



MARLIN A-24A

FINAL WELL REPORT

Prepared by

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Section 1

General Well Summary

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WELL DATA

Operator : ESSO Australia Ltd
Platform : Marlin
Well name : Marlin A-24A
Country : Australia
Location : Gippsland Basin
Field : Marlin
Permit : Vic/L3

Location AMG co-ordinates : 5 767 923.720m N 606 865.170m E

Location local co-ordinates : Lat: 38° 13' 49.203" S Long: 148° 13' 15.554" E

Surface co-ordinates : 3.18 mN -24.57 mE

Profile : Deviated

Reference depth : Rotary Table

RT to Seabed : 86.91 metres
RT above M.S.L. : 27.91 metres
Sea-water depth : 59.00 metres
Proposed total depth : 3242 metres
Actual total depth : 3275 metres
True vertical depth : 2676.92 metres
Spudded on : 13th April 2004
Total depth reached on : 4th May 2004

Drilling Contractor

Drilling Contractor : NABORS ISDL
Rig name : 453
Rig type : Platform

Drilling Phases

Diameter (inch)	From (mMDRT)	To (mMDRT)	Mud Type
8 ½"	655.0	3275.0	KCl / Glycol / PHPA

Cased Hole

Casing Diameter (inch)	Casing Type	Shoe Depth (mMDRT)
13 ⅜"	Surface	653.0
9 ⅝"	Intermediate	655.0
7"	Production	3275.0

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MUD LOGGING

Logging Unit Number: 137

Engineers: G. Fawns, R. Pereira, G. Doczy, S. Oades

Sampling Interval**Marlin A24A**

Sample Type	Number of sets	Quantity per set	Sampling interval	From (m)	To (m)
Washed and Dried	3	100 grams	10 metres	1460	1610
Washed and Dried	3	100 grams	5 metres	1610	3275

Cuttings Distribution

Company	Washed and Dried Sample Set
Esso Australia	1
Victorian Department of Energy and Minerals	1
Australian Bureau of Resources	1

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WELL SUMMARY

Marlin A-24A is a re-drill directional well designed to target the Turrum L-500 sandstone. Prior to drilling a 9⁵/₈" casing string was set at 655.0mMD as the 13³/₈" casing could not be tested above 250 psi. The well was drilled to a Total Depth of 3275 mMDRT (2676.92 mTVDRT) in an 8¹/₂" production hole. Reeves logs and Schlumberger open hole MDT's on TLC were run, 7" production casing was run, CHDTs were performed and then Marlin A-24A was suspended.

Prior to drilling operations commencing on MLA A-24A, the 13³/₈" casing was drilled out to 655.5 m with seawater and high viscosity sweeps. The 9⁵/₈" casing was run and cemented with the shoe set at 655 m. A kick-off assembly was made up and run in hole tagging cement at 641 m. Marlin A-24A was spudded at 06:40 hours on the 13th April 2004 after drilling out cement and shoe track to 656 m with seawater. While doing the kick-off in open hole from 656 to 661 m, the hole was displaced to new KCl/Polymer mud. When new hole had been drilled to 670 mMDRT, a Pressure Integrity Test (543 psi: 14.0 ppg EMW) was carried out with 9.0 ppg mud. After the P.I.T. test, a trip was made for a new bit and steerable BHA.

An 8¹/₂" steerable / MWD assembly was made up and used to drill ahead. The hole was drilled to a coring depth of 3158 m in the L-500 sands with various bits and without issues. Prior to coring, a packed hole wiper trip assembly was run in the hole to simulate the core barrel run. 27.16 m of core was cut from 3158.5 m to 3185.66 m using 3 core runs, after which the hole was drilled to TD at 3275.0 m.

Once out of cement and drilling new formation, PHPA, Glycol and Baracor-129 were added to the mud system to maintain mud rheology as per programmed concentrations. The mud weight was maintained at 9.4 ppg to 9.5 ppg until 1530 m where it was gradually weighted up to 9.7 ppg with Barite additions prior to drilling the Lakes Entrance formation. Baracarb 25 and 100 were added at 1530 m as per programmed concentrations to bridge the pore throats and reduce the likelihood of differential sticking and seepage losses through the Latrobe Formation. At 1603 m Barablok was added to the mud system at 4 ppb prior to drilling into coals, this was discontinued at 2032 m until the L-100 sand at 2538 m where it was once again added to the system at 4 ppb and maintained to TD. 1% EBL was added at 3167 m and the mud weight raised from 9.9 ppg to 10.1 ppg to reduce tight hole during coring section. Throughout the well to Total Depth, the mud weight ranged from 9.0 ppg to 10.15 ppg as dictated by hole conditions.

Marlin A-24A reached a Total Depth of 3275 m at 00:45 hours on the 4th of May 2004. The final survey at a depth of 3255.01 mMDRT had an inclination of 38.38° and an azimuth of 174.78°. A wiper trip was made to the 9⁵/₈" casing shoe prior to pulling out of the hole and running the Reeves shuttle conveyed memory logging system. After Reeves logging was completed, a Schlumberger Modular Reservoir Dynamics Tester (MDT) tool was run on drill pipe to further evaluate the reservoir. After pulling out of the hole, manifolds and the BOP were tested.. A post logging wiper trip was carried out and the mud was conditioned and mud weight reduced to 9.9 ppg. After waiting on weather due to strong winds holding up crane work, 7" production casing was run and set at 3275 m. After cutting casing and reinstalling and testing the B section and BOP, a CHDT sampling programme was then conducted after which the casing was tested prior to the rig skidding to Marlin A-22.

Throughout the Marlin A-24A drilling programme, there were no losses or gains encountered while drilling. Problematic tight hole was encountered on most trips after drilling into the La Trobe Group which required back reaming on the trip out and washing and reaming when tripping in the hole. The hole packed off at 1700 m on a trip out of hole at 2483 m which resulted in some mud losses. When pulling out of hole from 3158 m after the wiper trip, the hole packed off at 2305 m. After jarring down and freeing the string, the hole was circulated clean and back reamed to 2300 m.

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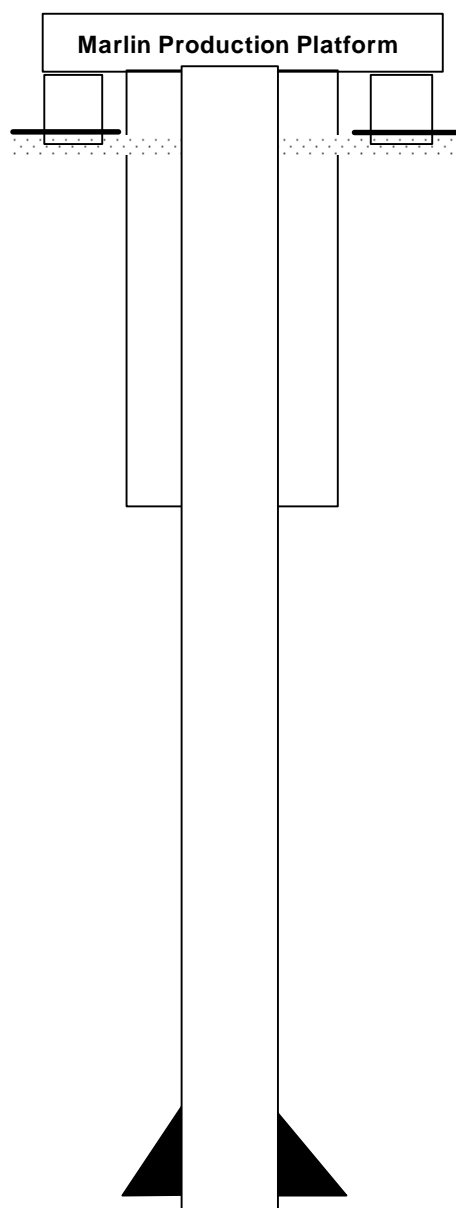
WELL PROFILE

Rotary Table to Mean Sea Level
27.91 m

Rotary Table to Sea Bed 86.91 m

9⁵/₈" Casing Set at 655 m

7" Production casing at 3275.0 m



NABORS Rig 453

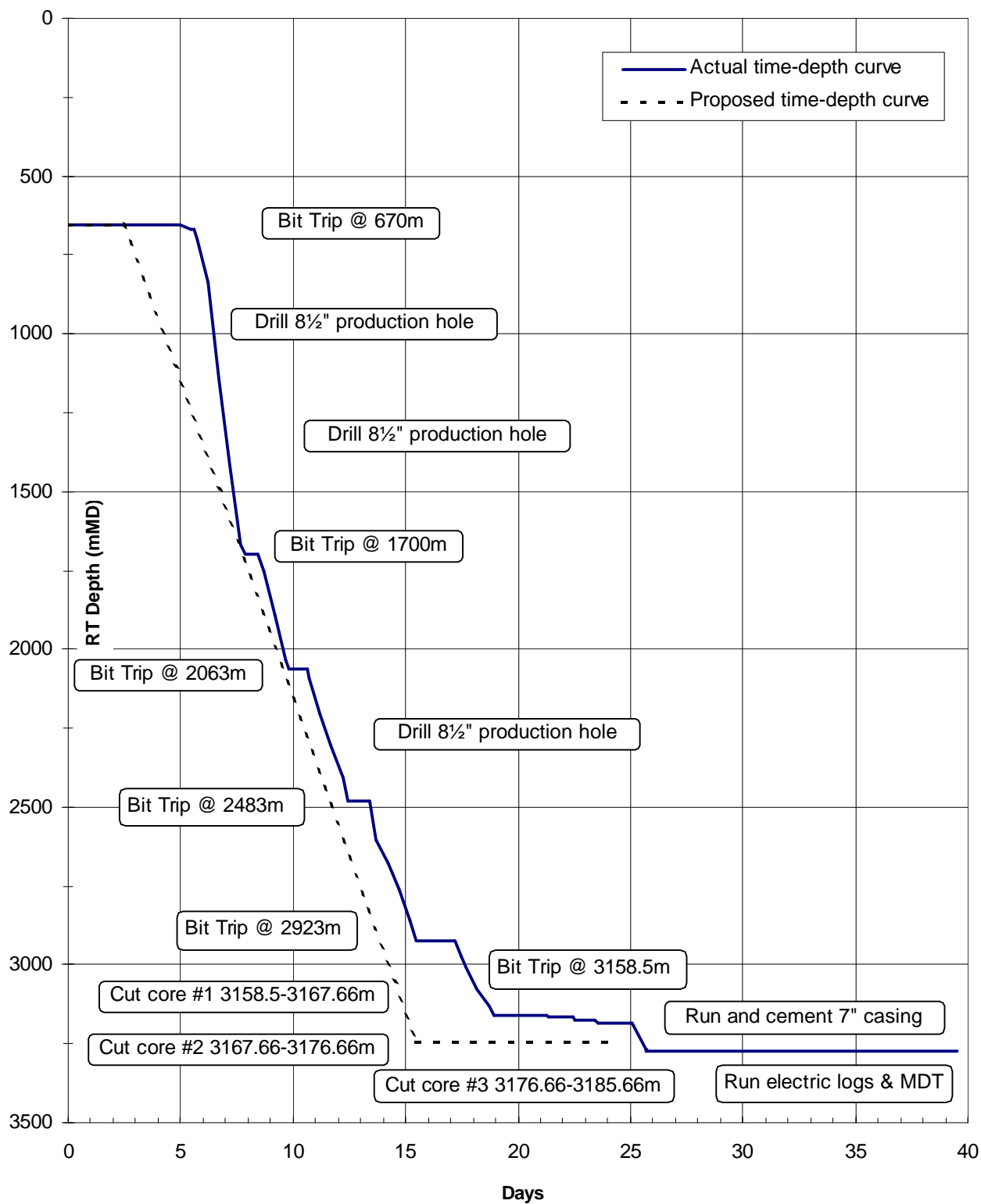
Kicked-off A-24A
13th April 2004

655.0 m – 3275.0 m
Mud Weight 9.0 – 10.15 ppg

8 ½" Hole drilled to 3275.0 m

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TIME-DEPTH CURVE (measured depth)



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BIT RUN SUMMARY

BIT	Size	Type	Jets	In(m)	Out(m)	Hours	Condition
1	8½	Security XS4	3 x 24	655	670	4.01	0-0-NO-A-E/E/E-IN-NO-PR
2	8½	Reed Hycalog RSX192	6 x 18 1 x 15	670	1700	35.74	4-8-WT/RO-C/N/G-X-38/16-NO-PR
3	8½	Reed Hycalog TD51AKPRDH	2 x 24 1 x 32	1700	2063	24.39	3-3-WT/LC-A/M-E/E/E-1/16-ER-BHA
4	8½	Security SEB485	2 x 24 1 x 32	2063	2483	32.3	3-3-WT-A-E/E/E-IN-ER-HR
5	8½	Reed Hycalog RSX162	3 x 18 3 x 21	2483	2923	34.4	1-2-WT-A-X-IN-NO-DMF
6	8½	Hughes-Christensen MX-DSR20GDX	1 x 18 2 x 32	2923	3158.5	30.5	6-6-CT/CD-A-F/F/E-2-ER-CP
7RR	8½	Reed – Hycalog DSX-173	7 x 21	3158.5	3158.5	0	2-8-A-A-X-IN-BT-TQ
CB 1	8½	Security DBS CD93	1.0 TFA	3158.5	3167.66	1.9	0-0-NO-A-X-IN-PN-TD
CB 1RR	8½	Security DBS CD93	1.0 TFA	3167.66	3176.66	1.5	1-1-CT-S-X-IN-PN-TD
CB 1RR	8½	Security DBS CD93	1.0 TFA	3176.66	3185.66	3.1	2-3-CT-S-X-IN-PN-TD
8	8½	Smith FG20ODPD	1 x 24 2 x 30	3185.66	3275.0	11.9	5-1-LT-M-E/E/E-IN-ER-TD

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CASING DATA

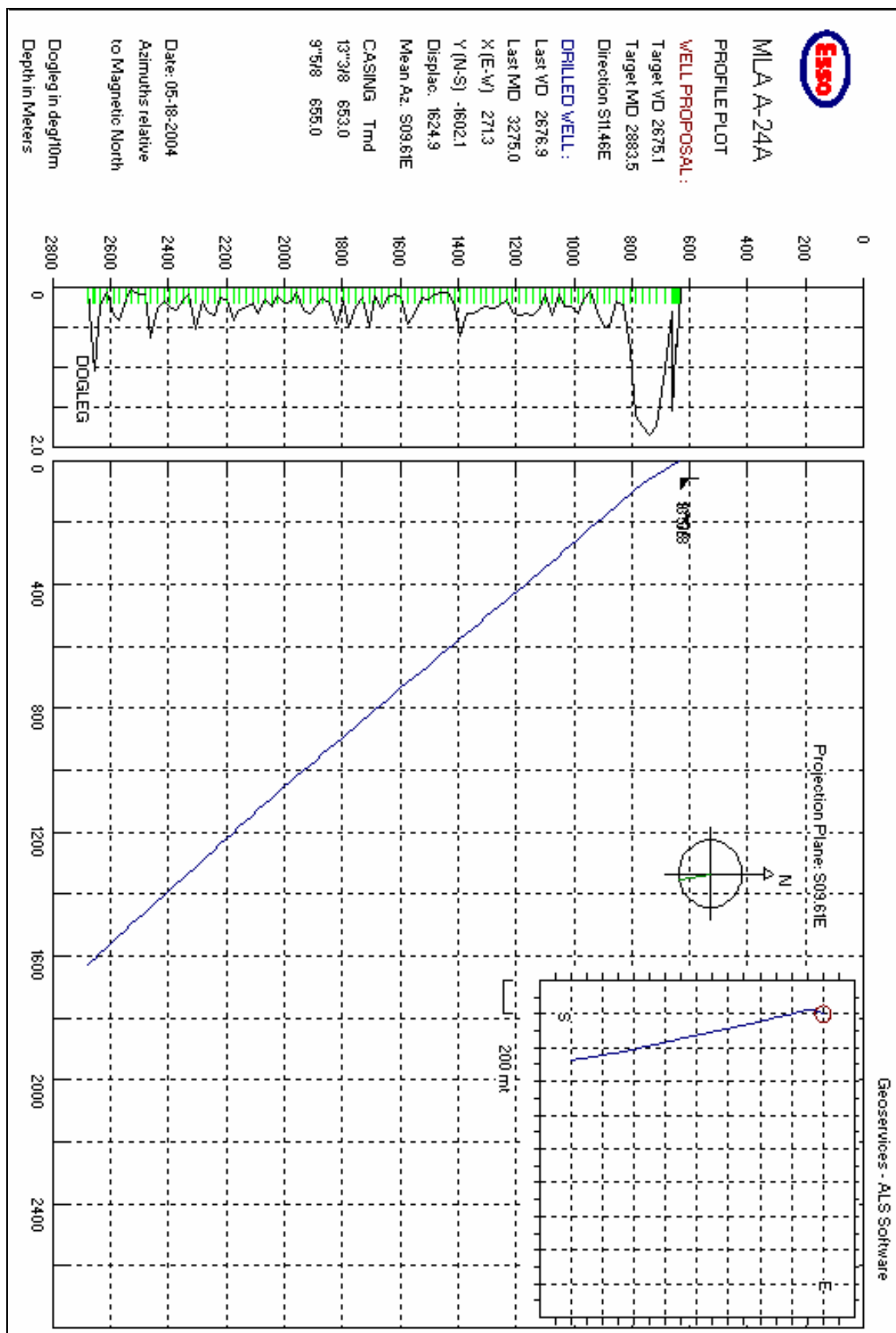
Type	Size (Inches)	Weight (lb/ft)	Grade	Thread	Depth (mMDRT)
Surface	13 ³ / ₈	54.5	J-55	LTC	653.0
Intermediate	9 ⁵ / ₈	47	L-80	LTC	655.0
Production	7	26	L-80	LTC	3275.0

CEMENTING DATA

Casing details	Cement Type	Dry Cement Volume (sx)	Cement Additives	Mix Water (bbls)	Slurry Volume (bbls)	Slurry Density (ppg)	Cement to/from (mMDRT)	Casing Pressure Test (psi)
9 ⁵ / ₈ "	HTB	434	ECONOLITE 100 gal CFR-3L 16 gal NF-6 3 gal	94.8	112.8	L :12.5 T :15.8	153.0 m 655.0 m	2500 psi
7"	HTB	860	HALAD 413L 30 gal / 10 bbl GAS CON 469 60 gal / 10 bbl SCR-100L 7 gal / 10 bbl CFR-3L 2 gal / 10 bbl NF-6 0.25 gal / 10 bbl	160	235	L:13.0 T:15.0	1514.0 m 3275.0 m	2000 psi

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WELL DIRECTIONAL PROFILE



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WELL DIARY

8th April 2004	Skid to MLA A24A and rig up.
9th April 2004	Reinstate rig after skidding. Nipple up BOP and pressure test as per programme.
10th April 2004	Pressure test BOP, make up clean out BHA and run in hole to 578 m. Wash and ream to 604m. Drill cement with seawater and Hi-Vis sweeps from 604 – 635 m.
11th April 2004	Drill cement from 635– 655.5 m. Circulate hole with 15 bbl of Hi-Vis sweep. Pull out of hole, rig up and run 9 ⁵ / ₈ " casing to 655 m. Circulate clean and cement as per programme. Wait on cement.
12th April 2004	Continue to wait on cement. Lift BOP and riser, cut casing and nipple down BOP and riser. Dress casing stump and nipple up BOP, riser, flowline and pressure test. Perform casing pressure test, install wear bushing and make up new BHA.
13th April 2004	Make up new BHA and run in hole. Tag top of cement at 643 m. Drill shoe track/cement with seawater and Hi-Vis sweeps to 656 m. Pump Hi-Vis sweep and displace hole to KCl / Polymer mud while drilling to 657 m. Condition aerated mud then drill / slide / survey to 670 m. Circulate hole clean and perform PIT to an EMW of 14.0 ppg. Pull out of hole and run in hole with new bit, cutting and slipping on way in. Wash and ream from 657 – 670 m. Drill / slide / survey from 670 – 698 m.
14th April 2004	Drill / slide / survey from 698 – 1141 m. (Run 2 Gyro surveys)
15th April 2004	Drill / slide / survey from 1141 – 1670 m.
16th April 2004	Drill / slide from 1670 – 1700 m (Slow ROP). Circulate hole clean and pull out of hole for new bit. Run in hole and precautionary wash / ream last 3 stands. Drill / slide from 1699 – 1753 m. (Circulate at 1720 m while repair mud pump.)
17th April 2004	Drill / slide from 1753 – 2032 m.
18th April 2004	Drill / slide from 2032 – 2063 m. Circulate hole clean and pull out of hole. Make up new bit and run in hole to shoe. Slip and cut drill line. Run in hole and precautionary washed last 2 stands to bottom. Drill / slide from 2063 m to 2092 m
19th April 2004	Drill / slide / survey from 2092 m to 2121 m. Rotate, reciprocate and circulate whilst Anadrill source MWD fault. Continue to drill, slide and survey from 2121 m to 2303 m
20th April 2004	Continue to drill, slide and survey from 2303 m to 2483 m. Rack back from 2483 m to 2379 m whilst circulate hole clean. Pull out of hole from 2379 m to 2002 m, 30 K overpull. Run in hole 2063 m. Rack back from 2063 m to 2034 m whilst circulating 2 x bottoms up.
21st April 2004	Pull out of hole from 2034 m to 1860 m, 30 K overpull. Run in hole to 188 m and backream from 1888 m to 1690 m. Work through pack off at 1700 m. Pull out of hole from 1690 m to surface. Make up new bit and run in hole to 2483 m. Wash through tight hole at 1760 m, work tight hole at 1860 m, 2002 m, 2100 m and 2350 m. Drill, steer and survey new hole from 2483 m to 2602 m.
22nd April 2004	Drill, steer and survey new hole from 2602 m to 2761 m.

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- 23rd April 2004** Drill, steer and survey new hole from 2761 m to 2923 m. Pump 20 bbl high viscosity sweeps and rack back from 2923 m to 2840 m whilst circulating hole clean. Pull out of hole from 2840 m to 2541 m, overpull 30 K. Run in hole to 2608 m. Rack from 2608 m to 2520 m whilst circulating hole clean.
- 24th April 2004** Pull out of hole from 2520 m to surface. Rack back BHA, flush motor, break out and lay out motor and bit. Pull wear bushing, make up blind ram test assembly, test lines and blind rams. Make up 5" test assembly. Test BOPs, choke and standpipe manifolds. Make up 4" test assembly and test VBRs. Lay out test assembly, Run wear bushing. Service rig. Howco test grey valve. Break down test assembly and clear rig floor. Pick up motor, make up bit and set bend at 0.78°, shallow test and run in hole to 628 m. Torque all connections.
- 25th April 2004** Slip and cut. Continue to run in hole to tight hole at 1675 m. Wash and ream tight hole from 1675 m to 1862 m. Continue to run in hole to 2064 m. Circulate hole clean. Continue to run in hole to 2923 m. Precautionary wash and ream last 2 stands. Circulate and condition mud until able to pump at full rate. Drill, steer and survey new hole from 2923 m to 3007 m.
- 26th April 2004** Drill, steer and survey new hole from 3007 m to 3124 m. Circulate hole clean and rack from 3124 m to 3100 m whilst geology analyse sample. Unable to circulate at required rate due to shaker screens loading up. High torque encountered. Flow check and pull out of hole from 3100 m to 2950 m whilst change #1 shaker screens. Circulate hole clean at maximum RPM and flow rate. Run in hole from 2950 m to 3124 m. Wash and ream last two stands. Drill, steer and survey new hole from 3124 m to 3131 m.
- 27th April 2004** Drill, steer and survey new hole from 3124 m to 3158 m. Circulate and condition hole. Pump 25 bbl super sweep and circulate hole clean whilst rack from 3158 m to 3080 m. Backream from 3080 m to 2877 m. Circulate hole clean with 2 x bottoms up. Pull out of hole from 2877 m to surface. Break out bit and lay out BHA. Function BOPs and flush choke manifold. Pick up, make up new bit and wiper trip assembly and run in hole.
- 28th April 2004** Continue to run in hole to hang up at 1665 m. Wash and ream tight hole from 1665 m to 1713 m whilst circulate bottoms up. Run in hole from 1713 m to hang up at 1904 m. Wash and ream tight hole from 1904 m to 2057 m. Run in hole from 2057 m to 2160 m. Wash and ream tight hole as required from 2160 m to hang up depth at 3135 m. Wash and ream from 3135 m to bottom at 3158 m. Establish parameters for coring. Pump 30 bbl super sweep and circulate hole clean whilst rack from 3158 m to 3090 m. Backream from 3090 m to 2884 m. Pull out of hole from 2884 m to 30 K overpull at 2305 m. Jar down and free string. Run in hole to 2344 m. Circulate hole clean and backream to 2300 m. Pull out of hole from 2300 m to surface. Rack HWDP, break and lay out cleanout BHA. Make up coring BHA and run in hole 177 m, change out jars. Rabbit tubulars. Continue to run in hole.
- 29th April 2004** Run in hole with core barrel. Slip and cut. Rig service. Continue to run in hole to hang up at 1654 m. Wash and ream 1654 m as per instructions. Continue to run in hole from 1654 m to 1895 m. Wash and ream from 1895 m to 2044 m. Work string whilst circulating bottoms up and change handling gear to 5". Continue to run in hole from 2044 m to 3158.5 m. Wash and ream last 3 stands. Rotate and work string whilst circulate and condition mud. Rotate and work string whilst release, pump and seat ball. Confirm with 200 psi pressure increase. Drill and core from 3158.5 m to 3167.5 m. Backream from 3167.5 m to 3143 m. Pull out of hole from 3143 m to tight hole at 2375 m. Work string, pump and rotate and jar free at 2375 m, 50 rpm, 60 spm, 550 psi. Continue to pull out of hole from 2375 m to 2044 m, work through tight hole at 2158 m. Change out handling gear to 4". Continue to pull out of hole from 2044 m, working through tight hole at 1813 m.

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30th April 2004	Continue to pull out of hole. Change out handling gear to 5". Review JSA's for handling core samples and H2S. Continue to pull out of hole. Break and lay out core barrel. Make up new core barrel and run in hole for core #2. Rig service at shoe. Continue to run in hole. Wash and ream last 2 stands. Rotate, work string whilst circulate and condition mud. Add EBL to mud system. Release, pump and seat ball, confirm with 200 psi increase. Drill and core from 3167.66 m to 3179.66 m. Slug pipe and pull out of hole. Tight spot at 2158 m.
1st May 2004	Continue to pull out of hole at controlled rate. Break and lay out core barrel. Make up new core barrel and run in hole for core #3. Rig service at shoe. Continue to run in hole. Wash and ream last 2 stands. Circulate and condition mud. Release, pump and seat ball, confirm with 200 psi increase. Drill and core from 3176.66 m to 3185.66 m. Slug pipe and pull out of hole.
2nd May 2004	Continue to pull out of hole at controlled rate, tight spot at 2160 m. Break and lay out core barrel and core BHA. Slip and cut drill line. Rig service. Make up steerable assembly, shallow test and run in hole to 1519 m. Unable to continue running in hole due to 55+ knot wind speed. Rotate, work string whilst circulate hole bottoms up. Work string whilst wait on wind speed to abate.
3rd May 2004	Work string whilst wait on wind speed to abate. Run in hole from 1519 m to 3125 m. Wash and ream from 3125 m to 3185 m whilst Anadrill log cored section. Drill and survey 8½" hole from 3185 m to 3255 m. Inspect and replace cap seal on mud pump #2. Drill and survey 8½" hole from 3255 m to 3269 m.
4th May 2004	Drill and survey 8½" hole from 3269 m to 3275 m TD at 00:45 hrs. Pump sweep and circulate hole clean. Pull out of hole to 1578 m. Pump sweep and circulate hole clean. Run in hole back to bottom. Circulate bottoms up and pump third sweep. Circulate hole clean. Pull out of hole to 1663 m and wait on weather due to gale force winds. Pull out of hole to 605 m and perform rig service.
5th May 2004	Perform rig service while waiting on weather and diesel. POOH from 605 m to 198 m. Rack back HWDP and jar. Break and lay down MWD, NMDC and bit. Make up 8½" wiper trip BHA and rack back in mast. Rig service. SCR power down, repair #2 SCR circuit breaker. Reeves calibrate depth sensor on draw works. Pick up and make up Reeves logging BHA, install radioactive source and run in hole on HWDP to 236 m. Rig to and run in hole from 236 m to 3019 m.
6th May 2004	Run in hole from 3019 m to 3275 m. Wash last stand to bottom. Work tight spot at 3258 m. Circulate, work string and rack back 1 stand per 20 minutes while circulating bottoms up from 3275 m to 3216 m. Insert dart, work string whilst pumping dart and deploy Reeves logging tool. Disc sheared at 1100 psi, logging tool depth at 3270 m. Pull out of hole at 6 m/min and log from 3270 m to 2102 m. Rig to and pull out of hole from 2102 m to 655 m. Flow check – ok. Pull out of hole from 655 m to 236 m. Pull out of hole and rack back HWDP and Jar from 236 m to 53 m. Remove radioactive source, break and lay down Reeves logging tools. Clear rig floor of excess equipment. Slip and cut drill line. Rig service. Rig up Schlumberger sheave at crown. Make up Schlumberger logging tools and run in hole to 16 m. Test wet connect – ok. Run in hole with logging tools on drill pipe from 16 m to 237 m at controlled rate. Rig to; run in hole from 237 m to 410 m at controlled rate.
7th May 2004	Continue to run in hole wireline logging tools on drill pipe. Attempt to test MDT tool at shoe without success. Pull out of hole to surface to inspect and run in hole.
8th May 2004	Continue to run in hole wireline to 3222 m. Conduct wireline logging while pull out of hole.
9th May 2004	Continue to perform wireline logging run, correlating and logging intervals with MDT tool from 3196.5 m to 2757 m. Shear wet connect and pull out of hole to 1600 m. Reattach wet connect and run in hole to 1931m. Correlate and log intervals from 1900 m to 1645 m. Shear wet connect, pump slug and pull out of hole, performing rig service at shoe.

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- 10th May 2004** Continue rig service and inspect monorail. Pull out of hole from 637 m to 15 m. Rack back HWDP, change out jars and rack same. Break and lay down Schlumberger MDT tool. Clear rig floor of excess equipment, retrieve wear bushing and break down running tool. Make up jetting tool, flush BOP and well profile. Test manifolds and BOP as per programme. Make up and re-run wear bushing, break down running tool. Clear rig floor of excess equipment and service rig. Make up 8½" wiper BHA and run in hole to 674 m and circulate bottoms up. Run in hole from 674 m to 1506 m and circulate bottoms up. Run in hole from 1506 m to 2400 m and circulate bottoms up. Run in hole from 2400 m to 2768 m.
- 11th May 2004** Run in hole from 2768 m to 3227 m. Wash and ream to 3275 m. Pump 20 bbl sweep. Circulate to clean hole and condition mud and reduce mud weight to 9.9 ppg. Flow check and pull out of hole from 3275 m to 3170 m. Pump slug, pull out of hole to 641 m. Service rig. Pull out of hole from 641 m to 185 m. Space out drill string in BOP, close 5" rams around 5" drill pipe, change middle pipe rams to 7" solids. Rack back HWDP and jar, lay down wiper BHA. Clear floor of excess equipment. Make up and retrieve wear bushing, break down running tool. Make up jetting assembly, flush well profile and break down assembly. Make up test assembly and shell test BOP 300 / 3000 psi, 5 / 5 min. Break down test assembly. Unable to rig up for casing run: 40+ knots, crane shut down. Wait on weather.
- 12th May 2004** Continue to wait on weather. Rig up and run 7" casing to 2639 m.
- 13th May 2004** Run 7" casing from 2639 m to 3275 m. Condition mud and circulate casing. Max gas 25 units. Cement casing as per programme. Bottom plug failure in diaphragm, replace plug and reinstall cement head. Continue cement job, bump plug and hold 2000 psi / 15 mins. Bleed back 3.5 bbl. Rig down surface lines and conduct rig maintenance while wait on cement. Wait on cement. Lift and secure riser / BOP and install casing slips. Cut casing.
- 14th May 2004** Lay out cut-off casing. Nipple down BOPs and riser. Dress casing stub and prepare to nipple up riser and B section. Nipple up B section. Attempt to test B section – No go. Conduct rig maintenance and dress middle pipe rams to 4½" - 7" variables and lower pipe rams to 7 solids while discuss options with drilling department. Make up casing spear and engage casing. Attempt to lift casing – No go, spear released at 290 klbs. Inspect derrick and TDS after spear releasing. Make up spear assembly and engage spear. Pick up to 215 klbs – grapple slips out of casing. Lay out grapple. Install B section, pressure test to 2000 psi. Bled back to 1900 psi and held for 15 minutes. Nipple up BOPs.
- 15th May 2004** Continue nipple up BOPs and test same. Run in and install wear bushing. Rig up Schlumberger and pick up tools. Run in hole with CHDT assembly to 3235 m, unable to reach TD. Pull out of hole to 3190 m. Record pressures and obtain sample at 3190 m. Retract tool and plug hole – pressure test OK. Next sample at 3203.5 m. Retract tool and plug hole – pressure test OK. Pull out of hole, Lay down tools and service tools.
- 16th May 2004** Continue to service Schlumberger tools. Oilphase recovers fluids from chambers. Pick up, make up and function CHDT tools. Run in hole to 3214 m, correlate depth, obtain samples and record flow. Pull out of hole from 3214 m to 3196.5 m. Reset tool and determine sample composition. Pull out of hole CHDT samples and redress tools. Pick-up, make-up and function test CHDT tools.
- 17th May 2004** Schlumberger run in hole with CHDT to 3172.5 m. Conduct CHDT sampling at 3172.5 m. Schlumberger pull out of hole with CHDT tool. Lay out CHDT tool and rig down wireline sheaves. Retrieve wearbushing. Test lines and casing. Nipple down BOP and riser. Install abandonment flange as per Cameron and test same. Backload excess A-24A equipment to boat. Off Marlin A-24A at 19:00 hours.

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FORMATION TOPS

DESCRIPTION	MD (m) RT	TVD (m) RT	TVD (m) SS
Lakes Entrance	1499.0	1301.27	1273.36
Latrobe Group (TOL)	1619.0	1396.07	1368.16
N1.2 Coal	1623.29	1399.44	1371.53
Base N/M Sands	2050.95	1735.45	1707.54
Top Turrum L-100 Sand	2538.86	2116.86	2088.95
Top Turrum L-500 Sands	3104.55	2548.20	2520.29
Top of Cretaceous Shale	3221.87	2635.79	2607.88
Total Depth	3275.0		

GEOLOGICAL SUMMARY**GIPPSLAND LIMESTONE**

655 m - 1499 m

CALCILUTITE and CALCISILTITE with CLAYSTONE at depth**CALCILUTITE**

Light grey, light to medium olive grey, medium grey in part, occasionally silty and grading to CALCISILTITE, trace disseminated pyrite, trace carbonaceous specks, trace fossil fragments and ooids, minor to trace lithics, soft to firm, sub-blocky to blocky, amorphous in part.

CALCISILTITE

Light grey to light olive grey, localised very fine arenaceous and grading to CALCARENITE, argillaceous and grading to CALCILUTITE in part, trace fossil fragments and ooids, trace carbonaceous specks, trace lithics, soft to firm, predominantly firm with depth, sub-blocky to blocky in parts with depth.

CLAYSTONE

Light olive grey to olive grey, light grey to medium grey, silty in part, moderate to very calcareous, grading to CALCILUTITE in part, trace disseminated pyrite, trace ooids, occasional trace fossil fragments, trace carbonaceous specks, soft to firm, sub-blocky to blocky, occasionally amorphous.

LAKES ENTRANCE FORMATION

1499 m – 1619 m

CLAYSTONE**CLAYSTONE**

Light olive grey to light grey, occasional olive grey to medium grey, very calcareous and grading to calcareous CLAYSTONE, minor disseminated pyrite, trace carbonaceous specks, trace ooids and fossil fragments, soft to firm, sub-blocky to amorphous.

LATROBE GROUP

1619 m - 1770 m

Interbedded SANDSTONE, SILTSTONE, CLAYSTONE and COAL**SANDSTONE**

Very light grey, clear to translucent grains, medium to coarse, very coarse and granules in part, rare bit fractured grains, very poorly sorted to moderate sorted with depth, angular to sub angular, trace pyrite cement, trace white argillaceous matrix, rare nodular pyrite with depth, loose, fair inferred porosity no fluorescence.

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CLAYSTONE	Very light grey to light brownish grey, brownish grey, light grey in part, calcareous, minor to common silt, grading to argillaceous SILTSTONE, trace carbonaceous specks, trace glauconite, trace nodular pyrite, trace disseminated pyrite, soft to moderately firm, dispersive, amorphous to sub-blocky.
SILTSTONE	Medium brown grey, very light grey to grey, very argillaceous, slightly calcareous, trace carbonaceous specks, slightly micro-micaceous, trace pyrite nodules, soft to firm, amorphous to sub-blocky.
COAL	Brownish black to black, earthy to dull lustre, brittle to soft with depth, sub-blocky to blocky, sub-fissile in part, hackly to angular fracture, lignitic.
1770 m – 1910 m	CLAYSTONE with interbedded SANDSTONE and minor COAL
SANDSTONE	Very light grey, clear to translucent grains, medium to coarse, common very coarse and trace granules, rare bit fractured grains, poorly sorted, moderately well sorted with depth, angular to sub angular, trace pyrite cement, trace white argillaceous matrix, rare nodular pyrite, loose, fair inferred porosity no fluorescence.
CLAYSTONE	Light brownish grey to brownish grey, minor to common white with depth, weakly calcareous, minor to common silt, grading to argillaceous SILTSTONE, trace carbonaceous specks and fragments, trace disseminated pyrite, very soft to moderately firm, dispersive, amorphous to sub - blocky.
COAL	Brownish black to black, dull to earthy lustre, friable to brittle, sub-fissile, sub-blocky to blocky, hackly to angular fracture, lignitic.
1910 m – 2350 m	CLAYSTONE with minor interbedded SANDSTONE and COAL
CLAYSTONE	Light brown grey to brown grey, medium light grey, minor white, weak to moderately calcareous, minor to common silt and grading in part to argillaceous SILTSTONE, trace carbonaceous specks and flecks, occasional trace disseminated pyrite, occasional trace nodular pyrite, very soft to moderately firm, dispersive, amorphous to rare sub-blocky.
SANDSTONE	Clear to translucent, light grey, very fine to fine, common medium to coarse loose grains, moderately sorted, angular sub-angular, common sub-rounded, trace pyrite cement, off white dispersive Kaolinitic matrix, loose to soft and friable aggregates, poor inferred porosity, no fluorescence.
COAL	Brown black to black, earthy to sub-vitreous lustre, occasional, friable to brittle, occasional moderately hard, sub-blocky to blocky, sub-fissile in part, hackly to angular fracture, sub-conchoidal in part, micromicaceous in part, lignitic.
2350 m – 2539 m	CLAYSTONE with interbedded SANDSTONE
CLAYSTONE	Dark yellow brown to brown grey, weak to moderately calcareous, minor to common silt, occasional very finely arenaceous, grading to argillaceous SILTSTONE in part, trace carbonaceous specks and fragments, trace nodular pyrite, dispersive to soft, occasionally moderately firm, amorphous to occasionally sub-blocky.
SANDSTONE	Light grey, clear to translucent, very fine to fine, occasional medium, moderately sorted to well sorted with depth, sub-rounded to sub-angular, common angular, minor quartz cement, abundant white argillaceous matrix, common carbonaceous specks, loose to occasionally friable, fair inferred porosity, no fluorescence.

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2539 m – 2620 m

Interbedded SANDSTONE, CLAYSTONE and minor COAL**SANDSTONE**

Clear, translucent, off white to very light grey, very fine to coarse, predominantly medium, common coarse off white milky grains, moderately sorted, sub-rounded to sub-angular, common angular, weak siliceous cement, local trace pyrite cement, trace calcareous/dolomitic cement, abundant white Kaolinite matrix, trace carbonaceous stains, dominantly loose to friable, fair inferred and visual porosity.

FLUORESCENCE

2585 m to 2595 m: 10% to trace dull orange yellow patchy to occasional moderately bright yellow green spotted fluorescence. No direct cut, thin film ring residue.

CLAYSTONE

Light to dark brown grey, occasional dark yellow brown, dark olive grey in part, occasional to common carbonaceous, weakly calcareous, common carbonaceous specks, micromicaceous in part, soft-dispersive, amorphous to sub-blocky.

COAL

Dark brown to black, dull to earthy, soft to moderately hard in part, occasional sub-conchoidal fracture, blocky, argillaceous, lignitic to sub-bituminous.

2620 m – 2750 m

CLAYSTONE with minor interbedded SANDSTONE and COAL**CLAYSTONE**

Light grey to grey, light brownish grey to brownish grey, occasional yellowish brown, rare light olive grey to olive grey in part, commonly silty grading to argillaceous SILTSTONE, occasional to common carbonaceous specks and streaks, dispersive, soft, rare sub-blocky.

SANDSTONE

Clear, translucent, milky, very fine to fine, occasional medium, moderately well sorted, sub-rounded to sub-angular, common argillaceous matrix, trace calcareous/dolomitic cement, trace carbonaceous specks, loose to friable, fair inferred porosity, trace dull yellow direct mineral fluorescence.

COAL

Dark brown to black, dull to earthy, occasional sub-vitreous, friable to firm, dominantly sub-blocky to blocky, sub-fissile in part, hackly to angular fracture, occasional sub-conchoidal, lignitic.

2750 m – 3104 m

Interbedded SANDSTONE, CLAYSTONE and COAL**SANDSTONE**

Clear to opaque, translucent, very light grey, very fine to predominantly medium, trace coarse, predominantly medium, poorly to moderately sorted, sub-rounded to sub-angular, loose, trace pyrite nodules, trace brown siliceous cemented aggregates, poor inferred porosity.

FLUORESCENCE

2795 m to 2800 m: Nil stain. Trace very dull yellow pinpoint fluorescence. Nil cut in white light, very slow cream cut fluorescence, thin ring residue, very poor show.
2960 m to 2965 m: 10 % fluorescence in aggregates. Nil stain. Very dull yellow orange patchy fluorescence. Nil cut in white light. Slow very pale white cut, nil residue, very poor show.

CLAYSTONE

(1) Light grey to grey, light brownish grey to brownish grey, occasional yellowish brown, rare light olive grey to olive grey in part, commonly silty grading to argillaceous SILTSTONE, occasional to common carbonaceous specks and streaks, dispersive, soft, rare sub-blocky.

(2) Brownish black, black, very carbonaceous grading to COAL in part, micromicaceous in part, friable to firm, sub-blocky.

COAL

Brown black to predominantly black, dull to sub-vitreous lustre, friable to firm, occasionally moderately hard, sub-blocky to blocky, sub-fissile in part, hackly to angular fracture, trace silty laminations, lignitic.

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3104 m – 3222 m

SANDSTONE with Interbedded CLAYSTONE**SANDSTONE**

Clear, translucent, opaque, pale grey, predominantly medium to coarse, minor very coarse, trace granular, sub-angular to predominantly sub-round, trace round, moderately sorted, trace fine grained aggregates with trace quartzite cement, tr pyrite nodules, local to trace disseminated pyrite inclusions, predominantly loose and clean sand, fair inferred porosity, very poor to poor visual porosity.

FLUORESCENCE

3135 m to 3140 m: trace in aggregates.

FLUORESCENCE

3140 m to 3150 m: Nil stain. 5% dull yellow patchy fluorescence. Nil cut in white light, moderate to rapid pale cream white cut, trace residual ring, poor to fair show.
3190m to 3221m: Nil stain, 5%-10% dull yellow moderately bright pinpoint to spotted fluorescence, nil cut in white light, trace dull white very slow cut, nil residual ring, poor show.

CLAYSTONE

Light brown grey to brown grey, minor silt, common carbonaceous specks, rare pyrite, soft, occasionally firm, amorphous to sub-blocky.

CRETACEOUS SHALE

3222 m – 3275 m TD.

CLAYSTONE with minor interbedded SANDSTONE .**CLAYSTONE**

Brown grey, silty in part, trace carbonaceous specks and fragments, slightly calcareous, predominantly very soft to amorphous, trace blocky, trace sub-fissile.

SANDSTONE

SANDSTONE: Clear to opaque, translucent, fine to medium, trace coarse, moderately well sorted, sub-angular to sub-round, minor angular, moderately siliceous cement, trace quartz overgrowths, trace brown grey argillaceous matrix, trace nodular pyrite, loose, trace firm aggregates, fair inferred porosity, no fluorescence.

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CORING SUMMARY

Core #1

Interval: 3158.5 m to 3167.66 m

Metres Cored: 9.16 m

Metres Recovered: 9.16 m

Recovery: 100%

Depth	%	LITHOLOGY DESCRIPTION and COMMENTS (classification, colour, hardness, texture, mineralogy, modifiers, cement)	Fluorescence
3158.5	100	SANDSTONE: Quartzose, clear, opaque, translucent, pale grey, medium to very coarse, predominantly coarse to very coarse, common granules (2-3mm), one 5mm broken granule, moderately sorted, sub-rounded, trace quartz cement, locally trace pyrite cement, locally trace clay matrix, minor disseminated pyrite, trace pyrite nodules, predominantly moderately hard, locally friable in part, trace interstitial porosity. Fluorescence. Hydrocarbon odour.	Nil stain. Patchy moderately bright yellow fluorescence. Immediate white cut. Thick pale brown film residue. Good show.
3159	100	SANDSTONE: Quartzose, generally as above, medium to very coarse, common granules, poorly sorted, moderately hard. Trace interstitial porosity. Trace Fluorescence.	Nil stain. Trace patchy dull yellow fluorescence. Immediate white cut. Thin film residue. Poor show.
3160	100	SANDSTONE: Quartzose, generally as above, medium to very coarse, common granules, poorly sorted, moderately hard to hard. Trace interstitial porosity. Trace Fluorescence.	Nil stain. Trace patchy dull yellow white fluorescence. Moderate white cut. Thin film residue. Poor show.
3161	90 10	SANDSTONE: Quartzose, as above, medium to granules, bimodal environment, very hard. Trace patchy fluorescence. CLAYSTONE: SANDSTONE/CLAYSTONE thin bed CONTACT. Brownish black, common silt grading to Siltstone, non calcareous, trace mica flakes, micro micaceous in part, hard, carbonaceous in part grading to Coal, common carbonaceous specks and flecks, local vitreous coal lenses.	Nil stain. Trace patchy dull yellow white fluorescence. Moderate white cut. Thin film residue. Poor show.
3162	80 20	SANDSTONE: Quartzose, clear, opaque, translucent, pale grey, medium grey, medium to very coarse, trace granules, sub-angular to sub-rounded, poorly sorted, trace slightly calcareous cement, trace quartz cement, common argillaceous matrix, trace pyrite nodule, trace pyrite cement, moderately hard. Trace (2 spots only) fluorescence. CLAYSTONE: Brownish black, common silt grading to Siltstone, non calcareous, trace mica flakes, micro micaceous in part, hard, carbonaceous in part grading to COAL, common carbonaceous specks and flecks, local vitreous coal lenses.	Nil stain. Trace spotted dull yellow white fluorescence. Slow white cut. Pale very thin ring residue. Very poor show.
3163	100	SANDSTONE: Quartzose, clear, opaque, translucent, pale grey, trace medium grey, medium to granules, poorly sorted, sub-angular to sub-rounded, abundant brownish black silty argillaceous matrix, trace mica flakes, carbonaceous specks in matrix, hard. Very poor visual porosity, Even fluorescence in matrix.	Nil stain. Even dull brown fluorescence. Trace very slow dull white cut. Nil residue. Very poor show.
3164	100	SANDSTONE: Quartzose, clear, opaque, translucent, pale grey, trace medium grey, medium to granules, poorly sorted, sub-rounded, locally brownish black silty clay matrix, trace slightly calcareous cement, trace carbonaceous specks in matrix, hard. Trace spotted fluorescence in clay matrix.	Nil stain. Trace spotted dull pale yellow white fluorescence. Very slow dull white cut. Trace residue. Very poor show.
3165	100	SANDSTONE: Quartzose, clear, opaque, translucent, trace pale grey, fine to medium, sub-angular to sub-rounded, moderately sorted, locally common clay matrix, common muscovite and minor biotite mica, trace glauconite nodule, trace chlorite?, hard.	Nil stain. Trace spotted dull pale yellow white fluorescence. Slow dull white cut. Thin ring residue. Poor show.

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Depth	%	LITHOLOGY DESCRIPTION and COMMENTS (classification, colour, hardness, texture, mineralogy, modifiers, cement)	Fluorescence
3166	100	SANDSTONE: Quartzose, clear, opaque, translucent, pale grey, trace medium grey, medium to very coarse grained, trace fine and granules, very poorly sorted, sub-angular to sub-rounded, minor angular, strong silica cement, trace pyrite cement, abundant brownish black silty argillaceous matrix in parts, trace mica flakes, trace carbonaceous specks in matrix, trace quartz overgrowths, trace chlorite grains, hard, very poor visual porosity.	Nil stain. Trace spotted dull pale yellow white fluorescence. Very slow dull white crush cut. Thin dull ring residue. Poor show. (Possibly Glycol)
3166.7	100	SANDSTONE: Quartzose, clear, opaque, translucent, trace pale grey, coarse to very coarse, minor medium, moderately well sorted, predominantly sub-angular to minor sub-rounded, minor angular, moderate siliceous cement, trace lithic grains, hard, friable in part, fair to good visual porosity.	Nil stain. Trace spotted dull pale yellow white fluorescence. Very slow dull white crush cut. Thin dull ring residue. Poor show. (Possibly Glycol)
3167.66	100	SANDSTONE: Quartzose, clear, opaque, translucent, trace pale grey, very coarse to granule, minor coarse, moderately well sorted, predominantly sub-angular to sub-rounded, minor angular and rounded, moderate siliceous cement, trace argillaceous matrix, trace lithic grains, firm to friable, fair to good visual porosity.	Nil stain. Trace spotted dull pale yellow white fluorescence. Very slow dull white crush cut. Thin dull ring residue. Poor show. (Possibly Glycol)

Core #2

Interval: 3167.66 m to 3176.66 m

Metres Cored: 9.0 m

Metres Recovered: 8.64 m

Recovery: 96%

Depth	%	LITHOLOGY DESCRIPTION and COMMENTS (classification, colour, hardness, texture, mineralogy, modifiers, cement)	Fluorescence
3167.66	100	SANDSTONE: Quartzose, clear, opaque, translucent, trace pale grey, very coarse to granule, minor coarse, moderately well sorted, predominantly sub-angular to sub-rounded, minor angular and rounded, moderate siliceous cement, trace quartz overgrowths, trace brownish grey argillaceous matrix, trace lithic grains, firm to friable, good visual intergranular porosity. (Some drilling mud invasion)	Nil stain. Trace dull pale yellow white fluorescence. Slow dull white cut and crush cut. Thin moderately bright ring residue. Poor show. (Partly Glycol)
3168	100	SANDSTONE: Quartzose, clear, opaque, translucent, trace pale grey, very coarse to granule, minor coarse, moderately well sorted, predominantly sub-angular to sub-rounded, minor angular and rounded, moderate siliceous cement, trace quartz overgrowths, trace brownish grey argillaceous matrix, trace lithic grains, trace pyrite pore fill and pyritic wood fragments, firm to friable, good visual intergranular porosity, minor kaolinitic pore fill in part.	Nil stain. Trace dull pale yellow white fluorescence. Slow dull white cut and crush cut. Thin moderately bright ring residue. Poor show. (Partly Glycol)
3169	100	SANDSTONE: Quartzose, clear, opaque, translucent, trace pale grey, coarse to granule, minor medium, poorly sorted, predominantly sub-angular to sub-rounded, minor angular and rounded, moderate siliceous cement, trace quartz overgrowths, trace brownish grey silty to argillaceous matrix, trace lithic grains, firm to friable, good visual intergranular porosity in part.	Nil stain. Trace dull pale yellow white fluorescence. Slow dull white cut and crush cut. Thin moderately bright ring residue. Poor show. (Partly Glycol)
3170	100	SANDSTONE: Quartzose, clear, opaque, translucent, trace pale grey, coarse to very coarse, trace granule and medium, moderately sorted, predominantly sub-angular to sub-rounded, minor angular and rounded, moderate siliceous cement, trace quartz overgrowths, trace brownish grey silty to argillaceous matrix, trace lithic grains, trace weathered feldspar grains, trace pyrite, firm to friable, good visual intergranular porosity.	Nil stain. Trace dull pale yellow white fluorescence. Slow dull white cut and crush cut. Thin moderately bright ring residue. Poor show. (Partly Glycol)

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Depth	%	LITHOLOGY DESCRIPTION and COMMENTS (classification, colour, hardness, texture, mineralogy, modifiers, cement)	Fluorescence
3171	100	SANDSTONE: generally as above, Quartzose, clear, opaque, translucent, trace pale grey, coarse to very coarse, trace granules and medium grains, moderately sorted, predominantly sub-angular to sub-rounded, minor angular and rounded, moderate siliceous cement, trace quartz overgrowths, trace brownish grey silty to argillaceous matrix, trace lithic grains, trace weathered feldspar grains, trace pyrite, firm to friable, good visual intergranular porosity.	Nil stain. Trace dull pale yellow white fluorescence. Very slow dull crush cut. Thin dull ring residue. Poor show. (Partly Glycol)
3172	100	SANDSTONE: generally as above, Quartzose, clear, opaque, translucent, trace pale grey, coarse to very coarse, trace granules, moderately sorted, predominantly sub-angular to sub-rounded, minor angular and rounded, moderate siliceous cement, trace localized pyrite cement, trace quartz overgrowths, trace brownish grey silty to argillaceous matrix, trace lithic grains, firm to friable, fair to good visual intergranular porosity.	Nil stain. Trace dull pale yellow white fluorescence. Very slow dull crush cut. Thin dull ring residue. Poor show. (Partly Glycol)
3173	100	SANDSTONE: Quartzose, clear, opaque, translucent, trace pale grey, coarse to very coarse, trace granule and medium, moderately to well sorted, predominantly sub-angular to sub-rounded, minor angular and trace rounded, moderate siliceous cement, trace quartz overgrowths, trace brownish grey silty to argillaceous matrix, trace lithic grains, trace weathered feldspar grains, firm to friable, good to very good visual intergranular porosity.	Nil stain. Nil direct fluorescence. Very slow dull crush cut. Thin dull ring residue. Poor show. (Partly Glycol)
3174	100	SANDSTONE: generally as above, Quartzose, clear, opaque, translucent, trace pale grey, coarse to very coarse, trace granule and medium, moderately to well sorted, predominantly sub-angular to sub-rounded, minor angular and trace rounded, moderate siliceous cement, trace quartz overgrowths, trace brownish grey silty to argillaceous matrix, nil to trace lithic grains, firm to friable, good to very good visual intergranular porosity.	Nil stain. Nil direct fluorescence. Slow dull to moderately bright crush cut. Thin moderately bright ring residue. Poor show. (Partly Glycol)
3175	100	SANDSTONE: Quartzose, clear, opaque, translucent, trace pale grey, medium to very coarse, trace granule, moderately sorted, predominantly sub-angular to sub-rounded, minor angular and trace rounded, moderate siliceous cement, trace quartz overgrowths, trace brownish grey silty to argillaceous matrix, nil to trace lithic grains, firm to friable, fair to good visual intergranular porosity.	Nil stain. Nil direct fluorescence. Very slow dull crush cut. Thin dull ring residue. Poor show. (Partly Glycol)
3175.5	100	SANDSTONE: Quartzose, clear, opaque, translucent, trace pale grey, coarse to very coarse, minor granule, moderately well sorted, predominantly sub-angular to sub-rounded, minor angular and rounded, moderate siliceous cement, trace quartz overgrowths, trace brownish grey argillaceous matrix, trace lithic grains, firm to friable, good visual intergranular porosity, minor kaolinitic pore fill in part.	Nil stain. Nil direct fluorescence. Very slow dull to moderately bright crush cut. Thin dull ring residue. Poor show. (Partly Glycol)
3176.3	100	SANDSTONE: Quartzose, clear, opaque, translucent, trace pale grey, coarse to very coarse, minor granule, moderately well sorted, predominantly sub-angular to sub-rounded, minor angular and rounded, moderate siliceous cement, trace pyrite cement, trace quartz overgrowths, trace brownish grey argillaceous matrix, trace lithic grains, trace coaly fragments pyritic in part, trace weathered feldspar grains, firm to predominantly friable, good visual intergranular porosity, trace pyritic pore fill in part.	Nil stain. Nil direct fluorescence. Very slow dull crush cut. Thin dull ring residue. Poor show. (Partly Glycol)

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Core #3

Interval: 3176.66 m to 3185.66 m

Metres Cored: 9.0 m

Metres Recovered: 9.0 m

Recovery: 100 %

Depth	%	LITHOLOGY DESCRIPTION and COMMENTS (classification, colour, hardness, texture, mineralogy, modifiers, cement)	Fluorescence
3176.66	100	SANDSTONE: Quartzose, clear, opaque, translucent, trace pale grey, coarse to very coarse, trace granule and medium grains, moderately well sorted, predominantly sub-angular to sub-rounded, minor angular and rounded, moderate siliceous cement, trace quartz overgrowths, trace brownish grey argillaceous matrix, trace lithic grains, trace weathered feldspar grains, firm to friable, good visual intergranular porosity.	Nil stain. Pale yellow white fluorescence. Slow dull white crush cut. Thin dull white ring residue. Poor show. (Partly Glycol)
3177	100	SANDSTONE: Quartzose, clear, opaque, translucent, trace pale grey, coarse to predominantly very coarse to granule, trace medium grains, poorly sorted, predominantly sub-angular to sub-rounded, minor angular and rounded, moderate siliceous cement, trace to rare quartz overgrowths, minor brownish black bituminous pore fill (Possibly Barablock), rare brownish grey argillaceous matrix, trace lithic/feldspathic grains, minor weathered feldspar grains, trace chlorite grains, trace Kaolinitic pore fill, locally common, firm to friable, fair visual intergranular porosity.	Nil stain. Nil direct fluorescence. Bituminous material has dull pale yellow white cut. Thick moderately bright yellow white ring residue. Poor show.
3178	100	SANDSTONE: Quartzose, clear, opaque, translucent, trace pale grey, coarse to very coarse, trace granule and medium grains, moderately well sorted, predominantly sub-angular to sub-rounded, minor angular and rounded, moderate siliceous cement, trace quartz overgrowths, trace lithic/feldspathic grains, trace weathered feldspar grains, firm to friable, good visual intergranular porosity.	Nil stain. Pale yellow white fluorescence. Very slow dull white crush cut. Thin dull white ring residue. Poor show. (Partly Glycol)
3179	100	SANDSTONE: generally as above, Quartzose, clear, opaque, translucent, trace pale grey, coarse to very coarse, trace granule and medium grains, moderately sorted, predominantly sub-angular to sub-rounded, minor angular and rounded, moderate siliceous cement, trace quartz overgrowths, trace lithic/feldspathic grains, trace weathered feldspar grains, trace chlorite grains, firm to friable, good visual intergranular porosity.	Nil stain. Pale yellow white fluorescence. Very slow dull white crush cut. Thin dull white ring residue. Poor show. (Partly Glycol)
3180	100	SANDSTONE: generally as above, Quartzose, clear, opaque, translucent, trace pale grey, coarse to very coarse, trace granule and medium grains, moderately sorted, predominantly sub-angular to sub-rounded, minor angular and rounded, moderate siliceous cement, trace quartz overgrowths, trace lithic/feldspathic grains, trace weathered feldspar grains, trace chlorite grains, firm to friable, good visual intergranular porosity.	Nil stain. Nil direct fluorescence. Very slow dull white crush cut. Thin dull white ring residue. Poor show. (Partly Glycol)
3181	100	SANDSTONE: Quartzose, clear, opaque, translucent, trace pale grey, coarse to predominantly very coarse to granule, trace medium grains, poorly sorted, predominantly sub-angular to sub-rounded, minor angular and rounded, moderate siliceous cement, rare quartz overgrowths, trace brownish grey argillaceous matrix, trace lithic/feldspathic grains, minor weathered feldspar grains, trace chlorite grains, trace kaolinitic pore fill, locally common, firm to friable, fair to good visual intergranular porosity.	Nil stain. Nil direct fluorescence. Very slow dull white crush cut. Thin dull white ring residue. Poor show. (Partly Glycol)
82	100	CLAYSTONE: Brownish grey, minor quartz silt, minor mica, chip sample has 20 mm pyrite nodule, trace very fine to fine quartz grains, trace chlorite grains, trace very finely disseminated pyrite, hard, blocky to sub-fissile, non calcareous.	

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Depth	%	LITHOLOGY DESCRIPTION and COMMENTS (classification, colour, hardness, texture, mineralogy, modifiers, cement)	Fluorescence
3183	100	COAL: Greyish black to black, predominantly earthy lustre with abundant fine vitreous laminae, sub-blocky to sub-fissile, uneven to angular fracture, minor plant remains.	
3184	100	COAL: Greyish black to black, earthy to predominantly sub-vitreous lustre with minor fine vitreous laminae, sub-blocky to blocky, angular to sub-conchoidal fracture, bituminous.	
3184.7	100	CLAYSTONE with minor interbedded COAL; CLAYSTONE: Brownish grey, minor quartz silt, trace mica, trace very fine to fine quartz grains, trace very finely disseminated pyrite, hard, blocky to sub-fissile, non calcareous. COAL: Black, vitreous lustre, sub-conchoidal fracture, bituminous.	
3185.66	100	CLAYSTONE: Brownish grey, common to locally abundant very fine to fine quartz grains, grading to arenaceous claystone in part, trace arenaceous laminae, minor quartz silt, trace mica, trace very finely disseminated pyrite, trace coaly fragments, hard, blocky to sub-fissile, non calcareous.	

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GAS REPORT

On drilling into the Latrobe Formation at 1619 mMDRT gas levels increased to 296 units from a background level of approximately 10 units. Gas levels varied from 23 units to 401 units in the Latrobe. Sandstone beds vary greatly in levels of gas. An average of 200 units in some sections is noted but other sections, for example 1652 m to 1668 m and 1685 m to 1770 m have much lower levels of between 23 and 40 units. The ratio of hydrocarbons in the larger peaks is generally consistent at 89% C1, 7% C2, 3% C3, 1% C4, tr %C5. N12 and N15 coals produced gas peaks at 1685 m and 1770 m respectively. The coal gases make the levels of Sandstone gas difficult to interpret until 1770 m.

Below 1770 m the Sandstone gas peaks are more easily definable with an average of approximately 300 units from Sandstone and between 10 and 60 units for Claystones down to the Top Turrum L-100 Sand.

The Top Turrum L-100 Sand was penetrated at 2538.86 metres. A peak of 667 units was detected at 2591 m from Sandstone at 2580 m to 2595 m. This peak had a ratio of 90/6/3/1/trace and was associated with fluorescence.

Fluorescence of trace to 10% was detected from 2585 m to 2595 m. Two other gas peaks of approximately 400 units occurred from the L100 sands and were associated with trace to 10% fluorescence. A further 20 peaks were seen throughout the Turrum L-100 sands of between 100 and 1028 units. Their average gas ratio composition was:

C1, 90%, C2, 6%, C3, 3%, C4, 1%, C5, traces.

At 3104.5 m the Turrum L-500 sands were encountered with a mud weight of 9.85 ppg and gas levels were 40 to 111 units with a ratio of 92/5//2/1/trace.

At a sandstone of approximately 40 metres thickness produced gas levels of between 30 and 90 units with an average of 40 units and a ratio of 92/5/2/1/trace. Fluorescence was present in this sandstone as follows: Fluorescence:3140 m-3150 m, Nil stain, 5% dull yellow patchy. Nil cut in white light, moderate cut, trace residual ring, poor to fair show.

At 3158.5 m gas levels of 50 units were present. Coring commenced from this depth. Three 9 metre cores were cut from 3158.50 m to 3185.66 m. Gas levels were lower during coring due to slower ROPs. Due to slow circulation rates whilst coring gas readings from the cored intervals were mostly lagged after tripping.

After the three cores were completed drilling continued to a total depth of 3275 mMDRT (2677mTVD).

Further Fluorescence was detected in samples after coring from 3190 m to 3221 m but gas levels remained with a ratio of 90/6/3/1/trace until the Top of Cretaceous Shale.

The gas levels remained relatively low at about 30 to 50 units and a ratio of 92/5/2/1/trace through the final formation to be encountered which was Cretaceous Shale at 3221 m MDRT (2635.18 m TVDRT).

Localised increases in background gas are attributed to both lithology variations and the penetration rate, which was dependant upon the drilling method (being either rotary or slide) carried out at the time. No CO₂ or H₂S was detected while drilling Marlin A-24A.

Mud weights from Top of Latrobe to total depth were between 9.70 ppg and 10.15 ppg at total depth. This range of mud weight resulted in no connection gases.

Geoservices has provided two 1:500 scale logs which detail gas detection for Marlin A-24A. These are the Gas Log and the Reserval Log.

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Gas peaks through the Latrobe Group

Depth metres	Total Gas units	C ₁ %	C ₂ %	C ₃ %	iC ₄ %	nC ₄ %	iC ₅ %	nC ₅ %
1622	296	3.209	0.279	0.087	0.009	0.018	0.004	0.004
1645	349	3.730	0.332	0.145	0.006	0.017	0.001	0.001
1675	307	2.178	0.149	0.059	0.005	0.011	0.002	0.002
1734	100	1.394	0.076	0.030	0.004	0.008	0.002	0.002
1745	114	1.446	0.086	0.034	0.004	0.009	0.002	0.003
1765	401	5.002	0.431	0.148	0.001	0.013	0.001	0.001
1853	100	1.398	0.104	0.053	0.007	0.015	0.005	0.005
1946	23	0.207	0.013	0.006	0.001	0.002	0.001	0.002
2068	35	0.518	0.030	0.009	0.001	0.001	0.001	0.001
2160.5	123	1.888	0.111	0.049	0.005	0.010	0.002	0.002
2193.5	96	1.256	0.081	0.042	0.006	0.010	0.003	0.002
2248	230	2.793	0.150	0.072	0.009	0.016	0.004	0.004
2251.5	273	3.766	0.274	0.123	0.006	0.015	0.003	0.003
2304	98	1.493	0.085	0.045	0.006	0.012	0.003	0.004
2310.5	303	3.542	0.272	0.105	0.014	0.025	0.007	0.007
2318.5	414	5.003	0.390	0.197	0.015	0.034	0.008	0.008
2341	164	2.420	0.144	0.073	0.010	0.017	0.005	0.005
2325.5	431	5.964	0.458	0.216	0.016	0.035	0.002	0.002
2391	103	1.587	0.089	0.042	0.005	0.010	0.002	0.003
2396	132	1.943	0.110	0.050	0.006	0.012	0.003	0.003
2404	182	2.626	0.149	0.070	0.009	0.016	0.004	0.005
2414	415	5.870	0.451	0.223	0.018	0.039	0.005	0.006
2423.5	390	4.862	0.349	0.160	0.011	0.027	0.001	0.001
2434	418	4.286	0.344	0.187	0.016	0.033	0.001	0.001
2456	307	4.192	0.326	0.174	0.016	0.033	0.008	0.009
2483.5	285	3.874	0.425	0.208	0.017	0.031	0.009	0.010
2493	346	4.584	0.337	0.166	0.008	0.022	0.003	0.003
2511	486	6.266	0.478	0.240	0.020	0.042	0.001	0.001
2529	352	4.019	0.324	0.168	0.012	0.029	0.001	0.001
2547	364	4.865	0.378	0.191	0.012	0.028	0.005	0.006
2563.6	230	3.259	0.248	0.104	0.013	0.024	0.006	0.007
2578.5	201	2.888	0.255	0.105	0.012	0.025	0.007	0.007
2587	605	4.622	0.321	0.155	0.009	0.026	0.001	0.001
2591	665	8.469	0.576	0.288	0.027	0.055	0.001	0.001
2610.5	333	4.693	0.317	0.146	0.009	0.025	0.001	0.001
2639	494	6.376	0.464	0.220	0.018	0.041	0.002	0.002
2653	325	3.953	0.286	0.094	0.011	0.23	0.006	0.007
2681.5	733	8.248	0.456	0.174	0.009	0.026	0.002	0.002
2705.5	163	2.552	0.123	0.053	0.006	0.013	0.003	0.004
2733	292	4.383	0.294	0.139	0.010	0.025	0.005	0.005
2770	1043	12.665	0.890	0.456	0.057	0.105	0.015	0.012
2819.5	1070	11.776	0.783	0.387	0.049	0.093	0.016	0.015
2852.5	839	8.869	0.680	0.345	0.047	0.078	0.015	0.012
2864	617	7.584	0.591	0.282	0.033	0.065	0.009	0.007
2890.5	219	2.596	0.147	0.086	0.012	0.023	0.007	0.007
2897	743	8.567	0.638	0.347	0.043	0.078	0.009	0.004
2931	201	2.620	0.149	0.080	0.010	0.021	0.006	0.006
2942	321	4.012	0.312	0.152	0.014	0.035	0.007	0.008
2957	407	5.150	0.369	0.175	0.019	0.047	0.005	0.003

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Depth metres	Total Gas units	C ₁ %	C ₂ %	C ₃ %	iC ₄ %	nC ₄ %	iC ₅ %	nC ₅ %
2981.5	182	2.138	0.120	0.050	0.007	0.017	0.006	0.006
3011.5	189	2.687	0.149	0.072	0.010	0.021	0.007	0.007
3036.5	167	2.393	0.145	0.065	0.008	0.016	0.004	0.005
3068.5	165	2.317	0.149	0.072	0.009	0.019	0.005	0.006
3082	89	1.346	0.066	0.029	0.003	0.008	0.002	0.002
3103.5	111	1.688	0.088	0.032	0.004	0.009	0.002	0.003
3123	80	1.231	0.058	0.024	0.003	0.007	0.002	0.002
3155	93	1.228	0.066	0.029	0.003	0.008	0.002	0.003

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MDT SUMMARY

Depth M	TVDSS M	Drawdown Mobility MD/CP	Hydrostatic Pressure		Formation Pressure PSIA	Test Type
			Before PSIA	After PSIA		
3220.5	2606.77	9.9	4736.20	4737.63	3723.65	Had two attempts. Appeared to have poor seal. 2nd attempt good
3214.5	2602.30					Seal failure
3214.0	2601.92	19.3	4733.00	4722.37	3716.20	Good test
3212.0	2600.45	18.1	4731.00	4718.43	3714.00	Good test
3203.0	2593.80		4698.60			Tight, retract after 10 minutes
3203.5	2594.09		4699.80	4700.30	3868.00	10cc pre-test, supercharged, try 2nd 10cc, supercharged
3197.0	2589.29		4686.00			Tight, retract move up 0.5m
3196.5	2588.94		4685.00	4685.50		Lost seal
3193.5	2586.64	4.2?	4679.63	4679.70	3755.86	Slow, exceeded 10 min limit, stop test.
3191.0	2584.83	5.7	4671.70	4272.99	3695.35	Good test
3189.0	2583.32		4668.24	4669.02		No seal
3188.5	2582.90		4667.29	4667.69		Tight
3187.0	2581.86		4663.54	4664.46		No seal - reset - Lose seal
3187.5	2582.19		4668.51	4667.68		No seal - reset - Lose seal
3180.0	2576.70		4652.10	4652.76		Unstable - possible plugging of probe
3179.5	2576.27		4646.71	4646.71		Using lower probe - no seal
3176.0	2573.73		4645.28	4645.12		Unstable - stop after 10 min
3175.0	2573.06		4643.74	4643.57		No seal
3182.0	2578.25		4656.39	4656.97		Set in Claystone to verify seal - OK
3172.0	2570.80		4638.50	4639.38		Unstable - possible plugging of probe
3170.0	2569.08		4634.10	4634.91		Lost seal
3169.0	2568.64		4633.98	4634.68		Unstable - possible plugging of probe
3160.0	2561.90		4615.97	4616.50		Set both probes - Lost seal
3141.0	2547.80		4583.05	4660.37		Not stabilising, possibly leaking seal –stop after 10 min @ 3750 psi.
3140.0	2547.08		4583.01	4582.82		Not stabilising, possibly leaking seal –stop after 10 min @ 3696 psi.
3128.0	2538.08	131.6	4559.86	4560.63	3674.89	Good test
3141.0	2547.80	22.6	4581.71	4582.29	3689.05	Not stabilised, stop after 10 minutes
3172.5	2571.22	307.5	4635.85	4636.79	3690.25	Good test
3196.5	2589.03		4682.47	4683.28		Lost seal
3196.0	2588.60		4682.06	4683.66		Lost seal
3190.0	2585.17	18.6	4673.67	4673.84	3695.95	Good test
3117.0	2529.82	628.1	4554.92	4548.07	3672.29	Good test
3085.5	2505.70	35.3	4491.31	4492.30	3669.13	Good test
3078.0	2499.96	52.1	4474.93	4475.22	3667.45	Good test
3069.5	2493.41	357.9	4460.90	4461.24	3723.84	Good test
3064.5	2489.59	3.7	4452.33	4452.75	3722.94	Good test
3038.0	2469.29		4409.13	4409.66		Tight
3037.5	2468.83	5.4	4408.26	4408.19	3718.77	Almost stable after 10 minutes, probe retracted. Supercharged?
2957.0	2407.40	1060.2	4280.90	4281.43	3683.38	Good test
2929.5	2386.71	352.8	4239.71	4239.60	3570.59	Good test
2922.0	2381.01	49.0	4228.42	4229.04	3569.25	Good test
2903.0	2366.58	21.9	4199.08	4199.40	3514.83	Good test
2896.5	2361.65	667.4	4189.69	4190.10	3513.13	Good test
2867.5	2339.37	179.9	4146.07	4146.30	3475.52	Good test

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Depth m	TVDS m	Drawdown Mobility MD/CP	Hydrostatic Pressure		Formation Pressure PSIA	Test Type
			Before PSIA	After PSIA		
2852.0	2327.39	49.7	4124.57	4125.56	3478.96	Good test
2836.7	2315.45	188.9	4100.27	4101.11	3437.34	Good test
2819.0	2301.70	537.5	4073.85	4074.15	3449.26	Good test
2800.0	2286.88	68.9	4047.22	4047.86	3443.95	Good test
2772.0	2265.08	610.8	4006.38	4006.87	3405.37	Good test
2766.5	2260.84	24.7	3998.72	3999.30	3404.05	Good test
2757.0	2253.56	305.6	3982.67	3983.07	3401.93	Good test
1900.0	1589.46	38.3	2814.64	2814.32	2181.25	Good test
1890.0	1581.64	339.6	2801.50	2801.39	2170.96	Good test
1853.0	1552.67	514.0	2750.87	2750.68	2128.98	Good test
1843.0	1544.81	758.7	2736.38	2736.29	2118.16	Good test
1752.0	1472.97	5481.1	2610.61	2610.56	2016.08	Good test
1740.0	1463.49	2747.6	2594.14	2593.89	2002.88	Good test
1730.0	1455.67	562.5	2579.41	2579.16	1994.44	Good test
1698.0	1430.90		2534.94	2534.99		Not stabilising after 10 mins, possibly plugging. Stop test and move
1697.0	1429.63		2533.49	2533.25		No seal, possible washout as bit changed at 1700 mMDRT during drilling
1687.0	1421.76	46.8	2519.41	2519.36	1998.28	Good test
1665.0	1404.36	20.8	2488.38	2488.43	1997.55	Good test
1657.0	1397.98	528.1	2477.20	2476.98	1996.29	Good test
1645.0	1388.58	84.7	2459.97	2459.80	1997.20	Stable on strain gauge after 10 mins, quartz gauge not completely stable

CHDT SUMMARY

Depth M	TVDS M	Drawdown Mobility MD/CP	Hydrostatic Pressure		Formation Pressure PSIA	Test Type
			Before PSIA	After PSIA		
3190.0	2584.50	47	4589.10	4582.60	3696.70	Cased hole pretest after drilling 1" in casing and formation. Good build up after few minutes, pump out
3201.8	2593.27	nd	4612.80	4610.00	3708.07	Build up OK through hole. Pump out causes blocking or collapse
3214.0	2602.06	nd	4638.20	4633.10	3716.97	Good Test. Drill to 1.74". Pump out to establish fluid. Take 3 SPMC samples
3196.5	2589.05	nd	4596.58	-	3701.10	Good Test. Drill to 1.7". Pump out to establish fluid. Draw down 4-500 psi
3172.5	2571.28	nd	4546.69	4539.79	3690.64	Good Test. Drill to 1.36". Pump out to sample gas. Take 4 SPMC samples

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