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Drilling Program

For

Fur Seal-1

Prepared by Labrador Petro-Management Pty Ltd

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Document Control

The control status of this document is tabulated below

Document Type	Document Custodian	Classification
DP	Drilling Manager	Controlled

Manual Revision

All users are encouraged to submit suggestions for revisions to this manual. Suggestions must be submitted in writing to the custodian. All suggestions must be screened and assessed by the custodian who is responsible for incorporating agreed, approved updates in future revisions of the document.

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Distribution Control

No	Internal Registered Holder
001	Drilling Manager
002	Exploration Manager
003	Senior Drilling Engineer
004	Operations Geologist
005	Wellsite Geologist
006	Drilling Engineer
007	Senior Drilling Supervisor (Ocean Patriot)
008	DPI x 3
008	Materials and Logistics Superintendent
009	Materials and Logistics Co-ordinator
010	Shore Base Supervisor
011	Apache Perth Library
012	NOPSA

No	External Registered Holder
013	Drilling Contractor (Ocean Patriot)
014	OIM (Ocean Patriot)
015	Drilling Fluid Contractor
016	Mudlogging Contractor
017	Cementing Contractor
018	Wireline Contractor
019	LWD Contractor
020	Workboat Managers x 2
021	Boat Masters x 3
022	Chief Pilot Bristows Helicopters (Essendon)



Approvals




<u>APPROVED</u>	<u>SIGNATURE</u>	<u>DATE</u>
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Senior Drilling Engineer		16/09/05
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1. Well Summary

Well name		Fur Seal-1
Type of Well		Exploration – Vertical
Permit		VIC/P-54
Operator		Apache Energy Ltd.
Objectives	<i>Primary</i>	Kingfish Formation
	<i>Secondary</i>	Volador Formations
Seismic Line		Northern Fields 3D Inline 3195 at Xline 7787
Geographical Location	<i>Latitude</i>	38° 07' 47.82" S
	<i>Longitude</i>	148° 09' 08.53" E
	<i>Northing</i>	5,779,139.3 m N
	<i>Easting</i>	600,997.9 m E
Approximate Elevation (RT-AHD)		22m
Water Depth		58m (AHD)
General Reference Datum		GDA94 / UTM Zone 55S, CM – 147°E
Surface Survey Tolerance		25m radius
Target Tolerance		50m radius
Rig Heading		± 045°
Anticipated Spud Date		27/10/05
Proposed Total Depth		2636mRT
Estimated Time to Drill		16 days
Drilling Contractor		Diamond Offshore
Rig Type		Semi submersible
Rig Name		Ocean Patriot
Attendant Craft	AHSV 1	Far Grip
	AHSV 2	Pacific Wrangler
	Helicopter	Bristow Super Puma from Essendon

Well: Fur Seal-1 Permit: Vic/P54 Rig: Ocean Patriot Water Depth: 58m RT-AHD: 22m		DRILLING & EVALUATION PROGRAMME SUMMARY												GDA94 Datum, (UTM Zone 55S, CM 147°E) Lat: 38°07'47.82"S Long: 148°09'08.53"E Northing: 5,779,139.3mN Easting: 600,997.9mE			
Fur Seal-1																	
Period	PREDICTED SECTION		Reservoir	Depth (mRT)	Abandonment Plugs	Casing (m RT)	Cementing	Hole Size	Casing Details	Bit	Mud System	Mud Weight (SG)	Directional	Wireline Logging		LWD	Formation sampling
	FORMATION(mRT)	LITHOLOGY					Density, TOC & Excess							Run#1	Run#2		
Tertiary	80m	RT-AHD ~ 22m WD ~ 58m	Gippsland limestone	500m		762mm ~ 112mRT Plug Tagged and pressure tested 340mm ~ 800mRT	1.89 SG to Seabed 300% Excess	914mm	762mm	TCI	Seawater w/ Hi-Vis Sweeps		Anders-drift			203mm x LWD-DIR-GR-RES	
							Lead: 1.50 SG 350m Tail: 1.89 SG 150m 50% Excess Class G Neat	406mm (16")	340mm (13 3/4")	PDC		1.03 - 1.05	MWD				
Late Cretaceous	1822m		Lakes Entrance Top Latrobe 2231m Kingfish 2243m Moonfish 2273m Kate Shale Volador 2534m Top Emporer TD-2634m	2000m		Plug #1 a & b	P&A: 1.90 SG 40m into 344mm shoe to 40m below 25% Excess Class G Neat	216mm (8 1/2")	-	PDC	KCI / PHPA	1.20 - 1.32	MWD	CBIL / STAR (Contingent)	SWC (Contingent)	171mm LWD Quad Combo	3 x Sets Washed & Dried Ditch cuttings at 5.0r 10m Interval Spacing
							P&A: 1.90 SG 50m above reservoir/s to TD 25% Excess Class G Neat										
				2500m													
				3000m													
Total Depth ~ 2634 mRT																	

Fur Seal-1

TIME v DEPTH CURVE

2. Manuals, Procedures & Commitments

Fur Seal-1 drilling campaign will be conducted in accordance with the WOMP for the well. This Drilling Program forms part of the WOMP which, in addition to the documents referenced below, are the governing documents under which the well will be drilled. The referenced documents are to be available on the “Ocean Patriot”, AEL’s Perth office and in some cases Diamond’s Perth Office.

It is the Senior Drilling Supervisor’s responsibility to ensure that these documents are present on board the rig prior to drilling operations commencing and to ensure that this drilling program has been read and understood by Apache’s Drilling Supervisors and Diamond Offshore’s OIM and Toolpushers.

A signed copy of this page must be faxed to the Drilling Engineer in charge of the well in Perth prior to the start of a well with a **X** or **√** in the ☐ to show what is present and what is not. All persons on board the rig are to be made aware that these documents govern the work by placing a signed copy of the page on the rig’s notice boards. The Bridging Document is to be read and understood by supervisory personnel on the rig.

After having confirmed with the Drilling Engineer in charge that you have the most current version of the Drilling Programme and subsequent programmes relating to activities on the well are on hand, the documents are to be read by the Apache Drilling Supervisors prior to commencing the work the programme relates to. Any ambiguities or concerns are to be raised immediate with the Drilling Engineer in Charge.

DOCUMENT	OWNER	DOCUMENT REFERENCE
<i>Rig Management Documents</i>		
<input type="checkbox"/> Bridging Document	AEL	DR-50-ID-013
<i>Governmental / Permit Specific Documents</i>		
<input type="checkbox"/> Schedule to the PSLA	AEL	AE-00-SG-002
<input type="checkbox"/> Emergency Response Manual for the MODU Operations in the Bass Strait	AEL	AE-00-ZF-033
<input type="checkbox"/> Oil Spill Contingency Plan for the Permit	AEL	AE-00-EF-013 (Rev 2)
<input type="checkbox"/> Environmental Plan for Permit VIC/P-54	AEL	EA-00-RI-003
<i>Well Specific Documents</i>		
<input type="checkbox"/> Well Operations Management Plan (WOMP)	AEL	DR-91-ZG-005
<input type="checkbox"/> P&A Programme	AEL	Uncontrolled (issued as required)
<i>Apache Management Documents</i>		
<input type="checkbox"/> Drilling Management Manual	AEL	AE-91-ID-001
<input type="checkbox"/> Drilling Standards Manual	AEL	AE-91-ID-004
<input type="checkbox"/> Drilling Process Manual	AEL	AE-91-ID-002
<input type="checkbox"/> Apache Emergency Contacts List	AEL	AE-00-ZF-034
<i>Technical Manuals</i>		
<input type="checkbox"/> Dril-Quip Procedures Manual for SS-10-C Subsea Wellheads	Dril-Quip	Uncontrolled

The following documents are only available in the Apache Perth Office

Emergency Response Management Manual	AEL	AE-00-ZF-025
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Name _____ Signed _____

Position Apache Drilling Supervisor Date _____

Fur Seal-1 will be drilled using the Environmental Management Plan (EMP) referenced on the previous page. The following guidelines indicate AEL's environmental commitments for this well and must be adhered to.

Offshore Commitments

Activity	Requirement
Disposal of drilling fluid and drilling cuttings	<ul style="list-style-type: none"> • WBM coated cuttings will be disposed directly to the seabed. • Solids control equipment to be optimised to ensure maximum separation of fluid from cuttings. • Follow Apache refuelling procedures and SBM transfer procedure when used (AE-91-IQ-098). • Record volume of drilling cuttings and fluid disposed into the ocean on environmental spreadsheet. Results to be reported to the Environmental Manager at the end of the well.
Pipe Dope	<ul style="list-style-type: none"> • Use pipe dope that has lowest concentration of heavy metals and hydrocarbons but still meets safety and performance criteria. • Record volume of pipe dope used on location on environmental spreadsheet. Results to be reported to the Environmental Manager at the end of the well.
Deck drainage, chemical storage and management	<ul style="list-style-type: none"> • Maintain good housekeeping practices • Chemicals are to be stored in bunded areas away from open drains and chemical containers are to be intact • Drip trays are to be used under all machinery and fuel points and valves. • In the event of a spill, all actions are to be taken to control the spill and divert deck drainage to on board containment tanks for treatment through oil in water separator. • Ensure absorbent material is on board to use in soaking up chemical or oil spills. • Maintain oil water separators regularly to ensure 15 ppm oil concentration alarm is functional • All releases of oil in water of > 50mg/l (instantaneous) or > 30 m/l (over a 24 hour period) are to be reported to Apache Perth office • All spills >80L must be reported to DPI within 2 hours either directly by contacting the DPI (primary contact number 03 9658 4414 or the DPI Environment Section mobile phone 0418 528 420. Apache's spill response plan also details the relevant personnel that may be required to be notified of a spill incident • Report all spills <80L through Apache incident reporting system
Liquid Discharges	<ul style="list-style-type: none"> • Excess water from the water maker to be discharged to sea • Treated sewage, grey water and main deck drainage under routing operating conditions to be discharged at sea level. • Cooling water to be discharged at barge of hull of drilling rig level to allow for sufficient cooling and oxygenation
Incident Reporting	<ul style="list-style-type: none"> • Apache incident reporting system to be used to report incidents within 2 hours
Waste Oil Management	<ul style="list-style-type: none"> • Waste oil and grease to be drummed and returned to mainland for recycling • Records of volume of waste oil taken off rig forwarded to the Environmental manager at the end of the well.

Spillage of diesel fuel or oil	<ul style="list-style-type: none"> • Follow Apache refuelling procedures (AE-91-IQ-098) • Refuelling of diesel to be carried out during daylight hours only, weather permitting. • In event of a spill take all actions to control the spill. • No dispersant use without DoIR approval • All spills >80L must be reported to DPI within 2 hours either directly by contacting the DPI (primary contact number 03 9658 4414 or the DPI Environment Section mobile phone 0418 528 420. Apache's spill response plan also details the relevant personnel that may be required to be notified of a spill incident • Report all spills <80L through Apache incident reporting system • Implement Apache's Oil Spill Contingency Plan if required
Discharge of combustion products from engines	<ul style="list-style-type: none"> • Inspections and tuning of engines and equipment are included on a regular maintenance schedule. • Optimise combustion or well test fluids and gas
Solid waste management <ul style="list-style-type: none"> • Food scraps • Garbage • Litter • Scrap metal and wood etc 	<ul style="list-style-type: none"> • Food scraps to be macerated prior to disposal overboard • No disposal of debris, garbage or litter into the sea (skips need covers to prevent wind blown rubbish – especially plastics and cups) • Segregate industrial waste (scrap metals / drums etc), wherever possible, for appropriate disposal onshore. • Reduce, reuse and recycle waste wherever practicable. • Record the volume and type of waste taken off rig and forward to the Environmental Manager at the end of the well. • ROV survey to check no rubbish left on seabed. Any debris will be removed.
Sewage discharge	<ul style="list-style-type: none"> • Sewage is to be treated to secondary level prior to discharge. • Sewage treatment plant is to be maintained to ensure effective treatment
Fishing	<ul style="list-style-type: none"> • No fishing is permitted from the drill rig whilst it is on location
Anchoring & Disturbance to the seabed	<ul style="list-style-type: none"> • No workboats are to anchor in areas where sensitive seabed features occur or subsea pipelines occur (none known or likely in immediate vicinity of Fur Seal-1)
Operational Environmental Awareness	<ul style="list-style-type: none"> • Personnel are familiar with the environmental requirements of the EP and all guidelines and procedures outlined are being followed. • All personnel have signed off the rig register book confirming their induction.
Large Animal Observations	<ul style="list-style-type: none"> • Fill in whale and turtle observation data sheets and forward to the Environmental Manager at the end of the well (Appendix in EP).

Perth Office Commitments

Activity	Requirement
Prior to drilling	<ul style="list-style-type: none"> • Make Fur Seal-1 EP available to personnel involved in drilling program.
Discharge of combustion products from engines	<ul style="list-style-type: none"> • Report greenhouse gas emissions data to Federal Government annually.
Environmental Audit	<ul style="list-style-type: none"> • Audit drilling rigs every six months whilst under contract to Apache • Review electronic waste and chemical log received from rig.

The following are the **responsibility** of **Senior Drilling Supervisor**. Management of the implementation of commitments will be performed by the stated personnel.

Commitment	Action by	Action	Timing
All guidelines and procedures will be followed.	Senior Drilling Supervisor	All guidelines and procedures in the Environment Management Plan will be complied with.	At all times
The risk of diesel spillage during re-fuelling shall be minimised.	Rig PIC / Bargemaster	Follow the re-fuelling procedure as referenced in the previous page.	At all times
All personnel on site will undergo an induction and education program.	Rig PIC/ Medic/ Safety Off.	Outline the environmental management requirements as referenced in the previous page.	To be given to all personnel during their induction to the rig.
Post copies of AEL's environmental commitments	Rig PIC/ Medic / Safety Off.	Post copies of the environmental commitments outlined on the previous page on all notice boards.	Prior to the start of the well.
There will be no interference with whales	Rig PIC/ Medic/ Safety Off.	Whale watching procedures to be adhered too.	At all times, but particularly between April and September.
A debris survey shall be conducted.	Senior Drilling Supervisor	A remotely operated vehicle will be used. A report and video will be submitted to Apache.	At end of drilling program, prior to rig moving off site.

The following are the **responsibility** of the **Environmental Coordinator**

Commitment	Action	Timing
An Environmental Management Plan shall be prepared for drilling activities.	The EMP shall be made available to all personnel involved in a drilling program.	Prior to the commencement of the drilling program.
Responsible Drilling Engineer to ensure all environmental commitments are met.	A list of the EMP commitments to be given to the responsible Drilling Engineer.	Prior to the commencement of the drilling program.
Well details and oil spill trajectories will be prepared.	Site specific environmental data and trajectories will be prepared and submitted to DA in the EMP for the well	At least 2 weeks prior to the commencement of drilling.
An oil spill contingency plan will be available.	The OSCP will be made available to all personnel on the rig. The projected trajectories will be included in the EMP for the well	Immediately.

The following are the **responsibility** of **Legal Counsel**

Commitment	Action	Timing
Apache and each of the Participants will hold extensive insurance for liability, control of well and clean-up.	Certification of currency of insurance in accordance with directions from the DA.	Prior to the commencement of the drilling program.

3. Geology

3.3 *Geological Goals and Objectives*

To fully evaluate the hydrocarbon potential at Fur Seal-1.

3.4 *Offset Wells*

Esso/BHP	Sweetlips-1	10.9 km @ 315°
Esso/BHP	Emperor-1	13.3 km @ 315°
Esso/BHP	Moonfish-1	11.2 km @ 247°
Esso/BHP	Remora-1	4.2 km @ 113°
Apache	Grayling-1A	12.6 km @ 113°
Esso/BHP	Sunfish-1	6.7 km @ 90°
Apache	Longtom-2	14.7 km @ 79°

Find further offset information in Appendix E.

3.5 *Prognosed Formation Tops*

Age	Formation	Depth (m tvd AHD)	Thick (m)	Lithology
	Sea Bed	-58		
Tertiary	Gippsland Limestone	-60	1740	Limestone
Late Cretaceous	Lakes Entrance Formation	-1800	409	Limestone / Marl
Late Cretaceous	Top Latrobe U/C surface / Turrum Formation	-2209	12	Sandstone / Siltstone
Late Cretaceous	Halibut Subgroup (Kingfish Formation)	-2221	30	Sandstone / Siltstone / Coal
Late Cretaceous	Moonfish Volcanics	-2251	69	Sandstone / Siltstone / Coal
Late Cretaceous	Kate Shale	-2320	11	Glauconitic Claystone / Siltstone
Late Cretaceous n	Volador Formation	-2331	181	Sandstone / Siltstone / Coal
Late Cretaceous	Emperor Fm (Kipper Shale / (?) Strzelecki)	-2512	100+	Claystone / Shale
	TD	-2612		

3.6 *Formation Data*

Formation	Permeability (md)	Porosity (%)	Pore Pressure (psi / SG)	Frac Pressure (SG)	Temp (°C)
Gippsland Limestone				1.35 - 1.7	10
Lakes Entrance Formation	Negligible	Negligible		1.60	83
Top Latrobe U/C surface / Turrum Formation					100
Halibut Subgroup (Kingfish Formation)	500mD-4D	23-25	3271 / 1.03		101
Moonfish Volcanics					102
Kate Shale	Negligible	Negligible			105
Volador Formation			3383 / 1.03		105
Emperor Fm (Kipper Shale / (?) Strzelecki)					113
					117

* Temperature profile is based on 4.2°C/100m and 10°C at the sea floor.

4. Evaluation Program

4.1 *Mudlogging*

4.1.1 Data Engineering Services

The Geoservices mud logging unit will monitor and record the drilling parameters from spud to TD.

4.1.2 Cutting Samples

Cuttings will be returned to the rig after the BOP stack is run when the 340mm (13 3/8") casing is set at \pm 800m. The Apache wellsite geologist will direct the sample frequency as required.

4.1.3 Mud Samples

Mud samples should be obtained for the geologist prior to reaching the target.

4.2 *LWD Logging*

Hole Size	Logging Tool(s)	Comments
406mm (16")	203mm (8") Gam/Res/Dir	Live transmission to Perth
216mm (8 1/2")	171mm (6 3/4") Quad Combo DIR/Gam/Res/Den/Neut/Sonic/Acc Caliper	Live transmission to Perth

4.3 *Coring*

If coring is required, the well will be plugged back above the pay, and a sidetrack commenced.

4.4 *Wireline Logging*

Hole Size	Logging Tool(s)	Comments
406mm (16")	None	
216mm (8 1/2")	Checkshots / VSP	Firm
216mm (8 1/2")	MDT	If Required
216mm (8 1/2")	FMI	If Required
216mm (8 1/2")	Rotary sidewall core	If Required

5. Drilling Program

5.1 *Rig Mobilization & Anchoring*

5.1.1 Contract Start-up

The contract commences when the last anchor is racked departing BAS's, Maclean-1 well location on tow to the Apache Fur Seal-1 location.

5.1.2 Anchoring Procedure

An anchoring plan will be discussed in a meeting attended by the Apache Drilling Supervisor, Survey Representative, Contractor OIM, Barge Captain, Tow master, Supply Vessel masters, and contracted survey personnel with the resultant anchoring plan prepared by the Barge Captain. This plan will address the hazards perceived and detail the anchoring procedures agreed to in the meeting. Several offset wells have resulted in anchors slipping and being required to be re-run. Severe weather at this time of the year may also pose hazards in anchor handling operations. The drilling unit will be positioned with a heading of $\pm 045^\circ$. The proposed Fur Seal-1 surface location is:

38° 07' 47.82" South

148° 09' 08.53" East

Datum: GDA94

The surface positioning tolerance is 10m radius from the proposed surface location. The rig position is to be verified by the Apache Drilling Supervisor with a hand held GPS.

Ensure all positioning information references GDA94.

5.1.3 Items to Be Reported on DDR

1. Actual location coordinates and elevation will be provided by the positioning contractor and the Apache Representative on the rig. The final coordinates, distance from proposed location and heading will be reported on the Daily Drilling and IADC Reports.
2. Positioning will include an accurate measurement of vertical elevation with reference to the spheroid. From this the exact elevation of the rotary table is to be recorded referenced to AHD. The tidal state and water depth will be recorded at the times the above measurements are taken. (*Note: A set of Tide Tables shall be provided*)
3. The time the last anchor is racked at BAS's Maclean-1 location is to be reported on the DDR and IADC reports. A record of when 3rd party equipment was loaded onto the rig should also be kept.
4. Datum for all vertical measurements will be Australian Height Datum (AHD). The water depth at location will be confirmed when the 914mm (36") BHA is set on the seabed prior to spud and all depths will be reported in meters below the rotary table (mRT) corrected for tide and referenced to AHD.

5.1.4 Preparation

While the rig is being moved from Maclean-1 to the location, the BOP stack will be tested as per the test schedule in Appendix A. Ensure that the ram configuration is as outlined in Appendix A.

Prepare the Hydraulic Abandonment Connector ("HAC") incorporated into the 762mm (30") Housing Joint. If time and weather conditions permit, make up the 762mm (30") conductor and hang off in the moon pool.

5.2 Drill 914mm (36") Hole & Run 762x508mm (30x20") Casing

5.2.1 Hole Section Objective

The objective of the section is to drill a stable, vertical hole to accept the 762x508mm (30x20") conductor, which will provide structural support for the wellhead and remaining casing strings.

5.2.2 Hazards

SECTION HAZARDS		
Hazard	Effect	Precautions
Shallow gas	Explosion hazard, reduced rig buoyancy.	Maintain bubble watch ROV on bottom to watch well Be prepared to pull rig off location up wind and current
Currents	Difficult to spud vertically Difficult to stab casing into hole	Wait on slack tide if necessary
Severe Weather	Excessive rig movement	Be aware of moving objects. Tag lines to be used at all times. Be aware of your position at all times
Handling Large BHA	Personal injury Equipment damage	Hold JSA and use STOP system when required

5.2.3 Drilling Fluids

The 914mm (36") hole will be drilled using seawater and high viscosity prehydrated bentonite (PHB) sweeps as detailed in the Drilling Fluids Program. If drill water supplies are limited alternate guar gum sweeps with gel sweeps. At section TD (~116mRT) the hole will be displaced to prehydrated gel mud (Refer to Appendix B – Drilling Fluids Summary for details of sweeps and TD displacement.)

5.2.4 BHA

Component	Approx Length (m)	Bottom Connection	Top Connection
660mm (26") milled tooth bit	0.7	-	7 5/8" Reg Pin
914mm (36") Hole opener	1.8	7 5/8" Reg Box	7 5/8" Reg Pin
Bit sub c/w ported float	0.7	7 5/8" Reg Box	7 5/8" Reg Box
241.3mm (9 1/2") Anderdrift (Totco ring on top)	3.5	7 5/8" Reg Pin	7 5/8" Reg Box
241.3mm (9 1/2") DC x 3	27	7 5/8" Reg Pin	7 5/8" Reg Box
Crossover	0.7	7 5/8" Reg Pin	6 5/8" Reg Box
203mm (8") DC x 3	27	6 5/8" Reg Pin	6 5/8" Reg Box
Crossover	0.7	6 5/8" Reg Pin	4 1/2" IF Box
127mm (5") HWDP x 12	108	4 1/2" IF Pin	4 1/2" IF Box
TOTAL	170.1		

Bit	IADC	Nozzles	Flowrate
660mm (26") Milled tooth bit	1.1.1	3 x 28	4542 lpm (1200 gpm)
914mm (36") Hole opener		4 x 20	4542 lpm (1200 gpm)

5.2.5 Survey

Anderdrift surveys will be taken prior to spud (to ensure the string is vertical) and as required to monitor the deviation. A Totco survey will be dropped at the 914mm (36") section TD, prior to POH if the Anderdrift tool fails to provide inclination data.

5.2.6 Evaluation

Mud logging: Drilling parameters and tide levels will be monitored. Drilling parameters are to be correlated with drill floor recorders. No formation evaluation will be undertaken in this hole section.

5.2.7 Drilling Procedure

1. Pick up 12jnts of HWDP and drill collars. Make up 914mm (36") BHA No 1. Measure and record the bit to hole opener spacing.
2. Deploy ROV
3. Run 914mm (36") BHA and tag the seabed. Take an Anderdrift survey prior to spudding, to ensure that the current is not inclining the drill string.
4. Note: Record water depth, date and time on Daily Drilling and IADC reports. Use tide tables to give the tide corrected water depth and record it referenced to AHD. Set tide markers and begin monitoring tide.
5. Spud the well and drill to ~116mRT or as necessary to place the bottom of the PGB ~1.5m above the seabed when the casing is on bottom, using seawater and the high viscosity sweep regime recommended in the Drilling Fluids Program.
6. Take Anderdrift surveys as required to ensure that the hole angle remains less than 1.5°, adjust WOB and RPM to control angle as required.
7. Circulate the hole clean and displace hole to PHB mud. Pick up until the HO is just below the seabed and run back to bottom. If no hole problems are encountered displace the hole to PHB mud (non flocculated) and pull out to run conductor. Drop a Totco prior to POH.
8. Note: The ROV will remain stationary on bottom maintaining sight of the hole until the 762mm (30") casing is run.

5.2.8 Casing Summary

Size (in)	Quantity	Description	Weight / Grade / Connections
762mm (30")	1	30" X 1.500" Hydraulic Connector Upper Joint:	30" OD, 1.5" Wall, API 5L, Grade X52, 456ppf, installed with Hydraulic Abandonment Pin Connector
762mm (30")	1	Lower HAC joint	30" OD, 1.5" Wall, API 5L, Grade X52, 456ppf installed with Hydraulic Abandonment Box Connector And SF-60 Box Connector At Each End
762mm (30")	1	Intermediate joint	30" OD, 1.0" Wall, API 5L, Grade X52, 310ppf Quik- Stab, Type SF-60 Pin x Box
762 x 508mm (30" x 20")	1	762mm x 508mm (30" x 20") Crossover Shoe joint, with 508mm (20") float shoe.	30" OD, 1.0" Wall, API 5L, Grade X52, 310ppf x 20" OD, 1.0" Wall, API 5L, Grade X56, 203ppf, Quik Stab SF-60 Box x Float Shoe

5.2.9 Cementing Summary

Displacement	Recipe / Excess	From	To	Density (SG)
Circulation/ Spacer	19 m ³ /3.18 m ³ (140bbls/20bbls) seawater with Fluorescein Dye			1.03
Slurry	Class 'G' neat CaCl ₂ : 1% bwoc D047 Antifoam: 0.01gal/sx Mix water: Seawater Yield: 1.19 ft ³ /sk Excess: 300% excess	Casing shoe @ ~116mRT	Seabed @ ~80mRT	1.89

5.2.10 Casing & Cementing Procedure

1. Pick up 762mm (30") casing/PGB assembly. Run DP single below 762mm (30") housing running tool. Check float and lower to fill with seawater.
2. Run 762mm (30") casing and observe the conductor entering the hole with the ROV. Fill each joint with seawater.
3. Check that the PGB inclination is less than 1°. If the inclination is >1° use guide line tension and/ or rig positioning to attempt to reduce the inclination to <1°.
4. Circulate 1 ½ times casing capacity with seawater. Rig up and test cementing lines to 13789 kPa (2000 psi).
5. Pump seawater plus dye and cement 762mm (30") casing with 300% excess over open hole volume and observe returns with ROV.
6. Displace the cement to within 5m of the shoe.

7. Confirm PGB angle is $<1^\circ$ and release running tool, confirming the PGB angle after release of the running tool.
8. Pull back with running tool and drill pipe stinger and wash the 762mm (30") housing area on the way out.
9. If any problems were noted with the primary cementation remedial grouting will be conducted.

5.2.11 Items to be Reported on DDR

1. Record distance from the top of 762mm (30") housing to rotary table, the PGB angle and heading in the Daily Drilling Reports.
2. Record details of casing string and cement job including observation of returns in Casing & Cementing Report.
3. Forward Casing & Cementing reports to town within 24 hours.

5.3 *Drill 406mm (16") Hole & Run 340mm (13 3/8") Casing*

5.3.1 Hole Section Objective

The 406mm (16") hole section will allow the 340mm (13 3/8") casing to be run and set into the Gippsland Limestone formation, at ~800 mMDRT in order to obtain a good FIT for drilling ahead to the 216mm (8 1/2") well TD at ~2634 mMDRT.

5.3.2 Hazards

SECTION HAZARDS		
Hazard	Effect	Precautions
Shallow gas	Explosion hazard Reduced rig buoyancy.	Maintain bubble watch ROV on bottom to watch well Be prepared to pull rig off location up wind and current
Lost circulation	Difficult to clean hole	Viscous sweeps programmed each single
Ledging	Inability to get casing to bottom	Control WOB and RPM to create good hole conditions. Maintain sweep programme and ream where necessary

5.3.3 Drilling Fluids

The 406mm (16") hole section will be drilled with seawater and high viscosity prehydrated bentonite (PHB) sweeps as detailed in the Drilling Fluids Program. At section TD the hole will be displaced to prehydrated gel mud. Refer to Appendix B - Drilling Fluids Summary for details of sweeps and TD displacement.

5.3.4 BHA

Component	Approx Length (m)	Bottom Connection	Top Connection
406mm (16") PDC bit	0.50		7 5/8" Reg Pin
244mm (9 5/8") Motor	9.0	7 5/8" Reg Box	7 5/8" Reg Box
241mm (9 1/2") x/o	1.0	7 5/8" Reg Pin	6 5/8" Reg Box
394mm (15 3/4") Integral Blade Stabilizer	2.5	6 5/8" Reg Pin	6 5/8" Reg Box
203mm (8") MWD Gam/Res	7.0	6 5/8" Reg Pin	6 5/8" Reg Box
203mm (8") MWD Dir/Pulser	6.0	6 5/8" Reg Pin	6 5/8" Reg Box
203mm (8") DC x 5	45.0	6 5/8" Reg Pin	6 5/8" Reg Box
203mm (8") Jar	9.0	6 5/8" Reg Pin	6 5/8" Reg Box
203mm (8") DC x 3	27.0	6 5/8" Reg Pin	6 5/8" Reg Box
Crossover Sub	1.25	6 5/8" Reg Pin	4 1/2" IF Box
127mm (5") HWDP x 15	135.00	4 1/2" IF Pin	4 1/2" IF Box
TOTAL	243.25		
Weight below Jars	17t (38klbs)		
Buoyed Weight below Jars	15t (33klbs)		

Bit	IADC	Nozzles	Flowrate
Security FS2563		7 x 18	4163 lpm (1100gpm)
TBA			4163 lpm (1100gpm)

5.3.5 Survey

Survey as required w/ MWD (one survey at least every 300m).

5.3.6 Drilling Procedure

1. Make up 476mm (18 3/4") wellhead housing and extension with reduced bore nominal seat protector installed, to the running tool with a 2 joint drill pipe stinger and SSR plugs below, and rack back/ lay out.
2. Break down 914mm (36") BHA components and make up 406mm (16") BHA No 2.
3. Attach soft line guides to BHA and run in hole. Use ROV to assist stabbing BHA into the 762mm (30") housing if necessary.
4. Record the top of cement and drill out the cement and the 508mm (20") shoe using seawater and hi-vis sweeps as per the Drilling Fluids Program.

Note: The ROV should be deployed throughout this section to observe for indications of shallow gas.

5. Drill ahead using seawater and hi-vis sweeps specified in the Drilling Fluids program to ~800 mRT (TVD), or as appropriate to set the actual length of 340mm (13 3/8") casing required with a 5m rathole.

Note: Minimise cuttings loading and ECD. Control WOB if hard stringers are encountered to minimise ledges through this interval.

6. At section TD sweep the hole clean with a 13.8m³ (150bbl) hi vis pill and if hole conditions are good, displace hole to hi vis prehydrated bentonite. If the hole is tight consider a wiper trip to the 508mm (20") shoe. (Refer to Appendix B – Drilling Fluids Summary for details of sweeps and TD displacement.)
7. Pull out to run casing and jet 762mm (30") housing area on way out. Confirm section TD using average joint method – do not strap the pipe.

5.3.7 Casing Summary

Size (in)	Quantity	Description	Weight / Grade / Connections
340mm (13 3/8")	1	Dril-Quip 476mm (18 3/4") SS-10C W/H and 508mm (20") housing upper extension	508mm (20") OD, 25.4mm (1.0") Wall, Grade X-56, quik-stab 406mm (16") Special type HD90 Box
340mm (13 3/8")	1	508mm (20") housing lower extension swedged to 340mm (13 3/8")	quik-stab 406mm (16") Special type HD90 Pin. 340mm (13 3/8"), 107 kg/m (72 lb/ft) BTC pin
340mm (13 3/8")	~54	Intermediate joints	101.2 kg/m (68 lb/ft), L80, BTC
340mm (13 3/8")	1	Float collar joint - Bakerlocked	101.2 kg/m (68 lb/ft), L80, BTC
340mm (13 3/8")	1	Shoe track joint – Bakerlocked	101.2 kg/m (68 lb/ft), L80, BTC
340mm (13 3/8")	1	Shoe joint w/ float shoe - Bakerlocked	101.2 kg/m (68 lb/ft), L80, BTC

Centralisers

- 2 spring bow centralisers per joint over shoe track
- 1 spring bow centraliser per joint for the lower 2 joints

5.3.8 Cementing Summary

Displacement	Recipe / Excess	From	To	Density (SG)
Circulation/spacer	80 / 3 m ³ (525/ 20bbls) seawater			1.03
Lead Slurry	Class 'G' + extender D047 Antifoam 0.01gal/sk D075 Extender: 0.42gal/sk D110 Retarder: 0.10gal/sk Mix water: Seawater Yield: 2.23 ft ³ /sk Excess in OH: 50%	650	300	1.50
Tail Slurry	Class 'G' neat D047 Antifoam 0.01gal/sk D110 Retarder: 0.01gal/sk Mix water: Drillwater Yield: 1.16 ft ³ /sk Excess in OH: 50%	800	650	1.90

Note: Slurry recipes will be confirmed prior to job

5.3.9 Casing & Cementing Procedure

1. Rig up handling equipment and TAM packer to run the 340mm (13 3/8") casing.
2. Run 340mm (13 3/8") shoe, intermediate and float collar joints, checking floats in shoe and collar.
3. Run 340mm (13 3/8") casing with softline on shoe joint for guidance.
4. Stab into the 30" housing while observing with ROV. Fill casing initially with 15.9m³ (100bbls) of PHB mud (17jts).
5. Continue running casing filling each joint with seawater as it is run.
6. Pick up 476mm (18 3/4") wellhead x 508mm (20") extension joint swedged to 340mm (13 3/8"), with the bore protector installed on running tool (with 2 joint stinger and plugs below).

Note: Make up stabbing guide on bottom of 340mm (13 3/8") wellhead extension prior to running casing.

7. Run landing string and land 476mm (18 3/4") wellhead in the 762mm (30") housing while observing with the ROV. Confirm latching with 22tonnes (50kips) overpull.
8. Circulate >110% times the casing capacity with seawater. Rig up and test cementing lines as per Appendix A.
9. Pump seawater spacer and cement the 340mm (13 3/8") casing with 50% excess over open hole volume and observe mud returns with the ROV.
10. Displace the slurry with seawater; bump the plug with 34,500kPa (500psi) over circulating pressure and pressure test casing as per Appendix A for 10mins. Do not over displace the calculated volume by more than half the capacity of the shoe track if the plug does not bump. In any case stop pumping if the pressure stops increasing.
11. Bleed off pressure, check floats are holding and release running tool. POOH and flush 476mm (18 3/4") wellhead housing area on way out.
12. Check slope indicators on PGB with ROV and record readings.
13. Move rig 15m away from wellhead in the direction of the current to minimize the risk of wellhead damage and lay down 406mm (16") drilling assembly.

5.3.10 Items to be Reported on DDR

1. Report the angle observed on the PGB slope indicator after releasing from the casing in DDR
2. Complete the Casing and Cementing Report which includes details of the casing run, and full details of the cementing job including the observation of returns.
3. Forward Casing & Cementing reports to town within 24 hours.

5.4 Run BOP & Riser

Note: *Prior to running, the BOP will have been tested on the stump as per Appendix A. Ensure new ring gaskets are fitted in the LMRP and wellhead connectors and a slope indicator is mounted above the flex joint. Function test BOP prior to running.*

1. With the rig off location run the BOP stack and riser as per the Drilling Contractors procedures testing the K & C lines as per Appendix A before picking up slip joint.
2. Pick up slip joint and attach tensioners and K & C lines. Pressure test K & C lines as per Appendix A.
3. Deploy ROV and move rig over wellhead.
4. Land BOP observing with ROV and latch. Confirm latching with 22tonnes (50kips) overpull and record slope indicator reading after landing the stack.
5. Install and latch diverter and function test.
6. Run isolation test tool and perform a full BOP test as per Appendix A.

5.5 Drill 216mm (8 ½”) Hole to TD

5.5.1 Hole Section Objective

The objective of the 216mm (8 ½”) hole section is to reach TD of 2634m TVDRT and to evaluate the Kingfish Formation (primary objective) and the Volador Formation (secondary objective) using LWD and, in the event of hydrocarbons being detected allow sufficient open hole in good condition to ensure wireline logs can be obtained, in particular the recovery of pressure data and samples using an MDT tool.

5.5.2 Hazards

SECTION HAZARDS		
Hazard	Effect	Precautions
Reactive shales/claystones,	Tight hole, difficulty running logs.	Follow Mud Programme specifications for KCl, and PHPA concentrations
Over balance in the reservoir sands.	Stuck pipe and logging tools.	Log with LWD. Maintain tight control of the mud weight. Ensure adequate stand off in BHA.
Moonfish Volcanics (may not be present)	Hard drilling. Damage bit. Cause a trip to change bit	Caution should be taken by controlling drilling parameters over this section.
High Gas Cut Mud	Delay in drilling operations. Possible well control issues.	Ensure all degassing equipment is operational. Check that agitators are working.
Coal Stringers	Tight hole, unable to get wireline tools to bottom	Ensure good hole conditions. Ream as required. Ensure wireline have Pipe Conveyed system onboard.

5.5.3 Drilling Fluids

The 216mm (8 ½”) hole will be drilled with an 6% KCl / PHPA to provide inhibition of any dispersive elements. It is anticipated that a mud weight of 1.2 – 1.32 SG will be

sufficient to drill to TD. (Refer to Appendix B Drilling Fluid Summary or Drilling Fluids Program for full details.)

5.5.4 BHA

Component	Approx Length (m)	Bottom Connection	Top Connection
216mm (8 ½") PDC bit	0.4		4 ½" Reg Pin
171 mm (6 ¾") Motor	9.0	4 ½" Reg Box	4 ½" IF Box
197mm (7¾") String Stabiliser	2.2	4 ½" IF Pin	4 ½" IF Box
171mm (6 ¾") Float sub c/w ported valve	1.0	4 ½" IF Pin	4 ½" IF Box
171mm (6 ¾") LWD Quad Combo	26.5	4 ½" IF Pin	4 ½" IF Box
165mm (6 ½") Drill Collars x 9	81.0	4 ½" IF Pin	4 ½" IF Box
165mm (6 ½") Drilling Jar	9.00	4 ½" IF Pin	4 ½" IF Pin
165mm (6 ½") Drill Collars x 2	18.0	4 ½" IF Pin	4 ½" IF Pin
127mm (5") HWDP x 15	135.0	4 ½" IF Pin	4 ½" IF Box
TOTAL	291.1		
Weight below Jars	18t (40klbs)		
Buoyed Weight below Jars	15t (34klbs)		

Bit	IADC	Nozzles	Flowrate
TBA			
TBA			

5.5.5 Survey

Survey as required w/ MWD (one survey at least every 300m).

5.5.6 Evaluation

Mud logging: Continuous monitoring of return drilling fluid, drilling parameters, tide and pit levels.

Cuttings: 5m sample interval, washed/ air dried.

Coring: No coring planned

FEWD: DGR/EWR-P4/SLD/CNP/BAT/ACAL/Dir

Wireline logging: A checkshot survey is the only firm wireline run. Wireline evaluation logs may be run if there are indications of commercial hydrocarbons present in the well. Any wireline logging

requirements will be confirmed prior to tripping out the 216mm (8 ½”) drilling assembly.

5.5.7 Drilling Procedure

1. Make up a 216mm (8 ½”) BHA No 3, shallow pulse test LWD as per LWD contractors instructions.
2. Run in hole and tag the top of cement inside the 340mm (13 ⅜”) casing.
3. Drill out cement and shoe and clean out rathole using old mud (dump mud to avoid contamination). Drill 3m of new hole while displacing to new 6% KCl / PHPA mud system. Circulate to balance and condition mud and pull back into the casing shoe.
4. Perform formation integrity test up to a formation strength of ± 1.70 SG equivalent mud weight, which is the anticipated leak off.
5. Conduct SCRs and CLFLs.
6. Drill ahead to TD of section at 2634m.
7. At section TD circulate the hole clean and pull out of hole. In the event of hydrocarbons a repeat section may be performed with the LWD tools at the request of the well-site geologist while pulling out of the hole. The well-site geologist will liaise with the LWD contractor to determine repeat section depths and tripping speeds. Do not round repeat section depths to the nearest stand.
8. Jet 476mm (18 ¾”) wellhead housing area on way out.
9. If there have been any problems with transmission of the LWD data check the memory data immediately, so that a decision on e-logs can be made.

5.6 Suspend or Plug and Abandonment

5.6.1 Cement Plug Summary

Plug #	Recipe / Excess	From	To	Density (SG)
1	TBA	TD	50m above hydrocarbons	1.89
2	25% excess in open hole	30m below shoe	50m above shoe	1.89
3	Class G neat	170m	110m	1.89

Recipes will be confirmed prior to abandonment.

5.6.2 P&A or Suspension Procedure

The Fur Seal-1 well is programmed as an exploration well which will be plugged and abandoned at the conclusion of drilling and evaluation operations. A preliminary abandonment procedure is outlined below and a specific abandonment program approved by the Authority will be issued after the evaluation results are confirmed.

1. Run in with cementing stinger on drill pipe and set cement abandonment plug #1 (TD – 50m above hydrocarbons).
2. Pull back to ± 830 mRT (MD) and spot 3m³ (20bbl) Hi Vis pill.
3. Pull Back to and set plug #2 across shoe (760-840m).
4. Lay down 216mm (8 ½”) BHA and excess drill pipe while waiting on cement.
5. Tag plug #2 (across shoe) with 2 MT to confirm placement depth.
6. Displace well to inhibited mud with Biocide and Cronox.
7. POOH laying down excess drill pipe.
8. Set balanced plug #3 at ~170m.
9. POOH laying out excess drill pipe.

-
10. Unlatch and pull riser and BOP.
 11. P/U 508mm (20") Casing cutting assembly dressed to cut 508mm and 762mm (20" and 30") and cut 508mm (20") casing spaced to accommodate the HAC.
 12. Follow the Dril-Quip Manual, 762mm (30") Hydraulic Abandonment connector procedure, for the retrieval of the wellhead housing and guide bases assisted by ROV. Should the HAC fail to release the 762mm casing will then be cut.
 13. Recover PGB and casing stub.
 14. Conduct seabed survey with ROV and record on CD.

5.6.3 Items to be Reported on the DDR

1. Plug placement depths and confirmation achieved.
2. Time taken to WOC.
3. Time taken to cut 508mm (20").
4. Mud weight left in hole.
5. Results of seabed survey.

5.7 ***Pull Anchors & Demobilization***

5.7.1 Contract Completion

Prepare a Statement of Facts for the drilling rig and the two workboats.

5.7.2 Pulling Anchors Procedure

1. Pull secondary anchors.
2. Connect boat to tow bridle.
3. Pull primary anchors.

5.7.3 Items to Be Reported on DDR

1. The date & time each anchor was racked.
2. The date & time the last anchor was racked and charges to Fur Seal-1 cease.
3. Statement of Facts (rig & boats)



APPENDIX A

PRESSURE TESTING REQUIREMENTS

Pressure Testing Requirements

BOP configuration

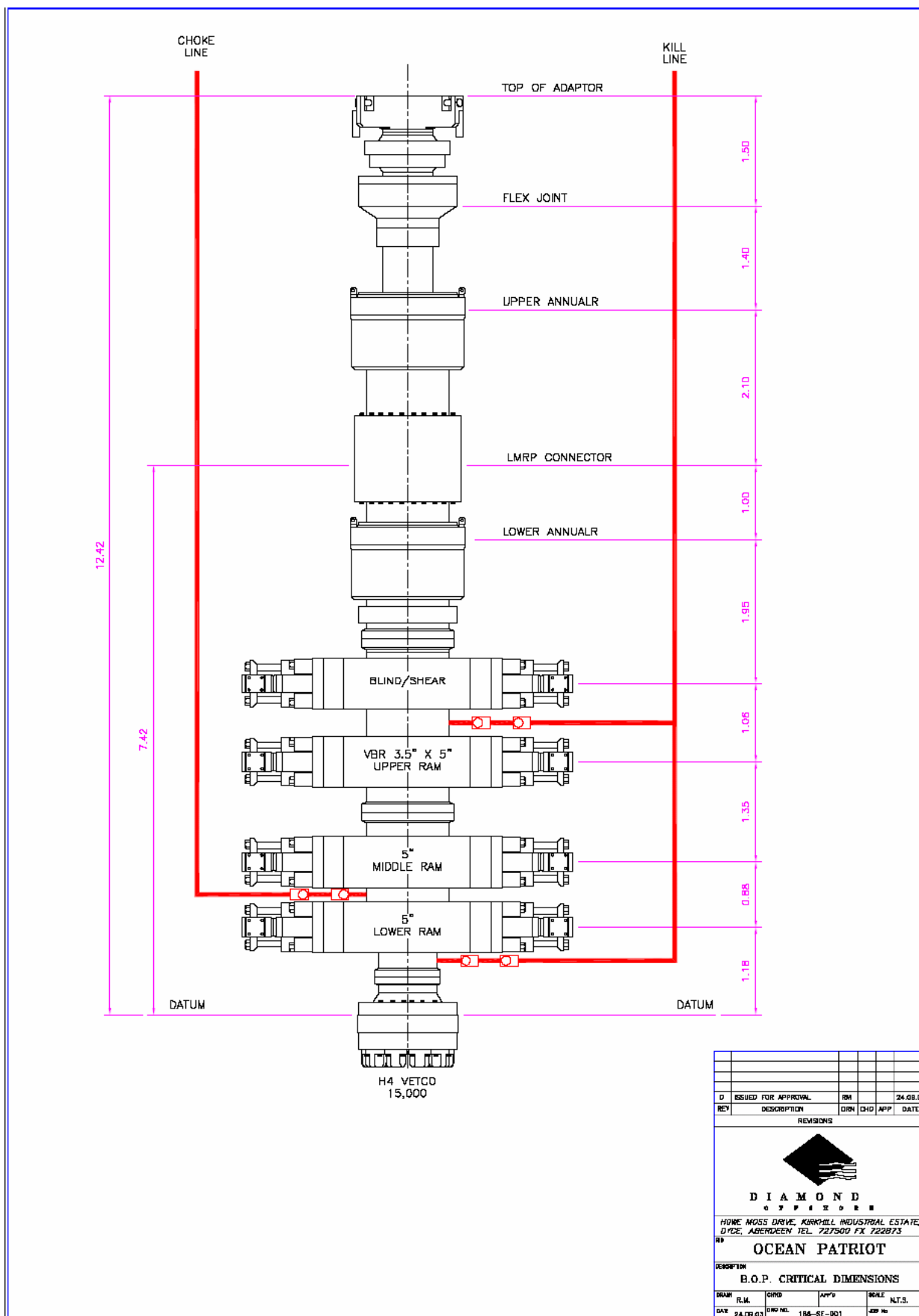
Component	Type/ Pressure Rating
Upper Annular	Cameron D Type – 68.9 MPa (10000 psi)
LMRP connector	476mm (18 ¾”) Cameron Collet
Lower Annular	Cameron D Type – 68.9 MPa (10000 psi)
Top rams: Shear/ Blind rams	Cameron U11 – 103.4 MPa (15,000 psi)
Kill line entry	103.4 MPa (15,000 psi)
Middle upper rams: variable rams 88.9-127mm (3½”-5”)	Cameron U11 – 103.4 MPa (15,000 psi)
Middle lower rams: 127mm (5”) pipe rams	Cameron U11 – 103.4 MPa (15,000 psi)
Choke line entry	103.4 MPa (15,000 psi) Below variable rams
Lower rams: 127mm (5”) pipe rams	Cameron U11 – 103.4 MPa (15,000 psi)
Kill line entry	103.4. MPa (15,000 psi)

Pressure Testing Schedule:

Item	Surface Test	340mm (13 ⅝”) Casing
Annular Preventer	17.2MPa (2,500 psi)	17.2MPa (2,500 psi)
Pipe Rams	34.4MPa (5,000 psi)	34.4MPa (5,000 psi)
Blind/ Shear Ram	34.4MPa (5,000 psi)	34.4MPa (5,000 psi)
Choke & Kill Lines/ manifold	34.4MPa (5,000 psi)	34.4MPa (5,000 psi)
Standpipe, TDS, IBOP	34.4MPa (5,000 psi)	34.4MPa (5,000 psi)
Casing Test		20.7MPa (3,000 psi)
Cement Lines	20.7MPa (3,000 psi)	20.7MPa (3,000 psi)
Max Anticipated Surface Press		20.4MPa (2,960 psi)
70% of Casing Burst (Information only)		24.3MPa (3,517 psi)
Connector test		Yes
LOT		Yes (FIT)

Note: Pressure tests will be conducted in two stages. The low pressure test shall be 1380 kPa (200 psi). All pressure tests shall be held for 10 mins with less than 5% decline.

BOP Schematic:





APPENDIX B

DRILLING FLUIDS PROGRAM

[illegible]

APPENDIX C

CASING DESIGN

WELL SUMMARY

	String	OD/Weight/Grade	Connection	MD Interval (m)	Drift Dia. (mm)	Minimum Safety Factor (Abs)			
						Burst	Collapse	Axial	Triaxial
1	Conductor Casing	762.00 mm, 460.884 kg/m, X-52	N/A	58.00-116.00	706.45	27.76	6.77	5.52	5.47
2									
3									
4	Surface Casing	339.73 mm, 101.195 kg/m, L-80	BTC, L-80	58.00-800.00	311.38	1.57 L	2.82	3.28 F	1.99
5									
6									
7									
8	L Conn Leak								
9	F Conn Fracture								

Minimum Design Safety Factors

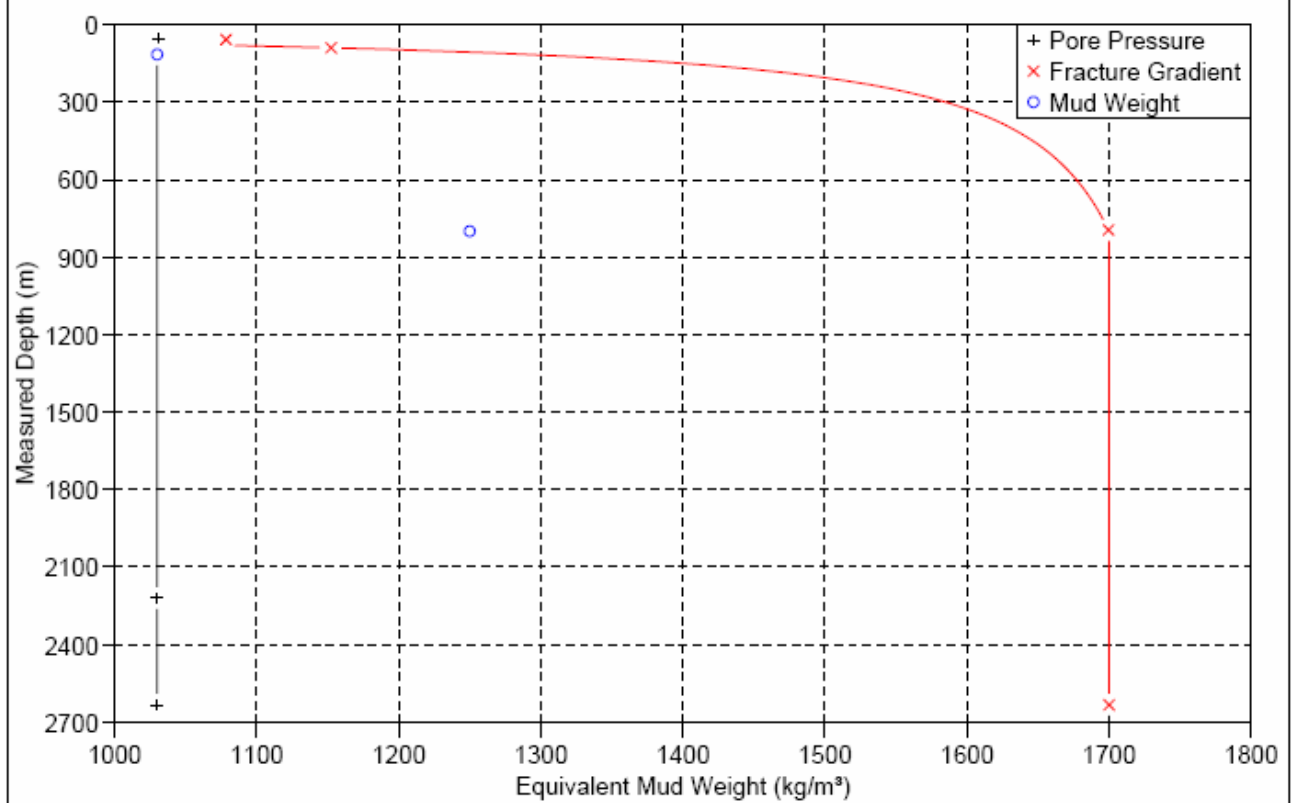
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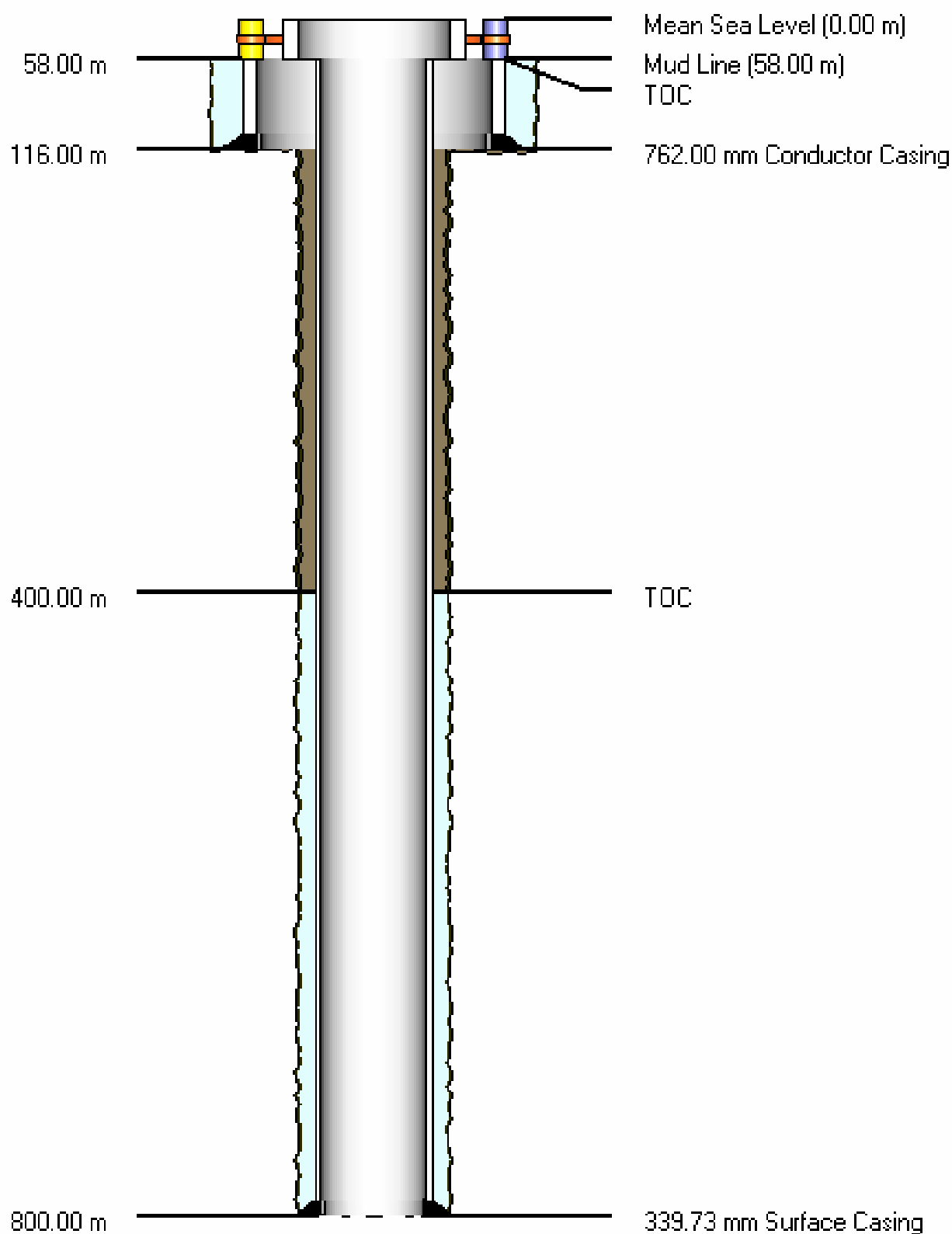
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Tension = 1.8

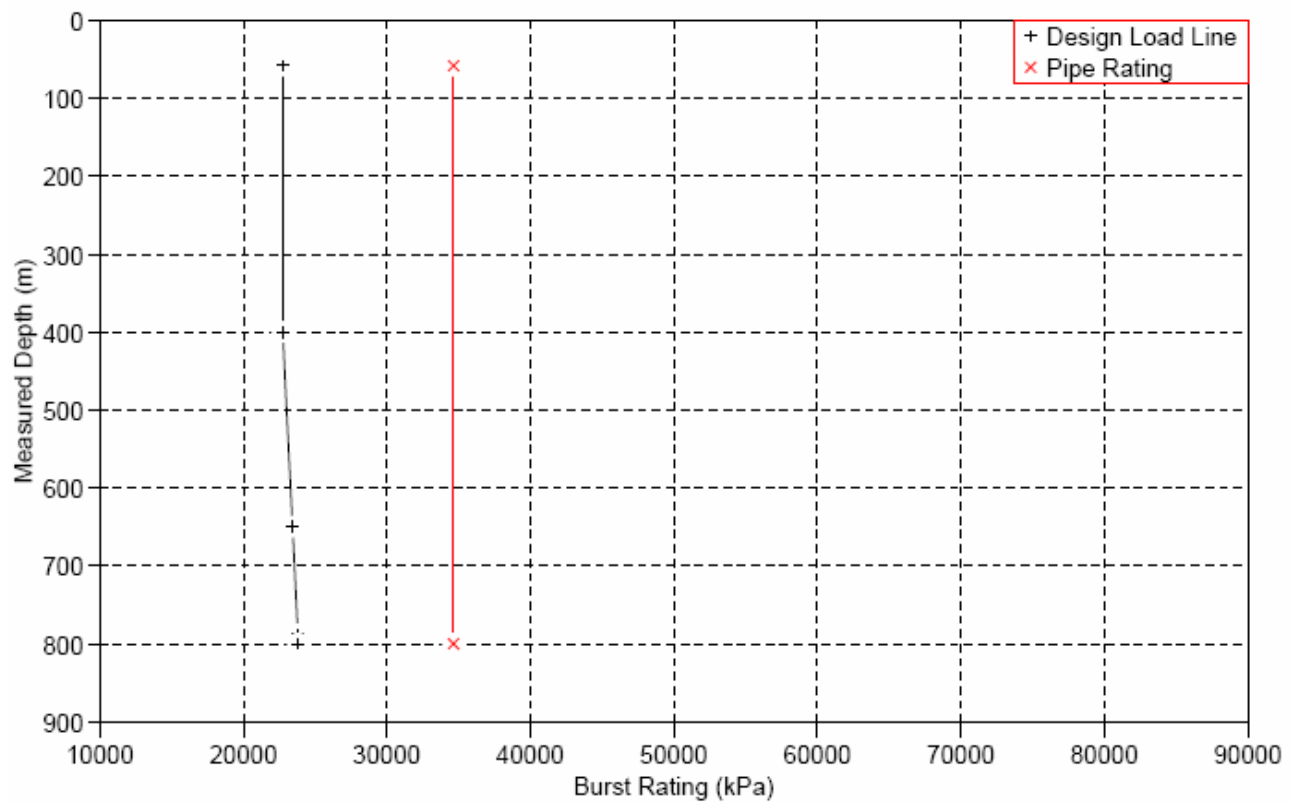
Kick Tolerance of 10.3 m³ (65bbbls), using an FIT of 1.65SG and a MW of 1.32SG and a pore pressure of 1.05SG.

PORE, FRACTURE & MW

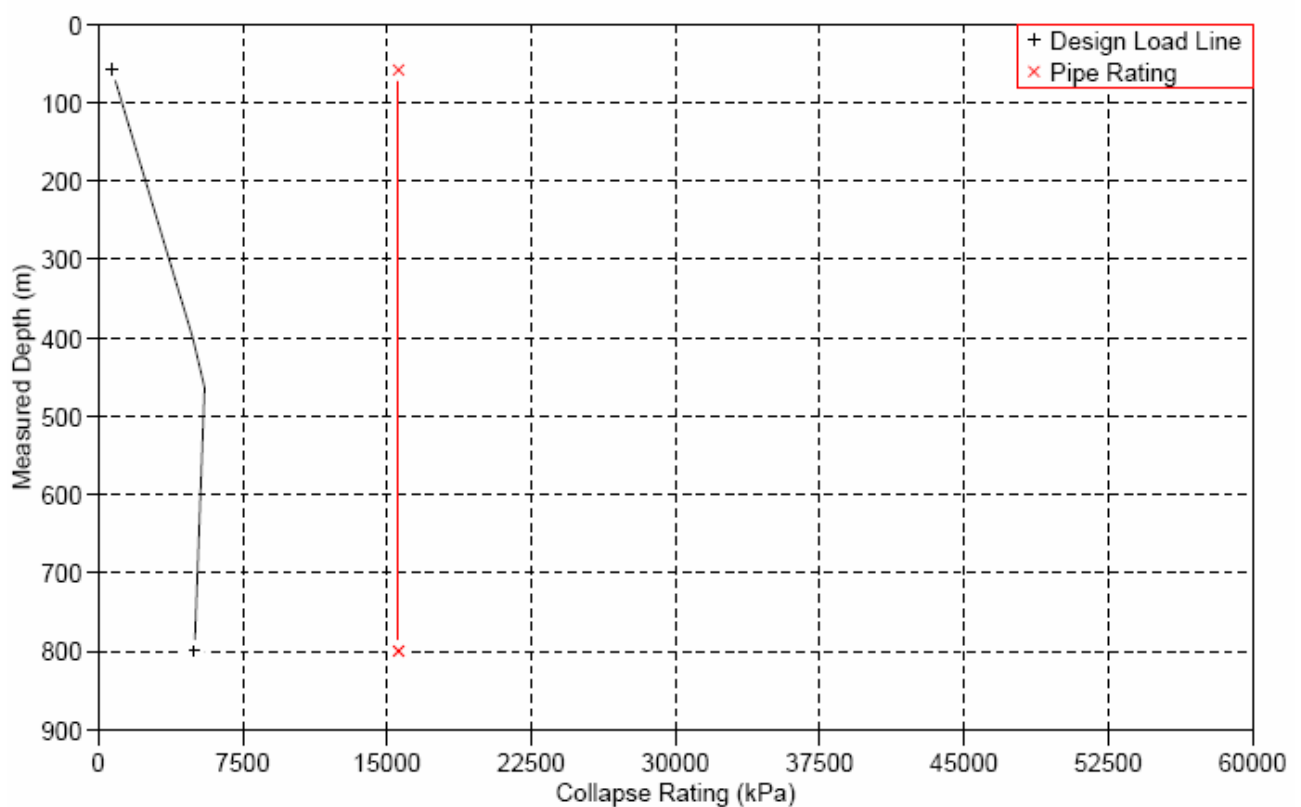




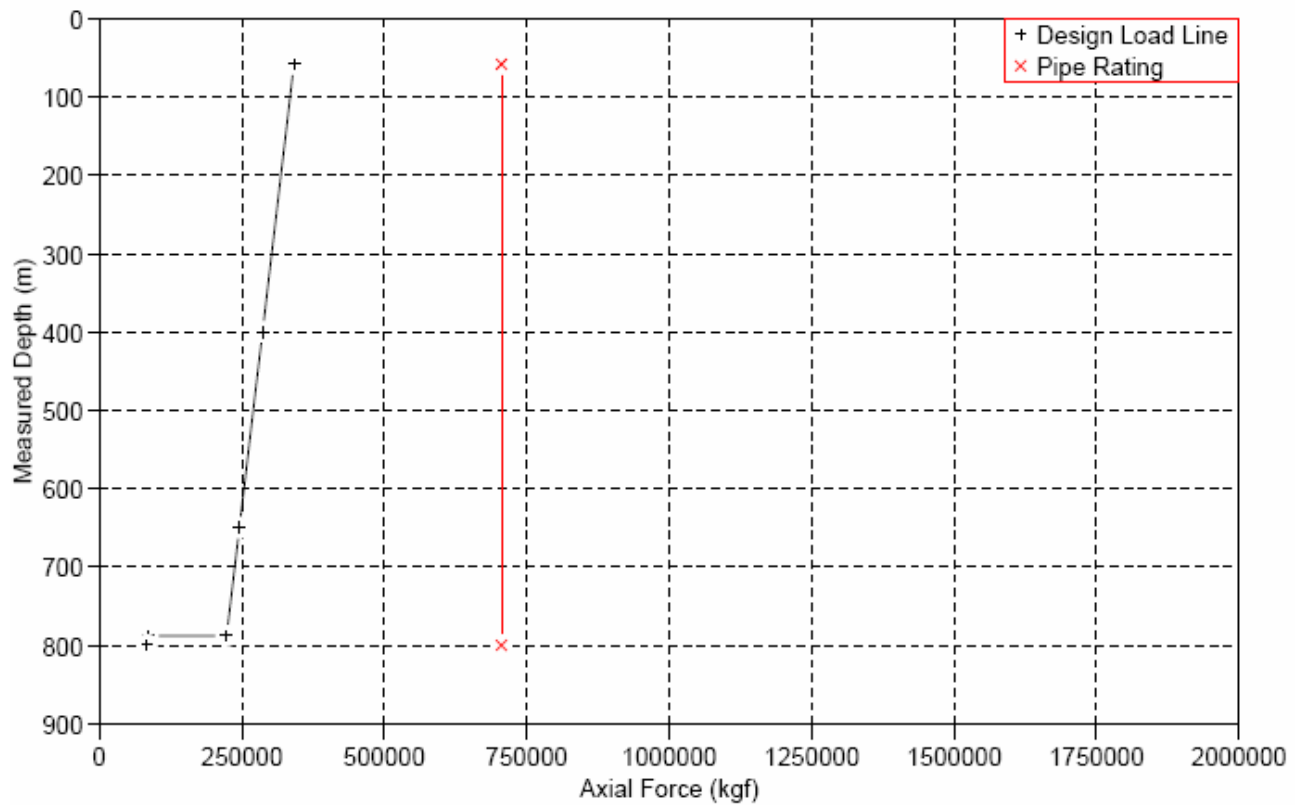
BURST DESIGN (339.73 mm Surface Casing)



COLLAPSE DESIGN (339.73 mm Surface Casing)



AXIAL DESIGN (339.73 mm Surface Casing)



APPENDIX D

HYDRAULICS CALCULATIONS

Theoretical Hydraulics Summary:

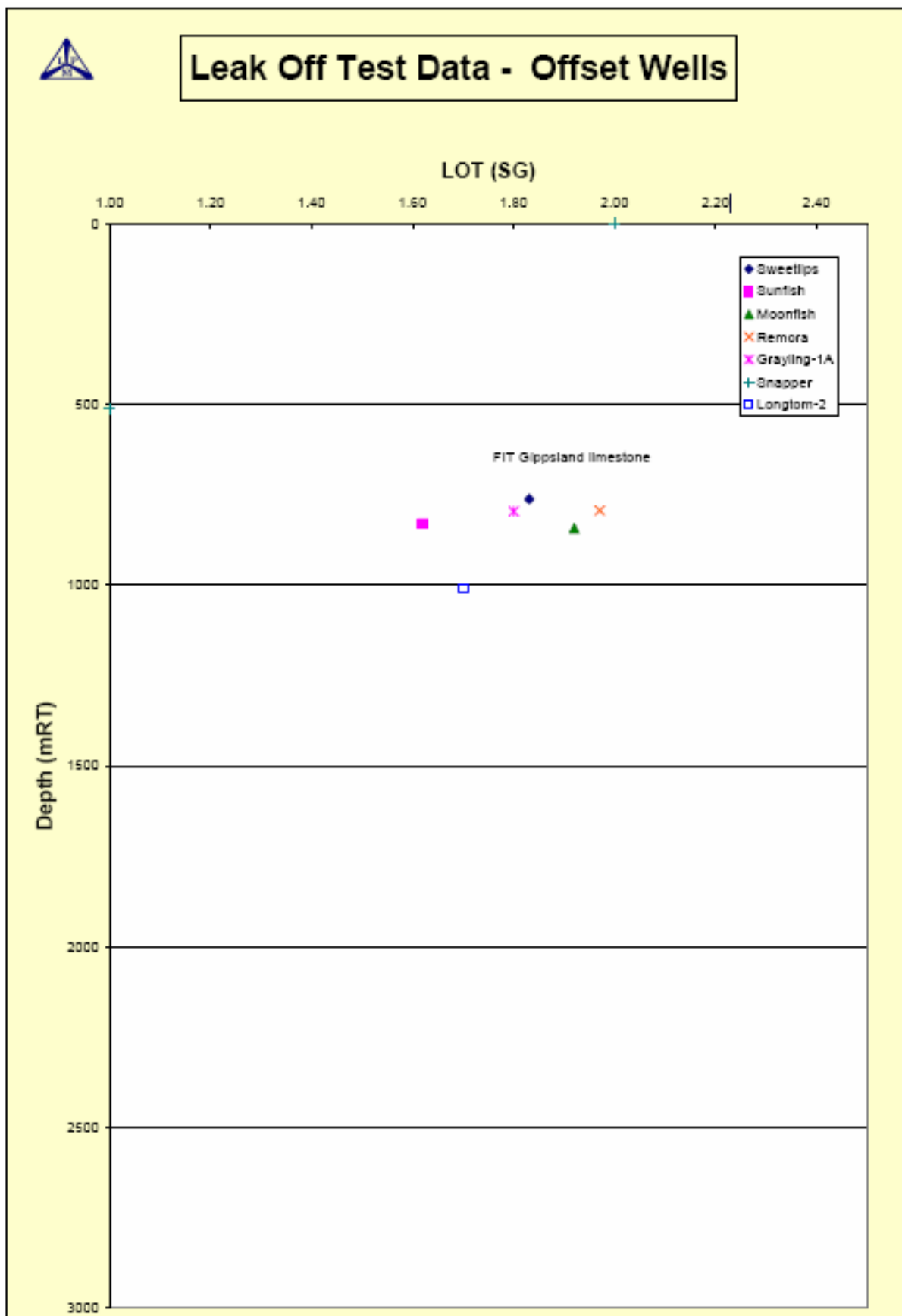
Rig: Ocean Patriot
2 x National 12-P160
Pump Model: 1 x Oilwell A1700-PT
Pump Stroke: 12 inches
Rod Diameter: 3.5 inches
Volumetric eff: 97 %

Operating Parameters	Bit size	mm (in)	406 (16)	216 (8½)
	Bit Type		PDC	PDC
	Depth In	m	116	800
	Depth out	m	800	2634
	Mud density	sg (ppg)	1.04 (8.7)	1.2 (10.0)
	Plastic Viscosity	cp	10	10
	Yield Point	lbf/100ft ²	10	25
Bit Hydraulics	Nozzles	32nds	7 x 18	5 x 15
	Flow	gpm (lpm)	1100 (4164)	600 (2271)
	TFA	cm ² (in ²)	11.2 (1.740)	5.6(0.982)
	Jet Velcocity	m/sec(ft/sec)	58.5(192)	64.3(211)
	Bit PD	kPa (psi)	1992 (289)	2772(402)
	Bit HHSI	HHSI	0.88	2.36
	Impact force	N(lbs)	1523(405)	2776(624)
SPP	kPa (psi)		15630 (2267)	16278 (2361)
OH Annular Velocities				
	127mm(5") HWDP / DP	m/min (ft/min)	37 (117)	95 (311)
	165mm(6½") DC	m/min (ft/min)		149 (490)
	203mm(8") DC	m/min (ft/min)	43 (140)	




APPENDIX E

OFFSET WELL DATA



WELL IDENTIFICATION INFORMATION						
Well Name	Remora	Rig Name	Diamond M Epoch			
Operator	ESSO/BHP	RT (m)	58.4			
Permit	Vic/P1	Water Depth (m)	22.00			
Well Type	New Field Wildcat	Spud Date	22-Apr-87			
Field Name	Remora	Rig Release Date	29-May-87			
Area/basin	Gippsland	Well trajectory (V/Dev)	v			
Primary Objectives		End Well Status	P&A			
Produced Fluid type						
Formation Tops	RT Depth (m)	Sub-Sea Depth (m)	Lithology / Comments			
Sea Floor <i>Enter Depths in mRT</i>	80.4	22.0				
Latrobe Group	2068	2009.6				
Base Turrum Formation	2124	2065.6				
L. balmei Seismic marker	2183	2124.6				
T. longus Seismic marker	2562	2503.6				
TD	2800	2741.6				
Same Geological Regime (Yes/No)		Yes				
Casing Size	Shoe Depth (m)	Hole Size	Hole Depth (m)	LOT (SG)	Leak Off	MW Range (SG)
30"						
20"	210	26 in	225			
16"						
13 3/8"	794	17 1/2 in	810	1.97	No	
9 5/8"		12¼"	2822			1.10-1.22
7"						
5"						
Good Drilling Practices / Successes						
Well was drilled to 2822m and wireline logged, MW 9.2ppg. Due to logs TD was extended. A gas kick was taken at 2944m and the MW raised to 10.2ppg and controlled (after the fact this was thought to be slightly underbalanced).						

WELL IDENTIFICATION INFORMATION						
Well Name	Grayling-1A	Rig Name	Ocean Patriot			
Operator	Apache	RT (m)	21.5			
Permit	Vic/P-54	Water Depth (m)	58.50			
Well Type	Exploration	Spud Date	28-Dec-04			
Field Name		Rig Release Date	27-Jan-05			
Area/basin	Gippsland	Well trajectory (V/Dev)	Dev			
Primary Objectives	Volador Formation	End Well Status	P&A dryhole			
Produced Fluid type						
Formation Tops	RT Depth (m)	Sub-Sea Depth (m)	Lithology / Comments			
Sea Floor	Enter Depths in mRT	80.0	58.5			
Gippsland Limestone (Seabed)	80	58.5				Seaspray Group
Lakes Entrance Formation	1325	1303.5				Seaspray Group
Top Gurnard Formation	1504.8	1483.3				Cobia
Kingfish Formation	1511.7	1490.2				Halibut
Lower M. diversus	1799.9	1778.4				Halibut
Top Kate Shale	2142.1	2120.6				Halibut
Top Volador Formation	2156.5	2135.0				Halibut
Top Companion Volcanics	2533.5	2512.0				Halibut
Chimaera Formation	2566.3	2544.8				Golden Beach
TD	2914	2892.5				Golden Beach
Same Geological Regime (Yes/No)		Yes				
Casing Size	Shoe Depth (m)	Hole Size	Hole Depth (m)	LOT (SG)	Leak Off	MW Range (SG)
30"	112	38 in	114		No	
20"					No	
16"					No	
13 3/8"	796.2	16"	811	1.8	No	
9 5/8"		8 1/2"	2914		No	1.18 - 1.32
7"					No	
5"					No	
Good Drilling Practices / Successes						
<ul style="list-style-type: none"> Set 344mm casing at 796.2mMDRT – Gippsland Limestone Drilled out directly in 216mm hole Casing ran to 520m and unable to pass this point. POOH, wiper trip re-run casing (~24hrs lost) Cross threaded wellhead joint (lost 45hrs) Drilled to 2740m back reaming out of hole (POOH due to slow ROP, wireline) Run RCI, unable to get past 810m – consider cleaning out shoe track with 311mm bit prior to drilling to TD in 216mm Wiper trip to 2740m (lost 25.5hrs) drilled ahead to 2914m (19hrs on bottom). POOH with tight spots between 2856m 18MT, 2785m 22.7MT, 2726m 27.3MT, continued backreaming out of hole. 2585m up to 45.5MT. RIH. Increase MW 1.28 SG. POOH hole OK Wireline Logs, RCI – 6 points OK, Tool stuck at 2074m Strip over and start logging again (25hrs) RCI tool failed, POOH to side entry sub. Run RCI on pipe, 2mins/std in casing, 3mins/std OH. 14.5 hrs to get back to logging point. 11 hours RCI sampling (20 points) further 16.5hrs to get unstuck and out of hole. MLR run 8hrs. (conventional) 						

 OFFSET WELL INFORMATION SHEET				Moonfish ESSO/BHP		
Prepared by: Paul O'Shea		Date: 10-Aug-05		Revision: 1.00		
Reviewed by: Ole Moller		Date: -		Revision: -		
WELL IDENTIFICATION INFORMATION						
Well Name	Moonfish	Rig Name	Atwood Falcon			
Operator	ESSO/BHP	RT (m)	23.0			
Permit	Vic / L10	Water Depth (m)	52.00			
Well Type	Exploration	Spud Date	12-May-92			
Field Name	Moonfish	Rig Release Date	21-Jul-92			
Area/basin	Gippsland	Well trajectory (V/Dev)	Dev			
Primary Objectives	Latrobe Group	End Well Status	P&A			
Produced Fluid type						
Formation Tops	RT Depth (m)	Sub-Sea Depth (m)	Lithology / Comments			
Sea Floor	Enter Depths in mRT	75.0	52.0			
Gippsland Limestone	75	52.0				
Lakes Entrance	845	822.0				
Latrobe Group	1640.6	1617.6				
N-1.4 coal	1725.9	1702.9				
N-1.9 coal	1830.1	1807.1				
M-2 reservoir	1901.7	1878.7				
L1 coal	2023	2000.0				
Volcanics	2207	2184.0				
Sub Volcanics	2254.3	2231.3				
Strzelecki (fault out)	2625	2602.0				
TD	3045	3022.0				
Same Geological Regime (Yes/No)		Yes				
Casing Size	Shoe Depth (m)	Hole Size	Hole Depth (m)	LOT (SG)	Leak Off	MW Range (SG)
30"						
20"	172.1	26 in	186			
16"						
13 3/8"	842.76	17 1/2 in	842.8	1.92	no	
9 5/8"		12 1/4"	2489			1.27
7"		8 1/2"	3037m			1.58
5"						
Good Drilling Practices / Successes						
<p>12 1/4" required 5 bit runs prior to 1 coring run (Core#1 2008.5-2021.75m). A further 4 bit runs were required to reach the next coring point. (cores #1 2257-2275m, #2 2275-2293, #3 2293-2299m), then 2 more bits runs to run intermediate logs. Unable to get logs past 1963-1968m, Wiper trip. MDT tool stuck at 2260.5m, recovered, wiper trip and logs continued with out incident. 2 bitruns to get to section TD, the first leaving the bearing of 1 cone downhole. 2nd was a junk basket run. MW 1.27SG. 8 1/2" hole had 2 bit pulled due to poor ROP. 1m drill breaks encountered at 2980m, 2986m, 2990m, 3018m & 3021m all indicated no flow. Gas from 3021m peaked at 752 units. 3rd drill bit to 3045m at which point a wiper trip was performed to the shoe, after performing a 10-10-10 test, MW increased in 0.06SG intervals to 1.52SG. While POOH the string encountered normal drag in the 8 1/2" hole but became stuck in 12 1/4" hole @ 2444m while back reaming out the hole. Jarred for 17hrs still stuck. Decreased MW to 1.45SG and gas increased to 1056 units. Increased MW 1.58 to control gas. Wireline showed string stuck at ~1850m. Cement was then pumped and spotted in the annulus.</p> <p>Drill pipe shut-in pressures were taken while WOC, no increase in the annulus but DP pressure increased from 195psi to 1230psi over 8 hours. Pressure was bled off and an injection rate thru the bit was attempted using the cement unit. Pressure increased to 2000psi after pumping 0.75bbbls. The annulus checked for leaks and was OK. Drill pipe was pressured up tp 4000psi and held for 30mins. The drill pipe was then perforated at 2294-2295.2m and cement plug 2 set over 2295-2195m. After WOC a further perforation at 2091.2-2090m (100m higher than proposed) after an obstruction encountered at 2094m. MW was decreased from 1.52SG to 1.22SG in 1/2ppg increments. Frre point was found at 1875m and a cement plug 3 set from 2091-1870m, the pipe was severed at 1828m. plug 4 from 1825-1809m in 2 staages. Sidetrack well at 888m (in 12 1/4")- 340mm casing set at 842.8m (Gippsland Limestone)</p>						

WELL IDENTIFICATION INFORMATION						
Well Name	Longtom-2	Rig Name	Ocean Patriot			
Operator	Apache	RT (m)	21.5			
Permit	Vic P-54	Water Depth (m)	56.80			
Well Type	Wildcat - Exploration	Spud Date	10-Nov-04			
Field Name	Bass Strait - Victoria	Rig Release Date	22-Dec-04			
Area/basin	Gippsland	Well trajectory (V/Dev)	v			
Primary Objectives	Admiral Formation	End Well Status	P&A			
Produced Fluid type	Gas					
Formation Tops	RT Depth (m)	Sub-Sea Depth (m)	Lithology / Comments			
Sea Floor	<i>Enter Depths in mRT</i>	78.3	56.8			
Gippsland	78.3	56.8				
Lakes Entrance	1061.1	1039.6				
Gurnard	1285	1263.5				
Kingfish	1299	1277.5	Halibut Group			
Kate Shale	1515.4	1493.9	Halibut Group			
Volador	1520.5	1499.0	Halibut Group			
Campanian Volcanics	1579.8	1558.3	Golden Beach Subgroup			
Kipper Shale	1635.6	1614.1				
A' Sandstone	2019	1997.5	Admiral Formation			
B' Sandstone	2108	2086.5	Admiral Formation			
C' Sandstone	2151.4	2129.9	Admiral Formation			
D' Sandstone	2179.4	2157.9	Admiral Formation			
E' Sandstone	2210.9	2189.4	Admiral Formation			
F' Sandstone	2261.4	2239.9	Admiral Formation			
Longtom Volcanics Member	2293.3	2271.8	Admiral Formation			
TD	2422	2400.5	Admiral Formation			
Same Geological Regime (Yes/No)		Yes				
Casing Size	Shoe Depth (m)	Hole Size	Hole Depth (m)	LOT (SG)	Leak Off	MW Range (SG)
30"	110	36 in	111		No	1.05
20"					No	
16"					No	
13 3/8"					No	
9 5/8"	1009	12 1/4 in	1009	1.7	No	1.05
7"	178	8 1/2 in			No	1.8
5"					No	1.25
Good Drilling Practices / Successes						
Cleaned rat hole with 1.25SG mud. Drilled ahead with 1.25 SG. Had a problem with gas cut mud while POH from 2312m. (MW raised to 1.32SG) Tight hole encountered with coal seams requiring reaming. Problems getting logs to bottom, RCI repeatedly hung up around 1815m. Pipe conveyed logs used, tight at 1867m and 1919 m. POOH, wiper trip and then 7" liner ran.						



APPENDIX F

CONTACT LIST

Service Contact List

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Apache Energy				
Senior Drilling Engineer - Perth	Ole Moller	9422 7241	0418 931 607	ole.moller@aus.apachecorp.com
Drilling Engineer - Perth	Paul O'Shea	9423 5615	0408 909 775	poshea@lpm.com.au
Drilling Materials Superintendent - Perth	Chris Glennon	9422 7442	0417 880 177	chris.glennon@aus.apachecorp.com
Operations Geologist - Perth	Adam Drescher	9422 7219	0417 116 124	adam.drescher@aus.apachecorp.com
IT&T Supervisor - Perth	Karen Moran	9422 7230		karen.moran@aus.apachecorp.com
Flights - Perth	Denise Kaehne	9422 7208	0419 049 031	denise.kahne@aus.apachecorp.com
Service Company's				
Bits - Smith	Doug Ferguson	9486 1400	0417 919 062	dferguson@smith.com
Bits - Security DBS	Joe Thompson	6424 4642	0414 911 787	joseph.thompson@halliburton.com
Bits - Reed	Les Szalai	9321 8268	0422 001 999	les.szalai@reedhycalog.com
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Casing Cutting - Smith	Robert Johnston	9455 5311	0417 912 643	rjohnston@smith.com
Casing - Weatherford - Coordinator	Rob DeGasperi	9262 7127	0419 447 565	robert.degasperi@ap.weatherford.com
Casing - Weatherford - Manager	Aaron Sinnot	9212 4606	0418 514 759	aaron.sinnot@ap.weatherford.com
Cementing - Dowell	Pam Kosarek	9420 4639	0402 894 010	pkosarek@perth.oilfield.slb.com
Cementing - Dowell	Mark James	9420 4843	0412 907 216	mjames@perth.oilfield.slb.com
Communications - Marcomm Manager	David Green	9277 4655	0407 080 635	david@acs-marcomm.com
Communications - Marcomm Field Eng.	Ron Stebbings	9277 4655		ron@acs-marcomm.com
LWD - Sperry Drilling	Peter Sammann	6424 4645	0424 710 174	peter.sammann@halliburton.com
Mudlogging - GeoServices Manager	John Ryan	9322 8122	0419 854 950	ian.pieniazek@geoservices.com
Mudlogging - GeoServices Coordinator	Ratna Semuli	(08) 8186 3611	0418 848 233	ratna.semuli@geoservices.com
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	Nigel Warman	9325 4822	0405 400 021	nwarman@miswaco.com
Rig Positioning - Fugro	Ian Hobbs	6241 1301	0407 382 039	is.hobbs@fugro.com.au
ROV - Fugro	Norm McKay	9344 7166	0408 382 039	n.mackay@fugro.com.au
	Terry Blake	TBA		t.blake@fugro.com.au
Wellheads - DrillQuip	Colin Nicol	9322 8600	0400 202 195	Willie_Bollard@Dril-Quip.com
Wireline - Schlumberger	Leigh Rigg	9420 4892	0401 994 284	lrigg@perth.oilfield.slb.com
Drilling Rig - Perth				
Sedco Perth office	Blue O'Shea	9213 3712	0412 245 517	bo'shea@perth.deepwater.com
	General Office	9213 3700		
Bristows Helicopters				
Essendon Airport	Operations Officer	(03)93794720	0407 449 484	
Vic DPI				
Manager Petroleum Operations	Terry McKinley	(03)96584414	0418 528 420	
NOPSA 24 hr				
		(08) 9480 9427		