



WEST TUNA W-33a

FINAL WELL REPORT

Prepared by

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West Tuna W-33a	MASTERLOG --	1:500 scale from 1972 to 2460 metres 1:200 scale from 2120 to 2460 metres
West Tuna W-33a	DRILLING LOG --	1:1000 scale from 1972 to 2460 metres
West Tuna W-33a	GAS RATIO LOG --	1:200 scale from 2120 to 2460 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-33a
Country : Australia
Location : Gippsland Basin
Structure : Tuna M-1
Field : West Tuna
Permit : Vic/ L4

Location AMG co-ordinates 5 771 796.08 mN 621 531.70 mE

Location local co-ordinates Lat: 38° 11' 36.419" S Long: 148° 23' 16.247" E

Target Local co-ordinates 1701.6 mN 175.7 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 : 2434 metres
Actual total depth : 2460 metres
True vertical depth : 1473.01 metres
Spudded on : 23rd April 2002
Total depth reached on : 24th April 2002

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>
8½"	1972	2460	KCl / Glycol / PHPA

Cased Hole

<u>Casing Diameter (inch)</u>	<u>Casing Type</u>	<u>Shoe Depth (m)</u>
20"	Conductor Shoe	155 MDRT (Existing)
13 ³ / ₈ "	Surface	811 MDRT (Existing)
9 ⁵ / ₈ "	Intermediate	1958 MDRT (Existing)
7"	Production	2454 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	2130	2260
Washed and Dried	3	100 grams	5 metres	2260	2460

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-33a is an infill well east of the West Tuna platform with the primary objective to enhance recovery of the M-1 oil reservoir. The well was drilled to a total depth of 2460m MDRT (1473.01 mTVDRT) in 8½" hole and completed with a single oil completion string of 3½" tubing in 7" production liner.

West Tuna W-33a was kicked off at 13:15 hours on 23rd April 2002 at 1972 m after cutting a window in the 9⁵/₈" casing.

After the plug and abandonment of West Tuna W-33 was completed, a 9⁵/₈" casing scraper assembly was made up and ran in the hole to 2250 m, scraping between 1945 m and 1975 m. After pulling out of the hole the EZSV bridge plug was made up and ran in hole and set at 1964.5 m. The whipstock and milling assembly was made up and ran in the hole to 1965.5 m. After the whipstock was sheared off, the casing window was milled from 1958.5 m to 1961.5 m and formation drilled to 1972 m. The well was displaced to a 10.5 ppg KCl/PHPA/Polymer mud before pulling out of the hole.

A 8½" rotary steerable assembly with a Geodiamond S75 PDC bit and motor at set 1.15° was made up and ran in hole to 1972 m. A P.I.T. was performed (12.5 ppg EMW at 402 psi with 10.5 ppg) to ESSO requirements. The well was rotary and slide drilled ahead from 1972 m to Total Depth at 2460 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-33a reached a total depth of 2460 m (1473.01 mTVD) at 15:00 hours on 24th April 2002. The final survey at a depth of 2438.02 m had an inclination of 52.65° and an azimuth of 355.37°. 7" production casing was run to a depth of 2454 m. West Tuna W-33a was completed as a single oil string with 3½" completion tubing run to 2258.45 m. West Tuna W-33a was handed over to Production on 07-05-2002 at 23:00 hours.

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WELL PROFILE

 Rotary Table to Mean Sea Level
 34.69 m

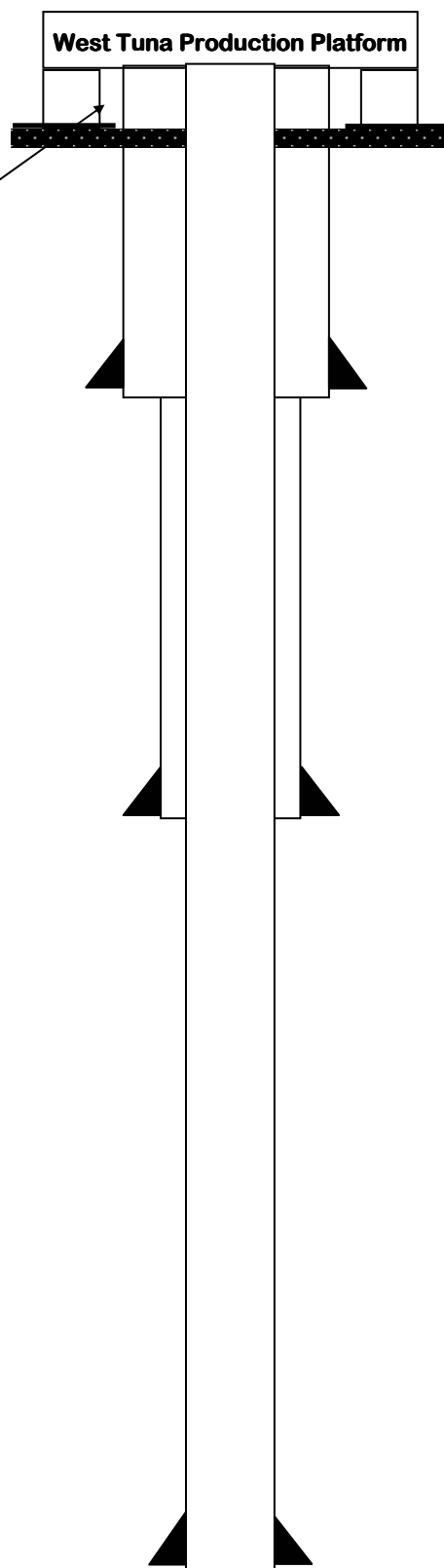
Rotary Table to Sea Bed 95.69 m

20" conductor shoe at 155 m

 13³/₈" Surface casing at 811 m

 9⁵/₈" Intermediate casing at 1958m

7" Production liner set at 2454 m


Nabors Rig 453

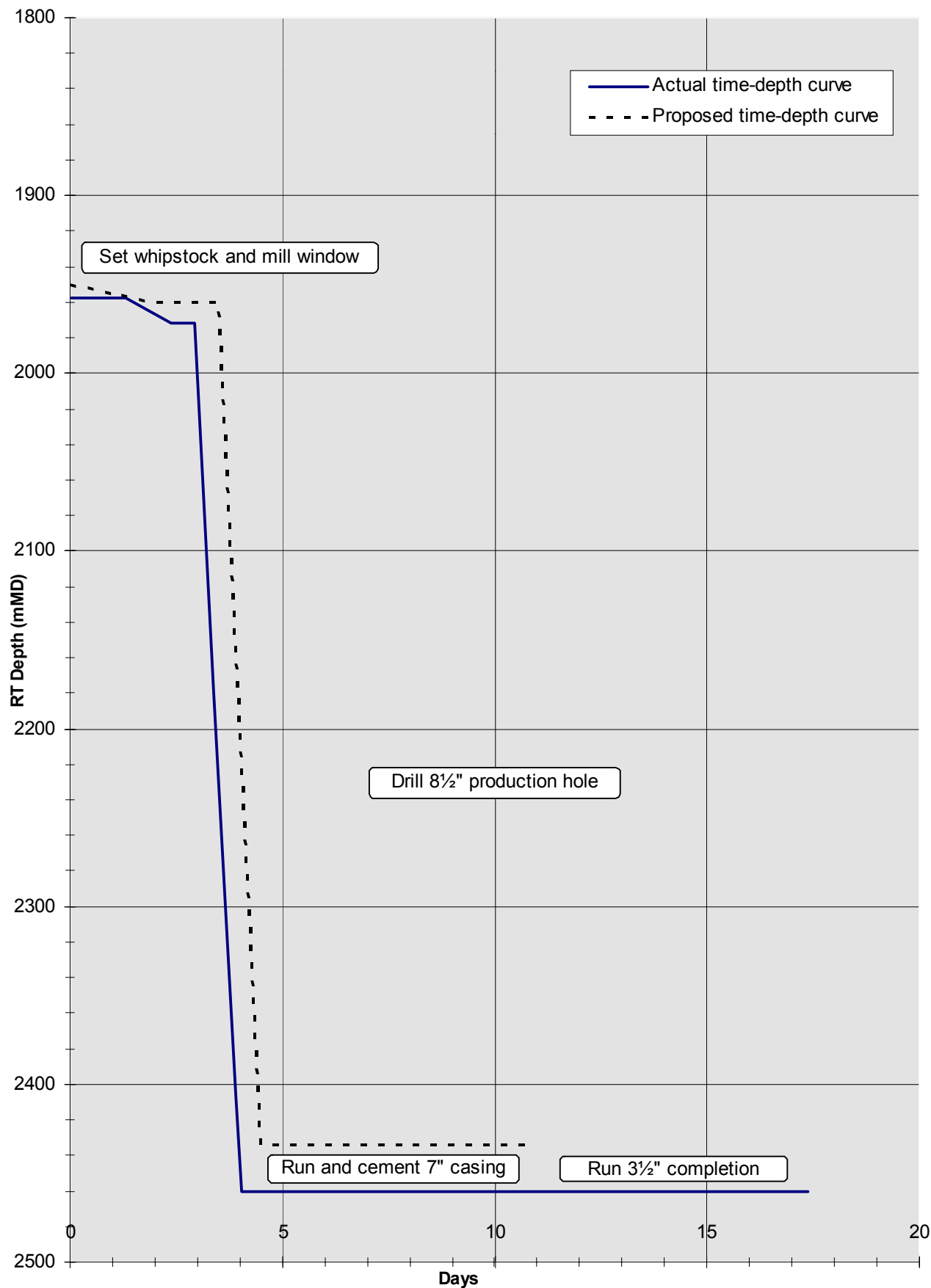
 Spudded W-33a
 23rd April 2002
 From 1972 m

 1972 m - 2460 m
 Mud Weight 10.5 - 10.8 ppg

 8¹/₂" Hole drilled to 2460m

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WTN W-33a TIME-DEPTH CURVE (measured depth)



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BIT RUN SUMMARY

BIT	Size (")	Type	Jets	In (m)	Out (m)	Hours	Condition
1RR	8½	Geodiamond S75	7 x 14	1972	2460	16.46	2-3-WT/CT-A-X-IN-LT-TD

CASING DATA

Type	Size (Inches)	Weight (lb/ft)	Grade	Thread	Depth (mMDRT)
Conductor	20"	84	K-55	BTC	155
Surface	13 ³ / ₈ "	54.5	K-55	BTC	811
Intermediate	9 ⁵ / ₈ "	47	L-80	LT&C	1958
Production	7"	26	L-80	LT&C	2454 - 1786

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)
7"	ABC Class G	640	Halad 413L 32 gal/10 bbl SCR-100L 2 gal/10 bbl	80	137	15.8	2454 - 1590	3000

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WELL DIRECTIONAL PROFILE
(From Geoservices ALS Software)

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WELL DIARY

19th April 2002	End of WTN W-33 plug and abandonment, start WTN-W33a at 15:00 hours. Change lower pipe ram to 5". Function test BOP. Dress rig floor to handle 5" tubulars. Rig up Schlumberger on pipe rack. Mix new mud system. Change out washpipe. Make up Cameron Combination tool and pull wear bushing. Run test plug and pressure test. Lay out test assembly. Make up Combination tool and re-run wear bushing.
20th April 2002	Run wear bushing. Make up 9 ⁵ / ₈ " casing scraper assembly and run in hole to 2250 m, working scraper over 1945 m to 1975 m. Pressure test casing. Pull out of hole and lay out scraper assembly. Rig up Schlumberger, make up EZSV, setting tool and CCL tool string. Run in hole, correlate and pull out of hole. Make up whipstock.
21st April 2002	Make up whipstock and milling assembly. Run in hole to tag EZSV at 1966 m. Pull out of hole from 1966 m to 1911 m, install pup joints for space out and run in hole to 1965.5 m. Rig up Schlumberger side entry sub, run in hole with Gyro tool and orientate whipstock face. Pull out of hole with Gyro tool, lay down, break and lay out side entry sub and joint of drill pipe. Set anchor and shear whipstock shear bolt. Mill window from 1958.5 m, pumping high viscosity sweeps as required.
22nd April 2002	Continue to mill window to 1972 m, pumping high viscosity sweeps as required. Work and ream through window area. Displace well to 10.5 ppg mud. Pull out of hole and lay out milling assembly.
23rd April 2002	Lay out milling assembly. Recovered wear bushing. Ran jetting tool and cleaned MC-2 and BOP's. Pulled jetting tool and ran wear bushing. Made up 8 ¹ / ₂ " steerable BHA and an in hole to 1950 m. Orientate tool face and work pipe through window to 1972 m. Pull out of to 1950 m, circulate and condition mud to 10.5 ppg. Conduct P.I.T. to 12.5 ppg EMW. Orientate tool face and ran in hole from 1950 m to 1972 m. Drill, steer and survey 8 ¹ / ₂ " hole from 1972 m to 2180 m.
24th April 2002	Drill, steer and survey 8 ¹ / ₂ " hole from 2180 m to 2460 m. Circulate well clean. Pull out of hole from 2460 m to 2267 m. Circulate well clean. Pull out of hole from 2238 m to 1949 m. Circulate well clean. Run in hole to bottom washing last 2 stands. Circulate well clean whilst adding Finagreen EBL. Pull out of hole.
25th April 2002	Pull out of hole to 2122 m. Run in hole from 2122 m to 2460 m, circulate 1.5 times Latrobe volume and backream from 2460 m to 2171 m. Circulate hole clean, pulling out of hole and racking back 1 stand every ½ hr from 2171 m to 2113 m. Pull out of hole to surface. Retrieve wearbushing. Change upper BOP rams, make up test plug assembly and run in hole, test BOP bonnet. Break and lay out test plug and re-run wear bushing. Pick up and make up cement head assembly to Baker instructions. Rig up Howco, line test and pressure test cement head. Rig down and lay down cement head assembly. Rig up to run 7" liner and pick up and make up float shoe, landing collar, float collar and run in hole. Run in hole with 7" casing as per program.
26th April 2002	Continue to run 7" casing as per program. Cement as per program. Plug not bumped, floats held. Lay out cement head, pick up 10 m and allow U tube to equalise and then pull out of hole.
27th April 2002	Continue to pull out of hole. Pull wear bushing and jet wellhead and BOP's, function test rams and change upper BOP rams to 2 ⁷ / ₈ "-5 ¹ / ₂ " variables. Test rams and re-run wear bushing. Run in hole with 9 ⁵ / ₈ " casing scraper to 1407 m and wash to cement stringers at 1428 m. Wash and ream from 1428 m to 1492 m and drill cement from 1492 m to 1736 m pumping sweeps as required.
28th April 2002	Drill cement from 1736 m to 1787 m pumping sweeps as required. Circulate well clean and pull out of hole to 1609 m. Run back in hole from to 1755 m, pull out of hole, break and lay out scraper assembly. Howco pressure test casing. Change out pipe rams to 3 ¹ / ₂ ", make up test assembly and test rams. Pick up and make up 7" scraper assembly and run in hole top of liner at 1787 m. Wash and ream from 1787 m to 1830 m, circulate well for 15 minutes, continue to run in to 2401 m working scraper from 2310 m to 2330 m.

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29th April 2002	Pull out of hole with scraper assembly. Rig up Schlumberger Wireline to run in hole with TCP guns. Run in hole with and set TCP guns. Pull out of hole with Schlumberger Wireline. Pick up packer and tailpipe assembly. Run in hole to set packer and tailpipe.
30th April 2002	Continue to run in hole to set packer and tailpipe. Set packer and tailpipe and pull out of hole. Break out and lay out packer running tool. Incident with crane, shutdown completion operations and wait on investigation.
1st May 2002	Shutdown completion operations and wait on investigation.
2nd May 2002	Shutdown completion operations and wait on investigation.
3rd May 2002	Shutdown completion operations and wait on investigation.
4th May 2002	Shutdown completion operations and wait on investigation and crane repairs.
5th May 2002	Run in hole with packer, set packer and pull out of hole. Rig up to run completion tubing.
6th May 2002	Run in hole with completion tubing to 1885 m. Make up TRSSV and pressure test control line. Run in hole with control line to 2253 m. Rig up FOBV and slickline, pressure test. Run in hole with shift tool to open SSD - no go. Pull out of hole and change tool. Run in hole and open SSD. Pull out of hole.
7th May 2002	HES RIH with shift tool and close SSD. Rig down lubricator, FOBV and surface lines. Set down tubing to no go. Space out, make up hanger and terminate control lines and pressure test same. RIH with hanger, engage in tubing and pressure test. Howco pressure test tubing against production annulus and packer. Run Cameron BPV. Nipple down BOP, riser and flowline. Install Xmas tree and pressure test. HES open TRSSV. Howco pressure test tubing and production annulus. Rig down equipment in wellhead area and restore deck grating at 23:00 hours.

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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	Not Applicable	
Top of Latrobe Group	2267	1357.5
Top of Coarse Clastics	2282	1366.6
TOTAL DEPTH	2460	1473.01

GEOLOGICAL SUMMARY**LAKES ENTRANCE FORMATION:**

1972 m - 2267 m

CLAYSTONE**CLAYSTONE**

Light to medium grey, very light grey, light brown in part, calcareous, locally occasional silty, trace disseminated pyrite, trace to common Ooids, Forams and microfossil fragments, trace carbonaceous and lithic specks, trace glauconite specks, dominantly soft to firm, sub-blocky to blocky, sub-fissile in part.

LATROBE FORMATION:

2267 m - 2282 m

Interbedded SANDSTONE and CLAYSTONE**CLAYSTONE**

Light olive grey to medium grey, light grey brown, calcareous, occasional glauconite, rare disseminated pyrite, carbonaceous specks, micromicaceous in part, soft to firm, sub-blocky to blocky.

SANDSTONE

Dark yellowish orange to moderate yellowish brown, fine, moderately sorted, strong calcareous and dolomitic cement, abundant yellowish orange argillaceous matrix, common glauconite, predominantly moderately hard aggregates, tight visual porosity, no fluorescence.

COARSE CLASTICS:

2282 m - 2460 m

SANDSTONE with CLAYSTONE**SANDSTONE**

Clear to translucent, opaque, light grey, medium to very coarse, dominantly medium, moderately to poorly sorted, sub-angular to sub-rounded, trace weak siliceous cement, minor pyrite cement in part, trace argillaceous matrix, predominantly loose and clean, good inferred porosity, trace fluorescence.

Fluorescence: 2360 m - 2375 m: trace dim even greenish yellow, instant diffuse crush cut, moderately bright thin film residue.

CLAYSTONE

Light brown grey to light grey, light brown, moderately calcareous, slightly silty, common carbonaceous specks, micromicaceous in part, dispersive to soft, amorphous.

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GAS REPORT

Gas was recorded from the kick-off point in the 8½" hole with initial background levels of 10 units and declining to 5 units at 2140 m until the Latrobe Formation at 2267 m. Composition of this gas was C₁ with traces of C₂ at the bottom of the Lakes Entrance.

On penetrating the Latrobe formation at 2267 m, there was a marked increase in gas levels, from 8 units to an initial peak of 200 units at 2275 m. The composition of the gases also changed with an increase in heavier gases (C₂ to C₅), indicating a hydrocarbon bearing lithology. Higher peaks were detected on penetration of the Coarse Clastics with a maximum peak of 436 units being recorded. Beneath the Oil water contact gas levels gradually dropped from over 100 units to around 20 units at TD.

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-33a.

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 %
2275	200	2.77	0.14	0.06	0.01	0.01	Trace	Trace
2289	240	3.19	0.19	0.09	0.01	0.01	Trace	Trace
298.5	436	3.64	0.25	0.13	0.02	0.03	0.01	0.01
2314	185	2.36	0.16	0.08	0.01	0.02	Trace	Trace
2327	132	1.26	0.11	0.07	0.01	0.01	Trace	Trace
2335	127	1.29	0.09	0.05	0.01	0.01	Trace	Trace
2352	228	2.62	0.16	0.09	0.01	0.01	Trace	Trace
2370	227	1.91	0.20	0.18	0.04	0.01	0.02	0.03
2389	116	0.79	0.08	0.07	0.01	0.03	0.01	0.01

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