recording Sample Rates . . . . . :	1,2 or 4 mSec
Cable Telemetry Rate . . . . . :	0.5 or 1 millisecond
Low Cut Filters . . . . . :	IN 2 Hz @ 12 db/octave IN 6 Hz @ 18 db/octave OUT 2.5 Hz @ 6 db/octave
High Cut Filters . . . . . :	Using 0.5 ms Telemetry Rate 392 Hz @ 214 db/octave 192 Hz @ 190 db/octave
High Cut Filters . . . . . :	Using 1.0 ms Telemetry Rate 196 Hz @ 214 db/octave 96 Hz @ 190 db/octave
Maximum Number of Streamers . . . . :	4
Maximum Number of Recorded Channels	:1024 demultiplexed
Tape Format . . . . . :	SEG D 8042 4-byte Demux
A/D Converter . . . . . :	24 bit (No Gain Ranging)
Instantaneous Dynamic Range . . . . . :	114 db
Harmonic Distortion . . . . . :	-106 db
Channel to Channel Similarity . . . . . :	± 1%
Streamer Test Functions . . . . . :	With or Without Phones
Shipboard Auxiliary Channels . . . . . :	16
Recording Medium . . . . . :	½ inch tape cartridges
Operator Interface . . . . . :	Sun Sparc 2 work station

6.1.1 WG-24 RECORDING SYSTEM SUMMARY

The WG-24 Marine Telemetry System is the latest system designed and developed by Western Geophysical for the acquisition of marine seismic data. The system uses delta sigma 24 bit A/D converters which provide an instantaneous dynamic range to >114 db, thus eliminating the need for any gain ranging and floating point amplifier. The use of fibre optic digital telemetry, with greatly reduced transmission error rates, provides a path capable of operating in streamer cables up to 10,000 metres long. The system can record up to 1024 channels of demultiplexed data and can acquire data from up to four streamers simultaneously.

Though the digital streamer cables are separate from the recording instruments by nature of their deployed environment, they are considered to be part of the recording system. The majority of raw data processing is carried out by electronic modules installed in the cable. For the purposes of this report a description of the cable electronics and their functions will be included with the recording system report. A following section in this report will deal with the physical characteristics of the cables.

6.2 STREAMER CABLE ELECTRONICS

Acquisition of the seismic data is via the streamer cables hydrophones, and electronic modules which are controlled by the WG-24 ship board electronics. The WG-24 cable has the streamer electronics distributed between the Streamer Module and the section itself. Four Marine Remote Units (MRU) are built into the live section with each MRU handling the initial data processing for two hydrophone groups.

The signal/data flow in the streamer starts at the output of the individual hydrophone groups. This data signal is fed into one of the two channels of the MRU where a preselected level of preamplifier gain is applied. Anti-alias filtering is applied to the data which is converted from analog to digital data form by a 24 bit Delta-Sigma Analogue to Digital (A/D)converter. The digital data from the A/D converter is then transmitted to the MRU output control for transmission on the MRU data bus to the streamer module. Figure 6.1 clearly illustrates the data flow through the cable electronics.

The Streamer Module handles data from eight MRU units (16 hydrophone groups). Each streamer module consists of three basic functional blocks. The FIR filter board (FFB), the data assembler and repeater board (DAR) and the control, power and enhanced delta modulator decoder board (CPE).

The CPE board decodes the command signals from the shipboard system and generates the control logic signals for the DAR and FFB boards. The CPE also generates MRU commands and test signals for both the MRU and the Streamer Module.

The DAR board assembles the data to be transmitted by the module, receives and repeats the data from downstream modules and generates the system clocks for the streamer module.

The FFB board demultiplexes the serialised MRU data into parallel channels, then converts the oversampled MRU channels into data samples at the selected telemetry rate, i.e. 0.5 or 1.0 milliseconds. The FFB also receives analogue status channel inputs and converts them to digital information through a simple 12 bit A/D converter. The digital data are then inserted into the digital data stream coming from the modules down stream and transmitted by the DAR board to the ship via the optical fibres with each streamer module acting as a repeater for data coming from astern.

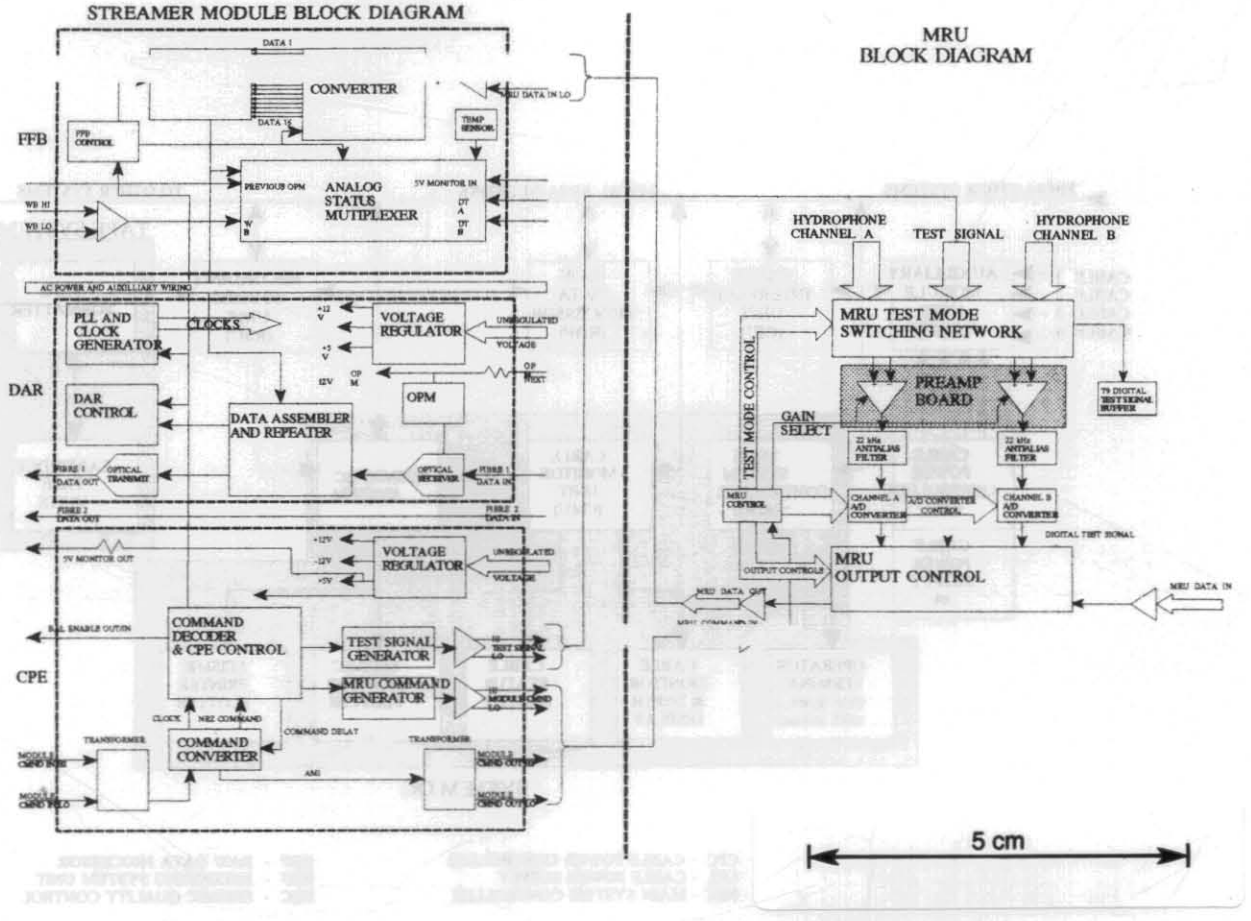

Figure 6.1 STREAMER CABLE ELECTRONICS BLOCK DIAGRAM

The cable head module is a non regenerative repeater that receives optical data from the streamer and sends it to the on board recording system via the reel assembly and lead in. It receives optical commands from the ship board electronics, converts them to electrical commands, then sends them down the cable to the streamer modules.

6.3 ON BOARD RECORDING SYSTEM

The on board recording system consists of nine sub-systems that are interfaced together to form the WG-24 recording system. These sub-systems and their functions are described below.

The Main System Controller (MSC) provides system level controls and receives status and error messages from all other sub-systems. The MSC builds a tape header for each seismic file on tape and contains the primary operator interface.

The Auxiliary Module Unit (AMU) can accommodate up to four streamers and provides for both optical to electrical conversion for incoming seismic data, and electrical to optical for outgoing commands. It monitors the cable power supply levels and provides facilities for shipboard auxiliary channels.

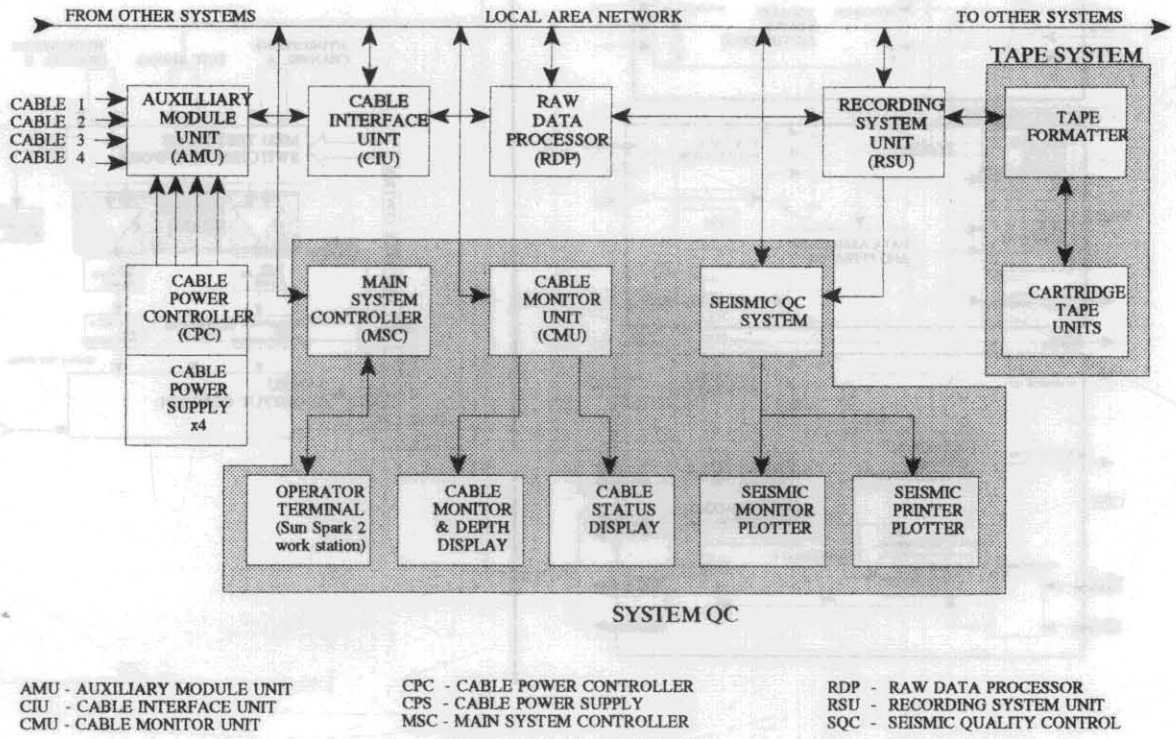

Figure 6.2 WG-24 SYSTEM BLOCK DIAGRAM

The Cable Interface Unit (CIU) interfaces the streamers to the recording system and provides the test capabilities for the system as a whole. In normal acquisition the CIU multiplexes the received seismic data from up to four streamers. It also receives commands from the RDP (see the following paragraph), and sends them on to the streamer(s). In test mode, the CIU functions as a data simulator for testing the recording system without the streamer, or as a stand alone cable controller for testing a single streamer without the recording system. The test signal generator is contained in the CIU.

The Raw Data Processor (RDP) performs the following front end data processing functions, adjacent channel summing (optional), error detection and correction, low cut filtering and anti-alias filtering. Recording system timing, and streamer cable commands for normal seismic data acquisition are generated in the RDP.

The Recording System Unit (RSU) demultiplexes the seismic and gun signature data, stores the header data and controls the CTU subsystem (see the following paragraph). The RSU contains a read after write interface that sends data to the SQC (see the paragraph after CTU) for monitoring and analysis.

The Cartridge Tape Unit (CTU) records the demultiplexed data onto cartridge tapes. The CTU subsystem consists of eight drives mounted into two racks. Four drives are used in normal recording configuration. However if duplicate tapes are required, the other four tape units are utilised to record the second or duplicate tape with two tape units recording the same file simultaneously. Also in the system are two formatter units, only one of which is used, the other being kept as a spare.

The Seismic Quality Control (SQC) provides basic quality control of the seismic data monitoring by monitoring the read after write data from the RSU. The data is presented for shot records as individual trace amplitude plotted against time. The SQC subsystem also outputs header data to the plotter and a separate printer as a further QC function.

The Cable Monitor Unit (CMU) provides quality assurance for the streamer data by monitoring status and telemetry errors. The CMU drives three high resolution colour monitors to display the status, telemetry error information and multiple streamer depth profiles. The CMU subsystem calibrates the streamer depth signals, displays them on the monitors and sends them to the MSC for inclusion in the external header.

Operator interface to the WG-24 is via a Sun Spark 2 work station terminal. All areas and functions of the system can be accessed via this terminal. The operator/observer has full control over the systems parameters and functions.

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6.4 SYSTEM CONFIGURATION OPTIONS

Numerous combinations of cable length, number of cables and recording options are available through the WG-24 recording system. Listed below are a sample of some options. Others options are available that are not listed here, but theoretically any recording combination is possible up to the limits of the recording system.

NUMBER OF STREAMERS	CHANNEL SUMMING	CHANNELS/ STREAMER	TOTAL CHS	RECORDED CHS	STREAMER LENGTH (m.)
1	No	416	416	416	5200
1	Yes	416	416	208	5200
2	No	256	512	512	3200
2	Yes	416	832	416	5200
2	No	512	1024	1024	6400
3	No	160	480	480	2000
3	Yes	192	384	192	2400
3	No	240	720	720	3000**
4	No	128	512	512	1600
4	Yes	192	768	384	2400
4	No	256	1024	1024	3200
4	Yes	416	1664	832	5200

** As used on this survey

6.5 WG-24 INSTRUMENT/STREAMER TESTS

TEST	NAME	FUNCTION
0		Used for normal recording operation
1	Analog Loopback	Tests the preamplifier and A/D converter dynamic range and the harmonic distortion with the phones out.
2	Analog Loopback	Same as Test 1 with test signal attenuated by 18db.
3	Analog Loopback	As Test 1 with phones in.
4	Analog Loopback	As Test 2 with phones in.
5	Preamplifier Noise	Tests the preamplifier and A/D converter noise with preamplifier inputs shorted.
6	Analog Impulse	Tests the system filters with the phones out.
7	Analog Impulse	As test 6 with the phones in.
8		Reserved for future use.
9	Digital Loopback	Tests the MRU to streamer module telemetry.
10	CMR	Tests the preamplifier common mode rejection.
11		Reserved for future use.
12		Reserved for future use.
13	Module Loopback	Checks the streamer module FIR filter and the module to shipboard telemetry.
14	Alternate Channel	Digital loopback tests the streamer module FIR filter and data assembler.
15		Reserved for future use.

6.6 RAMESSES FIELD PROCESSING SYSTEM

The RAMESSES system is a real time, on-line seismic processing package for use on board seismic vessels. The fact that the system can operate successfully in real time and process to a 60 fold stack section, 240 seismic data channels gives an indication of the processing power of the system.

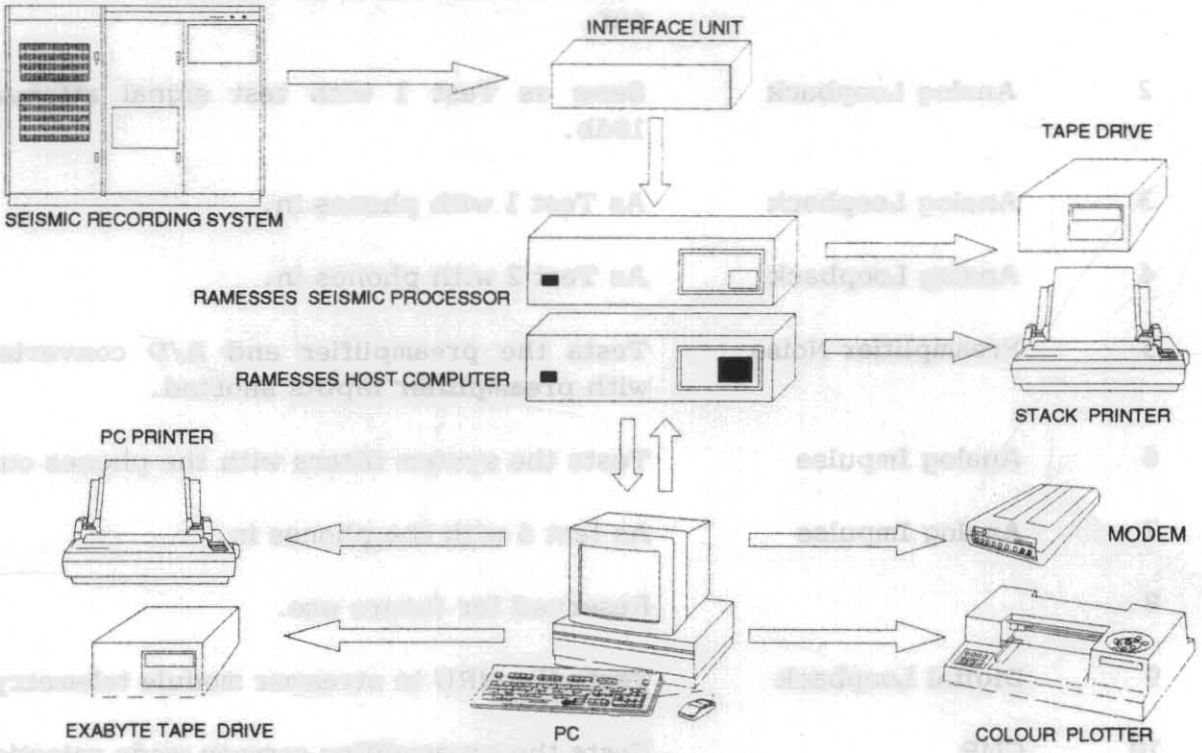

Figure 6.3 RAMESSES SYSTEM BLOCK DIAGRAM

The primary output of the system is a plotted stacked section which is generated as the vessel moves along the survey line collecting seismic data. RAMESSES can be configured to receive input data on-line from the seismic recording system through an interface unit, or off-line via a tape drive. In either mode the system can effectively process at the acquisition rate although the on-line mode is, of course significantly more efficient.

To enhance noise assessment and data quality analysis, shot records and CMP gathers can be monitored by the system with various options selectable for processing and display. The processed line data can be saved in SEG-Y format on either 3480 or Exabyte tape cartridges. This allows further enhanced processing or plotting at any future date. Also supplied with this system was the optional communications link, allowing the transfer of any data to the client's office facility.

7 STREAMER CABLE

7.1 STREAMER SPECIFICATIONS

Number of Cables	:	3 in use, (4 maximum)
Streamer Type	:	WG-24 Digital Telemetry
Active Streamer Length	:	3000 metres
Active Section Length	:	100 metres
Skin Type	:	PVC
No. Active sections	:	30
No. Streamer Electronic Modules	:	15
No. Connector Modules	:	15
No. of Groups per Section	:	8
Total No. Of Groups (per cable)	:	240
Group Interval	:	12.5 metres
Group Length	:	15.52 metres
No Hydrophones Per Group	:	16
Hydrophone Spacing	:	Centre weighted tapered array. 21% overlap on adjacent groups.
Hydrophone Type	:	LRS-2510 Acceleration cancelling
Hydrophone Model	:	WM1-018
Cable Sensitivity	:	49.5 µVolts/µBar
Depth Transducers	:	30
Waterbreak Detectors	:	31

7.2 STREAMER DESCRIPTION

This section of the report deals with the physical configuration of the digital streamer cable. The electronic components of the cable and their operations have already been discussed in the previous section of the report. The cable is made up of several differing elements.

Each element has a purpose in the make up of the cable and will be discussed as separate entities. Three components, the active sections, streamer electronic modules and connector modules form the majority of the cable. The other five components are used only once or twice in the cable and carry out a specialised function. These are the cable lead in, head stretch section, cable head section, terminator module and the tail stretch section. Each of the three cables are identical in configuration so the description that follows can be applied to each cable.

The cable is attached to the vessel by the Lead In, which is used to tow the entire cable from the vessel or the paravane. It is 285 metres long and is reinforced with steel armour to minimise damage as the Lead In is the section of the cable that endures the roughest usage. The reinforcing serves to sink the Lead In and consequently the head of the cable. This assists in bringing the cable down to the desired operating depth. There are no active elements in the lead in and its internal wiring serves as a carrier for the data from the cable to the vessel.

Between the Lead In and the active sections of the cable, 80 metre elastic Head Stretch sections are installed. These sections serve two functions. The first of these is to act as an electrical isolation section between the vessels' ground and the active cable sections and their electronic components. The stress members of these sections are made of heavy duty nylon rope. As this rope has a degree of elasticity, it provides the second function of the stretch section. That is to act as a damper between the vessels'/paravanes' motion and the active sections. This helps to attenuate front end noise on the cable. Naturally the more stretch sections used, the greater the dampening effect. Normally two stretch sections are installed at the head of each cable. However, due to the lack of sections aboard the vessel, only one stretch section was installed during the YOLLA 1 survey. This was evident by the amount of low frequency front end noise generated on the two outer cables that were towed off the paravanes.

An eight metre Cable Head section is installed immediately forward of the first active section of the cable. This section contains a several sensors that are used to position the head of the cable as well as a waterbreak phone, and a tension transducer to measure the amount of tow strain the cable is under. A 3.5 kHz acoustic receiver and a 12 kHz acoustic transmitter/receiver are installed in the section. They are part of the SSTS acoustic system and are used to acoustically measure the cable offset and cross cable separation.

The main body of the cable is made up of 30 active sections that are connected by alternate Streamer Modules and Connector Modules. These electronic modules not only process the seismic data in the cable, they also serve as electrical and physical stress member connectors to join the cable sections. Sections following the Streamer Modules are called "A" sections and sections following the Connector Modules are called "B" sections. The 8 groups in the "A" section are connected directly to the Streamer Module. As every Streamer Module can process data from 16 hydrophone groups, the Connector Module serves to relay the hydrophone data from the 8 groups in the "B" section to the Streamer Module. Figure 7.1 illustrates the cable configuration.

Each active section contains seven complete hydrophone groups and two half groups. These half groups are located at the head and tail of each section. When the sections are connected, either by the Streamer Module or the Connector Module, the half group in the tail of the section is joined to the half group in the head of the following section, thus making one complete group. This arrangement is utilised to minimise the flow noise of water over the module connections as the cable is towed through the water. The tail stretch section contains half a hydrophone group in the head of the section. These hydrophones are connected to the half group in the tail of the last active section installed in the cable when the sections are joined. This completes the last group in the cable, which in this instance is group 240.

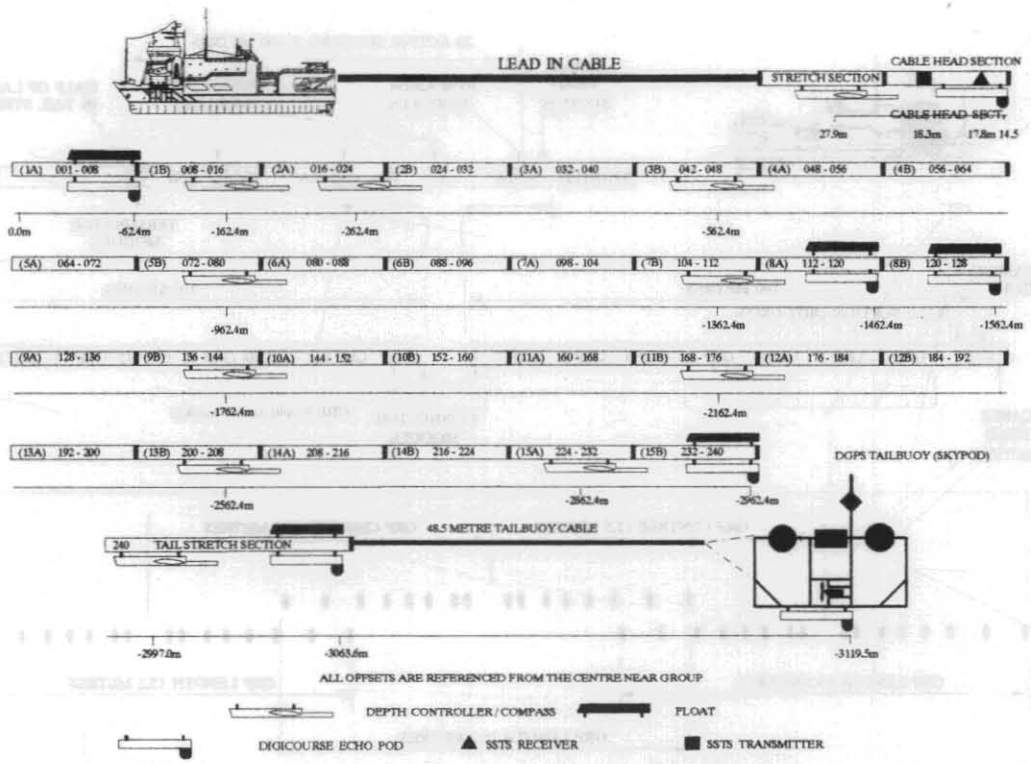

Figure 7.1 WG-24 STREAMER CABLE CONFIGURATION

There are 128 LRS-2510, model WM1-018 hydrophones, in each active section. Sixteen of these hydrophones are used make one hydrophone group, or trace. Trace interval is 12.5 metres centre to centre in an overlapping tapered array. Each hydrophone array is a centrally weighted tapered array 15.51 metres in length and overlaps its adjacent groups by a ratio of 21% (3.02 metres). This arrangement of hydrophones and groups helps to attenuate the noise levels on each trace making the cable less susceptible to swell noise generated by the sea. The arrangement of the groups in a section is illustrated in Figure 7.2.

The LRS-2510 hydrophone is a dual piezoelectric device. There are two pressure sensing elements in the hydrophone thus cancelling acceleration effects caused by motion of the cable through the water.

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Each active section contains a depth transducer installed about two metres from the head of the section. The depth transducers in all sections are active and recorded to tape, giving 30 depth readings along the length of each streamer.

A waterbreak detector (LRS-2510 hydrophone, model WMH-018) is installed two metres from the tail of every section. The only the water breaks active are the Cable Head section and the active "B" sections of the cable. Each of these water breaks contain their own A/D converter and the peak pick time of sixteen water breaks are recorded on the sixteen auxiliary channels in the WG-24 recording system. The water breaks recorded are the first six in the starboard cable and the first five in the other two cables.

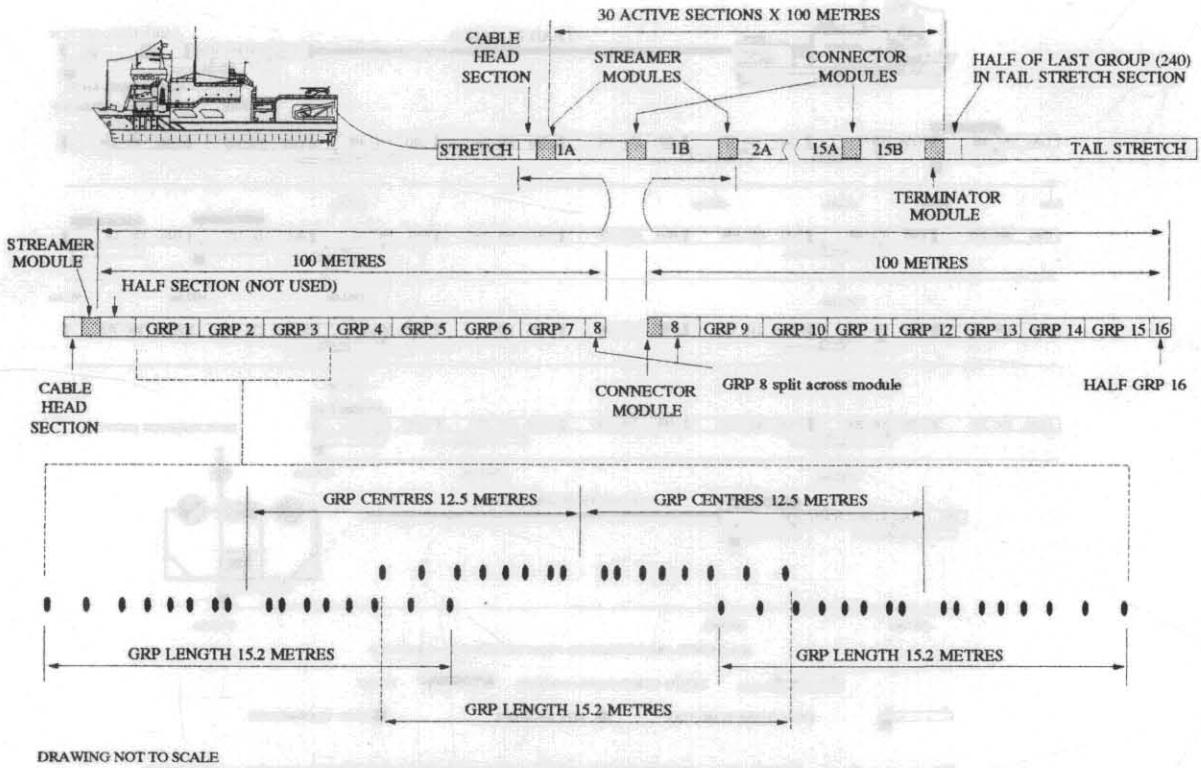

Figure 7.2 WG-24 STREAMER CABLE SECTION AND HYDROPHONE LAYOUT

There were ten depth controllers installed on the cable to assist in maintaining cable balance. The depth controllers were attached to collars clamped around the cable and are attached to a specific location in the section. This location is isolated from the hydrophone groups by five spacers and two oil blocks to prevent bird generated noise reaching the hydro-phones. The depth controllers used were Digicourse model 5011, which are remotely controlled from the instrument room.

5 cm

7.3 STREAMER QUALITY CONTROL

Quality control tests on the cable are carried out and recorded to tape with the recording instrument tests. These tests have been discussed in the previous section of the report. The following on-line quality control aids on performance of the streamer were performed on a line by line basis and most are real time quality control used during data gathering on line.

1. Streamer noise was monitored at the beginning and end of every line. A record is recorded to tape with out the energy source firing and a fixed gain plot of the record is produced on the wiggle trace plotter. This gives a visual view of the noise affect on the cable. In addition to this plot, the Seis QC system analyses the noise levels recorded and produces an average RMS value in µBar for all traces. These trace values are averaged to derive an RMS value for the entire cable. The noise levels could be printed on the Seismic QC wiggle trace plotter, or the printer plotter either in text mode, as a graph or both.

2. Before recording starts on each line an Harmonic distortion test is run on the cable with a signal level of -9db. This test is plotted on the wiggle trace plotter and examined for bad traces. The test and signal level are used as the harmonic distortion of the cable electronics is spec'd at this signal level. By running this test before the start of line, the electronic integrity of the cable is assured and any faults are identified.

3. During recording of a line, shot monitors are produced every forty shot points. These monitors are produced on a OYO plotter capable of producing a variable area/wiggle trace plot on 20 inch wide paper. All streamer cable groups can be displayed on the one plot with the cables plotted separately. Cable #1 is plotted first followed by cable #2 then cable #3. Cable depths are printed at the start of each cables plot.

4. Streamer depths were continuously displayed on the Cable Monitor Unit, recorded on the header of the WG-24 and printed on cable monitor plots every forty shotpoints.

5. Data telemetry errors were continuously monitored on the Cable Monitor Unit display of the WG-24.

6. Individual trace polarity can be tested during streamer deployment by physically tapping each group and observing the results on the multi-trace plotter. A less time consuming method is to observe the first breaks from a field shot on an expanded, wiggle trace plot of all groups and compare each group with its adjacent counterpart.

8 ENERGY SOURCE

8.1 ENERGY SOURCE DETAILS

Type	: LLP Airgun
Manufacturer	: Western Geophysical Company
Source Configuration	: Dual arrays / Wide tow
Source Operating Mode	: Alternate Array firing
Sequence Convention	: Starboard array fires on even shotpoint numbers.
Timing Control	: LRS-100 Airgun Controller
Number Of Primary Arrays	: 2
Array Configuration	: 3 Gun Strings (Sub Arrays) per Primary Array
Sub Array Length	: 18 Metres
Primary Array Separation	: 50 metres (Centre - Centre)
Sub Array Spread	: 20 metres (10 m x 10 m)
Number Of Guns per Array	: 21
Number Of Guns In Use	: 14
Number Of Spare Guns	: 7
Operating Volume	: 2700 in^3
Spare Volume in Each Array	: 1350 in^3
Array Output	: 45 Barmetres (4.5 mPa-m)
Operating Pressure	: 1800 psi. +/- 100 psi
Operating Depth	: 6 Metres
Air Supply Compressors	: 3 x CHERCO Compressors
Compressor Capacity	: 3 x 1800 cfm
Compressor Drive	: Caterpillar 3516DI Diesel Engines

8.2 ENERGY SOURCE SUMMARY

The energy sources used for this survey were tuned arrays of Western Geophysical LLP air guns. Two primary arrays, on the port and starboard side were used in an alternating firing sequence. Each primary array was composed of three sub arrays 18 metres long with a separation of 10 metres between the sub arrays. The separation between the primary arrays was 50 metres from port centre sub array to starboard centre sub array.

The air gun source arrays are designed to generate a discrete acoustic pulse into the water when electrically commanded, and consequently from this, reflected acoustic returns from the seabed are recorded on the towed streamers.

8.2.1 AIR GUN THEORY OF OPERATION

The LLP air gun is designed specifically for use in marine seismic survey operations. The air gun is designed to generate a discrete pulse of acoustic energy into the water when commanded by means of a electrical controlled firing device. An acoustic energy pulse is generated when high pressure air, stored in a reservoir in the air gun, is released into the water through four gun ports located in the main housing of the air gun. The air gun is comprised of three main parts, these being the reservoir, the main housing and the top housing that contains a solenoid and pressure sensing device.

Two models of the air gun make up the array on the Western Atlas. These are the LLP-7 and the LLP-8. The volumes of the LLP-7 air gun range from 20 to 200in^3. The LLP-8 volumes are from 115 to 465in^3.

The high-pressure air needed to operate the air guns is supplied by the compressors via the high pressure hose bundles and is fed directly into the gun through an inlet in the top housing. The increasing air pressure in the top housing acts on the shuttle and forces the shuttle to close on the firing seal, sealing both the reservoir and the top housing to the ingress of water. A small orifice in the shuttle allows passage of air through the shuttle into the reservoir.

As the gun is completely sealed the air pressure in both chambers continues to rise until it reaches the regulated supply pressure. The gun is fully pressurised at this point and is ready to fire. Because the upper flange of the shuttle is larger in area than the bottom flange, the unbalanced force acting on the shuttle holds the shuttle closed against the seals.

When a command to fire the gun is received from the gun controller the solenoid, located externally on the top housing is energised allowing the solenoid poppet to open. This action allows air from the top housing to flow through a channel in the housing to the underside of the top flange of the shuttle. This extra force under the shuttle, and the subsequent slight drop in the air pressure on the top of the shuttle creates an imbalance in the forces holding the shuttle closed.

The pressure in the reservoir overrides the pressure holding the shuttle immobile and forces the shuttle rapidly into the top housing and past the four ports in the gun body. As the lower flange of the shuttle passes the gun ports, air stored in the reservoir is vented through the ports directly into the surrounding water. It is this sudden venting of the high pressure air that creates the acoustic energy pulse.

A sensor mounted on the top housing senses the sudden drop in air pressure and indicates to the gun synchroniser that the gun has fired. The drop of pressure in the reservoir caused by the gun firing allows the air in the top housing to force the shuttle closed once again. The cycle is repeated as the air pressure increases in the reservoir and the gun is ready to fire. Figure 8.1 illustrates the firing sequence of a typical airgun.

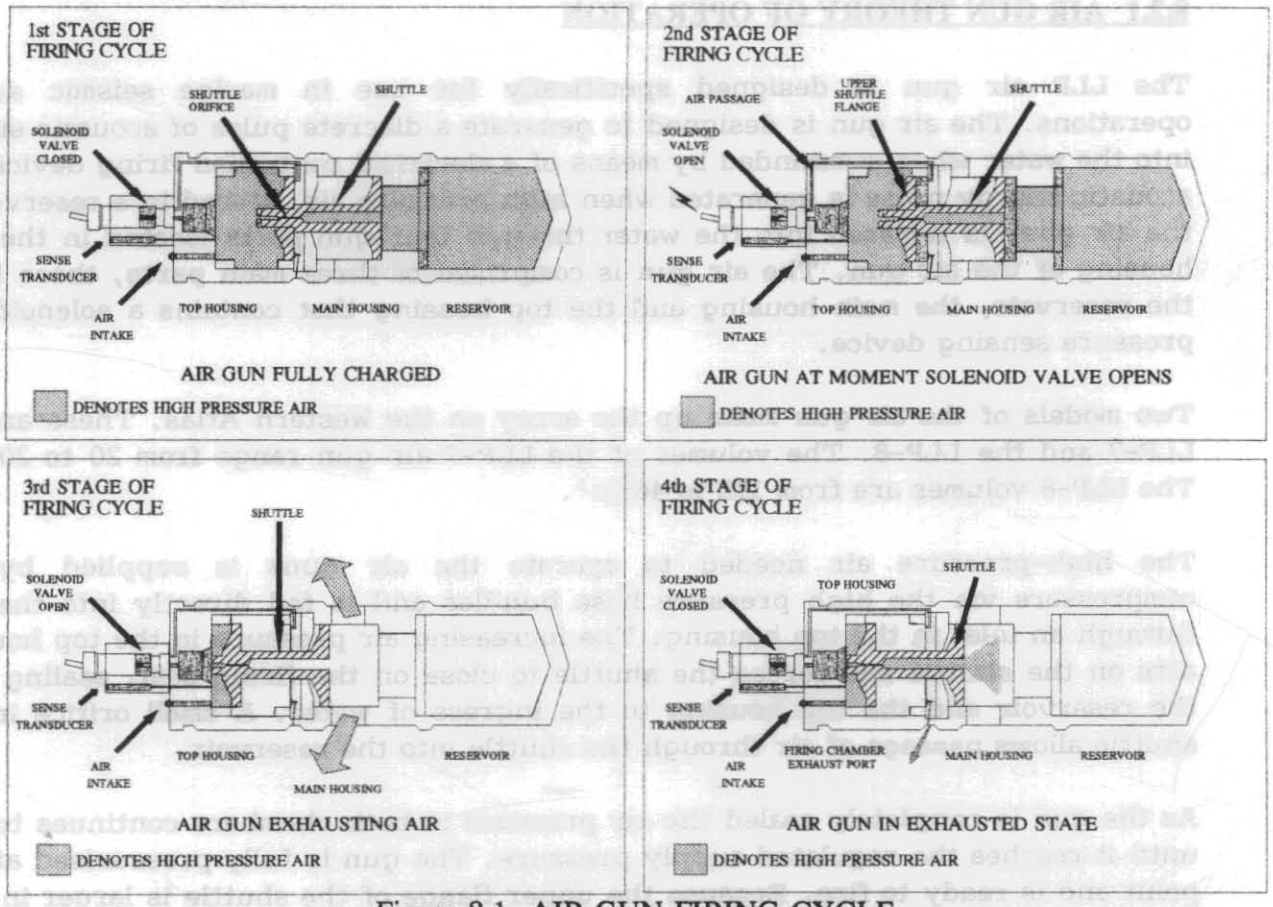

Figure 8.1 AIR GUN FIRING CYCLE

The air supply to the guns is supplied by 3 Cherco WBF-74XHD compressors. Each compressor supplies air at the rate of 1800 cubic feet per minute at the required 2000 psi. Two compressors are on line during normal operations and the third compressor is on stand by as a spare, in case of failure of one of the on line compressors. The compressors are driven by Caterpillar 3516 diesel engines of 900 horse power each.

5 cm

8.2.2 ENERGY SOURCE ARRAY DESCRIPTION

A six string dual source array was utilised for the survey. The air guns were configured in two primary source arrays, both consisting of three strings of air guns. On each gun string there are a combination of seven guns of varying sizes giving a total of forty two available guns, or twenty one available guns per primary array. Of these twenty one guns only fourteen were active to form the 2700 in^3 energy source. The remaining seven guns were kept in reserve as spare guns that could be substituted if one of the active guns failed during recording of a line. There was a fifty percent complement of spare guns available and every gun in each array had one spare gun that could be substituted in the event of failure. This redundancy of spare guns ensured that the full operating volume of both arrays could be maintained during production.

The two primary array sources were towed with a separation of 50 metres, from centre gun string to centre gun string. To achieve the wide separation the arrays were towed from paravanes that pulled the gun strings out to either side of the vessel. Within a primary array, a ten metre separation between each gun string was maintained. Individual guns were set at specific intervals along the gun string, to ensure a correctly tuned acoustic pulse, when fired. The Primary arrays were fired in an alternating sequence with the starboard array being fired on even numbered shot points, and the port array being fired on the odd numbered shot points. The towing arrangement and composition of the energy source is illustrated in figure 8.2.

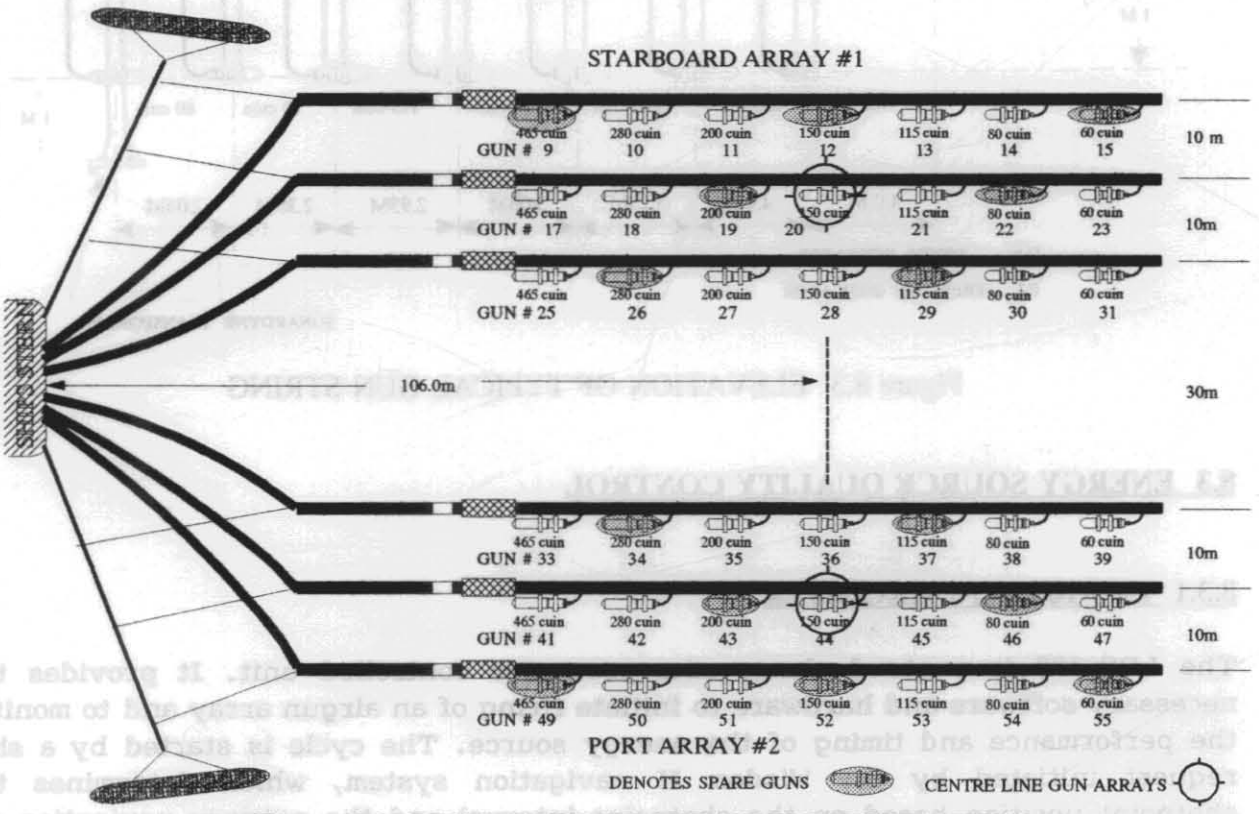

Figure 8.2 DUAL SOURCE ARRAY CONFIGURATION

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The hose bundles for the gun strings are suspended from a sausage shaped flotation tube by chains that are measured to allow the guns to stream at the desired depth. Each gun is suspended from the hose bundle and is towed one metre deeper than the hose bundle. An elevation of a gun string and its flotation tube is shown in figure 8.3. Depth transducers are attached to the hose bundles and it is the depth of the hose bundle that is relayed to the operators on the GMU. Because the guns are suspended deeper than the depth transducer, one metre has to added to the depth displayed on the GMU. The depth data and the air pressure are only displayed at the observer and gun mechanics work stations and are monitored by these people during recording. There is no hard copy made of the data to QC after a line is recorded. Therefore, a certain amount of trust must be given in the monitoring of these parameters for the energy source.

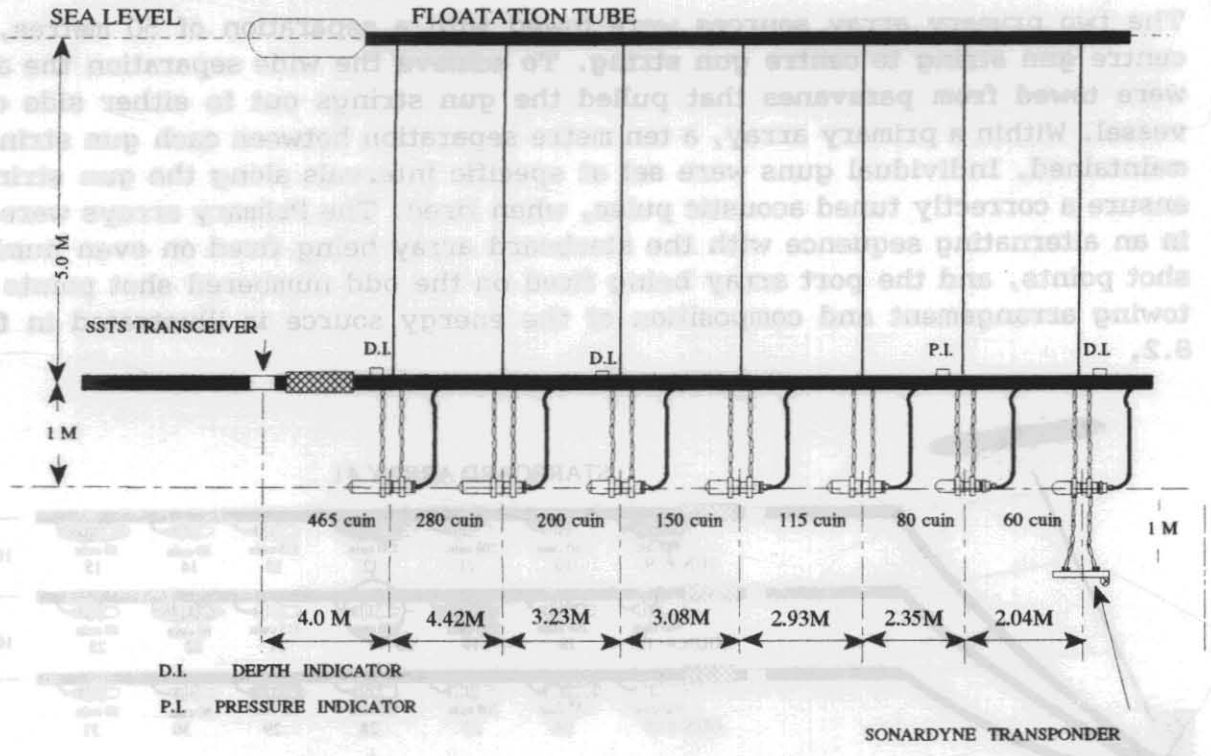

Figure 8.3 ELEVATION OF TYPICAL GUN STRING

8.3 ENERGY SOURCE QUALITY CONTROL

8.3.1 LRS-100 SYNCHRONISER

The LRS-100 is a stand alone, microprocessor controlled unit. It provides the necessary software and hardware to initiate firing of an airgun array and to monitor the performance and timing of the energy source. The cycle is started by a shot request initiated by the Wisdom II navigation system, which determines the shotpoint position based on the shotpoint interval and the primary navigation fix position.

5 cm

When the Navigation Interface Unit (NIU) receives the shot point closure from the Wisdom II it provides the WG-24 with a system start. The system start is also sent to the LRS-100 to set up the fire table in the synchroniser. Delays in the fire table are calculated from an average of the sync errors of the last eight shots. Upon receipt of the NIU system start, the WG-24 prepares to receive and record seismic data, and when ready issues the fire command to the LRS-100. The NIU can control alternate boat firing, alternate array firing or combinations of both.

The heart of the LRS-100 is the 16-Gun Controller Module (GCM). Up to four modules may be installed in the LRS-100 to provide synchronisation of up to 64 guns, though two LRS-100 units can operate in tandem should more air guns be needed. The 16-GCM accepts fire commands from the NIU and contains the circuitry required to provide time controlled fire pulses to each gun interfaced to the module. The 16-GCM also receives, upon firing, a fire detect signal from pressure sensors in each gun. The fire detect pulse nominally occurs at 128 mSec after the fire request is issued. Any deviation from this period for an individual gun is adjusted on subsequent shots. Field Timebreak (Time "0") is issued when the LRS-100 detects that 62.5 % of the array volume has been fired. After each firing the 16-GCM forwards the firing data to the Display Controller Module (DCM) and the Gun Monitor Unit (GMU).

As well as the basic individual gun timing control, the system also has data registers which can be used to display and record no-fires, auto fires and any guns which fire outside a selectable timing window. For this survey this window was set at ±1 ms. Displays available include a single LED for each gun status on a shot, an oscilloscope to monitor the condition of the analogue signals and a control panel display.

Although capable of operating in a full stand alone mode the LRS-100 was interfaced to a VT220 terminal and an AT computer which allow for the collection and display of source performance data via CRT monitors and a line printer on a shot by shot basis, enhancing the displays available as quality control indicators. Gun firing times, array volume, gun depth and array pressure are all written to tape in the expanded header of the WG-24 recording system.

All 64 channels in the system work in an identical fashion using time controlled fire pulses to the gun solenoids. Because the delay in firing air guns is a mechanical function it is impossible for the LRS-100 to fire the gun at the instant it receives the fire command from the NIU. Therefore, a constant firing delay has to be aimed for, to allow all the guns to fire at exactly the same time. In the case of the LRS-100 this delay is set at 128 mSecs after firing is requested. The counter used is a device which starts counting down from 128 msecs and on reaching zero resets itself to 128 and continues to count down again. A fire command is issued when the count down reaches zero.

When the WG-24 recording system requests the gun to be fired the counter starts counting down from 128 msecs and when the counter is zero the LRS-100 then signals the air gun to fire and the counter starts counting from 128 msecs. After the mechanical delay the return signal resets the LRS-100 and this stops the counter.

The next time a shot is required the counter resumes counting from the count it was stopped at on the previous shot. A time which is equal to 128 msecs minus the first delay measured, thus firing the gun at a fixed delay of 128 msecs.

This process is repeated shot after shot on all channels, with the average delay of the previous eight shots used as the applied delay for the forthcoming shot. The applied delay is updated in this manner for each shot using a constantly revised, "first in last out", rolling average.

8.3.2 ARRAY DEPTH/PRESSURE MONITORING SYSTEMS

The source depth/pressure monitoring devices used by the contractor were LRS model 2527B seawater depth/pressure transducers. The transducers operated within a range of 0-50 metres, and had an over-range limit of 70.4 metres. The indicators were pressure sensitive devices that indicated seawater depth or hose-air pressure. Both indicators used a transducer which produced an output voltage proportional to input pressure. The depth/pressure indicators performed voltage-to-frequency conversion on the transducer output voltage. The digital output signal had a variable pulse repetition frequency that varied from 2-4 kHz and indicates depth or air pressure variations. The depth indicator used a scale of 1 Hz/cm to indicate depth changes. The pressure indicator used a scale of 1 Hz/1psi to indicate air pressure changes. The transducers were calibrated to indicate zero depth or pressure at 2 kHz.

A total of 18 transducers were active at any one time during the survey, configured 3 per string on the six active strings. Six pressure transducers were used during the survey, with one transducer per string. Depth and pressure data was output to the GDU via the Gun Monitor Unit (GMU), and was also displayed on CRT monitors as a quality assurance tool.

8.3.3 SOURCE LOCATION SYSTEM

A Streamer / Source Tracking System II (SSTS II) was used to locate the source arrays relative to the other elements of the outboard configuration. The head of each source string had an SSTS phone attached and was an integral part of the triangulation network by which the WISDOM II positioning system calculated the position of each source string and cable head, relative to the Navigation Reference Point. A Digicourse Acoustic transponder was attached to the last gun on each centre gun string and was employed to provide redundancy in the positioning of the gun sources. A laser target was fixed to the front of the centre gun string of each primary array. This was used for the Mars Laser ranging positioning system and was integrated into the triangulation network by the Wisdom .

The system is fully described in `Streamer/Source Tracking System II', section 9.7 of this report.

9 POSITIONING SYSTEMS

9.1 POSITIONING SYSTEMS DETAILS

Vessel Positioning
- Primary . . . . . Argo DM-54
- Secondary . . . . . Multifix DGPS

Source Positioning
- Acoustic . . . . . SSTS-II (Streamer Source Tracking System - II)
  Digicourse Acoustic Pods
- Laser . . . . . MARS Laser Ranging system

Cable Positioning/Separation
- Acoustic . . . . . SSTS-II
  Digicourse Acoustic Pods
- Laser . . . . . MARS Laser Ranging system
- Compasses . . . . . Digicourse Model 5011 Compass/Depth Controllers

Tail Buoys
- Radio . . . . . Skypod GPS
- Acoustic . . . . . Digicourse Acoustic Pods

Antenna/Transducer Positioning with respect to Nav Reference Point

Antenna	+Fore/-aft	-Port/+Stbd	Height
Argo (NRP)	0.00m	0.00m	18.00m
Direct Injection Trimble	0.15m	0.84m	18.25m
Multifix Trimble	0.15m	0.55m	18.25m
Racal Skypod	-14.70m	-6.25m	16.40m
Depth Sounder Transducer	9.60m	-1.70m	-4.30m
SSTS-II Forward Transducer	9.10m	-1.90m	-4.30m
SSTS-II Aft Transducer	-24.60m	-1.80m	-4.30m
Mars Laser Ranging Unit	-48.62m	0.0m	10.40m

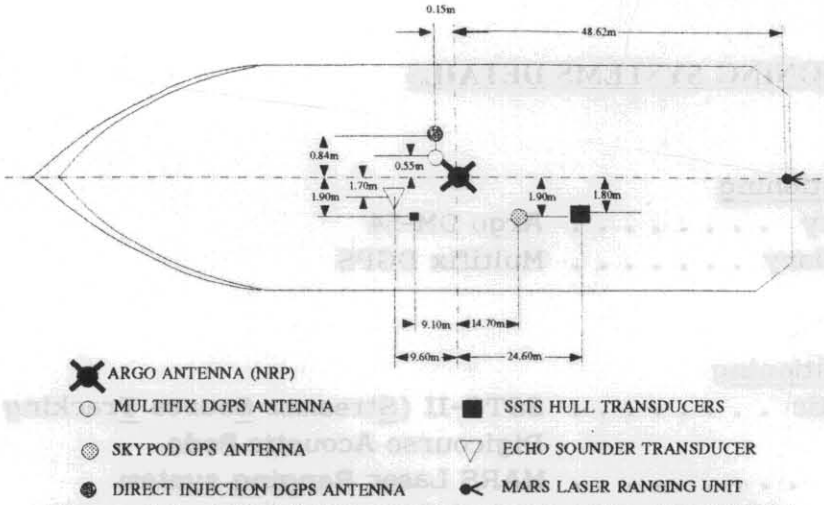

Figure 9.1 ANTENNA LOCATION AND OFFSETS

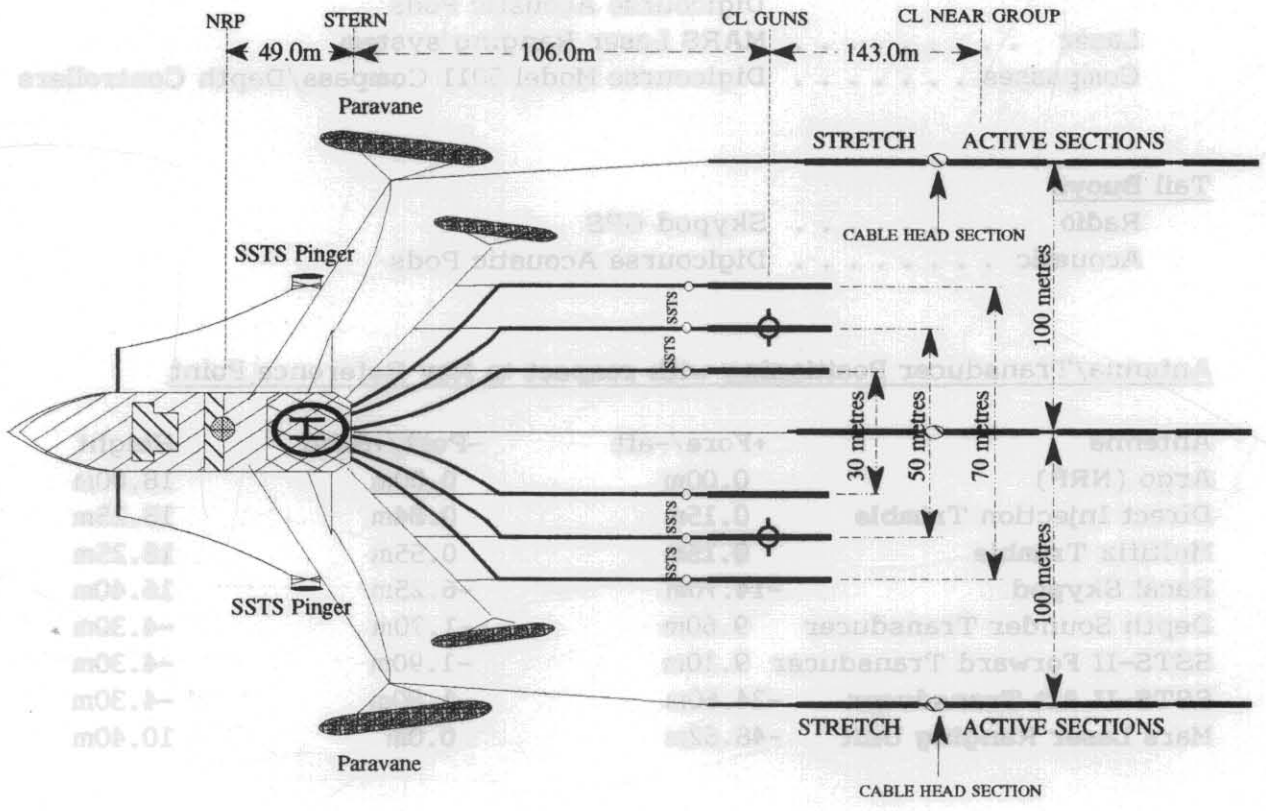

Figure 9.2 TOWING CONFIGURATION AND OFFSETS

5 cm

9.1.1 RADIO POSITIONING SYSTEMS DETAILS

Argo

Mobile Type	:	DM-54
Manufacturer	:	Western Cubic
Operating Mode	:	Range Range
Operating Frequency	:	1648.1 kHz
Propagation Velocity	:	299650 km/s
Lane Width	:	90.9077119 metres
Mobile Antenna	:	Argo Whip
Base Antenna	:	Ground Plane with Top Hat
Master Station	:	North Point
Smoothing Factor	:	02
Navigation Company	:	Western Geophysical Company
Equipment Owner	:	Western Geophysical Company

Multifix

Operating Platform	:	Compaq 486 33Mhz computer with 4 Mb ram, maths co-processor, VGA display and an 8 Channel Intelligent Digiboard COM/8i.
Operating System	:	Multifix Ver. 1.8
Satellite Receiver	:	Trimble 4000DL GPS Receivers.
Satellite Data Demodulator	:	DDM2400/2
Satellite Data Decoder	:	Type 90909
Differential Data Link	:	Racal Skydome with Antenna Control Unit
Equipment Owner	:	RACAL

Tail Buoy Skypod GPS

Tail Buoy Installation

Antenna	:	Combined GPS/UHF Type AD130
Data Transmission	:	Remote Tracking Unit, RTU-90912

Ship Board Installation

Operating Platform	:	Compaq 486 33Mhz computer with 4 Mb ram, maths co-processor, VGA display and an 8 Channel Intelligent Digiboard COM/8i.
Operating System	:	RACAL Remote Tracking System. Ver. 4.11
Satellite Receiver	:	Trimble 4000DL GPS Receiver.
Skypod Receiver	:	E1240E-R
Skypod Ship Unit	:	Type-90919
Equipment Owner	:	RACAL

MARS Laser Ranging System

Manufacturer	:	Schwartz Electro-Optics, Florida
Range	:	30-5000 metres
Range Accuracy	:	± 0.5metres
Scan Angle	:	± 90° (operating mode)
Azimuth Accuracy	:	± 0.013°
Laser Pulse Repetition . .	:	10 kHz
Horizontal Beam	:	1.0 milliradians
Vertical Beam	:	± 15° from horizon
Maximum No. of Targets .	:	10
Software Version	:	SEO MARS Encoder Version 3.3

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9.1.2 MAPPING PARAMETERS

The survey was referred to the Australian Geodetic Datum 1984 (AGD84), and was plotted on the Universal Transverse Mercator Grid Zone 55. The differential GPS system was operated in World Geodetic System 1984 (WGS84). The relevant parameters of the datum are shown below:

	AGD84	WGS84
Semi-Major Axis:	6378160.00m	6378137.00m
Inverse Flattening:	298.25	298.257224

Seven-Parameter Datum Shift from AGD84 to WGS84:

dX:	-116.00m	rX:	-0.23"
dY:	- 50.47m	rY:	-0.39"
dZ:	+141.69m	rZ:	-0.344"
f:	+0.0983ppm		

UTM ZONE 55

Latitude Origin	: 0° 00' 00.0" South
Longitude Origin	: 147° 00' 00.0" East
False Easting	: 500000.0m E
False Northing	: 10000000.0m N
Central Scale Factor	: 0.9996

All station parameters and positions in this report are quoted in terms of AGD84 and UTM Zone 55, unless otherwise noted.

9.1.3 ARGO BASE STATION COORDINATES

NARACOOPA AUS 0001	Latitude	39° 55' 30.52" S
	Longitude	144° 07' 37.96" E
	Height	47.80 m.
NORTH POINT AUS 0002	Latitude	40° 42' 53.88" S
	Longitude	145° 15' 29.94" E
	Height	3.9 m.
POINT SORRELL AUS 0003	Latitude	41° 07' 17.37" S
	Longitude	146° 31' 49.95" E
	Height	7.6 m.
CROPPIES POINT AUS 0004	Latitude	40° 51' 04.59" S
	Longitude	147° 35' 45.93" E
	Height	7.9 m.

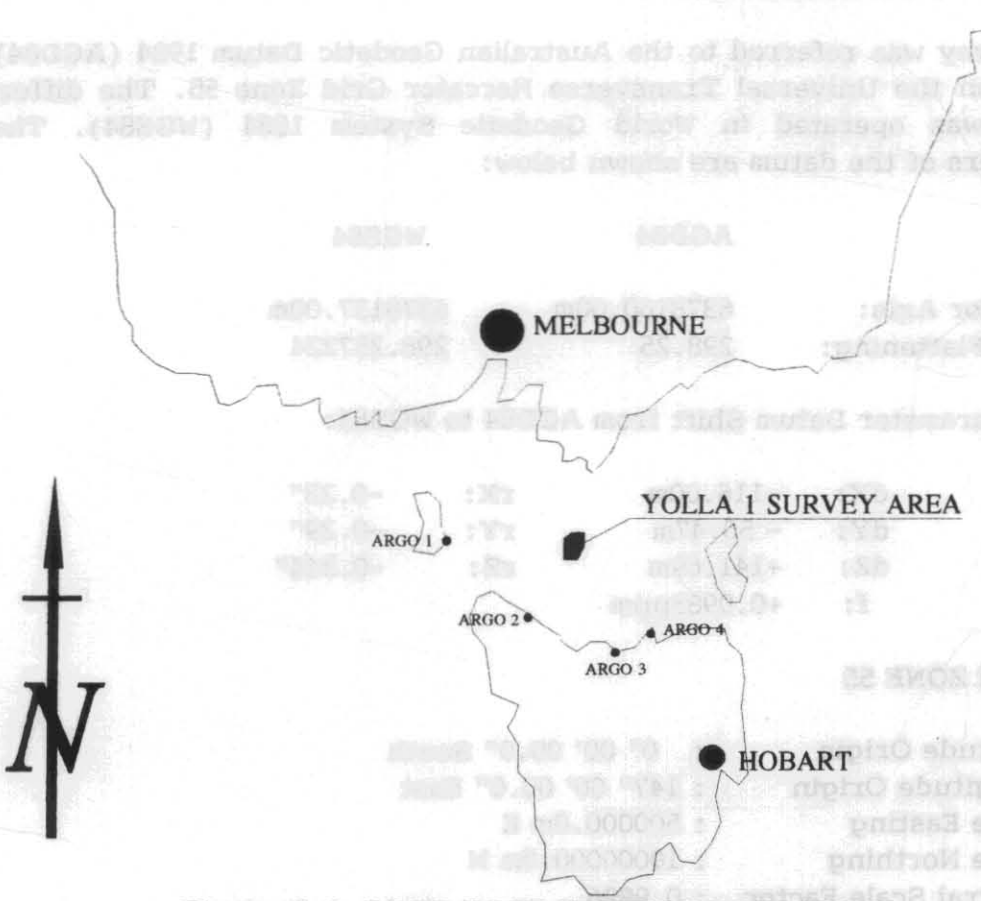

Figure 9.3 ARGO BASE STATION LOCATIONS

9.2 MULTIFIX DGPS DESCRIPTION

MULTIFIX is a multiple reference station, differential GPS mobile user system. A number of GPS reference stations are permanently installed at various locations in the area and data from all of these stations is sent via satellite up-link to the Inmarsat communications satellite system. A Multifix system on board a vessel then receives this data which is constantly available, the content of the data being a function of the area of operations. The Multifix system then calculates a position for each one, together with a network solution, using the entire data set, and this position is passed on to the contractor's navigation system. For this project three reference stations were used, Adelaide, Melbourne and Sydney, all of them part of the permanent chain of reference stations operated by Racal. Temporarily installed reference stations can also be used where the correction data is transmitted to the vessel via an RF link (Delta-Fix). The system is configured as shown in Figure 9.4 below.

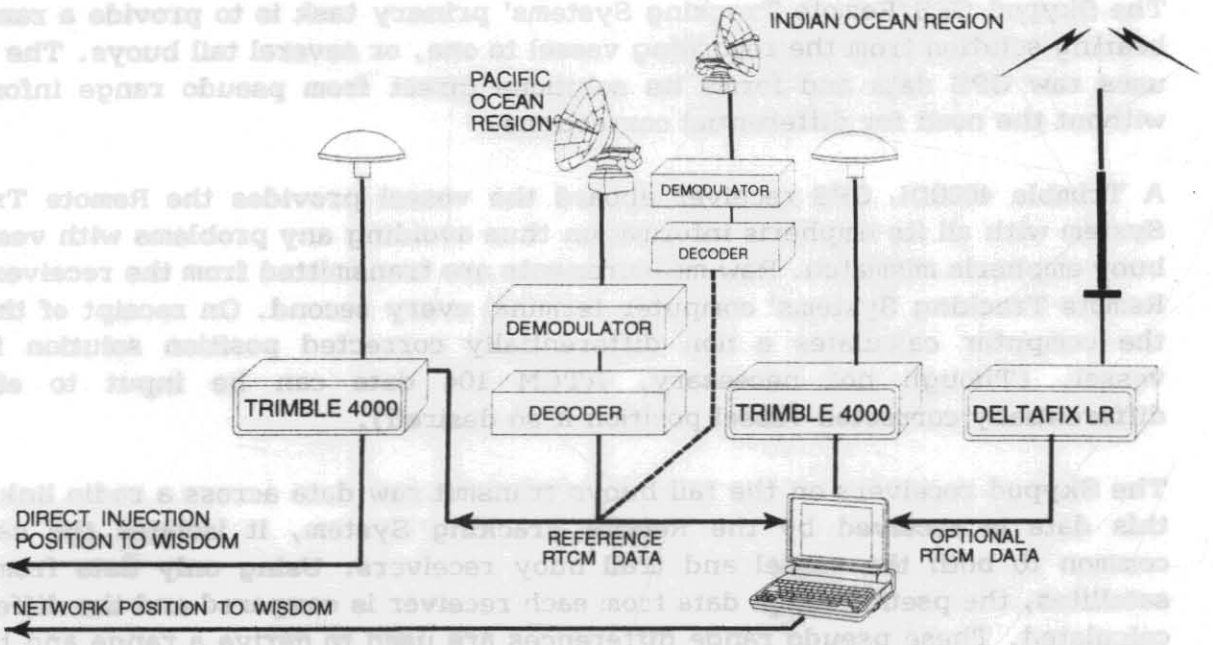

Figure 9.4 MULTIFIX SYSTEM BLOCK DIAGRAM

The system was appropriately equipped with spare units and the sub-contractor responsible installed a second Inmarsat terminal to be used in the event of a failure in the uploading of data to the Pacific satellite. This is shown as the spare unit in the diagram and tracked the Indian Ocean Satellite.

MULTIFIX is able to produce time series plots for three main areas of interest, namely the code carrier filters, the pseudo-range corrections and the network solutions obtained. MULTIFIX can also replay its logged data, either file by file, or in a batch mode for post survey data evaluation.

The following major equipment units were provided for this project,

Quantity	Description
3	Compaq 486 33Mhz computer with 4 Mb ram, maths co-processor, VGA display and an 8 Channel Intelligent Digiboard COM/8i.
2	Satellite Data Demodulator, DDM2400/2
2	Satellite Data Decoder, Type 90909
1	Racal Skydome with Antenna Control Unit
3	Trimble 4000DL GPS Receivers, Antennae, I/O Boxes

9.2.1 SKYPOD GPS/REMOTE TRACKING SYSTEM DESCRIPTION

The Skypod GPS/Remote Tracking Systems' primary task is to provide a range and bearing solution from the recording vessel to one, or several tail buoys. The system uses raw GPS data and forms its solutions direct from pseudo range information without the need for differential corrections.

A Trimble 4000DL GPS receiver aboard the vessel provides the Remote Tracking System with all its empheris information thus avoiding any problems with vessel-tail buoy empheris mismatch. Raw measurements are transmitted from the receiver to the Remote Tracking Systems' computer terminal every second. On receipt of this data the computer calculates a non differentially corrected position solution for the vessel. (Though not necessary, RTCM 104 data can be input to effect a differentially corrected vessel position if so desired).

The Skypod receivers on the tail buoys transmit raw data across a radio link. When this data is received by the Remote Tracking System, it isolates the satellites common to both the vessel and trail buoy receivers. Using only data from these satellites, the pseudo range data from each receiver is compared and the differences calculated. These pseudo range differences are used to derive a range and bearing from the vessel to the tail buoys. A tail buoy position is formed by applying the range and bearing to the vessel position.

9.3 ARGO SYSTEM DESCRIPTION

The DM-54 (ARGO) Positioning System determines the range (in lanes) to the Mobile Station from each of the Fixed or Shore Stations. The base station has the same configuration without the Control Display unit. Range measurement is achieved by computing fractional lane distances and maintaining an accumulation of whole lane counts. The fractional lane distances are determined by the difference between the phase of the transmitted RF signal and that of the received RF signal. This concept is based on the following two premises, namely that a propagated RF signal will travel through the atmosphere at a velocity which is predictable within certain limitations and that for any particular frequency, the wavelength is determinable. The distance travelled by an RF signal can be determined from the phase of the received signal i.e. if a received RF signal was at a phase angle of 90°, the signal would have travelled some multiple of whole lanes plus one quarter of a wavelength. A half wavelength is equal to the physical separation of two points if the two way travel time for an RF signal was one cycle. Thus this is the maximum unambiguous range which can be determined using phase measurement techniques. The half wavelength distance or lane, can be calculated as follows,

$$\text{Lane width in meters} = \frac{\text{Propagation Velocity (meters/second)}}{2 \times \text{Operating Frequency (hertz)}}$$

The propagation velocity is dependent on a number of parameters such as the combination of land/water path, temperature and humidity of the path, air pressure and the type of land/water in the path. The system used a base figure of 299650 kilometres per second as a propagation velocity. Propagation velocity was not determined for this system because calibration was carried out on site. The derived C-Os therefore comprised both partial lane counts and velocity factors. Any change in propagation velocity naturally affects the lane width value. The range measurement is performed by the system as follows:-

The range to the Mobile Station from all Base Stations must be known to a degree of accuracy less than the lane size of the system (in this case 90.9077119 metres) and the correct number of whole lanes entered into the system. The mobile station initiates the basic ranging process by transmitting a pulse of RF energy (the Interrogation Burst). Each of the base stations receive this signal, correct the phase to that of the original transmission and, in sequence transmit pulses of RF energy (the Reply Bursts). The Reply Bursts are received by the mobile station and their phases compared with that of the original Interrogation Burst. The phase difference is then used to calculate the fractional lane distance combined with the whole lane distance to provide ranges in lanes. In continuous operation the system is capable of maintaining and updating the whole lane count to each station.

All stations in any chain must have their system timing synchronised to accomplish accurate phase measurements. System timing is synchronised by using a timing pulse transmitted at the start of every alternate two second system time frame. Any station in the chain can be designated as master and issue this timing pulse. Figure 9.3 shows the basic timing relationship of the various RF signals in a four Station ARGO chain.

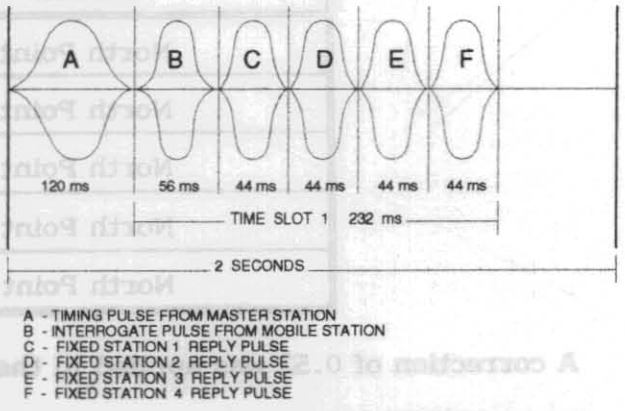

Figure 9.5 ARGO SYSTEM TIMING DIAGRAM

The ARGO configuration for the survey was a Multi user, four base station system, with the station North Point as master. The system operated on a frequency of 1648.1 kilohertz and the corresponding lane width was 90.9077119 metres. The base station data is given in Section 9.1.3 of this report. The system was supplied and operated by Western Geophysical Navigation with a shore crew compliment of one base station coordinator, two operators/station

The mobile Argo antenna was mounted on the vessel centre line at the top of the new bridge deck Its position was used as the Navigation Reference Point (NRP) for the survey and all offsets to other systems were made relative to this point.

The ARGO shore station installations were *not* inspected by any SAGASCO representatives during mobilisation.

5 cm

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9.4 NAVIGATION SYSTEM CALIBRATION

9.4.1 ARGO CALIBRATION

Date: 20 January 1994

Station	Dir.	Result
Naracoopa	213	+0.32
Naracoopa	303	+0.31
Naracoopa	033	+0.31
Naracoopa	123	+0.33
Naracoopa	Ave	+0.32

A correction of -0.32 was applied in the Wisdom, and later changed to 0.68 by the addition of 1 lane to this station.

Station	Dir.	Result
North Point	213	-0.53
North Point	303	-0.55
North Point	033	-0.49
North Point	123	-0.53
North Point	Ave	-0.52

A correction of 0.52 was applied in the Wisdom.

Station	Dir.	Result
Point Sorell	213	-0.41
Point Sorell	303	-0.41
Point Sorell	033	-0.40
Point Sorell	123	-0.37
Point Sorell	Ave.	-0.41

A correction of 0.41 was applied in the Wisdom.

Station	Dir.	Result
Croppies Point	213	-0.35
Croppies Point	303	-0.32
Croppies Point	033	-0.34
Croppies Point	123	-0.37
Croppies Point	Ave.	-0.34

A correction of 0.34 was applied in the Wisdom.

The observed partial lane counts as seen on the Acumen system.

Station	Result
Naracoopa	0.32
North Point	-0.52
Point Sorrell	-0.39
Croppies Point	-0.32

26 January, 1994

A static calibration check was performed on this date to check the Argo system.

Station	Result
Naracoopa	0.2
North Point	-0.02
Point Sorrell	-0.07
Croppies Point	-0.08

27 January, 1994

A second static calibration check was performed, to recheck the 26/01 check on the Argo system.

Station	Result
Naracoopa	0.23
North Point	-0.00
Point Sorrell	-0.05
Croppies Point	-0.07

4 February, 1994

The following calibration is a result of an ARGO system failure.

Station	Result
Naracoopa	-0.43
North Point	-0.12
Point Sorrell	-0.13
Croppies Point	-0.12

24 February, 1994

The following calibration was applied after 24 hours of observed data taken from survey line headings.

Station	Result
Naracoopa	-0.36
North Point	-0.09
Point Sorrell	-0.07
Croppies Point	-0.05

SAGASCO Resources Limited

YOLLA 1 Marine 3D Seismic Survey - Permit Area T/RL1 Bass Basin

PRE SURVEY BASELINE CROSSING LOG

CLIENT : SAGASCO RESOURCES LIMITED
PROSPECT: YOLLA 3D
PRE-PROSPECT

VESSEL: WESTERN ATLAS
PARTY: 116
DATE: 20-01-94 JD 020

TIMES IN G.M.T	Stn.# 1	Stn.# 2	Ship Ant.	Ship Head	Baseline Details	Result
CUT # 1 SYSTEM: AR/AR Time U.T.C Commenced:**14:53** Completed:**15:00**	NARACOOPA Ant.Type: GRND PLANE /TOP HAT DELAY -0.68 IN WISDOM	CROPPIES POINT Ant.Type: GRND PLANE /TOP HAT DELAY -0.35 IN WISDOM	OMNI	203°	Computed: 311948 Observed: 311961	+14 Metres
REMARKS:						
CUT # 2 SYSTEM: AR/AR Time U.T.C Commenced:**16:53** Completed:**17:01**	NARACOOPA Ant.Type: GRND PLANE /TOP HAT DELAY -0.68 IN WISDOM	POINT SORELL Ant.Type: GRND PLANE /TOP HAT DELAY -0.41 IN WISDOM	OMNI	213°	Computed: 243139 Observed: 243153	+14 Metres
REMARKS:						
CUT # 3 SYSTEM: AR/AR Time U.T.C Commenced:**17:49** Completed:**17:57**	NORTH POINT Ant.Type: GRND PLANE /TOP HAT DELAY -0.51 IN WISDOM	CROPPIES POINT Ant.Type: GRND PLANE /TOP HAT DELAY -0.35 IN WISDOM	OMNI	185°	Computed: 197907 Observed: 197921	+14 Metres
REMARKS:						
CUT # 4 SYSTEM: AR/AR Time U.T.C Commenced:**19:26** Completed:**19:32**	NARACOOPA Ant.Type: GRND PLANE /TOP HAT DELAY -0.68 IN WISDOM	POINT SORELL Ant.Type: GRND PLANE /TOP HAT DELAY -0.41 IN WISDOM	OMNI	033°	Computed: 243139 Observed: 243156	+17 Metres
REMARKS:						

SAGASCO Resources Limited

YOLLA 1 Marine 3D Seismic Survey - Permit Area T/RL1 Bass Basin

PRE SURVEY BASELINE CROSSING LOG

CLIENT : SAGASCO RESOURCES LIMITED
PROSPECT: YOLLA 3D
PRE-PROSPECT

VESSEL: WESTERN ATLAS
PARTY: 116
DATE: 20-01-94 JD 020

TIMES IN G.M.T	Stn.# 1	Stn.# 2	Ship Ant.	Ship Head	Baseline Details	Result
CUT # 5 SYSTEM: AR/AR Time U.T.C Commenced:**19:48** Completed:**19:56**	NORTH POINT Ant.Type: GRND PLANE /TOP HAT DELAY -0.53 IN WISDOM	CROPPIES POINT Ant.Type: GRND PLANE /TOP HAT DELAY -0.35 IN WISDOM	OMNI	XXX°	Computed: 197907 Observed: 197921	+14 Metres
REMARKS:						
CUT # 6 SYSTEM: AR/AR Time U.T.C Commenced:**22:00** Completed:**22:08**	NARACOOPA Ant.Type: GRND PLANE /TOP HAT DELAY -0.68 IN WISDOM	CROPPIES POINT Ant.Type: GRND PLANE /TOP HAT DELAY -0.35 IN WISDOM	OMNI	019°	Computed: 311948 Observed: 311961	+13 Metres
REMARKS:						

PROPAGATION ENTERED INTO WISDOM	:	299600 Km/sec
LANE WIDTH USED BY WISDOM	:	92.8071371 metres
MEAN OF 6 CALCULATED PROPAGATION VELOCITIES	:	299582.41 Km/sec

START OF SURVEY BASELINE CROSSING LOG

CLIENT : SAGASCO RESOURCES LIMITED
PROSPECT: YOLLA 3D
PRE-PROSPECT

VESSEL: WESTERN ATLAS
PARTY: 116
DATE: 26-01-94 JD 026

TIMES IN G.M.T	Stn.# 1	Stn.# 2	Ship Ant.	Ship Head	Baseline Details	Result
CUT # 1 SYSTEM: AR/AR Time U.T.C Commenced:16:38 Completed:16:45	NARACOOPA Ant.Type: GRND PLANE /TOP HAT DELAY -0.20 IN WISDOM	CROPPIES POINT Ant.Type: GRND PLANE /TOP HAT DELAY 0.08 IN WISDOM	OMNI	199°	Computed: 311948 Observed: 311964	+17 Metres
REMARKS:						
CUT # 2 SYSTEM: AR/AR Time U.T.C Commenced:18:38 Completed:18:44	NARACOOPA Ant.Type: GRND PLANE /TOP HAT DELAY -0.20 IN WISDOM	POINT SORELL Ant.Type: GRND PLANE /TOP HAT DELAY 0.07 IN WISDOM	OMNI	214°	Computed: 243139 Observed: 243157	+18 Metres
REMARKS:						
CUT # 3 SYSTEM: AR/AR Time U.T.C Commenced:18:56 Completed:19:02	NARACOOPA Ant.Type: GRND PLANE /TOP HAT DELAY -0.20 IN WISDOM	POINT SORELL Ant.Type: GRND PLANE /TOP HAT DELAY 0.07 IN WISDOM	OMNI	034°	Computed: 243139 Observed: 243160	+21 Metres
REMARKS:						
CUT # 4 SYSTEM: AR/AR Time U.T.C Commenced:20:40 Completed:20:46	NARACOOPA Ant.Type: GRND PLANE /TOP HAT DELAY -0.20 IN WISDOM	CROPPIES POINT Ant.Type: GRND PLANE /TOP HAT DELAY -0.08 IN WISDOM	OMNI	019°	Computed: 311948 Observed: 311967	+19 Metres
REMARKS:						

PROPAGATION ENTERED INTO WISDOM	:	299650 Km/sec
LANE WIDTH USED BY WISDOM	:	90.9077119 metres
MEAN OF 4 CALCULATED PROPAGATION VELOCITIES	:	299629.58 Km/sec

501153

MID SURVEY BASELINE CROSSING LOG

CLIENT : SAGASCO RESOURCES LTD
PROSPECT: YOLLA 3D
MID-PROSPECT

VESSEL: WESTERN ATLAS
PARTY: 116
DATE: 28-2-94 JD 317

TIMES IN G.M.T	Stn.# 1	Stn.# 2	Ship Ant.	Ship Head	Baseline Details	Result
CUT # 1 SYSTEM: AR/AR Time U.T.C Commenced:20:40 Completed:21:01	NARACOOPA Ant.Type:GRND PLANE /TOP HAT DELAY -0.36 IN WISDOM	POINT SORELL Ant.Type:GRND DELAY -0.16 IN WISDOM	OMNI	350°	Computed: 243139 Observed: 243153	+13 Metres
REMARKS:						
CUT # 2 SYSTEM: AR/AR TIME U.T.C. Commenced:21:31 Completed:21:39	NORTH POINT Ant.Type:GRND PLANE /TOP HAT DELAY -0.09 IN WISDOM	CROPPIES POINT Ant.Type: GRND PLANE /TOP HAT DELAY -0.05 IN WISDOM	OMNI	350°	Computed: 197907 Observed: 197916	+ 9 Metres
REMARKS:						
CUT # 3 SYSTEM: AR/AR Time U.T.C Commenced:00:06 Completed:00:15	NARACOOPA Ant.Type:GRND PLANE /TOP HAT DELAY -0.36 IN WISDOM	CROPPIES POINT Ant.Type:GRND PLANE /TOP HAT DELAY -0.05 IN WISDOM	OMNI	350°	Computed: 311948 Observed: 311961	+13 Metres
REMARKS:						
CUT # SYSTEM: AR/AR TIME U.T.C. Commenced: Completed:	Ant.Type: DELAY IN WISDOM	Ant.Type: DELAY IN WISDOM	OMNI		Computed: Observed:	 Metres
REMARKS:						

MEAN OF 4 CALCULATED PROPAGATION VELOCITIES : Km/sec
PROPAGATION ENTERED INTO WISDOM : 29965.000 Km/sec
LANE WIDTH USED BY WISDOM : 91.9077119 metres

SAGASCO Resources Limited

YOLLA 1 Marine 3D Seismic Survey - Permit Area T/RL1 Bass Basin

END OF SURVEY BASELINE CROSSING LOG

CLIENT : SAGASCO RESOURCES LIMITED
PROSPECT: YOLLA 3D
PRE-PROSPECT

VESSEL: WESTERN ATLAS
PARTY: 116
DATE: 16-03-94 JD 075

TIMES IN G.M.T	Stn.# 1	Stn.# 2	Ship Ant.	Ship Head	Baseline Details	Result
CUT # 1 SYSTEM: AR/AR Time U.T.C Commenced:**05:26** Completed:**05:33**	NARACOOPA Ant.Type: GRND PLANE /TOP HAT DELAY -0.36 IN WISDOM	CROPPIES POINT Ant.Type: GRND PLANE /TOP HAT DELAY -0.05 IN WISDOM	OMNI	181°	Computed: 31948 Observed: 31958	+10 Metres
REMARKS:						
CUT # 2 SYSTEM: AR/AR Time U.T.C Commenced:**07:50** Completed:**07:57**	NARACOOPA Ant.Type: GRND PLANE /TOP HAT DELAY -0.09 IN WISDOM	POINT SORELL Ant.Type: GRND PLANE /TOP HAT DELAY -0.05 IN WISDOM	OMNI	167°	Computed: 197907 Observed: 197912	+ 6 Metres
REMARKS:						
CUT # 3 SYSTEM: AR/AR Time U.T.C Commenced:**08:33** Completed:**08:40**	NORTH POINT Ant.Type: GRND PLANE /TOP HAT DELAY -0.51 IN WISDOM	CROPPIES POINT Ant.Type: GRND PLANE /TOP HAT DELAY -0.35 IN WISDOM	OMNI	185°	Computed: 243139 Observed: 243152	+13 Metres
REMARKS:						
CUT # 4 SYSTEM: AR/AR Time U.T.C Commenced:**09:25** Completed:**09:32**	NARACOOPA Ant.Type: GRND PLANE /TOP HAT DELAY -0.09 IN WISDOM	POINT SORELL Ant.Type: GRND PLANE /TOP HAT DELAY -0.07 IN WISDOM	OMNI	033°	Computed: 116291 Observed: 116300	+ 9 Metres
REMARKS:						

9.5 BATHOMETRY

A SIMRAD EA200 echo sounder was used throughout the survey. The instrument was a modular dual frequency hydrographic water depth measuring device with independent parallel processing within each frequency channel.

Each frequency had a separate ceramic transducer mounted in the vessel's hull, however only one was utilised. The frequency selected was 18kHz at 4kW of transmission power, with a medium (2 metres) pulse length and an receiving bandwidth which adjusted automatically to the pulse length (to 1.8 kHz). The pulse interval was set at continuous, and system noise margin was at 20dB.

Depth range scale was set at 0-100 metres and the time variable gain (TVG), which could be set to one of two algorithms controlling transmission loss compensation was set to 20logR, normal operations setting.

Data was output to the WISDOM II system via the Navigation Interface Unit (NIU).

An event marker was generated by the modified NIU and was transmitted to the echosounder at the same time as the seismic system and energy source start commands. The shot event was marked and sent, together with the depth data, to the NIU where it was recorded on WISDOM II tape, as well as on the seismic header information.

Velocity of sound through seawater was set at 1512 m/sec at the start of the survey. As this velocity was continuously computed by the SSTS velocimeter and recorded on WISDOM II tape together with the echogram data, any significant change in sound velocity was adjusted at the post processing stage.

9.6 WISDOM-II SYSTEM INTRODUCTION

The Western Integrated Survey Data Onboard Management System-II (WISDOM-II) is the latest navigation QC package from Western Geophysical. The WISDOM-II is a quality control tool used to monitor all external devices, acoustic positioning systems, and source positions with respect to the vessel. The system acquires data from a variety of sensors and from this data it processes position data, real-time displays of system performance, and navigation position data quality. The operator has over all control of the system operation, and can control eventing output and process control.

The WISDOM-II provides the same features as available in previous systems except that it has an expanded position sensor capability, for 3-D seismic surveys. Figure 9.6 shows a block diagram of the system.

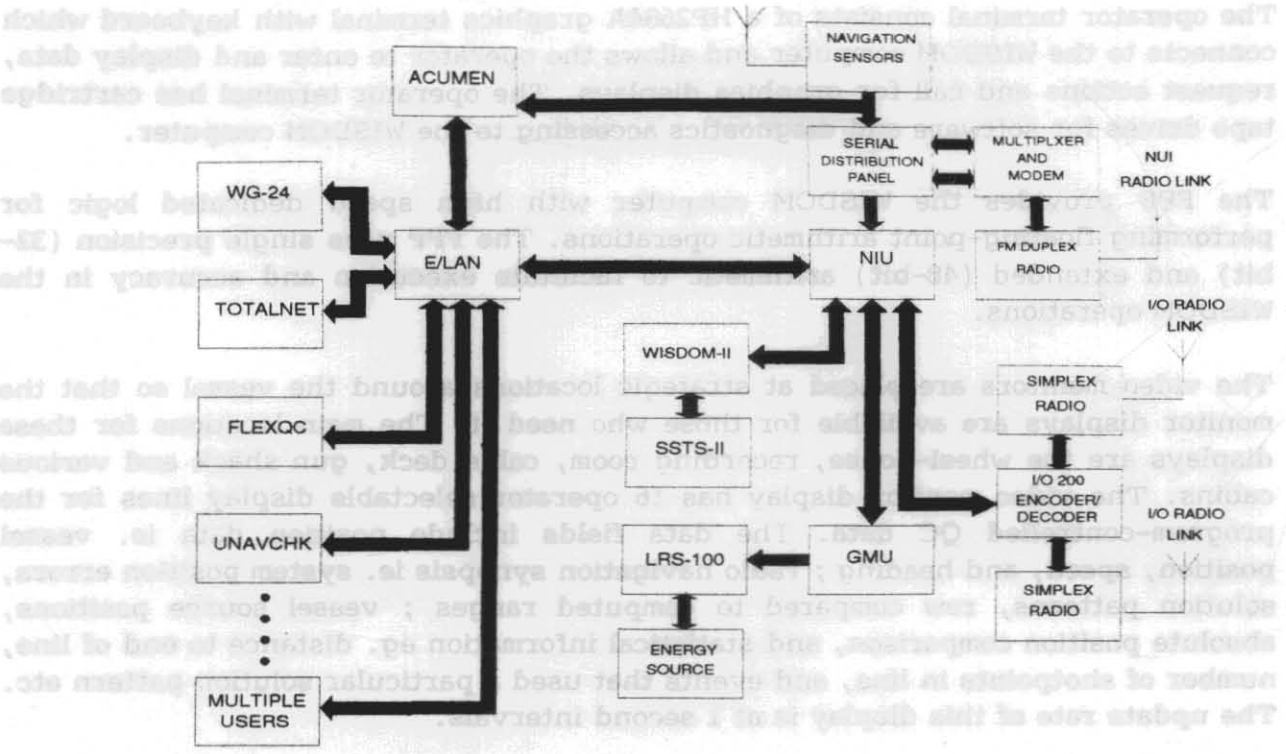

Figure 9.6 THE WISDOM-II SYSTEM CONFIGURATION

9.6.1 WISDOM-II DESCRIPTION

The WISDOM-II system is based on the general purpose HP 1000 Series F mini-computer with variable memory size. The computer processes the data received from the operator or if using the interface, indirectly from the external sensors. Data processing programs and data are stored in the main memory section. Parameters, status, commands, and computer results (data) are exchanged with the external peripherals via I/O interfaces. Connected to computer is the Floating Point Processor (FPP), video monitors, HP 2648A graphics terminal (operation terminal), Buffer/Interface Unit (BIU) and Epson line printer. An optional plotter can be used for onboard post-plotting if required. These units comprise the heart of the QC system.

The WISDOM computer receives data from the Navigation Interface Unit (NIU), and or operator terminal; processes it, then outputs the raw and processed data to tape. Hard copy data is output to the printer and all other information (operator selectable) is displayed on the video monitors through out the ship, or passed onto the various interface units.

The operator terminal consists of a HP2684A graphics terminal with keyboard which connects to the WISDOM computer and allows the operator to enter and display data, request actions and call for graphics displays. The operator terminal has cartridge tape drives for software and diagnostics accessing to the WISDOM computer.

The FPP provides the WISDOM computer with high speed dedicated logic for performing floating-point arithmetic operations. The FPP uses single precision (32-bit) and extended (48-bit) arithmetic to facilitate execution and accuracy in the WISDOM operations.

The video monitors are placed at strategic locations around the vessel so that the monitor displays are available for those who need it. The main locations for these displays are the wheel-house, recording room, cable deck, gun shack and various cabins. The video monitor display has 16 operator selectable display lines for the program-controlled QC data. The data fields include position data ie. vessel position, speed, and heading ; radio navigation synopsis ie. system position errors, solution patterns, raw compared to computed ranges ; vessel source positions, absolute position comparison, and statistical information eg. distance to end of line, number of shotpoints in line, and events that used a particular solution pattern etc. The update rate of this display is at 1 second intervals.

The BIU is a microprocessor-controlled interface that accepts data from the WISDOM computer and feeds it to the line printer. The purpose of the unit is to buffer the speed differences between the computer and the printer (9600/1200 baud), thus freeing the computer for other processing tasks . The line printer is an EPSON LQ-1170 high speed, high resolution serial dot matrix printer. The printouts are operator selectable depending of the requirements for the survey.

The recording subsystem consists of two tape decks (TELEX Tape Drive Model 9271) that use 10 inch x 3200 feet reels and record data at 6250 bpi 9 track GCR. The tape system can be used for program loading, data recording, utilities and diagnostic operations. The tape system has read after write capabilities which ensures data integrity. Raw and processed data is stored on tape, in a format known as NAVC, which has an extended data format for the 3-D surveying.

NAVC data format consists of six logical record types which consist of header, time, shot, transit, error, and common records. Also recorded are complete header records which appear at the beginning and end of tape and at the start of a line and end of a line. There is enough information on tape to recompute the system position and diagnose the sensor integrity. All system positioning information is recorded relative to time or shot event. Pop scan data is recorded to tape at operator selectable intervals. While recording 3-D data, positioning is recorded at every shotpoint with a shot identifier for seismic/navigation data matching.

9.6.2 NAVIGATION INTERFACE UNIT

The NIU is based on 68000 Microprocessor VME architecture, consisting of a CPU board, RAM disk, a General-Purpose Interface Bus (GPIB) board, four VCOM8 serial communication interface boards, a Navigation Timing Control (NTC) board, a Timing Distribution Unit (TDU) board, and a Ethernet Board.

The MVME147 CPU board provides a serial interface to the operator terminal, controls the VME bus, memory, and real time clock. The CPU board also contains a Standard Small Computer System Interface (SCSI) for the disk drive subsystem. The disk subsystem consists of a 360-Kbyte, 5.25 in. low density floppy disk drive, which provides the system with software load/save capability.

The MM6702C RAM disk board provides the system with 8-megabyte memory. A GPIB board provides the high speed interface between the NIU and the WISDOM computer. There are four VCOM8 boards present in the system, which provide serial communications interfacing for external devices. The NIU has the capability of 32 external serial devices each with an individual configuration. A new addition to the system is an ethernet datalink which now provides access to the new TOTALNET and FLEXQC systems.

The NIU has the capability of interfacing a Frequency Modulated (FM) duplex radio transceiver with multiplexer and modem used for dual-vessel operations. It provides external closures to the onboard systems via the Timing Distribution Unit (TDU) which interfaces to the WG 24 recording system, LRS-100 gun system, Digicourse system, SSTS II and the Acumen QC system.

These external devices are interfaced via the Serial Distribution Panel which provides the entire Wisdom II System with absolute and relative positioning devices, including Digicourse compass and acoustics, Multifix, Argo and Skypod positions.

Navigation and recording system data transfers are now done via the ethernet token ring data link, which link the Master System Controller (MSC) in the WG-24 and the Source Synchronisation System (SSS).

9.7 STREAMER/SOURCE TRACKING SYSTEM II

The Streamer/Source Tracking System II (SSTS-II) is a computer based, multi-channel, marine acoustic positioning system for multi-cable, multi-source seismic 3-D operations. The SSTS-II computes the streamer head and source positions from an array of sensors data , relative to each other, and relative to the survey grid, enhancing the quality of the positioning for 3-D binning system. The SSTS-II consists of both shipboard and in-water systems; the in-water system will be described first so as to gain an understanding of the configuration used.
Refer to Figure 9.7.

9.7.1 SSTS-II IN-WATER TRANSDUCER CONFIGURATION

The in-water system uses a combination of underwater transducers (pingers) and attached to the heads of the port and starboard streamers and to each source string are SSTS phones. Attached to the head of the starboard streamer is a cross cable pinger. This configuration forms a triangular series of acoustic paths. The shipboard system uses these acoustic travel time paths to calculate streamer and source positions relative to the Navigation Reference Point (NRP). All position data derived from this process is passed back to the WISDOM for magnetic storage, this data also forms an integral part of the binning system positioning.

The SSTS-II is capable of operating four pingers and 24 receivers. Three pingers and eight receivers are used for this set up. The three pingers are positioned one on each port and starboard towfish and one in the starboard streamer.

The port and starboard pingers operate as base stations and the centre streamer pinger operates as the cross-cable pinger. The base station pingers transmit at 3.5 kHz and the cross-cable pinger transmits on 12.5 kHz so as to differentiate transmitting pinger. Two receivers are installed in the ship's hull so as to derive the position of each port and starboard pinger. Once this is known, by using triangulation of travel paths, it is possible to calculate the receiver positions relative to the NRP.

9.7.2 SSTS-II TOWFISH ASSEMBLY

The in-water starboard and port pinger towfish are towed in conjunction with a depressor assembly which submerges the towfish to a depth of around 14 metres (to maximise signal strength), and also pulls the towfish away from the hull of the vessel.

Mounted on the starboard towfish is a quad-phone assembly used for pinger-to-pinger range measurement. The port towfish incorporates a velocimeter to measure the speed of sound in water at the operating depth. This measured velocity is used in the final calculations for the range measurements.

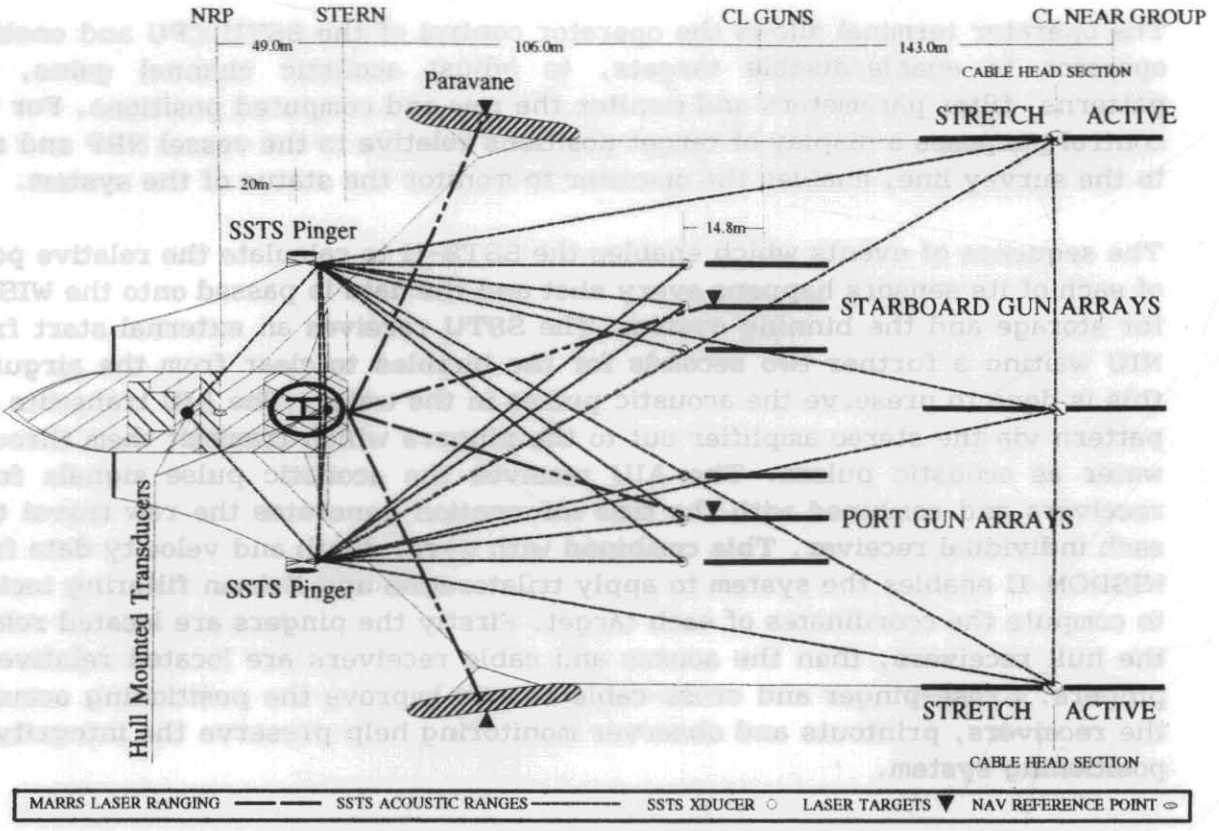

Figure 9.7 SSTS-II ACOUSTIC & LASER NET

9.7.3 SSTS-II SHIPBOARD SYSTEM

The SSTS-II shipboard system consists of an operator terminal, line printer, and two racks which house the SSTS chassis that contains the Streamer/Source Tracking Unit (SSTU) , Acoustic Interface Unit (AIU), and the Disk Subsystem, along with the Stereo Amplifier and colour monitor.

The SSTU is based on VME architecture, that contains the control boards for the disk subsystem, graphics monitor, and receiver range measurement subsystem. The disk subsystem supports a 20-Mbyte hard disk and a 360-Kbyte floppy disk drive, for software installation.

The AIU consists of the receiver amplifier boards, of which there are only 16 receivers and 3 pingers. The function of the AIU is to control the timing of the transmit and receive pulses. The stereo amplifier, amplifies the pinger signals, two channels are used for this, one for the towfish pingers and the other for the cross-cable pinger.

5 cm

The operator terminal allows the operator control of the SSTU CPU and enables the operator to enable/disable targets, to adjust acoustic channel gains, pinger patterns, filter parameters and monitor the raw and computed positions. For quality control purposes a display of target positions relative to the vessel NRP and relative to the survey line, enables the operator to monitor the status of the system.

The sequence of events which enables the SSTS-II to calculate the relative positions of each of its sensors happens every shot and the data is passed onto the WISDOM-II for storage and the binning system. The SSTU receives an external start from the NIU waiting a further two seconds for the bubbles to clear from the airgun shot, this is done to preserve the acoustic pulses in the water. The AIU transmits a pulse pattern via the stereo amplifier out to the pingers which transmit them through the water as acoustic pulses. The AIU receives the acoustic pulse signals from the receivers and combined with the time information generates the raw travel time for each individual receiver. This combined with gyro, depth and velocity data from the WISDOM-II enables the system to apply trilateration and Kalman filtering techniques to compute the coordinates of each target. Firstly the pingers are located relative to the hull receivers, then the source and cable receivers are located relative to the pingers. Cross-pinger and cross-cable ranges improve the positioning accuracy of the receivers, printouts and observer monitoring help preserve the integrity of the positioning system.

9.8 MARS SYSTEM

The MARS Laser Ranging System is used to determine the range and bearing of objects by means of a transmitted laser beam from a known point on the vessel to targets located on various elements of the trailing equipment. A Laser Ranging Unit was located on the stern of the vessel on the centre line at the helideck level. This location was used as it has no obstructions near the unit or in line with the targets that could interfere with the path of the laser. Targets were located on the paravanes of the two outer cables and on the front of the flotation tubes for the centre gun strings for both arrays.

The laser transmitter has a laser diode source and associated optics that produce a 25° vertical beam, depressed approximately 2.5° from the horizontal plane, with a horizontal divergence of 1.0 milliradians. Any target within a range of 30-5000 metres and a height of less than 20 metres above sea level can be illuminated by the laser beam. The targets are simple optical retro reflectors that return the laser beam along a path parallel to the transmitted beam. A rotary encoder is used to measure the bearing of the target. Range to the target is simply a function of time for the beam to reach the target and return to the ranging unit.

With a laser pulse repetition rate of 10 kHz any target in the sweep of the ranging head will be detected as the head scans across its operating arc. This arc is set at 180° and a complete sweep of the arc takes approximately two seconds, so range and bearing data are updated every two seconds. Calibration of the unit was carried out regularly to a fixed target located on the vessels, superstructure. The range and angle to this target is a known factor and the unit can be adjusted to reflect these measurements.

Data collected by the ranging unit is received in the instrument room on a portable 80286 computer operating SEO MARS Encoder version 3.3 software. The range and bearing data is corrected for the vessel roll and converted to a format acceptable to the WISDOM-II system. The data is then transferred to the WISDOM-II where it is incorporated into the positioning net along with the SSTS-II data. From the combination of these two systems an accurate position for the head of the outer streamer cables and the gun arrays can be determined.

9.9 DIGICOURSE ACOUSTIC/COMPASS SYSTEM

9.9.1 STREAMER COMPASS/DEPTH MEASUREMENT

The system performs two basic functions concurrently, control of the Digicourse cable level devices and control of the Digicourse echo modules. The functions of the cable level operations are such that three functions are executed by this system firstly, to control the depth of the streamers, secondly to measure the running depth of the streamers and thirdly to measure the heading of the streamer at a number of points to allow a streamer shape to be derived. The function of the echo module operation is to calculate the ranges relative to each echo other pod, perform two-way ranging at differing frequencies and to set up and calculate, from the pod network ranges, the relative position of the each of the node points.

The acoustic system employed for the survey was a DigiSCAN system designed and manufactured by DIGICOURSE Inc. This is a flexible system which allows the implementation of any of the manufacturer's streamer cable sensors. The following units were used on the streamers during the survey.

9.9.2 DIGICOURSE 293BSX OPERATOR STATION

The Model 293BSX Operator Station is a 16-bit 386 mini-computer working in an MSDOS environment. Equipped with 3.5"/ 5.25" floppy disk drives, 40Mbyte hard disk, 1 Mbytes of memory, four serial ports, one parallel port and a 12" monochrome monitor. This unit acts as the system controller for communications with the contractors WISDOM-II computer, the data transmission line and the graphic display. The software operates with high level language commands and is menu driven for easy operator control and access. The modem board is an independent, microprocessor-based unit that is located physically within the Operator Station.

The board can function in two ways, in the 293BSX mode where it is transparent on the transmission line, or in the modem-control mode where it is used as an intermediate data collection and storage device. This second function is used during the regular data collection cycle, when the modem polls the streamer sensors for data and, on reception, stores it in it's own non-volatile memory for recovery by the main CPU. This allows the main CPU to conduct other tasks during the data acquisition period. Initialisation procedures and diagnostics are run with the modem in 293BSX mode.

The sensors used for this set up were the Series 5011 Digicourse bird (cable control devices), and the Concurrent Multichannel Transceiver (CMX) model 4011 echo pods. All of these devices are designed to attach to marine seismic streamers using standard "collars". Communications to the unit from the vessel is achieved using a single twisted pair of wires as a transmission line and coils to inductively couple signals through sea water. The coils are located internally in each streamer section, in a fixed position thus dictating the positions at which the devices could be attached to the cables. Communications utilises serial FSK (frequency shift keying) data at a frequency of 27 kHz and a data rate of 2400 Bits/second.

9.9.3 DIGICOURSE 5011 COMPASS BIRD

The 5011 compass bird is the combination of a micro-processor based depth control device and a heading sensor in a single mechanical package. The unit uses wings which are capable of providing a raising or lowering force of 35 pounds at 5 knots. The overall mechanical design encompasses the need to minimise flow noise and by using non-corroding materials such as stainless steel and urethane, maintenance is kept to a minimum. Powered by Lithium batteries the unit performs several functions including:-

- Depth sensing from 0 - 400 feet (± 0.5)
- Adjusting wing angles to maintain a set running depth
- Reporting current depth and heading
- Reporting wing angle to a resolution of 0.3 ± 0.5°
- Emergency dive and surface

In operation the system display can be selected to illustrate several performance indicators, streamer shape, depth or a combination of both. Careful use of the wing angle data is also very useful in the initial stages of a survey when balancing the streamers.

9.9.4 DIGICOURSE ECHO POD

The Digicourse 4011 echo pod is an acoustic measuring device which mounts onto standard collars and communicates via the Digicourse communications coil built into each streamer section, the devices appear to the system as another bird. The acoustic network comprises a collection of nodes, that each represent a point on the streamer configuration. At each node a CMX pod is attached and performs range measurements to and from each other node in the network. The node initiates an acoustic signal to compute the range measurement arrival times and transmits this information to the shipboard system. Two-way range communications can be set up between individual nodes which reduces offsets and system errors resulting in very accurate range measurements between nodes.

The pod contains the telemetry interface, control logic, and the CMX. Each CMX can transmit on one of five assigned frequencies and can receive up to eight different signals on any single frequency. Data is received via a modem board interfaced to the streamer coils, this data is processed between each module and output to the host computer (WISDOM-II) via a serial data link. Differing data protocol can be sent to host when configured in the system. The data sent to the WISDOM-II system are individual range, node identifier and status.

Some of the features for the system specified by the manufacturer are:

- transmit channel range between 50 kHz and 100 kHz
- maximum range for two CMX is 640 metres
- up to eight different range measurements per CMX pod
- configuration of up to 255 range patterns
- transit time measurement accuracies to 0.1ms
- range resolution is 0.05ms

An example of the possible combinations of the nodal network is shown in Figure 9.8. Remote transducers are placed on the individual tailbuoys and data telemetry is passed via wiring in the tow section installed at the tail of the cable.

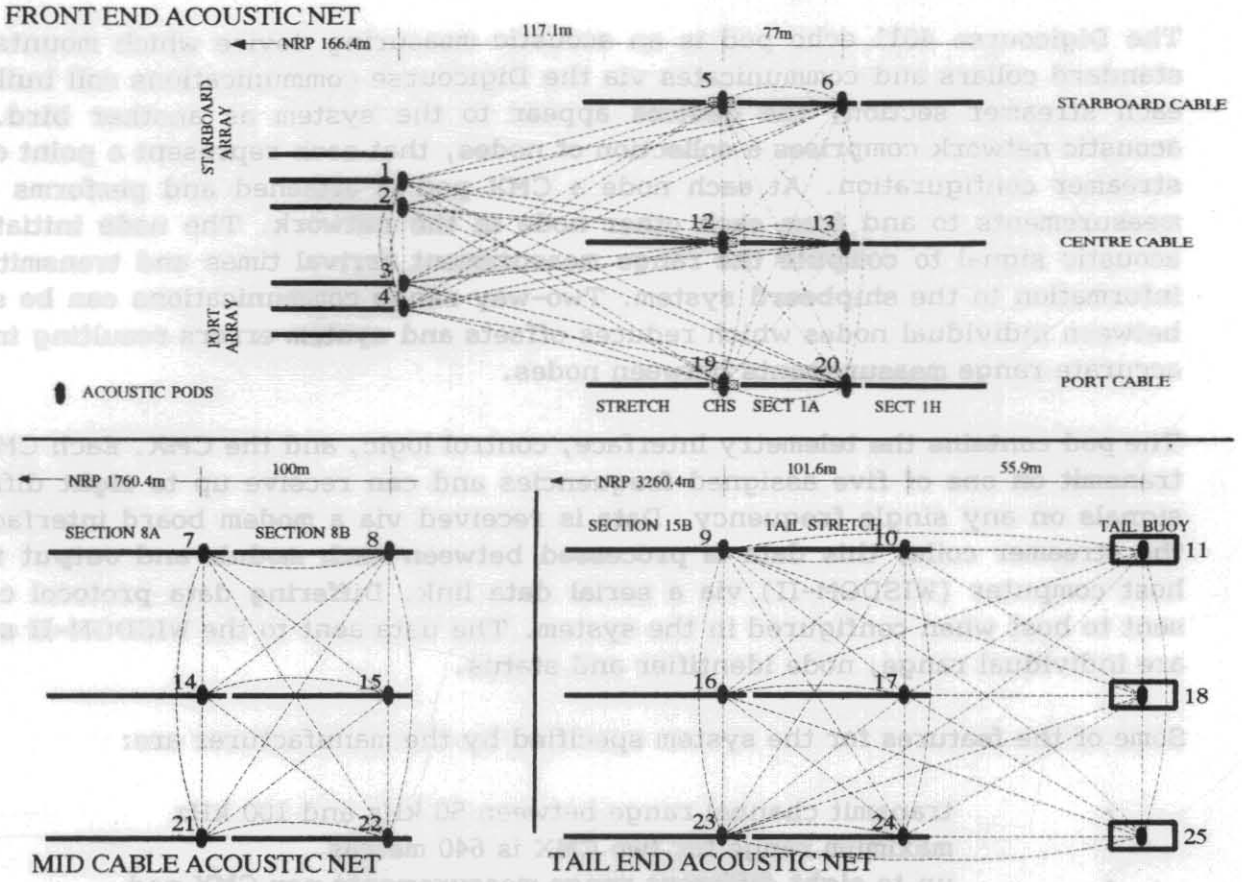

Figure 9.8 CABLE ACOUSTIC NET

9.9.5 DIGICOURSE COMPASS BIRD CALIBRATIONS

9.9.5.1 ONSHORE CALIBRATION CHECK

Refer to Appendix A

9.9.5.2 OFFSHORE CALIBRATION CHECK

The compass birds are monitored by the UNAVCHK system which post-processes each line, analysing each compass ,applying smoothing to the data and correcting for any spiking in the data ranges. The system builds a data base on a per line direction basis for each compass. The two line directions are 34° and 214°. Constant monitoring of these compass directions will establish a common magnetic declination for the area, which serves as a check for the Navigation system; but also derives the individual compass standard deviations and bias error (C-O). A history of dynamic bias and data stability for the compass will be generated and constant monitoring to detect any compass degradation.

5 cm

9.10 ACUMEN QUALITY CONTROL SYSTEM

ACUMEN is a navigation/positioning data processing system, which provides a means of total quality control for positioning in highly complex 3D surveys using modern technologies. The use of powerful SUNSPARC workstations as the hardware platform and UNIX as the operating system, results in a system which can process data from all navigation sensors in real time and produce binning plots very efficiently and concisely making "complete" real time QC possible. The system will interface to all presently utilised positioning systems, including, but not limited to MARS Laser system, Digicourse compass and acoustic systems, Sonardyne acoustic systems, Western Geophysical SSTS acoustic systems, Sercel Syledis and Geoloc radio positioning systems, Racal Microfix and Hyperfix radio positioning systems, Cubic Western ARGO radio positioning systems, Sercel/Trimble/Racal GPS/DGPS receivers, Offshore Navigation SPOT systems, Motorola Miniranger systems.

It is possible for the system to work up to the maxima of 30 Radio and Long Baseline acoustic patterns, 10 Radio and Long Baseline acoustic receivers, 10 DGPS/GPS receivers, 50 Laser and Short Baseline acoustic nodes (up to 2500 ranges and bearings), 10 separate seismic streamers, 10 sources, 24 compasses per streamer.

ACUMEN will produce statistics and time plots for Raw value and mean raw values, Current and mean residuals, Standard deviation and delta standard deviation, Rate of change, Number of rejections, and will compute and/or display on line Contractors vessel position, Vessel course/speed made good, Lines of Position for all radio positioning systems, Position, shape and feather angles for all individual streamers, Position, shape and active indicator for all individual sources, Error ellipses for navigation reference point, sources and any selected streamer groups, Completely independent CMP binning displays for coverage comparison and infill decisions.

ACUMEN will process all navigation/positioning data acquired during the survey, position the entire vessel/source/streamer spread as a single integrated system and reject all spurious observations in real time using a proven mathematical model. The system uses industry standard data recording formats i.e., Raw data is recorded in standard UKOOA P2/86 or P2/91 format, Processed data is recorded in standard UKOOA P1/84 or P1/90 format. ACUMEN has several other essential functions such as a full suite of geodetic computations and calibration routines, the ability to produce CMP binning displays based on processed data from any source, a statistical package for the comparison of pairs of UKOOA format files, the ability to transmit data using available, non exclusive, data links to any other location and the system can also be located and used in house by the client to make infill decisions.

The system is configured on SUN SPARC stations. SUN SPARC stations were selected for the system primarily for the inherent computational power, but the manufacturing standards of the hardware also ensure reliable performance in the typical marine acquisition environment. Interfacing to all other systems is easily and efficiently achieved by utilising a standard SUN serial/parallel controller. This gives multiplexed access to 1 parallel and 8 serial ports, sufficient capability for any present contractor configuration. It should also be noted that the hardware platform can be specified according to the application. For this survey the system was configured as shown in Figure 9.9.

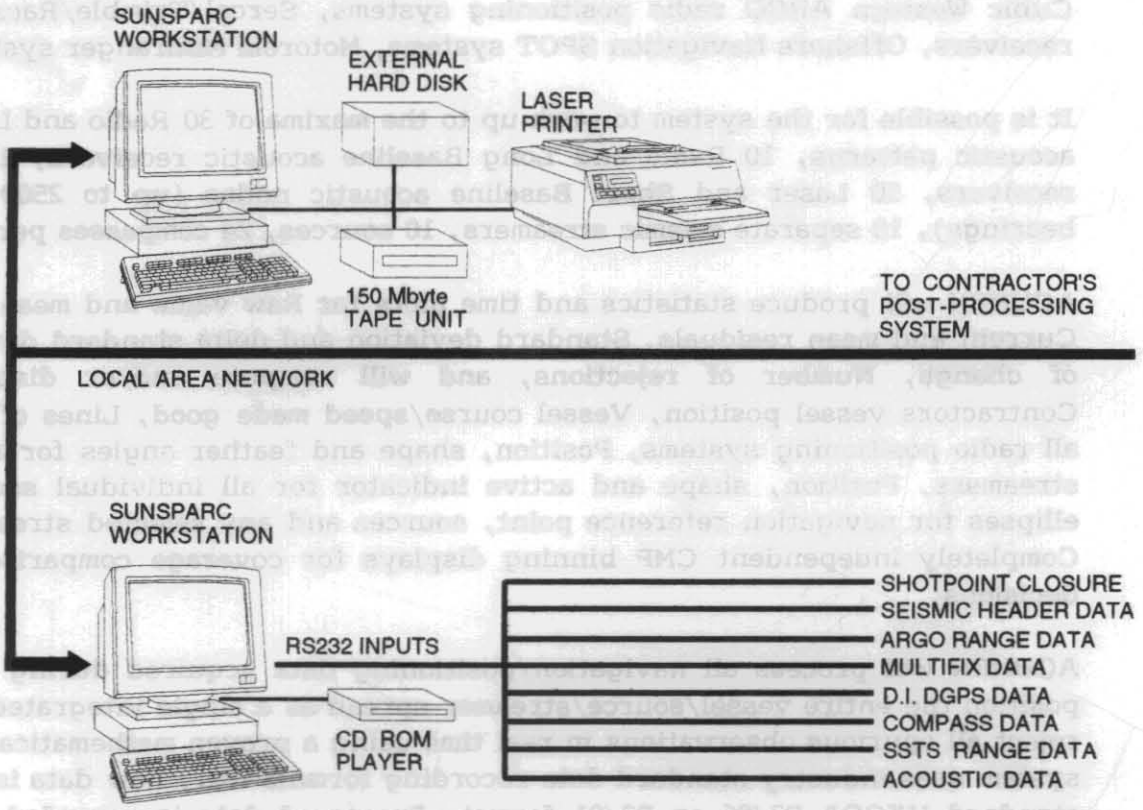

Figure 9.9 ACUMEN QC SYSTEM

For the Yolla survey the basic processing flow was as follows:

a) Read and process all positioning data, display vessel, sources, streamers and compare with contractor's vessel position taken from header data.
b) Record P286 file and store to disk.
c) Process P286 through to P190 and store to disk.
d) Receive contractor's P190 via LAN.
e) Compare respective P190 files and display results of binning each file.

With the two workstation configuration and the ethernet LAN installed, the efficiency of reprocessing and comparing 3D sail line data and binning displays was greatly increased. The entire process was also greatly simplified by the fact that agreement between the two systems was arrived at within hours of the contractor producing his first P190 file. A very good and close agreement was in fact seen for all of the comparisons completed during the course of the survey.

9.11 FLEXIBLE BINNING QUALITY CONTROL SYSTEM

The Flexible Binning Quality Control (FLEXQC) System is a real-time marine 3-D quality assurance system that ensures the efficiency and accuracy of multi-cable/multi-source surveys. The flexible system provides the operator with the capability to evaluate and control the CDP coverage, of a survey. The system gives the operator the capability to play back data to review the pre-recorded line data from the FLEXQC line database of the WISDOM tape and then if needed, apply a cell overlap and re-evaluate the coverage.

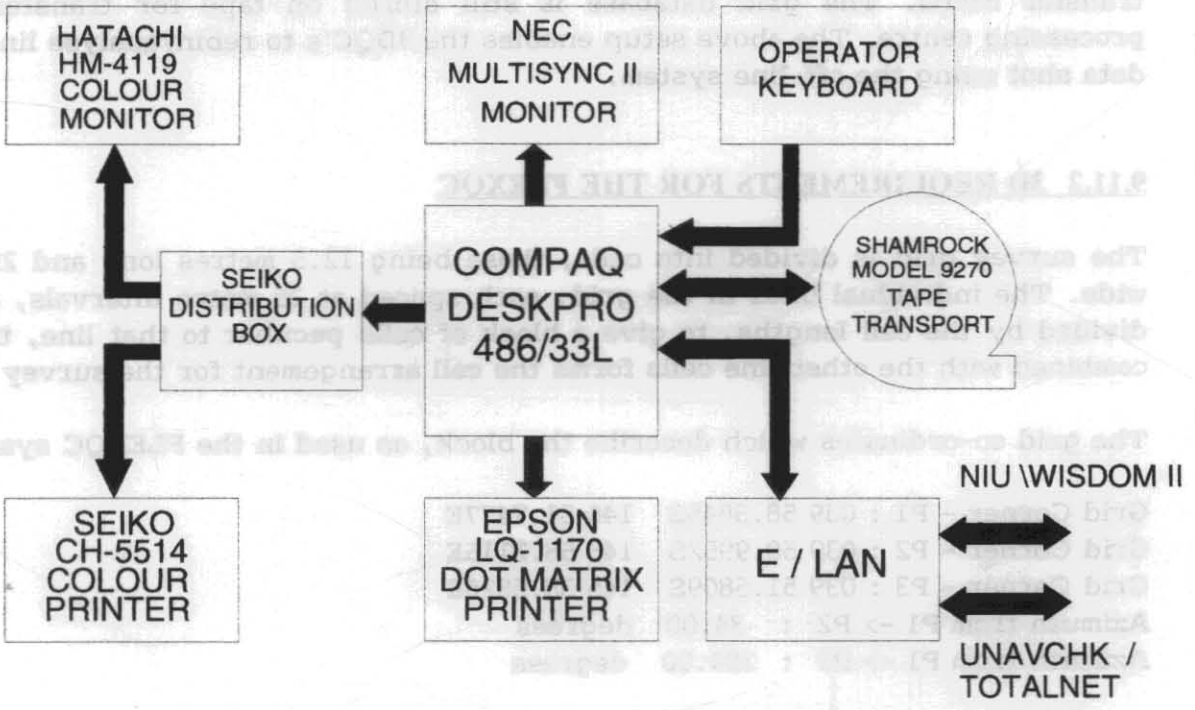

Figure 9.10 FLEXIBLE BINNING QUALITY CONTROL SYSTEM

9.11.1 FLEX QC SYSTEM CONFIGURATION

The FLEXQC system is built around a Compaq Deskpro 386/25 machine with peripheral high-resolution colour monitors, printers and tape drive. The system contains a custom graphics boards for the monitors, and a 314 Mbyte hard disk. The computer connects to the Wisdom computer via a ethernet LAN service and receives the positioning data collected by the WISDOM-II system via this service line. Also connected to this ethernet LAN is the TOTALNET system which is used to evaluate all the in-coming positioning systems to provide a QC package for Wisdom. The operator has full control over the system via a keyboard input, and monitors the status of the system via the operator terminal. The operator has the ability to monitor the binned line as it is recorded or replayed. A hard copy of this display can be output to a Seiko colour printer, or the display can simply be monitored via the Hitachi high-resolution monitor. A Shamrock tape transport can be used as mass storage area for grid block, recorded in UKOOA 1984 format standard.

The system set up on the Western Atlas is such that there are two FLEXQC machines, both have similar set ups except one machine is used solely for off-line operations. The ethernet link is used to access the on/off-line FLEXQC systems and also between the UNAVCHK systems. This does away with the transfer of data via magnetic tape, this being a slow procedure, although this is still a possible transfer media. The grid database is still stored on tape for transfer to the processing centre. The above setup enables the 3DQC's to rebin/analyse line by line data shot using the off-line system.

9.11.2 3D REQUIREMENTS FOR THE FLEXQC

The survey grid is divided into cells, these being 12.5 metres long and 25 metres wide. The individual lines in the grid, each spaced at 25 metre intervals, are then divided by the cell lengths, to give a block of cells peculiar to that line, this then combined with the other line cells forms the cell arrangement for the survey block.

The grid co-ordinates which describe the block, as used in the FLEXQC system are:

Grid Corner - P1 : 039 58.3845S 145 51.7477E
Grid Corner - P2 : 039 50.9952S 145 58.2115E
Grid Corner - P3 : 039 51.5809S 145 38.6826E
Azimuth from P1 -> P2 : 34.00 degrees
Azimuth from P1 -> P3 : 304.00 degrees

Cell length	: 12.500	Cell width	: 25.000
Number of lines	: 900	Number of cells	: 1320
First line number	: 1	Line increment	: 1
First shotpoint	: 101	Shot increment	: 2.0

The cables used are divided into four segments, ie. nears, near mids, far mids, and fars. As the cables are towed along a line these segments pass over the individual cells. The number of traces passing through each cell are defined as a percent coverage for that bin or cell. It is the requirement of the contractor to provide the necessary coverage for these areas, as set down by SAGASCO in accordance with Document No. WPT9310129-SGR. The nominal number of midpoints in each cell has been set at :

90% of all midpoints from the first segment of the cable (first 24 traces)
80% of all midpoints from the second segment of the cable (next 72 traces)
60% of all midpoints from the third segment of the cable (next 72 traces)
50% of all midpoints from the forth segment of the cable (next 72 traces)

If insufficient coverage for an area of cells is obtained then two methods remain to achieve the specifications for that area. The first would usually be considered, and that is to rebin the area using variable bin or cell overlap. This method is available to the FLEXQC system, and would be done off-line on the previously recorded data. The flexible binning variables employed by this system vary from an overlap factor of 1 to 5. This method would only be used where the binning already obtained marginally fails the clients specification.

The second method would be to reshoot the area as infill. This is used where holes or edited data failed to meet the specifications defined, usually as a result of steering/currents pushing the vessel off-line, and or a recording system failure. The area is physically reshot to bring the binned data up to the necessary specifications.

The line naming convention adopted for this survey was YOLzyxxx for lines, where z denoted either 0 for first attempt, 1 for second attempt etc.; and y denoted either 0 for prime line attempt or 1 for infill attempt; eg. YL21013 is an second attempt at infill line 013.

9.11.3 FLEX QC REAL-TIME OPERATIONS

The FLEXQC receives from the WISDOM-II cable sensor and positioning for each shot point in a line. The system generates the position of the vessel along with the cable(s) positions relative to each individual cell (bin). The midpoint coverage distribution for cell is then updated in the grid coverage database on a shot by shot basis. The system generates a colour code which represents the status of each cell as the cable passes over the area in question. A full-colour grid display shows the cumulative grid coverage as the survey progresses, this gives the operator immediate evaluation of the area and enables corrective adjustments to be made ie. vessel steering.

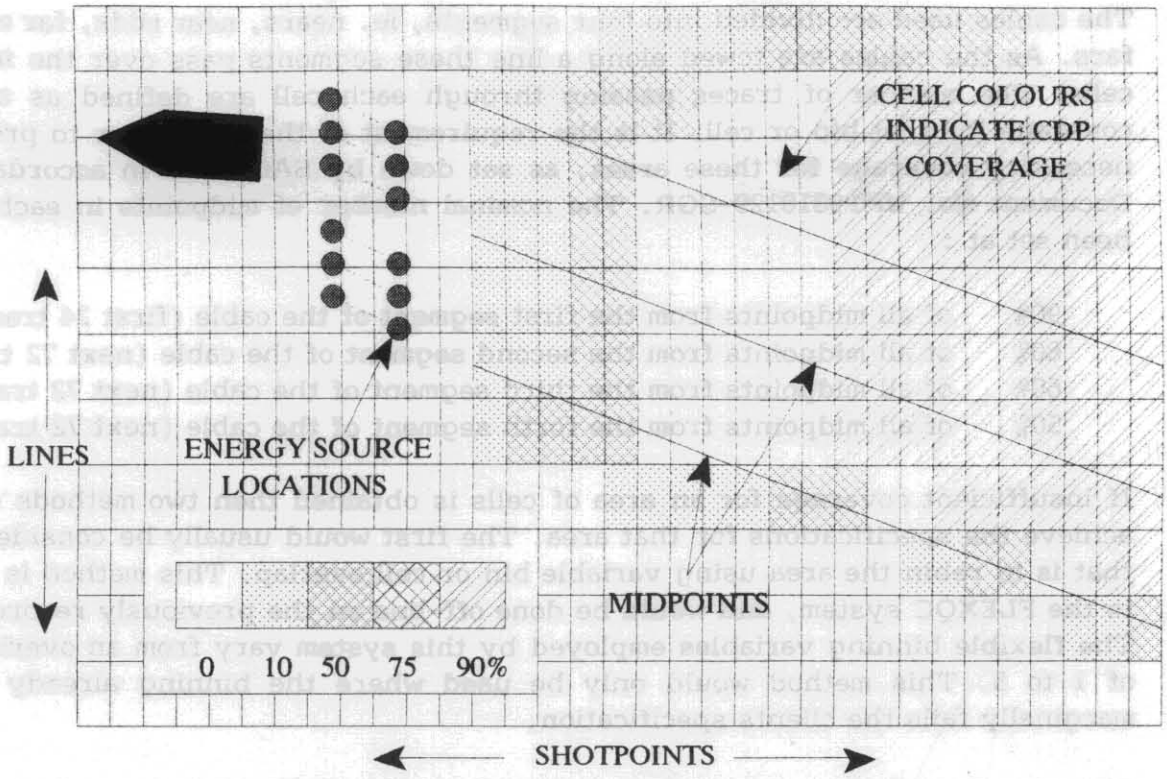

Figure 9.11 REAL-TIME BINNING DISPLAY

The object of the system is to ensure full coverage is obtained, this is done by either steering and/or careful management of tidal/current predictions to determine the optimum time at which to traverse the individual lines.

9.11.4 FLEX QC OFF-LINE OPERATIONS

The off-line FLEXQC system is identical to the real-time version except that the line data files now come from the tape drives or via the ethernet LAN data link to the FLEXQC (real-time) or UNAVCHK system. The equipment setup is similar and the system has the same features as the real-time system.

The off-line system is mostly used as a rebinning tool. Problems such as block edits, compass/SSTS position edits, rebin overlaps or faulty raw data, can be handled by the system, and processed off-line so as not to impede the real-time system when shooting. The rebinned data can then be updated in the main binning system by merely transferring block data between systems.

The system generates the same statistical features as the real-time system, these are used to decide on the necessary changes to be made.

5 cm

9.12 UNAVCHK NAVIGATION PROCESSING

UNAVCHK is designed specifically to analyse and process marine navigation data for either 2-D and/or 3-D surveys. Its function is to perform navigation data quality checks and post processing functions including source and receiver coordinate computations and vessel position computation.

Data is loaded either from WISDOM field tape (raw navigation data) [UKOOA-P2/86] using a TELEX tri-density tape drive, interfaced via a ATC-16 interface card or via the ethernet LAN data link interface to the WISDOM system. A hard-disk intermediate database is built from this data retrieval.

A IBM RS6000 computer and Unix Workstations are used for the processing and control of processing operations and a HP Laser Jet Series III for hard copy outputs. The software used can decode the navigation data from radio navigation sensors (for both ship and tailbuoy), fathometer, gyrocompass, SSTS, Digicourse compass and acoustics.

The software calculates the various coordinate positions for the vessel, tailbuoy, energy source, and the receiver groups. Statistical analysis is initially carried out on this raw data to determine a filter specification for processing. Initial de-spike filtering is applied to provide a cut-off point for unrealisable variations in the sensor data, a threshold is set and this represents the limit at which data variations should reasonably occur. The second set of filtering applied is a smoothing filter which; after having produced the data stability attributes such as standard deviation, jitter, and raw processed differences; corrects the data to a nominal raw data characteristic for each sensor.

Propagation velocities are monitored using data collected during baseline crossings and analysed for a fixed standard deviation and pattern residual. These derived values are then checked against previous values to see any change in characteristic.

Magnetic Declination is also monitored using the system. Mean tailbuoy misclosure angles are tabulated for each line during acquisition along with feather angles, wind direction and speed. Results will be evaluated in a per line direction basis for indications of residual and/or directional dependant misclosure not caused by surface conditions. After a sufficient database has been collected a magnetic declination can be achieved on the basis of the observed trends.

Compass bias is also monitored by the system when processing the raw sensor data. A database for the compasses will be built based on individual compass data, from this, standard deviation and jitter performance will be checked to detect possible trends indicating compass performance degradation.

The above techniques all contribute to quality control checks for area bias, these are applied and corrected if need be, to refine the value for the area. Navigation processing uses the raw sensor data to compute range corrected data, position corrected data, and sensor corrected data, which is used to accurately positions the vessel and sensors in the survey area.

The operator has the option to revise the filter settings after the initial pass. A visual check is performed to see the affect on the raw verses the processed data display. This is applied to the data and processed sensor plots, fix error plots, position comparison plots and cable shape plots. These plots provide a valuable QC tool for evaluating the navigation data. Manual editing is also available for the operator in cases where data integrity has been lost or damaged.

The UNAVCHK system can then generate final coordinates in UKOOA-P1/90 Postplot Data Exchange format to tape.

10 SURVEY LOGS

10.1 SURVEY ACTIVITY LOGS

Time	Activity	Hours Chg
** Date: 18/01/94		
		0.000
00:00	AUSTRAL PERSONNEL TRAVEL TO PORTLAND	24.000
** Subtotal **		
		24.000
** Date: 19/01/94		
00:00	VESSEL UNDERWAY TO PORTLAND	8.000
08:00	PORT CALL FOR RESUPPLY	7.133
15:08	SHIPS MAGNETIC COMPASS CALIBRATION	1.967
17:06	TRAVEL TO ARGO CALIBRATION POINT	6.900
** Subtotal **		
		24.000
** Date: 20/01/94		
00:00	TRAVEL TO KING IS. TO TRANSFER ODEGAARD ENGINEER	9.500
09:30	TRAVEL TO SURVEY AREA	5.500
15:00	DOWNTIME, WORKING TO RESOLVE DGPS FAILURE.	2.500
17:30	CONTINUE TO SLOWLY TRAVEL TO CENTRE OF PROSPECT	2.500
20:00	CALIBRATION, ARGO NAVIGATION SYSTEM	4.000
** Subtotal **		
		24.000
** Date: 21/01/94		
00:00	CALIBRATION, ARGO NAVIGATION SYSTEM	9.133
09:08	BASELINES COMPLETED, RETURN TO SURVEY AREA	2.033
11:10	STREAMER CONFIGURATION AND DEPLOYMENT	12.834
** Subtotal **		
		24.000
** Date: 22/01/94		
00:00	DEPLOYING AND CONFIGURING PORT STREAMER	24.000
** Subtotal **		
		24.000
** Date: 23/01/94		
00:00	CENTRE STREAMER CONFIGURATION AND DEPLOYMENT	23.000
23:00	RETRIEVE STREAMER FOR MEDIVAC	1.000
** Subtotal **		
		24.000
** Date: 24/01/94		
00:00	RETRIEVING STREAMER FOR MEDIVAC	0.333
00:20	VESSEL TRANSFER TO BURNIE FOR MEDIVAC	8.217
08:33	VESSEL ALONGSIDE IN BURNIE	2.617
11:10	DEPART BURNIE, TRAVEL TO STREAMER DEPLOYMENT POINT	4.333
15:30	CENTRE STREAMER CONFIGURATION AND DEPLOYMENT	8.500
** Subtotal **		
		24.000

** Date: 25/01/94		
00:00	CENTRE STREAMER CONFIGURATION AND DEPLOYMENT	11.333
11:20	STARBOARD STREAMER CONFIGURATION AND DEPLOYMENT	12.667
** Subtotal **		
		24.000
** Date: 26/01/94		
00:00	STARBOARD STREAMER DEPLOYMENT AND CONFIGURATION	10.750
10:45	DOWNTIME, ARGO NAVIGATION SYSTEM FAILURE	13.250
** Subtotal **		
		24.000
** Date: 27/01/94		
00:00	ARGO BASELINE CALIBRATION CHECK	10.883
10:53	STATIC CALIBRATION OF ARGO IN SURVEY LOCATION	1.867
12:45	STARBOARD STREAMER CONFIGURATION AND DEPLOYMENT	11.250
** Subtotal **		
		24.000
** Date: 28/01/94		
00:00	STARBOARD STREAMER CONFIGURATION AND DEPLOYMENT	24.000
** Subtotal **		
		24.000
** Date: 29/01/94		
00:00	STARBOARD STREAMER DEPLOYMENT AND CONFIGURATION	8.500
08:30	SEMI MONTHLY INSTRUMENT TESTS ON STARBOARD CABLE	6.250
14:45	PORT STREAMER CONFIGURATION AND DEPLOYMENT	9.250
** Subtotal **		
		24.000
** Date: 30/01/94		
00:00	STARBOARD AND PORT STREAMER CONFIGURATION	5.250
05:15	SOURCE CONFIGURATION CHECK WITH SSTS/LASER	18.750
** Subtotal **		
		24.000
** Date: 31/01/94		
00:00	SOURCE CONFIGURATION AND DEPLOYMENT	1.000
01:00	STREAMER REBALLAST AND DEPLOYMENT	4.250
05:15	NON CHARGEABLE WEATHER DOWNTIME	18.750
** Subtotal **		
		24.000
** Date: 01/02/94		
00:00	NON CHARGEABLE WEATHER	0.917
00:55	STREAMER CONFIGURATION AND DEPLOYMENT	9.333
10:15	SOURCE CONFIGURATION AND DEPLOYMENT	12.250
22:30	CENTRE STREAMER CONFIGURATION AND DEPLOYMENT	1.500
** Subtotal **		
		24.000

** Date: 02/02/94		
00:00	CENTRE STREAMER CONFIGURATION AND DEPLOYMENT	6.000
06:00	RUNNING A SET OF SEMI MONTHLY TESTS	6.000
12:00	VESSEL NOW STANDING BY FOR WEATHER	12.000
** Subtotal **		
		24.000
** Date: 03/02/94		
00:00	NON CHARGEABLE WEATHER	12.000
12:00	NON CHARGEABLE WEATHER	12.000
** Subtotal **		
		24.000
** Date: 04/02/94		
00:00	VESSEL RETURNING TO PROSPECT	9.750
09:45	STREAMER CONFIGURATION AND DEPLOYMENT	14.250
** Subtotal **		
		24.000
** Date: 05/02/94		
00:00	STREAMER CONFIGURATION AND DEPLOYMENT	6.667
06:40	SOURCE CONFIGURATION AND DEPLOYMENT	3.083
09:45	FINAL CHECKS ON STREAMER AND INSTRUMENTS	4.117
13:52	RUN IN TO LINE YOL00013	2.000
15:52	UNABLE TO START LINE, WISDOM HALT, CIRCLING	4.017
19:53	RECORDING LINE YOL-00013	0.767
20:39	LINE CHANGE	1.733
22:23	RECORDING LINE YOL-00205	1.467
23:51	LINE CHANGE	0.149
** Subtotal **		
		24.000
** Date: 06/02/94		
00:00	LINE CHANGE	3.733
03:44	RECORDING LINE YOL-00055	0.917
04:39	LINE CHANGE	1.850
06:30	RECORDING LINE YOL-00247	1.650
08:09	LINE CHANGE	2.500
10:39	RECORDING LINE YOL-00019	0.800
11:27	LINE CHANGE	1.850
13:18	RECORDING LINE YOL-00211	1.467
14:46	LINE CHANGE	1.650
16:25	RECORDING LINE YOL-00061	0.933
17:21	LINE CHANGE	1.667
19:01	RECORDING LINE YOL-253	1.583
20:36	LINE CHANGE	2.200
22:48	RECORDING LINE YOL-00025	0.833
23:38	LINE CHANGE	0.367
** Subtotal **		
		24.000

** Date: 07/02/94		
00:00	LINE CHANGE	1.350
01:21	RECORDING LINE YOL-00199	1.383
02:44	LINE CHANGE	1.500
04:14	RECORDING LINE YOL-00067	0.933
05:10	LINE CHANGE	1.550
06:43	RECORDING LINE YOL-00259	1.583
08:18	RETRIEVE TRAILING GEAR AND TRANSIT TO PORTLAND	15.701
** Subtotal **		
		24.000
** Date: 08/02/94		
00:00	TRANSIT TO PORTLAND FOR CREW CHANGE	24.000
** Subtotal **		
		24.000
** Date: 09/02/94		
00:00	PORT CALL FOR RESUPPLY/CREW CHANGE	24.000
** Subtotal **		
		24.000
** Date: 10/02/94		
00:00	VESSEL RETURNING TO PROSPECT	6.250
06:15	DEPLOYMENT OF STREAMERS	17.750
** Subtotal **		
		24.000
** Date: 11/02/94		
00:00	DEPLOYING STREAMER	11.267
11:16	RECORDING LINE YOL-00049	0.883
12:09	LINE CHANGE	1.700
13:51	RECORDING LINE YOL-00217	1.467
15:19	LINE CHANGE	1.617
16:56	RECORDING LINE YOL-00031	1.900
18:50	LINE CHANGE	0.650
19:29	RECORDING LINE YOL-00265	1.600
21:05	LINE CHANGE	1.683
22:46	RECORDING LINE YOL-00073	1.000
23:46	LINE CHANGE	0.233
** Subtotal **		
		24.000
** Date: 12/02/94		
00:00	LINE CHANGE	1.350
01:21	RECORDING LINE YOL-00193	1.450
02:48	LINE CHANGE	1.433
04:14	RECORDING LINE YOL-00037	0.850
05:05	LINE CHANGE	1.650
06:44	RECORDING LINE YOL-00271	1.700
08:26	LINE CHANGE	1.583
10:01	RECORDING LINE YOL-00079	0.967
10:59	LINE CHANGE	1.600
12:35	RECORDING LINE YOL-00223	1.550

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14:08	LINE CHANGE	1.700	
15:50	RECORDING LINE YOL-00007	0.750	
16:35	LINE CHANGE	1.767	
18:21	RECORDING LINE YOL-00229	1.517	
19:52	LINE CHANGE	1.567	
21:26	RECORDING LINE YOL-00001	0.750	
22:11	LINE CHANGE	1.816	
** Subtotal **			
		24.000	
** Date: 13/02/94			
00:00	RECORDING LINE YOL-00277	1.733	
01:44	LINE CHANGE	1.767	
03:30	WEATHER DOWNTIME	13.500	Y
17:00	DOWNTIME, ARGO NAVIGATION SYSTEM FAILURE	7.000	
** Subtotal **			
		24.000	
** Date: 14/02/94			
00:00	DOWNTIME, ARGO NAVIGATION SYSTEM FAILURE	8.200	
08:12	RECORDING LINE YOL-00241	1.517	
09:43	LINE CHANGE	1.850	
11:34	RECORDING LINE YOL-00085	1.017	
12:35	LINE CHANGE	1.650	
14:14	RECORDING LINE YOL-00313	1.783	
16:01	LINE CHANGE	1.917	
17:56	RECORDING LINE YOL-00043	0.900	
18:50	LINE CHANGE	1.617	
20:27	RECORDING LINE YOL-00235	1.500	
21:57	LINE CHANGE	1.083	
23:02	RECORDING LINE YOL-00121	0.966	
** Subtotal **			
		24.000	
** Date: 15/02/94			
00:00	RECORDING LINE YOL-00121	0.150	
00:09	LINE CHANGE	1.650	
01:48	RECORDING LINE YOL-00307	1.050	
02:51	RECORDING ROOM POWER FAILURE	3.283	
06:08	RECORDING LINE YOL-10307	0.700	
06:50	LINE CHANGE	1.550	
08:23	RECORDING LINE YOL-00127	1.167	
09:33	LINE CHANGE	1.900	
11:27	RECORDING LINE YOL-00301	1.717	
13:10	LINE CHANGE	1.767	
14:56	DOWNTIME, VESSEL EQUIPMENT FAILURE ATTEMPT AT LINE	0.283	
15:13	DOWNTIME, VESSEL EQUIPMENT FAILURE	2.383	
17:36	RECORDING LINE YOL-00283	1.650	
19:15	LINE CHANGE	1.567	
20:49	RECORDING LINE YOL-00187	1.350	
22:10	LINE CHANGE	1.533	
23:42	RECORDING LINE YOL-00289	0.300	
** Subtotal **			
		24.000	

** Date: 16/02/94			
00:00	RECORDING LINE YOL-00289	1.433	
01:26	LINE CHANGE	1.567	
03:00	RECORDING LINE YOL-00115	1.150	
04:09	LINE CHANGE	1.633	
05:47	RECORDING LINE YOL-00295	1.717	
07:30	LINE CHANGE	1.733	
09:14	RECORDING LINE YOL-00091	0.783	
10:01	WEATHER DOWNTIME	13.984	Y
** Subtotal **			
		24.000	
** Date: 17/02/94			
00:00	WEATHER DOWNTIME	11.533	Y
11:32	WEATHER DOWNTIME - ATTEMPT LINE YOL-00337 ABORT	3.200	Y
14:44	WEATHER DOWNTIME - ATTEMPT LINE YOL-00097 ABORT	3.183	Y
17:55	WEATHER DOWNTIME - ATTEMPT LINE YOL 00319 ABORT	3.700	Y
21:37	RECORDING LINE YOL-00181	1.333	
22:57	LINE CHANGE	1.051	
** Subtotal **			
		24.000	
** Date: 18/02/94			
00:00	LINE CHANGE	1.217	
01:13	RECORDING LINE YOL-00337	1.800	
03:01	LINE CHANGE	2.083	
05:06	RECORDING LINE YOL-00109	1.133	
06:14	LINE CHANGE	1.800	
08:02	RECORDING LINE YOL-00319	1.733	
09:46	LINE CHANGE	1.867	
11:38	RECORDING LINE YOL-00157	1.233	
12:52	LINE CHANGE	2.000	
14:52	RECORDING LINE YOL-00331	1.417	
16:17	WEATHER DOWNTIME	5.883	Y
22:10	RECORDING LINE YOL-00325	1.817	
23:59	LINE CHANGE	0.017	
** Subtotal **			
		24.000	

** Date: 19/02/94		
00:00	LINE CHANGE	1.817
01:49	RECORDING LINE YOL-00097	1.017
02:50	LINE CHANGE	1.967
04:48	RECORDING LINE YOL-00343	1.450
06:15	LINE CHANGE	1.950
08:12	RECORDING LINE YOL-00151	1.250
09:27	LINE CHANGE	2.000
11:27	RECORDING LINE YOL-00349	1.883
13:20	LINE CHANGE EXTENDED FOR GUN WORK.	2.717
16:03	RECORDING LINE YOL-00103	1.067
17:07	LINE CHANGE	2.200
19:19	RECORDING LINE YOL-00379	1.933
21:15	LINE CHANGE	2.117
23:22	RECORDING LINE YOL-00163	0.632
** Subtotal **		
		24.000
** Date: 20/02/94		
00:00	RECORDING LINE YOL-00163	0.650
00:39	LINE CHANGE	1.967
02:37	RECORDING LINE YOL-00355	1.933
04:33	LINE CHANGE	1.117
05:40	DOWNTIME - PORT PULLAVANE TOW HARNESS BROKEN	8.817
14:29	RECORDING LINE YOL-00373	1.983
16:28	LINE CHANGE	1.783
18:15	RECORDING LINE YOL-00133	1.183
19:26	LINE CHANGE	1.750
21:11	RECORDING LINE YOL-00367	1.933
23:07	LINE CHANGE	0.884
** Subtotal **		
		24.000
** Date: 21/02/94		
00:00	LINE CHANGE	0.867
00:52	RECORDING LINE YOL-00139	1.217
02:05	LINE CHANGE	1.883
03:58	RECORDING LINE YOL-00361	1.883
05:51	LINE CHANGE	1.750
07:36	RECORDING LINE YOL-00145	1.267
08:52	LINE CHANGE	1.917
10:47	RECORDING LINE YOL-00385	1.883
12:40	LINE CHANGE	1.717
14:23	RECORDING LINE YOL-00169	1.283
15:40	LINE CHANGE	2.200
17:52	RECORDING LINE YOL-10331	0.767
18:38	LINE CHANGE	1.317
19:57	RECORDING LINE YOL-00175	1.383
21:20	LINE CHANGE	1.883
23:13	RECORDING LINE YOL-00415	0.783
** Subtotal **		
		24.000

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** Date: 22/02/94		
00:00	RECORDING LINE YOL-00415	1.100
01:06	LINE CHANGE	2.050
03:09	RECORDING LINE YOL-00727	1.533
04:41	LINE CHANGE	1.900
06:35	RECORDING LINE YOL-00475	1.800
08:23	LINE CHANGE	1.683
10:04	RECORDING LINE YOL-00667	1.583
11:39	LINE CHANGE	1.917
13:34	RECORDING LINE YOL-00391	1.867
15:26	LINE CHANGE	1.867
17:18	RECORDING LINE YOL-00721	1.567
18:52	LINE CHANGE	1.850
20:43	RECORDING LINE YOL-00421	1.883
22:36	LINE CHANGE	1.400
** Subtotal **		
		24.000
** Date: 23/02/94		
00:00	LINE CHANGE	0.500
00:30	RECORDING LINE YOL-00673	1.617
02:07	LINE CHANGE	1.717
03:50	RECORDING LINE YOL-00481	1.867
05:42	LINE CHANGE	1.517
07:13	RECORDING LINE YOL-00715	1.500
08:43	LINE CHANGE	2.583
11:18	RECORDING LINE YOL-00427	1.817
13:07	LINE CHANGE	1.700
14:49	DOWNTIME, VESSEL EQUIPMENT FAILURE - AIR CON	0.667
15:29	DOWNTIME, VESSEL EQUIPMENT FAILURE - AIR CON	2.617
18:06	RECORDING LINE YOL-00487	1.850
19:57	LINE CHANGE	1.600
21:33	RECORDING LINE YOL-00679	1.617
23:10	LINE CHANGE	0.831
** Subtotal **		
		24.000
** Date: 24/02/94		
00:00	LINE CHANGE	1.250
01:15	RECORDING LINE YOL-00433	1.767
03:01	LINE CHANGE	2.033
05:03	RECORDING LINE YOL-00733	1.500
06:33	LINE CHANGE	1.767
08:19	RECORDING LINE YOL-00493	1.733
10:03	LINE CHANGE	1.500
11:33	RECORDING LINE YOL-00685	1.567
13:07	LINE CHANGE	2.200
15:19	RECORDING LINE YOL-00397	1.933
17:15	LINE CHANGE	1.917
19:10	RECORDING LINE YOL-00709	1.583
20:45	LINE CHANGE	2.167
22:55	RECORDING LINE YOL-00409	1.083
** Subtotal **		
		24.000

** Date: 25/02/94			
00:00	RECORDING LINE YOL-00409	0.817	
00:49	LINE CHANGE	1.817	
02:38	RECORDING LINE YOL-00691	1.633	
04:16	LINE CHANGE	1.833	
06:06	RECORDING LINE YOL-00499	1.850	
07:57	LINE CHANGE	1.533	
09:29	RECORDING LINE YOL-00751	1.350	
10:50	LINE CHANGE	1.883	
12:43	RECORDING LINE YOL-00451	1.883	
14:36	LINE CHANGE	1.650	
16:15	RECORDING LINE YOL-00697	1.567	
17:49	LINE CHANGE	2.033	
19:51	RECORDING LINE YOL-00469	1.850	
21:42	LINE CHANGE	1.683	
23:23	RECORDING LINE YOL-00661	0.618	
** Subtotal **			
		24.000	
** Date: 26/02/94			
00:00	RECORDING LINE YOL-00661	1.050	
01:03	LINE CHANGE	1.900	
02:57	RECORDING LINE YOL-00403	1.850	
04:48	LINE CHANGE	1.767	
06:34	RECORDING LINE YOL-00703	1.533	
08:06	MAINTENANCE OF TRAILING GEAR	15.900	
** Subtotal **			
		24.000	
** Date: 27/02/94			
00:00	MAINTENANCE OF TRAILING GEAR	0.633	
00:38	RECORDING LINE YOL-00775	1.367	
02:00	LINE CHANGE	2.067	
04:04	RECORDING LINE YOL-00445	1.867	
05:56	LINE CHANGE	1.683	
07:37	RECORDING LINE YOL-00739	1.500	
09:07	LINE CHANGE	1.850	
10:58	RECORDING LINE YOL-00463	1.783	
12:45	LINE CHANGE	1.817	
14:34	WEATHER DOWNTIME - ATTEMPTED LINE YOL-00769	1.483	Y
16:03	WEATHER DOWNTIME - WAITING FOR WEATHER TO MODERATE	7.950	Y
** Subtotal **			
		24.000	
** Date: 28/02/94			
00:00	WEATHER DOWNTIME - SEARCHING FOR LOST PARAVANE	8.250	Y
08:15	EMERGENCY RESPONSE PROCEDURES - MEDIVAC TO BURNIE	15.750	
** Subtotal **			
		24.000	
** Date: 01/03/94			
00:00	EMERGENCY RESPONSE PROCEDURES- RETURN TO PROSPECT	2.000	
02:00	WEATHER DOWNTIME - DEPLOYING CABLES.	22.000	Y
** Subtotal **			
		24.000	

** Date: 02/03/94			
00:00	WEATHER DOWNTIME - HEADING TO LINE YOL00535	2.817	Y
02:49	RECORDING LINE YOL-00535	1.850	
04:40	LINE CHANGE	1.550	
06:13	RECORDING LINE YOL-00781	1.417	
07:38	LINE CHANGE	1.850	
09:29	RECORDING LINE YOL-00505	1.767	
11:15	LINE CHANGE	1.217	
12:28	DOWNTIME, TRAILING GEAR EQUIPMENT FAILURE	11.532	
** Subtotal **			
		24.000	
** Date: 03/03/94			
00:00	DOWNTIME, TRAILING GEAR EQUIPMENT FAILURE	7.617	
07:37	RECORDING LINE YOL-00847	1.217	
08:50	LINE CHANGE	1.867	
10:42	RECORDING LINE YOL-00511	1.750	
12:27	LINE CHANGE	1.667	
14:07	RECORDING LINE YOL-00745	1.500	
15:37	LINE CHANGE	2.067	
17:41	RECORDING LINE YOL-00457	1.717	
19:24	LINE CHANGE	1.850	
21:15	RECORDING LINE YOL-00769	1.400	
22:39	LINE CHANGE	1.348	
** Subtotal **			
		24.000	
** Date: 04/03/94			
00:00	LINE CHANGE	0.750	
00:45	RECORDING LINE YOL-00565	1.767	
02:31	LINE CHANGE	1.817	
04:20	RECORDING LINE YOL-00655	1.650	
05:59	LINE CHANGE	1.650	
07:38	RECORDING LINE YOL-00529	1.717	
09:21	LINE CHANGE	1.617	
10:58	RECORDING LINE YOL-00763	1.333	
12:18	LINE CHANGE	2.067	
14:22	RECORDING LINE YOL-00439	1.833	
16:12	LINE CHANGE	1.733	
17:56	RECORDING LINE YOL-00757	1.433	
19:22	LINE CHANGE	1.667	
21:02	RECORDING LINE YOL-00541	1.767	
22:48	LINE CHANGE	1.199	
** Subtotal **			
		24.000	
** Date: 05/03/94			
00:00	LINE CHANGE	0.500	
00:30	RECORDING LINE YOL-00805	1.333	
01:50	LINE CHANGE	1.867	
03:42	RECORDING LINE YOL-00571	1.750	
05:27	LINE CHANGE	1.567	
07:01	RECORDING LINE YOL-00787	1.400	
08:25	LINE CHANGE	1.900	
10:19	RECORDING LINE YOL-00523	1.833	
12:09	LINE CHANGE	1.717	

13:52	WEATHER DOWNTIME - ATTEMPTED LINE YOL-00811	3.717	Y
17:35	WEATHER DOWNTIME - ATTEMPTED LINE YOL-00457	6.416	Y
** Subtotal **			
		24.000	
** Date: 06/03/94			
00:00	WEATHER DOWNTIME	1.383	Y
01:23	WEATHER DOWNTIME ATTEMPTED LINE YOL-00559	0.483	Y
01:52	WEATHER DOWNTIME ATTEMPTED LINE YOL-00793	3.383	Y
05:15	WEATHER DOWNTIME	4.150	Y
09:24	RECORDING LINE YOL-00517	1.800	
11:12	LINE CHANGE	2.067	
13:16	RECORDING LINE YOL-00799	1.333	
14:36	LINE CHANGE	2.267	
16:52	RECORDING LINE YOL-00559	1.717	
18:35	LINE CHANGE	1.917	
20:30	RECORDING LINE YOL-00793	1.350	
21:51	LINE CHANGE	2.150	
** Subtotal **			
		24.000	
** Date: 07/03/94			
00:00	LINE CHANGE	0.067	
00:04	RECORDING LINE YOL-00547	1.817	
01:53	LINE CHANGE	1.900	
03:47	RECORDING LINE YOL-00811	1.233	
05:01	LINE CHANGE	1.700	
06:43	RECORDING LINE YOL-00595	1.767	
08:29	LINE CHANGE	1.517	
10:00	RECORDING LINE YOL-00853	1.167	
11:10	LINE CHANGE	1.950	
13:07	RECORDING LINE YOL-00589	1.733	
14:51	LINE CHANGE	1.483	
16:20	RECORDING LINE YOL-00817	1.267	
17:36	LINE CHANGE	1.800	
19:24	RECORDING LINE YOL-00601	1.800	
21:12	LINE CHANGE	1.500	
22:42	RECORDING LINE YOL-00841	1.233	
23:56	LINE CHANGE	0.066	
** Subtotal **			
		24.000	
** Date: 08/03/94			
00:00	LINE CHANGE	1.050	
01:03	RECORDING LINE YOL-00553	2.750	
03:48	LINE CHANGE	1.583	
05:23	RECORDING LINE YOL-00649	1.683	
07:04	LINE CHANGE	1.633	
08:42	RECORDING LINE YOL-00607	1.733	
10:26	LINE CHANGE	1.533	
11:58	RECORDING LINE YOL-00859	1.117	
13:05	LINE CHANGE	2.017	
15:06	RECORDING LINE YOL-00583	1.800	
16:54	LINE CHANGE	1.683	

18:35	RECORDING LINE YOL-00643	1.767	
20:21	LINE CHANGE	1.800	
22:09	RECORDING LINE YOL-00613	1.667	
23:49	LINE CHANGE	0.184	
** Subtotal **			
		24.000	
** Date: 09/03/94			
00:00	LINE CHANGE	1.250	
01:15	RECORDING LINE YOL-00823	1.300	
02:33	LINE CHANGE	1.833	
04:23	RECORDING LINE YOL-00577	1.767	
06:09	LINE CHANGE	1.550	
07:42	RECORDING LINE YOL-00835	1.200	
08:54	LINE CHANGE	1.967	
10:52	RECORDING LINE YOL-00619	1.767	
12:38	LINE CHANGE	1.783	
14:25	RECORDING LINE YOL-00829	1.233	
15:39	LINE CHANGE	1.667	
17:19	RECORDING LINE YOL-00631	1.750	
19:04	LINE CHANGE	2.033	
21:06	RECORDING LINE YOL-00637	1.767	
22:52	LINE CHANGE	1.133	
** Subtotal **			
		24.000	
** Date: 10/03/94			
00:00	LINE CHANGE	0.750	
00:45	RECORDING LINE YOL-00625	1.733	
02:29	LINE CHANGE	2.117	
04:36	INFILL RECORDING YOL-01187	1.283	Y
05:53	INFILL LINE CHANGE	1.767	Y
07:39	INFILL RECORDING YOL-01367	1.883	Y
09:32	INFILL LINE CHANGE	1.950	Y
11:29	INFILL RECORDING LINE YOL-01133	1.033	Y
12:31	INFILL LINE CHANGE	1.800	Y
14:19	WEATHER DOWNTIME ATTEMPTED INFILL LINE YOL-01349	2.750	Y
17:04	INFILL RECORDING LINE YOL-01145	1.017	Y
18:05	INFILL LINE CHANGE	1.767	Y
19:51	INFILL RECORDING LINE YOL-01349	0.600	Y
20:27	LINE CHANGE	0.583	
21:02	RECORDING LINE YOL-10343 (RESHOOT EDITED LINE)	0.517	
21:33	INFILL LINE CHANGE	2.117	Y
23:40	INFILL RECORDING LINE YOL-01067	0.333	Y
** Subtotal **			
		24.000	

** Date: 11/03/94			
00:00	INFILL RECORDING LINE YOL-01067	0.533	Y
00:32	INFILL LINE CHANGE	1.850	Y
02:23	INFILL RECORDING LINE YOL-01343	1.733	Y
04:07	INFILL LINE CHANGE	1.383	Y
05:30	WEATHER DOWNTIME ATTEMPTED LINE YOL-01115	1.133	Y
06:38	WEATHER DOWNTIME ATTEMPTED LINE YOL-10091	1.367	Y
08:00	WEATHER DOWNTIME - WAITING FOR WEATHER TO MODERATE	16.001	Y
** Subtotal **			
		24.000	
** Date: 12/03/94			
00:00	WEATHER DOWNTIME	7.200	Y
07:12	INFILL RECORDING LINE YOL-01469	1.833	Y
09:02	INFILL LINE CHANGE	2.217	Y
11:15	INFILL RECORDING LINE YOL-01115	0.900	Y
12:09	LINE CHANGE	1.450	
13:36	RECORDING LINE YOL-10319	0.217	
13:49	LINE CHANGE	1.567	
15:23	RECORDING LINE YOL-10091	0.433	
15:49	INFILL LINE CHANGE	1.717	Y
17:32	INFILL RECORDING LINE YOL-01421	1.400	Y
18:56	INFILL LINE CHANGE	2.033	Y
20:58	WEATHER DOWNTIME	3.033	Y
** Subtotal **			
		24.000	
** Date: 13/03/94			
00:00	WEATHER DOWNTIME	2.933	Y
02:56	INFILL RECORDING LINE YOL-01055	0.900	Y
03:50	INFILL LINE CHANGE	1.967	Y
05:48	INFILL RECORDING LINE YOL-01451	1.767	Y
07:34	LINE CHANGE	1.933	
09:30	RECORDING LINE YOL-10109	0.100	
09:36	INFILL LINE CHANGE	0.517	Y
10:07	INFILL RECORDING LINE YOL-01085	0.400	Y
10:31	INFILL LINE CHANGE	1.800	Y
12:19	INFILL RECORDING LINE YOL-01439	1.033	Y
13:21	INFILL LINE CHANGE	1.783	Y
15:08	INFILL RECORDING LINE YOL-01679	0.867	Y
16:00	INFILL LINE CHANGE	1.667	Y
17:40	INFILL RECORDING LINE YOL-01487	1.683	Y
19:21	INFILL LINE CHANGE	1.650	Y
21:00	WEATHER DOWNTIME - ABORT ATTEMPT AT LINE YOL-01667	3.000	Y
** Subtotal **			
		24.000	
** Date: 14/03/94			
00:00	WEATHER DOWNTIME	7.533	Y
07:32	ABORTED RUN IN AIR LEAK ON GUNS	2.950	
10:29	INFILL RECORDING LINE YOL-01517	1.817	Y
12:18	INFILL LINE CHANGE	1.800	Y
14:06	INFILL RECORDING INFILL LINE YOL-01739	1.467	Y
15:34	INFILL LINE CHANGE	1.617	Y
17:11	INFILL RECORDING LINE YOL-01637	1.717	Y

18:54	INFILL LINE CHANGE	1.717	Y
20:37	INFILL RECORDING LINE YOL-01709	1.600	Y
22:13	INFILL LINE CHANGE	1.782	Y
** Subtotal **			
		24.000	
** Date: 15/03/94			
00:00	INFILL LINE CHANGE	0.100	Y
00:06	INFILL RECORDING LINE YOL-01499	1.883	Y
01:59	INFILL LINE CHANGE	1.683	Y
03:40	INFILL RECORDING LINE YOL-01667	1.550	Y
05:13	INFILL LINE CHANGE	0.783	Y
06:00	EMERGENCY RESPONSE PROCEDURES - MEDIVAC	4.117	
10:07	INFILL RECORDING LINE YOL-01835	0.983	Y
11:06	INFILL LINE CHANGE	1.683	Y
12:47	INFILL RECORDING LINE YOL-01751	1.133	Y
13:55	INFILL LINE CHANGE	1.283	Y
15:12	INFILL RECORDING LINE YOL-01595	1.333	Y
16:32	INFILL LINE CHANGE	1.783	Y
18:19	INFILL RECORDING LINE YOL-01685	1.533	Y
19:51	INFILL LINE CHANGE	1.100	Y
20:57	INFILL RECORDING LINE YOL-01817	0.867	Y
21:49	INFILL LINE CHANGE	2.033	Y
23:51	INFILL RECORDING LINE YOL-01649	0.153	Y
** Subtotal **			
		24.000	
** Date: 16/03/94			
00:00	INFILL RECORDING LINE YOL-01649	0.917	Y
00:55	INFILL LINE CHANGE	2.883	Y
03:48	INFILL RECORDING LINE YOL-01661	1.417	Y
05:13	MOBILISATION/DEMOBILISATION - END OF YOLLA SURVEY	18.783	
** Subtotal **			
		24.000	
** Date: 17/03/94			
00:00	DEMOBILISATION - END OF YOLLA 1 SURVEY	6.000	
06:00	DEMOBILISATION - END OF YOLLA 1 SURVEY	1.000	
07:00	NON-SURVEY RELATED ACTIVITIES	17.000	
** Subtotal **			
		24.000	
*** Total ***			
		1416.000	

10.2 SURVEY PRODUCTION LOGS

NOTE:- In the status column the following codes apply,
COM = Complete. MSP = Midnight Shotpoint.
TBC = To Be Completed. LCC= Line Considered Complete.

Line Details

Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
** Date 05/02/94							
* Sail Line YOL-00013							
00013 214	306-32	6.9000	306-32	6.9000	306-32	6.9000	COM
14 214	307-33	6.9000	307-33	6.9000	307-33	6.9000	COM
15 214	306-32	6.9000	306-32	6.9000	306-32	6.9000	COM
16 214	307-33	6.9000	307-33	6.9000	307-33	6.9000	COM
17 214	306-32	6.9000	306-32	6.9000	306-32	6.9000	COM
18 214	307-33	6.9000	307-33	6.9000	307-33	6.9000	COM
* Subsubtotal *		41.4000		41.4000		41.4000	
* Sail Line YOL-00205							
00205 034	111-621	12.8000	111-621	12.8000	111-621	12.8000	COM
206 034	110-620	12.8000	110-620	12.8000	110-620	12.8000	COM
207 034	111-621	12.8000	111-621	12.8000	111-621	12.8000	COM
208 034	110-620	12.8000	110-620	12.8000	110-620	12.8000	COM
209 034	111-621	12.8000	111-621	12.8000	111-621	12.8000	COM
210 034	110-620	12.8000	110-620	12.8000	110-620	12.8000	COM
* Subsubtotal *		76.8000		76.8000		76.8000	
** Subtotal **		118.2000		118.2000		118.2000	
** Date 06/02/94							
* Sail Line YOL-00055							
00055 214	358-32	8.2000	358-32	8.2000	358-32	8.2000	COM
56 214	357-33	8.1500	357-33	8.1500	357-33	8.1500	COM
57 214	358-32	8.2000	358-32	8.2000	358-32	8.2000	COM
58 214	357-33	8.1500	357-33	8.1500	357-33	8.1500	COM
59 214	358-32	8.2000	358-32	8.2000	358-32	8.2000	COM
60 214	357-33	8.1500	357-33	8.1500	357-33	8.1500	COM
* Subsubtotal *		49.0500		49.0500		49.0500	
* Sail Line YOL-00247							
00247 34	113-671	14.0000	113-671	14.0000	113-671	14.0000	COM
248 034	114-672	14.0000	114-672	14.0000	114-672	14.0000	COM
249 034	113-671	14.0000	113-671	14.0000	113-671	14.0000	COM
250 034	114-672	14.0000	114-672	14.0000	114-672	14.0000	COM
251 034	113-671	14.0000	113-671	14.0000	113-671	14.0000	COM
252 034	114-672	14.0000	114-672	14.0000	114-672	14.0000	COM
* Subsubtotal *		84.0000		84.0000		84.0000	

Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00019							
00019 214	314-32	7.1000	314-32	7.1000	314-32	7.1000	COM
20 214	313-33	7.0500	313-33	7.0500	313-33	7.0500	COM
21 214	314-32	7.1000	314-32	7.1000	314-32	7.1000	COM
22 214	313-33	7.0500	313-33	7.0500	313-33	7.0500	COM
23 214	314-32	7.1000	314-32	7.1000	314-32	7.1000	COM
24 214	313-33	7.0500	313-33	7.0500	313-33	7.0500	COM
* Subsubtotal *		42.4500		42.4500		42.4500	
* Sail Line YOL-00211							
00211 034	111-627	12.9500	111-627	12.9500	111-627	12.9500	COM
212 034	110-628	13.0000	110-628	13.0000	110-628	13.0000	COM
213 034	111-627	12.9500	111-627	12.9500	111-627	12.9500	COM
214 034	110-628	13.0000	110-628	13.0000	110-628	13.0000	COM
215 034	111-627	12.9500	111-627	12.9500	111-627	12.9500	COM
216 034	110-628	13.0000	110-628	13.0000	110-628	13.0000	COM
* Subsubtotal *		77.8500		77.8500		77.8500	
* Sail Line YOL-00061							
00061 214	366-32	8.4000	366-32	8.4000	366-32	8.4000	COM
62 214	365-33	8.3500	365-33	8.3500	365-33	8.3500	COM
63 214	366-32	8.4000	366-32	8.4000	366-32	8.4000	COM
64 214	365-33	8.3500	365-33	8.3500	365-33	8.3500	COM
65 214	366-32	8.4000	366-32	8.4000	366-32	8.4000	COM
66 214	365-33	8.3500	365-33	8.3500	365-33	8.3500	COM
* Subsubtotal *		50.2500		50.2500		50.2500	
* Sail Line YOL-00253							
00253 034	111-675	14.1500	111-675	14.1500	111-675	14.1500	COM
254 034	110-674	14.1500	110-674	14.1500	110-674	14.1500	COM
255 034	111-675	14.1500	111-675	14.1500	111-675	14.1500	COM
256 034	110-674	14.1500	110-674	14.1500	110-674	14.1500	COM
257 034	111-675	14.1500	111-675	14.1500	111-675	14.1500	COM
258 034	110-674	14.1500	110-674	14.1500	110-674	14.1500	COM
* Subsubtotal *		84.9000		84.9000		84.9000	
* Sail Line YOL-00025							
00025 214	320-32	7.2500	320-32	7.2500	320-32	7.2500	COM
26 214	321-33	7.2500	321-33	7.2500	321-33	7.2500	COM
27 214	320-32	7.2500	320-32	7.2500	320-32	7.2500	COM
28 214	321-33	7.2500	321-33	7.2500	321-33	7.2500	COM
29 214	320-32	7.2500	320-32	7.2500	320-32	7.2500	COM
30 214	321-33	7.2500	321-33	7.2500	321-33	7.2500	COM
* Subsubtotal *		43.5000		43.5000		43.5000	
** Subtotal **		432.0000		432.0000		432.0000	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
** Date 07/02/94								
* Sail Line YOL-00199								
00199	034	110-612	12.6000	110-612	12.6000	110-612	12.6000	COM
200	034	111-613	12.6000	111-613	12.6000	111-613	12.6000	COM
201	034	110-612	12.6000	110-612	12.6000	110-612	12.6000	COM
202	034	111-613	12.6000	111-613	12.6000	111-613	12.6000	COM
203	034	110-612	12.6000	110-612	12.6000	110-612	12.6000	COM
204	034	111-613	12.6000	111-613	12.6000	111-613	12.6000	COM
* Subsubtotal *			75.6000		75.6000		75.6000	
* Sail Line YOL-00067								
00067	214	372-32	8.5500	372-32	8.5500	372-32	8.5500	COM
68	214	373-33	8.5500	373-33	8.5500	373-33	8.5500	COM
69	214	372-32	8.5500	372-32	8.5500	372-32	8.5500	COM
70	214	373-33	8.5500	373-33	8.5500	373-33	8.5500	COM
71	214	372-32	8.5500	372-32	8.5500	372-32	8.5500	COM
72	214	373-33	8.5500	373-33	8.5500	373-33	8.5500	COM
* Subsubtotal *			51.3000		51.3000		51.3000	
* Sail Line YOL-00259								
00259	034	117-687	14.3000	117-687	14.3000	117-687	14.3000	COM
260	034	116-686	14.3000	116-686	14.3000	116-686	14.3000	COM
261	034	117-687	14.3000	117-687	14.3000	117-687	14.3000	COM
262	034	116-686	14.3000	116-686	14.3000	116-686	14.3000	COM
263	034	117-687	14.3000	117-687	14.3000	117-687	14.3000	COM
264	034	116-686	14.3000	116-686	14.3000	116-686	14.3000	COM
* Subsubtotal *			85.8000		85.8000		85.8000	
** Subtotal **			212.7000		212.7000		212.7000	
** Date 11/02/94								
* Sail Line YOL-00049								
00049	214	350-32	8.0000	350-32	8.0000	350-32	8.0000	COM
50	214	351-33	8.0000	351-33	8.0000	351-33	8.0000	COM
51	214	350-32	8.0000	350-32	8.0000	350-32	8.0000	COM
52	214	351-33	8.0000	351-33	8.0000	351-33	8.0000	COM
53	214	350-32	8.0000	350-32	8.0000	350-32	8.0000	COM
54	214	351-33	8.0000	351-33	8.0000	351-33	8.0000	COM
* Subsubtotal *			48.0000		48.0000		48.0000	

Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00217							
00217 034	111-635	13.1500	111-635	13.1500	111-635	13.1500	COM
218 034	110-634	13.1500	110-634	13.1500	110-634	13.1500	COM
219 034	111-635	13.1500	111-635	13.1500	111-635	13.1500	COM
220 034	110-634	13.1500	110-634	13.1500	110-634	13.1500	COM
221 034	111-635	13.1500	111-635	13.1500	111-635	13.1500	COM
222 034	110-634	13.1500	110-634	13.1500	110-634	13.1500	COM
* Subsubtotal *		78.9000		78.9000		78.9000	
* Sail Line YOL-00031							
00031 214	328-32	7.4500	328-32	7.4500	328-32	7.4500	COM
32 214	329-33	7.4500	329-33	7.4500	329-33	7.4500	COM
33 214	328-32	7.4500	328-32	7.4500	328-32	7.4500	COM
34 214	329-33	7.4500	329-33	7.4500	329-33	7.4500	COM
35 214	328-32	7.4500	328-32	7.4500	328-32	7.4500	COM
36 214	329-33	7.4500	329-33	7.4500	329-33	7.4500	COM
* Subsubtotal *		44.7000		44.7000		44.7000	
* Sail Line YOL-00265							
00265 034	117-693	14.4500	117-693	14.4500	117-693	14.4500	COM
266 034	118-694	14.4500	118-694	14.4500	118-694	14.4500	COM
267 034	117-693	14.4500	117-693	14.4500	117-693	14.4500	COM
268 034	118-694	14.4500	118-694	14.4500	118-694	14.4500	COM
269 034	117-693	14.4500	117-693	14.4500	117-693	14.4500	COM
270 034	118-694	14.4500	118-694	14.4500	118-694	14.4500	COM
* Subsubtotal *		86.7000		86.7000		86.7000	
* Sail Line YOL-00073							
00073 214	380-32	8.7500	380-32	8.7500	380-32	8.7500	COM
74 214	379-33	8.7000	379-33	8.7000	379-33	8.7000	COM
75 214	380-32	8.7500	380-32	8.7500	380-32	8.7500	COM
76 214	379-33	8.7000	379-33	8.7000	379-33	8.7000	COM
77 214	380-32	8.7500	380-32	8.7500	380-32	8.7500	COM
78 214	379-33	8.7000	379-33	8.7000	379-33	8.7000	COM
* Subsubtotal *		52.3500		52.3500		52.3500	
** Subtotal **		310.6500		310.6500		310.6500	
** Date 12/02/94							
* Sail Line YOL-00193							
00193 034	111-605	12.4000	111-605	12.4000	111-605	12.4000	COM
194 034	110-606	12.4500	110-606	12.4500	110-606	12.4500	COM
195 034	111-605	12.4000	111-605	12.4000	111-605	12.4000	COM
196 034	110-606	12.4500	110-606	12.4500	110-606	12.4500	COM
197 034	111-605	12.4000	111-605	12.4000	111-605	12.4000	COM
198 034	110-606	12.4500	110-606	12.4500	110-606	12.4500	COM
* Subsubtotal *		74.5500		74.5500		74.5500	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00037								
00037	214	336-32	7.6500	336-32	7.6500	336-32	7.6500	COM
38	214	335-33	7.6000	335-33	7.6000	335-33	7.6000	COM
39	214	336-32	7.6500	336-32	7.6500	336-32	7.6500	COM
40	214	335-33	7.6000	335-33	7.6000	335-33	7.6000	COM
41	214	336-32	7.6500	336-32	7.6500	336-32	7.6500	COM
42	214	335-33	7.6000	335-33	7.6000	335-33	7.6000	COM
* Subsubtotal *			45.7500		45.7500		45.7500	
* Sail Line YOL-00271								
00271	034	119-701	14.6000	119-701	14.6000	119-701	14.6000	COM
272	034	120-702	14.6000	120-702	14.6000	120-702	14.6000	COM
273	034	119-701	14.6000	119-701	14.6000	119-701	14.6000	COM
274	034	120-702	14.6000	120-702	14.6000	120-702	14.6000	COM
275	034	119-701	14.6000	119-701	14.6000	119-701	14.6000	COM
276	034	120-702	14.6000	120-702	14.6000	120-702	14.6000	COM
* Subsubtotal *			87.6000		87.6000		87.6000	
* Sail Line YOL-00079								
00079	214	388-32	8.9500	388-32	8.9500	388-32	8.9500	COM
80	214	387-33	8.9000	387-33	8.9000	387-33	8.9000	COM
81	214	388-32	8.9500	388-32	8.9500	388-32	8.9500	COM
82	214	387-33	8.9000	387-33	8.9000	387-33	8.9000	COM
83	214	388-32	8.9500	388-32	8.9500	388-32	8.9500	COM
84	214	387-33	8.9000	387-33	8.9000	387-33	8.9000	COM
* Subsubtotal *			53.5500		53.5500		53.5500	
* Sail Line YOL-00223								
00223	034	111-643	13.3500	111-643	13.3500	111-643	13.3500	COM
224	034	110-642	13.3500	110-642	13.3500	110-642	13.3500	COM
225	034	111-643	13.3500	111-643	13.3500	111-643	13.3500	COM
226	034	110-642	13.3500	110-642	13.3500	110-642	13.3500	COM
227	034	111-643	13.3500	111-643	13.3500	111-643	13.3500	COM
228	034	110-642	13.3500	110-642	13.3500	110-642	13.3500	COM
* Subsubtotal *			80.1000		80.1000		80.1000	
* Sail Line YOL-00007								
00007	214	298-32	6.7000	298-32	6.7000	298-32	6.7000	COM
8	214	299-33	6.7000	299-33	6.7000	299-33	6.7000	COM
9	214	298-32	6.7000	298-32	6.7000	298-32	6.7000	COM
10	214	299-33	6.7000	299-33	6.7000	299-33	6.7000	COM
11	214	298-32	6.7000	298-32	6.7000	298-32	6.7000	COM
12	214	299-33	6.7000	299-33	6.7000	299-33	6.7000	COM
* Subsubtotal *			40.2000		40.2000		40.2000	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00229								
00229	034	111-649	13.5000	111-649	13.5000	111-649	13.5000	COM
230	034	110-650	13.5500	110-650	13.5500	110-650	13.5500	COM
231	034	111-649	13.5000	111-649	13.5000	111-649	13.5000	COM
232	034	110-650	13.5500	110-650	13.5500	110-650	13.5500	COM
233	034	111-649	13.5000	111-649	13.5000	111-649	13.5000	COM
234	034	110-650	13.5500	110-650	13.5500	110-650	13.5500	COM
* Subsubtotal *			81.1500		81.1500		81.1500	
* Sail Line YOL-00001								
00001	214	292-32	6.5500	292-32	6.5500	292-32	6.5500	COM
2	214	291-33	6.5000	291-33	6.5000	291-33	6.5000	COM
3	214	292-32	6.5500	292-32	6.5500	292-32	6.5500	COM
4	214	291-33	6.5000	291-33	6.5000	291-33	6.5000	COM
5	214	292-32	6.5500	292-32	6.5500	292-32	6.5500	COM
6	214	291-33	6.5000	291-33	6.5000	291-33	6.5000	COM
* Subsubtotal *			39.1500		39.1500		39.1500	
** Subtotal **			502.0500		502.0500		502.0500	
** Date 13/02/94								
* Sail Line YOL-00277								
00277	034	141-709	14.2500	141-709	14.2500	141-709	14.2500	COM
278	034	140-708	14.2500	140-708	14.2500	140-708	14.2500	COM
279	034	141-709	14.2500	141-709	14.2500	141-709	14.2500	COM
280	034	140-708	14.2500	140-708	14.2500	140-708	14.2500	COM
281	034	141-709	14.2500	141-709	14.2500	141-709	14.2500	COM
282	034	140-708	14.2500	140-708	14.2500	140-708	14.2500	COM
* Subsubtotal *			85.5000		85.5000		85.5000	
** Subtotal **			85.5000		85.5000		85.5000	
** Date 14/02/94								
* Sail Line YOL-00241								
00241	034	112-664	13.8500	130-664	12.9000	130-664	12.9000	LCC
242	034	113-665	13.8500	129-665	12.9500	129-665	12.9500	LCC
243	034	112-664	13.8500	130-664	12.9000	130-664	12.9000	LCC
244	034	113-665	13.8500	129-665	12.9500	129-665	12.9500	LCC
245	034	112-664	13.8500	130-664	12.9000	130-664	12.9000	LCC
246	034	113-665	13.8500	129-665	12.9500	129-665	12.9500	LCC
* Subsubtotal *			83.1000		77.5500		77.5500	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00085								
00085	214	394-32	9.1000	394-32	9.1000	394-32	9.1000	COM
86	214	395-33	9.1000	395-33	9.1000	395-33	9.1000	COM
87	214	394-32	9.1000	394-32	9.1000	394-32	9.1000	COM
88	214	395-33	9.1000	395-33	9.1000	395-33	9.1000	COM
89	214	394-32	9.1000	394-32	9.1000	394-32	9.1000	COM
90	214	395-33	9.1000	395-33	9.1000	395-33	9.1000	COM
* Subsubtotal *			54.6000		54.6000		54.6000	
* Sail Line YOL-00313								
00313	034	129-753	15.6500	129-753	15.6500	129-753	15.6500	COM
314	034	128-752	15.6500	128-752	15.6500	128-752	15.6500	COM
315	034	129-753	15.6500	129-753	15.6500	129-753	15.6500	COM
316	034	128-752	15.6500	128-752	15.6500	128-752	15.6500	COM
317	034	129-753	15.6500	129-753	15.6500	129-753	15.6500	COM
318	034	128-752	15.6500	128-752	15.6500	128-752	15.6500	COM
* Subsubtotal *			93.9000		93.9000		93.9000	
* Sail Line YOL-00043								
00043	214	344-32	7.8500	344-32	7.8500	344-32	7.8500	COM
44	214	343-33	7.8000	343-33	7.8000	343-33	7.8000	COM
45	214	344-32	7.8500	344-32	7.8500	344-32	7.8500	COM
46	214	343-33	7.8000	343-33	7.8000	343-33	7.8000	COM
47	214	344-32	7.8500	344-32	7.8500	344-32	7.8500	COM
48	214	343-33	7.8000	343-33	7.8000	343-33	7.8000	COM
* Subsubtotal *			46.9500		46.9500		46.9500	
* Sail Line YOL-00235								
00235	034	111-657	13.7000	111-657	13.7000	111-657	13.7000	COM
236	034	110-656	13.7000	110-656	13.7000	110-656	13.7000	COM
237	034	111-657	13.7000	111-657	13.7000	111-657	13.7000	COM
238	034	110-656	13.7000	110-656	13.7000	110-656	13.7000	COM
239	034	111-657	13.7000	111-657	13.7000	111-657	13.7000	COM
240	034	110-656	13.7000	110-656	13.7000	110-656	13.7000	COM
* Subsubtotal *			82.2000		82.2000		82.2000	
* Sail Line YOL-00121								
00121	214	438-88	8.8000	438-88	8.8000	438-88	8.8000	MSP
122	214	439-89	8.8000	439-89	8.8000	439-89	8.8000	MSP
123	214	438-88	8.8000	438-88	8.8000	438-88	8.8000	MSP
124	214	439-89	8.8000	439-89	8.8000	439-89	8.8000	MSP
125	214	438-88	8.8000	438-88	8.8000	438-88	8.8000	MSP
126	214	439-89	8.8000	439-89	8.8000	439-89	8.8000	MSP
** Subtotal **			413.5500		408.0000		408.0000	

Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
** Date 15/02/94							
00121 214	86-32	1.4000	86-32	1.4000	86-32	1.4000	COM
122 214	87-33	1.4000	87-33	1.4000	87-33	1.4000	COM
123 214	86-32	1.4000	86-32	1.4000	86-32	1.4000	COM
124 214	87-33	1.4000	87-33	1.4000	87-33	1.4000	COM
125 214	86-32	1.4000	86-32	1.4000	86-32	1.4000	COM
126 214	87-33	1.4000	87-33	1.4000	87-33	1.4000	COM
* Subsubtotal *		61.2000		61.2000		61.2000	
* Sail Line YOL-00307							
00307 034	127-485	9.0000	127-485	9.0000	127-485	9.0000	TBC
308 034	128-484	8.9500	128-484	8.9500	128-484	8.9500	TBC
309 034	127-485	9.0000	127-485	9.0000	127-485	9.0000	TBC
310 034	128-484	8.9500	128-484	8.9500	128-484	8.9500	TBC
311 034	127-485	9.0000	127-485	9.0000	127-485	9.0000	TBC
312 034	128-484	8.9500	128-484	8.9500	128-484	8.9500	TBC
* Subsubtotal *		53.8500		53.8500		53.8500	
* Sail Line YOL-10307							
10307 034	487-745	6.5000	487-745	6.5000	487-745	6.5000	COM
10308 034	486-744	6.5000	486-744	6.5000	486-744	6.5000	COM
10309 034	487-745	6.5000	487-745	6.5000	487-745	6.5000	COM
10310 034	486-744	6.5000	486-744	6.5000	486-744	6.5000	COM
10311 034	487-745	6.5000	487-745	6.5000	487-745	6.5000	COM
10312 034	486-744	6.5000	486-744	6.5000	486-744	6.5000	COM
* Subsubtotal *		39.0000		39.0000		39.0000	
* Sail Line YOL-00127							
00127 214	446-32	10.4000	446-32	10.4000	446-32	10.4000	COM
128 214	447-33	10.4000	447-33	10.4000	447-33	10.4000	COM
129 214	446-32	10.4000	446-32	10.4000	446-32	10.4000	COM
130 214	447-33	10.4000	447-33	10.4000	447-33	10.4000	COM
131 214	446-32	10.4000	446-32	10.4000	446-32	10.4000	COM
132 214	447-33	10.4000	447-33	10.4000	447-33	10.4000	COM
* Subsubtotal *		62.4000		62.4000		62.4000	
* Sail Line YOL-00301							
00301 034	127-739	15.3500	127-739	15.3500	127-739	15.3500	COM
302 034	126-738	15.3500	126-738	15.3500	126-738	15.3500	COM
303 034	127-739	15.3500	127-739	15.3500	127-739	15.3500	COM
304 034	126-738	15.3500	126-738	15.3500	126-738	15.3500	COM
305 034	127-739	15.3500	127-739	15.3500	127-739	15.3500	COM
306 034	126-738	15.3500	126-738	15.3500	126-738	15.3500	COM
* Subsubtotal *		92.1000		92.1000		92.1000	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00283								
00283	034	123-717	14.9000	123-717	14.9000	123-717	14.9000	COM
284	034	122-716	14.9000	122-716	14.9000	122-716	14.9000	COM
285	034	123-717	14.9000	123-717	14.9000	123-717	14.9000	COM
286	034	122-716	14.9000	122-716	14.9000	122-716	14.9000	COM
287	034	123-717	14.9000	123-717	14.9000	123-717	14.9000	COM
288	034	122-716	14.9000	122-716	14.9000	122-716	14.9000	COM
* Subsubtotal *			89.4000		89.4000		89.4000	
* Sail Line YOL-00187								
00187	214	520-32	12.2500	520-32	12.2500	520-32	12.2500	COM
188	214	519-33	12.2000	519-33	12.2000	519-33	12.2000	COM
189	214	520-32	12.2500	520-32	12.2500	520-32	12.2500	COM
190	214	519-33	12.2000	519-33	12.2000	519-33	12.2000	COM
191	214	520-32	12.2500	520-32	12.2500	520-32	12.2500	COM
192	214	519-33	12.2000	519-33	12.2000	519-33	12.2000	COM
* Subsubtotal *			73.3500		73.3500		73.3500	
* Sail Line YOL-00289								
00289	034	123-223	2.5500	123-223	2.5500	123-223	2.5500	MSP
290	034	124-224	2.5500	124-224	2.5500	124-224	2.5500	MSP
291	034	123-223	2.5500	123-223	2.5500	123-223	2.5500	MSP
292	034	124-224	2.5500	124-224	2.5500	124-224	2.5500	MSP
293	034	123-223	2.5500	123-223	2.5500	123-223	2.5500	MSP
294	034	124-224	2.5500	124-224	2.5500	124-224	2.5500	MSP
** Subtotal **			433.8000		433.8000		433.8000	
** Date 16/02/94								
00289	034	225-723	12.5000	225-723	12.5000	225-723	12.5000	COM
290	034	226-724	12.5000	226-724	12.5000	226-724	12.5000	COM
291	034	225-723	12.5000	225-723	12.5000	225-723	12.5000	COM
292	034	226-724	12.5000	226-724	12.5000	226-724	12.5000	COM
293	034	225-723	12.5000	225-723	12.5000	225-723	12.5000	COM
294	034	226-724	12.5000	226-724	12.5000	226-724	12.5000	COM
* Subsubtotal *			90.3000		90.3000		90.3000	
* Sail Line YOL-00115								
00115	214	432-32	10.0500	432-32	10.0500	432-32	10.0500	COM
116	214	431-33	10.0000	431-33	10.0000	431-33	10.0000	COM
117	214	432-32	10.0500	432-32	10.0500	432-32	10.0500	COM
118	214	431-33	10.0000	431-33	10.0000	431-33	10.0000	COM
119	214	432-32	10.0500	432-32	10.0500	432-32	10.0500	COM
120	214	431-33	10.0000	431-33	10.0000	431-33	10.0000	COM
* Subsubtotal *			60.1500		60.1500		60.1500	

SAGASCO Resources Limited

YOLLA 1 Marine 3D Seismic Survey - Permit Area T/RL1 Bass Basin

Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00295							
00295 034	125-731	15.2000	125-731	15.2000	125-731	15.2000	COM
296 034	124-730	15.2000	124-730	15.2000	124-730	15.2000	COM
297 034	125-731	15.2000	125-731	15.2000	125-731	15.2000	COM
298 034	124-730	15.2000	124-730	15.2000	124-730	15.2000	COM
299 034	125-731	15.2000	125-731	15.2000	125-731	15.2000	COM
300 034	124-730	15.2000	124-730	15.2000	124-730	15.2000	COM
* Subsubtotal *		91.2000		91.2000		91.2000	
* Sail Line YOL-00091							
00091 214	402-186	5.4500	402-186	5.4500	402-186	5.4500	TBC
92 214	403-185	5.5000	403-185	5.5000	403-185	5.5000	TBC
93 214	402-186	5.4500	402-186	5.4500	402-186	5.4500	TBC
94 214	403-185	5.5000	403-185	5.5000	403-185	5.5000	TBC
95 214	402-186	5.4500	402-186	5.4500	402-186	5.4500	TBC
96 214	403-185	5.5000	403-185	5.5000	403-185	5.5000	TBC
* Subsubtotal *		32.8500		32.8500		32.8500	
** Subtotal **		259.2000		259.2000		259.2000	
** Date 17/02/94							
* Sail Line YOL-00181							
00181 214	512-32	12.0500	512-32	12.0500	512-32	12.0500	COM
182 214	513-33	12.0500	513-33	12.0500	513-33	12.0500	COM
183 214	512-32	12.0500	512-32	12.0500	512-32	12.0500	COM
184 214	513-33	12.0500	513-33	12.0500	513-33	12.0500	COM
185 214	512-32	12.0500	512-32	12.0500	512-32	12.0500	COM
186 214	513-33	12.0500	513-33	12.0500	513-33	12.0500	COM
* Subsubtotal *		72.3000		72.3000		72.3000	
** Subtotal **		72.3000		72.3000		72.3000	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
** Date 18/02/94								
* Sail Line YOL-00337								
00337	034	134-782	16.2500	134-782	16.2500	134-782	16.2500	COM
338	034	135-783	16.2500	135-783	16.2500	135-783	16.2500	COM
339	034	134-782	16.2500	134-782	16.2500	134-782	16.2500	COM
340	034	135-783	16.2500	135-783	16.2500	135-783	16.2500	COM
341	034	134-782	16.2500	134-782	16.2500	134-782	16.2500	COM
342	034	135-783	16.2500	135-783	16.2500	135-783	16.2500	COM
* Subsubtotal *			97.5000		97.5000		97.5000	
* Sail Line YOL-00109								
00109	214	425-33	9.8500	425-33	9.8500	425-33	9.8500	COM
110	214	424-32	9.8500	424-32	9.0000	424-32	9.0000	TBC
111	214	425-33	9.8500	425-33	9.8500	425-33	9.8500	COM
112	214	424-32	9.8500	424-32	9.0000	424-32	9.0000	TBC
113	214	425-33	9.8500	425-33	9.8500	425-33	9.8500	COM
114	214	424-32	9.8500	424-32	9.0000	424-32	9.0000	TBC
* Subsubtotal *			59.1000		56.5500		56.5500	
* Sail Line YOL-00319								
00319	034	130-760	15.8000	130-760	15.8000	130-760	15.8000	COM
320	034	131-761	15.8000	131-761	15.8000	131-761	15.8000	COM
321	034	130-760	15.8000	130-760	13.7500	130-760	13.7500	TBC
322	034	131-761	15.8000	131-761	13.8000	131-761	13.8000	TBC
323	034	130-760	15.8000	130-760	15.8000	130-760	15.8000	COM
324	034	131-761	15.8000	131-761	15.8000	131-761	15.8000	COM
* Subsubtotal *			94.8000		90.7500		90.7500	
* Sail Line YOL-00157								
00157	214	483-33	11.3000	483-33	11.3000	483-33	11.3000	COM
158	214	484-32	11.3500	484-32	11.3500	484-32	11.3500	COM
159	214	483-33	11.3000	483-33	11.3000	483-33	11.3000	COM
160	214	484-32	11.3500	484-32	11.3500	484-32	11.3500	COM
161	214	483-33	11.3000	483-33	11.3000	483-33	11.3000	COM
162	214	484-32	11.3500	484-32	11.3500	484-32	11.3500	COM
* Subsubtotal *			67.9500		67.9500		67.9500	
* Sail Line YOL-00331								
00331	034	134-498	9.1500	134-498	9.1500	134-498	9.1500	LCC
332	034	133-499	9.2000	133-499	9.2000	133-499	9.2000	LCC
333	034	134-498	9.1500	212-498	7.2000	212-498	7.2000	LCC
334	034	133-499	9.2000	211-499	7.2500	211-499	7.2500	LCC
335	034	134-498	9.1500	134-498	9.1500	134-498	9.1500	LCC
336	034	133-499	9.2000	133-499	9.2000	133-499	9.2000	LCC
* Subsubtotal *			55.0500		51.1500		51.1500	

Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00325							
00325 034	132-768	15.9500	132-768	15.9500	132-768	15.9500	COM
326 034	131-767	15.9500	131-767	15.9500	131-767	15.9500	COM
327 034	132-768	15.9500	132-768	15.9500	132-768	15.9500	COM
328 034	131-767	15.9500	131-767	15.9500	131-767	15.9500	COM
329 034	132-768	15.9500	132-768	15.9500	132-768	15.9500	COM
330 034	131-767	15.9500	131-767	15.9500	131-767	15.9500	COM
* Subsubtotal *		95.7000		95.7000		95.7000	
** Subtotal **		470.1000		459.6000		459.6000	
** Date 19/02/94							
* Sail Line YOL-00097							
00097 214	409-33	9.4500	409-33	9.4500	409-33	9.4500	COM
98 214	410-32	9.5000	410-32	9.5000	410-32	9.5000	COM
99 214	409-33	9.4500	409-33	9.4500	409-33	9.4500	COM
100 214	410-32	9.5000	410-32	9.5000	410-32	9.5000	COM
101 214	409-33	9.4500	409-33	9.4500	409-33	9.4500	COM
102 214	410-32	9.5000	410-32	9.5000	410-32	9.5000	COM
* Subsubtotal *		56.8500		56.8500		56.8500	
* Sail Line YOL-00343							
00343 034	136-592	11.4500	136-592	11.4500	136-592	11.4500	TBC
344 034	135-593	11.5000	135-593	11.5000	135-593	11.5000	TBC
345 034	136-592	11.4500	136-592	11.4500	136-592	11.4500	TBC
346 034	135-593	11.5000	135-593	11.5000	135-593	11.5000	TBC
347 034	136-592	11.4500	136-592	11.4500	136-592	11.4500	TBC
348 034	135-593	11.5000	135-593	11.5000	135-593	11.5000	TBC
* Subsubtotal *		68.8500		68.8500		68.8500	
* Sail Line YOL-00151							
00151 214	475-33	11.1000	475-33	11.1000	475-33	11.1000	COM
152 214	476-32	11.1500	476-32	11.1500	476-32	11.1500	COM
153 214	475-33	11.1000	475-33	11.1000	475-33	11.1000	COM
154 214	476-32	11.1500	476-32	11.1500	476-32	11.1500	COM
155 214	475-33	11.1000	475-33	11.1000	475-33	11.1000	COM
156 214	476-32	11.1500	476-32	11.1500	476-32	11.1500	COM
* Subsubtotal *		66.7500		66.7500		66.7500	
* Sail Line YOL-00349							
00349 034	138-798	16.5500	138-798	16.5500	138-798	16.5500	COM
350 034	137-797	16.5500	137-797	16.5500	137-797	16.5500	COM
351 034	138-798	16.5500	138-798	16.5500	138-798	16.5500	COM
352 034	137-797	16.5500	137-797	16.5500	137-797	16.5500	COM
353 034	138-798	16.5500	138-798	16.5500	138-798	16.5500	COM
354 034	137-797	16.5500	137-797	16.5500	137-797	16.5500	COM
* Subsubtotal *		99.3000		99.3000		99.3000	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00103								
00103	214	417-33	9.6500	417-33	9.6500	417-33	9.6500	COM
104	214	416-32	9.6500	416-32	9.6500	416-32	9.6500	COM
105	214	417-33	9.6500	417-33	9.6500	417-33	9.6500	COM
106	214	416-32	9.6500	416-32	9.6500	416-32	9.6500	COM
107	214	417-33	9.6500	417-33	9.6500	417-33	9.6500	COM
108	214	416-32	9.6500	416-32	9.6500	416-32	9.6500	COM
* Subsubtotal *			57.9000		57.9000		57.9000	
* Sail Line YOL-00379								
00379	034	144-828	17.1500	144-828	17.1500	144-828	17.1500	COM
380	034	145-829	17.1500	145-829	17.1500	145-829	17.1500	COM
381	034	144-828	17.1500	144-828	17.1500	144-828	17.1500	COM
382	034	145-829	17.1500	145-829	17.1500	145-829	17.1500	COM
383	034	144-828	17.1500	144-828	17.1500	144-828	17.1500	COM
384	034	145-829	17.1500	145-829	17.1500	145-829	17.1500	COM
* Subsubtotal *			102.9000		102.9000		102.9000	
* Sail Line YOL-00163								
00163	214	491-271	5.5500	491-271	5.5500	491-271	5.5500	MSP
164	214	490-270	5.5500	490-270	5.5500	490-270	5.5500	MSP
165	214	491-271	5.5500	491-271	5.5500	491-271	5.5500	MSP
166	214	490-270	5.5500	490-270	5.5500	490-270	5.5500	MSP
167	214	491-271	5.5500	491-271	5.5500	491-271	5.5500	MSP
168	214	490-270	5.5500	490-270	5.5500	490-270	5.5500	MSP
** Subtotal **			485.8500		485.8500		485.8500	
** Date 20/02/94								
00163	214	269-33	5.9500	269-33	5.9500	269-33	5.9500	COM
164	214	268-32	5.9500	268-32	5.9500	268-32	5.9500	COM
165	214	269-33	5.9500	269-33	5.9500	269-33	5.9500	COM
166	214	268-32	5.9500	268-32	5.9500	268-32	5.9500	COM
167	214	269-33	5.9500	269-33	5.9500	269-33	5.9500	COM
168	214	268-32	5.9500	268-32	5.9500	268-32	5.9500	COM
* Subsubtotal *			69.0000		69.0000		69.0000	
* Sail Line YOL-00355								
00355	034	138-804	16.7000	138-804	16.7000	138-804	16.7000	COM
356	034	139-805	16.7000	139-805	16.7000	139-805	16.7000	COM
357	034	138-804	16.7000	138-804	16.7000	138-804	16.7000	COM
358	034	139-805	16.7000	139-805	16.7000	139-805	16.7000	COM
359	034	138-804	16.7000	138-804	16.7000	138-804	16.7000	COM
360	034	139-805	16.7000	139-805	16.7000	139-805	16.7000	COM
* Subsubtotal *			100.2000		100.2000		100.2000	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00373								
00373	034	142-826	17.1500	142-826	17.1500	142-826	17.1500	COM
374	034	143-827	17.1500	143-827	17.1500	143-827	17.1500	COM
375	034	142-826	17.1500	142-826	17.1500	142-826	17.1500	COM
376	034	143-827	17.1500	143-827	17.1500	143-827	17.1500	COM
377	034	142-826	17.1500	142-826	17.1500	142-826	17.1500	COM
378	034	143-827	17.1500	143-827	17.1500	143-827	17.1500	COM
* Subsubtotal *			102.9000		102.9000		102.9000	
* Sail Line YOL-00133								
00133	214	453-33	10.5500	453-33	10.5500	453-33	10.5500	COM
134	214	454-32	10.6000	454-32	10.6000	454-32	10.6000	COM
135	214	453-33	10.5500	453-33	10.5500	453-33	10.5500	COM
136	214	454-32	10.6000	454-32	10.6000	454-32	10.6000	COM
137	214	453-33	10.5500	453-33	10.5500	453-33	10.5500	COM
138	214	454-32	10.6000	454-32	10.6000	454-32	10.6000	COM
* Subsubtotal *			63.4500		63.4500		63.4500	
* Sail Line YOL-00367								
00367	034	142-820	17.0000	142-820	17.0000	142-820	17.0000	COM
368	034	141-819	17.0000	141-819	17.0000	141-819	17.0000	COM
369	034	142-820	17.0000	142-820	17.0000	142-820	17.0000	COM
370	034	141-819	17.0000	141-819	17.0000	141-819	17.0000	COM
371	034	142-820	17.0000	142-820	17.0000	142-820	17.0000	COM
372	034	141-819	17.0000	141-819	17.0000	141-819	17.0000	COM
* Subsubtotal *			102.0000		102.0000		102.0000	
** Subtotal **			404.2500		404.2500		404.2500	
** Date 21/02/94								
* Sail Line YOL-00139								
00139	214	461-33	10.7500	461-33	10.7500	461-33	10.7500	COM
140	214	460-32	10.7500	460-32	10.7500	460-32	10.7500	COM
141	214	461-33	10.7500	461-33	10.7500	461-33	10.7500	COM
142	214	460-32	10.7500	460-32	10.7500	460-32	10.7500	COM
143	214	461-33	10.7500	461-33	10.7500	461-33	10.7500	COM
144	214	460-32	10.7500	460-32	10.7500	460-32	10.7500	COM
* Subsubtotal *			64.5000		64.5000		64.5000	
* Sail Line YOL-00361								
00361	034	140-812	16.8500	140-812	16.8500	140-812	16.8500	COM
362	034	141-813	16.8500	141-813	16.8500	141-813	16.8500	COM
363	034	140-812	16.8500	140-812	16.8500	140-812	16.8500	COM
364	034	141-813	16.8500	141-813	16.8500	141-813	16.8500	COM
365	034	140-812	16.8500	140-812	16.8500	140-812	16.8500	COM
366	034	141-813	16.8500	141-813	16.8500	141-813	16.8500	COM
* Subsubtotal *			101.1000		101.1000		101.1000	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00145								
00145	214	469-33	10.9500	469-33	10.9500	469-33	10.9500	COM
146	214	468-32	10.9500	468-32	10.9500	468-32	10.9500	COM
147	214	469-33	10.9500	469-33	10.9500	469-33	10.9500	COM
148	214	468-32	10.9500	468-32	10.9500	468-32	10.9500	COM
149	214	469-33	10.9500	469-33	10.9500	469-33	10.9500	COM
150	214	468-32	10.9500	468-32	10.9500	468-32	10.9500	COM
* Subsubtotal *			65.7000		65.7000		65.7000	
* Sail Line YOL-00385								
00385	034	146-828	17.1000	146-828	17.1000	146-828	17.1000	COM
386	034	145-829	17.1500	145-829	17.1500	145-829	17.1500	COM
387	034	146-828	17.1000	146-828	17.1000	146-828	17.1000	COM
388	034	145-829	17.1500	145-829	17.1500	145-829	17.1500	COM
389	034	146-828	17.1000	146-828	17.1000	146-828	17.1000	COM
390	034	145-829	17.1500	145-829	17.1500	145-829	17.1500	COM
* Subsubtotal *			102.7500		102.7500		102.7500	
* Sail Line YOL-00169								
00169	214	497-33	11.6500	497-33	11.6500	497-33	11.6500	COM
170	214	498-32	11.7000	498-32	11.7000	498-32	11.7000	COM
171	214	497-33	11.6500	497-33	11.6500	497-33	11.6500	COM
172	214	498-32	11.7000	498-32	11.7000	498-32	11.7000	COM
173	214	497-33	11.6500	497-33	11.6500	497-33	11.6500	COM
174	214	498-32	11.7000	498-32	11.7000	498-32	11.7000	COM
* Subsubtotal *			70.0500		70.0500		70.0500	
* Sail Line YOL-10331								
10331	034	500-776	6.9500	500-776	6.9500	500-776	6.9500	COM
10332	034	501-775	6.9000	501-775	6.9000	501-775	6.9000	COM
10333	034	500-776	6.9500	500-776	6.9500	500-776	6.9500	COM
10334	034	501-775	6.9000	501-775	6.9000	501-775	6.9000	COM
10335	034	500-776	6.9500	500-776	6.9500	500-776	6.9500	COM
10336	034	501-775	6.9000	501-775	6.9000	501-775	6.9000	COM
* Subsubtotal *			41.5500		41.5500		41.5500	
* Sail Line YOL-00175								
00175	214	505-33	11.8500	505-33	11.8500	505-33	11.8500	COM
176	214	506-32	11.9000	506-32	11.9000	506-32	11.9000	COM
177	214	505-33	11.8500	505-33	11.8500	505-33	11.8500	COM
178	214	506-32	11.9000	506-32	11.9000	506-32	11.9000	COM
179	214	505-33	11.8500	505-33	11.8500	505-33	11.8500	COM
180	214	506-32	11.9000	506-32	11.9000	506-32	11.9000	COM
* Subsubtotal *			71.2500		71.2500		71.2500	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00415								
00415	034	152-426	6.9000	152-426	6.9000	152-426	6.9000	MSP
416	034	153-425	6.8500	153-425	6.8500	153-425	6.8500	MSP
417	034	152-426	6.9000	152-426	6.9000	152-426	6.9000	MSP
418	034	153-425	6.8500	153-425	6.8500	153-425	6.8500	MSP
419	034	152-426	6.9000	152-426	6.9000	152-426	6.9000	MSP
420	034	153-425	6.8500	153-425	6.8500	153-425	6.8500	MSP
** Subtotal **			558.1500		558.1500		558.1500	
** Date 22/02/94								
00415	034	428-828	10.0500	428-828	10.0500	428-828	10.0500	COM
416	034	427-829	10.1000	427-829	10.1000	427-829	10.1000	COM
417	034	428-828	10.0500	428-828	10.0500	428-828	10.0500	COM
418	034	427-829	10.1000	427-829	10.1000	427-829	10.1000	COM
419	034	428-828	10.0500	428-828	10.0500	428-828	10.0500	COM
420	034	427-829	10.1000	427-829	10.1000	427-829	10.1000	COM
* Subsubtotal *			101.7000		101.7000		101.7000	
* Sail Line YOL-00727								
00727	214	689-149	13.5500	689-149	13.5500	689-149	13.5500	COM
728	214	688-150	13.5000	688-150	13.5000	688-150	13.5000	COM
729	214	689-149	13.5500	689-149	13.5500	689-149	13.5500	COM
730	214	688-150	13.5000	688-150	13.5000	688-150	13.5000	COM
731	214	689-149	13.5500	689-149	13.5500	689-149	13.5500	COM
732	214	688-150	13.5000	688-150	13.5000	688-150	13.5000	COM
* Subsubtotal *			81.1500		81.1500		81.1500	
* Sail Line YOL-00475								
00475	034	168-828	16.5500	168-828	16.5500	168-828	16.5500	COM
476	034	167-829	16.6000	167-829	16.6000	167-829	16.6000	COM
477	034	168-828	16.5500	168-828	16.5500	168-828	16.5500	COM
478	034	167-829	16.6000	167-829	16.6000	167-829	16.6000	COM
479	034	168-828	16.5500	168-828	16.5500	168-828	16.5500	COM
480	034	167-829	16.6000	167-829	16.6000	167-829	16.6000	COM
* Subsubtotal *			99.4500		99.4500		99.4500	
* Sail Line YOL-00667								
00667	214	727-135	14.8500	727-135	14.8500	727-135	14.8500	COM
668	214	728-136	14.8500	728-136	14.8500	728-136	14.8500	COM
669	214	727-135	14.8500	727-135	14.8500	727-135	14.8500	COM
670	214	728-136	14.8500	728-136	14.8500	728-136	14.8500	COM
671	214	727-135	14.8500	727-135	14.8500	727-135	14.8500	COM
672	214	728-136	14.8500	728-136	14.8500	728-136	14.8500	COM
* Subsubtotal *			89.1000		89.1000		89.1000	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00391								
00391	034	148-828	17.0500	148-828	17.0500	148-828	17.0500	COM
392	034	147-829	17.1000	147-829	17.1000	147-829	17.1000	COM
393	034	148-828	17.0500	148-828	17.0500	148-828	17.0500	COM
394	034	147-829	17.1000	147-829	17.1000	147-829	17.1000	COM
395	034	148-828	17.0500	148-828	17.0500	148-828	17.0500	COM
396	034	147-829	17.1000	147-829	17.1000	147-829	17.1000	COM
* Subsubtotal *			102.4500		102.4500		102.4500	
* Sail Line YOL-00721								
00721	214	693-149	13.6500	693-149	13.6500	693-149	13.6500	COM
722	214	692-148	13.6500	692-148	13.6500	692-148	13.6500	COM
723	214	693-149	13.6500	693-149	13.6500	693-149	13.6500	COM
724	214	692-148	13.6500	692-148	13.6500	692-148	13.6500	COM
725	214	693-149	13.6500	693-149	13.6500	693-149	13.6500	COM
726	214	692-148	13.6500	692-148	13.6500	692-148	13.6500	COM
* Subsubtotal *			81.9000		81.9000		81.9000	
* Sail Line YOL-00421								
00421	034	154-828	16.9000	154-828	16.9000	154-828	16.9000	COM
* Subsubtotal *			16.9000		16.9000		16.9000	
* Sail Line YOL-00421								
422	034	155-829	16.9000	155-829	16.9000	155-829	16.9000	COM
423	034	154-828	16.9000	154-828	16.9000	154-828	16.9000	COM
424	034	155-829	16.9000	155-829	16.9000	155-829	16.9000	COM
425	034	154-828	16.9000	154-828	16.9000	154-828	16.9000	COM
426	034	155-829	16.9000	155-829	16.9000	155-829	16.9000	COM
* Subsubtotal *			84.5000		84.5000		84.5000	
** Subtotal **			615.9000		615.9000		615.9000	
** Date 23/02/94								
* Sail Line YOL-00673								
00673	214	723-137	14.7000	723-137	14.7000	723-137	14.7000	COM
674	214	724-136	14.7500	724-136	14.7500	724-136	14.7500	COM
675	214	723-137	14.7000	723-137	14.7000	723-137	14.7000	COM
676	214	724-136	14.7500	724-136	14.7500	724-136	14.7500	COM
677	214	723-137	14.7000	723-137	14.7000	723-137	14.7000	COM
678	214	724-136	14.7500	724-136	14.7500	724-136	14.7500	COM
* Subsubtotal *			88.3500		88.3500		88.3500	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00481								
00481	034	168-828	16.5500	168-828	16.5500	168-828	16.5500	COM
482	034	169-829	16.5500	169-829	16.5500	169-829	16.5500	COM
483	034	168-828	16.5500	168-828	16.5500	168-828	16.5500	COM
484	034	169-829	16.5500	169-829	16.5500	169-829	16.5500	COM
485	034	168-828	16.5500	168-828	16.5500	168-828	16.5500	COM
486	034	169-829	16.5500	169-829	16.5500	169-829	16.5500	COM
* Subsubtotal *			99.3000		99.3000		99.3000	
* Sail Line YOL-00715								
00715	214	697-147	13.8000	697-147	13.8000	697-147	13.8000	COM
716	214	696-146	13.8000	696-146	13.8000	696-146	13.8000	COM
717	214	697-147	13.8000	697-147	13.8000	697-147	13.8000	COM
718	214	696-146	13.8000	696-146	13.8000	696-146	13.8000	COM
719	214	697-147	13.8000	697-147	13.8000	697-147	13.8000	COM
720	214	696-146	13.8000	696-146	13.8000	696-146	13.8000	COM
* Subsubtotal *			82.8000		82.8000		82.8000	
* Sail Line YOL-00427								
432	034	155-829	16.9000	155-829	16.9000	155-829	16.9000	COM
* Subsubtotal *			16.9000		16.9000		16.9000	
* Sail Line YOL-00487								
00487	034	170-828	16.5000	170-828	16.5000	170-828	16.5000	COM
488	034	171-829	16.5000	171-829	16.5000	171-829	16.5000	COM
489	034	170-828	16.5000	170-828	16.5000	170-828	16.5000	COM
490	034	171-829	16.5000	171-829	16.5000	171-829	16.5000	COM
491	034	170-828	16.5000	170-828	16.5000	170-828	16.5000	COM
492	034	171-829	16.5000	171-829	16.5000	171-829	16.5000	COM
* Subsubtotal *			99.0000		99.0000		99.0000	
* Sail Line YOL-00427								
00427	034	154-828	16.9000	154-828	16.9000	154-828	16.9000	COM
428	034	155-829	16.9000	155-829	16.9000	155-829	16.9000	COM
429	034	154-828	16.9000	154-828	16.9000	154-828	16.9000	COM
430	034	155-829	16.9000	155-829	16.9000	155-829	16.9000	COM
431	034	154-828	16.9000	154-828	16.9000	154-828	16.9000	COM
* Subsubtotal *			84.5000		84.5000		84.5000	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00679								
00679	214	719-139	14.5500	719-139	14.5500	719-139	14.5500	COM
680	214	720-138	14.6000	720-138	14.6000	720-138	14.6000	COM
681	214	719-139	14.5500	719-139	14.5500	719-139	14.5500	COM
682	214	720-138	14.6000	720-138	14.6000	720-138	14.6000	COM
683	214	719-139	14.5500	719-139	14.5500	719-139	14.5500	COM
684	214	720-138	14.6000	720-138	14.6000	720-138	14.6000	COM
* Subsubtotal *			87.4500		87.4500		87.4500	
** Subtotal **			558.3000		558.3000		558.3000	
** Date 24/02/94								
* Sail Line YOL-00433								
00433	034	158-828	16.8000	158-828	16.8000	158-828	16.8000	COM
434	034	157-829	16.8500	157-829	16.8500	157-829	16.8500	COM
435	034	158-828	16.8000	158-828	16.8000	158-828	16.8000	COM
436	034	157-829	16.8500	157-829	16.8500	157-829	16.8500	COM
437	034	158-828	16.8000	158-828	16.8000	158-828	16.8000	COM
438	034	157-829	16.8500	157-829	16.8500	157-829	16.8500	COM
* Subsubtotal *			100.9500		100.9500		100.9500	
* Sail Line YOL-00733								
00733	214	685-151	13.4000	685-151	13.4000	685-151	13.4000	COM
734	214	684-150	13.4000	684-150	13.4000	684-150	13.4000	COM
735	214	685-151	13.4000	685-151	13.4000	685-151	13.4000	COM
736	214	684-150	13.4000	684-150	13.4000	684-150	13.4000	COM
737	214	685-151	13.4000	685-151	13.4000	685-151	13.4000	COM
738	214	684-150	13.4000	684-150	13.4000	684-150	13.4000	COM
* Subsubtotal *			80.4000		80.4000		80.4000	
* Sail Line YOL-00493								
00493	034	172-828	16.4500	172-828	16.4500	172-828	16.4500	COM
494	034	171-829	16.5000	171-829	16.5000	171-829	16.5000	COM
495	034	172-828	16.4500	172-828	16.4500	172-828	16.4500	COM
496	034	171-829	16.5000	171-829	16.5000	171-829	16.5000	COM
497	034	172-828	16.4500	172-828	16.4500	172-828	16.4500	COM
498	034	171-829	16.5000	171-829	16.5000	171-829	16.5000	COM
* Subsubtotal *			98.8500		98.8500		98.8500	
* Sail Line YOL-00685								
00685	214	715-139	14.4500	715-139	14.4500	715-139	14.4500	COM
686	214	716-140	14.4500	716-140	14.4500	716-140	14.4500	COM
687	214	715-139	14.4500	715-139	14.4500	715-139	14.4500	COM
688	214	716-140	14.4500	716-140	14.4500	716-140	14.4500	COM
689	214	715-139	14.4500	715-139	14.4500	715-139	14.4500	COM
690	214	716-140	14.4500	716-140	14.4500	716-140	14.4500	COM
* Subsubtotal *			86.7000		86.7000		86.7000	

Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00397							
00397 034	148-828	17.0500	148-828	17.0500	148-828	17.0500	COM
398 034	149-829	17.0500	149-829	17.0500	149-829	17.0500	COM
399 034	148-828	17.0500	148-828	17.0500	148-828	17.0500	COM
400 034	149-829	17.0500	149-829	17.0500	149-829	17.0500	COM
401 034	148-828	17.0500	148-828	17.0500	148-828	17.0500	COM
402 034	149-829	17.0500	149-829	17.0500	149-829	17.0500	COM
* Subsubtotal *		102.3000		102.3000		102.3000	
* Sail Line YOL-00709							
00709 214	701-145	13.9500	701-145	13.9500	701-145	13.9500	COM
710 214	700-146	13.9000	700-146	13.9000	700-146	13.9000	COM
711 214	701-145	13.9500	701-145	13.9500	701-145	13.9500	COM
712 214	700-146	13.9000	700-146	13.9000	700-146	13.9000	COM
713 214	701-145	13.9500	701-145	13.9500	701-145	13.9500	COM
714 214	700-146	13.9000	700-146	13.9000	700-146	13.9000	COM
* Subsubtotal *		83.5500		83.5500		83.5500	
* Sail Line YOL-00409							
00409 034	152-532	9.5500	152-532	9.5500	152-532	9.5500	MSP
410 034	151-533	9.6000	151-533	9.6000	151-533	9.6000	MSP
411 034	152-532	9.5500	152-532	9.5500	152-532	9.5500	MSP
412 034	151-533	9.6000	151-533	9.6000	151-533	9.6000	MSP
413 034	152-532	9.5500	152-532	9.5500	152-532	9.5500	MSP
414 034	151-533	9.6000	151-533	9.6000	151-533	9.6000	MSP
** Subtotal **		610.2000		610.2000		610.2000	
** Date 25/02/94							
00409 034	534-828	7.4000	534-828	7.4000	534-828	7.4000	COM
410 034	535-829	7.4000	535-829	7.4000	535-829	7.4000	COM
411 034	534-828	7.4000	534-828	7.4000	534-828	7.4000	COM
412 034	535-829	7.4000	535-829	7.4000	535-829	7.4000	COM
413 034	534-828	7.4000	534-828	7.4000	534-828	7.4000	COM
414 034	535-829	7.4000	535-829	7.4000	535-829	7.4000	COM
* Subsubtotal *		101.8500		101.8500		101.8500	
* Sail Line YOL-00691							
00691 214	711-141	14.3000	711-141	14.3000	711-141	14.3000	COM
692 214	712-142	14.3000	712-142	14.3000	712-142	14.3000	COM
693 214	711-141	14.3000	711-141	14.3000	711-141	14.3000	COM
694 214	712-142	14.3000	712-142	14.3000	712-142	14.3000	COM
695 214	711-141	14.3000	711-141	14.3000	711-141	14.3000	COM
696 214	712-142	14.3000	712-142	14.3000	712-142	14.3000	COM
* Subsubtotal *		85.8000		85.8000		85.8000	

501205

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00499								
00499	034	174-828	16.4000	174-828	16.4000	174-828	16.4000	COM
500	034	173-829	16.4500	173-829	16.4500	173-829	16.4500	COM
501	034	174-828	16.4000	174-828	16.4000	174-828	16.4000	COM
502	034	173-829	16.4500	173-829	16.4500	173-829	16.4500	COM
503	034	174-828	16.4000	174-828	16.4000	174-828	16.4000	COM
504	034	173-829	16.4500	173-829	16.4500	173-829	16.4500	COM
* Subsubtotal *			98.5500		98.5500		98.5500	
* Sail Line YOL-00751								
00751	214	673-155	13.0000	673-155	13.0000	673-155	13.0000	COM
752	214	672-156	12.9500	672-156	12.9500	672-156	12.9500	COM
753	214	673-155	13.0000	673-155	13.0000	673-155	13.0000	COM
754	214	672-156	12.9500	672-156	12.9500	672-156	12.9500	COM
755	214	673-155	13.0000	673-155	13.0000	673-155	13.0000	COM
756	214	672-156	12.9500	672-156	12.9500	672-156	12.9500	COM
* Subsubtotal *			77.8500		77.8500		77.8500	
* Sail Line YOL-00451								
00451	034	162-828	16.7000	162-828	16.7000	162-828	16.7000	COM
452	034	161-829	16.7500	161-829	16.7500	161-829	16.7500	COM
453	034	162-828	16.7000	162-828	16.7000	162-828	16.7000	COM
454	034	161-829	16.7500	161-829	16.7500	161-829	16.7500	COM
455	034	162-828	16.7000	162-828	16.7000	162-828	16.7000	COM
456	034	161-829	16.7500	161-829	16.7500	161-829	16.7500	COM
* Subsubtotal *			100.3500		100.3500		100.3500	
* Sail Line YOL-00697								
00697	214	709-151	14.0000	709-151	14.0000	709-151	14.0000	LCC
698	214	708-150	14.0000	708-150	14.0000	708-150	14.0000	LCC
699	214	709-151	14.0000	709-151	14.0000	709-151	14.0000	LCC
700	214	708-150	14.0000	708-150	14.0000	708-150	14.0000	LCC
701	214	709-151	14.0000	709-151	14.0000	709-151	14.0000	LCC
702	214	708-150	14.0000	708-150	14.0000	708-150	14.0000	LCC
* Subsubtotal *			84.0000		84.0000		84.0000	
* Sail Line YOL-00469								
00469	034	166-828	16.6000	166-828	16.6000	166-828	16.6000	COM
470	034	165-829	16.6500	165-829	16.6500	165-829	16.6500	COM
471	034	166-828	16.6000	166-828	16.6000	166-828	16.6000	COM
472	034	165-829	16.6500	165-829	16.6500	165-829	16.6500	COM
473	034	166-828	16.6000	166-828	16.6000	166-828	16.6000	COM
474	034	165-829	16.6500	165-829	16.6500	165-829	16.6500	COM
* Subsubtotal *			99.7500		99.7500		99.7500	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00661								
00661	214	731-513	5.5000	731-513	5.5000	731-513	5.5000	MSP
662	214	732-512	5.5500	732-512	5.5500	732-512	5.5500	MSP
663	214	731-513	5.5000	731-513	5.5000	731-513	5.5000	MSP
664	214	732-512	5.5500	732-512	5.5500	732-512	5.5500	MSP
665	214	731-513	5.5000	731-513	5.5000	731-513	5.5000	MSP
666	214	732-512	5.5500	732-512	5.5500	732-512	5.5500	MSP
** Subtotal **			623.8500		623.8500		623.8500	
** Date 26/02/94								
00661	214	511-133	9.5000	511-133	9.5000	511-133	9.5000	COM
662	214	510-134	9.4500	510-134	9.4500	510-134	9.4500	COM
663	214	511-133	9.5000	511-133	9.5000	511-133	9.5000	COM
664	214	510-134	9.4500	510-134	9.4500	510-134	9.4500	COM
665	214	511-133	9.5000	511-133	9.5000	511-133	9.5000	COM
666	214	510-134	9.4500	510-134	9.4500	510-134	9.4500	COM
* Subsubtotal *			90.0000		90.0000		90.0000	
* Sail Line YOL-00403								
00403	034	150-828	17.0000	150-828	17.0000	150-828	17.0000	COM
404	034	149-829	17.0500	149-829	17.0500	149-829	17.0500	COM
405	034	150-828	17.0000	150-828	17.0000	150-828	17.0000	COM
406	034	149-829	17.0500	149-829	17.0500	149-829	17.0500	COM
407	034	150-828	17.0000	150-828	17.0000	150-828	17.0000	COM
408	034	149-829	17.0500	149-829	17.0500	149-829	17.0500	COM
* Subsubtotal *			102.1500		102.1500		102.1500	
* Sail Line YOL-00703								
00703	214	705-143	14.1000	705-143	14.1000	705-143	14.1000	COM
704	214	704-144	14.0500	704-144	14.0500	704-144	14.0500	COM
705	214	705-143	14.1000	705-143	14.1000	705-143	14.1000	COM
706	214	704-144	14.0500	704-144	14.0500	704-144	14.0500	COM
707	214	705-143	14.1000	705-143	14.1000	705-143	14.1000	COM
708	214	704-144	14.0500	704-144	14.0500	704-144	14.0500	COM
* Subsubtotal *			84.4500		84.4500		84.4500	
** Subtotal **			243.4500		243.4500		243.4500	
** Date 27/02/94								
* Sail Line YOL-00775								
00775	214	657-161	12.4500	657-161	12.4500	657-161	12.4500	COM
776	214	656-160	12.4500	656-160	12.4500	656-160	12.4500	COM
777	214	657-161	12.4500	657-161	12.4500	657-161	12.4500	COM
778	214	656-160	12.4500	656-160	12.4500	656-160	12.4500	COM
779	214	657-161	12.4500	657-161	12.4500	657-161	12.4500	COM
780	214	656-160	12.4500	656-160	12.4500	656-160	12.4500	COM
* Subsubtotal *			74.7000		74.7000		74.7000	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00445								
00445	034	160-828	16.7500	160-828	16.7500	160-828	16.7500	COM
446	034	161-829	16.7500	161-829	16.7500	161-829	16.7500	COM
447	034	160-828	16.7500	160-828	16.7500	160-828	16.7500	COM
448	034	161-829	16.7500	161-829	16.7500	161-829	16.7500	COM
449	034	160-828	16.7500	160-828	16.7500	160-828	16.7500	COM
450	034	161-829	16.7500	161-829	16.7500	161-829	16.7500	COM
* Subsubtotal *			100.5000		100.5000		100.5000	
* Sail Line YOL-00739								
00739	214	681-153	13.2500	681-153	13.2500	681-153	13.2500	COM
740	214	680-152	13.2500	680-152	13.2500	680-152	13.2500	COM
741	214	681-153	13.2500	681-153	13.2500	681-153	13.2500	COM
742	214	680-152	13.2500	680-152	13.2500	680-152	13.2500	COM
743	214	681-153	13.2500	681-153	13.2500	681-153	13.2500	COM
744	214	680-152	13.2500	680-152	13.2500	680-152	13.2500	COM
* Subsubtotal *			79.5000		79.5000		79.5000	
* Sail Line YOL-00463								
00463	034	164-828	16.6500	164-828	16.6500	164-828	16.6500	COM
464	034	165-829	16.6500	165-829	16.6500	165-829	16.6500	COM
465	034	164-828	16.6500	164-828	16.6500	164-828	16.6500	COM
466	034	165-829	16.6500	165-829	16.6500	165-829	16.6500	COM
467	034	164-828	16.6500	164-828	16.6500	164-828	16.6500	COM
468	034	165-829	16.6500	165-829	16.6500	165-829	16.6500	COM
* Subsubtotal *			99.9000		99.9000		99.9000	
** Subtotal **			354.6000		354.6000		354.6000	
** Date 02/03/94								
* Sail Line YOL-00535								
00535	034	182-828	16.2000	182-828	16.2000	182-828	16.2000	COM
536	034	181-829	16.2500	181-829	16.2500	181-829	16.2500	COM
537	034	182-828	16.2000	182-828	16.2000	182-828	16.2000	COM
538	034	181-829	16.2500	181-829	16.2500	181-829	16.2500	COM
539	034	182-828	16.2000	182-828	16.2000	182-828	16.2000	COM
540	034	181-829	16.2500	181-829	16.2500	181-829	16.2500	COM
* Subsubtotal *			97.3500		97.3500		97.3500	
* Sail Line YOL-00781								
00781	214	653-163	12.3000	653-163	12.3000	653-163	12.3000	COM
782	214	652-162	12.3000	652-162	12.3000	652-162	12.3000	COM
783	214	653-163	12.3000	653-163	12.3000	653-163	12.3000	COM
784	214	652-162	12.3000	652-162	12.3000	652-162	12.3000	COM
785	214	653-163	12.3000	653-163	12.3000	653-163	12.3000	COM
786	214	652-162	12.3000	652-162	12.3000	652-162	12.3000	COM
* Subsubtotal *			73.8000		73.8000		73.8000	

* Sail Line YOL-00505									
00505	034	174-828	16.4000	174-828	16.4000	174-828	16.4000	COM	
506	034	175-829	16.4000	175-829	16.4000	175-829	16.4000	COM	
507	034	174-828	16.4000	174-828	16.4000	174-828	16.4000	COM	
508	034	175-829	16.4000	175-829	16.4000	175-829	16.4000	COM	
509	034	174-828	16.4000	174-828	16.4000	174-828	16.4000	COM	
510	034	175-829	16.4000	175-829	16.4000	175-829	16.4000	COM	
* Subsubtotal *									
			98.4000		98.4000		98.4000		
** Subtotal **									
			269.5500		269.5500		269.5500		

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
** Date 03/03/94								
* Sail Line YOL-00847								
00847	214	609-179	10.8000	609-179	10.8000	609-179	10.8000	COM
848	214	608-178	10.8000	608-178	10.8000	608-178	10.8000	COM
849	214	609-179	10.8000	609-179	10.8000	609-179	10.8000	COM
850	214	608-178	10.8000	608-178	10.8000	608-178	10.8000	COM
851	214	609-179	10.8000	609-179	10.8000	609-179	10.8000	COM
852	214	608-178	10.8000	608-178	10.8000	608-178	10.8000	COM
* Subsubtotal *								
			64.8000		64.8000		64.8000	
* Sail Line YOL-00511								
00511	034	176-828	16.3500	176-828	16.3500	176-828	16.3500	COM
512	034	175-829	16.4000	175-829	16.4000	175-829	16.4000	COM
513	034	176-828	16.3500	176-828	16.3500	176-828	16.3500	COM
514	034	175-829	16.4000	175-829	16.4000	175-829	16.4000	COM
515	034	176-828	16.3500	176-828	16.3500	176-828	16.3500	COM
516	034	175-829	16.4000	175-829	16.4000	175-829	16.4000	COM
* Subsubtotal *								
			98.2500		98.2500		98.2500	
* Sail Line YOL-00745								
00745	214	677-153	13.1500	677-153	13.1500	677-153	13.1500	COM
746	214	676-154	13.1000	676-154	13.1000	676-154	13.1000	COM
747	214	677-153	13.1500	677-153	13.1500	677-153	13.1500	COM
748	214	676-154	13.1000	676-154	13.1000	676-154	13.1000	COM
749	214	677-153	13.1500	677-153	13.1500	677-153	13.1500	COM
750	214	676-154	13.1000	676-154	13.1000	676-154	13.1000	COM
* Subsubtotal *								
			78.7500		78.7500		78.7500	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00457								
00457	034	162-828	16.7000	162-828	16.7000	162-828	16.7000	COM
458	034	163-829	16.7000	163-829	16.7000	163-829	16.7000	COM
459	034	162-828	16.7000	162-828	16.7000	162-828	16.7000	COM
460	034	163-829	16.7000	163-829	16.7000	163-829	16.7000	COM
461	034	162-828	16.7000	162-828	16.7000	162-828	16.7000	COM
462	034	163-829	16.7000	163-829	16.7000	163-829	16.7000	COM
* Subsubtotal *			100.2000		100.2000		100.2000	
* Sail Line YOL-00769								
00769	214	661-159	12.6000	661-159	12.6000	661-159	12.6000	COM
770	214	660-160	12.5500	660-160	12.5500	660-160	12.5500	COM
771	214	661-159	12.6000	661-159	12.6000	661-159	12.6000	COM
772	214	660-160	12.5500	660-160	12.5500	660-160	12.5500	COM
773	214	661-159	12.6000	661-159	12.6000	661-159	12.6000	COM
774	214	660-160	12.5500	660-160	12.5500	660-160	12.5500	COM
* Subsubtotal *			75.4500		75.4500		75.4500	
** Subtotal **			417.4500		417.4500		417.4500	
** Date 04/03/94								
* Sail Line YOL-00565								
00565	034	188-828	16.0500	188-828	16.0500	188-828	16.0500	COM
566	034	189-829	16.0500	189-829	16.0500	189-829	16.0500	COM
567	034	188-828	16.0500	188-828	16.0500	188-828	16.0500	COM
568	034	189-829	16.0500	189-829	16.0500	189-829	16.0500	COM
569	034	188-828	16.0500	188-828	16.0500	188-828	16.0500	COM
570	034	189-829	16.0500	189-829	16.0500	189-829	16.0500	COM
* Subsubtotal *			96.3000		96.3000		96.3000	
* Sail Line YOL-00655								
00655	214	735-133	15.1000	735-133	15.1000	735-133	15.1000	COM
656	214	734-132	15.1000	734-132	15.1000	734-132	15.1000	COM
657	214	735-133	15.1000	735-133	15.1000	735-133	15.1000	COM
658	214	734-132	15.1000	734-132	15.1000	734-132	15.1000	COM
659	214	735-133	15.1000	735-133	15.1000	735-133	15.1000	COM
660	214	734-132	15.1000	734-132	15.1000	734-132	15.1000	COM
* Subsubtotal *			90.6000		90.6000		90.6000	
* Sail Line YOL-00529								
00529	034	180-828	16.2500	180-828	16.2500	180-828	16.2500	COM
530	034	181-829	16.2500	181-829	16.2500	181-829	16.2500	COM
531	034	180-828	16.2500	180-828	16.2500	180-828	16.2500	COM
532	034	181-829	16.2500	181-829	16.2500	181-829	16.2500	COM
533	034	180-828	16.2500	180-828	16.2500	180-828	16.2500	COM
534	034	181-829	16.2500	181-829	16.2500	181-829	16.2500	COM
* Subsubtotal *			97.5000		97.5000		97.5000	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00763								
00763	214	665-159	12.7000	665-159	12.7000	665-159	12.7000	COM
764	214	664-158	12.7000	664-158	12.7000	664-158	12.7000	COM
765	214	665-159	12.7000	665-159	12.7000	665-159	12.7000	COM
766	214	664-158	12.7000	664-158	12.7000	664-158	12.7000	COM
767	214	665-159	12.7000	665-159	12.7000	665-159	12.7000	COM
768	214	664-158	12.7000	664-158	12.7000	664-158	12.7000	COM
* Subsubtotal *			76.2000		76.2000		76.2000	
* Sail Line YOL-00439								
00439	034	158-828	16.8000	158-828	16.8000	158-828	16.8000	COM
440	034	159-829	16.8000	159-829	16.8000	159-829	16.8000	COM
441	034	158-828	16.8000	158-828	16.8000	158-828	16.8000	COM
442	034	159-829	16.8000	159-829	16.8000	159-829	16.8000	COM
443	034	158-828	16.8000	158-828	16.8000	158-828	16.8000	COM
444	034	159-829	16.8000	159-829	16.8000	159-829	16.8000	COM
* Subsubtotal *			100.8000		100.8000		100.8000	
* Sail Line YOL-00757								
00757	214	669-157	12.8500	669-157	12.8500	669-157	12.8500	COM
758	214	668-156	12.8500	668-156	12.8500	668-156	12.8500	COM
759	214	669-157	12.8500	669-157	12.8500	669-157	12.8500	COM
760	214	668-156	12.8500	668-156	12.8500	668-156	12.8500	COM
761	214	669-157	12.8500	669-157	12.8500	669-157	12.8500	COM
762	214	668-156	12.8500	668-156	12.8500	668-156	12.8500	COM
* Subsubtotal *			77.1000		77.1000		77.1000	
* Sail Line YOL-00541								
00541	034	184-828	16.1500	184-828	16.1500	184-828	16.1500	COM
542	034	183-829	16.2000	183-829	16.2000	183-829	16.2000	COM
543	034	184-828	16.1500	184-828	16.1500	184-828	16.1500	COM
544	034	183-829	16.2000	183-829	16.2000	183-829	16.2000	COM
545	034	184-828	16.1500	184-828	16.1500	184-828	16.1500	COM
546	034	183-829	16.2000	183-829	16.2000	183-829	16.2000	COM
* Subsubtotal *			97.0500		97.0500		97.0500	
** Subtotal **			635.5500		635.5500		635.5500	
** Date 05/03/94								
* Sail Line YOL-00805								
00805	214	637-169	11.7500	637-169	11.7500	637-169	11.7500	COM
806	214	636-168	11.7500	636-168	11.7500	636-168	11.7500	COM
807	214	637-169	11.7500	637-169	11.7500	637-169	11.7500	COM
808	214	636-168	11.7500	636-168	11.7500	636-168	11.7500	COM
809	214	637-169	11.7500	637-169	11.7500	637-169	11.7500	COM
810	214	636-168	11.7500	636-168	11.7500	636-168	11.7500	COM
* Subsubtotal *			70.5000		70.5000		70.5000	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00571								
00571	034	190-828	16.0000	190-828	16.0000	190-828	16.0000	COM
572	034	191-829	16.0000	191-829	16.0000	191-829	16.0000	COM
573	034	190-828	16.0000	190-828	16.0000	190-828	16.0000	COM
574	034	191-829	16.0000	191-829	16.0000	191-829	16.0000	COM
575	034	190-828	16.0000	190-828	16.0000	190-828	16.0000	COM
576	034	191-829	16.0000	191-829	16.0000	191-829	16.0000	COM
* Subsubtotal *			96.0000		96.0000		96.0000	
* Sail Line YOL-00787								
00787	214	649-163	12.2000	649-163	12.2000	649-163	12.2000	COM
788	214	648-164	12.1500	648-164	12.1500	648-164	12.1500	COM
789	214	649-163	12.2000	649-163	12.2000	649-163	12.2000	COM
790	214	648-164	12.1500	648-164	12.1500	648-164	12.1500	COM
791	214	649-163	12.2000	649-163	12.2000	649-163	12.2000	COM
792	214	648-164	12.1500	648-164	12.1500	648-164	12.1500	COM
* Subsubtotal *			73.0500		73.0500		73.0500	
* Sail Line YOL-00523								
00523	034	178-828	16.3000	178-828	16.3000	178-828	16.3000	COM
524	034	179-829	16.3000	179-829	16.3000	179-829	16.3000	COM
525	034	178-828	16.3000	178-828	16.3000	178-828	16.3000	COM
526	034	179-829	16.3000	179-829	16.3000	179-829	16.3000	COM
527	034	178-828	16.3000	178-828	16.3000	178-828	16.3000	COM
528	034	179-829	16.3000	179-829	16.3000	179-829	16.3000	COM
* Subsubtotal *			97.8000		97.8000		97.8000	
** Subtotal **			337.3500		337.3500		337.3500	
** Date 06/03/94								
* Sail Line YOL-00517								
00517	034	178-828	16.3000	178-828	16.3000	178-828	16.3000	COM
518	034	177-829	16.3500	177-829	16.3500	177-829	16.3500	COM
519	034	178-828	16.3000	178-828	16.3000	178-828	16.3000	COM
520	034	177-829	16.3500	177-829	16.3500	177-829	16.3500	COM
521	034	178-828	16.3000	178-828	16.3000	178-828	16.3000	COM
522	034	177-829	16.3500	177-829	16.3500	177-829	16.3500	COM
* Subsubtotal *			97.9500		97.9500		97.9500	
* Sail Line YOL-00799								
00799	214	641-167	11.9000	641-167	11.9000	641-167	11.9000	COM
800	214	640-166	11.9000	640-166	11.9000	640-166	11.9000	COM
801	214	641-167	11.9000	641-167	11.9000	641-167	11.9000	COM
802	214	640-166	11.9000	640-166	11.9000	640-166	11.9000	COM
803	214	641-167	11.9000	641-167	11.9000	641-167	11.9000	COM
804	214	640-166	11.9000	640-166	11.9000	640-166	11.9000	COM
* Subsubtotal *			71.4000		71.4000		71.4000	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00559								
00559	034	188-828	16.0500	188-828	16.0500	188-828	16.0500	COM
560	034	187-829	16.1000	187-829	16.1000	187-829	16.1000	COM
561	034	188-828	16.0500	188-828	16.0500	188-828	16.0500	COM
562	034	187-829	16.1000	187-829	16.1000	187-829	16.1000	COM
563	034	188-828	16.0500	188-828	16.0500	188-828	16.0500	COM
564	034	187-829	16.1000	187-829	16.1000	187-829	16.1000	COM
* Subsubtotal *			96.4500		96.4500		96.4500	
* Sail Line YOL-00793								
00793	214	645-165	12.0500	645-165	12.0500	645-165	12.0500	COM
794	214	644-166	12.0000	644-166	12.0000	644-166	12.0000	COM
795	214	645-165	12.0500	645-165	12.0500	645-165	12.0500	COM
796	214	644-166	12.0000	644-166	12.0000	644-166	12.0000	COM
797	214	645-165	12.0500	645-165	12.0500	645-165	12.0500	COM
798	214	644-166	12.0000	644-166	12.0000	644-166	12.0000	COM
* Subsubtotal *			72.1500		72.1500		72.1500	
** Subtotal **			337.9500		337.9500		337.9500	
** Date 07/03/94								
* Sail Line YOL-00547								
00547	034	184-828	16.1500	184-828	16.1500	184-828	16.1500	COM
548	034	185-829	16.1500	185-829	16.1500	185-829	16.1500	COM
549	034	184-828	16.1500	184-828	16.1500	184-828	16.1500	COM
550	034	185-829	16.1500	185-829	16.1500	185-829	16.1500	COM
551	034	184-828	16.1500	184-828	16.1500	184-828	16.1500	COM
552	034	185-829	16.1500	185-829	16.1500	185-829	16.1500	COM
* Subsubtotal *			96.9000		96.9000		96.9000	
* Sail Line YOL-00811								
00811	214	614-170	11.1500	614-170	11.1500	614-170	11.1500	TBC
812	214	613-169	11.1500	613-169	11.1500	613-169	11.1500	TBC
813	214	614-170	11.1500	614-170	11.1500	614-170	11.1500	TBC
814	214	613-169	11.1500	613-169	11.1500	613-169	11.1500	TBC
815	214	614-170	11.1500	614-170	11.1500	614-170	11.1500	TBC
816	214	613-169	11.1500	613-169	11.1500	613-169	11.1500	TBC
* Subsubtotal *			66.9000		66.9000		66.9000	
* Sail Line YOL-00595								
00595	034	196-828	15.8500	196-828	15.8500	196-828	15.8500	COM
596	034	197-829	15.8500	197-829	15.8500	197-829	15.8500	COM
597	034	196-828	15.8500	196-828	15.8500	196-828	15.8500	COM
598	034	197-829	15.8500	197-829	15.8500	197-829	15.8500	COM
599	034	196-828	15.8500	196-828	15.8500	196-828	15.8500	COM
600	034	197-829	15.8500	197-829	15.8500	197-829	15.8500	COM
* Subsubtotal *			95.1000		95.1000		95.1000	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00853								
00853	214	605-179	10.7000	605-179	10.7000	605-179	10.7000	COM
854	214	604-180	10.6500	604-180	10.6500	604-180	10.6500	COM
855	214	605-179	10.7000	605-179	10.7000	605-179	10.7000	COM
856	214	604-180	10.6500	604-180	10.6500	604-180	10.6500	COM
857	214	605-179	10.7000	605-179	10.7000	605-179	10.7000	COM
858	214	604-180	10.6500	604-180	10.6500	604-180	10.6500	COM
* Subsubtotal *			64.0500		64.0500		64.0500	
* Sail Line YOL-00589								
00589	034	194-828	15.9000	194-828	15.9000	194-828	15.9000	COM
590	034	195-829	15.9000	195-829	15.9000	195-829	15.9000	COM
591	034	194-828	15.9000	194-828	15.9000	194-828	15.9000	COM
592	034	195-829	15.9000	195-829	15.9000	195-829	15.9000	COM
593	034	194-828	15.9000	194-828	15.9000	194-828	15.9000	COM
594	034	195-829	15.9000	195-829	15.9000	195-829	15.9000	COM
* Subsubtotal *			95.4000		95.4000		95.4000	
* Sail Line YOL-00817								
00817	214	629-171	11.5000	629-171	11.5000	629-171	11.5000	COM
818	214	628-170	11.5000	628-170	11.5000	628-170	11.5000	COM
819	214	629-171	11.5000	629-171	11.5000	629-171	11.5000	COM
820	214	628-170	11.5000	628-170	11.5000	628-170	11.5000	COM
821	214	629-171	11.5000	629-171	11.5000	629-171	11.5000	COM
822	214	628-170	11.5000	628-170	11.5000	628-170	11.5000	COM
* Subsubtotal *			69.0000		69.0000		69.0000	
* Sail Line YOL-00601								
00601	034	198-828	15.8000	198-828	15.8000	198-828	15.8000	COM
602	034	197-829	15.8500	197-829	15.8500	197-829	15.8500	COM
603	034	198-828	15.8000	198-828	15.8000	198-828	15.8000	COM
604	034	197-829	15.8500	197-829	15.8500	197-829	15.8500	COM
605	034	198-828	15.8000	198-828	15.8000	198-828	15.8000	COM
606	034	197-829	15.8500	197-829	15.8500	197-829	15.8500	COM
* Subsubtotal *			94.9500		94.9500		94.9500	
* Sail Line YOL-00841								
00841	214	613-173	11.0500	613-173	11.0500	613-173	11.0500	COM
842	214	612-172	11.0500	612-172	11.0500	612-172	11.0500	COM
843	214	613-173	11.0500	613-173	11.0500	613-173	11.0500	COM
844	214	612-172	11.0500	612-172	11.0500	612-172	11.0500	COM
845	214	613-173	11.0500	613-173	11.0500	613-173	11.0500	COM
846	214	612-172	11.0500	612-172	11.0500	612-172	11.0500	COM
* Subsubtotal *			66.3000		66.3000		66.3000	
** Subtotal **			648.6000		648.6000		648.6000	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
** Date 08/03/94								
* Sail Line YOL-00553								
00553	034	186-828	16.1000	186-828	16.1000	186-828	16.1000	COM
554	034	187-829	16.1000	187-829	16.1000	187-829	16.1000	COM
555	034	186-828	16.1000	186-828	16.1000	186-828	16.1000	COM
556	034	187-829	16.1000	187-829	16.1000	187-829	16.1000	COM
557	034	186-828	16.1000	186-828	16.1000	186-828	16.1000	COM
558	034	187-829	16.1000	187-829	16.1000	187-829	16.1000	COM
* Subsubtotal *			96.6000		96.6000		96.6000	
* Sail Line YOL-00649								
00649	214	739-131	15.2500	739-131	15.2500	739-131	15.2500	COM
650	214	740-132	15.2500	740-132	15.2500	740-132	15.2500	COM
651	214	739-131	15.2500	739-131	15.2500	739-131	15.2500	COM
652	214	740-132	15.2500	740-132	15.2500	740-132	15.2500	COM
653	214	739-131	15.2500	739-131	15.2500	739-131	15.2500	COM
654	214	740-132	15.2500	740-132	15.2500	740-132	15.2500	COM
* Subsubtotal *			91.5000		91.5000		91.5000	
* Sail Line YOL-00607								
00607	034	198-828	15.8000	198-828	15.8000	198-828	15.8000	COM
608	034	199-829	15.8000	199-829	15.8000	199-829	15.8000	COM
609	034	198-828	15.8000	198-828	15.8000	198-828	15.8000	COM
610	034	199-829	15.8000	199-829	15.8000	199-829	15.8000	COM
611	034	198-828	15.8000	198-828	15.8000	198-828	15.8000	COM
612	034	199-829	15.8000	199-829	15.8000	199-829	15.8000	COM
* Subsubtotal *			94.8000		94.8000		94.8000	
* Sail Line YOL-00859								
00859	214	601-189	10.3500	601-189	10.3500	601-189	10.3500	COM
860	214	600-188	10.3500	600-188	10.3500	600-188	10.3500	COM
861	214	601-189	10.3500	601-189	10.3500	601-189	10.3500	COM
862	214	600-188	10.3500	600-188	10.3500	600-188	10.3500	COM
863	214	601-189	10.3500	601-189	10.3500	601-189	10.3500	COM
864	214	600-188	10.3500	600-188	10.3500	600-188	10.3500	COM
* Subsubtotal *			62.1000		62.1000		62.1000	
* Sail Line YOL-00583								
00583	034	194-828	15.9000	194-828	15.9000	194-828	15.9000	COM
584	034	193-829	15.9500	193-829	15.9500	193-829	15.9500	COM
585	034	194-828	15.9000	194-828	15.9000	194-828	15.9000	COM
586	034	193-829	15.9500	193-829	15.9500	193-829	15.9500	COM
587	034	194-828	15.9000	194-828	15.9000	194-828	15.9000	COM
588	034	193-829	15.9500	193-829	15.9500	193-829	15.9500	COM
* Subsubtotal *			95.5500		95.5500		95.5500	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00643								
00643	214	743-129	15.4000	743-129	15.4000	743-129	15.4000	COM
644	214	744-130	15.4000	744-130	15.4000	744-130	15.4000	COM
645	214	743-129	15.4000	743-129	15.4000	743-129	15.4000	COM
646	214	744-130	15.4000	744-130	15.4000	744-130	15.4000	COM
647	214	743-129	15.4000	743-129	15.4000	743-129	15.4000	COM
648	214	744-130	15.4000	744-130	15.4000	744-130	15.4000	COM
* Subsubtotal *			92.4000		92.4000		92.4000	
* Sail Line YOL-00613								
00613	034	200-828	15.7500	200-828	15.7500	200-828	15.7500	COM
614	034	201-829	15.7500	201-829	15.7500	201-829	15.7500	COM
615	034	200-828	15.7500	200-828	15.7500	200-828	15.7500	COM
616	034	201-829	15.7500	201-829	15.7500	201-829	15.7500	COM
617	034	200-828	15.7500	200-828	15.7500	200-828	15.7500	COM
618	034	201-829	15.7500	201-829	15.7500	201-829	15.7500	COM
* Subsubtotal *			94.5000		94.5000		94.5000	
** Subtotal **			627.4500		627.4500		627.4500	
** Date 09/03/94								
* Sail Line YOL-00823								
00823	214	625-173	11.3500	625-173	11.3500	625-173	11.3500	COM
824	214	624-172	11.3500	624-172	11.3500	624-172	11.3500	COM
825	214	625-173	11.3500	625-173	11.3500	625-173	11.3500	COM
826	214	624-172	11.3500	624-172	11.3500	624-172	11.3500	COM
827	214	625-173	11.3500	625-173	11.3500	625-173	11.3500	COM
828	214	624-172	11.3500	624-172	11.3500	624-172	11.3500	COM
* Subsubtotal *			68.1000		68.1000		68.1000	
* Sail Line YOL-00577								
00577	034	192-828	15.9500	192-828	15.9500	192-828	15.9500	COM
578	034	191-829	16.0000	191-829	16.0000	191-829	16.0000	COM
579	034	192-828	15.9500	192-828	15.9500	192-828	15.9500	COM
580	034	191-829	16.0000	191-829	16.0000	191-829	16.0000	COM
581	034	192-828	15.9500	192-828	15.9500	192-828	15.9500	COM
582	034	191-829	16.0000	191-829	16.0000	191-829	16.0000	COM
* Subsubtotal *			95.8500		95.8500		95.8500	
* Sail Line YOL-00835								
00835	214	617-175	11.1000	617-175	11.1000	617-175	11.1000	COM
836	214	616-176	11.0500	616-176	11.0500	616-176	11.0500	COM
837	214	617-175	11.1000	617-175	11.1000	617-175	11.1000	COM
838	214	616-176	11.0500	616-176	11.0500	616-176	11.0500	COM
839	214	617-175	11.1000	617-175	11.1000	617-175	11.1000	COM
840	214	616-176	11.0500	616-176	11.0500	616-176	11.0500	COM
* Subsubtotal *			66.4500		66.4500		66.4500	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-00619								
00619	034	202-828	15.7000	202-828	15.7000	202-828	15.7000	COM
620	034	201-829	15.7500	201-829	15.7500	201-829	15.7500	COM
621	034	202-828	15.7000	202-828	15.7000	202-828	15.7000	COM
622	034	201-829	15.7500	201-829	15.7500	201-829	15.7500	COM
623	034	202-828	15.7000	202-828	15.7000	202-828	15.7000	COM
624	034	201-829	15.7500	201-829	15.7500	201-829	15.7500	COM
* Subsubtotal *			94.3500		94.3500		94.3500	
* Sail Line YOL-00829								
00829	214	621-173	11.2500	621-173	11.2500	621-173	11.2500	COM
830	214	620-174	11.2000	620-174	11.2000	620-174	11.2000	COM
831	214	621-173	11.2500	621-173	11.2500	621-173	11.2500	COM
832	214	620-174	11.2000	620-174	11.2000	620-174	11.2000	COM
833	214	621-173	11.2500	621-173	11.2500	621-173	11.2500	COM
834	214	620-174	11.2000	620-174	11.2000	620-174	11.2000	COM
* Subsubtotal *			67.3500		67.3500		67.3500	
* Sail Line YOL-00631								
00631	034	204-828	15.6500	234-828	14.9000	234-828	14.9000	TBC
632	034	205-829	15.6500	233-829	14.9500	233-829	14.9500	TBC
633	034	204-828	15.6500	234-828	14.9000	234-828	14.9000	TBC
634	034	205-829	15.6500	233-829	14.9500	233-829	14.9500	TBC
635	034	204-828	15.6500	234-828	14.9000	234-828	14.9000	TBC
636	034	205-829	15.6500	233-829	14.9500	233-829	14.9500	TBC
* Subsubtotal *			93.9000		89.5500		89.5500	
* Sail Line YOL-00637								
00637	214	747-129	15.5000	747-129	15.5000	747-129	15.5000	COM
638	214	748-128	15.5500	748-128	15.5500	748-128	15.5500	COM
639	214	747-129	15.5000	747-129	15.5000	747-129	15.5000	COM
640	214	748-128	15.5500	748-128	15.5500	748-128	15.5500	COM
641	214	747-129	15.5000	747-129	15.5000	747-129	15.5000	COM
642	214	748-128	15.5500	748-128	15.5500	748-128	15.5500	COM
* Subsubtotal *			93.1500		93.1500		93.1500	
** Subtotal **			579.1500		574.8000		574.8000	
** Date 10/03/94								
* Sail Line YOL-00625								
00625	214	203-829	15.7000	203-829	15.7000	203-829	15.7000	COM
626	214	204-828	15.6500	204-828	15.6500	204-828	15.6500	COM
627	214	203-829	15.7000	203-829	15.7000	203-829	15.7000	COM
628	214	204-828	15.6500	204-828	15.6500	204-828	15.6500	COM
629	214	203-829	15.7000	203-829	15.7000	203-829	15.7000	COM
630	214	204-828	15.6500	204-828	15.6500	204-828	15.6500	COM
* Subsubtotal *			94.0500		94.0500		94.0500	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-01187								
01187	214	509-41	11.7500	509-41	11.7500	0-0	0.0000	COM
1188	214	510-40	11.8000	510-40	11.8000	0-0	0.0000	COM
1189	214	509-41	11.7500	509-41	11.7500	0-0	0.0000	COM
1190	214	510-40	11.8000	510-40	11.8000	0-0	0.0000	COM
1191	214	509-41	11.7500	509-41	11.7500	0-0	0.0000	COM
1192	214	510-40	11.8000	510-40	11.8000	0-0	0.0000	COM
* Subsubtotal *			70.6500		70.6500		0.0000	
* Sail Line YOL-01367								
01367	034	150-810	16.5500	150-810	16.5500	0-0	0.0000	COM
1368	034	151-809	16.5000	151-809	16.5000	0-0	0.0000	COM
1369	034	150-810	16.5500	150-810	16.5500	0-0	0.0000	COM
1370	034	151-809	16.5000	151-809	16.5000	0-0	0.0000	COM
1371	034	150-810	16.5500	150-810	16.5500	0-0	0.0000	COM
1372	034	151-809	16.5000	151-809	16.5000	0-0	0.0000	COM
* Subsubtotal *			99.1500		99.1500		0.0000	
* Sail Line YOL-01133								
01133	214	409-41	9.2500	409-41	9.2500	0-0	0.0000	COM
1134	214	410-40	9.3000	410-40	9.3000	0-0	0.0000	COM
1135	214	409-41	9.2500	409-41	9.2500	0-0	0.0000	COM
1136	214	410-40	9.3000	410-40	9.3000	0-0	0.0000	COM
1137	214	409-41	9.2500	409-41	9.2500	0-0	0.0000	COM
1138	214	410-40	9.3000	410-40	9.3000	0-0	0.0000	COM
* Subsubtotal *			55.6500		55.6500		0.0000	
* Sail Line YOL-01145								
01145	214	399-39	9.0500	399-39	9.0500	0-0	0.0000	COM
1146	214	400-38	9.1000	400-38	9.1000	0-0	0.0000	COM
1147	214	399-39	9.0500	399-39	9.0500	0-0	0.0000	COM
1148	214	400-38	9.1000	400-38	9.1000	0-0	0.0000	COM
1149	214	399-39	9.0500	399-39	9.0500	0-0	0.0000	COM
1150	214	400-38	9.1000	400-38	9.1000	0-0	0.0000	COM
* Subsubtotal *			54.4500		54.4500		0.0000	
* Sail Line YOL-01349								
01349	034	140-370	5.8000	140-370	5.8000	0-0	0.0000	COM
1350	034	141-369	5.7500	141-369	5.7500	0-0	0.0000	COM
1351	034	140-370	5.8000	140-370	5.8000	0-0	0.0000	COM
1352	034	141-369	5.7500	141-369	5.7500	0-0	0.0000	COM
1353	034	140-370	5.8000	140-370	5.8000	0-0	0.0000	COM
1354	034	141-369	5.7500	141-369	5.7500	0-0	0.0000	COM
* Subsubtotal *			34.6500		34.6500		0.0000	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-10343								
10343	034	594-790	4.9500	594-790	4.9500	594-790	4.9500	COM
10344	034	595-789	4.9000	595-789	4.9000	595-789	4.9000	COM
10345	034	594-790	4.9500	594-790	4.9500	594-790	4.9500	COM
10346	034	595-789	4.9000	595-789	4.9000	595-789	4.9000	COM
10347	034	594-790	4.9500	594-790	4.9500	594-790	4.9500	COM
10348	034	595-789	4.9000	595-789	4.9000	595-789	4.9000	COM
* Subsubtotal *			29.5500		29.5500		29.5500	
* Sail Line YOL-01067								
01067	214	339-231	2.7500	339-231	2.7500	0-0	0.0000	MSP
1068	214	340-230	2.8000	340-230	2.8000	0-0	0.0000	MSP
1069	214	339-231	2.7500	339-231	2.7500	0-0	0.0000	MSP
1070	214	340-230	2.8000	340-230	2.8000	0-0	0.0000	MSP
1071	214	339-231	2.7500	339-231	2.7500	0-0	0.0000	MSP
1072	214	340-230	2.8000	340-230	2.8000	0-0	0.0000	MSP
** Subtotal **			454.8000		454.8000		123.6000	
** Date 11/03/94								
01067	214	229-41	4.7500	229-41	4.7500	0-0	0.0000	COM
1068	214	228-40	4.7500	228-40	4.7500	0-0	0.0000	COM
1069	214	229-41	4.7500	229-41	4.7500	0-0	0.0000	COM
1070	214	228-40	4.7500	228-40	4.7500	0-0	0.0000	COM
1071	214	229-41	4.7500	229-41	4.7500	0-0	0.0000	COM
1072	214	228-40	4.7500	228-40	4.7500	0-0	0.0000	COM
* Subsubtotal *			45.1500		45.1500		0.0000	
* Sail Line YOL-01343								
01343	034	140-780	16.0500	140-780	16.0500	0-0	0.0000	COM
1344	034	141-779	16.0000	141-779	16.0000	0-0	0.0000	COM
1345	034	140-780	16.0500	140-780	16.0500	0-0	0.0000	COM
1346	034	141-779	16.0000	141-779	16.0000	0-0	0.0000	COM
1347	034	140-780	16.0500	140-780	16.0500	0-0	0.0000	COM
1348	034	141-779	16.0000	141-779	16.0000	0-0	0.0000	COM
* Subsubtotal *			96.1500		96.1500		0.0000	
** Subtotal **			124.6500		124.6500		0.0000	
** Date 12/03/94								
* Sail Line YOL-01469								
01469	034	176-820	16.1500	176-820	16.1500	0-0	0.0000	COM
1470	034	175-819	16.1500	175-819	16.1500	0-0	0.0000	COM
1471	034	176-820	16.1500	176-820	16.1500	0-0	0.0000	COM
1472	034	175-819	16.1500	175-819	16.1500	0-0	0.0000	COM
1473	034	176-820	16.1500	176-820	16.1500	0-0	0.0000	COM
1474	034	175-819	16.1500	175-819	16.1500	0-0	0.0000	COM
* Subsubtotal *			96.9000		96.9000		0.0000	

Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-01115							
01115 214	419-81	8.5000	419-81	8.5000	0-0	0.0000	COM
1116 214	420-80	8.5500	420-80	8.5500	0-0	0.0000	COM
1117 214	419-81	8.5000	419-81	8.5000	0-0	0.0000	COM
1118 214	420-80	8.5500	420-80	8.5500	0-0	0.0000	COM
1119 214	419-81	8.5000	419-81	8.5000	0-0	0.0000	COM
1120 214	420-80	8.5500	420-80	8.5500	0-0	0.0000	COM
* Subsubtotal *		51.1500		51.1500		0.0000	
* Sail Line YOL-10319							
10319 034	302-380	2.0000	302-380	2.0000	0-0	0.0000	COM
10320 034	301-379	2.0000	301-379	2.0000	0-0	0.0000	COM
10321 034	302-380	2.0000	302-380	2.0000	302-380	2.0000	COM
10322 034	301-379	2.0000	301-379	2.0000	301-379	2.0000	COM
10323 034	302-380	2.0000	302-380	2.0000	0-0	0.0000	COM
10324 034	301-379	2.0000	301-379	2.0000	0-0	0.0000	COM
* Subsubtotal *		12.0000		12.0000		4.0000	
* Sail Line YOL-10091							
10091 214	183-33	3.8000	183-33	3.8000	183-33	3.8000	COM
10092 214	184-32	3.8500	184-32	3.8500	184-32	3.8500	COM
10093 214	183-33	3.8000	183-33	3.8000	183-33	3.8000	COM
10094 214	184-32	3.8500	184-32	3.8500	184-32	3.8500	COM
10095 214	183-33	3.8000	183-33	3.8000	183-33	3.8000	COM
10096 214	184-32	3.8500	184-32	3.8500	184-32	3.8500	COM
* Subsubtotal *		22.9500		22.9500		22.9500	
* Sail Line YOL-01421							
01421 034	300-824	13.1500	300-824	13.1500	0-0	0.0000	COM
1422 034	301-825	13.1500	301-825	13.1500	0-0	0.0000	COM
1423 034	300-824	13.1500	300-824	13.1500	0-0	0.0000	COM
1424 034	301-825	13.1500	301-825	13.1500	0-0	0.0000	COM
1425 034	300-824	13.1500	300-824	13.1500	0-0	0.0000	COM
1426 034	301-825	13.1500	301-825	13.1500	0-0	0.0000	COM
* Subsubtotal *		78.9000		78.9000		0.0000	
** Subtotal **		261.9000		261.9000		26.9500	
** Date 13/03/94							
* Sail Line YOL-01055							
01055 214	357-41	7.9500	357-41	7.9500	0-0	0.0000	COM
1056 214	358-40	8.0000	358-40	8.0000	0-0	0.0000	COM
1057 214	357-41	7.9500	357-41	7.9500	0-0	0.0000	COM
1058 214	358-40	8.0000	358-40	8.0000	0-0	0.0000	COM
1059 214	357-41	7.9500	357-41	7.9500	0-0	0.0000	COM
1060 214	358-40	8.0000	358-40	8.0000	0-0	0.0000	COM
* Subsubtotal *		47.8500		47.8500		0.0000	

Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-01451							
01451 034	170-820	16.3000	170-820	16.3000	0-0	0.0000	COM
1452 034	171-819	16.2500	171-819	16.2500	0-0	0.0000	COM
1453 034	170-820	16.3000	170-820	16.3000	0-0	0.0000	COM
1454 034	171-819	16.2500	171-819	16.2500	0-0	0.0000	COM
1455 034	170-820	16.3000	170-820	16.3000	0-0	0.0000	COM
1456 034	171-819	16.2500	171-819	16.2500	0-0	0.0000	COM
* Subsubtotal *							
		97.6500		97.6500		0.0000	
* Sail Line YOL-10109							
10109 214	405-375	0.8000	405-375	0.8000	0-0	0.0000	COM
10110 214	406-374	0.8500	406-374	0.8500	406-374	0.8500	COM
10111 214	405-375	0.8000	405-375	0.8000	0-0	0.0000	COM
10112 214	406-374	0.8500	406-374	0.8500	406-374	0.8500	COM
10113 214	405-375	0.8000	405-375	0.8000	0-0	0.0000	COM
10114 214	406-374	0.8500	406-374	0.8500	406-374	0.8500	COM
* Subsubtotal *							
		4.9500		4.9500		2.5500	
* Sail Line YOL-01085							
01085 214	183-41	3.6000	183-41	3.6000	0-0	0.0000	COM
1086 214	184-40	3.6500	184-40	3.6500	0-0	0.0000	COM
1087 214	183-41	3.6000	183-41	3.6000	0-0	0.0000	COM
1088 214	184-40	3.6500	184-40	3.6500	0-0	0.0000	COM
1089 214	183-41	3.6000	183-41	3.6000	0-0	0.0000	COM
1090 214	184-40	3.6500	184-40	3.6500	0-0	0.0000	COM
* Subsubtotal *							
		21.7500		21.7500		0.0000	
* Sail Line YOL-01439							
01439 034	170-544	9.4000	170-544	9.4000	0-0	0.0000	COM
1440 034	171-545	9.4000	171-545	9.4000	0-0	0.0000	COM
1441 034	170-544	9.4000	170-544	9.4000	0-0	0.0000	COM
1442 034	171-545	9.4000	171-545	9.4000	0-0	0.0000	COM
1443 034	170-544	9.4000	170-544	9.4000	0-0	0.0000	COM
1444 034	171-545	9.4000	171-545	9.4000	0-0	0.0000	COM
* Subsubtotal *							
		56.4000		56.4000		0.0000	
* Sail Line YOL-01679							
01679 214	449-141	7.7500	449-141	7.7500	0-0	0.0000	COM
1680 214	450-140	7.8000	450-140	7.8000	0-0	0.0000	COM
1681 214	449-141	7.7500	449-141	7.7500	0-0	0.0000	COM
1682 214	450-140	7.8000	450-140	7.8000	0-0	0.0000	COM
1683 214	449-141	7.7500	449-141	7.7500	0-0	0.0000	COM
1684 214	450-140	7.8000	450-140	7.8000	0-0	0.0000	COM
* Subsubtotal *							
		46.6500		46.6500		0.0000	

	Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-01487								
01487	034	170-820	16.3000	170-820	16.3000	0-0	0.0000	COM
1488	034	171-819	16.2500	171-819	16.2500	0-0	0.0000	COM
1489	034	170-820	16.3000	170-820	16.3000	0-0	0.0000	COM
1490	034	171-819	16.2500	171-819	16.2500	0-0	0.0000	COM
1491	034	170-820	16.3000	170-820	16.3000	0-0	0.0000	COM
1492	034	171-819	16.2500	171-819	16.2500	0-0	0.0000	COM
* Subsubtotal *			97.6500		97.6500		0.0000	
** Subtotal **			372.9000		372.9000		2.5500	
** Date 14/03/94								
* Sail Line YOL-01517								
01517	034	178-820	16.1000	178-820	16.1000	0-0	0.0000	COM
1518	034	177-819	16.1000	177-819	16.1000	0-0	0.0000	COM
1519	034	178-820	16.1000	178-820	16.1000	0-0	0.0000	COM
1520	034	177-819	16.1000	177-819	16.1000	0-0	0.0000	COM
1521	034	178-820	16.1000	178-820	16.1000	0-0	0.0000	COM
1522	034	177-819	16.1000	177-819	16.1000	0-0	0.0000	COM
* Subsubtotal *			96.6000		96.6000		0.0000	
* Sail Line YOL-01739								
01739	214	681-161	13.0500	681-161	13.0500	0-0	0.0000	COM
1740	214	680-160	13.0500	680-160	13.0500	0-0	0.0000	COM
1741	214	681-161	13.0500	681-161	13.0500	0-0	0.0000	COM
1742	214	680-160	13.0500	680-160	13.0500	0-0	0.0000	COM
1743	214	681-161	13.0500	681-161	13.0500	0-0	0.0000	COM
1744	214	680-160	13.0500	680-160	13.0500	0-0	0.0000	COM
* Subsubtotal *			78.3000		78.3000		0.0000	
* Sail Line YOL-01637								
01637	034	206-820	15.4000	206-820	15.4000	0-0	0.0000	COM
1638	034	207-819	15.3500	207-819	15.3500	0-0	0.0000	COM
1639	034	206-820	15.4000	206-820	15.4000	0-0	0.0000	COM
1640	034	207-819	15.3500	207-819	15.3500	0-0	0.0000	COM
1641	034	206-820	15.4000	206-820	15.4000	0-0	0.0000	COM
1642	034	207-819	15.3500	207-819	15.3500	0-0	0.0000	COM
* Subsubtotal *			92.2500		92.2500		0.0000	

Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-01709							
01709 214	701-155	13.7000	701-155	13.7000	0-0	0.0000	COM
1710 214	700-156	13.6500	700-156	13.6500	0-0	0.0000	COM
1711 214	701-155	13.7000	701-155	13.7000	0-0	0.0000	COM
1712 214	700-156	13.6500	700-156	13.6500	0-0	0.0000	COM
1713 214	701-155	13.7000	701-155	13.7000	0-0	0.0000	COM
1714 214	700-156	13.6500	700-156	13.6500	0-0	0.0000	COM
* Subsubtotal *		82.0500		82.0500		0.0000	
** Subtotal **		349.2000		349.2000		0.0000	
** Date 15/03/94							
* Sail Line YOL-01499							
01499 034	174-820	16.2000	174-820	16.2000	0-0	0.0000	COM
1500 034	173-819	16.2000	173-819	16.2000	0-0	0.0000	COM
1501 034	174-820	16.2000	174-820	16.2000	0-0	0.0000	COM
1502 034	173-819	16.2000	173-819	16.2000	0-0	0.0000	COM
1503 034	174-820	16.2000	174-820	16.2000	0-0	0.0000	COM
1504 034	173-819	16.2000	173-819	16.2000	0-0	0.0000	COM
* Subsubtotal *		97.2000		97.2000		0.0000	
* Sail Line YOL-01667							
01667 214	719-175	13.6500	719-175	13.6500	0-0	0.0000	COM
1668 214	720-176	13.6500	720-176	13.6500	0-0	0.0000	COM
1669 214	719-175	13.6500	719-175	13.6500	0-0	0.0000	COM
1670 214	720-176	13.6500	720-176	13.6500	0-0	0.0000	COM
1671 214	719-175	13.6500	719-175	13.6500	0-0	0.0000	COM
1672 214	720-176	13.6500	720-176	13.6500	0-0	0.0000	COM
* Subsubtotal *		81.9000		81.9000		0.0000	
* Sail Line YOL-01835							
01835 034	260-620	9.0500	260-620	9.0500	0-0	0.0000	COM
1836 034	261-619	9.0000	261-619	9.0000	0-0	0.0000	COM
1837 034	260-620	9.0500	260-620	9.0500	0-0	0.0000	COM
1838 034	261-619	9.0000	261-619	9.0000	0-0	0.0000	COM
1839 034	260-620	9.0500	260-620	9.0500	0-0	0.0000	COM
1840 034	261-619	9.0000	261-619	9.0000	0-0	0.0000	COM
* Subsubtotal *		54.1500		54.1500		0.0000	
* Sail Line YOL-01751							
01751 214	555-161	9.9000	555-161	9.9000	0-0	0.0000	COM
1752 214	556-160	9.9500	556-160	9.9500	0-0	0.0000	COM
1753 214	555-161	9.9000	555-161	9.9000	0-0	0.0000	COM
1754 214	556-160	9.9500	556-160	9.9500	0-0	0.0000	COM
1755 214	555-161	9.9000	555-161	9.9000	0-0	0.0000	COM
1756 214	556-160	9.9500	556-160	9.9500	0-0	0.0000	COM
* Subsubtotal *		59.5500		59.5500		0.0000	

Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-01595							
01595 034	336-820	12.1500	336-820	12.1500	0-0	0.0000	COM
1596 034	335-819	12.1500	335-819	12.1500	0-0	0.0000	COM
1597 034	336-820	12.1500	336-820	12.1500	0-0	0.0000	COM
1598 034	335-819	12.1500	335-819	12.1500	0-0	0.0000	COM
1599 034	336-820	12.1500	336-820	12.1500	0-0	0.0000	COM
1600 034	335-819	12.1500	335-819	12.1500	0-0	0.0000	COM
* Subsubtotal *		72.9000		72.9000		0.0000	
* Sail Line YOL-01685							
01685 214	679-145	13.4000	679-145	13.4000	0-0	0.0000	COM
1686 214	680-146	13.4000	680-146	13.4000	0-0	0.0000	COM
1687 214	679-145	13.4000	679-145	13.4000	0-0	0.0000	COM
1688 214	680-146	13.4000	680-146	13.4000	0-0	0.0000	COM
1689 214	679-145	13.4000	679-145	13.4000	0-0	0.0000	COM
1690 214	680-146	13.4000	680-146	13.4000	0-0	0.0000	COM
* Subsubtotal *		80.4000		80.4000		0.0000	
* Sail Line YOL-01817							
01817 034	386-694	7.7500	386-694	7.7500	0-0	0.0000	COM
1818 034	385-695	7.8000	385-695	7.8000	0-0	0.0000	COM
1819 034	386-694	7.7500	386-694	7.7500	0-0	0.0000	COM
1820 034	385-695	7.8000	385-695	7.8000	0-0	0.0000	COM
1821 034	386-694	7.7500	386-694	7.7500	0-0	0.0000	COM
1822 034	385-695	7.8000	385-695	7.8000	0-0	0.0000	COM
* Subsubtotal *		46.6500		46.6500		0.0000	
* Sail Line YOL-01649							
01649 214	735-683	1.3500	735-683	1.3500	0-0	0.0000	MSP
1650 214	734-684	1.3000	734-684	1.3000	0-0	0.0000	MSP
1651 214	735-683	1.3500	735-683	1.3500	0-0	0.0000	MSP
1652 214	734-684	1.3000	734-684	1.3000	0-0	0.0000	MSP
1653 214	735-683	1.3500	735-683	1.3500	0-0	0.0000	MSP
1654 214	734-684	1.3000	734-684	1.3000	0-0	0.0000	MSP
** Subtotal **		500.7000		500.7000		0.0000	
** Date 16/03/94							
01649 214	681-365	7.9500	681-365	7.9500	0-0	0.0000	COM
1650 214	682-366	7.9500	682-366	7.9500	0-0	0.0000	COM
1651 214	681-365	7.9500	681-365	7.9500	0-0	0.0000	COM
1652 214	682-366	7.9500	682-366	7.9500	0-0	0.0000	COM
1653 214	681-365	7.9500	681-365	7.9500	0-0	0.0000	COM
1654 214	682-366	7.9500	682-366	7.9500	0-0	0.0000	COM
* Subsubtotal *		55.6500		55.6500		0.0000	

Azm	Overall SP Range	Overall Kilometres	Process SP Range	Process Kilometres	Charge SP Range	Charge Kilometres	Status
* Sail Line YOL-01661							
01661 214	605-141	11.6500	605-141	11.6500	0-0	0.0000	COM
1662 214	604-140	11.6500	604-140	11.6500	0-0	0.0000	COM
1663 214	605-141	11.6500	605-141	11.6500	0-0	0.0000	COM
1664 214	604-140	11.6500	604-140	11.6500	0-0	0.0000	COM
1665 214	605-141	11.6500	605-141	11.6500	0-0	0.0000	COM
1666 214	604-140	11.6500	604-140	11.6500	0-0	0.0000	COM
* Subsubtotal *		69.9000		69.9000		0.0000	
** Subtotal **		117.6000		117.6000		0.0000	
*** Total ***		13799.4000		13779.0000		11750.3500	

10.3 FIELD TAPE LOG

LINE NUMBER	Dir.	First Tape	Last Tape	Date Recorded
YOL-00013	214	1	15	05/02/94
YOL-00205	034	16	42	05/02/94
YOL-00055	214	38	55	06/02/94
YOL-00247	034	60	89	06/02/94
YOL-00019	214	90	104	06/02/94
YOL-00211	034	105	135	06/02/94
YOL-00061	214	139	155	06/02/94
YOL-00253	034	157	185	06/02/94
YOL-00025	214	185	200	06/02/94
YOL-00199	034	201	226	07/02/94
YOL-00067	214	227	244	07/02/94
YOL-00259	034	245	273	07/02/94
YOL-00049	214	274	290	11/02/94
YOL-00217	034	291	317	11/02/94
YOL-00031	214	318	333	11/02/94
YOL-00265	034	334	363	11/02/94
YOL-OOO73	214	364	381	11/02/94
YOL-00073	214	364	381	11/02/94
YOL-00193	034	382	407	12/02/94
YOL-00037	214	408	423	12/02/94
YOL-00271	034	424	456	12/02/94
YOL-00079	214	457	475	12/02/94
YOL-00223	034	476	502	12/02/94
YOL-00007	214	503	516	12/02/94
YOL-00229	034	517	540	12/02/94
YOL-00001	214	545	558	12/02/94
YOL-00277	034	559	588	13/02/94
YOL-00241	034	591	619	14/02/94
YOL-00085	214	619	637	14/02/94
YOL-00313	034	638	670	14/02/94
YOL-00043	214	671	686	14/02/94
YOL-00235	034	687	714	14/02/94
YOL-00121	214	716	736	14/02/94
YOL-00307	034	737	755	15/02/94
YOL-10307	034	756	769	15/02/94
YOL-00127	214	770	790	15/02/94
YOL-00301	034	791	823	15/02/94
YOL-00283	034	829	859	15/02/94
YOL-00187	214	860	884	15/02/94
YOL-00289	034	885	915	15/02/94
YOL-00115	214	916	936	16/02/94
YOL-00295	034	937	968	16/02/94
YOL-00091	214	969	980	16/02/94
YOL-00181	214	981	1005	17/02/94
YOL-00337	034	1006	1038	18/02/94
YOL-00109	214	1039	1059	18/02/94
YOL-00319	034	1060	1091	18/02/94
YOL-00157	214	1092	1115	18/02/94
YOL-00331	034	1116	1140	18/02/94
YOL-00325	034	1145	1177	18/02/94

LINE NUMBER	Dir.	First Tape	Last Tape	Date Recorded
YOL-00097	214	1178	1197	19/02/94
YOL-00343	034	1198	1221	19/02/94
YOL-00151	214	1223	1245	19/02/94
YOL-00349	034	1246	1281	19/02/94
YOL-00103	214	1281	1300	19/02/94
YOL-00379	034	1301	1336	19/02/94
YOL-00163	214	1337	1364	19/02/94
YOL-00355	034	1365	1398	20/02/94
YOL-00373	034	1399	1437	20/02/94
YOL-00133	214	1438	1460	20/02/94
YOL-00367	034	1461	1495	20/02/94
YOL-00139	214	1496	1517	21/02/94
YOL-00361	034	1518	1551	21/02/94
YOL-00145	214	1552	1574	21/02/94
YOL-00385	034	1575	1609	21/02/94
YOL-00169	214	1610	1637	21/02/94
YOL-10331	034	1637	1651	21/02/94
YOL-00175	214	1652	1677	21/02/94
YOL-00415	034	1678	1713	21/02/94
YOL-00727	214	1714	1741	22/02/94
YOL-00475	034	1742	1776	22/02/94
YOL-00667	214	1777	1806	22/02/94
YOL-00391	034	1807	1847	22/02/94
YOL-00721	214	1848	1876	22/02/94
YOL-00421	034	1877	1913	22/02/94
YOL-00673	214	1914	1943	23/02/94
YOL-00481	034	1944	1978	23/02/94
YOL-00715	214	1979	2006	23/02/94
YOL-00427	034	2007	2043	23/02/94
YOL-00487	034	2056	2091	23/02/94
YOL-00679	214	2092	2121	23/02/94
YOL-00433	034	2122	2155	24/02/94
YOL-00733	214	2156	2183	24/02/94
YOL-00493	034	2184	2217	24/02/94
YOL-00685	214	2218	2247	24/02/94
YOL-00397	034	2248	2283	24/02/94
YOL-00709	214	2284	2312	24/02/94
YOL-00409	034	2313	2348	25/02/94
YOL-00691	214	2349	2378	25/02/94
YOL-00499	034	2379	2412	25/02/94
YOL-00751	214	2413	2439	25/02/94
YOL-00451	034	2440	2474	25/02/94
YOL-00697	214	2475	2503	25/02/94
YOL-00469	034	2504	2537	25/02/94
YOL-00661	214	2538	2568	25/02/94
YOL-00403	034	2569	2604	26/02/94
YOL-00703	214	2605	2634	26/02/94
YOL-00775	214	2635	2660	27/02/94
YOL-00445	034	2661	2694	27/02/94
YOL-00739	214	2695	2723	27/02/94
YOL-00463	034	2724	2759	27/02/94
YOL-00535	034	2786	2818	02/03/94

LINE NUMBER	Dir.	First Tape	Last Tape	Date Recorded
YOL-00781	214	2819	2843	02/03/94
YOL-00505	034	2844	2877	02/03/94
YOL-00847	214	2878	2899	03/03/94
YOL-00511	034	2900	2933	03/03/94
YOL-00745	214	2934	2960	03/03/94
YOL-00457	034	2961	2994	03/03/94
YOL-00769	214	2995	3020	03/03/94
YOL-00565	034	3021	3053	04/03/94
YOL-00655	214	3054	3084	04/03/94
YOL-00529	034	3085	3117	04/03/94
YOL-00763	214	3118	3143	04/03/94
YOL-00439	034	3144	3177	04/03/94
YOL-00757	214	3178	3205	04/03/94
YOL-00541	034	3206	3228	04/03/94
YOL-00805	214	3239	3264	05/03/94
YOL-00571	034	3265	3298	05/03/94
YOL-00787	214	3298	3322	05/03/94
YOL-00523	034	3323	3355	05/03/94
YOL-00517	034	3365	3398	06/03/94
YOL-00799	214	3399	3422	06/03/94
YOL-00559	034	3423	3455	06/03/94
YOL-00793	214	3456	3480	06/03/94
YOL-00547	034	3481	3513	07/03/94
YOL-00811	214	3514	3536	07/03/94
YOL-00595	034	3537	3568	07/03/94
YOL-00853	214	3569	3590	07/03/94
YOL-00589	034	3591	3623	07/03/94
YOL-00817	214	3624	3648	07/03/94
YOL-00601	034	3649	3682	07/03/94
YOL-00841	214	3682	3704	07/03/94
YOL-00553	034	3705	3737	08/03/94
YOL-00649	214	3738	3768	08/03/94
YOL-00607	034	3769	3800	08/03/94
YOL-00859	214	3801	3822	08/03/94
YOL-00583	034	3823	3855	08/03/94
YOL-00643	214	3856	3890	08/03/94
YOL-00613	034	3891	3922	08/03/94
YOL-00823	214	3923	3945	09/03/94
YOL-00577	034	3946	3969	09/03/94
YOL-00835	214	3979	4001	09/03/94
YOL-00619	034	4002	4033	09/03/94
YOL-00829	214	4034	4057	09/03/94
YOL-00631	034	4058	4089	09/03/94
YOL-00637	214	4090	4121	09/03/94
YOL-00625	214	4122	4153	10/03/94
YOL-01187	214	4154	4177	10/03/94
YOL-01367	034	4178	4211	10/03/94
YOL-01133	214	4212	4230	10/03/94
YOL-01145	214	4231	4249	10/03/94
YOL-01349	034	4250	4262	10/03/94
YOL-10343	034	4263	4273	10/03/94
YOL-01067	214	4274	4289	10/03/94

501231

LINE NUMBER	Dir.	First Tape	Last Tape	Date Recorded
YOL-01343	034	4290	4322	11/03/94
YOL-01469	034	4323	4355	12/03/94
YOL-01115	214	4356	4373	12/03/94
YOL-10319	034	4374	4378	12/03/94
YOL-10091	214	4379	4387	12/03/94
YOL-01421	034	4388	4414	12/03/94
YOL-01055	214	4415	4431	13/03/94
YOL-01451	034	4432	4464	13/03/94
YOL-10109	214	4465	4466	13/03/94
YOL-01085	214	4467	4474	13/03/94
YOL-01439	034	4475	4494	13/03/94
YOL-01679	214	4495	4510	13/03/94
YOL-01487	034	4511	4544	13/03/94
YOL-01517	034	4545	4577	14/03/94
YOL-01739	214	4578	4604	14/03/94
YOL-01637	034	4605	4635	14/03/94
YOL-01709	214	4636	4664	14/03/94
YOL-01499	034	4665	4699	15/03/94
YOL-01667	214	4700	4727	15/03/94
YOL-01835	034	4728	4746	15/03/94
YOL-01751	214	4747	4757	15/03/94
YOL-01595	034	4769	4793	15/03/94
YOL-01685	214	4794	4821	15/03/94
YOL-01817	034	4822	4837	15/03/94
YOL-01649	214	4838	4856	15/03/94
YOL-01661	214	4857	4880	16/03/94

501232

10.4 LINE STATUS LOG

LINE	DIR	FSP	LSP	KMS	FPSP	LPSP	TOTPKM	DATE	Edit	STAT
00001	214	292	32	6.550	292	32	6.550	12/02/9	F	COM
2	214	291	33	6.500	291	33	6.500	12/02/9	F	COM
3	214	292	32	6.550	292	32	6.550	12/02/9	F	COM
4	214	291	33	6.500	291	33	6.500	12/02/9	F	COM
5	214	292	32	6.550	292	32	6.550	12/02/9	F	COM
6	214	291	33	6.500	291	33	6.500	12/02/9	F	COM
00007	214	298	32	6.700	298	32	6.700	12/02/9	F	COM
8	214	299	33	6.700	299	33	6.700	12/02/9	F	COM
9	214	298	32	6.700	298	32	6.700	12/02/9	F	COM
10	214	299	33	6.700	299	33	6.700	12/02/9	F	COM
11	214	298	32	6.700	298	32	6.700	12/02/9	F	COM
12	214	299	33	6.700	299	33	6.700	12/02/9	F	COM
00013	214	306	32	6.900	306	32	6.900	05/02/9	F	COM
14	214	307	33	6.900	307	33	6.900	05/02/9	F	COM
15	214	306	32	6.900	306	32	6.900	05/02/9	F	COM
16	214	307	33	6.900	307	33	6.900	05/02/9	F	COM
17	214	306	32	6.900	306	32	6.900	05/02/9	F	COM
18	214	307	33	6.900	307	33	6.900	05/02/9	F	COM
00019	214	314	32	7.100	314	32	7.100	06/02/9	F	COM
20	214	313	33	7.050	313	33	7.050	06/02/9	F	COM
21	214	314	32	7.100	314	32	7.100	06/02/9	F	COM
22	214	313	33	7.050	313	33	7.050	06/02/9	F	COM
23	214	314	32	7.100	314	32	7.100	06/02/9	F	COM
24	214	313	33	7.050	313	33	7.050	06/02/9	F	COM
00025	214	320	32	7.250	320	32	7.250	06/02/9	F	COM
26	214	321	33	7.250	321	33	7.250	06/02/9	F	COM
27	214	320	32	7.250	320	32	7.250	06/02/9	F	COM
28	214	321	33	7.250	321	33	7.250	06/02/9	F	COM
29	214	320	32	7.250	320	32	7.250	06/02/9	F	COM
30	214	321	33	7.250	321	33	7.250	06/02/9	F	COM
00031	214	328	32	7.450	328	32	7.450	11/02/9	F	COM
32	214	329	33	7.450	329	33	7.450	11/02/9	F	COM
33	214	328	32	7.450	328	32	7.450	11/02/9	F	COM
34	214	329	33	7.450	329	33	7.450	11/02/9	F	COM
35	214	328	32	7.450	328	32	7.450	11/02/9	F	COM
36	214	329	33	7.450	329	33	7.450	11/02/9	F	COM
00037	214	336	32	7.650	336	32	7.650	12/02/9	F	COM
38	214	335	33	7.600	335	33	7.600	12/02/9	F	COM
39	214	336	32	7.650	336	32	7.650	12/02/9	F	COM
40	214	335	33	7.600	335	33	7.600	12/02/9	F	COM
41	214	336	32	7.650	336	32	7.650	12/02/9	F	COM
42	214	335	33	7.600	335	33	7.600	12/02/9	F	COM
00043	214	344	32	7.850	344	32	7.850	14/02/9	F	COM
44	214	343	33	7.800	343	33	7.800	14/02/9	F	COM
45	214	344	32	7.850	344	32	7.850	14/02/9	F	COM
46	214	343	33	7.800	343	33	7.800	14/02/9	F	COM
47	214	344	32	7.850	344	32	7.850	14/02/9	F	COM
48	214	343	33	7.800	343	33	7.800	14/02/9	F	COM

LINE	DIR	FSP	LSP	KMS	FPSP	LPSP	TOTPKM	DATE		STAT
00049	214	350	32	8.000	350	32	8.000	11/02/9	F	COM
50	214	351	33	8.000	351	33	8.000	11/02/9	F	COM
51	214	350	32	8.000	350	32	8.000	11/02/9	F	COM
52	214	351	33	8.000	351	33	8.000	11/02/9	F	COM
53	214	350	32	8.000	350	32	8.000	11/02/9	F	COM
54	214	351	33	8.000	351	33	8.000	11/02/9	F	COM
00055	214	358	32	8.200	358	32	8.200	06/02/9	F	COM
56	214	357	33	8.150	357	33	8.150	06/02/9	F	COM
57	214	358	32	8.200	358	32	8.200	06/02/9	F	COM
58	214	357	33	8.150	357	33	8.150	06/02/9	F	COM
59	214	358	32	8.200	358	32	8.200	06/02/9	F	COM
60	214	357	33	8.150	357	33	8.150	06/02/9	F	COM
00061	214	366	32	8.400	366	32	8.400	06/02/9	F	COM
62	214	365	33	8.350	365	33	8.350	06/02/9	F	COM
63	214	366	32	8.400	366	32	8.400	06/02/9	F	COM
64	214	365	33	8.350	365	33	8.350	06/02/9	F	COM
65	214	366	32	8.400	366	32	8.400	06/02/9	F	COM
66	214	365	33	8.350	365	33	8.350	06/02/9	F	COM
00067	214	372	32	8.550	372	32	8.550	07/02/9	F	COM
68	214	373	33	8.550	373	33	8.550	07/02/9	F	COM
69	214	372	32	8.550	372	32	8.550	07/02/9	F	COM
70	214	373	33	8.550	373	33	8.550	07/02/9	F	COM
71	214	372	32	8.550	372	32	8.550	07/02/9	F	COM
72	214	373	33	8.550	373	33	8.550	07/02/9	F	COM
00073	214	380	32	8.750	380	32	8.750	11/02/9	F	COM
74	214	379	33	8.700	379	33	8.700	11/02/9	F	COM
75	214	380	32	8.750	380	32	8.750	11/02/9	F	COM
76	214	379	33	8.700	379	33	8.700	11/02/9	F	COM
77	214	380	32	8.750	380	32	8.750	11/02/9	F	COM
78	214	379	33	8.700	379	33	8.700	11/02/9	F	COM
00079	214	388	32	8.950	388	32	8.950	12/02/9	F	COM
80	214	387	33	8.900	387	33	8.900	12/02/9	F	COM
81	214	388	32	8.950	388	32	8.950	12/02/9	F	COM
82	214	387	33	8.900	387	33	8.900	12/02/9	F	COM
83	214	388	32	8.950	388	32	8.950	12/02/9	F	COM
84	214	387	33	8.900	387	33	8.900	12/02/9	F	COM
00085	214	394	32	9.100	394	32	9.100	14/02/9	F	COM
86	214	395	33	9.100	395	33	9.100	14/02/9	F	COM
87	214	394	32	9.100	394	32	9.100	14/02/9	F	COM
88	214	395	33	9.100	395	33	9.100	14/02/9	F	COM
89	214	394	32	9.100	394	32	9.100	14/02/9	F	COM
90	214	395	33	9.100	395	33	9.100	14/02/9	F	COM
00091	214	402	186	5.450	402	186	5.450	16/02/9	F	TBC
92	214	403	185	5.500	403	185	5.500	16/02/9	F	TBC
93	214	402	186	5.450	402	186	5.450	16/02/9	F	TBC
94	214	403	185	5.500	403	185	5.500	16/02/9	F	TBC
95	214	402	186	5.450	402	186	5.450	16/02/9	F	TBC
96	214	403	185	5.500	403	185	5.500	16/02/9	F	TBC
00097	214	409	33	9.450	409	33	9.450	19/02/9	F	COM
98	214	410	32	9.500	410	32	9.500	19/02/9	F	COM
99	214	409	33	9.450	409	33	9.450	19/02/9	F	COM
100	214	410	32	9.500	410	32	9.500	19/02/9	F	COM
101	214	409	33	9.450	409	33	9.450	19/02/9	F	COM
102	214	410	32	9.500	410	32	9.500	19/02/9	F	COM

LINE	DIR	FSP	LSP	KMS	FPSP	LPSP	TOTPKM	DATE		STAT
00103	214	417	33	9.650	417	33	9.650	19/02/9	F	COM
104	214	416	32	9.650	416	32	9.650	19/02/9	F	COM
105	214	417	33	9.650	417	33	9.650	19/02/9	F	COM
106	214	416	32	9.650	416	32	9.650	19/02/9	F	COM
107	214	417	33	9.650	417	33	9.650	19/02/9	F	COM
108	214	416	32	9.650	416	32	9.650	19/02/9	F	COM
00109	214	425	33	9.850	425	33	9.850	18/02/9	F	COM
110	214	424	32	9.850	424	32	9.000	18/02/9	T	TBC
111	214	425	33	9.850	425	33	9.850	18/02/9	F	COM
112	214	424	32	9.850	424	32	9.000	18/02/9	T	TBC
113	214	425	33	9.850	425	33	9.850	18/02/9	F	COM
114	214	424	32	9.850	424	32	9.000	18/02/9	T	TBC
00115	214	432	32	10.050	432	32	10.050	16/02/9	F	COM
116	214	431	33	10.000	431	33	10.000	16/02/9	F	COM
117	214	432	32	10.050	432	32	10.050	16/02/9	F	COM
118	214	431	33	10.000	431	33	10.000	16/02/9	F	COM
119	214	432	32	10.050	432	32	10.050	16/02/9	F	COM
120	214	431	33	10.000	431	33	10.000	16/02/9	F	COM
00121	214	438	88	8.800	438	88	8.800	14/02/9	F	MSP
00121	214	86	32	1.400	86	32	1.400	15/02/9	F	COM
122	214	439	89	8.800	439	89	8.800	14/02/9	F	MSP
122	214	87	33	1.400	87	33	1.400	15/02/9	F	COM
123	214	438	88	8.800	438	88	8.800	14/02/9	F	MSP
123	214	86	32	1.400	86	32	1.400	15/02/9	F	COM
124	214	439	89	8.800	439	89	8.800	14/02/9	F	MSP
124	214	87	33	1.400	87	33	1.400	15/02/9	F	COM
125	214	438	88	8.800	438	88	8.800	14/02/9	F	MSP
125	214	86	32	1.400	86	32	1.400	15/02/9	F	COM
126	214	439	89	8.800	439	89	8.800	14/02/9	F	MSP
126	214	87	33	1.400	87	33	1.400	15/02/9	F	COM
00127	214	446	32	10.400	446	32	10.400	15/02/9	F	COM
128	214	447	33	10.400	447	33	10.400	15/02/9	F	COM
129	214	446	32	10.400	446	32	10.400	15/02/9	F	COM
130	214	447	33	10.400	447	33	10.400	15/02/9	F	COM
131	214	446	32	10.400	446	32	10.400	15/02/9	F	COM
132	214	447	33	10.400	447	33	10.400	15/02/9	F	COM
00133	214	453	33	10.550	453	33	10.550	20/02/9	F	COM
134	214	454	32	10.600	454	32	10.600	20/02/9	F	COM
135	214	453	33	10.550	453	33	10.550	20/02/9	F	COM
136	214	454	32	10.600	454	32	10.600	20/02/9	F	COM
137	214	453	33	10.550	453	33	10.550	20/02/9	F	COM
138	214	454	32	10.600	454	32	10.600	20/02/9	F	COM
00139	214	461	33	10.750	461	33	10.750	21/02/9	F	COM
140	214	460	32	10.750	460	32	10.750	21/02/9	F	COM
141	214	461	33	10.750	461	33	10.750	21/02/9	F	COM
142	214	460	32	10.750	460	32	10.750	21/02/9	F	COM
143	214	461	33	10.750	461	33	10.750	21/02/9	F	COM
144	214	460	32	10.750	460	32	10.750	21/02/9	F	COM
00145	214	469	33	10.950	469	33	10.950	21/02/9	F	COM
146	214	468	32	10.950	468	32	10.950	21/02/9	F	COM
147	214	469	33	10.950	469	33	10.950	21/02/9	F	COM
148	214	468	32	10.950	468	32	10.950	21/02/9	F	COM
149	214	469	33	10.950	469	33	10.950	21/02/9	F	COM
150	214	468	32	10.950	468	32	10.950	21/02/9	F	COM

LINE	DIR	FSP	LSP	KMS	FPSP	LPSP	TOTPKM	DATE		STAT
00151	214	475	33	11.100	475	33	11.100	19/02/9	F	COM
152	214	476	32	11.150	476	32	11.150	19/02/9	F	COM
153	214	475	33	11.100	475	33	11.100	19/02/9	F	COM
154	214	476	32	11.150	476	32	11.150	19/02/9	F	COM
155	214	475	33	11.100	475	33	11.100	19/02/9	F	COM
156	214	476	32	11.150	476	32	11.150	19/02/9	F	COM
00157	214	483	33	11.300	483	33	11.300	18/02/9	F	COM
158	214	484	32	11.350	484	32	11.350	18/02/9	F	COM
159	214	483	33	11.300	483	33	11.300	18/02/9	F	COM
160	214	484	32	11.350	484	32	11.350	18/02/9	F	COM
161	214	483	33	11.300	483	33	11.300	18/02/9	F	COM
162	214	484	32	11.350	484	32	11.350	18/02/9	F	COM
00163	214	491	271	5.550	491	271	5.550	19/02/9	F	MSP
00163	214	269	33	5.950	269	33	5.950	20/02/9	F	COM
164	214	490	270	5.550	490	270	5.550	19/02/9	F	MSP
164	214	268	32	5.950	268	32	5.950	20/02/9	F	COM
165	214	491	271	5.550	491	271	5.550	19/02/9	F	MSP
165	214	269	33	5.950	269	33	5.950	20/02/9	F	COM
166	214	490	270	5.550	490	270	5.550	19/02/9	F	MSP
166	214	268	32	5.950	268	32	5.950	20/02/9	F	COM
167	214	491	271	5.550	491	271	5.550	19/02/9	F	MSP
167	214	269	33	5.950	269	33	5.950	20/02/9	F	COM
168	214	490	270	5.550	490	270	5.550	19/02/9	F	MSP
168	214	268	32	5.950	268	32	5.950	20/02/9	F	COM
00169	214	497	33	11.650	497	33	11.650	21/02/9	F	COM
170	214	498	32	11.700	498	32	11.700	21/02/9	F	COM
171	214	497	33	11.650	497	33	11.650	21/02/9	F	COM
172	214	498	32	11.700	498	32	11.700	21/02/9	F	COM
173	214	497	33	11.650	497	33	11.650	21/02/9	F	COM
174	214	498	32	11.700	498	32	11.700	21/02/9	F	COM
00175	214	505	33	11.850	505	33	11.850	21/02/9	F	COM
176	214	506	32	11.900	506	32	11.900	21/02/9	F	COM
177	214	505	33	11.850	505	33	11.850	21/02/9	F	COM
178	214	506	32	11.900	506	32	11.900	21/02/9	F	COM
179	214	505	33	11.850	505	33	11.850	21/02/9	F	COM
180	214	506	32	11.900	506	32	11.900	21/02/9	F	COM
00181	214	512	32	12.050	512	32	12.050	17/02/9	F	COM
182	214	513	33	12.050	513	33	12.050	17/02/9	F	COM
183	214	512	32	12.050	512	32	12.050	17/02/9	F	COM
184	214	513	33	12.050	513	33	12.050	17/02/9	F	COM
185	214	512	32	12.050	512	32	12.050	17/02/9	F	COM
186	214	513	33	12.050	513	33	12.050	17/02/9	F	COM
00187	214	520	32	12.250	520	32	12.250	15/02/9	F	COM
188	214	519	33	12.200	519	33	12.200	15/02/9	F	COM
189	214	520	32	12.250	520	32	12.250	15/02/9	F	COM
190	214	519	33	12.200	519	33	12.200	15/02/9	F	COM
191	214	520	32	12.250	520	32	12.250	15/02/9	F	COM
192	214	519	33	12.200	519	33	12.200	15/02/9	F	COM
00193	034	111	605	12.400	111	605	12.400	12/02/9	F	COM
194	034	110	606	12.450	110	606	12.450	12/02/9	F	COM
195	034	111	605	12.400	111	605	12.400	12/02/9	F	COM
196	034	110	606	12.450	110	606	12.450	12/02/9	F	COM
197	034	111	605	12.400	111	605	12.400	12/02/9	F	COM
198	034	110	606	12.450	110	606	12.450	12/02/9	F	COM

LINE	DIR	FSP	LSP	KMS	FPSP	LPSP	TOTPKM	DATE		STAT
00199	034	110	612	12.600	110	612	12.600	07/02/9	F	COM
200	034	111	613	12.600	111	613	12.600	07/02/9	F	COM
201	034	110	612	12.600	110	612	12.600	07/02/9	F	COM
202	034	111	613	12.600	111	613	12.600	07/02/9	F	COM
203	034	110	612	12.600	110	612	12.600	07/02/9	F	COM
204	034	111	613	12.600	111	613	12.600	07/02/9	F	COM
00205	034	111	621	12.800	111	621	12.800	05/02/9	F	COM
206	034	110	620	12.800	110	620	12.800	05/02/9	F	COM
207	034	111	621	12.800	111	621	12.800	05/02/9	F	COM
208	034	110	620	12.800	110	620	12.800	05/02/9	F	COM
209	034	111	621	12.800	111	621	12.800	05/02/9	F	COM
210	034	110	620	12.800	110	620	12.800	05/02/9	F	COM
00211	034	111	627	12.950	111	627	12.950	06/02/9	F	COM
212	034	110	628	13.000	110	628	13.000	06/02/9	F	COM
213	034	111	627	12.950	111	627	12.950	06/02/9	F	COM
214	034	110	628	13.000	110	628	13.000	06/02/9	F	COM
215	034	111	627	12.950	111	627	12.950	06/02/9	F	COM
216	034	110	628	13.000	110	628	13.000	06/02/9	F	COM
00217	034	111	635	13.150	111	635	13.150	11/02/9	F	COM
218	034	110	634	13.150	110	634	13.150	11/02/9	F	COM
219	034	111	635	13.150	111	635	13.150	11/02/9	F	COM
220	034	110	634	13.150	110	634	13.150	11/02/9	F	COM
221	034	111	635	13.150	111	635	13.150	11/02/9	F	COM
222	034	110	634	13.150	110	634	13.150	11/02/9	F	COM
00223	034	111	643	13.350	111	643	13.350	12/02/9	F	COM
224	034	110	642	13.350	110	642	13.350	12/02/9	F	COM
225	034	111	643	13.350	111	643	13.350	12/02/9	F	COM
226	034	110	642	13.350	110	642	13.350	12/02/9	F	COM
227	034	111	643	13.350	111	643	13.350	12/02/9	F	COM
228	034	110	642	13.350	110	642	13.350	12/02/9	F	COM
00229	034	111	649	13.500	111	649	13.500	12/02/9	F	COM
230	034	110	650	13.550	110	650	13.550	12/02/9	F	COM
231	034	111	649	13.500	111	649	13.500	12/02/9	F	COM
232	034	110	650	13.550	110	650	13.550	12/02/9	F	COM
233	034	111	649	13.500	111	649	13.500	12/02/9	F	COM
234	034	110	650	13.550	110	650	13.550	12/02/9	F	COM
00235	034	111	657	13.700	111	657	13.700	14/02/9	F	COM
236	034	110	656	13.700	110	656	13.700	14/02/9	F	COM
237	034	111	657	13.700	111	657	13.700	14/02/9	F	COM
238	034	110	656	13.700	110	656	13.700	14/02/9	F	COM
239	034	111	657	13.700	111	657	13.700	14/02/9	F	COM
240	034	110	656	13.700	110	656	13.700	14/02/9	F	COM
00241	034	112	664	13.850	130	664	12.900	14/02/9	T	LCC
242	034	113	665	13.850	129	665	12.950	14/02/9	T	LCC
243	034	112	664	13.850	130	664	12.900	14/02/9	T	LCC
244	034	113	665	13.850	129	665	12.950	14/02/9	T	LCC
245	034	112	664	13.850	130	664	12.900	14/02/9	T	LCC
246	034	113	665	13.850	129	665	12.950	14/02/9	T	LCC
00247	034	113	671	14.000	113	671	14.000	06/02/9	F	COM
248	034	114	672	14.000	114	672	14.000	06/02/9	F	COM
249	034	113	671	14.000	113	671	14.000	06/02/9	F	COM
250	034	114	672	14.000	114	672	14.000	06/02/9	F	COM
251	034	113	671	14.000	113	671	14.000	06/02/9	F	COM
252	034	114	672	14.000	114	672	14.000	06/02/9	F	COM

LINE	DIR	FSP	LSP	KMS	FPSP	LPSP	TOTPKM	DATE	STAT
00253	034	111	675	14.150	111	675	14.150	06/02/9 F	COM
254	034	110	674	14.150	110	674	14.150	06/02/9 F	COM
255	034	111	675	14.150	111	675	14.150	06/02/9 F	COM
256	034	110	674	14.150	110	674	14.150	06/02/9 F	COM
257	034	111	675	14.150	111	675	14.150	06/02/9 F	COM
258	034	110	674	14.150	110	674	14.150	06/02/9 F	COM
00259	034	117	687	14.300	117	687	14.300	07/02/9 F	COM
260	034	116	686	14.300	116	686	14.300	07/02/9 F	COM
261	034	117	687	14.300	117	687	14.300	07/02/9 F	COM
262	034	116	686	14.300	116	686	14.300	07/02/9 F	COM
263	034	117	687	14.300	117	687	14.300	07/02/9 F	COM
264	034	116	686	14.300	116	686	14.300	07/02/9 F	COM
00265	034	117	693	14.450	117	693	14.450	11/02/9 F	COM
266	034	118	694	14.450	118	694	14.450	11/02/9 F	COM
267	034	117	693	14.450	117	693	14.450	11/02/9 F	COM
268	034	118	694	14.450	118	694	14.450	11/02/9 F	COM
269	034	117	693	14.450	117	693	14.450	11/02/9 F	COM
270	034	118	694	14.450	118	694	14.450	11/02/9 F	COM
00271	034	119	701	14.600	119	701	14.600	12/02/9 F	COM
272	034	120	702	14.600	120	702	14.600	12/02/9 F	COM
273	034	119	701	14.600	119	701	14.600	12/02/9 F	COM
274	034	120	702	14.600	120	702	14.600	12/02/9 F	COM
275	034	119	701	14.600	119	701	14.600	12/02/9 F	COM
276	034	120	702	14.600	120	702	14.600	12/02/9 F	COM
00277	034	141	709	14.250	141	709	14.250	13/02/9 F	COM
278	034	140	708	14.250	140	708	14.250	13/02/9 F	COM
279	034	141	709	14.250	141	709	14.250	13/02/9 F	COM
280	034	140	708	14.250	140	708	14.250	13/02/9 F	COM
281	034	141	709	14.250	141	709	14.250	13/02/9 F	COM
282	034	140	708	14.250	140	708	14.250	13/02/9 F	COM
00283	034	123	717	14.900	123	717	14.900	15/02/9 F	COM
284	034	122	716	14.900	122	716	14.900	15/02/9 F	COM
285	034	123	717	14.900	123	717	14.900	15/02/9 F	COM
286	034	122	716	14.900	122	716	14.900	15/02/9 F	COM
287	034	123	717	14.900	123	717	14.900	15/02/9 F	COM
288	034	122	716	14.900	122	716	14.900	15/02/9 F	COM
00289	034	123	223	2.550	123	223	2.550	15/02/9 F	MSP
00289	034	225	723	12.500	225	723	12.500	16/02/9 F	COM
290	034	124	224	2.550	124	224	2.550	15/02/9 F	MSP
290	034	226	724	12.500	226	724	12.500	16/02/9 F	COM
291	034	123	223	2.550	123	223	2.550	15/02/9 F	MSP
291	034	225	723	12.500	225	723	12.500	16/02/9 F	COM
292	034	124	224	2.550	124	224	2.550	15/02/9 F	MSP
292	034	226	724	12.500	226	724	12.500	16/02/9 F	COM
293	034	123	223	2.550	123	223	2.550	15/02/9 F	MSP
293	034	225	723	12.500	225	723	12.500	16/02/9 F	COM
294	034	124	224	2.550	124	224	2.550	15/02/9 F	MSP
294	034	226	724	12.500	226	724	12.500	16/02/9 F	COM
00295	034	125	731	15.200	125	731	15.200	16/02/9 F	COM
296	034	124	730	15.200	124	730	15.200	16/02/9 F	COM
297	034	125	731	15.200	125	731	15.200	16/02/9 F	COM
298	034	124	730	15.200	124	730	15.200	16/02/9 F	COM
299	034	125	731	15.200	125	731	15.200	16/02/9 F	COM
300	034	124	730	15.200	124	730	15.200	16/02/9 F	COM

LINE	DIR	FSP	LSP	KMS	FPSP	LPSP	TOTPKM	DATE		STAT
00301	034	127	739	15.350	127	739	15.350	15/02/9	F	COM
302	034	126	738	15.350	126	738	15.350	15/02/9	F	COM
303	034	127	739	15.350	127	739	15.350	15/02/9	F	COM
304	034	126	738	15.350	126	738	15.350	15/02/9	F	COM
305	034	127	739	15.350	127	739	15.350	15/02/9	F	COM
306	034	126	738	15.350	126	738	15.350	15/02/9	F	COM
00307	034	127	485	9.000	127	485	9.000	15/02/9	F	TBC
308	034	128	484	8.950	128	484	8.950	15/02/9	F	TBC
309	034	127	485	9.000	127	485	9.000	15/02/9	F	TBC
310	034	128	484	8.950	128	484	8.950	15/02/9	F	TBC
311	034	127	485	9.000	127	485	9.000	15/02/9	F	TBC
312	034	128	484	8.950	128	484	8.950	15/02/9	F	TBC
00313	034	129	753	15.650	129	753	15.650	14/02/9	F	COM
314	034	128	752	15.650	128	752	15.650	14/02/9	F	COM
315	034	129	753	15.650	129	753	15.650	14/02/9	F	COM
316	034	128	752	15.650	128	752	15.650	14/02/9	F	COM
317	034	129	753	15.650	129	753	15.650	14/02/9	F	COM
318	034	128	752	15.650	128	752	15.650	14/02/9	F	COM
00319	034	130	760	15.800	130	760	15.800	18/02/9	F	COM
320	034	131	761	15.800	131	761	15.800	18/02/9	F	COM
321	034	130	760	15.800	130	760	13.750	18/02/9	T	TBC
322	034	131	761	15.800	131	761	13.800	18/02/9	T	TBC
323	034	130	760	15.800	130	760	15.800	18/02/9	F	COM
324	034	131	761	15.800	131	761	15.800	18/02/9	F	COM
00325	034	132	768	15.950	132	768	15.950	18/02/9	F	COM
326	034	131	767	15.950	131	767	15.950	18/02/9	F	COM
327	034	132	768	15.950	132	768	15.950	18/02/9	F	COM
328	034	131	767	15.950	131	767	15.950	18/02/9	F	COM
329	034	132	768	15.950	132	768	15.950	18/02/9	F	COM
330	034	131	767	15.950	131	767	15.950	18/02/9	F	COM
00331	034	134	498	9.150	134	498	9.150	18/02/9	F	LCC
332	034	133	499	9.200	133	499	9.200	18/02/9	F	LCC
333	034	134	498	9.150	212	498	7.200	18/02/9	T	LCC
334	034	133	499	9.200	211	499	7.250	18/02/9	T	LCC
335	034	134	498	9.150	134	498	9.150	18/02/9	F	LCC
336	034	133	499	9.200	133	499	9.200	18/02/9	F	LCC
00337	034	134	782	16.250	134	782	16.250	18/02/9	F	COM
338	034	135	783	16.250	135	783	16.250	18/02/9	F	COM
339	034	134	782	16.250	134	782	16.250	18/02/9	F	COM
340	034	135	783	16.250	135	783	16.250	18/02/9	F	COM
341	034	134	782	16.250	134	782	16.250	18/02/9	F	COM
342	034	135	783	16.250	135	783	16.250	18/02/9	F	COM
00343	034	136	592	11.450	136	592	11.450	19/02/9	F	TBC
344	034	135	593	11.500	135	593	11.500	19/02/9	F	TBC
345	034	136	592	11.450	136	592	11.450	19/02/9	F	TBC
346	034	135	593	11.500	135	593	11.500	19/02/9	F	TBC
347	034	136	592	11.450	136	592	11.450	19/02/9	F	TBC
348	034	135	593	11.500	135	593	11.500	19/02/9	F	TBC
00349	034	138	798	16.550	138	798	16.550	19/02/9	F	COM
350	034	137	797	16.550	137	797	16.550	19/02/9	F	COM
351	034	138	798	16.550	138	798	16.550	19/02/9	F	COM
352	034	137	797	16.550	137	797	16.550	19/02/9	F	COM
353	034	138	798	16.550	138	798	16.550	19/02/9	F	COM
354	034	137	797	16.550	137	797	16.550	19/02/9	F	COM

LINE	DIR	FSP	LSP	KMS	FPSP	LPSP	TOTPKM	DATE	STAT
00355	034	138	804	16.700	138	804	16.700	20/02/9 F	COM
356	034	139	805	16.700	139	805	16.700	20/02/9 F	COM
357	034	138	804	16.700	138	804	16.700	20/02/9 F	COM
358	034	139	805	16.700	139	805	16.700	20/02/9 F	COM
359	034	138	804	16.700	138	804	16.700	20/02/9 F	COM
360	034	139	805	16.700	139	805	16.700	20/02/9 F	COM
00361	034	140	812	16.850	140	812	16.850	21/02/9 F	COM
362	034	141	813	16.850	141	813	16.850	21/02/9 F	COM
363	034	140	812	16.850	140	812	16.850	21/02/9 F	COM
364	034	141	813	16.850	141	813	16.850	21/02/9 F	COM
365	034	140	812	16.850	140	812	16.850	21/02/9 F	COM
366	034	141	813	16.850	141	813	16.850	21/02/9 F	COM
00367	034	142	820	17.000	142	820	17.000	20/02/9 F	COM
368	034	141	819	17.000	141	819	17.000	20/02/9 F	COM
369	034	142	820	17.000	142	820	17.000	20/02/9 F	COM
370	034	141	819	17.000	141	819	17.000	20/02/9 F	COM
371	034	142	820	17.000	142	820	17.000	20/02/9 F	COM
372	034	141	819	17.000	141	819	17.000	20/02/9 F	COM
00373	034	142	826	17.150	142	826	17.150	20/02/9 F	COM
374	034	143	827	17.150	143	827	17.150	20/02/9 F	COM
375	034	142	826	17.150	142	826	17.150	20/02/9 F	COM
376	034	143	827	17.150	143	827	17.150	20/02/9 F	COM
377	034	142	826	17.150	142	826	17.150	20/02/9 F	COM
378	034	143	827	17.150	143	827	17.150	20/02/9 F	COM
00379	034	144	828	17.150	144	828	17.150	19/02/9 F	COM
380	034	145	829	17.150	145	829	17.150	19/02/9 F	COM
381	034	144	828	17.150	144	828	17.150	19/02/9 F	COM
382	034	145	829	17.150	145	829	17.150	19/02/9 F	COM
383	034	144	828	17.150	144	828	17.150	19/02/9 F	COM
384	034	145	829	17.150	145	829	17.150	19/02/9 F	COM
00385	034	146	828	17.100	146	828	17.100	21/02/9 F	COM
386	034	145	829	17.150	145	829	17.150	21/02/9 F	COM
387	034	146	828	17.100	146	828	17.100	21/02/9 F	COM
388	034	145	829	17.150	145	829	17.150	21/02/9 F	COM
389	034	146	828	17.100	146	828	17.100	21/02/9 F	COM
390	034	145	829	17.150	145	829	17.150	21/02/9 F	COM
00391	034	148	828	17.050	148	828	17.050	22/02/9 F	COM
392	034	147	829	17.100	147	829	17.100	22/02/9 F	COM
393	034	148	828	17.050	148	828	17.050	22/02/9 F	COM
394	034	147	829	17.100	147	829	17.100	22/02/9 F	COM
395	034	148	828	17.050	148	828	17.050	22/02/9 F	COM
396	034	147	829	17.100	147	829	17.100	22/02/9 F	COM
00397	034	148	828	17.050	148	828	17.050	24/02/9 F	COM
398	034	149	829	17.050	149	829	17.050	24/02/9 F	COM
399	034	148	828	17.050	148	828	17.050	24/02/9 F	COM
400	034	149	829	17.050	149	829	17.050	24/02/9 F	COM
401	034	148	828	17.050	148	828	17.050	24/02/9 F	COM
402	034	149	829	17.050	149	829	17.050	24/02/9 F	COM
00403	034	150	828	17.000	150	828	17.000	26/02/9 F	COM
404	034	149	829	17.050	149	829	17.050	26/02/9 F	COM
405	034	150	828	17.000	150	828	17.000	26/02/9 F	COM
406	034	149	829	17.050	149	829	17.050	26/02/9 F	COM
407	034	150	828	17.000	150	828	17.000	26/02/9 F	COM
408	034	149	829	17.050	149	829	17.050	26/02/9 F	COM

LINE	DIR	FSP	LSP	KMS	FPSP	LPSP	TOTPKM	DATE		STAT
00409	034	534	828	7.400	534	828	7.400	25/02/9	F	COM
00409	034	152	532	9.550	152	532	9.550	24/02/9	F	MSP
410	034	535	829	7.400	535	829	7.400	25/02/9	F	COM
410	034	151	533	9.600	151	533	9.600	24/02/9	F	MSP
411	034	534	828	7.400	534	828	7.400	25/02/9	F	COM
411	034	152	532	9.550	152	532	9.550	24/02/9	F	MSP
412	034	535	829	7.400	535	829	7.400	25/02/9	F	COM
412	034	151	533	9.600	151	533	9.600	24/02/9	F	MSP
413	034	534	828	7.400	534	828	7.400	25/02/9	F	COM
413	034	152	532	9.550	152	532	9.550	24/02/9	F	MSP
414	034	535	829	7.400	535	829	7.400	25/02/9	F	COM
414	034	151	533	9.600	151	533	9.600	24/02/9	F	MSP
00415	034	152	426	6.900	152	426	6.900	21/02/9	F	MSP
00415	034	428	828	10.050	428	828	10.050	22/02/9	F	COM
416	034	153	425	6.850	153	425	6.850	21/02/9	F	MSP
416	034	427	829	10.100	427	829	10.100	22/02/9	F	COM
417	034	152	426	6.900	152	426	6.900	21/02/9	F	MSP
417	034	428	828	10.050	428	828	10.050	22/02/9	F	COM
418	034	153	425	6.850	153	425	6.850	21/02/9	F	MSP
418	034	427	829	10.100	427	829	10.100	22/02/9	F	COM
419	034	152	426	6.900	152	426	6.900	21/02/9	F	MSP
419	034	428	828	10.050	428	828	10.050	22/02/9	F	COM
420	034	153	425	6.850	153	425	6.850	21/02/9	F	MSP
420	034	427	829	10.100	427	829	10.100	22/02/9	F	COM
00421	034	154	828	16.900	154	828	16.900	22/02/9	F	COM
422	034	155	829	16.900	155	829	16.900	22/02/9	F	COM
423	034	154	828	16.900	154	828	16.900	22/02/9	F	COM
424	034	155	829	16.900	155	829	16.900	22/02/9	F	COM
425	034	154	828	16.900	154	828	16.900	22/02/9	F	COM
426	034	155	829	16.900	155	829	16.900	22/02/9	F	COM
00427	034	154	828	16.900	154	828	16.900	23/02/9	F	COM
428	034	155	829	16.900	155	829	16.900	23/02/9	F	COM
429	034	154	828	16.900	154	828	16.900	23/02/9	F	COM
430	034	155	829	16.900	155	829	16.900	23/02/9	F	COM
431	034	154	828	16.900	154	828	16.900	23/02/9	F	COM
432	034	155	829	16.900	155	829	16.900	23/02/9	F	COM
00433	034	158	828	16.800	158	828	16.800	24/02/9	F	COM
434	034	157	829	16.850	157	829	16.850	24/02/9	F	COM
435	034	158	828	16.800	158	828	16.800	24/02/9	F	COM
436	034	157	829	16.850	157	829	16.850	24/02/9	F	COM
437	034	158	828	16.800	158	828	16.800	24/02/9	F	COM
438	034	157	829	16.850	157	829	16.850	24/02/9	F	COM
00439	034	158	828	16.800	158	828	16.800	04/03/9	F	COM
440	034	159	829	16.800	159	829	16.800	04/03/9	F	COM
441	034	158	828	16.800	158	828	16.800	04/03/9	F	COM
442	034	159	829	16.800	159	829	16.800	04/03/9	F	COM
443	034	158	828	16.800	158	828	16.800	04/03/9	F	COM
444	034	159	829	16.800	159	829	16.800	04/03/9	F	COM
00445	034	160	828	16.750	160	828	16.750	27/02/9	F	COM
446	034	161	829	16.750	161	829	16.750	27/02/9	F	COM
447	034	160	828	16.750	160	828	16.750	27/02/9	F	COM
448	034	161	829	16.750	161	829	16.750	27/02/9	F	COM
449	034	160	828	16.750	160	828	16.750	27/02/9	F	COM
450	034	161	829	16.750	161	829	16.750	27/02/9	F	COM

LINE	DIR	FSP	LSP	KMS	FPSP	LPSP	TOTPKM	DATE		STAT
00451	034	162	828	16.700	162	828	16.700	25/02/9	F	COM
452	034	161	829	16.750	161	829	16.750	25/02/9	F	COM
453	034	162	828	16.700	162	828	16.700	25/02/9	F	COM
454	034	161	829	16.750	161	829	16.750	25/02/9	F	COM
455	034	162	828	16.700	162	828	16.700	25/02/9	F	COM
456	034	161	829	16.750	161	829	16.750	25/02/9	F	COM
00457	034	162	828	16.700	162	828	16.700	03/03/9	F	COM
458	034	163	829	16.700	163	829	16.700	03/03/9	F	COM
459	034	162	828	16.700	162	828	16.700	03/03/9	F	COM
460	034	163	829	16.700	163	829	16.700	03/03/9	F	COM
461	034	162	828	16.700	162	828	16.700	03/03/9	F	COM
462	034	163	829	16.700	163	829	16.700	03/03/9	F	COM
00463	034	164	828	16.650	164	828	16.650	27/02/9	F	COM
464	034	165	829	16.650	165	829	16.650	27/02/9	F	COM
465	034	164	828	16.650	164	828	16.650	27/02/9	F	COM
466	034	165	829	16.650	165	829	16.650	27/02/9	F	COM
467	034	164	828	16.650	164	828	16.650	27/02/9	F	COM
468	034	165	829	16.650	165	829	16.650	27/02/9	F	COM
00469	034	166	828	16.600	166	828	16.600	25/02/9	F	COM
470	034	165	829	16.650	165	829	16.650	25/02/9	F	COM
471	034	166	828	16.600	166	828	16.600	25/02/9	F	COM
472	034	165	829	16.650	165	829	16.650	25/02/9	F	COM
473	034	166	828	16.600	166	828	16.600	25/02/9	F	COM
474	034	165	829	16.650	165	829	16.650	25/02/9	F	COM
00475	034	168	828	16.550	168	828	16.550	22/02/9	F	COM
476	034	167	829	16.600	167	829	16.600	22/02/9	F	COM
477	034	168	828	16.550	168	828	16.550	22/02/9	F	COM
478	034	167	829	16.600	167	829	16.600	22/02/9	F	COM
479	034	168	828	16.550	168	828	16.550	22/02/9	F	COM
480	034	167	829	16.600	167	829	16.600	22/02/9	F	COM
00481	034	168	828	16.550	168	828	16.550	23/02/9	F	COM
482	034	169	829	16.550	169	829	16.550	23/02/9	F	COM
483	034	168	828	16.550	168	828	16.550	23/02/9	F	COM
484	034	169	829	16.550	169	829	16.550	23/02/9	F	COM
485	034	168	828	16.550	168	828	16.550	23/02/9	F	COM
486	034	169	829	16.550	169	829	16.550	23/02/9	F	COM
00487	034	170	828	16.500	170	828	16.500	23/02/9	F	COM
488	034	171	829	16.500	171	829	16.500	23/02/9	F	COM
489	034	170	828	16.500	170	828	16.500	23/02/9	F	COM
490	034	171	829	16.500	171	829	16.500	23/02/9	F	COM
491	034	170	828	16.500	170	828	16.500	23/02/9	F	COM
492	034	171	829	16.500	171	829	16.500	23/02/9	F	COM
00493	034	172	828	16.450	172	828	16.450	24/02/9	F	COM
494	034	171	829	16.500	171	829	16.500	24/02/9	F	COM
495	034	172	828	16.450	172	828	16.450	24/02/9	F	COM
496	034	171	829	16.500	171	829	16.500	24/02/9	F	COM
497	034	172	828	16.450	172	828	16.450	24/02/9	F	COM
498	034	171	829	16.500	171	829	16.500	24/02/9	F	COM
00499	034	174	828	16.400	174	828	16.400	25/02/9	F	COM
500	034	173	829	16.450	173	829	16.450	25/02/9	F	COM
501	034	174	828	16.400	174	828	16.400	25/02/9	F	COM
502	034	173	829	16.450	173	829	16.450	25/02/9	F	COM
503	034	174	828	16.400	174	828	16.400	25/02/9	F	COM
504	034	173	829	16.450	173	829	16.450	25/02/9	F	COM

LINE	DIR	FSP	LSP	KMS	FPSP	LPSP	TOTPKM	DATE		STAT
00505	034	174	828	16.400	174	828	16.400	02/03/9	F	COM
506	034	175	829	16.400	175	829	16.400	02/03/9	F	COM
507	034	174	828	16.400	174	828	16.400	02/03/9	F	COM
508	034	175	829	16.400	175	829	16.400	02/03/9	F	COM
509	034	174	828	16.400	174	828	16.400	02/03/9	F	COM
510	034	175	829	16.400	175	829	16.400	02/03/9	F	COM
00511	034	176	828	16.350	176	828	16.350	03/03/9	F	COM
512	034	175	829	16.400	175	829	16.400	03/03/9	F	COM
513	034	176	828	16.350	176	828	16.350	03/03/9	F	COM
514	034	175	829	16.400	175	829	16.400	03/03/9	F	COM
515	034	176	828	16.350	176	828	16.350	03/03/9	F	COM
516	034	175	829	16.400	175	829	16.400	03/03/9	F	COM
00517	034	178	828	16.300	178	828	16.300	06/03/9	F	COM
518	034	177	829	16.350	177	829	16.350	06/03/9	F	COM
519	034	178	828	16.300	178	828	16.300	06/03/9	F	COM
520	034	177	829	16.350	177	829	16.350	06/03/9	F	COM
521	034	178	828	16.300	178	828	16.300	06/03/9	F	COM
522	034	177	829	16.350	177	829	16.350	06/03/9	F	COM
00523	034	178	828	16.300	178	828	16.300	05/03/9	F	COM
524	034	179	829	16.300	179	829	16.300	05/03/9	F	COM
525	034	178	828	16.300	178	828	16.300	05/03/9	F	COM
526	034	179	829	16.300	179	829	16.300	05/03/9	F	COM
527	034	178	828	16.300	178	828	16.300	05/03/9	F	COM
528	034	179	829	16.300	179	829	16.300	05/03/9	F	COM
00529	034	180	828	16.250	180	828	16.250	04/03/9	F	COM
530	034	181	829	16.250	181	829	16.250	04/03/9	F	COM
531	034	180	828	16.250	180	828	16.250	04/03/9	F	COM
532	034	181	829	16.250	181	829	16.250	04/03/9	F	COM
533	034	180	828	16.250	180	828	16.250	04/03/9	F	COM
534	034	181	829	16.250	181	829	16.250	04/03/9	F	COM
00535	034	182	828	16.200	182	828	16.200	02/03/9	F	COM
536	034	181	829	16.250	181	829	16.250	02/03/9	F	COM
537	034	182	828	16.200	182	828	16.200	02/03/9	F	COM
538	034	181	829	16.250	181	829	16.250	02/03/9	F	COM
539	034	182	828	16.200	182	828	16.200	02/03/9	F	COM
540	034	181	829	16.250	181	829	16.250	02/03/9	F	COM
00541	034	184	828	16.150	184	828	16.150	04/03/9	F	COM
542	034	183	829	16.200	183	829	16.200	04/03/9	F	COM
543	034	184	828	16.150	184	828	16.150	04/03/9	F	COM
544	034	183	829	16.200	183	829	16.200	04/03/9	F	COM
545	034	184	828	16.150	184	828	16.150	04/03/9	F	COM
546	034	183	829	16.200	183	829	16.200	04/03/9	F	COM
00547	034	184	828	16.150	184	828	16.150	07/03/9	F	COM
548	034	185	829	16.150	185	829	16.150	07/03/9	F	COM
549	034	184	828	16.150	184	828	16.150	07/03/9	F	COM
550	034	185	829	16.150	185	829	16.150	07/03/9	F	COM
551	034	184	828	16.150	184	828	16.150	07/03/9	F	COM
552	034	185	829	16.150	185	829	16.150	07/03/9	F	COM
00553	034	186	828	16.100	186	828	16.100	08/03/9	F	COM
554	034	187	829	16.100	187	829	16.100	08/03/9	F	COM
555	034	186	828	16.100	186	828	16.100	08/03/9	F	COM
556	034	187	829	16.100	187	829	16.100	08/03/9	F	COM
557	034	186	828	16.100	186	828	16.100	08/03/9	F	COM
558	034	187	829	16.100	187	829	16.100	08/03/9	F	COM

LINE	DIR	FSP	LSP	KMS	FPSP	LPSP	TOTPKM	DATE		STAT
00559	034	188	828	16.050	188	828	16.050	06/03/9	F	COM
560	034	187	829	16.100	187	829	16.100	06/03/9	F	COM
561	034	188	828	16.050	188	828	16.050	06/03/9	F	COM
562	034	187	829	16.100	187	829	16.100	06/03/9	F	COM
563	034	188	828	16.050	188	828	16.050	06/03/9	F	COM
564	034	187	829	16.100	187	829	16.100	06/03/9	F	COM
00565	034	188	828	16.050	188	828	16.050	04/03/9	F	COM
566	034	189	829	16.050	189	829	16.050	04/03/9	F	COM
567	034	188	828	16.050	188	828	16.050	04/03/9	F	COM
568	034	189	829	16.050	189	829	16.050	04/03/9	F	COM
569	034	188	828	16.050	188	828	16.050	04/03/9	F	COM
570	034	189	829	16.050	189	829	16.050	04/03/9	F	COM
00571	034	190	828	16.000	190	828	16.000	05/03/9	F	COM
572	034	191	829	16.000	191	829	16.000	05/03/9	F	COM
573	034	190	828	16.000	190	828	16.000	05/03/9	F	COM
574	034	191	829	16.000	191	829	16.000	05/03/9	F	COM
575	034	190	828	16.000	190	828	16.000	05/03/9	F	COM
576	034	191	829	16.000	191	829	16.000	05/03/9	F	COM
00577	034	192	828	15.950	192	828	15.950	09/03/9	F	COM
578	034	191	829	16.000	191	829	16.000	09/03/9	F	COM
579	034	192	828	15.950	192	828	15.950	09/03/9	F	COM
580	034	191	829	16.000	191	829	16.000	09/03/9	F	COM
581	034	192	828	15.950	192	828	15.950	09/03/9	F	COM
582	034	191	829	16.000	191	829	16.000	09/03/9	F	COM
00583	034	194	828	15.900	194	828	15.900	08/03/9	F	COM
584	034	193	829	15.950	193	829	15.950	08/03/9	F	COM
585	034	194	828	15.900	194	828	15.900	08/03/9	F	COM
586	034	193	829	15.950	193	829	15.950	08/03/9	F	COM
587	034	194	828	15.900	194	828	15.900	08/03/9	F	COM
588	034	193	829	15.950	193	829	15.950	08/03/9	F	COM
00589	034	194	828	15.900	194	828	15.900	07/03/9	F	COM
590	034	195	829	15.900	195	829	15.900	07/03/9	F	COM
591	034	194	828	15.900	194	828	15.900	07/03/9	F	COM
592	034	195	829	15.900	195	829	15.900	07/03/9	F	COM
593	034	194	828	15.900	194	828	15.900	07/03/9	F	COM
594	034	195	829	15.900	195	829	15.900	07/03/9	F	COM
00595	034	196	828	15.850	196	828	15.850	07/03/9	F	COM
596	034	197	829	15.850	197	829	15.850	07/03/9	F	COM
597	034	196	828	15.850	196	828	15.850	07/03/9	F	COM
598	034	197	829	15.850	197	829	15.850	07/03/9	F	COM
599	034	196	828	15.850	196	828	15.850	07/03/9	F	COM
600	034	197	829	15.850	197	829	15.850	07/03/9	F	COM
00601	034	198	828	15.800	198	828	15.800	07/03/9	F	COM
602	034	197	829	15.850	197	829	15.850	07/03/9	F	COM
603	034	198	828	15.800	198	828	15.800	07/03/9	F	COM
604	034	197	829	15.850	197	829	15.850	07/03/9	F	COM
605	034	198	828	15.800	198	828	15.800	07/03/9	F	COM
606	034	197	829	15.850	197	829	15.850	07/03/9	F	COM
00607	034	198	828	15.800	198	828	15.800	08/03/9	F	COM
608	034	199	829	15.800	199	829	15.800	08/03/9	F	COM
609	034	198	828	15.800	198	828	15.800	08/03/9	F	COM
610	034	199	829	15.800	199	829	15.800	08/03/9	F	COM
611	034	198	828	15.800	198	828	15.800	08/03/9	F	COM
612	034	199	829	15.800	199	829	15.800	08/03/9	F	COM

LINE	DIR	FSP	LSP	KMS	FPSP	LPSP	TOTPKM	DATE		STAT
00613	034	200	828	15.750	200	828	15.750	08/03/9	F	COM
614	034	201	829	15.750	201	829	15.750	08/03/9	F	COM
615	034	200	828	15.750	200	828	15.750	08/03/9	F	COM
616	034	201	829	15.750	201	829	15.750	08/03/9	F	COM
617	034	200	828	15.750	200	828	15.750	08/03/9	F	COM
618	034	201	829	15.750	201	829	15.750	08/03/9	F	COM
00619	034	202	828	15.700	202	828	15.700	09/03/9	F	COM
620	034	201	829	15.750	201	829	15.750	09/03/9	F	COM
621	034	202	828	15.700	202	828	15.700	09/03/9	F	COM
622	034	201	829	15.750	201	829	15.750	09/03/9	F	COM
623	034	202	828	15.700	202	828	15.700	09/03/9	F	COM
624	034	201	829	15.750	201	829	15.750	09/03/9	F	COM
00625	214	203	829	15.700	203	829	15.700	10/03/9	F	COM
626	214	204	828	15.650	204	828	15.650	10/03/9	F	COM
627	214	203	829	15.700	203	829	15.700	10/03/9	F	COM
628	214	204	828	15.650	204	828	15.650	10/03/9	F	COM
629	214	203	829	15.700	203	829	15.700	10/03/9	F	COM
630	214	204	828	15.650	204	828	15.650	10/03/9	F	COM
00631	034	204	828	15.650	234	828	14.900	09/03/9	T	TBC
632	034	205	829	15.650	233	829	14.950	09/03/9	T	TBC
633	034	204	828	15.650	234	828	14.900	09/03/9	T	TBC
634	034	205	829	15.650	233	829	14.950	09/03/9	T	TBC
635	034	204	828	15.650	234	828	14.900	09/03/9	T	TBC
636	034	205	829	15.650	233	829	14.950	09/03/9	T	TBC
00637	214	747	129	15.500	747	129	15.500	09/03/9	F	COM
638	214	748	128	15.550	748	128	15.550	09/03/9	F	COM
639	214	747	129	15.500	747	129	15.500	09/03/9	F	COM
640	214	748	128	15.550	748	128	15.550	09/03/9	F	COM
641	214	747	129	15.500	747	129	15.500	09/03/9	F	COM
642	214	748	128	15.550	748	128	15.550	09/03/9	F	COM
00643	214	743	129	15.400	743	129	15.400	08/03/9	F	COM
644	214	744	130	15.400	744	130	15.400	08/03/9	F	COM
645	214	743	129	15.400	743	129	15.400	08/03/9	F	COM
646	214	744	130	15.400	744	130	15.400	08/03/9	F	COM
647	214	743	129	15.400	743	129	15.400	08/03/9	F	COM
648	214	744	130	15.400	744	130	15.400	08/03/9	F	COM
00649	214	739	131	15.250	739	131	15.250	08/03/9	F	COM
650	214	740	132	15.250	740	132	15.250	08/03/9	F	COM
651	214	739	131	15.250	739	131	15.250	08/03/9	F	COM
652	214	740	132	15.250	740	132	15.250	08/03/9	F	COM
653	214	739	131	15.250	739	131	15.250	08/03/9	F	COM
654	214	740	132	15.250	740	132	15.250	08/03/9	F	COM
00655	214	735	133	15.100	735	133	15.100	04/03/9	F	COM
656	214	734	132	15.100	734	132	15.100	04/03/9	F	COM
657	214	735	133	15.100	735	133	15.100	04/03/9	F	COM
658	214	734	132	15.100	734	132	15.100	04/03/9	F	COM
659	214	735	133	15.100	735	133	15.100	04/03/9	F	COM
660	214	734	132	15.100	734	132	15.100	04/03/9	F	COM

LINE	DIR	FSP	LSP	KMS	FPSP	LPSP	TOTPKM	DATE		STAT
00661	214	731	513	5.500	731	513	5.500	25/02/9	F	MSP
00661	214	511	133	9.500	511	133	9.500	26/02/9	F	COM
662	214	732	512	5.550	732	512	5.550	25/02/9	F	MSP
662	214	510	134	9.450	510	134	9.450	26/02/9	F	COM
663	214	731	513	5.500	731	513	5.500	25/02/9	F	MSP
663	214	511	133	9.500	511	133	9.500	26/02/9	F	COM
664	214	732	512	5.550	732	512	5.550	25/02/9	F	MSP
664	214	510	134	9.450	510	134	9.450	26/02/9	F	COM
665	214	731	513	5.500	731	513	5.500	25/02/9	F	MSP
665	214	511	133	9.500	511	133	9.500	26/02/9	F	COM
666	214	732	512	5.550	732	512	5.550	25/02/9	F	MSP
666	214	510	134	9.450	510	134	9.450	26/02/9	F	COM
00667	214	727	135	14.850	727	135	14.850	22/02/9	F	COM
668	214	728	136	14.850	728	136	14.850	22/02/9	F	COM
669	214	727	135	14.850	727	135	14.850	22/02/9	F	COM
670	214	728	136	14.850	728	136	14.850	22/02/9	F	COM
671	214	727	135	14.850	727	135	14.850	22/02/9	F	COM
672	214	728	136	14.850	728	136	14.850	22/02/9	F	COM
00673	214	723	137	14.700	723	137	14.700	23/02/9	F	COM
674	214	724	136	14.750	724	136	14.750	23/02/9	F	COM
675	214	723	137	14.700	723	137	14.700	23/02/9	F	COM
676	214	724	136	14.750	724	136	14.750	23/02/9	F	COM
677	214	723	137	14.700	723	137	14.700	23/02/9	F	COM
678	214	724	136	14.750	724	136	14.750	23/02/9	F	COM
00679	214	719	139	14.550	719	139	14.550	23/02/9	F	COM
680	214	720	138	14.600	720	138	14.600	23/02/9	F	COM
681	214	719	139	14.550	719	139	14.550	23/02/9	F	COM
682	214	720	138	14.600	720	138	14.600	23/02/9	F	COM
683	214	719	139	14.550	719	139	14.550	23/02/9	F	COM
684	214	720	138	14.600	720	138	14.600	23/02/9	F	COM
00685	214	715	139	14.450	715	139	14.450	24/02/9	F	COM
686	214	716	140	14.450	716	140	14.450	24/02/9	F	COM
687	214	715	139	14.450	715	139	14.450	24/02/9	F	COM
688	214	716	140	14.450	716	140	14.450	24/02/9	F	COM
689	214	715	139	14.450	715	139	14.450	24/02/9	F	COM
690	214	716	140	14.450	716	140	14.450	24/02/9	F	COM
00691	214	711	141	14.300	711	141	14.300	25/02/9	F	COM
692	214	712	142	14.300	712	142	14.300	25/02/9	F	COM
693	214	711	141	14.300	711	141	14.300	25/02/9	F	COM
694	214	712	142	14.300	712	142	14.300	25/02/9	F	COM
695	214	711	141	14.300	711	141	14.300	25/02/9	F	COM
696	214	712	142	14.300	712	142	14.300	25/02/9	F	COM
00697	214	709	151	14.000	709	151	14.000	25/02/9	F	LCC
698	214	708	150	14.000	708	150	14.000	25/02/9	F	LCC
699	214	709	151	14.000	709	151	14.000	25/02/9	F	LCC
700	214	708	150	14.000	708	150	14.000	25/02/9	F	LCC
701	214	709	151	14.000	709	151	14.000	25/02/9	F	LCC
702	214	708	150	14.000	708	150	14.000	25/02/9	F	LCC
00703	214	705	143	14.100	705	143	14.100	26/02/9	F	COM
704	214	704	144	14.050	704	144	14.050	26/02/9	F	COM
705	214	705	143	14.100	705	143	14.100	26/02/9	F	COM
706	214	704	144	14.050	704	144	14.050	26/02/9	F	COM
707	214	705	143	14.100	705	143	14.100	26/02/9	F	COM
708	214	704	144	14.050	704	144	14.050	26/02/9	F	COM

LINE	DIR	FSP	LSP	KMS	FPSP	LPSP	TOTPKM	DATE		STAT
00709	214	701	145	13.950	701	145	13.950	24/02/9	F	COM
710	214	700	146	13.900	700	146	13.900	24/02/9	F	COM
711	214	701	145	13.950	701	145	13.950	24/02/9	F	COM
712	214	700	146	13.900	700	146	13.900	24/02/9	F	COM
713	214	701	145	13.950	701	145	13.950	24/02/9	F	COM
714	214	700	146	13.900	700	146	13.900	24/02/9	F	COM
00715	214	697	147	13.800	697	147	13.800	23/02/9	F	COM
716	214	696	146	13.800	696	146	13.800	23/02/9	F	COM
717	214	697	147	13.800	697	147	13.800	23/02/9	F	COM
718	214	696	146	13.800	696	146	13.800	23/02/9	F	COM
719	214	697	147	13.800	697	147	13.800	23/02/9	F	COM
720	214	696	146	13.800	696	146	13.800	23/02/9	F	COM
00721	214	693	149	13.650	693	149	13.650	22/02/9	F	COM
722	214	692	148	13.650	692	148	13.650	22/02/9	F	COM
723	214	693	149	13.650	693	149	13.650	22/02/9	F	COM
724	214	692	148	13.650	692	148	13.650	22/02/9	F	COM
725	214	693	149	13.650	693	149	13.650	22/02/9	F	COM
726	214	692	148	13.650	692	148	13.650	22/02/9	F	COM
00727	214	689	149	13.550	689	149	13.550	22/02/9	F	COM
728	214	688	150	13.500	688	150	13.500	22/02/9	F	COM
729	214	689	149	13.550	689	149	13.550	22/02/9	F	COM
730	214	688	150	13.500	688	150	13.500	22/02/9	F	COM
731	214	689	149	13.550	689	149	13.550	22/02/9	F	COM
732	214	688	150	13.500	688	150	13.500	22/02/9	F	COM
00733	214	685	151	13.400	685	151	13.400	24/02/9	F	COM
734	214	684	150	13.400	684	150	13.400	24/02/9	F	COM
735	214	685	151	13.400	685	151	13.400	24/02/9	F	COM
736	214	684	150	13.400	684	150	13.400	24/02/9	F	COM
737	214	685	151	13.400	685	151	13.400	24/02/9	F	COM
738	214	684	150	13.400	684	150	13.400	24/02/9	F	COM
00739	214	681	153	13.250	681	153	13.250	27/02/9	F	COM
740	214	680	152	13.250	680	152	13.250	27/02/9	F	COM
741	214	681	153	13.250	681	153	13.250	27/02/9	F	COM
742	214	680	152	13.250	680	152	13.250	27/02/9	F	COM
743	214	681	153	13.250	681	153	13.250	27/02/9	F	COM
744	214	680	152	13.250	680	152	13.250	27/02/9	F	COM
00745	214	677	153	13.150	677	153	13.150	03/03/9	F	COM
746	214	676	154	13.100	676	154	13.100	03/03/9	F	COM
747	214	677	153	13.150	677	153	13.150	03/03/9	F	COM
748	214	676	154	13.100	676	154	13.100	03/03/9	F	COM
749	214	677	153	13.150	677	153	13.150	03/03/9	F	COM
750	214	676	154	13.100	676	154	13.100	03/03/9	F	COM
00751	214	673	155	13.000	673	155	13.000	25/02/9	F	COM
752	214	672	156	12.950	672	156	12.950	25/02/9	F	COM
753	214	673	155	13.000	673	155	13.000	25/02/9	F	COM
754	214	672	156	12.950	672	156	12.950	25/02/9	F	COM
755	214	673	155	13.000	673	155	13.000	25/02/9	F	COM
756	214	672	156	12.950	672	156	12.950	25/02/9	F	COM
00757	214	669	157	12.850	669	157	12.850	04/03/9	F	COM
758	214	668	156	12.850	668	156	12.850	04/03/9	F	COM
759	214	669	157	12.850	669	157	12.850	04/03/9	F	COM
760	214	668	156	12.850	668	156	12.850	04/03/9	F	COM
761	214	669	157	12.850	669	157	12.850	04/03/9	F	COM
762	214	668	156	12.850	668	156	12.850	04/03/9	F	COM

LINE	DIR	FSP	LSP	KMS	FPSP	LPSP	TOTPKM	DATE		STAT
00763	214	665	159	12.700	665	159	12.700	04/03/9	F	COM
764	214	664	158	12.700	664	158	12.700	04/03/9	F	COM
765	214	665	159	12.700	665	159	12.700	04/03/9	F	COM
766	214	664	158	12.700	664	158	12.700	04/03/9	F	COM
767	214	665	159	12.700	665	159	12.700	04/03/9	F	COM
768	214	664	158	12.700	664	158	12.700	04/03/9	F	COM
00769	214	661	159	12.600	661	159	12.600	03/03/9	F	COM
770	214	660	160	12.550	660	160	12.550	03/03/9	F	COM
771	214	661	159	12.600	661	159	12.600	03/03/9	F	COM
772	214	660	160	12.550	660	160	12.550	03/03/9	F	COM
773	214	661	159	12.600	661	159	12.600	03/03/9	F	COM
774	214	660	160	12.550	660	160	12.550	03/03/9	F	COM
00775	214	657	161	12.450	657	161	12.450	27/02/9	F	COM
776	214	656	160	12.450	656	160	12.450	27/02/9	F	COM
777	214	657	161	12.450	657	161	12.450	27/02/9	F	COM
778	214	656	160	12.450	656	160	12.450	27/02/9	F	COM
779	214	657	161	12.450	657	161	12.450	27/02/9	F	COM
780	214	656	160	12.450	656	160	12.450	27/02/9	F	COM
00781	214	653	163	12.300	653	163	12.300	02/03/9	F	COM
782	214	652	162	12.300	652	162	12.300	02/03/9	F	COM
783	214	653	163	12.300	653	163	12.300	02/03/9	F	COM
784	214	652	162	12.300	652	162	12.300	02/03/9	F	COM
785	214	653	163	12.300	653	163	12.300	02/03/9	F	COM
786	214	652	162	12.300	652	162	12.300	02/03/9	F	COM
00787	214	649	163	12.200	649	163	12.200	05/03/9	F	COM
788	214	648	164	12.150	648	164	12.150	05/03/9	F	COM
789	214	649	163	12.200	649	163	12.200	05/03/9	F	COM
790	214	648	164	12.150	648	164	12.150	05/03/9	F	COM
791	214	649	163	12.200	649	163	12.200	05/03/9	F	COM
792	214	648	164	12.150	648	164	12.150	05/03/9	F	COM
00793	214	645	165	12.050	645	165	12.050	06/03/9	F	COM
794	214	644	166	12.000	644	166	12.000	06/03/9	F	COM
795	214	645	165	12.050	645	165	12.050	06/03/9	F	COM
796	214	644	166	12.000	644	166	12.000	06/03/9	F	COM
797	214	645	165	12.050	645	165	12.050	06/03/9	F	COM
798	214	644	166	12.000	644	166	12.000	06/03/9	F	COM
00799	214	641	167	11.900	641	167	11.900	06/03/9	F	COM
800	214	640	166	11.900	640	166	11.900	06/03/9	F	COM
801	214	641	167	11.900	641	167	11.900	06/03/9	F	COM
802	214	640	166	11.900	640	166	11.900	06/03/9	F	COM
803	214	641	167	11.900	641	167	11.900	06/03/9	F	COM
804	214	640	166	11.900	640	166	11.900	06/03/9	F	COM
00805	214	637	169	11.750	637	169	11.750	05/03/9	F	COM
806	214	636	168	11.750	636	168	11.750	05/03/9	F	COM
807	214	637	169	11.750	637	169	11.750	05/03/9	F	COM
808	214	636	168	11.750	636	168	11.750	05/03/9	F	COM
809	214	637	169	11.750	637	169	11.750	05/03/9	F	COM
810	214	636	168	11.750	636	168	11.750	05/03/9	F	COM
00811	214	614	170	11.150	614	170	11.150	07/03/9	F	TBC
812	214	613	169	11.150	613	169	11.150	07/03/9	F	TBC
813	214	614	170	11.150	614	170	11.150	07/03/9	F	TBC
814	214	613	169	11.150	613	169	11.150	07/03/9	F	TBC
815	214	614	170	11.150	614	170	11.150	07/03/9	F	TBC
816	214	613	169	11.150	613	169	11.150	07/03/9	F	TBC

LINE	DIR	FSP	LSP	KMS	FPSP	LPSP	TOTPKM	DATE		STAT
00817	214	629	171	11.500	629	171	11.500	07/03/9	F	COM
818	214	628	170	11.500	628	170	11.500	07/03/9	F	COM
819	214	629	171	11.500	629	171	11.500	07/03/9	F	COM
820	214	628	170	11.500	628	170	11.500	07/03/9	F	COM
821	214	629	171	11.500	629	171	11.500	07/03/9	F	COM
822	214	628	170	11.500	628	170	11.500	07/03/9	F	COM
00823	214	625	173	11.350	625	173	11.350	09/03/9	F	COM
824	214	624	172	11.350	624	172	11.350	09/03/9	F	COM
825	214	625	173	11.350	625	173	11.350	09/03/9	F	COM
826	214	624	172	11.350	624	172	11.350	09/03/9	F	COM
827	214	625	173	11.350	625	173	11.350	09/03/9	F	COM
828	214	624	172	11.350	624	172	11.350	09/03/9	F	COM
00829	214	621	173	11.250	621	173	11.250	09/03/9	F	COM
830	214	620	174	11.200	620	174	11.200	09/03/9	F	COM
831	214	621	173	11.250	621	173	11.250	09/03/9	F	COM
832	214	620	174	11.200	620	174	11.200	09/03/9	F	COM
833	214	621	173	11.250	621	173	11.250	09/03/9	F	COM
834	214	620	174	11.200	620	174	11.200	09/03/9	F	COM
00835	214	617	175	11.100	617	175	11.100	09/03/9	F	COM
836	214	616	176	11.050	616	176	11.050	09/03/9	F	COM
837	214	617	175	11.100	617	175	11.100	09/03/9	F	COM
838	214	616	176	11.050	616	176	11.050	09/03/9	F	COM
839	214	617	175	11.100	617	175	11.100	09/03/9	F	COM
840	214	616	176	11.050	616	176	11.050	09/03/9	F	COM
00841	214	613	173	11.050	613	173	11.050	07/03/9	F	COM
842	214	612	172	11.050	612	172	11.050	07/03/9	F	COM
843	214	613	173	11.050	613	173	11.050	07/03/9	F	COM
844	214	612	172	11.050	612	172	11.050	07/03/9	F	COM
845	214	613	173	11.050	613	173	11.050	07/03/9	F	COM
846	214	612	172	11.050	612	172	11.050	07/03/9	F	COM
00847	214	609	179	10.800	609	179	10.800	03/03/9	F	COM
848	214	608	178	10.800	608	178	10.800	03/03/9	F	COM
849	214	609	179	10.800	609	179	10.800	03/03/9	F	COM
850	214	608	178	10.800	608	178	10.800	03/03/9	F	COM
851	214	609	179	10.800	609	179	10.800	03/03/9	F	COM
852	214	608	178	10.800	608	178	10.800	03/03/9	F	COM
00853	214	605	179	10.700	605	179	10.700	07/03/9	F	COM
854	214	604	180	10.650	604	180	10.650	07/03/9	F	COM
855	214	605	179	10.700	605	179	10.700	07/03/9	F	COM
856	214	604	180	10.650	604	180	10.650	07/03/9	F	COM
857	214	605	179	10.700	605	179	10.700	07/03/9	F	COM
858	214	604	180	10.650	604	180	10.650	07/03/9	F	COM
00859	214	601	189	10.350	601	189	10.350	08/03/9	F	COM
860	214	600	188	10.350	600	188	10.350	08/03/9	F	COM
861	214	601	189	10.350	601	189	10.350	08/03/9	F	COM
862	214	600	188	10.350	600	188	10.350	08/03/9	F	COM
863	214	601	189	10.350	601	189	10.350	08/03/9	F	COM
864	214	600	188	10.350	600	188	10.350	08/03/9	F	COM
01055	214	357	41	7.950	357	41	7.950	13/03/9	F	COM
1056	214	358	40	8.000	358	40	8.000	13/03/9	F	COM
1057	214	357	41	7.950	357	41	7.950	13/03/9	F	COM
1058	214	358	40	8.000	358	40	8.000	13/03/9	F	COM
1059	214	357	41	7.950	357	41	7.950	13/03/9	F	COM
1060	214	358	40	8.000	358	40	8.000	13/03/9	F	COM

LINE	DIR	FSP	LSP	KMS	FPSP	LPSP	TOTPKM	DATE		STAT
01067	214	339	231	2.750	339	231	2.750	10/03/9	F	MSP
01067	214	229	41	4.750	229	41	4.750	11/03/9	F	COM
1068	214	340	230	2.800	340	230	2.800	10/03/9	F	MSP
1068	214	228	40	4.750	228	40	4.750	11/03/9	F	COM
1069	214	339	231	2.750	339	231	2.750	10/03/9	F	MSP
1069	214	229	41	4.750	229	41	4.750	11/03/9	F	COM
1070	214	340	230	2.800	340	230	2.800	10/03/9	F	MSP
1070	214	228	40	4.750	228	40	4.750	11/03/9	F	COM
1071	214	339	231	2.750	339	231	2.750	10/03/9	F	MSP
1071	214	229	41	4.750	229	41	4.750	11/03/9	F	COM
1072	214	340	230	2.800	340	230	2.800	10/03/9	F	MSP
1072	214	228	40	4.750	228	40	4.750	11/03/9	F	COM
01085	214	183	41	3.600	183	41	3.600	13/03/9	F	COM
1086	214	184	40	3.650	184	40	3.650	13/03/9	F	COM
1087	214	183	41	3.600	183	41	3.600	13/03/9	F	COM
1088	214	184	40	3.650	184	40	3.650	13/03/9	F	COM
1089	214	183	41	3.600	183	41	3.600	13/03/9	F	COM
1090	214	184	40	3.650	184	40	3.650	13/03/9	F	COM
01115	214	419	81	8.500	419	81	8.500	12/03/9	F	COM
1116	214	420	80	8.550	420	80	8.550	12/03/9	F	COM
1117	214	419	81	8.500	419	81	8.500	12/03/9	F	COM
1118	214	420	80	8.550	420	80	8.550	12/03/9	F	COM
1119	214	419	81	8.500	419	81	8.500	12/03/9	F	COM
1120	214	420	80	8.550	420	80	8.550	12/03/9	F	COM
01133	214	409	41	9.250	409	41	9.250	10/03/9	F	COM
1134	214	410	40	9.300	410	40	9.300	10/03/9	F	COM
1135	214	409	41	9.250	409	41	9.250	10/03/9	F	COM
1136	214	410	40	9.300	410	40	9.300	10/03/9	F	COM
1137	214	409	41	9.250	409	41	9.250	10/03/9	F	COM
1138	214	410	40	9.300	410	40	9.300	10/03/9	F	COM
01145	214	399	39	9.050	399	39	9.050	10/03/9	F	COM
1146	214	400	38	9.100	400	38	9.100	10/03/9	F	COM
1147	214	399	39	9.050	399	39	9.050	10/03/9	F	COM
1148	214	400	38	9.100	400	38	9.100	10/03/9	F	COM
1149	214	399	39	9.050	399	39	9.050	10/03/9	F	COM
1150	214	400	38	9.100	400	38	9.100	10/03/9	F	COM
01187	214	509	41	11.750	509	41	11.750	10/03/9	F	COM
1188	214	510	40	11.800	510	40	11.800	10/03/9	F	COM
1189	214	509	41	11.750	509	41	11.750	10/03/9	F	COM
1190	214	510	40	11.800	510	40	11.800	10/03/9	F	COM
1191	214	509	41	11.750	509	41	11.750	10/03/9	F	COM
1192	214	510	40	11.800	510	40	11.800	10/03/9	F	COM
01343	034	140	780	16.050	140	780	16.050	11/03/9	F	COM
1344	034	141	779	16.000	141	779	16.000	11/03/9	F	COM
1345	034	140	780	16.050	140	780	16.050	11/03/9	F	COM
1346	034	141	779	16.000	141	779	16.000	11/03/9	F	COM
1347	034	140	780	16.050	140	780	16.050	11/03/9	F	COM
1348	034	141	779	16.000	141	779	16.000	11/03/9	F	COM
01349	034	140	370	5.800	140	370	5.800	10/03/9	F	COM
1350	034	141	369	5.750	141	369	5.750	10/03/9	F	COM
1351	034	140	370	5.800	140	370	5.800	10/03/9	F	COM
1352	034	141	369	5.750	141	369	5.750	10/03/9	F	COM
1353	034	140	370	5.800	140	370	5.800	10/03/9	F	COM
1354	034	141	369	5.750	141	369	5.750	10/03/9	F	COM

LINE	DIR	FSP	LSP	KMS	FPSP	LPSP	TOTPKM	DATE	STAT
01367	034	150	810	16.550	150	810	16.550	10/03/9 F	COM
1368	034	151	809	16.500	151	809	16.500	10/03/9 F	COM
1369	034	150	810	16.550	150	810	16.550	10/03/9 F	COM
1370	034	151	809	16.500	151	809	16.500	10/03/9 F	COM
1371	034	150	810	16.550	150	810	16.550	10/03/9 F	COM
1372	034	151	809	16.500	151	809	16.500	10/03/9 F	COM
01421	034	300	824	13.150	300	824	13.150	12/03/9 F	COM
1422	034	301	825	13.150	301	825	13.150	12/03/9 F	COM
1423	034	300	824	13.150	300	824	13.150	12/03/9 F	COM
1424	034	301	825	13.150	301	825	13.150	12/03/9 F	COM
1425	034	300	824	13.150	300	824	13.150	12/03/9 F	COM
1426	034	301	825	13.150	301	825	13.150	12/03/9 F	COM
01439	034	170	544	9.400	170	544	9.400	13/03/9 F	COM
1440	034	171	545	9.400	171	545	9.400	13/03/9 F	COM
1441	034	170	544	9.400	170	544	9.400	13/03/9 F	COM
1442	034	171	545	9.400	171	545	9.400	13/03/9 F	COM
1443	034	170	544	9.400	170	544	9.400	13/03/9 F	COM
1444	034	171	545	9.400	171	545	9.400	13/03/9 F	COM
01451	034	170	820	16.300	170	820	16.300	13/03/9 F	COM
1452	034	171	819	16.250	171	819	16.250	13/03/9 F	COM
1453	034	170	820	16.300	170	820	16.300	13/03/9 F	COM
1454	034	171	819	16.250	171	819	16.250	13/03/9 F	COM
1455	034	170	820	16.300	170	820	16.300	13/03/9 F	COM
1456	034	171	819	16.250	171	819	16.250	13/03/9 F	COM
01469	034	176	820	16.150	176	820	16.150	12/03/9 F	COM
1470	034	175	819	16.150	175	819	16.150	12/03/9 F	COM
1471	034	176	820	16.150	176	820	16.150	12/03/9 F	COM
1472	034	175	819	16.150	175	819	16.150	12/03/9 F	COM
1473	034	176	820	16.150	176	820	16.150	12/03/9 F	COM
1474	034	175	819	16.150	175	819	16.150	12/03/9 F	COM
01487	034	170	820	16.300	170	820	16.300	13/03/9 F	COM
1488	034	171	819	16.250	171	819	16.250	13/03/9 F	COM
1489	034	170	820	16.300	170	820	16.300	13/03/9 F	COM
1490	034	171	819	16.250	171	819	16.250	13/03/9 F	COM
1491	034	170	820	16.300	170	820	16.300	13/03/9 F	COM
1492	034	171	819	16.250	171	819	16.250	13/03/9 F	COM
01499	034	174	820	16.200	174	820	16.200	15/03/9 F	COM
1500	034	173	819	16.200	173	819	16.200	15/03/9 F	COM
1501	034	174	820	16.200	174	820	16.200	15/03/9 F	COM
1502	034	173	819	16.200	173	819	16.200	15/03/9 F	COM
1503	034	174	820	16.200	174	820	16.200	15/03/9 F	COM
1504	034	173	819	16.200	173	819	16.200	15/03/9 F	COM
01517	034	178	820	16.100	178	820	16.100	14/03/9 F	COM
1518	034	177	819	16.100	177	819	16.100	14/03/9 F	COM
1519	034	178	820	16.100	178	820	16.100	14/03/9 F	COM
1520	034	177	819	16.100	177	819	16.100	14/03/9 F	COM
1521	034	178	820	16.100	178	820	16.100	14/03/9 F	COM
1522	034	177	819	16.100	177	819	16.100	14/03/9 F	COM
01595	034	336	820	12.150	336	820	12.150	15/03/9 F	COM
1596	034	335	819	12.150	335	819	12.150	15/03/9 F	COM
1597	034	336	820	12.150	336	820	12.150	15/03/9 F	COM
1598	034	335	819	12.150	335	819	12.150	15/03/9 F	COM
1599	034	336	820	12.150	336	820	12.150	15/03/9 F	COM
1600	034	335	819	12.150	335	819	12.150	15/03/9 F	COM

LINE	DIR	FSP	LSP	KMS	FPSP	LPSP	TOTPKM	DATE		STAT
01637	034	206	820	15.400	206	820	15.400	14/03/9	F	COM
1638	034	207	819	15.350	207	819	15.350	14/03/9	F	COM
1639	034	206	820	15.400	206	820	15.400	14/03/9	F	COM
1640	034	207	819	15.350	207	819	15.350	14/03/9	F	COM
1641	034	206	820	15.400	206	820	15.400	14/03/9	F	COM
1642	034	207	819	15.350	207	819	15.350	14/03/9	F	COM
01649	214	735	683	1.350	735	683	1.350	15/03/9	F	MSP
01649	214	681	365	7.950	681	365	7.950	16/03/9	F	COM
1650	214	734	684	1.300	734	684	1.300	15/03/9	F	MSP
1650	214	682	366	7.950	682	366	7.950	16/03/9	F	COM
1651	214	735	683	1.350	735	683	1.350	15/03/9	F	MSP
1651	214	681	365	7.950	681	365	7.950	16/03/9	F	COM
1652	214	734	684	1.300	734	684	1.300	15/03/9	F	MSP
1652	214	682	366	7.950	682	366	7.950	16/03/9	F	COM
1653	214	735	683	1.350	735	683	1.350	15/03/9	F	MSP
1653	214	681	365	7.950	681	365	7.950	16/03/9	F	COM
1654	214	734	684	1.300	734	684	1.300	15/03/9	F	MSP
1654	214	682	366	7.950	682	366	7.950	16/03/9	F	COM
01661	214	605	141	11.650	605	141	11.650	16/03/9	F	COM
1662	214	604	140	11.650	604	140	11.650	16/03/9	F	COM
1663	214	605	141	11.650	605	141	11.650	16/03/9	F	COM
1664	214	604	140	11.650	604	140	11.650	16/03/9	F	COM
1665	214	605	141	11.650	605	141	11.650	16/03/9	F	COM
1666	214	604	140	11.650	604	140	11.650	16/03/9	F	COM
01667	214	719	175	13.650	719	175	13.650	15/03/9	F	COM
1668	214	720	176	13.650	720	176	13.650	15/03/9	F	COM
1669	214	719	175	13.650	719	175	13.650	15/03/9	F	COM
1670	214	720	176	13.650	720	176	13.650	15/03/9	F	COM
1671	214	719	175	13.650	719	175	13.650	15/03/9	F	COM
1672	214	720	176	13.650	720	176	13.650	15/03/9	F	COM
01679	214	449	141	7.750	449	141	7.750	13/03/9	F	COM
1680	214	450	140	7.800	450	140	7.800	13/03/9	F	COM
1681	214	449	141	7.750	449	141	7.750	13/03/9	F	COM
1682	214	450	140	7.800	450	140	7.800	13/03/9	F	COM
1683	214	449	141	7.750	449	141	7.750	13/03/9	F	COM
1684	214	450	140	7.800	450	140	7.800	13/03/9	F	COM
01685	214	679	145	13.400	679	145	13.400	15/03/9	F	COM
1686	214	680	146	13.400	680	146	13.400	15/03/9	F	COM
1687	214	679	145	13.400	679	145	13.400	15/03/9	F	COM
1688	214	680	146	13.400	680	146	13.400	15/03/9	F	COM
1689	214	679	145	13.400	679	145	13.400	15/03/9	F	COM
1690	214	680	146	13.400	680	146	13.400	15/03/9	F	COM
01709	214	701	155	13.700	701	155	13.700	14/03/9	F	COM
1710	214	700	156	13.650	700	156	13.650	14/03/9	F	COM
1711	214	701	155	13.700	701	155	13.700	14/03/9	F	COM
1712	214	700	156	13.650	700	156	13.650	14/03/9	F	COM
1713	214	701	155	13.700	701	155	13.700	14/03/9	F	COM
1714	214	700	156	13.650	700	156	13.650	14/03/9	F	COM
01739	214	681	161	13.050	681	161	13.050	14/03/9	F	COM
1740	214	680	160	13.050	680	160	13.050	14/03/9	F	COM
1741	214	681	161	13.050	681	161	13.050	14/03/9	F	COM
1742	214	680	160	13.050	680	160	13.050	14/03/9	F	COM
1743	214	681	161	13.050	681	161	13.050	14/03/9	F	COM
1744	214	680	160	13.050	680	160	13.050	14/03/9	F	COM

LINE	DIR	FSP	LSP	KMS	FPSP	LPSP	TOTPKM	DATE	STAT
01751	214	555	161	9.900	555	161	9.900	15/03/9 F	COM
1752	214	556	160	9.950	556	160	9.950	15/03/9 F	COM
1753	214	555	161	9.900	555	161	9.900	15/03/9 F	COM
1754	214	556	160	9.950	556	160	9.950	15/03/9 F	COM
1755	214	555	161	9.900	555	161	9.900	15/03/9 F	COM
1756	214	556	160	9.950	556	160	9.950	15/03/9 F	COM
01817	034	386	694	7.750	386	694	7.750	15/03/9 F	COM
1818	034	385	695	7.800	385	695	7.800	15/03/9 F	COM
1819	034	386	694	7.750	386	694	7.750	15/03/9 F	COM
1820	034	385	695	7.800	385	695	7.800	15/03/9 F	COM
1821	034	386	694	7.750	386	694	7.750	15/03/9 F	COM
1822	034	385	695	7.800	385	695	7.800	15/03/9 F	COM
01835	034	260	620	9.050	260	620	9.050	15/03/9 F	COM
1836	034	261	619	9.000	261	619	9.000	15/03/9 F	COM
1837	034	260	620	9.050	260	620	9.050	15/03/9 F	COM
1838	034	261	619	9.000	261	619	9.000	15/03/9 F	COM
1839	034	260	620	9.050	260	620	9.050	15/03/9 F	COM
1840	034	261	619	9.000	261	619	9.000	15/03/9 F	COM
10091	214	183	33	3.800	183	33	3.800	12/03/9 F	COM
10092	214	184	32	3.850	184	32	3.850	12/03/9 F	COM
10093	214	183	33	3.800	183	33	3.800	12/03/9 F	COM
10094	214	184	32	3.850	184	32	3.850	12/03/9 F	COM
10095	214	183	33	3.800	183	33	3.800	12/03/9 F	COM
10096	214	184	32	3.850	184	32	3.850	12/03/9 F	COM
10109	214	405	375	0.800	405	375	0.800	13/03/9 F	COM
10110	214	406	374	0.850	406	374	0.850	13/03/9 F	COM
10111	214	405	375	0.800	405	375	0.800	13/03/9 F	COM
10112	214	406	374	0.850	406	374	0.850	13/03/9 F	COM
10113	214	405	375	0.800	405	375	0.800	13/03/9 F	COM
10114	214	406	374	0.850	406	374	0.850	13/03/9 F	COM
10307	034	487	745	6.500	487	745	6.500	15/02/9 F	COM
10308	034	486	744	6.500	486	744	6.500	15/02/9 F	COM
10309	034	487	745	6.500	487	745	6.500	15/02/9 F	COM
10310	034	486	744	6.500	486	744	6.500	15/02/9 F	COM
10311	034	487	745	6.500	487	745	6.500	15/02/9 F	COM
10312	034	486	744	6.500	486	744	6.500	15/02/9 F	COM
10319	034	302	380	2.000	302	380	2.000	12/03/9 F	COM
10320	034	301	379	2.000	301	379	2.000	12/03/9 F	COM
10321	034	302	380	2.000	302	380	2.000	12/03/9 F	COM
10322	034	301	379	2.000	301	379	2.000	12/03/9 F	COM
10323	034	302	380	2.000	302	380	2.000	12/03/9 F	COM
10324	034	301	379	2.000	301	379	2.000	12/03/9 F	COM
10331	034	500	776	6.950	500	776	6.950	21/02/9 F	COM
10332	034	501	775	6.900	501	775	6.900	21/02/9 F	COM
10333	034	500	776	6.950	500	776	6.950	21/02/9 F	COM
10334	034	501	775	6.900	501	775	6.900	21/02/9 F	COM
10335	034	500	776	6.950	500	776	6.950	21/02/9 F	COM
10336	034	501	775	6.900	501	775	6.900	21/02/9 F	COM
10343	034	594	790	4.950	594	790	4.950	10/03/9 F	COM
10344	034	595	789	4.900	595	789	4.900	10/03/9 F	COM
10345	034	594	790	4.950	594	790	4.950	10/03/9 F	COM
10346	034	595	789	4.900	595	789	4.900	10/03/9 F	COM
10347	034	594	790	4.950	594	790	4.950	10/03/9 F	COM
10348	034	595	789	4.900	595	789	4.900	10/03/9 F	COM

APPENDIX A

P190 COMPARISONS

P1/90 Comparisons between ACUMEN and WGC Systems.

Seq No.	Line No.	Date	Dir	Ref Rng	Ref Brg	Src Rng	Src Brg	Stm1 ch1 Rng	Stm1 ch1 Brg	Stm2 ch1 Rng	Stm2 ch1 Brg	Stm3 ch1 Rng	Stm3 ch1 Brg	Stm1 ch240 Rng	Stm1 ch240 Brg	Stm2 ch240 Rng	Stm2 ch240 Brg	Stm3 ch240 Rng	Stm3 ch240 Brg
		34	MIN	1	26	3	58	3	77	2	36	2	51	4	53	8	15	5	33
			MAX	8	266	16	327	12	289	15	337	14	321	18	321	22	330	19	335
			AVG	3	150	6	160	5	174	6	138	5	185	10	152	14	111	10	149
			STD	1	56	3	68	2	42	2	85	2	57	3	64	3	71	3	70
		214	MIN	1	26	2	113	2	41	2	101	2	33	5	59	6	159	6	140
			MAX	9	318	11	307	11	310	15	275	11	334	24	308	26	287	25	313
			AVG	3	175	6	224	5	195	6	203	5	216	11	228	15	233	11	238
			STD	2	58	2	53	2	78	3	37	2	82	4	43	4	27	4	38
2	205	05-Feb	34	4	210	5	163	8	211	3	177	9	194	7	221	9	89	7	213
4	247	06-Feb	34	4	85	6	67	3	149	6	49	4	137	8	175	11	127	8	139
6	211	06-Feb	34	7	175	9	102	12	230	10	94	11	192	13	172	18	77	14	119
8	253	06-Feb	34	3	122	6	263	5	235	5	176	5	276	11	151	15	88	15	94
10	199	06-Feb	34	2	106	3	199	3	242	4	196	3	275	11	285	13	291	11	291
12	259	07-Feb	34	3	106	5	180	4	175	6	201	4	210	12	192	16	183	12	188
14	217	14-Feb	34	1	158	3	158	3	202	4	129	3	224	13	110	16	77	11	109
16	265	11-Feb	34	3	76	5	130	3	175	5	79	3	187	9	116	13	61	8	127
20	271	12-Feb	34	5	41	7	60	3	154	7	40	3	111	10	93	16	60	10	88
22	223	12-Feb	34	3	41	7	85	3	157	6	51	6	155	11	109	18	54	10	131
24	229	12-Feb	34	2	112	5	99	4	195	4	53	6	173	6	156	15	58	8	114
26	277	13-Feb	34	1	207	12	122	7	149	7	101	9	167	11	203	14	73	8	192
27	241	14-Feb	34	1	150	9	109	6	142	7	86	8	165	8	152	15	81	11	117
29	313	14-Feb	34	3	76	6	72	3	249	7	40	4	169	9	201	13	65	8	206
31	235	14-Feb	34	3	94	6	91	4	221	7	38	3	161	8	219	13	68	8	179
33	307	15-Feb	34	4	138	5	85	4	262	7	72	2	196	9	223	15	43	9	72
36	301	15-Feb	34	2	219	9	313	8	256	8	329	6	300	13	293	13	166	12	248
38	283	15-Feb	34	5	35	8	164	4	122	9	108	5	225	9	133	14	57	10	134
40	289	16-Feb	34	1	187	5	279	4	216	5	235	4	241	12	156	17	129	11	157
42	295	16-Feb	34	6	63	16	327	7	279	15	337	10	321	12	176	17	120	16	205
46	337	17-Feb	34	1	96	4	187	3	157	6	67	3	202	12	83	16	56	12	47
48	319	18-Feb	34	4	83	8	211	3	167	9	168	6	155	7	75	15	171	11	115
50	331	18-Feb	34	4	266	9	239	4	122	10	189	6	106	10	53	16	166	15	220
52	325	18-Feb	34	1	171	4	109	5	127	4	70	4	107	13	85	13	39	12	70
54	343	20-Feb	34	4	132	8	85	5	136	8	53	4	100	12	107	18	60	14	89
56	349	20-Feb	34	4	122	9	84	3	148	8	57	5	110	16	63	22	49	16	54
58	379	19-Feb	34	4	45	9	82	5	131	10	65	6	103	13	60	20	48	13	51
60	355	20-Feb	34	3	152	9	94	5	132	8	69	6	127	11	72	16	48	10	60
61	373	20-Feb	34	4	113	9	91	4	147	8	55	4	118	14	66	19	51	17	69
63	367	20-Feb	34	4	170	9	88	5	155	8	51	5	133	10	108	17	58	14	64
63	367	20-Feb	34	4	170	9	88	5	156	8	51	5	133	10	108	17	58	14	64
65	361	21-Feb	34	4	149	9	85	5	131	8	57	5	117	10	131	15	74	10	103
67	385	21-Feb	34	3	79	8	81	3	196	8	47	4	114	11	67	20	31	15	46
69	10331	21-Feb	34	3	107	7	88	3	180	7	55	4	133	9	71	15	42	10	66
71	415	22-Feb	34	1	158	5	114	5	193	5	53	4	177	11	239	17	184	10	164
73	475	22-Feb	34	5	64	7	61	4	253	10	37	4	163	11	224	17	54	12	160
75	391	22-Feb	34	8	46	12	186	7	208	13	68	10	103	14	98	20	15	17	33
77	421	23-Feb	34	7	58	10	115	6	134	12	95	8	113	14	159	20	123	17	164
79	481	23-Feb	34	2	176	3	200	5	149	3	91	3	171	6	96	11	75	6	129
81	427	23-Feb	34	3	202	3	204	5	161	4	128	3	206	8	271	13	268	9	243

83	487	23-Feb	34	1	148	4	104	9	115	5	50	2	209	10	67	13	42	8	106
85	433	23-Feb	34	2	151	5	147	3	164	8	209	3	158	9	62	14	41	12	48
87	493	23-Feb	34	2	191	4	115	3	128	8	203	3	159	10	63	17	43	11	59
89	397	24-Feb	34	2	177	4	119	6	146	3	79	4	147	10	86	13	55	9	63
91	409	24-Feb	34	2	189	3	132	4	139	6	278	2	145	7	66	13	33	10	48
93	499	25-Feb	34	2	145	4	98	5	123	5	90	3	105	9	129	13	121	8	147
95	451	25-Feb	34	2	216	7	103	4	126	5	44	3	181	7	93	10	62	8	91
97	469	25-Feb	34	2	117	5	78	5	123	7	57	6	127	8	76	14	111	8	87
99	403	26-Feb	34	3	179	5	146	6	171	3	139	4	164	4	171	9	131	5	141
102	445	27-Feb	34	2	200	3	174	6	188	3	187	3	192	5	187	9	128	6	170
104	463	27-Feb	34	2	113	4	101	11	121	8	101	7	141	12	86	14	96	11	148
104	463	27-Feb	34	2	84	4	105	6	112	6	158	3	183	14	94	11	56	10	60
106	535	02-Mar	34	2	182	5	237	5	156	4	196	3	245	7	105	8	69	6	121
108	505	02-Mar	34	3	201	7	230	6	173	5	277	5	228	4	200	8	129	5	213
110	511	03-Mar	34	3	173	3	234	6	189	5	305	4	236	7	123	9	95	6	175
114	565	04-Mar	34	3	208	4	210	6	169	3	218	4	205	9	109	9	94	5	145
115	655	04-Mar	34	3	240	7	253	6	289	8	230	5	277	15	266	17	250	13	266
116	529	04-Mar	34	2	226	3	198	4	187	5	225	3	217	7	119	12	121	8	121
118	439	04-Mar	34	2	235	3	223	4	153	6	283	3	237	9	100	12	102	8	146
120	541	04-Mar	34	2	146	4	237	5	190	8	291	4	238	6	173	13	228	9	188
122	571	05-Mar	34	3	200	9	284	7	225	11	308	8	288	9	239	18	316	13	308
126	517	06-Mar	34	3	181	5	243	7	196	6	225	6	251	7	222	11	211	11	269
128	559	06-Mar	34	3	198	5	240	6	191	6	238	5	259	7	193	12	240	10	274
130	547	07-Mar	34	3	177	4	185	7	164	4	166	4	209	6	174	9	154	8	222
132	595	07-Mar	34	2	177	4	221	5	209	5	170	3	242	7	177	14	83	9	123
134	589	07-Mar	34	4	195	6	208	9	215	5	215	6	218	7	189	10	107	6	203
136	601	07-Mar	34	2	149	4	184	6	213	5	142	4	231	11	250	18	184	15	274
138	553	08-Mar	34	2	140	5	180	4	198	7	167	4	241	15	230	22	282	18	287
140	607	08-Mar	34	2	88	6	104	5	136	7	57	4	142	8	82	13	44	7	133
142	583	08-Mar	34	2	143	5	130	6	171	4	73	6	162	6	126	11	45	5	144
144	613	08-Mar	34	5	194	6	171	9	189	2	166	8	189	7	193	9	162	6	223
146	557	09-Mar	34	2	161	10	112	7	128	8	73	7	143	8	88	11	45	6	93
148	619	09-Mar	34	6	184	13	149	12	167	8	137	14	173	9	155	10	82	10	155
150	631	09-Mar	34	4	190	11	142	11	152	7	121	12	165	10	119	8	102	8	153
152	625	10-Mar	34	3	115	10	113	8	125	8	77	7	136	10	108	13	69	8	113
154	1367	10-Mar	34	6	215	12	158	11	171	7	145	11	182	10	138	10	93	9	148
156	1343	10-Mar	34	1	131	4	211	3	165	6	80	4	202	8	196	12	92	10	162
157	10343	10-Mar	34	5	26	6	58	4	77	10	36	5	51	12	113	17	45	12	77
159	1349	10-Mar	34	5	30	6	66	5	92	9	36	4	72	14	243	18	135	13	233
163	1469	12-Mar	34	3	199	7	142	8	154	7	108	6	157	8	146	11	90	9	129
165	10319	12-Mar	34	3	240	5	169	7	205	5	186	6	211	6	162	10	148	9	137
167	1421	12-Mar	34	4	201	4	197	7	183	3	120	4	183	6	136	9	144	7	172
169	1451	12-Mar	34	1	149	4	159	4	172	6	62	3	149	9	188	14	98	11	107
172	1439	13-Mar	34	2	221	4	129	3	146	7	50	3	125	10	109	14	74	13	74
174	1487	13-Mar	34	2	204	4	243	5	190	4	136	4	240	9	210	13	182	11	175
175	1517	14-Mar	34	2	190	4	189	5	180	4	121	4	191	8	204	11	146	9	185
177	1637	14-Mar	34	2	183	6	257	8	218	7	279	5	267	18	246	17	255	16	248
178	1709	14-Mar	34	2	210	6	258	6	237	6	229	5	274	10	186	13	211	8	200
179	1499	14-Mar	34	2	192	4	203	4	180	5	157	3	209	9	255	12	162	11	201
181	1835	15-Mar	34	2	198	5	211	6	187	5	234	4	245	7	223	10	78	8	170
183	1595	15-Mar	34	1	141	5	268	5	191	7	300	6	299	8	201	13	186	13	278
185	1817	15-Mar	34	2	127	9	310	6	244	11	323	9	311	16	321	21	330	19	335
1	13	05-Feb	214	2	109	5	151	4	142	5	164	5	121	12	248	14	249	12	264
3	55	06-Feb	214	2	155	3	127	4	104	3	161	4	63	8	199	14	229	8	216
5	19	06-Feb	214	3	318	4	156	5	93	3	171	3	129	10	252	12	269	12	278
7	61	06-Feb	214	2	192	7	290	9	290	6	264	9	334	22	283	25	280	22	296
9	25	06-Feb	214	2	115	2	246	5	59	4	173	5	33	7	214	13	234	8	245
11	67	07-Feb	214	1	119	3	282	3	41	3	215	5	65	7	183	15	220	7	219
13	49	11-Feb	214	3	202	4	255	7	58	2	213	9	148	14	308	20	287	15	313

15	31	12-Feb	214	2	202	5	264	6	194	4	251	8	313	20	294	26	281	21	299
17	73	11-Feb	214	2	163	4	249	6	193	3	228	7	211	12	286	16	272	13	297
19	37	12-Feb	214	1	168	3	213	4	110	3	203	4	164	7	258	13	257	8	268
21	79	12-Feb	214	1	115	3	168	4	65	3	175	4	51	8	263	12	248	7	254
23	7	12-Feb	214	2	150	5	148	3	116	5	167	2	84	16	282	18	268	14	277
25	1	12-Feb	214	2	82	7	123	5	58	8	132	5	62	8	234	8	257	9	278
28	85	14-Feb	214	2	110	4	151	4	86	5	157	4	68	9	234	13	225	9	221
30	43	14-Feb	214	2	252	3	225	2	193	4	200	4	171	8	193	13	230	7	225
32	121	15-Feb	214	4	111	4	219	6	128	3	205	9	115	10	169	10	225	9	221
35	127	15-Feb	214	2	264	7	278	4	278	6	251	7	322	13	265	18	265	12	288
39	187	15-Feb	214	3	184	7	302	7	224	5	273	10	314	8	227	13	269	9	246
41	115	16-Feb	214	1	159	8	288	7	298	8	273	7	330	9	188	13	246	7	208
43	91	16-Feb	214	1	158	8	307	8	307	8	274	8	328	9	196	14	248	7	214
44	97	17-Feb	214	2	208	4	208	4	113	5	196	3	211	9	204	16	203	11	200
45	181	17-Feb	214	1	139	5	241	5	171	5	215	5	257	9	236	13	257	8	251
47	109	17-Feb	214	1	133	6	270	5	250	5	244	5	310	8	266	10	238	7	260
49	157	18-Feb	214	2	206	8	264	4	244	7	234	5	293	14	258	18	241	13	251
55	151	19-Feb	214	3	297	7	138	5	87	5	161	5	144	14	141	20	164	18	159
57	103	20-Feb	214	5	278	6	160	7	136	6	179	5	180	11	258	13	238	11	237
59	163	20-Feb	214	1	124	7	139	4	96	7	157	4	132	11	144	15	159	14	147
62	113	18-Feb	214	1	99	8	138	4	108	9	149	7	131	9	208	15	189	11	193
64	139	21-Feb	214	3	256	6	158	4	160	6	175	3	178	8	237	14	215	11	228
64	139	21-Feb	214	3	256	6	158	4	160	6	175	3	178	8	237	14	215	11	228
66	145	21-Feb	214	2	299	5	155	4	167	5	175	4	157	8	241	13	220	9	228
68	169	21-Feb	214	3	186	3	180	4	129	3	201	2	147	5	256	9	228	6	234
70	175	21-Feb	214	1	93	5	160	4	131	5	178	3	121	8	170	12	186	10	181
72	727	22-Feb	214	3	119	3	216	5	153	3	209	4	191	6	234	12	233	11	246
74	667	22-Feb	214	1	124	5	263	2	196	5	210	3	236	10	215	15	217	8	230
76	721	22-Feb	214	5	138	8	304	9	211	5	275	10	292	10	286	13	265	11	300
78	673	23-Feb	214	2	143	6	265	3	215	6	209	4	285	9	233	14	226	8	254
80	715	23-Feb	214	9	26	8	214	11	53	4	101	11	89	12	120	6	239	9	274
84	679	23-Feb	214	2	152	4	215	7	291	6	201	2	207	19	259	20	251	19	272
86	733	23-Feb	214	1	139	4	254	4	265	7	174	3	293	10	281	14	240	16	261
88	685	24-Feb	214	2	241	5	278	6	303	5	212	8	320	13	217	15	198	9	245
90	709	24-Feb	214	4	188	7	247	5	267	9	194	5	269	12	240	18	232	16	249
92	691	25-Feb	214	4	213	7	234	5	260	11	117	5	254	11	222	16	210	13	237
94	751	25-Feb	214	1	159	4	234	4	262	7	185	4	291	11	242	15	233	13	272
96	697	25-Feb	214	2	183	5	231	3	184	6	188	3	195	9	247	14	236	10	241
100	703	26-Feb	214	1	239	3	258	6	305	6	180	4	306	6	238	11	207	6	233
101	775	27-Feb	214	1	137	4	275	10	289	4	176	5	296	14	248	10	220	7	256
103	739	27-Feb	214	4	207	6	214	3	233	9	185	4	219	6	173	14	197	11	203
107	781	02-Mar	214	1	140	6	264	7	310	4	244	6	318	9	262	10	246	9	284
109	847	03-Mar	214	4	204	10	267	7	275	8	231	6	295	13	251	17	252	12	276
111	745	03-Mar	214	3	212	10	278	6	277	8	243	7	299	24	287	24	270	25	286
112	457	03-Mar	214	3	211	10	278	7	287	8	243	7	302	22	283	21	262	21	282
113	769	03-Mar	214	3	215	7	259	5	252	8	223	5	293	16	270	20	258	13	273
117	763	04-Mar	214	2	159	5	253	5	275	6	189	4	280	11	240	13	212	6	227
119	757	04-Mar	214	5	193	9	268	8	274	9	229	6	286	20	258	19	240	17	263
121	805	05-Mar	214	4	205	11	281	8	278	9	250	7	294	14	264	17	249	11	252
123	787	05-Mar	214	4	208	11	273	8	278	9	243	7	291	15	241	16	231	10	242
127	799	06-Mar	214	4	211	9	273	7	284	9	247	7	304	16	268	19	252	13	272
129	793	06-Mar	214	2	228	7	270	7	268	8	240	6	289	15	257	15	240	11	269
131	811	07-Mar	214	2	193	5	235	5	208	7	210	4	207	10	236	14	220	9	200
133	853	07-Mar	214	3	173	4	228	5	253	7	202	3	239	13	228	14	213	9	203
135	817	07-Mar	214	2	81	5	299	8	307	4	249	8	255	13	282	15	263	10	294
137	841	07-Mar	214	4	191	5	226	6	265	8	216	3	245	13	213	15	205	10	184
139	639	08-Mar	214	6	217	8	227	7	252	11	214	6	229	11	218	17	216	11	199
141	859	08-Mar	214	3	213	5	197	3	186	8	193	4	202	11	212	15	219	11	206
143	643	08-Mar	214	1	94	4	162	5	192	5	172	3	134	9	155	14	167	10	149

147	835	09-Mar	214	6	193	10	160	5	158	15	161	8	166	11	213	16	199	12	195
149	829	09-Mar	214	6	199	9	185	5	203	12	189	7	182	13	211	18	212	13	198
151	637	09-Mar	214	1	122	4	113	4	155	7	156	5	116	9	174	13	277	10	161
153	1187	10-Mar	214	4	216	8	163	4	156	12	167	8	162	9	233	15	217	11	207
155	1133	10-Mar	214	1	109	6	115	6	61	7	154	5	116	6	210	12	205	7	209
158	1145	10-Mar	214	6	205	7	193	4	141	11	193	6	181	13	161	20	188	14	185
161	1067	11-Mar	214	5	212	8	242	4	235	10	219	5	256	13	238	20	245	14	257
164	1115	12-Mar	214	2	43	6	137	8	89	7	155	6	105	10	186	15	200	10	197
166	10091	12-Mar	214	1	168	4	225	6	192	6	212	5	252	8	234	14	246	8	264
168	1055	13-Mar	214	1	83	4	165	7	87	5	188	3	149	9	204	15	234	10	239
170	10109	13-Mar	214	2	53	5	293	7	156	3	211	5	172	5	171	12	250	7	270
171	1085	13-Mar	214	2	225	6	211	6	117	6	206	4	239	9	59	6	223	8	140
173	1679	13-Mar	214	4	225	6	219	4	193	9	208	4	239	10	220	17	222	13	225
176	1739	14-Mar	214	3	195	7	263	6	279	7	232	6	303	16	253	21	250	13	262
184	1751	15-Mar	214	3	235	8	275	8	258	8	260	8	305	13	273	22	275	13	285
184	1685	15-Mar	214	1	151	8	300	8	309	6	260	7	309	8	220	12	231	6	211
186	1649	16-Mar	214	5	191	7	245	3	202	10	231	4	253	11	190	17	229	11	213
187	1661	16-Mar	214	5	205	7	228	5	198	9	209	5	234	12	211	19	240	12	234

APPENDIX B

PRE-SURVEY NAVIGATION CHECKS

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WESTERN GEOPHYSICAL

WESTERN GEOPHYSICAL
NAVIGATION DEPARTMENT
MV WESTERN ATLAS
STARTUP CALIBRATIONS
FOR
SAGASCO RESOURCES LTD
JANUARY 1994

10,001 Richmond Avenue, Houston, Texas [illegible] P.O. Box 2469, Houston, Texas 77252-2469 (713) 789-3600 Telex 166214 Fax (713) 789-0172

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WESTERN GEOPHYSICAL

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1.0 OVERVIEW

The intention behind these calibrations and verifications is to provide assurance that the various positioning systems onboard are outputting quality data.
It is also part of on-going research into the various DGPS systems available. It is not only our intention to verify systems but also to highlight any potential problems.

1.1 PERSONNEL

B DEAN	NAVIGATION MANAGER
T KOLESKE	SENIOR NAVIGATOR
H McMENAMIN	SENIOR NAVIGATOR
S ELLIOTT	SENIOR NAVIGATOR
A EVANS	SURVEYOR\NAVIGATOR
W MAXTED	SURVEYOR\NAVIGATOR
N MEYERS	NAVIGATOR\BASE STATION TECH

1.2 SURVEY CONTROL

Spectrum Surveys provided an independant check on the survey control used for the surveys.
No discrepancies were found in station co-ordinates.

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2.0

DGPS SYSTEMS VERIFICATION

From known survey points, angles and distances were measured to a prism mounted on the navigation reference point (NRP). Offsets from each systems' antenna were accounted for in the Wisdom system.

For accurate comparisons the surveyor's watch was set to Wisdom time.

The verifications were carried out on three systems: Racal Multifix, Direct Injection and the Western Geophysical Marine Machine.

Two separate verifications were carried out, three days apart but at the same time of day, to see if there was any drift of group position, in relation to the surveyed point, using the same satellite constellation.

Results are shown as scatter plots in section 2.7

2.1

GEODETIC SYSTEMS

The first verification was conducted in AGD-84. The following datum shifts from WGS-84 to AGD-84 were entered into Wisdom.

X	116.00	RX	1.115071 *10^6 rad
Y	50.47	RY	1.890773 *10^6 rad
Z	-141.69	RZ	1.667759 *10^6 rad
SF	-0.0983		

For the second verification all datum shift parameters were zeroed with output positions in WGS-84.

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2.2

Field Observations for Verification 1

This survey was conducted in AGD-84

SET UP STATION : STN 2 BACK SIGHT : STN 1
BACK BEARING SET : 255°50 05 FACE LEFT IH=1.4

HA (DIRECT BEARING)	VA	S DIST	TIME
19 52 48	83 11 00	105.629	11 30
19 54 48	83 11 00	105.606	11 32
19 53 36	83 11 00	105.619	11 33
19 56 48	83 11 00	105.600	11 34
19 57 00	83 11 00	105.600	11 35
20 04 18	83 11 00	105.560	11 36
20 03 50	83 11 00	105.600	11 37
19 56 42	83 11 00	105.580	11 38
19 54 18	83 11 00	105.557	11 39
20 08 24	83 10 00	105.493	11 40
20 02 48	83 10 00	105.590	11 41
19 57 06	83 10 00	105.590	11 42
20 02 30	83 10 00	105.606	11 43
20 00 00	83 10 00	105.580	11 44
19 56 20	83 10 00	105.550	11 45
20 04 24	83 10 00	105.422	11 46
20 18 00	83 10 00	105.423	11 47
20 18 48	83 09 00	105.395	11 48
20 15 30	83 10 00	105.500	11 49
20 09 42	83 10 00	105.536	11 50
19 59 30	83 09 00	105.600	11 51
20 03 36	83 10 00	105.550	11 52
20 04 18	83 09 00	105.585	11 53
20 06 48	83 09 00	105.540	11 54
20 08 30	83 09 00	105.525	11 55
20 05 00	83 10 00	105.570	11 56
20 05 36	83 08 00	105.570	11 57
20 00 12	83 09 00	105.505	11 58
20 00 00	83 09 00	105.527	11 59
20 04 18	83 09 00	105.500	12 00

BACK SIGHT FACE LEFT 255 50 00
FACE RIGHT 075 50 06

MEAN	BEARING	VA	S DIST
	20 02 51	06 50	105.550
	H DIST	VERT DIST	
	104.800	+ 12.60	

MEAN SURVEYED POSITION AGD-84 32 03.1919 S
115 44.4730 E
ARBITRARY GRID CM 111° 6443808.7 N
947800.8 E

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WESTERN GEOPHYSICAL

2.3

Field Observations for Verification 2

This survey was conducted in WGS-84

SETUP STATION : STN 2 BACK SIGHT : STN 1
BACK BEARING SET: 255°50 05 FACE LEFT IH=1.4

HA (DIRECT BEARING)	VA	S DIST	TIME
20 25 24	83 14 00	105.764	11 30
20 25 06	83 14 00	105.755	11 31
20 25 42	83 14 00	105.753	11 32
20 25 36	83 14 00	105.757	11 33
20 24 06	83 14 00	105.777	11 34
20 25 06	83 14 00	105.771	11 35
20 25 00	83 14 00	105.762	11 36
20 25 06	83 14 00	105.759	11 37
20 24 36	83 14 00	105.774	11 38
20 24 42	83 14 00	105.772	11 39
20 24 30	83 14 00	105.780	11 40
20 23 42	83 14 00	105.774	11 41
20 23 24	83 14 00	105.793	11 42
20 22 54	83 14 00	105.800	11 43
20 22 54	83 15 00	105.786	11 44
20 22 54	83 15 00	105.796	11 45
20 21 42	83 15 00	105.800	11.46
20 21 30	83 15 00	105.799	11 47
20 21 24	83 15 00	105.834	11.48
20 21 36	83 14 00	105.832	11 49
20 21 18	83 13 06	105.832	11 50
20 21 36	83 14 00	105.820	11 51
20 20 36	83 15 00	105.820	11 52
20 19 48	83 15 00	105.816	11 53
20 20 00	83 14 00	105.850	11 54
20 20 00	83 14 00	105.830	11 55
20 20 06	83 15 00	105.826	11 56
20 20 06	83 15 00	105.830	11 57
20 19 54	83 15 00	105.831	11 59
20 19 54	83 15 00	105.833	12 00

BACK SIGHT FACE LEFT 255 50 06
FACE RIGHT 75 50 00

MEAN BEARING	VA	S DIST
20 23 04	06 46	105.798
H DIST	VD	
105.062	12.456	

MEAN SURVEYED POSITION : WGS-84 UTM COORDS
6453111.3 N
381304.3 E

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2.4 SCATTER PLOTS

All positions outputted by the three systems are plotted on a scatter plot in relation to the mean surveyed position. For these plots please refer to section 2.7

NOTE: DN01 = MULTIFIX
TR01 = DIRECT INJECTION
MM01 = MARINE MACHINE

2.5 SATELLITE INFORMATION

Verification 1

The following satellites were used during the survey.

START								
SV	5	25	16	17	20	12	03	24
AZM	69	292	93	344	125	22	237	140
ELEV	39	57	19	47	74	15	58	13
END								
SV	05	25	16	17	20	03		
AZM	57	259	107	339	78	226		
ELEV	29	40	21	62	69	58		

SATS 12 AND 24 DROPPED OUT DURING THE SURVEY DUE TO LOWER ELEVATIONS THAN THE SET MASK OF 10°.
NO POSITION JUMPS OCCURRED.
MEAN PDOP : 2.1

Verification 2

START								
SV	24	05	17	16	25	12	20	03
AZM	141	66	342	96	246	20	109	251
ELEV	10	37	50	20	37	13	73	57
END								
SV	05	17	26	25	20	03		
AZM	55	337	110	262	72	224		
ELEV	27	64	21	40	67	57		

Again we observed no position jumps when satellites dropped out.
MEAN PDOP: 2.1
PLEASE REFER TO THE SATELLITE GEOMETRY PLOTS.
ELEVATION MASK IN EACH SYSTEM RECEIVER WAS SET AT 10°.

REFERENCE STATIONS:
DIRECT INJECTION: PERTH
MULTIFIX : PERTH, DAMPIER, BROOME, DARWIN
MARINE MACHINE : DARWIN

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2.6 HEIGHT OF GPS ANTENNA ABOVE WGS-84 SPHEROID

During the survey the height from each receiver was booked every 60 seconds and compared to the surveyed height.

VERIFICATION 1

	STN 2 RL 2.6	+ IH 1.4	= 4.0	
MULTIFIX	VD 12.6	+ OFFSET 2.0	= 18.6	
DIRECT INJECTION	12.6	+ OFFSET 2.0	= 18.6	
MARINE MACHINE	12.6	+ OFFSET 0.5	= 17.1	

MEAN GPS HEIGHT DURING SURVEY:

MULTIFIX	13.9
DIRECT INJECTION	15.5
MARINE MACHINE	18.3

VERIFICATION 2

	COLLIMATION HEIGHT : 4.0			
MULTIFIX	VD 12,5	+ OFFSET 2.0	= 18.5	
DIRECT INJECTION	12.5	+ OFFSET 2.0	= 18.5	
MARINE MACHINE	12.5	+ OFFSET 0.5	= 17.0	

MEAN GPS HEIGHT DURING SURVEY:

MULTIFIX	14.5
DIRECT INJECTION	15.7
MARINE MACHINE	17.3

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5 cm

2.7 SCATTER PLOTS

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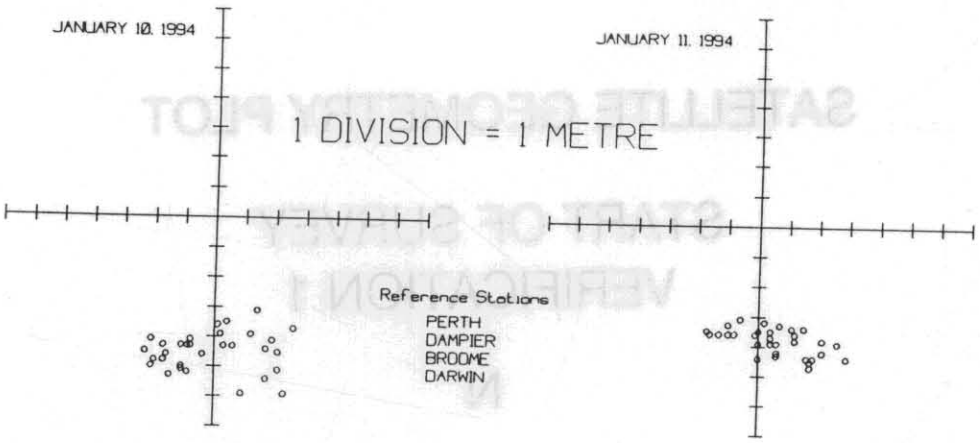
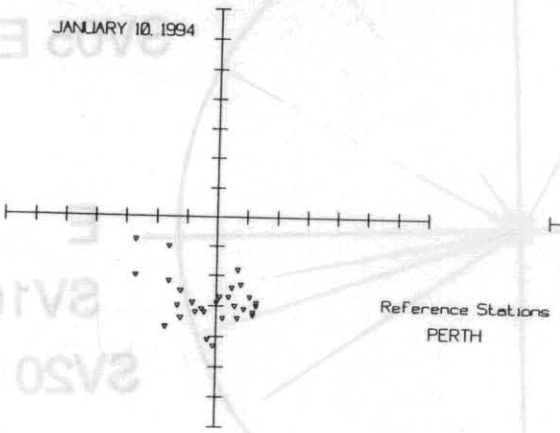
WESTERN GEOPHYSICAL

MULTIFIX

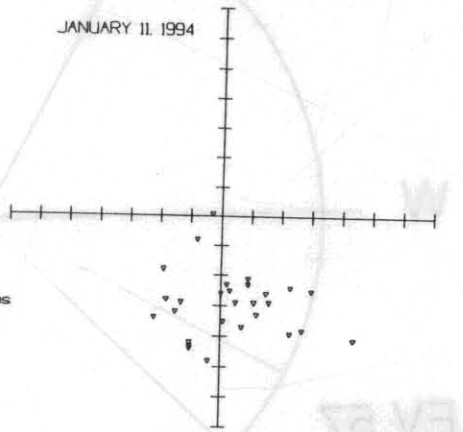


MULTIFIX

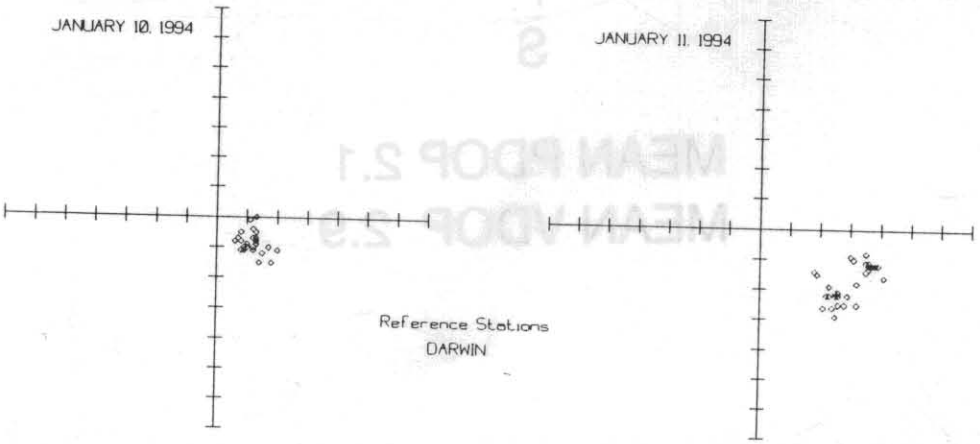
DIRECT INJECTION



DIRECT INJECTION



MARINE MACHINE



MARINE MACHINE

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2.8 SATTELITE GEOMETRY PLOTS

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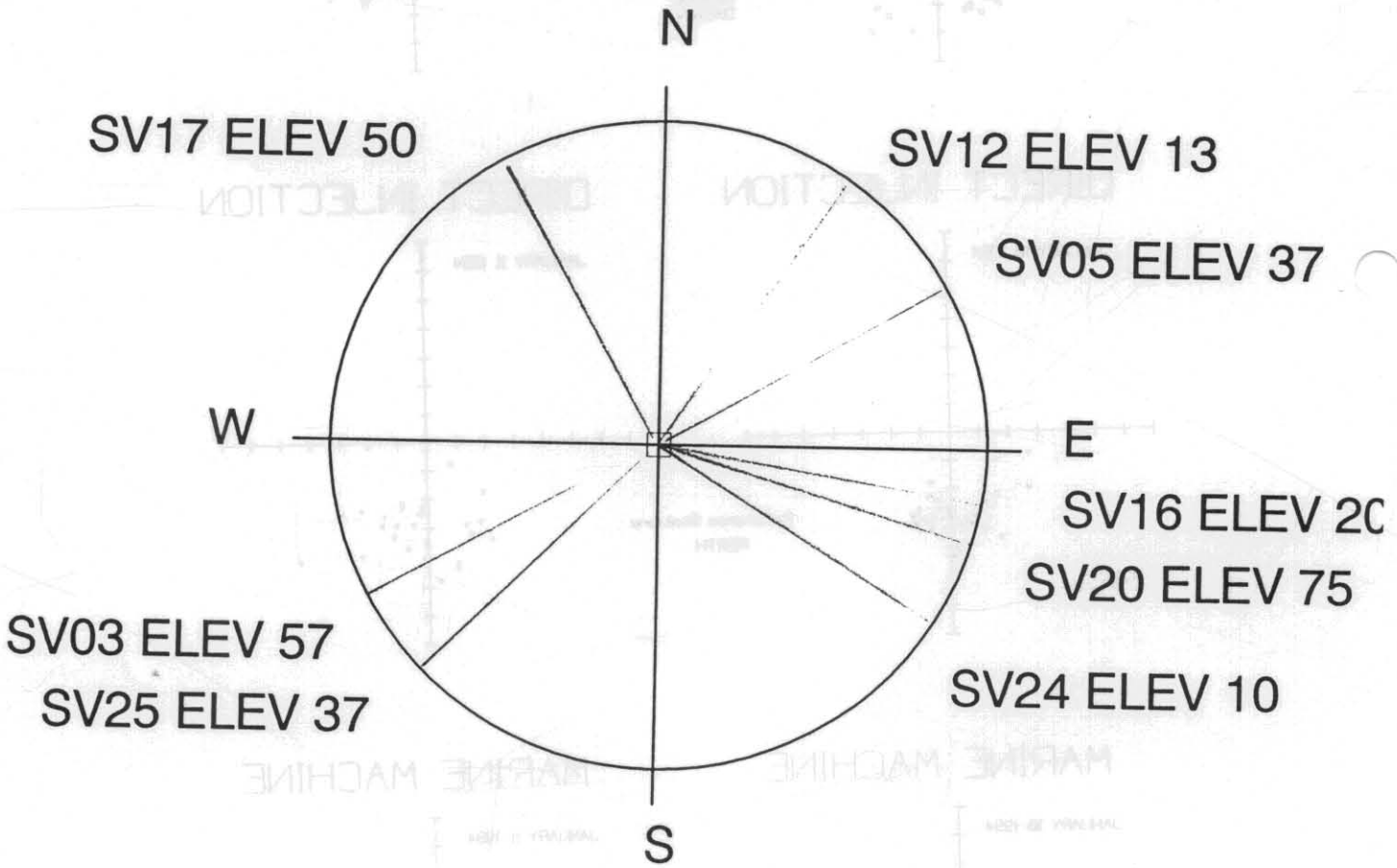
WESTERN GEOPHYSICAL

SATELLITE GEOMETRY PLOT

START OF SURVEY
VERIFICATION 1



MEAN PDOP 2.1
MEAN VDOP 2.9

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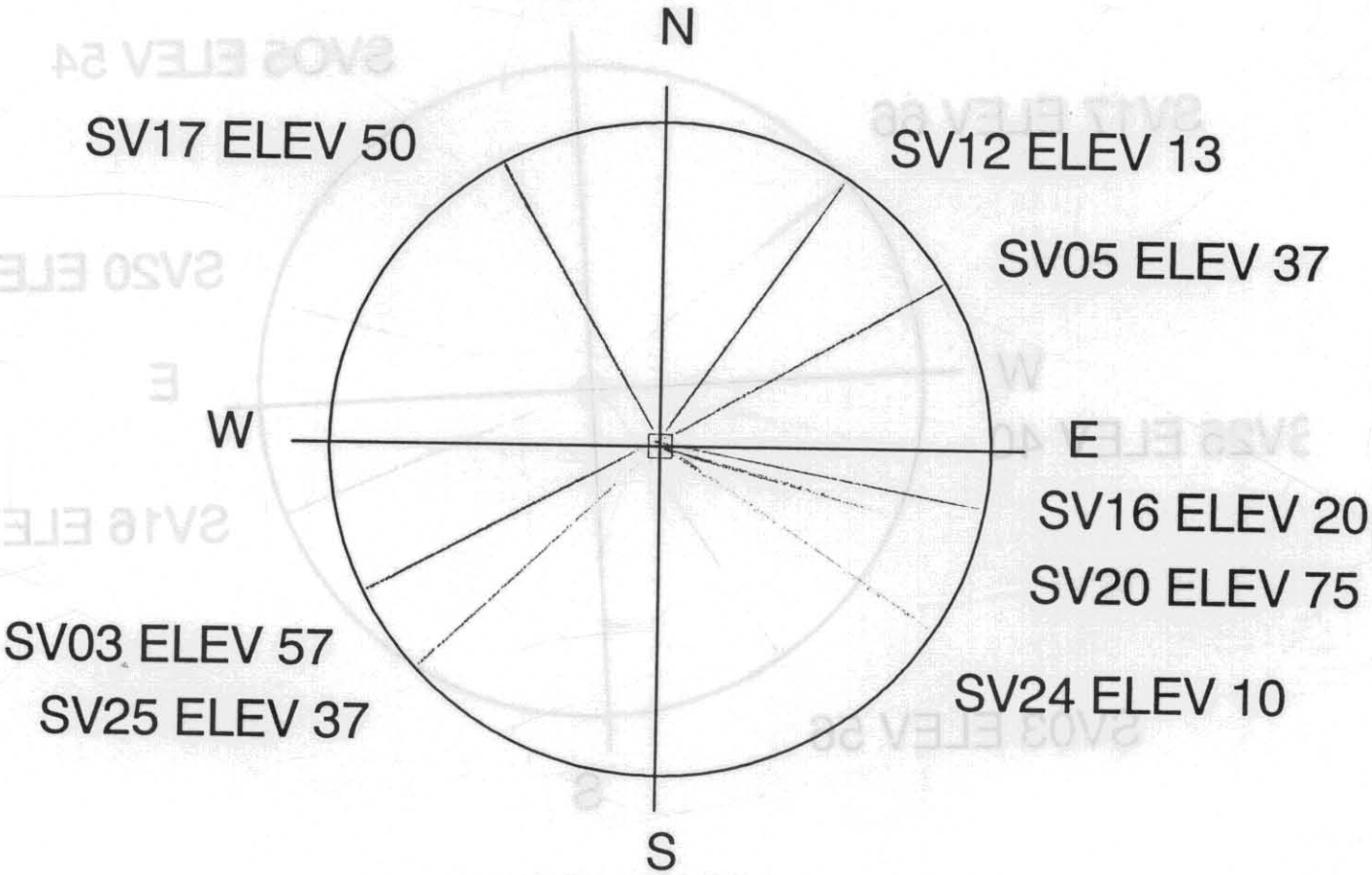
WESTERN GEOPHYSICAL

SATELLITE GEOMETRY PLOT

START OF SURVEY
VERIFICATION 2



MEAN PDOP 2.1
MEAN VDOP 2.9

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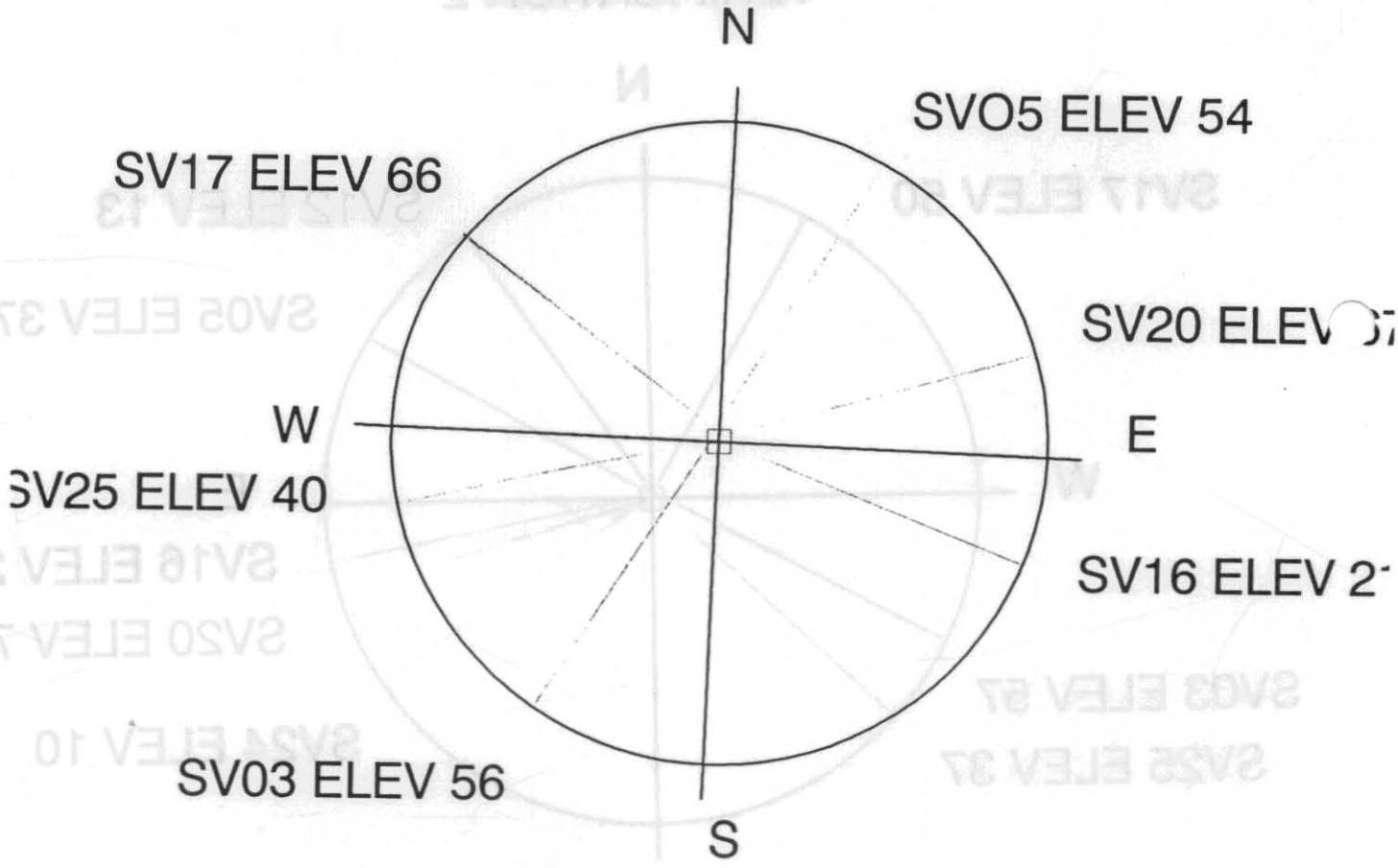
WESTERN GEOPHYSICAL

SATELLITE GEOMETRY PLOT

END OF SURVEY
VERIFICATION 2



MEAN PDOP 2.1
MEAN VDOP 2.9

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2.9 WISDOM PRINTOUTS

WISDOM OUTPUT VERIFICATION #1

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WESTERN GEOPHYSICAL

			REFERENCE POSITION 6443808.7	947800.8
	NORTHING	EASTING	delta N	delta E
3:29:59 DN01	6443808.4	947805.1	0.3	-4.3
TR01	6443807.5	947804.0	1.2	-3.2
MM01	6443808.1	947801.6	0.6	-0.8
3:30:59 DN01	6443809.1	947805.4	-0.4	-4.6
TR01	6443808.7	947803.7	0.0	-2.9
MM01	6443807.6	947800.9	1.1	-0.1
3:31:59 DN01	6443809.5	947804.9	-0.8	-4.1
TR01	6443807.8	947803.9	0.9	-3.1
MM01	6443807.9	947801.3	0.8	-0.5
3:32:59 DN01	6443809.6	947805.1	-0.9	-4.3
TR01	6443808.1	947803.8	0.6	-3.0
MM01	6443807.5	947801.2	1.2	-0.4
3:33:59 DN01	6443809.5	947805.1	-0.8	-4.3
TR01	6443807.5	947804.1	1.2	-3.3
MM01	6443807.6	947800.9	1.1	-0.1
3:34:59 DN01	6443808.5	947804.7	0.2	-3.9
TR01	6443808.2	947803.2	0.5	-2.4
MM01	6443807.8	947801.9	0.9	-1.1
3:35:59 DN01	6443808.6	947804.4	0.1	-3.6
TR01	6443807.4	947803.7	1.3	-2.9
MM01	6443807.8	947801.8	0.9	-1.0
3:36:59 DN01	6443808.3	947804.3	0.4	-3.5
TR01	6443807.4	947803.8	1.3	-3.0
MM01	6443807.8	947801.8	0.9	-1.0
3:37:59 DN01	6443807.3	947803.9	1.4	-3.1
TR01	6443809.2	947803.9	-0.5	-3.1
MM01	6443807.5	947801.5	1.2	-0.7

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WISDOM OUTPUT VERIFICATION #1

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3:38:59	DN01	6443806.1	947804.5	2.6	-3.7
	TR01	6443808.5	947804.2	0.2	-3.4
	MM01	6443807.4	947800.8	1.3	0.0
3:39:59	DN01	6443806.6	947805.3	2.1	-4.5
	TR01	6443809.0	947804.9	-0.3	-4.1
	MM01	6443807.5	947801.5	1.2	-0.7
3:40:59	DN01	6443808.1	947805.1	0.6	-4.3
	TR01	6443809.9	947804.2	-1.2	-3.4
	MM01	6443807.9	947801.9	0.8	-1.1
3:41:59	DN01	6443807.5	947804.7	1.2	-3.9
	TR01	6443808.3	947803.5	0.4	-2.7
	MM01	6443808.0	947801.5	0.7	-0.7
3:42:59	DN01	6443806.8	947804.9	1.9	-4.1
	TR01	6443808.6	947803.5	0.1	-2.7
	MM01	6443807.5	947801.8	1.2	-1.0
3:43:59	DN01	6443807.0	947805.2	1.7	-4.4
	TR01	6443810.3	947803.0	-1.6	-2.2
	MM01	6443807.4	947801.3	1.3	-0.5
3:44:59	DN01	6443806.6	947805.9	2.1	-5.1
	TR01	6443809.5	947803.4	-0.8	-2.6
	MM01	6443807.4	947801.5	1.3	-0.7
3:45:59	DN01	6443806.4	947806.7	2.3	-5.9
	TR01	6443810.0	947803.8	-1.3	-3.0
	MM01	6443807.2	947802.0	1.5	-1.2
3:46:59	DN01	6443807.0	947806.2	1.7	-5.4
	TR01	6443809.9	947803.3	-1.2	-2.5
	MM01	6443807.0	947802.0	1.7	-1.2
3:47:59	DN01	6443807.8	947806.7	0.9	-5.9
	TR01	6443809.1	947804.0	-0.4	-3.2
	MM01	6443807.3	947802.3	1.4	-1.5

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WISDOM OUTPUT VERIFICATION #1

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3:48:59	DN01	6443809.6	947806.0	-0.9	-5.2
	TR01	6443811.4	947802.8	-2.7	-2.0
	MM01	6443807.7	947801.8	1.0	-1.0
3:49:59	DN01	6443810.4	947805.1	-1.7	-4.3
	TR01	6443811.4	947801.6	-2.7	-0.8
	MM01	6443807.9	947801.9	0.8	-1.1
3:50:59	DN01	6443810.7	947805.6	-2.0	-4.8
	TR01	6443810.3	947801.8	-1.6	-1.0
	MM01	6443807.5	947801.9	1.2	-1.1
3:51:59	DN01	6443811.0	947805.3	-2.3	-4.5
	TR01	6443811.6	947803.0	-2.9	-2.2
	MM01	6443807.9	947801.6	0.8	-0.8
3:52:59	DN01	6443810.4	947805.6	-1.7	-4.8
	TR01	6443809.2	947803.9	-0.5	-3.1
	MM01	6443807.4	947801.7	1.3	-0.9
3:53:59	DN01	6443809.8	947805.9	-1.1	-5.1
	TR01	6443808.8	947805.1	-0.1	-4.3
	MM01	6443807.9	947801.9	0.8	-1.1
3:54:59	DN01	6443810.8	947805.8	-2.1	-5.0
	TR01	6443810.4	947804.5	-1.7	-3.7
	MM01	6443807.7	947801.7	1.0	-0.9
3:55:59	DN01	6443810.2	947806.1	-1.5	-5.3
	TR01	6443809.4	947804.0	-0.7	-3.2
	MM01	6443806.7	947801.9	2.0	-1.1
3:56:59	DN01	6443810.3	947805.4	-1.6	-4.6
	TR01	6443808.0	947802.6	0.7	-1.8
	MM01	6443807.4	947801.5	1.3	-0.7
3:57:59	DN01	6443809.8	947805.1	-1.1	-4.3
	TR01	6443807.9	947803.1	0.8	-2.3
	MM01	6443807.4	947801.6	1.3	-0.8

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WISDOM OUTPUT VERIFICATION #1

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3:58:59	DN01	6443809.8	947805.8	-1.1	-5.0
	TR01	6443807.6	947803.5	1.1	-2.7
	MM01	6443807.0	947801.8	1.7	-1.0
3:59:59	DN01	6443810.8	947804.9	-2.1	-4.1
	TR01	6443808.0	947804.2	0.7	-3.4
	MM01	6443806.9	947802.3	1.8	-1.5

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WISDOM OUTPUT VERIFICATION #2

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WESTERN GEOPHYSICAL

		REFERENCE POSITION			
			6453111.3	381304.3	
		NORTHING	EASTING	delta N	delta E
3:30:23	DN01	6453111.4	381307.9	-0.1	-3.6
	TR01	6453113.1	381307.1	-1.8	-2.8
	MM01	6453108.9	381306.9	2.4	-2.6
3:31:23	DN01	6453110.9	381307.8	0.4	-3.5
	TR01	6453112.6	381307.2	-1.3	-2.9
	MM01	6453109.2	381306.9	2.1	-2.6
3:32:23	DN01	6453111.1	381307.5	0.2	-3.2
	TR01	6453111.0	381306.8	0.3	-2.5
	MM01	6453108.8	381307.2	2.5	-2.9
3:33:23	DN01	6453110.7	381308.6	0.6	-4.3
	TR01	6453110.6	381308.0	0.7	-3.7
	MM01	6453109.2	381306.9	2.1	-2.6
3:34:23	DN01	6453110.1	381308.1	1.2	-3.8
	TR01	6453110.1	381307.6	1.2	-3.3
	MM01	6453108.5	381306.8	2.8	-2.5
3:35:22	DN01	6453110.2	381307.7	1.1	-3.4
	TR01	6453111.2	381307.8	0.1	-3.5
	MM01	6453108.1	381306.8	3.2	-2.5
3:36:23	DN01	6453109.8	381307.7	1.5	-3.4
	TR01	6453111.3	381306.9	0.0	-2.6
	MM01	6453108.7	381306.8	2.6	-2.5
3:37:23	DN01	6453109.2	381308.1	2.1	-3.8
	TR01	6453110.8	381307.2	0.5	-2.9
	MM01	6453108.7	381306.5	2.6	-2.2
3:38:23	DN01	6453109.2	381308.5	2.1	-4.2
	TR01	6453110.2	381307.2	1.1	-2.9
	MM01	6453109.1	381306.5	2.2	-2.2
3:39:23	DN01	6453109.6	381309.0	1.7	-4.7
	TR01	6453109.7	381307.2	1.6	-2.9
	MM01	6453108.8	381306.5	2.5	-2.2

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WISDOM OUTPUT VERIFICATION #2

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3:40:23	DN01	6453111.3	381308.7	0.0	-4.4
	TR01	6453108.3	381306.8	3.0	-2.5
	MM01	6453109.0	381306.5	2.3	-2.2
3:41:23	DN01	6453109.6	381308.8	1.7	-4.5
	TR01	6453110.4	381306.4	0.9	-2.1
	MM01	6453108.8	381306.4	2.5	-2.1
3:42:23	DN01	6453108.4	381308.7	2.9	-4.4
	TR01	6453109.8	381306.9	1.5	-2.6
	MM01	6453108.7	381306.4	2.6	-2.1
3:43:23	DN01	6453109.5	381308.7	1.8	-4.4
	TR01	6453110.4	381306.6	0.9	-2.3
	MM01	6453108.4	381306.5	2.9	-2.2
3:44:23	DN01	6453109.7	381308.7	1.6	-4.4
	TR01	6453109.8	381306.9	1.5	-2.6
	MM01	6453108.7	381306.4	2.6	-2.1
3:45:23	DN01	6453110.7	381308.5	0.6	-4.2
	TR01	6453110.1	381307.6	1.2	-3.3
	MM01	6453108.1	381306.1	3.2	-1.8
3:46:23	DN01	6453110.7	381308.2	0.6	-3.9
	TR01	6453109.0	381308.2	2.3	-3.9
	MM01	6453107.2	381305.9	4.1	-1.6
3:47:24	DN01	6453108.7	381308.2	2.6	-3.9
	TR01	6453106.9	381308.4	4.4	-4.1
	MM01	6453107.8	381305.4	3.5	-1.1
3:48:23	DN01	6453110.6	381307.6	0.7	-3.3
	TR01	6453108.6	381308.1	2.7	-3.8
	MM01	6453107.5	381305.5	3.8	-1.2
3:49:23	DN01	6453110.1	381307.9	1.2	-3.6
	TR01	6453111.0	381306.3	0.3	-2.0
	MM01	6453107.6	381305.5	3.7	-1.2
3:50:23	DN01	6453111.3	381307.8	0.0	-3.5
	TR01	6453112.1	381305.1	-0.8	-0.8
	MM01	6453108.2	381305.3	3.1	-1.0

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3:51:23	DN01	6453110.9	381308.2	0.4	-3.9
	TR01	6453111.6	381304.2	-0.3	0.1
	MM01	6453107.7	381305.5	3.6	-1.2
3:52:23	DN01	6453110.9	381308.0	0.4	-3.7
	TR01	6453109.0	381306.7	2.3	-2.4
	MM01	6453107.8	381305.1	3.5	-0.8
3:53:22	DN01	6453111.3	381308.2	0.0	-3.9
	TR01	6453111.1	381306.6	0.2	-2.3
	MM01	6453107.7	381305.4	3.6	-1.1
3:54:23	DN01	6453112.1	381307.9	-0.8	-3.6
	TR01	6453113.2	381306.1	-1.9	-1.8
	MM01	6453108.3	381305.2	3.0	-0.9
3:55:23	DN01	6453113.0	381307.6	-1.7	-3.3
	TR01	6453112.3	381308.5	-1.0	-4.2
	MM01	6453107.4	381305.5	3.9	-1.2
3:56:22	DN01	6453112.6	381307.9	-1.3	-3.6
	TR01	6453112.3	381308.7	-1.0	-4.4
	MM01	6453107.7	381305.6	3.6	-1.3
3:57:23	DN01	6453112.3	381307.6	-1.0	-3.3
	TR01	6453112.3	381308.6	-1.0	-4.3
	MM01	6453107.8	381305.7	3.5	-1.4
3:58:23	DN01	6453111.9	381307.4	-0.6	-3.1
	TR01	6453111.7	381309.1	-0.4	-4.8
	MM01	6453109.0	381306.2	2.3	-1.9
3:59:23	DN01	6453112.9	381307.9	-1.6	-3.6
	TR01	6453113.5	381307.7	-2.2	-3.4
	MM01	6453109.4	381305.8	1.9	-1.5
4:00:23	DN01	6453113.0	381307.8	-1.7	-3.5
	TR01	6453112.8	381307.5	-1.5	-3.2
	MM01	6453109.5	381305.7	1.8	-1.4

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3.0 GYRO CALIBRATION

From a survey station , angles and distances were measured to prisms mounted on permanent marks on the vessels center line on the bow and stern.
The Wisdom system time was set to the surveyors watch so that accurate comparisons could be made with the gyro reading which was printed out every 60 seconds.
The back bearing set on the theodolite was the true north bearing between the two survey marks,hence horizontal angle are direct bearings.

3.1 GYRO

The gyro calibrated is a Sperry MK 23.
Prior to the survey the latitude selector was set to actuall latitude.

3.2 VESSEL STABILITY

Western`s standard procedure for gyro settling time is min 12 hours in the first direction and 6 in the second.For the first direction on this occasion several days was allwed, on the second direction we allowed a full 12 hours.
The marine crew were very helpfull by ensuring all ropes remained tight for the settling and survey period.
During both surveys the gyro remained very stable as can be seen in the precession graphs.

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3.3 FIELD WORK

DIRECTION 1

SET UP STATION: 6M BACK SIGHT : RO 1
BACK BEARING SET: 298 04 55 FACE LEFT

	HA(DIRECT BEARING)	VA	S DIST	TIME
BOW	125 16 30	89 29	332 67	08 56
STN	139 08 20	88 56	330 66	08 56
BOW	125 16 20	89 25	332 67	08 57
STN	139 07 54	88 57	330 66	08 58
BOW	125 16 40	89 29	332 67	08 59
STN	139 08 10	88 57	330 66	09 00
BOW	125 16 00	89 29	332 68	09 01
STN	139 07 50	88 57	330 66	09 02
BOW	125 16 30	89 29	332 67	09 03
STN	139 08 06	88 57	330 67	09 04
BOW	125 16 30	89 29	332 68	09 05
STN	139 08 00	88 57	330 65	09 06
BOW	125 16 50	89 29	332 67	09 07
STN	139 08 10	88 57	330 65	09 08
BOW	125 16 50	89 29	332 69	09 09
STN	139 08 15	88 57	330 65	09 10
BOW	125 16 50	89 29	332 68	09 11
STN	139 08 30	88 56	330 65	09 11
BOW	125 16 40	89 29	332 69	09 12
STN	139 08 24	88 56	330 67	09 13
BOW	125 16 30	89 29	332 69	09 13
STN	139 08 20	88 56	330 66	09 14
BOW	125 16 54	89 29	332 66	09 15
STN	139 08 10	88 56	330 66	09 16
BOW	125 16 50	89 29	332 68	09 17
STN	139 08 18	88 56	330 66	09 18

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FIELD WORK

DIRECTION 2

SET UP STATION: 6M BACK SIGHT : RO 1
BACK BEARING SET: 298 04 55 FACE LEFT

	HA(DIRECT BEARING)	VA	S DIST	TIME
BOW	139 28 18	89 25	331 081	08 45
STN	125 36 18	88 56	331 850	08 47
BOW	139 28 42	89 24	331 100	08 49
STN	125 36 18	88 57	331 863	08 50
BOW	139 28 42	89 24	331 120	08 51
STN	125 36 00	88 57	331 860	08 52
BOW	139 28 36	89 25	331 120	08 53
STN	125 36 18	88 56	331 832	08 55
BOW	139 28 42	89 25	331 095	08 56
STN	125 36 24	88 56	331 870	08 57
BOW	139 28 48	89 24	331 124	08 58
STN	125 36 24	88 56	331 810	08 59
BOW	139 28 42	89 25	331 082	09 00
STN	125 36 18	88 56	331 800	09 01
BOW	139 29 00	89 25	331 110	09 03
STN	125 36 12	88 56	331 772	09 04
BOW	139 28 54	89 25	331 087	09 05
STN	125 36 12	88 57	331 761	09 06
BOW	139 28 54	89 25	331 071	09 07
STN	125 36 24	88 56	331 736	09 08
BOW	139 28 54	89 25	331 050	09 09
STN	125 36 18	88 57	331 718	09 10
BOW	139 29 06	89 25	331 051	09 11
STN	125 36 24	88 56	331 710	09 12

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3.4 RESULTS

DIRECTION 1

	SURVEYED HEADING	GYRO READING	DIFFERENCE
1	43.7°	44.0°	0.3°
2	43.7	43.9	0.2
3	43.7	43.9	0.2
4	43.7	43.9	0.2
5	43.7	43.9	0.2
6	43.8	43.9	0.1
7	43.7	43.9	0.2
8	43.7	43.9	0.2
9	43.7	43.9	0.2
10	43.7	43.9	0.2
11	43.7	43.9	0.2
12	43.7	43.9	0.2
13	43.7	43.9	0.2
MEAN	43.7	43.9	0.2

GYRO READING 0.2° HIGH

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RESULTS

DIRECTION 2

	SURVEYED HEADING	GYRO READING	DIFFERENCE
1	222.9°	223.4°	0.5°
2	223.0	223.4	0.4
3	223.0	223.4	0.4
4	223.0	223.4	0.4
5	223.1	223.4	0.3
6	223.0	223.4	0.4
7	223.0	223.4	0.4
8	223.0	223.4	0.4
9	223.0	223.4	0.4
10	223.0	223.4	0.4
11	223.0	223.4	0.4
12	223.0	223.4	0.4
13	223.0	223.4	0.4
MEAN	223.0	223.4	0.4

GYRO READING HIGH 0.4°

DIRECTION 1 GYRO READING 0.2° HIGH
DIRECTION 2 GYRO READING 0.4° HIGH

MEAN 0.30° HIGH

GYRO CORRECTION FOR WISDOM - 0.30°

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3.5 PRECISION PLOTS

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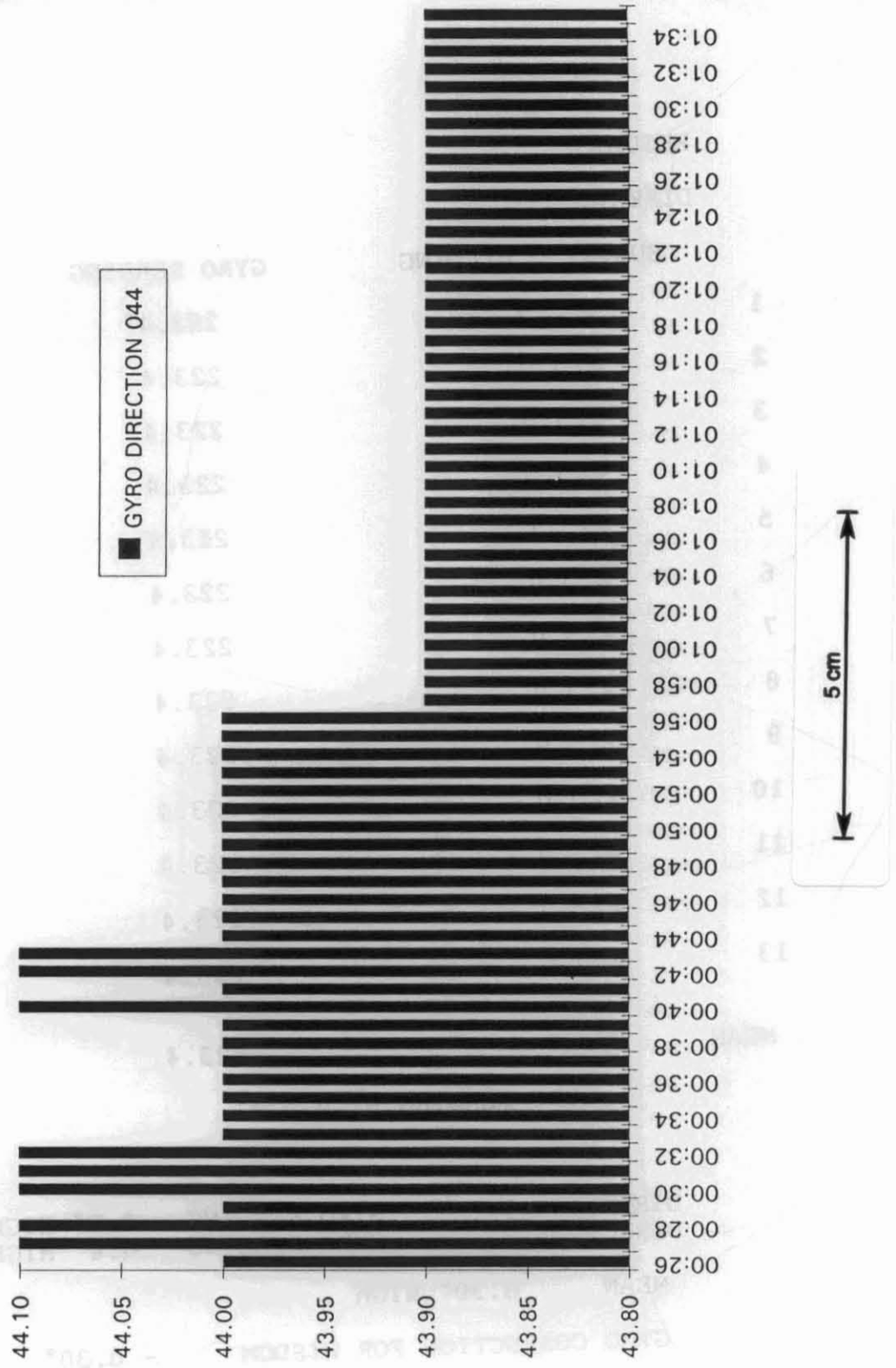

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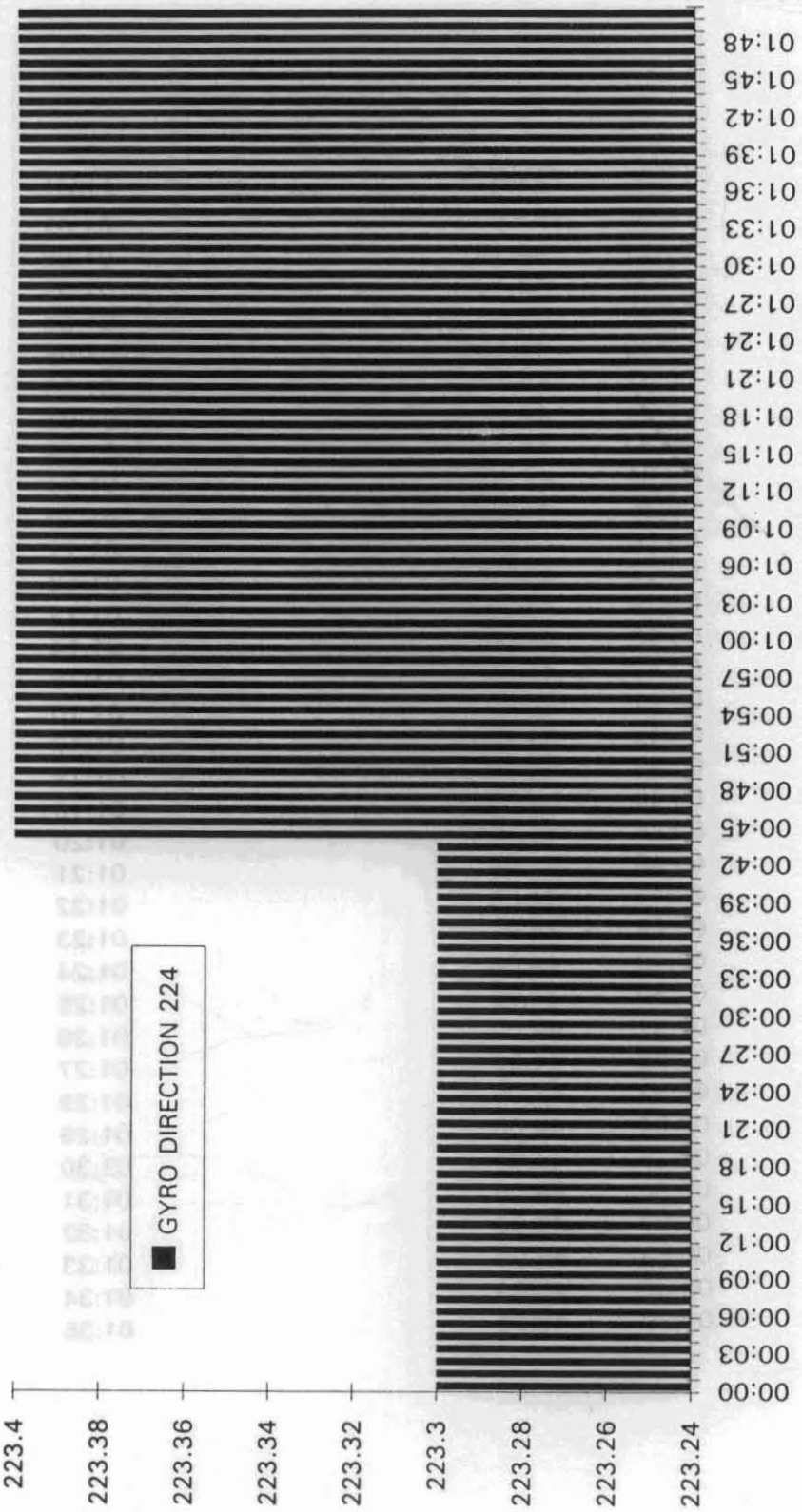
WESTERN GEOPHYSICAL



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3.6 WISDOM PRINTOUTS

WISDOM OUTPUT DIRECTION #1

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TIME	GYRO	TIME	GYRO
00:26	44.00	01:01	43.90
00:27	44.10	01:02	43.90
00:28	44.10	01:03	43.90
00:29	44.00	01:04	43.90
00:30	44.10	01:05	43.90
00:31	44.10	01:06	43.90
00:32	44.10	01:07	43.90
00:33	44.00	01:08	43.90
00:34	44.00	01:09	43.90
00:35	44.00	01:10	43.90
00:36	44.00	01:11	43.90
00:37	44.00	01:12	43.90
00:38	44.00	01:13	43.90
00:39	44.00	01:14	43.90
00:40	44.10	01:15	43.90
00:41	44.00	01:16	43.90
00:42	44.10	01:17	43.90
00:43	44.10	01:18	43.90
00:44	44.00	01:19	43.90
00:45	44.00	01:20	43.90
00:46	44.00	01:21	43.90
00:47	44.00	01:22	43.90
00:48	44.00	01:23	43.90
00:49	44.00	01:24	43.90
00:50	44.00	01:25	43.90
00:51	44.00	01:26	43.90
00:52	44.00	01:27	43.90
00:53	44.00	01:28	43.90
00:54	44.00	01:29	43.90
00:55	44.00	01:30	43.90
00:56	44.00	01:31	43.90
00:57	43.90	01:32	43.90
00:58	43.90	01:33	43.90
00:59	43.90	01:34	43.90
01:00	43.90	01:35	43.90

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WISDOM OUTPUT DIRECTION #2

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WESTERN GEOPHYSICAL

TIME	GYRO	TIME	GYRO
00:07	223.3	00:50	223.4
00:08	223.3	00:51	223.4
00:09	223.3	00:52	223.4
00:10	223.3	00:53	223.4
00:11	223.3	00:54	223.4
00:12	223.3	00:55	223.4
00:13	223.3	00:56	223.4
00:14	223.3	00:57	223.4
00:15	223.3	00:58	223.4
00:16	223.3	00:59	223.4
00:17	223.3	01:00	223.4
00:18	223.3	01:01	223.4
00:19	223.3	01:02	223.4
00:20	223.3	01:03	223.4
00:21	223.3	01:04	223.4
00:22	223.3	01:05	223.4
00:23	223.3	01:06	223.4
00:24	223.3	01:07	223.4
00:25	223.3	01:08	223.4
00:26	223.3	01:09	223.4
00:27	223.3	01:10	223.4
00:28	223.3	01:11	223.4
00:29	223.3	01:12	223.4
00:30	223.3	01:13	223.4
00:31	223.3	01:14	223.4
00:32	223.3	01:15	223.4
00:33	223.3	01:16	223.4
00:34	223.3	01:17	223.4
00:35	223.3	01:18	223.4
00:36	223.3	01:19	223.4
00:37	223.3	01:20	223.4
00:38	223.3	01:21	223.4
00:39	223.3	01:22	223.4
00:40	223.3	01:23	223.4
00:41	223.3	01:24	223.4
00:42	223.3	01:25	223.4
00:43	223.3	01:26	223.4
00:44	223.4	01:27	223.4
00:45	223.4	01:28	223.4
00:46	223.4	01:29	223.4
00:47	223.4	01:30	223.4
00:48	223.4	01:31	223.4
00:49	223.4	01:32	223.4

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4.0 RACAL TAILBUOY TRACKING SYSTEM (SKYPOD) VERIFICATION

METHOD The mean survey position of the NRP was manually entered into WISDOM as system position. A Skypod unit was then positioned over Station 1 (this point having been surveyed by Western Navigation), the Racal system then started sending WISDOM range and bearing data from NRP to the Skypod unit, WISDOM then calculated coordinates for this postion, outputting them to file and hard copy every 60 seconds.
Each Skypod unit was tested for a ten minute period.

4.1 RESULTS

For each Skypod unit a scatter plot has been made.
WGS-84 coordinates for Station 1 are : 381202.7 E
6452995.7 N

4.2 SCATTER PLOTS

4.3 WISDOM PRINTOUTS

4.4 CONCLUSIONS

The results obtained from the verification indicate an accuracy of upto + or - 7 metres from true position.
Navigation Manager Bluey Dean was not satisfied with the results obtained from the first verification so another test was done on the worst unit and two others.
The units were placed over a different mark on the other side of the harbour in a more open position to ascertain whether multipath problems were causing the erratic results. The results did not improve with the position change.

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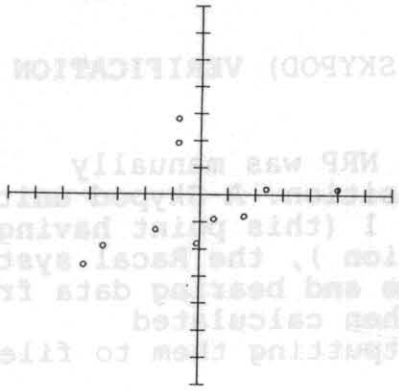
WESTERN GEOPHYSICAL

SKYPOD S/N 211



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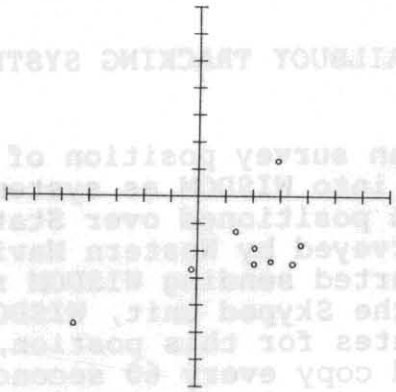

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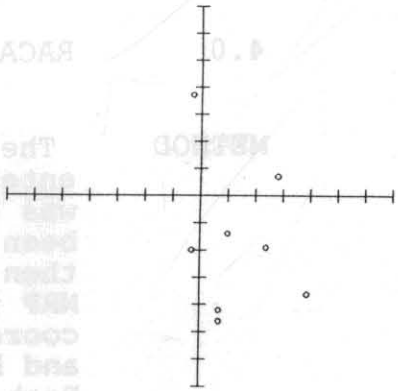

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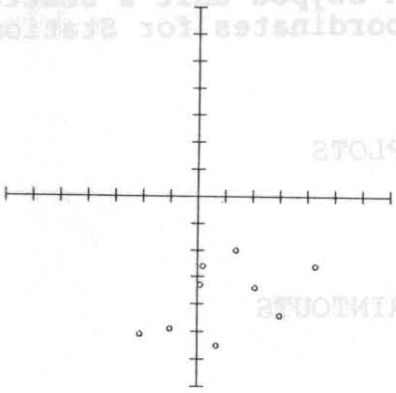

10 JANUARY 1994

1 DIVISION = 1 METRE

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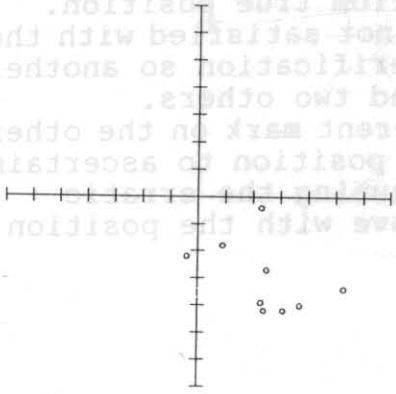

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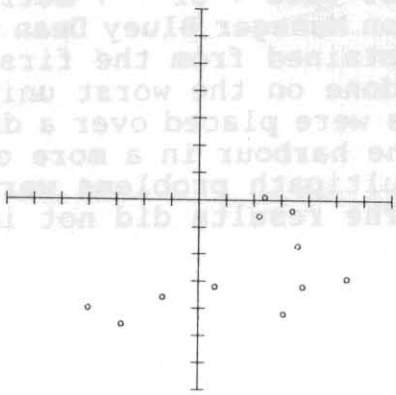

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5 cm

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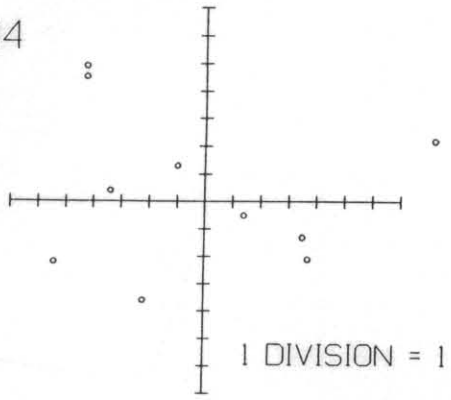
SKYPOD S/N 211

11 JANUARY 1994



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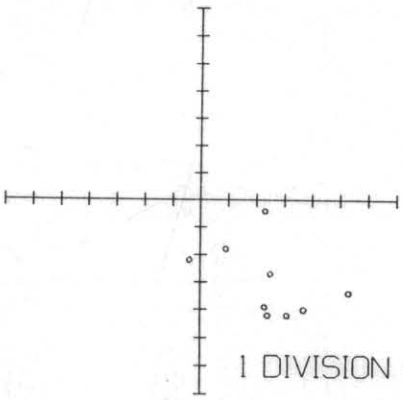

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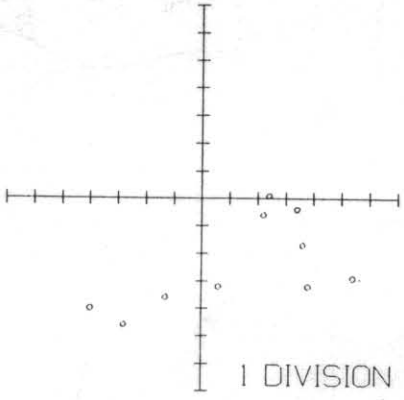

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5.0 MARS VERIFICATION

Mars prisms were set up over two surveyed points on the wharf. Via the Wisdom system co-ordinates were output in reference to the NRP. To simulate shooting conditions, a DGPS system was used as the reference position.

5.1 RESULTS:

SURVEYED POSITIONS

MARS 1	N 6453174.8	E 381380.5
MARS 2	N 6453177.4	E 381378.1

OUTPUT POSITION MEAN

MARS 1	N 6453173.0	E 381380.2
MARS 2	N 6453179.7	E 381379.5

Movement from the actual position is movement in the DGPS system and not Mars.This can be seen when the vector from surveyed position to actual position is compared to the DGPS position to actual position.

A check on a raw Mars distance output from the unit on the helideck to the survey point was carried out.

Mars distance	73.3
	73.2
	73.3
	73.3
	73.3
	73.2
	73.2
	73.2
Measured distance	73.2

For this survey one prism was used.It is our intent to use units of triple prisms to ensure a very reliable return on the up-coming prospects.

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PORTLAND VERIFICATIONS

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6.0 FATHOMETER VERIFICATION

A T\S DIP UNIT was used to measure water depth to compare with the SIMRAD E200 fathometer while along side in portland.

Four measurments were taken from various point around the vessel.ie stern ,bow, port and stb beam.
These values were then meaned and compared to the fathometer output in the Wisdom system.
Speed of sound in water used in fathometer was derived from a temprature and salinity test dip conducted.
1513 meters per second

VESSEL DRAFT AT TIME OF VERIFICATION: 4.5
This value was calculated by the marine engineer.

MEASUREMENTS:

STERN	13.1	STERN	12.9	STERN	12.4
PORT BEAM	12.9	PORT BEAM	12.3	PORT BEAM	12.4
STB BEAM	11.8	STB BEAM	12.4	STB BEAM	11.8
BOW	13.0	BOW	13.4	BOW	12.7

START TIME: 08 44 END: 09 40

MEAN DEPTH: 12.6

FATHOMETER OUTPUT: 12.4 multiplied by 1513/1500

MEAN DEPTH: 12.5

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7.0 PORTLAND DGPS VERIFICATION

Two dockside survey points were supplied in WGS-84

PL 1 N 5754841.8
E 554167.6

PL 2 BACK BEARING SET 17°52 25

The following comparisons were conducted on arrival in Portland.

1:	MULTIFIX.	REF SYDNEY MELBOURNE ADELAIDE
	DIRECT INJECTION	REF ADELAIDE
2	MULTIFIX	REF MELBOURNE
	DIRECT INJECTION	REF MELBOURNE
3	MULTIFIX	REF SYDNEY MELBOURNE ADELAIDE
	DIRECT INJECTION	REF MELBOURNE
4	MULTIFIX	REF ADELAIDE
	DIRECT INJECTION	REF ADELAIDE

7.1 SATELLITE INFORMATION

REVEIVER ELEVATION MASK 15°

START OF SURVEY 1

SV	4	20	05	13	24	12	09
AZM	110	236	220	151	32	269	322
ELEV	53	20	58	48	63	82	58

END OF SURVEY 4

SV	4	20	05	13	24	12	09
AZM	125	230	209	145	63	338	335
ELEV	45	30	70	36	72	73	47

MEAN PDOP 2.3
MEAN VDOP 1.9

NO GEOMETRY PLOTS WERE PLOTTED DUE TO THE TIME RESTRAINT.

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7,2 FIELD OBSERVATIONS

THE FOLLOWING READING IS A MEAN FROM READINGS TAKEN
THROUGH OUT THE SURVEY PERIOD.
WE DID NOT INCLUDE ALL READINGS IN AN EFFORT
TO FINISH THIS REPORT BEFORE THE VESSEL SAILED.

SETUP STATION : PL1 BACKSIGHT SET 0 00 00 FACE LEFT

	HA	VA	S DIST
1	302 12 21	69 27 00	38.903

HORIZONTAL DIST
36.4

MEAN SURVEYED POSITION:

WGS-84 UTM

N 5754869.9
E 554144.4

PLEASE REFER TO SCATTER PLOTS FOR RESULTS

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5 cm

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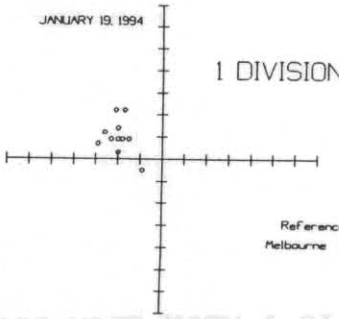
MULTIFIX



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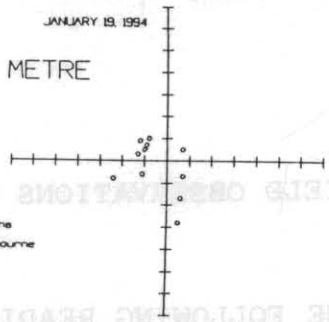
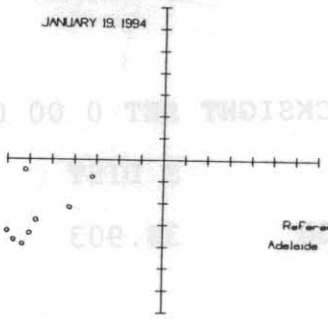
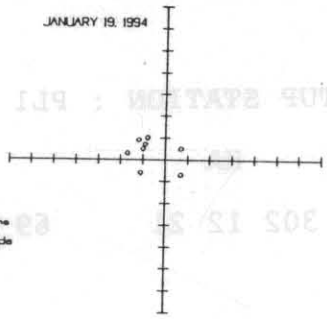


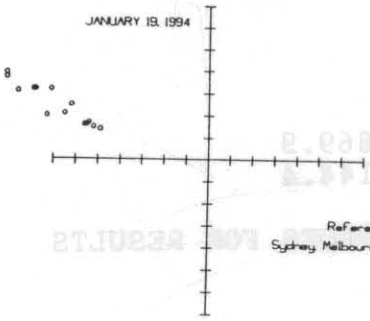
MULTIFIX



DIRECT INJECTION



MULTIFIX



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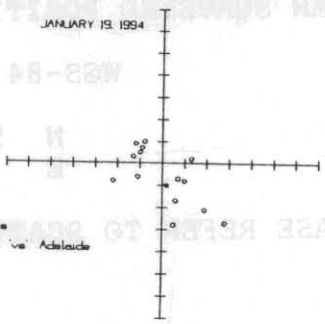

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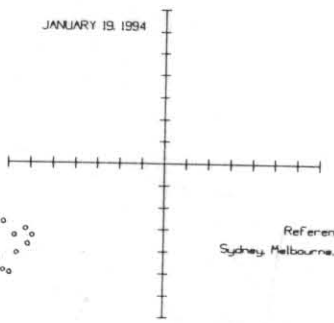
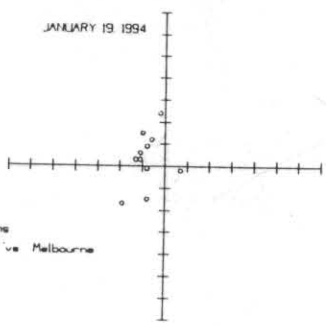


DIRECT INJECTION



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Reference Stations Sydney, Melbourne, Adelaide 'vs Adelaide

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WESTERN GEOPHYSICAL

REFERENCE POSITION
5754869.9 554144.4

MULTIFIX (DN01)

	Northing	Easting	Delta N	Delta E
23:15	5754875.4	554142.8	-5.5	1.6
23:16	5754875.3	554142.7	-5.4	1.7
23:17	5754875.1	554142.9	-5.2	1.5
23:18	5754874.5	554143.9	-4.6	0.5
23:19	5754874.8	554143.0	-4.9	1.4
23:20	5754875.5	554142.8	-5.6	1.6
23:21	5754876.1	554141.9	-6.2	2.5
23:22	5754876.1	554141.9	-6.2	2.5
23:23	5754876.4	554142.3	-6.5	2.1
23:24	5754877.2	554142.4	-7.3	2.0
23:25	5754877.7	554141.2	-7.8	3.2
23:26	5754877.0	554141.2	-7.1	3.2
23:27	5754879.0	554140.7	-9.1	3.7
23:28	5754879.0	554140.5	-9.1	3.9
23:29	5754878.5	554141.3	-8.6	3.1
23:30	5754877.8	554141.2	-7.9	3.2

DIRECT INJECTION (TR01)

Northing	Easting	Delta N	Delta E
5754869.2	554143.9	0.7	0.5
5754871.0	554145.0	-1.1	-0.6
5754870.9	554143.9	-1.0	0.5
5754871.1	554143.5	-1.2	0.9
5754870.7	554143.4	-0.8	1.0
5754870.8	554143.7	-0.9	0.7
5754871.2	554144.1	-1.3	0.3
5754869.2	554145.1	0.7	-0.7
5754869.3	554146.1	0.6	-1.7
5754869.4	554147.2	0.5	-2.8
5754872.3	554145.2	-2.4	-0.8
5754869.7	554145.4	0.2	-1.0
5754868.6	554144.2	1.3	0.2
5754868.9	554145.2	1.0	-0.8
5754868.0	554146.5	1.9	-2.1
5754867.1	554147.1	2.8	-2.7

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Reference Stations Adelaide 'vs' Adelaide

WESTERN GEOPHYSICAL

REFERENCE POSITION
5754869.9 554144.4

MULTIFIX (DN01)

	Northing	Easting	Delta N	Delta E
00:57	5754876.2	554148.3	-6.3	-3.9
00:58	5754876.6	554148.1	-6.7	-3.7
01:00	5754875.9	554147.8	-6.0	-3.4
01:02	5754876.9	554147.7	-7.0	-3.3
01:03	5754875.6	554147.2	-5.7	-2.8
01:05	5754873.1	554145.2	-3.2	-0.8
01:07	5754874.1	554146.6	-4.2	-2.2
01:08	5754876.1	554144.9	-6.2	-0.5

DIRECT INJECTION (TR01)

Northing	Easting	Delta N	Delta E
5754869.2	554143.9	0.7	0.5
5754871.0	554145.0	-1.1	-0.6
5754870.9	554143.9	-1.0	0.5
5754871.1	554143.5	-1.2	0.9
5754870.7	554143.4	-0.8	1.0
5754870.8	554143.7	-0.9	0.7
5754871.2	554144.1	-1.3	0.3
5754869.2	554145.1	0.7	-0.7

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WESTERN GEOPHYSICAL

REFERENCE POSITION
5754869.9 554144.4

MULTIFIX (DN01)

	Northing	Easting	Delta N	Delta E
00:29	5754876.0	554148.1	-6.1	-3.7
00:30	5754876.5	554148.5	-6.6	-4.1
00:31	5754876.1	554147.4	-6.2	-3.0
00:32	5754877.1	554149.3	-7.2	-4.9
00:33	5754875.8	554147.7	-5.9	-3.3
00:34	5754876.6	554147.7	-6.7	-3.3
00:35	5754877.4	554148.8	-7.5	-4.4
00:36	5754877.7	554148.0	-7.8	-3.6
00:37	5754877.1	554147.1	-7.2	-2.7
00:38	5754876.8	554149.4	-6.9	-5.0
00:39	5754876.8	554149.4	-6.9	-5.0

DIRECT INJECTION (TR01)

Northing	Easting	Delta N	Delta E
5754871.8	554146.1	-1.9	-1.7
5754871.0	554144.1	-1.1	0.3
5754870.5	554143.2	-0.6	1.2
5754871.0	554143.8	-1.1	0.6
5754870.7	554144.5	-0.8	-0.1
5754870.7	554143.5	-0.8	0.9
5754870.1	554142.0	-0.2	2.4
5754870.9	554142.9	-1.0	1.5
5754871.2	554144.1	-1.3	0.3
5754870.7	554145.9	-0.8	-1.5
5754869.2	554144.6	0.7	-0.2

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Reference Stations Melbourne 'vs' Melbourne

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WESTERN GEOPHYSICAL

REFERENCE POSITION
5754869.9 554144.4

MULTIFIX (DN01)

	Northing	Easting	Delta N	Delta E
00:10	5754870.8	554144.9	-0.9	-0.5
00:11	5754871.9	554144.1	-2.0	0.3
00:12	5754871.6	554142.2	-1.7	2.2
00:13	5754872.0	554142.2	-2.1	2.2
00:14	5754871.4	554143.5	-1.5	0.9
00:15	5754871.7	554143.5	-1.8	0.9
00:16	5754871.9	554143.0	-2.0	1.4
00:17	5754871.9	554143.5	-2.0	0.9
00:18	5754872.2	554143.5	-2.3	0.9
00:19	5754872.5	554143.2	-2.6	1.2
00:20	5754872.8	554143.7	-2.9	0.7

DIRECT INJECTION (TR01)

Northing	Easting	Delta N	Delta E
5754869.2	554143.9	0.7	0.5
5754871.0	554145.0	-1.1	-0.6
5754870.9	554143.9	-1.0	0.5
5754871.1	554143.5	-1.2	0.9
5754870.7	554143.4	-0.8	1.0
5754870.8	554143.7	-0.9	0.7
5754871.2	554144.1	-1.3	0.3
5754869.2	554145.1	0.7	-0.7
5754869.3	554146.1	0.6	-1.7
5754869.4	554147.2	0.5	-2.8
5754872.3	554145.2	-2.4	-0.8

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9.0 CONCLUSIONS\RECOMENDATIONS

DGPS SYSTEMS:

Good results were obtained from all the various verifications in Fremantle and Portland.
It must be noted that these verifications took place under strict guidelines with selected windows of the best geometry possible.We should also note that we were stationary instead of the normal 5 knot shooting speed.
Looking at the scatter plots, all system seem to output positions with a bias to the southern quadrents.This has been observed on most other verifications.
This is not an offset problem of any kind ,as we have looked into this possibility.
Recomendations can only come in the form of further investigation by continuing verifications and data analysing.

GYRO

The gyro remains stable with consistant results in regard to previous calibrations.

SKYPOD

The Fremantle verification showed position vaiiations of upto 7 meters.

GENERAL

All verifications and calibrations went well with no problems.

APPENDIX 3

CONTRACTOR'S OPERATIONS REPORT

WESTERN GEOPHYSICAL COMPANY

501302

FINAL OPERATIONS REPORT

SAGASCO RESOURCES LIMITED

YOLLA 3D SEISMIC SURVEY

19 JANUARY TO 16 MARCH 1994

BY
WESTERN GEOPHYSICAL COMPANY
R/V WESTERN ATLAS
PARTY 116

501303

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6.1 FIGURES

1. WG-24 STREAMER CABLE
2. WG-24 RECORDING SYSTEM BLOCK DIAGRAM

6.2 FIGURES

1. GENERAL HEADER
2. CHANNEL SET DESCRIPTOR
3. WG-24 EXTENDED HEADER, VERSION 1, BLOCK 1 DEFINITION
4. WG-24 EXTENDED HEADER, VERSION 1, BLOCK 2 DEFINITION
5. WG-24 EXTENDED HEADER, VERSION 1, BLOCK 3 DEFINITION
6. WG-24 EXTENDED HEADER, VERSION 1, BLOCK 4 THROUGH (3 + *N*) DEFINITION, WHERE *N* = NO. OF CABLES
7. WG-24 EXTENDED HEADER, VERSION 1, BLOCK 4 (4 + *N*) THROUGH (3 + *N* + *M*) DEFINITION, WHERE *N* = NO. OF CABLES & *M* = NO. OF CHANNELS SETS
8. WG-24 EXTENDED HEADER, VERSION 2, BLOCK 1 DEFINITION
9. WG-24 EXTENDED HEADER, VERSION 2, BLOCK 2 DEFINITION
10. WG-24 EXTENDED HEADER, VERSION 2, BLOCK 3 DEFINITION
11. WG-24 EXTENDED HEADER, VERSION 2, BLOCK 4 DEFINITION
12. WG-24 EXTENDED HEADER, VERSION 2, BLOCK 5 THROUGH (4 + *N*) DEFINITION, WHERE *N* = NO. OF CABLES
13. WG-24 EXTENDED HEADER, VERSION 2, BLOCK (5 + *N*) THROUGH (4 + *N* + *M*) DEFINITION, WHERE *N* = NO. OF CABLES & *M* = NO. OF CHANNELS SETS
14. WG-24 EXTENDED HEADER CABLE DEPTH BLOCKS
15. WG-24 EXTENDED HEADER CABLE STATUS BLOCKS
16. WG-24 EXTERNAL HEADER, VERSION 3 (USER HEADER)
17. WG-24 EXTERNAL HEADER, VERSION 4 (USER HEADER)
18. WG-24 EXTERNAL HEADER, VERSION 6 (USER HEADER)
19. WG-24 EXTERNAL HEADER, VERSION 6 (USER HEADER)
20. WG-24 EXTERNAL HEADER, VERSION 6 (USER HEADER)
21. WG-24 EXTERNAL HEADER, VERSION (USER HEADER)
22. WG-24 EXTERNAL HEADER, VERSION 6 (USER HEADER)
23. DEMULTIPLEXED DATA BODY

6.3 FIGURES

3. WG-24 PHONE GROUP DETAILS
4. MARINE REMOTE UNIT BLOCK DIAGRAM
5. STREAMER MODULE BLOCK DIAGRAM
6. STREAMER CONFIGURATION

6.4 FIGURES

1. ENERGY SOURCE CONFIGURATION

APPENDIX A - NAVIGATION

1. Navigation Report

2. Navigation Contractor's Report - RACAL SURVEY AUSTRALIA (under separate cover)

3. 3DQC Report

PLEASE NOTE:

APPENDIX A – NAVIGATION APPEARS AS APPENDIX 4 IN MAIN REPORT

1. INTRODUCTION AND LOCALITY/LINE MAP

FINAL OPERATIONS REPORT

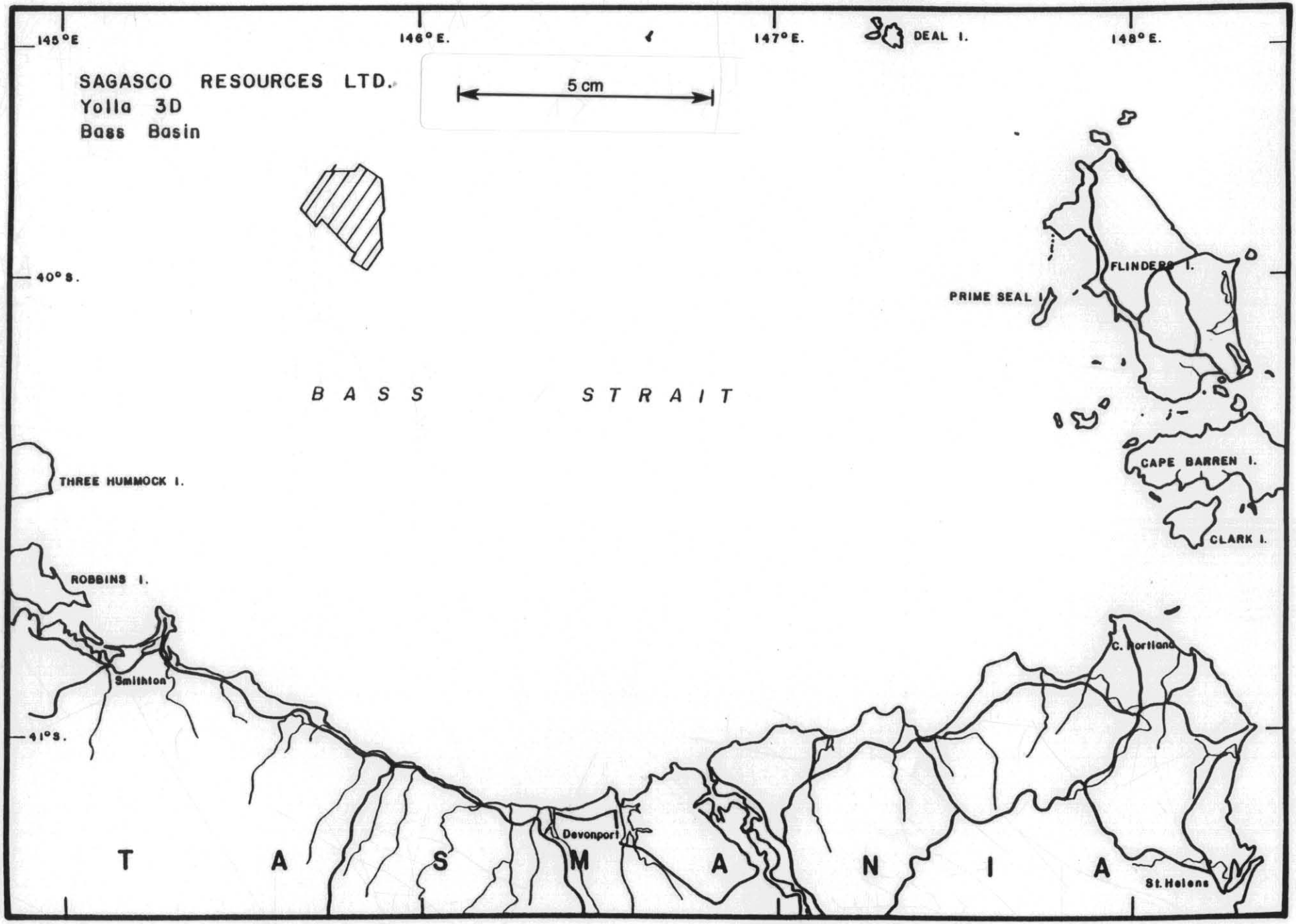
1. INTRODUCTION AND LOCALITY/LINE MAP

This is the final report for the marine geophysical 3D survey conducted in the Bass Strait by WESTERN GEOPHYSICAL COMPANY (WESTERN), utilizing the survey vessel R/V Western Atlas, contracted by SAGASCO RESOURCES LIMITED (SAGASCO).

In this report are details of the survey area, general information, vessel specifications and descriptions of the equipment used in the survey. A statistical summary, Coordinator's daily logs and Observers' line logs are also included in this report.

The navigation positioning system was provided by WESTERN, using ARGO as the primary system and Racal Differential GPS as the secondary system.

The 3D survey commenced on January 19, 1994 and was completed on March 16, 1994. A total of 11,750.200 Prime kilometres were acquired in this survey together with 293.755 Infill kilometres.


145°E
146°E.
147°E.
DEAL I.
148°E.
SAGASCO RESOURCES LTD.
Yolla 3D
Bass Basin
5 cm
40°S.
FLINDERS I.
PRIME SEAL I.
BASS STRAIT
CAPE BARREN I.
THREE HUMMOCK I.
CLARK I.
ROBBINS I.
C. Portland
Smithton
41°S.
Devonport
TASMANIA
St. Helens

501308

2. DESCRIPTION OF SURVEY AREA

2. DESCRIPTION OF SURVEY AREA

The 3D survey was in the T/RL1 YOLLA Block. The majority of the program occupied approximately two thirds of the block. The block is located 75 nautical miles East of King Island and 65 miles North of Burnie, Tasmania in deep water.

The approximate boundaries of the survey were:

Latitude 39° 55′ S to 40° 00′ S
Longitude 145° 38′ E to 145° 55′ E

2.1 WEATHER

Weather conditions for the first three days of production prior to the crew change break, 5th - 7th February, saw variable wind conditions ranging from South Easterly at 17-21 knots to Westerly at 11-16 knots, which caused the sea state chop to increase from 1.0 metre to 2.5 metres. The average daily temperature was between 15-16 °C. Visibility was poor, due to a thick fog screen about the survey area causing the MARS to lose track of its targets.

At the resumption of production on February 11, wind conditions varied from South Westerly at 10-20 knots to South Easterly up to 27 knots by February 13, which saw the sea state chop increase up to four metres. This in turn caused over 2500 pounds of force on the cables and the average RMS noise to climb to 10 microbars. The sea state was the cause of the pinger rope breaking.

Sea conditions moderated and by February 15, saw 1.0 to 1.5 metres of swell as the wind conditions swung from South Easterly at 11-16 knots to Westerly at 17-21 knots. Occasional fog coverage was experienced, with most of the days being partly cloudy, with up to 3/4 cloud coverage. At midday on February 16, wind conditions propelled to near gale force at 28-33 knots from the West-South-West direction with rough sea conditions and a swell of up to 4 metres. Noise on the cable was recorded at an average RMS of 12 microbars.

The main problem, however, was the stability of the cables. The inability to keep the cables balanced at a depth of 10 metres caused sequence 44 and the line prior to sequence 44 to be scratched. Sequence 50 was ended early due to cable #2 surfacing.

The weather conditions persisted into the morning of February 19, with strong winds of about 20-25 knots from a South Westerly direction. The skies were partly cloudy and the sea state was about 2.0 metres.

During the first half of March, weather conditions shifted from Southwest to Easterly, producing random periods of downtime. The total weather downtime reported for March was 23 percent, while overall survey downtime was under 19 percent.

2.2 TIDES

The tidal chart used was generated from the Burnie tidal corrections that display a dual symmetrical daily peak of approximately 3.0 metres, ranging from 1.0 - 3.0 metres total. From the commencement of the survey, there was effectively no attenuation in daily peaks and as a consequence, made it consistently easy to predict feather angles.

2.3 CURRENTS

Ocean currents were dependent upon prevailing winds. The currents were predominantly Southwesterly and did not cause a problem during 3D acquisition.

2.4 FEATHERING/INFILL

Cable feathering did not exceed five degrees. Adjacent lines were well predicted, resulting in approximateiy 31 line passes of infill out of 143 sail lines shot. The excellent streamer control produced a total infill rate of 17.17 percent.

2.5 BATHYMETRY

The general marine seabed for the entire block was sandy bottom. The average water depth was 79 metres throughout the survey area.

3. GENERAL INFORMATION

3.0 GENERAL INFORMATION

3.1 LOCATION OF OFFICES

SAGASCO RESOURCES LIMITED's registered office is located at the following address:

3rd Floor Hospitality House
60 Hindmarsh Square
Adelaide S.A. 5000
Telephone (08) 235 3737
Facsimile (08) 223 1851

WESTERN GEOPHYSICAL COMPANY's Perth office is located at:

2nd Level Sheraton Court
207 Adelaide Terrace
East Perth W.A. 6004
Telephone (09) 268 2682
Facsimile (09) 268 2600

WESTERN's head office is at:

10,001 Richmond Avenue
Houston Texas 77042
U.S.A.

The survey detailed in this report was conducted under the supervision of WESTERN's Perth office, located as above.

A temporary field office was set up for the Party Manager at:

Shoreline Building
Trawlers Wharf
Portland Victoria 3305
Telephone (055) 236 178
Facsimile (055) 233 790

3.2 COMMUNICATIONS

All communications with the vessel were made via Marisat and mobile phone. The facsimile machine and telephone were used for communications between the boat, SAGASCO'S office and WESTERN's Perth office.

3.3 KEY FIELD PERSONNEL

SAGASCO RESOURCES LIMITED

Exploration Manager	Doug Roberts
Onboard Representative	F.Renton/M.Green/R.Loweth

WESTERN GEOPHYSICAL COMPANY

Operations Supervisor	Terry Leighton
Party Manager	John Evans/Tom Meyer
Coordinator	D. Chow/W. Williams/H. Hume
Asst Coordinator	B. Bromwich
Observer	W. Simonton
Observer	J. Miears
Observer	M. Whetton
Airgun Mechanic	S. French
Airgun Mechanic	G. Simpson

WESTERN GEOPHYSICAL COMPANY (cont.)

Instrument Technician	K. Roberts
Navigator	T. Koleske
Navigator	H. McMenamin
Compressor Mechanic	D. Hill
Compressor Mechanic	A. Powell
Q. C. Geophysicists	S. Harper
Navigation Analyst	M. Friend/E. Karlsen
Geophysical/navigation Analyst	S. Metcalfe
Q. C. Navigation Postplotting	G. Nicholson
Omega/Unavchk Post-Processing	J. Hedges

RACAL SURVEY AUSTRALIA (Navigation Contractor's company - DGPS only)

Quality Control	B. Slevin

3.4 DISPOSITION OF DATA

Marine seismic data was sent to SAGASCO's elected processing centre, Digital Exploration Limited situated in Brisbane, Queensland. The first data shipment departed the Vessel on February 9th, arriving at the centre on February 11th. A second data shipment was offloaded and shipped from Tasmania on March 17th and arrived at the processing centre on March 18th.

Upon completion of the survey, the Navigation Data was delivered to SAGASCO.

3.5 INSTRUMENT TEST

All instrument tests were conducted during the survey.

3.6 MISCELLANEOUS

Local Agent/Supplier Descriptions:

Agents for bunkering:	Shell Fuel, supplied by West Vic Petroleum Services Keith Raeburn Telephone: 055-231800 A/H 055-295306
Shipping Agent:	Barwil Agency Shoreline Building Trawlers Wharf Telephone: 055-233372 Facsimile: 055-233790
Agent for food supplies:	Haebich Provedoring Daryl Blythman Telephone: 055-233372 Facsimile: 055-233790
Agent for hardware:	Haebich Provedoring Daryl Blythman Telephone: 055-233372 Facsimile: 055-233790
Agent for transportation:	Portland Travel Pty Ltd Roy Barker Air Freight Telephone: 055-233332 A/H: 055-233428 Mobile: 018-527212 Airport: 055-2652558

Travel Agent:	Portland Travel Roy Barker Air Freight Telephone: 055-233332 A/H: 055-233428 Mobile: 018-527212 Airport: 055-2652558
Support Vessels:	None Required
Helicopter Operator:	Lloyds Helicopter Company Sale Victoria Dave Sullivan Telephone: 051-761288 A/H: 051-480485 Mobile: 018-178246 Facsimile: 051-744403
Ambulance Service:	Air Ambulance Service of Victoria South Eastern Region Operations Manager Allan Kennedy Telephone: 051-200254 Direct Telephone: 051-200252 Facsimile: 051-200270

Two formal crew changes were conducted during the survey on February 9 and March 17, 1994. The first crew change was performed in Portland, Victoria, whilst the second one was performed in Burnie, Tasmania.

The vessel was refueled on February 8, with 400 tons of HSD fuel oil being loaded.

4. HEALTH, SAFETY AND ENVIRONMENT

4.0 HEALTH, SAFETY AND ENVIRONMENT

A vessel safety audit was conducted from January 10 to January 12 in Fremantle, Western Australia. The audit team was comprised of various management and vessel crew members. Safety meetings were held on a regular basis during the course of the survey. The first meeting was held after the survey started, on February 9 and meetings concluded on March 11. The safety meetings included everybody on board who was not required for production.

Abandon ship and lifeboat drills were held at various times during the survey.

All minutes of safety meetings were kept and distributed to WESTERN's supervisory staff, onboard Client Representatives and SAGASCO's office in Adelaide.

The following Medivacs took place on the vessel:

1. On February 23, the vessel had to travel into Port Burnie, Tasmania to take off one man.

2. On February 25, one of the seaman had to seek medical treatment. The Medivac took place by helicopter; no LTI was recorded.

3. On February 28. one Navigator had to seek medical treatment. The Medivac took place utilizing the port facilities at Burnie, Tasmania. No LTI was recorded.

4. On March 15, a Medivac took place by helicopter. A steward received medical attention for a dislocated shoulder.

M/V Western Atlas H.S.E. Statistics:

	Exposure Hrs	LTI	RWC
Western Geophysical	75,432	3	0
Sagasco Resources	3,240	0	0
Contractors	1,008	0	0
Total	79,680	3	0

The following list gives details of safety training courses that have been completed by members of the crew (WESTERN employees only):

	Total crew members	Percentage of total crew
Sea Survival Course	42	100%
Helicopter Underwater Escape Training	26	61%
First Aid	21	50%
Site Emergency Response	28	66%
Helicopter fire/landing.	4	9%
Crane operator	7	17%
Rigging and Slinging	3	7%
Fast rescue craft	6	14%
Driving Defensive	1	2%
Supervisor safety/reporting	8	19%
Accredited Auditors	2	5%

5. VESSEL SPECIFICATIONS

5. VESSEL SPECIFICATIONS

Owner	Western Sea Services of Panama Inc
Flag	Republic of Panama
Official Number	18058-88
Call Sign	HP4862
Port of Registry	Panama
Classification	A.B.S.
Date Built	1982
Date Refitted	1988
Length	80.77 metres
Beam	17.98 metres
Loadline	4.43 metres
Load Draft	4.3 metres
Light Draft	3.2 metres
Molded Depth	7.1 metres
Hull	Steel
Gross Tonnage	3,390 tons
Net Tonnage	1,017 tons
Cruising Speed	12 knots
Speed (Maximum)	15 knots
Cruising Range	60 days (Average 20 Tons/Day)
Main Engines	2 x Wartsila Nohab Polars F312V (2282 Kz each, Total 6,120 BHP)

Propellors	2 x Controllable pitch propellors
Bow Thruster	2 x 800 HP C.P.P. Electric
Stern Thruster	2 x 800 HP C.P.P. Electric
Main Generators	2 x 1,250 Kw driven by Wartsila Nohab Polars F38
Generators (Instrument)	2 x Westinghouse Life-line T AC Drive Motor, 60 Hz, 3-Phase
Fresh Water Capacity	322,788 litres (85,272 gallons)
Fresh Water Endurance	Unlimited (Water Makers onboard)
Fresh Water Maker	1 x Atlas AFGU 1S-15 Type 1 x Village - Reverse Osmosis Type
Fuel Capacity	1,354,897 litres (357,926 gallons)
Fuel Endurance	60 days (Average 20 tons per day)
Ballast	1,271,000 litres
Cable Oil Capacity	17,454 litres (4,611 gallons)
Heliport	18.3 x 18.3 metres Rated for S76, 212 and Super Puma 19,000 lbs
Accommodation	54 + 3 hospital
Navigation	1 x Furono GP70 GPS Receiver 2 x Kelvin Hughes 3000A Radar 1 x Tokimek 3400M Radar 1 x Anschutz/Kiel STD 12 Gyro 2 x Sperry MK23 Model 4 Gyro 1 x Koden KS540K MF Direction Finder 1 x Spilsbury LWX 100A NDB Direction Finder 1 x Furuno DFAX Weather Fax

Communication	2 x Sailor RT2048 Transceivers 1 x Skanti WR6000 2182 KHz Receiver 1 x ICOM ICM700TY HF SSB 1 x Collins COMM VHF Ground/Air 1 x Polaris Regency VHF Transceiver/DF 1 x JRC JSS 710 HF SSB Transceiver 1 x JRC JUE45A MKII Phone/Telex/Fax Inmarsat System 3 x ICOM H16 Handheld VHF
Radar	1 x Tokimek 3400 M 1 x Kelvin Hughes HR 3000A 1 x Kelvin Hughes HR 3000R
Auto Pilot	1 x Anschutz/Kiel
Life Boats	2 x 30 person
Life Rafts	6 x 20 person inflatable rafts 2 x 10 person inflatable rafts
Fire Detection System	Kidde Automated KDR-1000 Fire Alarm System
Fire Fighting Equipment	
AFFF Foam	Streamer Reels and Streamer Spares, Storage Area
Halon	Compressor Room, Instrument/Recording Room, Tape Storage Room, Engine Room, Paint Lockers and Incinerator Room

SEISMIC EQUIPMENT SPECIFICATIONS

A) Recording Instrument

Type of Instrumentation	WG-24 Marine Data Acquisition System
Recording Capacity	Single Cable Mode: 480 Multi Cable Mode: 960
Recording Format	4 Byte SEG-D, Demux, Code 8048
Maximum Record Length	Memory double-buffered Can record 960 channels 2 m/s, 12 sec records
Tape Decks	4 x 3480 Compatible Cartridge Tape Units, ANSI standard tapes
Sample Rate	1, 2 or 4 m/s
Array Forming Capability	Adjacent Trace Sum
Filter Selection (includes cable and shipboard)	
Low cut	-3 dB @ 2.5Hz, 12 dB/Octave -3 dB @ 6 Hz, 18 dB/Octave (digital FIR filters shipboard)
High Cut	1 m/s = -3 dB @ 392 Hz, 214 dB/Octave 2 m/s = -3 dB @ 196 Hz, 214 dB/Octave 4 m/s = -3 dB @ 96 Hz, 190 dB/Octave (digital FIR filters)
Seismic QC	All QC data, full read-after-write QC plots - AGC or fixed gain; harmonic distortion analysis; noise analysis; spectral analysis; frequency/phase response analysis; real-time display cable seis and depth data; colour graphics - cable electronics status and seismic data display

B) Energy Source

Source Type	LRS-7000 Low Pressure Airgun System
String Configuration	8 sub-arrays of 7 guns each
Source Volume	Various, up to 10,800 cu. in.
Source Pressure	2,000 psi
Compressors	3 x Cherco WBF74HXD driven by 3 x Cat 3516DI Compressor Engines (Total 4,800 SCFM)
GMU	64 Gun Unit, capable of displaying near field signatures and gun depth

C) Streamer Cable

Type	WG-24 Western Geophysical
No. of Cables	Up to four
Group Interval	12.5 metres
Maximum Number of Groups	960 (for Quad 3,000 m Cable Configuration)
Maximum Length	6,000 m (Single or Dual Cable Configuration)
Section Length	100 metres
Groups Per Section	8
Group Spacing	12.5 metre centre
Phones per Group	16 (12.5 metre)
Array Type	Tapered array, centre weighted, 15.2 metre overall length, 21% overlap adjacent groups

Section Configuration	8 seismic channels 1 waterbreak channel 1 depth transducer
Data Telemetry	Dual Optical Fiber
Operating Temperature	-20° to 65° C
Maximum Depth (electronics)	2,000 ft
Maximum Depth (phones aux equipment)	200 ft or as specified by the manufacturer
Operating Time on Reel:	Unlimited
Instantaneous Dynamic Range	>114 dB
Resolution (including sign)	24 bits
THD @ Maximum Input	<0.0005%
Pre-Amp Gain (selectable from vessel)	0 dB + 12 dB
Maximum Input Signal, Rms	5.793V, 117 mbar @ 0 dB preamp gain 1.448V, 28 mbar @ 12 dB preamp gain
Input Noise, Rms (input shorted)	11.6 μV 0.24μbar @ 0 dB preamp gain 2.9μV 0.06μbar @ 12 dB preamp gain
Group Sensitivity	49.45 V/bar
Channel-to-channel Gain Accuracy	±1%
Low-Cut Filter (due to hydrophone)	-3 dB @ 2.5 Hz, 6 dB/Octave

D) Navigation

WISDOM II™ Integrated Navigation System consists of:

Hewlett Packard HP2117F Mini Computer

Hewlett Packard HP2649 Graphics Terminal

Epson LQ1170 Printer

Sony VM4515 Video Monitor

Telex Shamrock 9270 1600/6250 bpi Tape Deck

WESTERN's Navigation Interface Unit (NIU)

E) Ancillary Equipment (optional)

FLEXQC℠ Real-Time 3-D Binning System

SSTS Phase II Acoustic Positioning System

DIGIRANGE Acoustic Positioning System

TOTALNET Realtime Navigation Processing

UNAVCHK℠ Onboard Navigation/QC Processing

OMEGA™ Onboard Seismic/QC Processing

DART™ (DGPS Automatic Remote Tracking) Tailbuoy Positioning System

F) Ancillary Equipment

OYO Plotter GS-624

WESTERN Micro Computer Header Expander System

Simrad EA200 Fathometer, 0 to 5,000 metre range

Simrad ED162 Fathometer

G) Test Equipment Specifications

Tektronix 2430A Digital Oscilloscope

Tektronix 2445B Oscilloscope

There is also an adequate stock of spare parts and all operating supplies for the above equipment.

6. DESCRIPTION OF EQUIPMENT

6. DESCRIPTION OF EQUIPMENT

6.1 WG24 MARINE DATA ACQUISITION SYSTEM

The WG24 Seismic Recording System is a new generation data acquisition system. It employs advanced technology to provide high resolution/low distortion seismic data recording previously unobtainable with conventional systems. The streamer cable has been designed for tow noise levels at 12.5m group centres that have previously only been obtainable utilizising 25m group centres.

The system provides:-

- New, low noise cable section design, featuring tapered overlapping arrays of 12.5m group centres.
- Individual channel analog/digital converters with digitizer at the hydrophone array location.
- Instantaneous dynamic range >114db using sigma delta modulation A/D techniques, without floating point amplifiers.
- Fibre optic data telemetry.
- Telemetry paths designed for streamers up to 10000m.
- Extensive test facilities for cable fault isolation.
- Up to 1024 seismic channels, demultiplexed in SEGD 8048 format.
- Up to four streamer cable recording.
- Data recorded on IBM3480 compatible cartridge tapes.

<u>System Description</u>

The system can be divided into two main parts.

1. The Streamer Cable.

2. The Shipboard Electronics.

These are shown in block diagrams Fig.1 and Fig.2.

WG-24 STREAMER CABLE

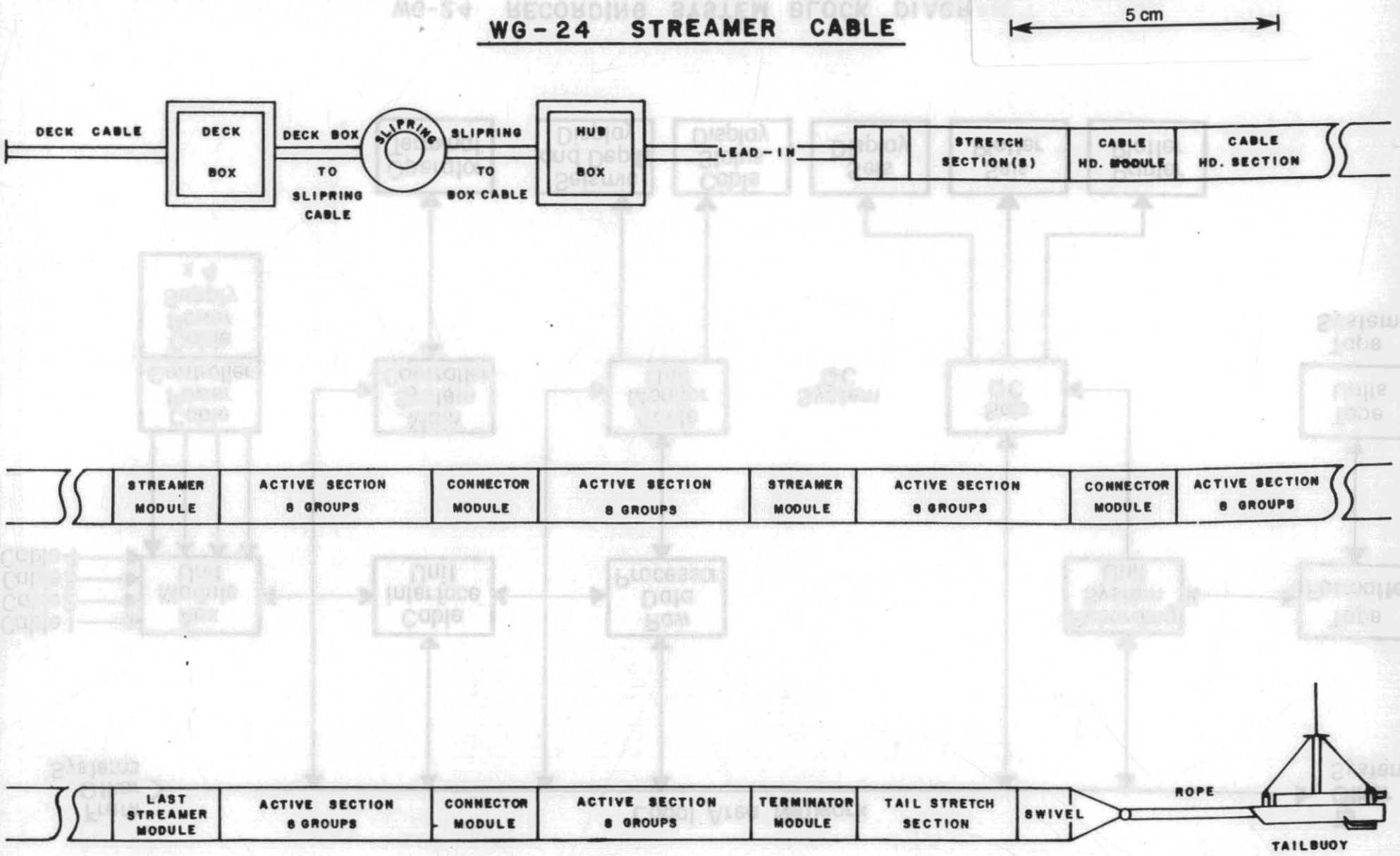
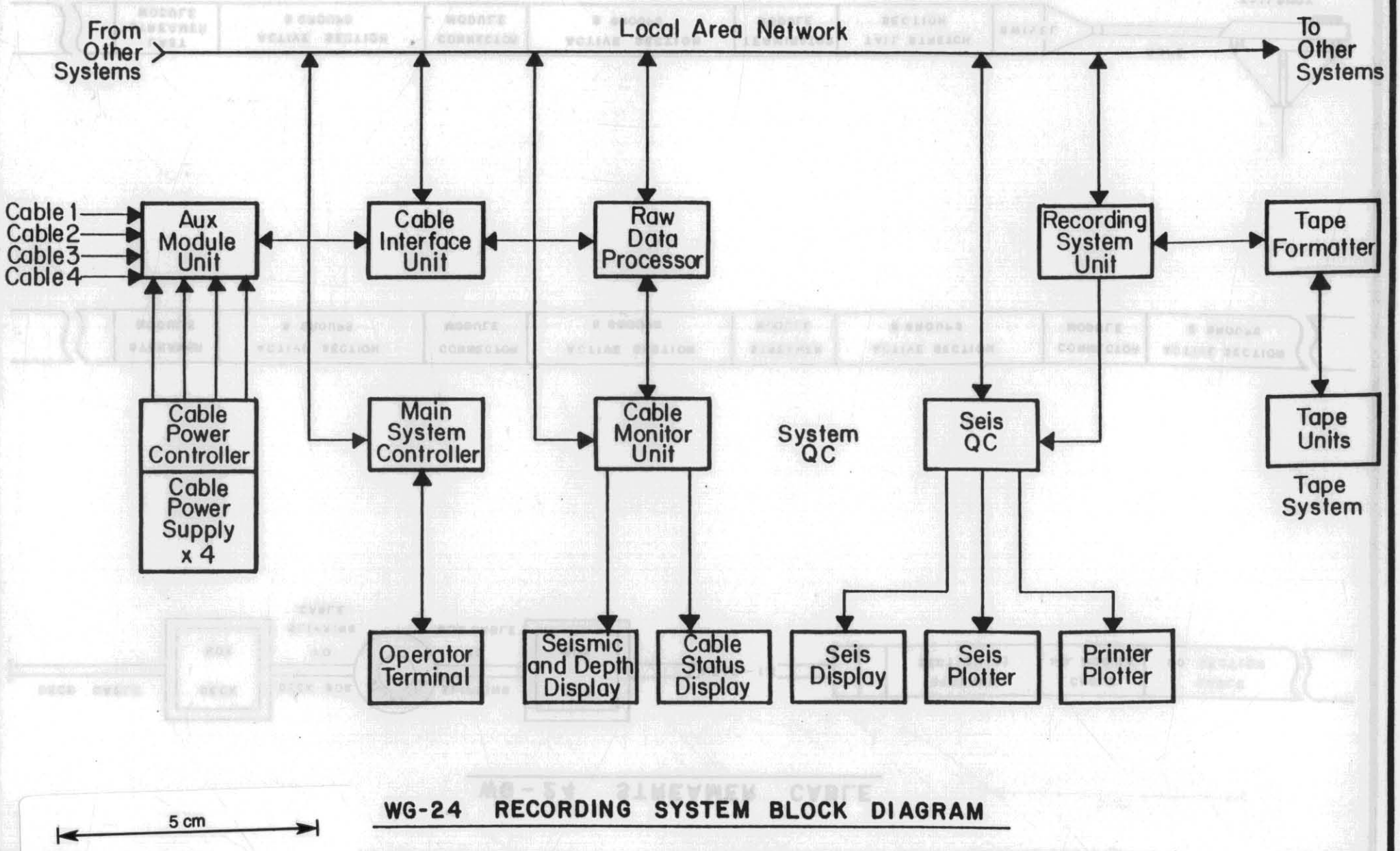


FIGURE 1



WG-24 RECORDING SYSTEM BLOCK DIAGRAM

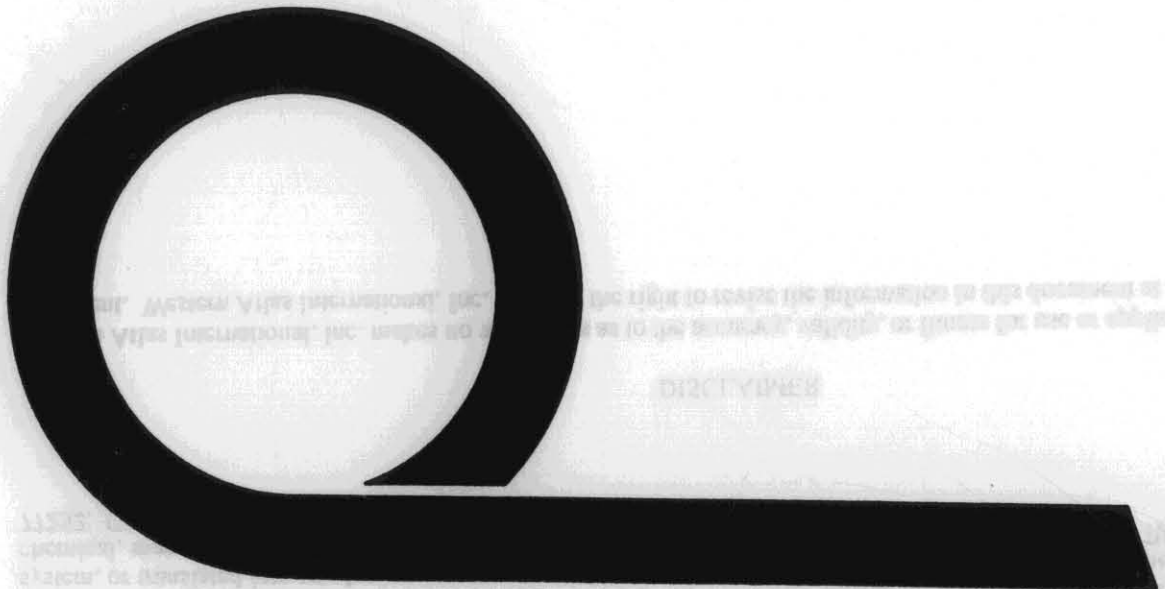
FIGURE 2

501335

6.2

WG-24
DIGITAL TELEMETRY SYSTEM
TAPE FORMAT

Rev. 1



Western Atlas International

WESTERN GEOPHYSICAL

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November 1992

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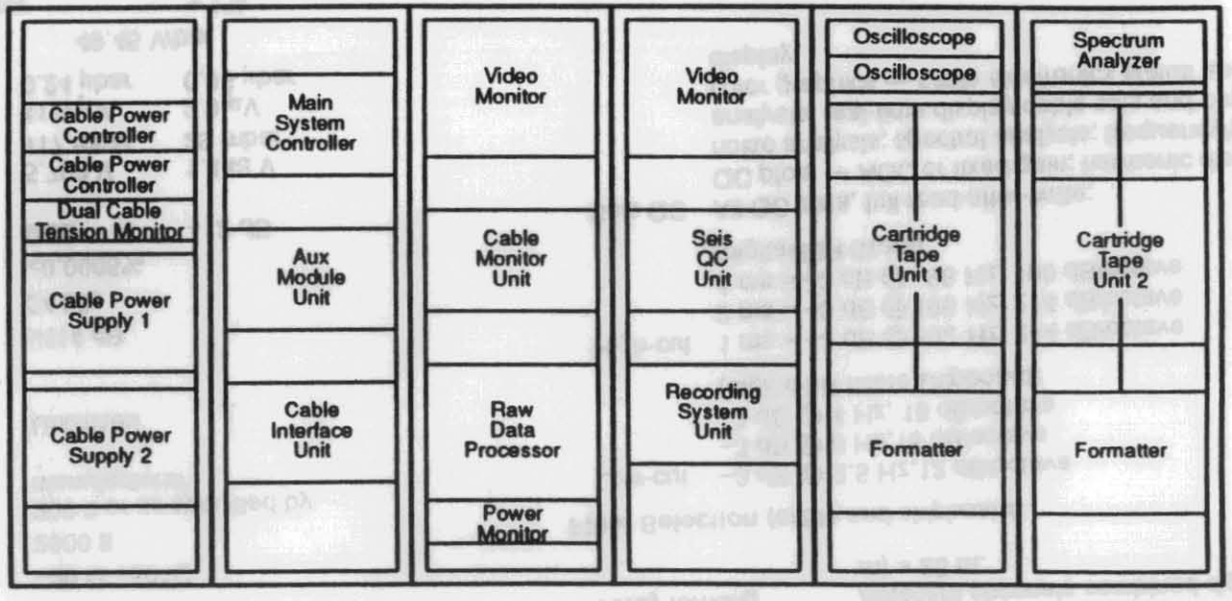
WG-24 Marine Data Acquisition System

The WG-24 System is a marine digital seismic data acquisition system featuring a state-of-the-art high-resolution digital streamer cable and a shipboard recording system with unparalleled quality control features. The system blends the use of 24-bit resolution data acquisition, fiber optic data telemetry, large channel capacity, and extended cable lengths to provide exceptional data quality and recording features. The WG-24 System has been designed with the geophysicist in mind.



FEATURES

Cable

- Instantaneous dynamic range to >114 dB using Enhanced Delta Modulated Encoder (EDME) with no floating point amplifier.
- Fiber optic data telemetry with multiple fiber paths. Increases bandwidth, eliminates transmission errors.
- Data/Command telemetry path designed for cable lengths >10,000 meters.
- Extensive instrument and diagnostic tests for fault isolation of section problems.
- Individual A/D converter per channel with digitizer at phone group.
- New low-noise section design featuring tapered phone groups with standard 12.5-meter spacing.

Shipboard (Basic Configuration*)

- Can record more than 1000 channels in a demultiplexed SEG-D format.
- Can acquire up to four (4) cables simultaneously.
- All data are recorded on 3480 or compatible cartridge tape drives.
- Improved seismic quality control (QC) functions, faster plotting, AGC gained plots, distortion, noise, spectral analysis.
- Improved digital FIR antialias filters and IIR low-cut filters.
- Extensive use of color graphics monitors for cable functions/status, as well as seismic displays on a shot-by-shot basis.

* System expandable in multiples of 4 streamer cables.

501338

SPECIFICATIONS

Streamer Cable

Section length	100 meters
Groups per section	8
Group spacing	12.5 meter center
Phones per group	16 (12.5 meter)
Array type	Tapered array, center weighted, 15.5 meter overall length, 21% overlap adjacent groups
Section configuration	8 seismic channels 1 waterbreak channel 1 depth transducer
Data telemetry	Dual optical fiber

Environmental

Operating temperature	–20 to +50°C
Maximum depth (electronics)	2000 ft
Maximum depth (phones, aux equipment)	200 ft or as specified by manufacturer
Operating time on reel	Unlimited

Streamer Electronics

Instantaneous dynamic range	>114 dB	
Resolution (including sign)	24 bits	
THD @ maximum input	<0.0005%	
Pre-amp gain (selectable from vessel)	0 dB	+12 dB
Max. input signal, rms	5.793 V 117 mbar	1.448 V 29 mbar
Input noise, rms (input shorted)	11.6 µV 0.24 µbar	2.9 µV 0.06 µbar
Group sensitivity	49.45 V/bar	
Channel-to-channel gain accuracy	±1%	
Low-cut filter (due to hydrophone)	–3 dB @ 2.5 Hz, 6 dB/octave	

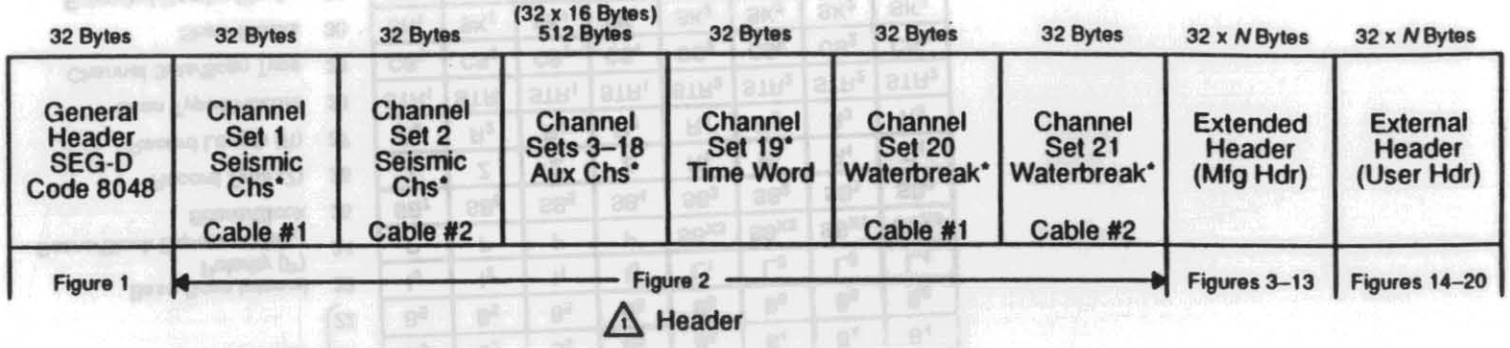
SPECIFICATIONS (Basic Configuration*)

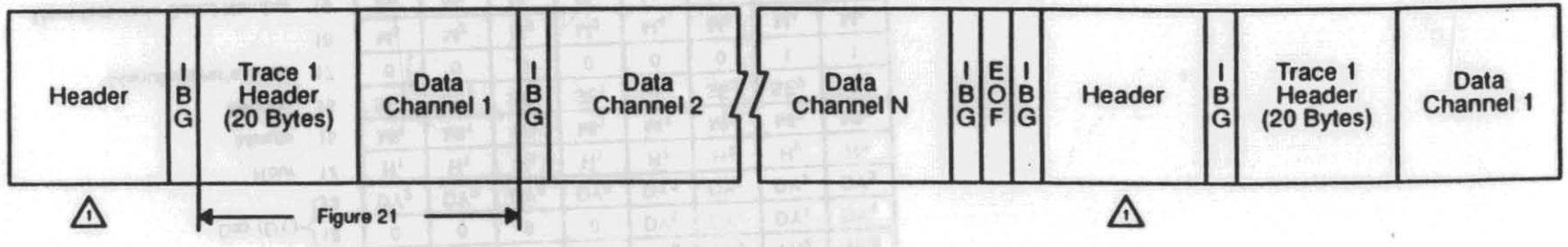
Recording capacity	1024 seis channels 16 waterbreak channels 16 auxiliary channels 1 timing word
Recording format	4-byte SEG-D, demultiplexed data format code 8048
Max. record length	Memory double-buffered. Example: Can record 960 channels 2 ms, 12-s record
Recording system	3480-compatible cartridge tape drives, ANSI standard tapes
Array forming	Adjacent channels combined digitally (2 × 12.5 m) = 25 m.

Filter Selection (cable and shipboard)

Low-cut	–3 dB @ 2.5 Hz, 12 dB/octave –3 dB @ 6 Hz, 18 dB/octave –3 dB @ 4 Hz, 18 dB/octave (digital IIR filters shipboard)
High-cut	1 ms = –3 dB @ 392 Hz, 214 dB/octave 2 ms = –3 dB @ 196 Hz, 214 dB/octave 4 ms = –3 dB @ 96 Hz, 190 dB/octave (digital FIR filters)
Seis QC	All QC data, full read-after-write; QC plots — AGC or fixed gain; harmonic distortion analysis; noise analysis; spectral analysis; frequency/phase response analysis; real-time display cable seis and depth data; color graphics — cable electronics status and seismic data display.

* System expandable in multiples of 4 streamer cables.





Data are Recorded on 3480 Cartridges at 38000 bpi (18 Tracks)

NOTES

All header fields are assumed to be recorded in binary coded decimal (BCD) format unless otherwise noted.

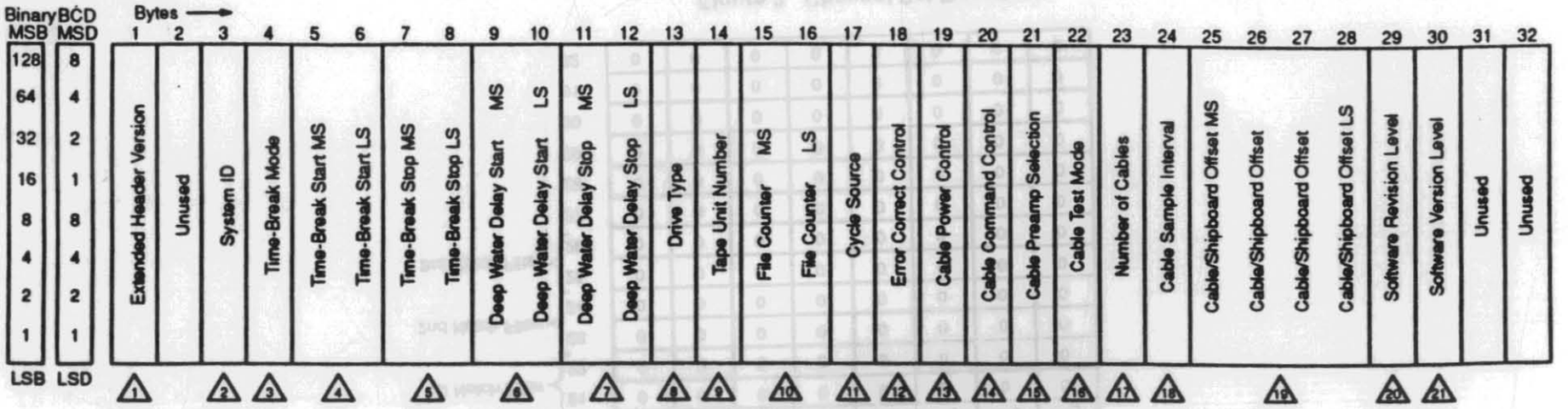
* Channel sets for seismic channels and waterbreak may change depending on the number of cables on the system.

Description	Byte	BCD Value MSD 8	4	2	1	8	4	2	1 LSD	Comments
File Number	1	F_1	F_1	F_1	F_1	F_2	F_2	F_2	F_2	
	2	F_3	F_3	F_3	F_3	F_4	F_4	F_4	F_4	
Format Code	3	1	0	0	0	0	0	0	0	
	4	0	1	0	0	1	0	0	0	
General Constants	5	K_1	K_1	K_1	K_1	K_2	K_2	K_2	K_2	
	6	K_3	K_3	K_3	K_3	K_4	K_4	K_4	K_4	
	7	K_5	K_5	K_5	K_5	K_6	K_6	K_6	K_6	
	8	K_7	K_7	K_7	K_7	K_8	K_8	K_8	K_8	
	9	K_9	K_9	K_9	K_9	K_{10}	K_{10}	K_{10}	K_{10}	
	10	K_{11}	K_{11}	K_{11}	K_{11}	K_{12}	K_{12}	K_{12}	K_{12}	
Year	11	YR_1	YR_1	YR_1	YR_1	YR_2	YR_2	YR_2	YR_2	
Day (DY)	12	0	0	0	0	DY_1	DY_1	DY_1	DY_1	
	13	DY_2	DY_2	DY_2	DY_2	DY_3	DY_3	DY_3	DY_3	
Hour	14	H_1	H_1	H_1	H_1	H_2	H_2	H_2	H_2	
Minute	15	MI_1	MI_1	MI_1	MI_1	MI_2	MI_2	MI_2	MI_2	
Second	16	SE_1	SE_1	SE_1	SE_1	SE_2	SE_2	SE_2	SE_2	
Manufacturer's Code	17	0	0	0	0	0	0	1	1	
	18	M_3	M_3	M_3	M_3	M_4	M_4	M_4	M_4	
Manufacturer's Serial Number	19	M_5	M_5	M_5	M_5	M_6	M_6	M_6	M_6	
Bytes per Scan	20	B_1	B_1	B_1	B_1	B_2	B_2	B_2	B_2	
	21	B_3	B_3	B_3	B_3	B_4	B_4	B_4	B_4	
	22	B_5	B_5	B_5	B_5	B_6	B_6	B_6	B_6	
Base Scan Interval	23	I_3	I_2	I_1	I_0	I_{-1}	I_{-2}	I_{-3}	I_{-4}	
Polarity (P) Scans/Block Exponent (SB_X)	24	P	P	P	P	SB_{X3}	SB_{X2}	SB_{X1}	SB_{X0}	
Scans/Block	25	SB_7	SB_6	SB_5	SB_4	SB_3	SB_2	SB_1	SB_0	
Record Type (Z)	26	Z	Z	Z	Z	R_1	R_1	R_1	R_1	
Record Length (R)	27	R_2	R_2	R_2	R_2	R_3	R_3	R_3	R_3	
Scan Types/Record	28	STR_1	STR_1	STR_1	STR_1	STR_2	STR_2	STR_2	STR_2	
Channel Sets/Scan Type	29	CS_1	CS_1	CS_1	CS_1	CS_2	CS_2	CS_2	CS_2	
Skew Blocks	30	SK_1	SK_1	SK_1	SK_1	SK_2	SK_2	SK_2	SK_2	
Extended Header Blocks	31	EC_1	EC_1	EC_1	EC_1	EC_2	EC_2	EC_2	EC_2	
External Header Blocks	32	EX_1	EX_1	EX_1	EX_1	EX_2	EX_2	EX_2	EX_2	

Figure 1. General Header

Description	Byte	BCD Value MSD 8	4	2	1	8	4	2	1 LSD	Comments
Scan-Type Number	1	ST_1	ST_1	ST_1	ST_1	ST_2	ST_2	ST_2	ST_2	
Channel Set Number	2	ST_3	ST_3	ST_3	ST_3	ST_4	ST_4	ST_4	ST_4	
Channel Set Start Time	3	TF_{16}	TF_{15}	TF_{14}	TF_{13}	TF_{12}	TF_{11}	TF_{10}	TF_9	
	4	TF_8	TF_7	TF_6	TF_5	TF_4	TF_3	TF_2	TF_1	
Channel Set End Time	5	TE_{16}	TE_{15}	TE_{14}	TE_{13}	TE_{12}	TE_{11}	TE_{10}	TE_9	
	6	TE_8	TE_7	TE_6	TE_5	TE_4	TE_3	TE_2	TE_1	
	7	0	0	0	0	0	0	0	0	
Descale Multiplier	8	MP_5	MP_4	MP_3	MP_2	MP_1	MP_0	MP_{-1}	MP_{-2}	
Number of Channels	9	CS_1	CS_1	CS_1	CS_1	CS_2	CS_2	CS_2	CS_2	
	10	CS_3	CS_3	CS_3	CS_3	CS_4	CS_4	CS_4	CS_4	
Channel Type (C)	11	C_1	C_1	C_1	C_1	0	0	0	0	
Samples/Ch (SC)	12	SC	SC	SC	SC	J	J	J	J	
Channel Gain (J)										
Alias Filter Frequency	13	AF_1	AF_1	AF_1	AF_1	AF_2	AF_2	AF_2	AF_2	
	14	AF_3	AF_3	AF_3	AF_3	AF_4	AF_4	AF_4	AF_4	
Alias Filter Slope (AS)	15	0	0	0	0	AS_1	AS_1	AS_1	AS_1	
	16	AS_2	AS_2	AS_2	AS_2	AS_3	AS_3	AS_3	AS_3	
Low-Cut Filter	17	LC_1	LC_1	LC_1	LC_1	LC_2	LC_2	LC_2	LC_2	
	18	LC_3	LC_3	LC_3	LC_3	LC_4	LC_4	LC_4	LC_4	
Low-Cut Filter Slope (LS)	19	0	0	0	0	LS_1	LS_1	LS_1	LS_1	
	20	LS_2	LS_2	LS_2	LS_2	LS_3	LS_3	LS_3	LS_3	
1st Notch Filter	21	0	0	0	0	0	0	0	0	
	22	0	0	0	0	0	0	0	0	
2nd Notch Filter	23	0	0	0	0	0	0	0	0	
	24	0	0	0	0	0	0	0	0	
3rd Notch Filter	25	0	0	0	0	0	0	0	0	
	26	0	0	0	0	0	0	0	0	
	27	0	0	0	0	0	0	0	0	
	28	0	0	0	0	0	0	0	0	
	29	0	0	0	0	0	0	0	0	
	30	0	0	0	0	0	0	0	0	
	31	0	0	0	0	0	0	0	0	
	32	0	0	0	0	0	0	0	0	

Figure 2. Channel Set Descriptor

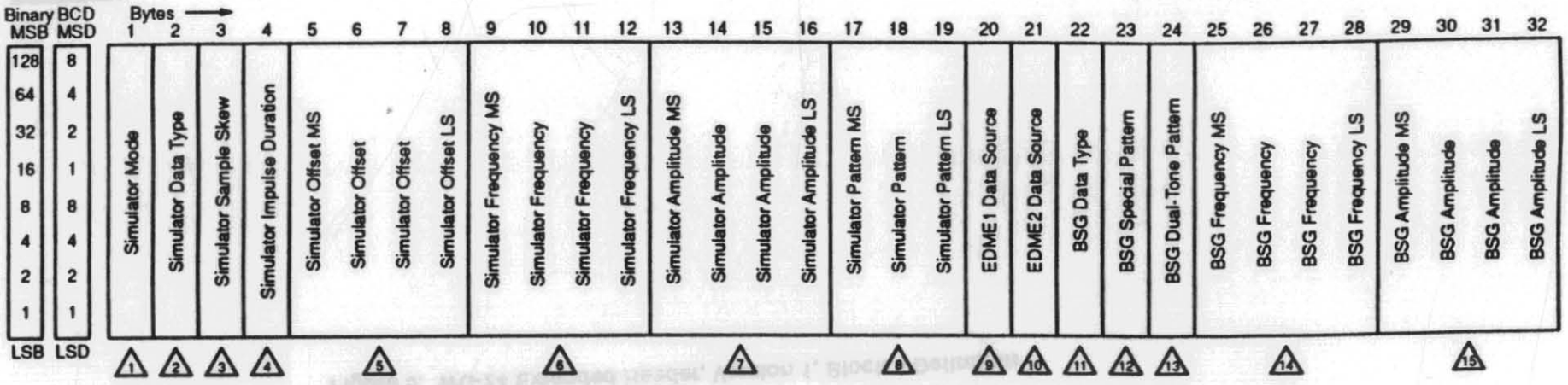


NOTES

1. Extended Header Version: Binary number (01 hex)
2. System ID: Binary number (04 hex).
3. Time-Break Mode: Binary number, where 01 = external, 02 = local, 03 = local (sweep).
4. Time-Break Start: Time from fire command to time-break window open; binary number in ms.
5. Time-Break Stop: Time from fire command to time-break window close; binary number in ms.
6. Deep Water Delay Start: Time from entering deep water delay to time break; binary number in ms.
7. Deep Water Delay Stop: Time from exiting deep water delay to time break; binary number in ms.
8. Drive Type: Binary number (01 hex = IBM 9480, 02 hex = STK 4280, 03 hex = Fujitsu M1016B formatter and drives).
9. Tape Unit Number: Indicates the tape drive that is used (0 to 7).
10. File Counter: Number of files that remain to be recorded on this tape.
11. Cycle Source: 01 hex = internal manual, 02 hex = internal auto, 03 hex = external.
12. Error Correct Control: 00 hex = disabled, 01 hex = enabled.
13. Cable Power Control/Status: 00 hex = cable power off/cable power not ok, 01 hex = cable power off/cable power ok, 10 hex = cable power on/cable power not ok, 11 hex = cable power on/cable power ok.
14. Cable Command Control: 00 hex = CIU controlling cable, 01 hex = RDP controlling cable.
15. Cable Preamp Selection: 01 hex = preamp = 0 dB, 02 hex = preamp = 12 dB.
16. Cable Test Mode: Hex 00 to 0E.
17. Number of Cables: The number of cables shooting.
18. Cable Sample Interval: 01 hex = 0.5 ms, 02 hex = 1.0 ms.
19. Cable/Shipboard Offset: IBM single pre-floating-point number distance in meters from the shipboard to the first module.
20. Software Revision Level: 11 hex for release 1.1, 30 hex for release 3.0.
21. Software Version Level: 1 = version A, 2 = version B, 3 = version C, . . . , etc..

All unused bytes are recorded as zero.

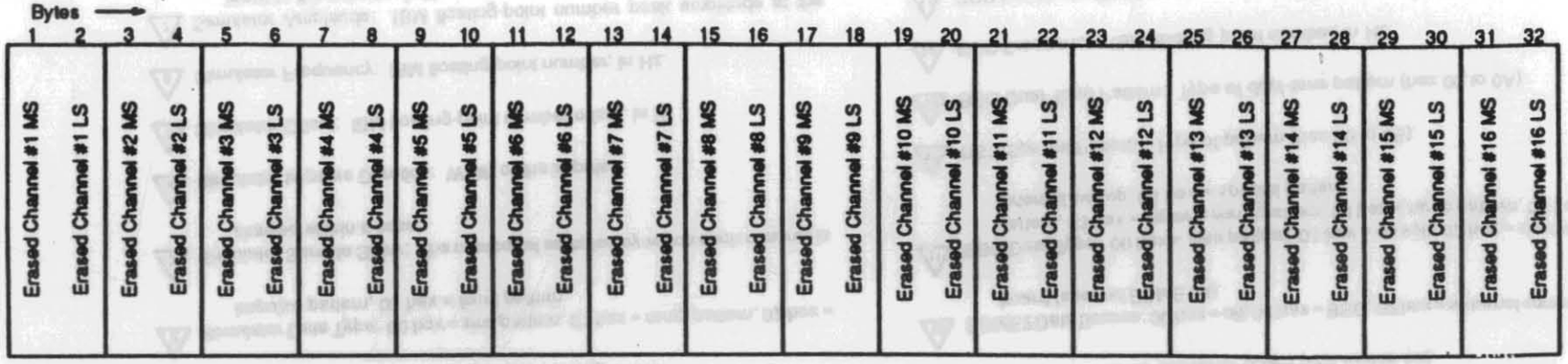
Figure 3. WG-24 Extended Header, Version 1, Block 1 Definition



NOTES

1. Simulator Mode: 00 hex = simulator off (bytes 2–19 are meaningless), 01 hex = simulator on/RAM mode, 02 hex = simulator on/RAM mode forcing errors, 03 hex = simulator on/aux duplicate, 04 hex = simulator on/aux duplicate forcing errors.
2. Simulator Data Type: 00 hex = sine pattern, 01 hex = ramp pattern, 02 hex = impulse pattern, 03 hex = fixed pattern.
3. Simulator Sample Skew: The number of samples by which each channel is skewed within a scan.
4. Simulator Impulse Duration: Width of the impulse.
5. Simulator Offset: IBM floating-point number offset, in V.
6. Simulator Frequency: IBM floating-point number, in Hz.
7. Simulator Amplitude: IBM floating-point number peak amplitude at the input to the preamp, in V.
8. Simulator Pattern: Pattern used on all channels.
9. EDME1 Data Source: 00 hex = off, 01 hex = bit stream generator (BSG), 02 hex = external converter board (first EDME bit).
10. EDME2 Data Source: 00 hex = off, 01 hex = BSG, 02 hex = external converter board (second EDME bit).
11. BSG Data Type: 00 hex = sine pattern, 01 hex = dc volt, 02 hex = dual-tone pattern, 03 hex = square-wave pattern, 04 hex = ramp pattern, 05 hex = external sweep, 06 hex = special pattern.
12. BSG Special Pattern: Type of pattern (hex 00 to 0E).
13. BSG Dual-Tone Pattern: Type of dual-tone pattern (hex 00 to 0A).
14. BSG Frequency: IBM floating-point number, in Hz.
15. BSG Amplitude: IBM floating-point number peak amplitude at input to preamp, in V.

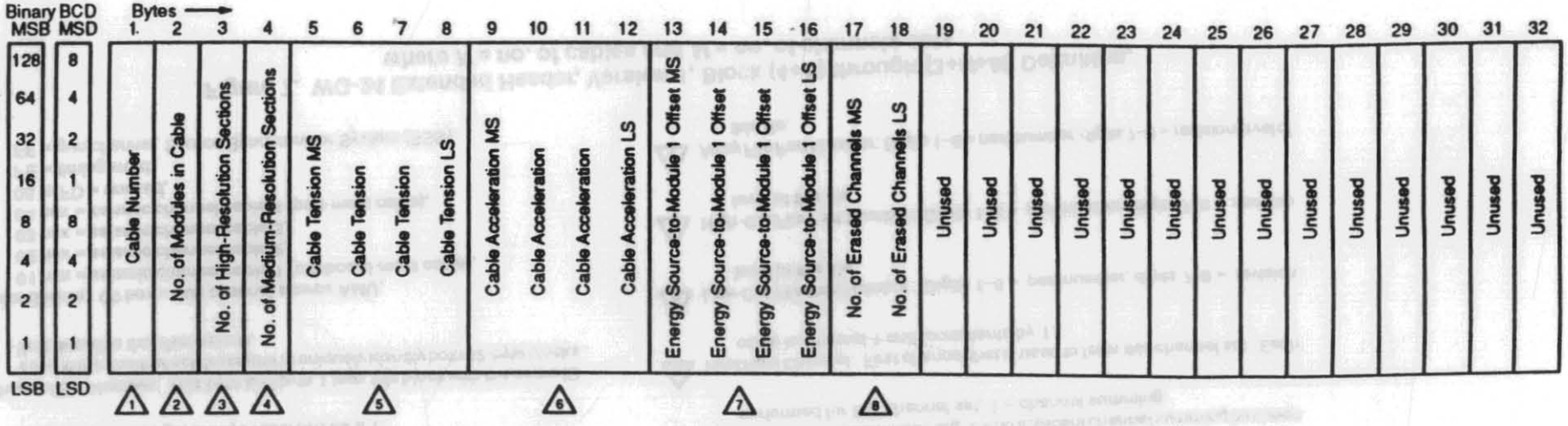
Figure 4. WG-24 Extended Header, Version 1, Block 2 Definition



NOTE

Erased Channel No. 1: The high 4 bits is the cable that contains the erased channel. Range from 01 hex (starboard-most cable) to *N* hex (port-most cable), where *N* is the number of cables in the system. The lower order 12 bits represent the channel that has been erased. Bytes 3 through 32, erased channels 2 through 12, are identical to the format described for the first channel.

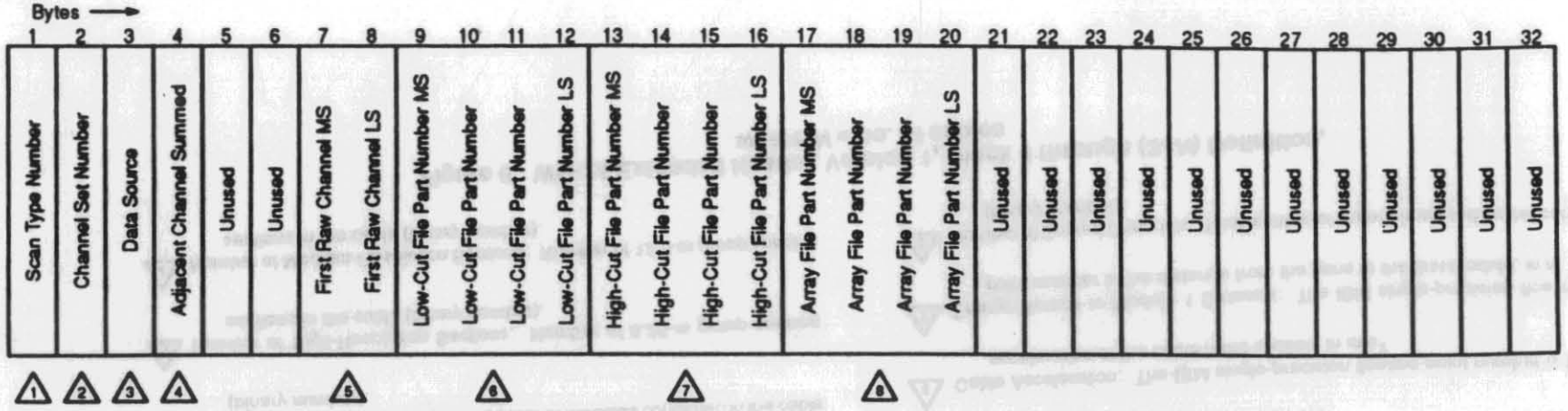
Figure 5. WG-24 Extended Header, Version 1, Block 3 Definition



NOTES

1. Cable Number: ID the number of the cable in this block (binary number).
2. Number of Modules in the Cable: Number of modules contained in the cable (binary number).
3. Number of High-Resolution Sections: Number of 6.25-m group spacing sections in the cable (binary number).
4. Number of Medium-Resolution Sections: Number of 12.5-m group spacing sections in the cable (binary number).
5. Cable Tension: The IBM single-precision floating-point number is the amount of tension on the cable, in Newtons (N).
6. Cable Acceleration: The IBM single-precision floating-point number is the acceleration at the cable head section, in m/s^2.
7. Energy Source-to-Module 1 Distance: The IBM single-precision floating-point number is the distance from the guns to the first module, in m.
8. Number of Erased Channels: Total number of channels erased for this cable (binary number).

Figure 6. WG-24 Extended Header, Version 1, Block 4 through (3+*N*) Definition, where *N* = no. of cables



NOTES

1. Scan Type Number: The BCD number ID of the scan type to which this channel set belongs, always recorded as a 1.

2. Channel Set Number: This byte and byte 1 tags this block with the same ID used in the channel set descriptor to uniquely identify both 32-byte blocks that describe the channel set.

3. Data Source: 00 hex = aux channel source AMU,
   01 hex = seismic channel cable 1 (starboard-most cable),
   02 hex = seismic channel cable 2,
   03 hex = seismic channel cable 3,
   04 hex = seismic channel cable 4 (port-most cable),
   05 to FD = unused,
   FE = timing word,
   FF = gun channel, Source Synchronizer System (SSS).

4. Adjacent Channel Summed Flag: 0 = no adjacent channel summing has been performed for this channel set, 1 = channel summing.

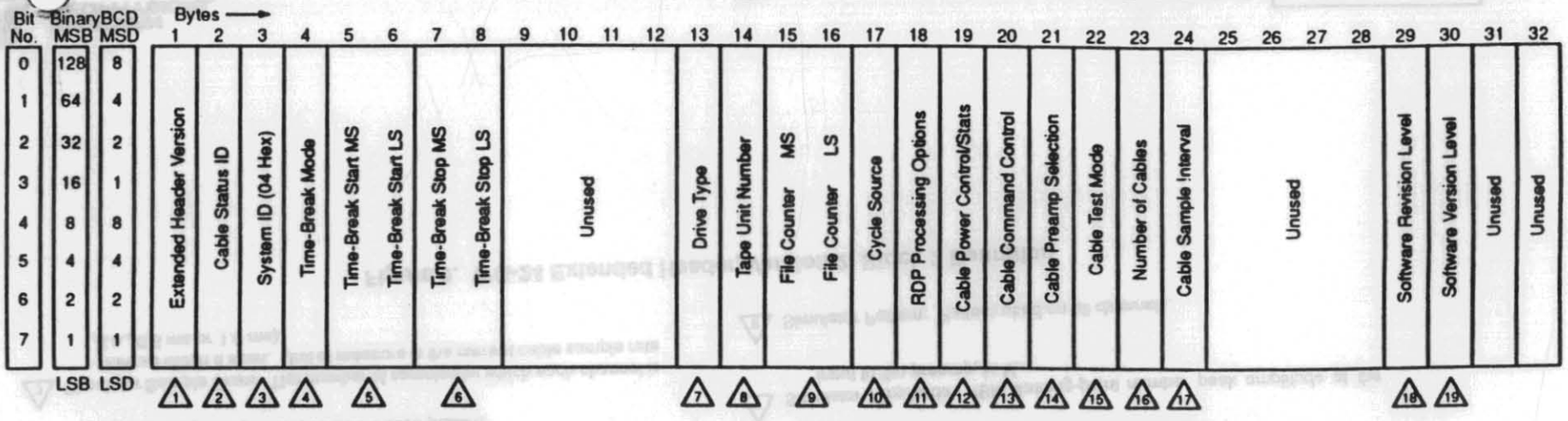
5. First Raw Channel: First channel that is used to form this channel set. Each cable is channel 1 and increments by 1.

6. Low-Cut File Part Number: Digits 1–6 = part number, digits 7–8 = revision level of this file.

7. High-Cut File Part Number: Digits 1–6 = part number, digits 7–8 = revision level of this file.

8. Array File Part Number: Digits 1–6 = part number, digits 7–8 = revision level of this file.

Figure 7. WG-24 Extended Header, Version 1, Block (4+*N*) through (3+*N*+*M*) Definition, where *N* = no. of cables and *M* = no. of channels sets

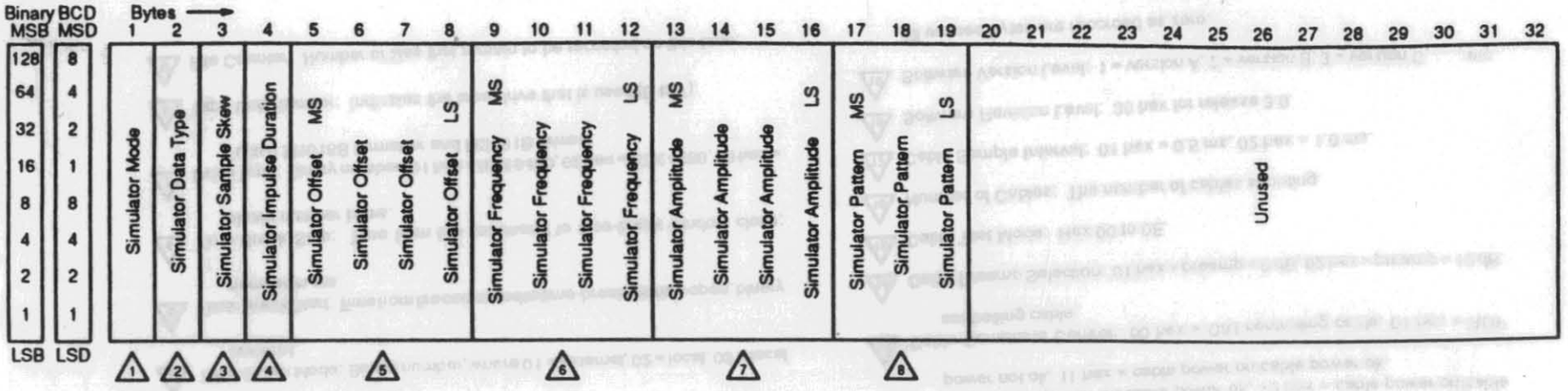


NOTES

1. Extended Header Version: Binary number (02 hex)
2. Cable Status ID: 02 hex = internal temperature in deg C, 04 hex = peak optic power received in µW, 05 hex = +5 V, 06 hex = +12 V, 07 hex = –12 V, 08 hex = +6 V, 09 hex = +15 V, 0A hex = –15 V, 0B hex = VCO control V, 0C hex = SPS +6 V, 0D hex = SPS +15 V, 0E hex = peak optic power from previous module µW, 0F hex = seaside module internal +5 V.
3. System ID: Binary number (04 hex).
4. Time-Break Mode: Binary number, where 01 = external, 02 = local, 03 = local (sweep).
5. Time-Break Start: Time from fire command to time-break window open; binary number in ms.
6. Time-Break Stop: Time from fire command to time-break window close; binary number in ms.
7. Drive Type: Binary number (01 hex = IBM 9480, 02 hex = STK 4280, 03 hex = Fujitsu M1016B formatter and M2481B drives).
8. Tape Unit Number: Indicates the tape drive that is used (0 to 7).
9. File Counter: Number of files that remain to be recorded on this tape.
10. Cycle Source: 01 hex = internal manual, 02 hex = internal auto, 03 hex= external.
11. RDP Processing Options, decoded as follows: bit 0 = spike detect, bit 1 = error correct, bit 2 = high-cut filter, bit 3 = low-cut filter, bit 4 = de-glitch, bit 5 = offset removal, bit 6 = MP correction, bit 7 = unused.
12. Cable Power Control/Status: 00 hex = cable power off/cable power not ok, 01 hex = cable power off/cable power ok, 10 hex = cable power on/cable power not ok, 11 hex = cable power on/cable power ok.
13. Cable Command Control: 00 hex = CIU controlling cable, 01 hex = RDP controlling cable.
14. Cable Preamp Selection: 01 hex = preamp = 0 dB, 02 hex = preamp = 12 dB.
15. Cable Test Mode: Hex 00 to 0E.
16. Number of Cables: The number of cables shooting.
17. Cable Sample Interval: 01 hex = 0.5 ms, 02 hex = 1.0 ms.
18. Software Revision Level: 30 hex for release 3.0.
19. Software Version Level: 1 = version A, 2 = version B, 3 = version C, . . . , etc.

All unused bytes are recorded as zero.

Figure 8. WG-24 Extended Header, Version 2, Block 1 Definition



NOTES

1. Simulator Mode: 00 hex = simulator off (bytes 2–19 are meaningless),
   01 hex = simulator on/RAM mode,
   02 hex = simulator on/RAM mode forcing errors,
   03 hex = simulator on/aux duplicate,
   04 hex = simulator on/aux duplicate forcing errors.

2. Simulator Data Type: 00 hex = sine pattern, 01 hex = ramp pattern, 02 hex = impulse pattern, 03 hex = fixed pattern.

3. Simulator Sample Skew: The number of samples by which each channel is skewed within a scan. Unit of measure is the current cable sample rate (i.e., 0.5 ms or 1.0 ms).

4. Simulator Impulse Duration: Width of the impulse, 500 µs increments.

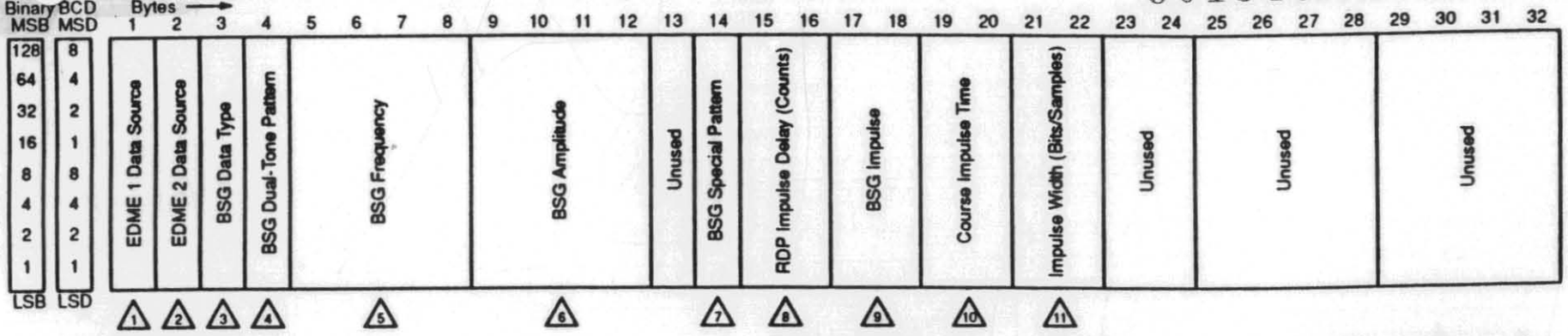
5. Simulator Offset: IBM floating-point number offset, in V.

6. Simulator Frequency: IBM floating-point number, in Hz.

7. Simulator Amplitude: IBM floating-point number peak amplitude at the input to the preamp, in V.

8. Simulator Pattern: Pattern used on all channels.

Figure 9. WG-24 Extended Header, Version 2, Block 2 Definition



NOTES

1. EDME 1 Data Source: 00 hex = off, 01 hex = BSG, 02 hex = external converter board.
2. EDME 2 Data Source: 00 hex = off, 01 hex = BSG, 02 hex = external converter board.
3. BSG Data Type: 00 hex = sine pattern, 01 hex = dc Volt, 02 hex = dual tone, 03 hex = square sine, 04 hex = ramp, 05 hex = external sweep, 06 hex = special pattern.
4. BSG Dual-Tone Pattern: Type of dual-tone pattern; 00 hex = 156 Hz @ –6 dB and 172 Hz @ –6 dB, 01 hex = 156.3 Hz @ –6 dB, 02 hex = 172 Hz @ –6 dB, 03 hex = 164 Hz @ –6 dB and 180 Hz @ –6 dB, 04 hex = 164 Hz @ –6 dB, 05 hex = 163.9 Hz @ –6 dB, 06 hex = 31 Hz @ –6 dB and 47 Hz @ –6 dB, 07 hex = 31 Hz @ –6 dB and 44 Hz @ –66 dB, 08 hex = 31 Hz @ –6 dB and 47 Hz @ –108 dB, 09 hex = 31 Hz @ –6 dB and 47 Hz @ –114 dB, 0A hex = 31 Hz @ –48 dB and 47 Hz @ –114 dB.
5. BSG Frequency: IBM floating-point number represents the frequency of the data pattern.
6. BSG Amplitude: IBM floating-point number represents the peak amplitude of the data generated.
7. BSG Special Pattern*: Type of pattern (hex 00 to 0E).
8. RDP Impulse Delay: Delay RDP will apply before issuing the start interrupt to the BSG, 1 count = 7.8125 µs.
9. BSG Impulse*: Type of impulse selected by the special pattern.
10. Course Impulse Time*: Delay in he BSG and step function, hex number in ms of delay.
11. Impulse Width*: Width of the impulse, hex number representing the number of bits per sample.

7 * Type of Pattern

Hex Value	Description	Impulse Field Defaults		
		BSG (9)	Course (10)	Width (11)
00	Constant Bit Pattern, all zeros	0000	0000	0000
01	Constant Bit Pattern, 25% ones	0011	0000	0000
02	Constant Bit Pattern, 50% ones	0055	0000	000
03	Constant Bit Pattern, 75% ones	0077	0000	0000
04	Constant Bit Pattern, all ones	00FF	0000	0000
05	Impulse, Direct, 16 bit, 0.125 ms	FF00	07D0	0010
06	Impulse, Direct, 32 bit, 0.250 ms	FF00	07D0	0020
07	Impulse, Direct, 64 Bit, 0.500 ms	FF00	07D0	0040
08	Impulse, Direct, 128 Bit, 1.00 ms	FF00	07D0	0080
09	Impulse, Delta Mod, 16 Bit, 0.12/0.25 ms @ 0.5/1.0 ms Telemetry	1155	07D0	0010
0A	Impulse, Delta Mod, 32 Bit, 0.25/0.50 ms @ 0.5/1.0 ms Telemetry	1155	07D0	0020
0B	Impulse, Delta Mod, 64 Bit, 0.50/1.0 ms @ 0.5/1.0 ms Telemetry	1155	07D0	0040
0C	Impulse, Delta Mod, 128 Bit, 1.0/2.0 ms @ 0.5/1.0 ms Telemetry	1155	07D0	0080
0D	Step Zeros to Ones	FF00	07D0	0000
0E	Step Ones to Zeros	00FF	07D0	0000

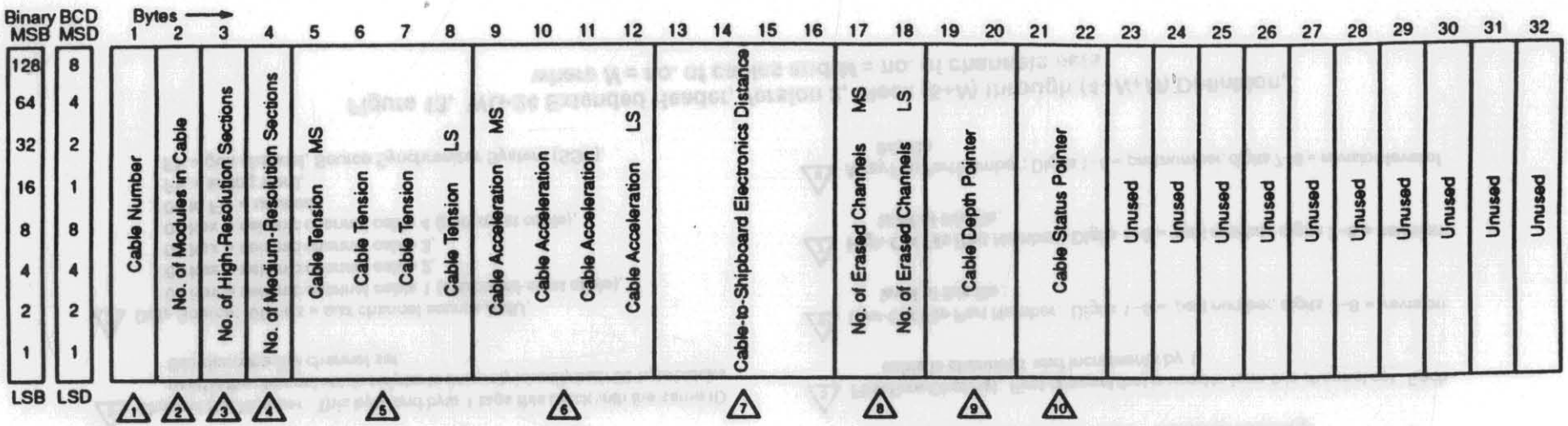
Figure 10. WG-24 Extended Header, Version 2, Block 3 Definition

Bit No.	Binary MSB	BCD MSD	Bytes → 1 2	3 4	5 6	7 8	9 10	11 12	13 14	15 16	17 18	19 20	21 22	23 24	25 26	27 28	29 30	31 32
0	128	8	Erased Channel #1 MS	Erased Channel #2 MS	Erased Channel #3 MS	Erased Channel #4 MS	Erased Channel #5 MS	Erased Channel #6 MS	Erased Channel #7 MS	Erased Channel #8 MS	Erased Channel #9 MS	Erased Channel #10 MS	Erased Channel #11 MS	Erased Channel #12 MS	Erased Channel #13 MS	Erased Channel #14 MS	Erased Channel #15 MS	Erased Channel #16 MS
1	64	4	Erased Channel #1 LS	Erased Channel #2 LS	Erased Channel #3 LS	Erased Channel #4 LS	Erased Channel #5 LS	Erased Channel #6 LS	Erased Channel #7 LS	Erased Channel #8 LS	Erased Channel #9 LS	Erased Channel #10 LS	Erased Channel #11 LS	Erased Channel #12 LS	Erased Channel #13 LS	Erased Channel #14 LS	Erased Channel #15 LS	Erased Channel #16 LS
2	32	2																
3	16	1																
4	8	8																
5	4	4																
6	2	2																
7	1	1																
	LSB	LSD																

NOTE

Erased Channel No. 1: The high 4 bits is the cable that contains the erased channel. Range from 01 hex (starboard-most cable) to *N* hex (port-most cable), where *N* is the number of cables in the system. The lower order 12 bits represent the channel that has been erased. Bytes 3 through 32, erased channels 2 through 16, are identical to the format described for the first channel.

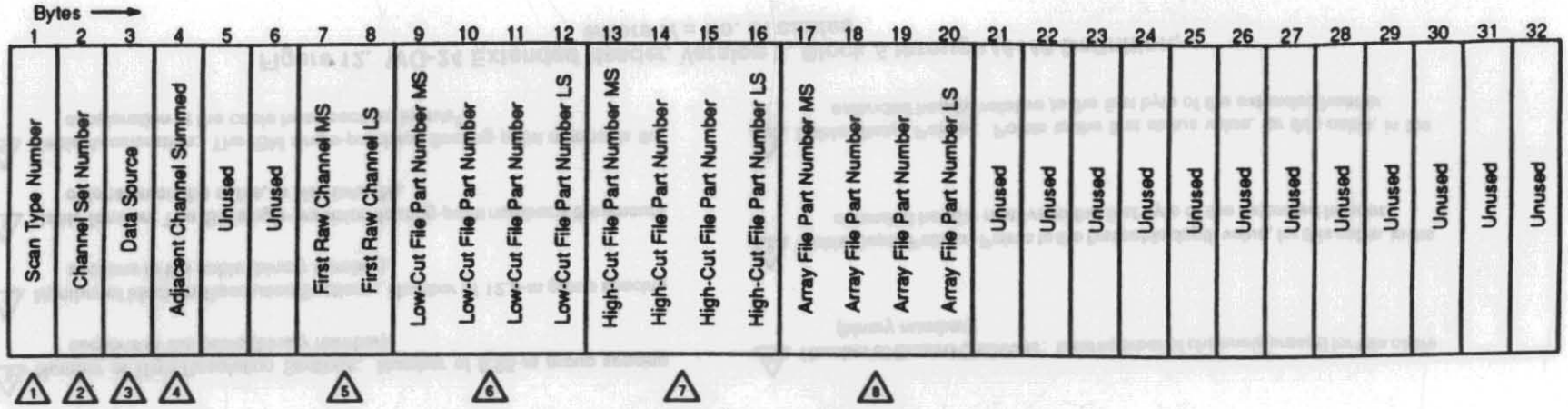
Figure 11. WG-24 Extended Header, Version 2, Block 4 Definition



NOTES

1. Cable Number: ID the number of the cable in this block (binary number).
2. Number of Modules in the Cable: Number of modules contained in the cable (binary number).
3. Number of High-Resolution Sections: Number of 6.25-m group spacing sections in the cable (binary number).
4. Number of Medium-Resolution Sections: Number of 12.5-m group spacing sections in the cable (binary number).
5. Cable Tension: The IBM single-precision floating-point number is the amount of tension on the cable, in Newtons (N).
6. Cable Acceleration: The IBM single-precision floating-point number is the acceleration at the cable head section, in m/s^2.
7. Shipboard System-to-Module 1 Distance: The IBM single-precision floating-point number is the distance from the shipboard system to the first module in the cable.
8. Number of Erased Channels: Total number of channels erased for this cable (binary number).
9. Cable Depth Pointer: Points to the first cable depth value, for this cable, in the extended header relative to the first byte of the extended header.
10. Cable Status Pointer: Points to the first status value, for this cable, in the extended header relative to the first byte of the extended header.

Figure 12. WG-24 Extended Header, Version 2, Block 5 through (4+*N*) Definition, where *N* = no. of cables



NOTES

1. Scan Type Number: The BCD number ID of the scan type to which this channel set belongs, always recorded as a 1.

2. Channel Set Number: This byte and byte 1 tags this block with the same ID used in the channel set descriptor to uniquely identify both 32-byte blocks that describe the channel set.

3. Data Source: 00 hex = aux channel source AMU,
   01 hex = seismic channel cable 1 (starboard-most cable),
   02 hex = seismic channel cable 2,
   03 hex = seismic channel cable 3,
   04 hex = seismic channel cable 4 (port-most cable),
   06 to FD = unused,
   FE = timing word,
   FF = gun channel, Source Synchronizer System (SSS).

4. Adjacent Channel Summed Flag: 0 = no adjacent channel summing has been performed for this channel set, 1 = channel summing.

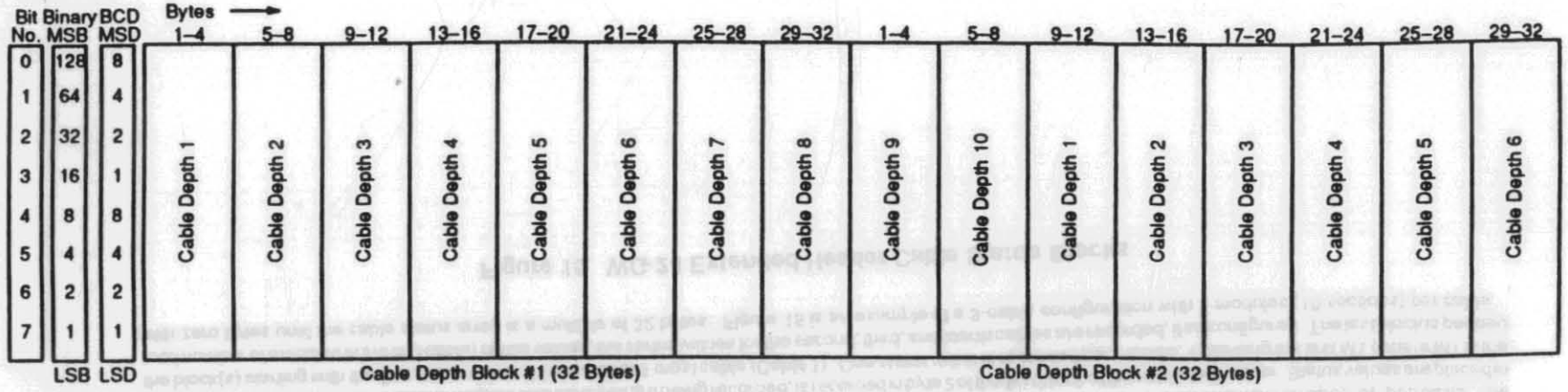
5. First Raw Channel: First channel that is used to form this channel set. Each cable is channel 1 and increments by 1.

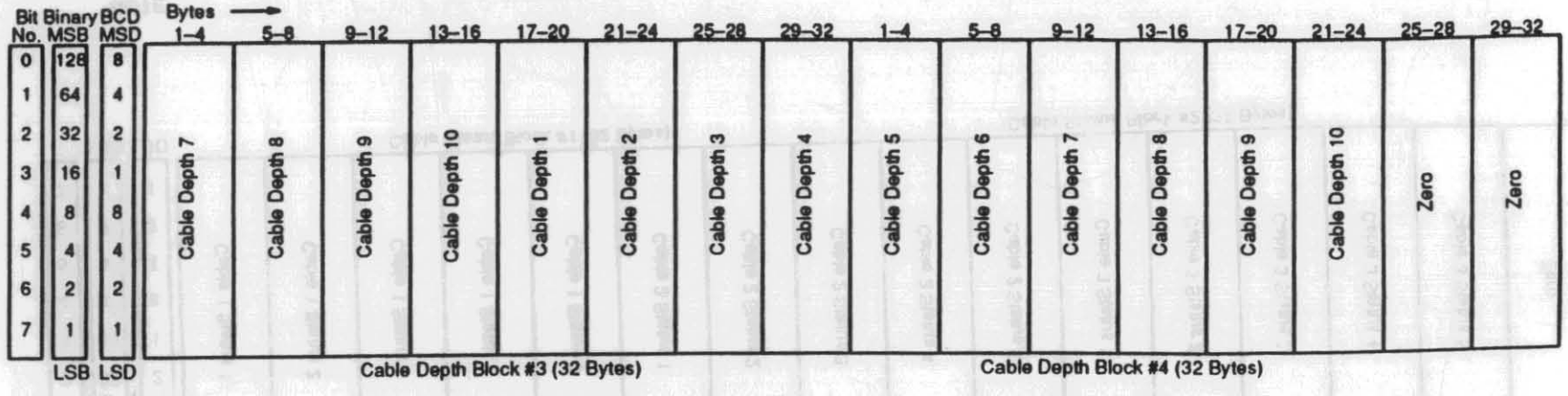
6. Low-Cut File Part Number: Digits 1–6 = part number, digits 7–8 = revision level of this file.

7. High-Cut File Part Number: Digits 1–6 = part number, digits 7–8 = revision level of this file.

8. Array File Part Number: Digits 1–6 = part number, digits 7–8 = revision level of this file.

Figure 13. WG-24 Extended Header, Version 2, Block (5+*N*) through (4+*N*+*M*) Definition, where *N* = no. of cables and *M* = no. of channels sets

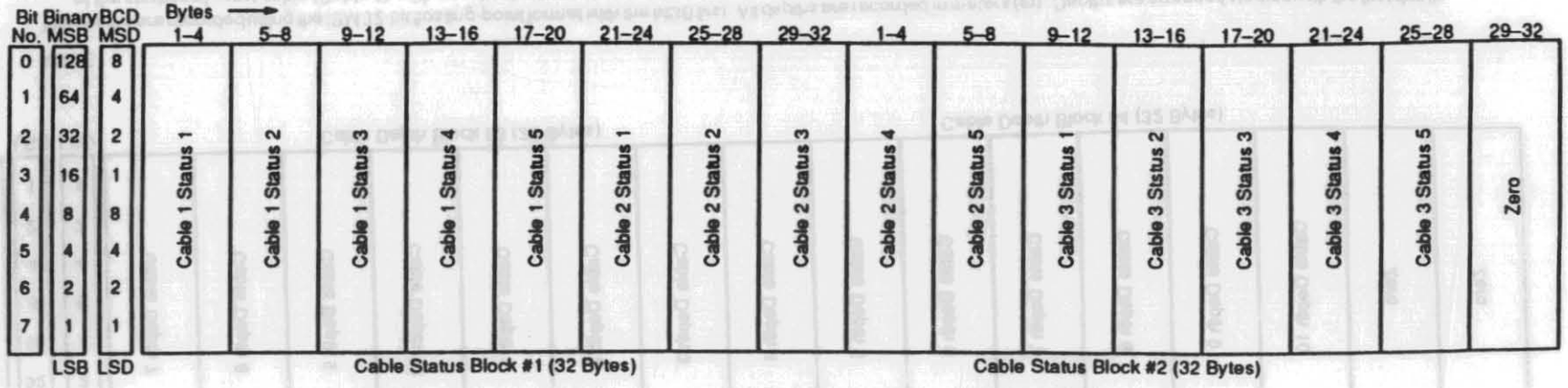




NOTE

The depths are recorded using the IBM 32-bit floating-point format with the MSB first. All depths are recorded in meters (m). Depths are arranged starting with the first depth of the starboard-most cable (Cable 1), with one depth channel recorded per section, regardless of whether it is a high- or medium-resolution section. Following the depths for cable one, the depths for the second, third, and fourth cables are recorded. If necessary, the last block is padded with zeros so that the cable depth array is an integer multiple of 32 bytes. Figure 14 is an example of a 3-cable configuration with 5 modules (10 sections) per cable.

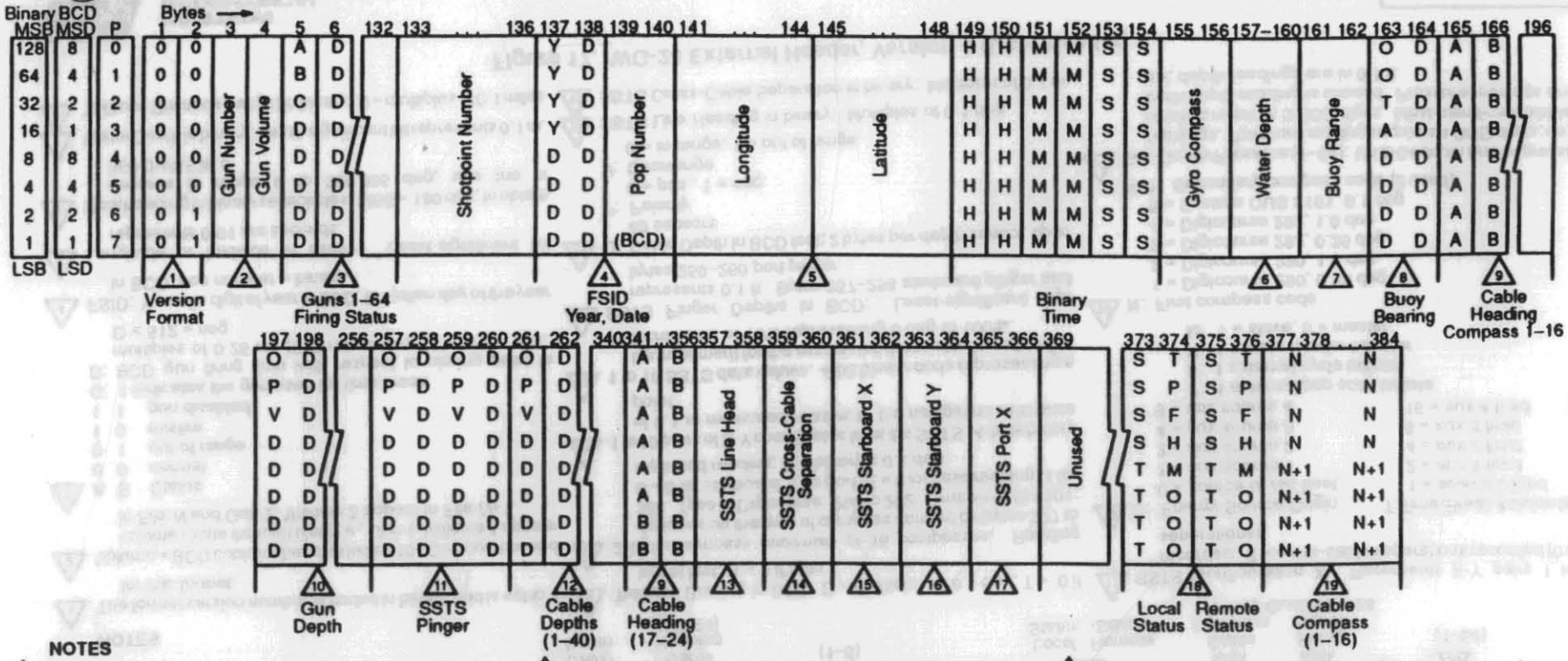
Figure 14. WG-24 Extended Header Cable Depth Blocks



NOTE

The status values are recorded using IBM 32-bit floating-point format with the MSB first. The WG-24 rotates through 13 different status channels on a pop-by-pop basis. The ID byte, which identifies the 13 different status channels that are being recorded, is recorded in byte 2 of the first block of the extended header. Status values are placed in the block(s) starting with the first status value of the starboard-most cable (Cable 1). One status value is recorded per module. Following the first M1 (where M1 is the total number of modules in the first cable) status values, the status values for the second, third, and fourth cables are recorded, if so configured. The last block is padded with zero bytes until the cable status array is a multiple of 32 bytes. Figure 15 is an example of a 3-cable configuration with 5 modules (10 sections) per cable.

Figure 15. WG-24 Extended Header Cable Status Blocks



NOTES

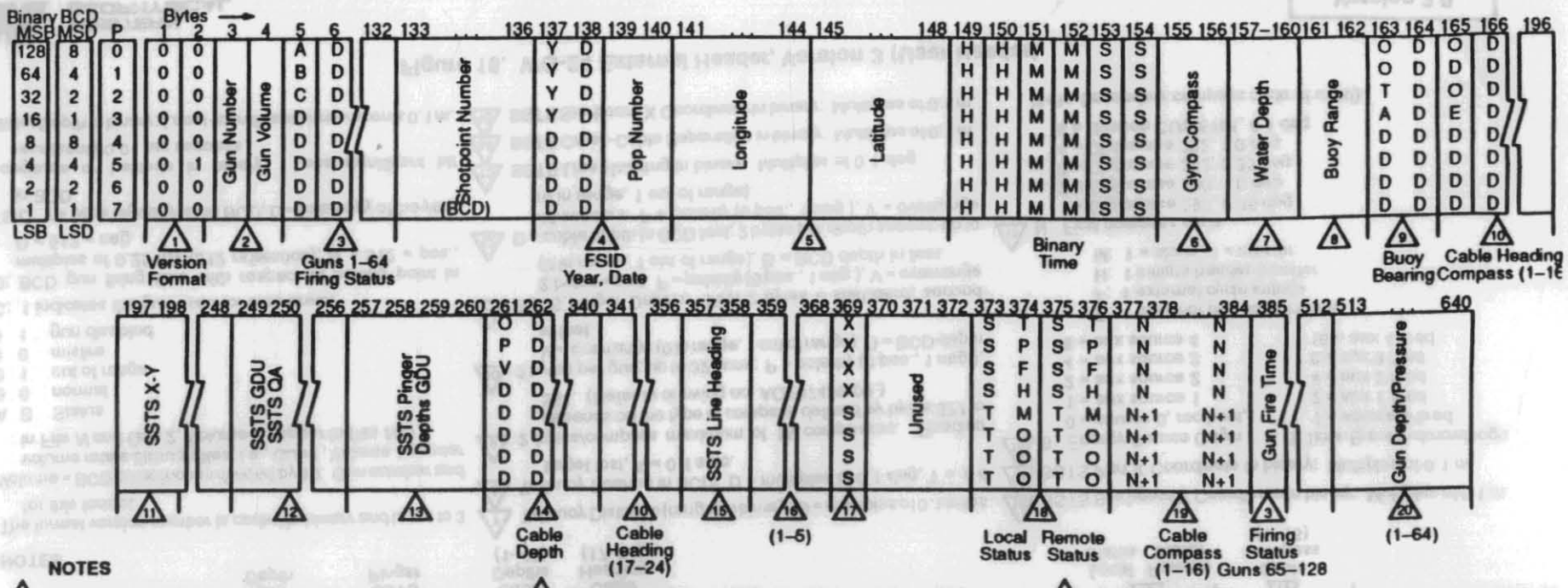
1. The format version number is coded in binary and is set to 3 for this format.
2. Volume = BCD cubic inches divided by 10. Gun number and volume rotate through files; i.e., Gun 1, Volume 1 appear in File *N* and Gun 2, Volume 2 appear in File *N*+1.
3. A B Status
   0 0 normal
   0 1 out of range
   1 0 misfire
   1 1 gun disabled
   C: 1 indicates the gun used for time break
   D: BCD gun firing time with respect to aiming point in multiples of 0.25 ms (512 reference); D > 512 = pos., D < 512 = neg.
4. FSID: Y = units digit of year in BCD, D = julian day of the year in BCD.
5. Longitude or Latitude in binary: Least-significant bit represents 0.01 arc seconds.
6. Water Depth in binary: Least-significant bit represents 0.1 m.
7. Tailbuoy Distance (range) in binary: D = multiples of 0.1 miles
8. Tailbuoy Bearing in BCD: D = multiples of 0.1 deg, T = 0 if target lost, A = 0 if auto.
9. 2 bytes/compass maximum of 16 compasses. Reading depends on the type of compass defined by bytes 377 to 384. (Refer to drawing no. AQ207426-00.)
10. 2 bytes per gun; up to 32 guns: P = polarity (0 pos., 1 neg.), V = overrange (0 in range, 1 out of range), D = BCD depth in feet.
11. SSTS Pinger Depths: First 2 bytes = starboard; second 2 bytes = port. P = polarity (0 pos., 1 neg.), V = overrange (0 in range, 1 out of range), D = BCD depth in feet.
12. D = cable depth in BCD feet; 2 bytes per depth sensor; up to 40 sensors. P = polarity (0 pos., 1 neg.), V = overrange (0 in range, 1 out of range).
13. SSTS Line Heading in binary: Multiples of 0.1 deg.
14. SSTS Cross-Cable Separation in binary: Multiples of 0.1 m.
15. SSTS Starboard X Coordinate in binary: Multiples of 0.1 m.
16. SSTS Starboard Y Coordinate in binary: Multiples of 0.1 m.
17. SSTS Port X Coordinate in binary: Multiples of 0.1 m.
18. S: Energy Source Origin
    0 = source 0, rec boat,
    1 = aux source 1
    2 = aux source 2
    4 = aux source 3
    8 = aux source 4

    T: Time-Break Acknowledge
    1 = source 0 fired
    2 = aux 1 fired
    4 = aux 2 fired
    8 = aux 3 fired
    16 = aux 4 fired

    P: 1 external pop scan initiate
    F: 1 external cycle initiate
    H: 1 initiate header transfer
    M: 1 = slave, 0 = master.
19. N: First compass code
    1 = Digicourse 290, 0.35 deg
    2 = Digicourse 290, 1.0 deg
    3 = Digicourse 292, 0.35 deg
    4 = Digicourse 292, 1.0 deg
    5 = Syntron CUS 8101, 0.1 deg

    N+1: Secondary compass code (if used).

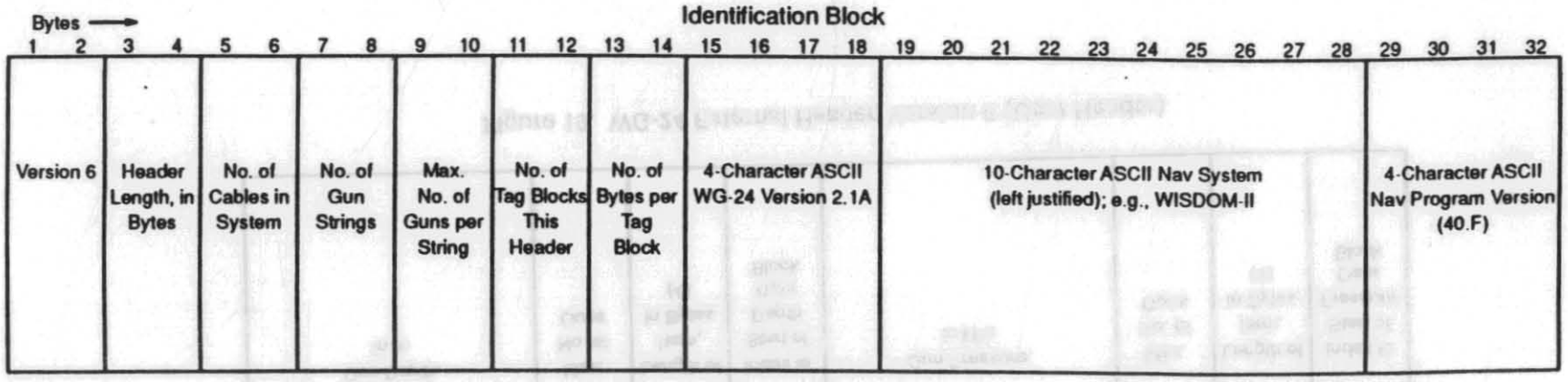
Figure 16. WG-24 External Header, Version 3 (User Header)



NOTES

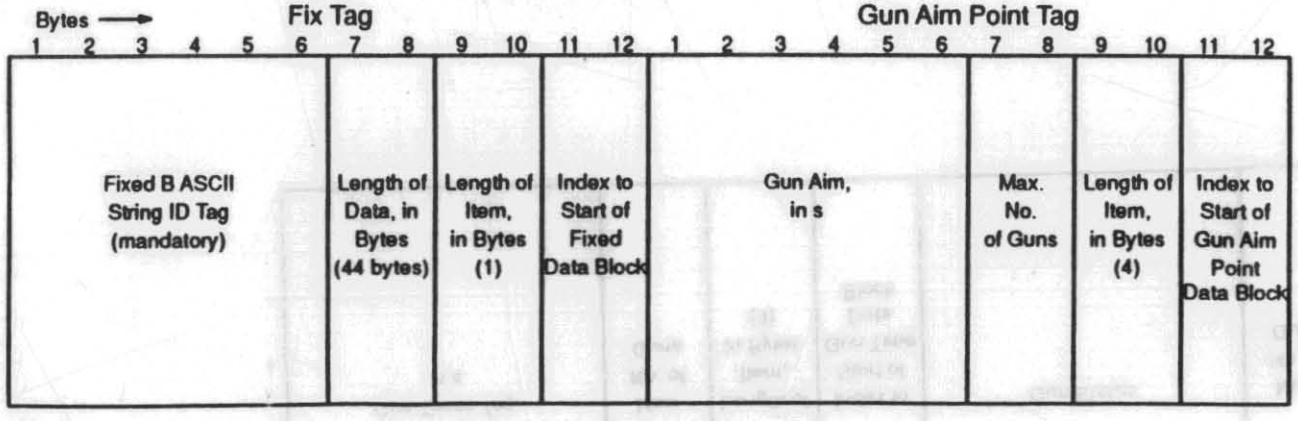
1. The format version number is coded in binary and is set to 4 for this format.
2. Volume = BCD cubic inches divided by 10. Gun number and volume rotate through files; i.e., Gun 1, Volume 1 appear in File *N* and Gun 2, Volume 2 appear in File *N*+1.
3. A B Status
   0 0 normal
   0 1 out of range
   1 0 misfire
   1 1 gun disabled
   C: 1 indicates the gun used for time break
   D: BCD gun firing time with respect to aiming point in multiples of 0.25 ms (512 reference); D > 512 = pos., D < 512 = neg.
4. FSID: Y = units digit of year in BCD, D = julian day of the year in BCD, pop number = binary.
5. Longitude or Latitude in binary: Least-significant bit represents 0.01 arc seconds.
6. Boat heading in binary semicircles; MSB = 180 deg; to obtain degrees in range 0 to 359.995 deg, use (no. x 360.0)/65536.0.
7. Water Depth in binary: Least-significant bit represents 0.1 m.
8. Tailbuoy Distance (range) in binary: D = multiples of 0.1 miles
9. Tailbuoy Bearing in BCD: D = multiples of 0.1 deg, T = 0 if target lost, A = 0 if auto.
10. 2 bytes/compass maximum of 16 compasses. Reading depends on the type of compass defined by bytes 377 to 384. Type of Digicourse: 290 to 292. Syntron CUS 8101: C = 0 for starboard, 1 for port; E = 0 for valid reading, 1 for repeated reading; D = binary x 0.1 deg.
11. 1 to 13 pairs of X-Y coordinates from the SSTS. 4-byte binary of 0.1 m measured relative to the navigation reference point.
12. 1 to 16 SSTS data values. 4-bit binary code representing a figure of merit for the associated data value from 0 to A in increments of 10% representing 0 deg to 100%.
13. SSTS Pinger Depths in BCD: Least-significant digit represents 0.1 ft. Bytes 257–258 starboard pinger and bytes 259–260 port pinger.
14. D: Cable Depth in BCD feet; 2 bytes per depth sensor, up to 40 sensors
    P: Polarity
    0 = pos., 1 = neg.
    V: Overrange
    0 = in range, 1 = out of range.
15. SSTS Line Heading in binary: Multiples of 0.1 deg.
16. SSTS Cross-Cable Separation in binary: Multiples of 0.1 m
17. SSTS Configuration X: Represents X-Y pairs 1 to 15 recorded. S = cross-cable separations recorded (0 to 15 separations).
18. S: Energy Source Origin
    0 = source 0, rec boat,
    1 = aux source 1
    2 = aux source 2
    4 = aux source 3
    8 = aux source 4
    T: Time-Break Acknowledge
    1 = source 0 fired
    2 = aux 1 fired
    4 = aux 2 fired
    8 = aux 3 fired
    16 = aux 4 fired
    P: 1 external pop scan initiate
    F: 1 external cycle initiate
    H: 1 initiate header transfer
    M: 1 = slave, 0 = master.
19. N: First compass code
    1 = Digicourse 290, 0.35 deg
    2 = Digicourse 290, 1.0 deg
    3 = Digicourse 292, 0.35 deg
    4 = Digicourse 292, 1.0 deg
    5 = Syntron CUS 8101, 0.1 deg
    N+1: Secondary compass code (if used).
20. Gun Depth/Pressure (1–64): Up to 64 depth and/or pressure readings. Pressure reading requires 4 BCD digits; depth reading requires 3 BCD digits. Most-significant nibble of each depth reading is unused. Pressure readings are in psi; depth readings are in 0.1 ft.

Figure 17. WG-24 External Header, Version 4 (User Header)



NOTE

All fields are 16-bit binary.



NOTES

Tag blocks need to be present only when there is a valid data block of that type.

All tags are in IEEE floating point format.

Figure 18. WG-24 External Header, Version 6 (User Header)

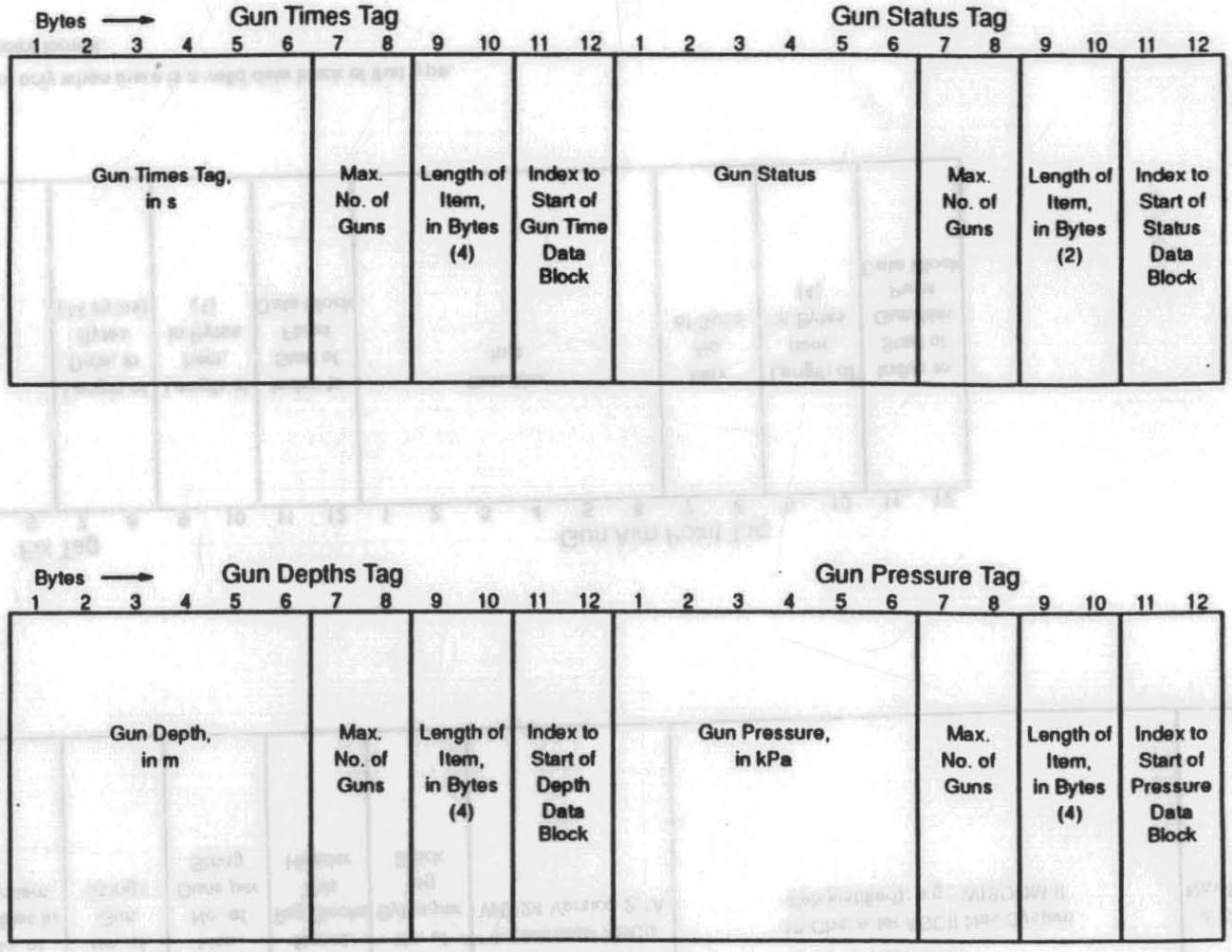
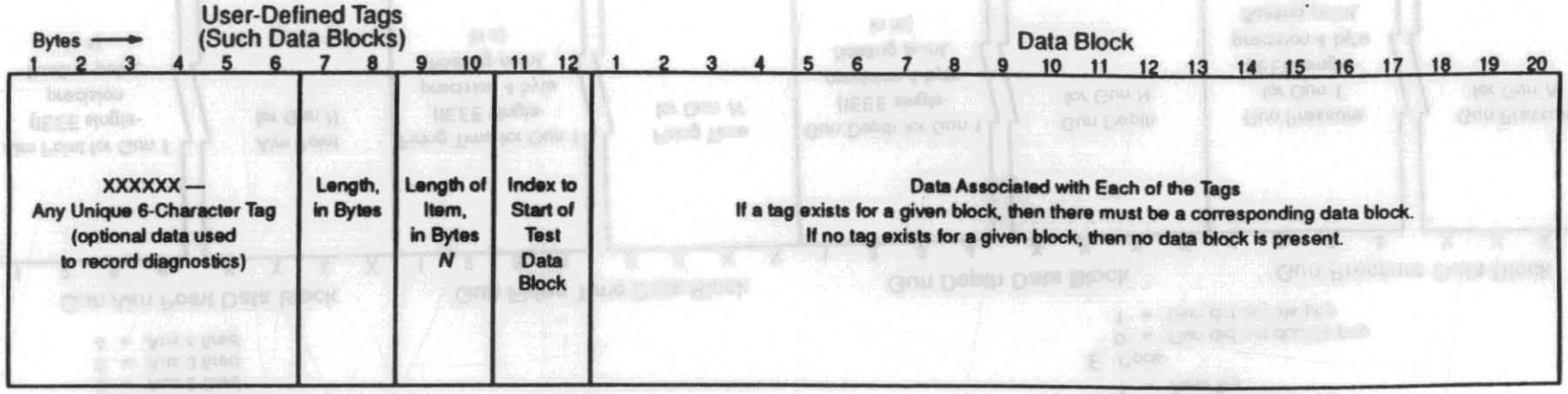


Figure 19. WG-24 External Header, Version 6 (User Header)



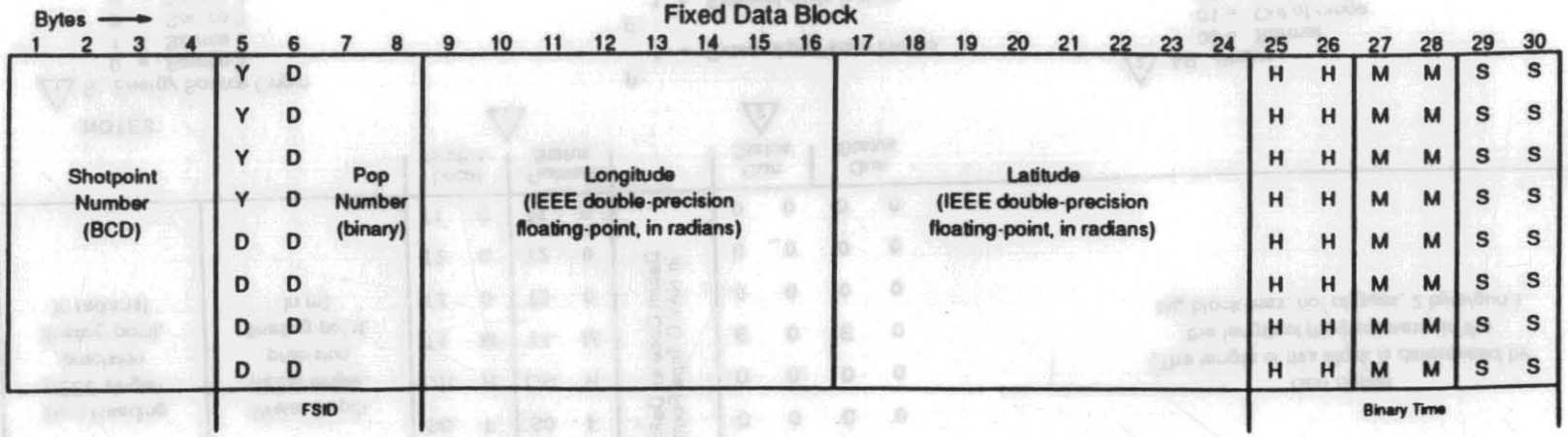


Figure 20. WG-24 External Header, Version 6 (User Header)

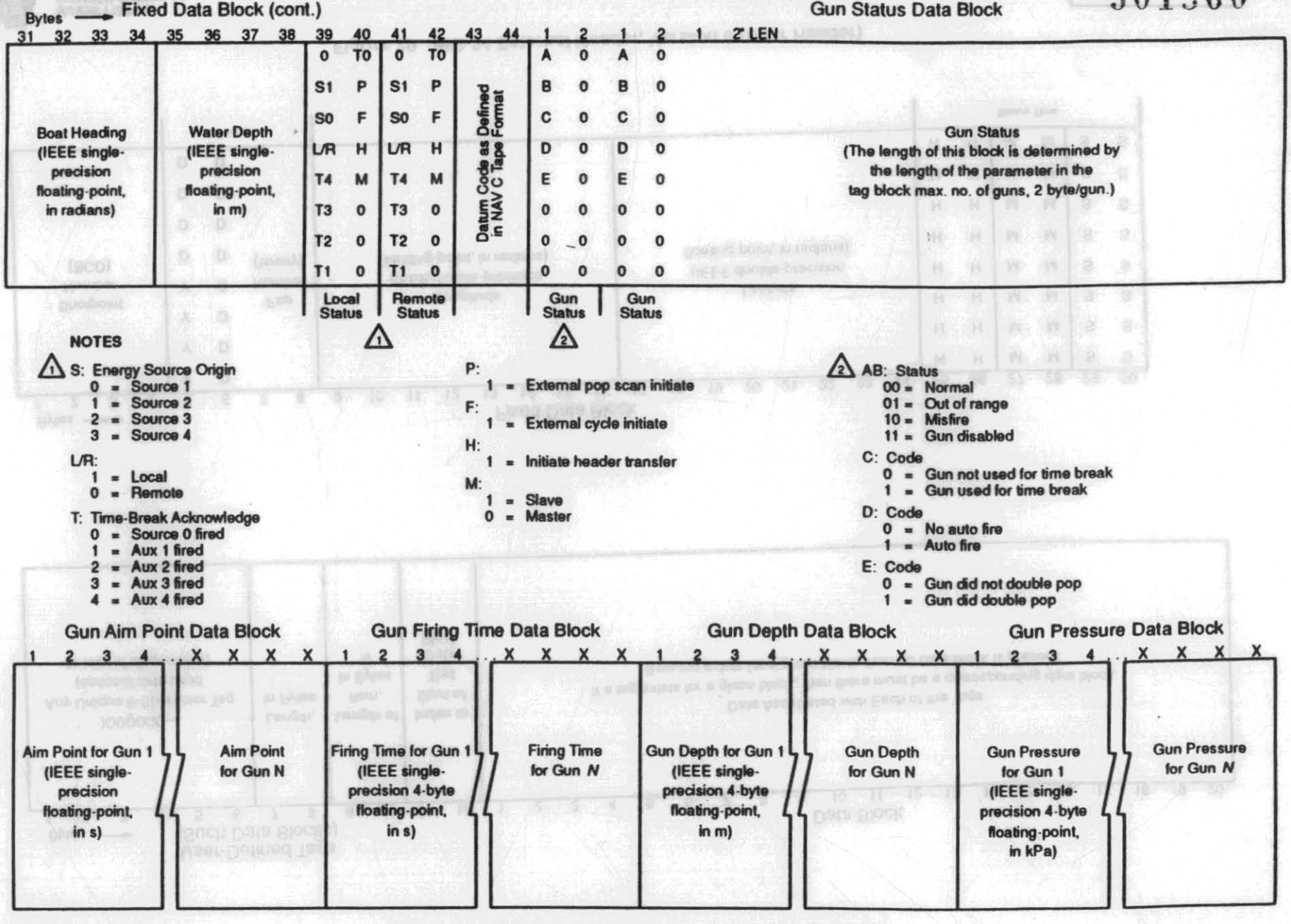


Figure 21. WG-24 External Header, Version (User Header)

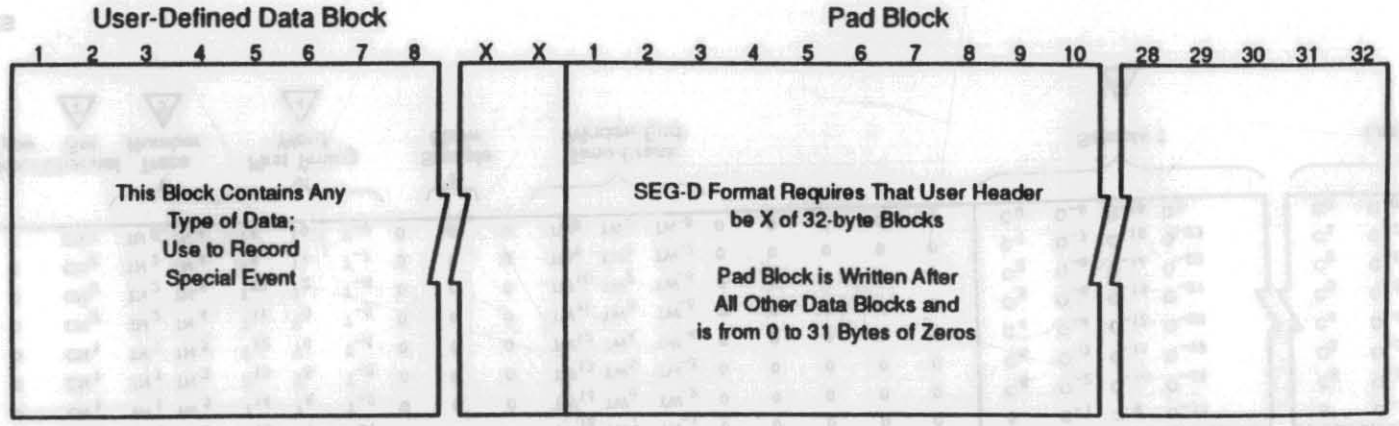
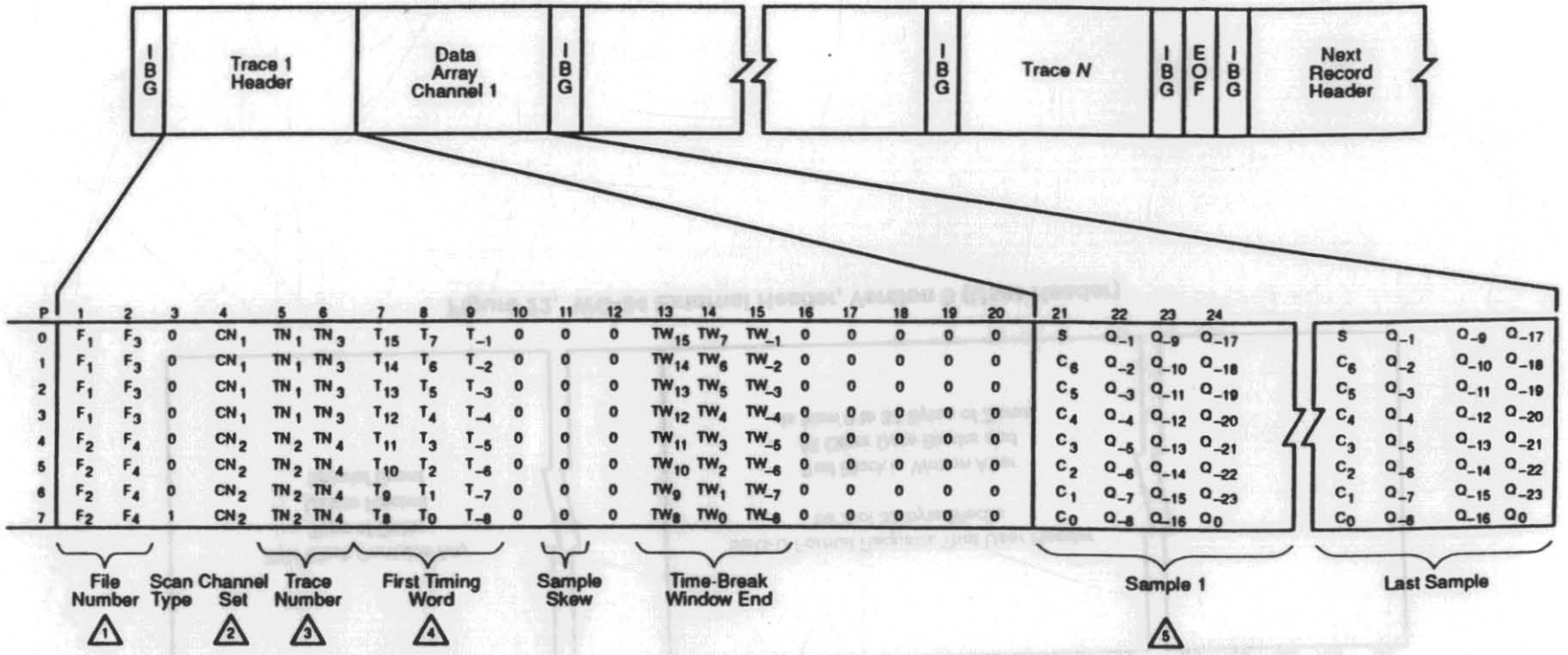


Figure 22. WG-24 External Header, Version 6 (User Header)



P	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
0	F_1	F_3	0	CN_1	TN_1	TN_3	T_{15}	T_7	T_{-1}	0	0	0	TW_{15}	TW_7	TW_{-1}	0	0	0	0	0	S	Q_{-1}	Q_{-9}	Q_{-17}
1	F_1	F_3	0	CN_1	TN_1	TN_3	T_{14}	T_6	T_{-2}	0	0	0	TW_{14}	TW_6	TW_{-2}	0	0	0	0	0	C_6	Q_{-2}	Q_{-10}	Q_{-18}
2	F_1	F_3	0	CN_1	TN_1	TN_3	T_{13}	T_5	T_{-3}	0	0	0	TW_{13}	TW_5	TW_{-3}	0	0	0	0	0	C_5	Q_{-3}	Q_{-11}	Q_{-19}
3	F_1	F_3	0	CN_1	TN_1	TN_3	T_{12}	T_4	T_{-4}	0	0	0	TW_{12}	TW_4	TW_{-4}	0	0	0	0	0	C_4	Q_{-4}	Q_{-12}	Q_{-20}
4	F_2	F_4	0	CN_2	TN_2	TN_4	T_{11}	T_3	T_{-5}	0	0	0	TW_{11}	TW_3	TW_{-5}	0	0	0	0	0	C_3	Q_{-5}	Q_{-13}	Q_{-21}
5	F_2	F_4	0	CN_2	TN_2	TN_4	T_{10}	T_2	T_{-6}	0	0	0	TW_{10}	TW_2	TW_{-6}	0	0	0	0	0	C_2	Q_{-6}	Q_{-14}	Q_{-22}
6	F_2	F_4	0	CN_2	TN_2	TN_4	T_9	T_1	T_{-7}	0	0	0	TW_9	TW_1	TW_{-7}	0	0	0	0	0	C_1	Q_{-7}	Q_{-15}	Q_{-23}
7	F_2	F_4	1	CN_2	TN_2	TN_4	T_8	T_0	T_{-8}	0	0	0	TW_8	TW_0	TW_{-8}	0	0	0	0	0	C_0	Q_{-8}	Q_{-16}	Q_0

P	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
0	F_1	F_3	0	CN_1	TN_1	TN_3	T_{15}	T_7	T_{-1}	0	0	0	TW_{15}	TW_7	TW_{-1}	0	0	0	0	0	S	Q_{-1}	Q_{-9}	Q_{-17}
1	F_1	F_3	0	CN_1	TN_1	TN_3	T_{14}	T_6	T_{-2}	0	0	0	TW_{14}	TW_6	TW_{-2}	0	0	0	0	0	C_6	Q_{-2}	Q_{-10}	Q_{-18}
2	F_1	F_3	0	CN_1	TN_1	TN_3	T_{13}	T_5	T_{-3}	0	0	0	TW_{13}	TW_5	TW_{-3}	0	0	0	0	0	C_5	Q_{-3}	Q_{-11}	Q_{-19}
3	F_1	F_3	0	CN_1	TN_1	TN_3	T_{12}	T_4	T_{-4}	0	0	0	TW_{12}	TW_4	TW_{-4}	0	0	0	0	0	C_4	Q_{-4}	Q_{-12}	Q_{-20}
4	F_2	F_4	0	CN_2	TN_2	TN_4	T_{11}	T_3	T_{-5}	0	0	0	TW_{11}	TW_3	TW_{-5}	0	0	0	0	0	C_3	Q_{-5}	Q_{-13}	Q_{-21}
5	F_2	F_4	0	CN_2	TN_2	TN_4	T_{10}	T_2	T_{-6}	0	0	0	TW_{10}	TW_2	TW_{-6}	0	0	0	0	0	C_2	Q_{-6}	Q_{-14}	Q_{-22}
6	F_2	F_4	0	CN_2	TN_2	TN_4	T_9	T_1	T_{-7}	0	0	0	TW_9	TW_1	TW_{-7}	0	0	0	0	0	C_1	Q_{-7}	Q_{-15}	Q_{-23}
7	F_2	F_4	1	CN_2	TN_2	TN_4	T_8	T_0	T_{-8}	0	0	0	TW_8	TW_0	TW_{-8}	0	0	0	0	0	C_0	Q_{-8}	Q_{-16}	Q_0

File Number (1) | Scan Type | Channel Set (2) | Trace Number (3) | First Timing Word (4) | Sample Skew | Time-Break Window End | Sample 1 (5) | Last Sample

NOTES

1. Same as bytes 1 and 2 of the General Header (Figure 1).
2. As shown in Figure 2, byte 2.
3. Sequential trace no. 1 to trace *N* in channel set order.
4. Time break or time-break override in ms from start-of-timing-word counter.
5. S = Sign Bit, where 1 is a negative number.

   C = Excess, 64 hexadecimal exponent $16^{(CCCCCCC-64)}$, where CCCCCCC = values from 0 to 127.

   Q = 1–23, magnitude fraction, values from $1-2^{-23}$ to $-1+2^{-23}$, input signal, MVP = S.QQQQ,QQQQ,QQQQ,QQQQ,QQQQ,QQQ $\times 16^{(CCCCCCC-64)} \times 2^{MP}$ (millivolts peak).

Figure 23. Demultiplexed Data Body

6.3 STREAMER CABLE

The streamer(s) begins at the input of the shipboard system and ends at the tailbuoy. There may be up to four physical streamers. They consist of three parts, the head components, the active sections/modules, and the tail components. The folllowing provides an overview of the components and their main functions.

Head Components

Deck Cable Two 75m cables, one optical, one electrical, provide data and command paths from the Recording Room to the reel.

Deck Box Receives optical commands from the Shipboard electronics, converts these to electrical and passes them to the slipring. Receives electrical seismic signals from the slipring, converts these to optical signals and passes them to the deck cable.

Slipring Enables the streamer to be reeled in and out without disconnecting the deck cable; it maintains a sliding contact between the fixed and rotating drums as the reel turns. The slipring contains no optical fibres.

Hub Box Receives electrical commands from the slipring and converts these to optical signals for transmission down the streamer cable. Receives optical seismic data from the streamer cable and converts these to electrical and passes them to the slipring. The hub box is located inside the drum of the reel. From the above it can be seen that the main function of the Deck/Slipring/Hub box is to provide an opto-electrical conversion path so all the signals are electrical when they pass through the slipring.

Lead In Tows the streamer and weights it down near the boat end so as to achieve the proper operating depth. This cable is steel reinforced and contains electrical wires and optical fibres.

Head Elastic Section Isolates the active sections from the boat to reduce tow noise. The elasticity is provided by a single nylon rope connected to three steel stress members at the head and tail of the section. These sections are 80m in length and there may be more than one connected.

Cable Head Module A repeater module that receives optical seismic data from the streamer modules and sends it upstream to the other head components. Receives optical commands, converts them to electrical signals, then sends them to the streamer modules. These module commands are now electrical for the whole streamer.

Cable Head Section This is a short (8m) section that houses a variety of sensors used to locate the head of the streamer.

They are -

- A tension transducer that sends tension information to a display in the Recording Room.
- A wideband acoustic receiver that amplifies signals received from transmitters associated with the Streamer Source Tracking System(SSTS).
- A Waterbreak Hydrophone.
- A 12khz SSTS Cross Cable transmitter that may be activated or deactivated from the Recording Room.

Active Sections/Modules

The active section and module assemblies form the central and major part of the streamer. Each active section is 100m long and are all identical and interchangeable. There are two different functioning modules, the Streamer, and the Connector.

The whole active streamer may be looked at as interconnected sub assemblies, each containing the following components:-

(a) A Streamer Module.
(b) An Active Section, designated the "A" section.
(c) A Connector Module.
(d) An Active Section, designated the "B" section.

These sub-assemblies are then connected end to end up to a maximum of 6000m. Although the design of the system allows telemetry to 10000m lengths, current mechanical limitations allow a maximum of 6000m streamers. The streamer cable has design features that minimize noise levels due to bulkhead obstructions and the movement of ballast oil within the section.

Following is a description of the functions of each component, starting from the hydrophone arrays towards the streamer module.

Each 100m section contains seven complete hydrophone arrays each of 15.52m length on group centres of 12.5m. The arrays have sixteen hydrophones configured in a centre weighted overlapping scheme as shown in Fig.3. At the tail of the section an array of eight hydrophones forms half of the eighth group in the section. The other part of the array is connected via the connector module and is contained within the next downstream section. This arrangement helps reduce noise at the module boundaries and maintains uniformity of the arrays throughout the streamer. The hydrophone arrays connect to electronic modules (Marine Remote Units, MRU) that are within the cable section. The MRU's perform dual channel seismic data acquisition near the hydrophone location,provides A/D conversion and transmits the digital data to the streamer module. There are thus four MRU's per cable section to handle eight channels. Associated with the MRU's is one Section Power Supply (SPS), located at the head of the cable section, it provides dc power for the Streamer Module, the MRU's and the Connector Module. The power for the SPS is provided from the Shipboard Electronics on a pair of wires down the length of the streamer.

WG24 24-bit converter technology

The conversion technique used can be described as a sigma delta converter, which can be contrasted against classical A/D conversion techniques such as successive approximation or dual slope integration.

The 24-bit sigma delta approach used in the WG24 can be subdivided into two major blocks. The first block,the sigma delta modulator is an over sampled, single bit A/D converter.

The second block is a digital filter. In the WG24, the sigma delta modulator is located in the MRU, the digital filter is in two stages, the first within the Streamer module and the second located in the Shipboard Recording System. At the output of the first stage of the filter in the streamer module, the data has 24bits per sample with about 20 of these bits being effective. This gives an instantaneous dynamic range of at least 114db. The sampling rate in the MRU is 15.6uS with the digital filter in the Shipboard System decimating this to 1, 2 or 4mS for recording.

Connector Module

Connects two identical active sections to support one streamer module. Other auxiliary functions are to buffer the MRU commands from the Streamer Moduleto the MRU's in the B section and to provide power to the depth transducer in the B section.

Streamer Module

Collects data from the MRU's in the A and B sections, passes this data through the digital filter then converts it to optical signals for transmission on the fibre optic link to the Shipboard Electronics. The optical section of the module also receives optical data from the modules downstream and buffers and repeats this data.

The Streamer Module receives and decodes commands from the Shipboard System that controls the MRU's. These commands also control the test functions that are generated in this module, then passed to the MRU's.

A conventional 12 bit A/D converter digitizes the depth transducer data in both the A and B sections, digitizes the water break detector in the B section and monitors the voltages supplied by the Section Power Supply.

Also monitored are the optical signals from the previous module, its own optic signals and the temperature of the module.

Tail Components

These components consist of the Terminator Module, the Tail Elastic section, and the Tailbuoy.

Terminator Module

Ends the streamer cable and provides proper termination for the MRU and Module commands. It also provides through connection for the hydrophones for half of the last array which are contained in the tail elastic section.

Tail Elastic Section

Isolates the tailbuoy towing noise from the active sections. Terminates the power lines for the streamer. Provides a swivel at the tail end for connection of the tailbuoy rope. As mentioned above, contains the hydrophones for the last array in the streamer cable.

Tailbuoy

Typically an active buoy that provides a radio location position of the buoy, a strobe light, a radar reflector and acoustic transceivers to support tail-end networks.

The Shipboard System

The WG24 Recording System enables streamer data acquisition, processing, recording, and quality control. The system consists of the following subsystems:

Main System Controller (MSC)
Auxiliary Module Unit (AMU)
Cable Interface Unit (CIU)
Raw Data Processor (RDP)
Recording System Unit (RSU)
Cartridge Tape Unit (CTU)
Seismic Quality Control (SQC)
Cable Monitor Unit (CMU)

Block diagram Fig 2 shows the interconnection of these units.

The subsystems are based on VME bus chassis running under a multi-tasking real time operating system. Following is a brief description of each subsystem's function.

Main System Controller (MSC)

Provides system-level controls and receives status and error messages from all other subsystems. The MSC builds the tape header for each seismic file on tape and contains the primary operator interface. The Wisdom navigation system interfaces to this subsystem, providing navigation header data and system start commands.

The MSC in turn controls the firing of the energy source via the LRS100 Synchronizer.

Auxiliary Module Unit (AMU)

Accomodates up to four streamers and provides optical to electrical conversion for incoming seismic data and electrical to optic conversion for outgoing commands. The unit contains a MRU and SPS identical to those in the active sections. Auxiliary channels may be connected to the system in this way. It also provides a means by which MRU's and SPS's can be tested on board.

Cable Interface Unit (CIU)

Interfaces the streamers to the recording system and provides test capabilities for both. In normal acquisition mode, the CIU multiplexes the received seismic data from up to four streamers. It also receives commands from the RDP and sends them to the streamers.

In test mode, the CIU functions as a data simulator for testing the recording system without the streamer or as a stand alone cable controller for testing a single streamer without the recording system. The CIU contains a test signal generator for testing the streamer cables.

Raw Data Processor (RDP)

Performs the following optional front end data processing functions:

- Adjacent trace summing.
- Error detection and correction.
- Low cut filtering.
- Anti aliasing filtering.
- The channel capacity of the system is established in this unit. Eight processor boards handle 128 channels each, which gives a maximum of 1024 seismic channels.
- The antialiasing filters are for 1,2 or 4mS sample rates and employ a 75 coefficient FIR filter.
- The low cut filter is an IIR type digital filter and can be switched in or out. In the out position the low cut filter is entirely due to the capacitance effect of the hydrophones.

- Adjacent trace summing may be employed to effectively reduce the number of channels ,eg: four cables 6000m long will yield 1664 channels, with trace summing this can be reduced to 832 which is within the system capability.
- The RDP generates the recording system timing and streamer commands for normal seismic data acquisition.

Recording System Unit (RSU)

Demultiplexes the seismic data, stores header data, and controls the CTU sub system. It contains a Read After Write interface that sends data to the SQC for monitoring and analysis.

Cartridge Tape Unit

Records demultiplexed data onto IBM compatable 3480 cartridge tapes. The subsystem consists of four IBM 9840 drive units with one tape formatter.

Seismic QC (SQC)

Provides quality assurance and Read after Write monitoring of the seismic data recorded on tape. The SQC runs data analysis routines to qualify the recording system and data stored to tape. Data provided to the display plotter is rasterized within this subsystem and also line printer data is output on a per shot basis for operator QC.

Cable Monitor Unit (CMU)

Provides quality assurance for the streamer data by monitoring status and telemetry errors. The CMU drives three high resolution colour monitors: one shows the the status and telemetry error information, while the other two show depth profiles for up to four streamers.

Cable depths are also sent to the MSC where they are merged into the tape header for recording on tape.

WG-24 PHONE GROUP DETAILS

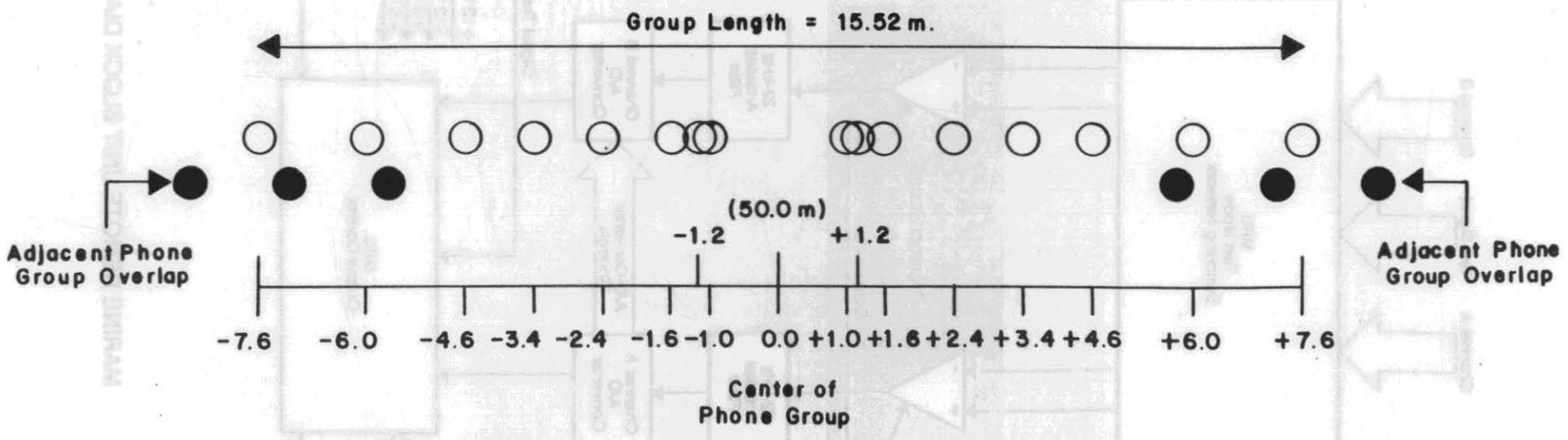


FIGURE 3

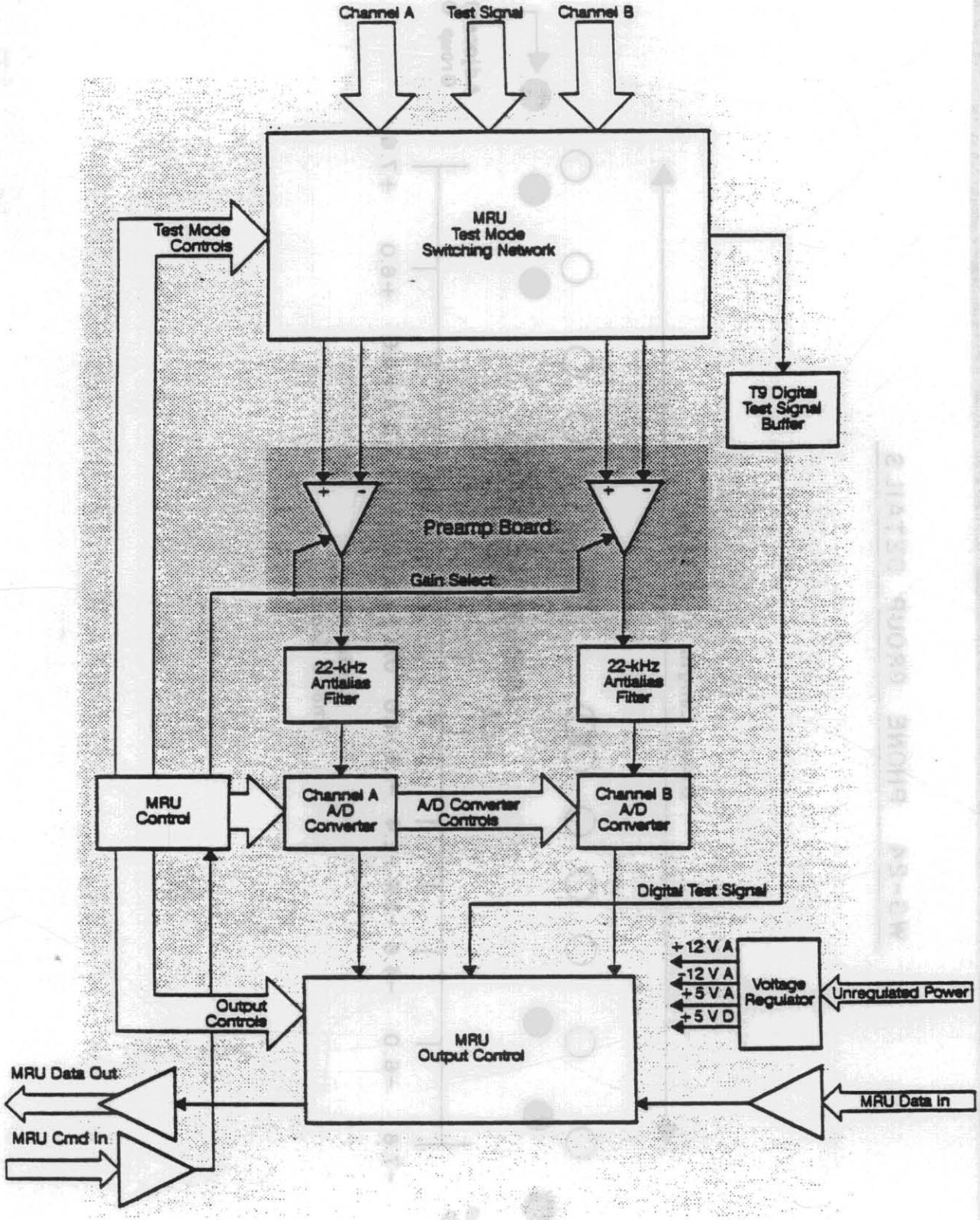


Fig 4. MARINE REMOTE UNIT BLOCK DIAGRAM

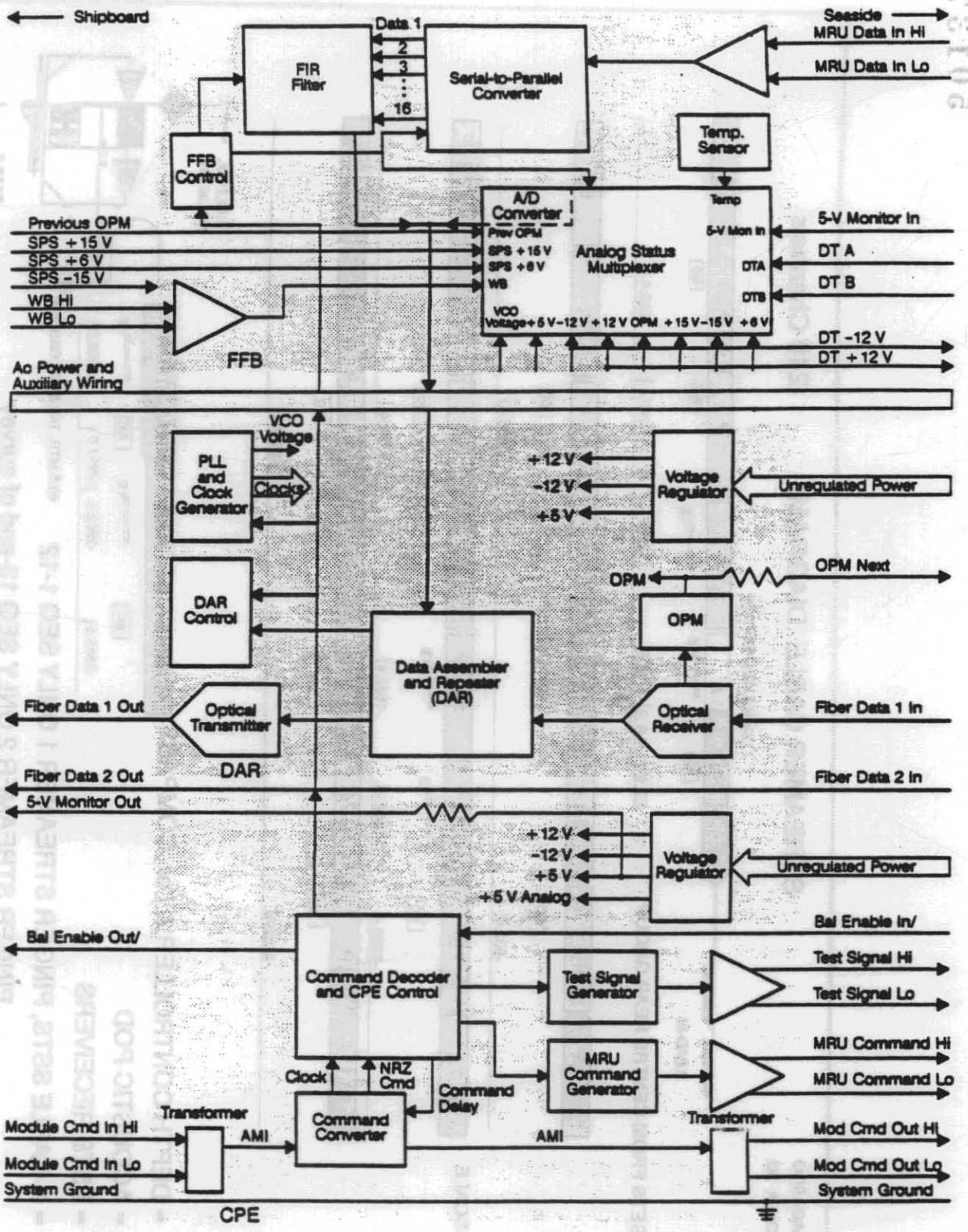


Fig. 5 STREAMER MODULE BLOCK DIAGRAM

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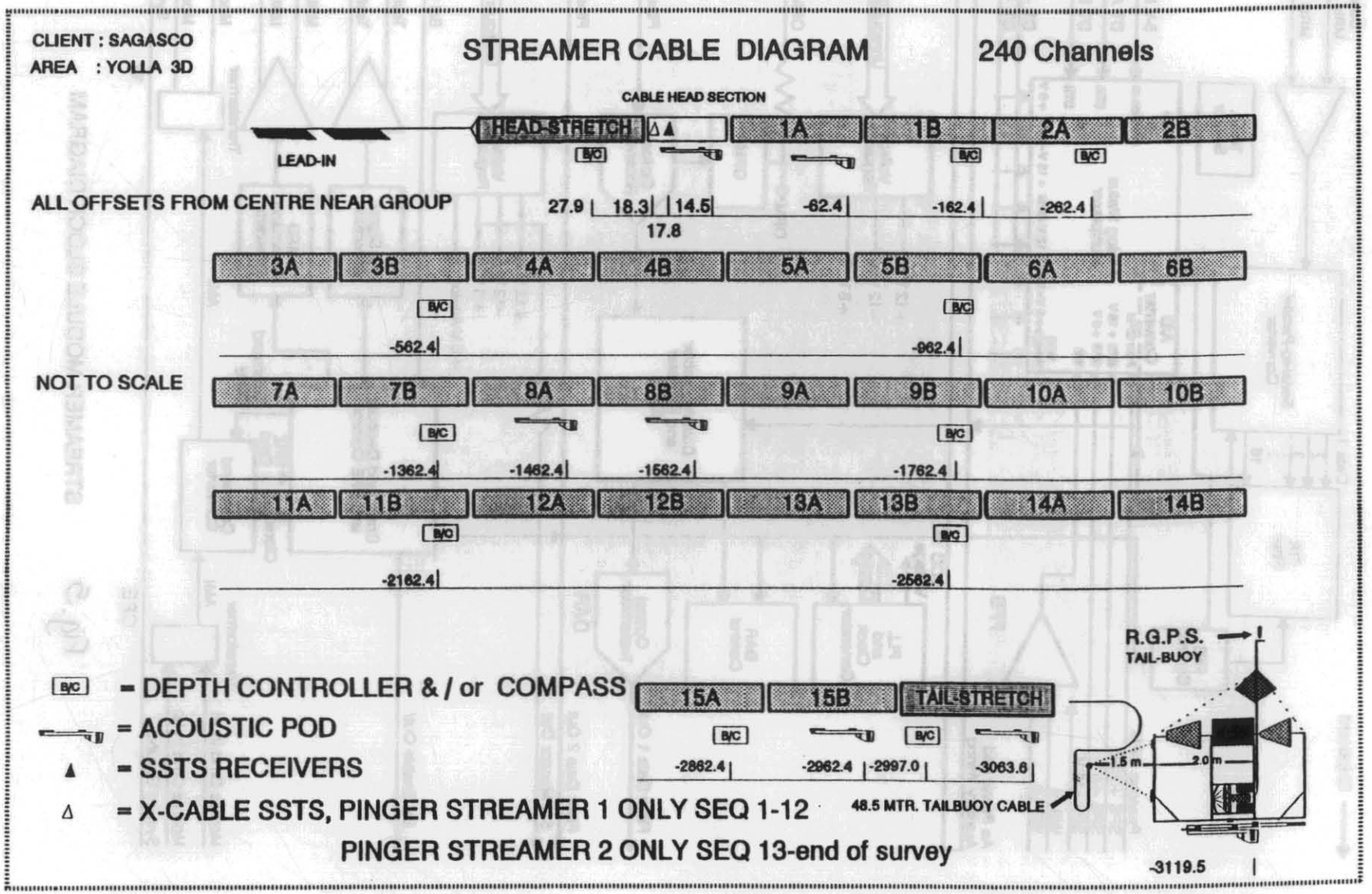

Fig. 6 STREAMER CONFIGURATION

6.4 ENERGY SOURCE

The low pressure energy source system consists of 56 WESTERN's low pressure airguns with reservoir capacities ranging from 60 to 465 cubic inches (see the following diagram).

Airguns have some inherent firing delay and do not fire immediately upon receipt of a "fire" command pulse. The amount of this delay tends to drift with time and naturally varies from unit to unit. To overcome this problem and to assure all airguns fire within specifications required for an optimum energy pulse, the system is controled by the LRS-100 Energy Source Synchronizer.

The LRS-100 is a modular microprocessor based system designed specifically to control the firing of a seismic energy source array, so that all guns fire concurrently or in a pre-designated staggered time sequence. The sytem accomplishes this by electronically sensing the individual gun delays and automatically establishing a firing sequence to compensate for the variations in delay.

The basic sequence of operation is as follows:

1. The Controller Module receives a fire command which signals the start of the firing cycle. The fire command signal may be issued by the seismic system, navigation system or the LRS-100 Cycle Controller.

2. At some pre-calculated point after receiving the fire command, the controller will issue a fire pulse to the solenoid power supply for each gun. The solenoid in turn triggers the release of the upper chamber air. As this occurs, an imbalance is created between the upper pressure reservoir and the lower pressure reservoir that allows the lower reservoir air to force the seat and shuttle upward and expose the exhaust ports, thus releasing the air to the water.

3. Upon firing, a sensor on the guns produces a return signal which is detected by the controller. Ideally, this fire detect signal should occur at a pre-selected time referred to as the Aiming Point.

4. If the fire detect for any gun does not occur at the Aiming Point, the controller will correct the error by adjusting the time at which the next fire pulse is issued to the gun. These adjustments are computed from a filter applied to the previous error values.

5. Time break for the recording system is generated by the synchroniser when 62.5 percent of the total enabled gun array volume has returned fire detect signals. The time break is thus a true representation of the release of air. There are no delays to be compensated for in processing of the data.

Through this method of constant electronic adjustment, the energy source system delivers its optimal seismic signals.

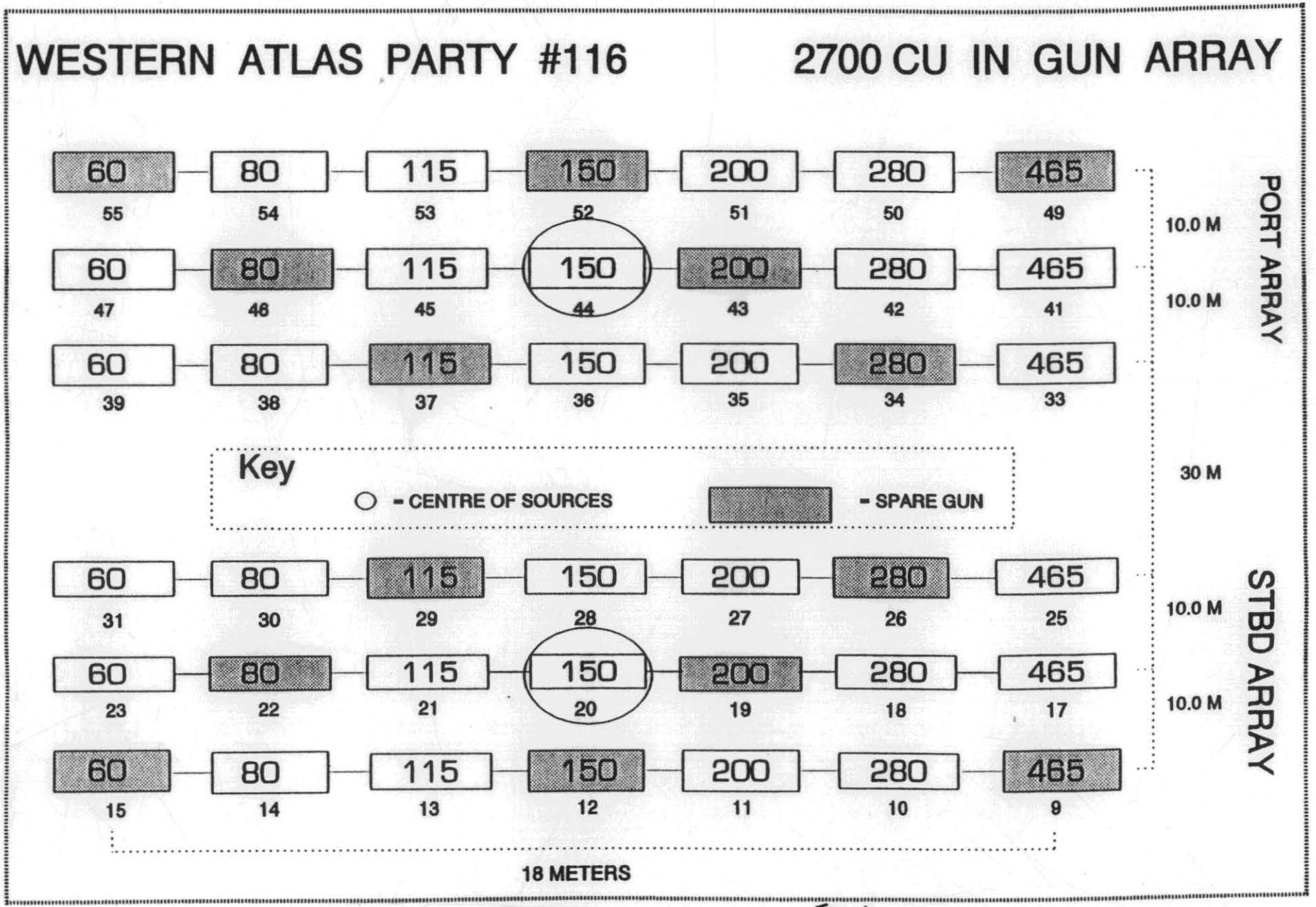

Fig. 1
ENERGY SOURCE CONFIGURATION

7. PARAMETER REPORTS

501379

PARAMETER REPORT

P01 - YOLLA 3D
February 05 to February 07 1994

Survey : YOLLA 3D
BLOCK : T/RL 1
AREA : BASS BASIN , AUSTRALIA
VESSEL : WESTERN ATLAS P116
CLIENT : SAGASCO RESOURCES LTD

PREPARED BY : Steve Metcalfe BASc

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SECTION 2 DATA ACQUISITION EQUIPMENT CONFIGURATION

TABLE 1.0 3D- Report Information

SEQ	DATE	JD	LINE	SEIS TAPE	NAV TAPE
001	05 FEB.	036	YOL00013	000001	P116-0230
012	07 FEB.	038	YOL00259	000273	P116-0231

2.1 LINE NAMING CONVENTION

The sail line naming convention adopted for the YOLLA 3D seismic survey followed the general format of, **YOL**###** where:

YOL = Prefix denoting the YOLLA 3D survey.
** = numerical prefix to designate; **PRIME - 00**
INFILL - 01
RESHOOT - 10
= the number of the lowest cmp line acquired.

EXAMPLE: For instance;

A) YOL00001, designated the CMP prime line 001, acquiring cmp's 001-006.
B) YOL10013, designated the first reshoot of prime line 013.
C) YOL21013, designated the second attempt at reshooting the infill of line 013.

NOTE: Any additional attempts to complete a prime line is termed a reshoot.

2.2 VESSEL AND PERSONNEL

PARTY No. : P-116

VESSEL : M. WESTERN ATLAS (PANAMANIAN FLAG)

CLIENT : SAGASCO RESOURCES LIMITED

AREA : YOLLA 3D , T/RL1 BLOCK , BASS BASIN , AUSTRALIA

CLIENT REP : FRANK RENTON

NAV REP : MATT ULVR-GREEN , ROGER LOWETH

RACAL NAV : BARRY SLEVIN

CO-ORDINATORS : BILL WILLIAMS , HAMISH HUME

TECHNICIANS	:	KEVIN ROBERTS , GRAHAM KNIGHT
NAVIGATORS	:	HUGH McMENAMIN , TOM KOLESKE
SURVEYORS (NAV)	:	ANDREW EVANS , WARWICK MAXTED
OBSERVERS	:	JOHN MIEARS , MATT SUSSMILCH
GUNNERS	:	STEVE FRENCH , PHIL COBBY
COMP. MECHANIC	:	DAVE HILL , ANDY POWELL
QUALITY CONTROL	:	STEVE METCALFE , GARY NICHOLSON

2.3 RECORDING SYSTEM

Recording System Type	:	1 x WG-24, S/N #14
Number of Streamer Modules	:	3 x 15
Number of Connector Modules	:	3 x 15
Time Break	:	Volume
Filters,		
: Hi Cut	:	196 Hz / 214 dB/octave
: Lo Cut	:	6 Hz / 18 dB/octave
Record Length	:	6 seconds
Sample Rate	:	2 milliseconds
Tape Speed/Density	:	78 IPS / 38000 BPI
SEG Format/Code	:	4-byte SEG D,Demultiplexed 8024
Tape Deck Type / Model	:	3480 Cartridge Tape Unit, ANSI Standard.
Header Format	:	Variable Byte, Version 6.
Auxiliary Channels	:	16 Auxiliary channels.

2.4 VESSEL NAVIGATION

WISDOM Version	:	50
Primary Navigation	:	Argo
Secondary Navigation	:	Racal Multifix
Gyrocompass Alignment	:	-0.3°

Depth of Transducer : 4.3 metres

Draft Compensation : Compensated for on tape and paper by the SIMRAD EA 200 fathometer.

Sound Propagation Velocity : 1500 m/s

Calibrated Velocity : 1512 m/s
(Velocity was not compensated for on tape or paper)

2.4.1 BASE STATIONS

NAME	LAT	LONG	ELEV.
NARACOOPA	39° 55.5087′ S	144° 7.6327′ E	47.8m
NORTH POINT	40° 42.8980 S	145° 15.4990′ E	3.9m
POINT SORELL	41° 7.2895 S	146° 31.8325′ E	7.6m
CROPPIES POINT	40° 51.0765 S	147° 35.7655′ E	7.9m

SECTION 3 GRID DEFINITION

POINT 1	39° 58.3845 S	145° 51.7477 E
POINT 2	39° 50.9952 S	145° 58.2115 E
POINT 3	39° 51.5809 S	145° 38.6826 E

Cell size in-line (metres)	:	12.50
Cell size cross-line (metres)	:	25.0
Length of each offset range (metres)	:	100.0
Minimum offset distance to be used (metres)	:	160.0
Number of cells (in-line)	:	1320
Number of lines (cross-line)	:	900
Number of offset ranges	:	30
Line number of first line	:	1
Line numbering increment	:	1
First shotpoint	:	101
Cells per shot	:	2

3.1 FULL COVERAGE AREA DEFINITION

	LINE No.	FIRST CELL	LAST CELL
1	1	1	397
2	233	1	967
3	376	67	1319
4	634	191	1319
5	864	300	1015

SECTION 4 GEODESIC PARAMETERS

4.1 SPHEROID

Spheroid	:	Australian National
Length of semi-major axis	:	6378160
Inversed Flattening (1/f)	:	0.003352892
Flattening	:	298.25
Local Datum	:	AGD 84
Datum Shift (7 Parameter)	:	From WGS-84 to Local
X- shift	:	+ 116.00 metres
Y- shift	:	+ 50.47 metres
Z- shift	:	- 141.69 metres
R_x	:	1.1150710 rad
R_y	:	1.8907730 rad
R_z	:	1.6677590 rad
Sc	:	- 0.0983 ppm
Geoid - Spheroid Separation	:	-1.00 m

4.2 PROJECTION

Projection	:	UTM SOUTH , ZONE 55
False Origin Latitude (WISDOM)	:	0° 00.0000 North
Longitude of Origin	:	147° 00.0000 East
True Origin Longitude (WISDOM)	:	147° 00.0000 East
Scale Factor at Origin	:	0.9996
False Easting at Origin	:	500 000 metres
False Northing at Origin	:	10 000 000 metres

SECTION 5 REFERENCE OFFSET PARAMETERS

5.1 NOMINAL OFFSETS

OFFSETS REFERENCED FROM NRP:	ELEV (+) DEPTH (-)	FORE (+) AFT (-)	STBD (+) PORT (-)
Centre Near Group, Cable 1 :	- 10.0 m	- 298 m	100 m
Centre Near Group, Cable 2 :	- 10.0 m	- 298 m	0 m
Centre Near Group, Cable 3 :	- 10.0 m	- 298 m	- 100 m
Centre Source (STBD) :	- 6.0 m	- 155 m	25 m
Centre Source (PORT) :	- 6.0 m	- 155 m	- 25 m
Antenna 1 Type - ARGO :	18.0 m	0 m	0 m
Antenna 3 Type - RACAL SKYPOD :	18.25 m	0.15 m	0.84 m
Antenna 4 Type - RACAL MULTIFIX	18.25 m	0.15 m	0.55 m
Antenna 7 Type - MARS LASER :	10.4 m	- 48.62 m	0 m

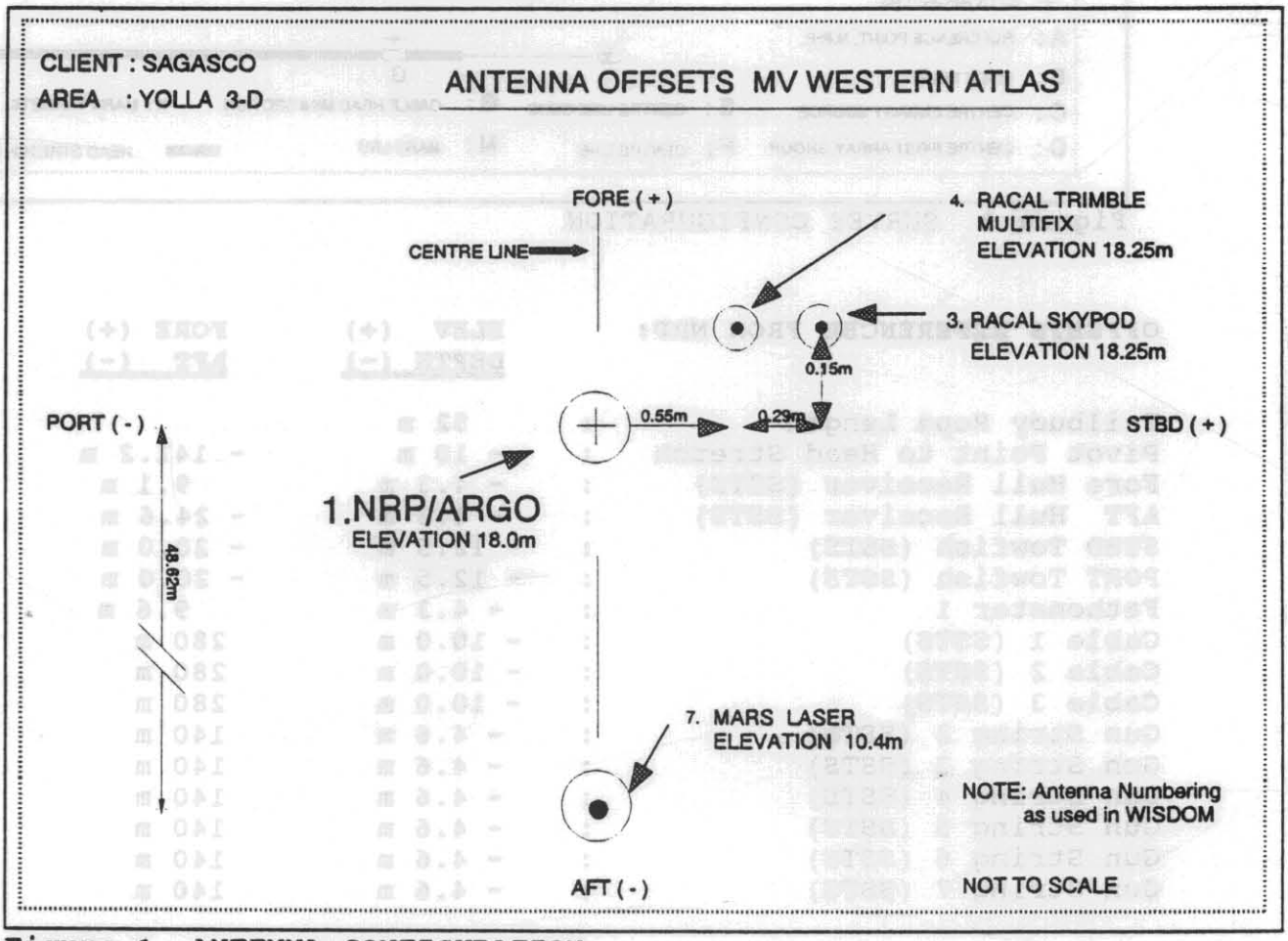


Figure 1 ANTENNA CONFIGURATION

5 cm

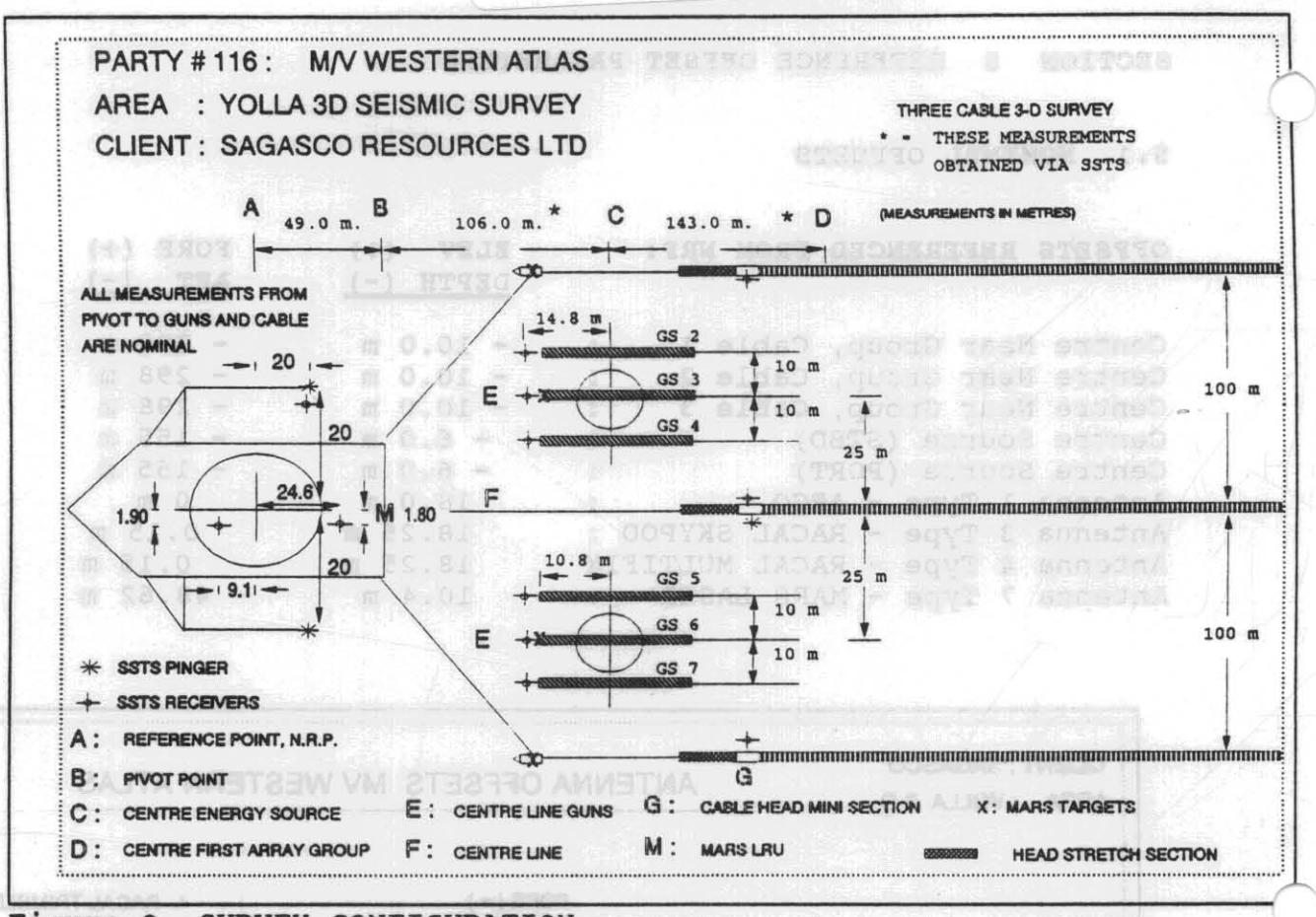


Figure 2 SURVEY CONFIGURATION

OFFSETS REFERENCED FROM NRP:	ELEV (+) DEPTH (-)	FORE (+) AFT (-)	STBD (+) PORT (-
Tailbuoy Rope Length :	52 m		
Pivot Point to Head Stretch :	- 10 m	- 141.2 m	0
Fore Hull Receiver (SSTS) :	- 4.3 m	9.1 m	- 1.9
AFT Hull Receiver (SSTS) :	- 4.3 m	- 24.6 m	- 1.8
STBD Towfish (SSTS) :	- 12.5 m	- 20.0 m	20.0
PORT Towfish (SSTS) :	- 12.5 m	- 20.0 m	- 20.0
Fathometer 1 :	- 4.3 m	9.6 m	- 1.7
Cable 1 (SSTS) :	- 10.0 m	280 m	100
Cable 2 (SSTS) :	- 10.0 m	280 m	0
Cable 3 (SSTS) :	- 10.0 m	280 m	- 100
Gun String 2 (SSTS) :	- 4.6 m	140 m	35
Gun String 3 (SSTS) :	- 4.6 m	140 m	25
Gun String 4 (SSTS) :	- 4.6 m	140 m	15
Gun String 5 (SSTS) :	- 4.6 m	140 m	- 15
Gun String 6 (SSTS) :	- 4.6 m	140 m	- 25
Gun String 7 (SSTS) :	- 4.6 m	140 m	- 35

5.2 ACOUSTIC / LASER NETWORKS

OFFSETS REFERENCED TO CABLE REFERENCE POINT (CRP) & CENTRE LINE OF VESSEL

5.2.1 HEAD NETWORK

		FORE + (m) AFT - (m)	STBD + (m) PORT - (m)	ELEV + (m) DEPTH -(m)
01	:	131.6 m	25 m	- 7.5
02	:	131.6 m	15 m	- 7.5
03	:	131.6 m	- 15 m	- 7.5
04	:	131.6 m	- 25 m	- 7.5
05	:	14.5 m	100 m	- 10.0
06	:	- 62.5 m	100 m	- 10.0
12	:	14.5 m	0 m	- 10.0
13	:	- 62.5 m	0 m	- 10.0
19	:	14.5 m	- 100 m	- 10.0
20	:	- 62.5 m	- 100 m	- 10.0

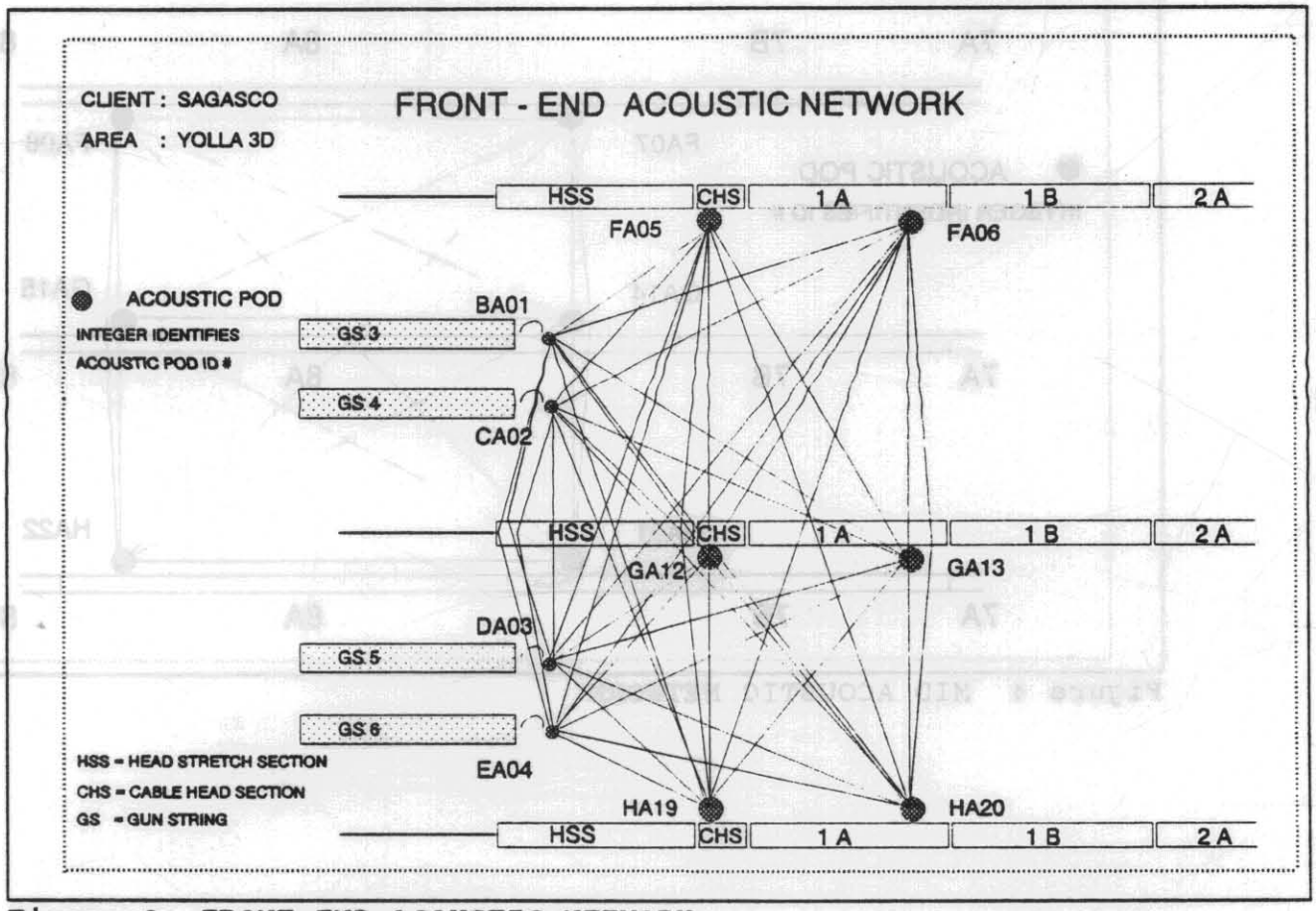


Figure 3 FRONT-END ACOUSTIC NETWORK

5 cm

5.2.2 MID NETWORK

		FORE + (m) / AFT - (m)	STBD + (m) / PORT - (m)	ELEV + (m) / DEPTH -(m)
07	:	- 1462.4 m	100 m	- 10.0
08	:	- 1562.4 m	100 m	- 10.0
14	:	- 1462.4 m	0 m	- 10.0
15	:	- 1562.4 m	0 m	- 10.0
21	:	- 1462.4 m	- 100 m	- 10.0
22	:	- 1562.4 m	- 100 m	- 10.0

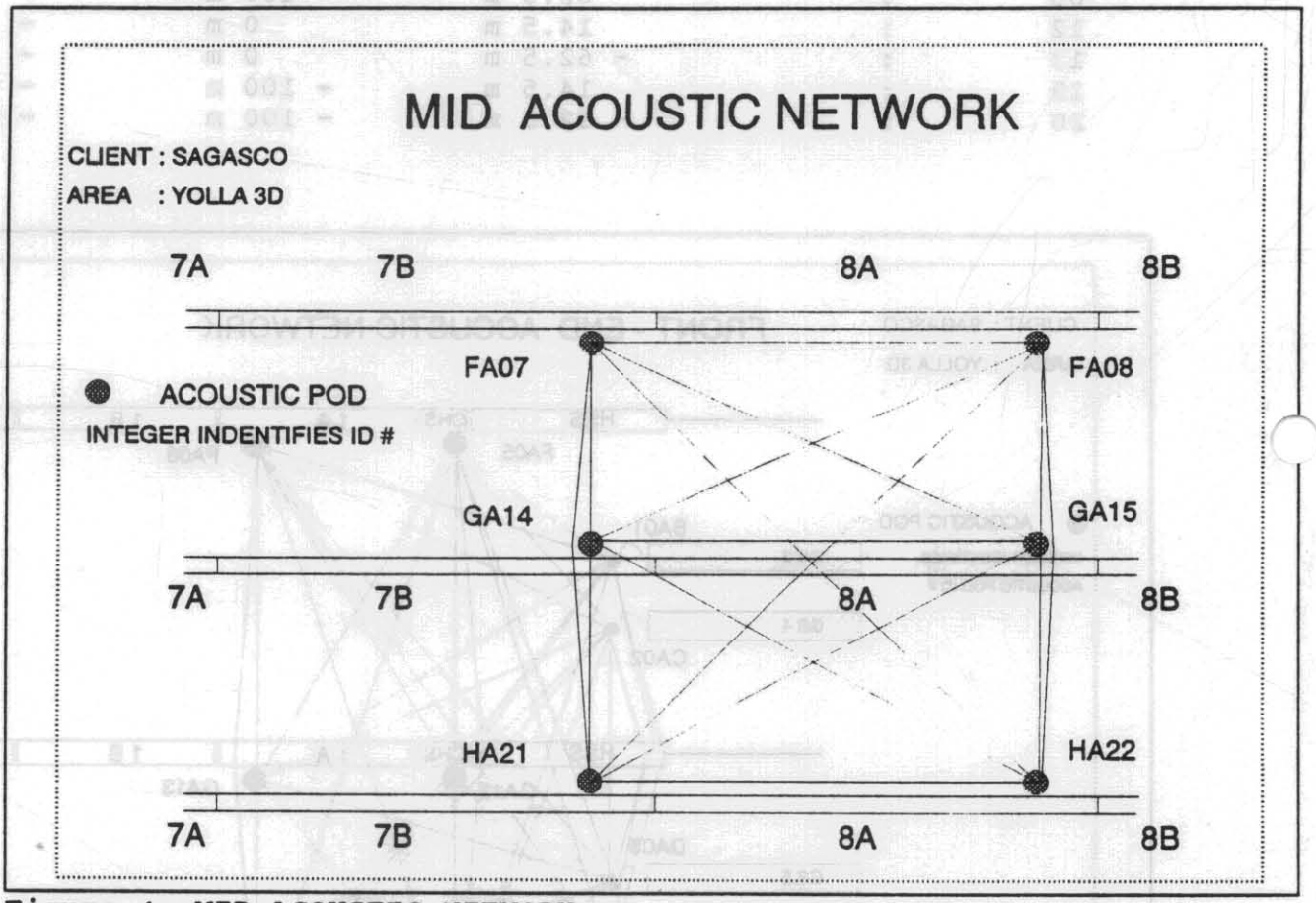
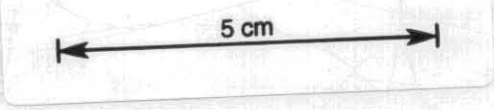


Figure 4 MID ACOUSTIC NETWORK



5.2.3 TAIL NETWORK

		FORE + (m) AFT - (m)	STBD + (m) PORT - (m)	ELEV + (m) DEPTH -(m)
09	:	- 2962.4 m	100 m	- 10.0
10	:	- 3063.6 m	100 m	- 10.0
11	:	- 3119.5 m	100 m	- 2.0
16	:	- 2962.4 m	0 m	- 10.0
17	:	- 3063.6 m	0 m	- 10.0
18	:	- 3119.5 m	0 m	- 2.0
23	:	- 2962.4 m	- 100 m	- 10.0
24	:	- 3063.6 m	- 100 m	- 10.0
25	:	- 3119.5 m	- 100 m	- 2.0

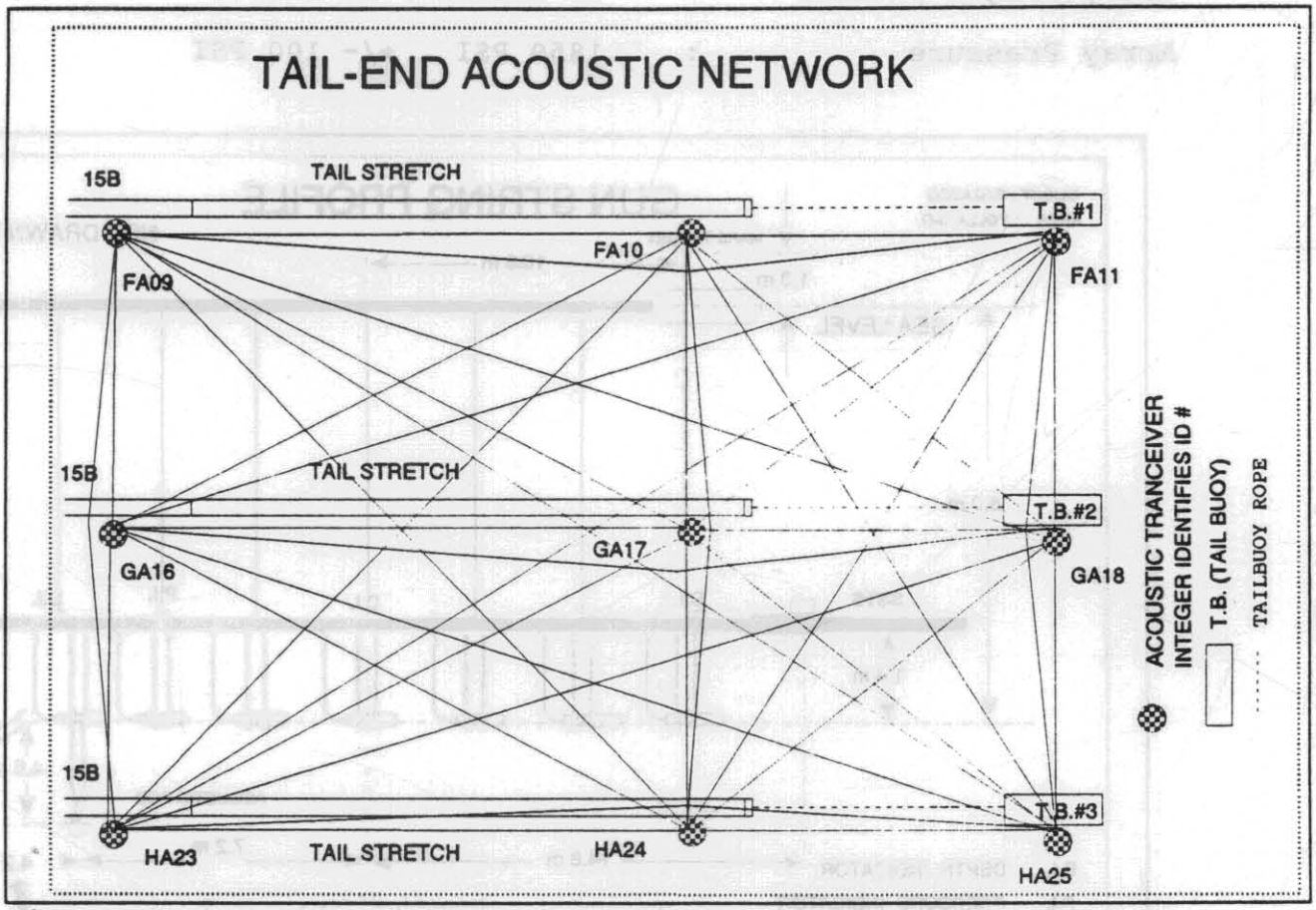


Figure 5 TAIL-END ACOUSTIC NETWORK

OFFSETS REFERENCED FROM SOURCE ARRAY CENTRE & VESSEL CENTRE LINE

5.2.4 MARS NETWORK

		FORE + (m) AFT - (m)	STBD + (m) PORT - (m)	ELEV + (m) DEPTH -(m)
STBD PULLERVANE	:			+ 1.3
Gun String 3	:	10.8 m	25 m	+ 1.3
Gun String 6	:	10.8 m	- 25 m	+ 1.3
PORT PULLERVANE	:			+ 1.3

5 cm

SECTION 6 ENERGY SOURCE

Configuration	:	Dual Source
Type	:	Litton Low Pressure
No. of Guns	:	14
No. of Guns / Sub Array	:	6 X (3 strings)
Array Volume	:	2700 cu.in. +/- 15%
Array Length / Width	:	18 metres / 20 metres
Array Pressure	:	1850 PSI +/- 100 PSI

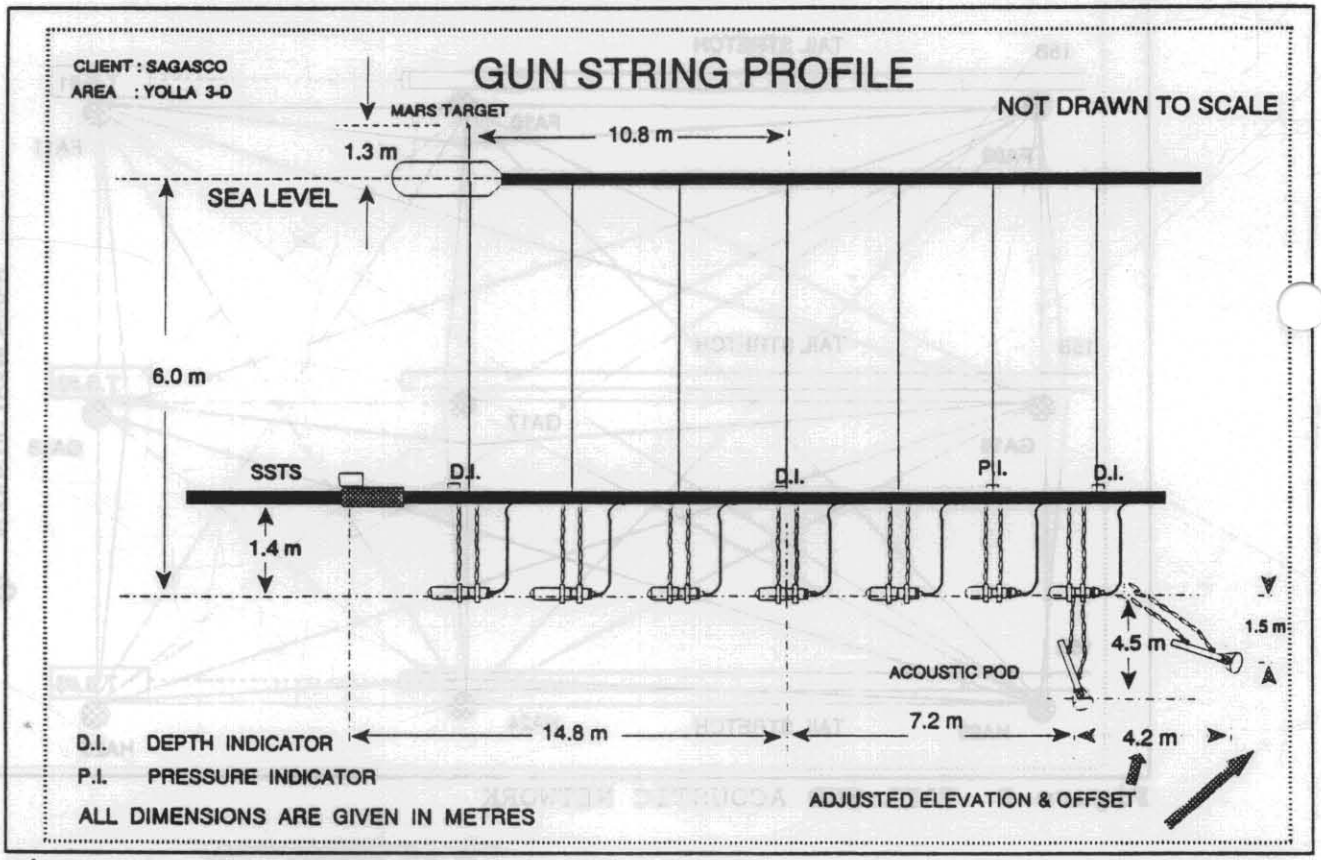


Figure 6 GUN STRING PROFILE

Operating Depth	:	6.0m +/- 1.5m
Sub Array Separation	:	10.0 metres
Array Separation	:	50.0 metres
shotpoint Interval	:	25.0 metres/shot
Nominal Fold	:	30

5 cm

6.1 ENERGY SOURCE ELEMENT DESCRIPTION

Number = Gun number
Volume = Gun volume
X = In-line distance from centre of source, (m). (+) = Fore , (-) = Aft
Y = Cross-line distance from centre of source, (m). (+) = STBD , (-) = PORT
Z = Vertical distance from sea level, (m). (+) = Above, (-) = Below

NUMBER	X	Y	Z	VOLUME	SOURCE No.
9	10.8	10.0	-6.0	465	1
10	6.4	10.0	-6.0	280	1
11	3.1	10.0	-6.0	200	1
12	0.0	10.0	-6.0	150	1
13	-2.9	10.0	-6.0	115	1
14	-5.2	10.0	-6.0	80	1
15	-7.2	10.0	-6.0	60	1
17	10.8	0.0	-6.0	465	1
18	6.4	0.0	-6.0	280	1
19	3.1	0.0	-6.0	200	1
20	0.0	0.0	-6.0	150	1
21	-2.9	0.0	-6.0	115	1
22	-5.2	0.0	-6.0	80	1
23	-7.2	0.0	-6.0	60	1
25	10.8	-10.0	-6.0	465	1
26	6.4	-10.0	-6.0	280	1
27	3.1	-10.0	-6.0	200	1
28	0.0	-10.0	-6.0	150	1
29	-2.9	-10.0	-6.0	115	1
30	-5.2	-10.0	-6.0	80	1
31	-7.2	-10.0	-6.0	60	1
33	10.8	10.0	-6.0	465	2
34	6.4	10.0	-6.0	280	2
35	3.1	10.0	-6.0	200	2
36	0.0	10.0	-6.0	150	2
37	-2.9	10.0	-6.0	115	2
38	-5.2	10.0	-6.0	80	2
39	-7.2	10.0	-6.0	60	2
41	10.8	0.0	-6.0	465	2
42	6.4	0.0	-6.0	280	2
43	3.1	0.0	-6.0	200	2
44	0.0	0.0	-6.0	150	2
45	-2.9	0.0	-6.0	115	2
46	-5.2	0.0	-6.0	80	2
47	-7.2	0.0	-6.0	60	2
49	10.8	-10.0	-6.0	465	2
50	6.4	-10.0	-6.0	280	2
51	3.1	-10.0	-6.0	200	2
52	0.0	-10.0	-6.0	150	2
53	-2.9	-10.0	-6.0	115	2
54	-5.2	-10.0	-6.0	80	2
55	-7.2	-10.0	-6.0	60	2

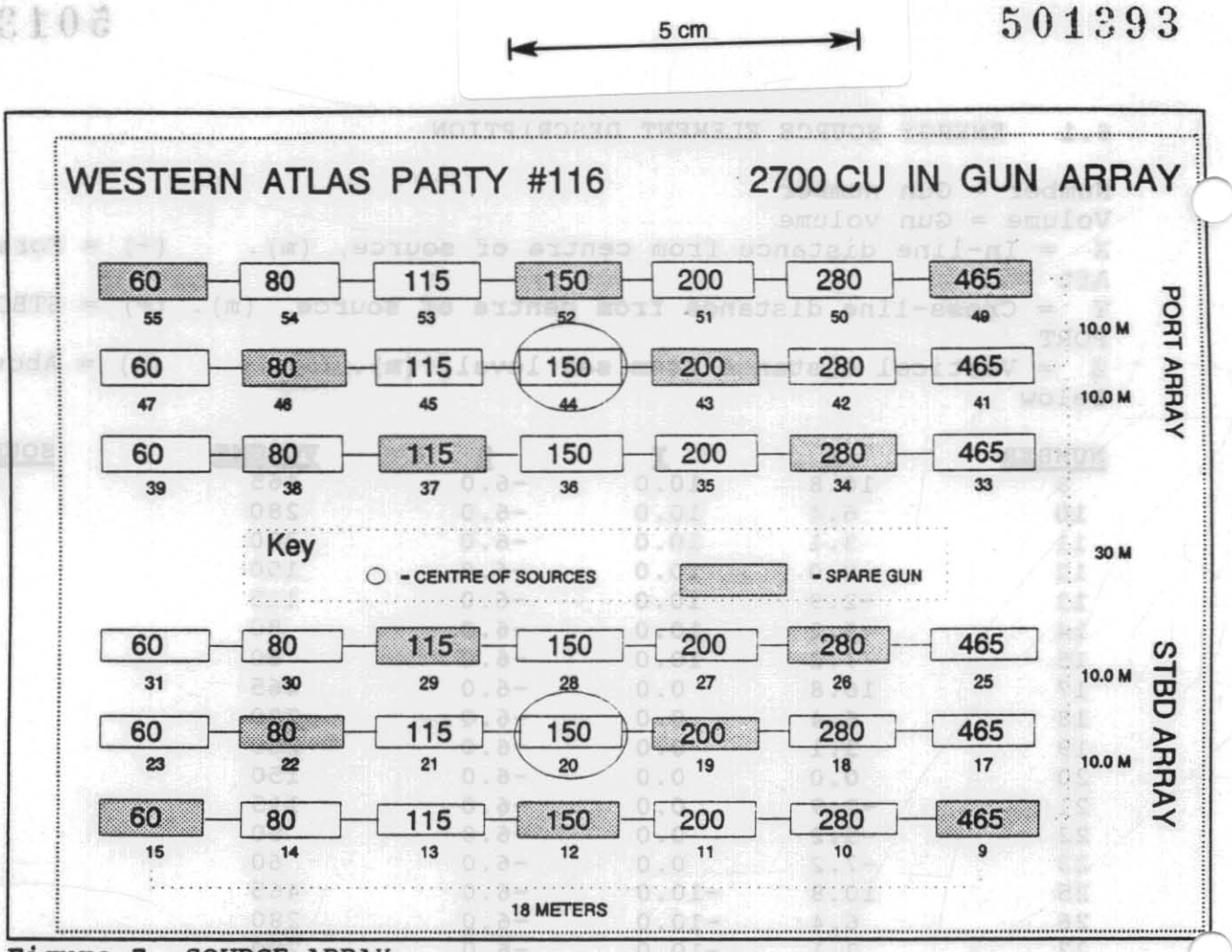


Figure 7 SOURCE ARRAY

SECTION 7 STREAMER CABLE PARAMETERS

Type	:	WG-24
Digital	:	yes
Series	:	2
Cable Length	:	3 x 3000 metres
Cable depth	:	10.0 metres +/- 1.5m .
No. Groups	:	240 (array formed)
Group Interval	:	12.5 metres
Group Length	:	15.5 metres
Group (Array) Type	:	Tapered array, centre weighted, 21% overlap on adjacent groups
Hydrophone Type	:	LRS
Hydrophone Model	:	WM-018
Hydrophone Sensitivity	:	49.45 volt/bar
No. Hydrophones/Array Grp.	:	16
No. Compass/Depth Controllers	:	3 x 11
Type of Compass/Depth Cntrl	:	DigiCOURSE 5011/03
No. Depth Indicators	:	3 x 30
DI's At Head of Groups	:	1,9,17,25,33,41,49,57,65,73,81,89,97, 105,113,121,129,137,145,153,161,169, 177,185,193,201,209,217,225,233,241, 249,257,265,273,281,289,297,305,313, 321,329,337,345,353,361,369,377,385, 393,401,409,417,425,433,441,449,457, 465,473,481,489,497,505,513,521,529, 537,545,553,561,569,577,585,593,601, 609,617,625,633,641,649,657,665,673, 681,689,697,705,713.
Compass/Bird Locations	:	Head Stretch Sections-Cables 1,2 & 3; Cable Head Sections-Cables 1,2 & 3; Tail Stretch Sections-Cables 1,2 & 3, Centre of Groups: 14, 22,46,78,110,142,174,206,230,254,262, 288,318,350,382,414,446,470,494,502,5 26,558,592,622,654,686,710.

Acoustic Unit Locations : Cable Head Sections-Cables 1,2 & 3; Centre of Group : 6,118,126,238,246,358,366,478,486,598, 606,718. Tail Stretch Sections-Cables 1,2 & 3.

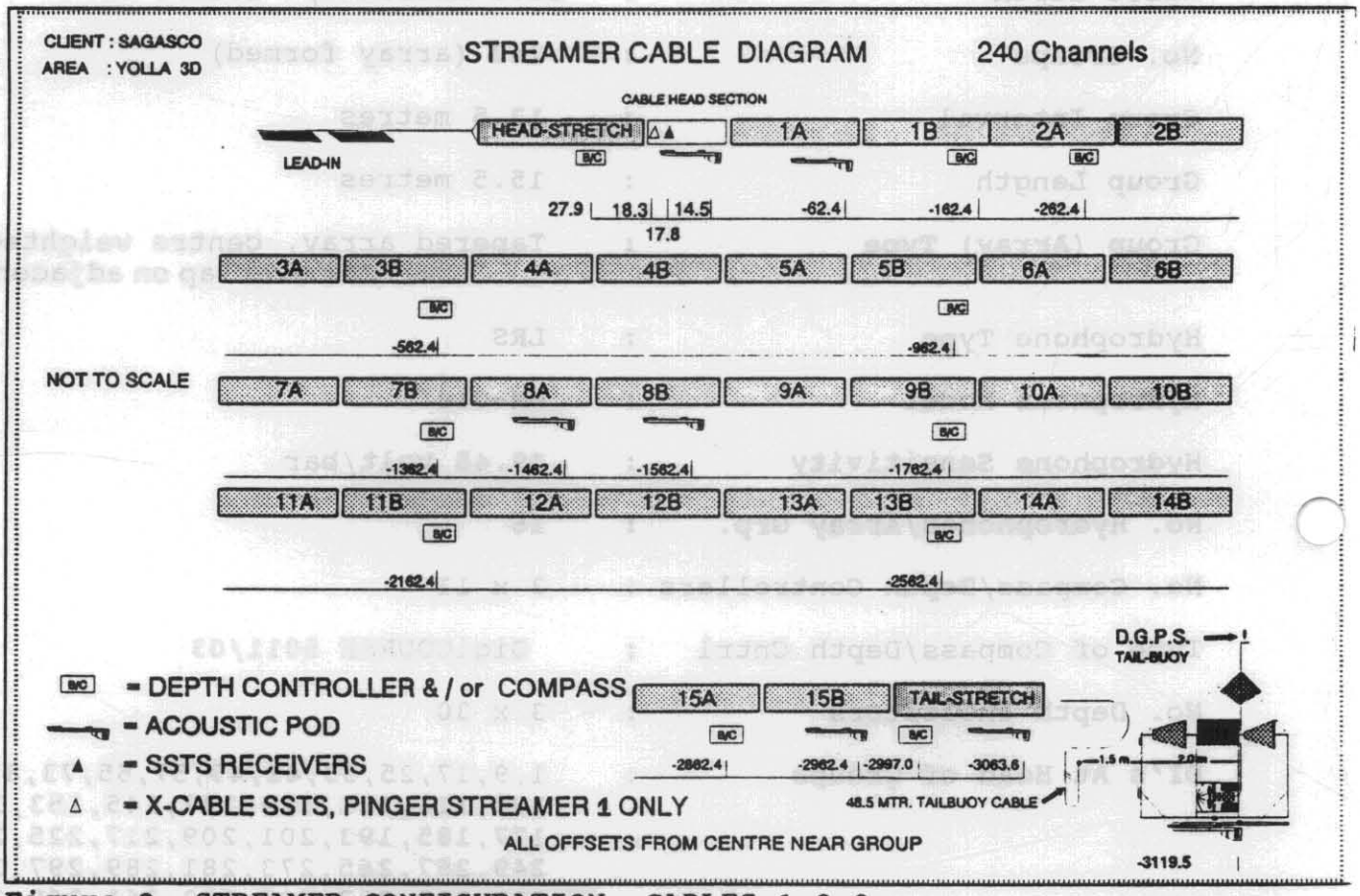
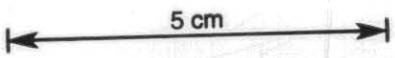


Figure 8 STREAMER CONFIGURATION, CABLES 1,2,3



5 cm

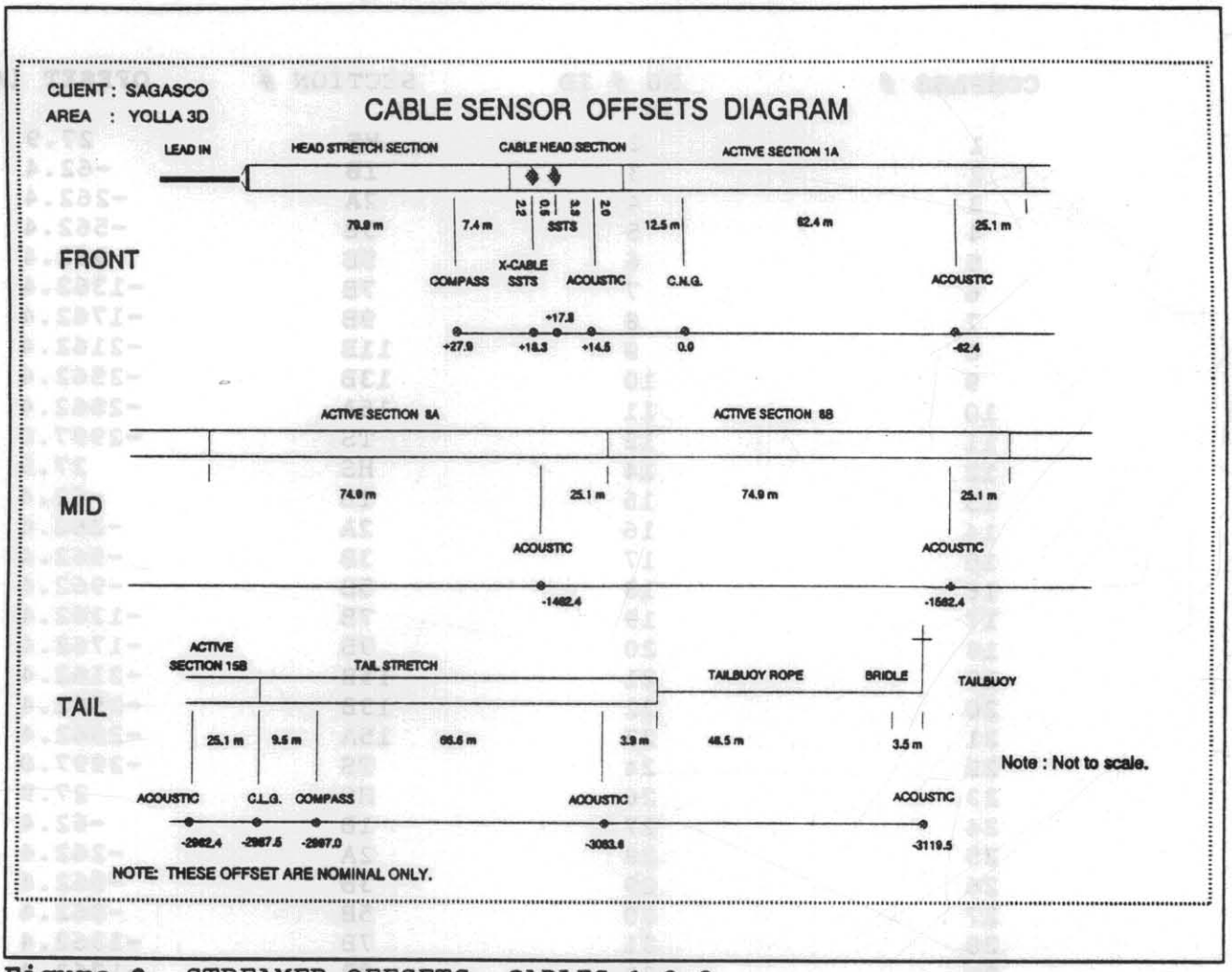


Figure 9 STREAMER OFFSETS, CABLES 1,2,3

7.1 COMPASS OFFSETS & MAGNETIC DECLINATION

Configuration for Three Cable / Dual Source .

All offsets are referenced to the first active near group . The first active near group (12.5m group separation) is located 12.5 metres AFT of the head of section 1A (first active section) .

COMPASS #	RU # ID	SECTION #	OFFSET (m)
1	2	HS	27.9
2	3	1B	-62.4
3	4	2A	-262.4
4	5	3B	-562.4
5	6	5B	-962.4
6	7	7B	-1362.4
7	8	9B	-1762.4
8	9	11B	-2162.4
9	10	13B	-2562.4
10	11	15A	-2862.4
11	12	TS	-2997.0
12	14	HS	27.9
13	15	1B	-62.4
14	16	2A	-262.4
15	17	3B	-562.4
16	18	5B	-962.4
17	19	7B	-1362.4
18	20	9B	-1762.4
19	21	11B	-2162.4
20	22	13B	-2562.4
21	23	15A	-2862.4
22	24	TS	-2997.0
23	26	HS	27.9
24	27	1B	-62.4
25	28	2A	-262.4
26	29	3B	-562.4
27	30	5B	-962.4
28	31	7B	-1362.4
29	32	9B	-1762.4
30	33	11B	-2162.4
31	34	13B	-2562.4
32	35	15A	-2862.4
33	36	TS	-2997.0

MAGNETIC DECLINATION used for the prospect area was 12.67° East . The source of information was derived onboard from the WORLD MAGNETIC MODEL 1990, using 30th January 1994 for computations.

501398

PARAMETER REPORT

P02 - YOLLA 3D
February 11 to March 16 1994

Survey : YOLLA 3D
BLOCK : T/RL 1
AREA : BASS BASIN , AUSTRALIA
VESSEL : WESTERN ATLAS P116
CLIENT : SAGASCO RESOURCES LTD

PREPARED BY : Steve Metcalfe BASc

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TABLE 1.0 3D-Report Information

SECTION 1 DATA ACQUISITION EQUIPMENT CONFIGURATION

TABLE 1.0 3D- Report Information

SEQ	DATE	JD	LINE	SEIS TAPE	NAV TAPE
013	11 FEB.	041	YOL00049	000274	P116-0232
187	16 MAR.	074	YOL01661	004880	P116-0251

1.1 LINE NAMING CONVENTION

The sail line naming convention adopted for the YOLLA 3D seismic survey followed the general format of, **YOL**###** where:

YOL = Prefix denoting the YOLLA 3D survey.
** = numerical prefix to designate; **PRIME - 00**
INFILL - 01
RESHOOT - 10
= the number of the lowest cmp line acquired.

EXAMPLE: For instance;

A) YOL00001, designated the CMP prime line 001, acquiring cmp's 001-006.
B) YOL10013, designated the first reshoot of prime line 013.
C) YOL21013, designated the second attempt at reshooting the infill of line 013.

NOTE: Any additional attempts to complete a prime line is termed a reshoot.

1.2 VESSEL AND PERSONNEL

PARTY No. : P-116

VESSEL : M.V. WESTERN ATLAS (PANAMANIAN FLAG)

CLIENT : SAGASCO RESOURCES LIMITED

AREA : YOLLA 3D , T/RL1 BLOCK , BASS BASIN , AUSTRALIA

CLIENT REP : RODNEY WALDRON

NAV REP : MATT ULVR-GREEN

SAFETY OFFICER : LYALL COWAN

CO-ORDINATORS : DICKIE CHOW , HAMISH HUME

TECHNICIANS : KEVIN ROBERTS , ERNEST DALE

NAVIGATORS : STEVE ELLIOT , TOM KOLESKE / WARWICK MAXTED

OBSERVERS : MARK WHETTON , MATT SUSSMILCH

GUNNERS : TOMMY MEANS , BRADY DEGENSTEIN

COMP. MECHANIC : GALEN HIEB , DAVE HILL

QUALITY CONTROL: STEVE METCALFE , GARY NICHOLSON

1.3 RECORDING SYSTEM

Recording System Type	:	1 x WG-24, S/N #14
Number of Streamer Modules	:	3 x 15
Number of Connector Modules	:	3 x 15
Time Break	:	Volume
Filters,		
: Hi Cut	:	196 Hz / 214 dB/octave
: Lo Cut	:	6 Hz / 18 dB/octave
Record Length	:	6 seconds
Sample Rate	:	2 milliseconds
Tape Speed/Density	:	2 m/s / 38000 BPI
SEG Format/Code	:	4-byte SEG D,Demultiplexed 8048
Tape Deck Type / Model	:	3480 Compatible Cartridge Tape Unit, ANSI Standard Tapes.
Header Format	:	Variable Byte, Version 6.
Auxiliary Channels	:	16 Auxiliary channels.

1.4 VESSEL NAVIGATION

WISDOM Version	:	50
Primary Navigation	:	Argo
Secondary Navigation	:	Racal Multifix
Gyrocompass Alignment	:	-0.3°
Depth of Transducer	:	4.3 metres

Draft Compensation : Compensated for on tape and paper by the SIMRAD EA 200 fathometer.

Sound Propagation Velocity : 1500 m/s

Calibrated Velocity : 1512 m/s
(Velocity was not compensated for on tape or paper)

1.4.1 BASE STATIONS

NAME	LAT	LONG	ELEV.
NARACOOPA	39° 55.5087′ S	144° 7.6327′ E	47.8m
NORTH POINT	40° 42.8980 S	145° 15.4990′ E	3.9m
POINT SORELL	41° 7.2895 S	146° 31.8325′ E	7.6m
CROPPIES POINT	40° 51.0765 S	147° 35.7655′ E	7.9m

SECTION 2 GRID DEFINITION

POINT 1	39° 58.3845 S	145° 51.7477 E
POINT 2	39° 50.9952 S	145° 58.2115 E
POINT 3	39° 51.5809 S	145° 38.6826 E

Cell size in-line (metres)	:	12.50
Cell size cross-line (metres)	:	25.0
Length of each offset range (metres)	:	100.0
Minimum offset distance to be used (metres)	:	160.0
Number of cells (in-line)	:	1320
Number of lines (cross-line)	:	900
Number of offset ranges	:	30
Line number of first line	:	1
Line numbering increment	:	1
First shotpoint	:	101
Cells per shot	:	2

2.1 FULL COVERAGE AREA DEFINITION

	LINE No.	FIRST CELL	LAST CELL
1	1	1	397
2	233	1	967
3	376	67	1319
4	634	191	1319
5	864	300	1015

SECTION 3 GEODETIC PARAMETERS

3.1 SPHEROID

Spheroid	:	Australian National
Length of semi-major axis	:	6378160
Inversed Flattening (1/f)	:	0.003352892
Flattening	:	298.25
Local Datum	:	AGD 84
Datum Shift (7 Parameter)	:	From WGS-84 to Local
X- shift	:	+ 116.00 metres
Y- shift	:	+ 50.47 metres
Z- shift	:	- 141.69 metres
R_x	:	1.1150710 rad
R_y	:	1.8907730 rad
R_z	:	1.6677590 rad
Sc	:	- 0.0983 ppm
Geoid - Spheroid Separation	:	-1.00 m

3.2 PROJECTION

Projection	:	UTM SOUTH , ZONE 55
False Origin Latitude (WISDOM)	:	0° 00.0000 North
Longitude of Origin	:	147° 00.0000 East
True Origin Longitude (WISDOM)	:	147° 00.0000 East
Scale Factor at Origin	:	0.9996
False Easting at Origin	:	500 000 metres
False Northing at Origin	:	10 000 000 metres

SECTION 4 REFERENCE OFFSET PARAMETERS

4.1 NAVIGATION ANTENNAS

OFFSETS REFERENCED FROM NRP:	ELEV (+) DEPTH (-)	FORE (+) AFT (-)	STBD (+ PORT (-
Antenna 1 Type - ARGO :	18.0 m	0 m	0
Antenna 4 Type - RACAL MULTIFIX	18.25 m	0.15 m	0.55
Antenna 5 Type - RACAL SKYPOD :	16.40 m	- 14.70 m	- 6.25
Antenna 7 Type - MARS LASER :	10.4 m	- 48.62 m	0

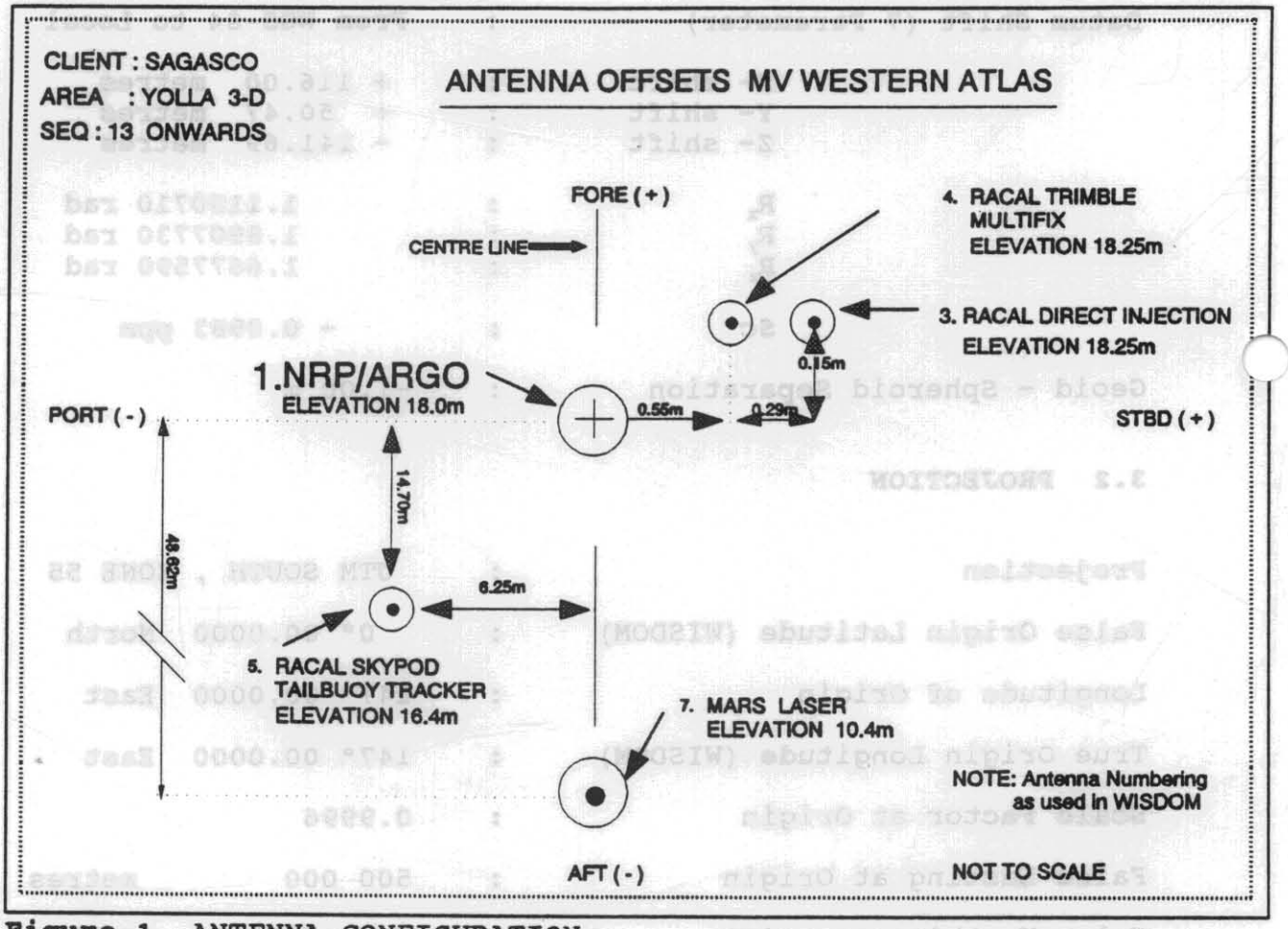


Figure 1 ANTENNA CONFIGURATION

5 cm

4.2 SURVEY CONFIGURATION

OFFSETS REFERENCED FROM NRP:		ELEV (+) DEPTH (-)	FORE (+) AFT (-)	STBD (+) PORT (-
Centre Near Group, Cable 1	:	- 10.0 m	- 298.8 m	100 m
Centre Near Group, Cable 2	:	- 10.0 m	- 298.8 m	0 m
Centre Near Group, Cable 3	:	- 10.0 m	- 298.8 m	- 100 m
Centre Source (STBD)	:	- 6.0 m	- 154.8 m	25 m
Centre Source (PORT)	:	- 6.0 m	- 154.8 m	- 25 m
Tailbuoy Rope Length	:	52 m		
Pivot Point to Head Stretch	:	- 10 m	- 142.0 m	0 m
Fathometer 1	:	- 4.3 m	9.6 m	- 1.7 m

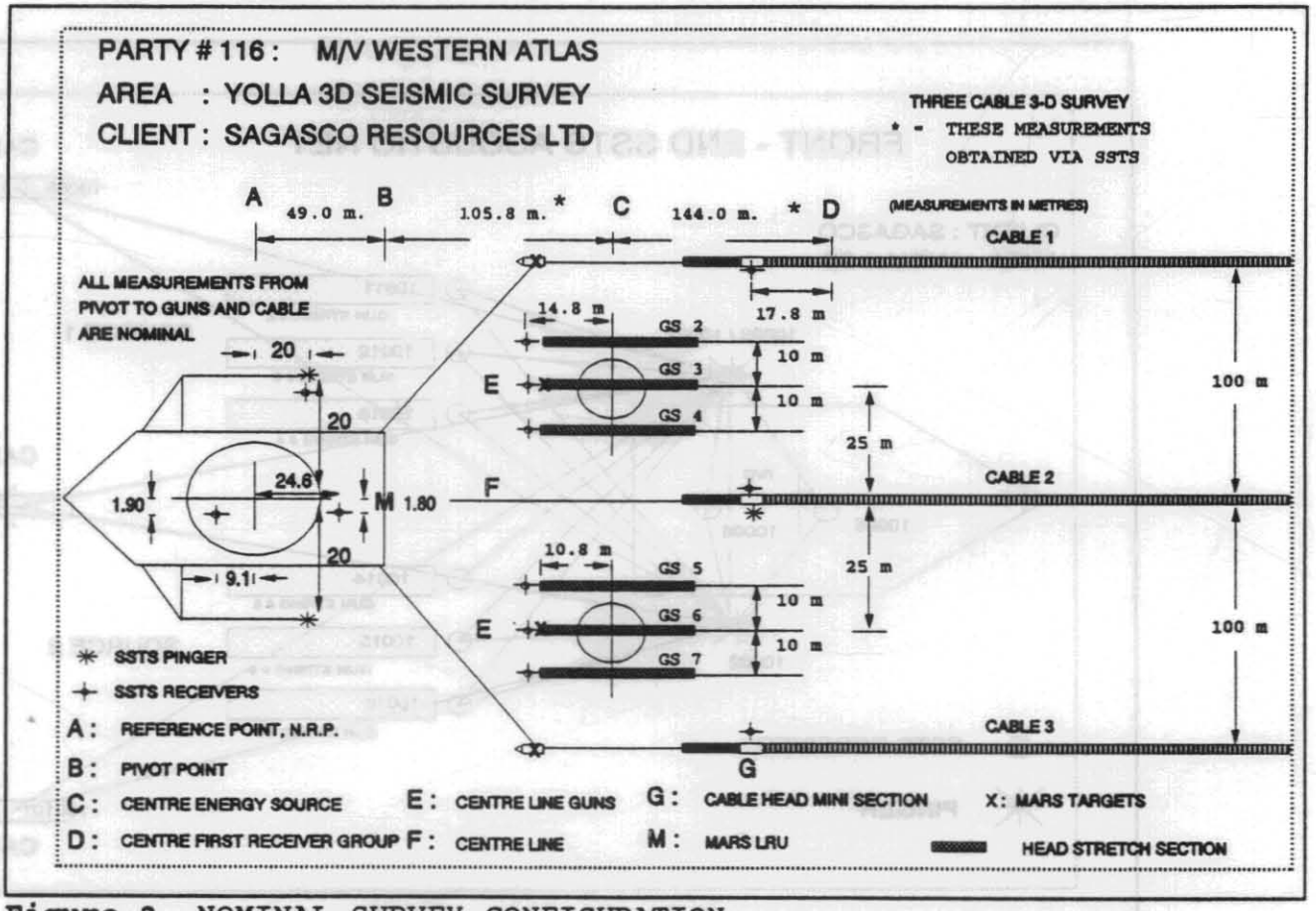


Figure 2 NOMINAL SURVEY CONFIGURATION

5 cm

4.3 SSTS NETWORK

OFFSETS REFERENCED FROM NRP:		ELEV (+) DEPTH (-)	FORE (+) AFT (-)	STBD (+) PORT (-)
Fore Hull Receiver (SSTS)	:	- 4.3 m	9.1 m	- 1.9
AFT Hull Receiver (SSTS)	:	- 4.3 m	- 24.6 m	- 1.8
STBD Towfish (SSTS)	:	- 12.5 m	- 20.0 m	20.0
PORT Towfish (SSTS)	:	- 12.5 m	- 20.0 m	- 20.0
Cable 1 (SSTS)	:	- 10.0 m	- 281.0 m	100
Cable 2 (SSTS)	:	- 10.0 m	- 281.0 m	0
Cable 3 (SSTS)	:	- 10.0 m	- 281.0 m	- 100
Gun String 2 (SSTS)	:	- 4.6 m	- 140.0 m	35
Gun String 3 (SSTS)	:	- 4.6 m	- 140.0 m	25
Gun String 4 (SSTS)	:	- 4.6 m	- 140.0 m	15
Gun String 5 (SSTS)	:	- 4.6 m	- 140.0 m	- 15
Gun String 6 (SSTS)	:	- 4.6 m	- 140.0 m	- 25
Gun String 7 (SSTS)	:	- 4.6 m	- 140.0 m	- 35

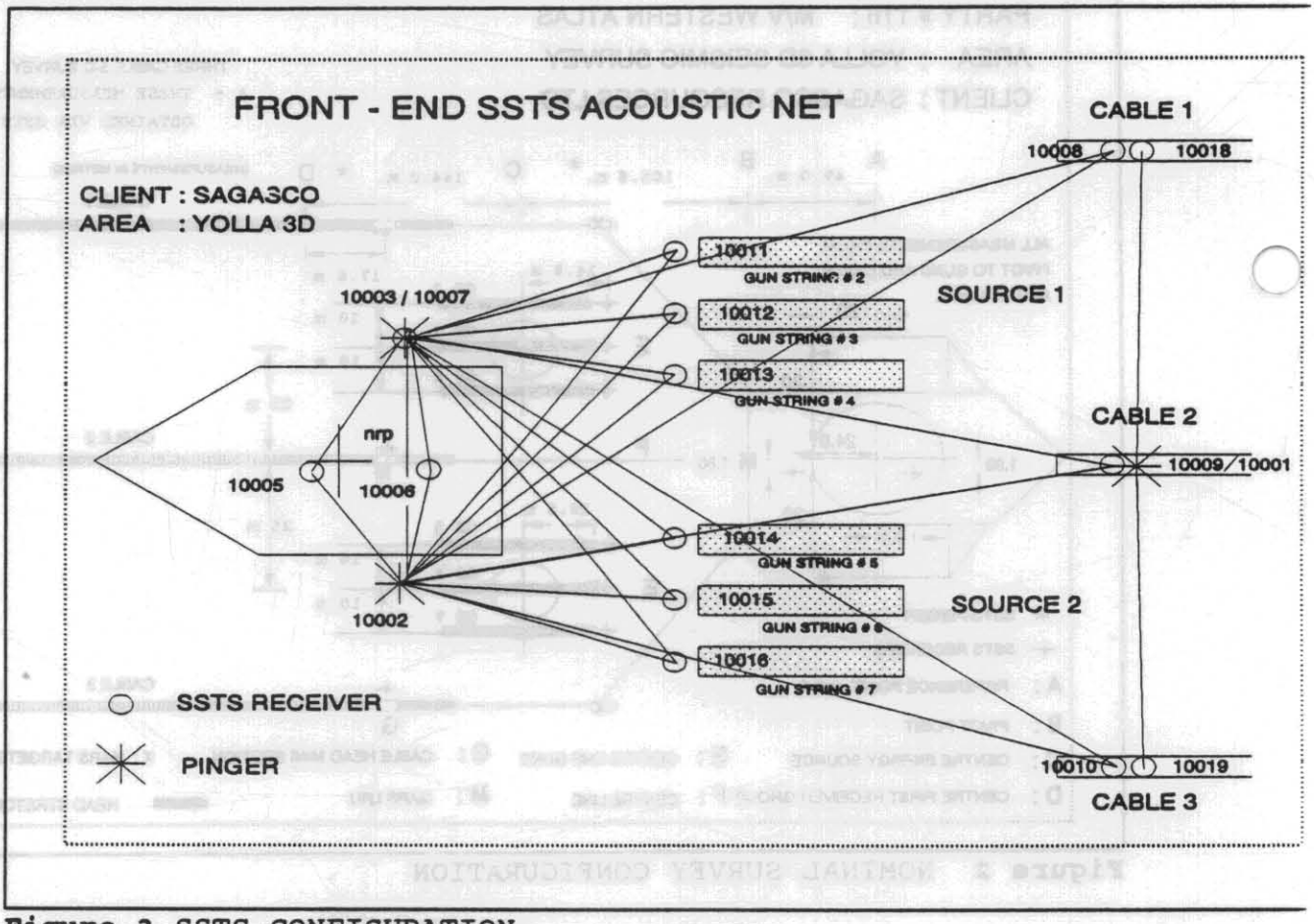


Figure 3 SSTS CONFIGURATION

5 cm

4.4 DIGICOURSE ACOUSTIC / LASER NETWORKS

FORE/AFT OFFSETS REFERENCED TO CABLE REFERENCE POINT (CRP).
STBD/PORT OFFSETS REFERENCED TO CABLE 2 (NOMINAL CENTRE LINE OF VESSEL)
ELEVATION MEASUREMENTS REFERENCED FROM MEAN SEA LEVEL.

4.4.1 HEAD NETWORK :

	FORE + (m) AFT - (m)	STBD + (m) PORT - (m)	ELEV + (m) DEPTH -(m)
01 :	132.6 m	25 m	- 7.5
02 :	132.6 m	15 m	- 7.5
03 :	132.6 m	- 15 m	- 7.5
04 :	132.6 m	- 25 m	- 7.5
05 :	14.5 m	100 m	- 10.0
06 :	- 62.4 m	100 m	- 10.0
12 :	14.5 m	0 m	- 10.0
13 :	- 62.4 m	0 m	- 10.0
19 :	14.5 m	- 100 m	- 10.0
20 :	- 62.4 m	- 100 m	- 10.0

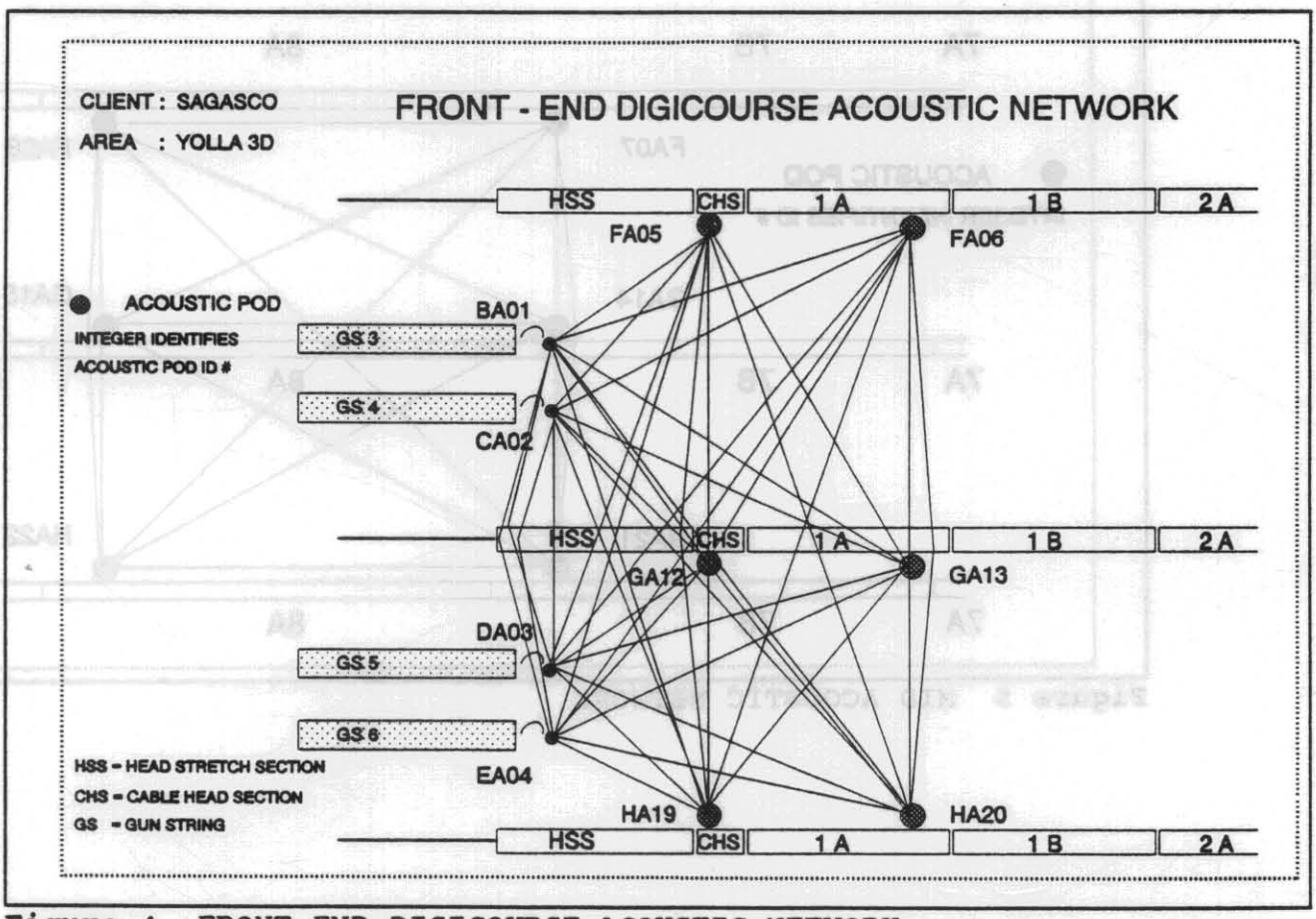
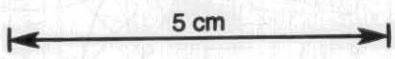


Figure 4 FRONT-END DIGICOURSE ACOUSTIC NETWORK



4.4.2 MID NETWORK

		FORE + (m) AFT - (m)	STBD + (m) PORT - (m)	ELEV + (m) DEPTH -(m)
07	:	- 1462.4 m	100 m	- 10.0
08	:	- 1562.4 m	100 m	- 10.0
14	:	- 1462.4 m	0 m	- 10.0
15	:	- 1562.4 m	0 m	- 10.0
21	:	- 1462.4 m	- 100 m	- 10.0
22	:	- 1562.4 m	- 100 m	- 10.0

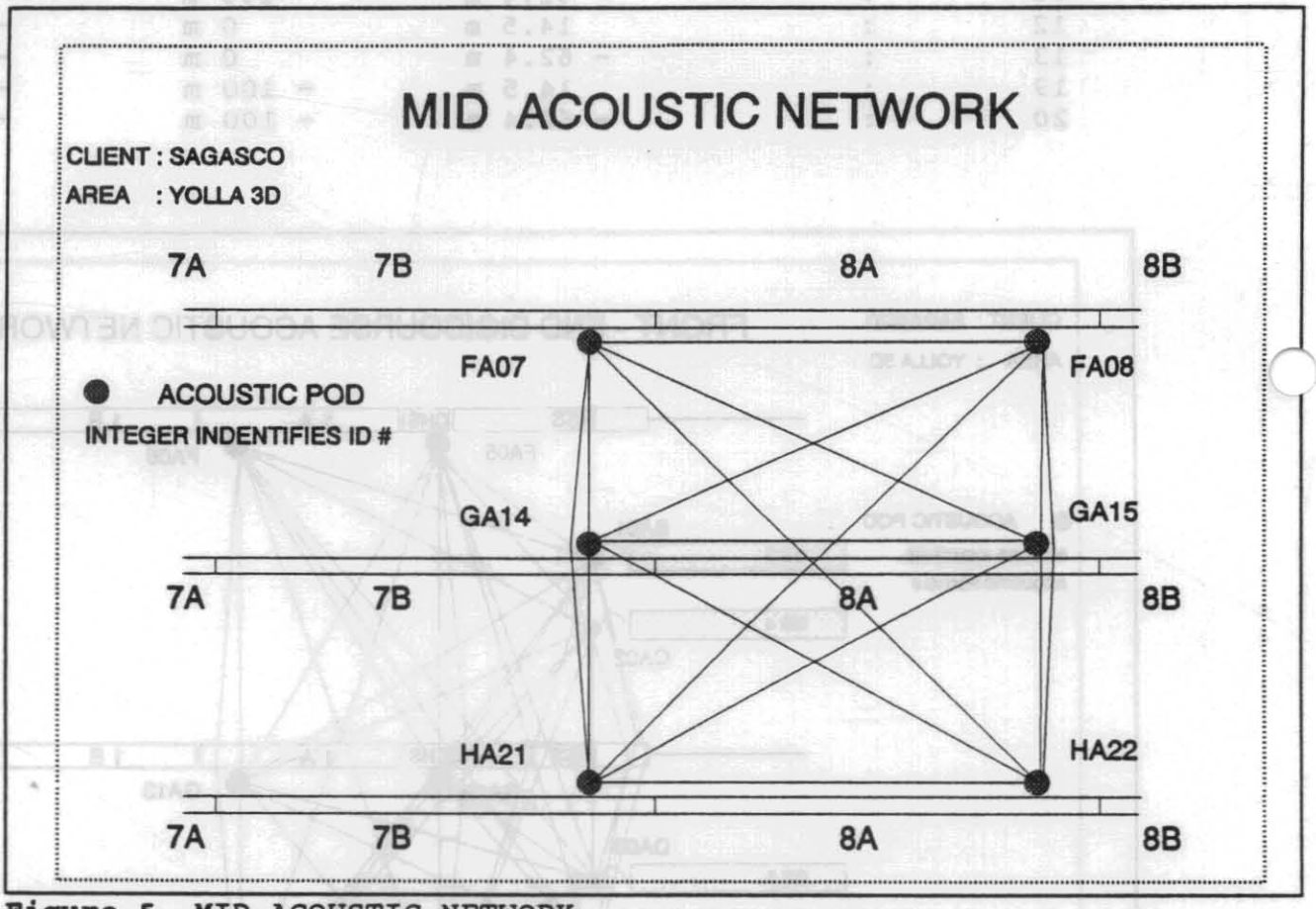


Figure 5 MID ACOUSTIC NETWORK

4.4.3 TAIL NETWORK		FORE + (m) AFT - (m)	STBD + (m) PORT - (m)	ELEV + (m) DEPTH -(m)
09	:	- 2962.4 m	100 m	- 10.0
10	:	- 3063.6 m	100 m	- 10.0
11	:	- 3119.5 m	100 m	- 2.0
16	:	- 2962.4 m	0 m	- 10.0
17	:	- 3063.6 m	0 m	- 10.0
18	:	- 3119.5 m	0 m	- 2.0
23	:	- 2962.4 m	- 100 m	- 10.0
24	:	- 3063.6 m	- 100 m	- 10.0
25	:	- 3119.5 m	- 100 m	- 2.0

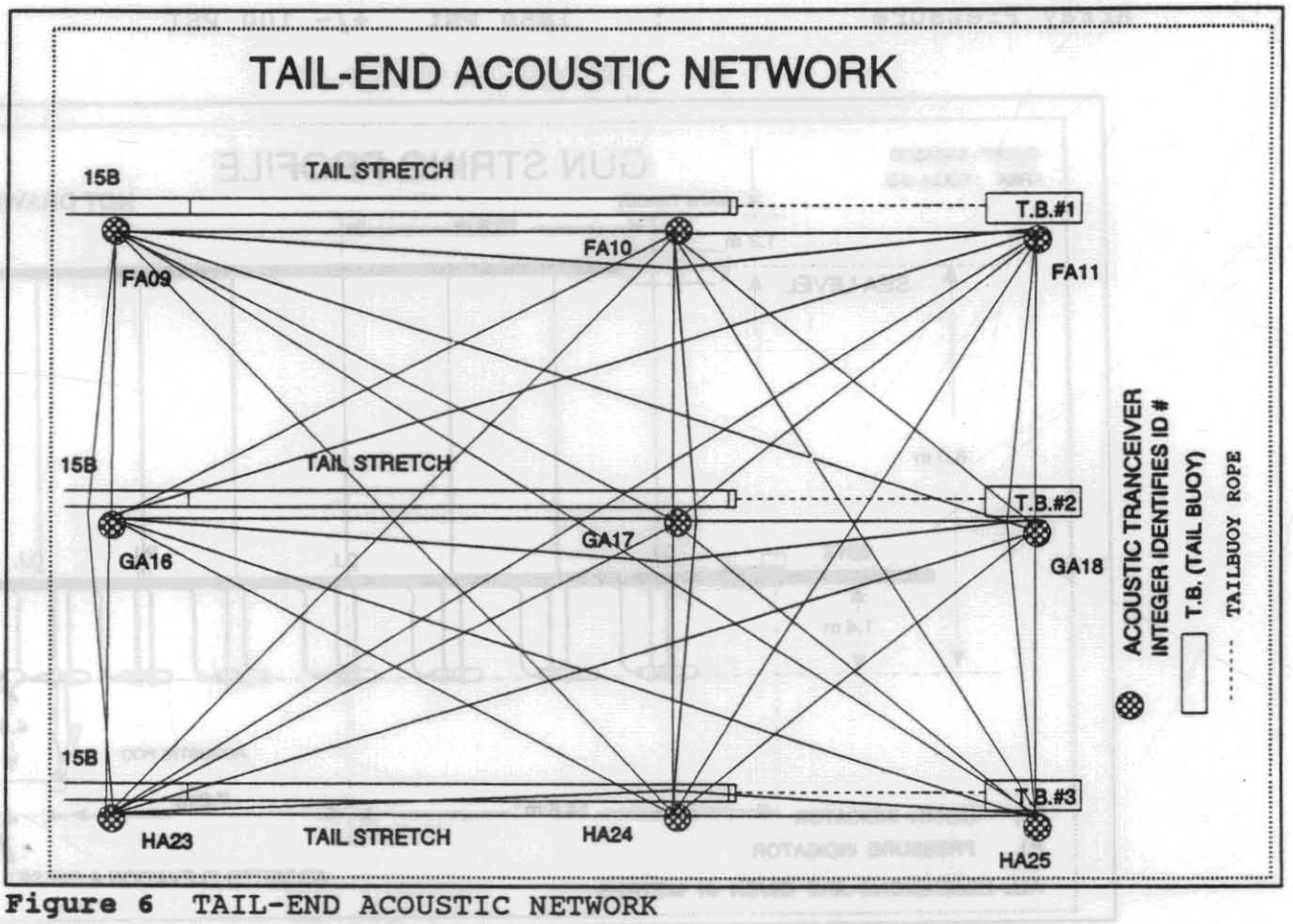


Figure 6 TAIL-END ACOUSTIC NETWORK

OFFSETS REFERENCED FROM SOURCE ARRAY CENTRE & VESSEL CENTRE LINE

4.4.4 MARS NETWORK		FORE + (m) AFT - (m)	STBD + (m) PORT - (m)	ELEV + (m) DEPTH -(m)
STBD PULLERVANE	:			+ 1.3
Gun String 3	:	10.8 m	25 m	+ 1.3
Gun String 6	:	10.8 m	- 25 m	+ 1.3
PORT PULLERVANE	:			+ 1.3

5 cm

SECTION 5 ENERGY SOURCE

Configuration	:	Dual Source
Type	:	Litton Low Pressure
No. of Guns	:	14
No. of Guns / Sub Array	:	6 X (3 strings)
Array Volume	:	2700 cu.in. +/- 15%
Array Length / Width	:	18 metres / 20 metres
Array Pressure	:	1850 PSI +/- 100 PSI

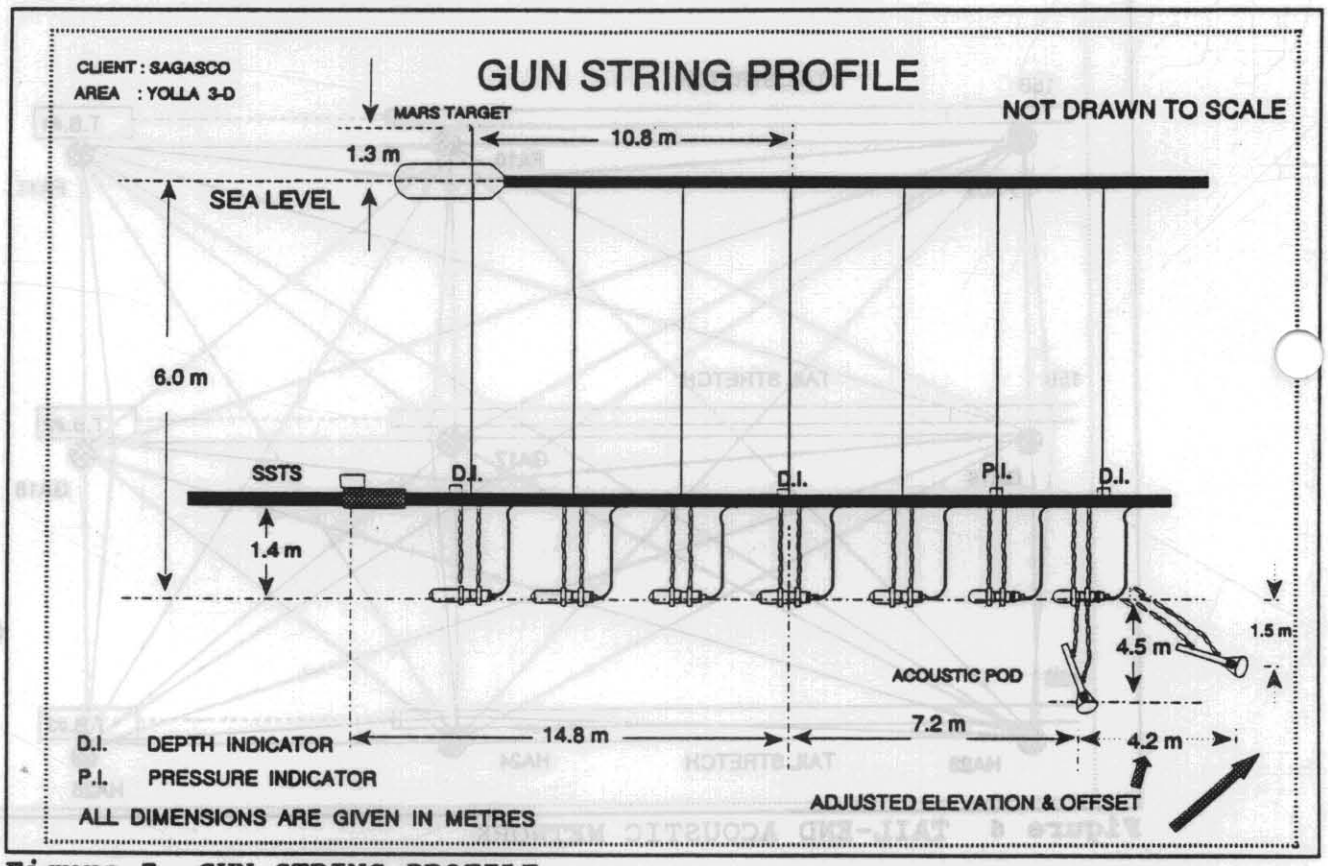


Figure 7 GUN STRING PROFILE

Operating Depth	:	6.0m +/- 1.5m
Sub Array Separation	:	10.0 metres
Array Separation	:	50.0 metres
shotpoint Interval	:	25.0 metres/shot
Nominal Fold	:	30

5 cm

5.1 ENERGY SOURCE ELEMENT DESCRIPTION

Number = Gun number
Volume = Gun volume
X = In-line distance from centre of source (m). (+) = Fore, (-) = Aft
Y = Cross-line distance from centre of source (m). (+) = STBD, (-) = POR
Z = Vertical distance from sea level (m). (+) = Above, (-) = Belo

NUMBER	X	Y	Z	VOLUME	SOURCE No.
9	10.8	10.0	-6.0	465	1
10	6.4	10.0	-6.0	280	1
11	3.1	10.0	-6.0	200	1
12	0.0	10.0	-6.0	150	1
13	-2.9	10.0	-6.0	115	1
14	-5.2	10.0	-6.0	80	1
15	-7.2	10.0	-6.0	60	1
17	10.8	0.0	-6.0	465	1
18	6.4	0.0	-6.0	280	1
19	3.1	0.0	-6.0	200	1
20	0.0	0.0	-6.0	150	1
21	-2.9	0.0	-6.0	115	1
22	-5.2	0.0	-6.0	80	1
23	-7.2	0.0	-6.0	60	1
25	10.8	-10.0	-6.0	465	1
26	6.4	-10.0	-6.0	280	1
27	3.1	-10.0	-6.0	200	1
28	0.0	-10.0	-6.0	150	1
29	-2.9	-10.0	-6.0	115	1
30	-5.2	-10.0	-6.0	80	1
31	-7.2	-10.0	-6.0	60	1
33	10.8	10.0	-6.0	465	2
34	6.4	10.0	-6.0	280	2
35	3.1	10.0	-6.0	200	2
36	0.0	10.0	-6.0	150	2
37	-2.9	10.0	-6.0	115	2
38	-5.2	10.0	-6.0	80	2
39	-7.2	10.0	-6.0	60	2
41	10.8	0.0	-6.0	465	2
42	6.4	0.0	-6.0	280	2
43	3.1	0.0	-6.0	200	2
44	0.0	0.0	-6.0	150	2
45	-2.9	0.0	-6.0	115	2
46	-5.2	0.0	-6.0	80	2
47	-7.2	0.0	-6.0	60	2
49	10.8	-10.0	-6.0	465	2
50	6.4	-10.0	-6.0	280	2
51	3.1	-10.0	-6.0	200	2
52	0.0	-10.0	-6.0	150	2
53	-2.9	-10.0	-6.0	115	2
54	-5.2	-10.0	-6.0	80	2
55	-7.2	-10.0	-6.0	60	2

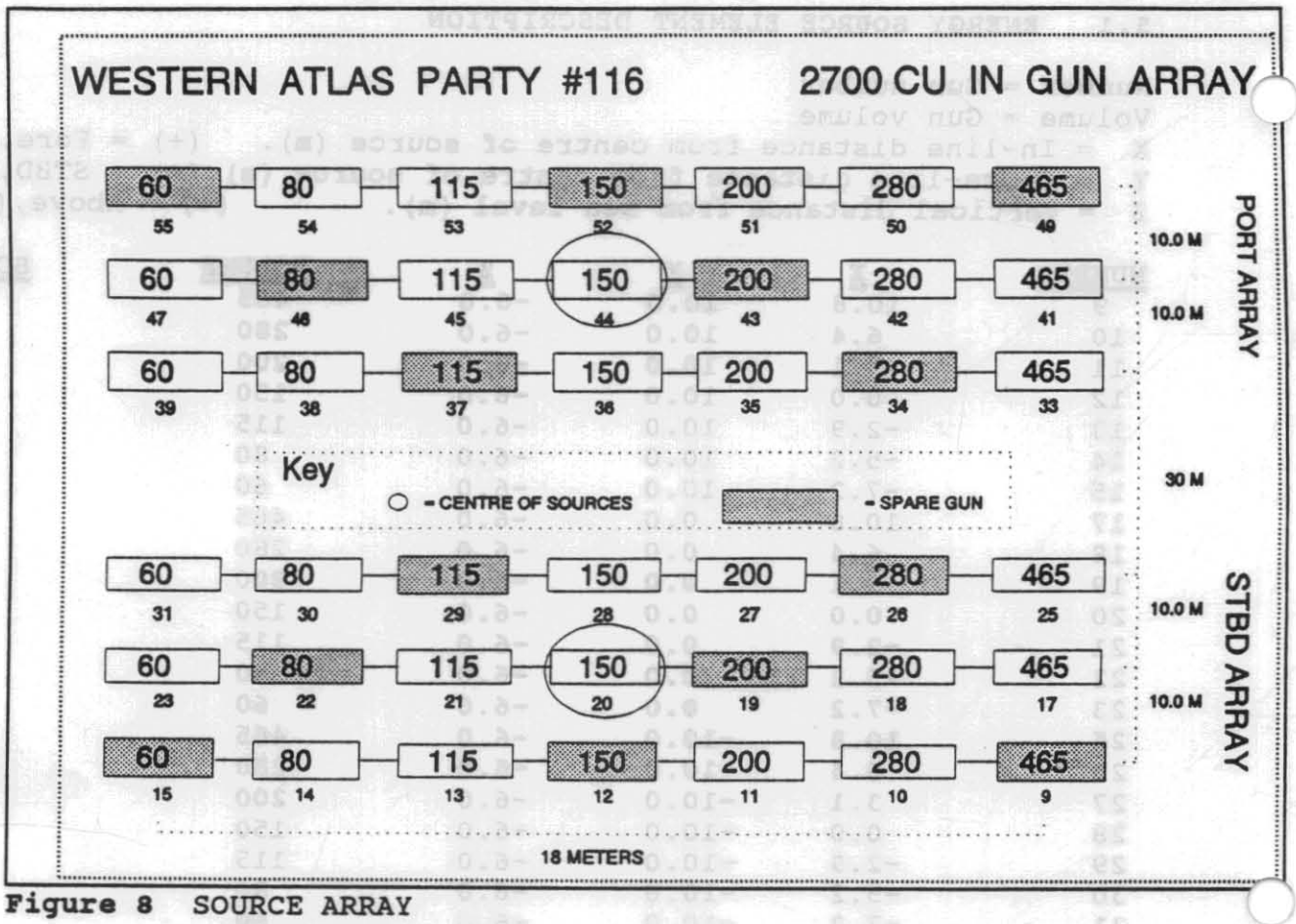
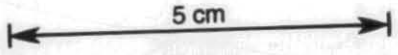


Figure 8 SOURCE ARRAY



SECTION 6 STREAMER CABLE PARAMETERS

Type	:	WG-24
Digital	:	yes
Series	:	2
Cable Length	:	3 x 3000 metres
Cable depth	:	10.0 metres +/- 1.5m .
No. Groups	:	240
Group Interval	:	12.5 metres
Group Length	:	15.5 metres
Group (Array) Type	:	Tapered array, centre weighted, 21% overlap on adjacent groups
Hydrophone Type	:	LRS
Hydrophone Model	:	WM-018
Hydrophone Sensitivity	:	49.45 volt/bar
No. Hydrophones/Array Grp.	:	16
No. Compass/Depth Controllers	:	3 x 11
Type of Compass/Depth Cntrl	:	DigiCOURSE 5011/03
No. Depth Indicators	:	3 x 30
DI's At Head of Groups	:	1,9,17,25,33,41,49,57,65,73,81,89,97 105,113,121,129,137,145,153,161,169 177,185,193,201,209,217,225,233,241 249,257,265,273,281,289,297,305,313 321,329,337,345,353,361,369,377,385 393,401,409,417,425,433,441,449,457 465,473,481,489,497,505,513,521,529 537,545,553,561,569,577,585,593,601 609,617,625,633,641,649,657,665,673 681,689,697,705,713.
Compass/Bird Locations	:	Head Stretch Sections-Cables 1,2 & 3 Cable Head Sections-Cables 1,2 & 3 Tail Stretch Sections-Cables 1,2 & 3 Centre of Groups: 14 22,46,78,110,142,174,206,230,254,262 288,318,350,382,414,446,470,494,502, 26,558,592,622,654,686,710.

Acoustic Unit Locations : Cable Head Sections-Cables 1,2 & 3 Centre of Group 6,118,126,238,246,358,366,478,486,[illegible] 606,718. Tail Stretch Sections-Cable 1,2 & 3.

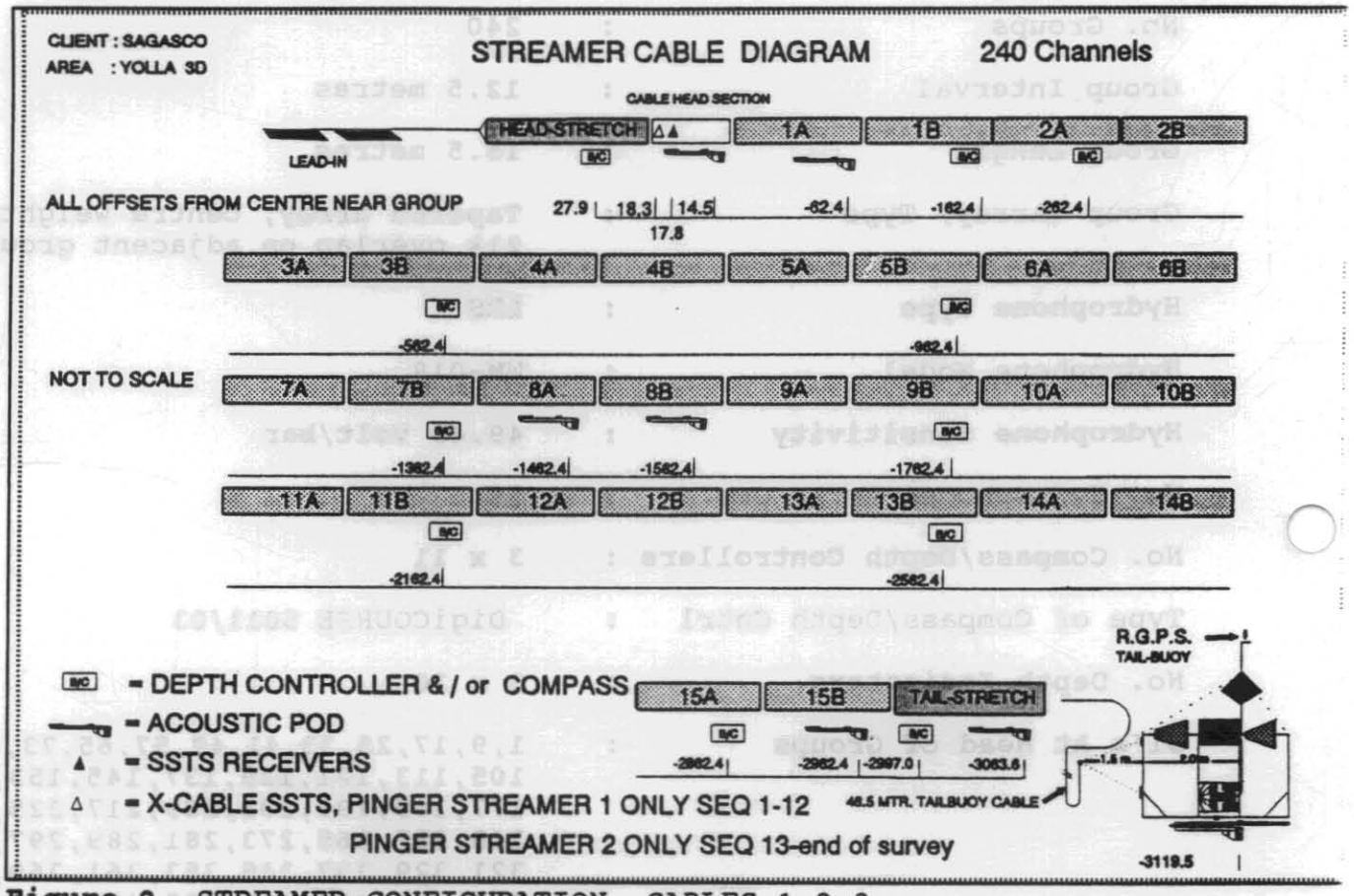


Figure 9 STREAMER CONFIGURATION, CABLES 1,2,3

5 cm

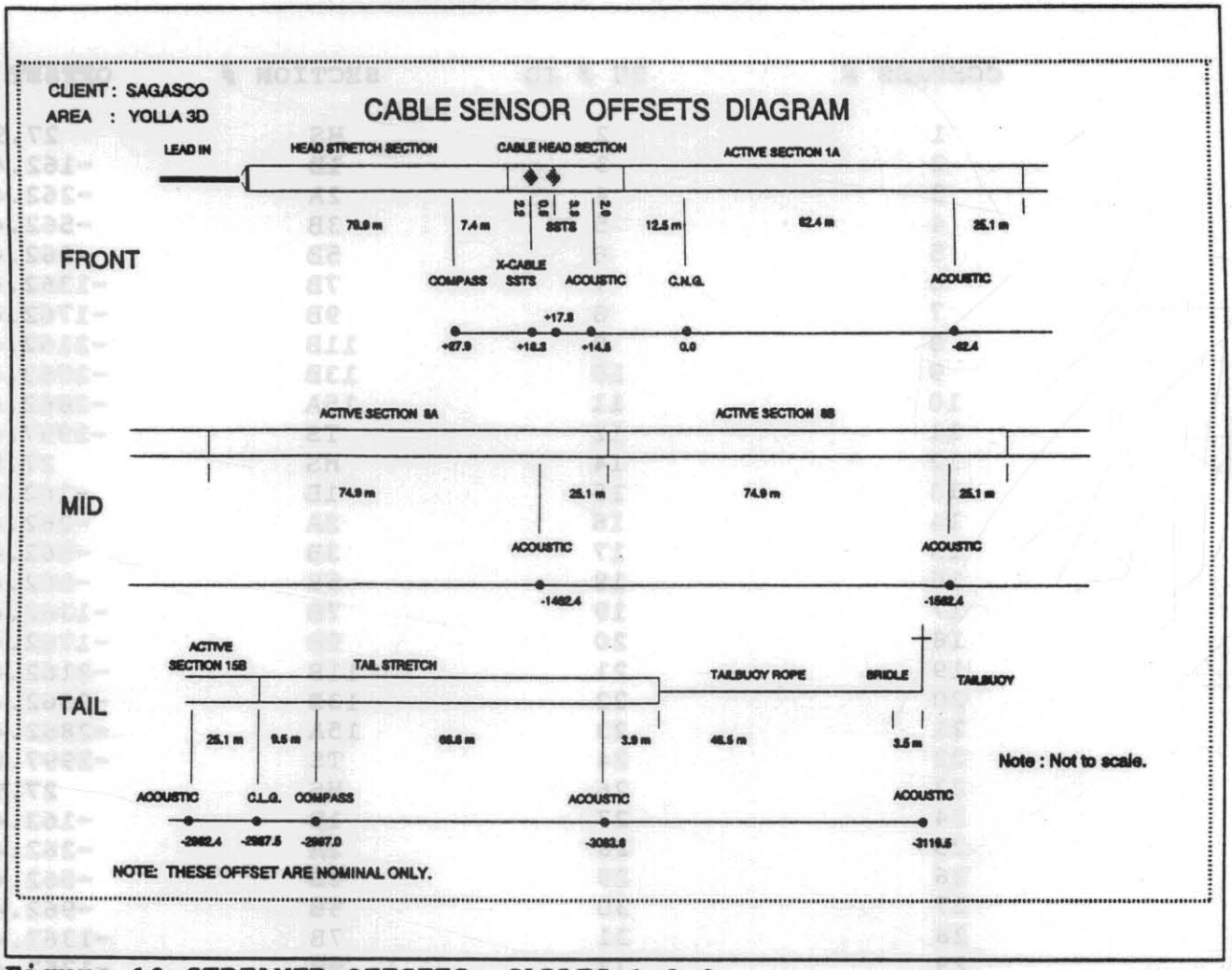


Figure 10 STREAMER OFFSETS, CABLES 1,2,3

6.1 COMPASS OFFSETS & MAGNETIC DECLINATION

Configuration for Three Cable / Dual Source .

All offsets are referenced to the first active near group . The firs active near group (12.5m group separation) is located 12.5 metres AFT o the head of section 1A (first active section) .

COMPASS #	RU # ID	SECTION #	OFFSET (m)
1	2	HS	27.9
2	3	1B	-162.4
3	4	2A	-262.4
4	5	3B	-562.4
5	6	5B	-962.4
6	7	7B	-1362.4
7	8	9B	-1762.4
8	9	11B	-2162.4
9	10	13B	-2562.4
10	11	15A	-2862.4
11	12	TS	-2997.0
12	14	HS	27.9
13	15	1B	-162.4
14	16	2A	-262.4
15	17	3B	-562.4
16	18	5B	-962.4
17	19	7B	-1362.4
18	20	9B	-1762.4
19	21	11B	-2162.4
20	22	13B	-2562.4
21	23	15A	-2862.4
22	24	TS	-2997.0
23	26	HS	27.9
24	27	1B	-162.4
25	28	2A	-262.4
26	29	3B	-562.4
27	30	5B	-962.4
28	31	7B	-1362.4
29	32	9B	-1762.4
30	33	11B	-2162.4
31	34	13B	-2562.4
32	35	15A	-2862.4
33	36	TS	-2997.0

MAGNETIC DECLINATION used for the prospect area was 12.67° East . Th source of information was derived onboard from the WORLD MAGNETIC MODE 1990, using 30th January 1994 for computations.

8. STATISTICAL SUMMARY AND SEISMIC TAPE SHIPPING LIST

Primary Line Summary Report
P116 M.V. WESTERN ATLAS
SAGASCO RESOURCES LTD - Contract No: WPT9310129-SGR

Line No	Cmp Lines	Dir	Fsp	Lsp	Sps	Ncsp	Sail_Kms	Cmp_Kms	Sq_Kms
February 05, 94									
YOL00013	13 - 18	214	307	32	276	0	6.900	41.400	1.03500
YOL00205	205 - 210	34	110	621	512	0	12.800	76.800	1.92000
Day Total					788	0	19.700	118.200	2.95500
February 06, 94									
YOL00055	55 - 60	214	358	32	327	0	8.175	49.050	1.22625
YOL00247	247 - 252	34	113	672	560	0	14.000	84.000	2.10000
YOL00019	19 - 24	214	314	32	283	0	7.075	42.450	1.06125
YOL00211	211 - 216	34	110	628	519	0	12.975	77.850	1.94625
YOL00061	61 - 66	214	366	32	335	0	8.375	50.250	1.25625
YOL00253	253 - 258	34	110	675	566	0	14.150	84.900	2.12250
YOL00025	25 - 30	214	321	32	290	0	7.250	43.500	1.08750
Day Total					2,880	0	72.000	432.000	10.80000
February 07, 94									
YOL00199	199 - 204	34	110	613	504	0	12.600	75.600	1.89000
YOL00067	67 - 72	214	373	32	342	0	8.550	51.300	1.28250
YOL00259	259 - 264	34	116	687	572	0	14.300	85.800	2.14500
Day Total					1,418	0	35.450	212.700	5.31750
February 11, 94									
YOL00049	49 - 54	214	351	32	320	0	8.000	48.000	1.20000
YOL00217	217 - 222	34	110	635	526	0	13.150	78.900	1.97250
YOL00031	31 - 36	214	329	32	298	0	7.450	44.700	1.11750
YOL00265	265 - 270	34	117	694	578	0	14.450	86.700	2.16750
YOL00073	73 - 78	214	380	32	349	0	8.725	52.350	1.30875
Day Total					2,071	0	51.775	310.650	7.76625
February 12, 94									
YOL00193	193 - 198	34	110	606	497	0	12.425	74.550	1.86375
YOL00037	37 - 42	214	336	32	305	0	7.625	45.750	1.14375
YOL00271	271 - 276	34	119	702	584	0	14.600	87.600	2.19000
YOL00079	79 - 84	214	388	32	357	0	8.925	53.550	1.33875
YOL00223	223 - 228	34	110	643	534	0	13.350	80.100	2.00250
YOL00007	7 - 12	214	299	32	268	0	6.700	40.200	1.00500
YOL00229	229 - 234	34	110	650	541	0	13.525	81.150	2.02875
YOL00001	1 - 6	214	292	32	261	0	6.525	39.150	0.97875
Day Total					3,347	0	83.675	502.050	12.55125
February 13, 94									
YOL00277	277 - 282	34	140	709	570	0	14.250	85.500	2.13750
Day Total					570	0	14.250	85.500	2.13750

Primary Line Summary Report
P116 M.V. WESTERN ATLAS
SAGASCO RESOURCES LTD - Contract No: WPT9310129-SGR

Line No	Cmp Lines	Dir	Fsp	Lsp	Sps	Ncsp	Sail_Kms	Cmp_Kms	Sq_Kms
February 14, 94									
YOL00241	241 - 246	34	129	665	537	20	12.925	77.550	1.93875
YOL00085	85 - 90	214	395	32	364	0	9.100	54.600	1.36500
YOL00313	313 - 318	34	128	753	626	0	15.650	93.900	2.34750
YOL00043	43 - 48	214	344	32	313	0	7.825	46.950	1.17375
YOL00235	235 - 240	34	110	657	548	0	13.700	82.200	2.05500
YOL00121	121 - 126	214	439	88	352	0	8.800	52.800	1.32000
Day Total					2,740	20	68.000	408.000	10.20000
February 15, 94									
YOL00121	121 - 126	214	87	32	56	0	1.400	8.400	0.21000
YOL00307	307 - 312	34	127	485	359	0	8.975	53.850	1.34625
YOL10307	307 - 312	34	486	745	260	0	6.500	39.000	0.97500
YOL00127	127 - 132	214	447	32	416	0	10.400	62.400	1.56000
YOL00301	301 - 306	34	126	739	614	0	15.350	92.100	2.30250
YOL00283	283 - 288	34	122	717	596	0	14.900	89.400	2.23500
YOL00187	187 - 192	214	520	32	489	0	12.225	73.350	1.83375
YOL00289	289 - 294	34	123	224	102	0	2.550	15.300	0.38250
Day Total					2,892	0	72.300	433.800	10.84500
February 16, 94									
YOL00289	289 - 294	34	225	724	500	0	12.500	75.000	1.87500
YOL00115	115 - 120	214	432	32	401	0	10.025	60.150	1.50375
YOL00295	295 - 300	34	124	731	608	0	15.200	91.200	2.28000
YOL00091	91 - 96	214	403	185	219	0	5.475	32.850	0.82125
Day Total					1,728	0	43.200	259.200	6.48000
February 17, 94									
YOL00181	181 - 186	214	513	32	482	0	12.050	72.300	1.80750
Day Total					482	0	12.050	72.300	1.80750
February 18, 94									
YOL00337	337 - 342	34	134	783	650	0	16.250	97.500	2.43750
YOL00109	109 - 114	214	425	407	19	0	0.475	2.850	0.07125
YOL00109	109 -	214	406	374	33	0	0.825	2.475	0.06188
YOL00109	109 - 114	214	373	32	342	0	8.550	51.300	1.28250
YOL00319	319 - 324	34	130	299	170	0	4.250	25.500	0.63750
YOL00319	319 - 322	34	300	380	81	0	2.025	8.100	0.20250
YOL00319	319 - 324	34	381	761	381	0	9.525	57.150	1.42875
YOL00157	157 - 162	214	484	32	453	0	11.325	67.950	1.69875
YOL00331	331 - 334	34	133	210	78	0	1.950	7.800	0.19500
YOL00331	331 - 336	34	211	499	289	0	7.225	43.350	1.08375
YOL00325	325 - 330	34	131	768	638	0	15.950	95.700	2.39250
Day Total					3,134	0	78.350	459.675	11.49188

Primary Line Summary Report
P116 M.V. WESTERN ATLAS
SAGASCO RESOURCES LTD - Contract No: WPT9310129-SGR

Line No	Cmp Lines	Dir	Fsp	Lsp	Sps	Ncsp	Sail_Kms	Cmp_Kms	Sq_Kms
February 19, 94									
YOL00097	97 - 102	214	410	32	379	0	9.475	56.850	1.42125
YOL00343	343 - 348	34	135	593	459	0	11.475	68.850	1.72125
YOL00151	151 - 156	214	476	32	445	0	11.125	66.750	1.66875
YOL00349	349 - 354	34	137	798	662	0	16.550	99.300	2.48250
YOL00103	103 - 108	214	417	32	386	0	9.650	57.900	1.44750
YOL00379	379 - 384	34	144	829	686	0	17.150	102.900	2.57250
YOL00163	163 - 168	214	491	270	222	0	5.550	33.300	0.83250
Day Total					3,239	0	80.975	485.850	12.14625
February 20, 94									
YOL00163	163 - 168	214	269	32	238	0	5.950	35.700	0.89250
YOL00355	355 - 360	34	138	805	668	0	16.700	100.200	2.50500
YOL00373	373 - 378	34	142	827	686	0	17.150	102.900	2.57250
YOL00133	133 - 138	214	454	32	423	0	10.575	63.450	1.58625
YOL00367	367 - 372	34	141	820	680	0	17.000	102.000	2.55000
Day Total					2,695	0	67.375	404.250	10.10625
February 21, 94									
YOL00139	139 - 144	214	461	32	430	0	10.750	64.500	1.61250
YOL00361	361 - 366	34	140	813	674	0	16.850	101.100	2.52750
YOL00145	145 - 150	214	469	32	438	0	10.950	65.700	1.64250
YOL00385	385 - 390	34	145	829	685	0	17.125	102.750	2.56875
YOL00169	169 - 174	214	498	32	467	0	11.675	70.050	1.75125
YOL10331	331 - 336	34	500	776	277	0	6.925	41.550	1.03875
YOL00175	175 - 180	214	506	32	475	0	11.875	71.250	1.78125
YOL00415	415 - 420	34	152	426	275	0	6.875	41.250	1.03125
Day Total					3,721	0	93.025	558.150	13.95375
February 22, 94									
YOL00415	415 - 420	34	427	829	403	0	10.075	60.450	1.51125
YOL00727	727 - 732	214	689	149	541	0	13.525	81.150	2.02875
YOL00475	475 - 480	34	167	829	663	0	16.575	99.450	2.48625
YOL00667	667 - 672	214	728	135	594	0	14.850	89.100	2.22750
YOL00391	391 - 396	34	147	829	683	0	17.075	102.450	2.56125
YOL00721	721 - 726	214	693	148	546	0	13.650	81.900	2.04750
YOL00421	421 - 426	34	154	829	676	0	16.900	101.400	2.53500
Day Total					4,106	0	102.650	615.900	15.39750

Primary Line Summary Report
P116 M.V. WESTERN ATLAS
SAGASCO RESOURCES LTD - Contract No: WPT9310129-SGR

Line No	Cmp Lines	Dir	Fsp	Lsp	Sps	Ncsp	Sail_Kms	Cmp_Kms	Sq_Kms
February 23, 94									
YOL00673	673 - 678	214	724	136	589	0	14.725	88.350	2.20875
YOL00481	481 - 486	34	168	829	662	0	16.550	99.300	2.48250
YOL00715	715 - 720	214	697	146	552	0	13.800	82.800	2.07000
YOL00427	427 - 432	34	155	829	675	0	16.875	101.250	2.53125
YOL00679	679 - 684	214	720	487	234	234	0.000	0.000	0.00000
YOL00487	487 - 492	34	170	829	660	0	16.500	99.000	2.47500
YOL00679	679 - 684	214	720	138	583	0	14.575	87.450	2.18625
Day Total					3,955	234	93.025	558.150	13.95375
February 24, 94									
YOL00433	433 - 438	34	157	829	673	0	16.825	100.950	2.52375
YOL00733	733 - 738	214	685	150	536	0	13.400	80.400	2.01000
YOL00493	493 - 498	34	171	829	659	0	16.475	98.850	2.47125
YOL00685	685 - 690	214	716	139	578	0	14.450	86.700	2.16750
YOL00397	397 - 402	34	148	829	682	0	17.050	102.300	2.55750
YOL00709	709 - 714	214	701	145	557	0	13.925	83.550	2.08875
YOL00409	409 - 414	34	151	533	383	0	9.575	57.450	1.43625
Day Total					4,068	0	101.700	610.200	15.25500
February 25, 94									
YOL00409	409 - 414	34	534	829	296	0	7.400	44.400	1.11000
YOL00691	691 - 696	214	712	141	572	0	14.300	85.800	2.14500
YOL00499	499 - 504	34	173	829	657	0	16.425	98.550	2.46375
YOL00751	751 - 756	214	673	155	519	0	12.975	77.850	1.94625
YOL00451	451 - 456	34	161	829	669	0	16.725	100.350	2.50875
YOL00697	697 - 702	214	709	150	560	0	14.000	84.000	2.10000
YOL00469	469 - 474	34	165	829	665	0	16.625	99.750	2.49375
YOL00661	661 - 666	214	732	512	221	0	5.525	33.150	0.82875
Day Total					4,159	0	103.975	623.850	15.59625
February 26, 94									
YOL00661	661 - 666	214	511	133	379	0	9.475	56.850	1.42125
YOL00403	403 - 408	34	149	829	681	0	17.025	102.150	2.55375
YOL00703	703 - 708	214	705	143	563	0	14.075	84.450	2.11125
Day Total					1,623	0	40.575	243.450	6.08625
February 27, 94									
YOL00775	775 - 780	214	657	160	498	0	12.450	74.700	1.86750
YOL00445	445 - 450	34	160	829	670	0	16.750	100.500	2.51250
YOL00739	739 - 744	214	681	152	530	0	13.250	79.500	1.98750
YOL00463	463 - 468	34	164	829	666	0	16.650	99.900	2.49750
YOL00769	769 - 774	214	661	159	503	503	0.000	0.000	0.00000
Day Total					2,867	503	59.100	354.600	8.86500
*** Total ***					52,483	757	1,293.150	7,748.475	193.71188

Line No	Cmp Lines	Dir	Fsp	Lsp	Sps	Ncsp	Sail_Kms	Cmp_Kms	Sq_Kms
March 02, 94									
YOL00535	535 - 540	34	181	829	649	0	16.225	97.350	2.43375
YOL00781	781 - 786	214	653	162	492	0	12.300	73.800	1.84500
YOL00505	505 - 510	34	174	829	656	0	16.400	98.400	2.46000
Day Total					1,797	0	44.925	269.550	6.73875
March 03, 94									
YOL00847	847 - 852	214	609	178	432	0	10.800	64.800	1.62000
YOL00511	511 - 516	34	175	829	655	0	16.375	98.250	2.45625
YOL00745	745 - 750	214	677	153	525	0	13.125	78.750	1.96875
YOL00457	457 - 462	34	162	829	668	0	16.700	100.200	2.50500
YOL00769	769 - 774	214	661	159	503	0	12.575	75.450	1.88625
Day Total					2,783	0	69.575	417.450	10.43625
March 04, 94									
YOL00565	565 - 570	34	188	829	642	0	16.050	96.300	2.40750
YOL00655	655 - 660	214	735	132	604	0	15.100	90.600	2.26500
YOL00529	529 - 534	34	180	829	650	0	16.250	97.500	2.43750
YOL00763	763 - 768	214	665	158	508	0	12.700	76.200	1.90500
YOL00439	439 - 444	34	158	829	672	0	16.800	100.800	2.52000
YOL00757	757 - 762	214	669	156	514	0	12.850	77.100	1.92750
YOL00541	541 - 546	34	183	829	647	0	16.175	97.050	2.42625
Day Total					4,237	0	105.925	635.550	15.88875
March 05, 94									
YOL00805	805 - 810	214	637	168	470	0	11.750	70.500	1.76250
YOL00571	571 - 576	34	190	829	640	0	16.000	96.000	2.40000
YOL00787	787 - 792	214	649	163	487	0	12.175	73.050	1.82625
YOL00523	523 - 528	34	178	829	652	0	16.300	97.800	2.44500
Day Total					2,249	0	56.225	337.350	8.43375
March 06, 94									
YOL00517	517 - 522	34	177	829	653	0	16.325	97.950	2.44875
YOL00799	799 - 804	214	641	166	476	0	11.900	71.400	1.78500
YOL00559	559 - 564	34	187	829	643	0	16.075	96.450	2.41125
YOL00793	793 - 798	214	645	165	481	0	12.025	72.150	1.80375
Day Total					2,253	0	56.325	337.950	8.44875

Line No	Cmp Lines	Dir	Fsp	Lsp	Sps	Ncsp	Sail_Kms	Cmp_Kms	Sq_Kms
March 07, 94									
YOL00547	547 - 552	34	184	829	646	0	16.150	96.900	2.42250
YOL00811	811 - 816	214	614	169	446	0	11.150	66.900	1.67250
YOL00595	595 - 600	34	196	829	634	0	15.850	95.100	2.37750
YOL00853	853 - 858	214	605	179	427	0	10.675	64.050	1.60125
YOL00589	589 - 594	34	194	829	636	0	15.900	95.400	2.38500
YOL00817	817 - 822	214	629	170	460	0	11.500	69.000	1.72500
YOL00601	601 - 606	34	197	829	633	0	15.825	94.950	2.37375
YOL00841	841 - 846	214	613	172	442	0	11.050	66.300	1.65750
Day Total					4,324	0	108.100	648.600	16.21500
March 08, 94									
YOL00553	553 - 558	34	186	829	644	0	16.100	96.600	2.41500
YOL00649	649 - 654	214	740	131	610	0	15.250	91.500	2.28750
YOL00607	607 - 612	34	198	829	632	0	15.800	94.800	2.37000
YOL00859	859 - 864	214	601	188	414	0	10.350	62.100	1.55250
YOL00583	583 - 588	34	193	829	637	0	15.925	95.550	2.38875
YOL00643	643 - 648	214	744	129	616	0	15.400	92.400	2.31000
YOL00613	613 - 618	34	200	829	630	0	15.750	94.500	2.36250
Day Total					4,183	0	104.575	627.450	15.68625
March 09, 94									
YOL00823	823 - 828	214	625	172	454	0	11.350	68.100	1.70250
YOL00577	577 - 582	34	191	829	639	0	15.975	95.850	2.39625
YOL00835	835 - 840	214	617	175	443	0	11.075	66.450	1.66125
YOL00619	619 - 624	34	201	829	629	0	15.725	94.350	2.35875
YOL00829	829 - 834	214	621	173	449	0	11.225	67.350	1.68375
YOL00631	631 - 636	34	233	829	597	0	14.925	89.550	2.23875
YOL00637	637 - 642	214	748	128	621	0	15.525	93.150	2.32875
Day Total					3,832	0	95.800	574.800	14.37000
March 10, 94									
YOL00625	625 - 630	34	203	829	627	0	15.675	94.050	2.35125
YOL10343	343 - 348	34	594	790	197	0	4.925	29.550	0.73875
Day Total					824	0	20.600	123.600	3.09000
March 12, 94									
YOL10319	0 -	34	301	380	80	0	2.000	4.000	0.10000
YOL10091	91 - 96	214	184	32	153	0	3.825	22.950	0.57375
Day Total					233	0	5.825	26.950	0.67375
March 13, 94									
YOL10109	0 -	214	406	374	33	0	0.825	2.475	0.06188
Day Total					33	0	0.825	2.475	0.06188
*** Total ***					26,748	0	668.700	4,001.725	100.04313

501425

Infill Line Summary Report — Page No: 1
P116 M.V. WESTERN ATLAS — March 26, 94
SAGASCO RESOURCES LTD - Contract No: WPT9310129-SGR

Line No	Cmp Lines	Dir	Fsp	Lsp	Sps	Ncsp	Sail_Kms	Inf_Kms	Inf SqKms
March 10, 94									
YOL01187	1187 - 1192	214	510	40	471	0	11.775	70.650	1.76625
YOL01367	1367 - 1372	34	150	810	661	0	16.525	99.150	2.47875
YOL01133	1133 - 1138	214	410	40	371	0	9.275	55.650	1.39125
YOL01145	1145 - 1150	214	400	38	363	0	9.075	54.450	1.36125
YOL01349	1349 - 1354	34	140	370	231	0	5.775	34.650	0.86625
YOL01067	1067 - 1072	214	340	230	111	0	2.775	16.650	0.41625
Day Total					2,208	0	55.200	331.200	8.28000
March 11, 94									
YOL01067	1067 - 1072	214	229	40	190	0	4.750	28.500	0.71250
YOL01343	1343 - 1348	34	140	780	641	0	16.025	96.150	2.40375
Day Total					831	0	20.775	124.650	3.11625
March 12, 94									
YOL01469	1469 - 1474	34	175	820	646	0	16.150	96.900	2.42250
YOL01115	1115 - 1120	214	420	80	341	0	8.525	51.150	1.27875
YOL01421	1421 - 1426	34	300	825	526	0	13.150	78.900	1.97250
Day Total					1,513	0	37.825	226.950	5.67375
March 13, 94									
YOL01055	1055 - 1060	214	358	40	319	0	7.975	47.850	1.19625
YOL01451	1451 - 1456	34	170	820	651	0	16.275	97.650	2.44125
YOL01085	1085 - 1090	214	184	40	145	0	3.625	21.750	0.54375
YOL01439	1439 - 1444	34	170	545	376	0	9.400	56.400	1.41000
YOL01679	1679 - 1684	214	450	140	311	0	7.775	46.650	1.16625
YOL01487	1487 - 1492	34	170	820	651	0	16.275	97.650	2.44125
Day Total					2,453	0	61.325	367.950	9.19875
March 14, 94									
YOL01517	1517 - 1522	34	177	820	644	0	16.100	96.600	2.41500
YOL01739	1739 - 1744	214	681	160	522	0	13.050	78.300	1.95750
YOL01637	1637 - 1642	34	206	820	615	0	15.375	92.250	2.30625
YOL01709	1709 - 1714	214	701	155	547	0	13.675	82.050	2.05125
Day Total					2,328	0	58.200	349.200	8.73000

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Infill Line Summary Report
P116 M.V. WESTERN ATLAS
SAGASCO RESOURCES LTD - Contract No: WPT9310129-SGR

Line No	Cmp Lines	Dir	Fsp	Lsp	Sps	Ncsp	Sail_Kms	Inf_Kms	Inf SqKms
March 15, 94									
YOL01499	1499 - 1504	34	173	820	648	0	16.200	97.200	2.43000
YOL01667	1667 - 1672	214	720	175	546	0	13.650	81.900	2.04750
YOL01835	1835 - 1840	34	260	620	361	0	9.025	54.150	1.35375
YOL01751	1751 - 1756	214	556	160	397	0	9.925	59.550	1.48875
YOL01595	1595 - 1600	34	335	820	486	0	12.150	72.900	1.82250
YOL01685	1685 - 1690	214	680	145	536	0	13.400	80.400	2.01000
YOL01817	1817 - 1822	34	385	695	311	0	7.775	46.650	1.16625
YOL01649	1649 - 1654	214	735	683	53	0	1.325	7.950	0.19875
Day Total					3,338	0	83.450	500.700	12.51750
March 16, 94									
YOL01649	1649 - 1654	214	682	365	318	0	7.950	47.700	1.19250
JL01661	1661 - 1666	214	605	140	466	0	11.650	69.900	1.74750
Day Total					784	0	19.600	117.600	2.94000
*** Total ***					13,455	0	336.375	2,018.250	50.45625

501427

Western Atlas International
A Litton/Dresser Company

WESTERN GEOPHYSICAL

DATA REEL SHIPPING LIST

SAGASCO

YOLLA 3D, BASS BASIN

SHIPMENT #: P-116-1-94

DESCRIPTION OF TAPES:

Descrip.	Value	Comment
Type	ROYAL GUARD	
Density	38KBPI	
Brand	3M	
Year of manufacture		

DESCRIPTION OF DATA:

Descrip.	Value	Comment
Survey	YOLLA 3D	
Year	1994	
Type	3D	
Format	SEG-D 8048	
Category		
Data Type		

Data Produced By	Western Geophysical Company
Acquisition Crew	Party 116, WESTERN ATLAS

Comment:

Prepared By: M.D. Whittle Date: 8th FEBRUARY 1994

Received By: _____ Date: _____

501428

SEQ	LINE	SP - SP	TAPE - TAPE	BOX	DATE	COMMENTS
1	YOL00013	307- 32	1- 15	1	05/02/94	SOL -EOL
2	YOL00205	110- 204	16- 20	1	05/02/94	SOL -CONT
"	"	205- 596	21- 40	2	"	CONT-CONT
"	"	597- 621	41- 42	3	"	CONT-EOL
3	YOL00055	358- 32	43- 59	3	06/02/94	SOL -EOL
4	YOL00247	0- 0	60- 60	3	06/02/94	SOL -CONT
"	"	116- 519	61- 80	4	"	CONT-CONT
"	"	520- 672	81- 89	5	"	CONT-EOL
5	YOL00019	314- 101	90- 100	5	06/02/94	SOL -CONT
"	"	100- 32	101- 104	6	"	CONT-EOL
6	YOL00211	0- 338	105- 120	6	06/02/94	SOL -CONT
"	"	339- 628	121- 135	7	"	CONT-EOL
7	YOL00061	0- 332	136- 140	7	06/02/94	SOL -CONT
"	"	331- 32	141- 155	8	"	CONT-EOL
8	YOL00253	0- 184	156- 160	8	06/02/94	SOL -CONT
"	"	185- 584	161- 180	9	"	CONT-CONT
"	"	585- 675	181- 185	10	"	CONT-EOL
9	YOL00025	321- 32	186- 200	10	"	SOL -EOL
10	YOL00199	110- 504	201- 220	11	07/02/94	SOL -CONT
"	"	505- 613	221- 226	12	"	CONT-EOL
11	YOL00067	373- 99	227- 240	12	07/02/94	SOL -CONT
"	"	98- 32	241- 244	13	"	CONT-EOL
12	YOL00259	116- 431	245- 260	13	07/02/94	SOL -CONT
"	"	432- 687	261- 273	14	07/02/94	CONT-EOL

Western Atlas International
A Litton/Bracker Company

WESTERN GEOPHYSICAL

DATA REEL SHIPPING LIST

SAGASCO

YOLLA 3D, BASS BASIN, TASMANIA

SHIPMENT #: P-116-OBS-SHIP03-94

DESCRIPTION OF TAPES:

Descrip.	Value	Comment
Type	CARTRIDGE	3480 COMPATIABLE
Density	38,000 BPI	1/2", 656' LENGTH
Brand	ROYAL GUARD	3M
Year of manufacture		1993

DESCRIPTION OF DATA:

Descrip.	Value	Comment
Survey	YOLLA 3D	BLOCK T/RL 1, BASS STRAIT
Year	1994	JAN/FEB/MAR
Type	3D	SINGLE VESSEL/DUAL SOURCE/3 STREAMER
Format	4-Byte SEG D	
Category		
Data Type	DEMULTIPLEXED 8024	

Data Produced By	Western Geophysical Company
Acquisition Crew	Party 116; WESTERN ATLAS

Comment: THIS IS THE 2nd OF 2 SHIPMENTS FOR THE SAGASCO YOLLA 3D SURVEY. IT ENCOMPASSES LINE SEQUENCE #13 - #187.

(NOTE: SHIPMENT 1 WAS LINE SEQUENCES #1 - #12)

Prepared By: MARK WHETTON Date: 16th MARCH '94

Received By: _____ Date: _____

SEQ	LINE	SP - SP	TAPE - TAPE	BOX	DATE	COMMENTS
13	YOL00049	351- 32	274- 290	17	11/02/94	SOL -EOL
14	YOL00217	110- 164	291- 293	17	11/02/94	SOL -CONT
"	"	165- 564	294- 313	18	"	CONT-CONT
"	"	565 635	314- 317	19	"	CONT-EOI
15	YOL00031	529- 32	318- 333	19	"	SOL -EOL
16	YOL00265	117- 511	334- 353	20	11/02/94	SOL -CONT
"	"	512 694	354- 363	21	"	CONT-EOI
17	YOL00073	580- 185	364- 373	21	11/02/94	SOL -CONT
"	"	184- 32	374- 381	22	"	CONT-EOL
18	YOL00193	110 343	382- 393	22	12/02/94	SOL -CONT
"	"	344- 606	394- 407	23	"	CONT-EOL
19	YOL00037	336- 222	408- 413	23	12/02/94	SOL -CONT
"	"	221 32	414- 423	24	"	CONT-EOI
20	YOL00271	119- 295	424- 433	24	12/02/94	SOL -CONT
"	"	296- 643	434- 453	25	"	CONT-CONT
"	"	644 702	454- 456	26	"	CONT-EOI
21	YOL00079	588- 55	457- 473	26	12/02/94	SOL -CONT
"	"	54- 32	474- 475	27	"	CONT-EOL
22	YOL00223	110 464	476- 493	27	12/02/94	SOL -CONT
"	"	465- 643	494- 502	28	"	CONT-EOL
23	YOL00007	299- 87	503- 513	28	12/02/94	SOL -CONT
"	"	86- 32	514- 516	29	"	CONT-EOL
24	YOL00229	110- 444	517- 533	29	12/02/94	SOL -CONT
"	"	445- 650	534- 541	30	"	CONT-EOL
25	YOL00001	292- 110	545- 553	30	12/02/94	SOL -CONT
"	"	117- 32	554- 558	31	"	CONT-EOL
26	YOL00277	120- 414	559- 573	31	12/02/94	SOL -CONT
"	"	415 709	574- 588	32	"	CONT-EOL
TAPES #00589-00590 HAVE NO DATA. DO NOT PROCESS. FIRST GOOD TAPE: #00591.						
27	YOL00241	0- 184	589- 593	32	14/02/94	SOL -CONT
"	"	185- 584	594- 613	33	"	CONT-CONT
"	"	585- 665	614- 618	34	"	CONT-EOL
28	YOL00085	395- 108	619- 633	34	14/02/94	SOL -CONT
"	"	107- 32	634- 637	35	"	CONT-EOL
29	YOL00313	128- 418	638- 653	35	14/02/94	SOL -CONT
"	"	419- 753	654- 670	36	"	CONT-EOL
30	YOL00043	344- 290	671 673	36	14/02/94	SOL -CONT
"	"	289- 32	674- 686	37	"	CONT-EOL
31	YOL00235	110- 244	687- 693	37	14/02/94	SOL -CONT
"	"	245- 637	694- 713	38	"	CONT-CONT
"	"	638- 657	714- 714	39	"	CONT-EOL
TAPE #00715 HAS NO DATA ON IT. DO NOT PROCESS. FIRST GOOD TAPE: #00716						
32	YOL00121	0- 80	715- 733	39	15/02/94	SOL -CONT
"	"	79- 32	734- 736	40	"	CONT-EOL
33	YOL00307	127- 462	737- 753	40	15/02/94	SOL -CONT
"	"	463- 485	754- 755	41	"	CONT-EOL
34	YOL10307	486- 745	756- 769	41	15/02/94	SOL -EOI
35	YOL00127	447- 371	770- 773	41	15/02/94	SOL -CONT
"	"	370- 32	774- 790	42	"	CONT-EOL
36	YOL00301	126- 180	791- 793	42	15/02/94	SOL -CONT
"	"	181- 555	794- 813	43	"	CONT-CONT
TAPE #000798 HAS NO DATA ON IT. DO NOT PROCESS.						
"	"	556 739	814- 823	44	"	CONT-EOL
LINE SEQ# 37 SCRATCHED. TAPES #00824-00828 HAVE NO DATA. DO NOT PROCESS.						
37	SCRATCHED LINE	0- 0	824- 828	44	15/02/94	SOL -EOL
38	YOL00283	122- 216	829- 833	44	15/02/94	SOL -CONT
"	"	217- 601	834- 853	45	"	CONT-CONT
"	"	602- 717	854- 859	46	"	CONT-EOL

SEQ	LINE	SP - SP	TAPE - TAPE	BOX	DATE	COMMENTS
39	YOL00187	520- 244	860- 873	46	15/02/94	SOL -CONT
"	"	243- 32	874- 884	47	"	CONT-EOL
40	YOL00289	123- 297	885- 893	47	15/02/94	SOL -CONT
"	"	298- 697	894- 913	48	"	CONT-CONT
"	"	698- 724	914- 915	49	"	CONT-EOL
41	YOL00115	432- 78	916- 933	49	16/02/94	SOL -CONT
"	"	77- 32	934- 936	50	"	CONT-EOL
42	YOL00295	124- 459	937- 953	50	16/02/94	SOL -CONT
"	"	460- 731	954- 968	51	"	CONT-EOL
43	YOL00091	403- 310	969- 973	51	16/02/94	SOL -CONT
"	"	309- 185	974- 980	52	"	CONT-EOL
LINE SEQ# 44 WAS SCRATCHED. NO DATA FOR THIS LINE.						
45	YOL00181	513- 260	981- 993	52	17/02/94	SOL -CONT
"	"	259- 32	994- 1005	53	"	CONT-EOL
46	YOL00337	134- 288	1006- 1013	53	18/02/94	SOL -CONT
"	"	289- 688	1014- 1033	54	"	CONT-CONT
"	"	689- 783	1034- 1038	55	"	CONT-EOL
47	YOL00109	425- 132	1039- 1053	55	18/02/94	SOL -CONT
"	"	131- 31	1054- 1059	56	"	CONT-EOL
48	YOL00319	130- 405	1060- 1073	56	18/02/94	SOL -CONT
"	"	406- 761	1074- 1091	57	"	CONT-EOL
49	YOL00157	484- 450	1092- 1093	57	18/02/94	SOL -CONT
"	"	449- 59	1094- 1113	58	"	CONT-CONT
"	"	58- 32	1114- 1115	59	"	CONT-EOL
50	YOL00331	133- 466	1116- 1133	59	18/02/94	SOL -CONT
"	"	467- 606	1134- 1140	60	"	CONT-EOL
LINE SEQ# 51 SCRATCHED. DO NOT PROCESS TAPES #001141-#001144.						
51	SCARATCHED LINE	491- 416	1141- 1144	60	18/02/94	SOL -EOL
52	YOL00325	131- 299	1145- 1153	60	18/02/94	SOL -CONT
"	"	300- 689	1154- 1173	61	"	CONT-CONT
"	"	690- 768	1174- 1177	62	"	CONT-EOL
53	YOL00097	410- 96	1178- 1193	62	18/02/94	SOL -CONT
"	"	95- 32	1194- 1197	63	"	CONT-EOL
54	YOL00343	135- 449	1198- 1213	63	18/02/94	SOL -CONT
"	"	450- 593	1214- 1222	64	"	CONT-EOL
TAPE #001219 HAS NO DATA ON IT. DO NOT PROCESS.						
55	YOL00151	476- 262	1223- 1233	64	19/02/94	SOL -CONT
"	"	261- 32	1234- 1245	65	"	CONT-EOL
56	YOL00349	137- 291	1246- 1253	65	19/02/94	SOL -CONT
"	"	292- 677	1254- 1273	66	"	CONT-CONT
"	"	678- 799	1274- 1280	67	"	CONT-EOL
57	YOL00103	417- 172	1281- 1293	67	19/02/94	SOL -CONT
"	"	171- 32	1294- 1300	68	"	CONT-EOL
58	YOL00379	144- 399	1301- 1313	68	19/02/94	SOL -CONT
"	"	400- 785	1314- 1333	69	"	CONT-CONT
"	"	786- 829	1334- 1336	70	"	CONT-EOL
59	YOL00163	491- 203	1337- 1353	70	19/02/94	SOL -CONT
"	"	202- 32	1354- 1364	71	"	CONT-EOL
60	YOL00355	138- 313	1365- 1373	71	20/02/94	SOL -CONT
"	"	316- 805	1374- 1398	72	20/02/94	CONT-EOL
61	YOL00373	142- 0	1399- 1413	73	20/02/94	SOL -CONT
TAPE #001413 HAS NO DATA ON IT. DO NOT PROCESS.						
"	"	404- 754	1414- 1433	74	"	CONT-CONT
"	"	755- 827	1434- 1437	75	"	CONT-EOL
62	YOL00133	454- 152	1438- 1453	75	20/02/94	SOL -CONT
"	"	151- 32	1454- 1460	76	"	CONT-EOL
63	YOL00367	141- 381	1461- 1473	76	20/02/94	SOL -CONT
"	"	382- 781	1474- 1493	77	"	CONT-CONT

SEQ	LINE	SP - SP	TAPE - TAPE	BOX	DATE	COMMENTS
63	YOL00367	782- 820	1494- 1495	78	20/02/94	CONT-EOL
64	YOL00139	461- 107	1496- 1513	78	20/02/94	SOL -CONT
"	"	106- 32	1514- 1517	79	"	CONT-EOL
65	YOL00361	140- 454	1518- 1533	79	21/02/94	SOL -CONT
"	"	455- 813	1534- 1551	80	"	CONT-EOL
66	YOL00145	469- 435	1552- 1553	80	21/02/94	SOL CONT
"	"	434- 35	1554- 1573	81	"	CONT-CONT
"	"	34- 32	1574- 1574	82	"	CONT-EOL
67	YOL00385	145- 519	1575- 1593	82	21/02/94	SOL CONT
"	"	520- 829	1594- 1609	83	"	CONT-EOL
68	YOL00169	498- 420	1610- 1613	83	21/02/94	SOL -CONT
"	"	419- 92	1614- 1633	84	"	CONT CONT
TAPE #001617, #001621 & #001625 HAVE NO DATA ON THEM. DO NOT PROCESS.						
"	"	91- 32	1634- 1636	85	"	CONT-EOL
69	YOL10331	500- 776	1637- 1651	85	21/02/94	SOL EOL
70	YOL00175	506- 290	1652- 1663	85	21/02/94	SOL -CONT
"	"	289- 32	1664- 1677	86	"	CONT-EOL
71	YOL00415	152- 265	1678 1683	86	21/02/94	SOL -CONT
"	"	266- 647	1684- 1703	87	"	CONT-CONT
"	"	648- 829	1704- 1713	88	"	CONT-EOL
72	YOL00727	689- 495	1714- 1723	88	22/02/94	SOL CONT
"	"	494- 149	1724- 1741	89	"	CONT-EOL
73	YOL00475	167- 201	1742- 1743	89	22/02/94	SOL -CONT
"	"	0- 781	1744- 1773	90	"	CONT CONT
TAPE# 001744 HAS NO DATA ON IT. DO NOT PROCESS.						
"	"	782- 829	1774- 1776	91	"	CONT-EOL
74	YOL00667	728- 194	1777 1803	91	22/02/94	SOL -CONT
"	"	193- 135	1804- 1806	92	"	CONT-EOL
75	YOL00391	147- 595	1807- 1833	92	22/02/94	SOL -CONT
"	"	596 029	1834 1847	93	"	CONT-EOL
76	YOL00721	693- 397	1848- 1863	93	22/02/94	SOL -CONT
"	"	396- 148	1864- 1876	94	"	CONT-EOL
77	YOL00421	154 467	1877- 1893	94	22/02/94	SOL -CONT
"	"	468- 829	1894- 1913	95	"	CONT-EOL
78	YOL00673	724- 527	1914- 1923	95	23/02/94	SOL -CONT
"	"	526 136	1924- 1943	96	"	CONT-EOL
79	YOL00481	168- 362	1944- 1953	96	23/02/94	SOL -CONT
"	"	363- 829	1954- 1978	97	"	CONT-EOL
80	YOL00715	697 603	1979 1983	97	23/02/94	SOL -CONT
"	"	602- 146	1984- 2006	98	"	CONT-EOL
81	YOL00427	155- 289	2007- 2013	98	23/02/94	SOL -CONT
"	"	290- 829	2014- 2043	99	23/02/94	CONT-EOL
82	YOL00679	720- 486	2044- 2055	100	23/02/94	SOL -EOL
83	YOL00487	170- 324	2056- 2063	100	23/02/94	SOL -CONT
"	"	325- 684	2064- 2083	101	"	CONT-CONT
TAPE #002067 & #002071 HAVE NO DATA ON THEM. DO NOT PROCESS.						
"	"	685- 829	2084- 2091	102	"	CONT-EOL
84	YOL00679	720- 486	2092- 2103	102	23/02/94	SOL -CONT
"	"	485- 138	2104- 2121	103	"	CONT-EOL
85	YOL00433	157- 191	2122- 2123	103	24/02/94	SOL -CONT
"	"	192- 591	2124- 2143	104	"	CONT-CONT
"	"	592- 829	2144- 2155	105	"	CONT-EOL
86	YOL00733	685- 531	2156- 2163	105	24/02/94	SOL -CONT
"	"	530- 150	2164- 2183	106	24/02/94	CONT-EOL
87	YOL00493	171- 566	2184- 2203	107	24/02/94	SOL CONT
"	"	567- 829	2204- 2217	108	"	CONT-EOL
88	YOL00685	716- 602	2218- 2223	108	24/02/94	SOL -CONT
"	"	601 202	2224- 2243	109	"	CONT-CONT

SEQ	LINE	SP - SP	TAPE - TAPE	BOX	DATE	COMMENTS
88	YOL00685	201- 139	2244- 2247	110	24/02/94	CONT-EOL
89	YOL00397	148- 462	2248- 2263	110	24/02/94	SOL -CONT
"	"	463- 829	2264- 2283	111	24/02/94	CONT-EOL
90	YOL00709	701- 306	2284- 2303	112	24/02/94	SOL -CONT
"	"	305- 145	2304- 2312	113	"	CONT-EOL
91	YOL00409	151- 366	2313- 2323	113	24/02/94	SOL -CONT
"	"	367- 746	2324- 2343	114	"	CONT-CONT
TAPE #002328 HAS NO DATA ON IT. DO NOT PROCESS.						
"	"	747- 829	2344- 2348	115	"	CONT-EOL
92	YOL00691	712- 422	2349- 2363	115	25/02/94	SOL -CONT
"	"	421- 141	2364- 2378	116	"	CONT-EOL
93	YOL00499	173- 266	2379- 2383	116	25/02/94	SOL -CONT
"	"	267- 666	2384- 2403	117	"	CONT-CONT
"	"	667- 829	2404- 2412	118	"	CONT-EOL
94	YOL00751	673- 459	2413- 2423	118	25/02/94	SOL -CONT
"	"	458- 155	2424- 2439	119	"	CONT-EOL
95	YOL00451	161- 228	2440- 2443	119	25/02/94	SOL -CONT
"	"	229- 616	2444- 2463	120	"	CONT-CONT
"	"	617- 829	2464- 2474	121	"	CONT-EOL
96	YOL00697	709- 535	2475- 2483	121	25/02/94	SOL -CONT
"	"	534- 150	2484- 2503	122	25/02/94	CONT-EOL
97	YOL00469	165- 559	2504- 2523	123	25/02/94	SOL -CONT
"	"	560- 829	2524- 2537	124	"	CONT-EOL
98	YOL00661	732- 618	2538- 2543	124	25/02/94	SOL -CONT
"	"	617- 218	2544- 2563	125	"	CONT-CONT
"	"	217- 133	2564- 2568	126	"	CONT-EOL
99	YOL00403	149- 443	2569- 2583	126	26/02/94	SOL -CONT
"	"	444- 818	2584- 2603	127	"	CONT-CONT
TAPE #002599 HAS NO DATA ON IT. DO NOT PROCESS.						
"	"	819- 829	2604- 2604	128	"	CONT-EOL
100	YOL00703	705- 331	2605- 2623	128	25/02/94	SOL -CONT
"	"	330- 143	2624- 2634	129	"	CONT-EOL
TAPE #002632 HAS NO DATA ON IT. DO NOT PROCESS.						
101	YOL00775	657- 503	2635- 2642	129	26/02/94	SOL -CONT
"	"	502- 160	2643- 2660	130	"	CONT-EOL
102	YOL00445	160- 215	2661- 2663	130	27/02/94	SOL -CONT
"	"	216- 615	2664- 2683	131	"	CONT-CONT
"	"	616- 829	2684- 2694	132	"	CONT-EOL
TAPE #002701 HAS NO DATA ON IT. DO NOT PROCESS.						
103	YOL00739	681- 544	2695- 2703	132	27/02/94	SOL -CONT
"	"	543- 152	2704- 2723	133	27/02/94	CONT-EOL
104	YOL00463	161- 557	2724- 2743	134	27/02/94	SOL -CONT
"	"	558- 829	2744- 2759	135	"	CONT-EOL
LINE SEQ# 105 SCRATCHED. DO NOT PROCESS TAPES #002760-#002785.						
105	SCRATCHED LINE	0- 0	2760- 2763	135	27/02/94	SOL -CONT
"	"	0- 0	2764- 2783	136	"	CONT-CONT
"	"	0- 0	2784- 2785	137	"	CONT-EOL
106	YOL00535	181- 535	2786- 2803	137	02/03/94	SOL -CONT
"	"	536- 829	2804- 2818	138	"	CONT-EOL
107	YOL00781	653- 559	2819- 2823	138	02/03/94	SOL -CONT
"	"	558- 162	2824- 2843	139	02/03/94	CONT-EOL
108	YOL00505	174- 568	2844- 2863	140	02/03/94	SOL -CONT
"	"	569- 829	2864- 2877	141	"	CONT-EOL
109	YOL00847	609- 495	2878- 2883	141	03/03/94	SOL -CONT
"	"	494- 178	2884- 2899	142	"	CONT-EOL
110	YOL00511	175- 249	2900- 2903	142	03/03/94	SOL -CONT
"	"	250- 649	2904- 2923	143	"	CONT-CONT
"	"	650- 829	2924- 2933	144	"	CONT-EOL

SEQ	LINE	SP - SP	TAPE - TAPE	BOX	DATE	COMMENTS
111	YOL00745	677- 483	2934- 2943	144	03/03/94	SOL -CONT
"	"	482- 153	2944- 2960	145	"	CONT-EOL
112	YOL00457	162- 216	2961- 2963	145	03/03/94	SOL -CONT
"	"	217- 616	2964- 2983	146	"	CONT-CONT
"	"	617- 829	2984- 2994	147	"	CONT-EOL
113	YOL00769	661- 487	2995- 3003	147	03/03/94	SOL -CONT
"	"	486- 159	3004- 3020	148	"	CONT-EOL
114	YOL00565	188- 242	3021- 3023	148	04/03/94	SOL -CONT
"	"	243- 642	3024- 3043	149	"	CONT-CONT
"	"	643- 829	3044- 3053	150	"	CONT-EOL
115	YOL00655	735- 538	3054- 3063	150	04/03/94	SOL -CONT
"	"	537- 138	3064- 3083	151	"	CONT-CONT
"	"	137- 132	3084- 3084	152	"	CONT-EOL
116	YOL00529	180- 554	3085- 3103	152	04/03/94	SOL -CONT
"	"	555- 829	3104- 3117	153	"	CONT-EOL
117	YOL00763	665- 551	3118- 3123	153	04/03/94	SOL -CONT
"	"	550- 158	3124- 3143	154	04/03/94	CONT-EOL
118	YOL00439	158- 552	3144- 3163	155	04/03/94	SOL -CONT
"	"	553- 829	3164- 3177	156	"	CONT-EOL
119	YOL00757	669- 555	3178- 3183	156	04/03/94	SOL -CONT
"	"	554- 177	3184- 3203	157	"	CONT-CONT
"	"	176- 156	3204- 3205	158	"	CONT-EOL
120	YOL00541	183- 537	3206- 3223	158	04/03/94	SOL -CONT
"	"	538- 829	3224- 3238	159	"	CONT-EOL
121	YOL00805	637- 543	3239- 3243	159	05/03/94	SOL -CONT
"	"	542- 183	3244- 3263	160	"	CONT-CONT
TAPE #003255 & #003261 HAVE NO DATA ON THEM. DO NOT PROCESS.						
"	"	182- 168	3264- 3264	161	"	CONT-EOL
122	YOL00571	190- 564	3265- 3283	161	05/03/94	SOL -CONT
"	"	565- 829	3284- 3297	162	"	CONT-EOL
123	YOL00787	649- 535	3298- 3303	162	05/03/94	SOL -CONT
"	"	534- 163	3304- 3322	163	"	CONT-EOL
124	YOL00523	178- 192	3323- 3323	163	05/03/94	SOL -CONT
"	"	193- 592	3324- 3343	164	"	CONT-CONT
"	"	593- 829	3344- 3355	165	"	CONT-EOL
LINE SEQ #125 WAS SCRATCHED. DO NOT PROCESS TAPES #003356-#003364						
125	SCRATCHED LINE	187- 340	3356- 3363	165	06/03/94	SOL -CONT
"	"	341- 360	3364- 3364	166	06/03/94	CONT-EOL
126	YOL00517	177- 189	3365- 3365	165	06/03/94	SOL -CONT
"	"	190- 549	3366- 3383	166	"	CONT-CONT
"	"	550- 829	3384- 3398	167	"	CONT-EOL
TAPE #003386 HAS NO DATA ON IT.DO NOT PROCESS.						
127	YOL00799	641- 547	3399- 3403	167	06/03/94	SOL -CONT
"	"	546- 166	3404- 3422	168	"	CONT-EOL
128	YOL00559	187- 201	3423- 3423	168	06/03/94	SOL -CONT
"	"	202- 601	3424- 3443	169	"	CONT-CONT
"	"	602- 829	3444- 3455	170	"	CONT-EOL
129	YOL00793	645- 491	3456- 3463	170	06/03/94	SOL -CONT
"	"	490- 165	3464- 3480	171	"	CONT-EOL
130	YOL00547	184- 238	3481- 3483	171	07/03/94	SOL -CONT
"	"	239- 638	3484- 3503	172	"	CONT-CONT
"	"	639- 829	3504- 3513	173	"	CONT-EOL
131	YOL00811	614- 418	3514- 3523	173	07/03/94	SOL -CONT
"	"	417- 169	3524- 3536	174	"	CONT-EOL
132	YOL00595	196- 330	3537- 3543	174	07/03/94	SOL -CONT
"	"	331- 730	3544- 3563	175	"	CONT-CONT
"	"	731- 829	3564- 3568	176	"	CONT-EOL
133	YOL00853	605- 311	3569- 3583	176	07/03/94	SOL -CONT

SEQ	LINE	SP - SP	TAPE - TAPE	BOX	DATE	COMMENTS
133	YOL00853	310- 179	3584- 3590	177	07/03/94	CONT-EOL
134	YOL00589	194- 448	3591- 3603	177	07/03/94	SOL -CONT
"	"	449- 829	3604- 3623	178	07/03/94	CONT-EOL
135	YOL00817	629- 256	3624- 3643	179	07/03/94	SOL -CONT
"	"	255- 170	3644- 3648	180	"	CONT-E
136	YOL00601	197- 490	3649- 3663	180	07/03/94	SOL -C...
"	"	491- 829	3664- 3681	181	"	CONT-EOL
TAPE #003678 HAS NO DATA ON IT. DO NOT PROCESS.						
137	YOL00841	613- 579	3682- 3683	181	07/03/94	SOL -CONT
"	"	578- 179	3684- 3703	182	"	CONT-CONT
"	"	178- 172	3704- 3704	183	"	CONT-EOL
138	YOL00553	186- 560	3705- 3723	183	08/03/94	SOL -CONT
"	"	561- 829	3724- 3737	184	"	CONT-EOL
139	YOL00649	740- 626	3738- 3743	184	08/03/94	SOL -CONT
"	"	625- 226	3744- 3763	185	"	CONT-CONT
"	"	225- 131	3764- 3768	186	"	CONT-EOL
140	YOL00607	198- 492	3769- 3783	186	08/03/94	SOL -CONT
"	"	493- 829	3784- 3800	187	"	CONT-EOL
141	YOL00859	601- 548	3801- 3803	187	08/03/94	SOL -CONT
"	"	547- 188	3804- 3822	188	08/03/94	CONT-EOL
142	YOL00583	193- 607	3823- 3843	189	08/03/94	SOL -CONT
"	"	608- 829	3844- 3855	190	"	CONT-EOL
143	YOL00643	744- 622	3856- 3863	190	08/03/94	SOL -CONT
"	"	620- 256	3864- 3883	191	"	CONT-CONT
TAPE #003870 HAS NO DATA ON IT. DO NOT PROCESS.						
"	"	255- 129	3884- 3890	192	"	CONT-EOL
144	YOL00613	200- 454	3891- 3903	192	08/03/94	SOL -CONT
"	"	455- 829	3904- 3922	193	"	CONT-EOL
145	YOL00823	625- 611	3923- 3923	193	09/03/94	SOL -CONT
"	"	610- 211	3924- 3943	194	"	CONT-CONT
"	"	210- 172	3944- 3945	195	"	CONT-EOL
146	YOL00577	191- 545	3946- 3963	195	09/03/94	SOL -CONT
"	"	546- 829	3964- 3978	196	"	CONT-EOL
147	YOL00835	617- 523	3979- 3983	196	09/03/94	SOL -CONT
"	"	522- 175	3984- 4001	197	"	CONT-EOL
148	YOL00619	201- 235	4002- 4003	197	09/03/94	SOL -C...
"	"	236- 635	4004- 4023	198	"	CONT-C...
"	"	636- 829	4024- 4033	199	"	CONT-EOL
149	YOL00829	621- 427	4034- 4043	199	09/03/94	SOL -CONT
"	"	426- 173	4044- 4057	200	"	CONT-EOL
150	YOL00631	204- 317	4058- 4063	200	09/03/94	SOL -CONT
"	"	318- 719	4064- 4083	201	"	CONT-CONT
"	"	720- 829	4084- 4089	202	"	CONT-EOL
151	YOL00637	748- 472	4090- 4103	202	09/03/94	SOL -CONT
"	"	471- 128	4104- 4121	203	"	CONT-EOL
152	YOL00625	203- 236	4122- 4123	203	10/03/94	SOL -CONT
"	"	237- 636	4124- 4143	204	"	CONT-CONT
"	"	637- 829	4144- 4153	205	"	CONT-EOL
153	YOL01187	510- 313	4154- 4163	205	10/03/94	SOL -CONT
"	"	312- 40	4164- 4177	206	"	CONT-EOL
154	YOL01367	150- 266	4178- 4183	206	10/03/94	SOL -CONT
"	"	267- 666	4184- 4203	207	"	CONT-CONT
"	"	667- 810	4204- 4211	208	"	CONT-EOL
155	YOL01133	410- 174	4212- 4223	208	10/03/94	SOL -CONT
"	"	173- 40	4224- 4230	209	"	CONT-EOL
LINE SEQ #156 & 157 WERE SCRATCHED. NO DATA FOR THESE LINES.						
158	YOL01145	400- 146	4231- 4243	209	10/03/94	SOL -CONT
"	"	145- 38	4244- 4249	210	"	CONT-EOL

SEQ	LINE	SP - SP	TAPE - TAPE	BOX	DATE	COMMENTS
159	YOL01349	140- 370	4250- 4262	210	10/03/94	SOL -EOL
160	YOL10343	594- 608	4263- 4263	210	10/03/94	SOL -CON
"	"	609- 790	4264- 4273	211	"	CONT-EOL
161	YOL01067	340- 147	4274- 4283	211	10/03/94	SOL -CONT
"	"	146- 40	4284- 4289	212	"	CONT-EOL
162	YOL01343	140- 414	4290- 4303	212	11/03/94	SOL -CON
"	"	415- 780	4304- 4322	213	"	CONT-EOL
163	YOL01469	175- 189	4323- 4323	213	12/03/94	SOL -CON
"	"	190- 589	4324- 4343	214	"	CONT-CON
"	"	590- 820	4344- 4355	215	"	CONT-EOL
164	YOL0115	420- 266	4356- 4363	215	12/03/94	SOL -CONT
"	"	265- 80	4364- 4373	216	"	CONT-EOL
165	YOL10319	301- 380	4374- 4378	216	12/03/94	SOL -EOL
166	YOL10091	184- 91	4379- 4383	216	12/03/94	SOL -CONT
"	"	90- 32	4384- 4387	217	"	CONT-EOL
167	YOL01421	300- 614	4388- 4403	217	12/03/94	SOL -CONT
"	"	615- 825	4404- 4414	218	"	CONT-EOL
168	YOL01055	358- 184	4415- 4423	218	13/03/94	SOL -CONT
"	"	183- 40	4424- 4431	219	"	CONT-EOL
169	YOL01451	170- 404	4432- 4443	219	13/03/94	SOL -CONT
"	"	405- 804	4444- 4463	220	"	CONT-CONT
"	"	805- 820	4464- 4464	221	"	CONT-EOL
170	YOL10109	406- 374	4465- 4466	221	13/03/94	SOL -EOL
171	YOL01085	184- 40	4467- 4474	221	13/03/94	SOL -EOL
172	YOL01439	170- 344	4475- 4483	221	13/03/94	SOL -CON
"	"	345- 545	4484- 4494	222	"	CONT-EOL
173	YOL01679	450- 276	4495- 4503	222	13/03/94	SOL -CONT
"	"	275- 140	4504- 4510	223	"	CONT-EOL
174	YOL01487	170- 424	4511- 4523	223	13/03/94	SOL -CONT
"	"	425- 815	4524- 4543	224	"	CONT-CONT
"	"	816- 820	4544- 4544	225	"	CONT-EOL
175	YOL01517	177- 551	4545- 4563	225	14/03/94	SOL -CONT
"	"	552- 820	4564- 4577	226	"	CONT-EOL
176	YOL01739	681- 568	4578- 4583	226	14/03/94	SOL -CONT
"	"	567- 168	4584- 4603	227	"	CONT-CONT
"	"	167- 160	4604- 4604	228	"	CONT-EOL
177	YOL01637	206- 580	4605- 4623	228	14/03/94	SOL -CONT
"	"	581- 820	4624- 4635	229	"	CONT-EOL
178	YOL01709	701- 562	4636- 4643	229	14/03/94	SOL -CONT
"	"	561- 162	4644- 4663	230	"	CONT-CONT
"	"	161- 155	4664- 4664	231	"	CONT-EOL
179	YOL01499	173- 531	4665- 4683	231	15/03/94	SOL -CONT
"	"	532- 820	4684- 4699	232	"	CONT-EOL
TAPE #004697 HAS NO DATA ON IT. DO NOT PROCESS.						
180	YOL01667	720- 647	4700- 4703	232	15/03/94	SOL -CONT
"	"	646- 247	4704- 4723	233	"	CONT-CONT
"	"	246- 175	4724- 4727	234	"	CONT-EOL
181	YOL01835	260- 574	4728- 4743	234	15/03/94	SOL -CONT
"	"	575- 620	4744- 4746	235	"	CONT-EOL
TAPE #004747 HAS NO DATA ON IT. DO NOT PROCESS. FIRST GOOD TAPE: #004748						
TAPE #004763 HAS NO DATA ON IT. DO NOT PROCESS.						
182	YOL01751	0- 0	4747- 4763	235	15/03/94	SOL -CONT
"	"	256- 160	4764- 4768	236	"	CONT-EOL
183	YOL01595	335- 620	4769- 4783	236	15/03/94	SOL -CONT
"	"	621- 820	4784- 4793	237	"	CONT-EOL
184	YOL01685	680- 486	4794- 4803	237	15/03/94	SOL -CONT
"	"	485- 145	4804- 4821	238	"	CONT-EOL
185	YOL01817	385- 418	4822- 4823	238	15/03/94	SOL -CONT

SEQ	LINE	SP - SP	TAPE - TAPE	BOX	DATE	COMMENTS
185	YOL01817	419- 695	4824- 4837	239	15/03/94	CONT-EOL
186	YOL01649	735- 621	4838- 4843	239	15/03/94	SOL -CONT
"	"	620- 365	4844- 4856	240	"	CONT-EOL
187	YOL01661	605- 471	4857- 4863	240	16/03/94	SOL -CONT
"	"	470- 140	4864- 4880	241	16/03/94	CONT-EOL

APPENDIX 4

NAVIGATION REPORT

WESTERN GEOPHYSICAL COMPANY

501439

WESTERN GEOPHYSICAL

NAVIGATION REPORT

SAGASCO RESOURCES LIMITED

YOLLA 3D, BASS BASIN

PARTY : P116
VESSEL : WESTERN ATLAS
CLIENT : SAGASCO RESOURCES LIMITED
AREA : BASS BASIN, AUSTRALIA

DATES
19 JAN. 1994 to 09 FEB. 1994

CLIENT REPS : FRANK RENTON, R. LOWETH,
M. ULVR-GREEN

RACAL REP. : B. SLEVIN

COORDINATORS : B. WILLIAMS, H. HUME

NAVIGATORS : H. McMENAMIN, T. KOLESKE, S. ELLIOTT
A. EVANS, W. MAXTED, N. MEYERS

DATES
09 FEB. 1994 to 17 MARCH 1994

CLIENT REPS : ROD WALDRON, M. ULVR-GREEN

RACAL REP. : NIL

COORDINATORS : D. CHOW, H. HUME

NAVIGATORS : T. KOLESKE, S. ELLIOTT, B. COLE
W. MAXTED, R. LIBKE

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APPENDIX A - NAVIGATION

1 NAVIGATION CONTRACTORS REPORT - RACAL SURVEY AUSTRALIA
2 QC REPORT

APPENDIX B - ONBOARD NAVIGATION PROCESSING

GENERAL INFORMATION

AREA:

The prospect consists of one block in the Bass Basin of South Eastern Australia, Yolla 3D. Shotpoints start at 101 increasing in the 034° direction and decreasing to 32 in the 214° direction (69 runouts). The line-naming convention adopted was **YOL**xxx**, where:

YOL = prefix denoting the YOLLA 3D survey
** = numerical prefix to designate:
PRIME - 00
INFILL - 01
RESHOOT - 10
xxx = number of the lowest CMP acquired.

PARAMETERS:

Three cable: 3000m/240 Channels per cable, with 25m shotpoint spacing.

SOURCE:

Dual source: 2700 cu. in. Dual array with 3 strings per array.

CABLE LOCATION:

Digicourse combined BIRDS AND COMPASS, 11 per cable. SSTS-II to locate all cables and sources. Mars laser tracking on both cable vanes and centre gun string of each source.

MANGETIC VARIATION:

12.67° (Done by the Q.C.'s onboard and confirmed by Western Geophysical, Perth).

STEPBACK:

Shotpoints are referenced from the NRP to the CMP. NRP (main Argo mast) to centre of source minus NRP to centre of near group.
280 - 140 = 140m.
Then (140/2) + 140 = 210m.
Then (210/25) = 8.4 (9) shotpoints.
Therefore, the first shotpoint will be 110 and shotpoint reference for the first waypoint will be 101.

GYRO CALIBRATION:

A pre-survey gyro check and MULTIFIX verification was done on 10 and 11 of January 1994, by A. Evans and W. Maxted of Western Geophysical. Correction to be entered into the WISDOM system = **0.30°**.

NAVIGATION INFORMATION

ARGO:

Primary navigation was Western-supplied ARGO (4 station chain).

FREQUENCY:	322820.0 Hz
PROPAGATION VELOCITY:	29960000.0 m/sec
LANEWIDTH:	92.8071371 metres

Equipment used:	RPU R1081466	CDU C1081212	ALU A1080328
spare:	RPU R1081444	CDU C0784331	ALU A0381375

RACAL MULTIFIX:

Secondary navigation was supplied and installed by RACAL Survey Australia. This system was used when ARGO ranges became unstable, with the approval of the client representative. Using two Trimble 4000DL receivers, this differential GPS system utilises the Inmarsat communications satellites to download corrections from the onshore refence stations in Adelaide, Sydney and Melbourne.

Before the corrections are sent to the vessel, they pass through Singapore monitoring centre, where the data is QC'd. Our prime solution DN01 is Racal's new software corrected and filtered system called **MULTIFIX**. This system receives data from one of the Trimble receivers and applies corrections from up to four reference stations and outputs a network position, which is a combination of mean corrections.

For this survey, DN01 used correction from Adelaide, Melbourne and Sydney. The MULTIFIX computer allows the operator many QC functions to maximise the quality of the position. During most of the survey, DN01 used the Racal-supplied dome, which was set on the Pacific Satellite; update rates were around 5 to 8 seconds.

TR01 was our Direct Injection solution, which received corrections from Adelaide or Melbourne. Our PDOP mask was set at 7 with an elevation mask of 10° for both DN01 and TR01. The system is interfaced to WISDOM™ II (Ver. 50) via the NIU™ (ver. 1.1).
Note: See the Event Log for use and non-use of Direct Injection.

VELOCITY OF SOUND IN WATER:

Nominal 1512.0 metres/second. This number was determined by a T/S Dip in the centre of the block. The VALEPORT MARINE series 600 MKII temperature, depth and salinity meter, serial # 9509 was used for the measurements. These measurements were then applied to the Wilson formula for the calcuation.

Depth:	Average: Temperature	Salinity
0 to 20 metres	16.42°	35.05 ppm
COMPUTED AVERAGE:	WILSON metres/second = 1511.73	

1512 m/s entered into the WISDOM navigation computer in accordance with Roger Loweth, the onboard client representative. This figure was derived from the monitored value by a velocimeter on the port pinger, during the offset varification and the computation (Wilson).

GEODESIC PARAMETERS

SPHEROID:	AUSTRALIAN NATIONAL	
PROJECTION:	U.T.M.	
SEMIMAJOR AXID:	6378160.000	
FLATTENING:	0.003352892	
LOCAL DATUM:	AGD 84	
GEOID-SPHEROID SEPARATION:	-1 METRE	
X-SHIFT:	116.00	}
Y-SHIFT:	50.47	}
Z-SHIFT:	-141.69	}
X-ROTATION:	1.11507 RAD 10^{-6}	} FROM W.G.S. 84
Y-ROTATION:	1.89077 RAD 10^{-6}	}
Z-ROTATION:	1.66776 RAD 10^{-6}	}
SCALE FACTOR:	-0.0983 PPM	}
CENTRAL MERIDIAN:	147 0.0000 EAST	
FALSE EASTING:	500000.00	
FALSE NORTHING:	10000000	
ORIGIN OF LATITUDE:	0 0.0	
ZONE NUMBER:	55	
GRID UNIT:	METRES	
UTM SCALE FACTOR:	0.9996	
CONVERSION FACTOR	1.00000000	

BASE STATION INFORMATION SHEET

STATION NAME : NARACOOPA, BASE 1

STATION TYPE : ARGO

LATITUDE : 39° 55.5087" S

LONGITUDE : 144° 07.6327" E

ANTENNA HEIGHT: 47.80 Meters

DELAY (C-O) : -0.68 (in WISDOM)

OFFSET : NO OFFSET USED

EQUIPMENT USED

ELECTRONICS IN USE R.P.U. **R1080320** A.L.U. **A0884723**
SPARE R.P.U. **R1080420** A.L.U. **A1080325**

BASE STATION INFORMATION SHEET

STATION NAME : NORTH POINT, BASE 2

STATION TYPE : ARGO

LATITUDE : 40° 42.8980" S

LONGITUDE : 145° 15.4990" E

ANTENNA HEIGHT: 3.90 Meters

DELAY (C-O) : -0.525 (in WISDOM)

OFFSET : NO OFFSET USED

EQUIPMENT USED

ELECTRONICS IN USE R.P.U. **R0679182** A.L.U. **A1080345**
SPARE R.P.U. **R0282517** A.L.U. **A1081462**

BASE STATION INFORMATION SHEET

STATION NAME : POINT SORELL, BASE 3

STATION TYPE : ARGO

LATITUDE : 41° 07.2895" S

LONGITUDE : 146° 31.8325" E

ANTENNA HEIGHT: 7.60 Meters

DELAY (C-O) : -0.4125 (in WISDOM)

OFFSET : NO OFFSET USED

EQUIPMENT USED

ELECTRONICS IN USE R.P.U. **R0581376** A.L.U. **A1282569**
SPARE R.P.U. **R1080328** A.L.U. **A0884726**

BASE STATION INFORMATION SHEET

STATION NAME : CROPPIES POINT, BASE 4

STATION TYPE : ARGO

LATITUDE : 40° 24.0902" S

LONGITUDE : 115° 34.6126" E

ANTENNA HEIGHT: 12.20 Meters

DELAY (C-O) : -0.20 (in WISDOM)

OFFSET : NO OFFSET USED

EQUIPMENT USED

ELECTRONICS IN USE R.P.U. **R0580301** A.L.U. **A1080332**
SPARE R.P.U. **R1081440** A.L.U. **A1080326**

ARGO CALIBRATION

FREQUENCY : 322820.0 Hz.
PROPAGATION VELOCITY : 29960000.0 m/Sec.
LANEWIDTH : 92.8071371 METRES.

On 20 January 1994 a static calibration was carried out in the prospe area. The propagation velocity and frequency were set at 29960000 m/s and 322820 Hz respectively, this gives us a lane width of 92.8071371 metres. ALL C-O values were set to zero. The system used as a comparison for the calibration was TR01 (Trimble DGPS direct injection).

RESULTS:

Heading 213°

STATION	C-O	SD
Naracoopa	0.32	0.01
North Point	-0.53	0.02
Point Sorell	-0.41	0.02
Croppies Point	-0.35	0.01

Heading 303°

STATION	C-O	SD
Naracoopa	0.31	0.02
North Point	-0.55	0.01
Point Sorell	-0.41	0.02
Croppies Point	-0.32	0.04

Heading 033°

STATION	C-O	SD
Naracoopa	0.32	0.02
North Point	-0.49	0.02
Point Sorell	-0.40	0.03
Croppies Point	-0.34	0.04

Heading 123°

STATION	C-O	SD
Naracoopa	0.33	0.03
North Point	-0.53	0.02
Point Sorell	-0.43	0.04
Croppies Point	-0.37	0.07

MEAN RESULTS

STATION	C-O
Naracoopa	0.32
North Point	-0.525
Point Sorell	-0.4125
Croppies Point	-0.345

For uniformity, one lane was added to base 1, the C-O changed to -0.68.

These results were entered in WISDOM and three baselines were cut. Naracoopa vs Croppies Point baseline was cut. Both directions show 14 metres long. Naracoopa vs Point Sorell baseline was cut. Both directions show 14 metres long. North Point vs Croppies Point baselin was cut. The first direction show 17 metres long, and the second was 14 metres long. The on board client was happy with results.

Note: These figures are not final. Two further calibrations were performed. See event log for results.

EVENT LOG

JD 019 19 JANUARY 1994 WEDNESDAY

00:01 Heading towards Portland, Victoria.

08:00 Alongside Portland dock.

10:00 Commence Multifix/Skypod verification.

15:00 Depart Portland for King Island to drop off Ramesses guy.

23:59 Still heading for King Island.

JD 020 20 JANUARY 1994 THURSDAY

00:01 Still heading for King Island.

07:30 Loading new version of NIU software (ver. 1.1).

08:00 Loading new version of WISDOM II software (ver. 50).

09:30 All GPS off the air, getting no data to all receivers. Arrive King Island drop off Ramesses guy.

09:35 Depart King Island for prospect area.

11:15 All Argo Stations on the air.

17:10 Powered down all units in recording room. Discovered RACAL Skypod antenna shorting. Changed out antenna.

17:30 All Systems powered up, all receivers in.

19:10 Master changed to Argo 3, while Argo 2 is down.

19:45 Argo 2 back on the air.

20:00 Start CAL 1 at 033°, TR01 prime.
End CAL 1 Results: **scratched.**

20:11 Lost differential corrections calibration aborted.

20:13 Start Rcalb 1 at 213°

20:43 End Cal 1

RESULTS:	C-O	SD
NARACOOPA	+0.32	0.01
NORTH POINT	-0.53	0.02
POINT SORELL	-0.41	0.02
CROPPIES POINT	-0.35	0.01

20:55 Start Rcalb 2 at 303°

NARACOOPA	+0.31	0.02
NORTH POINT	-0.55	0.01
POINT SORELL	-0.41	0.02
CROPPIES POINT	-0.32	0.04

21:33 Start Rcalb 3 at 033°

21:53 End Cal 3

RESULTS:	C-O	SD
NARACOOPA	+0.32	0.02
NORTH POINT	-0.49	0.01
POINT SORELL	-0.40	0.02
CROPPIES POINT	-0.32	0.04

22:05 Start Rcalb 4 at 123°

22:25 End Cal 4

RESULTS:	C-O	SD
NARACOOPA	+0.33	0.03
NORTH POINT	-0.53	0.02
POINT SORELL	-0.43	0.04
CROPPIES POINT	-0.37	0.07

MEAN RESULTS:

	C-O	SD
NARACOOPA	+0.32	0.02
NORTH POINT	-0.52	0.02
POINT SORELL	-0.41	0.03
CROPPIES POINT	-0.34	0.04

23:59 C-O's entered in WISDOM heading to baseline crossings.

JD 021 21 JANUARY 1994 FRIDAY

00:01 Heading to baseline crossings.

01:53 Start baseline cut 1 (Naracoopa vs. Croppies Point) at 203°.

02:00 End baseline cut 1, Result +14 M.

03:53 Start baseline cut 2 (Naracoopa vs. Point Sorell) at 213°.

04:01 End baseline cut 2, Result +14 M.

04:30 Loading new version of FLEXQC software (ver. 4.0N).

04:49 Start baseline cut 3 (North Point vs. Croppies Point) at 185°.

04:57 End baseline cut 3, Result +14 M.

06:26 Start baseline cut 4 (Naracoopa vs. Point Sorell) at 033°.

06:32 End baseline cut 4, Result +17 M.

06:48 Start baseline cut 5 (North Point vs. Croppies Point) @ 005°.

09:00 Start baseline cut 6 (Naracoopa vs. Croppies Point) at 019°.

09:08 End baseline cut 6, Result +13 M.

09:15 Client says ok, heading for prospect area to start cable out, and observe Argo.

10:00 Base station 2 off the air to change out insulator on tower.

11:00 Tailbuoy 3 powered up and test ok.

11:10 Tailbuoy 3 in water, start port cable out.

13:40 Argo 2 back on the air.

13:52 Argo 2 set as master.

14:45 Gun Strings 2, 3, 4, 5, 6, & 7 tap tested.
All good, channel 15 not set up as a gun channel.

15:28 Start check radio cal.

15:48 Station 3 to master, station 2 down for maintenance.
End radio cal check.

RESULTS:	C-O	SD
NARACOOPA	+0.04	0.19
NORTH POINT	+0.03	0.19
POINT SORELL	-0.04	0.04
CROPPIES POINT	-0.07	0.13

15:50 Argo down, all stations report receiving double transmission.

16:10 All stations back in after powering down & retuning antenna. Antenna detuned, VSWR light flashing, phase loop 88, antenna tune 50-60, transmission pulse less than 10.

strap only finger tight. Still VSWR light flashing when stations come in.

18:31 Change to spare R.P.U (S/No. R1081444).

19:00 All station in, High VSWR light still flashing, when stations come in. Sprayed out and cleaned all earthing bolts.

21:00 Powered up, All stations in, all good. Suspect the mast base earth strap.

22:20 Start Argo cal. check.

23:30 End Argo cal. check.

RESULTS:	C-O	SD
NARACOOPA	-0.03	0.23
NORTH POINT	-0.04	0.15
POINT SORELL	-0.08	0.05
CROPPIES POINT	-0.08	0.08

23:59 Still working on cable.

JD 022 22 JANUARY 1994 SATURDAY

00:01 Still working on cable.

02:15 Start radio cal. check.

02:45 End Argo cal. check.

RESULTS:	C-O	SD
NARACOOPA	-0.13	0.02
NORTH POINT	-0.10	0.02
POINT SORELL	-0.05	0.03
CROPPIES POINT	-0.03	0.06

09:00 Start radio cal. check.

09:30 End Argo cal. check.

RESULTS:	C-O	SD
NARACOOPA	-0.11	0.01
NORTH POINT	-0.07	0.01
POINT SORELL	-0.03	0.01
CROPPIES POINT	-0.03	0.01

09:32 Start radio cal. check.

RESULTS:	C-O	SD
NARACOOPA	-0.11	0.01
NORTH POINT	-0.07	0.01
POINT SORELL	-0.05	0.01
CROPPIES POINT	-0.05	0.01

14:00 Start radio cal. check.

15:24 End Argo cal. check.

RESULTS:	C-O	SD
NARACOOPA	-0.08	0.01
NORTH POINT	-0.07	0.01
POINT SORELL	-0.07	0.02
CROPPIES POINT	-0.05	0.02

15:31 Start radio cal. check.

18:03 End Argo cal. check.

RESULTS:	C-O	SD
NARACOOPA	-0.12	0.02
NORTH POINT	-0.10	0.03
POINT SORELL	-0.08	0.02
CROPPIES POINT	-0.03	0.02

20:50 Start Argo cal.

20:58 Stop cal. due to Argo station 4 drop out.

21:00 Start radio cal. check.

22:42 End Argo cal. check.

RESULTS:	C-O	SD
NARACOOPA	-0.10	0.03
NORTH POINT	-0.09	0.02
POINT SORELL	-0.08	0.06
CROPPIES POINT	-0.04	0.07

22:52 Entered mean of cal. results in WISDOM.

RESULTS:	C-O	SD	
NARACOOPA	-0.0713	(-0.68)	using -0.7513
NORTH POINT	-0.0638	(-0.525)	using -0.5888
POINT SORELL	-0.0600	(-0.4125)	using -0.4725
CROPPIES POINT	-0.0475	(-0.345)	using -0.3925

22:56 Start cal. with new figures, cal. stopped due to station 4 dropping out.

23:59 Still working on cable.

00:01 Still working on cable. Argo very erratic on nav screen, but ok in synopsis page.

06:30 Entered 2.0 in age (radio filter page.) for all stations. This seemed to clear up problems with SD's.

08:00 Mars tested and calibrated ok.

08:23 Start Argo cal. with new figures.

09:12 End Argo cal. check.

RESULTS:	C-O	SD
NARACOOPA	-0.05	0.01
NORTH POINT	-0.04	0.01
POINT SORELL	-0.01	0.01
CROPPIES POINT	-0.01	0.01

15:38 Start Argo cal. with new figures.

18:12 End Argo cal. check.

RESULTS:	C-O	SD
NARACOOPA	-0.06	0.02
NORTH POINT	-0.06	0.02
POINT SORELL	-0.07	0.02
CROPPIES POINT	-0.03	0.02

20:51 Start Argo cal.

23:59 Still working on cable.

JD 024 24 JANUARY 1994 MONDAY

00:01 Picking up cable.

00:18 Tailbuoy on board, heading to Burnie, Tasmania to drop off Mark Donnison (possible broken arm). Navigation rep. would like to do baselines(unofficial) on the way into Burnie.

03:38 Start b/l cut 1 (Argo 1 vs. Argo 4) at 190°, speed 9.0 kts.

03:43 End baseline cut 1, Result -6 M.

03:50 End Argo cal. check. 11907 Samples.

RESULTS:	C-O	SD
NARACOOPA	+0.12	0.11
NORTH POINT	+0.06	0.12
POINT SORELL	-0.04	0.11
CROPPIES POINT	-0.01	0.11

05:47 Start b/l cut 2 (Argo 2 vs. Argo 4) at 190°, speed 8.7 kts.

06:25	Start b/l cut 3 (Argo 1 vs. Argo 3) at 190°, speed 8.5 kts.
06:31	End baseline cut 3, Result -4 M.
07:02	Start b/l cut 4 (Argo 2 vs. Argo 3) at 190°, speed 8.4 kts.
07:08	End baseline cut 4, Result +2 M.
08:25	Alongside at Burnie, Tasmania.
11:10	Depart Burnie for prospect. Received RPU TO CDU interconnect cable from M. Vink.
11:57	Start b/l cut 5 (Argo 2 vs. Argo 3) at 359°, speed 11.3 kts.
12:02	End baseline cut 5, Result +11 M.
12:31	Start b/l cut 6 (Argo 1 vs. Argo 3) at 359°, speed 11.5 kts.
12:36	End baseline cut 6, Result -1 M.
12:52	Start b/l cut 7 (Argo 2 vs. Argo 4) at 359°, speed 11.4 kts.
12:56	End baseline cut 7, Result -2 M.
14:42	Start b/l cut 8 (Argo 1 vs. Argo 4) at 359°, speed 11.4 kts.
14:46	End baseline cut 8, Result -4 M.
16:00	Start laying cable. (tailbuoy in water.
17:30	50 m. difference from Argo to DGPS. Phase loop reading 60. Up the mast to spray out phase loop connections.
18:00	Powered up Argo in to 3-5 m. only for a few seconds then drifted back out to 30-50 m.
19:15	Re-tuning antenna, no change.
20:00	Re-spray connections, unable to tune antenna.
21:00	Change to spare ALU (S/No. A0381375), no change.
22:00	Put dummy load from mast to ALU , unable to get tune.
23:00	Run transmit test, failed.
23:15	Putting dummy load on RPU, failed test.
23:30	Change back to original RPU (S/No. A1081466).
23:50	No change, took dummy load off.
23:59	Still working on Argo problem and working on cable.

00:01 Still working on Argo problem and working on cable.

03:40 Cable tension monitors added to NIU, tested ok.

05:10 WISDOM reloaded, CRT frozen.

05:50 Both SSTS phones tested in cable 2, ok.

06:20 Cable out running tests, and balance.

07:30 Start cable #2 in.

10:00 Tailbuoy on board.

11:20 Stbd tailbuoy in water.

11:50 Stbd Kevlar rope replaced on pinger.

12:27 Remove 0.4 lane from each station in RPU.

12:31 Start Argo cal. with new figures.

13:09 End Argo cal. check.

RESULTS:	C-O	SD
NARACOOPA	+0.01	0.01
NORTH POINT	+0.02	0.01
POINT SORELL	-0.00	0.01
CROPPIES POINT	-0.00	0.01

13:42 Adding 0.4 lane back in RPU, and put 0.4 lane in WISDOM.

13:45 Start Argo cal. with new figures.

16:40 End Argo cal. check.

RESULTS:	C-O	SD
NARACOOPA	-0.06	0.02
NORTH POINT	-0.03	0.02
POINT SORELL	+0.02	0.02
CROPPIES POINT	+0.03	0.02

16:47 Start Argo cal.

18:06 End Argo cal. check.

RESULTS:	C-O	SD
NARACOOPA	-0.05	0.02
NORTH POINT	-0.05	0.02
POINT SORELL	-0.01	0.02
CROPPIES POINT	0.00	0.02

18:08 Station 4 down for maintenance.

18:30 Station 4 back on the air.

21:01 Start b/l cut 1 (Argo 1 vs. Argo 4) at 253°, speed 2.9 kts.

21:10 End baseline cut 1, Result +10 M.

23:48 End baseline cut 1, Result +3 M.

23:59 Working on stbd cable

JD 026 26 JANUARY 1994 WEDNESDAY

00:01 Working on stbd cable

04:00 Stbd cable out, running tests.

04:30 Both SSTS phones tap test good on cable 1.

05:05 Stbd cable out on roller, streaming cable in both directions.

07:00 Argo powered down, bring mast down to check and clean loading coil.

07:45 Found scuffs and cuts (able to coils) on loading coil, possible water on coils. Using spare loading coil after repairing small cut in rubber.

08:30 Argo antenna together, checking spare loading coil.

09:10 Argo back in, no changes in C-O's.

10:55 Tailbuoys on board heading to do Argo calibration in the centre of prospect.

12:00 Disabled SV # 24, unhealthy. Changed Argo frequency to 1648.1 in WISDOM and propagation velocity to 299650.

12:05 Argo powered down, mast down again to check and clean connections. Made copper earth strap from ALU. Cleaned all connections on stays. Changed out entire antenna.

17:00 Melbourne station on the air.

18:30 Melbourne differential station in, can not use until we have been told by on board RACAL man.

19:00 John Parry called, Told us to run earth strap around top of mast on stays and weld earth lugs on deck.

20:30 Tuned into around 60, phase loop 61, heading for re-cal. point at centre of block. (15 minutes in each direction due to GPS window)

21:52 Start Argo cal. @ 214° (static)

NARACOOPA	-0.22	0.01
NORTH POINT	-0.01	0.02
POINT SORELL	+0.02	0.02
CROPPIES POINT	+0.03	0.03

22:15 Start Argo cal. @ 124° (static)

22:30 End Argo cal. check.

RESULTS:	C-O	SD
NARACOOPA	-0.14	0.02
NORTH POINT	+0.03	0.02
POINT SORELL	+0.08	0.02
CROPPIES POINT	+0.09	0.02

22:39 Start Argo cal. @ 034° (static)

22:54 End Argo cal. check.

RESULTS:	C-O	SD
NARACOOPA	-0.19	0.01
NORTH POINT	+0.03	0.01
POINT SORELL	+0.07	0.01
CROPPIES POINT	+0.05	0.01

23:02 Start Argo cal. @ 304° (static)

23:17 End Argo cal. check.

RESULTS:	C-O	SD
NARACOOPA	-0.25	0.02
NORTH POINT	+0.01	0.01
POINT SORELL	+0.11	0.01
CROPPIES POINT	+0.13	0.02

MEAN RESULTS:

	C-O	SD
NARACOOPA	-0.20	0.02
NORTH POINT	+0.02	0.02
POINT SORELL	+0.07	0.02
CROPPIES POINT	+0.08	0.02

23:20 C-O's entered in WISDOM, doing a T/S dip.

23:59 T/S dip complete results 1512 m/s, heading to B/L crossings.

JD 027 27 JANUARY 1994 THURSDAY

00:01 Heading for Baseline crossings.

03:38 Start baseline cut 1 (Naracoopa vs. Croppies Point) at 199°.

03:45 End baseline cut 1, Result +17 M.

05:38 Start baseline cut 2 (Naracoopa vs. Point Sorell) at 214°.

05:44 End baseline cut 2, Result +18 M.

05:56 Start baseline cut 2 (Naracoopa vs. Point Sorell) at 034°.

06:02 End baseline cut 2, Result +21 M.

07:46 End baseline cut 1, Result +19 M.

07:47 Heading to calibration point 39° 51.0' S and 145° 50.0 E. to run another static calibration check in four directions.

09:45 Argo to standby to move phase loop cable off antenna.

10:20 Argo back up and running.

10:30 All C-O's back to zero for cal. check.

10:53 Start Argo cal. @ 304° (static)

11:08 End Argo cal. check.

RESULTS:	C-O	SD
NARACOOPA	-0.27	0.01
NORTH POINT	-0.04	0.01
POINT SORELL	+0.04	0.01
CROPPIES POINT	+0.08	0.01

11:17 Start Argo cal. @ 304° (static)

11:32 End Argo cal. check.

RESULTS:	C-O	SD
NARACOOPA	-0.27	0.01
NORTH POINT	-0.03	0.01
POINT SORELL	+0.01	0.01
CROPPIES POINT	+0.04	0.01

11:39 Start Argo cal. @ 304° (static)

11:54 End Argo cal. check.

RESULTS:	C-O	SD
NARACOOPA	-0.23	0.01
NORTH POINT	-0.02	0.01
POINT SORELL	+0.02	0.01
CROPPIES POINT	+0.07	0.01

12:04 Start Argo cal. @ 304° (static)

12:19 End Argo cal. check.

RESULTS:	C-O	SD
NARACOOPA	-0.23	0.02
NORTH POINT	+0.03	0.01
POINT SORELL	+0.01	0.01
CROPPIES POINT	+0.03	0.01

12:30 C-O's entered in WISDOM.

MEAN RESULTS:

	C-O	SD
NARACOOPA	-0.23	0.01
NORTH POINT	0.00	0.01
POINT SORELL	+0.05	0.01
CROPPIES POINT	+0.07	0.01

13:00 Argo station 4 down for maintenance

13:40 Station 4 back on the air. Argo looking good SD's from 0-2

23:59 Working on cable.

JD 028 28 JANUARY 1994 FRIDAY

00:01 Working on cable.

04:15 SSTS hull transducers down, AFT hull now can be done from recording room.

07:30 Navigation clean power down, d/t loose breaker.

08:10 Stbd cable out on vane running test. Mars tested and could not see target on vane.

08:55 SSTS pingers in water to test hull transducers and cable 1.

09:25 Pingers back on board, all tests ok, working on stbd cable.

12:00 Working on stbd cable, skypod trimble receiver has a problem, bad power supply problem.

13:00 Station 1 down for maintenance.

13:40 Station 1 back on the air.

14:00 Skypod now using Multifix GPS receiver. Skypod offset to NRP changed to same as Multifix, can't run both systems at the same time.

19:15 Skypod now using Direct Injection GPS receiver, and its offsets.

20:30 Melbourne differential station usable now.

23:59 Working on stbd cable.

00:01 Working on stbd cable. Stbd tailbuoy operational only when speed is above 4 knots. Batteries flat, run off generator.

08:20 Stbd cable out on vane, running tests. Checking new mars set up on vane, seems to be working ok.

09:40 WISDOM seeing stbd vane at 165 metres (slant range from NRP).

12:00 Cable work, distance from prism to LRU is 27.46 metres, height 10.4 metres. Centre of near group to SSTS phone on each cable is 11.65 metres, and centre of each array to SSTS phone is 13.0 metres.

16:45 Start cable 3 out, tailbuoy on cable 1 unstable.

19:45 Tailbuoy on cable one still unstable, sailing fair seas at 4 knots. Speed log @ 3 knots, course 081°.

23:59 Cable work.

JD 030 30 JANUARY 1994 SUNDAY

00:01 Cable work.

03:00 SSTS pingers deployed to check cable separation.

03:30 Cable 1 X-cable pinger. (temporary set up to check seps.)

05:45 Starting to deploy guns to check offsets and separations.

06:40 Tap test gun string 7, ok.

07:15 Tap test gun string 6, ok.

08:20 Tap test gun string 5, ok.

09:30 All port gun strings in water checking seps. with SSTS.

10:50 Port gun strings look ok, start stbd out to compare offsets.

11:25 Tap test gun string 2, ok.

12:00 Positioning guns.

14:00 Mars tracking 8 targets, intermittently.

14:45 Multifix down, all reference stations unstable, to 1000 metres. Suspect software problem. Calls made to Singapore hub station, no response as per normal. GPS raw position ok.

reference stations. NIU problem, WISDOM reloaded. Cleared all ports, re-entered Argo and gyro, nav. back up.

20:35 NIU hang-up, same as before. Re-entered all ports.

20:40 Reloading Multifix program found on RACAL spare computer.

21:00 Gun and cable vanes tangled.

21:40 Multifix back in.

22:15 Vanes untangled start guns up.

23:59 Picking up guns.

JD 031 31 JANUARY 1994 MONDAY

00:01 Picking up guns.

01:30 SSTS pingers on board.

02:05 Start both cables in. Lost 2 mars reflectors off port vane.

05:00 New pic module for GMU (SRCDEPGM.PIC ver. 0.01D) loaded, (4800,8,1,Odd).

05:15 Both tailbuoys on board, down for weather.

10:25 Both tailbuoys fitted with fresh batteries, ready to go!!

12:00 Down for weather, Installing 1 more generator on each tailbuoy. Multifix computer having time problems.

18:00 Multifix computer swapped with Skypod computer.

21:45 Argo drifted out 20 metres from GPS, out of prospect area.

23:59 Down for weather.

JD 032 01 FEBRUARY 1994 TUESDAY

00:01 Down for weather.

01:00 Port tailbuoy in water, working ok, acoustic pod no good.

01:20 Both tailbuoy and acoustic pod good, start port cable out.

03:30 Port cable deployed to tow point, checking balance.

04:20 Port cable on vane, WISDOM set up for 4 targets only.

05:00 Stbd tailbuoy and acoustic pod test good, start cable out.

08:25 SSTS pingers in water to check on offsets.

08:39 WISDOM crash.

08:43 WISDOM program 50 reloaded.

08:50 Centre tailbuoy fitted with a second generator.

09:20 Pingers back on board, adding oil to stbd cable.

10:00 Stbd cable back out on vane.

10:40 Pingers back in water to check separation.

12:00 Deploying stbd guns, SSTS having problems with gun and pinger depths from GMU.

13:00 Multifix computer still having timing problems.

14:30 All guns out, measuring offsets.

14:41 Argo 3 master. Argo needs to clean connections. SSTS unable to get depths for guns and pingers d/t program problem.

16:30 Guns coming on board to re-calibrate DI's.

17:30 Pingers up to check DI's.

18:00 Station 2 back up and back to master.

19:00 New multifix program down loaded from Singapore bulletin board.

21:45 Multifix back in 10m to DN01.

22:30 Cable 2 being deployed.

22:45 Multifix still having problems with time resetting. Mars tracking better once fog has lifted.

23:59 Working on middle cable.

JD 033 02 FEBRUARY 1994 WEDNESDAY

00:01 Working on cable 2.

00:06 All cables out, running semi monthly tests.

07:30 Multifix still not working.

08:00 Changing over Multifix and Skypod trimble receivers, still no good and Multifix.

10:00 Start guns out.

11:35 All guns back on board.

12:00 Multifix back in, (a cold solder joint an main cable.)
Down for weather.

10:30 Start all cables on board.

22:20 Stbd vane winch cable broken.

23:59 Picking up cables.

JD 034 03 FEBRUARY 1994 THURSDAY

00:01 Picking up cables.

00:35 All tailbuoys on board, down for weather heading for King Island to pick up spare parts.

02:30 Both Hull transducers up, down for weather.

06:30 Now heading for west side of King Island (Currie Harbour), rendezvous set for 12:00.

10:30 GMU rewired to put pingers back in slots 63 & 64.

12:00 Zodiac away to pick up spare parts from island. Board changed in SSTS possibly no more 12 db jumps.
Down for weather.

23:59 Down for weather, heading to prospect area to hang out.

JD 035 04 FEBRUARY 1994 FRIDAY

00:01 Down for weather.

04:30 Arrive prospect area, down for weather.

08:55 Tailbuoy switched on and sealed, looks good.

09:40 Acoustic pod on tailbuoy tests good.

09:45 Tailbuoy in water, start cable out.

11:35 Argo to standby to re-acquire timing pulse.

11:45 Argo back up still no phase loop.

12:00 Working on port cable 3 (port).

change.

15:30 Change out RPU, Adelaide reference station down. Tune 65-70 phase loop at 58.

17:00 Retuning, cable work continues on port cable.

20:45 Stbd tailbuoy sealed, Adelaide reference stations back up.

21:10 Port cable out picking up Mars on port vane.

21:14 Port cable out on vane.

22:20 Stbd tailbuoy in water, start stbd cable out.

23:30 Meg. tested on phase and RF cable.

23:35 Changing out RF cable.

23:59 Working on stbd cable, changing RF cable.

JD 036 05 FEBRUARY 1994 SATURDAY

00:01 Working on stbd cable, changing RF cable.

00:15 Powered up Argo, phase loop and tune still same.

01:00 J. Parry advises test RPU's with 50Ω resister. RPU 1081444 reads low on test 3.

01:55 Tailbuoy 2 powered up test good. Mars only seeing port vane.

03:00 RPU 1081466 reads good, original RPU 1081466 reconnected with original RF cables, and earthed. Tests good with test 3, phase loop still only 58. Two outside cables on vanes and test good, start centre cable out.

04:00 Vessel set Argo frequency to 1 as master and powered up. Phase loop only 52-53.

05:00 Vessel Argo set back to frequency 4, phase loop 56-57.

05:45 Centre cable out on tow, running tests.

06:30 Redid ground cable on RPU, phase loop at 60-61, Argo better.

06:40 Start guns out, ground cable put on CDU.

07:25 SSTS transducers down, pingers in water.

08:44 WISDOM crash, reload ver. 50.

09:10 Melbourne reference station off the air.

12:00 On run for first line, checking offsets.

14:00 Melbourne reference station back up.

15:41 **START OF NAVIGATION REEL #P116-0230**, Heading for SOL.

15:52 WISDOM crash., reload ver. 50.

16:17 **START OF NAVIGATION REEL #P116-0230** again, Heading for SOL.

16:25 Stop nav tape D/T errors still coming from relative position.

18:47 **START OF NAVIGATION REEL #P116-0230**, Heading for SOL.

19:53 (01) SOL YOL00013 307 214° 2.0 S

20:40 (01) EOL YOL00013 32 214° 2.9 S

22:23 (02) SOL YOL00205 110 130° 4.8 P, Multifix dome unwinding sp 110-116. s.p. 180 Multifix to prime D/T RD01 unstable.

23:51 (02) EOL YOL00205 621 130° 3.0 P

23:59 ON LINE CHANGE HEADING FOR SOL YOL00055.

JD 037 06 FEBRUARY 1994 SUNDAY

00:01 Extended line change D/T technicians. Heading for SOL YOL00055.

00:34 **END OF NAVIGATION REEL #P116-0230.**

01:15 **START OF NAVIGATION REEL #P116-0231.**

02:30 GMU pinger depths now coming into SSTS.

03:00 Change header x-fer start to 2.0000 was 1.2390 (NIU page 18).

03:44 (03) SOL YOL00055 358 214° 4.5 P

04:39 (03) EOL YOL00055 32 214° 5.1 P

06:30 (04) SOL YOL00247 113 034° 4.2 S, FGSP 116 D/T guns not firing. SP 194-199 and SP 281-286 no seismic data recorded system re-boot.

07:21 Change header x-fer start to 2.2000 was 2.0000 (NIU page 18).

09:28 Argo prime, Multifix backup.

10:02 Multifix prime, Argo backup. Speed fluctuation with Argo.

10:39 (05) SOL YOL00019 314 214° 4.4 S

11:06 SP 165 centre tailbuoy not updating, SP 156-146 re-boot tailbuoy computer.

11:27 (05) EOL YOL00019 32 214° 4.8 S

13:18 (06) SOL YOL00211 110 034° 5.3 P

14:46 (06) EOL YOL00211 628 034° 2.5 P

15:30 Change header x-fer start to 2.0000 was 2.2000 (NIU page 18).

16:25 (07) SOL YOL00061 366 214° 1.5 P, Cable 2 towards cable 3.

17:22 (07) EOL YOL00061 32 214° 3.6 P

19:02 (08) SOL YOL00253 110 034° 3.6 S, Cable 2 towards cable 1.

20:36 (08) EOL YOL00253 675 034° 0 , Towards EOL sep. improved with tide shift.

22:48 (09) SOL YOL00025 321 214° 1.0 S

23:38 (09) EOL YOL00025 32 214° 1.3 S

23:59 On line change heading for SOL YOL00199.

JD 038 07 FEBRUARY 1994 MONDAY

00:01 On line change heading for SOL YOL00199.

01:21 (10) SOL YOL00199 110 034° 2.5 P, Incorrect flip-flop stbd source/ odd sp).

02:44 (10) EOL YOL00199 613 034° 0.3 P

04:14 (11) SOL YOL00069 373 214° 1.9 P, Mars on stbd vane intermittent.

05:10 (11) EOL YOL00069 32 214° 2.4 P

06:43 (12) SOL YOL00211 110 034° 3.6 S, Acs 3 string 5 weak.

08:18 (12) EOL YOL00211 687 034° 0.3 S

08:25 Turning fair seas.

08:35 Start all guns up.

09:00 SSTS hull transducers up, blown hose on stbd boom (pingers).

10:00 All guns up.

13:45 All trailing gear on board, heading for Portland.

15:15 All lines binned on FLEX and grid backed up.

23:45 Direct Injection back up and running.

23:59 Heading for Portland.

JD 039 08 FEBRUARY 1994 TUESDAY

00:01 Heading for Portland.

11:00 Along side Portland.

13:00 Trimble for tailbuoy tracking gear reconnected and tested.

23:59 Along side Portland.

00:01 Along side Portland.

12:15 Depart Portland for prospect.

23:59 En route to prospect.

JD 041 10 FEBRUARY 1994 THURSDAY

00:01 En route to prospect. Technicians working on SSTS.

01:15 Argo powered up, ranges still weak.

06:00 Port tailbuoy in water.

08:00 Skypod ant. ht. measured @ 16.4 metres, entered in WISDOM.

09:00 SSTS repairs complete, 6db gain increments operational.

11:00 SSTS hull transducers lowered.

11:15 WISDOM reloaded, many ILL INT 14, from SSTS power up/down. Working on cable #3.

14:10 Stbd tailbuoy tests ok.

14:30 Mars purged, cable 3 SSTS tap tested and pinger tested ok.

15:30 Port streamer on vane, running tests.

15:35 Stbd tailbuoy #1 powered up and sealed, mars on port vane checks ok.

16:00 Start cable #1 out.

16:15 WISDOM reloaded, many ILL INT 14, from SSTS power up/down.

17:25 All Argo stations editing heavily, re-enter lane count.

18:00 Working on cable #1.

19:20 SSTS tap and ping test cable 1, ok.

19:36 WISDOM reloaded, many ILL INT 14, from SSTS power up/down.

20:15 Both vanes check ok with mars, separation 230-240.

20:35 Tailbuoy 2 Skypod on, tests ok, lid sealed.

22:03 Tailbuoy 2 in water.

23:59 Working on cable 2, technician playing with SSTS.

00:01	Working on cable 2, technician playing with SSTS.				
01:30	SSTS tap and ping test cable 2, ok,. X-cable now pinging on cable 2				
03:30	Cable 2 CHS spiking, seis data when pinging, changing out CHS.				
04:00	New CHS in cable 2, tests good.				
06:00	Start guns out.				
09:33	**START OF NAVIGATION REEL #P116-0233.**				
11:16	(13) SOL	YOL00049	351	214°	0.1 S
12:09	(13) EOL	YOL00049	32	214°	1.7 S
13:51	(14) SOL	YOL00217	110	034°	2.8 P
15:19	(14) EOL	YOL00217	635	034°	3.0 P
15:30	Tech. changed out TCB (Transmit control board) in SSTS.				
16:56	(15) SOL	YOL00031	329	214°	2.0 S
17:50	(15) EOL	YOL00031	32	214°	1.3 S
19:15	All mars ranges changed in WISDOM D/T no port vane range.				
19:29	(16) SOL	YOL00265	117	034°	1.5 S
19:30	All mars ranges changed in WISDOM to original set up.				
21:05	(16) EOL	YOL00265	694	034°	0.6 S
21:15	Changed x-pinger set up in Totalnet from cable 1 to cable 2.				
22:46	(17) SOL	YOL00073	380	214°	0.6 P
23:46	(17) EOL	YOL00073	32	214°	0.4 S
23:59	On line change, heading for SOL YOL00193 @ 034°.				

JD 043 12 FEBRUARY 1994 SATURDAY

00:01	On line change, heading for SOL YOL00193 @ 034°.				
00:15	Tech. changed out TCB (Transmit control board) original.				
01:21	(18) SOL	YOL00193	110	034°	1.7 P
02:48	(18) EOL	YOL00193	606	034°	2.3 P

05:05	(19)	EOL	YOL00037	32	214°	1.0 S
06:44	(20)	SOL	YOL00271	119	034°	0.7 S
08:26	(20)	EOL	YOL00271	702	034°	1.0 S

08:34 **END OF NAVIGATION REEL #P116-0232.**

08:43 **START OF NAVIGATION REEL #P116-0233.**

10:01	(21)	SOL	YOL00079	388	214°	1.8 P
10:59	(21)	EOL	YOL00079	32	214°	1.6 P
12:35	(22)	SOL	YOL00223	110	034°	0.1 S
14:08	(22)	EOL	YOL00223	643	034°	2.3 P
15:50	(23)	SOL	YOL00007	299	214°	2.8 S
16:35	(23)	EOL	YOL00007	32	214°	3.3 S

17:16 Multifix and direct injection out D/T dome unwrapping.

17:41 Losing lock, reset ACU and find lock.

18:21	(24)	SOL	YOL00229	110	034°	3.8 P
19:52	(24)	EOL	YOL00229	650	034°	2.3 P
21:26	(25)	SOL	YOL00001	292	214°	2.3 S
22:11	(25)	EOL	YOL00001	32	214°	1.1 S
23:56	(26)	SOL	YOL00277	120	034°	1.4 P

23:59 Continue shooting on line YOL00277 @ 034°.

JD 044 13 FEBRUARY 1994 SUNDAY

00:01 Continue shooting on line YOL00277 @ 034°.

00:38 SP 326-418 stbd tailbuoy not updating, only seeing 2 sats.

01:10 RACAL ACU lost lock sp 525, retuned.

01:31 SSTS stbd pinger @ 2 metres possible broken tow rope, SSTS data bad.

01:44	(26)	EOL	YOL00277	709	034°	2.5 P

03:23 Stbd pinger repaired and redeployed. (replaced towfish swivel at Kevlar).

06:45 Port pinger repaired and redeployed. All looks ok.

07:00 Pingers out of water, down for weather.

08:30 Argo phase loop down to 55, all stations out by 0.1 - 0.2 of a lane. Power down equipment and check connections, power back up, no improvement.

12:25 Argo to stand by, checking connections on antenna.

12:45 Reading with mega shows ½ meg leakage, cleaning connectors and check again, shows same.

13:00 Start guns out.

13:45 Argo back on, with phase loop cable cleaned, still no change.

14:10 Argo to stand by to clean all earths on mast and ALU.

15:00 All guns out, technician put spare TCB back in SSTS.

15:30 Pingers in water. Argo back in again, still no change.

16:00 Argo to stand by to put dummy load up antenna.

17:00 Found Argo antenna shorted, turning fair seas to drop mast and clean & remove water from loading coil. Test antenna while down and reads good after water runs out.

17:55 All Argo on hold in WISDOM.

18:00 Mast down removing water and cleaning antenna, replacing loading coil.

19:15 Argo mast now cleaned and back together tests good.

19:40 Argo mast back up, turning towards line, testing Argo.

19:50 Argo back up, VSWR 55-60, PHASE LOOP 64-68.

20:15 All stations showing 0.2 lane, VSWR 55-60, PHASE LOOP 65-70.

20:45 Unplug PHASE LOOP to see if it is working properly. All stations shift by .3 of a lane. This proves that PHASE LOOP is working. Change out RPU to prove that it is working correctly. Spare unit shows the same C-O's.

21:00 J. Parry called and asks us to run tests 2 and 3 as master. This test proves that we have a good tune. He confirms the fact that we need to re-calibrate.

21:30 Heading to line YOL00385 for re-calibration @ 034°.

23:59 Heading to Argo re-calibration.

JD 045 14 FEBRUARY 1994 MONDAY

00:01 Heading to Argo re-calibration.

01:29 Start Argocal at 034°

21:53 End Cal

RESULTS:	C-O	SD
NARACOOPA	-0.43	0.01
NORTH POINT	-0.11	0.01
POINT SORELL	-0.12	0.01
CROPPIES POINT	-0.11	0.02

02:14 Start Argocal at 214°

02:21 Power failure, **END OF NAVIGATION REEL #P116-0233.**

02:50 Power back on line, WISDOM program reloaded, heading to do second calibration.

03:33 **START OF NAVIGATION REEL #P116-0234.**

05:00 End Cal

RESULTS:	C-O	SD
NARACOOPA	-0.43	0.01
NORTH POINT	-0.12	0.01
POINT SORELL	-0.13	0.01
CROPPIES POINT	-0.13	0.02

MEAN RESULTS:

	C-O	SD
NARACOOPA	-0.43	0.01
NORTH POINT	-0.12	0.01
POINT SORELL	-0.13	0.01
CROPPIES POINT	-0.12	0.02

05:30 C-O's entered in WISDOM.

06:30 SSTS phone on gun string #5 changed.

08:12 (27) SOL YOL00241 112 034° 4.1 P, FGSP 129 D/T LRS 100.

08:41 SP 286-288 SSTS RUN/IDLE, pinger depths in incorrect slots.

09:43 (27) EOL YOL00241 665 034° 1.5 P

11:34 (28) SOL YOL00085 395 214° 1.0 S

12:35 (28) EOL YOL00085 32 214° 0.4 S

14:14 (29) SOL YOL00313 128 034° 0.2 P, acoustic 16 intermittent.

17:56 (30) SOL YOL00043 344 214° 1.3 S, acoustic 16 intermittent, tb 1 & 2 bad ranges.

18:50 (30) EOL YOL00043 32 214° 1.3 S

19:06 All cable nominal ranges changed was 280.0 now 298.8.
All gun nominal ranges changed was 140.0 now 154.8.

20:27 (31) SOL YOL00235 110 034° 1.4 P, acoustic 16 intermittent, tb 2 bad.

21:11 SP 374, system mode change to Multifix, Argo noisy.

21:57 (31) EOL YOL00235 657 034° 0.6 P

23:02 (32) SOL YOL00121 439 214° 0.3 P

23:08 Tailbuoy computer crash, reboot.

23:59 Continue shooting on line YOL00121.

JD 046 15 FEBRUARY 1994 TUESDAY

00:01 Continue shooting on line YOL00121.

00:09 (32) EOL YOL00121 32 214° 0.3 P

00:35 Argo back as prime navigation.

01:48 (33) SOL YOL00307 127 034° 0.7 S

02:51 (33) EEOL YOL00307 485 034° N/A , **D/T power failure.**
END OF NAVIGATION REEL #P116-0234.

03:31 Power back on, WISDOM reloaded.

04:06 **START OF NAVIGATION REEL #P116-0235.**

04:40 Tailbuoy software copied from Multifix computer and loaded.

06:08 (34) SOL YOL10307 486 034° 0.6 S

06:50 (34) EOL YOL10307 745 034° 0

08:23 (35) SOL YOL00127 447 214° 0.2 P

09:33 (35) EOL YOL00127 32 214° 0.7 P

11:57 Minimum cycle time was 6 now 8.

11:27 (36) SOL YOL00301 126 034° 2.5 S

14:56	(37) SOL	YOL00091	403	214°	0.5 P, acs 21 intermittent.
15:13	(37) EEOL	YOL00091	313	214°	1.3 S, **D/T power failure (all data scratched)**

END OF NAVIGATION REEL #P116-0235.

15:30 Clean power back on.

15:34 Reload WISDOM program.

15:53 **START OF NAVIGATION REEL #P116-0236.**

17:15 WISDOM screen frozen, reload WISDOM.

17:21 **START OF NAVIGATION REEL #P116-0236 (again).**

17:36	(38) SOL	YOL00283	122	034°	1.5 P
19:15	(38) EOL	YOL00283	717	034°	2.5 P

20:40 Multifix as prime navigation.

20:49	(39) SOL	YOL00187	520	214°	3.0 S
22:10	(39) EOL	YOL00187	32	214°	2.5 S
23:42	(40) SOL	YOL00187	123	034°	0.1 P

23:55 Station 4 +1 lane at sp 200.

23:59 Continue shooting on line YOL00289.

JD 047 16 FEBRUARY 1994 WEDNESDAY

00:01 Continue shooting on line YOL00289.

01:26	(40) EOL	YOL00289	724	034°	1.5 S

01:50 Argo as prime navigation.

03:00	(41) SOL	YOL00115	432	214°	2.0 P
04:09	(41) EOL	YOL00115	32	214°	2.3 P

04:30 SSTS phone on gun string 4 changed.

05:32 WISDOM using string 2 for stbd guns.

05:39 WISDOM using string 3 for stbd guns.

05:47 (42) SOL YOL00295 124 034° 3.5 S, SSTS affected by weather.

08:37 User header transfer delay now 0.2 secs, SSTS target window to 3 M.

09:14 (43) SOL YOL00091 403 214° 2.2 P

10:01 (43) EEOL YOL00091 132 214° 1.5 P, **LGSP 185 D/T cable 2 out of spec. caused sea state.**

12:00 User header transfer delay now 0.0 secs.

12:15 Pingers out of water, D/T weather.

12:25 Start guns up.

13:50 All guns on board, down for weather.

18:00 Still down for weather.

23:59 Still down for weather.

JD 048 17 FEBRUARY 1994 THURSDAY

00:01 Still down for weather.

07:48 Multifix as prime.

08:10 Heading for SOL YOL00377, replace splitter on port pinger.

11:32 (--) SOL YOL00289 724 034° 1.5 S, **scratched**

14:24 SV #03 held out in all trimbles, 'flagged bad from Melbourne differential station.

14:44 (44) SOL YOL00097 410 214° 0.3 P

14:48 (44) EEOL YOL00097 388 214° 0.3 P, **scratched D/t weather effecting the cables.** Going to other end of block.

17:27 Prime navigation to Argo, Multifix as back-up.

17:55 Line YOL00319 aborted on run-in D/T cable trim caused by weather. Going to other end of block and try again.

21:37 (45) SOL YOL00181 513 214° 0.5 P

22:57 (45) EOL YOL00181 32 214° 0.3 P

23:59 On line change heading for SOL YOL00337.

00:01 On line change heading for SOL YOL00337.

00:17 Argo to prime navigation.

00:56 Multifix to Prime, Argo un-steady.

01:13 (46) SOL YOL00337 134 034° 2.8 S

03:01 (46) EOL YOL00337 783 034° 3.3 S

03:04 **END OF NAVIGATION REEL #P116-0235.**

03:27 **START OF NAVIGATION REEL #P116-0236.**

03:50 Argo to prime navigation.

04:15 Multifix as prime navigation Argo still unstable.

05:06 (47) SOL YOL00109 425 214° 2.0 P

06:14 (47) EOL YOL00109 32 214° 0

07:43 Argo as prime navigation.

08:02 (48) SOL YOL00319 130 034° 1.9 P

09:46 (48) EOL YOL00319 761 034° 2.2 P

11:34 Multifix down, Melbourne off the air, re-boot Multifix, still down, no RTCM coming in.

11:37 Trimble direct injection as back-up, no differential, uplink from marisat down.

11:38 (49) SOL YOL00157 484 214° 2.0 S

12:15 RACAL called to inform us there is a major line fault OTC in the Eastern states, problem should be resolved soon.

12:52 (49) EOL YOL00157 32 214° 1.5 S

13:23 Starting to get diff. corrections from Melbourne.

13:30 Starting to get diff. corrections from Sydney.

13:37 Changed diff. station in direct injection to Melbourne.

14:01 Multifix as back-up, Argo 4-way as prime.

15:00 (50) SOL YOL00331 133 034° 1.0 S, sol-sp210 cable 2 out of spec. block edit.

15:14 SP 221 Multifix as prime navigation, Argo unstable.

16:17 (50) EEOL YOL00331 593 034° 0.7 S, **LGSP 499 D/T cable 2 out of spec.**

16:31 SV #03 disabled at all diff. stations, type 16 message from Melbourne.

17:58 Argo to prime navigation.

18:23 (51) SOL YOL00163 491 214° 1.0 S

18:33 (51) EEOL YOL00163 426 214° 0 , **scratched D/t weather effecting the cables.** Going to other end of

21:10 Add one lane to Croppies point.

21:53 Multifix as prime navigation, Argo noisy.

22:10 (52) SOL YOL00325 131 034° 1.6 P.

23:43 (52) EOL YOL00325 768 034° 0.5 P.

23:59 On line change heading for SOL YOL00097.

JD 050 19 FEBRUARY 1994 SATURDAY

00:01 On line change heading for SOL YOL00097.

01:08 Argo as prime navigation.

01:49 (53) SOL YOL00097 410 214° 0.2 S.

02:50 (53) EOL YOL00097 32 214° 0.4 P.

04:48 (54) SOL YOL00343 135 034° 0.2 P.

05:55 Multifix as prime navigation, Argo signals unstable.

06:15 (54) EOL YOL00343 615 034° 2.2 P, **LGSP 593 D/T guns.**

07:31 Argo to prime navigation

08:12 (55) SOL YOL00151 476 214° 4.2 S.

08:18 SP 442-400 Multifix computer hang-up, re-boot.

08:22 SP 422-369 direct injection in as back-up.

08:25 SV #12 disabled in all trimbles, maint. for 96 hrs, from 049, 15:00 UTC.

09:27 (55) EOL YOL00151 32 214° 4.4 S.

13:20	(56)	EOL	YOL00349	798	034°	1.8 P.
16:03	(57)	SOL	YOL00103	417	214°	0.3 P.
17:07	(57)	EOL	YOL00103	32	214°	0.1 P.
19:19	(58)	SOL	YOL00379	144	034°	2.2 P.

19:56 Multifix as prime navigation, Argo unstable.

21:15	(58)	EOL	YOL00379	829	034°	3.7 P.

21:25 **END OF NAVIGATION REEL #P116-0236.**

21:34 **START OF NAVIGATION REEL #P116-0237.**

23:22	(59)	SOL	YOL00163	491	214°	3.7 S.

23:59 Continue shooting on line YOL00163.

JD 051 20 FEBRUARY 1994 SUNDAY

00:01 Continue shooting on line YOL00163.

00:39	(59)	EOL	YOL00163	32	214°	2.7 S.

01:13 Argo to prime navigation.

02:26 Multifix as prime navigation.

02:37	(60)	SOL	YOL00355	138	034°	0.5 P.

03:27 Plus 1 lane into Croppies Point.

04:33	(60)	EOL	YOL00355	805	034°	0.7 P.

05:41 Picking up all guns to inspect port cable vane.

06:34 Plus 1 lane into Croppies Point.

07:00 All guns on board, port pinger up.

07:50 Port gun vane on board.

08:40 Port cable vane on board,

09:45 Commence cable vane back out.

10:30 Cable and port pinger back out.

11:49 Argo to prime navigation.

14:29	(61)	SOL	YOL00373	142	034°	1.9 P.

18:15	(62) SOL	YOL00133	454	214°	2.1 S.
19:26	(62) EOL	YOL00133	32	214°	1.8 S.
21:11	(63) SOL	YOL00367	141	034°	3.0 P.
23:07	(63) EOL	YOL00367	820	034°	2.6 P.
23:59	On line change heading for SOL YOL00139.				

JD 052 21 FEBRUARY 1994 MONDAY

00:11	Multifix down, ACU not tracking.				
00:12	ACU re-tuned, Multifix back in.				
00:52	(64) SOL	YOL00139	461	214°	2.4 S.
02:05	(64) EOL	YOL00139	32	214°	0.4 P.
03:25	Argo to prime navigation.				
03:40	Multifix prime navigation, minus one lane in Croppies Point.				
03:58	(65) SOL	YOL00361	140	034°	3.0 S.
05:51	(65) EOL	YOL00361	813	034°	0.8 S.
07:07	Argo to prime navigation.				
07:36	(66) SOL	YOL00145	469	214°	2.1 S.
08:52	(66) EOL	YOL00145	32	214°	3.4 S.
10:47	(67) SOL	YOL00385	145	034°	4.6 P.
12:40	(67) EOL	YOL00385	829	034°	4.2 P.
14:23	(68) SOL	YOL00169	498	214°	2.3 S.
15:28	SP 107 Multifix dropped out.				
15:30	SP 98 Multifix back in.				
15:40	(68) EOL	YOL00169	32	214°	1.5 P.
17:52	(69) SOL	YOL00361	500	034°	2.7 S.
18:38	(69) EOL	YOL00361	776	034°	1.4 S.
19:34	Multifix as prime navigation.				
19:57	(70) SOL	YOL00175	506	214°	0.2 P.

20:03 SP 474 DN01 reset, Multifix as Prime.

21:20 (70) EOL YOL00175 32 214° 0.1 S.

21:35 Error 09 on CDU, power off CDU at back and redo connection.

23:13 (71) SOL YOL00415 152 034° 0.6 P.

23:59 Continue shooting on line YOL00415.

JD 053 22 FEBRUARY 1994 TUESDAY

00:01 Continue shooting on line YOL00415.

01:06 (71) EOL YOL00415 829 034° 0.

01:09 **END OF NAVIGATION REEL #P116-0238.**

01:21 **START OF NAVIGATION REEL #P116-0239.**

03:09 (72) SOL YOL00727 689 214° 2.6 P.

04:41 (72) EOL YOL00727 149 214° 4.1 P.

06:35 (73) SOL YOL00475 167 034° 2.0 S.

08:23 (73) EOL YOL00475 829 034° 1.4 P.

note: Seeing high SD's Argo (5-9) with diff. between DN01/RD01 of 5-11 metres.

10:04 (74) SOL YOL00667 728 214° 2.4 S.

11:39 (74) EOL YOL00667 135 214° 4.0 S.

12:20 Base 2 signal strength is zero, base 3 to master.

12:25 Base 2 to standby to check out equipment.

12:31 RD03 Argo 3-way as backup.

12:35 Base 2 back up again, no problem found.

12:44 RD01 Argo 4-way as backup.

13:34 (75) SOL YOL00475 147 034° 3.8 P.

15:26 (75) EOL YOL00475 829 034° 0.2 S.

15:38 Base 2 back to master.

16:15 NIU timing changed.

18:52	(76) EOL	YOL00721	148	214°	2.0 P.
20:43	(77) SOL	YOL00475	167	034°	3.2 P.
23:36	(77) EOL	YOL00475	829	034°	2.8 P.

23:59 On line change heading for SOL YOL00673.

JD 054 23 FEBRUARY 1994 WEDNESDAY

00:01	On line change heading for SOL YOL00673.				
00:15	NTC timing in NIU adjusted by techs.				
00:30	(78) SOL	YOL00673	724	214°	2.0 S.
02:07	(78) EOL	YOL00673	136	214°	1.2 S.
03:50	(79) SOL	YOL00481	168	034°	1.2 S.
05:38	Minus one lane from Croppies point.				
05:40	Minus one lane from Croppies point.				
05:42	(79) EOL	YOL00481	829	034°	3.2 S.
07:13	(80) SOL	YOL00715	697	214°	3.4 P.
07:55	Spike in Multifix position.				
08:43	(80) EOL	YOL00715	146	214°	0.4 S.
08:59	Argo to prime navigation, rebooting Multifix.				
09:02	Multifix as prime navigation.				
09:04	SV #12 enabled in all trimbles.				
10:35	Base 2 down, changing RPU and running tests at station.				
10:46	Compass #3 disabled in WISDOM, not updating.				
10:54	RD03 Argo 3-way as backup.				
11:11	Base 2 back on the air (+3 lanes) and master station , new RPU S/No. **R0282517**.				
11:16	RD01 Argo 4-way as backup.				
11:18	(81) SOL	YOL00427	155	034°	3.7 P.
13:07	(81) EOL	YOL00475	829	034°	2.3 P.

14:49 (82) SOL YOL00679 720 214° 0.1 P.

15:29 (82) EEOL YOL00679 487 214° 0.1 P., **scratched D/t LRS 100 Problem.** Going to other end of block.

18:06 (83) SOL YOL00487 170 034° 2.6 S.

19:57 (83) EOL YOL00487 829 034° 0.6 S.

20:10 **END OF NAVIGATION REEL #P116-0239.**

20:18 **START OF NAVIGATION REEL #P116-0240.**

21:33 (84) SOL YOL00679 720 214° 1.6 S.

22:53 Plus 1 lane to Croppies Point.

23:10 (84) EOL YOL00679 138 214° 3.3 S.

23:45 Change SSTS phone on gun string 7.

23:59 On line change heading for SOL YOL00433.

JD 055 24 FEBRUARY 1994 THURSDAY

00:01 On line change heading for SOL YOL00433.

00:03 New C-O's entered in WISDOM.

MEAN RESULTS:

	C-O
NARACOOPA	-0.36
NORTH POINT	-0.09
POINT SORELL	-0.07
CROPPIES POINT	-0.05

00:15 Minus 2 lanes out of Croppies Point.

00:43 Minus 1 lane out of Croppies Point.

01:07 Plus 1 lane in of Croppies Point.

01:15 (85) SOL YOL00433 157 034° 4.0 P.

03:10 (85) EOL YOL00433 829 034° 0.9 S.

03:36 SV #03 enabled in all trimbles.

04:04 Argo to prime navigation.

05:03 (86) SOL YOL00733 685 214° 4.8 P.

06:33 (86) EOL YOL00733 150 214° 4.5 P.

10:03	(87)	EOL	YOL00493	829	034°	1.3 P.
11:33	(88)	SOL	YOL00685	716	214°	3.0 S.
13:08	(88)	EOL	YOL00685	139	214°	5.6 S.
15:19	(89)	SOL	YOL00397	148	034°	4.3 P.
17:15	(89)	EOL	YOL00397	829	034°	0.3 P.
19:10	(90)	SOL	YOL00709	701	214°	3.3 P.
20:45	(90)	EOL	YOL00709	145	214°	2.0 P.

22:26 Multifix to prime navigation.

22:55	(91)	SOL	YOL00409	151	034°	1.0 P.

23:59 Continue shooting on line YOL00409.

JD 056 25 FEBRUARY 1994 FRIDAY

00:01 Continue shooting on line YOL00409.

00:49	(91)	EOL	YOL00409	829	034°	0.

00:59 Argo to prime navigation.

02:38	(92)	SOL	YOL00691	712	214°	1.8 P.
04:16	(92)	EOL	YOL00691	141	214°	1.3 P.

05:50 Multifix to prime navigation, plus 2 lanes in Croppies Point.

06:06	(93)	SOL	YOL00499	172	034°	3.5 S.
07:57	(93)	EOL	YOL00499	829	034°	2.8 S.
09:29	(94)	SOL	YOL00751	673	214°	0.7 P.
10:50	(94)	EOL	YOL00751	155	214°	3.0 S.

10:57 **END OF NAVIGATION REEL #P116-0240.**

11:02 **START OF NAVIGATION REEL #P116-0241.**

12:43	(95)	SOL	YOL00451	161	034°	6.3 P.
14:36	(95)	EOL	YOL00451	829	034°	3.0 P.

15:10 Mars powered down, LRU removed from helideck in preparation for chopper to land.

17:49 (96) EEOL YOL00697 150 214° 1.8 P., **LGSP 150 D/T WISDOM hang-up.**

17:55 **END OF NAVIGATION REEL #P116-0241.**

18:04 Helicopter on deck.

18:12 Helicopter away with 2 WGC personnel and one Total Marine personnel.

18:15 WISDOM program reloaded

18:32 **START OF NAVIGATION REEL #P116-0242.**

19:20 Mars LRU remounted on helideck and purged. Powered back up.

19:51 (97) SOL YOL00469 165 034° 4.5 S.

21:42 (97) EOL YOL00469 829 034° 2.1 S.

23:23 (98) SOL YOL00661 732 214° 0.1 P.

23:40 Prime to Multifix, Argo noisy.

23:59 Continue shooting on line YOL00661.

JD 057 26 FEBRUARY 1994 SATURDAY

00:01 Continue shooting on line YOL00661.

01:03 (98) EOL YOL00661 133 214° 2.5 S.

01:23 Argo to prime navigation.

02:57 (99) SOL YOL00403 149 034° 4.0 P.

03:08 SP 220, Multifix to prime, Argo noisy.

04:48 (99) EOL YOL00403 829 034° 0.6 P.

05:10 RACAL London advise TBT should be using filter, activate "CTRL-S" after each reboot.

05:15 SSTS X-cable delays to 1.35 ms were 2.62 ms.

06:34 (100)SOL YOL00703 705 214° 2.4 P.

08:06 (100)EOL YOL00703 143 214° 3.0 P.

08:20 Zodiac away- replace acoustic pod(HA24) tail end port cable. Repaired data cable for port and centre tailbuoys. Pods (GA18) & (HA25) now both working. Could not repair data cable to stbd tailbuoy (FA11) cable severed and unrepairable

11:05	Zodiac back on board.				
12:10	Start all guns on board to work on module one cable 3.				
12:45	Stbd guns on board.				
13:00	SSTS pinger on board.				
14:55	Port cable vane on board.				
16:10	Port cable fully redeployed. Mars on port cable vane repaired.				
16:20	Wisdom reconfigured for 4 mars ranges.				
16:50	SSTS pinger back in water.				
17:05	Pick up stbd pinger to launch zodiac. Tailbuoys crossed.				
17:45	All guns deployed.				
21:20	Tailbuoys uncrossed, turning toward line.				
23:21	Add one lane to Croppies Point.				

JD 058 27 FEBRUARY 1994 SUNDAY

00:38	(101)SOL	YOL00775	657	214°	2.3 S.
02:00	(101)EOL	YOL00775	160	214°	2.7 S.
03:00	Argo prime navigation.				
03:30	Multifix prime, Argo still noisy.				
04:04	(102)SOL	YOL00445	160	034°	2.0 P, Mars not tracking due to heavy fog.
05:56	(102)EOL	YOL00445	829	034°	1.4 S.
06:59	Argo prime navigation				
07:37	(103)SOL	YOL00739	681	214°	4.3 P.
09:07	(103)EOL	YOL00739	152	214°	3.6 P.
10:58	(104)SOL	YOL00463	164	034°	0.8 S.
12:45	(104)EOL	YOL00463	829	034°	2.2 P.
14:25	Multifix prime navigation, Argo noisy.				
14:34	(105)SOL	YOL00679	661	214°	4.0 S.

scratched due to bad weather.

16:50 Stbd gun vane lost, 39° 55.262'S; 145° 39.966'E

17:01 SSTS pingers up on booms.

17:05 Start retrieving guns.

17:55 Guns on board.

19:00 Start retrieving cables.

20:56 Stbd tailbuoy breaks away, 39° 56.5556'S; 145 47.4628'E.

21:20 Tailbuoys 2 & 3 on board.

22:30 Tailbuoy 1 sighted.

23:10 Tailbuoy 1 skypod lost during retrieval.

23:20 Tailbuoy 1 on board.

23:25 Heading to look for gun vane.

JD 059 28 FEBRUARY 1994 MONDAY

00:35 All Argo stations reading 0.30-0.40 lanes short. Phase loop reading 85-90.

00:45 Argo powered down. Ohm out cable to phase loop, showing intermittent continuity to 56 ohms.

01:00 Navigators called to bridge to assist in search for gun vane.

08:00 Search for gun vane abandoned.

08:30 SSTS hull transducers raised, sea gates closed. En route to Burnie to medivac personnel. Awaiting calmer weather to investigate Argo phase loop problem.

12:30 Investigating phase loop problem.

12:45 Phase loop cable tests good for leakage.

13:00 Phase loop resistance reading OK.

13:30 All connections cleaned and reassembled.

14:30 Argo powered up, everything normal, phase loop reading 72.

18:00 Argo on standby, cleaning antenna and insulators.

18:30 Argo to mobile.

19:31 **Start of Navigation Reel BLXNG 059**

20:40 Start crossing #1: Naracoopa to Point Sorell.

21:01 End crossing #1: Result 13m long.

21:31 Start crossing #2: North Point to Point Sorell.

21:39 End crossing #2: Result 9m long.

20:40 Start crossing #3: Naracoopa to Point Sorell.

21:01 End crossing #1: Result 13m long.

JD 060 1 MARCH 1994 TUESDAY

00:06 Start crossing #3: Naracoopa to Croppies Point.

00:15 End crossing #3: Result 13m long.

00:16 En Route to prospect.

02:00 Tailbuoy 3 deployed, Port cable going out.

06:00 Skypod on tailbuoy 2 changed out. Was 1.3 low/low S/N 202, is 1.2 high/high S/N 232. Tailbuoys now reconfigured as: Tailbuoy 1 on channel 14, 2 on channel 10 and 3 on channel 16.

06:40 Port cable deployed.

07:05 Tailbuoy 1 deployed, Stbd cable going out.

09:50 SSTS transducers deployed.

13:05 Tailbuoy 2 deployed, now has skypod 1.3 low/low, channel 12. Start cable 2 out.

17:35 Cable 2 tap tests OK. Mars prisms on gun strings replaced, old prisms have water inside. Pdop switch in TBT software set to 4, was 7 on advise from Racal.

18:14 All cables deployed.

19:30 Stbd guns deployed.

19:45 Reload Wisdom, GPIB to SSTS down.

20:43 Compass changes entered in Wisdom.

21:20 Port guns deployed, turning for line.

JD 061 2 MARCH 1994 WEDNESDAY

01:09	**Start of Navigation Reel P116-0243.**				
01:31	Prime navigation Argo.				
02:49	(106)SOL	YOL00535	181	034°	0.5 P.
04:40	(106)EOL	YOL00535	829	034°	3.0 P.
06:13	(107)SOL	YOL00781	653	214°	2.1 S, acoustic pod 16 intermittent.
07:38	(107)EOL	YOL00781	162	214°	3.5 S.
09:29	(108)SOL	YOL00505	174	034°	3.0 P, SSTS not tracking string 7.
11:15	(108)EOL	YOL00505	829	034°	0.
12:28	Lost gun vane sighted, 39° 45.1320'S; 145° 47.3115'E.				
12:36	**Line YOL00757 aborted on run-in to retrieve vane.**				
13:15	Guns on board, retrieving cables.				
20:15	Vane recovered.				
20:40	Tailbuoy 1 deployed, start deploying cable.				
22:50	Cable 1 deployed.				
23:07	Tailbuoy 3 deployed, start deploying cable. Acoustic pod 16 replaced with S/N 3319. Mounts for SSTS phones on gun strings 4, 5, 6 & 7 repaired.				

JD 062 3 MARCH 1994 THURSDAY

00:50	Prime navigation to multifix, Argo noisy.				
01:50	Tailbuoy 2 deployed, start deploying cable.				
02:00	SSTS pingers deployed.				
04:00	Ships unit not locking on to tailbuoy's 1 & 2. Alternate ships unit channels and Drake recievers tried without success.				
07:00	Argo prime navigation.				
07:37	(109)SOL	YOL00847	609	214°	2.9 S, acoustic pod 16 still intermittent.
08:50	(109)EOL	YOL00847	178	214°	3.4 S.
10:42	(110)SOL	YOL00511	175	034°	2.9 P.

14:07	(111)SOL	YOL00745	677	214°	1.4 P.

14:09 Compass 4 disabled in Wisdom, noisy.

15:37	(111)EOL	YOL00745	153	214°	1.1 P.

16:30 Vessel skypod UHF antenna changed. Tailbuoys 1 & 2 still bad.

17:41	(112)SOL	YOL00457	162	034°	1.2 P.
19:24	(112)EOL	YOL00457	829	034°	1.8 P.

20:58 Multifix prime navigation, Argo noisy.

21:15	(113)SOL	YOL00769	661	214°	2.1 S.
22:39	(113)EOL	YOL00769	159	214°	1.0 S.

JD 063 4 MARCH 1994 FRIDAY

00:22 Argo prime navigation.

00:45	(114)SOL	YOL00565	188	034°	2.6 S.
02:31	(114)EOL	YOL00565	829	034°	2.4 S.

02:40 Second in-line amplifier removed from skypod RF at Racal's advice. Tailbuoy 1 signal strength on Drake reciever was too high, reading 90-95. Now reads 80-85

04:20	(115)SOL	YOL00655	736	214°	1.0 P.

05:24 SP's 350-340, SSTS ranges to cables bad.

05:59	(115)EOL	YOL00655	132	214°	1.4 S.
07:38	(116)SOL	YOL00529	180	034°	4.0 P.

08:25 Multifix hung-up, no differential data updates for about 15 secs.

09:00 No diff data to multifix for about 15 secs.

09:07 SV 27 disabled in all Trimbles, type 16 message - bad for 12 hrs from 19:15 UTC, JD 062.

09:21	(116)EOL	YOL00529	829	034°	4.1 P.

09:25 **End of Navigation Reel P116-0243**

09:35 **Start of Navigation Reel P116-0244**

10:58	(117)SOL	YOL00763	665	214°	3.8 S.

14:22	(118)SOL	YOL00439	158	034°	2.3 S.
16:12	(118)EOL	YOL00439	829	034°	1.2 S.
17:56	(119)SOL	YOL00757	669	214°	1.2 P.

18:58 Wisdom tracking SSTS gun string 7, string 6 ranges noisy.

19:03 Wisdom tracking SSTS gun string 6.

19:21	(119)EOL	YOL00757	156	214°	1.1 S.

20:58 Multifix prime navigation, Argo noisy.

21:02	(120)SOL	YOL000541	183	034°	3.9 P.
22:48	(120)EOL	YOL00541	829	034°	2.2 P.

JD 064 5 MARCH 1994 SATURDAY

00:24 Argo prime navigation.

00:30	(121)SOL	YOL00805	637	214°	0.8 P.

00:39 Sp 581, Multifix prime navigation, Argo noisy.

00:48 SV 27 enabled in all Trimbles.

01:00 Sp 461, Argo prime navigation, Multifix noisy, only 4 SV's in constellation.

01:07 Argo smoothing in CDU increased to 3.

01:11 Sp 393, Multifix prime navigation, now has 5 SV's, Argo still noisy.

01:50	(121)EOL	YOL00805	168	214°	2.3 P.

02:05 Argo smoothing set back to 2.

03:25 Argo prime navigation.

03:42	(122)SOL	YOL00571	190	034°	4.3 S.
05:27	(122)EOL	YOL00571	829	034°	0.6 S.
07:01	(123)SOL	YOL00787	649	214°	1.0 S.
08:25	(123)EOL	YOL00787	163	214°	3.6 S.
10:19	(124)SOL	YOL00523	178	034°	5.9 P.
12:09	(124)EOL	YOL00523	829	034°	3.4 P.

cables.

17:35 **Run-in to line YOL00547 aborted due to weather noise on cables.**

21:18 Multifix prime navigation, Argo noisy.

22:05 **Run-in to line YOL00811 aborted due to weather noise on cables.**

JD 065 6 MARCH 1994 SUNDAY

00:00 Clock's retarded one hour. Local time now 10 hrs ahead of UTM.

01:23 (125)SOL YOL00559 187 034° 3.9 S.

01:52 (125)EOL YOL00559 357 034° 4.0 S, **All data scratched due to bad weather.**

04:00 Pinger power unit on port pinger changed due to intermittent short.

04:30 Croppies point Argo adjusted -1 lane.

08:00 Origional pinger power unit repaired and replaced on port pinger, replacement unit under powered.

09:09 Argo prime navigation.

09:24 (126)SOL YOL00517 177 034° 4.2 P.

11:12 (126)EOL YOL00517 829 034° 2.9 P.

11:16 **End of Navigation Reel P116-0244**

11:24 **Start of Navigation Reel P116-0245**

13:16 (127)SOL YOL00799 641 214° 1.0 S.

14:36 (127)EOL YOL00799 166 214° 2.5 P.

16:52 (128)SOL YOL00559 187 034° 3.2 S.

18:35 (128)EOL YOL00559 829 034° 0.7 S.

20:30 (129)SOL YOL00793 645 214° 2.1 S.

20:38 Multifix prime navigation, Argo noisy.

21:51 (129)EOL YOL00793 165 214° 2.4 S.

JD 066 7 MARCH 1994 MONDAY

00:00 Argo prime navigation.

01:53 (130)EOL YOL00547 829 034° 1.5 S.

03:32 Wisdom crash on run-in to line YOL00811, **End of Navigation Reel P116-0245.**

03:46 Wisdom reloaded, **Start of Navigation Reel P116-0246.**

03:47 (131)SOL YOL00811 614 214° 2.3 P, FGSP 614, Multifix prime navigation, flip flop wrong.

03:57 Sp 558, Argo prime navigation.

04:52 Sydney differential station disabled in Multifix, noisy.

05:01 (131)EOL YOL00811 169 214° 1.9 P.

05:11 Sydney enabled in Multifix.

06:43 (132)SOL YOL00595 196 034° 1.8 P.

08:29 (132)EOL YOL00595 829 034° 2.9 P.

10:00 (133)SOL YOL00853 605 214° 4.2 S.

11:10 (133)EOL YOL00853 179 214° 4.7 S.

13:07 (134)SOL YOL00589 194 034° 2.5 P.

13:38 SV 22 diabled in Trimbles.

14:51 (134)EOL YOL00589 829 034° 1.5 S.

15:14 Multifix prime navigation, Argo CDU showing comms error.

15:58 RPU to CDU cable connection tightened. Argo prime.

16:20 (135)SOL YOL00817 629 214° 2.5 P.

16:52 Multifix prime navigation, Argo noisy.

17:36 (135)EOL YOL00817 170 214° 1.9 P.

18:59 Argo prime navigation.

19:24 (136)SOL YOL00601 197 034° 1.7 P.

21:12 (136)EOL YOL00601 829 034° 2.6 P.

22:42 (137)SOL YOL00841 613 214° 3.2 S, TBT not operational. Accidently powered down by tech.

22:44 TBT back up.

23:14 Multifix and Direct Injection lost differential, dome

23:56	(137)EOL	YOL00841	172	214°	3.0 S.

JD 067 8 MARCH 1994 TUESDAY

00:40	Multifix computer re-booted, program hung up.				
01:03	(138)SOL	YOL00553	186	034°	1.0 P.
01:21	Multifix prime navigation, Argo noisy.				
03:48	(138)EOL	YOL00553	829	034°	3.3 S.
05:16	Argo prime navigation.				
05:23	(139)SOL	YOL00649	740	214°	2.5 P.
07:04	(139)EOL	YOL00649	131	214°	0.4 P.
08:42	(140)SOL	YOL00607	198	034°	3.5 P.
10:26	(140)EOL	YOL00607	829	034°	4.4 P.
11:58	(141)SOL	YOL00859	601	214°	5.4 S.
13:05	(141)EOL	YOL00859	188	214°	4.2 S.
13:19	**End of Navigation Reel P116-0246**				
13:20	Wisdom reloaded.				
13:29	**Start of Navigation Reel P116-0247**				
15:06	(142)SOL	YOL00583	193	034°	1.9 P.
16:54	(142)EOL	YOL00583	829	034°	0.9 S.
18:35	(143)SOL	YOL00643	744	214°	0.4 P.
19:06	Multifix prime navigation, Argo noisy.				
20:21	(143)EOL	YOL00643	129	214°	1.2 S.
22:09	(144)SOL	YOL00613	200	034°	3.6 P.
22:27	SV 22 enabled in all Trimbles.				
23:49	(144)EOL	YOL00613	829	034°	2.7 P.

JD 068 9 MARCH 1994 WEDNESDAY

01:15	(145)SOL	YOL00823	625	214°	0.5 P.
02:33	(145)EOL	YOL00823	172	214°	1.2 P.

04:10 Argo prime navigation.

04:14 Multifix prime navigation, Argo still noisy,

04:23 (146)SOL YOL00577 191 034° 1.8 S.

06:09 (146)EOL YOL00577 829 034° 0.4 S.

06:42 Argo prime navigation.

07:42 (147)SOL YOL00835 617 214° 1.4 S.

08:54 (147)EOL YOL00835 175 214° 2.8 S.

10:52 (148)SOL YOL00619 201 034° 5.5 P.

12:38 (148)EOL YOL00619 829 034° 3.2 P.

14:25 (149)SOL YOL00829 621 214° 2.0 S.

15:39 (149)EOL YOL00829 173 214° 1.0 P.

15:44 Multifix prime navigation, Argo noisy.

17:19 (150)SOL YOL00631 204 034° 2.9 S., **FGSP 233, seismic recording system hang up.**

19:04 (150)EOL YOL00631 829 034° 1.5 S.

19:10 Argo on standby, insulator and bottom of mast cleaned.

19:40 Argo back on mobile.

21:06 (151)SOL YOL00637 748 214° 0.4 S.

22:52 (151)EOL YOL00637 128 214° 3.1 S.

JD 069 10 MARCH 1994 THURSDAY

00:25 1 lane added to Croppies Point.

00:42 1 lane taken out of Croppies Point.

00:45 (152)SOL YOL00625 203 034° 4.8 P.

02:29 (152)EOL YOL00625 829 034° 1.8 P.

02:32 **End of Navigation Reel P116-0247**

02:37 Tape deck hung up causing Wisdom program crash.

02:45 Wisdom reloaded. JD set to 067, should be 068.

02:46 **Start of Navigation Reel P116-0248**

04:36	(153)SOL	YOL01187	510	214°	0.2 S.
05:53	(153)EOL	YOL01187	40	214°	1.8 P.
07:39	(154)SOL	YOL01367	150	034°	1.3 S.
09:32	(154)EOL	YOL01367	810	034°	1.8 P.

10:00 Argo C-O's recalculated from line sequence 143 entered in Wisdom, SD's 2-4, difference to Multifix still 7-10m. Client rep requests C-O's be returned to origional values and that we continue shooting using Multifix as prime navigation.

10:12 Multifix prime navigation.

10:20 JD in Wisdom corrected to 069.

11:29	(155)SOL	YOL01133	410	214°	3.3 S
12:31	(155)EOL	YOL01133	40	214°	3.2 S.

12:35 **End of Navigation Reel P116-0248**

12:40 Wisdom reloaded, FSID incorrect.

12:57 **Start of Navigation Reel P116-0249**

14:19	(156)SOL	YOL01349	140	034°	2.2 P.
14:19	(156)EOL	YOL01349	144	034°, **all data scratched due to weather.**	
15:33	(157)SOL	YOL10343	594	034°	0.5 P.
15:34	(157)EOL	YOL10343	601	034°, **all data scratched due to weather.**	
17:04	(158)SOL	YOL01145	400	214°	0.3 P.
18:05	(158)EOL	YOL01145	38	214°	1.9 P.
19:51	(159)SOL	YOL01349	140	034°	1.9 S.
20:27	(159)EOL	YOL01349	370	034°	0.8 S.
21:02	(160)SOL	YOL10343	594	034°	1.0 P.
21:34	(160)EOL	YOL10343	790	034°	1.1 P.
23:40	(161)SOL	YOL01067	340	214°	2.3 S.

JD 070 11 MARCH 1994 FRIDAY

00:33	(161)EOL	YOL01067	40	214°	2.7 S.

04:07 (162)SOL YOL01343 780 034° 0.5 S.

04:15 Totalnet UPS showing low battery power, Totalnet powered down to allow battery to recharge.

05:39 **Line YOL1115 aborted on run-in due to weather.**

06:38 **Line YOL10091 aborted on run-in due to weather.**

07:10 Pingers out of the water, picking up guns.

08:30 Guns on board.

10:45 String 7 SSTS phone checked. Connectors in gun shack breakout panel tightened. Tap .tests good.

18:23 Stbd guns deployed.

21:50 Stbd guns back on board.

JD 071 12 MARCH 1994 SATURDAY

00:00 Standby for weather.

04:09 **End of Navigation Reel P116-0249**, SSTS comms to Wisdom down. Wisdom reloaded.

04:18 **Start of Navigation Reel P116-0250**

07:12 (163)SOL YOL01469 034° 175 1.5 P.

09:02 (163)EOL YOL01469 034° 820 2.0 P.

11:15 (164)SOL YOL01115 214° 420 4.7 S. Mars not tracking cable vanes.

12:09 (164)EOL YOL01115 214° 80 4.9 S.

13:36 (165)SOL YOL10319 034° 301 5.2 P.

13:49 (165)EOL YOL10319 034° 380 5.3 P.

15:23 (166)SOL YOL10091 214° 184 5.1 S.

15:49 (166)EOL YOL10091 214° 32 5.3 P.

17:32 (167)SOL YOL01421 034° 300 2.2 P.

18:56 (167)EOL YOL01421 034° 825 0.5 P.

20:58 **Run-in to line YOL01055 aborted due to weather.**

JD 072 13 MARCH 1994 SUNDAY

02:40	Mars not tracking cable vanes.				
02:56	(168)SOL	YOL01055	214°	358	4.1 S.
03:50	(168)EOL	YOL01055	214°	40	3.4 S.
05:48	(169)SOL	YOL01451	034°	170	1.6 P.
07:34	(169)EOL	YOL01451	034°	820	0.9 P.
07:56	Argo prime navigation.				
09:30	(170)SOL	YOL10109	214°	406	1.7 S.
09:36	(170)EOL	YOL10109	214°	374	1.7 S.
10:07	(171)SOL	YOL01085	214°	184	4.5 S.
10:31	(171)EOL	YOL01085	214°	40	1.5 S.
12:19	(172)SOL	YOL01439	034°	170	2.7 P.
13:21	(172)EOL	YOL01439	034°	545	3.2 P.
15:08	(173)SOL	YOL01679	214°	450	3.1 S.
16:00	(173)EOL	YOL01679	214°	140	3.0 S.
17:40	(174)SOL	YOL01487	034°	170	3.4 P.
19:10	Multifix prime navigation, Argo noisy.				
19:21	(174)EOL	YOL01487	034°	820	0.9 P.
19:28	**End of Navigation Reel P116-0250**				
19:32	**Start of Navigation Reel P116-0251**				
21:00	**Line YOL01667 aborted on run in due to weather.**				
23:03	SSTS pingers retrieved.				

JD 073 14 MARCH 1994 MONDAY

00:00	Standby for weather.
00:05	Guns on board
05:53	3 lanes added to Croppies Point.
07:00	Guns deployed.
07:26	Argo prime navigation.

10:29	(175)SOL	YOL01517	034°	177	3.2 P.
12:18	(175)EOL	YOL01517	034°	820	2.7 P.
14:06	(176)SOL	YOL01739	214°	681	2.6 S.
15:34	(176)EOL	YOL01769	214°	160	4.3 S.
14:06	(177)SOL	YOL01637	034°	206	9.2 P.
18:54	(177)EOL	YOL01637	034°	820	2.6 P.

20:25 Multifix prime navigation, Argo noisy.

20:37	(178)SOL	YOL01709	214°	701	0.5 S.
22:13	(178)EOL	YOL01709	214°	155	2.7 S.

JD 074 15 MARCH 1994 TUESDAY

00:06	(179)SOL	YOL01499	034°	173	4.2 P.
01:59	(179)EOL	YOL01499	034°	820	3.4 P.

03:28 Argo prime navigation.

03:40	(180)SOL	YOL01667	214°	720	1.2 S.
05:13	(180)EOL	YOL01667	214°	175	3.4 P.

06:00 **Turning off run-in to line YOL01595 for medivac chopper.**

06:20 Mars LRU removed from helideck.

07:55 Chopper away, heading for line.

08:40 Mars LRU re-installed on helideck, working OK.

10:07	(181)SOL	YOL01835	034°	260	1.2 S.
11:06	(181)EOL	YOL01835	034°	620	4.0 S.
12:47	(182)SOL	YOL01751	214°	556	3.4 S.
13:55	(182)EOL	YOL01751	214°	160	3.3 S.
15:12	(183)SOL	YOL01595	034°	335	5.1 P.
16:32	(183)EOL	YOL01595	034°	820	2.5 P.
18:19	(184)SOL	YOL01685	214°	680	1.7 S.
19:51	(184)EOL	YOL01685	214°	145	0.7 S.

20:57	(185)SOL	YOL01817	034°	385	1.5 S.
21:49	(185)EOL	YOL01817	034°	695	0.2 P.

23:01 Argo prime navigation.

23:51	(186)SOL	YOL01649	214°	735	0.

JD 075 16 MARCH 1994 WEDNESDAY

00:55	(186)EOL	YOL01649	214°	365	0.8 S.
03:48	(186)SOL	YOL01661	214°	605	1.4 S.

03:56 SP 558, Multifix prime nav, Argo CDU editing stations, phase loop reading 72-75.

05:13	(187)EOL	YOL01661	214°	140	3.1 S.

05:16 **End of Navigation Reel P116-0251**

06:15 SSTS pingers and transducers up, sea gates closed.

06:52 Guns on board

07:55 Argo mast cleaned, phase loop still 72-75.

11:00 Cables and tailbuoys on board. Stbd tailbuoy box damaged during retrieval.

12:45 Argo on standby, insulator and phase loop connections cleaned.

13:20 Argo mobile, phase loop reading 70-72.

15:26 Start baseline crossing Naracoopa to Croppies Point.

15:33 End baseline crossing Naracoopa to Croppies Point, 10M long.

15:26 Start baseline crossing North Point to Croppies Point.

15:33 End baseline crossing North Point to Croppies Point, 6M long.

15:26 Start baseline crossing Naracoopa to Point Sorell.

15:33 End baseline crossing Naracoopa to Point Sorell, 13M long.

15:26 Start baseline crossing North Point to Point Sorell.

15:33 End baseline crossing North Point to Point Sorell, 9M long.

19:45 Argo stations released by client rep for de mobilisation.

APPENDIX A - NAVIGATION

1. NAVIGATION CONTRACTOR'S REPORT - RACAL SURVEY AUSTRALIA

501501

POSITIONING CONTROL

FOR

WESTERN GEOPHYSICAL CO LTD

AND

SAGASCO

SUBJECT	:	**SKYFIX POSITIONING**
VESSEL	:	**WESTERN ATLAS**
LOCATION	:	**YOLLA 3D SEISMIC SURVEY, BASS BASIN**
DATE	:	**19th JANUARY - 16th MARCH 1994**
REFERENCE	:	**2179A**

501502

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1. ABSTRACT

RACAL SURVEY AUSTRALIA LIMITED (Racal) were contracted by WESTERN GEOPHYSICAL CO LTD (Westerns) to supply "Skyfix" DGPS as positioning for seismic work onboard the "Western Atlas" in the Yolla 3D Seismic Survey, Bass Basin prospect for Sagasco.

The work was carried out in the field between the 19th January - 16th March 1994.

2. GLOBAL POSITIONING SYSTEM (GPS)

2.1 SYSTEM DESCRIPTION

The NAVSTAR GPS (Navigational Satellite Timing and Ranging Global Positioning System) is an USA Military all- weather, space-based positioning system that transmits signals from a constellation of satellites orbiting the Earth. It is capable of providing suitably equipped users worldwide with accurate three dimensional positions on, or near, the Earths' surface. The accuracy of these determined positions can vary from a few millimetres to 100 metres depending on the method of data acquisition and processing. System design consists of three integrated parts: the Ground Control Segment, the Space Segment and the User Segment.

The operational space segment consists of 21 production satellites and 3 active spares; the term Space Vehicle (SV) is used as a synonym for satellite. The satellites are in high orbits, at approximately 20,200km, having an orbit period of 12 hours. They are arranged in 6 orbital planes, inclined at 55 degrees with near circular orbits. The configuration provides complete 4 satellite (3D) coverage worldwide.

The current configuration consists of both Block I (testing) and Block II satellites orbiting and transmitting healthy data. GPS Constellation history and status as of March 1994 is as follows:

Navstar#	SVN/PRN	Launch	Slot	Operational	Nav Lost	Reason for Failure	Months Operational
I-1	1/4	22/02/78	**	29/03/78	25/01/80	Clock	20
I-2	2/7	13/03/78	**	14/07/78	30/07/80	Clock	25
I-3	3/6	06/10/78	**	09/11/78	19/04/92	Clock	161
I-4	4/8	11/12/78	**	08/01/79	27/10/86	Clock	93
I-5	5/5	09/02/80	**	27/02/80	28/11/83	Wheel	45
I-6	6/9	26/04/80	**	16/05/80	10/12/90	Wheel	127
I-7	7/	18/12/81	**			Booster	0
I-8	8/11	14/7/83	**	10/08/83	04/05/93	EPS Degr.	116
I-9	9/13	13/06/84	C4	19/07/84	Operating		116
I-10	10/12	08/09/84	A1	03/10/84	Operating		112
I-11	11/3	09/10/84	C1	30/10/85	Operating		100
II-1	14/14	14/02/89	E1	14/04/89	Operating		58
II-2	13/2	10/06/89	B3	12/07/89	Operating		55
II-3	16/16	17/08/89	E3	13/09/89	Operating		53
II-4	19/19	21/10/89	A4	14/11/89	Operating		51
II-5	17/17	11/03/89	D3	11/01/90	Operating		49
II-6	18/18	24/01/90	F3	14/02/90	Operating		48
II-7	20/20	25/03/90	B2	19/04/90	Operating		46
II-8	21/21	02/08/90	E2	31/08/90	Operating		42
II-9	15/15	01/10/90	D2	20/10/90	Operating		40
II-10	23/23	26/11/90	E4	10/12/90	Operating		38
II-11	24/24	03/07/91	D1	30/08/91	Operating		30
II-12	25/25	23/02/92	A2	24/03/92	Operating		23
II-13	28/28	10/04/92	C2	25/04/92	Operating		22
II-14	26/26	07/07/92	F2	23/07/92	Operating		19
II-15	27/27	09/09/92	A3	30/09/92	Operating		16
II-16	32/1	22/11/92	F1	11/12/92	Operating		14
II-17	29/29	18/12/92	F4	05/01/93	Operating		13
II-18	22/22	03/02/93	B1	04/04/93	Operating		10
II-19	31/31	30/03/93	C3	13/04/93	Operating		10
II-20	37/7	13/05/93	C4	12/07/93	Operating		8
II-21	39/9	26/06/93	A1	20/07/93	Operating		7
II-22	35/5	30/08/93	B4	28/09/93	Operating		5
II-23	34/4	26/10/93	D4	29/11/93	Operating		3
II-24	36/6	10/03/94	C1	28/03/94	Operating		0

Projected Launch Dates (Net Date)

(Note: SVN 38 & 33 Launch Projected for FY '94,
SVN 40 & 30 Launch Projected for FY '95,
Actual Launches will be 'Launch on Need').

The amount of coverage that the satellite configuration provides depends upon the geographical position of the user. It should be noted that available coverage does not represent actual useable working periods, as the satellites will, at times, combine to produce poor geometry and therefore poor positioning. This can happen for short periods during the middle of multi-satellite coverage and is a result of the limited satellite constellations presently available. It is essential to ascertain the periods of good coverage prior to commencing any project involving GPS.

Individual satellites can be set 'unhealthy' from time to time whilst they are manoeuvred into new orbital planes or due to other operational circumstances which are usually predicted. The status of GPS and individual satellites can be obtained from one of the USA based GPS Bulletin Board Services. Prior to a project commencing, Racal Australia download by modem, the current status and almanac file, usually from the US Coast Guard Bulletin Board. In addition the Racal Survey Ltd office in Great Yarmouth, England monitor the GPS status daily and fax to all Racal operating companies any Notice Advisory to NAVSTAR Users (NANU's) that may affect the operational capabilities of the system.

2.2 GPS OBSERVATIONS

There are two important types of GPS observations (observables):

Pseudo-range and Carrier phase.

Carrier phase is sometimes also referred to as carrier beat phase. Pseudo-range techniques are generally used for navigation e.g. Deltanav or Multifix. In high-precision baseline surveying the carrier phase is used. Although the (undifferenced) phase can be used directly, it has become common practice, at least in surveying applications, to process certain linear combinations of the original carrier phase observations (double differences and triple differences).

Pseudo-ranges

The pseudo-range is a measure of the distance between the satellite and the receiver at the epochs of transmission and reception of the signals. The transit time of the signals is measured by comparing (correlating) identical pseudo-random noise (PRN) codes generated by the satellite and by the receiver. A code-tracking loop within the receiver shifts the internal replica of the PRN code in time until maximum correlation occurs. The codes generated at the receiver are derived from the receiver's own clock, and the codes of the satellite transmissions are generated by the satellite system of clocks. It follows that unavoidable timing errors in both the satellite and the receiver clock will cause the measured quantity (pseudo-range) to differ from the geometric distance.

In offshore applications, where instantaneous positions are required, Pseudo-range is the preferred observable. Given the satellite ephemeris (i.e. the position of the satellite at the epoch of transmission), there are seven unknowns: two clock errors, three receiver co-ordinates and the ionospheric and tropospheric delays. The effect of the satellite clock error is negligible for the typical navigation solution, particularly considering that the time errors are indistinguishable from the ionospheric and tropospheric delays. The satellite clocks are constantly monitored and synchronized with GPS time as maintained by the control centre. Actual offsets of the satellite clocks are approximated by polynomials in time and transmitted as part of the navigation message to the user for the correction of the measured pseudo-ranges. The ionospheric and tropospheric delays can be computed on the basis of ionospheric and tropospheric models, thus there are four unknowns left X, Y, Z and receiver clock error. These can be determined from four pseudo-ranges measured simultaneously to four GPS satellites.

Carrier Phase

The phase observable is the difference between the phase of the carrier signal of the satellite, measured at the receiver, and the phase of the local oscillator within the receiver at the epoch of measurement. This can be regarded as a biased range measurement of the satellite-receiver distance with the integer number of carrier waves being unknown. The wavelength of the L1 carrier is about 19cm. Because of the fraction of the carrier phase is measured, the term "interferometry" is often used to describe carrier phase techniques.

2.3 DIFFERENTIAL GPS (DGPS)

As the GPS is primarily a USA Defence system and the navigation accuracy to the civil user is degraded to about 100 metres standard deviation (Standard Position Service -SPS), as specified in the USA 1990 Federal Radio Navigation Plan. The means by which the USA Military degrade GPS is with the use of Selective Availability (SA) to control the accuracy of Pseudo-range measurements. Essentially, the user is given a false Pseudo-range for each satellite so that the resulting measurement is in error by a controlled amount.

DGPS is a means by which the civil user can overcome Selective Availability. It requires a receiver be located at a precisely known point from which Pseudo-range corrections for each satellite can be determined and monitored. These Pseudo-range corrections are then communicated by means of a telecommunications link to users at unknown locations. The DGPS technique has proven to be particularly effective and can improve the accuracy figure to 5 metres or better with or without Selective Availability activated. In the relative mode, most of the important systematic errors common to the known station and at the unknown location cancel out to improve the accuracy of the computed position.

2.4 "SKYFIX" DIFFERENTIAL LINK

Racal Survey Australia Limited introduced its SkyFix Differential GPS System in Australia in January 1991, using the Inmarsat Pacific and Indian Ocean marine communications satellites as the differential data broadcast link. Extensive performance trials and projects undertaken to date have shown SkyFix to meet the best industry expectations in terms of quality of service and accuracy.

The system embodies the successful combination of data capacity, range and coverage with a flexible networked approach that lends itself to comprehensive performance and quality monitoring.

The link capacity of 1200 bits per second allows data from a number of networked reference stations to be sent simultaneously without introducing unacceptable delays between reference station and user. With four reference stations each generating correction data for ranges from eight satellites, an update rate of better than three seconds is achieved by the SkyFix system.

Satellite communications systems, particularly at the Inmarsat L-band frequencies of 1.5 GHz are reliable and free of the interference associated with the crowded M.F./H.F. bands. This high data integrity gives users confidence that the corrections will be continuously received without interference.

The SkyFix Australian network commenced operation in January 1991, and now comprises reference stations at Dampier, Broome, Perth, Adelaide, Melbourne, Sydney, Cairns and Darwin.

The differential corrections generated at each reference station are brought via landline links, to the data hub and control centre in Singapore; where the system is monitored for performance and quality. From there, a composite message containing full RTCM 104 version 2 formatted data from all reference stations is sent via dual redundant links to Satellite Earth Stations at Sentosa Island, Singapore and O.T.C. Perth, Western Australia, for uplink and broadcast over the Inmarsat Pacific and Indian Ocean Region satellites.

The design of reference station networks provides a high quality service to major offshore hydrocarbons prospect areas, each of which, ideally, will be within coverage of more than one reference station.

The system is easily expandable to provide new areas of coverage by the addition of further networked reference stations; with the correction data from these automatically included in the system performance and quality control function at the control centres.

Whilst the DGPS service provider has no control over the operation of the GPS system itself, performance can be monitored, quantified and reported to users. The functions of the SkyFix data hub and control centre in Singapore are of fundamental importance, as its role is to guarantee the best possible system performance.

The SkyFix system includes a 24 hour monitoring facility to ensure the validity of data received at the control centre from the DGPS reference stations, and that the same data are received over the SkyFix satellite data link.

The monitor system that has been developed by Racal Survey is designed to provide maximum system performance information availability whilst providing a rapid indication of performance or fault problems should they occur. Monitoring and control functions therefore include extensive analysis, archiving of the reference corrections and the comparison of range rate corrections - arriving from different stations within the network. The system also receives the broadcast message from the satellite data link and applies this data to a monitor receiver at the control centre to verify positioning performance. Time series plots of this performance, in latitude, longitude, height, together with PDOP and HDOP figures are generated.

Monitoring the data on the link, in this way, also allows link performance to be appraised in terms of message success rate and in terms of overall system message delay.

Other functions include satellite status information, data recording, and a procedural approach to providing client information.

The SkyFix combination of the Inmarsat satellite communications links using the RTCM 104 Version 2 DGPS data protocol, the reference station, monitoring and user infrastructure have been shown, through a growing body of project trials experience to provide a Differentially GPS operating environment consistently capable or providing position accuracy's of 5 metres or better.

The SkyFix scheme is a homogeneous network within the WGS 84 geodetic reference frame. The original network, prior to the Australian extension included ten primary triangulation stations for which the WGS 84 values were supplied. The vectors established during this build up create a network between the Far East, Australia and Europe. Purely for the purposes of testing the strength and internal consistency the network has been subjected to a least squares adjustment by variation of co-ordinates. In the final analysis, two of the primary triangulation stations, Dongara 38 (W.A.) and Matera (Italy), were held fixed. The residual errors pertaining to the remaining eight primaries are listed below. For all stations included in the final analysis, the mean semi-major axis of the twenty-nine 95% error ellipsoids is just over 0.6 metres. The total variation about this mean is contained within plus or minus 0.6 metres.

Station	Latitude	Longitude	Height	Misclosure
Port Stanley (Hong Kong)	0.53m	- 1.56m	- 0.53m	1.73m
TC 58 (Abu Dhabi)	0.76m	- 0.97m	0.83m	1.49m
Station Hill(Broome W.A)	0.35m	0.50m	- 1.23m	1.95m
Gnangara (Perth W.A.)	1.04m	1.00m	- 1.82m	2.32m
Bologna (Italy)	- 0.14m	0.02m	0.39m	0.41m
Brimmond Hill (Scotland)	- 2.85m	0.32m	1.16m	3.09m
Dunnet Head (Scotland)	- 1.59m	1.50m	0.81m	2.04m
Tromso (Norway)	- 1.11m	2.25m	- 0.81m	2.64m

For the Australian extension to the network, two primary geodetic points were used at each site, together with the transportable laser ranging site, Gnangara 73, in Perth. Additional data were also obtained from AUSLIG for Darwin, Karratha and Tidbinbilla fiducial sites and included in the "SkyFix" adjustment. Trimble 4000 SST geodetic receivers were used to simultaneously obtain phase data which were then post processed to derive the vectors between sites. These vector results were entered into "Geolab" 3D adjustment software, to obtain adjusted values for the reference stations.

2.5 TRIMBLE 4000DLII GPS RECEIVER

The Trimble 4000DLII GPS receiver is designed for moderate precision static and dynamic positioning applications. The GPS receiver provides time and three-dimensional station co-ordinates at a once-per-second update rate.

The receiver receives the civilian coded signal (C/A) from the GPS NAVSTAR satellites. The receiver automatically acquires and simultaneously tracks GPS satellites and precisely measures carrier and code phase and computes position and velocity.

Latitude, longitude and height values are output on the World Geodetic System (WGS 84) Earth-centred, Earth-fixed co-ordinate system.

The receiver is designed to measure the following observables:

- Coarse/Acquisition (C/A) code Pseudo-ranges
- Rate of change of Pseudo-range
- Integrated Carrier

C/A code correlation techniques measure the propagation time of the signal from the satellite to the antenna. Latitude, longitude, height and time can be determined from measurements made from at least 4 satellites, by a process similar to triangulation.

To determine speed and heading, the receiver calculates the rate of change of Range (the range-rate) by measuring the Doppler shift of the carrier.

It is capable of receiving and processing differential corrections from other reference sources using the standard format of the Radio Technical Commission for Maritime Services, Special Committee 104 (RTCM SC-104), Version 1.0 or 2.0 protocols.

The 4000DL has several options available, including internal data logging memory, event marker logging etc. and therefore may be used alone or as part of a more extensive navigation system.

3. EQUIPMENT

Skyfix System	Serial Number
1 x "Skyfix" Radome	36
2 x Demodulators and Cables	2269/172, 2078/009
2 x Trimble 4000 DL	1531, 756
2 x Trimble 4000 DL antenna	
1 x Antenna Control Unit	176
1 x Compaq 486	317
1 x Compaq 486 prolinea	51671

4. GEODETIC PARAMETERS

The location co-ordinates are defined on Australian Geodetic Datum 1984 (AGD 84).

The Global Positioning System (GPS) is referenced to the World Geodetic System 1984 (WGS 84).

4.1 DATUMS

Datum	:	**Australian Geodetic Datum 1984**
Spheroid	:	Australian National
Semi-major Axis (a)	:	6 378 160.000m
Semi-minor Axis (b)	:	6 356 774.719m
Eccentricity Squared (e^2)	:	0.006 694 542
Flattening (1/f)	:	298.25
Datum	:	**World Geodetic System 1984**
Spheroid	:	WGS 84
Semi-major Axis (a)	:	6 378 137.000m
Semi-minor Axis (b)	:	6 356 752.3142m
Eccentricity Squared (e^2)	:	0.006 694 380
Flattening (1/f)	:	298.257 223 563

4.2 PROJECTION

Projection	:	**Universal Transverse Mercator**
AMG Zone	:	51
Central Meridian (C.M.)	:	123° East
Scale factor on the C.M.	:	0.9996
False Easting	:	500 000m
False Northing	:	10 000 000m
Latitude of Origin	:	0° (Equator)
Unit of Measure	:	International Metre

4.3 DATUM TRANSFORMATION

The following 7-parameter datum transformation was used to convert WGS 84 co-ordinates to AGD 84 co-ordinates:

Dx =	+116.00m
Dy =	+50.47m
Dz =	-141.69m
Rx =	+0.230"
Ry =	+0.390"
Rz =	+0.344"
Scale (K) =	-0.0983

Note: The sign conventions used in Racal software in the datum transformations were derived as follows:

GNS Survey Software:
The convention used is that used by the US Department of Defence and by Higgins (Transformation from WGS 84 to AGD 84 - An Interim Solution), where a positive rotation about the Z axis is an anti-clockwise movement of the X and Y axes (when viewed from the North Pole looking towards the centre of the Earth).

5. ADELAIDE, MELBOURNE AND SYDNEY REFERENCE STATION DESCRIPTIONS

RACAL SURVEY AUSTRALIA

STATION SUMMARY

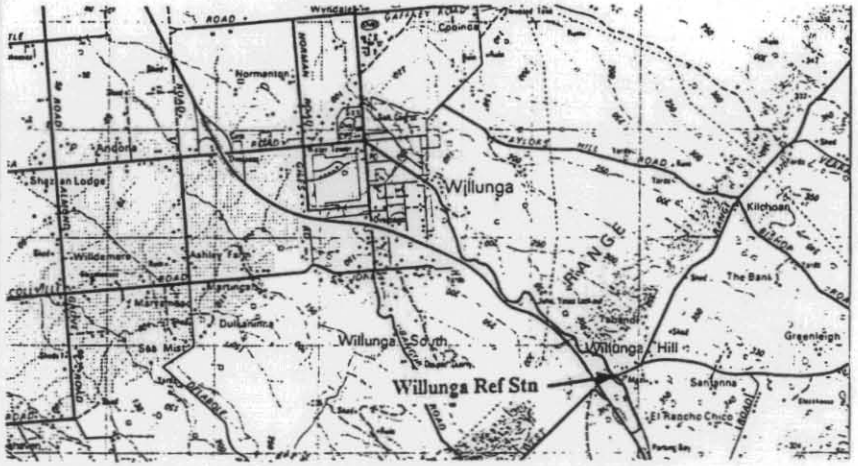
501514

5 cm

CLIENT SkyFix	JOB NO. 2029
LOCATION Corner of Meadows Road and Old Victor Harbor Road, Willunga, S.A.	
ORIGINAL STATION ESTABLISHED BY Racal Survey Australia	DATE 12/02/93
EXISTING STATION ESTABLISHED BY	DATE
MAP REFERENCE	PHOTO REFERENCE

STATION NAME/NUMBER Willunga Hill SkyFix Control Point		ORDER 1
DATUM WGS 84	a: 6 378 137.000 metres 1/f: 298.257 223 563	
LATITUDE: 35° 17' 30.559" South	LONGITUDE: 138° 34' 48.914" East	
U.T.M. ZONE	EASTING	NORTHING
Height 368.04 metres		

LOCALITY AND ACCESS DIAGRAM



REMARKS

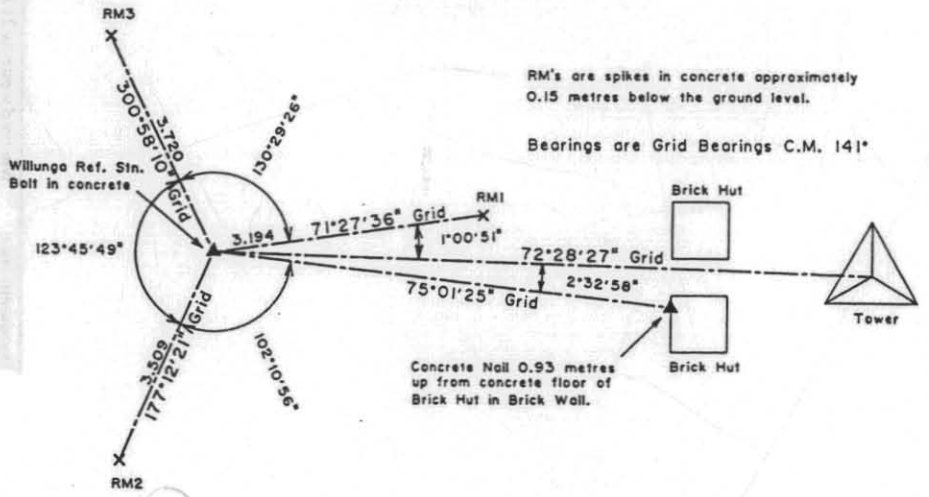
Willunga Hill Control Point was established by GPS survey. The mark is situated on council land on the south east corner of the intersection of the Old Victor Harbor Road and Meadows Road. The mark is approximately 42 metres to the west of the tower.

Access by vehicle with travelling time of approximately one hour from the Adelaide CBD.

Power (240 volts) and telephone (085 564 031) is available on site. Water is available from the service station opposite the tower.

SIGNED Anthony Kerr

STATION DIAGRAM



STATION DESCRIPTION

The station mark consists of a 0.300 metre long bolt set in concrete, with a star iron picket hammered into the ground adjacent to the mark. There are three reference marks concreted round the mark. These reference marks are approximately 0.150 metres below the surface of the ground.

Access

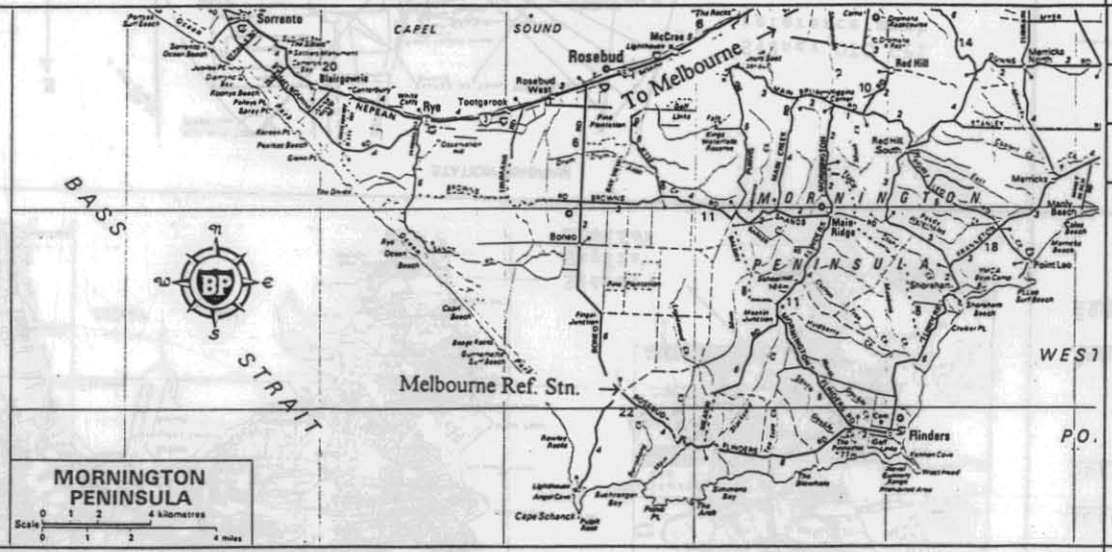
From the Adelaide CBD travel south west along the Anzac Highway. Turn left and travel south along Main South Road. Turn left into the Victor Harbor Road (Noarlunga - Victor Harbor Road) and travel south for 16.9 km past the McLaren Vale turnoff, past the Willunga turnoff and turn left into the old Victor Harbor Road. Travel for 0.7 km until the intersection of the old Victor Harbor Road and Meadows Road.

RACAL SUR[illegible] AUSTRALIA

501515

STATION SUMMARY

CLIENT	SkyFix	JOB NO.	A2188	STATION NAME/NUMBER	Melbourne SkyFix Control Point	ORDER 1
LOCATION	OTC Melbourne Radio Station, Cape Schanck Victoria			DATUM WGS 84	a: 6 378 137.000m	1/f: 298.257 223 563
ORIGINAL STATION ESTABLISHED BY	Racal Survey Australia	DATE	January 1994	LATITUDE: 38° 27' 52.89374 South		LONGITUDE: 144° 54' 46.61192" East
EXISTING STATION ESTABLISHED BY		DATE		U.T.M ZONE	EASTING	NORTHING
MAP REFERENCE		PHOTO REFERENCE		Height	=	139.192m (Spheroidal)



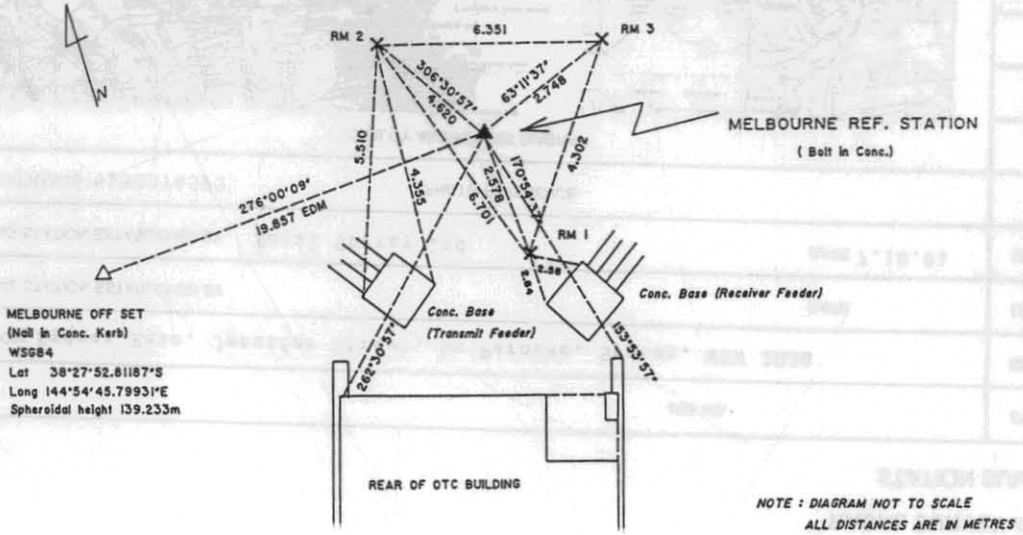
REMARKS

Melbourne Control Point was established by GPS survey. The mark is situated in the rear yard of the OTC Melbourne Radio Station which is private property. Permission for access to the Station should be sought from the Manager, OTC Melbourne Radio Station, Cape Schanck Victoria. Phone (059) 886 261.

Access is available by 2 wheel drive vehicle with travelling time of approximately 1½ hours from the Melbourne CBD.

Power (240 volts) and telephone is available on site.

SIGNED



STATION DESCRIPTION

The station mark consists of 0.300 metre long bolt set in concrete, with a brass plaque set in the concrete indicating the property of Racal Survey Australia Limited. Three iron spike reference marks have been concreted around the mark, approximately 0.150 metres below the surface of the ground.

ACCESS

From the Melbourne GPO head South East using the South Eastern Arterial (Route 1), Springvale Road (Route 40) and the Mornington Peninsula Freeway/Mooroduc Road (Route 11) for approximately 85 kilometres until the end of the Mornington Peninsula Freeway is reached. At the roundabout turn left and head south along Boneo Road (Route 67) passing straight through another roundabout and past the turn off to Cape Schanck for 10.7 kilometres until OTC is reached on the left.

5 cm

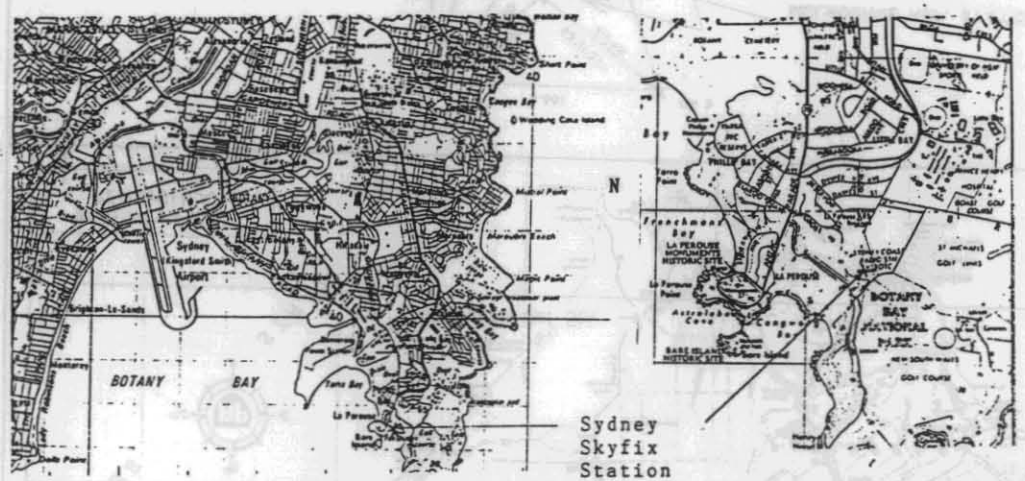
RACAL SURVEY AUSTRALIA

STATION SUMMARY

5 cm

CLIENT	JOB NO.	STATION NAME/NUMBER Sydney OTC 501516 — ORDER 1
LOCATION Sydney Raio, Jennifer Street, La Perouse, Sydney, NSW 2036		DATUM WGS 84 a: 6 378 137.000m 1/f: 298.257223563
ORIGINAL STATION ESTABLISHED BY	DATE	LATITUDE: 33° 59' 12.38163" S LONGITUDE: 151° 14' 24.71470" E Sph ht. 70.212m
EXISTING STATION ESTABLISHED BY Racal Survey Ltd	DATE 7.10.91	U.T.M. ZONE EASTING NORTHING
MAP REFERENCE 9130374372	PHOTO REFERENCE	

LOCALITY AND ACCESS DIAGRAM



REMARKS

Access: Contact station Manager prior to visit. Tel: 311 0626 Fx: 311 3455.

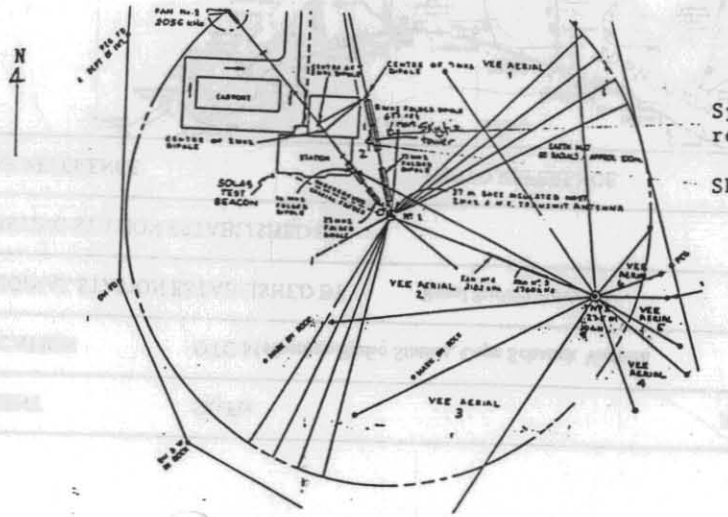
Survey Method: Sydney OTC GPS reference marker was positoned by static dual frequency phase differential GPS relative to Fleurs 7279, Watsons Bay (P) 7282 and the transportable SLR site, Perth, W.A.

Satellite Visibility: Good.

Equipment Requirements: Tripod over mark, 30m cable run to 240V power supp.

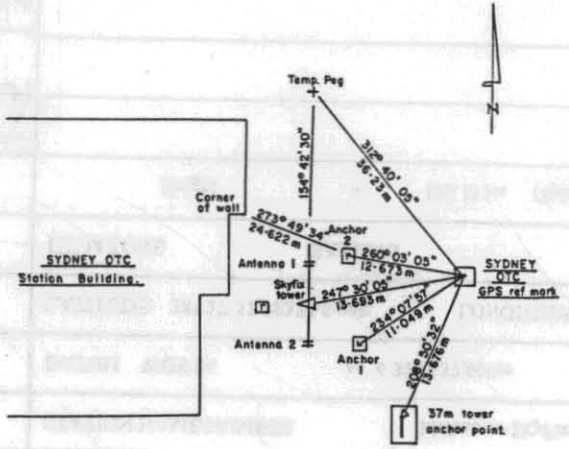
SIGNED M. Thach

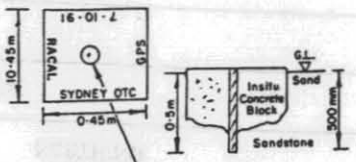
STATION DIAGRAM



STATION DESCRIPTION

G.P.S. Reference Marker





Galvanised steel expansion bolt set in concrete filled steel pipe fixed in 0.45m² insitu concrete block.

6. DISTRIBUTION

Copies of this report have been distributed as follows:

Western Geophysical Co. Limited Attn: Mr. Bluey Dean	:	2 copies
Racal Survey Australia Limited	:	1 copy

Gareth Jones
Area Surveyor

501518

APPENDIX A - NAVIGATION

2. QC REPORT

501519

WESTERN GEOPHYSICAL COMPANY OF AMERICA

3DQC REPORT

REPORT # Q01-YOLLA-3D

February 05 to March 16 1994

Survey : YOLLA 3-D
Block : T/RL 1
Area : Bass Basin, Australia
Vessel : Western Atlas P-116
Client : SAGASCO RESOURCES LTD

Prepared By: Steve Metcalfe BASc

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Appendix I — SYSTEM OVERVIEWS
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Appendix II — SSTS , WISDOM PARAMETERS & MAGNETIC DECLINATION CALCULATIONS

Appendix III — COMPASS LOGS

Appendix IV — COMPASS VERIFICATION RESULTS

Appendix V — FLEXQC COORDINATES , FINAL GRID STATISTICS & LINE LISTING

Appendix VI — SIGNIFICANT EVENTS LOG

1.0 GENERAL SURVEY DESCRIPTION

The YOLLA-3D seismic survey was acquired by the M/V WESTERN ATLAS for SAGASCO RESOURCES LIMITED east of King Island Bass Strait Australia.

The M/V WESTERN ATLAS was configured with three 3000m cables of WG-24 type and a dual source array totalling 2700 cubic inches. Each cable was configured with 240 channels at 12.5 metre intervals. This configuration enabled the Atlas to acquire 6 CMP's per swath. Seismic data was acquired using a record length of 6.0 seconds sampled at a 2 millisecond sampling rate.

The prospect area was approximately 1742 sail-line kilometres (full fold) and 261.4 square kilometres. Sail-lines 1-187 and 637-859 were shot in the 214° direction while sail-lines 193-631 were shot in the 034° direction. Acquisition commenced on the 5th February 1994 with line YOL00013 commencing production at 19:53 hours local. GMT to local time conversion is +11 hours.

TABLE 1.0 3D- Report Information

SEQ	DATE	JD	LINE	SEIS TAPE	NAV TAPE	QC REPORT
001	05 FEB.	036	YOL00013	000001	P116-0230	3DQC REPORT Q01 - YOLLA 3D
187	16 MAR.	074	YOL01661	004880	P116-0251	

2.0 KEY PERSONNEL

CLIENT CONTACT	:	SAGASCO RESOURCES LIMITED
ONBOARD CLIENT REP.	:	Frank Renton / Rodney Waldron
NAV. REP.	:	Matt Ulvr-Green / Roger Loweth
RACAL NAV.	:	Barry Slevin
CREW SUPERVISOR	:	Terry Leighton
PARTY MANAGER	:	John Evans
SAFETY OFFICER	:	Lyall Cowan
CO-ORDINATOR	:	Bill Williams / Dickie Chow
	:	Hamish Hume
QUALITY CONTROL	:	Steve Metcalfe (Geophysicist)
	:	Gary Nicholson (Surveyor)
SHIFT LEADER	:	Mark Donnison / Mark Whetton
	:	Matt Sussmilch / John Miears
SENIOR NAVIGATOR	:	Hugh McMiniman / Tom Koleske
	:	Steve Elliot
GUN CHIEF	:	Steve French / Tommy Means
INSTRUMENT TECH.	:	Kevin Roberts / Ernest Dale
COMPRESSOR MECH.	:	David Hill / Galen Hieb
	:	Andrew Powell

3.0 LINE NAMING CONVENTION

The sail line naming convention adopted for the YOLLA 3D seismic survey followed the general format of, **YOL**###** where:

YOL = Prefix denoting the YOLLA 3D survey.
** = numerical prefix to designate; **PRIME - 00**
INFILL - 01
RESHOOT - 10
= the number of the lowest cmp line acquired.

EXAMPLE: For instance;

A) YOL00001, designated the CMP prime line 001, acquiring cmp's 001-006.
B) YOL10013, designated the first reshoot of prime line 013.
C) YOL21013, designated the second attempt at reshooting the infill of line 013.

NOTE: Any additional attempts to complete a prime line is termed a reshoot.

4.0 SOFTWARE/FIRMWARE

CNAVCHK	: 4.0 rev F	Nav. Post Processing
UNAVCHK	: 2.0	Nav. Post Processing
RAMESSES	: V 7.32	Real Time Seismic Processing
DigiCOURSE software	: 6.05.01-D	Cable acoustic system
DigiCOURSE firmware	: V 6.04	Cable acoustic system
FLEXQC	: 4.0 N	Real time binning
NIU	: 1.0 F	Navigation Interface Unit
SSTS	: 5.1	Cable and source positioning
User Header	: 6	User header format
MARS	: 3.3	Marine Angle Ranging System
WISDOM II	: 50	Integrated Nav. system
NAVC	: 1.4	Navigation tape format
WG-24 firmware	: 2.1	Recording system
Seis QC	: 2.1	Recording system QC
WG-24 OBSERVER LOG	: 3.2	WGC Seismic Survey Log
WG-24 REEL LOG	: 3.2	WGC Seismic Tape Reel Log

5.0 GEODETIC PARAMETERS

5.1 Spheroid

Spheroid	: Australian National
Semi-major axis	: 6378160.000
Flattening	: 0.003352891869
Inverse Flattening	: 298.25

5.2 Projection

Projection	: Universal Transverse Mercator , South (UTS)
False Northing	: 10,000,000.000
False Easting	: 500,000.00000
Central Meridian	: 147 Degrees 0 Minutes East
Scale Factor	: 0.99960000

5.3 Datum Shift

Seven Parameter Datum Shift from W.G.S 84 to A.G.D 84 .

X-Shift	: 116.00
Y-Shift	: 50.47
Z-Shift	: -141.69
X-Rotation	: 1.1150710
Y-Rotation	: 1.8907730
Z-Rotation	: 1.6677590
Scale Factor	: -0.09830000

Geoid - Spheroid Separation = -1.00 m

6.0 SEISMIC CONFIGURATION AND PARAMETERS

6.1 Energy Source

The R/V Western Atlas was equipped with Litton Low Pressure 1800 psi airguns in a dual energy source array. The dual energy source configuration was composed of three gun strings per array, 18 metres in length. Gun strings 2 - 4 were assigned to the starboard array while gun strings 5 - 7 were assigned to the port array. Each array was composed of fourteen active airguns totalling 2700 cubic inches.

Starboard array, source number one, fires on even shotpoints and has a DC word = 1100 (hex.)

Port array, source number two, fires on odd shotpoints and has a DC word = 3200 (hex.).

6.1.1 Gun Signature Tests

A 2700 cubic inch synthetic signature drop test using the Western developed synthetic signature program provided the basis for the drop specifications. The only drops permitted were two guns per array of unequal volumes totalling 270 cu. in..

6.2 Streamer and Recording System

Three streamer optic cables of WG-24 Series 2 type, each of 100 metres separation were deployed.

Each streamer cable was composed of 30 active sections - 240 channels of split-group type , one cable head mini section at the head of the first active section , one head stretch section and one tail stretch section . The active sections were numbered 1A , 1B , 2A , 2B etc . Attached to the head of each 'A' section was a streamer module and a connector module was attached to the head of each 'B' section . Each active section essentially comprised 8 hydrophone groups with 16 hydrophones per group in a tapered array of 15.5 metres length with 12.5 metres group separation. The first eight hydrophones of section 1A were inactive thus all group centres were shifted down the cable by eight phones . To maintain the 240 channel configuration , there were eight hydrophones implanted in the tail stretch section.

6.2.1 Sensitivity Tests

No tests were performed.

7.0 NAVIGATION CONFIGURATION AND PARAMETERS

7.1 Navigation Reference Point

The Navigation Reference Point (NRP) is the Argo main mast that was situated 49 metres forward of the pivot point or stern . Zero metres in the Y- direction and 18 metres above the water line or in the Z-direction .

7.2 Gyrocompass

One SPERRY MK23 MOD C-3 GYROCOMPASS (serial no. 3155) has been in use . XYZ - offsets are zero. Calibration was performed in the Port of Fremantle WA on the 11th January 1994. A correction of -0.30° was used in WISDOM.

7.3 Fathometer

One SIMRAD EA 200 Fathometer was used. It was offset 9.60 metres fore, 1.70 metres port and 4.3 metres below mean sea level with respect to the N.R.P. The draft was compensated for on paper and tape. A calibrated sound velocity of propagation of 1512.0 m/s was entered in Wisdom. The velocity was not compensated for on paper or tape. A pre survey check was performed in the Port of Portland Victoria on the 19th January 1994.

7.4 Velocimeter

One Odom Digibar velocimeter has been used on a daily basis for speed of sound in water checks.

7.5 Compasses

Eleven DigiCourse 5000 series compass/birds (model no 5011/03) per cable were in use. Compasses were positioned equally on all cables. Units were positioned on the head stretch sections and on sections 1B, 2A, 3B, 5B, 7B, 9B, 11B, 13B, 15A & the fore coil of the tailstretch section.

7.6 Prime Navigation

The prime navigation system was ARGO and had 4-way fix Wisdom solution RD01, 3-way fix Wisdom solutions RD02-05. The base stations used were Naracoopa, North Point, Point Sorell and Croppies Point.

7.7 Backup Navigation

The backup navigation was RACAL MULTIFIX and had Wisdom solution DN01. The correction stations used were Adelaide, Melbourne and Sydney.

A RACAL SKYPOD RGPS DOME was used to position three tailbuoys, Wisdom Tailbuoy solutions were RP01 - RP03.

7.9 WISDOM-II

7.9.1 Parameters.

See Wisdom Parameter listing in Appendix II.

7.10 Magnetic Declination

The magnetic declination for the area has been calculated to 12.67° East using the World Geodetic Model 1990. Refer to Appendix II for details.

8.0 CABLE / GUNS POSITIONING CONFIGURATION AND PARAMETERS

8.1 SSTS-II

8.1.1 Configuration

The Source Streamer Tracking System was configured to track six gun-strings and three streamer cables . This was possible using two towfish pinger transducers (10002, 10003) located aproximately 40 metres apart and orthogonal to the two hull mounted transducers (10005, 10006) , forming a baseline for the system . Unit 10007 was used for a cross-pinger separation check and located on the starboard tow fish.

The six gun strings were tracked by attaching an SSTS receiver at the head of each gun string . Units 10011-10016 were attached to gun strings 2-7 respectively .

The streamer cables were tracked by using one SSTS receiver within the cable head mini section of each cable . Units 10008, 10009 & 10010 were at the head of cables 1-3 respectively. Cross cable ranges were achieved by using one pinger within the cable head mini section of cable 2 (unit 10001) and cross cable receiver phones; 10018 & 10019 in streamer cables 1 & 3 respectively.

See the Parameter Report for further details.

8.1.2 Parameters

See the Parameter Report for further details.

8.1.3 Performance

The Source Streamer Tracking System performed with consistancy even in the rough weather that was experienced during the survey. For a detailed analysis refer to the Navigation Processing Report.

8.2 Digicourse Cable Acoustic System

8.2.1 Configuration

The DigiCOURSE acoustic system was configured in three separate networks .

The front-end acoustic network consisted of six cable mounted pods ID's; 05, 06, 12, 13, 19 & 20; located on the cable head section and section 1A of each cable. Four gun mounted pods were positioned two per source array. One acoustic pod was located aft of gun strings 3, 4, 5 & 6 with ID numbers 01, 02, 03 & 04 respectively.

The mid acoustic network was composed of eight acoustic pods located on sections 7B & 8A of each cable. The acoustic pods had ID numbers 07, 08, 14, 15, 21 & 22 respectively.

The tail network consisted of nine acoustic pods, three of which were mounted on the tailbuoys. These pods were hard- wired to the streamer cables and were ID numbers 11, 18 & 25. An acoustic pod was positioned at the tail-end of the tail stretch section of each cable (ID's 10, 17 & 24) and at section 15B (ID's 9,16,23).

For further details, see the survey diagrams in the Parameter Report.

8.2.2 Performance

The Digicourse cable acoustic system performed with consistency throughout the survey. The front network held a tight position for both the source arrays and streamers throughout the survey. The mid network experienced some deterioration due to node drop outs through the duration of the survey, but was never reduced to less than one node per cable. The tail network experienced some node drop-outs, however due to the over-redundant nature of the network this did not deteriorate the overall quality of the solution. However, there were some instances where no tailbuoy information could be used.

For a full analysis, refer to the Navigation Processing Report.

8.3 Marine Angle Ranging System (MARS)

MARS was configured to track the central gunstrings and the cable paravanes of cables 1 & 3. Reflective targets were located 1.3 metres above the water line on the nose cones of gunstrings 3 & 6 and were assigned as relative source positions 5 & 6 respectively in Wisdom. The paravane targets were also 1.3 metres above the water line and were assigned as relative cable positions 4 & 7 in Wisdom. The MARS laser ranging unit (LRU) was located on the centre line of the vessel and 48.62 metres aft of the NRP 10.4 metres above the water line. All MARS ranges output to Wisdom were slant ranges.

8.3.1 Performance

The MARS system displayed a high quality range and azimuth to all targets even in the heavy sea conditions experienced. The exceptions were during periods of fog that sometimes lasted half the day and when moisture intruded into the MARS prisms and condensed on the prism protective lense.

For further information, refer to the Navigation Processing Report.

9.0 DATA PROCESSING

9.1 Seismic

Onboard Real Time Seismic Processing was provided using RAMESSES and operated by Western Geophysical personnel.

9.2 Navigation

Onboard Navigation Processing was provided using the Western Developed UNAVCHK software on an IBM RS6000 UNIX Workstation. For details refer to the Navigation Processing Final Report.

10.0 COMMON MIDPOINT BINNING

10.1 Grid Geometry

The survey grid was approximately 1742 sail-line kilometres (full fold) and 261.4 square kilometres. Prime sail-lines were oriented at 034° and the inverse direction was 214°. One hundred and forty four sail-lines were defined with sail-lines 1-187 and 637-859 shot in the 214° direction while sail-lines 193-631 were shot in the 034° direction. Each sail-line acquired six CMP lines with a stepback of nine shotpoints and a runout of 60 shotpoints to acquire full fold coverage, or 69 shotpoints in total.

10.2 Grid Definition

The 3D grid was defined using three lat/lon points as follows; Point 1: 39° 58.3845′ S 145° 51.7477′ E. Point 2: 39° 50.9952′ S 145° 58.2115′ E. Point 3: 39° 51.5809′ S 145° 38.6826′ E. 900 grid lines of 25 metres size and 1320 grid cells of 12.5 metres size were defined.

The 240 groups per streamer cable were arranged into 30 offsets for flexible binning purposes, hence each offset defined a fold of coverage.

For further information, refer to the Parameter Report.

10.3 Offset specifications.

There exists 30 offset groups with specifications provided in table 3 below .

TABLE 3

RECVR GROUPS	OFFSET GROUPS	SPEC (%)	SPEC (OFFSETS)
1 - 24	1 - 3	90	3/3
25- 96	4 - 12	80	8/9
97- 168	13 - 21	60	6/9
169- 240	22 - 30	50	5/9

A constant overlap set at 1.00 was used in the flexible binning program during prime line acquisition, however during infill purposes a linear taper was applied. This linear taper was set to 100% at offset 1 and to 200% at offset 30, effectively increasing the cell width from 25 metres at offset 1 to 50 metres at offset 30.

10.4 Infill.

Coverage on the near traces (offset groups 1-3) met the required specification, the near-mid traces (offsets 4-12) were a bit patchy with the far-mid (offsets 13-21) and far offset groups (offsets 22-30) defining a large portion of the infill required. In total, 29 lines of infill (20%) was re-acquired. Most of these sail-lines were composed of 1-2 cmp lines lacking coverage.

11.0 ENVIRONMENTAL INFLUENCES

11.1 Weather

Weather conditions for the first three days of production prior to the crew change break; 5th - 7th February saw variable wind conditions ranging from south easterly at 17-21 knots to westerly to west north westerly at 11-16 knots which caused the sea conditions to chop from 1.0 metre to 2.5 metres. The average daily temperature was between 15-16 °C, visibility was poor due to a thick fog screen about the survey area causing the MARS to lose track of its targets.

At the resumption of production on the 11th February, wind conditions varied from south westerly at 10-20 knots to south easterly up to 27 knots by the 13th February which saw the sea state chop up to four metres causing over 2500 pounds of force on the cables and the average RMS noise to climb to 10 microbars, the sea state was the cause of the pinger rope breaking. Sea conditions moderated and by the 15th February saw 1.0 to 1.5 metres of swell as the wind conditions swung from south easterly at 11-16 knots to westerly at 17-21 knots. Occasional fog coverage was experienced, however most of the days were partly cloudy up to 3/4 cloud coverage.

Midday on the 16th February wind conditions propelled to near gale force at 28-33 knots from the west- south west direction with rough sea conditions and a swell of up to 4 metres. Noise on the cable was recorded at an average RMS of 12 microbars, however the main problem was the stability of the cables. The inability to keep the cables balanced at 10 metres depth was the cause to scratch sequence 44 and the line prior to sequence 44. Also sequence 50 was ended early due to cable #2 surfacing.These weather conditions persisted into the morning of the 19th February with strong breezes of about 20 -25 knots from the south westerly direction, sea state about 2.0 metres with partly cloudy skies.

An easterly wind shift at 17-21 knots midday on the 19th February brought about fresh to near gale wind conditions lasting until the morning of the 22nd, wind direction was

essentially from the north east direction at 20-30 knots with moderate to rough sea conditions. Fortunately production was not hampered during this period.

A westerly wind shift midday on the 22nd February brought about pleasant conditions with mostly slight seas and south westerly breezes at 7-10 knots, daily temperatures ranged from 10-18° C with partly cloudy skies. These productive conditions lasted into the morning of the 27th February; however by midday on the 27th wind conditions strengthened from the south west to gale force in the late afternoon, the sea state was rough chopping up to 4 metres by late afternoon and effectively caused the starboard gun pullavane to snap from its cable thus ending the production for the month of February. The rough conditions lasted until the morning of the 1st March when sea conditions transformed back to slight to moderate conditions with south westerly breezes to 10 knots and partly cloudy skies with an average daily temperature of 13° C.

Slight to moderate seas were experienced from the 1st March to the morning of the 5th March, wind conditions were essentially from the south westerly direction between 5-12 knots. This period was beneficial to production. However, on the afternoon of the 5th March strong winds gusting to near gale conditions at 30 knots were experienced. Sea conditions immediately chopped up to 3-4 metres and production suffered as cables had a tendency to ride the swelly conditions thus pushing the nominal cable depths out of spec. Rough seas lasted till the morning of the 7th March as an easterly wind shift offset the south westerly front and sea conditions once again returned to a slight to moderate state, light airs blew from the south easterly direction. These conditions lasted for four days, most beneficial to production, until the morning of the 11th March when the winds shifted to a south westerly direction at near gale conditions once again. The sea state rose to 3-4 metres and once again throwing the cable depths out of spec in at least one line.

From the 12th March until the 16th March, the weather conditions were moderate and provided stable conditions to complete the survey. The days were partly cloudy with an average daily temperature of 16° C.

11.2 Tides

The tidal chart used has been generated from the Burnie tidal corrections that displays a dual symmetrical daily peak of approximately 3.0 metres, ranging from 1.0 - 3.0 metres total. From the commencement of the survey there has been effectively minimal attenuation in daily peaks reducing to a height of 2.5 metres and as a consequence has made it consistently easy to predict feather angles.

11.3 Currents

Ocean currents have not caused any problems to acquisition with the exception to the sea swells and state when the winds gust to near gale force conditions.

11.4 Feathering / Infill

It was observed that the environmental influences were more prominent when acquiring data in the 034° direction. This was dispayed particularly on the far offsets where portions of up to 2 and sometimes 3 adjacent cmp lines were left bare.

12.0 SIGNIFICANT EVENTS

12.1 Configuration Changes

12.1.1 Software/Firmware

No changes

12.1.2 Geodetic

No changes.

12.1.3 Seismic

No changes.

12.1.4 Navigation

From the eleventh of February, sequence 13 line YOL00049 the Racal Skypod Tailbuoy Tracker antenna was relocated to 14.70 metres aft and 6.25 metres port of the NRP at an elevation of 16.4 metres above mean sea level.

12.1.5 Cable / Source Positioning

No changes.

12.1.6 Common Midpoint Binning

No changes.

12.2 Parameter Changes

12.2.1 Geodetic

No changes.

12.2.2 Seismic

No Changes.

12.2.3 Navigation

After sequence 26, line YOL00277 on the 14th February the ARGO base station C-O's were changed in the Master Vessel Pattern Definition pages in Wisdom after a recalibration run due to antenna problems. The new C-O's entered were;

Naracoopa	-0.43	(from -0.23)
North Point	-0.12	(from 0.0)
Point Sorell	-0.13	(from 0.05)
Croppies Point	-0.12	(from 0.07)

After sequence 84, line YOL00679 on the 24th February the ARGO base station C-O's were changed in the Master Vessel Pattern Definition pages in Wisdom due to a position discrepancy between the Argo and Multifix solutions. The SD's were reviewed over a number of lines before new C-O's were entered ;

Naracoopa	-0.36
North Point	-0.09
Point Sorell	-0.07
Croppies Point	-0.05

12.2.4 Cable / Source Positioning

After sequence 30, line YOL00043 on the 14th February all cable nominal offsets were changed in the Master Vessel Cable General Definition pages in Wisdom to 298.8 metres from 280 metres to reflect the 17.8 metres offset from the SSTS receiver phone to the centre of the near group at the head of the cable.

After sequence 30, line YOL00043 on the 14th February all source nominal offsets were changed in the Master Vessel Source General Definition pages in Wisdom to 154.8 metres from 140.0 metres to reflect the 14.8 metres offset from the SSTS receiver phone to the centre of the energy source array.

After sequence 99, line YOL00403 on the 26th February the cross-cable receiver delays were adjusted in SSTS to 1.35 milliseconds from 2.62 milliseconds.

12.2.5 Common Midpoint Binning

No changes.

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APPENDIX I

SYSTEM OVERVIEWS

SYSTEM OVERVIEW APPENDIX

1.0 Streamer and Recording System

1.1 System Overview

The WG-24 Marine Telemetry System is a new generation marine digital seismic data acquisition system which acquires 24-bit high resolution seismic data. The data are filtered and decimated in each streamer module using digital filtering and transmitted serially to the shipboard recording system using high speed fibre optic digital telemetry. The WG-24 has superb bandwidth, anti aliasing and signal to noise performance. Some features include: tapered phone groups for noise reduction, individual A/D converter per channel, fibre optic data telemetry with multiple fibre paths (virtually eliminates transmission errors), improved filter response, can record up to 1024 demultiplexed channels in SEG-D 8048 format.

2.0 WISDOM-II

2.1 System Overview

WISDOM-II is an upgrade of the original integrated navigation system (WISDOM) , designed to meet requirements for new and external devices , and incorporating suggested changes from the field . This large number of external devices required the creation of a new tape format ; NAVC . In essence , the WISDOM-II system provides the same features available in the previous versions , but with expanded position sensor capability .

The WISDOM-II computer consists of an HP2117F general-purpose minicomputer with a variable sized memory . The computer receives data from the GDU (Geoscience Data Unit) , NIU (Navigation Interface Unit) or operator terminal , processes it , then outputs the raw and processed data to tape . It also outputs information to a printer and operator terminal , and updates the video monitor at user-specified intervals .

3.0 SOURCE STREAMER TRACKING SYSTEM II (SSTS II)

3.1 System Overview

The Streamer/Source Tracking System - Phase II (SSTS-II) is a computer-based , multichannel , marine acoustical positioning system for multicable , multisource 3-D seismic surveys . This system locates the streamer head and sources , thus increasing the quality of later seismic processing . All positioning data is referenced to the Navigation Reference Point (NRP) and written to magnetic tape .

SSTS-II consists of both an outboard and shipboard system. The outboard system uses acoustic transducers as base stations and targets , forming several triangular acoustic paths . The traveltimes along these acoustic paths are used by the shipboard system to calculate streamer head and source positions . Results are displayed on a real-time geometric display and a target quality assurance screen . Printed target position coordinates are displayed in a trending log .

4.0 DIGICOURSE CABLE ACOUSTICS

4.1 System Overview

The DIGIRANGE system developed by Digicourse uses battery - powered, microprocessor - controlled acoustic transceivers mounted on the streamers and tailbuoys to collect range information with a resolution of 0.05 milliseconds. The units are concurrent multichannel transceivers (CMX) that use an inductive communications coil in the streamer to communicate with shipboard equipment. The tailbuoy units use the same method, however the inductive coils are powered by an electric line or 'stick cable' between the tail of the streamers and the tailbuoys.

5.0 MARS- MARINE ANGLE RANGING SYSTEM

5.1 System Overview

The MARS system is a laser ranging system that is utilised as a relative positioning device. Standard survey prisms are mounted as targets that privide a means to reflect the laser light back to the MARS laser ranging unit (LRU). The LRU scans laser light with a vertical plane of 25° plunged 2.5° below the horizontal. From each scan of the LRU, the system provides a range and a bearing to each target. The resolution is one tenth of a metre and to one hundredth of a degree. The MARS system has the capability to validate each targets position by buffering four angle/range data pairs and comparing the data to range and angle

windows set by the user before the target is actually assigned a target number and displayed in the target status window of the system. MARS is also capable of slant corrections if desired.

6.0 COMMON MIDPOINT BINNING

6.1 System Overview

The FLEXQC system is a quality control tool used to monitor the fold of coverage throughout a seismic survey . It interfaces directly into the WISDOM integrated navigation system and produces linedata files based on the WISDOM data . These files can then be binned on the survey grid .
Some features include :

- Flexible cell binning both on-line and off-line (referred to as overlap constant) . This can be used to alter the cross-line dimension of the cell to include adjacent traces from surrounding cells .

- Statistical displays of compass , tailbuoy , acoustic , source , cable and vessel position , gyrocompass , etc are available realtime and as summaries at the end .

- Option to bin or playback P1/84 UKOOA files .

- Option to specify a full fold coverage definition .

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APPENDIX II

SSTS & WISDOM PARAMETERS & MAGNETIC DECLINATION CALCULATIONS

501543

SSTS V5.1 YR 94 DAY 074 CLIENT: The Wisdom client .... PARTY 116 BOAT: M/V WESTERN ATLAS
GMT 03:52 AREA: The Wisdom area ..... LIN. NUMBER: BLKHD 1 - 1

RECEIVER CONFIGURATION

Rcvr No.	AIU Ch.	Logical Name	Freq kHz.	Mode	Attribute	Mute	Depth Elmnt	Offsets X	Offsets Y	Nominal X	Nominal Y	Calibrate X	Calibrate Y	Nom. Depth	Depth Used	GDU ADR	Format	Bias Delay	Gain dB.
1	1	PORT HULL RCVR	3.5	Ena	Hull Rcvr1			0.0	0.0	9.1	-1.9	9.1	-1.9	4.3	DFR	270	TEL DYN	2.67	0
2	2	APT HULL RCVR	3.5	Ena	Hull Rcvr2			0.0	0.0	21.6	1.8	21.6	1.8	4.3	DFR	271	TEL DYN	2.67	-12
3	3	X-PINGER RCVR	3.5	Ena	X-PngRcvr1	ON-S		0.0	0.0	-20.0	20.0	0.0	0.0	12.5	GDU	300	GMU	3.28	-36
4	4	CABLE 1	3.5	Ena	CableRcvr1		Cbl 1	17.8	0.0	-280.0	100.0	0.0	0.0	10.0	DFR	260	LRS16	2.62	-36
5	5	CABLE 2	3.5	Ena	CableRcvr2		Cbl 2	17.8	0.0	-280.0	0.0	0.0	0.0	10.0	DFR	271	LRS16	2.62	-30
6	6	CABLE 3	3.5	Ena	CableRcvr3		Cbl 3	17.8	0.0	-280.0	-100.0	0.0	0.0	10.0	DFR	262	LRS16	2.62	-55
7	7	GUN STRING 2	3.5	Ena	SourcRcvr2		Src 1	14.8	10.0	-140.0	35.0	0.0	0.0	6.0	GDU	247	GMU	3.28	-30
8	8	GUN STRING 3	3.5	Ena	SourcRcvr3		Src 1	14.8	0.0	-140.0	25.0	0.0	0.0	6.0	GDU	254	GMU	3.28	-24
9	9	GUN STRING 4	3.5	Ena	SourcRcvr4		Src 1	14.8	-10.0	-140.0	15.0	0.0	0.0	6.0	GDU	257	GMU	3.28	-36
10	10	GUN STRING 5	3.5	Ena	SourcRcvr5		Src 2	14.8	10.0	140.0	15.0	0.0	0.0	6.0	GDU	263	GMU	3.28	-40
11	11	GUN STRING 6	3.5	Ena	SourcRcvr6		Src 2	14.8	0.0	-140.0	-25.0	0.0	0.0	6.0	GDU	267	GMU	3.28	-30
12	12	GUN STRING 7	3.5	Ena	SourcRcvr7		Src 2	14.8	-10.0	-140.0	-35.0	0.0	0.0	6.0	GDU	273	GMU	3.28	-30
13	15		3.5	Dis	Not Used														
14	19	XCABLE RCVR 1	12.5	Ena	X-CblRcvr1		Cbl 1	17.8	0.0	280.0	100.0	0.0	0.0	10.0	DFR	260	LRS16	1.35	-36
15	20	XCABLE RCVR 3	12.5	Ena	X-CblRcvr2		Cbl 3	17.8	0.0	-280.0	-100.0	0.0	0.0	10.0	DFR	263	TEL DYN	1.35	-24
16	21		12.5	Dis	Not Used														

PINGER CONFIGURATION

Xmtr No.	AIU Ch.	Logical Name	Freq kHz.	Mode	Attribute	Nominal X	Nominal Y	Calibrate X	Calibrate Y	Nom. Depth	Depth Used	GDU ADR	Format	Cycles	Pattern	Pulses	Bias Delay
1	1	STBD PINGER	3.5	Ena	StbdPinger	-20.0	20.0	0.0	0.0	12.5	GDU	300	GMU	3	01	4	0.40
2	2	PORT PINGER	3.5	Ena	PortPinger	-20.0	20.0	0.0	0.0	12.5	GDU	277	GMU	3	02	4	0.00
3	4	X-CABLE PINGER	12.5	Ena	CC Pinger	-280.0	0.0	0.0	0.0	10.0	DFR	303	LRS16	6	03	4	0.00
4	0	NOT IMPLEMENTED	3.5	Dis	Other Engr												

GENERAL PARAMETERS

Parameter Description	Parameter Value
Nominal Speed of Sound in Water (m/s)	1520
Velocimeter Value to be Used	GDU
GDU Address of Velocimeter	0
Internal Closure Repetition Rate (Sec)	15.0
Dwell Time After Closure (Sec)	2.0
Range Quality Threshold	0.50
Residual Error Threshold (meters)	2.5
Pinger Pattern Set	A
Number of Cables	3
Number of Sources	2
Number of Vessels	1
Vessel Name	M/V WESTERN ATLAS
Party Number	116
Vessel Length (meters)	80.6
Vessel Beam (meters)	18.0

TRACKING PARAMETERS

Kalman Initializer	X	Y	Convergence Criteria	Spike Criteria	CVW
Cable	2.4	6.0	0.67	2.0	350.0
Source	2.4	2.0	0.42	2.0	
Pinger	1.5	0.9	0.15	2.0	
Other	0.0	0.0			

WISDOM/SSTS GDU PARAMETERS

GDU Slot	Receiver Logical Name
Stbd Cable	CABLE 1
Port Cable	CABLE 3
Stbd Source	GUN STRING 6
Port Source	GUN STRING 6

SAGASCO RESOURCES LTD. YOLLA -3D BASS BASIN

P-116 M.V WESTERN ATLAS

SSTS PARAMETERS

16 MARCH 1994

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WISDOM II PARAMETERS

General Definitions
Master Vessel
11:19 PM MON., 14 MAR., 1994

	Year	Day	Minute	Sec*100	Format	Ver	Project Id	Project name and starting date
1	1994	73	1329	775	NAVC:2.1	50	YOLLA3D	YOLLA 3D 19011994

	Project description, type of survey and location	Client
1	3 CABLES 2 SOURCES3D SEISMIC SURVEY BASS BASIN	SAGASCO RESOURCES LIMITED

	Geophysical contractor	Position contractor
1	Western Geophysical.	Western Geophysical.

Col. M Time Record interval (0.01 second counts)
Col. Q Number of Radionavigation Pattern Channels
Col. R Maximum number of relative acoustic ranges/shot
Col. S Maximum number of satellites per lat/lon device
Col. T Maximum number of LOPs per radio solution
Col. U SSTS target ID number offset

	Col. M	Vessels	Active Cables	Active Source	Col. Q	Col. R	Col. S	Col. T	Col. U
1	1000	1	12300000	12000000	32	128	4	6	10004

Geodetic Definitions
Master Vessel
11:19 PM MON., 14 MAR., 1994

Col. A Spheroid code

	Col. A	Spheroid name	Local datum name	X Shift	Y Shift	Z Shift	X Rotation	Y Rotation	Z Rotation	Scale Factor
1	17	AUSTRALIAN NAT. AGD 84		116.00	50.47	-141.69	1.1150710	1.8907730	1.667759000	-.0983000000

Col. N Geoid-spheroid separation (meters)
Col. P Magnetic declination (degrees)

	Semi-major	Semi-minor	Flattening	Col. N	Date and source of magnetic declination	Col. P
1	6378160.000	6356774.719	.003352892	-1.00	CCMAIL FROM CARL WINNEFELD, PERTH DTD 20 DEC 1993	12.67

Projection Definition
Master Vessel
11:19 PM MON., 14 MAR., 1994

Col. A Projection type code

	Col. A	Projection type and name	Grid unit name	Conv. Factor
1	2	UTM SOUTH ZONE 55	METERS	1.00000

Col. K Latitude of scale factor definition (Degrees)
Col. L Longitude of scale factor definition (Degrees)

	Origin Lat	Origin Lon	False East	False North	C. Meridian	Scale Factor	Col. K	Col. L
1	0 0.0000	147 0.0000 E	500000.	.100000E+08	147 0.0000 E	.999600	0 0.0000	147 0.0000 E

Col. M Latitude of 1st standard parallel (Degrees)
Col. N Latitude of 2nd standard parallel (Degrees)
Col. O Latitude of start point (Degrees)
Col. Q Latitude of end point (Degrees)
Col. R Longitude of end point (Degrees)
Col. S Circular bearing of initial line of projection

Col. P Longitude of start point (Degrees) Col. T Angle from skew to rectified grid (Degrees)

	Col. M	Col. N	Col. O	Col. P	Col. Q	Col. R	Col. S	Col. T	
1	0 0.0000	0 0.0000	0 0.0000	0 0.0000	0 0.0000	0 0.0000	0 0.0000	0.000000	0.000000

Line Definitions
Master Vessel
11:19 PM MON., 14 MAR., 1994

Col. H Pops/shotpoint or shotpoints/closure Col. I Shotpoint sequence flag [?/Increment/Decrement]

	Name	From Lat	From Lon	To Lat	To Lon	Length (M)	Azimuth	Col. H	Col. I	First shot#	
1	YOL01835	39 50.4554 S	145 40.9955 E	39 46.1817 S	145 44.7463 E	9550.1	34.115	1	Incre	260.00	

Col. M Fire control [?/Distance/Time/Extern/Manual]
Col. O Time Fire Interval (0.01 second counts)
Col. P Minimum cycle time (0.01 second counts)
Col. Q Maximum cycle time (0.01 second counts)
Col. R Use maximum cycle time ? [Yes/No]
Col. T Shotpoint number control [?/Internal/External]
Col. U External closure indicator [?/Pop/Shot]
Col. V Popscan control [?/Fire/External]
Col. W Popscan delay (0.01 second counts)
Col. X User header transfer mode [?/Internal/External]
Col. Y User header transfer delay (0.01 second counts)

	BOL shot #	EOL shot #	Col. M	Meters/Pop	Col. O	Col. P	Co	Col. R	SP Vel	Filtr	Col. T	Col. U	Col. V	Col. W	Col.	Col. Y
1	244.00	626.000	Distan	25.0000	1000	800	3000	No	1.00000	Intern	Shot	Extern	0	Int	0	

Vessel Definition
Master Vessel
11:19 PM MON., 14 MAR., 1994

Vessel name and description
1 WESTERN ATLAS, P-116

Description of onboard processing system
1 WISDOM 50, FLEX 4.0N, NIU 1.1 TOTALNET 1.11B

Description of vessel steering point
1 MAIN NAVIGATION MAST SHOTPOINT IS CDP POSITION

Description of vessel reference point
1 DIRECTLY BELOW MAIN NAVIGATION MAST AT WATERLINE

	+Fore/-Aft	-Port/+Stbd	Above sea level	Draft	Length	Width	Time diff
1	49.0000	0.00000	0.00000	4.30000	80.0000	18.0000	-10

Pattern Definition
Master Vessel
11:19 PM MON., 14 MAR., 1994

Col. B Pattern type

Dev Type	Col. B	Description
1 AR01-Rad	3	RANGE/RANGE
2 AR01-Rad	3	RANGE/RANGE
3 AR01-Rad	3	RANGE/RANGE
4 AR01-Rad	3	RANGE/RANGE

Master Station	Latitude	Longitude	Antenna Hgt	Slave Station	Latitude	Longitude	Antenna Hgt
1 NARACOOPA	39 55.5087 S	144 7.6327 E	47.8000		0 0.0000	0 0.0000	0.00000
2 NORTH POINT	40 42.8980 S	145 15.4990 E	3.90000		0 0.0000	0 0.0000	0.00000
3 POINT SORELL	41 7.2895 S	146 31.8325 E	7.60000		0 0.0000	0 0.0000	0.00000
4 CROPPIES POINT	40 51.0765 S	147 35.7655 E	7.90000		0 0.0000	0 0.0000	0.00000

Col. M Station status [Undef/Active/Hold] Col. S Velocity scale factor

System Type	Col. M	Digits	Dec Pl	Prop Vel m/s	Frequency Hz	Wavelength	Col. S
1 ARGO	Active	0	0	29965000.00	329620.0000	90.9077119	1.00000
2 ARGO	Active	0	0	29965000.00	329620.0000	90.9077119	1.00000
3 ARGO	Active	0	0	29965000.00	329620.0000	90.9077119	1.00000
4 ARGO	Active	0	0	29965000.00	329620.0000	90.9077119	1.00000

Col. X Spike Limit Col. c Age of Data (100ms Counts)

	Base delay	Mobile delay C-O Corr.	Filter Factr	Col. X	Rng #	SBS	SS	SBS	RR	Ant #	Col. c
1	0.000000	0.0000000000	-.3600000000	.100000E-08	0	1	0	0	1	5	
2	0.000000	0.0000000000	-.0900000000	.100000E-08	0	2	0	0	1	5	
3	0.000000	0.0000000000	-.0700000000	.100000E-08	0	3	0	0	1	5	
4	0.000000	0.0000000000	-.0500000000	.100000E-08	0	4	0	0	1	5	

Lat/Lon Device Definition
Master Vessel
11:19 PM MON., 14 MAR., 1994

Device	Device description	
1 TR02	TRIMBLE 4000A	NOT IN USE (SHUT OFF)
2 TR01	RACAL TRIMBLE	DIRECT INJECTION
3 DN01	RACAL MULTIFIX	NETWORK SOLUTION
4 MM01	MARINE MACHINE (SHUT OFF)	WESTERN'S DGPS NOT IN USE

Col. M Time Corr to UTC (Sec*10)

Device	Filter	Lat Var	Lon Var	Hgt Var	VelE Var	VelN Var	VelZ Var	Lat Bias	Lon Bias	Col. M	Ant #
1 TR02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2
2 TR01	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3
3 DN01	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4
4 MM01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6

Antenna Definitions
Master Vessel
11:19 PM MON., 14 MAR., 1994

No.	Antenna	Descriptor	+Fore/-Aft	-Port/+Stbd	Elevation
1	1	ARGO NAVIGATION REFERENCE POINT	0.00000	0.00000	18.0000
2	3	RACAL DIRECT INJECTION	.150000	.840000	18.2500
3	4	RACAL MULTIFIX NETWORK SOLUTION	.150000	.550000	18.2500
4	5	RACAL SKYPOD TAILBUOY TRACKER.	-14.7000	-6.25000	16.4000
5	6	MARINE MACHINE WESTERN'S DGPS NETWORK NOT IN USE	.200000	-7.57000	16.0000
6	7	MARS LASER RANGING SYSTEM	-48.6200	0.00000	10.4000

Gyro Definitions
Master Vessel
11:20 PM MON., 14 MAR., 1994

Gyro	Description	Use	+Fore/-Aft	-Port/+Stbd	Elevation	Correction
1	SPERRY MK23 C-3 SER NO. 3155 CALIBRATED 11 JAN 1994	Yes	0.00000	0.00000	0.00000	-.30000

Fathometer Definition
Master Vessel
11:20 PM MON., 14 MAR., 1994

Col. F Sound Propagation Velocity(m/s) Col. G Calibrated Vel Of Prop (m/s)

Fathometer	Description	Type	+For-Aft	-Prt+Stb	Elev	Col. F	Col. G	Ref
1	SIMRAD EA 200 CAL ON 23 FEB 1993 CHECKED ON 19 JAN 1994 IN PORTLAND	2	9.60	-1.70	-4.30	1500.00	1512.00	Sea

Velocimeter Definition
Master Vessel
11:20 PM MON., 14 MAR., 1994

Col. E Unit Conversion Factor Col. F Speed of Sound Correction (m/s)

Velocimeter	Description	+Fore/-Aft	-Port/+Stbd	Elevation	Col. E	Col. F
1	ODOM DIGIBAR LOCATED ON PORT SSTS PINGER	-20.000	-20.000	-12.500	1.000	0.000

Cable General Definitions
Master Vessel
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Col. A Number of receiver groups
Col. D Number of receiver groups for binning
Col. E Group interval for binning
Col. F Center of near group offset for binning
Col. H Offset layback angle (Gyro/Track/Line)
Col. I Point to center of nearest Rx Group +Fore/-Aft
Col. J Point to center of nearest Rx Group -Port/+Stbd

	Col. A	Group Int	Group Length	Col. D	Col. E	Col. F	Manual	Col. H	Col. I	Col. J
1	240	12.5000	15.5000	240	12.5000	0.00000	No	Gyro	-298.800	100.000
2	240	12.5000	15.5000	240	12.5000	0.00000	No	Gyro	-298.800	0.00000
3	240	12.5000	15.5000	240	12.5000	0.00000	No	Gyro	-298.800	-100.000

Col. K Point to center of nearest Rx Group Elevation
Col. L Number of active cable sections
Col. M Active cable section length
Col. N Cable Head Section Length
Col. O Nominal head stretch length
Col. P Nomianl tail stretch length
Col. Q End of cable to tailbuoy reference point
Col. R Nominal cable depth

	Col. K	Col. L	Col. M	Col. N	Col. O	Col. P	Col. Q	Col. R
1	-10.0000	30	100.000	8.00000	87.3000	80.0000	52.0000	10.0000
2	-10.0000	30	100.000	8.00000	87.3000	80.0000	52.0000	10.0000
3	-10.0000	30	100.000	8.00000	87.3000	80.0000	52.0000	10.0000

Cable Compass Definitions
Master Vessel
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Col. F Compass Type Code (Fluxgate/Rot card)

RU	No	Type	Serial #	Use	Cable#	Col. F	Offset	Spike Limit
1	2	DIGI	8661	Yes	1	Rot ca	27.9000	60.0000
2	3	DIGI	6931	No	1	Rot ca	-162.400	60.0000
3	4	DIGI	8679	Yes	1	Rot ca	-262.400	60.0000
4	5	DIGI	8853	Yes	1	Rot ca	-562.400	60.0000
5	6	DIGI	8690	Yes	1	Rot ca	-962.400	60.0000
6	7	DIGI	8880	Yes	1	Rot ca	-1362.40	60.0000
7	8	DIGI	8749	Yes	1	Rot ca	-1762.40	60.0000
8	9	DIGI	7215	Yes	1	Rot ca	-2162.40	60.0000
9	10	DIGI	8829	Yes	1	Rot ca	-2562.40	60.0000
10	11	DIGI	8489	Yes	1	Rot ca	-2862.40	60.0000
11	12	DIGI	8542	Yes	1	Rot ca	-2997.00	60.0000
12	14	DIGI	8654	Yes	2	Rot ca	27.9000	60.0000
13	15	DIGI	7779	Yes	2	Rot ca	-162.400	60.0000
14	16	DIGI	8752	Yes	2	Rot ca	-262.400	60.0000
15	17	DIGI	8721	Yes	2	Rot ca	-562.400	60.0000
16	18	DIGI	9720	Yes	2	Rot ca	-962.400	60.0000
17	19	DIGI	9583	Yes	2	Rot ca	-1362.40	60.0000
18	20	DIGI	9690	Yes	2	Rot ca	-1762.40	60.0000
19	21	DIGI	6973	Yes	2	Rot ca	-2162.40	60.0000
20	22	DIGI	7796	Yes	2	Rot ca	-2562.40	60.0000
21	23	DIGI	8726	Yes	2	Rot ca	-2862.40	60.0000
22	24	DIGI	8985	Yes	2	Rot ca	-2997.00	60.0000
23	26	DIGI	8876	Yes	3	Rot ca	27.9000	60.0000
24	27	DIGI	8777	Yes	3	Rot ca	-162.400	60.0000
25	28	DIGI	9628	Yes	3	Rot ca	-262.400	60.0000
26	29	DIGI	9669	Yes	3	Rot ca	-562.400	60.0000
27	30	DIGI	9786	Yes	3	Rot ca	-962.400	60.0000
28	31	DIGI	8655	Yes	3	Rot ca	-1362.40	60.0000

29	32	DIGI	8712	Yes	3	Rot ca	-1762.40	60.0000
30	33	DIGI	8843	Yes	3	Rot ca	-2162.40	60.0000
31	34	DIGI	8963	Yes	3	Rot ca	-2562.40	60.0000
32	35	DIGI	9779	Yes	3	Rot ca	-2862.40	60.0000
33	36	DIGI	9393	Yes	3	Rot ca	-2997.00	60.0000

Col. I Number of bias corrections

	Col. I	Heading #1	Bias #1	Heading #2	Bias #2	Heading #3	Bias #3	Heading #4	Bias #4
1	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
11	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
13	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
14	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
16	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
17	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
18	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
19	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
21	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
22	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
23	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
24	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
25	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
26	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
27	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
28	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
29	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
30	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
31	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
32	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
33	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Source General Definitions
Master Vessel
11:20 PM MON., 14 MAR., 1994

Col. C Layback ref angle [Gyro/Track/Line]

Source array description		Manual	Col. C	+Fore/-Aft	-Port/+Stbd	Elevation	Nom Depth
1 STARBOARD SOURCE	STRINGS 2,3 & 4	No	Gyro	-154.800	25.0000	-6.00000	6.00000
2 PORT SOURCE	STRINGS 5,6 & 7	No	Gyro	-154.800	-25.0000	-6.00000	6.00000

Towfish Pinger Definitions
Master Vessel
11:20 PM MON., 14 MAR., 1994

Col. C Offset layback angle flag

Towfish Pinger Description	Manual	Col. C	+Fore/-Aft	-Port/+Stbd	Elevation
1 STBD PINGER	No	0	-20.0000	20.0000	-12.5000
2 PORT PINGER	No	0	-20.0000	-20.0000	-12.5000

Absolute Position Definitions
Master Vessel
11:20 PM MON., 14 MAR., 1994

Col. C Shotpoint Control ? [No/Yes] Col. D Lat/Lon Device No Col. E Relative Position No

Use	Description	Col. C	Col. D	Col. E	Pat #1	Pat #2	Pat #3	Pat #4	Pat #5	Pat #6
1 Yes	ARGO 1,2,3,4	No	0	0	1	2	3	4	0	0
2 Yes	ARGO 2,3,4	No	0	0	2	3	4	0	0	0
3 Yes	ARGO 1,3,4	No	0	0	1	3	4	0	0	0
4 Yes	ARGO 1,2,4	No	0	0	1	2	4	0	0	0
5 Yes	ARGO 1,2,3	No	0	0	1	2	3	0	0	0
6 Yes	RACAL MULTIFIX	No	3	0	0	0	0	0	0	0
7 Yes	RACAL DIRECT INJ	No	2	0	0	0	0	0	0	0
8 No		No	0	0	0	0	0	0	0	0
9 Yes	STBD TAILBUOY	No	0	1	0	0	0	0	0	0
10 Yes	MID TAILBUOY	No	0	2	0	0	0	0	0	0
11 Yes	PORT TAILBUOY	No	0	3	0	0	0	0	0	0
12 No		No	0	0	0	0	0	0	0	0

Relative Position Definitions
Master Vessel
11:20 PM MON., 14 MAR., 1994

Col. D Bearing reference [North/Gyro/Line/Grid North]

ID	No.	Relative position description	Ant	Col. D	Range Cor	Brg Cor	Rng Wind	Brg Wind
1	1	SKYPOD TAILBUOY #1 CABLE 1 (STBD)	5	North	0.0000	0.0000	0.000	0.000
2	2	SKYPOD TAILBUOY #2 CABLE 2 (MID)	5	North	0.0000	0.0000	0.000	0.000
3	3	SKYPOD TAILBUOY #3 CABLE 3 (PORT)	5	North	0.0000	0.0000	0.000	0.000
4	4	MARS STBD PULLERVANE	7	Gyro	0.0000	180.0000	0.000	0.000
5	5	MARS GUN STRING 3	7	Gyro	0.0000	180.0000	0.000	0.000
6	6	MARS GUN STRING 6	7	Gyro	0.0000	180.0000	0.000	0.000
7	7	MARS PORT PULLERVANE	7	Gyro	0.0000	180.0000	0.000	0.000
8	10002	PORT PINGER	0	North	0.0000	0.0000	0.000	0.000
9	10003	STBD PINGER	0	North	0.0000	0.0000	0.000	0.000
10	10008	CABLE 1	0	North	0.0000	0.0000	0.000	0.000
11	10009	CABLE 2	0	North	0.0000	0.0000	0.000	0.000
12	10010	CABLE 3	0	North	0.0000	0.0000	0.000	0.000
13	10011	GUN STRING 2	0	North	0.0000	0.0000	0.000	0.000
14	10012	GUN STRING 3	0	North	0.0000	0.0000	0.000	0.000
15	10013	GUN STRING 4	0	North	0.0000	0.0000	0.000	0.000
16	10014	GUN STRING 5	0	North	0.0000	0.0000	0.000	0.000
17	10015	GUN STRING 6	0	North	0.0000	0.0000	0.000	0.000
18	10016	GUN STRING 7	0	North	0.0000	0.0000	0.000	0.000

Vessel Position Definition
Master Vessel
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	Vessel	Ves MD	Pos Tp	Pos No
1	1	SYS	Absolute	1
2	1		Absolute	2
3	1		Absolute	3
4	1		Absolute	4
5	1		Absolute	5
6	1	BAK	Absolute	6
7	1		Absolute	7

Cable Position Definition
Master Vessel
11:20 PM MON., 14 MAR., 1994

	Cable#	Ref Pt	Pos Type	Pos No	+Fore/-Aft	-Port/+Stbd	Elevation
1	1	Cable	Relative	10008	17.8000	0.00000	0.00000
2	2	Cable	Relative	10009	17.8000	0.00000	0.00000
3	3	Cable	Relative	10010	17.8000	0.00000	0.00000
4	1	TBuoy	Relative	1	-3119.50	0.00000	10.0000
5	2	TBuoy	Relative	2	-3119.50	0.00000	10.0000
6	3	TBuoy	Relative	3	-3119.50	0.00000	10.0000
7	1	No	Relative	4	140.000	25.0000	11.3000
8	3	No	Relative	7	140.000	-25.0000	11.3000

Source Position Definition
Master Vessel
11:20 PM MON., 14 MAR., 1994

Source	Ref Pt	Pos Type	Pos No	+Fore/-Aft	-Port/+Stbd	Elevation
1	1	No Relative	10011	14.8000	10.0000	1.40000
2	1	Yes Relative	10012	14.8000	0.00000	1.40000
3	1	No Relative	10013	14.8000	-10.0000	1.40000
4	2	No Relative	10014	14.8000	10.0000	1.40000
5	2	Yes Relative	10015	14.8000	0.00000	1.40000
6	2	No Relative	10016	14.8000	-10.0000	1.40000
7	1	No Relative	5	10.8000	0.00000	7.30000
8	2	No Relative	6	10.8000	0.00000	7.30000

Towfish Pinger Position Definitions
Master Vessel
11:20 PM MON., 14 MAR., 1994

Col. A Towfish pinger number for this position
Col. B Use Towfish pinger reference ? [Yes/No]
Col. C Position type [Absolute/Relative]
Col. D Absolute or relative ID position number

	Col. A	Col. B	Col. C	Col. D
1	1	Yes	Relative	10003
2	2	Yes	Relative	10002

Acoustic Sensor Definitions
Master Vessel
11:20 PM MON., 14 MAR., 1994

Col. E Cable or source number

ID	Use	Type	Ref	Col. E	+Fore/-Aft	-Port/+Stbd	Elevation	Tx Delay	Rx Delay	Re-Tx Delay	Vel Prop m/s
1 1	Yes	Dig	Source	1	-11.4000	0.00000	-1.50000	0.00000	0.00000	0.00000	1512.00
2 2	Yes	Dig	Source	1	-11.4000	-10.0000	-1.50000	0.00000	0.00000	0.00000	1512.00
3 3	Yes	Dig	Source	2	-11.4000	10.0000	-1.50000	0.00000	0.00000	0.00000	1512.00
4 4	Yes	Dig	Source	2	-11.4000	0.00000	-1.50000	0.00000	0.00000	0.00000	1512.00
5 5	Yes	Dig	Cable	1	14.5000	0.00000	0.00000	0.00000	0.00000	0.00000	1512.00
6 6	Yes	Dig	Cable	1	-62.4000	0.00000	0.00000	0.00000	0.00000	0.00000	1512.00
7 7	Yes	Dig	Cable	1	-1462.40	0.00000	0.00000	0.00000	0.00000	0.00000	1512.00
8 8	Yes	Dig	Cable	1	-1562.40	0.00000	0.00000	0.00000	0.00000	0.00000	1512.00
9 9	Yes	Dig	Cable	1	-2962.40	0.00000	0.00000	0.00000	0.00000	0.00000	1512.00
10 10	Yes	Dig	Cable	1	-3063.60	0.00000	0.00000	0.00000	0.00000	0.00000	1512.00
11 11	Yes	Dig	Cable	1	-3119.50	0.00000	8.00000	0.00000	0.00000	0.00000	1512.00
12 12	Yes	Dig	Cable	2	14.5000	0.00000	0.00000	0.00000	0.00000	0.00000	1512.00
13 13	Yes	Dig	Cable	2	-62.4000	0.00000	0.00000	0.00000	0.00000	0.00000	1512.00
14 14	Yes	Dig	Cable	2	-1462.40	0.00000	0.00000	0.00000	0.00000	0.00000	1512.00
15 15	Yes	Dig	Cable	2	-1562.40	0.00000	0.00000	0.00000	0.00000	0.00000	1512.00
16 16	Yes	Dig	Cable	2	-2962.40	0.00000	0.00000	0.00000	0.00000	0.00000	1512.00
17 17	Yes	Dig	Cable	2	-3063.60	0.00000	0.00000	0.00000	0.00000	0.00000	1512.00
18 18	Yes	Dig	Cable	2	-3119.50	0.00000	8.00000	0.00000	0.00000	0.00000	1512.00
19 19	Yes	Dig	Cable	3	14.5000	0.00000	0.00000	0.00000	0.00000	0.00000	1512.00
20 20	Yes	Dig	Cable	3	-62.4000	0.00000	0.00000	0.00000	0.00000	0.00000	1512.00
21 21	Yes	Dig	Cable	3	-1462.40	0.00000	0.00000	0.00000	0.00000	0.00000	1512.00
22 22	Yes	Dig	Cable	3	-1562.40	0.00000	0.00000	0.00000	0.00000	0.00000	1512.00
23 23	Yes	Dig	Cable	3	-2962.40	0.00000	0.00000	0.00000	0.00000	0.00000	1512.00

24	24	Yes	Dig	Cable	3	-3063.60	0.00000	0.00000	0.00000	0.00000	0.00000	1512.00
25	25	Yes	Dig	Cable	3	-3119.50	0.00000	8.00000	0.00000	0.00000	0.00000	1512.00
26	10001	Yes	SSTS	Cable	1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1513.50
27	10002	Yes	SSTS	Towfish	2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1513.50
28	10003	Yes	SSTS	Towfish	1	0.00000	0.00000	0.00000	400.000	0.00000	0.00000	1513.50
29	10005	Yes	SSTS	Vessel	1	9.10000	-1.90000	-4.30000	0.00000	2670.00	0.00000	1513.50
30	10006	Yes	SSTS	Vessel	1	-24.6000	-1.80000	-4.30000	0.00000	2670.00	0.00000	1513.50
31	10007	Yes	SSTS	Towfish	1	-20.0000	20.0000	-12.5000	0.00000	3280.00	0.00000	1513.50
32	10008	Yes	SSTS	Cable	1	17.8000	0.00000	0.00000	0.00000	2620.00	0.00000	1513.50
33	10009	Yes	SSTS	Cable	2	17.8000	0.00000	0.00000	0.00000	2620.00	0.00000	1513.50
34	10010	Yes	SSTS	Cable	3	17.8000	0.00000	0.00000	0.00000	2620.00	0.00000	1513.50
35	10011	Yes	SSTS	Source	1	14.8000	10.0000	0.00000	0.00000	3280.00	0.00000	1513.50
36	10012	Yes	SSTS	Source	1	14.8000	0.00000	0.00000	0.00000	3280.00	0.00000	1513.50
37	10013	Yes	SSTS	Source	1	14.8000	-10.0000	0.00000	0.00000	3280.00	0.00000	1513.50
38	10014	Yes	SSTS	Source	2	14.8000	10.0000	0.00000	0.00000	3280.00	0.00000	1513.50
39	10015	Yes	SSTS	Source	2	14.8000	0.00000	0.00000	0.00000	3280.00	0.00000	1513.50
40	10016	Yes	SSTS	Source	2	14.8000	-10.0000	0.00000	0.00000	3280.00	0.00000	1513.50
41	10018	Yes	SSTS	Cable	1	17.8000	0.00000	0.00000	0.00000	1350.00	0.00000	1513.50
42	10019	Yes	SSTS	Cable	3	17.8000	0.00000	0.00000	0.00000	1350.00	0.00000	1513.50

Cable Tension Monitor Parameters
Master Vessel
11:21 PM MON., 14 MAR., 1994

Col. C CTM Fore/Aft Offset (Meters)

Col. D CTM Correction (Klbs)

CTM #		CTM Description	Col. C	Col. D
1	1	CABLE #1 (STBD)	16.3500	0.00000
2	2	CABLE #2 (MID) IS MONITOR #3	16.3500	0.00000
3	3	CABLE #3 (PORT) IS MONITOR #4	16.3500	0.00000

MAGNETIC DECLINATION CALCULATIONS

The magnetic declination value was derived onboard the R/V Western Atlas using Western Geophysical's Navigation Processing software, CNAVCHK version 4.1 Revision F and the World Magnetic Model 1990. The magnetic declination value entered in Wisdom of 12.67° was derived by averaging the values computed from four corners about the prospect.

POINT A : 39° 58.3655′ S
145° 51.7111′ E

POINT B : 39° 48.1969′ S
145° 52.7443′ E

POINT C : 39° 50.2175′ S
145° 40.6964′ E

POINT D : 39° 46.1790′ S
145° 44.2412′ E

Below are the results from Cnavchk.

CNAVCHK System

Magnetic Declination Results

Latitude: 39° 58.3655′ S
Longitude: 145° 51.7111′ E
Year: 1994 Month: 01 Day: 30
Model: WORLD MAGNETIC MODEL 1990

Component	Value (Degrees)	Change (Minutes/Year)
Declination	12.751	2.550
Inclination	-70.743	-0.093
Component	**Intensity (nT)**	**Change (nT/Year)**
X	19752.6	-8.1
Y	4469.9	13.6
Z	-57969.0	9.1
H	20252.0	-4.9
F	61404.8	-10.2

Magnetic Declination Results

Latitude: 39° 48.1969′ S
Longitude: 145° 52.7443′ E
Year: 1994 Month: 01 Day: 30
Model: WORLD MAGNETIC MODEL 1990

Component	Value (Degrees)	Change (Minutes/Year)
Declination	12.697	2.521
Inclination	-70.602	-0.090

Component	Intensity (nT)	Change (nT/Year)
X	19870.5	-8.1
Y	4476.8	13.5
Z	-57844.4	9.2
H	20368.5	-4.9
F	61325.8	-10.3

Magnetic Declination Results

Latitude: 39° 50.2175′ S
Longitude: 145° 40.6964′ E
Year: 1994 Month: 01 Day: 30
Model: WORLD MAGNETIC MODEL 1990

Component	Value (Degrees)	Change (Minutes/Year)
Declination	12.613	2.514
Inclination	-70.658	-0.094

Component	Intensity (nT)	Change (nT/Year)
X	19834.0	-8.1
Y	4438.3	13.4
Z	-57902.3	9.0
H	20324.5	-4.9
F	61365.8	-10.1

Magnetic Declination Results

Latitude: 39° 46.1790′ S
Longitude: 145° 44.2412′ E
Year: 1994 Month: 01 Day: 30
Model: WORLD MAGNETIC MODEL 1990

Component	Value (Degrees)	Change (Minutes/Year)
Declination	12.617	2.506
Inclination	-70.595	-0.092
Component	**Intensity (nT)**	**Change (nT/Year)**
X	19884.2	-8.1
Y	4450.8	13.4
Z	-57844.0	9.1
H	20376.3	-4.9
F	61328.0	-10.2

where; X = North Magnetic Intensity
Y = East Magnetic Intensity
Z = Vertical Magnetic Intensity
H = Horizontal Magnetic Intensity
F = Total Magnetic Intensity

501557

APPENDIX III

COMPASS LOGS

SAGASCO RESOURCES LTD, T/RL1, YOLLA-3D SURVEY

COMPASS LOG #1

FROM :	JDAY: 036	to	JDAY: 058
:	DATE: 05 FEBRUARY 1994	to	DATE: 27 FEBRUARY 1994
:	SEQ#: 1	to	SEQ#: 105
:	LINE: YOL00013	to	LINE: YOL00769

NOTE: *** ALL COMPASSES MEASURED FROM CNG. ***

COMPASS RU#	CABLE #	SECTION#	OFFSET (m)	SERIAL#
2	1	HEAD STRETCH	27.9	8658
3	1	1B	-162.4	6931
4	1	2A	-262.4	7611
5	1	3B	-562.4	8695
6	1	5B	-962.4	8690
7	1	7B	-1362.4	8880
8	1	9B	-1762.4	8749
9	1	11B	-2162.4	8763
10	1	13B	-2562.4	8829
11	1	15A	-2862.4	8489
12	1	TAIL STRETCH	-2997.0	8542
14	2	HEAD STRETCH	27.9	8654
15	2	1B	-162.4	7779
16	2	2A	-262.4	8752
17	2	3B	-562.4	8721
18	2	5B	-962.4	9720
19	2	7B	-1362.4	9583
20	2	9B	-1762.4	8524
21	2	11B	-2162.4	6973
22	2	13B	-2562.4	7796
23	2	15A	-2862.4	8726
24	2	TAIL STRETCH	-2997.0	8985
26	3	HEAD STRETCH	27.9	8876
27	3	1B	-162.4	8777
28	3	2A	-262.4	9628
29	3	3B	-562.4	9669
30	3	5B	-962.4	9786
31	3	7B	-1362.4	8655
32	3	9B	-1762.4	8712
33	3	11B	-2162.4	8843
34	3	13B	-2562.4	8963
35	3	15A	-2862.4	9779
36	3	TAIL STRETCH	-2997.0	7215

SPARE COMPASS LIST

7542	8713	9791	8785	8666	9690	9393
8728	9762	7012	7555	9598	8661	7100
8505	8853	8691	9643	8734	8577	8788
8679	5647					

SAGASCO RESOURCES LTD, T/RL1, YOLLA-3D SURVEY

COMPASS LOG #2

FROM :	JDAY: 061	to	JDAY: 074	
:	DATE: 02 MARCH 1994	to	DATE: 16 MARCH 1994	
:	SEQ#: 106	to	SEQ#: 187	
:	LINE: YOL00535	to	LINE: YOL01661	

NOTE: *** ALL COMPASSES MEASURED FROM CNG. ***

COMPASS RU#	CABLE #	SECTION#	OFFSET (m)	SERIAL#
2	1	HEAD STRETCH	27.9	**8661**
3	1	1B	-162.4	6931
4	1	2A	-262.4	**8679**
5	1	3B	-562.4	**8853**
6	1	5B	-962.4	8690
7	1	7B	-1362.4	8880
8	1	9B	-1762.4	8749
9	1	11B	-2162.4	**7215**
10	1	13B	-2562.4	8829
11	1	15A	-2862.4	8489
12	1	TAIL STRETCH	-2997.0	8542
14	2	HEAD STRETCH	27.9	8654
15	2	1B	-162.4	7779
16	2	2A	-262.4	8752
17	2	3B	-562.4	8721
18	2	5B	-962.4	9720
19	2	7B	-1362.4	9583
20	2	9B	-1762.4	**9690**
21	2	11B	-2162.4	6973
22	2	13B	-2562.4	7796
23	2	15A	-2862.4	8726
24	2	TAIL STRETCH	-2997.0	8985
26	3	HEAD STRETCH	27.9	8876
27	3	1B	-162.4	8777
28	3	2A	-262.4	9628
29	3	3B	-562.4	9669
30	3	5B	-962.4	9786
31	3	7B	-1362.4	8655
32	3	9B	-1762.4	8712
33	3	11B	-2162.4	8843
34	3	13B	-2562.4	8963
35	3	15A	-2862.4	9779
36	3	TAIL STRETCH	-2997.0	**9393**

COMMENTS: RU's 2, 4, 5, 9 & 20 S/N's 8658, 7611, 8695, 8763 & 8524 wer changed to S/N's 8661, 8679, 8853, 7215 & 9690 respectively D/T bi problems. RU 36 S/N 7215 replaced with S/N 9393.

SPARE COMPASS LIST

7542	8713	9791	8785	8666	8728	9762
7012	7555	9598	7100	8505	8691	9643
8734	8577	8788	5647			

APPENDIX IV

COMPASS VERIFICATION RESULTS

501561

WESTERN GEOPHYSICAL COMPANY

PERTH WA COMPASS CALIBRATION FOR SAGASCO RESOURCES LTD

PRE YOLLA-3D

JANUARY 1994

Prepared by : Steve Metcalfe BASc

INTRODUCTION

From the 11th - 12th of January 1994, a pre-survey onshore compas verification was undertaken at the Gnangarra Pine plantation, approximatel 3/4 hour drive north of Perth WA.

The verification was undertaken for the Yolla 3D Seismic Survey to b acquired by the M/V Western Atlas for SAGASCO RESOURCES LTD.

Fifty six DigiCOURSE 5000 series compass \ birds (Model no. 5011/03) wer verified using the DigiCOURSE industry standard procedure. The compasse were verified in the 34/214 degree direction.

PERSONNEL

11th			
Steve Metcalfe	Geophysicist	Western Geophysical Co.	
Warwick Maxted	Surveyor	Western Geophysical Co.	
Mike Friend	Nav. Analyst	Western Geophysical Co.	Don Eyema
Engineer	DigiCOURSE		
12th			
Steve Metcalfe	Geophysicist	Western Geophysical Co.	
Warwick Maxted	Surveyor	Western Geophysical Co.	
Mike Friend	Nav. Analyst	Western Geophysical Co.	

EQUIPMENT

1 Bartington Fluxgate magnetometer probe mounted on a non-magnetic Zeiss Jena Theodolite & Tripod.
1 V-Block mounted on Tripod.
1 Toshiba laptop computer with Digicourse modem box and the require software.
1 DC to AC converter.

PROCEDURE

The procedure adopted for the verification compared a known compute magnetic heading with the observed compass heading.

To achieve this, knowledge of the True azimuth from site #1 to site #2 wa not required.

The procedure required surveying a bearing from the V-Block location (sit #1) to a point (site #2) in the 34/214 degree direction. A check of th azimuth was accomplished by surveying site #1 from site #2.

A step-by-step guide follows;

I.Using the Bartington Magnetometer probe and theodolite, magnetic nort was determined in the following manner:

1)Position the theodolite over a pin in the centre of the V-Block locatior
this is site #1.

2)On the theodolite set 90 on both the vertical and horizontal.
Lock the bottom card.

4)Null the Bartington Magnetometer and release the bottom card.
This is reading (CA).

5)Rotate the theodolite through 180 degrees.
Check that the vertical is set on 90 and then null the magnetometer. Thi
is reading (CB).

6)Transit the theodolite and set the vertical to 270.
Null the magnetometer. This is reading (CC).

7)Rotate the theodolite through 180 degrees.
Check that the vertical is set on 270 and then null the
magnetometer. This is reading (CD).

To calculate the null azimuth:

Az = 270-((CA+CB+CC+CD)/4)

Set Az on the theodolite horizontal scale and 90 on the vertical.
Lock the bottom card and null the magnetometer.
Release the bottom card.
The theodolite is now in the magnetic world.

II.The remaining steps preceded the compass verification:

8)Survey a peg roughly 20 metres in the 34 degree direction.
Position a marker pin in the centre of the peg and record the bearing frc
site #1. This is site #2.

9)Position the theodolite over the pin of site #2.
Record a bearing to site #1.

10)Setup the V-Block as follows:

i)With the tripod already positioned at site #1, level the tripod base ar
position the V-Block.

ii)Using the spirit level, make sure the V-Block is level.

11)Attach a compass to the V-Block and verify using the followir
procedures:

34 degrees LEVEL
214 degrees LEVEL
34 degrees LEVEL
214 degrees LEVEL

NOTE 1: Every 3rd - 5th compass attached to the V-Block, a bearing from sit #2 to site #1 was recorded by using the results from step 7, and the recording the bearing to the pin and swing stand at site #1. Hence thi effectively eliminates the influence of the diurnal.

NOTE 2: After the compass was mounted in its position, a ten second dela was allowed for the compass heading to settle before a reading wa recorded, a further five seconds was allowed to observe any variation frc the original heading.

SPECIFICATIONS

The specifications adopted follows:

1. Each compass was mounted in a test rig and aligned within 5 degrees c the planned shooting direction.

2.The compass was then reversed to establish a calibration value in th opposite direction. The difference between the two verification value should not exceed 1 degrees.

3. Step 2 will be repeated to establish the compasses repeatability.

4.10% of the compasses were put through a pitch and roll verificatic (between +15 and -15 degrees) and shall not change more than 0.5 degree from the computed heading.

RESULTS

Tuesday 11th January 1994
15:00

SITE #1:

CA	90° 00′ 00"	East =	90.0000
CB	270° 23′ 00"	West =	270.3833
CC	270° 21′ 30"	East =	270.3583
CD	90° 04′ 00"	West =	90.0667
		SUM =	720.8083
		RESULT =	89.7979

Instrument Setting : 89° 48′ 00"

Azimuth from SITE #1 to SITE #2 = 33° 19′ 15"

Azimuth from SITE #2 to SITE #1 = 213° 25′ 00"

SITE #2:

CA	90° 00′ 00"	East =	90.0000
CB	270° 23′ 00"	West =	270.3833
CC	270° 21′ 30"	East =	270.3583
CD	90° 03′ 00"	West =	90.0508
		SUM =	720.7916
		RESULT =	89.8021

Instrument Setting : 89° 48′ 00"

Azimuth from SITE #1 to SITE #2 = 33° 20′ 20"

Azimuth from SITE #2 to SITE #1 = 213° 25′ 00"

As there was a 5 minute difference between azimuths, 5 minutes was subtracted from all computed headings.

WEDNESDAY 12th January 1994
10:00

SITE #1:	CA	90° 00′ 00"	East =	90.0000
	CB	270° 23′ 20"	West =	270.3889
	CC	270° 21′ 50"	East =	270.3639
	CD	90° 03′ 00"	West =	90.0500
			SUM =	720.8028
			RESULT =	89.7993

Instrument Setting : 89° 48′ 00"

Azimuth from SITE #1 to SITE #2 = 33° 24′ 50"

Azimuth from SITE #2 to SITE #1 = 213° 31′ 10"

As there was a 6 minute difference between azimuths, 6 minutes was subtracted from all computed headings.

RESULTS

DigiCOURSE
FIELD COMPASS VERIFICATION

LOCATION: PERTH
AUSTRALIA

DATE: 01-11-1994 VESSEL: WESTERN ATLAS CLIENT: SAGASCO

SERIAL NO.	COMPUTED HDG 1	COMPASS HDG 1-1	COMPASS HDG 1-2	C-O 1	COMPUTED HDG 2	COMPASS HDG 2-1	COMPASS HDG 2-2	C-O 2
7611	33.27	33.13	33.13	0.13	213.27	212.96	212.96	0.31
7542	33.27	33.13	33.13	0.13	213.27	213.13	213.13	0.14
8713	33.27	33.22	33.22	0.04	213.27	213.31	213.31	-0.04
8542	33.25	33.13	33.13	0.12	213.25	213.13	213.13	0.12
8763	33.25	33.13	33.13	0.12	213.25	213.13	213.13	0.12
9791	33.25	33.13	33.13	0.12	213.25	213.22	213.22	0.03
9786	33.25	33.40	32.96	0.07	213.25	213.22	213.22	0.03
8695	33.30	33.05	33.05	0.25	213.30	213.31	213.31	-0.01
8785	33.30	32.96	32.96	0.34	213.30	213.22	213.22	0.08
8489	33.30	32.96	32.96	0.34	213.30	213.40	213.40	-0.10
8666	33.30	33.05	33.05	0.25	213.30	213.13	213.13	0.17
9690	33.27	33.05	33.05	0.22	213.27	213.05	213.05	0.22
8658	33.27	33.22	33.22	0.04	213.27	213.13	213.13	0.13
8655	33.27	33.22	33.22	0.04	213.27	212.87	212.87	0.40
8690	33.27	33.05	33.05	0.22	213.27	213.05	213.05	0.22
8829	33.27	33.13	33.13	0.13	213.27	213.40	213.40	-0.13
9393	33.20	33.40	33.40	-0.20	213.20	213.31	213.31	-0.11
8777	33.20	33.05	33.05	0.15	213.20	213.13	213.13	0.07
8728	33.20	33.22	33.22	-0.02	213.20	213.05	213.05	0.15
8985	33.20	32.87	33.22	0.15	213.20	212.96	213.31	0.07
9762	33.20	33.22	33.22	-0.02	213.20	212.96	212.96	0.24
9583	33.28	33.31	32.96	0.14	213.27	213.13	213.13	0.14
9779	33.28	33.05	32.70	0.40	213.27	212.96	212.96	0.32
8876	33.28	33.13	33.13	0.14	213.27	213.13	213.13	0.14
7012	33.28	33.40	33.05	0.05	213.27	213.31	212.96	0.14
6973	33.28	32.87	33.22	0.23	213.27	213.31	213.31	-0.04
6931	33.28	33.31	33.31	-0.04	213.27	213.40	213.40	-0.12
7555	33.42	33.13	33.13	0.28	213.42	213.13	213.13	0.28
8524	33.42	33.31	33.31	0.11	213.42	213.49	213.49	-0.07
9598	33.42	33.40	33.40	0.02	213.42	213.40	213.40	0.02
7796	33.42	33.31	33.31	0.11	213.42	213.05	213.05	0.37
7779	33.27	33.40	33.40	-0.13	213.27	213.40	213.40	-0.13
7215	33.27	33.22	33.22	0.04	213.27	213.57	213.57	-0.31
8654	33.27	33.22	33.22	0.04	213.27	213.49	213.49	-0.22
8661	33.26	33.05	33.05	0.21	213.26	213.13	213.13	0.12
7100	33.26	33.40	33.40	-0.14	213.26	213.40	213.40	-0.14
8505	33.26	33.40	33.75	-0.32	213.26	213.66	213.66	-0.40
8726	33.26	33.05	33.40	0.04	213.26	213.40	213.05	0.04

DigiCOURSE
FIELD COMPASS VERIFICATION

LOCATION: PERTH
AUSTRALIA

DATE: 01-12-1994 VESSEL: ATLAS CLIENT: SAGASCO

SERIAL NO.	COMPUTED HDG 1	COMPASS HDG 1-1	COMPASS HDG 1-2	C-O 1	COMPUTED HDG 2	COMPASS HDG 2-1	COMPASS HDG 2-2	C-O 2
8853	33.25	33.31	33.31	-0.06	213.25	213.22	213.22	0.03
8691	33.25	33.22	33.22	0.03	213.25	213.40	213.40	-0.15
8749	33.25	32.87	32.87	0.38	213.25	212.96	212.96	0.29
9643	33.25	33.22	33.22	0.03	213.25	213.22	213.22	0.03
8734	33.23	33.22	33.22	0.01	213.23	213.49	213.13	-0.08
9669	33.23	33.49	33.49	-0.25	213.23	213.31	213.31	-0.08
8577	33.23	33.13	33.13	0.10	213.23	213.40	213.40	-0.17
9628	33.23	33.49	33.49	-0.25	213.23	213.31	213.31	-0.08
8843	33.23	33.22	33.22	0.01	213.23	213.13	213.13	0.10
8712	33.23	32.96	32.96	0.27	213.23	212.96	212.96	0.27
9720	33.23	33.05	33.05	0.18	213.23	213.13	213.13	0.10
8721	33.23	33.22	33.22	0.01	213.23	213.22	213.22	0.01
8963	33.23	33.05	33.05	0.18	213.23	213.22	213.22	0.01
8752	33.21	33.31	33.31	-0.10	213.21	213.57	213.22	-0.19
8788	33.21	33.13	33.13	0.07	213.21	213.22	213.22	-0.02
8679	33.21	33.13	33.13	0.07	213.21	213.13	213.13	0.07
8880	33.22	33.05	33.05	0.17	213.22	213.05	213.05	0.17
5647	33.22	33.22	33.57	-0.18	213.22	213.40	213.40	-0.18

DigiCOURSE
FIELD COMPASS VERIFICATION

LOCATION: PERTH
AUSTRALIA

DATE: 01-12-1994 VESSEL: ATLAS CLIENT: SAGASCO

SERIAL		8726		5647		8880	
BEARING		33.25		33.18		33.11	
		CMP HDG	C-O	CMP HDG	C-O	CMP HDG	C-O
LEVEL		33.05	0.20	33.22	-0.04	32.70	0.41
NOSE UP	5	33.05	0.20	33.31	-0.13	32.70	0.41
	10	33.05	0.20	33.22	-0.04	32.70	0.41
	15	33.05	0.20	33.57	-0.39	32.70	0.41
LEVEL		33.40	-0.15	33.22	-0.04	32.70	0.41
NOSE DOWN	5	33.40	-0.15	33.22	-0.04	32.70	0.41
	10	33.40	-0.15	33.13	0.05	32.70	0.41
	15	33.40	-0.15	33.22	-0.04	32.70	0.41
LEVEL		33.40	-0.15	33.22	-0.04	32.70	0.41
ROLL STBD	5	33.40	-0.15	33.22	-0.04	32.70	0.41
	10	33.40	-0.15	33.22	-0.04	32.96	0.15
	15	33.40	-0.15	33.49	-0.31	32.78	0.33
LEVEL		33.40	-0.15	33.22	-0.04	32.70	0.41
ROLL PORT	5	33.40	-0.15	33.13	0.05	32.70	0.41
	10	33.40	-0.15	33.22	-0.04	32.70	0.41
	15	33.40	-0.15	33.22	-0.04	32.70	0.41

501568

DigiCOURSE
FIELD COMPASS VERIFICATION

LOCATION: PERTH
AUSTRALIA

DATE: 01-12-1994 VESSEL: ATLAS CLIENT: SAGASCO

SERIAL		8788		9628		8721	
BEARING		33.08		33.06		33.09	
		CMP HDG	C-O	CMP HDG	C-O	CMP HDG	C-O
LEVEL		32.78	0.30	33.22	-0.16	32.43	0.66
NOSE UP	5	32.78	0.30	33.22	-0.16	32.78	0.31
	10	32.78	0.30	33.22	-0.16	32.78	0.31
	15	33.13	-0.05	33.49	-0.43	32.78	0.31
LEVEL		32.78	0.30	33.22	-0.16	32.52	0.57
NOSE DOWN	5	32.70	0.38	33.22	-0.16	32.43	0.66
	10	32.43	0.65	32.87	0.19	32.43	0.66
	15	32.43	0.65	32.78	0.28	32.17	0.92
LEVEL		32.78	0.30	33.13	-0.07	32.78	0.31
ROLL STBD	5	32.78	0.30	33.13	-0.07	32.70	0.39
	10	32.87	0.21	33.13	-0.07	32.78	0.31
	15	32.87	0.21	33.13	-0.07	32.87	0.22
LEVEL		32.78	0.30	33.22	-0.15	32.43	0.66
ROLL PORT	5	32.78	0.30	33.22	-0.15	32.52	0.57
	10	32.78	0.30	33.22	-0.15	32.43	0.66
	15	32.78	0.30	33.22	-0.15	32.43	0.66

NOTE: Compass 8721 results were repeated as the base plate on the V BLOCK was slightly loose, however the results were misplaced.

A magnetic sweep was performed using an EG & G GEOMETRICS proton processio magnetometer in a 20x15m grid about the swing stand location. Samples recorded at a 5 metre interval to verify a magnetically quiet location.

The diagram below shows the grid used and the resultant total magnetic value afte subtracting the average magnetic reading from the observed. The average magneti value was 58,545.5 NT. The V-Block was located at point "A" and the theodolite wa at point "B".

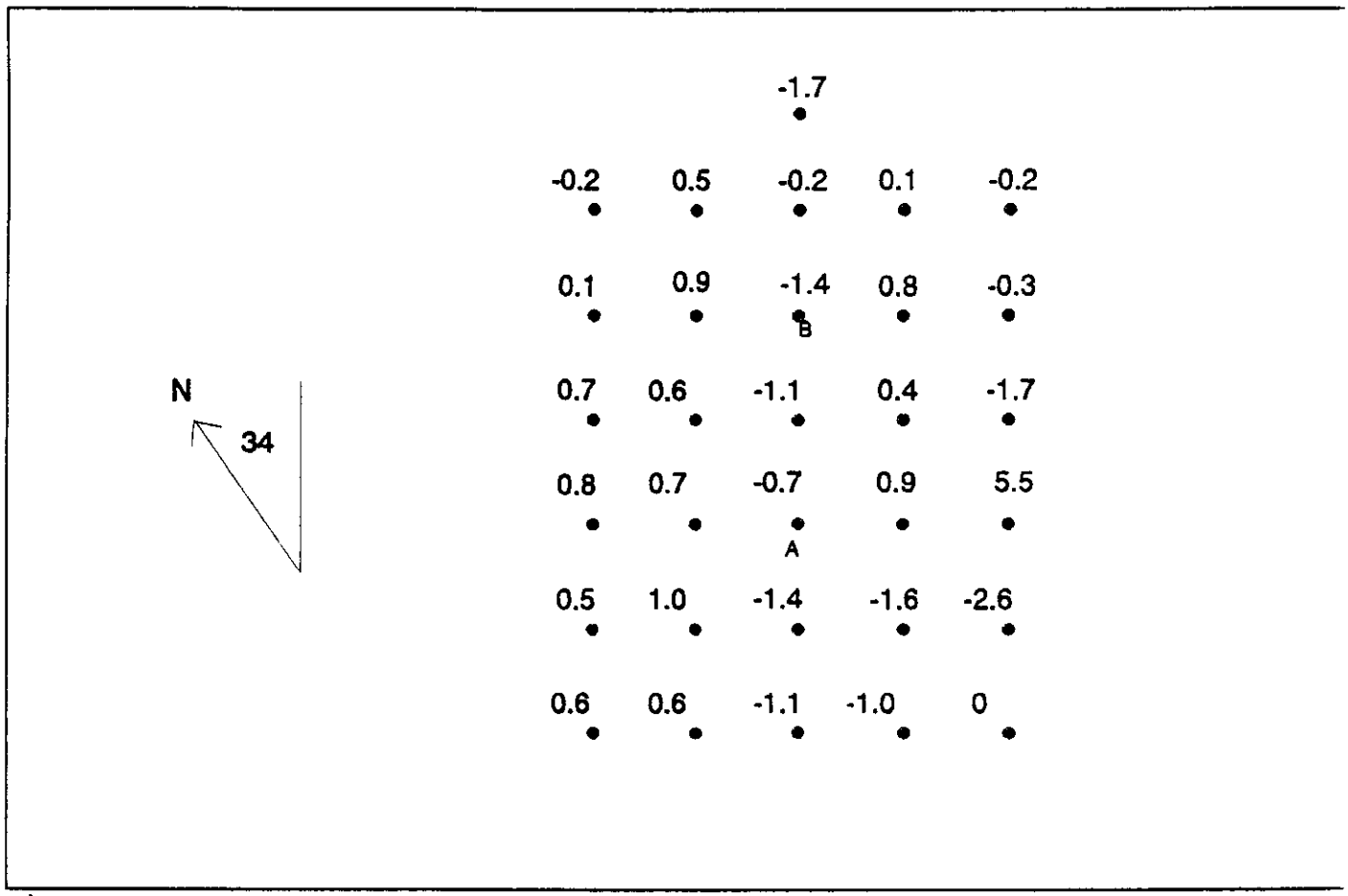

Figure 1

501570

APPENDIX V

FLEXQC COORDINATES & GRID STATISTICS

501571

Project file : YOLLA Date: 10/01/94

GENERAL SURVEY PARAMETERS

Client name : SAGASCO Resources Ltd
Survey area : BASS BASIN, YOLLA GAS FIELD
Survey details : YOLLA 3D SEISMIC SURVEY
Line prefix : YOL

SPHEROID PARAMETERS

Spheroid name : Australian Nat.
Semi-major axis : 6378160.000
Semi-minor axis : 6356774.719
Flattening (F) : 298.2500000
Reciprical (1/F) : 0.003352892

PROJECTION PARAMETERS

UTM Zone number : 55
Hemisphere code : S
Latitude of origin : 000 0.0000N
Scale factor on C.M. : 0.999600000
False Easting (metres) : 500000.0
Grid units equal to 1 metres : 1.000000000
Name of grid unit : METRES
Name of grid system : U.T.M. GRID

GRID DEFINITION PARAMETERS

Grid Corner - P1 : 039 58.3845S 145 51.7477E
Grid Corner - P2 : 039 50.9952S 145 58.2115E
Grid Corner - P3 : 039 51.5809S 145 38.6826E

Azimuth from P1 -> P2 : 34.00 degrees
Azimuth from P1 -> P3 : 304.00 degrees

Cell length	: 12.500	Cell width	: 25.000
Number of lines	: 900	Number of cells	: 1320
First line number	: 1	Line increment	: 1
First shotpoint	: 101	Shot increment	: 2.0

FULL-FOLD COVERAGE DEFINITION

LINE	CELL	CELL	
1	1	1	397
2	233	1	967
3	376	67	1319
4	634	191	1319
5	864	300	1015

NOTE: First and last shotpoints designate first and last full fol shotpoint for the sail line.

These lines shot in the 214° direction

LINE	POINT	LATITUDE	LONGITUDE	NORTHINGS	EASTINGS	RANGE
						YOL0000
101	039 58.3656S	145 51.7112E	5574631	402808	0	
YOL00001	301 039 56.1254S	145 53.6739E	5578810	405550	5000	
YOL00007	101 039 58.3203S	145 51.6239E	5574713	402683	0	
YOL00007	308 039 56.0017S	145 53.6552E	5579038	405521	5175	
YOL00013	101 039 58.2750S	145 51.5365E	5574795	402557	0	
YOL00013	316 039 55.8667S	145 53.6464E	5579288	405505	5375	
YOL00019	101 039 58.2296S	145 51.4492E	5574877	402432	0	
YOL00019	323 039 55.7430S	145 53.6277E	5579516	405476	5550	
YOL00025	101 039 58.1843S	145 51.3619E	5574960	402307	0	
YOL00025	330 039 55.6193S	145 53.6091E	5579745	405446	5725	
YOL00031	101 039 58.1390S	145 51.2745E	5575042	402181	0	
YOL00031	338 039 55.4844S	145 53.6002E	5579994	405431	5925	
YOL00037	101 039 58.0936S	145 51.1872E	5575124	402056	0	
YOL00037	345 039 55.3607S	145 53.5816E	5580223	405401	6100	
YOL00043	101 039 58.0483S	145 51.0999E	5575206	401930	0	
YOL00043	353 039 55.2257S	145 53.5727E	5580472	405385	6300	
YOL00049	101 039 58.0030S	145 51.0125E	5575289	401805	0	
YOL00049	360 039 55.1020S	145 53.5541E	5580701	405356	6475	
YOL00055	101 039 57.9576S	145 50.9252E	5575371	401680	0	
YOL00055	367 039 54.9783S	145 53.5354E	5580929	405327	6650	
YOL00061	101 039 57.9123S	145 50.8379E	5575453	401554	0	
YOL00061	375 039 54.8434S	145 53.5266E	5581179	405311	6850	
YOL00067	101 039 57.8670S	145 50.7506E	5575535	401429	0	
YOL00067	382 039 54.7197S	145 53.5079E	5581407	405282	7025	
YOL00073	101 039 57.8216S	145 50.6633E	5575618	401304	0	
YOL00073	389 039 54.5959S	145 53.4893E	5581636	405252	7200	
YOL00079	101 039 57.7763S	145 50.5759E	5575700	401178	0	
YOL00079	397 039 54.4610S	145 53.4804E	5581885	405236	7400	
YOL00085	101 039 57.7309S	145 50.4886E	5575782	401053	0	
YOL00085	404 039 54.3373S	145 53.4618E	5582114	405207	7575	

LINE	POINT	LATITUDE	LONGITUDE	NORTHINGS	EASTINGS	RANGE
YOL00091	101	039 57.6856S	145 50.4013E	5575864	400927	0
YOL00091	412	039 54.2024S	145 53.4530E	5582363	405191	7775
YOL00097	101	039 57.6403S	145 50.3140E	5575947	400802	0
YOL00097	419	039 54.0786S	145 53.4343E	5582592	405162	7950
YOL00103	101	039 57.5949S	145 50.2267E	5576029	400677	0
YOL00103	426	039 53.9549S	145 53.4157E	5582820	405133	8125
YOL00109	101	039 57.5496S	145 50.1394E	5576111	400551	0
YOL00109	434	039 53.8200S	145 53.4068E	5583070	405117	8325
YOL00115	101	039 57.5042S	145 50.0521E	5576194	400426	0
YOL00115	441	039 53.6963S	145 53.3882E	5583298	405087	8500
YOL00121	101	039 57.4589S	145 49.9648E	5576276	400300	0
YOL00121	448	039 53.5726S	145 53.3696E	5583527	405058	8675
YOL00127	101	039 57.4135S	145 49.8775E	5576358	400175	0
YOL00127	456	039 53.4376S	145 53.3607E	5583776	405042	8875
YOL00133	101	039 57.3682S	145 49.7902E	5576440	400050	0
YOL00133	463	039 53.3139S	145 53.3421E	5584005	405013	9050
YOL00139	101	039 57.3228S	145 49.7029E	5576523	399924	0
YOL00139	470	039 53.1902S	145 53.3235E	5584233	404984	9225
YOL00145	101	039 57.2775S	145 49.6156E	5576605	399799	0
YOL00145	478	039 53.0553S	145 53.3146E	5584483	404968	9425
YOL00151	101	039 57.2321S	145 49.5283E	5576687	399674	0
YOL00151	485	039 52.9316S	145 53.2960E	5584711	404938	9600
YOL00157	101	039 57.1868S	145 49.4410E	5576769	399548	0
YOL00157	493	039 52.7966S	145 53.2872E	5584961	404923	9800
YOL00163	101	039 57.1414S	145 49.3537E	5576852	399423	0
YOL00163	500	039 52.6729S	145 53.2685E	5585189	404893	9975
YOL00169	101	039 57.0961S	145 49.2664E	5576934	399297	0
YOL00169	507	039 52.5492S	145 53.2499E	5585418	404864	10150
YOL00175	101	039 57.0507S	145 49.1791E	5577016	399172	0
YOL00175	515	039 52.4143S	145 53.2411E	5585667	404848	10350
YOL00181	101	039 57.0053S	145 49.0919E	5577098	399047	0
YOL00181	522	039 52.2905S	145 53.2224E	5585896	404819	10525
YOL00187	101	039 56.9600S	145 49.0046E	5577181	398921	0
YOL00187	529	039 52.1668S	145 53.2038E	5586124	404789	10700

These lines shot in the 034° direction

LINE	POINT	LATITUDE	LONGITUDE	NORTHINGS	EASTINGS	RANGE
YOL00193	101	039 56.9146S	145 48.9173E	5577263	398796	0
YOL00193	537	039 52.0319S	145 53.1950E	5586374	404774	10900
YOL00199	101	039 56.8693S	145 48.8300E	5577345	398671	0
YOL00199	544	039 51.9082S	145 53.1764E	5586602	404744	11075
YOL00205	101	039 56.8239S	145 48.7427E	5577427	398545	0
YOL00205	552	039 51.7732S	145 53.1675E	5586852	404729	11275
YOL00211	101	039 56.7785S	145 48.6555E	5577510	398420	0
YOL00211	559	039 51.6495S	145 53.1489E	5587080	404699	11450
YOL00217	101	039 56.7332S	145 48.5682E	5577592	398294	0
YOL00217	566	039 51.5258S	145 53.1303E	5587309	404670	11625
YOL00223	101	039 56.6878S	145 48.4809E	5577674	398169	0
YOL00223	574	039 51.3909S	145 53.1215E	5587558	404654	11825
YOL00229	101	039 56.6424S	145 48.3937E	5577757	398044	0
YOL00229	581	039 51.2672S	145 53.1029E	5587787	404625	12000
YOL00235	101	039 56.5971S	145 48.3064E	5577839	397918	0
YOL00235	588	039 51.1434S	145 53.0842E	5588015	404595	12175
YOL00241	103	039 56.5293S	145 48.2388E	5577963	397820	0
YOL00241	596	039 51.0085S	145 53.0754E	5588265	404580	12325
YOL00247	104	039 56.4727S	145 48.1613E	5578066	397709	0
YOL00247	603	039 50.8848S	145 53.0568E	5588493	404550	12475
YOL00253	106	039 56.4050S	145 48.0937E	5578190	397611	0
YOL00253	611	039 50.7499S	145 53.0480E	5588743	404535	12625
YOL00259	107	039 56.3484S	145 48.0163E	5578293	397499	0
YOL00259	618	039 50.6261S	145 53.0294E	5588971	404505	12775
YOL00265	108	039 56.2918S	145 47.9389E	5578396	397387	0
YOL00265	625	039 50.5024S	145 53.0108E	5589200	404476	12925
YOL00271	110	039 56.2241S	145 47.8713E	5578520	397289	0
YOL00271	633	039 50.3675S	145 53.0019E	5589449	404460	13075
YOL00277	111	039 56.1675S	145 47.7938E	5578624	397178	0
YOL00277	640	039 50.2438S	145 52.9833E	5589678	404431	13225
YOL00283	113	039 56.0997S	145 47.7262E	5578748	397080	0
YOL00283	648	039 50.1088S	145 52.9745E	5589927	404415	13375

LINE	POINT	LATITUDE	LONGITUDE	NORTHINGS	EASTINGS	RANGE
YOL00289	114	039 56.0432S	145 47.6488E	5578851	396968	0
YOL00289	655	039 49.9851S	145 52.9559E	5590156	404386	13525
YOL00295	115	039 55.9866S	145 47.5714E	5578954	396856	0
YOL00295	662	039 49.8614S	145 52.9373E	5590384	404356	13675
YOL00301	117	039 55.9188S	145 47.5038E	5579078	396758	0
YOL00301	670	039 49.7265S	145 52.9285E	5590634	404341	13825
YOL00307	118	039 55.8623S	145 47.4264E	5579181	396647	0
YOL00307	677	039 49.6027S	145 52.9099E	5590862	404311	13975
YOL00313	119	039 55.8057S	145 47.3490E	5579284	396535	0
YOL00313	684	039 49.4790S	145 52.8913E	5591091	404282	14125
YOL00319	121	039 55.7379S	145 47.2814E	5579408	396437	0
YOL00319	692	039 49.3441S	145 52.8825E	5591340	404266	14275
YOL00325	122	039 55.6813S	145 47.2040E	5579512	396325	0
YOL00325	699	039 49.2204S	145 52.8639E	5591569	404237	14425
YOL00331	124	039 55.6136S	145 47.1364E	5579636	396227	0
YOL00331	707	039 49.0854S	145 52.8550E	5591818	404221	14575
YOL00337	125	039 55.5570S	145 47.0590E	5579739	396116	0
YOL00337	714	039 48.9617S	145 52.8364E	5592047	404192	14725
YOL00343	126	039 55.5004S	145 46.9816E	5579842	396004	0
YOL00343	721	039 48.8380S	145 52.8178E	5592275	404162	14875
YOL00349	128	039 55.4326S	145 46.9140E	5579966	395906	0
YOL00349	729	039 48.7031S	145 52.8090E	5592525	404147	15025
YOL00355	129	039 55.3761S	145 46.8366E	5580069	395795	0
YOL00355	736	039 48.5793S	145 52.7904E	5592753	404117	15175
YOL00361	131	039 55.3083S	145 46.7690E	5580193	395697	0
YOL00361	744	039 48.4444S	145 52.7816E	5593003	404101	15325
YOL00367	132	039 55.2517S	145 46.6916E	5580296	395585	0
YOL00367	751	039 48.3207S	145 52.7630E	5593231	404072	15475
YOL00373	133	039 55.1951S	145 46.6142E	5580400	395473	0
YOL00373	758	039 48.1970S	145 52.7444E	5593460	404043	15625
YOL00379	135	039 55.1273S	145 46.5467E	5580524	395375	0
YOL00379	760	039 48.1292S	145 52.6769E	5593584	403945	15625
YOL00385	136	039 55.0708S	145 46.4693E	5580627	395264	0
YOL00385	760	039 48.0839S	145 52.5898E	5593666	403819	15600

LINE	POINT	LATITUDE	LONGITUDE	NORTHINGS	EASTINGS	RANGE
YOL00391	138	039 55.0030S	145 46.4017E	5580751	395166	0
YOL00391	760	039 48.0386S	145 52.5026E	5593748	403694	15550
YOL00397	139	039 54.9464S	145 46.3243E	5580854	395054	0
YOL00397	760	039 47.9933S	145 52.4155E	5593831	403569	15525
YOL00403	140	039 54.8898S	145 46.2469E	5580957	394942	0
YOL00403	760	039 47.9480S	145 52.3284E	5593913	403443	15500
YOL00409	142	039 54.8220S	145 46.1794E	5581081	394844	0
YOL00409	760	039 47.9027S	145 52.2412E	5593995	403318	15450
YOL00415	143	039 54.7654S	145 46.1020E	5581184	394733	0
YOL00415	760	039 47.8573S	145 52.1541E	5594078	403192	15425
YOL00421	145	039 54.6977S	145 46.0345E	5581308	394635	0
YOL00421	760	039 47.8120S	145 52.0670E	5594160	403067	15375
YOL00427	146	039 54.6411S	145 45.9571E	5581412	394523	0
YOL00427	760	039 47.7667S	145 51.9799E	5594242	402942	15350
YOL00433	148	039 54.5733S	145 45.8895E	5581536	394425	0
YOL00433	760	039 47.7214S	145 51.8928E	5594324	402816	15300
YOL00439	149	039 54.5167S	145 45.8122E	5581639	394313	0
YOL00439	760	039 47.6760S	145 51.8056E	5594407	402691	15275
YOL00445	151	039 54.4489S	145 45.7446E	5581763	394215	0
YOL00445	760	039 47.6307S	145 51.7185E	5594489	402566	15225
YOL00451	152	039 54.3923S	145 45.6673E	5581866	394104	0
YOL00451	760	039 47.5854S	145 51.6314E	5594571	402440	15200
YOL00457	153	039 54.3357S	145 45.5899E	5581969	393992	0
YOL00457	760	039 47.5401S	145 51.5443E	5594653	402315	15175
YOL00463	155	039 54.2679S	145 45.5224E	5582093	393894	0
YOL00463	760	039 47.4947S	145 51.4572E	5594736	402189	15125
YOL00469	156	039 54.2113S	145 45.4450E	5582196	393782	0
YOL00469	760	039 47.4494S	145 51.3701E	5594818	402064	15100
YOL00475	158	039 54.1436S	145 45.3775E	5582321	393685	0
YOL00475	760	039 47.4041S	145 51.2830E	5594900	401939	15050
YOL00481	159	039 54.0870S	145 45.3001E	5582424	393573	0
YOL00481	760	039 47.3587S	145 51.1959E	5594982	401813	15025
YOL00487	161	039 54.0192S	145 45.2326E	5582548	393475	0
YOL00487	760	039 47.3134S	145 51.1088E	5595065	401688	14975

LINE	POINT	LATITUDE	LONGITUDE	NORTHINGS	EASTINGS	RANGE
YOL00493	162	039 53.9626S	145 45.1552E	5582651	393363	0
YOL00493	760	039 47.2681S	145 51.0217E	5595147	401563	14950
YOL00499	164	039 53.8948S	145 45.0877E	5582775	393265	0
YOL00499	760	039 47.2227S	145 50.9346E	5595229	401437	14900
YOL00505	165	039 53.8382S	145 45.0104E	5582878	393154	0
YOL00505	760	039 47.1774S	145 50.8475E	5595312	401312	14875
YOL00511	166	039 53.7816S	145 44.9330E	5582981	393042	0
YOL00511	760	039 47.1320S	145 50.7604E	5595394	401186	14850
YOL00517	168	039 53.7138S	145 44.8655E	5583105	392944	0
YOL00517	760	039 47.0867S	145 50.6733E	5595476	401061	14800
YOL00523	169	039 53.6572S	145 44.7882E	5583209	392832	0
YOL00523	760	039 47.0414S	145 50.5862E	5595558	400936	14775
YOL00529	171	039 53.5894S	145 44.7207E	5583333	392734	0
YOL00529	760	039 46.9960S	145 50.4991E	5595641	400810	14725
YOL00535	172	039 53.5328S	145 44.6433E	5583436	392623	0
YOL00535	760	039 46.9507S	145 50.4120E	5595723	400685	14700
YOL00541	174	039 53.4650S	145 44.5758E	5583560	392525	0
YOL00541	760	039 46.9053S	145 50.3250E	5595805	400560	14650
YOL00547	175	039 53.4084S	145 44.4985E	5583663	392413	0
YOL00547	760	039 46.8600S	145 50.2379E	5595887	400434	14625
YOL00553	177	039 53.3406S	145 44.4310E	5583787	392315	0
YOL00553	760	039 46.8146S	145 50.1508E	5595970	400309	14575
YOL00559	178	039 53.2840S	145 44.3537E	5583890	392203	0
YOL00559	760	039 46.7693S	145 50.0637E	5596052	400183	14550
YOL00565	179	039 53.2274S	145 44.2763E	5583993	392092	0
YOL00565	760	039 46.7239S	145 49.9766E	5596134	400058	14525
YOL00571	181	039 53.1596S	145 44.2088E	5584117	391994	0
YOL00571	760	039 46.6786S	145 49.8896E	5596217	399933	14475
YOL00577	182	039 53.1030S	145 44.1315E	5584221	391882	0
YOL00577	760	039 46.6332S	145 49.8025E	5596299	399807	14450
YOL00583	184	039 53.0352S	145 44.0640E	5584345	391784	0
YOL00583	760	039 46.5879S	145 49.7154E	5596381	399682	14400
YOL00589	185	039 52.9785S	145 43.9867E	5584448	391672	0
YOL00589	760	039 46.5425S	145 49.6284E	5596463	399557	14375

LINE	POINT	LATITUDE	LONGITUDE	NORTHINGS	EASTINGS	RANGE
YOL00595	187	039 52.9107S	145 43.9192E	5584572	391575	0
YOL00595	760	039 46.4972S	145 49.5413E	5596546	399431	14325
YOL00601	188	039 52.8541S	145 43.8419E	5584675	391463	0
YOL00601	760	039 46.4518S	145 49.4542E	5596628	399306	14300
YOL00607	189	039 52.7975S	145 43.7646E	5584778	391351	0
YOL00607	760	039 46.4065S	145 49.3672E	5596710	399180	14275
YOL00613	191	039 52.7297S	145 43.6971E	5584902	391253	0
YOL00613	760	039 46.3611S	145 49.2801E	5596792	399055	14225
YOL00619	192	039 52.6731S	145 43.6198E	5585005	391142	0
YOL00619	760	039 46.3158S	145 49.1930E	5596875	398930	14200
YOL00625	194	039 52.6053S	145 43.5524E	5585129	391044	0
YOL00625	760	039 46.2704S	145 49.1060E	5596957	398804	14150
YOL00631	195	039 52.5487S	145 43.4751E	5585233	390932	0
YOL00631	760	039 46.2250S	145 49.0189E	5597039	398679	14125

These lines shot in the 214° direction

LINE	POINT	LATITUDE	LONGITUDE	NORTHINGS	EASTINGS	RANGE
YOL00637	197	039 52.4809S	145 43.4076E	5585357	390834	0
YOL00637	757	039 46.2133S	145 48.9025E	5597059	398512	14000
YOL00643	198	039 52.4242S	145 43.3303E	5585460	390722	0
YOL00643	753	039 46.2127S	145 48.7762E	5597057	398332	13875
YOL00649	200	039 52.3564S	145 43.2628E	5585584	390624	0
YOL00649	749	039 46.2121S	145 48.6500E	5597056	398152	13725
YOL00655	201	039 52.2998S	145 43.1855E	5585687	390513	0
YOL00655	745	039 46.2115S	145 48.5237E	5597055	397972	13600
YOL00661	202	039 52.2432S	145 43.1082E	5585790	390401	0
YOL00661	741	039 46.2109S	145 48.3975E	5597054	397791	13475
YOL00667	204	039 52.1754S	145 43.0408E	5585914	390303	0
YOL00667	737	039 46.2103S	145 48.2713E	5597052	397611	13325
YOL00673	205	039 52.1188S	145 42.9635E	5586018	390191	0
YOL00673	733	039 46.2097S	145 48.1450E	5597051	397431	13200
YOL00679	207	039 52.0509S	145 42.8960E	5586142	390093	0
YOL00679	729	039 46.2092S	145 48.0188E	5597050	397251	13050

LINE	POINT	LATITUDE	LONGITUDE	NORTHINGS	EASTINGS	RANGE
YOL00685	208	039 51.9943S	145 42.8188E	5586245	389982	0
YOL00685	725	039 46.2086S	145 47.8925E	5597048	397071	12925
YOL00691	210	039 51.9265S	145 42.7513E	5586369	389884	0
YOL00691	721	039 46.2080S	145 47.7663E	5597047	396890	12775
YOL00697	211	039 51.8699S	145 42.6740E	5586472	389772	0
YOL00697	718	039 46.1962S	145 47.6499E	5597067	396724	12675
YOL00703	212	039 51.8133S	145 42.5968E	5586575	389660	0
YOL00703	714	039 46.1956S	145 47.5236E	5597065	396544	12550
YOL00709	214	039 51.7454S	145 42.5293E	5586699	389562	0
YOL00709	710	039 46.1950S	145 47.3974E	5597064	396363	12400
YOL00715	215	039 51.6888S	145 42.4520E	5586802	389451	0
YOL00715	706	039 46.1944S	145 47.2711E	5597063	396183	12275
YOL00721	217	039 51.6210S	145 42.3846E	5586926	389353	0
YOL00721	702	039 46.1937S	145 47.1449E	5597061	396003	12125
YOL00727	218	039 51.5644S	145 42.3073E	5587030	389241	0
YOL00727	698	039 46.1931S	145 47.0186E	5597060	395823	12000
YOL00733	219	039 51.5077S	145 42.2301E	5587133	389129	0
YOL00733	694	039 46.1925S	145 46.8924E	5597059	395642	11875
YOL00739	221	039 51.4399S	145 42.1626E	5587257	389032	0
YOL00739	690	039 46.1919S	145 46.7662E	5597057	395462	11725
YOL00745	222	039 51.3833S	145 42.0854E	5587360	388920	0
YOL00745	686	039 46.1913S	145 46.6399E	5597056	395282	11600
YOL00751	224	039 51.3155S	145 42.0179E	5587484	388822	0
YOL00751	682	039 46.1907S	145 46.5137E	5597055	395102	11450
YOL00757	225	039 51.2588S	145 41.9407E	5587587	388710	0
YOL00757	678	039 46.1900S	145 46.3874E	5597053	394922	11325
YOL00763	227	039 51.1910S	145 41.8733E	5587711	388612	0
YOL00763	674	039 46.1894S	145 46.2612E	5597052	394741	11175
YOL00769	228	039 51.1344S	145 41.7960E	5587814	388501	0
YOL00769	670	039 46.1888S	145 46.1350E	5597051	394561	11050
YOL00775	229	039 51.0777S	145 41.7188E	5587918	388389	0
YOL00775	666	039 46.1882S	145 46.0087E	5597049	394381	10925
YOL00781	231	039 51.0099S	145 41.6513E	5588042	388291	0
YOL00781	662	039 46.1875S	145 45.8825E	5597048	394201	10775

LINE	POINT	LATITUDE	LONGITUDE	NORTHINGS	EASTINGS	RANGE
YOL00787	232	039 50.9533S	145 41.5741E	5588145	388179	0
YOL00787	658	039 46.1869S	145 45.7562E	5597047	394020	10650
YOL00793	234	039 50.8854S	145 41.5067E	5588269	388081	0
YOL00793	654	039 46.1863S	145 45.6300E	5597046	393840	10500
YOL00799	235	039 50.8288S	145 41.4294E	5588372	387970	0
YOL00799	650	039 46.1856S	145 45.5037E	5597044	393660	10375
YOL00805	237	039 50.7610S	145 41.3620E	5588496	387872	0
YOL00805	646	039 46.1850S	145 45.3775E	5597043	393480	10225
YOL00811	238	039 50.7043S	145 41.2848E	5588599	387760	0
YOL00811	642	039 46.1843S	145 45.2513E	5597042	393300	10100
YOL00817	239	039 50.6477S	145 41.2076E	5588702	387648	0
YOL00817	638	039 46.1837S	145 45.1250E	5597040	393119	9975
YOL00823	241	039 50.5799S	145 41.1402E	5588827	387550	0
YOL00823	634	039 46.1830S	145 44.9988E	5597039	392939	9825
YOL00829	242	039 50.5232S	145 41.0629E	5588930	387439	0
YOL00829	630	039 46.1824S	145 44.8725E	5597038	392759	9700
YOL00835	244	039 50.4554S	145 40.9955E	5589054	387341	0
YOL00835	626	039 46.1817S	145 44.7463E	5597036	392579	9550
YOL00841	245	039 50.3987S	145 40.9183E	5589157	387229	0
YOL00841	622	039 46.1811S	145 44.6201E	5597035	392398	9425
YOL00847	247	039 50.3309S	145 40.8509E	5589281	387131	0
YOL00847	618	039 46.1804S	145 44.4938E	5597034	392218	9275
YOL00853	248	039 50.2742S	145 40.7737E	5589384	387019	0
YOL00853	614	039 46.1798S	145 44.3676E	5597032	392038	9150
YOL00859	249	039 50.2176S	145 40.6965E	5589487	386908	0
YOL00859	610	039 46.1791S	145 44.2413E	5597031	391858	9025

Total Kilometres : 1742.400

Total number lines : 144

501581

Grid Initialised at 16:14:06 on 7 FEB 1994
FlexQC PROJECT : YOLLA
CLIENT : SAGASCO RESOURCES LTD
AREA : YOLLA 3D

LINE	FILE	FSP	LSP	SEQ.	DAY TIME
YOL00013	LINEDATA\YOL00013.W00	307	32	1	36. 8:14
YOL00205	LINEDATA\YOL00205.W00	110	621	2	36.10:59
YOL00055	LINEDATA\YOL00055.W00	358	32	3	36.16:22
YOL00247	LINEDATA\YOL00247.W00	113	672	4	36.19:15
YOL00019	linedata\YOL00019.W00	314	32	5	36.23:13
YOL00211	linedata\YOL00211.W00	110	628	6	37. 2:10
YOL00061	linedata\YOL00061.W00	366	32	7	37. 5: 1
YOL00253	linedata\YOL00253.W00	110	675	8	37. 7:36
YOL00025	linedata\YOL00025.W00	321	32	9	37.11:22
YOL00199	linedata\YOL00199.W00	110	613	10	37.14: 8
YOL00067	linedata\YOL00067.W00	373	32	11	37.17:10
YOL00259	linedata\YOL00259.W00	116	687	12	37.19:29
YOL00049	linedata\YOL00049.W00	351	32	13	41.23:44
YOL00217	linedata\YOL00217.W00	110	635	14	42. 2:26
YOL00031	linedata\YOL00031.W00	329	32	15	42. 5:32
YOL00265	linedata\YOL00265.W00	117	694	16	42. 8: 7
YOL00073	linedata\YOL00073.W00	380	32	17	42.11:20
YOL00193	linedata\YOL00193.W00	110	606	18	42.13:59
YOL00037	linedata\YOL00037.W00	336	32	19	42.16:51
YOL00271	linedata\YOL00271.W00	119	702	20	42.19:24
YOL00079	linedata\YOL00079.W00	388	32	21	42.22:37
YOL00223	linedata\YOL00223.W00	110	643	22	43. 1:10
YOL00007	linedata\YOL00007.W00	299	32	23	43. 4:25
YOL00229	linedata\YOL00229.W00	110	650	24	43. 6:58
YOL00277	linedata\YOL00277.u00	120	709	26	0. 0: 0
YOL00001	linedata\YOL00001.w00	292	32	25	43.10: 1
YOL00307	linedata\YOL00307.t00	127	485	33	45. 0:24
YOL00085	linedata\YOL00085.w00	395	32	28	45. 0:?
YOL00313	linedata\YOL00313.w00	128	753	29	45. 2:4.
YOL00043	linedata\YOL00043.w00	344	32	30	45. 6:38
YOL00235	linedata\YOL00235.w00	110	657	31	45. 9: 3
YOL00121	linedata\YOL00121.w00	439	32	32	45.11:37
YOL00241	linedata\YOL00241.w00	129	584	27	44.20:47
YOL00241	linedata\YOL00241.w00	605	665	27	44.20:47
YOL10307	linedata\YOL10307.w00	486	705	34	45.18:46
YOL10307	linedata\YOL10307.w00	706	745	34	45.18:46
YOL00127	linedata\YOL00127.w00	447	32	35	45.21: 1
YOL00301	linedata\YOL00301.w00	126	739	36	46. 0: 4
YOL00283	linedata\YOL00283.w00	122	717	38	46. 6:22
YOL00187	linedata\YOL00187.w00	520	32	39	46. 9:28
YOL00289	linedata\YOL00289.W00	123	724	40	46.12:25
YOL00115	linedata\YOL00115.U00	432	32	41	0. 0: 0
YOL00295	linedata\YOL00295.U00	124	731	42	0. 0: 0
YOL00091	linedata\YOL00091.U00	403	185	43	0. 0: 0
YOL00181	linedata\YOL00181.W00	513	32	45	48.10:17
YOL00337	linedata\YOL00337.W00	134	783	46	48.13:46
YOL00307	linedata\YOL00307.t00	130	487	33	0. 0: 0
YOL00109	linedata\YOL00109.R00	406	374	47	48.17:42
YOL00109	linedata\YOL00109.W00	425	407	47	48.17:42
YOL00109	linedata\YOL00109.W00	373	32	47	48.17:42
YOL00157	linedata\YOL00157.W00	484	32	49	49. 0:16
YOL00319	linedata\YOL00319.W00	130	299	48	48.20:39
YOL00319	linedata\YOL00319.W00	381	761	48	48.20:39

YOL00319	linedata\YOL00319.R00	300	380	48	48.20:39
YOL00331	linedata\YOL00331.R00	133	210	50	49. 3:35
YOL00331	linedata\YOL00331.W00	211	499	50	49. 3:35
YOL00325	linedata\YOL00325.W00	131	768	52	49.10:45
YOL00097	linedata\YOL00097.W00	410	32	53	49.14:26
YOL00343	linedata\YOL00343.W00	135	593	54	49.17:22
YOL00151	linedata\YOL00151.W00	476	32	55	49.20:55
YOL00349	linedata\YOL00349.W00	137	417	56	50. 0: 3
YOL00349	linedata\YOL00349.W00	418	798	56	50. 0: 3
YOL00103	linedata\YOL00103.W00	417	32	57	50. 4:38
YOL00379	linedata\YOL00379.w00	144	829	58	50. 7:54
YOL00163	linedata\YOL00163.U00	491	32	59	0. 0: 0
YOL00355	linedata\YOL00355.W00	138	805	60	50.15:15
YOL00373	linedata\YOL00373.W00	142	827	61	51. 3: 6
YOL00133	linedata\YOL00133.U00	454	32	62	0. 0: 0
YOL00367	linedata\YOL00367.w00	141	820	63	51. 9:47
YOL00139	linedata\YOL00139.W00	461	32	64	51.13:29
YOL00145	linedata\YOL00145.W00	469	32	66	51.20:12
YOL00385	linedata\YOL00385.W00	145	829	67	51.23:23
YOL00169	linedata\YOL00169.W00	498	32	68	52. 2:57
YOL10331	linedata\YOL10331.W00	500	776	69	52. 6:34
YOL00175	linedata\YOL00175.W00	506	32	70	52. 8:33
YOL00727	linedata\YOL00727.W00	689	149	72	52.15:49
YOL00415	linedata\YOL00415.W00	152	829	71	52.11:48
YOL00475	linedata\YOL00475.W00	167	829	73	52.19:11
YOL00667	linedata\YOL00667.W00	728	135	74	52.22:40
YOL00391	linedata\YOL00391.W00	147	829	75	53. 2:13
YOL00721	linedata\YOL00721.W00	693	148	76	53. 5:52
YOL00421	linedata\YOL00421.W00	154	829	77	53. 9:20
YOL00673	linedata\YOL00673.W00	724	136	78	53.13: 9
YOL00481	linedata\YOL00481.W00	168	829	79	53.16:26
YOL00427	linedata\YOL00427.W00	155	829	81	53.23:54
YOL00487	linedata\YOL00487.W00	170	829	83	54. 6:41
YOL00715	linedata\YOL00715.W00	697	146	80	53.19:51
YOL00679	linedata\YOL00679.W00	720	138	84	54.10:18
YOL00433	linedata\YOL00433.W00	157	829	85	54.13:51
YOL00733	linedata\YOL00733.W00	685	150	86	54.17:38
YOL00493	linedata\YOL00493.W00	171	829	87	54.20:57
YOL00685	linedata\YOL00685.W00	716	139	88	55. 0: 8
YOL00397	linedata\YOL00397.W00	148	829	89	55. 3:53
YOL00709	linedata\YOL00709.W00	701	145	90	55. 7:46
YOL00409	linedata\YOL00409.W00	151	829	91	55.11:34
YOL00691	linedata\YOL00691.W00	712	141	92	55.15:15
YOL00499	linedata\YOL00499.W00	173	829	93	55.18:45
YOL00751	linedata\YOL00751.W00	673	155	94	55.22:12
YOL00451	linedata\YOL00451.W00	161	829	95	56. 1:21
YOL00697	linedata\YOL00697.W00	709	150	96	56. 4:57
YOL00469	linedata\YOL00469.W00	165	829	97	56. 8:27
YOL00661	linedata\YOL00661.W00	732	133	98	56.11:59
YOL00403	linedata\YOL00403.W00	149	829	99	56.15:33
YOL00703	linedata\YOL00703.W01	705	143	100	56.19:23
YOL00775	linedata\YOL00775.W00	657	160	101	57.13:12
YOL00445	linedata\YOL00445.W00	160	829	102	57.16:38
YOL00739	linedata\YOL00739.W00	681	152	103	57.20:11
YOL00463	linedata\YOL00463.W00	164	829	104	57.23:38
YOL00361	linedata\YOL00361.W00	140	813	65	51.16:39
YOL00535	linedata\YOL00535.W00	181	829	106	60.15:22
YOL00781	linedata\YOL00781.W00	653	162	107	60.18:53
YOL00505	linedata\YOL00505.W00	174	829	108	60.22: 9
YOL00847	linedata\YOL00847.W00	609	178	109	61.20:10

YOL00511	linedata\YOL00511.W00	175	829	110	61.23:19
YOL00745	linedata\YOL00745.W00	677	153	111	62. 2:45
YOL00457	linedata\YOL00457.W00	162	829	112	62. 6:20
YOL00769	linedata\YOL00769.W00	661	159	113	62. 9:53
YOL00565	linedata\YOL00565.W00	188	829	114	62.13:2
YOL00655	linedata\YOL00655.W00	736	132	115	62.16:56
YOL00529	linedata\YOL00529.W00	180	829	116	62.20:30
YOL00763	linedata\YOL00763.W00	665	158	117	62.23:40
YOL00439	linedata\YOL00439.W00	158	829	118	63. 3: 2
YOL00757	linedata\YOL00757.W00	669	156	119	63. 6:38
YOL00541	linedata\YOL00541.W00	183	829	120	63. 9:42
YOL00805	linedata\YOL00805.W00	637	168	121	63.13: 9
YOL00571	linedata\YOL00571.W00	190	829	122	63.16:16
YOL00787	linedata\YOL00787.W00	649	163	123	63.19:39
YOL00523	linedata\YOL00523.W00	178	829	124	63.22:56
YOL00517	linedata\YOL00517.W01	177	829	126	64.23: 7
YOL00799	linedata\YOL00799.W00	641	166	127	65. 2:51
YOL00559	linedata\YOL00559.U00	187	829	128	0. 0: 0
YOL00793	linedata\YOL00793.W00	645	165	129	65.10: 5
YOL00547	linedata\YOL00547.W00	184	829	130	65.13:39
YOL00811	linedata\YOL00811.W01	614	169	131	65.17:47
YOL00595	linedata\YOL00595.W00	196	829	132	65.20:19
YOL00853	linedata\YOL00853.W00	605	179	133	65.23:36
YOL00589	linedata\YOL00589.W00	194	829	134	66. 2:46
YOL00817	linedata\YOL00817.W00	629	170	135	66. 5:59
YOL00601	linedata\YOL00601.W00	197	829	136	66. 9: 1
YOL00841	linedata\YOL00841.W00	613	172	137	66.12:23
YOL00553	linedata\YOL00553.W00	186	829	138	66.15:41
YOL00649	linedata\YOL00649.W00	740	131	139	66.19: 0
YOL00607	linedata\YOL00607.W00	198	829	140	66.22:20
YOL00859	linedata\YOL00859.W00	601	188	141	67. 1:35
YOL00583	linedata\YOL00583.W00	193	829	142	67. 4:44
YOL00643	linedata\YOL00643.W00	744	129	143	67. 8:14
YOL00613	linedata\YOL00613.W00	200	829	144	67.11:48
YOL00577	linedata\YOL00577.W00	191	829	146	67.18:
YOL00823	linedata\YOL00823.W00	625	172	145	67.14:46
YOL00835	linedata\YOL00835.W00	617	175	147	67.21:21
YOL00619	linedata\YOL00619.W00	201	829	148	68. 0:28
YOL00829	linedata\YOL00829.W00	621	173	149	68. 4: 4
YOL00631	linedata\YOL00631.W00	233	829	150	68. 6:59
YOL00637	linedata\YOL00637.u00	748	128	151	0. 0: 0
YOL00625	linedata\YOL00625.W00	203	829	152	68.14:24
YOL01187	linedata\YOL01187.W00	510	41	153	67.18: 9
YOL01367	linedata\YOL01367.W00	150	810	154	67.21:12
YOL01133	linedata\YOL01133.W00	410	40	155	69. 0:57
YOL01145	linedata\YOL01145.W00	400	38	158	69. 6:40
YOL01349	linedata\YOL01349.W00	140	370	159	69. 9:28
YOL10343	linedata\YOL10343.u00	594	790	160	0. 0: 0
YOL01067	linedata\YOL01067.W00	340	40	161	69.13:14
YOL01343	linedata\YOL01343.W00	140	780	162	69.15:57
YOL01469	linedata\YOL01469.W00	175	820	163	70.20:47
YOL01115	linedata\YOL01115.W00	420	80	164	71. 0:48
YOL10319	linedata\YOL10319.W00	301	380	165	71. 3:14
YOL10091	linedata\YOL10091.W00	184	32	166	71. 5: 0
YOL01421	linedata\YOL01421.W00	300	825	167	71. 7:16
YOL01055	linedata\YOL01055.W00	358	40	168	71.16:25
YOL01451	linedata\YOL01451.W00	170	820	169	71.19:23
YOL10109	linedata\YOL10109.W00	406	374	170	71.23: 7
YOL01085	linedata\YOL01085.W00	184	40	171	71.23:40
YOL01439	linedata\YOL01439.W00	170	545	172	72. 1:53

YOL01679	linedata\YOL01679.W00	450	140	173	72. 4:42
YOL01487	linedata\YOL01487.W00	170	820	174	72. 7:16
YOL01517	linedata\YOL01517.W00	177	820	175	73. 0: 4
YOL01739	linedata\YOL01739.W00	681	160	176	73. 3:42
YOL01637	linedata\YOL01637.W00	206	820	177	73. 6:48
YOL01709	linedata\YOL01709.W00	701	155	178	73.10:11
YOL01499	linedata\YOL01499.W00	173	820	179	73.13:45
YOL01667	linedata\YOL01667.W00	720	175	180	73.17:14
YOL01835	linedata\YOL01835.W00	260	620	181	73.23:44
YOL01751	linedata\YOL01751.W00	556	160	182	74. 2:26
YOL01595	linedata\YOL01595.W00	335	820	183	74. 4:48
YOL01685	linedata\YOL01685.W00	680	145	184	74. 7:57
YOL01817	linedata\YOL01817.W00	385	695	185	74.10:35
YOL01661	linedata\YOL01661.W00	605	140	187	74.17:30
YOL01649	linedata\YOL01649.W00	735	365	186	74.13:27
YOL01751	linedata\YOL01751.W00	171	160	182	74. 2:26

End of line name table

*** FlexQC Grid Statistics ***

DATE : 15 MAR 1994

FlexQC PROJECT : YOLLA
CLIENT : SAGASCO RESOURCES LTD
AREA : YOLLA 3D

*** GEODETICS ***

SPHEROID CODE : 17
SPHEROID NAME : AUSTRALIAN NAT.
SEMIMAJOR AXIS : 6378160.000
FLATTENING : 0.003352891869

*** GRID DEFINITION ***

POINT 1 39 58.3845 S 145 51.7477 E
POINT 2 39 50.9952 S 145 58.2115 E
POINT 3 39 51.5809 S 145 38.6826 E

PRIME LINE AZIMUTH : 34.0 Degress
CROSS LINE AZIMUTH : 304.0 Degress

LINE SPACING : 25.000 Metres
CELL SPACING : 12.500 Metres
CELLS PER SHOT : 2.00

*** FULL COVERAGE GRID DEFINITION ***

	GRID LINE	FIRST CELL	LAST CELL
1	1	1	397
2	233	1	967
3	376	67	1319
4	634	191	1319
5	864	300	1015

*** OFFSETS ***

OFFSETS : 1 to 30

*** OVERLAP LIMITS ***

Using fixed Overlap constant : 1.000

Grid Line	First Cell	Last Cell	Contour Level	1 0	2 3	3 6	4 9	5 12	6 15	7 18	8 20	9 22
1	1	397		0.0	0.0	0.0	1.5	11.6	33.0	31.2	13.4	9.3
2	1	399		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
3	1	401		0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.7	98.0
4	1	404		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
5	1	406		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
6	1	409		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
7	1	411		0.0	0.0	0.0	4.1	2.4	21.9	32.4	25.3	13.9
8	1	414		0.0	0.0	0.0	0.5	7.7	65.2	19.6	6.8	0.2
9	1	416		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
10	1	419		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
11	1	421		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
12	1	424		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
13	1	426		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

14	1	428	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
15	1	431	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
16	1	433	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
17	1	436	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
18	1	438	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
19	1	441	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
20	1	443	0.0	0.0	0.0	0.0	0.0	1.4	5.6	12.9	80.1
21	1	446	0.0	0.0	0.0	0.0	0.0	12.1	34.5	37.0	16.4
22	1	448	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	98.7
23	1	451	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
24	1	453	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
25	1	455	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
26	1	458	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
27	1	460	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
28	1	463	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
29	1	465	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
30	1	468	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
31	1	470	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
32	1	473	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
33	1	475	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
34	1	478	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
35	1	480	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
36	1	482	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	99.8
37	1	485	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
38	1	487	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
39	1	490	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
40	1	492	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
41	1	495	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
42	1	497	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
43	1	500	0.0	0.0	0.0	0.0	0.0	1.0	4.4	11.0	83.6
44	1	502	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
45	1	505	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
46	1	507	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
47	1	510	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
48	1	512	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
49	1	514	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
50	1	517	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	99.0
51	1	519	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
52	1	522	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	99.8
53	1	524	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
54	1	527	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
55	1	529	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
56	1	532	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
57	1	534	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
58	1	537	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
59	1	539	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
60	1	541	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
61	1	544	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
62	1	546	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
63	1	549	0.0	0.0	0.0	0.0	0.0	0.2	4.4	15.7	79.8
64	1	551	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	99.6
65	1	554	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
66	1	556	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
67	1	559	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
68	1	561	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
69	1	564	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
70	1	566	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
71	1	568	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
72	1	571	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
73	1	573	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
74	1	576	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
75	1	578	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
76	1	581	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
77	1	583	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

78	1	586	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
79	1	588	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	99.7
80	1	591	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
81	1	593	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
82	1	596	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
83	1	598	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5	99.3
84	1	600	0.0	0.0	2.5	48.2	44.5	4.7	0.2	0.0	0.0
85	1	603	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	99.3
86	1	605	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
87	1	608	0.0	0.0	0.0	0.0	0.0	0.2	3.0	7.6	89.3
88	1	610	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
89	1	613	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
90	1	615	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
91	1	618	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
92	1	620	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
93	1	623	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
94	1	625	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
95	1	627	0.0	0.0	0.0	0.0	0.0	0.0	1.6	3.7	94.7
96	1	630	0.0	0.0	0.3	11.3	10.3	12.5	4.0	2.7	58.9
97	1	632	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
98	1	635	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
99	1	637	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
100	1	640	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
101	1	642	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
102	1	645	0.0	0.0	0.0	0.0	0.0	0.2	1.4	2.5	96.0
103	1	647	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
104	1	650	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
105	1	652	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
106	1	654	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
107	1	657	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
108	1	659	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
109	1	662	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	99.2
110	1	664	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
111	1	667	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
112	1	669	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
113	1	672	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
114	1	674	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
115	1	677	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
116	1	679	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
117	1	682	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
118	1	684	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
119	1	686	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	95.9
120	1	689	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
121	1	691	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
122	1	694	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
123	1	696	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
124	1	699	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
125	1	701	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
126	1	704	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
127	1	706	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
128	1	709	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
129	1	711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
130	1	713	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.8	98.0
131	1	716	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
132	1	718	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
133	1	721	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	99.7
134	1	723	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
135	1	726	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
136	1	728	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
137	1	731	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
138	1	733	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
139	1	736	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
140	1	738	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
141	1	740	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

142	1	743	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
143	1	745	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
144	1	748	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
145	1	750	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.5	98.3
146	1	753	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.6	97.5
147	1	755	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
148	1	758	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
149	1	760	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
150	1	763	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
151	1	765	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
152	1	767	0.0	0.0	0.0	0.0	0.0	0.4	3.4	18.1	78.1
153	1	770	0.0	0.0	0.0	0.0	0.0	5.6	22.9	32.7	38.8
154	1	772	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	99.7
155	1	775	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
156	1	777	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
157	1	780	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
158	1	782	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
159	1	785	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
160	1	787	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
161	1	790	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
162	1	792	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
163	1	795	0.0	0.0	0.0	0.0	0.0	0.0	1.6	2.3	96.1
164	1	797	0.0	0.0	0.0	0.0	0.0	2.8	27.6	47.6	22.1
165	1	799	0.0	0.0	0.0	0.0	0.0	0.0	0.1	4.9	95.0
166	1	802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
167	1	804	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
168	1	807	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
169	1	809	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
170	1	812	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
171	1	814	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
172	1	817	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
173	1	819	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	99.6
174	1	822	0.0	0.0	3.8	8.2	8.9	5.7	1.0	2.7	69.8
175	1	824	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
176	1	826	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
177	1	829	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
178	1	831	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
179	1	834	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
180	1	836	0.0	0.0	0.0	0.4	3.7	7.1	7.3	7.4	74.2
181	1	839	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
182	1	841	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
183	1	844	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
184	1	846	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
185	1	849	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
186	1	851	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
187	1	853	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
188	1	856	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
189	1	858	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
190	1	861	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
191	1	863	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
192	1	866	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
193	1	868	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
194	1	871	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	99.7
195	1	873	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.0	98.7
196	1	876	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
197	1	878	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
198	1	881	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
199	1	883	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
200	1	885	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
201	1	888	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
202	1	890	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
203	1	893	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
204	1	895	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
205	1	898	0.0	0.0	0.0	0.0	0.0	2.3	2.3	3.7	91.6

206	1	900	0.0	0.0	0.0	0.0	0.0	16.6	34.6	12.0	36.9
207	1	903	0.0	0.0	0.0	0.0	0.0	0.0	6.6	26.8	66.6
208	1	905	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	99.9
209	1	908	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
210	1	910	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
211	1	912	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
212	1	915	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
213	1	917	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
214	1	920	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
215	1	922	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
216	1	925	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
217	1	927	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
218	1	930	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
219	1	932	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
220	1	935	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
221	1	937	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
222	1	939	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
223	1	942	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
224	1	944	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
225	1	947	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
226	1	949	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
227	1	952	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
228	1	954	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
229	1	957	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	98.7
230	1	959	0.0	0.0	0.0	1.1	9.8	19.6	10.8	7.2	51.4
231	1	962	0.0	0.0	0.0	0.0	0.0	0.6	4.5	14.0	80.9
232	1	964	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
233	1	967	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
234	1	969	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
235	1	971	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
236	2	974	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
237	2	976	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
238	3	979	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
239	3	981	0.0	0.0	0.0	0.0	0.0	0.0	0.6	3.9	95.5
240	4	984	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	99.7
241	4	986	0.0	0.0	0.0	0.0	0.0	0.0	0.8	1.0	98.2
242	5	989	0.0	0.0	0.0	0.1	0.2	2.4	6.7	3.8	86.8
243	5	991	0.0	0.0	0.0	0.0	0.0	0.3	5.9	5.5	88.3
244	6	994	0.0	0.0	0.0	0.0	0.0	0.4	5.4	4.6	89.7
245	6	996	0.0	0.0	0.0	0.0	0.0	0.1	3.8	5.7	90.4
246	7	999	0.0	0.0	0.0	0.0	0.0	0.1	4.0	5.0	90.8
247	7	1001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
248	7	1003	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
249	8	1006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
250	8	1008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
251	9	1011	0.0	0.0	0.0	0.0	0.0	0.0	2.3	9.6	88.1
252	9	1013	0.0	0.0	0.0	0.0	0.0	0.6	8.6	23.4	67.5
253	10	1016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
254	10	1018	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
255	11	1021	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	98.4
256	11	1023	0.0	0.0	0.0	2.1	24.4	20.9	9.8	12.6	30.2
257	12	1026	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
258	12	1028	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
259	13	1031	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
260	13	1033	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
261	13	1035	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
262	14	1038	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
263	14	1040	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
264	15	1043	0.0	0.0	0.0	4.5	8.4	8.3	3.3	6.3	69.3
265	15	1045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
266	16	1048	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
267	16	1050	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
268	17	1053	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.7	98.8
269	17	1055	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

270	18	1058	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
271	18	1060	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
272	19	1063	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
273	19	1065	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	99.6
274	19	1067	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
275	20	1070	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	99.9
276	20	1072	0.0	0.0	0.0	0.0	0.0	0.0	2.5	4.7	92.8
277	21	1075	0.0	3.3	25.0	45.2	13.8	8.4	1.8	0.5	1.9
278	21	1077	0.0	0.0	0.0	0.0	0.0	0.1	1.9	11.4	86.7
279	22	1080	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
280	22	1082	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
281	23	1085	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
282	23	1087	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
283	24	1090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	99.8
284	24	1092	0.0	0.0	0.0	0.0	0.0	3.3	7.9	4.8	84.1
285	25	1095	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
286	25	1097	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
287	25	1099	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
288	26	1102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
289	26	1104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
290	27	1107	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
291	27	1109	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
292	28	1112	0.0	0.0	0.0	0.0	0.0	0.0	0.1	5.0	94.9
293	28	1114	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
294	29	1117	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
295	29	1119	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
296	30	1122	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
297	30	1124	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
298	31	1127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
299	31	1129	0.0	0.0	0.0	0.0	0.0	7.8	21.3	20.6	50.3
300	31	1131	0.0	0.0	0.0	0.0	0.0	0.0	1.0	7.0	92.0
301	32	1134	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
302	32	1136	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
303	33	1139	0.0	0.0	0.0	0.0	0.0	0.3	0.5	5.3	93.9
304	33	1141	0.0	0.0	0.0	0.0	0.0	0.0	1.9	14.5	83.6
305	34	1144	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
306	34	1146	0.0	0.0	0.0	0.0	0.2	4.9	16.4	24.6	54.0
307	35	1149	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	99.8
308	35	1151	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
309	36	1154	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
310	36	1156	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
311	37	1159	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
312	37	1161	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
313	37	1163	0.0	0.0	0.0	0.0	0.0	0.3	1.0	1.6	97.2
314	38	1166	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
315	38	1168	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
316	39	1171	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
317	39	1173	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
318	40	1176	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
319	40	1178	0.0	0.0	0.0	0.0	0.0	0.4	2.9	10.0	86.7
320	41	1181	0.0	0.0	0.0	0.0	0.6	20.6	42.9	27.8	8.2
321	41	1183	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
322	42	1186	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
323	42	1188	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
324	43	1191	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
325	43	1193	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
326	43	1195	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
327	44	1198	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
328	44	1200	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
329	45	1203	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
330	45	1205	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
331	46	1208	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
332	46	1210	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	99.5
333	47	1213	4.0	1.0	1.0	1.0	0.9	1.2	0.7	0.4	89.6

334	47	1215	0.0	1.3	2.7	1.3	2.6	0.9	1.0	0.6	89.6
335	48	1218	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
336	48	1220	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
337	49	1223	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
338	49	1225	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
339	49	1227	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
340	50	1230	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
341	50	1232	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
342	51	1235	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
343	51	1237	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
344	52	1240	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
345	52	1242	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
346	53	1245	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
347	53	1247	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
348	54	1250	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
349	54	1252	0.0	0.0	0.0	0.0	0.2	2.1	3.1	3.4	91.2
350	55	1255	0.0	0.0	0.0	0.0	0.0	0.6	3.6	12.5	83.3
351	55	1257	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
352	55	1259	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
353	56	1262	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
354	56	1264	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
355	57	1267	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
356	57	1269	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
357	58	1272	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
358	58	1274	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
359	59	1277	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
360	59	1279	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
361	60	1282	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
362	60	1284	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
363	61	1287	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
364	61	1289	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
365	61	1291	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
366	62	1294	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
367	62	1296	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
368	63	1299	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
369	63	1301	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
370	64	1304	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
371	64	1306	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
372	65	1309	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
373	65	1311	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
374	66	1314	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
375	66	1316	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
376	67	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
377	67	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
378	67	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	99.8
379	68	1319	0.0	0.0	0.0	0.0	1.4	9.7	15.7	17.5	55.7
380	68	1319	0.0	0.0	0.0	0.5	19.6	38.2	26.1	11.1	4.5
381	69	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.7	6.4	92.9
382	69	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
383	70	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
384	70	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
385	71	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
386	71	1319	0.0	0.0	0.0	0.0	0.0	0.0	1.3	11.8	86.9
387	72	1319	0.0	0.0	0.0	0.0	1.1	18.8	17.5	21.3	41.3
388	72	1319	0.0	0.0	0.0	0.0	0.0	0.1	9.1	36.5	54.2
389	73	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
390	73	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
391	74	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
392	74	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
393	75	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
394	75	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
395	76	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
396	76	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
397	77	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	99.2

398	77	1319	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.8	95.2
399	78	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
400	78	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
401	79	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
402	79	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
403	79	1319	0.0	0.0	0.0	0.0	2.1	7.2	6.6	6.6	77.5
404	80	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
405	80	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
406	81	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
407	81	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
408	82	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
409	82	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
410	83	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
411	83	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
412	84	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
413	84	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
414	85	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
415	85	1319	0.0	0.0	0.0	0.0	3.0	10.9	9.1	5.3	71.7
416	86	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
417	86	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
418	87	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
419	87	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
420	88	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
421	88	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.8	2.3	96.9
422	89	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	99.0
423	89	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
424	90	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
425	90	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
426	91	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
427	91	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	99.2
428	91	1319	0.0	0.0	0.0	0.0	0.0	2.2	5.9	5.7	86.2
429	92	1319	0.0	0.0	0.0	0.0	0.0	0.7	6.7	16.3	76.3
430	92	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
431	93	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
432	93	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
433	94	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
434	94	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
435	95	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
436	95	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
437	96	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
438	96	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
439	97	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
440	97	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
441	98	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
442	98	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
443	99	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
444	99	1319	0.0	0.0	0.0	0.0	1.8	4.3	6.2	3.6	84.0
445	100	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
446	100	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
447	101	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
448	101	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
449	102	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.4	2.3	97.3
450	102	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
451	103	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
452	103	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
453	104	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
454	104	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
455	104	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
456	105	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
457	105	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
458	106	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
459	106	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
460	107	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
461	107	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

462	108	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
463	108	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
464	109	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	99.8
465	109	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	98.6
466	110	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
467	110	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
468	111	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
469	111	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
470	112	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
471	112	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
472	113	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
473	113	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
474	114	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
475	114	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
476	115	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
477	115	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
478	116	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
479	116	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
480	116	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
481	117	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
482	117	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
483	118	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
484	118	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
485	119	1319	0.0	0.0	0.0	0.0	0.1	26.5	8.7	2.1	62.7
486	119	1319	0.0	0.0	0.0	0.6	2.6	5.7	6.7	8.9	75.5
487	120	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
488	120	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
489	121	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
490	121	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
491	122	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
492	122	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
493	123	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
494	123	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
495	124	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
496	124	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
497	125	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
498	125	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
499	126	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
500	126	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
501	127	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
502	127	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
503	128	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
504	128	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
505	129	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
506	129	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
507	129	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
508	130	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
509	130	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
510	131	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
511	131	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
512	132	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
513	132	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
514	133	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
515	133	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	99.5
516	134	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
517	134	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
518	135	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
519	135	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
520	136	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
521	136	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
522	137	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
523	137	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
524	138	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
525	138	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

526	139	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	99.7
527	139	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
528	140	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
529	140	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
530	141	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
531	141	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
532	141	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
533	142	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
534	142	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
535	143	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
536	143	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
537	144	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
538	144	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
539	145	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
540	145	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
541	146	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.6	2.0	97.4
542	146	1319	0.0	0.0	0.0	0.0	0.3	4.8	10.4	4.5	80.0
543	147	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
544	147	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
545	148	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
546	148	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
547	149	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
548	149	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
549	150	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.2	98.4
550	150	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
551	151	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
552	151	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
553	152	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
554	152	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
555	153	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	99.9
556	153	1319	0.0	0.0	0.0	0.0	0.0	0.0	1.3	2.7	96.1
557	153	1319	0.0	0.0	0.0	0.0	0.0	1.6	1.7	1.3	95.4
558	154	1319	0.0	0.0	0.8	2.1	16.6	14.6	3.0	1.8	61.1
559	154	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
560	155	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
561	155	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	99.7
562	156	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
563	156	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
564	157	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
565	157	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
566	158	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
567	158	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
568	159	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
569	159	1319	0.0	0.0	0.0	0.0	0.0	0.7	6.1	14.7	78.5
570	160	1319	0.0	0.0	0.0	4.1	4.2	6.6	3.3	3.8	77.9
571	160	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
572	161	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
573	161	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	99.7
574	162	1319	0.0	0.0	0.0	0.0	0.0	0.3	2.8	5.4	91.5
575	162	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.3	7.5	92.1
576	163	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
577	163	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
578	164	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
579	164	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
580	165	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
581	165	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	99.8
582	166	1319	0.0	0.0	0.0	1.6	22.2	6.4	0.5	0.7	68.6
583	166	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	99.7
584	166	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
585	167	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
586	167	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
587	168	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
588	168	1319	0.0	0.0	0.0	0.1	6.1	13.5	8.2	4.3	67.9
589	169	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	98.2

590	169	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
591	170	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
592	170	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	99.8
593	171	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.5	98.0
594	171	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
595	172	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
596	172	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
597	173	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
598	173	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
599	174	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
600	174	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
601	175	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	99.7
602	175	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.1	98.5
603	176	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
604	176	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
605	177	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
606	177	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	98.8
607	178	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	99.6
608	178	1319	0.0	0.0	0.0	0.0	0.0	1.8	3.9	8.4	85.9
609	178	1319	0.0	0.0	0.0	0.0	0.0	0.3	10.7	21.5	67.6
610	179	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.4	7.7	91.8
611	179	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
612	180	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
613	180	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
614	181	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
615	181	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
616	182	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
617	182	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
618	183	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
619	183	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
620	184	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
621	184	1319	0.0	0.0	0.0	0.0	0.0	0.1	1.5	11.0	87.4
622	185	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.8	97.0
623	185	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
624	186	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
625	186	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
626	187	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
627	187	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
628	188	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
629	188	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
630	189	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
631	189	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
632	190	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
633	190	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
634	191	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
635	191	1318	0.0	0.0	0.0	0.0	0.4	12.7	10.9	7.2	68.9
636	191	1317	0.0	0.0	0.0	0.0	0.0	0.0	0.4	5.8	93.9
637	192	1316	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
638	192	1314	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
639	193	1313	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
640	193	1312	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
641	194	1310	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
642	194	1309	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
643	195	1308	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
644	195	1306	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
645	196	1305	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
646	196	1304	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
647	197	1302	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
648	197	1301	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
649	198	1300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
650	198	1298	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
651	199	1297	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
652	199	1296	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
653	200	1294	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

654	200	1293	0.0	0.0	0.0	0.0	0.0	0.6	5.7	5.9	87.8
655	200	1292	0.0	0.0	0.0	0.0	0.0	0.9	3.5	4.1	91.5
656	201	1290	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
657	201	1289	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
658	202	1288	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	99.7
659	202	1286	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
660	203	1285	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
661	203	1284	0.0	0.0	0.0	0.0	0.0	0.8	2.5	2.7	94.0
662	204	1282	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	99.9
663	204	1281	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
664	205	1280	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
665	205	1279	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
666	206	1277	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
667	206	1276	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
668	207	1275	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
669	207	1273	0.0	0.0	0.0	0.0	0.0	0.0	0.5	3.7	95.9
670	208	1272	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
671	208	1271	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
672	209	1269	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
673	209	1268	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
674	209	1267	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
675	210	1265	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
676	210	1264	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
677	211	1263	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
678	211	1261	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
679	212	1260	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
680	212	1259	0.0	0.0	0.0	0.0	0.3	6.0	7.8	5.8	80.1
681	213	1257	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
682	213	1256	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
683	214	1255	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
684	214	1253	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
685	215	1252	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
686	215	1251	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
687	216	1249	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
688	216	1248	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
689	217	1247	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
690	217	1245	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
691	218	1244	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
692	218	1243	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
693	218	1242	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
694	219	1240	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
695	219	1239	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
696	220	1238	0.0	0.0	0.0	0.0	0.0	7.2	11.5	5.3	76.1
697	220	1236	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
698	221	1235	0.0	0.0	0.0	0.0	0.0	0.0	0.7	3.0	96.4
699	221	1234	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
700	222	1232	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
701	222	1231	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
702	223	1230	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
703	223	1228	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
704	224	1227	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
705	224	1226	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
706	225	1224	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	97.2
707	225	1223	0.0	0.0	0.0	0.0	0.0	0.0	0.7	7.3	92.0
708	226	1222	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
709	226	1220	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
710	227	1219	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
711	227	1218	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
712	227	1216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
713	228	1215	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
714	228	1214	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
715	229	1212	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
716	229	1211	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
717	230	1210	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

718	230	1208	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
719	231	1207	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
720	231	1206	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
721	232	1205	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
722	232	1203	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
723	233	1202	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
724	233	1201	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
725	234	1199	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
726	234	1198	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
727	235	1197	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
728	235	1195	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
729	236	1194	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
730	236	1193	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
731	236	1191	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
732	237	1190	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
733	237	1189	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
734	238	1187	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
735	238	1186	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	99.7
736	239	1185	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	99.7
737	239	1183	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
738	240	1182	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
739	240	1181	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
740	241	1179	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
741	241	1178	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
742	242	1177	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
743	242	1175	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
744	243	1174	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
745	243	1173	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
746	244	1171	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
747	244	1170	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
748	245	1169	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	98.7
749	245	1167	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
750	245	1166	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
751	246	1165	0.0	0.0	0.0	0.0	0.8	1.7	3.2	2.2	92.2
752	246	1164	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
753	247	1162	0.0	0.0	0.0	0.0	0.0	0.7	1.2	1.0	97.2
754	247	1161	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
755	248	1160	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
756	248	1158	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
757	249	1157	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
758	249	1156	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
759	250	1154	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
760	250	1153	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	99.9
761	251	1152	0.0	0.0	0.0	0.0	0.0	0.0	0.4	4.0	95.6
762	251	1150	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
763	252	1149	0.0	2.1	13.5	3.1	13.1	19.3	10.0	11.4	27.5
764	252	1148	0.0	0.0	0.0	0.0	10.9	19.6	23.5	5.6	40.4
765	253	1146	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	95.7
766	253	1145	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
767	254	1144	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
768	254	1142	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
769	254	1141	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
770	255	1140	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
771	255	1138	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
772	256	1137	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	99.8
773	256	1136	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
774	257	1134	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6	99.3
775	257	1133	0.0	0.0	0.0	0.0	0.0	0.2	2.5	2.3	95.0
776	258	1132	0.0	0.0	0.0	0.0	0.0	1.5	17.1	29.5	51.9
777	258	1130	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
778	259	1129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
779	259	1128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
780	260	1127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
781	260	1125	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

782	261	1124	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	98.5
783	261	1123	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	99.7
784	262	1121	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
785	262	1120	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
786	263	1119	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
787	263	1117	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
788	263	1116	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
789	264	1115	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	99.9
790	264	1113	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
791	265	1112	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
792	265	1111	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	99.9
793	266	1109	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
794	266	1108	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	98.8
795	267	1107	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
796	267	1105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
797	268	1104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
798	268	1103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
799	269	1101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
800	269	1100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
801	270	1099	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
802	270	1097	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
803	271	1096	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
804	271	1095	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
805	272	1093	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
806	272	1092	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
807	272	1091	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
808	273	1090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
809	273	1088	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
810	274	1087	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
811	274	1086	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.7	98.2
812	275	1084	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	98.8
813	275	1083	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.9	99.0
814	276	1082	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.1	98.6
815	276	1080	0.0	0.0	0.0	0.0	0.0	1.0	0.7	0.6	97.6
816	277	1079	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	99.9
817	277	1078	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
818	278	1076	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
819	278	1075	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
820	279	1074	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
821	279	1072	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	99.5
822	280	1071	0.0	0.0	0.0	0.0	0.0	2.8	2.7	2.8	91.8
823	280	1070	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
824	281	1068	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	99.7
825	281	1067	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
826	281	1066	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	99.5
827	282	1064	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
828	282	1063	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
829	283	1062	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
830	283	1060	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
831	284	1059	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
832	284	1058	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
833	285	1056	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
834	285	1055	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
835	286	1054	0.0	0.0	0.0	0.0	0.0	1.6	2.2	4.7	91.5
836	286	1053	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
837	287	1051	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
838	287	1050	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	97.0
839	288	1049	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
840	288	1047	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
841	289	1046	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
842	289	1045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	98.4
843	290	1043	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	97.9
844	290	1042	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
845	290	1041	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

846	291	1039	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
847	291	1038	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
848	292	1037	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
849	292	1035	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
850	293	1034	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
851	293	1033	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
852	294	1031	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
853	294	1030	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
854	295	1029	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
855	295	1027	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.9	92.1
856	296	1026	0.0	0.0	0.0	0.0	0.0	0.0	0.4	15.9	83.7
857	296	1025	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
858	297	1023	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
859	297	1022	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
860	298	1021	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
861	298	1019	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
862	299	1018	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
863	299	1017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
864	300	1015	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Totals			0.0	0.0	0.1	0.2	0.3	0.6	0.8	1.2	96.8

*** FlexQC Grid Statistics ***

DATE : 15 MAR 1994

FlexQC PROJECT : YOLLA
CLIENT : SAGASCO RESOURCES LTD
AREA : YOLLA 3D

*** GEODETICS ***

SPHEROID CODE : 17
SPHEROID NAME : AUSTRALIAN NAT.
SEMIMAJOR AXIS : 6378160.000
FLATTENING : 0.003352891869

*** GRID DEFINITION ***

POINT 1 39 58.3845 S 145 51.7477 E
POINT 2 39 50.9952 S 145 58.2115 E
POINT 3 39 51.5809 S 145 38.6826 E

PRIME LINE AZIMUTH : 34.0 Degress
CROSS LINE AZIMUTH : 304.0 Degress

LINE SPACING : 25.000 Metres
CELL SPACING : 12.500 Metres
CELLS PER SHOT : 2.00

*** FULL COVERAGE GRID DEFINITION ***

	GRID LINE	FIRST CELL	LAST CELL
1	1	1	397
2	233	1	967
3	376	67	1319
4	634	191	1319
5	864	300	1015

*** OFFSETS ***

OFFSETS : 1 to 30

*** OVERLAP LIMITS ***

Using Overlap set : 2

Grid Line	First Cell	Last Cell	Contour Level	1 0	2 3	3 6	4 9	5 12	6 15	7 18	8 20	9 22
1	1	397		0.0	0.0	0.0	0.0	0.0	1.0	7.3	11.6	80.1
2	1	399		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
3	1	401		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
4	1	404		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
5	1	406		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
6	1	409		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
7	1	411		0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	98.1
8	1	414		0.0	0.0	0.0	0.0	0.0	2.7	19.6	25.6	52.2
9	1	416		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
10	1	419		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
11	1	421		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
12	1	424		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
13	1	426		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
14	1	428		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
15	1	431		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
16	1	433		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
17	1	436		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
18	1	438		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
19	1	441		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
20	1	443		0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	98.9
21	1	446		0.0	0.0	0.0	0.0	0.0	0.0	0.4	5.4	94.2
22	1	448		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
23	1	451		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
24	1	453		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
25	1	455		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
26	1	458		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
27	1	460		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
28	1	463		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
29	1	465		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
30	1	468		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
31	1	470		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
32	1	473		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
33	1	475		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
34	1	478		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
35	1	480		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
36	1	482		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
37	1	485		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
38	1	487		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
39	1	490		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
40	1	492		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
41	1	495		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
42	1	497		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
43	1	500		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
44	1	502		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
45	1	505		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
46	1	507		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
47	1	510		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
48	1	512		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
49	1	514		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
50	1	517		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
51	1	519		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
52	1	522		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
53	1	524		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
54	1	527		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
55	1	529		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

56	1	532	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
57	1	534	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
58	1	537	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
59	1	539	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
60	1	541	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
61	1	544	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
62	1	546	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
63	1	549	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
64	1	551	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
65	1	554	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
66	1	556	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
67	1	559	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
68	1	561	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
69	1	564	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
70	1	566	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
71	1	568	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
72	1	571	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
73	1	573	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
74	1	576	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
75	1	578	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
76	1	581	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
77	1	583	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
78	1	586	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
79	1	588	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
80	1	591	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
81	1	593	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
82	1	596	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
83	1	598	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
84	1	600	0.0	0.0	0.0	1.0	22.8	48.8	20.0	2.3	5.0
85	1	603	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
86	1	605	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
87	1	608	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
88	1	610	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
89	1	613	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
90	1	615	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
91	1	618	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
92	1	620	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
93	1	623	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
94	1	625	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
95	1	627	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
96	1	630	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	99.5
97	1	632	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
98	1	635	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
99	1	637	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
100	1	640	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
101	1	642	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
102	1	645	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
103	1	647	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
104	1	650	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
105	1	652	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
106	1	654	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
107	1	657	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
108	1	659	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
109	1	662	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
110	1	664	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
111	1	667	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
112	1	669	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
113	1	672	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
114	1	674	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
115	1	677	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
116	1	679	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
117	1	682	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
118	1	684	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
119	1	686	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

120	1	689	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
121	1	691	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
122	1	694	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
123	1	696	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
124	1	699	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
125	1	701	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
126	1	704	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
127	1	706	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
128	1	709	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
129	1	711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
130	1	713	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
131	1	716	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
132	1	718	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
133	1	721	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
134	1	723	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
135	1	726	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
136	1	728	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
137	1	731	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
138	1	733	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
139	1	736	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
140	1	738	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
141	1	740	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
142	1	743	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
143	1	745	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
144	1	748	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
145	1	750	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
146	1	753	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
147	1	755	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
148	1	758	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
149	1	760	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
150	1	763	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
151	1	765	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
152	1	767	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
153	1	770	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
154	1	772	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
155	1	775	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
156	1	777	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
157	1	780	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
158	1	782	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
159	1	785	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
160	1	787	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
161	1	790	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
162	1	792	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
163	1	795	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
164	1	797	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
165	1	799	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
166	1	802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
167	1	804	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
168	1	807	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
169	1	809	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
170	1	812	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
171	1	814	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
172	1	817	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
173	1	819	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
174	1	822	0.0	0.0	0.0	0.0	0.0	0.7	0.6	1.0	97.7
175	1	824	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
176	1	826	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
177	1	829	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
178	1	831	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
179	1	834	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
180	1	836	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
181	1	839	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
182	1	841	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
183	1	844	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

184	1	846	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
185	1	849	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
186	1	851	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
187	1	853	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
188	1	856	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
189	1	858	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
190	1	861	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
191	1	863	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
192	1	866	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
193	1	868	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
194	1	871	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
195	1	873	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
196	1	876	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
197	1	878	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
198	1	881	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
199	1	883	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
200	1	885	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
201	1	888	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
202	1	890	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
203	1	893	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
204	1	895	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
205	1	898	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	99.8
206	1	900	0.0	0.0	0.0	0.0	0.0	0.0	0.2	7.7	92.1
207	1	903	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
208	1	905	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
209	1	908	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
210	1	910	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
211	1	912	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
212	1	915	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
213	1	917	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
214	1	920	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
215	1	922	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
216	1	925	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
217	1	927	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
218	1	930	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
219	1	932	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
220	1	935	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
221	1	937	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
222	1	939	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
223	1	942	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
224	1	944	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
225	1	947	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
226	1	949	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
227	1	952	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
228	1	954	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
229	1	957	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
230	1	959	0.0	0.0	0.0	0.0	0.2	0.9	2.3	5.0	91.6
231	1	962	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	99.1
232	1	964	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
233	1	967	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
234	1	969	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
235	1	971	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
236	2	974	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
237	2	976	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
238	3	979	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
239	3	981	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
240	4	984	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
241	4	986	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
242	5	989	0.0	0.0	0.0	0.0	0.0	0.0	1.7	4.5	93.8
243	5	991	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.6	90.4
244	6	994	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.1	90.9
245	6	996	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	91.0
246	7	999	0.0	0.0	0.0	0.0	0.0	0.0	0.3	4.4	95.3
247	7	1001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

248	7	1003	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
249	8	1006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
250	8	1008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
251	9	1011	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
252	9	1013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
253	10	1016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
254	10	1018	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
255	11	1021	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
256	11	1023	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
257	12	1026	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
258	12	1028	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
259	13	1031	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
260	13	1033	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
261	13	1035	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
262	14	1038	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
263	14	1040	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
264	15	1043	0.0	0.0	0.0	0.0	0.0	2.0	2.2	2.7	93.0
265	15	1045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
266	16	1048	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
267	16	1050	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
268	17	1053	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
269	17	1055	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
270	18	1058	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
271	18	1060	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
272	19	1063	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
273	19	1065	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
274	19	1067	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
275	20	1070	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
276	20	1072	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
277	21	1075	0.0	0.0	1.9	26.3	34.8	8.4	1.4	0.2	27.0
278	21	1077	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
279	22	1080	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
280	22	1082	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
281	23	1085	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
282	23	1087	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
283	24	1090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
284	24	1092	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
285	25	1095	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
286	25	1097	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
287	25	1099	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
288	26	1102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
289	26	1104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
290	27	1107	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
291	27	1109	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
292	28	1112	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
293	28	1114	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
294	29	1117	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
295	29	1119	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
296	30	1122	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
297	30	1124	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
298	31	1127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
299	31	1129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	99.9
300	31	1131	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
301	32	1134	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
302	32	1136	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
303	33	1139	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
304	33	1141	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
305	34	1144	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
306	34	1146	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
307	35	1149	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
308	35	1151	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
309	36	1154	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
310	36	1156	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
311	37	1159	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

312	37	1161	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
313	37	1163	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
314	38	1166	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
315	38	1168	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
316	39	1171	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
317	39	1173	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
318	40	1176	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
319	40	1178	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
320	41	1181	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.4	97.5
321	41	1183	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
322	42	1186	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
323	42	1188	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
324	43	1191	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
325	43	1193	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
326	43	1195	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
327	44	1198	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
328	44	1200	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
329	45	1203	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
330	45	1205	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
331	46	1208	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
332	46	1210	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
333	47	1213	3.7	1.1	1.0	1.2	0.8	0.6	0.5	0.7	90.4
334	47	1215	0.0	0.0	0.0	1.1	4.4	3.3	0.7	0.7	89.8
335	48	1218	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
336	48	1220	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
337	49	1223	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
338	49	1225	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
339	49	1227	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
340	50	1230	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
341	50	1232	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
342	51	1235	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
343	51	1237	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
344	52	1240	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
345	52	1242	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
346	53	1245	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
347	53	1247	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
348	54	1250	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
349	54	1252	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
350	55	1255	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
351	55	1257	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
352	55	1259	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
353	56	1262	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
354	56	1264	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
355	57	1267	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
356	57	1269	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
357	58	1272	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
358	58	1274	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
359	59	1277	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
360	59	1279	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
361	60	1282	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
362	60	1284	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
363	61	1287	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
364	61	1289	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
365	61	1291	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
366	62	1294	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
367	62	1296	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
368	63	1299	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
369	63	1301	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
370	64	1304	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
371	64	1306	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
372	65	1309	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
373	65	1311	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
374	66	1314	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
375	66	1316	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

376	67	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
377	67	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
378	67	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
379	68	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	99.9
380	68	1319	0.0	0.0	0.0	0.0	1.4	13.2	12.9	22.8	49.8
381	69	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
382	69	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
383	70	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
384	70	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
385	71	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
386	71	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
387	72	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	95.4
388	72	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	99.0
389	73	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
390	73	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
391	74	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
392	74	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
393	75	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
394	75	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
395	76	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
396	76	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
397	77	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
398	77	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
399	78	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
400	78	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
401	79	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
402	79	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
403	79	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
404	80	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
405	80	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
406	81	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
407	81	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
408	82	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
409	82	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
410	83	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
411	83	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
412	84	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
413	84	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
414	85	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
415	85	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
416	86	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
417	86	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
418	87	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
419	87	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
420	88	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
421	88	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
422	89	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
423	89	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
424	90	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
425	90	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
426	91	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
427	91	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
428	91	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	99.7
429	92	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	99.6
430	92	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
431	93	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
432	93	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
433	94	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
434	94	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
435	95	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
436	95	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
437	96	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
438	96	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
439	97	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

440	97	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
441	98	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
442	98	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
443	99	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
444	99	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
445	100	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
446	100	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
447	101	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
448	101	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
449	102	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
450	102	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
451	103	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
452	103	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
453	104	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
454	104	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
455	104	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
456	105	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
457	105	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
458	106	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
459	106	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
460	107	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
461	107	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
462	108	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
463	108	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
464	109	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
465	109	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
466	110	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
467	110	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
468	111	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
469	111	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
470	112	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
471	112	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
472	113	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
473	113	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
474	114	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
475	114	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
476	115	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
477	115	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
478	116	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
479	116	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
480	116	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
481	117	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
482	117	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
483	118	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
484	118	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
485	119	1319	0.0	0.0	0.0	0.0	0.0	0.2	8.0	11.1	80.7
486	119	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	98.4
487	120	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
488	120	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
489	121	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
490	121	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
491	122	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
492	122	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
493	123	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
494	123	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
495	124	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
496	124	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
497	125	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
498	125	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
499	126	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
500	126	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
501	127	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
502	127	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
503	128	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

504	128	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
505	129	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
506	129	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
507	129	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
508	130	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
509	130	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
510	131	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
511	131	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
512	132	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
513	132	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
514	133	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
515	133	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
516	134	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
517	134	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
518	135	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
519	135	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
520	136	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
521	136	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
522	137	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
523	137	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
524	138	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
525	138	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
526	139	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
527	139	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
528	140	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
529	140	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
530	141	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
531	141	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
532	141	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
533	142	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
534	142	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
535	143	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
536	143	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
537	144	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
538	144	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
539	145	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
540	145	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
541	146	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
542	146	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	99.0
543	147	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
544	147	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
545	148	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
546	148	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
547	149	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
548	149	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
549	150	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
550	150	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
551	151	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
552	151	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
553	152	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
554	152	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
555	153	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
556	153	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
557	153	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	99.1
558	154	1319	0.0	0.0	0.0	0.0	0.0	0.6	0.8	1.2	97.4
559	154	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
560	155	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
561	155	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
562	156	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
563	156	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
564	157	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
565	157	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
566	158	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
567	158	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

568	159	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
569	159	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
570	160	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.1	98.8
571	160	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
572	161	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
573	161	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
574	162	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	99.8
575	162	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
576	163	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
577	163	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
578	164	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
579	164	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
580	165	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
581	165	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
582	166	1319	0.0	0.0	0.0	0.0	1.1	6.9	7.3	3.9	80.8
583	166	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
584	166	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
585	167	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
586	167	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
587	168	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
588	168	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
589	169	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
590	169	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
591	170	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
592	170	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
593	171	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
594	171	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
595	172	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
596	172	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
597	173	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
598	173	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
599	174	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
600	174	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
601	175	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
602	175	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
603	176	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
604	176	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
605	177	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
606	177	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
607	178	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
608	178	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
609	178	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	99.4
610	179	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
611	179	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
612	180	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
613	180	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
614	181	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
615	181	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
616	182	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
617	182	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
618	183	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
619	183	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
620	184	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
621	184	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
622	185	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
623	185	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
624	186	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
625	186	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
626	187	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
627	187	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
628	188	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
629	188	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
630	189	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
631	189	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

632	190	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
633	190	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
634	191	1319	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
635	191	1318	0.0	0.0	0.0	0.0	0.0	2.0	8.6	14.9	74.5
636	191	1317	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	99.9
637	192	1316	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
638	192	1314	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
639	193	1313	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
640	193	1312	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
641	194	1310	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
642	194	1309	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
643	195	1308	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
644	195	1306	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
645	196	1305	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
646	196	1304	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
647	197	1302	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
648	197	1301	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
649	198	1300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
650	198	1298	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
651	199	1297	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
652	199	1296	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
653	200	1294	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
654	200	1293	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
655	200	1292	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
656	201	1290	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
657	201	1289	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
658	202	1288	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
659	202	1286	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
660	203	1285	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
661	203	1284	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
662	204	1282	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
663	204	1281	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
664	205	1280	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
665	205	1279	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
666	206	1277	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
667	206	1276	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
668	207	1275	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
669	207	1273	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
670	208	1272	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
671	208	1271	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
672	209	1269	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
673	209	1268	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
674	209	1267	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
675	210	1265	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
676	210	1264	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
677	211	1263	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
678	211	1261	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
679	212	1260	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
680	212	1259	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
681	213	1257	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
682	213	1256	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
683	214	1255	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
684	214	1253	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
685	215	1252	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
686	215	1251	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
687	216	1249	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
688	216	1248	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
689	217	1247	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
690	217	1245	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
691	218	1244	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
692	218	1243	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
693	218	1242	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
694	219	1240	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
695	219	1239	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

696	220	1238	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	99.9
697	220	1236	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
698	221	1235	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
699	221	1234	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
700	222	1232	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
701	222	1231	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
702	223	1230	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
703	223	1228	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
704	224	1227	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
705	224	1226	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
706	225	1224	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
707	225	1223	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
708	226	1222	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
709	226	1220	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
710	227	1219	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
711	227	1218	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
712	227	1216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
713	228	1215	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
714	228	1214	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
715	229	1212	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
716	229	1211	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
717	230	1210	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
718	230	1208	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
719	231	1207	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
720	231	1206	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
721	232	1205	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
722	232	1203	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
723	233	1202	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
724	233	1201	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
725	234	1199	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
726	234	1198	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
727	235	1197	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
728	235	1195	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
729	236	1194	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
730	236	1193	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
731	236	1191	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
732	237	1190	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
733	237	1189	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
734	238	1187	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
735	238	1186	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
736	239	1185	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
737	239	1183	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
738	240	1182	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
739	240	1181	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
740	241	1179	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
741	241	1178	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
742	242	1177	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
743	242	1175	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
744	243	1174	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
745	243	1173	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
746	244	1171	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
747	244	1170	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
748	245	1169	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
749	245	1167	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
750	245	1166	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
751	246	1165	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
752	246	1164	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
753	247	1162	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
754	247	1161	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
755	248	1160	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
756	248	1158	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
757	249	1157	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
758	249	1156	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
759	250	1154	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

760	250	1153	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
761	251	1152	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
762	251	1150	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
763	252	1149	0.0	0.0	0.0	0.8	5.6	3.7	1.9	1.9	86.2
764	252	1148	0.0	0.0	0.0	0.0	0.0	14.7	9.5	11.9	63.9
765	253	1146	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
766	253	1145	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
767	254	1144	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
768	254	1142	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
769	254	1141	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
770	255	1140	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
771	255	1138	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
772	256	1137	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
773	256	1136	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
774	257	1134	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
775	257	1133	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
776	258	1132	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
777	258	1130	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
778	259	1129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
779	259	1128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
780	260	1127	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
781	260	1125	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
782	261	1124	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
783	261	1123	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
784	262	1121	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
785	262	1120	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
786	263	1119	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
787	263	1117	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
788	263	1116	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
789	264	1115	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
790	264	1113	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
791	265	1112	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
792	265	1111	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
793	266	1109	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
794	266	1108	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
795	267	1107	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
796	267	1105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
797	268	1104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
798	268	1103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
799	269	1101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
800	269	1100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
801	270	1099	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
802	270	1097	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
803	271	1096	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
804	271	1095	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
805	272	1093	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
806	272	1092	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
807	272	1091	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
808	273	1090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
809	273	1088	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
810	274	1087	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
811	274	1086	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
812	275	1084	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	99.6
813	275	1083	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	99.8
814	276	1082	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	99.9
815	276	1080	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	99.9
816	277	1079	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
817	277	1078	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
818	278	1076	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
819	278	1075	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
820	279	1074	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
821	279	1072	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
822	280	1071	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
823	280	1070	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

824	281	1068	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
825	281	1067	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
826	281	1066	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
827	282	1064	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
828	282	1063	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
829	283	1062	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
830	283	1060	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
831	284	1059	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
832	284	1058	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
833	285	1056	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
834	285	1055	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
835	286	1054	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
836	286	1053	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
837	287	1051	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
838	287	105C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
839	288	1049	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
840	288	1047	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
841	289	1046	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
842	289	1045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
843	290	1043	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
844	290	1042	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
845	290	1041	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
846	291	1039	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
847	291	1038	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
848	292	1037	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
849	292	1035	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
850	293	1034	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
851	293	1033	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
852	294	1031	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
853	294	1030	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
854	295	1029	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
855	295	1027	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
856	296	1026	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
857	296	1025	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
858	297	1023	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
859	297	1022	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
860	298	1021	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
861	298	1019	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
862	299	1018	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
863	299	1017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
864	300	1015	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Totals			0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	99.4

APPENDIX VI

SIGNIFICANT EVENTS LOG

SIGNIFICANT EVENTS LOG

SEQ	JD	LOCAL	LINE	PROBLEM TYPE	SP to SP		REMARKS
001	036	19:53	YOL00013	SSTS			First line acquired. Nominal Pinger Depths used in SSTS.
004	037	06:30	YOL00247	GUNS	113	115	EDIT shotpoints due to GUNS. FGSP 116
007		16:25	YOL00061	SSTS			Pinger elevations from GMU now updating Previous 6 lines used nominal pinger depths
008		19:02	YOL00253	NAVIGATION	SOL	EOL	SOL & EOL shotpoints were incorrectly set. Should have been SP 115-680 not SP 110 -675. Typing error only.
010	038	01:21	YOL00199	SOURCE SELECT	SOL	EOL	Incorrect source selection. STBD array fired on odd sp's.
012		08:18	YOL00259	DATA SHIPMENT			Last line acquired in data shipment 1.
027	045	08:12	YOL00241	LRS100 TAPE DECK	112 585	128 604	EDIT sp's due to LRS-100 hang-up. Seismic block edit due to tape deck hang-up.
033	046	02:51	YOL00307	POWER FAILURE	485		EOL early due to recording room power failure. LGSP 485
037		15:13	YOL00091	POWER FAILURE			All data SCRATCHED due to recording room power failure.
043	047	10:01	YOL00091	CABLE DEPTHS	185		EOL early due to cable 2 depth out of spec due to sea state LGSP 185
044	048	14:48	YOL00097	CABLE DEPTHS			All data SCRATCHED due to cable depths out of spec due to sea state.

SEQ	JD	LOCAL	LINE	PROBLEM TYPE	SP to SP		REMARKS
047	049	06:14	YOL00109	SOURCE ARRAY	406	374	STBD source edit due to source misfiring.
048		09:46	YOL00319	CABLE DEPTHS	300	380	EDIT cable 2 due to cable depths out of spec due to sea state
050		16:17	YOL00331	CABLE DEPTHS	133 499	210	EDIT cable 2 due to cable depths out of spec due to sea state EOL early due to cable depths out of spec due to sea state LGSP 499
051		18:33	YOL00163	CABLE DEPTHS			All data scratched due to cable depths out of spec due to sea state.
054	050	06:15	YOL00343	GUNS	593		EOL early due to guns out of spec. LGSP 593
082	054	15:29	YOL00679	LRS100			All data SCRATCHED due to LRS100 problem
096	056	17:49	YOL00697	WISDOM	150		EOL early due to a WISDOM program crash LGSP 150
105	058	16:04	YOL00769	CABLE DEPTHS			All data SCRATCHED due to cable depths out of spec due to sea state.
125	065	01:52	YOL00559	WEATHER			All data scratched due to the sea state
131	066	03:47	YOL00811	WISDOM SOURCE SELECT	614		SOL late due to a WISDOM program crash FGSP 614. Incorrect source selection, STBD source firing on odd sp's.
137		22:42	YOL00841	SOURCE ARRAY	613	198	Incorrect source volume selected for STBD array, was 2850

SEQ	JD	LOCAL	LINE	PROBLEM TYPE	SP to SP		REMARKS
							should have been 2700 no data editted.
141	067	13:05	YOL00859	WISDOM	188		EOL early due to the WISDOM timing out. LGSP 188
150	068	17:19	YOL00631	SEISMIC	204	232	EDIT sp's due to an incorrect seismic record length selection. FGSP 233
153 154	069		YOL01187 YOL01367	JULIAN DAY (UTC)			Incorrect JD written to tape for these lines. Should have been JD 068 was 067.
156		14:19	YOL01349	CABLE DEPTH			All data SCRATCHED due to cable depths out of spec due to sea state.
157		15:34	YOL10343	CABLE DEPTH			All data SCRATCHED due to cable depths out of spec due to sea state.
177	073	17:11	YOL01637	SHOOTING DIR			Line shot opposite to the prime shooting direction.
185	074	20:57	YOL01817	SHOOTING DIR			Line shot opposite to the prime shooting direction
187	075	05:16	YOL01661	END OF SURVEY			Last line acquired on YOLLA-3D Seismic Survey.

APPENDIX B

ONBOARD NAVIGATION PROCESSING REPORT

501619

WESTERN GEOPHYSICAL

ONBOARD NAVIGATION PROCESSING REPORT

Report # U01 - YOLLA 3D 1994

CLIENT	:	SAGASCO RESOURCES LIMITED
AREA	:	YOLLA 3D
PARTY	:	WESTERN ATLAS PARTY 116
Period Covered	:	5 February 1994 to 7 February 1994
Sequences	:	1 to 12

Prepared by : Gary Nicholson
Survey Processing Coordinator

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1.0 Introduction.

This report covers Onboard Navigation Processing for the Sagasco Resources Ltd. Yolla 3D survey. The survey was conducted by the R/V Western Atlas using triple 3000 m cables and dual source. Shooting commenced on the 5th of February 1994 and sequence 187, the last line of the survey was completed on the 16th of March 1994.

2.0 Onboard Processing.

Processing was performed onboard using Western's UNAVCHK Version 1.1 running on an IBM RISC 6000 system.

Processing personnel were as follows:

Gary Nicholson	- Survey Processing Coordinator
Mike Friend	- Processing Analyst
Eric Karlson	- Processing Analyst

The average time to process one line, after setup was complete was approximately 1-2 hours. Lines took 1 to 3 hours to shoot plus around 1 hours for the line change.

2.1 Nominal Filters.

The nominal filters used in processing were as follows :

Sensor:	Despike	Threshold	Smoothing
Gyrocompass	3	2.0	1
Fathometer	7	1.5	5
RGPS TB Range	7	1.5	7
RGPS TB Bearing	7	1.5	7
Mars Range	7	1.5	7
Mars Bearing	7	1.5	7
Elevation	9	1.5	7
Compasses	13	1.5	9
Acoustic Ranges	5	1.5	3
ARGO Patterns	9	1.5	5
ARGO Vessel Pos.	5	1.5	3
DGPS Vessel Pos.	5	1.5	3

Any adjustments to these nominal filters are noted in the Line Processing Log section 3.0, and on the individual line processing sheet. The filters tabulated above were decided upon over the course of the first few lines based upon the data quality.

2.2 Shotpoint Data Check.

All processed lines were tested for errors in the following:

source select sequence,
FSID increment,
shotpoint count and
RDC word check.

The standard convention for the source select sequence was that the starboard source, number 1, fired on even shotpoints and the port source, number 2, fired on odd shotpoints. This was adhered to except for the following lines, which had the source select sequence reversed:

Seq	Line
10	YOL00199
131	YOL00811

Sequences 153 (YOL01187) and 154 (YOL01133) had the date incorrectly entered into WISDOM as julian day 67, this should have been julian day 68. The only affect this had on processing was that care had to be taken when applying the tidal corrections to ensure the correct day was used.

The only errors encountered were RDC word exceptions, where the source has not acknowledged that it has fired, i.e. the RDC word is 1000 or 3000 instead of 1100 or 3200, or the wrong source has acknowledged. This occurred in the following places:

Seq	Line	Shotpoint	RDC word
4	YOL00247	113	3000
		114	1000
		115	3000
		281	3000
		282	1000
		283	3000
		284	1000
		285	3000
		286	1000
		403	3000
7	YOL00061	313	3000
20	YOL00271	518	1000
		519	3100
33	YOL00307	373	3000

39	YOL00187	495	3000
		494	1200
46	YOL00337	154	1000
61	YOL00373	364	1000
66	YOL00145	150	1000
78	YOL00673	562	1000
		561	3000
79	YOL00481	450	1000
		451	3100
		595	3000
		596	1200
81	YOL00427	579	3000
		580	1200
99	YOL00403	726	1000
		727	3100
		748	1000
		749	3100
		811	3000
		812	1000
		813	3000
		814	1200
115	YOL00655	736	1000
		735	3100
117	YOL00763	394	1000
		393	3100
119	YOL00757	331	3000
		330	1200
144	YOL00613	409	3000
150	YOL00631	438	1000
		439	3100
179	YOL01499	794	1000
		795	3100

2.3 Gyrocompass Processing.

A minimal filter was used on the gyrocompass. The gyro alignment correction set in WISDOM was -0.3°. No adjustment was made to this in processing.

On several lines throughout the survey the gyrocompass data dropped to zero for one shotpoint, these lines are noted in the Line Processing Log. This was the only problem experienced in processing the gyrocompass. In all other cases of apparent spikes in the data these corresponded to sudden movements of the vessel.

2.4 Fathometer Processing.

The speed of sound in water that was used for the fathometer and the acoustics was 1512 m/s. This was determined by a T/S Dip measurement on 26th January 1994.

The fathometer was set to record with a velocity of 1500 m/s, a correction was applied to the raw data in processing to correct to 1512 m/s. The raw data was corrected for draft by the fathometer so no further correction was applied for this in processing.

A tidal correction was applied to the processed P1/90 water depth data. The tidal height used was based on the prediction of the tide at the port of Burnie, Tasmania, using the Admiralty NP159a V 2.00 tidal prediction program. This correction was between 0.2 and 3.5 metres. The water depth on the final P1/90's are therefore referenced to Chart Datum.

Appendix I contains the setup parameters used in NP159a as well as the corrections applied to every tenth shotpoint of the data.

After applying the tidal correction the water depths turned out to be remarkably consistent with almost all the data falling between 78.0 and 80.0 metres.

2.5 Range and Bearing Target Processing.

The RACAL SKYTRACK RGPS relative tailbuoys together with the MARS source targets were processed in this section. After seq 6 pinger elevations were also processed in this section so as to determine the mean pinger depth to be used in the network solution. Prior to this nominal depths of 12.5m were used as WISDOM was not receiving the depths due to software problems. Using nominal depths rather than measured depths will have very little effect on the positioning.

2.5.1 MARS

The MARS laser positioning system was set up to track targets on the two pullervanes and on the centre gunstring of each source array. During processing only the targets on the sources were used, the pullervane targets not being used as they were not tied to the cable other than by the first compass bearing which doesn't necessarily point to the pullervane.

In general the MARS data was of excellent quality, however it did suffer on several lines because of thick fog which meant it was unable to acquire targets. Another problem occasionally encountered was that the targets were swapped so that the target identified as the stbd source by MARS was actually the port source and vice-versa. When this occurred the source numbers associated with the targets were overwritten in post processing. See Line Processing Log for problems associated with individual lines.

2.5.2 SKYTRACK RGPS Tailbuoys

The main problem experienced in processing the RGPS tailbuoys was that from sequences 28 through to 91 occasionally the position jumped up to 20 metres. When this was identified on data for a tailbuoy it was not used for the line. On 15 lines this meant that no reliable tailbuoy data was available, in these cases the magnetic declination was adjusted by subtracting the mean value of the Cable Rotation Bias for all the previous lines shot in that direction from the value entered into WISDOM of 12.67°. See the Line Processing Log for the values used for these lines.

2.6 Acoustic Range Processing.

All available acoustic data was processed, including raw SSTS acoustic ranges. The real-time range and bearing from SSTS were not used in post-processing.

The acoustic data, both SSTS and Digicourse was of an extremely high quality with little filtering or editing being required. Occasional bottom returns were noticed on some SSTS ranges, these were easily identified and corrected.

In order to avoid conflict with the relative target numbering all the Digicourse acoustic pods were renumbered by adding 100 to the WISDOM numbers.

2.7 Cable Compass Processing.

For full compass logs see Onboard 3DQC Report.

2.7.1 Magnetic Declination.

A magnetic declination of 12.67° East was used. This was computed from the CNavchk utility using the IGRF 1990 model.

2.7.2 Compass Data.

Compass data quality was good throughout the lines covered. Compasses were only occasionally edited or removed, these instances are noted in the Line Processing Log.

2.7.3 Compass Biases.

No static biases were applied. Residual biases were computed for every line based on a surface consistent, quadratic, L-2 minimisation fit for each cable. These residual biases were not applied. Bias reports are available in QCSTAT Appendix 2.

2.8 Vessel Positioning

The primary vessel position was computed using a ARGO 4 range fix. For a few lines it was necessary to drop one of the stations for a portion of the line, these instances are noted in the Line Processing Log. No pattern weighting was applied to the ranges. On the majority of lines the ARGO fix had a maximum standard deviation of less than 5m.

A secondary RACAL MULTIFIX DGPS vessel position was computed on all lines. Comparisons between the MULTIFIX DGPS vessel position and the ARGO vessel position were computed for every line. The mean distance between the two positions was approximately 3.5m. Details of this comparison can be seen in the QCSTAT reports in appendix 2. Note that on some lines the comparison may be biased due to spikes in the DGPS position.

For approximately 35% of the lines MULTIFIX was used to determine the vessel position as it was judged to provide a better solution than the ARGO position. These lines are noted in the Line Processing Log.

2.9 Network Solution.

2.9.1 Cable Rotations.

Cable rotation biases were computed and applied in the UNAVCHK network refinement stage. These cable rotation biases are listed in Appendix II. The mean rotation bias was 0.33' for the primary direction and 0.23° for the inverse direction. This means that magnetic declination of 12.67' was too high.

2.9.2 Standard Deviations.

Initially, the standard deviations output by UNAVCHK were used for most of the measurements, however for the following measurements these defaults were used:

	Default SD
rGPS Range on T.B.	5.0
rGPS Bearing on T.B.	0.09
SSTS Acoustic Range	1.0
Digicourse Acoustics Range	1.0

A printout of the standard deviations used by UNAVCHK is included in Appendix III.

2.9.3 Offsets

The tail end acoustic offsets were changed to take into account the stretch of the stretch sections and tailbuoy ropes. The following offsets were calculated from mean in-line acoustic measurements from the first line. These were then monitored on a regular basis, and were adjusted when required. The offsets used were:

Sequences 1 to 100

23	-2962.4	16	-2962.4	9	-2962.4
24	-3070.0	17	-3070.0	10	-3070.0
25/ TB3	-3134.7	18/ TB2	-3134.7	11/ TB1	-3136.5

Sequences 101 to 105

23	-2962.4	16	-2962.4	9	-2962.4
24	-3071.1	17	-3070.2	10	-3070.5
25/ TB3	-3136.8	18/ TB2	-3137.4	11/ TB1	-3137.0

Sequences 106 to 187

23	-2962.4	16	-2962.4	9	-2962.4
24	-3071.1	17	-3070.2	10	-3070.5
25/ TB3	-3134.1	18/ TB2	-3132.4	11/ TB1	-3133.8

2.9.4 Aliasing.

Due to the close proximity of certain nodes, Unavchk makes use of aliasing to simplify the network. Following is a listing of the nodes that have been aliased:

Note: Nodes in **Bold** type are nodes used in Network; nodes beneath have been aliased.

Front-End

Source 2		Source 1	
R00006		**R00005**	
A10015		A10012	
Cable 3	Cable 2		Cable 1
A10010	**A10009**		**A10008**
A00119	A00112		A00105
A10019	A10018		A10001
C00026	C00014		C00002

Tail-End

Cable 3	Cable 2	Cable 1
R00003	**R00002**	**R00001**
A00125	A00118	A00111

The tailbuoy acoustic nodes were aliased to the tailbuoys when both were active. The SSTS cross cable pinger, the Digicourse units at the head, compasses #2, #14 and #26 and the SSTS receivers on each cable were all aliased together.

2.9.5 CLSNET Algorithm.

The CLSNET algorithm was used to solve the integrated network. The option to non-iteratively network every shot was selected. This method passes on the covariance matrix from one shot to the next.

The iteration limit for the CLSNET algorithm was set to 6 iterations. This only affected the first shotpoint - shotpoints after the first are not iterated. It was decided that, generally speaking, if the network took more than 6 iterations then there was something wrong with the input data.

The options to solve for cable rotation biases and cable stretch in the network adjustment were selected.

2.10 Coordinate Computation & Comparisons.

Vessel, source, receiver and tailbuoy positions were computed for each line. Several position comparisons were performed on each line to verify the quality of the network adjustment. These were:

NRP vs Source 1
NRP vs Source 2
NRP vs Cable 1 Group 1
NRP vs Cable 2 Group 1
NRP vs Cable 3 Group 1

Cable 1 Group 001 to Cable 2 Group 001
Cable 1 Group 120 to Cable 2 Group 120
Cable 1 Group 240 to Cable 2 Group 240
Cable 2 Group 001 to Cable 3 Group 001
Cable 2 Group 120 to Cable 3 Group 120
Cable 2 Group 240 to Cable 3 Group 240

Source 1 vs Source 2

For details of each of these comparisons see the QCSTAT reports appendix 2. The following comparisons were also made on each line and can be viewed or reported through the QCSTAT databases.

Source 1 vs Cable 1 Group 1
Source 1 vs Cable 2 Group 1
Source 1 vs Cable 3 Group 1
Source 2 vs Cable 1 Group 1
Source 2 vs Cable 2 Group 1
Source 2 vs Cable 3 Group 1
Raw vs Processed Source Position

Layback Model Comparisons.
Model Source 1 vs Computed Source 1
Model Source 2 vs Computed Source 2
Model Cable 1 vs Computed Cable 1
Model Cable 2 vs Computed Cable 2
Model Cable 3 vs Computed Cable 3

3.0 Line Processing Log.

The following lists the problems associated with each line processed and any events significant to navigation processing.

Seq#	Line	Problems / Comments
		Compass Log #1 **P1/90 Tape #1 starts** **ARGO used for vessel position unless stated otherwise.**
1	YOL00013	Tailbuoy 1 & 2 not used MARS source targets swapped MARS dropped for portions of line
2	YOL00205	Tailbuoy 2 dropped SP 204 - 321 Tailbuoy 3 dropped SP 210 - 334 MARS not used
3	YOL00055	Tailbuoy 1 not used
4	YOL00245	MARS not used RDC word exceptions: SP 113 (3000) SP 114 (1000) SP 115 (3000) SP 281 (3000) SP 282 (1000) SP 283 (3000) SP 284 (1000) SP 285 (3000) SP 286 (1000) SP 403 (3000)
5	YOL00019	Tailbuoy 1 not used Tailbuoy 2 dropped SP 195 - 145 MARS not used
6	YOL00211	Tailbuoy 1 not used MARS not used Spike in shot time difference around SP 600
7	YOL00061	Tailbuoys 1 & 2 not used RDC word exception: SP 313 (3000) Spike in shot time difference around SP 310 . Multifix used as vessel position
8	YOL00253	First shotpoint should have been called 115 not 110. First shotpoint incorrectly referenced in WISDOM. Data is in correct location.

		Tailbuoy 2 not used Spikes in shot time difference (to 13.2s) around SP 270 - 300 ARGO used SP 210 - 336 Multifix used as vessel position for rest of line
9	YOL00025	Tailbuoy 2 not used Multifix used as vessel position
10	YOL00199	Stbd source firing on odd SP's Multifix used as vessel position
11	YOL00067	Multifix used as vessel position
12	YOL00259	MARS dropped SP 516 - 573 ARGO used SP 516 - EOL Multifix used as vessel position for rest of line
		End of data shipment #1 **P1/90 Tape #2 starts**
13	YOL00049	MARS on port source not used. Compass filter to (11,1.5,7)
14	YOL00217	Fathometer data edited Tailbuoy 2 not used Tailbuoy 1 dropped SP 550-635 Multifix used for vessel position
		Default compass filter changed to (11,1.5,7)
15	YOL00031	Processed
16	YOL00265	Shot time spike around SP 490 Tailbuoy 2 not used MARS dropped SP 117 - 150 d/t targets being swapped Compass 6 edited Multifix position filter to (13,1.5,7)
		Acoustic pods 8 and 14 inactive until seq 106
17	YOL00073	Tailbuoy 2 edited Multifix used for vessel position
18	YOL00193	Processed
19	YOL00037	Tailbuoy 1 not used Multifix used for vessel position
20	YOL00271	RDC word exceptions: SP 518 (1000) SP 519 (3100) Shot time spike around SP 340

21	YOL00079	Tailbuoys 1 & 2 not used Tailbuoy 3 data edited Multifix used for vessel position
22	YOL00223	Tailbuoys 1 & 2 not used Shot time spikes around SP's 260, 510
23	YOL00007	Tailbuoy 2 not used Multifix used for vessel position
24	YOL00229	Tailbuoys 1 & 2 not used Tailbuoy 3 edited Multifix used for vessel position
25	YOL00001	Multifix used for vessel position
26	YOL00277	Tailbuoy 1 not used All ranges from Stbd SSTS pinger dropped SP's 638-709, d/t broken rope Multifix used for vessel position
		Acoustic pod 18 inactive until seq 101
27	YOL00241	2 * Gryocompass drop outs MARS not operational Tailbuoy 2 not used Range and bearing filter to (13,1.5,7) Multifix used for vessel position SSTS to string 5 not used
28	YOL00085	Stbd source MARS dropped SP 395 - 360, 212 - 32 Port source MARS dropped SP 395 - 368 No tailbuoys used Magnetic declination changed to 12.46°
29	YOL00313	Tailbuoys 1 & 2 not used Jumps in tailbuoy 3 range MARS on stbd source not used
30	YOL00043	Tailbuoys 1 & 2 not used Jumps in tailbuoy 3 range
31	YOL00235	Tailbuoy 2 not used MARS dropped SP 120 - 175
32	YOL00121	Tailbuoy 1 & 2 not used Tailbuoy 3 edited MARS dropped SP 133 - 72 Croppies Point pattern filter to (25,1.0,7)
33	YOL00307	RDC word exception: SP 373 (3000) No tailbuoys used Magnetic declination changed to 12.35°

34	YOL10307	Tailbuoys 1 & 2 not used MARS not used
35	YOL00127	Tailbuoys 1 & 2 not used
	P1/90 Tape #3 starts	
36	YOL00301	Tailbuoys 1 & 2 not used
37	SCRATCHED	
38	YOL00283	Tailbuoy 2 not used MARS not used
39	YOL00187	RDC word exceptions: SP 495 (3000) SP 494 (1200) Tailbuoy 2 not used
40	YOL00289	Tailbuoy 2 not used ARGO on 3 way fix SP 175 - 213 - Croppies Point dropped Multifix used for vessel position
41	YOL00115	Tailbuoys 1 & 2 not used SSTS to string 4 not used Multifix used for vessel position
42	YOL00295	Tailbuoy 2 not used MARS not used
43	YOL00091	Tailbuoys 1 & 2 not used MARS on stbd source not used Compass filter to (15,1.5,11) d/t sea state
44	SCRATCHED	
	Acoustic pod 11 inactive until seq 106 **Acoustic pod 25 inactive until seq 101**	
45	YOL00181	Tailbuoys 1 & 2 not used ARGO on 3 way fix SP 300 - 250 - Croppies Point dropped Multifix used for vessel position
46	YOL00337	RDC word exception : SP 154 (1000) Tailbuoy 2 not used Jumps in tailbuoy ranges Multifix used for vessel position
47	YOL00109	Tailbuoy 2 not used Tailbuoy 1 edited Multifix used for vessel position
48	YOL00319	Jumps in tailbuoy ranges Compass 21 not used

49	YOL00157	Tailbuoys 1 & 2 not used Jumps in tailbuoy 3 range MARS targets dropped: Stbd source SP's 350 - 324 Port source SP's 167 - 130 No Multifix position available
50	YOL00331	Tailbuoy 2 not used Compasses 21 & 24 not used d/t spikes Compass filter to (15,1.5,11)
51	SCRATCHED	
52	YOL00325	No tailbuoys used Magnetic Declination changed to 12.35° ARGO on 3 way fix: SP 440 - 481 - Point Sorrel dropped SP 609 - 675 - Croppies Point dropped Multifix used for vessel position with filter of (9,1.5,7)
53	YOL00097	Tailbuoys 1 & 2 not used Jump in tailbuoy 3 range
54	YOL00343	Tailbuoys 1 & 2 not used 3 * gyrocompass dropouts
55	YOL00151	Tailbuoys 1 & 2 not used Jumps in tailbuoy 3 range Multifix hangup SP's 442 - 400
56	YOL00349	No tailbuoys used Magnetic Declination changed to 12.35° 4 * gyrocompass dropouts MARS dropped SP's 370 - 420
57	YOL00103	Tailbuoy 2 not used Tailbuoy 1 edited
	P1/90 Tape #4 starts	
58	YOL00379	Tailbuoy 1 not used Several dropouts in gyrocompass data Gyrocompass filter to (7,2.0,1)
59	YOL00163	Tailbuoy 2 not used Jump in tailbuoy 3 range Multifix used for vessel position
60	YOL00355	Tailbuoy 2 not used Jumps in tailbuoy 1 & 3 ranges Several dropouts in gyrocompass data ARGO on 3 way fix: SP 405 - 471 - Croppies Point dropped SP 640 - 700 - Naracoopa dropped Pattern filter to (5,1.5,3)

		Position filters to (13,1.5,9)
61	YOL00373	RDC word exception: SP 364 (1000) Tailbuoy 2 not used Jumps in tailbuoy 1 & 3 ranges 3 * gyrocompass dropouts MARS not used Compass 32 not used
62	YOL00133	Jumps in tailbuoy ranges MARS dropped SP's 200 - 130 Multifix used for vessel position
63	YOL00367	Tailbuoy 2 not used Jumps in tailbuoy 1 & 3 ranges MARS not used Position filters to (7,1.5,3)
64	YOL00139	Jumps in tailbuoy ranges
65	YOL00361	Tailbuoy 2 not used MARS not used SSTS on string 5 not used 1 * dropout in gyrocompass
66	YOL00145	RDC word exception: SP 150 (1000) Jumps in tailbuoy ranges
67	YOL00385	Tailbuoys not used Magnetic declination changed to 12.36° MARS port source dropped SP's 620 - 690 3 * dropout in gyrocompass
68	YOL00169	Tailbuoy 2 not used Jumps in tailbuoy 1 & 3 ranges Spike in Multifix position
69	YOL10331	Tailbuoys 1 & 2 not used Fathometer edited MARS port source dropped SP's 721 - 750 SSTS on string 5 not used
70	YOL00175	Tailbuoy 2 not used First compass used for source tow angle Vessel position: ARGO SP's 506 - 411 Multifix SP's 410 - 32
71	YOL00415	Tailbuoy 2 not used Multifix used for vessel position
72	YOL00727	Tailbuoys not used Magnetic declination changed to 12.46° SSTS on string 5 not used
73	YOL00475	Tailbuoy 2 not used Shot time spikes at SOL

74	YOL00667	Tailbuoys not used Magnetic declination changed to 12.46° Fathometer edited Multifix used as vessel position
		P1/90 Tape #5 starts
75	YOL00391	Tailbuoys not used Magnetic declination changed to 12.36° Shot time spike around SP 670 Range and bearing filters to 911,1.5,7) Multifix used for vessel position
76	YOL00721	Tailbuoys 1 & 2 not used Shot times spikes SP's 370 - 320 Fathometer edited High SD for ARGO but still better position than Multifix
77	YOL00421	Tailbuoys 1 & 2 not used Shot times spikes SP's 430 - 550 Pattern filter to (13,1.5,9)
78	YOL00673	Tailbuoys 1 & 2 not used RDC word exceptions: SP 562 (1000) SP 561 (3000) SSTS on string 7 not used Multifix used for vessel position Multifix position filter to (13,1.5,9)
79	YOL00481	Tailbuoy 1 not used RDC word exceptions: SP 450 (1000) SP 451 (3100) SP 595 (3000) SP 596 (1200) SSTS on string 7 not used Multifix used for vessel position Position filters to (9,1.5,7) Spikes in ARGO position
		Compass 3 disabled in WISDOM until SEQ 106
80	YOL00715	Shot time spike around SP 440 Tailbuoys 1 & 2 not used SSTS on string 7 not used Spike in Multifix position
81	YOL00427	RDC word exceptions: SP 579 (3000) SP 580 (1200) Shot time spike around SP 350 Tailbuoy 2 not used Jumps in tailbuoy ranges SSTS on string 7 not used ARGO 3 way fix used - North Point dropped C-O's changed to -0.35 - Naracoopa -0.07 - Point Sorell

		-0.06 - Croppies Point Multifix too noisy to use Multifix filter to (35,1.5,9)
82	SCRATCHED	
83	YOL00487	Tailbuoys not used Magnetic declination changed to 12.36° Multifix used for vessel position Multifix filter to (11,1.5,7)
84	YOL00679	Tailbuoys not used Magnetic declination changed to 12.46° SSTS on string 7 not used Multifix used for vessel position Spike in ARGO position
85	YOL00433	Tailbuoys not used Magnetic declination changed to 12.36° Shot time spikes SP 560 - 700
86	YOL00733	Tailbuoys not used Magnetic declination changed to 12.46° Multifix used for vessel position Position filter to (9,1.5,7)
87	YOL00493	Tailbuoys not used Magnetic declination changed to 12.36° Fathometer data edited
88	YOL00685	Tailbuoys 1 & 2 not used Jump in tailbuoy 3 range
89	YOL00397	All tailbuoy range and bearings edited Fathometer data edited
90	YOL00709	Tailbuoys not used Magnetic declination changed to 12.46° Compass 32 not used Compass 30 edited
91	YOL00409	Tailbuoys not used Magnetic declination changed to 12.36°
		P1/90 Tape #6 starts
92	YOL00691	Tailbuoys 1 & 2 not used Compasses 17 & 32 not used
93	YOL00499	Tailbuoys 1 & 2 not used Fathometer data edited
94	YOL00751	Tailbuoys 1 & 2 not used Compass 32 not used Multifix used for vessel position ARGO to 3 way fix SP 673 -414

- North Point dropped

95	YOL00451	Tailbuoy 2 not used Fathometer data edited
96	YOL00697	Tailbuoys 1 & 2 not used MARS not used
97	YOL00469	Tailbuoy 2 not used MARS targets reversed MARS on port source not used
98	YOL00661	Tailbuoy 2 not used Multifix used for vessel position
99	YOL00403	RDC word exceptions: SP 726 (1000) SP 727 (3100) SP 748 (1000) SP 749 (3100) SP 811 (3000) SP 812 (1000) SP 813 (3000) SP 814 (1200) Shot time spike around SP 490 Tailbuoy 2 not used
100	YOL00703	Tailbuoys 1 & 2 not used Multifix used for vessel position

Tailend offsets updated in Unavchk
Acoustic pods 18 and 25 operational

101	YOL00775	Tailbuoys 1 & 2 not used Compass 15 edited MARS on port source not used MARS on stbd source dropped SP 600 - 475 Multifix used for vessel position Position filters to (13,1.5,7)
102	YOL00445	Tailbuoys 1 & 2 not used MARS not used Pattern filter to (13,1.0,7)
103	YOL00739	Tailbuoys 1 & 2 not used MARS on port source not used
104	YOL00463	Tailbuoys 1 & 2 not used Fathometer data edited
105	SCRATCHED	

Compass Log No. 2
Acoustic pods 8, 11 & 14 operational
Tailend offsets updated in Unavchk
Compass 3 enabled in WISDOM

106	YOL00535	Tailbuoy 1 & 2 data dropped in several places
107	YOL00781	Shot time spike around SP 370 Acoustic pod 16 not used Compass 12 not used
108	YOL00505	Acoustic pod 16 not used Compass 12 not used SSTS on string 7 not used
		P1/90 Tape # 7 starts
109	YOL00847	Tailbuoys 1 & 2 not used Tailbuoy 3 edited
110	YOL00511	Tailbuoys 1 & 2 not used
		Compass 4 disabled in WISDOM until Seq 132
111	YOL00745	Tailbuoys 1 & 2 not used Tailbuoy 3 edited Compass 12 not used
112	YOL00457	Tailbuoys 1 & 2 not used Small jump in tailbuoy 3 range Spike in Multifix position
113	YOL00769	Tailbuoys 1 & 2 not used ARGO pattern filter to (13,1.0,7)
114	YOL00565	Tailbuoys 1 & 2 not used Position filter to (7,1.5,5)
115	YOL00655	RDC word exceptions: SP 736 (1000) SP 735 (3100) Tailbuoys 1 & 2 not used
116	YOL00529	Tailbuoys 1 & 2 not used
117	YOL00763	RDC word exceptions: SP 394 (1000) SP 393 (3100) Tailbuoys 1 & 2 not used
118	YOL00439	Tailbuoys 1 & 2 not used
119	YOL00757	RDC word exceptions: SP 331 (3000) SP 330 (1200) 1 * gyrocompass data dropout MARS on port source dropped SP 208 - 180
120	YOL00541	Shot time spikes at start of line Tailbuoys 1 & 2 not used MARS not used
121	YOL00805	Gryocompass filter to (5,2.0,1)

		Tailbuoys 1 & 2 not used Compass 12 not used
122	YOL00571	Tailbuoys 1 & 2 not used SSTS on string 4 not used
123	YOL00787	Tailbuoys 1 & 2 not used MARS not used
124	YOL00523	Tailbuoys 1 & 2 not used
125	SCRATCHED	
		P1/90 Tape # 8 starts **Acoustic Pod 18 inactive until end of survey**
126	YOL00517	Tailbuoys 1 & 2 not used
127	YOL00799	Tailbuoys 1 & 2 not used SSTS on string 5 not used
128	YOL00559	Tailbuoys 1 & 2 not used Compass 8 edited
129	YOL00793	Tailbuoys 1 & 2 not used SSTS on string 7 not used
130	YOL00547	TotalNET linedata file used in processing, SP 325 missing from FLEX file Tailbuoys 1 & 2 not used
131	YOL00811	Source select sequence incorrect Stbd source firing on odd shot points Tailbuoys 1 & 2 not used SSTS on string 7 not used
		Compass 4 enabled in WISDOM
132	YOL00595	Tailbuoys 1 & 2 not used SSTS on string 7 not used
133	YOL00853	Tailbuoys 1 & 2 not used SSTS on string 7 not used
134	YOL00589	Tailbuoys 1 & 2 not used SSTS on string 7 not used Acoustic pod 16 not used Spike in Multifix position
135	YOL00817	Shot time spikes around SP 450 Tailbuoys 1 & 2 not used Acoustic pod 16 not used SSTS on string 7 not used ARGO pattern filter to (21,1.5,5) Multifix used for vessel position

136	YOL00601	Tailbuoys 1 & 2 not used Acoustic pod 16 not used SSTS on string 7 not used ARGO to 3-way fix SP's 671 - 766 - Croppies Point dropped
137	YOL00841	Tailbuoys 1 & 2 not used Tailbuoy 3 data edited SSTS on string 7 not used Spike in Multifix position
138	YOL00553	Tailbuoys 1 & 2 not used SSTS on string 7 not used Multifix used for vessel position
139	YOL00649	Tailbuoys 1 & 2 not used SSTS on string 7 not used
140	YOL00607	Tailbuoys 1 & 2 not used SSTS on string 7 not used Fathometer data edited
141	YOL00859	Tailbuoys 1 & 2 not used Acoustic pod 16 not used SSTS on string 7 not used Multifix dropped out
142	YOL00583	Tailbuoys 1 & 2 not used Acoustic pod 16 not used SSTS on string 7 not used

P1/90 Tape # 9 starts

143	YOL00643	Tailbuoys 1 & 2 not used Acoustic pod 16 not used SSTS on string 7 not used Compass 33 not used Multifix used for vessel position
144	YOL00613	RDC word exception: SP 409 (3000) Tailbuoys 1 & 2 not used SSTS on string 7 not used ARGO pattern filter to (13,1.5,7) Position filters to (13,1.5,9)
145	YOL00823	Tailbuoys 1 & 2 not used SSTS on string 7 not used Multifix used for vessel position
146	YOL00577	Dropouts in gyrocompass data Tailbuoys 1 & 2 not used SSTS on strings 5 & 7 not used Compasses 12 & 24 not used Multifix used for vessel position Position filters to (13,1.5,7)

147	YOL00835	Tailbuoys 1 & 2 not used SSTS on string 7 not used
		Acoustic pod 21 inactive until end of survey
148	YOL00619	3 * gyrocompass spikes Tailbuoys 1 & 2 not used SSTS string 7 not used
149	YOL00829	Tailbuoys 1 & 2 not used SSTS on string 7 not used
150	YOL00631	RDC word exceptions: SP 438 (1000) SP 439 (3100) Tailbuoys 1 & 2 not used Acoustic pod 16 not used SSTS on string 7 not used MARS dropped SP 570 - 615
151	YOL00637	Tailbuoys 1 & 2 not used SSTS on string 7 not used
152	YOL00625	Tailbuoys 1 & 2 not used SSTS on string 7 not used Multifix used for vessel position
153	YOL01187	Julian day incorrect in WISDOM - was 67 should be 68 - tide correction applied correctly Tailbuoys 1 & 2 not used Acoustic pod 16 not used SSTS on string 7 not used
154	YOL01367	Julian day incorrect in WISDOM - was 67 should be 68 - tide correction applied correctly Tailbuoys 1 & 2 not used 3 * gyrocompass spikes SSTS on string 5 & 7 not used
155	YOL01133	Tailbuoys 1 & 2 not used SSTS on string 7 not used Multifix used for vessel position
156	SCRATCHED	
157	SCRATCHED	
158	YOL01145	Tailbuoys 1 & 2 not used SSTS on string 7 not used
		Acoustic pod 23 inactive until end of survey
159	YOL01349	Tailbuoys 1 & 2 not used SSTS on string 7 not used Multifix used for vessel position

160	YOL10343	Tailbuoys 1 & 2 not used SSTS on string 7 not used Multifix used for vessel position
161	YOL01067	Shot time spikes SP 260 - 220 Tailbuoys 1 & 2 not used SSTS on string 7 not used
162	YOL01343	Tailbuoys 1 & 2 not used SSTS on string 7 not used Compass 35 edited Multifix used for vessel position
		P1/90 Tape #10 starts **Acoustic pod 25 inactive until end of survey**
163	YOL01469	Shot time spikes SP's 175 - 210 Tailbuoys 1 & 2 not used MARS dropped SP's 175 - 210 SSTS on string 5 not used Compasses 12 & 24 not used
164	YOL01115	Tailbuoys 1 & 2 not used MARS dropped SP's 100 - 80 Multifix used for vessel position
165	YOL10319	Spike in gryocompass data Tailbuoys 1 & 2 not used Compass bias to shot consistent d/t length of line
166	YOL10091	Tailbuoys 1 & 2 not used Multifix used for vessel position
167	YOL01421	Tailbuoys 1 & 2 not used
168	YOL01055	Tailbuoys 1 & 2 not used MARS dropped SP's 320 - 308 SSTS on string 4 not used Multifix used for vessel position
169	YOL01451	Tailbuoys 1 & 2 not used Multifix used for vessel position
170	YOL10109	Tailbuoys 1 & 2 not used Bias analysis to shot consistent d/t length of line Multifix used for vessel position
171	YOL01085	Tailbuoys 1 & 2 not used
172	YOL01439	Tailbuoys 1 & 2 not used
173	YOL01679	Tailbuoys 1 & 2 not used Spike in Multifix position

174	YOL01487	Tailbuoys 1 & 2 not used
		Acoustic pod 9 inactive until end of survey
175	YOL01517	Tailbuoys 1 & 2 not used
176	YOL01739	Tailbuoys 1 & 2 not used
		Compass 3 disabled until end of survey **Acoustic pod 5 inactive until end of survey**
177	YOL01637	Tailbuoys 1 & 2 not used
178	YOL01709	Shot time spike at start of line Tailbuoys 1 & 2 not used Tailbuoy 3 edited
179	YOL01499	RDC word exceptions: SP 794 (1000) SP 795 (3100) Tailbuoys 1 & 2 not used Tailbuoy 3 edited Pattern filter to (13,1.5,9)
180	YOL01667	Tailbuoys 1 & 2 not used MARS dropped SP 209 - 180 SSTS on string 7 not used
		Acoustic pod 6 inactive until end of survey
181	YOL01835	Tailbuoys 1 & 2 not used SSTS on string 7 not used
182	YOL01751	Tailbuoys 1 & 2 not used SSTS on string 5 not used
183	YOL01595	Tailbuoys 1 & 2 not used
		P1/90 Tape # 11 starts
184	YOL01685	Tailbuoys 1 & 2 not used SSTS on string 7 not used
185	YOL01817	Shot time spikes around SP's 509, 570, 615 Tailbuoys 1 & 2 not used Pattern filter to (15,1.5,9)
186	YOL01649	Tailbuoys 1 & 2 not used Tailbuoy 3 edited
187	YOL01661	Shot time spikes at start of line Tailbuoys 1 & 2 not used Tailbuoy 3 edited MARS not used Pattern filter to (15,1.5,5) Position filter to (15,1.5,5)

4.0 UKOOA P1/90 Production.

A P1/90 tape was produced containing all lines shot. Vessel, source, receiver, and tailbuoy positions were output along with the 'Western record'. This record contains the field shot identifier which matches the identifier on the seismic tape.

All UKOOA P1/90 files were corrected for tide depth using the data in Appendix I. Copies of all P1/90 files were kept on board the vessel.

Tape Listing

Tape: P190-01

Tape Format: UKOOA P1/90
6250 bpi
8000 blksize
EBCDIC coded

Seq	Line Name	SP From	To
1	YOL00013	307	32
5	YOL00019	314	32
9	YOL00025	321	32
3	YOL00055	358	32
7	YOL00061	366	32
11	YOL00067	373	32
10	YOL00199	110	613
2	YOL00205	110	621
6	YOL00211	110	628
4	YOL00247	113	672
8	YOL00253	110	675
12	YOL00259	116	687

Tape: P190-02

Tape Format: UKOOA P1/90
6250 bpi
8000 blksize
EBCDIC coded

Seq	Line Name	SP From	To
13	YOL00049	351	32
14	YOL00217	110	635
15	YOL00031	329	32
16	YOL00265	117	694
17	YOL00073	380	32
18	YOL00193	110	606
19	YOL00037	336	32
20	YOL00271	119	702
21	YOL00079	388	32
22	YOL00223	110	643
23	YOL00007	299	32
24	YOL00229	110	650
25	YOL00001	292	32
26	YOL00277	120	709
27	YOL00241	129	665
28	YOL00085	395	32
29	YOL00313	128	753
30	YOL00043	344	32
31	YOL00235	110	657
32	YOL00121	439	32
33	YOL00307	127	485
34	YOL10307	486	745
35	YOL00127	447	32

Tape: P190-03

Tape Format: UKOOA P1/90
6250 bpi
8000 blksize
EBCDIC coded

Seq	Line Name	SP From	To
36	YOL00301	126	739
38	YOL00283	122	717
39	YOL00187	520	32
40	YOL00289	123	724
41	YOL00115	432	32
42	YOL00295	124	731
43	YOL00091	403	185
45	YOL00181	513	32
46	YOL00337	134	783
47	YOL00109	425	32
48	YOL00319	130	761
49	YOL00157	484	32
50	YOL00331	133	593
52	YOL00325	131	768
53	YOL00097	410	32
54	YOL00343	135	593
55	YOL00151	476	32
56	YOL00349	137	798
57	YOL00103	417	32

Tape: P190-04

Tape Format: UKOOA P1/90
6250 bpi
8000 blksize
EBCDIC coded

Seq	Line Name	SP From	To
58	YOL00379	144	829
59	YOL00163	491	32
60	YOL00355	138	805
61	YOL00373	142	827
62	YOL00133	454	32
63	YOL00367	141	820
64	YOL00139	461	32
65	YOL00361	140	813
66	YOL00145	469	32
67	YOL00385	145	829
68	YOL00169	498	32
69	YOL10331	500	776
70	YOL00175	506	32
71	YOL00415	152	829
72	YOL00727	689	149
73	YOL00475	167	829
74	YOL00667	728	135

Tape: P190-05

Tape Format: UKOOA P1/90
6250 bpi
8000 blksize
EBCDIC coded

Seq	Line Name	SP From	To
75	YOL00391	147	829
76	YOL00721	693	148
77	YOL00421	154	829
78	YOL00673	724	136
79	YOL00481	168	829
80	YOL00715	697	146
81	YOL00427	155	829
83	YOL00487	170	829
84	YOL00679	720	138
85	YOL00433	157	829
86	YOL00733	685	150
87	YOL00493	171	829
88	YOL00685	716	139
89	YOL00397	148	829
90	YOL00709	701	145
91	YOL00409	151	829

Tape: P190-06

Tape Format: UKOOA P1/90
6250 bpi
8000 blksize
EBCDIC coded

Seq	Line Name	SP From	To
92	YOL00691	712	141
93	YOL00499	173	829
94	YOL00751	673	155
95	YOL00451	161	829
96	YOL00697	709	150
97	YOL00469	165	829
98	YOL00661	732	133
99	YOL00403	149	829
100	YOL00703	705	143
101	YOL00775	657	160
102	YOL00445	160	829
103	YOL00739	681	152
104	YOL00463	164	829
106	YOL00535	181	829
107	YOL00781	653	162
108	YOL00505	174	829

Tape: P190-07

Tape Format: UKOOA P1/90
6250 bpi
8000 blksize
EBCDIC coded

Seq	Line Name	SP From	To
109	YOL00847	609	178
110	YOL00511	175	829
111	YOL00745	677	153
112	YOL00457	162	829
113	YOL00769	661	159
114	YOL00565	188	829
115	YOL00655	736	132
116	YOL00529	180	829
117	YOL00763	665	158
118	YOL00439	158	829
119	YOL00757	669	156
120	YOL00541	183	829
121	YOL00805	637	168
122	YOL00571	190	829
123	YOL00787	649	163
124	YOL00523	178	829

Tape: P190-08

Tape Format: UKOOA P1/90
6250 bpi
8000 blksize
EBCDIC coded

Seq	Line Name	SP From	To
126	YOL00517	177	829
127	YOL00799	641	166
128	YOL00559	187	829
129	YOL00793	645	165
130	YOL00547	184	829
131	YOL00811	614	169
132	YOL00595	196	829
133	YOL00853	605	179
134	YOL00589	194	829
135	YOL00817	629	170
136	YOL00601	197	829
137	YOL00841	613	172
138	YOL00553	186	829
139	YOL00649	740	131
140	YOL00607	198	829
141	YOL00859	601	188
142	YOL00583	193	829

Tape: P190-09

Tape Format: UKOOA P1/90
6250 bpi
8000 blksize
EBCDIC coded

Seq	Line Name	SP From	To
143	YOL00643	744	129
144	YOL00613	200	829
145	YOL00823	625	172
146	YOL00577	191	829
147	YOL00835	617	175
148	YOL00619	201	829
149	YOL00829	621	173
150	YOL00631	233	829
151	YOL00637	748	128
152	YOL00625	203	829
153	YOL01187	510	40
154	YOL01367	150	810
155	YOL01133	410	40
158	YOL01145	400	38
159	YOL01349	140	370
160	YOL10343	594	790
161	YOL01067	340	40
162	YOL01343	140	780

Tape: P190-10

Tape Format: UKOOA P1/90
6250 bpi
8000 blksize
EBCDIC coded

Seq	Line Name	SP From	To
163	YOL01469	175	820
164	YOL01115	420	80
165	YOL10319	301	381
166	YOL10091	184	32
167	YOL01421	300	825
168	YOL01055	358	40
169	YOL01451	170	820
170	YOL10109	406	374
171	YOL01085	184	40
172	YOL01439	170	545
173	YOL01679	450	140
174	YOL01487	170	820
175	YOL01517	177	820
176	YOL01739	681	160
177	YOL01637	206	820
178	YOL01709	701	155
179	YOL01499	173	820
180	YOL01667	720	175
181	YOL01835	260	620
182	YOL01751	556	160
183	YOL01595	335	820

Tape: P190-11

Tape Format: UKOOA P1/90
6250 bpi
8000 blksize
EBCDIC coded

Seq	Line Name	SP From	To
184	YOL01685	680	145
185	YOL01817	385	695
186	YOL01649	735	365
187	YOL01661	605	140

501654

APPENDIX 5

BASE STATION DESCRIPTION

WESTERN GEOPHYSICAL COMPANY

501655

NARACOOPA

GENERAL

Location : East coast of King Island, Bass Strait.

Authority : Landowner Mr. Joris Weitjens, ph. (004) 611 103.

Occupation : Site was occupied from 12/01/94.

ACCESS

From King Island airport follow the road across the island to Naracoopa and down to the jetty. Continue on the unsealed road past the oil storage tanks to the Golden Spoon Cottage and Restaurant, the proprietor of which owns the station land. The marker is located on the hill above the house.

MARKER

Consists of a 800 x 700 mm concrete block with a WESTERN GEOPHYSICAL Co. Survey Marker set in the centre. The disk is inscribed AUS 0001 with an X indicating the mark. The concrete block is marked 20.12.93.

Established : By Western Geophysical.

Coordinates : Latitude 39° 55' 30.52" south

(AGD 84) Longitude 144° 07' 36.96" east

Elevation : 47.8 metres (AHD)

Witness Point : None sighted.

Vista : 360°

Tower : 100 foot active tower with capacitive top hat and 150 foot radial ground plane.

Offset : Nil

LOGISTICS

Site Prep.	:	Contact landowner before entering site.
Food	:	Available in Currie.
Fuel	:	Available in Currie.
Accommodation	:	Available in Currie.
Transport	:	Available in Currie.
Labour	:	Available in Currie.
Security	:	Nil.
Medical	:	Dial 000 for all emergencies, the nearest hospital is King Island District Hospital, South Road, Currie. Phone (004) 621 311.
Helicopter LZ	:	Established next to the site with wind sock and tower warning lights.
Summary	:	Attached.
Photograph	:	Attached.
Sketch	:	Attached.

501657

W E S T E R N G E O P H Y S I C A L N A V I G A T I O N

STATION SUMMARY

Station Number and/or Name: Naracoopa (AUS 0001) Order:

Area: King Island, Tasmania Map Number: Adm Chart 1695B Scale:

D A T U M		S T A T I O N V A L U E S
Spheroid:	Australian National	
Central Meridian:	147 deg East	
Datum:	AGD 84	
Latitude:	39° 55′ 30.52" S	
Longitude:	144° 07′ 36.96" E	
Projection:	U.T.M.	
Grid Coordinates:	N 5576582.9 m	
	E 254469.1 m	
Convergence:		
Datum for height:		
R.L.- Elevation (MSL):	47.8 m	

Reference Marks	Observed Direction	Magnetic Variation	Distance (Feet(f),Metres(m)	See Note(2)

DIAGRAM OF REFERENCE MARKS AND CADASTRAL CONNECTION (Note 2)

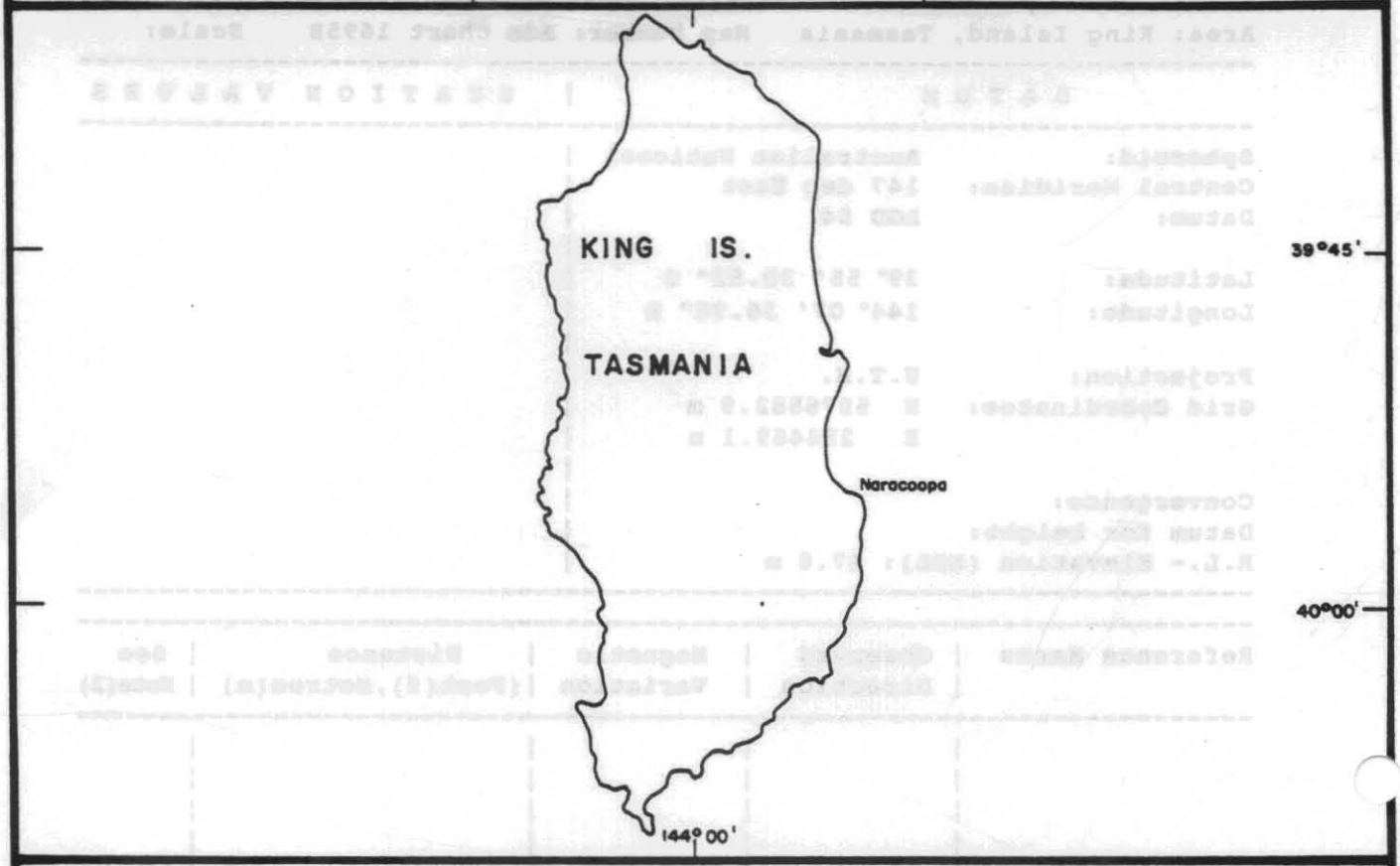
STATION ESTABLISHED BY: Western Geophysical Company

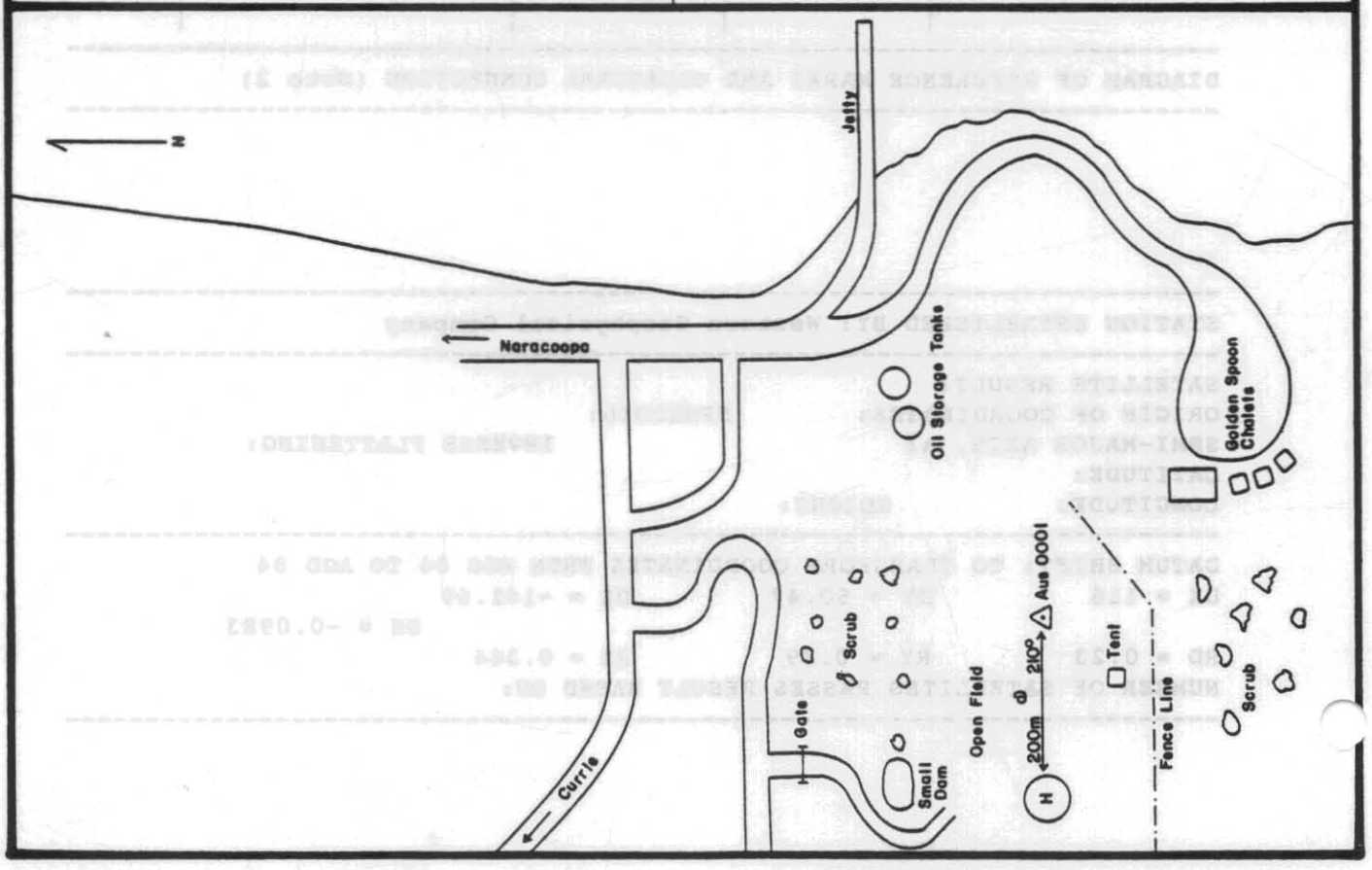
SATELLITE RESULT:
ORIGIN OF COORDINATES: SPHEROID:
SEMI-MAJOR AXIS, a: INVERSE FLATTENING:
LATITUDE:
LONGITUDE: HEIGHT:

DATUM SHIFT: TO TRANSFORM COORDINATES FROM WGS 84 TO AGD 84
DX = 116 DY = 50.47 DZ = -141.69
DS = -0.0983
RD = 0.23 RY = 0.39 RZ = 0.344
NUMBER OF SATELLITES PASSES RESULT BASED ON:

501658

STATION NAME NARACOOPA (AUS 0001)		COUNTRY AUSTRALIA
Latitude 39° 55' 30·52 "S	Easting 254469·1 m	Datum Aust Geodetic
Longitude 144° 07' 36·96 "E	Northing 5576582·9 m	Elevation 47·8 m
Spheroid Aust National	Projection UTM	Zone or CM 147° E (Z55)





5 cm

501659

NARACOOPA (AUS 0001)

STATION MARKER

Western Atlas International
A Litton/Dresser Company

WESTERN GEOPHYSICAL

501660

NARACOOPA (AUS 0001)

VISTA

Western Atlas International
A Litton/Dresser Company

WESTERN GEOPHYSICAL

501661

NORTH POINT

GENERAL

Location : Vicinity of Stanley, north west Tasmania.

Authority : Landowner Mr. David Bruce, ph. (004) 581 321.

Occupation : Site was occupied from 12/01/94.

ACCESS

From the A2 highway follow the B21 road toward Stanley for 6.25 km to a T junction. Turn left onto Dovecote Road and follow the road for 2.6 km to another T junction. Turn left onto the unsealed road and continue for 2.3 km to the gates of the "Western Plains" property. Directly ahead are the houses of the landowner and his son Mr. John Bruce, either of which will escort you to the site.

MARKER

Consists of a 800 x 600 mm concrete block with a WESTERN GEOPHYSICAL Co. Survey Marker set in the centre. The disk is inscribed AUS 0002 with an X indicating the mark. The concrete block is marked 17.12.93.

Established : By Western Geophysical.

Coordinates : Latitude 40° 42' 53.88" south

(AGD 84) Longitude 145° 15' 29.94" east

Elevation : 3.9 metres (AHD)

Witness Point : None sighted.

Vista : 360°

Tower : 100 foot active tower with capacitive top hat and 150 foot radial ground plane.

Offset : Nil

LOGISTICS

Site Prep.	:	Contact above landowner before entering site.
Food	:	Available in Stanley.
Fuel	:	Available in Stanley.
Accommodation	:	Available in Stanley.
Transport	:	Available in Stanley.
Labour	:	Available in Stanley.
Security	:	Nil.
Medical	:	Dial 000 for all emergencies, the nearest hospital is Smithton Regional Hospital, Bass Highway, Smithton. Phone (004) 521 351.
Helicopter LZ	:	Established next to the site with windsock and tower warning lights.
Summary	:	Attached.
Photograph	:	Attached.
Sketch	:	Attached.

501663

WESTERN GEOPHYSICAL NAVIGATION

STATION SUMMARY

Station Number and/or Name: North Point (AUS 0002) Order:

Area: Northern Tasmania Map Number: Adm Chart AUS 790 Scale:

DATUM		STATION VALUES
Spheroid:	Australian National	
Central Meridian:	147 deg East	
Datum:	AGD 84	
Latitude:	40° 42′ 53.88" S	
Longitude:	145° 15′ 29.94" E	
Projection:	U.T.M.	
Grid Coordinates:	N 5491409.1 m	
	E 352888.6 m	
Convergence:		
Datum for height:		
R.L.- Elevation (MSL):	3.9 m	

Reference Marks	Observed Direction	Magnetic Variation	Distance (Feet(f),Metres(m)	See Note(2)

DIAGRAM OF REFERENCE MARKS AND CADASTRAL CONNECTION (Note 2)

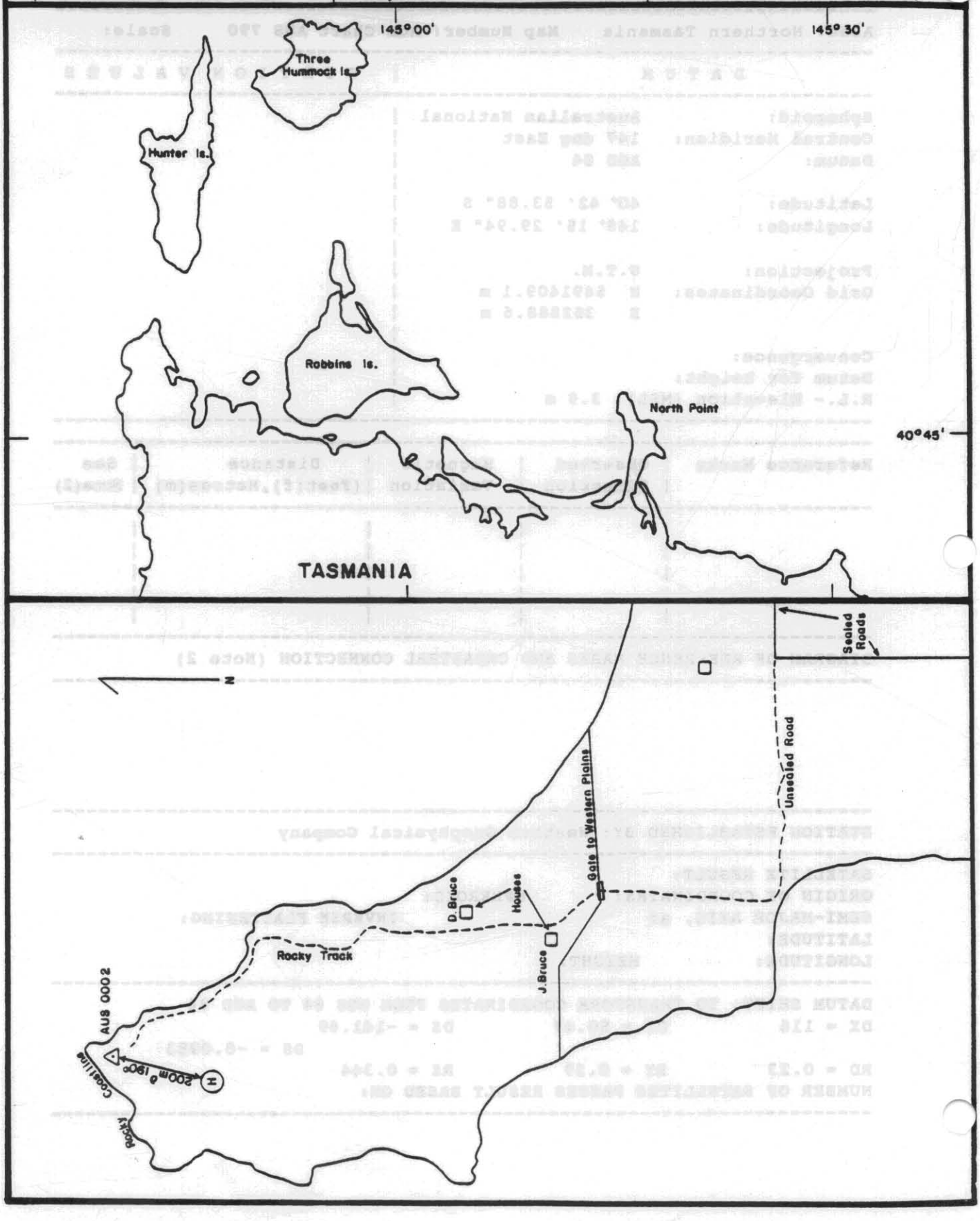
STATION ESTABLISHED BY: Western Geophysical Company

SATELLITE RESULT:
ORIGIN OF COORDINATES: SPHEROID:
SEMI-MAJOR AXIS, a: INVERSE FLATTENING:
LATITUDE:
LONGITUDE: HEIGHT:

DATUM SHIFT: TO TRANSFORM COORDINATES FROM WGS 84 TO AGD 84
DX = 116 DY = 50.47 DZ = -141.69
DS = -0.0983
RD = 0.23 RY = 0.39 RZ = 0.344
NUMBER OF SATELLITES PASSES RESULT BASED ON:

501664

STATION NAME NORTH POINT (AUS 0002)		COUNTRY AUSTRALIA
Latitude 40° 42' 53·88 "S	Easting 352888·6 m	Datum Aust Geodetic 84
Longitude 145° 15' 29.94" E	Northing 5491409·1 m	Elevation 3·9 m
Spheroid Aust National	Projection UTM	Zone or CM 147° E (Z 55)



501665

NORTH POINT (AUS 0002)

STATION MARKER

501666

NORTH POINT (AUS 0002)

VISTA

POINT SORELL

501667

GENERAL

Location : Vicinity of Devonport, northern Tasmania.

Authority : Landowner Mr. Don Moncrieff, ph. (004) 286 193.

Occupation : Site was occupied from 11/01/94.

ACCESS

From the eastern end of the Devonport bridge head east for 2.6 km to the junction of the B24 road to Port Sorell. Follow the B74 for 13.5 km to a small roundabout, turn left and follow the C708 road for 2.2 km to a right turn onto Dumbleton Street. Proceed for 300 metres, turn left onto Joyce Street and continue for 1.1 km. Turn right, proceed 100 metres, turn left and proceed for 400 metres onto an unsealed road to a T junction. Turn left and proceed for 400 metres to a gate and a right turn. Directly ahead is the house of the landowners son, Mr. Ron Moncrieff, the track to the right leads to the landowners house, either of which will escort you to the site.

MARKER

Consists of a 900 x 600 mm concrete block with a brass WESTERN GEOPHYSICAL Co. Survey Marker disk set in the centre. The disk is inscribed AUS 0003 with an X indicating the mark. The concrete block is marked 19.12.93.

Established : By Western Geophysical.

Coordinates : Latitude 41° 07' 17.37" south

(AGD 84) Longitude 146° 31' 49.95" east

Elevation : 7.6 metres (AHD)

Witness Point	:	None sighted.
Vista	:	360°
Tower	:	100 foot active tower with capacitive top hat and 150 foot radial ground plane.
Offset	:	Nil

LOGISTICS

Site Prep.	:	Contact landowner before entering site.
Food	:	Available in Devonport.
Fuel	:	Available in Devonport.
Accommodation	:	Available in Devonport.
Transport	:	Available in Devonport.
Labour	:	Available in Devonport.
Security	:	Nil.
Medical	:	Dial 000 for all emergencies, the nearest hospital is Mersey General Hospital, Tourquay Road, Latrobe. Phone (004) 265 111.
Helicopter LZ	:	Established next the site with windsock and tower warning lights.
Summary	:	Attached.
Photograph	:	Attached.
Sketch	:	Attached.

501669

W E S T E R N G E O P H Y S I C A L N A V I G A T I O N

STATION SUMMARY

Station Number and/or Name: Point Sorell (AUS 0003) Order:

Area: Northern Tasmania Map Number: Adm Chart AUS 799 Scale:

D A T U M		S T A T I O N V A L U E S
Spheroid:	Australian National	
Central Meridian:	147 deg East	
Datum:	AGD 84	
Latitude:	41° 07′ 17.37" S	
Longitude:	146° 31′ 49.95" E	
Projection:	U.T.M.	
Grid Coordinates:	N 5447634.0 m	
	E 460590.2 m	
Convergence:		
Datum for height:		
R.L.- Elevation (MSL): 7.6 m		

Reference Marks	Observed Direction	Magnetic Variation	Distance (Feet(f),Metres(m)	See Note(2)

DIAGRAM OF REFERENCE MARKS AND CADASTRAL CONNECTION (Note 2)

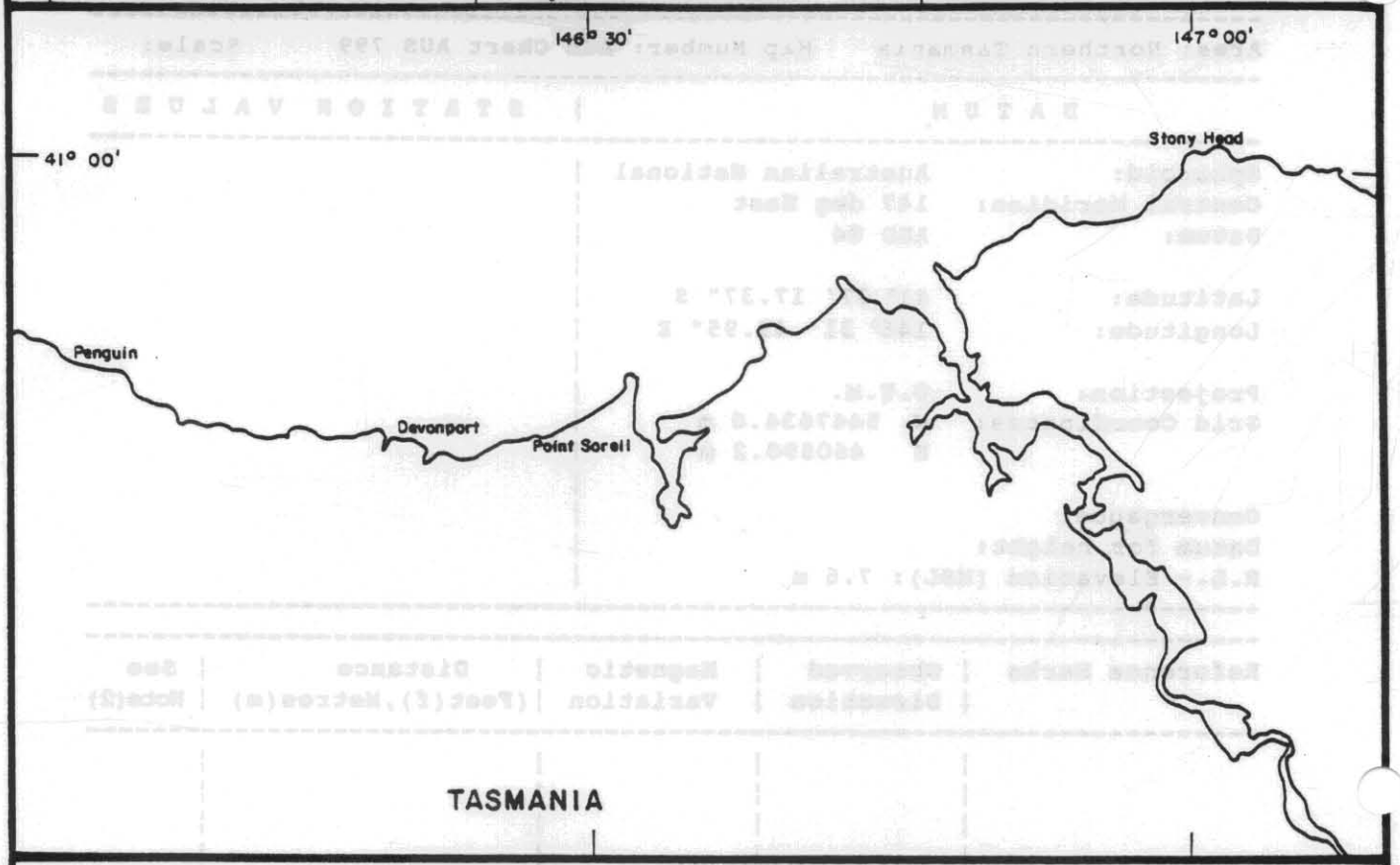
STATION ESTABLISHED BY: Western Geophysical Company

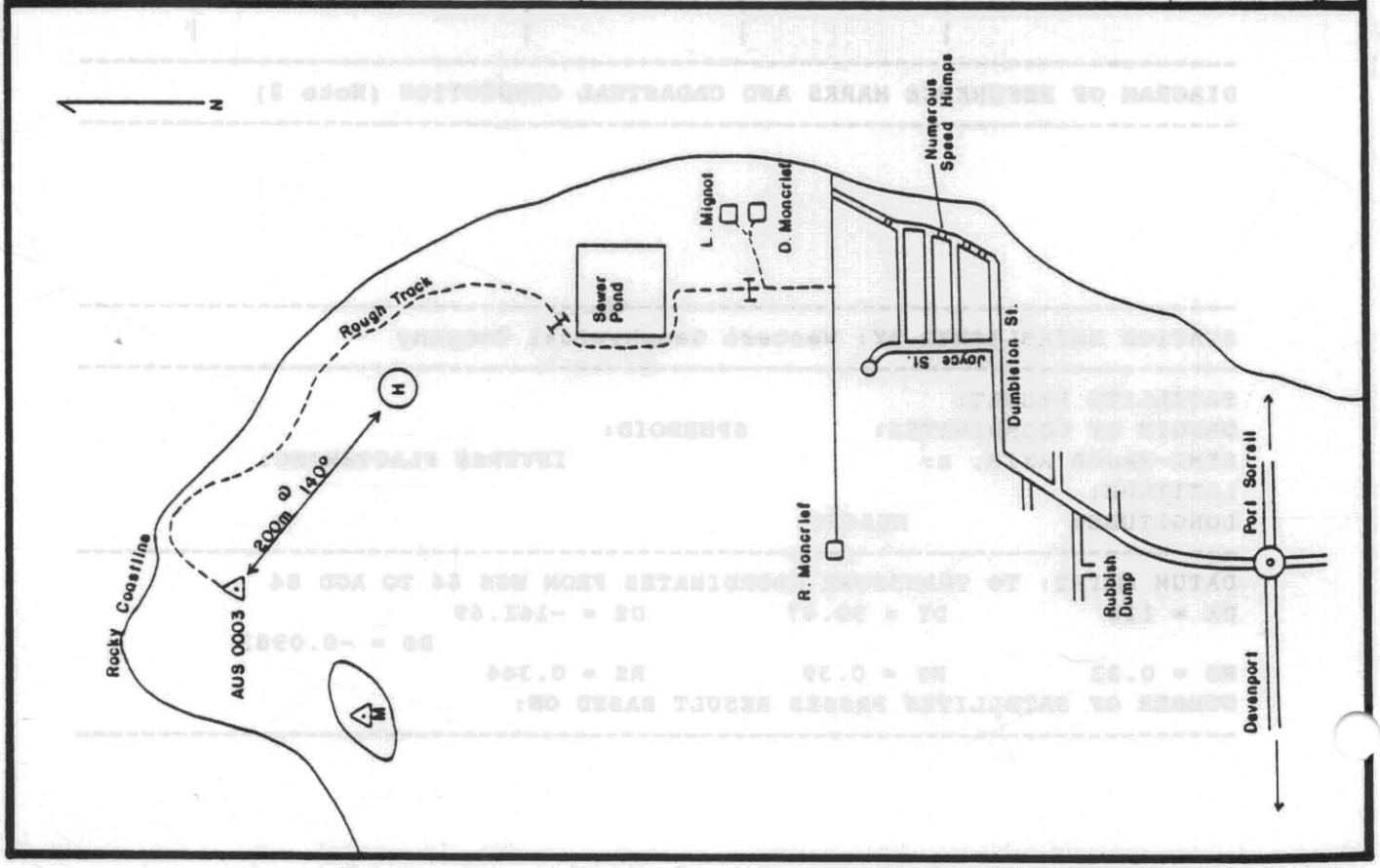
SATELLITE RESULT:
ORIGIN OF COORDINATES: SPHEROID:
SEMI-MAJOR AXIS, a: INVERSE FLATTENING:
LATITUDE:
LONGITUDE: HEIGHT:

DATUM SHIFT: TO TRANSFORM COORDINATES FROM WGS 84 TO AGD 84
DX = 116 DY = 50.47 DZ = -141.69
DS = -0.0983
RD = 0.23 RY = 0.39 RZ = 0.344
NUMBER OF SATELLITES PASSES RESULT BASED ON:

501670

STATION NAME POINT SORELL (AUS 0003)		COUNTRY AUSTRALIA
Latitude 41° 07' 17·37" S	Easting 460590·2 m	Datum Aust Geodetic 84
Longitude 146° 31' 49·95" E	Northing 5447634·0 m	Elevation 7·6 m
Spheroid Aust National	Projection UTM	Zone or CM 147° E (Z 55)





5 cm

501671

POINT SORRELL (AUS 0003)

STATION MARKER

Western Atlas International
A Litton/Dresser Company

WESTERN GEOPHYSICAL

501672

POINT SORRELL (AUS 0003)

VISTA

Western Atlas International
A Litton/Dresser Company

WESTERN GEOPHYSICAL

501673

CROPPIES POINT

GENERAL

Location : Vicinity of Waterhouse, north east Tasmania.

Authority : Parks and Wildlife Service.
Mt. William National Park.
Box 1, Gladstone 7264.
Head Ranger Mr. Brian Carson, ph. (003) 572 108.

Occupation : Site was occupied from 10/01/94.

ACCESS

From Launceston follow the A8 highway north to 5 km from Georgetown. Turn right onto the B82 and continue for 50.4 km, turn left, continue for 0.65 km and turn right onto Waterhouse Road. Proceed for 26.0 km to Homestead Road, signposted "WATERHOUSE PROTECTED AREA, Parks Wildlife & Heritage". Turn left onto Homestead Rd. and proceed for 7.0 km to a Y junction, take the right fork and continue for 1.2 km to a small track on the left signposted "Four Wheel Drive Only". Follow this track for 3.75 km to a small open area approximately 30 x 10 metres. The marker is located 75 metres at 345° form the centre of the clearing.

MARKER

Consists of a 600 x 600 mm concrete block with a brass WESTERN GEOPHYSICAL Co. Survey Marker disk set in the centre. The disk is inscribed AUS 0004 with an X indicating the mark. The concrete is marked 18.12.93.

Established : By Western Geophysical.

501674

Coordinates	:	Latitude 40° 51' 04.59" south
(AGD 84)		Longitude 147° 35' 45.93" east
Elevation	:	7.9 metres (AHD)
Witness Point	:	None sighted.
Vista	:	360°
Tower	:	100 foot active tower with capacitive top hat and 150 foot radial ground plane.
Offset	:	Nil

LOGISTICS

Site Prep.	:	Contact head ranger before mobilizing onto site.
Food	:	Available in Bridport.
Fuel	:	Available in Bridport.
Accommodation	:	Available in Bridport.
Transport	:	Available in Bridport.
Labour	:	Available in Bridport.
Security	:	Nil.
Medical	:	Dial 000 for all emergencies, the nearest hospital is Georgetown Country Hospital, Anne Street, Georgetown. Phone (003) 821 620.
Helicopter LZ	:	Established next to the site with windsock and tower warning lights.
Summary	:	Attached.
Photograph	:	Attached.
Sketch	:	Attached.

501675

WESTERN GEOPHYSICAL NAVIGATION

STATION SUMMARY

Station Number and/or Name: Croppies Point (AUS 0004) Order:

Area: Northern Tasmania Map Number: Adm Chart AUS 798 Scale:

DATUM		STATION VALUES
Spheroid:	Australian National	
Central Meridian:	147 deg East	
Datum:	AGD 84	
Latitude:	40° 51′ 04.59" S	
Longitude:	147° 35′ 45.93" E	
Projection:	U.T.M.	
Grid Coordinates:	N 5477565.1 m	
	E 550245.1 m	
Convergence:		
Datum for height:		
R.L.- Elevation (MSL):	47.8 m	

Reference Marks	Observed Direction	Magnetic Variation	Distance (Feet(f),Metres(m)	See Note(2)

DIAGRAM OF REFERENCE MARKS AND CADASTRAL CONNECTION (Note 2)

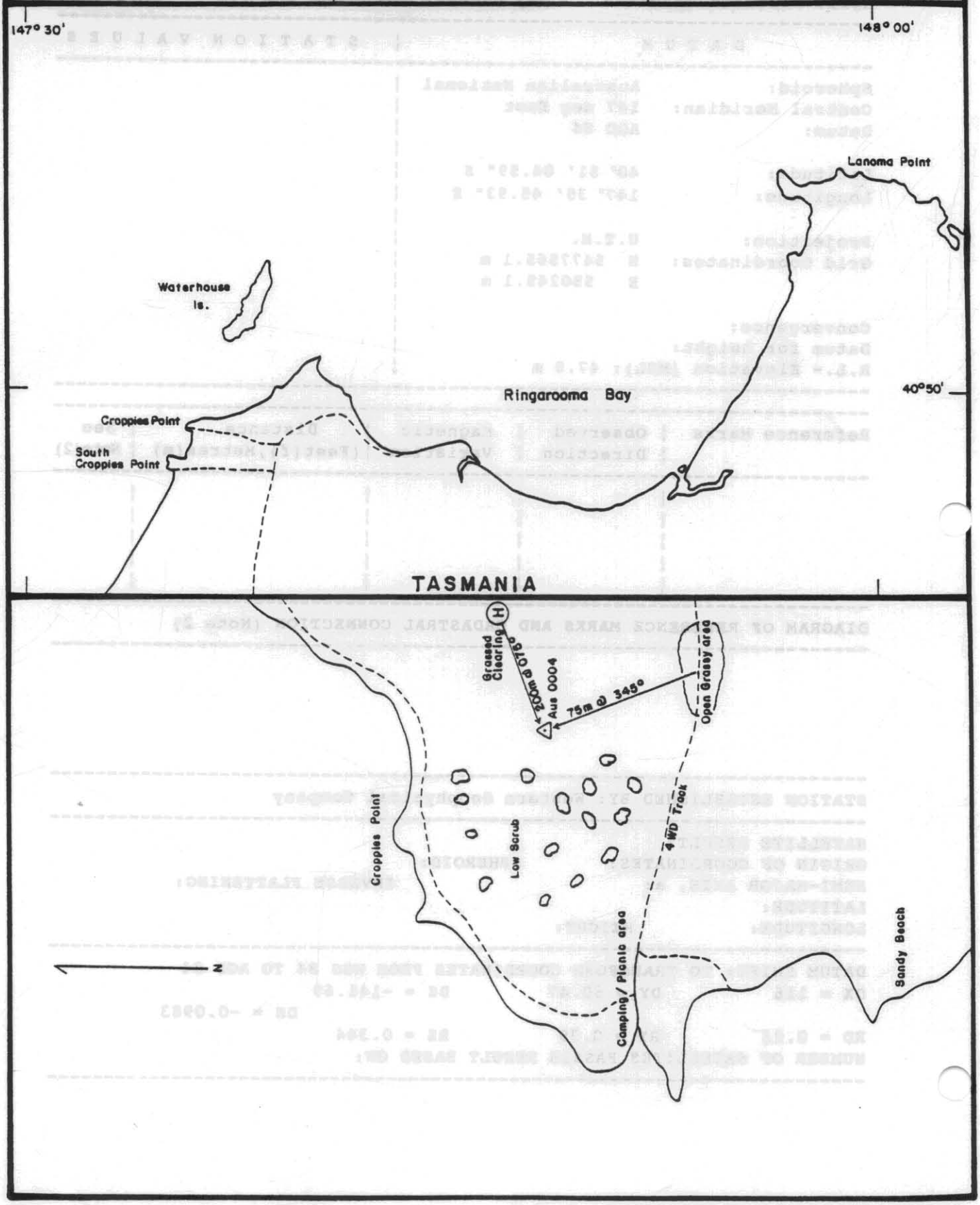
STATION ESTABLISHED BY: Western Geophysical Company

SATELLITE RESULT:
ORIGIN OF COORDINATES: SPHEROID:
SEMI-MAJOR AXIS, a: INVERSE FLATTENING:
LATITUDE:
LONGITUDE: HEIGHT:

DATUM SHIFT: TO TRANSFORM COORDINATES FROM WGS 84 TO AGD 84
DX = 116 DY = 50.47 DZ = -141.69
DS = -0.0983
RD = 0.23 RY = 0.39 RZ = 0.344
NUMBER OF SATELLITES PASSES RESULT BASED ON:

501676

STATION NAME CROPPIES POINT (AUS 0004)		COUNTRY AUSTRALIA
Latitude 40°51'04·59"S	Easting 550245·1 m	Datum Aust Geodetic 84
Longitude 147°35'45·93"E	Northing 5477565·1 m	Elevation 7·9 m
Spheroid Aust National	Projection UTM	Zone or CM 147° E (Z55)



CROPPIES POINT (AUS 0004)

STATION MARKER

VISTA

501678

APPENDIX 6

SURVEY CALIBRATION REPORT

WESTERN GEOPHYSICAL COMPANY

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1.1 PERSONNEL
1.2 SURVEY CONTROL

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2.1 GEODETIC SYSTEM
2.2 VERIFICATION 1
2.3 VERIFICATION 2
2.4 SCATTER PLOT
2.5 SATELLITE INFORMATION
2.6 GPS HEIGHT ABOVE SPHEROID
2.7 SCATTER PLOTS
2.8 SATELLITE GEOMETRY PLOTS
2.9 WISDOM PRINTOUTS

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5.1 RESULTS

PORTLAND

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9.0 CONCLUSIONS\RECOMMENDATIONS

APPENDIX A POST SURVEY CALIBRATION PT LINCOLN MARCH 1994
APPENDIX B NAVIGATION SYSTEM VERIFICATION APRIL 1994

1.0 OVERVIEW

The intention behind these calibrations and verifications is to provide assurance that the various positioning systems onboard are outputting quality data.
It is also part of on-going research into the various DGPS systems available. It is not only our intention to verify systems but also to highlight any potential problems.

1.1 PERSONNEL

B DEAN	NAVIGATION MANAGER
T KOLESKE	SENIOR NAVIGATOR
H McMENAMIN	SENIOR NAVIGATOR
S ELLIOTT	SENIOR NAVIGATOR
A EVANS	SURVEYOR\NAVIGATOR
W MAXTED	SURVEYOR\NAVIGATOR
N MEYERS	NAVIGATOR\BASE STATION TECH

1.2 SURVEY CONTROL

Spectrum Surveys provided an independant check on the survey control used for the surveys.
No discrepancies were found in station co-ordinates.

2.0

DGPS SYSTEMS VERIFICATION

From known survey points, angles and distances were measured to a prism mounted on the navigation reference point (NRP). Offsets from each systems' antenna were accounted for in the Wisdom system.

For accurate comparisons the surveyor's watch was set to Wisdom time.

The verifications were carried out on three systems: Racal Multifix, Direct Injection and the Western Geophysical Marine Machine.

Two separate verifications were carried out, three days apart but at the same time of day, to see if there was any drift of group position, in relation to the surveyed point, using the same satellite constellation.

Results are shown as scatter plots in section 2.7

2.1

GEODETIC SYSTEMS

The first verification was conducted in AGD-84. The following datum shifts from WGS-84 to AGD-84 were entered into Wisdom.

X	116.00	RX	1.115071 *10^6 rad
Y	50.47	RY	1.890773 *10^6 rad
Z	-141.69	RZ	1.667759 *10^6 rad
SF	-0.0983		

For the second verification all datum shift parameters were zeroed with output positions in WGS-84.

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A Litton/Dresser Company

WESTERN GEOPHYSICAL

2.2

Field Observations for Verification 1

This survey was conducted in AGD-84

SET UP STATION : STN 2 BACK SIGHT : STN 1
BACK BEARING SET : 255°50 05 FACE LEFT IH=1.4

HA (DIRECT BEARING)	VA	S DIST	TIME
19 52 48	83 11 00	105.629	11 30
19 54 48	83 11 00	105.606	11 32
19 53 36	83 11 00	105.619	11 33
19 56 48	83 11 00	105.600	11 34
19 57 00	83 11 00	105.600	11 35
20 04 18	83 11 00	105.560	11 36
20 03 50	83 11 00	105.600	11 37
19 56 42	83 11 00	105.580	11 38
19 54 18	83 11 00	105.557	11 39
20 08 24	83 10 00	105.493	11 40
20 02 48	83 10 00	105.590	11 41
19 57 06	83 10 00	105.590	11 42
20 02 30	83 10 00	105.606	11 43
20 00 00	83 10 00	105.580	11 44
19 56 20	83 10 00	105.550	11 45
20 04 24	83 10 00	105.422	11 46
20 18 00	83 10 00	105.423	11 47
20 18 48	83 09 00	105.395	11 48
20 15 30	83 10 00	105.500	11 49
20 09 42	83 10 00	105.536	11 50
19 59 30	83 09 00	105.600	11 51
20 03 36	83 10 00	105.550	11 52
20 04 18	83 09 00	105.585	11 53
20 06 48	83 09 00	105.540	11 54
20 08 30	83 09 00	105.525	11 55
20 05 00	83 10 00	105.570	11 56
20 05 36	83 08 00	105.570	11 57
20 00 12	83 09 00	105.505	11 58
20 00 00	83 09 00	105.527	11 59
20 04 18	83 09 00	105.500	12 00

BACK SIGHT FACE LEFT 255 50 00
FACE RIGHT 075 50 06

MEAN	BEARING	VA	S DIST
	20 02 51	06 50	105.550
	H DIST	VERT DIST	
	104.800	+ 12.60	

MEAN SURVEYED POSITION AGD-84 32 03.1919 S
115 44.4730 E
ARBITRARY GRID CM 111° 6443808.7 N
947800.8 E

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2.3

Field Observations for Verification 2

This survey was conducted in WGS-84

SETUP STATION : STN 2 BACK SIGHT : STN 1
BACK BEARING SET: 255°50 05 FACE LEFT IH=1.4

HA (DIRECT BEARING)	VA	S DIST	TIME
20 25 24	83 14 00	105.764	11 30
20 25 06	83 14 00	105.755	11 31
20 25 42	83 14 00	105.753	11 32
20 25 36	83 14 00	105.757	11 33
20 24 06	83 14 00	105.777	11 34
20 25 06	83 14 00	105.771	11 35
20 25 00	83 14 00	105.762	11 36
20 25 06	83 14 00	105.759	11 37
20 24 36	83 14 00	105.774	11 38
20 24 42	83 14 00	105.772	11 39
20 24 30	83 14 00	105.780	11 40
20 23 42	83 14 00	105.774	11 41
20 23 24	83 14 00	105.793	11 42
20 22 54	83 14 00	105.800	11 43
20 22 54	83 15 00	105.786	11 44
20 22 54	83 15 00	105.796	11 45
20 21 42	83 15 00	105.800	11.46
20 21 30	83 15 00	105.799	11 47
20 21 24	83 15 00	105.834	11.48
20 21 36	83 14 00	105.832	11 49
20 21 18	83 13 06	105.832	11 50
20 21 36	83 14 00	105.820	11 51
20 20 36	83 15 00	105.820	11 52
20 19 48	83 15 00	105.816	11 53
20 20 00	83 14 00	105.850	11 54
20 20 00	83 14 00	105.830	11 55
20 20 06	83 15 00	105.826	11 56
20 20 06	83 15 00	105.830	11 57
20 19 54	83 15 00	105.831	11 59
20 19 54	83 15 00	105.833	12 00

BACK SIGHT FACE LEFT 255 50 06
FACE RIGHT 75 50 00

MEAN BEARING	VA	S DIST
20 23 04	06 46	105.798
H DIST	VD	
105.062	12.456	

MEAN SURVEYED POSITION : WGS-84 UTM COORDS
6453111.3 N
381304.3 E

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2.4 SCATTER PLOTS

All positions outputted by the three systems are plotted on a scatter plot in relation to the mean surveyed position. For these plots please refer to section 2.7

NOTE: DN01 = MULTIFIX
TR01 = DIRECT INJECTION
MM01 = MARINE MACHINE

2.5 SATELLITE INFORMATION

Verification 1

The following satellites were used during the survey.

START								
SV	5	25	16	17	20	12	03	24
AZM	69	292	93	344	125	22	237	140
ELEV	39	57	19	47	74	15	58	13
END								
SV	05	25	16	17	20	03		
AZM	57	259	107	339	78	226		
ELEV	29	40	21	62	69	58		

SATS 12 AND 24 DROPPED OUT DURING THE SURVEY DUE TO LOWER ELEVATIONS THAN THE SET MASK OF 10°.
NO POSITION JUMPS OCCURRED.
MEAN PDOP : 2.1

Verification 2

START								
SV	24	05	17	16	25	12	20	03
AZM	141	66	342	96	246	20	109	251
ELEV	10	37	50	20	37	13	73	57
END								
SV	05	17	26	25	20	03		
AZM	55	337	110	262	72	224		
ELEV	27	64	21	40	67	57		

Again we observed no position jumps when satellites dropped out.
MEAN PDOP: 2.1
PLEASE REFER TO THE SATELLITE GEOMETRY PLOTS.
ELEVATION MASK IN EACH SYSTEM RECEIVER WAS SET AT 10°.

REFERENCE STATIONS:

DIRECT INJECTION	:	PERTH
MULTIFIX	:	PERTH, DAMPIER, BROOME, DARWIN
MARINE MACHINE	:	DARWIN

2.6 HEIGHT OF GPS ANTENNA ABOVE WGS-84 SPHEROID

During the survey the height from each receiver was booked every 60 seconds and compared to the surveyed height.

VERIFICATION 1

STN 2 RL 2.6 + IH 1.4 = 4.0

MULTIFIX	VD 12.6	+ OFFSET 2.0	= 18.6
DIRECT INJECTION	12.6	+ OFFSET 2.0	= 18.6
MARINE MACHINE	12.6	+ OFFSET 0.5	= 17.1

MEAN GPS HEIGHT DURING SURVEY:

MULTIFIX	13.9
DIRECT INJECTION	15.5
MARINE MACHINE	18.3

VERIFICATION 2

COLLIMATION HEIGHT : 4.0

MULTIFIX	VD 12,5	+ OFFSET 2.0	= 18.5
DIRECT INJECTION	12.5	+ OFFSET 2.0	= 18.5
MARINE MACHINE	12.5	+ OFFSET 0.5	= 17.0

MEAN GPS HEIGHT DURING SURVEY:

MULTIFIX	14.5
DIRECT INJECTION	15.7
MARINE MACHINE	17.3

2.7. SCATTER PLOTS

5 cm

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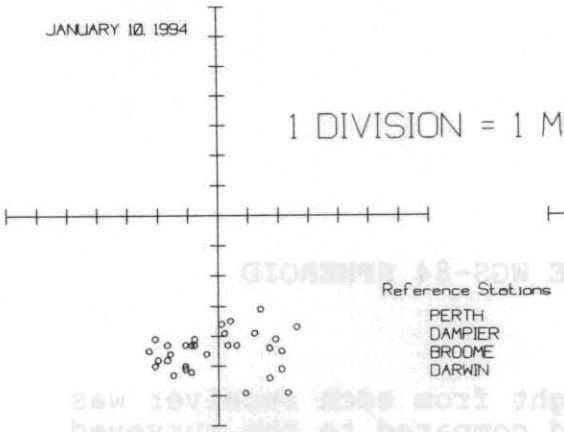
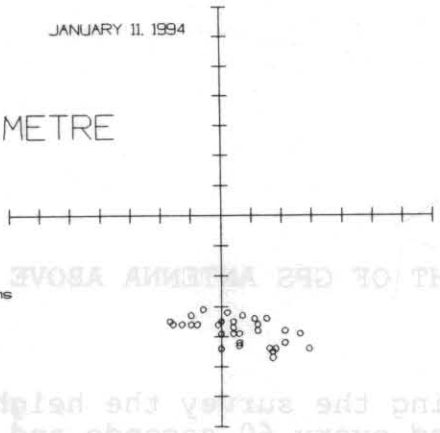
WESTERN GEOPHYSICAL

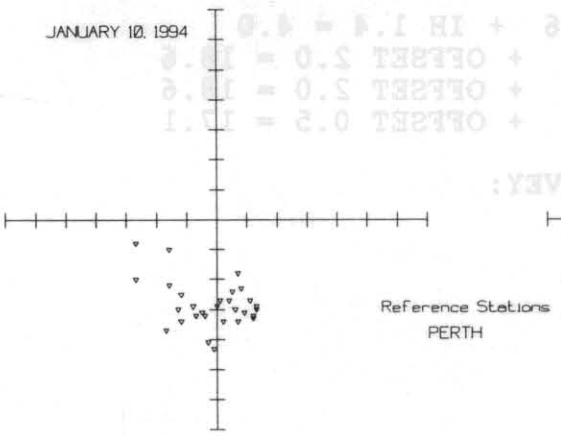
MULTIFIX



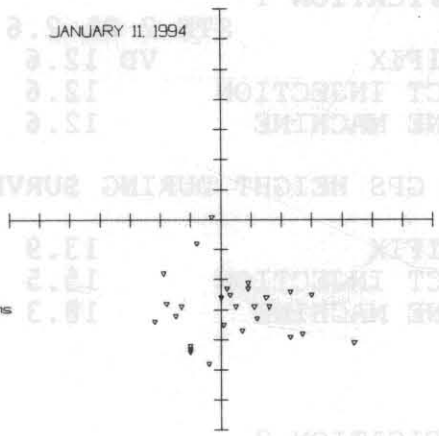
MULTIFIX



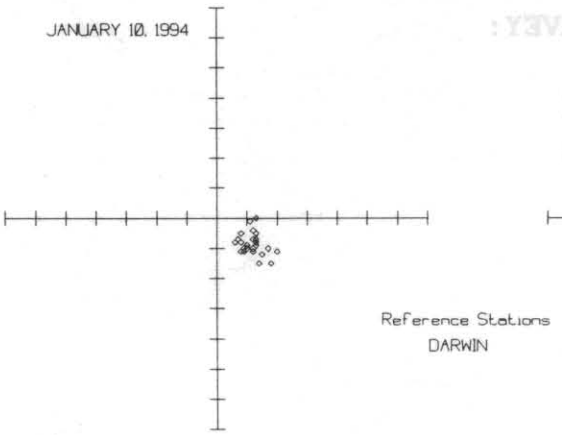
DIRECT INJECTION



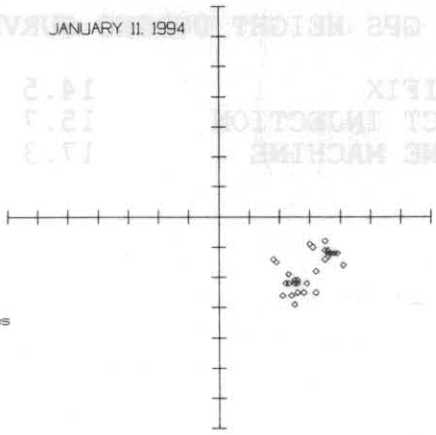
DIRECT INJECTION



MARINE MACHINE



MARINE MACHINE



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2.8. SATELLITE GEOMETRY PLOTS

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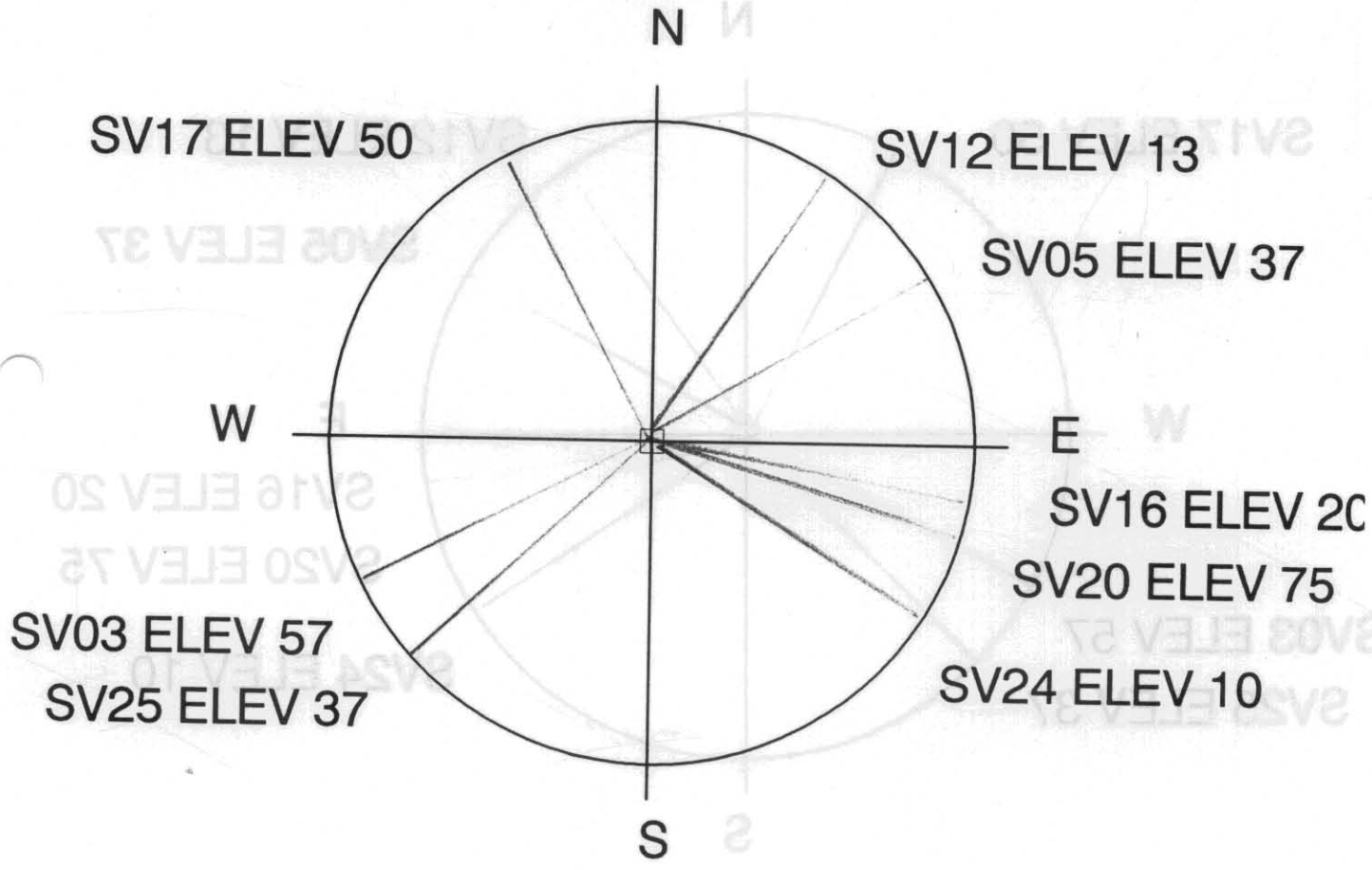
WESTERN GEOPHYSICAL

SATELLITE GEOMETRY PLOT

START OF SURVEY
VERIFICATION 1



MEAN PDOP 2.1
MEAN VDOP 2.9

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501088

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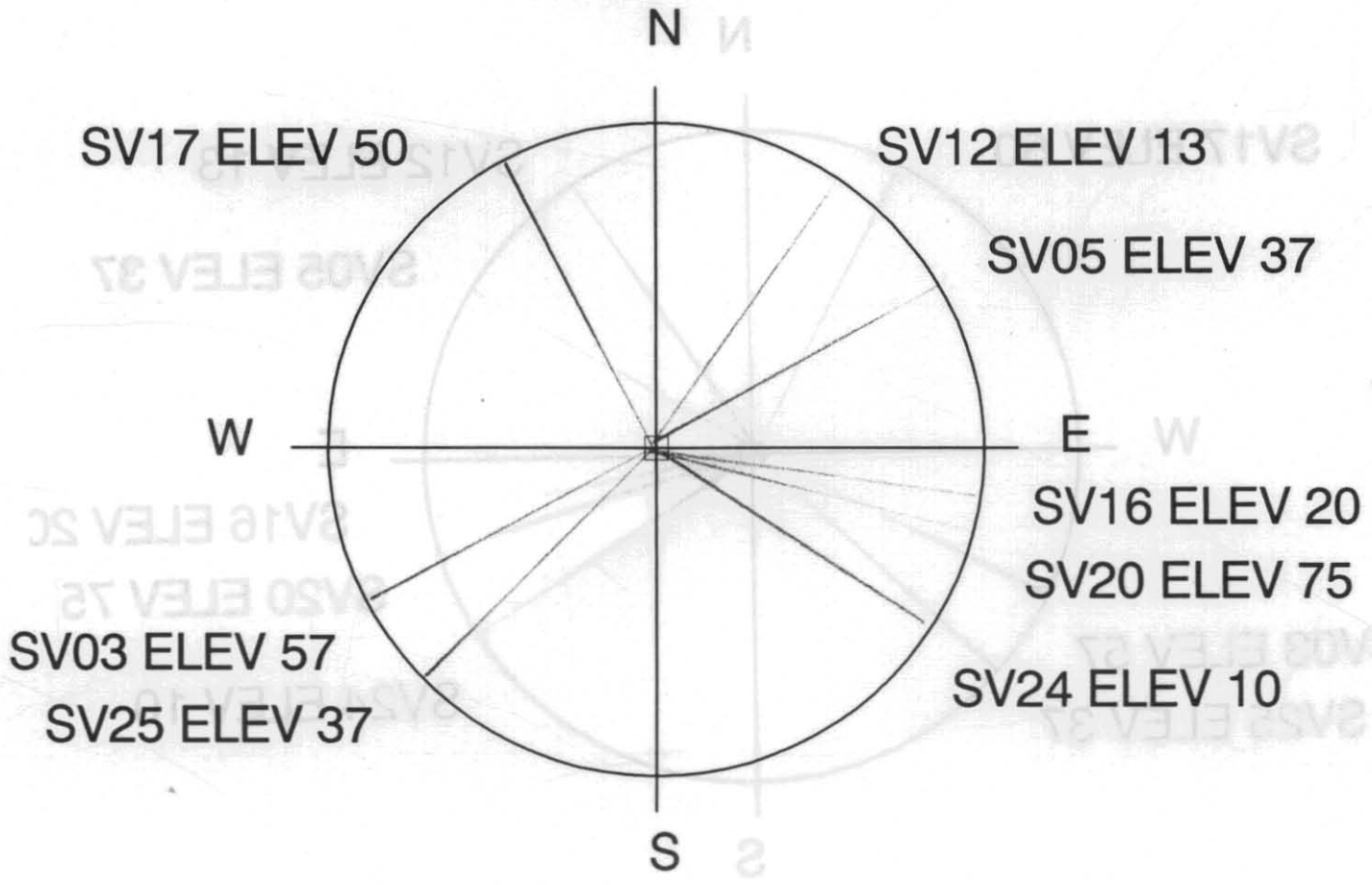
WESTERN GEOPHYSICAL

SATELLITE GEOMETRY PLOT

START OF SURVEY
VERIFICATION 2



MEAN PDOP 2.1
MEAN VDOP 2.9

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501689

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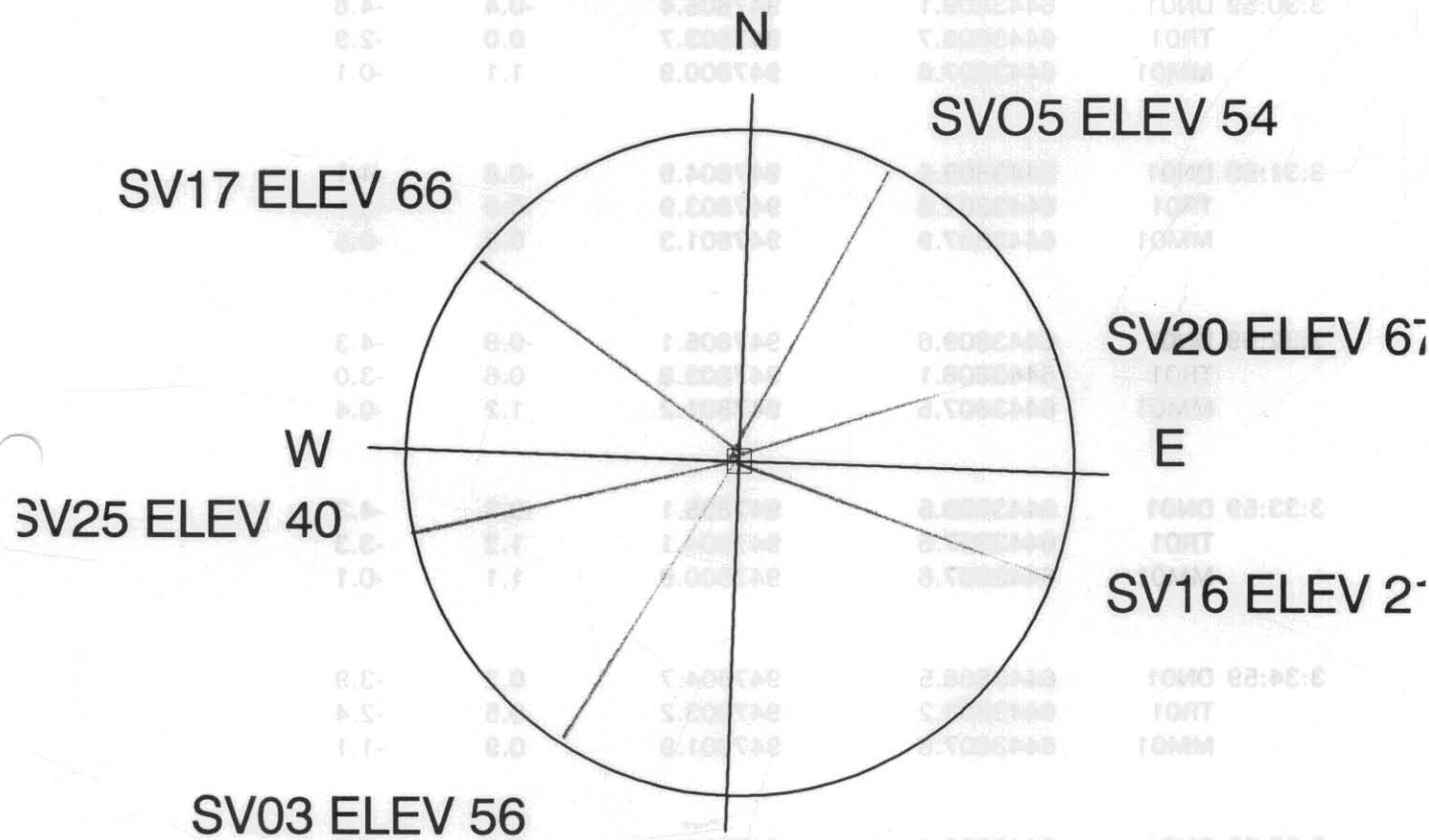
WESTERN GEOPHYSICAL

SATELLITE GEOMETRY PLOT

END OF SURVEY
VERIFICATION 2



MEAN PDOP 2.1
MEAN VDOP 2.9

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2.9.

501690

WISDOM OUTPUT VERIFICATION #1

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WESTERN GEOPHYSICAL

				REFERENCE POSITION 6443808.7	947800.8
		NORTHING	EASTING	delta N	delta E
3:29:59	DN01	6443808.4	947805.1	0.3	-4.3
	TR01	6443807.5	947804.0	1.2	-3.2
	MM01	6443808.1	947801.6	0.6	-0.8
3:30:59	DN01	6443809.1	947805.4	-0.4	-4.6
	TR01	6443808.7	947803.7	0.0	-2.9
	MM01	6443807.6	947800.9	1.1	-0.1
3:31:59	DN01	6443809.5	947804.9	-0.8	-4.1
	TR01	6443807.8	947803.9	0.9	-3.1
	MM01	6443807.9	947801.3	0.8	-0.5
3:32:59	DN01	6443809.6	947805.1	-0.9	-4.3
	TR01	6443808.1	947803.8	0.6	-3.0
	MM01	6443807.5	947801.2	1.2	-0.4
3:33:59	DN01	6443809.5	947805.1	-0.8	-4.3
	TR01	6443807.5	947804.1	1.2	-3.3
	MM01	6443807.6	947800.9	1.1	-0.1
3:34:59	DN01	6443808.5	947804.7	0.2	-3.9
	TR01	6443808.2	947803.2	0.5	-2.4
	MM01	6443807.8	947801.9	0.9	-1.1
3:35:59	DN01	6443808.6	947804.4	0.1	-3.6
	TR01	6443807.4	947803.7	1.3	-2.9
	MM01	6443807.8	947801.8	0.9	-1.0
3:36:59	DN01	6443808.3	947804.3	0.4	-3.5
	TR01	6443807.4	947803.8	1.3	-3.0
	MM01	6443807.8	947801.8	0.9	-1.0
3:37:59	DN01	6443807.3	947803.9	1.4	-3.1
	TR01	6443809.2	947803.9	-0.5	-3.1
	MM01	6443807.5	947801.5	1.2	-0.7

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WISDOM OUTPUT VERIFICATION #1

Western Atlas International
A Litton Dresser Company

WESTERN GEOPHYSICAL

3:38:59	DN01	6443806.1	947804.5	2.6	-3.7
	TR01	6443808.5	947804.2	0.2	-3.4
	MM01	6443807.4	947800.8	1.3	0.0
3:39:59	DN01	6443806.6	947805.3	2.1	-4.5
	TR01	6443809.0	947804.9	-0.3	-4.1
	MM01	6443807.5	947801.5	1.2	-0.7
3:40:59	DN01	6443808.1	947805.1	0.6	-4.3
	TR01	6443809.9	947804.2	-1.2	-3.4
	MM01	6443807.9	947801.9	0.8	-1.1
3:41:59	DN01	6443807.5	947804.7	1.2	-3.9
	TR01	6443808.3	947803.5	0.4	-2.7
	MM01	6443808.0	947801.5	0.7	-0.7
3:42:59	DN01	6443806.8	947804.9	1.9	-4.1
	TR01	6443808.6	947803.5	0.1	-2.7
	MM01	6443807.5	947801.8	1.2	-1.0
3:43:59	DN01	6443807.0	947805.2	1.7	-4.4
	TR01	6443810.3	947803.0	-1.6	-2.2
	MM01	6443807.4	947801.3	1.3	-0.5
3:44:59	DN01	6443806.6	947805.9	2.1	-5.1
	TR01	6443809.5	947803.4	-0.8	-2.6
	MM01	6443807.4	947801.5	1.3	-0.7
3:45:59	DN01	6443806.4	947806.7	2.3	-5.9
	TR01	6443810.0	947803.8	-1.3	-3.0
	MM01	6443807.2	947802.0	1.5	-1.2
3:46:59	DN01	6443807.0	947806.2	1.7	-5.4
	TR01	6443809.9	947803.3	-1.2	-2.5
	MM01	6443807.0	947802.0	1.7	-1.2
3:47:59	DN01	6443807.8	947806.7	0.9	-5.9
	TR01	6443809.1	947804.0	-0.4	-3.2
	MM01	6443807.3	947802.3	1.4	-1.5

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WESTERN GEOPHYSICAL

3:48:59	DN01	6443809.6	947806.0	-0.9	-5.2
	TR01	6443811.4	947802.8	-2.7	-2.0
	MM01	6443807.7	947801.8	1.0	-1.0
3:49:59	DN01	6443810.4	947805.1	-1.7	-4.3
	TR01	6443811.4	947801.6	-2.7	-0.8
	MM01	6443807.9	947801.9	0.8	-1.1
3:50:59	DN01	6443810.7	947805.6	-2.0	-4.8
	TR01	6443810.3	947801.8	-1.6	-1.0
	MM01	6443807.5	947801.9	1.2	-1.1
3:51:59	DN01	6443811.0	947805.3	-2.3	-4.5
	TR01	6443811.6	947803.0	-2.9	-2.2
	MM01	6443807.9	947801.6	0.8	-0.8
3:52:59	DN01	6443810.4	947805.6	-1.7	-4.8
	TR01	6443809.2	947803.9	-0.5	-3.1
	MM01	6443807.4	947801.7	1.3	-0.9
3:53:59	DN01	6443809.8	947805.9	-1.1	-5.1
	TR01	6443808.8	947805.1	-0.1	-4.3
	MM01	6443807.9	947801.9	0.8	-1.1
3:54:59	DN01	6443810.8	947805.8	-2.1	-5.0
	TR01	6443810.4	947804.5	-1.7	-3.7
	MM01	6443807.7	947801.7	1.0	-0.9
3:55:59	DN01	6443810.2	947806.1	-1.5	-5.3
	TR01	6443809.4	947804.0	-0.7	-3.2
	MM01	6443806.7	947801.9	2.0	-1.1
3:56:59	DN01	6443810.3	947805.4	-1.6	-4.6
	TR01	6443808.0	947802.6	0.7	-1.8
	MM01	6443807.4	947801.5	1.3	-0.7
3:57:59	DN01	6443809.8	947805.1	-1.1	-4.3
	TR01	6443807.9	947803.1	0.8	-2.3
	MM01	6443807.4	947801.6	1.3	-0.8

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WESTERN GEOPHYSICAL

3:58:59	DN01	6443809.8	947805.8	-1.1	-5.0
	TR01	6443807.6	947803.5	1.1	-2.7
	MM01	6443807.0	947801.8	1.7	-1.0
3:59:59	DN01	6443810.8	947804.9	-2.1	-4.1
	TR01	6443808.0	947804.2	0.7	-3.4
	MM01	6443806.9	947802.3	1.8	-1.5

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WISDOM OUTPUT VERIFICATION #2

WESTERN GEOPHYSICAL

				REFERENCE POSITION 6453111.3	381304.3
		NORTHING	EASTING	delta N	delta E
3:30:23	DN01	6453111.4	381307.9	-0.1	-3.6
	TR01	6453113.1	381307.1	-1.8	-2.8
	MM01	6453108.9	381306.9	2.4	-2.6
3:31:23	DN01	6453110.9	381307.8	0.4	-3.5
	TR01	6453112.6	381307.2	-1.3	-2.9
	MM01	6453109.2	381306.9	2.1	-2.6
3:32:23	DN01	6453111.1	381307.5	0.2	-3.2
	TR01	6453111.0	381306.8	0.3	-2.5
	MM01	6453108.8	381307.2	2.5	-2.9
3:33:23	DN01	6453110.7	381308.6	0.6	-4.3
	TR01	6453110.6	381308.0	0.7	-3.7
	MM01	6453109.2	381306.9	2.1	-2.6
3:34:23	DN01	6453110.1	381308.1	1.2	-3.8
	TR01	6453110.1	381307.6	1.2	-3.3
	MM01	6453108.5	381306.8	2.8	-2.5
3:35:22	DN01	6453110.2	381307.7	1.1	-3.4
	TR01	6453111.2	381307.8	0.1	-3.5
	MM01	6453108.1	381306.8	3.2	-2.5
3:36:23	DN01	6453109.8	381307.7	1.5	-3.4
	TR01	6453111.3	381306.9	0.0	-2.6
	MM01	6453108.7	381306.8	2.6	-2.5
3:37:23	DN01	6453109.2	381308.1	2.1	-3.8
	TR01	6453110.8	381307.2	0.5	-2.9
	MM01	6453108.7	381306.5	2.6	-2.2
3:38:23	DN01	6453109.2	381308.5	2.1	-4.2
	TR01	6453110.2	381307.2	1.1	-2.9
	MM01	6453109.1	381306.5	2.2	-2.2
3:39:23	DN01	6453109.6	381309.0	1.7	-4.7
	TR01	6453109.7	381307.2	1.6	-2.9
	MM01	6453108.8	381306.5	2.5	-2.2

WISDOM OUTPUT VERIFICATION #2

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WESTERN GEOPHYSICAL

3:40:23	DN01	6453111.3	381308.7	0.0	-4.4
	TR01	6453108.3	381306.8	3.0	-2.5
	MM01	6453109.0	381306.5	2.3	-2.2
3:41:23	DN01	6453109.6	381308.8	1.7	-4.5
	TR01	6453110.4	381306.4	0.9	-2.1
	MM01	6453108.8	381306.4	2.5	-2.1
3:42:23	DN01	6453108.4	381308.7	2.9	-4.4
	TR01	6453109.8	381306.9	1.5	-2.6
	MM01	6453108.7	381306.4	2.6	-2.1
3:43:23	DN01	6453109.5	381308.7	1.8	-4.4
	TR01	6453110.4	381306.6	0.9	-2.3
	MM01	6453108.4	381306.5	2.9	-2.2
3:44:23	DN01	6453109.7	381308.7	1.6	-4.4
	TR01	6453109.8	381306.9	1.5	-2.6
	MM01	6453108.7	381306.4	2.6	-2.1
3:45:23	DN01	6453110.7	381308.5	0.6	-4.2
	TR01	6453110.1	381307.6	1.2	-3.3
	MM01	6453108.1	381306.1	3.2	-1.8
3:46:23	DN01	6453110.7	381308.2	0.6	-3.9
	TR01	6453109.0	381308.2	2.3	-3.9
	MM01	6453107.2	381305.9	4.1	-1.6
3:47:24	DN01	6453108.7	381308.2	2.6	-3.9
	TR01	6453106.9	381308.4	4.4	-4.1
	MM01	6453107.8	381305.4	3.5	-1.1
3:48:23	DN01	6453110.6	381307.6	0.7	-3.3
	TR01	6453108.6	381308.1	2.7	-3.8
	MM01	6453107.5	381305.5	3.8	-1.2
3:49:23	DN01	6453110.1	381307.9	1.2	-3.6
	TR01	6453111.0	381306.3	0.3	-2.0
	MM01	6453107.6	381305.5	3.7	-1.2
3:50:23	DN01	6453111.3	381307.8	0.0	-3.5
	TR01	6453112.1	381305.1	-0.8	-0.8
	MM01	6453108.2	381305.3	3.1	-1.0

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3:51:23	DN01	6453110.9	381308.2	0.4	-3.9
	TR01	6453111.6	381304.2	-0.3	0.1
	MM01	6453107.7	381305.5	3.6	-1.2
3:52:23	DN01	6453110.9	381308.0	0.4	-3.7
	TR01	6453109.0	381306.7	2.3	-2.4
	MM01	6453107.8	381305.1	3.5	-0.8
3:53:22	DN01	6453111.3	381308.2	0.0	-3.9
	TR01	6453111.1	381306.6	0.2	-2.3
	MM01	6453107.7	381305.4	3.6	-1.1
3:54:23	DN01	6453112.1	381307.9	-0.8	-3.6
	TR01	6453113.2	381306.1	-1.9	-1.8
	MM01	6453108.3	381305.2	3.0	-0.9
3:55:23	DN01	6453113.0	381307.6	-1.7	-3.3
	TR01	6453112.3	381308.5	-1.0	-4.2
	MM01	6453107.4	381305.5	3.9	-1.2
3:56:22	DN01	6453112.6	381307.9	-1.3	-3.6
	TR01	6453112.3	381308.7	-1.0	-4.4
	MM01	6453107.7	381305.6	3.6	-1.3
3:57:23	DN01	6453112.3	381307.6	-1.0	-3.3
	TR01	6453112.3	381308.6	-1.0	-4.3
	MM01	6453107.8	381305.7	3.5	-1.4
3:58:23	DN01	6453111.9	381307.4	-0.6	-3.1
	TR01	6453111.7	381309.1	-0.4	-4.8
	MM01	6453109.0	381306.2	2.3	-1.9
3:59:23	DN01	6453112.9	381307.9	-1.6	-3.6
	TR01	6453113.5	381307.7	-2.2	-3.4
	MM01	6453109.4	381305.8	1.9	-1.5
4:00:23	DN01	6453113.0	381307.8	-1.7	-3.5
	TR01	6453112.8	381307.5	-1.5	-3.2
	MM01	6453109.5	381305.7	1.8	-1.4

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3.0 GYRO CALIBRATION

From a survey station , angles and distances were measured to prisms mounted on permanent marks on the vessels center line on the bow and stern.
The Wisdom system time was set to the surveyors watch so that accurate comparisons could be made with the gyro reading which was printed out every 60 seconds.
The back bearing set on the theodolite was the true north bearing between the two survey marks,hence horizontal angle are direct bearings.

3.1 GYRO

The gyro calibrated is a Sperry MK 23.
Prior to the survey the latitude selector was set to actuall latitude.

3.2 VESSEL STABILITY

Western`s standard procedure for gyro settling time is min 12 hours in the first direction and 6 in the second.For the first direction on this occasion several days was allwed, on the second direction we allowed a full 12 hours.
The marine crew were very helpfull by ensuring all ropes remained tight for the settling and survey period.
During both surveys the gyro remained very stable as can be seen in the precession graphs.

3.3 FIELD WORK

DIRECTION 1

SET UP STATION: 6M BACK SIGHT : RO 1
BACK BEARING SET: 298 04 55 FACE LEFT

	HA(DIRECT BEARING)	VA	S DIST	TIME
BOW	125 16 30	89 29	332 67	08 56
STN	139 08 20	88 56	330 66	08 56
BOW	125 16 20	89 25	332 67	08 57
STN	139 07 54	88 57	330 66	08 58
BOW	125 16 40	89 29	332 67	08 59
STN	139 08 10	88 57	330 66	09 00
BOW	125 16 00	89 29	332 68	09 01
STN	139 07 50	88 57	330 66	09 02
BOW	125 16 30	89 29	332 67	09 03
STN	139 08 06	88 57	330 67	09 04
BOW	125 16 30	89 29	332 68	09 05
STN	139 08 00	88 57	330 65	09 06
BOW	125 16 50	89 29	332 67	09 07
STN	139 08 10	88 57	330 65	09 08
BOW	125 16 50	89 29	332 69	09 09
STN	139 08 15	88 57	330 65	09 10
BOW	125 16 50	89 29	332 68	09 11
STN	139 08 30	88 56	330 65	09 11
BOW	125 16 40	89 29	332 69	09 12
STN	139 08 24	88 56	330 67	09 13
BOW	125 16 30	89 29	332 69	09 13
STN	139 08 20	88 56	330 66	09 14
BOW	125 16 54	89 29	332 66	09 15
STN	139 08 10	88 56	330 66	09 16
BOW	125 16 50	89 29	332 68	09 17
STN	139 08 18	88 56	330 66	09 18

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FIELD WORK

DIRECTION 2

SET UP STATION: 6M BACK SIGHT : RO 1
BACK BEARING SET: 298 04 55 FACE LEFT

	HA(DIRECT BEARING)	VA	S DIST	TIME
BOW	139 28 18	89 25	331 081	08 45
STN	125 36 18	88 56	331 850	08 47
BOW	139 28 42	89 24	331 100	08 49
STN	125 36 18	88 57	331 863	08 50
BOW	139 28 42	89 24	331 120	08 51
STN	125 36 00	88 57	331 860	08 52
BOW	139 28 36	89 25	331 120	08 53
STN	125 36 18	88 56	331 832	08 55
BOW	139 28 42	89 25	331 095	08 56
STN	125 36 24	88 56	331 870	08 57
BOW	139 28 48	89 24	331 124	08 58
STN	125 36 24	88 56	331 810	08 59
BOW	139 28 42	89 25	331 082	09 00
STN	125 36 18	88 56	331 800	09 01
BOW	139 29 00	89 25	331 110	09 03
STN	125 36 12	88 56	331 772	09 04
BOW	139 28 54	89 25	331 087	09 05
STN	125 36 12	88 57	331 761	09 06
BOW	139 28 54	89 25	331 071	09 07
STN	125 36 24	88 56	331 736	09 08
BOW	139 28 54	89 25	331 050	09 09
STN	125 36 18	88 57	331 718	09 10
BOW	139 29 06	89 25	331 051	09 11
STN	125 36 24	88 56	331 710	09 12

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3.4 RESULTS

DIRECTION 1

	SURVEYED HEADING	GYRO READING	DIFFERENCE
1	43.7°	44.0°	0.3°
2	43.7	43.9	0.2
3	43.7	43.9	0.2
4	43.7	43.9	0.2
5	43.7	43.9	0.2
6	43.8	43.9	0.1
7	43.7	43.9	0.2
8	43.7	43.9	0.2
9	43.7	43.9	0.2
10	43.7	43.9	0.2
11	43.7	43.9	0.2
12	43.7	43.9	0.2
13	43.7	43.9	0.2
MEAN	43.7	43.9	0.2

GYRO READING 0.2° HIGH

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RESULTS

DIRECTION 2

	SURVEYED HEADING	GYRO READING	DIFFERENCE
1	222.9°	223.4°	0.5°
2	223.0	223.4	0.4
3	223.0	223.4	0.4
4	223.0	223.4	0.4
5	223.1	223.4	0.3
6	223.0	223.4	0.4
7	223.0	223.4	0.4
8	223.0	223.4	0.4
9	223.0	223.4	0.4
10	223.0	223.4	0.4
11	223.0	223.4	0.4
12	223.0	223.4	0.4
13	223.0	223.4	0.4
MEAN	223.0	223.4	0.4

GYRO READING HIGH 0.4°

DIRECTION 1 GYRO READING 0.2° HIGH
DIRECTION 2 GYRO READING 0.4° HIGH

MEAN 0.30° HIGH

GYRO CORRECTION FOR WISDOM - 0.30°

3.5 PRECESSION PLOTS

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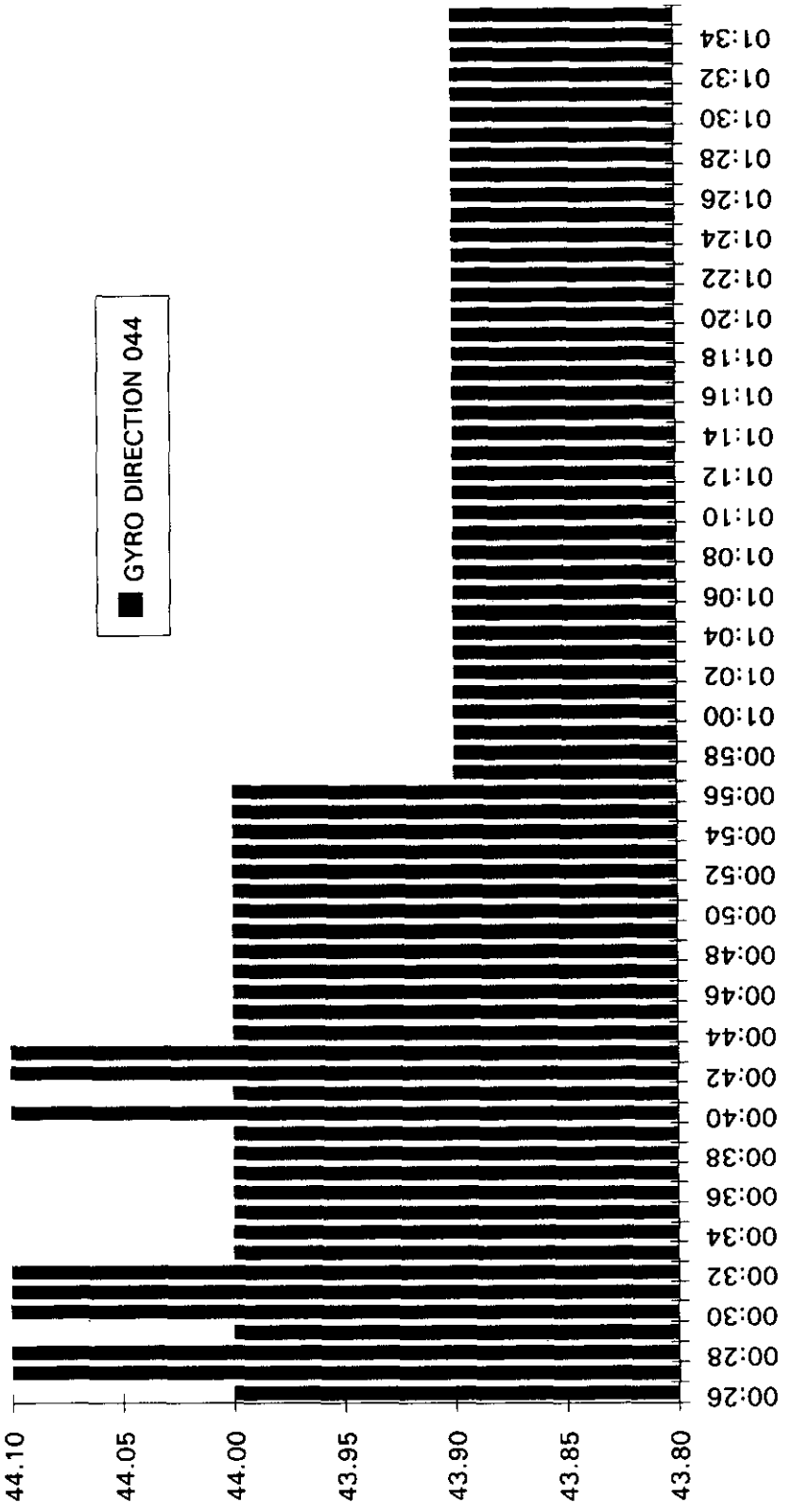

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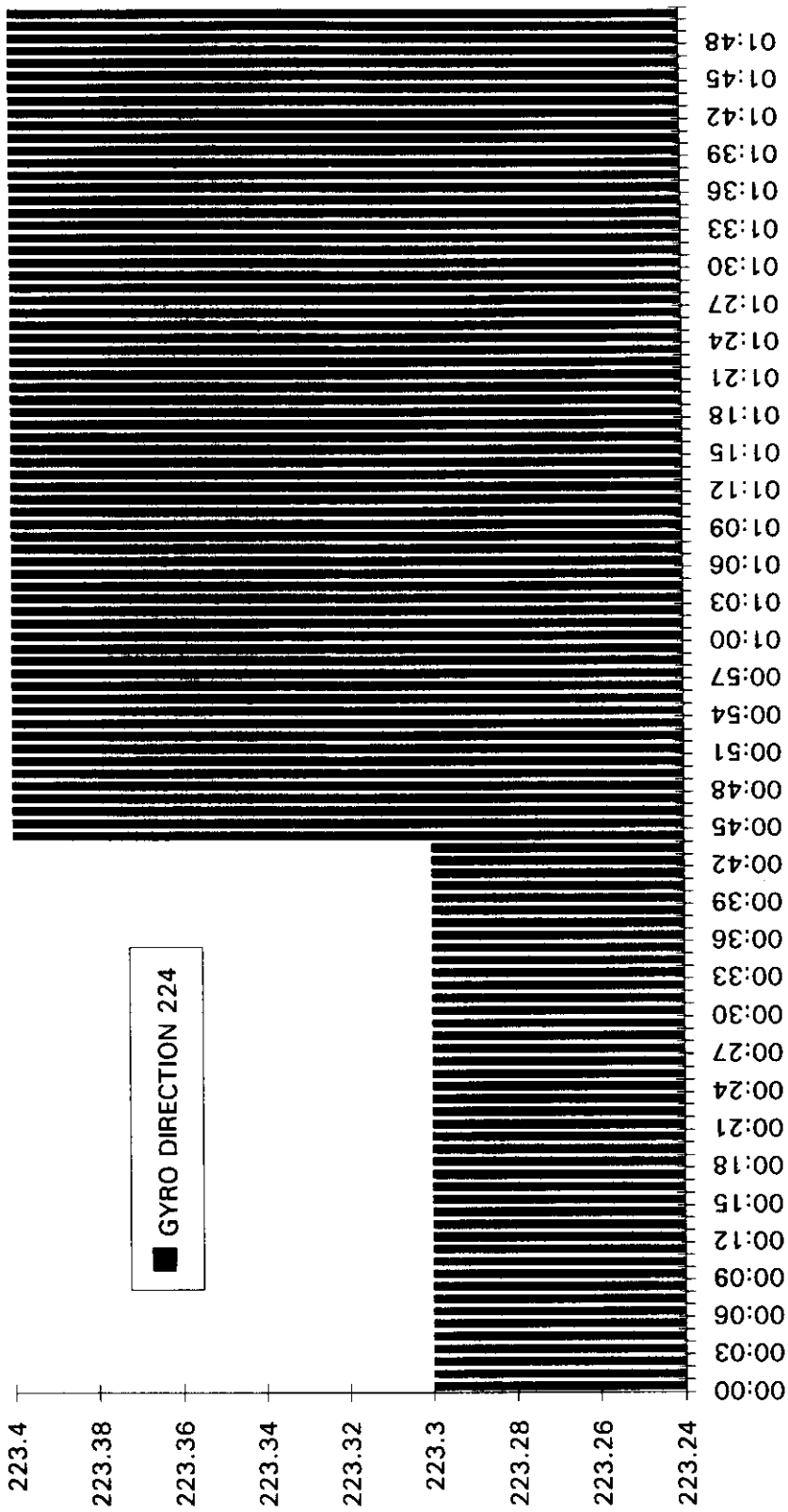

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WISDOM OUTPUT DIRECTION #1

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WESTERN GEOPHYSICAL

TIME	GYRO	TIME	GYRO
00:26	44.00	01:01	43.90
00:27	44.10	01:02	43.90
00:28	44.10	01:03	43.90
00:29	44.00	01:04	43.90
00:30	44.10	01:05	43.90
00:31	44.10	01:06	43.90
00:32	44.10	01:07	43.90
00:33	44.00	01:08	43.90
00:34	44.00	01:09	43.90
00:35	44.00	01:10	43.90
00:36	44.00	01:11	43.90
00:37	44.00	01:12	43.90
00:38	44.00	01:13	43.90
00:39	44.00	01:14	43.90
00:40	44.10	01:15	43.90
00:41	44.00	01:16	43.90
00:42	44.10	01:17	43.90
00:43	44.10	01:18	43.90
00:44	44.00	01:19	43.90
00:45	44.00	01:20	43.90
00:46	44.00	01:21	43.90
00:47	44.00	01:22	43.90
00:48	44.00	01:23	43.90
00:49	44.00	01:24	43.90
00:50	44.00	01:25	43.90
00:51	44.00	01:26	43.90
00:52	44.00	01:27	43.90
00:53	44.00	01:28	43.90
00:54	44.00	01:29	43.90
00:55	44.00	01:30	43.90
00:56	44.00	01:31	43.90
00:57	43.90	01:32	43.90
00:58	43.90	01:33	43.90
00:59	43.90	01:34	43.90
01:00	43.90	01:35	43.90

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WISDOM OUTPUT DIRECTION #2

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WESTERN GEOPHYSICAL

TIME	GYRO
00:07	223.3
00:08	223.3
00:09	223.3
00:10	223.3
00:11	223.3
00:12	223.3
00:13	223.3
00:14	223.3
00:15	223.3
00:16	223.3
00:17	223.3
00:18	223.3
00:19	223.3
00:20	223.3
00:21	223.3
00:22	223.3
00:23	223.3
00:24	223.3
00:25	223.3
00:26	223.3
00:27	223.3
00:28	223.3
00:29	223.3
00:30	223.3
00:31	223.3
00:32	223.3
00:33	223.3
00:34	223.3
00:35	223.3
00:36	223.3
00:37	223.3
00:38	223.3
00:39	223.3
00:40	223.3
00:41	223.3
00:42	223.3
00:43	223.3
00:44	223.4
00:45	223.4
00:46	223.4
00:47	223.4
00:48	223.4
00:49	223.4

TIME	GYRO
00:50	223.4
00:51	223.4
00:52	223.4
00:53	223.4
00:54	223.4
00:55	223.4
00:56	223.4
00:57	223.4
00:58	223.4
00:59	223.4
01:00	223.4
01:01	223.4
01:02	223.4
01:03	223.4
01:04	223.4
01:05	223.4
01:06	223.4
01:07	223.4
01:08	223.4
01:09	223.4
01:10	223.4
01:11	223.4
01:12	223.4
01:13	223.4
01:14	223.4
01:15	223.4
01:16	223.4
01:17	223.4
01:18	223.4
01:19	223.4
01:20	223.4
01:21	223.4
01:22	223.4
01:23	223.4
01:24	223.4
01:25	223.4
01:26	223.4
01:27	223.4
01:28	223.4
01:29	223.4
01:30	223.4
01:31	223.4
01:32	223.4

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4.0 RACAL TAILBUOY TRACKING SYSTEM (SKYPOD) VERIFICATION

METHOD The mean survey position of the NRP was manually entered into WISDOM as system position. A Skypod unit was then positioned over Station 1 (this point having been surveyed by Western Navigation), the Racal system then started sending WISDOM range and bearing data from NRP to the Skypod unit, WISDOM then calculated coordinates for this postion, outputting them to file and hard copy every 60 seconds.
Each Skypod unit was tested for a ten minute period.

4.1 RESULTS

For each Skypod unit a scatter plot has been made.
WGS-84 coordinates for Station 1 are : 381202.7 E
6452995.7 N

4.2 SCATTER PLOTS

4.3 WISDOM PRINTOUTS

4.4 CONCLUSIONS

The results obtained from the verification indicate an accuracy of upto + or - 7 metres from true position.
Navigation Manager Bluey Dean was not satisfied with the results obtained from the first verification so another test was done on the worst unit and two others.
The units were placed over a different mark on the other side of the harbour in a more open position to ascertain whether multipath problems were causing the erratic results. The results did not improve with the position change.

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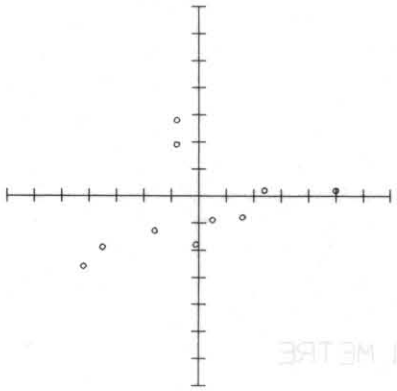
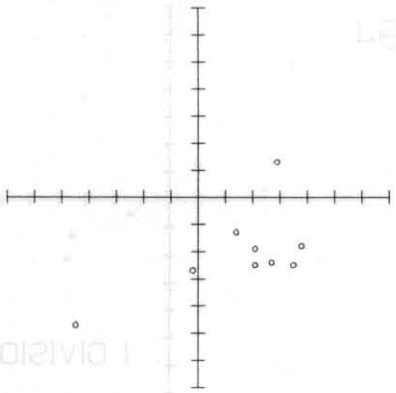
SKYPOD S/N 211



SKYPOD S/N 229



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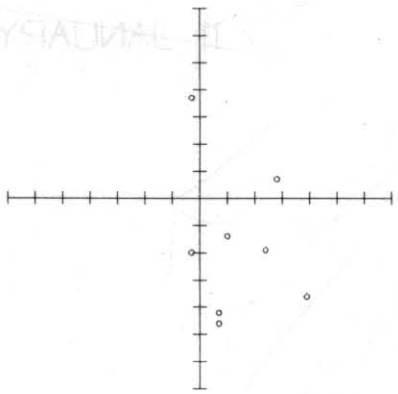

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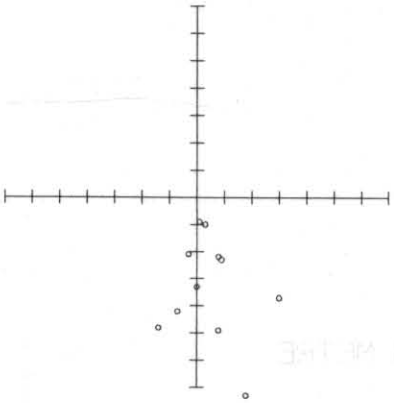

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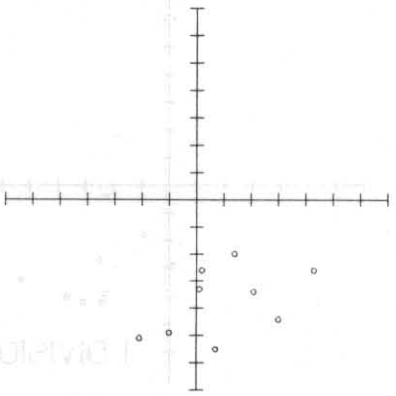
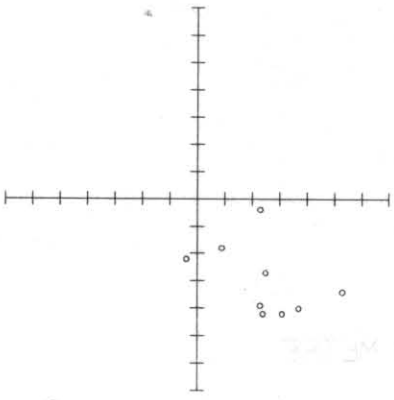


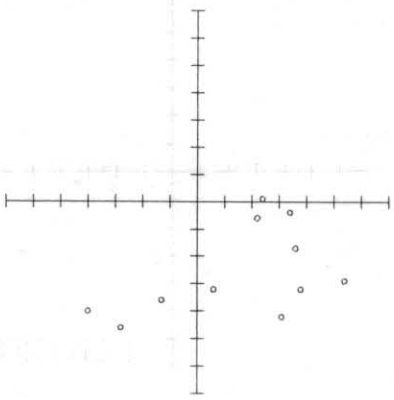
10 JANUARY 1994

1 DIVISION = 1 METRE

SKYPOD S/N 224



SKYPOD S/N 232



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5 cm

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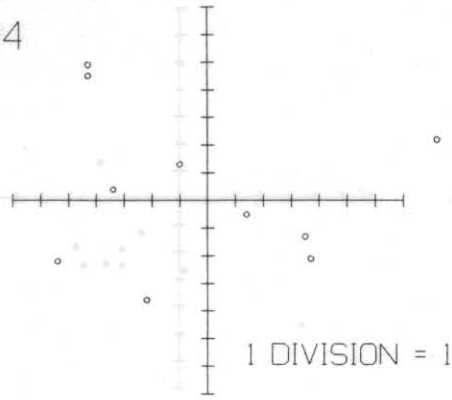
SKYPOD S/N 211

11 JANUARY 1994



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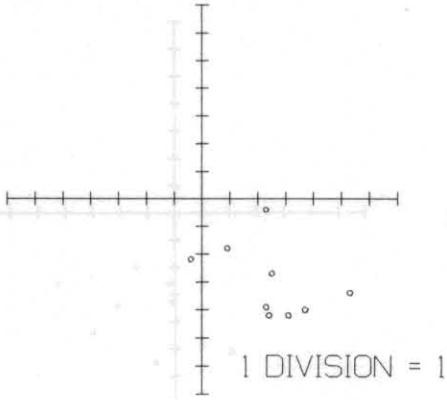

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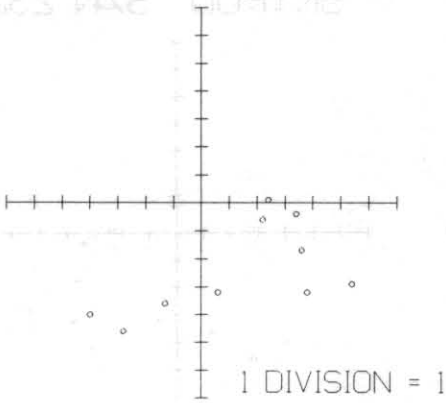

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5 cm

5.0 MARS VERIFICATION

Mars prisms were set up over two surveyed points on the wharf. Via the Wisdom system co-ordinates were output in reference to the NRP. To simulate shooting conditions, a DGPS system was used as the reference position.

5.1 RESULTS:

SURVEYED POSITIONS

MARS 1	N 6453174.8	E 381380.5
MARS 2	N 6453177.4	E 381378.1

OUTPUT POSITION MEAN

MARS 1	N 6453173.0	E 381380.2
MARS 2	N 6453179.7	E 381379.5

Movement from the actual position is movement in the DGPS system and not Mars.This can be seen when the vector from surveyed position to actual position is compared to the DGPS position to actual position.

A check on a raw Mars distance output from the unit on the helideck to the survey point was carried out.

Mars distance	73.3
	73.2
	73.3
	73.3
	73.3
	73.2
	73.2
	73.2
Measured distance	73.2

For this survey one prism was used.It is our intent to use units of triple prisms to ensure a very reliable return on the up-coming prospects.

6.0 FATHOMETER VERIFICATION

A T\S DIP UNIT was used to measure water depth to compare with the SIMRAD E200 fathometer while along side in portland.

Four measurments were taken from various point around the vessel.ie stern ,bow, port and stb beam.
These values were then meaned and compared to the fathometer output in the Wisdom system.
Speed of sound in water used in fathometer was derived from a temprature and salinity test dip conducted.
1513 meters per second

VESSEL DRAFT AT TIME OF VERIFICATION: 4.5
This value was calculated by the marine engineer.

MEASUREMENTS:

STERN	13.1	STERN	12.9	STERN	12.4
PORT BEAM	12.9	PORT BEAM	12.3	PORT BEAM	12.4
STB BEAM	11.8	STB BEAM	12.4	STB BEAM	11.8
BOW	13.0	BOW	13.4	BOW	12.7

START TIME: 08 44 END: 09 40

MEAN DEPTH: 12.6

FATHOMETER OUTPUT: 12.4 multiplied by 1513/1500

MEAN DEPTH: 12.5

7.0 PORTLAND DGPS VERIFICATION

Two dockside survey points were supplied in WGS-84

PL 1 N 5754841.8
E 554167.6

PL 2 BACK BEARING SET 17°52 25

The following comparisons were conducted on arrival in Portland.

1:	MULTIFIX.	REF SYDNEY MELBOURNE ADELAIDE
	DIRECT INJECTION	REF ADELAIDE
2	MULTIFIX	REF MELBOURNE
	DIRECT INJECTION	REF MELBOURNE
3	MULTIFIX	REF SYDNEY MELBOURNE ADELAIDE
	DIRECT INJECTION	REF MELBOURNE
4	MULTIFIX	REF ADELAIDE
	DIRECT INJECTION	REF ADELAIDE

7.1 SATELLITE INFORMATION

REVEIVER ELEVATION MASK 15°

START OF SURVEY 1

SV	4	20	05	13	24	12	09
AZM	110	236	220	151	32	269	322
ELEV	53	20	58	48	63	82	58

END OF SURVEY 4

SV	4	20	05	13	24	12	09
AZM	125	230	209	145	63	338	335
ELEV	45	30	70	36	72	73	47

MEAN PDOP 2.3
MEAN VDOP 1.9

NO GEOMETRY PLOTS WERE PLOTTED DUE TO THE TIME RESTRAINT.

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7,2 FIELD OBSERVATIONS

THE FOLLOWING READING IS A MEAN FROM READINGS TAKEN
THROUGH OUT THE SURVEY PERIOD.
WE DID NOT INCLUDE ALL READINGS IN AN EFFORT
TO FINISH THIS REPORT BEFORE THE VESSEL SAILED.

SETUP STATION : PL1 BACKSIGHT SET 0 00 00 FACE LEFT

	HA	VA	S DIST
1	302 12 21	69 27 00	38.903

HORIZONTAL DIST
36.4

MEAN SURVEYED POSITION:

WGS-84 UTM

N 5754869.9
E 554144.4

PLEASE REFER TO SCATTER PLOTS FOR RESULTS

10,001 Richmond Avenue, Houston, Texas 77042 P.O. Box 2469, Houston, Texas 77252-2469 (713) 789-9600 Telex 166214, Fax (713) 789-0172

501713

5 cm

Western Atlas International
A Litton Dresser Company

WESTERN GEOPHYSICAL

MULTIFIX

JANUARY 19, 1994

1 DIVISION = 1 METRE

Reference Stations
Melbourne vs Melbourne

DIRECT INJECTION

JANUARY 19, 1994

MULTIFIX

JANUARY 19, 1994

Reference Stations
Adelaide vs Adelaide

DIRECT INJECTION

JANUARY 19, 1994

MULTIFIX

JANUARY 19, 1994

Reference Stations
Sydney, Melbourne, Adelaide vs Adelaide

DIRECT INJECTION

JANUARY 19, 1994

MULTIFIX

JANUARY 19, 1994

Reference Stations
Sydney, Melbourne, Adelaide vs Melbourne

DIRECT INJECTION

JANUARY 19, 1994

10,001 Richmond Avenue, Houston, Texas 77042. P.O. Box 2469, Houston, Texas 77252-2469. (713) 789-9600. Telex 166214. Fax (713) 789-0172

Reference Stations Melbourne 'vs' Melbourne

Western Atlas International
A Litton Dresser Company

WESTERN GEOPHYSICAL

REFERENCE POSITION
5754869.9 554144.4

MULTIFIX (DN01)

	Northing	Easting	Delta N	Delta E
00:10	5754870.8	554144.9	-0.9	-0.5
00:11	5754871.9	554144.1	-2.0	0.3
00:12	5754871.6	554142.2	-1.7	2.2
00:13	5754872.0	554142.2	-2.1	2.2
00:14	5754871.4	554143.5	-1.5	0.9
00:15	5754871.7	554143.5	-1.8	0.9
00:16	5754871.9	554143.0	-2.0	1.4
00:17	5754871.9	554143.5	-2.0	0.9
00:18	5754872.2	554143.5	-2.3	0.9
00:19	5754872.5	554143.2	-2.6	1.2
00:20	5754872.8	554143.7	-2.9	0.7

DIRECT INJECTION (TR01)

Northing	Easting	Delta N	Delta E
5754869.2	554143.9	0.7	0.5
5754871.0	554145.0	-1.1	-0.6
5754870.9	554143.9	-1.0	0.5
5754871.1	554143.5	-1.2	0.9
5754870.7	554143.4	-0.8	1.0
5754870.8	554143.7	-0.9	0.7
5754871.2	554144.1	-1.3	0.3
5754869.2	554145.1	0.7	-0.7
5754869.3	554146.1	0.6	-1.7
5754869.4	554147.2	0.5	-2.8
5754872.3	554145.2	-2.4	-0.8

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Reference Stations Sydney, Melbourne, Adelaide 'vs Adelaide

Western Atlas International
A Litton Dresser Company

WESTERN GEOPHYSICAL

REFERENCE POSITION
5754869.9 554144.4

MULTIFIX (DN01)

	Northing	Easting	Delta N	Delta E
23:15	5754875.4	554142.8	-5.5	1.6
23:16	5754875.3	554142.7	-5.4	1.7
23:17	5754875.1	554142.9	-5.2	1.5
23:18	5754874.5	554143.9	-4.6	0.5
23:19	5754874.8	554143.0	-4.9	1.4
23:20	5754875.5	554142.8	-5.6	1.6
23:21	5754876.1	554141.9	-6.2	2.5
23:22	5754876.1	554141.9	-6.2	2.5
23:23	5754876.4	554142.3	-6.5	2.1
23:24	5754877.2	554142.4	-7.3	2.0
23:25	5754877.7	554141.2	-7.8	3.2
23:26	5754877.0	554141.2	-7.1	3.2
23:27	5754879.0	554140.7	-9.1	3.7
23:28	5754879.0	554140.5	-9.1	3.9
23:29	5754878.5	554141.3	-8.6	3.1
23:30	5754877.8	554141.2	-7.9	3.2

DIRECT INJECTION (TR01)

Northing	Easting	Delta N	Delta E
5754869.2	554143.9	0.7	0.5
5754871.0	554145.0	-1.1	-0.6
5754870.9	554143.9	-1.0	0.5
5754871.1	554143.5	-1.2	0.9
5754870.7	554143.4	-0.8	1.0
5754870.8	554143.7	-0.9	0.7
5754871.2	554144.1	-1.3	0.3
5754869.2	554145.1	0.7	-0.7
5754869.3	554146.1	0.6	-1.7
5754869.4	554147.2	0.5	-2.8
5754872.3	554145.2	-2.4	-0.8
5754869.7	554145.4	0.2	-1.0
5754868.6	554144.2	1.3	0.2
5754868.9	554145.2	1.0	-0.8
5754868.0	554146.5	1.9	-2.1
5754867.1	554147.1	2.8	-2.7

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501716

Reference Stations Adelaide 'vs' Adelaide

Western Atlas International
A Litton Dresser Company

WESTERN GEOPHYSICAL

REFERENCE POSITION
5754869.9 554144.4

MULTIFIX (DN01)

	Northing	Easting	Delta N	Delta E
00:57	5754876.2	554148.3	-6.3	-3.9
00:58	5754876.6	554148.1	-6.7	-3.7
01:00	5754875.9	554147.8	-6.0	-3.4
01:02	5754876.9	554147.7	-7.0	-3.3
01:03	5754875.6	554147.2	-5.7	-2.8
01:05	5754873.1	554145.2	-3.2	-0.8
01:07	5754874.1	554146.6	-4.2	-2.2
01:08	5754876.1	554144.9	-6.2	-0.5

DIRECT INJECTION (TR01)

Northing	Easting	Delta N	Delta E
5754869.2	554143.9	0.7	0.5
5754871.0	554145.0	-1.1	-0.6
5754870.9	554143.9	-1.0	0.5
5754871.1	554143.5	-1.2	0.9
5754870.7	554143.4	-0.8	1.0
5754870.8	554143.7	-0.9	0.7
5754871.2	554144.1	-1.3	0.3
5754869.2	554145.1	0.7	-0.7

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501717

Reference Stations Sydney, Melbourne, Adelaide 'vs' Melbourne

Western Atlas International
A Litton Dresser Company

WESTERN GEOPHYSICAL

REFERENCE POSITION
5754869.9 554144.4

MULTIFIX (DN01)

	Northing	Easting	Delta N	Delta E
00:29	5754876.0	554148.1	-6.1	-3.7
00:30	5754876.5	554148.5	-6.6	-4.1
00:31	5754876.1	554147.4	-6.2	-3.0
00:32	5754877.1	554149.3	-7.2	-4.9
00:33	5754875.8	554147.7	-5.9	-3.3
00:34	5754876.6	554147.7	-6.7	-3.3
00:35	5754877.4	554148.8	-7.5	-4.4
00:36	5754877.7	554148.0	-7.8	-3.6
00:37	5754877.1	554147.1	-7.2	-2.7
00:38	5754876.8	554149.4	-6.9	-5.0
00:39	5754876.8	554149.4	-6.9	-5.0

DIRECT INJECTION (TR01)

Northing	Easting	Delta N	Delta E
5754871.8	554146.1	-1.9	-1.7
5754871.0	554144.1	-1.1	0.3
5754870.5	554143.2	-0.6	1.2
5754871.0	554143.8	-1.1	0.6
5754870.7	554144.5	-0.8	-0.1
5754870.7	554143.5	-0.8	0.9
5754870.1	554142.0	-0.2	2.4
5754870.9	554142.9	-1.0	1.5
5754871.2	554144.1	-1.3	0.3
5754870.7	554145.9	-0.8	-1.5
5754869.2	554144.6	0.7	-0.2

10,001 Richmond Avenue, Houston, Texas 77042 P.O. Box 2469, Houston, Texas 77252-2469, (713) 789-9600, Telex 166214, Fax (713) 789-0172

9.0 CONCLUSIONS\RECOMENDATIONS

DGPS SYSTEMS:

Good results were obtained from all the various verifications in Fremantle and Portland.
It must be noted that these verifications took place under strict guidelines with selected windows of the best geometry possible.We should also note that we were stationary instead of the normal 5 knot shooting speed.
Looking at the scatter plots, all system seem to output positions with a bias to the southern quadrents.This has been observed on most other verifications.
This is not an offset problem of any kind ,as we have looked into this possibility.
Recomendations can only come in the form of further investigation by continuing verifications and data analysing.

GYRO

The gyro remains stable with consistant results in regard to previous calibrations.

SKYPOD

The Fremantle verification showed position vaiiations of upto 7 meters.

GENERAL

All verifications and calibrations went well with no problems.

501720

APPENDIX A

WESTERN GEOPHYSICAL

NAVIGATION DEPARTMENT

M/V WESTERN ATLAS
PARTY 116

POST SURVEY CALIBRATION REPORT

FOR

SAGASCO RESOURCES LTD

PORT LINCOLN, SOUTH AUSTRALIA

MARCH 1994

501721

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PERSONNEL

NAVIGATION MANAGER:	BLUEY DEAN
SENIOR NAVIGATORS:	HUGH McMENAMIN BARRY COLE
SURVEYORS:	ANDY EVANS ERIC KARLSEN
NAVIGATORS:	RICHARD LIBKE DAVE LINDLEY

501722

1.0 SURVEY CONTROL

Two survey points were supplied by P.A.Dansie & Associates of Port Lincoln. One point was the centre of a cast iron drainage grate on Brenan jetty and the back sight station was a trig beacon on Winter Hill.

Grate coordinates:

AGD 84: 34° 43 17.4566 S
135° 52 05.9095 E

AMG 84: 6157482.586 N
579503.435 E

Grid bearing to back sight station: 300° 53 31

DATUM SHIFT PARAMETERS:

The following datum shift values were used in the Wisdom system to shift WGS 84 TO AGD 84.

X	116.00	RX	1.115071	SPHEROIDAL ROTATIONS
Y	50.47	RY	1.890773	IN RADIANS X 10 -6
Z	-114.69	RZ	1.667759	

SF - 0.0983 PPM
GEOID - SPHEROID SEPARATION -4.9

2.0 DGPS VERIFICATION

From the survey point on Brenan Jetty, angles and distances were measured to a prism mounted on the navigation reference point using a theodolite and EDM. The three systems verified were Skyfix direct injection and Multifix. As the angles were turned to the NRP, the Wisdom system was outputting two positions which were corrected for antenna offsets. Our readings were synced to Wisdom time so that a direct comparison could be made.

2.1 SATELLITE INFORMATION

Each system had its elevation mask set to 15°.

REFERENCE STATIONS:

MULTIFIX	ADELAIDE, MELBOURNE, SYDNEY
DIRECT INJECTION	ADELAIDE

START OF SURVEY:

SV	15	29	14	25	18	22
AZM	345	246	177	134	270	63
ELEV	44	54	74	29	26	21

END OF SURVEY:

SV	15	29	14	25	18	22
AZM	350	228	135	136	260	73
ELEV	32	59	79	21	32	87

MEAN PDOP	3.1
MEAN VDOP	2.7

2.2 FIELD OBSERVATIONS

SET UP AT: CENTER OF GRATE
BACK SIGHT TO: WINTER HILL BEACON
SET FACE LEFT: 300 53 31

	HA	VA	SLOPE DIST	TIME
1	76 34 20	73 42 00	58.1	18 04
2	76 34 20	73 42 00	58.1	18 05
3	76 34 54	73 42 00	58.1	18 06
4	76 35 00	73 42 00	58 0	18 07
5	76 32 42	73 42 00	58.0	18 08
6	76 33 00	73 42 00	58.1	18 09
7	76 33 00	73 42 00	58.1	18 10
8	76 33 40	73 42 00	58.1	18 11
9	76 33 00	73 42 00	58.1	18 12
10	76 34 30	73 42 00	58.1	18 13
11	76 34 38	73 42 00	58.1	18 14
12	76 34 40	73 42 00	58.1	18 15
13	76 34 40	73 42 00	58.1	18 16
14	76 35 00	73 42 00	58.1	18 17
15	76 34 50	73 42 00	58.1	18 18
16	76 34 45	73 42 00	58.1	18 19
17	76 34 40	73 42 00	58.1	18 20
18	76 34 45	73 42 00	58.1	18 21
19	76 34 40	73 42 00	58.1	18 22
20	76 34 30	73 42 00	58.1	18 23
21	76 34 35	73 42 00	58.1	18 24
22	76 34 30	73 42 00	58.1	18 25
MEAN	76 35 00	73 42 00	58.1	

HORIZONTAL DISTANCE : 55.76
VERTICAL DISTANCE : 16.30

MEAN SURVEYED POSITION OF NRP

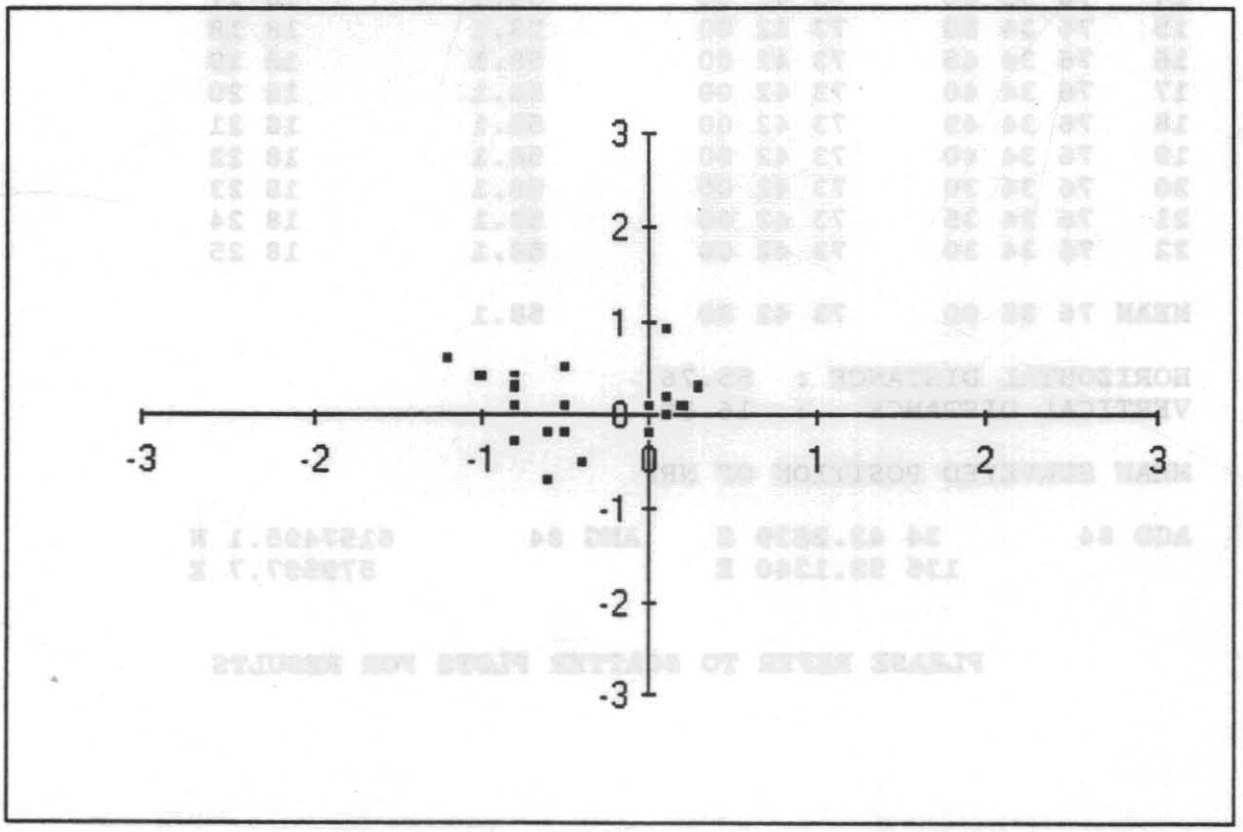
AGD 84	34 43.2839 S	AMG 84	6157495.1 N
	135 52.1340 E		579557.7 E

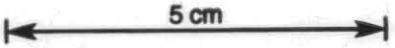
PLEASE REFER TO SCATTER PLOTS FOR RESULTS

3.0 SCATTER PLOTS

MULTIFIX

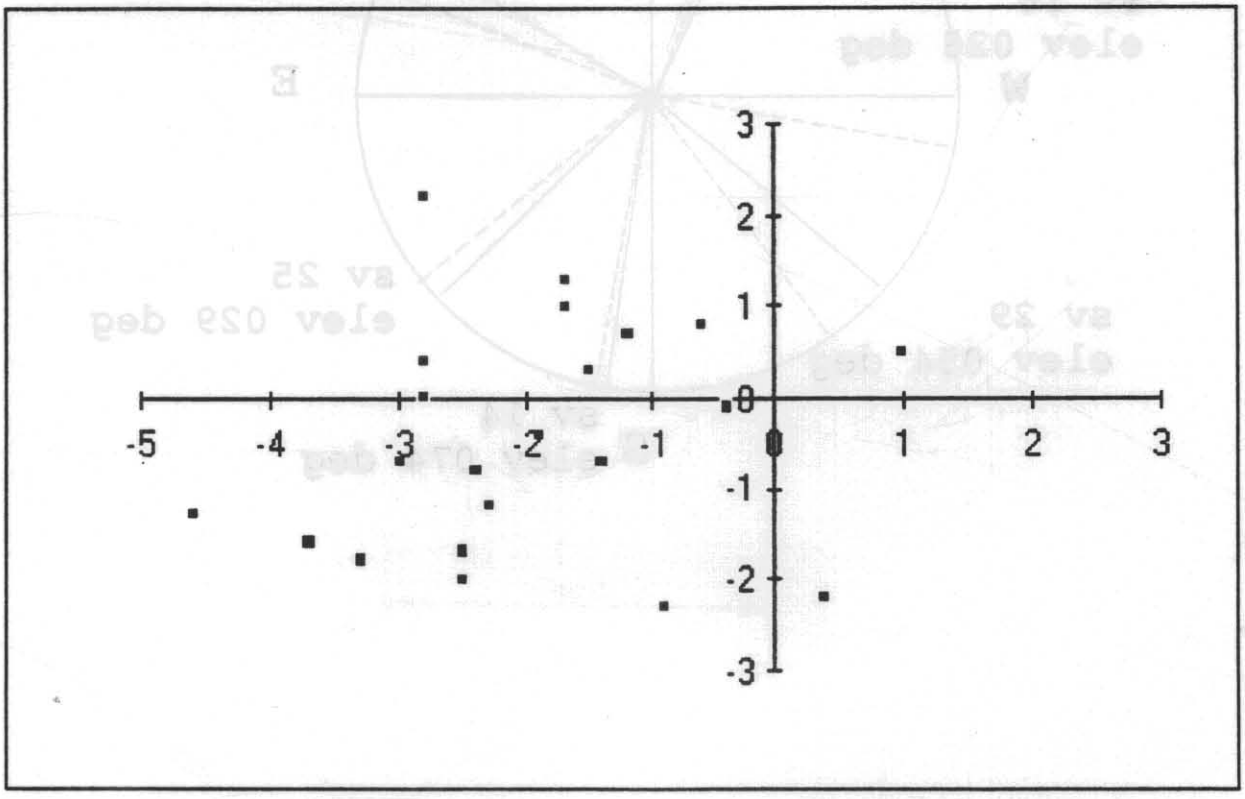
USING ADELAIDE,MELBOURNE AND SYDNEY REFERENCE STATIONS

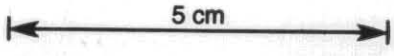




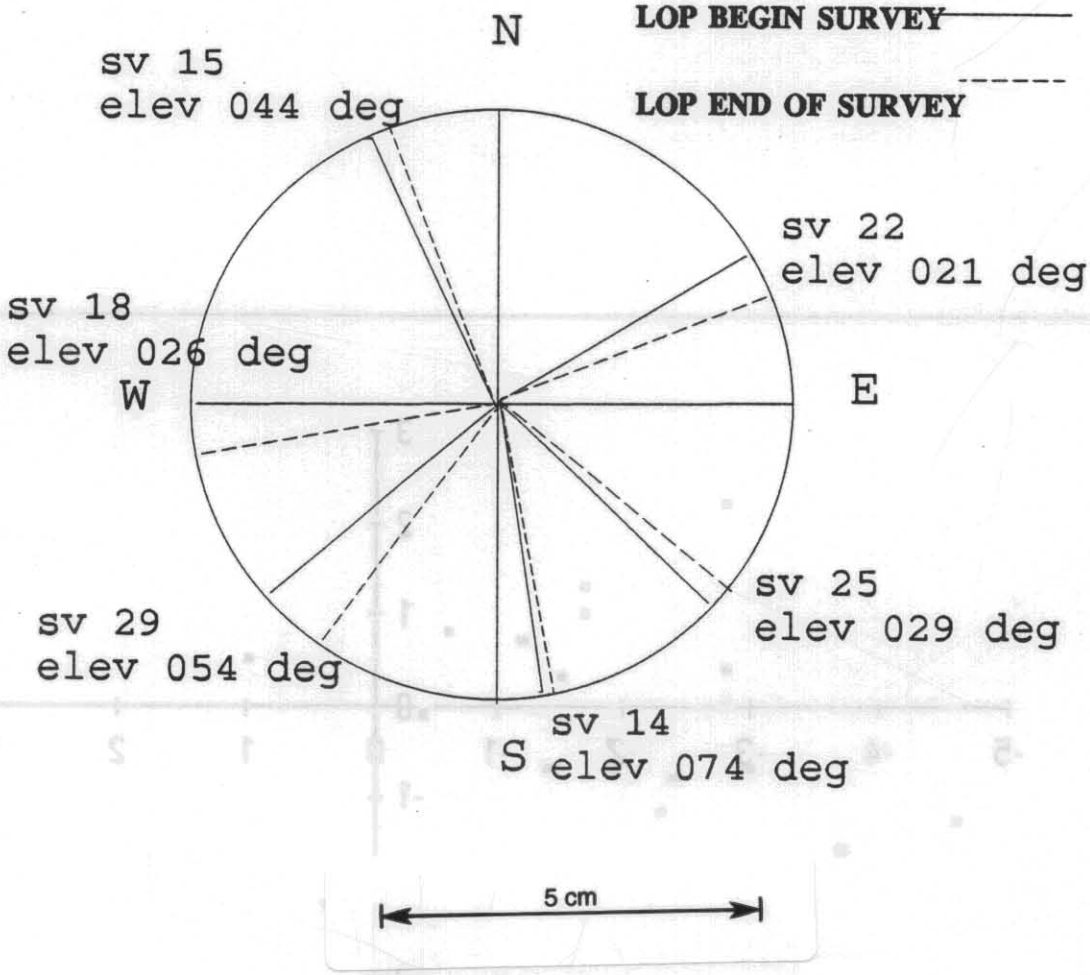
DIRECT INJECTION

USING ADELAIDE REFERENCE STATION





3.1 SATELLITE GEOMETRY PLOT



4.0 WISDOM PRINTOUTS

GMT	LOCAL			NORTHING	EASTING
8:34:56	18:04:56	DN01	multifix	6157495.1	579557.9
8:35:55	18:05:55	DN01	multifix	6157495.0	579557.7
8:36:55	18:06:55	DN01	multifix	6157494.9	579557.6
8:37:55	18:07:55	DN01	multifix	6157494.8	579557.4
8:38:56	18:08:56	DN01	multifix	6157495.6	579557.2
8:39:56	18:09:56	DN01	multifix	6157495.0	579556.8
8:40:56	18:10:56	DN01	multifix	6157495.0	579557.5
8:41:56	18:11:56	DN01	multifix	6157495.9	579558.0
8:42:55	18:12:55	DN01	multifix	6157495.6	579557.6
8:43:56	18:13:56	DN01	multifix	6157495.1	579557.6
8:44:56	18:14:56	DN01	multifix	6157495.6	579557.9
8:46:56	18:16:56	DN01	multifix	6157495.5	579558.2
8:47:55	18:17:55	DN01	multifix	6157495.9	579558.0
8:48:55	18:18:55	DN01	multifix	6157495.7	579557.9
8:49:55	18:19:55	DN01	multifix	6157495.7	579558.4
8:50:55	18:20:55	DN01	multifix	6157495.9	579558.0
8:51:55	18:21:55	DN01	multifix	6157495.9	579557.6
8:52:56	18:22:56	DN01	multifix	6157495.9	579557.3
8:53:56	18:23:56	DN01	multifix	6157495.9	579557.4
8:54:56	18:24:56	DN01	multifix	6157496.3	579557.1
8:55:56	18:25:56	DN01	multifix	6157496.1	579557.3
8:34:56	18:04:56	TR01	direct injec	6157496.5	579558.4
8:35:56	18:05:56	TR01	direct injec	6157497.9	579557.7
8:36:56	18:06:56	TR01	direct injec	6157496.3	579557.0
8:37:56	18:07:56	TR01	direct injec	6157494.1	579557.2
8:38:56	18:08:56	TR01	direct injec	6157495.7	579556.9
8:39:56	18:09:56	TR01	direct injec	6157495.5	579557.8
8:40:56	18:10:56	TR01	direct injec	6157494.7	579559.9
8:41:57	18:11:57	TR01	direct injec	6157496.0	579560.0
8:42:56	18:12:56	TR01	direct injec	6157497.6	579559.7
8:43:56	18:13:56	TR01	direct injec	6157497.6	579559.4
8:44:57	18:14:57	TR01	direct injec	6157498.4	579559.5
8:45:56	18:15:56	TR01	direct injec	6157497.4	579558.9
8:46:57	18:16:57	TR01	direct injec	6157496.8	579556.4
8:47:56	18:17:56	TR01	direct injec	6157497.9	579555.5
8:48:56	18:18:56	TR01	direct injec	6157496.6	579557.4
8:49:56	18:19:56	TR01	direct injec	6157496.8	579556.7
8:50:56	18:20:56	TR01	direct injec	6157497.9	579557.3
8:51:56	18:21:56	TR01	direct injec	6157497.5	579558.5
8:52:56	18:22:56	TR01	direct injec	6157498.8	579559.3
8:53:56	18:23:56	TR01	direct injec	6157497.0	579558.1
8:54:56	18:24:56	TR01	direct injec	6157498.1	579558.4
8:55:56	18:25:56	TR01	direct injec	6157499.7	579559.0

5.0 SKYPOD VERIFICATION

An attempt was made to verify the skypod system over a survey point on Brenan jetty. Unfortunately, due to the location of the vessel fuel intakes, we had to berth on the seaboard side. This faced the stern of the vessel towards an area of large buildings and conveyors. Due to multipath, we were unable to get a stable reading from any of the skypod receivers.

6.0 GYRO AND MARS SYSTEM VERIFICATION

A full Gyro and Mars verification will take place on arrival in Singapore around the middle of April. A copy of this survey will be forwarded as soon as possible.

501731

APPENDIX B

NAVIGATION SYSTEMS VERIFICATION REPORT

PREPARED FOR

MOBIL VIETNAM

APRIL 1994

LOYANG, SINGAPORE

VUNG TAU, VIETNAM

BY

WESTERN GEOPHYSICAL
NAVIGATION DEPARTMENT
MN WESTERN ATLAS
PARTY 116

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VIETNAM

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1. SINGAPORE DGPS VERIFICATION
2. TAIL BUOY VERIFICATION
3. MARS VERIFICATION
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1.0 OVERVIEW

As part of our self-QC program, the intention behind these calibrations and verifications is to provide assurance that the various positioning systems onboard are outputting quality data. It is also part of the navigation department's ongoing research into the different systems available. Not only is it our intention to verify systems, but also to highlight any potential problem areas.

1.1 PERSONNEL

B DEAN	NAVIGATION MANAGER
H McMENAMIN	SENIOR NAVIGATOR
S ELLIOT	SENIOR NAVIGATOR
A EVANS	SURVEYOR NAVIGATOR
W MAXTED	SURVEYOR NAVIGATOR

1.2 SURVEY CONTROL

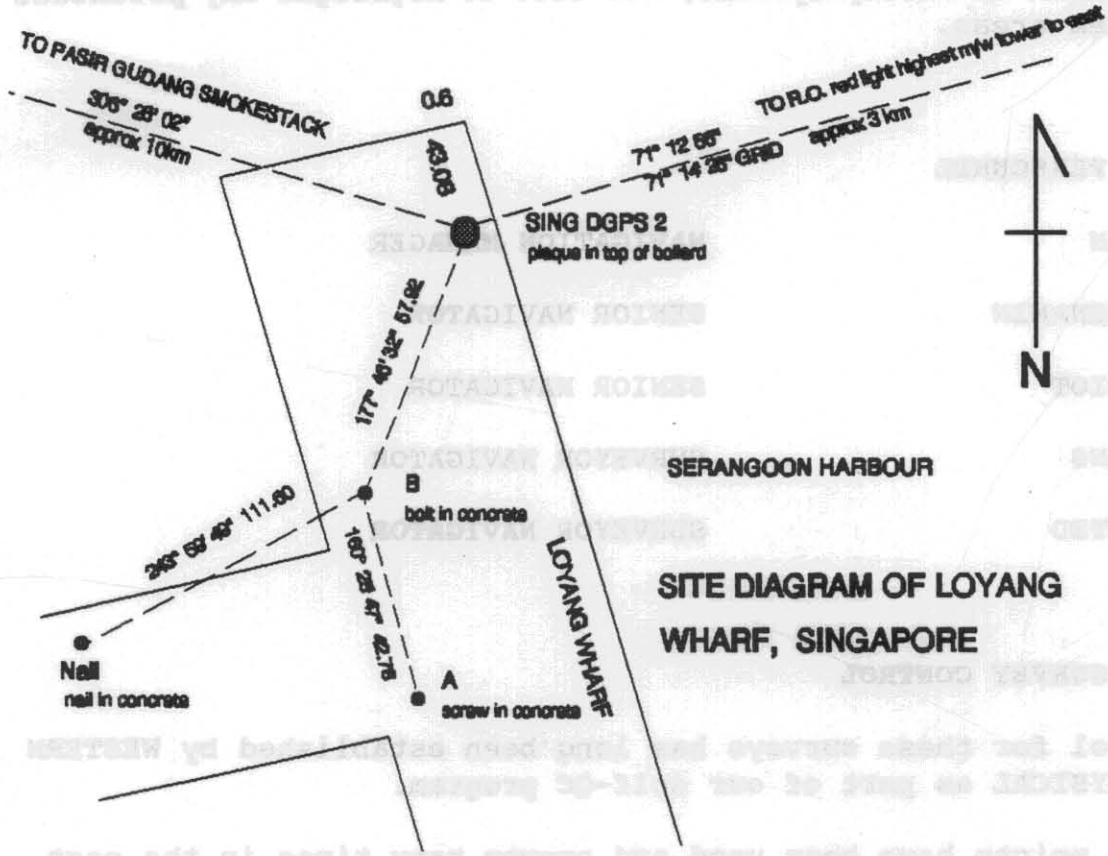
Control for these surveys has long been established by WESTERN GEOPHYSICAL as part of our self-QC program.

These points have been used and proven many times in the past. Base lines have been checked by WESTERN's surveyors by means of sun observations and points co-ordinated by GPS by a Wimpol surveyor, J. Bookman. The survey was supervised by B. Dean from WESTERN.

MAIN CONTROL POINT: SING DGPS2

WGS-84 SPHEROID AND DATUM
GRID UTM ZONE 48 CENTRAL MERIDIAN 105° EAST

NORTHING	153114.532
EASTING	385055.893



5 cm

SURVEY STATION DIAGRAM

2.0 DGPS SYSTEMS VERIFICATION

From known survey points, angles and distances were measured to a prism mounted on the navigation reference point (NRP). Offsets from each systems' antenna were accounted for in the Wisdom system.

For accurate comparisons, the surveyor's watch was set to Wisdom time. The verifications were carried out on two systems: Orion 1 and the Western Geophysical Marine Machine.

The results are shown as scatter plots.

2.1 GEODETIC SYSTEM

The geodetic system used for the survey was as follows:

SPHEROID	WGS-84
DATUM	WGS-84
PROJECTION	UTM
ZONE	48
CM	105°

As the DGPS systems and Wisdom output positions in WGS-84, no datum shift parameters were necessary.

2.2 FIELD OBSERVATIONS

SET UP STATION : B BACK SIGHT :SING DGPS2
BACK BEARING SET : 357 48 02 FACE LEFT

	HA (DIRECT BEARING)	VA	S DIST	TIME
1	38 35 20	66 11	35.03	13 30
2	38 35 20	66 12	35.02	13 31
3	38 35 30	66 09	35.02	13 32
4	38 35 30	66 09	35.03	13 34
5	38 36 00	66 09	35.02	13 35
6	38 35 20	66 09	35.02	13 36
7	38 35 00	66 10	35.02	13 37
8	38 34 50	66 08	35.00	13 38
9	38 35 50	66 08	35.03	13 39
10	38 35 40	66 08	35.03	13 40
11	38 35 30	66 07	34.99	13 41
12	38 33 50	66 07	34.99	13 42
13	38 38 50	66 07	35.02	13 43
14	38 37 30	66 07	34.98	13 44
15	38 37 10	66 07	35.01	13 45
16	38 31 40	66 04	35.01	13 46
17	38 44 40	66 08	35.00	13 47
18	38 44 30	66 08	34.99	13 48
19	38 42 50	66 08	35.08	13 49
20	38 45 50	66 06	35.03	13 50
21	38 40 30	66 06	35.00	13 51
22	38 36 20	66 05	35.00	13 52
23	38 39 50	66 04	35.00	13 53
24	38 35 20	66 06	35 00	13 54
25	38 35 00	66 05	35.00	13 55
26	38 35 00	66 03	34.98	13 56
27	38 35 30	66 03	34.97	13 57
28	38 33 20	66 04	34.96	13 58
29	38 35 00	66 02	34.97	13 59
30	38 38 00	66 03	34.97	14 00

BACK SIGHT FACE LEFT 357 48 30

MEAN	BEARING	H DIST
	38 37 21	32.04
	VERT DIST	14.2

MEAN SURVEYED POSITION WGS-84 UTM N 385078.12
E 153081.68

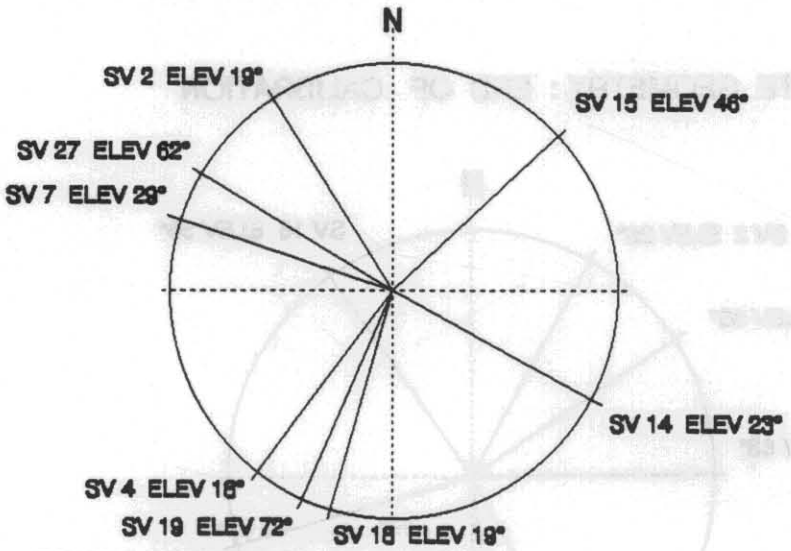
2.3 SATELLITE INFORMATION

The following satellites were used during the survey.

START						
SV	14	15	28	29	31	18
AZM	206	172	28	290	008	132
ELEV	27	31	35	69	70	39

END						
SV	14	15	28	29	31	18
AZM	192	160	26	244	10	298
ELEV	23	39	22	69	55	48

SATELLITE GEOMETRY: START OF CALIBRATION



MEAN PDOP : 2.7 VDOP : 2.3

REFERENCE STATIONS: ORION 1 : KUANTAN
MARINE MACHINE : KUANTAN

2.4 HEIGHT OF GPS ANTENNA ABOVE WGS-84 SPHEROID

During the survey the height from each receiver was booked every 60 seconds and compared to the surveyed height.

RL OF STATION: 14.2

ORION 1 VD 14.2 + OFFSET 7.4 = 35.8

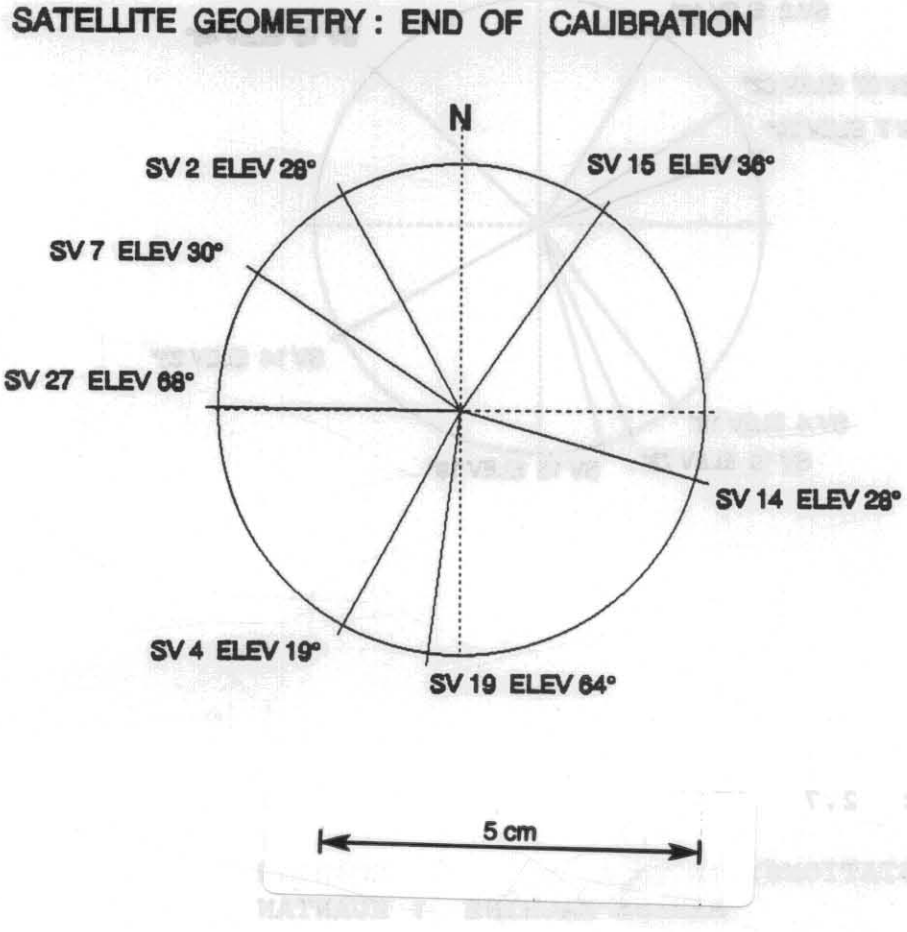
MARINE MACHINE 14.2 + OFFSET 7.4 = 35.8

MEAN GPS HEIGHT DURING SURVEY:

ORION 1 : 36.6

MARINE MACHINE : 35.6

2.5 SATELLITE GEOMETRY PLOT



3.0 TAILBOUY TRACKING SYSTEM

TRIMBLE SBS1000

Six tail bouy receivers were placed over survey mark A on the jetty for ten minute periods. Wisdom output a position every 60 seconds for a direct comparison. Six satellites were in view during the survey.

Refer to the scatter plots for results.

4.0 GYRO CALIBRATION

From the survey station, angles and distances were measured to prisms mounted on the centreline of the vessel on the bow and stern. A theodolite and EDM was used.

Twenty four readings were taken, one every minute. As the surveyor's watch was synchronised to Wisdom time, an accurate comparison could be made.

4.1 VESSEL STABILITY

In accordance with our standard procedure, the vessel was tied up firmly to the dock and the gyro allowed to settle overnight. The gyro movement was monitored prior to the survey to ensure that precession had stopped. After the first direction was completed, the vessel was turned and the procedure repeated.

Please refer to the precession graphs.

4.2 WISDOM PARAMETERS

The Wisdom system was set up to print out every 60 seconds to correspond with the surveyor's readings. The gyro alignment value was zeroed and the system placed in manual mode.

Gyro type: SPERRY MK 23

4.3 FIELD OBSERVATIONS

DIRECTION 1

STATION AT: B BACK SIGHT STATION: SING DGPS2
SET FACE LEFT: 357 46 32

	HORIZONTAL ANGLE	VERTICAL ANGLE	SLOPE DIST	TIME
1 STERN	02 49 40	86 00	71.84	06 53
2 BOW	96 21 40	85 33	31.60	06 54
3 STERN	02 49 50	85 33	71.83	06 55
4 BOW	96 25 10	85 33	31.53	06 57
5 STERN	02 49 50	86 09	71.83	06 58
6 BOW	96 23 20	85 33	31.57	07 00
7 STERN	02 49 50	86 09	71.82	07 01
8 BOW	96 24 00	85 34	31.56	07 02
9 STERN	02 49 30	86 09	71.82	07 04
10 BOW	96 24 10	85 34	31.56	07 05
11 STERN	02 49 25	86 10	71.83	07 06
12 BOW	96 24 00	85 35	31.56	07 07
13 STERN	02 49 50	86 09	71.83	07 09
14 BOW	96 26 10	85 34	31.56	07 10
15 STERN	02 49 24	86 09	71.81	07 13
16 BOW	96 32 30	85 33	31.44	07 15
17 STERN	02 50 20	86 09	71.81	07 16
18 BOW	96 34 20	85 32	31.41	07 18
19 STERN	02 50 20	86 09	71.81	07 19
20 BOW	96 34 40	85 32	31.39	07 20
21 STERN	02 50 30	84 09	71.80	07 21
22 BOW	96 36 20	85 31	31.38	07 22
23 STERN	02 50 48	86 09	71.80	07 23
24 BOW	96 36 50	85 31	31.37	07 23

DIRECTION 2

STATION AT: B BACK SIGHT STATION: A
SET FACE LEFT: 160 25 47

	HORIZONTAL ANGLE	VERTICAL ANGLE	SLOPE DIST	TIME
1 B	07 45 40	87 25	60.94	07 08
2 S	113 37 00	82 24	38.22	07 09
3 B	07 46 20	87 25	60.94	07 10
4 S	113 46 30	82 34	38.22	07 10
5 B	07 46 20	87 25	60.94	07 12
6 S	113 36 20	82 35	38.21	07 13
7 B	07 39 10	87 26	60.87	07 14
8 S	113 37 30	82 36	38.21	07 15
9 B	07 38 40	87 26	60.89	07 16
10S	113 35 30	82 35	38.21	07 17
11B	07 35 10	87 25	60.93	07 18
12S	113 35 10	82 34	38.20	07 18
13B	07 38 30	87 25	60.90	07 19
14S	113 35 30	82 35	38.20	07 20
15B	07 42 00	87 25	60.92	07 20
16S	113 35 30	82 36	38.20	07 22
17B	07 41 50	87 25	60.92	07 23
18S	113 35 20	82 34	38.20	07 25
19B	07 42 50	87 25	60.93	07 24
20S	113 34 00	82 34	60.92	07 25
21B	07 41 00	87 26	69.92	07 26
22S	113 35 00	82 25	38.20	07 26

4.4 RESULTS

DIRECTION 1

	GYRO HEADING	SURVEYED HEADING
1	159.6°	
2	159.6	159.70
3	159.6	
4	159.7	159.75
5	159.7	
6	159.7	159.72
7	159.7	
8	159.7	159.72
9	159.7	
10	159.7	159.72
11	159.7	
12	159.7	159.72
13	159.7	
14	159.7	159.74
15	159.7	
16	159.7	159.82
17	159.7	
18	159.7	159.86
19	159.7	
20	159.8	159.87
21	159.8	
22	159.8	159.88
23	159.8	
24	159.8	159.89
MEAN	159.71	159.78

GYRO READING LOW 0.07°

DIRECTION 2

	GYRO HEADING	SURVEYED HEADING
1	340.7	
2	340.7	340.65
3	340.7	
4	340.7	340.71
5	340.7	
6	340.7	340.67
7	340.7	
8	340.7	340.57
9	340.6	
10	340.7	340.56
11	340.6	
12	340.6	340.54
13	340.6	
14	340.6	340.57
15	340.6	
16	340.6	340.61
17	340.6	
18	340.6	340.61
19	340.6	
20	340.6	340.62
21	340.6	
22	340.6	340.60
MEAN	340.64	340.61

MEAN
GYRO READING HIGH 0.03°

MEAN OF BOTH DIRECTIONS LOW 0.04°

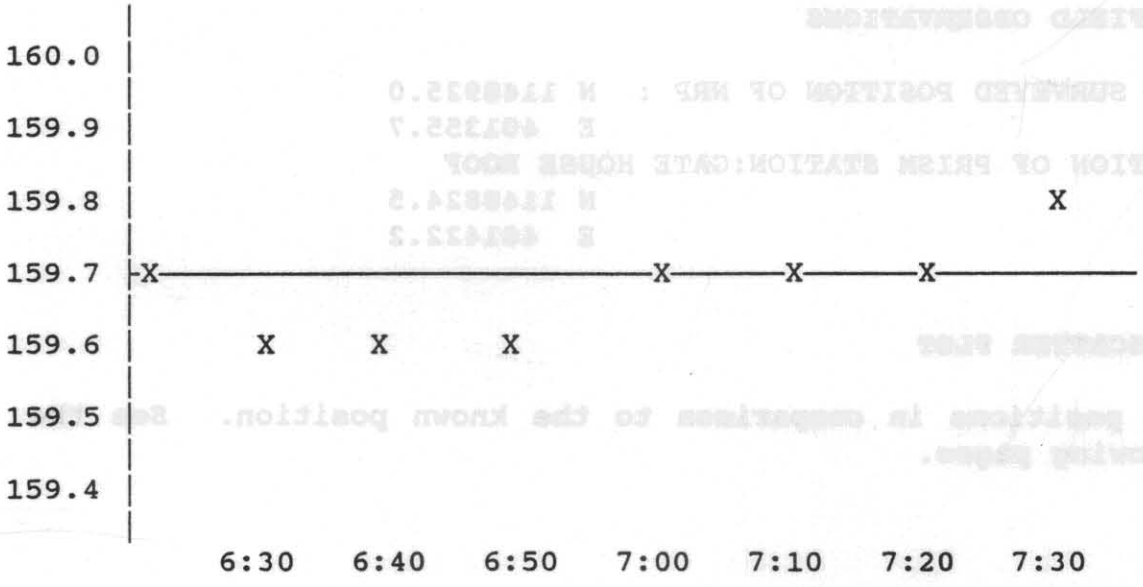
GYRO ALIGNMENT VALUE TO BE ENTERED INTO WISDOM:

NO CORRECTION

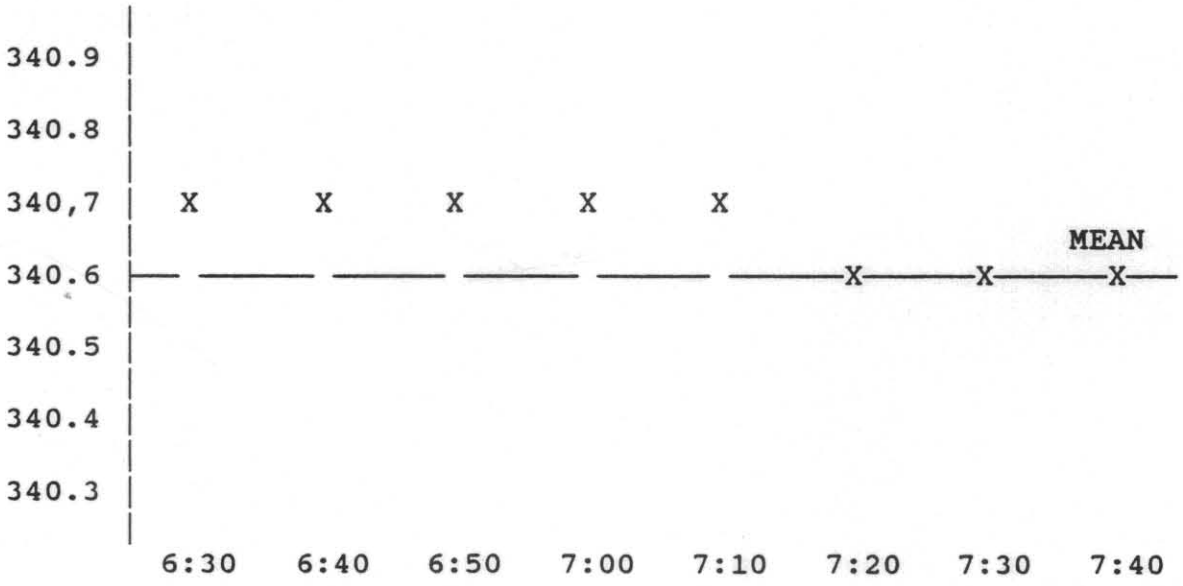
4.5 GYRO PRECESSION GRAPHS

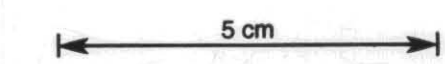
DIRECTION 1

The gyro reading was graphed 30 minutes before and during the survey to monitor Gyro precession.



DIRECTION 2





5.0 MARINE ANGLE RANGING SYSTEM VERIFICATION

A MARS prism was placed over a survey point on the jetty and its Wisdom position compared to the known co-ordinates. The Wisdom corrects for the offset from the LRU to NRP. The reference position was the mean surveyed position as surveyed during the verification period.

5.1 FIELD OBSERVATIONS

MEAN SURVEYED POSITION OF NRP : N 1148925.0
E 401355.7
POSITION OF PRISM STATION:GATE HOUSE ROOF
N 1148824.5
E 401422.2

5.2 SCATTER PLOT

MARS positions in comparison to the known position. See the following pages.

6.0 DGPS SYSTEMS VERIFICATION - VUNG TAU, VIETNAM

From known survey points, angles and distances were measured to a prism mounted on the navigation reference point (NRP). Offsets from each systems' antenna were accounted for in the Wisdom system.

For accurate comparisons the surveyor's watch was set to Wisdom time. The verifications were carried out on two systems: Orion 1 and the Western Geophysical Marine Machine.

The results are shown as scatter plots.

6.1 GEODETIC SYSTEM AND SURVEY CONTROL

The geodetic system used for the survey was as follows:

SPHEROID	WGS-84
DATUM	WGS-84
PROJECTION	TM
ZONE	n/a
CM	108°
MAIN CONTROL POINT	10 23 30.800 N
	107 05 54.613 E

As the two DGPS systems and Wisdom output positions in WGS-84 no datum shift parameters were necessary.

6.2 FIELD OBSERVATIONS

SET UP STATION : MCP BACK SIGHT : GATE HOUSE ROOF
BACK BEARING SET : 50 01 20 FACE LEFT

	HA	VA	S DIST	TIME
1	41 25 30	76 28	59.90	15 30
2	41 25 50	76 28	59.96	15 33
3	41 30 20	76 28	59.96	15 34
4	41 29 50	76 30	59.99	15 35
5	41 27 30	76 28	59.96	15 37
6	41 28 20	76 27	59.97	15 39
7	41 29 00	76 27	59.97	15 40
8	41 28 00	76 27	59.98	15 41
9	41 24 50	76 27	59.98	15 43
10	41 22 20	76 27	60.03	15 45
11	41 29 20	76 27	59.96	15 46
12	41 29 25	76 27	59.96	15 48
13	41 25 30	76 27	59.98	15 52
14	41 25 30	76 27	59.99	15 54
15	41 26 20	76 25	59.96	15 55
16	41 26 30	76 26	60.00	15 56
17	41 31 40	76 26	59.98	15 58
18	41 31 40	76 26	59.98	15 59

BACK SIGHT FACE LEFT 50 01 20
MEAN SURVEYED POSITION WGS-84 OF NRP N 1148925.0
E 401355.7

HA + 0° 15 12 =BEARING
BEARING TO BS =118°12 20

6.3 SATELLITE INFORMATION

The following satellites were used during the survey.

START

SV	14	18	07	27	02	15	19	04
AZM	126	190	284	306	328	46	196	216
ELEV	23	19	29	62	19	46	72	18

END

SV	14	07	27	02	04	15	19
AZM	112	300	272	338	216	036	188
ELEV	28	30	68	28	19	39	64

MEAN PDOP : 2.2
REFERENCE STATIONS:
ORION 1 : KUANTAN
MARINE MACHINE : KUANTAN

6.4 HEIGHT OF GPS ANTENNA ABOVE WGS-84 SPHEROID

During the survey, the height from each receiver was booked every 60 seconds and compared to the surveyed height.

RL OF STATION: 3.5 IH: 1.5

ORION 1	VD 14.0	+ OFFSET 6.8 = 25.8
MARINE MACHINE	14.0	+ OFFSET 6.8 = 25.8

MEAN GPS HEIGHT DURING SURVEY:

ORION 1	: 25.5
MARINE MACHINE	: 0.8 + 25.0 = 25.8

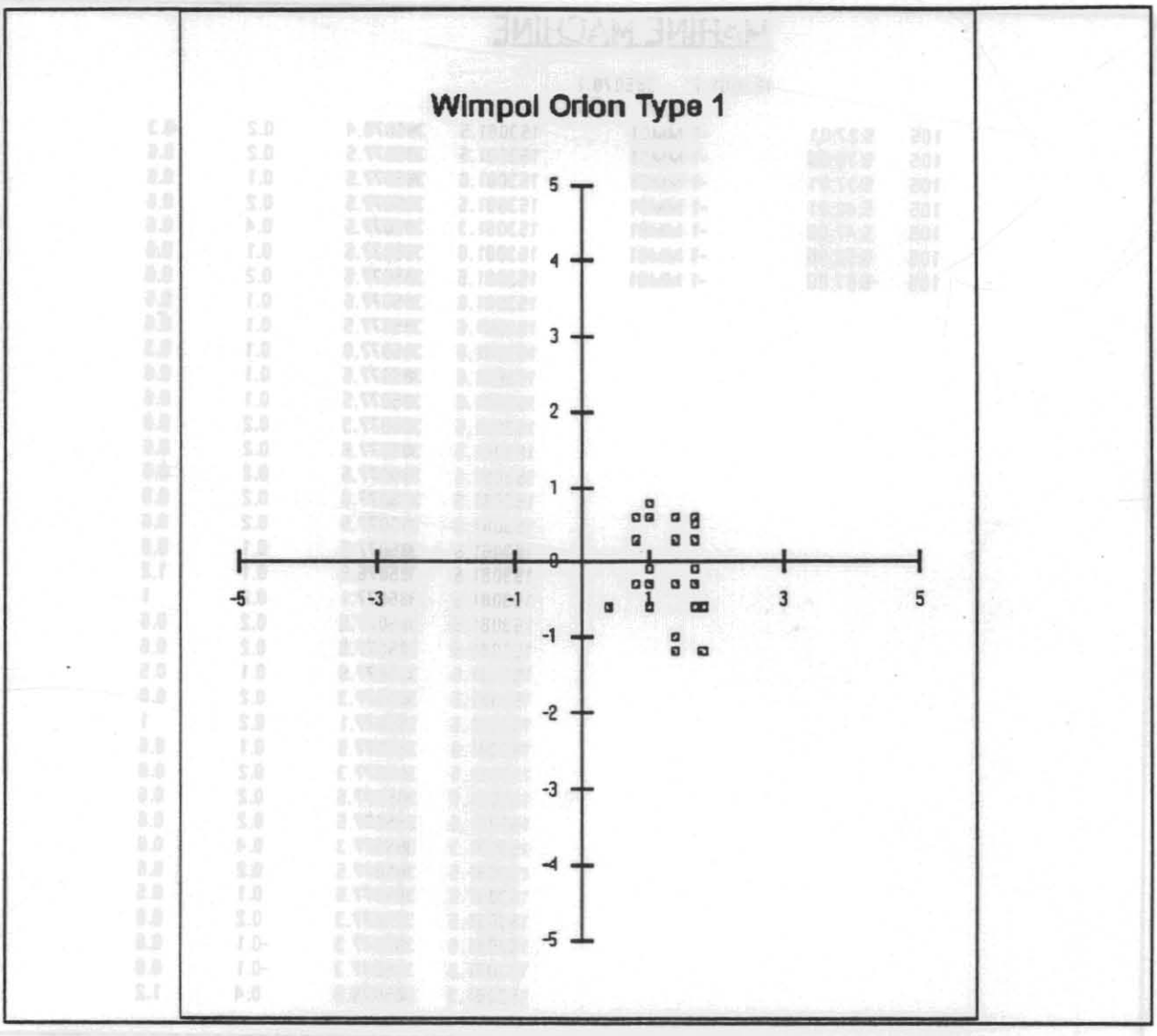
7.0 SCATTER PLOTS AND WISDOM PRINTOUTS

1. SINGAPORE DGPS VERIFICATION

ORION TYPE 1

153081.7 385078.1

105	5:27:01	-1 DN01	153080	385078.2	1.7	-0.1
105	5:32:01	-1 DN01	153080	385078.4	1.7	-0.3
105	5:37:01	-1 DN01	153080	385077.8	1.7	0.3
105	5:42:01	-1 DN01	153080.3	385078.4	1.4	-0.3
105	5:47:01	-1 DN01	153079.9	385078.7	1.8	-0.6
105	5:52:00	-1 DN01	153080	385078.2	1.7	-0.1
105	5:57:01	-1 DN01	153079.9	385079.3	1.8	-1.2
			153080.3	385079.1	1.4	-1
			153080.7	385078.7	1	-0.6
			153080.7	385078.7	1	-0.6
			153080.3	385077.8	1.4	0.3
			153080.7	385078.2	1	-0.1
			153080.9	385078.4	0.8	-0.3
			153080.7	385078.2	1	-0.1
			153080.9	385077.8	0.8	0.3
			153080.3	385077.8	1.4	0.3
			153080	385077.5	1.7	0.6
			153080	385078.2	1.7	-0.1
			153080.3	385079.3	1.4	-1.2
			153080.3	385078.4	1.4	-0.3
			153080.7	385078.7	1	-0.6
			153080.7	385077.5	1	0.6
			153080.9	385077.5	0.8	0.6
			153080.3	385077.5	1.4	0.6
			153080	385077.6	1.7	0.5
			153080	385078.4	1.7	-0.3
			153080.7	385078.4	1	-0.3
			153081.3	385078.7	0.4	-0.6
			153081.3	385078.7	0.4	-0.6
			153080	385078.2	1.7	-0.1
			153080	385078.7	1.7	-0.6
			153080.7	385078.2	1	-0.1
			153080.3	385077.5	1.4	0.6
			153080.7	385077.3	1	0.8
			153080.9	385077.8	0.8	0.3
			153080.7	385077.5	1	0.6

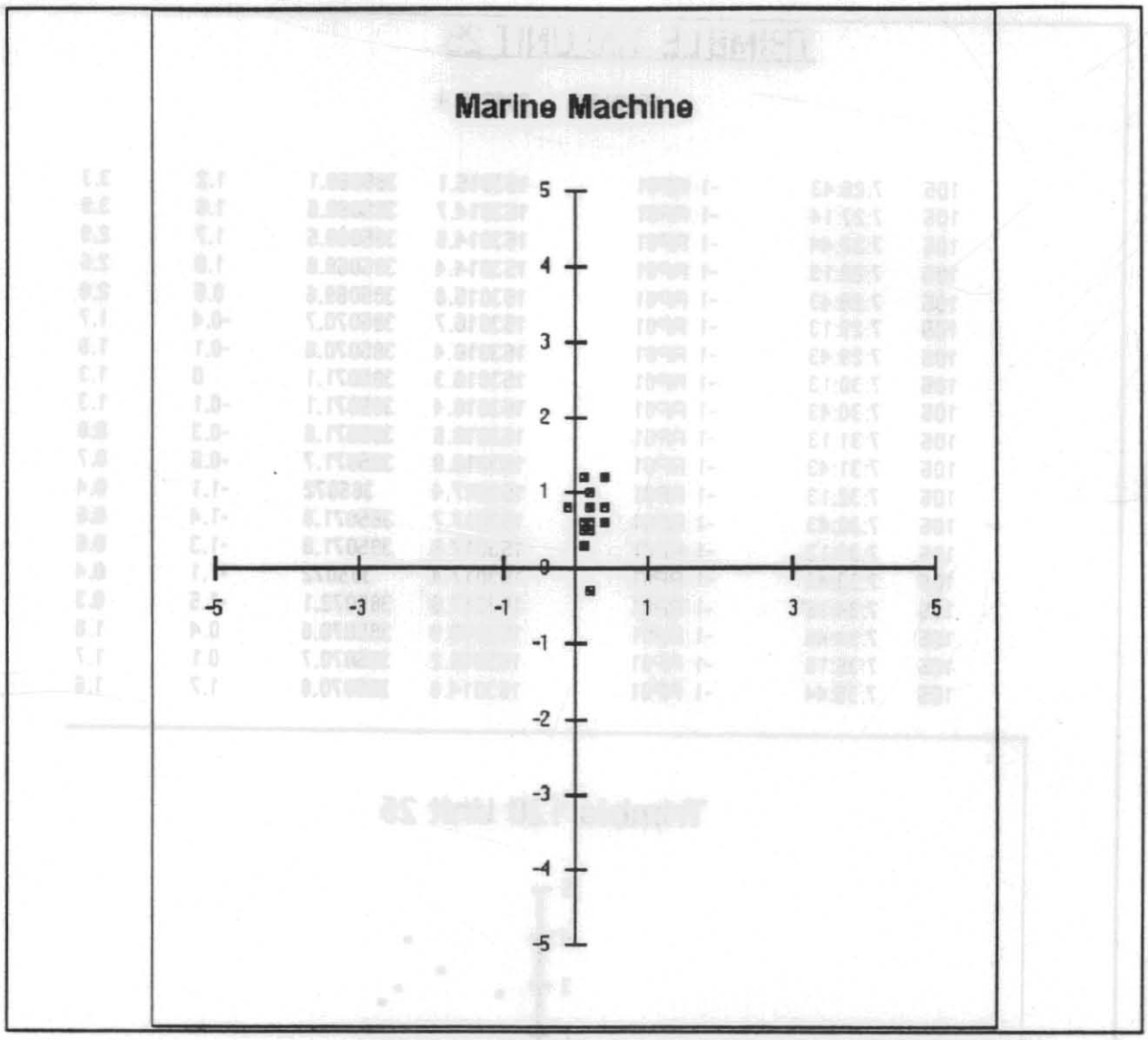


5 cm

MARINE MACHINE

153081.7 385078.1

105	5:27:01	-1 MM01	153081.5	385078.4	0.2	-0.3
105	5:32:00	-1 MM01	153081.5	385077.5	0.2	0.6
105	5:37:01	-1 MM01	153081.6	385077.5	0.1	0.6
105	5:42:01	-1 MM01	153081.5	385077.5	0.2	0.6
105	5:47:00	-1 MM01	153081.3	385077.5	0.4	0.6
105	5:52:00	-1 MM01	153081.6	385077.5	0.1	0.6
105	5:57:00	-1 MM01	153081.5	385077.5	0.2	0.6
			153081.6	385077.6	0.1	0.5
			153081.6	385077.5	0.1	0.6
			153081.6	385077.8	0.1	0.3
			153081.6	385077.5	0.1	0.6
			153081.6	385077.5	0.1	0.6
			153081.5	385077.3	0.2	0.8
			153081.5	385077.6	0.2	0.5
			153081.5	385077.6	0.2	0.5
			153081.5	385077.6	0.2	0.5
			153081.5	385077.5	0.2	0.6
			153081.6	385077.5	0.1	0.6
			153081.6	385076.9	0.1	1.2
			153081.5	385077.1	0.2	1
			153081.5	385077.5	0.2	0.6
			153081.5	385077.5	0.2	0.6
			153081.6	385077.6	0.1	0.5
			153081.5	385077.3	0.2	0.8
			153081.5	385077.1	0.2	1
			153081.6	385077.5	0.1	0.6
			153081.5	385077.3	0.2	0.8
			153081.5	385077.5	0.2	0.6
			153081.5	385077.5	0.2	0.6
			153081.3	385077.3	0.4	0.8
			153081.5	385077.5	0.2	0.6
			153081.6	385077.6	0.1	0.5
			153081.5	385077.3	0.2	0.8
			153081.8	385077.3	-0.1	0.8
			153081.8	385077.3	-0.1	0.8
			153081.3	385076.9	0.4	1.2



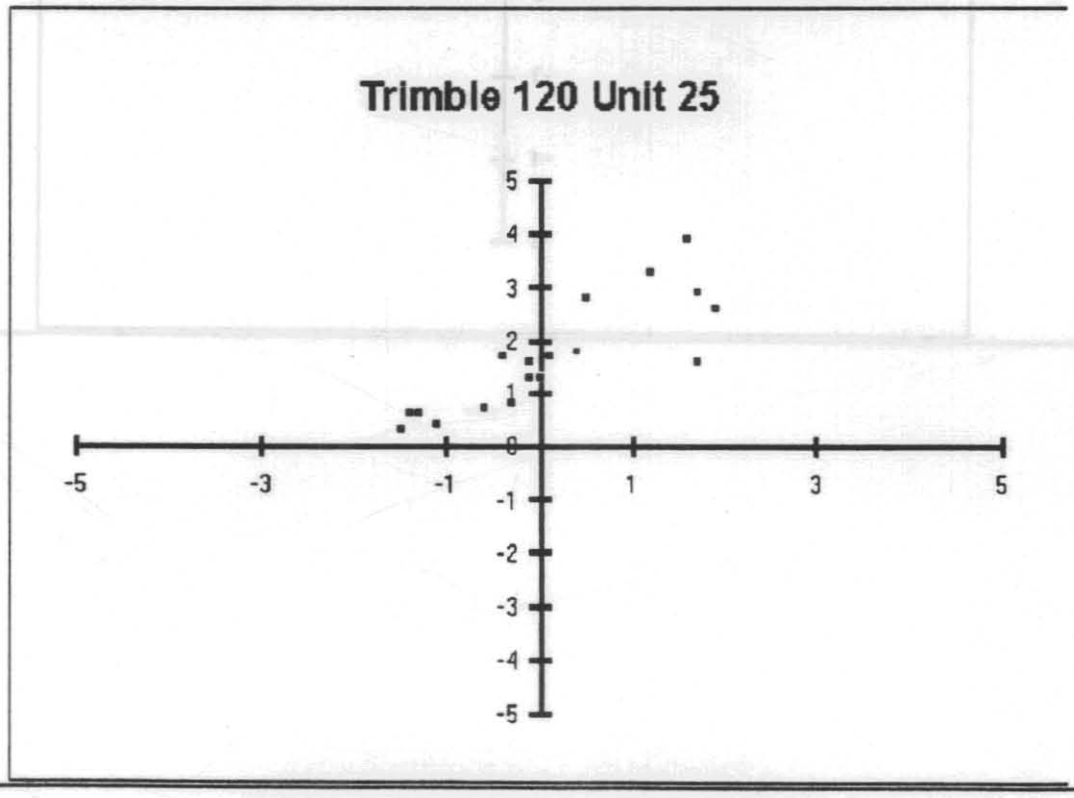
5 cm

2. TAIL BUOY VERIFICATION

TRIMBLE 120 UNIT 25

153016.3 385072.4

105	7:26:43	-1 RP01	153015.1	385069.1	1.2	3.3
105	7:27:14	-1 RP01	153014.7	385068.5	1.6	3.9
105	7:27:44	-1 RP01	153014.6	385069.5	1.7	2.9
105	7:28:13	-1 RP01	153014.4	385069.8	1.9	2.6
105	7:28:43	-1 RP01	153015.8	385069.6	0.5	2.8
105	7:29:13	-1 RP01	153016.7	385070.7	-0.4	1.7
105	7:29:43	-1 RP01	153016.4	385070.8	-0.1	1.6
105	7:30:13	-1 RP01	153016.3	385071.1	0	1.3
105	7:30:43	-1 RP01	153016.4	385071.1	-0.1	1.3
105	7:31:13	-1 RP01	153016.6	385071.6	-0.3	0.8
105	7:31:43	-1 RP01	153016.9	385071.7	-0.6	0.7
105	7:32:13	-1 RP01	153017.4	385072	-1.1	0.4
105	7:32:43	-1 RP01	153017.7	385071.8	-1.4	0.6
105	7:33:13	-1 RP01	153017.6	385071.8	-1.3	0.6
105	7:33:43	-1 RP01	153017.4	385072	-1.1	0.4
105	7:34:18	-1 RP01	153017.8	385072.1	-1.5	0.3
105	7:34:46	-1 RP01	153015.9	385070.6	0.4	1.8
105	7:35:15	-1 RP01	153016.2	385070.7	0.1	1.7
105	7:35:44	-1 RP01	153014.6	385070.8	1.7	1.6



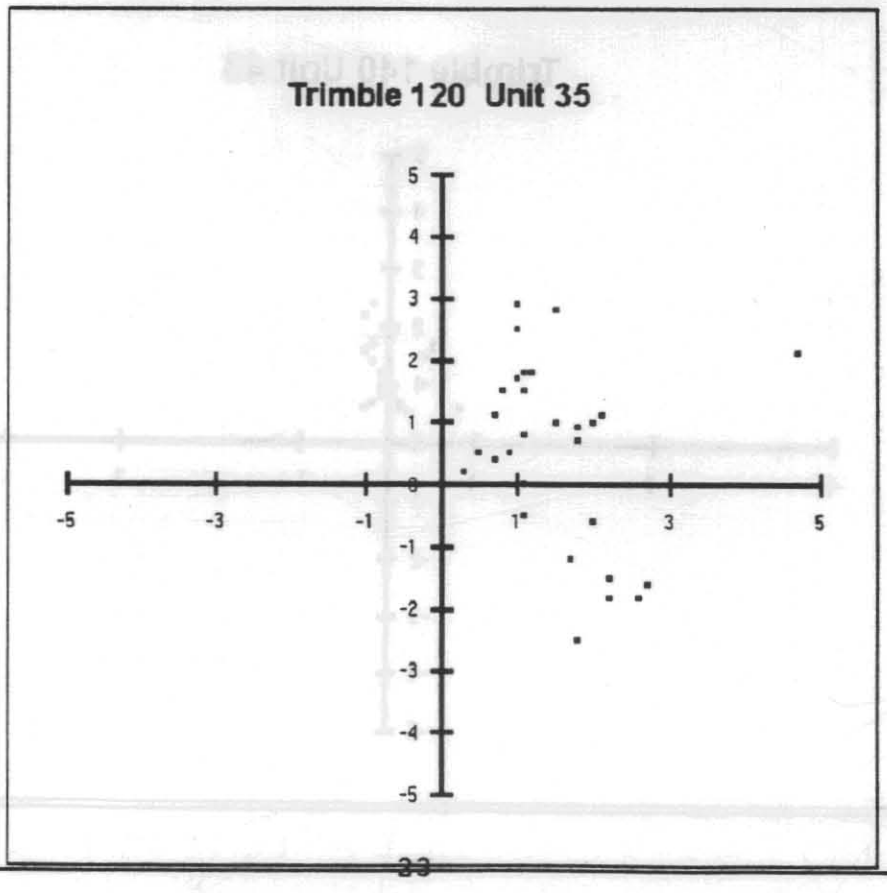
5 cm

501755

TRIMBLE 120 UNIT 35

153016.3 385072.4

105	7:07:28	-1 RP01	153013.6	385074	2.7	-1.6
105	7:07:44	-1 RP01	153014.1	385073.9	2.2	-1.5
105	7:08:14	-1 RP01	153014.3	385073	2	-0.6
105	7:08:44	-1 RP01	153011.6	385070.3	4.7	2.1
105	7:09:14	-1 RP01	153013.7	385074.2	2.6	-1.8
105	7:09:43	-1 RP01	153014.5	385074.9	1.8	-2.5
105	7:10:14	-1 RP01	153014.1	385074.2	2.2	-1.8
105	7:10:44	-1 RP01	153014.6	385073.6	1.7	-1.2
105	7:11:14	-1 RP01	153015.2	385072.9	1.1	-0.5
105	7:11:44	-1 RP01	153015.2	385072.4	1.1	0
105	7:12:14	-1 RP01	153015.2	385071.6	1.1	0.8
105	7:12:44	-1 RP01	153014.2	385071.3	2.1	1.1
105	7:13:14	-1 RP01	153014.5	385071.5	1.8	0.9
105	7:13:44	-1 RP01	153014.3	385071.4	2	1
105	7:14:14	-1 RP01	153014.5	385071.7	1.8	0.7
105	7:14:43	-1 RP01	153014.8	385071.4	1.5	1
105	7:15:13	-1 RP01	153015.4	385071.9	0.9	0.5
105	7:15:43	-1 RP01	153015.8	385071.9	0.5	0.5
105	7:16:13	-1 RP01	153015.6	385072	0.7	0.4
105	7:16:44	-1 RP01	153016	385072.2	0.3	0.2
105	7:17:13	-1 RP01	153015.6	385071.3	0.7	1.1
105	7:17:43	-1 RP01	153015.5	385070.9	0.8	1.5
105	7:18:14	-1 RP01	153015.2	385070.9	1.1	1.5
105	7:18:44	-1 RP01	153015.2	385070.6	1.1	1.8
105	7:19:14	-1 RP01	153015.3	385070.7	1	1.7
105	7:19:43	-1 RP01	153015.1	385070.6	1.2	1.8
105	7:20:13	-1 RP01	153015.3	385069.9	1	2.5
105	7:20:43	-1 RP01	153015.3	385069.5	1	2.9
105	7:21:13	-1 RP01	153014.8	385069.6	1.5	2.8



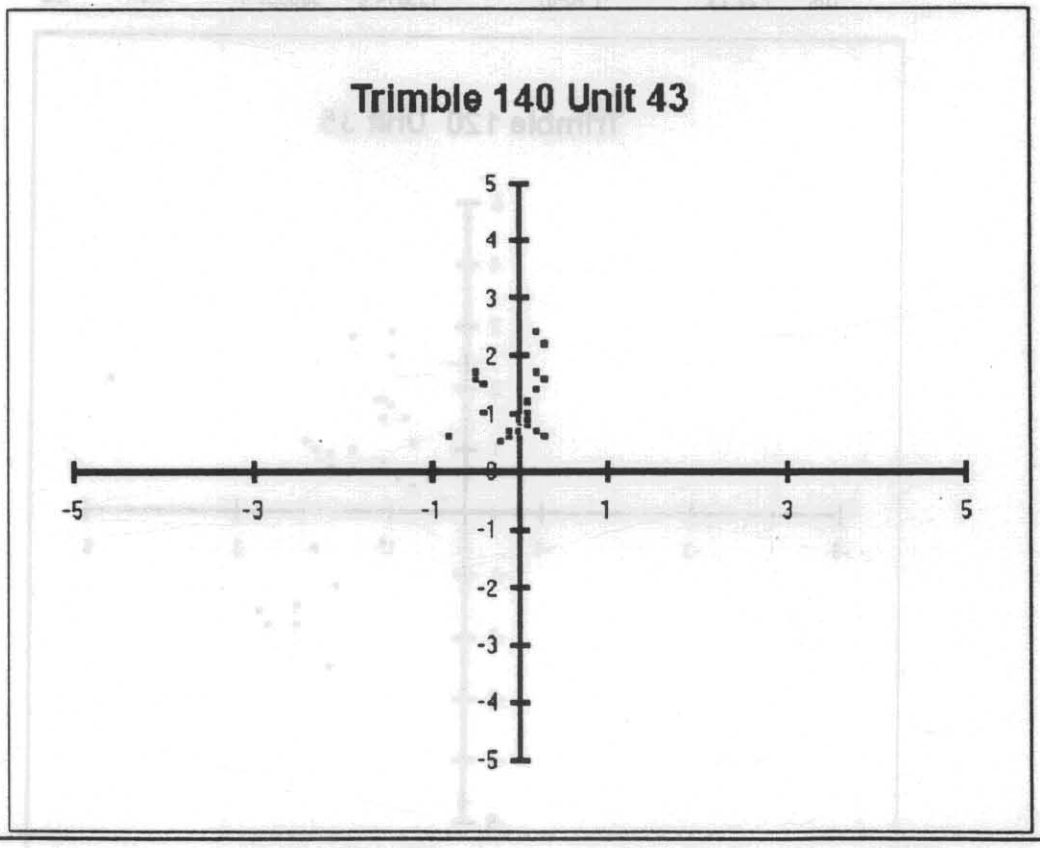
33

5 cm

TRIMBLE 140 UNIT 43

153016.3 385072.4

105	7:39:14	-1 RP01	153016	385070.2	0.3	2.2
105	7:39:43	-1 RP01	153016.1	385070	0.2	2.4
105	7:40:13	-1 RP01	153017.1	385071.8	-0.8	0.6
105	7:40:44	-1 RP01	153016.3	385071.5	0	0.9
105	7:41:14	-1 RP01	153016.7	385071.4	-0.4	1
105	7:41:43	-1 RP01	153016.8	385070.8	-0.5	1.6
105	7:42:18	-1 RP01	153016.7	385070.9	-0.4	1.5
105	7:42:43	-1 RP01	153016.8	385070.7	-0.5	1.7
105	7:43:13	-1 RP01	153016.5	385071.9	-0.2	0.5
105	7:43:44	-1 RP01	153016.4	385071.8	-0.1	0.6
105	7:44:13	-1 RP01	153016.4	385071.7	-0.1	0.7
105	7:44:43	-1 RP01	153016.3	385071.7	0	0.7
105	7:45:14	-1 RP01	153016.1	385071.7	0.2	0.7
105	7:45:44	-1 RP01	153016	385071.8	0.3	0.6
105	7:46:14	-1 RP01	153016.2	385071.6	0.1	0.8
105	7:46:44	-1 RP01	153016.2	385071.5	0.1	0.9
105	7:47:14	-1 RP01	153016.2	385071.4	0.1	1
105	7:47:44	-1 RP01	153016.2	385071.2	0.1	1.2
105	7:48:14	-1 RP01	153016.1	385071	0.2	1.4
105	7:48:44	-1 RP01	153016	385070.8	0.3	1.6
105	7:49:13	-1 RP01	153016.1	385070.7	0.2	1.7

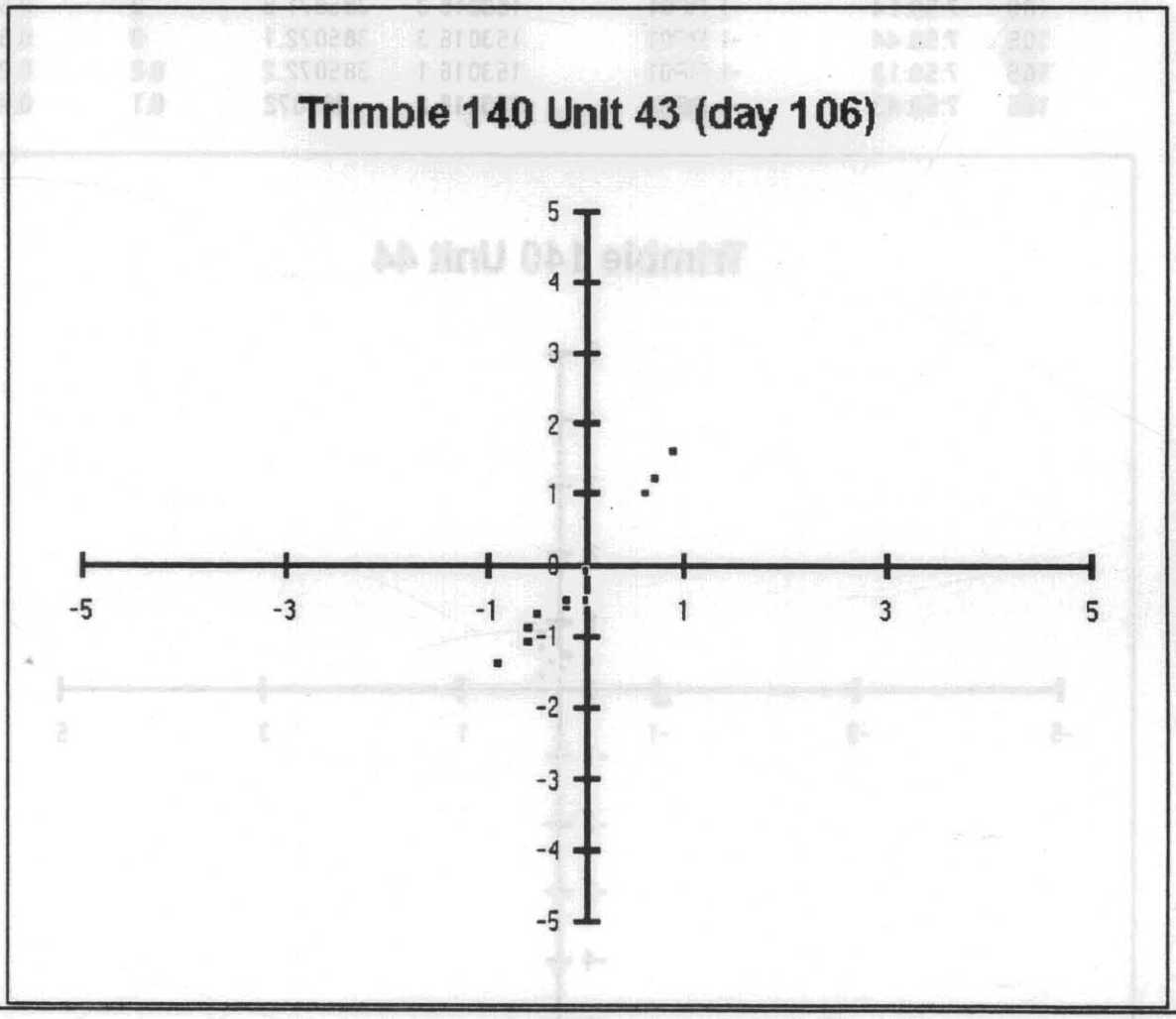


5 cm

TRIMBLE 140 UNIT 43 (JD 106)

153016.3 385072.4

106	2:32:57	-1 RP01	153016.5	385073	-0.2	-0.6
106	2:33:57	-1 RP01	153016.5	385072.9	-0.2	-0.5
106	2:34:57	-1 RP01	153016.3	385072.9	0	-0.5
106	2:35:57	-1 RP01	153016.3	385072.5	0	-0.1
106	2:36:57	-1 RP01	153015.7	385071.4	0.6	1
106	2:37:57	-1 RP01	153015.6	385071.2	0.7	1.2
106	2:38:57	-1 RP01	153015.4	385070.8	0.9	1.6
106	2:39:57	-1 RP01	153017.2	385073.8	-0.9	-1.4
106	2:40:57	-1 RP01	153016.9	385073.5	-0.6	-1.1
106	2:41:57	-1 RP01	153016.9	385073.3	-0.6	-0.9
106	2:42:57	-1 RP01	153016.8	385073.1	-0.5	-0.7

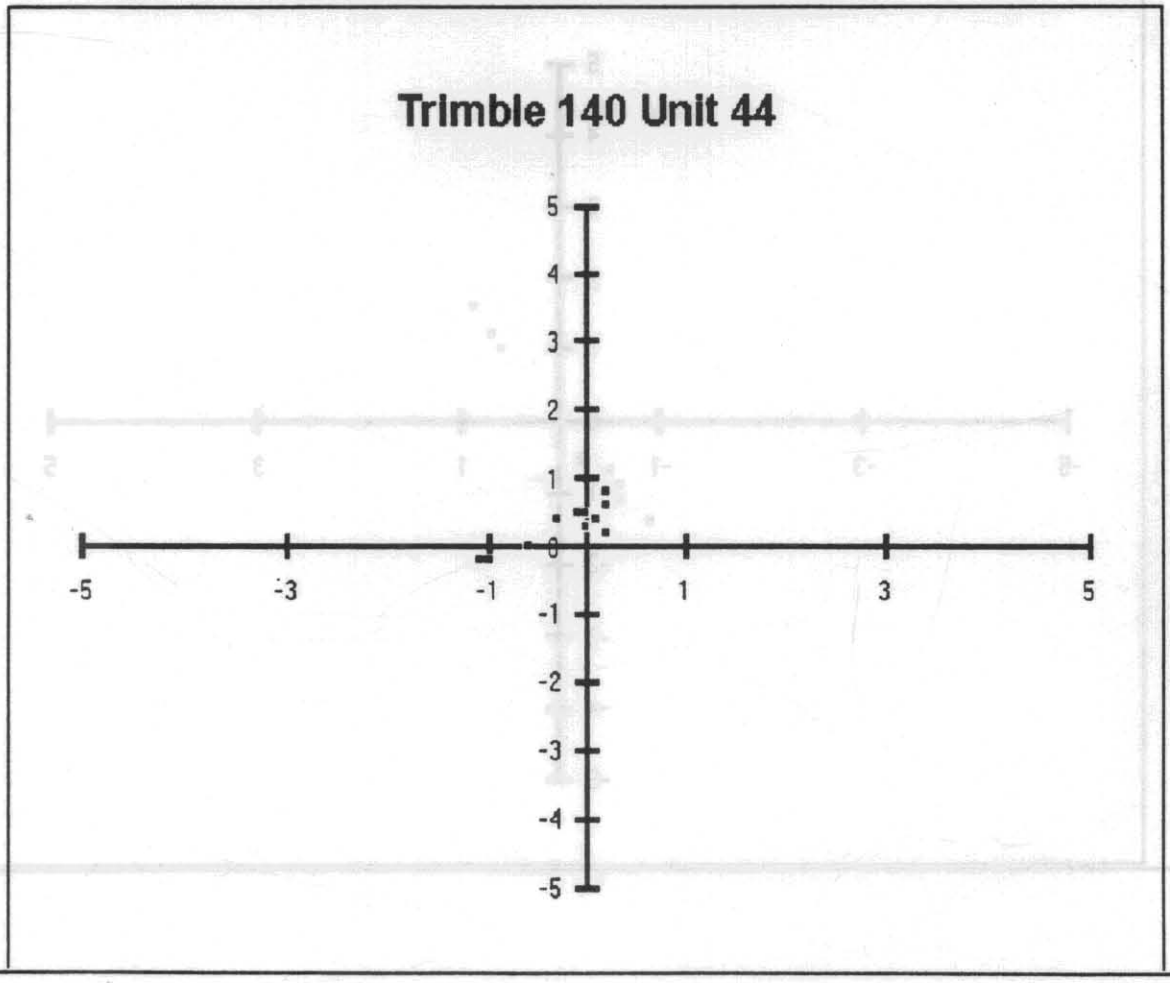


5 cm

TRIMBLE 140 UNIT 44

153016.3 385072.4

105	7:52:47	-1 RP01	153017.4	385072.6	-1.1	-0.2
105	7:53:13	-1 RP01	153017.3	385072.6	-1	-0.2
105	7:53:43	-1 RP01	153016.9	385072.4	-0.6	0
105	7:54:14	-1 RP01	153016.6	385072	-0.3	0.4
105	7:54:43	-1 RP01	153016.4	385071.9	-0.1	0.5
105	7:55:13	-1 RP01	153016.1	385071.8	0.2	0.6
105	7:55:43	-1 RP01	153016.1	385071.6	0.2	0.8
105	7:56:13	-1 RP01	153016.3	385072.1	0	0.3
105	7:56:44	-1 RP01	153016.4	385071.9	-0.1	0.5
105	7:57:13	-1 RP01	153016.3	385071.9	0	0.5
105	7:57:44	-1 RP01	153016.3	385071.9	0	0.5
105	7:58:14	-1 RP01	153016.3	385071.9	0	0.5
105	7:58:44	-1 RP01	153016.3	385072.1	0	0.3
105	7:59:13	-1 RP01	153016.1	385072.2	0.2	0.2
105	7:59:43	-1 RP01	153016.2	385072	0.1	0.4



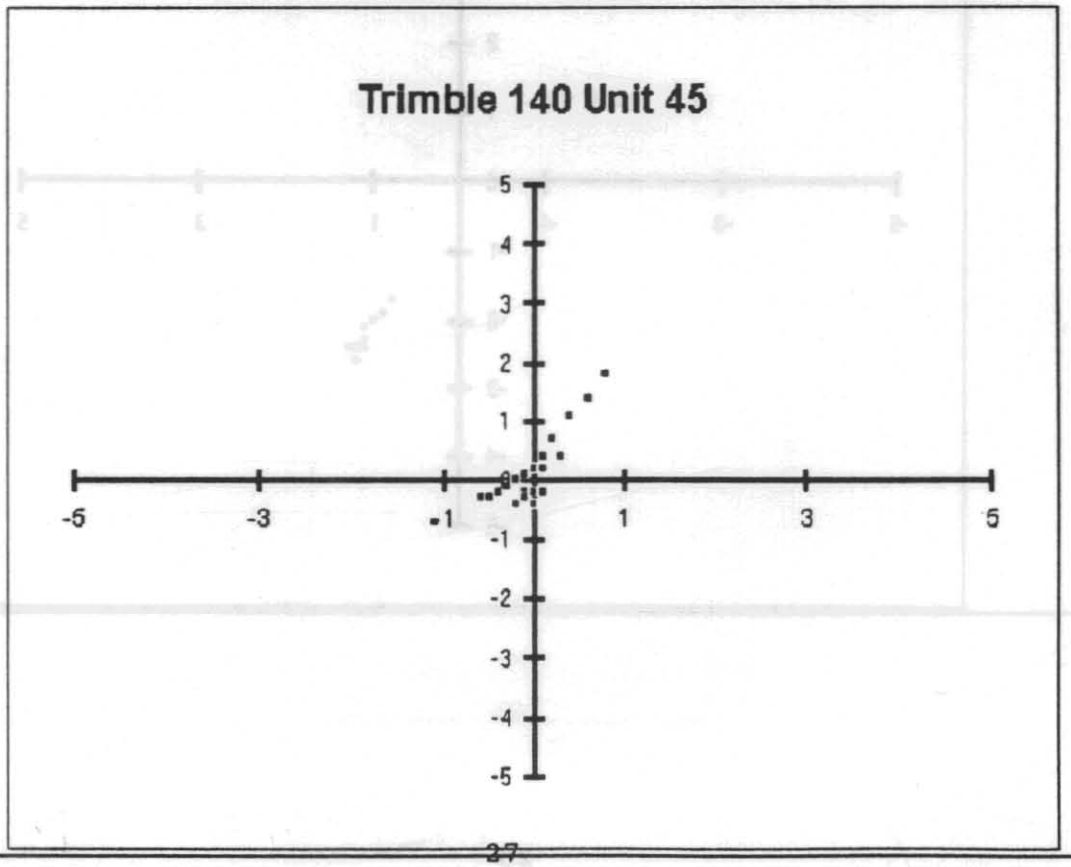
26

5 cm

TRIMBLE 140 UNIT 45

153016.3 385072.4

105	8:05:13	-1 RP01	153016.3	385072.2	0	0.2
105	8:05:44	-1 RP01	153016	385072	0.3	0.4
105	8:06:14	-1 RP01	153016.2	385072.2	0.1	0.2
105	8:06:43	-1 RP01	153016.4	385072.3	-0.1	0.1
105	8:07:14	-1 RP01	153016.6	385072.5	-0.3	-0.1
105	8:07:47	-1 RP01	153016.8	385072.7	-0.5	-0.3
105	8:08:14	-1 RP01	153016.7	385072.6	-0.4	-0.2
105	8:08:43	-1 RP01	153016.9	385072.7	-0.6	-0.3
105	8:09:13	-1 RP01	153017.4	385073.1	-1.1	-0.7
105	8:09:45	-1 RP01	153016.5	385072.8	-0.2	-0.4
105	8:10:13	-1 RP01	153016.3	385072.6	0	-0.2
105	8:10:44	-1 RP01	153016.2	385072	0.1	0.4
105	8:11:13	-1 RP01	153016.1	385071.7	0.2	0.7
105	8:11:44	-1 RP01	153015.9	385071.3	0.4	1.1
105	8:12:14	-1 RP01	153015.7	385071	0.6	1.4
105	8:12:44	-1 RP01	153015.5	385070.6	0.8	1.8
105	8:13:14	-1 RP01	153016.5	385072.4	-0.2	0
105	8:13:46	-1 RP01	153016.5	385072.4	-0.2	0
105	8:14:14	-1 RP01	153016.2	385072.6	0.1	-0.2
105	8:14:44	-1 RP01	153016.4	385072.6	-0.1	-0.2
105	8:15:14	-1 RP01	153016.4	385072.7	-0.1	-0.3
105	8:15:43	-1 RP01	153016.3	385072.8	0	-0.4



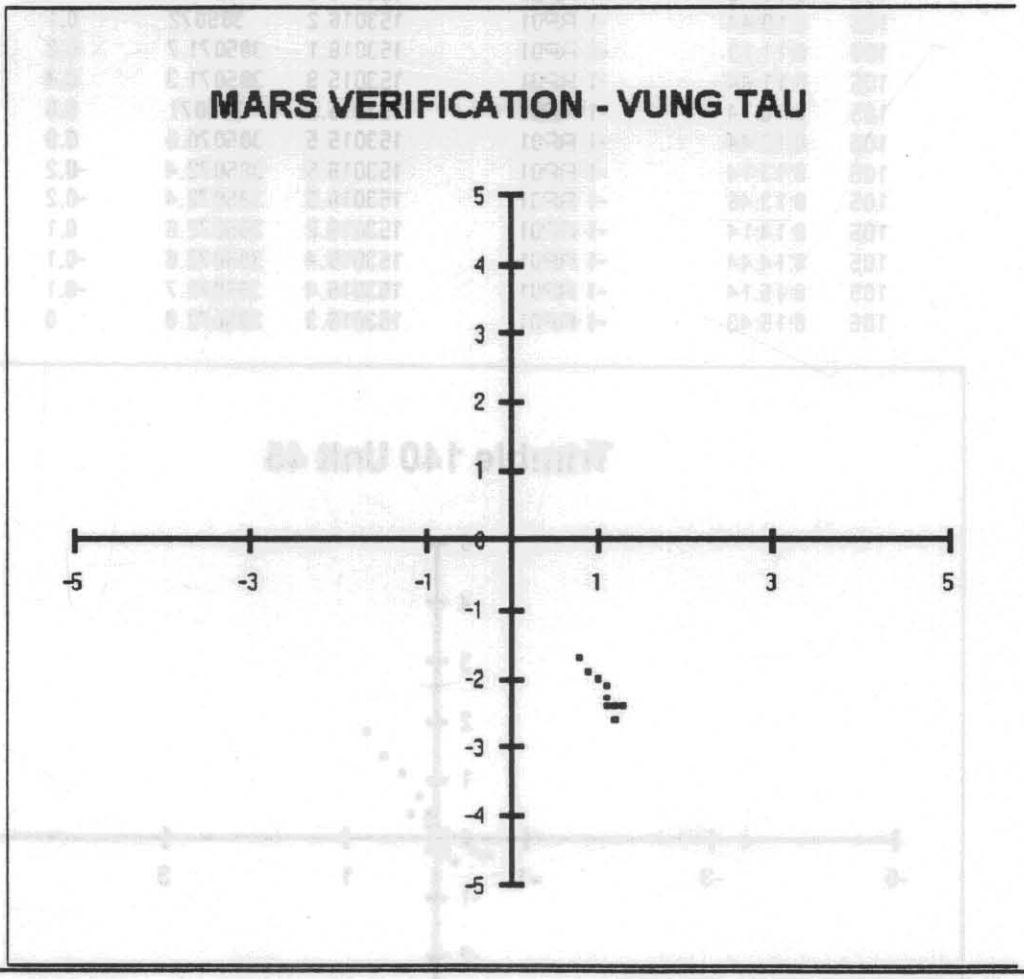
5 cm

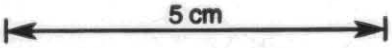
3. MARS VERIFICATION

MARS VERIFICATION - VUNG TAU

1148824.5 401422.2

109	9:32:53	140 RP06	1148823.6	401424.1	0.9	-1.9
109	9:33:53	140 RP06	1148823.4	401424.5	1.1	-2.3
109	9:34:54	140 RP06	1148823.4	401424.6	1.1	-2.4
109	9:35:53	140 RP06	1148823.6	401424.1	0.9	-1.9
109	9:36:51	140 RP06	1148823.3	401424.6	1.2	-2.4
109	9:37:53	140 RP06	1148823.4	401424.3	1.1	-2.1
109	9:38:53	140 RP06	1148823.7	401423.9	0.8	-1.7
109	9:39:51	140 RP06	1148823.2	401424.6	1.3	-2.4
109	9:40:53	140 RP06	1148823.3	401424.6	1.2	-2.4
109	9:41:53	140 RP06	1148823.3	401424.8	1.2	-2.6
109	9:42:51	140 RP06	1148823.5	401424.2	1	-2



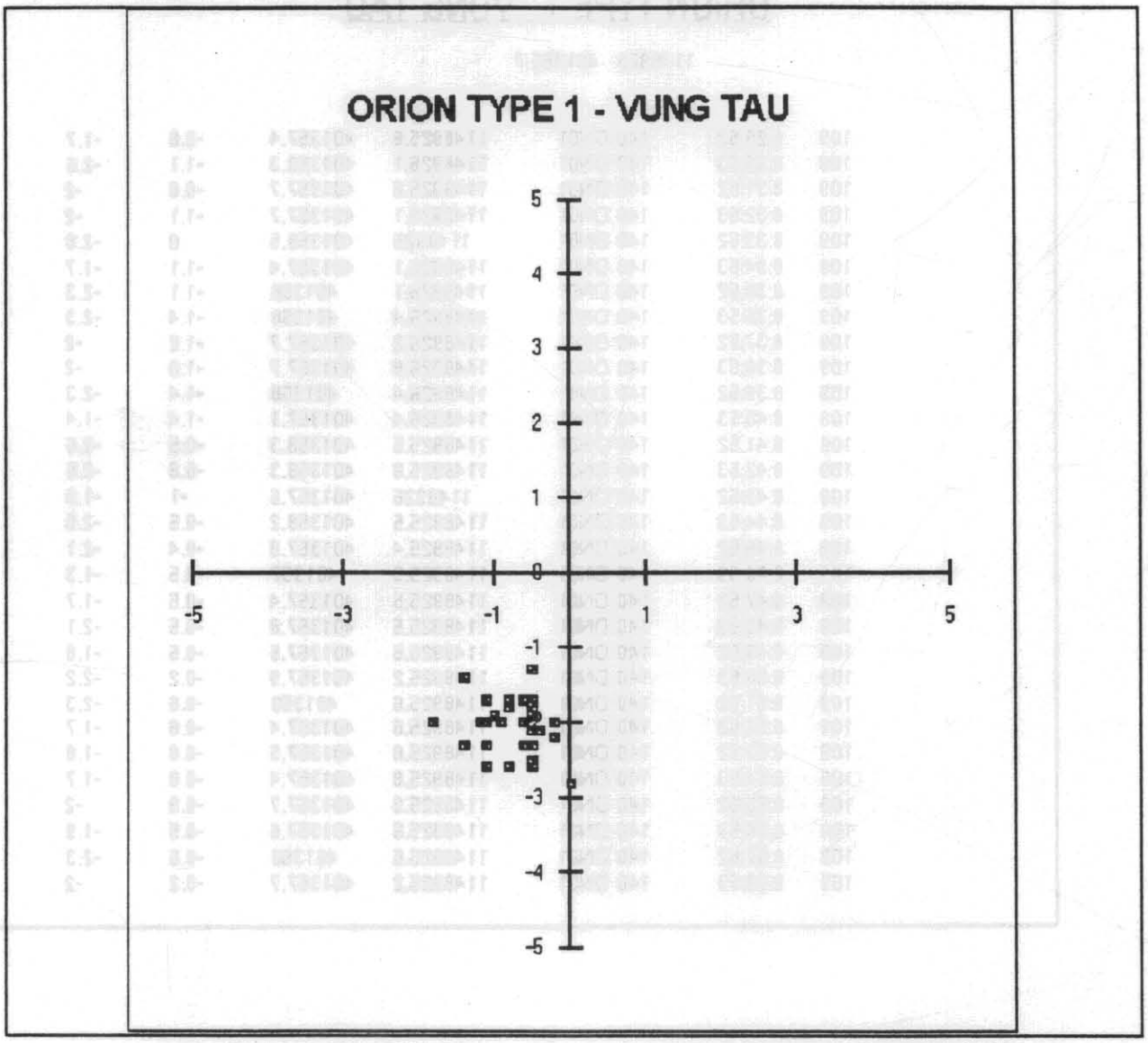


4. VIETNAM DGPS VERIFICATION

ORION TYPE 1 - VUNG TAU

1148925 401355.7

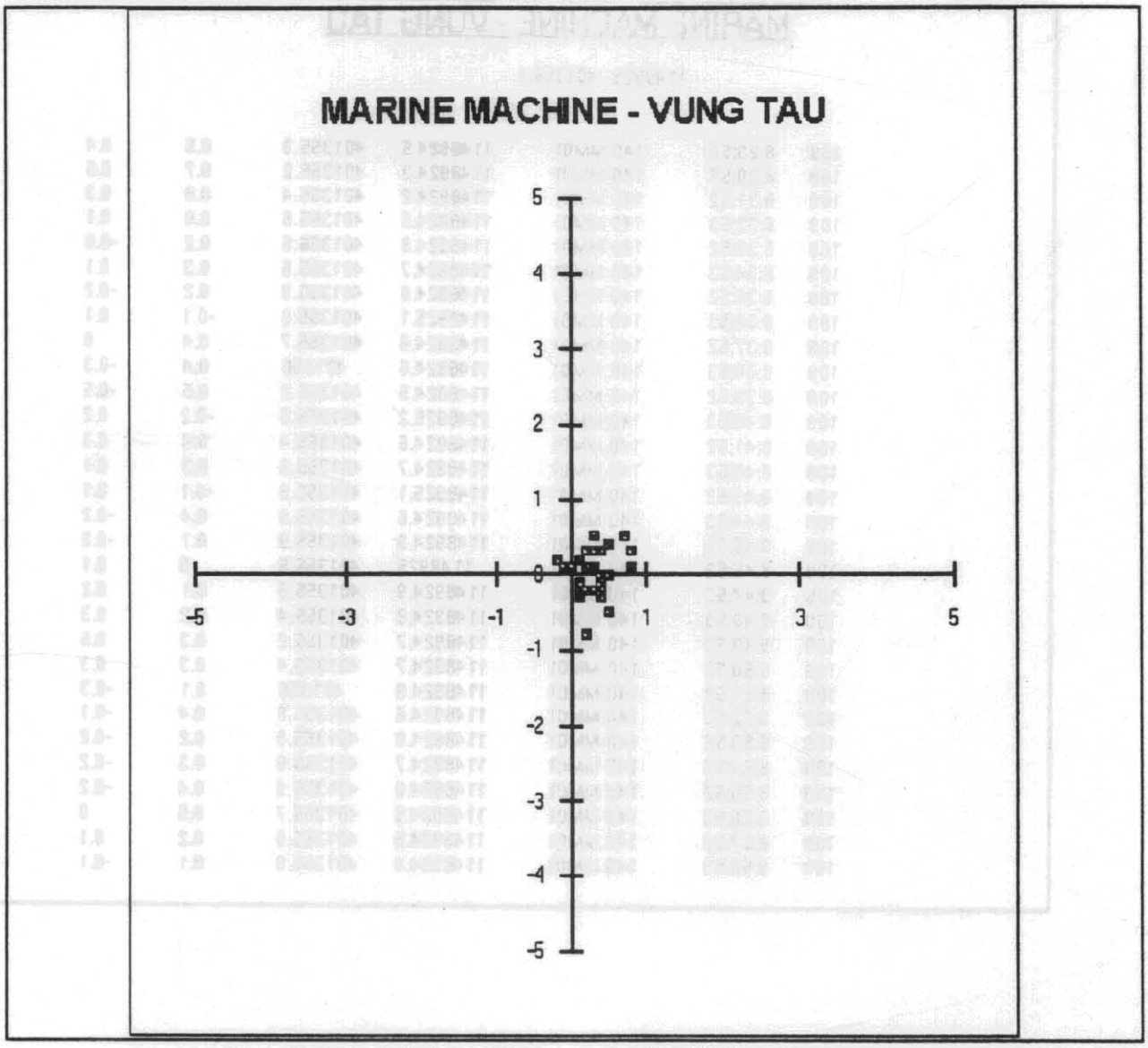
109	8:29:52	140 DN01	1148925.6	401357.4	-0.6	-1.7
109	8:30:53	140 DN01	1148926.1	401358.3	-1.1	-2.6
109	8:31:52	140 DN01	1148925.6	401357.7	-0.6	-2
109	8:32:53	140 DN01	1148926.1	401357.7	-1.1	-2
109	8:33:52	140 DN01	1148925	401358.5	0	-2.8
109	8:34:53	140 DN01	1148926.1	401357.4	-1.1	-1.7
109	8:35:52	140 DN01	1148926.1	401358	-1.1	-2.3
109	8:36:53	140 DN01	1148926.4	401358	-1.4	-2.3
109	8:37:52	140 DN01	1148926.2	401357.7	-1.2	-2
109	8:38:53	140 DN01	1148926.8	401357.7	-1.8	-2
109	8:39:52	140 DN01	1148926.4	401358	-1.4	-2.3
109	8:40:53	140 DN01	1148926.4	401357.1	-1.4	-1.4
109	8:41:52	140 DN01	1148925.5	401358.3	-0.5	-2.6
109	8:42:53	140 DN01	1148925.8	401358.3	-0.8	-2.6
109	8:43:52	140 DN01	1148926	401357.6	-1	-1.9
109	8:44:53	140 DN01	1148925.5	401358.2	-0.5	-2.5
109	8:45:52	140 DN01	1148925.4	401357.8	-0.4	-2.1
109	8:46:53	140 DN01	1148925.5	401357	-0.5	-1.3
109	8:47:52	140 DN01	1148925.5	401357.4	-0.5	-1.7
109	8:48:53	140 DN01	1148925.5	401357.8	-0.5	-2.1
109	8:49:52	140 DN01	1148925.5	401357.5	-0.5	-1.8
109	8:50:53	140 DN01	1148925.2	401357.9	-0.2	-2.2
109	8:51:52	140 DN01	1148925.6	401358	-0.6	-2.3
109	8:52:53	140 DN01	1148925.8	401357.4	-0.8	-1.7
109	8:53:52	140 DN01	1148925.8	401357.5	-0.8	-1.8
109	8:54:53	140 DN01	1148925.8	401357.4	-0.8	-1.7
109	8:55:52	140 DN01	1148925.9	401357.7	-0.9	-2
109	8:56:53	140 DN01	1148925.5	401357.6	-0.5	-1.9
109	8:57:52	140 DN01	1148925.5	401358	-0.5	-2.3
109	8:58:53	140 DN01	1148925.2	401357.7	-0.2	-2

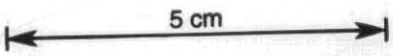

ORION TYPE 1 - VUNG TAU
5
4
3
2
1
0
-1
-3
-4
-5
-5
-3
-1
1
3
5
5 cm

MARINE MACHINE - VUNG TAU

1148925 401355.7

109	8:29:52	140 MM01	1148924.5	401355.3	0.5	0.4
109	8:30:53	140 MM01	1148924.3	401355.2	0.7	0.5
109	8:31:52	140 MM01	1148924.2	401355.4	0.8	0.3
109	8:32:53	140 MM01	1148924.2	401355.6	0.8	0.1
109	8:33:52	140 MM01	1148924.8	401356.5	0.2	-0.8
109	8:34:53	140 MM01	1148924.7	401355.6	0.3	0.1
109	8:35:52	140 MM01	1148924.8	401355.9	0.2	-0.2
109	8:36:53	140 MM01	1148925.1	401355.6	-0.1	0.1
109	8:37:52	140 MM01	1148924.6	401355.7	0.4	0
109	8:38:53	140 MM01	1148924.6	401356	0.4	-0.3
109	8:39:52	140 MM01	1148924.5	401356.2	0.5	-0.5
109	8:40:53	140 MM01	1148925.2	401355.5	-0.2	0.2
109	8:41:52	140 MM01	1148924.6	401355.4	0.4	0.3
109	8:42:53	140 MM01	1148924.7	401355.6	0.3	0.1
109	8:43:52	140 MM01	1148925.1	401355.6	-0.1	0.1
109	8:44:53	140 MM01	1148924.6	401355.9	0.4	-0.2
109	8:45:52	140 MM01	1148924.9	401355.9	0.1	-0.2
109	8:46:53	140 MM01	1148925	401355.6	0	0.1
109	8:47:52	140 MM01	1148924.9	401355.5	0.1	0.2
109	8:48:53	140 MM01	1148924.8	401355.4	0.2	0.3
109	8:49:52	140 MM01	1148924.7	401355.2	0.3	0.5
109	8:50:53	140 MM01	1148924.7	401355.4	0.3	0.3
109	8:51:52	140 MM01	1148924.9	401356	0.1	-0.3
109	8:52:53	140 MM01	1148924.6	401355.8	0.4	-0.1
109	8:53:52	140 MM01	1148924.8	401355.9	0.2	-0.2
109	8:54:53	140 MM01	1148924.7	401355.9	0.3	-0.2
109	8:55:52	140 MM01	1148924.6	401355.9	0.4	-0.2
109	8:56:53	140 MM01	1148924.5	401355.7	0.5	0
109	8:57:52	140 MM01	1148924.8	401355.6	0.2	0.1
109	8:58:53	140 MM01	1148924.9	401355.8	0.1	-0.1


MARINE MACHINE - VUNG TAU
5
4
3
2
1
0
-1
-2
-3
-4
-5
-5
-3
-1
1
3
5


5 cm

8.0 FATHOMETER VERIFICATION

A T\S DIP UNIT was used to measure water depths to compare with the SIMRAD E200 fathometer while along side in SINGAPORE.

Four measurements were taken from various points around the vessel, ie stern, bow, port and starboard beam.

These values were then averaged and compared to the fathometer output in the Wisdom system.

The speed of sound in water used was 1500 m/s.

SINGAPORE

MEASUREMENTS:

STERN	8.9	STERN	9.0	STERN	9.0
PORT BEAM	8.4	PORT BEAM	8.5	PORT BEAM	8.5
STB BEAM	9.3	STB BEAM	9.3	STB BEAM	9.4
BOW	9.3	BOW	9.4	BOW	9.3

MEAN DEPTH: 9.0m

FATHOMETER OUTPUT 4.9m
VESSEL DRAFT AT TIME OF VERIFICATION: 4.2m
MEAN DEPTH: 9.1m

VIETNAM

MEASUREMENTS:

STERN	9.3	STERN	9.4	STERN	9.3
PORT BEAM	9.3	PORT BEAM	9.3	PORT BEAM	9.4
STB BEAM	8.1	STB BEAM	8.0	STB BEAM	8.1
BOW	7.8	BOW	7.8	BOW	7.7

MEAN DEPTH: 8.6m

FATHOMETER OUTPUT 4.3m
VESSEL DRAFT AT TIME OF VERIFICATION: 4.3m
MEAN DEPTH: 8.6m

9.0 SSTS VS DIGICOURSE COMPARISON

This comparison was carried out on the 16th April 1994 at Eastern Anchorage in Singapore. The vessel was at anchor. A Digicourse gun CMX was suspended from each SSTS towfish by steel cables and lowered to a depth of 6-7m. The ranges obtained for SSTS were read from the Wisdom CRT while simultaneous readings were read directly from the Digicourse CRT. Readings were taken for 5 minutes at 10 second intervals from 10:11 to 10:16 UTC. Both the SSTS and Digicourse acoustics used an arbitrary speed of sound in water value of 1500m/s.

Results were as follows:-	MEAN	SD
SSTS	27.90m	0.06m
Digicourse	27.83m	0.10m

SSTS VS DIGICOURSE COMPARISON

	SSTS	DIGICOURSE
SAMPLES	27.8	27.68
	27.9	27.6
	27.9	27.75
	27.9	27.75
	27.9	27.75
	28	27.83
	28	27.9
	27.9	27.75
	27.9	27.9
	27.9	27.9
	27.9	27.9
	27.9	27.9
	27.9	27.9
	28	28.05
	27.9	27.9
	27.8	27.9
	27.9	27.97
	28	27.9
	28	27.9
	27.9	27.9
	27.9	27.97
	27.9	27.9
	27.9	27.9
	27.9	27.97
	28	27.9
	28	27.9
	28	27.9
	28	28.05
	28	27.97
MEAN	27.9	27.83
SD	0.06	0.10

10.0 CONCLUSIONS\RECOMMENDATIONS

In both Singapore and Vietnam, all systems performed very well. All verifications and calibrations were completed without any problems at all.

Recommendations can only come in the form of continuing our QC program of systems verifications to maintain a high standard of performance.

APPENDIX 7

SEISMIC DATA PROCESSING REPORT

DIGITAL EXPLORATION LIMITED

501769

SEISMIC DATA PROCESSING REPORT

FOR
SAGASCO RESOURCES LTD.

1994 YOLLA 3D SURVEY

BASS BASIN
AUSTRALIA
BLOCK: T/RL 1

BY

DIGITAL EXPLORATION LIMITED
(A DIGICON COMPANY)

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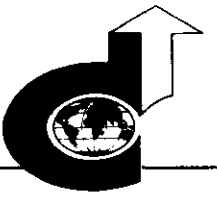

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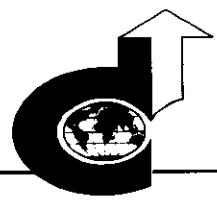

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501772

SAGASCO RESOURCES LTD.

YOLLA 3D SURVEY

BASS BASIN - T/RL1

1.0 INTRODUCTION

This report presents an account of the sequence and techniques used to process the 3D seismic data acquired in block T/RL1 in the Bass Basin for SAGASCO Resources Ltd. This survey was titled the Yolla 3D survey. Processing was carried out in Digital Exploration's Brisbane office between April and August 1994 on approximately 13,766 line kms, (11,734 cdp kms) of data. A summary of the survey and its acquisition parameters is given in section 2.0.

The processing parameters, such as choice of optimum filters (deconvolution and band-pass), mutes, velocity analyses, post stack scaling etc. were established by Digital Exploration in collaboration with SAGASCO. These tests are described in section 4.0. The processing sequence and the parameters used are given in Section 3.0 and the data processing system used by Digital Exploration is described in section 5.0.

2.0 FIELD ACQUISITION

2.1 ACQUISITION PARAMETERS

The data was recorded by Western Geophysical using the seismic vessel M/V WESTERN ATLAS (party no. P-116) during February and March 1994. A brief summary of the acquisition parameters is given below.

RECORDING INSTRUMENT

Type	: WG-24 (S/N #14)
Low cut Filter	: 6 / 18 hz / dB/oct
High cut Filter	: 196 / 214 hz / dB/oct
Record Length	: 6.0 seconds
Sample Interval	: 2.0 msec.
Tape Format	: SEG-D 4 byte demultiplexed 8048 3480 compatible cartridges at 38000 b.p.i

SOURCE

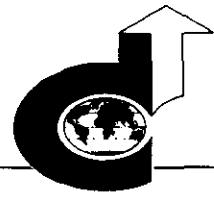
Configuration	: Dual source
Source separation	: 50 metres
Type	: Litton low pressure Airgun array 18 in array, 14 are active
Array Vol./pressure	: 2700 cu.in. / 1850 P.S.I. (per array)
Source Interval	: 25.0 metres flip-flop (50m per array)
Source Depth	: 6.0 (+/- 1.5) metres
Source Delay	: 0.0 milliseconds
Source to Antenna	: 155.0 metres

CABLES

Number	: 3
Type	: WG - 24
No. of groups	: 240 per cable
Group Interval	: 12.5 metres
No. of hydrophones per group	: 16
Cable Length	: 3000 metres
Near Offset	: 143.0 metres
Cable Depth	: 10.0 (+/- 1.5) metres

NAVIGATION

Vessel	Primary	: ARGO
	Secondary	: RACAL MULTIFIX.
Cable		: D.G.P.S. tailbouys
		: Front/mid/tail acoustic networks
		: 11 magnetic compasses per streamer
Guns		: MARS laser



2.2 SURVEY PARAMETERS

The source-receiver pattern used in the YOLLA 3D survey is shown in figure 1. This pattern resulted in a 25 metre CDP line spacing, a natural bin size of 6.25 x 25.0 metres, and a nominal fold of 30. It was decided to perform an adjacent trace summation on receivers, resulting in a 25.0 metre group interval, a natural bin size of 12.5 x 25.0 metres and a nominal fold of 30.

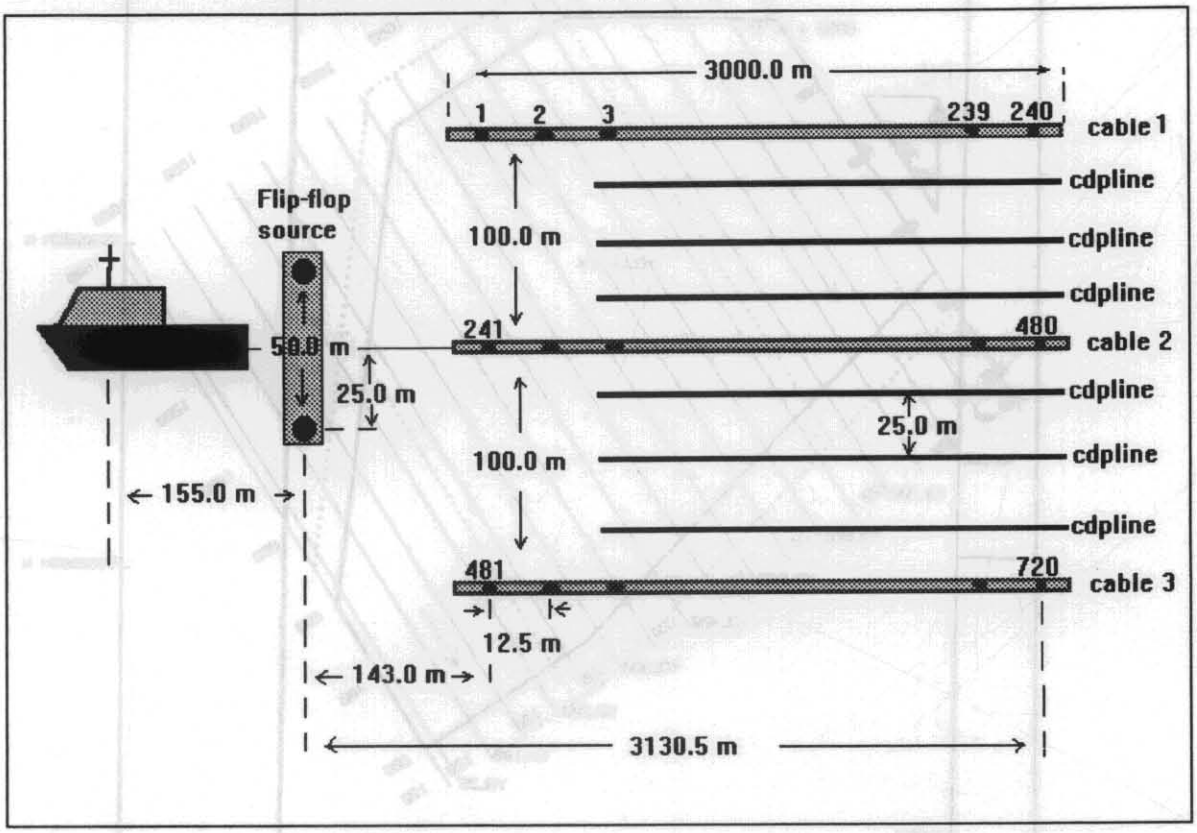
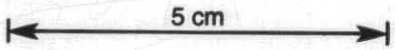


Figure 1. - Source - Receiver Pattern



There were 2,294 km of surface lines recorded, resulting in a subsurface volume of 13,766 km. A full list of the lines and shotpoint ranges processed is given in Appendix I. The seismic lines were orientated in a north-east/south-west direction at approximately 33.3 degreeds from north. A survey location map is given in figure 2.

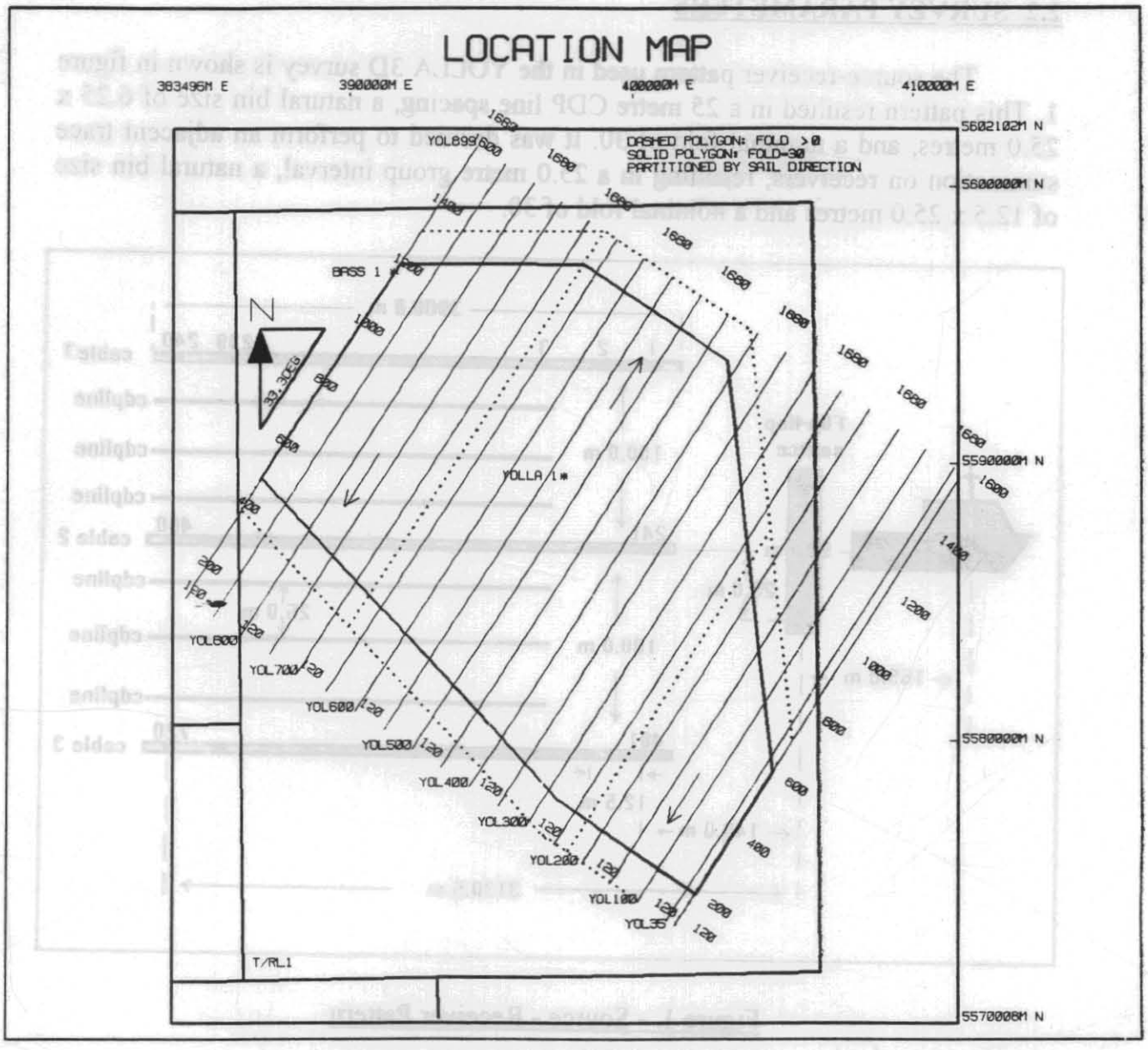


Figure 2 - Survey location map

3.0 PROCESSING SEQUENCE

A brief description of the steps taken in the processing sequence follows.

3.1 TRANSCRIPTION AND RESAMPLE

The field data was converted to Digicon's internal trace sequential format. The data were resampled from 2 msec to 4msec with a 0 - 100 hz minimum phase anti-alias filter applied prior to resampling to avoid temporal aliasing of the seismic data.

3.2 SHOT DOMAIN F-K VELOCITY FILTER

The F-K filter was designed to preserve data in the range of -2.0 km/sec to 2.0 km/sec (-6.25 to 6.25 msec/trace). No nmo was applied. A full-bell cosine taper was applied in the F-K domain between the 100% reject velocities. AGC was applied before and removed after filtering in order to avoid any high amplitude spikes creating artifacts after the F-K filtering. A low frequency protection of 8 hz was also used.

3.3 DATA REDUCTION

A 2:1 adjacent trace summation was performed after the application of nmo. The input was 720 channel at 12.5m with the output being 360 channel at 25.0m. The nmo correction was removed from the data after summation.

3.4 TRUE AMPLITUDE RECOVERY

True amplitude recovery consisted of the following basic steps.

a) Restoration
Restoration of the 32 bit floating data from 4 byte SEGD.

b) Correction for amplitude losses
These losses are due to the spherical spreading of the wavefront. Thus, as the amplitude of the recorded trace varies inversely with the radius of the advancing wavefront, each trace was multiplied by a function "V**2*T", where V is the seismic wave velocity and T is the two-way time.

3.5 NAVIGATION AND GEOMETRY

3.5.1 Tape QC procedures

The navigation data was processed and checked by Western Geophysical. On receipt by Digicon the data was checked again before being merged with the seismic data. This is standard practice by Digicon even on data processed by our own navigation department. The QC procedures followed for each tape are given below.

a) Plot of shot position

This was plotted for an odd shot increment so that it could be easily seen whether or not the data had been processed for dual array.

b) Plot of cables

These were plotted for every shot for each cable to seach for any discrepancies in the data. The cables were rotated about the shot in order to see the cable clearly.

c) Shot-offset plots

A plot of the offset and azimuth variation along the line was plotted for selected channels (ie the far and near channels only unless it was considered nesessary to plot other channels).

3.5.2 Geometry

On receipt of the processed navigation data it was possible to define the limits of the 3D grid on which the data would be binned. In order to have a regular geometry the data was rotated from its real world orientation to an east-west orientation. The average direction of the sail lines was found to be 33.3 degrees from north and so the survey was rotated 56.7 degrees. (see figure 3)

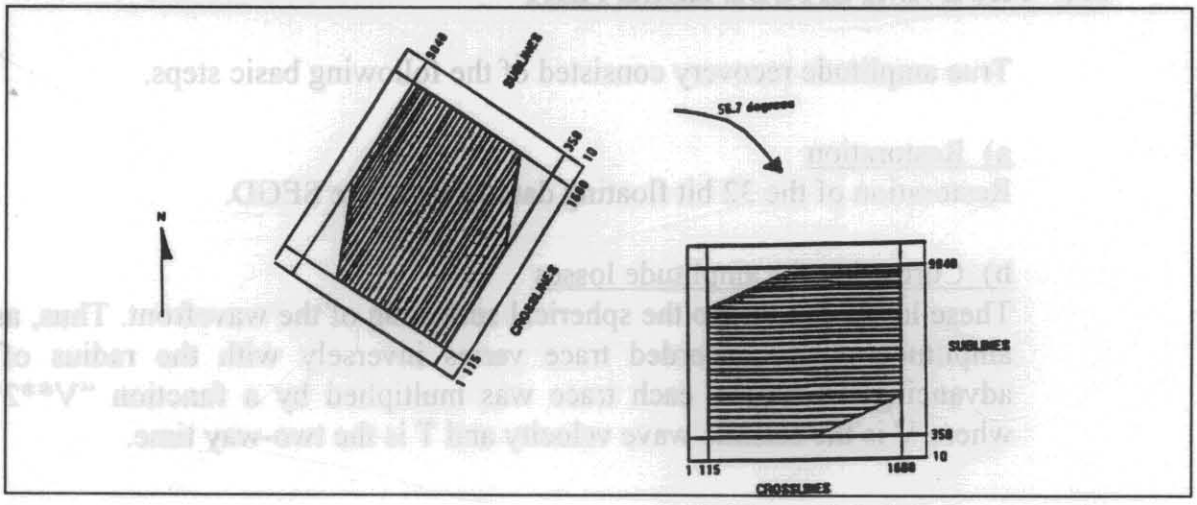


Figure 3 - Survey Rotation

5 cm

The origin of the rotated survey was selected as ;

- x = 4877500.0
- y = 2723000.0

This co-ordinate represents the centre of the lower left hand bin in the survey. Subsequent bin centres were defined at

- 12.5 metres intervals along the x-axis (west-east)
- 25.0 metres intervals along the y-axis (south-north)

A grid of 920 sublines x 1840 crosslines was defined

- Sublines numbered 10 to 9200 incremented by 10
- Crosslines numbered 1 to 1840 incremented by 1

The live data area fell approximately between;

- sublines 350 to 9040
- crosslines 115 to 1680

At the end of the survey SAGASCO requested that the sublines be renumbered from 10 - 9200 to 1 - 920 (ie subline numbering is divided by 10 so that the increment between sublines is 1)

The seismic traces may now be sorted into the above 3D bins based on a primary key of common-mid-point and a secondary key of increasing offset distance within each bin group. The maximum fold was 30.

3.5.3 Application QC procedures

After QC of the navigation data it was matched with the seismic data on the basis of the time header, which should be unique for the survey. A check was also made that the shotpoint numbers matched between the navigation and the seismic data. After merging the following QC's were produced;

a) Dump of the following headers for the near and far trace channels for each cable for each shot:

- waterdepth - time
- guncode - fieldrecord
- offset - navgun
- subline/crossline bin number

For each subsurface line the minimum and maximum subline values were reported.

b) An automatic check was made that the starboard array and cable were on the starboard side of the port array and cable by comparing near trace bin positions.

c) A near trace plot was produced for each subsurface line. An incorrect assignment of array along the line shows up as a jump in the direct arrival.

d) A line was drawn on the shot QC plots, calculated fom the offset to represent the theoretical first break time. These should concide with the first break on the plot.

e) The near traces for each subsurface line were NMO corrected and loaded onto disk to creat a near trace volume. Problems in navigation show up ias lineations in the timeslices and jitter in the inlines and crosslines. These were displayed with and without tidal statics to Q.C. the effectiveness of tidal static application. These were shipped to SAGASCO on tape for their Q.C..

3.6 STATIC CORRECTIONS - SOURCE/STREAMER DELAY

A static correction was applied for the source and streamer depths and gun delay, thus referencing the data to mean sea level. For these data the combined source/streamer/gun static correction applied was +10.66 msec.

3.7 TRACE EQUALISATION

A single gate trace equalisation was performed on the shots. The design gate was;

near offset : 400 - 3500 msec
far offset : 2400 - 4500 msec

3.8 WAVELET DECONVOLUTION

The routine maybe considered as operating in two stages for each shot gather namely:

a) **Estimation of the source wavelet.**
The program makes use of a series of averaged autocorrelation functions derived from specified time-gates for its estimate of the source wavelet's amplitude spectrum. The source wavelet is assumed to have a minimum phase spectrum. The low and high frequency ends of the spectrum are then amortised using imposed roll-off values.

b) **Design and application of a shaping filter**
The user specifies a zero-phase Butterworth 'output' wavelet. A filter is then designed to shape the estimated source wavelet to this desired output. The last stage in the process is the application of the filters to the field record.

For these data, a single operator was designed per shot with no offset dependence. A single design gate was determined from examination of selected field records to include the good signal to noise ratio portions of the data excluding first arrival energy from refractions. Amortisation of the estimated source spectrum was performed using tapers of 8 dB/oct below 6 hz and 72 dB/oct above 100 hz.

The desired output from the Wavelet Deconvolution was a zero phase wavelet with the frequency range 6 hz (18 dB/oct taper on) to 70 hz (60 dB/oct taper off). The design gate of the Wavelet Deconvolution was as follows:

near offset : 400 - 3500 msec
far offset : 2400 - 4500 msec

The deconvolution filters for all data were applied to the whole seismic trace.

3.9 PREDICTIVE DECONVOLUTION

Gapped predictive deconvolution was applied to reduce reverberation and short path multiple energies. The gap length between the start time and the onset of the filter was determined so as to attenuate the multiple energy while preserving the main zero-phase pulse of the input wavelet. Operations were designed and applied on a trace by trace basis.

For these data the following parameters were selected from a range of initial tests (see Parameter Testing);

Operator Length (include. gap)	: 248 msec.
Gap Length	: 48 msec.
Percentage White Noise	: 0.1 %
Number of Design Gates	: 1

The design gate of the deconvolution was;

near offset : 400 - 3500 msec
far offset : 2400 - 4500 msec

The deconvolution filters for all data were applied to the whole seismic trace.

3.10 FIRST PASS VELOCITIES

TANGO "DIVAN" was used in the velocity analysis and is a comprehensive velocity determination package. At each velocity analysis location the data is sorted into 2D CMP gathers and are normal move-out corrected with a range of velocities specified by the user. These gathers are then summed to observe the stack response. The module provides a display of the selected velocity control depth points showing;

a) Central CMP gather before correction for normal move-out.

b) Normal move-out corrected central CMP gathers associated with their respective velocity fan functions.

c) Display of the stack associated with the suite of selected velocity fan functions.

A semblance function is computed across the stacked panels and displayed in graphical form for user reference. Based on the semblance values the program provides optional time-velocity picks which are displayed as a numerical listing and also imposed on the velocity time graph. This is positioned to the right of the actual data. Offset information displayed above each gather trace can be used to determine the required prestack mute pattern. The mute pattern used for the analysis is displayed on each normal move-out corrected gather record.

A list of lines used in the first pass velocity analyses is given in Appendix II. These lines were chosen from the navigation Q.C. displays to be lines with minimal feather. For these data the above analyses were conducted every 1.0 Km using 21 alternate CMP gathers and 11 velocity functions. F-K demultiple (ZMULT see section 3.11) using 90% of a specific regional velocity function was applied to the data to aid the first pass velocity interpretation. Various ,QC plots are produced as the velocities are being picked, including isovels both in the subline and crossline direction and timeslice velocity maps.

First pass velocities were used in the F-K transform multiple attenuation (section 3.11) to provide separation between multiple and primary energy.

3.11 F-K TRANSFORM MULTIPLE ATTENUATION (ZMULT)

ZMULT is a multiple attenuation process which is based on the separation of primary events from multiples utilising the F-K domain transform on common midpoint gathered data. Application of a normal moveout curve, which over corrects the primaries and under corrects the multiples, will move these events into different quadrants of the F-K domain. By zeroing the "multiple" quadrant, inverse transforming the data and removing the over correction velocity, the multiples are attenuated. Velocity analyses can be considerably improved by the application of this process.

For the program to attenuate multiples, an appropriate NMO correction must be applied prior to the application of ZMULT. The NMO over correction applied was a constant percentage of the initial velocity field and is given below;

Time (ms)	% Percentage Velocity
0 - 6000	90

3.12 SECOND PASS VELOCITY ANALYSIS

A second pass of velocity analyses using Digicon's TANGO DIVAN routine were produced at 0.5 Km intervals, using 21 alternate CMP gathers and 11 velocity functions. Separation between functions was reduced from the first pass to provide more accurate velocity interpretation. 2D DMO was applied to the velocity lines. A full list of the lines used in the second pass velocity analysis is given in appendix II. Again these lines were chosen because of their minimal feather. They were taken as a 2D subline and 2D F-K DMO was applied to these lines before analysis.

Digital Exploration's geoscientists interpreted the velocity analyses on a horizon consistent basis. Quality control for the final stacking velocities was provided by SAGASCO. The improved data quality at this stage produced a more accurate velocity interpretation than in the first pass. These stacking velocities were used in the 3D DMO correction (section 3.15) and subsequently for the final stack volume (section 3.16).

Final stacking velocities for these data were displayed above the migrated subline films only. A listing of the stacking velocities was also provided on a diskette in "Western" format to SAGASCO.

3.13 TIDAL STATICS

Tidal statics for the survey were applied to the data. Tide heights were provided from a nearby land location at a 100 second interval and then were subsequently interpolated and converted to a time correction by Digicon.

Various time slices and cross-line and in-line sections were inspected before and after corrections to QC the improvement.

3.14 trace excursion

In order to achieve even fold and offset across the survey Trace Excursion was applied to the data. Excursion is applied in order to prevent a varying fold coverage across the survey producing different signal to noise ratios and to infill any holes left in the coverage by the acquisition.

In Digicon's "Trace Excursion" technique the navigation data is examined and each trace assigned an offset range. Duplicate traces in an offset range in any given bin are discarded according to the criteria that the nearest trace to the bin centre is the one kept. If no trace in a bin exists for a particular offset then a trace may be borrowed from an adjacent bin (in the crossline direction) if it fulfils the offset requirements. User input restrictions are placed on the maximum distance from the bin from which a trace may be borrowed. (refer to figure 4).

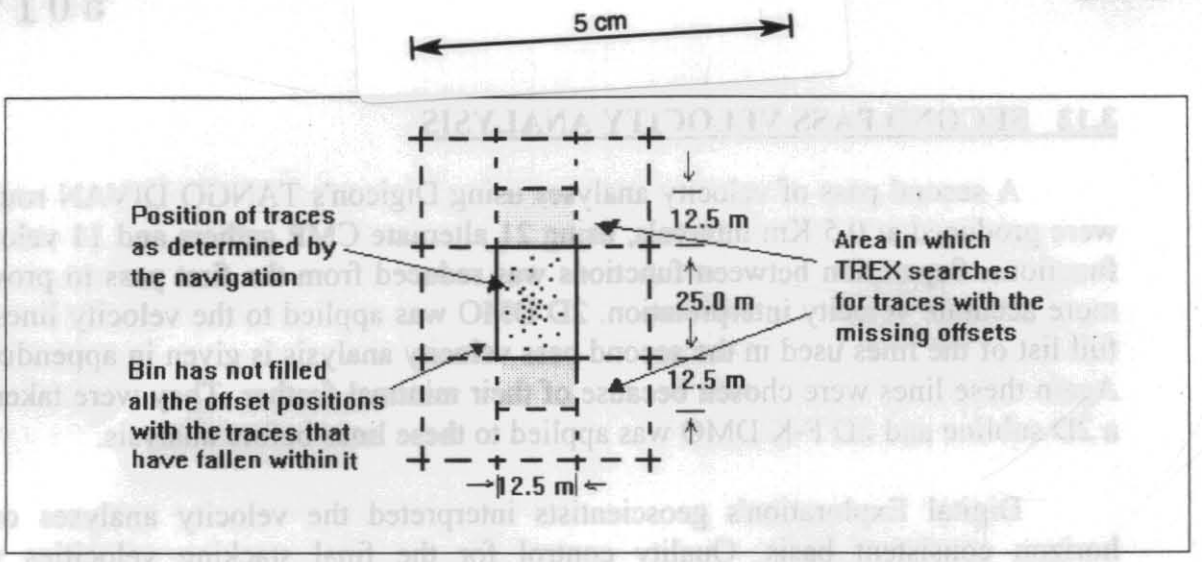


Figure 4 - Half bin trace excrusion

For this survey 30 offset groups were set up since the data was recorded with a nominal fold of 30. Tests were produced for a portion of the data to investigate the effect of different maximum excursion distances on the fold coverage (see section 4.5). It was concluded that the excursion distance should vary with offset as described below;

near traces (offsets 144 - 1076 metres) - half bin (12.5 metres)
mid traces (offsets 1180 - 2112 metres) - full bin (25.0 metres)
far traces (offsets 2216 - 3148 metres) - full bin (25.0 metres)

Refer to figure 5 for summary of TREX statistics.

3.15 3D DIP MOVEOUT CORRECTION (DMO)- KIRCHHOFF

A partial 3d migration before stack was achieved with a Kirchhoff algorithm. The maximum dip parameter was +/- 12 msec/trace and the anti-alias measures were switched on. Also a velocity gradient of alpha = 0.5 was used.

3.16 NORMAL MOVEOUT

The stacking velocity functions derived from the final velocity analysis were used to compute the 3D normal moveout (NMO) corrections to be applied to the traces in the final binned gathers.

The NMO is performed assuming that the energy travels in a straight raypath and utilizes the following equation :

$$TT = (T0^{**}2 + (X^{**}2/V^{**}2))^{**}0.5$$

where: TT = Total recorded travel time in seconds
X = Offset

```
Number of traces processed.....32967000
Number of traces deleted.....6504751
Number of traces copied ONLY once.....1753923
Number of traces borrowed ONLY once.....991272
Number of traces copied TWICE.....39786
Number of traces borrowed TWICE.....53539
Number of traces deleted due to azimuth.....0
Number of traces outside azimuth range used....0
Number of identical traces not used.....0
Number of in-fill traces NOT used.....0
Total number of traces now in swath.....28349283
Total number of bins in swath.....1692800
Total number of populated bins.....1048547
Number of bins in range  1 achieving min fold  858640
Number of bins in range  2 achieving min fold  926627
Number of bins in range  3 achieving min fold  919940
Number of bins in range  4 achieving min fold  901390
Range  1 has min fold =   4 and max fold =   7
    and used an excursion distance =      12.50
Range  2 has min fold =   6 and max fold =   7
    and used an excursion distance =      12.50
Range  3 has min fold =  10 and max fold =  10
    and used an excursion distance =      25.00
Range  4 has min fold =  10 and max fold =  10
    and used an excursion distance =      25.00
```

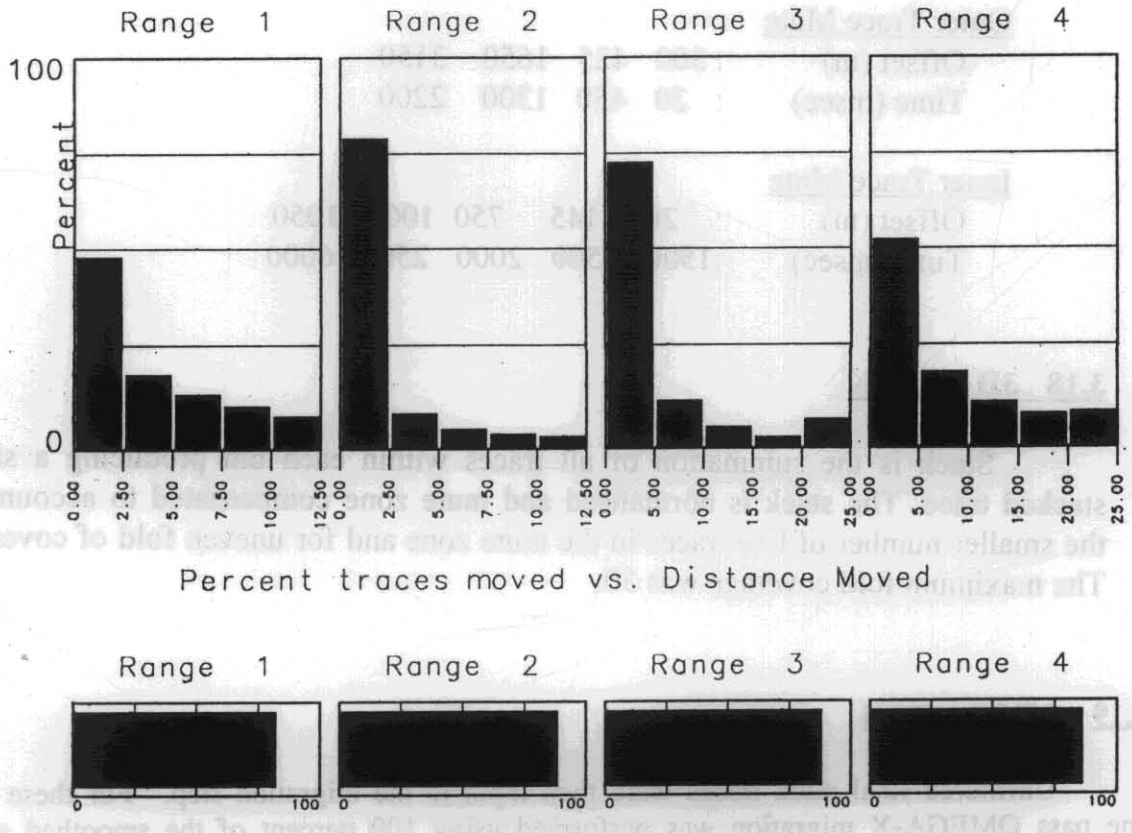
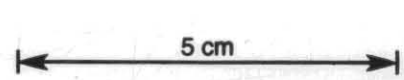


Figure 5



T0 = Time of reflector at zero offset in seconds
V = RMS velocity
**N = raise to the power N

Velocity-time knee points are honoured on adjacent control points prior to interpolation of the temporal velocity field. The space variant velocity function is then derived by linear interpolation between control points.

3.17 PRE-STACK MUTE

A front-end mute (or ramp) was applied to the shallow and far offset data to remove undesirable stretching after NMO application. A near trace mute was also applied to remove any residual multiple energy left after the F-K multiple attentuation. The mute pattern was determined from comparative prestack mute tests and from NMO corrected gather displays. The pre-stack mute pattern was;

Outer Trace Mute

Offset (m)	: 300	425	1650	3150
Time (msec)	: 20	450	1300	2200

Inner Trace Mute

Offset (m)	: 20	145	750	1000	1050
Time (msec)	:1500	1500	2000	2500	6000

3.18 3D STACK

Stack is the summation of all traces within each bin producing a single stacked trace. The stack is normalised and mute zone compensated to account for the smaller number of live traces in the mute zone and for uneven fold of coverage. The maximum fold coverage was 30.

3.19 MIGRATION

Unfiltered final stack traces were then input to the migration step. For these data, a one pass OMEGA-X migration was performed using 100 percent of the smoothed stacking velocities. The data was progressively migrated down to 6 seconds in 1 second portions with 4 frequency ranges so that the migration could be AC'ed while processing progressed.

The OMEGA-X algorithm operated in the frequency range 3 Hz to 90 Hz and used a Tau step size equivalent to 20 ms.

3.20 TIME VARIANT BANDPASS FILTER

Application of a time variant filter to remove unwanted noise lying outside the frequency range of the desired reflection data was performed with a series of zero-phase bandpass filters. These following filters were selected from a series of filter test panels:

Time (msec)	Low freq/slope (hz/dB)	High freq/slope (hz/dB)
0	12/12	80/72
1000	12/12	80/60
2000	12/12	70/60
3000	12/12	50/48
6000	12/12	40/36

3.21 TRACE EQUALISATION

For display purposes, a multi-gated balance was applied to the data after filtering to bring the data to the desired amplitude level. The average absolute value (AABS) of the gate is computed and a scalar is applied to the centre point of the gate. This is repeated for each gate with the scalar interpolated between gate centres.

Gate Times

Start(msec)	End(msec)
0	200
100	300
200	500
400	1000
500	1500
1000	2000
1500	2500
2000	3000
2500	3500
3000	6000

3.22 DE-CHEQUER

A 5 trace de-chequer was applied from 0 - 700 msec to remove the jitter effect caused by 4 adjacent traces coming from the same shot.

3.23 TRACE SCALING

Due to residual multiple energies left in the deeper part of the data producing quite strong reflections, the data was scaled down. The scaling factor is given below;

Time (msec)	Scaling (dB)
0	0
3000	0
4000	-6
6000	-6

3.24 DISPLAY PARAMETERS

3.24.1 Films

Crosslines and sublines of the migrated data were plotted on film and supplied to SAGASCO (as well as 2 paper prints of the films). The range of the lines filmed were:

- every 10th subline - range 40 to 890 (SAGASCO notation)
- every 20th crossline - range 180 to 1620

The following parameters were used for the filming :

a) Vertical scale : 3.937 inches/sec.
(10.0 cm/sec)

b) Horizontal scale : Sublines
20.0 traces per cm (1:25,000)
50.8 traces per inch.
: Crosslines
10.0 traces per cm (1:25,000)
25.4 traces per inch.

c) Display mode : Wiggle trace variable area

d) Display gain : 85%

e) Polarity : Black Peak-positive sample.
(Field polarity maintained throughout processing)

f) Resample : to 1 msec.

3 migrated time slices were also provided at a 1:25000 scale as requested with 2 prints. The times displayed were - 1648 msec
- 1920 msec
- 2208 msec

3.24.2 Trex plots

Various 1:25000 colour TREX plots were provided to SAGASCO. These plots are described below in table 1.

offset range (metres)	fold before TREX	pop. before TREX	fold after 25.0m TREX	fold after 12.5m TREX	pop. after mixed TREX	fold after mixed TREX
near (A) 144-455	yes	yes	yes	yes		
near (B) 144-1076	yes		yes			
mid 1180-2112	yes		yes			
far 2216-3148	yes		yes			
full 144-3148	yes	yes			yes	yes

Table 1 - TREX plots that have be supplied to SAGASCO

For this table and for the plots supplied "fold" indicates the total number of traces within a bin (unlimited maximum) and "pop." (or population) indicates the total number of offsets that are filled within a bin (maximum of 30) without duplication.

3.25 ARCHIVING

a) 4 sets of stacked data were supplied on exabyte tape in SEG-Y format. A summary of the exabyte tapes used is given in Appendix III. The sets supplied were:

- raw final stacks
- filtered and scaled final stacks
- raw migrated stacks
- filtered and scaled migrated stacks

b) The trace excursion data gathered into CDP bins with tidal statics applied and rotated back was supplied in SEGY format. See Appendix III for tape contents.

c) A bin location tape containing the X-Y coordinates for each live bin in the survey in UKOOA format was supplied.

d) Stacking velocity information was archived on diskette in a "Western" format for both the raw picked velocities and the smoothed version used to migrate the volume.

4.0 PARAMETER TESTING

4.1 INITIAL TESTING

3 lines were chosen by SAGASCO Resources as 2D test lines. They covered the survey area with the central line being close to the Yolla 1 well. Lines chosen were:

- YOL - 00259
- YOL - 00499
- YOL - 00679

Tests included,

a) Every 50th shot displayed for each cable for line yol- 00259 and an A.G.C. of 1000 msec was applied.

b) Spherical divergence was applied to line YOL-00259 (s.p. 116-119). A velocity function was chosen for the spherical divergence correction and a shot was displayed with the following tests:

i) Spherical divergence V**2*T
ii) Spherical divergence V**2*T followed by a single trace balance
iii) Spherical divergence V**2*T followed by a mute

c) Several zero phase band phase filters were applied to a shot record after the application of gain recovery to ascertain the range of useful frequency present in the data. Line tested was YOL-00259 (S.P. 116). Filter parameters tested were;

1) out - out
2) out - 7.5/30 hz/dB per oct.
3) 5/24 - 10/30 hz/dB per oct.
4) 7.5/24 - 15/30 hz/dB per oct.
5) 10/24 - 20/30 hz/dB per oct.
6) 12.5/24 - 25/30 hz/dB per oct.
7) 15/24 - 30/30 hz/dB per oct.
8) 20/30 - 40/48 hz/dB per oct.
9) 25/30 - 50/60 hz/dB per oct.
10) 30/30 - 60/60 hz/dB per oct.
11) 35/40 - 70/72 hz/dB per oct.
12) 40/48 - 80/72 hz/dB per oct.
13) 50/60 - 100/72 hz/dB per oct.
14) 60/60 - 120/72 hz/dB per oct.
15) 70/72 - out hz/dB per oct.
16) 80/72 - out hz/dB per oct.
17) 90/72 - out hz/dB per oct.

4.2 F-K FILTER TESTS ON SHOTS

The line tested was YOL-00259 (S.P. 116-119). F-K filter tests were carried out using a full cosine bell taper in the K direction, removable A.G.C. and a 8 Hz low frequency protection. The following symmetrical FK cuts were tested:

a) No FK filter
b) +1.50 to -1.50 Km/sec (+8.33 to -8.33 msec/trace)
c) +2.00 to -2.00 Km/sec (+6.25 to -6.25 msec/trace)
d) +2.75 to -2.75 Km/sec (+4.545 to -4.545 msec/trace)
e) as (d) with NMO applied and removed

4.3 SHOT PROCESSING STACK PANAL TESTS

Using information obtained from running the shot tests, a number of stack panel tests were carried out to confirm the parameters chosen. All panels had an adjacent trace sum applied following the F-K filter. Where signature Deconvolution was applied an 8-70 Hz output frequency rate was used.

Velocities used for stack were ran at 2Km intervals using an FK filter +/-1.50 km/sec and a signature deconvolution of 8-70 Hz output. Lines tested were;

YOL - 00499 s.p. 173-829
YOL- 00679 s.p. 720-138

tests included;

a) FK +1.5/-1.5Km/sec/sum/sigdcn
b) FK +2.0/-2.0Km/sec/sum/sigdcn
c) FK +1.5/-1.5Km/sec/sum/offset dependent sigdcn (3 offsets)
d) FK +1.5/-1.5Km/sec/sum/spike deconvolution
e) FK +1.5/-1.5Km/sec/sum/gap 8 msec
f) FK +1.5/-1.5Km/sec/sum/gap 16 msec
g) FK +1.5/-1.5Km/sec/sum/sigdcn-OD/gap 48 msec
(line YOL-00499 only)
h) filter scan display of the spike deconvolution stack panel.

From the above tests the F-K velocity filter on shots was selected as +/-2.0Km/sec, 2:1 sum and a signature deconvolution with a 6-70 Hz zero phase output for production.

4.4 MULTIPLE ATTENUATION TEST

Stack panels plus a velocity analyses were produced for the following tests.

Lines tested were; YOL-00259
YOL-00499
YOL 00679

Tests included;

a) Production shot processing - FK+2.0/-2.0Km/sec/sum/sigdcn 6-70H_z
b) As (a) plus Gap Deconvolution of 48 msec
c) As (a) plus FK Demultiple 90% input velocities
d) As (a) plus Radon Demultiple 90% input velocities
e) As (a) plus Radon Demultiple 94% input velocities
f) As (a) plus Radon Demultiple 94% input velocities with an inside trace mute (line YOL-00499 only)

Additional tests as stacks only were run for line YOL-00259 as follows:

g) As (a) plus Wave Equation Demultiple
h) As (a) plus Wave Equation Demultiple plus FK Demultiple 90% velocities

4.5 TRACE EXCURSION

These were tested using Digicon's interactive software and hardcopy displays were produced for a selection of these. Trace excursion tests were;

a) 3 ranges (m): 144-1076, 1180-2112, 2216-3148
b) 4 ranges (m): 144-455, 559-1077, 1180-2112, 2216-3148

For each of the above offset selections, excursion distances of half bin (12.5m) and full bin (25m) were tested. Displays were produced for individual offset ranges as well as all combined and displays with and without the duplicate traces.

For production 3 offset ranges were selected with 12.5m excusion for the near offset and 25.0m excursion for the mid and far offsets.

4.6 DMO TESTS

For these tests, sail line YOL-00451 with subline 489 was used. Tests included;

a) 2d FK DMO
b) 2d Kirchhoff DMO
c) 3d DMO

Stacks for (b) and (c) were displayed with and without filter, scaling and dechequer.

4.7 NMO MUTING

Mute tests were performed on lines YOL-00259 (crosslines 520-640) and YOL-00493 (crosslines 640-760). A subline was taken from each as a test panel and successively increasing fold of coverage were stacked

Inner mute test

1) inner 2 fold
2) inner 3 fold
3) inner 5 fold
4) inner 7 fold
5) inner 9 fold
6) inner 12 fold
7) inner 15 fold
8) inner 18 fold
9) inner 22 fold
10) inner 24 fold
11) inner 28 fold
12) full fold

Outer mute test

1) outer 28 fold
2) outer 27 fold
3) outer 26 fold
4) outer 25 fold
5) outer 24 fold
6) outer 23 fold
7) outer 22 fold
8) outer 21 fold
9) outer 20 fold

From these tests a mute was selected as described in section 3.17

4.8 MIGRATION TESTS

Migration velocity tests were trialed on subline 674 and run in 2D. Tests included;

1) OMEGA-X - 95% stk vels, 16 msec layer, freq. range 6-60 Hz.
2) OMEGA-X - 95% stk vels, 16 msec layer, freq. range 6-160 Hz.
3) OMEGA-X - 95% stk vels, 25 msec layer, freq. range 6-160 Hz.
4) OMEGA-X - 95% stk vels, 33 msec layer, freq. range 6-160 Hz.
5) OMEGA-X - 95% stk vels, 42 msec layer, freq. range 6-160 Hz.
6) OMEGA-X - 100% stk vels, 42 msec layer, freq. range 6-160 Hz.
7) OMEGA-X - 90% stk vels, 42 msec layer, freq. range 6-160 Hz.

8) P.S.P.I. - 95% stk vels, 16 msec layer, freq. range 3-90 Hz.
9) P.S.P.I. - 95% stk vels, 16 msec layer, freq. range 6-60 Hz.
10) P.S.P.I. - 95% stk vels, 42 msec layer, freq. range 6-60 Hz.

3D MIGRATION TESTS:

Several one-pass migration tests were run on volumes of the 3D stack data.

Velocity

Further velocity investigation was performed on a volume 200x600 traces [sublines 570-770; xlines 600-1200]. An OMEGA-X/3-90Hz/20ms step 3D migration with 90%, 95% & 100% of the smoothed stacking velocity field . This test confirmed the use of the 100% factor, which was also consistent with a velocity comparison at the Yolla-1 well (to the depth of the well).

High Dip Imaging

A one pass PSPI (Gazdag Phase Shift migration Plus Interpolation for lateral velocity handling) migration was tested on two stack volumes where it was suspected that some steep dips may have been coming from fault plane events. Volumes tested were 100x600 traces [sublines 620-720; xlines 600-1200] and 100x600traces further to the north-east [sublines 620-720; xlines 900-1500].

It was found that only minor imaging improvement was to be gained from the PSPI option. Further inspection of the near trace QC volume loaded on SAGACSO's workstation at the time concluded that the apparent steep dips were in fact diffraction tails when viewed oblique to the subline direction.

Migration Choice

From these tests an OMEGA-X one-pass migration was chosen using:
100% of smoothed final stack velocity field ,
3-90Hz operating bandwidth,
20ms (approx time equivalent) tau step.

4.9 POST STACK FILTER

This was tested on subline 650 (xlines 700-1000). Scans were displayed with and without scaling after filtering. The following zero phase bandpasses were displayed:

1) out	6) 20 - 40 Hz	11) 60 - out
2) out - 10 Hz	7) 25 - 50 Hz	12) 70 - out
3) 7.5 - 15 Hz	8) 30 - 60 Hz	13) 80 - out
4) 10 - 20 Hz	9) 40 - 80 Hz	14) 90 - out
5) 15 - 30 Hz	10) 50 - 100 Hz	15) 100 - out

4.10 SCALING

Several gates were tested upon subline 650 (crosslines 750-1000). Tests included;

1) no scaling
2) multi gate balance - single gate
3) multi gate balance - gate length = 3000 msec (50% overlap)
4) multi gate balance - gate length = 2000 msec (50% overlap)
5) multi gate balance - gate length = 1000 msec (50% overlap)
6) multi gate balance - gate length = 500 msec (50% overlap)
7) multi gate balance - gate length = 250 msec (50% overlap)

4.11 TAU-P FILTER

A TAU-P filter was tested on subline 650 (crosslines 600-1200) with

1) 60% addback
2) 80% addback

but was not selected for production due to only very minor advantages.

5.0 THE DATA PROCESSING SYSTEM

At the time that this survey was processed, Digicon's installation in Brisbane was based on an 8 node HP META SERIES, two CONVEX C220 supercomputers, 3 HP712 workstations and two Digital Equipment Corporation's VAX 8650's. A brief description of the VAX computers and their peripheral devices is given below as well as a hardware and network configuration of the META SERIES, CONVEX computers and the HP712 workstations:-

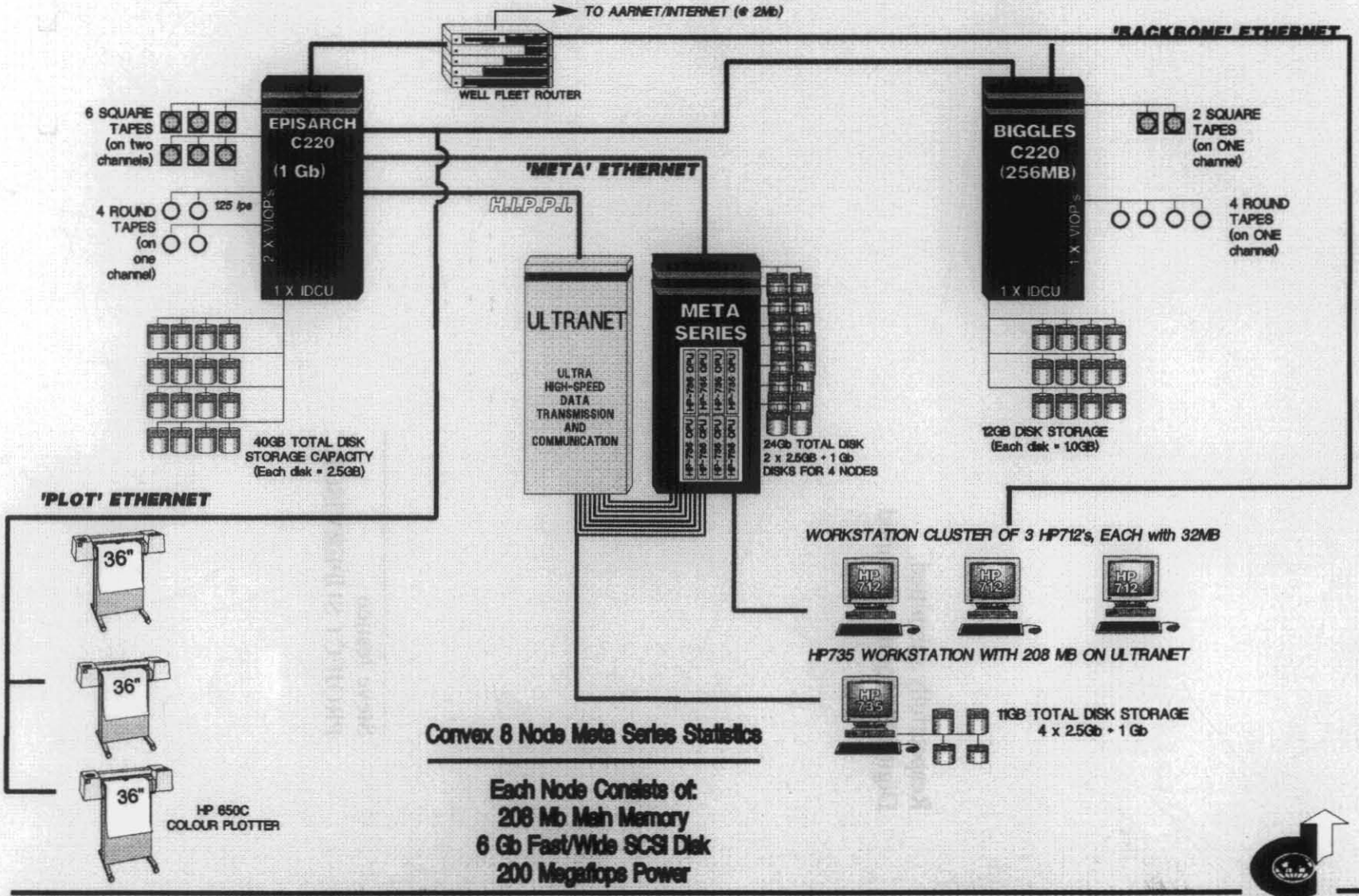
1) System 1 (VAX1)- 1 unit 8650 CPU
- 32 Mbyte physical memory
- 4 x 1.23 Gbyte SABRE disk drives
- 4 x FPS 100 Array Processor
- 2 x Numerix Vector Processor(*)
- 16 x Telex tri-density tape drives
- 1 x high speed line printer
- 1 x 2.5/5.0 Gbyte Exabyte drive.

2) System 2 (VAX2)- 1 unit 8650 CPU
- 32 Mbyte physical memory
- 2 x 1.23 Gbyte SABRE disk drives
- 4 x 400 Mbyte Fujitsu disk drives
- 4 x FPS 100 Array Processor
- 1 x Numerix Vector Processor(*)
- 16 x Telex tri-density tape drives
- 1 x high speed line printer
- 1 x 2.5/5.0 Gbyte Exabyte drive.

3) Additional Hardware
- 1 x 22" Benson electrostatic plotter
- 1 x 36" thermal plotter.
- 1 x 36" Versatec electrostatic plotter
- 1 x GEOSPACE high resolution (508 dots/inch) film plotter
- 2 x Summagraphic digitizer tables
- 1 x Sun Sparc Station 1
- 1 x Sun Sparc Station 2

(*) The Numerix Vector Processor has 16 Mbyte memory and offers computation power of 30 Mflops.

SeismicTANGO HARDWARE & NETWORK CONFIGURATION



DP_BRS

DIGICON BRISBANE : TOTAL CPU POWER = 2.2 Gflops

501797

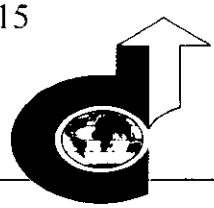
The TANGO system was used to process the data and is Digicon's internal software and database management system. The seismic data processing software is modular by design and therefore completely flexible allowing the user to control the number and sequence of operations performed in any job.

Respectfully submitted,
Digital Exploration Limited

Steve Jestico
PROJECT SUPERVISOR

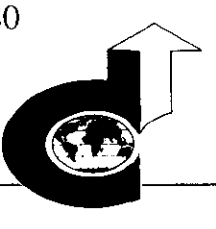
APPENDIX I - LINE AND FIELD TAPE SUMMARY

Line	Shot range	Box range	Field tape no.	CDP km.
YOL00001	292 - 32	8203-8204	545 - 558	39.15
YOL00007	299 - 32	8201-8202	503 - 516	39.90
YOL00013	307 - 32	8000	1 - 15	41.40
YOL00019	314 - 32	8004-8005	90 - 104	42.45
YOL00025	321 - 32	8009	186 - 200	43.50
YOL00031	329 - 32	8016	318 - 333	44.70
YOL00037	336 - 32	8020-8021	408 - 423	45.75
YOL00043	344 - 32	8209-8210	671 - 686	46.95
YOL00049	351 - 32	8014	274 - 290	48.00
YOL00055	358 - 32	8002	43 - 59	49.05
YOL00061	366 - 32	8006-8007	139 - 155	50.25
YOL00067	373 - 32	8011-8012	227 - 244	51.30
YOL00073	380 - 32	8018-8019	364 - 381	52.35
YOL00079	388 - 32	8023,8200	457 - 475	53.55
YOL00085	394 - 32	8207-8208	619 - 637	54.60
YOL00091	403 - 185	8400-8401	969 - 980	32.85
YOL010091	184 - 32	6021-6022	4379-4387	22.95
YOL00097	410 - 32	8411-8412	1178-1197	56.85
YOL00103	417 - 32	8600-8601	1281-1300	57.90
YOL00109	425 - 32	8404-8405	1039-1059	59.10
YOL010109	406 - 374	6202	4465-4466	4.95
YOL00115	432 - 32	8222-8223	916 - 936	60.15
YOL00121	439 - 32	8212-8213	716 - 736	61.20
YOL00127	447 - 32	8214-8215	770 - 790	62.40
YOL00133	454 - 32	8608-8609	1438-1460	63.45
YOL00139	461 - 32	8611-8612	1496-1517	64.50
YOL00145	469 - 32	8613-8615	1552-1574	65.70
YOL00151	476 - 32	8413-8414	1223-1245	66.75
YOL00157	484 - 32	8406-8408	1092-1115	67.95
YOL00163	491 - 32	8603-8604	1337-1364	69.80
YOL00169	498 - 32	8800-8802	1610-1636	70.05
YOL00175	506 - 32	8802-8803	1652-1677	71.25
YOL00181	513 - 32	8401-8402	981 -1005	72.30
YOL00187	520 - 32	8219-8220	860 - 884	73.35
YOL00193	110 - 606	8019-8020	382 - 407	74.55
YOL00199	110 - 613	8010-8011	201 - 226	75.60
YOL00205	110 - 621	8000-8002	16 - 42	76.80
YOL00211	110 - 628	8005-8006	107 - 135	77.85
YOL00217	110 - 635	8014-8016	294 - 317	78.90
YOL00223	110 - 643	8200-8201	476 - 502	80.10
YOL00229	110 - 650	8202-8203	417 - 544	81.15



Line	Shot range	Box range	Field tapes	CDP km.
YOL00235	110 - 657	8210-8212	687 - 714	82.20
YOL00241	110 - 665	8205-8207	589 - 618	80.55
YOL00247	116 - 672	8002-8004	60 - 89	83.55
YOL00253	110 - 675	8007-8009	157 - 185	84.90
YOL00259	116 - 687	8012-8013	245 - 273	85.80
YOL00265	117 - 694	8017-8018	334 - 363	86.70
YOL00271	119 - 702	8021-8023	424 - 456	87.60
YOL00277	120 - 709	8204-8205	559 - 588	88.50
YOL00283	122 - 717	8217-8219	829 - 859	89.40
YOL00289	123 - 724	8220-8222	885 - 915	90.30
YOL00295	124 - 731	8223,8400	937 - 968	91.20
YOL00301	126 - 739	8215-8217	791 - 823	92.10
YOL00307	127 - 485	8213	737 - 755	53.85
YOL10307	486 - 745	8214	756 - 769	39.00
YOL00313	128 - 753	8208-8209	638 - 670	93.90
YOL00319	130 - 761	8405-8406	1060-1091	94.80
YOL10319	301 - 380	6021	4374-4378	12.00
YOL00325	131 - 768	8409-8411	1145-1177	95.70
YOL00331	133 - 499	8802	1637-1651	55.05
YOL10331	500 - 776	8409	1134-1140	40.05
YOL00337	134 - 783	8402-8404	1006-1038	97.50
YOL00343	135 - 593	8412-8413	1198-1222	68.85
YOL10343	594 - 790	6015-6016	4263-4273	29.55
YOL00349	137 - 798	8414,8415 8600	1246-1280	99.30
YOL00355	138 - 805	8604-8606	1365-1398	100.20
YOL00361	140 - 813	8612-8613	1518-1551	101.10
YOL00367	141 - 820	8609-8611	1461-1495	102.00
YOL00373	142 - 827	8606-8608	1399-1437	102.90
YOL00379	144 - 829	8601-8603	1301-1336	102.90
YOL00385	145 - 829	8615,8800	1575-1609	102.75
YOL00391	147 - 829	8809-8810	1807-1847	102.45
YOL00397	148 - 829	7011-7012	2248-2283	102.30
YOL00403	149 - 829	7203-7205	2569-2604	102.15
YOL00409	151 - 829	7014-7016	2313-2348	101.85
YOL00415	152 - 829	8803-8805	1678-1713	101.70
YOL00421	154 - 825	8811-8812	1877-1913	100.80
YOL00427	155 - 829	8815,7000	2007-2043	101.25
YOL00433	157 - 829	7004-7006	2122-2155	100.95
YOL00439	158 - 829	7408-7409	3144-3177	100.80
YOL00445	160 - 829	7207-7209	2662-2694	100.50
YOL00451	161 - 829	7020-7022	2440-2474	100.35
YOL00457	162 - 829	7222,7223, 7400	2961-2994	100.20

Line	Shot range	Box range	Field tape no.	CDP km.
YOL00463	164 - 829	7211-7212	2724-2763	99.90
YOL00469	165 - 829	7200-7201	2504-2537	99.75
YOL00475	167 - 829	8806-8808	1742-1776	99.45
YOL00481	168 - 829	8813-8814	1944-1978	99.30
YOL00487	170 - 829	7001-7003	2056-2091	99.00
YOL00493	171 - 829	7008-7009	2184-2217	98.80
YOL00499	173 - 829	7017-7019	2379-2412	98.55
YOL00505	174 - 829	7217-7218	2844-2877	98.40
YOL00511	175 - 829	7219-7221	2900-2933	98.25
YOL00517	177 - 829	7603-7604	3365-3398	97.95
YOL00523	178 - 829	7600-7603	3323-3364	97.80
YOL00529	180 - 829	7405-7406	3085-3117	97.50
YOL00535	181 - 829	7214-7215	2784-2818	97.35
YOL00541	183 - 829	7411-7412	3206-3238	97.05
YOL00547	184 - 829	7608-7610	3481-3513	96.90
YOL00553	186 - 829	7804-7805	3705-3737	96.60
YOL00559	187 - 829	7602, 7605-7607	3423-3463	96.45
YOL00565	188 - 829	7401-7403	3021-3053	96.30
YOL00571	190 - 829	7414-7415	3265-3297	96.00
YOL00577	191 - 829	6000-6001	3946-3978	95.85
YOL00583	193 - 829	7810-7810	3824-3855	95.55
YOL00589	194 - 829	7614-7615	3591-3623	95.40
YOL00595	196 - 829	7611-7613	3537-3568	95.10
YOL00601	197 - 829	7801-7802	3649-3681	94.95
YOL00607	198 - 829	7807-7808	3769-3800	94.80
YOL00613	200 - 829	7813-7814	3891-3922	94.50
YOL00619	201 - 829	6002-6004	4002-4033	94.35
YOL00625	203 - 829	6008-6010	4122-4153	94.05
YOL00631	233 - 829	6005-6007	4058-4089	89.55
YOL00637	748 - 128	6007-6008	4090-4121	93.15
YOL00643	744 - 129	7811-7813	3856-3890	92.40
YOL00649	740 - 131	7805-7807	3738-3768	91.50
YOL00655	735 - 132	7403-7405	3054-3084	90.60
YOL00661	732 - 133	7201-7203	2538-2568	90.00
YOL00667	728 - 135	8808-8809	1777-1806	89.10
YOL00673	724 - 136	8812-8813	1914-1943	88.35
YOL00679	720 - 138	7003-7004	2092-2121	87.45
YOL00685	716 - 139	7009-7011	2218-2247	86.70
YOL00691	712 - 141	7016-7017	2349-2378	85.80
YOL00697	709 - 150	7022-7023	2475-2503	84.00
YOL00703	705 - 143	7205-7206	2605-2634	84.45
YOL00709	701 - 145	7013-7013	2284-2312	83.55
YOL00715	697 - 146	8814-8815	1979-2006	82.80



Line	Shot range	Box range	Field tape no.	CDP km.
YOL00721	693 - 148	8810-8811	1848-1876	81.90
YOL00727	689 - 149	8805-8806	1714-1741	81.15
YOL00733	685 - 150	7006-7007	2156-2183	80.40
YOL00739	681 - 152	7209-7210	2695-2723	79.50
YOL00745	677 - 153	7221-7222	2934-2960	78.75
YOL00751	673 - 155	7019-7020	2413-2439	77.85
YOL00757	669 - 156	7409-7411	3178-3205	77.10
YOL00763	665 - 158	7406-7407	3118-3143	76.20
YOL00769	661 - 159	7212-7213	2760-2783	75.45
		7400-7401	2995-3020	
YOL00775	657 - 160	7206-7207	2635-2661	74.70
YOL00781	653 - 162	7215-7216	2819-2843	73.80
YOL00787	649 - 163	7415,7600	3298-3322	73.05
YOL00793	645 - 165	7607-7608	3456-3480	72.15
YOL00799	641 - 166	7604-7605	3399-3422	71.40
YOL00805	637 - 168	7412-7414	3239-3264	70.50
YOL00811	614 - 169	7610-7611	3514-3536	66.90
YOL00817	629 - 170	7800-7801	3624-3648	69.00
YOL00823	625 - 172	7814,7815,	3923-3945	68.10
		6000		
YOL00829	621 - 173	6004-6005	4034-4057	67.35
YOL00835	617 - 175	6001-6002	3979-4001	66.45
YOL00841	613 - 172	7802-7804	3682-3704	66.30
YOL00847	609 - 178	7218-7219	2878-2899	64.80
YOL00853	605 - 179	7613-7614	3569-3590	64.05
YOL00859	601 - 188	7808-7809	3801-3822	62.10
YOL01055	358 - 40	6023,6200	4415-4431	47.85
YOL01067	340 - 40	6016-6017	4274-4289	45.15
YOL01085	184 - 40	6202	4467-4474	21.75
YOL01115	419 - 80	6020-6021	4356-4373	51.15
YOL01133	410 - 40	6013-6014	4212-4230	55.65
YOL01145	400 - 38	6014-6015	4231-4249	54.45
YOL01187	510 - 40	6010-6011	4154-4177	47.10
YOL01343	140 - 780	6017-6018	4290-4322	96.15
YOL01349	140 - 370	6015	4250-4262	34.65
YOL01367	150 - 810	6011-6013	4178-4211	99.15
YOL01421	301 - 825	6022-6023	4388-4414	78.90
YOL01439	170 - 545	6202-6203	4475-4494	56.40
YOL01451	170 - 820	6200-6202	4432-4464	97.65
YOL01469	175 - 820	6018-6020	4323-4355	96.90
YOL01487	170 - 820	6204-6206	4511-4544	97.65
YOL01499	173 - 820	6212-6213	4665-4699	97.20
YOL01517	177 - 820	6206-6207	4545-4577	96.60
YOL01595	335 - 820	6217-6218	4769-4793	72.90

Line	Shot range	Box range	Field tape no.	CDP km.
YOL01637	206 - 820	6209-6210	4605-4635	92.25
YOL01649	735 - 365	6220-6221	4838-4856	55.65
YOL01661	605 - 140	6221-6222	4857-4880	69.90
YOL01667	720 - 175	6213-6215	4700-4727	81.80
YOL01679	450 - 140	6203-6204	4495-4510	46.65
YOL01685	680 - 145	6218-6219	4794-4821	80.40
YOL01709	701 - 155	6210-6212	4636-4664	82.05
YOL01739	681 - 160	6207-6209	4578-4604	78.30
YOL01751	556 - 160	6216-6217	4747-4768	59.55
YOL01817	385 - 695	6219-6220	4822-4837	43.65
YOL01835	260 - 620	6215-6216	4728-4746	54.15

APPENDIX II - VELOCITY LINE SUMMARY

1) First Pass Velocity Lines (1km x 1km grid)

Line	Shot range	CDP km's
YOL00025	321 - 32	43.50
YOL00061	366 - 32	50.25
YOL00097	410 - 32	56.85
YOL00139	461 - 32	64.50
YOL00181	513 - 32	72.30
YOL00223	110 - 643	80.10
YOL00259	116 - 687	85.80
YOL00301	126 - 739	92.10
YOL00337	134 - 783	97.50
YOL00373	142 - 827	102.90
YOL00415	152 - 829	101.70
YOL00457	162 - 829	100.20
YOL00493	171 - 829	98.80
YOL00547	184 - 829	96.90
YOL00577	191 - 829	95.85
YOL00613	200 - 829	94.50
YOL00661	732 - 133	90.00
YOL00697	709 - 150	84.00
YOL00745	677 - 153	78.75
YOL00775	657 - 160	74.70
YOL00817	629 - 170	69.00
YOL00847	609 - 178	64.80

2) Second Pass Velocity Lines (0.5km x 0.5km grid)

Line	Shot range	CDP km's
YOL00001	292 - 32	39.15
YOL00025	321 - 32	43.50
YOL00043	344 - 32	46.95
YOL00061	366 - 32	50.25
YOL00079	388 - 32	53.55
YOL00097	410 - 32	56.85
YOL00121	439 - 32	61.20
YOL00139	461 - 32	64.50
YOL00157	484 - 32	67.95
YOL00181	513 - 32	72.30
YOL00199	110 - 613	75.60
YOL00223	110 - 643	80.10

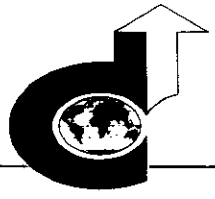
Yolla 3D Final Velocity Analyses Lines		
NB Velocity file line numbers refer to subsurface line		
Velocity Analyses Plots are labelled by SAIL lines		
3D SUBLINE	**SURFACE LINE**	***SAIL LINE***
from processing...	from acquisition...	*"Velocity Panel Label"*
38	3	***1***
62	27	***25***
80	45	***43***
98	63	***61***
116	81	***79***
134	99	***97***
158	123	***121***
176	141	***139***
194	159	***157***
218	183	***181***
236	201	***199***
259	224	***223***
277	242	***241***
295	260	***259***
319	284	***283***
337	302	***301***
361	326	***325***
373	338	***337***
391	356	***355***
409	374	***373***
427	392	***391***
451	416	***415***
469	434	***433***
493	458	***457***
511	476	***475***
529	494	***493***
553	518	***517***
583	548	***547***
595	560	***559***
613	578	***577***
631	596	***595***
649	614	***613***
674	639	***637***
698	663	***661***
716	681	***679***
734	699	***697***
752	717	***715***
782	747	***745***
794	759	***757***
812	777	***775***
836	801	***799***
854	819	***817***
866	831	***829***
884	849	***847***

APPENDIX III - EXABYTE ARCHIVING SUMMARY

1. STACKED DATA

TAPE NUMBER	CONTENT DESCRIPTION
EXA - 1770	Filtered and Scaled Stack Sublines 35-280
EXA - 1664	Filtered and Scaled Stack Sublines 281-481
EXA - 1663	Filtered and Scaled Stack Sublines 482-682
EXA - 1715	Filtered and Scaled Stack Sublines 683-899
EXA - 1734	Raw Final Stack Sublines 35-280
EXA - 1739	Raw Final Stack Sublines 281-481
EXA - 1740	Raw Final Stack Sublines 482-682
EXA - 1741	Raw Final Stack Sublines 683-899
EXA - 1742	Filtered Scaled Migration Stacks Sublines 35-280
EXA - 1743	Filtered Scaled Migration Stacks Sublines 281-481
EXA - 1744	Filtered Scaled Migration Stacks Sublines 482-682
EXA - 1745	Filtered Scaled Migration Stacks Sublines 683-899
EXA - 1746	Raw Migrated Stacks 35-280
EXA - 1747	Raw Migrated Stacks 281-481
EXA - 1748	Raw Migrated Stacks 482-682
EXA - 1749	Raw Migrated Stacks 683-899

Data were archived in segy format at 5.0 gigabyte density.

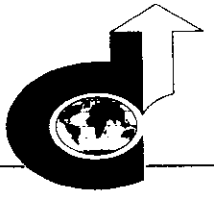


2 GATHERED DATA

Trace excursion data gathered into CDP bins with FK demultiple processing and tidal statics applied and rotated back. These data do not have DMO processing.

TAPE NUMBER	CONTENT DESCRIPTION
EXA - 1737	Trace Excursion Gathers Sublines 35-64
EXA - 1754	Trace Excursion Gathers Sublines 65-90
EXA - 1792	Trace Excursion Gathers Sublines 91-115
EXA - 1794	Trace Excursion Gathers Sublines 116-140
EXA - 1863	Trace Excursion Gathers Sublines 141-162
EXA - 1758	Trace Excursion Gathers Sublines 163-182
EXA - 1795	Trace Excursion Gathers Sublines 183-201
EXA - 1809	Trace Excursion Gathers Sublines 202-219
EXA - 1803	Trace Excursion Gathers Sublines 220-237
EXA - 1806	Trace Excursion Gathers Sublines 238-254
EXA - 1813	Trace Excursion Gathers Sublines 255-270
EXA - 1812	Trace Excursion Gathers Sublines 271-285
EXA - 1815	Trace Excursion Gathers Sublines 286-300
EXA - 1816	Trace Excursion Gathers Sublines 301-314
EXA - 1817	Trace Excursion Gathers Sublines 315-328
EXA - 1818	Trace Excursion Gathers Sublines 329-342
EXA - 1820	Trace Excursion Gathers Sublines 343-355
EXA - 1823	Trace Excursion Gathers Sublines 356-368
EXA - 1826	Trace Excursion Gathers Sublines 369-381
EXA - 1827	Trace Excursion Gathers Sublines 382-394
EXA - 1828	Trace Excursion Gathers Sublines 395-406
EXA - 1829	Trace Excursion Gathers Sublines 407-418
EXA - 1832	Trace Excursion Gathers Sublines 419-430
EXA - 1833	Trace Excursion Gathers Sublines 431-442
EXA - 1834	Trace Excursion Gathers Sublines 443-454
EXA - 1847	Trace Excursion Gathers Sublines 455-466
EXA - 1836	Trace Excursion Gathers Sublines 467-478
EXA - 1837	Trace Excursion Gathers Sublines 479-490
EXA - 1838	Trace Excursion Gathers Sublines 491-502
EXA - 1840	Trace Excursion Gathers Sublines 503-514
EXA - 1841	Trace Excursion Gathers Sublines 515-526
EXA - 1842	Trace Excursion Gathers Sublines 527-538
EXA - 1843	Trace Excursion Gathers Sublines 539-550
EXA - 1860	Trace Excursion Gathers Sublines 551-562
EXA - 1844	Trace Excursion Gathers Sublines 563-574
EXA - 1845	Trace Excursion Gathers Sublines 575-586
EXA - 1874	Trace Excursion Gathers Sublines 587-598
EXA - 1876	Trace Excursion Gathers Sublines 599-610
EXA - 1846	Trace Excursion Gathers Sublines 611-622
EXA - 1848	Trace Excursion Gathers Sublines 623-634

TAPE NUMBER	CONTENT DESCRIPTION
EXA - 1849	Trace Excursion Gathers Sublines 635-646
EXA - 1850	Trace Excursion Gathers Sublines 647-658
EXA - 1851	Trace Excursion Gathers Sublines 659-670
EXA - 1852	Trace Excursion Gathers Sublines 671-682
EXA - 1853	Trace Excursion Gathers Sublines 683-694
EXA - 1857	Trace Excursion Gathers Sublines 695-706
EXA - 1866	Trace Excursion Gathers Sublines 707-718
EXA - 1867	Trace Excursion Gathers Sublines 719-730
EXA - 1868	Trace Excursion Gathers Sublines 731-744
EXA - 1869	Trace Excursion Gathers Sublines 745-758
EXA - 1873	Trace Excursion Gathers Sublines 759-772
EXA - 1871	Trace Excursion Gathers Sublines 773-786
EXA - 1877	Trace Excursion Gathers Sublines 787-800
EXA - 1878	Trace Excursion Gathers Sublines 801-815
EXA - 1879	Trace Excursion Gathers Sublines 816-831
EXA - 1880	Trace Excursion Gathers Sublines 832-848
EXA - 1882	Trace Excursion Gathers Sublines 849-865
EXA - 1884	Trace Excursion Gathers Sublines 866-884
EXA - 1886	Trace Excursion Gathers Sublines 885-904



ATTRIBUTED LOCATIONS FOR STACK DATA

BYTES	ATTRIBUTE	COMMENT
21-24	CDP	
37-40	OFFSET	
73-76	ANTX (cdpx co-ordinate)	
77-80	ANTY (cdpy co-ordinate)	
185-186	SUBLINE	
187-188	SUBLINE	
197-200	BIN (digicon unique CDP number)	

ATTRIBUTE LOCATIONS FOR GATHER DATA

BYTES	ATTRIBUTE	COMMENT
9-12	FIELDRECORD	
13-16	CHANNEL	
17-20	NAVTIME	(Julian)
21-24	CDP	
33-36	SHOTRECORD	
37-40	OFFSET	
41-44	NAVSHOT	
45-48	GUNCODE	
73-76	SHOTX	
77-80	SHOTY	
81-84	RECX	
85-88	RECY	
181-184	MIDX	(Midpoint between shot&recv)
185-188	MIDY	
193-196	CDPX	
197-200	CDPY	
201-204	LINESEQUENCE	
205-208	BIN	(combination of shot&recv)
209-212	CDPLBL	(same as BIN)
213-216	SUBLINE	
217-220	CROSSLINE	

APPENDIX IV - PERSONNEL

Key personnel assigned to the processing of the YOLLA 3D data were;

Steve Jestico	- supervising geophysicist
Chris Denchfield	- 3D marine processing supervisor (UK)
Steve Berry	- Assistant supervising geophysicist (UK)
Amy Cheang	- Senior geophysicist
Amanda van Wyk	- input geophysicist
Sonya Hines	- input geophysicist

145°40 145°45 145°50 145°55

39°45

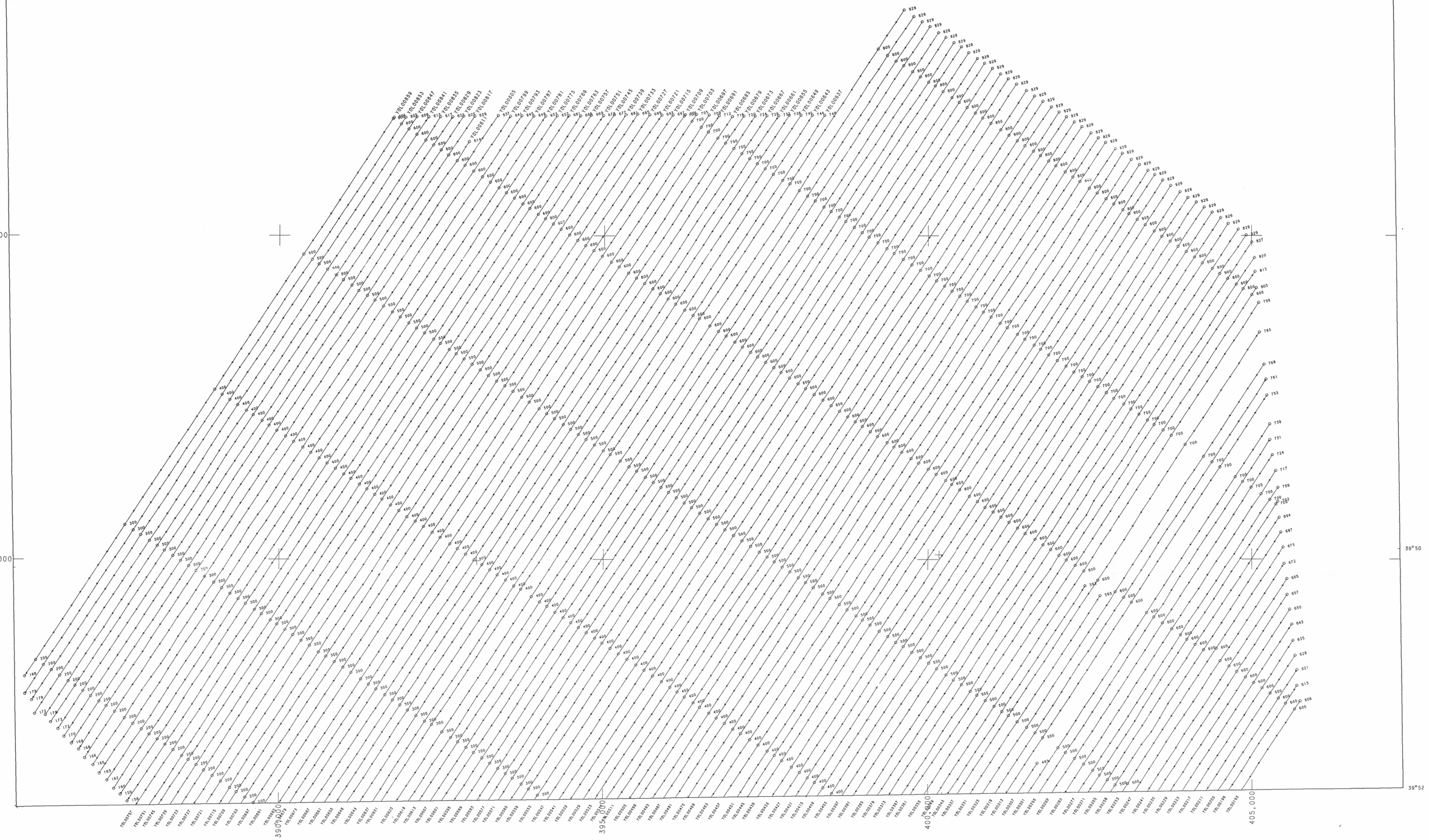
39°50

39°52

5,595,000

5,590,000

390,000 395,000 400,000 405,000



LEGEND

○ PRIME LINES : MAP 1 OF 2

5 cm

KILOMETRES

STATUTE MILES

NAUTICAL MILES

501810

REVISIONS		SAGASCO RESOURCES LTD.	
DATE	BY		
		YOLLA 3D SEISMIC SURVEY 1994	
		SHOT POINT MAP	
		SCALE: 1 : 25,000	GRID SYSTEM: UTM ZONE 55S GRID UNIT: METRES FALSE NORTHING: 10,000,000.00
		PROJECTION: TRANSVERSE MERCATOR SPHEROID: AUSTRALIAN NAT. CENT. MERIDIAN: 147°00' 00.000" E	FALSE EASTING: 500,000.00 FALSE ORIGIN AT C.M. AND LATITUDE: 0°00' 00.000" N
		SCALE FACTOR ON CENTRAL MERIDIAN: 0.9996000000	GEODETIC DATUM: AGD 84
WESTERN GEOPHYSICAL		DATE (DD/MM/YY): 20- 3-94	MAP NO.: OR-0408

Enclosure 1

145°40

145°55

39°52

39°55

40°00

5,585,000

5,580,000

5,575,000

390,000

395,000

400,000

405,000

LEGEND
○ PRIME LINES : MAP 2 OF 2

5 cm

KILOMETRES

STATUTE MILES

NAUTICAL MILES

501811

REVISIONS		SAGASCO RESOURCES LTD.
DATE	BY	
		YOLLA 3D SEISMIC SURVEY 1994
		SHOT POINT MAP
		SCALE: 1 : 25,000
		GRID SYSTEM: UTM ZONE 55S GRID UNIT: METRES FALSE NORTHING: 10,000,000.00 FALSE EASTING: 500,000.00 FALSE ORIGIN AT C.M. AND LATITUDE: 0°00' 00.000" N
		PROJECTION: TRANSVERSE MERCATOR SPHEROID: AUSTRALIAN NAT. CENT. MERIDIAN: 147°00' 00.000" E SCALE FACTOR ON CENTRAL MERIDIAN: 0.9996000000
		GEODETIC DATUM: AGD 84
WESTERN GEOPHYSICAL	DATE (DD/MM/YY): 20- 3-94	MAP NO.: OA-0402

Enclosure 2

145°40 145°45 145°50 145°55

39°45

,595,000

,590,000

39°50

39°52

390,000 395,000 400,000 405,000

YOL01835 YOL01817 YOL01731 YOL01739 YOL01709 YOL01685 YOL01679 YOL01687 YOL01661 YOL01657 YOL01595 YOL01649 YOL01489 YOL01487 YOL01469 YOL01431 YOL01459 YOL01421 YOL01357 YOL01345 YOL10343 YOL10331 YOL10307

501812

LEGEND	
o	INFILL/RESHOOT LINES : MAP 1 OF 2

5 cm

KILOMETRES

STATUTE MILES

NAUTICAL MILES

REVISIONS		SAGASCO RESOURCES LTD.	
DATE	BY	YOLLA 3D SEISMIC SURVEY 1994	
		SHOT POINT MAP	
		SCALE: 1 : 25,000	GRID SYSTEM: UTM ZONE 55S GRID UNIT: METRES FALSE NORTHING: 10,000,000.00 FALSE EASTING: 500,000.00 FALSE ORIGIN AT C.M. AND LATITUDE: 0°00' 00.000" N
		PROJECTION: TRANSVERSE MERCATOR SPHEROID: AUSTRALIAN NAT. CENT. MERIDIAN: 147°00' 00.000" E SCALE FACTOR ON CENTRAL MERIDIAN: 0.9996000000	GEODETIC DATUM: AGD 84
WESTERN GEOPHYSICAL		DATE (DD/MM/YY): 20- 3-94	MAP NO.: OR-0403

Enclosure 3

145°40 145°45 145°50 145°55

39°52 39°55 40°00

5,585,000 5,580,000 5,575,000

390,000 395,000 400,000 405,000

501813

LEGEND
○ INFILL/RESHOOT LINES : MAP 2 OF 2

5 cm

KILOMETRES

STATUTE MILES

NAUTICAL MILES

REVISIONS		SAGASCO RESOURCES LTD.	
DATE	BY	YOLLA 3D SEISMIC SURVEY 1994	
		SHOT POINT MAP	
		SCALE: 1 : 25,000	GRID SYSTEM: UTM ZONE 55S GRID UNIT: METRES FALSE NORTHING: 10,000,000.00 FALSE EASTING: 500,000.00 FALSE ORIGIN AT C.M. AND LATITUDE: 0°00' 00.000" N
		PROJECTION: TRANSVERSE MERCATOR SPHEROID: AUSTRALIAN NAT. CENT. MERIDIAN: 147°00' 00.000" E SCALE FACTOR ON CENTRAL MERIDIAN: 0.9996000000	GEODETIC DATUM: AGD 84
WESTERN GEOPHYSICAL		DATE (DD/MM/YY): 20- 3-94	MAP NO.: OR-0408

Enclosure 4

145°40 145°45 145°50 145°55

39°45

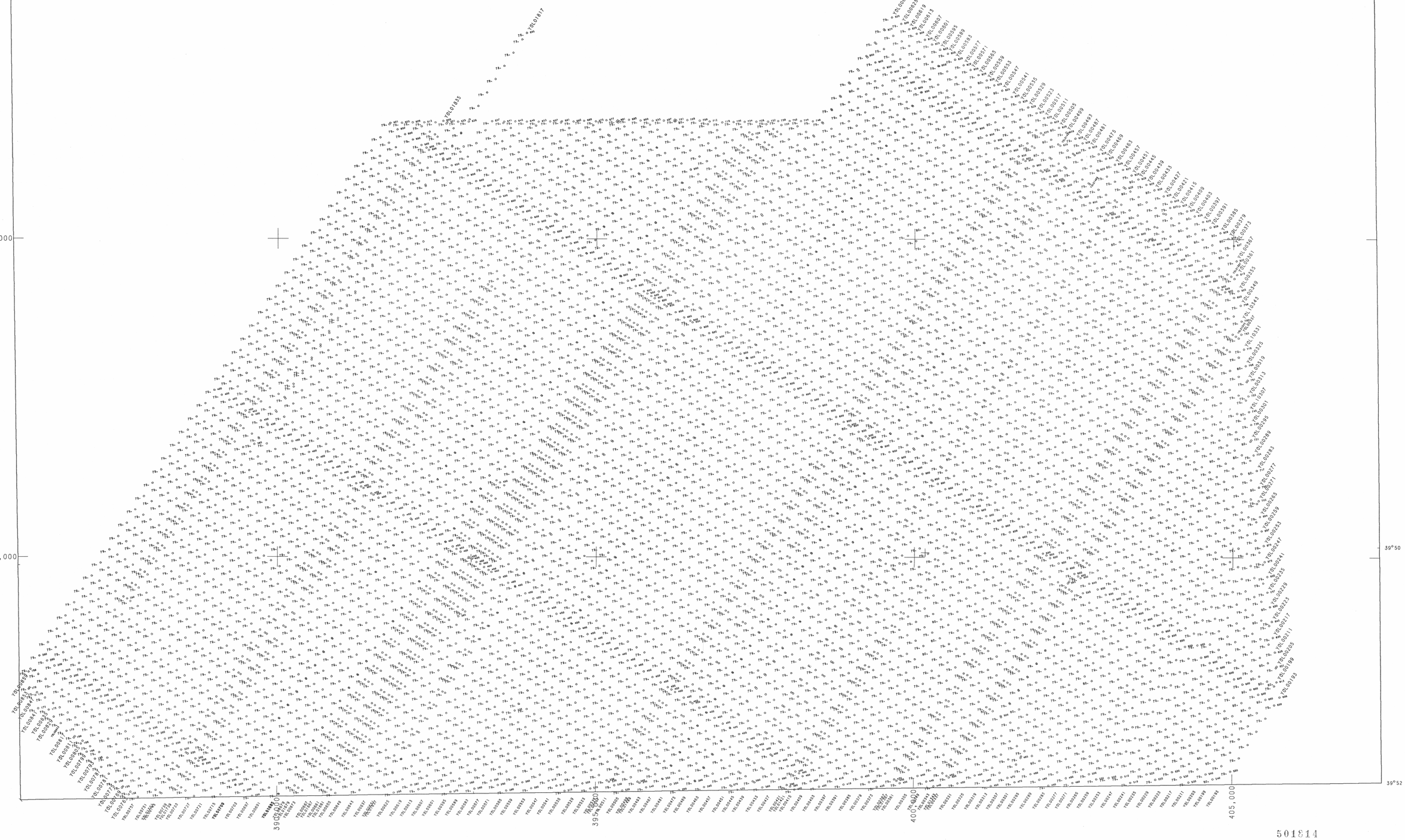
5,595,000

5,590,000

39°50

39°52

405,000



501814

5 cm

0 1 2
KILOMETRES

0 1 2
STATUTE MILES

0 1 2
NAUTICAL MILES

REVISIONS		SAGASCO RESOURCES LTD.
DATE	BY	YOLLA 3D SEISMIC SURVEY
		WATER DEPTH
		SCALE: 1 : 25,000
		GRID SYSTEM: UTM ZONE 55S GRID UNIT: METRES FALSE NORTHING: 10,000,000.00 FALSE EASTING: 500,000.00 FALSE ORIGIN AT C.M. AND LATITUDE: 0°00' 00.000" N
		PROJECTION: TRANSVERSE MERCATOR SPHEROID: AUSTRALIAN NAT. CENT. MERIDIAN: 147°00' 00.000" E SCALE FACTOR ON CENTRAL MERIDIAN: 0.9996000000
WESTERN GEOPHYSICAL		DATE (DD/MM/YY): 22- 3-94
		GEODETIC DATUM: AGD 84
		MAP NO.: MAP 1 OF 2

OR-0402

Enclosure 5

145°40

145°55

39°52

39°55

40°00

5,585,000

5,580,000

5,575,000

390,000

395,000

400,000

405,000

5 cm

KILOMETRES

STATUTE MILES

NAUTICAL MILES

2

501815

REVISIONS		SAGASCO RESOURCES LTD.
DATE	BY	YOLLA 3D SEISMIC SURVEY
		WATER DEPTH
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		PROJECTION: TRANSVERSE MERCATOR SPHEROID: AUSTRALIAN NAT. CENT. MERIDIAN: 147°00' 00.000" E SCALE FACTOR ON CENTRAL MERIDIAN: 0.9996000000
		GEODETIC DATUM: AGD 84
WESTERN GEOPHYSICAL		DATE (DD/MM/YY): 22- 3-94
		MAP NO.: MAP 2 OF 2

OR-0402 **Enclosure 6**