



# **WEST TUNA W-48a**

## **FINAL WELL REPORT**

Prepared by

**Geoservices Overseas S.A.**

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**SECTION 3 -- GEOSERVICES WELL LOGS**

West Tuna W-48a	MASTERLOG --	1:500 scale from 626 to 2268 metres 1:200 scale from 1950 to 2268 metres
West Tuna W-48a	DRILLING LOG --	1:1000 scale from 626 to 2268 metres
West Tuna W-48a	GAS RATIO LOG --	1:200 scale from 1950 to 2268 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-48a  
Country : Australia  
Location : Gippsland Basin  
Structure : Tuna M-1  
Field : West Tuna  
Permit : Vic/ L4

Location AMG co-ordinates 5 771 791.69 mN 621 538.53 mE

Location local co-ordinates Lat :38° 11' 36.558" S Long :148° 29' 16.531" E

Target Local co-ordinates 592.38 mN 1327.61 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 : 2259 metres  
Actual total depth : 2268 metres  
True vertical depth : 1449.46 metres  
Spudded on : 20th January 2002  
Total depth reached on : 24th January 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"	626	2268	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)
10¾"	Surface	622 MDRT (Existing)
7"	Production	2261.9 MDRT

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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	1950	2080
Washed and Dried	3	100 grams	5 metres	2080	2268

**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

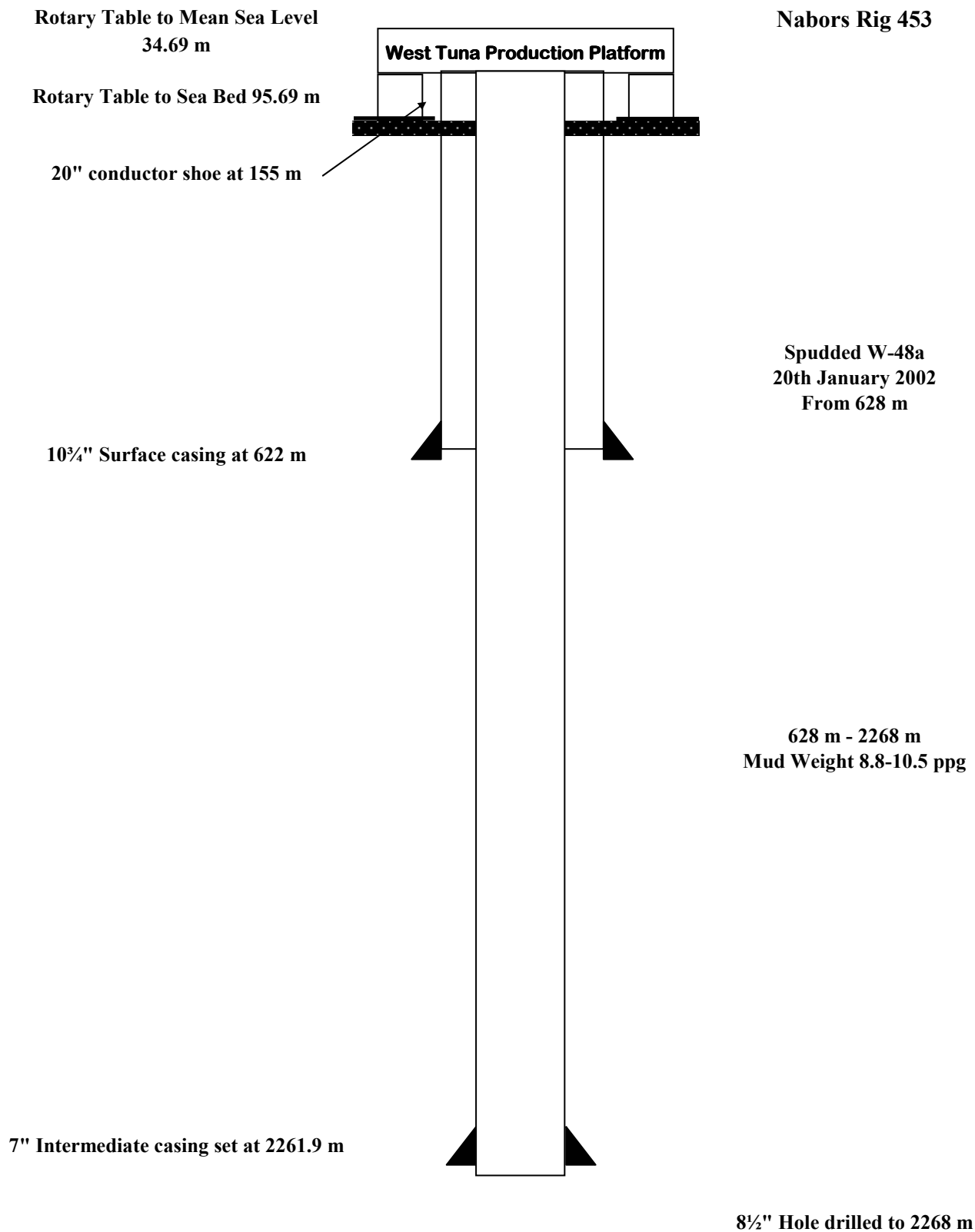
West Tuna W-48a is an infill well east of the West Tuna platform. The primary objective is to enhance recovery of the M-1 oil reservoir and to capture oil "hung-up" as a result of possible baffling in this part of the field as reflected by underperformance of existing wells. A lateral well branching off the plugged and abandoned West Tuna W-48, it was drilled to a total depth of 2268 mMDRT (1449.5 mTVDR) in 8½" hole and completed with a single oil completion string of 3½" tubing in 7" intermediate production casing.

**West Tuna W-48a was kicked off at 12:30 hours on 20th January 2002 after drilling out the cement plug to 628 m.**

After the plug and abandonment of West Tuna W-48 was completed, an 8½" kick-off MWD/LWD steerable assembly with a Hughes MX-20D rock bit and motor set at 1.5° was made up and ran in the hole to the top of the cement plug at 565 m. The cement plug was drilled out to 628 m and the well kicked-off using seawater and then displaced to a 8.8 ppg KCl/PHPA/Polymer mud when the first formation was observed at 641 m. The assembly drilled 6 m of new formation and was then pulled back into the casing prior to performing a P.I.T. (12.5 ppg EMW at 393 psi with 8.8 ppg mud) to ESSO requirements. The kick-off assembly was then pulled out of the hole and an 8½" MWD/LWD steerable assembly with a Geodiamond S75PX PDC bit and motor set at 1.15° was made up and ran in hole to 647 m. The well was rotary and slide drilled ahead to Total Depth at 2268 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.

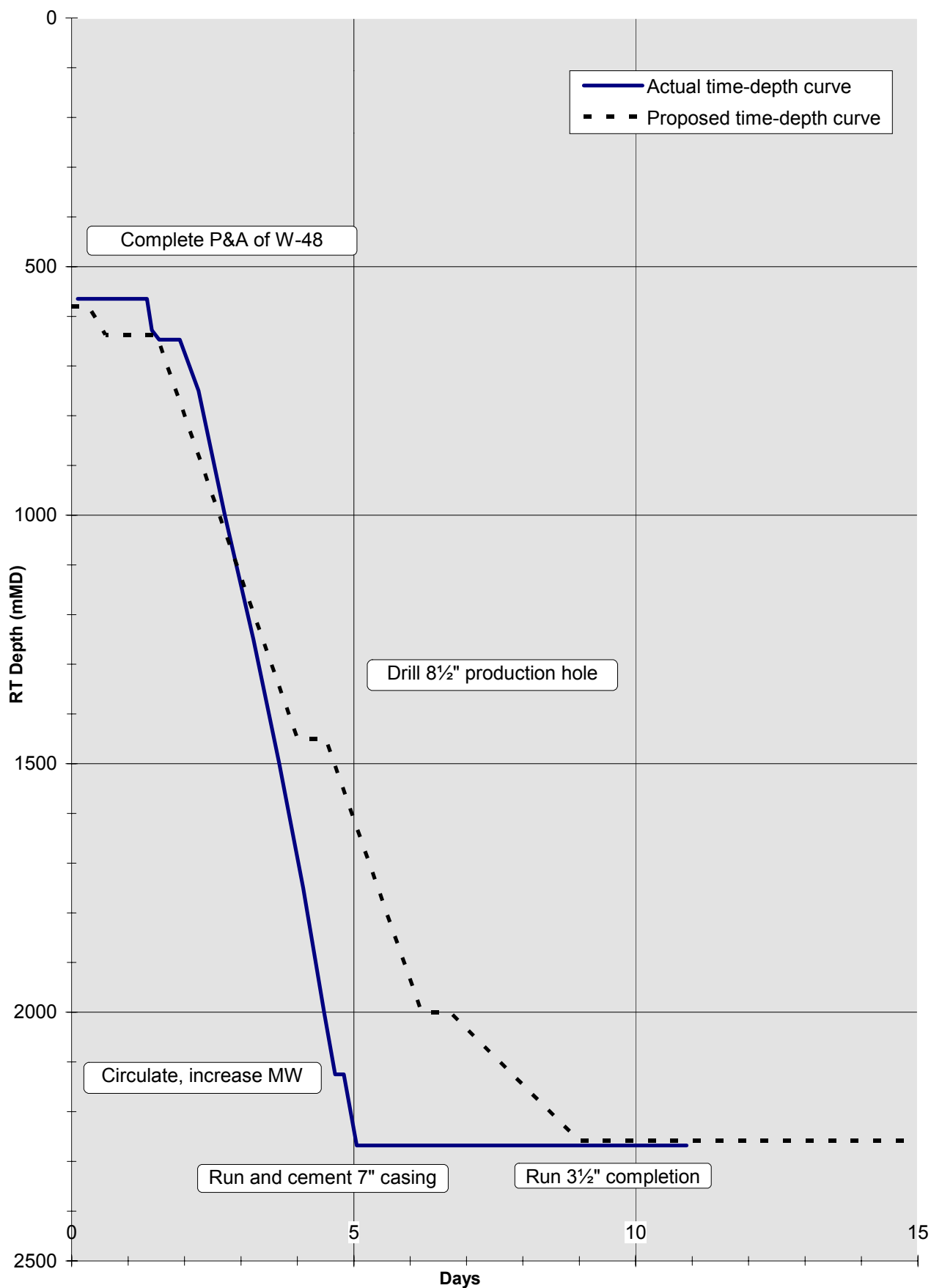
**West Tuna W-48a reached a total depth of 2268 m (1449.5 mTVD) at 04:00 hours on 24th January 2002.** The final survey at a depth of 2243.9 m had an inclination of 66.47° and an azimuth of 59.87°. 7" production casing was run to a depth of 2261.9 m. West Tuna W-48a was completed as a single oil string with 3½" completion tubing run to 2169 m. West Tuna W-48a was handed over to Production on 30-01-2002 at 01:00 hours.

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**WELL PROFILE**


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### WTN W-48a TIME-DEPTH CURVE (measured depth)



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**BIT RUN SUMMARY**

BIT	Size (")	Type	Jets	In (m)	Out (m)	Hours	Condition
1RR	8½"	Hughes MX-20D	3 x 22	626	647	2.83	1-2-WT-A-E-E-E-I-BT-BHA
2	8½"	GeoDiam S75HPX	7 x 14	647	2268	44.88	2-6-WT-A-X-IN-BT-TD

**CASING DATA**

Type	Size (Inches)	Weight (lb/ft)	Grade	Thread	Depth (mMDRT)
Conductor	20"	84	K-55	BTC	155
Surface	10¾"	47	L-80	LT&C	622
Production	7"	26	L-80	LT&C	2261.9

**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	644	32 gal/10 bbl Halad 413L 1 gal/10 bbl SCR-100L 0.25 gal/10bbl NF-5	80	133	15.8	1696-2261.9	2500

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**WELL DIRECTIONAL PROFILE**  
(From Geoservices Software)

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**WELL DIARY**

<b>19th January 2002</b>	End of WTN W-48 P & A. Change running gear. Nipple up BOP's. Remove wearbushing, run test assembly and pressure test BOP's. Run wearbushing and make up bit and tools. (Pressure test choke and kill lines off critical path). Shallow test motor. Pick up 9 joints of 5" HWDP. Pull back and load source. Run in and pick up jars and 14 joints of HWDP.
<b>20th January 2002</b>	Run in hole. Pick up 5" drillpipe, break circulation and rack stands in derrick. Pick up 5" drillpipe, break circulation and rack stands in derrick. Pick up 5" drillpipe from 260 m to 545 m. Wash down to T.O.C. at 565 m. Pressure test 10¾" casing. Drill cement from 565 m to 628 m. Kick-off well from 628 m to 647 m, first formation at 641 m. Pump high viscosity pill and displace to mud while drilling. Circulate and condition mud. Pull out to 626 m and conduct P.I.T. (12.5 ppg EMW, 393 psi with 8.8 ppg). Pull out of hole and change bit. Run in hole with BHA and pick up 5" drillpipe from 260 m to 546 m. Run in and wash last stand to bottom.
<b>21st January 2002</b>	Drill, steer and survey 8½" hole from 647 m to 1089 m.
<b>22nd January 2002</b>	Drill, steer and survey 8½" hole from 1089 m to 1622 m.
<b>23rd January 2002</b>	Steer, rotate and survey 8½" hole from 1622 m to 2125 m. Circulate while working string. Backream to 2039 m, whilst increasing mud weight from 10.3 ppg to 10.6 ppg. Wash to bottom. Steer, rotate and survey 8½" hole from 2125 m to 2181 m.
<b>24th January 2002</b>	Steer, rotate and survey 8½" hole from 2181 m to 2268 m. Circulated hole clean. Wiper trip to shoe at 622 m, backreaming to 2000 m. Circulate hole clean. Slip and cut. Run in hole to bottom and circulate hole clean. Pull out of hole to 1500 m and circulate hole clean. Continue to pull out of hole.
<b>25th January 2002</b>	Continue to pull out of hole. Remove wearbushing. Change rams and pressure test BOP's. Rig up and run 7" casing.
<b>26th January 2002</b>	Continue to run 7" casing. Pick up and make up hanger. Make up cement head and pumping lines, break circulation and circulate hole clean pressure test lines and pump and displace cement as per program, plug not bumped, floats held, 1 bbl bleed back. Wait on cement. Rig down cement head, back out hanger running tool and lay out landing joint. Rig down 7" casing running equipment, dress TDS to 3½" handling equipment. Change out BOP rams. Make up and run in hole and set 13⅝" seal assembly. Make up test plug assembly and shell test BOP's. Make up and run wearbushing. Pick up and make up 7" casing scraper assembly and run in hole on 3½" drillpipe.
<b>27th January 2002</b>	Continue to run in hole 7" casing scraper assembly to 2220 m. Drill cement from 2220 m to top of float collar at 2237 m. Pump high viscosity pill and circulate hole clean. Displace hole to brine. Pressure test casing to 2500 psi. Pull out of hole with scraper assembly and lay out same. Rig up Schlumberger and run in hole with 7" gauge ring/junk basket to 2228 m. Pull out of hole. Make up MAX-R guns and GR/CCL assembly, run in hole, correlate and pull out of hole.
<b>28th January 2002</b>	Pull out of hole with Schlumberger. Rig up Weatherford. Pick up and make up Halliburton packer and tail pipe assembly onto Schlumberger wireline and run in hole, correlate and set packer at 2144 m. Pull out of hole and rig down wireline. Pull wearbushing. Make up jetting assembly and flush MC2, break down and lay out assembly. Rig service. Make up seal assembly and run in hole with 3½" completion.
<b>29th January 2002</b>	Continue to run 3½" completion. Land out hanger, engage lock ring, confirm latch, pressure test hanger seals. Rig up Howco and pressure test tubing. Release from hanger, lay out landing joints and running tool. Cameron run BPV. Nipple down bell nipple, flow line, BOP and riser. Prepare to and skid rig north for access to install Xmas tree. Cameron terminate control line, raise permit, orientate and install Xmas tree. Pressure test. Pull BPV. Reinstate grating around well head. Rig up Howco and pressure test tubing
<b>30th January 2002</b>	Complete pressure test. Dismantle scaffold from under main deck and reinstate main deck grating. Hand over W-48a to production at 01:00 hours.

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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	Not Applicable
Top of Lakes Entrance	1570	1131.8
Top of Latrobe Group	2082	1369.5
Top of Coarse Clastics	2105.5	1379.9
<b>TOTAL DEPTH</b>	<b>2268</b>	<b>1449.5</b>

**GEOLOGICAL SUMMARY****GIPPSLAND FORMATION**626 m - 690 m **LIMESTONE**

**CALCISILTITE** Very light grey to light grey, light olive grey, occasional fossil fragments, minor carbonaceous specks, soft to occasional moderate hard, sticky, amorphous, sub-blocky to blocky.

690m - 1140 m **LIMESTONE**

**CALCILUTITE** Very light grey to pale olive grey, light olive grey to olive grey in parts, occasional silty material, trace carbonaceous specks, common fossils and fossil fragments, minor to locally common disseminated pyrite, minor calcite grains, predominantly soft, commonly firm, sub-blocky to blocky.

1140 m - 1570 m **MARL**

**MARL** Light to medium grey, olive grey to medium grey, minor to locally common fossils and fossil fragments, trace disseminated pyrite, trace to locally common calcite grains, common ooids, soft to firm, commonly moderately hard, sub-blocky to blocky.

**LAKES ENTRANCE FORMATION:**1570 m - 2082 m **CLAYSTONE**

**CLAYSTONE** Light grey, olive grey to dark olive grey, medium grey to occasional dark grey, calcareous, silty in part and locally grading to Siltstone, trace disseminated pyrite, trace to common Ooids, Forams and microfossil fragments, trace carbonaceous and lithic specks, trace disseminated glauconite with depth, rare sparry calcite fragments, dominantly firm to soft, occasional moderate hard, sub-blocky to blocky.

**LATROBE FORMATION:**2082 m - 2105.5 m **Interbedded, SILTSTONE and SANDSTONE**

**SANDSTONE** Light grey, greyish orange to moderate yellowish brown, translucent, fine to medium, commonly coarse, moderate to poorly sorted, sub-angular, sub-spherical, moderately strong siliceous cement, common dolomitic cement, common argillaceous matrix, minor glauconite, minor pyrite, commonly moderate hard aggregates, loose, poor visible porosity, no fluorescence.

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**SILTSTONE**

Pale yellowish brown to pale brown, moderately calcareous, common carbonaceous flakes, commonly micromicaceous, occasional disseminated glauconite, soft, dispersive, predominantly amorphous.

**COARSE CLASTICS:**

2105.5 m - 2268 m

**SANDSTONE with minor CLAYSTONE****SANDSTONE**

Quartzose, clear to translucent, locally occasionally, smoky, medium to very coarse, dominantly medium to coarse, moderately well sorted, angular to sub-rounded, dominantly sub-angular to sub-rounded, sub-spherical in part, trace weak siliceous cement, locally trace pyritic cement, minor to trace argillaceous matrix, generally loose and clean, fair to predominantly good inferred porosity, no fluorescence.

**CLAYSTONE**

Medium light grey, moderately calcareous, silty, minor disseminated carbonaceous material, commonly micromicaceous, firm, sub-blocky.

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## GAS REPORT

Gas was recorded from the kick-off point in the 8½" hole with only C<sub>1</sub> seen ranging between 0.05% and 0.2% until the Claystone of the Lakes Entrance formation. The gas level until the Lakes Entrance formation, ranged from 5 to 10 units with the average being around 8 units. In the Claystone of the Lakes Entrance formation there was a noticeable increase in the gas curve from 1840 m from 10 units to 30 units by 1940 m. The gas consisted predominantly of C<sub>1</sub> with C<sub>2</sub> being detected from 1960 m and C<sub>3</sub> from 2010 m.

On penetrating the Latrobe formation at 2082 m there was a marked increase in gas levels, from 30 units to an initial peak of 368 units at 2087.5 m. The composition of the gases also changed with an increase in heavier gases (C<sub>2</sub> to C<sub>5</sub>), indicating a hydrocarbon bearing lithology. Higher peaks were detected on penetration of the Coarse Clastics. Gas levels throughout the Latrobe were erratic due to drilling parameters and lithology variations, varying from 60 units up to a peak of 1258 units. Beneath the oil water contact (2201 m) gas levels dropped significantly from 500 units to around 55 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 CO<sub>2</sub> or H<sub>2</sub>S was detected while drilling West Tuna W-48a.

Connection gas was noted from 1230 m ranging from 3 units to a maximum of 70 units above background in the Latrobe, although averaging 10 units to 15 units. Mud weight was increased from 9.5 ppg to 10.0 ppg prior to the Lakes Entrance. Connection gas was largely masked in the Latrobe by the hydrocarbon gas peaks. The mud weight was raised from 10.2 ppg to 10.5 ppg at 2125 m in the Latrobe due to hole concerns and this also suppressed connection gases.

### Gas peaks through the Latrobe Group

Depth metres	Total Gas units	C <sub>1</sub> %	C <sub>2</sub> %	C <sub>3</sub> %	iC <sub>4</sub> %	nC <sub>4</sub> %	iC <sub>5</sub> %	nC <sub>5</sub> %
2087.5	368	2.31	0.13	0.08	0.01	0.03	0.01	0.01
2109.0	731	9.97	0.58	0.10	0.09	0.10	0.05	0.04
2140.5	985	10.75	0.72	0.54	0.10	0.11	0.05	0.04
2162.0	471	5.36	0.28	0.20	0.03	0.06	0.02	0.02
2178.0	778	8.81	0.63	0.47	0.11	0.13	0.06	0.04
2198.0	1258	10.21	1.22	1.15	0.27	0.48	0.24	0.31
2215.5	267	1.35	0.19	0.22	0.06	0.12	0.07	0.07

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