



# **FLOUNDER A-02a**

## **FINAL WELL REPORT**

Prepared by  
**Geoservices Overseas S.A.**  
Engineers: R. Pereira, M. Boyd, P. Rady, G. Fawns

Esso Australia Ltd.  
12 Riverside Quay,  
South Bank, Melbourne  
Victoria 3006  
Australia  
Tel: (03) 9270-3625  
Fax: (03) 9270-3593

Geoservices Overseas SA  
Suite 6, 23 Plain Street,  
East Perth  
Western Australia 6004  
Australia  
Tel: (08) 9225-5677  
Fax: (08) 9225-4277

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Revision	Date	Issued by	Approved by	Remarks
1	27-09-2003	Geoservices Unit 137	Base Mud logging Coordinator	

## **Section 1** **General Well Summary**

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**WELL DATA**

Operator : Esso Australia Ltd  
Platform : Flounder  
Well name : Flounder A-02a  
Country : Australia  
Location : Gippsland Basin  
Structure : Flounder T-1  
Field : Flounder  
Permit : Vic/L11

Location AMG co-ordinates : 5 758 713.16 mN 625 840.82 mE

Location local co-ordinates : Lat: 38° 18' 39.106" S Long: 148° 26' 21.740" E

Surface co-ordinates : 2.12 E 0.06 N

Profile : Deviated  
Reference depth : Rotary Table  
RT to Seabed : 126.85 metres  
RT above M.S.L. : 33.85 metres  
Sea-water depth : 93.00 metres  
Proposed total depth : 2796.0 metres  
Actual total depth : 2803.0 metres  
True vertical depth : 2615.2 metres  
Spudded on : 04th September 2003  
Total depth reached on : 15th September 2003

**Drilling Contractor**

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

**Drilling Phases**

Diameter (inch)	From (m)	To (m)	Mud Type
8 ½"	1362	2803	KCl / Glycol / PHPA

**Cased Hole**

Casing Diameter (inch)	Casing Type	Shoe Depth (m)
20"	Conductor	203 MDKB
13-3/8"	Surface	981 MDKB
9-5/8"	Whipstock	1354 MDKB
7"	Production	2796.9 MDKB

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## MUD LOGGING

Logging Unit Number: 137

Engineers: R. Pereira, M. Boyd, P. Rady, G. Fawns

### Sampling Interval

#### Flounder A-02a

Sample Type	Number of sets	Quantity per set	Sampling interval	From (m)	To (m)
Washed and Dried	3	100 grams	10 metres	1830	1980
Washed and Dried	3	100 grams	5 metres	1980	2803

### 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

Flounder A-02a is a conventional directional well designed to recover reserves from the T-1.1 sand. The secondary objective of the well is the P sand. The well was drilled to a Total Depth of 2803 m MDRT in 8½" hole and completed with a single oil completion string of 3½" tubing in 7" production casing.

**Flounder A-02a was officially spudded at 07:30 hours on the 04th of September 2003 after setting a 9<sup>5</sup>/<sub>8</sub>" whipstock and milling a window in the existing 9<sup>5</sup>/<sub>8</sub>" casing from 1346 m to 1362 m.**

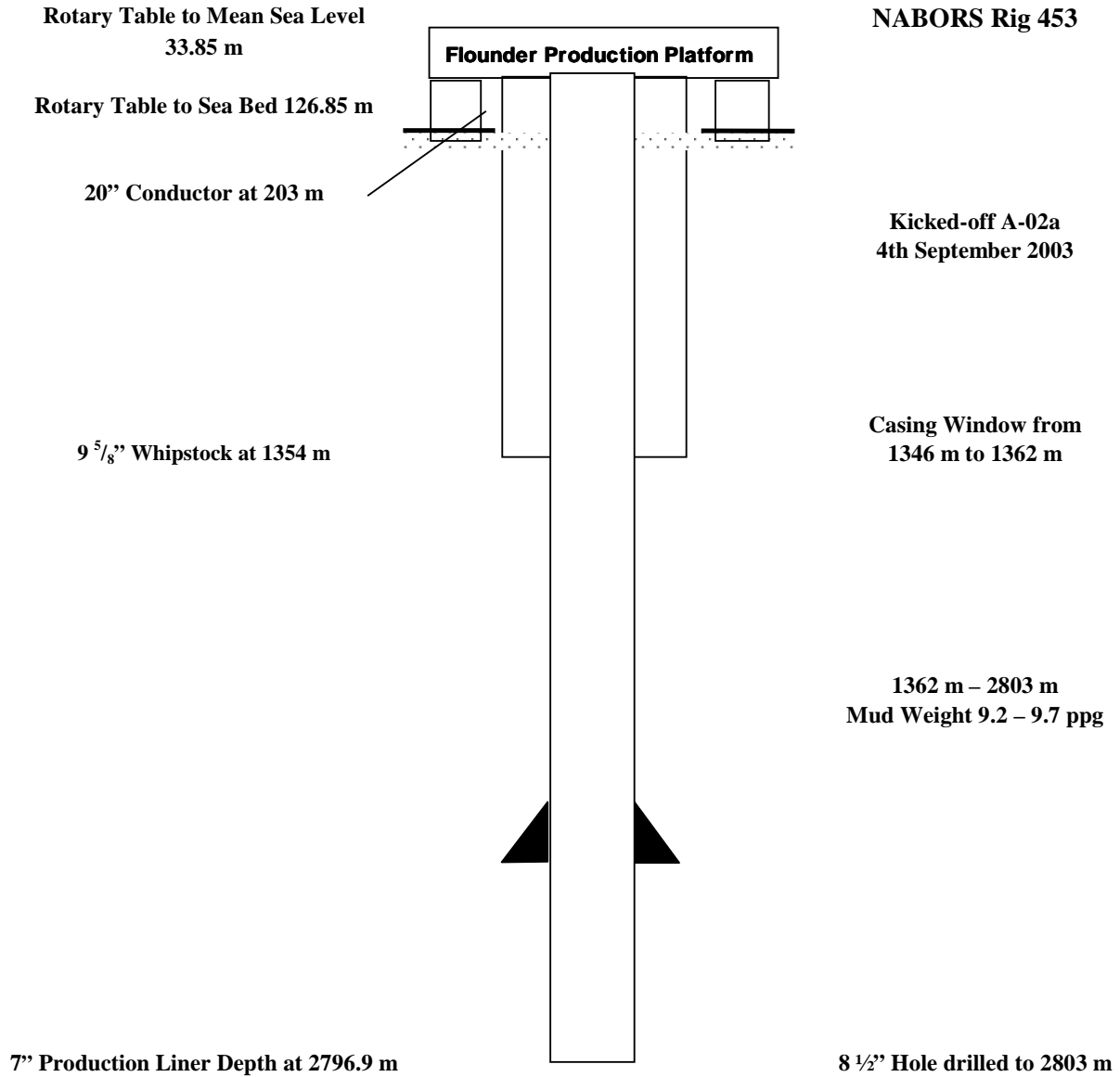
After milling the casing window, the string was pulled back inside the casing to 1335 m and a PIT (958 psi at 9.2 ppg: 13.4 ppg EMW) was carried out. After pulling out with the milling assembly, a 8½" steerable / MWD drilling assembly was made up with a Geodiamond S73PX bit and run in the hole. The well was kicked-off and drilled, steered and rotated to 2243 m where it was pulled due to a slow penetration rate. The second bit, a Smith FG20 ODPD, was made up, run in hole and drilled, steered and rotated ahead from 2243 m to 2391 m where it was pulled due to a slow penetration rate. The third bit, a Smith FG20 ODPD, was made up, run in hole and drilled, steered and rotated ahead from 2391 m to 2637 m where it was pulled due to rotating hours. The fourth bit, a Smith FG20 ODPD, was made up, run in hole and drilled, steered and rotated ahead from 2637 m to 2748 m where it was pulled due to rotating hours. The fifth bit, a Smith GFI30 ODGPS, was made up, run in hole and drilled, steered and rotated ahead from 2748 m to Total Depth at 2803 m.

The hole was back reamed from 2803 m to the casing shoe prior to running in hole with Reeves Logging tools with the shuttle system.

An initial mud weight of 9.2 ppg was used to drill out the well and at 1432 m the mud weight was increased to 9.7 ppg due to shallow gas. This mud weight was maintained until 1700 m where it was gradually reduced to 9.3 ppg in preparation for the addition of Baracarb. Baracarb 25, 50, and 100 were added at 1957 m to bridge the pore throats and reduce the likelihood of differential sticking and seepage losses through the Latrobe Formation. Barablok was added at 2371 m to a concentration of 2.6 ppb in order to stabilise the Coals. Glycol and Baracor-129 and Barazan D were added to maintain mud properties.

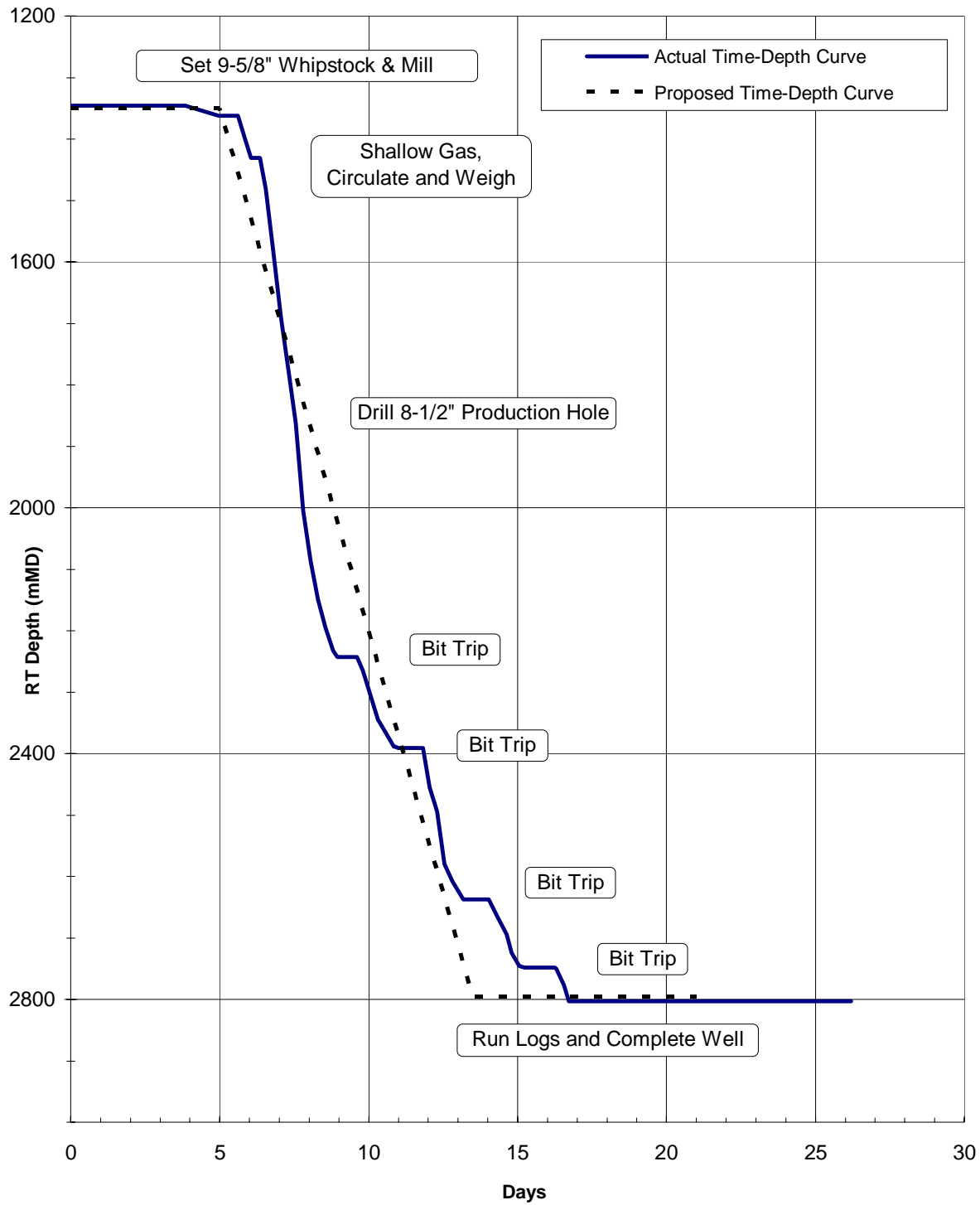
**Flounder A-02a reached a Total Depth of 2803 m (2615.20 m TVDRT) at 10:15 hours on the 15th September 2003.** The final survey at a depth of 2783.99 m had an inclination of 38.26° and an azimuth of 333.88°. The hole was logged, production casing run and the completion program executed.

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**WELL PROFILE**

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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	Geodiamond S73PX	6 x 20	1362	2243	47.5	2-3-WT-NTS-X-IN-ER-PR
2	8½	Smith FG20 ODPD	1 x 30, 2 x 24	2243	2391	23.4	8-8-LC-1/2/3-F/F/F-3-CR-PR
3	8½	Smith FG20 ODPD	1 x 30, 2 x 24	2391	2637	24.0	3-2-WT/BT-1/2/3-E/E/E-3-ER-HR
4	8½	Smith FG20 ODPD	1 x 30, 2 x 24	2637	2748	25.8	8-8-LC/LT-1/2/3-F/F/F-15-RG-HR
5	8½	Smith GFI30 ODGPS	1 x 30, 2 x 24	2748	2803	10.4	6-4-BT/WT-N1/2/3-E/E/E-2-ER-TD

**CASING DATA**

Type	Size (inches)	Weight (lb/ft)	Grade	Thread	Depth (mMDRT)
Conductor	20"	133	K-55	BTC	203
Surface	13 <sup>3</sup> / <sub>8</sub> "	54.5	K-55	BTC	981
Intermediate	9 <sup>5</sup> / <sub>8</sub> "	47	N-80	BTC	1350
Production	7"	26	L-80	LTC	2796.9

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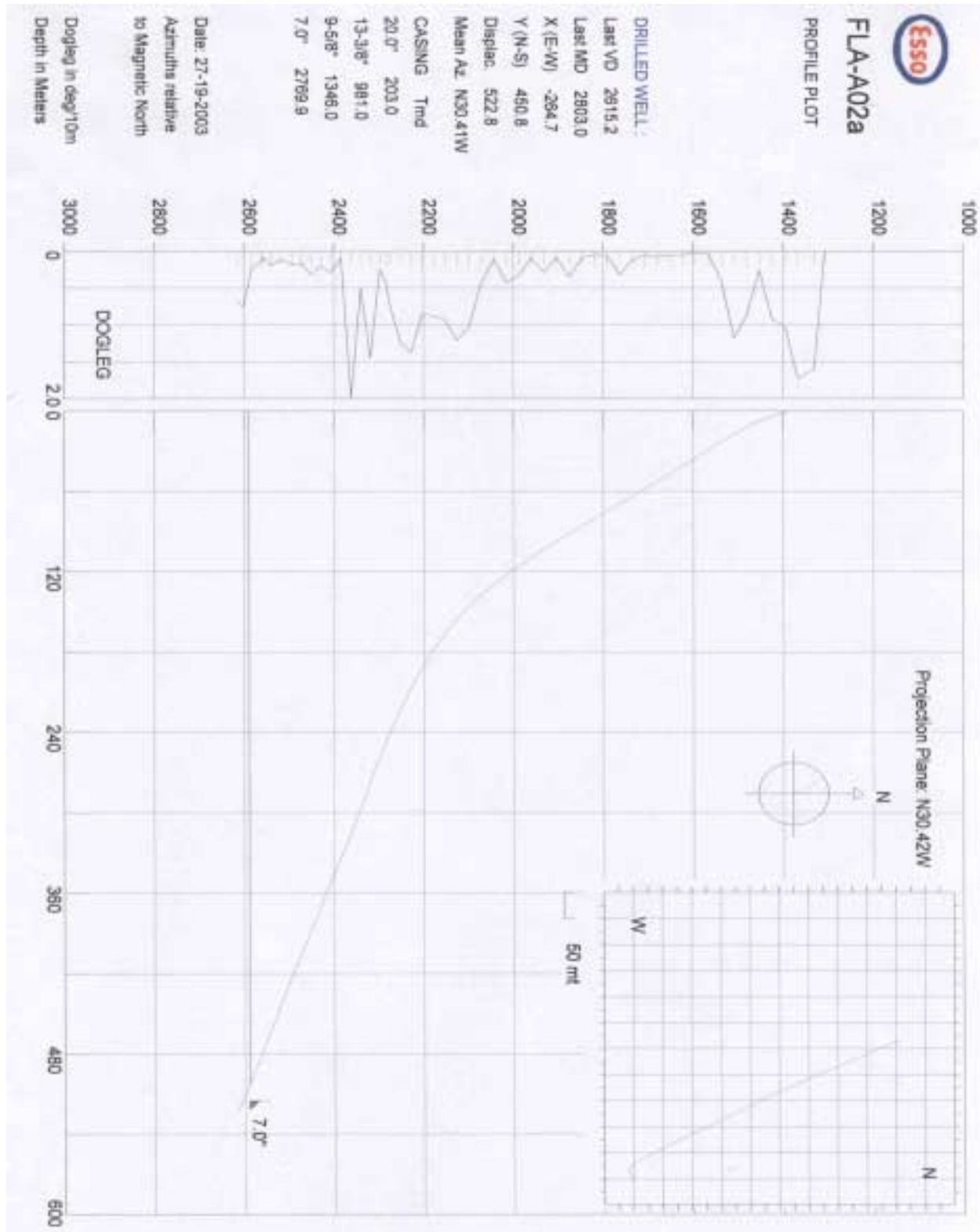
**CEMENTING DATA**

<b>Casing Details</b>	<b>Cement Type</b>	<b>Dry Cement Volume (sx)</b>	<b>Cement Additives</b>	<b>Mix Water (bbls)</b>	<b>Slurry Volume (bbls)</b>	<b>Slurry Density (ppg)</b>	<b>Cement To / From (mMDRT)</b>	<b>Casing Pressure Test (psi)</b>
7"	HTB	225	HALAD 413L 30 gal / 10 bbls	54	75	13.0	1300 m	3000 psi
LEAD			SCR-100L 5 gal / 10 bbls				2803 m	
			CFR-3L 5 gal / 10 bbls					
			NF-5 0.25 gal / 10 bbls					
			GASCON 469 60 gal / 10 bbls					
TAIL		622	HALAD 413L 32 gal / 10 bbls	70	90	15.8		
			SCR-100L 2 gal / 10 bbls					
			CFR-3L 5 gal / 10 bbls					
			NF-5 0.25 gal / 10 bbls					

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## WELL DIRECTIONAL PROFILE

(Extracted from Geoservices ALS Software)



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**WELL DIARY**

<b>29th August 2003</b>	Prepare to and skid lower package of the rig. Prepare to skid top package of rig.
<b>30th August 2003</b>	Prepare to and skid top package of rig. Reinstall rig over A-02a. Erect scaffolding stairs and hand rails. Clear pipe deck and install catwalk and V door. Remove deck grating. Cameron remove abandonment flange and "B" section. Cameron install new "B" section, service and attempt to pressure test same, no go. Unable to continue operation due to east crane incident. Discuss incident with crew and wait for approval to continue operation. Nipple up drill spool and riser. Change lower pipe rams to 4" solids. Commence nipple up BOP's and bel nipple. Function test remote panel and koomey unit. Rig up high pressure lines. Howco break circulation and test lines. Howco pressure test casing against blind rams.
<b>31st August 2003</b>	Rig up high pressure lines to choke manifold. Make up circulating head to TDS. Howco flush and test lines. Test manifold. Break down lines. Rig service. Rig up lines to circulating head on TDS. Howco flush, test TDS and stand pipe valves. Pressure test grey valve. Break down test assembly and rig to 4" handling gear. Slip and cut. Rig service. Change out saver sub and TDS dies. Make up test assembly and run in hole and pressure test BOP's. Break out same. Make up combo tool and run wear bushing. Break down combo tool. Rig to 3½" handling gear and run in hole 3½" HWDP. Lay out sideways. Change out handling gear to 4". Make up and retrieve wear bushing. Break down running tool. Make up test plug, run in hole and leave same in "B" section. Rig to and Howco test blind rams. Run in hole and retrieve test plug. Break down same. Make up and run wear bushing. Break down running tool. Unable to continue due to wind speed. Continue with housekeeping and maintenance.
<b>01st September 2003</b>	Pick up and make up casing scraper, trip in hole with casing scraper and work scraper from 1345 m to 1365 m. Condition mud and circulate. Circulate hole clean with seawater. Pull out of hole from 1365 m. Perform rig maintenance while waiting on weather. Rig up Schlumberger wireline and run in hole with EZSV, correlate and set EZSV and 1354 m. Pull out of hole and rig down wireline. Pick up and make up 9 <sup>5</sup> / <sub>8</sub> " whipstock BHA and run in hole.
<b>02nd September 2003</b>	Continue to run in hole with 9 <sup>5</sup> / <sub>8</sub> " whipstock BHA. Circulate and displace hole to mud. Circulate and condition mud. Rig up wireline, run gyro surveys, orient whipstock, confirm orientation and pull out of hole with wireline tools. Set whipstock. Mill window in casing from 1346 m.
<b>03rd September 2003</b>	Continue to mill window in casing from 1350 m to 1362 m, pumping high viscosity sweeps as required. Pull inside window and circulate hole clean. Flow check. Rig up Howco to perform PIT test, EMW of 12.5 ppg with 9.2 ppg mud, to 766psi at 1335 m. Pump slug and pull out of hole. Perform rig service with BHA in hole while waiting on high winds. Pull out and break down BHA.
<b>04th September 2003</b>	Break down and lay out milling assembly. Make up drilling assembly, pick up and make up MWD tools and run in hole. Function test MWD tools. Change out handling tools and continue to run in hole. Wash and ream to bottom. Drill steer and survey 8½" hole to 1432 m. High gas recorded (2850 units). Shut in and circulate through choke. Continue to circulate through choke while increasing mud weight to 9.4 ppg. Circulate via flowline, higher gas levels recorded (4308 units), switch back to choke, continue to increase mud weight to 9.6 ppg.
<b>05th September 2003</b>	Circulate to condition mud and continue drilling with 9.6 ppg mud. Drill steer and survey 8½" hole from 1432 m to 1775 m.
<b>06th September 2003</b>	Drill steer and survey 8½" hole from 1775 m to 2150 m.
<b>07th September 2003</b>	Drill steer and survey 8½" hole from 2150 m to 2243 m. Circulate hole clean while racking back to 2216 m. Pull out of hole.

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<b>08th September 2003</b>	Rack back BHA, set bend at 0° and break out bit. Make up new bit, shallow test, set bend to 1.15° and run in hole to 1317 m. Orientate tool face and run in hole from 1317 m to 2243 m (precautionary wash last 2 stands). Drill, steer and survey from 2243 m to 2344 m.
<b>09th September 2003</b>	Drill, steer and survey from 2344 m to 2389 m (pack off), circulate bottoms up while rotate and reciprocate string. Pull out of hole from 2389 m to 2239 m, run in hole from 2239 m to 2389 m, pump super sweep and circulate hole. Drill, steer and survey from 2389 m to 2391 m, pump sweep and circulate hole clean.
<b>10th September 2003</b>	Continue to pull out of hole to 197 m, flow check and rack back BHA, break bit out and lay out same. Pick up and make up new motor and bit. Shallow test MWD set motor bend to 1.15°, check float and run in hole to bottom (precautionary wash and ream last 4 stands). Drill, steer and survey 8½" hole from 2391 m to 2494 m.
<b>11th September 2003</b>	Drill, steer and survey 8½" hole from 2494 m to 2632 m. Circulate whilst inspect and repair Mud pump # 1. Drill, steer and survey from 2632 m to 2637 m. Rack from 2637 m to 2580 m whilst circulate 2 x bottoms up, Flow check – "OK" and pull out of hole from 2580 m.
<b>12th September 2003</b>	Continue to pull out of hole to 1277 m. Orientate motor and continue pulling out of hole to 197 m, rack back BHA. Change bit, MWD and stabiliser. Shallow test MWD and set bend to 1.15°, orientate and run in hole to 2495 m. Wash and ream from 2495 m to 2637 m (tight hole from 2539 m to 2580 m) Drill, steer and survey 8½" hole from 2637 m to 2664 m.
<b>13th September 2003</b>	Drill, steer and survey from 2664 m to 2748 m. Circulate prior to pulling out of hole.
<b>14th September 2003</b>	Circulate prior to pulling out of hole. Flow check. Pull out of hole, (orientate toolface at shoe), and rack BHA. Set motor bend to 0° and break out bit. Clean and clear rig floor. Pull wear bushing, function koomey and remotes. Make up test assembly and test BOP's. Break down test assembly and run wear bushing. Make up bit, shallow test and run in hole to 1288 m. Test choke manifold and standpipe. Slip and cut drill line. Conduct CFT's. Service rig and inspect torque beam. Run in hole from 1288 m to 2637 m. Tag, pull free and ream obstruction at 2532 m. Run in hole from 2532 m to 2637 m. Wash and ream to 2748 m. Break in bit, drill and survey 8½" hole from 2748 m to 2751 m.
<b>15th September 2003</b>	Drill and survey 8½" hole from 2751 m to 2803 m. Pump 20 bbl high viscosity sweep and rack back from 2803 m to 2724 m whilst circulating hole clean. Pull out of hole from 2724 m to 1430 m. Pump 20 bbl super sweep and circulate hole clean. Pull out of hole from 1430 m to 1317 m. Rig service and inspect torque beam. Run in hole to bottom washing and reaming last few stands. Backream out of hole.
<b>16th September 2003</b>	Backream out of hole to 1940 m. Pull out of hole from 1940 m to 1450 m. Pump 15 bbl super sweep and rotate and reciprocate whilst circulate clean. Pull out of hole to 197 m. Rack BHA from 197 m. Flush BHA with seawater, barafilm same and break out bit and clear rig floor. Rig up wireline sheave and Reeves logging tools. Load radioactive source and run in hole to 2798 m. Log, pull out of hole, remove source and lay out logging tools. Rig down wireline sheave. Make up wear bushing assembly and run in hole and retrieve. Lay out same. Make up jetting assembly, jet BOP's and wellhead. Lay out same. Change out upper pipe rams to 7" solids. Function test rams and make up 7" shooting nipple and test assembly. Test UPR's, rig down shooting nipple and test assembly. Make up wearbushing assembly, install and lay out assembly.
<b>17th September 2003</b>	Make up BHA and run in hole to 251 m. Run in hole with drill pipe to 280 m. Rig service. Preventative maintenance whilst wait on weather. Rack drill pipe and lay out HWDP and jars. Flush, barafilm, lay out BHA and break out bit. Pull wearbushing and clear rig floor. Rig to run 7" casing. Pick up lipstick joint. Preventative maintenance whilst wait on weather. Check float and shoe, run casing to 471 m. Preventative maintenance whilst wait on weather.

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<b>18th September 2003</b>	Preventative maintenance whilst wait on weather. Continue to run 7" casing as per program.
<b>19th September 2003</b>	Continue to run 7" casing as per program to 2797 m. Change out bails, rig up cement head and high pressure lines. Circulate and condition mud at 2797 m whilst reduce gas units from 400 to 25. Pressure test lines. Howco mix and pump cement as per program. Wait on cement, conduct rig maintenance and prepare to rig down stack.
<b>20th September 2003</b>	Wait on cement, conduct rig maintenance and prepare to rig down stack. Remove cement head and master bushings. Remove flowline, lift and secure BOP's and riser. Pick up string to 240 klb and Cameron set casing slips. Slack off string weight. Furmanite rough cut casing. Lower, re-instate BOP and riser. Weatherford break and lay down landing joints. Clear rig floor. Nipple down bell nipple, BOP's and riser. Furmanite cut and dress 7" casing stump. Cameron nipple up tubing spool and attempt to pressure test lower void, no go. Cameron nipple down tubing spool, re-tension slip seal assembly, nipple up tuning spool and attempt to pressure test same, no go. Cameron nipple down tubing spool, re-tension slip seal assembly, nipple up tuning spool and attempt to pressure test same to 3000 psi OK. Change out UPR's and LPR's. Cameron install wing valve, companion flange and low torque valve. Modify and install well head deck grating. Nipple up Bop, riser, bell nipple and return lines. Function test BOP's. Make up test assembly and high pressure lines. Howco test lines and test UPR's and LPR's.
<b>21st September 2003</b>	Howco continue to test UPR's and LPR's. Break down test assembly. Make up and run wear bushing, break down running tool. Pick up and make up 7" casing scraper BHA and run in hole to 68 m. Rig service. Continue to run in hole to 2765 m. Work scraper over intervals 2082 m and 2177 m. Howco test casing to 3000 psi. Circulate hole clean and displace with inhibited sea water. Pull out of hole and lay down drill pipe from 2765 m to 2307 m. Barafilm pipe. Run in hole from 2307 m to 2738 m with drill pipe from derrick. Rig service. Wait on weather. Conduct rig maintenance. Pull out of hole and lay down drill pipe from 2738 m. Barafilm pipe.
<b>22nd September 2003</b>	Continue to pull out of hole and lay down drill pipe to 355 m. Run in hole from 355 m to 929 m. Pull out of hole and lay down drill pipe from 292 m to 68 m. Break and lay down 7" casing scraper BHA. Clear and position Schlumberger unit on pipe deck. Rig up Schlumberger equipment, shooting nipple and hydraulic line wiper. Howco test shooting nipple and hydraulic line wiper. Lay out and strap 3½" tubing on deck. Rig service. Unable to arm and run perforating guns due to weather conditions and storm warning in area.
<b>23rd September 2003</b>	Schlumberger obtain permit, arm perforating gun and run in hole to 450 m. SCR / DC downtime. SCR shut down, electrician fault find and rectify same. Continue to run in hole with perforating guns, correlate and perforate from 2128 m to 2133 m. Pull out of hole to 50 m. Remove pumping lines, H.L.W. and F.O.B.V. Continue to pull out of hole, break and lay down perforating guns. Schlumberger make up gauge ring, junk basket and run in hole to 10 m. Re-instate pumping lines, H.L.W. and F.O.B.V. Continue to run in hole to 2200 m. Pull out of hole from 2200 m to 50 m. Rig down pumping lines, H.L.W. and F.O.B.V. Continue to pull out of hole, break and lay down gauge ring and junk basket. Rig down Schlumberger sheaves and shooting nipple assembly. Pull wearbushing. Jet BOP's. Rig service. Rig down Schlumberger unit and dress rig floor and prepare decks to run 3½" completion tubing. Pick up and make up tail pipe assembly and run in hole with 3½" tubing as per ESSO program.
<b>24th September 2003</b>	Continue to run 3½" tubing as per ESSO program to 1495 m. Unable to continue due to 40+ knot winds and crane shut down. Conduct maintenance. Continue to run in hole with 3½" tubing from 1495 m to 2173 m. Make up THRT, Cameron terminate control and test same. Make up landing joints, land and engage hanger. Conduct 10 klb overpull as per Cameron instructions. Rig up, FOBV pump in lines and HES lubricator. Howco test lubricator. Cameron test tubing hanger. HES run in hole with test tool to XN nipple at 2182 m. Howco pressure up and set AHC packers as per HES instructions. HES pull out of hole with test tool, lay down HES lubricator. Howco pressure test tubing, lock in same. Howco pressure test PA , bleed down both. Rig down pump in lines and test assembly. Remove THRT and landing joints, break down same. Rig down Weatherford 3½" handling gear. Cameron install BPV. Nipple down return lines, bell nipple, BOP's and riser. Geoservices released at 21:15 hours.

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## Section 2

### Geological Summary

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**FORMATION TOPS**

DESCRIPTION	MD (m) RT	TVD (m) RT	TVD (m) SS
Top Gippsland Limestone	Not Applicable		
Top of Lakes Entrance	1958.0	1904.0	1370.15
Top of Latrobe Group	1983.0	1928.5	1894.65
P Sand	2132.5	2073.8	2039.95
Base Tuna Flounder Channel	2330.0	2251.3	2217.45
Shallow Coal Marker	2406.6	2311.1	2277.25
MPM Coal	2486.4	2371.0	2337.15
Top T-1.1 Sand	2691.9	2529.7	2495.85
Base T-1.1 Sand	2749.9	2573.8	2539.95
Top T-1.2 Sand	2765.1	2585.5	2551.65
TD	2803.0	2615.2	2581.35

**GEOLOGICAL SUMMARY****GIPPSLAND LIMESTONE**

1362 m – 1958 m      **CALCILUTITE with minor CLAYSTONE beds at depth**

**CALCILUTITE**      Light grey to medium grey, olive grey in part, argillaceous, grading to CLAYSTONE with depth, silty in part, lithics, occasional carbonaceous specks, occasional ooids and foraminifers, trace disseminated and nodular pyrite, trace calcite and fossil fragments, soft to firm, sub-blocky to blocky.

**CLAYSTONE**      Medium grey to medium dark grey, slightly to moderately calcareous and grading to CALCILUTITE, trace disseminated pyrite, firm, sub-blocky.

**LAKES ENTRANCE FORMATION**

1958 m – 1983 m      **Interbedded CALCILUTITE, SILTSTONE and CLAYSTONE**

**CALCILUTITE**      Light grey to light olive grey, grading to CLAYSTONE in part, trace foraminifers and ooids, soft to firm, sub-blocky to blocky.

**SILTSTONE**      Medium dark grey, argillaceous, slightly calcareous, grading to CLAYSTONE in part, micromicaceous, minor disseminated pyrite, firm, sub-blocky.

**CLAYSTONE**      Medium dark grey to medium grey, moderate to slightly calcareous, silty and grading to SILTSTONE in part, trace glauconite, trace lithics and very fine carbonaceous specks, trace pyrite, soft to firm, sub-blocky to blocky.

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**LATROBE GROUP**

1983 m – 2132.5 m

**SILTSTONE****SILTSTONE**

Grey brown to dusky brown, dark yellow brown with depth, argillaceous, non to slightly calcareous, minor glauconite decreasing to trace with depth, trace very fine quartz grains, trace to rare disseminated and nodular pyrite, trace to rare carbonaceous matter, trace micro-mica, very soft to soft, slightly sticky, dispersive, amorphous.

**P SAND**

2132.5 m - 2160 m

**SANDSTONE with minor SILTSTONE interbeds****SANDSTONE**

Medium light grey to medium grey, very fine to fine, occasionally medium, trace loose coarse quartz, moderate sorted, angular to sub-rounded, weak siliceous cement, minor to common argillaceous matrix, trace pyrite inclusions, rare to minor quartz overgrowths, grading to fine to medium with depth, poorly to fair inferred porosity, fluorescence.

**FLUORESCENCE**

2130-2160 m; Trace to 10%, spotted to patchy very dim, very pale yellow fluorescence, instant weak blooming milky yellow crush cut, moderate thick pale yellow residual ring.

2160 m – 2330 m

**SILTSTONE with interbedded SANDSTONE and minor CLAYSTONE****SILTSTONE**

Dark yellow brown to moderate yellow brown, argillaceous, common fine arenaceous, micro-micaceous in part, minor dark brown lithics, rare carbonaceous specks, soft to very soft, sub-blocky to amorphous.

**SANDSTONE**

Very light grey to medium grey, very fine to medium, occasionally coarse quartz grains, poorly to moderately sorted, angular to rounded, weak siliceous cement, trace pyritic cement and inclusions in coarse grains, locally common to abundant white to light grey kaolinite/argillaceous matrix, trace disseminated/nodular pyrite, common bit fractured grains and quartz overgrowths, trace carbonaceous specks, rare feldspar, predominantly friable aggregates, poorly visible porosity, fluorescence.

**FLUORESCENCE**

2190-2215 m; Trace to 5% pinpoint to spotted pale yellow fluorescence. Instant weak slow bleeding cut, instant blooming milky yellow crush cut, thin to moderate pale yellow residual ring.

**FLUORESCENCE**

2245-2255 m; Trace to 5%, pin point to spotted dull yellow, very weak instant pale milky yellow cut, very dim thin, pale yellow to white residual ring, no visible ring in white light.

**FLUORESCENCE**

2270-2280 m; Trace spotted dim pale yellow, no cut, extra weak dim pale yellow crush cut, very faint very dim with pale yellow to white residual ring, no visible ring in white light.

**FLUORESCENCE**

2300-2330 m; 10% to trace, pinpoint to spotted pale yellow to moderate bright yellow orange, very weak slow bleeding pale yellow cut, instant milky green to yellow crush cut, moderate thick pale green yellow residual ring, very faint clear ring visible in white light.

**SILTSTONE**

Dark yellow brown to moderate yellow brown, argillaceous, locally slightly calcareous, rare pale green glauconite grains, trace carbonaceous flakes, rare pyrite, trace micro-micaceous, trace mica, trace disseminated and crystalline pyrite, sticky to very soft, amorphous.

**CLAYSTONE**

Pale yellow brown, non calcareous, slightly silty in part, trace very fine disseminated pyrite, soft to slightly dispersive, sub-blocky to blocky.

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**BASE TUNA FLOUNDER CHANNEL**

2330 m – 2406.6 m

**SILTSTONE with interbedded SANDSTONE, COAL and trace DOLOMITE****SILTSTONE**

Dark yellow brown to dusky yellow brown, argillaceous, non to very slightly calcareous, trace pyrite, trace carbonaceous, trace micro-micaceous, very soft, sticky, dispersive, amorphous.

**SANDSTONE**

Clear to frosted, medium to coarse, moderate well sorted, sub-rounded to rounded, poorly cement aggregates, common silty matrix, predominantly loose, occasionally hard to very hard aggregates, fair to poorly inferred porosity, fluorescence.

**FLUORESCENCE**

2365-2375 m; Trace spotted dull pale yellow, no cut, pale green crush cut, moderately thick bright yellow green residual ring, no visible ring in white light.

**COAL**

Brown to black, earthy grading to carbonaceous SHALE, locally common pyrite, friable, blocky to sub-conchoidal fracture.

**SILTSTONE**

Dark yellow brown to medium yellow brown, argillaceous, very slightly calcareous in part, rare very fine disseminated carbonaceous mat, trace pyrite aggregates, locally micro-micaceous, very soft to soft, amorphous.

**SANDSTONE**

Light grey to very light grey, very fine to fine, rare minor medium, moderate sorted, sub-angular to sub-rounded, trace siliceous cement, common to abundant white kaolinitic matrix, trace crystalline dolomitic in part, rare nodules pyrite, rare carbonaceous flakes, soft to loose, poorly inferred porosity, fluorescence.

**FLUORESCENCE**

2395-2405 m; Trace in dolomite, spotted moderate bright yellow, weak slow pale yellow cut, instant green yellow crush cut, trace light brown oil staining.

**SHALLOW COAL MARKER**

2406.6 m – 2486.4 m

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

Very light grey to medium grey, clear to translucent, white, very fine to fine, grading to medium to coarse and very coarse with depth, poorly sorted, well sorted with depth, sub-angular to sub-rounded, rounded in part, trace siliceous cement, rare calcareous cement, rare quartz overgrowths, trace pyritic cement, trace sideritic with depth, rare to locally minor white argillaceous/kaolinite matrix, trace nodular pyrite, predominantly loose, occasionally friable to firm, poorly to fair inferred porosity, good inferred porosity in part, fluorescence.

**FLUORESCENCE**

2460-2465 m; Trace pinpoint moderate bright yellow, very weak slow bleeding cut, weak milky yellow crush cut, medium moderate bright yellow residual ring.

**SILTSTONE**

Light olive grey, light brown to dark yellow brown, moderate brown to brown grey, argillaceous, slightly calcareous in part, rare carbonaceous laminations, trace pyrite, sub-blocky to blocky.

**COAL**

Brown to black, occasionally dull brown, rare earthy, generally sub-vitreous, sub-conchoidal, sub-blocky to blocky, firm to very firm.

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**MID PALAEOCENCE MARKER**

2486.4 m – 2580 m

**SANDSTONE with minor SILTSTONE****SANDSTONE**

Light olive grey, translucent to transparent, fine to very coarse, predominantly medium to coarse, poorly to moderate sorted, sub-angular to rounded, occasionally angular, trace pyrite cement, trace white kaolinitic matrix, rare quartz overgrowths, trace very fine crystalline pyrite inclusions in quartz, trace grey lithics, trace Fe staining, good inferred porosity, fluorescence.

**FLUORESCENCE**

2505-2545 m; Trace spotted dull yellow to orange fluorescence, very weak dim pale yellow cut, instant weak green to yellow crush cut, very thin, dull yellow residual ring.

**FLUORESCENCE**

2575-2580 m; Trace pinpoint to spotted dull yellow orange fluorescence, slow streaming milky yellow cut, dim pale yellow residual ring.

**SILTSTONE**

Olive grey, argillaceous, non calcareous, rare very fine disseminated carbonaceous specks, very soft, very dispersive, amorphous.

2580 m – 2691.9 m

**SILTSTONE with minor SANDSTONE****SILTSTONE**

Olive grey to olive black, predominantly argillaceous, very slightly calcareous, occasionally becoming very fine arenaceous, trace carbonaceous fragments, trace very fine quartz grains, trace very fine glauconite grains, trace to rare very fine crystalline pyrite, occasional carbonaceous flecks, very soft to sticky, amorphous.

**SANDSTONE**

Pale yellow brown to dark yellow brown, olive grey in part, silty to very fine and grade to SILTSTONE in part, very fine to fine in part, trace medium, poor to moderate sorted, sub-rounded to rounded, moderate strong dolomitic cement and minor pyrite cement, rare argillaceous matrix in part, minor pelloidal glauconite, minor disseminated pyrite, rare feldspar, trace mica flecks, no porosity, no fluorescence.

**T-1.1 - SAND**

2691.9 m – 2765.1 m

**SANDSTONE and SILTSTONE with minor DOLOMITE****SANDSTONE**

Very light grey to light grey, translucent to frosted, pale yellow brown, fine to medium, minor coarse to very coarse increasing with depth, moderate to poor sorted, sub-angular to sub-rounded, occasional rounded, moderate to strong dolomite cement, minor to common pyrite cement, minor argillaceous/kaolinitic matrix, common quartz overgrowths, trace glauconite, trace very fine pyrite inclusions, trace Fe staining, firm to moderate hard, friable in part, fair to good inferred porosity reducing with depth to very poor, fluorescence.

**FLUORESCENCE**

2690-2735 m; Trace to 10% pinpoint to spotted moderate bright green yellow fluorescence, very slow pale milky cut, instant milky green yellow crush cut, thin to moderate thick moderate bright green yellow ring residue, no visible residue in white light.

**SILTSTONE**

Olive black, occasional olive grey, trace to rare disseminated carbonaceous specks, trace pale green glauconite, trace disseminated pyrite, trace carbonaceous fragments, soft to very soft, sub-blocky to blocky, occasional sub-fissile

**DOLOMITE**

Very pale orange to pale yellow brown, predominantly as soft blocky rock flour, occasional firm and friable aggregates, texture destroyed by bit wear, mineral fluorescence.

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**T-1.2 - SAND**

2765.1m – 2803 m

**SANDSTONE interbedded with SILTSTONE and minor COAL****SANDSTONE**

Very light grey to light olive grey, very fine to occasional fine, silty in part, sub-angular to sub-rounded, occasional angular, abundant argillaceous/kaolinitic matrix, trace glauconite, trace mica, trace feldspar, trace carbonaceous specks, soft to friable, no visual porosity, no fluorescence.

**SILTSTONE**

Olive grey to olive black, dark yellow brown in part, rare minor dark green grey to green black, argillaceous, slightly calcareous, rare to minor glauconite, trace to rare very fine disseminated carbonaceous specks, trace mica, trace pyrite nodules, very fine to fine quartz grain inclusions, very soft to dispersive, sub-blocky to blocky, occasional soft to firm and blocky to sub-fissile, amorphous.

**COAL**

Black, brown black, dull to minor vitreous lustre, predominantly earthy, woody texture, locally banded, grade to CARBONACEOUS SILTSTONE, trace pyrite nodules, moderate hard to hard, brittle, sub-conchoidal fracture in part, occasional sub-fissile.

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## GAS REPORT

Gas was present on exiting from the 9 5/8" casing in low concentrations. Initially Methane was the only gas released until a shallow gas pocket between 1415 mMDRT and 1432 mMDRT which released a maximum of 4308 units of predominantly Methane gas with minor amounts of Ethane & Propane. This gas was circulated out and the mud weight was increased from 9.1 ppg to 9.65 ppg to keep it in check. On drilling ahead the background gas reduced to around 10 to 20 units with Methane being the only gas released. Connection gases were then observed and varied from 14 units above background gas to a maximum of 195 units above background gas. The mud weight was then reduced prior to entering the Latrobe formation to 9.35 ppg which resulted in the corresponding increase in the connection gases to a maximum of 210 units above background gas as we neared the Lakes Entrance formation.

Methane continued to be the predominant gas on entering the Lakes Entrance formation and the Latrobe group with only trace amounts of Ethane being released, with the background gas staying between 5 and 10 units. The mud weight was slowly increased to 9.5 ppg after entering the Latrobe at 1983 mMDRT, but that did not stop higher amounts of connection gas (maximum of 462 units above background gas) being released on approaching the P sand. There was also a gradual increase in the background gas to around 20 units with a corresponding increase in the concentrations of Ethane and Propane prior to entering the P sand. On entering this predominantly sandy section at 2132.5 mMDRT, there was a sudden increase in gas to a maximum of 250 units with the whole range of gases from Methane to Pentane being released.

The gas ratios plot show an increase in the Wetness and a corresponding decrease in the Balance just prior to entering this sand which indicate a possible productive oil zone. The hydrocarbon Character plot indicates that the gas-oil contact is at approximately 2130 mMDRT with the oil density increasing as the curves diverge with possible residual oil at around 2138 mMDRT. This presence of oil is supported by minor fluorescence seen between 2130 mMDRT to 2160 mMDRT, though the lower part could be water flushed. The heavier gases gradually reduced in concentrations on progressing through this zone.

There were traces of fluorescence seen in some of the Sandstone sections all the way to the T1.1 Sand, but the gas ratios plot did not indicate anything of interest. Connection gases were present in decreasing amounts for the rest of the well with some being masked by localised increases due to lithology.

Throughout the predominantly Siltstone interval beneath the base of the Tuna Flounder Channel gas levels varied between a low of 3 and a maximum of 23 units. There were some Coal seams in this section but there were no significantly large gas increases associated with these besides the major marker Coal seams. The Mid Palaeocene Marker Coal released the highest amount of gas with a maximum of 127 units. The Sandstone section just below this marker showed a slight increase in concentrations of some of the heavier gases with a maximum gas peak of 61 units with the background gases staying consistently at around 15 units right through the top of this zone. The background gas dropped gradually to around 4 units on encountering the T-Shale with a predominantly Methane rich mixture and stayed that way till the T 1.1 Sand was intersected at 2691.9 mMDRT. The Siltstone in this zone was carbonaceous and this compositional change was possibly related to that.

At the top of the T1.1 Sand gas levels averaged between 40 and 60 units with a peak gas reading of 75 units, with trace fluorescence seen between 2690 mMDRT to 2735 mMDRT. The crossing of the Wetness and Balance plots suggests that there could be the possibility of a small pocket of productive gas around 2695 mMDRT followed by possibly productive oil all the way to around 2736 mMDRT combined with increasing density with depth. There might also be a possibility of a water saturated cap rock existing between this zone at around 2712 mMDRT to 2716 mMDRT as indicated by cuttings samples and a decrease in fluorescence at this depth.

The Methane ratios in the T1.1 and T1.2 Sandstones stayed between 65% and 93% with occasional increases in the ratio of heavier (C3 to C5) gases. Background gas levels in these zones were initially as high as 30 units in the T1.1 and gradually reduced to 10 units on entering the T1.2 Sand right up to total depth.

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 CO<sub>2</sub> or H<sub>2</sub>S was detected while drilling Flounder A-02a.

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**Gas peaks through the Latrobe Group**

<b>Depth metres</b>	<b>Total Gas units</b>	<b>C<sub>1</sub> %</b>	<b>C<sub>2</sub> %</b>	<b>C<sub>3</sub> %</b>	<b>iC<sub>4</sub> %</b>	<b>nC<sub>4</sub> %</b>	<b>iC<sub>5</sub> %</b>	<b>nC<sub>5</sub> %</b>
2106	28	0.590	0.019	0.003	0.000	0.000	0.000	0.000
2125	23	0.308	0.025	0.010	0.000	0.000	0.000	0.000
2136	250	1.341	0.315	0.301	0.076	0.139	0.040	0.040
2139	122	0.658	0.169	0.193	0.045	0.085	0.025	0.025
2142	56	0.322	0.102	0.116	0.026	0.051	0.016	0.016
2181	33	0.274	0.034	0.027	0.005	0.011	0.004	0.004
2255	15	0.209	0.004	0.003	0.000	0.000	0.000	0.000
2293	34	0.480	0.013	0.008	0.001	0.003	0.001	0.001
2308	6	0.071	0.005	0.005	0.001	0.000	0.000	0.000
2339	23	0.203	0.029	0.009	0.001	0.002	0.000	0.000
2415	45	0.569	0.071	0.021	0.001	0.004	0.002	0.001
2521	61	0.573	0.084	0.030	0.002	0.007	0.002	0.002
2695	57	0.715	0.078	0.033	0.004	0.008	0.002	0.002
2704	20	0.181	0.035	0.020	0.003	0.007	0.002	0.002
2714	32	0.218	0.051	0.032	0.005	0.012	0.004	0.004
2720	41	0.265	0.068	0.043	0.007	0.015	0.005	0.006
2731	42	0.265	0.063	0.043	0.007	0.016	0.006	0.006
2737	25	0.106	0.033	0.028	0.006	0.013	0.005	0.006
2753	12	0.157	0.007	0.002	0.001	0.001	0.001	0.001
2767	20	0.195	0.029	0.012	0.001	0.003	0.002	0.001
2791	11	0.105	0.016	0.007	0.000	0.002	0.001	0.001

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