

WCR VOL 1

SNAPPER-6

**ESSO EXPLORATION AND PRODUCTION
AUSTRALIA INC.**

PETROLEUM DIVISION

WELL COMPLETION REPORT

SNAPPER-6

VOLUME 1

04 FEB 1987

GIPPSLAND BASIN

VICTORIA

ESSO AUSTRALIA LIMITED

Compiled by: P.GLENTON

JANUARY 1987

SNAPPER-6
WELL COMPLETION REPORT
VOLUME 1

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ESSO AUSTRALIA LTD

COMPLETION REPORT

WELL : SNAPPER-6

LOCATION : Latitude : 38° 13' 55.87" S
Longitude : 148° 00' 41.89" E
X = 588,539.6m E
Y = 5,767,924.5m N
Map Projection: UTM AMG ZONE 55 CM 147° E
Geographical Location: Bass Strait Victoria
Field: Snapper

PERMIT : VIC/L10

ELEVATION : 21m KB

WATER DEPTH : 55m

TOTAL DEPTH : 3021m KB (3000m SS)

PLUG BACK TYPE : Cement

REASONS FOR PLUGGING BACK : Plugged and abandoned

MOVE IN : 24th December, 1985

SPUDED : 22:30 hrs, 24th December, 1985

REACHED T.D. : 11th January, 1986

RIG RELEASED : 1600 hrs, 21st January, 1986

OPERATOR : Esso Exploration and Production Australia Inc.

PERMITTEE OR LICENCEE : BHP Petroleum Pty Ltd

ESSO INTEREST : 50%

OTHER INTEREST : 50%

CONTRACTOR : South Seas Drilling Company

RIG NAME : Southern Cross

EQUIPMENT TYPE : Semi Submersible

TOTAL RIG DAYS : 29 days

DRILLING AFE NO. : 235017

TYPE COMPLETION : Plugged and Abandoned

WELL CLASSIFICATION : Before Drilling Extension/Deeper Pool Test
After Drilling Extension Well/Minor
Hydrocarbon in Deeper Pool
Test.

31381/42

SNAPPER 6 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	CC	12.90		193	Float Shoe Joint
20	94	X-52	CC	97.04	Across Collars on First Five Joints		8 Joints
24	670		CC	10.20			Wellhead Pile Joint No EP7
13-3/8	54.5	K-55	Butt.	12.49		793	Float Shoe Joint
13-3/8	54.5	K-55	Butt.	12.46			Float Collar Joint
13-3/8	54.5	K-55	Butt.	680.05	Across Collars on First Six Joints		57 Joints
13-3/8	54.5	K-55	Butt.	12.21			Hanger Joint. Hgr. No EHW35. Seal Ass'y. No ESW31.

SNAPPER 6 CEMENT DATA

CEMENT JOB TYPE	CEMENT TOP mRKB	CEMENT BTM mRKB	CEMENT ADDITIVES	CEMENT VOLUME SXS	CEMENT WEIGHT PPG	REMARKS
20" Csg.	76	117	2.2% gel w/ 173 bbls seawater	750	13.3	Lead slurry. Divers confirm cmt returns.
20" Csg.	117	189	42 bbls seawater	350	15.8	Tail slurry. Displace w/ 16 bbls . Float held.
13-3/8" Csg.	295	767	125 bbls seawater	1,050	15.8	Displace w/356 bbls.Did not bump plug. Floats held.
P&A Plug No. 1	2,870	3,021	43bbls Freshwater & 24 gal HR6L	360	15.8	Displace w/162bbls of mud.
P&A Plug No. 2	2,720	2,870	43bbls Freshwater & 24 gal HR6L	360	15.8	Displace w/153bbls of mud.
P&A Plug No. 3	2,570	2,720	42bbls Freshwater & 21 gal HR6L	350	15.8	Displace w/145bbls of mud.
P&A Plug No. 4	2,350	2,500	42bbls Freshwater & 19 gal HR6L	350	15.8	Displace w/129bbls of mud.
P&A Plug No. 5	1,900	1,980	24.5bbls Freshwater & 8 gal	205	15.7	Displace w/103bbls of mud.
P&A Plug No. 6	1,284	1,445	58bbls Freshwater.	485	15.8	Displace w/68bbls of mud. Tagged @1284m w/15 Kips.
P&A Plug No. 7	1,210	1,285	27bbls Freshwater.	225.	15.8	Displace w/64bbls of mud.

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

SNAPPER 6 CEMENT DATA

CEMENT JOB TYPE	CEMENT TOP mRKB	CEMENT BTM mRKB	CEMENT ADDITIVES	CEMENT VOLUME sxs	CEMENT WEIGHT ppg	REMARKS
P&A Plug No. 8	732	843	30bbls Seawater.	300	15.8	Displace w/37bbls of mud. Tagged @ 732m. Pressure tested to 1500 psi.
P&A Plug No. 9	115	215	56bbls Seawater.	470	15.8	Pressure tested to 500 psi.

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

OPERATIONS SUMMARY

SNAPPER-6

Moving/Mooring

The Southern Cross departed the Angelfish-1 location at 2200 hours on December 23, 1985 and arrived on the Snapper-6 location at 0630 hours on December 24, 1986. The 16 nautical mile tow was completed in 8.5 hours at an average speed of 2 knots.

Anchor No. 8 was dropped by the rig on approach to the location. The remaining seven anchors were run by the Torrens Tide, Swan Tide and Lady Sally. All anchors were run in 6.5 hours and pretensioned to 200 kips.

The final rig location was:

Latitude	:	38° 13' 55.87" S
Longitude	:	148° 00' 41.89" E
X	=	588,540m E
Y	=	5,767,925m N

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

The rig was located 5.24m at 061° from the called location and 40 km south of Lakes Entrance, Victoria.

Drill 26" Hole for 20" Casing

The drilling template was run and landed at a seafloor depth of 76m. The 26" hole was drilled to 211m using seawater and high viscosity gel slugs to clean the hole. A wiper trip was made to the seafloor and the hole was displaced with 350 bbls of high viscosity gel mud. A 50 bbl hi-vis pill was spotted at 90m prior to pulling out to run 20" casing.

The 20" casing was run and cemented with the casing shoe at 193m. The BOP stack was run and the collet connector and casing were tested to 500 psi against the shear rams.

Drill 17-1/2" Hole for 13-3/8" Casing

The cement and casing shoe were drilled out and the 17-1/2" hole drilled to 808m using a seawater/gel mud system. A wiper trip was made to the 20" casing shoe and the hole was circulated clean.

An attempt was made to run a sonic log, but the tool would not pass below 704m. The long spaced sonic sonde was replaced with a short spaced sonde, but the tool would not pass below 774m. The sonic log was run from 774m to 193m.

A wiper trip washed and reamed through a bridge at 698m. Tight hole was also encountered from 764m to 808m.

The 13-3/8" casing was run and cemented with the shoe at 793m. The plug was not bumped but the floats held. The wellhead was washed and the seal assembly was run and tested to 200/5000 psi.

Drill 12-1/4" Hole to 3021m

The excess cement, float collar, cement and float shoe were drilled out and the rat hole was cleaned out to 808m. Six metres of new hole were drilled and a Phase II PIT was run to leak off at 650 psi, indicating an integrity of 14.2 ppg EMW at the 13-3/8" casing shoe.

The 12-1/4" hole was drilled to the programmed TD of 3021m with a 9.5 ppg gel/polymer mud. No significant problems were encountered. While drilling ahead at 2109m, the rig's AWU members withdrew their labour. The bit was pulled into the 13-3/8" shoe, where an open hole PIT was conducted to a leakoff of 12.64 ppg EMW at the shoe. By this time, the rig crews had elected to return to work, so the bit trip was completed and drilling resumed. No time was lost due to the AWU walkout.

The DLL/MSFL/LDL/CNL/GR/AMS/SP combination log, along with RFT's, DDBHC-GR, WST's and CST's were run at TD.

Plug and Abandonment

A cementing diverter tool run on 5" drillpipe set Plugs No. 1 - 6 at 3023m to 2870m, 2870 - 2720m, 2720 - 2570m, 2500 - 2350m, 1980 - 1900m and 1445 - 1284m, respectively. These plugs were required to cover hydrocarbon zones over each interval. Plug No. 6 was tagged at 1284m. Bottoms up was circulated with gas readings of 5-110-10 recorded. Due to the high gas readings, Plug No. 7 was set from 1285 - 1210m.

Plug No. 8 was set across the 13-3/8" casing shoe from 843 - 732m. After tagging the plug with a gauge ring and junk basket, the plug was pressure tested to 1500 psi.

A 13-3/8" EZSV bridge plug was set at 680m and a Pengo cutter severed the 13-3/8" casing at 180m. The casing was recovered with a casing spear. Plug No. 9 was set across the casing stub from 215 - 115m and pressure tested to 500 psi.

The BOP stack was pulled and the 20" casing was cut at 88m. The wellhead/pile joint and 4 post guidebase were recovered with the wellhead running tool. The mousetrap slings again failed to engage and the drilling template was recovered using the "J" slot running tool.

Pull Anchors

After a 1.4 day delay due to waiting on weather and a 1.0 day delay due to an AWU mass meeting, all anchors were recovered in 13 hours by the workboats Lady Sally, Swan Tide and Torrens Tide.

The rig departed Snapper-6 at 1600 hours January 1986 enroute to the Mackerel-1 (wellhead recovery) location using the Lady Sally as the towboat.

WELL: SNAPPER-6

WIRELINE LOGS AND SURVEYS

<u>Type and Scale</u>		<u>From</u>	<u>To</u>
<u>Suite 1</u>			
BHC-GR-CAL	1:200 1:500	765-194m	
DIT-GR-CAL	1:200	774.8-194m	
<u>Suite 2</u>			
DLTE-MSFL-GR-SP) 1:200) 1:500)) COMBINATION TOOL)	3012.5-794.2m	
LDTG-CNTH-GR-AMS) 1:200) 1:500	3005.7-1290m	
DDBHC-GR) 1:200) 1:500)) COMBINATION TOOL)	2991.5-794.2m	
DIT-GR-CAL) 1:200	3003.0-794.2m	
RFT-HP (Pretest and sample record) Runs 1-5			
RFT-GR (Pretest and sample record) Runs 1-5			
WST-GR Shot 12 levels			
RFT-HP (Pretest and sample record) Run 6			
RFT-GR (Pretest and sample record) Run 6			
CST-GR	1:200	2998-1325m	
(SHOT 60, RECOVERED 54)			

SUMMARY OF WIRELINE FORMATION TEST PROGRAMME - SNAPPER-6

TEST & SEAT NO.	DEPTH (METRES) K.B.	CHAMBER	RECOVERY (LITRES)				HEWLETT-PACKARD FORMATION PRESSURE		HEWLETT-PACKARD HYDROSTATIC PRESSURE		REMARKS	
			OIL Litres	COND. Litres	GAS Litres m ³	FORMATION WATER Litres	MUD FILTRATE Litres	MPaa	Psia	MPaa		Psia
1/1	2952.5	Pretest						30.82	4469.8	32.82	4760.0	Valid
1/2	2936.8	Pretest						-	-	32.64	4734.5	Aborted. Tight.
1/3	2936.0	Pretest						-	-	32.64	4734.4	Aborted. Seal Failure.
1/4	2937.0	Pretest						-	-	32.66	4736.5	Tight/Seal Failure.
1/5	2937.0	Pretest						-	-	32.66	4736.5	Tight/Seal Failure.
1/6	2885.8	Pretest						30.82	4470.5	32.04	4647.5	?Supercharged.
1/7	2866.0	Pretest						-	-	31.85	4619.4	Aborted/Decreasing Fm Pressure.
1/8	2866.0	Pretest						29.33	4254.0	31.84	4618.4	Valid
1/9	2885.8	Pretest						-	-	32.08	4653.5	Abort. ?Blocked Probe
1/10	2885.8	Pretest						-	-	32.08	4652.8	Abort. Not Valid.
1/11	2885.0	Pretest						30.83	4471.8	32.06	4650.6	Valid. ?Supercharged.
1/12	2974.0	Pretest						32.94	4778.0	32.97	4781.4	Valid?
1/13	2974.0	Pretest						32.94	4778.1	32.97	4782.2	Valid. ?Supercharged/
1/14	2890.5	Pretest						30.58	4435.3	32.08	4653.1	Valid.
1/15	2854.5	Pretest						29.90	4336.3	31.61	4584.8	Valid. Poss.supercharged
1/16	2847.0	Pretest						-	-	31.61	4583.1	Valid/Tight
1/17	2846.0	Pretest						29.39	4263.0	31.62	4585.6	Valid/Tight
1/18	2827.0	Pretest						-	-	31.39	4552.6	Very tight
1/19	2826.5	Pretest						-	-	31.40	4553.6	Very tight
1/20	2818.0	Pretest						28.54	4138.9	31.32	4543.1	Valid
1/21	2811.0	Pretest						29.03	4210.5	31.23	4529.5	Valid
1/22	2773.4	Pretest						-	-	30.81	4468.1	Very tight. Aborted.
1/23	2774.4	Pretest						30.77	4463.0	30.84	4472.5	Valid. Supercharged.
1/24	2705.4	Pretest						27.27	3954.9	30.08	4362.7	Tight/Valid.
1/25	2695.0	Pretest						-	-	30.00	4351.3	Very tight/aborted
1/26	2695.5	Pretest						-	-	30.02	4353.5	Seal Failure
1/27	2695.5	Pretest						-	-	30.01	4353.1	Seal Failure
1/28	2695.3	Pretest						-	-	30.01	4352.1	Seal Failure
1/29	2695.3	Pretest						-	-	30.01	4352.3	Seal Failure
1/30	2691.5	Pretest						26.73	3877.1	29.97	4346.2	Valid test

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			OIL	COND.	GAS	FORMATION WATER	MUD FILTRATE	MPaa	Psla	MPaa		Psla
1/31	2660.0	Pretest						26.23	3803.8	29.62	4295.5	Valid
1/32	2654.5	Pretest						26.20	3800.5	29.43	4290.0	Valid
1/33	2640.5	Pretest						27.02	3934.8*	29.31	4267.8	Tight/Supercharged. *Unstabilised.
1/34	2640.5	Pretest						27.02	3935.5*	29.31	4267.9	Tight/Supercharged. *Unstabilised.
1/35	2640.2	Pretest						27.13	3934.7	29.44	4269.5	Tight/Supercharged.
1/36	2602.0	Pretest						25.62	3715.3	29.00	4206.0	Valid
1/37	2598.0	Pretest						25.57	3708.7	28.95	4199.5	Valid
1/38	2584.5	Pretest						25.43	3688.7	28.81	4178.0	Valid
1/39	2557.5	Pretest						25.18	3652.7	28.52	4136.6	Valid
1/40	2546.0	Pretest						25.06	3635.1	28.39	4117.1	Valid
1/41	2484.8	Pretest						-	-	27.74	4023.1	Seal failure
1/42	2484.8	Pretest						24.47	3549.4	27.74	4023.1	Valid
1/43	2454.0	Pretest						-	-	27.63	3972.5	Very tight
1/44	2453.8	Pretest						24.17	3505.1	27.39	3972.1	Valid
1/45	2435.0	Pretest						24.03	3484.7	27.17	3941.1	Tight. Valid
1/46	2417.0	Pretest						23.91	3467.9	26.99	3915.1	Valid. Supercharged.
1/47	2774.5	Pretest						<u>MPag</u> 30.70	<u>Psig</u> 4453	<u>MPag</u> 30.79	<u>Psig</u> 4465	Valid. Supercharged. Strain gauge only. Temp. re-calibrated
1/48	2974.0	Pretest						32.92	4774	32.95	4779	Strain gauge only. Valid.
1/49	2408.5	Pretest						<u>MPaa</u> -	<u>Psla</u> -	<u>MPaa</u> 26.90	<u>Psla</u> 3904.3	Tight then seal failure.
1/50	2408.5	Pretest						-	-	26.90	3901.3	Very tight. Aborted.
1/51	2408.3	Pretest						36.47	3839.2*	26.90	3904.3	*Unstabilised. Supercharged.
1/52	2392.5	Pretest						23.48	3405.2	26.72	3875.4	Valid
1/53	2374.5	Pretest						-	-	26.52	3846.7	Very tight. Aborted.
1/54	2374.3	Pretest						23.41	3394.7	26.52	3846.8	Valid
1/55	2342.5	Pretest						23.05	3342.7	26.48	3796.8	Valid

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TEST & SEAT NO.	DEPTH (METRES) K.B.	CHAMBER	RECOVERY (LITRES)				HEWLETT-PACKARD FORMATION PRESSURE		HEWLETT-PACKARD HYDROSTATIC PRESSURE		REMARKS		
			OIL	COND.	GAS	FORMATION WATER	MUD FILTRATE	MPaa	Psla	MPaa		Psla	
													Litres
1/56	2290.5	Pretest						22.6	3277.6	25.60	3713.2	Valid	
1/57	2251.0	Pretest						22.19	3218.6	25.17	3651.0	Valid	
1/58*	2143.5	Pretest						21.09	3058.9	24.01	3481.8	Valid (*calibrated)	
1/59	2101.5	Pretest						20.75	3009.9	23.53	3413.2	Valid	
1/60	2051.0	Pretest						20.26	2938.5	22.96	3330.0	Valid	
1/61	2000.0	Pretest						19.57	2838.9	22.39	3247.7	Valid	
1/62	1948.0	Pretest						-	-	21.84	3167.6	Very tight. Aborted	
1/63	1947.5	Pretest						19.13	2774.8	21.85	3168.7	Valid	
1/64	1941.8	Pretest						19.12	2773.3	21.78	3159.2	Valid	
1/65	1920.5	Pretest						18.78	2724.2	21.54	3123.6	Valid.	
1/66	1899.0	Pretest						18.70	2712.5	21.30	3089.5	Valid.	
1/67	1873.0	Pretest						18.18	2636.3	21.02	3048.1	Valid	
1/68	1856.0	Pretest						18.00	2610.8	20.83	3020.6	Valid	
1/69	1829.6	Pretest						17.79	2580.1	20.54	2979.1	Valid	
1/70	1790.8	Pretest						-	-	20.11	2917.1	Very tight. Aborted.	
1/71	1790.6	Pretest						-	-	20.12	2917.7	Very tight. Aborted.	
1/72	1768.1	Pretest						17.11	2481.6	19.86	2879.9	Valid	
1/73	1747.8	Pretest						16.95	2459.0	19.63	2847.1	Valid	
1/74	1731.5	Pretest						16.77	2432.7	19.45	2821.4	Valid	
1/75	1728.3	Pretest						16.74	2427.7	19.42	2816.7	Valid	
1/76	1717.0	Pretest						16.63	2412.0	19.29	2797.2	Valid	
								<u>MPag</u>	<u>Pslg</u>	<u>MPag</u>	<u>Pslg</u>		
2/77	2818.0	45.44	-	0.75	1.6	-	34.0	28.44	4125	31.28	4537.0	Valid; Good P.T. Pressure in Pslg. Sample Taken. Sample Preserved	
								-	-	-	-		
								<u>MPaa</u>	<u>Psla</u>	<u>MPaa</u>	<u>Psla</u>		
3/78	1372.0	Pretest						-	-	15.75	2284.3	Aborted - length of time to stabilise	
3/79	1372.0	Pretest						14.90	2161	15.76	2285.5	Aborted. Supercharged. Length of time to stabilize.	
3/80	1389.0	Pretest						13.60	1973	15.97	2315.6	Supercharged. Pressure too high.	

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TEST & SEAT NO.	DEPTH (METRES) K.B.	CHAMBER	RECOVERY (LITRES)				FORMATION WATER	MUD FILTRATE	HEWLETT-PACKARD FORMATION PRESSURE		HEWLETT-PACKARD HYDROSTATIC PRESSURE		REMARKS
			OIL	COND.	GAS				MPaa	Psia	MPaa	Psia	
			Litres	Litres	Litres	m ³	Litres	Litres					
3/81	1372.5	Pretest							15.94	2307	15.77	2287.6	Aborted. Supercharged. Pressure increased from hydrostatic when set
3/82	1372.5	Pretest							16.04	2326.0	15.77	2287.6	Aborted - as above. Supercharged.
3/83	1369.0	Pretest							13.56	1966.7	15.73	2281.8	Supercharged.
3/84	1402.0	Pretest							13.60	1971.9	16.12	2338.1	Valid
3/85	1401.0	Pretest							13.60	1972.1	16.11	2336.2	Aborted. Not stabilized. Pressure too low.
3/86	1399.0	Pretest							13.59	1971.4	16.08	2332.8	Valid
3/87	1405.0	Pretest							13.61	1973.4	16.15	2342.8	Valid
3/88	1422.0	Pretest							13.91	2017.0	16.35	2371.6	Supercharged.
3/89	1438.0	Pretest							13.90	2016.4	16.54	2398.8	Valid
3/90	1453.0	Pretest							14.06	2039.1	16.72	2424.6	Valid
3/91	1422.0	Pretest							-	-	16.34	2370.5	Aborted. Pressure too high.
3/92	1418.0	Pretest							13.70	1987.7	16.30	2363.5	Valid
3/93	1411.0	Pretest							13.66	1981.8	16.21	2351.4	Supercharged
3/94	1411.3	Pretest							<u>MPag</u> 16.31	<u>Psig</u> 2365	16.22	2351.9	Aborted. Pressure increased from hydrostatic.
3/95	1411.1	Pretest							<u>MPaa</u> 13.66	<u>Psia</u> 1981.8	16.21	2351.0	Supercharged.
3/96	1411.5	Pretest							13.67	1982.0	16.22	2351.8	Not stabilised. Supercharged.
3/97	1407.5	Pretest							-	-	16.17	2345.0	Seal Failure. (Pressure & Hydrostatic)
3/98	1407.5	Pretest							13.6	1975.8	16.20	2345.0	Slightly Supercharged.
3/99	1407.0	Pretest							13.6	1975.4	16.16	2344.0	Valid. Good Permeability.
3/100	1413.5	Pretest							-	-	16.24	2354.9	Seal Failure. Done to check apparent deep OMC.
3/101	1413.5	Pretest							-	-	16.24	2355.1	Seal failure.
3/102	1413.2	Pretest							-	-	16.23	2354.5	Seal failure.

SUMMARY OF WIRELINE FORMATION TEST PROGRAMME - SNAPPER-6

<u>TEST & SEAT NO.</u>	<u>DEPTH (METRES) K.B.</u>	<u>CHAMBER</u>	<u>RECOVERY (LITRES)</u>				<u>FORMATION WATER</u>	<u>MUD FILTRATE</u>	<u>HEWLETT-PACKARD FORMATION PRESSURE</u>		<u>HEWLETT-PACKARD HYDROSTATIC PRESSURE</u>		<u>REMARKS</u>
			<u>OIL</u>	<u>COND.</u>	<u>GAS</u>	<u>COND.</u>			<u>MPaa</u>	<u>Psia</u>	<u>MPaa</u>	<u>Psia</u>	
		Litres	Litres	Litres	m ³	Litres	Litres						
3/103	1413.0	Pretest						-	-	16.23	2354.3	Seal failure.	
3/104	1412.8	Pretest						-	-	16.23	2353.9	Seal failure.	
3/105	1411.7	Pretest						13.75	1980.0	16.21	2351.7	Supercharged - Pretest to check packer.	
								<u>MPag</u>	<u>Psig</u>	<u>MPag</u>	<u>Psig</u>		
3/106	2847.0	45.44	-	-	-	-	-	29.37	4260.0	32.46	4708.0	Supercharged. Aborted. Very tight.	
		10.4	-	-	-	-	-						
3/107	2846.0	45.44	-	-	-	-	-	29.34	4256.0	32.45	4706.0	Aborted. Possibly supercharged. Very tight.	
		10.4	-	-	-	-	-						
3/108	2845.5	45.44	-	-	-	-	-	29.45	4271.0	32.44	4705.0	Aborted. Very tight. Supercharged.	
		10.4	-	-	-	-	-						
3/109	2844.5	45.44	-	-	-	-	-	29.62	4296.0	32.43	4704.0	Aborted. Very tight. Supercharged.	
		10.4	-	-	-	-	-						
3/110	2846.0	45.44	-	-	0.01	-	9.0	29.28	4246.0	32.44	4705.0	Very tight.	
		10.4	-	-	-	-	1.75						
4/111	1411.0	45.44	-	-	-	-	-	13.53	1963.0	16.02	2324.0	Aborted. Very tight.	
		10.4	-	-	-	-	-						
4/112	1411.2	45.44	-	-	-	-	-	13.51	1960.0	16.02	2324.0	Aborted. Very tight.	
		10.4	-	-	-	-	-						
4/113	1411.4	45.44	-	-	-	-	-	13.51	1959.0	16.03	2325.0	Aborted. Very tight.	
		10.4	-	-	-	-	-						
4/114	1412.8	45.44	-	-	-	-	-	-	-	16.04	2327.0	Aborted. No seal.	
		10.4	-	-	-	-	-						
5/115	1407.5	45.44	-	-	-	-	-	-	-	15.93	2311.0	No seal.	
		10.4	-	-	-	-	-						
5/116	1407.5	45.44	-	-	-	-	-	-	-	15.93	2311	No seal.	
		10.4	-	-	-	-	-						
6/117	1407.5	45.44	-	-	-	-	-	-	-	16.20	2349*	No Seal. *High hydrostatic.	
		10.4	-	-	-	-	-						

SUMMARY OF WIRELINE FORMATION TEST PROGRAMME - SNAPPER-6

TEST & SEAT NO.	DEPTH (METRES) K.B.	RECOVERY (LITRES)						HEWLETT-PACKARD FORMATION PRESSURE		HEWLETT-PACKARD HYDROSTATIC PRESSURE		REMARKS
		CHAMBER	OIL	COND.	GAS	FORMATION WATER	MUD FILTRATE	MPag	Psig	MPag	Psig	
		Litres	Litres	Litres	m ³	Litres	Litres					
6/118	1407.5	45.44	-	-	-	-	-	-	-	16.20	2349	No seat.
		10.4	-	-	-	-	-	-	-			
6/119	1407.4	45.44	-	-	-	-	-	-	-	16.20	2349	No seat.
		10.4	-	-	-	-	-	-	-			
6/120	1407.4	45.44	-	-	-	-	-	13.60	1973	16.20	2349	Supercharged. Opened 12 gal. chamber. Seal failed.
		10.4	-	-	-	-	-	-	-			
6/121	1407.1	45.44	-	-	-	-	-	-	-	16.19	2348	No seat.
		10.4	-	-	-	-	-	-	-			
6/122	1407.1	45.44	-	-	-	-	-	-	-	16.19	2348	Seal failure.
		10.4	-	-	-	-	-	-	-			
6/123	1406.9	45.44	5.75	-	0.61	-	21.5*	16.19	1957	16.20	2349	Valid pretest. Opened 2-3/4 gal. chamber; 12 gal. chamber reopened. *Mud.
		10.4	8.0	-	0.53	-	-	-	-			
6/124	1424.7	Pretest						MPaa	Psia	MPaa	Psia	
								14.89	2160.0	16.53	2397.4	Aborted. Pressure too high.
6/125	1424.7	Pretest						-	-	16.53	2397.6	Aborted. Pressure too high.
6/126	1422.2	Pretest						13.74	1993.5	16.50	2393.5	Valid.
6/127	1416.0	Pretest						13.69	1984.9	16.43	2383.0	Valid
6/128	1405.0	Pretest						13.60	1972.9	16.30	2363.0	Valid
6/129	1404.0	Pretest						-	-	16.29	2362.4	Seal failure.
6/130	1404.0	Pretest						-	-	16.29	2362.5	No seat.

31381/61-66

WELL: SNAPPER-6

SAMPLES, CONVENTIONAL CORES, SIDEWALL CORES

<u>INTERVAL</u>	<u>TYPE</u>
220-3021mKB	Three sets of washed and oven dried cuttings and one set of lightly washed and air dried cuttings; Sampled at 10m intervals from 220-1330m. Sampled at 5m intervals from 1330-3021m. One set of cuttings for geochemical analysis sampled at 15m intervals, composed of three 5m samples.
1325-2998mKB	Shot 60 sidewall cores, recovered 54. No conventional cores cut.

31381/43

TEMPERATURE RECORD - SNAPPER-6

LOGGING RUN	THERMOMETER DEPTH (m)	MAX. RECORDED TEMPERATURE (C°)	CIRCULATION TIME (t _k) (hours)	TIME AFTER CIRCULATION STOPPED (t)	HORNER TEMPERATURE (C°)	GEOHERMAL GRADIENT (C°/km)
<u>Suite 1</u>						
BHC-GR-CAL	765m	38.9	1.33	5.33	-	-
<u>Suite 2</u>						
DLTE-MSFL-GR-SP/ LDTC-CNTH-AMS (Combination tool)	2971.0m	101.5	1.5	6.38	133	40.75
DDBHC-GR	2972.0m	124.0	1.33	21.3		
WST-GR	2998.0m	127.0	1.33	28.0		

31381/51

FIGURES

LOCALITY MAP SNAPPER-6

SCALE 1:250 000

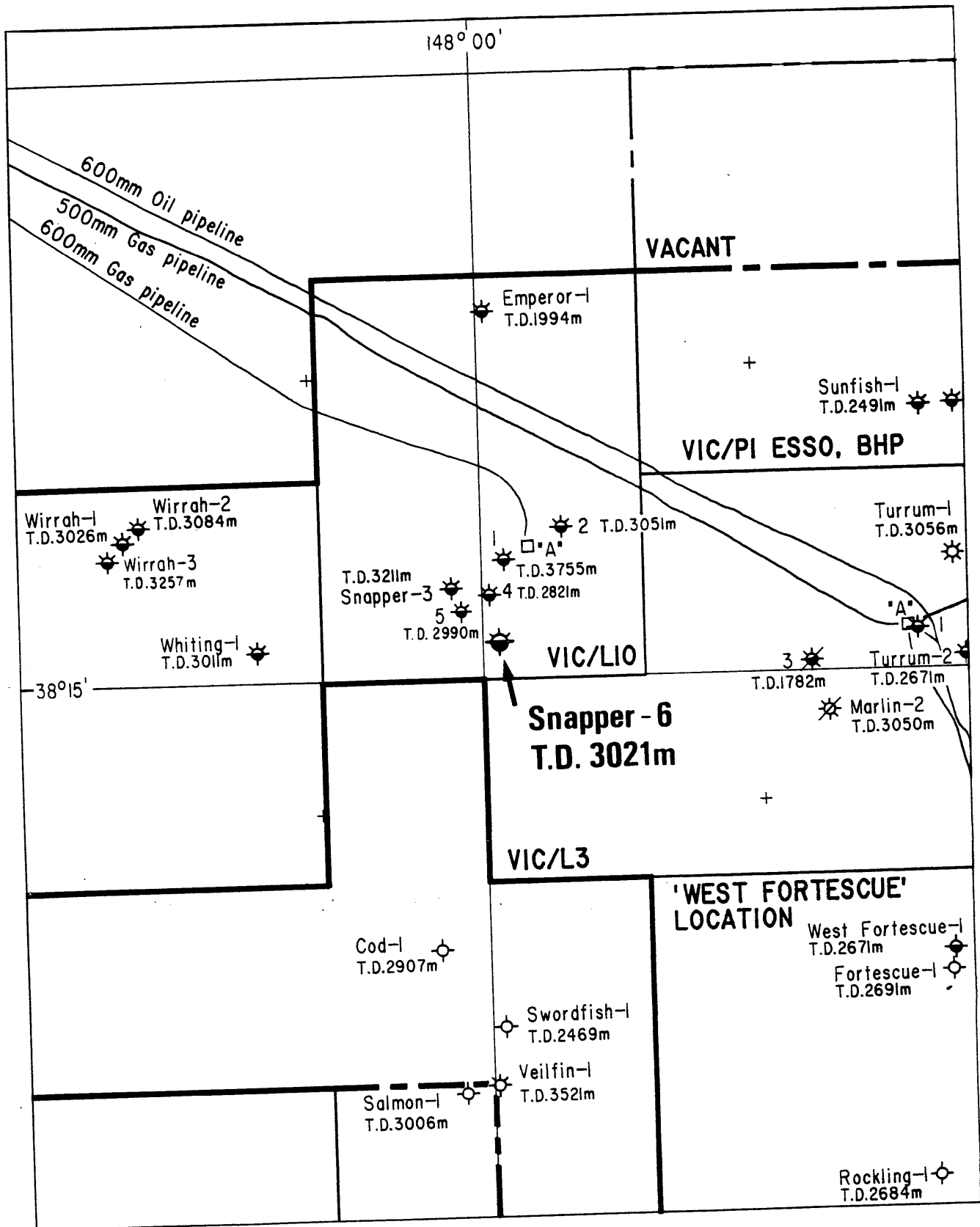
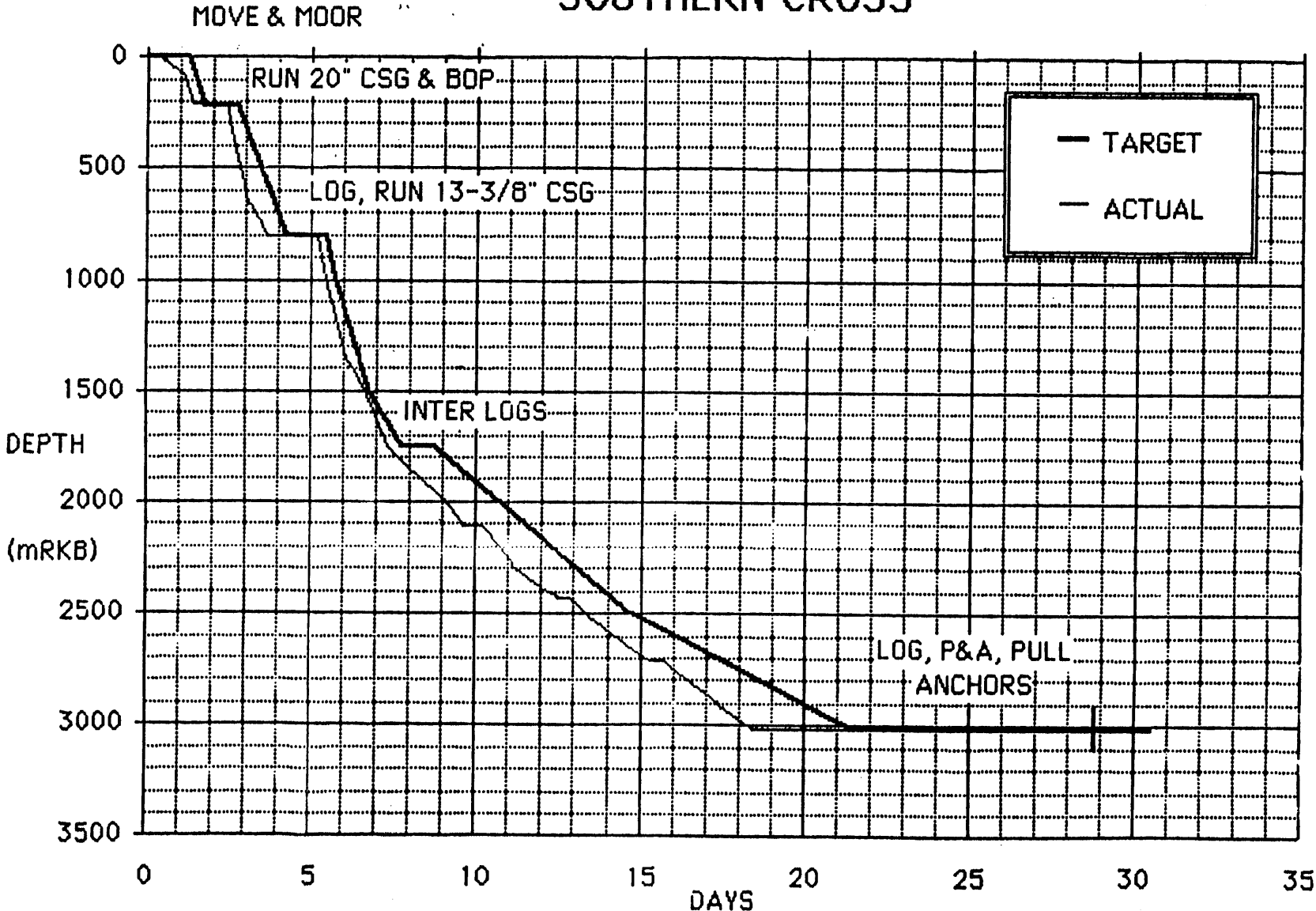
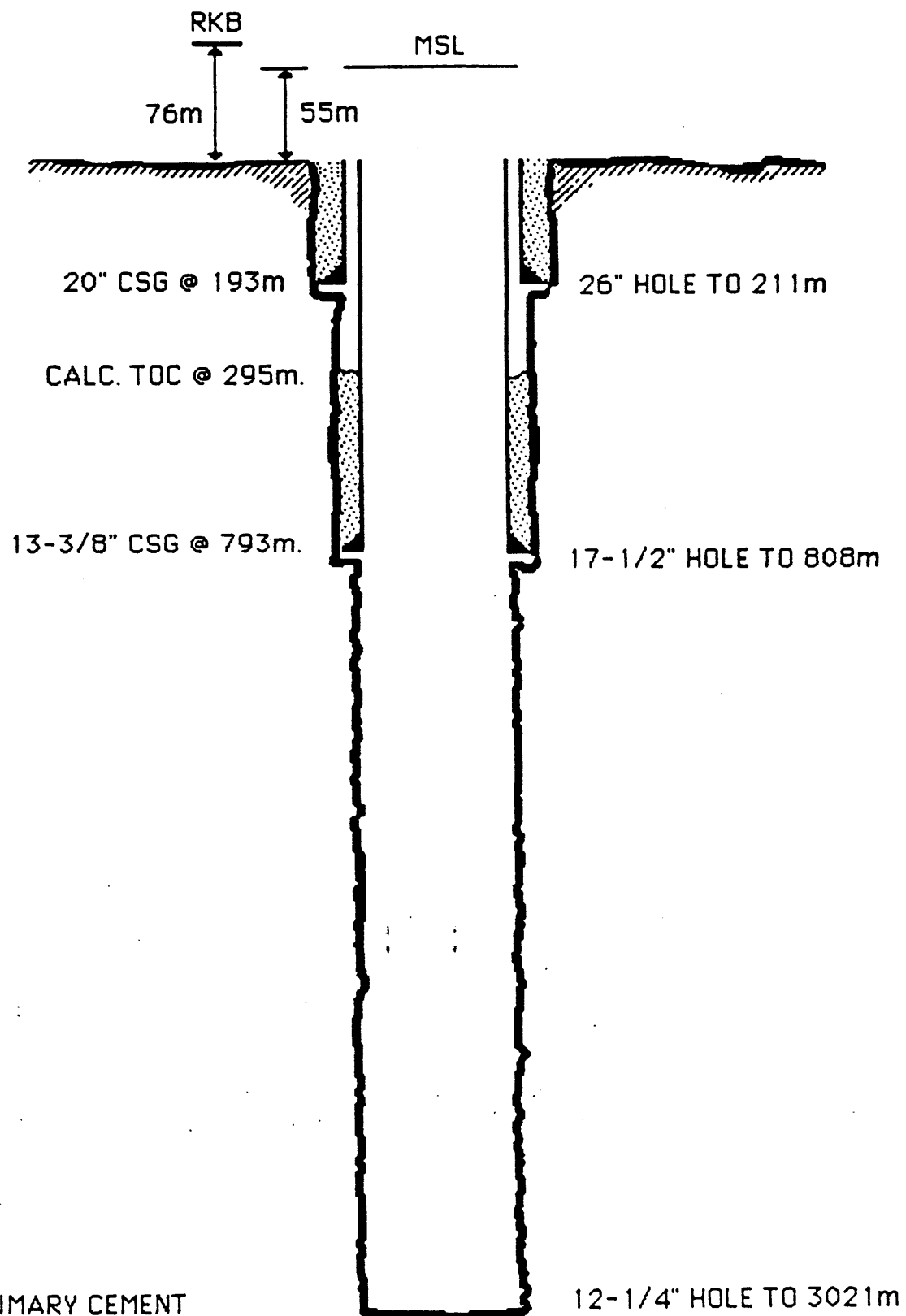


Fig.1

SNAPPER 6 PROGRESS CURVE SOUTHERN CROSS



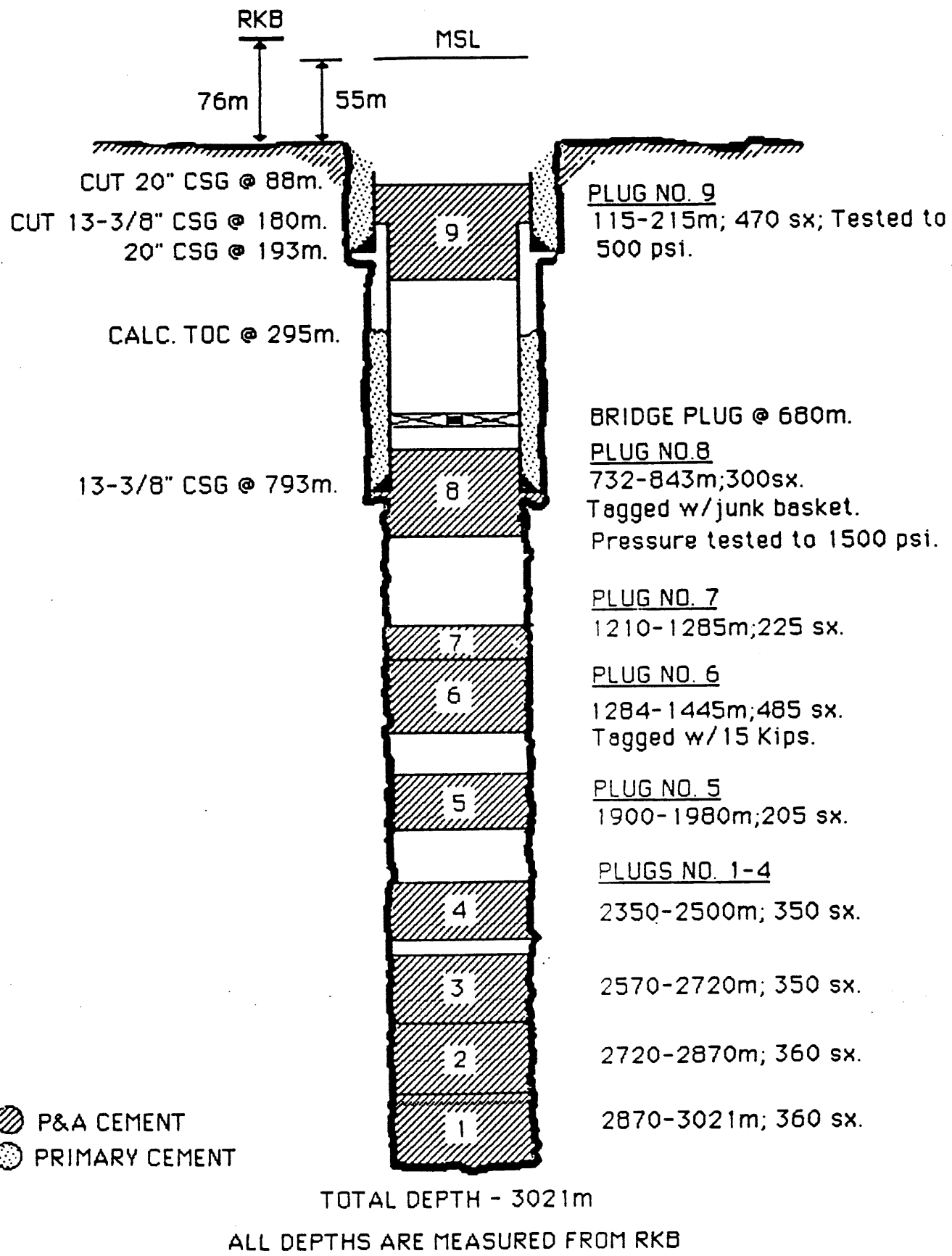
SNAPPER-6 WELLBORE SCHEMATIC



⊙ PRIMARY CEMENT

ALL DEPTHS ARE MEASURED FROM RKB

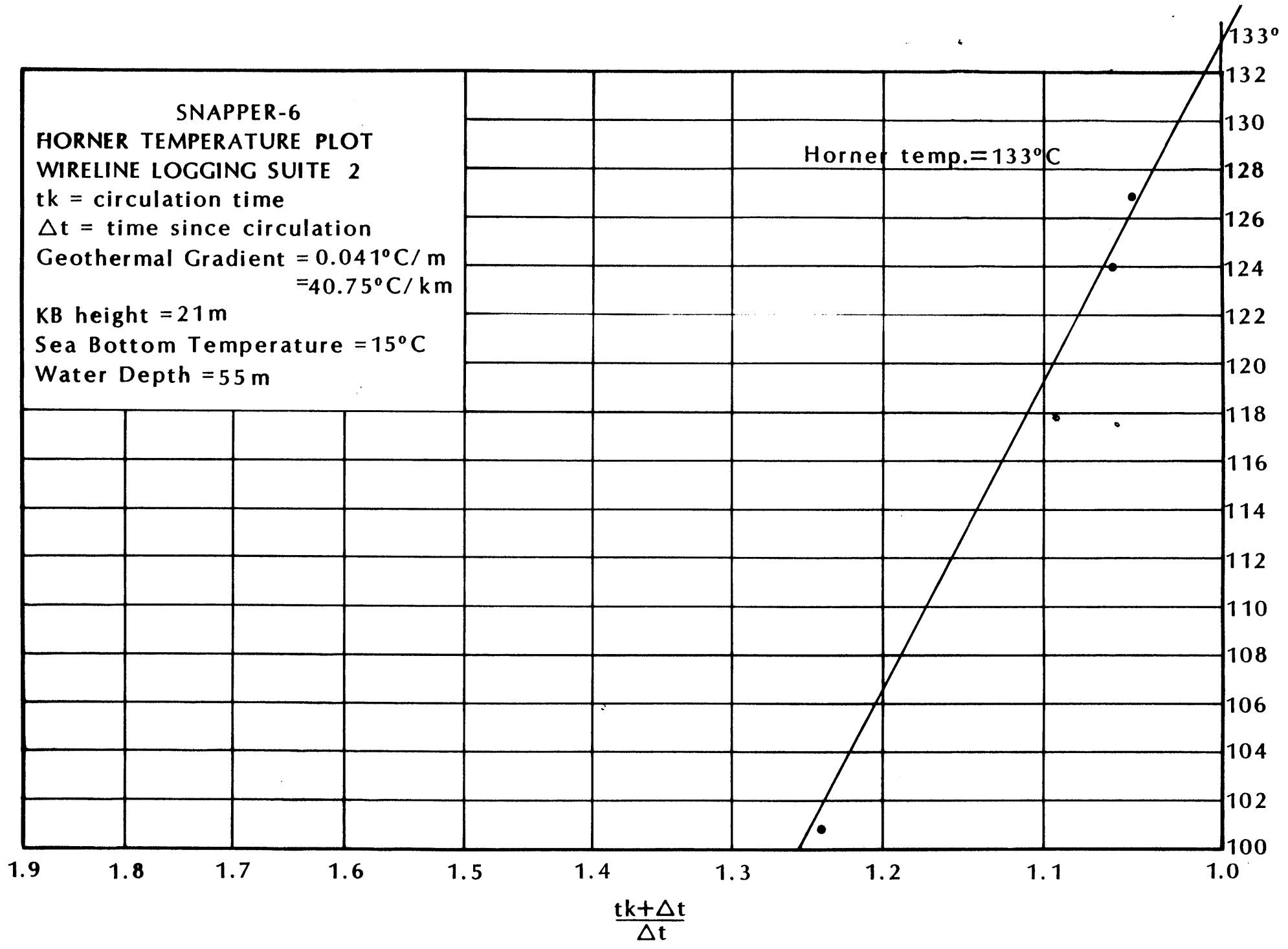
SNAPPER-6 ABANDONMENT SCHEMATIC



TEMPERATURE°C

SNAPPER-6
HORNER TEMPERATURE PLOT
WIRELINE LOGGING SUITE 2
tk = circulation time
 Δt = time since circulation
Geothermal Gradient = 0.041°C/m
= 40.75°C/km
KB height = 21m
Sea Bottom Temperature = 15°C
Water Depth = 55m

Horner temp. = 133°C



APPENDIX 1

LITHOLOGY

DESCRIPTIONS

SNAPPER-6

Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Descriptions</u>
220m	100	LIMESTONE: Calcarenite: grey to light grey; firm to moderately hard; skeletal; common calcite; very fossiliferous; abundant shell fragments; corals.
220-230m	100	LIMESTONE: Calcarenite: as above; very skeletal; 70% coral and shell fragments; clean.
230-240m	100	LIMESTONE: Calcarenite: as above.
240-250m	100	LIMESTONE: Calcarenite: as above.
250-260m	100	LIMESTONE: white; grey; brittle; firm; very fossiliferous; ranging from bryozoa, mollusca and corals; abundant coral stems and shell fragments; mainly calcarenite ranging to occasional calcilutite.
260-270m	100	LIMESTONE: Calcarenite: as above.
270-280m	100	LIMESTONE: as above.
280-290m	100	LIMESTONE: as above.
290-300m	100	LIMESTONE: as above.
300-310m	100	LIMESTONE: as above.
310-320m	100	LIMESTONE: as above.
320-330m	100	LIMESTONE: as above.
330-340m	100	LIMESTONE: as above.
340-350m	100	LIMESTONE: as above.
350-360m	100	LIMESTONE: as above.
360-370m	100	LIMESTONE: as above.
370-380m	100	LIMESTONE: as above.
380-390m	100	LIMESTONE: as above.
390-400m	100	LIMESTONE: Calcarenite: white to grey and buff; firm; brittle; fossiliferous; ranging from bryozoa to abundant coral stems and shell fragments.
400-410m	100	LIMESTONE: as above.
410-420m	100	LIMESTONE: as above.
420-430m	100	LIMESTONE: as above.
430-440m	100	LIMESTONE: as above.

440-450m	100	LIMESTONE: as above.
450-460m	100	LIMESTONE: as above.
460-470m	100	LIMESTONE: as above.
470-480m	100	LIMESTONE: as above.
480-490m	100	LIMESTONE: as above.
490-500m	100	LIMESTONE: as above.
500-510m	100	LIMESTONE: as above.
510-520m	100	LIMESTONE: Calcarenite: white to light grey; buff; brittle; soft; fossiliferous-bryozoa; forams; shell fragments; abundant coral stems.
520-530m	100	LIMESTONE: as above.
530-540m	100	LIMESTONE: Calcarenite: white to light grey; buff; brittle; soft; becoming less fossiliferous; otherwise as above.
540-550m	100	LIMESTONE: as above.
550-560m	100	LIMESTONE: as above.
560-570m	100	LIMESTONE: grading in part to calcilutite; otherwise as above.
570-580m	100	LIMESTONE: light grey; soft to firm; rounded cuttings of skeletal calcarenite; grading to predominantly calcisiltite; occasional fossil fragments; dominantly mollusca; forams and brachiopods.
580-590m	100	LIMESTONE: Calcilutite: light grey; white and occasionally grey; firm to soft; rounded cuttings of skeletal calcarenite.
	Trace	Fossil fragments; dominantly forams and mollusca.
590-600m	100	LIMESTONE: as above.
600-610m	100	LIMESTONE: as above.
610-620m	100	LIMESTONE: 70% Calcarenite; 30% Calcilutite; trace quartz grains and pyrite; light grey; white; soft to firm; occasional fossil fragments; dominantly mollusca, forams and brachiopods.
620-630m	100	LIMESTONE: as above.
630-640m	100	LIMESTONE: 70% Calcarenite, 30% Calcilutite: trace calcite grains; light grey; white and buff; firm, occasionally hard; occasional fossil fragments; dominantly mollusca; forams and brachiopods; calcisiltite common.

640-650m	100	LIMESTONE: 80% Calcarenite; 20% Calcilutite: grey and light grey; firm to moderately hard; abundant fossils; shell fragments;
	Trace	Calcite, Pyrite, Forams.
650-660m	100	LIMESTONE: as above.
660-670m	100	LIMESTONE: as above; but fewer fossils.
670-680m	100	LIMESTONE: 80% Calcarenite; 20% Calcilutite: grey to light grey; firm to moderately hard.
	Trace	Fossils; shell fragments and coral stems.
	Trace	Pyrite; Calcite.
680-690m	100	LIMESTONE: as above.
690-700m	100	LIMESTONE: 70% Calcarenite; 30% Calcilutite.
700-710m	100	LIMESTONE: 60% Calcarenite; 40% Calcilutite: fossils common; including shell fragments, coral stems.
	Trace	Pyrite, Calcite.
710-720m	100	LIMESTONE: as above.
720-730m	100	LIMESTONE: 70% Calcarenite; 30% Calcilutite: minor fossils; mostly shell fragments and coral stems; minor calcite; occasional coarse quartz grains.
730-740m	100	LIMESTONE: 70% Calcarenite; 30% Calcilutite: light to dark grey; firm to hard; grading to calcisiltite in parts; Minor fossils; commonly forams and brachiopods.
	Trace	Pyrite, Calcite.
740-750m	100	LIMESTONE: as above, with trace quartz.
750-760m	100	LIMESTONE: as above.
760-770m	100	LIMESTONE: as above; becoming sticky in parts; 40% calcilutite; minor fossils.
770-780m	100	LIMESTONE: as above;
	Trace	Pyrite; forams common; grading to Calcilsiltite in parts.
780-790m	100	LIMESTONE: as above; 70% Calcarenite; 30% Calcilutite; firm to moderately hard, silty in parts.
790-800m	100	LIMESTONE: as above.
800-810m	100	LIMESTONE: as above; 50% Calcilutite; 50% Calcarenite; grading to calcisiltite; soft to firm; sticky; water dispersive; occasional calcite; occasional fossils.
810-820m		Sample heavily contaminated with cement.
820-830m	100	LIMESTONE: 50% Calcarenite; 50% Calcilutite grading to Calcisiltite; light grey to grey; soft to firm, sticky, water dispersive.
	Trace	Fossils, Pyrite.

830-840m	100	LIMESTONE: as above.
840-850m	100	LIMESTONE: 60% Calcilutite; 40% Calcarenite grading to Calcisiltite.
	Trace	Fossils, Pyrite.
850-860m	100	LIMESTONE: as above.
860-870m	100	LIMESTONE: 50% Calcarenite; grading in part to Calcisiltite; 50% Calcilutite: light grey to grey; soft to firm; commonly sticky; dispersive; common fossils; mostly forams.
	Trace	Glauconite; Pyrite; Calcite.
870-880m	100	LIMESTONE: as above.
880-890m	100	LIMESTONE: as above.
890-900m	100	LIMESTONE: as above.
900-910m	100	LIMESTONE: 50% Calcarenite; 50% Calcilutite: very light grey to grey; very soft to firm; sticky; dispersive.
	Trace	Fossils; commonly forams.
910-920m	100	LIMESTONE: as above; 60% Calcarenite grading to Calcisiltite; 40% Calcilutite.
920-930m	100	LIMESTONE: 50% Calcarenite; grading to Calcisiltite; 50% Calcilutite; light to dark grey; soft to firm to hard; sticky; dispersive; Fossils commonly forams; Pyrite.
	Trace	
930-940m	100	LIMESTONE: as above.
	Trace	QUARTZ: coarse grained.
940-950m	100	LIMESTONE: Calcisiltite to occasional Calcilutite: light to dark grey; soft, predominantly water sensitive; sticky; grading overall to an argillaceous Limestone/ calcareous Mudstone.
	Trace	Fossils.
950-960m	100	LIMESTONE: as above.
960-970m	100	LIMESTONE: Calcisiltite to occasional Calcilutite: light to dark grey, soft, predominantly water sensitive, sticky; Fossils.
	Trace	
970-980m	100	LIMESTONE: as above; white; soft to firm;
	Trace	Pyrite, Quartz.
980-990m	100	LIMESTONE: Calcisiltite to occasional Calcilutite: light to dark grey; soft to firm.
	Trace	Dolomite, Pyrite; Calcite; Fossils; Quartz.
990-1000m	100	LIMESTONE: Calcisiltite grading to Calcilutite: light to dark grey; soft to firm; occasionally hard; Dolomite; Quartz;
	Trace	Fossils, Pyrite.

1000-1010m	100	LIMESTONE: as above.
1010-1020m	100	LIMESTONE: as above.
1020-1030m	100	LIMESTONE: as above.
1030-1040m	100	LIMESTONE: as above.
1040-1050m	100	LIMESTONE: Predominantly Calcisiltite: light grey to grey; soft; water sensitive; becoming increasingly argillaceous.
	Trace	Fossils.
1050-1060m	100	LIMESTONE: as above.
1060-1070m	100	LIMESTONE: grading to Calcareous Mudstone; otherwise as above.
1070-1080m	100	LIMESTONE: as above.
1080-1090m	100	LIMESTONE: as above.
1090-1100m	100	LIMESTONE: as above.
1100-1110m	100	LIMESTONE: Predominantly Calcisiltite with occasional Calcilutite: light grey to dark grey; soft to firm; water sensitive; argillaceous matrix; occasional carbonaceous flecks; minor forams; grading in part to calcareous siltstone.
	Trace	Dolomite.
1110-1120m	100	LIMESTONE: as above.
1120-1130m	100	LIMESTONE: as above.
1130-1140m	100	LIMESTONE: as above.
1140-1150m	100	LIMESTONE: as above.
1150-1160m	100	LIMESTONE: as above.
1160-1170m	100	LIMESTONE: grading in part to an argillaceous calcisiltite otherwise as above;
	Trace	Dolomite.
1170-1180m	100	LIMESTONE: as above.
1180-1190m	100	LIMESTONE: as above.
1190-1200m	100	LIMESTONE: as above.
1200-1210m	100	LIMESTONE: as above.
1210-1220m	100	LIMESTONE: as above.
1220-1230m	100	LIMESTONE: as above.
1230-1240m	100	LIMESTONE: as above.
1240-1250m	100	LIMESTONE: Predominantly Calcisiltite: white, grey to light grey; soft; gummy; very silty; argillaceous grading to marl; rare fossils;
	Trace	Dolomite.

1250-1260m	100	LIMESTONE: as above.
1260-1270m	100	LIMESTONE: as above.
1270-1280m	100	LIMESTONE: becoming increasingly argillaceous and marly; otherwise as above.
1280-1290m	100	LIMESTONE: as above.
1290-1300m	100	LIMESTONE: grading to calcareous Siltstone; otherwise as above.
1300-1310m	Trace	Pyrite
	70	LIMESTONE: as above.
	30	SILTSTONE: white; very soft; water sensitive; sticky; grading to gumbo.
1310-1320m	70	LIMESTONE: as above.
	30	SILTSTONE: as above.
1320-1330m	50	LIMESTONE: as above.
	50	SILTSTONE: as above.
SPOT SAMPLE: @ 1333 mKB		
1330-1333m	80	SANDSTONE: dark brown to brown; firm, medium; subrounded to subangular; quartz aggregates in a dominantly siliceous cement and siltstone matrix; abundant medium to coarse green glauconitic pellets; good porosity; no shows.
	20	SILTSTONE: as above.
1333-1335m	80	SANDSTONE: light brown to brown; friable but firm; predominantly medium grained; subangular to subrounded quartz aggregates; occasionally fine grained; in a siliceous to calcareous cement and a dominantly argillaceous siltstone matrix; abundant dark green; rounded to angular; medium to coarse glauconite pellets; Fair to good visual porosity; no fluorescence or cut; occasional pyrite; occasional coarse to very coarse; well rounded; clear; loose quartz grains.
	20	SILTSTONE: grey; calcareous; clean; blocky; platy.
1335-1340m	80	SANDSTONE: as above.
	20	SILTSTONE: as above.
1340-1345m	70	SANDSTONE: common coarse to very coarse; loose; rounded quartz grains; otherwise as above.
	30	SILTSTONE: as above.
1345-1350m	100	SANDSTONE: clear to opaque and frosted; coarse to very coarse; predominantly subangular to occasionally subrounded; loose quartz grains; good sorting; good inferred porosity; no shows;
	Trace	SILTSTONE.
1350-1355m	100	SANDSTONE: as above.
1355-1360m	100	SANDSTONE: as above.

1360-1365m	100	SANDSTONE: as above.
1365-1370m	100	SANDSTONE: as above.
1370-1375m	50	SANDSTONE: as above.
	50	SILTSTONE: blue grey; siliceous; clean; firm; very calcareous; platy; no shows.
1375-1380m	100	SANDSTONE: clear to opaque and frosted; commonly coarse to very coarse grained; occasionally subrounded loose quartz grains; clean, excellent sorting, good inferred porosity; no shows.
1380-1385m	100	SANDSTONE: as above.
1385-1390m	100	SANDSTONE: becoming increasingly medium grained: common coarser loose quartz grains; otherwise as above.
1390-1395m	100	SANDSTONE: as above.
1395-1400m	100	SANDSTONE: as above.
1400-1405m	100	SANDSTONE: clean; opaque; frosted; medium to occasional coarse grained; subrounded to subangular; loose quartz grains; clean; good sorting; good inferred porosity; trace of pinpoint blue-white fluorescence with no observable cut.
1405-1410m	90	SANDSTONE: 5% bright white-yellow fluorescence with extremely slow diffuse white cut; trace dolomite; otherwise as above.
	10	COAL: black; blocky; angular; hard.
1410-1415m	100	SANDSTONE: 10% bright white-yellow fluorescence with slow diffuse white cut; otherwise as above.
1415-1420	100	SANDSTONE: clear to opaque; frosted; clear, bimodal, medium to coarse grained; subangular to subrounded loose quartz grains; excellent sorting; good inferred porosity; trace pinpoint white-yellow fluorescence with no observable cut; trace dolomite.
1420-1425m	100	SANDSTONE: relatively immature quartz as above; no shows.
1425-1430m	90	SANDSTONE: predominantly medium grained loose angular quartz grains; otherwise as above.
	10	COAL: as above; grading to a carbonaceous silt.
1430-1435m	100	SANDSTONE: bimodal; clear to opaque; loose; clean quartz grains; as above.
1435-1440m	90	SANDSTONE: as above.
	10	SILTSTONE: dark grey, carbonaceous, blocky.
1440-1445m	100	SANDSTONE: as above.

1445-1450m	100	SANDSTONE: as above.
1450-1455m	90	SANDSTONE: as above.
	10	SILTSTONE: as above.
1455-1460m	90	SANDSTONE: as above.
	10	SILTSTONE: as above.
1460-1465m	90	SANDSTONE: clear to opaque and frosted; bi-modal loose quartz grains; ranging from subangular to subrounded; medium to coarse grain; good sorting; good inferred porosity; no shows.
	10	SILTSTONE: as above.
1465-1470m	100	COAL: black; blocky; hard; conchoidal fracture; 30 u. gas.
1470-1475m	100	COAL: as above.
1475-1480m	100	SANDSTONE: clear to opaque and frosted; medium to coarse grained; loose subangular to subrounded clean quartz grains; good sorting; good inferred porosity; trace fine grained siliceous cemented quartz aggregates; no shows.
1480-1485m	90	SANDSTONE: fine grained siliceous cemented quartz aggregates becoming more abundant; otherwise as above.
	10	COAL: as above.
1485-1490m	100	SANDSTONE: clear to opaque and frosted; fine grained; subangular to subrounded; loose quartz grains; occasionally medium grained; very well sorted; good inferred porosity; no shows.
1490-1495m	100	SANDSTONE: as above.
1495-1500m	100	SANDSTONE: as above.
1500-1505m	100	SANDSTONE: common dolomite rhombs with yellow-white mineral fluorescence; otherwise as above.
1505-1510m	100	SANDSTONE: as above.
1510-1515m	100	SANDSTONE: as above; no mineral fluorescence.
1515-1520m	100	SANDSTONE: as above.
1520-1525m	100	SANDSTONE: as above.
1525-1530m	100	SANDSTONE: as above.
1530-1535m	100	SANDSTONE: clear to opaque and frosted; coarse to very coarse grained; very angular to angular; loose quartz grains, occasional pyritic encrustations; scattered medium grained, subangular quartz aggregates in a dominantly siliceous to dolomitic but sometimes calcareous cement; occasional coarse discrete dolomite rhombs with relatively bright yellow-white mineral fluorescence; excellent sorting; very clean; excellent inferred porosity; no shows.

1535-1540m	100	SANDSTONE: as above.
1540-1545m	100	SANDSTONE: as above.
1545-1550	100	SANDSTONE: 15% relatively bright yellow-white mineral fluorescence; otherwise as above.
1550-1555m	100	SANDSTONE: as above.
1555-1560m	100	SANDSTONE: as above.
1560-1565m	100	SANDSTONE: clear to opaque and frosted; coarse to very coarse grained; loose quartz grains; occasionally medium grained; subrounded quartz aggregates; common clear calcite crystal aggregates and pale yellow to buff dolomite rhombs with associated dull yellow-white mineral fluorescence; no shows; scattered pyrite.
1565-1470m	90 10	SANDSTONE: as above. COAL: as above.
1570-1575m	100	SANDSTONE: as above.
1575-1580m	100	SANDSTONE: clear to frosted and opaque; occasionally amber, predominantly coarse to very coarse grained; angular; loose; clear quartz grains; common dolomite and calcite fragments with associated relatively bright yellow-white mineral fluorescence; excellent sorting; excellent inferred porosity; no shows.
1580-1585m	100	SANDSTONE: as above.
1585-1590m	100	SANDSTONE: as above.
1590-1595m	100	SANDSTONE: increasing percentage of fine to medium grained; subrounded loose quartz grains; otherwise as above.
1595-1600m	100	SANDSTONE: as above.
1600-1605m	100	SANDSTONE: common coarse grained; angular loose quartz grains; occasionally medium grained; otherwise as above.
1605-1610m	100	SANDSTONE: as above.
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: clear to opaque and frosted; medium to coarse grained; loose quartz grains; angular to very angular; otherwise as above.
1640-1645m	100	COAL: black; vitreous; hard; blocky; conchoidal fracture.

1645-1650m	100	COAL: as above.
1650-1655m	80 20	COAL: as above. SANDSTONE: white; very fine grained; quartz aggregates in a dominantly clean, sticky, water sensitive siltstone matrix; no shows.
1655-1660m	100	SANDSTONE: as above.
1660-1665m	100	SANDSTONE: clear to frosted and opaque; predominantly medium to occasionally coarse grained, loose, clean quartz grains; excellent sorting; excellent inferred porosity; occasional dolomite/calcite fragments; no shows.
1665-1670m	100	SANDSTONE: as above.
1670-1675m	100	SANDSTONE: as above.
1675-1680m	100	SANDSTONE: as above.
1680-1685m	100	SANDSTONE: clear to frosted; loose; coarse grained; angular grains with a trace of very fine grained quartz aggregates in a dominantly siltstone matrix; otherwise as above.
1685-1690m	90 10	SANDSTONE: as above. SILTSTONE: pale brown to amber; soft; carbonaceous flecks throughout.
1690-1695m	100	SANDSTONE: as above.
1695-1700m	100	SANDSTONE: as above.
1700-1705m	70 30	SANDSTONE: as above. COAL: as above.
1705-1710m	100	COAL: black, hard, vitreous
1710-1715m	100	COAL: as above.
1715-1720m	70 30	COAL: as above. SANDSTONE: as above.
1720-1725m	70 20 10	SILTSTONE: brown and grey to dark grey; soft to firm; blocky; argillaceous; micaceous cuttings; carbonaceous in part. COAL: as above. SANDSTONE: as above.
1725-1730m	50 50	SANDSTONE: as above. SILTSTONE: as above.
1730-1735m	60 40	SILTSTONE: as above. SANDSTONE: as above.
1735-1740m	60 40	SILTSTONE: as above. COAL: as above.
1740-1745m	80 20	COAL: as above. SILTSTONE: as above.

1745-1750m	60	COAL: as above.
	40	SILTSTONE: as above.
1750-1755m	70	COAL: as above.
	30	SILTSTONE: white and beige; soft; water sensitive in part; quartzose; relatively clean.
1755-1760m	40	SILTSTONE: white brown and grey; argillaceous to siliceous; soft to firm, blocky, micaceous, calcareous in parts; no shows.
	30	SANDSTONE: clear to opaque; medium to coarse grained; subangular to subrounded, loose quartz grains; no shows.
	30	COAL: as above.
1760-1765m	50	SANDSTONE: white; fine grained; subangular to subrounded quartz aggregates in a dominantly soft clay matrix; siliceous cement; relatively clean; fair to good sorting; poor porosity; no show.
	50	COAL: as above.
1765-1770m	40	SANDSTONE: as above.
	30	SILTSTONE: as above.
	30	COAL: as above.
1770-1775m	70	SANDSTONE: white; beige and light grey; very fine to fine grained; subrounded to subangular; quartz aggregates in a cement ranging from hard clear siliceous to soft water sensitive kaolinite in a dispersive siltstone matrix, occasional argillaceous and dark carbonaceous flecks, fair sorting, poor porosity; no shows.
	30	SILTSTONE: brown and dark to light grey; firm, argillaceous; occasionally water sensitive.
	trace	COAL: as above.
1775-1780m	100	COAL: black; vitreous; hard, blocky with common conchoidal fracture.
1780-1785m	60	COAL: as above.
	40	SANDSTONE: as above.
1785-1790m	60	COAL: as above.
	20	SANDSTONE: as above.
	20	SILTSTONE: as above.
1790-1795m		SANDSTONE: as above.
		SILTSTONE: as above.
		COAL: as above.
1795-1800m	50	SILTSTONE: as above.
	40	COAL: as above.
	10	SANDSTONE: as above.
1800-1805m	60	COAL:
	40	SILTSTONE: white to blue grey, soft water sensitive in a kaolinite matrix, commonly firm siliceous, slightly calcareous.
1805-1810m	100	SILTSTONE: predominantly blue grey, firm, siliceous, slightly calcareous.

1810-1815m	70	COAL: as above.
	30	SILTSTONE: as above.
1815-1820m	70	SILTSTONE: brown and blue grey; blocky; soft to mainly firm; argillaceous; calcareous in occasional carbonaceous flecks; grading to very fine sandstone.
1815-1820m cont'd	20	SANDSTONE: white; pale brown and beige; very fine grained; subrounded quartz aggregates in a dominantly soft, water sensitive kaolinite matrix; poor sorting; poor porosity; occasional coarse grained; clear to opaque; subangular; loose quartz grains; no shows.
	10	COAL: black; vitreous; conchoidal fracture; hard.
1820-1825m	60	COAL: as above.
	20	SANDSTONE: as above.
	20	SILTSTONE: as above.
1825-1830m	30	SANDSTONE: as above.
	40	SILTSTONE: as above.
	30	COAL: as above
1830-1835m	70	SANDSTONE: as above.
	30	SILTSTONE: as above.
1835-1840m	80	COAL: as above.
	20	SANDSTONE: as above.
1840-1845m	40	SILTSTONE: brown, light brown and blue grey; blocky; soft to mainly firm; argillaceous; calcareous; occasionally carbonaceous.
	40	COAL: black to black-brown; silty in parts.
	20	SANDSTONE: as above; common; loose; coarse grains.
1845-1850m	70	SILTSTONE: light brown; brown and blue grey; blocky; soft to firm; argillaceous; calcareous; occasional carbonaceous flecks; sandy in parts; kaolinitic in parts.
	20	SANDSTONE: white; light brown and beige; very fine grained; subrounded quartz aggregates; in a soft water sensitive silty/clay matrix; poor porosity; occasional loose coarse subrounded quartz grains.
	10	COAL: as above.
1850-1855m	50	SILTSTONE: light brown; tan and blue grey; blocky; occasionally subfissile; argillaceous; calcareous; occasionally dolomitic; firm; occasionally moderate to hard; trace pyrite aggregates.
	40	SANDSTONE: 30% very fine grained as above. 70% loose; clear to frosted; coarse to very coarse grained; angular to subrounded quartz grains; poorly sorted.
	10	COAL: as above.
1855-1860m	90	SANDSTONE: clear to opaque and frosted; coarse to very coarse grained; very angular to angular; loose quartz grains; moderately to poorly sorted; very hard, trace siliceous matrix.
	10	SILTSTONE: as above.

1860-1865m	50	COAL: black, subvitreous, moderately hard, conchoidal fracture.
	50	SANDSTONE: as above; subangular to subrounded.
1865-1870m	80	SANDSTONE: as above.
	20	COAL: as above.
1870-1875m	100	SANDSTONE: as above.
1875-1880m	100	SANDSTONE: as above.
1880-1885m	100	SANDSTONE: as above.
1885-1890m	60	SANDSTONE: clear to frosted; opaque and loose; coarse grained; subangular to subrounded; quartz grains; fair sorting; good inferred porosity; no shows; trace pyrite.
	20	SILTSTONE: light grey and brown, micromicaceous and argillaceous; occasionally calcareous; subfissile to blocky; hard to firm
	20	COAL: black; vitreous; hard; conchoidal fracture.
1890-1895m	70	COAL: as above.
	30	SANDSTONE: occasionally white and light grey; fine to medium grained; subrounded to subangular; quartz aggregates in a dominantly calcareous cement; otherwise as above.
	trace	SILTSTONE:
1895-1900m	50	SANDSTONE: as above.
	50	SILTSTONE: grey and brown; argillaceous; blocky; hard; micromicaceous; very carbonaceous; grading in parts to coal.
1900-1905m	50	SILTSTONE: brown and grey; argillaceous; soft and blocky.
	40	SANDSTONE: as above.
	10	COAL: as above.
1905-1910m	50	SANDSTONE: as above.
	40	SILTSTONE: as above.
	10	COAL: as above.
1910-1915m	60	COAL: as above.
	20	SANDSTONE: as above.
	20	SILTSTONE: as above.
1915-1920m	70	SANDSTONE: clear to opaque and white; predominantly medium grained; subrounded to subangular quartz aggregates; in a dominantly calcareous dolomitic cement, common white kaolinite matrix, soft to firm, fair sorting, fair to good inferred porosity; common clear, coarse grained subangular, loose quartz grains. 10% dull yellow-gold mineral fluorescence.
	20	SILTSTONE: brown and light grey, argillaceous to siliceous, slightly carbonaceous, blocky to subfissile, firm.
	10	COAL: as above.

1920-1925m	80	SANDSTONE: predominantly clear to opaque, coarse grained, subangular, loose quartz grains, good sorting, good inferred porosity, otherwise as above.
	20	SILTSTONE: as above.
1925-1930m	70	SANDSTONE as above.
	30	SILTSTONE: as above.
1930-1935m	60	COAL: as above.
	20	SANDSTONE: as above.
	20	SILTSTONE: as above.
1935-1940m	60	SANDSTONE: increased white, kaolinitic, water sensitive matrix; otherwise as above.
	20	SILTSTONE: as above.
	20	COAL: as above.
1940-1945m	70	SILTSTONE: white and brown, soft, water sensitive dispersive clay matrix, argillaceous, with occasionally siliceous matrix.
	30	COAL: as above.
1945-1950m	60	SILTSTONE: as above.
	30	SANDSTONE: white, very fine grained, subrounded to subangular quartz grains, in a dominantly soft, water sensitive kaolinitic matrix; sticky, very argillaceous, scattered carbonaceous flecks, grading to siltstone as above.
	10	COAL: as above.
1950-1955m	60	SILTSTONE: as above.
	30	SANDSTONE: as above.
	10	COAL: as above.
1955-1960m	50	SANDSTONE: as above.
	50	SILTSTONE: as above.
1960-1965m	50	SANDSTONE: as above.
	50	SILTSTONE: as above.
1965-1970m	100	COAL: as above.
1970-1975m	60	COAL: as above.
	40	SILTSTONE: as above.
1975-1980m	50	SANDSTONE: as above.
	40	SILTSTONE: as above.
	10	COAL: as above.
1980-1985m	60	SANDSTONE: white, very fine to fine grained, subrounded to subangular, quartz aggregates in a dominantly siliceous cement; occasionally white with a clay matrix, good sorting, fair porosity; no shows.
	30	SILTSTONE: as above.
	10	COAL: as above.

1985-1990m	50	SANDSTONE: white and light grey, very fine to fine grained, subangular to subrounded, quartz aggregates in a dominantly siliceous, slightly calcareous cement, occasionally with a soft, water sensitive, clay matrix; good sorting, fair to poor porosity; no shows.
	30	COAL: black, subvitreous, hard, conchoidal fracture.
	20	SILTSTONE: light grey and brown, micromicaceous, argillaceous, hard, firm.
1990-1995m	50	SANDSTONE: as above.
	50	SILTSTONE: as above.
1995-2000m	70	SANDSTONE: clear to opaque, very coarse to occasional medium grained, subangular to subrounded, loose quartz grains; common white, light brown and beige, fine to very fine grained quartz aggregates, in a dominantly argillaceous to white clay matrix, poor sorting, fair to good porosity; no shows.
1995-2000m cont'd	30	SILTSTONE: as above.
2000-2005m	70	SANDSTONE: as above.
	30	SILTSTONE: grading in part to very fine grained sandstone as above.
2005-2010m	70	SANDSTONE: as above.
	30	SILTSTONE: as above.
2010-2015m	60	COAL: black, subvitreous, hard.
	20	SANDSTONE: as above.
	20	SILTSTONE: as above.
2015-2020m	50	COAL: as above.
	40	SILTSTONE: as above.
	10	SANDSTONE: as above.
2020-2025m	40	SILTSTONE: as above.
	30	SANDSTONE: as above.
	30	COAL: as above.
2025-2030m	50	SANDSTONE: white pale brown and light grey, very fine to fine grained, subangular to subrounded quartz aggregates in a dominantly siliceous to calcareous dolomite cement, very argillaceous in parts, commonly carbonaceous; scattered coarse to very coarse grained, angular, loose quartz grains; trace dull yellow gold mineral fluorescence; no shows; trace pyrite.
	50	SILTSTONE: dark brown, argillaceous, with black carbonaceous laminae, blocky, hard, grading to very fine grained sandstone as above.
2030-2035m	70	SILTSTONE: as above.
	30	SANDSTONE: as above.
2035-2040m	40	SILTSTONE: as above.
	30	SANDSTONE: as above.
	30	COAL: as above.

2040-2045m	60	SANDSTONE: as above.
	40	SILTSTONE: as above.
2045-2050m	40	SANDSTONE: as above.
	40	SILTSTONE: as above.
	20	COAL: as above.
2050-2055m	50	COAL: as above.
	30	SILTSTONE: as above.
	20	SANDSTONE: as above.
2055-2060m	100	COAL: as above.
2060-2065m	50	SILTSTONE: as above.
	40	COAL: as above.
	10	SANDSTONE: as above.
2065-2070m	60	SILTSTONE: as above.
	30	COAL: as above.
	10	SANDSTONE: as above.
2070-2075m	60	SILTSTONE: as above.
	40	SANDSTONE: white and light grey, predominantly fine grained, subangular to subrounded, quartz aggregates in a dominantly siliceous, slightly dolomite cement, relatively clean, fair sorting, with occasionally coarse to very coarse grained, subangular, loose quartz grains, fair to good porosity; no shows; trace pyrite.
2075-2080m	70	SILTSTONE: light brown, beige and grey, firm, blocky, hard, siliceous, argillaceous and slightly calcareous; occasionally carbonaceous and micromicaceous.
	30	SANDSTONE: as above.
2080-2085m	60	SILTSTONE: as above.
	30	COAL: as above.
	10	SANDSTONE: as above.
2085-2090m	60	SILTSTONE: as above.
	30	SANDSTONE: as above.
	10	COAL: as above.
2090-2095m	90	SILTSTONE: brown, light grey, blocky.
	10	SANDSTONE: as above.
2095-2100m	80	SILTSTONE: as above.
	20	SANDSTONE: as above.
2100-2105m	80	SANDSTONE: white, and light grey, fine grained, subrounded to subangular, clean, quartz aggregates in a hard, siliceous slightly dolomitic cement; very argillaceous; black carbonaceous laminae common throughout; trace pyrite; poor sorting, poor to fair porosity, with occasional white kaolinite matrix; no shows.
	20	SILTSTONE: dark grey and brown, blocky, firm, siliceous, carbonaceous and argillaceous.
2105-2110m	60	SILTSTONE: as above.
	40	COAL: as above.

2110-2115m	60	SILTSTONE: as above.
	40	COAL: as above.
2115-2120m	60	COAL: as above.
	40	SILTSTONE: as above.
2120-2125m	50	SILTSTONE: as above.
	40	COAL: as above.
	10	SANDSTONE: as above.
2125-2130m	50	SILTSTONE: as above.
	40	SANDSTONE: as above.
	10	COAL: as above.
2130-2135m	50	SILTSTONE: as above.
	40	COAL: as above.
	10	SANDSTONE: as above.
2135-2140m	60	SILTSTONE: as above.
	40	SANDSTONE: as above.
2140-2145m	70	SANDSTONE: white, beige and light grey, fine to medium grained, subangular to subrounded, quartz aggregates in a dominantly siliceous cement, slightly argillaceous with a white kaolinite matrix, poor sorting, poor to fair porosity; with a trace of clear coarse to very coarse grained, loose quartz grains; no shows.
	30	SILTSTONE: as above.
2145-2150m	40	SILTSTONE: pale to dark brown, dark grey and beige, blocky to subplatey cuttings, firm to occasional soft, fine, black carbonaceous laminations, with occasional sandy layers grading to very fine grained sandstone, as above.
	30	SANDSTONE: light grey, clear, predominantly medium to occasionally fine grained, subangular to subrounded, quartz aggregates in a dominantly siliceous cement; sucrosic, white, clay matrix, slightly argillaceous, poor sorting, poor porosity; trace pyrite; no shows.
	30	COAL: as above.
2150-2155m	70	SILTSTONE: as above.
	20	SANDSTONE: trace clear to opaque, coarse grained, subrounded, loose quartz grains, otherwise as above.
	10	COAL: as above.
2155-2160m	40	SILTSTONE: light grey to dark brown, irregular to blocky cuttings, firm to occasionally soft, carbonaceous laminae, slightly calcareous.
	30	SANDSTONE: light grey and white, very fine to medium grained, subangular to subrounded, quartz aggregates in a dominantly sucrosic, white, clay matrix, minor calcareous cement and dolomite, slightly argillaceous, poor sorting, poor inferred porosity; also loose quartz crystals, medium to coarse grained, angular to subangular; no shows.
	30	COAL: vitreous lustre, conchoidal fracture, hard.

2160-2165m	50	SILTSTONE: as above; non calcareous.
	40	SANDSTONE: beige, white and light grey, very fine to fine grained, subangular to subrounded, quartz aggregates with a white clay matrix, water sensitive, occasional carbonaceous laminae, moderate sorting, occasional loose, medium grained, subrounded, quartz grains; minor pyrite; no shows.
	10	COAL: as above.
2165-2170m	40	COAL: as above.
	40	SANDSTONE: light grey and light brown, very fine to fine grained, argillaceous, occasional carbonaceous laminae, rounded to subrounded quartz aggregates with predominantly white clay matrix, moderate to good sorting, moderate porosity; occasional medium grained, subangular to subrounded, loose quartz grains; no shows.
	20	SILTSTONE: white, light brown and dark brown, cuttings with occasional carbonaceous laminae.
2170-2175m	50	SANDSTONE: as above; no shows.
	30	COAL: as above.
	20	SILTSTONE: as above, grades to very fine sandstone.
2175-2180m	50	SANDSTONE: beige to light grey and white, very fine to fine grained, subrounded, quartz aggregates, minor calcareous cement, white clay matrix, water sensitive, moderate sorting, low to moderate porosity, occasional loose, medium grained angular quartz grains; occasional octahedral pyrite; no shows.
	30	SILTSTONE: as above.
	20	COAL: as above.
2180-2185m	80	SANDSTONE: white, beige and light grey, very fine to fine grained, subrounded to subangular, quartz aggregates, minor siliceous cement, minor calcareous cement, predominantly white clay matrix, firm, occasionally soft; minor encrusted pyrite; no shows.
	10	SILTSTONE: beige and dark brown, argillaceous, common carbonaceous laminae.
	10	COAL: bladed, distinctly conchoidal.
2185-2190m	80	COAL: as above.
	15	SANDSTONE: beige to light grey, fine grained, well rounded to subrounded, quartz aggregates in dominantly siliceous matrix and variable, white clay matrix with calcareous cement. Very slightly dolomitic, and argillaceous; minor loose, medium grained, subrounded, quartz particles; pyrite encrusted on quartz in a highly siliceous matrix; distinct difference between aggregates with predominantly siliceous matrix and softer white clay matrix, moderate sorting, low inferred porosity.
	5	SILTSTONE: beige to light purple, slightly argillaceous, minor carbonaceous laminations.

2190-2195m	70	COAL: as above.
	20	SANDSTONE: as above.
	10	SILTSTONE: as above.
2195-2200m	60	SANDSTONE: white, light grey and beige, very fine to fine grained, well rounded to subrounded quartz grains in a predominantly soft white, clay, matrix, forming quartz grain aggregates, slightly argillaceous, with minor carbonaceous laminations; slightly calcareous, moderate to good sorting, low to moderate porosity; individual quartz crystals, medium to coarse grained, well rounded to subrounded; no shows.
	30	SILTSTONE: light grey to dark brown, common carbonaceous laminae, grades into very fine sand.
	10	COAL: as above.
2200-2205m	60	SANDSTONE: as above.
	40	SILTSTONE: as above.
2205-2210m	70	SANDSTONE: beige to light grey, very fine to fine grained, well rounded to subrounded, commonly argillaceous, predominantly white kaolin matrix, combines quartz into aggregates, sorting moderate to good, medium porosity; loose quartz crystals, fine to medium grained, subrounded to subangular; minor pyrite; no shows.
	30	SILTSTONE: as above.
	trace	COAL: as above.
2120-2215m	50	SANDSTONE: beige to light grey and dark grey, very fine to fine grained, well rounded to subrounded, quartz aggregates in a dominantly siliceous and occasionally kaolinitic matrix; minor carbonate cement, minor pyrite and dolomite; moderate to good sorting, moderate porosity; no shows.
	40	SILTSTONE: light to dark brown, carbonaceous laminae common.
	10	COAL: as above.
2215-2220m	80	SANDSTONE: as above.
	20	SILTSTONE: as above.
	trace	COAL: as above.
2220-2225m	60	SANDSTONE: as above.
	40	SILTSTONE: as above.
2225-2230m	70	SANDSTONE: as above.
	30	SILTSTONE: as above.
2230-2235m	70	SANDSTONE: as above.
	30	SILTSTONE: as above.
2235-2240m	80	SANDSTONE: as above.
	20	SILTSTONE: as above.
2240-2245m	40	COAL: as above.
	30	SANDSTONE: as above.
	30	SILTSTONE: as above.

2245-2250m	70	SANDSTONE: brown, grey and beige, predominantly very fine to fine grained, subangular to subrounded quartz aggregates in a siliceous to slightly dolomitic cement, occasional water sensitive white kaolin matrix, very argillaceous with common black carbonaceous laminae scattered throughout, firm to friable, fair sorting, fair porosity; no shows.
	20	SILTSTONE: dark brown and dark grey, argillaceous to carbonaceous, sub platy to blocky cuttings, soft to firm.
	10	COAL: black, subvitreous lustre, hard, with conchoidal fracture.
2250-2255m	70	SANDSTONE: as above.
	30	SILTSTONE: as above.
2255-2260m	70	SANDSTONE: white, light brown and grey, very fine to fine grained, subangular to subrounded, quartz aggregates in a dominantly sucrosic, white, water sensitive, clay matrix, very argillaceous, carbonaceous, friable, soft to occasionally firm, fair sorting, fair porosity, no shows.
	20	SILTSTONE: dark grey and dark brown, blocky, relatively hard, micromicaceous, carbonaceous specks.
	10	COAL: black, subvitreous to vitreous lustre, brittle, with conchoidal fracture.
2260-2265m	40	SANDSTONE: as above.
	20	SILTSTONE: as above.
	40	COAL: as above.
2265-2270m	50	COAL: as above.
	30	SILTSTONE: as above.
	20	SANDSTONE: as above.
2270-2275m	60	COAL: as above.
	20	SANDSTONE: as above.
	20	SILTSTONE: as above.
2275-2280m	60	SILTSTONE: as above.
	30	SANDSTONE: white, beige and light grey, very fine to medium grained, subangular to subrounded quartz aggregates in dominantly siliceous cement with occasional white, water sensitive kaolinitic matrix, very argillaceous with carbonaceous laminae; note increase in size of quartz; loose quartz crystals, medium to very coarse grained, subangular to subrounded, moderate porosity, moderate sorting; no shows.
	10	COAL: as above.
2280-2285m	50	SANDSTONE: beige and light grey, subangular to subrounded, quartz aggregates occur as both very fine to fine grained in dominantly siliceous cement and occasional kaolin matrix and as medium grained in distinctly more siliceous cement with lesser white kaolin

2280-2285m cont'd		matrix; occasionally very argillaceous with carbonaceous laminae throughout; sorting moderate, moderate porosity; loose quartz crystals, medium to very coarse grained, subangular to subrounded common; minor pyrite; no shows.
	40	SILTSTONE: as above.
	10	COAL: as above.
2285-2290m	50	SANDSTONE: beige, dark brown and light grey, very fine to medium grained, subangular to subrounded, quartz aggregates with commonly high proportion of siliceous cement and occasionally a high percentage of kaolin, water sensitive matrix, very argillaceous, medium to coarse grained aggregates also occur with the higher percentage of siliceous cement; loose coarse to very coarse grained, subangular to subrounded, quartz crystals much more common than above; crystals often appear frosted; moderate to good sorting, good inferred porosity; no shows.
	40	SILTSTONE: dark brown and beige, blocky cuttings, carbonaceous laminae common, grades to very fine sand.
	10	COAL: as above.
2290-2295m	70	COAL: as above.
	20	SANDSTONE: beige, white and light grey, very fine to medium grained, well rounded to subrounded quartz aggregates in siliceous and calcareous cement with occasional, water sensitive, kaolin matrix and minor pyrite encrustations, moderately argillaceous with common carbonaceous laminae, moderate sorting, moderate porosity, loose quartz crystal, subangular to subrounded, medium to coarse grained; no shows.
	10	SILTSTONE: as above.
2295-2300m	50	SILTSTONE: as above.
	30	SANDSTONE: beige and light grey, very fine to medium grained, quartz aggregates in dominantly siliceous cement, with lesser calcareous cement and occasional kaolin matrix, minor dolomite, very argillaceous and carbonaceous laminae common, moderate sorting, moderate porosity; lesser loose medium to very coarse grained, subangular to subrounded; quartz crystals, minor loose pyrite; no shows.
	20	COAL: mainly bituminous variety, although fracturing of some gives cuttings the impression that some of the coal is sapropelic.
2300-2305m	60	SILTSTONE: dark brown to light brown, carbonaceous laminae common, blocky to irregular cuttings,
	40	SANDSTONE: white, light grey and beige, very fine to medium grained, subangular to subrounded quartz aggregates in dominantly siliceous and minor calcareous cement with occasional white "sucrosic" kaolin matrix;

2300-2305m cont'd		very argillaceous with common carbonaceous laminae, moderate sorting, moderate porosity; lesser loose medium grained, subrounded; quartz crystals, no shows. COAL: as above.
	Trace	
2305-2310m	90	SANDSTONE: beige, white, light grey and dark brown, very fine to medium grained, subrounded to subangular, quartz aggregates in dominantly siliceous cement with only very minor calcareous cement, and frequent white, water sensitive kaolin matrix, minor dolomite, very argillaceous with common carbonaceous laminae, generally firm, occasionally soft; significant increase in loose, medium to coarse, subangular to subrounded quartz crystals, moderate sorting, moderate inferred porosity; minor pyrite; no shows.
	10	SILTSTONE: as above.
	Minor	COAL: cuttings as above.
2310-2315m	60	COAL: vitreous lustre, marked conchoidal fracture, some cuttings have appearance of sapropelic coals.
	30	SANDSTONE: white to light grey, very fine to fine grained and medium grained (minor) aggregates, quartz crystals in a water sensitive, white kaolin matrix with occasional siliceous and minor dolomitic cement, very argillaceous and laminae of carbonaceous material common, moderate sorting, moderate porosity, loose, fine to medium grained, subrounded to subangular quartz crystals; no shows.
	10	SILTSTONE: as above.
2315-2320m	40	SANDSTONE: as above.
	30	SILTSTONE: as above.
	30	COAL: as above.
2320-2325m	70	SANDSTONE: as above.
	30	SILTSTONE: as above.
2325-2330m	50	SILTSTONE: as above.
	40	SANDSTONE: as above.
	10	COAL: as above.
2330-2335m	50	SANDSTONE: as above.
	40	SILTSTONE: as above.
	10	COAL: as above.
2335-2340m	60	SANDSTONE: becoming increasingly siliceous, commonly cemented with argillaceous matrix, otherwise as above.
	40	SILTSTONE: as above.
2340-2345m	90	SANDSTONE: white, light grey, beige and brown, predominantly very fine to fine grained, subrounded to subangular, quartz aggregates in a dominantly siliceous cement with common sucrosic, white, water sensitive kaolin matrix, trace dolomite/calcite, commonly argillaceous

2340-2345m cont'd		with carbonaceous laminae, significant increase in loose, medium to coarse grained subangular to subrounded quartz crystals, moderate sorting, moderate to good inferred porosity, minor pyrite; no shows.
	10	SILTSTONE: dark grey and brown, firm, argillaceous, common carbonaceous laminae throughout, grading to very fine sandstone above.
2345-2350m	80	SANDSTONE: 2 types: Type (1): predominantly clear to opaque, coarse to very coarse grained, subangular to subrounded, loose quartz grains, good inferred porosity; no shows. Type (2): white, light grey and beige, very fine to fine to occasional medium grained quartz aggregates in a dominantly dolomitic/calcite cement, appreciably less argillaceous matrix, minor carbonaceous laminations, a clean sand with fair to moderate sorting, moderate porosity, 20% relatively bright, gold-yellow mineral fluorescence; Trace to 10% white-yellow fluorescence with very slow, diffuse, milky-white, crush cut.
	20	SILTSTONE: as above.
2350-2355m	70	SANDSTONE: white, beige and light grey, very fine to fine grained, occasionally medium grained, subangular to subrounded quartz aggregates in a siliceous to dolomitic cement. Very argillaceous matrix, common black, carbonaceous laminations, moderate sorting, poor to fair porosity; diminishing, clean to opaque, coarse grained, subangular to subrounded, loose quartz grains, 5% to 10% dull, yellow-white fluorescence with very slow, diffuse, milky white cut, leaving a dull blue-white cloudy halo after 30 minutes, 5-10% yellow gold mineral fluorescence.
	30	SILTSTONE: brown, beige and dark grey, firm to blocky, carbonaceous and argillaceous.
2355-2360m	70	SANDSTONE: as above; shows as above.
	30	SILTSTONE: as above.
2360-2365m	80	SANDSTONE: beige and light grey, very fine to medium grained, subangular to subrounded, quartz aggregates with dominantly siliceous cement and minor calcareous and dolomitic cement; very argillaceous matrix common, and a distinct bimodal framework with very fine and medium grained aggregates, the latter commonly having a higher percentage of siliceous cement, moderate to good sorting; moderate porosity; loose, coarse to very coarse grained, subangular to subrounded quartz crystals common; less than 5% dull yellow-white fluorescence with very rapid diffuse milky white cut producing a blue-white halo almost immediately upon addition of chloroethane; less than 5% yellow gold mineral fluorescence.
	20	SILTSTONE: as above.

2365-2370m	60	SANDSTONE: beige to light grey, very fine to medium grained, subrounded to subangular, quartz aggregates in dominantly siliceous cement, less dolomitic and calcareous cement than above; argillaceous matrix - common with carbonaceous laminae; minor pyrite; loose, subangular to subrounded, coarse to very coarse grained quartz common, some frosted; moderate sorting, moderate inferred porosity; very minor dull yellow-white fluorescence with slow diffuse, milky-white cut producing a blue-white halo after about 10 mins; minor yellow-gold mineral fluorescence.
	30	COAL: vitreous lustre, well developed conchoidal fracture.
	10	SILTSTONE: dark brown, irregular to blocky cuttings, carbonaceous laminae very common.
2370-2375m	70	SANDSTONE: as above; no shows.
	25	SILTSTONE: as above.
	5	COAL: as above.
2375-2380m	60	SANDSTONE: beige and light grey, predominantly very fine to fine grained, subrounded to subangular quartz aggregates in dominantly siliceous cement with common argillaceous matrix; less common medium to coarse grained quartz aggregates in argillaceous matrix, moderate sorting, moderate to low porosity; no shows.
	40	SILTSTONE: as above.
2380-2385m	70	COAL: as above.
	20	SANDSTONE: beige, white and light grey, very fine to fine grained, well rounded to subrounded quartz aggregates in commonly siliceous cement and lesser calcareous and dolomite cement; very argillaceous with common carbonaceous laminae, moderate sorting, moderate porosity; loose, medium to very coarse grained, subrounded to subangular quartz crystals common; no shows.
	10	SILTSTONE: as above.
2385-2390m	90	COAL: as above.
	5	SANDSTONE: dark brown, beige and light grey, very fine to fine grained, well rounded to subrounded quartz aggregates in dominantly siliceous cement; minor calcareous cement, very argillaceous, carbonaceous laminae common, moderate to good sorting, moderate porosity; occasional medium to coarse grained, loose, subangular to subrounded quartz crystals; minor loose pyrite; no shows.
	5	SILTSTONE: as above.
2390-2395m	90	SILTSTONE: beige, light to dark brown and dark grey, very argillaceous, commonly carbonaceous, relatively soft to occasionally firm, partly siliceous, grading in part to very fine grained sandstone.
	10	SANDSTONE: as above.

2395-2400m	60	SILTSTONE: increasingly carbonaceous, dark.
	40	COAL: as above.
2400-2405m	60	SANDSTONE: white and cream, predominantly fine grained, subangular to subrounded, quartz aggregates in a dominantly hard dolomitic cement; slightly water sensitive, clay and argillaceous matrix, clear, good sorting, firm; fair to poor porosity; 20% relatively bright to dull yellow-gold mineral fluorescence; trace yellow fluorescence with very slow diffuse crush cut after 15 mins.
	30	SILTSTONE: as above.
	10	COAL: as above.
2405-2410m	70	SANDSTONE: increasing amount of medium to coarse grained, dolomite rhombs, otherwise as above.
	20	SILTSTONE: very carbonaceous as above.
	10	COAL:
2410-2415m	60	SANDSTONE: white, yellow-brown, and light grey, fine grained, subrounded to subangular, quartz aggregates in a siliceous to dolomitic cement, occasionally with white clay matrix, occasional medium grained, angular, well cemented dolomite rhombs, moderate sorting, poor porosity, 10% dull yellow mineral fluorescence with possible trace yellow hydrocarbon fluorescence with very slow diffuse white crush cut; slight coal contamination producing some white cut; occasional clear, opaque, coarse grained, subrounded, loose quartz crystals, good inferred porosity; no shows.
	40	SILTSTONE: as above.
2415-2420m	40	SILTSTONE: dark grey to dark brown, very carbonaceous, platy to subfissile in part, micromicaceous, firm, brittle, grading to a low grade coal.
	40	COAL: as above.
	20	SANDSTONE: increasing amounts of white, water sensitive, argillaceous matrix; otherwise as above.
2420-2425m	50	SANDSTONE: trace to 5% white-yellow hydrocarbon fluorescence with slow to moderate white crush cut, trace to 5% dull yellow gold mineral fluorescence, occasional pyrite; otherwise as above.
	40	SILTSTONE: as above.
	10	COAL: as above.
2425-2430m	50	SILTSTONE: as above.
	40	SANDSTONE: white, beige and light grey, very fine to medium grained, subrounded to subangular, quartz aggregates, in dominantly dolomitic cement, common siliceous cement and occasional argillaceous matrix, moderate sorting, poor porosity; loose, subangular to subrounded, coarse to very coarse grained, quartz crystals common; moderate to good inferred porosity; 5-10% blue-white fluorescence; no cut observed.
	10	COAL: as above.

2430-2435m	80	SANDSTONE: 2 types: Type (1): beige and light grey, very fine to fine grained, occasionally medium grained, subrounded to subangular in dominantly calcareous cement with lesser siliceous cement and dolomite; moderate sorting, moderate to poor porosity. Type (2): coarse to very coarse grained, loose, angular to subangular quartz crystals, good inferred porosity; minor loose pyrite; no shows.
	20	SILTSTONE: dark brown to beige, carbonaceous laminae common.
2435-2440m	60	SANDSTONE: beige and light grey, very fine to fine grained with occasional medium grained, subangular to subrounded, quartz aggregates with a dominantly calcareous cement, trace dolomite and lesser siliceous cement; siliceous cement generally restricted to medium grained aggregates; poor to moderate porosity, good to moderate sorting; lesser amount of coarse to very coarse grained, loose quartz crystals than the previous interval; good inferred porosity; minor loose pyrite; no shows.
	40	SILTSTONE: as above.
2440-2445m	70	SANDSTONE: white and light grey, very fine to fine grained, well rounded to subrounded quartz aggregates in a dominantly calcareous cement, with minor siliceous cement and trace dolomite; minor argillaceous matrix, good to moderate sorting, poor to moderate porosity; minor coarse to very coarse grained, loose quartz grains, minor pyrite; no shows.
	30	SILTSTONE: as above.
2445-2450m	90	SANDSTONE: increasing amount of coarse to very coarse grained, loose quartz grains, otherwise as above.
	10	SILTSTONE:
2450-2455m	60	SANDSTONE: as above.
	20	SILTSTONE: as above.
	20	COAL: as above.
2455-2460m	60	SANDSTONE: increasing proportion of siliceously cemented, fine to medium grained, quartz aggregates, otherwise as above.
	40	SILTSTONE: dark brown, micromicaceous with common carbonaceous laminae.
2460-2465m	80	SANDSTONE: 2 types: Type (1): beige and light grey, very fine to fine grained, well rounded to subrounded quartz aggregates in dominantly calcareous and siliceous cement; minor argillaceous matrix, good sorting, poor to moderate porosity, minor pyrite encrusted carbonaceous laminae. Type (2): medium to very coarse grained, loose, subangular to subrounded quartz grains, good to moderate inferred porosity; no shows.
	20	SILTSTONE: as above.

2465-2470m	70	SANDSTONE: beige and light grey, very fine to medium grained, subrounded to subangular quartz aggregates in a dominantly siliceous cement with subordinate dolomite cement and distinctly less calcareous cement; good to moderate sorting, poor to moderate porosity; common, medium to very coarse grained, subrounded to subangular, quartz aggregates, good inferred porosity; no shows.
	30	SILTSTONE: as above.
2470-2475m	60	SANDSTONE: beige to light grey, very fine to fine grained and occasionally medium grained, subrounded to subangular quartz aggregates in a dominantly siliceous cement with less dolomite and more calcite than for the previous interval; good to moderate sorting; poor to moderate porosity; loose medium to very coarse grained, subrounded to subangular quartz grains, good to moderate inferred porosity; minor loose pyrite; no shows.
	40	SILTSTONE: dark brown, highly fissile; carbonaceous laminae common.
2475-2480m	50	SANDSTONE: lesser calcareous cement than above, otherwise as above.
	50	SILTSTONE: as above.
2480-2485m	80	SANDSTONE: white, light grey and beige, very fine to medium grained, well rounded and subrounded, quartz in aggregates with dominantly siliceous cement and lesser calcareous cement and minor dolomite, sorting is moderate and porosity low; fine to very coarse grained, well rounded to subrounded, loose, quartz grains common, moderate to good inferred porosity; no shows.
	20	SILTSTONE: as above.
2485-2490m	85	COAL: black, vitreous lustre, well developed conchoidal fracture.
	10	SANDSTONE: beige and light grey, very fine to medium grained, subrounded to subangular, quartz aggregates in a dominantly siliceous cement; lesser dolomite cement and minor calcareous cement; moderate sorting, poor to moderate porosity; minor, loose, fine to coarse quartz grains; no shows.
	5	SILTSTONE: as above.
2490-2495m	90	COAL: as above.
	5	SANDSTONE: as above.
	5	SILTSTONE: as above.
2495-2500m	40	SANDSTONE: beige to light brown and light grey, very fine to fine grained, occasional medium grained, well rounded to subrounded quartz aggregates in dominantly siliceous cement with minor calcareous cement and minor argillaceous matrix, moderate to good sorting, poor to moderate porosity; minor loose, medium to coarse grained quartz crystals; no shows.
	30	SILTSTONE: dark brown, blocky cuttings, highly fissile, carbonaceous laminae common.
	30	COAL: as above.

2500-2505m	80	SANDSTONE: dominantly siliceous cement, with an increase in dolomitic cement and a decrease in calcareous cement in the quartz aggregates, and an increase in loose quartz grains, otherwise as above.
	10	SILTSTONE: as above.
	10	COAL: as above.
2505-2510m	80	SANDSTONE: white, light grey and beige, subrounded to subangular, very fine to fine grained quartz aggregates in a dominantly siliceous cement with minor calcareous cement and minor argillaceous matrix, moderate sorting, moderate to poor porosity; no shows.
	10	SILTSTONE: as above.
	10	COAL: as above.
2510-2515m	50	SANDSTONE: as above with minor pyrite
	30	COAL: as above.
	20	SILTSTONE: as above.
2515-2520m	100	COAL: as above.
2520-2525m	45	COAL: as above.
	30	SANDSTONE: beige and light grey, very fine to fine grained, subrounded to subangular, quartz grains in aggregates with a dominantly siliceous cement and common, white, water sensitive and argillaceous matrix, moderate sorting, poor to moderate porosity; no shows.
	25	SILTSTONE: dark brown, very carbonaceous, highly fissile.
2525-2530m	60	SILTSTONE: as above.
	40	SANDSTONE: white, beige and grey, very fine to fine grained, subrounded to well rounded, quartz aggregates in a very argillaceous, white clay matrix with dominantly siliceous cement, moderate to good sorting, poor to moderate porosity; no shows.
2530-2535m	90	SANDSTONE: as above.
	10	SILTSTONE: as above.
2535-2540m	90	SANDSTONE: predominantly clear to opaque and frosted, coarse to very coarse grained, subangular to angular, quartz crystals, very good to excellent inferred porosity; lesser beige to light grey, very fine to medium grained, subangular to subrounded quartz aggregates in dominantly siliceous cement, minor calcareous cement, moderate to good sorting, moderate to poor porosity; no shows.
	10	SILTSTONE: light brown to dark brown, carbonaceous blocky cuttings.
2540-2545m	100	SANDSTONE: almost exclusively, clear and frosted coarse to very coarse grained, angular to subangular quartz, well sorted; excellent inferred porosity; very minor light brown to light grey, very fine to fine grained, subrounded to subangular quartz aggregates; minor pyrite, encrusted in quartz aggregates and as loose crystals; no shows.

2545-2550m	100	SANDSTONE: as above.
2550-2555m	100	SANDSTONE: as above.
2555-2560m	95	SANDSTONE: predominantly medium to very coarse grained, angular to very angular quartz, less uniformity of grain size than above, good to very good inferred porosity; an increase in quantity of very fine to fine and medium grained, subangular to subrounded quartz aggregates in predominantly siliceous cement, with common argillaceous matrix, moderate to good sorting, poor to moderate inferred porosity; pyrite commonly encrusted in quartz aggregates and on large, quartz crystals.
	5	SILTSTONE: dark brown, dark to light grey, fissile, carbonaceous cuttings.
	Minor	COAL: as above.
2560-2565m	90	SANDSTONE: white and buff, light grey, predominantly fine to very fine grained, occasionally medium grained, subangular to subrounded quartz aggregates in a dominantly siliceous cement with common, white, soft, water sensitive clay matrix, occasionally argillaceous, trace black carbonaceous laminae, poor sorting, fair porosity; minor clear to opaque and frosted, quartz crystals, good inferred porosity; no shows.
	10	SILTSTONE: dark to light grey and light to dark brown, carbonaceous, firm, occasionally subfissile.
2565-2570m	90	SANDSTONE: increase in water sensitive, white kaolin and argillaceous matrix and pyrite which is commonly encrusted in quartz aggregates, otherwise as above.
	10	SILTSTONE: as above.
2570-2575m	80	SANDSTONE: white, clear and buff, mainly fine to occasionally medium grained, subangular to subrounded quartz aggregates in a dominantly firm, siliceous cement with a white, water sensitive clay matrix, occasionally argillaceous, generally clean with moderate sorting, moderate to poor porosity, 5% blue-white relatively bright fluorescence with instantaneous milky white crush cut.
	20	SILTSTONE: as above.
2575-2580m	90	SANDSTONE: white, buff, light grey and light brown, very fine to fine, to occasionally medium grained, subangular to subrounded quartz aggregates in an increasingly silt matrix, with occasional black carbonaceous laminations and discrete calcite clasts, very clean, trace pyrite, good sorting, poor to moderate porosity, 10% blue-white, relatively bright fluorescence with slow to instantaneous diffuse milky white cut.
	10	SILTSTONE: as above.

2580-2585m	80	SANDSTONE: white to opaque and frosted, coarse to very coarse grained, subangular to angular, loose quartz grains, minor quartz aggregates, excellent sorting, good inferred porosity; trace to 5% shows as above.
	20	SILTSTONE: as above.
2585-2590m	60	SILTSTONE: as above.
	40	SANDSTONE: as above.
2590-2595m	80	SANDSTONE: increasing amounts of fine to medium grained, subangular to subrounded quartz aggregates in a dominantly siliceous and minor dolomite cement, minor argillaceous matrix, firm, moderate sorting, fair to good porosity; no shows; common loose, angular, coarse grained sandstone as above.
	20	SILTSTONE:
2595-2600m	95	SANDSTONE: predominantly opaque and frosted, loose, coarse to very coarse grained, angular quartz with occasional white to light grey, fine to medium grained, subangular to subrounded quartz aggregates, otherwise as above.
	5	SILTSTONE: as above.
2600-2605m	70	SANDSTONE: as above.
	30	SILTSTONE: grey, brown and beige, firm, blocky to subfissile, micromicaceous, siliceous, argillaceous, occasionally carbonaceous.
2605-2610m	70	SILTSTONE: as above.
	20	SANDSTONE: tan and light grey, very fine to fine grained, occasionally medium grained, subangular to subrounded quartz aggregates in a dominantly siliceous cement with common carbonaceous laminae, good to moderate sorting; poor to moderate porosity; loose, coarse to very coarse grained, subangular to subrounded, clear and frosted quartz grains, good to moderate inferred porosity; no shows.
	10	COAL: well developed conchoidal fracture, vitreous to subvitreous lustre.
2610-2615m	90	SILTSTONE: as above.
	10	SANDSTONE: beige to tan brown and light grey, subrounded to subangular, very fine to fine grained and occasionally medium grained quartz aggregates in a dominantly siliceous cement; minor coarse to very coarse grained, rounded to subrounded, loose quartz grains; aggregates have moderate sorting with poor to moderate porosity; trace to 5% white-blue hydrocarbon fluorescence with slow streaming, white cut; trace dull yellow mineral fluorescence.
2615-2620m	80	SILTSTONE: dark brown, very carbonaceous, blocky cuttings.
	20	SANDSTONE: increase in angular to subangular, coarse to very coarse, loose quartz grains; otherwise as above.

2620-2625m	70	SILTSTONE: dark brown as above; also some is light grey, less carbonaceous than above, grades to a very fine sandstone.
	30	SANDSTONE: white, cream and light grey, very fine to fine grained, subrounded quartz in aggregates with predominantly siliceous cement, with minor calcareous cement and an increased percentage of white kaolin matrix; poor to moderate sorting with poor porosity; minor loose subangular to subrounded, coarse to very coarse grained quartz crystals; trace white-blue hydrocarbon fluorescence with slow streaming crush cut.
2625-2630m	60	SILTSTONE: dark brown, carbonaceous laminae common.
	30	SANDSTONE: dark brown, tan and light grey, very fine to fine and occasionally medium grained, moderate sorting, subrounded to subangular quartz grains in aggregates with predominantly siliceous cement, also common dolomitic cement; poor to very poor porosity; no shows.
	10	COAL: black, vitreous lustre, well developed conchoidal fracture.
2630-2635m	70	SILTSTONE: as above.
	30	SANDSTONE: trace to 5% blue-white fluorescence with extremely slow diffuse white crush cut; otherwise as above.
		SPOT SAMPLE
2635-2639m	80	SANDSTONE: predominantly white, beige light grey and pale brown, fine to occasionally medium grained, subangular to subrounded, quartz aggregates in a dominantly siliceous, partly dolomitic cement, minor white clay matrix, firm, moderate sorting; poor porosity; 5-10% blue-white fluorescence with extremely slow diffuse crush cut.
	20	SILTSTONE: as above.
2639-2640m	60	SANDSTONE: increasing amounts of coarse to very coarse grained, subangular, loose quartz grains; no shows; otherwise as above.
	20	SILTSTONE: as above.
	20	COAL: as above.
2640-2645m	60	SANDSTONE: trace to 5% blue-white fluorescence with streaming white cut; otherwise as above.
	20	SILTSTONE: as above.
	20	COAL: as above.
2645-2650m	70	SANDSTONE: dark grey to light grey and dark to light brown, fine to medium grained, subrounded to subangular, quartz aggregates in dominantly siliceous and partly dolomitic cement with occasional argillaceous matrix, moderate to good sorting, poor to moderate porosity; loose, angular to subangular quartz crystals, coarse to very coarse grained; good inferred porosity; trace to 5% hydrocarbon fluorescence with slow milky-white crush cut.
	30	SILTSTONE: dark grey, carbonaceous and planar cuttings, displaying very good fissility.

2650-2655m	80	SANDSTONE: light brown, beige and light grey, very fine to medium grained, subrounded to subangular, quartz aggregates in dominantly siliceous and commonly dolomitic cement with occasional argillaceous matrix, moderate to good sorting, poor to moderate porosity; very common loose, subangular to subrounded, coarse to very coarse grained, quartz crystal; good inferred porosity; minor pyrite; 5% hydrocarbon fluorescence with rapid diffuse milky-white crush cut.
	20	SILTSTONE: as above.
2655-2660m	90	SANDSTONE: predominantly coarse to very coarse grained, angular to subangular, loose quartz crystals; good inferred porosity; lesser amounts of siliceously and dolomitically cemented, fine to medium grained, subrounded to subangular quartz aggregates with minor argillaceous matrix; pyrite in minor quantities in quartz aggregates; 5% hydrocarbon fluorescence with rapid diffuse milky white cut.
	10	SILTSTONE: dark brown, micromicaceous, subfissile.
2660-2665m	90	SANDSTONE: increase in the percentage of quartz aggregates, otherwise as above.
	10	SILTSTONE: as above.
2665-2670m	80	SANDSTONE: predominantly light grey, beige, white and dark brown, fine to medium grained, subrounded to subangular, quartz aggregates in dominantly siliceous and dolomitic cement with occasional argillaceous matrix and common carbonaceous laminae; common subrounded to subangular, coarse to very coarse grained, loose quartz grains; good inferred porosity; trace to 5% hydrocarbon fluorescence with slow streaming milky white cut.
	20	SILTSTONE: as above.
2670-2675m	60	SANDSTONE: predominantly siliceously cemented, fine to medium grained, subrounded to subangular quartz aggregates, dark brown, light grey and beige in colour, moderate sorting, poor porosity; common loose, coarse to very coarse grained, angular to subangular quartz crystals common; trace hydrocarbon fluorescence with rapid milky-white crush cut.
	30	SILTSTONE: micromicaceous, dark brown, fissile, carbonaceous.
	10	COAL: subvitreous to vitreous lustre with marked conchoidal fracture.
2675-2680m	60	SANDSTONE: increase in argillaceous matrix, otherwise as above.
	40	SILTSTONE: as above.

2680-2685m	60	SILTSTONE: dark brown, carbonaceous, micromicaceous and fissile cuttings.
	30	SANDSTONE: tan, brown, dark brown, light grey and dark grey, fine to very fine grained, occasionally medium grained, subangular to subrounded quartz aggregates in dominantly siliceous and dolomitic cement with minor argillaceous matrix; minor pyrite; trace hydrocarbon fluorescence with diffuse; slow milky white crush cut.
	10	COAL: as above.
2685-2690m	60	SILTSTONE: as above.
	30	SANDSTONE: as above.
	10	COAL: as above.
2690-2695m	50	SANDSTONE: as above.
	50	SILTSTONE: as above.
2695-2700m	60	SANDSTONE: as above.
	40	SILTSTONE: as above.
2700-2705m	80	SANDSTONE: as above.
	20	SILTSTONE: as above.
2705-2710m	80	SANDSTONE: beige, dark brown and light grey, fine to medium grained, subangular to subrounded quartz aggregates in dominantly siliceous to dolomitic cement with minor argillaceous matrix, moderate sorting; poor to moderate porosity; common angular to subangular, coarse to very coarse grained, loose quartz crystals common; trace to 5% hydrocarbon fluorescence with rapid diffuse (and streaming) milky white cut.
	20	SILTSTONE: dark brown, carbonaceous and fissile, grading to very fine sandstone.
2710-2715m	60	SANDSTONE: increase in the number of loose subangular to angular, quartz crystals; otherwise as above; 5% hydrocarbon fluorescence with rapid diffuse milky white cut.
	40	SILTSTONE: as above.
2715-2720m	60	SANDSTONE: dark grey, light grey, dark brown and light brown, fine to medium grained, subrounded to subangular, quartz aggregates in dominantly siliceous cement with common calcareous and dolomite cement and minor argillaceous matrix, moderate sorting; poor to moderate porosity; loose, coarse to very coarse grained, angular to subangular quartz grains common; 5% hydrocarbon fluorescence with slow diffuse milky white cut.
	40	SILTSTONE: as above.
2720-2725m	70	SANDSTONE: as above; with less calcareous and dolomite cement.
	30	SILTSTONE: as above.

2725-2730m	60	SANDSTONE: clear, white, beige and brown, very fine to medium grained, subangular to angular, quartz aggregates in siliceous cement, calcareous cement common, occasionally argillaceous, moderate sorting; tight to poor porosity; 5-10% blue-white fluorescence with slow to moderate diffuse cut.
	40	SILTSTONE: as above.
2730-2735m	80	SILTSTONE: dark brown to dark grey, argillaceous, carbonaceous and blocky to subfissile, firm to hard, micromicaceous, grading in part to very fine sandstone as above.
	20	SANDSTONE: buff, tan, grey, dark and brown, very fine to fine grained, occasionally medium grained, subangular to subrounded quartz aggregates in a siliceous, partly dolomitic cement; very argillaceous to silty matrix; poor sorting, trace pyrite; poor porosity to tight; 5% pale blue-white fluorescence with very slow, weak diffuse cut.
2735-2740m	90	SILTSTONE: as above.
	10	SANDSTONE: as above.
2740-2745m	60	SILTSTONE: as above.
	30	COAL: as above.
	10	SANDSTONE: as above.
2745-2750m	60	SILTSTONE: predominantly dark grey to brown, very carbonaceous, micromicaceous, scattered coal laminations, subfissile to fissile, blocky, firm to hard.
	40	SANDSTONE: beige, tan and white, fine to occasionally medium grained, subangular to subrounded, quartz aggregates in a dominantly siliceous, partly dolomite cement, slightly argillaceous to silty matrix, firm to hard; poor porosity; 10% relatively bright blue-white fluorescence in moderate to slow weak diffuse cut.
2750-2755m	50	SANDSTONE: 15% blue-white fluorescence with slow diffuse weak cut; otherwise as above.
	50	SILTSTONE: as above.
2755-2760m	90	SILTSTONE: as above.
	10	SANDSTONE: as above; trace shows.
2760-2765m	90	SILTSTONE: as above.
	10	SANDSTONE: as above; trace shows.
2765-2770m	70	SANDSTONE: white and grey, predominantly very fine to fine grained, subangular to subrounded quartz aggregates in a dominantly soft, water sensitive matrix, argillaceous with common black carbonaceous specks, moderate sorting; poor porosity; 10% blue-white fluorescence with slow streaming white cut; occasional scattered coarse to very coarse grained, very angular to angular quartz grains.
	30	SILTSTONE: as above.

2770-2775m	80	SANDSTONE: white, clear to opaque and frosted, hard, predominantly medium to coarse grained, subangular to subrounded, loose quartz aggregates in a dominantly siliceous cement, minor white, kaolinite matrix, good sorting; moderate porosity; 30% relatively bright blue-white fluorescence with moderate streaming to diffuse white cut.
	20	SILTSTONE: grey and light brown, argillaceous, carbonaceous, soft to firm, minor carbonaceous laminations scattered throughout.
2775-2780m	80	SANDSTONE: 15% blue-white fluorescence with slow to moderate streaming white cut; otherwise as above.
	20	SILTSTONE: as above.
2780-2785m	60	SANDSTONE: 10-15% blue-white fluorescence, very slow to slow diffuse cut; otherwise as above.
	40	SILTSTONE: as above.
2785-2790m	60	SANDSTONE: white, clear, beige, grey, very fine to fine grained, quartz aggregates in dominantly siliceous cement, with minor calcareous cement, good sorting; poor porosity; 5% blue-white fluorescence with very slow, diffuse white cut.
	40	SILTSTONE: as above.
2790-2795m	70	SANDSTONE: as above.
	30	SILTSTONE: as above.
2795-2800m	60	SANDSTONE: as above.
	40	SILTSTONE: as above.
2800-2805m	70	SANDSTONE: white, beige and dark brown quartz aggregates with 5% blue-white fluorescence with weak slow diffuse cut; otherwise as above.
	30	SILTSTONE: as above.
2805-2810m	60	SANDSTONE: clear, white, dark grey and brown, very fine to medium grained, subangular to subrounded quartz aggregates, with dominantly siliceous cement and minor calcareous cement; 25% blue-white fluorescence with rapid diffuse and slow streaming cut.
	40	SILTSTONE: brown and grey, soft to moderately firm, minor carbonaceous laminations.
2810-2815m	70	SANDSTONE: 2 types: Type (1): tan to dark brown and light grey, cream, very fine to fine and occasionally medium grained, well rounded to subrounded quartz aggregates in a predominantly siliceous cement with minor calcareous cement, good to moderate sorting; poor porosity. Type (2): coarse to very coarse grained, very common subrounded to angular, loose quartz crystals; good inferred porosity. 20% hydrocarbon fluorescence with rapid diffuse dull milky-white cut.
	30	SILTSTONE: grades to very fine sandstone; otherwise as above. SPOT SAMPLE

2816m	60	SANDSTONE: as above with 30% hydrocarbon fluorescence with rapid, diffuse dull milky-white cut.
	40	SILTSTONE: as above.
2815-2820m	60	SANDSTONE: minor argillaceous matrix but aggregates still highly cemented and represent greater proportion of the sandstone; otherwise as above; 15% hydrocarbon fluorescence with rapid, diffuse, dull to semi-bright crush cut.
	40	SILTSTONE: as above.
		SPOT SAMPLE
2821m	60	SANDSTONE: as above; 30% hydrocarbon fluorescence with diffuse, rapid, dull milky-white cut.
	40	SILTSTONE: grades to very fine sandstone; otherwise as above.
2820-2825m	70	SANDSTONE: as above; 30% blue-white hydrocarbon fluorescence with slow, diffuse, dull milky-white cut.
	30	SILTSTONE: as above.
2825-2830m	70	SANDSTONE: same as 2810-2815m giving Type (1) and Type (2); 30% blue-white hydrocarbon fluorescence with slow streaming white cut.
	30	SILTSTONE: as above.
2830-2835m	70	SANDSTONE: as above; 30% hydrocarbon fluorescence, diffuse, dull milky white cut.
	30	SILTSTONE: as above.
2835-2840m	50	SANDSTONE: translucent to occasionally milky white, loose grains and aggregates, moderate to hard, medium grained, occasionally coarse to very coarse grained, subangular to subrounded, siliceous cemented aggregates, with possibly minor dolomite cement, occasional carbonaceous flecks; poor to moderate visible porosity; 30% moderate to bright white, yellowish white and bluish white fluorescence; slow streaming cut; no oil stain.
	50	SILTSTONE: as above.
	Trace	COAL: approaching 5%.
		C.B.U. @ 2841.6m.
2841.6m	70	SILTSTONE: as above.
	30	SANDSTONE: as above; 20% dull to moderate bright yellowish white and occasionally blue fluorescence; slow steaming white cut; no stain; transparent residue; tight.
2840-2845m	50	SANDSTONE: as above; 20% milky white to bluish white fluorescence; slow diffuse cut; no oil stain.
	40	SILTSTONE: steely grey, brownish grey and black, soft to firm, blocky to angular cuttings, highly carbonaceous, occasional fissile, shale cuttings.
	10	COAL: black, brittle, vitreous lustre, conchoidal fracture.

2845-2850m	50	SILTSTONE: as above.
	50	SANDSTONE: as above; 5% fluorescence as above; diffuse to occasional streaming white cut.
	Trace	COAL: (approaching 5%) as above.
2850-2855m	70	SANDSTONE: as above; 20% fluorescence as above, slow diffuse to occasionally streaming white cut.
	20	SILTSTONE: as above.
	10	COAL: as above.
	Trace	PYRITE.
2855-2860m	60	SILTSTONE: as above.
	40	SANDSTONE: as above; 5% dull bluish white fluorescence; slow, weak streaming to diffuse cut.
	Trace	COAL: as above.
2860-2865m	60	SILTSTONE: light grey, grey brown and dark grey, soft to hard, carbonaceous.
	40	SANDSTONE: translucent to light grey aggregates with occasional loose grains, medium grained, subangular to subrounded, moderate sorting, minor argillaceous matrix, siliceous cement, poor visible porosity; 5% bluish white and occasionally yellow fluorescence; very slow diffuse cut.
	Trace	PYRITE.
2865-2870m	80	SILTSTONE: as above.
	20	SANDSTONE: as above; 5-10% fluorescence as above; weak diffuse to occasionally streaming cut.
	Trace	COAL: as above.
2870-2875m	60	SILTSTONE: as above.
	40	SANDSTONE: as above. 5% dull bluish white fluorescence with weak crush cut.
	Trace	COAL: as above.
	Trace	PYRITE.
2875-2880m	70	SILTSTONE: as above; carbonaceous.
	20	SANDSTONE: white, firm to hard, very fine to fine grained, moderately to poorly sorted, subangular, argillaceous matrix, poor visible porosity; trace bright blue fluorescence, very fast, strong streaming white cut; no oil stain.
	10	COAL: as above; grades into carbonaceous siltstone.
	Trace	PYRITE.
2880-2885m	70	SILTSTONE: dark brownish grey to steely grey, moderately hard, carbonaceous and subfissile, grading into a fissile carbonaceous shale.
	30	SANDSTONE: as above; trace bright bluish-white and yellow-white fluorescence; no instant cut; weak crush cut.
	Trace	COAL: approaching 5% as above.
	Trace	PYRITE.

2885-2890m	60	SANDSTONE: light grey, white and translucent; 2 types - Type (1): loose grains, medium to predominantly coarse grained, subrounded to subangular and occasional rounded, well sorted; good inferred porosity. Type (2): aggregates, fine to medium grained, moderately hard to hard, moderately sorted, subangular, minor argillaceous matrix, siliceous cement; poor visible porosity; trace dull to moderately bright yellow fluorescence; no instant cut; weak crush cut.
	40	SILTSTONE: as above.
	Trace	COAL: as above.
	Trace	PYRITE.
2890-2895m	50	SANDSTONE: as above; 5% blue-white hydrocarbon fluorescence; no instant cut; fast crush cut.
	50	SILTSTONE: as above.
	Trace	COAL: as above.
2895-2900m	50	SANDSTONE: as above; 5% blue-white hydrocarbon fluorescence; no instant cut; slow milky white crush cut.
	50	SILTSTONE: as above.
	Trace	COAL: as above.
2900-2905m	50	SANDSTONE: dominance of Type (1) over Type (2); otherwise as above; 5% blue-white fluorescence; no instant cut; milky white slow crush cut.
	50	SILTSTONE: as above; with carbonaceous matter.
2905-2910m	70	SILTSTONE: as above; with increasing carbonaceous matter.
	30	SANDSTONE: equal amounts of Type (1) and Type (2), trace blue-white hydrocarbon fluorescence; no instant cut; very slow dull diffuse milky white crush cut; otherwise as above.
2910-2915m	70	SILTSTONE: as above; carbonaceous flecks common, moderately hard.
	30	SANDSTONE: Type (2) more dominant than Type (1); otherwise as above.
2915-2920m	70	SILTSTONE: light brown, dark brown and dark grey, visible laminations and flecks of carbonaceous matter, moderately hard.
	30	SANDSTONE: clear, white, light brown and light grey - 2 types: Type (1): separate quartz grains, medium to coarse grained, subangular to subrounded, good inferred porosity. Type (2): quartzose aggregates with dominantly siliceous cement and minor dolomite cement, very fine to fine to medium grained, minor argillaceous matrix; poor porosity; 5% blue-white hydrocarbon fluorescence; slow diffuse cut and slow streaming cut.
2915-2920m cont'd		COAL: black, vitreous lustre, conchoidal fracture.
	Trace	PYRITE.
	Trace	

2920-2925m	80	SILTSTONE: as above.
	20	SANDSTONE: as above, trace hydrocarbon blue-white fluorescence with slow diffuse milky white cut, also some carbonaceous matter.
	Trace	COAL: as above.
2925-2930m	60	SILTSTONE: as above, increasingly fissile.
	20	SANDSTONE: as above, trace blue-white hydrocarbon fluorescence with diffuse cut.
	20	COAL: as above.
2930-2935m	70	SILTSTONE: as above; with high amounts of carbonaceous matter.
	20	SANDSTONE: as above; with Type (2) dominant; 5% blue-white hydrocarbon fluorescence, slow diffuse milky white cut.
	10	COAL: as above.
2935-2940m	50	SANDSTONE: clear, white, light grey and light brown - 2 types: Type (1): separate quartz grains, subrounded to subangular, fine to medium grained, good inferred porosity. Type (2): dominant over (1); quartzose aggregates with siliceous cement and minor dolomite cement, very fine to fine grained, common carbonaceous matter in Type (2). 20% hydrocarbon fluorescence, yellowish white with bright milky white diffuse cut; poor porosity.
	50	SILTSTONE: dark grey, light and dark brown with laminations and carbonaceous flecks, soft to moderately hard.
	Trace	COAL: as above.
2940-2945m	50	SANDSTONE: as above; with an increase in Type (2); 30% yellow-white fluorescence; slow diffuse weak milky white cut.
	50	SILTSTONE: as above.
	Trace	COAL: grades to carbonaceous shale.
2945-2950m	50	SANDSTONE: contains both Type (1) and Type (2); 10-15% blue-white to yellow-white fluorescence; slow diffuse and slow streaming milky white cut.
	50	SILTSTONE: as above.
	Trace	COAL: as above.
2950-2955m	50	SILTSTONE: very carbonaceous, dark brown, blocky fissile cuttings.
	40	SANDSTONE: white and beige, very firm, fine to medium grained, subrounded to subangular, quartz aggregates, in a predominantly siliceous cement with common white clay matrix; pyrite encrusted, moderate sorting; poor to very poor porosity; also common loose, coarse to very coarse grained, subangular to subrounded quartz crystals; 5% hydrocarbon fluorescence with dull slow diffuse cut; trace yellow mineral fluorescence.
	10	COAL: as above.

2955-2960m	80	SILTSTONE: as above; except more steel grey in colour and highly carbonaceous siltstone.
	20	SANDSTONE: as above; no shows; very poor visible porosity.
2960-2965m	60	SILTSTONE: brownish grey, light grey and dark grey, soft to moderately hard, blocky cuttings, carbonaceous and micaceous in parts.
	30	SANDSTONE: translucent to milky white, fine to coarse grained, predominantly medium grained, aggregates are moderately hard, angular to subangular, moderate to poorly sorted, with siliceous cement; no shows; 5% dull yellow mineral fluorescence; poor visible porosity.
	10	COAL: black, brittle, vitreous to earthy lustre, conchoidal fracture when vitreous.
2965-2970m	70	SILTSTONE: as above.
	20	SANDSTONE: as above; no shows; poor visible porosity.
	10	COAL: as above.
	Trace	PYRITE.
2970-2975m	80	SILTSTONE: as above.
	20	SANDSTONE: as above; no shows; poor visible porosity.
	Trace	COAL: as above.
2975-2980m	50	SILTSTONE: dark brown, brownish grey and dark grey, very hard, carbonaceous, subfissile when highly carbonaceous, grades into very fine sandstone in places.
	50	SANDSTONE: translucent to light grey, moderately hard to very hard, very fine to coarse grained aggregates, angular to occasionally subrounded, poorly sorted, clay matrix, siliceous and dolomitic cement; 20% dull yellow dolomite mineral fluorescence; poor visible porosity; no shows.
	Trace	COAL: as above.
	Trace	PYRITE.
2980-2985m	60	SILTSTONE: as above.
	40	SANDSTONE: as above; dolomite cemented aggregates; no shows; poor visible porosity.
	Trace Trace	COAL: nearly 5%, as above. PYRITE.
2985-2990m	60	SILTSTONE: as above.
	30	SANDSTONE: as above; very poor visible porosity; no shows.
	10	COAL: black, vitreous to dominantly earthy lustre, grades into carbonaceous siltstone.
	Trace	CLAYSTONE.
2990-2995m	80	SILTSTONE: as above.
	20	SANDSTONE: quartz grains, rounded to subangular; trace yellow white hydrocarbon fluorescence; slow dull milky white diffuse cut.
	Trace	COAL: as above.

2995-3000m	90	SILTSTONE: as above.
	10	SANDSTONE: clear, white and light brown, very fine to fine grained, subrounded to subangular, quartz aggregates, siliceous cement, clay matrix; trace yellow-white to blue-white fluorescence with slow dull milky white diffuse cut and minor slow streaming cut.
	Trace	COAL: vitreous lustre; as above.
3000-3005m	90	SILTSTONE: as above.
	10	SANDSTONE: as above.
	Trace	COAL: as above.
3005-3010m	80	SILTSTONE: as above.
	10	SANDSTONE: as above; no shows.
	10	COAL: grades to carbonaceous shale.
3010-3015m	50	SANDSTONE: as above; with a trace of blue-white fluorescence; no instant cut; dull milky white crush cut.
	50	SILTSTONE: as above.
	Trace	COAL: as above.
3015-3021m	60	SANDSTONE: as above; with a trace of blue-white fluorescence; dull milky white diffuse cut.
	40	SILTSTONE: grade to carbonaceous shale.
	Trace	COAL: as above.

APPENDIX 2

SIDEWALL CORE

DESCRIPTIONS

SNAPPER-6

SIDEWALL CORE DESCRIPTIONS

<u>No.</u>	<u>Depth</u>	<u>Rec.</u> (mm)	<u>Rock</u> <u>Type</u>	<u>Description</u>
1	2998.1			NO RECOVERY.
2	2988.0	33	COAL	Black, hard, earthy lustre.
3	2952.8	8	SANDSTONE	Light brown, medium grained, moderately to well sorted, subangular, friable, clay matrix, no shows, pyrite and shale inclusions.
4	2946.1	20	COAL	Black, firm, earthy appearance, very low vitrinite content.
5	2905.0	20	CARBONACEOUS SILTSTONE	Dark brown, firm, micromicaceous.
6	2868.1			NO RECOVERY.
7	2865.3	25	SANDSTONE	Light grey, medium grained, moderate sorting, subangular, friable, argillaceous matrix; no shows; carbonaceous fragments, water sensitive matrix.
8	2847.5	20	Sandstone	Light grey, fine grained, moderate sorting, subangular, friable; no shows; with a high percentage of argillaceous matrix, carbonaceous inclusions.
9	2829.0			NO RECOVERY.
10	2786.0	25	CARBONACEOUS SILTSTONE	Dark grey, very fine grained, soft, sandy (very fine), mica inclusions.
11	2750.1	15	SANDSTONE	Light grey, medium grained, moderate sorting, subangular, friable, clay matrix, siliceous cement, coal and shale inclusions; trace to 5% fluorescence; spotty dull blue-white diffuse cut; no cut residue.
12	2744.0	15	CARBONACEOUS SILTSTONE	Black, very firm, sandy patches, micromicaceous.
13	2698.6			NO RECOVERY.
14	2659.1	25	SANDSTONE	Light grey, medium to coarse grained, moderate sorting, subangular, friable, slightly calcareous, clay matrix; pyrite and carbonaceous inclusions; 15-20% fluorescence; patchy dull blue-white diffuse cut; no residue.
15	2654.0	20	SANDSTONE	Light grey, medium to coarse grained, moderate sorting, subangular, friable, slightly calcareous, clay matrix; 10% fluorescence; patchy dull to bright blue-white, rapid streaming cut; no residue; minor siliceous cement.

16	2640.4	30	SANDSTONE	Light grey, fine grained, moderate to good sorting, subrounded, friable, high percentage of clay matrix; 5% fluorescence; spotty bright blue-white rapid diffuse crush cut; no residue; carbonaceous inclusions.
17	2636.0	15	CARBONACEOUS SILTSTONE	Dark grey, very hard, siliceous, common mica crystals.
18	2580.0	45	CLAYSTONE	Dark grey, very hard, sandy, siltstone and sand inclusions.
19	2517.0	20	CARBONACEOUS SILTSTONE	Dark grey, hard, earthy lustre.
20	2484.9	15	SANDSTONE	Light grey, fine grained, poor sorting, angular, soft, white clay matrix; no shows, carbonaceous and coaly laminae.
21	2462.0	30	SILTSTONE	Dark grey, soft, clayey, fine and coarse mica flake inclusions.
22	2435.3	20	SANDSTONE	Light grey, medium grained, good sorting, subangular, friable, clay matrix; no shows; carbonaceous laminae, shale inclusions, good porosity.
23	2396.0	20	CARBONACEOUS SILTSTONE	Dark grey, firm, micromicaceous.
24	2391.5			NO RECOVERY.
25	2337.1	20	CLAYSTONE	Light grey, soft, sandy, mica inclusions.
26	2274.1	20	CARBONACEOUS CLAYSTONE	Black, soft.
27	2211.0	30	SANDSTONE	Light grey, very fine grained, good to moderate sorting, subrounded, friable, clay matrix; no shows; common carbonaceous laminae.
28	2153.5	30	SILTSTONE	Dark grey, hard.
29	2099.0	30	SILTSTONE	Black, firm, clayey, micromicaceous.
30	2037.5	25	CLAYSTONE	Light grey, soft, sandy, carbonaceous streaks.
31	1976.1	33	SHALE	Medium to light grey, soft, slightly sandy.
32	1915.0	28	SHALE	Medium to light grey, soft, sandy.
33	1870.0	24	SHALE	Dark grey, brown, soft, micaceous, patches of pyrite present.
34	1845.0	31	SILTSTONE	Medium to light grey, firm, sandy.
35	1818.5	21	SILTSTONE	Medium grey, firm, siliceous, coal streaks.
36	1787.0	58	SHALE	Medium grey, brown, firm, carbonaceous fragments.

37	1759.5	26	SHALE	Medium to light grey, soft, lignite fragments and coaly flecks.
38	1726.0	17	SILTSTONE	Light brown, medium light grey, soft, slightly sandy, light and dark laminations.
39	1704.1	38	SILTSTONE	Light grey, soft, sandy, coaly and carbonaceous laminations.
40	1675.0			NO RECOVERY.
41	1656.0	34	SILTSTONE	Light grey, soft, siliceous, carbonaceous laminations.
42	1605.0	49	SHALE	Medium to light grey to soft, occasionally well rounded, medium to coarse quartz grains.
43	1556.9	33	SILTSTONE	Medium to dark grey, soft, slightly calcareous, slightly sandy, well laminated, flecks of pyrite and carbonaceous matter.
44	1516.0	23	SHALE	Dark brown, soft, slightly micaceous.
45	1475.0	48	SHALE	Medium light grey, firm, very slightly sandy, rare coal fragments.
46	1433.5	51	SILTSTONE	Brown, soft, slightly sandy, coaly laminations and light and dark laminations.
47	1413.5	43	SANDSTONE	Medium grey, medium to coarse grained, poor sorting, subangular, friable, 5% calcareous, tending to unconsolidated, 30% fluorescence, even, dull, light blue, no cut or crushed cut. slight hydrocarbon odour.
48	1412.5	40	SANDSTONE	Medium to light grey, very fine grained, good sorting, subrounded, firm, argillaceous, carbonaceous laminae; 40% fluorescence; patchy, tending to bright pale yellow, slow streaming, light blue fluorescent cut; slight hydrocarbon odour.
49	1411.5	48	SANDSTONE	Medium to dark grey, fine to coarse grained, poor sorting, subangular, friable, argillaceous and containing rock fragments; 10% fluorescence; patchy, dull, pale yellow; slow diffuse light blue fluorescent cut; strong hydrocarbon odour.
50	1410.5	35	SANDSTONE	Medium grey, very fine to fine grained, good sorting, subangular, firm, argillaceous; 50% fluorescence; patchy, moderate, pale yellow; moderate streaming light blue fluorescent cut; strong hydrocarbon odour.

51	1410.0	34	SANDSTONE	Medium grey, fine to coarse grained, poor sorting, subangular, firm to hard, very silty, more cemented (silica), than previous SWCs, strong hydrocarbon odour.
52	1407.7	32	SANDSTONE	Medium grey, fine to very coarse grained, very poor sorting, subangular to subrounded, friable, unconsolidated, rounded coal grains; 20% fluorescence; even, dull, pale yellow, instantaneous diffuse light blue fluorescent cut; very strong hydrocarbon odour.
53	1407.0	33	SANDSTONE	Medium grey, medium to very coarse grained, very poor sorting, subangular to subrounded, friable, 20% calcareous, unconsolidated; 30% fluorescence, dull, pale yellow, slow streaming, light blue, fluorescent cut; strong hydrocarbon odour.
54	1357.5	30	SANDSTONE	Medium to dark grey, medium grained, good sorting, subangular to subrounded, friable, unconsolidated.
55	1351.5	38	SANDSTONE	Medium to dark grey, fine to medium grained, good sorting, subangular, friable, unconsolidated, water sensitive.
56	1348.0	48	SANDSTONE	Medium grey, fine to medium grained, moderate sorting, subangular, soft, argillaceous, pyritic in parts, minor glauconite.
57	1342.0	43	SILTSTONE	Grey to brown, hard, occasional coarse quartz grains.
58	1337.0	44	SILTSTONE	Brown, hard, 10% calcareous, occasional coarse quartz grains, silica cemented.
59	1331.0	52	CALCAREOUS SILTSTONE	Medium to dark grey, hard, 30% calcareous, glauconitic, fissile.
60	1325.0	42	CALCILUTITE	Medium to dark grey, soft, 30% calcareous.

SNAPPER-6

SIDEWALL CORE GAS ANALYSIS

<u>NO.</u>	<u>DEPTH</u>	<u>C1</u>	<u>C2</u>	<u>C3</u>	<u>C4</u>	<u>C5</u>	<u>C6</u>
3	2952.8	148	14	7	3		
7	2865.3	428	90	44	22	64	50
11	2750	107	37	17	26	46	18
14	2659	247	434	812	944	482	346
15	2654	297	48	57	52	70	86
16	2640.3	58	28	29	41	29	31
20	2484.8	148	14	13	14	20	41
22	2435.2	1345	208	40	5	4	5
47	1413.5	33	11	6	3	2	3
48	1412.5	196	118	96	51	39	40
49	1411.5	544	2888	1812	3466	1613	922
50	1410.5	560	3068	1812	857	627	490
51	1410	231	1963	2266	3277	1165	922
52	1407.7	527	1173	831	420	308	209
53	1407	660	4602	5437	5034	1702	1152

31381/45

APPENDIX 3

VELOCITY SURVEY

REPORT

APPENDIX 4
VELOCITY SURVEY REPORT
SNAPPER-6

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ENCLOSURES

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

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1. SUMMARY PAGE

WELL: SNAPPER-6
TYPE: Wildcat
BASIN: Gippsland
LICENCE: VIC/L10
DATE OF SURVEY: January 14, 1986
CONTRACTOR: Schlumberger
RECORDED BY: S. P. Ramiah (Schlumberger)
WITNESSED BY: F. A. Romanik (Esso)
COMPUTATIONS BY: M. Sanders (Schlumberger)
WELLHEAD CO-ORDINATES: 38° 13' 55.871" S
148° 00' 41.89" E
X = 588,539.6 mE
Y = 5,767,924.5 mN
RIG: Southern Cross
WATER DEPTH: 55.0 m
K.B. ELEVATION: 21.0 m AMSL
D.F. ELEVATION: 20.7 m AMSL
T.D. WHEN SHOT: 3021 mKB
CASING DEPTHS: 20" @ 193m, 13 3/8" @ 793m
ENERGY SOURCE: Bolt Airgun, 120 cu. in.
SOURCE DEPTH: 9.1m below MSL
SOURCE OFFSET: 37 m
SOURCE AZIMUTH: 90°
SOURCE SENSOR: Accelerometer
DOWNHOLE GEOPHONE: Geospace HS-1
RECORDING INSTRUMENT: Schlumberger Cyber Service Unit (CSU)

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2. FIELD REPORT FROM ESSO REPRESENTATIVE

SNAPPER-6 VELOCITY SURVEY

The check shot survey followed a wiper trip and the sonic log.

Schlumberger rigged up for the Check Shot survey at 1330 on January 14 and zeroed the tool at 1350. Twelve levels were shot from 200mKB to 3003mKB. The survey was completed at 1720. All levels had very good breaks and even the 200m level in the casing was not too noisy.

All of the Schlumberger equipment operated very well.

RICK ROMANIK

Doc 2307L/44

3. SCHLUMBERGER PROCESSING REPORT

1.0 INTRODUCTION

A velocity check shot survey was conducted in the Snapper - 6 well on 14-January-1986. Twelve levels from 200 metres to 3003 metres below DF were shot using an airgun source. All 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 Parameters

Elevation SRD	Mean Sea Level
Elevation KB	21.0 metres AMSL
Elevation DF	20.7 metres AMSL
Elevation GL	-55.0 metres AMSL
No. of Levels	12
Well Deviation	Nil
Total Depth	3021 metres below DF
Energy Source	Bolt airgun, 120 cu.in.
Source Offset	37 metres
Source Depth	9.1 metres below MSL
Source Azimuth	90°
Reference Sensor	Accelerometer
Sensor Offset	37 metres
Sensor Depth	9.1 metres below MSL
Sensor Azimuth	90°
Downhole Geophone	Geospace HS-1
	High Temp. (350° F)
	Coil Resist. 225Ω ±10 %
	Natural Freq. 8-12 hertz
	Sensitivity 0.45 V/in/sec
	Maximum tilt angle 60°

Recording was made on the Schlumberger Cyber 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.

3.0 CHECK SHOT DATA

A total of 12 check levels were shot during the survey.

The level at 1473 metres below DF was shot going into and coming out of the well. The transit times from both sets of data were similar. All good shots have been included in the final stack.

The level at 3003 metres was shot with and without cable slack. The CSU first break picks indicate different times on the data stacked with and without cable slack. No difference, however was discernable on the raw data and all good shots have been included in the final stack.

A plot of the stacked check shot data is displayed as Plot 5 of the Raw and Stacked Shots.

Table 2

Level Depth (m below DF)	Stacked Shots	Rejected Shots	Quality	Comments
75.7	-	-	-	Imposed shot - sea floor
200	5	0	Good	
500	5	0	Good	
800	5	0	Good	
1070	5	0	Good	
1355	6	1	Good	
1473	6	15	Good	Shot going in
1473	4	5	Good	
1635	5	0	Good	
1864	5	0	Good	
2100	4	3	Good	
2400	3	3	Good	
2700	3	3	Good	
3003	6	5	Good	Shot with cable slack
3003	3	1	Good	Without cable slack

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 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 Well Seismic Calibration processing chain.

Density data was only available to 1288 metres below DF. Above this depth a constant density reading of 2.25 gm/cc has been imposed. The density log has been edited over intervals of borehole washout.

The sonic log has been patched horizontally from 200 - 210 metres where the log quality is affected by borehole washout. The sonic log has been extrapolated at a constant Δt from 2992 to the bottom checkshot at 3003 metres. Minor zones of cycle skipping have been edited.

Density log interval : 1288 to 3003 metres below DF
Sonic log interval : 210 to 2992 metres below DF

5.2 Source Offset

The moonpool hydrophone was positioned close to the wellhead. An average transit time from gun to moonpool hydrophone of 25 msec was measured. Using this time and a water velocity of 1480 m/sec an offset of 37 metres was calculated between gun and moonpool hydrophone. Assuming that the hydrophone to wellhead distance is small, an offset of 37 metres has been used.

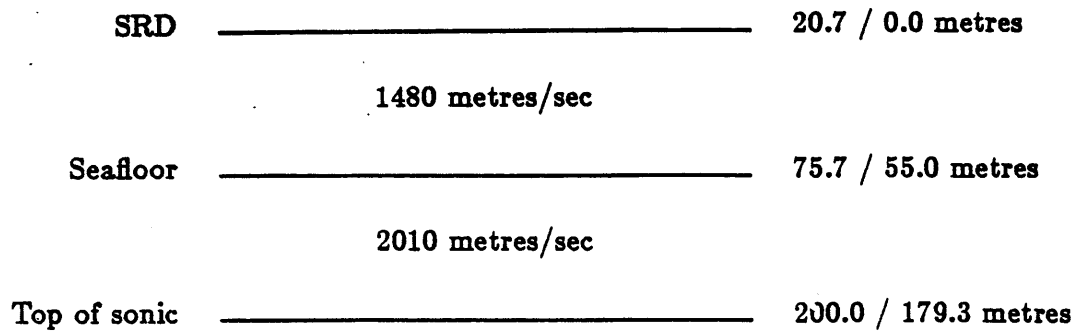
5.3 Correction to Datum

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 msec has been applied vertically between gun and datum.

5.4 Imposed Shots and Velocity Modelling

An imposed shot at the sea floor (75.7 metres below DF) has been used in addition to the checkshot data to calibrate the sonic log. The transit time has been calculated assuming a water velocity of 1480 metres/sec. The checkshot at the top of the sonic is of good quality and has been used in the sonic calibration.

The velocity model used is displayed below. Depths stated are referenced to metres below derrick floor and metres below mean sea level respectively.



The diagram shows three depth intervals with their corresponding velocities. Each interval is represented by a horizontal line with a label on the left and depth values on the right. The velocity for each interval is centered below the line.

SRD	20.7 / 0.0 metres
	1480 metres/sec
Seafloor	75.7 / 55.0 metres
	2010 metres/sec
Top of sonic	200.0 / 179.3 metres

5.5 Sonic Calibration Results

The top of the sonic log (200.0 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.

Depth Interval (m below DF)	Block Shift μ sec/m	Δt_{min} μ sec/m	Equiv Block Shift μ sec/m
20.7-200	0.0	-	0.0
200-814	19.06	-	19.06
814-1352	10.41	-	10.41
1352-1862	7.06	-	7.06
1862-2499	21.38	-	21.38
2400-3003	5.14	-	5.14

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

6.0 GEOGRAM PROCESSING

GEOGRAM plots 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
Reflection coefficients
Attenuation coefficients
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:

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

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:

$$A_n = (1 - R_1^2) \cdot (1 - R_2^2) \cdot (1 - R_3^2) \dots (1 - R_n^2)$$

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

$$Primary_n = R_n \cdot A_{n-1}$$

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

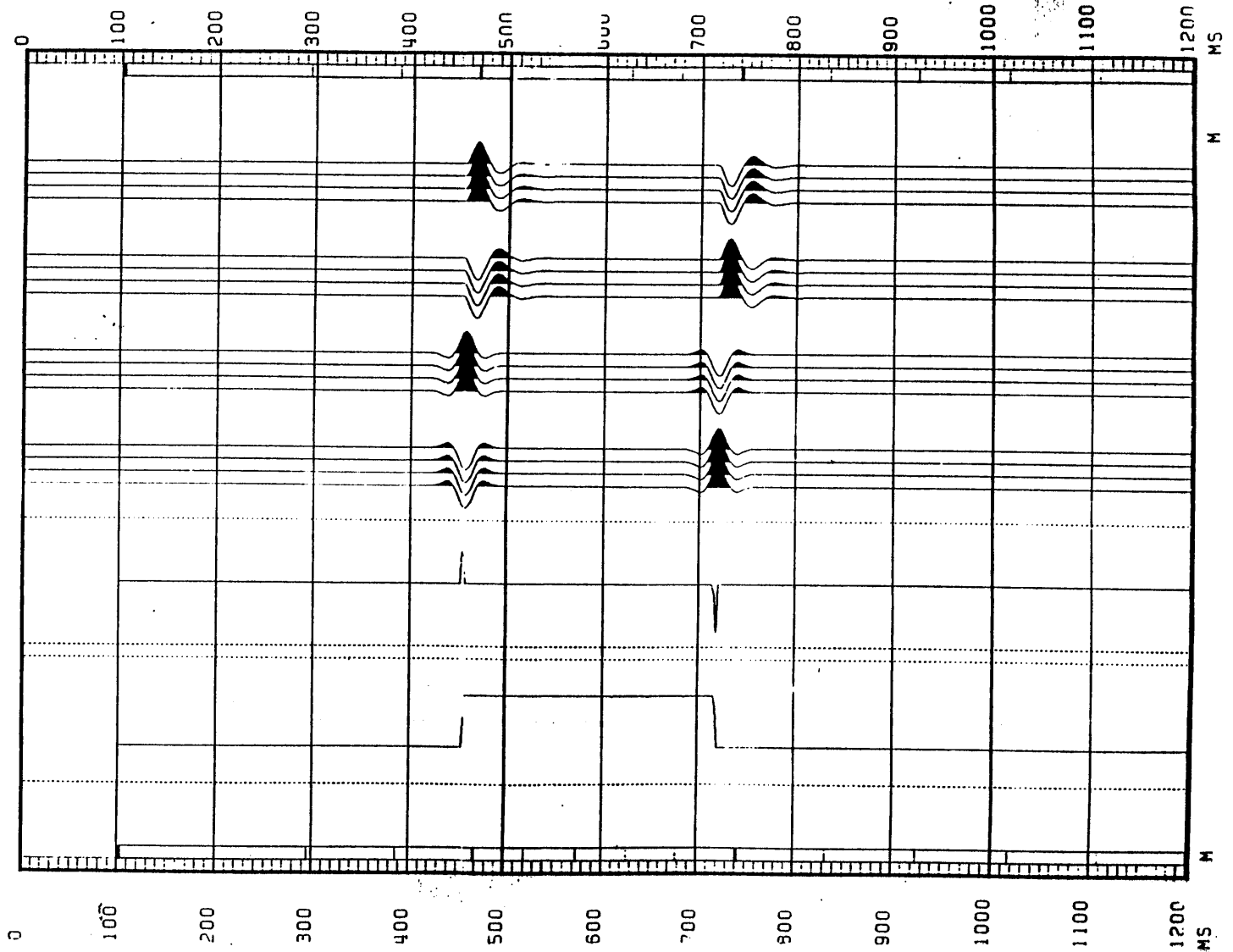
Standard procedure of convolution of wavelet with reflection coefficients. The output is the synthetic seismogram.

SCHLUMBERGER (SEG-1976) WAVELET POLARITY CONVENTION

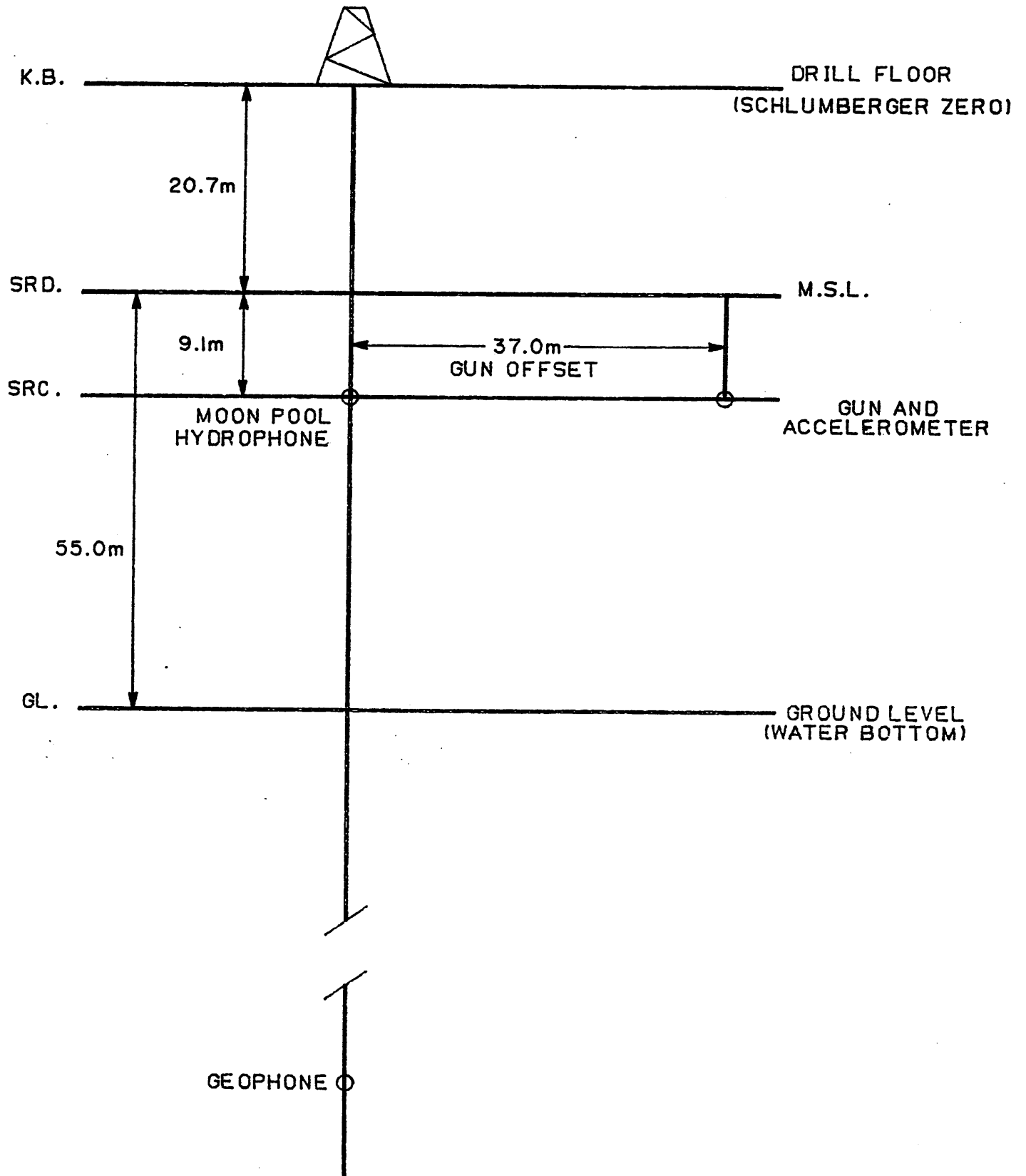
Figure 1

- MINIMUM PHASE RICKER
REVERSE POLARITY
- MINIMUM PHASE RICKER
NORMAL POLARITY
- ZERO PHASE RICKER
REVERSE POLARITY
- ZERO PHASE RICKER
NORMAL POLARITY
- REFLECTION COEFF
- INTERVAL VELOCITY

0.3000
-0.3000
5000.00
M/S
1000.00



5. GUN GEOMETRY SKETCH SNAPPER-6



6. CHECK SHOT DATA - OBSERVED AND CORRECTED

SNAPPER-6 VELOCITY SURVEY

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	75.70	55.00	0	39.80	30.99	37.13	1481			
2	200.00	179.30	124.30	95.00	92.83	98.98	1811	124.30	61.85	2010
3	500.00	479.30	424.30	224.00	223.31	229.46	2089	300.00	130.48	2299
4	800.00	779.30	724.30	344.00	343.60	349.75	2228	300.00	120.29	2494
5	1070.00	1049.30	994.30	453.00	452.71	458.86	2287	270.00	109.11	2475
6	1355.00	1334.30	1279.30	562.00	561.78	567.93	2349	285.00	109.07	2613
7	1473.00	1452.30	1397.30	604.00	603.80	609.95	2381	118.00	42.02	2808
8	1635.00	1614.30	1559.30	654.00	653.83	659.97	2446	162.00	50.02	3238
9	1864.00	1843.30	1788.30	732.00	731.85	738.00	2498	229.00	78.02	2935
10	2100.00	2079.30	2024.30	807.00	806.87	813.02	2553	236.00	75.02	3146
11	2400.00	2379.30	2324.30	899.00	898.89	905.04	2629	300.00	92.02	3260
12	2700.00	2679.30	2624.30	980.00	979.91	986.05	2717	300.00	81.02	3703
13	3003.00	2982.30	2927.30	1060.00	1059.92	1066.07	2797	303.00	80.01	3787

PE601117

This is an enclosure indicator page.
The enclosure PE601117 is enclosed within the
container PE902242 at this location in this
document.

The enclosure PE601117 has the following characteristics:

ITEM_BARCODE = PE601117
CONTAINER_BARCODE = PE902242
NAME = Seismic Calibration Log-Adjusted
continuous velocity
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = VELOCITY_CHART
DESCRIPTION = Seismic Calibration Log
REMARKS =
DATE_CREATED = 22/01/86
DATE_RECEIVED = 4/02/87
W_NO = W925
WELL_NAME = Snapper-6
CONTRACTOR = Schlumberger
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE601118

This is an enclosure indicator page.
The enclosure PE601118 is enclosed within the
container PE902242 at this location in this
document.

The enclosure PE601118 has the following characteristics:

ITEM_BARCODE = PE601118
CONTAINER_BARCODE = PE902242
NAME = Seismic Calibration Log-Adjusted
continuous velocity
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = VELOCITY_CHART
DESCRIPTION = Seismic Calibration Log
REMARKS =
DATE_CREATED = 22/01/86
DATE_RECEIVED = 4/02/87
W_NO = W925
WELL_NAME = Snapper-6
CONTRACTOR = Schlumberger
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE902243

This is an enclosure indicator page.
The enclosure PE902243 is enclosed within the
container PE902242 at this location in this
document.

The enclosure PE902243 has the following characteristics:

ITEM_BARCODE = PE902243
CONTAINER_BARCODE = PE902242
 NAME = Raw&Stacked Checkshot Data
 BASIN = GIPPSLAND
 PERMIT =
 TYPE = WELL
 SUBTYPE = VELOCITY_CHART
 DESCRIPTION = Raw&Stacked Checkshot Data
 REMARKS =
 DATE_CREATED = 22/01/86
 DATE_RECEIVED = 4/02/87
 W_NO = W925
 WELL_NAME = Snapper-6
 CONTRACTOR = Schlumberger
 CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE902346

This is an enclosure indicator page.
The enclosure PE902346 is enclosed within the
container PE902242 at this location in this
document.

The enclosure PE902346 has the following characteristics:

ITEM_BARCODE = PE902346
CONTAINER_BARCODE = PE902242
NAME = Synthetic Seismogram - Geogram
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = SYNTH_SEISMOGRAM
DESCRIPTION = Synthetic Seismogram - Geogram
REMARKS =
DATE_CREATED = 22/01/86
DATE_RECEIVED = 4/02/87
W_NO = W925
WELL_NAME = Snapper-6
CONTRACTOR = Schlumberger
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE907566

This is an enclosure indicator page.
The enclosure PE907566 is enclosed within the
container PE902242 at this location in this
document.

The enclosure PE907566 has the following characteristics:

ITEM_BARCODE = PE907566
CONTAINER_BARCODE = PE902242
NAME = Synthetic Seismogram - Geogram
BASIN = GIPPSLAND
PERMIT = VIC/L10
TYPE = WELL
SUBTYPE = SYNTH_SEISMOGRAM
DESCRIPTION = Geogram from WST Richer Wavelets,
Minimum Phase, Reverse Polarity
(enclosure from WCR vol.1) for Snapper-6
REMARKS =
DATE_CREATED =
DATE_RECEIVED =
W_NO = W925
WELL_NAME = Snapper-6
CONTRACTOR = Schlumberger
CLIENT_OP_CO = ESSO Australia Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE902347

This is an enclosure indicator page.
The enclosure PE902347 is enclosed within the
container PE902242 at this location in this
document.

The enclosure PE902347 has the following characteristics:

ITEM_BARCODE = PE902347
CONTAINER_BARCODE = PE902242
NAME = Time Depth Curve
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = VELOCITY_CHART
DESCRIPTION = Time Depth Curve
REMARKS =
DATE_CREATED = 15/01/86
DATE_RECEIVED = 4/02/87
W_NO = W925
WELL_NAME = Snapper-6
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)