



911353 001
(PAGE 1/23)



JOB NUMBER : AU1096G377

PETROLEUM DIVISION

11 OCT 1996

ESSO AUSTRALIA LIMITED

Marlin Platform, Bass Strait

Well : Marlin A-24 (Re-Survey)

9 5/8" Casing/5 1/2" Liner Gyro Multishot

Survey date : 18 October 1996

Job number : AU1096G377

JOB NUMBER : AU1096G377

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JOB NUMBER : AU1096G377

1.0 DISCUSSION AND SURVEY CERTIFICATION SHEET

JOB NUMBER : AU1096G377

1.1 DISCUSSION

A Gyro Multi-shot re-survey was performed in Well MLA-24 in the 9 5/8" casing and 5 1/2" liner to a depth of 3250 metres (Wireline depth.) . Gyro tool # 500 was run with a Schlumberger PGGT (CCL-GR) on 1/2" conducting wireline. A wireline stretch correction of +4.0 metres was added prior to performing the outrun survey.

After completing the outrun survey and re-zeroing at surface, it was noted that there was a 10 metre difference in the wireline odometer reading. This indicated that a wireline induced depth discrepancy existed in the outrun survey depths.

The inrun and outrun quality control stations were checked over the build section of the well. It was possible to see a uniform depth difference of 10 metres over these stations, indicating that the that the wireline odometer reading was 10 metres deep while the Gyro outrun was being performed.

In addition to this, there were four sections of Gamma Ray - CCL data obtained by Schlumberger during the outrun of this Gyro run. When the GR-CCL data from the interval 3250 m - 3200 m is compared to the GR-CCL data obtained during the Schlumberger TDT run a clear 10 metre difference can be seen. Also when comparing the GR-CCL data from the interval 1790 m -1680 m to the GR-CCL data obtained during the abandoned Schlumberger CBL run from approximately 1861 m- 1710 m, a 10 metre difference was noted.

Using the above quality control methods it can be seen that we are justified in applying a block shift of -10 metres to all outrun depths.

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1.2 SURVEY CERTIFICATION SHEET

The data for this survey and the calculations for this survey were obtained and performed by me according to the standards and procedures as set forth by Gyrodata Limited, and are true and correct to the best of my knowledge.



B.MUNRO
SURVEY ENGINEER

DATE : 21 OCTOBER 1996

gyro/data

JOB NUMBER : AU1096G377

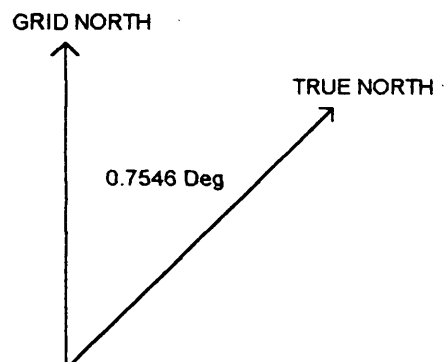
2.0 SURVEY DETAILS

JOB NUMBER : AU1096G377

2.1 SURVEY DETAILS

CLIENT : ESSO AUSTRALIA LIMITED
RIG : MARLIN PLATFORM
LOCATION : BASS STRAIT, AUSTRALIA
WELL : MLA-24
LATITUDE : -38.2318°S
LONGITUDE : 148.2194°E
SURVEY DATE : 18 OCTOBER 1996
SURVEY TYPE : GYRO MULTISHOT OF 9 5/8" CSG / 5 1/2" LINER (RE-SURVEY)
DEPTH REFERENCE : ORIGINAL R.K.B.
MAX. SURVEY DEPTH : 3240 m
SURVEY TIED ONTO : TUBING HEAD FLANGE (11.67 m BELOW ORIGINAL R.K.B.)
SURVEY INTERVAL : INRUN 150-300 m / OUTRUN 30 m
SLOT CO-ORDINATES : N = 0.0 m
E = 0.0 m
TARGET DIRECTION : N/A
* GRID CORRECTION : 0.7546° EAST TO GRID NORTH
CALCULATION METHOD : MINIMUM CURVATURE
SURVEYOR : B.MUNRO

* Grid North is 0.7546 deg West of True North. Since the Gyrodata tool references itself to True North, in order to reference every azimuth to Grid North 0.7546 deg must be added to every directional reading. Gyrodata describe this as a positive or "East" correction.



JOB NUMBER : AU1096G377

3.0 OUTRUN SURVEY LISTING

A Gyrodata Directional Survey

for

ESSO AUSTRALIA LIMITED

Location: MARLIN PLATFORM, BASS STRAIT, WELL: MLA-24 (RE-SURVEY)

9 5/8" CASING - 5 1/2" LINER RE-SURVEY - DEFINITIVE RESULTS

Job Number: AU1096G377

Run Date: 18-Oct-96 23:30:29

Surveyor: B.MUNRO

Calculation Method: MINIMUM CURVATURE

Survey Latitude: -38.231800 deg. S

Azimuth Correction: 0.7546 deg East to Grid North

Closure Calculated from Well Head Location

Horizontal Coordinates Calculated from Well Head Location

NOTE: A depth shift of 10 metres has been applied to all
outrun depths due to a wireline re-zero discrepancy
of 10 metres at surface. (For details see Survey Report.)

A Gyrodata Directional Survey

ESSO AUSTRALIA LIMITED

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Location: MARLIN PLATFORM, BASS STRAIT, WELL: MLA-24 (RE-SURVEY)

9 5/8" CASING - 5 1/2" LINER RE-SURVEY - DEFINITIVE RESULTS

Job Number: AU1096G377

MEASURED DEPTH meters	I N C L deg.	A Z I M U T H deg.	V E R T I C A L DEPTH meters	H O R I Z O N T A L C O O R D I N A T E S meters	D O G L E G S E V E R I T Y deg/30m
0.0	0.00	0.00	0.0	0.00 N 0.00 E	0.00

ALL DEPTHS REFERENCED TO ORIGINAL R.K.B. (11.67 m ABOVE T.H.F.)

A 4.0 m WIRELINE STRETCH CORRECTION WAS ADDED TO ALL DEPTHS
AFTER THE SCHLUMBERGER GR-CCL CORRELATION

110.0	.17	292.45	110.0	.06 N .15 W	.05
140.0	.73	71.02	140.0	.14 N .01 W	.87
170.0	.61	92.83	170.0	.20 N .33 E	.28
200.0	1.35	331.37	200.0	.50 N .32 E	1.76
230.0	.67	288.25	230.0	.87 N .02 W	.98
260.0	.96	209.39	260.0	.70 N .31 W	1.06
290.0	2.05	196.04	290.0	.03 S .58 W	1.14
320.0	4.53	202.44	319.9	1.64 S 1.18 W	2.50
350.0	7.26	203.74	349.8	4.47 S 2.40 W	2.73
380.0	9.85	203.65	379.4	8.56 S 4.19 W	2.59
410.0	12.75	207.54	408.8	13.85 S 6.75 W	3.00
440.0	14.51	205.80	438.0	20.16 S 9.92 W	1.81
470.0	16.84	203.67	466.9	27.53 S 13.30 W	2.40
500.0	19.15	205.64	495.4	35.95 S 17.17 W	2.39
530.0	21.87	205.25	523.5	45.44 S 21.69 W	2.72
560.0	24.74	206.84	551.1	56.10 S 26.91 W	2.94
590.0	27.76	208.91	578.0	67.82 S 33.12 W	3.16
620.0	30.90	209.25	604.1	80.66 S 40.26 W	3.14
650.0	33.21	211.11	629.5	94.41 S 48.27 W	2.51
680.0	33.88	210.30	654.5	108.67 S 56.74 W	.80
710.0	34.20	210.47	679.4	123.15 S 65.23 W	.33
740.0	34.44	209.99	704.2	137.77 S 73.75 W	.36
770.0	34.58	210.60	728.9	152.44 S 82.32 W	.37
800.0	34.83	211.00	753.6	167.11 S 91.06 W	.34
830.0	34.93	210.67	778.2	181.84 S 99.86 W	.21
860.0	34.86	211.19	802.8	196.56 S 108.68 W	.30
890.0	34.98	211.55	827.4	211.23 S 117.62 W	.24
920.0	34.90	211.74	852.0	225.85 S 126.63 W	.13
950.0	34.70	211.89	876.6	240.40 S 135.66 W	.22
980.0	34.80	212.89	901.3	254.84 S 144.82 W	.58
1010.0	34.89	212.85	925.9	269.24 S 154.12 W	.09
1040.0	35.03	212.82	950.5	283.68 S 163.45 W	.14
1070.0	35.14	213.03	975.0	298.16 S 172.82 W	.16
1100.0	35.27	213.00	999.5	312.66 S 182.24 W	.13
1130.0	35.42	213.31	1024.0	327.19 S 191.73 W	.24
1160.0	35.44	213.50	1048.4	341.70 S 201.31 W	.11
1190.0	35.69	213.95	1072.8	356.22 S 211.00 W	.37

A G y r o d a t a D i r e c t i o n a l S u r v e y

ESSO AUSTRALIA LIMITED

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Location: MARLIN PLATFORM, BASS STRAIT, WELL: MLA-24 (RE-SURVEY)

9 5/8" CASING - 5 1/2" LINER RE-SURVEY - DEFINITIVE RESULTS

Job Number: AU1096G377

MEASURED DEPTH meters	I N C L deg.	A Z I M U T H deg.	V E R T I C A L DEPTH meters	H O R I Z O N T A L C O O R D I N A T E S meters	D O G L E G SEVERITY deg/30m	
1220.0	35.61	214.10	1097.2	370.71 S	220.78 W	.12
1250.0	35.52	214.75	1121.6	385.10 S	230.64 W	.39
1280.0	35.53	215.94	1146.0	399.32 S	240.73 W	.69
1310.0	35.46	215.86	1170.5	413.43 S	250.94 W	.08
1340.0	35.77	216.03	1194.9	427.57 S	261.20 W	.32
1370.0	36.12	215.81	1219.1	441.83 S	271.53 W	.38
1400.0	36.34	216.81	1243.3	456.12 S	282.03 W	.63
1430.0	36.59	217.48	1267.5	470.33 S	292.79 W	.47
1460.0	36.64	216.95	1291.5	484.58 S	303.62 W	.32
1490.0	36.84	217.51	1315.6	498.87 S	314.47 W	.39
1520.0	37.12	217.91	1339.6	513.14 S	325.51 W	.37
1550.0	37.30	218.08	1363.4	527.44 S	336.68 W	.21
1580.0	37.71	219.80	1387.2	541.64 S	348.16 W	1.12
1610.0	37.47	218.83	1411.0	555.80 S	359.75 W	.64
1640.0	38.27	218.46	1434.7	570.19 S	371.25 W	.83
1670.0	38.71	218.37	1458.2	584.82 S	382.85 W	.44
1700.0	37.96	219.67	1481.7	599.27 S	394.56 W	1.10
1730.0	37.84	219.66	1505.4	613.46 S	406.33 W	.12
1760.0	37.92	219.50	1529.1	627.66 S	418.06 W	.12
1790.0	38.65	219.16	1552.6	642.03 S	429.84 W	.76
1820.0	39.09	219.30	1576.0	656.62 S	441.75 W	.45
1850.0	39.38	219.40	1599.2	671.29 S	453.78 W	.30
1880.0	40.11	219.27	1622.3	686.12 S	465.94 W	.73
1910.0	40.40	219.30	1645.2	701.13 S	478.21 W	.29
1940.0	40.98	219.29	1667.9	716.26 S	490.60 W	.58
1970.0	41.21	219.39	1690.5	731.51 S	503.10 W	.24
2000.0	42.05	219.74	1713.0	746.88 S	515.80 W	.87
2030.0	42.97	220.19	1735.1	762.41 S	528.82 W	.97
2060.0	43.56	220.55	1756.9	778.08 S	542.14 W	.64
2090.0	43.96	220.48	1778.6	793.85 S	555.62 W	.40
2120.0	43.80	220.87	1800.2	809.62 S	569.17 W	.31
2150.0	44.16	220.81	1821.8	825.38 S	582.79 W	.36
2180.0	44.90	220.99	1843.2	841.28 S	596.57 W	.75
2210.0	45.23	221.30	1864.4	857.27 S	610.54 W	.40
2240.0	44.31	221.86	1885.7	873.08 S	624.56 W	1.00
2270.0	44.00	222.36	1907.2	888.58 S	638.58 W	.47
2300.0	44.21	222.58	1928.7	903.98 S	652.67 W	.26
2330.0	44.60	222.81	1950.2	919.41 S	666.91 W	.42
2360.0	45.36	222.86	1971.4	934.96 S	681.33 W	.76
2390.0	45.71	222.88	1992.4	950.65 S	695.89 W	.35
2420.0	45.72	222.75	2013.3	966.41 S	710.49 W	.09
2450.0	46.36	222.80	2034.2	982.26 S	725.15 W	.63

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Location: MARLIN PLATFORM, BASS STRAIT, WELL: MLA-24 (RE-SURVEY)

9 5/8" CASING - 5 1/2" LINER RE-SURVEY - DEFINITIVE RESULTS

Job Number: AU1096G377

MEASURED DEPTH meters	I N C L deg.	AZIMUTH deg.	VERTICAL DEPTH meters	H O R I Z O N T A L C O O R D I N A T E S meters		DOGLEG SEVERITY deg/30m
2480.0	46.62	222.81	2054.8	998.22 S	739.94 W	.27
2510.0	47.29	222.75	2075.3	1014.31 S	754.83 W	.67
2540.0	47.79	222.90	2095.6	1030.55 S	769.88 W	.51
2570.0	47.10	223.23	2115.8	1046.69 S	784.97 W	.74
2600.0	46.75	223.46	2136.3	1062.63 S	800.01 W	.39
2630.0	45.55	223.63	2157.1	1078.31 S	814.91 W	1.20
2660.0	45.26	224.06	2178.2	1093.71 S	829.71 W	.42
2690.0	45.35	225.99	2199.3	1108.78 S	844.79 W	1.38
2720.0	45.55	226.63	2220.3	1123.55 S	860.25 W	.49
2750.0	45.09	227.20	2241.4	1138.12 S	875.83 W	.61
2780.0	44.26	228.52	2262.8	1152.28 S	891.47 W	1.25
2810.0	43.85	228.71	2284.3	1166.07 S	907.12 W	.43
2840.0	43.27	228.73	2306.1	1179.71 S	922.66 W	.58
2870.0	42.37	229.79	2328.1	1193.01 S	938.11 W	1.16
2900.0	40.30	231.42	2350.6	1205.59 S	953.41 W	2.33
2930.0	39.21	231.98	2373.6	1217.48 S	968.47 W	1.14
2960.0	37.31	233.89	2397.2	1228.68 S	983.28 W	2.24
2990.0	36.36	233.90	2421.2	1239.28 S	997.81 W	.95
3020.0	36.15	234.15	2445.4	1249.70 S	1012.17 W	.26
3050.0	35.55	234.77	2469.7	1259.91 S	1026.47 W	.70
3080.0	35.01	235.05	2494.2	1269.88 S	1040.64 W	.56
3110.0	34.45	235.58	2518.9	1279.60 S	1054.70 W	.64
3140.0	33.84	235.89	2543.7	1289.08 S	1068.62 W	.63
3170.0	33.27	236.15	2568.7	1298.35 S	1082.37 W	.59
3200.0	33.55	236.11	2593.7	1307.56 S	1096.08 W	.28
3230.0	33.73	235.62	2618.7	1316.88 S	1109.84 W	.33
3240.0	33.98	236.35	2627.0	1320.00 S	1114.46 W	1.42

Final Station Closure: Distance: 1727.55 m Az: 220.17 deg.

gyro/data

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JOB NUMBER : AU1096G377

4.0 QUALITY CONTROL

JOB NUMBER : AU1096G377

4.1 QUALITY CONTROL REPORT

TOOL NUMBER : 500
MAXIMUM GYRO TEMPERATURE : 88.51 °C
MAXIMUM AMBIENT TEMPERATURE : 126.50 °C
MAXIMUM INCLINATION : 47.79 °
AVERAGE AZIMUTH : 220.17°
WIRELINE REZERO VALUE : (see Discussion)
REZERO ERROR / K : 0.0 m/K

CALIBRATION USED FOR FIELD SURVEY : 28 SEPTEMBER 1996
CALIBRATION TEMPERATURES: 77.52, 80.13, 86.78°C
CALIBRATION USED FOR FINAL SURVEY : 28 SEPTEMBER 1996

BOTTOM LINE COMPARISONS

	M.D.	INC	AZIMUTH	TVD	NORTHING	EASTING
GYRO SURVEY	3240	33.98	236.35	2627.00	-1320.00	-1114.46
PREVIOUS SURVEY DATA (INTERPOLATED)	3240	33.72	236.00	2635.88	-1416.40	-949.72

TVD DIFFERENCE : 8.88 METRES (2.74 m/K)
LATERAL DIFFERENCE : 190.87 METRES (58.91 m/K)

Quality Control Comparisons

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ESSO AUSTRALIA LIMITED
 WELL: MLA-24 (RE-SURVEY)
 9 5/8" CASING - 5 1/2" LINER RE-SURVEY

Job Number : AU1096G377 / AU1096G377

INRUN/OUTRUN Comparison

Depth	INRUN Inc	OUTRUN Inc	Delta	INRUN Az	OUTRUN Az	Delta
300.0	3.10	3.00	.100	192.15	194.09	-1.936
450.0	14.46	14.43	.035	206.43	206.29	.140
600.0	28.71	28.61	.099	207.80	207.71	.084
900.0	35.11	35.10	.000	211.38	211.15	.230
1200.0	35.56	35.46	.100	213.91	213.43	.473
1500.0	37.04	37.14	-.098	217.41	217.55	-.148
1800.0	38.94	38.74	.204	218.10	218.42	-.321
2100.0	43.96	43.99	-.030	219.66	219.98	-.321
2400.0	45.72	45.83	-.110	221.55	221.28	.263
2700.0	44.97	44.83	.140	225.32	225.31	.014

For Inclinations Greater than 0 degrees:

Average Inclination Difference = .04408 deg.
 Average Azimuth Difference = -.1524 deg.

A Gyrodata Directional Survey

for

ESSO AUSTRALIA LIMITED

Location: MARLIN PLATFORM, BASS STRAIT, WELL: MLA-24 (RE-SURVEY)

9 5/8" CASING - 5 1/2" LINER RE-SURVEY - INRUN RESULTS

Job Number: AU1096G377

Run Date: 18-Oct-96 23:30:29

Surveyor: B.MUNRO

Calculation Method: MINIMUM CURVATURE

Survey Latitude: -38.231800 deg. S

Azimuth Correction: 0.7546 deg East to Grid North

A Gyrodata Directional Survey

ESSO AUSTRALIA LIMITED

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Location: MARLIN PLATFORM, BASS STRAIT, WELL: MLA-24 (RE-SURVEY)

9 5/8" CASING - 5 1/2" LINER RE-SURVEY - INRUN RESULTS

Job Number: AU1096G377

MEASURED DEPTH meters	I N C L deg.	AZIMUTH deg.
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INRUN RESULTS

300.0	3.10	192.15
450.0	14.46	206.43
600.0	28.71	207.80
900.0	35.11	211.38
1200.0	35.56	213.91
1500.0	37.04	217.41
1800.0	38.94	218.10
2100.0	43.96	219.66
2400.0	45.72	221.55
2700.0	44.97	225.32

JOB NUMBER : AU1096G377

4.2 FUNCTION TEST

5 Survey stations were collected at the measured depth shown below. The tables show the repeatability of the gyro tool in both inclination and azimuth at one measured depth.

INCLINATION

M.D. m	1	2	3	4	5
3240	33.97	33.99	33.97	33.98	33.98

AZIMUTH

M.D. m	1	2	3	4	5
3240	236.29	236.34	236.38	236.34	236.35

JOB NUMBER : AU1096G377

5.0 EQUIPMENT AND CHRONOLOGICAL REPORT

JOB NUMBER : AU1096G377

5.1 EQUIPMENT REPORT

DOWNHOLE ELECTRONICS

SURFACE ELECTRONICS

PRIMARY

TOOL No. 500
GYRO SECTION A0016
DATA SECTION C0019
POWER SECTION C0037

COMPUTER A0264
POWER SUPPLY A0066
PRINTER A0057
INTERFACE A0051

BACKUP

TOOL No. 702
GYRO SECTION A0016
DATA SECTION C0011
POWER SECTION C0009

COMPUTER A0270
POWER SUPPLY A0026
PRINTER A0117
INTERFACE A0068

WIRELINE COMPANY : SCHLUMBERGER

CABLE SIZE : 1/2"

RUNNING GEAR

Snub nose, bumper sub, sinker bar, gyro heat-shield barrel, pressure barrel, wear bushings.

TOTAL LENGTH OF TOOL : 4.73 m

MAXIMUM O.D. : 3.7 inches

TOTAL WEIGHT OF TOOL : 121 kg

JOB NUMBER : AU1096G377

5.2 CHRONOLOGICAL REPORT

14 October 1996

07:30 Gyrodata Engineer B.Munro checks in for flight to Marlin platform.
09:00 Commence equipment check.
13:30 All tools checked, OK.
Stand-by.

15 October 1996

08:50 Rig up tool #500.
09:10 Zero tool referenced to original R.K.B. on blind rams. (+3.2 m)
09:15 Commence inrun stations from 300 metres.
10:30 Tool hangs up at approx. 1870 metres (top of 5 1/2" liner.)
11:00 Commence POOH with Gyro tool.
12:15 Out of hole, begin rig down of wireline.
12:30 Finish rig-down. Stand-by.

18 October 1996

22:50 Power up Gyro #500 and test on catwalk.
23:05 Zero tool on blind rams and pressure test lubricator.
23:20 Run in hole, carrying out inrun check shots.

19 October 1996

00:50 Reach T.D. of 3240 metres.
00:55 Commence outrun survey stations, every 30 metres.
01:20 Turn off Gyro and commence GR-CCL run.
01:35 Attempt to re-start Gyro - unsuccessful.

JOB NUMBER : AU1096G377

5.2 CHRONOLOGICAL REPORT

01:45 Begin POOH with Gyro tool.

02:15 Power up Gyro and RIH to 3240 m.

02:45 Commence outrun.

03:30 Second GR-CCI section.

03:45 Re-commence Gyro run.

04:20 Third GR-CCL section.

04:35 Re-commence Gyro run.

05:10 Fourth GR-CCL section.

05:25 Re-commence Gyro run.

08:00 Finish Gyro run, POOH.

08:20 Re-zero tool at surface, a 10 metre wireline induced discrepancy was
noticed.
(see Discussion for full details.)

08:45 Rig down tool and wireline.

09:30 Rig down complete.

13:50 Depart Platform.