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**PremierOil**

Australasia



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T/RL1

**BASS BASIN,  
TASMANIA  
DRILLING PROGRAM  
YOLLA-2**

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**MARCH 1998  
REV 0**

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OR-0439

**PREMIER OIL AUSTRALASIA  
DRILLING PROGRAM  
EXPLORATION WELL YOLLA-2**

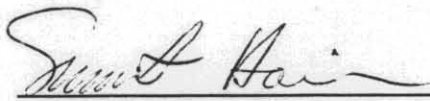
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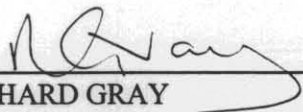
YOLLA-2  
DRY-HOLE DRILLING PROGRAM

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PREPARED BY :   
STUART HARRISON  
Drilling Engineer

APPROVED BY :   
BLAINE MULMER  
Operations Manager

AUTHORISED BY :   
RICHARD GRAY  
Operations Manager  
Premier Oil Pacific

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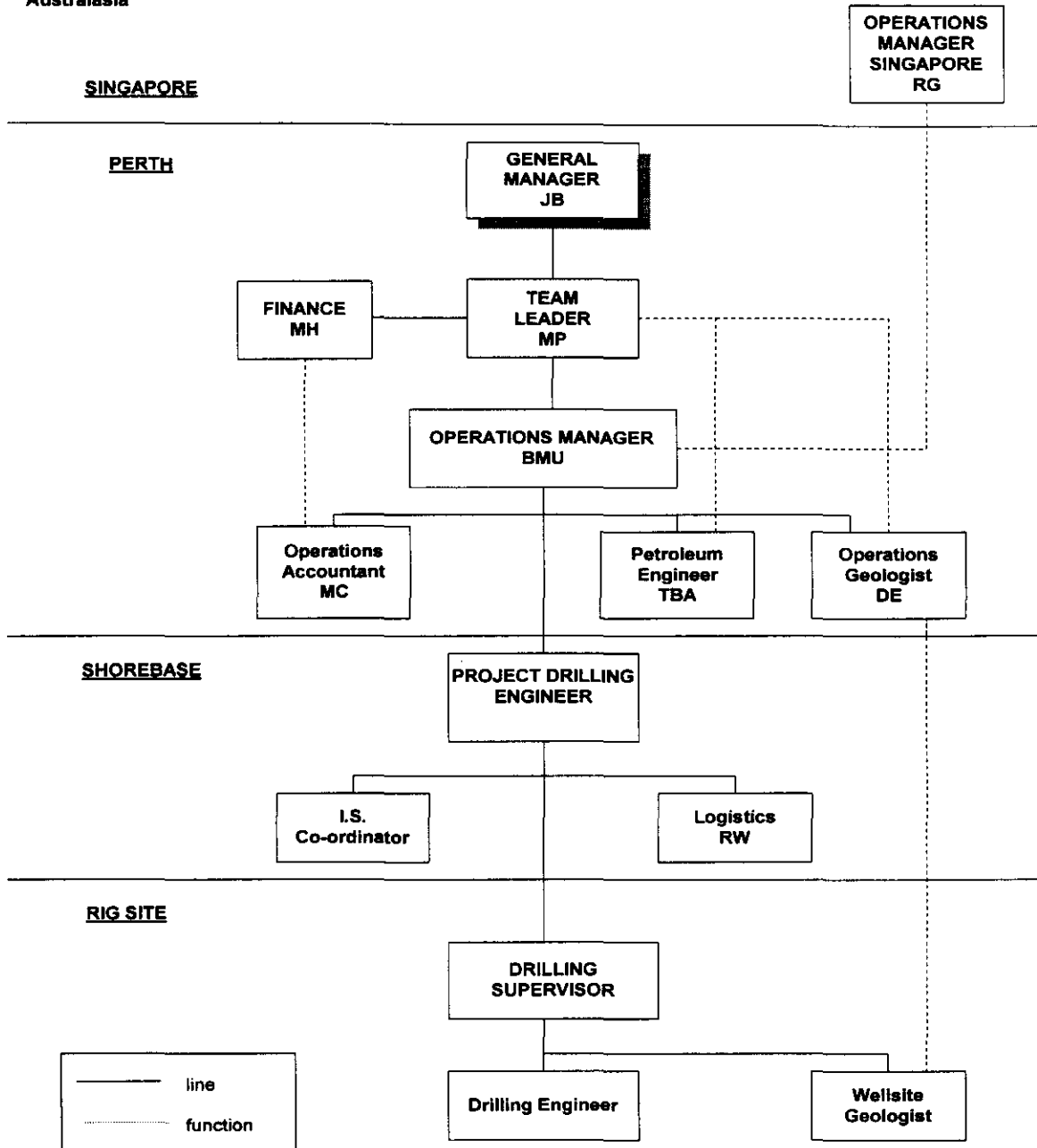
**APPENDICES**

- Appendix A    Geology Summary & Formation Evaluation
- Appendix B    Drilling Fluid Program
- Appendix C    Cementing Program
- Appendix D    Casing Design Parameters
- Appendix E    Blowout Preventer Pressure Testing
- Appendix F    Wellhead Stack-Up Diagram
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- Appendix J    Contact Listing

1. OPERATIONS ORGANOGRAM

**PremierOil**  
Australasia

**BASS BASIN ORGANOGRAM**



Operations Manager:	Blaine Ulmer (BMU)	
Project Drilling Engineer:	(Bass Basin)	TBA
Team Leader:	(Bass Basin)	Mark Akers (MA)/ Mark Pogson (MP)
RG -	Richard Gray	RW - Rick White
MH -	Mark Hancock	DE - Dave Evans
JB -	John Begg	
BMU	Blaine Ulmer	
SH -	Stuart Harrison	

## **2. SECURITY OF INFORMATION POLICY**

Normal security measures will be taken to ensure that all information gained from drilling Yolla-2 will be kept confidential. To accomplish this, the following procedures will be observed.

1. Information should not be transferred to any person other than Premier personnel and service staff directly involved in the planning, drilling and testing of this well.
2. No unauthorised personnel to be allowed on the rig.
3. Only the drilling crews, Service Company personnel and Premier personnel are allowed on the rig site. No visitors will be allowed unless authorised by the Premier Project Drilling Engineer in Geelong.
4. Daily drilling information will be distributed to partners by the office in Perth. If requests are made for information, this request should be referred to the Premier Team Leader in Perth.
5. The logging operations will be supervised by Premier Oil personnel.
6. The logging information will be kept confidential. Only information which will help the Drilling Supervisor, Toolpusher and Wellsite Geologist perform more efficiently and maintain well control will be kept onboard the rig.
7. Only personnel authorised by the Drilling Supervisor and Well Site Geologist will have access to the logging unit during logging operations.
8. No public announcements will be made except as written and authorised by the Perth office of Premier Oil.
9. All service personnel, particularly Mud Loggers, Wireline Logging Engineers and Cementing Engineers, should have the above emphasised at the time of their arrival at the rig, and also at the time of their departure.
10. The Joint Venture partner after proper notification to Premier, will have full & open access for their representative(s) to monitor the drilling operations including wireline logging, coring and testing.



**4. LOCATION MAPS**

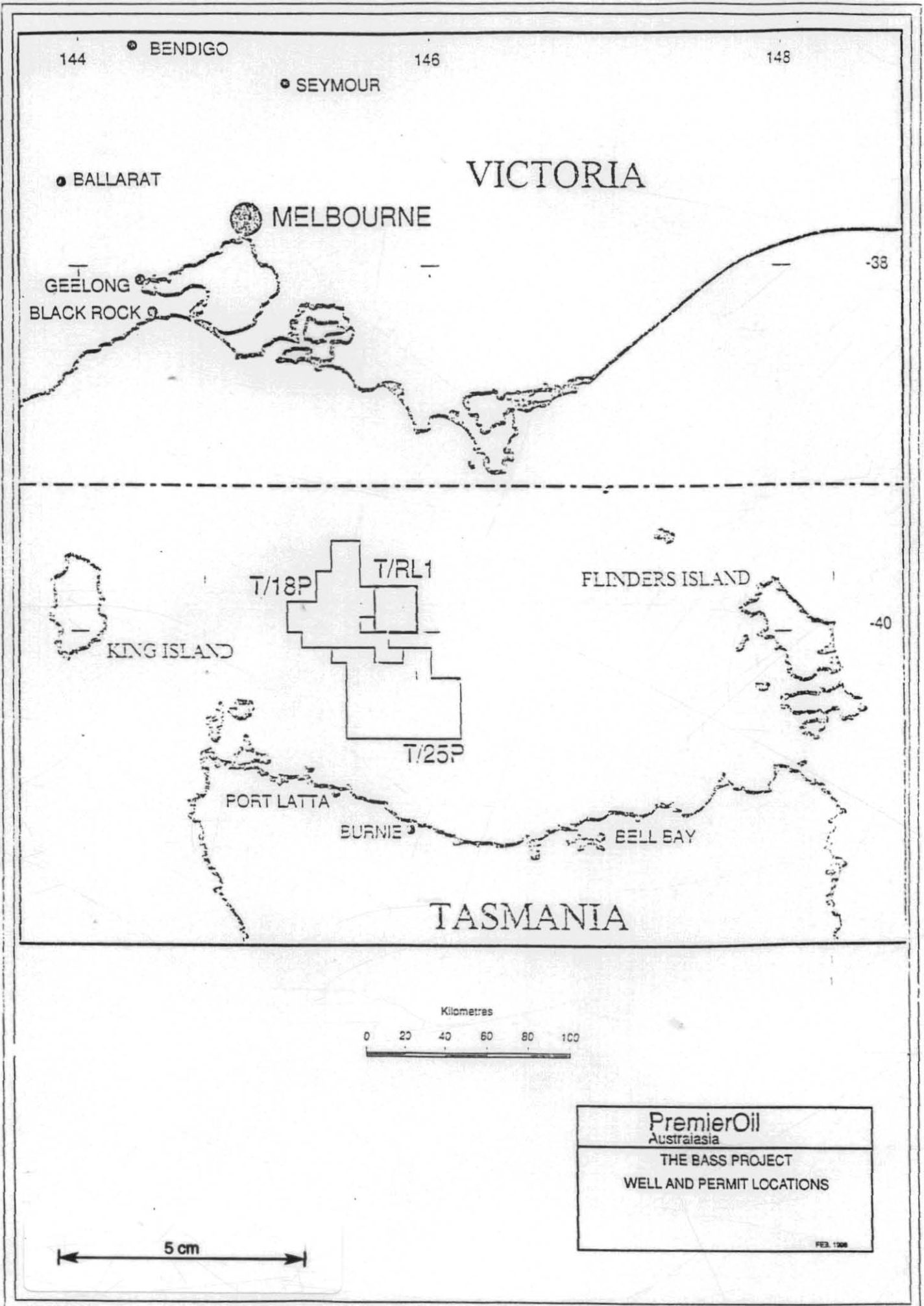


FIGURE 1

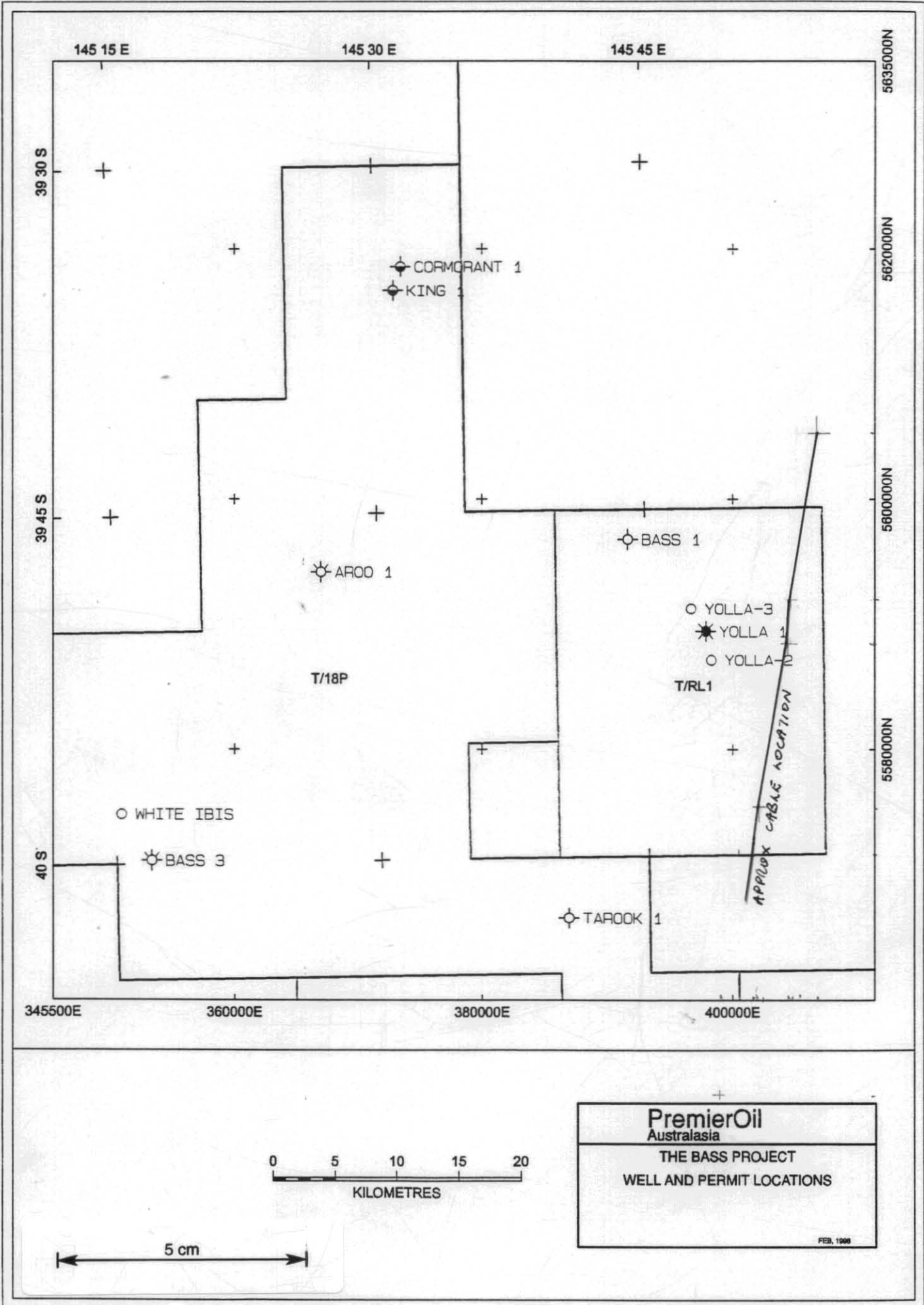


FIGURE 2

## 5. WELL OBJECTIVES

### 5.1 Safety and Environmental

- Incur no lost time accidents for the duration of the well.
- Successfully utilise water based mud throughout the well.
- Implement H<sub>2</sub>S procedures if required.

### 5.2 Geological & Reservoir Objectives

The detailed geological summary and formation evaluation programme is enclosed in Appendix A.

The geological objective is planned to be drilled in the 311mm (12¼") hole section. Planned TD for the well is 3350 m RKB +/- 10%.

The primary objective is to appraise the hydrocarbon bearing potential of the Eastern View Coal Measures.

- Run a full suite of electric logs and, dependant upon shows, run the following optional logs : MDT, FMS and CMR or equivalent.

### 5.3 Drilling Engineering Objectives

- Successfully drill well with modified casing program, avoiding need for drilling hole to TD in 216mm (8 ½") hole.
- Drill all hole sections with WBM and avoid any stuck pipe occurrences.
- Minimise formation damage particularly in the reservoir section.
- Implement Mooring Analysis to minimise waiting on weather.
- Drill well under AFE and within 35 days

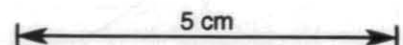
**6. GEOLOGICAL INFORMATION****6.1 Predicted Section**

**PremierOil**  
Australasia  
T/RL1 - BASS BASIN  
**PREDICTED SECTION**  
**YOLLA-2 APPRAISAL**

STRATIGRAPHY		LITHOLOGY	REMARKS	DEPTH			
				metres below K.B.	metres subsea	TWT (msec)	
Seismic Marker *			"Sea Floor"	91	78	108	
<b>TERTIARY</b>	<b>MIOCENE TO RECENT</b>	<b>TORQUAY GROUP</b>	"Recent - Mid Miocene"				
			"Mid Miocene"	580	567	510	
			"Lower - Mid Miocene"	828	815	693	
			"Miocene Volcanics"	1281	1268	1127	
			"Oligocene Unc"	1376	1363	1199	
	<b>OLIGOCENE</b>	<b>TORQUAY GROUP</b>					
			"Demons Bluff Formation"	1483	1470	1269	
			"Top EVCM"	1733	1720	1431	
			"Early Eocene"	1887	1874	1539	
			"Middle M. diversus"	2286	2273	1792	
<b>EOCENE</b>	<b>EASTERN VIEW GROUP</b>						
		"Near Top 2718 Sand"	2465	2452	1907		
		"Early Palaeocene"	2723	2710	2038		
		"Deep Onlap Seismic Event"	2938	2925	2149		
			3238	3225	2289		
<b>PALAEOCENE</b>	<b>EASTERN VIEW GROUP</b>						
			3313	3300	2324		

**PTD -3300mSS**

**LOCATION :** Seismic Line - Inline 465 CDP 878  
 Latitude - 39°51'33.82"S  
 Longitude - 145°48'38.53"E  
 K.B. Elevation - 13 metres



## 6.2 Formation Description

### Torquay Group; Seabed - 1094m RKB

Early Miocene to Middle Miocene

Upper carbonate section and a lower claystone section with the change occurring at around 700m. The claystone is extremely soft and highly dispersive.

### Angahook Formation; 1094 - 1732m RKB

Early Oligocene to Early Miocene

Unit 1	1094 - 1292m	Claystones becoming firmer with depth, traces of siltstone, mica and pyrite.
Unit 2	1292 - 1336m	Volcanic material, sandstones and claystones with traces of pyrite and chert pebble fragments throughout.
Unit 3	1336 - 1482m	Sandstone with interbedded claystone. Sandstones are fine grained, well cemented and very silty and also contain abundant pyrite.
Unit 4	1482 - 1732m	Stringers of dolomite and dolomitic limestones interbedded with fine grained sandstones and sandy claystones. Contains abundant pyrite.

### Demons Bluff Formation; 1732 - 1886m RKB

Late Eocene

Claystone with thin interbeds of sandstone and dolomitic limestone. Pyrite content increase with depth.

### Eastern View Coal Measures; 1886 - 3237m RKB

Late Eocene to Early Palaeocene

Interbedded sandstones, coals, shales with occasional thin stringers of hard dolomite. Possibility of a number of zones of volcanic extrusives consisting of pumice and tuff.

### Palaeocene Extrusives; 3237 - 3350m RKB

Volcanic extrusive with the possibility of a number of zones of interbedded sandstones, coal and shale.

### 6.3 Shallow Gas

Shallow gas has not been encountered in any of the offset wells and is not expected on Yolla-2. Exemption from Premier Drilling Standards & Operations Guidelines Section 4.43, shallow gas survey, has been granted by the Far East Operations Manager due to the extensive seismic surveys carried out by Amoco in the area that covers the Yolla-2 location.

### 6.4 Pore Pressure Gradients

Offset data indicates that all the formations are expected to be normally pressured, with a seawater gradient 1.042 s.g. EMW. RFT data from Yolla-1 gives formation pressures of 1.040 s.g. at 2820m. Background gas is not expected until 950m.

### 6.5 Fracture Gradients

In the primary offset wells Leak-Off tests were not performed, however Formation Integrity Tests have been performed in both the Torquay group and the Demons Bluff Formation. These have given up to 1.83 s.g. EMW at 416m and 1.75 s.g. EMW at 1660m respectively ( Tilana-1, Yolla-1 gave 1.5 s.g EMW at 400m. and 1.63 s.g. EMW at 1752m for the same formations). No leak off has been recorded in any of the offset wells.

### 6.6 Temperature Gradients

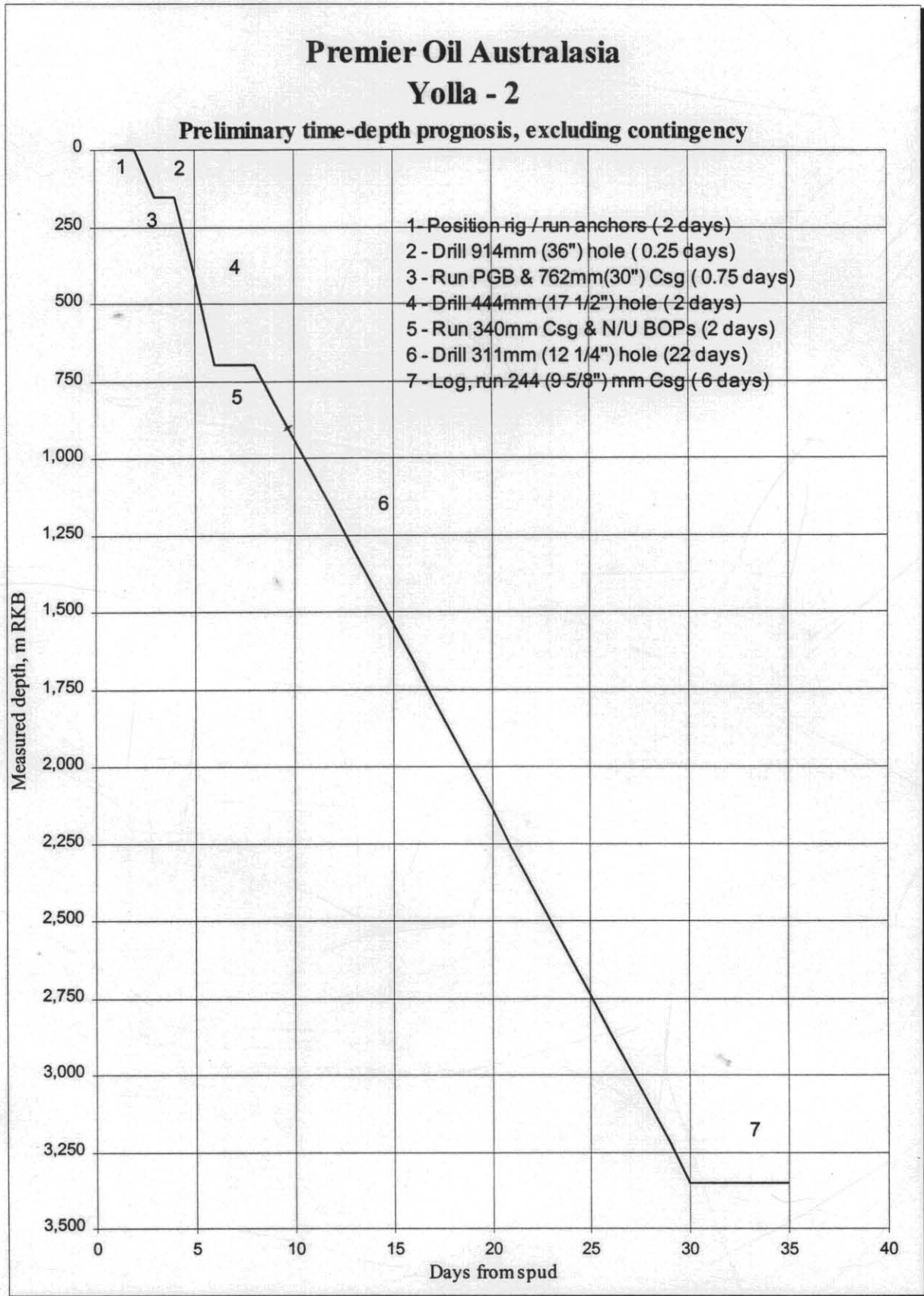
The geothermal gradient for Yolla-2 is expected to be 3.42 deg C/100m. with a BHT of 128 deg C (assumes a mud line temp of 14 deg C ). Gradient based on offset logging data.

### 6.7 Anticipated Hydrocarbons / CO<sub>2</sub> / H<sub>2</sub>S

In Yolla-1 two sands within the Eastern View Coal Measures were tested and found to contain hydrocarbons. These sands were tested from 2805m to 2824m and 1812m to 1833m. They produced 15.1MMCFD gas ( 11% CO<sub>2</sub>) and 580 BCPD (30/64" choke), and 11.8MMCFD gas, 891.9 BCPD, and 300 BWPD, respectively. Yolla-2 is expected to have similar gas bearing sands at similar depths. In addition a deeper sand is also expected to produce hydrocarbon and as such will be the target of further evaluation.

- CO<sub>2</sub>** In the control wells CO<sub>2</sub> contamination of the drilling fluid has been a problem, and CO<sub>2</sub> can be expected in the Yolla-2 well. Offsets suggest that the CO<sub>2</sub> can be expected below 1700m, however using a KCl/polymer/PHPA mud system for the 311mm (12¼") section should avoid any related problems.
- H<sub>2</sub>S** H<sub>2</sub>S has not been recorded in any of the control wells and is not expected in the Yolla-2 well.

7. DRILLING TIME DEPTH CURVE



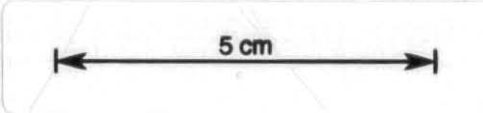
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8. DRILLING SUMMARY

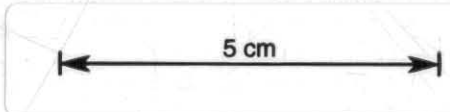
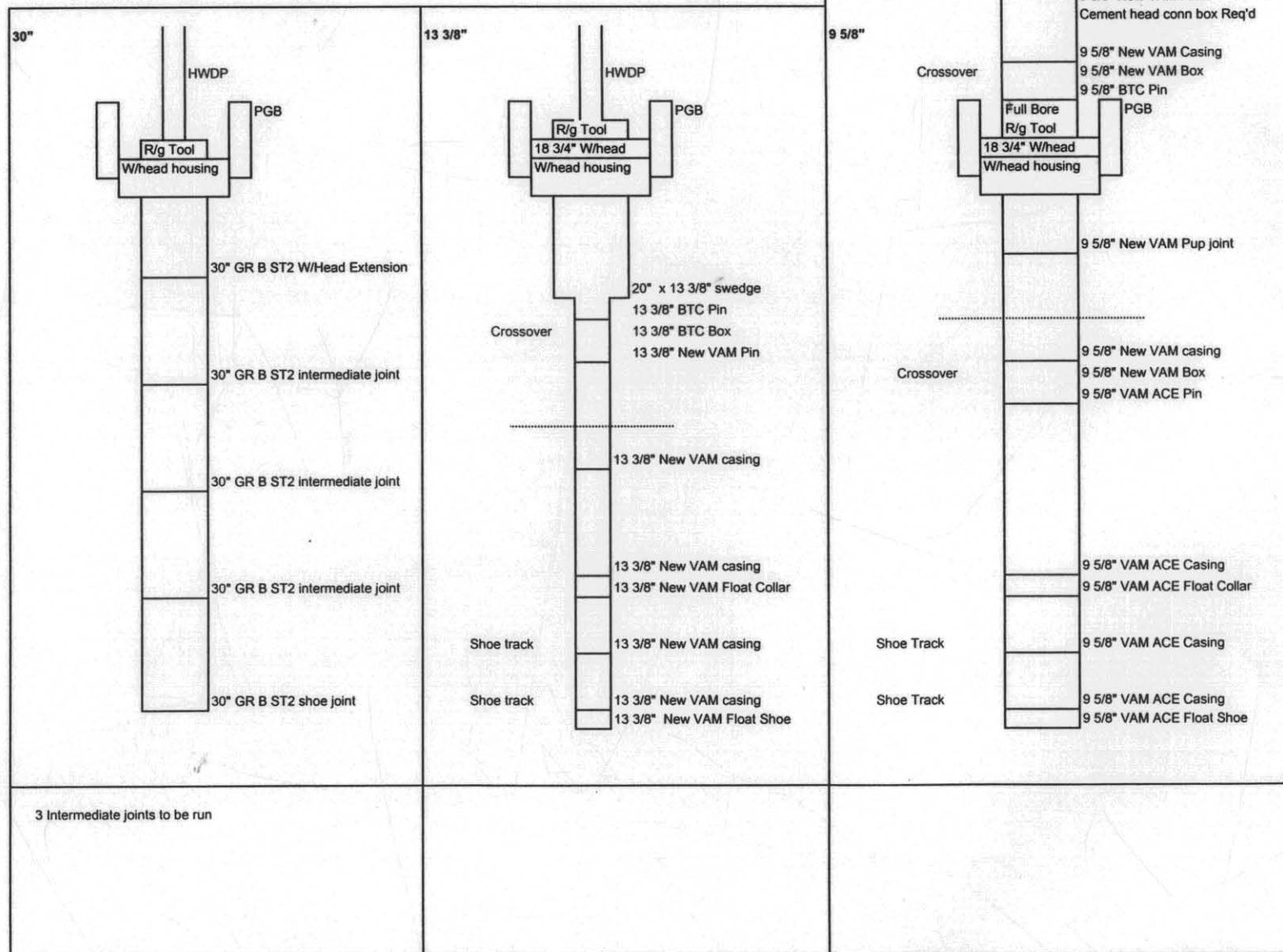
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Depths Are Related To Kelly Bushing ( rkb)

YOLLA-2 DRILLING SUMMARY						Hole Size (mm)	Hole Depth (m)	Casing		Cement	Mud		Well Head BOP	Logging
								Shoe (+/-m)	Size/Grade/Wt Connections	Type / Volume / Properties	Type	Properties		
762mm						914	156	151	762mm (30"), 462kg /m , GR B, ST-2	Lead : 150%XSOH Cmt : Class 'G' Wt : 1.9 s.g. TOC : Seabed	Seawater / hi vis sweeps	MW 1.02-1.05 FV>120secs/ltr YP > 28Pa		None
340mm						444	709	700	340mm (13 <sup>3</sup> / <sub>8</sub> " ), L80, 101kg/m, New VAM  Safety Factors Burst 1.34 Collapse 2.16 Tension 7.27	Lead : 100%XSOH Cmt : Class 'G' Wt : 1.44 s.g. TOC : Seabed Tail : 100%XSOH Cmt : Class 'G' Wt : 1.9s.g. TOC : 550 m	Seawater / hi vis sweeps	MW 1.02-1.05 FV>120secs/ltr YP > 28Pa		None
244mm						311	3350	3340	244mm (9 <sup>5</sup> / <sub>8</sub> " ) Special Drift New VAM / VAM ACE  Safety Factors Burst 1.21 Collapse 1.52 Tension 1.73	Lead : 100%XSOH Cmt : Class 'G' Wt : 1.58 s.g. TOC : 600 Tail : 50%XSOH Cmt : Class 'G' Wt : 1.9s.g. TOC : 2750 m	F/water KCl / Polymer/ PHPA	MW 1.1-1.2 pH 9 PV 10-15 cps YP 8.6-10.5Pa KCl 5%w/w	Vecto SG-5 10K subsea w/head  18 3/4" 10K Subsea BOP's	Wireline Logging Basic Supercombo + MDT + Checkshot + options



**YOLLA-2 Casing & Running Strings**



## 9. RIG MOVE & ANCHOR PLAN

### 9.1 Environmental Conditions in the Bass Straits

Wind roses for the months April through July for the Bass Straits indicate a predominant westerly wind with a tendency towards the northwest and becoming predominantly north west in July. These winds account for some 40% of the time.

Wave roses for the same period show a predominant southwesterly direction with a trend towards west and northwest. This southwesterly tendency accounts for some 25% to 30% for April to June and then tends towards west and northwest in July.

Currents in the Bass Straits are understood to be relatively weak in the area around the Yolla-2 location. Although tidal currents of around 1 m/s occur at both entrances (east and west) to the Bass Strait, they occur to all intents simultaneously and cancel one another out in the area concerned.

Wind driven currents are said to be of the order of 2% of wind speed, and are therefore very weak.

On the basis of this information it would appear that a heading of 270deg would appear best in order to satisfy all the above elements.

It is understood from the master of the Northern Explorer III that the heading can be adjusted by up to 20deg by manipulation of the mooring lines. This would allow for the vessel to stem any violent winds from 250deg round 290deg.

In July the wind as stated tends to be mainly from the north west at around 15m/sec, but the waves remain predominantly from west by south with significant heights of around 3m. This would put the wind some 45deg on the starboard bow and the swell 45deg on the port bow. Adjustment of heading would then have to be towards the more violent of the elements, and some downtime whilst waiting on weather is bound to occur.

### 9.2 Anchor Location

Yolla-2 location : 39 51' 33.82"S, 145 48' 38.53"E

Water Depth: 78m

No site data is available for Yolla-2 location, but data from site survey of Yolla-1, some 2km to the north indicates a flat featureless seabed with no evidence of surface anomalies, debris or channeling.

The TELSTRA submarine cable runs in a north by east direction (approximately 008deg) to the east of the Yolla-2 location. The closest recorded point to the location is some 3.45 miles away.

Recorded co-ordinates approximately 1mile north and one mile south of the nearest recorded point of approach are:

	39 48' 59"S	145 53' 18"E
Closest point	39 50' 53"S	145 53' 08"E
	39 58' 03"S	145 51' 36"E

### 9.3 Anchor Plan

It is understood that the anchors for the Northern Explorer III are numbered sequentially clockwise from the after port bow anchor, i.e #1 and #2 anchors are on the port bow.

The master has expressed a desire to opt for a 35deg anchor separation at the bow and similar at the stern.

This will allow for flexibility in the heading adjustment and at the same time position the bow anchors in the direction of the prevailing wind and waves.

Anchors would therefore, if the recommended heading of 270deg is used, be placed as follows :-

#1	200	#2	235	#3	305	#4	340
#5	020	#6	055	#7	125	#8	160

Each anchor leg will consist of the following :-

- 2500ft of 3" rig anchor wire to
- 750ft of 2.75" ORQ Stud link chain
- 7 ton Bruce anchor
- 325ft of 3" ground wire (minimum length - preferable in one piece)
- 7 ton Bruce back up anchor
- 325ft of 3" riser penant wire
- 50ft of 3" pigtail wire
- surface marker buoy

The chain will be in 250ft lengths and this will require 2 Kenter Joining Links per anchor leg i.e. 16 kenters. A further 8 kenters should be available as spares. ( The practice of hammering cold lead plugs into the locking pin aperture should be discouraged as it has been found on occasions that these can fail - molten lead should be poured into the locking pin aperture)

Other shackles in the system should be consistent with the breaking load of the wire.

The test certificates for all the above should be available, and the AHT should note and record the identifying number and exact positions of all the shackles in use in

the system. This is particularly important in the case of any accident or incident that may result in an enquiry.

#### 9.4 Rig Positioning

Prior to commencing run-in to new location, if time and weather permit, a gyro calibration/check should be performed.

Distance and bearing to intended location and first anchor drop are to be displayed continuously, together with speed, heading, CMG, position quality, off track distance and position of rig in geographical and grid co-ordinates. As the first anchor drop position of the relevant anchor fairlead in relation to the run-in line to be clearly seen. The system will, if selected, track the appropriate fairlead as opposed to the rig's datum. A fix is to be taken when the anchor is dropped and the GNS anchor location file updated accordingly.

As the rig continues towards location, comparison is to be made between distance travelled from the anchor drop point and the amount of chain veered to detect any anchor drag or excess of chain.

During pre-tensioning/ballasting operations, the rig's position is to be monitored

When the rig has been accepted by the Premier Survey representative and Drilling Representatives as being within the required positioning tolerance for the location a *Final Fix Analysis* is to be performed within GNS .

As a minimum, 1 hour of observations, at a 10 second interval (approx. 360 samples) is to be obtained for all positioning systems. For DGPS the observation period should include at least three constellations with PDOP less than 4 and with five or more SV's.

Before collecting DGPS data for the final fix, the satellite availability for *All-In-View PDOP vs Time* should be consulted and/or made using Mission Planning software with a recent almanac (Note: Almanacs should be valid for 3 months from date of download). The prediction should be made with an elevation mask of 15° and the appropriate curtains for the drilling rig's derrick. From the *All-In-View PDOP vs Time* prediction, a suitable period for collecting the final fix DGPS data is to be selected and advised. The minimum elevation mask to be set during the collection of the final fix DGPS data is 10° and if MultiFix 2 is in use a delta of 5° is to be set.

On completion of final fix analysis, the Premier Survey Rep and Drilling Representatives shall be advised of the rig's drill stem location in relation to the intended location and position tolerance. Graphic screen dumps should be used to ensure that all relevant personnel are fully aware of the drill stem's location.

**10. DRILL 914MM (36") HOLE - RUN 762MM (30") CASING**

This program and the procedures outlined herein are intended as a guide. The Drilling Supervisor will hold a regular morning meeting with contractor personnel to review planned operations during the next 24 hours. This project is a team effort and all personnel are expected to participate on this basis. Ideas on how to improve procedures which will result in a more efficient and safer operation will be encouraged at all times by the Drilling Supervisor.

**Objective**

**Drill sufficient 914mm (36") hole to provide 2.4m (8') from top of the 762mm (30") WH to the mud line.**

**Use lightest weight on bit reasonable to safeguard against developing hole angle.**

**914mm (36") Hole Preparation**

- Mix sufficient pre-hydrated gel mud for section and Guar Gum Hi-Vis sweeps.
- Make up 914mm (36") drilling assembly.
- Install the bullseye on the PGB.
- Paint the bottom of the 762mm (30") shoe joint white and paint 1m spacing lines on the bottom 5m of the shoe joint.
- Paint 1m spacing lines on the top 5m of the 762mm (30") below the housing joint.
- Paint the bottom of the 340mm (13<sup>3</sup>/<sub>8</sub>" ), shoe joint white and paint 1m spacing lines on the bottom 5m of the shoe joint.
- Pressure test the BOP's/choke manifold/standpipe.
- Dispatch water samples to Cement Contractor for lab testing.

**Bit Program for 914mm (36") Hole Section**

IADC	In/Out	m	WOB kg	RPM	Av ROP m/hr	Hours
1-1-1 660mm (26") + 914mm (36") hole opener	Seabed /125	34	5k - 10k	80	20	1.6

A detailed hydraulics plan will be issued prior to spud, however general guidelines are:

Nozzles : Bit - 3 x 18, 1 x 20 : Hole opener - 4 x 16

Pump Pressure : 12500 kPa

Flow Rate : 4500 lpm

### Drilling Fluid Program

Refer to Drilling Fluids Program in Appendix B for details.

Mud Type : Seawater with Hi vis sweeps ( Guar Gum & Bentonite Gel )

### 914mm (36") Hole Recommended BHA

Component	Size OD	Number	Approx. length	Comments
Bit	660mm (26")	1	0.50m	Bored for Float -Totco
Hole opener	914mm (36")	1	2.50m	
Bit Sub	241mm	1	0.50m	
Drill Collar	241mm	3	28.20m	
X/O	241mm	1	0.50m	
Drill Collar	203mm	6	56.4m	
X/Over	203mm	1	0.50m	
BHA Total			89.1m	
HWDP	127mm	3	28.2m	

### Survey Program

Totco survey at section TD.

### Potential Drilling Hazards

No problems have been reported on any of the control wells which set 762mm (30") casing at 190 - 200m depths. No problems are foreseen for this section.

### 914mm (36") Drilling Procedure

1. RIH with 914mm (36") BHA and tag seabed. Record the water depth, corrected for tide, and the air gap measurement on the IADC report noting the date and time of day.
2. Drill using hi vis Guar Gum mud sweeps and seawater. Spud the well with a maximum of 4500kg (10,000lbs) of bit weight , 70rpm and pumps at half speed until the first drill collar is buried, then increase pumps to 4500lpm (1200gpm). The seabed survey shows

the seabed to be made up of sand/shell fragments with no channeling features or debris at time of survey.

3. Drill to the approximate 762mm (30") casing point as per drilling programme, allowing 2.4m stick up above mud line to 762mm (30") wellhead .
4. Hole should be slugged with 16m<sup>3</sup> (100bbls) of Guar Gum spud mud each single.
5. At casing point displace hole with gel mud and circulate out 16m<sup>3</sup> to ensure clean hole. Drop a totco survey prior to pulling out.
6. A wiper trip should be made to check for bridges or fill. If no fill or drag is experienced, again displace with mud and pull out of hole.

#### 762mm (30") Casing

Weight kg/m	Grade	Conn.	Shoe Depth m RKB
462  (1"WT)	X-52	ST2	151

#### Wellhead & 762mm (30") Casing Running Preparation

- Clean, tally and drift casing
- Have Vecto engineer check PGB and wellhead housing as per Vecto Operating and Service Procedures.
- An open ended stinger - 1 jt drill pipe will be made up to the running tool in the mousehole to ensure cement to surface with minimum excess slurry pumped.
- Running tool will be made up prior to picking up 762mm(30") casing and racked back in derrick.
- Position the wellhead on the spider beams orienting the guide posts with the guide wires. Run the 762mm (30") casing and float shoe through the PGB. Ensure circulation is possible through the float shoe. The 762mm (30") wellhead housing will be pre-welded to the last joint of 762mm (30") casing. ST2 connections are snap ring type with pin up box down configuration. Slings will be used with the pad eyes to handle 762mm (30") casing, these will be cut off once ST2 connections are made up.
- Prior to using running tool rotate the tool stem of the cam actuated running tool to the right to push the rams back into the ram housing. Position the running tool into the

762mm(30") housing and carefully turn the tool by hand to the right until the anti-rotation pins engage slots in the 30" housing. Rotate the tool stem to the left, approximately 2 ½ turns using chain tongs. Note the position of the word 'Lock' on the tool stem. It should be immediately above the indicator ring. Then turn the tool stem back 1/8 of a turn to break any "seize".

- Pick up 762mm(30") housing joint and position over intermediate joint and make up ST2 connection. Pick up the string and cut off the landing pads, lower and land, using HWDP, the 762mm (30") housing in the PGB. Install the split retaining plates in the PGB to lock the wellhead housing in place.

### Running and Cementing Procedure

- Pick up casing/wellhead assembly with HWDP and remove the spider beams.
- Lower the assembly to the waterline. When the casing is filled with water, close the valve on the running tool.
- Run the casing and land on bottom without rotating the running string. Jump ROV to assist in stabbing of conductor into hole and to record the stick up height of wellhead above seafloor ( 2.4m recommended).
- Adjust the motion compensator to hold the weight of running string plus 25 per cent of casing weight while cementing. Do not permit the casing to sink while cement is being mixed nor float while cement is being displaced.
- Use the ROV and check the wellhead bullseye for inclination less the 1.5 degrees. Leave the camera on bottom to observe returns while cementing.
- Mix and pump cement as specified in Appendix C.

	( seabed - 150m rkb) 150% excess
Class 'G' cement	94lb sx ( 42.6kg)
Seawater	5.16 gal/sx (458ltr/mT)
D047 Antifoam	0.01gal/sx (0.9ltr/mT)
CaCl2 Accelerator	2% BWOC
Density	15.8ppg (1.9sg)
Yield	1.16cuft/sx (0.78m3/mT)
Thickening Time	+/- 2hrs
24hr Comp strength	+/- 3000psi

- Check the float shoe. Should the float not hold, shut-in at the surface and allow the cement to take an initial set prior to releasing the pressure.

- Back off the running tool, by rotating to the right approximately 2 ½ turns. When tool disengages or releases from wellhead housing the compensator will stroke closed. Pick up carefully until stinger is clear of wellhead housing and pull out of the hole.

**Materials & Equipment for 914mm (36") hole.**

<b><u>Item</u></b>	<b><u>Description</u></b>	<b><u>Qty</u></b>
1	Vecto housing assembly, 762mm (30") with full 762mm (30") x 1.5" WT casing joint w/ ST-2 box down	1
2	762mm (30") x 1"WT intermediate joint with ST-2 pin up and ST -2 box down	3
3	762mm (30") x 1"WT shoe joint with ST-2 pin up and single valve float shoe down	1
4	Vecto SG-5 Permanent Guide base, removable, plates & studs	1
5	Slope indicator on PGB	1
6	Bit 660mm(26") 1-1-1 with jets	1
7	Bit breaker plate, 660mm (26")	1
8	914mm(36") four arm hole opener with jets	1
9	Drill collars 8", 6 5/8" reg conn	9
10	O-ring for 762mm(30") running tool	1
11	Rig positioning equipment	1 set

**11. DRILL 444MM (17½") HOLE - RUN 340MM (13<sup>3</sup>/<sub>8</sub>") CASING****Objectives**

**Drill 444mm (17½") hole to a section TD of 700m, placing the 340mm (13 3/8") shoe in a competent formation to ensure good LOT.**

**Avoiding hole problems by ensuring the hole is kept clean by maximising flow rates and diligent use of Hi vis sweeps.**

**Only one bit used to drill the section by optimising hydraulics and parameters, preventing bit balling and maximising performance.**

**444mm (17½") Hole Preparation**

- Break out 914mm (36") assembly and make up 508mm (20") cement drilling assembly.
- Make up 444mm (17 ½") stabilizer BHA
- Ensure enough Hi-vis mud is available for sweeping and displacing hole.
- Measure to 340mm (13<sup>3</sup>/<sub>8</sub>") casing and 340mm (13<sup>3</sup>/<sub>8</sub>") - 508mm (20") wellhead swedge and housing to be run and calculated the depth of hole required in order to have a 9m rathole to allow for fill and other contingencies.

**Bit Program for 444mm (17½") Hole Section**

IADC	In/Out	m	WOB kg	RPM	Av ROP m/hr	Hours	Formation
1-1-5	125/700	575	15k-20k	90-140	20	29	Torquay Group

A detailed hydraulics plan will be issued prior to spud, however general guidelines are:

Nozzles : 3 x 16, 1 x 14

Pump Pressure : 20700 kPa

Flow Rate : 7500 lpm

**Drilling Fluid Program**

Refer to Drilling Fluids Program in Appendix B for details.

Mud Type : Seawater with Hi vis sweeps. ( Guar Gum & Bentonite Gel )

**444mm (17½") Hole Recommended BHA**

Component	Size OD mm	Number	Approx. length	Comments
Bit	444	1	0.5	
Bit Sub	203	1	0.5	
Anderdrift	203	1	2.54	6 5/8" Reg
Totco ring		1	-	
8" NMDC	203	1	9.4	
8" DC	203	1	9.4	
17 ½" String Stab	444	1	2.4	6 5/8" Reg
8" DC	203	1	9.4	
17 ½" String Stab	444	1	2.4	6 5/8" Reg
8" DC	203	6	56.4	
Jar	203	1	3.0	
8" DC	203	3	28.2	
X/O	203	1	0.7	6 5/8" Reg x NC50
HWDP	127	1	9.4	
HDIS		1		
<b>BHA Total</b>			<b>134.24m</b>	
HWDP	127mm	14	131.60m	

This BHA will be used to drill out the 762mm(30") shoe with 660mm (26") bit and then to drill the 444mm ( 17 ½") hole section.

**Survey Program**

Anderdrift throughout section.

Electronic Multi-shot survey at section TD.

**Potential Drilling Hazards**

Hazard	Solution / Comment
Drag / Bridging	Hole should be slugged with 5m <sup>3</sup> (35 bbls) of viscous mud prior to making connections. Increase slug size if problem not resolved. Wiper Trip at section TD / ream if necessary

**660m (26") Cement Drilling Procedure**

1. RIH with 660m (26") cement drilling assembly and tag cement. Record the depth, drill out of the 762mm (30") casing using low parameters and circulating with seawater. Drill new formation. Work bit through drilled out float shoe.
2. POOH and lay down 660mm (26") bit and pick up 444mm (17 ½") bit.

**444mm (17½") Drilling Procedure**

1. RIH with 444mm (17 ½") BHA tag new formation.
2. When string stabilizer is out of shoe drill using parameters shown above with hi vis mud sweeps and seawater with returns to seabed. Slug a 5m<sup>3</sup> (35bbls) viscous Guar Gum mud pill every single.
3. Drill to the section TD as calculated.
4. At section TD displace hole with a weighted gel mud 1.14sg.
5. A-wiper trip should be made to check for bridges or fill. If no fill or drag is experienced, run back to bottom, check for fill, drop EMS and pump BHA out carefully ensuring hole stays full of weighted mud. Pump rate should be sufficient to keep hole full and no more.

**340mm (13 3/8") Casing**

Weight kg/m	Grade	Conn.	Shoe Depth m RKB	M/U Torque Min ft-lbs	M/U Torque Opt ft-lbs	M/U Torque Max ft-lbs
101	L80	New VAM	700	14400	15900	17400

Centralizer Placement :- 2 per joint for shoe track and 1 per two joints up to 550m RKB

**340mm (13 3/8") Casing Running Preparation**

- Clean, tally and drift casing.
- Paint 340mm (13 3/8") shoe white to aid identifying the location of the shoe on TV while stabbing into the 762mm (30") housing. Soft line guides to be attached to the float shoe to aid stab in.
- The high pressure housing, running assembly will be made up and racked back in the derrick prior to drilling the 444mm ( 17 ½") hole.
- Prior to using running tool rotate the shaft of the running tool to the right (unlock) and push the dogs into place.

**Running and Cementing Procedure**

- Run a string of 340mm (13 3/8") OD 101kg/m casing with New VAM connectors.

- Fill the casing with water as run. Ascertain that circulation is possible through the shoe.
- Torque the casing as per New VAM make up torque limits. Do not weld casing.
- Install the 340mm (13 3/8") New VAM x BTC crossover, 340mm (13 3/8") BTC to 508mm (20") swedge and 476mm (18 1/4") housing in the casing string.
- Lower the running tool into the high pressure wellhead housing, rotate the tool stem to the left approximately five times until it stops (lock), do not force. Verify that the word 'lock' is just visible above the housing. Run on HWDP. Fill the drill pipe every stand. Stab the 340mm (13 3/8") casing into the 762mm (30") housing. Observe the stab on TV.
- Break circulation prior to landing the high pressure housing. Land without rotating the running string. Make pick-up test of 22700kg (50,000lbs) over string weight to verify lockdown. Check bullseye with ROV.
- Mix and pump the cement as specified in Appendix C.

	Lead ( seabed - 550m rkb) 100% excess	Tail ( 550m - 700m rkb) 100% excess
Class 'G' cement	94lb sx ( 42.6kg)	94lb sx ( 42.6kg)
Seawater	15.17 gal/sx (1347ltr/mT)	5.32gal/sx (472ltr/mT)
Drillwater		
D047 Antifoam	0.01 gal/sx (0.9ltr/mT)	0.01 gal/sx (0.9ltr/mT)
D075 Extender	0.5gal/sx (44.4ltr/mT)	
D300 FLAC		
D145 Dispersant		
D110 Retarder		
Density	12.0ppg (1.44sg)	15.8ppg (1.90sg)
Yield	2.55cuft/sx (1.69m3/mT)	1.16cuft/sx (0.78m3/mT)
Thickening Time	+/- 3hrs	+/- 6hrs
24hr Comp strength	+/- 500psi	+/- 4500psi

- Do not overdisplace the casing, Pump at reduced rate for half shoe track volume until plugs bump.
- Check the float shoe. If the float holds, slack off and check PGB for subsidance, if okay release the running tool by rotating the running string to the right approximately five turns and pick up carefully the running string. Should the float not hold, shut-in at the surface and allow the cement to take an initial set prior to releasing the pressure.
- Observe returns while cementing. At completion of cement job, back out the running tool and wash out the wellhead and thoroughly to remove any cement that might have accumulated in the wellhead.

**Materials & Equipment for 444mm (17 1/2") hole.**

<b><u>Item</u></b>	<b><u>Description</u></b>	<b><u>Qty</u></b>
1	Vecto 18 3/4" high pressure wellhead housing with housing extension 508mm(20") x 1"WT crossed over 13 3/8" BTC pin down	1
2	340mm (13 3/8") BTC box to 340mm (13 3/8") New VAM pin crossover	1
3	340mm (13 3/8") 101kg/m L80 New VAM Casing	53
4	340mm (13 3/8") 101kg/m L80 New VAM Casing shoe joint	1
5	340mm (13 3/8") 101kg/m L80 New VAM Casing collar joint	1
6	Centralizers 340mm (13 3/8") bow type	10
7	660mm (26") bit, 1-1-1	1
8	444mm (17 1/2") bit 1-1-1 with jets	1
9	Bit breaker plate 660mm	1
10	Bit breaker plate 444mm	1
11	Anderdrift 8" , with 6 /58" reg conns	1
12	NMDC 8"	1
13	444mm (17 1/2") string stablizer	2
14	8" drilling jars	3
15	Klampon protectors 444mm	3
16	Running tool for high pressure wellhead housing	1
17	AX gasket	2
18	O-ring for 18 3/4" wellhead housing running tool spare	1
19	Wear bushing for 18 3/4" housing	1
20	Combination running and testing tool for running WB and testing 18 3/4" housing	1
22	O-ring for running and testing tool	1
23	Tam packer with 340mm (13 3/8") element	1
24	Hevi Wate DP 5"	30

## 12. DRILL 311MM (12¼") HOLE - RUN 244MM (9<sup>5</sup>/<sub>8</sub>") CASING

### Objective

- Minimise formation damage through good mud management and tripping practices i.e. avoiding the need to back ream.
- Minimise open hole exposure by drilling as quickly and safely as possible.
- Achieve good hole quality for extensive wireline logging program.

### Function Testing the BOP stack

Ram position to be as follows, top down :- Blind/shear, 127mm (5") pipe, Variable bore, 127mm (5") Pipe.

Function test BOP's prior to running. Note gallons to function and closing time.

Complete the BOP test and inspection affidavits and send to shore for filing.

### Running the Stack and Riser

The pressure and function test will be completed outside the critical path. Other preparations for running the BOP will proceed simultaneously in order to have the stack ready to run as soon as possible after cementing the 340mm (13<sup>3</sup>/<sub>8</sub>") casing,

- Position the BOP stack on the spider beams. Insert the guide lines in the posts of the BOP stack.
- Install and lock the lower marine riser package onto the 476mm (18 ¾") BOP stack with a new standard AX ring gasket.
- Install a new standard AX ring in the wellhead connector. Clean and grease with proper lubricant. Function test all preventers, failsafe valves, and the WH connector from both pods while BOP is sitting on spider beams.
- Insert the guide lines in the marine riser guide frame.
- Place the marine riser handling spider on the rotary table.
- Pick up a double joint of marine riser that has been previously racked back in the derrick using the marine riser handling sub. Lower the marine riser joint through the marine riser handling spider and make up to top of the ball joint.
- Pick up the BOP stack, remove the spider beams and lower the marine riser joint until it can be landed on the marine riser handling spider. Continue to run the marine riser spacing out as necessary. Test the choke and kill line as run. (Every third joint to 34.5MPa, (5000psi)).

- Pick up the telescopic joint (locked in the closed position) and attach to the riser assembly.
- Remove the pins that lock the slip joint in the closed position.
- Stroke out the slip joint inner barrel and pick up entire assembly. Remove the marine riser handling spider and the lower slip joint through the rotary table until the riser tensioning cables can be installed on the riser tensioning ring on the outer barrel of the slip joint. Adjust the tension on the cables to support approximately 125 percent of the weight of the marine riser.
- Install the air operating line to the slip joint packing gland; 5 to 10 psi (34kPa - 68kPa) is normally sufficient pressure to maintain an effective seal against the hydrostatic head of the drilling fluid. Install the choke line to the terminal fitting on the slip joint. Install the diverter package.
- Tension the guide wires for landing the BOP stack.
- Lower the riser and the BOP stack until the wellhead connector of the BOP stack is landed in the wellhead housing. Observe the landing with the TV.

Note: The wellhead connector should be open when the connector is on the spider beams and the control valve maintained in the open position until it is landed on the wellhead housing. Lock the BOP stack on the wellhead housing with 10.3MPa (1500psi). A pick up test of 22.6k kg (50,000lbs) above stack weight should be performed to ensure the connector is latched.

- Land and lock the diverter housing.
- Reduce the tension in the guide wires to 34.4MPa ( 5000psi). Set riser tension to +/- 18.1k kg (40,000lbs).
- Test the wellhead connector and casing against the blind/shear rams to 3.4MPa (500psi) for 30 minutes. Re-check permanent datum ( top of 476mm (18 ¾") housing) and ram space out with a painted test joint.
- Run the 476mm (18¾") nominal seat protector.
- Prior to drilling out cement, close the diverter bag on the drill pipe and function test the system. Check and record choke line friction and check hang off space out. Perform hang-off on second pipe rams from the bottom.

### **311mm (12¼") Hole Preparation**

- Break out 444mm (17½") BHA and make up 311mm (12 ¼") drilling assembly
- Install the 476mm (18¾") BOP stack and marine riser
- Pressure test the BOP stack on the test stump
- Ensure adequate mud is mixed to drill the section
- Measure to 244mm (9<sup>5</sup>/<sub>8</sub>") casing and wellhead housing to be run and calculated the depth of hole required in order to have a 9m rathole to allow for fill and other contingencies.
- Test the casing against the blind/shear ram to 7MPa (1000psi) prior to drilling out.
- Pump through choke and kill line at 45 and 90 SPM to measure the circulating pressure loss. Record along with mud weight. Repeat every hour.

### Well Control

The following abnormal pressure indicators will be monitored below surface casing :-

*DxC exponent*

*Cuttings morphology in shales*

*Gas Levels*

*ROP*

*Mud properties*

Conduct well control drills routinely in line with Northern Offshore policy & procedures and the Petroleum (Submerged Lands) Act

Test BOP's after setting each casing string or every 14 days operations.

Run and report slow pump rates daily

### Bit Program for 311mm (12¼") Hole Section

IADC	In/Out	m	WOB kg	RPM	Av ROP m/hr	Hours	Formation
M122	700/2400	1700	8-15k	12/140	60	29	Torquay, Demons Bluff, Eastern View Coal Measures
5-4-7	2400/2650	250	20-30k	70/80	15	18	EVCN
M433	2650/3350	700	8-15k	12/140	40	20	EVCN

A detailed hydraulics plan will be issued prior to spud.

**Drilling Fluid Program**

Refer to Drilling Fluids Program in Appendix B for details.

Freshwater KCl/ PHPA / Polymer

Density (SG)	PV (cps)	YP (pa)	Gels (pa)	KCl (%w/w)	pH	Drill Solids	MBT (kg/m <sup>3</sup> )	API fluid loss
1.1 -1.2	ALAP	8.6 -10.5	2.4/4.8-7.2/14.4	5 or as hole cond dictate	+/- 9	<6 % v/v	<71.5	6 - 8

**311mm (12¼") Hole Recommended BHA**

Component	Size OD mm	Number	Approx. length	Comments
Bit	311	1	0.5	
Bit Sub	203	1	0.5	
Anderdrift	203	1	2.54	6 5/8" Reg
Totco ring		1	-	
8" NMDC	203	1	9.4	
8" DC	203	1	9.4	
12 ¼" String Stab	311	1	2.4	6 5/8" Reg
8" DC	203	1	9.4	
12 ¼" String Stab	311	1	2.4	6 5/8" Reg
8" DC	203	6	56.4	
Jar	203	1	3.0	
8" DC	203	3	28.2	
X/O	203	1	0.7	6 5/8" Reg x NC50
HWDP	127	1	9.4	
HDIS		1		
<b>BHA Total</b>			<b>134.24m</b>	
<b>HWDP</b>	<b>127mm</b>	<b>14</b>	<b>131.60m</b>	

**Survey Program**

Anderdrift throughout section.

Electronic Multi-shot survey at section TD.

**Potential Drilling Hazards**

Hazard	Solution / Comment
Drag / Bridging	Increase mud weight to a maximum of 1.2s.g. Wiper trip / ream if necessary
CO <sub>2</sub> Contamination	KCl/polymer/PHPA drilling fluid system will be not be affected by this form of contamination.
Losses	Self healing losses have been encountered in the upper half on the Angahook formation on previous wells of up to 47.7m <sup>3</sup> (300bbls).
Washout/Sloughing	Maintain low end rheology of drilling fluid with temperature stable polymers, prevent turbulent flow.

**311mm (12¼") Drilling Procedure**

1. Pick up grade "G" drill pipe or better to maintain 68k kg (150Kips) overpull (minimum).
2. Run the 340mm (13<sup>3</sup>/<sub>8</sub>") wear bushing.
3. RIH with 311mm (12¼") BHA and tag cement. Record the depth, drill out of the 340mm (13<sup>3</sup>/<sub>8</sub>") casing using low parameters.
4. After drilling out cement and cleaning to bottom, drill 3m of new formation. Circulate and condition the mud and perform FIT to 1.75sg.
5. Drill to the core point as given in the formation evaluation section of Appendix A.
6. Pull out of hole and make up and run in with coring assembly. Core as per Appendix A.
7. Retrieve core and break out as per formation evaluation programme.
8. Run in hole with drilling assembly ream to bottom and drill ahead to programmed TD.
9. Wiper trips should be made initially every 24 hours.

**244mm (9<sup>5</sup>/<sub>8</sub>" ) Casing**

Weight kg/m	Grade	Conn.	Shoe Depth m RKB	M/U Torque Min ft-lbs	M/U Torque Opt ft-lbs	M/U Torque Max ft-lbs
79	L80	New VAM / VAM ACE	3350 +/- 10%	14400	15900	17400

Centralizer Placement:- 2 per joint for shoe track and 1 per joint up to 100m above the zone of interest.

**244mm (9<sup>5</sup>/<sub>8</sub>" ) Casing Running Preparation**

- Clean, tally and drift casing - 244mm (9 5/8") {79Kg/m casing is special drift for 216mm (8 1/2")}, and VAM ACE x New VAM crossover.
- Retrieve 340mm (13<sup>3</sup>/<sub>8</sub>" ) wear bushing.
- Torque the casing as per New VAM /VAM ACE make up torque limits. Do not weld casing. VAM ACE will be run first then crossed over to New VAM.
- The casing shoe, float collar, and all casing collars on the bottom two joints will be thread locked.
- Make up the 244mm (9 5/8") BTC pin x 244mm (9 5/8") cement wiper plug launching assembly on bottom of running tool. Lower assembly

**Running and Cementing Procedure**

- As soon as float equipment is picked up check floats for circulation.
- Fill the casing with water as run. Calculate the running speed to avoid excessive surge pressures.
- After installing the pup joint and hanger, the 244mm (9<sup>5</sup>/<sub>8</sub>" ) casing will be run on casing 244mm (9<sup>5</sup>/<sub>8</sub>" ), using the full bore running tool. ( This will be crossed over from BTC back to New VAM for the running string. )
- When the casing is landed and cement head and lines connected, break circulation slowly.
- While circulating , keep the annular velocity the same as used when drilling.

- Mix and pump cement as per Appendix C.

	Lead ( 600m - 2750m rkb) 50% excess	Tail ( 2750m -3350m) 50% excess
Class 'G' cement	94lb sx ( 42.6kg)	94lb sx ( 42.6kg)
Seawater	9.75 gal/sx (865ltr/mT)	
Drillwater		3.99gal/sx (354ltr/mT)
D047 Antifoam	0.01gal/sx (0.9ltr/mT)	0.03 gal/sx (2.7ltr/mT)
D075 Extender	0.35gal/sx (31.1ltr/mT)	
D300 FLAC		0.90gal/sx (79.9ltr/mT)
D145 Dispersant		0.25gal/sx (22.2ltr/mT)
D110 Retarder	0.25gal/sx (22.2ltr/mT)	0.03gal/sx (2.7ltr/mT)
Density	13.2ppg (1.58sg)	15.8ppg (1.90sg)
Yield	1.86cuft/sx (1.24m3/mT)	1.16cuft/sx (0.78m3/mT)
Thickening Time	+/- 5.5hrs	+/- 4hrs
24hr Comp strength	+/- 1000psi	+/- 4200psi

- Do not overdisplace the casing, Pump at reduced rate for half shoe track volume until plugs bump. Check the float.
- Observe returns while cementing. At completion of cement job, back out the running tool and wash out the wellhead and BOP's thoroughly to remove any cement that might have accumulated in the wellhead, BOP's or riser.

#### **Setting and Testing the 244mm (9<sup>5</sup>/<sub>8</sub>") Seal Assembly**

- Have wellhead service engineer on board to set 244mm (9<sup>5</sup>/<sub>8</sub>") seal assembly. Run on 203mm (8") drill collars and HWDP. Have spare seal on board.
- Test seal assembly to 34.5MPa (5000psi). Do not collapse the 244mm (9<sup>5</sup>/<sub>8</sub>") casing.
- Test the BOP stack and choke manifold to 34.5MPa (5000psi), and the annular to 17.6MPa (2500psi) prior to cleaning out the 244mm (9<sup>5</sup>/<sub>8</sub>") casing.

#### **Testing**

The testing programme will be issued separately.

**Materials & Equipment for 311mm (12 ¼") hole.**

<b><u>Item</u></b>	<b><u>Description</u></b>	<b><u>Qty</u></b>
1	Vecto casing hanger 18 ¾" x 244mm ( 9 5/8") made up on a pup joint of 244mm ( 9 5/8") New VAM casing	1
2	Vecto full bore running tool for 18 ¾" x 244mm ( 9 5/8") casing hanger with 244mm (9 5/8") BTC box up	1
3	O-ring for 18 ¾" x 244mm ( 9 5/8") full bore running tool	1
4	Vecto seal assembly, torque set for 244mm ( 9 5/8") casing	1
5	O-ring for 244mm (9 5/8") seal assembly	1
6	Running tool for seal assembly	1
7	Test tool, lands in 244mm ( 9 5/8") seal assembly	1
8	Wear bushing , 18 ¾" x 244mm ( 9 5/8") for torque set seal assembly	1
9	244mm (9 5/8") 79kg/m L80 Special drift VAM ACE shoe joint	1
10	244mm (9 5/8") 79kg/m L80 Special drift VAM ACE collar joint	1
11	244mm (9 5/8") 79kg/m L80 Special drift VAM ACE casing	1
12	244mm (9 5/8") 79kg/m L80 Special drift New VAM casing	275
13	244mm (9 5/8") 79kg/m L80 Special drift New VAM box x VAM ACE pin crossover	1
14	244mm (9 5/8") 79kg/m L80 Special drift New VAM box x BTC pin crossover	1
15	Centralizers, bow type	55
16	Klampon protectors 244mm	1
17	Tam packer with 244mm (9 5/8") element	1
18	311mm (12 ¼") bits	4
19	Bit breaker plate 311mm	1
20	Anderdrift 8" , with 6 /58" reg conns	1
22	NMDC 8"	1
23	311mm (12 ¼") string stablizer	3
24	8" drilling jars	3
25	Sidetrack package	1 set
26	Fishing tools	as req'd
27	Surface plug set equipment including ball and dart launching manifold	1

**APPENDIX A**

**GEOLOGY SUMMARY**

**&**

**FORMATION EVALUATION**

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**1. WELL OBJECTIVES**

1. To establish the productivity of major gas and oil bearing intervals.
2. To accurately determine the extent of net reservoir sands.
3. To add substantial reserves to proven category.
4. To accurately define the composition of reservoir fluids.
5. To test up-side potential of deeper onlapping sands.
6. To ensure an economic accumulation is not left up-dip of Yolla-2 if the well is dry.

## 2. GEOLOGY

### 2.1. General

The Yolla-2 appraisal well is designed to further evaluate the hydrocarbons present in the sands of the Eastern View Coal Measures (EVCN) in the Yolla-1 discovery. The well is located 2350m SSE of the Yolla-1 surface location and approximately 50m structurally lower at reservoir level.

### 2.2. Structure

The Bass Basin is a late Mesozoic - Cainozoic intra-cratonic basin, trending northwest-southeast between Victoria and northern Tasmania. It is separated from the Torquay Sub-basin to the west and northwest by the King Island - Mornington Rise, which began to form in the Miocene, and from the Gippsland Basin to the east by the Palaeozoic rocks of the Bassian Rise.

Structurally the Yolla prospect is a faulted Jurassic palaeo high (volcano) which is overlain with, and onlapped by sediments of the Upper and Lower Eastern View Coal Measures.

### 2.3. Reservoir Stratigraphy

It is expected that the Late Eocene, Top Eastern View Coal Measures will be encountered at around 1887 mMD, the section is made up of sands, silts coals, muds and volcanics deposited in a complex mixture of distributary channels, strandline sand bars, peat swamps and shallow lagoons. An unconformity of possible regional extent, the *M.diversus* (prognosed at 2465 mMD in Yolla-2) is used informally to divide the ECVN into Upper and Lower.

On the whole the Lower Eastern View Coal Measures are comprised of finer grained clastics. In the Yolla permit these clastics onlap the volcanic pile and are envisaged to be well developed at the Yolla-2 location.

Because of the potential for intraformational seals in the marine section, the well is intended to make a substantial penetration of the stacked fluvial sandstone of the Early Cretaceous Lower Pretty Hill Formation.

The TD is planned at 3350 mMD +/- 10% to take into consideration penetrating potential interbedded volcanics and clastics that may contain hydrocarbons.

The overlying Upper Eocene marginal marine Demons Bluff and the Oligocene to Recent marine Torquay Group stratigraphy is expected to be similar to that encountered in Yolla-1.

**2.4. Predicted Section**

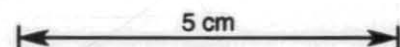
See accompanying Figure.

**PremierOil**  
Australasia  
T/RL1 - BASS BASIN  
**PREDICTED SECTION**  
**YOLLA-2 APPRAISAL**

STRATIGRAPHY		LITHOLOGY	REMARKS	DEPTH		
				metres below K.B.	metres subsea	TWT (msec)
Seismic Marker *			"Sea Floor"	91	78	108
<b>TERTIARY</b>	<b>MIOCENE TO RECENT</b>	<b>TORQUAY GROUP</b>	"Recent - Mid Miocene"			
			"Mid Miocene"	580	567	510
			"Lower - Mid Miocene"	828	815	693
			"Miocene Volcanics"	1281	1268	1127
			"Oligocene Unc"	1376	1363	1199
	<b>OLIGOCENE</b>	<b>EASTERN VIEW GROUP</b>	"Demonic Bluff Formation"	1483	1470	1269
			"Top EVCm"	1733	1720	1431
			"Early Eocene"	1887	1874	1539
			"Middle M. diversus"	2286	2273	1792
			"Near Top 2718 Sand"	2465	2452	1907
<b>EOCENE</b>	<b>EASTERN VIEW GROUP</b>	"Early Palaeocene"	2723	2710	2038	
		"Deep Onlap Seismic Event"	2938	2925	2149	
			3238	3225	2289	
<b>PALAEOCENE</b>	<b>EASTERN VIEW GROUP</b>		3313	3300	2324	

PTD -3300mSS

LOCATION : Seismic Line - Inline 465 CDP 878  
 Latitude - 39°51'33.82"S  
 Longitude - 145°48'38.53"E  
 K.B. Elevation - 13 metres



### 3. OVERVIEW

The Operator on behalf of the Joint Venture Partners hopes to provide a fit for purpose and cost effective Formation Evaluation programme for the Bass Basin drilling campaign. In order to achieve this goal the Operator will utilise Mud Logging, Wireline Logging and Formation pressure testing/sampling, VSP survey, and an extensive core acquisition program with appropriate Routine and Special Core Analysis (SCAL).

The Operator with the input of the Joint Venture would like to be able to modify the program at short notice should hole/weather conditions during the Formation Evaluation program dictate that the program be curtailed.

#### 4. MUD LOGGING

Geoservices will provide a state of the art computerised mudlogging and engineering data acquisition service comprising a data engineer and mud logger on each 12 hour tour.

##### Services will include:-

- A full well pressure monitoring service
- Continuous monitoring of drilling and geological parameters
- Calculated data analysis as required
- Daily and interval reporting
- Logs and graphs of drilling parameters vs time and/or depth
- Mudlog to be electronically transmitted in digital form on a daily basis to Premiers Perth office

Drilling parameters only will be recorded down to the 13<sup>3</sup>/<sub>8</sub>" casing shoe at approximately 700m MD. Cuttings will be collected when the BOP's and marine riser are connected prior to drilling the 12<sup>1</sup>/<sub>4</sub>" hole.

The mud loggers will bag, pack and distribute the samples as follows:

Sample Distribution	Hole Section	Frequency (m)	Unwashed (Sets)	Unwashed (Quantity)	Washed and Dried (Sets)	Washed and Dried (Quantity)
Premier Oil Australasia	12 <sup>1</sup> / <sub>4</sub> " Hole	5m to	1	300g	2	100g
		1750m 3m to TD	1	300g	2	100g
Boral	12 <sup>1</sup> / <sub>4</sub> " Hole	"	"	"	1 1	100g 100g
Minerals Resources Tasmania	12 <sup>1</sup> / <sub>4</sub> " Hole	"	"	"	1 1	100g 100g

Additionally 1 Samplex sample tray will be collected and geochemistry samples taken at twenty metre intervals below the 340 mm (13<sup>3</sup>/<sub>8</sub>") shoe.

## 5. CONVENTIONAL WIRELINE LOGGING

It is the intention of the Operator to have a fit for purpose and cost effective wireline logging programme comprising a standard, firm logging package and optional tools for additional evaluation should they be required.

### 5.1. Firm Logging Program

The following tools will be run as a Super-Combo should hole conditions permit. These logs are viewed as the essentials in evaluating the formation.

- Auxiliary Measurement Sonde (AMS)
- Standard Gamma Ray (SGT)
- Digital Sonic Tool (SDT)
- Litho-Density Tool (LDT)
- Compensated Neutron Tool (CNT)
- Dual Laterlog (DLT)
- Micro-Spherically Focused Tool (MSFL)

### 5.2. Optional Logging Tools

The optional logging tools will be introduced as need arises. Their introduction into the program should be supported by a clear understanding of the value that they add.

Optional Logging Tools shall be provided comprising:

- Fullbore Formation MicroImager Log (FMI)
- Modular Formation Dynamics Tester Log (MDT) complete with pump-out sub and 2 x 2<sup>3</sup>/<sub>4</sub> gal & 3 x 1 gal PVT chambers
- Fast response quartz pressure gauge
- Combinable Magnetic Resonance Tool (CMR)
- Natural Gamma Ray Spectroscopy Tool (NGT)
- Stratigraphic High-Resolution Dipmeter Tool (SHDT)
- Sidewall Coring guns (CST)

**PROPOSED LOGGING RUNS**

Logs will be run from TD to the 13<sup>3</sup>/<sub>8</sub>" casing shoe. The 17<sup>1</sup>/<sub>2</sub>" hole will be logged behind the 13<sup>3</sup>/<sub>8</sub>" casing when the final TD logging is run. Should 9<sup>5</sup>/<sub>8</sub>" casing be run prior to reaching TD and before intersecting the zones of interest the Operator will run one suite of intermediate wireline logs.

	<b>Indicate if Firm or Optional</b>	<b>Yolla-2</b>
<b>FINAL LOGGING SUITE</b>		
*Gamma-Sp-Caliper-Resistivity-Density-Neutron-PEF-Array Sonic	Firm	Run in the Platform Express (PEX) configuration (Conventional tools will be used as backup)
*High Resolution Dipmeter (SHDT) acquired with the FMS tool	Optional	Objective to obtain structural and stratigraphic dip information, FMS data will also be acquired and purchased at a later stage should it be required
Nuclear Magnetic Resonance (CMR)	Optional	Objective to determine Porosity and permeability. Dependent on poor core recovery
**Modular Dynamics Formation Tester (MDT)	Firm	Objective to obtain baseline formation pressure profile in reservoir sands, to confirm hydraulic continuity and to sample zones of interest( up to 50 pressures and 3 samples)
*Sidewall Cores(CST)	Optional	Contingent on core recovery, and/or hydrocarbon evaluation (contact definition) and/or age dating. Anticipate 30 shots
*VSP	Firm	A maximum of 50 levels to obtain velocity information and time correlation to surface seismic (cased or open hole depending on operational requirements/hole condition)

\*

## 6. VSP ACQUISITION

It is anticipated that most of the VSP's will be zero offset.

VSP equipment will be required but not limited to:

- 1 x seismic logging unit (including processing capabilities so that a field processed corridor stack in digital and hard copy form is available immediately after the VSP)
- 1 x Airgun Unit, to provide the optimal type and size of source for a water depth of approximately 80m.
- Downhole Geophones with noise reduction capabilities, including the ability to discriminate against tube waves would be considered important; wall locked geophones suitable for vertical or deviated wells and to run in either cased or open hole as required; three component sensors and gimballed tri-axial assembly is required.
- 1 x high pressure air supply
- 1 x Artemis and DGPS system for remote positioning
- 1 x remote source controller
- 1 x adapter to run on wireline logging contractors wireline
- Spares as necessary

### 6.1. VSP Data Processing

VSP data processing will include paper prints of VSP/Synthetic Seismogram composite displaying:-

- Corridor stack
- Synthetic Seismogram
- Drift curve
- Drift corrected sonic log
- Density Log
- Reflection Coefficient Log
- Acoustic Impedance Log
- Gamma ray, caliper, resistivity and any other selected log
- T-D listing of drift corrected check shots

Each composite will be displayed in Zero Phase SEG negative. For each phase, three different filter versions are required.

Digital VSP data in SEG-Y format is required and should include the unscaled, unfiltered, corridor stack and the scaled, filtered corridor stack, with possibly three different filters applied. Digital data in SEG-Y format of the Synthetic Seismogram is also required.

**7. DATA TRANSMISSION AND PROCESSING**

**7.1. Log Data Transmission Services**

Logging contractor will provide log data transmission services from the drillship to Perth. Contractor shall provide edited LIS format tapes and a minimum of 2 sepi + 5 paper prints of such data to Premier in Perth within six 3 days of successful transmission from the drillship.

**7.2. Log Analysis Services**

Logging contractor shall provide computerised log analysis services including image and dipmeter processing when requested.

## 8. YOLLA CORING PROGRAM

The objective of the coring programme is to provide direct evaluation of reservoir properties, wireline log calibration data, and geological modelling information.

Due to relatively poor core recoveries in Yolla-1 the Operator will utilise an antiwhirl face discharge bit in the coring BHA to minimise core damage during cutting. A disposable aluminium inner core barrel will also be used, this will act as a ready made core transportation system.

Two 18 metre cores are required to be cut in the Palaeocene to Early Eocene reservoir sequence (ideally the Z1S2809 and Z3S2973 sands if developed and hydrocarbon bearing in Yolla-2).

Cores will be cut in the objective section if good hydrocarbon shows are encountered. A "good hydrocarbon show" is defined here as an interval of at least 2m with evidence of sufficient porosity, permeability, and hydrocarbon saturation that it would be likely to produce if tested.

In addition, Yolla-1 offset data will be utilised in choosing coring point. Both the Z1S2809 and Z3S2973 sands have thin hydrocarbon bearing sands directly above them the Z1S2755 and Z3S2952 respectively in Yolla-1. This will allow the Wellsite Geologist once he has picked up the thin hydrocarbon bearing sands in Yolla-2 to isopach down using Yolla-1 sand thicknesses to pick coring point. Drilling will have to be controlled to 15m/hour 50m above the prognosed coring point.

Once the core is cut, brought to the surface, marked up and cut into 1 metre sections, the wellsite geologist can take rock chips from each end of the core for lithological and show evaluation, after which the core will be "resinated". Non fluorescing resin is poured down the annulus of the 1 metre sections to further stabilise the core for transportation and reduce fluid evaporation.

The core will then be carefully packed and shipped in a normal sea container as soon as possible to the Operator's shore base facility for forward air freighting to the Operators Core analysis Laboratory in Perth

Core plugs will not be taken in isolation. Before choosing plugs core gamma, probe permeability, Brinell Hardness, core photography and a core description will have been undertaken. Plugs will be taken at 30cm intervals to ensure that samples are not statistically biased. Plugs will be taken parallel to bedding and not across bedding planes.

The plugging intensity will have to be greater in the more heterogeneous formations. 5% of plugs cut will be vertical, and they will be chosen on the grounds of the preliminary information above. These plugs will be cut in the more homogeneous sands.

It is anticipated that 50 to 60 plugs cut in homogeneous sands will be sent for SCAL. The core analysis results will become available more quickly if SCAL and routine core analysis are run concurrently. Porosity/permeability measurements will be undertaken on the SCAL samples to help choose plugs for capillary pressure measurements.

The SCAL program is minimal and will be reviewed when we have actual core in the Operators chosen core laboratory. In particular, the extent of analysis done at Net Overburden Pressure (NOBP) will depend on how unconsolidated the sand is, as little meaningful ambient data can be collected on totally unconsolidated material. It is not anticipated that whole core analysis will be carried out on the first well. The whole core needs to be removed before the core is slabbed and on the first well we will not know the amount or how to identify the appropriate laminated sections if present.

### 8.1. Core Processing

- Slabbing core in resinated aluminium barrels
- Core gamma
- Drilling, trimming and sleeving core plugs
- Profile permeametry
- UV and white light photography
- Core lithological description
- Residual fluids if required (retort method )
- Brinell Hardness

### 8.2. Routine Core Analysis

- Cleaning and drying
- Porosity
- Permeability
- Grain density
- Sieve analysis

### 8.3. Special Core Analysis

- Thin section preparation and 250 point count
- Formation factor - multiple salinity (4 brines)
- Resistivity index, overburden, per liquid saturation
- CEC wet chemistry
- Specific liquid permeability

- Capillary pressure, OB, centrifuge, overburden drainage and imbibition
- Air Brine Pc, overburden centrifuge, drainage
- Gas-oil relative permeability, centrifuge, coreflood, steady-state
- Rock compressibility
- Rock Strength

## 9. DATA DISTRIBUTION

### 9.1. Cuttings

Sets of cuttings will be distributed at the conclusion of drilling. Addresses will be advised.

### 9.2. Cores

The one meter lengths of aluminium and resin encapsulated core will be carefully packed and shipped in a normal sea container as soon as possible to the Operator's shore base facility for forward shipment to the Operators Core analysis Laboratory in Perth.

### 9.3. Geochemistry Samples

When spot samples of cuttings, core chips, rig lubricants or mud are taken for geochemical analysis, send them to Premier Oil, Perth, attention Operations Geologist.

### 9.4. Sidewall Cores

Sidewall cores are to be delivered or hand carried to Premier Oil, Perth, attention Operations Geologist.

### 9.5. Wireline Logs

For each suite:

An ASCII file of principle logs sampled at .1524m will be created on floppy disk and transmitted digitally to Premier Oil. The file should be prepared and transmitted between logging runs.

Fax a print of each log (1:500) to Premier Oil as soon as possible.

Copies of all logs will be dispatched to Premier Oil, Perth as follows:

Film:	1 copy at 1:500 and 1:200
Paper Prints:	5 copies of each film
Digital Tape:	1 tape LIS format

Processing at a computing centre of SHDT and VSP will be required, along with FMI and CMR if run. Five copies of each report will required.

At the conclusion, an LIS edit tape for the well.

## 9.6. Mudlog

The mudlog is to be brought up to date at 0600 hours (Perth time) each morning with the information available at that time. The mudlog for the previous 24 hours progress is to be faxed to Premier Oil, Perth by 0730 hours - attention Operations Geologist.

An ASCII file of drill rate, chromatograph and other relevant curves for the same period will be prepared and transmitted to Premier Oil at the same time.

At the conclusion of drilling the following copies of the Mudlog, Pressure Log and Gas Ratio Log are required:

Film:	1 copy
Prints:	5 copies
3 1/2" disk:	1 copy ASCII file of relevant logs

A full report (5 copies) will be provided after the conclusion of the well.

## 9.7. Hydrocarbon Samples

Water and gas samples from DSTs and all fluid samples recovered from the MDT will be retained by Premier Oil for analysis.

## **10. REPORTING REQUIREMENTS**

The reporting requirements are summarised in the table below. All daily reports to partners will be sent at about 0900 hours from the Perth office. All times refer to Perth time.

### **10.1. Geological**

#### **10.1.1. Geological Reporting**

The Daily Geological Report covering the samples available in the period 0600 to 0600 hours is to be sent to Premier Oil, Perth by 07:30 hours - attention Operations Geologist. Status report to be made by telephone to Operations Geologist at 1600 hours.

#### **10.1.2. Mud Logging, LWD and Wireline Logs**

See sections 5.6, 5.7 and 5.8 above.

**APPENDIX B**

**DRILLING FLUID PROGRAM**

**DRILLING FLUID PROGRAM**

**914MM HOLE / 762mm (30") CASING TO 138 M (RKB)**

**444MM (17½") HOLE / 340mm (13¾") CASING TO 700 M (RKB)**

**SYSTEM DISCUSSION**

These sections are to be drilled with seawater, slugging the hole on connections with high viscosity /high yield point fluid. No shallow gas has been encountered on offset wells.

To provide adequate lifting capacity and ensure clean hole, high volume, high viscosity pills are to be pumped every single or as deemed necessary – 120+ vis, 8 -12 m3. This pill volume is sufficient to cover ca. 20 M annular volume. The frequency of these pills should be increased if there is any indication of poor hole cleaning, eg fill on connections.

For the 444mm (17½") section, the same system is to be used. The volume of hi-vis pills is reduced, 5 m3 every single.

To reduce drill water requirements and provide a more economical fluid, guar gum rather than bentonite is to be used to build the hi-vis sweeps.

Prior to check trip and also the conductor/casing run, the open hole is to be over-displaced with viscous bentonite mud to minimise fill. The final displacement mud is to be un-weighted.

Sufficient chemicals are to be onboard to spud the well twice.

A contingency stock of drilling detergent should be held in the event of bit balling. 2% v/v is recommended in all sweeps pumped should this occurrence be noted.

**SPUD SYSTEM**

**914mm (36") Hole / 762mm (30") Casing to 156 M (RKB)**

**444mm (17½") Hole / 340mm (13¾") Casing to 700 M (RKB) (Cont'd)**

**SYSTEM FORMULATION PER CUBIC METRE**

**HI-VIS SWEEPS**

Sea Water: 0.99 m3

Guar Gum: 10.0 kg/m3

**BENTONITE DISPLACEMENT FLUID**

Drill Water: 0.97 m3  
 Soda Ash: 0.72 kg/m3  
 Caustic Soda: 0.72 kg/m3  
 Bentonite: 85.8 kg/m3

**914mm Hole / 762mm (30") Casing to 156 M (RKB)**

**444mm Hole / 340mm (13<sup>3</sup>/<sub>8</sub>") Casing to 700 M (RKB) (Cont'd)**

**SPUD SYSTEM****RECOMMENDED PROPERTIES**

	<b><u>HI-VIS SWEEPS</u></b>	<b><u>BENTONITE DISPLACEMENT</u></b>
DENSITY:	Native (1.02 s.g.)	Unweighted -- 1.05 s.g.
FUNNEL VISCOSITY :	>120 secs / ltr	>100 secs / ltr
YIELD POINT:	> 28 pascals	> 19 pascals
API FL:	No control	No control

**ENGINEERING COMMENTS**

1. When Guar Gum is used, a neutral pH should be maintained. No lime or caustic soda additions should be made.
2. Prior to check trip and running casing, displace the hole to bentonite slurry and circulate out BHA to ensure clean hole and reduce hole fill.
3. Do not add lime to the displacement slurries as:
  - a) flocculation increases the fluid loss of the slurry and thus cause thicker wall cake on any exposed sands, and
  - b) flocculation results in air entrapment and difficulty in weighting up the system, if dictated by hole conditions.

Drilling Fluid Procedure (Cont'd)311 mm HOLE / 244mm (9<sup>5</sup>/<sub>8</sub>") CASING TO 3,350 M (RKB)KCl/IDBOND PHPA POLYMER SYSTEM

Reactive and dispersible shale formations will be encountered in this interval.

A KCl / IDBOND polymer is recommended to provide the level of inhibition required for successful drilling.

Based on offset well experience, a level of 5% w/w of potassium chloride is recommended. Nevertheless, cuttings must be carefully examined for any signs of hydration (lack of inhibition) and appropriate corrective action initiated, if necessary.

The inhibitive effect of the potassium ion will be supplemented by additions of IDBOND, PHPA polymer. This polymer encapsulates drilled cuttings, minimising their dispersion and improving solids control efficiency. Dilution rates will therefore be lowered. IDBOND also "plasters" off the wellbore, minimising filtrate invasion and enhancing wellbore stability. Additions will be stopped prior to reaching the prognosed depth of the reservoir.

Like all non-dispersed water-based fluids, this system is sensitive to the levels of entrained drilled solids. These must be carefully monitored and controlled at a maximum of 6% v/v to control the rheology, particularly the gel strengths in the desired ranges.

Fluid yield point is to be 18-22 kg/100ft<sup>2</sup> in this section to ensure good hole cleaning at the anticipated high rates of penetration.

Of critical importance to the successful completion of this interval is mud weight.

Mud density should be controlled initially at 1.1 s.g. and raised as hole conditions dictate. Mud weights up to 1.20 s.g. have typically been used by section TD.

Lost circulation has been observed to siltstones and sandstones below the 340mm (13<sup>3</sup>/<sub>8</sub>") casing shoe. Any increase in mud weight should be made only in response to hole conditions.

Differential sticking in the reservoir is always a potential occurrence, though it has not been encountered on offset wells.

The fluid loss must be strictly controlled below 6mls to minimise the possibility of differential sticking. Filter cake thickness must be carefully monitored and maintained as thin and tough as possible.

No high temperature products or high temperature stabilisers will be required.

**Drilling Fluid Procedure (Cont'd)****311 mm Hole 244mm (95/8") Casing to 3,350 M (RKB) (Cont'd)****INITIAL SYSTEM FORMULATION FOR 1 M3 OF KCl/IDBOND PHPA POLYMER**

Drill Water (m3)	0.96
IDVIS D (kg)	2.15
IDF-FLR (kg)	4.30
IDFLO B (kg)	5.7
KCl (kg)	50.0
Caustic Potash (kg)	0.57
IDBOND L (kg)	4.77 while drilling shale

**EXPECTED PROPERTIES**

DENSITY (s.g.)	1.03
PLASTIC VISCOSITY (cps) @120°F	10 – 15
YIELD POINT (pascals)	8.6 – 10.5 @ 120°F
GELS (pascals)	1.4 / 2.8
API FLUID LOSS (mls)	< 8
KCl (% w/w)	5
IDBOND Active Polymer (kg/m3)	1.43
pH	9

**RECOMMENDED PROPERTIES**

DENSITY (S.G.)	1.09 – 1.20
PLASTIC VISCOSITY @ 120 F (cps)	A.L.A.P
YIELD POINT @ 120 F (pascals)	8.6 – 10.5
FUNNEL VISCOSITY (sec/ltr)	Report with Temperature
GELS (pascals)	2.4 / 4.8 – 7.2 / 14.4
KCl (% w/w brine phase)	5 or as hole conditions dictate
IDBOND Active Polymer (kg/m3)	1.43 – 2.86 while drilling shale
pH	+/- 9.0
MAXIMUM DRILL SOLIDS (% v/v)	< 6.0
MBT (kg/m3 equivalent bentonite)	< 71.5
API FLUID LOSS (mls)	6.0 – 8.0

**Drilling Fluid Procedure (Cont'd)****311 mm HOLE SECTION****SPECIFIC ENGINEERING COMMENTS****1. DRILLING OUT SHOE**

Drill out the shoe and clean out the rat hole using seawater and viscous pills (using fluid displaced from inside 340mm (13<sup>3</sup>/<sub>8</sub>" ) casing). This will eliminate cement contamination of the new polymer fluid and subsequent conditioning.

**2. RESERVE VOLUME**

The properties of all water-based muds can deteriorate much more rapidly than oil-based muds due to their greater degree of interaction with formation drilled.

Frequent checking of the active system is essential. Premix volume of approximately 25-30% of the active volume must be available at all times in the event of major whole mud dilution being required to control mud properties.

**3. STOCK LEVELS**

Dilution rates of up to 0.3 m<sup>3</sup>/M can be expected.

It remains essential that sufficient stocks of materials are available to cope with these estimated dilution rates.

Suggested minimum stock levels to start this section are:

120	Sx	<b>IDVIS D polymer</b>
240	Sx	<b>IDF-FLR</b>
320	Sx	<b>IDFLO B</b>
80	Sx	<b>IDF-FLR XL</b>
80	Dm	Caustic Potash
250	MT	Barite
24	Dm	<b>IDCIDE L</b>
32	Dm	<b>DEFOAMER</b>
16	Dm	<b>DRILLING DETERGENT</b>
192	Dm	<b>IDBOND</b>

**4. MUD WEIGHT**

Initial mud weight is to be controlled at 1.1 s.g. - use of a lower density will probably result in tight hole and even caving formation. Increases in mud weight are to be made **ONLY** in response to tight hole conditions and/or caving formation due to the possibility of losses to siltstone and sandstone formation below the 340mm (13<sup>3</sup>/<sub>8</sub>" ) casing shoe.

Losses and differential sticking in the reservoir are potential occurrences. Increases in mud density are to be made **ONLY** in response to alleviate tight hole and/or caving formation or control formation pressures and are to be made incrementally.

**STRICT CONTROL IS REQUIRED.** Only use a tru-weight (pressurised) mud balance.

5. **INHIBITION LEVEL**

An ion selective electrode is to be used to determine the potassium ion level in the fluid.

On no account is the chloride level to be used as an indication of the potassium ion concentration. The potassium concentration should be maintained either by direct addition of KCl powder to the active system or by suitably dosed premixes.

Should bit balling occur, inhibition levels should be reviewed. As a temporary measure, addition of 1.0% v/v Drilling Detergent (1 x 200 lt dm per 20 m<sup>3</sup> of mud) is recommended.

The inhibition of the system can be increased by incremental increases of potassium chloride of 5 ppb.

All premixes are to be formulated with 4.77 kg/m<sup>3</sup> **IDBOND Liquid PHPA**.

All maintenance additions of PHPA are to be made using **IDBOND** liquid PHPA **DIRECTLY** to the active system. Use of the liquid product will provide for easier and more effective addition while drilling.

An excess of **IDBOND** of 1.43 – 2.86 kg/m<sup>3</sup> is to be maintained. As a guideline, 2 drums of **IDBOND** liquid PHPA will have to be added directly to the active for every 30 M of hole drilled.

6. **pH**

The pH is to be maintained at ca.9 to reduce corrosion but also minimise dispersion of claystone.

Caustic potash is to be used for pH control rather than caustic soda which will provide additional potassium ions and so aid inhibition.

7. **FLUID LOSS**

API filtrate is to be controlled between 6 - 8mls down to the prognosed depth of the top of the reservoir.

Prior to drilling ahead through the reservoir, the API fluid loss must be lowered to below 6 mls to minimise the potential for differential sticking. This fluid loss must be maintained at this level to TD. Should any increases in mud density have to be made, say 0.05 s.g. and more, the fluid loss should be lowered further to ca.4mls.

## 8. SOLIDS CONTROL EQUIPMENT

Once the polymers have been sheared, the finest possible screens must be utilised on the shale shakers.

Mud cleaner / desilter is to be run only in the event of problems with shaker screen blinding.

## 9. BIOCIDE TREATMENT

Test slides are to be used on a daily basis to determine the level of bacteria present in the mud. Close monitoring of filtrate loss and pH in conjunction with the results of "bug" tests will determine whether treatment with biocide, **IDCIDE L**, is necessary. The use of biocide treated starch, **IDFLO B** should minimise, if not eliminate the need for any biocide treatment.

## 10. CARBONATE CONTAMINATION

Carbon dioxide contamination has been encountered on offset wells below 1700 M. A Garret Gas Train will be used to monitor the drilling fluid for the presence of carbonates.

Treatment with lime or calcium chloride may be required, depending on the pH of the drilling fluid.

**APPENDIX C**

**CEMENTING PROGRAM**

## Cementing program 762 mm (30") Conductor

### **Objective:**

Required TOC is at seabed. Case off the unconsolidated formation by setting the 30"(762 mm) casing 60m below the seabed at 151m RKB. A tail pipe below the casing running tool will be used to ensure cement to surface with minimum excess slurry pumped.

### **Well considerations:**

No hydrocarbons are expected and formation pressures are hydrostatic at 1.02 sg equivalent. BHST/BHCT=27/27 degrees Celsius

The maximum expected ECD for this job is 1.27 sg (referenced to sealevel) at the 30"(762 mm) shoe. Based on this value losses are unlikely to occur. If total losses do seem to occur, it should be attempted to reduce the pump rate. If total losses occur, a topfill job may be attempted through spaghetti tubing.

### **Centralisation:**

The well is planned vertical and for this short section no centralisers should be required. Also indications from the attached simulations show that even at minimum casing stand-off the slurry will still efficiently displace any fluid in front of it.

### **Slurry considerations:**

A single 1.90 sg Class 'G' slurry is proposed with the following composition:

Class 'G' cement	sk of 94 lbs (42.6 kg)
Seawater	5.16 gal/sk (458 ltr/mT)
D047 Antifoam	0.01 gal/sk (0.9 ltr/mT)
CaCl <sub>2</sub> Accelerator	2% BWOC
Density	15.8 ppg (1.90 sg)
Yield	1.16 cuft/sk (0.78 m <sup>3</sup> /mT)
Thickening time	+/-2 hrs
24 hr. comp. Strength	+/-3000 psi

### **Slurry volume:**

The estimated slurry volume is based on 30"(762 mm) casing in 36"(914 mm) open hole plus 150 % excess.

The slurry will be mixed and pumped until good returns of slurry are seen at the seabed. Once good slurry returns have been verified, the string can be displaced with 5 bbl(0.8 m<sup>3</sup>) seawater (is underdisplaced by +/-2 bbl(0.3 m<sup>3</sup>)). The slurry is advised to be under displaced in order to minimise the possibility of a wet shoe.

**Spacer considerations:**

70 bbl(11.1 m<sup>3</sup>) of clean seawater ahead of the slurry should be sufficient to remove any remains of gel sweeps used while drilling.

**Note: To help spotting the slurry when it comes to the seabed, and therewith reducing the amount of excess slurry pumped, a tracer can be mixed in the last 10 bbl(1.6 m<sup>3</sup>) of seawater ahead of the slurry.**

**Pumping and Operational Program:**

1. Rig up cement lines and line for mudcirculation.
2. Circulate minimum of bottoms up till returns are clean.
3. Break circulation with cement unit and pressure test lines
4. Pump 70 bbl(11.1 m<sup>3</sup>) of seawater @ 7 bpm(1100 lpm).
5. Mix and pump slurry at 1.90 sg at 6-7 bpm(950-1100 lpm), until good slurry returns are observed at seabed.
6. Electronic density measurements to be verified against pressurised mudbalance regularly throughout the job for Quality Assurance.
7. Mixwater, dry cement and slurry samples to be taken.
8. Once good slurry returns at seabed have been verified, displace with 5 bbl(0.8 m<sup>3</sup>) seawater.

Note: Using this volume, the slurry is under displaced by +/- 2 bbl(0.3 m<sup>3</sup>). (To avoid contamination of the shoetrack when no dart is used).

**Note: Displacement volume is based on 5”(127 mm), 19.5#/ft(29 kg/m) drillpipe. The displacement volume needs to be recalculated on the rig, once the exact composition of the inner string has been confirmed.**

7. Bleed off pressure, if any, and check for returns.

## Cementing program 340mm (13<sup>3/8</sup>" ) Casing

### Objective:

Required TOC is at seabed. The 13 3/8"(340 mm) conductor will be set at 700 meter to allow use of the riser and provide well control for the next section. Subsea plug release system will be used for separating wash, slurry and displacement.

### Well considerations:

No hydrocarbons are expected and formation pressures are hydrostatic at 1.02 sg equivalent.

BHST/BHCT= 36/32 degrees Celsius (based on 3 degC/100m plus seabed of 15 degC.)

The maximum expected ECD for this job is 1.40 sg (referenced to sealevel) at the 13 3/8"(340 mm) shoe and 1.12 sg at the 30"(762 mm) shoe. Based on the expected ECD's, losses are unlikely to occur.

If total losses do seem to occur, it should be attempted to reduce the pumprate. If total losses occur, a topfill job may be attempted through spaghetti tubing.

### Centralisation:

The well is planned vertical, but even a small deviation will cause the casing to sit against the borehole, which may jeopardise a good bonding and hydraulic seal. For cementing purposes, at least the first two joints are recommended to be centralised with two ST-A4 centraliser per joint and remainder of the tail slurry section upto 550 meter RKB with 1 centraliser every two joints.

### Slurry considerations:

A 1.44 sg Class 'G' slurry is proposed for the lead slurry, followed by a 1.90 sg tail slurry to provide a strong cement at the 13 3/8" shoe. Composition of slurries is as follows:

	<u>Lead</u>	<u>Tail</u>
Class 'G' cement	sk of 94 lbs (42.6 kg)	sk of 94 lbs (42.6 kg)
Seawater	15.17 gal/sk (1347 ltr/mT)	5.32 gal/sk (472 ltr/mT)
D047 Antifoam	0.01 gal/sk (0.9 ltr/mT)	0.01 gal/sk (0.9 ltr/mT)
D075 Extender	0.50 gal/sk (44.4 ltr/mT)	--
Density	12.0 ppg (1.44 sg)	15.8 ppg (1.90 sg)
Yield	2.55 cuft/sk (1.69 m3/mT)	1.16 cuft/sk (0.78 m3/mT)
Thickening time	+/-3 hrs	+/-6 hrs
24 hr comp. Strength	+/- 500 psi	+/-4500 psi

**Slurry volume:**

The estimated slurry volume is based on 13 3/8"(340 mm) casing in 17 1/2"(445 mm) open hole plus 100% excess. The excess may be increased depending on hole conditions. The volume based on 100% works out at 535 bbl(85 m3) of slurry: 125 bbl(19.9 m3) of tail slurry to cover 150 meter annular length and 410 bbl(65.1 m3) of lead slurry to take TOC to seabed.

**Spacer considerations:**

70 bbl(11.1 m3) of clean seawater ahead of the slurry should be sufficient to remove any remains of gel sweeps used while drilling.

**Note: To help spotting the slurry when it comes to the seabed, and therewith reducing the amount of excess slurry pumped, a tracer can be mixed in the last 10 bbl(1.6 m3) of seawater ahead of the slurry.**

**Pumping and Operational Program:**

1. Rig up subsea cement head, cement lines and line for mudcirculation.
2. Circulate minimum of bottoms up till returns are clean.
3. Break circulation with cement unit and pressure test lines
4. Pump 70 bbl(11.1 m3) of seawater @ 7 bpm(1100 lpm).
5. Release ball for bottom plug
6. Mix and pump 410 bbl(60.1 m3) of 1.44 sg lead slurry at 7-8 bpm(1100-1270 lpm)
7. Mix and pump a minimum 125 bbl(19.9 m3) of 1.90 sg tail slurry at 6-7 bpm(950-1100 lpm).
8. Electronic density measurements to be verified against pressurised mudbalance regularly throughout the job for Quality Assurance.
9. Mixwater, dry cement and slurry samples to be taken.
10. Release dart for top plug
11. Displace with mud at minimum 15 bpm(2385 lpm). The first 10 bbl(1.6 m3) should be pumped at reduced rate in order to get a positive pressure indication when the dart launches the top plug.

12. Slow down to 5 bpm(795 lpm) for the last 10 bbl(1.6 m3) in order to have a controlled bumping of the plug.
13. Bump plug and pressure test casing as required
14. Bleed off pressure and check for returns.

## Cementing program 244mm (9<sup>5</sup>/<sub>8</sub>" ) Casing

### Objective:

Required TOC is at 600 meter (+/-100 meter inside the 13 3/8"(340 mm) casing). The 9 5/8"(244 mm) production casing will be set at 3350 meter. 9 5/8" casing will be run to surface and full bore plugs will be used for separating spacer, slurry and displacement.

### Well considerations:

Hydrocarbons are expected and formation pressures are at this point unknown but not expected to be highly over pressured. BHST/BHCT= 110/75 degrees Celsius (based on 3 degC/100m plus seabed of 15 degC.). Top of zone of interest is 2718 meter.

The maximum expected ECD (based on static cement column) for this job is 1.55 sg (referenced to rigfloor) at the 9 5/8"(244 mm) shoe.

If total losses occur during the job, it should be attempted to reduce the pumprate. As U-tubing will occur during this job, a temporary reduction of returns should not be confused with losses.

### Centralisation:

The well is planned vertical, but even a small deviation will cause the casing to sit against the borehole, which will jeopardise a good bonding and hydraulic seal. For a good seal and bonding across the reservoir section, the first two joints are recommended to be centralised with two ST-A3 centralisers per joint, and a further 574 meter (upto 100 meter above zone of interest) should be centralised with one centraliser per joint.

If prevention of annular flows and/or pressures is a concern in this area, ST-A3 centralisers should be run at 1 per 2 joints upto required TOC at 600 meter.

**Slurry considerations:**

Because the operator is not expecting the bottom hole static temperature to be above 110 degrees Celsius, the slurry designs are without silica. A 1.58 sg Class 'G' filler slurry is proposed for the lead slurry, which is followed by a 1.90 sg tail slurry to provide a strong cement across the zone of interest. The slurry compositions are as follows:

	<u>Lead</u>	<u>Tail</u>
Class 'G' cement	sk of 94 lbs (42.6 kg)	sk of 94 lbs (42.6 kg)
Seawater	9.75 gal/sk (865 ltr/mT)	--
Drillwater	--	3.99 gal/sk (354 ltr/mT)
D047 Antifoam	0.01 gal/sk (0.9 ltr/mT)	0.03 gal/sk (2.7 ltr/mT)
D075 Extender	0.35 gal/sk (31.1 ltr/mT)	--
D300 FLAC	--	0.90 gal/sk (79.9 ltr/mT)
D145 Dispersant	--	0.25 gal/sk (22.2 ltr/mT)
D110 Retarder	0.25 gal/sk (22.2 ltr/mT)	0.03 gal/sk (2.7 ltr/mT)
Density	13.2 ppg (1.58 sg)	15.8 ppg (1.90 sg)
Yield	1.86 cuft/sk (1.24 m3/mT)	1.16 cuft/sk (0.78 m3/mT)
Thickening time	+/- 5.5 hrs	+/- 4 hrs
24 hr comp. Strength	+/- 1000 psi	+/- 4200 psi

**Slurry volume:**

The slurry volume should be based on caliper log plus 10% excess. For planning purposes the volume is based on 9 5/8"(244 mm) casing in 12 1/4"(311 mm) open hole plus 50% excess. For TOC at 600 meter, the total required slurry volume is 705 bbl(112 m3) of slurry: 165 bbl(26.2 m3) of tail slurry to cover 600 meter annular length and 540 bbl(85.8 m3) of lead slurry to take TOC to 600 meter.

**Spacer considerations:**

To thin and remove mud from the annulus, it is advised to pump 70 bbl(11.1 m3) of turbulent Chemical wash to thin the mud and breakdown the filtercake(if formation pressures allow, more wash may be pumped). The chemical wash will be followed by 60 bbl(9.5 m3) of weighted Mudpush spacer to remove the filtercake.

**Pumping and Operational Program:**

1. Make up cement head to casing.
2. Rig up cement lines and line for mudcirculation.
3. Circulate minimum of bottoms up till returns are clean.
4. Break circulation with cement unit and pressure test lines

5. Pump 70 bbl(11.1 m3) of Chemical wash @ 7-8 bpm(1100-1270 lpm).
6. Pump 60 bbl(9.5 m3) of Mudpush spacer @ 7-8 bpm(1100-1270lpm)
7. Release bottom plug
8. Mix and pump 540 bbl(85.8 m3) of 1.58 sg lead slurry at 7-8 bpm(1100-1270 lpm).
9. Mix and pump a minimum 165 bbl(26.2 m3) of 1.90 sg tail slurry at 6-7 bpm(950-1100 lpm)
10. Electronic density measurements to be verified against pressurised mudbalance regularly throughout the job for Quality Assurance.
11. Mixwater, dry cement and slurry samples of each stage to be taken.
12. Release top plug
13. Displace with mud at 15 bpm(2385 lpm). Slow down to 5 bpm(795 lpm) for the last 10 bbl(1.6 m3) in order to have a controlled bumping of the plug.
14. Bump plug and pressure test casing as required
15. Bleed off pressure and check for returns.

**APPENDIX D**

**CASING DESIGN**

**Casing Design Summary**

API minimum Design Safety Factors:-

BURST 1.1  
 COLLAPSE 1.05  
 TENSION 1.6

<b>Casing Size OD (mm)</b>	<b>762</b>	<b>340</b>	<b>244</b>
<b>Hole Size (mm)</b>	914	444	311
<b>Shoe Depth (m RKB)</b>	125	700	3350
<b>Casing Grade</b>	GR B	L80	L-80
<b>Casing Weight (kg/m)</b>	462	101	79.6
<b>Casing Connection</b>	RL-4	New VAM	New VAM / VAM ACE
<b>Casing Size ID (mm)</b>	711	315	216.8
<b>Casing Drift (mm)</b>		311.4	216 - special drift
<b>Minimum Internal Yield (kPa)</b>		33987	54669
<b>Collapse Resistance (kPa)</b>		15649	45638
<b>Tensile Strength (1000 kg)</b>		3431	2743
<b>Burst Design Factor</b>		1.34	1.21
<b>Collapse Design Factor</b>		2.16	1.52
<b>Tension Design Factor</b>		7.27	1.73
<b>Pressure Test (kPa)</b>		5500	28000
<b>Comments</b>	Conductor	Surface	Production

CSG DES Surf

**SURFACE CASING DESIGN - 339.725 mm**

**Selected casing specifications**

Proposed Casing Reference Number :			
Outside Diameter :	Cod	13.375 in	340 mm
Weight :	Wt	68.0 lb/ft	101.2 kg/m
Grade :		L-80	
Minimum Internal Yield pressure :	Miy	4,930 psi	33,987 kPa
Collapse Resistance :	Coll	2,270 psi	15,649 kPa
Tensile Strength :	Ten	1,556 k.lbs	3,431 k.kg
Internal Diameter :	Cid	12.415 in	315.3 mm
Casing Connection :		New VAM	

**Design Safety Factor Summary**

	Burst	Collapse	Tensile
Required DSF	1.10	1.05	1.60
Actual DSF	1.34	2.16	7.27
Meets Design Requirements?	Yes	Yes	Yes

**Design Considerations**

Depth of casing shoe	Dsh	2,297 ft	700 m
Mud density behind casing	Rmb	9.00 ppg	1.08 sg
Top of cement	Dtoc	0 ft	0 m
Cement slurry design :			
Lead slurry	Cml	12.0 ppg from	Dcmllt 0 to Dcmllb 1,805 ft
Tail slurry	Cmt	15.8 ppg from	Dcmmt 1,805 to Dcmmb 2,297 ft
Next Hole section TD	Dtd	10,991 ft	3,350 m
Max pore pressure in next hole section	Rf	8.7 ppg	1.042 sg
Max mud weight in next hole section	Rm	10.0 ppg	1.200 sg
Leak-off at shoe	Rsh	14.2 ppg	1.70 sg
Gas gradient	Rg	0.12 psi/ft	2.71 kPa/m
Water depth	Dw	256 ft	78 m
Rotary table elevation	Drte	41 ft	12.5 m
Seawater gradient	Rsw	0.45 psi/ft	10.18 kPa/m
Casing Pressure tested to :	Cpt	800 psi	5,515 kPa/m

**Burst Design**

Internal loading condition :	Gas column to surface with influx at TD.		
External loading condition :	Water Depth		
Expected Pore Pressure :	10.0 ppg      1.20 sg      from offset data		
Burst at Casing Head :	$(Dtd * Rf * 0.052) - ((Dtd - Dw - Drte) * Rg)$		
	Pbst =	3,682 psi	25,382 kPa
Burst design factor :	Miy / Pbst =	1.34	

## CSG DES Surf

**Collapse Design**

Internal loading condition :	Drilling at section TD and losses result in mud level dropping to 50% of hole depth		
External loading condition :	Hydrostatic pressure exerted by the column of mud behind casing		
Mud weight :	10.0 ppg	1.20 sg	
Mud level	=	5,496 ft	1,675 m
Dmcp	Maximum collapse pressure is at	2,297 ft	700 m
Max collapse pressure : Pcoll	$\{(Dmcp - (Dw + Drte)) \times Rmb \times 0.052\} + (Dw \times Rsw)$		
	=	1,051 psi	7,249 kPa
Collapse design factor :	Coll / Pcoll	=	2.16

**Collapse Cementing Check**

Internal loading condition :	Evacuated to seawater		
External loading condition :	Hydrostatic pressure due to a cement column 10% above programmed weight		
Collapse pressure at shoe :	$\{(Dcmtb - Dcmtt) \times (Cmt \times 110\% \times 0.052) + (Dw \times Rsw) + \{(Dcmlt - Dw - Drte) \times Rmb \times 0.052\} + (Dcmlb - Dcmlt) \times (Cml \times 110\% \times 0.052) - \{(Dsh - (Dw + Drte)) \times Rsw\}$		
Pcolc	=	760 psi	5,237 kPa
Collapse design factor :	Coll / Pcolc	=	2.99
Worst case collapse design factor :		=	2.16

**Tension Design**

Loading condition :	Weight of casing string in mud plus pressure test assuming no cement around outside of casing		
Mud weight :	9.0 ppg	1.08 sg	
Buoyancy Factor BF :	0.863		
Tension at mudline :			
due to weight :	Wt x (Dsh-Dw-Drte)	=	117,320 lbs 53,206 kg
due to press test :	Cpt x ((Cid/2) <sup>2</sup> x PI)	=	96,844 lbs 43,920 kg
	Tmax	=	214,164 lbs 97,127 kg
Tension design factor :	Ten / Tmax	=	7.27

## CSG DES Prod

**PRODUCTION CASING DESIGN - 9.625 in**

Option B

**Selected casing specifications**

Proposed Casing Reference Number :			
Outside Diameter :	Cod	9.625 in	244.5 mm
Weight :	Wt	53.5 lb/ft	79.6 kg/m
Grade :		L-80	
Minimum Internal Yield pressure :	Miy	7,930 psi	54,669 kPa
Collapse Resistance :	Coll	6,620 psi	45,638 kPa
Tensile Strength :	Ten	1,244 k.lbs	2,743 k.kg
Internal Diameter :	Cid	8.535 in	216.8 mm
Casing Connection :		New VAM	

**Design Safety Factor Summary**

	Burst	Collapse	Tensile
Required DSF	1.10	1.05	1.60
Actual DSF	1.21	1.52	1.73
Meets Design Requirements?	Yes	Yes	Yes

**Design Considerations**

Hole section TD	Dtd	10,991 ft	3,350.0 m
Depth of casing shoe	Dsh	10,991 ft	3,350.0 m
Mud density behind casing	Rmb	10.0 ppg	1.20 s.g
Max pore pressure	Rf	8.7 ppg	1.042 s.g
Max mud weight	Rm	10.0 ppg	1.20 s.g
Packer depth	Dpk	8,203 ft	2,500.0 m
Testing kill fluid density	Rtkf	9.2 ppg	1.10 s.g
Pore pressure at packer depth	Rfpc	8.7 ppg	1.042 s.g
Top of cement	Dtoc	1,641 ft	500.0 m
Cement slurry design :			
Lead slurry	Cml	13.2 ppg from	Dcmll to Dcmllb
Tail slurry	Cmt	15.8 ppg from	9,023 to 10,991 ft
			Dcmll to Dcmllb
Gas gradient	Rg	0.12 psi/ft	2.7 kPa/m
Water depth	Dw	256 ft	78.0 m
Rotary table elevation	Drte	41 ft	12.5 m
Seawater gradient	Rw	0.45 psi/ft	10.2 kPa/m
Casing Pressure tested to :	Cpt	4,100 psi	28,265.4 kPa

**Burst Design**

Internal loading condition :	A tubing leak at surface while testing, applying reservoir pressure on top of a column of kill weight fluid		
External loading condition :	Pore pressure at packer setting depth		
<b>Burst at Casing Head :</b>	$((Dtd-Dw-Drte) \times Rf \times 0.052) - (Dtd \times Rg)$		
	Pbst	=	<b>3,512 psi</b>
<b>Burst design factor :</b>	Miy / Pbst	=	<b>2.26</b> (shoe)
<b>Burst at Packer :</b>	$((Dtd-Dw-Drte) \times Rf \times 0.052) - (Dtd \times Rg) + (Dpk \times Rtkf \times 0.052) - (Dtoc \times Rmb \times 0.052)$		
	Pbst	=	<b>6,570 psi</b>
<b>Burst design factor :</b>	Miy / Pbst	=	<b>1.21</b> (shoe)
<b>Worst Case burst design factor :</b>			<b>1.21</b>

## CSG DES Prod

**Collapse Design**

Internal loading condition : Perforations plugged during testing and surface pressure bled to zero with full column of gas inside tubing

External loading condition : Hydrostatic pressure exerted by the column of mud behind casing

**Max collapse pressure :**  $((D_{sh}-D_w-D_{rte}) \times R_{mb} \times 0.052) + (D_w \times R_{sw}) - (D_{td} \times R_g)$   
(at shoe)  $P_{coll} =$  **4,360 psi**

**Collapse design factor :**  $Coll / P_{coll} =$  **1.52**

**Collapse Cementing Check**

Internal loading condition : Hydrostatic pressure exerted by the column of water

External loading condition : Hydrostatic pressure due to a cement column 10% above programmed weight

**Collapse pressure at shoe :**  $\{D_{cmlt} \times R_{mb} \times 0.052\} + \{(D_{cmtb} - D_{cmtt}) \times (C_{mt} \times 110\% \times 0.052)\} + \{(D_{cmlb} - D_{cmlt}) \times (C_{ml} \times 110\% \times 0.052)\} - (D_{sh} \times R_w)$   
 $P_{colc} =$  **3,260 psi**

**Collapse design factor :**  $Coll / P_{colc} =$  **2.03**

**Worst case collapse design factor :**  $=$  **1.52**

**Tension Design**

Loading condition : Weight of casing string in mud plus pressure test assuming no cement around outside of casing

Mud weight : **10.0 ppg**

Buoyancy Factor BF : **0.85**

**Tension at mudline :**

due to weight :  $W_t \times (D_{sh}-D_w-D_{rte}) \times BF =$  **484,895 lbs**

due to press test :  $C_{pt} \times ((C_{id}/2)^2 \times PI) =$  **234,575 lbs**

$T_{max} =$  **719,470 lbs**

**Tension design factor :**  $Ten / T_{max} =$  **1.73**

<b>KICK TOLERANCE CALCULATION SHEET</b>	<b>WELL: Yolla - 2</b>
---	------------------------

CURRENT MUD WT. =	9.34	ppg		1.12	s.g.
CURRENT HOLE SIZE =	12.25	in		311	mm
DRILL PIPE O.D.	5.00	in		127	mm
BHA ( COLLARS ) O.D.	8.0	in		203	mm
L.O.T. - E.M.W. = (FIT)	14.59	ppg		1.75	s.g.
BHA LENGTH	404.5	ft		123.3	m
LAST CASING / LINER SET AT - TVD:	2296.7	ft		700.00	m
CURRENT DEPTH - TVD:	10991	ft		3350	m
INFLUX GRADIENT :	0.12	psi/ft		2.7	kPa/m
1 DRILL PIPE IN OPEN HOLE	8,290.10	ft		2526.7	m
2 BHA IN OPEN HOLE	404.55	ft		123.3	m
3 ANNULAR VOLUME OF O.H.					
Due to BHA	33.83	Bbls		5.4	m3
Due to D.P,	1,006.24	Bbls		160.0	m3
4 M.A.A.S.P.:	627.27	psi		4324.4	kPa
5 MAX SHOE PRESSURE	1,742.43	psi		12012.3	kPa
6 OH PRESSURE DUE TO MUD	4,221.66	psi		29104.1	kPa
7 ESTIMATED PORE PRESSURE Assumes Mud weight only just overbalance	5,336.82	psi		36792.0	kPa
8 HEIGHT OF INFLUX @ SHOE	1,715.99	ft		523.0	m
9 INFLUX VOLUME @ SHOE	208.3	Bbls		33.1	m3
10 INFLUX VOLUME @ TD	68.00	Bbls		10.8	m3
11 VOLUME AROUND COLLARS	33.83	Bbls		5.4	m3
12 HEIGHT OF INFLUX @ TD	686.12	ft		209.1	m

<b>KICK TOLERANCE =</b>	<b>68.0</b>	<b>Bbls</b>		<b>10.8</b>	<b>m3</b>
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**APPENDIX E**

**BLOWOUT PREVENTER PRESSURE  
TESTING**

**BOP PRESSURE TESTING**

COMPONENT	311MM (12¼") HOLE	216MM (8½") HOLE
Annular Preventer	1400 / 24100	1400 / 24100
Pipe Rams	1400 / 27600	1400 / 40000
Blind Ram	1400 / 27600	1400 / 40000
Choke / Kill Lines	1400 / 27600	1400 / 40000
Choke Manifold	1400 / 27600	1400 / 40000

All pressures in kPa.

BOP's, choke manifold and other well control equipment will be tested at the following intervals, whichever comes first:

- after each new string of casing is run
- every 14 days regardless of the operation in progress

Before testing, ensure the casing annulus valve is opened to prevent casing collapse in the event of a wellhead seal leak.

Casing will be pressure tested, prior to drilling out the casing shoe, to the following pressures:

340mm (13<sup>3</sup>/<sub>8</sub>") Casing            5500 kPa

244mm (9<sup>5</sup>/<sub>8</sub>") Casing            28000 kPa

The 340mm (13<sup>3</sup>/<sub>8</sub>") casing pressure test is based on a surface pressure in excess of that required to breakdown the 340mm (13<sup>3</sup>/<sub>8</sub>") casing shoe with the casing fully evacuated to gas.

The 244mm (9<sup>5</sup>/<sub>8</sub>") casing pressure test is based on a surface pressure in excess of that expected if the well is fully evacuated to gas at TD of the 216mm (8½") hole section with a 1.04 SG equivalent formation pressure.

**APPENDIX F**

**WELLHEAD STACK-UP  
DIAGRAMS**

# VETCO GRAY

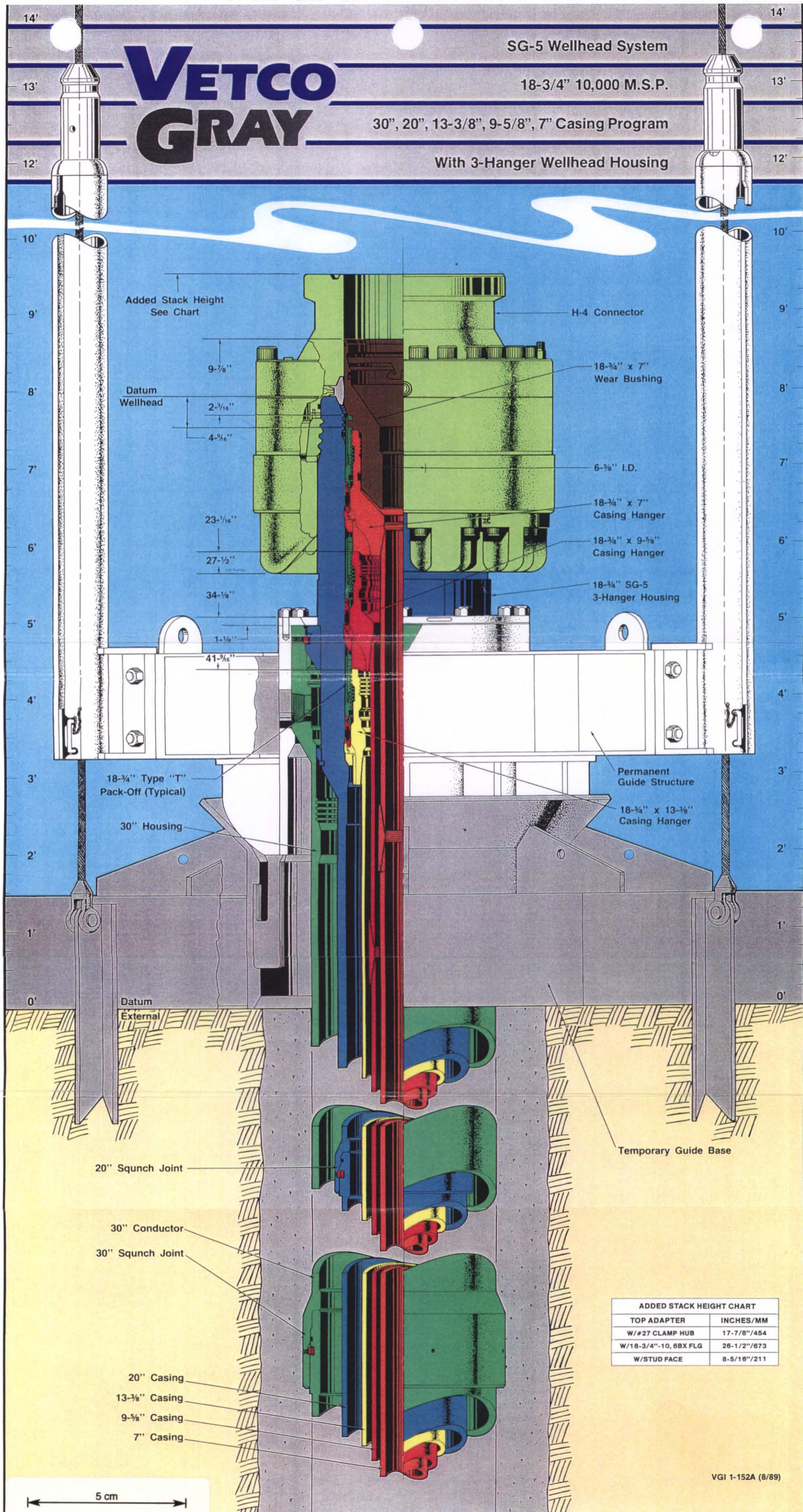
SG-5 Wellhead System

18-3/4" 10,000 M.S.P.

30", 20", 13-3/8", 9-5/8", 7" Casing Program

With 3-Hanger Wellhead Housing

637088



ADDED STACK HEIGHT CHART	
TOP ADAPTER	INCHES/MM
W/#27 CLAMP HUB	17-7/8"/454
W/18-3/4"-10, 6BX FLG	26-1/2"/673
W/STUD FACE	8-5/16"/211

**APPENDIX G**

**REFERENCE DOCUMENTATION**

**Reference Documentation**

The following documents/information shall be available on the rig. Contact the Perth office if any of this information is required :

- PremierOil Australasia, Drilling Operations and HSE Manual
- PremierOil Australasia, Bass Basin Emergency Response Manual
- PremierOil Australasia, Bass Basin Oil Spill Contingency Plan
- PremierOil Australasia, Bass Basin Environmental Assessment
- PremierOil Australasia, Wellsite Geology Manual
- PremierOil Australasia, Bridging Document
- PremierOil Australasia, Well Control Procedures Manual
- Northern Explorer III Vessel Safety Case
- Northern Offshore Safety Management System
- Northern Offshore Emergency Response Manual

**APPENDIX H**

**SUPPORT SERVICES**

## SUPPORT SERVICES

### Marine Support Services

- 1) AHTS vessel details:

<u>Name</u>	<u>Type</u>	<u>Contractor</u>	<u>HP</u>	<u>Continuous Bollard Pull (Tonne)</u>
TBA				
TBA				

- 2) The shore base will be at Geelong, Victoria

- 3) One way transit time to location :

<u>Vessel</u>	<u>Economy</u>	<u>Full steam</u>
TBA		
TBA		

### Helicopter Support Services

- 1) Helicopter Details :

<u>Type</u>	<u>Capacity to Rig</u>	<u>Capacity from Rig</u>
Sikorsky S76A++	9	11
Bell 412	9	11

- 2) The helicopter base will be at Essendon Airport.

- 3) One way transit time will be

<u>Aircraft</u>	<u>Transit Time</u>
Sikorsky S76A++	62 minutes
Bell 412	67 minutes

**APPENDIX J**

**CONTACT DIRECTORY**

	Work	After Hours	Emergency / Pager	Mobile	Facsimile
<b><u>Operations Office -Geelong</u></b> <b><u>(++61 3)</u></b>					
Project Drilling Engineer - Gordon Hunter					
Logistics Co-ordinator - Rick White					
<b><u>Perth Office (++61 8)</u></b>					
General Manager - John Begg	9480 4100	9488 6316		041 9903 268	9324 1212
Bass Basin Team Leader - Mark Pogson	9480 4100	9272 6863		0412 575 162	9324 1212
Operations Manager - Blane Ulmer	9324 1855			0412 557 331	9324 1851
Operations Geologist - David Evans	9324 1855	9387 2614		0412 179 506	9324 1851
Operations Accountant - Martin Cotton	9324 1855				9324 1851
<b><u>Boral Energy Resources Ltd</u></b> <b><u>(++61 8)</u></b>					
Angus Guthrie	8235 3737				8323 1851
<b><u>Cue Energy Resources NL</u></b> <b><u>(++61 3)</u></b>					
Andrew Adams	9629 7577			0419 372 479	9629 7318
<b><u>Santos</u></b>					
TBA					
<b><u>Northern Offshore</u></b>					
Base Manager					
Drilling Superintendent					
Material Export					

Technical					
Safety					
Accounts					
<b><u>Schlumberger</u></b>					
Integrated Service Co-ordinator - TBA					
Materials Co-ordinator - TBA					
<b><u>Helicopters</u></b>					
Lloyds	08 8373 0700				08 8373 1119
<b><u>Supply Vessels</u></b>					
TBA					
<b><u>Fire Fighting Consultant</u></b>					
Boots & Coots Inc (Houston)	0011 1713 931 8884				