



WEST TUNA W-8a

FINAL WELL REPORT

Prepared by

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SECTION 3 -- GEOSERVICES WELL LOGS

West Tuna W-8a	MASTERLOG --	1:500 scale from 695 to 3590 metres 1:200 scale from 1900 to 3590 metres
West Tuna W-8a	DRILLING LOG --	1:1000 scale from 695 to 3590 metres
West Tuna W-8a	GAS RATIO LOG --	1:200 scale from 1900 to 3590 metres

Revision	Date	Issued by	Approved by	Remarks
1	08-04-2002	Geoservices Unit 95	Base Mudlogging Coordinator	

Section 1

General Well Summary

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1	08-04-2002	Geoservices Unit 95	Base Mudlogging Coordinator	

WELL DATA

Operator : Esso Australia Ltd
Platform : West Tuna
Well name : West Tuna W-8a
Country : Australia
Location : Gippsland Basin
Structure : Tuna M-1
Field : West Tuna
Permit : Vic/ L4

Location AMG co-ordinates 5 771 795.17 mN 621 484.71 mE

Location local co-ordinates Lat: 38° 11' 36.471" S Long: 148° 23' 14.317" E

Target Local co-ordinates 1892.7 mN 1064.6 mW

Profile : Deviated
Reference depth : Rotary Table
RT to Seabed : 95.69 metres
RT above M.S.L. : 34.69 metres
Sea-water depth : 61.00 metres
Proposed total depth : 3584 metres
Actual total depth : 3590 metres
True vertical depth : 2094.97 metres
Spudded on : 25th February 2002
Total depth reached on : 24th March 2002

Drilling Contractor

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

Drilling Phases

Diameter (inch)	From (m)	To (m)	Mud Type
12¼"	695	1312	Seawater / Gel and KCl / Glycol / PHPA
8½"	1312	3590	KCl / Glycol / PHPA

Cased Hole

Casing Diameter (inch)	Casing Type	Shoe Depth (m)
20"	Conductor Shoe	167 MDRT (Existing)
13 ³ / ₈ "	Surface	690 MDRT (Existing)
9 ⁵ / ₈ "	Intermediate	1306.7 MDRT
7"	Production	3583.4 MDRT

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MUD LOGGING

Logging Unit Number: 95

Engineers: M. Boyd., G. Fawns, P. Rady, M. Smith

Sampling Interval

Sample Type	Number of sets	Quantity per set	Sampling interval	From (m)	To (m)
Washed and Dried	3	100 grams	10 metres	1920	2030
Washed and Dried	3	100 grams	5 metres	2030	3590

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

West Tuna W-8a is an infill well, east of the West Tuna platform. The objective is to capture oil from the T-1U and T-1L reservoirs by firstly capturing unswept oil from the T-1L and then to enhance the depletion of the T-1U. West Tuna W-8a was kicked off at a depth of 695 m after W-8 was plugged and abandoned and was drilled to a total depth of 3590 m MDRT (2094.97 mTVDRT) in 8½" hole and completed with a single oil completion string of 4½" liner in 7" production casing.

West Tuna W-8a was kicked off at 06:00 hours on 25th February 2002 after drilling out the cement plug to 695 m.

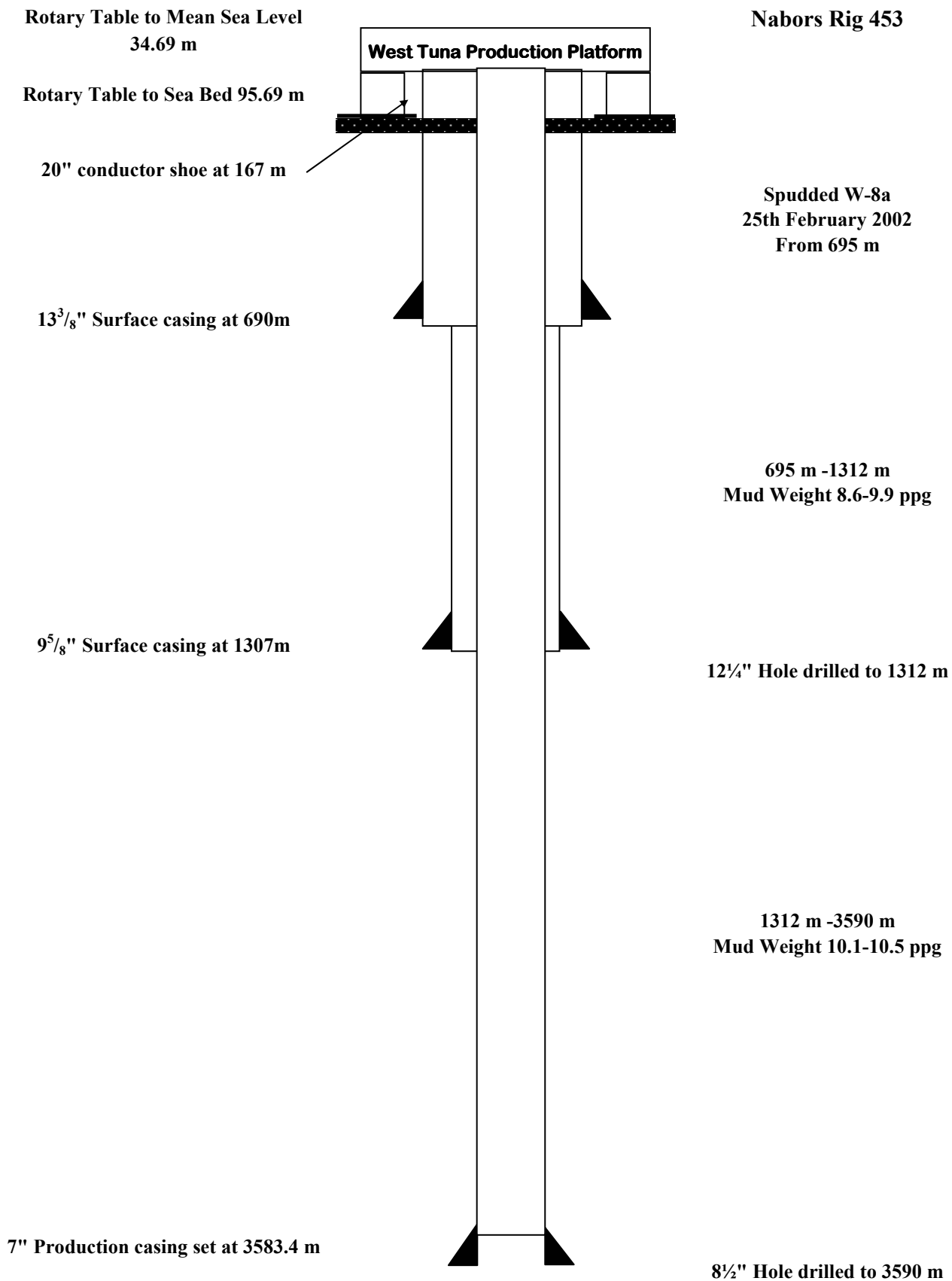
After the plug and abandonment of West Tuna W-8 was completed, a 12¼" rock bit was made up and ran in the hole to the top of the cement plug at 650 m. The cement plug was drilled out to 695 m and the bit pulled. A kick-off MWD/LWD steerable assembly with a Hycalog PDC bit and motor set at 1.5° was then made up and ran in the hole to 695 m. The well kicked-off using a 8.4 ppg gel mud. and was then displaced to a 8.6 ppg Seawater/Gel mud when the first formation was observed at 720 m. This assembly drilled 2 m of new formation and was then pulled back into the casing where a successful P.I.T. was conducted to 418 psi (12.5 ppg EMW with 8.6 ppg mud). The well was drilled to a depth of 825 m where due to balling of the bit it was pulled out of hole, cleaned and run back in. Once back on bottom the well was drilled to 920 m where the bit was pulled again due to balling and the mud system was changed to a KCl/PHPA/Glycol system. After running back to bottom with a new bit and displacing hole to the new mud system, the well was drilled ahead to a casing depth of 1312 m. The 9⅝" casing was run and cemented at 1307 m. This Phase of the well was drilled using alternating methods of rotary and slide drilling.

An 8½" MWD/LWD steerable assembly with a motor set at 0.78° was run in hole and tagged cement at 1277 m. After drilling out to 1306 m, with seawater, the well was displaced to a 9.5 ppg KCl/PHPA/Glycol mud system. The assembly drilled 3 m of new formation and was then pulled back into casing to conduct a successful P.I.T. to 533 psi (12.5 ppg EMW with 9.5 ppg mud). Once drilling resumed only 30 m of new hole was drilled until the bit was pulled due to bit balling and a new bit run which drilled to 2490 m, with wiper trips run at 1288 m and 2126 m. The next bit drilled to 2583 m, where it was pulled due to a slow penetration rate. A tri-cone rock bit was used to drill the next section to a depth of 2790 m, where it was pulled due to a slow penetration rate. A Geodiamond PDC was next run to 3120 m and pulled due to high torque. The new bit, another tri-cone, drilled to 3300 m at a steady rate, where it was tripped to change out the LWD tools prior to the reservoir section. The final bit run was a total of 290 m, with a pre-cautionary wiper trip at 3470 m. The bit, a tri-cone, drilled consistently with variations in penetration rate due to lithology.

Maintained mud volumes and properties by pre-mix addition. Controlled mud weight by dilution with seawater and by dumping sand trap as necessary. Baracarb-25 and Baracarb-100 were added to the mud system prior to entering the Latrobe Formation to bridge the pore throats and reduce the likelihood of differential sticking and seepage losses. Finagreen-EBL was added from 2491 m, to aid lubricity and reduce torque.

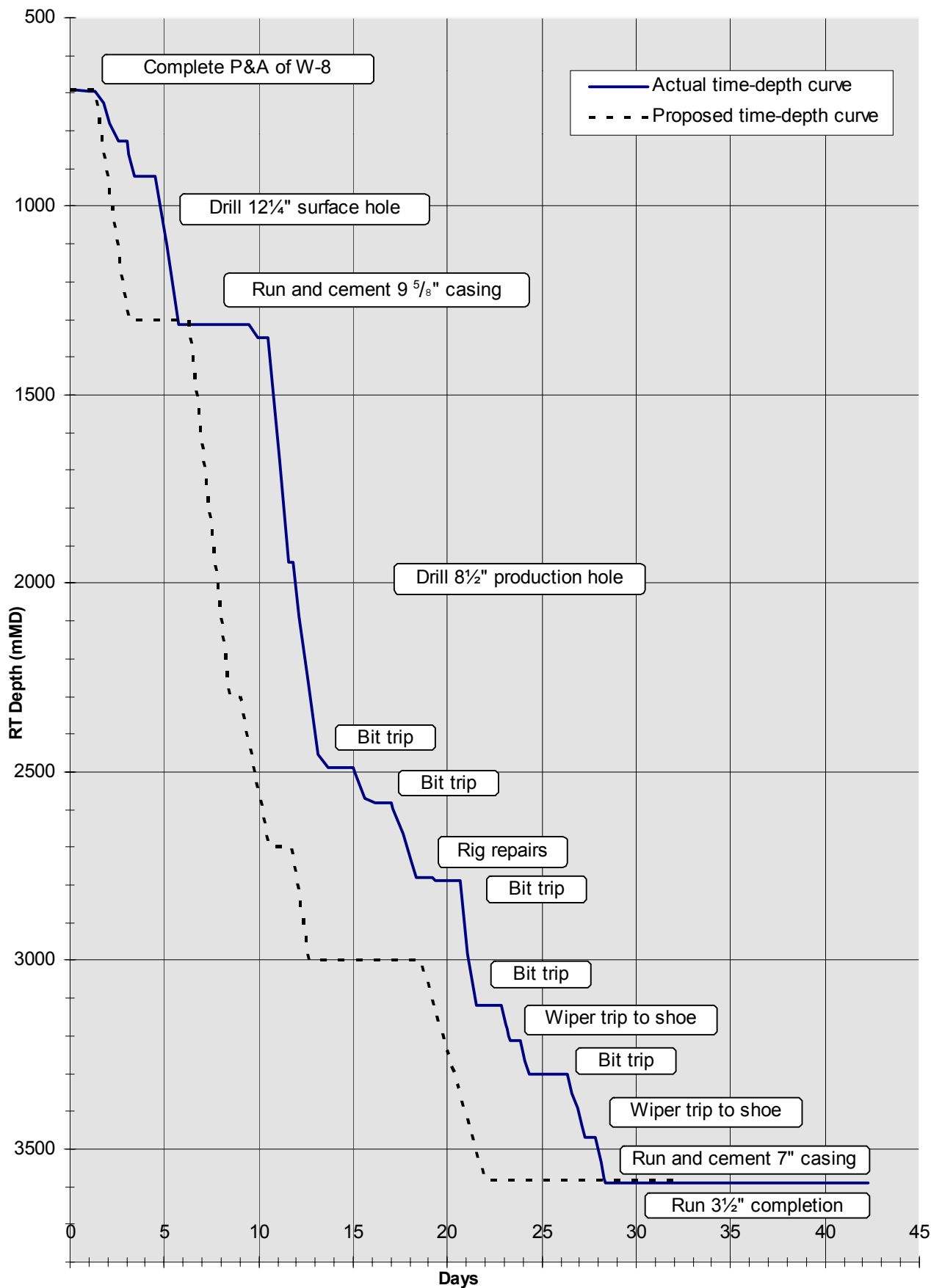
West Tuna W-8a reached a total depth of 3590 m (2094.97 mTVD) at 06:45 hours on 24th March 2002. The final survey at a depth of 3561.3 m had an inclination of 56.88° and an azimuth of 43.56°. 7" production casing was run to a depth of 3583.4 m. West Tuna W-8a was completed as a single oil string with 3½" completion tubing run to 3363 m. West Tuna W-8a was handed over to Production on 07-04-2002 at 05:00 hours.

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WELL PROFILE


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WTN W-8a TIME-DEPTH CURVE (measured depth)



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BIT RUN SUMMARY

BIT	Size (")	Type	Jets	In (m)	Out (m)	Hours	Condition
1RR	12¼"	Smith XL20D	3 x 18	650	695	3.81	3-4-WT-A-E/E-I-PN-BHA.
2RR4	12¼"	Hycalog DS195	5 x 18	695	825	19.91	1-3-BT-S-X-IN-CT-BU.
2RR5	12¼"	Hycalog DS195	5 x 18	825	920	5.32	1-3-BT-S-X-1-CT-BU.
3	12¼"	Hycalog DS195	5 x 16	920	1312	19.16	1-1-NO-A-X-IN-NO-TC.
4	8½"	Hycalog DS203	6 x 16	1312	1349	5.30	0-3-CT-G-X-IN-BU-PR.
5	8½"	SII Geodiamond S75HPX	7 x 14	1349	2490	44.4	6-8-WT-A-X-IN-CT-PR.
6	8½"	SII Geodiamond M73VPX	6 x 15	2490	2583	22.4	7-8-RO-T-X-IN-BT-PR.
7	8½"	Security X53OD	3 x 22	2583	2790	26.95	7-5-LT-M-E-I-ER-PR
8	8½"	Geodiamond M74PX	6 x 16	2790	3120	12.94	0-1-WT-G-X-I-NO-TQ
9	8½"	HTC MX20D	3 x 22	3120	3300	16.01	3-3-WT-A-E-I-ER-BHA
10	8½"	HTC MX20D	3 x 22	3300	3590	25.91	5-5-WT-A-F-IN-ER-TD

CASING DATA

Type	Size (Inches)	Weight (lb/ft)	Grade	Thread	Depth (mMDRT)
Conductor	20"	84	K-55	BTC	167
Surface	13 ³ / ₈ "	54.5	K-55	BTC	690
Intermediate	9 ⁵ / ₈ "	47	L-80	LT&C	1306.7
Production	7"	26	L-80	LT&C	3583.4

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 "	ABC Class G	520	0.25 gal/10bbl NF-5	61	105	15.8	1306 - 975	1500
7"	ABC Class G	858	<u>Lead:</u> Halad 413L 32 gal/ bbl, SCR-100L 3 gal/10 bbl <u>Tail:</u> Halad 413L 32 gal/ bbl, SCR-100L 2 gal/10 bbl	104.2	177	15.8	3584 - 1879	2000

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WELL DIRECTIONAL PROFILE
(From Geoservices ALS Software)

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WELL DIARY

23rd February 2002	End of WTN W-8 P & A.
24th February 2002	Pull wearbushing. Nipple down fast lock connector on riser and pick up BOP. Remove slip bowl from compact housing. Lower BOP and nipple up fast lock. Change out lower BOP rams to 5" pipe. Pick up combination test tool and run in hole. Test lines, lower pipe rams, riser and bonnets to 300/3000 psi for 5 minutes. Run wear bushing. Pick up, break out and lay out Cameron emergency seal assembly. Pick up and make up bit and BHA. Run in hole and tag cement at 650 m. Drill cement from 650 m to 672 m. Howco pressure test casing. Continue drilling cement from 672 m to 695 m. Circulate hole clean and pull out of hole.
25th February 2002	Continue to pull out of hole. Pick up and make up BHA and run in hole on drillpipe to 695 m. Orientate tool face to obtain kick off at 695 m whilst displace hole with 8.4 ppg gel mud. Drill, steer and survey new hole from 695 m to 722 m. Pull back to 670 m and circulate hole clean. P.I.T. (418 psi with 8.6 ppg mud). Rig service. Drill, steer and survey from 722 m to 780 m.
26th February 2002	Drill, steer and survey from 780 m to 822 m. Backream to 690 m. Run in hole from 690 m to 822 m. Drill, steer and survey from 822 m to 825 m. Pull out of hole. Run in hole with BHA, lay out NMDC and continue to run in hole to 825 m. Circulate and condition mud whilst raise mud weight. Drill, steer and survey from 825 m to 860 m.
27th February 2002	Drill, steer and survey from 860 m to 906 m. Bit balled, back ream from 906 m to 827 m, wash and ream in hole from 827 m to 906 m. Pump 30 bbls seawater and attempt to flush bit. Drill, steer and survey from 906 m to 921 m. Pull out of hole. Monitor well while dumping and cleaning mud system. Make up and run in hole with BHA, HWDP and DP to 656 m. Continue to clean out mud tanks and mix 9.4 ppg KCl/PHPA/Glycol mud whilst monitoring well.
28th February 2002	Continue to mix 9.4 ppg KCl/PHPA/Glycol mud whilst monitoring well. Run in hole from 656 m to 920 m. Displaced well to new mud. Pull out of hole from 920 m to 656 m, conduct rig service and inspect TDS torque beam whilst monitoring well and mixing additional new mud. Run in hole from 656 m to 920 m and resumed drill, steer and survey new hole from 920 m to 1058 m. Bit balled at 1058 m, rotate and work string whilst pump 20 bbls sea water in unsuccessful attempt to flush bit. Attempt to clear balled bit with a 10 bbl Citric Acid pill spotted and let soak for 1 hour. Pumped a Walnut pill and continued to drill, steer and survey from 1058 m to 1103 m.
1st March 2002	Continue to drill, steer and survey from 1103 m to 1312 m. Rotated and worked string, racking back 1 stand every ½ hour whilst circulating hole clean from 1312 m to 1170 m. Flow checked hole - static, slugged pipe and pulled out of hole from 1170 m to 670 m. Orientated tool face, worked string whilst circulating hole clean at 670 m and flow checked - static. Ran in hole from 670 m.
2nd March 2002	Ran in hole to 1312 m, precautionary washing down last 2 stands to bottom. Rotated and worked string whilst circulating 1½ times bottoms up. Flow checked - static, slugged pipe and pulled out of hole from 1312 m to 256 m, broke out, laid down Jar and racked back BHA. Made up and retrieved wear bushing and broke down assembly. Made up and jetted well head and BOP, broke down assembly, changed out UPR to 9 ⁵ / ₈ ", made up BOP test assembly, shell tested same - OK and broke down same. Rigged up to run 9 ⁵ / ₈ " casing, picked up and made up Shoe and Float assembly, confirmed Float OK and ran in hole with 9 ⁵ / ₈ " casing as per program to 680 m. Broke circulation and circulated 1.5 times casing volume. Conducted JSA on running casing in high winds and continued to run 9 ⁵ / ₈ " casing as per program to 885 m.
3rd March 2002	Continued running in hole with 9 ⁵ / ₈ " casing to 1307 m. Made up circulating swage and lines, broke circulation and circulated 1.5 times casing volume. Broke out circulating swage, made up cement head and lines and continued circulating whilst offloading boat. Held pre-cement job meeting, pumped 60 bbls sea water. Howco broke circulation, pressure tested lines, Howco mixed and pumped cement as per program. Rigged down cement head and Howco lines, dismantled scaffolding, broke and laid out landing joint and running assembly. Made up Cameron jetting assembly and jetted well head, broke down same. Changed out UPR to 2 ⁷ / ₈ " - 5½" VAR. Ran in hole with test plug, shell tested BOP and installed wear bushing. Ran in hole with 3½" drill pipe.

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4th March 2002	Continued to run in hole with 3½" drill pipe, pulled out of hole and laid out. Made up and retrieved wear bushing and broke down assembly. Made up test assembly and Howco lines, Howco pressure tested BOP and choke manifold. Broke down assembly. Made up and ran wear bushing then broke down running tool. Made up 8½" BHA as per Anadrill instructions, set bend at 0.78°, shallow tested motor and loaded radioactive source. Ran in hole to 831 m.
5th March 2002	Continued running in hole to 1231 m and washed from 1231 m to top of cement at 1277 m. Drilled cement, float and shoe track from 1277 m to 1287 m and circulated hole clean. Pressure tested casing. Continued to drill cement and shoe track from 1287 m to 1306 m. Displaced well to 9.5 ppg PHPA mud whilst drilling from 1306 m to 1315 m. Circulated bottoms up and conducted a P.I.T. (12.5 ppg EMW with 533 psi with 9.5 ppg mud). Continued drilling 8½" hole to 1345m. Possible balled bit, attempted to unball bit. Racked back 1 stand, pumped 40 gallons EZ mud and attempted to flush bit. Pumped 20 bbls seawater and attempted to flush bit. Pumped 20 bbls Citric acid and spotted at bit and soaked for 30 mins. Ran in hole and attempted to unball bit while drilling from 1345 m to 1349 m. Flow checked well, slugged pipe and pulled out of hole.
6th March 2002	Continued to pull out of hole and racked back BHA. Made up new BHA and ran in hole and continued to drill, steer and survey 8½" hole from 1349 m to 1673 m.
7th March 2002	Continued to drill, steer and survey 8½" hole to 1944 m. Flow checked, pumped slug and pulled out of hole for wiper trip to 1288 m. Ran in to bottom and continued drill, steer and survey 8½" hole to 2089 m.
8th March 2002	Continued to drill, steer and survey 8½" hole to 2126 m. Pulled out of hole for two stand wiper trip and wash back to bottom. Continued to drill, steer and survey 8½" hole to 2454 m
9th March 2002	Continued to drill, steer and survey 8½" hole to 2490 m. Pulled out of hole due to low penetration rate.
10th March 2002	Ran back in hole and washed last two stands to bottom and continued to circulate whilst working on Top drive. Pulled back one stand and continued to circulate and add 2% Finagreen to reduce torque. Continued to drill, steer and survey 8½" hole to 2500 m.
11th March 2002	Drill, steer and survey 8½" hole from 2500 m to 2583 m.
12th March 2002	Work string and circulate hole clean. Flow check and pull out of hole to shoe. Perform rig maintenance at shoe and continue to pull out of hole. Rack back heavy weight drill pipe, remove radioactive source and lay out motor. Pick up new motor and make up BHA to run in hole. Load radioactive source. Continue to run in hole to shoe and perform rig service. Continue to run in hole washing last two stands to bottom. Drill, steer and survey 8½" hole from 2583 m to 2595 m.
13th March 2002	Drill, steer and survey 8½" hole from 2595 m to 2742 m.
14th March 2002	Drill, steer and survey 8½" hole from 2742 m to 2779 m. Pull up and circulate, while conducting rig repairs.
15th March 2002	Run back to bottom and drill, steer and survey 8½" hole from 2779 m to 2790 m. Circulate hole clean, pull five stands and pump slug. Pull out of hole to shoe, circulate hole clean and flow check. Pull out of hole, download source, break out tools and flush motor. Change bit, make up tools and shallow test. Load source and run in hole with BHA. Pick up and rack back 18 joints of drillpipe. Run in hole.
16th March 2002	Run in hole. Slip and cut. Run in hole to 1997 m. Pick up pipe to 2432 m. Run in hole and work through tight spot at 2693 m. Wash and ream to 2750 m, carry out pump repairs. Wash and ream to 2780 m and work string to clean hole. Wash and ream to bottom. Drill and survey hole from 2790 m to 2837 m. Work string while log interval 2808 m to 2837 m. Drill ahead to 2982 m.

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17th March 2002	Circulate and work string while reducing mud weight. Drill and survey hole from 2982 m to 3097 m. Circulate hole clean. Drill 8½" hole from 3097 m to 3120 m. Circulate hole clean and flow check. Pull out of hole and work through tight spot at 2947 m. Continue to pull out of hole and work through tight spot at 2866 m. Flow check and pull out to 2640 m, excessive drag. Run in hole to 2720 m and circulate hole clean. Pull out of hole to shoe and circulate hole clean. Lay out six joints of drillpipe and continue to pull out of hole.
18th March 2002	Pull out of hole, laying out 30 joints. Remove source, change bit, down load tools and shallow test. Load source and run in hole, picking up pipe. Rig service and H ₂ S drill conducted at shoe. Run in hole to 3097 m. Circulate, rotate and work string to bottom while carrying out shaker repairs. Drill, steer and survey 8½" hole from 3120 m to 3170 m.
19th March 2002	Drill, steer and survey from 3170 m to 3213 m. Circulate hole clean and backream to 3165 m. Pull out of hole to 2970 m and circulate hole clean. Pull out of hole to the shoe and circulate. Rig service. Run in hole and wash last stand to bottom. Drill, steer and survey from 3213 m to 3264 m.
20th March 2002	Drill, steer and survey from 3264 m to 3300 m. Circulate hole clean and pull out of hole for bit and BHA change. Make up combination tool and pull wearbushing. Make up and jet seal area. Make up test assembly and pressure test lines, BOP's, choke and standpipe manifold.
21st March 2002	Complete pressure testing. Run wearbushing and lay out assembly. Slip and cut. Pick up and make up motor. Ready RAB, MWD and ADN. Space out BHA and rack back. Lay out RAB tool. Make up bit, RAB, MWD and ADN and shallow test. Run in hole.
22nd March 2002	Continue to run in hole. Wash two stands to bottom. Drill, steer and survey new hole from 3300 m to 3438 m.
23rd March 2002	Drill, steer and survey new hole from 3438 m to 3470 m. Wiper trip to inside shoe at 1280 m. Circulate hole clean. Rig service. Run in hole and drill, steer and survey new hole from 3470 m to 3535 m.
24th March 2002	Drill, steer and survey new hole from 3535 m to 3590 m. Circulate. Pull out of hole. Download source. Pick up new RAB tool, make up BHA and run in hole.
25th March 2002	Run in hole to 3275 m. Attempt to ream and log from 3275 m to 3290 m, unsuccessful. Run in hole to 3590 m. Backream and log well from 3590 m to 3220 m. Circulate well clean and run in hole to 3590 m. Circulate and condition mud. Rack back 1 stand every half hour from 3590 m to 3519 m. Pull out of hole.
26th March 2002	Continue to pull out of hole. Make up wearbushing running tool and pull same. Make up jetting tool and jet wellhead. Change out BOP rams to 7", make up test assembly and shell test BOP's. Service rig. Dress rig floor to run 7" casing. Check shoe and float assembly. Run in hole with 7" casing as per program.
27th March 2002	Continue to run 7" casing as per program. Cement as per program.
28th March 2002	Continue to cement as per program. Wait on cement. Rig down BOP. Lay out cement head, pressure test hanger body seals. Nipple up stack and pressure test same as per requirements.
29th March 2002	Lay down 5" drillpipe. Make up scraper assembly and run in hole with the same on 3½" drillpipe.
30th March 2002	Continue to run in hole with scraper assembly. Scrape casing as per required. Pull out of hole with casing scraper.

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31st March 2002	Continue to pull out of hole, with 3½" drill pipe. Lay out heavy weight drill pipe and scaper assembly. Rig up Schlumberger wireline and run in hole with TCP guns. Correlate depth and fire guns. Pull out and lay out guns.
1st April 2002	Continue with completion operations, make up guns and run in hole on drill pipe.
2nd April 2002	Continue to run in hole, set gun hanger and rig up wireline to correlate and set depth. Pull out of hole with Schlumberger wireline. Set packer at 3363 m. Pull out of hole with 3½" drill pipe. Pick up packer and rig up to run in hole with 2 ⁷ / ₈ " and 3½" tubing.
3rd April 2002	Run in hole with and set 2 ⁷ / ₈ " tubing on drill pipe at 3259 m. Halliburton set packer. Pull out of hole. Make up packer and rig up to run in hole with 3½" tubing.
4th April 2002	Run in hole with 3½" tubing. Set packer and pull out of hole.
5th April 2002	Run in hole with 3½" completion assembly. Land hanger and confirm MAXR guns have fired.
6th April 2002	Pressure test tubing, Cameron install control lines and christmas tree.
7th April 2002	Cameron continue to install christmas tree. Clear equipment from wellhead. Rig released 05:00 hrs.

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Section 2

Geological Summary

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FORMATION TOPS

DESCRIPTION	MD (m) - RT	TVD (m) - RT
Top of Gippsland Limestone	Not Applicable	
Top of Lakes Entrance	1507	1130.4
Top of Latrobe Group	2042	1368.9
Top of Coarse Clastics	2061	1377.4
Base of Tuna/Flounder Channel	2594	1620.5
Mid-Palaeocene Marker	2968.5	1794.7
TOTAL DEPTH	3590	2094.97

GEOLOGICAL SUMMARY**GIPPSLAND FORMATION**

695 m - 840 m

LIMESTONE**CALCARENITE**

White to very light grey, light to medium grey brown, very fine to silty and grades to Calcisiltite, abundant fossils, glauconite, lithic, loose to firm, brittle in part, poor visual porosity, no show.

840 m - 1140 m

LIMESTONE**CALCILUTITE**

Very light grey to light grey, medium grey to dark grey in part, common fossils and fossil fragments, minor to trace disseminated and nodular pyrite, trace calcite grains, trace carbonaceous specks, locally glauconite grains, predominantly soft to occasionally firm, amorphous to sub-blocky.

1140 m - 1507m

MARL**MARL**

Light to medium grey grading to predominantly medium grey with depth, light olive grey, trace silty, trace fossils and fossil fragments, trace disseminated pyrite, trace carbonaceous and lithic specks, soft to firm, sub-blocky to blocky.

LAKES ENTRANCE FORMATION:

1507 m - 2042 m

CLAYSTONE**CLAYSTONE**

Olive grey to dark olive grey, light grey to medium grey to green grey, calcareous, locally occasional arenaceous, trace disseminated pyrite, trace to common Ooids, Forams and microfossil fragments, trace carbonaceous and lithic specks, trace disseminated glauconite with depth, dominantly firm to soft, occasionally moderate hard, sub-blocky to blocky.

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LATROBE GROUP:**LATROBE FORMATION:**2042 m - 2061 m **Interbedded CLAYSTONE and SILTSTONE****CLAYSTONE**

Pale yellow orange to dark yellow orange, occasionally light brown grey, green grey in part, trace arenaceous, nodular glauconite in part, occasionally nodular pyrite, very soft to dispersive, sub-blocky to amorphous.

SILTSTONE

Light brown grey to light brown, dark brown to dark black brown, argillaceous, trace to occasionally very fine arenaceous, trace to occasional carbonaceous flakes, trace to rare disseminated and nodular pyrite, occasional disseminated glauconite, firm to moderately hard, sub-blocky to blocky.

COARSE CLASTICS:2061 m - 2173 m **SANDSTONE with trace SILTSTONE and CLAYSTONE****SANDSTONE**

Quartzose, clear to translucent, opaque, very light grey, medium to coarse, dominantly medium, moderately sorted, sub-angular to sub-rounded, trace weak siliceous cement, locally disseminated and nodular pyrite, predominantly loose and clean, good inferred porosity.

FLUORESCENCE

2160 m to 2175 m; 40% faint to moderately bright patchy yellow green fluorescence, slow white crush cut, thin ring residue.

SILTSTONE:

Light grey to light green grey, trace very fine arenaceous in part, firm to moderately hard, sub-fissile.

CLAYSTONE

Light grey, trace very fine arenaceous, dispersive to very soft, amorphous to blocky.

TUNA / FLOUNDER CHANNEL:2173 m - 2370 m **CLAYSTONE with interbedded SANDSTONE and trace SILTSTONE****CLAYSTONE**

Pale grey to olive grey, pale brown to yellowish brown to dark yellowish brown, very fine arenaceous, silty in part, carbonaceous speaks and inclusions, disseminated and nodular pyrite, micromicaceous in part, soft to dispersive, amorphous, sub-fissile.

SANDSTONE

Clear to translucent, very fine to coarse, dominantly fine to medium, predominantly moderately sorted, sub-angular to sub-rounded, weak siliceous cement, common argillaceous matrix, loose, poor inferred porosity, no fluorescence.

SILTSTONE

Greyish brown to dark brown, argillaceous, carbonaceous material, micromicaceous, soft to firm, sub-blocky.

2370 m - 2515 m **SANDSTONE with interbedded CLAYSTONE and trace SILTSTONE****SANDSTONE (1)**

Clear to translucent, medium to coarse, moderately sorted, sub-angular to sub-rounded, trace siliceous cement, trace disseminated and nodular pyrite, clean, loose, good inferred porosity, no fluorescence.

SANDSTONE (2)

Clear to translucent, fine to coarse, dominantly medium, moderately sorted, sub-angular to sub-rounded, moderate to strong dolomitic cement, trace pyrite cement, clean, friable to moderately hard aggregates, poor inferred porosity, no fluorescence.

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CLAYSTONE Dark grey, light brown to yellowish brown, common carbonaceous specks, common disseminated pyrite, moderately hard to hard, sub-fissile to fissile.

SILTSTONE Medium dark grey, argillaceous, dolomitic, firm to predominantly moderately hard, sub-blocky.

2515 m - 2594 m **CLAYSTONE with interbedded SANDSTONE**

CLAYSTONE (1) Light brown to dark grey brown, dark grey in part, minor carbonaceous specks, trace to locally common disseminated pyrite, locally common micromicaceous, dominantly dispersive and amorphous, occasionally moderately hard and sub-fissile.

CLAYSTONE (2) Yellow brown, light grey, weakly calcareous, trace nodular pyrite, firm to occasionally moderately hard, sub-blocky to blocky.

SANDSTONE Clear to translucent, fine to medium, predominantly, medium, trace coarse, well sorted, sub-angular to sub-rounded, minor dolomitic cement, predominantly clean and loose, good inferred porosity, no fluorescence.

MID PALAEOCENE MARKER:

2594 m - 2968.5 m **CLAYSTONE with interbedded SANDSTONE and minor COAL**

CLAYSTONE Light brown to light brown grey, light grey, yellowish brown, very fine arenaceous in part, occasional to locally common carbonaceous inclusions and material, trace to locally occasional disseminated pyrite, occasional to common micromicaceous, dominantly soft to dispersive, amorphous, sub-blocky to sub-fissile in part.

SANDSTONE Clear to translucent, white, opaque, dominantly fine to medium, occasionally coarse, moderately sorted, sub-angular to sub-rounded, weak siliceous cement, trace to minor argillaceous matrix, trace nodular pyrite, loose, trace aggregates, fair to poor inferred porosity, poor visible porosity, no fluorescence.

COAL Black, brown black, dull to sub-vitreous, earthy in part, firm to brittle, angular to uneven, rarely sub-conchoidal, silty in part.

LOWER LATROBE GROUP

2968.5 m to 3220 m **Interbedded SANDSTONE and CLAYSTONE with trace COAL**

SANDSTONE Clear to translucent, opaque, fine to dominantly medium to coarse, moderately to in part poorly sorted, sub-angular to sub-rounded, occasionally angular, weak siliceous cement, trace to locally occasional argillaceous matrix, trace pyrite, generally clean, fair inferred porosity, no fluorescence.

CLAYSTONE Light brown grey, pale to light grey, pale brown, arenaceous in part, occasional to locally common carbonaceous inclusions and material, micromicaceous, soft to dispersive, firm in part, amorphous, sub-fissile in part.

COAL Black, brown black, dull to sub-vitreous, earthy in part, firm to brittle, angular to uneven, rarely sub-conchoidal, silty in part.

3220 m to 3590 m **Interbedded CLAYSTONE and SANDSTONE with trace COAL**

CLAYSTONE Light brown grey, pale to light grey, pale brown to white, occasional to locally common carbonaceous inclusions and material, locally nodular pyrite, micromicaceous in part, soft to dispersive, amorphous.

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SANDSTONE

Clear to translucent, opaque, very fine in part, fine to medium, rarely coarse, moderate to poorly sorted, sub-angular to sub-rounded, occasionally angular, trace pyrite cement, weak siliceous cement, locally common to abundant argillaceous matrix, rare to minor nodular pyrite, loose, fair to poor inferred porosity.

FLUORESCENCE

3340 m to 3365 m; 30% dull yellowish patchy fluorescence, very slow crush cut, no ring residue.

3365 m to 3410 m; Trace to 30% pale to moderately bright yellowish patchy, fluorescence, very slow white crush cut, no residue ring.

3450 m to 3500 m; Trace to 30% pale to moderately bright yellowish patchy, fluorescence, very slow white crush cut, no residue ring.

COAL

Black, brown black, dull to sub-vitreous, earthy in part, firm to brittle, angular to uneven, rarely sub-conchoidal, silty in part.

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GAS REPORT

Gas was recorded from the kick-off point in the 12¼" hole, with C₁ seen ranging between 0.05% and 0.3% and only trace C₂ at the bottom of the Lakes Entrance, with the first Siltstone. The gas level ranged from 5 to 15 units with the average being around 5 units.

On penetrating the Latrobe formation at 2042 m, there was a marked increase in gas levels, from 8 units to an initial peak of 105 units at 2053 m. The composition of the gases also changed with an increase in heavier gases (C₂ to C₃), indicating a hydrocarbon bearing lithology. Higher peaks were detected on penetration of the Coarse Clastics. Gas levels throughout the Latrobe formation were erratic due to drilling parameters and lithology variations, varying from 15 units up to a peak of 485 units.

The gas level to the base of the Tuna / Flounder Channel decreased from an initial 50 units at 2178 m to a low of 2.5 units by 2500 m. There was an attendant decrease in heavier hydrocarbons, such that by 2380 m there was only C₁ present in the gas stream.

The gas level in the next drilled section, from 2594 m to 2968.5 m, was greatly influenced by the carbonaceous content of the lithology and the highest readings were recorded from the numerous small Coals intersected during the section. The largest of these peaks, at 150 units, was the Mid-Palaeocene Marker.

Gas levels during the lower Latrobe Group section averaged 5 to 10 units, with peaks of 25 to 40 units, until the T-1 reservoir. In the T-1, the back ground gas level was 20 to 25 units, peaking 50 to 80 units, with an increased presence of heavier hydrocarbons.

Localised increases in background gas are attributable 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 West Tuna W-8a.

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 %
2053.0	105	1.55	0.10	0.05	0.01	0.02		
2085.0	215	3.29	0.21	0.13	0.02	0.03	0.01	0.01
2143.0	485	6.32	0.49	0.21	0.05	0.08	0.03	0.07
2161.0	466	3.88	0.53	0.37	0.09	0.12	0.07	0.08
2167.5	379	3.09	0.43	0.30	0.08	0.14	0.07	0.10
2842.0	46	0.30	0.02	0.01				
2961.0	137	2.29	0.16	0.04				
2965.0	150	2.38	0.17	0.05	0.00	0.01		
3380.0	78	1.00	0.09	0.03	0.00	0.01		
3389.0	65	0.80	0.08	0.03	0.00	0.01		
3530.0	57	0.72	0.05	0.02				
3533.5	57	0.73	0.05	0.02				

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