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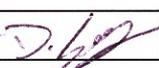
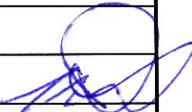
CASINO DEVELOPMENT

CASINO-4DW DRILLING AND COMPLETION PROGRAMME

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VIC-P44

APPROVAL

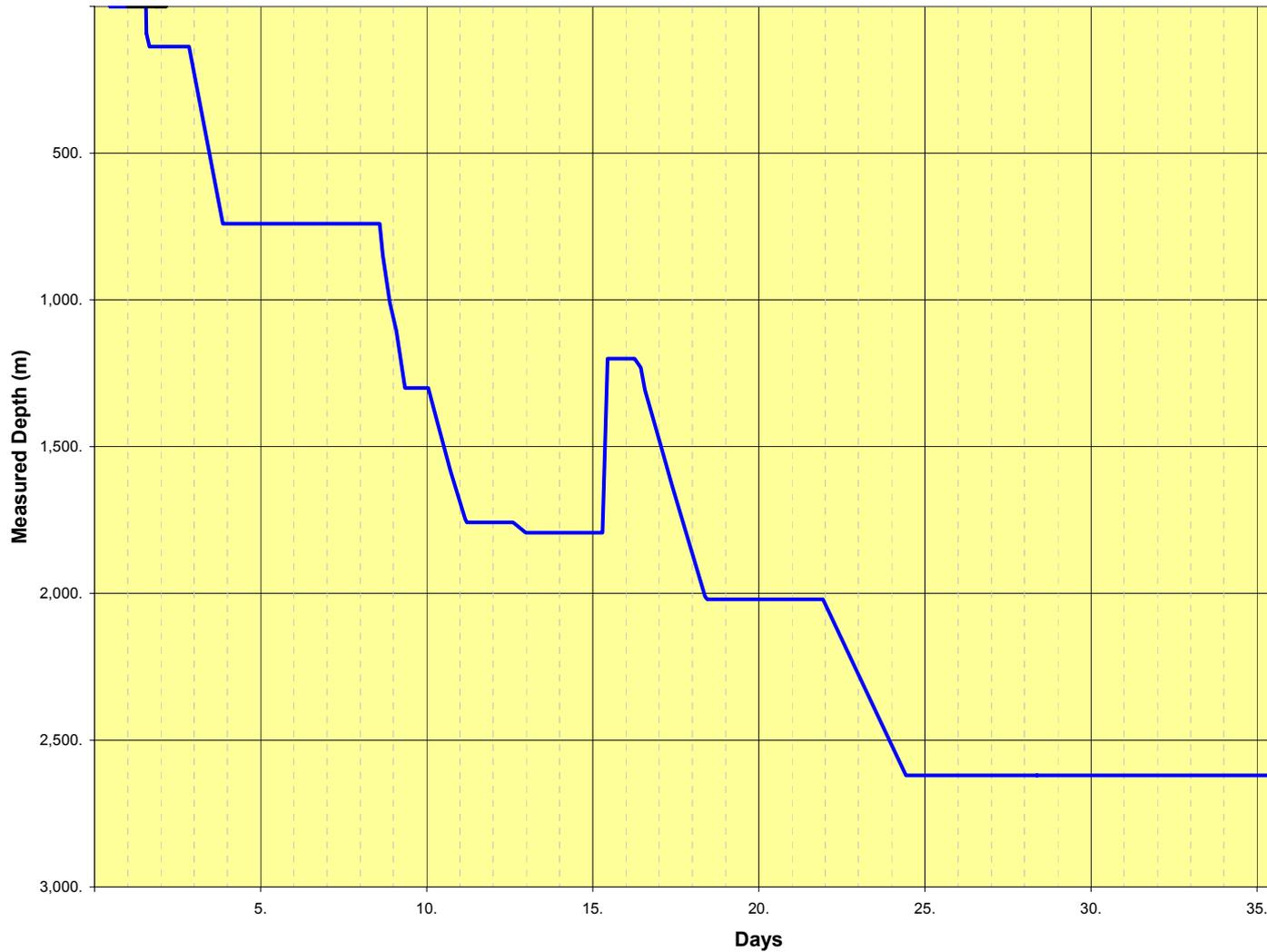
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CASINO-4DW DRILLING AND COMPLETION PROGRAMME

1	WELL INFORMATION	5
1.1	Programme Basis	6
1.2	Reference Manuals.....	6
1.3	Drilling Hazards	6
1.4	Operational Setting	6
2	GEOLOGICAL INFORMATION	8
2.1	Objectives	8
2.2	Formation Tops	8
2.3	Temperature, Pore Pressure and Fracture Gradient	9
3	DRILLING INFORMATION	10
3.1	914mm (36") Hole for 762mm (30") Casing (90mRT – 134mRT).....	10
3.2	445mm (17½") Hole for 340mm (13⅜") Casing (134mRT – 740mRT).....	10
3.3	311mm (12¼") Hole for 244mm (9⅝") Casing (740mRT - 2034mRT)	10
3.4	216mm (8½") Hole for 194mm (7⅝") OD Sand Screens (2034mRT MD – 2624mRT MD)	10
3.5	Summary Drilling Sequence.....	11
3.6	Casing Design Summary	12
3.7	Drilling Fluid Summary	14
3.8	Cementing Summary.....	16
3.9	Pressure Testing Schedule	17
3.10	Formation Integrity Tests	18
3.11	Directional Plan	19
3.12	Target Tolerance.....	20
3.13	Well Suspension / Abandonment	21
4	EVALUATION	22
4.1	Directional Surveying Programme	22
4.2	Real-time Logging Requirements (FEWD).....	22
4.3	Sampling Programme	22
4.4	Wireline Logging	22
4.5	Coring.....	22
4.6	Testing.....	22
5	COMPLETION.....	23
5.1	Introduction.....	23
5.2	Summary Completion Procedure	24
5.3	Completion Program Barrier Summary.....	26
	FIGURE 1 – WELL LOCATION MAP	27
	FIGURE 2 – TIME DEPTH CURVE.....	28



28

ATTACHMENT A – OCEAN PATRIOT BLOW OUT PREVENTION EQUIPMENT29

ATTACHMENT B – LIST OF CONTRACTORS30

ATTACHMENT C – COMPLETION SCHEMATIC.....31

1 WELL INFORMATION

Summary Data Sheet

Well Name :	Casino-4
Well Designation :	Horizontal Gas Producer
Permit :	VIC P-44
Interest Holders:	Santos Ltd 50% AWE 25% Mitsui 25%
Operator :	Santos Ltd
Anticipated spud date :	26 March 2004
Budget Duration :	38 days Drilling Operations 31 days, Completion Operations 7 days
Drilling Contractor / Rig :	Diamond Offshore General Company (DOGC) / Ocean Patriot
RT - SL / Water Depth:	22 m / 70 m water depth PRELIMINARY
Geographic Surface Location :	Lat 38° 47' 12.937" S Long 142° 41' 54.522" E Easting: 647 519 mE Northing: 5 705 498mN
Surface Position Tolerance:	5 m radius
Target Location : (GDA94)	<p>Casino-4 Pilot Hole Vertical well with 70m radius tolerance.</p> <p>Casino-4DW Heel Depth: 1745mRT TVD (Top Reservoir) Lat 38° 47' 07.117" S Long 142° 41' 35.157" E Easting: 647055.1 mE Northing: 5705686.1 mN</p> <p>Casino-4 Toe Depth: 1755mRT TVD Lat 38° 47' 01.608" S Long 142° 41' 11.167 E Easting: 646 479.4 mE Northing: 5 705 866.6 mN</p> <p><i>Heel and toe targets may vary depending on actual top reservoir depth</i></p>
Primary Objective :	Waarre A Sandstone
Depth of Objective :	2020mRT MD (1745 mRT TVD)
Well Depth (TD):	2624 mRT MD (1755mRT TVD)

Note: The Casino-4H well target is the Waarre-A well location referred to in the Casino Development VIC-P44 Field Development Plan (Document ref. 5738041-FDP-001-0) page 170 of the Casino Field Development Plan.

See Figure 1 and Figure 2 respectively for the Casino-4DW well location map and time depth curve.

1.1 Programme Basis

This Drilling and Completion Programme describes the activities that have been programmed for the well.

This programme is to be used in conjunction with the documents referenced below.

- Detailed Drilling & Completion Instructions for Casino-4 & 4DW
- Santos Drilling Guidelines
- Casino Well Design Workbook

Any changes to this programme can only be made with the written approval of the Drilling and Completions Manager – Offshore Australia via a Change Control Form (as detailed in the Drilling and Completions Management System).

1.2 Reference Manuals

The Casino Drilling and Completions EHS Management System Manual defines how Santos will manage EHS for this programme.

1.3 Drilling Hazards

Shallow Gas	No shallow gas is expected at this location (based on seismic interpretation). Additionally, no shallow gas was encountered in Casino-1 which was drilled 150 metres from Casino-4DW Routine shallow gas procedures shall be in place for riserless top hole drilling (as per DOGC procedures).
Toxic Gas	No H ₂ S has been observed in the offset wells and is not expected on Casino-4.
Lost Circulation	17 ½” Hole This hole section will be drilled riserless on Casino-4 & 4DW. 12 ¼” Hole: Potential for high mud losses in Dilwyn Formation in the upper part of the hole section. This formation is planned for drilling with seawater and high vis sweeps. There are no recorded losses below the Pebble Point formation in offset wells. 8 ½” Hole: The entire 8 ½” hole section will be drilled in the Waarre A sandstone. No lost circulation has been observed in offset wells in the Waarre A formation. Full returns are expected in Casino-4DW.
Differential Sticking	Differential sticking has not been observed on offset wells and is considered a low risk on Casino-4 & 4DW.
Abnormal Pressure	Formation pressure data from Casino-1 indicates maximum formation pressure of 1.12sg in Waarre sands. Formations above the Waarre A sand are prognosed to be normally pressured.
Fracture Gradient	LOT data from offset wells are shown in section 2.3. Insufficient fracture gradient is not expected to be a limiting factor Casino-4 & 4DW based on recent offset drilling within the Casino field.
Borehole Stability	17 ½” Hole: Tight hole has been experienced in offset wells. Connections shall be reamed through problem sections. 12 ¼” hole: A wellbore stability study has been conducted and reviewed. Sufficient mud weight is programmed to control borehole breakout based on this study. 8½” Hole: No stability problems are expected in the Waarre A sands.
Hard Drilling	17 ½” Hole: No hard drilling is expected in this hole section.

	<p>12 ¼" hole: Pyrite stringers (potentially destructive to PDC bits) are expected in the Massacre Shale. The pyrite zone will be drilled with a TCI bit prior to running a PDC bit.</p> <p>8½" Hole: There is potential that the Waarre A sand will be abrasive. However rock strength analysis from offset wells indicates the section is PDC drillable if suitable drilling parameters are adopted.</p>
Drillstring Vibration	No drillstring vibration problems were reported on offset wells.
Temperature	No abnormal temperatures are expected on Casino-4 & 4DW. The expected maximum static BHT is 79°C.
Weather	Casino-4 location is not subject to cyclonic activity. Heavy weather however, may limit operations periodically. Heavy weather operating procedures are detailed in the DOGC Emergency Response Manual.
Seabed Conditions	No seabed related problems are expected during spudding operations based on recent offset well experience and location surveys.

1.4 Operational Setting

Casino-4 & 4DW will be drilled by the semi-submersible mobile offshore drilling unit (MODU) Ocean Patriot, which is operated by Diamond Offshore (DOGC).

Marine logistical support for drilling operations will be from the Portland Supply Base. Two vessels will be utilised during Casino-4 & 4DW operations for towing and supply. One vessel will remain in the vicinity of the MODU at all times during operations to provide support in the event of an emergency. Distance from Portland to the Casino-4 location is ~60 nm. One way economy sailing time is ~4 hours.

One way helicopter flying duration (from Essendon airport) is ~80 minutes depending on the weather conditions.

2 GEOLOGICAL INFORMATION

2.1 Objectives

Casino-4

Casino-4 pilot hole will be drilled as a vertical pilot hole to recover a core of the Waarre A sands. The data obtained from this well will be used to understand the subsequent production performance of the Waarre A reservoir. The pilot hole will be located ~150m adjacent to the Casino-1 exploration well.

Casino-4DW

Casino-4DW is proposed as a sub horizontal gas producer targeting the Waarre-A sand. The vertical pilot hole will be plugged back and the well sidetracked from Casino-4. Once sidetracking operations have begun the well will be designated as Casino-4DW. The well will be drilled with a 600 metre production hole at ~89 degrees inclination and be completed with 6 5/8" sintered screens and 7" corrosion resistant (13Cr80) production tubing.

2.2 Formation Tops

Formation Tops	Predicted Depth (mRT TVD) Casino-4	Predicted Depth (mRT TVD) Casino-4DW	Uncertainty
Mepunga Formation	763	763	±5m
Wangerrip Group	841	841	±5m
Pebble Point Formation	1000	1000	±5m
Massacre Shale	1102	1102	±5m
Timboon Sandstone	1111	1111	±5m
Paaratte Formation	1297	1297	±5m
Paaratte Gas Sand	1513	1513	±5m
Skull Creek Mudstone	1562	1563	±5m
Top Upper Waarre A	1745	1736	±5m
Top Lower Waarre A	1758	1746	±5m
Calcite Cemented Zone	1793	1753	±5m
Total Depth	1815	1755.5	

Note 1: The Ocean Patriot rotary table is 22 m above LAT.

2.3 Temperature, Pore Pressure and Fracture Gradient

The maximum expected bottom hole temperature at Casino-4 & 4DW (at 1720m mRT TVD) is 79°C.

The pore pressure for the Waarre A sand in Casino-4DW is expected to be ~1.12sg EMW. Mud weights of ~1.23 - 1.3sg are planned for the 311mm (12¼") hole sections in Casino-4 & 4DW to control potential wellbore instability in formations above the target. This mud weight also provides sufficient trip margin once the Waarre A sand has been intersected. A mud weight of 1.24sg is planned for drilling the 216mm (8½") hole section.

The leak off tests (LOT) on the offset wells are shown below.

Well	LOT (sg)	Depth (m TVD)
Casino-1	2.07	758
Casino-2	1.22	691
Casino-3	1.8	648
Minerva-3	1.63	587
Minerva-4	1.77	624

3 DRILLING INFORMATION

3.1 914mm (36") Hole for 762mm (30") Casing (90mRT – 134mRT)

The 914mm (36") hole will be drilled to approximately 134mRT MD to allow setting of a 4 joint, 762mm (30") conductor string with a swaged 508mm (20") shoe. The 914mm (36") hole section will be drilled vertically with seawater and gel sweeps and will be drilled with a 660mm (26") bit / 914mm (36") hole opener combination.

3.2 445mm (17½") Hole for 340mm (13⅜") Casing (134mRT – 740mRT)

After drilling out the 508mm (20") swaged conductor shoe with a 445mm (17½") bit, 445mm (17½") hole will be drilled riser-less to the 340mm (13⅜") casing point at approximately 740mRT MD (approximately 20m above the Mepunga formation). After running and cementing the 340mm (13⅜") casing, the 18 ¾" Drill Through Horizontal Subsea Tree will be installed prior to running BOPs. A detailed procedure for running the tree will be issued to the rig prior to spud.

3.3 311mm (12¼") Hole for 244mm (9⅝") Casing (740mRT - 2034mRT)

Casino-4

After drilling out the 340mm (13⅜") casing shoe at ~730mRT MD, a vertical 311mm (12¼") pilot hole will be drilled down to coring point at ~1779mRT MD. A 27-36m core will be cut through the Waarre A sand from ~1779m to ~1815m.

After coring an electric logging program will be run. Details of logging runs are outlined in section 4.

Casino-4DW

After evaluation of the pilot hole, the well will be plugged back as detailed in section 5 of this program. A kick-off plug will then be set to allow the well to be sidetracked at approximately 1200mRT MD. Angle will be built at a rate of 3.5°/30m to ~89° inclination at the 244mm (9⅝") casing point approximately 1 metre TVD below the top of the Waarre 'A' sand.

See section 3.11 for additional directional drilling data.

3.4 216mm (8½") Hole for 194mm (7⅝") OD Sand Screens (2034mRT MD – 2624mRT MD)

After drilling out the 9⅝" casing shoe, 216mm hole will be drilled to a target total depth of 2624mRT MD at an inclination of 89°.

Refer to section 5 for details on running the lower completion.

3.5 Summary Drilling Sequence.

The following is an outline of the planned drilling sequence on Casino-4:

- Mobilise rig to the Casino-4 Location;
- Run anchors;
- Drill 914mm (36") hole to ~134mRT MD with 660mm (26") bit and hole opener;
- Run and cement 762mm (30") conductor;
- Drill 444mm (17½") hole to 740mRT MD;
- Run and cement 340mm (13⅜") surface casing;
- Run 18 ¾" Drill Through Horizontal Subsea Tree
- Run BOPs;
- Drill 311mm (12 ¼") pilot hole hole to ~1760mRT MD (with a programmed bit trip at ~1200m);
- Core approximately 36 metres of Waarre-A sand to ~1796m;
- Run wireline logs;
- Abandon pilot hole and set a kick-off plug;
- Sidetrack the well at ~1200mRT MD;
- Drill 311mm (12¼") hole to the 244mm (9⅝") casing point at ~2034mRT MD;
- Run and cement 244mm (9⅝") intermediate casing to ~2034mRT MD;
- Drill 216mm (8½") hole to ~2634m;
- Run lower completion;
- Run upper completion;
- Clean-up well / test;
- Suspend well;
- Recover anchors.

Refer to the Casino-4 & 4DW time depth curve in Figure 2.

3.6 Casing Design Summary

CASING DESIGN – Weight, Grade & Strength							
Seabed Depth: 92m RT							
HOLE SIZE	CSG SIZE	SETTING DEPTH (mRT MD)	Casing			Strength	
			JOINT TYPE	WEIGHT/GRADE/CONNECTIONS	BURST MPa (psi)	COLLAPSE MPa (psi)	TENSION kdaN (kips)
914mm (36")	762mm (30")	134	Wellhead	762mm (30") (30") Cameron Wellhead Housing STM-10 c/w 1 x 38mm (1.5") WT, 762mm (30") Intermediate Extension (30" x 1.5" Lynx HT Box down)	20.7 (3000)	10.9 (1581)	1486 (3320)
			Conductor	1 x 25mm WT 762mm (30") Intermediate Joint (Lynx HT Pin x Lynx SA-2 Box) 1 x 25mm WT 762mm (30") (Intermediate Joint (Lynx SA-2 Pin x SA-2 box)			
			Shoe Joint (Swaged to 508mm (20"))	762mm (30") x 25mm WT (X52) x 508mm x 25mm WT (X56) Crossover joint (Lynx SA-2 pin up)			
445mm (17½")	340mm (13⅜")	730	Wellhead	476mm (18¾") Cameron STM-10 'E' Housing with w/ H4 profile, w/508mm (20") 25mm WT (1") x 340mm (13⅜") 107kg/m (72ppf) crossover extension, BTC pin down.	37.1 (5379)	18.4 (2668)	739 (1662)
			Surface	340mm (13⅜") 107kg/m (72ppf); L80; BTC			
			Shoe joint	340mm (13⅜") 107kg/m (72ppf); L80; BTC			
311mm (12¼")	273mm (10¾") x 244mm (9⅝")	2024	Casing Hanger	330mm x 273mm (10¾") STM-10 Casing Hanger	44.4 (6438)	27.7 (4020)	568 (1278)
			Intermediate	7 jts 273mm (10¾") 83kg/m (55½ppf); L80; Vam Top (down to 152 mRT MD) 1 jt x 273mm (10¾") x 244mm (9⅝") L80 Vam Top XO (at ~164 mRT MD) 122 jts 244mm (9⅝") 70 kg/m (47ppf); L80; Vam Top (164 – 1628 mRT MD) 1 jt 244mm (9⅝") 70 kg/m (47ppf) L80 Vam top box / KS Bear Pin XO 10 jts 244mm (9⅝") 70 kg/m(47ppf); 13Cr80; KSBear (1640 – 1748 mRT MD) 1 jt 244mm (9⅝") 70 kg/m (47ppf) 13Cr80; KS Bear box / Vam Top Pin XO 18 jts 244mm (9⅝") 70 kg/m (47ppf); L80; Vam Top (1760 – 1976 mRT MD) 1 jt 244mm (9⅝") 70 kg/m (47ppf) L80; Vam Top box / BTC Pin XO			
			Float, Shoe joints	244mm (9⅝"), 70 kg/m (47ppf), L-80, BTC (1988 – 2016mRT MD)			
(8½")	168mm (6⅝") (194mm OD)	Packer @ 1730 ~2600	Lower Completion Tubing	168mm 35.7 kg/m (24 ppf); 13Cr80; KSBear (1730 – 2016 mRT MD)	51.3 (7438)	39.7 (5756)	247 (555)
			Sintered Sand Screens	Base Pipe: 168mm 35.7kg/m (24 ppf); 13Cr80; KSBear Sintered Screens: 175µm (2016 – 2616mRT MD)			

CASING DESIGN – Safety Factors & Design Assumptions									
Seabed Depth: 92m RT									
Casing			Safety Factors*				Worst Case Design Assumptions		
HOLE SIZE	CSG SIZE	SETTING DEPTH (mRT)	BURST	COLLAPSE	AXIAL	TRIAxIAL	BURST	COLLAPSE	AXIAL
914mm (36") (36")	762mm (30") (30")	134	-	-	-	-	-	-	-
445mm (17½")	340mm (13¾")	730	1.29	4.5	3.3	1.79	Casing pressure test.	Cementing	Pressure test
311mm (12¼")	273mm (10¾")	164	1.34	11.4	2.25	1.63	Casing pressure test.	Full evacuation – production case	Green cement pressure test
	x 244mm (9⅝")	XO 2024	1.41	1.58	2.28	1.71	Casing pressure test.		Green cement pressure test
216mm (8½")	168mm (6⅝")	Packer – 1730 Toe - 2614	N/A**	N/A**	N/A**	N/A**	N/A	N/A	N/A

Notes: *Safety Factor = Pipe Rating ÷ Design Load
Casing design carried out using StressCheck 2000.1

**The 168mm liner string is not a pressure integral string.

3.8 Cementing Summary

Hole SIZE	Casing SIZE/SETTING DEPTH (mRT MD)	Cement Slurry							Notes PRE-FLUSH/ POST FLUSH
		TYPE	REQUIREMENTS	WATER	WEIGHT (ppg) YIELD (CuFt/Sk)	EXCESS	TOC (mRT)	ADDITIVES	
36"	30"x20" @ 134m BHST / BHCT 23°C / 26°C	Tail 'G'	Job Pumping Time 2.0 hr Thickening Time 2.5hr Compressive strength 3000 psi	SW	15.8 1.19	200% excess on gauge hole	TOC @ seabed.	D047: 0.01 gal/sk S001: 1.00%BWOC	Pre: 6.4 m ³ seawater; 1.6 m ³ with Dye/Mica Post: Displace w/ seawater 2.5 m ³
17 1/2"	13 3/8" @ 730m BHST / BHCT 46°C / 27°C	Lead 'G'	Job Pumping Time 1.0 hr Thickening Time 8.0 hr	SW	12.5 2.23	50% excess on gauge open hole	TOC @ seabed	D047: 0.02 gal/sk D075: 0.42 gal/sk	Pre: 19.1 m ³ Sea water
		Tail 'G'	Job Pumping Time 1.0 hr Thickening Time 3.5 hr Comp. strength 3000 psi	SW	15.8 1.18	20% excess on gauge open hole	TOC @ 1620m	D047: 0.01 gal/sk D145A: 0.03 gal/sk	
12 1/4"	Plug 1@ 1792m BHST / BHCT 84°C / 59°C	'G'	Job Pumping Time 1.0 hr Thickening Time 3.5 hr	DW	15.8 1.16	10% excess on caliper	TOC @ 1592m	D047: 0.01 gal/sk D110: 0.03 gal/sk D145A: 0.04 gal/sk	Pre: TBA
12 1/4"	KOP@ 1350m BHST / BHCT 68°C / 46°C	'G'	Job Pumping Time 1.0 hr Thickening Time 3.0 hr	DW	15.8 1.06	10% excess on caliper	TOC @ 1200m	D047: 0.02 gal/sk D145A: 0.08 gal/sk	Pre: TBA
12 1/4"	9 5/8" @ 2024m BHST / BHCT 81°C / 54°C	Lead 'G'	Job Pumping Time 1.3 hr Thickening Time 3.5 hr	SW	12.5 2.23	20% Excess on gauge hole	TOC @ 1506m	D047: 0.02 gal/sk D075: 0.42 gal/sk	Pre: TBA
		Tail 'G'	Fluid Loss <150mL/30min Job Pumping Time 1.0 hr Thickening Time 3.5 hr	DW	15.8 1.16	20% Excess on gauge hole	TOC @ 1856m	D047: 0.01 gal/sk D193: 0.25 gal/sk D145A: 0.08 gal/sk	

Notes: (1) Volume includes excess as stated
(2) Volumes to be confirmed with Dowell prior to the job
(3) Additive quantities and thickening times to be confirmed with lab testing using rig samples.

D047 Antifoam
S001 Accelerator
D075 Liquid Extender
D110 Retarder
D145A Dispersant

3.9 Pressure Testing Schedule

Test Performed	On Stump		340mm (13 ³ / ₈ " Casing		273mm (10 ³ / ₄ " x 244mm (9 ⁵ / ₈ " Casing*	
	MPa	psi	MPa	psi	MPa	psi
Pressure testing after bumping the cement top plug:						
340mm (13 ³ / ₈ " Casing initial test – contingent upon bumping the plug (<i>limited by Cameron running tool</i>)	-	-	20.7	3000	-	-
273mm (10 ³ / ₄ " x 244mm (9 ⁵ / ₈ " Casing initial test – contingent upon bumping the plug	-	-	-	-	27.6	4,000
BOP testing:						
70% of casing burst 340mm (13 ³ / ₈ " (for information)	-	-	24.2	3514	-	-
70% of casing burst 273mm (10 ³ / ₄ " (for information)	-	-	-	-	31.1	4,506
70% of casing burst 244mm (9 ⁵ / ₈ " (for information)	-	-	-	-	33.2	4,809
Blind/Shear Ram	34.5	5,000	20.5	3000	27.6	4,000
LMRP Connector	27.6	4000	17.2	2,500	17.2	2,500
Wellhead Connector	-	-	27.6	4,000	27.6	4,000
Annular Preventer	27.6	4000	17.2	2,500	17.2	2,500
Pipe Rams	34.5	5,000	27.6	4,000	27.6	4,000
Choke Manifold, Choke and kill lines, TDS Safety valves, Standpipe Manifold	-	-	27.6	4,000	27.6	4,000

- A full BOP stump test shall be conducted prior to the running the stack (off critical path). This test shall be conducted prior to loading of the subsea trees (i.e. immediately on release from the previous operator's well).
- A full BOP test shall be conducted prior to drilling out of the 340mm (13³/₈" string.
- A full BOP test shall be conducted at least every 14 days.
- A test plug shall be utilised for all BOP pressure tests and connector pressure tests once the stack has been run except for the blind/shear ram test.
- The test shall include a 5 minute low pressure test to 1.4 MPa (200 psi). High pressure testing shall be conducted for 10 minutes
- The worst case theoretical surface pressure has been calculated at 18.6 MPa (2700 psi) assuming total evacuation to gas and the maximum estimated formation pressure prognosed for the Waarre-A formation
- A blind/shear test is not required during routine tests once in open hole.
- The blind/shear rams shall be tested against casing/cement
- The 273mm (10-3/4") shall only be pressure tested during the initial BOP stump test and once the tubing hanger landing string has been run.

3.10 Formation Integrity Tests

340mm (13 3/8") Casing Shoe

A full leak-off test (LOT) shall be performed at the 340mm (13 3/8") casing shoe on Casino-4DW

A leak off test in the range of 1.6 – 1.80 sg is expected at the 340mm casing shoe at a depth of ~730mRT MD. A leak-off test of 1.5 sg is sufficient for a 7.95 m³ (50bbl) swabbed gas kick tolerance with a mud weight of 1.2 sg and maximum expected formation pressures.

244mm (9 5/8") Casing Shoe

No formation integrity test or leak-off test is planned at the 244m casing shoe on Casino-4DW.

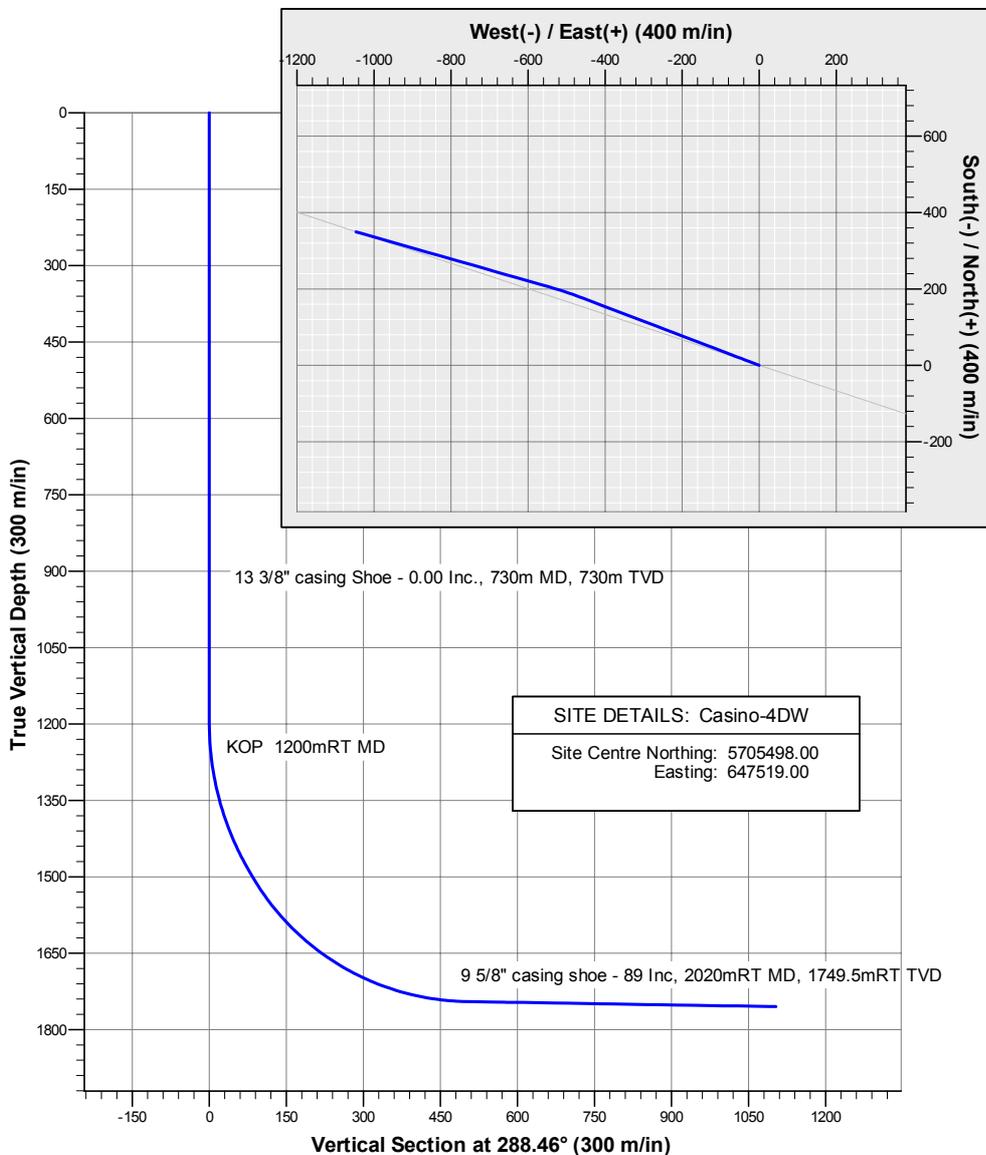
3.11 Directional Plan

The following figures illustrate the directional Program for Casino-4DW.



CASINO-4DW

WELL PROFILE DATA										
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.00	0.00	291.01	0.00	0.00	0.00	0.000	0.00	0.00	
2	1200.66	0.00	291.01	1200.66	0.00	0.00	0.000	0.00	0.00	
3	1500.66	30.00	291.01	1487.14	27.52	-71.66	3.000	291.01	76.69	
4	1514.96	30.00	291.01	1499.52	30.08	-78.33	0.000	0.00	83.83	
5	2020.67	89.00	291.01	1745.00	179.48	-467.37	3.500	0.00	500.16	C4 Heel (Rev E)
6	2095.22	89.05	286.04	1746.27	203.15	-538.03	2.000	-89.42	574.67	
7	2623.15	89.05	286.04	1754.98	348.97	-1045.35	0.000	0.00	1102.06	
8	2624.25	89.09	286.04	1755.00	349.28	-1046.40	0.984	4.84	1103.16	C4 Toe (Rev E)



3.12 Target Tolerance

Casino-4

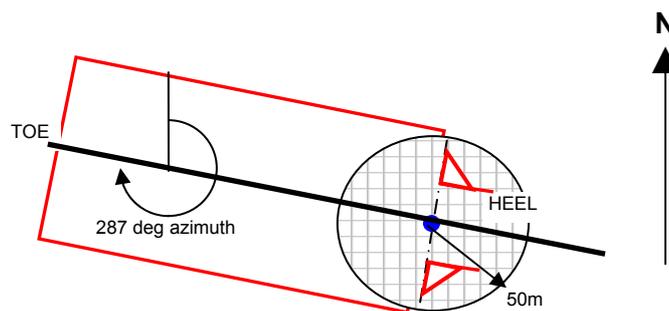
Target		Tolerance
Lat	38° 47' 12.94" S	70m radius
Long	142° 41' 35.15" E	
Easting:	647 519 mE	
Northing:	5 705 686mN	
Target depth	1745mRT TVD	

The target corresponds with the top of the Waarre-A sand. Following intersection, the well will be drilled vertically to ~1779mRT MD and cored to ~1815mRT MD.

Casino-4DW

Heel Target		Toe Target	
Lat:	38° 47' 07.117" S	Lat:	38° 47' 01.608" S
Long:	142° 41' 35.157" E	Long:	142° 41' 11.167" E
Easting:	647055.1 mE	Easting:	646479.4 mE
Northing:	5705686.1 mN	Northing:	5705866.6 mN
Depth:	1745mRT TVD	Depth:	1755mRT TVD

Tolerance



Plan View

The 216mm (8 1/2") hole section will be drilled at ~89 degrees to intersect the Waarre-A sand.

3.13 Well Suspension / Abandonment

Casino-4

The 311mm (12 ¼”) pilot hole will be plugged back with 1.9SG cement from section TD to 30 metres TVD above the top Waarre-A Sand (top hydrocarbons). Top of cement will be nominally at 1706mRT MD. This plug will be set on bottom and shall not be tagged. A kick-off plug will then be set to allow sidetrack at ~1200m RT MD.

4 EVALUATION

4.1 Directional Surveying Programme

Hole Section	Survey Type
445mm (17½")	EMS dropped at section TD
311mm (12¼")	MWD (Measurement While Drilling)
216mm (8½")	MWD (Measurement While Drilling)

4.2 Real-time Logging Requirements (FEWD)

Hole Section	Survey Type
445mm (17½")	Not required
311mm (12¼") Casino-4	GR-Res
311mm (12¼") Casino-4DW	GR-Res
216mm (8½")	GR-Res-Neutron Density

4.3 Sampling Programme

Cuttings samples will be collected at 6m intervals from beneath the 340mm (13 3/8") shoe to 100m above the Waarre-A Sand where the sampling interval will be shortened to 3m through to TD. A detailed sampling programme will be available at the well site.

4.4 Wireline Logging

Hole Section	Logging Tools
445mm (17½")	Not required
311mm (12¼") Casino-4	Run 1 : GR-Resistivity Run 2 : GR-Neutron-Density Run 3 : GR-CMR Contingent Runs : FMS : MSCT Depth interval: TD – 20m above top Waarre A
311mm (12¼") Casino-4DW	Not required
216mm (8½")	Not required

4.5 Coring

A 36 metre core run is planned for Casino-4 (pilot hole) in the Waarre-A sand.

4.6 Testing

A well clean-up is planned for Casino-4DW following installation of the upper completion and is detailed in Section 5.

5 COMPLETION

5.1 Introduction

Casino – 4DW will be completed as a sub-sea horizontal gas producer in the Waarre A sands, tied back via sub-sea flow lines to a shore based gas processing plant. The completion has been designed to be as reliable as possible to remove the need for any re-entry over its producing life of around 12 years. There are no dynamic and primary elastomer seals with the exception of the packer element. The produced gas contains 0.8% Carbon Dioxide and no Hydrogen Sulphide. Chrome metallurgy (13% or greater) has been specified to ensure long life in the expected corrosive environment. Reservoir sand strength studies have concluded that the risk of sand production is low, but cannot be disregarded and therefore a sand exclusion system has been incorporated into the completion as the sub-sea system cannot tolerate sand production. Early water break-through is not expected, and when it occurs, will signal the end of the producing wells life.

The horizontal subsea tree will be installed and BOPs run immediately prior to drilling the 12¼" hole section. Detailed procedures will be generated to cover the tree installation sequence.

Once TD has been reached, it will be necessary to both thoroughly clean the wellbore and to condition the mud, the objectives being trouble free installation of the sand screens and to ensure the drill-in fluid does not plug the screens. No internal wash-string will be run, so hole cleanliness is essential as the OD of the sand screens is 193.7mm (7⁵/₈"). A trip to scrap packer setting depths and brush the riser will be conducted before running of the sand screens.

Refer to Attachment C for further detail on the upper and lower completion of Casino 4DW.

The lower completion comprises of 168.3mm (6⁵/₈") sintered sand screens (193.7mm; 7⁵/₈" OD) in the ~600m horizontal section hung off via a packer set in the lower portion of the 244.5mm (9⁵/₈") production casing at around 1700mRT MD where the deviation is 45-50 degrees. The screens will be run in the drill-in fluid and the packer will be set. The running string assembly will then be disengaged and the casing displaced to completion brine. No isolation plug will be set in the top of the liner hanger, therefore the density of the brine must be lower than the drill-in fluid density to prevent inversion. The running string will then be recovered.

The upper completion is a single 177.8mm (7") 13Cr tubing completion with a Tubing Retrievable Safety Valve (TRSV) installed approximately 50m below the mudline. A permanent hydraulic set packer will be set at approximately 1700mRT MD. During completion running, the hole will be monitored and kept full at all times, via the trip tank, as there is no mechanical barrier isolating the reservoir. A wireline entry guide will be positioned a minimum of one tubing length above the top of the lower completion with the permanent packer set within the 13Cr section of casing. Chrome metallurgy will be used for all flow wetted areas.

The upper completion will be landed with a 187.3mm (7³/₈") subsea test tree run on a 244.5mm (9⁵/₈") landing string.

The tubing will be displaced with diesel prior to packer setting in order to provide under-balance for the well flowback. A standing valve will then be run on slickline and set in the standing valve profile in the tailpipe below the production packer. The tubing will then be pressure tested and the packer set. The tubing will then be pressure tested to 27.6MPa (4000 psi). Note: maximum SITHP during production operations is ~ 18.6MPa (2700 psi).

Due to the absence of mechanical isolation from the reservoir, it will not be possible to pressure test the TRSV prior to setting the packer or pressure test the packer from below once the packer is set. Note the TRSV will be body tested prior to running in hole. The TRSV will be inflow tested after packer setting and the production packer will be pressure tested from above via an annular pressure test. A contingency chemical cutting tool will be available to cut the chemical cut sub to allow recovery of the upper completion if required.

The well will be cleaned up and then well tested in order to determine key reservoir parameters and well deliverability. Bean-up will be gradual to avoid hydraulic shocks to the formation & potential de-stabilisation (say, over a 1-2 hr period). Hydrate inhibitors will be injected at the subsea test tree. Gauges may be set in the standing valve profile for measurement of downhole pressure and temperature data.

After clean-up, the well will be shut-in and the TRSV inflow tested. The well will then be left in a condition to be connected to sub-sea flowlines and umbilicals.

5.2 Summary Completion Procedure

Detailed completion procedures will be issued prior to installation. An outline of the procedure is given below and assumes that the subsea tree and BOPs are installed, the 216mm (8½") hole has been drilled to TD and conditioned with clean kill weight mud.

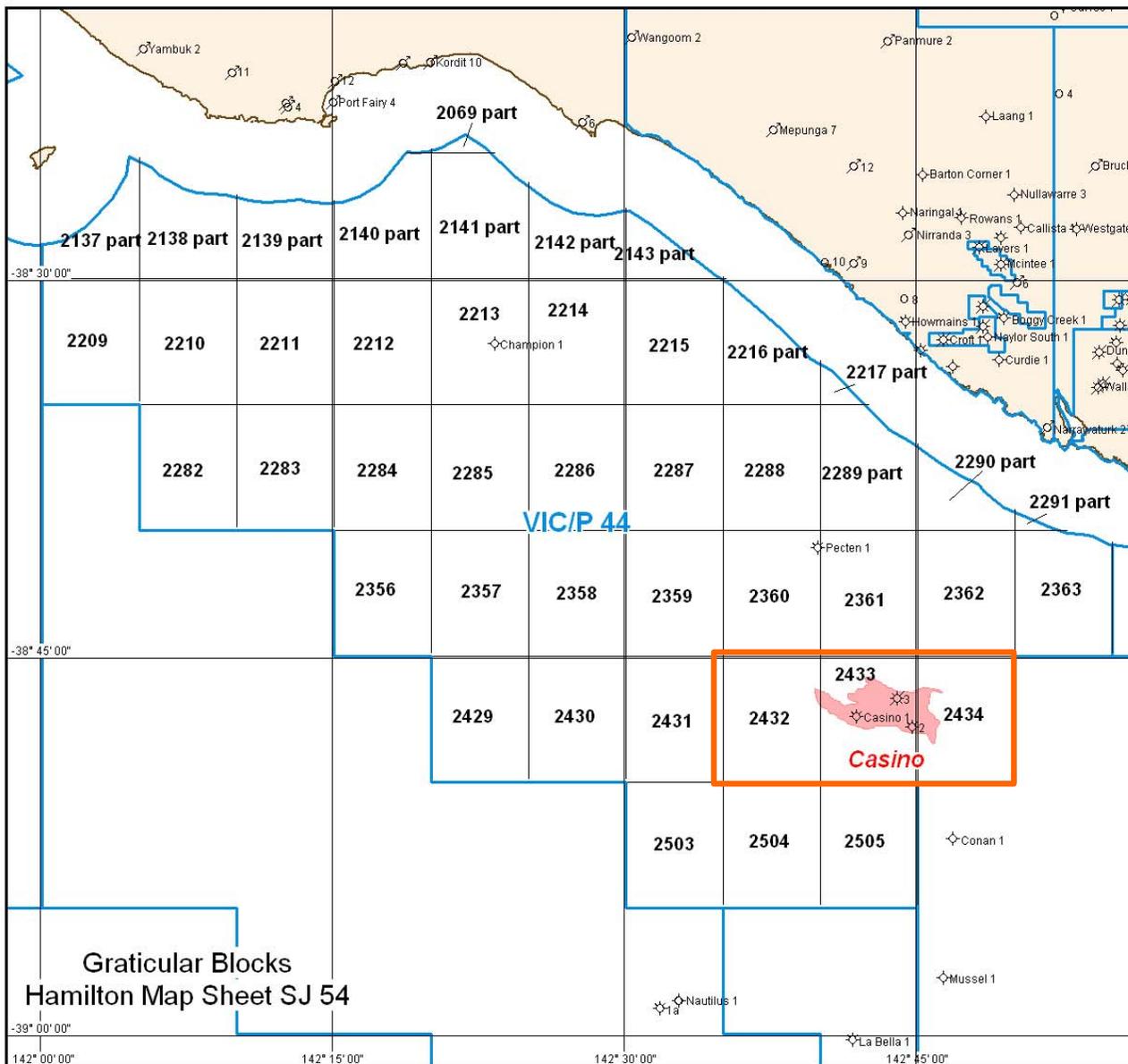
- Run 244.5mm (9⅝") casing scrapers and scrape casing at packer setting depths. Clean riser with riser brush. Function and jet BOP's and circulate clean. Jet wellhead and sub-sea tree.
- Run 168.3mm (6⅝") (193.7mm; 7⅝" OD) sintered sand screens with bullnose. Run sufficient blank 13Cr 168.3mm (6⅝") tubing to place packer in cased hole section with deviation approx. 50 degrees.
- Make up packer & running tool assembly to 168.3mm (6⅝") pipe
- X/O to drillpipe and RIH at controlled speed to required depth.
- Set packer. Disengage running tool.
- POOH until bottom of running tool is ~20m above top of packer.
- Displace upper part of well to kill weight brine. Note: Density of brine will be less than density of drill-in fluid to prevent fluid inversion.
- POOH and lay down running tool. Pull XT Drill Through Wear Bushing. Jet Production XT profiles with rubber coated bull-nose.
- Run upper completion. Sub-assemblies consists of:
 - Wireline Entry Guide (WEG);
 - 117.5mm (4⅝") RNQN nipple profile;
 - Permanent production packer & 140mm (5½") chemical cutting sub;
 - Tubing Retrieval Safety Valve (TRSV) & flow couplings (note: pressure to be held on TRSV control line whilst running TRSV in hole).
 - Tubing Hanger.
- Make up Tubing Hanger to running tool and 187.3 mm (7⅝") subsea test tree. Run in hole with 244.5 mm (9⅝") landing string.
- Rig up flowhead and slickline equipment. Land tubing hanger in Production XT. Pressure test the flowhead to the welltest choke manifold and production test equipment.
- Pump Diesel into tubing and displace tubing volume (minus a safety factor), taking returns from annulus via choke manifold.

- RIH with standing valve on slickline. Pressure test tubing to 15.5MPa (2250 psi)/10 mins – a higher pressure will set packer.
- Increase pressure and set packer Packer will start to set at ~ 19.0MPa (2750 psi). Test tubing to 27.6MPa (4000 psi). Bleed-off pressure in tubing (keeping TRSV open).
- Pull standing valve using slickline. Run downhole pressure gauges on slickline.
- Pressure test annulus above packer to 27.6 MPa (4000 psi).
- Bean-up well progressively over 1-2 hrs and avoid imposing hydraulic shocks on the sand face. Flow well to clean-up and conduct well test as per instruction from Reservoir Engineer. Hydrate inhibitors to be injected at the sub-sea tree.
- Close well in at Flowhead. Pull downhole pressure gauges with slickline. Close TRSV. Inflow test TRSV by bleeding off above.
- Run Lower Crown Plug and POOH Landing String Assembly.
- Jet ITC profile. Run Internal Tree Cap/Upper Crown Plug & pressure test same.
- Pull the Rig BOP's
- Run Debris Cap.
- Recover anchors.
- Move rig to Casino 5 location.

5.3 Completion Program Barrier Summary

Programmed Step	Internal Barriers	Annular Barriers
Run Lower Completion	<ol style="list-style-type: none"> 1. Overbalance drilling fluid 2. IBOP / top drive 3. stabbing valve 	<ol style="list-style-type: none"> 1. Overbalance drilling fluid 2. BOP – annular or pipe rams for drill pipe 3. BOP – shear rams whilst sand screens across stack
Run Upper Completion (Pre landing of and pressure testing of tubing hanger and pre circulation of diesel)	<ol style="list-style-type: none"> 1. Overbalance drilling fluid 2. IBOP / top drive 3. stabbing valve 	<ol style="list-style-type: none"> 1. Overbalance packer fluid 2. BOP – annular or pipe rams for tubing 3. BOP – shear rams whilst completion above the BOP 4. BOP – shear rams when landing string umbilicals prior to landing the tubing hanger
Run Upper Completion (Post Landing of tubing hanger and post circulation of diesel). Includes setting of downhole pressure gauges on slickline	<ol style="list-style-type: none"> 1. Flowhead and co-flexip line (pressure tested) 2. Slickline Pressure Control Equipment (PCE) (pressure tested) 3. Welltest choke manifold (pressure tested) 4. Subsea Test Tree Valves and lubricator valves. 	<ol style="list-style-type: none"> 1. Overbalance packer fluid 2. Tested Tubing Hanger seals 3. BOP - 9 5/8" rams (pressure tested)
Run Upper Completion (Post packer setting) and Post Clean up flow	<ol style="list-style-type: none"> 1. Flowhead and co-flexip line (pressure tested) 2. Slickline PCE (pressure tested) 3. Welltest choke manifold (pressure tested) 4. Subsea Test Tree Valves and lubricator valves. 	<ol style="list-style-type: none"> 1. Overbalance packer fluid 2. Production packer 3. Tested Tubing Hanger seals 4. BOP - 9 5/8" rams (pressure tested)
Suspension (During recovery of Landing string and running of ITC)	<ol style="list-style-type: none"> 1. Lower crown plug (pressure tested) 2. BOP – shear rams 	<ol style="list-style-type: none"> 1. Overbalance packer fluid 2. Production packer 3. Tested Tubing Hanger seals 4. BOP – shear rams
Pulling BOP and running debris cap	<ol style="list-style-type: none"> 1. Lower crown plug (pressure tested) 2. ITC & Upper crown plug (pressure tested) 	<ol style="list-style-type: none"> 1. Lower crown plug (pressure tested) 2. ITC & Upper crown plug (pressure tested)

Figure 1 – Well Location Map



Santos
VIC/P44
Declaration of
Location Over
Casino Field



Santos Ltd ABN 80 007 550 923, Feb 2004 File No. OTWAY 603

Figure 2

Figure 2 – Time Depth Curve



Attachment A – Ocean Patriot Blow Out Prevention Equipment

Cameron 18-3/4" Type ULL BOP rated to 15,000 psi working pressure.

Component	Type / Pressure Rating
Upper Annular	Cameron Type D 18-3/4" – 34.5mPa (10,000 psi)
LMRP Connector	473mm (18 3/4") Cameron Collett 34.5 MPa (10,000 psi)
Lower Annular	Cameron Type D 18-3/4" 34.5mPa (10,000 psi)
#1 Blind/Shear Rams	Cameron ULL Blind/Shear 103 MPa (15,000 psi)
Upper Kill Entry	Below ram #1 – 103 MPa (15,000 psi)
#2 Upper Pipe Rams Variable	Cameron ULL Variable 89mmx127mm (3 1/2" x 5") 103 MPa (15,000 psi)
#3 Middle Pipe Rams 273mm (10-3/4")	Cameron ULL - 273mm (10-3/4") pipe ram 103 MPa (15,000 psi)
Choke Entry	Below ram #3– 103 MPa (15,000 psi)
#4 Lower Pipe Rams 127mm (5")	Cameron ULL - 127mm (5") pipe ram 103 MPa (15,000 psi)
Lower Kill Entry	Below ram #4 – 103 MPa (15,000 psi)

Attachment B – List of Contractors

Baker Atlas Level 2, 200 Adelaide Terrace Perth, WA 6004 Contact: Scott Blair	Tel: (08) 9455 0915 Fax: (08) 9455 0961 Mob: 0417 357 071	Wireline Logging
Bristow Helicopter 130 Fauntleroy Avenue Redcliffe, WA 6104 Contact: Patrick Thirley	Tel: (08) 9478 3388 Fax: (08) 9478 3844 Mob: 0418 121795	Helicopters
Cameron 1 Glencairn Ave Deer Park VIC 3023 Contact: Bruce Hassett	Tel: (03) 9361 4444 Fax: Mobile: 0411 704 914	Wellheads & Trees
Diamond Offshore General Company Unit 2, 5 Turner Avenue, Bentley WA, 6012 Contact: Steve Ramsey	Tel: (08)6363 8945 Fax: (08) 6363 8999 Mobile: 0431 507 423	Drilling Contractor
Dowell Schlumberger Level 5, 256 St Georges Terrace Perth WA 6000 Contact: Matt Cazalet	Tel: (08) 9420 4659 Fax: (08) 9420 4715 Mobile: 0411 654 526	Cementing
ECL Australia Level 1, 610 Murray St West Perth, WA 6005 Contact: Ian Scorgie	Tel: (08) 9480-0105 Fax: (08) 9480-0105	Rig Positioning - QA
Expro Group 42-44 Wittenberg Drive Canning Vale WA 6155 Contact: Dave Linkston	Tel: (08) 9456 7619 Fax: (08) Mobile: 0403 242 966	Well Testing
Farstad Shipping Level 9, 16 St Georges Tce Perth, WA 6000 Contact: Captain Bruce Dann	Tel: (03) 9254 1546 Fax: (03) 9254 1659 Mobile: 0408 488 382	Workboats
Fugro (Thales) Hydrographic House, 4 Ledger Road Balcatta, 6021 Contact: Terry Blake	Tel: (08) 6241 1351 Fax: (08) 9344 8783 Mobile: 0427 779 190	Rig Positioning
Halliburton Sperry Sun Level 2, 256 St Georges Terrace Perth WA 6000 Contact: Steve Edwards	Tel: (08) 6424 4607 Fax: (08) 6424 4699 Mobile: 0417 931 764	MWD
K&S Freighters Canal Court, Portland Vic 3305 P.O. Box 649 Contact: David Whitehead	Tel: (03) 5523 4144 Fax: (03) 5523 5647 Mobile: 0419 829 792	Shorebase
MI Australia Pty Ltd Level 11, 251 Adelaide Terrace Perth, WA 6000 Contact: Dave Bennett	Tel: (08) 9325 4822 Fax: (08) 9325 1897 Mobile: 0417 971 769	Drilling Fluids
Security DBS Level 2, 256 St Georges Terrace Perth, 6000 Contact: Joe Thompson	Tel: (08) 6424 4642 Fax: (08) 6424 4699 Mobile: 0414 911 787	Coring Services
Swire Pacific Offshore 2nd Floor, Queensgate Centre, Cnr William & Newman Streets Fremantle, WA 6160 Contact: Sam Pullen	Tel: (08) 9430 5434 Fax: Mobile: 0411 430 669	Workboats
Weatherford Level 2, 225 St Georges Terrace Perth, WA 6000 Contact: Aaron Sinnott	Tel: (08) 92124606 Fax: (08) 9226 4638 Mob: 0418 51 759	Casing Running Services

Attachment C – Completion Schematic

