



WEST TUNA W-4a - Redrill

FINAL WELL REPORT

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West Tuna W-4a - Redrill MASTERLOG --	1:500 scale from 2410 to 2833 metres 1:200 scale from 2580 to 2833 metres
West Tuna W-4a - Redrill DRILLING LOG --	1:1000 scale from 2410 to 2833 metres
West Tuna W-4a - Redrill GAS RATIO LOG --	1:200 scale from 2700 to 2833 metres

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Section 1

General Well Summary

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WELL DATA

Operator : Esso Australia Ltd
Platform : West Tuna
Well name : West Tuna W-4a - Redrill
Country : Australia
Location : Gippsland Basin
Structure : Tuna M-1
Field : West Tuna
Permit : Vic/ L4

Location AMG co-ordinates 5 771 796.88 mN 621 489.42 mE

Location local co-ordinates Lat: 38° 11' 36.414" S Long: 148° 23' 14.509" E

Target Local co-ordinates 1164.51 mN 1703.05 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 : 2856 metres
Actual total depth : 2833 metres
True vertical depth : 1462.7 metres
Kicked off on : 30th July 2001
Total depth reached on : 31st July 2001

Drilling Contractor

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

Drilling Phases

<u>Diameter (inch)</u>	<u>From (m)</u>	<u>To (m)</u>	<u>Mud Type</u>
6"	2410	2833	KCl / glycol / PHPA

Cased Hole

<u>Casing Diameter (inch)</u>	<u>Casing Type</u>	<u>Shoe Depth (m)</u>
20"	Conductor Shoe	169 MDKB (Existing)
10 ³ / ₄ "	Surface Casing	961 MDKB (Existing)
7 ⁵ / ₈ "	Production Casing	3230 MDKB (Existing)
4 ¹ / ₂ "	Liner	2829 MDRT

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MUD LOGGING

Logging Unit Number: 95

Engineers: G. Doczy, G. Fawns.

Sampling Interval

Sample Type	Number of sets	Quantity per set	Sampling interval	From (m)	To (m)
Washed and Dried	3	100 grams	10 metres	2580	2730
	3	100 grams	5 metres	2730	2833

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-4a - Redrill is a lateral well branching off the existing West Tuna W-4 well with the primary objective of the M-1 sand on the Western flank of the Tuna Structure. The well was to be drilled to a total depth of 2856 m MDRT (1471 m TVDRT) in 6" hole and completed with a single oil completion string of 3¹/₂" tubing in 4¹/₂" liner.

West Tuna W-4a - Redrill was kicked off at 04:45 hrs on 30th July 2001 at 2410 m after cutting a window in the 7⁵/₈" casing.

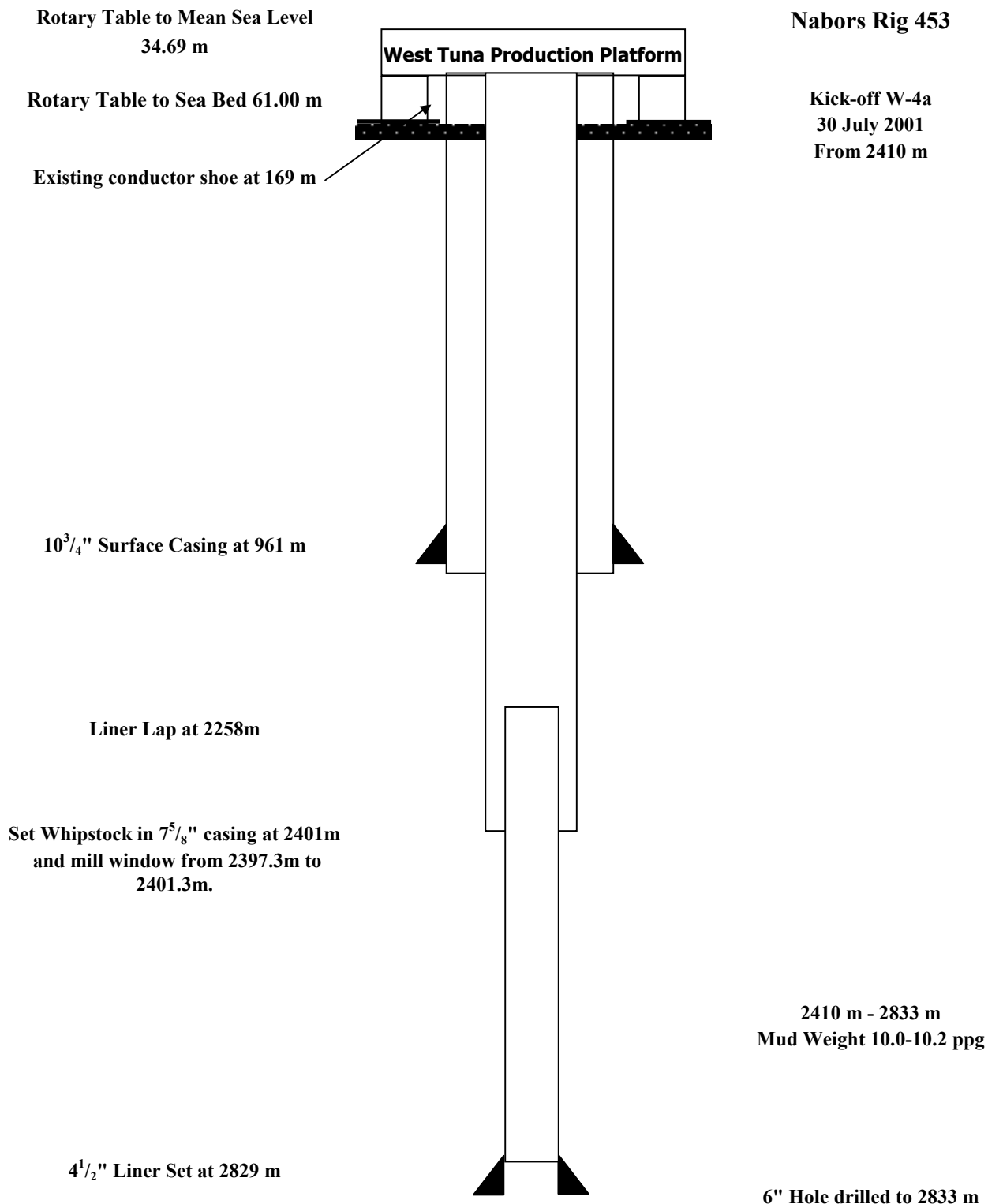
After skidding the rig across from West Tuna W-21, a 7⁵/₈" casing scraper assembly was made up and ran in the hole to 2420 m, scraping between 2390 m and 2420 m. After pulling out of the hole the EZSV bridge plug was made up and ran in hole and set at 2403 m. The whipstock assembly was made up and ran in the hole to 2401 m. The milling assembly was made up and ran in the hole. After the whipstock was sheared off, the casing window was milled from 2397.3 m to 2401.3 m and formation drilled to 2410 m.

After pulling out of the hole a 6" rotary steerable assembly with a Geodiamond S75PX PDC bit and motor at set 1.15° was made up and ran in hole to 2383 m. The well was displaced to a 10.0 ppg KCl/PHPA/Polymer mud before a P.I.T. was performed (12.5 ppg EMW at 532 psi with 9.9 ppg) to ESSO requirements. The well was rotary and slide drilled ahead from 2410 m to Total Depth at 2833 m. 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.

West Tuna W-4a - Redrill reached a total depth of 2833 m (1462.7 mTVD) at 11:50 hrs on 31st July 2001. The final survey at a depth of 2816.93 m had an inclination of 43.46° and an azimuth of 260.90°. 4¹/₂" liner was run to a depth of 2829 m. West Tuna W-4a - Redrill was completed as a single oil string with 3¹/₂" completion tubing run to 2246 m. West Tuna W-4a - Redrill was handed over to Production on 10-08-2001 at 06:00 hrs.

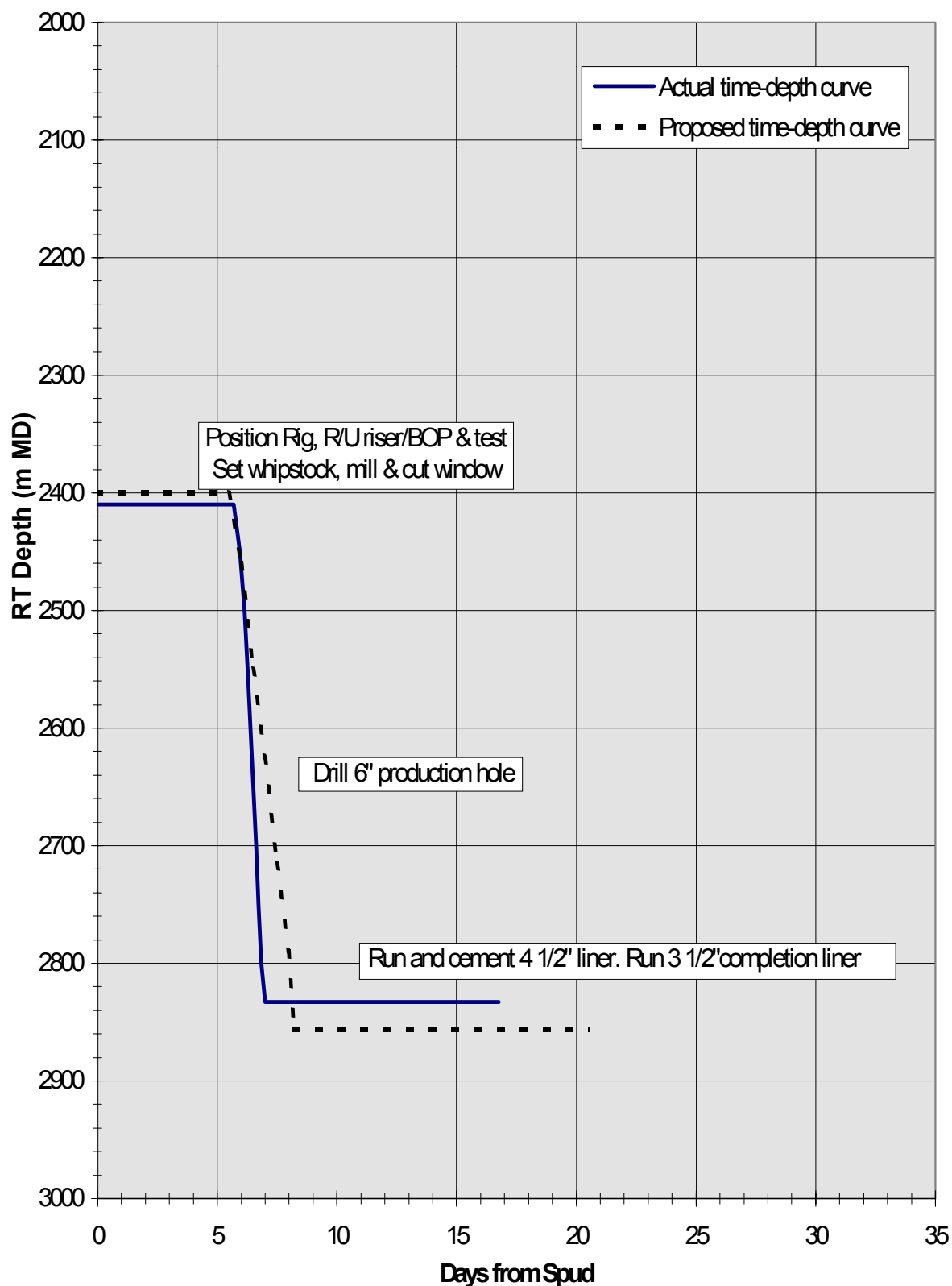
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WELL PROFILE



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WTN W-4a TIME-DEPTH CURVE (measured depth)



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BIT RUN SUMMARY

BIT	Size (")	Type	Jets	In (m)	Out (m)	Hours	Condition
1	6"	Geodiamond S75PX	5 x 15	2410	2833	15.35	1-1-WT,BT-A,N-X-I-CT-TD

CASING DATA

Type	Size (Inches)	Weight (lb/ft)	Grade	Thread	Depth (mMDRT)
Liner	4½"	12.6	13Cr-80	VAM-ACE	2258.2 to 2829.5

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)
4½"	ABC Class G	Lead 370	HALAD 413LNF-5	46	76	15.8	2034 to 2829.5	3000

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WELL DIRECTIONAL PROFILE
(from Geoservices Software)

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WELL DIARY

24th July 2001	Skidded rig over from WTN W-21 to WTN W-4a at 13:00 hours. Rig up.
25th July 2001	Nipple up fast lock, riser, BOP's, bell nipple and flowline.
26th July 2001	Test BOP's 300/3000 psi - OK. Run in hole with wear bushing. Make up 7 ⁵ / ₈ " casing scraper, scrape to 2420 m. Make up high viscosity sweep with XCD, circulate. Pull out of hole. Lay down scraper. Make up Schlumberger wireline and run in hole.
27th July 2001	Run in hole with Schlumberger wireline to 1136 m. Pull out of hole. Make up Schlumberger wireline gamma ray and CCL tools and run in hole to 2411 m, log from 2411 m to 2000 m. Pull out of hole and lay out Schlumberger wireline sheaves. Make up EZSV and run in hole. Halliburton set EZSV bridge plug at 2403 m. Pull out of hole and lay out EZSV set tool. Make up Baker Oil Tools whipstock assembly and run in hole.
28th July 2001	Continue to run in hole with whipstock assembly to 2401 m. Rig up Schlumberger gyro tools and run in hole to 2389 m. Orientate and work string to correct tool face for setting whipstock with gyro tool. Schlumberger pull out of hole due to gyro failure (over heating). Change out gyro tool and run in hole with gyro tool to 2389 m. Orientate and work string to confirm whipstock face orientation. Schlumberger pull out of hole with gyro tool and lay out. Tagged EZSV at 2403 m. Shear BTA and confirm BTA set. Slack off and shear off whipstock. Rig down Schlumberger sheaves. Mill window in 7 ⁵ / ₈ " casing from 2397.3 m to 2399.5 m.
29th July 2001	Continue to mill window in 7 ⁵ / ₈ " casing from 2399.5 m to 2410 m. (Top of window at 2397.3 m and bottom of window at 2401.3m). Pump 30 barrels high viscosity pill, rotate and work string through window. Flow check and pulled out of hole. Lay down Baker milling tools. Pick up and make up rotary steerable BHA and run in hole to 1689 m. Slip and cut of drill line. Run in hole from 1689 m to 1810 m. Conduct rig floor crew H ₂ S and BOP drill, Total Safety held a debrief. Continue run in hole 1810 m to 2383 m. Displace well to 10.0 ppg mud. Circulate and condition whilst orientating toolface to whipstock setting. Wait on mud transfer line to be repaired.
30th July 2001	Perform P.I.T. to 12.5 ppg EMW at 532 psi with 9.9 ppg mud and ¾ barrel bleed back. Rotary drill/slide/survey new 6" hole from 2410 m to 2643 m.
31st July 2001	Rotary drill/slide/survey new 6" hole from 2643 m to 2833 m. Circulate hole clean and pull out of hole to 2772 m. Log hole from 2772 m to 2809 m. Circulate 1.5 times Latrobe open hole volume. Backream to top of Latrobe and circulate 1.5 times bottoms up. Pull out of hole to whipstock. Run in hole to bottom. Circulate 1.5 times Latrobe volume. Backream to top of Latrobe and circulate hole clean 1,5 times bottoms up. Flow check, pump slug and pull out of hole.
1st August 2001	Continue to pull out. Download source, break out and layout LWD/MWD tools and rack back BHA. Pull wear bushing and jet well head and BOP's. Complete pressure test of all elements. Run wear bushing. Wait on weather. Make up Baker Oil Tools cement head and pressure test. Rig up to run 4 ¹ / ₂ " liner. Make up and run shoe track.
2nd August 2001	Run 4 ¹ / ₂ " liner to 571 m. Make up liner hanger and setting tool and continue to run in on 3 ¹ / ₂ " drillpipe. Make up TDS and pump through window to 2822 m. Pick up cement head and circulate at 2831 m. Set hanger at 2829 m, (liner lap at 2258 m). Circulate, test lines and cement as per program. Displace and bump plug, bleed back - floats hold. Lay out cement head, pull back and circulate bottoms up. Pull out of hole.

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3rd August 2001	Run 4 ¹ / ₂ " liner and then change running gear to pick up and run hanger and hanger setting tool. Run in on drillpipe to 1950 m. Wash to top of cement at 2034 m. Wash and ream cement to top of liner at 2258 m. Pump high viscosity pill and circulate hole clean. Pull out of hole, laying out 3 ¹ / ₂ " drillpipe and heavyweight.
4th August 2001	Continue to pull out of hole, laying out heavyweight. Rig up and run liner scraper on 2 ⁷ / ₈ " tubing to 661 m. Run in on drillpipe to 2242 m and slip and cut. Wash and ream cement in liner from 2258 m to 2808 m. Circulate casing clean with seawater.
5th August 2001	Continue circulating clean with seawater. Displace to completion brine. Pull out of hole with drillpipe. Rig up Weatherford tong and pull out tubing; layout scraper. Rig up and pressure test liner. Make up perforating guns and run in on tubing to 594 m. Run in on drillpipe to 2800 m, working tight hole from 2271 m to 2318 m and spacing out with 2 pup joints at 2746 m. Pull back to 2780 m and rig up Schlumberger sheaves.
6th August 2001	Rig up Schlumberger. Make up side entry sub. Run GR/CCL for depth correlation. Pull out of hole and rig down tool and sub. Rig up HOWCO side entry sub and pressure test. Fire perforation guns. Rig down HOWCO. Flow check and pull out of hole. Tight hole at 2645 m, circulate. Pull out to 2232 m and conduct rig service. Monitor well - drink rate 2 bbl/hr. Pull out of hole to 594 m, flow check. Change over and pull tubing. Breakdown and layout perforating guns and rig down Schlumberger sheaves. Make up 7 ⁵ / ₈ " VTL packer and tailpipe assembly on 3 ¹ / ₂ " drillpipe.
7th August 2001	Run packer and tailpipe assembly on drillpipe. Stab in and set down. Rig up pump down assembly and surface lines. HOWCO break circulation and pressure test lines. Stab packer in liner hanger, drop ball, pressure up and set packer. release running tool, pressure up and shear ball seat. Rig down and pull out 21 stands into derrick. Lay out drillpipe. Make up and run 3 ¹ / ₂ " completion string.
8th August 2001	Continue to run in hole with 3 ¹ / ₂ " tubing. Pick up TRSSSV and sting into VTL packer. Space out. Make up tubing head assembly. Terminate control lines and pressure test same to 5000psi. Wait on weather while monitoring well.
9th August 2001	Continue to monitor well while waiting on weather. Rig up wireline unit on catwalk while waiting on weather. Run in with hanger and land out B section, confirm latch with 10klb overpull. Cameron pressure test seals to 5000psi. Rig up lubricator and run in hole to pull out plug at 2168m. Halliburton pressure test tubing 2300psi for 15 minutes. Pressure test annulus to 2000psi for 10 minutes. Release hanger running tool, Pull out of hole and lay out landing joints. Install BPV and rig down Weatherford from rig floor. Cameron continue with completion, install christmas tree and crown cap.
10th August 2001	Retrieve BPV and install 2 way V/V. Fill void and pressure test, retrieve V/V. Remove crown cap and install Bowen BOP's and related equipment. Release rig and turn well over to production at 06:00 hrs.

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Geological Summary

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FORMATION TOPS

DESCRIPTION	MD (m) - RT	TVD (m) - RT
Top of Lakes Entrance	2410.0 (casing window)	1200.0
Top of Latrobe Group	2718.5	1379.5
Top of Coarse Clastics	2730.5	1388.5
TOTAL DEPTH	2833.0	1462.7

GEOLOGICAL SUMMARY**LAKES ENTRANCE FORMATION**2410m - 2718.5m **CLAYSTONE**

CLAYSTONE: Light grey to grey green, light medium grey to medium dark grey, moderately calcareous, slightly silty in part, locally slightly micromicaceous, trace fossil fragments, locally trace carbonaceous specks and flecks, trace disseminated pyrite, locally trace glauconite, very soft to firm, occasional moderately hard, amorphous to blocky, sub-blocky in part.

LA TROBE FORMATION2718.5m - 2730.5m **CLAYSTONE**

CLAYSTONE: Pale yellow orange to dark yellow orange, moderately calcareous, common limonitic staining, trace glauconite, very soft, dispersive, amorphous.

COARSE CLASTICS2730.5m - 2833m **SANDSTONE with minor SILTSTONE**

SANDSTONE: Clear, translucent, milky, very fine to medium, occasional coarse, moderately sorted, sub-angular to sub-rounded, locally rounded, locally angular, occasional white to light grey argillaceous matrix, trace pyrite nodules, trace glauconite, loose and clean, very good inferred porosity, no fluorescence.

SILTSTONE Light grey, light greenish grey, medium green grey, argillaceous, weakly calcareous, rare carbonaceous specks, soft to moderately hard, sub-blocky to blocky, amorphous in part.

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GAS REPORT

In the Claystone of the Lakes Entrance formation the trend of the gas curve was to increase gradually from an average of around 15 units at 2500 mMDRT to between 50 and 70 units near 2660 mMDRT. The gas consisted predominantly of C₁ with C₂ and C₃ gradually increasing. C₂ from trace amounts to 0.35%; and for C₃, from trace amounts to 0.15% prior to entering the Latrobe at 2718.5 mMDRT. On penetrating the Latrobe Formation at 2718.5 mMDRT, there was a marked increase in the gas levels, not only in magnitude, but also in composition, indicating the first hydrocarbon bearing lithology. Drilling with a mud weight of 10.2 ppg, the background gas ranged from 120 to 140 units, consisting of gas components from C₁ to C₅.

There was no connection gas recorded during the drilling of this well. Localised increases in background gas are attributable to 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-4a Redrill.

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 %
2724	1074	16.88	0.68	0.32	0.07	0.10	0.04	0.04
2753	1803	23.27	1.43	0.81	0.15	0.27	0.09	0.09
2778	1337	18.11	1.11	0.70	0.15	0.26	0.11	0.12

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