TUNA A-11b

FINAL WELL REPORT

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CONTENTS

SECTION 1 -- GENERAL WELL SUMMARY

WELL DATA	4
MUDLOGGING	5
WELL SUMMARY	6
WELL PROFILE	7
DAY VS DEPTH PLOT	8
BIT SUMMARY	9
CASING and CEMENTING DETAILS	9
WELL DIRECTIONAL PROFILE	10
WELL DIARY	11

SECTION 2 -- GEOLOGICAL SUMMARY

FORMATION TOPS	14
GEOLOGICAL SUMMARY	14
GAS REPORT	15

SECTION 3 -- GEOSERVICES WELL LOGS

Tuna A-11b	MASTERLOG --	1:500 scale from 2515 to 3041 metres 1:200 scale from 2515 to 3041 metres
Tuna A-11b	DRILLING LOG --	1:1000 scale from 2515 to 3041 metres
Tuna A-11b	GAS RATIO LOG --	1:200 scale from 2515 to 3041 metres

Section 1
General Well Summary

WELL DATA

Operator	: Esso Australia Ltd	
Platform	: Tuna	
Well name	: Tuna A-11b	
Country	: Australia	
Location	: Gippsland Basin	
Structure	: Tuna T-1	
Field	: Tuna	
Permit	: Vic / L9	
Location AMG co-ordinates	5 774 222.571 mN	624 227.11 mE
Location Local co-ordinates	Lat: 38° 10' 16.391" S	Long: 148° 25' 5.5" E
Target Local co-ordinates	-1042.08 mN	1737.81 mW
Profile	: Deviated	
Reference depth	: Rotary Table	
RT to Seabed	: 90.72 metres	
RT above M.S.L.	: 31.32 metres	
Sea-water depth	: 59.40 metres	
Proposed total depth	: 3059 metres	
Actual total depth	3041metres	
True vertical depth	: 2077.05 metres	
Spudded on	: 11th November 2002	
Total depth reached on	: 17th November 2002	

Drilling Contractor

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

Drilling Phases

Diameter (inch)	From (m)	To (m)	Mud Type
6"	2512.5	3041	KCl / Glycol / PHPA

Cased Hole

Casing Diameter (inch)	Casing Type	Shoe Depth (m)
20"	Conductor Shoe	156 MDRT (Existing)
$13^{3}/_{8}$"	Surface	957.6 MDRT (Existing)
$9^{5}/_{8}$"	Intermediate	2031.9 MDRT (Existing)
7"	Liner	2512.5 MDRT (Existing)
$4^{1}/_{2}$"	Production Liner	3038 MDRT

MUD LOGGING

Logging Unit Number: 95

Engineers: M. Boyd, R. Pereira, S. Oades.

Sampling Interval

Sample Type	Number of sets	Quantity per set	Sampling interval	From (m)	To (m)
Washed and Dried	3	100 grams	5 metres	2515	3041

Cuttings Distribution

Company	Washed and Dried Sample Set
Esso Australia	1
Victorian Department of Energy and Minerals	1
Australian Bureau of Resources	1

WELL SUMMARY

Tuna A-11b was spudded at 18:00 hours on 11th November 2002 after setting a whipstock in 7" liner and milling a window.

Tuna A-11b is a redrill of Tuna A-11a designed to enhance recovery in the South-Western part of the T-1 reservoir. Tuna A11a had previously been worked over in October 2000 and prior to drilling had been plugged below 2500 m. A whipstock assembly was used to mill a window in the in the 7" liner from 2505 mMDRT to 2512.5 mMDRT.

A watermelon mill was used to mill the window in the 7" liner. After the initial milling run a 6" PDC bit was used to clean out the window and drill the first 5 m of new hole to 2818.0 mMDRT. A PIT was performed to an EMW of 13.5 ppg. A trip back to surface was made and a second 6" steerable MWD assembly was run, this assembly drilled to TD.

The well was drilled to a total depth of 3041 mMDRT (2077.05 mTVDRT) in 6" hole and completed with a 41/2” liner

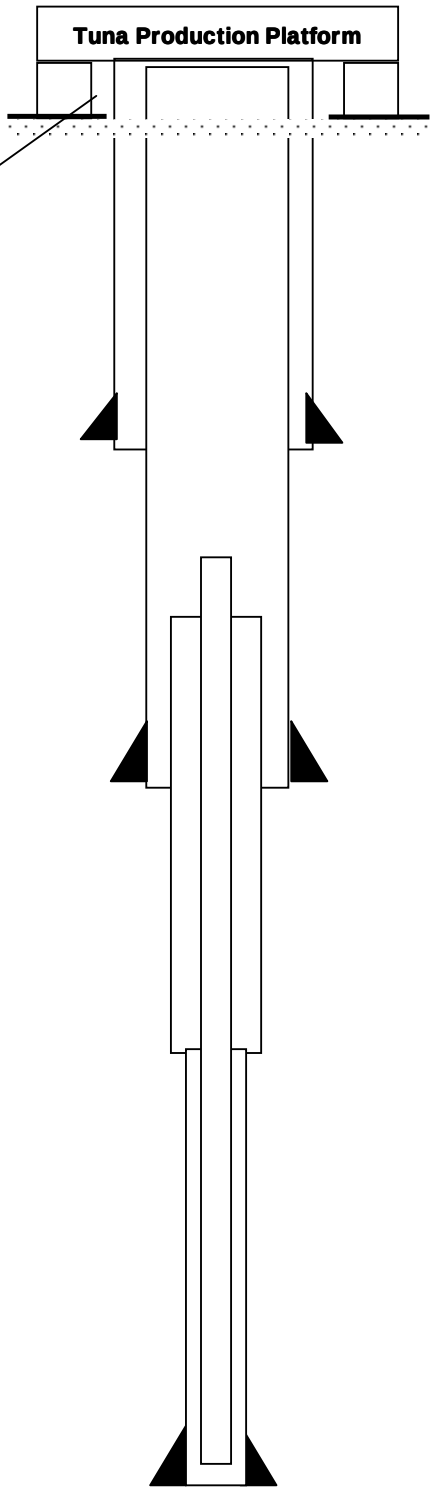
Baracarb-25 and Baracarb-100 were added to the mud system after drilling into new formation to bridge the pore throats and reduce the likelihood of differential sticking and seepage losses.

Tuna A-11b reached a Total Depth of 3041 mMDRT (2077.05 mTVDRT) at 00:30 hours on 17th November 2002. The final survey at a depth of 3021.59 m had an inclination of 56.37° and an azimuth of 223.13°. 4½" production liner was run from 1875 mMDRT to 3038 mMDRT. Tuna A-11b was completed as a single oil string with $2^{7}/_{8}$" completion tubing and handed over to Production on 23-11-2002.

WELL PROFILE for Tuna A-11b

Rotary Table to Mean Sea Level 31.32 m

Nabors Rig 453



Rotary Table to Sea Bed 90.72 m

20" conductor shoe at 156 m

$13^{3}/_{8}$" Surface casing at 957.6 m

4½" Production Liner top at 1875 m

7" Production Liner top at 1929 m

$9^{5}/_{8}$" Intermediate casing at 2031.9 m

Spudded Tuna A-11b 11th November 2002

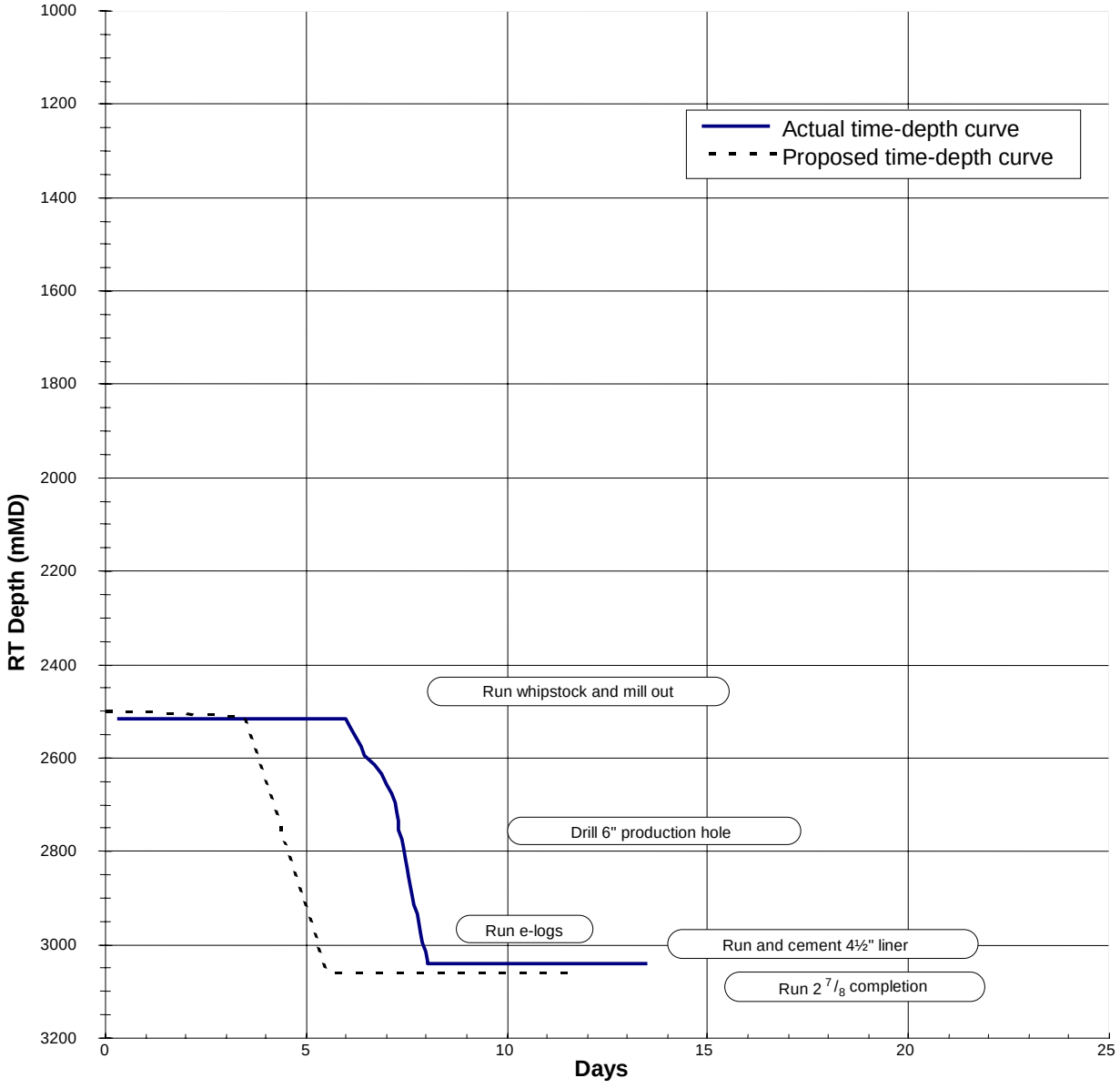
Window in 7" Production Liner at 2512.5 m

2518 m – 3041 m
Mud Weight 9.6 – 9.8 ppg

4½" Production Liner at 3038 m

6" Hole drilled to 3041 m

TUNA A-11b DAY-DEPTH CURVE (measured depth)



Revision	Date	Issued by	Approved by	Remarks
1	25-11-2002	Geoservices Unit 95	Base Mudlogging Coordinator	

BIT RUN SUMMARY

Bit	**Size** (")	**Type**	**Jets**	**In** (m)	**Out** (m)	**Hours**	**Condition**
1	6"	Watermelon Mill	N/A	2510	2512.5	N/A	N/A
1RR	6"	Geodiamond S75HPX	N/A	2515.5	2518.5	N/A	N/A
2	6"	Geodiamond S75HPX	2x16 3x18	2518.5	3041	29.30	3-2-WT-T-CT-N-T-X-IN-BT-TD

CASING DATA

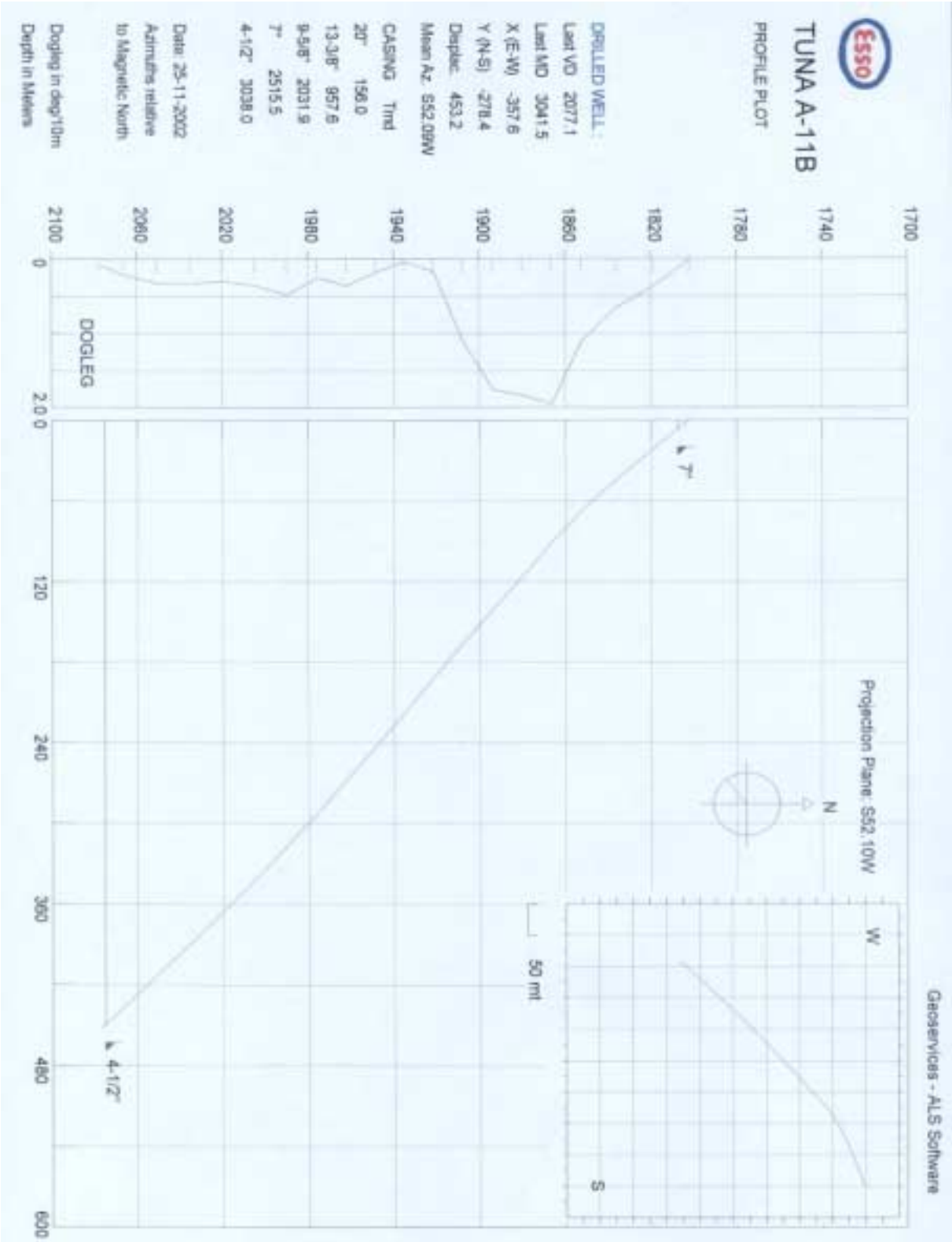
Type	**Size** (inches)	**Weight** (lb/ft)	**Grade**	**Thread**	**Depth** (mMDRT)
Conductor	20"	133	K-55	BTC	156
Surface	$13^{3}/_{8}$"	54.5	K-55	BTC	957.6
Intermediate	$9^{5}/_{8}$"	40	J-55	BTC	2031.9
Production	7"	26	L-80	BTC	1929 – 2512.5
Liner	4½"	12.6	13Cr80	BTC	1875 - 3038

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"	G	270	HALAD 413L 32gal/10 bbls SCR 2gal/10 bbls NF–5 0.25gal/10 bbls	33	53	15.8	2175 m to 3038 m	2000

WELL DIRECTIONAL PROFILE

(From Geoservices ALS Software)



WELL DIARY

9th November 2002 Circulate through choke manifold. JSA. Flow check. Run in hole from 2875 m-3003 m. Set down 25klbs weight on bit. Unable to rotate and pass 3003 m. 20klbs overpull. Packer appears stuck in burn shoe. JSA. Pull out of hole 5" drillpipe with burnshoe from 3003 m-1240 m. JSA. Flow check. Well static. Pull out of hole 3½"drillpipe from 1240 m to 234 m. JSA. Rack 3½"drillpipe and lay out burnshoe assembly. JSA. Pick up and make up 3½" drillpipe and run in to 1177 m. Then run in 5" drillpipe from 1177 m-3003 m. Tag packer at 3003 m. Circulate hole clean prior to cementing. 142 units of bottoms up gas detected. Circulate until gas reduced to 12 units. Set balanced cement plug from 3001 m to 2815 m. Displace and pull out to 2810 m. Reverse circulate and dump cement returns. Wait on cement and integrity of cement samples.

10th November 2002 Forward circulate while waiting on cement. JSA. Attempt to tag cement at 2817 m, too soft. Pull back to 2811 m and wait. Run in hole and tag again at 2817 m. Pull back to 2811 m. Pressure test lines and set a balanced cement plug from 2811 m to 2692 m. Pull out to 2668 m and reverse circulate. Dump returns. Lay out circulating assembly. Pick up to 2640 m. Displace well to inhibited seawater. Wait on cement. Rig service. Run in hole from 2640 m and tag top of cement at 2692 m. Pull out of hole from 2692 m to 1177 m with 5" drillpipe. Trip drill conducted. Dress rig floor to 3½". Pull out to 172 m with 3½" drillpipe. Continue to pull out to surface. Layout 18 joints of 3½" drillpipe. Run in hole with 7" casing scraper to 2535 m. Reciprocate the upper watermelon mill across the interval from 2503 m-2514 m. Pull out of hole.

11th November 2002 Continue to pull out of hole after scraper run. Pressure test, rig up Schlumberger wireline and run gauge ring, junk basket and GR-CCL. Pull out of hole. Run in hole and set EZSV, pressure test casing, bleed off from 800psi - 500psi over 5 minutes. Make up and run in hole, set RTTS. Slip and cut drilling line. Change out rams. JSA prior to releasing RTTS, service break. Pull wear bushing, make up assembly to pressure test BOP's.

12th November 2002 Complete pressure testing. Run in hole with whipstock and milling assembly. Rig up Schlumberger wireline. Tag EZSV at 2413 m. Pull out of hole to 2510 m. Run SDI gyro tool, orientate and set whipstock, shear off and displace hole to mud. Mill window in casing.

13th November 2002 Continue to mill window. Pull out of hole from 2512 m due to slow progress. Lay out mill BHA and rig down Schlumberger wireline sheave. Make up new mill BHA with PDC bit and run in hole to complete milling window.

14th November 2002 Continue to run in hole. Precautionary wash and ream to bottom and complete milling window. Perform PIT with EMW 13.5 ppg. Flow check and pull out of hole. Lay out milling assembly, make up 6” steerable drilling assembly and run in hole, shallow test MWD and continue to run in hole. Perform rig service and continue to run in hole. Obtain toolface through window and tag bottom.

15th November 2002 Drill steer and survey 6” hole. Circulate while rotating and working string while reducing mud weight from 9.7 ppg to 9.5 ppg. Continue to drilling steer and survey 6" hole.

16th November 2002 Continue to drill steer and survey 6" hole. Reach Total Depth at 3041 m. At TD circulate well clean and wiper trip back to 1 stand below window at 2510 m.

17th November 2002 Run in hole to Total Depth and circulate hole clean. Pull out of hole, lay out BHA and rig up to run Reeves logging.

18th November 2002 Load radioactive sources into logging tools. Run in hole with logging assembly and 3½"drill pipe. Dress rig floor to run 5" drill pipe and continue to run in hole with 5" drill pipe. Circulate hole clean at TD and work string back to 2984 m. Install and pump dart down string, engage logging tools at 3035 m. Pull out of hole, logging to 2475 m. Rig service, slip and cut drilling line. Slug pipe and continue to pull out of hole.

19th November 2002 Continue pull out of hole, lay out Reeves 3½" drill pipe & logging tools. Run in hole with 3½" Heavy weight drill pipe, drill pipe & lay out Heavy weight drill pipe, drill pipe & drill collars. Make up and rack back 5" Heavy weight drill pipe. Pick up and make up liner cement head and pup joints. Howco test lines and liner cement head - OK. Rig up Weatherford to run 4½" liner, make up shoe track and run in hole with 4½" liner to 1168 m.

20th November 2002 Continue to run in hole with 4½" liner on 5" drill pipe. Circulate well clean at 2500 m then continue to run in hole to 2995 m. Wash to 3041 m (TD), rig up cement head and lines and cement liner as per programme. Rig down high pressure lines. Lay out cement head. Pick up and set packer. Reverse circulate well clean with seawater, displace well to inhibited seawater. Pull out of hole with liner hanger setting tool on 5" drill pipe.

21st November 2002 Rig down hanger tool, pressure test casing and conduct rig service. Rig up with Schlumberger wireline for gauge ring run. Run in hole with gauge ring to 2989 m. Pull out of hole, rig down Schlumberger wireline and rig up to run $2^{7}/_{8}$" completion tubing. Conduct rig service and run in hole with tubing.

22nd November 2002 Continue to run in hole with tubing. Install control lines and continue to run in hole. Space out, lay down landing joints and confirm seals with 2300 psi on tubing. Rig down test assembly and complete well as per programme. Terminate control lines and nipple up Christmas tree.

23rd November 2002 Continue to nipple up Christmas tree, hand well over to production. Prepare for rig skid. Rig released from Tuna A-11b at 05:00hrs on 23rd November 2002.

Section 2
Geological Summary

FORMATION TOPS

DESCRIPTION	MD (m) RT	TVD (m) RT	TVD (m) SS
Top of Lakes Entrance	1052	1083	1051.68
Top of Latrobe Group	1302	1333	1301.68
Top of Coarse Clastics	1316	1347	1315.68
TOTAL DEPTH	3041	2077.05	2045.73

GEOLOGICAL SUMMARY

LATROBE FORMATION:

2512.5 m - 3041 m **Interbedded SANDSTONE and SILTSTONE with occasional CLAYSTONE and traces of COAL**

CLAYSTONE Light olive grey to light brown grey, brown grey in part, locally abundant carbonaceous material, common carbonaceous laminations and flecks, trace disseminated pyrite, soft to occasionally firm, subblocky to subfissile.

SILTSTONE: Dark grey to dark brown, brown grey occasionally grading to light brown grey, abundantly carbonaceous in part, common carbonaceous grading to trace COAL, common carbonaceous laminations and flecks, trace micromicaceous in part, occasional nodular and disseminated pyrite, subblocky to subfissile.

SANDSTONE: Quartzose, clear to translucent, very light grey to white, dominantly fine to medium, occasionally very coarse, well to occasionally moderately well sorted, angular to subrounded, trace local siliceous cement, rare pyritic cement, traces of white to light grey kaolinite matrix, trace grey lithic fragments, minor carbonaceous flecks, predominantly loose, fair to good visual and inferred porosity.

COAL: Black, subvitreous to earthy, grading to Carbonaceous Siltstone, subconchoidal to blocky, brittle.

GAS REPORT

On drilling out into the Latrobe formation from 2515 m gas levels were initially very low. In the first 260 m gas levels did not rise above 5 units and were composed completely of Methane (C_1).

Between 2760 mMDRT and 2843 mMDRT gas levels increased slightly with one peak of 15 units, the increase in gas levels and change in composition over this interval corresponded with an increase in the percentage of Siltstone in the returned cuttings. The siltstone was carbonaceous in parts and the increase in gas may have been related to this.

From 2483 mMDRT on there was an increase in gas from a background level of 5 units to 10 units to between 30 units to 35 units with the peak gas of 45 units recorded at 2853 m. This corresponded, approximately, to the prognosed T1-GOC.

Gas levels remained between approximately 25 units and 35 units for the remainder of the well. For the last 20 m of the well gas levels gradually decreased from 36 units to 20 units. The composition of the background gas at this depth was mainly C_1 with traces of C_3.

Connection gas was not detected during this well.

Localised increases in background gas are attributed 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 CO_2 or H_2S was detected while drilling Tuna A-11b.

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** %
2610	2	0.06	0.01	0	0	0	0	0
2665	5	0.05	0.01	0	0	0	0	0
2785	15	0.16	0.02	0.01	0	0	0	0
2835	7	0.1	0.01	0	0	0	0	0
2850	43	0.34	0.04	0.02	0	0	0	0
2853	45	0.31	0.04	0.02	0	0.01	0	0
2862	42	0.28	0.05	0.02	0	0.01	0	0
2876	24	0.28	0.03	0.01	0	0	0	0
2888	28	0.46	0.03	0.01	0	0.01	0	0
2908	34	0.56	0.04	0.02	0	0.01	0	0
2945	39	0.59	0.04	0.02	0	0.01	0	0
2965	32	0.42	0.03	0.01	0	0.01	0	0
2980	31	0.3	0.02	0.01	0	0	0	0
3000	23	0.23	0.02	0.01	0	0	0	0
3020	36	0.34	0.02	0.01	0	0	0	0