

**ESSO EXPLORATION AND PRODUCTION  
AUSTRALIA INC.**

**PETROLEUM DIVISION**

**WELL COMPLETION REPORT**

**ADMIRAL-1**

**VOLUME I**

**07 MAR 1990**

**BASIC DATA**

**GIPPSLAND BASIN  
VICTORIA**

**ESSO AUSTRALIA LIMITED**

Compiled by:  
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February 1990

ADMIRAL - 1

WELL COMPLETION REPORT

VOLUME 1: BASIC DATA

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02890121

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1. WELL DATA RECORD

ADMIRAL - 1

LOCATION : Latitude : 38° 09' 12.2" South  
Longitude : 148° 38' 50.7" East  
X = 644341.4  
Y = 5775869.8  
Map Projection: UTM Zone 55  
Geographical Location: Bass Strait,  
Victoria  
Field: Admiral

PERMIT : Vic/P19

ELEVATION : 21 m

WATER DEPTH : 101 m

TOTAL DEPTH : 2162 m (Driller) 2162 m (Logger)

PLUG BACK TYPE : Cement Plug (157 m - 237 m)

REASONS FOR  
PLUGGING BACK : Plug and Abandon

MOVE IN : 22/11/89 0200 hours

SPUDDED : 22/11/89 1645 hours

REACHED T.D. : 03/12/89 0930 hours

RIG RELEASED : 08/12/89 1915 hours

OPERATOR : Esso Australia Resources Limited.

PERMITTEE OR LICENCEE : Esso Australia Resources Limited.: 25%  
BHP Petroleum (Victoria) Pty. Ltd.: 25%  
Shell Company of Australia Pty. Ltd.: 20%  
The News Corporation Ltd.: 10%  
TNT Management Pty. Ltd.: 10%  
Crusader (Victoria) Pty. Ltd.: 7.5%  
Petroz NL : 2.5%

ESSO INTEREST : 25%

OTHER INTEREST : 75%

CONTRACTOR : South Seas Drilling Company

RIG NAME : Southern Cross

EQUIPMENT TYPE : Semisubmersible

TOTAL RIG DAYS : 17.18

DRILLING AFE NO. : 32-239011

TYPE COMPLETION : Plug and Abandon

WELL CLASSIFICATION : Before Drilling: New Field Wildcat  
After Drilling: Dry Hole

ESSO AUSTRALIA LTD.  
ADMIRAL-1 FINAL WELL REPORT  
Operations Summary

1. MOVING/MOORING

After bolstering the No. 1 anchor at the Shell Judith-1 location, the Southern Cross was towed by the MV Lady Penelope to the Admiral-1 location. Anchor No.8 was dropped at Admiral-1 at 1745 hours November 21, 1989, thus completing the 5nm tow in 2.75 hours at an average speed of 1.8 kts. While under tow, the swivel on mooring lines Nos. 2,4,5 and 7 were changed out.

The MV's Lady Diana and Lady Penelope then ran and set the eight anchors in 8.25 hours and the rig was moved towards the called location. The anchors were load tested to 250 kips and were then slacked off to an operating pretension of 100 kips. After ballasting down, the TGB was run and landed at a seafloor depth of 122m RKB. The rig position was determined to be 2.5m on a bearing of 251° from the called location.

2. DRILLING OPERATIONS

a) 26" Hole/20" Casing

After setting the TGB, the 26" bit/26" hole opener BHA was made up and stabbed into the TGB, thus spudding the Admiral-1 well at 1200 hours November 22, 1989. The 26" hole was drilled from 122m to 230m, at an average ROP of 22.7 mph, using seawater and high viscosity gel slugs to clean the hole. After pumping a high viscosity sweep, 100 bbls of high viscosity mud was spotted, a Totco was dropped and the bit was pulled to the seafloor. The Totco was recovered and the bit was RIH. No drag or fill was encountered, 200 bbls of high viscosity mud was spotted in the hole at TD, then three strands of drillstring was POOH and an additional 150 bbls of high viscosity mud was spotted. The drillstring was then POOH to run casing.

Seven joints of 20", 94 ppf, X-56, LS casing, plus a crossover joint (129 ppf, LS x ALT-2) and the 24" pile joint/18<sup>3</sup>/<sub>4</sub>" Vetco SG-5 wellhead assembly were then run, with the 20" shoe at 226m. The casing was cemented to the seafloor, using a drillpipe stinger, with a lead slurry of 750 sx of Class "G" cement plus 2.2% prehydrated gel and a tail slurry of 600 sx of Class "G" cement plus 1.5% CaCl<sub>2</sub>.

The BOP stack was run and landed and the shear rams, wellhead connector and casing were tested to 500 psi.

b) 17<sup>1</sup>/<sub>2</sub>" Hole/13<sup>3</sup>/<sub>8</sub>" Casing

A 17<sup>1</sup>/<sub>2</sub>" bit and pendulum BHA were then picked up and RIH to the TOC at 219m. The cement and 20" casing shoe were drilled and the 17-1/2" hole was drilled from 230m to 830m, at an average ROP of 17.7 mph, using a seawater/gel mud. Eventually native clays established a mud system, causing the mud density to rise from 8.6 ppg to 9.5ppg by 600m. Density was then controlled by dumping and dilution as drilling progressed. After reaching TD, a Totco was dropped and a wiper trip was made to the 20" casing shoe. The Totco was recovered and the bit was RIH. The hole was then circulated clean, the drillstring was POOH and the BHC/GR/CAL log was run.

The wearbushing was then pulled and 60 joints of 13<sup>3</sup>/<sub>8</sub>", 54.5 ppf, K-55, BTC casing, plus the casing hanger pup joint (68 ppf, N-80) were run and landed with the shoe at 819m. The casing was cemented in place with 1000 sx of Class "G" neat cement. The estimated TOC was calculated to be at 319m based on an 18" average hole diameter as per the caliper log. The top plug was bumped and the pressure was increased to 1500 psi to test the casing. After closing the annular and flushing the wellhead sealing area with 2 bbls of high viscosity mud, the packoff was successfully energized, using a cementing kelly, and tested to 200/2000 psi along with the BOP stack. A Phase I PIT was then run against the shear rams to 1500 psi and the choke manifold was tested to 200/1500 psi.

c) 12<sup>1</sup>/<sub>4</sub>" Hole

An ATJ-1 bit and pendulum BHA, with a 12<sup>3</sup>/<sub>16</sub>" stabilizer, were then RIH. The MWD tool had been taken off contract prior to the Judith-1 well and was not included in the string. The cement plugs and float collar/float shoe were drilled out and 3m of hole was drilled to 835m, where a Phase I PIT was conducted to 1000 psi (16.5 ppg EMW) with no leakoff.

The 12<sup>1</sup>/<sub>4</sub>" hole was then drilled from 835m to 1532m, at an average ROP of 19.7 mph, where the bit was pulled due to increased torque and a decrease in ROP. While drilling this section at about 1150m, the mud in the hole was displaced with a 9.5 ppg, seawater/polymer/prehydrated gel mud system. Lithology in this section graded from the Gippsland Limestone to the claystone/siltstone formations of the Lakes Entrance and onto the Top of Latrobe Coarse Clastics (picked at ± 1236m or about 55m low to prognosis). After drilling through sandstone/siltstone/coal sequences in the Latrobe, a siliceous volcanic section was topped at 1521m. The bit then drilled to 1532m where a trip was made. While POOH, up to 100 kips of overpull was encountered over the interval 1441-1234m and the hole was swabbing. Therefore, the bit was run back to bottom and the hole was circulated clean (maximum gas = 44 units). The drillstring was then POOH without incident and the bit was found to be 1/2" undergauge.

Two HP51A bits were then required to drill to the TD of the well at 2162m. The programmed TD was 1871m; however, because the Strzelecki Group had not been encountered by this depth, it was decided to deepen the well. The first HP51A drilled the interval 1532-1967m at an average ROP of 10.0 mph. When POOH to change the bit, 80 kips of overpull was encountered over the interval 1895-1721m and the hole was swabbing. Therefore, the bit was run back to bottom and the hole was circulated clean (maximum gas = 33 units). The drillstring was then POOH to 1650m, where it was necessary to pick up the kelly and work through the interval 1650-1550m. The drillstring was then POOH without incident and the bit was changed. A survey showed that the hole deviation had increased from 0.75° at 1532m to 6° at 1967m (dogleg severity = 1.40°/30m). The second HP51A was then RIH to 1353m where a bridge was tagged. After washing and reaming bridges to 1386m and cleaning out 3m of fill, the bit drilled to the TD of the well at 2162m at an average ROP of 6.1 mph. The top of the Strzelecki Group was picked at ± 2105m. After dropping a survey, a wiper trip was made to the 13<sup>3</sup>/<sub>8</sub>" casing shoe. The bit was RIH and the hole was conditioned. The drillstring was then POOH without incident. A survey at TD showed that the hole deviation had decreased to 4°, resulting in a calculated dogleg severity of 4.36°/30m.

After rigging up Schlumberger, electric logs were run as follows:

Run No. 1 = DLL/MSFL/LDL/CNL/SP/GR/CAL/AMS  
Run No. 2 = LDL/BHC/GR  
Run No. 3 = SHDT/GR  
Run No. 4 = WST (Hydrophone fell off)  
Run No. 5 = CST/GR (60 cores shot, 51 recovered)  
Run No. 6 = WST (24 levels)

Because the caliper arm on the LDL was stuck partially closed on Run No. 1, it was necessary to rerun the LDL for Run No. 2. Also, on the first attempt at running the WST, the hydrophone fell off when shooting the first level at 835m. The WST was then suspended and rerun after running CST's. Total non-productive time for these two failures was 8.25 hours.

### 3. PLUG & ABANDONMENT

After completing final logs, open-ended drillpipe was RIH to 1236m and a 100m balanced cement plug (P & A Plug No. 1) was set across the Top of Latrobe using 250sx of Class "G" neat cement mixed in freshwater. After tagging the plug with 15 kips at 1200m, the pipe was pulled up to 869m and a 100m balanced cement plug (P & A Plug No.2) was set across the 13<sup>3/8</sup>" casing shoe using 325sx of Class "G" neat cement mixed in seawater. The plug was later pressure tested to 1500 psi and tagged at 758m with 15 kips.

After POOH and retrieving the wearbushing, Schlumberger was rigged up and the 13<sup>3/8</sup>" casing was cut at 207m using a Pengo explosive cutter. A spear was run and seven joints of casing plus a stub were pulled and laid down.

Open-ended drillpipe was RIH and an 80m balanced cement plug (P & A Plug No. 3) was set across the 13<sup>3/8</sup>" casing stub, from 237m to 157m, using 375sx of Class "G" cement mixed in seawater. While laying down drillpipe, Plug No. 3 was pressure tested 500 psi.

The inner barrel of the slip joint was then pinned closed and the BOP stack and riser were pulled. A mechanical cutter was RIH and the 20" casing was cut at 132m ( $\pm$  1m below the pile joint assembly ALT-2 connector). An 18<sup>3/4</sup>" wellhead running tool and bumper sub were then run and the wellhead, PGB and TGB were retrieved and laid down.

### 4. PULLING ANCHORS

After the rig was deballasted from drilling draft (48ft) to transit draft (21ft), the MV Torungen Supplier recovered anchor No. 6. The anchor, which had been damaged during the Judith-1 well, was then changed out and bolstered. The MV Lady Penelope then attempted to catch the No. 3 buoy; however, due to weather (38kt winds, 12 ft seas), the boat could not recover the buoy. After waiting for 15 hours, the weather abated sufficiently to proceed with the anchor retrieval operation. The remaining seven anchors were then recovered in 12.25 hours. Included in this time was 2.75 hours of NPT spent retrieving a dropped chain (No. 7) and repairing the No. 8 winch. Under tow by the Lady Penelope, the rig departed to install the Seahorse-1 subsea completion at 1915 hours December 8, 1989.

While deballasting/pulling anchors, a seabed survey of the location was conducted using the RCV 225 vehicle. This vehicle, which is not equipped with sonar or a manipulator, was installed on the rig to replace the RCV 150, which was transferred to the MV Flinders Tide to perform pipeline inspections.

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ADMIRAL-1 FINAL WELL REPORT  
CASING DATA

OD (In.)	WEIGHT (LB/FT)	GRADE	CONNECTION	LENGTH (m)	SHOE DEPTH (mRKB)	CENTRALIZER POSITION	REMARKS
20	94	X-56	LS	12.31	226	NONE	FLOAT SHOE JOINT
20	94	X-56	LS	71.13		NONE	6 INTERMEDIATE JOINTS
20	129	X-56	LS x ALT-2	11.99		NONE	CROSSOVER JOINT
24	670	----	ALT-2	10.99		NONE	WELLHEAD: VETCO SG-5 S/N 394360-3
				=====			
				106.42			
13-3/8	54.5	K-55	BTC	11.57	819	NONE	FLOAT SHOE JOINT
	54.5	K-55	BTC	11.96		1 ACROSS COLLAR	FLOAT JOINT
	54.5	K-55	BTC	11.56		NONE	FLOAT COLLAR JOINT
	54.5	K-55	BTC	660.52		1 ACROSS FIRST FIVE COLLARS	57 INTERMEDIATE JOINTS
	68	N-80	BTC	2.76		NONE	CASING HANGER PUP JOINT -CSG HANGER: SG-5, TYPE T, S/N AB468050-1 (LOCK RING REMOVED) -PACKOFF ASSY: SG-5, S/N 334027-3
				=====			
				698.37			



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ADMIRAL-1 FINAL WELL REPORT  
CEMENT DATA

DATE (1989)	TYPE JOB	INTERVAL (M-RKB)	TYPE CEMENT	VOLUME (SX)	SLURRY WEIGHT (PPG)	ADDITIVES	MIX WATER	REMARKS
23-Nov	20" PRIMARY LEAD		CLASS "G"	750	13.2	2.2% PHG	FW	CEMENT THROUGH DP STINGER. CMT VOLUME AS PER PROGRAM TO PROVIDE 200% EXCESS ABOVE GAUGE HOLE VOLUME W/ TOC @ SEAFLOOR.
23-Nov	20" PRIMARY TAIL	226-122	CLASS "G"	600	15.8	1.5% CaCl <sub>2</sub>	SW	
26-Nov	13-3/8" PRIMARY	819-319	CLASS "G"	1000	15.8	----	SW	CMT VOLUME BASED ON 18" AVG. HOLE DIAMETER PER THE CALIPER LOG. BUMPED PLUG W/ 1500 PSI.
05-Dec	P & A PLUG No.1	1286-1200	CLASS "G"	250	15.8	----	FW	SET TO COVER THE TOP OF LATROBE PICKED @ 1236m. TAGGED WITH 15 KIPS.
05-Dec	P & A PLUG No.2	869-758	CLASS "G"	325	15.8	----	SW	SET ACROSS 13-3/8" CASING SHOE @ 819m. TESTED TO 1500 PSI, TAGGED WITH 15 KIPS.
06-Dec	P & A PLUG No.3	237-157	CLASS "G"	375	15.8	----	SW	SET ACROSS 13-3/8" CASING STUB @ 207m. TESTED TO 500 PSI.

5. SAMPLES, SIDEWALL CORES

ADMIRAL -1

INTERVAL (m)

TYPE

830 - 2162

Cutting samples - 3 sets of washed and oven dried and 1 set of bagged air dried cuttings.

Samples from 830 - 1080 at 30m intervals.

Samples from 1080 - 2162 at 5m intervals.

830 - 2162

Unwashed composite tinned samples for geochemistry collected at 30m/15m intervals.

2155 - 1234.5

Sidewall Cores, Shot 60.

Rec: 51, Bought: 51.

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6. WIRELINE LOGS AND SURVEYS  
ADMIRAL - 1

<u>TYPE AND SCALE</u>		<u>FROM(m)</u>	<u>TO(m)</u>
	<u>SUITE 1</u>		
✓ <sup>COMBO</sup> BHC-CAL-GR	1:200 1:500	829	100
	<u>SUITE 2</u>		
✓ DLL-MSFL-GR-SP-AMS )	1:200	2158	819
) 'COMBO'	1:500		
✓ LDL-CNL-GR )	1:200	2154	1150
)	1:500		
✓ <sup>COMBO</sup> BHC-LDL-GR-CAL	1:200	2160	819
)	1:500		
✓ SHDT-GR	1:200	2161.5	1100
WST	(24 Levels)	2160	835
CST-GR (SIDEWALL CORES)	(60 Shots)	2155	1234.5

7. TEMPERATURE RECORD - ADMIRAL -1

LOGGING RUN	THERMOMETER DEPTH (m)	MAX. RECORDED TEMPERATURE (C°)	CIRCULATION TIME (t <sub>k</sub> ) (hours)	TIME AFTER CIRCULATION STOPPED (t)	HORNER TEMPERATURE (C°)	GEOHERMAL GRADIENT (C°/km)
<u>Suite 1</u>						
BHC-CAL-GR	813.2	39	1 H	7 H 30 M (7.5)		
<u>Suite 2</u>						
DLL-MSFL-LDL-CNL-GR-SP	2134.0	72 }	1 H 15 M	5 H 35 M (5.58) }	98 °	42.69
BHC-LDL-GR	2144.0	78 }		12 H 30 M (12.5) }		
SHDT-GR	2151.1	85 }		18 H (18.0) }		
WST	2154.0	93 }		21 H (21.0) }		
CST's						

# FIGURES

# ADMIRAL-1 Locality Map

Scale 1: 250 000

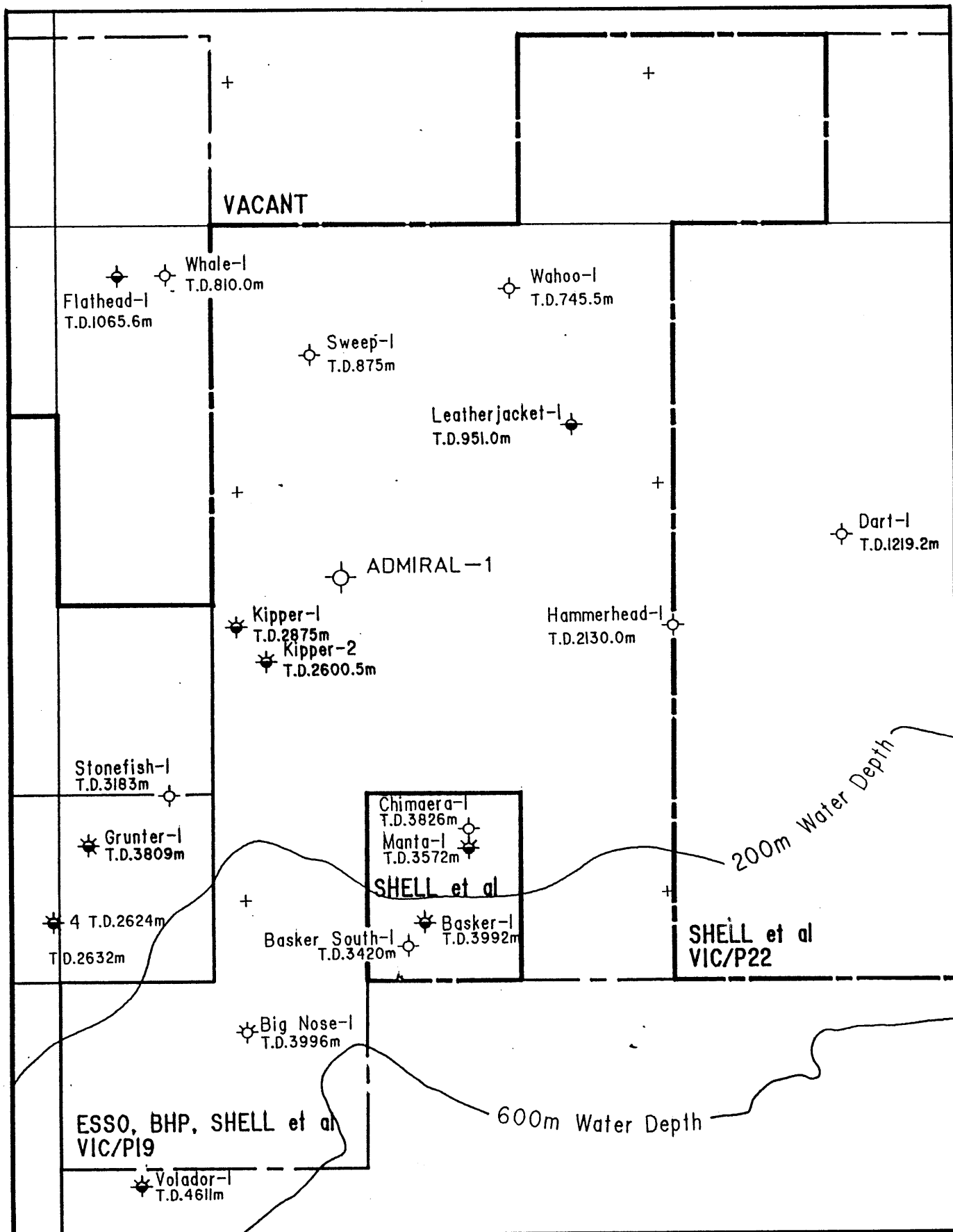
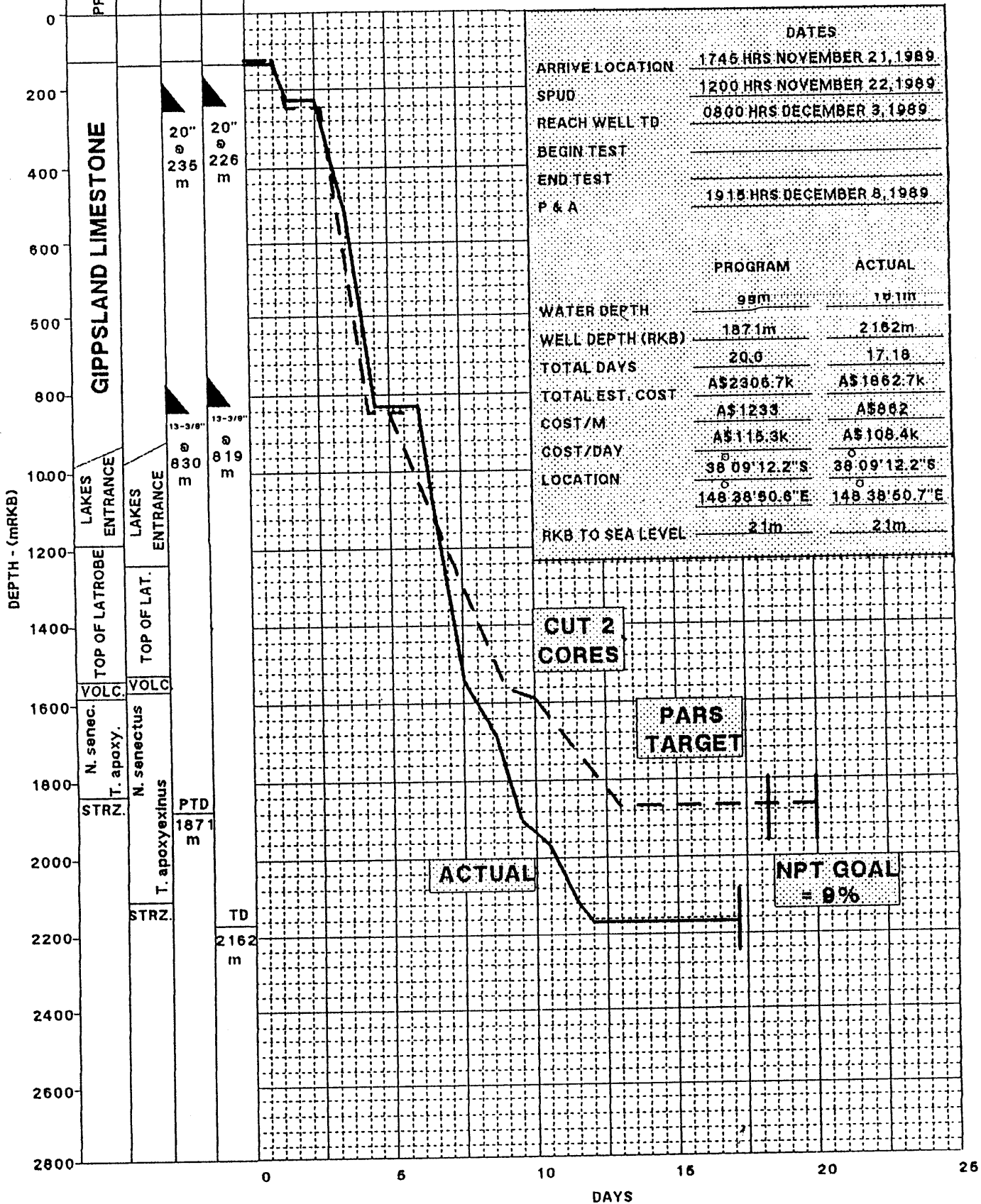


Fig. 1

**ESSO AUSTRALIA LTD.  
PARS WELL PROGRESS CURVE**

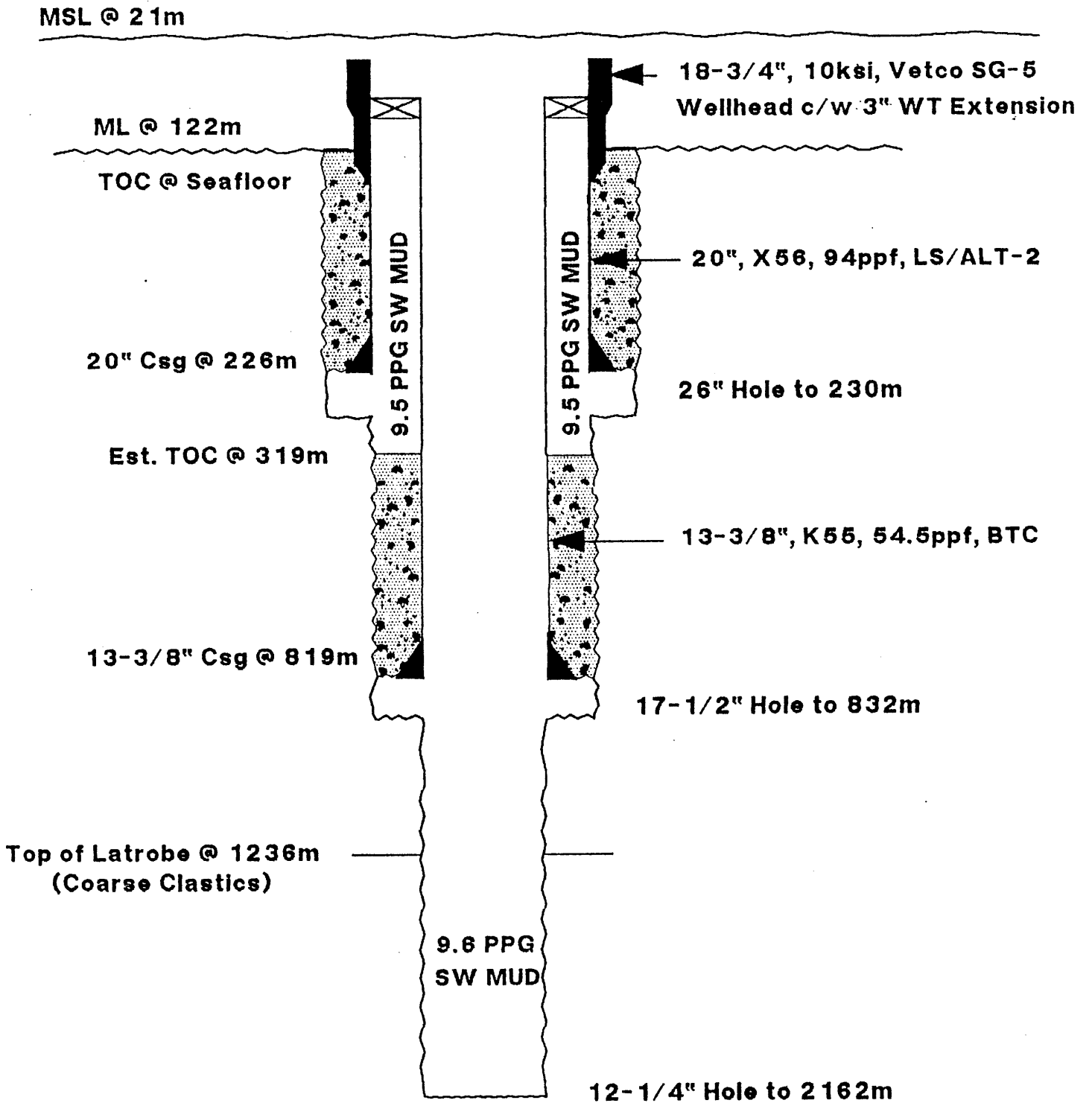
WELL ADMIRAL-1

RIG SOUTHERN CROSS



ESSO AUSTRALIA LTD.  
ADMIRAL-1 FINAL WELL REPORT  
WELLBORE SCHEMATIC

RKB



All depths are meters RKB



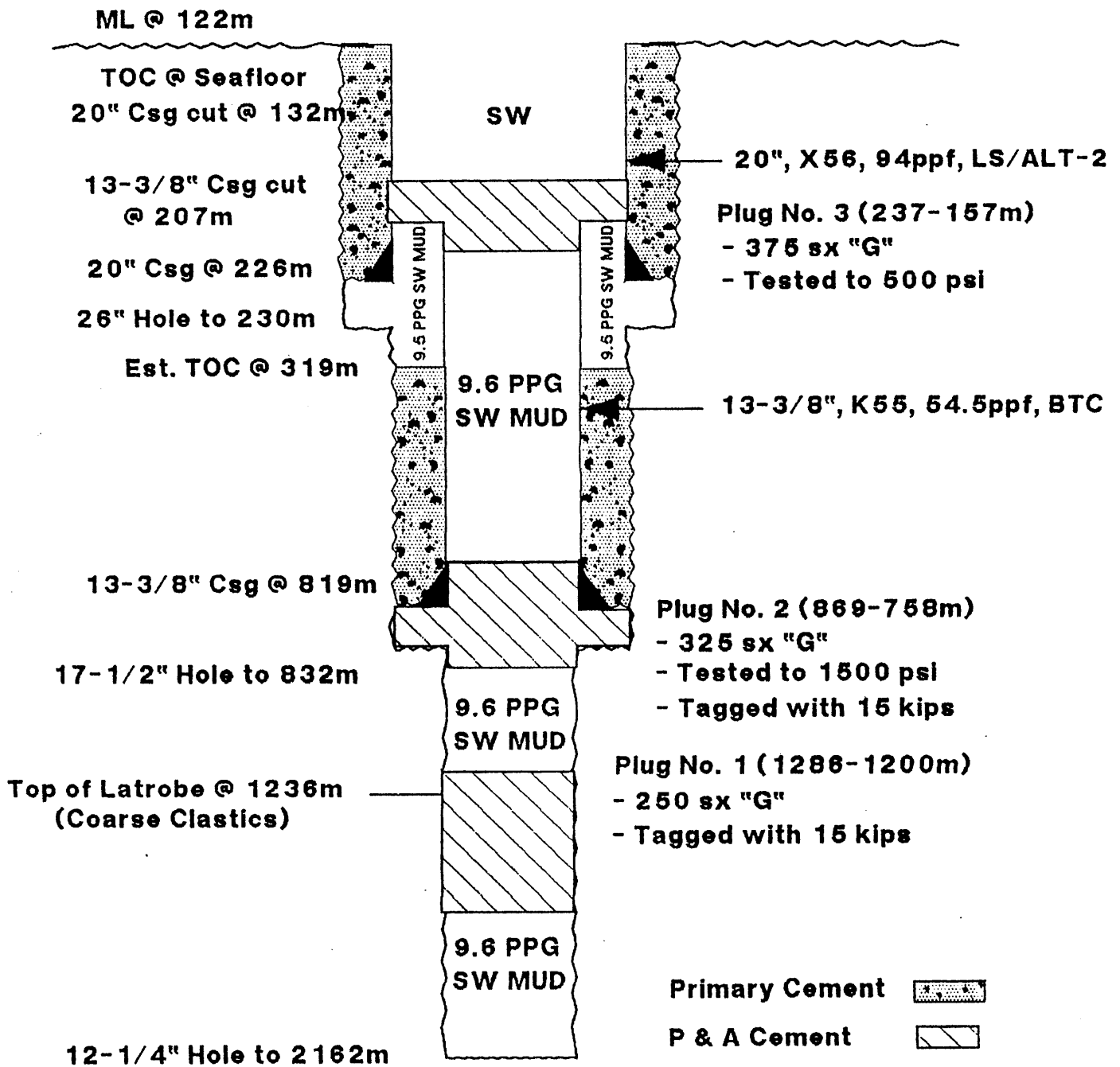
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## ADMIRAL-1 FINAL WELL REPORT

### WELLBORE ABANDONMENT SCHEMATIC

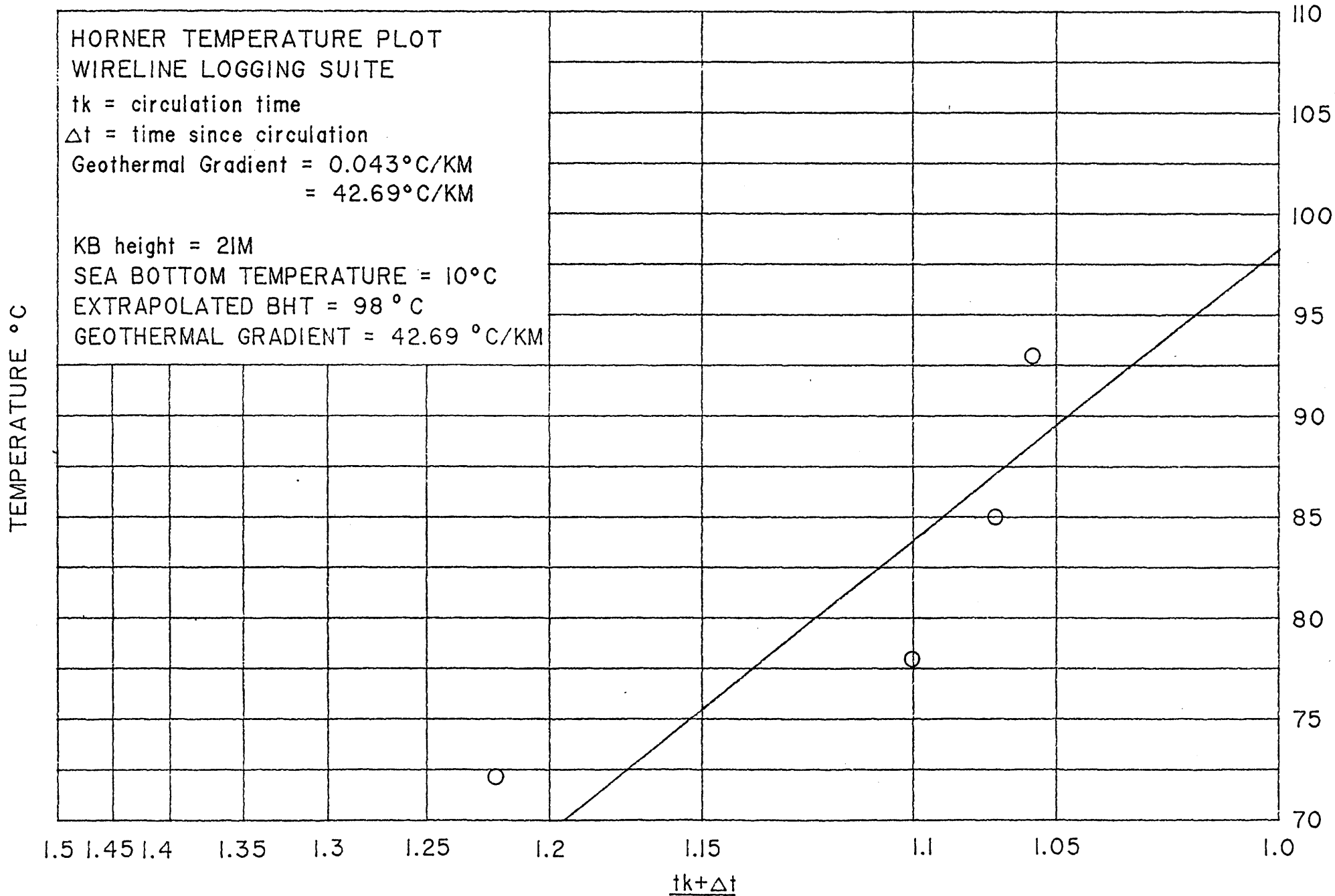
RKB

MSL @ 21m



All depths are meters RKB

# ADMIRAL-1



# APPENDIX 1

ADMIRAL-1

Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
840-850	100	<u>LIMESTONE</u> : calcsiltite to calcilutite, light grey to grey, very fine, argillaceous, rare carbonaceous flecks, rare glauconite, subblocky, soft to firm, tight visual porosity (common cement contamination).
850-860	100	<u>LIMESTONE</u> : calcilutite, as above, rare foraminifera, blocky to subfissile in part, tight visual porosity.
860-870	100	<u>LIMESTONE</u> : calcilutite grading to calcisiltite, as above, carbonaceous flecks in part, very argillaceous in part, soft, subblocky.
870-880	100	<u>LIMESTONE</u> : as above.
880-890	100	<u>LIMESTONE</u> : calcilutite, light grey to grey, very fine, argillaceous in part, as above, common foraminifera in part, common fossil fragments in part, soft, tight visual porosity.
890-900	100	<u>LIMESTONE</u> : as above, trace glauconite.
900-910	100	<u>LIMESTONE</u> : calcilutite, light grey to buff to grey, argillaceous, very fine, minor carbonaceous flecks, rare glauconite, trace pyrite in part, common foraminifera in part, blocky to subfissile, soft to firm, tight visual porosity.
910-920	100	<u>LIMESTONE</u> : as above, calcilutite grading to calcisiltite.
920-930	100	<u>LIMESTONE</u> : as above, grey to dark grey in part.

ADMIRAL-1

Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
930-940	100	<u>LIMESTONE</u> : as above, common fissile fracture.
940-950	100	<u>LIMESTONE</u> : as above.
950-960	100	<u>LIMESTONE</u> : as above, grey to dark grey, trace pyrite, trace fossil fragments, firm, tight visual porosity.
960-970	100	<u>LIMESTONE</u> : as above.
970-980	100	<u>LIMESTONE</u> : calcilutite grading to calcisiltite, light grey to grey, very fine, argillaceous, trace pyrite, trace glauconite, trace fossil fragments, blocky, soft to firm, tight visual porosity.
980-990	100	<u>LIMESTONE</u> : as above, calcilutite, fossil fragments in part, commonly fissile.
990-1000	100	<u>LIMESTONE</u> : as above.
1000-1010	100	<u>LIMESTONE</u> : as above, common pyrite in part, subfissile to fissile.
1010-1020	100	<u>LIMESTONE</u> : as above.
1020-1030	100	<u>LIMESTONE</u> : as above.
1030-1040	100	<u>LIMESTONE</u> : calcilutite, light grey to grey, occasional buff to white, argillaceous, trace carbonaceous flecks, trace pyrite, blocky to subfissile, firm, tight visual porosity.
1040-1050	100	<u>LIMESTONE</u> : as above, very clayey in part.
1050-1060	100	<u>LIMESTONE</u> : calcilutite to calcisiltite, light grey to grey, occasionally buff, very

ADMIRAL-1

Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
		argillaceous in part, trace pyrite, common foraminifera and fossil fragments in part, blocky to subfissile, firm to soft.
1060-1070	100	<u>LIMESTONE</u> : as above, occasional glauconite, minor pyrite in part.
1070-1080	100	<u>LIMESTONE</u> : predominantly calcilutite as above, grading to calcarenite, well sorted, light grey, trace to common glauconite in part, trace pyrite, occasional foraminifera and fossil fragments, firm, blocky, tight visual porosity.
1080-1090	100	<u>LIMESTONE</u> : white to light grey to buff, calcisiltite grading to calcarenite in part, occasional fossil fragments as above, trace glauconite, soft, dispersive, very argillaceous in part.
1090-1095	100	<u>CALCAREOUS SILTSTONE</u> : light grey to grey, grading to calcisiltite, argillaceous grading to claystone, minor carbonaceous flecks, trace pyrite, trace glauconite, occasional foraminifera and fossil fragments, blocky, soft to firm.
1095-1100	100	<u>CALCAREOUS SILTSTONE</u> : light grey to grey to buff, as above.
1100-1105	100	<u>CALCAREOUS SILTSTONE</u> : as above, grading to calcisiltite.
1105-1110	100	<u>CALCAREOUS SILTSTONE</u> : as above.
1110-1115	100	<u>CALCAREOUS SILTSTONE</u> : as above, grading to claystone in part.

ADMIRAL-1

Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
1115-1120	100	<u>CALCAREOUS SILTSTONE</u> : as above, grading to calcarenite in part, blocky to subfissile.
1120-1125	100	<u>CALCAREOUS SILTSTONE</u> : as above.
1125-1130	100	<u>CALCAREOUS SILTSTONE</u> : light grey to grey, grading to calcisiltite, trace glauconite, trace fossil fragments, trace foraminifera, minor pyrite in part, subfissile to fissile, firm.
1130-1135	100	<u>CALCAREOUS SILTSTONE</u> : as above.
1135-1140	100	<u>CALCAREOUS SILTSTONE</u> : light grey to grey, buff in part, as above, becoming arenaceous, micromicaeous in part, as above, grading to calcarenite.
1140-1145	100	<u>CALCAREOUS SILTSTONE</u> : as above, becoming arenaceous with depth.
1145-1150	100	<u>CALCAREOUS SILTSTONE</u> : as above.
1150-1155	100	<u>CALCAREOUS SILTSTONE</u> : as above.
1155-1160	100	<u>CALCAREOUS SILTSTONE</u> : as above.
1160-1165	100	<u>CALCAREOUS SILTSTONE</u> : light grey, grading to calcisiltite, arenaceous in part, minor micromica flecks, trace pyrite, trace glauconite, blocky, soft to firm.
1165-1170	100	<u>CALCAREOUS SILTSTONE</u> : as above.
1170-1175	100	<u>CALCAREOUS SILTSTONE</u> : as above.

ADMIRAL-1

Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
1175-1180	100	<u>CALCAREOUS SILTSTONE</u> : as above, argillaceous, soft, dispersive in part.
1180-1185	100	<u>CALCAREOUS SILTSTONE</u> : as above, argillaceous, grading to claystone.
1185-1190	100	<u>CALCAREOUS SILTSTONE</u> : as above, grading to calcisiltite, common fossil fragments, trace glauconite, soft, dispersive in part.
1190-1195	100	<u>CALCAREOUS SILTSTONE</u> : as above.
1195-1200	100	<u>CALCAREOUS SILTSTONE</u> : as above, common foraminifera in part.
1200-1205	100	<u>CALCAREOUS SILTSTONE</u> : as above, micromicaceous, blocky, soft, dispersive.
1205-1210	100	<u>CALCAREOUS SILTSTONE</u> : as above, light grey to grey, buff to off white in part.
1210-1215	100	<u>CALCAREOUS SILTSTONE</u> : as above.
1215-1220	100	<u>CALCAREOUS SILTSTONE</u> : as above, predominantly light grey to buff, blocky, firm,. Fluorescence: 30% dim yellow (mineral) no cut.
1220-1225	100	<u>CALCAREOUS SILTSTONE</u> : as above.
1225-1230	100	<u>CALCAREOUS SILTSTONE</u> : as above.
1230-1235	100	<u>CALCAREOUS SILTSTONE</u> : light grey to buff, occasionally grey, argillaceous, micromica in part, minor glauconite, blocky, soft to firm, dispersive in part.



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Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
1235-1240	100	<u>CALCAREOUS SILTSTONE</u> : as above, minor glauconite, minor fossil fragments.
1240-1245	95	<u>CALCAREOUS SILTSTONE</u> : as above, arenaceous in part.
	5	<u>SANDSTONE</u> : light brown, yellow, medium, subrounded to rounded, loose grains. Fluorescence: 20%, dim to dull, yellow, patchy, very weak crush cut, trace to nil residue.
1245-1250	60	<u>SILTSTONE</u> : light grey to grey, calcareous as above.
	15	<u>SANDSTONE</u> : (i) light brown, clear, medium to coarse, subrounded to rounded, well sorted, generally loose, fair to good visual porosity, no fluorescence.
	25	<u>SANDSTONE</u> : (ii) light brown to brown, very fine, subangular to subrounded, well sorted, common cemented aggregates, argillaceous matrix; tight visual porosity, no fluorescence, common carbonaceous flecks.
1250-1255	70	<u>SILTSTONE</u> : as above.
	15	<u>SANDSTONE</u> : (i) as above.
	15	<u>SANDSTONE</u> : (ii) as above.
1255-1260	10	<u>SILTSTONE</u> : as above.
	50	<u>SANDSTONE</u> : as above, dark brown to brown, medium to very coarse, loose, good visual porosity, no fluorescence.
	40	<u>SANDSTONE</u> : (ii) as above.
1260-1265	10	<u>SILTSTONE</u> : as above.
	50	<u>SANDSTONE</u> : as above.
	40	<u>SANDSTONE</u> : (ii) as above.

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Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
1265-1270	40	<u>SILTSTONE</u> : as above.
	20	<u>SANDSTONE</u> : (i) as above.
	15	<u>SANDSTONE</u> : (ii) as above.
	25	<u>COAL</u> : black, subvitreous, blocky, moderately hard.
1270-1275	40	<u>SILTSTONE</u> : light grey, calcareous, argillaceous, blocky, minor carbonaceous flecks, firm.
	20	<u>SANDSTONE</u> : (i) light brown to brown, medium to very coarse, subrounded to rounded, loose, good visual porosity, no fluorescence.
	10	<u>SANDSTONE</u> : (ii) as above.
	30	<u>COAL</u> : as above, silty in part.
1275-1280	100	<u>SANDSTONE</u> : clear to light grey, medium to coarse, occasionally very coarse, subrounded to rounded, well sorted, occasional angular fractured grains, minor argillaceous matrix, silica cement, minor quartz overgrowths, trace pyrite, generally loose, good to excellent visual porosity, no fluorescence.
1280-1285	100	<u>SANDSTONE</u> : as above.
1285-1290	95	<u>SANDSTONE</u> : as above, medium to coarse, predominantly coarse, as above.
	5	<u>COAL</u> : black, subvitreous, silty in part, blocky, subconchoidal fracture, moderately hard.
1290-1295	95	<u>SANDSTONE</u> : as above.
	5	<u>COAL</u> : as above.
1295-1300	95	<u>SANDSTONE</u> : light grey brown, medium to coarse, subangular to subrounded, moderately well sorted, argillaceous matrix, trace

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Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
		pyrite, generally loose, good visual porosity, no fluorescence.
	5	<u>COAL</u> : as above, commonly silty.
1300-1305	95	<u>SANDSTONE</u> : as above.
	5	<u>SILTSTONE</u> : dark grey brown, micromicaceous, carbonaceous flecks, blocky, firm to moderately hard.
	TR	<u>COAL</u> : as above.
1305-1310	100	<u>SANDSTONE</u> : clear, white to light grey to light brown, fine to very coarse, predominantly medium to coarse, subrounded to rounded, well sorted, argillaceous matrix in part, silica cement in part, minor quartz overgrowths, good visual porosity, no fluorescence.
	TR	<u>SILTSTONE</u> : light grey to light brown, calcareous, micromica, carbonaceous flecks, blocky, firm to moderately hard.
	TR	<u>COAL</u> : black, subvitreous, silty, blocky, moderately hard.
1310-1315	95	<u>SANDSTONE</u> : as above.
	5	<u>SILTSTONE</u> : as above.
	TR	<u>COAL</u> : as above.
1315-1320	100	<u>SANDSTONE</u> : as above, predominantly fine to medium, argillaceous matrix, subangular to subrounded, trace pyrite.
	TR	<u>SILTSTONE</u> : as above.
	TR	<u>COAL</u> : as above.
1320-1325	80	<u>SANDSTONE</u> : as above, common argillaceous matrix.
	20	<u>SILTSTONE</u> ; as above, carbonaceous, grading to coal, micromicaceous.

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Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
	TR	<u>COAL</u> : as above.
1325-1330	95	<u>SANDSTONE</u> : as above, predominantly medium to coarse, common pyrite.
	5	<u>COAL</u> : as above.
1330-1335	90	<u>SANDSTONE</u> : as above.
	10	<u>COAL</u> : as above, silty, grading to carbonaceous siltstone.
1335-1340	90	<u>SANDSTONE</u> : as above.
	10	<u>SILTSTONE</u> : dark grey to grey brown, arenaceous in part, micromicaceous, carbonaceous flecks, blocky, moderately hard.
1340-1345	90	<u>SANDSTONE</u> : as above.
	10	<u>SILTSTONE</u> : as above.
1345-1350	95	<u>SANDSTONE</u> : clear, light grey to light brown, fine to medium, predominantly medium, occasionally coarse, subangular to subrounded, well sorted, argillaceous matrix, silica cement, occasional quartz overgrowths, common pyrite, generally loose, good visual porosity, no fluorescence.
	5	<u>SILTSTONE</u> : as above.
1350-1355	95	<u>SANDSTONE</u> : as above, minor fine aggregates, silica cement, argillaceous matrix, friable.
	5	<u>SILTSTONE</u> : as above.
1355-1360	95	<u>SANDSTONE</u> : as above, predominantly medium to coarse, no fluorescence, good visual porosity.
	5	<u>COAL</u> : as above.

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Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
1360-1365	90	<u>SANDSTONE</u> : as above, argillaceous matrix in part.
	5	<u>SILTSTONE</u> : as above.
	5	<u>COAL</u> : as above.
1365-1370	85	<u>SANDSTONE</u> : as above, common argillaceous matrix.
	15	<u>SILTSTONE</u> : as above.
	TR	<u>COAL</u> : as above.
1370-1375	95	<u>SANDSTONE</u> : as above.
	5	<u>SILTSTONE</u> : as above.
	TR	<u>COAL</u> : as above.
1375-1380	90	<u>SANDSTONE</u> : clear to light grey, fine to very coarse, predominantly medium, subangular to angular, poorly sorted, silica cement in part, quartz overgrowths, common argillaceous matrix, trace pyrite, fair visual porosity, no fluorescence.
	10	<u>SILTSTONE</u> : light grey to buff, micaceous, blocky, carbonaceous flecks, moderately hard.
1380-1385	90	<u>SANDSTONE</u> : as above.
	10	<u>SILTSTONE</u> : as above.
	TR	<u>COAL</u> : as above.
1385-1390	100	<u>SANDSTONE</u> : clear, white to light grey, fine to very coarse, predominantly medium to coarse, subangular to subrounded, well sorted, silica cement, quartz overgrowths, common bit fractured grains, good visual porosity, no fluorescence.
1390-1400	90	<u>SANDSTONE</u> : as above.
	10	<u>SILTSTONE</u> : as above.

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Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
	TR	<u>COAL</u> : black, subvitreous, silty in part, as above.
1400-1405	100	<u>SANDSTONE</u> : as above, medium grained, well sorted, excellent visual porosity, no fluorescence.
1405-1410	100	<u>SANDSTONE</u> : as above.
1410-1415	100	<u>SANDSTONE</u> : as above, angular to subangular, good visual porosity, no fluorescence.
1415-1420	95 5	<u>SANDSTONE</u> : as above, common pyrite. <u>SILTSTONE</u> : light grey to grey, micromicaceous, minor carbonaceous flecks, blocky to subfissile, moderately hard.
1420-1425	90 10	<u>SANDSTONE</u> : as above. <u>SILTSTONE</u> : as above.
1425-1430	80 20	<u>SANDSTONE</u> : as above. <u>SILTSTONE</u> : as above.
1430-1435	95 5	<u>SANDSTONE</u> : as above. <u>SILTSTONE</u> : as above.
1435-1440	95 5	<u>SANDSTONE</u> : as above, common quartz overgrowths, bit fractured grains. <u>SILTSTONE</u> : as above.
1440-1445	90 10	<u>SANDSTONE</u> : as above. <u>SILTSTONE</u> : as above.
1445-1450	50	<u>SANDSTONE</u> : clear, white to light grey, fine to very coarse, predominantly medium, subangular to subrounded, poorly sorted, argillaceous matrix, silica cement, common

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Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
	30	quartz overgrowths, common pyrite, generally loose, good visual porosity, no fluorescence. <u>COAL</u> : black to dark brown black, subvitreous, silty in part, laminated, sub to conchoidal fracture in part, blocky, moderately hard.
	20	<u>SILTSTONE</u> : light grey to buff, argillaceous micromicaceous, subfissile to fissile, moderately hard.
1450-1455	80	<u>SANDSTONE</u> : as above, medium to very coarse, predominantly coarse.
	20	<u>COAL</u> : as above.
1455-1460	85	<u>SANDSTONE</u> : as above.
	15	<u>COAL</u> : as above.
1460-1465	95	<u>SANDSTONE</u> : clear, white to light grey, fine to very coarse, predominantly medium, very good visual porosity, no fluorescence.
	5	<u>SILTSTONE</u> : as above.
1465-1470	75	<u>SANDSTONE</u> : as above.
	20	<u>COAL</u> : as above.
	5	<u>SILTSTONE</u> : as above.
1470-1475	90	<u>SANDSTONE</u> : as above.
	10	<u>SILTSTONE</u> : as above.
	TR	<u>COAL</u> : as above.
1475-1480	80	<u>SANDSTONE</u> : as above, poorly sorted, good visual porosity, no fluorescence.
	10	<u>SILTSTONE</u> : as above, occasional brown to dark brown, carbonaceous in part, micromicaceous, blocky to subfissile, moderately hard.
	10	<u>COAL</u> : as above, silty in part.

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Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
1480-1485	100	<u>SANDSTONE</u> : light grey, clear to translucent, medium to very coarse (bit fractured) moderately sorted, subrounded to rounded, trace white argillaceous matrix, loose, trace pyrite, common chert grains, rare volcanic lithics, very good to excellent inferred porosity, no fluorescence.
	TR	<u>SILTSTONE</u> : tan to dark brown, carbonaceous/micaceous (keragenous) subfissile to fissile, firm.
1485-1490	100	<u>SANDSTONE</u> : as above, trace tuffaceous lithics, trace muscovite, no fluorescence.
	TR	<u>SILTSTONE</u> : as above.
1490-1495	90	<u>SANDSTONE</u> : as above, common volcanic lithics, very good inferred porosity, no fluorescence.
	10	<u>SILTSTONE</u> : as above, grading to silty coal in part.
1495-1500	70	<u>VOLCANICS</u> : cream tuffaceous with green siliceous inclusions, common to abundant devitrified glass shards randomly oriented in green silicified argillite (?celadonite), tuffaceous matrix is soft, blocky, dispersive, moderately effervescent in 10% HCl, strong sulphurous odour.
	30	<u>SANDSTONE</u> : as above, no fluorescence.
	TR	<u>SILTSTONE</u> : as above.
1500-1505	50	<u>VOLCANICS</u> : green, red, pink siliceous inclusions in cream tuffaceous dispersive matrix, soft, blocky to amorphous.
	50	<u>SANDSTONE</u> : as above, cream, crystalline pyrite, no fluorescence.
	TR	<u>SILTSTONE</u> : as above.



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Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
1505-1510	60	<u>SANDSTONE</u> : as above, no fluorescence.
	40	<u>VOLCANICS</u> : predominantly tuffaceous with rare pink, brown to green silica inclusions.
1510-1515	70	<u>SANDSTONE</u> : as above, abundant black chert fragments, no fluorescence.
	30	<u>VOLCANICS</u> : as above.
1515-1520	50	<u>SANDSTONE</u> : as above, becoming predominantly medium grained, very good inferred porosity, no fluorescence.
	40	<u>VOLCANICS</u> : as above.
	10	<u>COAL</u> : black, vitreous, conchoidal, silty in part, brittle, moderately hard.
1520-1525	40	<u>SANDSTONE</u> : as above, no fluorescence.
	40	<u>VOLCANICS</u> : cream to green silicified tuffaceous as above, common pink, red and grey/blue inclusions, abundant devitrified glass shards.
	20	<u>SILTSTONE</u> : dark brown, keragenous, as above.
1525-1530	90	<u>VOLCANICS</u> : as above.
	10	<u>SANDSTONE</u> : as above, no fluorescence.
	TR	<u>SILTSTONE</u> : as above.
1530-1535	40	<u>SANDSTONE</u> : clear, white to light grey to light brown, fine to coarse, predominantly fine, subangular to subrounded, well sorted, common well cemented aggregates, common silica cement, argillaceous matrix in part, common pyrite, moderately hard, no fluorescence.
	30	<u>VOLCANICS</u> : cream, tuffaceous, green siliceous inclusions, common to abundant devitrified glass shards, common pink, red and cream/blue inclusions, soft to dispersive in part.

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Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
	30	<u>SILTSTONE</u> : soft, grey, argillaceous, micromicaceous in part, carbonaceous flecks in part, blocky to subfissile, moderately hard.
1535-1540	50	<u>VOLCANICS</u> : as above.
	20	<u>SANDSTONE</u> : as above.
	30	<u>SILTSTONE</u> : as above.
1540-1545	60	<u>SANDSTONE</u> : as above, poor to fair visual porosity, no fluorescence.
	20	<u>VOLCANICS</u> : as above.
	20	<u>SILTSTONE</u> : as above.
1545-1550	70	<u>SANDSTONE</u> : as above, predominantly fine, well cemented aggregates, fluorescence: 30%, dull, orange, patchy, no cut.
	20	<u>VOLCANICS</u> : predominantly cream, as above.
	10	<u>SILTSTONE</u> : as above.
1550-1555	60	<u>SANDSTONE</u> : as above.
	30	<u>VOLCANICS</u> : as above.
	10	<u>SILTSTONE</u> : as above.
1555-1560	60	<u>SILTSTONE</u> : light grey to dark grey brown, arenaceous, grades to very fine sandstone, micromicaceous in part, minor carbonaceous flecks, pyritic in part, blocky, firm to moderately hard.
	25	<u>SANDSTONE</u> : dark to light grey brown, very fine to fine, subangular to subrounded, moderately sorted, generally loose, argillaceous matrix, poor to fair visual porosity, fluorescence 5% as above.
	15	<u>VOLCANICS</u> : as above.

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Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
1560-1565	40	<u>SANDSTONE</u> : light grey to light brown, fine to very fine, subangular to subrounded, well sorted, argillaceous matrix, generally loose, fair visual porosity, occasional well cemented aggregates, rare coarse to very coarse grains, fluorescence: 5%, as above.
	50	<u>SILTSTONE</u> : light grey to grey brown, argillaceous, micromicaceous in part, fissile to subfissile, moderately hard.
	10	<u>VOLCANICS</u> : cream, green, tuffaceous, as above.
1565-1570	70	<u>SANDSTONE</u> : clear, white to light grey, fine to coarse, predominantly medium, subangular to subrounded, common argillaceous clasts, silica cement, quartz overgrowths, minor argillaceous matrix, generally loose, fair visual porosity.
	30	<u>SILTSTONE</u> : as above, blocky, minor carbonaceous flecks.
1570-1575	80	<u>SANDSTONE</u> : as above, medium to coarse, predominantly medium, subrounded to rounded, good visual porosity, no fluorescence.
	20	<u>SILTSTONE</u> : as above, common pyrite in part.
1575-1580	40	<u>SANDSTONE</u> : as above, pyrite matrix in part.
	60	<u>SILTSTONE</u> : as above.
1580-1585	30	<u>SANDSTONE</u> : as above, occasional coarse grains, rare aggregates, pyrite matrix in part.
	70	<u>SILTSTONE</u> : as above, carbonaceous laminae.
1585-1590	95	<u>SANDSTONE</u> : clear, white, commonly frosted, medium to coarse, predominantly coarse, minor fine to medium grain aggregates, commonly

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Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
		silica cemented, subangular to subrounded moderately well sorted, generally loose, well cemented aggregates, good visual porosity, no fluorescence.
	5	<u>SILTSTONE</u> : grey to dark grey, as above.
1590-1595	100	<u>SANDSTONE</u> : as above, commonly well cemented aggregates, poor visual porosity, no fluorescence.
1595-1600	90	<u>SANDSTONE</u> : as above.
	10	<u>SILTSTONE</u> : as above, minor pyrite.
1600-1610	100	<u>SANDSTONE</u> : clear, white to buff, fine to medium, occasional very coarse bit fractured grains, subangular to subrounded, moderately well sorted, silica cement, argillaceous matrix, common well cemented aggregates, moderately hard, poor visual porosity, no fluorescence.
1610-1615	70	<u>SANDSTONE</u> : as above, common matrix/cement, common aggregates, poor visual porosity.
	30	<u>SILTSTONE</u> : dark grey to grey, micromicaceous, common carbonaceous flecks and laminae in part, blocky, firm to moderately hard.
1615-1620	30	<u>SANDSTONE</u> : as above.
	70	<u>SILTSTONE</u> : dark grey to grey brown, micromicaceous, common carbonaceous laminae, as above.
1620-1625	30	<u>SANDSTONE</u> : light grey, clear to translucent, fine to medium, predominantly fine, poorly sorted, subangular to subrounded, weak silica cement, abundant white to light grey argillaceous matrix, common carbonaceous

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Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
		fragments, rare pyrite, common mica, very poor visual porosity, no fluorescence.
	70	<u>SILTSTONE</u> : medium grey, argillaceous, abundant carbonaceous flecks and laminae, common interlaminated cream arenaceous siltstone, blocky, soft to occasionally firm.
	TR	<u>CLAYSTONE</u> : medium grey, sticky, washing out of sample.
1625-1630	40	<u>SANDSTONE</u> : as above, with very fine, loose quartz grains, (? clay matrix supported, washing out at shakers), no fluorescence.
	60	<u>SILTSTONE</u> : as above.
1630-1635	20	<u>SANDSTONE</u> : predominantly very fine, as above, no fluorescence.
	80	<u>SILTSTONE</u> : as above, finely laminated, very argillaceous, grading to claystone, microcarbonaceous, blocky, soft.
1635-1640	10	<u>SANDSTONE</u> : as above, very poor inferred porosity, no fluorescence.
	90	<u>SILTSTONE</u> : medium grey, microcarbonaceous as above.
1640-1645	20	<u>SANDSTONE</u> : very fine to fine, as above, no fluorescence.
	80	<u>SILTSTONE</u> : as above.
1645-1650	90	<u>SILTSTONE</u> : as above, abundant clay washing out at shakers.
	10	<u>SANDSTONE</u> : very fine as above, no fluorescence.
1650-1655	90	<u>SILTSTONE</u> : as above.
	10	<u>SANDSTONE</u> : as above, no fluorescence.

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Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
1655-1660	80	<u>SILTSTONE</u> : as above.
	20	<u>SANDSTONE</u> : as above, no fluorescence.
1660-1665	80	<u>SILTSTONE</u> : grey to grey brown, arenaceous, grading to very fine sandstone, micromicaceous, common carbonaceous flecks, clay washing out, minor pyrite, blocky, soft to firm.
	20	<u>SANDSTONE</u> : light grey brown, very fine, subangular to subrounded well sorted, grading to arenaceous siltstone, common argillaceous matrix, loose to friable, poor visual porosity, no fluorescence.
1665-1670	90	<u>SILTSTONE</u> : as above.
	10	<u>SANDSTONE</u> : as above, no fluorescence.
1670-1675	95	<u>SILTSTONE</u> : as above.
	5	<u>SANDSTONE</u> : as above, no fluorescence.
1675-1680	100	<u>SILTSTONE</u> : as above, common carbonaceous flecks and laminae.
1680-1685	100	<u>SILTSTONE</u> : as above.
1685-1690	50	<u>SILTSTONE</u> : as above.
	50	<u>SANDSTONE</u> : light grey to light brown to buff, very fine to medium, predominantly fine, subangular to subrounded, well sorted, common well cemented aggregates, argillaceous matrix, minor carbonaceous flecks, trace pyrite, friable to moderately hard, poor visual porosity, no fluorescence.
1690-1695	80	<u>SANDSTONE</u> : as above, no fluorescence.
	20	<u>SILTSTONE</u> : as above.

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Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
1695-1700	60	<u>SILTSTONE</u> : as above, grading to very fine arenaceous sandstone.
	40	<u>SANDSTONE</u> : as above, no fluorescence.
1700-1705	95	<u>SILTSTONE</u> : as above.
	5	<u>SANDSTONE</u> : as above, no fluorescence.
1705-1710	100	<u>SILTSTONE</u> : as above.
1710-1715	100	<u>SILTSTONE</u> : dark grey, becoming more argillaceous, as above.
1715-1720	80	<u>SILTSTONE</u> : as above.
	20	<u>SANDSTONE</u> : light brown to buff, very fine to fine, subangular to subrounded, well sorted, common argillaceous matrix, friable to loose, common cemented aggregates, tight visual porosity, no fluorescence.
1720-1725	90	<u>SILTSTONE</u> : as above.
	10	<u>SANDSTONE</u> : as above, no fluorescence.
1725-1730	90	<u>SILTSTONE</u> : medium grey, argillaceous, common to abundant carbonaceous fragments, blocky to subfissile, soft to firm.
	10	<u>SANDSTONE</u> : light to medium grey, very fine, well sorted, subangular to subrounded, loose, dirty, abundant inferred argillaceous matrix (washing out) very poor inferred porosity, no fluorescence.
1730-1735	80	<u>SILTSTONE</u> : as above, common carbonaceous laminae.
	20	<u>SANDSTONE</u> : as above, plus occasional fine to medium, silica cemented grain aggregates with abundant white argillaceous matrix, very poor visual porosity, no fluorescence.

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Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
1735-1740	90	<u>SILTSTONE</u> : as above.
	10	<u>SANDSTONE</u> : as above, predominantly fine aggregates, no fluorescence.
1740-1745	100	<u>SILTSTONE</u> : as above.
	TR	<u>SANDSTONE</u> : as above.
	TR	<u>COAL</u> : black, vitreous, conchoidal, silty in part, brittle, moderately hard.
1745-1750	80	<u>SILTSTONE</u> : as above, ?sideritic in parts.
	20	<u>SANDSTONE</u> : light grey, clear to milky, fine to medium, moderately sorted, subangular to subrounded, moderate silica cement, common white argillaceous matrix, poor visual porosity, no fluorescence.
1750-1755	100	<u>SILTSTONE</u> : as above, becoming more carbonaceous, common siderite.
	TR	<u>SANDSTONE</u> : as above, no fluorescence.
1755-1760	100	<u>SILTSTONE</u> : becoming medium brown, carbonaceous, as above.
	TR	<u>SANDSTONE</u> : as above, no fluorescence.
1760-1765	70	<u>SILTSTONE</u> : as above.
	30	<u>SANDSTONE</u> : light brown, clear to translucent, fine to medium, moderately sorted, subangular to subrounded, moderate to strong silica cement, common to abundant white to light brown argillaceous matrix, very poor visual porosity, no fluorescence.
1765-1770	100	<u>SILTSTONE</u> : medium grey to medium brown, argillaceous and carbonaceous, grading to claystone, abundant carbonaceous fragments and laminae, trace siderite, common



ADMIRAL-1

Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
		disseminated very fine quartz grains, blocky to amorphous, soft to firm.
	TR	<u>SANDSTONE</u> : as above, no fluorescence.
1770-1775	90	<u>SILTSTONE</u> : as above.
	10	<u>SANDSTONE</u> : as above, predominantly very fine, no fluorescence.
1775-1780	50	<u>SILTSTONE</u> : as above.
	50	<u>SANDSTONE</u> : cream, clear to translucent, fine, well sorted, subrounded to subangular, abundant off white argillaceous matrix, moderate silica cement, moderately hard, very poor visual porosity, trace very dull mineral fluorescence, no cut.
1780-1785	90	<u>SANDSTONE</u> : as above, weak silica cement, abundant argillaceous matrix, friable to moderately hard, very dull, even, mineral (?siderite) fluorescence, no cut.
	10	<u>SILTSTONE</u> : light grey to light brown, interlaminated arenaceous and argillaceous, predominantly arenaceous, grading to very fine sandstone as above, trace carbonaceous flecks, blocky to sucrosic, firm to moderately hard.
1785-1790	90	<u>SANDSTONE</u> : cream to white, fine to very coarse, predominantly as above, minor very coarse angular bit fractured grains, poorly sorted, poor visual porosity, no fluorescence.
	10	<u>SILTSTONE</u> : as above.
1790-1795	70	<u>SANDSTONE</u> : as above, no fluorescence.
	30	<u>SILTSTONE</u> : as above.

ADMIRAL-1

Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description.</u>
1795-1800	20	<u>SANDSTONE</u> : as above, common very coarse, grains, no fluorescence.
	80	<u>SILTSTONE</u> : as above.
1800-1805	95	<u>SANDSTONE</u> : cream to buff, very fine to fine, predominantly fine, well sorted, subangular to subrounded, argillaceous matrix, moderate silica cement, friable to moderately hard, poor to very poor visual porosity, fluorescence: dull even (mineral).
	5	<u>SILTSTONE</u> : as above.
1805-1810	60	<u>SANDSTONE</u> : as above, very fine grading to arenaceous siltstone in part, common argillaceous matrix, no fluorescence.
	40	<u>SILTSTONE</u> : as above, common carbonaceous laminae.
1810-1815	85	<u>SANDSTONE</u> : cream to buff, very fine to fine, well sorted, subangular to subrounded, common argillaceous matrix, moderate silica cement, quartz overgrowths in part, minor lithics, trace pyrite, friable to moderately hard, tight visual porosity, fluorescence: dull even (mineral).
	15	<u>SILTSTONE</u> : as above.
1815-1820	15	<u>SANDSTONE</u> : as above.
	85	<u>SILTSTONE</u> : dark grey brown to grey, argillaceous in part, micromicaceous, common carbonaceous flecks and laminae, blocky, moderately hard.
	TR	<u>COAL</u> : black, subvitreous to vitreous, conchoidal fracture, blocky, moderately hard to hard.

ADMIRAL-1

Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
1820-1825	40	<u>SANDSTONE</u> : as above, very well cemented, silica cement, argillaceous matrix, tight visual porosity, no fluorescence.
	60	<u>SILTSTONE</u> : as above.
1825-1830	60	<u>SANDSTONE</u> : as above, no fluorescence.
	40	<u>SILTSTONE</u> : as above, subfissile to fissile in part.
1830-1835	30	<u>SANDSTONE</u> : as above, commonly very well cemented, tight visual porosity, no fluorescence.
	70	<u>SILTSTONE</u> : as above, subfissile to fissile in part.
1835-1840	70	<u>SANDSTONE</u> : as above, no fluorescence.
	30	<u>SILTSTONE</u> : as above.
1840-1845	20	<u>SANDSTONE</u> : as above, no fluorescence.
	80	<u>SILTSTONE</u> : as above.
1845-1850	60	<u>SANDSTONE</u> : as above.
	40	<u>SILTSTONE</u> : as above.
1850-1855	70	<u>SANDSTONE</u> : cream to buff, very fine to fine, occasionally coarse, subangular to subrounded, well sorted, common well cemented aggregates, common silica cement, common argillaceous matrix, trace pyrite, common very fine sucrosic aggregates, moderately hard, friable in part, occasional loose grains, tight to very poor visual porosity, no fluorescence.
	30	<u>SILTSTONE</u> : dark grey brown to dark grey, micromicaceous, abundant carbonaceous flecks and laminae, blocky, subfissile in part, moderately hard to firm.

ADMIRAL-1

Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
1855-1860	60	<u>SANDSTONE</u> : as above, very fine to fine, grading to arenaceous siltstone in part, no fluorescence.
	40	<u>SILTSTONE</u> : as above.
1860-1865	80	<u>SANDSTONE</u> : cream to off white, very fine to fine, subangular to subrounded, occasional angular sucrosic aggregates, well sorted, strong silica cement, quartzitic in part, minor lithics and pink feldspar, moderately hard to hard, tight visual porosity, no fluorescence.
	20	<u>SILTSTONE</u> : as above.
1865-1870	60	<u>SANDSTONE</u> : as above with common loose coarse quartz grains, moderately hard to hard, no visual porosity, no fluorescence.
	40	<u>SILTSTONE</u> : medium grey, argillaceous with carbonaceous laminae as above.
1870-1875	10	<u>SANDSTONE</u> : as above, predominantly fine grained aggregates, very poor visual porosity, no fluorescence.
	70	<u>SILTSTONE</u> : as above.
	20	<u>CLAYSTONE</u> : medium to dark grey, common carbonaceous laminae, puggy, waxy lustre, sticky in part, fissile, firm.
1875-1880	TR	<u>SANDSTONE</u> : as above, no fluorescence.
	50	<u>SILTSTONE</u> : as above, abundant clay washing out at shakers.
	50	<u>CLAYSTONE</u> : as above, coaly laminae have silica infilled microfractures.
1880-1885	TR	<u>SANDSTONE</u> : very fine grained, loose, (?disseminated quartz grains, washed out of clay).
	50	<u>SILTSTONE</u> : as above.

ADMIRAL-1

Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
	50	<u>CLAYSTONE</u> : as above, rare microfractures.
1885-1890	10	<u>SANDSTONE</u> : as above, fine to medium, silica cemented aggregates, no fluorescence.
	80	<u>SILTSTONE</u> : as above.
	10	<u>CLAYSTONE</u> : as above, becoming silty in part, common coal fragments.
1890-1895	10	<u>SANDSTONE</u> : as above, no fluorescence, rare very high (grain dissolution) porosity.
	60	<u>SILTSTONE</u> : as above.
	30	<u>CLAYSTONE</u> : as above.
1895-1900	TR	<u>SANDSTONE</u> : as above, no fluorescence.
	70	<u>SILTSTONE</u> : as above.
	30	<u>CLAYSTONE</u> : as above.
1900-1905	TR	<u>SANDSTONE</u> : as above, no fluorescence.
	90	<u>SILTSTONE</u> : as above.
	10	<u>CLAYSTONE</u> : as above.
1905-1910	10	<u>SANDSTONE</u> : as above, no fluorescence.
	80	<u>SILTSTONE</u> : as above, trace arenaceous laminae in part.
	10	<u>CLAYSTONE</u> : as above.
1910-1915	20	<u>SANDSTONE</u> : as above, no fluorescence, trace siderite cement.
	70	<u>SILTSTONE</u> : as above.
	10	<u>CLAYSTONE</u> : as above.
1915-1920	10	<u>SANDSTONE</u> : as above, no fluorescence.
	90	<u>SILTSTONE</u> : as above.
	TR	<u>CLAYSTONE</u> : as above.
1920-1925	TR	<u>SANDSTONE</u> : as above, no fluorescence.
	90	<u>SILTSTONE</u> : as above.

ADMIRAL-1

Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
	10	<u>CLAYSTONE</u> : as above.
1925-1930	50	<u>SANDSTONE</u> : as above, common loose medium quartz grains, no fluorescence.
	50	<u>SILTSTONE</u> : as above.
	TR	<u>CLAYSTONE</u> : as above.
1930-1935	60	<u>SANDSTONE</u> : cream to off white, very fine to fine, subangular to subrounded, moderately well sorted, common silica cement, argillaceous matrix, common lithics, well cemented, moderately hard to hard, tight visual porosity, no fluorescence.
	40	<u>SILTSTONE</u> : grey to dark grey brown, micromicaceous in part, carbonaceous flecks, blocky, firm to moderately hard.
	TR	<u>CLAYSTONE</u> : as above.
1935-1940	50	<u>SANDSTONE</u> : as above, occasional loose grains, no fluorescence.
	50	<u>SILTSTONE</u> : as above.
1940-1945	30	<u>SANDSTONE</u> : as above, no fluorescence.
	70	<u>SILTSTONE</u> : as above.
1945-1950	30	<u>SANDSTONE</u> : as above, common argillaceous matrix, no fluorescence.
	70	<u>SILTSTONE</u> : as above, common carbonaceous flecks and laminae.
1950-1955	90	<u>SANDSTONE</u> : as above, occasional coarse loose grains, no fluorescence.
	10	<u>SILTSTONE</u> : as above.
1955-1960	95	<u>SANDSTONE</u> : as above, common loose grains, no fluorescence.
	5	<u>SILTSTONE</u> : as above.

ADMIRAL-1

Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
1960-1965	100	<u>SANDSTONE</u> : as above, poor visual porosity, no fluorescence.
1965-1970	80	<u>SANDSTONE</u> : as above, common lithics, no fluorescence.
	20	<u>SILTSTONE</u> : as above.
1970-1975	50	<u>SANDSTONE</u> : as above, no fluorescence.
	40	<u>SILTSTONE</u> : as above.
	TR	<u>CLAYSTONE</u> :
	10	<u>CAVINGS</u> : volcanic tuffaceous and marine siltstone.
1975-1980	20	<u>SANDSTONE</u> : as above, no fluorescence.
	40	<u>SILTSTONE</u> : as above.
	40	<u>CAVINGS</u> : as above.
1980-1985	20	<u>SANDSTONE</u> : as above, no fluorescence.
	60	<u>SILTSTONE</u> : as above.
	20	<u>CAVINGS</u> : as above.
1985-1990	20	<u>SANDSTONE</u> : light brown, clear to translucent, very fine to medium, predominantly fine moderately sorted, subangular to subrounded, weak to moderate silica cement, abundant argillaceous matrix, common lithics, moderately hard aggregates, predominantly loose (washing out of clay) very poor to no inferred porosity, no fluorescence.
	80	<u>SILTSTONE</u> : medium grey, argillaceous, abundant coal fragments, trace siderite, subblocky, soft to firm.
1990-1995	40	<u>SANDSTONE</u> : as above, predominantly very fine to fine grained aggregates, very poor visual porosity, no fluorescence.
	60	<u>SILTSTONE</u> : medium grey, as above.

ADMIRAL-1

Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
1995-2000	60	<u>SANDSTONE</u> : as above, no fluorescence.
	40	<u>SILTSTONE</u> : as above, arenaceous in part.
2000-2005	20	<u>SANDSTONE</u> : as above, angular grained aggregates, no fluorescence.
	80	<u>SILTSTONE</u> : as above, subfissile to fissile in part.
2005-2010	40	<u>SANDSTONE</u> : off white to buff, very fine to fine, subangular to subrounded, moderately well sorted, common silica cement, abundant argillaceous matrix, common lithics, moderately hard to hard, no visual porosity, no fluorescence.
	60	<u>SILTSTONE</u> : grey to dark grey, argillaceous, arenaceous in part, common carbonaceous flecks, subblocky to subfissile, firm to moderately hard.
2010-2015	80	<u>SANDSTONE</u> : as above, no fluorescence.
	20	<u>SILTSTONE</u> : as above.
2015-2020	95	<u>SANDSTONE</u> : as above, fine to medium, medium well cemented aggregates, very poor to nil visual porosity, no fluorescence.
	5	<u>SILTSTONE</u> : as above.
2020-2025	90	<u>SANDSTONE</u> : as above, no fluorescence.
	10	<u>SILTSTONE</u> : as above, micromicaceous in part.
2025-2030	90	<u>SANDSTONE</u> : as above, minor coarse, subrounded to rounded grains, trace pyrite, very poor to nil visual porosity, no fluorescence.
	10	<u>SILTSTONE</u> : as above.



ADMIRAL-1

Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
2030-2035	90	<u>SANDSTONE</u> : as above, generally loose grains, trace feldspar, trace pyrite, poor visual porosity, no fluorescence.
	10	<u>SILTSTONE</u> : as above.
2035-2040	70	<u>SANDSTONE</u> : as above, no fluorescence.
	30	<u>SILTSTONE</u> : as above, micromicaceous in part.
2040-2045	40	<u>SANDSTONE</u> : as above, no fluorescence.
	60	<u>SILTSTONE</u> : as above, common carbonaceous material/coal fragments.
2045-2050	10	<u>SANDSTONE</u> : off white to buff, very fine to fine, subangular to subrounded, moderately well sorted, common argillaceous matrix, common silica cement, common lithics, moderately hard, no visual porosity, no fluorescence.
	90	<u>SILTSTONE</u> : dark grey to grey black, common carbonaceous material/coal fragments, arenaceous in part, blocky to subfissile, firm to moderately hard.
2050-2055	100	<u>SILTSTONE</u> : black grey to dark grey brown, as above.
	TR	<u>SANDSTONE</u> : as above.
2055-2060	10	<u>SANDSTONE</u> ; as above, minor pyrite in part, tight visual porosity, no fluorescence.
	90	<u>SILTSTONE</u> : as above.
2060-2065	20	<u>SANDSTONE</u> : as above, no fluorescence.
	80	<u>SILTSTONE</u> : as above.
2065-2070	60	<u>SANDSTONE</u> : as above, common loose grains, no fluorescence.

ADMIRAL-1

Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
	40	<u>SILTSTONE</u> : as above, occasional light grey green argillaceous, subfissile, firm to moderately hard.
2070-2075	70	<u>SANDSTONE</u> : as above, no fluorescence.
	30	<u>SILTSTONE</u> : as above.
2075-2080	70	<u>SANDSTONE</u> : white to off white, very fine to medium, predominantly fine, subangular to angular, moderately well sorted, common lithics, common black chert, minor argillaceous matrix, common silica cement, well cemented aggregates, minor pyrite, minor pink feldspar, moderately hard to hard, no visual porosity, no fluorescence.
	30	<u>SILTSTONE</u> : light grey to grey, as above, less carbonaceous material.
2080-2085	95	<u>SANDSTONE</u> : as above, abundant chert, trace lithics, no fluorescence.
	5	<u>SILTSTONE</u> : as above.
2085-2090	95	<u>SANDSTONE</u> : white to off white, clear to opaque, fine to medium, predominantly fine, subangular to angular, moderately well sorted, common well cemented aggregates, minor argillaceous matrix, common silica cement, common lithics, abundant black chert, minor pink feldspar, trace pyrite, rare chlorite, moderately hard, no visual porosity, no fluorescence.
	5	<u>SILTSTONE</u> : as above, less carbonaceous material.
2090-2095	95	<u>SANDSTONE</u> : as above, no fluorescence.
	5	<u>SILTSTONE</u> : as above.

ADMIRAL-1

Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
2095-2100	100	<u>SANDSTONE</u> : white, clear to opaque, fine to coarse, occasional very coarse round grains, subangular to angular, moderately well sorted, common cemented aggregates, common black chert, common lithics, minor pink feldspar, minor argillaceous matrix, common silica cement, trace pyrite, no visual porosity, no fluorescence.
	TR	<u>SILTSTONE</u> : as above.
2100-2105	100	<u>SANDSTONE</u> : as above, occasional very coarse angular fractured grains.
	TR	<u>SILTSTONE</u> : as above.
2105-2110	100	<u>SANDSTONE</u> : as above, no fluorescence.
	TR	<u>SILTSTONE</u> : as above.
2110-2115	100	<u>SANDSTONE</u> : as above, abundant chert grains, common feldspar, rare green ?chlorite, very poor to no porosity, no fluorescence.
	TR	<u>SILTSTONE</u> : as above (cavings).
2115-2120	100	<u>SANDSTONE</u> : as above with abundant loose (bit fractured) rounded quartz granules (conglomeratic), rare pyrite, no fluorescence.
2120-2125	100	<u>SANDSTONE</u> : as above, with abundant very coarse bit fractured lithic clasts, including black to dark grey chert, medium grey quartzite (remnant very fine grained texture), silicified metasediments, pink to brick red feldspars (potassium), rare silicified chloritic (?tuffaceous) claystone.
2125-2130	100	<u>SANDSTONE</u> : (20%) fine to medium, clear quartz and black chert aggregates as above. (80%)

ADMIRAL-1

Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Description</u>
		coarse (conglomeratic) angular bit fractured lithic fragments (predominantly quartzite and pink feldspar).
2130-2135	100	<u>LITHIC CONGLOMERATE</u> : bit fractured clasts of black to dark grey chert, white to cream to pale green quartzite, rare acid volcanics (tuffaceous) abundant pink feldspar, no inferred porosity, no fluorescence.
	TR	<u>SANDSTONE</u> : as above.
2135-2140	100	<u>LITHIC CONGLOMERATE</u> : as above, no fluorescence.
2140-2145	100	<u>LITHIC CONGLOMERATE</u> : as above, no fluorescence.
2145-2150	100	<u>LITHIC CONGLOMERATE</u> : as above, no fluorescence.
2150-2162	100	<u>LITHIC CONGLOMERATE</u> : as above, no fluorescence.

# APPENDIX

## 2

ADMIRAL 1

SIDEWALL CORE DESCRIPTIONS

Gun No. 1

<u>NO.</u>	<u>Depth</u> (m)	<u>Rec.</u> (mm)	<u>Description</u>
1	2155	-	No recovery.
2	2151.1	40	Mud cake with clasts of sandstone and siltstone. Not extracted.  Gas: 369/25/20/TR/TR*
3	2149	-	No recovery.
4	2144.1	-	No recovery.
5	2139.5	-	No recovery.
6	2130.6	-	No recovery.
7	2120.5	-	No recovery.
8	2115	25	<u>SANDSTONE</u> : white, with black chert, clear to translucent and black, very fine to medium, predominantly medium, subrounded to subangular, moderately sorted, abundant white argillaceous matrix, moderate silica cement, firm to moderately hard, no visual porosity, no fluorescence.  Gas: 65/8/TR
9	2103.6	35	<u>SILTSTONE</u> : medium grey, argillaceous, common carbonaceous flecks and laminae, micromicaceous, homogeneous with trace arenaceous laminae, slightly swelling, blocky to subfissile, firm.  Gas: 306/226/57/TR/TR
10	2086	-	No recovery.
11	2079	-	No recovery.
12	2071.3	30	<u>SILTSTONE</u> : as above, slightly more arenaceous.  Gas: 22/65/39/3/5/-

\* ppm C1/C2/C3/IC4/NC4/C5 respectively.

ADMIRAL 1

SIDEWALL CORE DESCRIPTIONS

Gun No. 1

<u>NO.</u>	<u>Depth</u> (m)	<u>Rec.</u> (mm)	<u>Description</u>
13	2061.5	35	<u>SILTSTONE</u> : medium grey to mottled, white arenaceous in medium grey argillaceous matrix with abundant carbonaceous flecks and fragments, micromicaceous, blocky, firm. Gas: 108/210/82/3/7/-
14	2056	30	<u>SILTSTONE</u> : as above, slightly less carbonaceous material, more argillaceous, blocky to subfissile, firm. Gas: 10/104/112/11/15/-
15	2048.9	30	<u>SILTSTONE</u> : medium grey, white arenaceous with grey argillaceous matrix, abundant carbonaceous fragments, large carbonaceous claystone intraclasts, sucrosic to fissile, firm. Gas: 18/136/131/12/12/-
16	2036	35	<u>SILTSTONE</u> : medium grey, argillaceous, grading to claystone, microcarbonaceous, micromicaceous, subfissile, firm. Gas: 108/208/76/3/4/-
17	2016.1	30	<u>SILTSTONE</u> : light to medium grey, arenaceous with grey argillaceous matrix, abundant carbonaceous fragments, micromicaceous, sucrosic, blocky, firm to friable. Gas: 45/78/36/-/-/-
18	1988	35	SANDSTONE - CARBONACEOUS CLAYSTONE. <u>SANDSTONE</u> : white to cream, clear to milky, very fine-fine, moderately sorted,

ADMIRAL 1

SIDEWALL CORE DESCRIPTIONS

Gun No. 1

<u>NO.</u>	<u>Depth</u> (m)	<u>Rec.</u> (mm)	<u>Description</u>
			subangular to subrounded, abundant white to cream argillaceous matrix, moderate silica cement, common black chert grains, firm to friable, no visual porosity, no fluorescence. <u>CLAYSTONE</u> : medium brown, carbonaceous, micromicaceous, arenaceous siltstone lamina (0.2 mm) parallel to core axis, firm, blocky to subfissile (sharp boundary between sandstone and claystone). Gas: 54/10/16/-/-/-
19	1972.5	20	<u>SILTSTONE</u> : medium grey, arenaceous with grey argillaceous matrix, abundant carbonaceous fragments, micromicaceous, blocky, firm. Gas: 63/104/39/TR/-/-
20	1961.1	35	<u>SILTSTONE</u> : as above, more argillaceous, grading to silty claystone. Gas: 81/13/41/2/2/-
21	1936	40	<u>SILTSTONE</u> : as above with light grey arenaceous laminae. Gas: 27/107/45/-/-/-
22	1912	35	<u>SILTSTONE</u> : argillaceous and arenaceous as above, micro faulted approximately perpendicular to bedding (arenaceous against argillaceous siltstones). Gas: 40/30/13/-/-/-
23	1899	15	<u>SILTSTONE</u> : medium grey argillaceous with light grey arenaceous laminae (0.5mm)



ADMIRAL 1

SIDEWALL CORE DESCRIPTIONS

Gun No. 1

<u>NO.</u>	<u>Depth</u> (m)	<u>Rec.</u> (mm)	<u>Description</u>
			parallel to core axis, micromicaceous, trace carbonaceous flecks, blocky to subfissile, firm. Gas: 4/5/10/-/-/-
24	1873.2	33	<u>CLAYSTONE</u> : medium grey to medium brown, homogeneous, abundant disseminated very fine quartz grains, microcarbonaceous, micromicaceous, very fine disseminated ?siderite, blocky to amorphous, soft. Gas: 18/2/-/-/-/-
25	1858.1	40	<u>CLAYSTONE</u> : medium brown, silty, distorted and discontinuous arenaceous siltstone laminae (0.1-0.2mm) subparallel to core axis, grades to siltstone as above, micromicaceous, microcarbonaceous, blocky to amorphous, firm to soft. Gas: 58/70/20/-/-/-
26	1843.1	40	<u>SILTSTONE</u> : medium brown, grades to claystone as above, interlaminated argillaceous and arenaceous with carbonaceous flecks, micromicaceous, blocky, firm. Gas: 90/93/45/2/7/-
27	1831	40	<u>SILTSTONE</u> : medium grey, arenaceous in grey argillaceous matrix, micromicaceous, microcarbonaceous, homogeneous, blocky, sucrosic, friable to firm. Gas: 11/TR/10/-/-/-
28	1816.6	35	<u>CLAYSTONE</u> : medium brown, homogeneous,

ADMIRAL 1

SIDEWALL CORE DESCRIPTIONS

Gun No. 1

<u>NO.</u>	<u>Depth</u> (m)	<u>Rec.</u> (mm)	<u>Description</u>
			micromicaceous, trace microcarbonaceous matter, blocky to subfissile, soft to firm. Gas: 18/28/15/2/2/-
29	1806.5	35	<u>CLAYSTONE</u> : medium brown, homogeneous, blocky, firm to soft. Gas: 60/46/14/1/2/-
30	1796	35	<u>CLAYSTONE</u> : medium brown, homogeneous, slightly silty, micromicaceous, blocky, firm. Gas: 23/25/8/TR/-/-
31	1787	30	<u>SILTSTONE</u> : medium brown, arenaceous with abundant grey argillaceous matrix, discontinuous arenaceous laminae (lenses) parallel to core axis, blocky, firm. Gas: 28/13/6/-/-/-
32	1768.8	30	<u>CLAYSTONE</u> : medium grey, silty and very fine sandstone laminae and lenses parallel to core axis, micromicaceous, trace carbonaceous flecks, blocky, firm. Gas: 18/12/1/-/-/-
33	1749.5	40	<u>SILTSTONE</u> : medium brown, argillaceous, homogeneous, micromicaceous, blocky, firm. Gas: TR/-/-/-/-/-
34	1728.4	30	<u>SILTSTONE</u> : medium grey argillaceous with cream to white arenaceous crosslaminae, abundant carbonaceous flecks and laminae, micromicaceous, blocky to subfissile, firm. Gas: 37/13/5/-/-/-

ADMIRAL 1

SIDEWALL CORE DESCRIPTIONS

Gun No. 1

<u>NO.</u>	<u>Depth</u> (m)	<u>Rec.</u> (mm)	<u>Description</u>
35	1697.5	25	<u>SILTSTONE</u> : medium grey to medium brown, argillaceous, homogeneous, micromicaceous, microcarbonaceous, blocky, firm. Gas: 17/6/5/-/-/-
36	1680.5	38	<u>CLAYSTONE</u> : medium grey, homogeneous, slightly plastic, slightly silty, blocky, firm to soft. Gas: 28/TR/10/-/-/-
37	1648.5	38	<u>SILTSTONE</u> : medium grey, argillaceous, grading to claystone as above, minor white arenaceous lenses, micromicaceous, microcarbonaceous, blocky, firm. Gas: 94/-/-/-/-/-
38	1620.1	35	<u>SILTSTONE</u> : medium grey, arenaceous with abundant grey argillaceous matrix, minor distorted and discontinuous white arenaceous laminae parallel to core axis, micromicaceous, microcarbonaceous, blocky, firm. Gas: 83/2/5/-/-/-
39	1606.2	25	<u>CLAYSTONE</u> : medium brown, homogeneous, slightly plastic, micromicaceous, trace microcarbonaceous, blocky, soft to firm. Gas: 102/3/5/-/-/-
40	1590	30	<u>SANDSTONE</u> : white to cream, clear to milky, fine grained, well sorted, subangular to subrounded, abundant white argillaceous matrix, moderate inferred silica cement, common coal fragments, common altered feldspar,

ADMIRAL 1

SIDEWALL CORE DESCRIPTIONS

Gun No. 1

<u>NO.</u>	<u>Depth</u> (m)	<u>Rec.</u> (mm)	<u>Description</u>
			(kaolinitic), friable, very poor inferred porosity, fair to good visual porosity (core impact enhanced), no fluorescence, no cut. Gas: No gas detected.
41	1580.5	30	<u>SILTSTONE</u> : medium grey, arenaceous with abundant grey argillaceous matrix, abundant carbonaceous fragments, micromicaceous, homogeneous, blocky to sucrosic, firm. Gas: 167/7/27/-/-/-
42	1563.9	25	<u>CLAYSTONE</u> : medium grey/brown, homogeneous, carbonaceous flecks (leaf remains?) trace micromicaceous specks, trace disseminated very fine quartz grains, blocky, soft to firm. Gas: 32/26/41/TR/TR
43	1555.6	25	<u>CLAYSTONE</u> : As above, more silty, grading to siltstone. Gas: 93/7/15/TR/TR/-
44	1533.5	20	<u>SANDSTONE</u> : off white to light brown, clear to milky, very fine to silty, poorly sorted, subangular to subrounded, abundant cream argillaceous matrix (matrix supported), traces silica cement, common carbonaceous fragments, trace mica, friable to soft to firm, no visual porosity, no fluorescence. Gas: trace/-

ADMIRAL 1

SIDEWALL CORE DESCRIPTIONS

Gun No. 1

<u>NO.</u>	<u>Depth</u> (m)	<u>Rec.</u> (mm)	<u>Description</u>
45	1518.3	35	<u>CLAYSTONE</u> : medium brown, homogeneous, trace carbonaceous flecks (?leaf fragments), plastic, blocky, firm to soft. Gas: 648/91/179/18/37/21
46	1508.1	20	<u>CONGLOMERATE</u> : white to cream, pebbles (larger than core diameter) in a matrix of fine to coarse sandstone, very poorly sorted, abundant white dispersive argillaceous matrix, moderate inferred silica cement, lithics (chert, banded chalcedonic quartz) trace carbonaceous fragments, hard, very poor visual porosity, trace dull yellow fluorescence, no cut. Gas: trace/-
47	1477.5	40	<u>CLAYSTONE</u> : medium grey, homogeneous, slightly plastic, slightly silty, micromicaceous, trace microcarbonaceous material, blocky, firm to soft. Gas: 270/40/102/13/48/21
48	1437.0	30	<u>SILTSTONE</u> : medium grey, arenaceous with abundant grey argillaceous matrix, large (1-3mm) intraclasts of mudstone, siltstone and quartz, common lignitic plant fragments (roots), localised pyrite, micromicaceous, abundant disseminated carbonaceous flecks, blocky to sucrosic, firm to friable. Gas: 104/14/36/7/13/-

ADMIRAL 1

SIDEWALL CORE DESCRIPTIONS

Gun No. 1

<u>NO.</u>	<u>Depth</u> (m)	<u>Rec.</u> (mm)	<u>Description</u>
49	1430.8	38	<u>SANDSTONE</u> : mottled dark grey and green, clear to translucent and green stained, very fine to very coarse (up to 3mm) very poorly sorted, rounded to well rounded, abundant grey clay to glauconite to silty pyrite matrix, matrix supported, weak silica cement, abundant glauconite, abundant disseminated pyrite, dispersive, firm to moderately hard, no visual porosity, no fluorescence. Gas: 30/-/-/-/-/-
50	1428.9	40	<u>SANDSTONE/SILTSTONE</u> : medium brown, well rounded clear to translucent quartz pebbles (up to 5mm) in medium brown arenaceous siltstone matrix, very dispersive, matrix supported, abundant nodular glauconite, abundant disseminated micropyrte, firm, no visual porosity, no fluorescence. Gas: 27/7/71/19/73/35
51	1427	30	<u>SILTSTONE</u> : medium brown, arenaceous with abundant very dispersive argillaceous matrix, homogeneous, micromicaceous, microcarbonaceous and carbonaceous fragments, blocky, firm. Gas: 36/13/66/19/52/27

ADMIRAL 1

SIDEWALL CORE DESCRIPTIONS

Gun No. 1

<u>NO.</u>	<u>Depth</u> (m)	<u>Rec.</u> (mm)	<u>Description</u>
52	1359.6	25	<u>CLAYSTONE</u> : light grey, homogeneous, silty, common disseminated quartz grains, lignitic (root) casts, micromicaceous, blocky, firm. Gas: 9/-/-/-/-/-
53	1314	25	<u>CLAYSTONE</u> : medium brown, vaguely laminated parallel to core axis, slightly plastic, slightly sticky, subfissile, firm to soft. Gas: 54/98/87/10/11/TR
54	1258.8	30	<u>CLAYSTONE</u> : as above, distorted laminae, root casts (lignitic), micromicaceous, trace arenaceous siltstone ?clasts and lenses, blocky, firm. Gas: 54/104/122/42/61/14
55	1275	45	<u>SILTSTONE</u> : medium brown, arenaceous with abundant brown dispersive argillaceous matrix, common coarse to very coarse quartz grains, common nodular pyrite, micromicaceous, trace carbonaceous flecks, blocky, firm. Gas: 342/280/81/96/157/90
56	1268.7	35	<u>SANDSTONE</u> : light grey, clear to translucent, very fine to fine, predominately fine, well sorted, subrounded to rounded, trace argillaceous matrix, weak silica cement, abundant very fine glauconite, micromicaceous, trace pyrite, friable, fair visual porosity, no fluorescence. Gas: 18/-/-/-/-/-
57	1254	50	<u>SILTSTONE</u> : tan, arenaceous with brown to yellow/brown argillaceous/micaceous matrix, homogeneous, trace glauconite, trace mica, blocky, firm. Gas: 20/4/25/TR/-/-

ADMIRAL 1

SIDEWALL CORE DESCRIPTIONS

Gun No. 1

<u>NO.</u>	<u>Depth</u> (m)	<u>Rec.</u> (mm)	<u>Description</u>
58	1241.4	50	<u>SILTSTONE</u> : as above with common coarse quartz grains and common glauconite nodules. Gas: 72/151/3/3/10/-
59	1238	30	<u>SANDSTONE</u> : mottled medium grey and yellow/brown, very fine to medium, poorly sorted, rounded to well rounded, abundant grey argillaceous matrix (dispersive), matrix supported, abundant yellow brown (? altered glauconite) nodules, trace weak calcareous cement, gastropod (4mm) cast with remnant altered shell fragments, common grain dissolution vughs, trace mica, firm, no visual (interconnected) porosity, trace mineral (calcite) fluorescence. Gas: 35/4/7/22/5/-
60	1234.5	20	<u>CLAYSTONE</u> : light grey, homogeneous, trace micromicaceous specks, dispersive, rare carbonaceous flecks, blocky, firm. Gas: 65/7/6/4/10/6

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# APPENDIX 3

THE SCHLUMBERGER REPORT

SONIC CALIBRATION

AND GEOGRAM

PROCESSING REPORT

ADMIRAL No.1

HAS BEEN DISTRIBUTED SEPARATELY