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WCR VOL 1

TURRUM-4

Esso Australia Ltd.

WELL COMPLETION REPORT

BA

**VOLUME 1
BASIC DATA**

TURRUM-4

PETROLEUM DIVISION

16 MAR 1993

**GIPPSLAND BASIN
VICTORIA**

ESSO AUSTRALIA LIMITED

Compiled by - Jonathan Reeve

WELL COMPLETION REPORT

VOLUME 1: BASIC DATA

CONTENTS

1. WELL DATA RECORD
2. OPERATIONS SUMMARY
3. CASING DATA
4. CEMENTING DATA
5. SAMPLES, CONVENTIONAL CORES, SIDEWALL CORES
6. WIRELINE LOGS AND SURVEYS
7. SUMMARY OF FORMATION TEST PROGRAMME
8. TEMPERATURE RECORD

FIGURES

1. LOCALITY MAP
2. WELL PROGRESS CURVE
3. WELL BORE SCHEMATIC
4. ABANDONMENT SCHEMATIC
5. HORNER TEMPERATURE PLOT - SUITE 2

APPENDICES

1. LITHOLOGICAL DESCRIPTIONS
2. CORE DESCRIPTIONS
3. SIDEWALL CORE DESCRIPTIONS
4. RFT RESULTS
5. VELOCITY SURVEY REPORT

TURRUM-4

ESSO AUSTRALIA LTD

1. WELL DATA RECORD

LOCATION : Latitude : 38⁰ 16'39.58" South
Longitude : 148⁰ 15'44.16" East
AMG: X=610407mE
Y=5762609mN
Map Projection: UTM Zone 55
Geographical Location: Bass Strait, Victoria
Field : Turrum

PERMIT : Vic/L4

ELEVATION : 23m

WATER DEPTH : 62m

TOTAL DEPTH : 2778m (Driller)
2778m (Logger)

PLUG BACK TYPE : Three cement plugs.

REASONS FOR PLUGGING BACK : Dry hole.

MOVE IN : 27/8/92 07:15 Hours

SPUDED : 28/8/92 12:30 Hours

REACHED TD : 09/09/92 18.15 Hours

RIG RELEASED : 15/09/92 14:00 Hours

OPERATOR : Esso Australia Resources Ltd.

PERMIT OR LICENCEE : BHP Petroleum (Bass Strait) Pty Ltd and Esso Australia Resources Ltd.

ESSO INTEREST : 50%

OTHER INTEREST : BHPP 50%

CONTRACTOR : Atwood Oceanics

RIG NAME : Atwood Falcon

EQUIPMENT TYPE : Semi-Submersible

TOTAL RIG DAYS : 20

DRILLING AFE NO : L61012101

TYPE COMPLETION : Plugged and abandoned

WELL CLASSIFICATION : Before Drilling: Outpost/Extension Test
After Drilling: Dry hole

2.

OPERATIONS SUMMARY

The Atwood Falcon arrived at the Turrum 4 location at 07:15 hours on August 27, 1992. After the anchors were run and set by the Maersk Lifter and the Lady Caroline, the rig was ballasted to drilling draft at 20:00 hours on August 27, 1992. The final location was 5.0 m on a true bearing of 315 degrees from the called location. The water depth at the final location was 62m and the KB height was 23m.

a) 26" HOLE SECTION

The 26" bottom hole assembly was made up and stood back in the derrick, along with 124 stands of 5" drill pipe. The temporary guide base running tool and bumper sub were then made up and the temporary guide base run to the sea floor. The temporary guide base was set on a 1.5 degree angle before pulling out and laying down the running tool. The 26" drilling assembly was then picked up and stabbed into the temporary guide base. Turrum 4 was spudded at 12:30 hours on August 28th 1992. The 26" hole was drilled from 85m to 192m using seawater as the borehole fluid. High viscosity sweeps were made every stand to clean the hole. A 50 barrel high viscosity pill was circulated and the hole displaced with 400 barrels of high viscosity mud prior to running a survey which indicated 0.25 degrees of deviation. A wiper trip was then made to the seafloor prior to returning to TD and pumping 290 barrels of high viscosity mud. The bottom hole assembly was then tripped to 135m before pumping a further 150 barrels of high viscosity mud and pulling out to run 20" casing.

Six joints of 20" casing plus a cross-over joint were run with the 18 3/4" wellhead assembly. The 20" casing shoe was set at 182.6m. The 20" casing was cemented with a lead slurry of 340 sacks of class 'G' cement mixed with 3.1% prehydrated gel in freshwater and a tail slurry of 490 sacks of class 'G' neat cement mixed with 58 barrels of seawater. The cement was displaced with 17 barrels of seawater. The well head was set at 83mKB.

The BOP stack and riser were rigged up and run and the CK and kill lines tested to 300/3000 psi. The BOP stack was latched to the 18 3/4" wellhead and pull tested to 50 kips overpull. The diverter was made up and installed and the casing and connector were pressure tested to 500psi. The 26" bottom hole assembly was then layed down.

b) 17 1/2" HOLE SECTION

A 17 1/2" bit and bottom hole assembly were picked up and run in the hole, tagging the top of cement at 175m. The cement and casing shoe were drilled out from 175 to 182m and the rathole cleaned out to 192m before drilling the 17 1/2" hole from 192m to 775m. The hole was circulated clean and a single shot survey taken. A wiper trip was made to the 20" casing shoe and the survey recovered. The survey indicated 1.5 degree deviation toward an azimuth of 036 degrees. The bottom hole assembly was then tripped back to TD with a ledge encountered at 768m. After breaking through the ledge and reaching bottom, the hole was again circulated clean prior to pulling out to run logs and casing. Schlumberger were rigged up and the suite 1 SLS-GR-AMS logging run made. Schlumberger were then rigged down before running 13.3/8" casing.

Eleven joints and one pup joint of 68lb/ft and 46 joints of 54.5lb/ft 13.3/8" casing were run and the casing shoe set at 759.2m. The casing was cemented with 860 sacks of class 'G' neat cement mixed with 102 barrels of seawater at a slurry density of 15.8ppg. The riser was then circulated clean and the cement lines rigged down. The seal assembly was set and tested to 200/2000psi. The BOP blue pod was pressure tested to 200/5000psi and the BOP yellow pod was function tested. The surface lines were also pressure tested to 200/5000psi before laying down the 17 1/2" bottom hole assembly.

c) 12 1/4" HOLE SECTION

A 12 1/4" bottom hole assembly consisting of a PDC bit, mud motor and MWD was made up run into the hole. The float collar, cement and float shoe were drilled out and the rat hole cleaned out to 775m. The 12 1/4" hole was then drilled from 775 to 778m before circulating and performing a phase II P.I.T. to a maximum pressure of 725psi with no leak off (EMW = 15.0ppg). The 12 1/4" hole was then drilled from 778m to 2158m, where the bit was pulled and the mud motor layed out due to a low rate of penetration. A new HTC ATMP-J22 bit was picked up and run in the hole. Washing and reaming was necessary from 2104m to 2158m. Drilling then continued to 2564m where the hole was circulated clean and the bit pulled due to a low rate of penetration. Tight hole was encountered between 2415m and 1992m, requiring back reaming with the top drive. Once out of the hole the bit was changed out for a new Reed HP51HJSK and an additional stabiliser picked up. This bottom hole assembly was run in the hole to 1985m where the string stood up. The top drive was connected and the hole reamed to 2020m. Further tight spots were reamed at 2098m, 2166m, 2347m and 2434m. Drilling proceeded from 2564m to 2778m where TD was called. The hole was circulated clean prior to making a wiper trip to 1905m. Intermittent tight spots were encountered between 2673m and 2098m with back reaming required from 2577m to 2568m. The bottom hole assembly was then tripped back to TD and the hole again circulated clean prior to pulling out of the hole to run logging suite 2. No tight spots were encountered while pulling out.

Schlumberger were rigged up for logging suite 2, which consisted of:

- DLL-MSFL-SLS-GR-AMS
- FMS-LDL-CNL-NGS-AMS
- MDT-GR-AMS
- CSAT-GR-AMS
- CST (sidewall cores)

The logging program was completed without problems and Schlumberger were rigged down.

Open ended drill pipe was run in the hole to 1957m and the hole circulated for one hour. The first cement plug was set using 292 sacks of class G neat cement mixed with 35 barrels of fresh water to a slurry density of 15.8ppg. While waiting cement 33 stands of drill pipe were layed down. The top of plug 1 was tagged at 1857m prior to pulling out to 800m and setting plug 2. 370 sacks of class G cement were mixed with 44 barrels of seawater to a slurry density of 15.8ppg before pulling to 600m to wait on cement. The top of plug 2 was tagged at 681m. The abandonment program was then suspended for 18 hours due to weather before a pingo cutter was run in on Schlumberger wireline to cut the casing below the well head. The casing stub was pulled and cement plug 3 set between 210 and 110m. The BOP stack and riser were then pulled. The Maersk Lifter and the Lady Caroline pulled the anchors and the rig was released at 14:00 hours on Septmeber 15, 1992.

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TURRUM - 4 FINAL WELL REPORT
CASING DATA

OD (In.)	WEIGHT (LB/FT)	GRADE	CONNECTION	LENGTH (M)	SHOE DEPTH (mMD-RKB)	CENTRALIZER POSITION	REMARKS
20	94	X-52	JV	13.18	182.63	ONE @ 177m	FLOAT SHOE JOINT
20	94	X-52	JV	62.27		ONE @ 137m	6 INTERMEDIATE JOINTS
20	94	X-52	JV x ALT-2	12.60			1 INTERMEDIATE JOINT-XO
24	670	---	ALT-2 x WH	11.55		NONE	CIW TGB USED FROM WS-1 TOP OF 30" WH @ 83.03m
				=====			
				99.60			
13-3/8	54.5	K-55	BTC	12.50	759.18	1 ACROSS MIDDLE	FLOAT SHOE JOINT (BTM)
	54.5	K-55	BTC	11.82		1 ACROSS MIDDLE	FLOAT COLLAR JOINT (BTM)
	54.5	K-55	BTC	516.68		1 ACROSS FIRST SIX COLLARS	46 INTERMEDIATE JOINTS
	68	K-55	BTC	130.12		NONE	12 INTERMEDIATE JOINTS
			HANGER	2.65			
				=====			
				673.77			

ESSO AUSTRALIA LTD.
TURRUM-4 FINAL WELL REPORT
CEMENT DATA

DATE (1992)	TYPE JOB	INTERVAL (mMD-RKB)	TYPE CEMENT	VOLUME (SX)	SLURRY WEIGHT (PPG)	ADDITIVES	MIX WATER	REMARKS
29-AUG	20" PRIMARY LEAD	182.63-86	CLASS "G"	340	12.5	3.1% PH Gel	FW	CEMENT THROUGH DP STINGER. CMT VOLUME CALCULATED TO PROVIDE 150% EXCESS ABOVE GAUGE HOLE. TOC @ MUDLINE WITH RETURNS SEEN.
	20" PRIMARY TAIL		CLASS "G"	490	15.8	----	SW	
1-SEP	13-3/8" PRIMARY	759-359	CLASS "G"	860	15.8	----	SW	BUMPED PLUG WITH 1500 PSI, NO LR. FLOATS HELD OK, DISPLACED W/SW.
11-SEP	P & A PLUG No.1	1957-1857	CLASS "G"	292	15.8	----	FW	TAGGED TOC AT 1857M.
12-SEP	P & A PLUG No.2	800-681	CLASS "G"	370	15.8	----	SW	SET ACROSS 13-3/3" SHOE. TAGGED-15K# S/O. TOC AT 681M.
13-SEP	P & A PLUG No.3	210-110	CLASS "G"	475	15.8	2% CaCl ₂	SW	SET AS SURFACE PLUG. TEST PLUG TO 500 PSI.

5. SAMPLES, CONVENTIONAL CORES, SIDEWALL CORES

<u>Interval (m)</u>	<u>Type</u>
185 - 3045	Cuttings samples- 3 sets of washed and oven dried plus 1 set of bagged air dried cuttings. Samples from 185 - 1820m @ 10m intervals Samples from 1820 - 2778m @ 5m intervals
1902 - 2734	Sidewall cores - Shot 60, recovered 52.

6. WIRELINE LOGS AND SURVEYS

<u>Type and Scale</u>		<u>From (m)</u>	<u>To (m)</u>
	<u>Suite 1</u>		
SLS-GR-AMS	1:200	182	772
GR-AMS (continued)	1:200	85	182
	<u>Suite 2</u>		
DLL-MSFL-SLS-GR-AMS	1:200	1900	2773
SLS-GR-AMS (continued)	1:200	759	1900
FMS-LDL-CNL-NGS-AMS	1:200	1900	2777
MDT-GR-AMS	36 Pretests	1963	2746
CSAT-GR-AMS	21 Levels	447	2772
CST	Shot 60, recovered 52	1902	2734

SUMMARY OF WIRELINE FORMATION TEST PROGRAMME
Turrum 4

Test	Depth (m)	Type	Oil (l)	Recovery Gas (ft3)	Water (l)	Filt (l)	Form Press. (Psia)	Hydro Press. (Psia)	Remarks
1-1	1965.5	Pretest					2729.0	3252	Hydro not stable
1-2	1965.5	Pretest					2729.2	3256	Hydro not stable
1-3	1968.0	Pretest					2737.0	3269	Hydro not stable
1-4	1993.0	Pretest						3305	Aban Tight
1-5	1977.6	Pretest					2748.5	3273	Good test
1-6	1993.1	Pretest					2798.3	3299	Good test
1-7	2038.0	Pretest					2875.9	3373	Good test
1-8	2064.1	Pretest					2931.9	3415	Ex. Perm
1-9	2130.6	Pretest					3044.2	3522	Good test
1-10	2248.4	Pretest					3225.8	3717	Good Perm
1-11	2312.6	Pretest					3288.8	3823	Ex Perm
1-12	2320.0	Pretest					3299.4	3835	Ex Perm
1-13	2326.1	Pretest					3308.7	3845	Ex Perm
1-14	2367.1	Pretest					3385.2	3912	Ex Perm
1-15	2403.5	Pretest					3449.4	3971	Ex Perm
1-16	2408.5	Pretest					3456.1	3978	Ex Perm
1-17	2432.5	Pretest					3485.7	4019	Ex Perm
1-18	2536.1	Pretest					3636.6	4186	Poor Perm
1-19	2546.6	Pretest					3657.2	4203	Ex Perm
1-20	2574.0	Pretest					3708.1	4247	Ex Perm
1-21	2608.0	Pretest					3745.8	4302	Ex Perm
1-22	2626.5	Pretest					3764.9	4332	Ex Perm
1-23	2631.0	Pretest					3771.0	4340	Ex Perm
1-24	2639.1	Pretest					3783.1	4353	Ex Perm
1-25	2676.6	Pretest					3840.3	4414	Ex Perm
1-26	2684.0	Pretest					3850.8	4426	Ex Perm
1-27	2692.5	Pretest					3873.7	4440	Supercharged?
1-28	2730.0	Pretest					3882.8	4501	Ex Perm
1-29	2735.5	Pretest					3890.4	4510	Ex Perm
1-30	2746.0	Pretest					3904.9	4527	Ex Perm
1-31	2370.0	Pretest					3388.5	3916	Good Perm

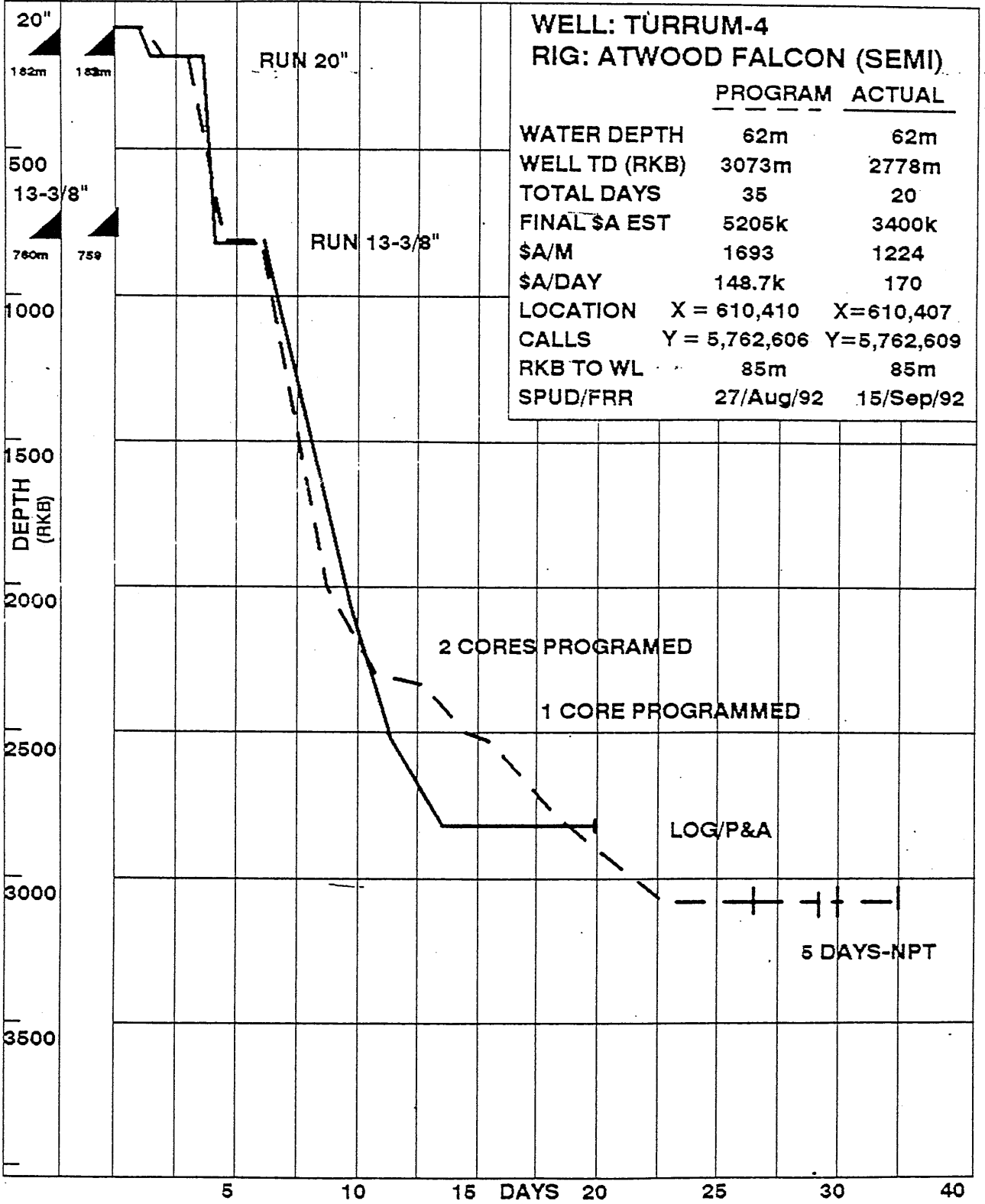
FIGURES

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WELL PROGRESS CURVE

CSG PTS

PLAN	ACTUAL
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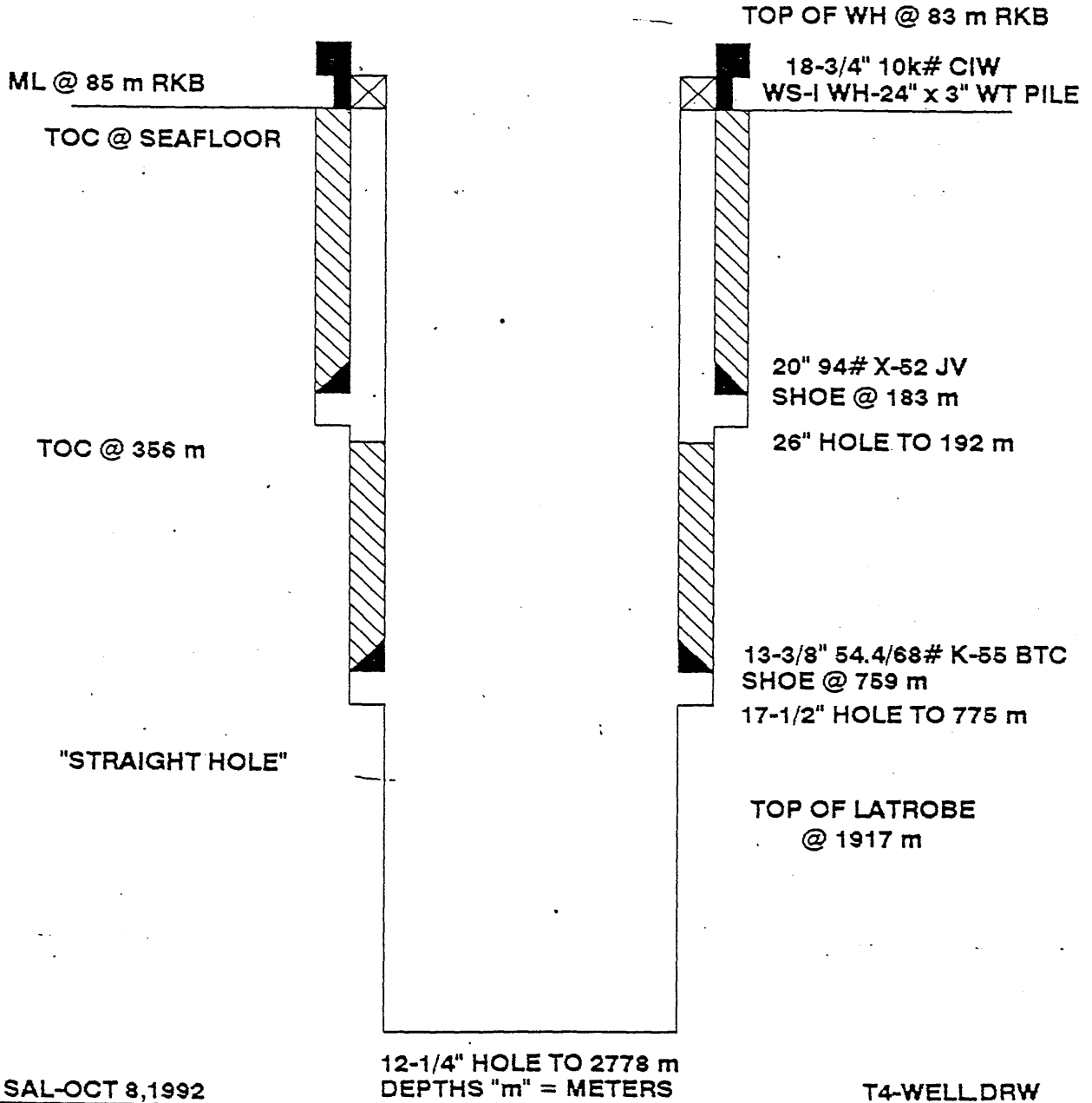


ESSO AUSTRALIA LTD. TURRUM #4 FINALIZED WELL SKETCH

MSL @ 23 m RKB

ALL DEPTHS FROM RKB

WATER DEPTH = 62 m



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TURRUM-4 P&A WELLBORE SKETCH

MSL @ 23 m RKB

ALL DEPTHS FROM RKB

WATER DEPTH = 62 m

ML @ 85 m RKB

TOC @ SEAFLOOR
20" CUT @ 96m

SEAWATER

PLUG #3 (210-110m)
CLASS G-475 SX
MIX WITH SEAWATER
+ 2% CaCl₂
TEST WITH 500 PSI

13-3/8" CUT @ 177m

20" 94# X-52 JV
SHOE @ 183 m

TOC @ 356 m

26" HOLE TO 192 m

PLUG #2 (800-681m)
CLASS G 375 SX
MIX WITH SEAWATER
TAG W/15K#-P/T-1500 PSI

13-3/8" 54.4/68# K-55 BTC
SHOE @ 759 m
17-1/2" HOLE TO 775 m

PLUG #1 (1957-1857m)
CLASS G-292 SX
MIX WITH FRESHWATER
TAG WITH 15 K#

TOP OF LATROBE
@ 1917 m

"STRAIGHT HOLE"

 PRIMARY CEMENT

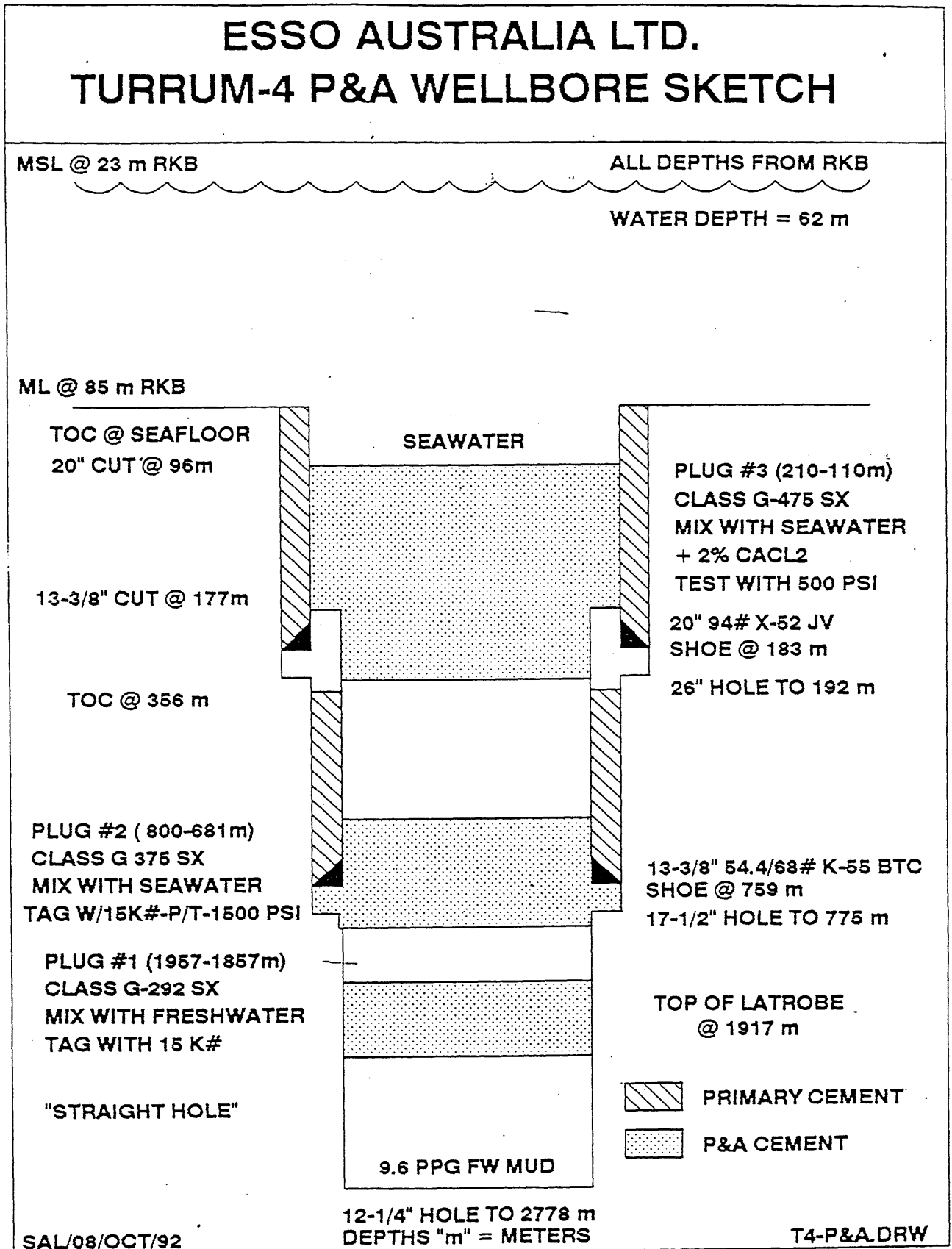
 P&A CEMENT

9.6 PPG FW MUD

12-1/4" HOLE TO 2778 m
DEPTHS "m" = METERS

SAL/08/OCT/92

T4-P&A.DRW



TURRUM-4

HORNER TEMPERATURE PLOT

WIRELINE LOGGING SUITE 2

tk=2hrs

Δt = time since last circulation

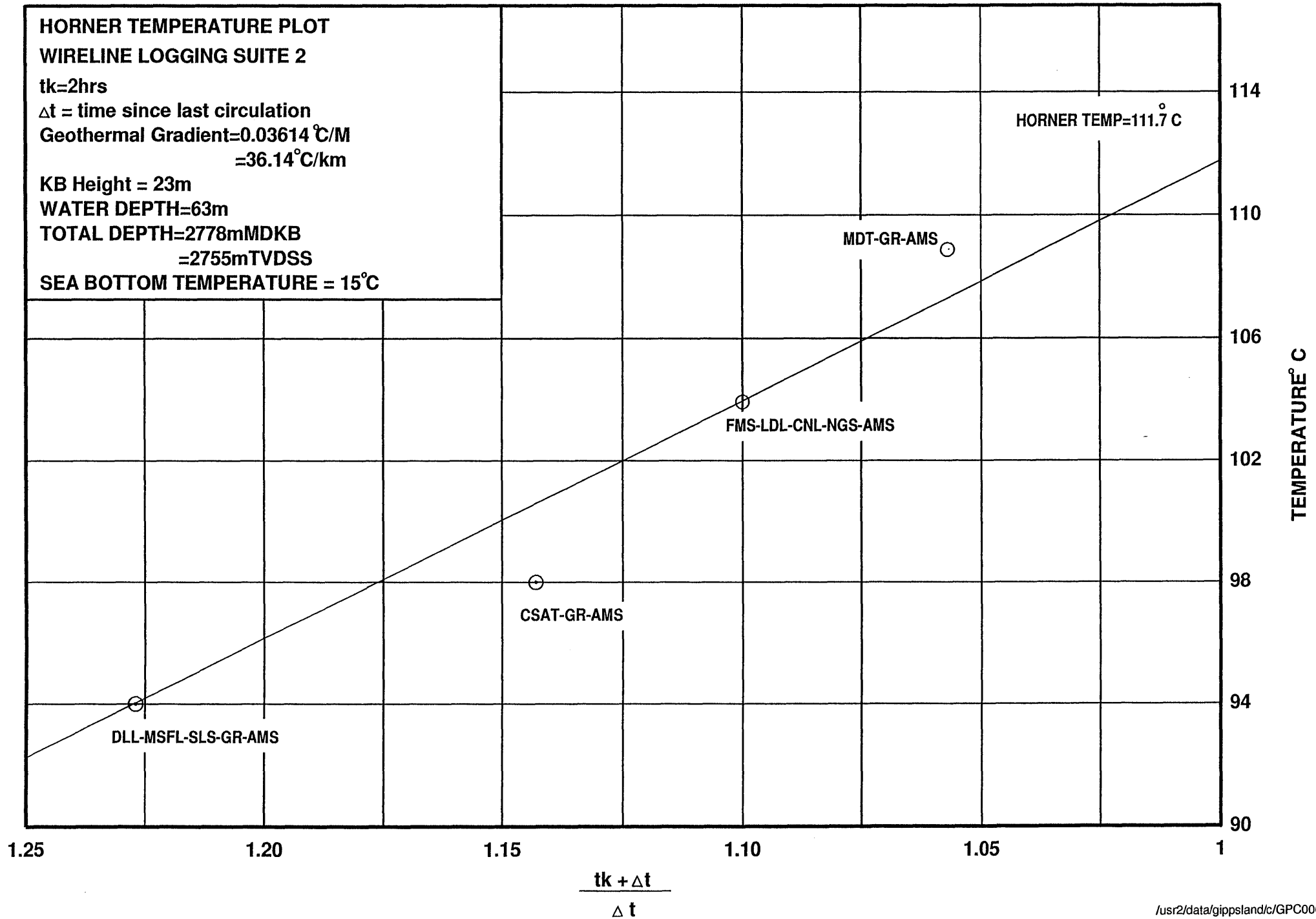
Geothermal Gradient=0.03614 °C/M
 =36.14 °C/km

KB Height = 23m

WATER DEPTH=63m

TOTAL DEPTH=2778mMDKB
 =2755mTVDSS

SEA BOTTOM TEMPERATURE = 15°C





APPENDIX 1

TURRUM 4

Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
775-80	100	LIMESTONE: Calcisiltite, light grey to light greenish grey, argillaceous, common forams, soft to firm.
780-90	100	LIMESTONE: Calcisiltite, as above, sparitic in part, trace medium quartz.
790-800	100	LIMESTONE: Calcisiltite, light grey to light greenish grey, occasionally off white, predominantly argillaceous, occasionally microcrystalline and sparitic, firm, blocky, abundant forams, trace medium quartz.
800-10	100	LIMESTONE: Calcisiltite as above.
810-20	100	LIMESTONE: Calcisiltite, as above, becoming more sparitic, less argillaceous, firm to hard, trace glauconite, trace carbonaceous detritus.
	TR	CLAYSTONE: Off white to light grey, calcareous, soluble and dispersive.
820-30	100	LIMESTONE: Calcisiltite to calcarenite, as above, less argillaceous.
830-40	100	LIMESTONE: Calcisiltite, light grey, off white, generally argillaceous, trace glauconite, trace carbonaceous specks, abundant forams, occasionally microcrystalline and sparitic, predominantly firm to hard, blocky, dolomitic in part.
840-50	100	LIMESTONE: Calcisiltite, as above, becoming more argillaceous.
850-60	100	LIMESTONE: Calcisiltite, as above.
860-70	100	LIMESTONE: Calcisiltite, as above.
870-80	100	LIMESTONE: Calcisiltite, light greenish grey to light grey, moderately to very argillaceous, common carbonaceous specks, rare glauconite specks, abundant micro fossils including forams, slightly dolomitic, firm to hard, blocky, locally grades to calcareous claystone.
880-90	100	LIMESTONE: Calcisiltite, as above.
890-900	90	LIMESTONE: Calcisiltite, as above.

	10	CLAYSTONE: Grey to light grey, firm, calcareous, soluble.
900-10	90	LIMESTONE: Calcisiltite, as above.
	10	CLAYSTONE: As above.
910-20	90	LIMESTONE: Calcisiltite, light grey, light olive grey, occasionally microcrystalline and sparitic, slightly to moderately argillaceous, dolomitic, trace carbonaceous detritus, trace glauconite, abundant micro fossils and forams, firm to hard, blocky.
	10	CLAYSTONE: As above.
920-30	90	LIMESTONE: Calcisiltite, as above.
	10	CLAYSTONE: As above.
930-40	90	LIMESTONE: Calcisiltite, as above.
	10	CLAYSTONE: As above.
940-50	90	LIMESTONE: Calcisiltite, as above.
	10	CLAYSTONE: As above.
950-60	90	LIMESTONE: Calcisiltite, as above, with trace echinoid fragments.
	10	CLAYSTONE: As above.
960-70	90	LIMESTONE: Predominantly calcisiltite, microcrystalline and sparitic in part, light grey to occasionally off white, slightly to moderately argillaceous, trace carbonaceous specks, trace glauconite, abundant microfossils and forams, trace to common fossil fragments, firm to hard, blocky to splintery.
	10	CLAYSTONE: As above.
970-80	100	LIMESTONE: Calcisiltite, as above.
	TR	CLAYSTONE: As above.
980-90	90	LIMESTONE: Calcisiltite, as above.
	10	CLAYSTONE: Light grey, soft, soluble and dispersive, calcareous.
990-1000	90	LIMESTONE: Calcisiltite, as above.
	10	CLAYSTONE: As above.
1000-10	90	LIMESTONE: Calcisiltite, as above.
	10	CLAYSTONE: As above.
1010-20	90	LIMESTONE: Calcisiltite, occasionally calcilutite, as above.
	10	CLAYSTONE: As above.
1020-30	90	LIMESTONE: Calcisiltite to calcilutite, as above.
	10	CLAYSTONE: As above.

1030-40	90	LIMESTONE: Calcisiltite to calcilutite, light grey, moderately argillaceous, trace carbonaceous specks, trace glauconite, abundant forams and microfossils, firm, blocky, grades to calcareous claystone.
	10	CLAYSTONE: As above.
1040-50	90	LIMESTONE: Calcisiltite to calcilutite, as above.
	10	CLAYSTONE: As above.
1050-60	90	LIMESTONE: Calcilutite grading to calcisiltite, light grey, moderately argillaceous, trace carbonaceous specks, trace glauconite, dolomite, abundant forams and microfossils, firm to moderately hard, blocky, grading to calcareous claystone.
	10	CLAYSTONE: As above.
1060-70	90	LIMESTONE: Calcilutite, as above, common sponge spicules.
	10	CLAYSTONE: As above.
1070-80	90	LIMESTONE: Calcilutite, occasionally calcisiltite, as above, very argillaceous, occasionally recrystalline and very hard, generally moderately dolomitic, grading to calcareous claystone.
	10	CLAYSTONE: Light grey, calcareous, soft, soluble and dispersive.
1080-90	90	LIMESTONE: Calcilutite, as above.
	10	CLAYSTONE: As above.
1090-1100	90	LIMESTONE: Predominantly calcilutite, as above.
	10	CLAYSTONE: As above.
1100-10	90	LIMESTONE: Calcilutite to calcisiltite, as above.
	10	CLAYSTONE: As above.
1110-20	90	LIMESTONE: Calcilutite to calcisiltite, as above.
	10	CLAYSTONE: As above.
1120-30	90	LIMESTONE: Calcisiltite to calcilutite, as above.
	10	CLAYSTONE: As above.
1130-40	90	LIMESTONE: Calcilutite to predominantly calcisiltite, as above.
	10	CLAYSTONE: As above.
1140-50	90	LIMESTONE: Calcisiltite to calcilutite, light grey, moderately argillaceous, trace glauconite, slightly dolomitic, abundant forams and microfossils, trace echinoid

		fragments, firm to moderately hard, blocky to platy. CLAYSTONE: As above.
	10	
1150-60	90	LIMESTONE: Calcisiltite to calcilutite, as above, grading to calcareous claystone in part. CLAYSTONE: As above.
	10	
1160-80	90	LIMESTONE: Calcisiltite, as above.
	10	CLAYSTONE: As above.
1180-90	90	LIMESTONE: Calcisiltite to calcilutite, moderately argillaceous, as above.
	10	CLAYSTONE: As above.
1190-1200	90	LIMESTONE: Calcisiltite, moderately to very argillaceous, grading to calcareous claystone in part.
	10	CLAYSTONE: As above.
1200-10	100	LIMESTONE: Calcisiltite, light grey, moderately argillaceous, trace glauconite, slightly dolomitic, abundant forams and microfossils, firm to moderately hard, blocky, occasionally grades to calcareous claystone.
1210-30	100	LIMESTONE: Calcilutite, light grey, moderately argillaceous, trace glauconite, slightly dolomitic, abundant forams, microfossils, firm to moderately hard, blocky, grades to calcareous claystone.
1230-50	100	LIMESTONE: Calcilutite as above, trace mica, trace disseminated pyrite.
1250-60	90	LIMESTONE: Calcilutite to calcisiltite, as above.
	10	CLAYSTONE: Light grey, calcareous, soft to firm, soluble, dispersive.
1260-70	90	LIMESTONE: Calcilutite to calcisiltite, moderately to very argillaceous, grades to calcareous claystone.
	10	CLAYSTONE: As above.
1270-80	100	LIMESTONE: Calcisiltite, light grey, moderately argillaceous, trace glauconite, rare trace mica and disseminated pyrite, occasional carbonaceous specks, dolomitic, firm to hard, trace forams, blocky, firm to hard.
	TR	CLAYSTONE: As above.
1280-90	100	LIMESTONE: Calcisiltite, as above.
	TR	CLAYSTONE: As above.
1290-1300	100	LIMESTONE: Calcisiltite, as above, very argillaceous, grades to calcareous claystone.

	TR	CLAYSTONE: As above.
1300-10	100	LIMESTONE: Calcisiltite, as above, very argillaceous, grades to calcareous claystone.
1310-20	100	LIMESTONE: Calcisiltite, as above, very argillaceous, grades to calcareous claystone, occasionally white and recrystallised.
	TR	CLAYSTONE: As above.
1320-30	100	LIMESTONE: Calcisiltite to calcilutite, as above, very argillaceous, grades to calcareous claystone.
1330-40	90	LIMESTONE: Calcisiltite to predominantly calcilutite, as above, very argillaceous, grading to calcareous claystone.
	10	CLAYSTONE: Light grey, firm, calcareous, subfissile to blocky.
1340-50	100	LIMESTONE: Calcisiltite, off white to very light grey, slightly to moderately argillaceous, slightly dolomitic, trace glauconite and carbonaceous specks, trace microfossils, firm to moderately hard, blocky to subblocky.
1350-60	100	LIMESTONE: Calcisiltite, as above.
1360-70	90	LIMESTONE: Calcisiltite, as above.
	10	CLAYSTONE: Light grey, calcareous, soft to firm, blocky.
1370-80	90	LIMESTONE: Calcisiltite, as above.
	10	CLAYSTONE: Light grey, as above.
1380-90	90	LIMESTONE: Calcisiltite, as above, moderately to very argillaceous, grading to calcareous claystone.
	10	CLAYSTONE: As above.
1390-1400	90	LIMESTONE: Calcisiltite, as above, occasionally light grey, very argillaceous, grading to calcareous claystone.
	10	CLAYSTONE: As above.
1400-10	90	LIMESTONE: Calcisiltite, as above, occasionally light grey, very argillaceous, grading to calcareous claystone.
	10	CLAYSTONE: As above.
1410-20	90	LIMESTONE: Calcisiltite, as above, occasionally light grey, very argillaceous, grading to calcareous claystone.
	10	CLAYSTONE: As above.
1420-30	90	LIMESTONE: Calcisiltite, as above, occasionally light grey, very argillaceous, grading to calcareous claystone.

	10	CLAYSTONE: As above.
1430-40	90	LIMESTONE: Calcisiltite, as above, very argillaceous, grading to calcareous claystone in part.
	10	CLAYSTONE: As above.
1440-50	100	LIMESTONE: Calcisiltite, off white, very light grey to very light brown, slightly to moderately argillaceous, trace glauconite, trace to common microfossils, firm to moderately hard, blocky, dolomitic in part.
1450-60	100	LIMESTONE: Calcisiltite, as above, off white.
1460-70	100	LIMESTONE: Calcisiltite, as above.
1470-80	100	LIMESTONE: Calcisiltite, as above, off white to light grey.
1480-90	100	LIMESTONE: Calcisiltite, as above.
1490-1500	80	LIMESTONE: Calcisiltite, as above.
	20	CLAYSTONE: Grey to light grey, slightly to moderately calcareous, disseminated pyrite in part, trace mica flecks, trace carbonaceous specks, firm, blocky.
1500-10	70	LIMESTONE: Calcilutite, off white to very light grey, very argillaceous, trace to common microfossils and forams, trace bryozoan fragments, grading to calcareous claystone, slightly dolomitic, occasionally clean and recrystallised, firm to blocky.
	30	CLAYSTONE: As above.
1510-20	80	LIMESTONE: Calcilutite, as above, predominantly light grey, very marly, grading to calcareous claystone.
	20	CLAYSTONE: As above.
1520-30	50	LIMESTONE: Calcilutite, as above, predominantly light grey, very marly, grading to calcareous claystone.
	50	CLAYSTONE: As above.
1530-40	80	CLAYSTONE: Grey to light grey, slightly to moderately calcareous, occasionally very calcareous, trace mica, trace carbonaceous specks, soft to firm, subblocky.
	20	LIMESTONE: As above calcilutite, grading to calcareous claystone.
1540-50	80	CLAYSTONE: As above.
	20	LIMESTONE: As above calcilutite, very argillaceous

1550-60	90 10	CLAYSTONE: As above, silty in part. LIMESTONE: As above, calcilutite.
1560-80	70 30	CLAYSTONE: Light grey to grey, occasionally dark grey, moderately to very calcareous, trace glauconite, disseminated pyrite, occasional trace mica and carbonaceous specks, silty in part, soft to firm, blocky to subfissile. LIMESTONE: Calcisiltite, very light grey to very light brownish grey, argillaceous, common to abundant microfossils and forams, soft to firm, subblocky, dolomitic in part.
1580-1600	80 20	CLAYSTONE: As above. LIMESTONE: Calcisiltite to calcilutite, very argillaceous grading to calcareous claystone.
1600-20	90 10	CLAYSTONE: As above, with abundant calcareous detrital grains, silty texture. LIMESTONE: As above calcilutite, very argillaceous grading to calcareous claystone.
1620-40	90 10	CLAYSTONE: As above, very calcareous and marly LIMESTONE: As above, calcilutite.
1640-50	90 10	CLAYSTONE: Light grey, very argillaceous, abundant calcareous detrital grains, trace disseminated pyrite, trace glauconite, trace carbonaceous specks, firm, subblocky, silty texture, common microfossils. LIMESTONE: Calcilutite, with abundant microfossils, very argillaceous grading to calcareous claystone.
1650-60	90 10	CLAYSTONE: As above. LIMESTONE: Calcilutite, as above.
1660-70	90 10	CLAYSTONE: Light grey to grey, very calcareous, silty texture, trace microfossils, trace mica, trace disseminated pyrite, trace glauconite, firm to moderately hard, blocky, trace rose quartz? LIMESTONE: Calcilutite, light grey, very argillaceous, common microfossils, blocky, grading to calcareous claystone.
1670-80	80 20	CLAYSTONE: As above. LIMESTONE: Calcilutite to calcisiltite, as above, very argillaceous, marly.
1680-90	80 20	CLAYSTONE: As above, very calcareous. LIMESTONE: As above, calcilutite to calcisiltite.
1690-1700	80	CLAYSTONE: As above, very calcareous.

	20	LIMESTONE: As above, calcilutite to calcisiltite in part.
1700-10	70	CLAYSTONE: As above, very calcareous, predominantly very light grey.
	30	LIMESTONE: As above, calcilutite to calcisiltite in part.
1710-20	70	CLAYSTONE: As above, very light grey to light grey, very calcareous, marly.
	30	LIMESTONE: As above, calcilutite, off white to light grey.
1720-30	80	CLAYSTONE: Very light grey to light grey, occasionally green grey, very calcareous, trace glauconite, trace disseminated pyrite, trace micromica, firm, blocky, occasional microfossils and forams.
	20	LIMESTONE: Very light grey to off white, predominantly calcilutite, occasionally calcisiltite, colourless and microcrystalline in part, common forams and microfossils, firm to moderately hard, blocky.
1730-40	90	CLAYSTONE: As above.
	10	LIMESTONE: Calcilutite, as above.
1740-50	90	CLAYSTONE: As above.
	10	LIMESTONE: As above, calcilutite.
1750-70	70	CLAYSTONE: As above.
	30	LIMESTONE: As above.
1770-80	90	CLAYSTONE: As above.
	10	LIMESTONE: As above.
1780-90	90	CLAYSTONE: As above, becoming less calcareous
	10	LIMESTONE: As above, calcilutite, grading to calcareous claystone.
1790-1800	90	CLAYSTONE: Very light grey to light grey, slightly calcareous, silty in part, soft to firm, subblocky to plastic,
	10	LIMESTONE: Calcilutite, grading to calcareous claystone.
1800-10	100	CLAYSTONE: As above.
	TR	LIMESTONE: As above calcilutite.
1810-20	100	CLAYSTONE: As above, slightly to moderately calcareous in part.
1820-30	100	CLAYSTONE: As above, trace glauconite, trace carbonaceous detritus.
	TR	LIMESTONE: Calcilutite, as above.

1830-40	100	CLAYSTONE: Very light grey to light grey, slightly calcareous, slightly silty in part, trace glauconite, occasional carbonaceous specks, trace disseminated pyrite in part, soft to firm, subblocky, trace microfossils and forams. LIMESTONE: As above.
	TR	
1840-50	100	CLAYSTONE: As above.
1850-60	100	CLAYSTONE: As above.
1860-70	100	CLAYSTONE: As above.
1870-80	100	CLAYSTONE: As above.
1880-90	100	CLAYSTONE: As above.
1890-1900	100	CLAYSTONE: As above.
1900-10	100	CLAYSTONE: As above.
1910-20	70	CLAYSTONE: As above.
	20	CLAYSTONE: Brown, non calcareous, silty, micaceous, firm to hard, subfissile.
	10	SANDSTONE: Colourless to light brown, very coarse grains, well rounded, well sorted, trace pyrite cement, abundant clay matrix, friable to loose, no show, nil to trace porosity.
1920-30	80	CLAYSTONE: As above, very silty in part, grading to siltstone.
	20	SILTSTONE: Brown to dark brown, argillaceous, micaceous, non calcareous, firm to moderately hard, blocky to subfissile.
1930-40	70	CLAYSTONE: As above, trace carbonaceous microlaminae.
	20	SILTSTONE: As above becoming very sandy in part.
	10	SANDSTONE: Light brown, fine to very fine, subrounded to rounded, well sorted, moderate silica cement, common white argillaceous matrix, trace mica, friable to hard, no visible porosity, no show.
1940-50	100	SILTSTONE: As above, becoming predominantly grey brown.
1950-60	20	SILTSTONE: As above, predominantly grey brown.
	30	CLAYSTONE: Light grey to grey brown, soft, non calcareous, slightly silty, soluble and dispersive.
	50	SANDSTONE: White to colourless, very coarse to granular, subangular to well rounded, good sorting, predominantly moderate to good sphericity, weak pyrite

			cement, trace white matrix, quartzose, unconsolidated to loose, good porosity, no show.
1960-70	40		SANDSTONE: As above.
	40		SILTSTONE: Grey brown, slightly calcareous, carbonaceous in part, argillaceous, micaceous, slightly sandy in part, firm to moderately hard, subfissile to blocky.
	20		CLAYSTONE: Light grey to grey brown, slightly calcareous, soft to firm, dispersive and soluble in part, subfissile, carbonaceous in part.
1970-80	20		CLAYSTONE: As above with coaly microlaminae.
	30		SANDSTONE: As above, coarse to granular, poor to moderate sorting, good porosity, no show.
	50		SILTSTONE: Brown to grey brown, non calcareous, argillaceous, sandy in part, carbonaceous and coaly microlaminae, trace pyrite nodules and concretions, firm to hard, blocky to subfissile.
1980-90	70		CLAYSTONE: Light brown to brown, grey brown, occasionally light grey, very carbonaceous in part, silty in part, non calcareous, micromicaceous in part, trace pyrite, soft to firm, subfissile.
	30		SILTSTONE: Light grey, firm, non calcareous, rare carbonaceous microlaminae, grading to silty sandstone, no show.
	TR		COAL: Black, dull, firm to hard, blocky.
1990-2000	10		COAL: Black to very dark grey, dull, earthy in part, firm, argillaceous, blocky.
	30		SILTSTONE: Light brown to brown, argillaceous, carbonaceous in part, soft to firm, laminated, subfissile, non calcareous.
	60		CLAYSTONE: As above.
2000-10	10		SANDSTONE: Light brown to brown, very fine to silt, well sorted, well rounded, weak silica cement, silty matrix, poor visible porosity, no show.
	30		CLAYSTONE: As above.
	60		SILTSTONE: As above.
2010-20	70		CLAYSTONE: Light brown to brown to grey brown, micromicaceous, non calcareous, occasionally silty, carbonaceous in part, trace pyrite, laminated, fissile.
	20		SILTSTONE: Light brown to light brown grey, argillaceous in part, non calcareous, locally carbonaceous, firm, friable, no show.

	10	SANDSTONE: Very light grey to light brown, silty to very fine sand, well sorted, rounded, weak silica cement, silty matrix, friable, poor to fair porosity, no show.
2020-30	60 40	CLAYSTONE: As above. SILTSTONE: As above.
2030-35	20 30 50	CLAYSTONE: As above. SILTSTONE: As above. SANDSTONE: White, light orange brown, very fine to predominantly medium, subangular to angular, moderately to well sorted, weak silica cement, abundant white clay matrix, trace carbonaceous detritus, nil to trace porosity, no show.
	TR	COAL: Black, dull, firm, blocky.
2035-40	90 10	CLAYSTONE: Brown to grey brown, as above, commonly silty. SILTSTONE: As above.
2040-50	90 10	CLAYSTONE: Brown to grey brown, non calcareous, micromicaceous, occasionally silty, firm to moderately hard, subfissile. SILTSTONE: Light grey, firm to moderately hard, non calcareous, blocky.
2050-55	100	CLAYSTONE: As above.
2055-60	90 10	CLAYSTONE: As above. SANDSTONE: Colourless to translucent, medium to coarse, angular to subrounded, moderately to well sorted, weak silica cement, trace to common white argillaceous matrix, friable, poor porosity, no show.
2060-65	90 10	CLAYSTONE: Predominantly as above, becoming off white to light brown and less carbonaceous. SANDSTONE: As above with moderate pyrite cement, hard, tight, no porosity, no show.
	TR	COAL: Black, brownish black, dull, firm to moderately hard, very pyritic in part, platy to blocky.
2065-75	10 20 70	COAL: As above. SILTSTONE: Off white to light grey, non calcareous, argillaceous matrix, trace mica, firm to hard, laminated. CLAYSTONE: Light brown to brown, firm, micromicaceous, locally carbonaceous, laminated in part, subfissile.
2075-80	70 20	CLAYSTONE: As above, commonly light grey brown, soft, sticky and plastic. SILTSTONE: As above.

	10	SANDSTONE: Off white to light grey, very fine to silty, well rounded, well sorted, weak silica cement, silty matrix, friable, trace to fair porosity, no show.
2080-85	90	CLAYSTONE: Grey brown to brown, soft to firm, non calcareous, silty in part, micromicaceous in part, occasional carbonaceous detritus, subfissile.
	10	SANDSTONE: As above, very fine to silty, no show.
2085-90	90	CLAYSTONE: As above predominantly brown, also light grey.
	10	SANDSTONE: As above, very fine to silty, no show.
	TR	COAL: Black to brown black, dull, blocky firm to soft.
2090-95	100	CLAYSTONE: As above brown to light brown.
2095-2100	80	CLAYSTONE: As above, brown to light brown.
	20	SILTSTONE: Light brown, firm to hard, blocky, silica cement, slightly argillaceous, trace carbonaceous detritus.
2100-05	90	CLAYSTONE: As above, light brown to brown, trace pyrite nodules.
	10	SILTSTONE: As above.
	TR	COAL: Black, dull, firm, platy to blocky.
2105-10	80	CLAYSTONE: Brown to light brown, as above.
	10	COAL: Black to brown black, dull to subvitreous, firm to hard, argillaceous, blocky to subplaty.
	10	SANDSTONE: Colourless translucent, white, very fine to very coarse, subrounded to angular, poor to moderate sorting, weak silica cement, white argillaceous matrix, friable to loose, quartzose, poor porosity, no show.
2110-15	90	CLAYSTONE: Brown to dark brown, non calcareous, slightly silty in part, carbonaceous specks, rare pyrite, firm to moderately hard, subfissile.
	10	SILTSTONE: As above.
2115-20	80	CLAYSTONE: As above.
	10	SILTSTONE: As above.
	10	SANDSTONE: Off white to light brown, silty to very fine, well rounded, well sorted, weak silica cement, white argillaceous matrix, friable, fair porosity, no show.
2120-25	80	CLAYSTONE: As above.

	20	SILTSTONE: As above.
2125-30	30	CLAYSTONE: As above.
	30	SILTSTONE: Light grey brown, firm to hard, generally argillaceous, occasionally sandy, occasional carbonaceous specks.
	40	SANDSTONE: White, translucent, very fine to very coarse, predominantly very fine to fine, subangular to well rounded, poor sorting, weak silica cement, abundant white hygrotergic matrix, friable, poor porosity, no show.
2130-35	80	CLAYSTONE: As above, predominantly brown.
	20	SILTSTONE: As above.
2135-40	20	CLAYSTONE: As above, predominantly brown.
	30	SILTSTONE: As above.
	50	SANDSTONE: Off white to brownish white, very fine to very coarse, predominantly very fine to fine, subrounded, poor sorting, trace pyrite cement, weak silica cement, abundant white hygrotergic clay matrix, trace mica, trace carbonaceous specks, friable, poor to trace porosity, no show.
2140-45	10	SANDSTONE: As above, predominantly fine, strong dolomitic cement, no porosity, no show, weak mineral fluorescence.
	40	CLAYSTONE: Off white to light grey, hygrotergic, very sandy, soft, sticky, grading to very argillaceous sandstone.
	50	SILTSTONE: Light grey brown as above.
2145-50	10	SANDSTONE: As above.
	30	SILTSTONE: As above.
	60	CLAYSTONE: Brown to dark brown, silty, micromicaceous, trace carbonaceous specks, non calcareous, firm, soluble in part, subfissile.
2150-55	90	CLAYSTONE: As above.
	10	SILTSTONE: As above.
2155-60	20	CLAYSTONE: As above.
	20	SILTSTONE: As above.
	50	SANDSTONE (1): White, very fine to fine, subrounded, well sorted, weak silica cement, abundant white hygrotergic clay matrix, trace mica, friable, poor porosity, no show.
	10	SANDSTONE (2): Light grey, fine, subangular to angular, well sorted, strong dolomitic cement, trace mica, trace lithics, hard, no porosity, no show, dull pink mineral fluorescence.

2160-65	70	CLAYSTONE: As above.
	20	SILTSTONE: As above.
	10	SANDSTONE (2): As above.
2165-70	30	CLAYSTONE: As above, very carbonaceous in part.
	30	SILTSTONE: Grey brown to brown grey, firm to hard, argillaceous, non calcareous, very carbonaceous in part, trace pyrite, blocky to subfissile.
	40	SANDSTONE: Off white to light grey, laminated, very fine to silty, occasionally fine, subangular to subrounded, well sorted, weak silica cement, moderate dolomitic cement, common white argillaceous matrix, trace to locally abundant carbonaceous matter, friable to hard, no visible porosity, no show, dull pink mineral fluorescence in part.
2170-75	50	CLAYSTONE: As above, very carbonaceous in part.
	30	SANDSTONE: As above, locally with hygrotergic white matrix.
	20	SILTSTONE: As above, becoming off white to light grey in part.
2175-80	70	CLAYSTONE: As above, brown to dark brown, firm to hard, micaceous to micromicaceous, non calcareous, silty microlaminae, occasional carbonaceous microlaminae, blocky to subfissile.
	30	SILTSTONE: Brown, firm, argillaceous, non calcareous, carbonaceous and coaly microlaminae, locally sandy, blocky.
2180-85	10	COAL: Black, dull to earthy, firm to hard, argillaceous, trace pyrite, blocky.
	30	SILTSTONE: As above, becoming off white to light brown, occasionally very sandy, grading to silty sandstone.
	60	CLAYSTONE: As above, becoming grey brown in part.
2185-90	50	CLAYSTONE: As above, soluble and dispersive in part.
	30	SILTSTONE: As above, off white to light brown.
	20	SANDSTONE: Colourless to translucent, light brown to off white, opaque, very fine to very coarse, poor sorting, subangular to rounded, variably cemented, strong pyritic cement, white to light brown argillaceous matrix, trace lithic grains, very hard to friable, poor visible porosity, no show.
2190-95	20	SANDSTONE: As above, predominantly medium grained, strong dolomite/siderite cement, no porosity, no show.

	10	SILTSTONE: As above.
	70	CLAYSTONE: Brown to light brown, soft to firm, non calcareous, silty, micromicaceous, soluble and dispersive in part, subfissile.
2195-2200	60	SANDSTONE: Colourless to translucent, coarse to fine, predominantly medium, subrounded, moderately to well sorted, trace pyrite, predominantly strong dolomite/siderite cement, trace interstitial clay, trace mica flecks, trace carbonaceous specks, friable to predominantly very hard, no visible porosity, dull pink orange mineral fluorescence.
	10	SILTSTONE: As above.
	30	CLAYSTONE: As above.
2200-05	100	CLAYSTONE: Brown, firm to moderately hard, micromicaceous, fissile.
	TR	DOLOMITE: Light brown to brown, microcrystalline to crystalline, argillaceous, very hard, splintery.
2205-10	90	CLAYSTONE: As above.
	10	SILTSTONE: As above.
2210-15	70	CLAYSTONE: As above.
	30	SILTSTONE: Light grey brown to grey brown, firm, argillaceous and carbonaceous in part, locally sandy, laminated, non calcareous, blocky.
2215-20	30	CLAYSTONE: As above, becoming brown grey in part.
	30	SILTSTONE: As above, becoming predominantly grey.
	40	SANDSTONE: Off white to light grey to grey, silty to very fine, occasionally fine to medium, subrounded to angular, moderate to weak sorting, weak silica cement, locally abundant white argillaceous matrix, carbonaceous microlaminae, trace mica, trace pyrite, friable, poor visible porosity, no show, dull mineral fluorescence.
2220-25	70	CLAYSTONE: As above.
	20	SILTSTONE: As above.
	10	SANDSTONE: As above.
2225-30	30	CLAYSTONE: Grey brown to grey, firm, non calcareous, micromicaceous, occasional silty laminae, subfissile to fissile.
	30	SILTSTONE: Light brown to off white to light grey, occasionally mottled, non calcareous, commonly argillaceous, sandy in part, soft to firm, grading to silty sandstone in part.
	40	SANDSTONE: As above, silty to very fine, abundant argillaceous matrix, poor to trace

		visible porosity, no show, local dolomite/siderite cement, hard and tight.
2230-35	50	CLAYSTONE: Brown, firm to moderately hard, non calcareous, generally silty, micaceous to micromicaceous, disseminated pyrite in part, locally carbonaceous, blocky to subfissile, dolomitic concretions.
	40	SILTSTONE: Brown, grey brown to grey, firm, argillaceous, laminated, non calcareous, carbonaceous microlaminae, trace pyrite, blocky.
	10	SANDSTONE: As above, very fine to silty, dolomite/siderite cement, very hard, no visible porosity, no show.
2235-40	60	CLAYSTONE: Grey to dark grey, soft to firm, non calcareous, silty laminae, blocky.
	20	SILTSTONE: Light to medium grey, non calcareous, argillaceous, micaceous, carbonaceous specks and laminae, soft to firm, blocky.
	20	SANDSTONE: Off white to light grey, very fine to silty, subangular to subrounded, well sorted, weak silica cement, strong dolomite and pyrite cement in part, abundant white argillaceous matrix, trace mica, trace carbonaceous specks in part, friable to very hard, no porosity, no show.
2240-45	30	CLAYSTONE: As above.
	40	SILTSTONE: As above.
	30	SANDSTONE: As above.
2245-50	60	SILTSTONE: As above.
	40	CLAYSTONE: As above, brownish grey in part.
2250-55	60	CLAYSTONE: As above but very soft, sticky and soluble.
	30	SILTSTONE: As above.
	10	SANDSTONE: White to light grey, silty to fine, laminated, subrounded to subangular, well to moderately sorted, weak silica cement, abundant white argillaceous matrix, trace carbonaceous specks and laminae, friable, poor to fair porosity, no show.
2255-60	40	SANDSTONE: As above.
	40	SILTSTONE: As above, very sandy grading to silty sandstone.
	20	CLAYSTONE: White to light brown, soft, soluble, sticky, plastic, non calcareous, locally sandy, grading to argillaceous sandstone.
2260-65	20	SANDSTONE (1): As above.

	20	SANDSTONE (2): Colourless, fine to very coarse, predominantly medium to coarse, subrounded to angular, poor sorting, weak silica cement, trace interstitial white clay, friable, good to excellent porosity, no show.
	20	CLAYSTONE: Grey to dark grey, firm, micaceous, carbonaceous specks, non calcareous, blocky.
	40	SILTSTONE: As above.
2265-70	70	CLAYSTONE: As above, predominantly light to medium brown.
	20	SILTSTONE: As above.
	10	SANDSTONE (1): As above.
2270-75	70	SANDSTONE: White to light grey, colourless, very fine to fine, subangular to subrounded, weak to moderate sorting, weak silica cement, abundant white hygrotergic matrix, friable, poor visible porosity, no show.
	20	SILTSTONE: As above.
	10	CLAYSTONE: As above.
	TR	DOLOMITIC: Brown, microcrystalline, argillaceous, very hard.
2275-80	20	SANDSTONE: Colourless, translucent, medium to coarse, subangular, moderate sorting, weak silica cement, white argillaceous matrix, quartz overgrowths, trace mica, friable, fair visible porosity, no show.
	20	SILTSTONE: As above.
	60	CLAYSTONE: As above.
	TR	COAL: Black, dull to subvitreous, firm to blocky.
2280-85	80	SANDSTONE: White to light grey, very fine to medium, poor sorting, subangular to subrounded, weak silica cement, abundant white hygrotergic matrix, trace mica, trace carbonaceous microlaminae and specks, friable, poor to no visible porosity, no show.
	20	CLAYSTONE: As above.
2285-90	70	CLAYSTONE: Brown grey to grey brown, firm, laminated, silty in part, non calcareous, micaceous, carbonaceous specks, subfissile to fissile.
	30	SANDSTONE: As above, very fine to silty, no show.
2290-95	100	CLAYSTONE: Brown grey to grey brown, soft to firm, sticky, plastic in part, silty in part, non calcareous, micromicaceous carbonaceous specks, fissile.
2295-2300	15	COAL: Black, subvitreous to vitreous, hard, brittle, trace pyrite, blocky.

	70	SILTSTONE: Light grey, soft, very argillaceous, carbonaceous specks, non calcareous, locally sandy, grading to silty sandstone.
	15	CLAYSTONE: As above.
2300-05	90	SANDSTONE: Off white to very light grey, streaked grey, silty to very fine, subangular to rounded, moderate to well sorted, weak silica cement, abundant white hygroscopic matrix, carbonaceous streaks, friable, trace to poor visible porosity, no show, grades to sandy siltstone.
	10	CLAYSTONE: Grey to brown grey as above.
2305-10	70	SANDSTONE: Colourless, translucent, very fine to very coarse, predominantly medium to coarse, angular to rounded, predominantly angular to subangular, moderate sorting, weak silica cement, trace secondary pyritic cement, trace to common white argillaceous matrix, quartz overgrowths, quartzose, trace mica, flecks trace feldspar, friable to loose, good porosity, no show.
	30	CLAYSTONE: Grey brown to dark grey, firm, non calcareous, common carbonaceous streaks, silty, subfissile.
2310-15	100	SANDSTONE: As above.
2315-20	100	SANDSTONE: As above.
2320-25	60	SANDSTONE (1): As above.
	10	SANDSTONE (2): White, medium subrounded, well sorted, strong dolomite cement, trace interstitial clay, trace mica and lithic grains, hard to very hard, nil to trace visible porosity, no show.
	10	SILTSTONE: Brown to grey brown, firm to soft, argillaceous, carbonaceous streaks, blocky to subfissile.
	20	CLAYSTONE: Grey to brown grey, silty in part, non calcareous, soft to firm, sticky, coaly streaks and specks, blocky.
2325-30	50	SANDSTONE (1): As above.
	30	SANDSTONE (3): Pale orange, fine to medium, occasionally coarse, subangular, moderate sorting, very strong siderite cement, trace pyrite nodules, trace mica, trace chlorite, very hard, no visible porosity, moderate pink orange mineral fluorescence, no show.
	20	CLAYSTONE: As above.
2330-35	80	SANDSTONE: Colourless to white to light orange, fine to very coarse, poor sorting,

		angular to subrounded, generally weak silica cement, siderite and pyrite cement in part, common to abundant white argillaceous matrix, trace mica and feldspar, friable to very hard, poor to fair visible porosity, no show.
	20	CLAYSTONE: Grey to grey brown, brown grey, soft, sticky, non calcareous, carbonaceous, laminated, occasionally silty.
2335-40	50	SANDSTONE: Off white to brown white, fine, well sorted, subangular to subrounded, weak silica cement, common white argillaceous matrix, common carbonaceous detritus, friable, poor porosity, no show.
	40	CLAYSTONE: As above.
	10	SILTSTONE: Light grey, soft, sticky, argillaceous, carbonaceous microlaminae, subblocky.
2340-45	70	CLAYSTONE: Grey brown to brown, soft to firm, sticky, plastic in part, commonly carbonaceous, silty in part, subfissile.
	10	SILTSTONE: As above.
	20	SANDSTONE: As above.
2345-50	50	COAL: Black, subvitreous, firm to hard, blocky to platy, irregular fracture, slightly argillaceous.
	40	CLAYSTONE: As above, predominantly brown to light brown.
	10	SILTSTONE: As above.
2350-55	10	COAL: As above.
	60	CLAYSTONE: As above, very carbonaceous.
	30	SANDSTONE; White to light brown, fine to coarse, poor sorting, subangular to rounded, weak silica cement, abundant white argillaceous matrix, trace carbonaceous microlaminae, friable, poor visible porosity, no show.
2355-60	40	CLAYSTONE: As above.
	20	SILTSTONE: Light grey, firm, sandy, carbonaceous laminae, friable.
	40	SANDSTONE: Light brown, translucent, medium, subangular to angular, weak sorting, moderate sorting, weak silica cement, trace to common clay matrix, trace carbonaceous flecks, friable to hard, fair visible porosity, no show.
2360-65	40	SANDSTONE: Colourless, translucent, fine to coarse, predominantly medium, angular to subangular, moderate sorting, weak silica cement, locally strong pyrite cement, trace

	60	interstitial clay, friable, occasionally very hard, good visible porosity, no show. CLAYSTONE: Light brown to brown, firm to soft, laminated, silty in part, common coaly and carbonaceous laminae, micaceous in part, non calcareous, platy.
	TR	DOLOMITE: Brown, very hard, argillaceous, microcrystalline.
2365-70	40	COAL: Black, dull, occasionally subvitreous, hard, brittle, blocky to platy, irregular to subconchoidal fracture.
	40	SANDSTONE: As above, trace mica, locally abundant white argillaceous matrix.
	20	CLAYSTONE: As above.
2370-75	20	COAL: As above.
	20	CLAYSTONE: As above.
	10	SILTSTONE: Brown to dark brown, firm, friable, argillaceous, carbonaceous, blocky.
	50	SANDSTONE: White to brownish white, very fine to coarse, predominantly fine, subangular to subrounded, poor to moderate sorting, weak to moderate siderite cement, trace to abundant white argillaceous matrix, trace feldspars, trace lithic grains, friable to very hard, poor to nil visible porosity, moderate pink orange mineral fluorescence.
2375-80	10	COAL: As above, dull.
	30	SANDSTONE: As above.
	60	CLAYSTONE: Off white, light brown to brown, soft, soluble, dispersive, silty and sandy in part.
2380-85	10	COAL: As above.
	20	SANDSTONE: As above.
	70	CLAYSTONE: As above.
2385-90	80	CLAYSTONE: As above, very carbonaceous and very silty.
	10	SANDSTONE: As above.
	10	SILTSTONE: As above.
2390-95	10	COAL: Black, subvitreous, hard, brittle, blocky to platy.
	40	SANDSTONE: Off white to light brown, fine to coarse, rounded to subangular, moderate sorting, weak to moderate calcareous cement, common white argillaceous matrix, trace pyrite cement and nodules, trace green chlorite, friable to very hard, fair to nil visible porosity, no show.
	40	CLAYSTONE: As above, very carbonaceous in part, occasionally dark grey.
	10	SILTSTONE: As above.
	TR	DOLOMITE: Tan to brown, crystalline, argillaceous, very hard.

2397 (Spot sample)		COAL: Black to greyish black, hard, subvitreous to vitreous, blocky to platy, subconchoidal fracture, trace pyrite.
2395-2400	20	CLAYSTONE: As above.
	80	SANDSTONE: Colourless, translucent, light grey, very fine to very coarse, subangular to subrounded, occasionally rounded, poor sphericity, weak silica cement, trace white interstitial clay, trace mica flecks, friable to loose, good porosity, no show.
2400-05	20	CLAYSTONE: As above.
	80	SANDSTONE: As above, very coarse to very fine, poor sorting, trace to abundant white matrix, poor porosity, no show.
2405-10	50	SANDSTONE: As above, abundant white argillaceous matrix.
	40	CLAYSTONE: As above, abundant carbonaceous microlaminae.
	10	SILTSTONE: Light to medium brown, firm, carbonaceous specks, laminated, friable, subblocky.
2410-15	50	CLAYSTONE: Light to medium grey, grey brown, soft, streaky, carbonaceous and coaly specks, non calcareous.
	40	SANDSTONE: Colourless to white, occasionally brown, very fine to coarse, predominantly medium, angular to subrounded, poor sorting, weak silica cement, moderately calcareous cement in part, trace mica, white argillaceous matrix in part, trace pyrite, friable to very hard, fair to trace visible porosity, no show.
	10	SILTSTONE: As above.
2415-20	30	COAL: Black, subvitreous to vitreous, hard, brittle, trace pyrite, subconchoidal fracture, blocky.
	70	CLAYSTONE: As above, predominantly grey brown.
2420-25	50	CLAYSTONE: As above, grey brown.
	40	SANDSTONE: White to light brown, very fine to silty, well sorted, subrounded, weak silica cement, abundant white argillaceous matrix, trace to common carbonaceous laminae, friable, trace visible porosity, no show, grading to siltstone.
	10	SILTSTONE: As above, also light grey to off white.
2425-30	50	CLAYSTONE: As above.
	50	SANDSTONE: Colourless to white, granular to fine, predominantly medium, subrounded

		to angular, moderate sorting, weak silica cement, common quartz overgrowths, white argillaceous matrix in part, trace mica, predominantly quartzose, occasional white feldspars and pink orange quartz, friable to loose, good visible porosity, no show.
2430-35	50 50	CLAYSTONE: As above. SILTSTONE: Light to medium brown to grey brown, firm to hard, laminated, argillaceous in part, carbonaceous microlaminae, non calcareous, blocky to platy.
2435-40	40 40 20	CLAYSTONE: Brown, grey brown, soft to firm, slightly silty, non calcareous, occasional carbonaceous specks and flecks. SANDSTONE: Light brown, fine to medium, moderate sorting, subangular, strong pyritic and dolomitic cement, brown argillaceous matrix, very hard, no visible porosity, no show. SILTSTONE: As above.
2440-45	100	CLAYSTONE: As above, with dolomitic concretions.
2445-50	80 20	CLAYSTONE: As above. SILTSTONE: As above.
2451 (Spot sample)		COAL: Black, subvitreous, hard, brittle, blocky, pyrite.
2450-55	70 30	COAL: As above subconchoidal fracture, predominantly dull lustre. CLAYSTONE: As above.
2455-60	10 40 50	COAL: As above. CLAYSTONE: Grey brown, soft to firm, silty in part, abundant carbonaceous specks and microlaminae, non calcareous, blocky to subfissile. SANDSTONE: White to off white, silty to fine, predominantly very fine, subrounded, moderately to well sorted, weak silica cement, local moderate calcareous cement, abundant white argillaceous matrix, carbonaceous microlaminae, friable to very hard, trace to poor porosity, no show.
2460-65	60 40	SANDSTONE: As above, light olive brown to off white, very argillaceous, grading to sandy claystone. CLAYSTONE: As above, also off white to light brown.
2465-70	60 40	CLAYSTONE: As above. SANDSTONE: As above.

2470-75	80	CLAYSTONE: Grey brown to brown, soft to very hard, predominantly firm, common carbonaceous specks and microlaminae, silty in part, generally non calcareous, common dolomitic stringers and concretions.
	20	SANDSTONE: As above predominantly light brown.
2475-80	10	COAL: Black, dull, hard, brittle, subconchoidal fracture, blocky to platy.
	80	CLAYSTONE: As above, pyritic nodules, fissile to subfissile.
	10	SANDSTONE: As above, moderate dolomitic cement, tight, no show, trace dull orange mineral fluorescence.
2480-85	30	CLAYSTONE: As above.
	20	SILTSTONE: Off white to light brown, firm, carbonaceous specks and microlaminae, blocky.
	50	SANDSTONE: White to off white, brownish white, silty to fine, predominantly very fine, subangular to subrounded, moderate sorting, weak to moderate silica cement, occasionally strong dolomitic cement, abundant white matrix, trace mica, carbonaceous specks and detritus, friable to hard, nil to poor visible porosity, no show, grading to sandy claystone.
2485-90	20	CLAYSTONE (1): As above.
	20	CLAYSTONE (2): White to off white, sandy in part, non calcareous, soft, sticky, soluble and dispersive.
	60	SANDSTONE: As above.
2490-95	10	COAL: Black to brown, dull, submetallic lustre in part, hard to very hard, brittle, even to subconchoidal fracture, trace pyrite.
	30	CLAYSTONE (2): As above.
	60	SANDSTONE: As above, predominantly very fine, abundant white matrix, no show.
2497 (Spot sample)		COAL: Black to dark greyish black as above, bleeding gas.
2495-2500	50	COAL: As above.
	30	SANDSTONE: Light brown to off white, very fine, well sorted, weak to moderate silica cement, clean to common white clay matrix, coaly microlaminae.
	20	CLAYSTONE: Brown to grey brown, soft to firm, non calcareous, carbonaceous specks and microlaminae, silty in part, micromicaceous in part, blocky to subfissile.
2500-05	70	SANDSTONE: As above.

		30	CLAYSTONE: As above.
2505-10		40	SANDSTONE: As above, becoming very argillaceous.
		60	CLAYSTONE: As above.
2510-15		30	CLAYSTONE: As above.
		30	SILTSTONE: Off white to light brown, firm, non calcareous, carbonaceous laminae, grades to silty sandstone.
		40	SANDSTONE: As above, very fine to silty, very argillaceous in part.
2515-20		60	SANDSTONE: As above, very fine to silt.
		20	SILTSTONE: As above.
		20	CLAYSTONE: As above.
2520-25		30	CLAYSTONE: As above.
		70	COAL: Black, submetallic to dull, hard, brittle, irregular fracture, pyritic.
2525-30		90	COAL: As above dull and earthy in part, argillaceous in part.
		10	CLAYSTONE: Brown to light brown, soft, soluble, dispersive, carbonaceous specks, sticky, plastic.
2530-35		60	SANDSTONE: White to colourless, very fine to coarse, predominantly medium, subangular, moderate to poor sorting, weak silica cement, common to abundant white argillaceous matrix, common mica, friable to loose, good visible porosity, no show, trace pyrite in part.
		10	COAL: As above.
		30	CLAYSTONE: As above, becoming firm to moderately hard in part, micromicaceous, trace pyrite nodules.
2535-40		80	CLAYSTONE: Brown, firm, non calcareous, micromicaceous, carbonaceous microlaminae in part, subfissile to fissile.
		20	SILTSTONE: Brown to off white, firm to hard, non calcareous, carbonaceous specks and microlaminae, blocky.
2540-45		60	SANDSTONE: Off white to white, very fine to predominantly fine, subangular to rounded, well sorted, moderate siderite cement, white argillaceous matrix, trace mica, common carbonaceous flecks and microlaminae, trace feldspars and lithic grains, friable to very hard, nil to poor porosity, no show, abundant yellow pink mineral fluorescence.
		10	COAL: Black, dull to earthy, hard, brittle, blocky to platy.
		30	CLAYSTONE: As above, grey brown.

2545-50	30	COAL: As above.
	70	CLAYSTONE: As above, light to medium brown to grey brown, firm to hard, as above.
2550-55	70	CLAYSTONE: Off white to light brown, soft, sticky, plastic, non calcareous, silty in part, pyrite nodules, micromicaceous, blocky.
	30	SANDSTONE: Off white, very fine to fine, well sorted, subangular to subrounded, weak to moderate siderite cement, locally abundant white argillaceous matrix, trace mica, trace carbonaceous specks, friable to hard, trace visible porosity, no show, dull mineral fluorescence.
2555-60	40	COAL: Black, greyish black, dull to subvitreous, hard, brittle, subconchoidal fracture, trace pyrite, very argillaceous in part.
	60	CLAYSTONE: As above, also dark brown to dark grey, very carbonaceous with very hard dolomite concretions.
2560-65	100	CLAYSTONE: Grey brown to brown, firm to moderately hard, non calcareous, locally silty, commonly carbonaceous with coaly microlaminae, pyrite nodules, mica in part, slightly hygroturgid, subfissile.
2565-70	70	SANDSTONE: Off white to brownish white, fine, occasionally coarse to very coarse, well sorted, subangular, weak silica cement, abundant white argillaceous matrix, locally clean, trace mica and carbonaceous specks, friable to hard, fair to predominantly trace visible porosity, no show.
	30	CLAYSTONE: Dark grey brown to grey, firm to moderately hard, carbonaceous, silty in part, trace pyrite nodules, dolomitic concretions, blocky.
2570-75	30	SANDSTONE: As above, locally strong pyrite cement.
	70	CLAYSTONE: Predominantly dark brown as above, very silty and sandy in part.
2575-80	100	CLAYSTONE: Dark grey brown to brown, firm to hard, generally silty to very silty, carbonaceous, micaceous in part, non calcareous, subfissile to fissile, locally grades to argillaceous siltstone.
2580-85	100	CLAYSTONE: As above with dolomite concretions.
2587 (Spot sample)		COAL: Black, grey black, hard, brittle, dull to occasionally subvitreous, irregular fracture, argillaceous in part, subfissile.

2585-90	30	COAL: As above.
	70	CLAYSTONE: Predominantly as above, also light brown, soft, sticky, plastic.
2590-95	10	COAL: As above.
	10	SANDSTONE: Off white to light brown, as above.
	40	SILTSTONE: Brown, occasionally grey, firm to hard, blocky, laminated, non calcareous, carbonaceous specks and microlaminae.
	40	CLAYSTONE: As above predominantly brown to grey brown, hard, subfissile.
2595-2600	20	SANDSTONE (1): Colourless to translucent, white, fine to very coarse, predominantly medium, moderate sorting, subangular to angular, weak silica cement, trace secondary pyrite cement, clean to locally abundant white clay matrix, mica, feldspars, friable, good to excellent porosity, no show.
	40	SANDSTONE (2) As above predominantly very fine to fine, no show.
	20	CLAYSTONE: As above.
	20	SILTSTONE: As above.
2600-05	20	SANDSTONE (1): As above.
	10	COAL: Black, grey black, hard, subvitreous to dull, irregular fracture, argillaceous in part, subfissile.
	50	CLAYSTONE: As above.
	20	SILTSTONE: As above.
2605-10	80	SANDSTONE: Off white to light brown, very fine to fine, well sorted, subangular to well rounded, weak silica cement, trace mica, moderate to abundant in part white argillaceous matrix, carbonaceous and coaly specks, mica friable, poor visible porosity, no show.
	10	SILTSTONE: As above.
	10	CLAYSTONE: As above.
2610-15	80	SANDSTONE: As above but also translucent to colourless, medium, subangular to angular, weak silica cement, moderate siderite cement in part, trace to abundant white matrix, trace mica, trace feldspars, carbonaceous detritus, friable to hard, fair to trace visible porosity, no show, dull yellow pink mineral fluorescence.
	20	CLAYSTONE: As above.
2615-20	70	SANDSTONE: As above, becoming commonly medium to very coarse, predominantly fine to medium, local pyrite cement, nodules and aggregates.

	20	CLAYSTONE: As above.
	10	SILTSTONE: As above.
2620-25	70	SANDSTONE: Colourless to white, very fine to very coarse, predominantly medium to coarse, angular to subrounded, poor sorting, weak silica cement, common moderate siderite cement, frequent pyrite cement, white argillaceous matrix in part, clean in part, trace feldspars, trace mica and carbonaceous specks, friable to predominantly hard to very hard, good to predominantly nil porosity, no show, dull pinkish mineral fluorescence.
	30	CLAYSTONE: Brown, firm, blocky, carbonaceous and coaly microlaminae, non calcareous, silty in part, trace pyrite streaks.
2625-30	100	SANDSTONE: As above, predominantly medium, predominantly weak silica cement with argillaceous matrix, local bands of strong siderite or pyrite cement, generally good porosity, no show.
2630-35	100	SANDSTONE: As above, predominantly fine with abundant white matrix, common pyrite cement.
2635-40	100	SANDSTONE: As above, predominantly fine, abundant white argillaceous matrix, friable, local siderite cement.
2640-45	90	SANDSTONE: As above, predominantly white, fine to very fine, abundant white argillaceous matrix, common carbonaceous and coaly microlaminae friable, nil to fair porosity, no show.
	10	COAL: Black to greyish black, dull, hard, brittle, irregular fracture, pyrite nodules, occasional argillaceous inclusions.
2647 (Spot sample)		COAL: Black to grey black, black brown, dull to earthy, hard, irregular fracture, blocky to subfissile, very argillaceous in part, grading to carbonaceous shale.
2645-50	50	SANDSTONE: Off white to light brown, very fine to medium, poor sorting, subrounded, very strong siderite cement, trace to common argillaceous matrix, trace mica, trace to common carbonaceous detritus, trace pyrite and feldspars, very hard, no visible porosity, no show, bright pinkish orange mineral fluorescence.
	30	SILTSTONE: Off white to light brown, firm, non calcareous, argillaceous, carbonaceous microlaminae, blocky.
	20	CLAYSTONE: Off white to light brown, generally silty, carbonaceous and coaly

		streaks and microlaminae soft to firm, soluble and dispersive in part, blocky.
2650-55	100	CLAYSTONE: Light grey brown, soft to firm, non calcareous, blocky to subfissile, slightly hygroturgid.
2655-60	20	CLAYSTONE: As above.
	80	COAL: Black, predominantly dull, occasionally subvitreous, hard, brittle, irregular, fracture, blocky to subfissile.
2660-65	60	SANDSTONE: White to off white, very fine to fine, well sorted, subangular, weak silica cement, abundant white argillaceous matrix, occasionally clean, feldspars, friable, very poor to nil visible porosity, no show, locally grades to sandy claystone.
	10	CLAYSTONE: As above.
	10	SILTSTONE: As above, predominantly light brown to grey brown.
	20	COAL: As above.
2665-70	50	CLAYSTONE: As above predominantly firm, common silty sandstone.
	20	SANDSTONE: As above, occasionally coarse to very coarse, becoming very carbonaceous.
	30	SILTSTONE: As above.
2670-75	80	SANDSTONE: White to off white to light brown, very fine to very coarse, angular to subangular, poor sorting, generally as above, nil to trace porosity, no show.
	20	CLAYSTONE: As above.
2675-80	10	COAL: Black to brownish black, firm to hard, dull to subvitreous, platy.
	10	CLAYSTONE: As above.
	80	SANDSTONE: As above, very fine to very coarse, very poor sorting, locally common pyrite cement, clean in part, nil to fair visible porosity, no show, weak siderite cement.
2680-85	10	COAL: As above.
	10	CLAYSTONE: As above.
	80	SANDSTONE: Off white, very fine to medium, subangular to angular, poor sorting, very strong siderite cement, trace argillaceous matrix, trace pyrite, trace feldspar, trace mica, very hard, no visible porosity, no show.
2685-90	60	SANDSTONE: Off white to light brown, as above with weak siderite and silica cement, abundant white clay matrix, common carbonaceous and coaly matter, friable, poor porosity, no show.

	20	CLAYSTONE: Light brown to brown, soft to moderately hard, non calcareous, commonly carbonaceous, platy, subfissile.
	20	SILTSTONE: Brown to grey brown, firm to hard, argillaceous, non calcareous, carbonaceous, blocky.
2690-95	10	COAL: Black, brown black, dull to earthy, hard, argillaceous, pyrite, blocky to platy, irregular fracture.
	50	CLAYSTONE: As above, grades to argillaceous siltstone, fissile in part.
	20	SILTSTONE: As above.
	20	SANDSTONE: As above.
2695-2700	60	COAL: Black, dull to subvitreous, hard, brittle, irregular to subconchoidal fracture, platy in part.
	30	SHALE: Brown to grey brown, firm, carbonaceous, non calcareous, soluble, slightly hygroturgid, fissile.
	10	SANDSTONE: As above.
2700-05	60	SHALE: As above.
	10	COAL: As above.
	30	SANDSTONE: White to light brown, grey brown, very fine to very coarse, predominantly very fine to moderate, subangular to angular, occasionally subrounded, weak silica cement, abundant white and grey brown argillaceous matrix, very carbonaceous in part, mica, friable, generally no visible porosity, but becoming clean with good porosity with increasing grain size, no shows.
2705-10	60	SHALE: As above.
	40	SANDSTONE: As above, no show.
2710-15	60	SHALE: As above.
	20	SANDSTONE: As above very fine to silty, friable, nil to poor porosity, no show.
	20	SILTSTONE: Light grey, light brown, firm, friable, generally carbonaceous, commonly argillaceous, mica, blocky, laminated.
2715-20	60	COAL: Black, occasionally greyish black, dull, occasionally subvitreous, hard, blocky, irregular to subconchoidal fracture.
	20	SILTSTONE: As above.
	20	SHALE: As above.
2720-25	80	COAL: As above.
	20	SHALE: As above.
2725-30	20	SHALE: As above.
	80	SANDSTONE: Colourless, translucent, very fine to granular, predominantly medium to

		coarse, poor sorting, angular to subrounded, weak silica cement, trace siderite cement, trace pyrite cement, trace white interstitial clay, trace feldspars, friable, good porosity, no show.
2730-35	100	SANDSTONE: Predominantly as above, predominantly medium.
2735-40	100	SANDSTONE: As above, predominantly medium to coarse, clean, good porosity, no show.
2740-45	100	SANDSTONE: White to off white, light brown, very fine to coarse, predominantly fine, subangular, moderate sorting, weak to moderate silica cement, trace to abundant white clay matrix, mica, trace green chlorite? Carbonaceous specks in part, friable, trace to fair porosity, no show.
2745-50	100	SANDSTONE: As above, predominantly medium, predominantly friable, no show.
2750-55	100	SANDSTONE: As above, predominantly medium, trace secondary siderite cement, friable, fair porosity, no show.
2755-60	10	COAL: Black, greyish black, dull to predominantly subvitreous, hard, brittle, conchoidal fracture.
	70	SANDSTONE: Light grey, fine grain, well sorted, subangular, weak to moderate silica cement, abundant grey argillaceous matrix, trace to common mica, trace green grains, commonly carbonaceous, friable to hard, trace visible porosity, no show.
	20	CLAYSTONE: Dark grey, soft to firm, pyrite, non calcareous, sticky, slightly hygroturgid.
2760-65	10	COAL: As above.
	10	CLAYSTONE: As above.
	80	SANDSTONE: As above becoming predominantly silty to very fine, very argillaceous.
2765-70	10	COAL: As above.
	30	CLAYSTONE: As above.
	60	SANDSTONE: Grey, very fine to granular, poor sorting, angular to well rounded with increasing grain size, moderate to weak silica cement, trace pyrite cement, common grey clay matrix, trace mica, trace pyrite nodules, trace chert, trace feldspars, friable to loose, fair visible porosity, no show.
2770-75	20	CLAYSTONE: As above.

80

SANDSTONE: Colourless, translucent, medium to predominantly granular, angular to subangular, occasionally rounded, moderately to well sorted, weak silica cement, predominantly clean, trace mica, trace chert, trace feldspars, loose, good visible porosity, no show.

2775-77

100

SANDSTONE: As above, no show.

APPENDIX 2

TURRUM 4

CORE DESCRIPTIONS

No cores were cut in Turrum 4

APPENDIX 3

TURRUM-4

Sidewall Core Descriptions

<u>No.</u>	<u>Depth</u> (m)	<u>Rec.</u> (mm)	<u>Description</u> (Gas C1/C2/C3/C4/C5)
1	2734.0	Broken	SANDSTONE: White, off white, stained slightly orange in part, silt to coarse, predominantly very fine, angular to subangular, poor sorting, weak silica cement, trace to common white sericitic clay matrix, trace pyrite, generally disseminated, friable, fair porosity, no show. GAS: 77/8/3/8/4
2	2734.0	Broken	SANDSTONE: As above with visible carbonaceous streaks, evidence of bullet overlapping shot one. GAS: 79/6/6/6/3
3	2726.0	0	Bullet lost
4	2726.0	Broken	COAL: Black to brown, dull to subvitreous, hard, brittle, irregular fracture, platy to subplaty. GAS: 72/18/8/1/1
5	2716.0	Broken	Interlaminated sandstone and claystone SANDSTONE: Off white to light brown, very fine, subangular, well sorted, weak silica cement, silty matrix, friable, no porosity. CLAYSTONE: Dark brown, non calcareous, silty, carbonaceous and coaly microlaminae, micromicaceous, subfissile. GAS: 44/26/16/14/TR
6	2716.0	20	CLAYSTONE: With occasional sand laminations. As above. GAS: 45/32/21/2/TR
7	2703.0	Broken	COAL: Black, dull to subvitreous, hard, brittle subconchoidal fracture, platy. GAS: 74/21/5/TR
8	2696.0	20	SANDSTONE: White to off white, silt to very coarse, angular to subangular, poor sorting, weak silica cement, white argillaceous and silty matrix, trace green grains, trace mica, friable, no porosity, no show with interlaminae. CLAYSTONE: Brown to grey brown, soft to firm, carbonaceous and coaly microlaminae, subfissile. GAS: 41/32/20/6/1
9	2696.0	0	Empty.
10	2672.0	0	Bullet lost.
11	2672.0	0	Bullet lost.

Sidewall Core Descriptions

<u>No.</u>	<u>Depth</u> (m)	<u>Rec.</u> (mm)	<u>Description</u> (Gas C1/C2/C3/C4/C5)
12	2664.0	0	Bullet lost.
13	2657.0	15	SHALE: Grey brown, firm, non calcareous, mica, silty, fissile to subfissile. GAS: 45/32/16/7/TR
14	2657.0	Broken	SILTSTONE: Light brown to brown, argillaceous, mica, firm, laminated, subfissile. GAS: 39/32/20/8/1
15	2635.5	15	SANDSTONE: Off white mottled grey, very fine to very coarse, poor sorting, angular to subrounded with increasing grain size, strong siderite cement, 10% strong secondary pyrite cement, trace to common white clay matrix, trace mica flecks, trace altered feldspars, hard to very hard, no visible porosity, no show, dull yellow orange mineral fluorescence. GAS: 72/14/6/7/1
16	2632.5	18	SANDSTONE: White, fine to coarse, moderate sorting, angular to subrounded, weak silica cement, trace secondary siderite cement, abundant white sericitic matrix, friable, poor porosity, no show. GAS: 81/7/7/4/1
17	2623.0	Broken	CLAYSTONE: Light brown to grey brown, non calcareous, very silty, slightly micromicaceous, firm to moderately hard, subfissile. GAS: 39/29/22/10/TR
18	2623.0	Broken	CLAYSTONE: As above with minor sandy laminations. GAS: 42/27/21/9/1
19	2591.5	Broken	COAL: Black, dull to subvitreous, hard, brittle, platy irregular fracture. GAS: 73/17/8/2/TR
20	2585.0	Broken	CLAYSTONE: Light brownish grey, firm to hard, non calcareous, slightly silty, blocky. GAS: 59/20/15/5/1
21	2585.0	Broken	CLAYSTONE: As above. GAS: 50/20/21/8/1
22	2541.0	Broken	SILTSTONE: Light brown, mottled off white and orange, firm, very sandy, micromicaceous, non calcareous, carbonaceous specks, blocky. GAS: 36/30/20/13/1
23	2541.0	Broken	CLAYSTONE: Dark grey brown to brown grey, firm to hard, laminated, slightly silty, non calcareous, subfissile.

Sidewall Core Descriptions

<u>No.</u>	<u>Depth</u> (m)	<u>Rec.</u> (mm)	<u>Description</u> (Gas C1/C2/C3/C4/C5)
			GAS: 67/21/9/3/TR
24	2528.0	Broken	COAL: Black to brownish black, hard, brittle, earthy lustre, subconchoidal fracture, platy, silty. GAS: 73/18/7/2/TR
25	2503.5	15	Claystone with sandy lamination. CLAYSTONE: Grey brown, firm, non calcareous, slightly silty, trace pyrite, slightly micaceous, subfissile, sandy laminae are off white, very fine, with abundant white argillaceous matrix. GAS: 66/23/8/3/TR
26	2503.5	20	CLAYSTONE: As above. GAS: 62/25/10/3/TR
27	2488.0	Broken	SANDSTONE: Off white to light grey, very fine, subangular, well sorted, weak silica cement, trace secondary calcareous cement, white matrix, trace mica, friable, fair visible porosity, no show. GAS: 45/15/15/23/2
28	2488.0	24	SANDSTONE: As above, shows evidence of intersecting previous shot. GAS: 72/10/7/10/1
29	2441.5	Broken	CLAYSTONE: Grey brown, firm, non calcareous, slightly silty, subfissile. GAS: 47/30/16/6/1
30	2441.5	Broken	CLAYSTONE: As above. GAS: 43/33/19/5/TR
31	2436.0	0	Bullet lost.
32	2404.0	Broken	SANDSTONE: White, very fine to medium, moderate sorting, subrounded, weak silica cement, trace white argillaceous matrix, friable, good visible porosity, no show. GAS: 53/32/6/6/3
33	2390.0	Broken	CLAYSTONE; Grey brown, firm, non calcareous, micromicaceous, slightly silty, trace disseminated pyrite, blocky. GAS: 48/34/13/4/1
34	2373.5	Broken	COAL: Black, dull to subvitreous, hard, brittle, irregular fracture, platy. GAS: 63/30/7/TR/TR
35	2365.0	Broken	SANDSTONE: Light brown, very fine to coarse, predominantly very fine, subangular, good to moderate sorting, weak silica cement, abundant silt

Sidewall Core Descriptions

<u>No.</u>	<u>Depth</u> (m)	<u>Rec.</u> (mm)	<u>Description</u> (Gas C1/C2/C3/C4/C5)
			and clay matrix, slightly hygrotergic, trace mica, friable, poor visible porosity, no show. GAS: 29/36/24/8/3
36	2365.0	0	Empty.
37	2330.0	12	SANDSTONE: Pale orange to off white, fine to granular, occasionally medium, generally bimodal, angular to subrounded with increasing grain size, 90% strong siderite cement, trace pyrite cement, trace mica, trace interstitial clay, very hard, no visible porosity, no show, bright yellow orange to yellow pink mineral fluorescence. GAS: 54/22/11/13/TR
38	2327.5	18	SANDSTONE: Grey, very fine, occasionally fine to medium, well sorted, subangular, trace silica cement, abundant hygrotergic grey clay, trace mica, friable, good to poor visible porosity, no show. GAS: 23/23/35/16/3
39	2327.5	Broken	SANDSTONE: As above. GAS: 27/16/29/23/5
40	2323.0	Broken	SANDSTONE: White to off white to greyish white, very fine to fine, well sorted, subangular to rounded, trace silica cement, trace disseminated pyrite, abundant white argillaceous matrix, trace mica, friable, good visible porosity, no show. GAS: 100/TR/TR/-/-
41	2315.5	15	SANDSTONE: White to light grey, very fine to granular, poor sorting, angular to well rounded generally with increasing grain size, trace silica cement, abundant white argillaceous matrix, trace feldspars, friable, poor to locally excellent visible porosity, no show. GAS: 53/7/20/16/4
42	2313.5	Broken	SANDSTONE: As above, very fine to granular, clean, excellent visible porosity, no show. GAS: 42/6/25/23/4
43	2308.0	Broken	CLAYSTONE: Brown to grey brown, firm, non calcareous, slightly silty, trace disseminated pyrite, subfissile. GAS: 31/30/28/9/2
44	2308.0	Broken	CLAYSTONE: As above. GAS: 21/31/33/15/TR
45	2302.5	Broken	CLAYSTONE: As above, slightly dolomitic, non silty. GAS: 34/32/24/8/2

Sidewall Core Descriptions

<u>No.</u>	<u>Depth</u> (m)	<u>Rec.</u> (mm)	<u>Description</u> (Gas C1/C2/C3/C4/C5)
46	2290.0	Broken	SILTSTONE: Grey brown, hard, argillaceous, mica, disseminated pyrite, subfissile. GAS: 21/40/30/9/TR
47	2290.0	Broken	SILTSTONE: As above, very argillaceous, with light grey microlaminae. GAS: 29/37/24/8/2
48	2187.0	Broken	CLAYSTONE: Interlamimated brown and light grey bands, firm to moderately hard, silty, non calcareous, micromicaceous, trace pyrite nodules, disseminated pyrite in part, subfissile. GAS: 11/29/40/17/3
49	2187.0	16	CLAYSTONE: As above. GAS: 11/30/40/17/2
50	2111.5	Broken	CLAYSTONE: Light brown to brown, firm to hard, micromicaceous, slight trace disseminated pyrite, non calcareous, subfissile. GAS: 35/39/20/6/TR
51	2109.5	Broken	CLAYSTONE: Brown, firm to moderately hard, slightly silty, trace carbonaceous specks, subfissile. GAS; 40/33/20/7/TR
52	2076.0	Broken	CLAYSTONE: Dark brown, firm to moderately hard silty, non calcareous, common disseminated pyrite, micromicaceous, subfissile. GAS: 35/44/15/5/1
53	2002.0	Broken	CLAYSTONE: Light brown with light grey silt microlaminae, firm, non calcareous, slightly silty, slightly micromicaceous, subfissile. GAS: 32/40/19/8/1
54	1982.5	20	CLAYSTONE: Brown to light brown, firm to moderately hard, non calcareous, disseminated and nodular pyrite, slightly micromicaceous, subfissile. GAS: 50/32/12/5/1
55	1962.0	Broken	CLAYSTONE: Light brown with abundant light grey silt laminae, firm to moderately hard, carbonaceous streaks, micromicaceous, slightly silty, subfissile. GAS: 24/41/21/11/3
56	1954.0	20	CLAYSTONE: With silt laminae as above, increasingly silty. GAS: 26/35/23/13/3
57	1937.0	0	Bullet lost.

Sidewall Core Descriptions

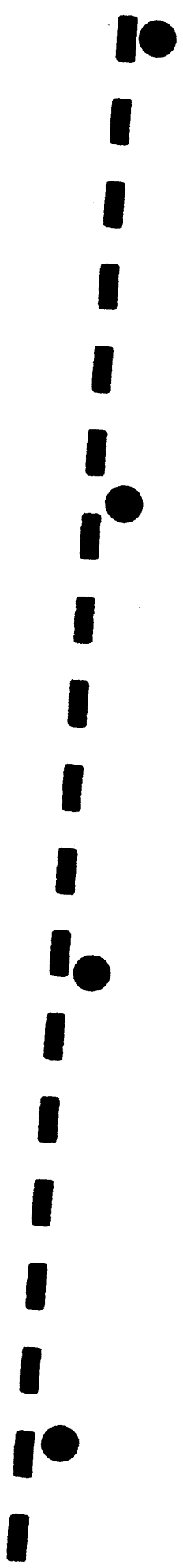
<u>No.</u>	<u>Depth</u> (m)	<u>Rec.</u> (mm)	<u>Description</u> (Gas C1/C2/C3/C4/C5)
58	1923.0	15	CLAYSTONE: Brown, firm to moderately hard, slightly calcareous, very silty and sandy with light grey sand microlaminae, micromicaceous, blocky grading to argillaceous sandstone. GAS: 7/29/29/26/9
59	1913.0	20	CLAYSTONE: Light grey, firm to moderately hard, very calcareous, common glauconite grains, abundant microfossils, blocky, grading to marly limestone. GAS: 5/40/50/5/TR
60	1902.0	38	LIMESTONE: Light grey, soft to sticky, very argillaceous, glauconite grains, abundant microfossils, grading to calcareous claystone. GAS: 45/15/15/18/7

APPENDIX 4

TURRUM 4

RFT RESULTS

No RFT samples were taken in Turrum 4



APPENDIX 5

TURRUM 4

VELOCITY SURVEY REPORT

Distributed under separate cover