



WEST TUNA W-20

FINAL WELL REPORT

Prepared by

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West Tuna W-20	MASTERLOG --	1:500 scale from 100 to 3663 metres 1:200 scale from 3350 to 3663 metres
West Tuna W-20	DRILLING LOG --	1:1000 scale from 100 to 3663 metres
West Tuna W-20	GAS RATIO LOG --	1:200 scale from 3350 to 3663 metres

Revision	Date	Issued by	Approved by	Remarks
1	10-11-2001	Geoservices Unit 95	Base Mudlogging Coordinator	

Section 1

General Well Summary

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WELL DATA

Operator : Esso Australia Ltd
Platform : West Tuna
Well name : West Tuna W-20
Country : Australia
Location : Gippsland Basin
Structure : Tuna M-1
Field : West Tuna
Permit : Vic/ L4

Location AMG co-ordinates 5 772 790.65 mN 621 484.80 mE

Location local co-ordinates Lat: 38° 11' 36.618" S Long: 148° 23' 14.323" E

Target Local co-ordinates 383.33 mN 3,051.99 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 : 3710 metres
Actual total depth : 3663 metres
True vertical depth : 1443.94 metres
Spudded on : 15th October 2001
Total depth reached on : 9th November 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>
20"	94.7	170	Seawater / Gel
12¼"	170	837	Seawater / Gel
8½"	837	3010	KCl / glycol / PHPA
6"	3010	3663	KCl / glycol / PHPA

Cased Hole

<u>Casing Diameter (inch)</u>	<u>Casing Type</u>	<u>Shoe Depth (m)</u>
16"	Conductor Shoe	167 MDKB
9 ⁵ / ₈ "	Surface	834 MDKB
7"	Production	3005 MDKB
4½"	Liner	2845 to 3657 MDKB

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MUD LOGGING

Logging Unit Number: 95

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

Sampling Interval

Sample Type	Number of sets	Quantity per set	Sampling interval	From (m)	To (m)
Washed and Dried	3	100 grams	10 metres	3300	3450
Washed and Dried	3	100 grams	5 metres	3450	3663

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-20 is an infill well north west of the West Tuna platform, with the primary objective of optimising well spacing and to enhance recovery of the M-1 oil reservoir. The Final Phase, a 6" production hole was drilled to a total depth of 3663 mMDRT (1443.94 m TVDRT) and completed as an single oil producer with a 3½" completion string in 7" Intermediate production casing and 4½" Production liner.

West Tuna W-20 was spudded at 03:30 hours on the 15th of October 2001.

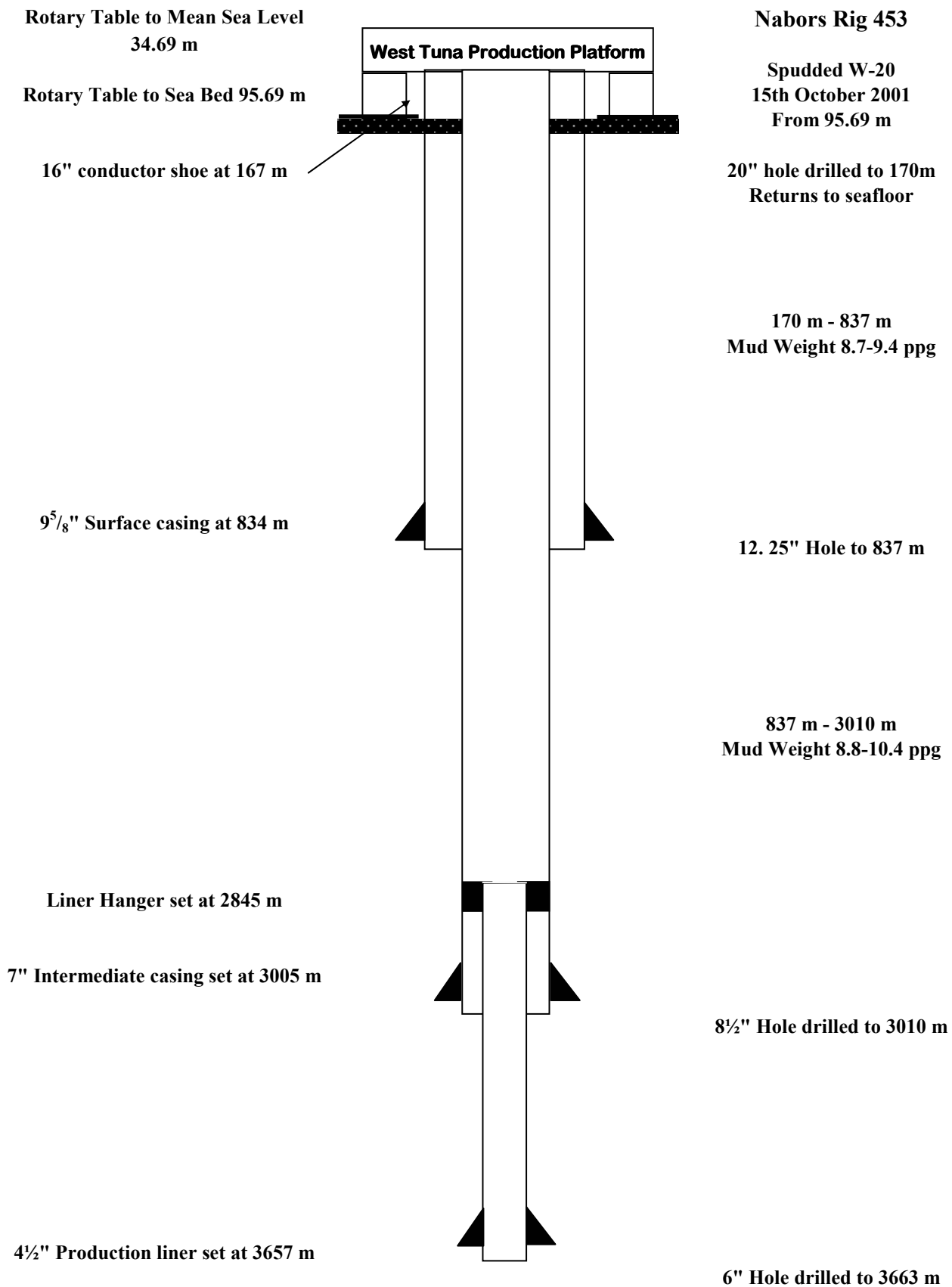
After skidding the rig across from West Tuna W-3, a 20" bit was made up and lowered to the seafloor at 95.7 m. 20" hole was drilled to 170 m with minimal RPM and WOB using seawater and high viscosity gel sweeps. 16" conductor was run and cemented at 167 m.

A 12¼" steerable assembly, with a Hycalog DS195 bit was made up and used to drill this hole section with a Gel/Seawater mud system. An average mud weight of 9.4 ppg was maintained by dilution with water and prehydrated Gel. The final depth for this section was 837 m and the formation had a static mud loss rate of 2 bbls per hour. The 9⁵/₈" casing was run and cemented at 834 m. With junk in the hole, an 8½" rotary assembly, with a Hughes MX-20 bit, was made up and run in the hole to drill the shoe track and 5 m of new formation to 842 m. The well was displaced to a 9.2 ppg KCl/PHPA/Polymer mud, prior to the required P.I.T. being performed (12.5 ppg EMW at 400 psi). An 8½" LWD/MWD steerable assembly with a Geodiamond S75HPX bit was made up and run. The well was then drilled to 2514 m and a wiper trip to the 9⁵/₈" casing shoe conducted prior to running a gyro survey to determine if the well path was within its limitations to minimise well interference with West Tuna-W40. The well was then drilled to the final section depth of 3010 m, adding 2.0% Finagreen EBL torque reducer from 2800 m. The 7" casing was run and cemented at 3005 m.

A 6" LWD/MWD steerable assembly with a Geodiamond S75HPX bit was made up and run in the hole to drill the cement, shoe track and 2 m of new formation to 3012 m where a P.I.T. was performed (16.0 ppg EMW at 1210 psi). The well was then drilled to a total depth of 3663 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.

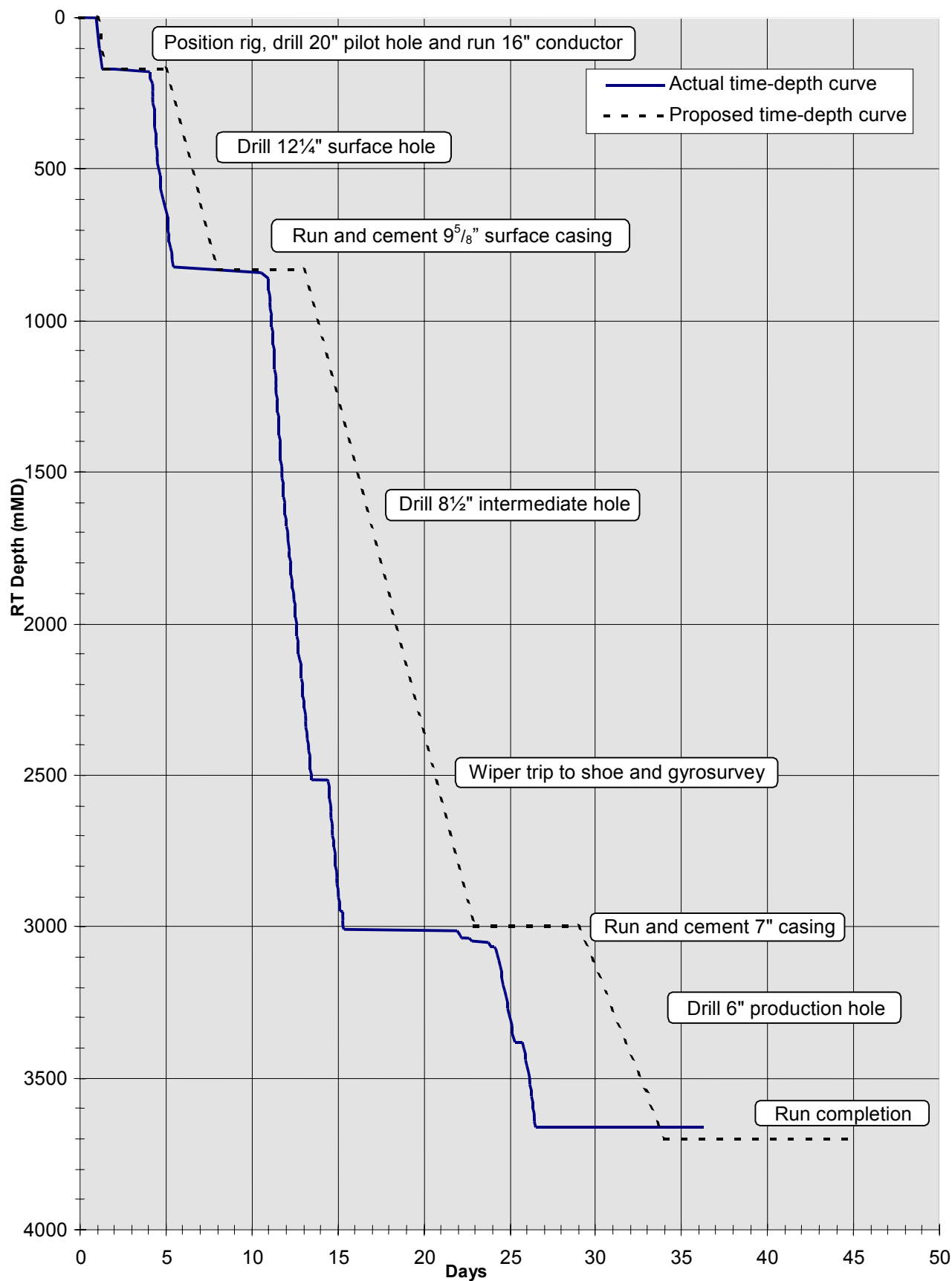
West Tuna W-20 reached a total depth of 3663 m (1443.94 mTVD) at 12:30 hours on 09th November 2001. The final survey at a depth of 3644.82 m had an inclination of 65.30° and an azimuth of 85.4°. 4½" liner was set at a depth of 3657.00 m. West Tuna W-20 was completed as a single oil string with 2⁷/₈" completion tubing run to 2245 m with the Liner Lap at 2845 m. West Tuna W-20 was handed over to Production on 19-11-2001.

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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	20"	Smith SDGHC	3 x 20	94.7	170	2.57	1-1-WT-A-EEE-IN-NO-TC
2RR	12¼"	Hycalog DS195	5 x 18	170	837	23.29	1-1-WT-A-X-IN-CT-TC
3RR2	8½"	Hughes MX-20D	3 x 22	837	842	0.94	1-2-WT-A-EEE-IN-BT-BHA
4	8½"	GeoDiam S75HPX	7 x 14	842	3010	47.26	1-1-WT-A-X-IN-NO-TC
5	6"	GeoDiam S75HPX	5 x 15	3010	3049	7.96	0-0-PN-A-X-IN-CT-PR
5RR	6"	GeoDiam S75HPX	5 x 15	3049	3663	32.73	6-4-WT-A-X-IN-PN-TD.

CASING DATA

Type	Size (Inches)	Weight (lb/ft)	Grade	Thread	Depth (mMDRT)
Conductor	16"	84	K-55	BTC	167
Surface	9 ⁵ / ₈ "	47	L-80	LT&C/Vamace	834
Production	7"	26/29	L-80	LT&C	3005
Liner	4½"	12.6	13Cr	VAM	3657

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)
16"	ABC Class G	247	CaCl ₂ 1% BWOC	P30.3	51	15.9	95 - 167	
9 ⁵ / ₈ "	ABC Class G	541 300	14.6 gal/10bbl Econolite	168 38	220 68	12.5 15.9	Surf-834	2000
7"	ABC Class G	850	2 gal/10bbl HR-6L 2 gal/10bbl CFR-3L 0.25 gal/bbl NF-5	104	183	15.8	3000-2250	2000
4½"	ABC Class G	395	32 gal/10bbl Halad-413L 2 gal/10bbl SCR-100L 0.25 gal/10bbl NF-5	49.1	81.5	15.8	2645-3657	3000

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WELL DIRECTIONAL PROFILE
(From Geoservices ALS Software)

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WELL DIARY

14th October 2001	Skid and reinstate rig over W-20. Raise permit, remove platform grating, pick up and make up BHA and run in hole.
15th October 2001	Run in hole and tag at 97 m, drill 20" conductor hole from 97 m pumping high viscosity sweeps each joint to 170 m. Pull out of hole to 90 m, run in hole tag fill at 154 m, wash from 154 m to 170 m, circulate hole clean with 20 bbl high viscosity pill and 1.5 times volume. Pull out of hole from 170 m to 90 m, run in hole to 170 m, circulate 30 bbls high viscosity pill and displace well to high viscosity gel and pull out of hole racking back HWDP and laying out BHA. Rig up and run 16" conductor to 167 m, rig up to run cement string and run in hole with same and space out.
16th October 2001	Install circulating head, set 25 klbs on flat face sealing adaptor, fill annulus and monitor for 15 minutes - OK. Circulate 1.5 times volume and Halliburton mix and pump cement as per program. Pull out of hole with cement string.
17th October 2001	Install riser, diverter, overboard line, bell nipple and flow line. Pressure test diverter to 200 psi. Make up 12¼" bit and BHA and run in hole to 148 m. Slip and cut drill line. Service rig and inspect torque beam. Install Schlumberger sheave in crown. Continue to run in hole tagging cement at 166 m. Drill out cement and shoe with seawater.
18th October 2001	Continue to drill out shoe track and new formation to 209 m. Function test diverter and diverter line. Circulate well clean. Rig up and gyro survey 16" conductor casing. Continue to rotary and slide drill 12¼" hole from 209 m to 470 m.
19th October 2001	Continue to rotary and slide drill 12¼" hole from 470 m to 837 m. Circulate hole clean. Pull out of hole to 145 m. Circulate hole clean. Rig service and inspect torque beam pin retainer. Run in hole to 837 m, circulate hole clean, spot high viscosity pill and pull out of hole to 166 m. Circulate hole clean. Run in hole due to weather condition. Circulate at bottom and spot high viscosity pill.
20th October 2001	Circulate at bottom and spot high viscosity pill, flow check, pump slug and pull out of hole. Rack back HWDP and lay out BHA. Clear rig floor of excess equipment and rig down Schlumberger sheave. Rig service. Rig up to run 9 ⁵ / ₈ " casing. Pick up, make up and test shoe track. Thread damaged on float collar so lay out. Pick up, make up and test new shoe track. Run in hole on 9 ⁵ / ₈ " casing to 835 m. Rig up cement head and surface lines. Circulate 1.5 times casing volume. Pressure test Halliburton cement unit lines. Halliburton mix and pump cement as per ESSO program. Displace with 201.5 bbls seawater. Bump plug at 2000 psi.
21st October 2001	Wait on cement, rig down return lines and prepare to rig down diverter. Slack off casing (5 mm slump). Rig down cement head and lay out. Nipple down bell nipple. Furmanite rig to and cut 9 ⁵ / ₈ " casing. Lay out casing joint. Lay out bell nipple, rig down diverter and nipple down riser. Lift riser and secure. Furmanite second cut and lay out casing joint. Skid rig 4 inches. Rig with Furmanite cut MC2 adaptor from conductor and lay out same. Cut 9 ⁵ / ₈ " casing and dress stump. Erect habitat and prepare to weld braden head to 9 ⁵ / ₈ " casing.
22nd October 2001	Prepare and weld Braden head to 9 ⁵ / ₈ " casing stump. Construction commence to weld "A" Section to 9 ⁵ / ₈ " casing stub. Continue to lay out and strap 7" casing. Mix PHPA mud. Pressure test BOP's and SPP manifold. X-ray "A" Section weld. Carry out MPI. Apply heat beads to weld and wait for weld to reach required temperature. Inspect derrick. Secure diverter overboard line. Dress shakers with new screens. Work on new flowline and continue with rig maintenance whilst construction continue to heat treat Braden head.

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23rd October 2001	Wait on top up cement job to harden. Continue with rig maintenance. Run in hole with 3½" DP, pull out of hole, break down and lay out same. Rig to and pick up and run riser. Nipple up "A" Section. Nipple up BOP's, install bell nipple and new flow trough. Function test BOP's. Halliburton pressure test "A" Section side outlet V/V against casing and blind rams. Make up test plug and test annulus. Lay out same. Run wear bushing. Pick up 5" DP and run in hole.
24th October 2001	Run in hole and drill cement and shoe track. Displace to mud at 837 m and drill 5 m of new hole. Circulate and condition mud prior to conducting PIT. Pull out of hole and change to MWD/steerable assembly. Run in hole and drill ahead from 842 m.
25th October 2001	Drill, steer and survey 8½" hole from 906 m to 1662 m.
26th October 2001	Drill, steer and survey 8½" from 1662 m to 2244 m.
27th October 2001	Drill, steer and survey 8½" hole from 2244 m to 2513 m. Circulate bottoms up while reciprocating pipe, flow check and wiper trip to shoe and circulate. Slip and cut drill line, rig service and rig up Schlumberger/SDI. Run in hole.
28th October 2001	Run in hole to 2456 m and wash to bottom at 2513 m. Circulate bottoms up and pull back to 2505 m. Rig up SDI side entry sub and run in tool and initialise. Run gyro survey to 2369 m. Pull out of hole with tool and rig down Schlumberger/SDI. Analyse data while circulating. Drill ahead.
29th October 2001	Continue to drill to 2949 m. Rotate, work string and circulate while working on rig problem. Drill to 3010 m TD. Rotate, work string and circulate hole clean; flow check - static. Pull out of hole to 1700 m and precautionary backream to 1600 m. Pull out of hole to shoe and rotate, work string and circulate. Run in hole to 2977 m and wash to bottom.
30th October 2001	Rotate, work string and circulate on bottom. Backream 5 stands and pump slug. Pull out of hole, soft breaking each joint. Break and layout BHA and bit. Jet BOP's and "A" Section. Flow check well for 15 minutes. Close blinds and change rams to 7". Pressure test 300/3000 psi against Hydril. Rig up to run 7" casing. Run shoe track.
31st October 2001	Run 7" casing to shoe. Change bails and rig up casing fill tool, with push plate. Continue running casing to 1747 m and pick up flotation collar. Run casing to 3005 m. Line pressure test, 400/4000 psi. Shear flotation collar with 3400 psi. Rig down casing fill tool and rig up cement head. Circulate casing. Drop bottom plug; mix and pump cement as per ESSO program. Drop top plug and displace with seawater.
1st November 2001	Pump cement and displace, bump plug. Wait on cement. Bleed off and lay down cement head. Nipple down BOP's and riser. Set slips and change bails. Rig down bell nipple, flow trough and lift BOP stack and riser. Cut landing joint and layout. Nipple down BOP stack and riser and relocate. Remove "A" Section and rough cut casing at well head. Pressure test lower void to 3000 psi Create habit for final cut and dressing of casing. Run mouse hole through rotary table and rig up to layout drillpipe.
2nd November 2001	Layout drillpipe and HWDP. Change upper rams and pressure test. Nipple up BOP stack and riser to "A" Section. Make up test tool and conduct full pressure test of BOP stack.
3rd November 2001	Continue with BOP stack test. Run wearbushing. Slip and cut drilling line. Pick up 3½" drillpipe and rack back 27 stands in derrick. Make up bit and BHA - load source. Run in, picking up 3½" drillpipe.
4th November 2001	Run in, picking up 3½" drillpipe. Install WWT protectors on each joint from 2062 m to 2925 m. Wash down and tag cement at 2978 m. Halliburton pressure test lines to 300/3000 psi and casing to 2000 psi for 10 minutes. Drill cement and shoe track to 3010 m. Work string and circulate, while conditioning mud at 3012 m.

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5th November 2001	Drill to 3038 m and trip to remove WWT protectors from 2925 m to 2062 m. Run in hole and drill ahead to 3049 m. Pull back 2 stands and pump slug. Pull out of hole.
6th November 2001	Pull out of hole to BHA and download source. Inspect bit, find it balled up and with 2 blocked jets. Unplug and run BHA in hole, after programming LWD tool and reloading source. Run in and precautionary wash last 2 stands to bottom. Drill ahead to 3065 m, pressure increased and penetration rate dropped. Work pipe to attempt to clear suspected blocked jets.
7th November 2001	Continue to circulate mud weighing up to 11.0 ppg while reciprocating pipe, pump pill to clear suspected blocked jets. Run in hole and continue drilling, sliding and surveying 6" hole from 3065 m to 3244 m. Rotate and work pipe while replacing valve cap, retaining ring, studs and nuts on # 3 cylinder on # 2 mud pump. Continue drilling, sliding and surveying 6" hole from 3244 m to 3299 m.
8th November 2001	Drill, steer and survey from 3299 m to 3380 m. Work pipe and rotate while circulating hole clean. Pull out of hole to 3210 and work string, rotate hole clean. Run in hole to 3270 m, circulate hole clean and pull out of hole to 2983 m, circulate hole clean. Conduct rig service, bench test, replace and install mud pump relief valves. Run in hole to 3380 m with precaution whilst washing, reaming to bottom and continue to drill ahead.
9th November 2001	Drill, steer, survey and log 6" hole from 3443 m to 3663 m. Rotate pipe and work string while circulating 1.5 times Latrobe volume. Pump out of hole to 3615 m. Continue to circulate and pull out of hole. Flow check well and pull out of hole to 2977m. Work string while circulating hole clean. Rig service and cut and slip drilling line. Run in hole to TD with precautionary wash to bottom of last two stands. Circulate Latrobe volume and backream out of hole.
10th November 2001	Continue to backream out of hole, circulate at shoe and pull out of hole to 255m. Continue to pull out of hole, lay down radioactive source and break and lay out drilling assembly. Perform rig service, pick up and make up cement head and pressure test to 5000psi. Dress rig floor to run 4½" casing. Run in hole with 4½" casing to 804m.
11th November 2001	Pick up and make up 4½" casing liner hanger assembly and run in hole on 3½" drill pipe to 3657 m, circulate and cement as per programme. Pull out of hole with 15 stands of 3½" drill pipe and circulate casing clean. Continue to pull out of hole with 3½" drill pipe.
12th November 2001	Break and lay out Liner Hanging tool. Jet Wellhead and BOP's, make up 4½" clean out assembly and run in hole, tag and drill cement from 2633 m to 2846 m pumping Hi Viscosity sweeps as required. Work string while pumping sweep and displace hole to seawater. Rig up Halliburton and pressure test liner lap, OK. Pull out of hole to 2617 m, conduct H ₂ S drill and continue to pull out of hole laying out singles of 3½" drill pipe from 717 m to 114 m. Run in hole with 4 stands of Heavy weight drill pipe, lay out same, pull out of hole and Lay out 7" scraper assembly.
13th November 2001	Continue to lay out 7" scraper assembly, dress drill floor to run 2⅞" tubing, rig up Weatherford, make up 4½" Liner clean out assembly, pick up 2⅞" tubing and run in hole to 818 m. Rig down Weatherford and dress rig floor to run 3½" drill pipe. Run in hole with drill pipe to liner lap 2844 m. Drill through liner lap and wash down to 2950 m. Run in hole to 3268 m. Pump Hi Vis and circulate well clean. Pressure test liner lap and liner and pull out of hole to 2825m. Displace well to 9.1 ppg brine. Slip and cut drilling line, perform rig service. Continue to POOH with 3½" drill pipe.
14th November 2001	Continue to pull out of hole with 3½" drill pipe and 2⅞" tubing. Rig up perforating guns and run in hole to 3596 m. rig up Schlumberger sheave and crown, make up pump down sub. Wireline unable to pass 830 m. Attempt to pump at 10spm, 100psi. Break off TDS, break circulation and pull out of hole 15 stands. Attempt to pump down, increasing pump pressure, pull out of hole 10 stands, pump pressure OK, circulate and re-run tool.

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15th November 2001	Space out and correlate guns. Pull out of hole with Schlumberger. Perforate well as per programme. Pull out of hole and prepare to pick up packer. Make up packer and RIH on 3½" drill pipe.
16th November 2001	Continue to run in hole on 3½" drill pipe with packer, space out to set packer, drop ball, pressure up to confirm ball is seated, set packer as per programme at 2817.91 m. Shear off packer and confirm. Pump hole volume, flow check, OK. Pull out of hole laying out drill pipe singles to 1320m. Service rig, pull out of hole to surface, make up wear bushing and running tool, jet Wellhead and BOP's. Dress rig floor to run 3½" completion, make up seal assembly and RIH with 3½" tubing.
17th November 2001	Continue to run in hole with 3½" tubing. Install TRSSV and run in hole with tubing and control line from 2400m to 2818m. Sting into packer and space out and install hanger. Land hanger and confirm latch. Rig up HES lubricator and Halliburton pumping lines. Run in hole with N test tool, pressure test tubing to 2000 psi, pull out of hole with N test tool.
18th November 2001	Terminate control lines, install thread protector and install Xmas tree. Shell test Xmas tree. Nipple up Totco riser and HES lubricator. Pressure test, OK. Run in hole to retrieve plug. Rig down lubricator and Totco BOP. Install crown cap, remove excess equipment from Wellhead area, remove deluge grating and reinstate platform grating. Prepare to skid rig to W16. High winds, wait on weather.

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Geological Summary

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FORMATION TOPS

DESCRIPTION	MD (m) - RT	TVD (m) - RT
Top of Lakes Entrance	2580	1127.9
Top of Latrobe Group	3405	1356
Top of Coarse Clastics	3442	1366.9
TOTAL DEPTH	3663	1443.94

GEOLOGICAL SUMMARY**LAKES ENTRANCE FORMATION:**2580 m - 3405 m **CLAYSTONE**

CLAYSTONE Light olive grey to light grey, medium grey to rare medium dark grey, calcareous, locally grading to traces of SILTSTONE in part, trace to locally disseminated and nodular pyrite, trace ooids, forams and microfossil fragments, trace carbonaceous and lithic specks, traces of sparry calcite fragments, dominantly soft to firm, sub-blocky.

LATROBE FORMATION:3405 m - 3442 m **Interbedded SANDSTONE, SILTSTONE and CLAYSTONE.**

SANDSTONE Clear to translucent, opaque, fine to coarse, very poorly sorted to poorly sorted with depth, sub-angular to sub-rounded, locally common pyrite nodules, locally light grey argillaceous matrix, trace siliceous cement, trace glauconite, predominantly loose, fair to good inferred porosity, no fluorescence.

CLAYSTONE Pale yellow orange to dark brown, grey green, calcareous, occasionally disseminated pyrite, common fossil fragments, slightly micromicaceous, firm, subfissile to subblocky.

SILTSTONE Light grey to medium grey, medium brown to dark brown, argillaceous, trace very fine arenaceous, calcareous, trace disseminated pyrite to occasional nodular pyrite, glauconite, trace carbonaceous material, soft to firm, subblocky to subfissile.

COARSE CLASTICS:3442 m - 3663 m **SANDSTONE with minor SILTSTONE and trace CLAYSTONE.**

SANDSTONE Clear to translucent, opaque to occasionally milky, medium to coarse, occasionally very coarse, poorly sorted, sub-angular to sub-rounded, local minor pyritic cement grading to trace with depth, siliceous cement, traces of nodular pyrite, generally loose and clean, fair to good inferred porosity, very good in part.

SILTSTONE Light to medium brown, locally dark brown to brown black, locally medium grey to dark grey, argillaceous to very argillaceous, carbonaceous in part, slightly micromicaceous, very soft to dispersive, sub-fissile to fissile, amorphous in part.

CLAYSTONE Light brown, common carbonaceous specks, minor disseminated pyrite, soft to dispersive, amorphous.

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GAS REPORT

No gas was recorded while drilling out from the conductor at 167 m. Gas was first recorded at 370 m and consisted of C₁ (Methane). The composition of the gas remained unchanged throughout the 12¼" hole section with total hydrocarbon gas detected beginning at around 5 units and increasing steadily to an average background of 15 units with peaks of up to 30 units.

Gas readings during the drilling of the 8½" hole section exhibited several major characteristics. The composition initially consisted of C₁ (Methane) until 1700 m, where traces of C₂ (Ethane) were detected and this composition continued until 2520 m and onwards where traces of C₃ (Propane) were detected. From 842 m to 1106 m the background total hydrocarbon gas detected averaged 10 to 15 units with occasional peaks up to 20 units. At 1106 m there was a significant change in the background gas with a change in background gas from 20 to 25 units with peaks up to 50 units which continued until 2520 m. Connection gas was noted from 1106 m onwards ranging from 5 to 39 units above background gas. From 1200 m onwards the mud weight was allowed to build in order to improve hole stability and this had the effect of controlling the connection gas. This connection gas plus the increase in background gas from 1106 m is indicative of gas migration from the West Tuna W-40 well which is in close proximity. At 2520 m there was a further significant change in the background gas with an increase from 25 to 30 units up to 60 to 70 units. This increase in background gas was a result of an impending formation change from the Gippsland to the Lakes Entrance at 2580 m where the amounts of C₂ and C₃ increased as did the background total hydrocarbon gas from 60 to 70 units up to 100 units. Gas levels gradually decreased in value from 2790 m to 3010 m as the mud weight was increased from 10.0 ppg to 10.5 ppg.

The 7" casing shoe was set at 3005 m and from 3010 m. The 6½" hole produced less gas with background levels of 5 to 15 units initially being recorded. This gradually increased to 10 to 15 units with peaks of 40 units until prior to entering the Latrobe formation. The composition of the gas in this section was predominantly 100% C₁, with occasional trace amounts of C₂, this was probably due to the lower amount of total gases detected. Prior to entering the Latrobe formation gas levels rapidly increased to around 35 to 50 units.

On penetrating the Latrobe formation at 3405 m there was an increase in gas levels. After 3420 m total detected gases rapidly increased to over 100 units. The composition of the gases also changed dramatically with an increase in heavier gases (C₂ to C₅) indicating a hydrocarbon bearing lithology. Throughout the Latrobe were consistently over 300 units. Individual peaks of between 700 and 1300 units were measured and the background gas throughout this section was approximately 200 to 400 units. Beneath the Oil water contact gas levels gradually dropped to below 100 units at TD.

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-20.

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 %
3412	36	0.65	0.02	0.01	0.00	0.00	0.00	0.00
3427	779	10.39	0.56	0.25	0.04	0.07	0.01	0.02
3442	385	3.69	0.27	0.14	0.02	0.05	0.01	0.01
3466	1004	7.00	0.87	0.45	0.10	0.15	0.06	0.07
3477	886	6.92	0.67	0.29	0.07	0.11	0.04	0.05
3494	1270	14.22	1.07	0.52	0.10	0.14	0.06	0.07
3508	749	9.71	0.64	0.28	0.05	0.10	0.05	0.04
3520	920	10.57	0.55	0.23	0.05	0.08	0.04	0.03
3551	372	4.69	0.30	0.16	0.04	0.07	0.05	0.03
3561	558	8.12	0.41	0.18	0.04	0.07	0.04	0.03
3596	404	4.11	0.43	0.24	0.05	0.11	0.07	0.05

Revision	Date	Issued by	Approved by	Remarks
1	10-11-2001	Geoservices Unit 95	Base Mudlogging Coordinator	