WCR (BASIC DATA)
VOLUME 1 OF 2
WHIPTAIL-1A
(W915)

ESSO EXPLORATION AND PRODUCTION
AUSTRALIA INC.

86 pg + 6 enclosures 1/86

OIL and GAS DIVISION

WELL COMPLETION REPORT
WHIPTAIL-1A
BASIC DATA
VOLUME I 27 MAR 1986

GIPPSLAND BASIN
VICTORIA

ESSO AUSTRALIA LIMITED

Compiled by: P.A.ARDITTO

MARCH.1986

WHIPTAIL-1A

WELL COMPLETION REPORT

VOLUME 1

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APPENDICES

ESSO AUSTRALIA LTD

1. WELL DATA RECORD

WELL	:	WHIPTAIL-1A
LOCATION	:	Latitude : 38° 19' 30.351" S Longitude : 147° 31' 09.587" E X = 545,394.04 mE Y = 5,757,971.49 mN Map Projection: AMG ZONE 55 CM 147° E Geographical Location: Bass Strait Victoria Field: WHIPTAIL
PERMIT	:	Vic/L1
ELEVATION	:	21m KB
WATER DEPTH	:	39m
TOTAL DEPTH	:	2821m KB (2800 mSS)
PLUG BACK TYPE	:	Balanced cement plug
REASONS FOR PLUGGING BACK	:	Well suspended
MOVE IN	:	04:15 hrs., August 6, 1985
SPUDDED	:	01:45 hrs., August 10, 1985
REACHED T.D.	:	August 28, 1985
RIG RELEASED	:	04:45 hrs., September 4, 1985
OPERATOR	:	Esso Exploration and Production Australia Inc.
PERMITTEE OR LICENCEE	:	BHP Petroleum Pty. Ltd. & EEPA
ESSO INTEREST	:	50%
OTHER INTEREST	:	50%
CONTRACTOR	:	South Seas Drilling Company
RIG NAME	:	Southern Cross
EQUIPMENT TYPE	:	Semi submersible
TOTAL RIG DAYS	:	30
DRILLING AFE NO.	:	05-235009
TYPE COMPLETION	:	Plugged cased and Suspended
WELL CLASSIFICATION	:	Before Drilling New field Wildcat After Drilling New field discovery.

2. OPERATIONS SUMMARY
WHIPTAIL-1

MOVING/MOORING

The Southern Cross departed the Snapper-5 well location at 2115 hrs, August 5, 1985 and arrived at the Whiptail-1 location at 0415 hrs, August 6, 1985. The workboat, Lady Sally, towed the rig 25 nautical miles in 7 hours at an average speed of 3.6 knots.

While approaching the well location, the rig dropped the No. 1 anchor. The remaining seven anchors were run by the Swan Tide and Torrens Tide. The No. 1 anchor was pulled and its flukes cleared of a fouled pendant line after all but anchor No. 6 had been run.

Before deployment, Anchor No. 7 was fitted with a Baldt detachable chain chaser and used to test the feasibility of a chain chaser on a wire and chain mooring system. Due to unfamiliarity with the chain chaser, the workboat, Torrens Tide, made two trips to set the anchor.

All anchors were run in 12 hours and pretensioned to 230 kips.

Final Rig Location

Latitude : 38° 19' 30.391"S
Longitude : 147° 31' 10.327"E
X : 545,412mE
Y : 5,757,970mN

AMG Zone 55, Universal Transverse Mercator Projection, Australian Geodetic Datum.

The rig was located 1.85m at 180° from the called location and approximately 70km southwest of Lakes Entrance, Victoria.

DRILL 26" HOLE FOR 20" CASING

The drilling template was run and landed at a seafloor depth of 61mRKB. The 26" hole was drilled to 198m using seawater and high viscosity gel slugs to clean the hole. A wiper trip was conducted and the hole displaced with high viscosity mud prior to pulling the bit to run casing. The 18-3/4" pile joint assembly and 20" casing were run and cemented with the casing shoe at 180m.

After the BOP stack and riser were run, the pressure test on the casing and collet connector failed. Divers observed a leak in the casing annulus. Open ended drillpipe tagged cement inside the casing at 91m.

Due to the leak in the casing, the BOP stack was pulled and the 20" casing mechanically cut. The pile joint assembly, four post guidebase and drilling template were retrieved. On surface, the "CC" connector between the pile joint assembly and 20" casing crossover joint was inspected and found missing its O-ring.

WHIPTAIL-1A

MOVE

The rig was winched approximately 18m at 273° from the Whiptail-1 location.

Final Rig Location

Latitude : 38° 19' 30.351"S
Longitude : 147° 31' 09.587"E
X : 545,394mE
Y : 5,757,971mN

AMG Zone 55, Universal Transverse Mercator Projection, Australian Geodetic Datum

DRILL 26" HOLE FOR 20" CASING

The drilling template was run and landed at a seafloor depth of 60mRKB. The 26" hole was drilled to 197m and the 20" casing run and cemented at 182m in the same manner as in the Whiptail-1 well. The BOP stack was run and the collet connector and casing tested to 500psi.

17-1/2" HOLE FOR 13-3/8" CASING

Cement inside the 20" casing was tagged at 173m and drilled out along with new hole to a depth of 797m. High viscosity gel pills were pumped every third connection to 350m. While POH at TD, tight hole was experienced from 779 to 721m and singles had to be pumped out from 721 to 550m. After running back to bottom and washing 6m of fill, no further hole problems occurred.

The hole was logged and 13-3/8" casing was run and cemented at 782m. The plug was bumped with 1600 psi. A Cameron 13-3/8" Weight Set seal assembly was run and pressure tested to 200/5000psi. The BOP stack was then tested.

DRILL 12-1/4" HOLE TO 2821m

After drilling out the float collar and cement below the lowest casing connection, the casing was pressure tested to 1500psi. The remaining cement and new hole was drilled to 803m before a casing shoe PIT was run to leakoff at 500psi (12.4ppg EMW at casing shoe).

The 12-1/4" hole was drilled to 1165.4m using a seawater gel mud system. The mud weight was gradually increased from 8.8ppg to 10.3ppg over the interval 941m to 1062m. The mud weight was increased so that a 300psi overbalance would be present before penetrating a predicted 36m gas column in the top of the "Coarse Clastics".

At 1165.4m, an open hole PIT was run to leakoff at 400psi (13.3ppg EMW at casing shoe) before the bit was pulled. Core No. 1 was cut from 1165.4 to 1175.4m. The 12-1/4" hole was drilled to the original TD of 2021m. The mud weight was dropped from 10.3ppg to 9.8ppg by 1942m, reducing the overbalance at the top of the "Coarse Clastics" to 200psi.

After running logs and RFT's at 2021m, the well depth was extended to 2821m upon geologist's request. Since RFT results showed the pressure at the top of the "Coarse Clastics" to be less than anticipated, the mud weight was reduced further to 9.5ppg. In the extended hole section, a second core was cut from 2737.2m to 2754.6m. At 2821m, logs, RFT's and sidewall cores were run.

9-5/8" SUBSEA COMPLETION CASING AND WELL ABANDONMENT

Since an accumulation of oil was found in the Latrobe Formation, the well was to be left for a future subsea completion. Before the sands were cased off, a cement plug was set at 1600m to 1500m, just below the proposed casing shoe depth, to help ensure a better casing cement job. Since no hydrocarbons were found below 1450m, no other open hole cement plugs were set.

The 9-5/8" casing was run and cemented at a depth of 1485m. The casing string included two 10-3/4" casing joints just below the 10-3/4" casing hanger. The larger casing was used because the subsea safety valves run in a subsea completion will not fit easily inside 9-5/8" casing. The casing was cemented using a 9-5/8" subsea release plug set below a drillpipe stinger and wellhead running tool. The plug was bumped with 3000psi.

While preparing to run the seal assembly, a fatality occurred on the rig floor. Operations were shut down for 21-1/2 hours while the accident was investigated.

After the investigation, a Cameron 10-3/4" Weight Set seal assembly was set and tested to 5000psi. Open ended drillpipe was run and tagged the top of cement inside the casing at 1463m.

Cement Plug No. 2 was set inside the 9-5/8" casing from 160 to 95m using a 3-1/2" cement diverter tool, 3-1/2" tubing stinger, and 5" drillpipe. The BOP stack was then pulled. Divers measured the 10-3/4" seal assembly stack up inside the wellhead and cut the guidelines after the corrosion cap was set.

DEMOORING

After waiting 29 hours for weather, the rig was deballasted and all anchors were pulled by the Torrens Tide, Swan Tide and Lady Sally workboats. The rig departed the well location at 0445 hours on August 4, 1985 on tow by the Lady Sally to the East Halibut-1 location.

1848L/33-35

3. WHIPTAIL 1/1A CASING DATA

CSG O.D. in.	CSG WT. ppf	CSG GRADE	CSG CONN.	CSG LGTH mtrs.	CENTRALIZER POSITION.	SHOE DPTH mRKB	REMARKS
20	94	X-52	JV	12.58		180	Float Shoe Jnt.
20	94	X-52	JV	85.87	Across Collars on First Five Jnts.		7 Jnts.
20	94	X-52	JV/CC	13.38			Crossover Jnt.
24	670		CC	10.96			Pile Jnt. Ass'y No. EP2
20	94	X-52	JV	11.49		182	Float Shoe Jnt.
20	94	X-52	JV	67.86	Across Collars on First Five Jnts.		7 Jnts.
20	129	X-52	JV/CC	12.36			Crossover Jnt.
24	670		CC	11.10			Pile Jnt. Ass'y No. EP8
13-3/8	54.5	K-55	Butt.	12.43		782	Float Shoe Jnt.
13-3/8	54.5	K-55	Butt.	12.34			Float Collar Jnt.
13-3/8	54.5	K-55	Butt.	685.79	Across Collars on First Six Jnts.		59 Jnts.
13-3/8	54.5	K-55	Butt.	12.87			Hgr Jnt. Hgr No. EHW32. S/A No. ESW32.

WHIPTAIL 1/1A CASING DATA

CSG O.D. in.	CSG WT. ppf	CSG GRADE	CSG CONN.	CSG LGTH mtrs.	CENTRALIZER POSITION.	SHOE DPTH mRKB	REMARKS
9-5/8	47.0	N-80	Butt.	12.22	Middle of Jnt.	1,485	Float Shoe Jnt.
9-5/8	47.0	N-80	Butt.	11.79			Float Collar Jnt.
9-5/8	47.0	N-80	Butt.	1,376.20	Across Collars On First 5 Jnts.		118 Jnts.
9-5/8	47.0	N-80	Butt.	1.86			Pup Jnt.
10-3/4	51.0	N-80	Butt.	0.80			9-5/8"x10-3/4" Swedge
10-3/4	51.0	N-80	Butt.	11.60			1 Jnts.
10-3/4	51.0	N-80	Butt.	12.45			Hgr. Jnt. Hgr No. EHW101. S/A NO. ESW101.

4. WHIPTAIL 1/1A CEMENT DATA

CEMENT JOB TYPE	CEMENT TOP mRKB	CEMENT BTM mRKB	CEMENT ADDITIVES	CEMENT VOLUME sxs	CEMENT WEIGHT ppg	REMARKS
20" Csg	61	180	2.2% Gel w/ 173 Bbls Seawater	750	13.3	Lead Slurry. Divers confirm cmt returns.
20" Csg	-91	-163	42 Bbls Seawater	350	15.8	Tail Slurry. Cmt Inside Casing. Tagged TOC @ 91m.
20" Csg	60	99	2.2% Gel w/ 173 Bbls Seawater	750	13.3	Lead Slurry. Divers confirm cmt returns.
20" Csg	99	182	42 Bbls Seawater	350	15.8	Tail Slurry. Bled back 1 Bbl. Float Held.
13-3/8" Csg	282	782	125 Bbls Seawater	1,050	15.8	Displace w/ 354 Bbls.Bump Plug w/ 1600 psi.
P&A Plug No. 1	1,500	1,600	32 Bbls Freshwater	269	15.8	Tagged @ 1482m. Dressed Off.
9-5/8" Csg	957	1,485	0.4% HR6L w/ 63 Bbls FW	530	15.8	Displace w/ 335 Bbls. Bump Plug w/ 3000psi.Tagged TOC @ 1463m.
P&A Plug No. 2	95	160	9 Bbls Seawater	75	15.8	Set Inside 9-5/8" Csg.

Total: 4,124

CLASS 'G' CEMENT USED ON ALL JOBS. GEL ADDITIVE IS PRE-HYDRATED.

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WELL: WHIPTAIL 1A

5. SAMPLES, CONVENTIONAL CORES, SIDEWALL CORES

INTERVAL	TYPE
200.0 - 2820.0m	Cuttings samples - 3 sets of washed and oven dried cuttings and 1 set of bagged and air dried cuttings. Sampled from 200 - 1000m at 10m intervals, Sampled from 1000 - 1165m; 1175 - 2736m and 2755 - 2820m at 5m intervals.
200.0 - 2820.0m	1 set of unwashed canned samples for geochemistry, collected at 15m intervals.
1050.0 - 2820.0m	Washed and air dried canned samples every 30m (for fission track analysis).
1165.4 - 1175.5m	Core No.1, plastic sleeve, recovered 77% (7.8m)
2737.2 - 2754.6m	Core No.2, recovered 56.3% (9.8m)
1120.0 - 2780.9m	Sidewall Cores Run No.1 shot 60 recovered 55

WELL: WHIPTAIL-1A

6. WIRELINE LOGS AND SURVEYS

Type and Scale		From	To
	Suite 1		
BHC-GR	1:200 1:500	796.0	60.0m
	Suite 2		
DLTE-MSFL-GR	1:200 1:500	2007.0	782.0m
LDTC-CNTH-GR	1:200 1:500	2006.0	1100.0m
BHC-GR	1:200 1:500	2007.0	782.0m
RFT-HP (PRETEST AND SAMPLE RECORD) RUNS 1 - 7 RFT-GR (PRETEST AND SAMPLE RECORD) RUNS 1 - 7			
	Suite 3		
DDBHC-GR	1:200 1:500	2815.5	1950.0m
DLTE-MSFL-GR	1:200 1:500	2815.5	1950.0m
LDTC-CNTH-GR	1:200 1:500	2809.5	1950.0m
RFT-HP (PRETEST & SAMPLE RECORD) RUNS 8-9 RFT-GR (PRETEST & SAMPLE RECORD) RUNS 8-9			
WST-GR (CHECKSHOT SURVEY) 18 LEVELS		2815.0	200.0m
CST-GR	1:200	2781.0	1120.0m

7. SUMMARY OF WIRELINE FORMATION TEST PROGRAMME - WHIPTAIL-1A

TEST	SEAT	DEPTH (METRES) K.B.	CHAMBER	RECOVERY (LITRES) OIL	COND.	GAS	FORMATION WATER	MUD FILTRATE	HEWLETT-PACKARD FORMATION PRESSURE MPaa/g	Psia/g	HEWLETT-PACKARD HYDROSTATIC PRESSURE MPaa/g	Psia/g	REMARKS
			Litres	Litres	Litres	m^3	Litres	Litres	(Note: psia from HP gauge psig from Schlumberger strain gauge).				
1	1	1397.5	22.7	22.0	-	0.020	-	-	13.64	1979(g)	16.18	2347(g)	Valid pretest, sample taken
			10.4	9.6	-	-	-	-					
2	2	1380.2	22.7	16.3	-	0.006	-	5.25	13.52	1961(g)	15.98	2317(g)	Valid pretest, sample taken
			10.4	-	-	-	-	-					Sample preserved
3	3	1285.5	22.7	-	-	0.018	21.5	-	12.56	1821(g)	14.89	2159(g)	Valid pretest, sample taken
			10.4	-	-	-	9.7	-					
4	4	1295.0	22.7	-	-	-	21.5	-	12.64	1833(g)	14.98	2173(g)	Valid pretest, sample taken
			10.4	-	-	-	9.75	-					
5	5	1154.0	Sampling abandoned			-	-	-	-	-	13.32	1932(g)	Tight
5	6	1154.0	Sampling abandoned			-	-	-	-	-	13.32	1932(g)	Tight
5	7	1158.0	22.7	-	-	0.024	22.0	-	11.15	1617(g)	13.37	1939(g)	Valid pretest, sample taken
			10.4	-	-	-	10.2	-					
6	8	1497.5	Sampling abandoned			-	-	-	14.62	2121(g)	17.35	2517(g)	Seal failure
6	9	1497.0	Sampling abandoned			-	-	-	-	-	-	-	No seal
6	10	1497.0	22.7	-	-	-	20.5	-	14.63	2122(g)	17.35	2516(g)	Valid pretest, sample taken
			10.4	-	-	-	9.0	-					
7	11	1275.5	Sampling abandoned			-	-	-	-	-	14.73	2137(g)	Tight
7	12	1276.5	Sampling abandoned			-	-	-	-	-	14.73	2137(g)	Tight
7	13	1278.5	Sampling abandoned			-	-	-	-	-	14.76	2141(g)	Tight
7	14	1454.0	Pretest						14.23	2064.3(a)	16.86	2445.9(a)	Valid
7	15	1420.0	Pretest						13.89	2014.3(a)	16.45	2385.7(a)	Valid
7	16	1403.5	Pretest						13.73	1991.5(a)	16.26	2357.9(a)	Valid
7	17	1397.5	Pretest						13.67	1982.0(a)	16.19	2347.5(a)	Valid
7	18	1392.0	Pretest						13.62	1975.8(a)	16.12	2337.6(a)	Valid
7	19	1385.5	Pretest						13.58	1968.9(a)	16.04	2326.6(a)	Valid
7	20	1380.0	Pretest						13.54	1963.2(a)	15.98	2317.4(a)	Valid
7	21	1369.0	Pretest						13.37	1939.2(a)	15.85	2298.5(a)	Valid
7	22	1352.5	Pretest						13.22	1916.8(a)	15.65	2270.3(a)	Valid

SUMMARY OF WIRELINE FORMATION TEST PROGRAMME - WHIPTAIL-1A

TEST	SEAT	DEPTH (METRES) K.B.	CHAMBER	RECOVERY (LITRES) OIL	COND.	GAS	FORMATION WATER	MUD FILTRATE	HEWLETT-PACKARD FORMATION PRESSURE MPaa	Psia	HEWLETT-PACKARD HYDROSTATIC PRESSURE MPaa	Psia	REMARKS
			Litres	Litres	Litres	m^3	Litres	Litres	Note: psia from HP gauge psig from Schlumberger strain gauge)				
7	23	1331.0	Pretest						13.01	1886.8(a)	15.40	2234.2(a)	Valid
7	24	1363.5	22.7	-	0.014	-	22.0	-	13.27	1924.(g)	15.71	2279(g)	Valid pretest, sample taken
			10.4	-	-	-	10.0						Sample taken.
8	25	2664.5	Sampling	Abandoned					26.17	3796(g)	29.91	4338(g)	Tight
8	26	2665.0	Sampling	Abandoned							29.82	4325(g)	Tight
8	27	2666.8	Sampling	Abandoned					26.09	3784(g)	29.82	4325(g)	Tight
8	28	2663.7	Sampling	Abandoned					-	-	29.79	4320(g)	Tight
8	29	2665.0	Sampling	Abandoned					-	-	29.82	4325(g)	Tight
8	30	2650.0	Sampling	Abandoned					-	-	29.65	4301(g)	Tight
8	31	2649.5	Sampling	Abandoned					25.88	3754.0	29.65	4300(g)	Tight
8	32	2648.5	Sampling	Abandoned					25.86	3750.0	29.61	4295(g)	Tight
8	33	2651.0	45.4	-	-	0.023	-	20.0	25.89	3755.0	29.66	4302(g)	Tight - Composite sample of run 8
9	34	1497.0	Pretest						14.65	2124.3	16.82	2439.4(a)	Valid
9	35	1467.0	Pretest						14.35	2081.9	16.47	2389.3(a)	Valid
9	36	1436.0	Pretest						14.05	2038.3	16.12	2337.5(a)	Valid
9	37	1407.0	Pretest						13.76	1996.0	15.78	2288.5(a)	Valid
9	38	1380.0	Pretest						13.53	1962.5	15.53	2252.8(a)	Valid
9	39	2665.0	Sampling	Abandoned					-	-	29.93	4341.0(a)	Tight
9	40	2665.0	Sampling	Abandoned					-	-	29.95	4344.0(a)	Tight
9	41	2664.5	45.4	-	-	0.017	-	7.3	26.21	3801(a)	29.94	4342.0(a)	Valid pretest Sample taken
			10.4	-	-	tr	-	3.0					Sample taken

8. TEMPERATURE RECORD - WHIPTAIL-1A

LOGGING RUN	THERMOMETER DEPTH (m)	MAX. RECORDED TEMPERATURE (C°)	CIRCULATION TIME (t_k) (hours)	TIME AFTER CIRCULATION STOPPED (t)	HORNER TEMPERATURE (C°)	GEOTHERMAL GRADIENT (C°/km)
Suite 1						
BHC-GR	796.0	44.4	1.0	5.0		
Suite 2						
DLTE-MSFL-LDTC-CNTH-GR (Combination Tool)	2007.0	72.2	1.0	5.0	86.0	38.81
BHC-GR	2007.0	78.8	1.0	10.0		
RFT-GR (Pretest and Sample Record)	1497.5	70.5	1.0	35.5		
Suite 3						
DLTE-MSFL-LDTC-CNTH-GR (Combination Tool)	2815.5	82.0	1.0	6.37	144.2	48.64
DDBHC-GR	2815.5	113.0	1.0	13.18		
RFT-GR (Pretest and sample)	2665.0	91.0	1.0	25.82		
CST-GR	2781.0	113.0	1.0	36.67		

FIGURES

LOCALITY MAP

WHIPTAIL-1A

SCALE 1:250 000

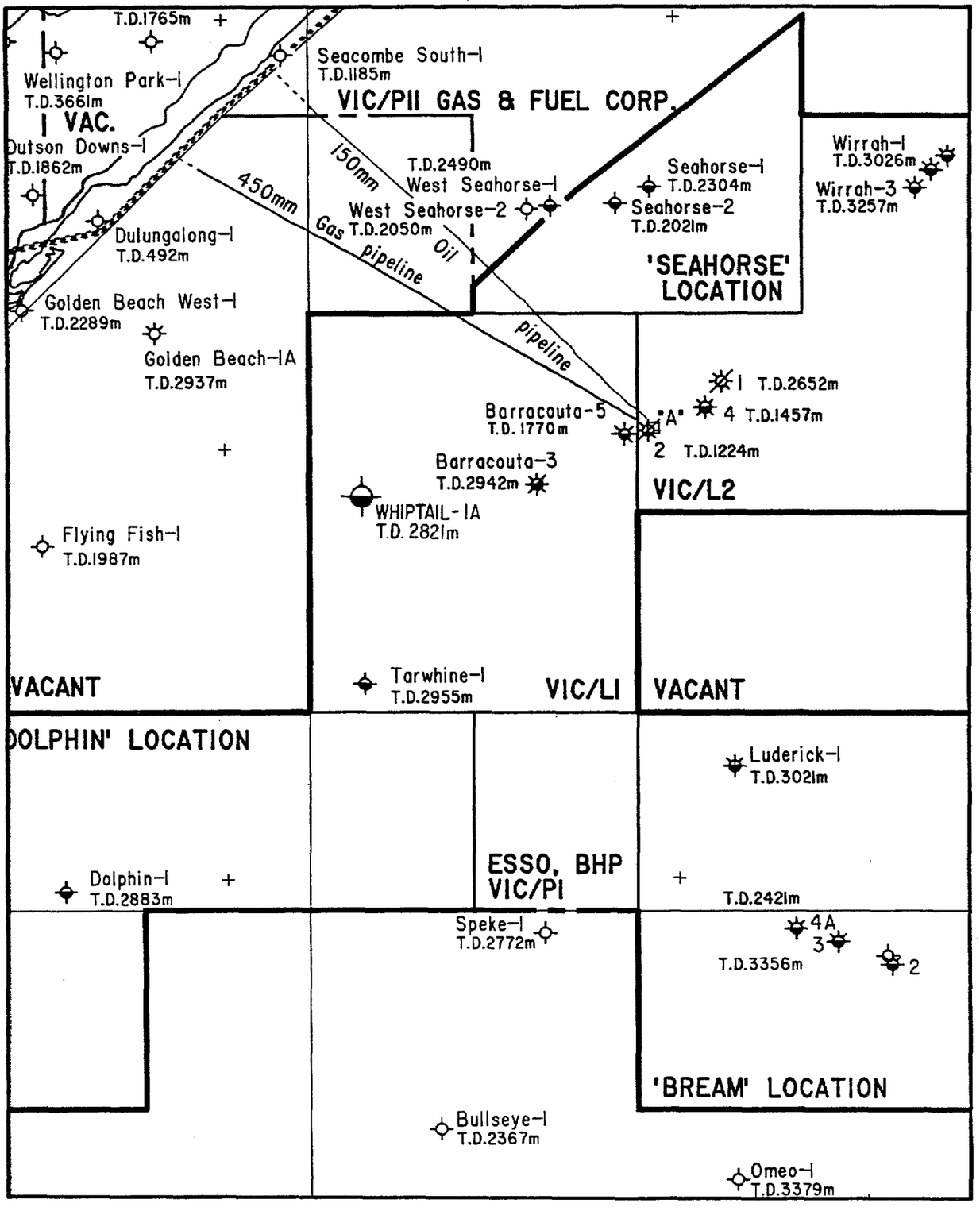


FIGURE 1

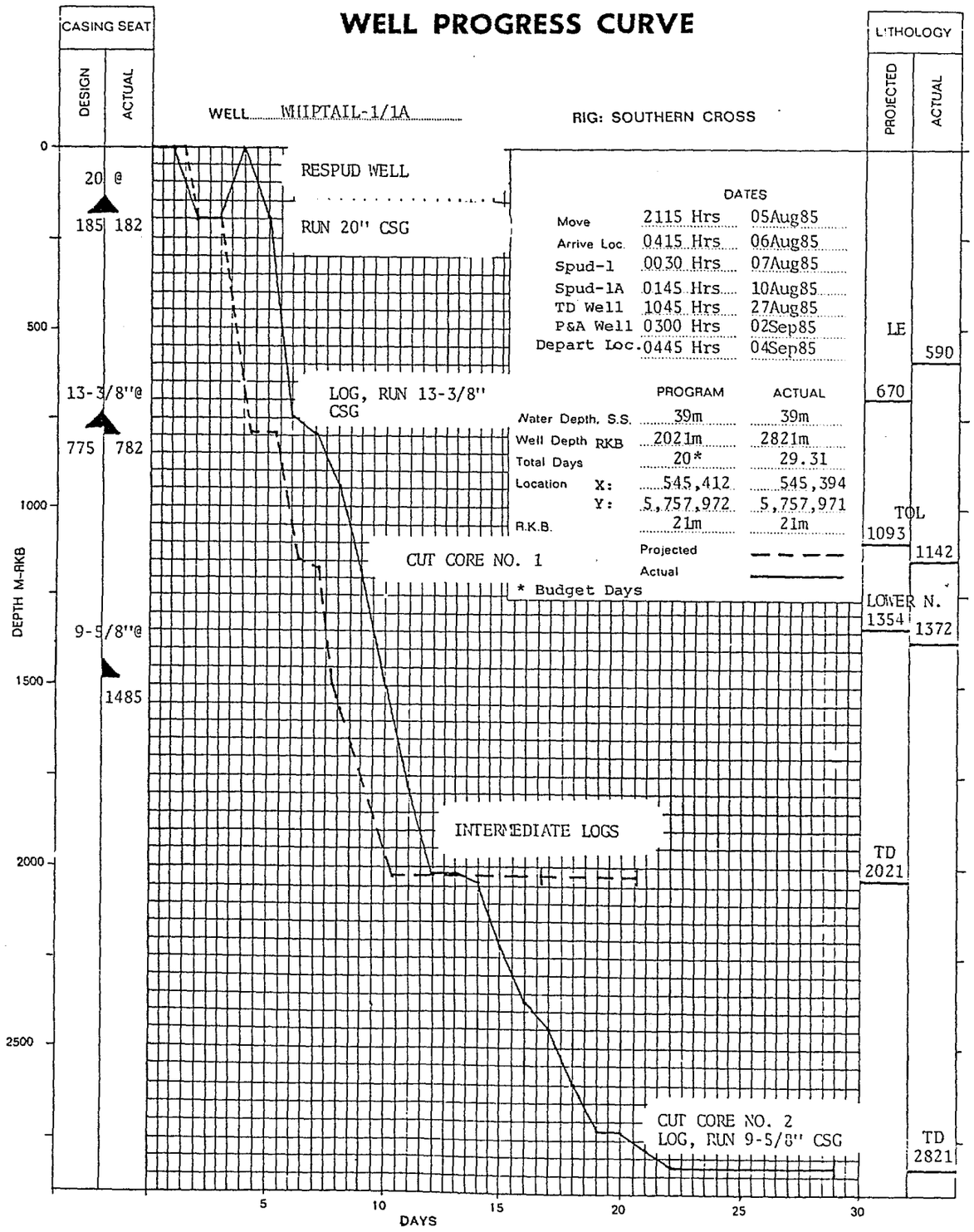

WELL PROGRESS CURVE
WELL MUIPTAIL-1/1A
RIG: SOUTHERN CROSS
CASING SEAT
DESIGN
ACTUAL
LITHOLOGY
PROJECTED
ACTUAL
DEPTH M-RKB
0
500
1000
1500
2000
2500
20" @
185
182
13-3/8"@
775
782
9-5/8"@
1485
RESPUD WELL
RUN 20" CSG
LOG, RUN 13-3/8" CSG
CUT CORE NO. 1
INTERMEDIATE LOGS
CUT CORE NO. 2
LOG, RUN 9-5/8" CSG
DATES
Move 2115 Hrs 05Aug85
Arrive Loc. 0415 Hrs 06Aug85
Spud-1 0030 Hrs 07Aug85
Spud-1A 0145 Hrs 10Aug85
TD Well 1045 Hrs 27Aug85
P&A Well 0300 Hrs 02Sep85
Depart Loc. 0445 Hrs 04Sep85
PROGRAM ACTUAL
Water Depth, S.S. 39m 39m
Well Depth RKB 2021m 2821m
Total Days 20* 29.31
Location X: 545,412 545,394
Y: 5,757,972 5,757,971
R.K.B. 21m 21m
Projected
Actual
* Budget Days
LE
590
670
TOL
1093
1142
LOWER N.
1354
1372
TD
2021
TD
2821
5
10
15
20
25
30
DAYS

FIGURE 2

WHIPTAIL 1A
WELLBORE SCHEMATIC

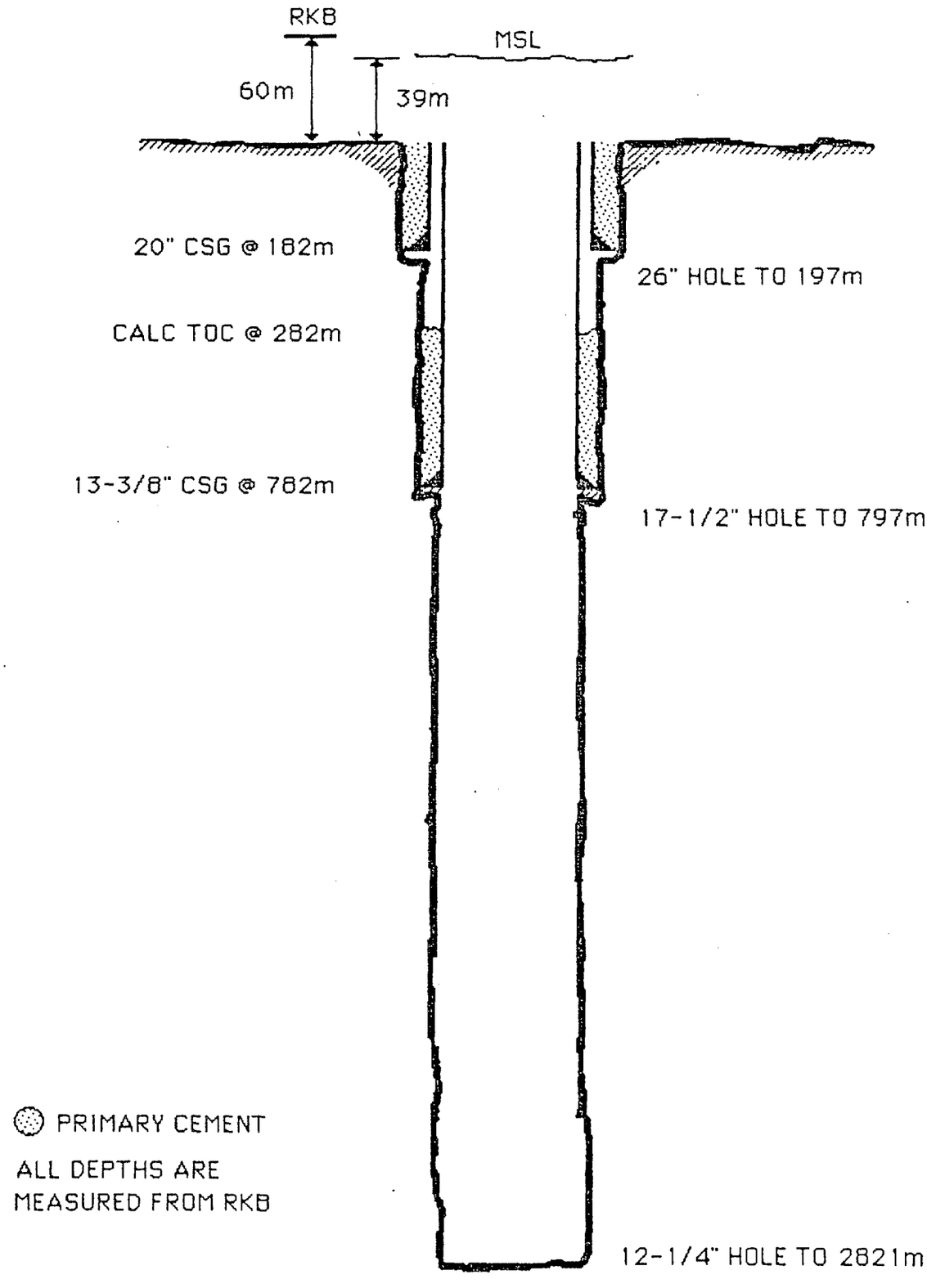


FIGURE 3

WHIPTAIL 1
ABANDONMENT SCHEMATIC

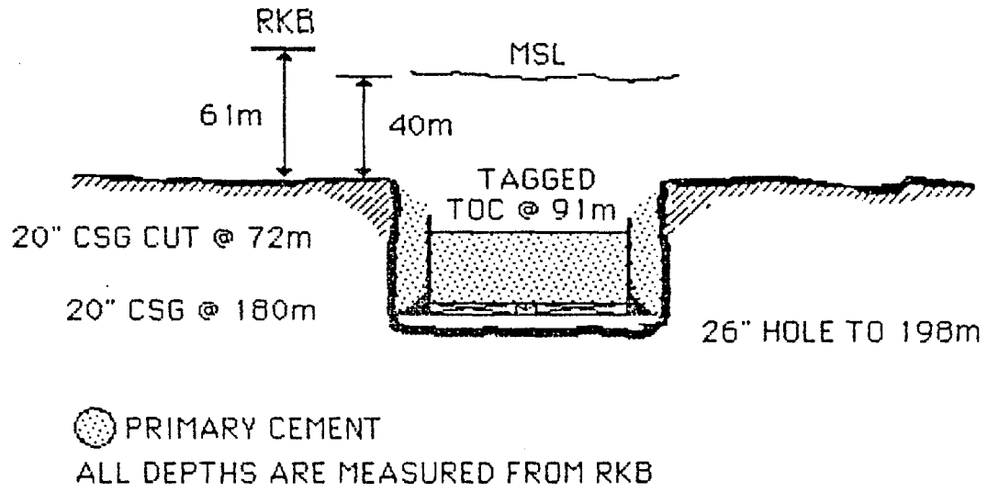


FIGURE 4A

WHIPTAIL 1A
ABANDONMENT SCHEMATIC

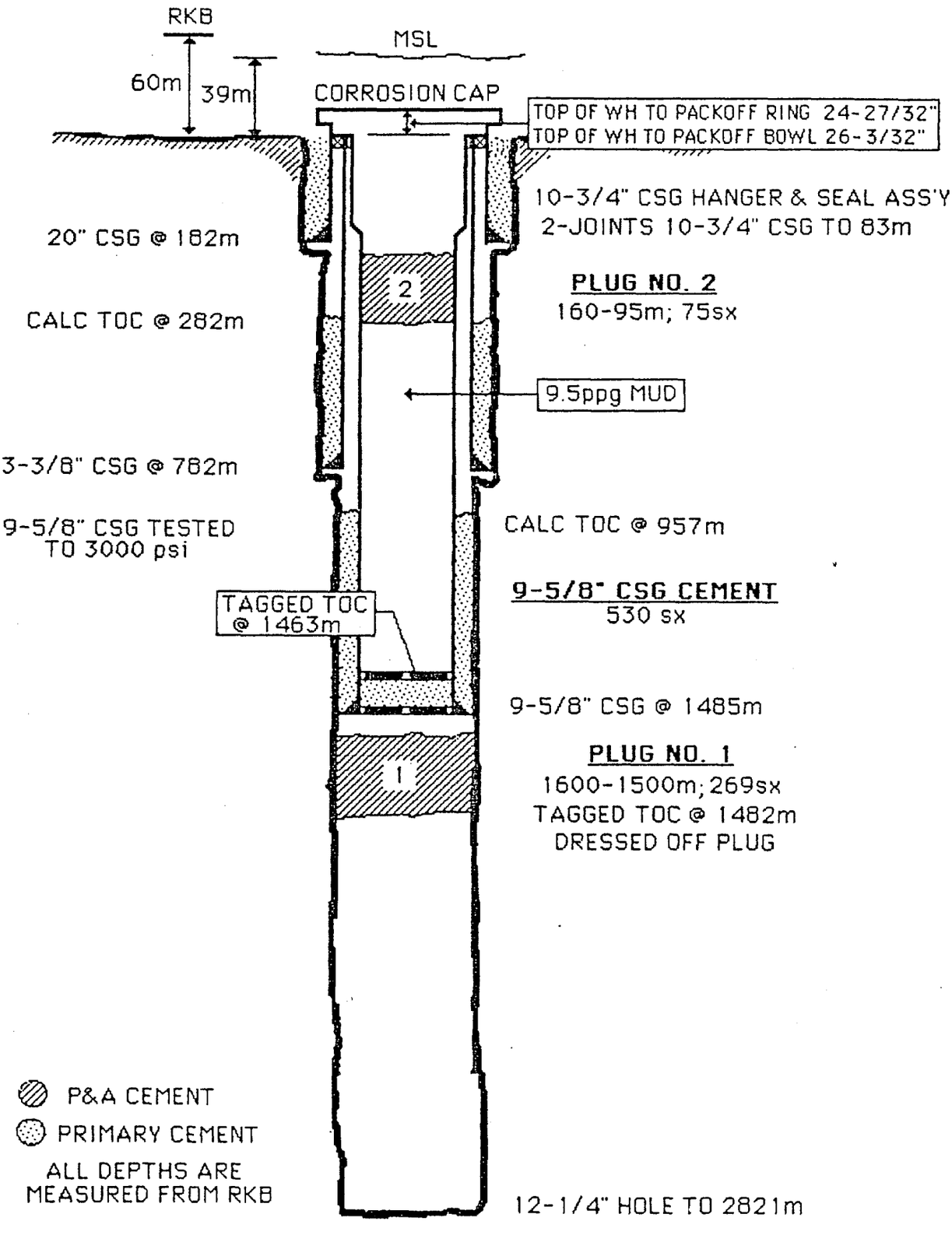


FIGURE 4B

FIGURE 5A

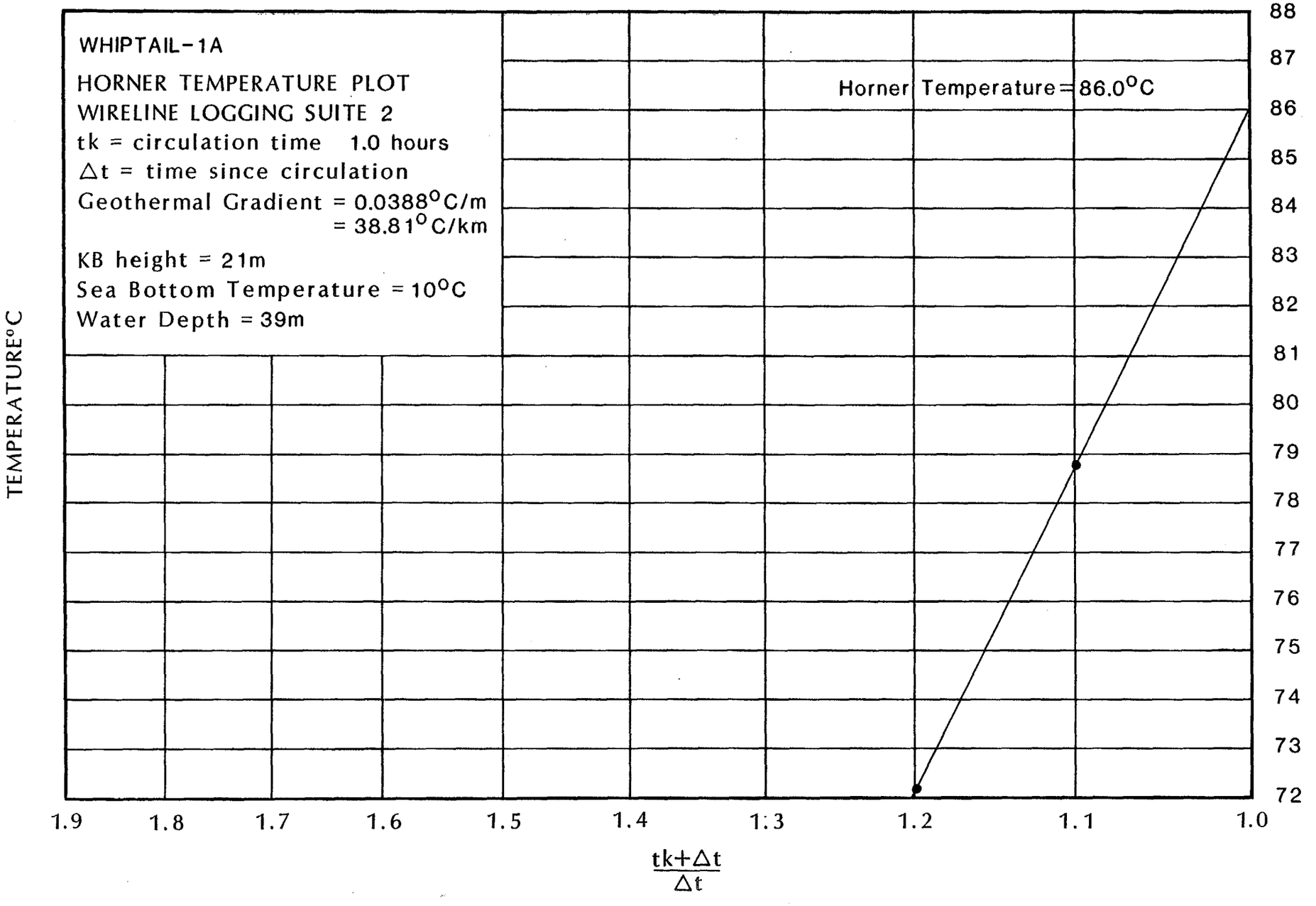
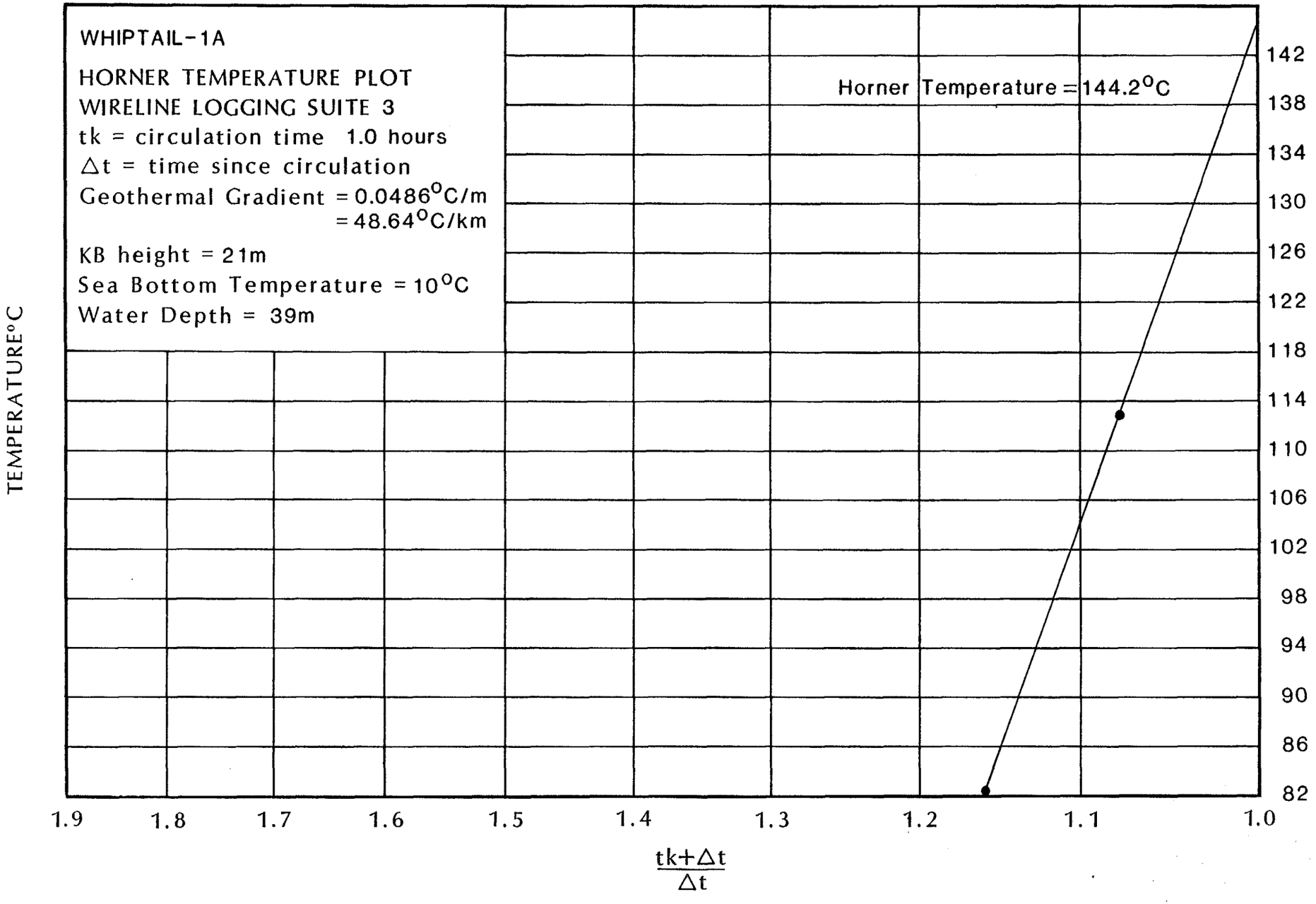

WHIPTAIL-1A
HORNER TEMPERATURE PLOT
WIRELINE LOGGING SUITE 2
tk = circulation time 1.0 hours
Δt = time since circulation
Geothermal Gradient = 0.0388°C/m
= 38.81°C/km
KB height = 21m
Sea Bottom Temperature = 10°C
Water Depth = 39m
Horner Temperature = 86.0°C
TEMPERATURE°C
88
87
86
85
84
83
82
81
80
79
78
77
76
75
74
73
72
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
tk+Δt / Δt

FIGURE 5B


WHIPTAIL-1A
HORNER TEMPERATURE PLOT
WIRELINE LOGGING SUITE 3
tk = circulation time 1.0 hours
Δt = time since circulation
Geothermal Gradient = 0.0486°C/m
= 48.64°C/km
KB height = 21m
Sea Bottom Temperature = 10°C
Water Depth = 39m
Horner Temperature = 144.2°C
TEMPERATURE°C
142
138
134
130
126
122
118
114
110
106
102
98
94
90
86
82
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
tk+Δt / Δt

APPENDIX 1

APPENDIX 1

Lithological Descriptions

WHIPTAIL-1A

Lithology Descriptions

Depth	%	Descriptions
200-210m	100	CALCARENITE: White to light grey (fossiliferous limestone) dominantly fossil fragments e.g. coral, gastropods, fragments of brachiopods (larger cement fragments present).
210-220m	100	CALCARENITE: [fossiliferous limestone] as above.
220-230m	100	CALCARENITE: As above.
230-240m	100	CALCARENITE: Dominantly fossil fragments including coral, gastropods, brachiopods [fossiliferous limestone], clean.
240-250m	100	CALCARENITE: As above.
250-260m	100	CALCARENITE: As above.
260-270m	100	CALCARENITE: As above, or fossiliferous limestone, fine to medium grained aggregates, medium to hard.
270-280m	100	CALCARENITE: As above.
280-290m	100	CALCARENITE: As above.
290-300m	100	CALCARENITE: Dominantly fossiliferous fragments.
300-310m	100	CALCARENITE: As above, i.e. light grey, white to buff, hard to medium hard, fine to medium grained, very abundant fossils, clean. Trace pyrite, trace glauconite.
310-320m	100	CALCARENITE: Dominantly fossiliferous fragments, some aggregates, medium hard, light grey to white, medium grained, trace pyrite and glauconite.
320-330m	100	CALCARENITE: As above.
330-340m	100	CALCARENITE: As above.
340-350m	100	CALCARENITE: As above.
350-360m	100	CALCARENITE: Bright white, occasionally very light grey, dominantly white, very fossiliferous, very firm to brittle, predominantly fossil fragments, of coral, brachiopods, forams and gastropods.
360-370m	100	CALCARENITE: As above.
370-380m	50 50	CALCARENITE: As above. SANDSTONE: Translucent, clear, white, yellow, well rounded grains, subrounded, medium to coarse grains, poor to moderately sorted, no matrix detectable, coarse quartz grains, occasional fine grains.

380-390m	50	SANDSTONE: As above.
	50	CALCARENITE: As above, light grey to white.
390-400m	70	SANDSTONE: Loose quartz grains, translucent, clear, white, yellow occasionally light blue, very well rounded, occasionally sub rounded, frosted, medium to fine grained, occasional coarse grains, moderately sorted.
	30	CALCARENITE: As above.
400-410m	70	SANDSTONE: Loose quartz grains, as above.
	30	CALCARENITE: As above.
410-420m	100	SANDSTONE: Loose quartz grains, fine to medium grained, moderately well sorted, subrounded.
420-430m	80	SANDSTONE: Loose quartz, as above.
	20	CALCARENITE: As above. Shell fragments.
430-440m	60	SANDSTONE: Loose quartz, as above, medium to coarse grained, occasionally fine grained, well rounded to rounded, frosted as above.
	40	CALCARENITE: As above.
440-450m	80	CALCARENITE: White, light grey, very fossiliferous, firm to brittle, shell fragments, coral fragments, bryozoans.
	20	SANDSTONE: Loose quartz, medium to coarse grains, subrounded to subangular, poor to moderately sorted, translucent, yellow, clear, white.
450-460m	100	CALCARENITE: Light grey, white, very fossiliferous, firm to brittle, coral fragments, shell fragments, bryozoans, gastropods, very fossiliferous.
460-470m	100	CALCARENITE: As above.
470-480m	100	CALCARENITE: As above.
480-490m	100	CALCARENITE: As above.
490-500m	100	CALCARENITE: As above. Predominantly white, occasionally light grey, very fossiliferous.
500-510m	100	CALCARENITE: As above.
510-520m	80	CALCARENITE: As above.
	20	SANDSTONE: Loose quartz grains, medium to coarse grained, translucent, opaque, white, smokey to frosted, well rounded to rounded, moderately to poorly sorted.
520-530m	100	SANDSTONE: Loose quartz grains, translucent, white, frosted, well rounded to rounded, moderately sorted, very clean, fossiliferous fragments, shell/coral fragments, bryozoans, subrounded to subangular in parts.
530-540m	100	CALCARENITE: As above. Loose quartz common.
540-550m	100	CALCARENITE: 100% loose quartz grains.

550-560m	100	CALCARENITE: 90% loose quartz grains, translucent, white, clear, frosted, well rounded to rounded to occasionally subangular, moderately sorted, matrix not visible, very fossiliferous, shell/coral fragments, bryozoans, as above.
560-570m	100	CALCARENITE AGGREGATES: Very fine quartz grains, fossiliferous, white, light grey. 20% loose quartz grains.
570-580m	100	CALCARENITE: As above, 10% loose quartz aggregates.
580-590m	90	CALCARENITE: White to light grey, very fine to fine to medium grained quartz, very occasional loose quartz grains, subrounded to subangular, clear white translucent quartz aggregates, very fossiliferous, coral, shell fragments common, bryozoa, forams.
	10	CALCISILTITE: Light grey to grey, fossiliferous, grading to Calcarenitic in parts, silty matrix.
590-600m	90	CALCARENITE: As above. Aggregates firm to hard.
	10	CALCISILTITE: As above.
600-610m	100	CALCARENITE: As above. Trace glauconite.
610-620m	80	CALCARENITE: As above, trace glauconite.
	20	CALCISILTITE: Light grey, grey, firm to hard, brittle, silty, argillaceous and calcitic matrix, coral/shell fragments, forams, bryozoans. Trace Calcilutite, grey, firm to moderately hard, silty.
620-630m	80	CALCARENITE: As above.
	20	CALCISILTITE: As above, occasional pyrite. Trace Calcilutite.
630-640m	70	CALCARENITE: As above.
	30	CALCISILTITE: As above, occasional pyrite.
640-650m	70	CALCARENITE: As above
	30	CALCISILTITE: As above.
650-660m	50	CALCARENITE: As above
	50	CALCISILTITE: Light grey to grey, blocky, firm to moderately hard, silty argillaceous calcitic matrix grading to Calcilutite in parts, soft to firm, glauconitic. Fossiliferous fragments, coral, bryozoa, forams.
660-670m	40	CALCARENITE: As above
	60	CALCISILTITE: As above, commonly grey to occasionally light grey, soft, sticky, micro-micaceous, shell fragments.
670-680m	30	CALCARENITE: As above
	70	CALCISILTITE: As above.
680-690m	80	CALCARENITE: As above predominantly white.
	20	CALCISILTITE: As above.

690-700m	80	CALCARENITE: As above.
	20	CALCISILTITE: As above.
700-710m	80	CALCARENITE: White to light grey, very fine to fine grained quartz, moderately sorted, fossiliferous, shell fragments and bryozoans, occasionally medium to coarse grained quartz, well rounded, calcitic matrix.
	20	CALCISILTITE: Grey to light grey, occasionally fossiliferous fragments, blocky, firm to very hard, siliceous in parts, pyritic in parts, trace dolomite.
710-720m	70	CALCARENITE: As above
	30	CALCISILTITE/CALCAREOUS SILTSTONE: grey to light grey to grey-brown, soft to firm to very hard in parts, predominantly firm, blocky, occasionally very fine to fine quartz grains, pyritic inclusions, argillaceous and predominantly calcite matrix.
720-730m	50	CALCAREOUS SILTSTONE: Grey to light grey to grey-brown, soft to firm to hard, blocky with occasional fine grained quartz, pyritic in part with predominantly calcite matrix, argillaceous in part.
	50	CALCARENITE: As above.
730-740m	60	CALCISILTITE: Soft to moderately firm, grey to light grey to brown, blocky, occasional quartz inclusions, occasional pyrite, calcite matrix, argillaceous in part.
	40	CALCISILTITE: Light grey to grey, moderately hard to hard, moderate sorting. Occasional fossil fragments including corals, shell fragments, gastropods, bryozoa.
740-750m	50	CALCARENITE: As above.
	50	CALCISILTITE: As above. Occasional fossils and pyrite.
750-760m	60	CALCARENITE: Soft to moderately firm, some quartz grains, calcareous cement, fine to medium grained.
	40	CALCISILTITE: Grey to light brown, soft to moderately firm, blocky, calcite matrix. Occasionally pyritic, fossils and calcite crystals.
760-770m	70	CALCARENITE: White, light grey, medium to coarse grains, firm to moderately hard, friable in parts.
	30	CALCISILTITE: Grey to grey brown, firm, friable, blocky, occasional fossils.
770-780m	60	CALCARENITE: White to grey, fine to medium grained, soft to firm, some moderately hard, friable in parts.
	40	CALCISILTITE: Grey to grey-brown, soft to firm, blocky. Occasional of fossils replaced by pyrite.
780-790m	60	CALCARENITE: As above.
	40	CALCISILTITE: As above.
790-800m	70	CALCARENITE: As above
	30	CALCISILTITE: As above.

800-810m	70	CALCARENITE: Light to medium grey, firm, scattered carbonaceous siltstone spread evenly throughout, firm, blocky, occasionally light grey, coarse. Broken limestone shell fragments in a light calcareous matrix, common buff to white bryozoa with distinct apertures and fenestrae, good sorting.
	30	CALCISILTITE: Grey, firm, blocky, calcareous matrix, very clear.
810-820m	50	CALCARENITE: As above.
	50	CALCISILTITE: As above. Trace pyrite, crystalline limestone in parts.
820-830m	80	CALCISILTITE: Light grey, argillaceous, soft to occasionally firm, blocky to poorly indurated, very clean.
	20	CALCARENITE: As above.
830-840m	90	CALCISILTITE: As above (soft), argillaceous.
	10	CALCARENITE: As above.
840-850m	90	CALCISILTITE: Light grey-green to grey, soft to occasionally firm, argillaceous in parts, very calcareous, trace fossils, trace pyrite.
	10	CALCARENITE: Light grey to white, very fine grained sandy, very calcareous and argillaceous, friable to soft.
850-860m	70	CALCISILTITE: As above
	30	CALCARENITE: As above.
860-870m	100	CALCISILTITE: As above.
870-880m	100	CALCISILTITE: Light grey to light grey-green, soft to occasionally friable, poorly indurated to blocky, argillaceous, fossiliferous.
880-890m	100	CALCISILTITE: As above.
890-900m	100	CALCISILTITE: As above.
900-910m	100	CALCISILTITE: As above.
910-920m	100	CALCISILTITE: As above.
920-930m	100	CALCISILTITE: As above.
930-940m	100	CALCISILTITE: As above.
940-950m	100	CALCISILTITE: As above.
950-960m	100	CALCISILTITE: As above. Light grey to grey-green, soft to firm, occasionally friable, poorly indurated, blocky, argillaceous, fossiliferous, carbonaceous inclusions in parts.
960-970m	100	CALCISILTITE: Light grey to green-grey, soft to firm, friable, argillaceous, occasional fossils.
970-980m	100	CALCISILTITE: As above.
980-990m	100	CALCISILTITE: As above.

990-1000m	100	CALCISILTITE: As above.
1000-1005m	100	CALCISILTITE: As above
1005-1010m	100	CALCISILTITE: Grey to light grey to grey green, blocky, soft, occasionally firm, argillaceous cement, subfissile in parts, fossiliferous in parts, poorly indurated grading to Calcilutite.
1010-1015m	100	CALCISILTITE: As above.
1015-1020m	100	CALCISILTITE: As above.
1020-1025m	100	CALCISILTITE: As above. Grading to Calcilutite in parts.
1025-1030m	100	CALCISILTITE: As above.
1030-1035m	100	CALCISILTITE: As above.
1035-1040m	100	CALCISILTITE: Grey to light grey to grey-green, occasionally grey-brown, blocky, soft to firm, argillaceous matrix, very calcareous, sub fissile in parts, fossiliferous in parts, poorly indurated, grading to Calcilutite in parts.
1040-1045m	100	CALCISILTITE: As above.
1045-1050m	100	CALCISILTITE: As above.
1050-1055m	100	CALCISILTITE: Grey to occasionally light grey to grey brown, blocky, soft to firm, argillaceous matrix, very calcareous, fossiliferous in parts, bryozoa, moderately indurated, grading to Calcilutite.
1055-1060m	100	CALCISILTITE: As above, grading to Calcilutite.
1060-1065m	100	CALCISILTITE/CALCARENITE: As above.
1065-1070m	100	CALCISILTITE: As above.
1070-1075m	100	CALCARENITE/CALCISILTITE: Becoming increasingly argillaceous, otherwise as above.
1075-1080m	100	CALCISILTITE: As above.
1080-1085m	100	CALCISILTITE: As above.
1085-1090m	100	CALCISILTITE: As above.
1090-1095m	100	CALCISILTITE: Pale brown to light blue grey, predominantly argillaceous with a calcitic matrix, soft, water sensitive in parts, blocky, rare fossiliferous fragments, scattered pyrite.
1095-1100m	100	CALCISILTITE: As above.
1100-1105m	100	CALCISILTITE: As above.
1105-1110m	100	CALCISILTITE: Trace dark green coarse angular glauconite pellets, otherwise as above.

1110-1115m	100	CALCISILTITE: As above.
1115-1120m	100	CALCISILTITE: Glauconite becoming more abundant, otherwise as above.
1120-1125m	100	CALCISILTITE: As above.
1125-1130m	100	CALCISILTITE: Pale brown to pale blue grey, argillaceous to silica matrix in a predominantly calcareous cement, water sensitive in part, trace fossil fragments, occasional pyrite, common very coarse to granular, subrounded glauconite pellets.
1130-1135m	100	CALCISILTITE: As above.
1135-1140m	100	CALCISILTITE: Becoming increasingly fossiliferous: bryozoa, forams.
1140-1145m	100	CALCISILTITE: Commonly beige angular, granular sized, hard cryptocrystalline limestone clasts, less glauconite, occasional fossils, becoming increasingly siliceous.
1145-1150m	100	CALCISILTITE: Scattered glauconite pellets, slightly more argillaceous, otherwise as above.
1150-1155m	100	CALCISILTITE: Trace clear loose quartz grains - otherwise as above.
1155-1160m	70	CALCISILTITE: Grading to argillaceous siltstone, no shows.
	30	SANDSTONE: Clear, loose, coarse grained, subangular to angular quartz, occasionally well cemented medium grained quartz aggregates, fair sorting, good porosity. No fluorescence or cut, common glauconite.
1160-1165m	80	SANDSTONE: As above.
	20	SILTSTONE: Brown, argillaceous to calcareous matrix, water sensitive in parts.
Core #1 1165.4-1175.5m		See Core Description No. 1
1175-1180m	100	SANDSTONE: Clear to translucent, very clean, fine to medium to coarse grains, predominantly medium to coarse grains, poorly sorted, sub angular to angular. No fluorescence, good porosity, no shows.
1180-1185m	100	SANDSTONE: As above. No fluorescence.
1185-1190m	100	SANDSTONE: As above. 5% dull to bright yellow mineral fluorescence.
1190-1195m	100	SANDSTONE: As above 10% yellow mineral fluorescence.
1195-1200m	100	SANDSTONE: Clear to translucent, white, medium to coarse grained, occasionally fine grained, subangular to subrounded, moderate to poorly sorted, 10% yellow mineral fluorescence, good porosity, no shows.

1200-1205m	60	SANDSTONE: As above. 10% dull yellow occasionally bright mineral fluorescence.
	40	SILTSTONE: Dark grey-brown to black-brown, firm to hard, predominantly hard, brittle, very carbonaceous grading to coal in parts.
1205-1210m	70	SILTSTONE: Dark brown, black brown, grey, blocky to occasionally subfissile, firm to hard, predominantly hard, brittle, very carbonaceous, grading to coal in parts.
	30	SANDSTONE: As above. 5% dull mineral fluorescence.
1210-1215m	70	SILTSTONE: As above.
	30	SANDSTONE: As above.
1215-1220m	60	SILTSTONE: 30% carbonaceous siltstone, as above. 30% light grey to grey, argillaceous, blocky, carbonaceous flecks, soft to firm to moderately hard, predominantly firm to moderately hard, trace pyrite.
	40	SANDSTONE: As above.
1220-1225m	70	SILTSTONE: As above.
	30	SANDSTONE: As above.
1225-1230m	60	SANDSTONE: Bimodal, white, clear, loose to frosted coarse to very coarse subrounded quartz grains grading to mainly medium grained, good porosity, no shows.
	40	SILTSTONE: Brown, grey, argillaceous, to carbonaceous, firm to hard, blocky, pyrite common.
1230-1235m	100	SANDSTONE: As above.
1235-1240m	100	SANDSTONE: As above.
1240-1245m	100	SANDSTONE: Bimodal, white, clear, loose frosted, coarse to very coarse subangular to angular quartz grains, very immature, fine to medium grained quartz forming coarse aggregates, slightly calcareous matrix, no shows.
1245-1250m	50	SANDSTONE: As above.
	50	SILTSTONE: As above.
1250-1255m	90	SANDSTONE: As above.
	10	SILTSTONE: As above.
1255-1260m	100	SANDSTONE: As above.
1260-1265m	100	SANDSTONE: As above.
1265-1270m	100	SANDSTONE: As above.
1270-1275m	100	SANDSTONE: As above.
1275-1280m	100	SANDSTONE: White, clear, frosted, loose, coarse grained angular quartz fragments, well faceted, welded quartz aggregates, occasionally very coarse to granular sized angular smokey quartz fragments.

1280-1285m	80	SANDSTONE: As above.
	20	SILTSTONE: Dark grey brown, very carbonaceous, slightly argillaceous, blocky, firm.
1285-1290m	50	SANDSTONE: As above.
	50	SILTSTONE: As above.
1290-1295m	70	SANDSTONE: As above.
	30	SILTSTONE: As above.
1295-1300m	100	SANDSTONE: As above.
1300-1305m	100	SILTSTONE: As above.
1305-1310m	70	SANDSTONE: As above.
	30	SILTSTONE: As above.
1310-1315m	80	SANDSTONE: As above
	20	SILTSTONE: As above
1315-1320m	70	SANDSTONE: As above.
	30	SILTSTONE: Very carbonaceous, grading to a dirty coal, otherwise as above.
1320-1325m	70	SANDSTONE: As above.
	30	SILTSTONE: As above.
1325-1330m	100	SILTSTONE: Clear to frosted, clean, coarse to very coarse grained, angular loose quartz, well faceted, immature, excellent inferred porosity, no shows.
1330-1335m	100	SANDSTONE: As above.
1335-1340m	100	SANDSTONE: As above.
1340-1345m	100	SANDSTONE: As above.
1345-1350m	100	SANDSTONE: As above.
1350-1355m	100	SANDSTONE: As above.
1355-1360m	100	SANDSTONE: As above.
1360-1365m	60	SANDSTONE: As above.
	40	SILTSTONE: As above.
1365-1370m	100	SANDSTONE: As above.
1370-1375m	70	COAL: Black, brittle - friable, vitreous.
	30	SANDSTONE: clear to translucent, coarse to very coarse grains, loose, no matrix, quartz, subangular to angular grains, good visual porosity, no shows.
	Trace	SILTSTONE: Dark brown, friable, carbonaceous, fissile to blocky.
1375-1380m	60	SANDSTONE: As above.
	30	COAL: As above.
	10	SILTSTONE: As above (trace pyrite).
1380-1385m	60	SANDSTONE: As above.
	20	SILTSTONE: As above.
	20	COAL: As above.

1385-1390m	70	SANDSTONE: As above, more than 10% calcite mineral fluorescence.
	20	SILTSTONE: As above.
	10	COAL: As above.
1390-1395m	70	SANDSTONE: 10% calcite mineral fluorescence; otherwise as above.
	20	SILTSTONE: As above
	10	COAL: As above.
1395-1400m	30	SANDSTONE: As above.
	50	SILTSTONE: Very carbonaceous, blocky, grading in part to a dirty coal.
	20	COAL: As above.
1400-1405m	30	SANDSTONE: As above.
	50	SILTSTONE: As above.
	20	COAL: As above.
1405-1410m	80	SANDSTONE: Clear to translucent, coarse to very coarse grained quartz, loose, no matrix, well sorted subangular to angular grains, good visual porosity. Less than 10% dull white fluorescence with very slow diffuse milky white cut.
	10	SILTSTONE: Very dark brown, grading to coal, friable, very carbonaceous, arenaceous in part.
	10	COAL: Black, brittle to friable, grades to carbonaceous siltstone.
1410-1415m	100	SANDSTONE: As above.
1415-1420m	70	SANDSTONE: As above less than 5% dull white fluorescence with very slow diffuse milky white cut.
	20	COAL: As above, trace pyrite.
	10	SILTSTONE: As above.
1420-1425m	80	SANDSTONE: As above, no shows.
	20	COAL: As above.
1425-1430m	70	SANDSTONE: As above.
	10	SILTSTONE: As above.
	20	COAL: As above.
1430-1435m	100	SANDSTONE: As above.
	Trace	SILTSTONE: As above.
	Trace	COAL: As above.
1435-1440m	50	SANDSTONE: As above.
	40	SILTSTONE: Dark brown to light brown, carbonaceous, argillaceous, gummy.
	10	COAL: As above.
1440-1445m	100	SANDSTONE: As above.
1445-1450m	80	COAL: As above.
	10	SANDSTONE: As above.
	10	SILTSTONE: As above.
1450-1455m	50	SANDSTONE: As above.
	30	COAL: As above.
	20	SILTSTONE: As above

1455-1460m	100	SANDSTONE: As above.
1460-1465m	100	SANDSTONE: Predominantly white, clear to occasionally pale yellow, clean, loose, coarse to very coarse grained, angular quartz grains without any matrix; trace very fine to fine grained subangular to subrounded quartz aggregates in a dominantly silica matrix; good sorting, good inferred porosity. No shows.
1465-1470m	100	SANDSTONE: As above.
1470-1475m	100	SANDSTONE: As above.
1475-1480m	100	SANDSTONE: As above.
1480-1485m	100	SANDSTONE: As above.
1485-1490m	100	SANDSTONE: As above.
1490-1495m	90 10	SANDSTONE: As above, trace pyrite, no shows. COAL: As above.
1495-1500m	100	SANDSTONE: As above, no fluorescence, no shows. Trace coal and siltstone.
1500-1505m	100	SANDSTONE: As above.
1505-1510m	100	SANDSTONE: Clear to white, predominantly quartz, medium to coarse grained sandstone, subangular to subrounded, very good sorting, trace coal and pyrite and siltstone. No shows.
1510-1515m	90 10	SANDSTONE: As above. SILTSTONE: Dark grey to brown, carbonaceous, argillaceous, firm to hard, trace pyrite, grading to coal in parts.
1515-1520m	100	SANDSTONE: As above.
1520-1525m	90 10	SANDSTONE: As above. SILTSTONE: As above.
1525-1530m	100	SANDSTONE: Type 1: 50% As above. Type 2: 50% white, clear, translucent, medium to coarse grained, subangular to subrounded, good sorting, white clayey matrix (soft sticky) traces of pyrite and coal.
1530-1535m	90 10	SANDSTONE: As above Type 1: 40% Type 2: 60%. SILTSTONE: As above
1535-1540m	100	SANDSTONE: Type 1: 60%. Type 2: 40%. No shows. No fluorescence.
1540-1545m	100	SANDSTONE: Translucent, clear, white, coarse to very coarse grained to occasionally medium grained, very angular to angular, frosted, poor to moderately sorted, trace pyrite, no shows. Also 30% in white clay matrix, sticky. Trace coal/siltstone.

1545-1550m	100	SANDSTONE: Translucent to white, coarse grained, subangular to subrounded, moderately sorted, no matrix. Minor coal, siltstone and white clay matrix, no shows.
1550-1555m	100	SANDSTONE: Translucent clear to white, coarse grained, subangular to subrounded in part. Good sorting, no cement or matrix, traces of pyrite, coal, traces of white argillaceous clay. No shows.
1555-1560m	100	SANDSTONE: As above, increase in pyrite.
1560-1565m	100	SANDSTONE: As above, with an increase in the amount of pyrite compared to previous sample.
1565-1570m	100	SANDSTONE: As above, increase in coal 5%.
1570-1575m	100	SANDSTONE: Translucent, clear, occasionally white, frosted, angular to subangular quartz, coarse to very coarse grained, granular in parts. No shows. Moderate to well sorted, no matrix, pyrite increasing to 5-10%, trace coal.
1575-1580m	100	SANDSTONE: As above.
1580-1585m	100	SANDSTONE: As above.
1585-1590m	100	SANDSTONE: As above.
1590-1595m	100	SANDSTONE: As above
1595-1600m	100	SANDSTONE: As above
1600-1605m	100	SANDSTONE: Trace dull white yellow calcite mineral fluorescence, otherwise as above.
1605-1610m	100	SANDSTONE: 10% dull yellow gold mineral fluorescence.
1610-1615m	100	SANDSTONE: As above.
1615-1620m	100	SANDSTONE: As above.
1620-1625m	100	SANDSTONE: As above.
1625-1630m	100	SANDSTONE: As above.
1630-1635m	100	SANDSTONE: As above.
1635-1640m	100	SANDSTONE: No mineral fluorescence.
1640-1645m	100	SANDSTONE: As above.
1645-1650m	100	SANDSTONE: As above.
1650-1655m	100	SANDSTONE: As above.
1655-1660m	100	SANDSTONE: White, clear, frosted, coarse to very coarse grained, very angular to angular, loose quartz grains, no matrix, 10% bright white yellow mineral fluorescence.
1660-1665m	100	SANDSTONE: As above.

1665-1670m	100	SANDSTONE: As above.
1670-1675m	100	SANDSTONE: Clean translucent, coarse to very coarse, loose quartz, no matrix, subangular to angular grains, well sorted, no shows. 5% mineral fluorescence.
	Trace	COAL: Grades to very carbonaceous siltstone, black, blocky, friable, brittle.
1675-1680m	100	SANDSTONE: As above.
	Trace	SILTSTONE: Dark brown to light grey, carbonaceous flecks in part, otherwise very carbonaceous, friable to soft, argillaceous.
1680-1685m	60	SANDSTONE: As above.
	10	SILTSTONE: As above.
	30	COAL: As above.
1685-1690m	60	SANDSTONE: As above.
	20	SILTSTONE: As above.
	20	COAL: As above.
1690-1695m	100	SANDSTONE: As above.
1695-1700m	90	SANDSTONE: As above.
	10	COAL: As above.
1700-1705m	90	SANDSTONE: As above.
	10	COAL: As above.
1705-1710m	100	SANDSTONE: As above
	Trace	SILTSTONE: As above.
1710-1715m	100	SANDSTONE: As above.
1715-1720m	100	SANDSTONE: Clear to translucent, coarse to very coarse grained, well sorted, loose quartz, no matrix, subangular to angular grains, no shows, trace pyrite.
1720-1725m	100	SANDSTONE: As above.
1725-1730m	100	SANDSTONE: As above.
1730-1735m	100	SANDSTONE: As above.
1735-1740m	100	SANDSTONE: As above.
1740-1745m	100	SANDSTONE: As above
1745-1750m	100	SANDSTONE: As above.
1750-1755m	100	SANDSTONE: As above.
1755-1760m	100	SANDSTONE: As above.
1760-1765m	100	SANDSTONE: As above.
1765-1770m	100	SANDSTONE: As above.
1770-1775m	100	SANDSTONE: Clear to translucent, loose quartz, well sorted, coarse to very coarse grains, subrounded to subangular (dominantly angular) no matrix or cement, trace pyrite aggregates with quartz.

1775-1780m	100	SANDSTONE: As above.
1780-1785m	100	SANDSTONE: As above.
1785-1790m	100	SANDSTONE: Clear, clean, frosted, loose, medium to coarse grained, subangular to subrounded quartz grains - no matrix, good sorting, good porosity, trace pyrite. No shows.
1790-1795m	100	SANDSTONE: As above.
1795-1800m	100	SANDSTONE: As above.
1800-1805m	100	SANDSTONE: As above.
1805-1810m	100	SANDSTONE: As above.
1810-1815m	100	SANDSTONE: As above.
1815-1820m	100	SANDSTONE: As above.
1820-1825m	100	SANDSTONE: As above.
1825-1830m	100	SANDSTONE: As above.
1830-1835m	100	SANDSTONE: As above.
1835-1840m	100	SANDSTONE: As above.
1840-1845m	100	SANDSTONE: As above
1845-1850m	100	SANDSTONE: As above.
1850-1855m	100	SANDSTONE: As above.
1855-1860m	100	SANDSTONE: As above.
1860-1865m	100	SANDSTONE: Clear to translucent-white, loose quartz grains, subangular to angular, well sorted, no matrix, good inferred porosity, no shows. Trace pyrite.
1865-1870m	100	SANDSTONE: As above.
1870-1875m	100	SANDSTONE: As above.
1875-1880m	100	SANDSTONE: As above.
1880-1885m	100	SANDSTONE: As above.
1885-1890m	100	SANDSTONE: Clear to translucent white, loose quartz grains, moderately well sorted, no matrix, subangular to angular, good visual porosity, no shows, common pyrite.
1890-1895m	100	SANDSTONE: Type 1: As above. Type 2: translucent white, medium to fine grained, argillaceous matrix, friable, subangular to angular, moderately sorted, no shows, moderate to poor visual porosity, Common pyrite.
	Trace	SILTSTONE: Light grey to dark brown, argillaceous, arenaceous, carbonaceous.
1895-1900m	100	SANDSTONE: As above.

1900-1905m	100	SANDSTONE: As above.
1905-1910m	100	SANDSTONE: (one type only). Clear - translucent, trace white, coarse to very coarse grained, loose quartz, no matrix, subangular to angular, moderate to well sorted, no show, good visual porosity. Trace pyrite.
1910-1915m	100	SANDSTONE: Clear to translucent to frosted, coarse to very coarse grained, loose quartz, no matrix, subangular to angular grains, moderately well sorted, good inferred porosity, no shows, common pyrite.
1915-1920m	100	SANDSTONE: As above.
1920-1925m	100	SANDSTONE: As above.
1925-1930m	100	SANDSTONE: As above.
1930-1935m	100	SANDSTONE: As above
1935-1940m	100	SANDSTONE: As above.
1940-1945m	100	SANDSTONE: As above.
1945-1950m	100	SANDSTONE: As above.
1950-1955m	100	SANDSTONE: As above.
1955-1960m	100	SANDSTONE: As above.
1960-1965m	100	SANDSTONE: As above.
1965-1970m	100	SANDSTONE: Clear to translucent, frosted, white, coarse to very coarse grains, occasionally medium grained, moderate to well sorted, loose quartz, subangular to angular grains, good visual porosity, no shows, common pyrite. Trace fine to medium grained subangular to subrounded quartz aggregates in a silica matrix.
1970-1975m	100	SANDSTONE: As above.
1975-1980m	100	SANDSTONE: As above.
1980-1985m	100	SANDSTONE: Clear, translucent to frosted, predominantly medium to occasionally fine grained, subangular, loose quartz, no matrix, trace medium grained subangular quartz aggregates in a dominately silica matrix, excellent sorting, good inferred porosity, no shows, trace pyrite.
1985-1990m	100 Trace	SANDSTONE: As above. SILTSTONE: As above.
1990-1995m	100 Trace	SANDSTONE: As above. SILTSTONE: As above.
1995-2000m	100	SANDSTONE: As above.
2000-2005m	100 Trace	SANDSTONE: As above. SILTSTONE: As above.

2005-2010m	100	SANDSTONE: As above.
2010-2015m	100	SANDSTONE: As above.
2015-2020	100	SANDSTONE: As above.
2020-2025m	100	SANDSTONE: As above.
2025-2030m	100	SANDSTONE: Clear, translucent, frosted, predominantly coarse to very coarse grained, angular to subangular unconsolidated fused quartz, similar to above, except slightly altered and fused appearance, no shows.
2030-2035m	100	SANDSTONE: As above.
2035-2040m	100	SANDSTONE: As above.
2040-2045m	100	SANDSTONE: Clear, glassy, translucent white, clean, coarse to very coarse grained, predominantly angular to occasionally subangular quartz, wholly unconsolidated but individual pieces appear fused or slightly metamorphosed, less faceted, with chaotic crystalline structure, very hard, no shows.
2045-2050m	100	SANDSTONE: As above.
2050-2055m	100	SANDSTONE: As above.
2055-2060m	100	SANDSTONE: As above.
2060-2065m	100	SANDSTONE: As above.
2065-2070m	100	SANDSTONE: Shattered glass appearance otherwise as above.
2070-2075m	100	SANDSTONE: As above.
2075-2080m	100	SANDSTONE: Greater percentage of finer grained quartz, otherwise as above.
2080-2085m	100	SANDSTONE: As above.
2085-2090m	100	SANDSTONE: As above.
2090-2095m	100	SANDSTONE: As above.
2095-2100m	70 30 Trace	SANDSTONE: As above. Trace pyrite. COAL: As above. SILTSTONE: As above.
2100-2105m	90 10	SANDSTONE: As above. SILTSTONE: Light grey, brown, argillaceous, carbonaceous, firm, water sensitive in parts.
2105-2110m	50 50	SANDSTONE: As above. SILTSTONE: As above.
2110-2115m	60 40	SANDSTONE: As above. SILTSTONE: As above.
2115-2120m	100	SANDSTONE: As above

2120-2125m	100	SANDSTONE: White, clear, glassy, frosted, coarse grained, angular to subangular fused quartz grains, slightly altered, good sorting, good to fair inferred porosity, hard, no shows.
	Trace	SILTSTONE: As above.
2125-2130m	80	SANDSTONE: As above.
	20	SILTSTONE: As above.
2130-2135m	100	SANDSTONE: As above.
2135-2140m	100	SANDSTONE: As above.
2140-2145m	100	SANDSTONE: Clear, translucent, coarse to very coarse grains, occasionally fine to medium grains, poorly sorted, angular to subangular grains, loose quartz, no matrix, no shows.
2145-2150m	100	SANDSTONE: As above.
2150-2155m	100	SANDSTONE: As above.
2155-2160m	20	SANDSTONE: As above, occasional pyrite.
	70	SILTSTONE: dark grey brown, occasionally pale grey, slightly argillaceous, predominantly carbonaceous, scattered black carbonaceous laminae and specks, firm.
	10	COAL: As above.
2160-2165m	10	SANDSTONE: As above.
	80	SILTSTONE: As above
	10	COAL: As above.
		CBU @ 2170. No shows. No fluorescence.
2165-2170m	80	SANDSTONE: As above.
	20	SILTSTONE: As above.
2170-2175m	90	SANDSTONE: As above.
	10	SILTSTONE: As above.
2175-2180m	100	SANDSTONE: As above.
2180-2185m	100	SANDSTONE: Becoming fine to medium grained quartz and more rounded, otherwise as above.
2185-2190m	100	SANDSTONE: As above.
2190-2195m	100	SANDSTONE: White, translucent, glassy, predominantly fine to medium grained subangular to subrounded slightly altered fused quartz, occasionally coarse angular fused quartz, fair sorting, fair to good inferred porosity, firm, well indurated, no shows.
2195-2200m	100	SANDSTONE: As above.
2200-2205m	100	SANDSTONE: As above.
	Trace	SILTSTONE: Medium brown, carbonaceous specks, pyritized in parts, friable to firm, arenaceous.
2205-2210m	70	SANDSTONE: As above.
	30	SILTSTONE: As above (abundant pyrite).
2210-2215m	100	SANDSTONE: As above.
	Trace	SILTSTONE: As above.

2215-2220m	80	SANDSTONE: Clear to translucent, medium to fine to coarse grained, poorly sorted loose angular quartz, no matrix, good to fair inferred porosity, no shows.
	20	SILTSTONE: Light grey, light brown occasionally dark brown, arenaceous, carbonaceous in part, friable, firm, pyritic and blocky.
2220-2225m	60	SANDSTONE: As above.
	40	SILTSTONE: As above.
2225-2230m	90	SILTSTONE: Grey-brown, brown, light grey, occasionally dark grey, carbonaceous laminae in parts, predominantly carbonaceous, argillaceous, firm to medium hard, soft in parts, blocky, occasionally subfissile, pyritic, no shows.
	10	SANDSTONE: As above, occasionally fine grained aggregates.
2230-2235m	70	SILTSTONE: As above.
	30	SANDSTONE: As above.
2235-2240m	90	SANDSTONE: White, translucent to clear, clean, predominantly fine to medium grained, subrounded to subangular quartz aggregates in a mainly silica matrix, occasionally coarse to very coarse subangular quartz fragments, poor sorting. No shows.
	10	SILTSTONE: As above.
2240-2245m	100	SANDSTONE: As above.
2245-2250m	100	SANDSTONE: As above.
2250-2255m	80	SANDSTONE: As above.
	20	SILTSTONE: As above.
2255-2260m	70	SANDSTONE: As above.
	30	SILTSTONE: As above.
2260-2265m	100	SANDSTONE: As above.
2265-2270m	100	SANDSTONE: As above.
2270-2275m	100	SANDSTONE: Increasingly finer subrounded quartz aggregates, otherwise as above.
2275-2280m	90	SANDSTONE: As above.
	10	SILTSTONE: As above.
2280-2285m	100	SANDSTONE: As above.
2285-2290m	80	SANDSTONE: Bimodal, clear, translucent, clean, fine to medium grained subrounded to subangular quartz aggregates in a dominantly silica matrix, slightly altered, scattered coarse to very coarse grained subangular quartz fragments, trace pyrite, poor sorting, trace mineral fluorescence. No shows.
	10	SILTSTONE: Dark grey/brown, carbonaceous, slightly argillaceous, firm, no shows.
	10	COAL: As above.

2290-2295m	70	SANDSTONE: As above. Common pyrite.
	30	SILTSTONE: As above.
2295-2300m	80	SANDSTONE: As above.
	20	SILTSTONE: As above.
2300-2305m	90	SANDSTONE: As above.
	10	SILTSTONE: As above.
2305-2310m	100	SANDSTONE: As above.
2310-2315m	70	SANDSTONE: As above.
	30	SILTSTONE: As above.
2315-2320m	50	SANDSTONE: As above.
	50	SILTSTONE: As above.
2320-2325m	100	SANDSTONE: As above.
2325-2330m	90	SANDSTONE: As above.
	10	SILTSTONE: As above.
2330-2335m	60	SANDSTONE: White, milky, clear, clean, predominantly fine grained subrounded to subangular quartz aggregates in a silica matrix, scattered coarse to very coarse grained subrounded quartz fragments, very poor sorting, trace mineral calcite fluorescence. No shows. Occasionally pyrite.
	40	SILTSTONE: Light grey brown, predominantly argillaceous, with minor carbonaceous flecks throughout, water sensitive in part.
	Trace	COAL: As above.
2335-2340m	80	SANDSTONE: As above.
	20	SILTSTONE: As above.
2340-2345m	50	SANDSTONE: As above.
	50	SILTSTONE: As above.
2345-2350m	50	SANDSTONE: As above.
	50	SILTSTONE: As above.
2350-2355m	90	SANDSTONE: As above.
	10	SILTSTONE: As above.
2355-2360m	90	SANDSTONE: White, clear, clean, medium grained, subrounded to subangular quartz aggregates in a silica matrix, common coarse grained angular quartz fragments, poor sorting, no shows.
	10	SILTSTONE: Light grey, predominantly argillaceous, minor carbonaceous, firm.
2360-2365m	100	SANDSTONE: As above.
	Trace	SILTSTONE: As above.
2365-2370m	90	SANDSTONE: As above.
	10	SILTSTONE: As above.
2370-2375m	60	SANDSTONE: As above.
	40	SILTSTONE: Light grey, grey/brown, predominantly argillaceous, carbonaceous, firm, blocky, very carbonaceous in parts grading to coal, pyritic in parts.

2375-2380m	70	SANDSTONE: As above.
	30	SILTSTONE: As above.
	Trace	COAL: As above.
2380-2385m	100	SANDSTONE: white, opaque, translucent, clean, medium to coarse grains, predominantly angular to subangular, occasionally subrounded, quartz aggregates in silica matrix, also loose quartz grains, poorly sorted, trace pyrite. No shows.
	Trace	SILTSTONE: As above.
2385-2390m	90	SANDSTONE: As above.
	10	SILTSTONE: grey/brown, dark grey, light grey, very carbonaceous in parts, argillaceous. Soft to firm, blocky, carbonaceous and grading to coal in parts.
	Trace	COAL: As above.
2390-2395m	70	SILTSTONE: As above.
	30	SANDSTONE: As above.
2395-2400m	50	SANDSTONE: As above.
	50	SILTSTONE: As above.
2400-2405m	50	SANDSTONE: As above.
	50	SILTSTONE: As above.
2405-2410m	80	SANDSTONE: As above.
	20	SILTSTONE: As above.
2410-2415m	60	SANDSTONE: White, clear, clean, very coarse grained, subangular quartz fragments, occasionally medium grained subrounded to subangular quartz aggregates, in a dominantly silica matrix, poor sorting, no shows.
	40	SILTSTONE: Light brown, beige, micromicaceous, blocky, firm, water sensitive in parts.
2415-2420m	80	SILTSTONE: As above.
	20	SANDSTONE: As above.
2420-2425m	80	SILTSTONE: As above.
	20	SANDSTONE: As above.
2425-2430m	70	SILTSTONE: As above.
	30	SANDSTONE: As above.
2430-2435m	70	SANDSTONE: As above.
	30	SILTSTONE: As above.
2435-2440m	80	SANDSTONE: Clear, white, translucent, medium to very coarse to coarse grained, angular, loose quartz fragments - no matrix, common medium grained subrounded to subangular quartz aggregates in dominantly silica matrix, poor sorting, fair to good porosity. Trace mineral fluorescence.
	20	SILTSTONE: Light brown, beige, micromicaceous, predominantly argillaceous, minor carbonaceous, blocky and firm.
2440-2445m	90	SANDSTONE: As above.
	10	SILTSTONE: As above.

2445-2450m	90	SANDSTONE: Translucent to clear to white, milky in part, coarse to very coarse grained, angular to subangular, loose quartz grains with no matrix, poorly sorted, 5% white fluorescence, no cut, no crush cut (maybe mineral fluorescence). Also medium grained, subangular to subrounded, loose and silica cemented quartz, no shows, fair to good porosity.
	10	SILTSTONE: Light grey to dark grey, brown, micromicaceous, argillaceous, carbonaceous flecks in part, blocky, firm, no shows.
2450-2455m	80	SANDSTONE: As above. 5% mineral fluorescence, no cut, no crush cut.
	20	SILTSTONE: As above. Becoming more carbonaceous.
2455-2460m	90	SANDSTONE: As above. Less than 5% mineral fluorescence, white to yellow, no cut, no crush cut. Trace residual ring.
	10	SILTSTONE: As above.
2460-2465m	90	SANDSTONE: White, translucent, milky, predominantly coarse to very coarse grained, subangular loose quartz aggregates, common medium grained subangular to subrounded quartz aggregates in a dominantly silica matrix, common pyrite, poor sorting, tight to fair inferred porosity; 10% white to white yellow fluorescence with no crush cut, leaves a residual ring of fluorescence after 15 mins.
	10	SILTSTONE: As above.
	Trace	COAL: As above.
2465-2470m	100	SANDSTONE: As above.
	Trace	COAL: As above.
2470-2475m	90	SANDSTONE: As above. 5% white-yellow fluorescence with no crush cut, leaves a residual ring of fluorescence.
	10	SILTSTONE: As above.
	Trace	COAL: As above.
2475-2480m	60	SANDSTONE: As above. Trace mineral fluorescence.
	40	SILTSTONE: As above.
2480-2485m	70	SANDSTONE: As above.
	30	SILTSTONE: As above.
2485-2490m	100	SANDSTONE: white, translucent, clear, clean, coarse to very coarse grained with occasional medium grained subangular quartz fragments, no matrix, fair sorting, fair to good inferred porosity, hard, 5% yellow/white mineral fluorescence with no crush cut, but faint residual ring after 15 mins., trace dull red/brown mineral fluorescence.
2490-2495m	100	SANDSTONE: As above.

2495-2500m	70	SILTSTONE: Light grey to grey beige to grey brown, argillaceous, carbonaceous, blocky, soft to firm, micromicaceous in part.
	30	SANDSTONE: As above. Trace yellow mineral fluorescence, no cut.
	Trace	COAL: As above.
2500-2505m	50	SANDSTONE: As above. No mineral fluorescence.
	50	SILTSTONE: As above.
2505-2510m	50	SANDSTONE: As above. Trace fluorescence. No cut.
	50	SILTSTONE: As above.
2510-2515m	50	SANDSTONE: As above. Trace fluorescence. No cut.
	50	SILTSTONE: As above.
2515-2520m	70	SANDSTONE: White, translucent, clear, loose, very coarse grained, subangular quartz fragments, fair sorting, relatively clean, trace to 5% yellow-white fluorescence with very slow diffuse crush cut, residue ring after 15 mins.
	30	SILTSTONE: As above.
2520-2525m	80	SANDSTONE: As above.
	20	SILTSTONE: As above.
2525-2530m	90	SANDSTONE: As above. Trace fluorescence with no cut.
	10	SILTSTONE: As above.
2530-2535m	50	SANDSTONE: As above.
	50	SILTSTONE: As above
2535-2540m	50	SANDSTONE: As above.
	50	SILTSTONE: White/grey, beige, micromicaceous, kaolinitic, carbonaceous, predominantly argillaceous, water sensitive, soft, sticky, no shows.
2540-2545m	50	SANDSTONE: As above.
	50	SILTSTONE: As above.
2545-2550m	30	SANDSTONE: As above.
	70	SILTSTONE: As above.
2550-2555m	70	SANDSTONE: As above.
	30	SILTSTONE: Beige, pale brown, predominantly argillaceous, slightly carbonaceous, water sensitive, soft, sticky.
2555-2560m	80	SANDSTONE: White, clear, translucent, relatively clean, predominantly coarse to very coarse grained, loose subangular, occasionally subrounded quartz fragments, scattered medium grained welded quartz aggregates in a dominantly tight silica matrix, trace white-yellow fluorescence with no visible crush cut, trace dull orange dolomitic mineral fluorescence.
	20	SILTSTONE: As above.

2560-2565m	80	SILTSTONE: As above.
	20	SANDSTONE: As above.
2565-2570m	60	SILTSTONE: As above.
	40	SANDSTONE: As above.
2570-2575m	100	SANDSTONE: As above. No shows.
2575-2580m	90	SANDSTONE: White, translucent, clear, unconsolidated, coarse to very coarse grained, subangular to angular quartz fragments, occasionally medium grained subrounded quartz aggregates in a tight silica matrix, fair sorting, good inferred porosity for unconsolidated grains but poor porosity for tightly cemented aggregates, common pyrite crystals, no shows.
	10	SILTSTONE: White/beige to light brown, very argillaceous, water sensitive, sticky, scattered carbonacous flecks throughout.
2580-2585m	50	SANDSTONE: As above.
	50	SILTSTONE: As above.
2585-2590m	100	SILTSTONE: As above.
	Trace	SANDSTONE: As above.
2590-2595m	50	SANDSTONE: As above.
	50	SILTSTONE: As above.
2595-2600m	20	SANDSTONE: As above.
	80	SILTSTONE: As above.
2600-2605m	100	SILTSTONE: Pale brown, beige, predominantly argillaceous, water sensitive, soft to occasionally firm, blocky, minor scattered carbonaceous flecks, sticky, no shows.
2605-2610m	60	SANDSTONE: As above.
	40	SILTSTONE: As above.
2610-2615m	100	SANDSTONE: As above.
2615-2620m	60	SILTSTONE: As above; trace shows as for sandstone lithology.
	40	SANDSTONE: As above; trace white/yellow fluorescence with no cut to rare very slow diffuse white cut, white residual ring after 15 mins.
2620-2625m	90	SANDSTONE: White, translucent, clear, loose, coarse to very coarse grained, subangular quartz fragments, trace pyrite, fair sorting, fair to good inferred porosity, 5% white/yellow fluorescence with very slow diffuse cut, white residue ring after 15 min.
	10	SILTSTONE: As above.
2625-2630m	100	SANDSTONE: No shows, otherwise as above.
2630-2635m	80	SANDSTONE: As above.
	20	SILTSTONE: As above.
2635-2640m	60	SANDSTONE: As above.
	40	SILTSTONE: As above.

2640-2645m	100	SILTSTONE: Pale brown, beige, predominantly argillaceous, trace carbonaceous, water sensitive, sticky, blocky, no shows.
2645-2650m	80 20	SILTSTONE: As above. SANDSTONE: As above.
2650-2655m	80 20	SANDSTONE: As above. SILTSTONE: As above.
2655-2660m	100	SANDSTONE: As above; trace dull yellow fluorescence, no crush cut or residue ring.
2660-2665m	100	SANDSTONE: Translucent, white, clear, predominantly subangular to subrounded loose quartz fragments, no matrix, oblique to parallel to random fracturing, occasional pyrite encrustations and coarse pyrite fragments, occasional fracture parting between quartz, poor sorting, fair porosity, 20% moderately bright white yellow fluorescence with only 5% slow diffuse crush cut, trace dolomite mineral fluorescence.
Grab Sample	100	SANDSTONE: As above; 50% relatively bright-yellow fluorescence with slow to moderately diffuse milky-white cut, lithology has greater amounts of fine to medium grained subrounded to subangular aggregates, in a silica to argillaceous matrix.
2666-2670m	90 10	SANDSTONE: As above. 10% fluorescence, cut as above. SILTSTONE: As above.
2670-2675m	100	SANDSTONE: As above, trace fluorescence with rare diffuse crush cut.
2675-2680m	100	SANDSTONE: As above.
2680-2685m	100	SANDSTONE: As above.
2685-2690m	90 10	SANDSTONE: As above, trace shows. SILTSTONE: As above.
2690-2695m	100	SANDSTONE: As above.
2695-2700m	100	SANDSTONE: As above. No shows.
2700-2705m	100	SANDSTONE: White, clear, translucent, coarse to very coarse grained, subangular, loose fragments, with fine to medium grained, subrounded to subangular quartz aggregates in a dominantly silica matrix, occasional argillaceous/kaolinitic white clay matrix, fair sorting, fair inferred porosity, no shows.
2705-2710m	50 50	SANDSTONE: As above. SILTSTONE: As above.
2710-2715m	50 50	SANDSTONE: As above. SILTSTONE: As above.
2715-2720m	80 20	SILTSTONE: As above. SANDSTONE: As above.

APPENDIX 3

2720-2725m	100	SILTSTONE: Beige, black, light-grey, dark/light-brown, predominantly siliceous to argillaceous matrix, slightly carbonaceous, hard, firm, blocky, grading into very fine grained sandstone, occasionally water sensitive.
2725-2730m	100	SILTSTONE: As above.
2730-2735m	50	SANDSTONE: As above.
	50	SILTSTONE: As above.
2735-2736m Bottoms up Sample POOH for Core #2	100	SANDSTONE: White, clear, translucent, coarse to very coarse grained, subangular to subrounded, loose quartz fragments, common (20%) fine to medium grained quartz aggregates in a dominantly silica matrix, occasional argillaceous matrix, poor sorting, no fluorescence or cut.
Core #2 2737.1-2755m		See Core Description no. 2.
2755-2760m	80	SANDSTONE: Bimodal, fine to medium grained, subrounded to subangular, quartz aggregates in a dominantly white silica matrix, occasional loose coarse grained subangular quartz grains, poor sorting, relatively tight to occasionally fair porosity, occasional pyrite and biotite, no shows.
	20	SILTSTONE: Dark-grey/brown, argillaceous, micromicaceous, firm, blocky, scattered black carbonaceous laminae.
2760-2765m	60	SANDSTONE: As above.
	40	SILTSTONE: As above.
2765-2770m	90	SANDSTONE: Dominantly loose, translucent, coarse grained subrounded quartz grains, poorly sorted, occasionally medium grained quartz aggregates in a white silica matrix.
	10	SILTSTONE: As above.
	Trace	Pyrite.
2770-2775m	100	SANDSTONE: Dominantly quartz, loose, translucent, coarse grained, subangular to subrounded, dominantly subangular, moderately sorted, no matrix, some medium sized quartz aggregates, subrounded to subangular, white silica matrix, poorly sorted. Traces of pyrite, carbonaceous material, biotite and montmorillonite, occasional siltstone (as above).
2775-2780m	80	SANDSTONE: Dominantly loose quartz, translucent-transparent, coarse grained, subangular to subrounded poor to moderate sorting. Also quartz aggregates with quartz matrix and trace pyrite, tight porosity.
	20	SILTSTONE: Brown/grey colour, argillaceous, minor carbonaceous, minor mica.

2780-2785m	50	SANDSTONE: Dominantly loose quartz, translucent-transparent, medium to coarse grained, subangular to subrounded, poor to moderate sorting. Quartz aggregates with silica matrix, tight porosity, pyrite also within aggregates (minor), minor free pyrite.
	50	SILTSTONE: Pale brown to grey, firm, argillaceous, minor carbonaceous.
2785-2790m	50	SANDSTONE: Dominantly loose quartz, translucent - transparent, medium to coarse, grained, subangular to subrounded, moderate sorting. Quartz aggregates with silica matrix, tight porosity, minor free pyrite.
	50	SILTSTONE: Pale to dark brown, firm, micaceous, carbonaceous.
2790-2795m	60	SANDSTONE: Dominantly loose quartz, translucent-transparent, medium to coarse grained, subangular to subrounded, poorly sorted. Also quartz aggregates with silica matrix, tight porosity, trace pyrite.
	40	SILSTONE: Light to dark brown, soft to firm, carbonaceous (minor).
2795-2800m	60	SANDSTONE: White, fine grained sub-rounded quartz aggregates in a white siliceous matrix, poor sorting, 5% white/yellow fluorescence with no observable crush cut, otherwise as above.
	40	SILTSTONE: As above.
2800-2805m	60	SANDSTONE: Dominantly loose quartz, translucent-transparent, medium to coarse grained, subangular to subrounded, poorly sorted. Aggregates: silica matrix, minor pyrite, tight porosity.
	40	SILTSTONE: Pale to dark brown, moderate to firm, minor carbonaceous material, minor free pyrite.
2805-2810m	60	SANDSTONE: Quartz grains, translucent to transparent, fine to medium grained, subangular to subrounded. Aggregates: silica matrix, minor pyrite.
	40	SILTSTONE: As above.
2810-2815m	60	SANDSTONE: Translucent to transparent, medium to coarse grained, angular to subangular, poorly sorted, trace white/yellow fluorescence, quartz grains. Aggregates: silica matrix, trace pyrite, tight porosity, minor free pyrite.
	40	SILTSTONE: Pale to dark brown, medium to firm, some is carbonaceous.
2815-2820m	80	SILTSTONE: Pale to dark brown, soft to firm, some is carbonaceous, minor mica.
	20	SANDSTONE: translucent to transparent, medium to coarse grained, angular to subangular, poorly sorted, trace white/yellow fluorescence, quartz grains. Aggregates: silica matrix, trace pyrite.

APPENDIX 2

APPENDIX 2

Core Descriptions

Core No. 1 Well : WHIPTAIL-1A

Interval Cored : 1165.4m - 1175.2m
Cut : 9.8m Recovered : 7.6m (78%)
Bit Type : PVC RC 476 Bit Size : 9-7/8 OD and 4-3/4 ID
Described by : Jeff Roche Date : 14.08.85

Int. (m)	Depth & ROP (m/hr)	Graphic	Shows	Descriptive Lithology
1165	50 0			1165.4-1166.0m SANDSTONE - white, clear, frosted, clean, unconsolidated to friable, predominantly fine to occasionally medium grained, subrounded to occasionally subangular, relatively mature quartz, with mica/muscovite flakes. Excellent sorting, excellent inferred porosity, no visible fluorescence or oil, slight petroliferous odour; trace subangular, coarse to very coarse grained, quartz fragments scattered throughout.
1166				
1167				
1168				1166.0-1169.0m SANDSTONE - no petroliferous odour, otherwise as above.
1169	60			1169.0-1173.0m SANDSTONE - clear, clean, frosted, unconsolidated, mainly medium to coarse grained, subangular quartz grains, trace mica, excellent sorting, excellent inferred porosity, minor dolomitic mineral fluorescence, no shows.
1170	55			
1171				Interpreted as a clean relatively mature marine sandstone.
1172	55			
1173	60			
1174	55			
1175	60			

Core No. 2 Well : WHIPTAIL-1A

Interval Cored : 2737.2m - 2754.6m
Cut : 17.4m Recovered : 9.8m (56.3%)
Bit Type : RC4 Bit Size : 9/7-8" OD and 4-3/4" ID
Described by : Jeff Roche Date : 26.8.85

Int. (m)	Depth & ROP (m/hr)	Graphic	Shows
2937	50 0		
2938			L
2939			
2940			
2941			
2942			
2943			
2944			G
2945			
2946			
2947			G

2737.2 - 2738.2m SANDSTONE - grains are clear, grey, translucent, medium to occasional coarse, subangular, fairly sorted, white crystalline, poor to fair visual porosity; sucrosic silica cement; overall relatively friable but some firm to hard, occasional loose, coarse, angular to subangular grains, black biotite and very coarse yellow pyrite pieces distributed throughout. Some reddish-brown altered garnet-like crystals or mafic minor shale concretions present. Porosity depends on amount of cement. No shows. Massive to faintly parallel bedding near the base. Bedding planes are not particularly distinct, but generally are parallel at base with subtle festoon cross bedding towards the top. Fining upward sequence, probably moderately high energy environment, possibly bioturbated.

2738.2 - 2743.3m SHALEY SILTSTONE - massive medium dark grey, hard to very hard, firm, moderately micromicaceous, slightly argillaceous, very carbonaceous, non calcareous with abundant medium grained rounded biotite which is evenly distributed. Minor flat peat fragments and coarse quartz pieces from erosional base at 2743.3 m up to 2739 m. Grades to a black massive, non-fissile bituminous shale above 2739 m, with very fine yellow disseminated pyrite and occasional reddish brown altered mafics. Sharp contacts with both overlying and underlying sandstone sequences.

2743.3 - 2745.5m SILTY SANDSTONE - stacked fining upward sequences, grading from medium to occasional coarse grained sandstone at the base, through to finely laminated siltstone and sandstone layers near the mid sections at 2944.6 m. This 2744.6 cycle is repeated before truncation by the overlying siltstone sequence which abbreviates the cycle. Overall the sandstone is clear, translucent, grey, subrounded to subangular in a white subcrystalline siliceous matrix, hard, firm fair sorting with fair visual porosity.

Core No.	2 cont'd	Well	: WHIPTAIL-1A
Interval Cored	: 2737.2m - 2754.6m		
Cut	: 17.4m	Recovered	: 9.8m (56.3%)
Bit Type	: RC4	Bit Size	: 9/7-8" OD and 4-3/4" ID
Described by	: Jeff Roche	Date	: 26.8.85

Descriptive Lithology

2743.3-2745.5m cont'd - No shows. At 2743.5, black vitreous subangular coal clasts evenly distributed throughout the siliceous sandstone. Fine carbonaceous laminae define the horizontal and inclined parallel laminations, ranging from 30° near the base to 5° near the top of the sequence representing low energy current ripples and small scale cross-beds. Scattered discontinuous flat peat lenses of less than 1 cm occur throughout. Occasional parallel lenticular coarse grained sandstone lenses cut across a predominantly massive medium grained sandstone matrix at 2744.5 m. Black, fine, coal laminae near the base at 2745.6 m defines parallel bedding planes ranging from 15-20°.

2745.5 - 2747.0m SANDSTONE - massive, clear, translucent, grey, medium grained subrounded quartz in a sub crystalline siliceous matrix, firm, hard, clean, good sorting, poor to fair visual porosity, faintly laminated with subtle cross bedding throughout. No shows.

2747-2754.6m No recovery

APPRENDIX 3

Sidewall Core Descriptions

WHIPTAIL-1A

SIDEWALL CORE DESCRIPTIONS

No.	Depth	Rec. (mm)	Rock Type	Description
1	2781.0		SILTSTONE	light grey, well sorted, soft; quartzose, argillaceous.
2.	2715.0		SILTSTONE	light grey, well sorted, soft; quartzose, argillaceous.
3	2712.0		SILTSTONE	dark grey, moderately sorted, soft; argillaceous, coaly.
4	2676.1		SANDSTONE	grey, fine grained, moderately sorted, subrounded, friable; carbonaceous, coaly.
5	2666.0		SANDSTONE	white grey, fine grained, moderately sorted, subrounded, friable; carbonaceous.
6	2653.5		SANDSTONE	white grey, fine to medium grained, well sorted, subrounded, friable; carbonaceous, coaly.
7	2634.0		SANDSTONE	light grey, fine grained, moderately sorted, subrounded, friable; argillaceous, carbonaceous; 30% fluorescence.
8	2618.0		SANDSTONE	light grey, medium grained, well sorted, friable; argillaceous; 30% spotty bright blue white fluorescence; very faint pale white cut; C1-C3, only trace C4.
9	2600.0		CLAYSTONE	light brown, soft; argillaceous.
10	2547.1		SILTSTONE	dark brown, hard; carbonaceous, argillaceous.
11	2476.5		CLAYSTONE	dark brown, firm; carbonaceous, argillaceous.
12	2452.1		SANDSTONE	white, fine to medium grained, well sorted, subrounded, friable; slightly argillaceous; 100% even bright white fluorescence; bright white cut; C1-C3, only trace C4.
13	2415.0		SILTSTONE	light brown, well sorted, soft; argillaceous, quartzose.
14	2361.8		NO RECOVERY	
15	2292.8		SANDSTONE	grey, fine grained, moderately sorted, subrounded, friable; carbonaceous, trace mica.

16	2245.1	SANDSTONE	grey, fine grained, moderately sorted, subrounded, friable; carbonaceous trace, mica.
17	2218.3	CLAYSTONE	dark brown, firm; argillaceous, carbonaceous.
18	2163.0	NO RECOVERY	
19	2126.4	SANDSTONE	grey, fine to medium grained, poorly sorted, subrounded, friable; argillaceous, carbonaceous.
20	2099.5	SANDSTONE	white, fine to medium grained, well sorted, subrounded, friable; mica.
21	2006.3	SANDSTONE	grey to white, fine to medium grained, well sorted, subrounded, friable; slightly carbonaceous.
22	2090.0	SANDSTONE	grey to white, fine grained, moderately sorted, subrounded, friable; mica.
23	2060.8	SANDSTONE	grey to white, fine to medium grained, moderately sorted, subrounded, friable; carbonaceous.
24	1992.5	SANDSTONE	grey to white, fine to medium grained, moderately sorted, subrounded, friable; carbonaceous, trace mica.
25	1940.1	SANDSTONE	grey to white, fine grained, well sorted, subrounded, friable; trace mica.
26	1864.0	SANDSTONE	grey to white, fine grained, well sorted, subrounded, friable; trace mica.
27	1810.9	SILTSTONE	dark grey, firm; carbonaceous, argillaceous.
28	1735.1	SANDSTONE	light grey, fine grained, well sorted, subrounded, friable; carbonaceous, trace mica.
29	1698.0	SANDSTONE	light grey, fine grained, well sorted, subrounded, friable; carbonaceous.
30	1660.0	SANDSTONE	white, fine grained, well sorted, subrounded, friable; pyritic, trace mica.
31	1635.2	CLAYSTONE	light brown, firm; argillaceous.
32	1589.5	SANDSTONE	white, fine grained, well sorted, subrounded, trace mica.
33	1580.0	SANDSTONE	light grey, fine grained, moderately sorted, subrounded, friable; trace mica, carbonaceous.

34	1571.8	SILTSTONE	white, well sorted, firm to soft, quartzose.
35	1501.5	SILTSTONE	grey, well sorted, firm, quartzose.
36	1478.0	CLAYSTONE	grey, firm, argillaceous, silty.
37	1451.8	SILTSTONE	white, well sorted, firm, quartzose, trace mica, coaly.
38	1447.1	COAL	black, brittle.
39	1431.0	NO RECOVERY	
40	1409.5	VERY FINE SANDSTONE-SILTSTONE	white grey, very fine to fine grained, moderately sorted, firm, quartzose, trace mica, carbonaceous.
41	1402.0	SANDSTONE	white, fine grained, well sorted, friable; trace mica.
42	1383.5	SANDSTONE	white, fine grained, well sorted, friable; trace mica.
43	1382.6	SILTSTONE-VERY FINE SANDSTONE	grey to black, very fine to fine grained, poorly sorted, firm; quartzose, carbonaceous, coaly.
44	1381.5	SILTSTONE	dark brown, firm, carbonaceous, trace mica.
45	1380.0	SANDSTONE	dull white, very fine to fine grained, well sorted, subrounded, friable; mica; 80% even, relatively bright white fluorescence, relatively bright white cut; C1-C4 only.
46	1375.6	SILTSTONE	dark brown, hard, carbonaceous, coaly.
47	1360.0	NO RECOVERY	
48	1344.0	SILTSTONE	light grey, firm; quartzose, carbonaceous.
49	1312.0	SILTSTONE	light grey, firm; quartzose, carbonaceous.
50	1278.0	SILTSTONE	dark grey to black, firm; carbonaceous, trace mica.
51	1257.5	CLAYSTONE	pale brown, firm, argillaceous, silty.
52	1228.6	CLAYSTONE	dark brown, firm, very argillaceous, carbonaceous.
53	1202.5	SILTSTONE	black, hard, carbonaceous.
54	1164.0	SANDSTONE	white to grey, fine grained, subrounded, friable; carbonaceous.

55	1154.7	SILTSTONE	black, firm, carbonaceous.
56	1147.8	SILTSTONE	black, firm, carbonaceous.
57	1141.3	NO RECOVERY	
58	1134.7	SILTSTONE	dark brown, firm, carbonaceous, moderately calcareous.
59	1128.5	SILTSTONE	dark brown, firm, carbonaceous, moderately calcareous.
60	1120.0	SILTSTONE	dark brown, firm, carbonaceous, moderately calcareous.

APPENDIX 4

APPENDIX 4

Sidewall Core Gas Analysis

WHIPTAIL #1A

SIDEWALL CORE GAS ANALYSIS

NO.	DEPTH (m)	C1	C2	C3	C4	C5	C6
4	2676.0	1133	36	16	TR	--	--
5	2666.0	785	10	--	--	--	--
6	2653.5	1918	35	10	TR	--	--
8	2618.0	2163	30	8	TR	--	--
12	2412.0	2420	33	8	TR	--	--
20	2099.5	3208	46	11	TR	--	--
22	2090.0	2371	31	8	TR	--	--
41	1402.0	3139	44	11	TR	--	--
42	1383.5	2232	39	11	TR	--	--
45	1380.0	2098	39	8	TR	--	--
15	2292.8	802	14	TR	--	--	--
25	1940.0	786	11	--	--	--	--
26	1864.0	3139	52	12	TR	--	--
28	1735.0	2964	46	11	TR	--	--
29	1698.0	2092	30	8	TR	--	--
33	1580.0	2058	33	8	TR	--	--
23	2060.8	1918	35	8	TR	--	--
24	1992.5	2441	47	10	TR	--	--
19	2126.0	TR	--	--	--	--	--
32	1589.5	3488	60	14	TR	--	--
16	2245.0	2232	33	8	TR	--	--

TOTAL 21 SAMPLES

1848L/54

APPENDIX 5

APPENDIX 5

RFT Results

RFT SAMPLE TEST REPORT

Well : Whiptail-1A

OBSERVER : Jeff Roche DATE : 18 August 1985 RUN NO. : One

	CHAMBER 1 (22.7 lit.)		CHAMBER 2 (10.4 lit.)	
SEAT NO.	1/1		1/1	
DEPTH	1397.5		1397.5	
A. RECORDING TIMES				
Tool Set	1428			
Pretest Open	1428		1449	
Time Open	4		1	
Chamber Open	1432		1450	
Chamber Full	1443		1453	
Fill Time	11		3	
Start Build Up	1443		1453	
Finish Build Up	1446		1457	
Build Up Time	3		4	
Seal Chamber	1448		1458	
Tool Retract			1459	
Total Time	20 mins.		9 mins.	
B. SAMPLE PRESSURE				
IHP	2347	psig		psig
ISIP	1979	psig	1971	psig
Initial Flowing Press.	1767	psig	1514	psig
Final Flowing Press.	1888	psig	1943	psig
Sampling Press. Range	121	psig	429	psig
FSIP	1971		1972	psig
FHP			2342	psig
Form.Press.(Horner)				psig
C. TEMPERATURE				
Depth Tool Reached	1450	m		m
Max. Rec. Temp	66.4	deg C		deg C
Time Circ. Stopped	23.25/17th	hrs.		hrs.
Time since Circ.	15	hrs.		hrs.
Form.Temp.(Horner)		deg C		psig
D. SAMPLE RECOVERY				
Surface Pressure	325	psig		psig
Amt Gas	0.71	cu ft	-	lit.
Amt Oil	22.00	lit	9.60	lit.
Amt Water	-	lit	-	lit.
Amt Others (Filtrate)	Trace	lit.		lit.
E. SAMPLE PROPERTIES				
Gas Composition				
C1	45,043	ppm	-	ppm
C2	4,220	ppm	-	ppm
C3	4,493	ppm	-	ppm
IC4/nC4	1,997	ppm	-	ppm
C5	441	ppm	-	ppm
C6+	110	ppm	-	ppm
CO2/H2S	-/-	ppm	-/-	ppm
Oil Properties	37 deg API@ 15	deg C	42 deg API@ 15	deg C
Colour	Reddish Brown		Reddish Brown	
Fluorescence	Bright White		Bright White	
GOR	5 SCF/BBL			
Water Properties				
Resistivity	0.377 ohm-m @ 14	deg C	@	deg C
NaCl Equivalent	21,000	ppm		ppm
Cl-titrated	12,500	ppm		ppm
Tritium	In: 3220 DPM Rec: 2876 DPM			DPM
Est Water Type	Filtrate			
Mud Filtrate Properties				
Resistivity	.295 ohm-m @ 16	deg C	ohm-m @	deg C
NaCl Equivalent	25,000	ppm		ppm
Cl-titrated	17,000	ppm		ppm
Calibration				
Calibration Press.				
Calibration Temp.				
Hewlett Packard No.				
Mud Weight	9.8	ppg	9.8	ppg
Calc.Hydrostatic	9.8	ppg	9.8	ppg
Chokesize/Probe Type	1 x .030"/Martineau		1 x .030"/Martineau	
REMARKS				

RFT SAMPLE TEST REPORT

Well : Whiptail-1A

OBSERVER : Jeff Roche DATE : 18 August 1985 RUN NO. : Two

	CHAMBER 1 (22.7 lit.)		CHAMBER 2 (10.4 lit.)	
SEAT NO.	2/2 2/2		2/2	
DEPTH	1380.2 1380.2		1380.2	
A. RECORDING TIMES				
Tool Set	1746 1821			
Pretest Open	1748 1757 1822			
Time Open	4			
Chamber Open	1826		1839	
Chamber Full	1834		1843	
Fill Time	8		4	
Start Build Up	1834		1843	
Finish Build Up	1838		1847	
Build Up Time	4		4	
Seal Chamber	1751 1838		1847	
Tool Retract			1848	
Total Time	17 mins.		9 mins.	
B. SAMPLE PRESSURE				
IHP	2320 2320 2317 psig			psig
ISIP	1961		1954	psig
Initial Flowing Press.	1833		1707	psig
Final Flowing Press.	1939		1949	psig
Sampling Press. Range	106		242	psig
FSIP	1954		1954	psig
FHP			2311	psig
Form.Press.(Horner)				psig
C. TEMPERATURE				
Depth Tool Reached		m		m
Max. Rec. Temp		deg C		deg C
Time Circ. Stopped	23.25/17th	hrs.		hrs.
Time since Circ.	18	hrs.		hrs.
Form.Temp.(Horner)		deg C		psig
D. SAMPLE RECOVERY				
Surface Pressure	575	psig		psig
Amt Gas	0.2	cu ft		lit.
Amt Oil	16.30	lit		lit.
Amt Water	-	lit		lit.
Amt Others (Filtrate)	5.25	lit.		lit.
E. SAMPLE PROPERTIES				
Gas Composition				
C1	NOT ENOUGH	ppm		ppm
C2	GAS	ppm		ppm
C3	TO	ppm		ppm
IC4/nC4	MEASURE	ppm		ppm
C5		ppm		ppm
C6+		ppm		ppm
CO2/H2S		ppm		ppm
Oil Properties	41 deg API@ 20	deg C	API@	deg C
Colour	Honey Brown			
Fluorescence	Bright White			
GOR	2 SCF/BBL			
Water Properties				
Resistivity	0.342 ohm-m @ 14	deg C	@	deg C
NaCl Equivalent	23,000	ppm		ppm
Cl-titrated	14,500	ppm		ppm
Tritium	In: 3210 DPM Rec: 2432 DPM			DPM
Est Water Type	Filtrate			
Mud Filtrate Properties				
Resistivity	.295 ohm-m @ 16	deg C	ohm@	deg C
NaCl Equivalent	25,000	ppm		ppm
Cl-titrated	17,000	ppm		ppm
Calibration				
Calibration Press.				
Calibration Temp.				
Hewlett Packard No.				
Mud Weight	9.8	ppg		ppg
Calc.Hydrostatic	9.8	ppg		ppg
Chokesize/Probe Type	1 x .030"/Martineau		1 x .030"/Martineau	
REMARKS			CHAMBER PRESERVED	

RFT SAMPLE TEST REPORT

Well : Whiptail-1A

OBSERVER : Jeff Roche DATE : 18 August 1985 RUN NO. : Three

	CHAMBER 1 (22.7 lit.)		CHAMBER 2 (10.4 lit.)	
SEAT NO.	3/3		3/3	
DEPTH	1285.5		1285.5	
A. RECORDING TIMES				
Tool Set	2113			
Pretest Open	2114			
Time Open				
Chamber Open	2117		2131	
Chamber Full	2126		2134	
Fill Time	9		3	
Start Build Up	2126		2134	
Finish Build Up	2129		2136	
Build Up Time	3		2	
Seal Chamber	2130		2137	
Tool Retract			2138	
Total Time	17	mins.	7	mins
B. SAMPLE PRESSURE				
IHP	2159	psig		psig
ISIP	1821	psig	1819	psig
Initial Flowing Press.	1805	psig	1794	psig
Final Flowing Press.	1810	psig	1800	psig
Sampling Press. Range	5	psig	6	psig
FSIP	1819		1821	psig
FHP			2161	psig
Form.Press.(Horner)				psig
C. TEMPERATURE				
Depth Tool Reached		m		m
Max. Rec. Temp		deg C		deg C
Time Circ. Stopped	23.25/17th	hrs.		hrs.
Time since Circ.	22	hrs.		hrs.
Form.Temp.(Horner)		deg C		psig
D. SAMPLE RECOVERY				
Surface Pressure	600	psig		psig
Amt Gas	0.64	cu ft		lit.
Amt Oil		lit		lit.
Amt Water	21.50	lit	9.70	lit.
Amt Others (Filtrate)		lit.		lit.
E. SAMPLE PROPERTIES				
Gas Composition				
C1		ppm		ppm
C2		ppm		ppm
C3		ppm		ppm
TC4/nC4		ppm		ppm
C5		ppm		ppm
C6+		ppm		ppm
CO2/H2S		ppm		ppm
Oil Properties	API@	deg C	API@	deg C
Colour				
Fluorescence				
GOR				
Water Properties				
Resistivity	0.653 ohm-m @ 13	deg C	0.996 @ 12	deg C
NaCl Equivalent	12,000	ppm	9,000	ppm
Cl-titrated	9,000	ppm	7,000	ppm
Tritium	In: 3050 DPM Rec: 1467 DPM		Rec 855	DPM
Est Water Type	Filtrate/Formation Water		Formation Water	
Mud Filtrate Properties				
Resistivity	.295 ohm-m @ 16	deg C	ohm@	deg C
NaCl Equivalent	25,000	ppm		ppm
Cl-titrated	17,000	ppm		ppm
Calibration				
Calibration Press.				
Calibration Temp.	66.6	deg C		
Hewlett Packard No.				
Mud Weight	9.8	ppg		ppg
Calc.Hydrostatic	9.9	ppg		ppg
Chokesize/Probe Type	1 x .030"/Martineau		1 x .030"/Martineau	
REMARKS				

RFT SAMPLE TEST REPORT

Well : Whiptail-1

OBSERVER : Jeff Roche DATE : 18 August 1985 RUN NO. : Four

	CHAMBER 1 (22.7 lit.)		CHAMBER 2 (10.4 lit.)	
SEAT NO.	4/4		4/4	
DEPTH	1295.0		1295.0	
A. RECORDING TIMES				
Tool Set	2323			
Pretest Open	2323			
Time Open	7			
Chamber Open	2330		2344	
Chamber Full	2339		2347	
Fill Time	9		3	
Start Build Up	2340		2347	
Finish Build Up	2343		2350	
Build Up Time	3		3	
Seal Chamber	2344		2352	
Tool Retract			2353	
Total Time	21	mins.	9	
B. SAMPLE PRESSURE				
IHP	2173	psig		psig
ISIP	1833	psig	1828	psig
Initial Flowing Press.	1808	psig	1389	psig
Final Flowing Press.	1822	psig	1797	psig
Sampling Press. Range	14	psig	408	psig
FSIP	1828		1831	psig
FHP			2172	psig
Form.Press.(Horner)				psig
C. TEMPERATURE				
Depth Tool Reached		m		m
Max. Rec. Temp		deg C		deg C
Time Circ. Stopped	23.25/17th	hrs.		hrs.
Time since Circ.	24	hrs.		hrs.
Form.Temp.(Horner)		deg C		psig
D. SAMPLE RECOVERY				
Surface Pressure	600	psig	-	psig
Amt Gas	-	lit.	-	lit.
Amt Oil	-	lit	-	lit.
Amt Water	21.50	lit	9.750	lit.
Amt Others (Filtrate)		lit.		lit.
E. SAMPLE PROPERTIES				
Gas Composition				
C1		ppm		ppm
C2		ppm		ppm
C3		ppm		ppm
TC4/nC4		ppm		ppm
C5		ppm		ppm
C6+		ppm		ppm
CO2/H2S		ppm		ppm
Oil Properties	API@	deg C	API@	deg C
Colour				
Fluorescence				
GOR				
Water Properties				
Resistivity	1.660 ohm-m @	21 deg C	2.710 @	deg C
NaCl Equivalent	3800	ppm	2400	ppm
Cl-titrated	4,500	ppm	5,000	ppm
Tritium	In: 3210 DPM Rec: 492 DPM		Rec: 295	DPM
Est Water Type	Formation Water		Formation Water	
Mud Filtrate Properties				
Resistivity	.295 ohm-m @ 16	deg C	.295 ohm-m @ 16	deg C
NaCl Equivalent	25,000	ppm	25,000	ppm
Cl-titrated	17,000	ppm	17,000	ppm
Calibration				
Calibration Press.				
Calibration Temp.	64			
Hewlett Packard No.				
Mud Weight	9.8	ppg	9.8	ppg
Calc.Hydrostatic	9.8	ppg	9.8	ppg
Chokesize/Probe Type	1 x .030"/Martineau		1 x .030"/Martineau	
REMARKS				

RFT SAMPLE TEST REPORT

Well : Whiptail-1A

OBSERVER : Jeff Roche DATE : 19 August 1985 RUN NO. : Five

	CHAMBER 1 (22.7 lit.)			CHAMBER 2 (10.4 lit.)	
SEAT NO.	5/5	5/6	5/7		
DEPTH	1154.0	1154.2	1158.0	1158.0	
A. RECORDING TIMES					
Tool Set	0146	0157	0202		
Pretest Open	0147	0158	0202		
Time Open			4		
Chamber Open			0206	0303	
Chamber Full			0251	0322	
Fill Time			45	19	
Start Build Up			0251	0322	
Finish Build Up			0302	0324	
Build Up Time			9	2	
Seal Chamber			0302	0325	
Tool Retract	0154			0326	
Total Time			60 mins.	23	
B. SAMPLE PRESSURE					
IHP	1932	1932	1939 psig		psig
ISIP			1617	1622	psig
Initial Flowing Press.			72	31	psig
Final Flowing Press.			502	525	psig
Sampling Press. Range			430	494	psig
FSIP			1622	1623	psig
FHP				1939	psig
Form.Press.(Horner)					psig
C. TEMPERATURE					
Depth Tool Reached			m		m
Max. Rec. Temp			deg C		deg C
Time Circ. Stopped	23.25/17th		hrs.		hrs.
Time since Circ.	26.5		hrs.		hrs.
Form.Temp.(Horner)			deg C		psig
D. SAMPLE RECOVERY					
Surface Pressure		650	psig	-	psig
Amt Gas		0.85	cu ft		lit.
Amt Oil			lit		lit.
Amt Water			lit		lit.
Amt Others (Filtrate)		22.00	lit.	10.20	lit.
E. SAMPLE PROPERTIES					
Gas Composition					
C1	NOT ENOUGH		ppm		ppm
C2	GAS		ppm		ppm
C3	TO		ppm		ppm
TC4/nC4	MEASURE		ppm		ppm
C5			ppm		ppm
C6+			ppm		ppm
CO2/H2S			ppm		ppm
Oil Properties	API@		deg C	API@	deg C
Colour					
Fluorescence					
GOR					
Water Properties					
Resistivity	1.300 ohm-m @ 19		deg C	2.35 ohm-m @ 19	deg C
NaCl Equivalent	5,000		ppm	3,500	ppm
Cl-titrated	5,500		ppm	5,000	ppm
Tritium	In: 3098 DPM Rec: 616 DPM			Rec: 532	DPM
Est Water Type	Formation Water			Formation Water	
Mud Filtrate Properties					
Resistivity	.295 ohm-m @ 16		deg C	ohm@	deg C
NaCl Equivalent	25,000		ppm		ppm
Cl-titrated	17,000		ppm		ppm
Calibration					
Calibration Press.					
Calibration Temp.					
Hewlett Packard No.					
Mud Weight	9.8		ppg		ppg
Calc.Hydrostatic	9.9		ppg		ppg
Chokesize/Probe Type	1 x .030"/Martineau			1 x .030"/Martineau	
REMARKS	Tight (5/5) Min Flow Press=200	V. Tight (5/6) Min Flow Press=13		V. Clean Water	

RFT SAMPLE TEST REPORT

Well : Whiptail-1A

OBSERVER : Jeff Roche DATE : 19 August 1985 RUN NO. : Six

	CHAMBER 1 (22.7 lit.)			CHAMBER 2 (10.4 lit.)	
SEAT NO.	6/8	6/9	6/10	6/10	
DEPTH	1497.5	1497.0	1497.0	1497.0	
A. RECORDING TIMES					
Tool Set	0528	0535	0540		
Pretest Open	0530		0540		
Time Open			1		
Chamber Open	0533		0541	0546	
Chamber Full			0546	0548	
Fill Time			5	2	
Start Build Up			0546	0546	
Finish Build Up			0546	0548	
Build Up Time				2	
Seal Chamber				05:52	
Tool Retract				05:55	
Total Time		mins.			
B. SAMPLE PRESSURE					
IHP	2517	2515	2516		psig
ISIP	2121		2122	2118	psig
Initial Flowing Press.	2500		2110	1182	psig
Final Flowing Press.			2112	2120	psig
Sampling Press. Range				1000	psig
FSIP			2118	2120	psig
FHP				0514	psig
Form.Press.(Horner)					psig
C. TEMPERATURE					
Depth Tool Reached			m		m
Max. Rec. Temp			deg C		deg C
Time Circ. Stopped	23.25/17th		hrs.		hrs.
Time since Circ.	30		hrs.		hrs.
Form.Temp.(Horner)			deg C		psig
D. SAMPLE RECOVERY					
Surface Pressure	150		psig	-	psig
Amt Gas	-		lit.	-	lit.
Amt Oil	-		lit	-	lit.
Amt Water	20.50		lit	9.00	lit.
Amt Others (Filtrate)	-		lit.		lit.
E. SAMPLE PROPERTIES					
Gas Composition					
C1			ppm		ppm
C2			ppm		ppm
C3			ppm		ppm
TC4/nC4			ppm		ppm
C5			ppm		ppm
C6+			ppm		ppm
CO2/H2S			ppm		ppm
Oil Properties	API@		deg C	API@	deg C
Colour					
Fluorescence					
GOR					
Water Properties					
Resistivity	.613 ohm-m @ 20 deg C			1.700 ohm-m @ 18 deg C	
NaCl Equivalent	10,000		ppm	3,700	ppm
Cl-titrated	10,000		ppm	4,500	ppm
Tritium	In: 3200 DPM Rec: 1594 DPM			Rec: 400	dpm
Est Water Type	Filtrate/Formation water			Formation water	
Mud Filtrate Properties					
Resistivity	.295 ohm-m @ 16		deg C	ohm@	deg C
NaCl Equivalent	25,000		ppm		ppm
Cl-titrated	27,000		ppm		ppm
Calibration					
Calibration Press.			ppm		ppm
Calibration Temp.					
Hewlett Packard No.			ppg		ppg
Mud Weight	9.8		ppg	9.8	ppg
Calc.Hydrostatic					
Chokesize/Probe Type	[illegible] .030"/Martineau			1 x .030"/Martineau	
REMARKS	Seal Failure	No Seal			

RFT SAMPLE TEST REPORT

Well : Whiptail-1A

OBSERVER : Jeff Roche DATE : 19 August 1985 RUN NO. : Seven

	CHAMBER 1 (22 lit.)			CHAMBER 2 (10.4 lit.)	
SEAT NO.	7/11	7/12	7/13		
DEPTH	1275.5	1276.5	1278.5		
A. RECORDING TIMES					
Tool Set	0753	0758	0805		
Pretest Open	0754	0800	0805		
Time Open					
Chamber Open					
Chamber Full					
Fill Time			mins.	mins.	
Start Build Up					
Finish Build Up					
Build Up Time				mins.	
Seal Chamber					
Tool Retract					
Total Time			mins.	mins.	
B. SAMPLE PRESSURE					
IHP	2137	2137	2141 psig		psig
ISIP			psig		psig
Initial Flowing Press.			psig		psig
Final Flowing Press.			psig		psig
Sampling Press. Range			psig		psig
FSIP					psig
FHP					psig
Form.Press.(Horner)					psig
C. TEMPERATURE					
Depth Tool Reached			m		m
Max. Rec. Temp			deg C		deg C
Time Circ. Stopped		hrs		hrs	
Time since Circ.			hrs		hrs
Form.Temp.(Horner)					psig
D. SAMPLE RECOVERY					
Surface Pressure			psig		psig
Amt Gas			cu ft		cu ft
Amt Oil			lit		lit
Amt Water			lit		lit
Amt Others (Filtrate)			cc		cc
E. SAMPLE PROPERTIES					
Gas Composition					
C1			ppm		ppm
C2			ppm		ppm
C3			ppm		ppm
TC4/nC4			ppm		ppm
C5			ppm		ppm
C6+			ppm		ppm
CO2/H2S			%/ppm		%/ppm
Oil Properties		API@	deg C	API@	deg C
Colour					
Fluorescence					
GOR					
Water Properties					
Resistivity		ohm@	deg C	ohm@	deg C
NaCl Equivalent			ppm		ppm
Cl-titrated			ppm		ppm
Tritium			DPM		DPM
Est. Water Type					
Mud Filtrate Properties					
Resistivity		ohm@	deg C	ohm@	deg C
NaCl Equivalent			ppm		ppm
Cl-titrated			ppm		ppm
Calibration					
Calibration Press.					
Calibration Temp.					
Hewlett Packard No.					
Mud Weight			ppg		ppg
Calc.Hydrostatic			ppg		ppg
Chokesize/Probe Type					
REMARKS	Very tight				

RFT SAMPLE TEST REPORT

Well : Whiptail-1A

OBSERVER : J. Roche/D. Bailey DATE : 19 August 1985 RUN NO. : Seven

	CHAMBER 1 (22.7 lit.)	CHAMBER 2 (10.4 lit.)
SEAT NO.	7/24	7/24
DEPTH	1363.5	1363.5
A. RECORDING TIMES		
Tool Set	1055	
Pretest Open	1056	
Time Open	2 mins	
Chamber Open	1058	1115
Chamber Full	1111	1116
Fill Time	13 mins	1 min
Start Build Up	1111	1116
Finish Build Up	1114	1118
Build Up Time	3 mins	2 mins
Seal Chamber	1114	1118
Tool Retract		1118
Total Time	mins.	0.23 hrs
B. SAMPLE PRESSURE		
IHP	2279 psig	psig
ISIP	1924 psig	1919 psig
Initial Flowing Press.	1095 psig	1119 psig
Final Flowing Press.	1918 psig	1910 psig
Sampling Press. Range	823 psig	791 psig
FSIP	1919 psig	1920 psig
FHP		2277 psig
Form.Press.(Horner)		psig
C. TEMPERATURE		
Depth Tool Reached	m	m
Max. Rec. Temp	deg C	deg C
Time Circ. Stopped	hrs.	hrs.
Time since Circ.	hrs.	hrs.
Form.Temp.(Horner)	deg C	psig
D. SAMPLE RECOVERY		
Surface Pressure	450 psig	- psig
Amt Gas	0.5 cu ft	- lit.
Amt Oil	- lit	- lit.
Amt Water	22.0 lit	10.0 lit.
Amt Others (Filtrate)	lit.	lit.
E. SAMPLE PROPERTIES		
Gas Composition		
C1	ppm	ppm
C2	ppm	ppm
C3	ppm	ppm
TC4/nC4	ppm	ppm
C5	ppm	ppm
C6+	ppm	ppm
CO2/H2S	ppm	ppm
Oil Properties	API@ deg C	API@ deg C
Colour		
Fluorescence		
GOR		
Water Properties		
Resistivity	0.455 ohm-m @ 20 deg C	0.710 ohm-m @ 20 deg C
NaCl Equivalent	14,000 ppm	9000 ppm
Cl-titrated	ppm	ppm
Tritium	In: 3139 DPM Rec: 160 DPM	Rec: 92 DPM
Est Water Type	Formation water	Formation water
Mud Filtrate Properties		
Resistivity	.295 ohm-m @ 16 deg C	ohm@ deg C
NaCl Equivalent	25,000 ppm	ppm
Cl-titrated	17,000 ppm	ppm
Calibration		
Calibration Press.		
Calibration Temp.		
Hewlett Packard No.		
Mud Weight	9.8 ppg	ppg
Calc.Hydrostatic	9.8 ppg	ppg
Chokesize/Probe Type	1 x .030"/Martineau	1 x .030"/Martineau
REMARKS		

RFT SAMPLE TEST REPORT

Well : Whiptail-1A

OBSERVER : J. Roche/R. Mosley DATE : 28 August 1985 RUN NO. : Eight

	CHAMBER 1 (45.4 lit.)				CHAMBER 2 (10.4 lit.)		
SEAT NO.	8/25	8/26	8/27	8/28	8/29		
DEPTH	2664.5	2666.8	2665.0	2663.7	2665.0	2665.0	
A. RECORDING TIMES							
Tool Set	0551	0638	0614	0645	0653	0655	
Pretest Open	0551	0638	0614	0645	0653	0655	
Time Open	6		4				
Chamber Open	0557		0618				
Chamber Full							
Fill Time							
Start Build Up							
Finish Build Up							
Build Up Time							
Seal Chamber	0608		0630				
Tool Retract	0609	0640	0632	0648	0654	0658	
Total Time			hrs.				
B. SAMPLE PRESSURE							
IHP	4338	4325	4325	4320	4325	4325	psig
ISIP	3796		3784	psig			psig
Initial Flowing Press.							psig
Final Flowing Press.							psig
Sampling Press. Range							psig
FSIP							psig
FHP							psig
Form.Press.(Horner)							psig
C. TEMPERATURE							
Depth Tool Reached	2667			m			m
Max. Rec. Temp	87.8		88.3	deg C			deg C
Time Circ. Stopped				hrs.			hrs.
Time since Circ.				hrs.			hrs.
Form.Temp.(Horner)				deg C			psig
D. SAMPLE RECOVERY							
Surface Pressure				psig			psig
Amt Gas				lit.			lit.
Amt Oil				lit			lit.
Amt Water				lit			lit.
Amt Others (Filtrate)				lit.			lit.
E. SAMPLE PROPERTIES							
Gas Composition							
C1				ppm			ppm
C2				ppm			ppm
C3				ppm			ppm
TC4/nC4				ppm			ppm
C5				ppm			ppm
C6+				ppm			ppm
CO2/H2S				ppm			ppm
Oil Properties		API@		deg C		API@	deg C
Colour							
Fluorescence							
GOR							
Water Properties							
Resistivity		@		deg C		@	deg C
NaCl Equivalent				ppm			ppm
Cl-titrated				ppm			ppm
Tritium				DPM			DPM
Est Water Type							
Mud Filtrate Properties							
Resistivity		ohm@		deg C		ohm@	deg C
NaCl Equivalent				ppm			ppm
Cl-titrated				ppm			ppm
Calibration							
Calibration Press.							
Calibration Temp.							
Hewlett Packard No.							
Mud Weight				ppg			ppg
Calc.Hydrostatic				ppg			ppg
Chokesize							
REMARKS	Tight tests						

RFT SAMPLE TEST REPORT

Well : Whiptail 1A

OBSERVER : Jeff Roche/Rob Mosley DATE : 28 August 1985 RUN NO. : Eight

	CHAMBER 1 (45.4 lit.)				CHAMBER 2 (10.4 lit.)	
SEAT NO.	8/30	8/31	8/32	8/33		
DEPTH	2650.0	2649.5	2648.5	2651.0		
A. RECORDING TIMES						
Tool Set	0705	0712	0728	0737		
Pretest Open	0705	0712	0728	0737		
Time Open		3		3		
Chamber Open		0715		0740		
Chamber Full						
Fill Time						
Start Build Up						
Finish Build Up						
Build Up Time						
Seal Chamber		0719		0756		
Tool Retract	0707	0724	0731	0758		
Total Time				hrs.		
B. SAMPLE PRESSURE						
IHP	4301	4300	4295	4302		psig
ISIP		3754		3755		psig
Initial Flowing Press.		40		20		psig
Final Flowing Press.		40		138		psig
Sampling Press. Range						psig
FSIP						psig
FHP						psig
Form.Press.(Horner)						psig
C. TEMPERATURE						
Depth Tool Reached		2667		m		m
Max. Rec. Temp		88.3		deg C		deg C
Time Circ. Stopped	12.00/27th			hrs.		hrs.
Time since Circ.	19.5			hrs.		hrs.
Form.Temp.(Horner)				deg C		psig
D. SAMPLE RECOVERY						
Surface Pressure				psig		psig
Amt Gas		0.8		cu ft		lit.
Amt Oil				lit		lit.
Amt Water		20.00		lit		lit.
Amt Others (Filtrate)				lit.		lit.
E. SAMPLE PROPERTIES						
Gas Composition						
C1	NOT ENOUGH			ppm		ppm
C2	GAS			ppm		ppm
C3	TO			ppm		ppm
TC4/nC4	MEASURE			ppm		ppm
C5				ppm		ppm
C6+				ppm		ppm
CO2/H2S				ppm		ppm
Oil Properties		API@		deg C	API@	deg C
Colour						
Fluorescence						
GOR						
Water Properties						
Resistivity		.23 ohm-m @ 16		deg C	@	deg C
NaCl Equivalent		30,000		ppm		ppm
Cl-titrated		18,000		ppm		ppm
Tritium	In: 3250 DPM Rec: 3020 DPM					ppm
Est Water Type		Filtrate				
Mud Filtrate Properties						
Resistivity		.210 ohm-m @ 18.5		deg C	ohm@	deg C
NaCl Equivalent		35,000		ppm		ppm
Cl-titrated		18,000		ppm		ppm
Calibration						
Calibration Press.						
Calibration Temp.						
Hewlett Packard No.						
Mud Weight		9.5		ppg		ppg
Calc.Hydrostatic		9.5		ppg		ppg
Chokesize/Probe Type		.030"/Martineau				
REMARKS	Tight				Not opened	

RFT SAMPLE TEST REPORT

Well : Whiptail-1A

OBSERVER : Jeff Roche/Rob Mosely DATE : 28 August 1985 RUN NO. : Nine

	CHAMBER 1 (45.4 lit.)				CHAMBER 2 (10.4 lit.)	
SEAT NO.	9/39	9/40	9/41		9/41	
DEPTH	2665.0	2665.0	2664.5		2664.5	
A. RECORDING TIMES						
Tool Set	1336	1340	1349			
Pretest Open	1336	1340	1349			
Time Open						
Chamber Open			1355		1447	
Chamber Full						
Fill Time						
Start Build Up						
Finish Build Up						
Build Up Time						
Seal Chamber			1443		1506	
Tool Retract	1338	1343			1508	
Total Time			mins.			
B. SAMPLE PRESSURE						
IHP	4341	4344	4342	psia		psia
ISIP	4344	4343	3801		3771	psia
Initial Flowing Press.			33		50	psia
Final Flowing Press.			65		65	psia
Sampling Press. Range						psia
FSIP			3771		3755	psia
FHP					4339	psia
Form.Press.(Horner)						psia
C. TEMPERATURE						
Depth Tool Reached				m		m
Max. Rec. Temp				deg C		deg C
Time Circ. Stopped				hrs.		hrs.
Time since Circ.				hrs.		hrs.
Form.Temp.(Horner)				deg C		psig
D. SAMPLE RECOVERY						
Surface Pressure		0		psig	0	psig
Amt Gas		0.6		cu ft	Trace	cu ft
Amt Oil				lit		lit.
Amt Water		7.30		lit	3.0	lit.
Amt Others (Filtrate)				lit.		lit.
E. SAMPLE PROPERTIES						
Gas Composition						
C1	Insufficient			ppm	147333	ppm
C2	sample			ppm	6028	ppm
C3				ppm	691	ppm
TC4/nC4				ppm	249	ppm
C5				ppm	80	ppm
C6+				ppm	30	ppm
CO2/H2S				ppm	NIL	ppm
Oil Properties		API@		deg C	API@	deg C
Colour						
Fluorescence						
GOR						
Water Properties						
Resistivity		0.265 @	16.5	deg C	0.268 @	16.5 deg C
NaCl Equivalent				ppm		ppm
Cl-titrated		17,500		ppm	18,000	ppm
Tritium	In: 3250 DPM Rec: 2801 DPM				Rec: 2692	DPM
Est Water Type		Filtrate			Filtrate	
Mud Properties						
Resistivity	0.210 ohm-m @ 18.5 deg C				0.210 ohm-m @ 18.5 deg C	
NaCl Equivalent		35,000		ppm		ppm
Cl-titrated		18,000		ppm	18,000	ppm
Calibration						
Calibration Press.						
Calibration Temp.						
Hewlett Packard No.						
Mud Weight		9.5		ppg		ppg
Calc.Hydrostatic		9.6		ppg		ppg
Chokesize/Probe Type		/ Longnose			/ Longnose	
REMARKS	HP Gauge					

APPENDIX 6

APPENDIX 6

APPENDIX 6

Velocity Survey Report

VELOCITY SURVEY REPORT

CONTENTS

ENCLOSURES

1. Schlumberger Seismic Calibration Log; Sonic Drift Curve, Adjusted Continuous Velocity Log and Schlumberger Time-Depth Curve.
2. Schlumberger Raw and Stacked Shots.
3. Schlumberger "Geogram" (Synthetic Seismogram).
4. Esso Time-Depth Curve.

1. MARINE VELOCITY SURVEY SUMMARY

WELL:	WHIPTAIL-1A
TYPE:	Wildcat
BASIN:	Gippsland
LICENCE:	VIC/L1
DATE OF SURVEY:	August 28, 1985.
CONTRACTOR:	Schlumberger
RECORDED BY:	D. J. Dawson (Schlumberger)
WITNESSED BY:	A. G. Barrett (Esso)
WELLHEAD CO-ORDINATES:	38° 19' 30.351" S 147° 31' 9.587" E X = 545,394.04 mE Y = 5,757,971.49 mN
RIG:	Southern Cross
WATER DEPTH:	39.0 m
K.B. ELEVATION:	21.0 m AMSL
D.F. ELEVATION:	20.7 m AMSL
T.D. WHEN SHOT:	2821 m (driller) 2817.5 m (logger)
CASING DEPTHS:	20" @ 182m, 13 3/8" @ 782m
ENERGY SOURCE:	Bolt Airgun, 200 cu. in.
SOURCE DEPTH:	9.1m below MSL
SOURCE OFFSET:	37 m
SOURCE AZIMUTH:	50°
SOURCE SENSOR:	Accelerometer
DOWNHOLE GEOPHONE:	Geospace HS-1
RECORDING INSTRUMENT:	Schlumberger computerised service unit (CSU)

2. FIELD REPORT FROM ESSO REPRESENTATIVE

WHIPTAIL-1A VELOCITY SURVEY

The first shot was attempted at 1756 hrs. It was unsuccessful because of a fatal CPU error. Another shot was tried at 1803 hrs and another fatal error occurred. The engineer then changed the software from version 28.2 (which is the commercial release of the field test version 28.15) and replaced it with version 28.15.

The next shot attempt was also unsuccessful. A tap on the gun air supply was found to be disconnected.

After the next shot, the the engineer noticed that the polarity of the moonpool hydrophone was reversed. This was remedied and the first valid shot was taken at 1829 hrs.

The first seven valid shots were used to determine the gun offset.

A gamma-ray correlation was then run over the interval 1148m to 1175m. It showed that the depth recorder was reading 2m shallow. A correction was made for this discrepancy.

One more valid shot was then fired before another fatal CPU error occurred. At this stage the engineer mounted a new data tape as he thought that this may have been the problem. He also changed to another CPU and reloaded the WST program.

Shots were fired at 1126m on the way to TD to compare with shots fired on the way out. (The latter shots showed a difference of 2.4 msec.)

Another gamma-ray correlation was performed at TD. It showed that no further correction was required.

Again after one valid shot at TD a fatal CPU error occurred. This time the engineer thought the problem may be related to switching between the gamma-ray and WST programs. He referred to the operator's printout for the Snapper-5 WST and found exactly the same problem had occurred. After setting up the WST program yet again the survey proceeded smoothly.

The lowest level of data acquired was at 2815m. Noise at this level did not present a problem. In fact, the hole presented very few noise problems except at the highest level attempted, 200m. Data were acquired at this level but are probably unreliable.

Four shots were recorded at 1530m. All four were of only fair quality, consequently the tool was moved up to 1525m, where three good shots were recorded.

The last shot was fired at 2309 hrs and the tool was out of the hole at 2326 hrs and rigged down at 2330 hrs. The tool zero could not be checked as the drillers were working on the rig compensators as the tool came out of the hole but it is believed that the discrepancy was less than one metre. In all nineteen levels of data were acquired from 104 shots.

Weather conditions at the time of the survey were:

Wind	20 knots	dir 260°
Swell	6 ft	dir 260° period 6s
Wave ht	1 ft	dir 260° period 1s
Current	0.4 knots	dir 080°

Generally overcast.

A. G. Barrett.

2061L/52

1.0 INTRODUCTION

A velocity check shot survey was conducted in the WHIPTAIL #1A well on 28-August-1985. Nineteen levels from 200*metres* to 2815*metres* below DF were shot using an airgun source. Seventeen of these levels have been used in the calibration of the sonic log.

The shot times and calibrated sonic times have been corrected to a nominal Mean Sea Level Datum.

2.0 DATA ACQUISITION

Table 1 : Field Equipment and Survey Paramters

Elevation SRD	Mean Sea Level
Elevation KB	21.0*metres* AMSL
Elevation DF	20.7*metres* AMSL
Elevation GL	−39.0*metres* AMSL
No. of Levels	19
Well Deviation	Nil
Total Depth	2815*metres* below DF
Energy Source	Bolt airgun,200*cu.in.*
Source Offset	37*metres*
Source Depth	9.1*metres* below MSL
Source Azimuth	50°
Reference Sensor	Accelerometer
Sensor Offset	37*metres*
Sensor Depth	9.1*metres* below MSL
Downhole Geophone	Geospace HS-1 High Temp. (350°*F*) Coil Resist. 225Ω ±10 % Natural Freq. 8 − 12*Hz* Sensitivity 0.45*V/in/sec* Maximum tilt angle 60°

Recording was made on the Schlumberger Computerized Service Unit (CSU) using LIS format.

2.1 Survey Details

The survey was shot as a standard offshore velocity survey. A moonpool hydrophone was positioned close to the wellhead and has been used to calculate the gun offset position. No major problems were noted during the survey.

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3.0 CHECK SHOT DATA

A total of 19 check levels were shot during the survey. The stacked data at 200*metres* below DF is distorted by noise, probably due to casing arrivals. After filtering with a 10 - 80*Hz* bandpass filter the first arrival is still significantly distorted and hence has been omitted from the computations and calibration of the sonic log. The stacked data at 1530*metres* below DF is also slightly distorted. This level is very close to the adjacent level at 1525*metres* below DF and hence has also been omitted from the computations and calibration of the sonic log.

The level at 1126*metres* below DF was shot both going into and coming out of the well. Transit times from both sets of data were similar but only the data from the shots shot coming out of the well has been used in the final stack.

A plot of the stacked check shot data is displayed as Plot 7 of the Raw and Stacked Shots.

Table 2

Level Depth (m below DF)	Stacked Shots	Rejected Shots	Quality	Comments
200	4	1	Poor	Distorted / Omitted
390	3	0	Good	
688	3	0	Good	
800	3	3	Good	
967	3	0	Good	
1126	7	8	Good	
1157	4	0	Good	
1203	4	0	Good	
1379	5	2	Good	
1525	3	0	Good	
1530	3	1	Fair	Omitted
1687	4	0	Good	
1867	3	0	Good	
2002	3	1	Good	
2166	3	0	Good	
2312	4	1	Good	
2456	3	0	Good	
2619	3	0	Good	
2815	4	3	Good	

4.0 SONIC CALIBRATION

A 'drift' curve is obtained using the sonic log and the vertical check level times. The term 'drift' is defined as the seismic time (from check shots) minus the sonic time (from integration of edited sonic). Commonly the word 'drift' is used to identify the above difference, or to identify the gradient of drift verses increasing depth, or to identify a difference of drift between two levels.

The gradient of drift, that is the slope of the drift curve, can be negative or positive.

For a negative drift $\frac{\Delta drift}{\Delta depth} < 0$, the sonic time is greater than the seismic time over a certain section of the log.

For a positive drift $\frac{\Delta drift}{\Delta depth} > 0$, the sonic time is less than the seismic time over a certain section of the log.

The drift curve, between two levels, is then an indication of the error on the integrated sonic or an indication of the amount of correction required on the sonic to have the TTI of the corrected sonic match the check shot times.

Two methods of correction to the sonic log are used.

1. **Uniform or block shift** This method applies a uniform correction to all the sonic values over the interval. This uniform correction is applied in the case of positive drift and is the average correction represented by the drift curve gradient expressed in $\mu sec/m$.
2. **ΔT Minimum** In the case of negative drift a second method is used, called Δt minimum. This applies a differential correction to the sonic log, where it is assumed that the greatest amount of transit time error is caused by the lower velocity sections of the log. Over a given interval the method will correct only Δt values which are higher than a threshold, the Δt_{min}. Values of Δt which are lower than the threshold are not corrected. The correction is a reduction of the excess of Δt over Δt_{min}, $\Delta t - \Delta t_{min}$.

   $\Delta t - \Delta t_{min}$ is reduced through multiplication by a reduction coefficient which remains constant over the interval. This reduction coefficient, named G, can be be defined as:

$$G = 1 + \frac{drift}{\int (\Delta t - \Delta t_{min}) dZ}$$

   Where drift is the drift over the interval to be corrected and the value $\int (\Delta t - \Delta t_{min}) dZ$ is the time difference between the integrals of the two curves Δt and Δt_{min}, only over the intervals where $\Delta t > \Delta t_{min}$.

   Hence the corrected sonic: $\Delta t = G(\Delta t - \Delta t_{min}) + \Delta t_{min}$.

5.0 SONIC CALIBRATION PROCESSING

5.1 Open Hole Logs

Both the sonic and density logs used have been edited prior to input into the WST chain.

Density data was only available below 1100*metres* below DF. Above this depth a constant density reading of 2.21*g/cc* has been imposed. The density log has been patched over intervals of borehole washout, notably, 2041 - 2043, 2156 - 2163, 2203 - 2205, 2217 - 2219, 2370 - 2375, 2389 - 2391, 2411 - 2413, 2642 - 2647, 2690 - 2692, 2696.5 - 2698.5, 2713 - 2720 and 2730 - 2735*metres* below DF. A number of smaller zones have also been patched.

Density log interval	:	1100 to 2815*metres* below DF
Sonic log interval	:	183 to 2815*metres* below DF

5.2 Source Offset

The moonpool hydrophone was positioned 4.42*metres* from the wellhead. This hydrophone was recording at each shot and an average transit time from gun to moonpool hydrophone of 22*msec* was measured. Using this time and a water velocity of 1480*m/sec* an offset of 32.56*metres* was calculated between gun and moonpool hydrophone. Hence the offset of the gun from the wellhead was calculated as $32.56 + 4.42 = 36.98$*metres*

5.3 Correction to Datum

Seismic Reference Datum (SRD) is at Mean Sea Level. The airgun was positioned 9.1*metres* below MSL. Using a water velocity of 1480*metres/sec* a correction of 6.15*msecs* has been applied vertically between gun and datum.

5.4 Imposed Shots and Velocity Modelling

Two imposed shots were used in addition to the checkshot data to calibrate the sonic log.

1. Sea floor : depth 59.7*metres* below DF, water velocity 1480*metres/sec*
2. Top sonic : depth 183.03*metres* below DF. The velocities above and below this level were chosen to maintain a linear sonic drift curve from this level down to lower check levels.

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The velocity model used is displayed below. Depths stated are referenced to metres below Derrick Floor and metres below Mean Sea Level respectively.

SRD ——————————— 20.7 / 0.0*metres*

1480*metres/sec*

Seabed ——————————— 59.7 / 39*metres*

1970*metres/sec*

Top of sonic ——————————— 183.03 / 162.33*metres*

5.5 Sonic Calibration Results

The top of the sonic log (183.03*metres* below DF)is chosen as the origin for the calibration drift curve. The drift curve indicates a number of corrections to be made to the sonic log. A list of shifts used on the sonic data is given below. The check level at 1157*metres* below DF is lying 3*msec* off the drift curve. Although the geophone stack for this level is good the drift indicated by this check level has not been followed and instead a more general drift has been applied.

Table 3

Depth Interval (m below DF)	Block Shift $\mu sec/m$	Δt_{min} $\mu sec/m$	Equiv Block Shift $\mu sec/m$
0-183	0	-	0
183-797.3	17.74	-	17.74
797.3-1202	9.39	-	9.39
1202-2234	0.48	-	0.48
2234-2634	-	223.55	-9.00
2634-2815	13.81	-	13.81

The adjusted sonic curve is considered to be the best result using the available data.

6.0 GEOGRAM PROCESSING

Geograms were generated using 20,25,30 and 35*hertz* Ricker wavelets.The presentations include both normal and reverse polarity at 3.75*in/sec.*

Geogram processing produces synthetic seismic traces based on reflection coefficients generated from sonic and density measurements in the well-bore. The steps in the processing chain are the following:

Time to depth conversion
Generate reflection coefficients
Generate attenuation coefficients
Choose a suitable wavelet
Convolution
Output.

6.1 Time to Depth Conversion

Open hole logs are recorded from the bottom to top with a depth index. This data is converted to a two-way time index and flipped to read from the top to bottom in order to match the seismic section.

6.2 Primary Reflection Coefficients

Sonic and density data are averaged over chosen time intervals (normally 2 or 4 *millisecs*). Reflection coefficients are then computed using:

$$R = \frac{\rho_2.\nu_2 - \rho_1.\nu_1}{\rho_2.\nu_2 + \rho_1.\nu_1}$$

where
ρ_1 = density of the layer above the reflection interface
ρ_2 = density of the layer below the reflection interface
ν_1 = compressional wave velocity of the layer above the reflection interface
ν_2 = compressional wave velocity of the layer below the reflection interface

This computation is done for each time interval to generate a set of primary reflection coefficients without transmission losses.

6.3 Primaries with Transmission Loss

Transmission loss on two-way attenuation coefficients are computed using:

$$A_n = (1 - R_1^2).(1 - R_2^2).(1 - R_3^2)...(1 - R_n^2)$$

A set of primary reflection coefficients with transmission loss is generated using:

$$Primary_n = R_n.A_{n-1}$$

6.4 Primaries plus Multiples

Multiples are computed from these input reflection coefficients using the transform technique from the top of the well to obtain the impulse response of the earth. The transform outputs primaries plus multiples.

6.5 Multiples Only

By subtracting previously calculated primaries from the above result we obtain multiples only.

6.6 Wavelet

A theoretical wavelet is chosen to use for convolution with the reflection coefficients previously generated. Choices available include:

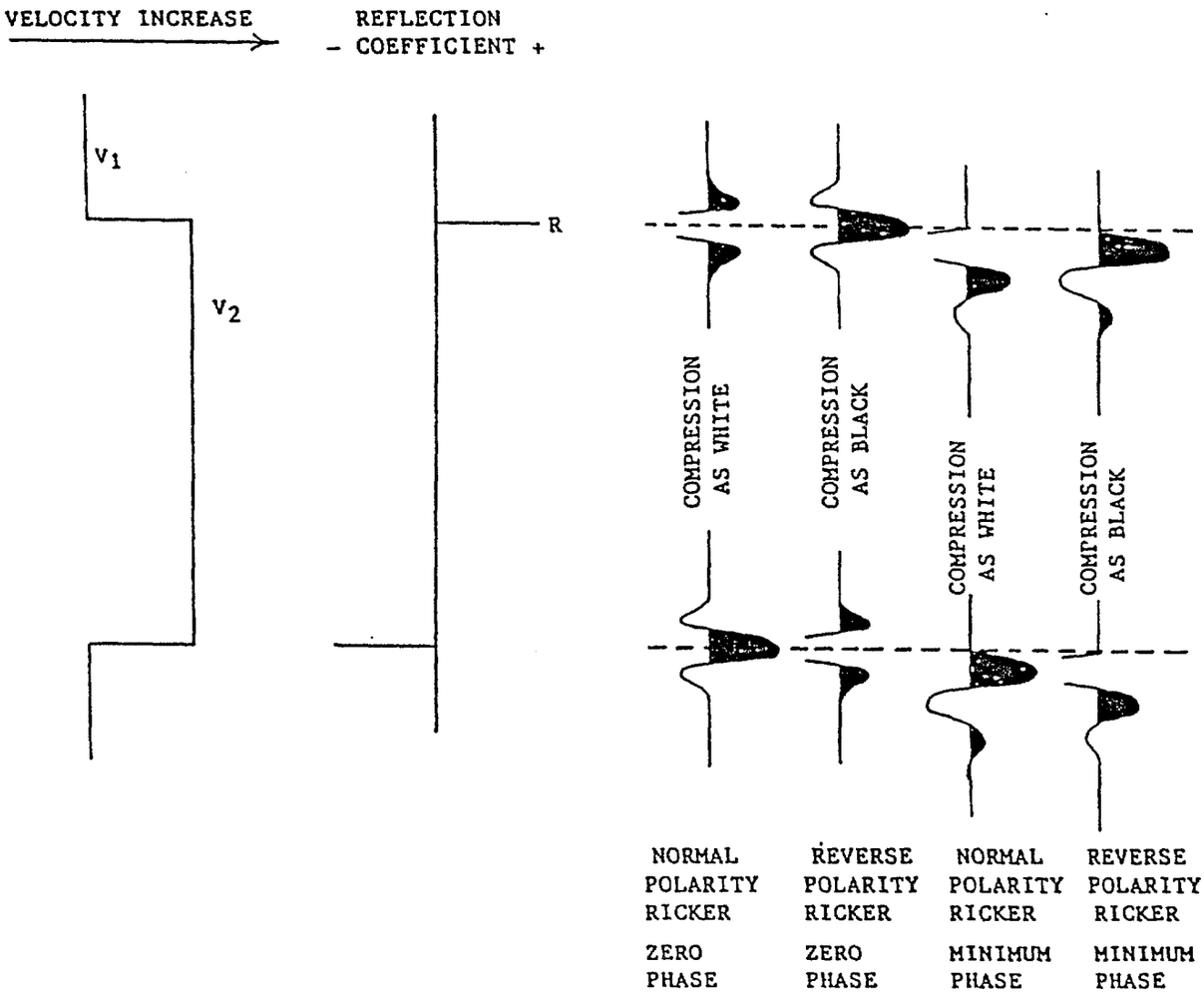
Klauder wavelet
Ricker zero phase wavelet
Ricker minimum phase wavelet
User defined wavelet.

All wavelets can be chosen with or without butterworth filtering and with user defined centre frequencies. Polarity conventions are shown in Figure 1. These Geograms were generated using zero and minimum phase ricker wavelets.

6.7 Convolution

Standard procedure of convolution of wavelet with reflection coefficients. The output is the synthetic seismogram.

SCHLUMBERGER WAVELET POLARITY CONVENTION



NOTE: WAVELET DISPLAYED UNDER GEOGRAMS ARE FOR A REFLECTION COEFFICIENT OF -0.5

FIGURE 1

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Schlumberger

WELL SEISMIC SERVICE FIELD REPORT

COMPANY	WELL	DATE	LOCATION	ENGINEER	WITNESSED BY
ESSO AUST.	WHIPTAIL#1A	28/8/85	VEA	DAWSON	BARRETT

FT ☐ METRES ☒ | JACK UP ☐ SHIP ☐ PLATFORM ☐ SEMI-SUB ☒ | WEATHER:

SCHLUMBERGER ZERO	DRILL FLOOR	AT ELEVATION	20.7m	RELATIVE TO MEAN SEA LEVEL (M.S.L.)
LOG MEASURED FROM	DF	AT ELEVATION	0 m	RELATIVE TO SCHLUMBERGER ZERO
DRILLING MEASURED FROM	DF	AT ELEVATION	0 m	RELATIVE TO SCHLUMBERGER ZERO

SOURCE

GUN TYPE WATER ☐ AIR ☒
VOLUME 1 x 200 CU INCHES
PRESSURE 120 BARS
VIBRATOR TYPE
SWEEP LENGTH SECONDS
FROM HZ TO HZ

TIDEL INFORMATION DISTANCE HOUR DATE

TIDE LEVEL TO M.S.L.
(RECORD IF LEVEL VARIES MORE THAN 2 METRES DURING SURVEY)

CSU SOFTWARE VERSION: | MAX. HOLE DEV: 0° AZIM:

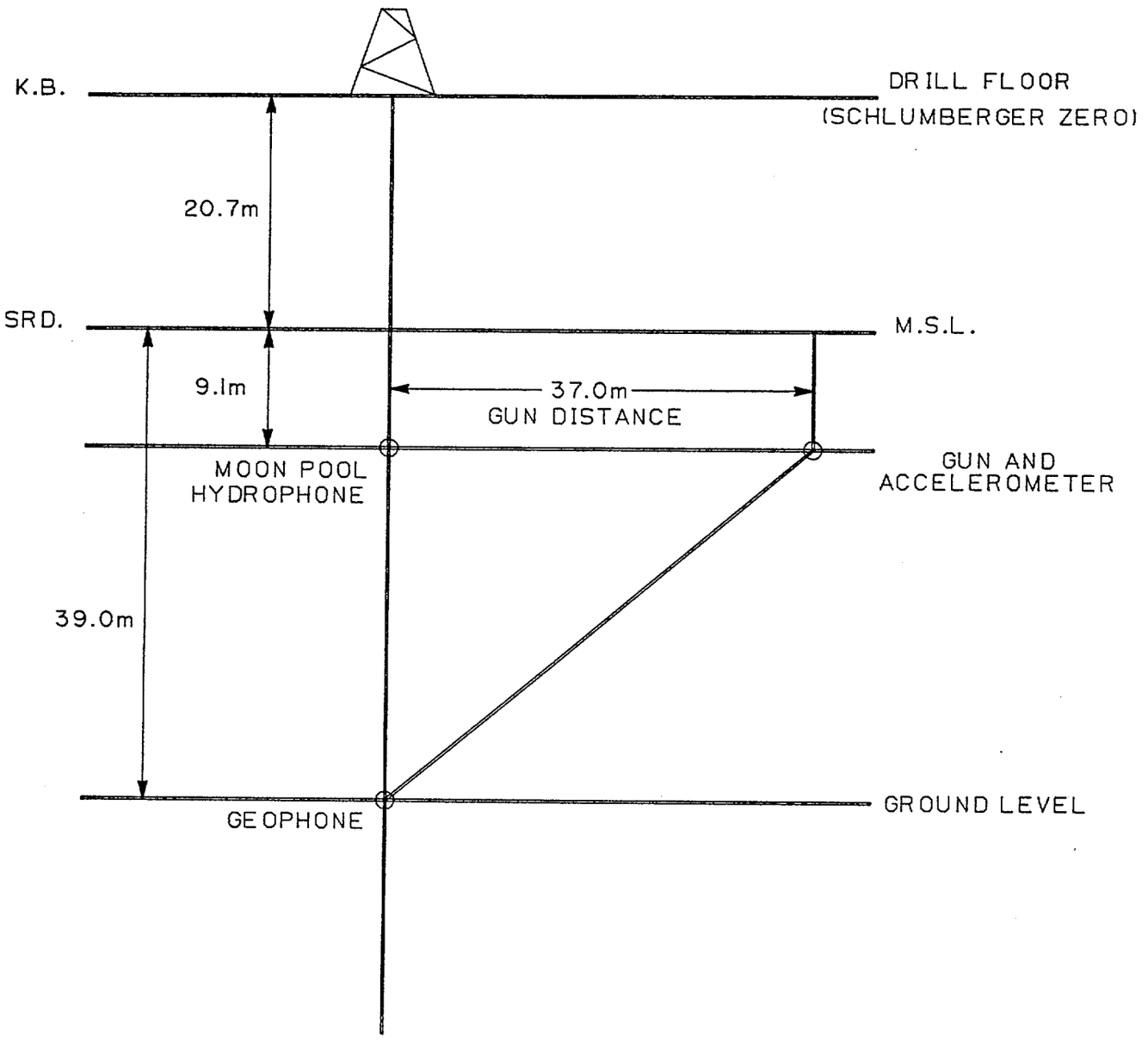
NOTE: SHOTS HIGHLY RECOMMENDED AT TD, TOP EACH SONIC, ABOVE AND BELOW BAD HOLE INTERVALS

UNCORRECTED RESULTS Quality: G = Good, P = Poor, U = Unsatisfactory

SHOT NO.	DEPTH	GUN PRESSURE	FILTERS	TRANSIT TIME	HOUR SHOT	FILE	STACK	STACKED SHOTS	QUALITY / REMARKS
	29.8 m		OFF	24.8	18:36		1	8,9,10	
	1126		OFF	464.0	19:35		1	1,2,5	
	2815		OFF	939.3	20:47	16	1	4,5,6	
	2619		OFF	891.4	21:05	16	2	7,8,9	
	2456		OFF	851.4	21:20	16	3	10,11,12	
	2312		OFF	817.5	21:30	16	4	14,16,17	
	2166		OFF	781.2	21:38	16	5	18,19,20	
	2002		OFF	737.0	21:45	16	6	22 - 24	
	1867		OFF	702.2	21:49	16	7	25 - 27	
	1687		OFF	651.0	21:54	16	8	28,30,31	
	1525		OFF	604.9	22:05	16	9	36 - 38	
	1379		OFF	557.2	22:11	16	10	39,40,45	
	1203		OFF	494.6	22:16	16	11	47 - 49	
	1157		OFF	476.5	22:24	16	12	50, 51,53	
	1126		OFF	466.4	22:30	16	13	55,56,58,59	
	1126		OFF	466.4	22:33	16	14	60,62,63	
	967		OFF	400.4	22:39	16	15	64,65,66	
	800		OFF	329.5	22:47	16	16	70 - 72	
	688		OFF	289.9	22:52	16	17	73 - 75	
	390		OFF	175.4	22:58	16	18	76 - 78	
	200		OFF	61.6	23:13	16	19	80, 81,83	

5. GUN GEOMETRY SKETCH

WHIPTAIL-1A



DWG. 2310/OP/3

6. CHECK SHOT DATA - OBSERVED AND CORRECTED

LEVEL NUMBER	MEASUR DEPTH FROM DF M	VERTIC DEPTH FROM SRD M	VERTIC DEPTH FROM GL M	OBSERV TRAVEL TIME HYD/GEO MS	VERTIC TRAVEL TIME SRC/GEO MS	VERTIC TRAVEL TIME SRD/GEO MS	AVERAGE VELOC SRD/GEO M/S	DELTA DEPTH BETWEEN SHOTS M	DELTA TIME BETWEEN SHOTS MS	INTERV VELOC BETWEEN SHOTS M/S
1	59,70	39,00	0	32,14	20,20	26,35	1480			
								123,33	62,62	1970
2	183,03	162,33	123,33	85,20	82,82	88,97	1825			
								206,97	91,26	2268
3	390,00	369,30	330,30	175,00	174,08	180,23	2049			
								298,00	113,46	2626
4	688,00	667,30	628,30	288,00	287,55	293,69	2272			
								112,00	40,08	2795
5	800,00	779,30	740,30	328,00	327,62	333,77	2335			
								167,00	70,07	2383
6	967,00	946,30	907,30	398,00	397,69	403,84	2343			
								159,00	67,05	2372
7	1126,00	1105,30	1066,30	465,00	464,74	470,88	2347			
								31,00	10,01	3097
8	1157,00	1136,30	1097,30	475,00	474,74	480,89	2363			
								46,00	18,01	2554
9	1203,00	1182,30	1143,30	493,00	492,76	498,90	2370			
								176,00	63,04	2792
10	1379,00	1358,30	1319,30	556,00	555,79	561,94	2417			
								146,00	46,02	3172
11	1525,00	1504,30	1465,30	602,00	601,82	607,96	2474			
								162,00	47,02	3445
12	1687,00	1666,30	1627,30	649,00	648,84	654,99	2544			
								180,00	51,02	3528
13	1867,00	1846,30	1807,30	700,00	699,86	706,01	2615			
								135,00	35,01	3856
14	2002,00	1981,30	1942,30	735,00	734,87	741,02	2674			
								164,00	42,01	3904
15	2166,00	2145,30	2106,30	777,00	776,88	783,03	2740			
								146,00	37,01	3945
16	2312,00	2291,30	2252,30	814,00	813,89	820,04	2794			
								144,00	34,01	4234
17	2456,00	2435,30	2396,30	848,00	847,90	854,05	2851			
								163,00	40,01	4074
18	2619,00	2598,30	2559,30	888,00	887,91	894,06	2906			
								196,00	50,01	3919
19	2815,00	2794,30	2755,30	938,00	937,92	944,07	2960			

PE601140

This is an enclosure indicator page.
The enclosure PE601140 is enclosed within the container PE902377 at this location in this document.

The enclosure PE601140 has the following characteristics:

ITEM_BARCODE	= PE601140
CONTAINER_BARCODE	= PE902377
NAME	= Seismic Calibration Log
BASIN	= GIPPSLAND
PERMIT	= VIC/L1
TYPE	= WELL
SUBTYPE	= VELOCITY_CHART
DESCRIPTION	= Seismic Calibration Log, Adjusted Continuous Velocity Log, CPI, (enclosure from WCR vol.1) for Whiptail-1
REMARKS	=
DATE_CREATED	= 11/10/85
DATE_RECEIVED	= 27/03/86
W_NO	= W915
WELL_NAME	= Whiptail-1A
CONTRACTOR	= SCHLUMBERGER
CLIENT_OP_CO	= ESSO AUSTRALIA LTD

(Inserted by DNRE - Vic Govt Mines Dept)

PE601141

This is an enclosure indicator page.
The enclosure PE601141 is enclosed within the container PE902377 at this location in this document.

The enclosure PE601141 has the following characteristics:

ITEM_BARCODE	= PE601141
CONTAINER_BARCODE	= PE902377
NAME	= Seismic Calibration Log
BASIN	= GIPPSLAND
PERMIT	= VIC/L1
TYPE	= WELL
SUBTYPE	= VELOCITY_CHART
DESCRIPTION	= Seismic Calibration Log, Adjusted continuous data, Perth Computing Centre, (enclosure from WCR vol.1) for Whiptail-1
REMARKS	=
DATE_CREATED	= 7/09/85
DATE_RECEIVED	= 27/03/86
W_NO	= W915
WELL_NAME	= Whiptail-1A
CONTRACTOR	= SCHLUMBERGER
CLIENT_OP_CO	= ESSO AUSTRALIA LTD

(Inserted by DNRE - Vic Govt Mines Dept)

PE902378

This is an enclosure indicator page.
The enclosure PE902378 is enclosed within the container PE902377 at this location in this document.

The enclosure PE902378 has the following characteristics:

ITEM_BARCODE	PE902378
CONTAINER_BARCODE	PE902377
NAME	Raw and Stacked Shots - Velocity check shot survey
BASIN	GIPPSLAND
PERMIT	VIC/L1
TYPE	WELL
SUBTYPE	VELOCITY_CHART
DESCRIPTION	Raw and Stacked Shots - Velocity check shot survey (enclosure from WCR vol.1) for Whiptail-1
REMARKS	
DATE_CREATED	11/10/85
DATE_RECEIVED	27/03/86
W_NO	W915
WELL_NAME	Whiptail-1A
CONTRACTOR	SCHLUMBERGER
CLIENT_OP_CO	ESSO AUSTRALIA LTD

(Inserted by DNRE - Vic Govt Mines Dept)

PE902379

This is an enclosure indicator page.
The enclosure PE902379 is enclosed within the container PE902377 at this location in this document.

The enclosure PE902379 has the following characteristics:

ITEM_BARCODE	= PE902379
CONTAINER_BARCODE	= PE902377
NAME	= Synthetic Seismogram - Geogram
BASIN	= GIPPSLAND
PERMIT	= VIC/L1
TYPE	= WELL
SUBTYPE	= SYNTH_SEISMOGRAM
DESCRIPTION	= Synthetic Seismogram - Geogram (enclosure from WCR vol.1) for Whiptail-1
REMARKS	=
DATE_CREATED	= 7/09/85
DATE_RECEIVED	= 27/03/86
W_NO	= W915
WELL_NAME	= Whiptail-1A
CONTRACTOR	= SCHLUMBERGER
CLIENT_OP_CO	= ESSO AUSTRALIA LTD

(Inserted by DNRE - Vic Govt Mines Dept)

PE902380

This is an enclosure indicator page.
The enclosure PE902380 is enclosed within the container PE902377 at this location in this document.

The enclosure PE902380 has the following characteristics:

ITEM_BARCODE	= PE902380
CONTAINER_BARCODE	= PE902377
NAME	= Time Depth Curve
BASIN	= GIPPSLAND
PERMIT	= VIC/L1
TYPE	= WELL
SUBTYPE	= VELOCITY_CHART
DESCRIPTION	= Time Depth Curve (enclosure from WCR vol.1) for Whiptail-1
REMARKS	=
DATE_CREATED	= 28/08/85
DATE_RECEIVED	= 27/03/86
W_NO	= W915
WELL_NAME	= Whiptail-1A
CONTRACTOR	=
CLIENT_OP_CO	= ESSO EXPLORATION AND PRODUCTION AUSTRALIA LTD

(Inserted by DNRE - Vic Govt Mines Dept)