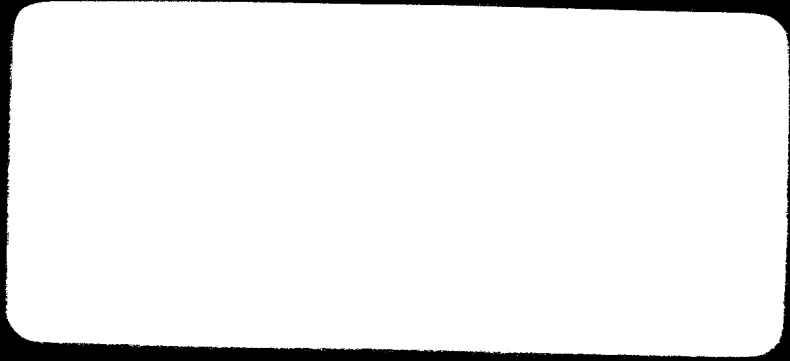


DEPT. NAT. RES & ENV



PE900983



PETROLEUM DIVISION
WELL COMPLETION REPORT

WHALESHARK-1

VOLUME 1
BASIC DATA
24 FEB 1993

GIPPSLAND BASIN
VICTORIA

ESSO AUSTRALIA LIMITED

Compiled by - Greg Clota
August 1992

WHALESHARK-1
WELL COMPLETION REPORT
VOLUME 1: BASIC DATA

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ESSO AUSTRALIA LTDWELL DATA RECORDWHALESHARK-1

LOCATION : Latitude: 38° 23' 45.08" South
Longitude: 148° 53' 26.08" East
X= 665117 mE
Y= 5748531 mN
Map Projection: UTM Zone 55
Geographical Location: Bass Strait, Victoria
Field: WHALESHARK

PERMIT : Vic/P24

ELEVATION : 22m

WATER DEPTH : 717.3m

TOTAL DEPTH : 2870m (Driller) 2865m (Logger)

PLUG BACK TYPE : Cement Plug

REASONS FOR PLUGGING BACK : Plug and Abandon

MOVE IN : 29/07/92 2016 hours

SPUDDED : 02/08/92 1330 hours

REACHED TD : 16/08/92 2200 hours

RIG RELEASED : 27/08/92 1430 hours

OPERATOR : Esso Australia Resources Ltd.

PERMITTEE OR LICENCEE : BHP Petroleum (Victoria) Pty Ltd and Esso Australia Resources Ltd.

ESSO INTEREST : 50%

OTHER INTEREST : 50%

CONTRACTOR : Atwood Oceanics

RIG NAME : Atwood Falcon

EQUIPMENT TYPE : Semi-submersible

TOTAL RIG DAYS : 36.35

DRILLING AFE NO : L66012001

TYPE COMPLETION : Plugged and Abandoned

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

OPERATIONS SUMMARYMOVING/MOORING

After abandoning Moonfish-1 ST1, the Atwood Falcon was towed by the MV Lady Caroline to the Whaleshark-1 location. The rig departed the Moonfish-1 ST1 location at 0330 hours, 21 July 1992 and arrived at the Whaleshark-1 location with the No.7 anchor on bottom at 2016 hours, 29 July 1992.

The MV Maersk Lifter set the anchors using the MV Flinders Tide to mark the anchor position. The rig location was 18m on a True bearing of 037 Deg from the called location. After relocating the rig and respudding Whaleshark-1 the final rig position was 16m on a True bearing of 270 Deg from the called location. Rotary table to seabed was 739.5m and water depth was 717.3m.

DRILLING OPERATIONSa) 36" Hole/30" Casing

The 26" bit/36" hole opener BHA was made up and stabbed into the TGB. The well was spudded at 1330 hours, 2 August 1992 and drilled from 739m to 775.5m. After a wiper trip the hole was displaced with a high viscosity gel pill. The 30" casing was run with the PGB. When, the PGB was landed it had a 5 Deg angle. The 30" casing was retrieved and the rig shifted to respud Whaleshark-1 at 1800 hours, 3 August 1992.

A 17 1/2" bit with slick BHA was used to drill from 738m to 775m pumping high viscosity sweeps as necessary. A trip was made and the BHA was modified with the addition of tandem 26" and 36" hole openers. The hole was opened to 36" from 739m to 775m. A wiper trip was made and the hole was displaced with high viscosity mud.

36.13m of 30" X52 casing was run and cemented with 500 sacks of class "G" neat cement plus 2% calcium chloride. The casing shoe was set at 773.3m.

b) 17 1/2" Hole/13 3/8" Casing

A rerun Hughes 17 1/2" X3A bit was RIH to top of cement at 768m. The cement and float shoe were drilled out and the rat hole cleaned prior to drilling ahead from 775m to 1505m. A wiper trip was made to the 30" casing shoe prior to displacing the hole with high viscosity gel mud. The drillstring was tripped and the 13 3/8" casing was run (the single shot survey was 1 1/2 Deg N43W).

52 joints of 53.5 lb/ft and 11 joints of 68 lb/ft K55 BTC 13 3/8" casing with a 24" pile joint and 18 3/4" wellhead were run and landed with drillpipe. The casing was cemented with a lead slurry of 1430 sacks of class "G" cement plus 3.1% pre-hydrated gel and followed by a tail slurry of 670 sacks of class "G" neat cement. The wellhead was jetted clear of cuttings and cement before tripping out the running tools.

The BOP's were run and landed. The stack was function tested on both pods and the shear rams, connector and casing were tested to 200/1500 psi.

c) 12 1/4" Hole

A 12 1/4" Hycalog DS40HF PDC bit in combination with an F2000M mud motor was made up and used to drill out the 13 3/8" casing, clean out the rat hole and drill 3m of

new formation to 1508m. A Phase II PIT was performed, without leak-off (EMW = 14.8ppg). Drilling continued from 1508m to 1901m where a trip was made to pick up a slow speed mud motor due to low penetration rates.

A new 12 1/4" Hycalog DS40HF bit and F2000S mud motor were made up and drilled ahead from 1901m. The dump valve on the mud motor failed at 2425m necessitating a trip. A new 12 1/4", Hughes ATM11HG, bit was made up and a rotary assembly was RIH to drill ahead from 2425m to 2436m. The rate of penetration was considered too low and a bit trip was made.

A rerun 12 1/4" Hycalog DS40HF bit was made up and run into the hole on a rotary drilling assembly. Drilling proceeded from 2436m to 2441m. The penetration rate did not improve and a further bit trip was made. A new 12 1/4" Reed HP51AJ bit was made up and run into the hole and drilled ahead from 2441m to 2870m (TD). Samples were circulated at 2721m, 2754m and 2851m for geological evaluation. A wiper trip was made to the 13 3/8" casing shoe and the hole circulated clean prior to pulling out of the hole to run E-Logs.

Suite 1 of the E-Logs consisted of DLL-MSFL-BHC-SP-GR-AMS, CSAT-GR-AMS, FMS-LDL-CNL-NGS-AMS, and CST.

After the electric logging program open ended drill pipe was run into the hole. Four cement plugs were spotted and tagged over the following intervals; 2800 - 2675m, 1519 - 1390m, 880 - 791m and 791-780m.

ESSO AUSTRALIA LTD.
 WHALESHARK-1 FINAL WELL REPORT
 CASING DATA

OD (In.)	WEIGHT (LB/FT)	GRADE	CONNECTION	LENGTH (M)	SHOE DEPTH (mMD-RKB)	CENTRALIZER POSITION	REMARKS
<u>30</u>	310	X-52	ST-2	12.06	<u>773.30</u>	NONE	FLOAT SHOE JOINT
30	310	X-52	ST-2 x ALT-2	11.74		NONE	1 INTERMEDIATE JOINT-XO
30	457	X-52	ALT-2	12.33		NONE	30" WH # M154810
				=====			RUN WITH 11.44m X-TENSION
				36.13			AND VETCO PGB WITH CIW TOP
							TOP OF 30" WH @ 737.30m
<u>13-3/8</u>	54.5	K-55	BTC	12.10	<u>1489.20</u>		FLOAT SHOE JOINT
	54.5	K-55	BTC	11.82		1 ACROSS MIDDLE	FLOAT JOINT
	54.5	K-55	BTC	12.18		1 ACROSS MIDDLE	FLOAT COLLAR JOINT
	54.5	K-55	BTC	572.76		1 ACROSS FIRST SEVEN COLLARS	50 INTERMEDIATE JOINTS
	68	K-55	BTC	130.34		NONE	11 INTERMEDIATE JOINTS
	68	K-55	BTC	13.60		NONE	20" ALT-2 x 13-3/8" BTC XO
				=====			OF 4.11m + 8.68m HPWH
				752.80		(# SN 862980)-----	18-3/4" 10K PSI SG-5-WETCO
						TOP OF WH-736.4m	THREE STOP RINGS USED ON LOWEST THREE CENTRALIZERS

ESSO AUSTRALIA LTD.
 WHALESARK-1 FINAL WELL REPORT
 CEMENT DATA

DATE (1992)	TYPE JOB	INTERVAL (mMD-RKB)	TYPE CEMENT	VOLUME (SX)	SLURRY WEIGHT (PPG)	ADDITIVES	MIX WATER	REMARKS
4-AUG	30" CASING PRIMARY	773.3-739	CLASS "G"	500	15.8	2% CaCl ₂	SW	CEMENT THROUGH DP STINGER. CMT VOLUME CALCULATED TO PROVIDE 100% EXCESS ABOVE GAUGE HOLE VOLUME WITH TOC @ SEAFLOOR.
8-AUG	13-3/8" PRIMARY-LEAD	1489.2-739	CLASS "G"	1430	12.5	3.1% PH-G	FW	CMT VOLUME BASED ON GAUGE HOLE HOLE DIAMETER-100% EXCESS. BUMPED PLUG W/ 1500 PSI. FLOATS OK. HAD GOOD CEMENT RETURNS @ ML.
	13-3/8" PRIMARY-TAIL		CLASS "G"	670	15.8	----	SW	
18-AUG	P & A PLUG No. 1	2800-2675	CLASS "G"	350	15.8	----	FW	SET ACROSS LATROBE SAND. TAGGED WITH 15K# S/O.
19-AUG	P & A PLUG No. 2	1519-1390	CLASS "G"	400	15.8	----	SW	SET ACROSS 13-3/3" SHOE. TAGGED-15K# S/O, P/T 1500 PSI.
19-AUG	P & A PLUG No. 3	880-791	CLASS "G"	250	15.8	2% CaCl ₂	SW	SET AS SURFACE PLUG. TAGGED WITH 15K# S/O.
20-AUG	P & A PLUG No. 4	791-780	CLASS "G"	85	15.8	----	SW	SET AS SECOND SURFACE PLUG. NOT TAGGED.

5.

SAMPLES, CONVENTIONAL CORES, SIDEWALL CORESInterval (m)Type

1505 - 2870

Cuttings samples - 3 sets of washed and oven dried a
and 1 set of bagged air dried cuttings.Samples from 1505 - 2470m at 10m intervals.
Samples from 2470 - 2870m at 5m intervals

CST, 30 Shot, Recovered and Bought 30 (100%).

6.

WIRELINE LOGS AND SURVEYSType and ScaleFromToSuite 1

DLL-MSFL-SP-BHC-GR-AMS

1:200

2862.5

2650

CSAT-GR-AMS (Checkshots)

18 Levels

2850

1046

FMS-LDL-CNL-NGS-AMS

1:200

2860

2400

CST

(30 Shot/30 Recovered) 2850

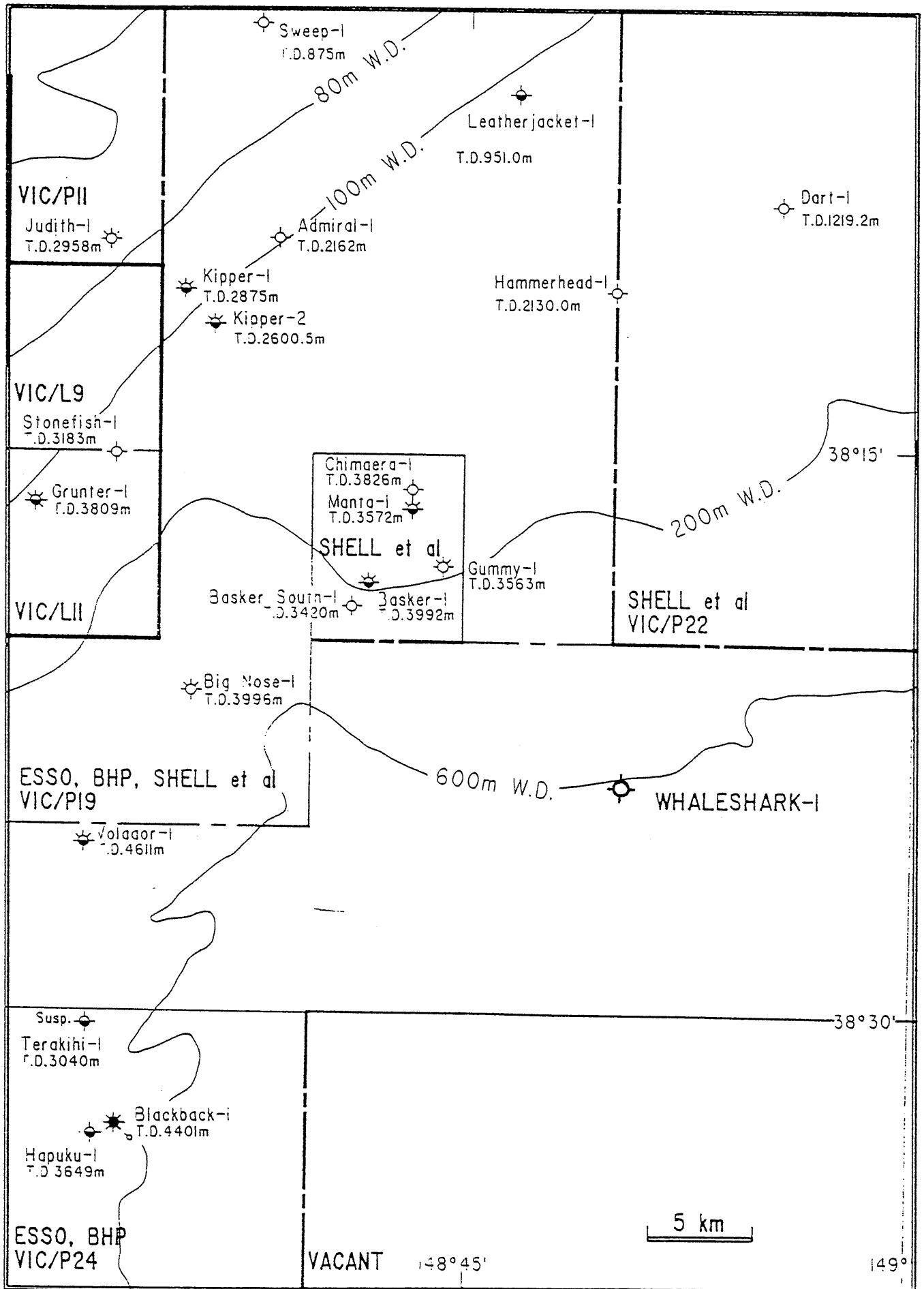
1561

*TEMPERATURE RECORD
WHALESARK*

LOGGING RUN	THERMO DEPTH (M)	MAX REC TEMP (C ^o)	CIRCULATION TIME (t _k) (hours)	TIME AFTER CIRCULATION STOPPED (t)	HORNER TEMP (C ^o)	GEOHERMAL GRADIENT (C ^o /km)
DLL-MSFL-BHC-SP-GR-AMS	2833	55	2.0	13.0	66.2	26.66
CSAT-GR	2859	58	2.0	19.5	66.2	26.66
FMS-LDL-CNL-NGS-AMS	2850	61	2.0	24.75	66.2	26.66

FIGURES

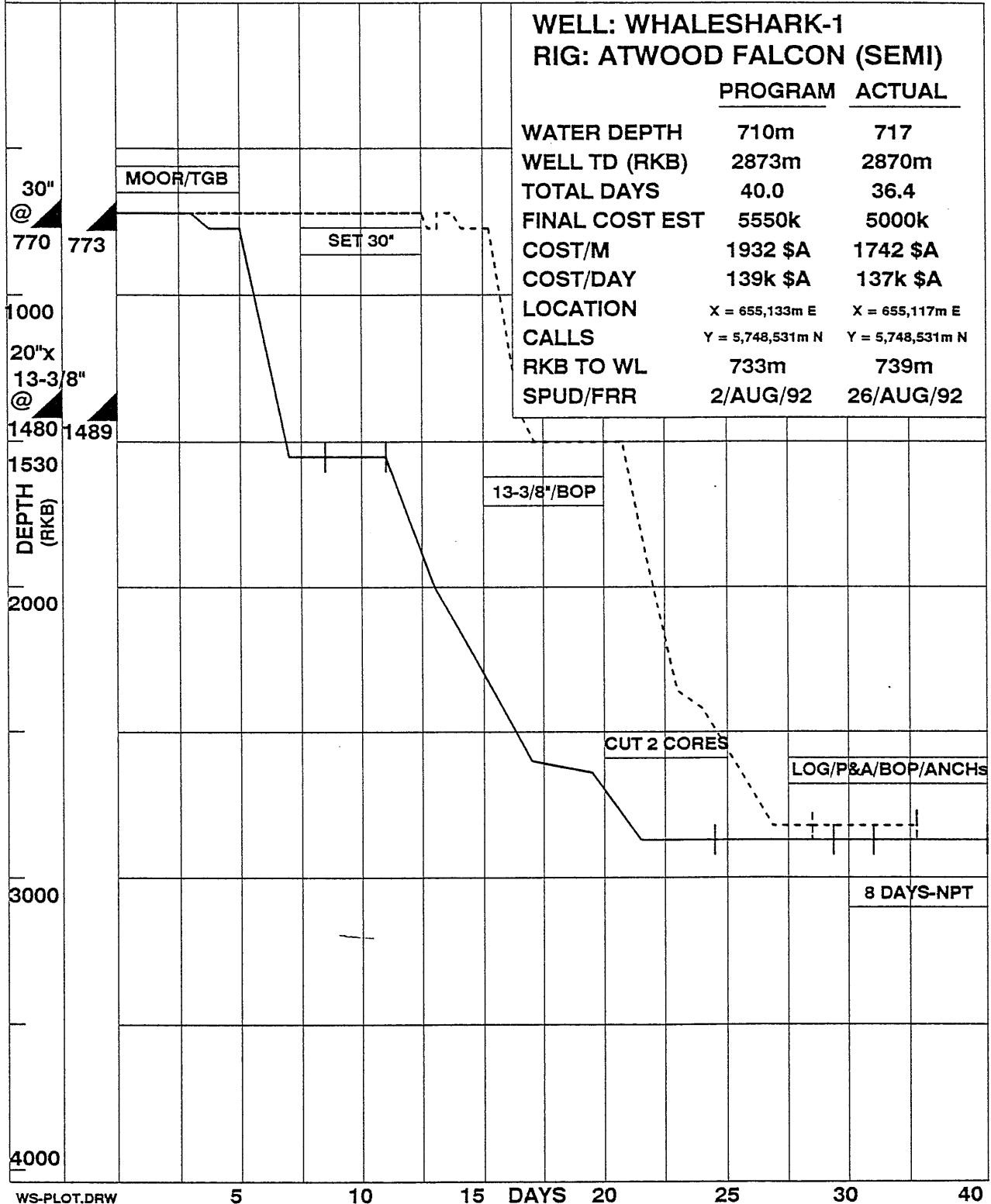
LOCALITY MAP PROPOSED WHALESHARK-1



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WELL PROGRESS CURVE

CSG PTS	
PLAN	FINAL



ESSO AUSTRALIA LTD.

WHALESHARK-1 FINALIZED WELL SKETCH

RKB

MSL @ 22 m RKB

ALL DEPTHS FROM RKB

WATER DEPTH = 717 m

30" SUSPENSION JT
TOP @ 737m RKB
ML @ 739 m RKB

TOP OF WH @ 736 m RKB
18-3/4" 10k# SG-5 WH
24" x 3" WT PILE
ABOVE 20" 133# X-56
ALT-2 SWEGE TO 13-3/8"

TOC @ SEAFLOOR
BOTH CASINGS

TOC TAIL @ 1337m

30" 457# X-52 ALT-2
310# X-52 ST-2 W/SHOE
SHOE @ 773m
26" X 36" HOLE TO 775m

13-3/8" 54.4/68# K-55 BTC
SHOE @ 1489 m
(WITH 20" JT/PILE/HPWH)

"STRAIGHT HOLE"
MAX ANGLE-7 DEG

17-1/2" HOLE TO 1505 m

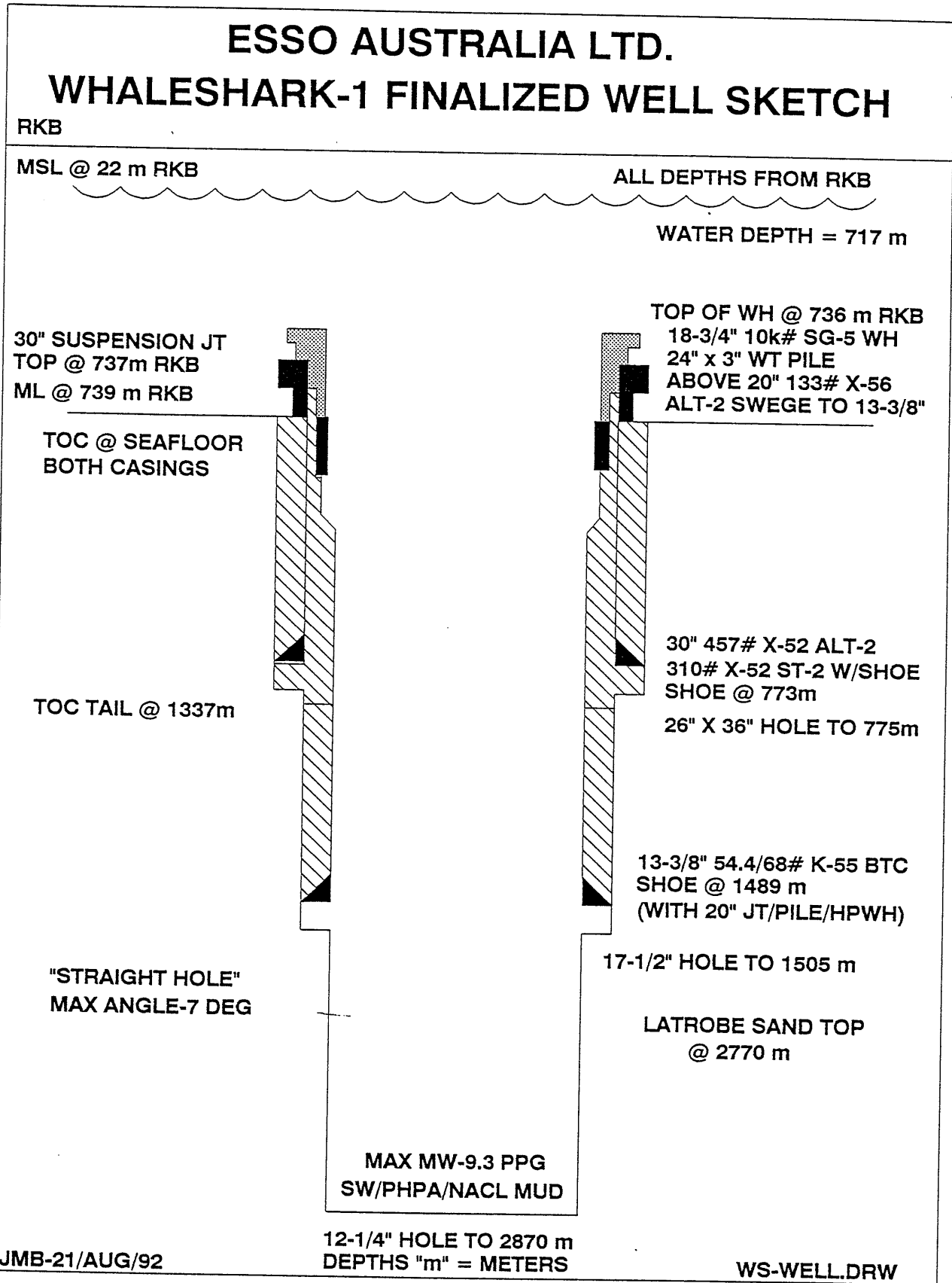
LATROBE SAND TOP
@ 2770 m

MAX MW-9.3 PPG
SW/PHPA/NACL MUD

JMB-21/AUG/92

12-1/4" HOLE TO 2870 m
DEPTH "m" = METERS

WS-WELL.DRW



ESSO AUSTRALIA LTD.

WHALESHARK-1 P&A WELLBORE SKETCH

RKB

MSL @ 22 m RKB

ALL DEPTHS FROM RKB

WATER DEPTH = 717 m

FISH LEFT IN WH-12-1/4" BIT/11-3/4" T/S MULTI-STRING CUTTER WITH 3-6-1/4" KNIVES
 12-1/8 SS/12-1/4" SS/3-PONY SDC/XO/14-3/8" MARINE SWIVEL W-21" OD RING-15.74m

TOP OF 18-3/4" WH @ 736.4m TWISTED-OFF 6-5/8" R BOX UP PGB POSTS @ 734.3m
 VETCO-10K#-SG-5 TOF @ 736.4m
 VETCO PGB/CIW TGB BOF @ 752.1m
 ML @ 739 m RKB

TOC @ SEAFLOOR
 BOTH CASINGS
 20"/13-3/8" CUT @ 751m
 STUB TOP-12m BML

PLUG #4 (791-780)
 CLASS G NEAT-WITH SW
 85 SX-NO 2% CACL2
 PLUG #3 (880-791)
 CLASS G NEAT-WITH SW
 250 SX-WITH 2% CACL2
 TAG WITH 15K#
 30" 457# X-52 ALT-2
 310# X-52 ST-2 W/SHOE
 SHOE @ 773m
 36" HOLE TO 775m

TOC TAIL @ 1337m

PLUG #2 (1519-1390)
 CLASS G NEAT-WITH SW
 400 SX-TAG WITH 15K#
 TESTED TO 1500 PSI

13-3/8" 54.4/68# K-55 BTC
 SHOE @ 1489 m

"STRAIGHT HOLE"
 MAX ANGLE-7 DEG

17-1/2" HOLE TO 1505 m

9.3# NACL MUD

9.3# NACL MUD

LATROBE SAND TOP
 @ 2770 m

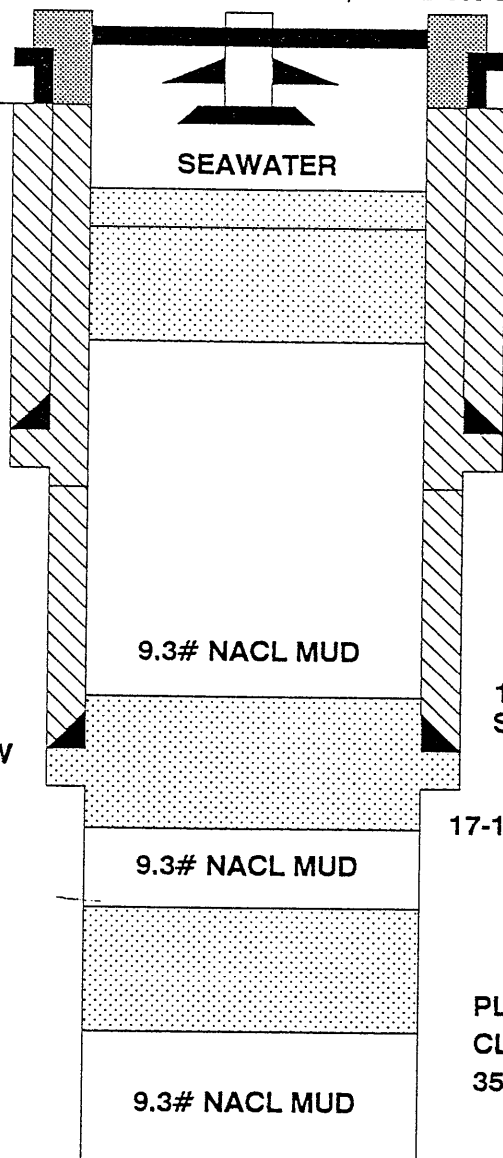
9.3# NACL MUD

PLUG #1 (2800-2675)
 CLASS G NEAT-WITH FW
 350 SX-TAG WITH 15K#

12-1/4" HOLE TO 2870 m
 DEPTHS "m" = METERS

JMB-24/AUG/92

WS-P&A.DRW



WHALESHARK-1

HORNER TEMPERATURE PLOT

WIRELINE LOGGING SUITE 1

tk=2hrs

Δt = time since last circulation

Geothermal Gradient=0.02666°C/M
=26.66°C/km

KB Height=22m

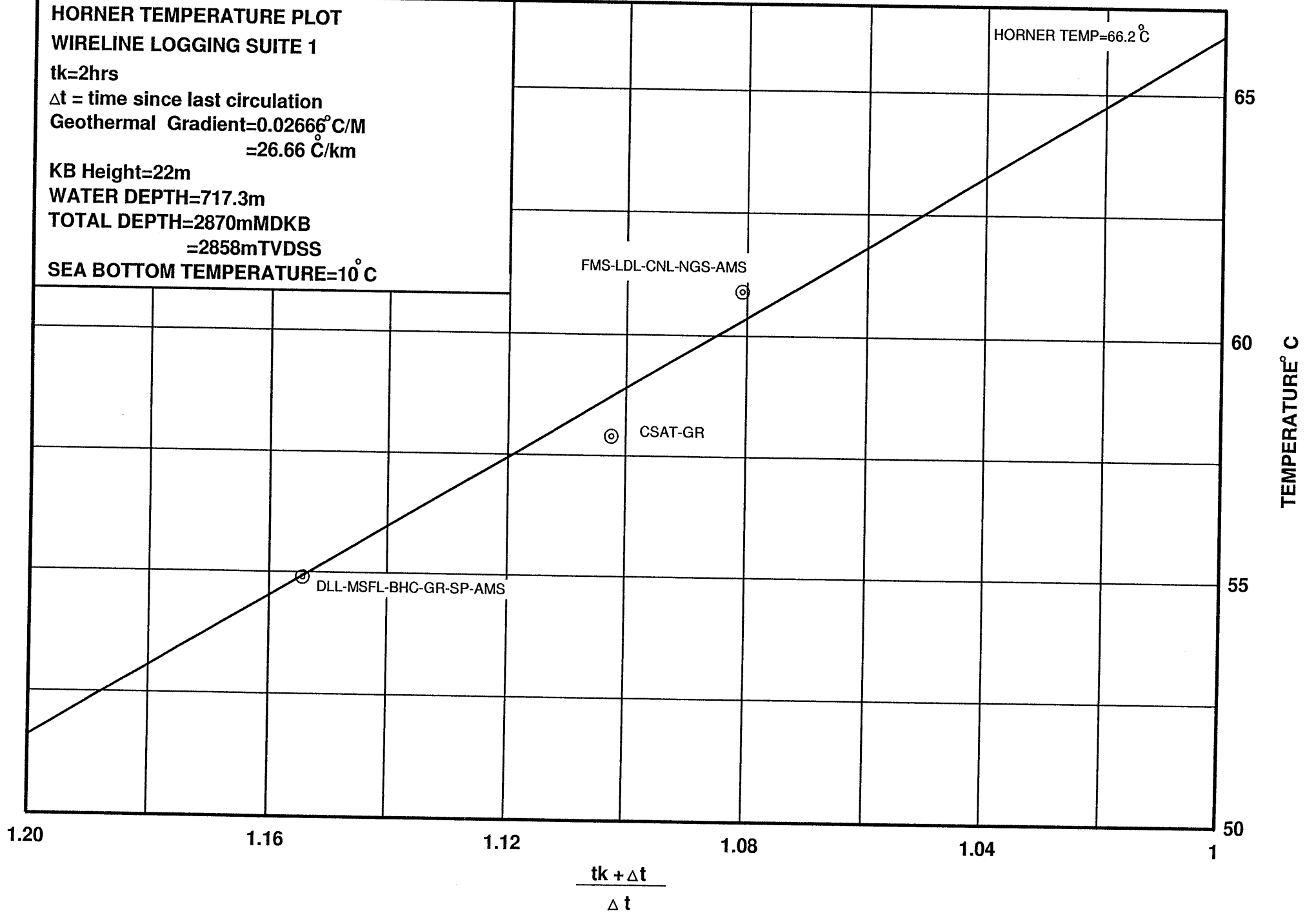
WATER DEPTH=717.3m

TOTAL DEPTH=2870mMDKB

=2858mTVDSS

SEA BOTTOM TEMPERATURE=10°C

HORNER TEMP=66.2°C



APPENDIX 1.

WHALESHARK 1

Lithology Descriptions

<u>Depth(m)</u>	<u>%</u>	<u>Description</u>
1505-10	100	LIMESTONE: Medium grey, brown grey, olive grey, calcarenite, fine, abundant micritic/argillaceous cement/matrix, trace glauconite, trace quartz sand, trace lithic fragments, firm, brittle, blocky to angular fragments in part (60% cement contamination).
1510-20	100	LIMESTONE: As above, calcarenite, (30% cement contamination).
1520-30	100	LIMESTONE: Grey brown, olive grey, occasionally medium grey, calcilutite, trace calcareous sand, rare quartz sand, trace glauconite, very argillaceous, firm, slightly dispersive, massive to blocky, platy in part.
1530-40	100	LIMESTONE: Grey brown, olive grey, calcisiltite, very argillaceous, rare forams, trace fossil fragments, occasional glauconite, trace lithic fragments/nodules, soft to dispersive, occasionally firm, amorphous to massive.
1540-50	100	LIMESTONE: Light to medium grey, grey brown, calcarenite, very fine, trace glauconite, trace fossil fragments, trace carbonaceous fragments, firm to brittle, blocky, locally grades to calcisiltite as above.
1550-60	100	LIMESTONE: Grey brown, olive grey, calcilutite, trace lithic fragments, trace calcareous sand, rare forams, soft to dispersive, massive, amorphous, occasionally grades to calcisiltite/calcarenite, as above.
1560-70	100	LIMESTONE: Light brown grey, olive grey, light grey, calcarenite, fine to very fine, abundant argillaceous matrix, micritic cement, trace forams, trace lithic fragments, firm, massive to blocky.
1570-80	100	LIMESTONE: Light grey, light brown grey, olive grey, calcarenite, very fine to fine, abundant argillaceous matrix, micritic, trace forams, trace ooids, trace lithic fragments, firm to loose grains, massive.
1580-90	100	LIMESTONE: As above, calcarenite, becoming increasingly argillaceous, grades to calcisiltite.

WHALESHARK 1

<u>Depth (m)</u>	<u>%</u>	<u>Description</u>
1590-1600	100	LIMESTONE: Light grey brown, medium grey, olive grey, calcarenite, very fine to fine, common argillaceous matrix, micritic, trace glauconite, trace lithic fragments, trace fossil and foram fragments, firm to occasionally moderately hard, blocky to occasionally loose.
1600-10	100	LIMESTONE: As above, calcarenite, becoming increasingly argillaceous, grades to calcisiltite in part.
1610-20	100	LIMESTONE: As above, calcarenite/calcisiltite.
1620-30	100	LIMESTONE: Light grey brown, medium grey, olive grey, calcarenite, very fine to fine, moderately to very argillaceous, micritic, trace lithic fragments, trace carbonaceous fragments, rare fossil fragments, trace glauconite, firm to moderately hard, blocky.
1630-40	100	LIMESTONE: As above, calcarenite.
1640-50	100	LIMESTONE: As above, calcarenite, common fossil/skeletal fragments.
1650-60	100	LIMESTONE: Off white, light brown grey, olive grey, calcarenite, very fine to fine, micritic cement, moderately argillaceous, trace to common glauconite, trace carbonaceous fragments, trace ooids, moderately hard, blocky.
1660-70	100	LIMESTONE: Calcarenite as above.
1670-80	100	LIMESTONE: Medium grey, olive grey, brown grey, calcarenite (grading to calcisiltite) very fine to occasionally fine, moderately to very argillaceous, micritic, trace ooids, trace foram and fossil fragments, trace glauconite, trace lithic fragments, rare quartz grains, firm, blocky.
1680-90	100	LIMESTONE: Medium grey, grey brown, olive grey, calcarenite very fine, very argillaceous, micritic, trace glauconite, trace lithic fragments, trace carbonaceous fragments, moderately hard, firm, blocky.
1690-1700	100	LIMESTONE: Calcarenite, as above.
1700-10	100	LIMESTONE: Calcarenite, as above, trace foram, trace to rare nodular pyrite, moderately hard, blocky.

WHALESHARK 1

<u>Depth (m)</u>	<u>%</u>	<u>Description</u>
1710-20	100	LIMESTONE: Medium grey, dark green grey, brown grey, calcarenite, very fine to occasionally fine, micritic cement, moderately to locally very argillaceous, trace quartz sand, trace glauconite, trace lithic fragments, slightly carbonaceous, trace shell fragments, trace gastropods, firm to moderately hard, blocky.
1720-30	100	LIMESTONE: Calcarenite, as above.
1730-40	100	LIMESTONE: Medium grey, grey brown, olive grey, calcisiltite, very argillaceous, micritic, slightly sandy, slightly carbonaceous, trace lithic fragments, firm to moderately hard, blocky, locally grades to calcarenite as above.
1740-50	100	LIMESTONE: Medium dark grey, olive grey, calcarenite, very fine, moderately argillaceous, micritic, trace glauconite, trace lithics, firm to moderately hard, blocky.
1750-60	100	LIMESTONE: Medium dark grey, olive grey, brown grey, calcarenite, very fine, moderately to very argillaceous, micritic, trace lithic and carbonaceous fragments, trace to rare ooids, firm, moderately hard in part, blocky.
1760-70	100	LIMESTONE: Predominantly as above, calcarenite becoming increasingly argillaceous, grades to calcisiltite.
1770-80	100	LIMESTONE: As above, calcarenite grades to calcisiltite.
1780-90	100	LIMESTONE: As above, calcarenite grading to calcisiltite, trace shell debris.
1790-1800	100	LIMESTONE: Brown grey, olive grey, calcisiltite, very argillaceous, micritic, trace calcareous sand, trace lithic fragments, trace glauconite, rare coal fragments, soft to firm, slightly dispersive, massive to blocky.
1800-10	100	LIMESTONE: As above, calcisiltite.
1810-20	100	LIMESTONE: As above, calcisiltite.
1820-30	100	LIMESTONE: As above, calcisiltite.
1830-40	100	LIMESTONE: Brown grey, medium dark grey, olive grey, calcarenite, very fine to occasionally fine, common argillaceous matrix, micritic, trace lithic fragments, trace

WHALESHARK 1

<u>Depth (m)</u>	<u>%</u>	<u>Description</u>
		glaucanite, moderately hard, blocky, occasional grades to calcilutite.
1840-50	100	LIMESTONE: Predominantly medium dark grey, olive grey, grey brown, calcarenite grades to calcisiltite, very fine, moderately argillaceous, slightly carbonaceous, trace glaucanite, slightly pyritic, moderately hard, blocky.
1850-60	100	LIMESTONE: Light brown, grey brown, calcilutite, slightly silty, trace lithic fragments, trace pyrite, soft to plastic, moderately hard in part, massive to blocky.
1860-70	100	LIMESTONE: light brown, grey brown, olive grey, calcilutite, becoming silty/sandy, common very fine calcareous sand, trace lithic fragments, trace carbonaceous flecks, trace glaucanite, firm to moderately hard, massive to blocky.
1870-80	100	LIMESTONE: Light grey brown, olive grey, calcarenite, very fine to fine, moderately argillaceous, micritic, trace glaucanite, trace carbonaceous and lithic fragments, moderately hard, blocky.
1880-90	100	LIMESTONE: As above calcarenite grading to calcisiltite.
1890-1900	100	LIMESTONE: Predominantly as above, calcarenite, occasional calcisiltite.
1900-10	100	LIMESTONE: As above, increasingly calcisiltite, moderately to very argillaceous in part.
1910-20	100	LIMESTONE: Grey brown, olive grey, calcarenite, very fine to fine, moderately argillaceous, micritic, trace glaucanite, trace carbonaceous and lithic fragments soft to moderately hard, blocky.
1920-30	100	LIMESTONE: As above, light grey brown, moderately hard to occasionally hard.
1930-40	100	LIMESTONE: Light grey brown, grey brown, medium grey, olive grey, calcarenite, very fine to fine, moderately argillaceous, trace glaucanite, trace carbonaceous and lithic fragments, moderately hard to occasionally hard, blocky, trace sparitic calcite.
1940-50	100	LIMESTONE: Olive grey, brown grey, medium grey brown, calcarenite, very fine to fine, moderately to very argillaceous, trace

WHALESHARK 1

<u>Depth (m)</u>	<u>%</u>	<u>Description</u>
		glaucanite, trace carbonaceous specks, trace lithics, moderately hard, occasionally hard, blocky, platy in part.
1950-60	100	LIMESTONE: Predominantly as above, calcarenite becoming locally very silty grades to calcisiltite, trace quartz sand.
1960-70	100	LIMESTONE: As above, calcarenite grading to calcisiltite, trace gastropods, moderately hard, blocky to platy.
1970-80	100	LIMESTONE: Grey brown, olive grey, off white, light grey, calcarenite, very fine to fine, very argillaceous, micritic, trace ooids (occasionally oolitic), trace carbonaceous flecks, rare glauconite, trace lithic fragments, firm to moderately hard, occasionally hard, blocky.
1980-90	100	LIMESTONE: As above calcarenite.
1990-2000	100	LIMESTONE: Grey brown, olive grey, occasionally off white to light grey, calcarenite, very fine to fine, moderately argillaceous, micritic, trace vein calcite, trace glauconite, trace to common lithic fragments, trace carbonaceous fragments, slightly fossiliferous in part, moderately hard, blocky.
2000-10	100	LIMESTONE: Calcarenite, predominantly as above, trace to common fossil/shelly fragments, trace ooids (oolites), moderately hard to hard, blocky.
2010-20	100	LIMESTONE: Calcarenite as above.
2020-30	100	LIMESTONE: Calcarenite as above.
2030-40	80	CALCISILTITE: Light grey, light brown grey, moderately argillaceous, trace carbonaceous and lithic fragments, soft.
	20	CALCARENITE: Very fine to fine, brown grey, moderately argillaceous, trace glauconite, trace carbonaceous and lithic fragments, micritic, moderately hard to hard, blocky.
2040-50	70	CALCISILTITE: As above.
	30	CALCARENITE: As above, very fine, firm to moderately hard.
2050-60	90	CALCISILTITE: As above.
	10	CALCARENITE: As above.

WHALESHARK 1

<u>Depth (m)</u>	<u>%</u>	<u>Description</u>
2060-70	100	LIMESTONE: Brown grey, green grey, olive grey, occasionally light grey, calcarenite very fine to fine, moderately argillaceous, micritic, trace glauconite, trace carbonaceous fragments, trace lithics, firm to moderately hard, occasionally hard.
2070-80	100	LIMESTONE: Olive grey, medium grey, calcarenite, very fine, becoming increasingly argillaceous and micritic, trace glauconite, trace carbonaceous and lithic fragments, firm to moderately hard, grading to calcisiltite.
2080-90	70	CALCISILTITE: Light to medium grey, trace glauconite, trace carbonaceous fragments, argillaceous, soft.
	30	CALCARENITE: Brown grey, olive grey, very fine, moderately argillaceous, micritic, trace glauconite, trace carbonaceous fragments, firm to moderately hard, blocky.
2090-2100	100	LIMESTONE: Light to medium grey, olive grey, grey brown, calcarenite, very fine, occasionally fine, grading to calcisiltite, argillaceous, micritic, trace glauconite, trace carbonaceous fragments, trace lithics, soft to moderately hard, blocky.
2100-10	100	LIMESTONE: Predominantly calcarenite as above, very fine to fine.
2110-20	100	LIMESTONE: As above, very fine, light brown grey, becoming more argillaceous and micritic, grading to calcisiltite.
2120-30	100	LIMESTONE: Light to medium grey, light brown grey, brown grey, olive grey, predominantly calcisiltite, minor calcarenite, argillaceous, micritic, trace glauconite, trace carbonaceous fragments, soft, occasionally moderately hard and blocky (calcarenite).
2130-40	100	LIMESTONE: As above, increasingly olive grey, increasingly calcarenitic.
2140-50	100	LIMESTONE: As above.
2150-60	100	LIMESTONE: Olive grey, brown grey, calcisiltite to very fine calcarenite, argillaceous, micritic, trace glauconite, trace carbonaceous fragments, trace lithics, soft to firm, occasionally hard, blocky in part.
2160-70	100	LIMESTONE: As above.
2170-80	100	LIMESTONE: Grey brown, olive grey, calcisiltite, very argillaceous, micritic, trace

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<u>Depth (m)</u>	<u>%</u>	<u>Description</u>
		calcareous sand in part, trace lithics, trace carbonaceous fragments, soft to firm, dispersive, massive, marly texture.
2180-90	100	LIMESTONE: As above, calcisiltite, occasionally grades to calcarenite.
2190-2200	100	LIMESTONE: As above calcisiltite.
2200-10	100	LIMESTONE: Grey brown, olive grey, occasionally light grey, calcisiltite grades to very fine calcarenite, moderately to very argillaceous, micritic, trace carbonaceous fragments, slightly carbonaceous, firm, massive to blocky.
2210-20	100	LIMESTONE: Calcisiltite, slightly marly texture, predominantly as above.
2220-30	100	LIMESTONE: As above, slightly marly.
2230-40	100	LIMESTONE: Olive grey, brown grey, calcisiltite, moderately to very argillaceous, slightly sandy, trace lithic fragments, moderately hard to firm, massive to blocky, marly texture in part.
2240-50	100	LIMESTONE: Light brown grey, olive grey, grey brown, calcarenite, very fine, very argillaceous, silty in part, trace lithic fragments, trace carbonaceous specks, firm to occasionally moderately hard, blocky to massive.
2250-60	100	LIMESTONE: As above, calcarenite.
2260-70	100	LIMESTONE: As above, calcarenite locally becoming very argillaceous/silty, grades to calcisiltite.
2270-80	100	LIMESTONE: Light grey, brown grey, olive grey in part, calcisiltite, very argillaceous, slightly sandy in part, trace carbonaceous fragments, trace glauconite, soft to firm, massive, marly texture.
2280-90	100	LIMESTONE: As above, calcisiltite.
2290-2300	100	LIMESTONE: Calcisiltite as above, grading to very fine calcarenite in part, trace vein calcite, trace fossils.
2300-10	100	LIMESTONE: As above.
2310-20	100	LIMESTONE: Medium grey, brown grey, olive grey, calcisiltite, occasionally very fine calcarenite in part, very argillaceous, trace

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<u>Depth (m)</u>	<u>%</u>	<u>Description</u>
		glaucinite, trace carbonaceous fragments, soft to firm, rarely, moderately hard, massive, marly texture.
2320-30	100	LIMESTONE: As above.
2330-40	100	LIMESTONE: As above.
2340-50	100	LIMESTONE: Medium grey, brown grey, olive grey, calcisiltite, moderately to predominantly very argillaceous, trace glauconite, trace carbonaceous fragments, soft to firm, occasionally moderately hard, massive to occasionally platy, marly texture.
2350-60	100	LIMESTONE: Calcisiltite as above, medium to dark grey, massive.
2360-70	100	LIMESTONE: Calcisiltite, medium to dark grey, olive grey, brown grey, very argillaceous, trace glauconite, trace carbonaceous fragments, soft to firm, massive to blocky, trace vein calcite, marly texture.
2370-80	100	LIMESTONE: Light to medium grey, olive grey, brown grey, calcisiltite as above.
2380-90	100	LIMESTONE: Light to medium grey, brown grey, calcisiltite, moderately argillaceous, micritic, trace glauconite, trace carbonaceous fragments, soft to firm, occasionally moderately hard, massive to occasionally platy.
2390-2400	100	LIMESTONE: Medium to dark grey, brown grey, calcisiltite as above, soft to moderately hard, occasionally hard.
2400-10	100	LIMESTONE: Medium to dark grey, brown grey, calcisiltite, moderately argillaceous, micritic, trace glauconite, trace carbonaceous fragments, firm to hard, massive to blocky.
2410-20	100	LIMESTONE: Medium to dark grey, brown grey, predominantly calcisiltite, occasionally calcilutite, rare very fine calcarenite, argillaceous, trace glauconite, trace carbonaceous fragments, trace vein calcite, firm to hard, massive to platy, subfissile in part.
2420-30	100	LIMESTONE: Brown grey, dark green grey calcisiltite, trace to common very fine calcareous sand, trace glauconite, trace carbonaceous flecks, firm to moderately hard, occasionally hard, blocky, (occasionally grades to calcarenite).

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<u>Depth (m)</u>	<u>%</u>	<u>Description</u>
2430-40	100	LIMESTONE: Dark green grey, brown grey, calcisiltite, trace to locally common very fine to fine calcareous sand, rare glauconite, micritic, occasionally cryptocrystalline, slightly carbonaceous, trace lithics, moderately hard, occasionally hard, blocky, angular fragments (possibly recrystallised in part).
2440-50	90	LIMESTONE: Grey brown, olive grey, medium brown grey, calcisiltite, moderately to very argillaceous, micritic, common very fine calcareous sand, trace quartz sand, trace lithics, moderately hard to occasionally hard, blocky, angular fragments hard, (occasionally slightly recrystallised).
	10	CLAYSTONE: Medium to dark grey, very calcareous, slightly silty, moderately carbonaceous, soft to firm, blocky to subfissile.
2450-60	80	LIMESTONE: As above, becoming slightly glauconitic, firm to moderately hard, occasionally hard.
	20	CLAYSTONE: Predominantly as above, light to medium grey, occasionally dark grey, soft to firm, occasionally sticky, massive, to blocky, subfissile in part.
2460-70	90	LIMESTONE: Grey brown, olive grey, calcisiltite, moderately argillaceous, micritic, occasionally very fine calcarenite, trace glauconite, trace lithics, firm to hard, blocky, angular fragments where hard, (occasionally slightly recrystallised).
	10	CLAYSTONE: Light to medium grey, very calcareous, soft to firm, massive to blocky, subfissile in part.
2470-75	80	LIMESTONE: As above, becoming increasingly micritic.
	20	CLAYSTONE: As above.
2475-80	80	LIMESTONE: As above.
	20	CLAYSTONE: Predominantly as above, occasionally silty, occasionally sticky.
2480-85	80	LIMESTONE: Grey brown, olive grey, calcisiltite, moderately micritic, rare very fine calcarenite, trace glauconite, trace lithics, moderately hard to hard, occasionally firm, blocky, angular fragments (occasionally slightly recrystallised).
	20	CLAYSTONE: Light to medium grey, very calcareous, soft to firm, predominantly

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<u>Depth (m)</u>	<u>%</u>	<u>Description</u>
		blocky, subfissile in part, commonly silty, occasionally sticky.
2485-90	70 30	LIMESTONE: As above. CLAYSTONE: As above, trace carbonaceous specks.
2490-95	80 20	LIMESTONE: As above, trace very fine calcarenite. CLAYSTONE: As above.
2495-2500	80 20	LIMESTONE: As above, calcisiltite, grades to calcarenite, very fine to fine, firm to hard, trace vein calcite. CLAYSTONE: As above, occasionally dark grey.
2500-05	80 20	LIMESTONE: Brown grey, olive grey, occasionally medium grey, calcisiltite grading to calcarenite very fine to fine, moderately to very argillaceous, micritic, trace glauconite, trace lithics, firm to moderately hard, occasionally hard, massive to blocky. CLAYSTONE: Light to medium grey, occasionally dark grey, very calcareous, grading to siltstone, massive to blocky, occasionally sticky, subfissile in part, trace carbonaceous specks.
2505-10	90 10	LIMESTONE: As above, calcisiltite, trace very fine calcareous sand, slightly carbonaceous in part, firm to moderately hard, blocky. CLAYSTONE: As above.
2510-15	80 20	LIMESTONE: Grey brown, olive grey, calcisiltite, trace very fine calcareous sand, trace glauconite, trace carbonaceous specks, moderately to very argillaceous, micritic, firm to moderately hard, occasionally hard, blocky. CLAYSTONE: Light to medium grey, occasionally dark grey, moderately carbonaceous, slightly silty, very calcareous, soft to firm, sticky in part, blocky to subfissile.
2515-20	90 10	LIMESTONE: As above. CLAYSTONE: As above.
2520-25	90 10	LIMESTONE: Predominantly as above, grades to calcarenite, very fine. CLAYSTONE: As above.
2525-30	80	LIMESTONE: Grey brown, olive grey, occasionally light brown grey, calcisiltite (locally grades to calcarenite), common very

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<u>Depth (m)</u>	<u>%</u>	<u>Description</u>
		fine calcareous sand, trace quartz sand, moderately to very argillaceous, micritic, trace glauconite, trace carbonaceous fragments, firm to moderately hard, locally hard, blocky (occasionally slightly recrystallised).
	20	CLAYSTONE: Light to medium grey, occasionally dark grey, very calcareous, slightly carbonaceous, slightly silty, soft to firm, blocky to subfissile in part.
2530-35	80	LIMESTONE: Olive grey, brown grey, green grey, calcilutite, slightly silty/sandy in part, very argillaceous, trace glauconite, trace carbonaceous fragments, soft to firm, moderately hard in part, massive to blocky, occasionally grades to calcareous claystone, marly texture in part.
	20	CLAYSTONE: As above.
2535-40	90	LIMESTONE: Olive grey, brown grey, light brown grey, calcilutite to calcisiltite, slightly sandy, micritic, very argillaceous, trace glauconite, trace lithic fragments, firm to moderately hard, blocky.
	10	CLAYSTONE: As above.
2540-45	100	LIMESTONE: As above, becoming increasingly sandy grades to calcarenite.
	TR	CLAYSTONE: As above.
2545-50	90	LIMESTONE: Olive grey, medium brown grey, calcisiltite, trace to common very fine calcareous sand, moderately argillaceous, micritic, trace free vein calcite, trace glauconite, trace carbonaceous and lithic fragments, firm to predominantly moderately hard, hard in part, massive to blocky.
	10	CLAYSTONE: Medium to dark grey, occasionally light grey, very calcareous, slightly carbonaceous, trace silt, firm to soft, blocky to subfissile.
2550-55	80	LIMESTONE: As above.
	20	CLAYSTONE: As above.
2555-60	90	LIMESTONE: As above, trace ooids.
	10	CLAYSTONE: Basically as above, occasionally light grey, off white.
2560-65	70	LIMESTONE: Medium brown, brown grey, olive grey, calcisiltite, trace very fine calcareous sand, trace ooids and forams, micritic, moderately to very argillaceous, trace glauconite, trace carbonaceous and lithic fragments, firm to moderately hard, locally

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<u>Depth (m)</u>	<u>%</u>	<u>Description</u>
	30	hard, massive to blocky, occasionally angular fragments. CLAYSTONE: Off white to light grey, medium to dark grey in part, slightly silty in part, very calcareous, soft to dispersive, firm, massive to blocky, subfissile in part.
2565-70	70 30	LIMESTONE: As above. CLAYSTONE: As above.
2570-75	70 30	LIMESTONE: As above. CLAYSTONE: Predominantly as above, predominantly off white to light grey, grey brown, very calcareous, soft to dispersive, massive to blocky, amorphous in part, marly texture.
2575-80	60 40	LIMESTONE: As above. CLAYSTONE: Off white to light grey, light grey brown, medium grey, very silty, very calcareous, soft to dispersive, trace carbonaceous fragments, massive to blocky.
2580-85	70 30	LIMESTONE: Light to medium brown, olive grey, calcisiltite, trace to common very fine to fine calcareous sand, micritic, moderately to very argillaceous, trace free vein calcite, trace glauconite, trace lithic fragments, firm to moderately hard, blocky. CLAYSTONE: As above, marly texture in part.
2585-90	60 40	LIMESTONE: As above. CLAYSTONE: As above.
2590-95	60 40	LIMESTONE: As above. CLAYSTONE: As above.
2595-2600	50 50	LIMESTONE: Light to medium brown, brown grey, olive grey, calcisiltite (occasionally grades to calcarenite), common very fine calcareous sand, trace glauconite, trace lithic fragments, rare ooids, trace fossil fragments, trace free vein calcite, moderately hard, blocky, angular fracture. CLAYSTONE: Off white to light grey, light brown grey, slightly silty, trace carbonaceous specks, very calcareous, soft to firm, sticky, slightly dispersive, amorphous to massive, occasionally blocky to subfissile.
2600-05	60 40	LIMESTONE: As above, calcisiltite/calcarenite, trace forams. CLAYSTONE: As above.

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<u>Depth (m)</u>	<u>%</u>	<u>Description</u>
2605-10	40	LIMESTONE: As above, trace forams, slightly glauconitic, trace pyrite, nodular in part, moderately hard, blocky.
	60	CLAYSTONE: As above.
2610-15	10	LIMESTONE: As above.
	90	CLAYSTONE: Pale grey to off white, very slightly silty, weak calcareous cement in part; trace chlorite, micromicaceous, soft to dispersive, amorphous, hygroturgid.
2615-20	100 TR	CLAYSTONE: As above. LIMESTONE: As above.
2620-25	100	CLAYSTONE: As above, slightly calcareous, trace fine to medium quartz sand grains.
2625-30	100	CLAYSTONE: Pale grey to off white, light brown grey, slightly silty, slightly arenaceous in part, slightly calcareous, trace white calcareous inclusions, slightly chloritic, soft to dispersive, amorphous, hygroturgid.
2630-35	100	CLAYSTONE: Off white, light to medium grey, slightly silty, slightly calcareous, slightly chloritic, trace carbonaceous specks, soft to dispersive, amorphous, hygroturgid.
2635-40	100	CLAYSTONE: Light to medium grey, olive grey, moderately calcareous, trace chlorite, trace carbonaceous specks, trace fossils, trace vein calcite, soft to dispersive, amorphous, hygroturgid.
2640-45	100	CLAYSTONE: Light to medium grey, light brown grey, moderately to very calcareous in part, trace carbonaceous specks, soft to dispersive, amorphous, marly in part, hygroturgid.
2645-50	100	CLAYSTONE: Light to medium grey, olive grey, moderately calcareous, slightly chloritic in part, trace carbonaceous specks, soft to dispersive, amorphous, marly in part, hygroturgid, weak calcite cement in part.
2650-55	100	CLAYSTONE: Light to medium grey, olive grey, moderately calcareous, trace carbonaceous specks, trace lithics, weak calcite cement in part, soft to dispersive, occasionally firm, amorphous, marly in part, hygroturgid in part.
2655-60	100	CLAYSTONE: Light to medium grey, olive grey, moderately calcareous, weak calcite cement in part, trace fossils, soft to

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<u>Depth (m)</u>	<u>%</u>	<u>Description</u>
		dispersive, occasionally firm, amorphous, marly in part, hygroturgid.
2660-65	100	CLAYSTONE: Light to medium grey, occasionally brown grey, moderately calcareous, trace carbonaceous specks, trace lithics, soft to dispersive, amorphous, occasionally sticky, marly in part, hygroturgid.
2665-70	100	CLAYSTONE: Light to medium grey, dark grey, slightly to moderately calcareous, trace carbonaceous specks, trace lithics, soft to dispersive, occasionally firm to moderately hard, amorphous to blocky, sticky in part, subfissile in part, marly in part, hygroturgid in part.
2670-75	100	CLAYSTONE: Light to medium grey, dark grey, slightly to moderately calcareous, trace pyrite, trace carbonaceous specks, trace lithics, soft to dispersive, occasionally firm to moderately hard, amorphous to blocky, subfissile in part, slightly marly in part, hygroturgid in part.
	TR	LIMESTONE: Medium to dark grey, brown grey, calcarenite, very fine, grades to calcisiltite, slightly recrystallised, firm to moderately hard, occasionally hard, blocky, very argillaceous, trace forams, (possibly cavings).
2675-80	100	CLAYSTONE: Predominantly as above, slightly calcareous, trace nodular pyrite, rarely marly, trace glauconite, silty in part, occasionally grades to siltstone, trace pinpoint mineral fluorescence, no cut, no crush cut.
2680-85	100	CLAYSTONE: Light to medium grey, dark grey, slightly calcareous, trace pyrite, trace carbonaceous specks, trace lithics, trace fossils, silty in part, occasionally grades to siltstone, soft to dispersive, occasionally moderately hard, amorphous to blocky, subfissile in part, pinpoint white mineral fluorescence, no cut, no crush cut.
2685-90	100	CLAYSTONE: Off white, light to medium grey, dark grey, brown grey, slightly calcareous, trace carbonaceous specks, trace lithics, trace fossils, silty in part, occasionally grades to siltstone, soft to dispersive, occasionally moderately hard, amorphous to blocky, subfissile in part, hygroturgid.
2690-95	100	CLAYSTONE: As above, slightly chloritic in part.

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<u>Depth (m)</u>	<u>%</u>	<u>Description</u>
2695-2700	100	CLAYSTONE: As above, trace pyrite, slightly chloritic in part.
2700-05	100	CLAYSTONE: Predominantly as above, off white, light to medium grey, light brown grey.
2705-10	100	CLAYSTONE: Off white, light to medium grey, slightly calcareous, slightly arenaceous, trace nodular pyrite, trace carbonaceous specks, soft to firm, massive to amorphous occasionally subfissile, hygroturgid in part.
2710-15	100	CLAYSTONE: As above, trace fossils and forams, trace pyrite.
2715-20	90	SILTSTONE: Medium grey brown, occasionally yellow brown, very argillaceous, tuffaceous in part, slightly arenaceous, trace glauconite, soft to firm, slightly dispersive, massive to amorphous.
	10	CLAYSTONE: As above.
2720-25	100	SILTSTONE: Medium to dark brown, very argillaceous, slightly arenaceous, trace glauconite, trace light yellow tuffaceous inclusions, trace pyrite, slightly micromicaceous, soft to firm, amorphous to massive.
	TR	CLAYSTONE: Pale grey to off white, slightly calcareous, slightly silty, trace carbonaceous specks, soft to dispersive, amorphous.
2725-30	100	SILTSTONE: As above, trace carbonaceous fragments.
	TR	CLAYSTONE: As above.
2730-35	100	SILTSTONE: As above, trace to common arenaceous inclusions.
2735-40	100	SILTSTONE: Medium to dark brown, medium grey, very argillaceous, trace quartz sand, common glauconite nodules, trace disseminated pyrite, trace lithic and carbonaceous fragments, soft to occasionally firm, dispersive, massive to amorphous.
2740-45	100	SILTSTONE: As above.
2745-50	TR	SANDSTONE: Clear to translucent, fine to occasionally medium, subangular to rounded, moderate sorting, trace pyritic cement, trace glauconite, friable to predominantly loose, inferred fair porosity, no fluorescence.
	100	SILTSTONE: As above.

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<u>Depth (m)</u>	<u>%</u>	<u>Description</u>
2750-55	TR 100	SANDSTONE: As above, no fluorescence. SILTSTONE: As above, trace forams.
2755-60	TR 100	SANDSTONE: As above, becoming medium to occasionally coarse, no fluorescence. SILTSTONE: As above, common glauconite.
2760-65	TR 100	SANDSTONE: As above, no fluorescence. SILTSTONE: Medium to dark brown, grey brown, medium to dark green, very argillaceous, very glauconitic, trace lithics, soft to dispersive, massive to amorphous.
2765-70	70	SANDSTONE: Clear to translucent, light to medium green, fine to medium, subangular to subrounded, moderate to good sorting, abundant argillaceous matrix, abundant glauconite nodules, trace nodular pyrite, loose, inferred very good to good porosity, no fluorescence.
	30	SILTSTONE: Medium brown, medium green, very argillaceous, glauconite, trace carbonaceous specks, micromicaceous, soft to dispersive, amorphous to massive.
2770-75	70	SANDSTONE: Predominantly as above, very fine to medium, predominantly very fine, grades to siltstone.
	30	SILTSTONE: As above.
2775-80	90	SANDSTONE: Light green, occasionally clear to translucent, very fine to fine, subangular, good sorting, abundant argillaceous matrix, abundant glauconite nodules, very silty, trace nodular pyrite, loose, inferred good porosity, no fluorescence.
	10	SILTSTONE: As above.
2780-85	100	SANDSTONE: Light green to medium green, occasionally clear to translucent, very fine to fine, subangular to subrounded, moderate to good sorting, abundant argillaceous matrix, abundant glauconite, trace pyrite, loose, inferred good porosity, grades to siltstone in part, no fluorescence.
2785-90	100	SANDSTONE: As above, sandstone becomes fine to occasionally medium in part.
2790-95	100	SANDSTONE: As above.
2795-2800	90	SANDSTONE: As above, occasionally fine to medium, predominantly very fine, silty in part, grades to siltstone.

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<u>Depth (m)</u>	<u>%</u>	<u>Description</u>
	10	SILTSTONE: Medium brown, grey brown, very argillaceous, trace mica, trace carbonaceous fragments, soft to firm, dispersive in part, massive to amorphous.
2800-05	80	SANDSTONE: As above, very argillaceous in part.
	20	SILTSTONE: Predominantly as above, green grey, medium green, glauconitic, soft to firm, massive to amorphous.
2805-10	80	SANDSTONE: Clear to translucent, green grey in part, fine to coarse, subangular to subrounded, moderate to poor sorting, argillaceous/silty matrix, common glauconite, trace yellow quartz, trace nodular pyrite, loose, inferred good porosity, no fluorescence.
	20	SILTSTONE: Light to medium grey, very argillaceous, trace lithic fragments, trace carbonaceous matter, slightly glauconitic, slightly micromicaceous, soft to firm, dispersive, massive to amorphous.
2810-15	80	SANDSTONE: As above.
	20	SILTSTONE: As above.
2815-20	70	SANDSTONE: Clear to translucent, frosted, medium to very coarse, subrounded, poor sorting, trace argillaceous matrix, trace pyrite, trace yellow/limonitic quartz, trace glauconite, loose, inferred good porosity, no florescence.
	30	SILTSTONE: As above.
2820-25	70	SANDSTONE: As above.
	30	SILTSTONE: As above.
2825-30	90	SANDSTONE: Clear to translucent, frosted, predominantly medium to occasionally coarse, subangular to subrounded, moderate sorting, trace argillaceous matrix, trace very coarse milky quartz, trace limonitic stained quartz, trace to common glauconite, trace smoky quartz, loose, inferred good porosity.
	10	SILTSTONE: As above.
2830-35	90	SANDSTONE: As above.
	10	SILTSTONE: As above.
2835-40	100	SANDSTONE: Predominantly as above, medium to coarse, loose, inferred good porosity, no shows.
2840-45	70	SANDSTONE: Clear to translucent, frosted, medium to predominantly coarse, subangular to subrounded, moderate to good sorting,

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<u>Depth (m)</u>	<u>%</u>	<u>Description</u>
	30	trace kaolinite matrix, trace pyrite cement, trace nodular pyrite, trace milky quartz, trace smoky quartz, rare glauconite, loose, good porosity, no fluorescence. SILTSTONE: Light to medium grey, very argillaceous, slightly micromicaceous, trace carbonaceous fragments, slightly arenaceous in part, soft to firm, blocky to massive, subfissile in part.
2845-50	60 40	SANDSTONE: As above, no fluorescence. SILTSTONE: As above.
2850-55	60 40	SANDSTONE: As above, trace limonite stained yellow quartz. SILTSTONE: Off white, light to medium grey, light brown grey, very argillaceous, trace carbonaceous fragments, trace glauconite, slightly arenaceous in part, soft to moderately hard, massive to blocky, subfissile in part.
2855-60	50 50 TR	SANDSTONE: Predominantly as above, fine to coarse, occasionally very coarse, poor to moderate sorting. SILTSTONE: As above, micromicaceous in part, soft to firm, occasionally moderately hard. COAL: Black, blocky, earthy to vitreous, occasionally splintery, conchoidal fracture in part, firm to hard.
2860-65	30 70 TR	SANDSTONE: As above, predominantly fine to medium, occasionally coarse to very coarse, moderate sorting. SILTSTONE: As above, very argillaceous, grading to claystone. COAL: As above.
2865-70	30 70 TR	SANDSTONE: As above. SILTSTONE: As above. COAL: As above, dark brown to black.

APPENDIX 2

WHALESHARK 1

CORE DESCRIPTIONS

No cores were cut in Whaleshark 1

APPENDIX 3

WHALESHARK-1

Sidewall Core Descriptions

<u>No.</u>	<u>Depth</u> (m)	<u>Rec.</u> (mm)	<u>Description</u> (Gas C1/C2/C3/C4/C5)
1	2850.0	15	100% SANDSTONE: Light to medium grey, very fine to fine, subangular to subrounded, moderate sorting, common clay (kaolinite?) matrix, silty in part, trace lithics, trace pyrite, soft to firm, poor porosity, no fluorescence. ✓ GAS: 45/5/30/11/9
2	2842.0	35	100% SANDSTONE: Clear to translucent, light to medium grey, fine to coarse, occasionally very coarse, angular to subrounded, poor to moderate sorting, trace silty matrix, trace pyrite cement, trace lithics, loose to friable, good porosity, no fluorescence. ✓ GAS: 42/6/35/13/4
3	2839.0	20	100% SANDSTONE: Clear to translucent, light to medium grey, fine to occasionally coarse, subangular to subrounded, moderate sorting, trace silty to argillaceous matrix, micromicaceous, common smoky quartz, rare milky quartz, trace lithics, loose to friable, good porosity, no fluorescence. ✓ GAS: 22/37/23/9/9
4	2834.0	35	100% SANDSTONE: Medium grey, very fine to fine, moderate to good sorting, subangular to subrounded, common silty to argillaceous matrix, micromicaceous, trace lithics, trace smoky quartz, trace pyrite, friable to firm, poor to fair porosity, no fluorescence. ✓ GAS: 76/15/7/2/TR
5	2822.0	30	100% SANDSTONE: Light to medium grey, brown grey, very fine, grades to siltstone, occasionally fine, subangular to subrounded, moderate sorting, common swelling clay matrix, trace to common silty mica, trace pyrite, trace lithics, trace milky quartz, trace smoky quartz, soft to firm, poor porosity, no fluorescence. ✓ GAS: 46/34/14/4/2
6	2807.0	30	100% SANDSTONE: Dark green, brown, light grey, clear to translucent, very fine to fine, moderate sorting, subangular to subrounded, trace to in part common claystone matrix, abundant glauconite, trace mica as above, firm, well defined layering (sedimentary) particularly of glauconite, poor to fair porosity, no fluorescence. ✓ GAS: 43/22/14/13/8

Sidewall Core Descriptions

<u>No.</u>	<u>Depth</u> (m)	<u>Rec.</u> (mm)	<u>Description</u> (Gas C1/C2/C3/C4/C5)
7	2799.0	35	100% SANDSTONE: Dark green, medium to dark brown, light to medium grey, very fine to fine, moderate sorting, subangular to subrounded, weak silica cement, trace to common swelling clay matrix, silty in part, abundant glauconite, trace to common mica, trace pyrite, firm to moderately hard, poor porosity, no fluorescence. GAS: 57/17/13/13/TR
8	2786.0	45	100% SANDSTONE: Dark green, clear to translucent, very fine to fine, moderate sorting, subangular to subrounded, weak silica cement in part, abundant glauconite, trace mica, glauconite dispersed evenly throughout sample, firm to moderately hard, fair porosity, no fluorescence. GAS: 76/13/7/3/1
9	2783.0	40	100% SANDSTONE: Dark green, clear to translucent, light grey, light brown, very fine to fine, subangular to subrounded, moderate sorting, weak silica cement in part, abundant glauconite, rare mica (some appears slightly oxidised), soft to firm, poor to fair porosity, no fluorescence. GAS: 51/16/10/20/3
10	2765.0	35	100% SANDSTONE: Dark green, brown, very fine, grades to siltstone, subangular to subrounded, moderate to poor sorting, weak to moderate silica cement in part, silty matrix, abundant glauconite, common mica, micromicaceous, firm to moderately hard, nil to very poor porosity, no fluorescence. GAS: 44/13/15/27/1
11	2760.0	40	100% SANDSTONE: Dark green, dark brown, very fine to fine, subangular to occasionally subrounded, moderate sorting, abundant glauconite, silty to argillaceous matrix, trace carbonaceous fragments, trace pyrite, trace mica, firm, nil to very poor porosity, no fluorescence. GAS: 72/7/4/15/2
12	2756.0	45	100% SILTSTONE: Dark brown, dark green, occasionally grades to very fine sand, argillaceous matrix, common to abundant glauconite, very abundant dark brown material (immature organic matter?), trace to common pyrite, trace detrital mica, trace carbonaceous fragments, micromicaceous, firm to moderately hard, nil to very poor porosity, no fluorescence. GAS: 79/9/5/5/2
13	2746.0	40	100% SILTSTONE: Dark brown, dark green, argillaceous matrix, common glauconite, very abundant dark brown material as above, trace detrital

Sidewall Core Descriptions

<u>No.</u>	<u>Depth</u> (m)	<u>Rec.</u> (mm)	<u>Description</u> (Gas C1/C2/C3/C4/C5)
			mica, trace carbonaceous fragments, trace fine quartz sand, trace pyrite, micromicaceous, firm to moderately hard, subfissile in part, nil porosity, no fluorescence. GAS: 88/7/3/2/TR
14	2726.0	35	100% SILTSTONE: As above, trace to common pyrite cement, very abundant dark brown material as above, micromicaceous, firm, nil porosity, no fluorescence. GAS: 71/14/10/5/0
15	2725.0	40	100% SILTSTONE: As above, trace to common pyrite cement, pyrite veins, common argillaceous matrix, nil porosity no fluorescence. GAS 82/11/5/2/0
16	2721.0	30	100% LIMESTONE: Light grey, calcisiltite, slightly to moderately argillaceous, trace detrital mica, trace glauconite, trace carbonaceous fragments, trace pyrite veins, trace fossils, firm to moderately hard, nil porosity. GAS: 86/6/5/3/TR
17	2720.0	25	100% LIMESTONE: Off white to light grey, calcarenite, very fine, grades to calcisiltite, very slightly argillaceous, trace glauconite, trace detrital mica, trace lithics, trace pyrite (oxidised in part), trace fossils, soft to firm, nil to poor porosity, no fluorescence. GAS: 80/9/7/4/0
18	2693.0	20	100% LIMESTONE: Off white, light to medium grey, calcisiltite, grades to very fine calcarenite in part, occasional veins of fine crystalline calcite, trace pyrite, firm, nil porosity, no fluorescence. GAS: 87/7/3/3/0
19	2617.0	30	100% LIMESTONE: Medium grey, olive grey, calcilutite, trace fossils, trace pyrite, firm, nil porosity, no fluorescence. GAS: 91/3/3/3/TR
20	2606.0	25	100% LIMESTONE: Off white, light to medium grey, calcarenite, very fine, occasionally grades to calcisiltite, trace carbonaceous fragments, trace fossils, trace lithics, faint laminations, firm to occasionally moderately hard, nil to very poor porosity, no fluorescence. GAS: 53/16/10/21
21	2445.0	25	100% LIMESTONE: Light brown, grey, calcisiltite, very argillaceous, trace lithics, trace to common

Sidewall Core Descriptions

<u>No.</u>	<u>Depth</u> (m)	<u>Rec.</u> (mm)	<u>Description</u> (Gas C1/C2/C3/C4/C5)
			glaucanite, trace very fine quartz, moderately hard, nil porosity, no fluorescence. GAS: 62/11/14/7/6
22	2290.0	20	100% LIMESTONE: Light brown grey, calcisiltite, slightly argillaceous, trace glauconite, trace pyrite, slightly recrystallised, moderately hard to hard, nil porosity, no fluorescence. GAS: 56/11/8/22/3
23	2285.0	Fragments	100% LIMESTONE: Light grey, light to medium brown grey, calcisiltite, grades to very fine calcarenite, moderate calcite cement, slightly argillaceous, trace glauconite, trace lithics, moderately defined layering between light grey and brown grey may reflect variations in argillaceous content. GAS: 63/14/11/12/TR
24	2143.0	Fragments	100% LIMESTONE: Light grey, calcisiltite to very fine calcarenite, weak calcite cement in part, trace to common glauconite, trace pyrite, trace mica, firm to moderately hard, nil porosity, no fluorescence. GAS: 62/8/12/7/11
25	1987.0	40	100% LIMESTONE: Light grey, light brown grey, calcarenite, very fine, grades to calcisiltite in part, trace glauconite, trace lithics, trace pyrite, soft to firm, faint layering (mm scale), poor porosity, no fluorescence. GAS: 55/4/14/27/0
26	1762.0	30	100% LIMESTONE: Light brown grey, calcisiltite, moderately argillaceous, trace lithics, trace glauconite, trace carbonaceous fragments, firm to moderately hard, nil porosity, no fluorescence. GAS: 81/9/6/4
27	1755.0	25	100% LIMESTONE: Off white to light grey brown, calcisiltite, moderately argillaceous, trace lithics, trace glauconite, trace carbonaceous fragments, trace detrital mica, soft to firm, very faint layering, nil porosity, no fluorescence. GAS: 81/9/5/5/0
28	1747.0	25	100% LIMESTONE: Off white to light grey, light grey brown, calcisiltite, occasionally grades to very fine calcarenite, slightly argillaceous, trace lithics, trace pyrite, firm, occasional thin poorly defined finely crystalline calcite veins, nil to very poor porosity where sandy, no fluorescence. GAS: 74/12/8/6/0
29	1693.0	Fragments	100% LIMESTONE: Off white to light grey, light grey brown, calcisiltite, occasionally grades to very

Sidewall Core Descriptions

<u>No.</u>	<u>Depth</u> (m)	<u>Rec.</u> (mm)	<u>Description</u> (Gas C1/C2/C3/C4/C5)
			fine calcarenite, slightly argillaceous, trace lithics, trace carbonaceous fragments, firm to occasionally moderately hard, faint carbonaceous microlaminae, nil porosity, no fluorescence. GAS: 58/17/12/13/0
30	1561.0	25	100% LIMESTONE: Light grey, light grey brown, calcisiltite, slightly argillaceous, trace pyrite, trace carbonaceous fragments, trace lithics, firm, nil porosity, no fluorescence. GAS: 70/17/6/7/0

APPENDIX 4

WHALESHARK 1

RFT RESULTS

No RFT's were run in Whaleshark 1

APPENDIX 5

WHALESHARK 1

VELOCITY SURVEY REPORT

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