

W827

WCR VOL 1

SNAPPER - 4 (W827)

# W827

## W827

VDMC

WELL COMPLETION REPORT

SNAPPER 4

VOLUME 1 - 1 MAY 1984

OIL and GAS DIVISION

GIPPSLAND BASIN  
VICTORIA

ESSO AUSTRALIA LIMITED

SNAPPER-4

WELL COMPLETION REPORT

BASIC DATA

VOLUME 1

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1. ESSO AUSTRALIA LTD

WELL DATA RECORD

WELL : SNAPPER - 4

LOCATION : Latitude : 38° 12' 54.38"S  
Longitude : 148° 00' 14.00"E  
X = 587 882 N  
Y = 5 769 827 .E  
Map Projection: UTM Zone 55  
Geographical Location: S.E. Victoria  
Field: Snapper, Gippsland Basin

PERMIT : VIC/L10

ELEVATION : 21m ASL

WATER DEPTH : 57m

TOTAL DEPTH : 2821m Average Angle : Vertical Hole

PLUG BACK TYPE : Balanced Plug

REASONS FOR PLUGGING BACK : Plug and Abandonment

MOVE IN : 1st July, 1983

RIG UP : 1st July, 1983

SPUDDED : 2nd July, 1983

RIG DOWN COMPLETE : 20th September, 1983

RIG RELEASED : 22nd September, 1983

OPERATOR : Esso Exploration and Production Australia Inc.

PERMITTEE OR LICENCEE : B.H.P. Petroleum P/L and EEPA Inc

ESSO INTEREST : 50%

OTHER INTEREST : 50%

CONTRACTOR : South Seas Drilling Company

RIG NAME : Southern Cross

EQUIPMENT TYPE : Semi-submersible

TOTAL RIG DAYS : 83

DRILLING AFE NO. : 030500308233007

TYPE COMPLETION : Plug and Abandonment

WELL CLASSIFICATION : Before Drilling Deeper Pool Test  
After Drilling Deeper Pool Discovery

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## 2. OPERATIONS SUMMARY

### SNAPPER - 4

#### Move and Moor

The semi-submersible Southern Cross departed the Luderick-1 location at 1400 hrs on 1st July, 1983, and arrived at the Snapper-4 location at 1945 hrs the same day. The rig was towed 37.06 km (20 Nautical Miles) by the workboat Lady Vera in 5-3/4 hours at an average speed of 6.45 km/hr (4.48 knots).

Anchor No. 8 was dropped by the rig with the remaining seven anchors being run by the workboats Bass Tide and Southern Tide in 7-3/4 hours. All anchors were successfully pretensioned to 200 kips after replacing a fouled pendant line on Anchor No. 8.

#### 26" Hole for 20" Conductor

The drilling template was run and landed at a seafloor depth of 78m RKB. The 26" hole was drilled to 215m with seawater and displaced at TD with high viscosity gel mud.

The 18-3/4" wellhead and 20" casing were run and cemented at a shoe depth of 200m RKB. The BOP stack and riser were run and the casing and collet connector tested against the shear rams to 500 psi.

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

After drilling out the 20" casing shoe, the 17-1/2" hole was drilled to 800m using seawater with slugs of high viscosity gel mud. A wiper trip was made to the 20" shoe with 40-50 kips drag from 800 to 650m and 3m fill on bottom. After circulating bottoms up, the bit was pulled and the hole wiped at 577m to eliminate a tight spot. The first attempt to log the hole was aborted when the sonde failed to pass below 677m. The bit was rerun and a bridge washed from 673 to 692m. Fill was tagged at 790m and the hole washed and reamed to bottom. A hole was swept with a high viscosity pill and the bit pulled without drag. The Sonic-GR log was then successfully run.

The 13-3/8" casing was run and landed at a shoe depth of 780m. After mixing and pumping 1130 sx (231 bbls) of cement, an attempt was made to pump down the top plug dart. The dart became lodged in a T.I.W. ball valve run below the cementing head and could not pass. The casing hanger running tool was backed out to enable laying down the safety valve. After the running string was made back up into the hanger, the dart was dropped and the casing displaced with 252 bbls when an increase in pump pressure was observed. Displacement was stopped to prevent possible over displacement of the slurry, as it was suspected that the cement had gravitated down the casing while the running tool had been backed out of the casing hanger.

The 13-3/8" seal assembly was then set and pressure tested along with the BOP stack to 5000 psi. The casing was pressure tested against the shear rams to 1500 psi. Cement was tagged inside the 13-3/8" casing at 532m and drilled out to approximately 774m, where the casing was again pressure tested to 1500 psi.

### 12-1/4" Hole for 9-5/8" Protective Casing

After drilling out the remaining cement and 6m of new hole, a Phase II PIT was conducted to 1200 psi (18.0 ppg EMW) without leakoff. The hole was drilled with an X3A to 1312m while building mud weight to 10.5 ppg by 1113m. This mud weight was programmed to provide a 300 psi overbalance into the gas-filled top of Latrobe Formation. The hole was then drilled with a J22 bit to 1516m where wireline logs, 2 RFT's, and one piggyback sidewall core gun were run.

The 9-5/8" casing was then run and cemented at a shoe depth of 1501m. Before cementing, the casing and annulus were displaced with 11.5 ppg mud. The heavier mud was used to provide sufficient hydrostatic pressure to prevent annular gas flow with the cement in place.

Three unsuccessful attempts were made to set the 9-5/8" seal assembly, due apparently to some sort of misalignment in the 18-3/4" wellhead. The seal assembly was eventually set by using a modified running tool, as was used during the Whiting-1 seal assembly difficulties. The pack-off ring was energized and the seal assembly and BOP stack successfully pressure tested to 200/5000 psi. The 9-5/8" casing and annular preventers were pressure tested to 200/3500 psi.

### 8-1/2" Hole

The packed bottom hole assembly was run and cement tagged at 1437m inside the 9-5/8" casing. After drilling 1.5m of cement, the string was picked up and pump pressure lost. The string was pulled to find that the connection between the equalizing sub and cushion sub on the Cougar shock tool had backed out. The fish was recovered on the first attempt and the shock sub laid down.

A new J-22 bit was picked up and the cement and float equipment were drilled out along with 6m of new hole. A Phase II PIT was run to leakoff of 1700 psi with 10.0 ppg mud in the hole (16.6 ppg EMW). The mud weight was reduced to 9.2 ppg (200 psi overbalance at casing shoe) while drilling ahead. The hole was drilled to 1796m, where drilling was stopped at 1530 hours 14th July, 1983, due to an Australian Worker's Union decision to strike.

The bit was pulled and open ended drillpipe run to 1440m inside the 9-5/8" casing where a 118 sx cement plug was set. After WOC, the plug was tagged with 15 kips at 1374m and pressure tested to 2300 psi. The drillstring was then hung off on the UPR.

The AWU members finished working at 1400 hours 15th July, 1983, and left the rig the same day. The AMFSU/ETU maintenance men were "stood down" at 0800 hours 18th July and left the rig the same day.

On the 26th and 27th July, 1983 the hung off drillstring was picked up and the cement plug tested to 2300 psi. The drillpipe was again hung off on the upper pipe rams and backed out at the hang off tool. The BOP was then closed in, and the riser and LMRP were pulled and secured on deck.

The AMFSU/ETU workers returned to work at 1445 hours on 3rd September and the AWU members returned to work at 1200 hours on 4th September, 1983. The LMRP and riser were run and the BOP and seal assembly pressure tested to 3500 psi. The cement plug at the 9-5/8" casing shoe was drilled out and the hole was conditioned back to 1796m.

Drilling commenced at 1000 hours on 6th September, 1983 to 2141m where 54 bbls of mud were lost into the formation. A 26 sack LCM pill was pumped and circulation with full returns regained.

Drilling continued to 2821 metres total depth with four 8-1/2" J22 bits.

Final logs were run, including another 3 RFT's, velocity survey and 3 sidewall core runs. High gas units were noted during final logging and the gas was circulated out while conditioning mud.

### Plug and Abandonment

Four open hole balanced plugs were set from 2821m to 2632m, 2632m to 2444m, 2021m to 1849m and 1716m to 1565m. The fourth plug was tagged at 1565m with 15 kips. Balanced Plug No. 5 was set across the 9-5/8" casing shoe from 1551m to 1451m and successfully pressure tested to 2000 psi.

A 9-5/8" GR-JB run was made to 1370m and a 9-5/8" bridge plug was set at 1338m. Trouble passing the wellhead with the 9-5/8" Pengo cutter and a misfire called for another 9-5/8" GR-JB run to be made. The following run with the 9-5/8" Pengo cutter proved successful and a cut was made at 305m; the casing stub was retrieved using a casing spear.

Balanced Hole Plug No. 6 was set across the 9-5/8" casing stub from 335 to 260m and successfully pressure tested to 1500 psi. A 13-3/8" GR-JB run was made to 240m and a 13-3/8" bridge plug was set at 220m. A 13-3/8" pengo cutter was run to 169m where the 13-3/8" casing was cut and then retrieved.

Balanced Hole Plug No. 7 was set across the 13-3/8" casing stub from 200 to 110m and successfully pressure tested to 500 psi.

The BOP stack and riser were pulled and a 20" casing cutter run to 85.33m. Following two unsuccessful attempts to cut and retrieve the 20" casing, the cutter was rerun and the 20" casing was cut at 85.33m. The casing stub and wellhead were then retrieved along with the base and template.

### Pulling Anchors

After 0.96 days of waiting on weather the work boats Atlas Dampier, Lady Vera and Bass Tide pulled seven anchors and the rig pulled in Anchor No. 7. Anchors No. 1 and 6 were changed out with new swivels. Old swivels on Anchors No. 4 and 5 were removed (new swivels on anchors No. 4 and 5 were installed during the AWU strike). No. 7 pendant wire parted on the 13th September, 1983 and was recovered on the same day. No. 3 pendant wire parted on the 21st September 1983, while the anchor was being retrieved, resulting in the use of a chain chaser to retrieve Anchor No. 3. Total demoooring time was 15 hours. The rig was towed by the Atlas Dampier, and departed the location for Sunfish-2 at 1500 hours, 22nd September, 1983.

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4. CEMENT DATA

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DATE	DEPTH METRES	TYPE JOB	TYPE CEMENT	AMOUNT	ADDITIVES	REMARKS
03/7/83	199.63	20" CASING PRIMARY LEAD	BLUE CIRCLE TYPE 101	745 sx	8% PRE- HYDRATED GEL	50/50 FRESHWATER SEAWATER 12.9 PPG
03/7/83	199.63	20" CASING PRIMARY TAIL	BLUE CIRCLE TYPE 101	350 sx		SEAWATER 15.8 PPG
06/7/83	780.36	13-3/8" CSG PRIMARY	BLUE CIRCLE TYPE 101	1130 sx		SEAWATER 15.8 PPG
10/7/83	1500.73	9-5/8" CSG PRIMARY	BLUE CIRCLE TYPE 101	425 sx	1.0 % HALAD-9	FRESHWATER
15/7/83	1440 - 1374	PLUG BACK CASING	BLUE CIRCLE TYPE 101	118 sx		FRESHWATER TAGGED W/ 15 KIPS
16/9/83	2821 - 2632	P&A OPEN HOLE BALANCED PLUG	BLUE CIRCLE TYPE 101	267 sx	1.2% HR6L	FRESHWATER SLURRY WT 15.8 PPG
16/9/83	2632 - 2444	P&A OPEN HOLE BALANCED PLUG	BLUE CIRCLE TYPE 101	273 sx	1.2% HR6L	FRESHWATER SLURRY WT 15.8 PPG
17/9/83	2021 - 1849	P&A OPEN HOLE BALANCED PLUG	BLUE CIRCLE TYPE 101	215 sx	0.8% HR6L	FRESHWATER SLURRY WT 15.8 PPG
17/9/83	1716 - 1565	P&A OPEN HOLE BALANCED PLUG	BLUE CIRCLE TYPE 101	200 sx	0.4% HR6L	FRESHWATER SLURRY WT 15.8 PPG TAGGED W/ 15 KIPS
17/9/83	1551 - 1451	P&A OPEN HOLE 9-5/8" CSG SHOE BAL. PLUG	BLUE CIRCLE TYPE 101	163 sx	0.4% HR6L	FRESHWATER SLURRY WT 15.8 PPG PRESS. TESTED TO 2000 PSI.
18/9/83	335 - 260	P&A BAL. PLUG ACROSS 9-5/8" CSG STUB	BLUE CIRCLE TYPE 101	219 sx		SEAWATER SLURRY WT 15.8 PPG PRESS. TESTED TO 1500 PSI



WELL: SNAPPER-4

5. SAMPLES, CONVENTIONAL CORES, SIDEWALL CORES

<u>INTERVAL</u>	<u>TYPE</u>
220 - 2821m	Cuttings Samples: 3 sets washed and dried samples, and 3 sacks washed and bagged cuttings every 5m.
220 - 2821m	Unwashed canned samples every 15m.
988 - 1500.7m	Sidewall Cores: Shot 51, Recovered 51.
1514.0 - 2804.0m	Sidewall Cores: Shot 125, Recovered 107; lost 10; misfired 7, no recovery 1.
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WELL: Snapper - 4

6. WIRELINE LOGS AND SURVEYS

<u>Type and Scale</u>	<u>From</u>	<u>To</u>
<u>Suite 1</u>		
(BHC) GR 1:200 1:500	200	796m and GR to sea floor
<u>Suite 2</u>		
(DLL) MSFL GR 1:200 1:500	779	1513.5m
(LDT) CNT-H GR 1:200 1:500	779	1513.5m
BHC CNT-A GR 1:200 1:500	779	1513.2m
HDT 1:200	1200	1513.0m
<u>RFT Recording Pretests:</u> Run 1: 18 attempted 18 successful Run 2: 1 segregated sample	1266.5	1493.0m at 1410.1m
(HP) Presssure Record	1266.5	1493.0m
(CST) Shot: 51 Recov'd: 51	988.0	1500.7m
<u>Suite 3</u>		
(DLL) MSFL GR 1:200 1:500	1500.0	2815.0m
(LDT) (CNT-H) GR 1:200 1:500	1500.0	2821.0m
BHC CNT-A GR 1:200 1:500	1500.0	2819.0m
HDT 1:200	1500.0	2819.0m
<u>RFT Recording Pretests:</u> Run 3: 25 attempted 24 successful Run 4: attempted sample - seal failure successful segregated sample Run 5: successful segregated sample	1601.0	2668.5m at 2530.0m at 2529.5m at 2668.5m

WELL: Snapper - 4

WIRELINE LOGS AND SURVEYS (contd)

<u>Type and Scale</u>		<u>From</u>	<u>To</u>
	Run 6:	attempted sample - seal failure	at 1942.5m
		attempted sample - seal failure	at 1942.4m
		successful segregated sample	at 1942.6m
HP Pressure Record		1601.0	2668.5m
CST	Shot: 125	1514.0	2804.0m
	Recov'd: 107		
	Lost: 10		
	Misfired: 7		
	No Recov'y: 1		
Velocity Survey	17 levels	Sea level	2820m

NB: Two types of neutron logs were run in Suites 2 and 3, namely the CNT-H and the older generation CNT-A. The CNT-A and the LDT GR logs were later merged for final presentation as the LDL CNL GR log.

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7. SUMMARY OF WIRELINE FORMATION TEST PROGRAMME - SNAPPER 4

TEST	SEAT	DEPTH (METRES) K.B.	CHAMBER	RECOVERY (LITRES)				HEWLETT-PACKARD FORMATION PRESSURE		HEWLETT-PACKARD HYDROSTATIC PRESSURE		REMARKS	
				OIL	COND.	GAS	FORMATION WATER	MUD FILTRATE	MPaa	Psia	MPaa		Psia
				Litres	Litres	Litres	m <sup>3</sup>	Litres	Litres				
1	1	1493.0	Pretest						14.51	2104.4	18.58	2694.8	Valid
	2	1463.5	Pretest						14.23	2063.6	18.21	2640.8	Valid
	3	1438.5	Pretest						13.99	2028.4	17.90	2595.5	Valid
	4	1426.0	Pretest						13.87	2011.3	17.75	2573.9	Valid
	5	1418.5	Pretest						13.80	2001.4	17.65	2560.5	Valid
	6	1411.3	Pretest						13.72	1990.6	17.57	2548.4	Valid
	7	1410.0	Pretest						13.72	1989.5	17.56	2546.2	Valid
	8	1408.5	Pretest						13.71	1988.2	17.54	2543.5	Valid
	9	1406.5	Pretest						13.70	1986.5	17.52	2541.1	Valid
	10	1404.0	Pretest						13.69	1986.1	17.49	2536.8	Valid
	11	1357.5	Pretest						13.64	1978.9	16.92	2454.3	Valid
	12	1342.0	Pretest						13.63	1976.5	16.73	2426.4	Valid
	13	1339.0	Pretest						13.62	1976.0	16.69	2421.3	Valid
	14	1333.0	Pretest						13.62	1974.8	16.62	2411.2	Valid
	15	1325.0	Pretest						13.61	1973.6	16.52	2396.5	Valid
	16	1304.0	Pretest						13.59	1971.0	16.26	2359.0	Valid
	17	1293.0	Pretest						13.58	1969.1	16.13	2339.7	Valid
	18	1266.5	Pretest						13.55	1965.5	15.81	2292.6	Valid
2	19	1410.1	22.7 lit 3.7 lit	15.60		1432.80	1.00		13.72	1990.4	17.54	2543.5	Valid Pretest, Segregated sample taken
3	20	2668.5	Pretest						27.16	3939.1	30.41	4411.5	Valid
	21	2630.5	Pretest						26.74	3877.7	29.98	4348.3	Valid
	22	2566.0	Pretest						26.40	3828.7	29.26	4243.4	Supercharged, tight.
	23	2530.0	Pretest						25.88	3753.5	28.84	4183.3	Valid
	24	2527.0	Pretest						26.17+	3795+	28.85	4184.1	Supercharged, tight.
	25	2524.5	Pretest						26.02+	3774+	28.83	4180.8	Supercharged, tight.
	26	2494.0	Pretest						25.10	3640.3	28.47	4129.1	Valid
	27	2269.0	Pretest						22.39	3247.8	25.99	3769.3	Valid
	28	2220.0	Pretest						21.86	3169.8	25.46	3692.3	Valid
	29	2204.5	Pretest						21.70	3147.9	25.30	3669.7	Valid

SUMMARY OF WIRELINE FORMATION TEST PROGRAMME - SNAPPER 4

TEST SEAT	DEPTH (METRES) K.B.	CHAMBER	RECOVERY (LITRES)					HEWLETT-PACKARD FORMATION PRESSURE		HEWLETT-PACKARD HYDROSTATIC PRESSURE		REMARKS	
			OIL	COND.	GAS	FORMATION	MUD	MPaa	Psia	MPaa	Psia		
						WATER	FILTRATE						Litres
			Litres	Litres	m <sup>3</sup>	Litres	Litres						
	30	2113.5	Pretest						20.76	3010.8	24.32	3527.8	Valid
	31	2084.0	Pretest						20.77+	3013+	24.00	3481.3	Supercharged? Tight
	32	2069.0	Pretest						20.37	2954.8	23.86	3460.3	Valid
	33	1990.0	Pretest						19.68	2854.9	22.98	3333.0	Valid
	34	1964.2	Pretest						19.53	2832.5	22.71	3293.9	Valid
	35	1942.5	Pretest						19.28	2796.7	22.48	3259.9	Valid
	36	1925.2	Pretest						-	-	28.30	3234.4	Tight
	37	1912.5	Pretest						18.97	2751.0	22.16	3214.1	Valid
	38	1894.5	Pretest						18.88	2738.2	21.96	3184.6	Valid
	39	1889.6	Pretest						18.87	2737.4	21.92	3179.1	Valid
	40	1880.0	Pretest						18.36	2663.5	21.82	3164.2	Valid
	41	1691.0	Pretest						16.44	2383.7	19.68	2854.8	Valid
	42	1682.2	Pretest						16.38	2376.2	19.58	2839.5	Valid
	43	1668.2	Pretest						16.23	2353.6	19.43	2818.3	Valid
	44	1601.0	Pretest						15.56	2256.3	18.67	2707.4	Valid
4	45	2530.0	Pretest						-	-	28.81	4178.4	Seal failure
	46	2529.5	22.7 lit	Tr.		854.66	17.30	18.98	3753.5	28.81	4178.1	Valid pretest, Segregated sample taken	
			10.4 lit	Tr.		582.98	6.50	-	-	-	-	-	taken
5	47	2668.5	22.7 lit			45.28	21.00	27.15	3938.2	30.25	4388.0	Valid pretest, Segregated sample taken	
			10.4 lit			42.45	9.00	-	-	-	-	-	taken
6	48	1942.5	22.7 lit					19.28	2796.0	22.23	3224.3	Seal failure during 22.7 lit sampling.	
	49	1942.4	22.7 lit			200.93	20.95	19.29	2797.4	22.22	3223.0	Filled 22.7 lit chamber, seal failure during 10.4 lit sampling	
			10.4 lit										
	50	1942.6	10.4 lit			316.96	7.20	19.29	2797.7	22.24	3225.0	Valid pretest. Took 10.4 lit sample.	

8. TEMPERATURE RECORD - SNAPPER 4

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 CAL GR	796.0	36.7		3.05		
<u>Suite 2</u>						
DLL MSFL GR	1513.5	57.8	1.15	4.00		
LDL GR	1513.0	62.2	1.15	7.20	78.5	47.72
BHC CNL GR	1513.2	66.6	1.15	10.35		
HDT	1513.0	68.9	1.15	14.15		
<u>Suite 3</u>						
DLL MSFL GR	2815.0	107.7	1.30	8.00		
LDT CNL GR	2821.0	113.3	1.30	13.00	128.5	43.20
BHC GR	2819.0	117.1	1.30	19.00		
HDT	2819.0	121.1	1.30	25.00		

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FIGURES

# LOCALITY MAP

## SNAPPER-4

SCALE - 1:250,000

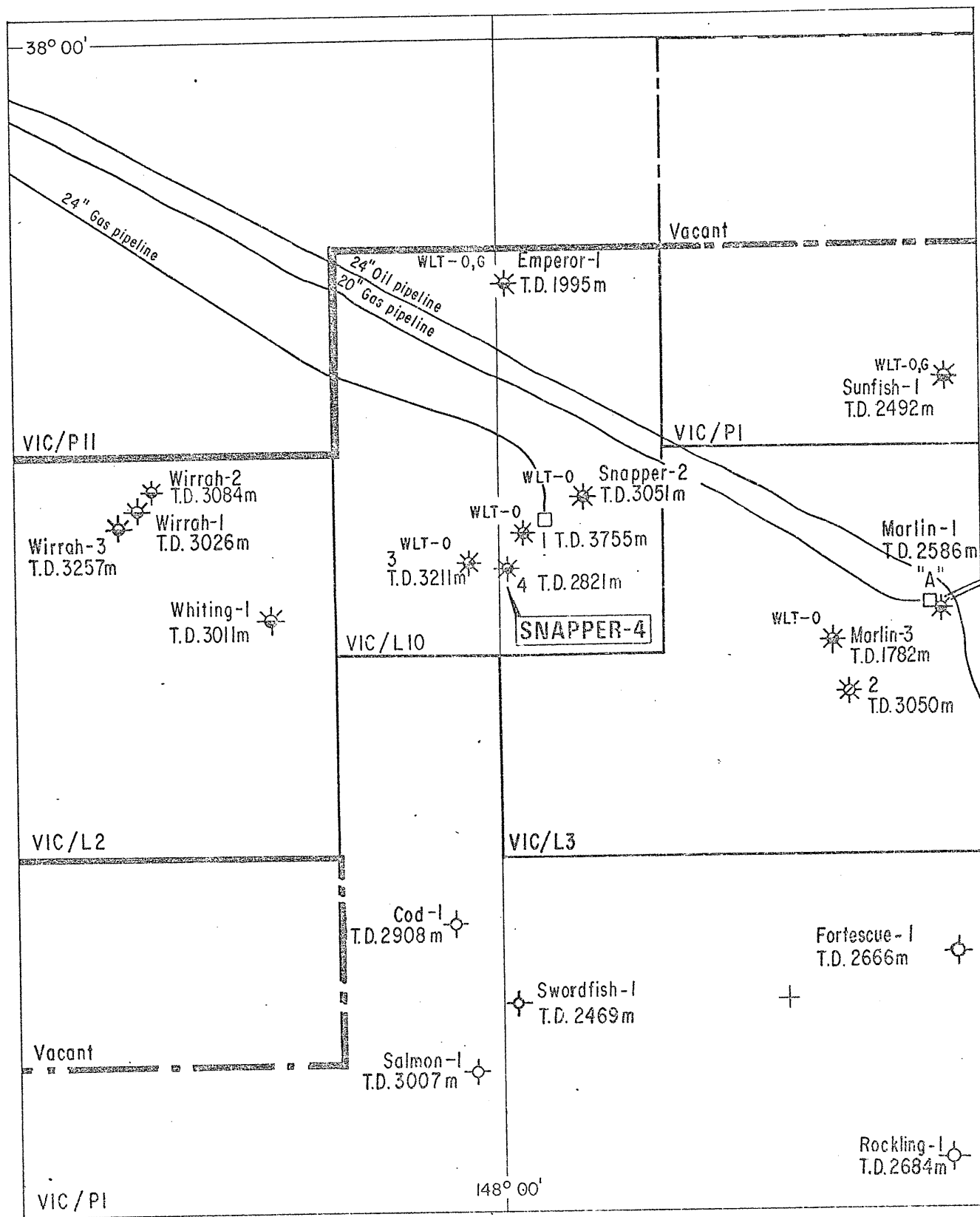
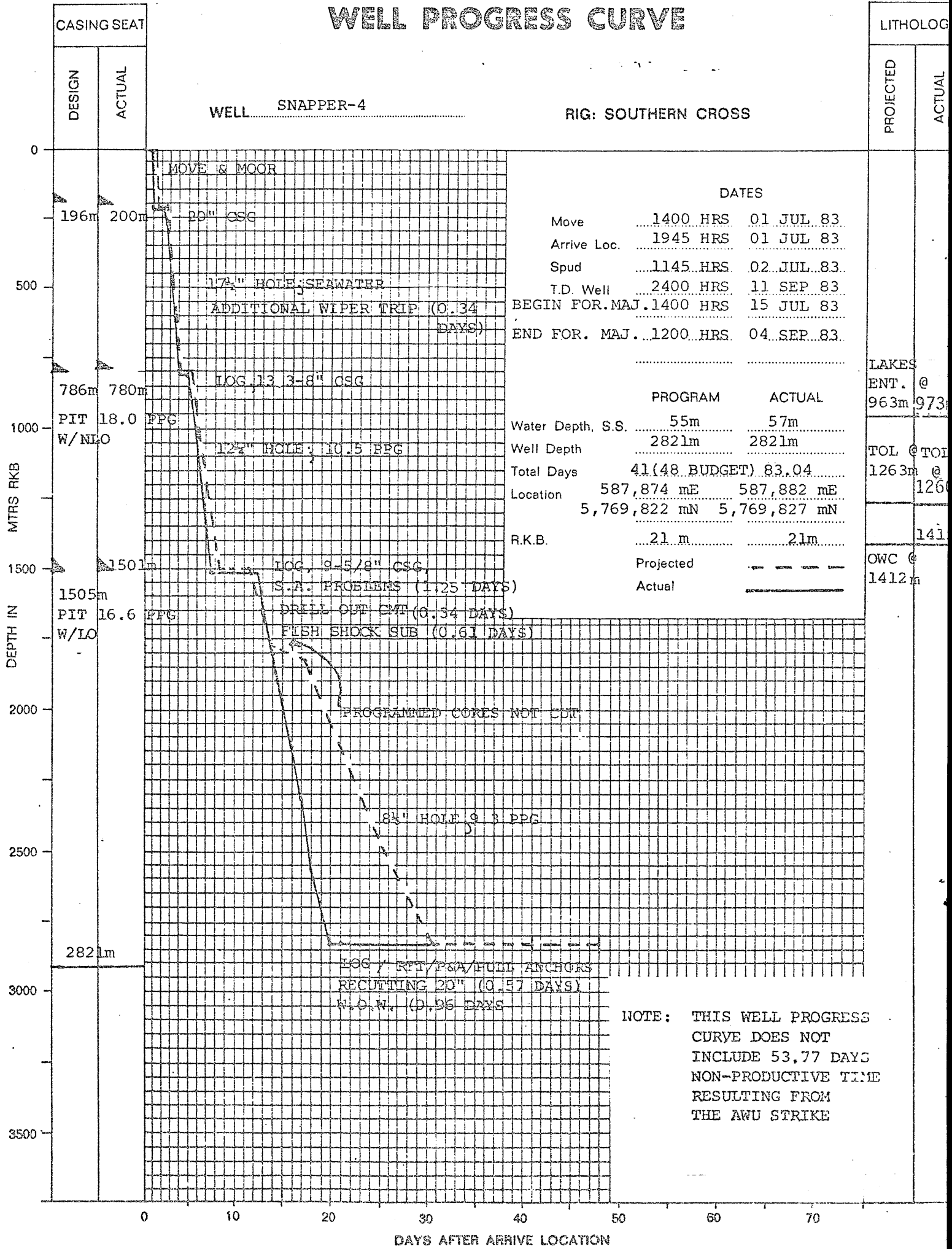


Figure 1

# WELL PROGRESS CURVE

WELL SNAPPER-4

RIG: SOUTHERN CROSS



NOTE: THIS WELL PROGRESS CURVE DOES NOT INCLUDE 53.77 DAYS NON-PRODUCTIVE TIME RESULTING FROM THE AWU STRIKE

FIGURE 2.

WELLBORE SCHEMATIC

WELL: SNAPPER-4

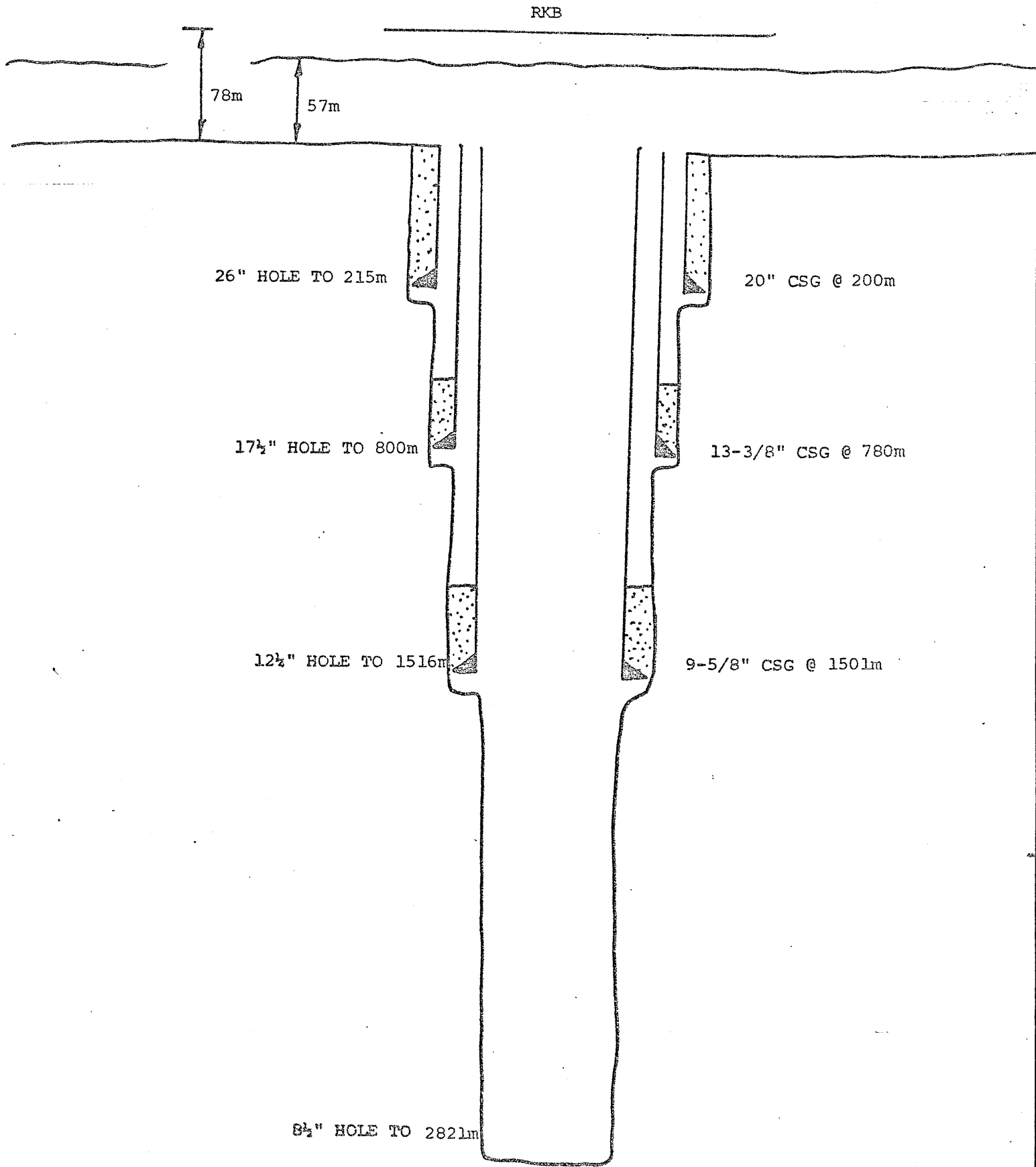


FIGURE 3.

ABANDONMENT SCHEMATIC

WELL: SNAPPER-4

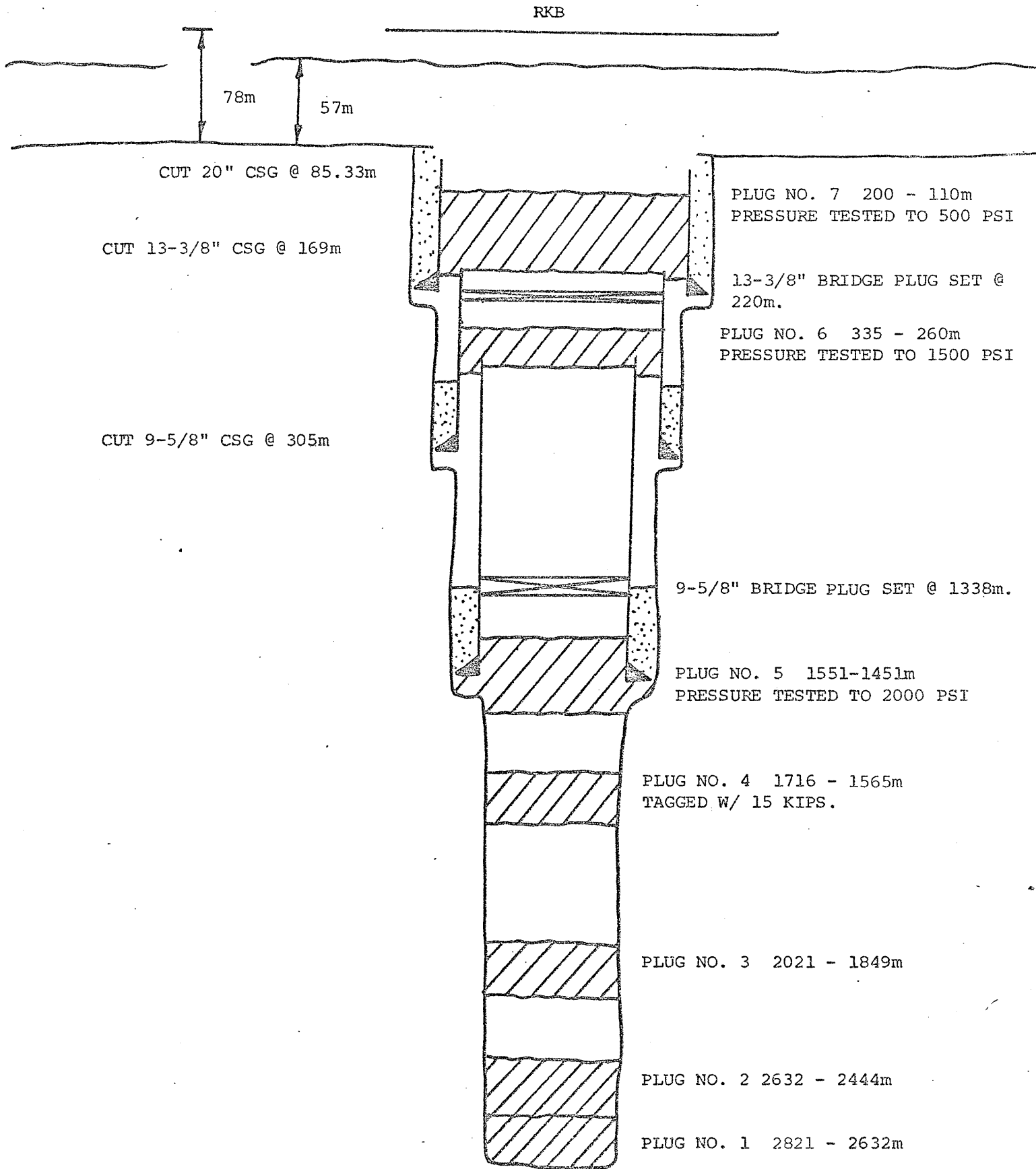


FIGURE 4.

FIGURE 5.

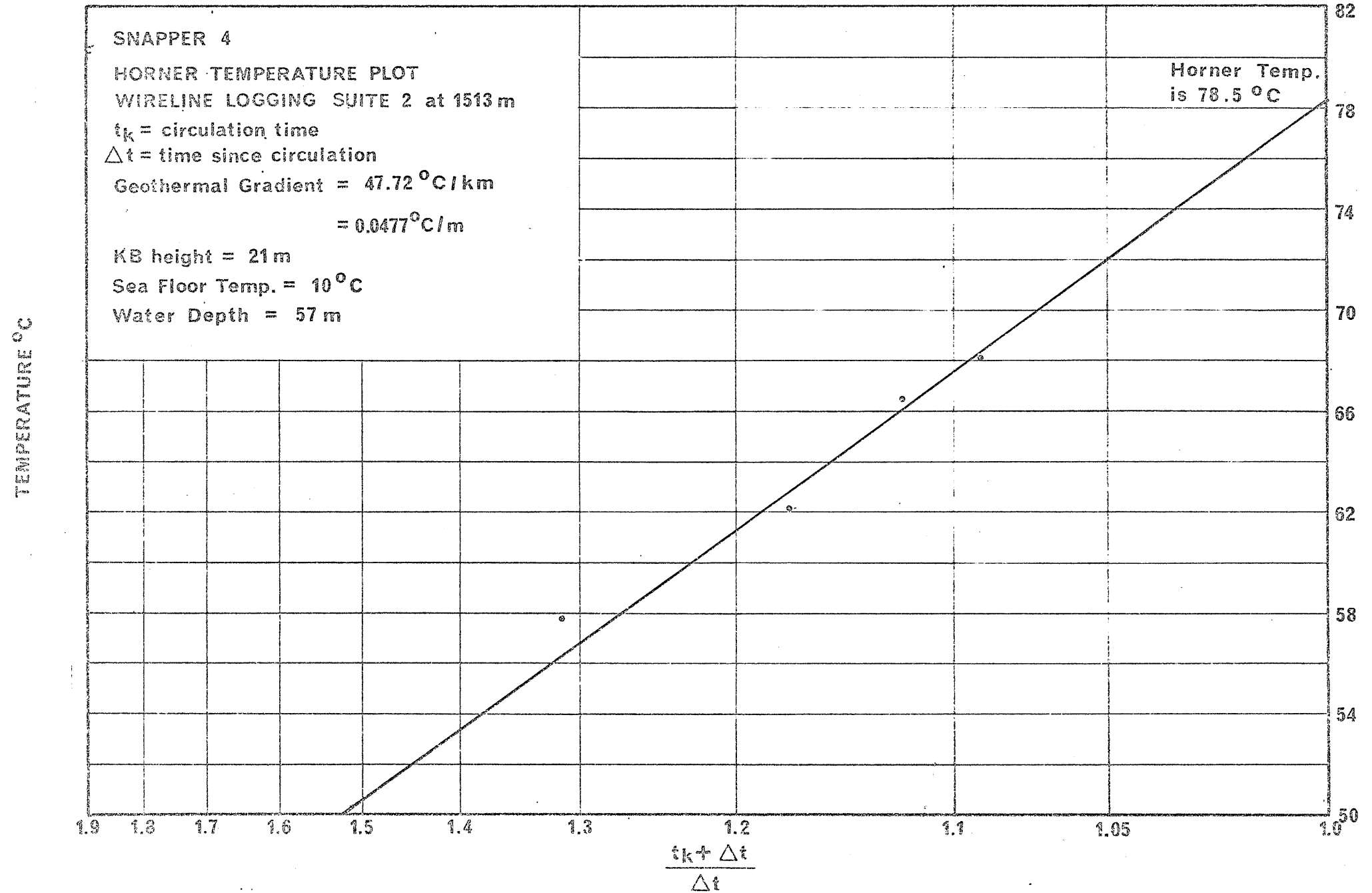
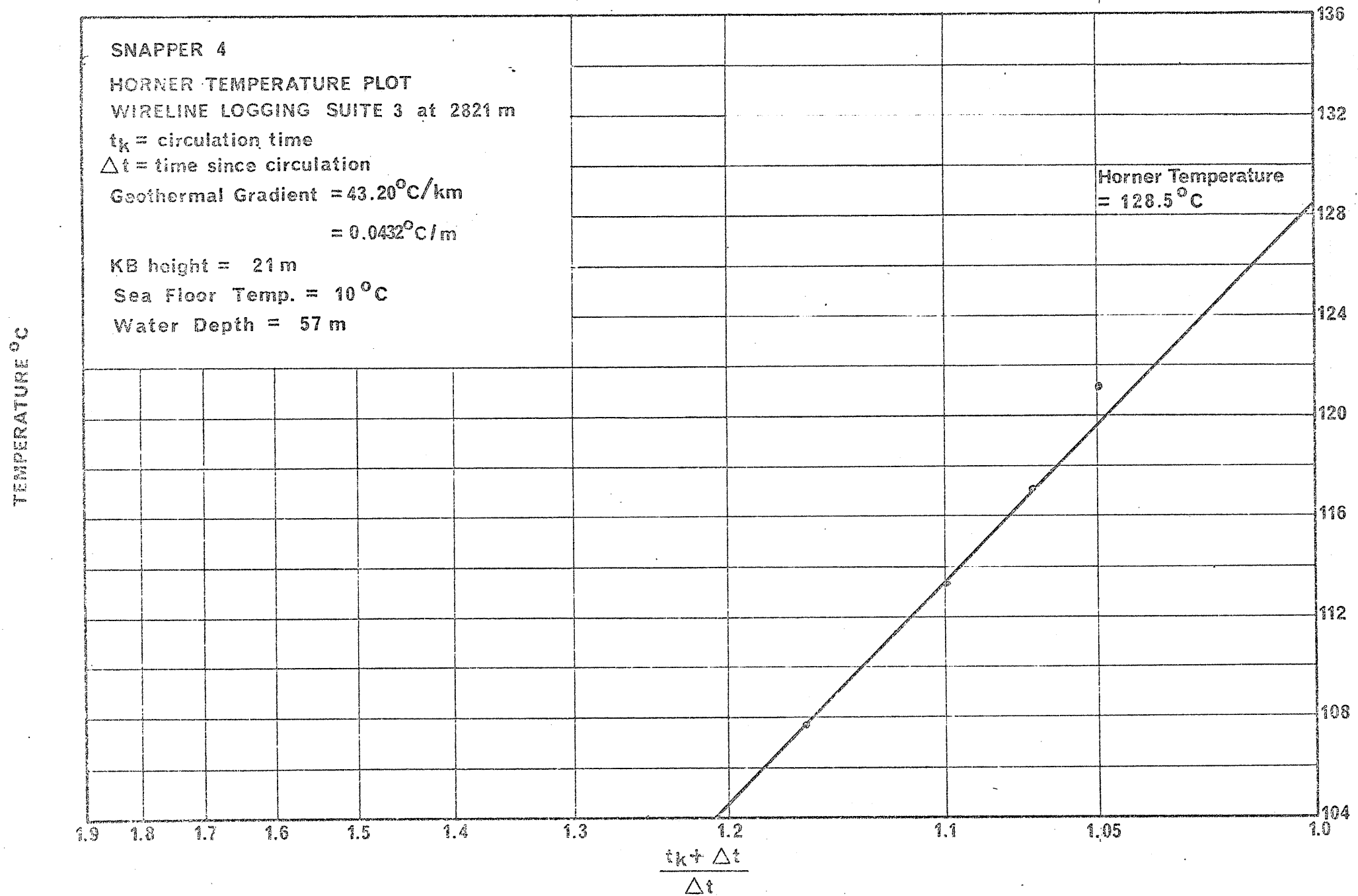


FIGURE 6.



APPENDIX 1



APPENDIX 1

Lithological Descriptions

## SNAPPER 4

Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
220 - 230m	100	LIMESTONE/CALCARENITE: white, clear, well sorted, biosparite, extremely fossiliferous, shell fragments, echinoid spines, bryozoa, sponge spicules.
230 - 240m	100	CALCARENITE: as above.
240 - 250m	100	CALCARENITE: as above.
250 - 260m	100	CALCARENITE: as above.
260 - 270m	100	CALCARENITE: as above.
270 - 280m	100	CALCARENITE: white, light grey to very light grey, hard, moderately well sorted, clay content approximately 40%, lithic specks, fossiliferous - bryozoa, octacorals, trace loose quartz grains, trace glauconite.
280 - 290m	100	CALCARENITE: as above.
290 - 300m	100	CALCARENITE: as above.
300 - 310m	100	CALCARENITE: as above.
310 - 320m	100	CALCARENITE: as above.
320 - 330m	100	CALCARENITE: as above.
330 - 340m	100	CALCARENITE: as above.
340 - 350m	100	CALCARENITE: as above.
350 - 360m	100	CALCARENITE: white to light grey, firm to hard, moderately sorted, well cemented, lithic fragments, glauconite, fossils - bryozoa, forams, octacoral, shell fragments.
360 - 370m	100	CALCARENITE: as above.
370 - 380m	100	CALCARENITE: as above.
380 - 390m	100	CALCARENITE: as above.
390 - 400m	100	CALCARENITE: as above.
400 - 410m	100	CALCARENITE: as above.
410 - 420m	100	CALCARENITE: as above.
420 - 430m	100	CALCARENITE: as above.
430 - 440m	100	CALCARENITE: as above.
440 - 450m	100	CALCARENITE: light medium grey, firm to hard, moderately well sorted, clay content high, trace glauconitic lithics, stained loose quartz grains, fossiliferous - octacorals.
450 - 460m	100	CALCARENITE: as above.

460 - 470m	100	CALCARENITE: as above.
470 - 480m	100	CALCARENITE: as above.
480 - 490m	100	CALCARENITE: as above.
490 - 500m	100	CALCARENITE: as above.
500 - 510m	100	CALCARENITE: as above.
510 - 520m	100	CALCARENITE: as above.
520 - 530m	100	CALCARENITE: as above.
530 - 540m	100	CALCARENITE: as above.
540 - 550m	60 40	CALCARENITE: as above. SILTSTONE: light grey to medium grey, firm to hard, blocky cuttings, very calcareous, argillaceous, arenaceous in parts, trace lithics, trace glauconite.
550 - 560m	100	CALCARENITE: as above.
560 - 570m	100	CALCISILTITE/CALCARENITE: light grey to buff, poor to moderate sorting, trace glauconitic lithics, forams.
570 - 580m	100	CALCISILTITE/CALCARENITE: as above.
580 - 590m	100	CALCISILTITE/CALCARENITE: as above.
590 - 600m	100	CALCISILTITE/CALCARENITE: as above.
600 - 610m	100	CALCISILTITE/CALCARENITE: as above.
610 - 620m	100	CALCISILTITE: light medium grey, increased clay content, moderately well sorted, arenaceous in parts, trace glauconite, fossils - bryozoa, forams, ostracods.
620 - 630m	100	CALCISILTITE: as above.
630 - 640m	100	CALCISILTITE: as above.
640 - 650m	100	CALCISILTITE: as above.
650 - 660m	100	CALCISILTITE: as above.
660 - 670m	100	CALCISILTITE: light to medium grey, firm to hard, argillaceous, arenaceous in parts, trace pyrite, lithics, fossils - forams, bryozoa, coral.
670 - 680m	100	CALCISILTITE: as above.
680 - 690m	100	CALCISILTITE: as above.
690 - 700m	100	CALCISILTITE: as above.
700 - 710m	100	CALCISILTITE: as above.
710 - 720m	100	CALCISILTITE: light medium grey, argillaceous, arenaceous in parts, carbonaceous flecks, trace lithic fragments, abundant fossils - bryozoa, forams, ostracods, shell fragments.

720 - 730m	100	CALCISILTITE: as above.
730 - 740m	100	CALCISILTITE: as above.
740 - 750m	100	CALCISILTITE: as above.
750 - 760m	100	CALCISILTITE: as above.
760 - 770m	100	CALCISILTITE: as above.
770 - 780m	100	CALCISILTITE: light medium grey, firm, moderately sorted, arenaceous in parts, slightly glauconitic, trace pyrite, lithics, fossils - forams, bryozoa, ostracoda.
780 - 790m	100	CALCISILTITE: as above.
790 - 800m	100	CALCISILTITE: as above.
800 - 810m	100	CALCISILTITE/CALCILUTITE: medium light grey, firm to occasionally soft, very argillaceous, very rare forams.
810 - 820m	100	CALCISILTITE/CALCILUTITE: as above.
820 - 830m	100	CALCISILTITE/CALCILUTITE: as above.
830 - 840m	100	CALCISILTITE/CALCILUTITE: as above, with a trace of crystalline calcite.
840 - 850m	100	CALCISILTITE/CALCILUTITE: as above, with a trace of echinoderm plates and very rare forams.
850 - 860m	100	CALCISILTITE/CALCILUTITE: sample becoming considerably more argillaceous, otherwise as above.
860 - 870m	100	CALCISILTITE/CALCILUTITE: as above.
870 - 880m	100	CALCISILTITE/CALCILUTITE: as above.
880 - 890m	100	CALCISILTITE/CALCILUTITE: as above.
890 - 900m	100	CALCISILTITE/CALCILUTITE: as above.
900 - 910m	100	CALCISILTITE/CALCILUTITE: as above.
910 - 920m	100	CALCISILTITE/CALCILUTITE: as above, with very rare pyrite.
920 - 930m	100	CALCISILTITE/CALCILUTITE: slightly more fossiliferous, otherwise as above.
930 - 940m	100	CALCISILTITE/CALCILUTITE: as above.
940 - 950m	100	CALCISILTITE/CALCILUTITE: no pyrite, otherwise as above.
950 - 960m	100	CALCISILTITE/CALCILUTITE: as above.
960 - 970m	100	CALCISILTITE/CALCILUTITE: as above.
970 - 980m	100	CALCISILTITE/CALCILUTITE: as above.
980 - 990m	100	CALCISILTITE/CALCILUTITE: as above.
990 - 1000m	100	CALCISILTITE/CALCILUTITE: as above.

1000 - 1010m	100	CALCISILTITE/CALCILUTITE: becoming very argillaceous, with a trace of forams, otherwise as above.
1010 - 1020m	100	CALCISILTITE/CALCILUTITE: very argillaceous as above, with traces of forams and bryozoa.
1020 - 1030m	60	CALCAREOUS CLAYSTONE/SILTSTONE: white to medium light grey, soft and slightly sticky to firm, predominantly rounded cuttings, very calcareous.
	40	CALCISILTITE/CALCILUTITE: as above.
	trace	FORAMS
	trace	Broken Fragment - bryozoan or coral.
1030 - 1040m	100	CALCAREOUS CLAYSTONE/SILTSTONE: as above.
	trace	CALCISILTITE/CALCILUTITE: as above.
1040 - 1050m	100	CALCAREOUS CLAYSTONE/SILTSTONE: as above.
	trace	CALCITE: with bright yellow-white mineral fluorescence (no cut, no crush cut).
	trace	FORAMS
	trace	BRYOZOA
1050 - 1060m	100	CALCAREOUS CLAYSTONE/SILTSTONE: as above.
	trace	CALCITE: as above.
	trace	FORAMS
1060 - 1070m	100	CALCAREOUS CLAYSTONE/SILTSTONE: as above.
	trace	CALCITE: as above.
	trace	FORAMS
1070 - 1080m	100	CALCAREOUS CLAYSTONE/SILTSTONE: as above, predominantly calcareous claystone as above.
	rare	CALCITE: as above.
1080 - 1090m	100	CALCAREOUS CLAYSTONE/SILTSTONE: as above and tending to sticky.
	trace	CALCITE: as above.
1090 - 1100m	100	CALCAREOUS CLAYSTONE/SILTSTONE: as above.
	trace	FORAMS
	trace	BRYOZOA FRAGMENTS
1100 - 1110m	100	CALCAREOUS CLAYSTONE/SILTSTONE: predominantly calcareous claystone as above.
1110 - 1120m	100	CALCAREOUS CLAYSTONE and minor CALCAREOUS SILTSTONE: as above.
	trace	FORAMS
	trace	ECHINOID SPINES
	trace	SHELL FRAGMENTS
1120 - 1130m	60	CALCAREOUS CLAYSTONE: very light grey to medium light grey, very soft, sticky, trace forams, trace pyrite inclusions, calcareous, grades to calcareous siltstone.
	40	CALCAREOUS SILTSTONE: medium light to medium grey, firm to soft, calcareous, forams, mica, occasional glauconite inclusions, grades to calcareous claystone.
1130 - 1140m	90	CALCAREOUS CLAYSTONE: with occasional very fine grained quartz inclusions, and black ?carbonaceous inclusions, otherwise as above.
	10	CALCAREOUS SILTSTONE: as above, grades to calcareous claystone.

1140 - 1150m	100 trace	CALCAREOUS CLAYSTONE/SILTSTONE: as above. FORAMS
1150 - 1160m	80 20 trace	CALCAREOUS CLAYSTONE: as above. CALCAREOUS SILTSTONE: tending to firm to moderately hard in parts, grading to calcareous claystone, as above. CALCITE
1160 - 1170m	80 20	CLAYSTONE: less calcareous, otherwise as above. SILTSTONE: less calcareous, otherwise as above.
1170 - 1180m	70 30	CLAYSTONE: as above. SILTSTONE: grades to claystone; with very fine grain size black ?carbonaceous inclusions, pyrite, otherwise as above.
1180 - 1190m	100	CLAYSTONE/SILTSTONE: with occasional inclusions of glauconite, otherwise as above.
1190 - 1200m	100 trace	CLAYSTONE/SILTSTONE: as above. FORAMS
1200 - 1210m	100 trace	CLAYSTONE: only slightly sticky, otherwise as above, grades from siltstone in parts. FORAMS
1210 - 1220m	100 trace	CLAYSTONE/SILTSTONE: as above. FORAMS
1220 - 1225m	80 20	CLAYSTONE: light to medium light grey, very soft, rounded cuttings, calcareous, slightly sticky, black carbonaceous inclusions. SILTSTONE: grading to shale - medium grey, firm, rounded cuttings, tending to subfissile in parts, calcareous.
1225 - 1230m	90 10 trace	CLAYSTONE: as above. SILTSTONE: grading to shale - as above. FORAMS
1230 - 1235m	100 trace trace	CLAYSTONE: as above. SILTSTONE: grading to shale - as above. FORAMS
1235 - 1240m	60 40 trace	CLAYSTONE: as above. SHALE: tending subfissile to fissile. FORAMS
1240 - 1245m	60 40 trace	CLAYSTONE: as above. SHALE: as above. FORAMS
1245 - 1250m	100 trace	CALCISILTITE/CALCILUTITE: medium light grey, very argillaceous, soft to occasionally firm, occasional forams. GLAUCONITE: green, medium grained, rounded, moderately hard cuttings, very rare.
1250 - 1255m	100	CALCILUTITE/CALCISILTITE: as above, with more fossil fragments.
1255 - 1260m	100	CALCILUTITE/CALCISILTITE: as above.

1260 - 1265m	90	CALCISILTITE/CALCILUTITE: as above.
	10	SILTSTONE: tan, soft, slightly calcareous. Quartzose loose grains grade from siltstone to very fine grained sandstone, subangular to subrounded, moderately well sorted.
	trace	GLAUCONITE: medium grained, subrounded green grains, very rare.
	trace	COAL: black, blocky specks.
1265 - 1270m	trace	SHELL FRAGMENTS: as above.
	20	CALCILUTITE/CALCISILTITE: as above.
	80	SILTSTONE: 50% as above; 50% greenish grey, moderately hard to firm, quartzose with common fine grained glauconite grains. Slightly calcareous.
	trace	PYRITE: fine grained, granular cuttings.
1270 - 1275m	trace	SANDSTONE: loose quartz - medium grained, clear, subangular to subrounded grains, very rare.
	90	SILTSTONE: as above, mostly the greenish variety.
	5	SANDSTONE: loose quartz, medium to coarse grained, clear, subangular to subrounded.
	5	CALCILUTITE/CALCISILTITE: as above.
1275 - 1280m	trace	GLAUCONITE: loose, medium subrounded grains.
	90	SILTSTONE: as above, grades to very fine grained sandstone with subangular to subrounded quartz grains. There is some evidence of the loose quartz grains as above, being scattered in the siltstone, with the siltstone as a matrix.
	5	CALCILUTITE/CALCISILTITE: as above.
	5	SANDSTONE: as above.
1280 - 1285m	50	SILTSTONE: as above.
	50	SANDSTONE: as above.
	trace	PYRITE: blocky, granular cuttings.
1285 - 1290m	90	SANDSTONE: as above, occasional trace of dull yellow mineral fluorescence which appears to be from quartz grains showing slight acid reaction - possibly dolomite.
	10	SILTSTONE: as above.
	trace	PYRITE: as above, quite common, sometimes seen encrusting quartz grains and surrounding glauconite grains.
1290 - 1295m	100	SANDSTONE: as above, no shows.
	trace	PYRITE: as above.
	trace	SILTSTONE/CALCISILTITE/CALCILUTITE: as above.
1295 - 1300m	100	SANDSTONE: as above.
	trace	PYRITE: as above, very rare.
	trace	SILTSTONE/CALCISILTITE/CALCILUTITE: as above.
1300 - 1305m	100	SANDSTONE: as above.
	trace	PYRITE: as above, very rare.
	trace	SILTSTONE/CALCISILTITE/CALCILUTITE: as above.
1305 - 1310m	100	SANDSTONE: as above.
	trace	PYRITE: as above, very rare.
	trace	SILTSTONE/CALCISILTITE/CALCILUTITE: as above.

1310 - 1315m	80	SANDSTONE: as above, very rare mineral fluorescence as above.
	5	COAL: black, blocky, angular, vitreous cuttings.
	5	SILTSTONE: greenish grey, as above.
	10	CALCISILTITE/CALCILUTITE: as above, probably cavings.
1315 - 1320m	50	SANDSTONE: as above, trace mineral fluorescence as above.
	40	COAL: as above, some argillaceous.
	5	SILTSTONE: as above.
	5	CALCISILTITE/CALCILUTITE: as above.
1320 - 1325m	90	SANDSTONE: as above, trace mineral fluorescence as above.
	10	COAL: as above.
	trace	LIMESTONE: as above.
	trace	PYRITE: loose granular cuttings, also occasionally cementing sandstone.
1325 - 1330m	90	SANDSTONE: as above, also occasionally amber, white or pink translucent grains. Trace mineral fluorescence as above, very rare.
	5	COAL: as above.
	5	SILTSTONE/LIMESTONE: as above.
1330 - 1335m	100	SANDSTONE: as above, no shows, mineral fluorescence as above.
	trace	COAL
	trace	SILTSTONE
	trace	LIMESTONE
1335 - 1340m	100	SANDSTONE: predominantly clear, occasionally amber, translucent white, medium to coarse grained, subangular to subrounded, moderately well sorted, loose grains.
	trace	COAL
	trace	SILTSTONE
	trace	LIMESTONE
1340 - 1345m	90	SANDSTONE: as above.
	10	COAL: as above.
	trace	SILTSTONE
	trace	LIMESTONE
	trace	PYRITE: as above, rare.
1345 - 1350m	100	SANDSTONE: as above, slightly more angular grains.
	trace	SILTSTONE
	trace	COAL
	trace	PYRITE
1350 - 1355m	100	SANDSTONE: clear to translucent, loose quartz grains, medium to very coarse grained, predominantly coarse to very coarse, occasionally subangular to dominantly subrounded, well sorted, no shows.
	trace	SILTSTONE: medium grey to brown grey, occasionally greenish grey, soft to firm, blocky cuttings, greenish cuttings are calcareous, carbonaceous flecking in parts, grades to shale in parts.
	trace	COAL: black, brittle angular cuttings.
	trace	PYRITE: microcrystalline aggregates.



1355 - 1360m	100	SANDSTONE: occasional granule sized grains, subrounded to rounded grains, otherwise as above.
	trace	SILTSTONE: very carbonaceous in parts, otherwise as above.
	trace	PYRITE: as above.
1360 - 1365m	90	SANDSTONE: subangular to rounded grains, predominantly subrounded, occasionally white quartz grains, otherwise as above.
	trace	SILTSTONE: as above, greenish grey, calcareous cuttings no longer present.
	10	COAL: as above.
1365 - 1370m	70	SANDSTONE: as above.
	20	COAL: as above.
	10	SILTSTONE: as above, and very carbonaceous, grading to shale in parts. Rare very carbonaceous cuttings showed bright white fluorescence, no cut, and white crush cut.
1370 - 1375m	80	SANDSTONE: as above.
	10	SILTSTONE: with rare very dull, pale yellow fluorescence, no cut, no crush cut, otherwise as above.
	10	COAL: as above.
1375 - 1380m	60	SANDSTONE: as above.
	30	COAL: as above.
	10	SILTSTONE: as above, no fluorescence.
1380 - 1385m	60	SANDSTONE: as above.
	20	CLAYSTONE: buff, very soft to dispersive, well rounded cuttings, carbonaceous flecking, trace mica.
	10	SILTSTONE: as above.
10	COAL: as above,	
1385 - 1390m	60	SANDSTONE: common rounded to well rounded grains, as above, no shows. Also quartz aggregates - clear to translucent, friable, fine to very coarse grained, predominantly medium to coarse, rounded to well rounded (coarser grains are well rounded), poor to moderate sorting, calcareous/dolomitic cement. Approximately 5-10% of whole sample has yellow white fluorescence, no cut, no crush cut.
	20	COAL: as above.
	10	SILTSTONE: as above, also trace greenish-grey calcareous siltstone, as above.
10	CLAYSTONE: as above.	
1390 - 1395m	60	SANDSTONE: loose quartz - as above. Quartz aggregates (approximately 5-10% of whole sample) as above, with fluorescence as above. Also few cuttings show yellow fluorescence and slow, very weak, very small amount of white streaming cut. No crush cut.
	30	SILTSTONE: firm to moderately hard, otherwise as above, trace glauconite.
	10	CLAYSTONE: as above.
	trace	COAL: as above.
	trace	PYRITE: as above.

1395 - 1400m	90	COAL: black, brittle, angular cuttings, vitreous.
	10	SANDSTONE: loose quartz as above. Trace very fine grained sandstone aggregates, light grey, friable, very fine grained, well sorted, dolomitic cement. With yellow fluorescence and slow faint yellow crush cut.
1400 - 1405m	100	COAL: black, brittle, as above.
	trace	SANDSTONE: loose quartz grains, trace aggregates as above, with fluorescence and cut as above.
	trace	SILTSTONE: as above.
1405 - 1410m	70	SANDSTONE: loose quartz - translucent to occasionally white, medium to very coarse grained, predominantly coarse to very coarse, subrounded to rounded, the very coarse grains are commonly very well rounded, no shows. Also very fine grained sandstone aggregates - light grey, friable, very fine to fine grained, subrounded grains, well sorted, argillaceous and calcareous/dolomitic cement, trace carbonaceous inclusions, pyrite, mica, patchy white fluorescence, no cut, no crush cut. Trace medium grained aggregates as previously described. No shows.
	20	SILTSTONE: medium light grey to medium dark grey, brown grey, occasionally greenish grey, soft to moderately hard, blocky cuttings, calcareous in parts.
	10	COAL: as above.
	trace	PYRITE: microcrystalline aggregates.
1410 - 1415m	90	SANDSTONE: loose quartz - as above, very fine grained aggregates as above, with yellow fluorescence, no cut, no crush cut.
	10	SILTSTONE: as above.
	trace trace	COAL: as above. DOLOMITE: buff, hard, crystalline, bright yellow fluorescence, no cut.
1415 - 1420m	90	SANDSTONE: predominantly loose quartz as above. Also very fine grained sandstone as above with trace fluorescence as above. Medium grained aggregates - white, moderately hard, medium grained, subrounded, moderately well sorted, dolomitic cement.
	10	SILTSTONE: as above.
	trace trace	COAL: as above. DOLOMITE: as above.
1420 - 1425m	90	SANDSTONE: predominantly loose quartz - as above. Trace very fine grained sandstone aggregates as above, with dolomitic cement and mineral fluorescence.
	10	SILTSTONE: as above, grading to claystone - medium light grey, very soft, calcareous, carbonaceous flecking.
	trace trace	COAL: as above. DOLOMITE: as above.

1425 - 1430m	100	SANDSTONE: predominantly loose quartz - predominantly coarse to granule sized, rounded to well rounded grains, otherwise as above. No shows. Also trace of medium grained dolomite cemented aggregates, with patchy white fluorescence, no cut.
	trace	SILTSTONE: as above.
	trace	PYRITE: as above.
1430 - 1435m	100	SANDSTONE: predominantly loose quartz as above. Trace of medium grained aggregates as above. No shows.
	trace	COAL: as above.
	trace	SILTSTONE: as above, occasionally grading to claystone as above.
	trace	DOLOMITE: as above.
1435 - 1440m	100	SANDSTONE: predominantly loose quartz - dominantly very coarse otherwise as above. Trace very fine grained sandstone as above with patchy white fluorescence as above (dolomite cement). Trace medium grained aggregates as above, with patchy white fluorescence, no cut.
1440 - 1445m	100	SANDSTONE: predominantly loose quartz. Trace medium to coarse grained aggregates - white, friable to moderately hard, medium to coarse grained, dominantly medium, subrounded, dolomite cement, patchy white fluorescence, no cut.
1445 - 1450m	60	SANDSTONE: predominantly loose quartz, clear grains, coarse to occasionally medium grained, moderately well sorted, subangular to angular, occasionally subrounded, occasional dolomitic cement, gives trace bright white yellow spotty mineral fluorescence. No hydrocarbon cut.
	30	COAL: black, firm to moderately hard, predominantly argillaceous, occasionally vitreous blocky cuttings.
	10	SILTSTONE: pale brown/yellow brown, argillaceous, silty, calcareous.
	trace	PYRITE: blocky, granular cuttings.
1450 - 1455m	100	SANDSTONE: as above, trace mineral fluorescence as above.
	trace	COAL
	trace	PYRITE
	trace	SILTSTONE
	trace	(4 or 5 cuttings) gave instant bright yellow streaming cut. Unable to isolate or determine lithology of these cuttings.
1455 - 1460m	100	SANDSTONE: as above.
	tr-10%	DOLOMITE - yellow mineral fluorescence.
	trace	COAL
	trace	SILTSTONE
	trace	White claylike substance - kaolinite?
	trace	Hydrocarbon fluorescence from siltstone and apparently from white clay above, strong yellow spotty fluorescence with slow strong yellow cut.

1460 - 1465m	90	SANDSTONE: 1) 70% as above; 2) 20% clear, quartzose, fine to medium grained, subangular to subrounded, poorly sorted aggregates with yellow fluorescing dolomitic cement. Poor visible porosity.
	5	COAL: as above.
	5	SILTSTONE: pale brown, light grey, soft, rounded to occasionally angular cuttings, calcareously cemented.
1465 - 1470m	trace	WHITE CLAY Up to 60% spotty yellow fluorescence - nearly all mineral fluorescence. One cutting gave yellow cut - could only isolate an orange fluorescing kerogen cutting which gave strong moderately fast bright yellow cut.
	90	SANDSTONE: 1) 30% loose grains as above; 2) 60% aggregates as above. The dolomitic cement of these cuttings gives bright yellow mineral fluorescence.
1470 - 1475m	10	SILTSTONE/COAL: as above. Trace of yellow hydrocarbon fluorescence from siltstone cuttings (1 or 2 cuttings) which give slow moderate yellow cut.
	90	SANDSTONE: 1) 50% loose grains as above; 2) 50% aggregates as above, very poor visible porosity.
1475 - 1480m	10	COAL: as above.
	trace	SILTSTONE: quite common. 30% mineral fluorescence.
1480 - 1485m	90	SANDSTONE: 1) one third loose grains as above; 2) two thirds aggregates as above.
	5	CLAY: white, as above.
	tr-5	COAL/SILTSTONE: as above. 60% mineral fluorescence as above.
1485 - 1490m	80	SANDSTONE: as above, predominantly aggregates as above.
	10	COAL: argillaceous, black, dark brown.
	10	SILTSTONE: as above. 60% mineral fluorescence as above.
1490 - 1495m	90	SANDSTONE: as above.
	5	COAL: as above.
	5	SILTSTONE: as above. 60% mineral fluorescence as above.
1495 - 1500m	100	SANDSTONE: as above.
	trace	COAL
	trace	SILTSTONE
	trace	PYRITE: blocky, granular cuttings. 90% spotty yellow mineral fluorescence as above.
1495 - 1500m	100	SANDSTONE: 1) 50% loose quartz grains as above; 2) 50% aggregates as above, poor visible porosity.
	trace	COAL/SILTSTONE: as above, some non argillaceous coal present.
	trace	CLAY: white, as above. 80% mineral fluorescence from sandstone, as above.

1500 - 1505m	100 trace trace trace	SANDSTONE: as above. COAL SILTSTONE CLAYSTONE Fluorescence as above.
1505 - 1510m	100  trace trace trace	SANDSTONE: predominantly loose clear quartz grains, as above; aggregates - as above, still common. COAL SILTSTONE CLAY: white, as above. 60% mineral fluorescence as above.
1510 - 1515m	100  trace trace trace trace	SANDSTONE: as above. Many of the aggregates seem to break into loose fine to medium grained, angular to subangular, clear quartz grains. COAL PYRITE SILTSTONE CLAY 50% mineral fluorescence as above.  Pulled out of hole to run 9-5/8" casing.
1515 - 1520m	100	CEMENT
1520 - 1525m	100  trace trace trace trace trace	SANDSTONE: 2 types, predominantly 1) loose clear quartz grains, coarse grained, angular to subangular, well sorted; 2) aggregates - clear, subangular quartz grains, medium grained, well sorted, some silica and some dolomitic cement, Very poor visible porosity. No shows, trace bright yellow spotty fluorescence from dolomite. LIMESTONE SILTSTONE PYRITE CEMENT COAL Possibly all cavings - however the pyrite could be associated with the sandstone.
1525 - 1530m	80  20  trace  trace	SANDSTONE: as above with dolomite mineral fluorescence as above; also some calcareous cement present, no shows. SILTSTONE: light grey, hard, grading to very fine grained sandstone. Carbonaceous flecks present, calcareous cement, very poor visible porosity. PYRITE: quite common angular granular cuttings. COAL
1530 - 1535m	100 trace trace	SANDSTONE: as above, no shows. SILTSTONE COAL
1535 - 1540m	100 trace trace	SANDSTONE: as above, no shows. SILTSTONE COAL
1540 - 1545m	50 50	SANDSTONE: as above, no shows. COAL: black, vitreous, also black speckled with red brown spots, ie. clean and also dirty argillaceous coal.

1545 - 1550m	100 trace	COAL: as above, predominantly clean, black vitreous, subangular cuttings. SANDSTONE: as above.
1550 - 1555m	100 trace	COAL: as above. SANDSTONE: as above, no shows.
1558.5m	100 trace trace	Grab Sample COAL: as above. SANDSTONE: as above, more common. SILTSTONE
1555 - 1560m	90 5 5	COAL: as above, trace moderately fast yellow cut from 1-2 cuttings with kerogen. No hydrocarbon shows. SANDSTONE: as above. SILTSTONE: light grey to grey, rounded cuttings, firm to moderately hard, subrounded to subangular, calcareous, occasional carbonaceous flecks.
1560 - 1565m	100 trace trace trace	COAL: as above. SANDSTONE SILTSTONE Yellow fluorescence, no shows.
1565 - 1570m	90 10 trace	SANDSTONE: 2 types - 1) 60% aggregates of clear quartz grains. The grains are subangular to angular, medium grained with fine grained matrix, well sorted. The aggregates are hard, have dolomitic cement with bright yellow spotty fluorescence and very poor visible porosity. 2) 30% loose clear quartz grains, medium to coarse grained, moderately well sorted. COAL: as above. SILTSTONE Traces of moderately bright yellow hydrocarbon cut (few cuttings) - could not isolate source/lithology.
1570 - 1575m	60 40 trace trace	SANDSTONE: 2/3 type 2) loose quartz, as above. 1/3 aggregates as above. 30% mineral fluorescence from dolomitic cement. COAL: as above. SILTSTONE PYRITE
1575 - 1580m	90 10	SANDSTONE: predominantly loose grains, 10% dolomite fluorescence from aggregates as above. COAL: as above.
1580 - 1585m	100 trace trace trace	SANDSTONE: predominantly loose quartz grains as above, occasional medium grained aggregates as above. Dolomite fluorescence (yellow spotty) from aggregates. PYRITE SILTSTONE
1585 - 1590m	100 trace trace	SANDSTONE: predominantly loose quartz grains as above, trace dolomite fluorescing aggregates as above. COAL PYRITE: as cement in occasional sandstone aggregates.

1590 - 1595m	100	SANDSTONE: predominantly loose quartz grains as above, trace to 10% dolomite fluorescing aggregates as above. No shows.
	trace	COAL
1595 - 1600m	100	SANDSTONE: predominantly loose quartz grains as above, trace dolomite mineral fluorescence from aggregates as above.
	trace	COAL
1600 - 1605m	100	SANDSTONE: predominantly loose grains as above, trace fluorescing dolomite cemented aggregates, as above.
	trace	COAL: much less common.
1605 - 1610m	80	SANDSTONE: predominantly loose grains as above, trace fluorescing dolomite cemented aggregates.
	20	COAL: mostly black, angular, vitreous cuttings with conchoidal fracture. Occasional dirty, silty blocky cuttings.
	trace	PYRITE
	trace	SILTSTONE
1610 - 1615m	100	COAL: black, vitreous angular cuttings.
	trace	SANDSTONE: as above, with associated trace dolomitic yellow spotty mineral fluorescence (few cuttings).
	trace	PYRITE: associated with coal.
1615 - 1620m	100	COAL: as above, no shows. The desander sample contains about 45% siltstone - argillaceous and carbonaceous; 45% medium grained, clear, loose quartz grains, 10% pyrite.
1620 - 1625m	100	COAL: as above.
	trace	SILTSTONE: as above.
	trace	SANDSTONE: rare.
	trace	PYRITE
1625 - 1630m	90	SILTSTONE: olive grey, greyish red, very argillaceous, carbonaceous flecks common, slightly calcareous, subangular to subrounded cuttings, soft to moderately hard, mostly firm to moderately hard, occasionally give trace dull orange mineral fluorescence, no cut.
	10	COAL: as above.
	trace	SANDSTONE: loose grains as above. Trace few spots of bright yellow mineral fluorescence from dolomite.
1630 - 1635m	50	SILTSTONE: as above, and also a light grey variety which grades to a fine grained sandstone.
	40	SANDSTONE: light grey, quartzose aggregates, moderately hard, subangular to angular cuttings, with siliceous cement, occasional carbonaceous flecks, slightly argillaceous. Trace loose quartz grains, as above. 10% spotty dull yellow fluorescence from siltstone and fine grained sandstone with calcareous cement.
	10	COAL: as above.

1635 - 1640m	80	COAL: as above.
	10	SILTSTONE: as above.
	10	SANDSTONE: as above, trace spotty yellow dolomite fluorescence. No shows.
1644m		Spot Sample
	60	SANDSTONE: loose quartz - translucent, medium to coarse grained, occasionally very coarse grains, subrounded, moderately to well sorted, no shows. Also trace translucent to white, friable, very fine to predominantly fine grained, rounded grains, moderately to well sorted, dolomitic cement, trace carbonaceous inclusions. No shows.
	40	SILTSTONE: pale brown to medium dark grey, firm to soft, blocky cuttings, carbonaceous flecking to very carbonaceous.
	trace	COAL: as above.
	trace	PYRITE: microcrystalline aggregates.
1644 - 1645m	60	SILTSTONE: as above.
	30	SANDSTONE: loose quartz - as above. Also quartz aggregates - medium grained, friable to moderately hard, calcareous, with dull patchy yellow white fluorescence, no cut, otherwise as above.
	10	COAL: black, moderately hard, brittle, vitreous, conchoidal fracture.
	trace	PYRITE: as above. 1 cutting of black ?carbonaceous matter had dull yellowish fluorescence and moderately fast streaming white cut.
1645 - 1650m	60	COAL: as above.
	30	SILTSTONE: as above.
	10	SANDSTONE: loose quartz as above, aggregates as above, spotty dull fluorescence as above.
	trace	PYRITE
1650 - 1655m	70	SILTSTONE: very carbonaceous in parts.
	20	COAL: as above.
	10	SANDSTONE: loose quartz and aggregates as above. 1 cutting black and orange ?carbonaceous matter/kerogen? showed very weak cut.
1655 - 1660m	80	SILTSTONE: very carbonaceous in parts, otherwise as above.
	10	COAL: as above.
	10	SANDSTONE: loose quartz and very fine to medium grained aggregates, medium grained aggregates calcareously cemented, as above.
1660 - 1665m	70	SILTSTONE: as above.
	20	SANDSTONE: loose quartz and quartz aggregates as above. Quartz aggregates have only rare (ie. less than a trace) dull spotty yellow white fluorescence without cut. 1 cutting black/orange ?carbonaceous matter/amber? has white streaming cut.
	10	COAL: as above.



1665 - 1670m	50	SILTSTONE: occasionally moderately hard, otherwise as above.
	40	SANDSTONE: predominantly loose quartz - as above, and fine to medium grained quartz aggregates, calcareous and dolomitic cemented aggregates.
	10 trace	COAL: as above. CLAYSTONE: white, very soft.
1670 - 1675m	70	COAL: as above.
	20	SILTSTONE: as above.
	10 trace	SANDSTONE: loose quartz grains, subangular to subrounded, commonly very coarse grains, otherwise as above. Aggregates as above, both calcareous and dolomite cemented. Fluorescence as above, ie. dull spotty yellow white fluorescence, no cut. PYRITE
1675 - 1680m	90	COAL: angular cuttings as above.
	trace	SILTSTONE: less carbonaceous, otherwise as above.
	10 trace	SANDSTONE: loose quartz grains as above, aggregates as above, however without fluorescence. PYRITE: as above. Few cuttings black carbonaceous matter - show white fluorescence and fast streaming yellow white cut.
1680 - 1685m	70	COAL: as above.
	30	SANDSTONE: predominantly loose quartz as above, trace aggregates, no fluorescence.
	trace	SILTSTONE
1685 - 1690m	60	COAL: black, hard, brittle, angular cuttings, vitreous, conchoidal fracture.
	30	SANDSTONE: predominantly loose quartz as above. Also trace quartz aggregates - fine and medium grained with some having calcareous cement and dull spotty yellow white fluorescence and no cut.
	10 trace	SILTSTONE: very carbonaceous in parts, otherwise as above. PYRITE: as above.
1690 - 1695m	70	COAL: as above.
	20	SILTSTONE: as above.
	10 trace	SANDSTONE: predominantly loose quartz as above, only very occasional very fine grained sandstone aggregates as above, also occasional dolomitic cemented aggregates as above. PYRITE: as above.
1695 - 1700m	30	CLAYSTONE: white, very soft to dispersive, very well rounded cuttings, occasionally carbonaceous inclusions.
	30	SILTSTONE: as above, with rare cuttings having very dull orange fluorescence, no cut.
	25	SANDSTONE: loose quartz - translucent, coarse to very coarse, subrounded, moderately well sorted. Rare quartz aggregates with calcareous cement and fluorescence as above.
	10	COAL: as above.
	5	PYRITE: common microcrystalline aggregates.

1700 - 1705m	30	CLAYSTONE: water sensitive, as above.
	30	SILTSTONE: predominantly brown, firm, blocky cuttings with carbonaceous inclusions, grading to claystone.
	20	COAL: as above.
	20	SANDSTONE: loose quartz as above, and trace calcareous aggregates as above.
	trace	PYRITE: as above.
1705 - 1710m	50	COAL: as above.
	30	CLAYSTONE: as above.
	10	SILTSTONE: as above.
	10	SANDSTONE: predominantly loose quartz grains as above, ie. no shows. Trace dolomitic/calcareous cemented quartz aggregates with dull spotty white/yellow fluorescence and no cut ie. as above.
	trace	PYRITE: as above. 1 cutting - carbonaceous matter showed bright white fast streaming cut.
1710 - 1715m	80	SANDSTONE: minor loose quartz as above. Predominantly quartz aggregates - very fine grained, grading to silt sized grains, light grey, moderately hard, very well sorted, poor visual porosity, dolomitic/?calcareous cement, carbonaceous flecking, has very dull orange fluorescence, no cut.
	10	COAL: as above.
	10	SILTSTONE: as above.
	trace	CLAYSTONE: as above.
1715 - 1720m	40	SANDSTONE: trace loose quartz as above. Predominantly very fine grained aggregates as above, with fluorescence as above, occasional medium grained calcareous cemented aggregates as above.
	40	COAL: as above.
	20	SILTSTONE: as above, and also light to medium light grey, firm to soft cuttings, cuttings tending to subfissile, carbonaceous inclusions.
	trace	PYRITE: as above.
1720 - 1725m	90	SANDSTONE: occasionally loose quartz - translucent, very coarse, subangular. Predominantly quartz aggregates - 2 types 1) fine to predominantly medium grained, well cemented, argillaceous, trace pyrite otherwise as above; with dull orange fluorescence, no cut, as above; 2) white, friable to moderately hard, fine to medium grained, dominantly fine grained, rounded grains, moderately to well sorted, calcareous/dolomitic cement, moderate visible porosity, fine grained carbonaceous inclusions, no shows.
	10	SILTSTONE: as above.
	trace	COAL: as above.
1725 - 1730m	100	SANDSTONE: occasionally loose quartz - as above; predominantly quartz aggregates and types 1) and 2) as above.
	trace	SILTSTONE: as above.
	trace	PYRITE: as above.
1730 - 1735m	100	COAL: black, moderately hard, angular cuttings, vitreous, subconchoidal fracture.
	trace	SANDSTONE: quartzose aggregates as above.

1735 - 1740m	30	COAL: as above.
	30	SILTSTONE: as above.
	30	SANDSTONE: loose quartz as above; also quartz aggregates types 1) and 2) as above.
	10	CLAYSTONE: as above.
1740 - 1745m	50	COAL: as above.
	40	SILTSTONE: as above.
	10	SANDSTONE: loose quartz - as above and occasional aggregates as above. 2 cuttings - black carbonaceous matter showed bright white fluorescence and fast streaming cut.
1745 - 1750m	80	SILTSTONE: buff, predominantly pale brown to greyish red, depending upon the amount of carbonaceous matter present. Darker cuttings are predominantly angular, moderately hard, carbonaceous, argillaceous. The lighter cuttings are less argillaceous, firm, subrounded cuttings, slightly calcareous and occasionally grading to very fine grained sandstone.
	10	SANDSTONE: 1) predominantly loose clear quartz grains, subangular to angular, coarse grained, moderately well sorted; 2) clear, quartzose aggregates of medium to fine grained, subangular to angular, poorly sorted, hard cuttings with dolomitic cement, gives trace bright yellow mineral fluorescence from dolomite.
	10	COAL: black, vitreous brittle angular cuttings, also grades to dirty coaly rounded cuttings.
	trace	PYRITE: occasionally in carbonaceous silty cuttings, usually granular cuttings or as cement in the sandstone.
	1750 - 1755m	100
	trace	PYRITE
	trace	COAL
	trace	SILTSTONE
1755 - 1760m	60	SILTSTONE: as above.
	40	SANDSTONE: as above, except very coarse grained to medium grained, moderately well sorted, predominantly as above. Trace mineral fluorescence as above, no shows.
	trace	PYRITE
1760 - 1765m	80	SILTSTONE: as above.
	10	COAL: as above.
	10	SANDSTONE: loose quartz grains as above, also predominantly very fine grained sandstone, light grey to medium light grey, quartzose, moderately hard subrounded cuttings with siliceous and, occasionally dolomitic and calcareous cement, very poor visible porosity, subangular to angular, very fine grained clear quartz grains, well sorted. No shows. Trace dull orange and yellow mineral fluorescence from calcareous cemented siltstone and dolomitic cemented sandstone.

1765 - 1770m	100	COAL: as above.
	trace	SILTSTONE: as above.
	trace	SANDSTONE: loose quartz grains as above, very fine grained aggregates as above, trace mineral fluorescence as above, no shows.
	trace	PYRITE
1770 - 1775m	80	SILTSTONE: as above, darker varieties being more common.
	20	COAL: as above, one dirty cutting gave hydrocarbon cut, shows bright yellow cut, strong yellow crush cut.
	trace	SANDSTONE: as above.
	trace	PYRITE: as above. Trace orange and yellow mineral fluorescence as above.
1775 - 1780m	50	SILTSTONE: as above, lighter than above, gives dull orange mineral fluorescence.
	40	SANDSTONE: loose clear medium to coarse grained quartz grains, moderately well sorted, subangular to angular, no shows. Occasional bright yellow mineral fluorescence possibly from occasional dolomitic cemented sandstone aggregates.
	10	COAL: as above.
	trace	PYRITE: as above. One cutting gave fast strong yellow hydrocarbon cut.
1780 - 1785m	50	SILTSTONE: as above, gives very dull orange fluorescence.
	40	SANDSTONE: as above, the fine grained aggregates becoming more abundant.
	10	COAL: as above.
	trace	PYRITE: as above. A carbonaceous silty cutting and a coal cutting give strong slow yellow hydrocarbon cut.
1785 - 1790m	80	SILTSTONE: as above.
	10	SANDSTONE: predominantly light grey, fine to very fine grained quartzose aggregates, grains are subangular to subrounded, slightly argillaceous matrix, calcareous and dolomitic cement giving moderately bright spotty yellow mineral fluorescence, moderately hard angular cuttings, very poor visible porosity. Occasional loose quartz grains as above.
	10	COAL: as above.
	trace	PYRITE: as above.
1790 - 1795m	90	SILTSTONE: as above.
	5	SANDSTONE: as above, with associated moderately bright yellow mineral fluorescence.
	5	COAL: as above.
	trace	PYRITE: as above.
1795 - 1800m	90	COAL: black, firm to moderately hard, brittle, predominantly angular cuttings, with occasional very angular cuttings and occasional subrounded cuttings, some may be cavings.
	10	SILTSTONE: light grey to medium grey, firm, subrounded cuttings, occasionally carbonaceous flecking.

1800 - 1805m	80	SILTSTONE: light grey to medium dark grey, also buff, soft to firm, subrounded to rounded cuttings, non calcareous, carbonaceous inclusions common in darker cuttings. Rare cuttings with dull, pale orange fluorescence, no cut.
	20 trace	COAL: as above. SANDSTONE: loose quartz - clear, medium to coarse grained, angular to subangular (1 cutting with bright white fluorescence, no cut).
1805 - 1810m	50	SILTSTONE: as above, and grading to claystone, white, very soft.
	50 trace	COAL: as above. SANDSTONE: loose quartz as above.
1810 - 1815m	100	COAL: firm to moderately hard, subangular cuttings, vitreous in parts, otherwise as above.
	trace trace	SILTSTONE: as above. SANDSTONE: trace loose quartz as above. Also trace sandstone aggregates - white, friable to moderately hard, very fine to fine grained, rounded to subrounded grains, quartzose, very well sorted, quartzose? matrix plus trace dolomitic cement, dull yellow white mineral fluorescence, no shows.
1815 - 1820m	80	COAL: as above.
	10	SILTSTONE: as above, no longer grading to claystone.
	10	SANDSTONE: as above.
1820 - 1825m	90	COAL: as above.
	5	SILTSTONE: as above.
	5	SANDSTONE: as above.
1825 - 1830m	80	COAL: becoming softer, predominantly firm, only occasionally moderately hard, otherwise as above.
	10	SILTSTONE: as above.
	10	SANDSTONE: as above.
	trace	PYRITE: very fine aggregates.
1830 - 1835m	50	SANDSTONE: quartzose aggregates as above.
	30	SILTSTONE: as above.
	20	COAL: as above.
	trace	PYRITE: microcrystalline aggregates.
1835 - 1840m	70	SANDSTONE: quartzose aggregates as above. Also loose quartz translucent, subrounded, medium to coarse grained, moderately well sorted, no shows.
	20	SILTSTONE: as above, and grading to claystone as above.
	10	COAL: as above.
	trace	PYRITE: as above.
1840 - 1845m	60	SANDSTONE: as above.
	20	COAL: as above.
	20	SILTSTONE: as above.
	trace	PYRITE: as above.

1845 - 1850m	60	SILTSTONE: as above, and frequently grading to claystone as above.
	20	COAL: as above.
	10	SHALE: medium dark grey, firm, blocky to subfissile cuttings, common carbonaceous flecking.
	10	SANDSTONE: quartzose aggregates, as above.
1850 - 1855m	70	SILTSTONE: light grey to medium dark grey, pale brown, firm to occasionally moderately hard, rounded, blocky cuttings. Grades to claystone - white to light grey, very soft, well rounded, blocky cuttings, silt sized quartz grain inclusions. Siltstone has trace dull, pale white mineral fluorescence.
	20	SANDSTONE: quartz aggregates as above, (very fine grained quartz ), loose quartz as above.
	10	SHALE: as above.
	trace	COAL: as above.
	trace	PYRITE: as above.
1855 - 1860m	40	CLAYSTONE: very soft to dispersive, otherwise as above.
	30	SILTSTONE: as above.
	10	SANDSTONE: quartz aggregates, moderately hard, otherwise as above; loose quartz occasionally very coarse grained.
	20	COAL: as above.
1860 - 1865m	60	SILTSTONE: as above, with carbonaceous inclusions.
	20	COAL: black, brittle, angular to subangular cuttings, vitreous.
	10	SHALE: as above.
	10	SANDSTONE: loose quartz, medium to coarse grained, and aggregates as above.
	trace	PYRITE: as above.
1865 - 1870m	20	COAL: as above.
	20	CLAYSTONE: as above, not only as discrete cuttings, also dispersed through sample.
	60	SILTSTONE: as above.
	trace	SANDSTONE: very coarse grained loose quartz as above. Occasionally quartz aggregates as above.
1870 - 1875m	60	SILTSTONE: as above.
	20	COAL: as above.
	20	CLAYSTONE: as above, not only as discrete cuttings, also dispersed through sample.
	trace	SANDSTONE: very coarse grained, loose quartz as above; occasional quartz aggregates as above.
1875 - 1880m	40	SILTSTONE: as above.
	30	COAL: as above.
	20	CLAYSTONE: predominantly discrete, consolidated cuttings, slightly sticky, otherwise as above.
	10	SHALE: carbonaceous layering, otherwise as above.
	trace	SANDSTONE: moderately hard aggregates as above.

1880 - 1885m	40	SILTSTONE: as above.
	40	SANDSTONE: loose quartz - translucent, medium grained, subrounded, very well sorted, no shows.
	10	COAL: as above.
	10	CLAYSTONE: as above.
	trace	SHALE: as above. Also trace light grey, moderately hard, very fine to fine grained, subrounded grains, moderately well sorted, well cemented, dolomitic cement, very dull orange gold mineral fluorescence (no cut).
1885 - 1890m	40	COAL: as above.
	40	SILTSTONE: as above.
	20	SANDSTONE: loose quartz as above; quartz aggregates as above, with mineral fluorescence as above.
1890 - 1895m	40	SANDSTONE: loose quartz as above; quartz aggregates, fine to medium grained; both grey, 'dirty', sandstone with dull orange mineral fluorescence, and white, 'clean' sandstone with white mineral fluorescence. Both have dolomitic cement.
	30	SILTSTONE: as above.
	20	COAL: as above.
	10	SHALE: carbonaceous layering as above.
1895 - 1900m	80	SILTSTONE: buff, light grey to medium dark grey, firm, subrounded, blocky cuttings, carbonaceous inclusions and layering.
	trace	COAL: as above.
	20	SANDSTONE: loose quartz - translucent, medium grained, subrounded grains, well sorted, no shows. Quartz aggregates - very light grey, friable to moderately hard, subrounded grains, very well sorted, dolomitic cement, in parts argillaceous, occasional carbonaceous inclusions, poor visual porosity, dull white to pale yellow mineral fluorescence, argillaceous sandstone has dull orange mineral fluorescence.
1900 - 1905m	50	SILTSTONE: as above.
	30	COAL: black, firm, angular cuttings, vitreous.
	20	SANDSTONE: quartz aggregates as above with dull spotty, pale yellow mineral fluorescence; plus one cutting - siltstone with occasional very fine grained quartz inclusions, moderately hard, buff, with bright pale yellow fluorescence, and fast pale yellow streaming cut.
1905 - 1910m	90	COAL: some non vitreous cuttings, otherwise as above.
	10	SILTSTONE: as above.
	trace	SANDSTONE: very fine grained quartz aggregates, with dull mineral fluorescence as above. Few cuttings of black carbonaceous matter, hard, very bright white fluorescence and cut.

1910 - 1915m	70	COAL: as above.
	20	SILTSTONE: as above, and grading to very carbonaceous shale in parts.
	10	SANDSTONE: trace translucent, medium to coarse grained, subangular, very fine grained aggregates as above with mineral fluorescence as above.
	trace	PYRITE: microcrystalline aggregates.
1915 - 1920m	40	COAL: as above.
	30	SILTSTONE: as above.
	20	SANDSTONE: loose quartz - clear to translucent, medium to coarse grained, occasionally very coarse, angular to subrounded, predominantly subrounded, no shows. Quartz aggregates - very fine grained and very fine to fine grained aggregates - white to very light grey, friable to moderately hard, subrounded grains, well to very well sorted, dolomitic cement, with dull gold mineral fluorescence. 1 cutting very fine grained sandstone (almost silt sized) light grey, friable, well rounded cutting, very well sorted, carbonaceous inclusions has bright pale yellow fluorescence with fast pale yellow cut.
	10	SHALE: greyish brown, medium dark grey, firm, subfissile to occasionally fissile cuttings, very carbonaceous.
	trace	PYRITE: as above.
1920 - 1925m	30	SILTSTONE: as above.
	30	SANDSTONE: loose quartz as above. Quartz aggregates as above, some very argillaceous, have dull, pale orange gold fluorescence.
	20	COAL: predominantly non vitreous, otherwise as above.
	20	SHALE: as above.
	trace	PYRITE: microcrystalline aggregates as above.
1925 - 1930m	30	SHALE: as above, also light brown to pale brown, hard.
	30	SANDSTONE: loose quartz as above. Quartz aggregates as above, dull orange fluorescence as above.
	20	COAL: as above.
	20	SILTSTONE: buff, light grey to medium dark grey, firm, blocky cuttings, carbonaceous inclusions.
	trace	PYRITE: as above.
1930 - 1935m	40	SILTSTONE: as above.
	30	SHALE: as above, (both dark and light varieties).
	20	SANDSTONE: loose quartz - predominantly medium grained, otherwise as above. Quartz aggregates as above.
	10	COAL: as above.
	trace	PYRITE: as above.
1935 - 1940m	50	SILTSTONE: as above.
	30	SHALE: as above.
	20	SANDSTONE: predominantly quartz aggregates as above. Minor loose quartz as above.
	trace	DOLOMITE: buff, very hard, angular cuttings.
	trace	COAL: as above. One very fine grained sandstone cutting gave bright pale yellow fluorescence and fast pale yellow streaming cut.



1940 - 1945m	50	SILTSTONE: as above.
	30	SHALE: predominantly grey variety.
	10	SANDSTONE: predominantly quartz aggregates, trace loose quartz as above.
	10	DOLOMITE: as above.
1945 - 1950m	trace	COAL: as above.
	50	SHALE: as above.
	30	SILTSTONE: as above.
	20	SANDSTONE: quartz aggregates; trace loose quartz as above, mineral fluorescence as above.
1950 - 1955m	trace	COAL: as above.
	trace	DOLOMITE: as above.
	50	SHALE: as above.
	20	COAL: as above.
1955 - 1960m	20	SILTSTONE: as above.
	10	SANDSTONE: quartz aggregates as above.
	trace	PYRITE: as above.
	trace	DOLOMITE
1960 - 1965m	50	COAL: as above.
	20	SHALE: as above.
	20	SILTSTONE: as above.
	10	SANDSTONE: as above, quartz.
1965 - 1970m	trace	PYRITE
	50	COAL: as above.
	40	SHALE: as above.
	10	SILTSTONE: as above.
1970 - 1975m	trace	SANDSTONE: aggregates as above.
	trace	PYRITE: as above.
	100	COAL: as above.
	trace	SHALE: as above.
1975 - 1980m	trace	SILTSTONE: as above.
	trace	SANDSTONE: as above.
	60	COAL: as above.
	20	SILTSTONE: as above.
1980 - 1985m	20	SHALE: as above.
	20	SILTSTONE: as above.
	10	SANDSTONE: as above.
	10	SANDSTONE: aggregates as above, trace loose quartz as above.
1985 - 1990m	80	COAL: as above.
	50	SHALE: subfissile cuttings, as above.
	10	SILTSTONE: soft to firm, otherwise as above.
	10	SANDSTONE: aggregates as above, trace loose quartz as above.
1990 - 1995m	40	COAL: as above.
	30	SHALE: as above.
	20	SILTSTONE: as above.
	10	SANDSTONE: as above, quartz aggregates as above.
trace	PYRITE: as above.	

1995 - 2000m	50	COAL: as above.
	30	SILTSTONE: pale brown, light to medium grey, firm, blocky cuttings, carbonaceous inclusions.
	10	SHALE: light grey to medium dark grey, brown grey, soft to firm, blocky to subfissile cuttings, carbonaceous inclusions and layering.
	10 trace	SANDSTONE: as above, quartz aggregates. PYRITE: as above.
2000 - 2005m	40	SHALE: as above.
	30	SILTSTONE: as above.
	20	COAL: as above.
	10	SANDSTONE: trace loose quartz, predominantly quartz aggregates as above.
2005 - 2010m	50	SHALE: as above.
	40	SILTSTONE: as above.
	10	SANDSTONE: as above, loose quartz and very fine grained sandstone.
	trace	COAL: as above.
2010 - 2015m	40	COAL: as above.
	30	SHALE: as above.
	20	SILTSTONE: as above.
	10	SANDSTONE: as above.
2015 - 2020m	60	SHALE: as above.
	40	SILTSTONE: light to medium dark grey, soft to firm, blocky cuttings.
	trace	COAL: as above, earthy lustre.
	trace	SANDSTONE: very fine grained aggregates as above.
2020 - 2025m	40	SHALE: as above.
	40	SILTSTONE: as above.
	10	COAL: black, moderately hard, predominantly angular cuttings, also some subrounded, some cuttings vitreous, some conchoidal fracture.
	10	SANDSTONE: loose quartz - translucent, medium to very coarse, predominantly medium to coarse grained, subrounded, moderately well sorted. No shows. Trace quartzose aggregates - white to light grey, friable, very fine grained and medium grained aggregates, subrounded, well sorted, white mineral fluorescence.
	trace	DOLOMITE: pale brown, hard, angular cuttings.
2025 - 2030m	40	SILTSTONE: as above.
	40	SHALE: as above.
	10	SANDSTONE: very fine grained aggregates as above; medium to very coarse grained loose quartz as above.
	10	DOLOMITE: buff to yellow brown, hard, angular cuttings, microcrystalline.
	trace	PYRITE
2030 - 2035m	45	SILTSTONE: as above.
	40	SHALE: as above.
	10	SANDSTONE: aggregates are moderately hard, otherwise as above; loose quartz as above.
	5	DOLOMITE: as above.
	trace	PYRITE: microcrystalline aggregates.

2035 - 2040m	40	SHALE: as above, very dark grey in parts.
	30	SILTSTONE: as above.
	20	COAL: black, moderately hard, brittle, angular cuttings, commonly vitreous with conchoidal fracture.
	10	SANDSTONE: very fine grained aggregates, friable, also loose quartz.
2040 - 2045m	50	COAL: as above.
	30	SHALE: as above.
	10	SILTSTONE: as above.
	10	SANDSTONE: loose quartz as above; very fine grained aggregates as above.
2045 - 2050m	60	COAL: predominantly angular cuttings, some are subrounded.
	20	SHALE: commonly dark grey, and very carbonaceous.
	10	SILTSTONE: as above.
	10	SANDSTONE: as above.
2050 - 2055m	30	SILTSTONE: as above.
	30	SANDSTONE: very fine and fine grained quartz aggregates.
	20	COAL: as above.
	20	SHALE: as above.
2055 - 2060m	100	COAL: as above.
	trace	SHALE: as above.
	trace	SANDSTONE: quartz aggregates.
	trace	CLAYSTONE: white, soft, rounded cuttings.
2060 - 2065m	40	SANDSTONE: predominantly loose quartz - clear to translucent, medium to coarse grained, subangular, few subrounded; moderately well sorted, no shows. Minor quartz aggregates - light grey, friable, fine grained, subrounded, well sorted, dolomitic cement, occasional carbonaceous inclusions, poor to moderate visual porosity. Dull gold and pale white mineral fluorescence. 2 cuttings (probably cavings) medium grained sandstone, showed pale yellow fluorescence and fast pale yellow cut.
	30	SILTSTONE: medium light grey, carbonaceous inclusions, blocky cuttings.
	20	SHALE: pale brown, medium dark grey and dark grey, firm, subfissile cuttings, carbonaceous inclusions.
	10	COAL: as above.
2065 - 2070m	50	SHALE: as above.
	40	SILTSTONE: as above.
	10	COAL: black, moderately hard, brittle, vitreous.
	trace	SANDSTONE: very fine grained aggregates, as above.

2070 - 2075m	80	SANDSTONE: loose quartz - translucent, fine to very coarse grained, predominantly medium to coarse, subangular to subrounded, moderately well sorted, no shows; quartz aggregates - white, very friable, very fine grained, very well sorted, dolomitic cement, also argillaceous matrix in parts (some sandstone aggregates are grey and argillaceous), carbonaceous inclusions, trace very dull white mineral fluorescence.
	10	SHALE: as above.
	10	COAL: as above. One cutting black, carbonaceous material giving bright white fluorescence and strong, fast white cut.
2075 - 2080m	30	COAL: dull lustre, subangular to subrounded cuttings, soft to firm, otherwise as above.
	30	SANDSTONE: very fine grained sandstone aggregates as above. Trace loose quartz as above.
	20	SHALE: grades from coal in parts - very carbonaceous.
	20	SILTSTONE: as above, grades to a very soft claystone at times.
	trace	PYRITE: microcrystalline aggregates.
2080 - 2085m	100	COAL: bright lustre, subangular cuttings, soft to firm, as above.
	trace	SHALE: as above.
	trace	SANDSTONE: quartz aggregates as above, 3 cuttings have pale white fluorescence, slow streaming pale white cut.
2085 - 2090m	100	COAL: as above.
	trace	SHALE: as above.
	trace	SANDSTONE: occasional very coarse quartz grains, predominantly quartz aggregates as above.
	trace	PYRITE: as above.
2090 - 2095m	80	COAL: more argillaceous in parts, otherwise as above.
	10	SHALE: as above.
	10	SANDSTONE: occasionally very coarse grains, predominantly quartzose aggregates as above.
	trace	SILTSTONE: as above.
2095 - 2100m	80	COAL: as above.
	10	SHALE: as above.
	10	SANDSTONE: loose quartz as above, quartz aggregates as above.
	trace	CLAYSTONE: white, very soft to dispersive.
	trace	SILTSTONE: as above.
trace	DOLOMITE: buff to yellow grey, very hard, subangular cuttings, crystalline, very pale, dull orange fluorescence.	
2100 - 2105m	50	SHALE: as above.
	30	SILTSTONE: predominantly medium grey, soft to firm, carbonaceous inclusions.
	10	COAL: as above.
	10	SANDSTONE: occasionally loose quartz grains as above. Predominantly quartz aggregates, which become in parts quite argillaceous and carbonaceous.

2105 - 2110m	80	COAL: as above.
	20	SHALE: as above.
	trace	CLAYSTONE: buff to light grey, soft to firm, rounded blocky cuttings.
	trace	SANDSTONE: quartz aggregates, as above.
2110 - 2115m	50	SHALE: very carbonaceous shale (probably grades from coal), dark grey, firm, subfissile to fissile cuttings, commonly carbonaceous matter. Also light grey shale as above.
	20	SANDSTONE: medium to very coarse loose quartz as above. Aggregates as above, also fine grained aggregates, otherwise as above.
	20	SILTSTONE: as above.
	10	COAL: as above.
	trace	PYRITE: as above.
	trace	DOLOMITE: as above.
2115 - 2120m	40	SANDSTONE: loose quartz as above, quartz aggregates as above, 2 cuttings bright white fluorescence and white instant crush cut.
	40	SHALE: as above.
	10	COAL: as above.
	10	SILTSTONE: as above.
2120 - 2125m	40	SILTSTONE: as above, grading to claystone in part.
	30	SHALE: as above.
	20	SANDSTONE: loose quartz and aggregates as above (white mineral fluorescence as above).
	10	COAL: as above.
	trace	DOLOMITE: as above, with dull orange mineral fluorescence as above.
2125 - 2130m	40	SANDSTONE: loose quartz and aggregates.
	30	SHALE: as above.
	20	SILTSTONE: as above.
	10	COAL: as above.
	trace	DOLOMITE: as above, 3% dolomite calcimetry reading.
2130 - 2135m	90	SANDSTONE: loose quartz predominantly translucent to frosty, medium to very coarse grained, predominantly medium to coarse, subangular to subrounded, moderately well sorted, no shows. Also trace quartz aggregates.
	10	SHALE: as above.
	trace	DOLOMITE: as above, 1% dolomite - calcimetry reading.
2135 - 2140m	30	SANDSTONE: loose quartz - as above. Quartz aggregates - white to medium grey, very friable to occasionally moderately hard, very fine grained, very well sorted, dolomitic cement, common carbonaceous inclusions - especially in greyer cuttings. No shows.
	30	SILTSTONE: light grey to medium grey to brown, firm, rounded to subrounded blocky cuttings, carbonaceous inclusions.
	30	SHALE: medium dark grey, pale brown to brown grey, firm, subfissile cuttings, very carbonaceous in parts, carbonaceous layering etc.
	10	COAL: black, firm, angular to subangular cuttings, subvitreous.
	trace	DOLOMITE: buff to pale brown, hard, angular to subangular cuttings, dull orange fluorescence.
	trace	PYRITE

2140 - 2145m	80	SILTSTONE: as above, firm to occasionally moderately hard.
	10	SHALE: as above.
	10	SANDSTONE: loose quartz and aggregates as above. 2 aggregates bright white fluorescence, small amount of slow white streaming cut.
	trace	COAL: as above.
	trace	PYRITE: microcrystalline aggregates.
2145 - 2150m	70	SILTSTONE: very light grey also, otherwise as above.
	20	SHALE: as above.
	10	SANDSTONE: loose quartz and aggregates as above.
	trace	COAL: as above.
	trace	PYRITE: as above. Few black carbonaceous cuttings have bright white fluorescence and white streaming cut.
2150 - 2155m	90	SANDSTONE: predominantly loose quartz - translucent, medium to coarse grained, occasionally very coarse, subangular to subrounded, moderately well sorted, no shows. Trace quartz aggregates, as above.
	10	SILTSTONE: as above.
	trace	SHALE: as above.
	trace	COAL: as above.
	trace	PYRITE: as above.
2155 - 2160m	100	SANDSTONE: loose quartz as above, trace quartz aggregates.
	trace	SILTSTONE: as above.
	trace	PYRITE: as above.
2160 - 2165m	80	SANDSTONE: loose quartz - as above. Trace quartz aggregates - some aggregates are very fine to fine grained, commonly carbonaceous inclusions.
	10	SILTSTONE: as above.
	10	SHALE: as above, trace light grey, non carbonaceous shale.
	trace	COAL: as above.
	trace	PYRITE: as above.
2165 - 2170m	50	SANDSTONE: loose quartz and aggregates as above.
	40	SILTSTONE: predominantly very light grey to medium grey, otherwise as above.
	10	SHALE: as above.
	trace	CLAYSTONE: white, very soft, slightly sticky, well rounded cuttings, carbonaceous inclusions.
2170 - 2175m	70	SILTSTONE: cuttings generally darker and more carbonaceous.
	20	SHALE: as above.
	10	SANDSTONE: loose quartz and aggregates, 2 aggregate cuttings - bright yellow to white fluorescence and streaming cut.
	trace	COAL: as above.
	trace	CLAYSTONE: as above.
2175 - 2180m	90	SANDSTONE: loose quartz as above, trace aggregates.
	10	SILTSTONE: as above.
	trace	SHALE: as above.

2180 - 2185m	80	SANDSTONE: predominantly loose quartz as above, occasional aggregates as above.
	10	SILTSTONE: as above.
	10	SHALE: as above.
2185 - 2190m	60	SILTSTONE: as above.
	20	SANDSTONE: predominantly loose quartz as above, occasional aggregates as above.
	15	SHALE: as above.
	5	PYRITE: as above.
2190 - 2195m	80	SILTSTONE: very light grey to medium grey, firm, blocky, subrounded cuttings, carbonaceous inclusions, very fine grained quartz inclusions.
	10	SHALE: medium grey to brownish grey, also very light grey, firm, blocky to subfissile cuttings, common carbonaceous inclusions - carbonaceous layering etc.
	10	SANDSTONE: loose quartz as above.
	trace	PYRITE: as above.
2195 - 2200m	90	SANDSTONE: predominantly loose quartz as above. Trace 1) very fine grained aggregates - as above. Also 2) translucent- frosty, friable, medium grained, occasionally coarse grains, subrounded to rounded, moderately well sorted, dolomitic cement, poor visible porosity, carbonaceous inclusions. Faint white mineral fluorescence.
	10	SILTSTONE: as above.
	trace	PYRITE: as above.
2200 - 2205m	100	SANDSTONE: predominantly loose quartz, trace very fine grained aggregates as above, also medium grained aggregates as above, having bright white mineral fluorescence.
	trace	SILTSTONE: as above.
	trace	SHALE: dark, carbonaceous, as above.
	trace	PYRITE: as above.
2205 - 2210m	100	SANDSTONE: predominantly loose quartz - as above. Also medium aggregates as above, with bright white mineral fluorescence as above.
	trace	SILTSTONE: as above.
2210 - 2215m	90	SANDSTONE: loose quartz - as above, and medium aggregates - as above, with mineral fluorescence as above.
	5	SILTSTONE: as above.
	5	SHALE: as above.
2215 - 2220m	100	SANDSTONE: loose quartz - translucent, medium to very coarse grained, predominantly rounded, moderately well sorted, no shows. Trace medium grained aggregates with mineral fluorescence as above.
	trace	SHALE: brown to black, very carbonaceous.
2220 - 2225m	100	SANDSTONE: loose quartz as above. Trace medium grained aggregates with mineral fluorescence as above. Quartz grains are frequently encrusted with pyrite. Also occasional aggregates with encrusting pyrite (or possible pyrite matrix).
	trace	PYRITE: microcrystalline aggregates as well as being associated with sandstone as above.
	trace	SHALE
	trace	COAL
	trace	SILTSTONE

2225 - 2230m	80	SANDSTONE: loose quartz as above. Trace medium grained aggregates as above. Fine to very fine grained aggregates as above. Also light grey, very friable, very fine grained (almost silt sized quartz grains), very well sorted, argillaceous matrix, poor visual porosity. Pale yellow fluorescence with pale yellow white, very slow, faint streaming cut and instant to fast bright yellow white crush cut. Sand with show is approximately 20% of sample.
	10	SILTSTONE: as above.
	10	SHALE: as above.
2230 - 2235m	100	SANDSTONE: loose quartz, subangular to subrounded, otherwise as above. Trace fine grained aggregates as above. Trace medium grained aggregates as above.
	trace	COAL
	trace	SHALE
2235 - 2240m	100	SANDSTONE: loose quartz, as above. Quartz aggregates, translucent, medium to coarse grained, subrounded, moderate sorting, dolomitic cement, with pale brown iron staining, bright white mineral fluorescence.
	trace	SILTSTONE
	trace	SHALE
2240 - 2245m	100	SANDSTONE: loose quartz, as above. Quartz aggregates, translucent, medium to coarse grained, subrounded, moderate sorting, dolomitic cement, with pale brown iron staining, bright white mineral fluorescence.
	trace	SILTSTONE
	trace	SHALE
2245 - 2250m	60	SILTSTONE: light grey to medium grey, firm, rounded, blocky cuttings, carbonaceous inclusions.
	20	SHALE: occasional light grey to brownish grey, firm, subfissile cuttings, carbonaceous inclusions common in darker cuttings, carbonaceous layering in parts.
	20	SANDSTONE: loose quartz - medium to coarse grained as above. Medium grained aggregates as above. Very fine grained aggregates - light grey to medium light grey, very friable, very fine grained, subrounded, very well sorted, dolomitic cement, carbonaceous inclusions in parts, no shows. Bright white mineral fluorescence. 2 cuttings (very fine sandstone) had faint white moderately fast streaming cut and crush cut.
2250 - 2255m	trace	PYRITE: microcrystalline aggregates.
	60	SILTSTONE: as above.
	20	SHALE: as above.
2255 - 2260m	10	SANDSTONE: very fine grained aggregates as above, with trace mineral fluorescence as above. Medium aggregates as above, with white to pale yellow mineral fluorescence.
	10	SHALE: as above.
	10	CLAYSTONE: white to light grey, very soft, blocky, rounded cuttings.



2255 - 2260m	60	SILTSTONE: as above.
	30	SHALE: as above.
	10	SANDSTONE: occasional loose quartz - as above. Very fine grained and medium grained aggregates as above. Mineral fluorescence as above.
	trace	CLAYSTONE: as above.
2260 - 2265m	80	SANDSTONE: trace loose quartz as above. Predominantly medium grained quartz aggregates, also fine grained aggregates, mineral fluorescence as above.
	10	SILTSTONE: as above.
	10	SHALE: as above.
	trace	CLAYSTONE: as above.
2265 - 2270m	80	SANDSTONE: minor loose quartz as above. Medium grained quartz aggregates - white to translucent, friable, medium grained, subrounded, well sorted, dolomitic cement, carbonaceous inclusions. Bright white mineral fluorescence.
	10	COAL: black, firm, brittle, angular cuttings, vitreous.
	80	SANDSTONE: loose quartz as above. Medium grained quartz aggregates as above. Mineral fluorescence as above.
	10	COAL: as above.
2270 - 2275m	5	SILTSTONE: as above.
	5	SHALE: as above.
	70	SILTSTONE: light grey to medium grey, firm, blocky, subrounded to rounded cuttings, with common silt size quartz grains, carbonaceous flecking.
	10	SANDSTONE: loose quartz - translucent, medium grained, subangular, occasionally coarse and subrounded. Medium grained quartz aggregates as above, fluorescence as above.
2275 - 2280m	10	COAL: as above.
	10	SHALE: as above.
	90	SILTSTONE: predominantly light grey with quartz inclusions less common, otherwise as above.
	10	SHALE: light grey to brownish grey, firm, blocky to subfissile cuttings, carbonaceous.
2280 - 2285m	trace	CLAYSTONE: white to light grey, very soft to dispersive, well rounded cuttings, occasional very fine quartz grain inclusions.
	trace	SANDSTONE: trace loose quartz as above. Predominantly medium grained aggregates as above.
	50	SILTSTONE: as above.
	30	COAL: black, brittle, angular cuttings, vitreous in part.
2285 - 2290m	20	SHALE: as above.
	trace	SANDSTONE: medium grained aggregates as above.
	trace	DOLOMITE: buff to light grey, hard, angular cuttings, crystalline.

2290 - 2295m	80	SILTSTONE: light grey to medium grey, firm to soft, rounded cuttings, carbonaceous inclusions, silt to very fine sand sized quartz grain inclusions.
	20	SHALE: as above.
	trace	COAL: as above.
	trace	SANDSTONE: medium grained aggregates as above, occasional loose quartz grains, coarse grains as above. Mineral fluorescence as above.
2295 - 2300m	80	COAL: as above.
	20	SILTSTONE: as above.
	trace	PYRITE: as above.
2300 - 2305m	70	SILTSTONE: as above.
	20	COAL: as above.
	10	SHALE: as above.
2305 - 2310m	80	SILTSTONE: as above.
	20	SHALE: brownish grey, firm, blocky to predominantly subfissile cuttings, carbonaceous inclusions and layering.
	trace	COAL: as above.
2310 - 2315m	50	COAL: as above.
	40	SILTSTONE: as above.
	10	SHALE: as above.
2315 - 2320m	70	SILTSTONE: as above.
	20	COAL: as above.
	10	SANDSTONE: tan to pale brown, very hard, very fine grained quartz grains, carbonaceous inclusions, very well cemented in dolomitic cement, very poor porosity, faint dull orange fluorescence.
	trace	SHALE: as above.
	trace	DOLOMITE: buff to pale brown, hard, angular blocky cuttings, microcrystalline.
2320 - 2325m	60	SILTSTONE: as above.
	40	SHALE: as above.
	trace	COAL: as above.
	trace	SANDSTONE: medium grained aggregates, as above, occasional very fine grained aggregates, as above.
	trace	DOLOMITE: as above.
	trace	PYRITE: as above.
2325 - 2330m	70	SILTSTONE: as above.
	20	SHALE: as above.
	10	COAL: as above.
	trace	SANDSTONE: as above, predominantly medium grained aggregates.
2330 - 2335m	80	SILTSTONE: as above.
	20	SHALE: as above.
	trace	COAL: as above.
	trace	DOLOMITE: as above.
2335 - 2340m	80	SILTSTONE: as above.
	20	SHALE: as above.
	trace	COAL: as above.
2340 - 2345m	50	SILTSTONE: as above.
	30	SHALE: as above.
	20	COAL: as above.

2345 - 2350m	60	COAL: as above.
	20	SILTSTONE: as above.
	20	SHALE: as above.
2350 - 2355m	70	SILTSTONE: light grey to medium grey, soft to dominantly firm, blocky cuttings, carbonaceous flecking.
	20	SHALE: brown grey to dark grey, firm, subfissile, carbonaceous flecking and layering.
	10	COAL: black, firm, brittle, argillaceous to subrounded cuttings.
	trace	SANDSTONE: medium grained and fine grained aggregates as above.
2355 - 2360m	50	SANDSTONE: predominanty loose quartz - translucent, medium to coarse grained, subangular to subrounded, poor to moderate sorting, no shows. Medium aggregates as above. Very fine grained aggregates, very light grey to buff, very friable, very fine grained, subrounded to rounded grains, well sorted, carbonaceous inclusions, dolomitic cement, no shows.
	30	SHALE: as above.
	20	SILTSTONE: as above.
	trace	PYRITE: microcrystalline aggregates.
2360 - 2365m	40	SHALE: very carbonaceous in part.
	30	SILTSTONE: as above.
	30	SANDSTONE: predominantly loose quartz as above, also very fine grained and medium grained aggregates as above; medium grained aggregates have bright white mineral fluorescence.
	trace	PYRITE: as above.
2365 - 2370m	50	SILTSTONE: as above.
	30	SANDSTONE: predominantly loose quartz - as above. Trace medium grained aggregates with fluorescence as above, and very fine grained aggregates as above.
	20	SHALE: as above.
	trace	PYRITE: as above.
2370 - 2375m	50	SILTSTONE: as above.
	30	SHALE: as above.
	10	SANDSTONE: trace loose quartz as above, very fine grained aggregates as above.
	10	COAL: as above.
	trace	PYRITE: as above.
2375 - 2380m	90	SANDSTONE: loose quartz - translucent, medium to coarse grained, occasional very coarse, subangular to subrounded, no shows.
	10	SILTSTONE: medium grey to medium dark grey, firm, carbonaceous flecking.
	trace	PYRITE: as above.
2380 - 2385m	40	SHALE: as above.
	30	SANDSTONE: predominantly loose quartz as above. Trace medium grained and very fine grained aggregates as above.
	30	SILTSTONE: as above.

2385 - 2390m	50	SHALE: medium grey to medium dark grey, firm, blocky cuttings, subfissile in parts, common carbonaceous inclusions.
	50	SILTSTONE: medium light grey to medium grey, firm, blocky cuttings, common carbonaceous inclusions.
	trace	SANDSTONE: loose quartz as above, and very fine grained aggregates, as above.
2390 - 2395m	90	COAL: black, firm, brittle, subangular cuttings, vitreous.
	10	SILTSTONE: as above.
	trace	SHALE: as above.
	trace	SANDSTONE: very fine grained and medium grained aggregates as above. Few black carbonaceous matter cuttings, have bright yellow or white fluorescence and yellow or white streaming cut and instant crush cut; brown residue under white light and bright yellow residue under white light.
2395 - 2400m	60	COAL: as above.
	20	SANDSTONE: quartz aggregates - light grey to medium light grey, friable, very fine grained to fine grained, rounded, well sorted, argillaceous matrix, trace dolomitic cement, carbonaceous inclusions, carbonaceous content varies ie. darker cuttings have common carbonaceous inclusions. No shows. 2 cuttings black carbonaceous ?shale with ?amber inclusions have bright yellow fluorescence, occasionally white, bright yellow, moderately fast streaming cut and crush cut.
	10	SHALE: as above.
	10	SILTSTONE: as above.
2400 - 2405m	70	COAL: as above.
	20	SHALE: as above.
	10	SILTSTONE: occasional buff to light grey cuttings, otherwise as above.
	trace	SANDSTONE: as above. 2 cuttings - black, carbonaceous matter as above, (2400m sample) with fluorescence as above, moderately fast white streaming cut, instant white crush cut.
2405 - 2410m	40	SILTSTONE: as above.
	40	SHALE: as above.
	10	COAL: as above.
	10	SANDSTONE: trace medium grained, white, non argillaceous, quartz aggregates as above. Also occasional loose quartz as above. Few cuttings of black, carbonaceous shale with fluorescent cut and crush cut, as above. Residue as above.
2410 - 2415m	50	SHALE: very carbonaceous, as above.
	30	COAL: subvitreous, otherwise as above.
	20	SILTSTONE: as above.
	trace	SANDSTONE: aggregates, as above. 1 cutting - black, carbonaceous shale with fluorescence and cut as above. Residue as above.

2415 - 2420m	60	SILTSTONE: as above.
	40	SHALE: as above.
	trace	SANDSTONE: argillaceous, carbonaceous aggregates as above.
	trace	COAL: as above. 1 cutting of black, carbonaceous shale with fluorescent cut, crush cut and residue as above.
2420 - 2425m	50	SHALE: grading from coal, as above.
	30	COAL: as above, but no longer vitreous.
	20	SILTSTONE: as above.
		1 cutting of black, carbonaceous shale with fluorescence, cut, crush cut and residue as above.
2425 - 2430m	40	SHALE: as above.
	30	COAL: as above.
	30	SILTSTONE: as above.
	trace	SANDSTONE: very fine and medium grained aggregates as above. 1 cutting of black, carbonaceous shale with fluorescence, cut, crush cut and residue as above.
2430 - 2435m	40	SHALE: as above.
	30	SILTSTONE: as above.
	20	SANDSTONE: trace loose quartz - as above. Also very fine grained quartz aggregates - very light grey to light grey, very friable, well sorted, carbonaceous inclusions, dolomite cement. Dull orange mineral fluorescence.
	10	COAL: as above,
2435 - 2440m	50	SHALE: as above.
	30	SILTSTONE: as above.
	10	SANDSTONE: also medium grained aggregates, as above. Dull orange mineral fluorescence.
	10	COAL: as above.
2440 - 2445m	80	SHALE: medium dark grey to greyish brown, firm, blocky to fissile cuttings, dominantly subfissile, very carbonaceous.
	10	SILTSTONE: as above.
	10	COAL: vitreous in parts, otherwise as above.
	trace	SANDSTONE: as above.
2445 - 2450m	70	SILTSTONE: medium light grey to medium dark grey, firm, blocky cuttings, common carbonaceous inclusions.
	20	SHALE: as above.
	10	SANDSTONE: as above.
	trace	PYRITE: as above.
	trace	COAL: as above.
2450 - 2455m	60	SHALE: as above.
	30	SILTSTONE: as above.
	10	SANDSTONE: as above.
	trace	COAL: as above.

2455 - 2460m	80	SHALE: as above.
	20	SILTSTONE: as above.
	trace	SANDSTONE: quartz aggregates - very light grey to medium light grey, very friable, fine grained, rounded grains, well sorted, white ?clay matrix, poor to moderate visible porosity, carbonaceous inclusions, with moderately bright white fluorescence, faint moderately fast white streaming cut, and very faint crush cut. Faint white ring residue under UV light, colourless under white light.
	trace	COAL: as above.
	trace	PYRITE: as above.
2460 - 2465m	50	SILTSTONE: as above.
	40	SHALE: as above.
	10	COAL: as above.
	trace	SANDSTONE: slight trace of aggregates with show as above.
2465 - 2470m	70	SILTSTONE: as above.
	30	SHALE: as above.
	trace	COAL: as above.
	rare	SANDSTONE: 2 cuttings - very fine to fine grained aggregates, otherwise as above, with fluorescence and cut as above; crush cut faint white.
2470 - 2475m	80	SILTSTONE: with silt to very fine grained quartz inclusions, otherwise as above.
	20	SHALE: as above.
	trace	SANDSTONE: few cuttings of sandstone aggregates as above, with pale yellow to white fluorescence and pale yellow to white slow streaming cut, yellow streaming crush cut.
2475 - 2480m	50	SANDSTONE: predominantly loose quartz, translucent, medium grained, subrounded, moderately well sorted, no shows. Also very fine grained aggregates as above, with fluorescence as above and moderately fast white streaming cut and crush cut.
	40	SILTSTONE: light grey to medium grey, firm, blocky cuttings, quartz and carbonaceous matter inclusions.
	10	SHALE: less carbonaceous, otherwise as above.
	trace	PYRITE: as above.
2480 - 2485m	70	SANDSTONE: predominantly loose quartz - translucent, medium to coarse grained, subangular to rounded, moderately well sorted, no shows. Also fine grained quartz aggregates as above, with bright white fluorescence, slow to moderately fast white streaming cut, faint crush cut. Approximately 15% of sample is aggregates.
	20	SILTSTONE: as above.
	10	SHALE: as above.
2485 - 2490m	50	SILTSTONE: as above.
	30	SANDSTONE: loose quartz as above. Also fine grained aggregates as above with shows as above. Show sands comprise approximately 10% of the entire sample.
	20	SHALE: as above.

2490 - 2495m	80	SANDSTONE: predominantly loose quartz as above. Aggregates now fine and medium grained, otherwise as above, (very friable), shows as above. Aggregates comprise approximately 15-20% of whole sample.
	20	SILTSTONE: as above.
2495 - 2500m	90	SANDSTONE: predominantly loose quartz as above. Aggregates now very fine grained, fine grained and medium grained - the medium grained aggregates may have only 2 or 3 grains cemented together. All have shows as above. Aggregates comprise approximately 10% of sample.
	10	SILTSTONE: as above.
	trace	PYRITE: as above.
2500 - 2505m	60	SILTSTONE: medium light grey to medium dark grey, firm, blocky cittings, common carbonaceous inclusions and flecking.
	30	SHALE: medium grey to dark grey, firm, blocky to subfissile cuttings, common carbonaceous inclusions and flecking.
	10	SANDSTONE: trace loose quartz as above, quartz aggregates as above, with shows as above, comprise approximately 3-5% of sample.
2505 - 2510m	50	SILTSTONE: as above.
	45	SHALE: as above.
	5	SANDSTONE: trace loose quartz, as above. Aggregates as above with shows as above. Quartz aggregates with shows comprise approximately 3% of the sample.
2510 - 2515m	50	SILTSTONE: as above.
	50	SHALE: as above.
	trace	SANDSTONE: loose quartz as above. Aggregates as above with shows as above.
2515 - 2520m	70	SILTSTONE: as above.
	30	SHALE: some fissile cuttings now, otherwise as above.
	trace	SANDSTONE: aggregates as above, with shows as above, these aggregates comprise approximately 2% of the sample. Also occasional loose quartz as above.
2520 - 2525m	70	SILTSTONE: as above.
	20	SHALE: as above.
	10	SANDSTONE: trace loose quartz as above, also quartz aggregates as above, with shows as above in approximately 1% of aggregates in sample.
2525 - 2530m	60	SANDSTONE: predominantly loose quartz as above. Quartz aggregates - white to light grey, friable, medium grained, orangish white ?cement, no shows.
	20	SILTSTONE: as above.
	20	SHALE: as above.
	trace	COAL: as above.
2530 - 2535m	50	SILTSTONE: as above.
	40	SHALE: as above.
	10	SANDSTONE: trace loose quartz as above. Quartz aggregates as above, (ie. for 2525 - 2530m). No shows.

2535 - 2540m	70	SILTSTONE: rounded cuttings, as above.
	20	SANDSTONE: quartz aggregates with white to orangish cement, no shows, ie. as above.
	10	SHALE: as above.
2540 - 2545m	80	SILTSTONE: as above.
	10	SHALE: as above.
	10	SANDSTONE: aggregates as above.
2545 - 2550m	100	SILTSTONE: as above.
	trace	SHALE: as above.
	trace	SANDSTONE: trace loose quartz as above, aggregates as above.
2550 - 2555m	100	SILTSTONE: as above.
	trace	SHALE: as above.
	trace	SANDSTONE: quartz aggregates - translucent, friable, fine to medium grained, subrounded, moderately well sorted, dolomitic cement, occasional carbonaceous inclusions, no shows.
	trace	PYRITE: microcrystalline aggregates.
2555 - 2560m	100	SILTSTONE: as above.
	trace	SHALE: as above.
	trace	COAL: as above.
	trace	SANDSTONE: trace loose quartz as above, aggregates as above.
	trace	PYRITE: as above.
2560 - 2565m	70	SILTSTONE: light grey to medium dark grey, firm, blocky cuttings, common carbonaceous flecking and inclusions.
	20	SHALE: medium grey to dark grey, firm, subfissile to fissile cuttings, common carbonaceous flecking and inclusions.
	10	SANDSTONE: loose quartz as above, trace fine to medium grained aggregates as above. Also very fine grained aggregates - white, friable, subrounded, well sorted, siliceous cement, occasional carbonaceous inclusions, no shows.
2565 - 2570m	50	SANDSTONE: predominantly loose quartz, also very fine and medium grained aggregates as above, with white mineral fluorescence. Loose quartz, translucent, medium grained, subangular to subrounded, moderately well sorted, no shows.
	30	SILTSTONE: as above.
	10	COAL: black, brittle, very small angular cuttings, vitreous in part.
	10	SHALE: as above, several elongate cuttings.
2570 - 2575m	65	SANDSTONE: predominantly loose quartz as above. Also medium grained aggregates as above, with white mineral fluorescence, also trace very fine grained aggregates as above.
	15	SILTSTONE: as above.
	10	COAL: black, brittle, angular cuttings, vitreous.
	10	SHALE: as above.
2575 - 2580m	trace	PYRITE: as above.
	60	SANDSTONE: predominantly loose quartz as above. Also trace medium grained aggregates as above, with mineral fluorescence.
	30	SILTSTONE: as above.
	10	SHALE: as above.
	trace	COAL: as above.



2580 - 2585m	70	SILTSTONE: as above.
	20	SHALE: as above.
	10	SANDSTONE: loose quartz and medium and very fine grained aggregates as above.
	trace	COAL: as above.
2585 - 2590m	40	SILTSTONE: as above.
	30	SANDSTONE: predominantly loose quartz and trace medium grained aggregates with mineral fluorescence as above.
	20	SHALE: as above.
	10	COAL: as above.
2590 - 2595m	90	SANDSTONE: predominantly loose quartz as above. Also quartz aggregates, translucent, very friable, fine to medium grained, dominantly fine grained, rounded grains, moderately well sorted, dolomitic cement, white mineral fluorescence.
	10	COAL: as above.
	trace	SHALE: as above.
2595 - 2600m	50	COAL: black, moderately hard, brittle, angular cuttings, vitreous.
	20	SILTSTONE: as above.
	20	SANDSTONE: predominantly loose quartz, translucent, medium to coarse grained - dominantly medium, subrounded. No shows. Also quartz aggregates, translucent, very friable, coarse grains, well sorted, dolomitic cement, carbonaceous inclusions, mineral fluorescence.
	10	SHALE: as above.
2600 - 2605m	30	COAL: as above.
	30	SILTSTONE: as above.
	20	SHALE: as above.
	20	SANDSTONE: loose quartz as above, aggregates as above.
2605 - 2610m	60	SILTSTONE: moderately hard, with common quartz inclusions in parts, otherwise as above.
	20	SHALE: as above.
	10	COAL: as above.
	10	SANDSTONE: loose quartz and aggregates as above.
	trace	PYRITE: as above.
2610 - 2615m	70	SILTSTONE: as above.
	20	COAL: as above.
	10	SANDSTONE: loose quartz and aggregates as above.
2615 - 2620m	70	SILTSTONE: as above.
	20	SHALE: as above.
	10	COAL: as above.
	trace	SANDSTONE: loose quartz and aggregates as above.
2620 - 2625m	60	SILTSTONE: as above.
	30	COAL: as above.
	10	SHALE: as above.
	trace	SANDSTONE: loose quartz and aggregates as above.

2625 - 2630m	50	SILTSTONE: as above.
	30	SHALE: as above, and becoming very carbonaceous in part, fissile cuttings.
	10	COAL: as above.
	10	SANDSTONE: loose quartz and aggregates as above.
2630 - 2635m	90	SANDSTONE: loose quartz - translucent, medium grained to occasionally coarse, subrounded to rounded - dominantly rounded, well sorted, no shows. Also occasional aggregates as above.
	10	SHALE: as above.
	trace	SILTSTONE: as above.
2635 - 2640m	50	SANDSTONE: dominantly loose quartz - with occasional very coarse grains, otherwise as above. Quartz aggregates - coarse grained, as above. Also 2 cuttings - quartz aggregates, medium light grey, friable, fine grained, subrounded to rounded, well sorted, trace of siliceous cement, carbonaceous inclusions, poor visual porosity, dull spotty pale yellow fluorescence, slow faint pale yellow streaming cut, no crush cut.
	40	SHALE: as above.
	10	SILTSTONE: as above.
	trace	COAL: as above.
2640 - 2645m	60	SHALE: buff to dark grey, firm, blocky to fissile cuttings, dominantly subfissile to fissile, darker cuttings very carbonaceous.
	40	SILTSTONE: buff to medium grey, firm, blocky cuttings, occasionally carbonaceous inclusions.
	trace	COAL: as above.
	trace	SANDSTONE: occasional loose quartz grains, as above. Occasionally coarse grained aggregates as above. Also two cuttings fine grained aggregates with shows as above.
2645 - 2650m	70	SILTSTONE: as above.
	30	SHALE: as above.
	trace	SANDSTONE: 2 cuttings fine grained aggregates, as above, with very slow, diffuse, pale white cut and slow white streaming crush cut. Also trace medium grained aggregates - white, friable, subangular to subrounded, well sorted, dolomitic cement, white mineral fluorescence, no shows.
	trace	PYRITE: microcrystalline aggregates.
2650 - 2655m	60	SILTSTONE: as above.
	30	SHALE: as above, with occasional elongate cuttings.
	10	COAL: as above.
	trace	SANDSTONE: trace loose quartz - as above. Also quartz aggregates, very fine grained aggregates, as above. Few cuttings with shows as above.
2655 - 2660m	60	SHALE: predominantly darker cuttings, to brownish grey, very carbonaceous, otherwise as above.
	20	COAL: black, firm, angular cuttings, vitreous.
	20	SILTSTONE: predominantly medium grey, otherwise as above.
	trace	SANDSTONE: trace medium grained aggregates. No shows.

2660 - 2665m	50	SILTSTONE: as above.
	30	SHALE: as above.
	20	COAL: as above.
	trace	SANDSTONE: trace quartz aggregates, white to light grey, friable, fine to medium grained, subrounded, dolomitic cement, carbonaceous inclusions in parts. White to pale yellow mineral fluorescence (no cut). No shows.
2665 - 2670m	80	SANDSTONE: loose quartz - translucent, medium to coarse grained, subangular to subrounded, moderate sorting. No shows. Quartz aggregates - translucent, friable, fine to coarse grained, predominantly medium, subangular to subrounded, moderate sorting, dolomite cement, bright white mineral fluorescence, no shows.
	10	SILTSTONE: as above.
	10	COAL: as above.
	trace	SHALE: as above.
2670 - 2675m	70	SANDSTONE: predominantly loose quartz - predominantly subrounded, otherwise as above; quartz aggregates - as above, with mineral fluorescence as above.
	20	SHALE: brownish grey, firm, blocky to fissile cuttings, dominantly subfissile to fissile cuttings,
	10	COAL: as above.
2675 - 2680m	40	SHALE: as above.
	30	SANDSTONE: quartz aggregates - occasionally well rounded grains otherwise as above, occasional loose quartz as above.
	30	COAL: as above.
2680 - 2685m	90	COAL: black, firm, angular cuttings, vitreous in part, subconchoidal fracture in part.
	10	SANDSTONE: quartz aggregates and loose quartz as above.
2685 - 2690m	50	SANDSTONE: loose quartz as above, predominantly quartz aggregates as above. 1 cutting sandstone aggregate with argillaceous matrix, bright white fluorescence, faint, slow white streaming cut.
	40	COAL: as above.
	10	SHALE: as above.
2690 - 2695m	70	SANDSTONE: predominantly quartz aggregates as above, with mineral fluorescence; also loose quartz as above. 1 cutting of fine grained sandstone with argillaceous matrix and fluorescence and cut as above in previous sample (2685 - 2690m).
	20	COAL: as above.
	10	SHALE: as above.
2695 - 2700m	60	SHALE: brownish grey to dark grey, soft to firm, subfissile to fissile cuttings, carbonaceous.
	40	COAL: black, firm to moderately hard, brittle, angular to subangular cuttings.
	trace	SANDSTONE: quartz aggregates as above. 1 cutting fine grained sandstone with argillaceous matrix, moderate visible porosity, has fluorescence and cut as described in 2690m

2700 - 2705m	80	SHALE: as above.
	20	COAL: as above.
	trace	SANDSTONE: quartz aggregates as above. 1 cutting as described for sample 2690m ie - light grey, friable, fine grained, subrounded grains, argillaceous matrix, carbonaceous inclusions, with dull white fluorescence and slow faint white streaming cut, all as above.
2705 - 2710m	50	SILTSTONE: as above.
	20	SHALE: as above.
	20	SANDSTONE: trace loose coarse grained quartz as above. Quartz aggregates as above, no shows.
	10	COAL: as above.
2710 - 2715m	70	SILTSTONE: as above.
	20	SHALE: as above.
	10	COAL: as above.
	trace	SANDSTONE: quartz aggregates, as above.
2715 - 2720m	90	COAL: moderately hard, vitreous, otherwise as above.
	10	SHALE: as above.
	trace	SILTSTONE: as above.
	trace	SANDSTONE: as above.
2720 - 2725m	70	COAL: as above.
	20	SILTSTONE: as above.
	10	SHALE: as above.
	trace	SANDSTONE: very occasional quartz aggregates as above.
2725 - 2730m	60	COAL: as above.
	20	SHALE: as above.
	20	SILTSTONE: as above.
	trace	PYRITE: as above.
	trace	SANDSTONE: very occasional quartz aggregates as above.
2730 - 2735m	40	COAL: as above.
	40	SHALE: as above.
	20	SILTSTONE: as above.
2735 - 2740m	70	COAL: as above.
	20	SHALE: as above.
	10	SILTSTONE: as above.
2740 - 2745m	60	SILTSTONE: as above.
	30	SHALE: as above.
	10	COAL: as above.
	trace	SANDSTONE: quartz aggregates as above, no shows.
2745 - 2750m	70	SILTSTONE: as above.
	20	SHALE: as above.
	10	COAL: as above.
		1 black carbonaceous shale cutting showed medium bright white fluorescence, faint white slow streaming cut.
2750 - 2755m	70	SILTSTONE: as above.
	20	SHALE: as above.
	10	COAL: as above.
	trace	SANDSTONE: quartz aggregates as above, no shows.

2755 - 2760m	80	SANDSTONE: predominantly loose quartz, translucent, medium to coarse grained, subangular to subrounded, well sorted, no shows. Quartz aggregates - white, very friable, fine and medium grained, moderately well sorted, white ?clay cement, no shows.
	20	SHALE: as above.
	trace	COAL: as above.
2760 - 2765m	50	SANDSTONE: predominantly loose quartz - medium to coarse grained, predominantly medium grained, otherwise as above. Occasional quartz aggregates as above.
	50	SILTSTONE: as above.
2765 - 2770m	90	SILTSTONE: as above, also with light grey to medium grey cuttings with silt size quartz inclusions.
	10	SANDSTONE: loose quartz - as above and quartz aggregates as above.
	trace	SHALE: as above.
2770 - 2775m	60	SILTSTONE: as above.
	30	SANDSTONE: loose quartz as above.
	10	SHALE: as above.
2775 - 2780m	60	SILTSTONE: as above.
	40	SANDSTONE: loose quartz, as above.
	trace	PYRITE: as above.
2780 - 2785m	70	SILTSTONE: medium grey to medium dark grey, firm, blocky cuttings, carbonaceous flecking in parts.
	30	SANDSTONE: loose quartz as above, quartz aggregates as above.
2785 - 2790m	50	SILTSTONE: as above.
	30	SHALE: greyish brown to dark grey, firm, blocky to fissile cuttings, dominantly subfissile, carbonaceous,
	20	SANDSTONE: loose quartz as above, occasional aggregates as above.
2790 - 2795m	80	SILTSTONE: as above.
	10	SHALE: as above.
	10	SANDSTONE: loose quartz as above, occasional aggregates as above.
	trace	PYRITE: as above.
2795 - 2800m	70	SANDSTONE: loose quartz, translucent to occasionally clear, medium to coarse grained, occasionally very coarse, subangular to subrounded, poor to moderate sorting, many of the cuttings appear to be fragments rather than grains (due to angularity, very thin cuttings, etc.), no shows.
	20	SHALE: as above.
	10	SILTSTONE: as above.
	trace	COAL: as above.

2800 - 2805m	80	SANDSTONE: predominantly loose quartz fragments, clear to translucent, medium to coarse grained, occasionally very coarse, angular to subangular, no shows. Also quartz aggregates 1) buff, moderately hard, fine to medium grained, subrounded, moderate to well sorted, light brown siliceous cement, no shows.
	10	COAL: as above.
	10	SHALE: as above.
2805 - 2810m	70	SANDSTONE: predominantly loose quartz fragments, also trace aggregates as above.
	30	SHALE: as above.
	trace	COAL: as above.
2810 - 2815m	60	SANDSTONE: predominantly loose quartz fragments as above, trace quartz aggregates as above, also 2) white, moderately hard, fine to medium grained, subrounded to rounded dolomitic cement, no shows.
	40	SHALE: as above.
2815 - 2821m	70	SANDSTONE: predominantly loose quartz fragments, as above, trace aggregates 1) as above, and 2) as above.
	20	SHALE: as above.
	10	COAL: black, firm, brittle, angular cuttings, vitreous conchoidal fracture.

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APPENDIX 2

APPENDIX 2

Sidewall Core Descriptions



## SNAPPER - 4

SIDEWALL CORE DESCRIPTIONS

<u>No.</u>	<u>Depth</u>	<u>Rec.</u> (mm)	<u>Rock</u> <u>Type</u>	<u>Description</u>
1	1500.7	25	Sandstone	Clear to white, friable, fine to coarse grained, predominantly medium to coarse grained, poorly sorted, subangular to subrounded, dolomitic cement, patchy white mineral fluorescence.
2	1497.0	15	Sandstone	White, fine to very coarse grained, predominantly medium grained, poorly sorted, subangular to subrounded, friable, loosely cemented dolomitic cement, patchy white mineral fluorescence.
3	1495.5	15	Sandstone	Light grey, very fine grained to fine grained, moderately sorted, subangular to subrounded, firm, moderately calcareous, trace pyrite, trace carbonaceous flecks, poor visible porosity.
4	1486.0	35	Sandstone	Light grey, fine grained, well sorted, subrounded, friable, slightly calcareous, trace carbonaceous flecks, trace patchy dull yellow fluorescence, patchy dolomite fluorescence.
5	1485.0	25	Sandstone	Moderately hard, coarse to fine grained, poorly sorted, rounded to subangular, moderately calcareous, calcareous cement, fine and medium grained matrix, coarse grains generally subrounded, dolomite fluorescence, poor visible porosity. Trace patchy dull yellow fluorescence.
6	1453.5	25	Sandstone	Medium light grey, very fine grained, well sorted, subangular, friable, slightly calcareous, carbonaceous patches, slightly argillaceous, poor visible porosity.
7	1446.0	28	Coal	Black, moderately hard, brittle, vitreous, subconchoidal fracture.
8	1441.9	35	Siltstone	Medium light grey, firm, argillaceous.
9	1414.9	25	Siltstone	Medium light grey, firm, argillaceous.
10	1411.9	25	Coal	Brownish black, moderately hard, brittle, argillaceous coal.
11	1409.9	25	Sandstone	Buff, very fine to granule, dominantly medium to coarse grained, poorly sorted, subrounded to rounded, very friable, loosely cemented, trace siliceous cement, 80% bright white fluorescence, very slow streaming pale white cut, pale white ring (UV light), small amount of pale instantaneous crush cut.

12	1402.8	21	Sandstone	White, very fine grained, well sorted, subrounded, very friable, trace mica and carbonaceous matter, 50% dull yellow white fluorescence, very slow streaming pale white cut, moderately bright white ring (under UV light).
13	1389.0	22	Siltstone	Medium dark grey, firm, micaceous, trace carbonaceous matter.
14	1387.5	40	Coal	Dark brownish black, moderately hard, brittle, subconchoidal fracture.
15	1372.0	20	Siltstone	Medium grey, silt sized quartz grains, well sorted, firm, micromicaceous, trace carbonaceous matter.
16	1362.0	35	Coal	Black, firm, brittle, vitreous.
17	1350.5	35	Siltstone	Black, firm, almost coal, very carbonaceous, argillaceous.
18	1346.5	50	Clay	Light grey, moderately hard, slightly calcareous.
19	1342.5	25	Sandstone	Clear to transparent, medium to very coarse grained, dominantly medium to coarse, poorly to moderately sorted, subrounded, occasionally subangular, friable, trace carbonaceous matter.
20	1330.0	35	Siltstone	Medium dark grey, firm, trace carbonaceous flecks, extremely argillaceous.
21	1313.4	25	Siltstone	Olive grey, firm, occasionally medium grained, angular, clear quartz grains.
22	1307.4	35	Coal	Grey red, brittle, firm, silty.
23	1306.0	30	Siltstone	Grey red, moderately hard, very argillaceous, carbonaceous.
24	1288.9	30	Sandstone	Medium grey to medium dark grey, very fine to very coarse grained, dominantly very fine to fine grained, poorly sorted, subangular to subrounded, friable, trace mica, trace pyrite.
25	1287.0	35	Siltstone	Medium dark grey, firm, trace glauconite, trace pyrite, with common fine to very coarse, subangular to well rounded quartz grains.
26	1281.5	41	Siltstone	Medium dark grey, firm, common very fine grained quartz and occasional well rounded, very coarse quartz grains, micaceous, trace glauconite.
27	1279.0	30	Siltstone	Brownish grey, firm, slightly calcareous, micaceous, coarse to silt sized quartz angular grains.
28	1275.4	40	Siltstone	Medium grey to medium dark grey, firm to moderately hard, common very fine grained quartz grains, micaceous, carbonaceous matter.

29	1274.0	34	Sandstone	Medium dark grey, very fine grained, well sorted, subrounded, friable to moderately hard, micaceous, carbonaceous matter, rare glauconite.
30	1273.0	40	Sandstone	Medium light grey, very fine to fine grained, poorly sorted, subrounded, friable, very argillaceous, silty matrix.
31	1270.0	29	Siltstone	Medium grey, friable to moderately hard, slightly calcareous, trace glauconite and common very fine grained quartz, trace carbonaceous matter.
32	1266.5	35	Sandstone	Medium grey, very fine grained, well sorted, subrounded, friable, glauconitic, micaceous, trace carbonaceous matter.
33	1265.0	40	Sandstone	Medium grey, very fine grained, well sorted, subrounded, friable, common glauconite, carbonaceous matter, mica.
34	1260.0	40	Siltstone	Brown grey, firm, very argillaceous, carbonaceous.
35	1258.5	25	Limestone	Medium light grey, moderately hard, very calcareous, trace glauconite, rare calcilutite, slightly fissile, abundant clay.
36	1254.9	30	Limestone	As above, some calcareous arenite made of fine grain size calcareous (possibly fossil fragments) sized grains, abundant clay.
37	1250.0	35	Limestone	Medium light grey, firm, very calcareous, argillaceous, calcilutite, abundant clay.
38	1240.0	40	Limestone	Medium light grey, firm, very calcareous, abundant clay, calcisiltite.
39	1228.5	35	Limestone	Medium light grey, firm, very calcareous, abundant clay, calcilutite.
40	1213.9	30	Limestone	Medium light grey, firm, very calcareous, abundant clay, calcilutite, subfissile.
41	1189.0	40	Limestone	Medium light grey, firm, very calcareous, abundant clay, calcilutite, subfissile.
42	1168.5	35	Limestone	Medium light grey, moderately hard, very calcareous, abundant clay, calcilutite, subfissile.
43	1149.8	35	Limestone	Medium light grey, hard, very calcareous, abundant clay, calcisiltite.
44	1129.0	35	Limestone	Medium light grey, firm, very calcareous, trace bryozoa shell fragments, calcisiltite, abundant clay.
45	1108.0	30	Limestone	Medium light grey, hard, very calcareous, trace bryozoa shell fragments, calcisiltite.

46	1088.0	26	Calcareous Siltstone	Medium grey, hard, very calcareous.
47	1068.0	30	Calcareous Siltstone/Claystone	Medium dark grey, moderately hard, very calcareous.
48	1048.0	39	Calcareous Claystone	Medium light grey, moderately hard, very calcareous.
49	1028.0	28	Calcilutite	Medium light grey, firm to sticky, very calcareous.
50	1008.0	30	Calcilutite	Medium grey to medium dark grey, firm, very calcareous.
51	988.0	30	Calcisiltite	Medium grey, firm, very calcareous.
52	2804.0	20	Shale	Brown grey, soft, carbonaceous.
53	2784.0	20	Shale	Brown grey, soft, carbonaceous.
54	2768.2	10	Sandstone	Light grey, fine to medium grained, well sorted, subangular to subrounded, soft, trace carbonaceous, trace argillaceous, 10% spotty dull orange fluorescence (mineral?).
55	2760.0	15	Sandstone	Light grey, very fine to medium grained, moderately to well sorted, subangular to subrounded, soft, very argillaceous, slightly carbonaceous.
56	2750.7	10	Sandstone	Light grey, very fine to coarse grained, angular to subrounded, poorly to moderately sorted, soft, argillaceous, trace carbonaceous, trace spotty dull orange yellow fluorescence.
57	2743.6	15	Sandstone	Light grey, fine to coarse grained, poorly to moderately sorted, angular to subrounded, soft, argillaceous, trace carbonaceous.
58	2740.0	12	Shale	Brown grey, soft, minor coal laminations, silty.
59	2725.5	5	Shale	Brown, soft.
60	2716.3	25	Coal	Black, soft, very brittle.
61	2710.0	10	Shale	Brown grey, soft, carbonaceous in part.
62	2701.5	15	Sandstone	Light grey to medium light grey, fine to medium grained, moderate sorting, subangular to subrounded, soft, argillaceous, trace carbonaceous. 3% spotty dull orange fluorescence.
63	2693.0	15	Shale	Brown grey, soft, carbonaceous in part.
64	2691.5	7	Sandstone	Light grey, fine to medium grained, moderately sorted, subangular to subrounded, soft, argillaceous, trace pyrite, trace carbonaceous, 80% even bright yellow white fluorescence, instantaneous diffuse to slow streaming dull white cut, 100% clear residue.

65	2688.0	15	Sandstone	Light grey to buff, fine to coarse grained, poorly to moderately sorted, subangular to subrounded, soft, coal laminations, argillaceous in part, 70% even bright white fluorescence, instantaneous diffuse to faint streaming dull white cut, 100% clear residue.
66	2683.5	15	Shale/ Sandstone	Medium dark grey, soft; Very light grey to medium light grey, very fine to very coarse grained, well sorted, subangular to subrounded, carbonaceous, silty.
67	2677.0	15	Sandstone	Light grey, fine to medium grained, moderately to well sorted, subangular to subrounded, soft, argillaceous, trace carbonaceous, trace spotty dull yellow fluorescence.
68	2670.0	10	Shale	Brown grey, soft, minor coaly fragments.
69	2654.8	10	Sandstone	Light grey, fine to medium grained, moderately to well sorted, subangular to subrounded, soft, argillaceous in part, carbonaceous laminations, coaly laminations.
70	2650.5	20	Shale	Brown grey to brown, soft, silty, trace sand grains.
71	2634.0			No Recovery - Pulled Off.
72	2616.0			No Recovery - Pulled Off.
73	2602.9	15	Siltstone	Medium grey, soft to firm, very argillaceous, trace very fine grained sand, subfissile.
74	2586.4			No Recovery.
75	2572.0	5	Sandstone	Light to medium light grey, very fine grained, well sorted, subangular to subrounded, soft to hard, trace coaly material.
76	2550.0	15	Siltstone	Medium grey to brown grey, soft, very argillaceous, carbonaceous in part.
77	2532.9	5	Sandstone	Medium light grey, very fine grained, well sorted, subrounded, soft, very argillaceous, silty in part, carbonaceous in part.
78	2524.4	10	Sandstone	Light grey, very fine to medium grained, poorly to moderately sorted, subangular to subrounded, soft, argillaceous in part, pyritic.
79	2516.9	5	Shale	Brown grey, firm to hard, silty in part.
80	2504.9	20	Shale/ Coal	Brown grey to brown, soft to firm, black, firm.

81	2481.5	20	Sandstone	Light grey to medium light grey, very fine to coarse grained, poorly to moderately sorted, subangular to subrounded, soft, trace carbonaceous, pyritic, argillaceous in part; 50% even bright white fluorescence, instantaneous diffuse streaming dull white cut.
82	2465.0	15	Siltstone	Brown grey, soft to firm, argillaceous.
83	2448.1	15	Siltstone	Brown grey, soft to firm, very argillaceous, subfissile.
84	2425.0	20	Siltstone	Light grey to medium grey, very fine grained to sandy, soft to firm, sandy laminations, carbonaceous laminations.
85	2407.4	20	Shale	Medium grey to brown grey, firm, silty.
86	2390.1	23	Shale	Brown grey, firm to hard, silty in part.
87	2368.0	20	Siltstone	Light grey to brown, very fine grained to sandy, soft to firm, quartzose, carbonaceous laminations.
88	2352.2	20	Shale	Brown grey, soft to firm, coaly laminations.
89	2328.4	20	Shale	Brown grey, soft to firm.
90	2309.4	20	Shale	Medium grey to brown grey, soft to firm, silty.
91	2288.1	25	Siltstone	Light grey, soft to firm, minor argillaceous matrix, trace carbonaceous laminations.
92	2265.3	20	Shale	Brown grey, soft to firm, minor coaly laminations, silty in part.
93	2246.0	30	Shale	Brown grey, soft to firm.
94	2226.3	10	Sandstone	Light grey, very fine grained, well sorted, subangular to subrounded, soft, grades to siltstone, trace uneven dull yellow fluorescence, slow streaming cut.
95	2211.1	15	Sandstone	Light grey, very fine to fine grained, well sorted, subangular to subrounded, soft, silty, coaly laminations.
96	2188.0	20	Siltstone	Light grey, soft.
97	2169.2	15	Siltstone	Light to medium light grey, soft, argillaceous in part.
98	2146.9	10	Siltstone	Medium light grey, soft, trace carbonaceous.
99	2120.5	17	Siltstone	Light grey, soft to firm, argillaceous in part.
100	2104.0	20	Shale	Pale brown, firm, silty in part.
101	2083.9	20	Sandstone	Light grey, very fine to fine grained, well sorted, subangular to subrounded, firm, carbonaceous laminations, pyritic.

102	2078.9	17	Shale	Brown, soft, sandy laminations.
103	2640.0	25	Siltstone	Dark grey to brown, firm to soft, argillaceous.
104	2063.0			No Recovery - Pulled Off.
105	2046.9	45	Siltstone	Medium grey, firm, argillaceous.
106	2029.0	32	Siltstone	Light grey to brown, firm, argillaceous, trace carbonaceous, laminations of light grey and brown siltstone.
107	2011.5	35	Siltstone	Pale brown, firm to hard, argillaceous, trace coaly laminations.
108	1986.0	30	Siltstone	Brown, firm to hard, argillaceous, sandy laminations.
109	1978.0			No Recovery - Pulled Off.
110	1974.0			No Recovery - Pulled Off.
111	1970.4	30	Siltstone	Light to medium grey, firm to hard, argillaceous, 1 section of core is brown, coaly, woody texture.
112	1953.0	35	Siltstone	Brown, firm to hard, argillaceous in part, trace very fine grained quartz.
113	1945.7			No Recovery - Pulled Off.
114	1942.3			No Recovery - Pulled Off.
115	1935.5	35	Sandstone	Light grey to light brown, very fine grained, well sorted, subangular to subrounded, hard, silty in part, trace carbonaceous, trace mica.
116	1933.0			No Recovery - Pulled Off.
117	1928.5	35	Claystone	Brown, sandy to very fine grained to silty, firm, sandy laminations.
118	1925.0			No Recovery - Pulled Off.
119	1918.1	42	Shale	Brown, firm, silty laminations light grey.
120	1910.0	40	Sandstone	Light grey to buff, very fine to fine grained, moderately to well sorted, subangular to subrounded, firm, silty in part.
121	1905.0	45	Sandstone	Buff, very fine to fine grained, moderately to well sorted, subangular to subrounded, soft to firm, silty in part, very dull white crush cut.
122	1901.9			No Recovery - Pulled Off.
123	1894.3	35	Sandstone	Very light grey, very fine grained to fine grained, moderately to well sorted, subangular to subrounded, soft to firm, carbonaceous laminations, silty in part, 2% spotty dull white fluorescence, dull white crush cut, clear residue.

124	1889.5	35	Sandstone	Buff, fine to medium grained, moderately sorted, subangular to subrounded, soft to firm, silty in part, dull white crush cut.
125	1877.0	27	Siltstone	Light grey, firm, grades to very fine grained sandstone.
126	1867.0	35	Claystone	Light grey to yellow grey.
127	1856.0	30	Siltstone	Medium light grey, firm to hard, trace carbonaceous.
128	1849.0	30	Siltstone	Medium light grey, firm to hard, trace carbonaceous laminations, argillaceous in part.
129	1822.0	30	Siltstone	Medium light grey to medium grey, firm.
130	1800.0	30	Siltstone	Medium light grey, firm, argillaceous in part.
131	1780.3	35	Sandstone	Light grey, fine grained, moderately sorted, subangular to subrounded, firm, silty, 10% even bright white fluorescence, dull white crush cut;
			Siltstone	Light brown, firm, argillaceous, slightly carbonaceous, laminated sandstone and siltstone.
132	1765.5	35	Siltstone	Brown to light grey, firm, sandy (very fine grained).
133	1746.5			No Recovery - Misfire.
134	1728.0	20	Siltstone	Medium light grey, firm, trace carbonaceous specks.
135	1719.7	25	Claystone	Light grey, firm, subfissile.
136	1702.0			No Recovery - Misfire.
137	1688.3	17	Siltstone	Medium light grey, firm, argillaceous, trace very fine grained quartz.
138	1680.0	30	Sandstone	Very light grey, very fine to fine grained, moderately well sorted, subrounded, friable, trace carbonaceous inclusions.
139	1675.5			No Recovery - Misfire.
140	1661.7	35	Sandstone	Light grey, very fine to fine grained, moderately well sorted, subrounded to rounded, friable, carbonaceous inclusions.
141	1648.5	25	Siltstone	Brown and light grey, firm, quartzose (light grey parts only), minor carbonaceous laminations, brown and light grey laminations.
142	1647.3			No Recovery - Misfire.
143	1638.5	30	Siltstone	Brown, firm, very argillaceous, carbonaceous.



144	1634.0	30	Siltstone	Medium light grey, firm, carbonaceous inclusions and laminations.
145	1629.0			No Recovery - Misfire.
146	1621.0	30	Coal	Black brown, firm, earthy, brittle.
147	1614.5	25	Siltstone	Brown grey, firm, carbonaceous laminations (trace), argillaceous.
148	1611.5			No Recovery - Misfire.
149	1609.0	20	Siltstone	Light grey, firm to soft, very argillaceous, quartzose.
150	1574.5	25	Siltstone	Light brown and light grey, firm, argillaceous, mostly brown with minor light grey laminations, trace carbonaceous laminations.
151	1561.5			No Recovery - Misfire.
152	1530.4	25	Siltstone	Light brown and light grey, firm, argillaceous, laminations brown with light grey, trace carbonaceous laminations.
153	1514.0	25	Sandstone	Light grey, very fine grained, very well sorted, subrounded, friable, very fine grained quartz grains in argillaceous matrix, no fluorescence, very faint dull diffuse white cut.
154	2668.5	15	Sandstone	Light grey, medium to coarse grained, moderately sorted, subangular to subrounded, friable, carbonaceous inclusions.
155	2586.5	20	Siltstone	Medium dark grey, soft to firm, carbonaceous, argillaceous.
156	2530.0	25	Sandstone	Medium light grey, fine to medium grained, moderately sorted, subrounded, friable, occasional carbonaceous inclusions; 20% patchy dull yellow fluorescence, faint dull diffuse streaming cut, no residue.
157	2494.0	25	Sandstone	Very light grey, very fine to coarse grained, poorly sorted, subrounded, very friable, occasional carbonaceous inclusions; 70% even bright white fluorescence, moderately bright, streaming diffuse white cut, and white crush cut.
158	2483.2	30	Sandstone	Buff to very light grey, fine grained to occasionally very coarse grains, poorly to moderately sorted, subangular, moderately hard, occasional carbonaceous inclusions, 40% patchy bright white fluorescence, instant, faint white streaming cut and white crush cut.
159	2480.5	15	Sandstone	Medium light grey, very fine to fine grained, well sorted, subrounded, very friable.

160	2477.0	30	Sandstone	Very light grey, very fine to fine grained, well sorted, subangular to subrounded, moderately hard, occasional black carbonaceous inclusions, trace dull orange gold mineral fluorescence (no cut).
161*	2063.0	25	Shale	Brownish grey, firm, trace micromicaceous.
162*	2063.0	25	Shale	Brownish grey, firm, trace micromicaceous.
163	1945.7	35	Sandstone	Medium grey, fine to very fine grained, well sorted, subrounded to rounded, friable, common carbonaceous inclusions, argillaceous.
164	1942.3	45	Sandstone	Buff, very fine to fine grained, well sorted, subrounded, moderately hard, trace carbonaceous inclusions.
165	1933.0	40	Sandstone	Medium light grey, very fine grained, well sorted, subrounded, friable, moderately hard, trace dolomitic cement, common carbonaceous inclusions.
166	1925.0	40	Sandstone	Medium grey, fine to medium grained, moderately sorted, subrounded, friable, argillaceous inclusions, carbonaceous inclusions, trace mica, no fluorescence, very faint dull white diffuse cut.
167*	1902.0	30	Shale	Brownish grey, firm, occasionally very carbonaceous, coaly layers.
168*	1902.0	30	Shale	Brownish grey, firm, very thin coal layers.
169	1889.4	45	Sandstone	Buff, fine grained, well sorted, subrounded to rounded, friable, carbonaceous inclusions, argillaceous matrix, no fluorescence, very faint dull diffuse white cut.
170	1746.5	25	Shale	Brownish grey, firm, carbonaceous layering.
171	1702.0	30	Siltstone	Light grey, firm, very fine grained quartz grain inclusions.
172	1675.5	30	Shale	Greyish brown, firm to moderately hard, very finely laminated, trace pyrite.
173	1647.3	35	Coal	Black, very hard, brittle, dull, earthy lustre.
174	1628.9	27	Siltstone	Medium dark grey, firm.

175	1611.5	54	Coal	Black, very hard, brittle, dull earthy lustre.
176	1561.5	25	Siltstone	Very light grey, firm, occasional carbonaceous laminations.

\*Note: CST Numbers 161, 162 and 167, 168 -- 2 shots were fired at each of these depths, (ie. 2063.0 and 1902.0) as the initial shots were thought to have misfired. However, the first shots were successful, resulting in 2 cores at each depth.

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> %	<u>C6+</u> %
1	1500.7	0.038	0.009	0.002	0.001	0.001	0.006	
2	1497.0	0.025	0.005	0.003	0.003	0.003	0.007	
11	1409.9	0.190	0.119	0.122	0.073	0.058	0.067	Tr.
12	1402.8	(Sample opened)		0.001	0.003	0.004	0.015	Tr.
19	1342.5	0.126	0.019	0.022	0.017	0.015	0.022	Tr.
24	1288.9	0.234	0.034	0.037	0.051	0.064	0.111	Tr.
25	1287.9	0.205	0.060	0.115	0.126	0.090	0.067	Tr.
27	1279.0	0.220	0.042	0.080	0.042	0.023	0.028	Tr.
29	1274.0	0.310	0.079	0.081	0.082	0.090	0.122	Tr.
30	1273.0	0.101	0.017	0.022	0.024	0.026	0.028	Tr.
31	1270.0	0.063	0.021	0.026	0.026	0.019	0.022	Tr.
32	1266.5	0.071	0.011	0.009	0.009	0.010	0.017	Tr.
33	1265.0	0.063	0.011	0.011	0.010	0.009	0.017	Tr.
54	2768.2	0.291	0.038	0.075	0.064	0.040	0.016	
56	2750.7	0.166	0.019	0.041	0.049	0.033	0.011	
57	2743.6	0.036	0.009	0.013	0.023	0.022	0.011	
62	2701.5	0.054	0.020	0.019	0.021	0.024	0.011	
64	2691.5	0.049	0.021	0.025	0.026	0.028	0.022	
65	2688.0	0.027	0.017	0.038	0.044	0.054	0.030	
67	2677.0	0.031	0.021	0.044	0.065	0.059	0.033	
69	2654.8	0.112	0.128	0.114	0.128	0.113	0.542	
75	2572.0	0.009	0.006	0.010	0.020	0.031	0.033	
78	2524.4	0.027	0.015	0.021	0.038	0.059	0.043	
81	2481.5	0.016	0.015	0.016	0.016	0.026	0.030	
95	2211.1	0.031	0.024	0.019	0.015	0.017	0.014	
101	2084.0	0.058	0.015	0.014	0.026	0.040	0.035	
115	1935.5	0.027	0.017	0.008	0.008	0.012	0.005	
120	1910.0	0.036	0.027	0.014	0.014	0.016	0.011	
121	1905.0	0.025	0.024	0.024	0.021	0.033	0.016	
123	1894.3	0.027	0.012	0.019	0.027	0.035	0.033	
124	1889.5	0.139	0.030	0.030	0.030	0.039	0.032	
138	1680.0	0.099	0.118	0.125	0.064	0.040	0.022	
140	1661.7	0.011	0.015	0.026	0.027	0.028	0.026	
144	1634.0	0.031	0.018	0.037	0.037	0.028	0.019	
153	1514.0	0.040	0.023	0.049	0.050	0.035	0.030	
156	2530.0	0.013	0.009	0.026	0.025	0.021	0.022	
157	2494.0	0.013	0.018	0.034	0.032	0.028	0.021	
158	2483.2	0.193	0.121	0.285	0.219	0.160	0.036	
164	1942.3	0.152	0.151	0.287	0.155	0.132	0.071	
165	1933.0	0.188	0.112	0.202	0.207	0.155	0.037	
166	1925.0	0.224	0.110	0.176	0.219	0.160	0.077	
169	1889.4	0.322	0.084	0.166	0.304	0.282	0.173	

APPENDIX 3

APPENDIX 3

Velocity Survey Report

OIL and GAS DIVISION

05 OCT 1984

SNAPPER - 4

VELOCITY SURVEY REPORT

1. Marine Velocity Survey data.
2. Schlumberger processing report.
3. Schlumberger field report.
4. Check shot data - observed and corrected.
5. Gun geometry sketch.

ENCLOSURES

1. Schlumberger Geogram.
2. Schlumberger seismic calibration log.
3. Schlumberger CSU field log - WST check shots.
4. Time-Depth Curve.

0745L

MARINE VELOCITY SURVEY DATA

Well ..... SNAPPER 4 .....

Basin ..... GIPPSLAND .....

INTRODUCTION

Esso Personnel ..... R. ROMANIK .....

Contractor ..... SCHLUMBERGER .....

Supplied (1) Instruments.  
(2) Personnel

Seismic Observer..... M.AW D. WAY .....

Marine Shooter .....

Navigation.....

(3) Licenced Shooting Boat

Name.....

Date Loaded.....

Date Released.....

Agent.....

(4) Seismic Source

Water Gun

Bolt 1900B 200 cu inch 30 ft. depth .....

Personnel and Instruments

assembled at .....Date .....

Boarded (rig) Southern Cross.....Date Sept. 13-83 .....

Date of survey ...Sept.14-1983.....

Casing Depth ..... 780M - 13 3/8" .....

..... 1501m - 9 5/8" .....

T.D. when shot ...2820.M.....

water depth .....57.0 .....metres

SURVEY PROCEDURE

Weather: Wind ..... 5-10 MPH .....

Swell ..... SLIGHT .....

Sea ..... CALM .....

Rig Movement ..... NIL .....

Rig Noise ..... LIMITED .....

Hydrophones: Number.....TWO.....  
 Depth below sea level ...10.....metres  
 Position .One in top of gun and one in  
 ..moonpool.....  
 Gas Gun: number of shots per level ...Variable.....  
 gun depth .....10.....metres  
 Well phone positioning:  
 No of depths .....20.....  
 Time: first shot .....17 36.....  
 last shot .....23.30.....  
 Total rig time .....3 hours.....

RESULTS

Quality of results (good .....20 Good.....  
 (fair .....  
 (poor .....  
 (not used .....

Comparison of Interval Times with Sonic Log

/ / average .....microsec/metre  
 / / max .....microsec/metre

CONCLUSION

Reliability of T-D curve .....Fair.....

COMMENTS



## PROCESSING REPORT

SNAPPER 4

1. OPEN HOLE LOGS:

The sonic data from logs run on 5 July, 9 July, 12 September 1983, were spliced and merged with the FDC data from the logs run on 9 July and 12 September.

2. SHOT DATA:

Level 2819.5 shots 9, 11, 12, 13 omitted  
Level 2710.0 shots 16, 17, 18, 20, 12, 25, 26, 28, 29 omitted  
Level 2550.0 shots 31 omitted  
Level 1265.0 shots 72 omitted  
Level 1120.0 shots 77, 78, 79 omitted  
Level 1000.0 shots 84, 85, 86, 88, 89, 90, 91, 93, 94  
                  95, 96, 97, 99, 100 omitted  
Level 830 shots 16 omitted

All other shots were stacked.

3. SONIC CALIBRATION PROCESSING:

Well is assumed vertical. SRD is mean sea level.

Kelly Bushing (K.B.) = 21.0m above SRD  
Rotary Table (R.T.) = 20.7m above SRD  
Ground Level (G.L.) = 57.0m below SRD

Gun and shot sensor was calculated to be 37 meters from the wellbore using the moon pool shot.

Average velocity of sea water = 1480m/sec.


4. DRIFT CURVE COMPUTATIONS:

The drift curve was averaged using false knees at 1824, 1270, 200 meters below K.B. These depths were selected to prevent causing false reflectors.

5. GEOGRAM COMPUTATIONS:

The geogram was computed using a zero phase wavelet and frequencies 20, 25, 30, 35 Hz.

Yours faithfully,



T. L. HIGGINS



# WELL SEISMIC SERVICE FIELD REPORT

COMPANY	WELL	DATE	LOCATION	ENGINEER	WITNESSED BY
Esso Australia	SNAPPER 4	15.9.83	SEA	M. AW	BRAMALL
FEET <input type="checkbox"/> METRES <input checked="" type="checkbox"/>	JACK UP <input type="checkbox"/> PLATFORM <input type="checkbox"/>	SHIP <input type="checkbox"/> SEMI-SUB <input checked="" type="checkbox"/>	WEATHER:		

SCHLUMBERGER ZERO	KB	AT ELEVATION	21.0M	RELATIVE TO MEAN SEA LEVEL (M.S.L.)
LOG MEASURED FROM	KB	AT ELEVATION	0 M	RELATIVE TO SCHLUMBERGER ZERO
DRILLING MEASURED FROM	KB	AT ELEVATION	0 M	RELATIVE TO SCHLUMBERGER ZERO

<b>SOURCE</b>		<b>TIDEL INFORMATION</b>		DISTANCE	HOUR	DATE
GUN TYPE	WATER <input type="checkbox"/> AIR <input checked="" type="checkbox"/>	TIDE LEVEL TO M.S.L.				
VOLUME	200 x _____ CU INCHES	(RECORD IF LEVEL VARIES MORE THAN 2 METRES DURING SURVEY)				
PRESSURE	140 BARS					NOT AVAILABLE
VIBRATOR TYPE	_____					
SWEEP LENGTH	_____ SECONDS					
FROM	_____ HZ TO _____ HZ	CSU SOFTWARE VERSION: 25	MAX. HOLE DEV: 4.5° C	2110M	AZIM: N/A	

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

### UNCORRECTED RESULTS

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

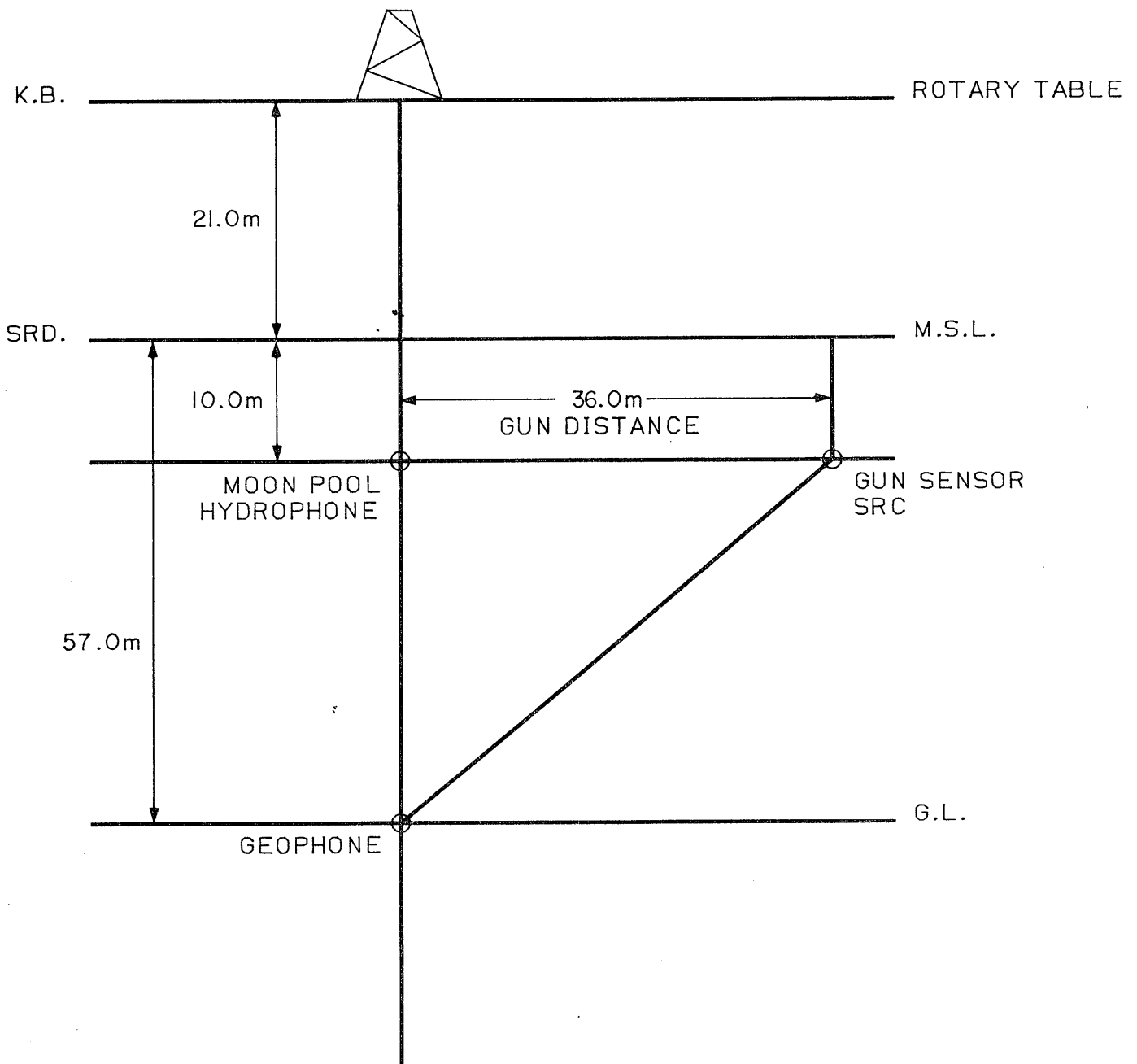
SHOT NO.	DEPTH	GUN PRESSURE	FILTERS	TRANSIT TIME	HOUR SHOT	FILE	STACK	STACKED SHOTS	QUALITY / REMARKS
1	825	140 Bar	None	346.4	00:14			1 - 6	G
2	2819.5	140 Bar	None	1000.2	01:02			7 - 13	G
3	2710	140 Bar	None	971.7	01:25			14 - 24	G
4	2550	104 Bar	None	930.7	01:38			25 - 30	G
5	2305	140 Bar	None	860	01:49			31 - 33	G
6	2050	140 Bar	None	788.2	02:00			34 - 36	G
7	1800	140 Bar	None	706.1	02:09			37 - 39	G
8	1650	140 Bar	None	655.9	02:16			40 - 42	G
9	1570	140 Bar	None	629.7	02:21			43 - 45	G
10	1540	140 Bar	None	618	02:25			46 - 48	G
11	1500	140 Bar	none	606.6	02:33			49 - 51	G
12	1420	140 Bar	None	582.7	02:41			52 - 54	G
13	1325	140 bar	None	547.9	02:47			55 - 58	G
14	1265	140 Bar	None	526.6	02:55			59 - 62	G
15	1120	140 Bar	None	469.8	05:04			63 - 68	G
16	1000	140 Bar	None	423.3	03:36			69 - 83	G
17	825	140 Bar	None	347.4	03:43			84 - 88	G
18	OM	140 Bar	None	245	03:52			89 - 93	G Hydro- phone in Moon- pool

- 1) 825 M station repeated going up and down.
- 2) Offset distance of gun accelerometer measured by range finder ≈ 38M
- 3) Hydrophone in moonpool - 30' - 0" below MSL
- 4) Date log recorded September 15, 1983

VELOCITY SURVEY - SNAPPER-4

<u>LEVEL</u>	<u>MEASURED</u>	<u>VERTICAL</u>	<u>OBSERVED</u>	<u>VERTICAL</u>	<u>AVERAGE</u>	<u>DELTA</u>	<u>DELTA</u>	<u>INTERVAL</u>
<u>NUMBER</u>	<u>DEPTH</u>	<u>DEPTH</u>	<u>TRAVEL</u>	<u>TRAVEL</u>	<u>VELOCITY</u>	<u>DEPTH</u>	<u>TIME</u>	<u>VELOCITY</u>
	<u>FROM KB</u>	<u>FROM MSL</u>	<u>TIME</u>	<u>TIME MSL/ GEOPHONE</u>	<u>MSL/GEOPHONE</u>	<u>BETWEEN</u>	<u>BETWEEN</u>	<u>BETWEEN</u>
	<u>(M)</u>	<u>(M)</u>	<u>(MS)</u>	<u>(M/S)</u>	<u>(M/S)</u>	<u>(M)</u>	<u>(MS)</u>	<u>(M/S)</u>
1	78.00	57.00	40.87	38.51	1480	747.00	314.29	2377
2	825.00	804.00	347.00	352.80	2279	175.00	76.07	2301
3	1000.00	979.00	423.00	428.87	2283	120.00	47.04	2551
4	1120.00	1099.00	470.00	475.91	2309	145.00	56.03	2588
5	1265.00	1244.00	526.00	531.94	2339	60.00	22.01	2726
6	1325.00	1304.00	548.00	553.95	2354	95.00	35.02	2713
7	1420.00	1399.00	583.00	588.97	2375	80.00	23.01	3476
8	1500.00	1479.00	606.00	611.98	2417	40.00	12.01	3332
9	1540.00	1519.00	618.00	623.99	2434	30.00	11.00	2726
10	1570.00	1549.00	629.00	634.99	2439	80.00	27.01	2962
11	1650.00	1629.00	656.00	662.00	2461	150.00	50.02	2999
12	1800.00	1779.00	706.00	712.02	2499	250.00	82.02	3048
13	2050.00	2029.00	788.00	794.04	2555	255.00	71.02	3591
14	2305.00	2284.00	859.00	865.06	2640	245.00	71.01	3450
15	2550.00	2529.00	930.00	936.08	2702	160.00	41.01	3902
16	2710.00	2689.00	971.00	977.08	2752	109.50	29.00	3775
17	2819.50	2798.50	1000.00	1006.09	2782			

# SNAPPER-4 GUN GEOMETRY SKETCH



PE902528

This is an enclosure indicator page.  
The enclosure PE902528 is enclosed within the  
container PE902527 at this location in this  
document.

The enclosure PE902528 has the following characteristics:

ITEM\_BARCODE = PE902528  
CONTAINER\_BARCODE = PE902527  
NAME = Time Depth Curve  
BASIN = GIPPSLAND  
PERMIT =  
TYPE = WELL  
SUBTYPE = VELOCITY\_CHART  
DESCRIPTION = Time Depth Curve  
REMARKS =  
DATE\_CREATED = 19/03/84  
DATE\_RECEIVED = 5/10/84  
W\_NO = W827  
WELL\_NAME = Snapper-4  
CONTRACTOR = ESSO  
CLIENT\_OP\_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)