

SANTOS

**WEST MEREENIE 23
WELL COMPLETION REPORT**

**COMPILED FOR
SANTOS LIMITED
(A.B.N. 80 007 550 923)**

Prepared By:
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June, 2014

WEST MEREENIE 23

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LOCATION MAP

131° 25' E

131° 30' E

23° 55' S

24° 00' S

Northwest Mereenie 1

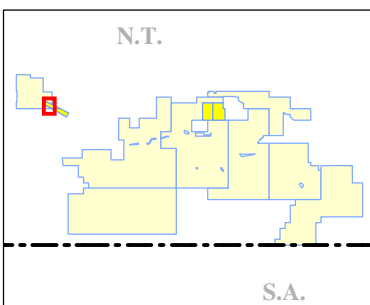
West Mereenie 1

OL 4

Mereenie 1

West Mereenie 23

16



- Gas Pipeline
- Oil Pipeline
- Water Pipeline

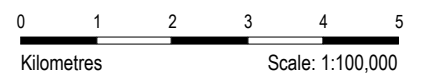
Tenements Production

- Santos Production Permit
- Santos Exploration Permit

Santos

OL 4 - Northern Territory

West Mereenie 23



WELL CARD

WELL: WEST MEREENIE 23	WELL CATEGORY: Appraisal	SPUD: 00:45 02/08/2013 with rig Boart Longyear WW07	
	WELL INTENT: Oil	RIG RELEASE TOP HOLE: 20:00 08/08/2013	
LAT: 23° 58' 09.88" S LONG: 131° 26' 50.17" E (GDA 94)		RE-ENTRY: 04:00 18/12/2013 with rig Ensign 918	
SEISMIC STATION: Line M87-10, SP 378		T.D.: 16:30 28/12/2013	
ELEVATION GND: 743.83 m RT: 748.98 m		RIG RELEASED: 03:00 08/01/2014 CMPLT: 22/03/2014	
BLOCK / LICENCE: Mereenie Block / OL 4, Northern Territory		RIG: Top Hole: Boart Longyear WW07 Bottom Hole: Ensign 918	
TD: 1573.3 m (Logger Extrap.), 1572.0 m (Driller)		STATUS: Single Completion Oil Well (SCO)	
PBTD: 1557.94 m (Driller) TOP HOLE TD: 570 m (Driller)		REMARKS: Top hole drilled with Boart Rig WW07, production hole with Ensign Rig 918. Cased and completed Pacoota (P3-120 / 130) oil well. Pay identified in the Stairway (gas) and Pacoota (oil and gas).	
TYPE STRUCTURE: Anticline		HOLE SIZE	CSG SIZE
TYPE COMPLETION: Conventional 2 3/8" 4.7 lb/ft J55 EUE tubing		12 1/4"	9 5/8"
ZONE(S): Pacoota P3-120 (Oil)		8 1/2"	5 1/2"
			2 3/8"
			SHOE DEPTH
			566.9 m (D&L)
			1570.7 m (D)
			1430.4 m (D)
			TYPE
			36.0 lb/ft
			15.5 lb/ft
			4.7 lb/ft

AGE	FORMATION OR ZONE TOPS	DEPTH (m)		THICKNESS	HIGH (H)
		LOGGERS	TVD SS	TVD (m)	LOW (L)
L. SILURIAN TO M. DEVONIAN	MEREENIE SANDSTONE	5.2	+743.8	447.2	-
LATE ORDOVICIAN	CARMICHAEL SANDSTONE	452.5	+296.7	97.5	0.7 m H
MID TO LATE ORDOVICIAN	UPPER STOKES SILTSTONE	550.0	+199.2	270.6	11.8 m L
MID ORDOVICIAN	LOWER STOKES SILTSTONE	822.6	-71.4	72.7	10.4 m L
MID ORDOVICIAN	UPPER STAIRWAY	896.7	-144.1	62.9	7.1 m L
MID ORDOVICIAN	MIDDLE STAIRWAY	960.9	-207.0	112.8	1.0 m L
MID ORDOVICIAN	LOWER STAIRWAY 2	1076.3	-319.8	61.1	1.2 m H
MID ORDOVICIAN	LOWER STAIRWAY 1	1137.6	-380.9	36.0	0.1 m H
EARLY ORDOVICIAN	HORN VALLEY SILTSTONE	1173.7	-416.8	81.9	3.8 m L
EARLY ORDOVICIAN	PACOOKA P1	1255.9	-498.7	102.3	6.7 m L
EARLY ORDOVICIAN	PACOOKA P2	1365.0	-601.0	58.1	10.0 m L
EARLY ORDOVICIAN	PACOOKA P3	1438.7	-659.1	67.5	10.1 m L
EARLY ORDOVICIAN	PACOOKA P3-120	1472.7	-683.8	-	10.8 m L
EARLY ORDOVICIAN	PACOOKA P3-190	1502.5	-705.0	-	11.0 m L
EARLY ORDOVICIAN	PACOOKA P4	1533.8	-726.6	26.9+	10.6 m L
	TOTAL DEPTH (LOGGER EXT.)	1573.3	-753.5		

LOG INTERPRETATION (Category 1 – Proved Producibility) MD					PERFORATIONS (6 shots/ft, 60° phase)				
FORMATION	INTERVAL (m)	NET PAY (m)	Ø _T %	SW _T %	FORMATION	INTERVAL (m)			
GAS					Pacoota P3-120	1467 - 1491			
Pacoota P1-60	1273.3 – 1281.6	2.82	7.6	10.4					
Pacoota P1-80	1281.6 – 1290.1	2.41	10.6	18.9					
Pacoota P1-280	1341.3 – 1347.5	3.2	5.6	13.8					
Pacoota P1-310	1347.5 – 1360.2	1.85	5.5	16.0					
Pacoota P1-350	1360.2 – 1365.0	2.11	6.1	14.1					
TOTAL GAS	1273.3 – 1365.0	12.4	7.1	14.7					
OIL									
Pacoota P3-120/130	1472.7 – 1491.0	4.5	9.5	23.0	FORM.	NO.	INTERVAL (m)	CUT	REC.
							No Cores Cut		

LOG	SUITE / RUN	INTERVAL (m)	BHT / TIME / REMARKS	LOG	SUITE / RUN	INTERVAL (m)	BHT / TIME / REMARKS
PEX-HNGS-SP	1 / 1		62.6°C @ 1539.9m	CMR-GR	1 / 4	1573.3 – 870	61.7°C @ 1560.2m
GR		1550 – 20	12 Hrs 45 Min				75 Hrs 45 Min
HNGS		1551 – 566					
HRLA		1566 – 567		MDT-GR	1 / 5	941 – 1471.2	61.7°C @ 1474.8m
MCFL		1566 – 567					101 Hrs 15 Min
CNL		1563 – 567					59 points: 8 valid, 14 curtailed, 37 seal failures
TLD1		1565 – 567					
TLD2		1556 – 567					
SP		1546 – 567		GR-CCL	1 / 6	1390 – 1335	DST 1
FMI-Sonic Scan	1 / 2	1573.3 – 870.0	60.7°C @ 1546.0m	GR-CCL	1 / 7	1355 – 1315	DST 2
			25 Hrs 30 Min				
ECS-CMR-GR	1 / 3	-	Tools Fished				

OPEN HOLE FLOW TESTS										
NO.	INTERVAL (m)	FORMATION	FLOW (mins)	SHUT IN (mins)	DIGITAL GAUGE IP / FP (psig)	SIP (psig)	MAX SURF PRESS (psig)	GAS TO SURF (mins)	TC / BC	REMARKS
1	1493.0 – 1521.8	P3-150/170/190	240	240	9.0 / 25.9	>1293	0.0	-	¾"	Rec: 1bbl RHM
2	1475.0 – 1493.3	P3-120/130	240	240	13.7 / 89.9	>692	0.0	-	½"	Rec: 4bbl WCM

SUMMARY

Location

West Mereenie 23 is an Oil Appraisal Well. This well's location is approximately 1.0 km west of West Mereenie 5, on the western end of the south flank of the Mereenie structure in licence area OL 4. The well is approximately 290 km west of Alice Springs, the closest facility being the Mereenie Central Treatment Plant 12 km to the south-east, (OL 4, south-west Northern Territory).

Objectives

The 2013-14 Mereenie drilling campaign was designed to target the oil and gas sands in the P1, P3 and P4, of the Pacoota Sandstone and gas in the Lower Stairway Sandstone. The West Mereenie 19-24 and East Mereenie 44-45 well program's primary targets are oil in the Pacoota P3 and P1, with oil secondary targets in the P4 and gas secondary targets in the P1 and Lower Stairway Sandstone. The field is defined by a four-way dip closure for the Pacoota Sandstone and Stairway Sandstone. The anticline is an elongated north-west to south-east structure on the western side of the West MacDonnell Ranges within the Amadeus Basin. Prior to this campaign 18 wells had been drilled in West Mereenie.

The primary objective of this campaign is to appraise reservoir extent and fluid limits in the central and western areas of the Pacoota oil reservoirs and bring oil on production to develop the 2P undeveloped oil reserve. The second objective is to undertake data gathering and other key evaluation of a variety of tight sandstones and organic shales throughout the Ordovician Stairway, Horn Valley and Pacoota sequence. Volumes of contingent gas and tight oil resources have also been identified within the Stairway & Pacoota.

In the Mereenie Field, oil is produced from the Pacoota P3 reservoir and gas from the Pacoota P1 reservoir. Gas condensate liquid is then separated at surface. The oil and condensate is then mixed and transported by truck. Gas is transported by the NT Gas Pipeline. Any surplus gas is reinjected into the Pacoota P3 reservoir to enhance oil recovery.

The deviated appraisal well, West Mereenie 23, is the second well in this drilling program, and is located on the western end of the south flank in an appraisal step-out location west of the successful West Mereenie 5 well. The primary targets were the P3-120/130 (as producing in West Mereenie 5) as well as prognosed additional pay in the lower P3 sands (P3-190/230/250) within the oil column, due to the 45° well design which was drilled at an updip azimuth. This design allows for a more reasonable standoff from both the gas oil contact (GOC) and oil water contact (OWC), allowing for depth prognosis and fluid contact uncertainty.

The greatest risks associated with the West Mereenie 23 well are sweep (due to offset production from West Mereenie 5) and mechanical (complete & frac). In the mean prognosed outcome, one follow-up producer well will be required to develop the area tested by West Mereenie 23, most likely a farther west-northwest step-out, with a 45° lateral to intersect the entire P3 system.

A total of 8.0 m of net oil pay was predicted for the Pacoota P3 Sandstone. The P3-120/130 and Pacoota P3-190/230/250 were the primary objectives (oil) of West Mereenie 23. The Pacoota P4 was the secondary objective (oil).

Results Of Drilling

West Mereenie 23 was spudded at 00:45 hours on the 2nd of August, 2013 with the drilling rig Boart Longyear WW7. Surface holes for all wells in this campaign were batch drilled. The 12 3/8" surface hole in this well was drilled to 379 m with an air hammer bit, at which point 12 1/4" Dual Tube Flooded Reverse Circulation (DTFRC) drilling proceeded to 570 m. 9 5/8" surface casing was set at 566.9 m (D&L). Operations were suspended at 20:00 hours on the 8th of August, 2013 and the Boart Longyear WW7 rig was released. At 04:00 hours on the 18th of December, 2013 West Mereenie 23 was re-entered with the drilling rig Ensign 918. The 9 5/8" casing shoe was drilled out and 8 3/4" hole was then drilled to 573 m, and a Formation Integrity Test (FIT) performed to 15.1 ppg EMW. The 8 3/4" production hole was then air hammer drilled ahead to 1066 m at which point the bit was changed and a directional assembly picked up. The 8 1/2" directional production hole was air drilled from 1066 m to 1455 m at which point drilling continued with drilling mud to a total depth of 1572.0 m (Driller), 1473.3 m (Logger Extrapolated), 26.9 m TVD into the Pacoota P4. Total depth was reached at 16:30 hours on the 28th of December, 2013.

While drilling West Mereenie 23, Measurement While Drilling (MWD) surveys were taken at regular intervals to ensure that the well intersected the Pacoota P3-120/130 primary objective within the specified 35m lateral tolerance in structural dip direction and 70 m lateral tolerance orthogonal to planned well azimuth, at an inclination of 45°. Maximum recorded deviation was 47.2° from 1547.8 m to 1551.3 m. At total depth, it is estimated that the well was displaced 262.5 m at a direction of 9.2° from the surface location.

Regular gas flow tests were performed at formation boundaries and whenever the blooie line gas flare was observed to increase in size. A total of eight flow tests were performed while air drilling in West Mereenie 23. A maximum flow rate of 0.63 MMcfd was observed at 1439 m at the top of the Pacoota P3.

After pulling out of hole to surface, the following suite of Schlumberger wireline logs were performed, Run: 1) PEX-HNGS-HRLA-SP, Run 2) FMI-Sonic Scanner, Run 3) ECS-CMR-GR (Became stuck – successfully fished), Run 4) CMR-GR, Run 5) MDT-GR (59 points: 8 valid, 14 curtailed, 37 no seals), Run 6: GR-CCL (DST 1), Run 7: GR-CCL (DST 2).

Following wireline logging two inflate straddle DST's were performed. DST 1: 1493.0 m to 1521.8 m performed in the Pacoota P3-150/170/190 recovered 1 bbl of rat hole mud. DST 2: 1475.0 m to 1493.3 m performed in the Pacoota P3-120/130 recovered 1 bbl of water cut mud with oil film followed by 3 bbls of water cut mud with trace fluorescence. Based on wireline log analysis and hydrocarbon shows while drilling, West Mereenie 23 was cased and suspended.

Formation tops in West Mereenie 23 ranged from 1.2 m high (Lower Stairway 2) to 11.8 m low (Upper Stokes Siltstone) to prognosis. All formation tops were low to prognosis in West Mereenie 23, with the exception of the Carmichael Sandstone and Lower Stairway 1 and 2, which were high to prognosis. The primary objectives Pacoota P3-120/130 and Pacoota P3-190/230/250 were 10.8 m low and 11.0 m low to prognosis respectively.

Oil fluorescence shows were encountered as follows: 951 m to 959 m (Upper Stairway Sandstone) 20% decreasing to 10% oil fluorescence, 17 units (59/19/11/8/3 %), 1321 m to 1333 m (Pacoota P1) trace oil fluorescence, 3031 units (77/15/5/2/1 %), 1444 m to 1454 m (Pacoota P3) trace to 10% oil fluorescence, 3799 units (77/15/5/2/1 %), 1468 m to 1470 m (Pacoota P3) 10 to 20% oil fluorescence, 147 units (50/21/14/9/6 %), 1475 m to 1489 m (Pacoota P3-120) 30% decreasing to 10% oil fluorescence, 330 units (37/23/18/13/9 %).

Log analysis (combined with hydrocarbon shows recorded while drilling) indicates 12.4 m of Category 1 net gas pay (average porosity 7.1%, average Sw 14.7%) within the Pacoota Sandstone, and 4.5 m of Category 1 net oil pay (average porosity 9.5%, average Sw 23.0%) within the Pacoota P3-120 for West Mereenie 23. Also identified was 56.2 m of Category 2 net gas pay (average porosity 6.6%, average Sw 46.2%) within the Stairway and Pacoota Sandstones, and 10.0 m of Category 2 net oil pay (average porosity 8.5%, average Sw 27.0%) within the Pacoota P3-120 for West Mereenie 23.

Status

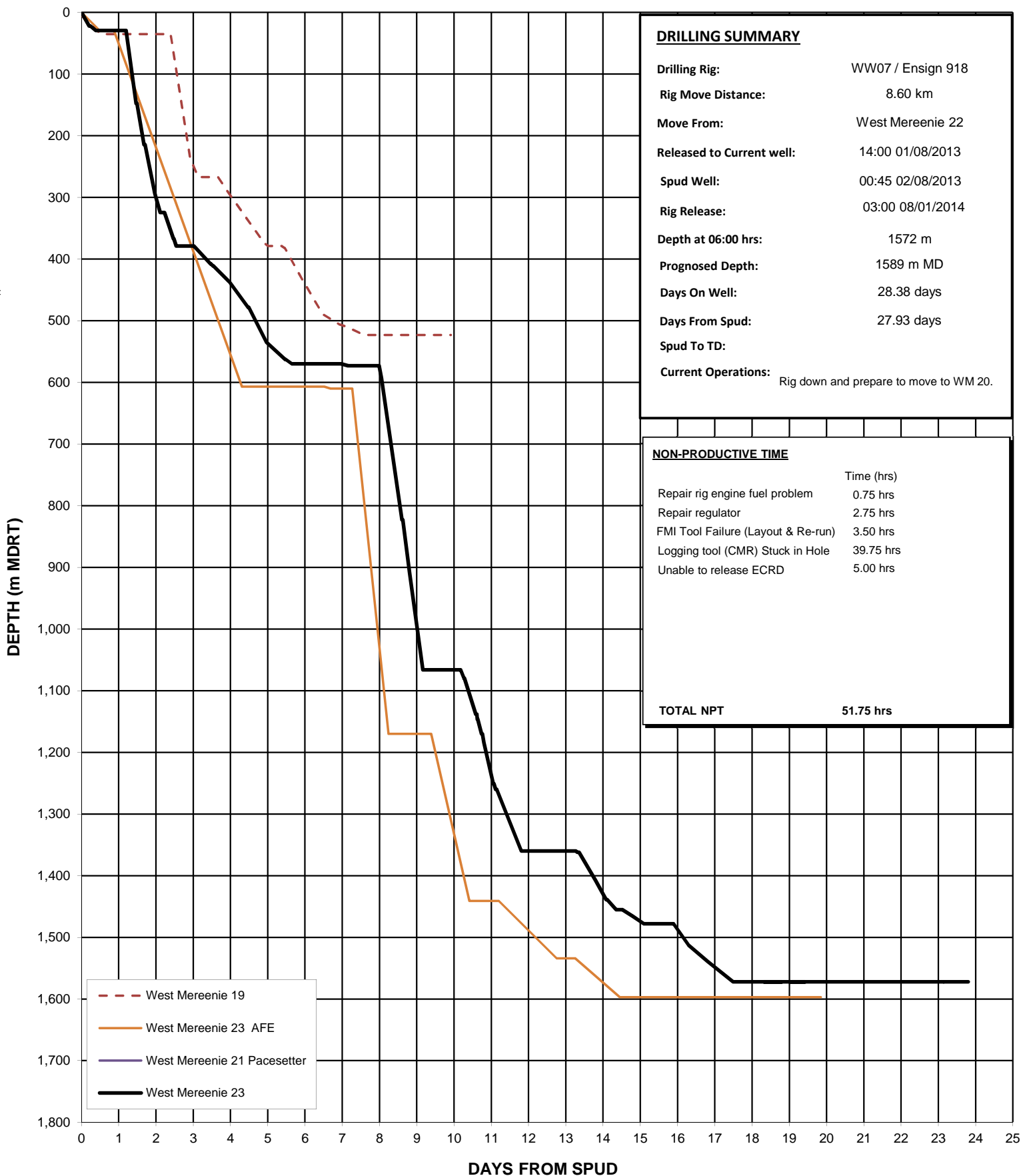
Completion of West Mereenie 23 as a single oil producer was undertaken in late March 2014. 2 3/8" production tubing was run to 1430.4 m, the well perforated and artificial lift installed.

AUTHOR: D. Adderley

DATE: June, 2014

TIME vs DEPTH CURVE

West Mereenie 23 TIME DEPTH CURVE



DRILLING SUMMARY	
Drilling Rig:	WW07 / Ensign 918
Rig Move Distance:	8.60 km
Move From:	West Mereenie 22
Released to Current well:	14:00 01/08/2013
Spud Well:	00:45 02/08/2013
Rig Release:	03:00 08/01/2014
Depth at 06:00 hrs:	1572 m
Prognosed Depth:	1589 m MD
Days On Well:	28.38 days
Days From Spud:	27.93 days
Spud To TD:	
Current Operations:	Rig down and prepare to move to WM 20.

NON-PRODUCTIVE TIME	
	Time (hrs)
Repair rig engine fuel problem	0.75 hrs
Repair regulator	2.75 hrs
FMI Tool Failure (Layout & Re-run)	3.50 hrs
Logging tool (CMR) Stuck in Hole	39.75 hrs
Unable to release ECRD	5.00 hrs
TOTAL NPT	51.75 hrs

WELL HISTORY

1. GENERAL DATA

Well Name: West Mereenie 23

Well Classification: Oil Appraisal Well

Interest Holders: Santos QNT 93.7500%
Santos Ltd 6.2500%

Participating Interests: Santos QNT 93.7500%
Santos Ltd 6.2500%

Operator: SANTOS

Block / Licence: OL 4, Northern Territory

Surveyed Location: Latitude: 23° 58' 09.88" South (GDA 94)
Longitude: 131° 26' 50.17" East (GDA 94)

Surveyed Elevation: Ground Level: 743.83 m
Rotary Level: 748.98 m

Seismic Location: Line M87-10, SP 378

Total Depth: Driller: 1572.0 m
Logger: 1573.3 m (Extrapolated)

Completion: **Surface Casing:** 51 joints of 9 5/8" 36 lb/ft K55 BTC casing set at 566.9 m (Driller) 566.9 m (Logger)

Production Casing: 130 joints of 5 1/2" 15.5 lb/ft K55 BTC casing set at 1570.7 m (Driller)

Production Tubing: 148 joints of 2 3/8" 4.7 lb/ft J55 EUE tubing set at 1430.4 m (Driller)

PBTD: 1557.9 m

Status: Single Completion Oil Well (SCO)

2. **DRILLING DATA**

Date Drilling Commenced:	00:45 hours, 2 nd August 2013
Date Drilling Suspended:	20:00 hours, 8 th August 2013
Date Well Re-entered:	04:00 hours, 18 th December 2013
Date Drilling Completed (TD):	16:30 hours, 28 th December 2013
Date Rig Released:	03:00 hours, 8 th January 2014
Contractor:	Boart Longyear / Ensign International Energy Services
Rig:	Boart Longyear WW07 / Ensign 918
Rig Specifications:	Refer to Appendix XII

3. **DRILLING SUMMARY**

(a) **Drilling Summary** (All Depths Driller's RT unless otherwise stated)

West Mereenie 23 was spudded at 00:45 hours on 02nd of August, 2013 with the drilling rig Boart Longyear WW7, surface holes for all wells in this campaign were batch drilled. The 12 3/8" surface hole in this well was drilled to 379 m with an air hammer bit, at which point 12 1/4" Dual Tube Flooded Reverse Circulation (DTFRC) drilling proceeded to 570 m. 9 5/8" surface casing was set at 566.9 m (D) and 566.9 m (L), operations were suspended at 20:00 hours on 8th August, 2013 and the Boart Longyear WW7 rig was released. At 04:00 hours on 18th December, 2013 West Mereenie 23 was re-entered with the drilling rig Ensign 918. The 9 5/8" casing shoe was drilled out and 8 3/4" hole was then drilled to 573 m, and a Formation Integrity Test (FIT) performed to 15.1 ppg EMW. The 8 3/4" production hole was then air hammer drilled ahead to 1066 m at which point the bit was changed and a directional assembly picked up. The 8 1/2" directional production hole was air drilled from 1066 m to 1455 m at which point drilling continued with drilling mud to a total depth of 1572.0 m (Driller), 1473.3 m (Logger Extrapolated), 26.9 m TVD into the Pacoota P4. Total depth was reached at 16:30 hours on 28th December, 2013.

While drilling West Mereenie 23, Measurement While Drilling (MWD) surveys were taken at regular intervals to ensure that the well intersected the Pacoota P3-120/130 primary objective within the specified 35 m lateral tolerance in structural dip direction and 70 m lateral tolerance orthogonal to planned well azimuth, at an inclination of 45°. At total depth, it is estimated that the well was displaced 262.5 m at a direction of 9.2° from the surface location.

Regular gas flow tests were performed at formation boundaries and whenever the blooie line gas flare was observed to increase in size. A total of eight flow tests were performed while air drilling in West Mereenie 23. A maximum flow rate of 0.63 MMcf/d was observed at 1439 m at the top of the Pacoota P3.

After pulling out of hole to surface, the following suite of Schlumberger wireline logs were performed, Run: 1) PEX-HNGS-HRLA-SP, Run 2) FMI-Sonic Scanner, Run 3) ECS-CMR-GR (Became stuck – successfully fished), Run 4) CMR-GR, Run 5) MDT-GR (59 points: 8 valid, 14 curtailed, 37 no seals), Run 6: GR-CCL (DST 1), Run 7: GR-CCL (DST 2).

Following wireline logging two inflate straddle DST's were performed. DST 1: 1493.0 m to 1521.8 m performed in the Pacoota P3-150/170/190 recovered 1 bbl of rat hole mud. DST 2: 1475.0 m to 1493.3 m performed in the Pacoota P3-120/130 recovered 1 bbl of water cut mud with oil film followed by 3 bbls of water cut mud with trace fluorescence. Based on wireline log analysis and hydrocarbon shows while drilling, West Mereenie 23 was cased and suspended.

Tables I and II summarise the major drilling operations in this hole. More comprehensive summaries are appended to this report (Appendix XI: Drilling: Final Well Report).

TABLE I: CASING, HOLE, AND CEMENT DETAILS

BIT SIZE	DEPTH	CASING SIZE	CASING DEPTH	JNTS	CASING TYPE	CEMENT
12 3/8" / 12 1/4"	570 m	9 5/8"	566.9 m	51	36 lb/ft K55 BTC	166 barrels (372 sacks) of 11.8 - 15.8 ppg Class 'G' plus additives.
8 3/4" / 8 1/2"	1572 m	5 1/2"	1570.7 m	130	15.5 lb/ft K55 BTC	275.0 barrels of 11.8 - 12.0 ppg cement plus additives.

TABLE II: SUMMARY OF MUD SYSTEMS

HOLE SECTION	12 3/8"	12 1/4"	8 3/4" / 8 1/2"	8 1/2"
Interval	Spud to 379 m	379 m to 570 m	570 m to 1455 m	1455 m to 1572 m
Mud Type	Air Drilled	Water	Air Drilled	NaCl-Polymer
Mud Weight (ppg)	-	8.33	-	8.7 – 8.8
Funnel Viscosity (sec/qt)	-	-	-	27 - 35
PV (cps)	-	-	-	5 - 14
YP (lb/100ft ²)	-	-	-	9.0 – 9.5
pH	-	-	-	10.0 – 13.0
API Fluid Loss	-	-	-	40000 - 46000
Chlorides (ppm)	-	-	-	6.0 – 6.3

(b) Trouble Time

A total of 3.5 hours of Trouble Time were recorded during the drilling of West Mereenie 23. The well duration was 666.25 hours (spud to rig release); 0.5% of this total operational time was attributed to non-productive time. A comprehensive time breakdown is available in Appendix XI (Drilling: Final Well Report).

TABLE III: SUMMARY OF NON-PRODUCTIVE TIME

OPERATION	HOURS LOST	% OF LOST TIME
Repair rig engine fuel problem	0.75	21.4
Repair regulator	2.75	78.6
TOTAL	3.5	100.0

(c) Water Supply

Make up water was trucked from the West Mereenie 15 Bore, and analysed on site with the following results:

TABLE IV: WATER SUPPLY ANALYSIS

SOURCE	West Mereenie 15 Bore
DEPTHS USED	Spud to TD
Chlorides	150mg/l
pH	7.0
Hardness	8mg/l
Pf / Mf	- / -

(d) Mudlogging

Mudlogging services were provided by Geoservices Australasia (Unit 015). Samples were collected, washed and described at 15 m intervals from Surface to 870 m, 3 m intervals from 870 m to 1572 m Total Depth (not all samples were caught due to high ROP).

All samples were checked for oil shows using ultraviolet fluorescence from 570 m to TD. Gas levels were monitored from 570 m to TD, using an FID total gas detector and FID chromatograph (GeoFast). Total gas was monitored in gas units (1 unit = 200 ppm methane equivalent in air) and the chromatograph was calibrated to measure ppm (parts per million) concentrations of the alkane gasses methane, ethane, propane, butane and pentane. Other parameters monitored included rate of penetration, weight on hook, stand pipe pressure, RPM, torque and mud pit levels.

(e) Testing

Two Drill Stem Tests were run in West Mereenie 23. Test reports and charts are presented in Appendix VII: Drill Stem Test Data.

DST #1, 1493.0 m – 1521.8 m (Pacoota P3-150/170/190); open 240 mins / closed 240 mins NFTS. Reverse circulated 1 bbl (37 m) of 8.8 ppg rat hole mud.

DST #2, 1475.0 m – 1493.3 m (Pacoota P3-120/130); open 240 mins / closed 240 mins NFTS. Reverse circulated 1 bbl (36 mMD) 8.5 ppg water cut mud with oil film followed by 3 bbls (133 mMD) 8.5 ppg water cut mud with trace fluorescence.

(f) Coring

No Cores were cut in West Mereenie 23.

(g) Electric Logging

One suite of electric logs was run in West Mereenie 23:

TABLE V: ELECTRIC LOGGING SUMMARY

TYPE OF LOG	SUITE / RUN	INTERVAL (m)	BHT / TIME / REMARKS
PEX-HNGS-SP	1 / 1		62.2°C @ 1539.9 m
GR		1550 – 20	12 Hours 45 Mins
HNGS		1551 – 566	
HRLA		1566 – 567	
MCFL		1566 – 567	
CNL		1563 – 567	
TLD1		1565 – 567	
TLD2		1556 – 567	
SP		1546 – 567	
FMI-Sonic Scan	1 / 2	1573.3 – 870.0	60.7°C @ 1546.0 m
			25 Hours 30 Mins
ECS-CMR-GR	1 / 3	-	Tools Fished
CMR-GR	1 / 4	1573.3 – 870.0	61.7°C @ 1560.2 m
			75 Hours 45 Mins
MDT-GR	1 / 5	941.0 – 1471.2	61.7°C @ 1474.8 m
			101 Hours 15 Mins
			59 Points: 8 valid, 14 curtailed, 37 seal failures.
GR-CCL	1 / 6	1390 – 1335	DST 1
GR-CCL	1 / 7	1355 – 1315	DST 2

(h) Geothermal Gradient

An extrapolated bottom hole temperature of 64.4°C at 1573.3 m (Logger Extrapolated) is calculated based on the maximum temperature from Run 5. This gives a geothermal gradient of 27.67°C/km. Data used for calculations is as follows:

TABLE VI: TEMPERATURE SUMMARY

	MAX RECORDED TEMP (°C)	DEPTH RECORDED (m)	TIME SINCE CIRCULATION (hours)
Run 1	62.6	1539.9	12.75
Run 2	60.7	1546.0	25.50
Run 4	61.7	1560.2	75.75
Run 5	61.7	1474.9	101.25

(i) Hole Deviation

West Mereenie 23 was designed as a deviated well to intersect the primary objectives Pacoota P3-120/130 and P3-190/230/250. Maximum recorded deviation was 47.2° from 1547.8 m to 1551.3 m. The well bore deviation was monitored utilising a giro in the surface hole and Measurement While Drilling (MWD) surveys from the surface casing shoe to TD. Maximum well displacement was 262.5 m at 9.2°(Grid North) at 1572 m (TD).

Deviation survey results are summarised in Appendix VI (Deviation Data) and on the Composite Log (Enclosure I) and Mudlog (Enclosure II).

(j) Velocity Survey

No Velocity Survey was run in West Mereenie 23.

(k) Completion Summary

West Mereenie 23 has been completed with 2 ¾” production tubing as an oil producer. One zone was perforated in late March 2014, Pacoota P3-120 (1467 m to 1491 m).

GEOLOGY

1. **PRE-DRILLING SUMMARY** (after Well Proposal)

West Mereenie 23 is an Oil Appraisal Well. This well's location is approximately 1.0 km west of West Mereenie 5, on the western end of the south flank of the Mereenie structure in licence area OL 4. The field is approximately 290 km west of Alice Springs, the closest facility being the Mereenie Central Treatment Plant 12 km to the south-east, (OL 4, south-west Northern Territory).

The 2013-14 Mereenie drilling campaign was designed to target the oil and gas sands in the P1, P3 and P4, of the Pacoota Sandstone and gas in the Lower Stairway Sandstone. The West Mereenie 19-24 and East Mereenie 44-45 well program's primary targets are oil in the Pacoota P3 and P1, with oil secondary targets in the P4 and gas secondary targets in the P1 and Lower Stairway Sandstone. The field is defined by four-way dip closure for the Pacoota Sandstone and Stairway Sandstone, the anticline is an elongated north-west to south-east structure on the western side of the West MacDonnell Ranges. Prior to this campaign 18 wells had been drilled in West Mereenie.

A total of 8.0 m of net oil pay was predicted for the Pacoota P3-120/130 and Pacoota P3-190/230/250 primary targets.

2. **DRILLING RATIONALE** (after Well Proposal)

The primary objective of this campaign is to appraise reservoir extent and fluid limits in the central and western areas of the Pacoota oil reservoirs and bring oil on production to develop the 2P undeveloped oil reserve. The second objective is to undertake data gathering and other key evaluation of a variety of tight sandstones and organic shales throughout the Ordovician Stairway, Horn Valley and Pacoota sequence. Volumes of contingent gas and tight oil resources have also been identified within the Stairway & Pacoota.

The Mereenie Field was discovered in 1963 and commenced production in 1984, delivering hydrocarbon liquids to South Australia and gas to Northern Territory. The field is \pm 290 km west of the town of Alice Springs, within the Amadeus Basin in the southern region of the Northern Territory.

Santos first acquired equity and then assumed Operatorship for the field in 1993, nine years after first production.

Prior to this campaign, a total of sixty-two wells had been drilled in the field since discovery. The majority of the historical wells have been drilled to intersect key target sands within the oil rim. Only eight of the sixty-two wells have been located on the structural crest, up-dip of the oil rims, specifically to produce from the gas cap.

In the Mereenie Field oil is produced from the Pacoota P3 reservoir and gas from the Pacoota P1 reservoir, gas condensate liquid is then separated at surface. The oil and condensate is then mixed and transported by truck, gas is transported by the NT Gas Pipeline. Any surplus gas is reinjected into the Pacoota P3 reservoir to enhance oil recovery.

West Mereenie 23 is the second well in this drilling program, and is located on the western end of the south flank in an appraisal step-out location west of the successful West Mereenie 5 well. The primary targets were the P3-120/130 (as producing in West Mereenie 5) as well as prognosed additional pay in the lower P3 sands (P3-190/230/250) within the oil column, due to the 45° well design which was drilled at an updip azimuth. This design allows for a more reasonable standoff from both the gas oil contact (GOC) and oil water contact (OWC), allowing for depth prognosis and fluid contact uncertainty.

Santos has 100% equity in West Mereenie 23, which is a 45° deviated appraisal well. The Common P3 Original Gas Oil Contact (OGOC) is at -649.2 mSS. The P3 Original Oil Water Contact (OOWC), as observed in West Mereenie 11, is at -723.9 mSS.

The greatest risks associated with the West Mereenie 23 well were sweep (due to offset production from West Mereenie 5) and mechanical (complete & frac). In the mean prognosed outcome, one follow-up producer well will be required to develop the area tested by West Mereenie 23, most likely a farther west-northwest step-out, with a 45° lateral to intersect the entire P3 system.

The P3-120/130 and Pacoota P3-190/230/250 were the primary objectives (oil) of West Mereenie 23, with the Pacoota P4 being the secondary objective (oil).

3. **RESULTS OF DRILLING**

(a) **Stratigraphy** (Logger's Depths)

The following table lists the formations intersected in West Mereenie 23, together with subsea elevations and thicknesses. All depths are Logger's Depths.

TABLE VII: WEST MEREENIE 23 STRATIGRAPHY

AGE	FORMATIONS	MDRT (m)	TVD SS (m)	THICKNESS TVD (m)
L. SILURIAN TO M. DEV.	MEREENIE SANDSTONE	5.2	+743.8	447.2
LATE ORDOVICIAN	CARMICHAEL SANDSTONE	452.5	+296.7	97.5
MID TO L. ORDOVICIAN	UPPER STOKES SILTSTONE	550.0	+199.2	270.6
MID ORDOVICIAN	LOWER STOKES SILTSTONE	822.6	-71.4	72.7
MID ORDOVICIAN	UPPER STAIRWAY	896.7	-144.1	62.9
MID ORDOVICIAN	MIDDLE STAIRWAY	960.9	-207.0	112.8
MID ORDOVICIAN	LOWER STAIRWAY 2	1076.3	-319.8	61.1
MID ORDOVICIAN	LOWER STAIRWAY 1	1137.6	-380.9	36.0
EARLY ORDOVICIAN	HORN VALLEY SILTSTONE	1173.7	-416.8	81.9
EARLY ORDOVICIAN	PACOOKA P1	1255.9	-498.7	102.3
EARLY ORDOVICIAN	PACOOKA P2	1365.0	-601.0	58.1
EARLY ORDOVICIAN	PACOOKA P3	1438.7	-659.1	67.5
EARLY ORDOVICIAN	PACOOKA P3-120	1472.7	-683.8	-
EARLY ORDOVICIAN	PACOOKA P3-190	1502.5	-705.0	-
EARLY ORDOVICIAN	PACOOKA P4	1533.8	-726.6	26.9+
	TOTAL DEPTH (LGR EXT.)	1573.3	-753.5	

Cuttings samples were collected, washed and described at 15 m intervals from Surface to 870 m, 3 m intervals from 870 m to 1573.3 m (Loggers extrapolated TD), not all samples were caught due to high ROP.

A brief summary of the section penetrated in West Mereenie 23 (with associated depositional environments) is found below. For detailed lithological descriptions refer to Appendix Ia.

The stratigraphic sequence penetrated by West Mereenie 23 consists of aeolian, fluvial, lacustrine, and shallow marine sediments comprising sandstones, siltstones, and minor carbonates of Late Silurian to Early Ordovician age.

Relatively restricted clastic deposits in the Ordovician of the Amadeus Basin include the marginal marine Pacoota Sandstone, the shallow marine Horn Valley Siltstone, and the tidally influenced Stairway Sandstone.

Total depth for West Mereenie 23 was reached at 1573.3 m (-753.5 m TVD SS), 254.8m TVD into the **PACOOKA SANDSTONE (Early Ordovician)**. Geologically, the Pacoota Sandstone forms a thick unit of dominantly sandstones and siltstones, deposited in alluvial, coastal and marine shoreface settings. The Pacoota Sandstone has been subdivided into four sub-units from the P1 at the top to the P4 at the base. Of these the P1 and P3 units are the most commercially productive.

Conformably overlying the Pacoota Sandstone is the **HORN VALLEY SILTSTONE (Early Ordovician)**. The formation is a massive dark grey brown siltstone sequence with occasional fossiliferous limestone interbeds. The Horn Valley Siltstone was deposited in a predominantly shallow marine environment.

The **STARIWAY SANDSTONE (Mid Ordovician)** conformably overlies the Horn Valley Siltstone. The formation is divided into an Upper dominantly sandstone unit, a Middle siltstone unit and Lower interbedded sandstone / siltstone unit. The sandstones were deposited in a predominantly tidally influenced marine depositional environment.

The **STOKES FORMATION (Mid to Late Ordovician)** conformably overlies the Stairway Sandstone and forms the seal for the hydrocarbon accumulations of the Mereenie Anticline. The formation consists of a massive siltstone sequence, interbedded with minor sandstones. The formation was deposited in a predominantly shallow marine environment.

Conformably overlying the Stokes Formation is the **CARMICHAEL SANDSTONE (Late Ordovician)**. The formation is a sandstone sequence with minor siltstone interbeds. The formation was deposited in an estuarine environment.

Unconformably overlying the Carmichael Sandstone is the **MEREENIE SANDSTONE (Late Silurian to Mid Devonian)**. The formation consists of a massive sandstone sequence that was deposited in a shallow marine and aeolian environment. The Mereenie Sandstone is a permeable groundwater aquifer in this area.

The Mereenie Sandstone is overlain by **UNDIFFERENTIATED SURFICIAL DEPOSITS (Quaternary)**. A thin veneer of iron stained quartz sand of aeolian origin is observed at surface.

For further details concerning the formations encountered in West Mereenie 23, refer to Appendix I of this report.

(b) Stratigraphic Prognosis (after Well Proposal)

The stratigraphic sequence intersected in West Mereenie 23 was as prognosed, as illustrated by the table below. Formation tops in West Mereenie 23 ranged from 1.2 m high (Lower Stairway 2) to 11.8 m low (Upper Stokes Siltstone) to prognosis. All formation tops were low to prognosis in West Mereenie 23, with the exception of the Carmichael Sandstone and Lower Stairway 1 and 2, which were high to prognosis. The primary objectives Pacoota P3-120/130 and Pacoota P3-190/230/250 were 10.8 m low and 11.0 m low to prognosis respectively. The Pacoota P3-120/130 and Pacoota P3-190/230/250 were 6.1 m low and 2.4 m low respectively to the correlation well West Mereenie 5. Formation thicknesses were within ± 12.5 m of prognosis in West Mereenie 23.

The depth prognosis (and actual well results) for West Mereenie 23 are tabled below. All depths quoted in this table are Logger's Depths:

TABLE VIII: ACTUAL VERSUS PROGNOSSED DEPTHS AND THICKNESSES IN WEST MEREENIE 23

FORMATION	PROG TVD SS DEPTH (m)	ACT TVD SS DEPTH (m)	DEPTH DIFF (m)	PROG TVD THICK (m)	ACT TVD THICK (m)	THICK DIFF (m)
MEREENIE SANDSTONE	+743.8	+743.8	-	447.8	447.2	-0.6
CARMICHAEL SANDSTONE	+296.0	+296.7	0.7 m H	85.0	97.5	+12.5
UPPER STOKES SILTSTONE	+211.0	+199.2	11.8 m L	272.0	270.6	-1.4
LOWER STOKES SILTSTONE	-61.0	-71.4	10.4 m L	76.0	72.7	-3.3
UPPER STAIRWAY	-137.0	-144.1	7.1 m L	69.0	62.9	-6.1
MIDDLE STAIRWAY	-206.0	-207.0	1.0 m L	115.0	112.8	-2.2
LOWER STAIRWAY 2	-321.0	-319.8	1.2 m H	60.0	61.1	+1.1
LOWER STAIRWAY 1	-381.0	-380.9	0.1 m H	32.0	36.0	+4.0
HORN VALLEY SILTSTONE	-413.0	-416.8	3.8 m L	79.0	81.9	+2.9
PACOOTA P1	-492.0	-498.7	6.7 m L	99.0	102.3	+3.3
PACOOTA P2	-591.0	-601.0	10.0 m L	58.0	58.1	+0.1
PACOOTA P3	-649.0	-659.1	10.1 m L	67.0	67.5	+0.5
PACOOTA P3-120	-673.0	-683.8	10.8 m L	-	-	-
PACOOTA P3-190	-694.0	-705.0	11.0 m L	-	-	-
PACOOTA P4	-716.0	-726.6	10.6 m L	69.0+	26.9+	-
TOTAL DEPTH (LGR EXT.)	-785.0	-753.5				

(c) Hydrocarbon Summary (Logger's Depths)

Total gas was recorded from the start of the production hole at 570 m to total depth using an FID total gas detector. One unit of gas is equal to 200 ppm methane equivalent. Chromatographic analysis was determined using an FID chromatograph and these values are quoted as percentages (C1 – C5). Ditch cuttings were collected, washed and described at 15 m intervals from Surface to 870 m and 3 m intervals from 870 m to 1573.3 m Total Depth (Logger Extrapolated), not all samples were caught due to high ROP. All samples were checked for oil shows using ultraviolet fluorescence.

The following table summarises the gas readings and hydrocarbon fluorescence observed while drilling each formation in West Mereenie 23.

TABLE IX: HYDROCARBON SUMMARY FOR EACH FORMATION

FORMATION OR ZONE	LOGGERS DEPTH (m)		TOTAL GAS (Units)	GAS RATIO (%)	FLUORESCENCE / COMMENTS
	FROM	TO			
UPPER STOKES SLTST	550.0	822.6	0 - 13	-	
LOWER STOKES SLTST	822.6	896.7	0 - 0	-	
UPPER STAIRWAY	896.7	960.9	0 - 17	59/19/11/8/3	951m - 959m: 20% decreasing to 10% fluorescence.
MIDDLE STAIRWAY	960.9	1076.3	0 - 12	81/19/Tr	
LOWER STAIRWAY 2	1076.3	1137.6	0 - 3	82/14/4	
LOWER STAIRWAY 1	1137.6	1173.7	0 - 7	74/16/6/4	
HORN VALLEY SLTST	1173.7	1255.9	0 - 14	73/16/6/3/2	
PACOOTA P1	1255.9	1365.0	0 - 4966	76/15/5/2/2	1321m - 1333m: Trace fluorescence.
PACOOTA P2	1365.0	1438.7	127 - 4738	77/15/5/2/1	
PACOOTA P3	1438.7	1472.7	4 - 4712	77/15/5/2/1	1444m - 1454m: Trace to 10% fluorescence. 1468m - 1470m: 10-20% fluorescence.
PACOOTA P3-120	1472.7	1502.5	5 - 330	37/23/18/13/9	1475m - 1489m: 30% decreasing to 10% fluorescence.
PACOOTA P3-190	1502.5	1533.8	5 - 30	58/18/11/8/5	
PACOOTA P4	1533.8	1573.3	2 - 5	89/11	

The table below summarises the hydrocarbon shows and associated gas readings, which were observed in cuttings while drilling West Mereenie 23. These hydrocarbon shows were part of the Daily Geologic Reports sent from the field and which are summarised below. Sandstones in the intervals mentioned below are described in this section:

TABLE X: SUMMARY OF HYDROCARBON SHOWS AND ASSOCIATED GAS READINGS WHILE DRILLING WEST MEREENIE 23

INTERVAL (Loggers Depths)	LITHOLOGY & HYDROCARBON FLUORESCENCE	GAS
	UPPER STAIRWAY SANDSTONE	
948m – 960m ROP: 1.6 – 4.5 AVE: 3.0 min/m	SANDSTONE: off white to occasionally light grey, very fine to rare medium, dominantly fine, moderately sorted, sub rounded to occasionally sub angular, moderately strong siliceous cement, trace to nil off white argillaceous matrix, hard, common loose, very poor to tight visual porosity, poor inferred porosity. FLUORESCENCE: 20% decreasing to 10% dull white pinpoint fluorescence, very slow diffuse crush cut, thin ring residue.	17 U / 1 U 59/19/11/8/3 % (Maximum at 948.5m)
	PACOOTA P1	
1256m – 1260m ROP: 2.5 – 9.5 AVE: 5.2 min/m	SANDSTONE: very fine to medium, minor coarse, poorly sorted, loose, friable to hard, poor inferred porosity, tight visual porosity, no fluorescence. Gas Rate @ 1260m: Too Small To Measure - Intermittent 2-3m lazy orange flare prior to test, occasional 1m lazy orange flare during test.	4965 U / 30 U 59/21/11/5/4 % (Maximum at 1257.5m)

1277m – 1286m ROP: 2.6 – 20.0 AVE: 7.8 min/m	SANDSTONE: fine to occasionally medium, hard to very hard, very poor to tight visual porosity, trace dull mineral fluorescence. No Flare.	3707 U / 30 U 78/15/5/1/1 % (Maximum at 1285m)
1320m – 1332m ROP: 1.8 – 9.1 AVE: 3.2 min/m	SANDSTONE: very fine to occasionally medium, hard to very hard, occasionally loose, very poor to tight visual and inferred porosity. FLUORESCENCE: trace dim green yellow pinpoint fluorescence, very slow diffuse crush cut, thin ring residue.	3031 U / 1500 U 77/15/5/2/1 % (Maximum at 1323.5m)
PACOOTA P3		
1446m – 1452m ROP: 12.0 – 42.2 AVE: 20.5 min/m	SANDSTONE: fine to dominantly medium, generally loose clean grains, poor visual and inferred porosity. FLUORESCENCE: trace to 10% dim green pinpoint fluorescence, very slow diffuse crush cut, thin ring residue.	3799 U / 1300 U 77/15/5/2/1 % (Maximum at 1451m)
1468m – 1470m ROP: 15.2 – 27.5 AVE: 19.8 min/m	SANDSTONE: very fine to medium, generally loose clean grains, friable to moderately hard in part, poor inferred porosity, very poor to poor visual porosity. FLUORESCENCE: 10-20% moderately bright green white spotted fluorescence, slow diffuse cut, thin ring residue.	147 U / 5 U 50/21/14/9/6 % (Maximum at 1469m)
PACOOTA P3-120		
1476m – 1489m ROP: 6.9 – 51.0 AVE: 28.6 min/m	SANDSTONE: fine to medium, generally loose clean grains, friable to moderately hard, poor to fair inferred porosity. FLUORESCENCE: 30% decreasing to 10% moderately bright to bright green white patchy fluorescence, slow diffuse cut, thin ring residue.	330 U / 10 U 37/23/18/13/9 % (Maximum at 1482m)

TABLE XI: SUMMARY OF BLOOIE LINE GAS FLOW TESTS PERFORMED WHILE AIR DRILLING WEST MEREENIE 23

FLOW TEST DEPTH (Drillers)	GAS FLOW RATE * Minimum flow rate measurable is 0.5 MMcfd.	MUD LOG GAS PEAK (Composition)
1066m #1	Middle Stairway Sandstone. Maximum gas flare rate = 0.00 MMcfd. (No gas flare)	17 U / 1 U 59/19/11/8/3 % (Max. at 948.5m)
1080m #2	Lower Stairway Sandstone 2. Maximum gas flare rate = 0.00 MMcfd. (No gas flare)	1 U / Trace 73/17/10 % (Max. at 1072m)
1138m #3	Lower Stairway Sandstone 1. Maximum gas flare rate = 0.00 MMcfd. (No gas flare)	2 U / Trace 82/14/4 % (Max. at 1112m)
1170m #4	Horn Valley Siltstone. Maximum gas flare rate = 0.00 MMcfd. (No gas flare)	5 U / Trace 65/18/9/6/2 % (Max. at 1152m)
1251m #5	Pacoota P1. Maximum gas flare rate = 0.00 MMcfd. (No gas flare)	7 U / Trace 76/16/5/3 % (Max. at 1174m)
1260m #6	Pacoota P1. Maximum gas flare rate = 0.00 MMcfd, Rate Too Small To Measure - RTSTM. (Intermittent 2-3m lazy orange flare prior to test, occasional 1m lazy orange flare during test)	4965 U / 7 U 59/21/11/5/4 % (Max. at 1257.5m)

1360m	#7	Pacoota P2. Maximum gas flare rate = 0.00 MMcfd, Rate Too Small To Measure - RTSTM. (No gas flare)	4774 U / 1800 U 76/15/5/2/2 % (Max. at 1357m)
1439m	#8	Pacoota P3. Maximum gas flare rate = 0.63 MMcfd. (No gas flare)	4737 U / 1400 U 76/16/5/2/1 % (Max. at 1417m)

The tables below are summaries of pay encountered as well as any associated hydrocarbon fluorescence observed whilst drilling West Mereenie 23:

TABLE XII: SUMMARY OF OIL PAY IN WEST MEREENIE 23

INTERVAL (loggers depth) (mMD)		NET SAND (mMD)	NET PAY (mMD)	AVE ØT (%)	AVE SWT (%)	AVE Kint (md)	NET PAY INTERVALS / REMARKS
Pacoota P2 (1365.0 - 1438.7)	Cat 1						OGOC intersected within the basal 14m section of the P2 section. No fluorescence observed.
	Cat 2						
	Cat 3	0.33	0.33	5.8	33.1	0.24	
Pacoota P3-10 (1438.7 - 1458.8)	Cat 1						Mud drilled from 1455m MD Minor oil fluores. across middle 6m.
	Cat 2						
	Cat 3	3.84	3.84	6.2	26.8	0.86	
Pacoota P3-70 (1458.8 - 1464.4)	Cat 1						No Fluorescence & low gas readings.
	Cat 2						
	Cat 3						
Pacoota P3-90 (1464.4 - 1472.7)	Cat 1						10-20% mod. Bright green-white spotted Fluorescence with gas reading.
	Cat 2						
	Cat 3	1.40	1.40	7.9	22.0	2.84	
Pacoota P3-120/130 (1472.7 - 1491.0)	Cat 1	4.50	4.50	9.5	23.0	5.29	DST 2*: Recovered filtrate cut mud plus thin oil film. Zone severely depleted via nearby oil production.
	Cat 2	9.96	9.96	8.5	27.0	3.19	
	Cat 3	11.48	11.48	8.2	27.7	2.81	
Pacoota P3-150 (1491.0 - 1502.5)	Cat 1						No Fluorescence & low gas readings Low perm.
	Cat 2						
	Cat 3	0.61	0.61	6.7	40.3	0.56	
Pacoota P3-190 (1502.5 - 1517.3)	Cat 1						No Fluorescence & low gas readings Sand maybe a transition zone. Low perm.
	Cat 2						
	Cat 3	0.91	0.91	6.5	64.2	0.37	
Pacoota P3-230 (1517.3 - 1533.8)	Cat 1						No Fluorescence & low Gas readings. Zone assumed to be wet. Low perm.
	Cat 2	3.23	0.00	8.2	77.9	1.84	
	Cat 3	4.83	0.00	8.0	79.0	1.50	
Pacoota P4 (1533.8 - 1572.0)	Cat 1						No Fluorescence & low gas readings.
	Cat 2	11.10	0.00	8.3	78.2	#	
	Cat 3	13.08	0.00	8.1	80.2	#	
TOTALS	Cat 1	4.50	4.50	9.5	23.0	5.29	
	Cat 2	24.29	9.96	8.5	27.0	3.19	
	Cat 3	30.91	18.57	7.6	29.1	2.17	

Permeability calculation anomalously high

TABLE XIII: SUMMARY OF GAS PAY IN WEST MEREENIE 23

INTERVAL (loggers depth) (mMD)		NET SAND (mMD)	NET PAY (mMD)	AVE ØT (%)	AVE SWT (%)	AVE Kint (md)	NET PAY INTERVALS / REMARKS
Upper Stairway (top) (896.7 - 930.6)	Cat 1						Gas readings commenced below 909m MD. No recorded gas flows / flares.
	Cat 2						
	Cat 3	4.22	4.22	6.0	68.4	0.31	
Basal Upper STW (930.6 - 960.9)	Cat 1						Increased gas peaks across this section. Up to 20% dull white pin-point fluorescence. No recorded gas flows / flares.
	Cat 2	16.36	16.36	6.9	60.6	0.84	
	Cat 3	18.01	18.01	6.7	62.5	0.77	
Lower Stairway 2 (1076.3 - 1137.6)	Cat 1						No gas flows on western flank. Minor gas recorded. Sw calculations are anomalously high based on height above the FWL.
	Cat 2	7.52	7.52	8.0	69.0	0.89	
	Cat 3	8.48	8.48	7.6	69.5	0.80	
Lower Stairway 1 (1137.6 - 1173.7)	Cat 1						No gas flows on western flank. Minor gas peaks Recorded on mudlog. No recorded gas flows / flares.
	Cat 2	12.42	12.42	5.3	52.8	0.34	
	Cat 3	14.91	14.91	5.3	54.5	0.29	
Pacoota P1-40 (1255.9 - 1273.3)	Cat 1						Gas flow recorded in crestal West Mereenie 18 well-bore. Gas peak recorded on mudlog GTS @ RTSTM (2-3m intermittent flare).
	Cat 2						
	Cat 3	2.18	2.18	8.1	34.5	0.37	
Pacoota P1-60 (1273.3 - 1281.6)	Cat 1	2.82	2.82	7.6	10.4	19.34	Gas peaks recorded Valid pressure point taken across zone. No depletion. No recorded gas flows / flares.
	Cat 2	2.92	2.92	7.5	17.2	18.68	
	Cat 3	3.86	3.86	7.7	17.4	14.23	
Pacoota P1-80 (1281.6 - 1290.1)	Cat 1	2.41	2.41	10.6	18.9	44.61	Gas peaks recorded Valid pressure point taken across zone. Zone depleted by ~ 600 psi. No recorded gas flows / flares.
	Cat 2	2.69	2.69	10.2	19.9	40.01	
	Cat 3	3.45	3.45	9.4	22.7	31.21	
Pacoota P1-110 (1290.1 - 1300.0)	Cat 1						Minor gas show.
	Cat 2						
	Cat 3	0.28	0.28	4.0	31.4	0.07	
Pacoota P1-200 (1312.8 - 1320.5)	Cat 1						Gas peaks recorded. No recorded gas flows / flares.
	Cat 2	0.97	0.97	7.1	39.7	0.34	
	Cat 3	1.17	1.17	7.0	40.3	0.29	
Pacoota P1-210 (1320.5 - 1326.2)	Cat 1						Gas peaks recorded. Trace dim green-yell pin-point fluorescence. No recorded gas flows / flares.
	Cat 2	1.17	1.17	9.6	40.3	1.69	
	Cat 3	1.40	1.40	9.4	40.1	1.46	

Pacoota P1-240 (1326.2 - 1341.3)	Cat 1						Gas peaks recorded. Trace dim green-yell pin-point fluorescence. No recorded gas flows / flares.
	Cat 2						
	Cat 3	0.51	0.51	7.3	33.0	0.35	
Pacoota P1-280 (1341.3 - 1347.5)	Cat 1	3.20	3.20	5.6	13.8	2.39	Zone severely depleted due to production.
	Cat 2	3.58	3.58	5.5	14.8	2.17	
	Cat 3	3.71	3.71	5.5	16.5	2.10	
Pacoota P1-310 (1347.5 - 1360.2)	Cat 1	1.85	1.85	5.5	16.0	1.76	Gas peaks recorded. GTS @ RTSTM (no flare).
	Cat 2	5.66	5.66	4.8	20.0	0.73	
	Cat 3	7.11	7.11	4.6	21.4	0.59	
Pacoota P1-350 (1360.2 - 1365.0)	Cat 1	2.11	2.11	6.1	14.1	3.14	Gas peaks recorded. Valid pressure point taken across zone. No depletion. GTS @ RTSTM (no flare).
	Cat 2	2.87	2.87	5.7	15.8	2.39	
	Cat 3	3.02	3.02	5.6	16.1	2.27	
Pacoota P2 (1365.0 - 1438.7)	Cat 1						OGOC intersected within the basal 14m section of the P2 Gas peaks recorded.
	Cat 2						
	Cat 3	30.40	30.40	6.1	56.6	0.49	
TOTALS	Cat 1	12.40	12.40	7.1	14.7	14.50	
	Cat 2	56.16	56.16	6.6	46.2	3.71	
	Cat 3	102.72	102.72	6.3	50.3	2.20	

4. SUMMARY

West Mereenie 23 is an Oil Appraisal Well. This well's location is approximately 1.0 km west of West Mereenie 5, on the western end of the south flank of the Mereenie structure in licence area OL 4. The field is approximately 290 km west of Alice Springs, the closest facility being the Mereenie Central Treatment Plant 12 km to the south-east, (OL 4, south-west Northern Territory).

The Mereenie Field was discovered in 1963 and commenced production in 1984, delivering hydrocarbon liquids to South Australia and gas to Northern Territory. Santos first acquired equity and then assumed Operatorship for the field in 1993, nine years after first production.

Prior to this campaign, a total of sixty-two wells had been drilled in the field since discovery. The majority of the historical wells have been drilled to intersect key target sands within the oil rim. Only eight of the sixty-two wells have been located on the structural crest, up-dip of the oil rims, specifically to produce from the gas cap.

The 2013-14 Mereenie drilling campaign was designed to target the oil and gas sands in the P1, P3 and P4, of the Pacoota Sandstone and gas in the Lower Stairway Sandstone. The West Mereenie 19-24 and East Mereenie 44-45 well program's primary targets are oil in the Pacoota P3 and P1, with oil secondary targets in the P4 and gas secondary targets in the P1 and Lower Stairway Sandstone. The field is defined by four-way dip closure for the Pacoota Sandstone and Stairway Sandstone, the anticline is an elongated northwest – southeast structure on the western side of the West MacDonnell Ranges within the Amadeus Basin. Prior to this campaign 18 wells had been drilled in West Mereenie.

The primary objective of this campaign is to appraise reservoir extent and fluid limits in the central and western areas of the Pacoota oil reservoirs and bring oil on production to develop the 2P undeveloped oil reserve. The second objective is to undertake data gathering and other key evaluation of a variety of tight sandstones and organic shales throughout the Ordovician Stairway, Horn Valley and Pacoota sequence. Volumes of contingent gas and tight oil resources have also been identified within the Stairway & Pacoota.

In the Mereenie Field oil is produced from the Pacoota P3 reservoir and gas from the Pacoota P1 reservoir, gas condensate liquid is then separated at surface. The oil and condensate is then mixed and transported by truck, gas is transported by the NT Gas Pipeline. Any surplus gas is reinjected into the Pacoota P3 reservoir to enhance oil recovery.

The deviated appraisal well, West Mereenie 23, is the second well in this drilling program, and is located on the western end of the south flank in an appraisal step-out location west of the successful West Mereenie 5 well. The primary targets were the P3-120/130 (as producing in West Mereenie 5) as well as prognosed additional pay in the lower P3 sands (P3-190/230/250) within the oil column, due to the 45° well design which was drilled at an updip azimuth. This design allows for a more reasonable standoff from both the gas oil contact (GOC) and oil water contact (OWC), allowing for depth prognosis and fluid contact uncertainty.

The greatest risks associated with the West Mereenie 23 well were sweep (due to offset production from West Mereenie 5) and mechanical (complete & frac). In the mean prognosed outcome, one follow-up producer well will be required to develop the area tested by West Mereenie 23, most likely a farther west-northwest step-out, with a 45° lateral to intersect the entire P3 system.

A total of 8.0 m of net oil pay was predicted for the Pacoota P3 Sandstone. The P3-120/130 and Pacoota P3-190/230/250 were the primary objectives (oil) of West Mereenie 23, the Pacoota P4 was the secondary objective (oil).

West Mereenie 23 was spudded at 00:45 hours on the 2nd of August, 2013 with the drilling rig Boart Longyear WW7. Surface holes for all wells in this campaign were batch drilled. The 12 3/8" surface hole in this well was drilled to 379 m with an air hammer bit, at which point 12 1/4" Dual Tube Flooded Reverse Circulation (DTFRC) drilling proceeded to 570 m. 9 5/8" surface casing was set at 566.9 m (D&L). Operations were suspended at 20:00 hours on the 8th of August, 2013 and the Boart Longyear WW7 rig was released. At 04:00 hours on the 18th of December, 2013 West Mereenie 23 was re-entered with the drilling rig Ensign 918. The 9 5/8" casing shoe was drilled out and 8 3/4" hole was then drilled to 573 m, and a Formation Integrity Test (FIT) performed to 15.1 ppg EMW. The 8 3/4" production hole was then air hammer drilled ahead to 1066 m at which point the bit was changed and a directional assembly picked up. The 8 1/2" directional production hole was air drilled from 1066 m to 1455 m at which point drilling continued with drilling mud to a total depth of 1572.0 m (Driller), 1473.3 m (Logger Extrapolated), 26.9 m TVD into the Pacoota P4. Total depth was reached at 16:30 hours on the 28th of December, 2013.

While drilling West Mereenie 23, Measurement While Drilling (MWD) surveys were taken at regular intervals to ensure that the well intersected the Pacoota P3-120/130 primary objective within the specified 35m lateral tolerance in structural dip direction and 70 m lateral tolerance orthogonal to planned well azimuth, at an inclination of 45°. Maximum recorded deviation was 47.2° from 1547.8 m to 1551.3 m. At total depth, it is estimated that the well was displaced 262.5 m at a direction of 9.2° from the surface location.

Regular gas flow tests were performed at formation boundaries and whenever the blooie line gas flare was observed to increase in size. A total of eight flow tests were performed while air drilling in West Mereenie 23. A maximum flow rate of 0.63 MMcfd was observed at 1439 m at the top of the Pacoota P3.

After pulling out of hole to surface, the following suite of Schlumberger wireline logs were performed, Run: 1) PEX-HNGS-HRLA-SP, Run 2) FMI-Sonic Scanner, Run 3) ECS-CMR-GR (Became stuck – successfully fished), Run 4) CMR-GR, Run 5) MDT-GR (59 points: 8 valid, 14 curtailed, 37 no seals), Run 6: GR-CCL (DST 1), Run 7: GR-CCL (DST 2).

Following wireline logging two inflate straddle DST's were performed. DST 1: 1493.0 m to 1521.8 m performed in the Pacoota P3-150/170/190 recovered 1 bbl of rat hole mud. DST 2: 1475.0 m to 1493.3 m performed in the Pacoota P3-120/130 recovered 1 bbl of water cut mud with oil film followed by 3 bbls of water cut mud with trace fluorescence. Based on wireline log analysis and hydrocarbon shows while drilling, West Mereenie 23 was cased and suspended.

The stratigraphic sequence intersected in West Mereenie 23 was as prognosed. Formation tops in West Mereenie 23 ranged from 1.2 m high (Lower Stairway 2) to 11.8 m low (Upper Stokes Siltstone) to prognosis. All formation tops were low to prognosis in West Mereenie 23, with the exception of the Carmichael Sandstone and Lower Stairway 1 and 2, which were high to prognosis. The primary objectives Pacoota P3-120/130 and Pacoota P3-190/230/250 were 10.8 m low and 11.0 m low to prognosis respectively. The Pacoota P3-120/130 and Pacoota P3-190/230/250 were 6.1m low and 2.4m low respectively to the correlation well West Mereenie 5. Formation thicknesses were within ± 12.5 m of prognosis in West Mereenie 23

Oil fluorescence shows were encountered as follows: 951 m to 959 m (Upper Stairway Sandstone) 20% decreasing to 10% oil fluorescence, 17 units (59/19/11/8/3 %), 1321 m to 1333 m (Pacoota P1) trace oil fluorescence, 3031 units (77/15/5/2/1 %), 1444 m to 1454 m (Pacoota P3) trace to 10% oil fluorescence, 3799 units (77/15/5/2/1 %), 1468 m to 1470 m (Pacoota P3) 10 to 20% oil fluorescence, 147 units (50/21/14/9/6 %), 1475 m to 1489 m (Pacoota P3-120) 30% decreasing to 10% oil fluorescence, 330 units (37/23/18/13/9 %).

Log analysis (combined with hydrocarbon shows recorded while drilling) indicates 12.4 m of Category 1 net gas pay (average porosity 7.1%, average Sw 14.7%) within the Pacoota Sandstone, and 4.5 m of Category 1 net oil pay (average porosity 9.5%, average Sw 23.0%) within the Pacoota P3-120 for West Mereenie 23. Also identified was 56.2 m of Category 2 net gas pay (average porosity 6.6%, average Sw 46.2%) within the Stairway and Pacoota Sandstones, and 10.0 m of Category 2 net oil pay (average porosity 8.5%, average Sw 27.0%) within the Pacoota P3-120 for West Mereenie 23.

West Mereenie 23 has been completed with 2 3/8" production tubing as an oil producer. One zone was perforated in late March 2014, Pacoota P3-120 (1467 m to 1491 m).

5. REFERENCES

- SANTOS, 2013 West Mereenie 19 - 24 / East Mereenie 44 - 45 Well Proposal, Santos Ltd. (unpublished)
- SANTOS, January 2014 West Mereenie 23 Preliminary Well Card, Santos Ltd (unpublished)
- SANTOS, May 2005 West Mereenie 18 Well Completion Report, Santos Ltd. (unpublished)
- SANTOS, May 2013 Mereenie Drilling Program 2013, Santos Ltd. (unpublished)

APPENDIX I: SAMPLE DESCRIPTIONS

APPENDIX I (a): CUTTINGS

APPENDIX I(a): CUTTINGS

Cuttings samples were collected, washed and described at 15 m intervals from Surface to 870 m and 3 m intervals from 870 m to 1573.3 m Total Depth (Logger Extrapolated). Not all samples were caught due to high ROP's. All samples were checked for oil shows using ultraviolet fluorescence.

MEREENIE SANDSTONE

LATE SILURIAN TO MID DEVONIAN

From 5.2 m to 452.5 m

Thickness: 447.2 m TVD

5.2m to 449.0m **NO GEOLOGIST ON SITE - DESCRIPTIONS NOT AVAILABLE.**

449.0m to 452.5m **INTERBEDDED SANDSTONE AND SILTSTONE**

SANDSTONE: Translucent, pale red brown, very pale brown, pale grey to pale pink, off white to pale grey, very fine to fine, well sorted, sub-rounded to sub-angular, strong siliceous cement, trace strong calcareous cement, common pale grey to off white and pale pink to pale grey argillaceous matrix, hard to occasionally moderately hard, very poor visual porosity.

SILTSTONE: red brown, brown, argillaceous, arenaceous in part, siliceous, grading to very fine SANDSTONE in part, trace lithics, trace micro-micaceous, hard to brittle, occasionally moderately hard, sub-fissile to sub-blocky.

CARMICHAEL SANDSTONE

LATE ORDOVICIAN

From 452.5 m to 550.0 m

Thickness: 97.5 m TVD

452.5m to 480.0m **MASSIVE SANDSTONE AND MINOR SILTSTONE INTERBEDS**

SANDSTONE: Translucent, pale red brown, pale pink orange, trace off white to grey, very fine to fine, well sorted, sub-rounded to sub-angular, strong siliceous cement, trace strong calcareous cement in part, common off white to pale grey and pale pink orange argillaceous matrix, trace lithics, hard to occasionally moderately hard, very poor visual porosity.

SILTSTONE: red brown, argillaceous, arenaceous in part, siliceous, trace lithics, trace micro-micaceous, hard to brittle, occasionally moderately hard, sub-blocky to blocky.

480.0m to 538.0m **MASSIVE SANDSTONE AND MINOR SILTSTONE INTERBEDS**

SANDSTONE: Translucent, pale red brown, pale pink orange, trace off white to grey, fine to very fine, well sorted, sub-rounded to sub-angular, strong siliceous cement, trace to minor strong calcareous cement in part, minor to common off white to pale grey and pale pink orange to red brown argillaceous matrix, trace lithics, hard to occasionally moderately hard, very poor to poor visual porosity.

SILTSTONE: red brown, arenaceous, argillaceous in part, siliceous, grading to very fine SANDSTONE in parts, trace lithics, moderately hard to hard, sub-blocky to occasionally sub-fissile.

538.0m to 550.0m **MASSIVE SANDSTONE AND MINOR SILTSTONE INTERBEDS**
SANDSTONE: Translucent, pale pink orange, trace off white to grey pink, mottled pale pink, off white and red brown, very fine to fine, occasional medium and coarse, moderately well sorted, sub-rounded to sub-angular, strong siliceous cement, common strong calcareous cement in part, common off white to pale grey and pale pink orange argillaceous matrix, grading to arenaceous SILTSTONE in part, trace lithics, hard to occasionally moderately hard, very poor visual porosity.
SILTSTONE: red brown, arenaceous, argillaceous in part, siliceous, grading to very fine SANDSTONE in parts, trace lithics, moderately hard to hard, sub-blocky to occasionally sub-fissile.

STOKES SILTSTONE
MID TO LATE ORDOVICIAN
From 550.0 m to 896.7 m
Thickness: 343.3 m TVD

550.0m to 555.0m **INTERBEDDED SILTSTONE AND SANDSTONE**
SILTSTONE (10-50%): (1) Red brown, mottled light grey in part, argillaceous, trace arenaceous, siliceous, occasional lithics, trace micro-micaceous, hard to brittle, occasionally moderately hard, sub-fissile to occasionally sub-blocky.
(2) Light grey, green grey, arenaceous, siliceous, hard, sub-blocky to occasionally sub-fissile.
SANDSTONE (50-90%): Red brown, brown, minor off white to grey, very fine, well sorted, sub-rounded to sub-angular, strong siliceous cement, trace strong calcareous cement, common red brown and off white and off white to pale grey argillaceous matrix, grading to arenaceous SILTSTONE in part, trace lithics, hard to moderately hard, very poor visual porosity.

555.0m to 570.0m **MASSIVE SILTSTONE WITH MINOR SANDSTONE INTERBEDS**
SILTSTONE: (1) Red brown, mottled light grey in part, argillaceous, trace arenaceous, siliceous, occasional lithics, occasionally micro-micaceous, hard to occasionally brittle, occasionally moderately hard, sub-fissile to occasionally sub-blocky.
(2) Light grey, green grey, arenaceous, siliceous, hard, sub-blocky to occasionally sub-fissile.
SANDSTONE: Translucent, pale grey to off white, pale grey, very fine to fine, well sorted, sub-rounded to sub-angular, strong siliceous cement, minor strong calcareous cement, minor pale grey to off white silty matrix, hard, grading to arenaceous SILTSTONE in part, hard minor moderately hard, very poor visual porosity.

570.0m to 573.0m **SILTSTONE WITH MINOR SANDSTONE.**
SILTSTONE: light to medium brown red, occasionally purple red, minor orange red, siliceous in part, minor lithics, moderately hard to occasionally firm, sub blocky to sub fissile.
SANDSTONE: clear to translucent, light orange yellow in part, very fine to occasionally fine, well sorted, sub angular to sub rounded, weak siliceous cement, no matrix, loose grains, poor inferred porosity, no fluorescence.

- 573.0m to 735.0m **SILTSTONE WITH TRACE SANDSTONE.**
 SILTSTONE: medium brown red, medium grey in part, minor localised medium purple, argillaceous, trace lithics, locally micro micaceous, hard, occasionally moderately hard to very hard, sub blocky to sub fissile.
 SANDSTONE: off white to light brown, occasionally light grey, very fine, minor fine to rare medium, grading to arenaceous Siltstone in part, well sorted, sub angular to sub rounded, strong siliceous cement, minor off white argillaceous matrix, rare lithics, hard to minor moderately hard, tight visual porosity, no fluorescence.
- 735.0m to 822.0m **SILTSTONE WITH MINOR SANDSTONE.**
 SILTSTONE: medium red brown, medium grey green in part, arenaceous in part, locally micro micaceous, occasionally siliceous, hard, sub fissile to occasionally sub blocky.
 SANDSTONE: light grey to occasionally off white, very fine to fine, rare medium, moderately sorted, sub angular, moderately to strong siliceous cement, minor light grey argillaceous matrix, hard, very poor to tight visual porosity, no fluorescence.
- 822.0m to 896.7m **SILTSTONE WITH MINOR SANDSTONE.**
 SILTSTONE: medium to dark grey, rare brown red, argillaceous, very fine arenaceous in part, micro micaceous, hard to very hard, sub blocky to sub fissile.
 SANDSTONE: off white to light grey, medium grey in part, very fine, grading to arenaceous Siltstone in part, very well sorted, sub angular to sub rounded, strong siliceous cement, common light grey argillaceous matrix, hard, tight visual porosity, no fluorescence.

STAIRWAY SANDSTONE

MID ORDOVICIAN

From 896.7 m to 1173.7 m

Thickness: 272.8 m TVD

- 896.7m to 906.0m **SILTSTONE WITH OCCASIONAL SANDSTONE INTERBEDS.**
 SILTSTONE: medium to dark grey, minor medium green, trace brown red, argillaceous, very fine arenaceous in part, hard to very hard, sub blocky to sub fissile.
 SANDSTONE: off white to light grey, medium grey green, very fine, grading to arenaceous Siltstone, very well sorted, sub angular to sub rounded, strong siliceous cement, locally common light grey argillaceous matrix, hard, tight visual porosity, trace dull green yellow mineral fluorescence.
- 906.0m to 964.0m **SANDSTONE WITH OCCASIONAL INTERBEDDED SILTSTONE.**
 SANDSTONE: off white to light grey, clear to translucent, very fine to fine, medium to coarse in part, moderately sorted, sub rounded to sub angular, strong siliceous cement, rare off white argillaceous matrix, rare lithics, hard, commonly loose, tight visual porosity, very poor inferred porosity. **Sandstone from 948m to 960m displays 20% decreasing to 10% dull white pinpoint fluorescence, very slow diffuse crush cut, thin ring residue.**
 SILTSTONE: medium to dark grey, medium brown grey in part, argillaceous to arenaceous, occasionally grading to very fine Sandstone, trace lithics, hard to very hard, sub blocky to sub fissile.

- 964.0m to 990.0m **SILTSTONE WITH MINOR SANDSTONE.**
 SILTSTONE: medium to dark grey, occasionally medium to dark brown grey, argillaceous to very fine arenaceous, trace micro micaceous, rare lithics, moderately hard, hard in part, sub fissile to sub blocky.
 SANDSTONE: off white, clear to translucent, very fine to fine, trace medium, moderately well sorted, sub angular to sub rounded, strong siliceous cement, trace off white argillaceous matrix, rare lithics, hard, commonly loose, tight visual porosity, very poor inferred porosity, no fluorescence.
- 990.0m to 1066.0m **INTERBEDDED SILTSTONE AND SANDSTONE.**
 SILTSTONE: dark to very dark grey, argillaceous, occasionally micro micaceous, minor carbonaceous specks, hard to occasionally very hard, sub blocky to occasionally sub fissile.
 SANDSTONE: medium to occasionally light grey, rare off white, very fine to fine, occasionally medium, moderately sorted, sub angular, strong siliceous cement, trace off white argillaceous matrix, occasional localised carbonaceous specks, hard to very hard, very poor to tight visual porosity, no fluorescence.
- 1066.0m to 1076.0m **SILTSTONE WITH INTERBEDDED SANDSTONE.**
 SILTSTONE: dark grey, occasionally medium grey, locally arenaceous, minor lithics, rare disseminated pyrite, hard to very hard, blocky to sub blocky.
 SANDSTONE: translucent grey to off white, light grey brown, fine to medium, moderately sorted, sub angular, strong siliceous cement, common off white to light grey argillaceous matrix, occasional carbonaceous specks, moderately hard to hard, tight visual porosity, no fluorescence.
- 1076.0m to 1090.0m **SILTSTONE WITH INTERBEDDED SANDSTONE.**
 SILTSTONE: dark grey to dark brown grey, argillaceous to locally arenaceous, minor micro micaceous, occasional disseminated pyrite, very hard to hard, sub fissile to sub blocky.
 SANDSTONE: clear to translucent, frosted to off white, very fine to medium, angular to occasionally sub rounded, very strong siliceous cement, trace off white argillaceous matrix, very hard to hard, commonly loose, very poor to tight visual porosity, poor inferred porosity, no fluorescence.
- 1090.0m to 1137.0m **SANDSTONE WITH INTERBEDDED SILTSTONE.**
 SANDSTONE: clear to translucent, off white to light grey, fine to coarse, poorly sorted, sub rounded to minor angular, strong siliceous cement, trace off white argillaceous matrix, rare carbonaceous material, minor quartz overgrowths, commonly loose, hard to very hard, very poor to poor visual and inferred porosity, no fluorescence.
 SILTSTONE: medium to dark grey, minor dark grey brown, arenaceous in part, occasional nodular pyrite, minor micro micaceous, trace lithics, hard to very hard, sub blocky.
- 1137.0m to 1151.0m **INTERBEDDED SILTSTONE AND SANDSTONE.**
 SILTSTONE: mottled dark grey brown, dark grey, minor medium grey, occasionally arenaceous, rare lithics, hard to very hard, sub fissile to sub blocky.
 SANDSTONE: light to medium grey, off white, fine to medium, coarse in part, moderately sorted, sub angular, occasionally sub rounded, strong siliceous cement, minor light grey argillaceous matrix, occasional carbonaceous specks, hard to very hard, rare loose, very poor to tight visual porosity, poor to very poor inferred porosity, no fluorescence.

1151.0m to 1173.7m **SANDSTONE WITH INTERBEDDED SILTSTONE.**
SANDSTONE: off white, clear to translucent, fine to medium, coarse in part, moderately sorted, sub angular to sub rounded, strong siliceous cement, minor off white argillaceous matrix, minor lithics, loose, hard, locally very hard, tight visual and very poor inferred porosity, dull orange mineral fluorescence.
SILTSTONE: dark to occasionally medium brown grey, dark grey, arenaceous in part, common micro micaceous, occasional to common nodular pyrite, hard to very hard, blocky to sub blocky, rare sub fissile.

HORN VALLEY SILTSTONE

EARLY ORDOVICIAN

From 1173.7 m to 1255.9 m

Thickness: 81.9 m TVD

1173.7m to 1191.0m **SILTSTONE WITH MINOR SANDSTONE INTERBEDS.**
SILTSTONE: dark grey brown, dark grey to dark brown, rare arenaceous, argillaceous in part, micro micaceous in part, locally common to abundant carbonaceous material, minor nodular pyrite, hard to very hard, blocky to sub blocky, rare sub fissile.
SANDSTONE: off white to frosted, light to medium grey, very fine to fine, well sorted, sub rounded to minor round, strong calcareous and siliceous cement, common off white to light grey argillaceous matrix, hard to very hard, tight visual porosity, no fluorescence.

1191.0m to 1227.0m **SILTSTONE WITH MINOR LIMESTONE AND SANDSTONE.**
SILTSTONE: medium to dark grey, medium to dark grey brown, argillaceous, rare disseminated pyrite, locally common carbonaceous, moderately hard to hard, sub blocky to blocky.
LIMESTONE: light brown to medium brown grey, occasionally medium grey, micritic, arenaceous, cryptocrystalline, hard to very hard.
SANDSTONE: off white, light to medium grey, very fine to fine, well sorted, sub rounded to minor round, strong siliceous cement, common off white to light grey argillaceous matrix, hard to very hard, tight visual porosity, no fluorescence.

1227.0m to 1255.9m **SILTSTONE WITH MINOR LIMESTONE AND SANDSTONE.**
SILTSTONE: dark grey brown, dark grey, argillaceous, locally carbonaceous, rare lithics, common pyrite nodules, hard to very hard, sub fissile to minor fissile.
LIMESTONE: dark grey to grey brown, off white, medium green brown in part, generally argillaceous, arenaceous in part, cryptocrystalline to crystalline, hard to moderately hard.
SANDSTONE: clear to translucent, off white, fine to medium, moderately sorted, angular to sub angular, moderate to strong siliceous cement, trace off white argillaceous matrix, loose, hard, very poor to tight visual porosity, poor inferred porosity, no fluorescence.

PACOOTA SANDSTONE

EARLY ORDOVICIAN

From 1255.9 m to 1573.3 m (T.D.)

Thickness: 254.8 m+ TVD

- 1255.9m to 1286.0m **SANDSTONE WITH INTERBEDDED SILTSTONE.**
SANDSTONE: translucent grey to off white, clear to translucent, fine to occasionally medium, moderately well sorted, sub angular, minor angular, strong siliceous cement, occasional off white to light grey argillaceous matrix, minor disseminated pyrite, hard to very hard, very poor to tight visual porosity, trace dull mineral fluorescence.
SILTSTONE: dark to occasionally medium grey, dark grey brown, arenaceous in part, common micro micaceous, minor disseminated pyrite, hard to very hard, sub blocky to occasionally blocky.
- 1286.0m to 1320.0m **INTERBEDDED SILTSTONE AND SANDSTONE.**
SILTSTONE: dark to occasionally medium grey, dark to medium brown grey, argillaceous, occasionally arenaceous, grading to very fine Sandstone, minor micro micaceous, trace to occasional disseminated and nodular pyrite, hard to very hard, sub blocky to sub fissile in part.
SANDSTONE: frosted, off white to light grey, light brown, very fine to medium, moderately sorted, sub rounded to sub angular, strong siliceous cement, off white argillaceous and occasional light brown silty matrix, trace lithics, trace disseminated pyrite, rare quartz overgrowths, hard, occasionally loose, very poor to tight visual porosity, poor inferred porosity, no fluorescence.
- 1320.0m to 1360.0m **INTERBEDDED SILTSTONE AND SANDSTONE.**
SANDSTONE: clear to translucent, light grey, very fine to occasionally medium, moderately sorted, sub rounded to dominantly sub angular, strong siliceous cement, trace to minor off white argillaceous matrix, trace disseminated and nodular pyrite, rare quartz overgrowths, hard to very hard, occasionally loose, very poor to tight visual and inferred porosity. **Sandstone from 1320m to 1332m displays trace dim green yellow pinpoint fluorescence, very slow diffuse crush cut, thin ring residue.**
SILTSTONE: dark to occasionally medium grey, dark grey brown, argillaceous in part, commonly micro micaceous, rare disseminated pyrite, hard to commonly very hard, sub fissile to dominantly sub blocky.
- 1360.0m to 1366.0m **SANDSTONE WITH MINOR SILSTONE INTERBEDS.**
SANDSTONE: clear to translucent, light grey, very fine to occasionally medium, moderately sorted, sub rounded to dominantly sub angular, strong siliceous cement, trace to minor off white argillaceous matrix, trace disseminated and nodular pyrite, rare quartz overgrowths, hard to very hard, occasionally loose, very poor to tight visual and inferred porosity, no fluorescence.
SILTSTONE: dark to occasionally medium grey, dark grey brown, argillaceous in part, commonly micro micaceous, rare disseminated pyrite, hard to commonly very hard, sub fissile to dominantly sub blocky.

- 1366.0m to 1395.0m **INTERBEDDED SILTSTONE AND SANDSTONE.**
SILTSTONE: medium to dark grey, occasionally light grey, rare green grey, arenaceous in part, commonly micro micaceous, minor to common disseminated pyrite, rare nodular pyrite, hard to very hard, blocky to minor sub fissile.
SANDSTONE: off white to light brown, clear to translucent, fine to medium, rare coarse, moderately sorted, angular to sub rounded, moderate to strong siliceous cement, rare off white argillaceous matrix, occasional disseminated and nodular pyrite, trace lithics, loose, hard, very poor visual and inferred porosity, no fluorescence.
- 1395.0m to 1410.0m **INTERBEDDED SANDSTONE AND SILTSTONE.**
SANDSTONE: clear to translucent, frosted, opaque grey, very fine to medium, poorly sorted, round to sub angular, weak to moderately siliceous cement, light grey argillaceous matrix, rare disseminated pyrite, generally loose, occasionally hard, poor inferred porosity, tight visual porosity, no fluorescence.
SILTSTONE: medium to dark grey, occasionally light grey, rare green grey, argillaceous, arenaceous grading to very fine Sandstone in part, commonly micro micaceous, minor to common disseminated pyrite, occasional pyrite nodules, hard to very hard, blocky to minor sub fissile.
- 1410.0m to 1428.0m **INTERBEDDED SILTSTONE AND SANDSTONE.**
SILTSTONE: light to medium grey, dark grey brown, generally arenaceous grading to very fine Sandstone, occasionally argillaceous, occasional glauconite specks and micro micaceous, rare pyrite nodules, moderately hard to hard, sub blocky to sub fissile.
SANDSTONE: clear to translucent, frosted, opaque, fine to medium, occasionally coarse, poor to moderately sorted, sub rounded to angular, strong siliceous cement, trace to nil off white argillaceous matrix, abundant glauconite grains, occasional nodular pyrite, generally loose, occasionally hard, poor inferred porosity, tight visual porosity, no fluorescence.
- 1428.0m to 1439.0m **INTERBEDDED SANDSTONE AND SILTSTONE.**
SANDSTONE: clear to translucent, opaque, very fine to medium, poorly sorted, angular to sub angular, weak to moderate siliceous cement, trace off white argillaceous matrix, common to locally abundant glauconite grains, generally loose, friable to moderately hard, poor inferred porosity, tight visual porosity, no fluorescence.
SILTSTONE: medium to dark grey brown, dark grey, commonly arenaceous grading to very fine Sandstone in part, occasional pyrite nodules, occasional localised glauconite specks, micro micaceous in part, very hard to occasionally hard, blocky to occasionally sub blocky.
- 1439.0m to 1455.0m **MASSIVE SANDSTONE WITH MINOR SILTSTONE.**
SANDSTONE: clear to translucent, fine to dominantly medium, well sorted, sub angular to sub rounded, moderately siliceous cement, trace to nil off white argillaceous matrix, rare lithics, generally loose clean grains, poor visual and inferred porosity. **Sandstone from 1446m to 1452m displays trace to 10% dim green pinpoint fluorescence, very slow diffuse crush cut, thin ring residue.**
SILTSTONE: dark to very dark grey, minor medium grey, argillaceous in part, locally micro micaceous, hard to very hard, blocky to sub blocky.

- 1455.0m to 1473.0m **SANDSTONE WITH MINOR SILTSTONE.**
SANDSTONE: clear to translucent, translucent red pink, frosted, very fine to medium, poorly sorted, sub angular to sub rounded, weak to moderate siliceous cement, trace red argillaceous matrix, generally loose clean grains, friable to moderately hard in part, poor inferred porosity, very poor to poor visual porosity. **Sandstone from 1468m to 1470m displays 10-20% moderately bright green white spotted fluorescence, slow diffuse cut, thin ring residue.**
SILTSTONE: medium to dark mottled brown red, rare argillaceous to occasionally arenaceous, trace lithics, moderately hard to hard, sub blocky to blocky.
- 1473.0m to 1489.0m **SANDSTONE WITH MINOR SILTSTONE.**
SANDSTONE: clear to translucent, translucent red pink, fine to medium, well sorted, sub angular to minor sub rounded, moderately siliceous cement, nil matrix, generally loose clean grains, friable to moderately hard, poor to fair inferred porosity. **Sandstone from 1475m to 1489m displays 30% decreasing to 10% moderately bright to bright green white patchy fluorescence, slow diffuse cut, thin ring residue.**
SILTSTONE: medium to dark mottled brown red, rare argillaceous to occasionally arenaceous, trace lithics, moderately hard to hard, sub blocky to blocky.
- 1489.0m to 1502.5m **SANDSTONE WITH TRACE SILTSTONE.**
SANDSTONE: very light pink red, clear to translucent, fine to occasionally very fine, very well sorted, sub angular to minor sub rounded, weak siliceous cement, trace off white argillaceous matrix, minor rock flour, common loose clean grains, occasionally friable to moderately hard, poor visual porosity, poor to occasionally fair inferred porosity, no fluorescence.
SILTSTONE: medium red brown, dark grey, arenaceous in part, trace lithics, trace micro micaceous, moderately hard to hard, sub fissile to dominantly sub blocky.
- 1502.5m to 1534.0m **SANDSTONE WITH MINOR SILTSTONE.**
SANDSTONE: light pink red, clear to translucent, off white in part, very fine to fine, well sorted, sub angular to minor sub rounded, weak siliceous cement, trace off white argillaceous matrix, commonly loose, friable to rare moderately hard, poor visual and inferred porosity, no fluorescence.
SILTSTONE: medium brown red, dark grey, arenaceous in part, locally common micro micaceous, moderately hard to generally hard, sub blocky to occasionally blocky.
- 1534.0m to 1545.0m **SANDSTONE WITH RARE SILTSTONE.**
SANDSTONE: clear to translucent, minor off white, rare light pink red, very fine to medium, dominantly fine to medium, moderately sorted, angular to sub angular, weak siliceous cement, minor off white argillaceous matrix, trace lithics, dominantly loose, occasionally friable to moderately hard, very poor visual porosity, poor inferred porosity, no fluorescence.
SILTSTONE: medium to dark red brown, arenaceous, commonly micro micaceous, moderately hard to hard, sub blocky to blocky.

1545.0m to 1573.3m

SANDSTONE WITH RARE SILTSTONE.

T.D.

SANDSTONE: clear to translucent, occasionally off white, minor light pink red, very fine to fine, occasionally medium, well sorted, sub angular to angular, minor sub rounded, weak siliceous cement, nil to trace off white argillaceous matrix, rare lithics, dominantly loose, trace friable, poor to tight visual porosity, poor inferred porosity, no fluorescence.

SILTSTONE: medium brown red, argillaceous, trace lithics, firm to moderately hard, sub blocky to blocky.

APPENDIX I (b): HYDROCARBON SHOW REPORTS

SANTOS LIMITED
OIL SHOW EVALUATION REPORT

WELL: West Mereenie 23
INTERVAL: 951m – 959m (L)
FORMATION: Upper Stairway Sandstone

GEOLOGIST: D. Adderley
DATE: 20/12/2013
GAS PK/RATIO: 17 U 59/19/11/8/3 %

C1 ppm	5k	10k	20k	30k	40k	50k	100k	150k	200k	>250k
C2+ ppm	500	750	1k	2k	3k	4k	5k	7.5k	10k	>15k
Porosity Ø	Tight			Poor		Fair		Good		Good++
% with Fluorescence	Trace	10	20	30	40	50	60	70	80	>90
Fluorescence Appearance	Trace		Spotted			Streaked		Patchy		Solid
Brightness of Fluorescence	Very Dull		Dull		Dim			Bright		Glowing
Type of Cut	Trace	Very Slow Crush	Crush	Instant Crush	Very Slow Streaming	Slow Streaming	Moderate Streaming	Streaming	Fast Streaming	Instant
Residue on Spot Plate	Trace	Heavy Trace	Very Thin Ring	Thin Ring	Thick Ring	Very Thick Ring	Thin Film	Thin Film+	Thick Film	Solid
Show Rating	Trace		Poor		Fair		Good			Good+++
Comments:	<p>SANDSTONE: off white to occasionally light grey, very fine to rare medium, dominantly fine, moderately sorted, sub rounded to occasionally sub angular, moderately strong siliceous cement, trace to nil off white argillaceous matrix, hard, common loose, very poor to tight visual porosity, poor inferred porosity. FLUORESCENCE: 20% decreasing to 10% dull white pinpoint fluorescence, very slow diffuse crush cut, thin ring residue.</p>									

SANTOS LIMITED
OIL SHOW EVALUATION REPORT

WELL: West Mereenie 23
INTERVAL: 1321m – 1333m (L)
FORMATION: Pacoota P1

GEOLOGIST: D. Adderley
DATE: 22/12/2013
GAS PK/RATIO: 3031U 77/15/5/2/1 %

C1 ppm	5k	10k	20k	30k	40k	50k	100k	150k	200k	>250k
C2+ ppm	500	750	1k	2k	3k	4k	5k	7.5k	10k	>15k
Porosity Ø	Tight			Poor		Fair		Good		Good++
% with Fluorescence	Trace	10	20	30	40	50	60	70	80	>90
Fluorescence Appearance	Trace		Spotted			Streaked		Patchy		Solid
Brightness of Fluorescence	Very Dull		Dull		Dim			Bright		Glowing
Type of Cut	Trace	Very Slow Crush	Crush	Instant Crush	Very Slow Streaming	Slow Streaming	Moderate Streaming	Streaming	Fast Streaming	Instant
Residue on Spot Plate	Trace	Heavy Trace	Very Thin Ring	Thin Ring	Thick Ring	Very Thick Ring	Thin Film	Thin Film+	Thick Film	Solid
Show Rating	Trace		Poor		Fair		Good			Good+++
Comments:	<p>SANDSTONE: very fine to occasionally medium, hard to very hard, occasionally loose, very poor to tight visual and inferred porosity. FLUORESCENCE: trace dim green yellow pinpoint fluorescence, very slow diffuse crush cut, thin ring residue.</p>									

SANTOS LIMITED
OIL SHOW EVALUATION REPORT

WELL: West Mereenie 23
INTERVAL: 1444m – 1454m (L)
FORMATION: Pacoota P3

GEOLOGIST: D. Adderley
DATE: 25/12/2013
GAS PK/RATIO: 3799 U 77/15/5/2/1 %

C1 ppm	5k	10k	20k	30k	40k	50k	100k	150k	200k	>250k
C2+ ppm	500	750	1k	2k	3k	4k	5k	7.5k	10k	>15k
Porosity Ø	Tight			Poor		Fair		Good		Good++
% with Fluorescence	Trace	10	20	30	40	50	60	70	80	>90
Fluorescence Appearance	Trace		Spotted			Streaked		Patchy		Solid
Brightness of Fluorescence	Very Dull		Dull		Dim			Bright		Glowing
Type of Cut	Trace	Very Slow Crush	Crush	Instant Crush	Very Slow Streaming	Slow Streaming	Moderate Streaming	Streaming	Fast Streaming	Instant
Residue on Spot Plate	Trace	Heavy Trace	Very Thin Ring	Thin Ring	Thick Ring	Very Thick Ring	Thin Film	Thin Film+	Thick Film	Solid
Show Rating	Trace		Poor		Fair		Good			Good+++
Comments:	SANDSTONE: fine to dominantly medium, generally loose clean grains, poor visual and inferred porosity. FLUORESCENCE: trace to 10% dim green pinpoint fluorescence, very slow diffuse crush cut, thin ring residue.									

SANTOS LIMITED
OIL SHOW EVALUATION REPORT

WELL: West Mereenie 23
 INTERVAL: 1468m – 1470m (L)
 FORMATION: Pacoota P3

GEOLOGIST: D. Adderley
 DATE: 26/12/2013
 GAS PK/RATIO: 147 U 50/21/14/9/6 %

C1 ppm	5k	10k	20k	30k	40k	50k	100k	150k	200k	>250k
C2+ ppm	500	750	1k	2k	3k	4k	5k	7.5k	10k	>15k
Porosity Ø	Tight			Poor		Fair		Good		Good++
% with Fluorescence	Trace	10	20	30	40	50	60	70	80	>90
Fluorescence Appearance	Trace		Spotted			Streaked		Patchy		Solid
Brightness of Fluorescence	Very Dull		Dull		Dim			Bright		Glowing
Type of Cut	Trace	Very Slow Crush	Crush	Instant Crush	Very Slow Streaming	Slow Streaming	Moderate Streaming	Streaming	Fast Streaming	Instant
Residue on Spot Plate	Trace	Heavy Trace	Very Thin Ring	Thin Ring	Thick Ring	Very Thick Ring	Thin Film	Thin Film+	Thick Film	Solid
Show Rating	Trace		Poor		Fair		Good			Good+++
Comments:	SANDSTONE: very fine to medium, generally loose clean grains, friable to moderately hard in part, poor inferred porosity, very poor to poor visual porosity. FLUORESCENCE: 10-20% moderately bright green white spotted fluorescence, slow diffuse cut, thin ring residue.									

SANTOS LIMITED
OIL SHOW EVALUATION REPORT

WELL: West Mereenie 23
 INTERVAL: 1475m – 1489m (L)
 FORMATION: Pacoota P3-120

GEOLOGIST: D. Adderley
 DATE: 27/12/2013
 GAS PK/RATIO: 330 U 37/23/18/13/9 %

C1 ppm	5k	10k	20k	30k	40k	50k	100k	150k	200k	>250k
C2+ ppm	500	750	1k	2k	3k	4k	5k	7.5k	10k	>15k
Porosity Ø	Tight			Poor		Fair		Good		Good++
% with Fluorescence	Trace	10	20	30	40	50	60	70	80	>90
Fluorescence Appearance	Trace		Spotted			Streaked		Patchy		Solid
Brightness of Fluorescence	Very Dull		Dull		Dim			Bright		Glowing
Type of Cut	Trace	Very Slow Crush	Crush	Instant Crush	Very Slow Streaming	Slow Streaming	Moderate Streaming	Streaming	Fast Streaming	Instant
Residue on Spot Plate	Trace	Heavy Trace	Very Thin Ring	Thin Ring	Thick Ring	Very Thick Ring	Thin Film	Thin Film+	Thick Film	Solid
Show Rating	Trace		Poor		Fair		Good			Good+++
Comments:	SANDSTONE: fine to medium, generally loose clean grains, friable to moderately hard, poor to fair inferred porosity. FLUORESCENCE: 30% decreasing to 10% moderately bright to bright green white patchy fluorescence, slow diffuse cut, thin ring residue.									

APPENDIX I(c): SIDEWALL CORES

No Sidewall Coring was performed in West Mereenie 23.

APPENDIX II: PALYNOLOGY REPORT

No Palynology Data is available for West Mereenie 23.

APPENDIX III: CORE DATA

No Cores were cut in West Mereenie 23.

APPENDIX IV: LOG INTERPRETATION

APPENDIX IV (a): LOG ANALYSIS

West Merreenie 23

Log Analysis

Carmine Grasso

May 2014

EA – Development Victoria / Merreenie

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WEST MEREENIE 23

LOG ANALYSIS

1. SUMMARY

West Mereenie 23 was drilled as a 45° deviated Pacoota P3 Sandstone oil appraisal well in the Mereenie Field. Top hole section was drilled to 570m MD in August 2013 by the Boart Longyear WW07 rig, re-entered in December 2013 by the Ensign 918 rig and reached a TD of 1572m MD in December 2013. West Mereenie 23 is located on the southern flank of the western sub-culmination of the Mereenie Field. It was an appraisal step-out location west of the successful West Mereenie 5 well. The primary targets are the P3-120/130 (as was produced in WM5) plus it was prognosed to intersect additional pay in the lower P3 sands (P3-190/230/250) within the oil column, due to the 45° well design. Secondary objectives were to appraise the conventional gas reservoirs of the Upper and Lower Stairway Sandstone and the Pacoota P1 section.

In addition to the standard wire-line logs, viz., PEX-HRLA-HNGS-SP; more sophisticated logging runs, viz., FMI-SonicScanner and GR-CMR⁺ were conducted in order to evaluate the unconventional potential of the Middle Stairway Sandstone, Horn Valley Siltstone and the Pacoota P2 Sandstone.

Throughout the air-mist drilled section, only one gas flow was recorded above the gas measurement limit of 0.56 MMscf/d. Post logging, two open-hole drill stem test were conducted across the upper and lower Pacoota P3 section with both recording no fluids to surface. DST 1 across the P3-150/190/230 zones; recovered 1bbl (37m) of 8.8 ppg rat hole mud (no fluorescence in sample). Sample chamber contained 5L of 8.8 ppg mud (no fluorescence in sample). DST 2 across the P3-120/130 zones; recovered 1bbl (36m) of 8.5 ppg water cut mud with oil film followed by 3bbls (133m) of 8.5 ppg water cut mud with trace fluorescence. Sample chamber contained 6L of 9.0 ppg mud (no fluorescence in sample).

This is the final evaluation of West Mereenie 23 for inclusion in the Well Completion Report. Two evaluation processes were used to interpret this well, first the deterministic method as documented in "Petrophysical Review of the Mereenie Field", (1996), by S. Clinch and secondly, a Mutimin petrophysical interpretation package (key log evaluations displayed on Well Evaluation Summary [WES] plot). The former process has been documented in this report.

A total of 4.5 mMD of proved (Category 1) oil pay was intersected in this well, along with 12.4 mMD of proved (Category 1) gas pay. A total of 10.0 mMD of proved & probable (Category 2) oil pay was intersected, along with a total of 36.2 mMD of proved & probable (Category 2) gas pay was intersected in sands that have been proven either to flow or have intersected significant gas peaks on the northern flank.

Table 1(a) & (b) summarises the sands and pay found in this well, as shown on the accompanying WES plot. The top and base of each sand cycle are listed together with average petrophysical properties for the sand as defined by three sets of cutoffs. The cutoffs detailing the three categories are presented in Table 8. Category 3; low permeability cutoffs are more reflective of Proved, Probable & Possible (3P) hydrocarbon in place (HIP), whereas Category 2; conventional cutoffs are more reflective of Proved & Probable (2P) HIP. Category 1; are based on more stringent criteria and reflect proved producibility (1P) HIP. Where appropriate, remarks (e.g. DST results) further qualify the interpretation. Category 1, 2 and 3 pay is totalled by formation in Table 1a & 1b below. Table 1c & 1d compares thicknesses in measured depth (MD), true stratigraphic thickness (TST) & true vertical depth (TVD).

TABLE 1(a): Oil Pay
(DENSITY POROSITY/ARCHIE SW)

INTERVAL (loggers depth) (mMD)		NET SAND (mMD)	NET PAY (mMD)	AVE ϕ_T (%)	AVE SW _T (%)	AVE Kint (md)	NET PAY INTERVALS / REMARKS
Pacoota P2 (1365.0-1438.7)	Cat 1						OGOC intersected within the basal 14m section of the P2 section. No fluorescence observed.
	Cat 2						
	Cat 3	0.33	0.33	5.8	33.1	0.24	
Pacoota P3-10 (1438.7-1458.8)	Cat 1						Mud drilled from 1455m MD. Minor oil fluores. across middle 6m.
	Cat 2						
	Cat 3	3.84	3.84	6.2	26.8	0.86	
Pacoota P3-70 (1458.8-1464.4)	Cat 1						No Fluorescence & low gas readings.
	Cat 2						
	Cat 3						
Pacoota P3-90 (1464.4-1472.7)	Cat 1						10-20% mod. Bright green-white spotted. Fluorescence with gas reading.
	Cat 2						
	Cat 3	1.40	1.40	7.9	22.0	2.84	
Pacoota P3-120/130 (1472.7-1491.0)	Cat 1	4.50	4.50	9.5	23.0	5.29	DST 2*: Recovered filtrate cut mud plus thin oil film. Zone severely depleted via nearby oil production.
	Cat 2	9.96	9.96	8.5	27.0	3.19	
	Cat 3	11.48	11.48	8.2	27.7	2.81	
Pacoota P3-150 (1491.0-1502.5)	Cat 1						No Fluorescence & low gas readings. Low perm.
	Cat 2						
	Cat 3	0.61	0.61	6.7	40.3	0.56	
Pacoota P3-190 (1502.5-1517.3)	Cat 1						No Fluorescence & low gas readings. Sand maybe a transition zone. Low perm.
	Cat 2						
	Cat 3	0.91	0.91	6.5	64.2	0.37	
Pacoota P3 – 230 (1517.3-1533.8)	Cat 1						No Fluorescence & low gas readings. Zone assumed to be wet. Low perm.
	Cat 2	3.23	0.00	8.2	77.9	1.84	
	Cat 3	4.83	0.00	8.0	79.0	1.50	
Pacoota P4 (1533.8-1572.0)	Cat 1						No Fluorescence & low gas readings.
	Cat 2	11.10	0.00	8.3	78.2	#	
	Cat 3	13.08	0.00	8.1	80.2	#	
TOTALS	Cat 1	4.50	4.50	9.5	23.0	5.29	
	Cat 2	24.29	9.96	8.5	27.0	3.19	
	Cat 3	30.91	18.57	7.6	29.1	2.17	

* As of May 13th 2014, 6 weeks post frac of the P3-120/130 and connection, West Mereenie 23 is producing @ 55 BOPD with a 20% water cut. Oil rate has been slowly increasing.
Permeability calculation anomalous/y high

TABLE 1(b): Gas Pay
(DENSITY POROSITY/ARCHIE SW)

INTERVAL (loggers depth) (mMD)		NET SAND (mMD)	NET PAY (mMD)	AVE ϕ_T (%)	AVE SW _T (%)	AVE Kint (md)	NET PAY INTERVALS / REMARKS
Upper Stairway (top) (896.7-930.6)	Cat 1						Gas readings commenced below 909m MD. No recorded gas flows/flares.
	Cat 2						
	Cat 3	4.22	4.22	6.0	68.4	0.31	
Basal Upper STW (930.6-960.9)	Cat 1						Increased gas peaks across this section. Up to 20% dull white pin-point fluorescence. No recorded gas flows/flares.
	Cat 2	16.36	16.36	6.9	60.6	0.84	
	Cat 3	18.01	18.01	6.7	62.5	0.77	
Lower Stairway 2 (1076.3-1137.6)	Cat 1						No gas flows on western flank. Minor gas recorded Sw calculations are anomalously high based on height above the FWL.
	Cat 2	7.52	7.52	8.0	69.0	0.89	
	Cat 3	8.48	8.48	7.6	69.5	0.80	
Lower Stairway 1 (1137.6-1173.7)	Cat 1						No gas flows on western flank. Minor gas peaks recorded on Mudlog. No recorded gas flows/flares.
	Cat 2	12.42	12.42	5.3	52.8	0.34	
	Cat 3	14.91	14.91	5.3	54.5	0.29	
Pacoota P1-40 (1255.9-1273.3)	Cat 1						Gas flow recorded in crestal West Mereneie 18 well-bore. Gas peak recorded on Mudlog. GTS @ RTSTM (2-3m intermittent flare).
	Cat 2						
	Cat 3	2.18	2.18	8.1	34.5	0.37	
Pacoota P1-60 (1273.3-1281.6)	Cat 1	2.82	2.82	7.6	10.4	19.34	Gas peaks recorded. Valid pressure point taken across zone. No depletion. No recorded gas flows/flares.
	Cat 2	2.92	2.92	7.5	17.2	18.68	
	Cat 3	3.86	3.86	7.7	17.4	14.23	
Pacoota P1-80 (1281.6-1290.1)	Cat 1	2.41	2.41	10.6	18.9	44.61	Gas peaks recorded. Valid pressure point taken across zone. Zone depleted by ~ 600 psi. No recorded gas flows/flares.
	Cat 2	2.69	2.69	10.2	19.9	40.01	
	Cat 3	3.45	3.45	9.4	22.7	31.21	
Pacoota P1-110 (1290.1-1300.0)	Cat 1						Minor gas show.
	Cat 2						
	Cat 3	0.28	0.28	4.0	31.4	0.07	
Pacoota P1-200 (1312.8-1320.5)	Cat 1						Gas peaks recorded. No recorded gas flows/flares.
	Cat 2	0.97	0.97	7.1	39.7	0.34	
	Cat 3	1.17	1.17	7.0	40.3	0.29	
Pacoota P1-210 (1320.5-1326.2)	Cat 1						Gas peaks recorded. Trace dim green-yell pin-point fluorescence. No recorded gas flows/flares.
	Cat 2	1.17	1.17	9.6	40.3	1.69	
	Cat 3	1.40	1.40	9.4	40.1	1.46	
Pacoota P1-240 (1326.2-1341.3)	Cat 1						Gas peaks recorded. Trace dim green-yell pin-point fluorescence. No recorded gas flows/flares.
	Cat 2						
	Cat 3	0.51	0.51	7.3	33.0	0.35	
Pacoota P1-280 (1341.3-1347.5)	Cat 1	3.20	3.20	5.6	13.8	2.39	Zone severely depleted due to production.
	Cat 2	3.58	3.58	5.5	14.8	2.17	
	Cat 3	3.71	3.71	5.5	16.5	2.10	
Pacoota P1-310 (1347.5-1360.2)	Cat 1	1.85	1.85	5.5	16.0	1.76	Gas peaks recorded. GTS @ RTSTM (no flare).
	Cat 2	5.66	5.66	4.8	20.0	0.73	
	Cat 3	7.11	7.11	4.6	21.4	0.59	
Pacoota P1-350 (1360.2-1365.0)	Cat 1	2.11	2.11	6.1	14.1	3.14	Gas peaks recorded. Valid pressure point taken across zone. No depletion. GTS @ RTSTM (no flare).
	Cat 2	2.87	2.87	5.7	15.8	2.39	
	Cat 3	3.02	3.02	5.6	16.1	2.27	
Pacoota P2 (1365.0-1438.7)	Cat 1						OGOC intersected within the basal 14m section of the P2. Gas peaks recorded.
	Cat 2						
	Cat 3	30.40	30.40	6.1	56.6	0.49	
TOTALS	Cat 1	12.40	12.40	7.1	14.7	14.50	
	Cat 2	56.16	56.16	6.6	46.2	3.71	
	Cat 3	102.72	102.72	6.3	50.3	2.20	

TABLE 1(c): Oil Pay
(DENSITY POROSITY/ARCHIE SW)

INTERVAL (loggers depth) (mMD)		NET SAND (mMD)	NET PAY (mMD)	NET SAND (mTST)#	NET PAY (mTST)#	NET SAND (mTVD)	NET PAY (mTVD)
Pacoota P2 (1365.0-1438.7)	Cat 1						
	Cat 2						
	Cat 3	0.33	0.33	0.29	0.29	0.24	0.24
Pacoota P3-10 (1438.7-1458.8)	Cat 1						
	Cat 2						
	Cat 3	3.84	3.84	3.35	3.35	2.79	2.79
Pacoota P3-70 (1458.8-1464.4)	Cat 1						
	Cat 2						
	Cat 3						
Pacoota P3-90 (1464.4-1472.7)	Cat 1						
	Cat 2						
	Cat 3	1.40	1.40	1.22	1.22	1.01	1.01
Pacoota P3-120/130 (1472.7-1491.0)	Cat 1	4.50	4.50	3.88	3.88	3.23	3.23
	Cat 2	9.96	9.96	8.60	8.60	7.12	7.12
	Cat 3	11.48	11.48	9.91	9.91	8.21	8.21
Pacoota P3-150 (1491.0-1502.5)	Cat 1						
	Cat 2						
	Cat 3	0.61	0.61	0.52	0.52	0.43	0.43
Pacoota P3-190 (1502.5-1517.3)	Cat 1						
	Cat 2						
	Cat 3	0.91	0.91	0.77	0.77	0.64	0.64
Pacoota P3 – 230 (1517.3-1533.8)	Cat 1						
	Cat 2	3.23	0.00	2.72	0.00	2.22	0.00
	Cat 3	4.83	0.00	4.06	0.00	3.32	0.00
Pacoota P4 (1533.8-1572.0)	Cat 1						
	Cat 2	11.10	0.00	9.34	0.00	7.54	0.00
	Cat 3	13.08	0.00	11.00	0.00	8.89	0.00
TOTALS	Cat 1	4.50	4.50	3.88	3.88	3.23	3.23
	Cat 2	24.29	9.96	20.66	8.60	16.88	7.12
	Cat 3	36.48	18.57	31.12	16.06	25.53	13.32

Structural dip of 14 degrees assumed for all horizons based on Schlumberger's Qlook FMI interpretation (verbal).

**TABLE 1(d): Gas Pay
(DENSITY POROSITY/ARCHIE SW)**

INTERVAL (loggers depth) (mMD)		NET SAND (mMD)	NET PAY (mMD)	NET SAND (mTST)#	NET PAY (mTST)#	NET SAND (mTVD)	NET PAY (mTVD)
Upper Stairway (top) (896.7-930.6)	Cat 1						
	Cat 2						
	Cat 3	4.22	4.22	4.22	4.22	4.13	4.13
Basal Upper STW (930.6-960.9)	Cat 1						
	Cat 2	16.36	16.36	16.36	16.36	16.02	16.02
	Cat 3	18.01	18.01	18.01	18.01	17.64	17.64
Lower Stairway 2 (1076.3-1137.6)	Cat 1						
	Cat 2	7.52	7.52	7.38	7.38	7.51	7.51
	Cat 3	8.48	8.48	8.33	8.33	8.48	8.48
Lower Stairway 1 (1137.6-1173.7)	Cat 1						
	Cat 2	12.42	12.42	12.19	12.19	12.37	12.37
	Cat 3	14.91	14.91	14.64	14.64	14.85	14.85
Pacoota P1-40 (1255.9-1273.3)	Cat 1						
	Cat 2						
	Cat 3	2.18	2.18	2.18	2.18	2.14	2.14
Pacoota P1-60 (1273.3-1281.6)	Cat 1	2.82	2.82	2.82	2.82	2.72	2.72
	Cat 2	2.92	2.92	2.92	2.92	2.82	2.82
	Cat 3	3.86	3.86	3.86	3.86	3.73	3.73
Pacoota P1-80 (1281.6-1290.1)	Cat 1	2.41	2.41	2.41	2.41	2.32	2.32
	Cat 2	2.69	2.69	2.69	2.69	2.59	2.59
	Cat 3	3.45	3.45	3.45	3.45	3.32	3.32
Pacoota P1-110 (1290.1-1300.0)	Cat 1						
	Cat 2						
	Cat 3	0.28	0.28	0.28	0.28	0.27	0.27
Pacoota P1-200 (1312.8-1320.5)	Cat 1						
	Cat 2	0.97	0.97	0.96	0.96	0.90	0.90
	Cat 3	1.17	1.17	1.16	1.16	1.09	1.09
Pacoota P1-210 (1320.5-1326.2)	Cat 1						
	Cat 2	1.17	1.17	1.16	1.16	1.09	1.09
	Cat 3	1.40	1.40	1.39	1.39	1.30	1.30
Pacoota P1-240 (1326.2-1341.3)	Cat 1						
	Cat 2						
	Cat 3	0.51	0.51	0.50	0.50	0.47	0.47
Pacoota P1-280 (1341.3-1347.5)	Cat 1	3.20	3.20	3.14	3.14	2.91	2.91
	Cat 2	3.58	3.58	3.51	3.51	3.26	3.26
	Cat 3	3.71	3.71	3.64	3.64	3.37	3.37
Pacoota P1-310 (1347.5-1360.2)	Cat 1	1.85	1.85	1.81	1.81	1.67	1.67
	Cat 2	5.66	5.66	5.52	5.52	5.10	5.10
	Cat 3	7.11	7.11	6.94	6.94	6.40	6.40
Pacoota P1-350 (1360.2-1365.0)	Cat 1	2.11	2.11	2.05	2.05	1.86	1.86
	Cat 2	2.87	2.87	2.78	2.78	2.54	2.54
	Cat 3	3.02	3.02	2.93	2.93	2.67	2.67
Pacoota P2 (1365.0-1438.7)	Cat 1						
	Cat 2						
	Cat 3	30.40	30.40	27.72	27.72	25.17	25.17
TOTALS	Cat 1	12.40	12.40	12.23	12.23	11.48	11.48
	Cat 2	56.16	56.16	55.47	55.47	54.19	54.19
	Cat 3	102.72	102.72	99.25	99.25	95.02	95.02

Structural dip of 14 degrees assumed for all horizons based on Schlumberger's Qlook FMI interpretation (verbal).

2. **GENERAL DATA**

(a) **Introduction**

Open hole logs were acquired in one suite at a total depth of 1572m MD. Details of the logging run appear below:

TABLE 2(a) - Logs Run

RUN	MNEMONICS	INTERVAL (mMD)	REMARKS
1	PEX		
	GR	20 - 1550	
	HNGR	566 - 1551	
	SP	567 - 1546	
	CALI	567 - 1553	
	RXOZ	567 - 1566	
	RLA1/2/3/4/5	567 - 1566	
	TNPH	567 - 1563	
	RHOZ	567 - 1565	N.B: Dual axis, X-Y Density log run
	PEFZ	567 - 1565	
	HDRA	567 - 1565	
2	GR-FMI-SSCAN		
	FMI	870 - 1573	
	DTCO	870 - 1573	
	DTSM	870 - 1573	
	DTST	870 - 1573	
3	GR-ECS-CMR+	-	Became stuck – successfully fished out
4	GR-CMR+	870 - 1573	ECS failed – not run
5	GR-MDT	941 - 1471.2	59 tests attempted: 8 valid, 14 curtailed, 37 seal failures

(b) **Cores and Sidewall Cores**

No full hole cores or sidewall cores were taken from West Mereenie 23.

(c) Open Hole/Drill Stem Tests & MDT's

Eight Open-hole flow tests and two open-hole drill stems test were successfully conducted in West Mereenie 23 (Table 2c), with the results tabulated below:

59 pressure tests were attempted with 8 valid, 14 curtailed and 37 seal failures.

TABLE 2(b) – OFT Results

OFT	DEPTH* from (mMD)	DEPTH* to (mMD)	HOLE SIZE	REMARKS#
1	567	1066	8 1/2 in	Gas @ 0.0 MMCFD (no gas flare)
2	567	1080	8 1/2 in	Gas @ 0.0 MMCFD (no gas flare)
3	567	1138	8 1/2 in	Gas @ 0.0 MMCFD (no gas flare)
4	567	1170	8 1/2 in	Gas @ 0.0 MMCFD (no gas flare)
5	567	1251	8 1/2 in	Gas @ 0.0 MMCFD (no gas flare)
6	567	1260	8 1/2 in	Gas @ RTSTM (Intermittent 2-3m lazy orange flare)
7	567	1360	8 1/2 in	Gas @ RTSTM (no gas flare)
8	567	1439	8 1/2 in	Gas @ 0.63 MMCFD (no gas flare)

* Depth in Drillers

Minimum flow rate measurable is 0.56 MMcf/d

TABLE 2(c) - DST Results

DST	INTERVAL (mMD)	FORMATION	REMARKS
1	1493.6 - 1522.4 (D) 1493.0 - 1521.8 (L)	P3-150/190/230	DST 1: NFTS. Reverse Circulate: 1bbl (37m) of 8.8 ppg rat hole mud (no fluorescence in sample). Sample chamber contained 5L of 8.8 ppg mud (no fluorescence in sample).
2	1475.6 - 1493.9 (D) 1475.0 - 1493.3 (L)	P3-120/130	DST 2: NFTS. Reverse Circulate: 1bbl (36m) of 8.5 ppg water cut mud with oil film followed by 3bbbls (133m) of 8.5 ppg water cut mud with trace fluorescence. Sample chamber contained 6L of 9.0 ppg mud (no fluorescence in sample).

(L) = Loggers Depth

(D) = Drillers Depth

3. HOLE CONDITIONS

(a) Drilling Overview

9-5/8" surface casing in West Mereenie 23 was set at 567m. West Mereenie 23 was then drilled with an 8-3/4" bit to 1016m and then an 8-1/2" bit to a total depth of 1572m. Intervals of air and mud drilling are summarized below.

TABLE 3 – Drilling Fluid Type

INTERVAL(m)	FLUID TYPE	COMMENTS
567 - 1455	Air-Mist Drilled	Displaced the well to 8.7ppg mud. @ 1455m MD
1455 - 1572	Mud Drilled	

(b) Hole Conditions

Hole conditions in this well-bore are generally good over the majority of the hole.

(c) Bore Hole Fluids

At the time of logging the mud properties of West Mereenie 23 were as follows:

TABLE 4 – Mud Properties

PARAMETERS	SUITE 1
KCl	0 %
NaCl	6%
MW	8.8 ppg
Rm	0.11 Ω m @ 30.4° C
Rmf	0.087 Ω m @ 30.4° C
Rmc	0.14 Ω m @ 30.4° C
Barite	0 %

(d) Temperature

Table 5 summarises maximum temperatures recorded during wireline logging operations.

TABLE 5 - Wireline Logging, Maximum Recorded Temperatures Suite 1

BHT (°C)	DEPTH (m)	TOOL	HOURS SINCE CIRC. STOPPED
62.6 @ 1566m	1507	PEX-HNGS-HRLA, Nuclear Curves	12 hours 45 minutes
60.7 @ 1546m	1573	FMI-SSCAN	25 hours 30 minutes
61.7 @ 1560m	1573	#ECS-CMR+	75 hours 45 minutes
61.7 @ 1471m	1475	MDT-GR	101 hours 15 minutes

ECS failed

4. ENVIRONMENTAL CORRECTIONS

Environmental corrections were applied by Santos using Paradigm's Geolog7 log interpretation package or were applied in the field by Schlumberger.

Resistivity Curves (HRLA and MCFL)

The High Resolution Laterolog Array output curves were environmentally corrected for hole size and invasion.

Gamma Ray (HNGS)

The Gamma Ray was corrected for borehole size and mud weight.

Density Log (RHO8)

The density log (RHO8) was corrected for borehole size and mud weight.

Neutron Log (HTNP)

The neutron log (HTNP) was corrected for borehole size, standoff, mud type, mud cake thickness, mud weight, temperature and pressure and borehole salinity.

5. INTERPRETATION PROCEDURES

The interpretation in Table 1(a) and 1(b) of the log analysis summary used Density porosity and Archie Sw. Vsh is calculated from Density-Neutron and Thorium-Potassium[#]. More information on the evaluation procedure can be found in the Petrophysical Review of the Mereenie Field (1996), except for #.

TABLE 6 Density Porosity Evaluation

Formation	Grain Density (g/cc)	Fluid Density Gas/Oil # (g/cc)	Fluid Density Water (g/cc)
Stairway (Upper)	2.664	0.85	1.0
Stairway (Basal Upper)	2.664	0.40	1.0
Stairway (Middle)	2.664	0.60	1.0
Stairway (Lower)	2.664	0.85	1.0
Horn Valley Shale	2.68	0.85	1.0
Pacoota P1-40/60	2.66	0.70	1.0
Pacoota P1-80	2.643	0.55	1.0
Pacoota P1-110	2.644	0.85	1.0
Pacoota P1-120/180	2.66	0.50	1.0
Pacoota P1-200	2.635	0.50	1.0
Pacoota P1-210	2.66	0.85	1.0
Pacoota P1-240	2.644	0.85	1.0
Pacoota P1-280	2.67	0.65	1.0
Pacoota P1-310	2.654	0.80	1.0
Pacoota P1-350	2.667	0.60	1.0
Pacoota P2	2.645	0.50	1.0
Pacoota P3-10	2.642	0.85	1.0
Pacoota P3-70/90	2.66	0.85	1.0
Pacoota P3-120/130	2.639	0.60	1.0
Pacoota P3-150	2.641	0.85	1.0
Pacoota P3-190	2.634	0.85	1.0
Pacoota P3-230/250	2.634	1.0	1.0
Pacoota P4	2.64	1.2	1.35

Values used to obtain a reasonable match with CMR⁺ porosities

TABLE 7 - Evaluation Parameters

PARAMETERS	Stairway and Horn Valley	All P1 and P2	P3-10, P3-70/90 and P3-120/130	P3-150 and P3-190/230/250	P4
a	1	1	1	1	1
m	1.8	1.8	1.72	1.94	1.88
n	1.8	1.8	1.70	1.75	1.80
Rw @ 77 F	0.13	0.04	0.11	0.11	0.11
Vshale	D-N	D-N	D-N	D-N	D-N
Porosity	Density	Density	Density	Density	Density
Saturation	Archie	Archie	Archie	Archie	Archie

TABLE 8 - Cut Off Parameters Used

Stairway Gas Cut Offs

Parameter	High Perm (1P)		Conventional (2P)		Low Perm (3P)	
	Cut Off	Ka equ.	Cut Off	Ka equ.	Cut Off	Ka equ.
Log \emptyset	3.6	0.5	2.3	0.1	1.8	0.05
Gr*	60					
Sw	80		80		85*	

* Approximated from the Thorium-Potassium Vsh Method

Pacoota P1 Gas Cut Offs

Parameter	High Perm (1P)		Conventional (2P)		Low Perm (3P)	
	Cut Off	Ka equ.	Cut Off	Ka equ.	Cut Off	Ka equ.
Log \emptyset	4.5	0.5	3.4	0.1	2.8	0.05
Vsh (DN)	50		50			
Sw	65		70		80*	

Pacoota P3 Gas Cut Offs

Parameter	High Perm (1P)		Conventional (2P)		Low Perm (3P)	
	Cut Off	Ka equ.	Cut Off	Ka equ.	Cut Off	Ka equ.
Log \emptyset	5.5	0.5	5.2	0.1	4.6	0.05
Gr*	120		120		125	
Sw	80		80		80*	

* GR cut off only used for P3-10 and P3-70/90 sands only. Approximated from the Thorium-Potassium Vsh Method

Pacoota P3 Oil Cut Offs

Parameter	High Perm (1P)		Conventional (2P)		Low Perm (3P)	
	Cut Off	Ka equ.	Cut Off	Ka equ.	Cut Off	Ka equ.
Log \emptyset	6.8	5	6.2	1	5.5	0.5
Gr*	105		115		120	
Sw	55		55		55*	

* GR cut off only used for P3-10 and P3-70/90 sands only. Approximated from the Thorium-Potassium Vsh Method

Pacoota P4 Oil Cut Offs

Parameter	High Perm (1P)		Conventional (2P)		Low Perm (3P)	
	Cut Off	Ka equ.	Cut Off	Ka equ.	Cut Off	Ka equ.
Log \emptyset	6.8	5	5.7	1	4.6	0.5
Vsh (DN)	25		25		25	
Gr*	40		40		40	
Sw	85		85		85*	

* Approximated from the Thorium-Potassium Vsh Method

6. WES PLOT DESCRIPTION

This well evaluation summary (WES) plot displays key deterministic and Multimin outputs.

To the left of the plot are three tracks containing measured logs (Spectral gamma-ray logs, shale indicators and borehole indicators, and CMR⁺ porosity logs). The next track contains information on perforations, cores cut and sidewall cores. To the right of the depth scales is a track containing DST's, OHT's, and RFT/MDT points. The next three tracks contain measured logs (resistivity plus Rt, both compressional and sheer sonic, and density-neutron porosity logs, including PEF).

To the right there are two tracks. The first contains deterministically log derived volume of shale calculations based on density-neutron (Vsh_DN) and thorium-potassium (Vsh_THOR_POTA)[#] and also Multimin derived volume of shale (VOL_WETCALY). Included in this track are total clay points derived from XRD data from cores. Second track contains the CMR⁺ total and effective porosity logs.

The next seven tracks all contain essentially log derived curves. First track contains the density total (ϕ_t) and effective (ϕ_e) evaluated porosities over the zones of interest. It will also contain core porosity (corrected to overburden conditions) if core data is available, together with the CMR⁺ porosity logs[#] (TCMR) for comparison purposes. The second track contains information on the Archie log derived saturations, as well as core derived saturations if core data is available and total gas curve (TGAS). Track 3 contains the Multimin derived porosities across the zones of interest (including TCMR for comparison), with track 4 containing information on the Multimin log derived saturations, as well as core derived saturations if core data is available and total gas curve (TGAS).

Track 5 contains the Multimin derived volumes of gas, oil, water and clay bound water. In addition both clay (CBW[#]) and capillary (BVI/Swirr[#]) bound water, and free fluid volumes (FFV[#]) calculated from the CMR⁺ logs.

Multimin derived lithology is presented in track 6. Track 7 contains permeabilities derived from the Coates FFI equation (KINT_FFI) and those measured from the CMR⁺ (Timur/Coates - KTIM). In addition, both pressure derived mobilities as well as core derived permeabilities if core data is available is shown in Track 7.

The eighth track contains the flags relating to net sand and net pay. Three pairs of these flags are presented, the first pair (to the left) represent proved sand/pay, whilst the second pair (in the middle) represents probable sand/pay and the third pair (to the right) represents possible pay. The colour coding of the flags are as follows:

yellow	net sand
green	oil pay
red	gas pay
cyan	water

To the far right of the plot is information about net sand and net pay zones, lowest known oil / gas, highest known water, contact locations as well as formation tops.

[#] $V_{sh_THOR_POTA} = THOR_POTA_SEPARATION - (-10.16) / (-1.36 - (-10.16))$,
where $THOR_POTA_SEPARATION = (THOR/10) - (10 - POTA/2)$

TCMR = Total Porosity from CMR (ϕ_{tcmr})

CMRP_3MS = Effective porosity from CMR (ϕ_{ecmr})

CBW = TCMR - CMRP_3MS

BVI/Swirr = BFV(Bound Fluid Volume) – CBW

FFV = CMRP_3MS - BVI

Appendix 1: Deterministic Method : Sand and Pay Summary Report: Category 1 – High Permeability Cut-offs (Gas) in measured depth

```

*****
*
*      Pay Summary Report for  GASPAY1      *
*
*      Project : madd_drilling              *
*      User id  : gracia                    *
*      Date    : 16-May-2014 13:46:17      *
*
*****
    
```

DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
896.700	930.600	33.900	0.000	0.000	0.000	-	-	-	-
[Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
930.600	960.900	30.300	0.000	0.000	0.000	-	-	-	-
[Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
960.900	1076.300	115.400	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 2; Well: WEST_MEREENIE_23]									
1076.300	1137.600	61.300	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 1; Well: WEST_MEREENIE_23]									
1137.600	1173.700	36.100	0.000	0.000	0.000	-	-	-	-
[Interval: HORN VALLEY SILSTONE; Well: WEST_MEREENIE_23]									
1173.700	1255.900	82.200	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-40; Well: WEST_MEREENIE_23]									
1255.900	1273.300	17.400	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-60; Well: WEST_MEREENIE_23]									
1273.300	1281.600	8.300	2.819	0.340	54.532	0.076	0.102	0.075	19.342
[Interval: PACOOTA P1-80; Well: WEST_MEREENIE_23]									
1281.600	1290.100	8.500	2.413	0.284	107.643	0.106	0.189	0.095	44.610

DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA P1-110; Well: WEST_MERREENIE_23]									
1290.100	1300.000	9.900	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-120/180; Well: WEST_MERREENIE_23]									
1300.000	1312.800	12.800	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-200; Well: WEST_MERREENIE_23]									
1312.800	1320.500	7.700	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-210; Well: WEST_MERREENIE_23]									
1320.500	1326.200	5.700	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-240; Well: WEST_MERREENIE_23]									
1326.200	1341.300	15.100	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-280; Well: WEST_MERREENIE_23]									
1341.300	1347.500	6.200	3.200	0.516	7.653	0.056	0.138	0.055	2.391
[Interval: PACOOTA P1-310; Well: WEST_MERREENIE_23]									
1347.500	1360.200	12.700	1.854	0.146	3.257	0.055	0.160	0.050	1.757
[Interval: PACOOTA P1-350; Well: WEST_MERREENIE_23]									
1360.200	1365.000	4.800	2.108	0.439	6.622	0.061	0.141	0.058	3.141
[Interval: PACOOTA SST. P2; Well: WEST_MERREENIE_23]									
1365.000	1425.140	60.140	0.000	0.000	0.000	-	-	-	-
[Interval: OGOC; Well: WEST_MERREENIE_23]									
1425.140	1438.700	13.560	0.000	0.000	0.000	-	-	-	-
[Interval: P3-10; Well: WEST_MERREENIE_23]									
1438.700	1458.800	20.100	0.000	0.000	0.000	-	-	-	-
[Interval: P3-70; Well: WEST_MERREENIE_23]									
1458.800	1464.400	5.600	0.000	0.000	0.000	-	-	-	-
[Interval: P3-90; Well: WEST_MERREENIE_23]									
1464.400	1472.700	8.300	0.000	0.000	0.000	-	-	-	-

DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA SST. P3 (120/130); Well: WEST_MERREENIE_23]									
1472.700	1491.000	18.300	0.000	0.000	0.000	-	-	-	-
[Interval: P3-150; Well: WEST_MERREENIE_23]									
1491.000	1502.500	11.500	0.000	0.000	0.000	-	-	-	-
[Interval: P3-190; Well: WEST_MERREENIE_23]									
1502.500	1517.300	14.800	0.000	0.000	0.000	-	-	-	-
[Interval: P3-230/250; Well: WEST_MERREENIE_23]									
1517.300	1533.800	16.500	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA SST. P4; Well: WEST_MERREENIE_23]									
1533.800	1572.000	38.200	0.000	0.000	0.000	-	-	-	-
[Well WEST_MERREENIE_23]									
896.700	1572.000	675.300	12.395	0.018	179.708	0.071	0.147	0.067	14.498

Appendix 1 (continued): Deterministic Method: Sand and Pay Summary Report: Category 2 – Conventional Cut-offs (Gas)

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*
*       Pay Summary Report for  GASPAY2       *
*
*       Project  : madd_drilling              *
*       User id  : gracia                      *
*       Date    : 16-May-2014 13:46:17       *
*
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DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
896.700	930.600	33.900	0.000	0.000	0.000	-	-	-	-
[Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
930.600	960.900	30.300	16.358	0.540	13.768	0.069	0.606	0.061	0.842
[Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
960.900	1076.300	115.400	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 2; Well: WEST_MEREENIE_23]									
1076.300	1137.600	61.300	7.518	0.123	6.706	0.080	0.690	0.069	0.892
[Interval: LOWER STAIRWAY 1; Well: WEST_MEREENIE_23]									
1137.600	1173.700	36.100	12.421	0.344	4.257	0.053	0.528	0.043	0.343
[Interval: HORN VALLEY SILSTONE; Well: WEST_MEREENIE_23]									
1173.700	1255.900	82.200	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-40; Well: WEST_MEREENIE_23]									
1255.900	1273.300	17.400	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-60; Well: WEST_MEREENIE_23]									
1273.300	1281.600	8.300	2.921	0.352	54.553	0.075	0.104	0.074	18.676
[Interval: PACOOTA P1-80; Well: WEST_MEREENIE_23]									
1281.600	1290.100	8.500	2.692	0.317	107.715	0.102	0.199	0.091	40.007

DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA P1-110; Well: WEST_MERREENIE_23]									
1290.100	1300.000	9.900	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-120/180; Well: WEST_MERREENIE_23]									
1300.000	1312.800	12.800	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-200; Well: WEST_MERREENIE_23]									
1312.800	1320.500	7.700	0.965	0.125	0.324	0.071	0.397	0.062	0.336
[Interval: PACOOTA P1-210; Well: WEST_MERREENIE_23]									
1320.500	1326.200	5.700	1.168	0.205	1.973	0.096	0.403	0.085	1.688
[Interval: PACOOTA P1-240; Well: WEST_MERREENIE_23]									
1326.200	1341.300	15.100	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-280; Well: WEST_MERREENIE_23]									
1341.300	1347.500	6.200	3.581	0.578	7.780	0.055	0.148	0.053	2.172
[Interval: PACOOTA P1-310; Well: WEST_MERREENIE_23]									
1347.500	1360.200	12.700	5.664	0.446	4.132	0.048	0.200	0.041	0.729
[Interval: PACOOTA P1-350; Well: WEST_MERREENIE_23]									
1360.200	1365.000	4.800	2.870	0.598	6.854	0.057	0.158	0.053	2.388
[Interval: PACOOTA SST. P2; Well: WEST_MERREENIE_23]									
1365.000	1425.140	60.140	0.000	0.000	0.000	-	-	-	-
[Interval: OGOC; Well: WEST_MERREENIE_23]									
1425.140	1438.700	13.560	0.000	0.000	0.000	-	-	-	-
[Interval: P3-10; Well: WEST_MERREENIE_23]									
1438.700	1458.800	20.100	0.000	0.000	0.000	-	-	-	-
[Interval: P3-70; Well: WEST_MERREENIE_23]									
1458.800	1464.400	5.600	0.000	0.000	0.000	-	-	-	-
[Interval: P3-90; Well: WEST_MERREENIE_23]									
1464.400	1472.700	8.300	0.000	0.000	0.000	-	-	-	-

DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA SST. P3 (120/130); Well: WEST_MERREENIE_23]									
1472.700	1491.000	18.300	0.000	0.000	0.000	-	-	-	-
[Interval: P3-150; Well: WEST_MERREENIE_23]									
1491.000	1502.500	11.500	0.000	0.000	0.000	-	-	-	-
[Interval: P3-190; Well: WEST_MERREENIE_23]									
1502.500	1517.300	14.800	0.000	0.000	0.000	-	-	-	-
[Interval: P3-230/250; Well: WEST_MERREENIE_23]									
1517.300	1533.800	16.500	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA SST. P4; Well: WEST_MERREENIE_23]									
1533.800	1572.000	38.200	0.000	0.000	0.000	-	-	-	-
[Well WEST_MERREENIE_23]									
896.700	1572.000	675.300	56.159	0.083	208.064	0.066	0.462	0.058	3.705

Appendix 1(continued): Deterministic Method: Sand and Pay Summary Report: Category 3 – Low Permeability Cut-offs (Gas)

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*
*       Pay Summary Report for GASPAY3       *
*
*       Project : madd_drilling             *
*       User id  : gracia                   *
*       Date    : 16-May-2014 13:46:17    *
*
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DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
896.700	930.600	33.900	4.216	0.124	1.294	0.060	0.684	0.052	0.307
[Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
930.600	960.900	30.300	18.009	0.594	13.796	0.067	0.625	0.058	0.766
[Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
960.900	1076.300	115.400	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 2; Well: WEST_MEREENIE_23]									
1076.300	1137.600	61.300	8.484	0.138	6.777	0.076	0.695	0.065	0.799
[Interval: LOWER STAIRWAY 1; Well: WEST_MEREENIE_23]									
1137.600	1173.700	36.100	14.910	0.413	4.384	0.053	0.545	0.042	0.294
[Interval: HORN VALLEY SILSTONE; Well: WEST_MEREENIE_23]									
1173.700	1255.900	82.200	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-40; Well: WEST_MEREENIE_23]									
1255.900	1273.300	17.400	2.184	0.126	0.797	0.081	0.345	0.069	0.365
[Interval: PACOOTA P1-60; Well: WEST_MEREENIE_23]									
1273.300	1281.600	8.300	3.861	0.465	54.941	0.077	0.174	0.072	14.230
[Interval: PACOOTA P1-80; Well: WEST_MEREENIE_23]									
1281.600	1290.100	8.500	3.454	0.406	107.794	0.094	0.227	0.082	31.205

DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA P1-110; Well: WEST_MERREENIE_23]									
1290.100	1300.000	9.900	0.279	0.028	0.019	0.040	0.314	0.035	0.068
[Interval: PACOOTA P1-120/180; Well: WEST_MERREENIE_23]									
1300.000	1312.800	12.800	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-200; Well: WEST_MERREENIE_23]									
1312.800	1320.500	7.700	1.168	0.152	0.339	0.070	0.403	0.060	0.290
[Interval: PACOOTA P1-210; Well: WEST_MERREENIE_23]									
1320.500	1326.200	5.700	1.397	0.245	2.045	0.094	0.401	0.083	1.464
[Interval: PACOOTA P1-240; Well: WEST_MERREENIE_23]									
1326.200	1341.300	15.100	0.508	0.034	0.180	0.073	0.330	0.058	0.354
[Interval: PACOOTA P1-280; Well: WEST_MERREENIE_23]									
1341.300	1347.500	6.200	3.708	0.598	7.782	0.055	0.165	0.052	2.099
[Interval: PACOOTA P1-310; Well: WEST_MERREENIE_23]									
1347.500	1360.200	12.700	7.112	0.560	4.214	0.046	0.214	0.039	0.592
[Interval: PACOOTA P1-350; Well: WEST_MERREENIE_23]									
1360.200	1365.000	4.800	3.023	0.630	6.861	0.056	0.162	0.052	2.270
[Interval: PACOOTA SST. P2; Well: WEST_MERREENIE_23]									
1365.000	1425.140	60.140	30.404	0.506	14.797	0.061	0.566	0.046	0.487
[Interval: OGOC; Well: WEST_MERREENIE_23]									
1425.140	1438.700	13.560	0.000	0.000	0.000	-	-	-	-
[Interval: P3-10; Well: WEST_MERREENIE_23]									
1438.700	1458.800	20.100	0.000	0.000	0.000	-	-	-	-
[Interval: P3-70; Well: WEST_MERREENIE_23]									
1458.800	1464.400	5.600	0.000	0.000	0.000	-	-	-	-
[Interval: P3-90; Well: WEST_MERREENIE_23]									
1464.400	1472.700	8.300	0.000	0.000	0.000	-	-	-	-

DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA SST. P3 (120/130); Well: WEST_MERREENIE_23]									
1472.700	1491.000	18.300	0.000	0.000	0.000	-	-	-	-
[Interval: P3-150; Well: WEST_MERREENIE_23]									
1491.000	1502.500	11.500	0.000	0.000	0.000	-	-	-	-
[Interval: P3-190; Well: WEST_MERREENIE_23]									
1502.500	1517.300	14.800	0.000	0.000	0.000	-	-	-	-
[Interval: P3-230/250; Well: WEST_MERREENIE_23]									
1517.300	1533.800	16.500	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA SST. P4; Well: WEST_MERREENIE_23]									
1533.800	1572.000	38.200	0.000	0.000	0.000	-	-	-	-
[Well WEST_MERREENIE_23]									
896.700	1572.000	675.300	102.718	0.152	226.020	0.063	0.503	0.053	2.200

Appendix 2: Deterministic Method: Sand and Pay Summary Report: Category 1 – High Permeability Cut-offs (Oil)

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*****
*
*      Pay Summary Report for OILPAY1      *
*
*      Project : madd_drilling             *
*      User id  : gracia                   *
*      Date    : 16-May-2014 13:46:17     *
*
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DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: UPPER STAIRWAY SANDSTONE; Well: WEST_MERREENIE_23]									
896.700	930.600	33.900	0.000	0.000	0.000	-	-	-	-
[Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MERREENIE_23]									
930.600	960.900	30.300	0.000	0.000	0.000	-	-	-	-
[Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MERREENIE_23]									
960.900	1076.300	115.400	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 2; Well: WEST_MERREENIE_23]									
1076.300	1137.600	61.300	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 1; Well: WEST_MERREENIE_23]									
1137.600	1173.700	36.100	0.000	0.000	0.000	-	-	-	-
[Interval: HORN VALLEY SILSTONE; Well: WEST_MERREENIE_23]									
1173.700	1255.900	82.200	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-40; Well: WEST_MERREENIE_23]									
1255.900	1273.300	17.400	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-60; Well: WEST_MERREENIE_23]									
1273.300	1281.600	8.300	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-80; Well: WEST_MERREENIE_23]									
1281.600	1290.100	8.500	0.000	0.000	0.000	-	-	-	-

DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA P1-110; Well: WEST_MERREENIE_23]									
1290.100	1300.000	9.900	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-120/180; Well: WEST_MERREENIE_23]									
1300.000	1312.800	12.800	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-200; Well: WEST_MERREENIE_23]									
1312.800	1320.500	7.700	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-210; Well: WEST_MERREENIE_23]									
1320.500	1326.200	5.700	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-240; Well: WEST_MERREENIE_23]									
1326.200	1341.300	15.100	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-280; Well: WEST_MERREENIE_23]									
1341.300	1347.500	6.200	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-310; Well: WEST_MERREENIE_23]									
1347.500	1360.200	12.700	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-350; Well: WEST_MERREENIE_23]									
1360.200	1365.000	4.800	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA SST. P2; Well: WEST_MERREENIE_23]									
1365.000	1425.140	60.140	0.000	0.000	0.000	-	-	-	-
[Interval: OGOC; Well: WEST_MERREENIE_23]									
1425.140	1438.700	13.560	0.000	0.000	0.000	-	-	-	-
[Interval: P3-10; Well: WEST_MERREENIE_23]									
1438.700	1458.800	20.100	0.000	0.000	0.000	-	-	-	-
[Interval: P3-70; Well: WEST_MERREENIE_23]									
1458.800	1464.400	5.600	0.000	0.000	0.000	-	-	-	-
[Interval: P3-90; Well: WEST_MERREENIE_23]									
1464.400	1472.700	8.300	0.000	0.000	0.000	-	-	-	-

DEPTH_TOP	DEPTH_BASE	GROSS	NET	NET_TO_GROSS	KINTH	PHIT_AV	SWT_AV	PHIE_AM	KINT_AM
METRES	METRES	METRES	METRES	M/M	MDM	V/V	V/V	V/V	MD
[Interval: UPPER STAIRWAY SANDSTONE; Well: WEST_MERREENIE_19]									
[Interval: PACOOTA SST. P3 (120/130); Well: WEST_MERREENIE_23]									
1472.700	1491.000	18.300	4.496	0.246	23.776	0.095	0.230	0.093	5.288
[Interval: P3-150; Well: WEST_MERREENIE_23]									
1491.000	1502.500	11.500	0.000	0.000	0.000	-	-	-	-
[Interval: P3-190; Well: WEST_MERREENIE_23]									
1502.500	1517.300	14.800	0.000	0.000	0.000	-	-	-	-
[Interval: P3-230/250; Well: WEST_MERREENIE_23]									
1517.300	1533.800	16.500	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA SST. P4; Well: WEST_MERREENIE_23]									
1533.800	1572.000	38.200	0.000	0.000	0.000	-	-	-	-
[Well WEST_MERREENIE_23]									
896.700	1572.000	675.300	4.496	0.007	23.776	0.095	0.230	0.093	5.288

Appendix 2 (continued): Deterministic Method: Sand and Pay Summary Report: Category 2 – Conventional Cut-offs (Oil)

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*****
*
*      Pay Summary Report for OILPAY2      *
*
*      Project : madd_drilling             *
*      User id  : gracia                   *
*      Date    : 16-May-2014 13:46:17    *
*
*****
    
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DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
896.700	930.600	33.900	0.000	0.000	0.000	-	-	-	-
[Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
930.600	960.900	30.300	0.000	0.000	0.000	-	-	-	-
[Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
960.900	1076.300	115.400	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 2; Well: WEST_MEREENIE_23]									
1076.300	1137.600	61.300	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 1; Well: WEST_MEREENIE_23]									
1137.600	1173.700	36.100	0.000	0.000	0.000	-	-	-	-
[Interval: HORN VALLEY SILSTONE; Well: WEST_MEREENIE_23]									
1173.700	1255.900	82.200	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-40; Well: WEST_MEREENIE_23]									
1255.900	1273.300	17.400	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-60; Well: WEST_MEREENIE_23]									
1273.300	1281.600	8.300	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-80; Well: WEST_MEREENIE_23]									
1281.600	1290.100	8.500	0.000	0.000	0.000	-	-	-	-

DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA P1-110; Well: WEST_MERREENIE_23]									
1290.100	1300.000	9.900	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-120/180; Well: WEST_MERREENIE_23]									
1300.000	1312.800	12.800	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-200; Well: WEST_MERREENIE_23]									
1312.800	1320.500	7.700	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-210; Well: WEST_MERREENIE_23]									
1320.500	1326.200	5.700	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-240; Well: WEST_MERREENIE_23]									
1326.200	1341.300	15.100	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-280; Well: WEST_MERREENIE_23]									
1341.300	1347.500	6.200	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-310; Well: WEST_MERREENIE_23]									
1347.500	1360.200	12.700	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-350; Well: WEST_MERREENIE_23]									
1360.200	1365.000	4.800	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA SST. P2; Well: WEST_MERREENIE_23]									
1365.000	1425.140	60.140	0.000	0.000	0.000	-	-	-	-
[Interval: OGOC; Well: WEST_MERREENIE_23]									
1425.140	1438.700	13.560	0.000	0.000	0.000	-	-	-	-
[Interval: P3-10; Well: WEST_MERREENIE_23]									
1438.700	1458.800	20.100	0.000	0.000	0.000	-	-	-	-
[Interval: P3-70; Well: WEST_MERREENIE_23]									
1458.800	1464.400	5.600	0.000	0.000	0.000	-	-	-	-
[Interval: P3-90; Well: WEST_MERREENIE_23]									
1464.400	1472.700	8.300	0.000	0.000	0.000	-	-	-	-

DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA SST. P3 (120/130); Well: WEST_MERREENIE_23]									
1472.700	1491.000	18.300	9.957	0.544	31.802	0.085	0.270	0.083	3.194
[Interval: P3-150; Well: WEST_MERREENIE_23]									
1491.000	1502.500	11.500	0.000	0.000	0.000	-	-	-	-
[Interval: P3-190; Well: WEST_MERREENIE_23]									
1502.500	1517.300	14.800	0.000	0.000	0.000	-	-	-	-
[Interval: P3-230/250; Well: WEST_MERREENIE_23]									
1517.300	1533.800	16.500	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA SST. P4; Well: WEST_MERREENIE_23]									
1533.800	1572.000	38.200	0.000	0.000	0.000	-	-	-	-
[Well WEST_MERREENIE_23]									
896.700	1572.000	675.300	9.957	0.015	31.802	0.085	0.270	0.083	3.194

Appendix 2 (continued): Deterministic Method: Sand and Pay Summary Report: Category 3 – Low Permeability Cut-offs (Oil)

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*
*      Pay Summary Report for OILPAY3      *
*
*      Project : madd_drilling             *
*      User id  : gracia                   *
*      Date    : 16-May-2014 13:46:17     *
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DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: UPPER STAIRWAY SANDSTONE; Well: WEST_MERREENIE_23]									
896.700	930.600	33.900	0.000	0.000	0.000	-	-	-	-
[Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MERREENIE_23]									
930.600	960.900	30.300	0.000	0.000	0.000	-	-	-	-
[Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MERREENIE_23]									
960.900	1076.300	115.400	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 2; Well: WEST_MERREENIE_23]									
1076.300	1137.600	61.300	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 1; Well: WEST_MERREENIE_23]									
1137.600	1173.700	36.100	0.000	0.000	0.000	-	-	-	-
[Interval: HORN VALLEY SILSTONE; Well: WEST_MERREENIE_23]									
1173.700	1255.900	82.200	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-40; Well: WEST_MERREENIE_23]									
1255.900	1273.300	17.400	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-60; Well: WEST_MERREENIE_23]									
1273.300	1281.600	8.300	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-80; Well: WEST_MERREENIE_23]									
1281.600	1290.100	8.500	0.000	0.000	0.000	-	-	-	-

DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA P1-110; Well: WEST_MERREENIE_23]									
1290.100	1300.000	9.900	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-120/180; Well: WEST_MERREENIE_23]									
1300.000	1312.800	12.800	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-200; Well: WEST_MERREENIE_23]									
1312.800	1320.500	7.700	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-210; Well: WEST_MERREENIE_23]									
1320.500	1326.200	5.700	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-240; Well: WEST_MERREENIE_23]									
1326.200	1341.300	15.100	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-280; Well: WEST_MERREENIE_23]									
1341.300	1347.500	6.200	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-310; Well: WEST_MERREENIE_23]									
1347.500	1360.200	12.700	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-350; Well: WEST_MERREENIE_23]									
1360.200	1365.000	4.800	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA SST. P2; Well: WEST_MERREENIE_23]									
1365.000	1425.140	60.140	0.000	0.000	0.000	-	-	-	-
[Interval: OGOC; Well: WEST_MERREENIE_23]									
1425.140	1438.700	13.560	0.330	0.024	0.080	0.058	0.331	0.055	0.241
[Interval: P3-10; Well: WEST_MERREENIE_23]									
1438.700	1458.800	20.100	3.835	0.191	3.286	0.062	0.268	0.062	0.857
[Interval: P3-70; Well: WEST_MERREENIE_23]									
1458.800	1464.400	5.600	0.000	0.000	0.000	-	-	-	-
[Interval: P3-90; Well: WEST_MERREENIE_23]									
1464.400	1472.700	8.300	1.397	0.168	3.972	0.079	0.220	0.077	2.843

DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA SST. P3 (120/130); Well: WEST_MERREENIE_23]									
1472.700	1491.000	18.300	11.481	0.627	32.290	0.082	0.277	0.080	2.813
[Interval: P3-150; Well: WEST_MERREENIE_23]									
1491.000	1502.500	11.500	0.610	0.053	0.343	0.067	0.403	0.066	0.563
[Interval: P3-190; Well: WEST_MERREENIE_23]									
1502.500	1517.300	14.800	0.914	0.062	0.334	0.065	0.642	0.062	0.365
[Interval: P3-230/250; Well: WEST_MERREENIE_23]									
1517.300	1533.800	16.500	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA SST. P4; Well: WEST_MERREENIE_23]									
1533.800	1572.000	38.200	0.000	0.000	0.000	-	-	-	-
[Well WEST_MERREENIE_23]									
896.700	1572.000	675.300	18.567	0.027	40.304	0.076	0.291	0.074	2.171

Appendix 3: Deterministic Method: Sand and Pay Summary Report: Category 1 – High Permeability Cut-offs (Net Sand)

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*****
*
*       Pay Summary Report for SAND1
*
*       Project : madd_drilling
*       User id  : gracia
*       Date    : 16-May-2014 13:46:17
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DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: UPPER STAIRWAY SANDSTONE; Well: WEST_MERREENIE_23]									
896.700	930.600	33.900	0.000	0.000	0.000	-	-	-	-
[Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MERREENIE_23]									
930.600	960.900	30.300	0.000	0.000	0.000	-	-	-	-
[Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MERREENIE_23]									
960.900	1076.300	115.400	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 2; Well: WEST_MERREENIE_23]									
1076.300	1137.600	61.300	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 1; Well: WEST_MERREENIE_23]									
1137.600	1173.700	36.100	0.000	0.000	0.000	-	-	-	-
[Interval: HORN VALLEY SILSTONE; Well: WEST_MERREENIE_23]									
1173.700	1255.900	82.200	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-40; Well: WEST_MERREENIE_23]									
1255.900	1273.300	17.400	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-60; Well: WEST_MERREENIE_23]									
1273.300	1281.600	8.300	2.819	0.340	54.532	0.076	0.102	0.075	19.342
[Interval: PACOOTA P1-80; Well: WEST_MERREENIE_23]									
1281.600	1290.100	8.500	2.413	0.284	107.643	0.106	0.189	0.095	44.610

DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA P1-110; Well: WEST_MERREENIE_23]									
1290.100	1300.000	9.900	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-120/180; Well: WEST_MERREENIE_23]									
1300.000	1312.800	12.800	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-200; Well: WEST_MERREENIE_23]									
1312.800	1320.500	7.700	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-210; Well: WEST_MERREENIE_23]									
1320.500	1326.200	5.700	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-240; Well: WEST_MERREENIE_23]									
1326.200	1341.300	15.100	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-280; Well: WEST_MERREENIE_23]									
1341.300	1347.500	6.200	3.200	0.516	7.653	0.056	0.138	0.055	2.391
[Interval: PACOOTA P1-310; Well: WEST_MERREENIE_23]									
1347.500	1360.200	12.700	1.854	0.146	3.257	0.055	0.160	0.050	1.757
[Interval: PACOOTA P1-350; Well: WEST_MERREENIE_23]									
1360.200	1365.000	4.800	2.108	0.439	6.622	0.061	0.141	0.058	3.141
[Interval: PACOOTA SST. P2; Well: WEST_MERREENIE_23]									
1365.000	1425.140	60.140	0.000	0.000	0.000	-	-	-	-
[Interval: OGOC; Well: WEST_MERREENIE_23]									
1425.140	1438.700	13.560	0.000	0.000	0.000	-	-	-	-
[Interval: P3-10; Well: WEST_MERREENIE_23]									
1438.700	1458.800	20.100	0.000	0.000	0.000	-	-	-	-
[Interval: P3-70; Well: WEST_MERREENIE_23]									
1458.800	1464.400	5.600	0.000	0.000	0.000	-	-	-	-
[Interval: P3-90; Well: WEST_MERREENIE_23]									
1464.400	1472.700	8.300	0.000	0.000	0.000	-	-	-	-

DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA SST. P3 (120/130); Well: WEST_MERREENIE_23]									
1472.700	1491.000	18.300	4.496	0.246	23.776	0.095	0.230	0.093	5.288
[Interval: P3-150; Well: WEST_MERREENIE_23]									
1491.000	1502.500	11.500	0.000	0.000	0.000	-	-	-	-
[Interval: P3-190; Well: WEST_MERREENIE_23]									
1502.500	1517.300	14.800	0.000	0.000	0.000	-	-	-	-
[Interval: P3-230/250; Well: WEST_MERREENIE_23]									
1517.300	1533.800	16.500	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA SST. P4; Well: WEST_MERREENIE_23]									
1533.800	1572.000	38.200	0.000	0.000	0.000	-	-	-	-
[Well WEST_MERREENIE_23]									
896.700	1572.000	675.300	16.891	0.025	203.484	0.077	0.174	0.074	12.047

Appendix 3 (continued): Deterministic Method: Sand and Pay Summary Report: Category 2 – Conventional Cut-offs (Net Sand)

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*****
*
*       Pay Summary Report for SAND2
*
*       Project : madd_drilling
*       User id : gracia
*       Date    : 16-May-2014 13:46:17
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DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
896.700	930.600	33.900	0.000	0.000	0.000	-	-	-	-
[Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
930.600	960.900	30.300	16.358	0.540	13.768	0.069	0.606	0.061	0.842
[Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
960.900	1076.300	115.400	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 2; Well: WEST_MEREENIE_23]									
1076.300	1137.600	61.300	7.518	0.123	6.706	0.080	0.690	0.069	0.892
[Interval: LOWER STAIRWAY 1; Well: WEST_MEREENIE_23]									
1137.600	1173.700	36.100	12.421	0.344	4.257	0.053	0.528	0.043	0.343
[Interval: HORN VALLEY SILSTONE; Well: WEST_MEREENIE_23]									
1173.700	1255.900	82.200	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-40; Well: WEST_MEREENIE_23]									
1255.900	1273.300	17.400	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-60; Well: WEST_MEREENIE_23]									
1273.300	1281.600	8.300	2.921	0.352	54.553	0.075	0.104	0.074	18.676
[Interval: PACOOTA P1-80; Well: WEST_MEREENIE_23]									
1281.600	1290.100	8.500	2.692	0.317	107.715	0.102	0.199	0.091	40.007

DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA P1-110; Well: WEST_MEREENIE_23]									
1290.100	1300.000	9.900	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-120/180; Well: WEST_MEREENIE_23]									
1300.000	1312.800	12.800	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-200; Well: WEST_MEREENIE_23]									
1312.800	1320.500	7.700	0.965	0.125	0.324	0.071	0.397	0.062	0.336
[Interval: PACOOTA P1-210; Well: WEST_MEREENIE_23]									
1320.500	1326.200	5.700	1.168	0.205	1.973	0.096	0.403	0.085	1.688
[Interval: PACOOTA P1-240; Well: WEST_MEREENIE_23]									
1326.200	1341.300	15.100	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-280; Well: WEST_MEREENIE_23]									
1341.300	1347.500	6.200	3.581	0.578	7.780	0.055	0.148	0.053	2.172
[Interval: PACOOTA P1-310; Well: WEST_MEREENIE_23]									
1347.500	1360.200	12.700	5.664	0.446	4.132	0.048	0.200	0.041	0.729
[Interval: PACOOTA P1-350; Well: WEST_MEREENIE_23]									
1360.200	1365.000	4.800	2.870	0.598	6.854	0.057	0.158	0.053	2.388
[Interval: PACOOTA SST. P2; Well: WEST_MEREENIE_23]									
1365.000	1425.140	60.140	0.000	0.000	0.000	-	-	-	-
[Interval: OGO; Well: WEST_MEREENIE_23]									
1425.140	1438.700	13.560	0.000	0.000	0.000	-	-	-	-
[Interval: P3-10; Well: WEST_MEREENIE_23]									
1438.700	1458.800	20.100	0.000	0.000	0.000	-	-	-	-
[Interval: P3-70; Well: WEST_MEREENIE_23]									
1458.800	1464.400	5.600	0.000	0.000	0.000	-	-	-	-
[Interval: P3-90; Well: WEST_MEREENIE_23]									
1464.400	1472.700	8.300	0.000	0.000	0.000	-	-	-	-

DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA SST. P3 (120/130); Well: WEST_MERREENIE_23]									
1472.700	1491.000	18.300	9.957	0.544	31.802	0.085	0.270	0.083	3.194
[Interval: P3-150; Well: WEST_MERREENIE_23]									
1491.000	1502.500	11.500	0.000	0.000	0.000	-	-	-	-
[Interval: P3-190; Well: WEST_MERREENIE_23]									
1502.500	1517.300	14.800	0.000	0.000	0.000	-	-	-	-
[Interval: P3-230/250; Well: WEST_MERREENIE_23]									
1517.300	1533.800	16.500	3.226	0.196	5.943	0.082	0.779	0.079	1.842
[Interval: PACOOTA SST. P4; Well: WEST_MERREENIE_23]									
1533.800	1572.000	38.200	11.100	0.291	13859.311	0.083	0.782	0.078	1248.609#
[Well WEST_MERREENIE_23]									
896.700	1572.000	675.300	80.442	0.119	14105.120	0.071	0.500	0.065	175.346#

Calculated value too high which affects overall total average permeability value.

Appendix 3 (continued): Deterministic Method: Sand and Pay Summary Report: Category 3 – Low Permeability Cut-offs (Net Sand)

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*****
*
*       Pay Summary Report for SAND3
*
*       Project : madd_drilling
*       User id  : gracia
*       Date    : 16-May-2014 13:46:17
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DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: UPPER STAIRWAY SANDSTONE; Well: WEST_MERREENIE_23]									
896.700	930.600	33.900	4.216	0.124	1.294	0.060	0.684	0.052	0.307
[Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MERREENIE_23]									
930.600	960.900	30.300	18.110	0.598	13.801	0.067	0.626	0.058	0.762
[Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MERREENIE_23]									
960.900	1076.300	115.400	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 2; Well: WEST_MERREENIE_23]									
1076.300	1137.600	61.300	8.484	0.138	6.777	0.076	0.695	0.065	0.799
[Interval: LOWER STAIRWAY 1; Well: WEST_MERREENIE_23]									
1137.600	1173.700	36.100	14.961	0.414	4.398	0.053	0.546	0.042	0.294
[Interval: HORN VALLEY SILSTONE; Well: WEST_MERREENIE_23]									
1173.700	1255.900	82.200	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-40; Well: WEST_MERREENIE_23]									
1255.900	1273.300	17.400	2.184	0.126	0.797	0.081	0.345	0.069	0.365
[Interval: PACOOTA P1-60; Well: WEST_MERREENIE_23]									
1273.300	1281.600	8.300	3.861	0.465	54.941	0.077	0.174	0.072	14.230
[Interval: PACOOTA P1-80; Well: WEST_MERREENIE_23]									
1281.600	1290.100	8.500	3.454	0.406	107.794	0.094	0.227	0.082	31.205

DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA P1-110; Well: WEST_MERREENIE_23]									
1290.100	1300.000	9.900	0.279	0.028	0.019	0.040	0.314	0.035	0.068
[Interval: PACOOTA P1-120/180; Well: WEST_MERREENIE_23]									
1300.000	1312.800	12.800	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-200; Well: WEST_MERREENIE_23]									
1312.800	1320.500	7.700	1.168	0.152	0.339	0.070	0.403	0.060	0.290
[Interval: PACOOTA P1-210; Well: WEST_MERREENIE_23]									
1320.500	1326.200	5.700	1.397	0.245	2.045	0.094	0.401	0.083	1.464
[Interval: PACOOTA P1-240; Well: WEST_MERREENIE_23]									
1326.200	1341.300	15.100	0.508	0.034	0.180	0.073	0.330	0.058	0.354
[Interval: PACOOTA P1-280; Well: WEST_MERREENIE_23]									
1341.300	1347.500	6.200	3.708	0.598	7.782	0.055	0.165	0.052	2.099
[Interval: PACOOTA P1-310; Well: WEST_MERREENIE_23]									
1347.500	1360.200	12.700	7.112	0.560	4.214	0.046	0.214	0.039	0.592
[Interval: PACOOTA P1-350; Well: WEST_MERREENIE_23]									
1360.200	1365.000	4.800	3.023	0.630	6.861	0.056	0.162	0.052	2.270
[Interval: PACOOTA SST. P2; Well: WEST_MERREENIE_23]									
1365.000	1425.140	60.140	30.404	0.506	14.797	0.061	0.566	0.046	0.487
[Interval: OGO; Well: WEST_MERREENIE_23]									
1425.140	1438.700	13.560	0.330	0.024	0.080	0.058	0.331	0.055	0.241
[Interval: P3-10; Well: WEST_MERREENIE_23]									
1438.700	1458.800	20.100	3.835	0.191	3.286	0.062	0.268	0.062	0.857
[Interval: P3-70; Well: WEST_MERREENIE_23]									
1458.800	1464.400	5.600	0.000	0.000	0.000	-	-	-	-
[Interval: P3-90; Well: WEST_MERREENIE_23]									
1464.400	1472.700	8.300	1.397	0.168	3.972	0.079	0.220	0.077	2.843

DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA SST. P3 (120/130); Well: WEST_MERREENIE_23]									
1472.700	1491.000	18.300	11.481	0.627	32.290	0.082	0.277	0.080	2.813
[Interval: P3-150; Well: WEST_MERREENIE_23]									
1491.000	1502.500	11.500	0.610	0.053	0.343	0.067	0.403	0.066	0.563
[Interval: P3-190; Well: WEST_MERREENIE_23]									
1502.500	1517.300	14.800	0.914	0.062	0.334	0.065	0.642	0.062	0.365
[Interval: P3-230/250; Well: WEST_MERREENIE_23]									
1517.300	1533.800	16.500	4.826	0.292	7.240	0.080	0.790	0.076	1.500
[Interval: PACOOTA SST. P4; Well: WEST_MERREENIE_23]									
1533.800	1572.000	38.200	13.081	0.342	13885.863	0.081	0.802	0.076	1061.529#
[Well WEST_MERREENIE_23]									
896.700	1572.000	675.300	139.344	0.206	14159.445	0.067	0.517	0.058	101.615#

Calculated value too high which affects overall total average permeability value

Appendix 4: Deterministic Method: Sand and Pay Summary Report: Category 1 – High Permeability Cut-offs (Gas) in true vertical depth

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*****
*
*       Pay Summary Report for  GASPAY1       *
*
*       Project  : madd_drilling             *
*       User id  : gracia                    *
*       Date    : 16-May-2014 13:46:17      *
*
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TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: UPPER STAIRWAY SANDSTONE; Well: WEST_MEREEENIE_23]									
893.100	926.301	33.200	0.000	0.000	0.000	-	-	-	-
[Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MEREEENIE_23]									
926.301	955.977	29.677	0.000	0.000	0.000	-	-	-	-
[Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MEREEENIE_23]									
955.977	1068.785	112.807	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 2; Well: WEST_MEREEENIE_23]									
1068.785	1129.859	61.074	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 1; Well: WEST_MEREEENIE_23]									
1129.859	1165.824	35.965	0.000	0.000	0.000	-	-	-	-
[Interval: HORN VALLEY SILSTONE; Well: WEST_MEREEENIE_23]									
1165.824	1247.642	81.818	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-40; Well: WEST_MEREEENIE_23]									
1247.642	1264.663	17.021	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-60; Well: WEST_MEREEENIE_23]									
1264.663	1272.688	8.025	2.722	0.339	52.649	0.076	0.102	0.075	19.340
[Interval: PACOOTA P1-80; Well: WEST_MEREEENIE_23]									
1272.688	1280.847	8.159	2.320	0.284	103.522	0.106	0.189	0.095	44.623

TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA P1-110; Well: WEST_MERREENIE_23]									
1280.847	1290.271	9.424	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-120/180; Well: WEST_MERREENIE_23]									
1290.271	1302.337	12.065	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-200; Well: WEST_MERREENIE_23]									
1302.337	1309.528	7.191	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-210; Well: WEST_MERREENIE_23]									
1309.528	1314.819	5.291	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-240; Well: WEST_MERREENIE_23]									
1314.819	1328.695	13.876	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-280; Well: WEST_MERREENIE_23]									
1328.695	1334.330	5.636	2.911	0.517	6.961	0.056	0.138	0.055	2.391
[Interval: PACOOTA P1-310; Well: WEST_MERREENIE_23]									
1334.330	1345.754	11.424	1.668	0.146	2.932	0.055	0.160	0.050	1.758
[Interval: PACOOTA P1-350; Well: WEST_MERREENIE_23]									
1345.754	1350.006	4.252	1.863	0.438	5.849	0.061	0.141	0.058	3.140
[Interval: PACOOTA SST. P2; Well: WEST_MERREENIE_23]									
1350.006	1398.202	48.196	0.000	0.000	0.000	-	-	-	-
[Interval: OGOC; Well: WEST_MERREENIE_23]									
1398.202	1408.080	9.878	0.000	0.000	0.000	-	-	-	-
[Interval: P3-10; Well: WEST_MERREENIE_23]									
1408.080	1422.709	14.629	0.000	0.000	0.000	-	-	-	-
[Interval: P3-70; Well: WEST_MERREENIE_23]									
1422.709	1426.782	4.073	0.000	0.000	0.000	-	-	-	-
[Interval: P3-90; Well: WEST_MERREENIE_23]									
1426.782	1432.806	6.024	0.000	0.000	0.000	-	-	-	-

DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA SST. P3 (120/130); Well: WEST_MERREENIE_23]									
1432.806	1445.885	13.079	0.000	0.000	0.000	-	-	-	-
[Interval: P3-150; Well: WEST_MERREENIE_23]									
1445.885	1453.971	8.085	0.000	0.000	0.000	-	-	-	-
[Interval: P3-190; Well: WEST_MERREENIE_23]									
1453.971	1464.282	10.312	0.000	0.000	0.000	-	-	-	-
[Interval: P3-230/250; Well: WEST_MERREENIE_23]									
1464.282	1475.634	11.351	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA SST. P4; Well: WEST_MERREENIE_23]									
1475.634	1501.645	26.011	0.000	0.000	0.000	-	-	-	-
[Well WEST_MERREENIE_23]									
893.100	1501.645	608.545	11.484	0.019	171.912	0.071	0.147	0.068	14.969

Appendix 4 (continued): Deterministic Method: Sand and Pay Summary Report: Category 2 – Conventional Cut-offs (Gas)

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*
*       Pay Summary Report for  GASPAY2
*
*       Project  : madd_drilling
*       User id  : graca
*       Date    : 16-May-2014 13:46:17
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TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
893.100	926.301	33.200	0.000	0.000	0.000	-	-	-	-
[Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
926.301	955.977	29.677	16.021	0.540	13.485	0.069	0.606	0.061	0.842
[Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
955.977	1068.785	112.807	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 2; Well: WEST_MEREENIE_23]									
1068.785	1129.859	61.074	7.512	0.123	6.702	0.080	0.690	0.069	0.892
[Interval: LOWER STAIRWAY 1; Well: WEST_MEREENIE_23]									
1129.859	1165.824	35.965	12.369	0.344	4.240	0.053	0.528	0.043	0.343
[Interval: HORN VALLEY SILSTONE; Well: WEST_MEREENIE_23]									
1165.824	1247.642	81.818	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-40; Well: WEST_MEREENIE_23]									
1247.642	1264.663	17.021	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-60; Well: WEST_MEREENIE_23]									
1264.663	1272.688	8.025	2.820	0.351	52.669	0.075	0.104	0.074	18.674
[Interval: PACOOTA P1-80; Well: WEST_MEREENIE_23]									
1272.688	1280.847	8.159	2.589	0.317	103.591	0.102	0.199	0.091	40.018

TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA P1-110; Well: WEST_MERREENIE_23]									
1280.847	1290.271	9.424	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-120/180; Well: WEST_MERREENIE_23]									
1290.271	1302.337	12.065	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-200; Well: WEST_MERREENIE_23]									
1302.337	1309.528	7.191	0.901	0.125	0.303	0.071	0.397	0.062	0.336
[Interval: PACOOTA P1-210; Well: WEST_MERREENIE_23]									
1309.528	1314.819	5.291	1.085	0.205	1.832	0.096	0.403	0.085	1.688
[Interval: PACOOTA P1-240; Well: WEST_MERREENIE_23]									
1314.819	1328.695	13.876	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-280; Well: WEST_MERREENIE_23]									
1328.695	1334.330	5.636	3.258	0.578	7.076	0.055	0.148	0.053	2.172
[Interval: PACOOTA P1-310; Well: WEST_MERREENIE_23]									
1334.330	1345.754	11.424	5.095	0.446	3.720	0.048	0.200	0.041	0.730
[Interval: PACOOTA P1-350; Well: WEST_MERREENIE_23]									
1345.754	1350.006	4.252	2.538	0.597	6.054	0.057	0.158	0.053	2.385
[Interval: PACOOTA SST. P2; Well: WEST_MERREENIE_23]									
1350.006	1398.202	48.196	0.000	0.000	0.000	-	-	-	-
[Interval: OGOC; Well: WEST_MERREENIE_23]									
1398.202	1408.080	9.878	0.000	0.000	0.000	-	-	-	-
[Interval: P3-10; Well: WEST_MERREENIE_23]									
1408.080	1422.709	14.629	0.000	0.000	0.000	-	-	-	-
[Interval: P3-70; Well: WEST_MERREENIE_23]									
1422.709	1426.782	4.073	0.000	0.000	0.000	-	-	-	-
[Interval: P3-90; Well: WEST_MERREENIE_23]									
1426.782	1432.806	6.024	0.000	0.000	0.000	-	-	-	-

TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA SST. P3 (120/130); Well: WEST_MERREENIE_23]									
1432.806	1445.885	13.079	0.000	0.000	0.000	-	-	-	-
[Interval: P3-150; Well: WEST_MERREENIE_23]									
1445.885	1453.971	8.085	0.000	0.000	0.000	-	-	-	-
[Interval: P3-190; Well: WEST_MERREENIE_23]									
1453.971	1464.282	10.312	0.000	0.000	0.000	-	-	-	-
[Interval: P3-230/250; Well: WEST_MERREENIE_23]									
1464.282	1475.634	11.351	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA SST. P4; Well: WEST_MERREENIE_23]									
1475.634	1501.645	26.011	0.000	0.000	0.000	-	-	-	-
[Well WEST_MERREENIE_23]									
893.100	1501.645	608.545	54.188	0.089	199.672	0.066	0.468	0.058	3.685

Appendix 4(continued): Deterministic Method: Sand and Pay Summary Report: Category 3 – Low Permeability Cut-offs (Gas)

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*
*       Pay Summary Report for GASPAY3       *
*
*       Project : madd_drilling             *
*       User id  : gracia                   *
*       Date    : 16-May-2014 13:46:17     *
*
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TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
893.100	926.301	33.200	4.129	0.124	1.267	0.060	0.684	0.052	0.307
[Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
926.301	955.977	29.677	17.638	0.594	13.512	0.067	0.625	0.058	0.766
[Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
955.977	1068.785	112.807	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 2; Well: WEST_MEREENIE_23]									
1068.785	1129.859	61.074	8.476	0.139	6.773	0.076	0.695	0.065	0.799
[Interval: LOWER STAIRWAY 1; Well: WEST_MEREENIE_23]									
1129.859	1165.824	35.965	14.847	0.413	4.367	0.053	0.545	0.042	0.294
[Interval: HORN VALLEY SILSTONE; Well: WEST_MEREENIE_23]									
1165.824	1247.642	81.818	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-40; Well: WEST_MEREENIE_23]									
1247.642	1264.663	17.021	2.138	0.126	0.780	0.081	0.345	0.069	0.365
[Interval: PACOOTA P1-60; Well: WEST_MEREENIE_23]									
1264.663	1272.688	8.025	3.731	0.465	53.045	0.077	0.174	0.072	14.217
[Interval: PACOOTA P1-80; Well: WEST_MEREENIE_23]									
1272.688	1280.847	8.159	3.320	0.407	103.666	0.094	0.227	0.082	31.222

TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA P1-110; Well: WEST_MERREENIE_23]									
1280.847	1290.271	9.424	0.267	0.028	0.018	0.040	0.314	0.035	0.068
[Interval: PACOOTA P1-120/180; Well: WEST_MERREENIE_23]									
1290.271	1302.337	12.065	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-200; Well: WEST_MERREENIE_23]									
1302.337	1309.528	7.191	1.091	0.152	0.316	0.069	0.403	0.060	0.290
[Interval: PACOOTA P1-210; Well: WEST_MERREENIE_23]									
1309.528	1314.819	5.291	1.297	0.245	1.899	0.094	0.401	0.083	1.464
[Interval: PACOOTA P1-240; Well: WEST_MERREENIE_23]									
1314.819	1328.695	13.876	0.466	0.034	0.165	0.073	0.330	0.058	0.354
[Interval: PACOOTA P1-280; Well: WEST_MERREENIE_23]									
1328.695	1334.330	5.636	3.374	0.599	7.078	0.055	0.165	0.052	2.098
[Interval: PACOOTA P1-310; Well: WEST_MERREENIE_23]									
1334.330	1345.754	11.424	6.396	0.560	3.793	0.046	0.214	0.039	0.593
[Interval: PACOOTA P1-350; Well: WEST_MERREENIE_23]									
1345.754	1350.006	4.252	2.673	0.629	6.060	0.056	0.163	0.052	2.267
[Interval: PACOOTA SST. P2; Well: WEST_MERREENIE_23]									
1350.006	1398.202	48.196	25.171	0.522	12.391	0.061	0.565	0.046	0.492
[Interval: OGOC; Well: WEST_MERREENIE_23]									
1398.202	1408.080	9.878	0.000	0.000	0.000	-	-	-	-
[Interval: P3-10; Well: WEST_MERREENIE_23]									
1408.080	1422.709	14.629	0.000	0.000	0.000	-	-	-	-
[Interval: P3-70; Well: WEST_MERREENIE_23]									
1422.709	1426.782	4.073	0.000	0.000	0.000	-	-	-	-
[Interval: P3-90; Well: WEST_MERREENIE_23]									
1426.782	1432.806	6.024	0.000	0.000	0.000	-	-	-	-

TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA SST. P3 (120/130); Well: WEST_MERREENIE_23]									
1432.806	1445.885	13.079	0.000	0.000	0.000	-	-	-	-
[Interval: P3-150; Well: WEST_MERREENIE_23]									
1445.885	1453.971	8.085	0.000	0.000	0.000	-	-	-	-
[Interval: P3-190; Well: WEST_MERREENIE_23]									
1453.971	1464.282	10.312	0.000	0.000	0.000	-	-	-	-
[Interval: P3-230/250; Well: WEST_MERREENIE_23]									
1464.282	1475.634	11.351	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA SST. P4; Well: WEST_MERREENIE_23]									
1475.634	1501.645	26.011	0.000	0.000	0.000	-	-	-	-
[Well WEST_MERREENIE_23]									
893.100	1501.645	608.545	95.015	0.156	215.130	0.064	0.504	0.053	2.264

Appendix 5: Deterministic Method: Sand and Pay Summary Report: Category 1 – High Permeability Cut-offs (Oil) in true vertical depth

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*****
*
*      Pay Summary Report for OILPAY1      *
*
*      Project : madd_drilling             *
*      User id  : gracia                   *
*      Date    : 16-May-2014 13:46:17     *
*
*****
    
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TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
893.100	926.301	33.200	0.000	0.000	0.000	-	-	-	-
[Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
926.301	955.977	29.677	0.000	0.000	0.000	-	-	-	-
[Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
955.977	1068.785	112.807	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 2; Well: WEST_MEREENIE_23]									
1068.785	1129.859	61.074	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 1; Well: WEST_MEREENIE_23]									
1129.859	1165.824	35.965	0.000	0.000	0.000	-	-	-	-
[Interval: HORN VALLEY SILSTONE; Well: WEST_MEREENIE_23]									
1165.824	1247.642	81.818	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-40; Well: WEST_MEREENIE_23]									
1247.642	1264.663	17.021	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-60; Well: WEST_MEREENIE_23]									
1264.663	1272.688	8.025	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-80; Well: WEST_MEREENIE_23]									
1272.688	1280.847	8.159	0.000	0.000	0.000	-	-	-	-

TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA P1-110; Well: WEST_MEREENIE_23]									
1280.847	1290.271	9.424	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-120/180; Well: WEST_MEREENIE_23]									
1290.271	1302.337	12.065	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-200; Well: WEST_MEREENIE_23]									
1302.337	1309.528	7.191	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-210; Well: WEST_MEREENIE_23]									
1309.528	1314.819	5.291	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-240; Well: WEST_MEREENIE_23]									
1314.819	1328.695	13.876	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-280; Well: WEST_MEREENIE_23]									
1328.695	1334.330	5.636	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-310; Well: WEST_MEREENIE_23]									
1334.330	1345.754	11.424	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-350; Well: WEST_MEREENIE_23]									
1345.754	1350.006	4.252	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA SST. P2; Well: WEST_MEREENIE_23]									
1350.006	1398.202	48.196	0.000	0.000	0.000	-	-	-	-
[Interval: OGOC; Well: WEST_MEREENIE_23]									
1398.202	1408.080	9.878	0.000	0.000	0.000	-	-	-	-
[Interval: P3-10; Well: WEST_MEREENIE_23]									
1408.080	1422.709	14.629	0.000	0.000	0.000	-	-	-	-
[Interval: P3-70; Well: WEST_MEREENIE_23]									
1422.709	1426.782	4.073	0.000	0.000	0.000	-	-	-	-
[Interval: P3-90; Well: WEST_MEREENIE_23]									
1426.782	1432.806	6.024	0.000	0.000	0.000	-	-	-	-

TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA SST. P3 (120/130); Well: WEST_MERREENIE_23]									
1432.806	1445.885	13.079	3.228	0.247	17.082	0.095	0.230	0.093	5.292
[Interval: P3-150; Well: WEST_MERREENIE_23]									
1445.885	1453.971	8.085	0.000	0.000	0.000	-	-	-	-
[Interval: P3-190; Well: WEST_MERREENIE_23]									
1453.971	1464.282	10.312	0.000	0.000	0.000	-	-	-	-
[Interval: P3-230/250; Well: WEST_MERREENIE_23]									
1464.282	1475.634	11.351	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA SST. P4; Well: WEST_MERREENIE_23]									
1475.634	1501.645	26.011	0.000	0.000	0.000	-	-	-	-
[Well WEST_MERREENIE_23]									
893.100	1501.645	608.545	3.228	0.005	17.082	0.095	0.230	0.093	5.292

Appendix 5 (continued): Deterministic Method: Sand and Pay Summary Report: Category 2 – Conventional Cut-offs (Oil)

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*
*      Pay Summary Report for OILPAY2      *
*
*      Project   : madd_drilling           *
*      User id   : gracia                   *
*      Date      : 16-May-2014 13:46:17   *
*
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TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
893.100	926.301	33.200	0.000	0.000	0.000	-	-	-	-
[Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
926.301	955.977	29.677	0.000	0.000	0.000	-	-	-	-
[Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
955.977	1068.785	112.807	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 2; Well: WEST_MEREENIE_23]									
1068.785	1129.859	61.074	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 1; Well: WEST_MEREENIE_23]									
1129.859	1165.824	35.965	0.000	0.000	0.000	-	-	-	-
[Interval: HORN VALLEY SILSTONE; Well: WEST_MEREENIE_23]									
1165.824	1247.642	81.818	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-40; Well: WEST_MEREENIE_23]									
1247.642	1264.663	17.021	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-60; Well: WEST_MEREENIE_23]									
1264.663	1272.688	8.025	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-80; Well: WEST_MEREENIE_23]									
1272.688	1280.847	8.159	0.000	0.000	0.000	-	-	-	-

TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA P1-110; Well: WEST_MERREENIE_23]									
1280.847	1290.271	9.424	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-120/180; Well: WEST_MERREENIE_23]									
1290.271	1302.337	12.065	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-200; Well: WEST_MERREENIE_23]									
1302.337	1309.528	7.191	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-210; Well: WEST_MERREENIE_23]									
1309.528	1314.819	5.291	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-240; Well: WEST_MERREENIE_23]									
1314.819	1328.695	13.876	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-280; Well: WEST_MERREENIE_23]									
1328.695	1334.330	5.636	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-310; Well: WEST_MERREENIE_23]									
1334.330	1345.754	11.424	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-350; Well: WEST_MERREENIE_23]									
1345.754	1350.006	4.252	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA SST. P2; Well: WEST_MERREENIE_23]									
1350.006	1398.202	48.196	0.000	0.000	0.000	-	-	-	-
[Interval: OGOC; Well: WEST_MERREENIE_23]									
1398.202	1408.080	9.878	0.000	0.000	0.000	-	-	-	-
[Interval: P3-10; Well: WEST_MERREENIE_23]									
1408.080	1422.709	14.629	0.000	0.000	0.000	-	-	-	-
[Interval: P3-70; Well: WEST_MERREENIE_23]									
1422.709	1426.782	4.073	0.000	0.000	0.000	-	-	-	-
[Interval: P3-90; Well: WEST_MERREENIE_23]									
1426.782	1432.806	6.024	0.000	0.000	0.000	-	-	-	-

TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA SST. P3 (120/130); Well: WEST_MERREENIE_23]									
1432.806	1445.885	13.079	7.121	0.544	22.809	0.085	0.269	0.083	3.203
[Interval: P3-150; Well: WEST_MERREENIE_23]									
1445.885	1453.971	8.085	0.000	0.000	0.000	-	-	-	-
[Interval: P3-190; Well: WEST_MERREENIE_23]									
1453.971	1464.282	10.312	0.000	0.000	0.000	-	-	-	-
[Interval: P3-230/250; Well: WEST_MERREENIE_23]									
1464.282	1475.634	11.351	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA SST. P4; Well: WEST_MERREENIE_23]									
1475.634	1501.645	26.011	0.000	0.000	0.000	-	-	-	-
[Well WEST_MERREENIE_23]									
893.100	1501.645	608.545	7.121	0.012	22.809	0.085	0.269	0.083	3.203

Appendix 5 (continued): Deterministic Method: Sand and Pay Summary Report: Category 3 – Low Permeability Cut-offs (Oil)

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*
*      Pay Summary Report for OILPAY3      *
*
*      Project : madd_drilling             *
*      User id  : gracia                   *
*      Date    : 16-May-2014 13:46:17    *
*
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TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
893.100	926.301	33.200	0.000	0.000	0.000	-	-	-	-
[Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
926.301	955.977	29.677	0.000	0.000	0.000	-	-	-	-
[Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
955.977	1068.785	112.807	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 2; Well: WEST_MEREENIE_23]									
1068.785	1129.859	61.074	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 1; Well: WEST_MEREENIE_23]									
1129.859	1165.824	35.965	0.000	0.000	0.000	-	-	-	-
[Interval: HORN VALLEY SILSTONE; Well: WEST_MEREENIE_23]									
1165.824	1247.642	81.818	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-40; Well: WEST_MEREENIE_23]									
1247.642	1264.663	17.021	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-60; Well: WEST_MEREENIE_23]									
1264.663	1272.688	8.025	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-80; Well: WEST_MEREENIE_23]									
1272.688	1280.847	8.159	0.000	0.000	0.000	-	-	-	-

TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA P1-110; Well: WEST_MEREENIE_23]									
1280.847	1290.271	9.424	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-120/180; Well: WEST_MEREENIE_23]									
1290.271	1302.337	12.065	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-200; Well: WEST_MEREENIE_23]									
1302.337	1309.528	7.191	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-210; Well: WEST_MEREENIE_23]									
1309.528	1314.819	5.291	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-240; Well: WEST_MEREENIE_23]									
1314.819	1328.695	13.876	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-280; Well: WEST_MEREENIE_23]									
1328.695	1334.330	5.636	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-310; Well: WEST_MEREENIE_23]									
1334.330	1345.754	11.424	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-350; Well: WEST_MEREENIE_23]									
1345.754	1350.006	4.252	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA SST. P2; Well: WEST_MEREENIE_23]									
1350.006	1398.202	48.196	0.000	0.000	0.000	-	-	-	-
[Interval: OGOC; Well: WEST_MEREENIE_23]									
1398.202	1408.080	9.878	0.240	0.024	0.058	0.058	0.331	0.055	0.241
[Interval: P3-10; Well: WEST_MEREENIE_23]									
1408.080	1422.709	14.629	2.791	0.191	2.391	0.062	0.268	0.062	0.857
[Interval: P3-70; Well: WEST_MEREENIE_23]									
1422.709	1426.782	4.073	0.000	0.000	0.000	-	-	-	-
[Interval: P3-90; Well: WEST_MEREENIE_23]									
1426.782	1432.806	6.024	1.014	0.168	2.883	0.079	0.220	0.077	2.843

TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA SST. P3 (120/130); Well: WEST_MERREENIE_23]									
1432.806	1445.885	13.079	8.206	0.627	23.157	0.082	0.277	0.080	2.822
[Interval: P3-150; Well: WEST_MERREENIE_23]									
1445.885	1453.971	8.085	0.428	0.053	0.241	0.067	0.403	0.066	0.563
[Interval: P3-190; Well: WEST_MERREENIE_23]									
1453.971	1464.282	10.312	0.636	0.062	0.232	0.065	0.642	0.062	0.365
[Interval: P3-230/250; Well: WEST_MERREENIE_23]									
1464.282	1475.634	11.351	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA SST. P4; Well: WEST_MERREENIE_23]									
1475.634	1501.645	26.011	0.000	0.000	0.000	-	-	-	-
[Well WEST_MERREENIE_23]									
893.100	1501.645	608.545	13.315	0.022	28.962	0.076	0.290	0.074	2.175

Appendix 6: Deterministic Method: Sand and Pay Summary Report: Category 1 – High Permeability Cut-offs (Net Sand)

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*****
*
*       Pay Summary Report for SAND1
*
*       Project : madd_drilling
*       User id  : gracia
*       Date    : 16-May-2014 13:46:17
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TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
893.100	926.301	33.200	0.000	0.000	0.000	-	-	-	-
[Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
926.301	955.977	29.677	0.000	0.000	0.000	-	-	-	-
[Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
955.977	1068.785	112.807	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 2; Well: WEST_MEREENIE_23]									
1068.785	1129.859	61.074	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 1; Well: WEST_MEREENIE_23]									
1129.859	1165.824	35.965	0.000	0.000	0.000	-	-	-	-
[Interval: HORN VALLEY SILSTONE; Well: WEST_MEREENIE_23]									
1165.824	1247.642	81.818	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-40; Well: WEST_MEREENIE_23]									
1247.642	1264.663	17.021	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-60; Well: WEST_MEREENIE_23]									
1264.663	1272.688	8.025	2.722	0.339	52.649	0.076	0.102	0.075	19.340
[Interval: PACOOTA P1-80; Well: WEST_MEREENIE_23]									
1272.688	1280.847	8.159	2.320	0.284	103.522	0.106	0.189	0.095	44.623

TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA P1-110; Well: WEST_MERREENIE_23]									
1280.847	1290.271	9.424	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-120/180; Well: WEST_MERREENIE_23]									
1290.271	1302.337	12.065	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-200; Well: WEST_MERREENIE_23]									
1302.337	1309.528	7.191	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-210; Well: WEST_MERREENIE_23]									
1309.528	1314.819	5.291	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-240; Well: WEST_MERREENIE_23]									
1314.819	1328.695	13.876	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-280; Well: WEST_MERREENIE_23]									
1328.695	1334.330	5.636	2.911	0.517	6.961	0.056	0.138	0.055	2.391
[Interval: PACOOTA P1-310; Well: WEST_MERREENIE_23]									
1334.330	1345.754	11.424	1.668	0.146	2.932	0.055	0.160	0.050	1.758
[Interval: PACOOTA P1-350; Well: WEST_MERREENIE_23]									
1345.754	1350.006	4.252	1.863	0.438	5.849	0.061	0.141	0.058	3.140
[Interval: PACOOTA SST. P2; Well: WEST_MERREENIE_23]									
1350.006	1398.202	48.196	0.000	0.000	0.000	-	-	-	-
[Interval: OGOC; Well: WEST_MERREENIE_23]									
1398.202	1408.080	9.878	0.000	0.000	0.000	-	-	-	-
[Interval: P3-10; Well: WEST_MERREENIE_23]									
1408.080	1422.709	14.629	0.000	0.000	0.000	-	-	-	-
[Interval: P3-70; Well: WEST_MERREENIE_23]									
1422.709	1426.782	4.073	0.000	0.000	0.000	-	-	-	-
[Interval: P3-90; Well: WEST_MERREENIE_23]									
1426.782	1432.806	6.024	0.000	0.000	0.000	-	-	-	-

TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA SST. P3 (120/130); Well: WEST_MERREENIE_23]									
1432.806	1445.885	13.079	3.228	0.247	17.082	0.095	0.230	0.093	5.292
[Interval: P3-150; Well: WEST_MERREENIE_23]									
1445.885	1453.971	8.085	0.000	0.000	0.000	-	-	-	-
[Interval: P3-190; Well: WEST_MERREENIE_23]									
1453.971	1464.282	10.312	0.000	0.000	0.000	-	-	-	-
[Interval: P3-230/250; Well: WEST_MERREENIE_23]									
1464.282	1475.634	11.351	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA SST. P4; Well: WEST_MERREENIE_23]									
1475.634	1501.645	26.011	0.000	0.000	0.000	-	-	-	-
[Well WEST_MERREENIE_23]									
893.100	1501.645	608.545	14.712	0.024	188.994	0.076	0.170	0.073	12.846

Appendix 6 (continued): Deterministic Method: Sand and Pay Summary Report: Category 2 – Conventional Cut-offs (Net Sand)

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*****
*
*       Pay Summary Report for SAND2
*
*       Project : madd_drilling
*       User id : gracia
*       Date    : 16-May-2014 13:46:17
*
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TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
893.100	926.301	33.200	0.000	0.000	0.000	-	-	-	-
[Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
926.301	955.977	29.677	16.021	0.540	13.485	0.069	0.606	0.061	0.842
[Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
955.977	1068.785	112.807	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 2; Well: WEST_MEREENIE_23]									
1068.785	1129.859	61.074	7.512	0.123	6.702	0.080	0.690	0.069	0.892
[Interval: LOWER STAIRWAY 1; Well: WEST_MEREENIE_23]									
1129.859	1165.824	35.965	12.369	0.344	4.240	0.053	0.528	0.043	0.343
[Interval: HORN VALLEY SILSTONE; Well: WEST_MEREENIE_23]									
1165.824	1247.642	81.818	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-40; Well: WEST_MEREENIE_23]									
1247.642	1264.663	17.021	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-60; Well: WEST_MEREENIE_23]									
1264.663	1272.688	8.025	2.820	0.351	52.669	0.075	0.104	0.074	18.674
[Interval: PACOOTA P1-80; Well: WEST_MEREENIE_23]									
1272.688	1280.847	8.159	2.589	0.317	103.591	0.102	0.199	0.091	40.018

TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA P1-110; Well: WEST_MERREENIE_23]									
1280.847	1290.271	9.424	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-120/180; Well: WEST_MERREENIE_23]									
1290.271	1302.337	12.065	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-200; Well: WEST_MERREENIE_23]									
[Interval: PACOOTA P1-210; Well: WEST_MERREENIE_23]									
1309.528	1314.819	5.291	1.085	0.205	1.832	0.096	0.403	0.085	1.688
[Interval: PACOOTA P1-240; Well: WEST_MERREENIE_23]									
1314.819	1328.695	13.876	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-280; Well: WEST_MERREENIE_23]									
1328.695	1334.330	5.636	3.258	0.578	7.076	0.055	0.148	0.053	2.172
[Interval: PACOOTA P1-310; Well: WEST_MERREENIE_23]									
1334.330	1345.754	11.424	5.095	0.446	3.720	0.048	0.200	0.041	0.730
[Interval: PACOOTA P1-350; Well: WEST_MERREENIE_23]									
1345.754	1350.006	4.252	2.538	0.597	6.054	0.057	0.158	0.053	2.385
[Interval: PACOOTA SST. P2; Well: WEST_MERREENIE_23]									
1350.006	1398.202	48.196	0.000	0.000	0.000	-	-	-	-
[Interval: OGOC; Well: WEST_MERREENIE_23]									
1398.202	1408.080	9.878	0.000	0.000	0.000	-	-	-	-
[Interval: P3-10; Well: WEST_MERREENIE_23]									
1408.080	1422.709	14.629	0.000	0.000	0.000	-	-	-	-
[Interval: P3-70; Well: WEST_MERREENIE_23]									
1422.709	1426.782	4.073	0.000	0.000	0.000	-	-	-	-
[Interval: P3-90; Well: WEST_MERREENIE_23]									
1426.782	1432.806	6.024	0.000	0.000	0.000	-	-	-	-

TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA SST. P3 (120/130); Well: WEST_MERREENIE_23]									
1432.806	1445.885	13.079	7.121	0.544	22.809	0.085	0.269	0.083	3.203
[Interval: P3-150; Well: WEST_MERREENIE_23]									
1445.885	1453.971	8.085	0.000	0.000	0.000	-	-	-	-
[Interval: P3-190; Well: WEST_MERREENIE_23]									
1453.971	1464.282	10.312	0.000	0.000	0.000	-	-	-	-
[Interval: P3-230/250; Well: WEST_MERREENIE_23]									
1464.282	1475.634	11.351	2.215	0.195	4.083	0.082	0.779	0.079	1.843
[Interval: PACOOTA SST. P4; Well: WEST_MERREENIE_23]									
1475.634	1501.645	26.011	7.544	0.290	9416.593	0.083	0.782	0.078	1248.221#
[Well WEST_MERREENIE_23]									
893.100	1501.645	608.545	71.069	0.117	9643.157	0.070	0.494	0.063	135.687#

Calculated value too high which affects overall total average permeability value.

Appendix 6 (continued): Deterministic Method: Sand and Pay Summary Report: Category 3 – Low Permeability Cut-offs (Net Sand)

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*****
*
*       Pay Summary Report for SAND3
*
*       Project : madd_drilling
*       User id  : gracia
*       Date    : 16-May-2014 13:46:17
*
*****
    
```

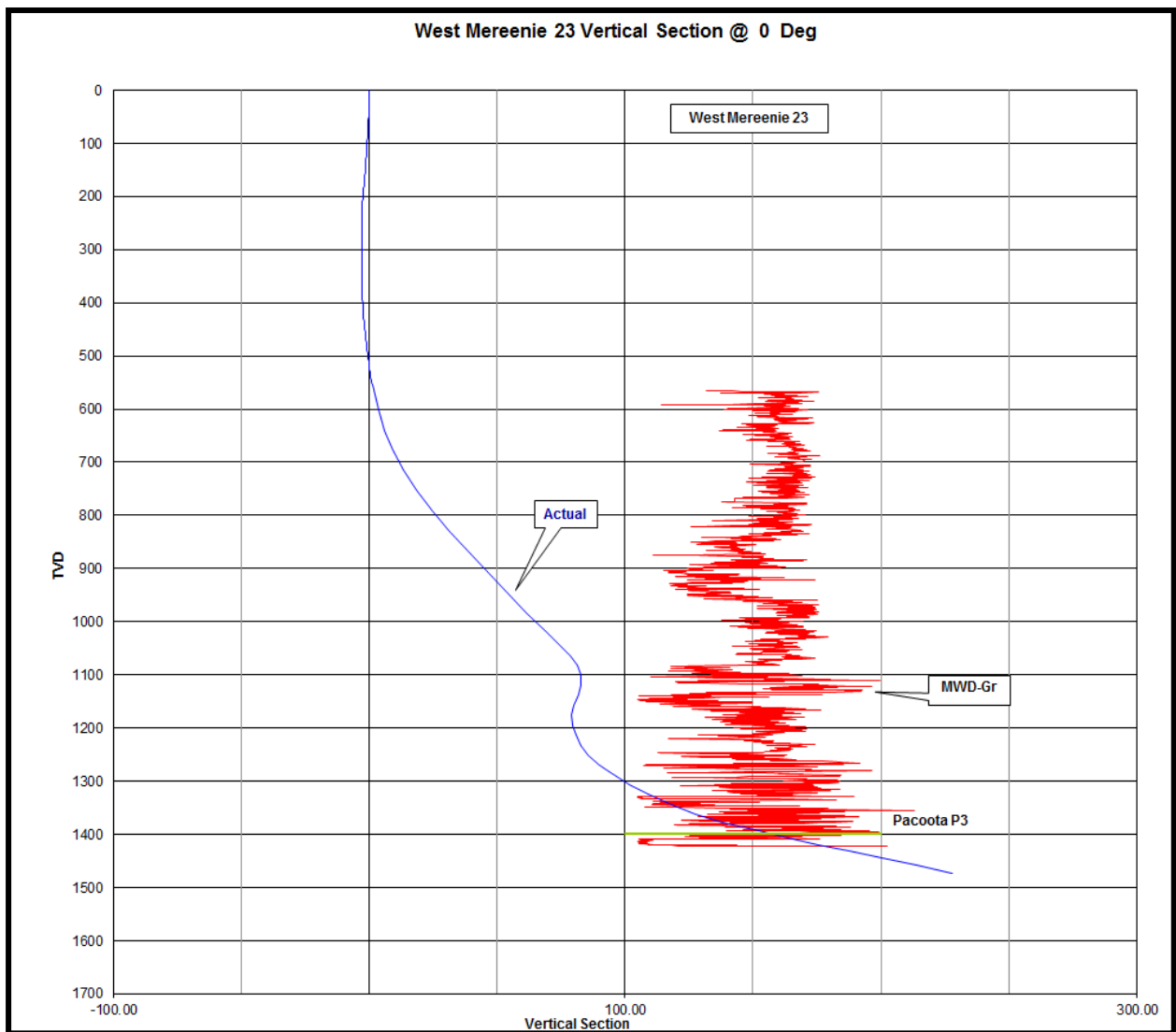
TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
893.100	926.301	33.200	4.129	0.124	1.267	0.060	0.684	0.052	0.307
[Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
926.301	955.977	29.677	17.738	0.598	13.517	0.067	0.626	0.058	0.762
[Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MEREENIE_23]									
955.977	1068.785	112.807	0.000	0.000	0.000	-	-	-	-
[Interval: LOWER STAIRWAY 2; Well: WEST_MEREENIE_23]									
1068.785	1129.859	61.074	8.476	0.139	6.773	0.076	0.695	0.065	0.799
[Interval: LOWER STAIRWAY 1; Well: WEST_MEREENIE_23]									
1129.859	1165.824	35.965	14.898	0.414	4.380	0.053	0.546	0.042	0.294
[Interval: HORN VALLEY SILSTONE; Well: WEST_MEREENIE_23]									
1165.824	1247.642	81.818	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-40; Well: WEST_MEREENIE_23]									
1247.642	1264.663	17.021	2.138	0.126	0.780	0.081	0.345	0.069	0.365
[Interval: PACOOTA P1-60; Well: WEST_MEREENIE_23]									
1264.663	1272.688	8.025	3.731	0.465	53.045	0.077	0.174	0.072	14.217
[Interval: PACOOTA P1-80; Well: WEST_MEREENIE_23]									
1272.688	1280.847	8.159	3.320	0.407	103.666	0.094	0.227	0.082	31.222

TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA P1-110; Well: WEST_MERREENIE_23]									
1280.847	1290.271	9.424	0.267	0.028	0.018	0.040	0.314	0.035	0.068
[Interval: PACOOTA P1-120/180; Well: WEST_MERREENIE_23]									
1290.271	1302.337	12.065	0.000	0.000	0.000	-	-	-	-
[Interval: PACOOTA P1-200; Well: WEST_MERREENIE_23]									
1302.337	1309.528	7.191	1.091	0.152	0.316	0.069	0.403	0.060	0.290
[Interval: PACOOTA P1-210; Well: WEST_MERREENIE_23]									
1309.528	1314.819	5.291	1.297	0.245	1.899	0.094	0.401	0.083	1.464
[Interval: PACOOTA P1-240; Well: WEST_MERREENIE_23]									
1314.819	1328.695	13.876	0.466	0.034	0.165	0.073	0.330	0.058	0.354
[Interval: PACOOTA P1-280; Well: WEST_MERREENIE_23]									
1328.695	1334.330	5.636	3.374	0.599	7.078	0.055	0.165	0.052	2.098
[Interval: PACOOTA P1-310; Well: WEST_MERREENIE_23]									
1334.330	1345.754	11.424	6.396	0.560	3.793	0.046	0.214	0.039	0.593
[Interval: PACOOTA P1-350; Well: WEST_MERREENIE_23]									
1345.754	1350.006	4.252	2.673	0.629	6.060	0.056	0.163	0.052	2.267
[Interval: PACOOTA SST. P2; Well: WEST_MERREENIE_23]									
1350.006	1398.202	48.196	25.171	0.522	12.391	0.061	0.565	0.046	0.492
[Interval: OGOC; Well: WEST_MERREENIE_23]									
1398.202	1408.080	9.878	0.240	0.024	0.058	0.058	0.331	0.055	0.241
[Interval: P3-10; Well: WEST_MERREENIE_23]									
1408.080	1422.709	14.629	2.791	0.191	2.391	0.062	0.268	0.062	0.857
[Interval: P3-70; Well: WEST_MERREENIE_23]									
1422.709	1426.782	4.073	0.000	0.000	0.000	-	-	-	-
[Interval: P3-90; Well: WEST_MERREENIE_23]									
1426.782	1432.806	6.024	1.014	0.168	2.883	0.079	0.220	0.077	2.843

TVD_TOP METRES	TVD_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	KINTH MDM	PHIT_AV V/V	SWT_AV V/V	PHIE_AM V/V	KINT_AM MD
[Interval: PACOOTA SST. P3 (120/130); Well: WEST_MERREENIE_23]									
1432.806	1445.885	13.079	8.206	0.627	23.157	0.082	0.277	0.080	2.822
[Interval: P3-150; Well: WEST_MERREENIE_23]									
1445.885	1453.971	8.085	0.428	0.053	0.241	0.067	0.403	0.066	0.563
[Interval: P3-190; Well: WEST_MERREENIE_23]									
1453.971	1464.282	10.312	0.636	0.062	0.232	0.065	0.642	0.062	0.365
[Interval: P3-230/250; Well: WEST_MERREENIE_23]									
1464.282	1475.634	11.351	3.315	0.292	4.974	0.080	0.790	0.076	1.501
[Interval: PACOOTA SST. P4; Well: WEST_MERREENIE_23]									
1475.634	1501.645	26.011	8.891	0.342	9434.634	0.081	0.802	0.076	1061.155#
[Well WEST_MERREENIE_23]									
893.100	1501.645	608.545	120.685	0.198	9683.718	0.067	0.514	0.058	80.239#

Calculated value too high which affects overall total average permeability value

Figure 1: West Mereenie 23 Well-Bore Trajectory



APPENDIX IV (b): MDT PRESSURE SURVEY DATA

Santos

PRESSURE SURVEY

Well: West Mereenie 23
 Witness: David Adderley
 Engineer: Tamara Svetlichnaya / Chen Xiang

RT: 749.0 m
 Last circulated at : 28/12/2013 17:30 hrs

Gauge Type : Quartz (strain backup)
 Probe/Packer Type : LD (Large Diameter)

Page : 1
 Date : 1/01/2014

	FORMATION	DEPTH RT MD m	DEPTH TVD RT m	DEPTH SUBSEA m	TEST RESULTS							INTERPRETATION					COMMENTS FLUID TYPE
					HYDRO BEFORE PSIA	INITIAL DRAWDOWN PSIA	FINAL BUILD UP PSIA	FORM PRESS PSIA	HYDRO AFTER PSIA	TEMP Deg C	D/D MOB MD/CP	TYPE D/D	TEST TIME mins	RATE CHANGE PSI/MIN	TYPE BUILD UP	DEPL SC	
	CORRELATION PASS 1	968															Add +0.3m
1	Upper Stairway	941.2	936.7	-187.7	1441.2				1441.3	45.5			8				Seal Failure
2	Upper Stairway	941.0	936.5	-187.5	1441.0	208.6	222.1		1440.8	45.9		N	5	35	S		Curtailed
3	Upper Stairway	947.0	942.4	-193.4	1449.9				1450.0	46.6			6				Seal Failure
4	Upper Stairway	947.3	942.7	-193.7	1450.5				1450.5	46.6			6				Seal Failure
5	Upper Stairway	946.7	942.1	-193.1	1449.7				1449.7	46.6			10				Seal Failure
6	Upper Stairway	954.0	949.2	-200.2	1460.6				1460.7	47.1			6				Seal Failure
7	Middle Stairway	993.0	987.4	-238.4	1518.9	46.5	52.0		1518.6	48.0		L	3.5	80	S		Shale Test - Curtailed
8	Upper Stairway	953.8	949.0	-200.0	1460.3				1460.3	47.9			6				Seal Failure
9	Upper Stairway	955.0	950.2	-201.2	1462.1				1462.1	46.7			5				Seal Failure
10	Upper Stairway	954.7	949.9	-200.9	1461.7				1461.7	46.7			5				Seal Failure
11	Upper Stairway	958.0	953.1	-204.1	1466.6				1466.6	46.9			4.5				Seal Failure
12	Upper Stairway	957.7	952.8	-203.8	1466.2				1466.2	47.1			4				Seal Failure
	CORRELATION PASS 2	1190															Add +0.3m
13	Lower Stairway 1	1151.8	1144.0	-395.0	1757.7				1757.7	51.3			4				Seal Failure
14	Lower Stairway 1	1152.0	1144.2	-395.2	1758.0				1758.0	51.7			4				Seal Failure
15	Lower Stairway 1	1153.0	1145.2	-396.2	1759.6				1759.6	52.1			5				Seal Failure
16	Lower Stairway 1	1152.8	1145.0	-396.0	1759.2				1759.3	52.4			4.5				Seal Failure
17	Lower Stairway 1	1154.5	1146.7	-397.7	1761.9				1761.9	52.4			4				Seal Failure
18	Lower Stairway 1	1155.0	1147.2	-398.2	1762.7				1762.7	52.5			4.5				Seal Failure
19	Lower Stairway 1	1154.7	1146.9	-397.9	1762.3				1762.3	52.7			4				Seal Failure
	CORRELATION PASS 3	1300															Add +0.2m
20	Pacoota P1-60	1277.7	1268.9	-519.9	1948.6	200.2	1704.3	1704.3	1948.5	54.2	0.24	N	9.5	<1	S		Good Test
21	Pacoota P1-60	1278.5	1269.7	-520.7	1949.7	195.3	485.3		1949.6	54.6		N	6	80	S		Curtailed
22	Pacoota P1-60	1278.8	1270.0	-521.0	1950.1	195.5	1551.0		1950.1	54.9		N	10	5	S		Curtailed
23	Pacoota P1-60	1279.5	1270.7	-521.7	1951.2	198.2	1529.4		1951.2	55.2		N	10	8	S		Curtailed
24	Pacoota P1-60	1279.3	1270.5	-521.5	1950.9	423.2	1569.6		1950.9	55.4		N	10	9	S		Curtailed
25	Pacoota P1-60	1279.7	1270.9	-521.9	1951.5				1951.6	55.5			5.5				Seal Failure
26	Pacoota P1-60	1279.8	1271.0	-522.0	1951.8	184.7	256.2		1951.6	55.6		N	5	23	S		Curtailed
27	Pacoota P1-80	1283.5	1274.6	-525.6	1957.2	1064.6	1146.3	1146.3	1957.1	55.5	1.9	N	7	<1	R	Depl	Good Test
28	Pacoota P1-80	1285.2	1276.2	-527.2	1959.6				1959.6	55.5			6.5				Seal Failure
29	Pacoota P1-40	1263.2	1254.8	-505.8	1927.0				1926.9	53.7			4				Seal Failure
	CORRELATION PASS 4	1380															Add +0.2m
30	Pacoota P1-210	1322.8	1311.7	-562.7	2014.1				2014.1	55.1			3.5				Seal Failure
31	Pacoota P1-280	1342.5	1329.9	-580.9	2041.8	220.5	641.3	641.3	2041.7	56.0	0.44	N	10	2	S	Depl	Good Test
32	Pacoota P1-280	1343.5	1330.8	-581.8	2043.0	183.0	733.3		2042.9	56.6		N	10	4	S	Depl	Curtailed
33	Pacoota P1-280	1344.0	1331.2	-582.2	2043.9	217.2	713.1	713.1	2043.8	56.6	0.23	N	8		S	Depl	Good Test
34	Pacoota P1-280	1345.0	1332.2	-583.2	2045.1	191.9	249.0		2045.1	56.5		N	7	18	S		Curtailed
35	Pacoota P1-280	1344.7	1331.9	-582.9	2044.8	189.4	233.7		2044.7	56.6		N		20	S		Curtailed

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PRESSURE SURVEY

Well: West Mereenie 23
 Witness: David Adderley
 Engineer: Tamara Svetlichnaya / Chen Xiang

RT: 749.0 m
 Last circulated at: 28/12/2013 17:30 hrs

Gauge Type: Quartz (strain backup)
 Probe/Packer Type: LD (Large Diameter)

Page: 1
 Date: 1/01/2014

	FORMATION	DEPTH RT MD m	DEPTH TVD RT m	DEPTH SUBSEA m	TEST RESULTS							INTERPRETATION					COMMENTS FLUID TYPE	
					HYDRO BEFORE PSIA	INITIAL DRAWDOWN PSIA	FINAL BUILD UP PSIA	FORM PRESS PSIA	HYDRO AFTER PSIA	TEMP Deg C	D/D MOB MD/CP	TYPE D/D	TEST TIME mins	RATE CHANGE PSI/MIN	TYPE BUILD UP	DEPL SC		
36	Pacoota P1-310	1351.0	1337.4	-588.4	2053.6					2053.5	56.5			3.5				Seal Failure
37	Pacoota P1-310	1351.3	1337.7	-588.7	2054.0					2053.9	56.5			5				Seal Failure
38	Pacoota P1-310	1353.0	1339.3	-590.3	2056.4					2056.3	56.5			4				Seal Failure
39	Pacoota P1-310	1352.8	1339.1	-590.1	2056.1					2056.0	56.4			4				Seal Failure
40	Pacoota P1-310	1357.3	1343.1	-594.1	2062.2	255.7	311.2			2062.1	56.2		N	5	14	S		Curtailed
41	Pacoota P1-350	1362.5	1347.9	-598.9	2069.2	304.4	1965.8	1965.8		2069.2	56.7	0.04	N	7.5	<1	S	SC?	Good Test
42	Pacoota P1-350	1363.5	1348.8	-599.8	2070.3					2070.3	57.0			3.5				Seal Failure
43	Pacoota P1-350	1363.3	1348.6	-599.6	2070.3					2070.3	57.2			4				Seal Failure
44	Pacoota P1-350	1364.0	1349.2	-600.2	2071.3					2071.3	57.2			4				Seal Failure
	CORRELATION PASS 5	1455																Add +0.5m
45	Pacoota P2	1393.1	1373.6	-624.6	2108.9	281.9	383.3			2108.7	57.4		N	4.5	36	S		Curtailed
46	Pacoota P2	1393.3	1373.8	-624.8	2109.0					2109.0	57.5			3.5				Seal Failure
47	Pacoota P2	1433.9	1404.6	-655.6	2156.1					2156.1	57.8			4				Seal Failure
48	Pacoota P2	1434.1	1404.8	-655.8	2156.3					2156.3	58.1			4				Seal Failure
49	Pacoota P3-10	1439.1	1408.4	-659.4	2162.0	397.0	2083.7	2083.7		2161.8	58.6	0.07	N	7.5	<1	S	SC?	Good Test
50	Pacoota P3-10	1440.4	1409.4	-660.4	2163.4					2163.4	58.7			4				Seal Failure
	CORRELATION PASS 6	1475																Add +0.4m
51	Pacoota P3-10	1449.9	1416.2	-667.2	2173.7					2173.7	58.9			3.5				Seal Failure
52	Pacoota P3-10	1453.9	1419.1	-670.1	2178.2					2178.2	59.9			4				Seal Failure
53	Pacoota P3-90	1468.1	1429.5	-680.5	2194.0					2194.0	59.2			3.5				Seal Failure
54	Pacoota P3-90	1468.3	1429.6	-680.6	2194.0					2194.0	59.2			4				Seal Failure
55	Pacoota P3-90	1468.6	1429.9	-680.9	2194.5	400.5	2072.9	2072.9		2194.4	59.5	0.04	N	10	<1	S		Good Test
56	Pacoota P3-90	1468.9	1430.1	-681.1	2194.8	312.9	1984.8			2194.7	59.6		N	10	28	S		Curtailed
57	Pacoota P3-90	1469.2	1430.3	-681.3	2195.1					2195.1	59.7			4				Seal Failure
58	Pacoota P3-90	1468.7	1429.9	-680.9	2194.6	423.0	2051.4	2051.4		2194.5	59.8	0.19	N	9.5	<1	S		Good Test
59	Pacoota P3-90	1471.2	1431.7	-682.7	2197.5					2197.4	59.8			3.5				Seal Failure

Planned pressure points below 1471.2m were not attempted due to being unable to pass tight / sticky hole at 1484m.

Expected Temp Gradient:	2.1	deg C/100m
Expected Water Gradient:	0.433	psi/ft
Mud Weight :	8.8	ppg
Mud Gradient:	0.4576	psi/ft

Normal Drawdown : Pressure does not drop to zero
 Limited Drawdown : Pressure drops to zero
 Build Up types: Immediate, Rapid, Good, Slow.

RESULTS SUMMARY

Tests Requested: 70
 Total Tests: 59
 Good Tests: 8
 Curtailed Tests: 14
 Seal Failures: 37
 Samples: 0
 Correlation Passes: 6

APPENDIX IV(c): FIELD ELECTRIC LOG REPORT

Santos

FIELD ELECTRIC LOG REPORT

WELL: West Meerenie 23 **GEOLOGIST:** David Adderley
LOGGING ENGINEER: T. Svetlichnaya / L. Sultanova / C. Xiang
RUN NO: 1, 2, 3, 4, 5, 6, 7
DRILLER DEPTH: 1572m **LOGGER'S DEPTH:** 1573.3m
ARRIVED ON SITE: 28/12/2013
ACTUAL LOG TIME: 27.00 hrs **LOST TIME LOGGER'S:** 25.0 hrs
TOTAL TIME: 74.50 hrs **LOST TIME OTHERS:** 19.5 hrs

TYPE OF LOG	PEX-HNGS-HRLA-SP	FMI-SONIC SCANNER	ECS-CMR-GR
TIME CIRC STOPPED	17:30 hrs 28-December-13	17:30 hrs 28-December-13	17:30 hrs 28-December-13
TIME TOOL RIG UP	03:00 hrs 29-Dec-13	10:15 hrs 29-Dec-13	23:30 hrs 29-Dec-13
TIME RUN IN HOLE	05:00 hrs 29-Dec-13	16:30 hrs 29-Dec-13	03:00 hrs 30-Dec-13
TIME ON BOTTOM/ START LOG	06:15 hrs 29-Dec-13	19:00 hrs 29-Dec-13	-
TIME TOOL RIG DOWN	10:15 hrs 29-Dec-13	23:30 hrs 29-Dec-13	17:15 hrs 30-Dec-13
TOTAL TIME	7:15	13:15	17:45

TYPE OF LOG	CMR-GR	MDT-GR	GR-CCL (DST 1)
TIME CIRC STOPPED	17:30 hrs 28-December-13	17:30 hrs 28-December-13	10:30 hrs 02-January-14
TIME TOOL RIG UP	17:15 hrs 31-Dec-13	06:15 hrs 01-Jan-14	05:30 hrs 03-Jan-14
TIME RUN IN HOLE	19:30 hrs 31-Dec-13	07:15 hrs 01-Jan-14	06:00 hrs 03-Jan-14
TIME ON BOTTOM/ START LOG	21:15 hrs 31-Dec-13	07:45 hrs 01-Jan-14	06:15 hrs 03-Jan-14
TIME TOOL RIG DOWN	06:15 hrs 01-Jan-14	01:30 hrs 02-Jan-14	07:45 hrs 03-Jan-14
TOTAL TIME	13:00	19:15	2:15

TYPE OF LOG	GR-CCL (DST 2)		
TIME CIRC STOPPED	10:30 hrs 02-January-14		
TIME TOOL RIG UP	15:00 hrs 04-Jan-14		
TIME RUN IN HOLE	15:15 hrs 04-Jan-14		
TIME ON BOTTOM/ START LOG	15:30 hrs 04-Jan-14		
TIME TOOL RIG DOWN	16:45 hrs 04-Jan-14		
TOTAL TIME	1:45		

TYPE OF LOG	FROM	TO	TIME SINCE LAST CIRC	COMMENTS/REPEAT SECTION	BHT
Run 1: PEX-HNGS-HRLA-SP					
GR	1550m	20m	12.75 hrs	og bulk shifted to tie into casing sho	62.6 °C at 1539.9m
HNGS	1551m	566m			
HRLA	1566m	567m			
MCFL	1566m	567m			
CNL	1563m	567m			
TLD1	1565m	567m			
TLD2	1556m	567m			
SP	1546m	567m			
Run 2: FMI-SSCAN	1573.3m	870m	25.5 hrs	SSCAN in full acquisition mode from TD to 870m	60.7 °C at 1546.0m
Run 3: ECS-CMR-GR	-	-	-	Became stuck - Successfully Fished	-
Run 4: CMR-GR	1573.3m	870m	75.75 hrs	400'/hr (ECS failed - not run)	61.7 °C at 1560.2m
Run 5: MDT-GR	941.0m	1471.2m	101.25 hrs	59 points: 8 good, 14 curtailed, 37 seal failures	61.7 °C at 1474.8m
Run 6: GR-CCL	1390m	1335m	-	Pip found at 1368.55m (up 2.1m)	-
Run 7: GR-CCL	1355m	1315m	-	Pip found at 1340.05m (up 1.0m)	-

MUD DATA					
MUD SYSTEM:	NaCl		MW:	8.8	
Rm:	0.11 Ohm.M @ 30.4° C		FV:	34	
Rmf:	0.09 Ohm.M @ 30.4° C		PV/YP:	5/14	
Rmc:	0.14 Ohm.M @ 30.4° C		FL:	11	pH: 9.0

REMARKS / RECOMMENDATIONS:

- 1) No wireline jars or rollers were available for any logging runs.
- 2) Schlumberger provided hand held radios for communications to the rig floor while rigging up / down - used in conjunction with hand signals.
- 3) No telephone was available in the wireline unit.
- 4) Winch operators display not working for first three runs - had to turn around to see engineers display for depth and alarms etc.
- 5) Two of the four air conditioners not working.

Run 1: PEX-HRLA-HNGS-SP

- 1) Schlumberger depth control procedures followed involved: Zeroing at surface. Applying no correction while RIH recording down log. Applying no correction at TD. Logging up main pass with calipers open.
- 2) At this point a depth shift correction would then have been applied at surface tying the main pass into the downlog. However this would have resulted in too much correction (4.3m) being applied in 47° inclination hole and was not followed.
- 3) Instead a bulk shift of 2.3m was added to the main pass to tie into the Drillers casing shoe depth of 566.9m, this resulted in a loggers TD of 1573.3m (1572m drillers).
- 4) High Resolution data (1750'/hr) was recorded from TD to 870m, standard resolution (3600'/hr) was recorded from 870m to surface.
- 5) The upper density caliper (CALI.2) displayed large variation in readings from 1" under gauge to 2" over gauge - 0.19" added in casing. The four arm caliper of the FMI tool on Run 2 showed the hole to be close to in gauge, upper density caliper readings suspected to be incorrect.
- 6) Due to the suspect upper density caliper (CALI.2), the corresponding density curve (RHO8.2) may also not be reliable.
- 7) Several washed out zones were observed in the Lower Stairway 2 and Horn Valley Siltstone. No tight hole was observed in Run 1.

Run 2: FMI-Sonic Scanner

- 1) When powering up tool string near surface FMI tool would not respond, trouble shot without success. Pulled out of hole and replaced cartridge on FMI tool which corrected problem. Picked up tools again and tested string successfully - 3.5hrs lost time loggers.
- 2) At 1469m while running in hole lost cable head tension from 1000lbs to ~260lbs, picked up (not sticky) and informed company man, he advised to attempt to work past. Lost tension again higher at 1408m. Picked up to 1360m and ran in hole to TD with low HTen but tool still moving. Night company man came to unit to observe running in hole to bottom with low cable head tension.
- 3) Logged up main FMI-Sonic Scanner pass from TD to 1270m, Schlumberger decided FMI data quality was inadequate due to 'phase shift' affecting image alignment (caused by hole deviation). Ran in hole again to correct phase shift and logged up again from TD to 870m. This phase shift correction and re-logging resulted in 1hr lost time other - attributed to hole deviation.
- 4) Due to difficulty getting down a correlation was not performed at TD - Log depth shifted after recording, +3.9m was added to match Run 1.

Run 3: ECS-CMR-GR

- 1) The WSG was not present in the logging unit for Run 3 due to being out of hours, this was decided in consultation with the Operations Geologist as there were a total of four logging runs scheduled. WSG was present from approximately one hour after tools getting stuck.
- 2) Calibrated ECS by logging up within casing, while running in hole.
- 3) Apparently the Schlumberger field engineers were given instructions, by Schlumberger in town, to perform a frequency test (LFST) at 1477m due to the higher porosity in that zone, for tuning the CMR tool.
- 4) The two Schlumberger engineers, who were both up at that time, followed that instruction to stop at 1477m. This was in the same region that there was difficulty getting tools down on the previous run - deviation in this section of hole is about 43°.
- 5) At 1481m (CMR antenna 1477m) the tools became stuck in hole, 8000lbs tension was applied to try to free the tools - unsuccessfully.
- 6) The Schlumberger engineers on site commented that they had limited experience working with highly deviated wells.
- 7) Decision was made to release the ECRD. At 13:13hrs attempted to apply voltage to release cable head - unable to apply voltage. At 15:35hrs the problem was rectified, voltage and current were able to be applied to try to release head. Six attempts were made each time increasing voltage, attempting to release head unsuccessfully. When spooling out extra cable the head released unexpectedly at 16:26hrs - retrieved cable. 3hrs lost time loggers was attributed while attempting to release the ECRD.
- 8) A fishing assembly with overshot was made up and ran in hole, the fish was tagged at 1465m. The fish was chased to bottom before it could be latched at 1557m (rupture disk burst at 2000psi). When at surface it was found that the rubber 'bottom nose' was left in hole.
- 9) 37hrs lost time other was attributed from the time the Run 3: ECS-CMR-GR tools became stuck in hole during a frequency test at 1481m, until the same frequency test was performed during Run 4: CMR-GR at 1279m - During this time Run 3 tools were fished out of hole.

Run 4: CMR-GR

- 1) The fished ECS tool was successfully tested on surface (no backup), then when the tool was made up in the derrick it failed - suspected short.
- 2) The backup CMR tool was made up with a HNGS tool (used only for weight) and ran in hole for Run 4.
- 3) No hole finder was available for Run 4.
- 4) Depth control tied into GR from run 1.
- 5) A drop off test was performed at 1279m (antenna depth) prior to performing a frequency test (LFST) to tune the CMR tool.
- 6) While logging up at 400'/hr, the tools became briefly stuck, the calipers were closed and 2500lbs overpull applied to get free, the calipers were opened again at 1472m.

Run 5: MDT-GR

- 1) Depth control tied into GR from run 1.
- 2) Drop off tests were regularly performed to try to identify zones where tools may become stuck - all drop off tests were good.
- 3) A 10 minute pre-test time limit was adhered to for all points. A 1 psi/minute stabilisation criteria was used.
- 4) Due to the high frequency of seal failures in the Stairway Sandstone, a shale test was performed at 933m (point 7) successfully.
- 5) While running in hole after point 59, the tools were held up at 1484m, overpull picking back up. The company man was informed and was present for the second attempt to pass, again the tools stopped moving, overpull of 1800lbs was observed. Pulled out of hole and confirmed cancellation of remaining points with Operations Geologist.
- 6) 59 points: 8 good, 14 curtailed, 37 seal failures.

Run 6: GR-CCL (DST 1)

- 1) Depth control tied into GR from run 1.
- 2) Pip tag found at 1368.55m, needed to move pipe up 2.1m to packer setting depth.

Run 7: GR-CCL (DST 2)

- 1) Depth control tied into GR from run 1.
- 2) Pip tag found at 1340.05m, needed to move pipe up 1.0m to packer setting depth.

LOST TIME BREAKDOWN:

Run 2: FMI-Sonic Scanner, **3.5hrs lost time loggers**. At 12:49hrs 29/12/2013, at 80m, discovered FMI tool not powering up, pulled out and changed a part of the FMI tool (cartridge). At 16:19hrs the tool string was made up again and successfully tested.

Run 2: FMI-Sonic Scanner, **1.0hr lost time other**. At 17:55hrs 29/12/2013, logged up from TD. At 1270m stopped recording due to image quality problems (suspected due to hole deviation), ran in hole and corrected phase shift. At 19:02hrs commenced logging up again.

Run 3: ECS-CMR-GR, **37.0hrs lost time other** was attributed from the time the Run 3: ECS-CMR-GR tools became stuck in hole during a frequency test at 1481m, until the same frequency test was performed during Run 4: CMR-GR at 1279m - During this time Run 3 tools were unlatched and fished out of hole. The 37hrs does not include the 3hrs described below while trying to release the cable using the ECRD.

Note: 50% of this lost time subsequently attributed to SLB

Run 3: ECS-CMR-GR, **3.0hrs lost time loggers**. At 13:13hrs 30/12/2013, Schlumberger attempted to release their cable from the tools using the ECRD. At 16:26hrs the cable was successfully released, allowing 15 minutes for how long the ECRD should have taken to release, 3.0hrs of lost time was recorded. A number of issues contributed to this lost time, apparently the wrong software was being used first, then it was thought that too much tension was being applied to the cable while trying to release.

WELLSITE LOG QUALITY CONTRL CHECKS

LOF	Y	MUD SAMPLE RES	Y	TOOL NO./CODE CHECK	Y
OFFSET WELL DATA	Y	CABLE DATA CARD	Y	LOG SEQUENCE CONFIRM	Y

LOG TYPE	PEX-HRLA-HNGS	FMI-SSCAN	CMR-GR	COMMENTS
Casing Check	Y		Y	
Scale Check	Y	Y	Y	
Depth Casing Total	Y			Run 1: Loggers casing shoe tied into Drillers
Calibration OK	Y	Y	Y	
Repeatability	Y	Y	Y	
Logging Speed	1750/hr	1150/hr	400/hr	
Offset well repeatability	Y			
Noisy/Missing Data	N	N	N	
Rm Measurement	Y	Y	Y	
LLS/LLD/Check	Y			
PERF/RHOB Check	Y			
Caliper Check	N	Y	Y	Run 1: CALI.2 data unreliable
Log Header/Tail	Y			
Comments				
Print/Film Quality	Y	Y	Y	

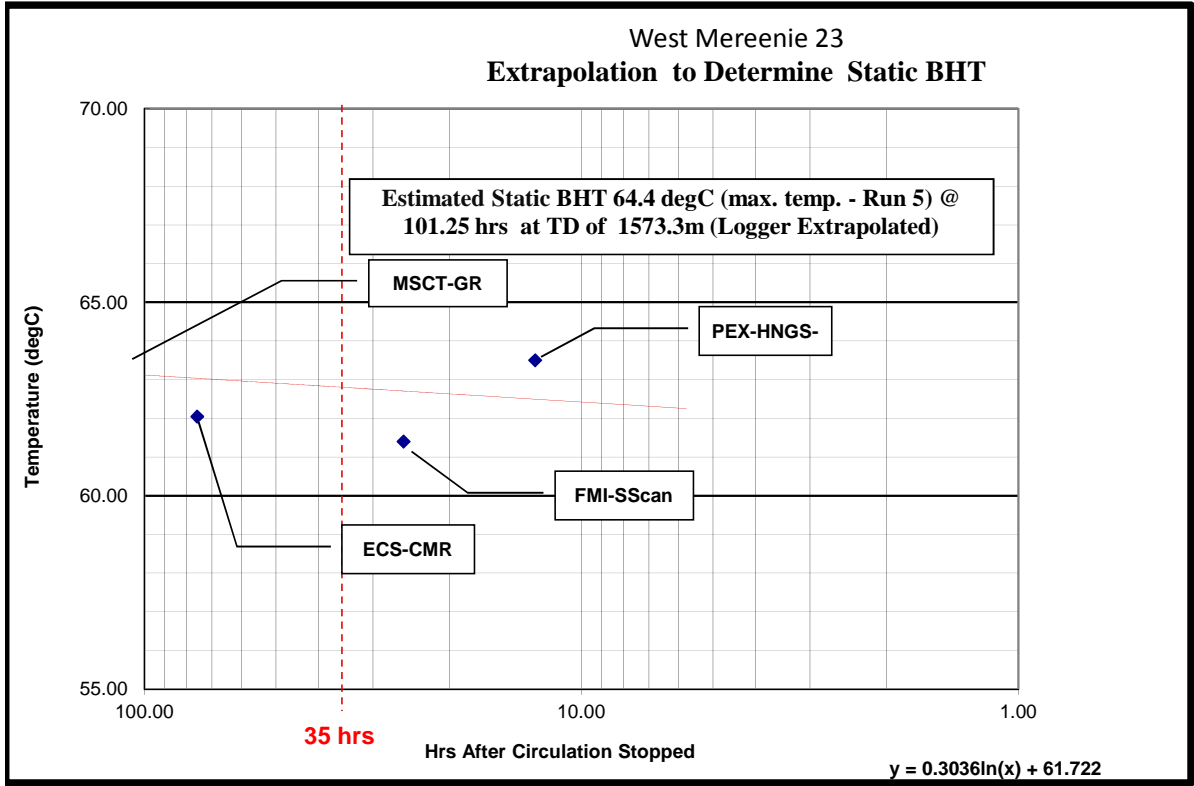
COMMENTS: Several lost time issues - Explained to engineer. No backup ECS tool, rollers or backup hole finder available for this job

ENGINEERS COMMENTS (If this report has not been discussed with the Engineer state reason)

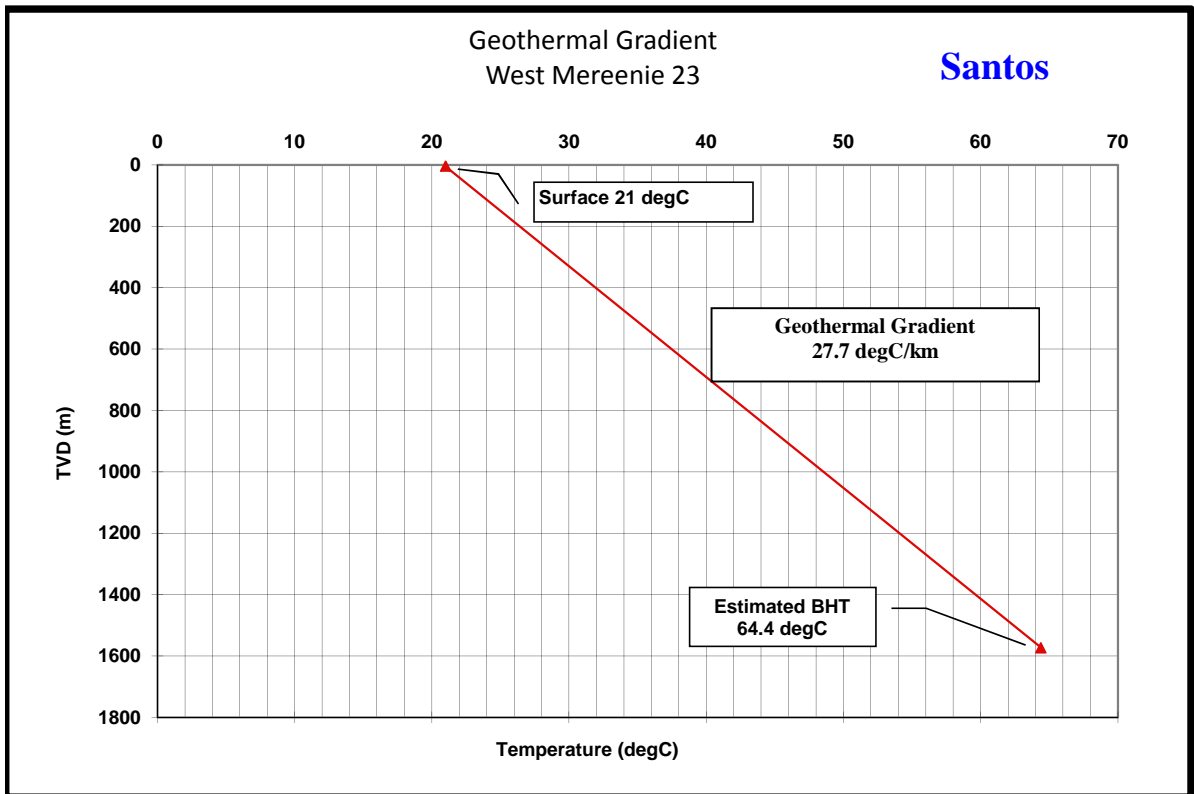
APPENDIX V: GEOTHERMAL GRADIENT

An extrapolated static bottom hole temperature of 64.4°C at 1573.3 m (L) and a geothermal gradient of 27.67°C/km was calculated from the down hole temperatures recorded during logging operations on West Mereenie 23, based on maximum temperature on Run 5.

	Max Recorded Temp (degC)	Depth Recorded (m)	Time Since Circulation. (hrs)	Total Depth (m)	Estimated BHT (degC)
Run 1	62.6	1539.9	12.75	1573.3	63.50
Run 2	60.7	1546.0	25.50	1573.3	61.40
Run 4	61.7	1560.2	75.75	1573.3	62.04
Run 5	61.7	1474.9	101.25	1573.3	64.42



STATIC BHT @ 35 hrs	64.4	°C	@	1573.3	m
SURFACE TEMP.	21	°C	@	5	m
Geothermal Gradient for Suite 2		27.67		°C/km	



APPENDIX VI: DEVIATION DATA

West Mereenie 23 was designed to intersect the primary objectives Pacoota P3-120/130 and P3-190/230/250 within the specified 35m lateral tolerance in structural dip direction and 70m lateral tolerance orthogonal to planned well azimuth, at an inclination of 45°. Maximum recorded deviation was 47.2° from 1547.8m to 1551.3m. The well bore deviation was monitored utilising a giro in the surface hole and Measurement While Drilling (MWD) surveys from the surface casing shoe to TD. Maximum well displacement was 262.5m at 9.2°(Grid North) at 1572m (TD).

DEPTH	INCLIN	AZIM	TVD	TVD	Northing	Easting	Dog Leg	Vert	Vert	Displ	Direction
metres	deg	deg	metres	S/S m	north	east	°/30m	sect	plane		true
0.0	0.0	0.0	0.0	-749.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.0	0.3	305.2	5.0	-744.0	0.0	0.0	1.8	0.0	0.0	0.0	305.2
10.0	0.2	322.1	10.0	-739.0	0.0	0.0	0.9	0.0	0.0	0.0	308.9
15.0	0.2	52.4	15.0	-734.0	0.0	0.0	1.4	0.0	0.0	0.0	320.5
20.0	0.4	100.2	20.0	-729.0	0.0	0.0	2.0	0.0	0.0	0.0	355.4
25.0	0.6	151.4	25.0	-724.0	0.0	0.0	2.9	0.0	0.0	0.0	81.3
30.0	0.6	162.3	30.0	-719.0	0.0	0.0	0.7	0.0	0.0	0.1	133.0
35.0	0.6	163.8	35.0	-714.0	-0.1	0.1	0.1	-0.1	0.1	0.1	146.4
40.0	0.6	167.6	40.0	-709.0	-0.2	0.1	0.2	-0.2	0.2	0.2	152.4
45.0	0.7	174.0	45.0	-704.0	-0.2	0.1	0.4	-0.2	0.2	0.2	156.9
50.0	0.6	184.0	50.0	-699.0	-0.3	0.1	0.7	-0.3	0.3	0.3	161.2
55.0	0.7	186.8	55.0	-694.0	-0.3	0.1	0.4	-0.3	0.3	0.3	165.2
60.0	0.7	192.9	60.0	-689.0	-0.4	0.1	0.4	-0.4	0.4	0.4	168.9
65.0	0.7	205.9	65.0	-684.0	-0.4	0.1	0.9	-0.4	0.4	0.4	172.9
70.0	0.7	215.6	70.0	-679.0	-0.5	0.0	0.8	-0.5	0.5	0.5	177.4
75.0	0.8	217.8	75.0	-674.0	-0.5	0.0	0.5	-0.5	0.5	0.5	182.0
80.0	0.9	222.1	80.0	-669.0	-0.6	-0.1	0.6	-0.6	0.6	0.6	186.4
85.0	1.0	225.2	85.0	-664.0	-0.7	-0.1	0.4	-0.7	0.7	0.7	190.6
90.0	1.0	226.4	90.0	-659.0	-0.7	-0.2	0.2	-0.7	0.7	0.7	194.3
95.0	1.1	229.0	95.0	-654.0	-0.8	-0.2	0.7	-0.8	0.8	0.8	197.8
100.0	1.1	229.6	100.0	-649.0	-0.8	-0.3	0.1	-0.8	0.8	0.9	200.9
105.0	1.2	231.2	105.0	-644.0	-0.9	-0.4	0.9	-0.9	0.9	1.0	203.8
110.0	1.3	232.3	110.0	-639.0	-1.0	-0.5	0.4	-1.0	1.0	1.1	206.5

115.0	1.3	234.5	115.0	-634.0	-1.0	-0.6	0.5	-1.0	1.0	1.2	209.0
120.0	1.3	239.5	120.0	-629.0	-1.1	-0.7	0.7	-1.1	1.1	1.3	211.4
125.0	1.3	240.0	125.0	-624.0	-1.2	-0.8	0.1	-1.2	1.2	1.4	213.7
130.0	1.5	240.5	130.0	-619.0	-1.2	-0.9	0.7	-1.2	1.2	1.5	215.8
135.0	1.6	239.0	135.0	-614.0	-1.3	-1.0	0.9	-1.3	1.3	1.6	217.7
140.0	1.7	237.6	140.0	-609.0	-1.4	-1.1	0.6	-1.4	1.4	1.8	219.3
145.0	1.8	237.5	145.0	-604.0	-1.4	-1.2	0.6	-1.4	1.4	1.9	220.8
150.0	1.9	239.2	150.0	-599.0	-1.5	-1.4	0.4	-1.5	1.5	2.1	222.1
155.0	2.0	233.9	155.0	-594.0	-1.6	-1.5	1.3	-1.6	1.6	2.2	223.2
160.0	2.0	234.5	160.0	-589.0	-1.7	-1.7	0.1	-1.7	1.7	2.4	224.0
165.0	2.0	235.7	165.0	-584.0	-1.8	-1.8	0.4	-1.8	1.8	2.6	224.7
170.0	2.1	237.2	170.0	-579.0	-1.9	-2.0	0.6	-1.9	1.9	2.7	225.5
175.0	2.2	234.7	175.0	-574.0	-2.0	-2.1	0.7	-2.0	2.0	2.9	226.1
180.0	2.2	237.9	180.0	-569.0	-2.1	-2.3	0.8	-2.1	2.1	3.1	226.8
185.0	2.2	237.3	185.0	-564.0	-2.2	-2.4	0.3	-2.2	2.2	3.3	227.4
190.0	2.1	237.4	189.9	-559.1	-2.3	-2.6	0.6	-2.3	2.3	3.5	227.9
195.0	2.0	238.9	194.9	-554.1	-2.4	-2.7	0.8	-2.4	2.4	3.7	228.4
200.0	1.8	241.1	199.9	-549.1	-2.5	-2.9	0.9	-2.5	2.5	3.8	228.9
205.0	1.7	244.3	204.9	-544.1	-2.6	-3.0	0.9	-2.6	2.6	4.0	229.4
210.0	1.7	245.9	209.9	-539.1	-2.6	-3.1	0.3	-2.6	2.6	4.1	230.0
215.0	1.7	243.9	214.9	-534.1	-2.7	-3.3	0.4	-2.7	2.7	4.3	230.5
220.0	1.7	245.6	219.9	-529.1	-2.8	-3.4	0.3	-2.8	2.8	4.4	231.0
225.0	1.5	248.8	224.9	-524.1	-2.8	-3.5	1.0	-2.8	2.8	4.5	231.4
230.0	1.6	259.5	229.9	-519.1	-2.9	-3.7	1.8	-2.9	-2.9	4.7	232.1
235.0	1.6	259.2	234.9	-514.1	-2.9	-3.8	0.0	-2.9	-2.9	4.8	232.8
240.0	1.7	260.9	239.9	-509.1	-2.9	-3.9	0.5	-2.9	-2.9	4.9	233.6
245.0	1.7	257.5	244.9	-504.1	-2.9	-4.1	0.8	-2.9	2.9	5.0	234.3
250.0	1.6	253.9	249.9	-499.1	-3.0	-4.2	1.3	-3.0	3.0	5.2	234.9
255.0	1.6	269.5	254.9	-494.1	-3.0	-4.4	2.6	-3.0	-3.0	5.3	235.6
260.0	1.6	264.4	259.9	-489.1	-3.0	-4.5	0.9	-3.0	-3.0	5.4	236.4
265.0	1.5	275.4	264.9	-484.1	-3.0	-4.6	1.8	-3.0	-3.0	5.5	237.1

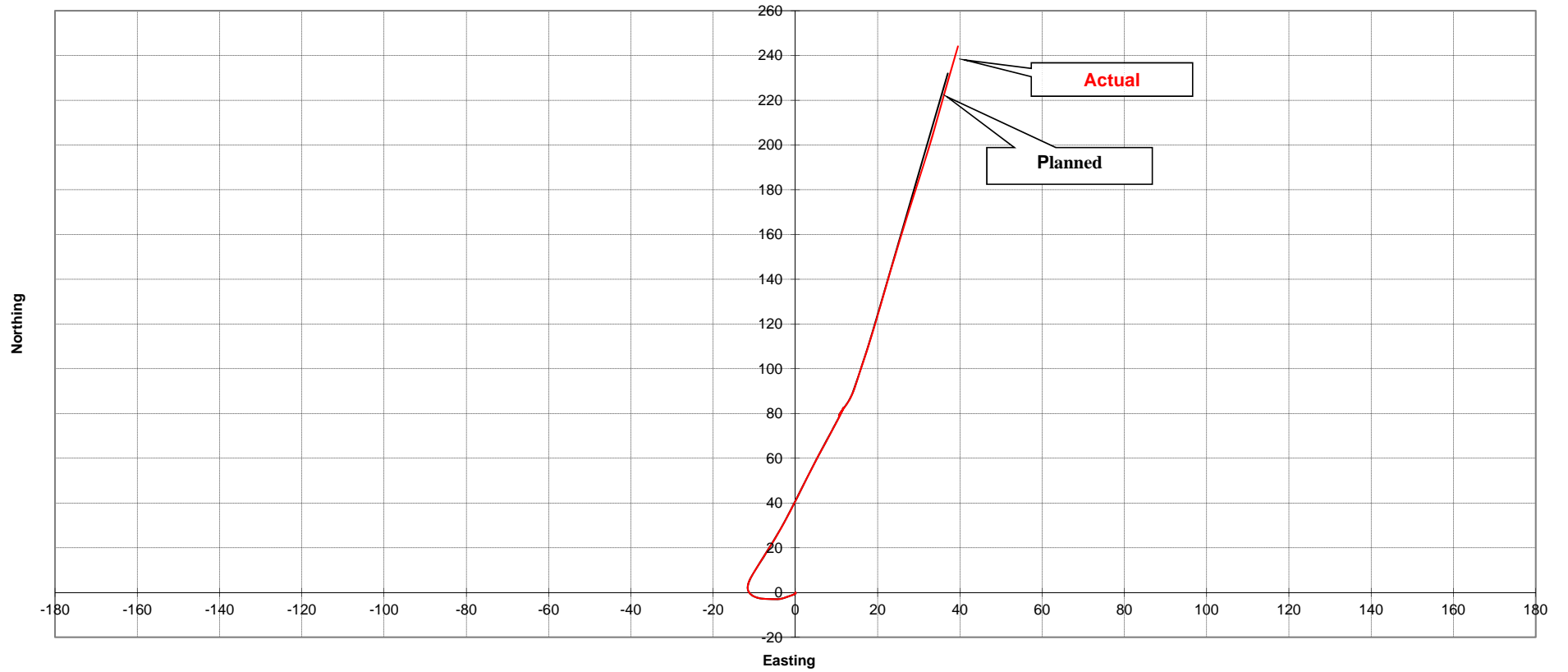
270.0	1.4	277.3	269.9	-479.1	-3.0	-4.8	0.8	-3.0	-3.0	5.6	237.9
275.0	1.5	276.6	274.9	-474.1	-3.0	-4.9	0.8	-3.0	-3.0	5.7	238.7
280.0	1.5	275.5	279.9	-469.1	-3.0	-5.0	0.3	-3.0	-3.0	5.8	239.5
285.0	1.5	273.5	284.9	-464.1	-2.9	-5.1	0.4	-2.9	-2.9	5.9	240.2
290.0	1.7	273.0	289.9	-459.1	-2.9	-5.3	0.8	-2.9	-2.9	6.0	241.0
295.0	1.6	269.9	294.9	-454.1	-2.9	-5.4	0.7	-2.9	-2.9	6.2	241.6
300.0	1.6	270.6	299.9	-449.1	-2.9	-5.6	0.3	-2.9	-2.9	6.3	242.2
305.0	1.6	271.9	304.9	-444.1	-2.9	-5.7	0.3	-2.9	-2.9	6.4	242.8
310.0	1.7	271.9	309.9	-439.1	-2.9	-5.9	0.5	-2.9	-2.9	6.5	243.4
315.0	1.7	271.6	314.9	-434.1	-2.9	-6.0	0.1	-2.9	-2.9	6.7	244.0
320.0	1.8	270.2	319.9	-429.1	-2.9	-6.1	0.6	-2.9	-2.9	6.8	244.6
325.0	1.8	272.9	324.9	-424.1	-2.9	-6.3	0.5	-2.9	-2.9	6.9	245.2
330.0	1.7	271.6	329.9	-419.1	-2.9	-6.5	0.5	-2.9	-2.9	7.1	245.7
335.0	1.8	271.9	334.9	-414.1	-2.9	-6.6	0.2	-2.9	-2.9	7.2	246.3
340.0	1.7	271.5	339.9	-409.1	-2.9	-6.8	0.1	-2.9	-2.9	7.4	246.8
345.0	1.8	272.8	344.9	-404.1	-2.9	-6.9	0.4	-2.9	-2.9	7.5	247.3
350.0	1.9	271.8	349.9	-399.1	-2.9	-7.1	0.7	-2.9	-2.9	7.6	247.8
355.0	1.9	274.9	354.9	-394.1	-2.9	-7.2	0.6	-2.9	-2.9	7.8	248.3
360.0	2.0	275.5	359.9	-389.1	-2.9	-7.4	0.4	-2.9	-2.9	7.9	248.9
365.0	2.0	274.7	364.9	-384.1	-2.8	-7.6	0.2	-2.8	-2.8	8.1	249.4
370.0	1.9	276.6	369.9	-379.1	-2.8	-7.7	0.9	-2.8	-2.8	8.2	249.9
375.0	1.8	280.4	374.9	-374.1	-2.8	-7.9	0.8	-2.8	-2.8	8.4	250.5
380.0	1.8	284.7	379.9	-369.1	-2.8	-8.1	0.8	-2.8	-2.8	8.5	251.0
385.0	1.8	285.3	384.9	-364.1	-2.7	-8.2	0.1	-2.7	-2.7	8.7	251.6
390.0	1.8	286.1	389.9	-359.1	-2.7	-8.4	0.2	-2.7	-2.7	8.8	252.2
395.0	1.8	286.3	394.9	-354.1	-2.6	-8.5	0.1	-2.6	-2.6	8.9	252.7
400.0	2.0	285.7	399.9	-349.1	-2.6	-8.7	1.3	-2.6	-2.6	9.1	253.3
405.0	1.9	287.9	404.9	-344.1	-2.5	-8.8	1.1	-2.5	-2.5	9.2	253.9
410.0	1.7	295.6	409.9	-339.1	-2.5	-9.0	1.8	-2.5	-2.5	9.3	254.5
415.0	1.7	300.7	414.8	-334.2	-2.4	-9.1	0.9	-2.4	-2.4	9.4	255.1
420.0	1.8	303.9	419.8	-329.2	-2.3	-9.2	0.9	-2.3	-2.3	9.5	255.8

425.0	1.9	302.9	424.8	-324.2	-2.3	-9.4	0.3	-2.3	-2.3	9.6	256.5
430.0	2.0	305.9	429.8	-319.2	-2.2	-9.5	1.1	-2.2	-2.2	9.8	257.2
435.0	1.9	305.3	434.8	-314.2	-2.1	-9.7	0.7	-2.1	-2.1	9.9	258.0
440.0	1.7	305.9	439.8	-309.2	-2.0	-9.8	1.2	-2.0	-2.0	10.0	258.7
445.0	1.8	306.5	444.8	-304.2	-1.9	-9.9	0.4	-1.9	-1.9	10.1	259.3
450.0	1.7	310.7	449.8	-299.2	-1.8	-10.0	0.8	-1.8	-1.8	10.2	260.0
455.0	1.7	313.5	454.8	-294.2	-1.7	-10.1	0.5	-1.7	-1.7	10.3	260.6
460.0	1.8	316.1	459.8	-289.2	-1.6	-10.3	0.5	-1.6	-1.6	10.4	261.3
465.0	2.0	319.0	464.8	-284.2	-1.4	-10.4	1.4	-1.4	-1.4	10.5	262.0
470.0	1.7	319.3	469.8	-279.2	-1.3	-10.5	1.7	-1.3	-1.3	10.6	262.8
475.0	1.7	325.7	474.8	-274.2	-1.2	-10.6	1.1	-1.2	-1.2	10.6	263.5
480.0	1.8	331.7	479.8	-269.2	-1.1	-10.6	1.3	-1.1	-1.1	10.7	264.2
485.0	1.8	327.7	484.8	-264.2	-0.9	-10.7	0.7	-0.9	-0.9	10.8	265.0
490.0	2.0	317.2	489.8	-259.2	-0.8	-10.8	2.5	-0.8	-0.8	10.8	265.7
495.0	1.6	327.3	494.8	-254.2	-0.7	-10.9	3.1	-0.7	-0.7	10.9	266.4
500.0	1.6	330.0	499.8	-249.2	-0.6	-11.0	0.5	-0.6	-0.6	11.0	267.1
505.0	1.8	335.6	504.8	-244.2	-0.4	-11.1	1.5	-0.4	-0.4	11.1	267.8
510.0	1.9	336.0	509.8	-239.2	-0.3	-11.1	0.5	-0.3	-0.3	11.1	268.6
515.0	1.8	336.8	514.8	-234.2	-0.1	-11.2	1.0	-0.1	-0.1	11.2	269.3
520.0	1.6	339.7	519.8	-229.2	0.0	-11.2	0.8	0.0	0.0	11.2	270.0
525.0	1.7	339.6	524.8	-224.2	0.1	-11.3	0.4	0.1	0.1	11.3	270.7
530.0	1.7	346.7	529.8	-219.2	0.3	-11.3	1.3	0.3	0.3	11.3	271.4
535.0	1.6	346.4	534.8	-214.2	0.4	-11.4	0.7	0.4	0.4	11.4	272.1
540.0	2.1	343.6	539.8	-209.2	0.6	-11.4	2.8	0.6	0.6	11.4	272.9
545.0	1.9	347.8	544.8	-204.2	0.8	-11.5	1.4	0.8	0.8	11.5	273.8
550.0	2.3	346.8	549.8	-199.2	0.9	-11.5	2.0	0.9	0.9	11.5	274.6
555.0	2.2	350.2	554.8	-194.2	1.1	-11.5	0.9	1.1	1.1	11.6	275.6
602.3	3.5	6.9	602.0	-147.0	3.5	-11.5	1.0	3.5	-3.5	12.0	286.7
640.9	4.3	15.2	640.5	-108.5	6.0	-11.0	0.8	6.0	-6.0	12.5	298.8
678.0	5.9	18.6	677.5	-71.5	9.2	-10.0	1.3	9.2	-9.2	13.6	312.5
716.1	7.6	19.0	715.3	-33.7	13.4	-8.6	1.3	13.4	-13.4	15.9	327.4

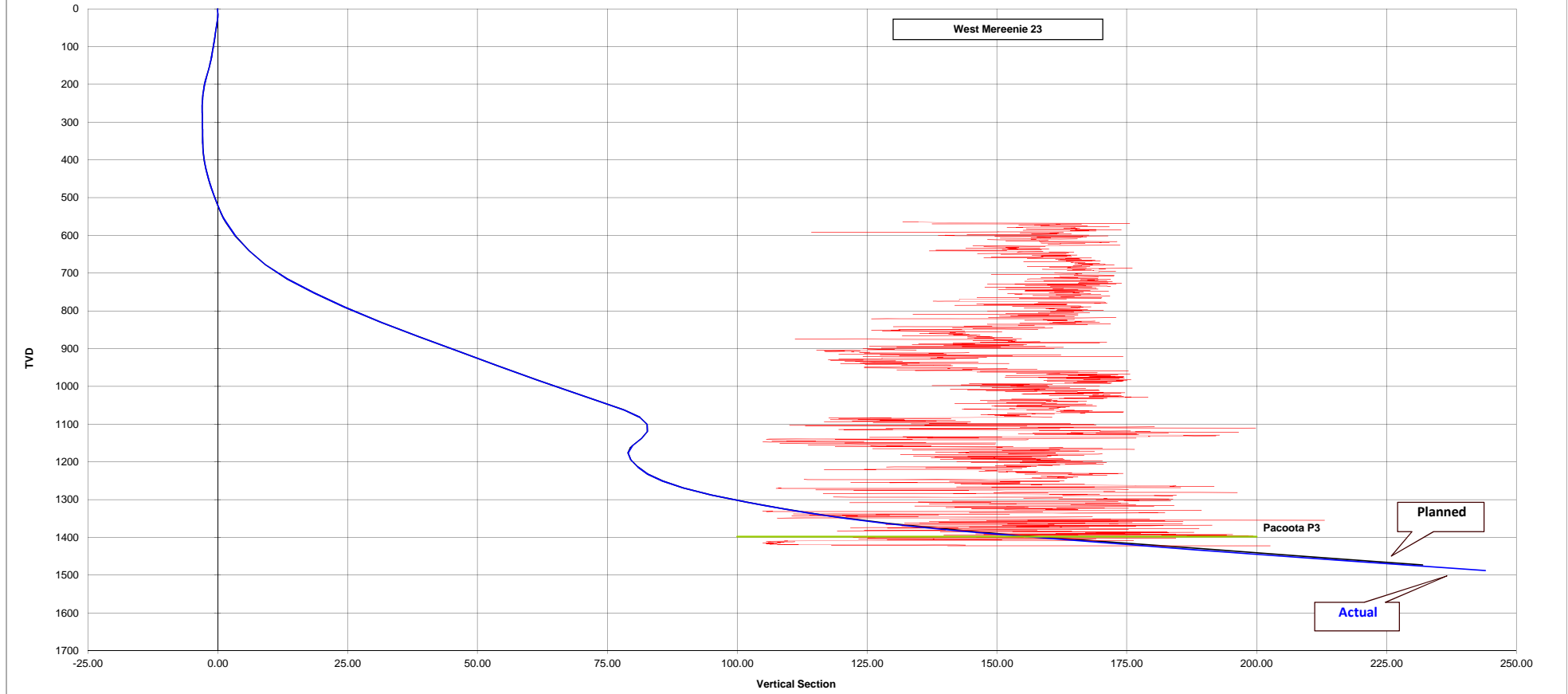
754.2	8.9	18.7	753.0	4.0	18.6	-6.8	1.0	18.6	-18.6	19.8	339.9
791.7	9.8	18.6	790.0	41.0	24.4	-4.9	0.7	24.4	-24.4	24.9	348.7
833.0	10.9	16.1	830.6	81.6	31.5	-2.7	0.9	31.5	-31.5	31.6	355.2
871.6	11.5	15.8	868.5	119.5	38.7	-0.6	0.5	38.7	-38.7	38.7	359.1
910.8	11.7	14.9	906.9	157.9	46.3	1.5	0.2	46.3	-46.3	46.3	1.8
949.7	11.6	15.6	945.0	196.0	53.9	3.6	0.1	53.9	-53.9	54.0	3.8
988.4	12.1	16.3	982.9	233.9	61.5	5.7	0.4	61.5	-61.5	61.8	5.3
1028.2	12.5	16.5	1021.8	272.8	69.6	8.1	0.3	69.6	-69.6	70.1	6.6
1051.2	12.9	15.8	1044.2	295.2	74.5	9.5	0.6	74.5	-74.5	75.1	7.3
1070.8	11.2	16.3	1063.4	314.4	78.4	10.7	2.6	78.4	-78.4	79.1	7.7
1089.6	6.9	13.8	1081.9	332.9	81.3	11.4	6.9	81.3	-81.3	82.1	8.0
1108.3	2.1	11.9	1100.6	351.6	82.7	11.8	7.7	82.7	-82.7	83.5	8.1
1127.0	1.9	195.9	1119.3	370.3	82.7	11.8	6.4	82.7	-82.7	83.6	8.1
1145.5	5.4	194.5	1137.7	388.7	81.6	11.5	5.7	81.6	-81.6	82.4	8.0
1164.8	5.3	198.8	1156.9	407.9	79.9	10.9	0.6	79.9	-79.9	80.6	7.8
1183.9	0.3	235.5	1176.0	427.0	79.0	10.6	8.0	79.0	-79.0	79.7	7.6
1202.2	3.8	12.7	1194.3	445.3	79.6	10.7	6.6	79.6	-79.6	80.3	7.7
1221.5	4.7	25.5	1213.6	464.6	80.9	11.2	2.0	80.9	-80.9	81.7	7.9
1240.3	7.9	20.5	1232.2	483.2	82.8	12.0	5.2	82.8	-82.8	83.7	8.2
1259.1	10.7	19.6	1250.8	501.8	85.7	13.0	4.4	85.7	-85.7	86.6	8.6
1277.7	14.9	11.3	1268.9	519.9	89.6	14.0	7.4	89.6	-89.6	90.7	8.9
1297.1	18.2	9.8	1287.5	538.5	95.1	15.1	5.1	95.1	-95.1	96.2	9.0
1317.7	21.1	10.3	1306.9	557.9	101.9	16.3	4.2	101.9	-101.9	103.2	9.1
1336.6	23.6	9.9	1324.4	575.4	108.9	17.5	4.0	108.9	-108.9	110.3	9.1
1359.1	26.6	9.5	1344.8	595.8	118.3	19.1	4.0	118.3	-118.3	119.9	9.2
1377.8	32.2	8.7	1361.1	612.1	127.4	20.6	9.0	127.4	-127.4	129.1	9.2
1397.0	37.5	8.9	1376.8	627.8	138.2	22.3	8.3	138.2	-138.2	140.0	9.1
1416.5	41.9	9.4	1391.8	642.8	150.5	24.2	6.8	150.5	-150.5	152.5	9.2
1433.6	43.5	9.4	1404.4	655.4	162.0	26.1	2.9	162.0	-162.0	164.1	9.2
1454.1	43.2	9.9	1419.3	670.3	175.8	28.5	0.7	175.8	-175.8	178.1	9.2
1471.5	43.5	10.1	1431.9	682.9	187.6	30.6	0.6	187.6	-187.6	190.1	9.3

1490.3	45.1	9.0	1445.4	696.4	200.6	32.8	2.8	200.6	-200.6	203.2	9.3
1509.3	45.8	8.7	1458.7	709.7	213.9	34.8	1.2	213.9	-213.9	216.8	9.3
1528.9	46.7	8.8	1472.3	723.3	227.9	37.0	1.4	227.9	-227.9	230.9	9.2
1547.8	47.0	9.1	1485.2	736.2	241.6	39.1	0.6	241.6	-241.6	244.7	9.2
1551.3	47.2	9.0	1487.6	738.6	244.1	39.5	1.6	244.1	-244.1	247.3	9.2
1572.0 Extrap.	47.2	9.0	1501.6	752.6	259.1	41.9	0.0	259.1	-259.1	262.5	9.2

West Mereenie 23 Plan View



West Mereenie 23 Vertical Section @ 0 Deg



APPENDIX VII: DRILL STEM TEST DATA

Santos

DRILL STEM TEST REPORT – DST 1

WELL: West Mereenie 23	DST NO: 1	DATE: 03-01-14
INTERVAL: (L) 1493.0m – 1521.8m (D) 1493.6m – 1522.4m	FORMATION:	Pacoota P3-150/170/190
TESTING CO. Pro-Test Pty Ltd.	CIRC STOPPED:	10:30 hrs 02-01-2014
TEST TYPE: Conventional Inflate Straddle	HOURS SINCE CIRC:	23.75hrs
CUSHION: N/A	SEPARATOR	Yes
	Rmf:	0.166 ohm @ 75° F
	Rw: (Cushion)	N/A
GEOLOGIST: D. Adderley	Tracer:	N/A

REMARKS

ELAPSED TIME (MIN)		REMARKS / PRESSURES	ELAPSED TIME (MIN)		REMARKS / PRESSURES
07:00 03/01/14		GR-CCL correlation – pip tag @ 1268.55m	19:22	554	Close annular, continue reverse circulation
09:30		Rotate to inflate 30 minutes	19:34	566	Collect sample – 8.8ppg rat hole mud
10:00		Observed bubbles in bucket before opening	22:00	712	Pull out of hole
10:08	0	Weight down, tools opened – increase in bubbles. Weak blow top of bucket			
10:27	19	Very weak blow, top of bucket (sustained)			
14:08	240	Pick up and shut tools in			
18:08	480	Deflate packers, allow to relax			
18:20	492	Tools stuck apply overpull			
19:05	537	Tools free			
19:11	543	Drop bar, commence reverse circulation			

SURFACE FLOW SUMMARY

CHOKE SIZE (IN) SURFACE	FLUID TO SURFACE (MIN)	FLOWING TIME/ SHUT IN TIME (MIN)	MAXIMUM SURFACE PRESSURE (FLOW) (PSIA)	FINAL GAS RATE (MMCFD)	FINAL LIQUIDS RATE	FIELD GAS ANALYSIS	FIELD LIQUIDS ANALYSIS
3/4"	N/A	240/240	N/A	N/A	N/A	N/A	N/A

PACKER DATA:

Packer Type/Manufacturer	INFLATE / IPI
Top Packer Serial No.	IPI-6.75-07
Bottom Packer Serial No.	IPI-6.75-08
Packer Element size	6 3/4"
Element length	66"

WELL:

West Mereenie 23

DST NO: 1

DATE: 03-01-14

FIELD DOWNHOLE PRESSURE DATA

		RECOVERY (1248)	INSIDE (1221)	OUTSIDE (1198/1186)	TIME (mins)
DEPTH	M	1480.93	1486.74	1493.73	
INITIAL HYDRO.	PSI		2208.0psi	2214.0psi	
INITIAL FLOW	PSI	9.0psi	15.9psi	21.8psi	10:08hrs (0)
FINAL FLOW	PSI				
INITIAL SHUT-IN	PSI	25.9psi	32.8psi	38.4psi	14:08hrs (240)
FINAL SHUT-IN	PSI	25.7psi	1287.7psi	1293.0psi	18:08hrs (480)
FINAL HYDRO.	PSI	2194.0psi	2204.0psi	2210.0psi	
TEMPERATURE	°F	58.7°C	58.7°C	58.7°C	

RECOVERYREVERSE CIRCULATED
PULLED

X

1	REVERSE CIRCULATED	Recovered 1bbl (37m) of 8.8ppg rat hole mud (no fluorescence in sample)
2	CHART RECOVERY	16.9psi increase = 11.3mTVD = 15.7mMD = 0.4bbl of 8.8ppg rat hole mud

SAMPLE DATA**GAS/CONDENSATE**

SAMPLE NO	BOMB NO	TYPE	SOURCE	PRESS/TEMP

OIL/CONDENSATE

SAMPLE NO	TYPE	SAMPLE	RMF	TRACER	CL (PPM)

WATER, MUDDY WATER AND MUD

SAMPLE NO.	TYPE	Rw / Rm	REMARKS

FILTRATE

SAMPLE NO.	TYPE	Rw / Rm	REMARKS

Remarks:

- DST #1: 1493.0m-1521.8m (L).
- Wiper trip performed prior to DST #1, after wireline logging.
- Santos Drilling tank number 011 and test separator number 002 on site for test – not utilised.
- Schlumberger wireline correlation, pip tag found at 1368.55m. String needed to move up 2.1m to setting depth.
- Very weak bubble blow observed after setting packers – before opening tools. Annular mud level not dropping, bubbles may be due to heat expansion in the pipe.
- 10:08hrs tools opened, bubbles in bucket increased from pre-opening. Weak blow top of bucket. Very weak blow after 19 minutes – sustained for remaining duration of flow period.
- Reverse circulation recovered 1bbl of 8.8ppg rat hole mud (no fluorescence in sample).
- Sample chamber contained 5L of 8.8ppg rat hole mud (no fluorescence in sample).
- The fluid chart recorder showed a 7psi increase in pressure while rotating to inflate, a small amount of mud was possibly entering the string at this time – which may explain the very weak bubble blow observed prior to opening tools.
- Chart recovery: 16.9psi increase = 11.3mTVD = 15.7mMD = 0.4bbl of 8.8ppg rat hole mud.
- None of the recovered mud samples were retained or sent for analysis.

DST Field Report

Date Issued: 4 Jan 2014

Pro-Test Pty Ltd
76 Spencer St
Roma Qld 4455
P: (07) 4622 6800
ABN: 22 134 641 240

Field Copy

Test Number: 1	Well Name: West Mereenie 23	Formation: Pacoota Sands
Date: 3/1/2014	Customer: Santos	Test Interval: 1493.00mRT-1521.78mRT
Job Number: 530-SAN-IF	Drilling Rig: Ensign 918	Well TD: 1572.00mRT
Test Type: Inflate Straddle	Permit / Lease: NT OL4	Interval Length: 28.78m
km's to Rig: 3040	State: NT	Zero Reference: RT
Company Man: Darryl Whitbread	Test Result: Successful	DST Supervisor: Simon Withers
Night Co. Man: Dave Sheeran	Tool String: IF1	DST Supervisor: Brett McIntosh
WSG: David Adderley	Pump: 2	
Mobilised by: George Nairn		

Well Information

Main Hole Size / Element Size:	8.5" / 6.75"	Qty & OD	ID
OH Size at Top / Btm Element:	8.5" / 8.5"	Drill Pipe:	4" / 3.24"
Total Time Spent Rotating:	25 mins	Hewiwaite:	60 x 4" / 2.5625"
Sleeve position before RIH:	Up	Drill Collar:	16 x 6.5" / 2.8125"
Sleeve position after POOH:	Down	Mud Weight / Type:	8.8ppg / Salt Base
Caliper Log Run:	Yes	DST Tool Wt:	8 klbs
Caliper Type:	FMI	Total String Wt:	140 klbs
General Hole Condition:	Good	Prior Rig Operations:	Wiper Trip

Drill Stem Test Information

Serial Number:	1248	1221	1198/1186
Pressure Rating:	6000psi	6000psi	6000/6000psi
Battery Serial No.:	509	510	524/594
Position:	Fluid Recorder	Inside Recorder	Outside Recorder
Depth:	1480.93mRT	1486.74mRT	1493.73mRT
Initial Hydrostatic:	8.2 psig	2208 psig	2214 psig
Start of Pre Flow:	N/A	N/A psig	N/A psig
End of Pre Flow:	N/A	N/A psig	N/A psig
Initial Shut In:	N/A psig	N/A psig	N/A psig
Start of Main Flow:	9.00	15.9 psig	21.8 psig
End of Main Flow:	25.90	32.8 psig	38.4 psig
Final Shut In:	25.7 psig	1287.7 psig	1293 psig
Final Hydrostatic:	2194 psig	2204 psig	2210 psig
Maximum Temp. during Test:	58.7 °C	58.7 °C	58.7 °C

	Start	Finish	Duration	Weight to function tool
Pre Flow:	N/A	N/A hrs	##### mins	N/A klbs
Initial Shut In:	N/A	N/A hrs	##### mins	
Main Flow:	10:10	14:15 hrs	245 mins	25 klbs
Final Shut In:	14:15	18:14 hrs	239 mins	

Pre Flow Description

N/A

Main Flow Description

Weak blow on the surface of the bucket when the tool opened remaining the same for 1 hour then reducing to intermitant weak bubbles on the surface of the bucket for the rest of the flow period..

Total Fluid Recovered: 15.7mMD, 11.25mTVD, 0.4bbls plus N/Am N/A cushion.
 calculated from: Fluid Recorder Inside Recorder Outside Recorder Actual (Pulled to Fluid) Pump Strokes
 Formation Fluid Consisted of: Rat Hole Mud
 Sample Chamber Contents: Rat Hole Mud Sample Chamber Pressure: 10.5 psig

- | | | | |
|---|---|--|---|
| <input checked="" type="checkbox"/> Drop Bar Released | <input checked="" type="checkbox"/> Impact Type Circ. Sub Activated | <input checked="" type="checkbox"/> Hollow Shear Pin Recovered | <input type="checkbox"/> Closed Chamber |
| <input checked="" type="checkbox"/> Well Circulated before POOH | <input type="checkbox"/> Pressure Type Circ. Sub Activated | <input type="checkbox"/> Pulled to Fluid then Circulated | <input type="checkbox"/> EMRT Run |

Top Packer Re-use / Condition: Yes - Good
 Bottom Packer Re-use / Condition: Yes - Good

Field Copy

Drill Stem Test Information

Comments

On the 3/1/14 between 18:14 and 19:03, the following happened whilst deflating. After several attempts to deflate, the string was holding overpull and sitting weight down with the max up weight of 250klb's and a down weight of 75klb's. There was pipe movement of roughly 1-2m whilst going up and down with overpull etc. It wasn't until 19:03 where it was noticed a difference where the packers had no major over pull and appeared to be free. The fluid recovery was calculated from the fluid recorder taking into consideration that the pipe that was being filled was on an angle of 45 degrees. Hence recovery of 11.25mTVD, 15.7mMD, 0.4bbbls.

Sequence of Events

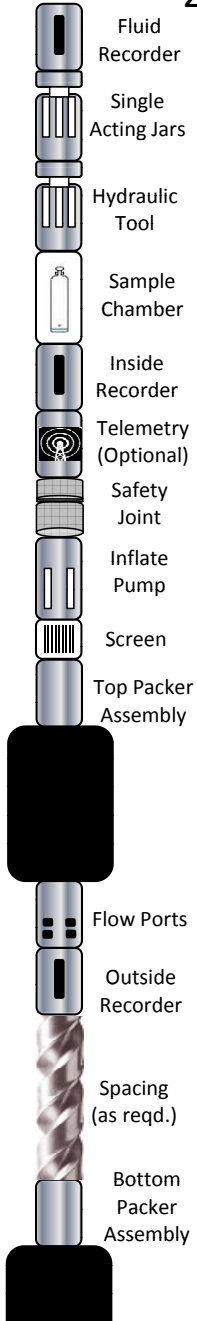
28 Dec 2013	05:00 hrs	Test crew depart base / previous well.	30 Dec 2013	17:00 hrs	Test crew arrive at rig / camp.
		Arrive at Cobar	3 Jan 2014	14:15 hrs	Pick up 20klbs over SW & close tool for the shut in
29 Dec 2013	06:00 hrs	Depart Cobar		18:05 hrs	PJSM -Deflate packers/ reverse/conventionally circ.
		Arrive at Glendambo		18:14 hrs	Set down 10klbs with RH turn to equalise pressure
30 Dec 2013	06:00 hrs	Depart Glendambo		18:17 hrs	Pick up to neutral to allow elements to deflate
	17:00 hrs	Arrive at Mereenie		18:18 hrs	Work pipe to check tools are free. Not free
31 Dec 2013	07:00 hrs	Brett completed Mereenie site induction			For deflation information see comments box above
	08:00 hrs	Work on service container		19:03 hrs	Work pipe to check tools are free. Packers free
	11:30 hrs	Return to camp		19:10 hrs	Function test pumps
	16:30 hrs	Go to Rig (Ensign 918)		19:14 hrs	Drop bar, activate impact sub
		Brett completed site induction		19:15 hrs	Commence reverse circulation
	18:15 hrs	Return to camp		19:23 hrs	Pipe and annular have U tubed @ 562 strokes
1 Jan 2014		Happy New Year		19:24 hrs	Close BOP
	06:30 hrs	Work on service container		19:36 hrs	Continue reverse circulation
	08:00 hrs	Go to Rig (Ensign 918)		19:41 hrs	Stop reverse circulating - pumped 696 strokes
		Still logging		19:44 hrs	Open BOP
	10:00 hrs	Return to camp		19:47 hrs	Commence B/D of surface equipment
		Go to Rig (Ensign 918)		20:48 hrs	Commence forward circulation
		Check separator and tank are ready to go		21:54 hrs	Stop circulating - pumped X strokes
	18:45 hrs	Return to camp		22:00 hrs	POOH to change interval for DST 2
2 Jan 2014	06:35 hrs	Go to Rig (Ensign 918)	4 Jan 2014	03:30 hrs	DST tools at surface
		Complete Pipe Tally		03:50 hrs	PJSM- B/D DST tools to change interval
	08:30 hrs	Return to camp		03:55 hrs	Start B/D tools
	13:00 hrs	Go to Rig (Ensign 918)		04:10 hrs	Take sample from sample chamber
		Adjust Pipe Tally (1.5 mtrs in the interval)		05:16 hrs	Start memory gauges for DST 2
	13:30 hrs	Return to camp		06:40 hrs	Complete M/U tools for DST 2
	17:42 hrs	Go to Rig (Ensign 918)		07:30 hrs	Compile reports
	18:02 hrs	Start the gauges			
	18:57 hrs	PJSM - M/U tools			
	19:15 hrs	Commence M/U of the tools			
	22:50 hrs	Complete M/U of the tools			
	23:00 hrs	Commence RIH			
3 Jan 2014	05:45 hrs	Go to Rig (Ensign 918)			
	06:10 hrs	Arrive at rig			
	07:55 hrs	PJSM - M/U surface equip/ Pressure testing/DST			
	08:20 hrs	Commence M/U of surface equipment			
	08:55 hrs	Pressure test surface equipment & bleed lines			
		String weights - Static:140 klbs↑:165klbs ↓:114klbs			
	09:20 hrs	Function test pumps			
	09:31 hrs	Start rotating 60 rpm then slow to 45 rpm			
	09:51 hrs	Stop rotating and let packers square off			
	09:56 hrs	Continue rotating at 45 rpm			
	10:01 hrs	Stop rotating and check seat with 15k overpull			
		Good seat			
	10:06 hrs	Set down 25klbs weight to open tool			
	10:10 hrs	Tool open - Main Flow			

Test Tool Tally

Field Copy

Test No: 1 **Well Name:** West Mereenie 23 **Formation:** Pacoota Sands
Date: 3/1/2014 **Customer:** Santos **Test Interval:** 1493.00mRT-1521.78mRT
Job No: 530-SAN-IF **Drilling Rig:** Ensign 918 **Well TD:** 1572.00mRT
Test Type: Inflate Straddle **Permit:** NT OL4 **Interval Length:** 28.78m

Ground Level: 743.83m **Cushion Type:** N/A **DST Supervisor:** Simon Withers
RT Level: 748.98m **Cushion Wt:** N/Appg **Company Man:** Darryl Whitbread
Zero Reference: RT **Cushion Amount:** N/Am **WSG:** David Adderley

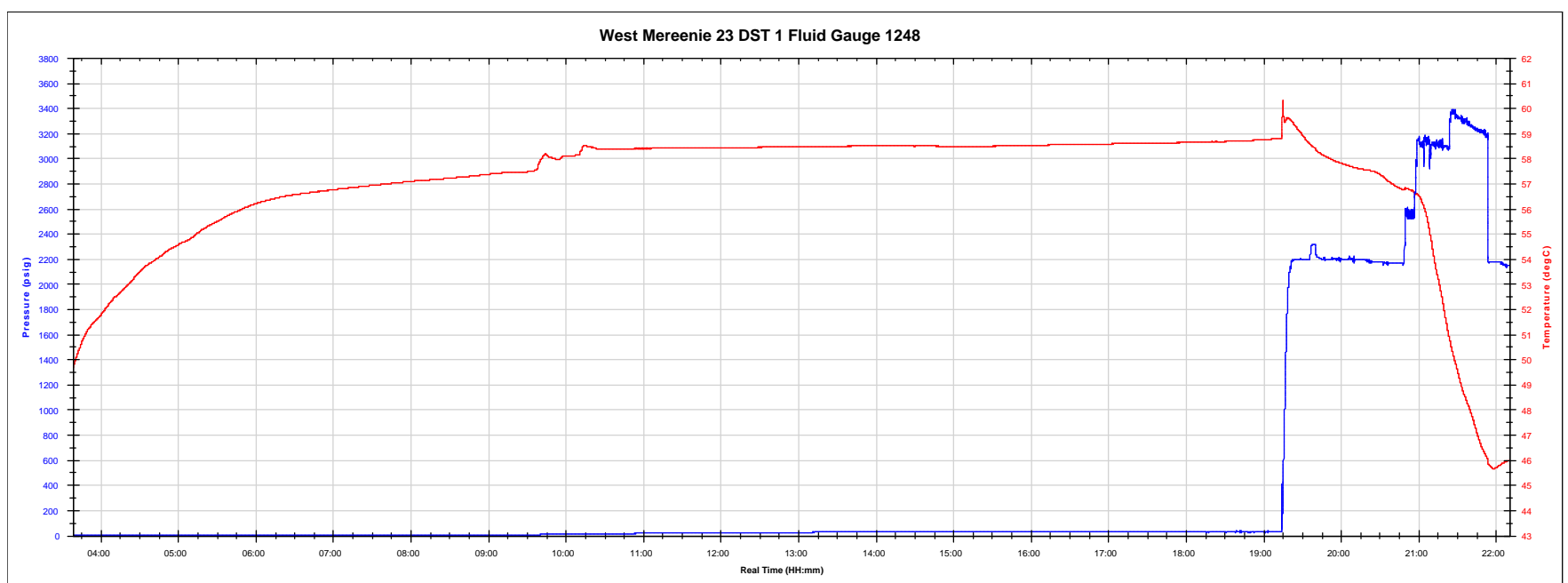


Description	Qty	ID	OD	Length	Depth	bbls/ft	bbls
Drill Pipe	2	3.24	4	19.41	-3.81	0.01020	0.6
Pup Joint	2x4.62	3.24	4	9.24	15.60	0.01020	0.3
Drill Pipe	1	3.24	4	9.71	24.84	0.01020	0.3
HWDP	94	2.5625	4	884.85	34.55	0.00638	18.5
Drill Pipe	44	3.24	4	427.12	919.40	0.01020	14.3
HWDP	2	2.5625	4	18.83	1346.52	0.00638	0.4
Rig XO				1.10	1365.35		
Pip Tag					1366.45		
Drill Collars	11	2.8125	6.5	101.87	1366.45	0.00768	2.6
Circulating Sub	CS29			0.37	1468.32	Total: 37.1bbls	
Drill Collars	1	2.8125	6.5	9.31	1468.69	Stks: 589	
Circulating Sub	CS04			0.43	1478.00		
XO Sub				0.30	1478.43		
Bumper Sub				2.20	1478.73		
Fluid Recorder	Serial #: 1248			0.81	1480.93		
Testing Jars				1.86	1481.74		
Hydraulic Tool				1.94	1483.60		
Sample Chamber				1.20	1485.54		
Inside Recorder	Serial #: 1221			0.29	1486.74		
Safety Joint				0.69	1487.03		
Pump				2.57	1487.72		
Screen				1.05	1490.29		
Top Packer (Element Serial #: IPI-6.75-07)				1.66	1491.34		
PACKER SEAL DEPTH					1493.00 mRT		
Stick Down				0.73	1493.00		
Outside Recorder	Serial #: 1198/1186			0.97	1493.73		
XO Sub				0.29	1494.70		
Drill Collars	2	2.8125	6.5	18.97	1494.99		
XO Sub				0.34	1513.96		
Spacing	4x1.5/1x1			7.00	1514.30		
Stick Up				0.48	1521.30		
PACKER SEAL DEPTH					1521.78 mRT		
Bottom Packer (Element Serial #: IPI-6.75-08)				1.78	1521.78		
Drag Spring				1.90	1523.56		
Bottom of Tool String					1525.46		

**Please note that depths listed are to top of tool **

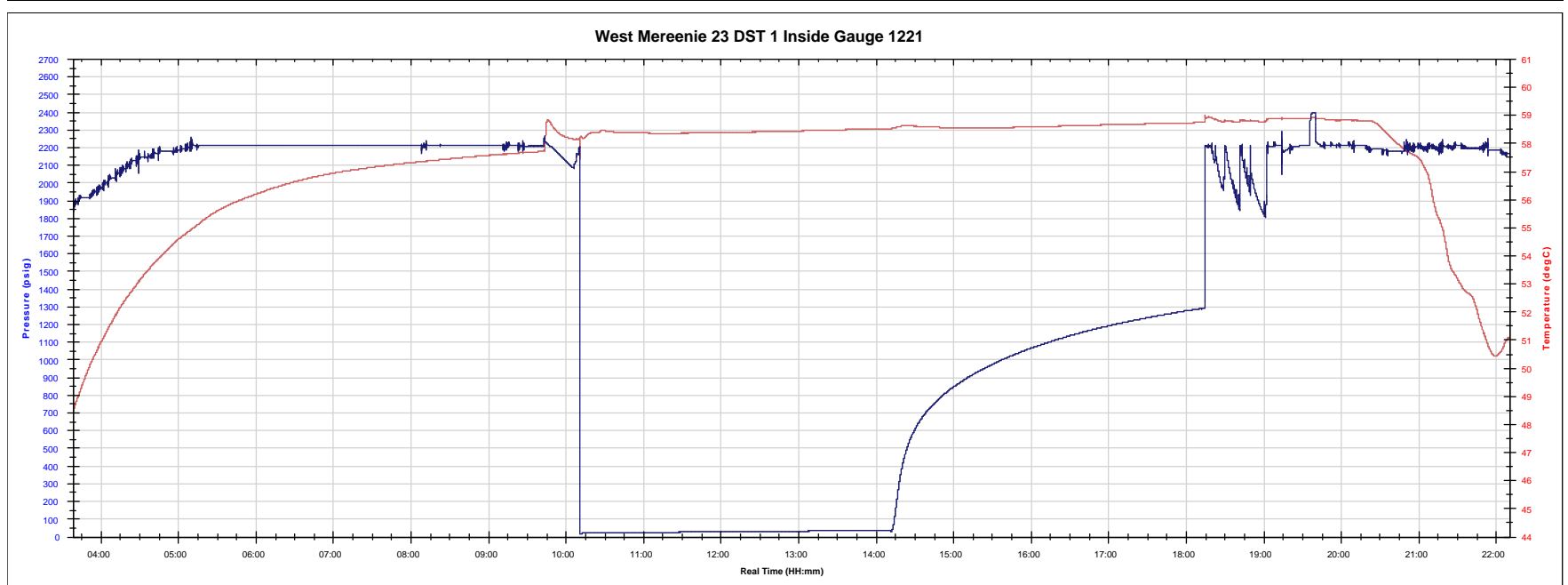
Test Date: 03/01/2014 - 04/01/2014
Max Pressure: 2400.563 psig

Serial Number: P1198
Max Temperature: 58.955 degC



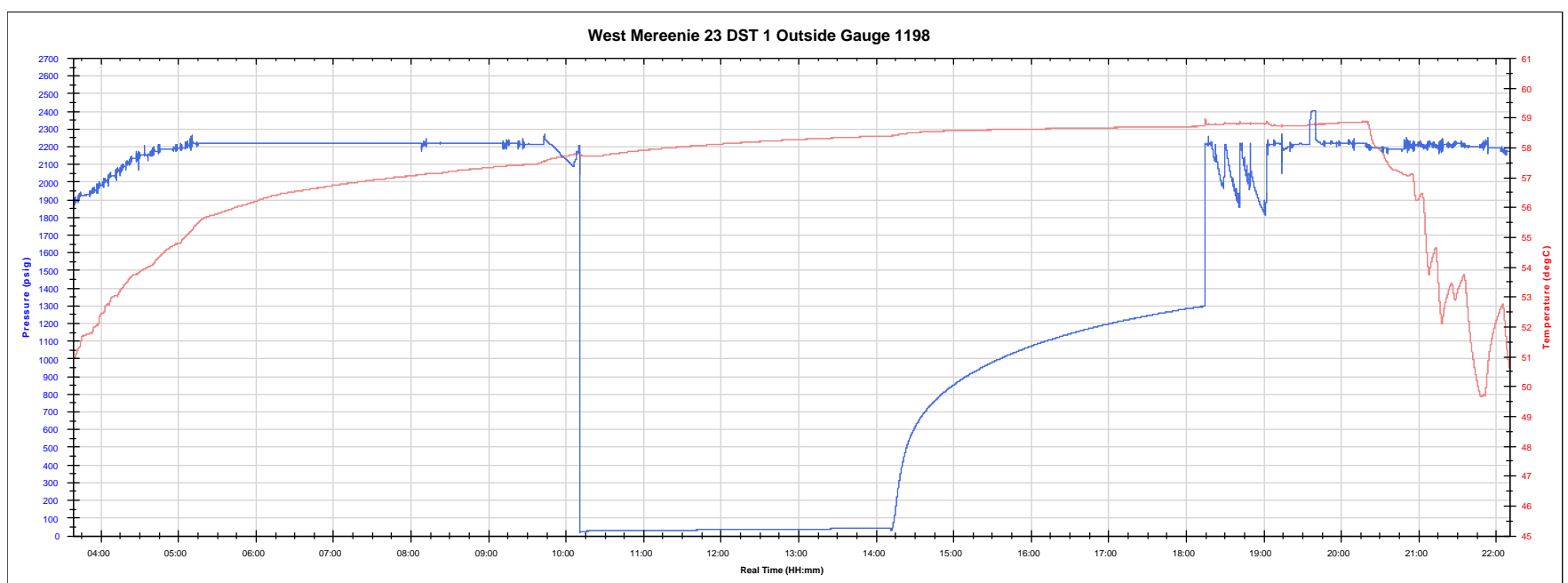
Test Date: 03/01/2014 - 04/01/2014
Max Pressure: 2400.563 psig

Serial Number: P1198
Max Temperature: 58.955 degC



Test Date: 03/01/2014 - 04/01/2014
Max Pressure: 2400.563 psig

Serial Number: P1198
Max Temperature: 58.955 degC



Santos

DRILL STEM TEST REPORT – DST 2

WELL:	West Mereenie 23	DST NO:	2	DATE:	04-01-14
INTERVAL:	(L) 1475.0m – 1493.3m (D) 1475.6m – 1493.9m	FORMATION:	Pacoota P3-120/130	CIRC STOPPED:	22:00 hrs 03-01-2014
TESTING CO.	Pro-Test Pty Ltd.	HOURS SINCE CIRC:	21.25hrs	SEPARATOR	Yes
TEST TYPE:	Conventional Inflate Straddle	Rmf:	0.166 ohm @ 75° F	Rw: (Cushion)	N/A
CUSHION:	N/A	Tracer:	N/A		
GEOLOGIST:	D. Adderley				

REMARKS

ELAPSED TIME (MIN)		REMARKS / PRESSURES	ELAPSED TIME (MIN)		REMARKS / PRESSURES
16:00 04/01/14		GR-CCL correlation – pip tag @ 1340.05m	03:46	510	Collect sample – 8.5ppg water cut mud, oil film
18:38		Rotate to inflate 30 minutes	03:51	515	Collect sample – 8.5ppg water cut mud, trace fluor
19:16	0	Weight down, tools opened. Weak blow top of bucket at ½”	05:43	627	Pull out of hole
19:20	4	Weak blow, 1 ½”			
19:23	7	Weak blow, 2”			
19:45	29	Weak blow, 3” (sustained)			
23:16	240	Pick up string, shut tools			
03:16 05/01/14	480	Deflate packers			
03:33	497	Drop bar, commence reverse circulation			
03:42	506	Close annular, continue reverse circulation			

SURFACE FLOW SUMMARY

CHOKE SIZE (IN) SURFACE	FLUID TO SURFACE (MIN)	FLOWING TIME/ SHUT IN TIME (MIN)	MAXIMUM SURFACE PRESSURE (FLOW) (PSIA)	FINAL GAS RATE (MMCFD)	FINAL LIQUIDS RATE	FIELD GAS ANALYSIS	FIELD LIQUIDS ANALYSIS
½”	N/A	240/240	N/A	N/A	N/A	N/A	N/A

PACKER DATA:

Packer Type/Manufacturer	INFLATE / IPI
Top Packer Serial No.	IPI-6.75-07
Bottom Packer Serial No.	IPI-6.75-08
Packer Element size	6 3/4”
Element length	66”

WELL:

West Mereenie 23

DST NO: 2

DATE: 04-01-14

FIELD DOWNHOLE PRESSURE DATA

		RECOVERY (1248)	INSIDE (1221)	OUTSIDE (1198/1186)	TIME (mins)
DEPTH	M	1462.93	1468.74	1475.73	
INITIAL HYDRO.	PSI	Pressure Recorder	2183.0psi	2189.0psi	
INITIAL FLOW	PSI	Failure	13.7psi	20.8psi	19:16hrs (0)
FINAL FLOW	PSI				
INITIAL SHUT-IN	PSI		89.9psi	95.4psi	23:16hrs (240)
FINAL SHUT-IN	PSI		692.0psi	698.3psi	03:16hrs (480)
FINAL HYDRO.	PSI		2182.0psi	2188.0psi	
TEMPERATURE	°F		58.1°C	58.3°C	

RECOVERYREVERSE CIRCULATED
PULLED

X

1	REVERSE CIRCULATED	Recovered 1bbl (36mMD) 8.5ppg water cut mud with oil film followed by 3bbls (133mMD) 8.5ppg water cut mud with trace fluorescence.
2	CHART RECOVERY	76.2psi increase = 52.5mTVD = 70.9mMD = 1.8bbls of 8.5ppg water cut mud (Inside pressure recorder #1221)

SAMPLE DATA**GAS/CONDENSATE**

SAMPLE NO	BOMB NO	TYPE	SOURCE	PRESS/TEMP

OIL/CONDENSATE

SAMPLE NO	TYPE	SAMPLE	RMF	TRACER	CL (PPM)

WATER, MUDDY WATER AND MUD

SAMPLE NO.	TYPE	Rw / Rm	REMARKS
1	Water cut mud 8.5ppg	0.15 ohm.m @ 75F	Oil film on sample / pipe dope contamination (reverse circulation)
2	Water cut mud 8.5ppg	0.20 ohm.m @ 75F	Trace fluorescence (reverse circulation)
	Rat hole mud 9.0ppg	0.15 ohm.m @ 75F	Mud sample not kept or sent for analysis (sample chamber)

FILTRATE

SAMPLE NO.	TYPE	Rw / Rm	REMARKS
3	Mud filtrate	0.166 ohm.m @75F	Collected during wiper trip prior to DST 1 (02/01/2013)

Remarks:

- DST #1: 1475.0m-1493.3m (L).
- Wiper trip performed prior to DST #1. DST 2 followed immediately after DST #1.
- Santos Drilling tank number 011 and test separator number 002 on site for test. Separator not utilised, water cut mud with oil film diverted to tank 011.
- Schlumberger wireline correlation, pip tag found at 1340.05m. String needed to move up 1.0m to setting depth.
- 19:16hrs 04/01/2013 tools opened, Weak blow top of bucket at ½". Increased to 3" after 29 minutes – sustained for remaining duration of flow period.
- Reverse circulation recovered 1bbl (36mMD) 8.5ppg water cut mud with oil film followed by 3bbls (133mMD) 8.5ppg water cut mud with trace fluorescence.
- Sample chamber contained 6L of 9.0ppg rat hole mud (no fluorescence in sample). This mud weight was double-checked by the mud engineer – could not explain why 9.0ppg when mud in the hole was 8.8ppg. This sample was not retained as it only contained rat hole mud.
- Chart recovery: 76.2psi increase = 52.5mTVD = 70.9mMD = 1.8bbls of 8.5ppg water cut mud. Fluid Recorder #1248 recorded inaccurate data in part, so was not used. Recovery calculations were based on Inside Recorder #1221.
- Mud weight in active system was 8.8ppg.

DST Field Report

Date Issued: 5 Jan 2014

Pro-Test Pty Ltd
76 Spencer St
Roma Qld 4455
P: (07) 4622 6800
ABN: 22 134 641 240

Field Copy

Well Information

Test Number: 2	Well Name: West Mereenie 23	Formation: P3-120/130 Oil Sands
Date: 4/1/2014	Customer: Santos	Test Interval: 1475.00mRT-1493.34mRT
Job Number: 530-SAN-IF	Drilling Rig: Ensign 918	Well TD: 1572.00mRT
Test Type: Inflate Straddle	Permit / Lease: NT OL4	Interval Length: 18.34m
km's to Rig: 3040	State: NT	Zero Reference: RT

Company Man: Darryl Whitbread	Test Result: Successful	DST Supervisor: Simon Withers
Night Co. Man: Dave Sheeran	Tool String: IF1	DST Supervisor: Brett McIntosh
WSG: David Adderley	Pump: 2	
Mobilised by: George Nairn		

Main Hole Size / Element Size:	8.5" / 6.75"	Qty & OD	ID
OH Size at Top / Btm Element:	8.5" / 8.5"	Drill Pipe:	4" / 3.24"
Total Time Spent Rotating:	25 mins	Hewiwaite:	60 x 4" / 2.5625"
Sleeve position before RIH:	Up	Drill Collar:	16 x 6.5" / 2.8125"
Sleeve position after POOH:	Down	Mud Weight / Type:	8.8ppg / Salt Base
Caliper Log Run:	Yes	DST Tool Wt:	6 klbs
Caliper Type:	FMI	Total String Wt:	116 klbs
General Hole Condition:	Good	Prior Rig Operations:	DST

Drill Stem Test Information

Serial Number:	1248	1221	1198/1186
Pressure Rating:	6000psi	6000psi	6000/6000psi
Battery Serial No.:	509	510	524/594
Position:	Fluid Recorder	Inside Recorder	Outside Recorder
Depth:	1462.93mRT	1468.74mRT	1475.73mRT
Initial Hydrostatic:	Failure psig	2183 psig	2189 psig
Start of Pre Flow:	N/A	N/A psig	N/A psig
End of Pre Flow:	N/A	N/A psig	N/A psig
Initial Shut In:	N/A psig	N/A psig	N/A psig
Start of Main Flow:	Failure	13.7 psig	20.8 psig
End of Main Flow:	Failure	89.9 psig	95.4 psig
Final Shut In:	Failure psig	692 psig	698.3 psig
Final Hydrostatic:	Failure psig	2182 psig	2188 psig
Maximum Temp. during Test:	Failure °C	58.1 °C	58.3 °C

	Start	Finish	Duration	Weight to function tool
Pre Flow:	N/A	N/A hrs	##### mins	N/A klbs
Initial Shut In:	N/A	N/A hrs	##### mins	
Main Flow:	19:18	23:18 hrs	240 mins	63 klbs
Final Shut In:	23:18	3:19 hrs	241 mins	

Pre Flow Description

N/A

Main Flow Description

Weak blow at top of bucket when tool opened, increasing to a weak blow 3" from top of bucket after 27 minutes where it remained for the rest of the flow period. No oil/gas to surface.

Total Fluid Recovered: 52.5mTVD, 70.9mMD, 1.8bbls plus N/Am N/A cushion.
 calculated from: Fluid Recorder Inside Recorder Outside Recorder Actual (Pulled to Fluid) Pump Strokes
 Formation Fluid Consisted of: Oil cut water
 Sample Chamber Contents: Drilling fluid Sample Chamber Pressure: 6.4 psig

- | | | | |
|---|---|--|---|
| <input checked="" type="checkbox"/> Drop Bar Released | <input checked="" type="checkbox"/> Impact Type Circ. Sub Activated | <input checked="" type="checkbox"/> Hollow Shear Pin Recovered | <input type="checkbox"/> Closed Chamber |
| <input checked="" type="checkbox"/> Well Circulated before POOH | <input type="checkbox"/> Pressure Type Circ. Sub Activated | <input type="checkbox"/> Pulled to Fluid then Circulated | <input type="checkbox"/> EMRT Run |

Top Packer Re-use / Condition: Yes - Good
 Bottom Packer Re-use / Condition: Yes - Good

DST Field Report

Date Issued: 5 Jan 2014

Pro-Test Pty Ltd
76 Spencer St
Roma Qld 4455
P: (07) 4622 6800
ABN: 22 134 641 240

Field Copy

Drill Stem Test Information

Comments

Please note that the weights being applied when moving pipe up and down don't take into consideration the drag which is occurring due to the deviation of the well. Hence the 63klbs to open the tool is miss leading. Fluid gauge 1248 for DST 2 has taken inaccurate data points and cannot be used for analysis. Sample was drained successfully from DST sampler when tools back to surface. The fluid recovery was calculated from the inside recorder taking into consideration that the pipe that was being filled was on an angle of 45 degrees. Hence recovery of 52.5mTVD, 70.9mMD, 1.8bbls.

Sequence of Events

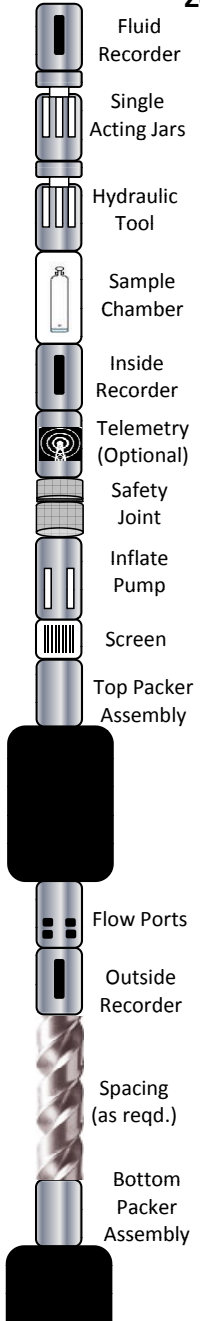
28 Dec 2013	05:00 hrs	Test crew depart base / previous well.	30 Dec 2013	17:00 hrs	Test crew arrive at rig / camp.
4 Jan 2014	05:15 hrs	Continue to adjust interval spacing for DST 2	5 Jan 2014	10:30 hrs	Commence B/D of DST tools
	05:16 hrs	Start memory gauges		13:00 hrs	Complete B/D of DST tools & compile reports
	06:40 hrs	Commence RIH for DST 2		14:10 hrs	Return to camp / Tools to service container
	06:45 hrs	Compile reports for DST 1	6 Jan 2014		Service tools
	07:30 hrs	2 x DST crew return to camp	7 Jan 2014		Service tools
	14:00 hrs	2 x DST crew arrive at rig	8 Jan 2014	05:30 hrs	Depart for Roma
	14:35 hrs	Complete RIH, 1m stick up for correlation			
	14:40 hrs	Commence correlation			
	16:50 hrs	Complete correlation. Adjusted stick up = 2m total			
	16:55 hrs	PJSM-M/U surface equipment / Pressure testing / Conducting the DST			
	17:10 hrs	Commence M/U of surface equipment			
	17:52 hrs	Pressure test surface equipment & bleed lines			
	18:28 hrs	String weights -Static:116 klbs↑:158 klbs ↓:113 klbs			
	18:37 hrs	Function test pumps			
	18:41 hrs	Start rotating at 60 rpm then slow rotation to 45 rpm			
	19:01 hrs	Stop rotating / Let packers square off			
	19:06 hrs	Continue rotating at 45rpm			
	19:11 hrs	Stop rotating			
	19:14 hrs	Test packer seat & hold with 20klbs overpull for 1min			
	19:15 hrs	Set down 63klbs weight to open tool			
	19:18 hrs	Tool open - Main Flow			
	23:18 hrs	Pick up 17klbs over SW & close tool for final shut in			
	23:21 hrs	Pick up a further 5klbs for a total of 22klbs over SW			
	23:44 hrs	Pick up a further 10klbs for a total of 32klbs over SW			
5 Jan 2014	00:08 hrs	Rotate string to ensure pipe not stuck. String weight dropped down 30klbs to 160klbs			
	00:09 hrs	Pick up to 185klbs and rotate string again			
	00:10 hrs	Stop rotating pipe and maintain 27klbs over SW			
	03:17 hrs	Set down 40klbs with RH turn to equalise pressure Pick up to neutral to allow elements to deflate			
	03:24 hrs	PJSM - reverse/conventionally circ.			
	03:30 hrs	Work pipe to check tools are free Function test pumps / Zero strokes			
	03:35 hrs	Drop the Bar			
	03:36 hrs	Start reverse circulation			
	03:45 hrs	Fluid equalized at 494 stks / Close BOP			
	03:47 hrs	Continue reverse circulation			
	03:48 hrs	Fluid returns at 510 stks (oily water) divert to tank			
	04:03 hrs	At 632 stks divert to flare pit (mud wait 8.3 ppg)			
	04:09 hrs	At 719 stks divert to poorboy (8.6 ppg)			
	04:14 hrs	Stop reverse circulation at 771 stks			
	04:15 hrs	Rig down surface equipment			
	05:05 hrs	Layout 1 stand of DP / Start conventional circulation			
	10:25 hrs	PJSM - B/D DST tools			

Test Tool Tally

Field Copy

Test No: 2 **Well Name:** West Mereenie 23 **Formation:** P3-120/130 Oil Sands
Date: 4/1/2014 **Customer:** Santos **Test Interval:** 1475.00mRT-1493.34mRT
Job No: 530-SAN-IF **Drilling Rig:** Ensign 918 **Well TD:** 1572.00mRT
Test Type: Inflate Straddle **Permit:** NT OL4 **Interval Length:** 18.34m

Ground Level: 743.83m **Cushion Type:** N/A **DST Supervisor:** Simon Withers
RT Level: 748.98m **Cushion Wt:** N/Appg **Company Man:** Darryl Whitbread
Zero Reference: RT **Cushion Amount:** N/Am **WSG:** David Adderley



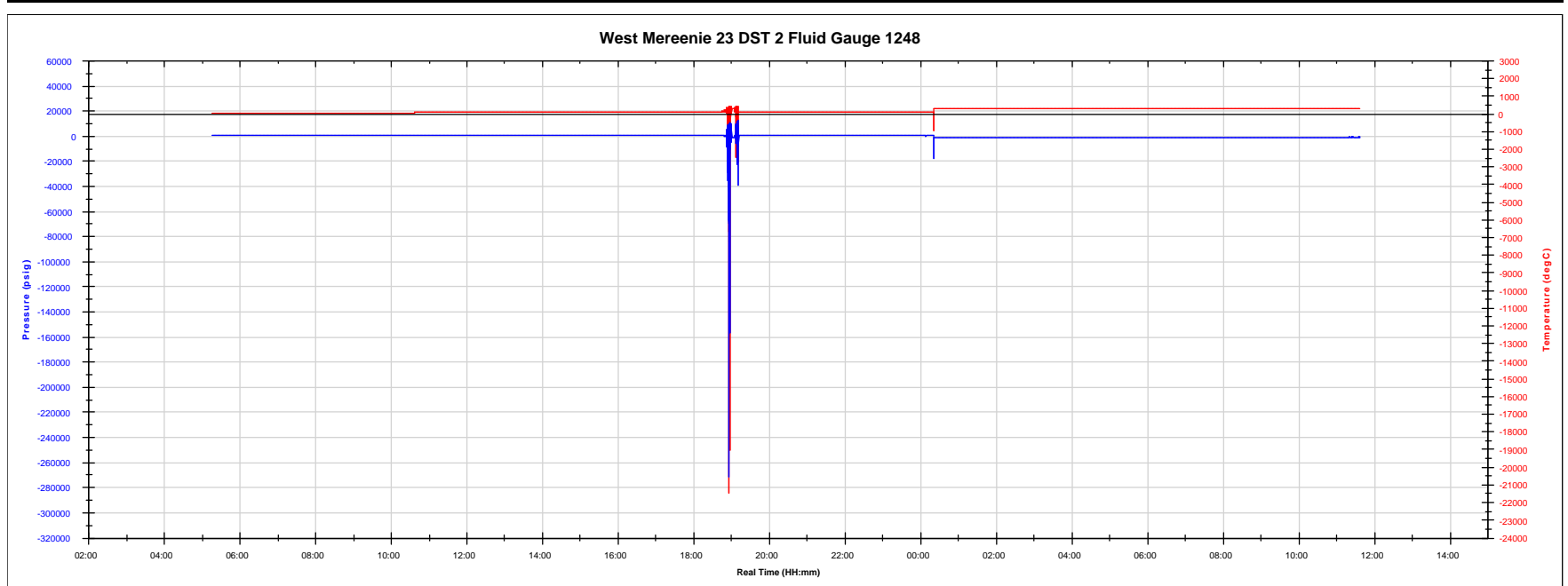
Description	Qty	ID	OD	Length	Depth	bbls/ft	bbls
Drill Pipe	1	3.24	4	9.71	-2.60	0.01020	0.3
HWDP	94	2.5625	4	884.85	7.11	0.00638	18.5
Drill Pipe	44	3.24	4	427.12	891.96	0.01020	14.3
HWDP	2	2.5625	4	18.83	1319.08	0.00638	0.4
Rig XO				1.10	1337.91		
Pip Tag					1339.01		
Drill Collars	12	2.8125	6.5	111.18	1339.01	0.00768	2.8
Circulating Sub	CS29			0.37	1450.19	Total: 36.3bbls	
Drill Collars	1	2.8125	6.5	9.44	1450.56	Stks: 578	
Circulating Sub	CS04			0.43	1460.00		
XO Sub				0.30	1460.43		
Bumper Sub				2.20	1460.73		
Fluid Recorder	Serial #: 1248			0.81	1462.93		
Testing Jars				1.86	1463.74		
Hydraulic Tool				1.94	1465.60		
Sample Chamber				1.20	1467.54		
Inside Recorder	Serial #: 1221			0.29	1468.74		
Safety Joint				0.69	1469.03		
Pump				2.57	1469.72		
Screen				1.05	1472.29		
Top Packer (Element Serial #: IPI-6.75-07)				1.66	1473.34		
PACKER SEAL DEPTH					1475.00 mRT		
Stick Down				0.73	1475.00		
Outside Recorder	Serial #: 1198/1186			0.97	1475.73		
XO Sub				0.29	1476.70		
Drill Collars	1	2.8125	6.5	9.53	1476.99		
XO Sub				0.34	1486.52		
Spacing (as reqd.)	4x1.5			6.00	1486.86		
Stick Up				0.48	1492.86		
PACKER SEAL DEPTH					1493.34 mRT		
Bottom Packer (Element Serial #: IPI-6.75-08)				1.78	1493.34		
Drag Spring				1.90	1495.12		
Bottom of Tool String					1497.02		

**Please note that depths listed are to top of tool **



Test Date: 04/01/2014 - 05/01/2014
Max Pressure: 2636.664 psig

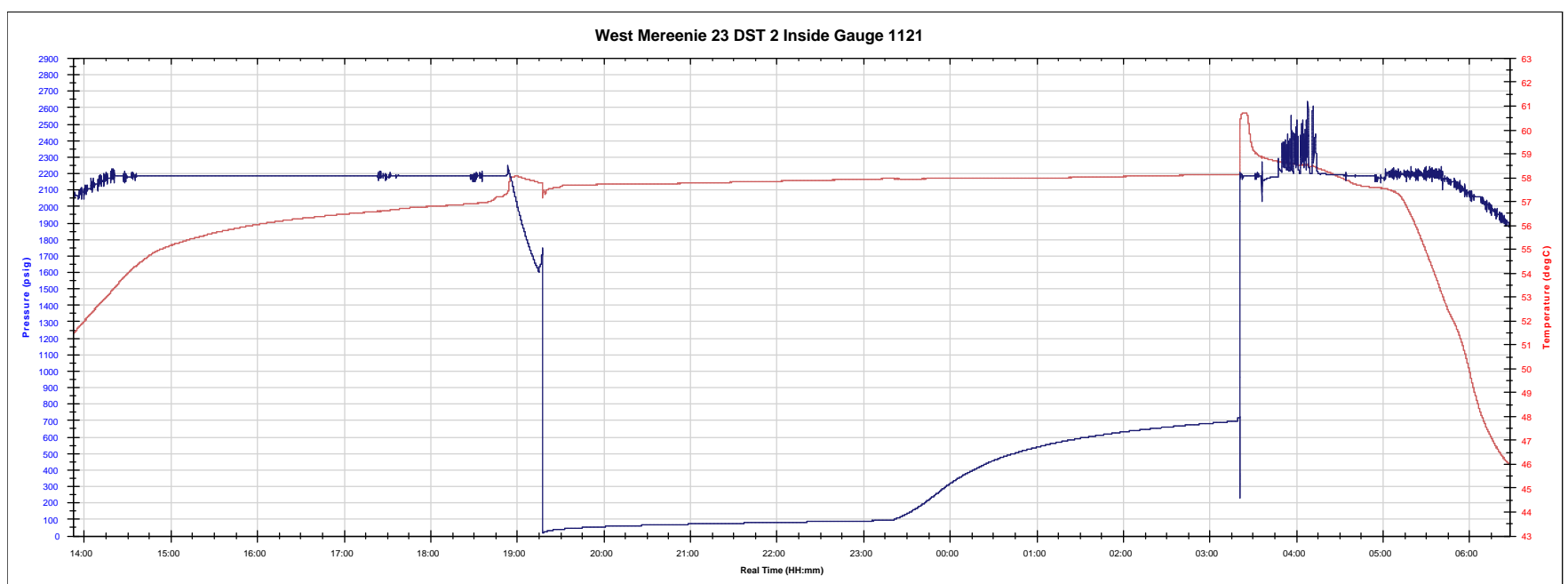
Serial Number: P1221
Max Temperature: 60.702 degC





Test Date: 04/01/2014 - 05/01/2014
Max Pressure: 2642.387 psig

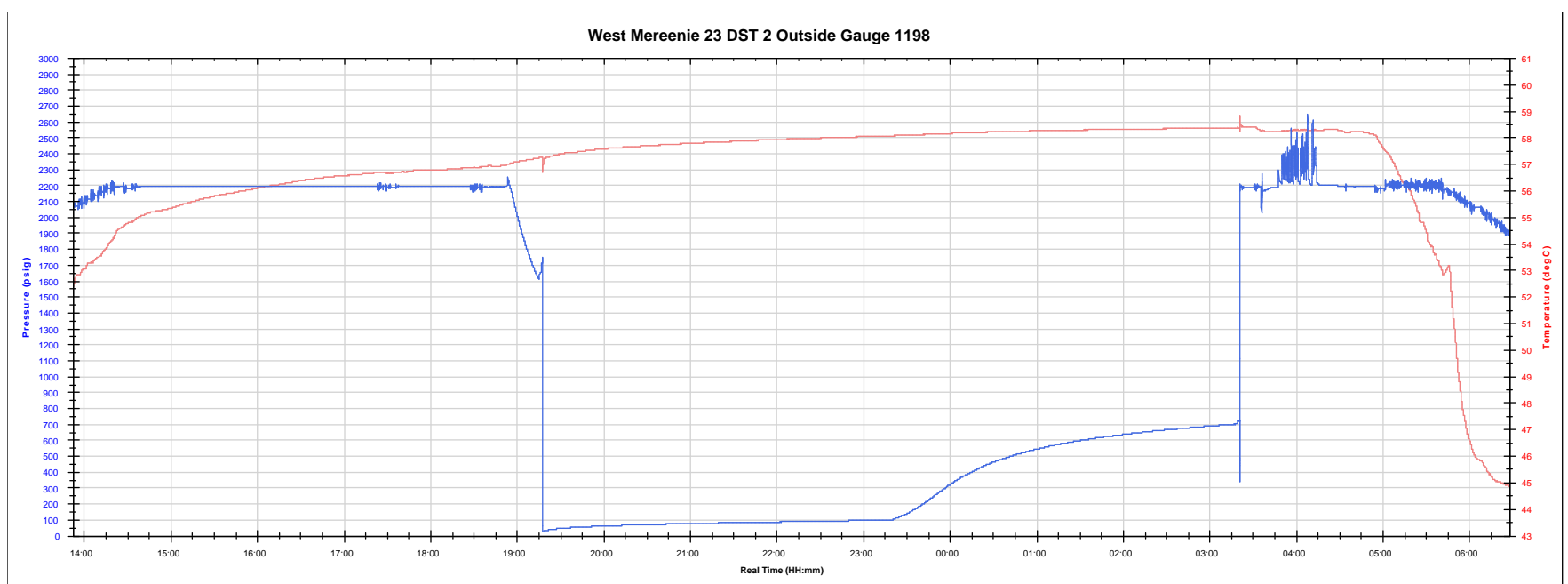
Serial Number: P1198
Max Temperature: 58.816 degC





Test Date: 04/01/2014 - 05/01/2014
Max Pressure: 2642.387 psig

Serial Number: P1198
Max Temperature: 58.816 degC



APPENDIX VIII: HYDROCARBON ANALYSIS

No Hydrocarbon Analysis was performed for West Mereenie 23.

APPENDIX IX: WATER ANALYSIS



This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025
Accreditation No 2013

Certificate of Analysis



**BUREAU
VERITAS**

Santos Limited
GPO Box 2319
ADELAIDE SA 5000
Australia

Attention: Novi Komalasari

Project Name 14PEAD0005200
Collected by Client
Client Ref: 849485-666

Customer Sample ID	West Mereenie-23 Sample 1	West Mereenie-23 Sample 2
Description	Sample 1	Sample 2
Date Collected	31/03/2014	31/03/2014
Time Collected	13:45	13:45
Date Received	28/04/2014	28/04/2014
Sample Type	Water	Water
WATER ANALYSIS		
Test/Reference	Unit	
PROPERTIES: APHA 4500-H+ A,B		
pH at Measured Temp.	6.1	6.0
Measured Temp.	°C 20.1	19.6
PROPERTIES: APHA 2510 A,B		
Electrical Conductivity @ 25°C	µS/cm 85000	88000
Resistivity @ 25°C	M.Ohm 0.12	0.11
ANIONS mg/L P3100-PW-004		
Hydroxide as OH*	mg/L <1	<1
Carbonate as CO3*	mg/L <1	<1
Bicarbonate as HCO3*	mg/L 190	150
ANIONS mg/L APHA 4110		
Chloride as Cl	mg/L 38000	34000
Nitrate as NO3	mg/L <0.1	<0.1
Sulphate as SO4	mg/L 1600	1600
Total Anions	mg/L 40000	36000
ANIONS meq/L P3100-PW-004		
Hydroxide as OH*	meq/L <0.01	<0.01
Carbonate as CO3*	meq/L <0.01	<0.01
Bicarbonate as HCO3*	meq/L 3	2
ANIONS meq/L APHA 1050 A		
Chloride as Cl*	meq/L 1100	960
Nitrate as NO3*	meq/L <0.01	<0.01
Sulphate as SO4*	meq/L 33	32
Total Anions*	meq/L 1100	1000
CATIONS Dissolved mg/L APHA 3120		
Potassium as K	mg/L 1400	1400
Sodium as Na	mg/L 18000	18000
Calcium as Ca	mg/L 3300	3200
Magnesium as Mg	mg/L 860	840
CATIONS mg/L APHA 3120		
Total Cations	mg/L 24000	24000
CATIONS meq/L APHA 1050 A		
Potassium as K*	meq/L 36	35
Sodium as Na*	meq/L 790	800



Customer Sample ID		West	West
Description		Mereenie-23	Mereenie-23
Date Collected		Sample 1	Sample 2
Time Collected		31/03/2014	31/03/2014
Date Received		13:45	13:45
Sample Type		28/04/2014	28/04/2014
		Water	Water

WATER ANALYSIS

Test/Reference	Unit		
Calcium as Ca*	meq/L	170	160
Magnesium as Mg*	meq/L	71	69
Total Cations*	meq/L	1100	1100
DERIVED PARAMETERS APHA 4110 & 3120			
Ion balance (Diff * 100/Sum)	%	2	3
Acceptance Criteria	%	5	5
Satisfactory		Yes	Yes
DERIVED PARAMETERS APHA 2320 A,B			
Total Alkalinity (calc as CaCO ₃)	mg/L	160	120
DERIVED PARAMETERS APHA 4110 & 3120			
Total Cations + Anions	mg/L	64000	60000
DERIVED PARAMETERS APHA 2340 B			
Hardness (calc as CaCO ₃)	mg/L	12000	12000
DERIVED PARAMETERS APHA 2540 A,B,C,D			
Calculated Total Dissolved Solids	mg/L	54000	57000

Test Description

DERIVED PARAMETERS If the ion balance in this sample is unsatisfactory it is most likely due to a component or components of the sample that is not within the scope of this analysis.

Authorised By

Valentina Pavlovic Chemist Accreditation No 2013

Laboratory Manager

James Dennett Operations Manager

Final Report

- Indicates Not Requested * Indicates NATA accreditation does not cover the performance of this service

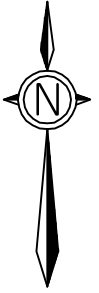
Samples will be discarded after 30 days unless otherwise notified.

Bureau Veritas shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Amdel Limited be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

The samples were not collected by Laboratory staff.

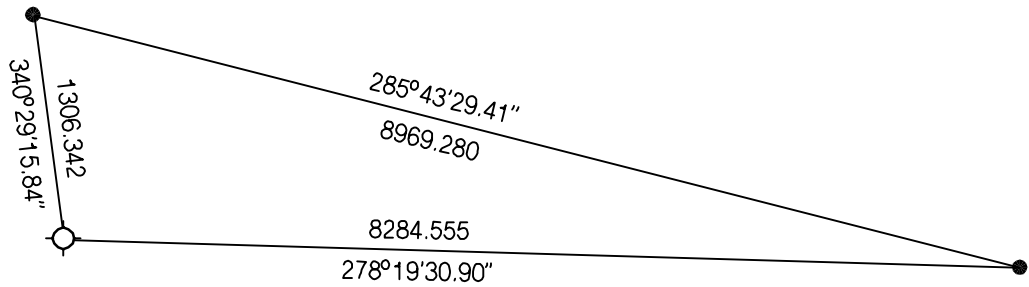
APPENDIX X: WELL LOCATION SURVEY

NORTHERN TERRITORY
WELL LOCATION
REFERENCE MARKS SKETCH PLAN
PETROLEUM PRODUCTION LICENCE PPL 4



Well Name	WEST MEREENIE #23		
Region	ALICE SPRINGS		
Spheroid	GRS80 ELLIPSOID	MGA 94	ZONE 52
Latitude	23°58'09.8841"	Grid Reference (metres)	
Longitude	131°26'50.1703"	Easting	749 024.290
Convergence	+0°59'40.97"	Northing	7 346 998.510

BM WM 15
EL 766.901 metres
E 748 587.853
N 7 348 230.132



WEST MEREENIE #23

BM WM 16
EL 786.774 metres
E 757 223.760
N 7 345 798.648

NOTES :This sketch plan is Not to Scale
Distances and Co-ordinates are in metres
Datum for bearings - PLANE

		AHD (metres)
Elevations	G L	743.83
	B H	743.80

Co ordinates obtained by GPS Survey
Datum - BM WM 16
Leveled by GPS
Estimated Horizontal error less than 1.00 metre
Estimated Vertical error less than 0.10 metre
Installed and Levelled by FYFE PTY LTD
ACN 062 592 465

Authority for Elevations	BM WM 16
Adopted Elevation of Authority	786.774
Date	12th March 2014

Date 28th March 2014

File Reference 10630WE23

REGISTERED SURVEYOR

APPENDIX XI: DRILLING - FINAL WELL REPORT



WEST MEREENIE 23
(01 Aug 2013 - 08 Jan 2014)

Field - Mereenie

FINAL WELL REPORT

Santos Ltd

Report Compiler: Alex Fawcett

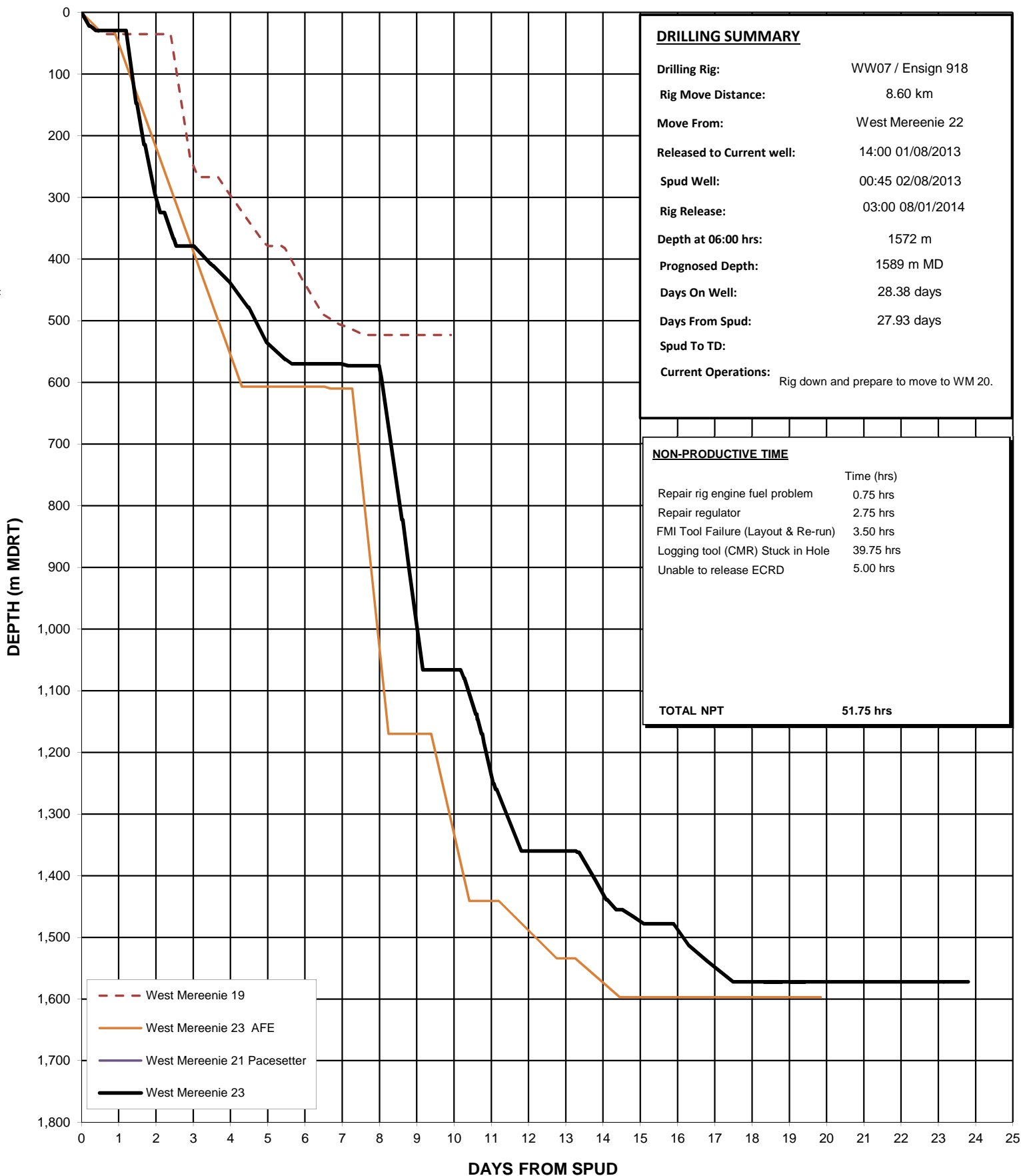
Date of Issue: 4 June 2014

Wellname: WEST MEREENIE 23	Operation Co: Santos Ltd	Rig: Ensign 918
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Well Summary

Well Objective	:West Mereenie 23 is located on the western south flank in a appraisal step out location west of the successful West Mereenie 05. The production hole will be directional drilled to intersect the pay zone at a 45 deg. angle.
Country	:Australia
Field	:Mereenie
Block	:OL 4
Well	:WEST MEREENIE 23
Well Type	:Appraisal
Operating Company	:Santos Ltd
Rig	:Ensign 918
Permit	:OL I
Licence	:-
Latitude	:23 Deg 58 Min 09.81 Sec
Longitude	:131 Deg 26 Min 50.17 Sec
RT to GL:	:5.15 m RT GL
GL Elevation	:743.83 m
Planned TD	:1,595.0 m
Actual TD	:1,572.0 m
Spud Date / Time	:06 Dec 2013 / 06:00
TD Reached Date / Time	:28 Dec 2013 / 16:30
Rig Released Date / Time	:08 Jan 2014 / 03:00
Total Days Since Spud	:24.34 () D
Total Days on Operations	:35.99 () D

West Mereenie 23 TIME DEPTH CURVE



Well: West Mereenie 23
Date: 30/06/2014 Day 28
Operator: Santos
Rig: WW07 / Ensign 918
Location: Amadeus Basin



Operations Summary (24 hours through midnight):

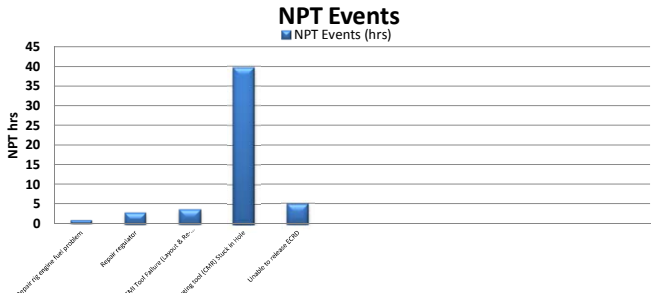
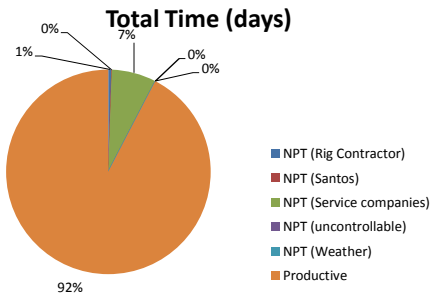
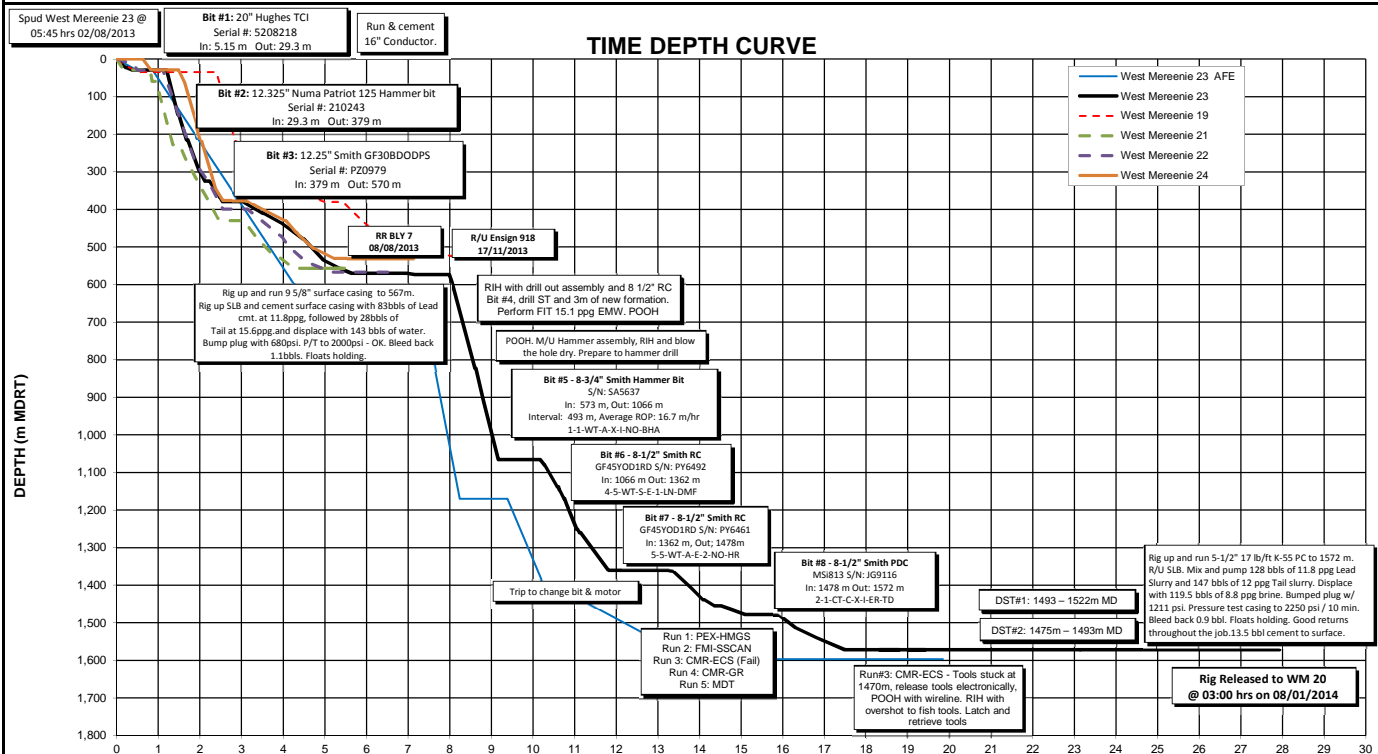
RIH and cement 5.5" Casing, 13.5bbl cement to surface.
 Set casing slips. Nipple down BOP. Install Tubing head and Pressurer Test.
 Rig down TDS.

06:00 Update:

Rig down and prepare to move to WM 20.

Forecast:

Release Rig to West Mereenie 20 @ 03:00hrs.
 Ensign crew change. General Rig down and prepare for 10 k/m Rig move to West Mereenie 20.



Drilling Performance

	AFE	Daily Actual	Cum Actual	Estimated Final	Target	Actual	Target	Actual
Surface Hole Days	8.0		7.0	7.0	LTI 0	0	Contained Spills 0	0
Total Well Days	24.7		28.4	28.4	ADI 0	0	Uncontained Spills 0	0
Total Well Spud to TD (Days)	14.7		17.5	17.5	MTI 0	0		
Total Well Spud to Rig Release (Days)	19.7			19.7	FAC 0	0		
Measured Depth (m)	1,589		1,572		NMI 0	0		
Drilled Interval (m) Last 30Hrs		N/A						
AVG ROP (m/hr) - Last 30Hrs		N/A						

Happy Hour Targets Summary

Happy Hour Performance Summary

High Return Targets	Time (days)			Efficiency (days)		Happy Hour Target	Happy Hour Variance
	AFE	Pacesetter	Actual	Potential	Actual		
1. Surface Hole	3.7	3.5	4.4	-0.5	0.7	24.7 days	
2. Surface Casing	1.6	1.6	1.1	-0.3	-0.5	23.6 days	
3. Production Hole	8.5	8.1	10.7	-0.2	2.2		

Comments on Costs/NPT:

* 48.25 hrs NPT for CMR tool stuck in hole and subsequent fishing job
 * Overrun for increased logging scope / Rig time

Wellname: WEST MEREENIE 23	Operation Co: Santos Ltd	Rig: Ensign 918
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Well History

#	Date	Depth (m)	24 Hour Summary
1	01 Aug 2013		Load out non essential equipment f/ WM24 to WM23 Wait on confirmation to suspend WM24 from Adelaide office Rig down on WM24, move to WM23, Spot rig and trailers, Rig up, Mix spud mud Load 20" BHA into mast
2	02 Aug 2013	29.3	Hold pre spud meeting & inspection, conduct hazard hunt. Spud & drill 20" conductor hole to 29.3m, POOH, lay down BHA Run 16" casing in to 29.3m, Mix & tremmie 2.25bbls cmt @ 15 ppg with 4% calcium chloride (hot mix), WOC, Mix and tremmie 7.8bbls cmt @ 14.8ppg with 2% calcium chloride, WOC, Raise PTM (Hot work, Confind space) weld flange to 16" casing, Nipple up diverter & blooie line, Pick up & break down Hammer BHA to make up new assembly
3	03 Aug 2013	294.0	Break down 12 1/4" BHA from previous well WM24, Make up & test run New 12.45" Numa patriot 125 Air Hammer, Make up BHA assembly & RIH Drill 12.45" Hole f/ 29.3 to 294m
4	04 Aug 2013	379.0	Drill ahead w/ 12.45" Air hammer 294 to 324.5m Rig hold back regulator malfunction, stop pull back 2 jnts, replace faulty regulator. Drill ahead w/ 12.45" Air hammer f/ 324.5 to 379m ROP approx 11m/hr, Excessive formation water, Sumps full, stop Air hammer drilling POOH, Break down Hammer & BHA, make up DTFR BHA & RIH
5	05 Aug 2013	437.0	RIH w/ 12.25" DTFR assembly, Drill ahead f/ 379 to 437m
6	06 Aug 2013	535.0	Drill ahead 12.25" hole w/ DTFR f/ 437m to 535m.
7	07 Aug 2013	570.0	Drill 12-1/4" surface hole f/ 535m to 570m, (Geo. confirmed T.D.) circ. hole clean, collect bottoms up sample, POOH to run 9-5/8" csg. Raise PTW (Hot work , Confind space) Cut 16" conductor csg 24" below GL, Weld in Braden Head landing ring, Nipple down DTFR flow & discharge lines
8	08 Aug 2013	570.0	Run 9 5/8" casing to shoe depth @ 566.86m and cement same. Remove rig floor, install "B" section 11" 3000psi x 7 1/16" 5000psi Tubing Spool dressed with blank flange & Companion flange, Pressure Test THS/Casing to 2000psi. Suspend well and release rig as per. NT DME approval. Rig released @ 20:00hrs on 8-08-13
9	11 Dec 2013	570.0	Rig released on WM 19 @ 13:30 Hrs. General rig down on WM 19. Move equipment to WM23. 25% rigged down 25% moved
10	12 Dec 2013	570.0	Wait on daylight.Rig down on WM19 and move to WM23.Wait on daylight.
11	13 Dec 2013	570.0	WOD. Rig move f/ WM19 to WM 23. Moved 75%, Spotted 50% on WM23 and rig up 15%. WOD.
12	14 Dec 2013	570.0	WOD. Rig move f/ WM19 to WM 23. Moved 100%, Spotted 100% on WM23 and rig up 60%.
13	15 Dec 2013	570.0	Cotinue to Rig up, Pre-spud checks, check ESD, Hazard hunt & Prespud safety meeting,

#	Date	Depth (m)	24 Hour Summary
			Weekly safety meeting, Nipple up BOP and RFCD and flow Tee line.
14	16 Dec 2013	570.0	Pressure test BOPE , choke, kill and choke valves and lines, RFCD and surface lines. Pressure test all gate valves / rams and annular to 200 psi low / 5 mins 2000 psi high 10 mins. Make up conbo tool, RIH set plug, Pressure test blooie line to 500psi for 10mins , pull test plug.
15	17 Dec 2013	570.0	Pick up D/pipe make up and rack back in stands, Make up 8 1/2" bit & BHA, RIH.
16	18 Dec 2013	573.0	Drilled out shoe track and 3m new formation, circulate hole clean, FIT to EMW15.1ppg, Flow check, POOH with 8 3/4" bit and BHA, tested ADA equipment, Rig up Directional equipment, strap BHA #5, Make up 8 3/4" Air hammer , BHA and RIH to 197m.
17	19 Dec 2013	907.0	RIH with 8 3/4" hammer bit and BHA to 556m, fit Rotating head, PJSM, unload well and hammer drill 8 3/4" hole from 573m to 907m
18	20 Dec 2013	1,066.0	Air hammer drilled 8 3/4" hole to 1066m, circulate hole clean , kill well with 8.8ppg mud , POOH with air hammer and BHA, lay out air hammer and directional tools, strap BHA #6, Make up 8 1/2" bit and motor , surface test motor, make up directional tools and RIH to 112m.
19	21 Dec 2013	1,184.0	RIH with 8 1/2" TCI bit and 6 3/4" motor and Directional BHA to 1066m, Blow well dry, flow test, Drill ahead with directional assembly to 1184m, with flow test as directed by insite Geologist.
20	22 Dec 2013	1,359.7	Directional Drill ahead to 1359.7m with gas flow test as directed by Geo
21	23 Dec 2013	1,360.0	POOH to change bit and directional motor, BOP test, M/up new bit and D/H motor, RIH with new bit and motor to 139m.
22	24 Dec 2013	1,408.0	RIH with new 8.5" bit and D/H motor to 1360m, reamed and washed last to stands down, Continue to drill ahead to section TD.
23	25 Dec 2013	1,466.0	Continue to drill ahead to 1439m , perform a gas flow test , drill ahead to 1450m, displace hole from Air and mist to mud, drill ahead on mud to 1466m.
24	26 Dec 2013	1,478.0	Continue to drill ahead on Mud slowly to 1478m, Circulate hole clean, Flow check, POOH for bit change, Lay out bit dog sub and D/H motor, pick up new D/H motor , bit and dog sub, Make up test on surface, RIH with BHA #8 from surface to 1318m, filling pipe every 20stands.
25	27 Dec 2013	1,539.0	RIH with new bit. Drilled to 1539m.
26	28 Dec 2013	1,572.0	Drilled to 8.5 section TD 1572m MD. Circulated hole clean Trip out to 149m..
27	29 Dec 2013	1,572.0	Laid down Directional assembly. completed Wire Line Logs 1 and 2.
28	30 Dec 2013	1,572.0	
28	30 Dec 2013	1,572.0	Attempt to free stuck logging tools (No Go). Disconnect and rig down Wire line sheaves. RIH with overshot Fishing assembly and attempt to latch on to Fish.
29	31 Dec 2013	1,572.0	Latched and recovered stuck Logging tools to surface. Wire Line logging Run #3.
30	01 Jan 2014	1,572.0	Completed Wireline logging runs 4 and 5.

Wellname: WEST MEREENIE 23	Operation Co: Santos Ltd	Rig: Ensign 918
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#	Date	Depth (m)	24 Hour Summary
31	02 Jan 2014	1,572.0	Completed Log Run #4. Completed Wiper trip. RIH DST run #1.
32	03 Jan 2014	1,572.0	Completed DST Run #1.
33	04 Jan 2014	1,572.0	POOH with DST Tools run #1. RIH with DST Tools. Perform DST run #2.
34	05 Jan 2014	1,572.0	Completed DST run #2. POOH recovered gauges and samples. laid down DST Tools. Completed BOP Test. Slip and cut Drilling line. Wiper trip.
35	06 Jan 2014	1,572.0	Completed Wiper Trip. Circulated hole clean. POOH sideways and laid out all tubulars. Rigged up and ran 5.5" Casing.
36	07 Jan 2014	1,572.0	RIH and cement 5.5" Casing, 13.5bbl cement to surface. Set casing slips. Nipple down BOP. Install Tubing head and Pressurer Test. Rig down TDS.
37	08 Jan 2014	1,572.0	

Wellname: WEST MEREEENIE 23	Drilling Co: Santos Ltd	Rig: Ensign 918
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Mud Record

Water Based																		
Date - Time	Mud Type Description	Depth (m)	Temp (°F)	MW (ppg)	VIS (sec/qt)	PV (cP)	YP (lbf/100ft²)	Gel 10s / 10m / 30m (lbf/100ft²)	F.L. API (cm³)	F.L. HTHP (cm³/30min)	Solids (%)	Sand (%)	MBT	pH	Cl (mg/L)	Hard (mg/L)	KCl (%)	
11 Dec 2013 - 00:00	Water Base Mud	0.0	0.0	0.00	0	0	0	0 / 0 / 0	0.0	0.0	0.00		0.0	0	0	0.0	0.0	
12 Dec 2013 - 00:00	Water Base Mud	0.0	0.0	0.00	0	0	0	0 / 0 / 0	0.0	0.0	0.00		0.0	0	0	0.0	0.0	
13 Dec 2013 - 00:00	Water Base Mud	0.0	0.0	0.00	0	0	0	0 / 0 / 0	0.0	0.0	0.00		0.0	0	0	0.0	0.0	
14 Dec 2013 - 00:00	Water Base Mud	0.0	0.0	0.00	0	0	0	0 / 0 / 0	0.0	0.0	0.00		0.0	0	0	0.0	0.0	
15 Dec 2013 - 00:00	Water Base Mud	0.0	0.0	0.00	0	0	0	0 / 0 / 0	0.0	0.0	0.00		0.0	0	0	0.0	0.0	
16 Dec 2013 - 00:00	Water Base Mud	0.0	0.0	0.00	0	0	0	0 / 0 / 0	0.0	0.0	0.00		0.0	0	0	0.0	0.0	
17 Dec 2013 - 00:00	Water Base Mud	0.0	0.0	0.00	0	0	0	0 / 0 / 0	0.0	0.0	0.00		0.0	0	0	0.0	0.0	
18 Dec 2013 - 00:00	Water Base Mud	0.0	0.0	0.00	0	0	0	0 / 0 / 0	0.0	0.0	0.00		0.0	0	0	0.0	0.0	
19 Dec 2013 - 00:00	Water Base Mud	0.0	0.0	0.00	0	0	0	0 / 0 / 0	0.0	0.0	0.00		0.0	0	0	0.0	0.0	
20 Dec 2013 - 00:00	Water Base Mud	0.0	0.0	0.00	0	0	0	0 / 0 / 0	0.0	0.0	0.00		0.0	0	0	0.0	0.0	
21 Dec 2013 - 00:00	Water Base Mud	0.0	0.0	0.00	0	0	0	0 / 0 / 0	0.0	0.0	0.00		0.0	0	0	0.0	0.0	
22 Dec 2013 - 00:00	Water Base Mud	0.0	0.0	0.00	0	0	0	0 / 0 / 0	0.0	0.0	0.00		0.0	0	0	0.0	0.0	
23 Dec 2013 - 00:00	Water Base Mud	0.0	0.0	0.00	0	0	0	0 / 0 / 0	0.0	0.0	0.00		0.0	0	0	0.0	0.0	
24 Dec 2013 - 00:00	Water Base Mud	0.0	0.0	0.00	0	0	0	0 / 0 / 0	0.0	0.0	0.00		0.0	0	0	0.0	0.0	
25 Dec 2013 - 23:30	Water Base Mud	1,465.0	35.0	8.70	27	2	5	1 / 2 / 2	0.0	0.0	1.00	1.00	0.0	10	40,000	60.0	6.0	
26 Dec 2013 - 19:00	Water Base Mud	1,478.0		8.70	35	3	5	1 / 2 / 2	0.0	0.0	1.00	1.00	0.0	10	40,000	60.0	6.0	
27 Dec 2013 - 22:00	Water Base Mud	1,538.0	49.0	8.70	35	5	12	5 / 7 / 8	12.0	0.0	4.00	0.01	0.0	9	41,000	100.0	6.1	Á
28 Dec 2013 - 22:00	Water Base Mud	1,538.0	49.0	8.80	34	6	14	6 / 8 / 9	12.0	0.0	4.00	0.01	0.0	9	46,000	100.0	6.1	Á
29 Dec 2013 - 22:00	Water Base Mud	1,538.0	49.0	8.80	34	6	14	6 / 8 / 9	12.0	0.0	4.00	0.01	0.0	9	46,000	100.0	6.1	
29 Dec 2013 - 22:00	Water Base Mud	1,572.0	49.0	8.80	34	6	14	6 / 8 / 9	12.0	0.0	4.00	0.01	0.0	9	46,000	100.0	6.1	
30 Dec 2013 - 22:00	Water Base Mud	1,538.0	49.0	8.80	34	6	14	6 / 8 / 9	12.0	0.0	4.00	0.01	0.0	9	46,000	100.0	6.1	
30 Dec 2013 - 22:00	Water Base Mud	1,572.0	49.0	8.80	34	6	14	6 / 8 / 9	12.0	0.0	4.00	0.01	0.0	9	46,000	100.0	6.1	
31 Dec 2013 - 22:00	Water Base Mud	1,572.0	49.0	8.80	34	6	14	6 / 8 / 9	12.0	0.0	4.00	0.01	0.0	9	46,000	100.0	6.1	
01 Jan 2014 - 22:00	Water Base Mud	1,572.0	49.0	8.80	34	6	14	6 / 8 / 9	12.0	0.0	4.00	0.01	0.0	9	46,000	100.0	6.1	
02 Jan 2014 - 22:00	Water Base Mud	1,572.0	49.0	8.80	34	6	17	7 / 8 / 8		0.0	5.00	0.02	0.0	9	46,000	240.0		
03 Jan 2014 - 18:00	Water Base Mud	1,572.0	49.0	8.80	34	6	17	7 / 8 / 8		0.0	5.00	0.02	0.0	9	46,000	240.0		
04 Jan 2014 - 18:00	Water Base Mud	1,572.0	49.0	8.80	34	6	17	7 / 8 / 8		0.0	5.00	0.02	0.0	9	46,000	240.0		
05 Jan 2014 - 18:00	Water Base Mud	1,572.0	40.0	8.80	34	6	17	7 / 8 / 8		0.0	5.00	0.02	0.0	99	46,000	240.0		
06 Jan 2014 - 18:00	Water Base Mud	1,572.0	40.0	8.80	34	6	17	7 / 8 / 8		0.0	5.00	0.02	0.0	99	46,000	240.0		
07 Jan 2014 - 00:00	Water Base Mud	1,572.0			34			/ /										Á

Wellname: WEST MEREENIE 23	Operation Co: Santos Ltd	Rig: Ensign 918
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Casing & Cementing Summary

Wellname: WEST MEREENIE 23	Operation Co: Santos Ltd	Rig: Ensign 918
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Casing Type: Surface Casing	Originated By: Brian Marriott	Checked By: Matthew Howard	Date: 08 Aug 2013
Hole Size: 12 1/4 in	Casing Size: 9 5/8 in	GL-RT: 5.15m	Contractor:
Total Depth MD:570.00m	Total Depth 570.00m	Casing Depth 566.9m	Casing Depth 566.86m
	TVD:	MD:	TVD:
PRE-FLUSH 10.0bbl@ 8.4ppg	SPACER 10.0bbl @ 8.4ppg		
Additives:	Additives: Pump 10bbls water ahead, pressure test lines to 3000psi, ok, pump additional 10bbls of water		
Water Source			
CEMENT	ADDITIVES	%	Amount Units
TAIL SLURRY :	162sack	D 47 Anti foam	3.00 gal
Brand / Class:	ABC / A	D 80 Dispersant	50.00 gal
Slurry Yield:	1.18ft³/sack		
Mixwater Req't:	5.23gal/sack		
Actual Slurry Pumped:	28.0bbl		
Density:	15.6ppg		
Cement Top (MD):	430.0m		
LEAD SLURRY :	210sack	Bentonite 1.50 BWOC	389.00 lbs
Brand / Class:	ABC / A	D 47 Anti foam	5.00 gal
Slurry Yield:	2.52ft³/sack	D 75 Extender	70.00 gal
Mixwater Req't:	15.22gal/sack		
Actual Slurry Pumped:	83.0bbl		
Density:	11.8ppg		
Cement Top (MD):	125.0m		
DISPLACEMENT	Fluid: Water @ 8.4ppg		
Theoretical Displ. From Avg Caliper ID: 143.3bbl	Bumped Plug with: 683psi		
Actual Displ. From Tubs: 143.0bbl @ 5.0bbl/min	Pressure Tested To: 2,000psi		
Actual Displ. From Barrel Counter: 142.0bbl	Bleed Back: 1.1bbl		
Actual Displ. From Tank Dip:	Displaced via: Schulmberger cmt. unit		
ACTIVITY	Time/Date	Returns to Surface: 0.0bbl mud,0.0bbl cmt	
Start Running csg.	02:00 8/8/07	Casing Action During Preflush : No Action	Cement : No Action
Casing On Bottom	09:15 8/8/07	Displacement : No Action	Displacement : No Action
Start Circulation	10:00 8/8/07	Top Up Job run: Yes	220 sack of class A
Start Pressure Test	10:10 8/8/07	Plug Set: Make: Topco	Type: Non Rotating
Pump Preflush	10:20 8/8/07	Centralizer Type: Bow Spring	Centralizer Placement Depth: 563, 557, 543, 531, 520, 509, 475, 442, 409, 375, 341, 308, 274, 241, 208, 174, 141, 108, 75
Start Mixing	10:25 8/8/07	Wiper Plug Top: Yes	
Finish Mixing	11:20 8/8/07	Wiper Plug Bottom: Yes	
Start Displacing	11:25 8/8/07		
Stop Displ./Bump	11:50 8/8/07		
Pressure Test	12:00 8/8/07		
CASING AND EQUIPMENT DETAILS			
Stick Up			
No. Joints	OD	Wt	Grade
1			Datum for Ensign 918
1	9.625in		Braden Head with Pup Joint
49	9.625in		Casing Full Joints
1	9.625in		Float Collar Joint
1	10.500in		Float Collar
1	9.625in		Float shoe Joint
1	10.500in		Float Shoe
			Thread
			Length
			From
			To

Wellname: WEST MEREENIE 23	Operation Co: Santos Ltd	Rig: Ensign 918
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Theoretical Bouyed wt. of casing:	56.0klb	Bradenhead Height above GL:	0.00m
Casing wt. prior to landing csg:		Bradenhead Description / Length:	11" 5k GE SCH 1 Top x 9-5/8" Box Bottom/ 3.30m
Actual wt. of casing (last joint run-block wt):		Tubing Spool Size:	11" 3K Flange Bottom x 7-1/16" 5K Studded Top
Landing wt. (after cementing and pressure bleed off):		Setting Slips:	
Thread Dope Used :	Bestolife 2000		
Cementing Job Remarks:	<p>Nil Cmt. returns to surface. Good cmt. job w/ no problems. The #3 lo-torque valves on the cmt. head require a complete strip down & service. Operator stated he had just greased the valves, but it took his full body wt. to operate the valves. Top up job, between the 9-5/8" csg. & 16" csg. 45bbbls (220sx) of 15.6ppg cmt.</p>		

Wellname: WEST MEREEENIE 23	Operation Co: Santos Ltd	Rig: Ensign 918
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Casing Type: Production Casing	Originated By: Darryl Whitbread	Checked By: Matthew Howard	Date: 07 Jan 2014
Hole Size: 8 1/2 in	Casing Size: 5 1/2 in	GL-RT: 5.15m	Contractor:
Total Depth MD: 1,572.00m	Total Depth 1,502.00m TVD:	Casing Depth 1,570.7m MD:	Casing Depth 1,500.20m TVD:
PRE-FLUSH @	SPACER 40.0bbl @ 8.4ppg		
Additives:	Additives: No additives		
Water Source			

CEMENT	ADDITIVES	%	Amount	Units
TAIL SLURRY :	489sack	D047 Antifoam	20.00	gal
Brand / Class:	ABC / LiteCRETE	D145A	100.00	gal
Slurry Yield:	1.69ft³/sack	Dispersant		
Mixwater Req't:	6.15gal/sack	D500 Gasblok	486.00	gal
Actual Slurry Pumped:	147.0bbl			
Density:	12.0ppg			
Cement Top (MD):	746.0m			
LEAD SLURRY :	282sack	D020 Bentonite	550.00	lbs
Brand / Class:	ABC / G	D47 Antifoam	5.00	gal
Slurry Yield:	2.55ft³/sack	D75 Extender	106.00	gal
Mixwater Req't:	15.57gal/sack			
Actual Slurry Pumped:	128.0bbl			
Density:	11.8ppg			
Cement Top (MD):	0.0m			

DISPLACEMENT	Fluid:	Brine @ 8.8ppg
Theoretical Displ. From Avg Caliper ID: 119.8bbl	Bumped Plug with:	1,211psi
Actual Displ. From Tubs: 119.5bbl @ 5.0bbl/min	Pressure Tested To:	2,250psi
Actual Displ. From Barrel Counter: 120.4bbl	Bleed Back:	0.9bbl
Actual Displ. From Tank Dip: 119.5bbl	Displaced via:	SLB cement unit

ACTIVITY	Time/Date	Returns to Surface: 399.0bbl mud, 13.5bbl cmt
Start Running csg.	20:30 6/1/07	Casing Action During Preflush : Reciprocate Cement : Reciprocate Displacement : Reciprocate
Casing On Bottom	07:10 7/1/07	
Start Circulation	07:10 7/1/07	Top Up Job run: No of class
Start Pressure Test	10:35 7/1/07	Plug Set: Make: Top-Co Type: Wiper
Pump Preflush	10:45 7/1/07	Centralizer Type: 8.5-8.75"/Steel Bow Spring & Fibreglass Solid Centralizer Placement Depth: Solid @ 1567m, then every 12m to 1159m. Bow @ 1146m, then every 36m to 62m. 1 x Bow @ 35m.
Start Mixing	11:10 7/1/07	
Finish Mixing	12:25 7/1/07	
Start Displacing	12:35 7/1/07	
Stop Displ./Bump	13:10 7/1/07	
Pressure Test	13:20 7/1/07	Wiper Plug Top: Yes Wiper Plug Bottom: Yes

CASING AND EQUIPMENT DETAILS								
Stick Up								
No. Joints	OD	Wt	Grade	Comment	Thread	Length	From	To
1	5.500in	17.0lbs/ft	L80	Landing Joint	JFE Bear	12.06m	-1.13m	10.93m
108	5.500in	17.0lbs/ft	L80		JFE Bear	36.21m	10.93m	47.14m
1	5.500in	17.0lbs/ft	L80	Spacer	JFE Bear	3.03m	47.14m	50.17m
7	5.500in	17.0lbs/ft	L80		JFE Bear	1,408.68m	50.17m	1,458.85m
1	5.500in	17.0lbs/ft	L80	Marker Joint	JFE Bear	3.04m	1,458.85m	1,461.89m
2	5.500in	17.0lbs/ft	L80		JFE Bear	96.05m	1,461.89m	1,557.94m
1				Float Collar	JFE Bear	0.30m	1,557.94m	1,558.24m
1	5.500in	17.0lbs/ft	L80		JFE Bear	12.06m	1,558.24m	1,570.30m
1				Float Shoe	JFE Bear	0.40m	1,570.30m	1,570.70m

Wellname: WEST MEREENIE 23	Operation Co: Santos Ltd	Rig: Ensign 918
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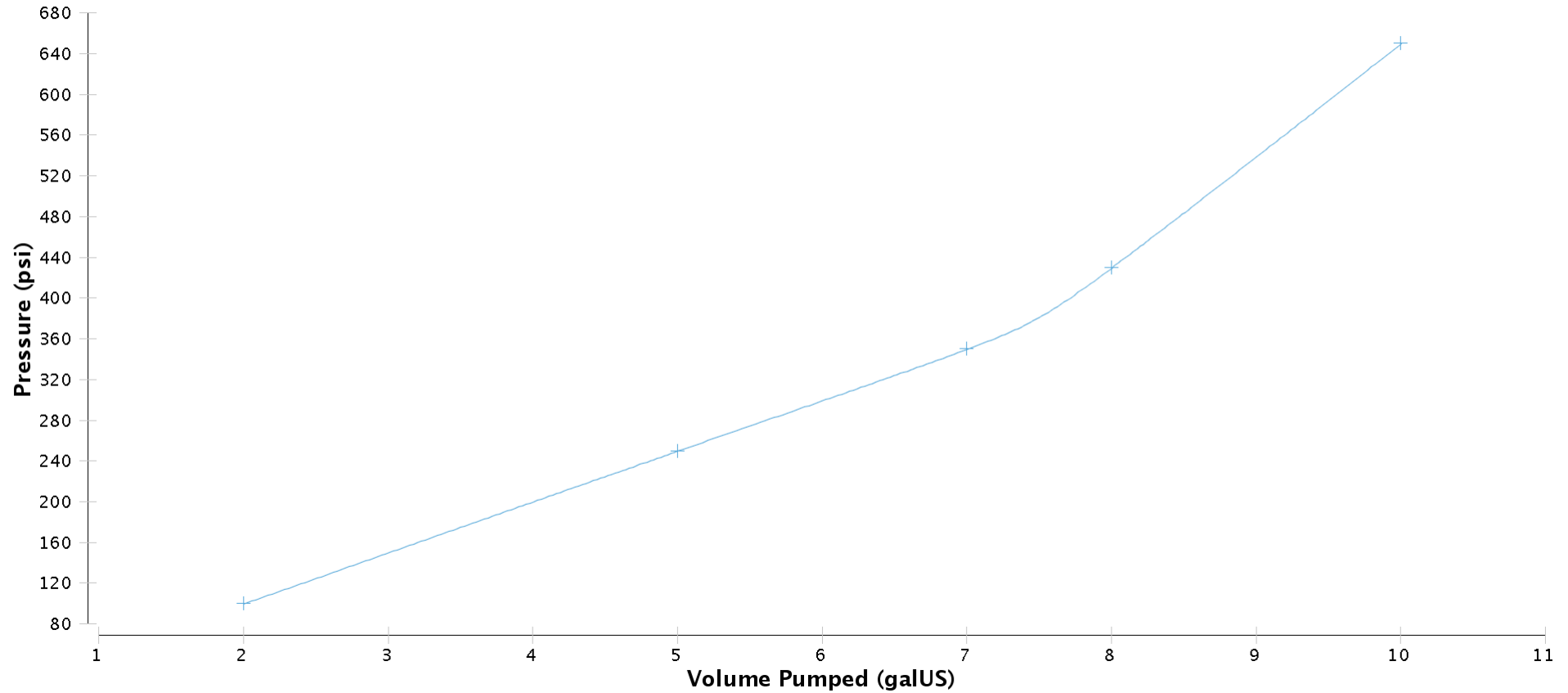
Theoretical Bouyed wt. of casing:	75.5klb	Bradenhead Height above GL:	0.00m
Casing wt. prior to landing csg:	74.0klb	Bradenhead Description / Length:	11" 5k psi GE SCH1 top x 9-5/8" BTC Box bottom/
Actual wt. of casing (last joint run-block wt):	86.0klb	Tubing Spool Size:	11" 5K X 7 1/16" 3K
Landing wt. (after cementing and pressure bleed off):	69.0klb	Setting Slips:	71.0klb
Thread Dope Used :	Bestolife 2000		
Cementing Job Remarks:	Full returns throughout the job. Pre-flush to surface 68 bbls into displacement, cement to surface 106 bbls into displacement. Floats held post pressure test.		

Wellname: WEST MEREENIE 23	Drilling Co: Santos Ltd	Rig: Ensign 918
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Leak Off Test

Leak Off Test							
Day #		Leak-Off Test No		Casing Size		Rig Representative	
16		1		9 5/8 in		Graham Blue	
Mud Density In Use	Hole Depth	EMW	Shoe Depth	Leak-Off Pressure	Max. Pressure Recorded	Vol. Pumped	Vol. Regained
8.40 ppg	573.00 m	15.05 ppg	573.00 m	650 psi	650 psi	10.0 galUS	10.0 galUS
Leak Off Test Details							
Volume Pumped (galUS)				Pressure (psi)			
2.0				100			
5.0				250			
7.0				350			
8.0				430			
10.0				650			

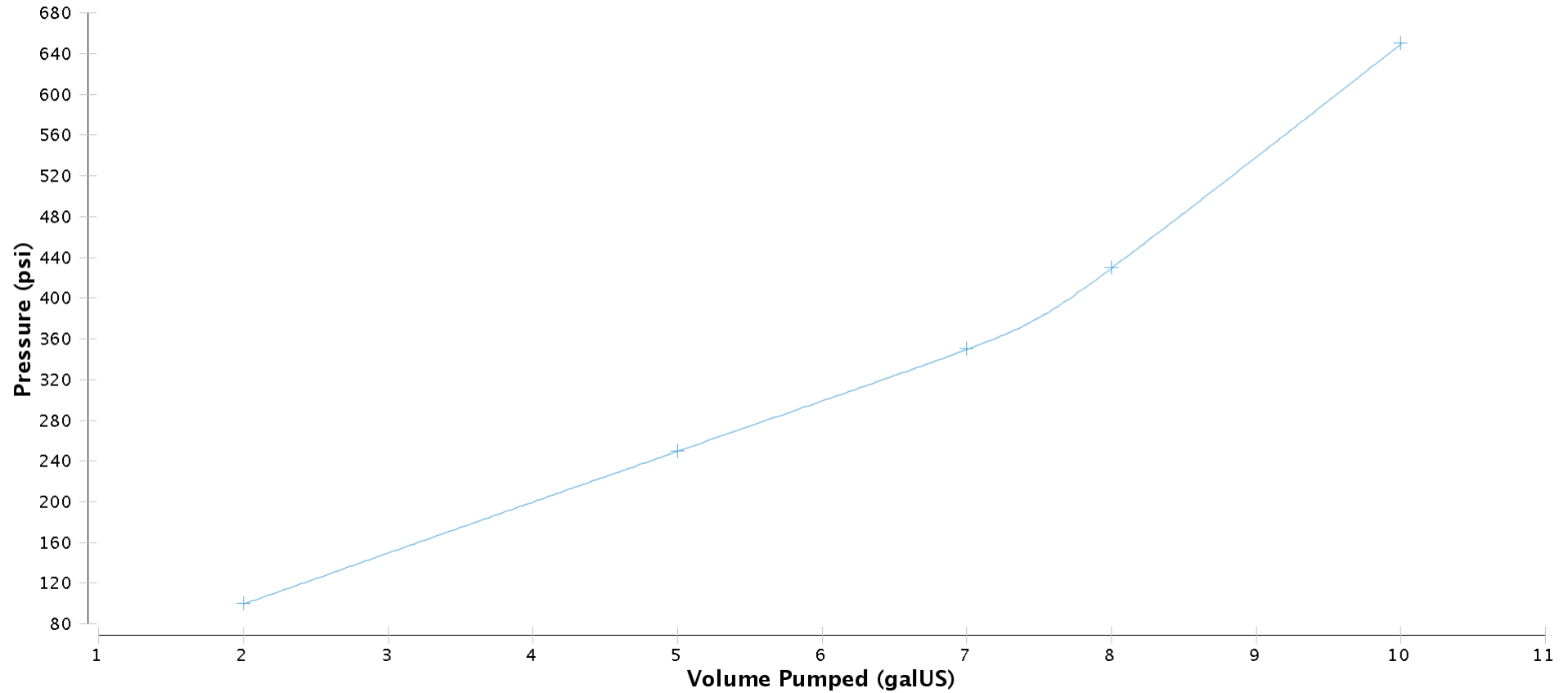
Formation Integrity Test



Wellname: WEST MEREENIE 23	Drilling Co: Santos Ltd	Rig: Ensign 918
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Leak Off Test							
Day #		Leak-Off Test No		Casing Size		Rig Representative	
17		1		9 5/8 in		Graham Blue	
Mud Density In Use	Hole Depth	EMW	Shoe Depth	Leak-Off Pressure	Max. Pressure Recorded	Vol. Pumped	Vol. Regained
8.40 ppg	573.00 m	15.05 ppg	573.00 m	650 psi	650 psi	10.0 galUS	10.0 galUS
Leak Off Test Details							
Volume Pumped (galUS)				Pressure (psi)			
2.0				100			
5.0				250			
7.0				350			
8.0				430			
10.0				650			

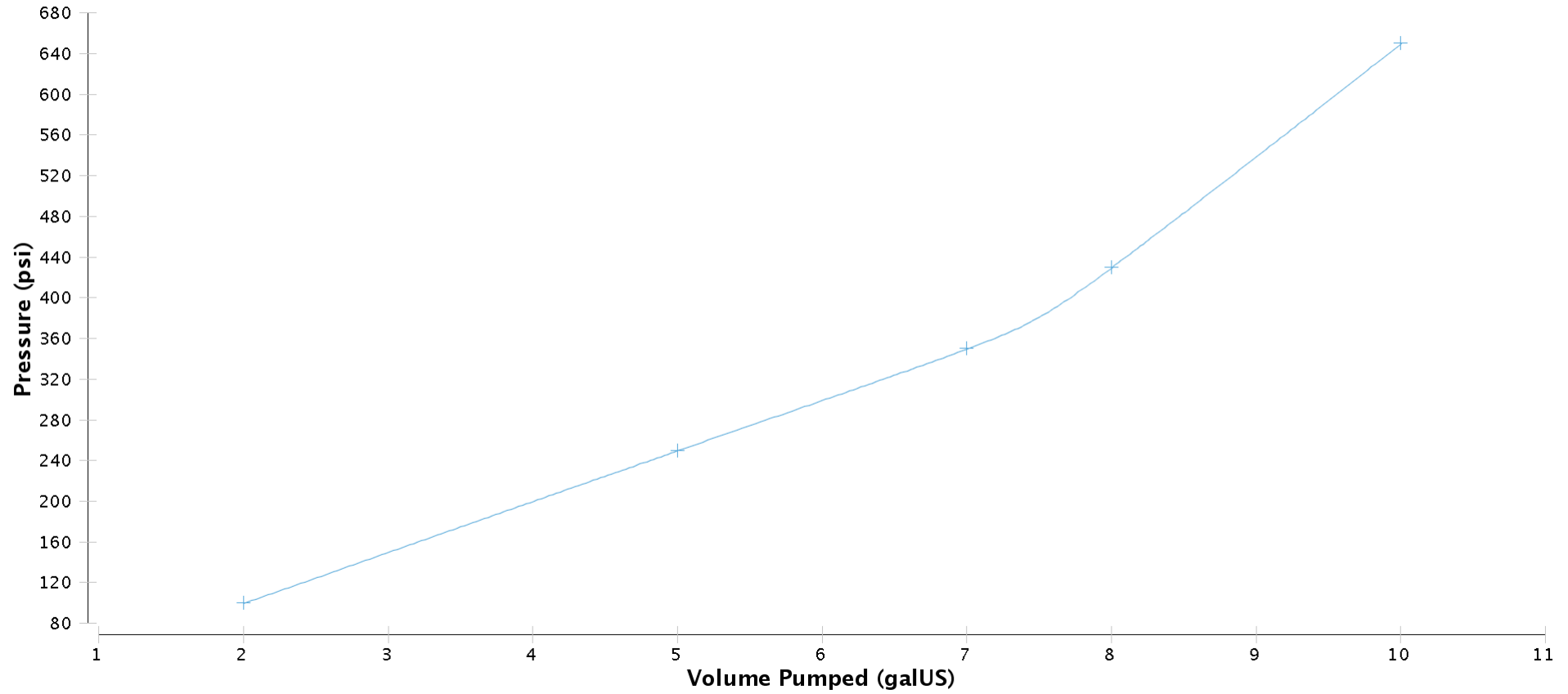
Formation Integrity Test



Wellname: WEST MEREENIE 23	Drilling Co: Santos Ltd	Rig: Ensign 918
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Leak Off Test							
Day #		Leak-Off Test No		Casing Size		Rig Representative	
18		1		9 5/8 in		Graham Blue	
Mud Density In Use	Hole Depth	EMW	Shoe Depth	Leak-Off Pressure	Max. Pressure Recorded	Vol. Pumped	Vol. Regained
8.40 ppg	573.00 m	15.05 ppg	573.00 m	650 psi	650 psi	10.0 galUS	10.0 galUS
Leak Off Test Details							
Volume Pumped (galUS)				Pressure (psi)			
2.0				100			
5.0				250			
7.0				350			
8.0				430			
10.0				650			

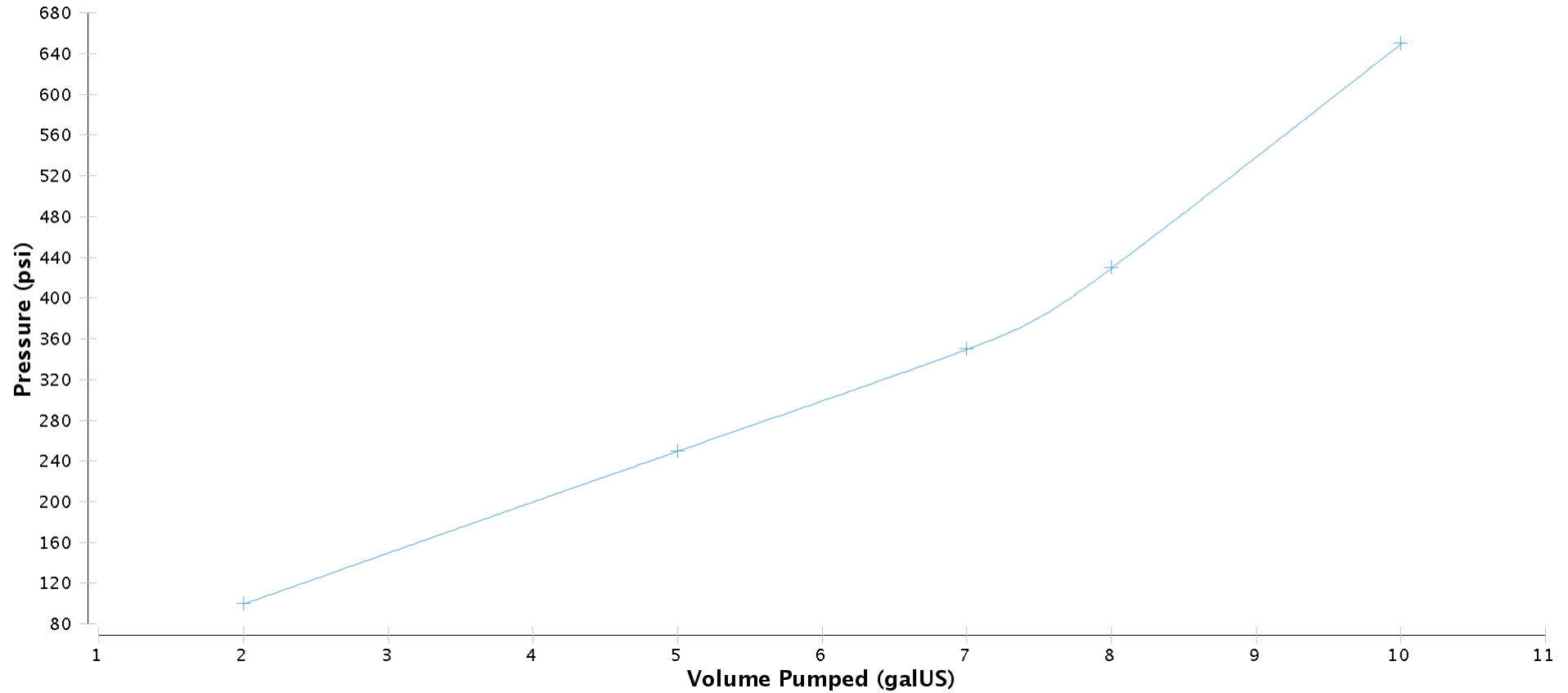
Formation Integrity Test



Wellname: WEST MEREENIE 23	Drilling Co: Santos Ltd	Rig: Ensign 918
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Leak Off Test							
Day #		Leak-Off Test No		Casing Size		Rig Representative	
19		1		9 5/8 in		Graham Blue	
Mud Density In Use	Hole Depth	EMW	Shoe Depth	Leak-Off Pressure	Max. Pressure Recorded	Vol. Pumped	Vol. Regained
8.40 ppg	573.00 m	15.05 ppg	573.00 m	650 psi	650 psi	10.0 galUS	10.0 galUS
Leak Off Test Details							
Volume Pumped (galUS)				Pressure (psi)			
2.0				100			
5.0				250			
7.0				350			
8.0				430			
10.0				650			

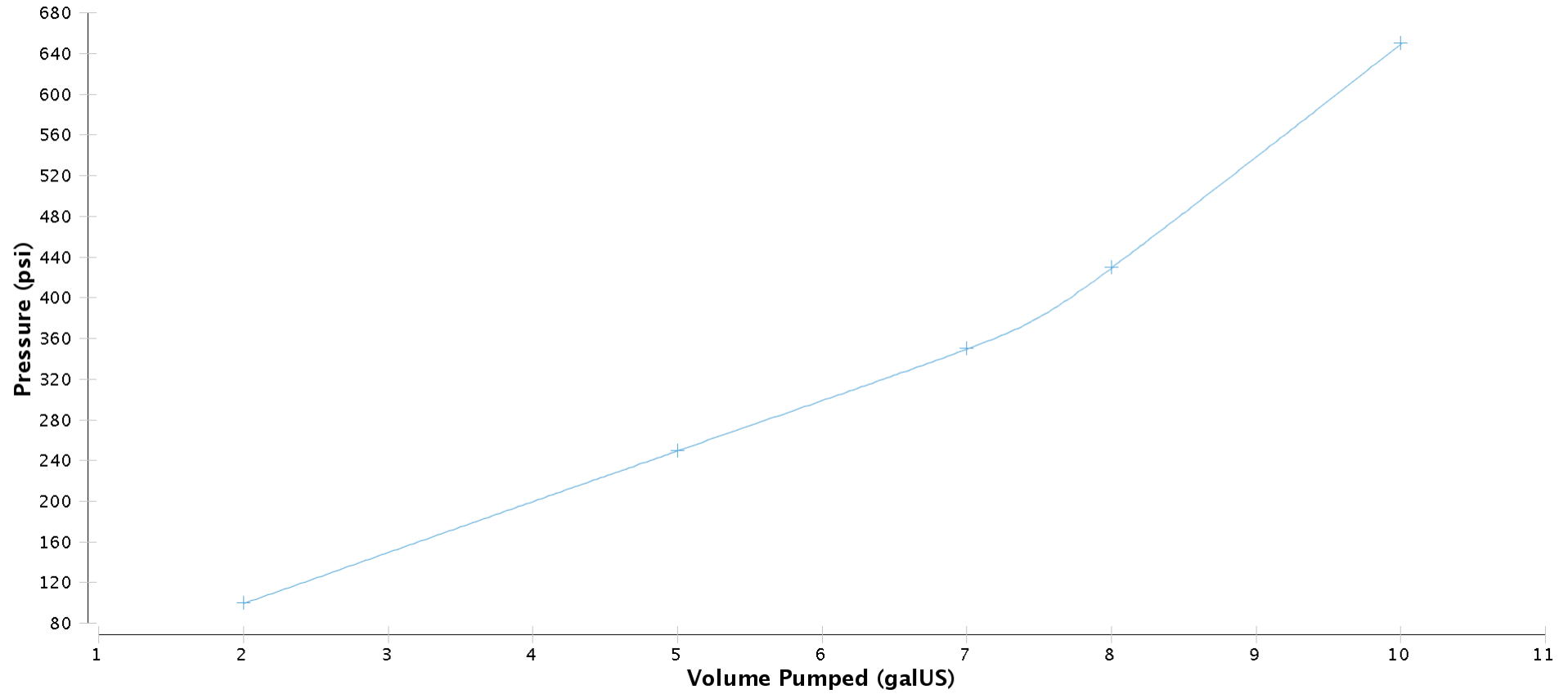
Formation Integrity Test



Wellname: WEST MEREENIE 23	Drilling Co: Santos Ltd	Rig: Ensign 918
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Leak Off Test							
Day #		Leak-Off Test No		Casing Size		Rig Representative	
20		1		9 5/8 in		Graham Blue	
Mud Density In Use	Hole Depth	EMW	Shoe Depth	Leak-Off Pressure	Max. Pressure Recorded	Vol. Pumped	Vol. Regained
8.40 ppg	573.00 m	15.05 ppg	573.00 m	650 psi	650 psi	10.0 galUS	10.0 galUS
Leak Off Test Details							
Volume Pumped (galUS)				Pressure (psi)			
2.0				100			
5.0				250			
7.0				350			
8.0				430			
10.0				650			

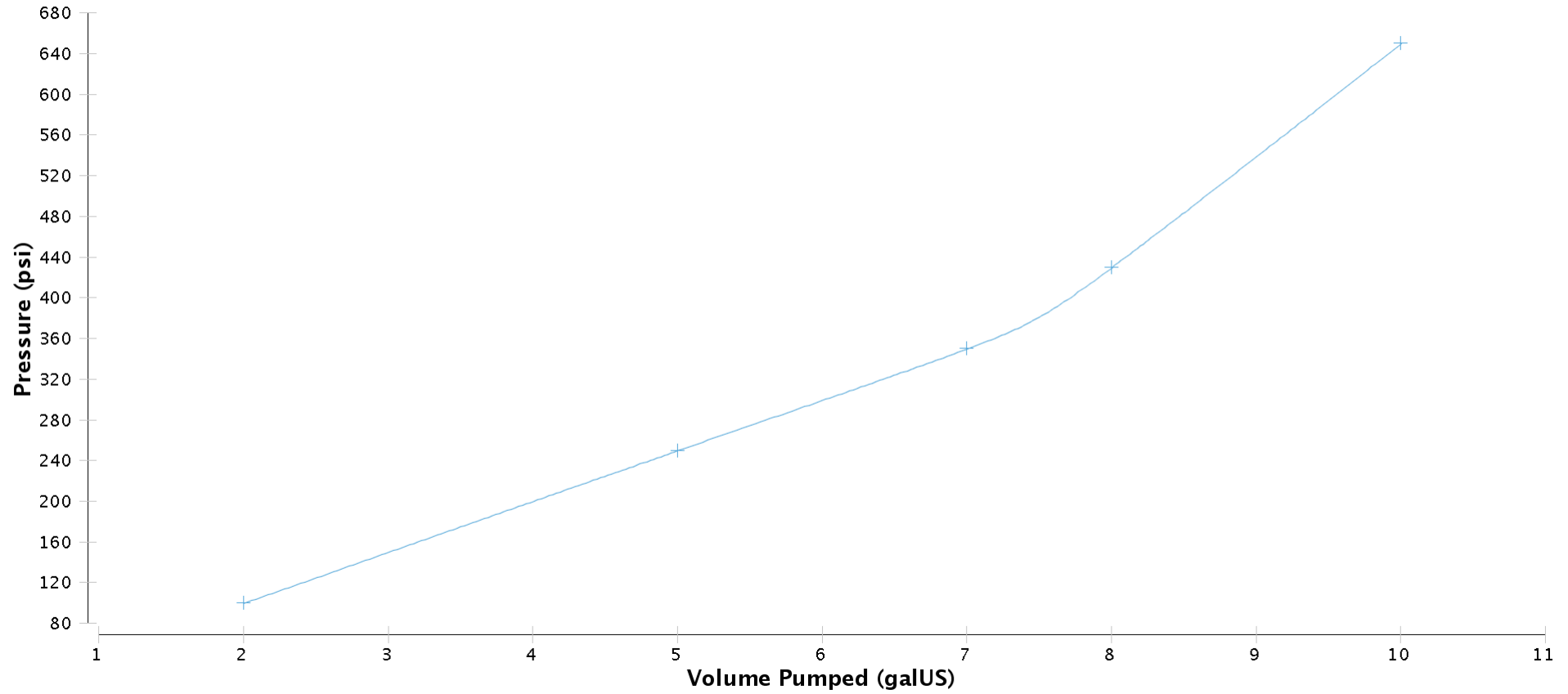
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Wellname: WEST MEREENIE 23	Drilling Co: Santos Ltd	Rig: Ensign 918
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Leak Off Test							
Day #		Leak-Off Test No		Casing Size		Rig Representative	
21		1		9 5/8 in		Graham Blue	
Mud Density In Use	Hole Depth	EMW	Shoe Depth	Leak-Off Pressure	Max. Pressure Recorded	Vol. Pumped	Vol. Regained
8.40 ppg	573.00 m	15.05 ppg	573.00 m	650 psi	650 psi	10.0 galUS	10.0 galUS
Leak Off Test Details							
Volume Pumped (galUS)				Pressure (psi)			
2.0				100			
5.0				250			
7.0				350			
8.0				430			
10.0				650			

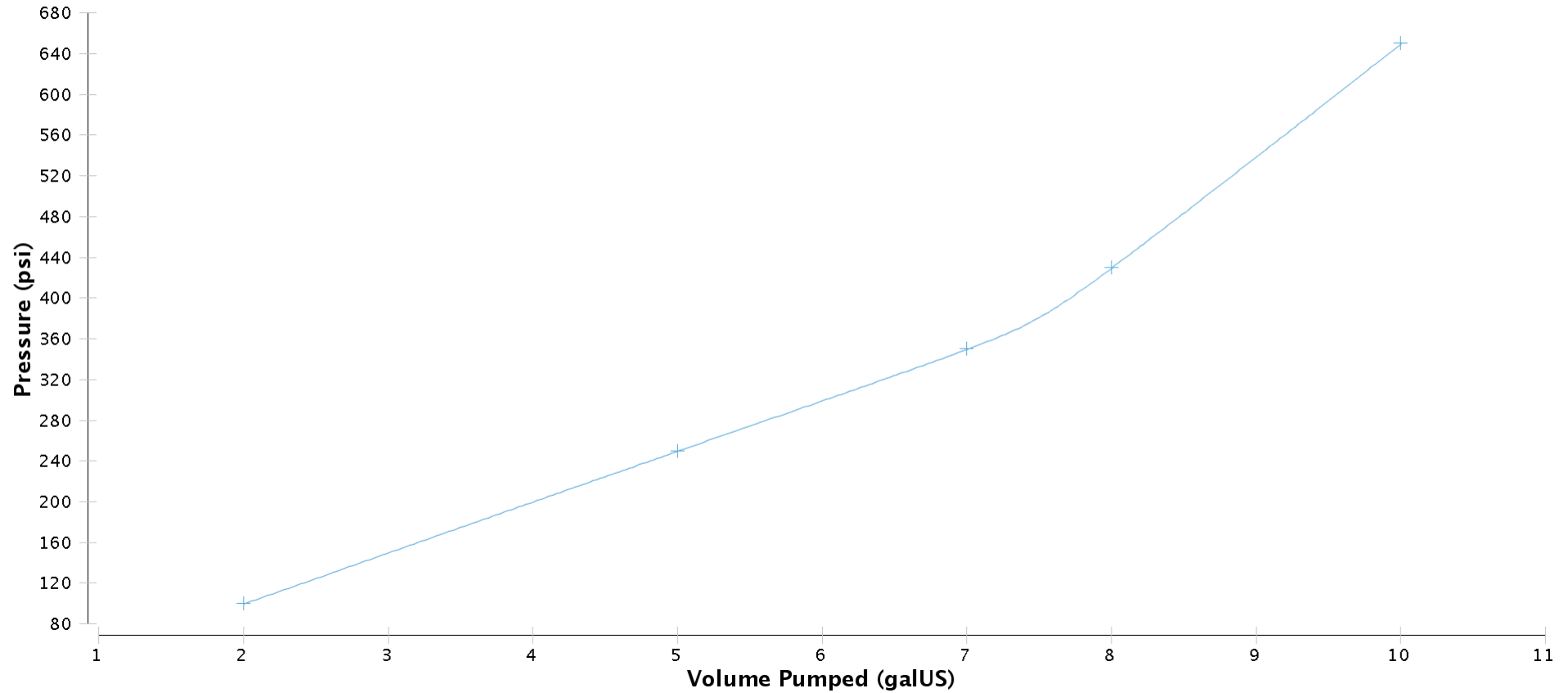
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Wellname: WEST MEREENIE 23	Drilling Co: Santos Ltd	Rig: Ensign 918
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Leak Off Test							
Day #		Leak-Off Test No		Casing Size		Rig Representative	
22		1		9 5/8 in		Graham Blue	
Mud Density In Use	Hole Depth	EMW	Shoe Depth	Leak-Off Pressure	Max. Pressure Recorded	Vol. Pumped	Vol. Regained
8.40 ppg	573.00 m	15.05 ppg	573.00 m	650 psi	650 psi	10.0 galUS	10.0 galUS
Leak Off Test Details							
Volume Pumped (galUS)				Pressure (psi)			
2.0				100			
5.0				250			
7.0				350			
8.0				430			
10.0				650			

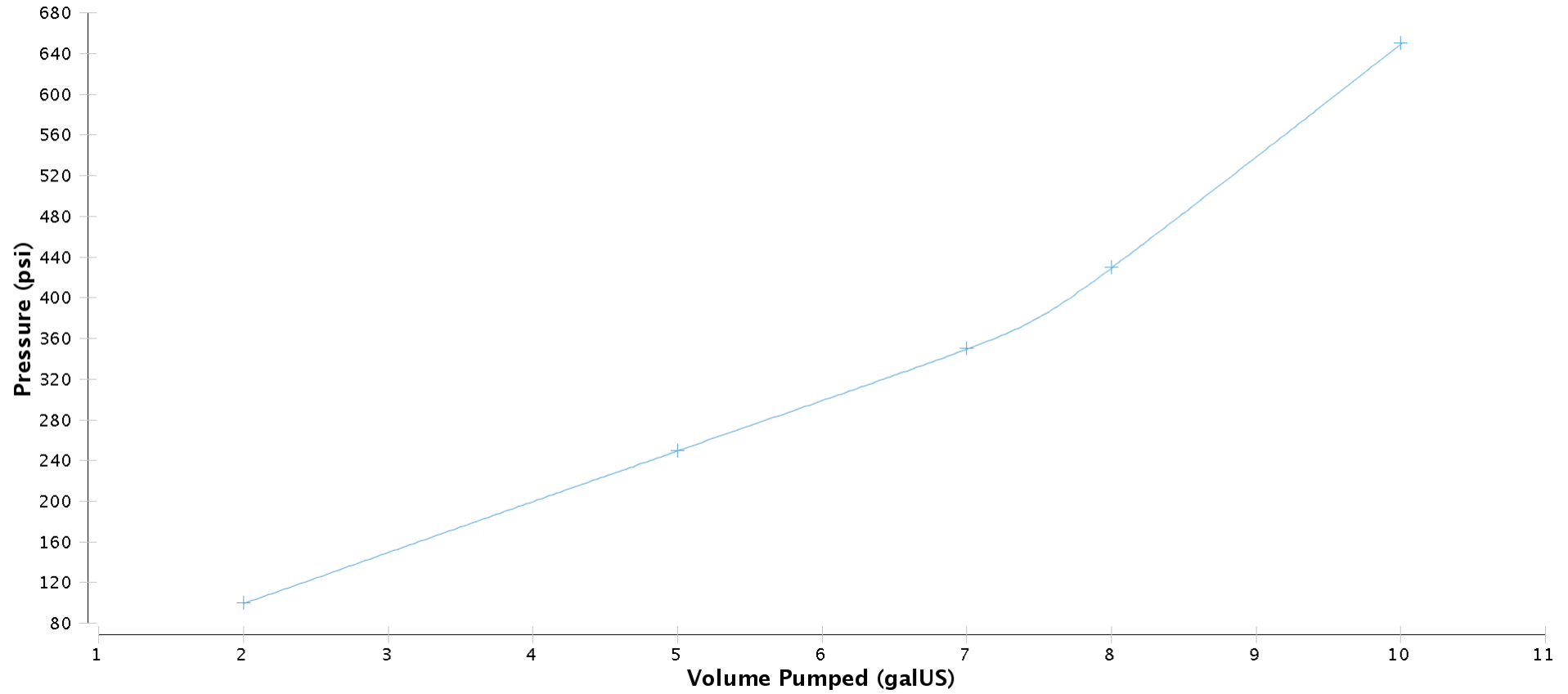
Formation Integrity Test



Wellname: WEST MEREENIE 23	Drilling Co: Santos Ltd	Rig: Ensign 918
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Leak Off Test							
Day #		Leak-Off Test No		Casing Size		Rig Representative	
23		1		9 5/8 in		Graham Blue	
Mud Density In Use	Hole Depth	EMW	Shoe Depth	Leak-Off Pressure	Max. Pressure Recorded	Vol. Pumped	Vol. Regained
8.40 ppg	573.00 m	15.05 ppg	573.00 m	650 psi	650 psi	10.0 galUS	10.0 galUS
Leak Off Test Details							
Volume Pumped (galUS)				Pressure (psi)			
2.0				100			
5.0				250			
7.0				350			
8.0				430			
10.0				650			

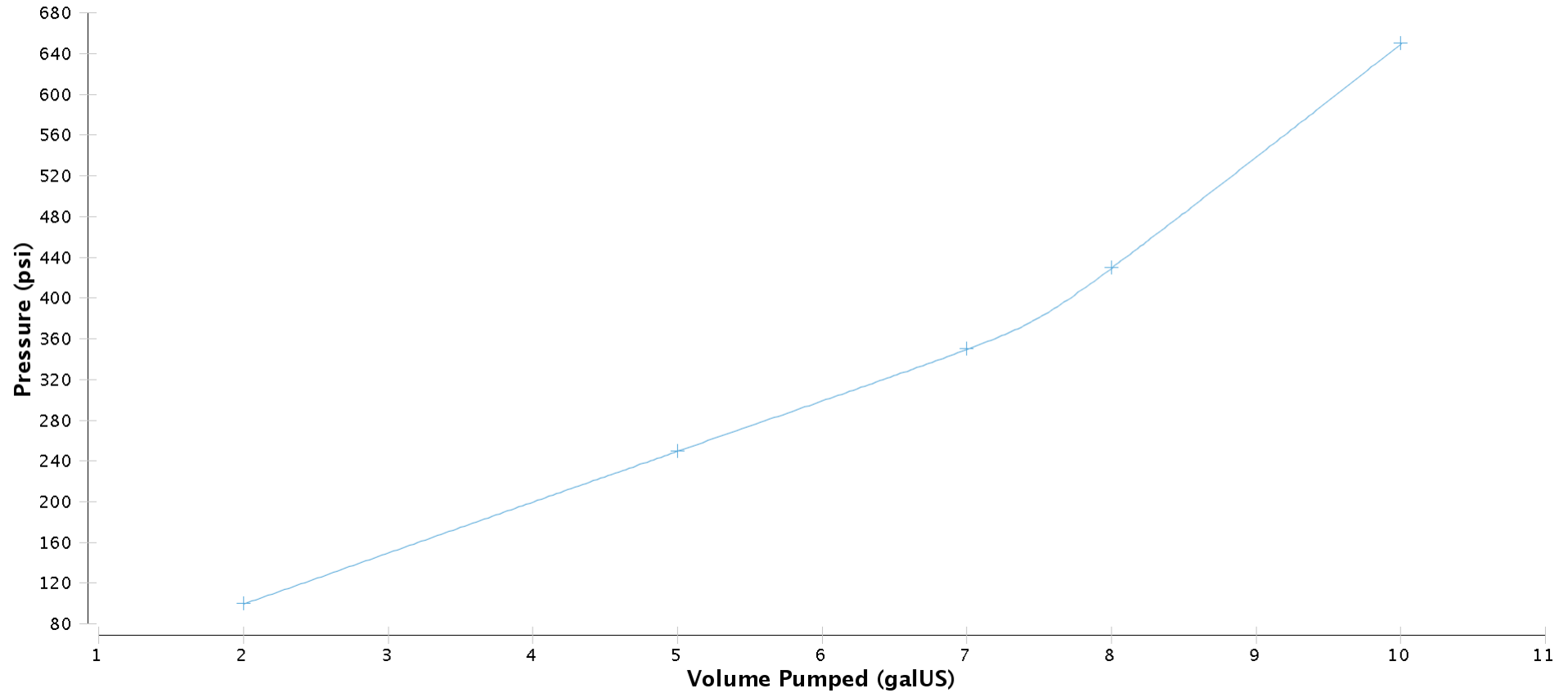
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Wellname: WEST MEREENIE 23	Drilling Co: Santos Ltd	Rig: Ensign 918
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Leak Off Test							
Day #		Leak-Off Test No		Casing Size		Rig Representative	
24		1		9 5/8 in		Graham Blue	
Mud Density In Use	Hole Depth	EMW	Shoe Depth	Leak-Off Pressure	Max. Pressure Recorded	Vol. Pumped	Vol. Regained
8.40 ppg	573.00 m	15.05 ppg	573.00 m	650 psi	650 psi	10.0 galUS	10.0 galUS
Leak Off Test Details							
Volume Pumped (galUS)				Pressure (psi)			
2.0				100			
5.0				250			
7.0				350			
8.0				430			
10.0				650			

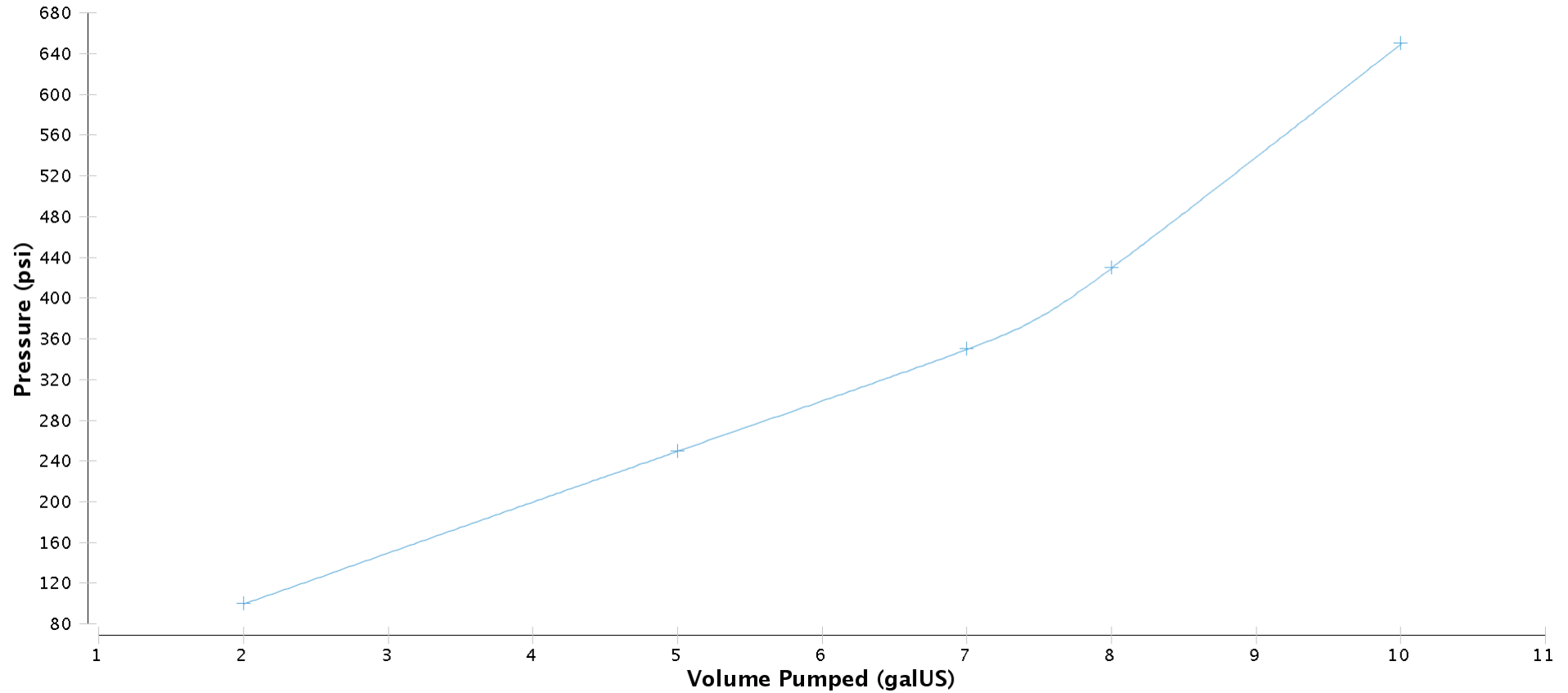
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Wellname: WEST MEREENIE 23	Drilling Co: Santos Ltd	Rig: Ensign 918
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Leak Off Test							
Day #		Leak-Off Test No		Casing Size		Rig Representative	
25		1		9 5/8 in		Graham Blue	
Mud Density In Use	Hole Depth	EMW	Shoe Depth	Leak-Off Pressure	Max. Pressure Recorded	Vol. Pumped	Vol. Regained
8.40 ppg	573.00 m	15.05 ppg	573.00 m	650 psi	650 psi	10.0 galUS	10.0 galUS
Leak Off Test Details							
Volume Pumped (galUS)				Pressure (psi)			
2.0				100			
5.0				250			
7.0				350			
8.0				430			
10.0				650			

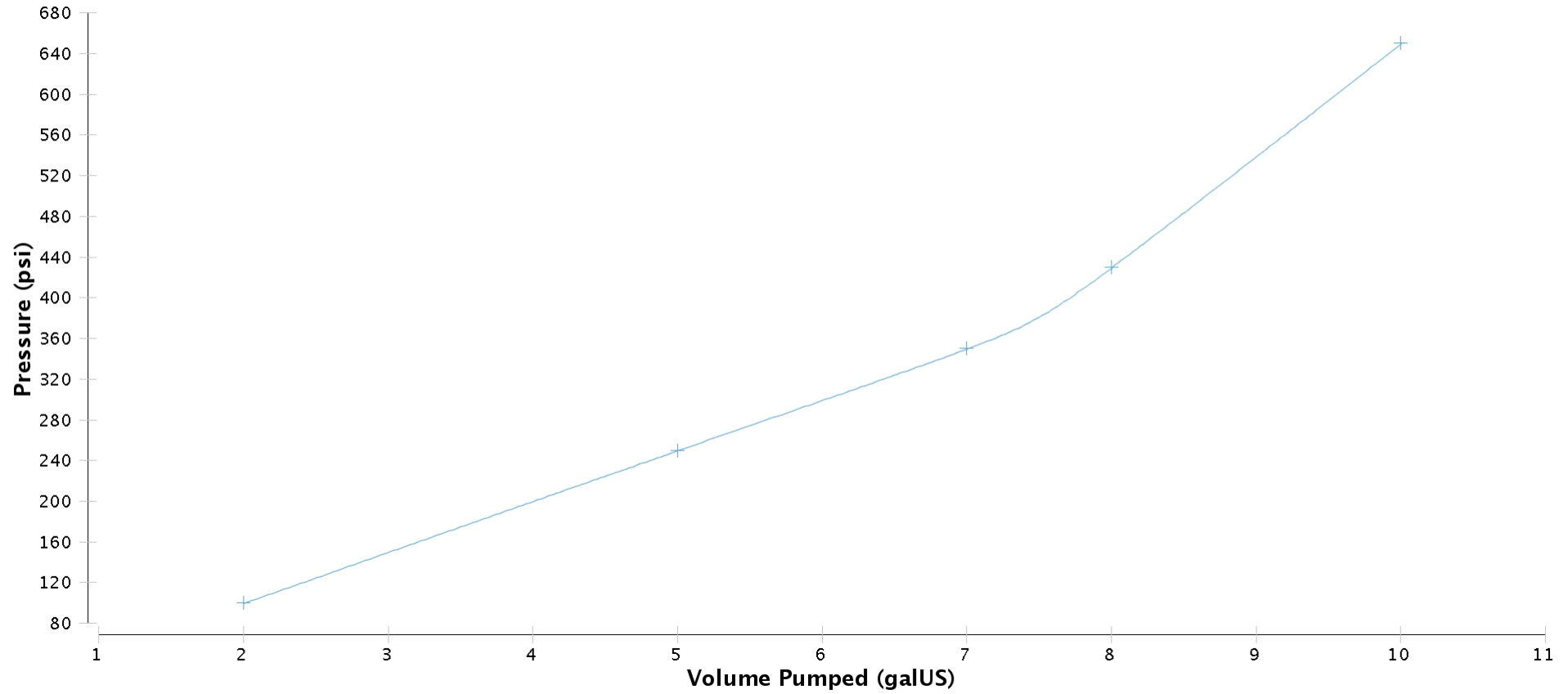
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Wellname: WEST MEREENIE 23	Drilling Co: Santos Ltd	Rig: Ensign 918
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Leak Off Test							
Day #		Leak-Off Test No		Casing Size		Rig Representative	
26		1		9 5/8 in		Graham Blue	
Mud Density In Use	Hole Depth	EMW	Shoe Depth	Leak-Off Pressure	Max. Pressure Recorded	Vol. Pumped	Vol. Regained
8.40 ppg	573.00 m	15.05 ppg	573.00 m	650 psi	650 psi	10.0 galUS	10.0 galUS
Leak Off Test Details							
Volume Pumped (galUS)				Pressure (psi)			
2.0				100			
5.0				250			
7.0				350			
8.0				430			
10.0				650			

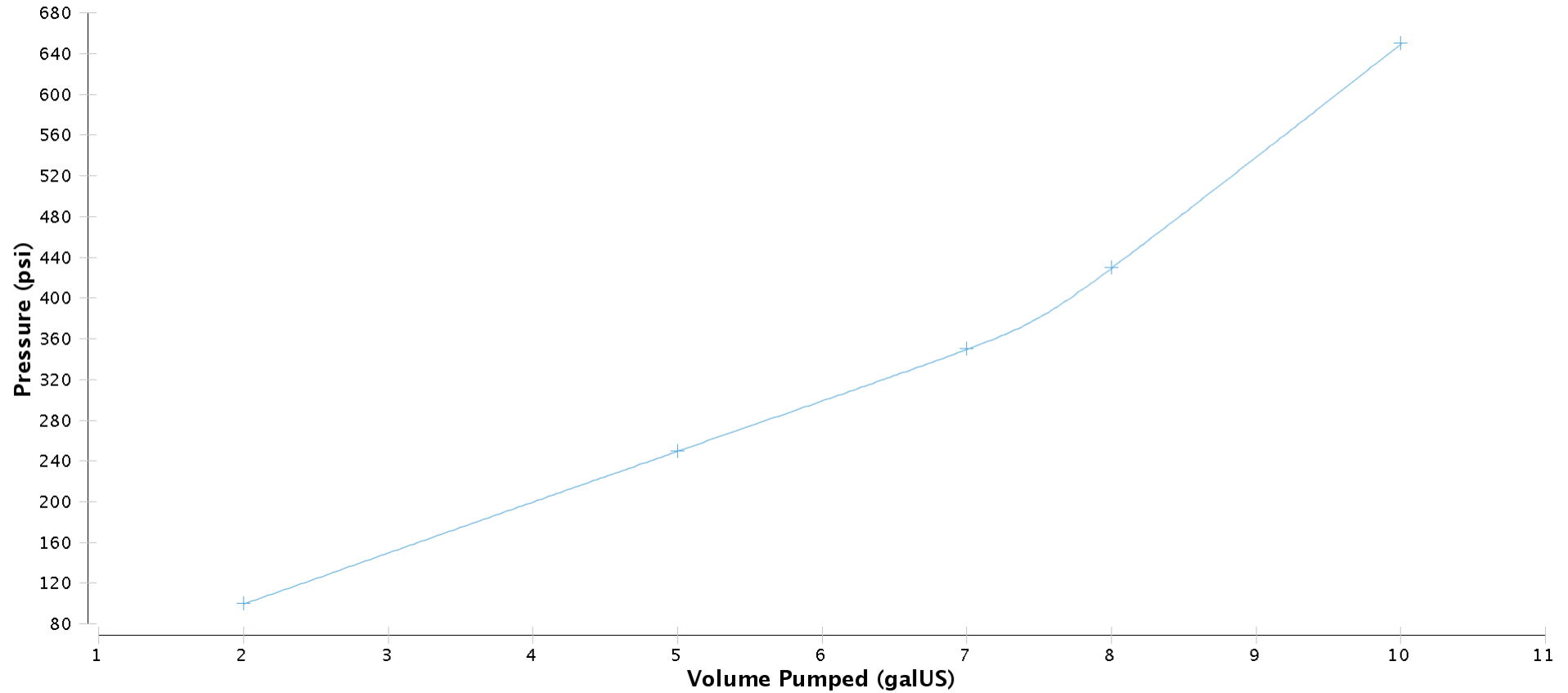
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Wellname: WEST MEREENIE 23	Drilling Co: Santos Ltd	Rig: Ensign 918
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Leak Off Test							
Day #		Leak-Off Test No		Casing Size		Rig Representative	
27		1		9 5/8 in		Graham Blue	
Mud Density In Use	Hole Depth	EMW	Shoe Depth	Leak-Off Pressure	Max. Pressure Recorded	Vol. Pumped	Vol. Regained
8.40 ppg	573.00 m	15.05 ppg	573.00 m	650 psi	650 psi	10.0 galUS	10.0 galUS
Leak Off Test Details							
Volume Pumped (galUS)				Pressure (psi)			
2.0				100			
5.0				250			
7.0				350			
8.0				430			
10.0				650			

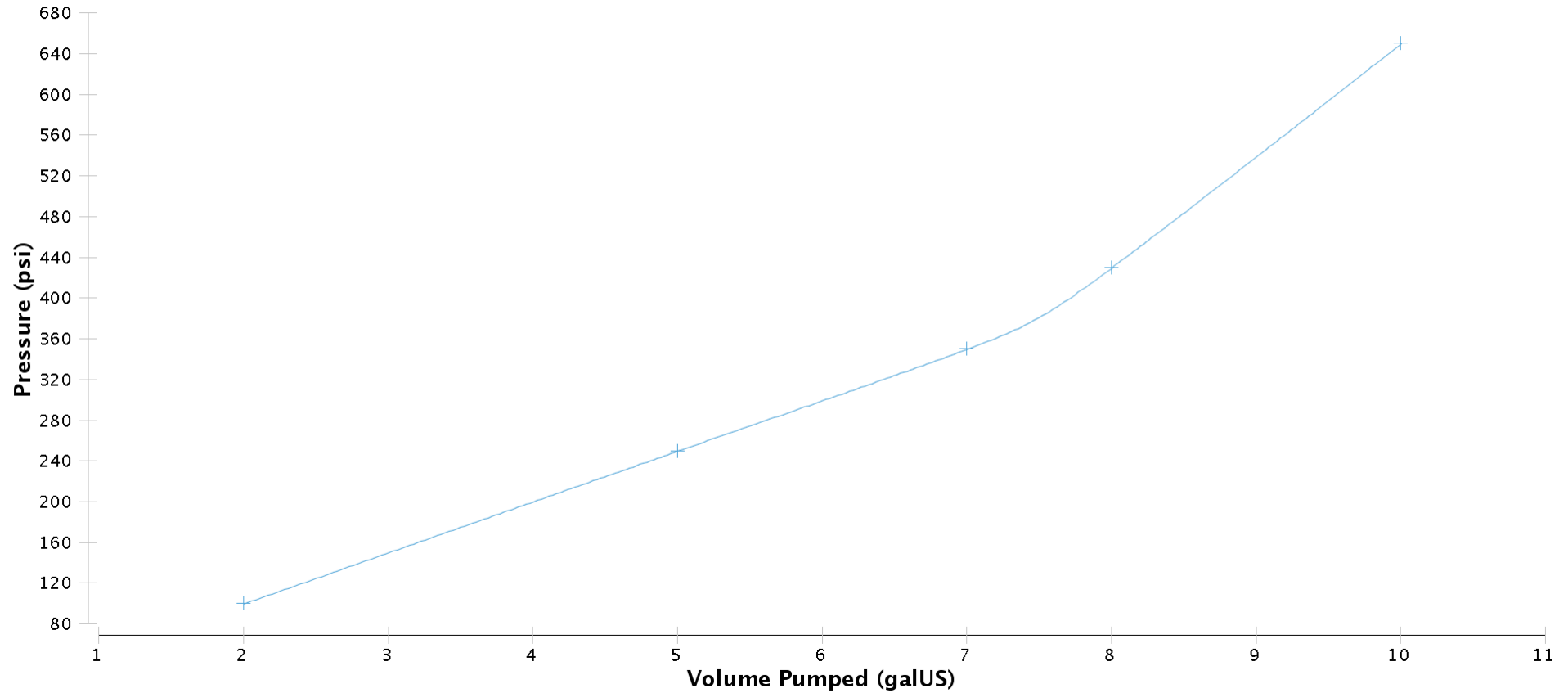
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Wellname: WEST MEREENIE 23	Drilling Co: Santos Ltd	Rig: Ensign 918
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Leak Off Test							
Day #		Leak-Off Test No		Casing Size		Rig Representative	
28		1		9 5/8 in		Graham Blue	
Mud Density In Use	Hole Depth	EMW	Shoe Depth	Leak-Off Pressure	Max. Pressure Recorded	Vol. Pumped	Vol. Regained
8.40 ppg	573.00 m	15.05 ppg	573.00 m	650 psi	650 psi	10.0 galUS	10.0 galUS
Leak Off Test Details							
Volume Pumped (galUS)				Pressure (psi)			
2.0				100			
5.0				250			
7.0				350			
8.0				430			
10.0				650			

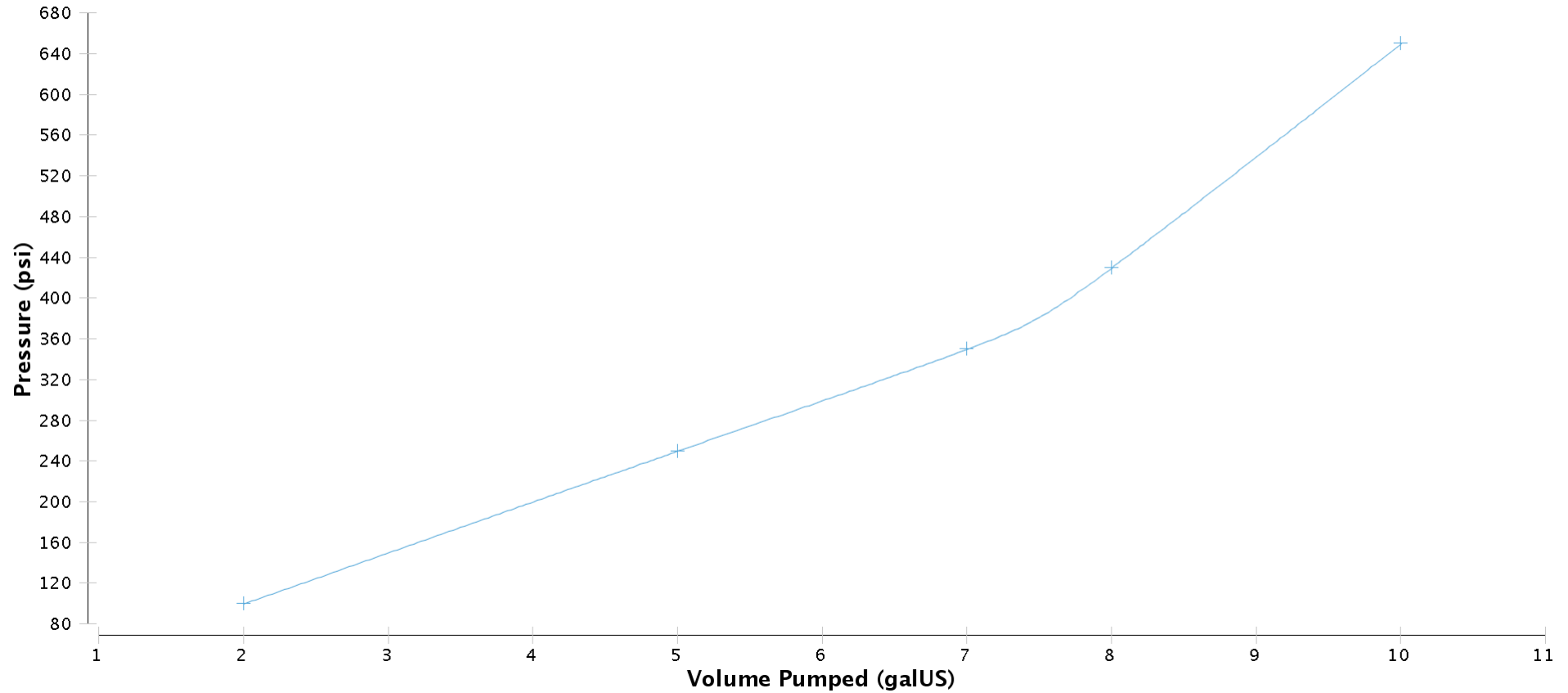
Formation Integrity Test



Wellname: WEST MEREENIE 23	Drilling Co: Santos Ltd	Rig: Ensign 918
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Leak Off Test							
Day #		Leak-Off Test No		Casing Size		Rig Representative	
29		1		9 5/8 in		Graham Blue	
Mud Density In Use	Hole Depth	EMW	Shoe Depth	Leak-Off Pressure	Max. Pressure Recorded	Vol. Pumped	Vol. Regained
8.40 ppg	573.00 m	15.05 ppg	573.00 m	650 psi	650 psi	10.0 galUS	10.0 galUS
Leak Off Test Details							
Volume Pumped (galUS)				Pressure (psi)			
2.0				100			
5.0				250			
7.0				350			
8.0				430			
10.0				650			

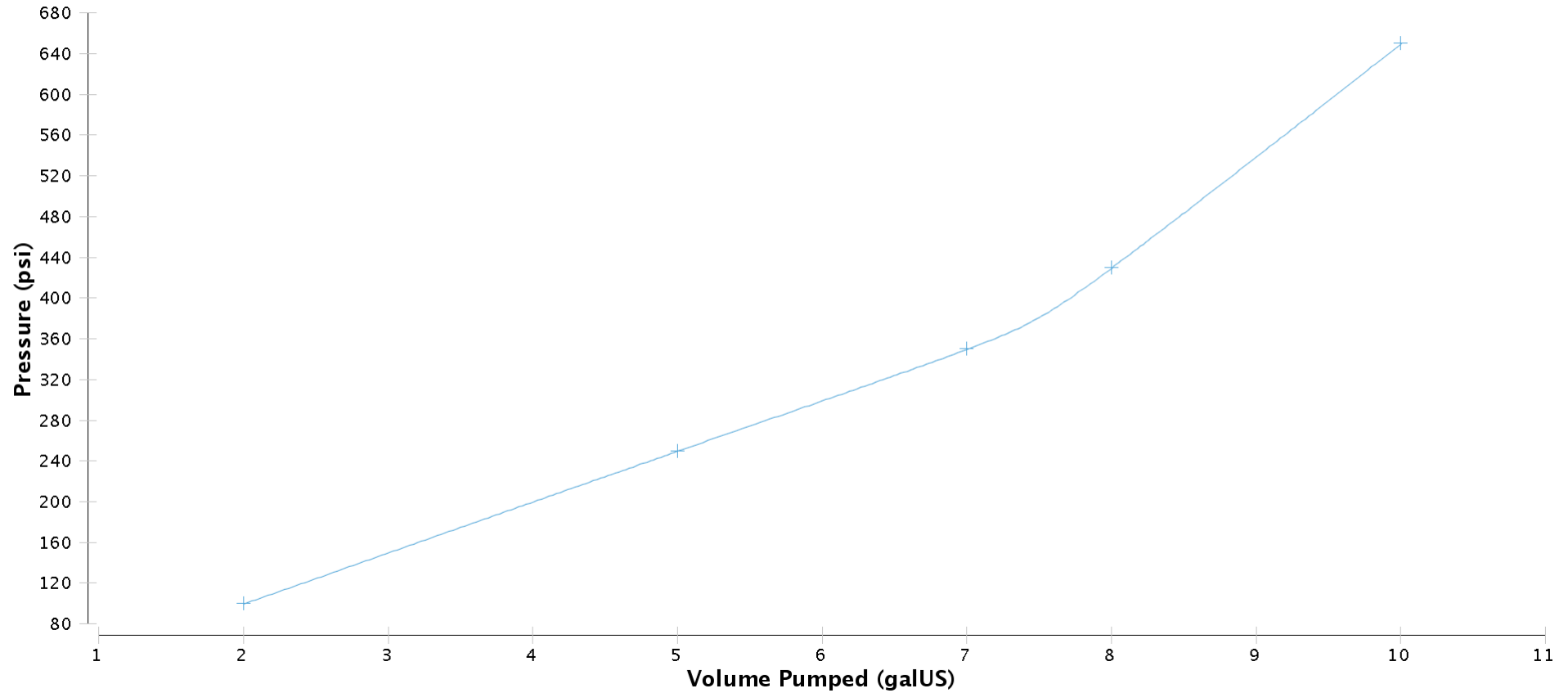
Formation Integrity Test



Wellname: WEST MEREENIE 23	Drilling Co: Santos Ltd	Rig: Ensign 918
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Leak Off Test							
Day #		Leak-Off Test No		Casing Size		Rig Representative	
30		1		9 5/8 in		Graham Blue	
Mud Density In Use	Hole Depth	EMW	Shoe Depth	Leak-Off Pressure	Max. Pressure Recorded	Vol. Pumped	Vol. Regained
8.40 ppg	573.00 m	15.05 ppg	573.00 m	650 psi	650 psi	10.0 galUS	10.0 galUS
Leak Off Test Details							
Volume Pumped (galUS)				Pressure (psi)			
2.0				100			
5.0				250			
7.0				350			
8.0				430			
10.0				650			

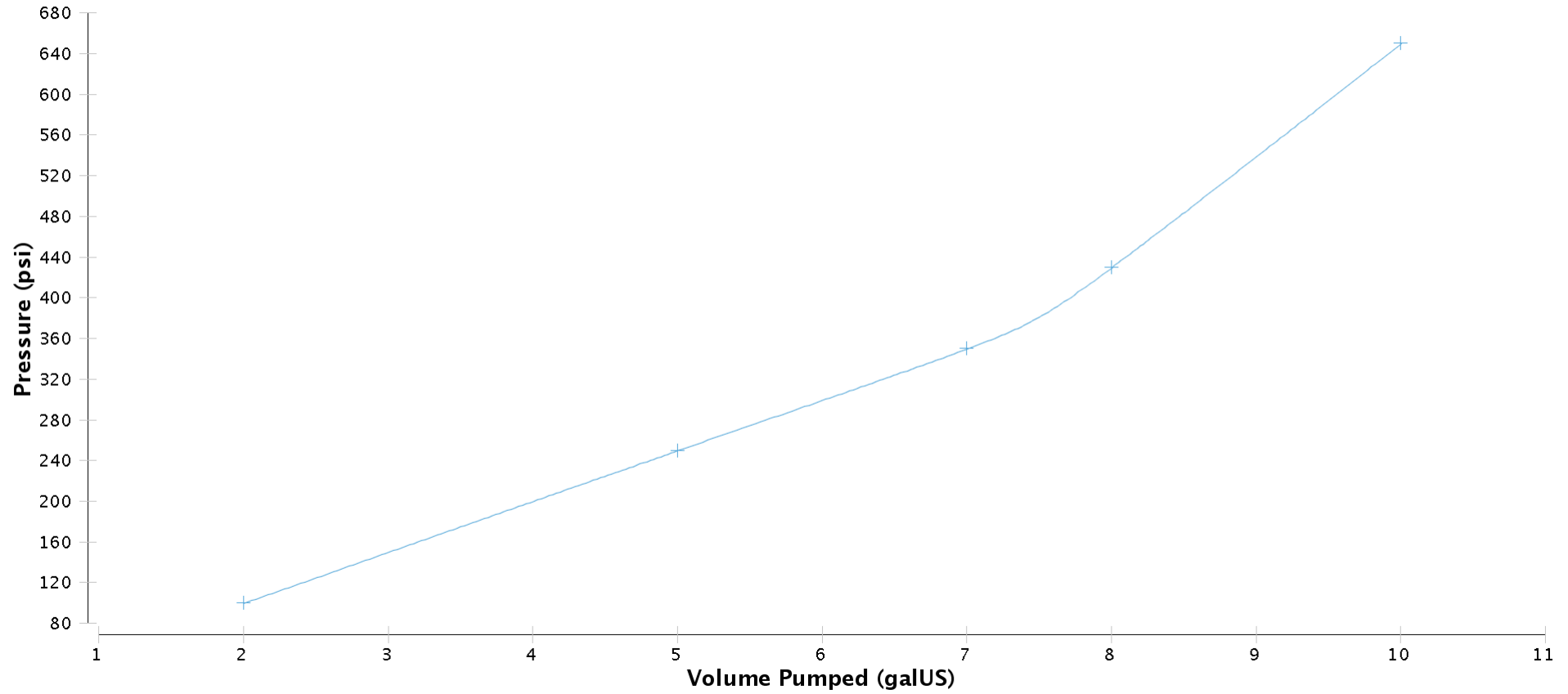
Formation Integrity Test



Wellname: WEST MEREENIE 23	Drilling Co: Santos Ltd	Rig: Ensign 918
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Leak Off Test							
Day #		Leak-Off Test No		Casing Size		Rig Representative	
31		1		9 5/8 in		Graham Blue	
Mud Density In Use	Hole Depth	EMW	Shoe Depth	Leak-Off Pressure	Max. Pressure Recorded	Vol. Pumped	Vol. Regained
8.40 ppg	573.00 m	15.05 ppg	573.00 m	650 psi	650 psi	10.0 galUS	10.0 galUS
Leak Off Test Details							
Volume Pumped (galUS)				Pressure (psi)			
2.0				100			
5.0				250			
7.0				350			
8.0				430			
10.0				650			

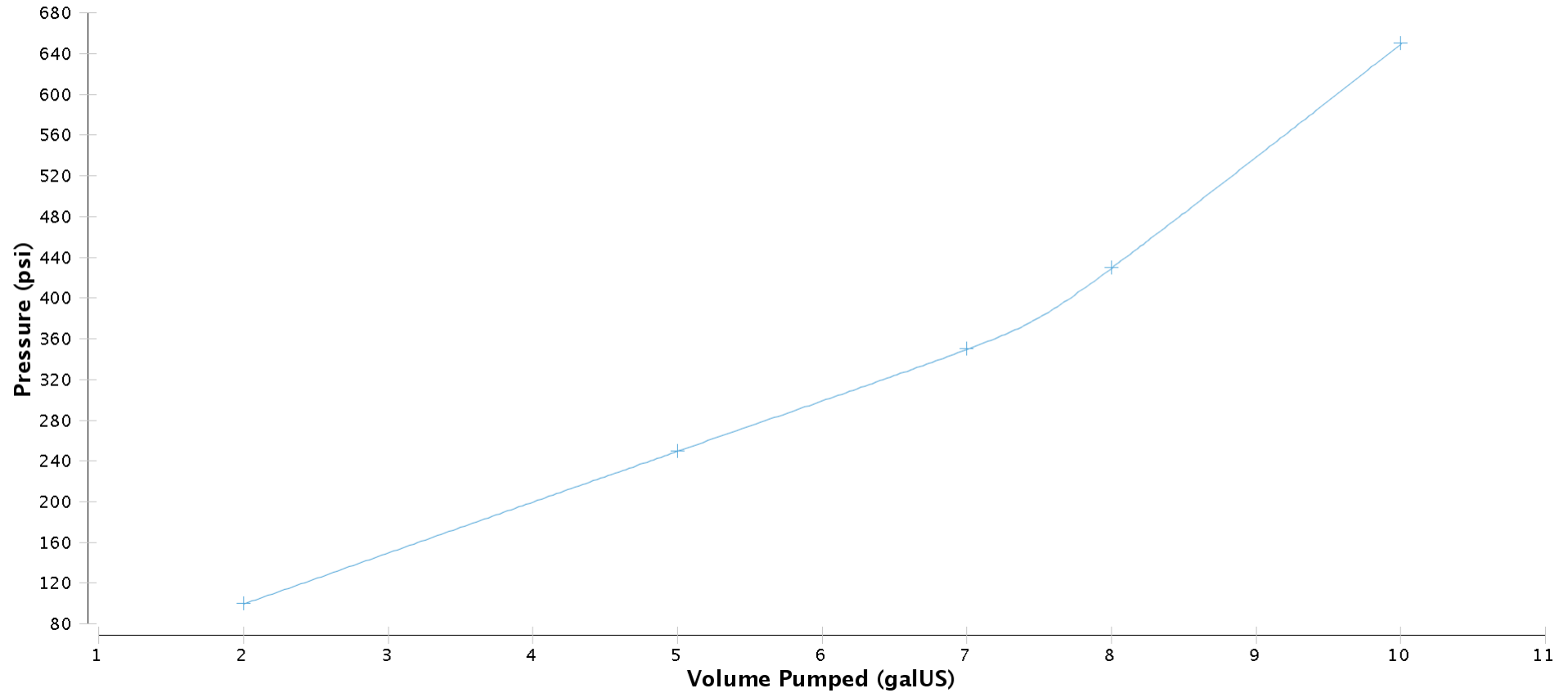
Formation Integrity Test



Wellname: WEST MEREENIE 23	Drilling Co: Santos Ltd	Rig: Ensign 918
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Leak Off Test							
Day #		Leak-Off Test No		Casing Size		Rig Representative	
32		1		9 5/8 in		Graham Blue	
Mud Density In Use	Hole Depth	EMW	Shoe Depth	Leak-Off Pressure	Max. Pressure Recorded	Vol. Pumped	Vol. Regained
8.40 ppg	573.00 m	15.05 ppg	573.00 m	650 psi	650 psi	10.0 galUS	10.0 galUS
Leak Off Test Details							
Volume Pumped (galUS)				Pressure (psi)			
2.0				100			
5.0				250			
7.0				350			
8.0				430			
10.0				650			

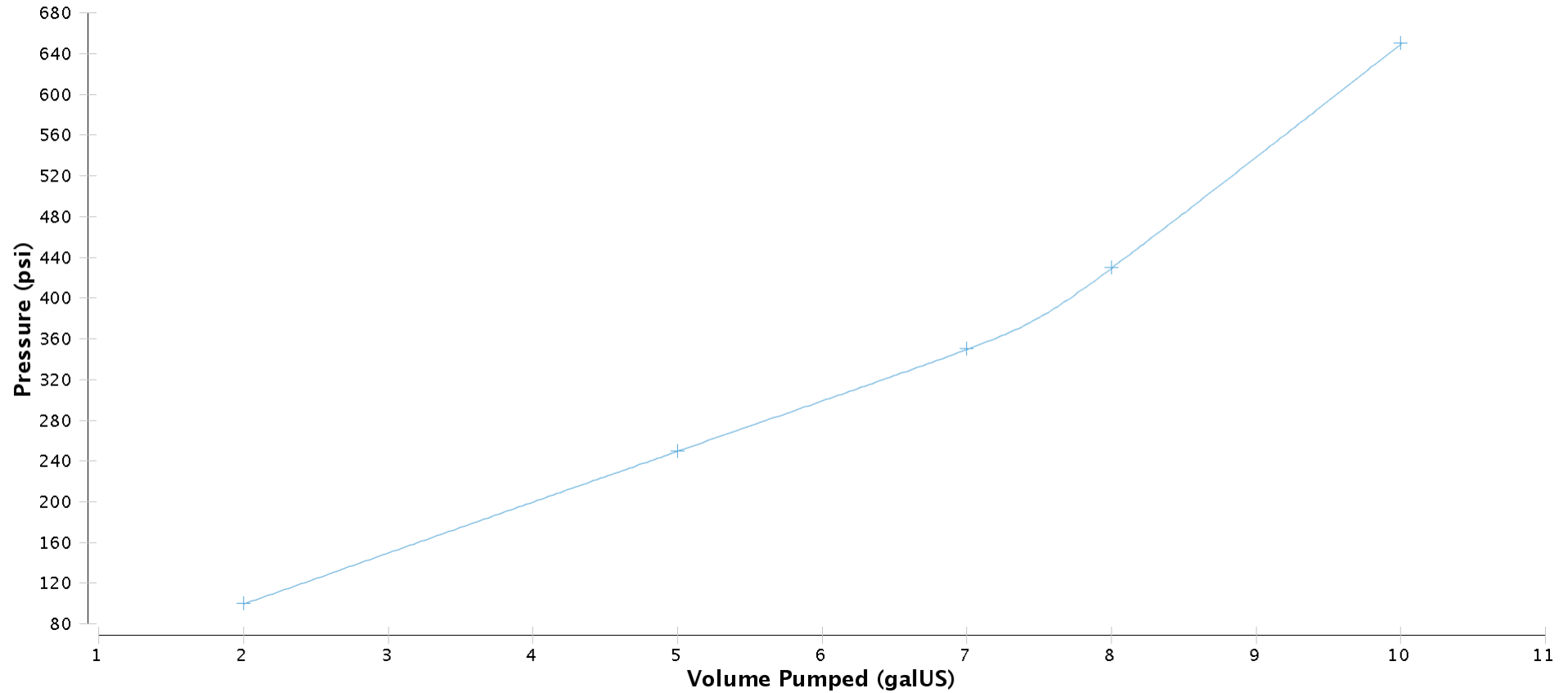
Formation Integrity Test



Wellname: WEST MEREENIE 23	Drilling Co: Santos Ltd	Rig: Ensign 918
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Leak Off Test							
Day #		Leak-Off Test No		Casing Size		Rig Representative	
33		1		9 5/8 in		Graham Blue	
Mud Density In Use	Hole Depth	EMW	Shoe Depth	Leak-Off Pressure	Max. Pressure Recorded	Vol. Pumped	Vol. Regained
8.40 ppg	573.00 m	15.05 ppg	573.00 m	650 psi	650 psi	10.0 galUS	10.0 galUS
Leak Off Test Details							
Volume Pumped (galUS)				Pressure (psi)			
2.0				100			
5.0				250			
7.0				350			
8.0				430			
10.0				650			

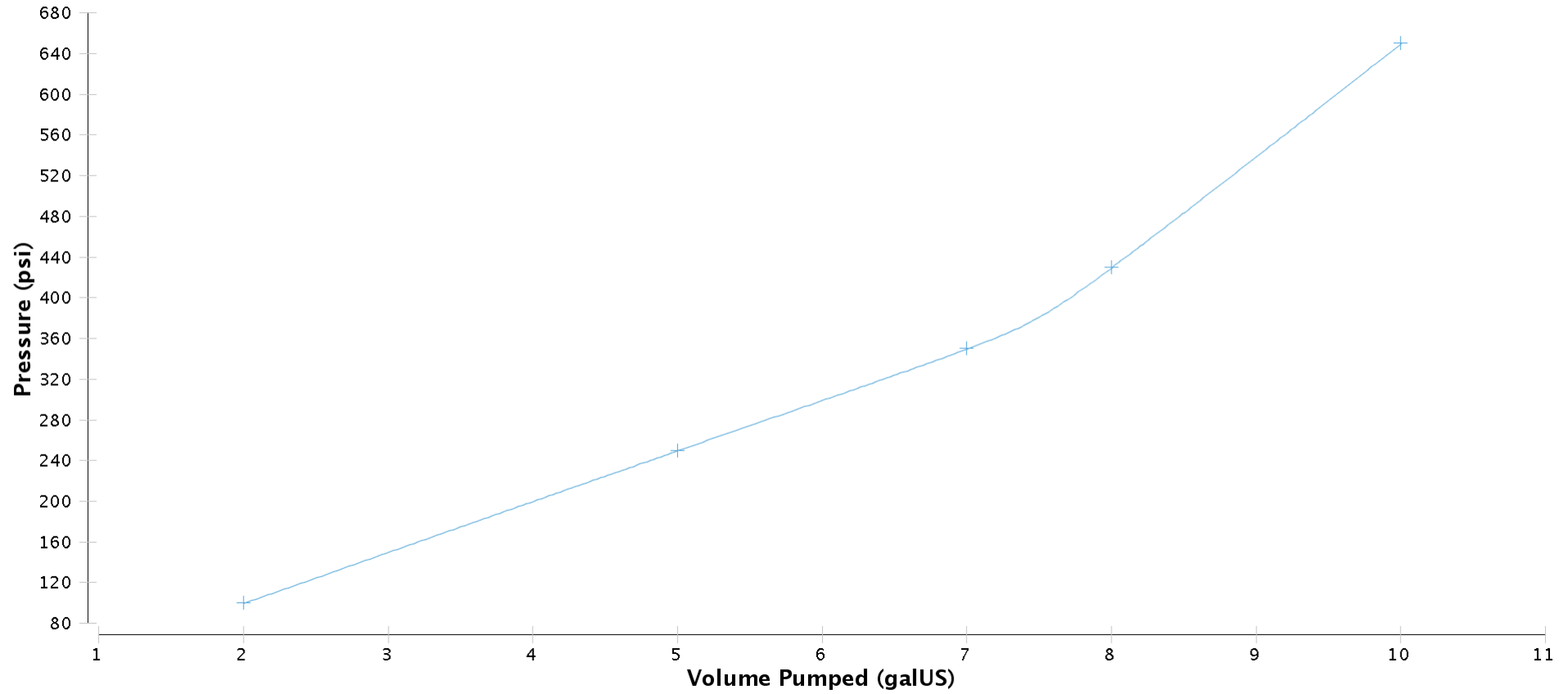
Formation Integrity Test



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Leak Off Test							
Day #		Leak-Off Test No		Casing Size		Rig Representative	
34		1		9 5/8 in		Graham Blue	
Mud Density In Use	Hole Depth	EMW	Shoe Depth	Leak-Off Pressure	Max. Pressure Recorded	Vol. Pumped	Vol. Regained
8.40 ppg	573.00 m	15.05 ppg	573.00 m	650 psi	650 psi	10.0 galUS	10.0 galUS
Leak Off Test Details							
Volume Pumped (galUS)				Pressure (psi)			
2.0				100			
5.0				250			
7.0				350			
8.0				430			
10.0				650			

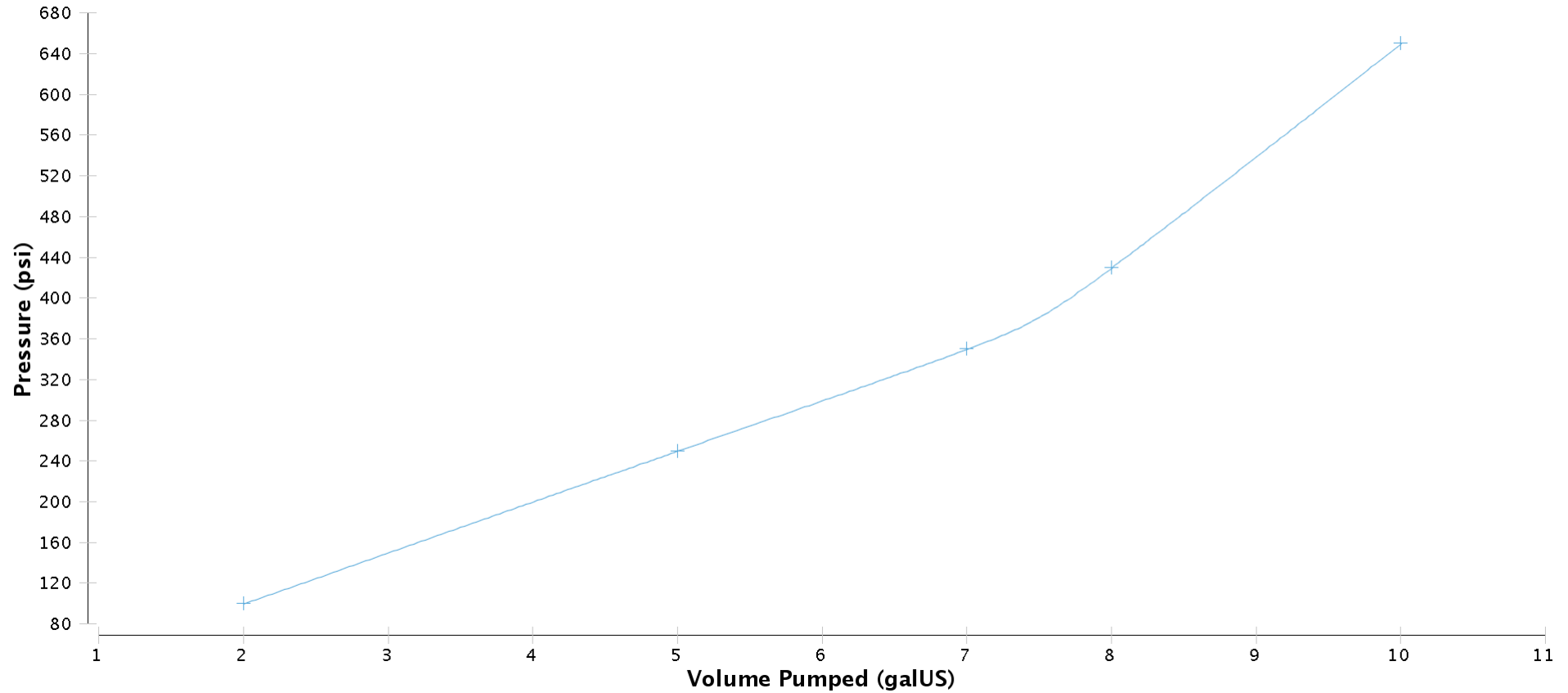
Formation Integrity Test



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Leak Off Test							
Day #		Leak-Off Test No		Casing Size		Rig Representative	
35		1		9 5/8 in		Graham Blue	
Mud Density In Use	Hole Depth	EMW	Shoe Depth	Leak-Off Pressure	Max. Pressure Recorded	Vol. Pumped	Vol. Regained
8.40 ppg	573.00 m	15.05 ppg	573.00 m	650 psi	650 psi	10.0 galUS	10.0 galUS
Leak Off Test Details							
Volume Pumped (galUS)				Pressure (psi)			
2.0				100			
5.0				250			
7.0				350			
8.0				430			
10.0				650			

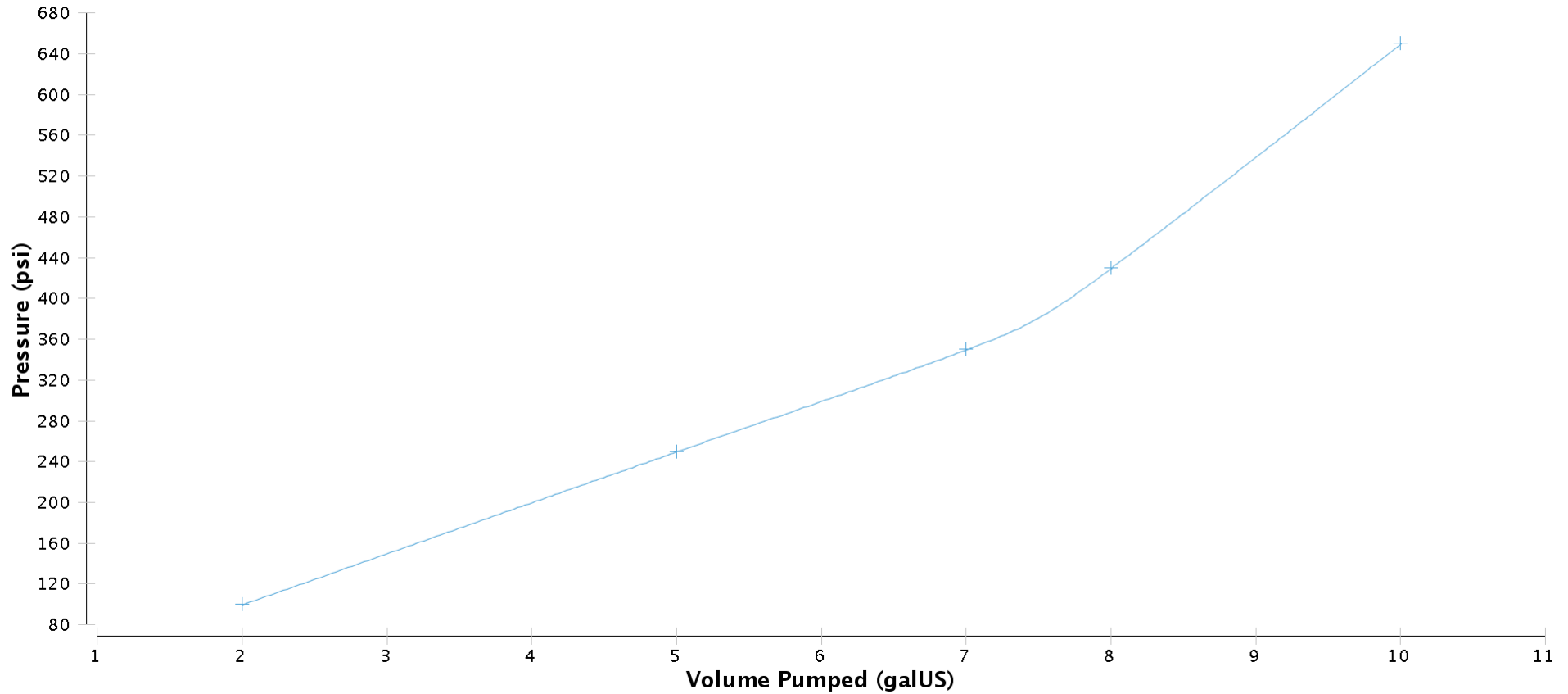
Formation Integrity Test



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Leak Off Test							
Day #		Leak-Off Test No		Casing Size		Rig Representative	
36		1		9 5/8 in		Graham Blue	
Mud Density In Use	Hole Depth	EMW	Shoe Depth	Leak-Off Pressure	Max. Pressure Recorded	Vol. Pumped	Vol. Regained
8.40 ppg	573.00 m	15.05 ppg	573.00 m	650 psi	650 psi	10.0 galUS	10.0 galUS
Leak Off Test Details							
Volume Pumped (galUS)				Pressure (psi)			
2.0				100			
5.0				250			
7.0				350			
8.0				430			
10.0				650			

Formation Integrity Test



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Activity Record

Day #1 (01 Aug 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PS	P	RM		06:00	14:00	8.00		Cont rig down & load out non essential loads f/ WM 24 to WM 23. Wait on decision f/ Adelaide for WM24 go forward plan
PS	P	RM		14:00	18:00	4.00		Cont rig down & load out non essential loads f/ WM 24 to WM 23. Conduct requirement for WM 24 suspension as per WM 24 daily report
PS	P	RM		18:00	24:00	6.00		Nipple down rig, move off WM24 hole, service rig, transport f/ WM 24 to WM 23, spot same and commence to rig up & align with center of cellar Spot mud tank, Load safe trailer & align with rig Fill water tanks with water, Top up mud system & mix spud mud Load 20" BHA into mast
Day #2 (02 Aug 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PS	P	SM		00:00	00:45	0.75		Conduct hazard hunt, Hold pre spud safety meeting & conduct pre spud inspection, Ok to spud
CP	P	DO		00:45	05:45	5.00	22.1	Spud in & drill 20" conductor hole to 22.15m (Note; Rig 918 Datum Point of 5.15 RT to G.L.)
CP	P	CMD		05:45	06:30	0.75	22.1	Circ. & condition mud.
CP	P	DO		06:30	10:00	3.50	29.3	Drill 20" conductor hole from 22.15m to 29.3
CP	P	CHC		10:00	10:30	0.50	29.3	Circ. hole clean
CP	P	TO		10:30	12:30	2.00	29.3	POOH lay out 14" BHA , bit, Roller Reamers
CP	P	RRC		12:30	12:45	0.25	29.3	PJSM, Rig up to run 16" conductor
CP	P	RC		12:45	15:30	2.75	29.3	Run 2 x 16" jnts of conductor pipe, weld same, sit on bottom @ 29.3m. P.U. jnt. of drill pipe & run thru. table, remove section of rig floor, align & centre conductor, chain down & secure, check measurement. ok, re-install rig floor.

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Day #2 (02 Aug 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
CP	P	CMC		15:30	16:15	0.75	29.3	Run tremmie pipe between 16" csg. & open hole aprox 1-1/2 met. f/ bottom. Break circ. Mix & pump 2.25bbls of Cmt. @ 15.0ppg w/ 4% Calcium chloride hot mix. (take cmt. sample) Displace tremmie pipe with water , POOH. Flush pump w/ water.
CP	P	WOC		16:15	18:00	1.75	29.3	WOC check sample
CP	P	CMC		18:00	20:00	2.00	29.3	Run tremmie pipe between 16" csg. & open hole, tag cmt. P.U. #1 met. break circ. Mix & pump 7.8 bbls Cmt. @ 14.8ppg w/ 2% Calcium chloride. (take cmt sample) Displace tremmie pipe with water , POOH. Flush pump & lines w/ water, clean up cmt equipment
CP	P	CMC		20:00	23:00	3.00	29.3	WOC, Raise PTW (confined space & hot work), Weld Diverter flange on 16" conductor, cleanout & cement cellar floor, Nipple up diverter & blooie line
SH	P	HBHA		23:00	24:00	1.00	29.3	Pick up & break down Hammer BHA f/ previous WM24 well. Lay out both roller reamers
Day #3 (03 Aug 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
SH	P	HBHA		00:00	03:00	3.00	29.3	Continue breaking down BHA f/ previous WM24 well, make up new 12.45" Air hammer BHA assembly, Assemble new hammer & Test fire same. Note; only #1 roller reamer RIH, due to no replacement parts for 2nd R.R.
SH	P	TI		03:00	05:30	2.50	29.3	RIH w/ Hammer & BHA, Tag bottom @ 29.3m, No cement in casing, Remove 8" flooded reverse discharge hose from head, Install washington rubber to diverter,
SH	P	D		05:30	12:00	6.50	147.6	Commence hammer drilling 12.45" surface hole f/ 29.3 to 147.60m
SH	P	RS		12:00	12:30	0.50	147.6	PJSM, Rig service
SH	P	D		12:30	17:00	4.50	214.6	Hammer Drill 12.45" surface hole f/ 147.6m to 214.6 m Commence making water from 158m approx 20gpm (Air input 2300 cfm @ 340psi)
SH	TP	RR	mcrig	17:00	17:45	0.75	214.6	Rig repairs Fuel problem on rig engine, Bleed lines & prime filters Start engine & run up, OK to commence drilling again

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Day #3 (03 Aug 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
SH	P	D		17:45	24:00	6.25	294.0	Hammer Drill 12.45" surface hole f/ 214.6 m to 294m Strap 9 5/8" casing Formation water increased to approx 40gpm (Air input 2300cfm @ 340psi) (Average day ROP; 15.36 m/hr w/ connections)
Day #4 (04 Aug 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
SH	P	D		00:00	03:30	3.50	324.5	Drill ahead 12.45" hole f/ 294 to 324.5m Hold back regulator malfunction
SH	TP	RR	mcrig	03:30	06:15	2.75	324.5	Rig repair. Pull back lay down #1 jnt of pipe, make repairs to hold back regulator Pick up jnt, Attempt to drill on, Regulator still not functioning Pull back double in mast & set in slips BL fitter mechanic to rig. Fault find problem & rectify same.
SH	P	D		06:15	12:00	5.75	367.0	Drill ahead 12.45" hole f/ 324.5m to 367m
SH	P	SM		12:00	12:15	0.25	367.0	PJSM
SH	P	D		12:15	13:45	1.50	379.0	Drill ahead 12.45"hole f/ 367m to 379m (Instantaneous ROP 11 m/hr @ 379m,water flow increased, hole making too much water.)
SH	P	CHC		13:45	14:00	0.25	379.0	Condition mud & circ. hole clean
SH	P	TO		14:00	15:30	1.50	379.0	POOH w/ Hammer to switch to flooded reverse.
SH	P	HBHA		15:30	17:45	2.25	379.0	Break down hammer & subs, Make up 12.25" Tricone & DTFR BHA
SH	P	TI		17:45	21:45	4.00	379.0	RIH w/ DTFR BHA
SH	P	HT		21:45	22:30	0.75	379.0	Nipple up DTFR flow & discharge lines
SH	P	TI		22:30	23:45	1.25	379.0	RIH w/ 7" DTFR DP
SH	P	RS		23:45	24:00	0.25	379.0	Rig service
Day #5 (05 Aug 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
SH	P	TI		00:00	01:15	1.25	379.0	RIH w/ DTFR pipe to 370m, precautionary wash last 9m to bottom.

Day #5 (05 Aug 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
SH	P	D		01:15	12:00	10.75	408.0	Bed in bit, Commence drilling 12.25" hole w/ DTFR f/ 379m to 408m WOB = 27k >> RPM = 44 >> Tq. = 3500 to 3900ft/lbs >> SPP = 177
SH	P	SM		12:00	12:15	0.25	408.0	PJSM
SH	P	D		12:15	13:30	1.25	411.0	Cont. drilling 12.25" hole w/ DTFR f/ 408m to 411m
SH	P	RS		13:30	13:45	0.25	411.0	Rig service
SH	P	D		13:45	24:00	10.25	437.0	Cont. drilling 12.25" hole w/ DTFR f/ 411m to 437m WOB = 27k >> RPM = 50 >> Tq. = 3800 to 4300ft/lbs >> SPP = 224 (Approx 2.6 m/hr w/ connections)
Day #6 (06 Aug 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
SH	P	D		00:00	12:00	12.00	478.0	Cont. drill ahead 12.25" hole w/ DTFR f/ 437m to 478m WOB = 27k >> RPM = 46 >> Tq. = 3800 to 4300ft/lbs >> SPP = 279 Average ROP; 3.4 m/hr w/ connections
SH	P	RS		12:00	12:30	0.50	478.0	Hold PJSM. Conduct rig service.
SH	P	D		12:30	24:00	11.50	535.0	Cont. drill ahead 12.25" hole w/ DTFR f/ 478m to 535m WOB = 27k >> RPM = 54 >> Tq. = 3600 to 5100ft/lbs >> SPP = 354 Average ROP: 4.9 m/hr w/ connections
Day #7 (07 Aug 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
SH	P	D		00:00	12:00	12.00	563.0	Drill ahead 12.25" hole w/ DTFR f/ 535 to 563m WOB= 27k >> RPM= 51 >> Tq= 3800 - 4300 ft/lbs >> SSP = 386 Top of Stokes Fm. @ 551m > 13m low. Confirmed by Geo. Spot samples as follows; 559m = 90% Siltstone > 10% sandstone 562m = 100% Siltstone > Trace of Sandstone
SH	P	RS		12:00	12:30	0.50	563.0	PJSM, Rig Service

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Day #7 (07 Aug 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
SH	P	D		12:30	16:15	3.75	570.0	Drill ahead 12.25" hole w/ DTFR f/ 535 to 570m WOB= 27k >> RPM= 50 >> Tq= 3800 - 4300 ft/lbs >> SSP = 389 Spot samples as follows; 565m = 100% Siltstone 568m = 90% Siltstone > 10% Sandstone 570m = 100% Siltstone
SH	P	CHC		16:15	16:30	0.25	570.0	Circ. bottoms up for sample. = 100% Siltstone
SC	P	TO		16:30	22:00	5.50	570.0	POOH to run 9-5/8" surface csg. Dump active mud system & clean out same. Fill w/ clean water for Cmt. job.
SC	P	CMC		22:00	24:00	2.00	570.0	Raise PTW: (Hot work, Confind space) Cut 16"conductor casing 24" below GL & weld in Braden Head landing ring. Nipple down DTFR flow & discharge lines, Clear drill floor, Rig up to run csg
Day #8 (08 Aug 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
SC	P	SM		00:00	00:15	0.25	570.0	PJSM, Running casing
SC	P	CMC		00:15	02:00	1.75	570.0	Cont rig up to run 9 5/8" surface casing
SC	P	CMC		02:00	09:15	7.25	570.0	Commence running 9 5/8" casing, Pick up shoe jnt, Check flow path w/ water, Pick up & make up float collar jnt, check flow path w/ water Run csg. & centralisers as per csg tally. Note; filled cmt. basket w/ Bentonite chips when RIH. Run a total on 51 x 36lb/ft x K55 x BTC csg., set shoe at 566.86. Remove csg. slips, land csg. on landing ring, top up with water.
SC	TP	CMC	othr	09:15	11:30	2.25	570.0	Wait on Suspension approval from NT DME Hold PJSM Rig down non-essential equipment. Approved granted to suspend well. Commence R/U cementing equipment

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Day #8 (08 Aug 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
SC	P	CMC		11:30	12:15	0.75	570.0	<p>OCR observe loading cmt. plugs in cmt. head, Clear rig floor of csg. running equip.</p> <p>Head up, check top plug indicator, ok, chain down csg., install bottom plug in csg., pump 10bbbls water ahead, pressure test lines to 3000psi, ok, bleed off, pump additional 10bbbls of water</p> <p>Mix & pump 83bbbls (210 sx) of Lead cmt. @ 11.8ppg, followed by 83bbbls (162 sx) of Tail cmt. @ 15.6ppg, release top plug, displace with 143bbbls of water, bump plug with 683psi, pressure up to 2000psi for 10 minutes, good test, bleed back 1.1 bbbls of water. floats holding.</p>
SC	P	CMC		12:15	13:45	1.50	570.0	<p>PJSM, run stinger, perform top up job between 9-5/8" csg. and 16" conductor.</p> <p>Spot additional bentonite chips, drilled cuttings, aggregate, Calc. Chloride & sx. cmt. in stinger entry to fall down onto cmt. basket.</p> <p>Mix & pump 30bbbls of cmt. at 15.6ppg between 9-5/8" & 16" conductor, no returns.</p> <p>Spot additional bentonite chips, drilled cuttings, aggregate, Calc. Chloride & sx. cmt. in stinger entry to fall down onto cmt. basket.</p> <p>Mix & pump 15bbbls of cmt. at 15.6ppg between 9-5/8" & 16" conductor, good returns, hole full of cmt.</p> <p>Total of 220 sx cmt. for top up job. w/ additives D 47 = 5 gal. & D 80 = 75 gal.</p> <p>Rig down stinger</p>
SC	P	CMC		13:45	14:30	0.75	570.0	<p>Rig down Cmt. head, back out landing jnt., lay out same, clear rig floor.</p> <p>Rig down & clean cmt. unit.</p>
SC	P	RD		14:30	17:45	3.25	570.0	<p>Rig down csg. slips support base, lay over Mast, move rig off cellar to allow safer access for the installation of Tbg. Spool.</p> <p>Remove rig support base f/ over cellar, rig floor & pipe handler.</p> <p>Load out non essential equipment to WM 20.</p>
SC	P	WH		17:45	20:00	2.25	570.0	<p>G.E. Rep. install spin flange & Tubing Spool, 11" 3k flange bottom x 7-1/16" 5k studded top, pressure test same to 2000psi. Good Test</p> <p>Release rig @ 20:00 hrs on 8-08-13</p>
Day #9 (11 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	RD		13:30	19:00	5.50	570.0	<p>General rig down on WM19. Move misc. loads to WM23.</p> <p>25% rigged down</p> <p>25% moved</p>

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Day #9 (11 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	RD		19:00	24:00	5.00	570.0	Wait on Daylight.
Day #10 (12 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	RD		00:00	06:00	6.00	570.0	Wait on Daylight.
PH	P	RD		06:00	18:00	12.00	570.0	Rig down on WM19 . Move to WM23. 50 % Rig moved.
PH	P	RD		18:00	24:00	6.00	570.0	Wait on daylight.
Day #11 (13 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	RD		00:00	06:00	6.00	570.0	Wait on Daylight.
PH	P	RM		06:00	18:00	12.00	570.0	PJSM. Spot Sub-base / Ponybase and Carrier. Load out and spot Day Tank and Generator shack. Spot Shacker and Suction Tanks. Load out Steel and Fuel Skids. Spot Mudpumps, Poorboy Degasser, Catwalk, Rig Generator and Fuel Skid. Inspect Drawworks torque converter. Spot BOP Cradle. Raise Mast.
PH	P	RM		18:00	24:00	6.00	570.0	Wait on Daylight.
Day #12 (14 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	RM		00:00	06:00	6.00	570.0	Wait on Daylight.
PH	P	RM		06:00	12:00	6.00	570.0	Hold PTSM with all on site, Rigged down and loaded out office, accomodation & workshop from WM19 Spotted and rigged up wellsite officers, accomodation & workshop om WM23 Raised mast top section raised rig floor, Continued to load out remaining fork loads from WM19, Continued with lease cleanup
PH	P	RU		12:00	24:00	12.00	570.0	Installed BOP into subbase. Spotted & raised doghouse & V-Door Continued with Rigging up

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Day #13 (15 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	RU		00:00	06:30	6.50	570.0	Rigged up TDS service loop and saddle. Rigged up Rig service lines Rigged up instrumentation lines, service and install sensors. Continue Rigging up Rig floor. Run ESD lines.
PH	P	RU		06:30	08:45	2.25	570.0	GE remove tubing spool and spin flange. Install drilling adaptor. Pressure test same to 3000 psi / 15 mins OK.
PH	P	RU		08:45	14:45	6.00	570.0	Test all Rig ESD's / 5 seconds f/ remote. Test TDS ESD. OK. R/U Surface line shock hoses. Work thru pre-spudcheck list. Check mud tanks for leaks.Dress Rig floor. Continue rig up. Complete R/U TDS. Tape off Hazardous areas.
PH	P	SM		14:45	15:00	0.25	570.0	Conduct Hazard Hunt.
PH	P	NUB		15:00	19:00	4.00	570.0	PJSM , tail in BOP , N/U BOPE, choke, kill lines, Rig up koomey lines
PH	P	NUB		19:00	24:00	5.00	570.0	Rigged up diverter, pneumatic valves, stand, blooie line, charge up koomey
Day #14 (16 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	NUB		00:00	00:45	0.75	570.0	Continued rigging up RFCD blooey line and manifold.
PH	P	NUB		00:45	01:30	0.75	570.0	Function test BOPE and top up with Hydraulic fluid
PH	P	PT		01:30	18:00	16.50	570.0	Picked up pup joint, make up test plug, Pressure test BOPE , choke, kill and choke valves and lines, RFCD and surface lines. Pressure test all gate valves / rams and annular to 200 psi low / 5 mins 2000 psi high 10 mins.
PH	P	PT		18:00	20:15	2.25	570.0	Layed out test assmbly, make up conbo tool, RIH set plug, Pressure test blooie line to 500psi for 10mins , pull test plug.
PH	P	BT		20:15	20:45	0.50	570.0	Performed Koomy darw down test.
PH	P	HBHA		20:45	24:00	3.25	570.0	Run in and set wear bushing, Make up 12 1/4" drill assembly.
Day #15 (17 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	HBHA		00:00	03:30	3.50	570.0	Drilled mouse hole and installed sock

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Day #15 (17 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	TI		03:30	07:30	4.00	570.0	Layed out 12 1/4" bit and d/collar, Picked up D/pipe and RIH @ 194 m. POOH.
PH	P	TI		07:30	07:45	0.25	570.0	Install RFCD Bell nipple.
PH	P	TI		07:45	16:00	8.25	570.0	Continued RIH w/ singles DP and POOH racking stands in mast.
PH	P	TI		16:00	20:30	4.50	570.0	Picked up HWDP singls RIH , POOH and rack back in stands.
PH	P	TI		20:30	24:00	3.50	570.0	Held PJSM, Rig up BHA, Make up 8 3/4" bit and BHA , RIH from surface to 113m
Day #16 (18 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	TI		00:00	03:30	3.50	570.0	Continued to Make up BHA and RIH from 113m to 540m
PH	P	RW		03:30	04:00	0.50	570.0	Wash down from 540m, Tagged top of cmt at 559.15m
PH	P	DFS		04:00	08:30	4.50	573.0	Drill out cmt and float and shoe track from 559.15m to 573m
PH	P	CIR		08:30	08:45	0.25	573.0	Circulated hold clean
PH	P	LOT		08:45	10:15	1.50	573.0	Pull back inside casing shoe to 549m, Ferform FIT with MW8.4ppg at 650psi for 10 mins = EMW 15.1ppg
PH	P	TO		10:15	12:00	1.75	573.0	Flow check, POOH from 549m to 143m.
PH	P	TO		12:00	14:30	2.50	573.0	Flow check, POOH from 143m to surface, clean floor
PH	P	RS		14:30	15:00	0.50	573.0	Serviced Rig, TDS, Wash pipe
PH	P	HT		15:00	19:00	4.00	573.0	Comission ADA, mix polymer and transfer to ADA, rig up directional equipment, organise and strap BHA #5
PH	P	TI		19:00	24:00	5.00	573.0	Make up 8 3/4" hammer bit and BHA, surface test hammer, MWD tools, RIH with BHA from surface to 197m.
Day #17 (19 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	TI		00:00	02:30	2.50	573.0	Continue to RIH with 8 3/4" air hammer bit and BHA , from 197m to 556m.
PH	P	HT		02:30	04:00	1.50	573.0	Installed Rotating head

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Day #17 (19 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	SM		04:00	04:30	0.50	573.0	PJSM on Air operation, making conations and kill procdures.
PH	P	D		04:30	06:00	1.50	593.0	Unload well, Drilling ahead 8 3/4" hole with Air hammer from 573m to 593m
PH	P	D		06:00	19:15	13.25	823.0	Drilled ahead 8 3/4" hole with Air hammer from 593m to 823m with RPM 60, WOB 2klb Torque 3800 CFM 3000 Mist at 15gpm with 0.2% fom mix
PH	P	RS		19:15	19:45	0.50	823.0	Rig service, inspect THD
PH	P	D		19:45	24:00	4.25	907.0	Drilled ahead 8 3/4" hole with Air hammer from 823m to 907m with RPM 60, WOB 2klb Torque 3800 CFM 3000 Mist at 15gpm with 0.2% fom mix
Day #18 (20 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	D		00:00	08:45	8.75	1,066.0	Drilled ahead 8 3/4" hole with Air hammer from 907m to 1066m with RPM 60, WOB 2klb Torque 3800 CFM 3000 Mist at 15gpm with 0.2% fom mix
PH	P	CMD		08:45	10:15	1.50	1,066.0	Circulate hole clean w/ air. Displace hole to 8.8 ppg mud. Circulate further bottoms up. Record SCR's. Flow check.
PH	P	TO		10:15	12:15	2.00	1,066.0	POOH f/ 1066 m to 538 m.
PH	P	HT		12:15	12:45	0.50	1,066.0	Removed rotating head rubber. Install bell nipple.
PH	P	TO		12:45	14:00	1.25	1,066.0	Continued POOH from 538m to 168m.
PH	P	HT		14:00	14:15	0.25	1,066.0	Changed Elevators from 4" to 4 1/2", Flow check.
PH	P	TO		14:15	17:00	2.75	1,066.0	Continued POOH from 168m to surface, laying out air hammer and directional tools.
PH	P	HT		17:00	19:00	2.00	1,066.0	Strap and caliper BHA #6,

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Day #18 (20 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	HBHA		19:00	24:00	5.00	1,066.0	Make up 8 1/2" bit and 6.75" motor surface test motor, scribe in hole , install directional tools, RIH to 112m
Day #19 (21 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	TI		00:00	05:30	5.50	1,066.0	Continued to RIH with 8 1/2" bit amd directional BHA from 112m to 1048m
PH	P	HT		05:30	06:15	0.75	1,066.0	Install Rotating head
PH	P	CIR		06:15	07:30	1.25	1,066.0	Unload well and blow dry with air
PH	P	FLTG		07:30	08:30	1.00	1,066.0	Gas flow test on well, 0flow
PH	P	RU		08:30	09:00	0.50	1,066.0	Rig up Pathfinder insterments chang out shack.
PH	P	DM		09:00	11:15	2.25	1,080.0	Drilled ahead 8 1/2" hole with down hole motor from 1066m to 1080m RPM 40, WOB 15klb Torque 3900 CFM 2400 Mist at 20gpm with 0.2% fom mix
PH	P	FLTG		11:15	11:30	0.25	1,080.0	Gas flow test on well , 0 flow
PH	P	DM		11:30	18:45	7.25	1,138.0	Drilled ahead 8 1/2" hole with down hole motor from 1080m to 1138m RPM 40, WOB 15klb Torque 3900 CFM 2400 Mist at 20gpm with 0.2% fom mix
PH	P	FLTG		18:45	19:30	0.75	1,138.0	Circulate hole clean , Gas flow test on well , 0 flow
PH	P	DM		19:30	19:45	0.25	1,146.0	Drilled ahead 8 1/2" hole with down hole motor from 1038m to 1146m. RPM 40, WOB 15klb Torque 3900 CFM 2400 Mist at 20gpm with 0.2% fom mix
PH	P	RS		19:45	20:00	0.25	1,146.0	Rig service,

Day #19 (21 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	DM		20:00	22:30	2.50	1,170.0	Drilled ahead 8 1/2" hole with down hole motor from 1146m to 1170m. RPM 40, WOB 15klb Torque 3900 CFM 2400 Mist at 20gpm with 0.2% fom mix
PH	P	FLTG		22:30	23:00	0.50	1,170.0	Circulate hole clean , Gas flow test on well , 0 flow
PH	P	DM		23:00	24:00	1.00	1,184.0	Drilled ahead 8 1/2" hole with down hole motor from 1170m to 1184m. RPM 40, WOB 15klb Torque 3900 CFM 2400 Mist at 20gpm with 0.2% fom mix
Day #20 (22 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	DM		00:00	06:00	6.00	1,251.0	Drilled ahead 8 1/2" hole with down hole motor from 1184m to 1251m. RPM 40, WOB 15klb Torque 4600 CFM 2400 Mist at 20gpm with 0.2% foam mix
PH	P	FLTG		06:00	06:30	0.50	1,251.0	Circulated hole clean, Conduct gas flow test, 0 flow
PH	P	DM		06:30	07:30	1.00	1,260.0	Drilled ahead 8 1/2" hole with down hole motor from 1251m to 1260m. RPM 40, WOB 15klb Torque 4600 CFM 2400 Mist at 20gpm with 0.2% foam mix
PH	P	FLTG		07:30	08:15	0.75	1,260.0	Circulated hole clean, Conduct gas flow test , to small to measure
PH	P	DM		08:15	24:00	15.75	1,359.7	Drilled ahead 8 1/2" hole with down hole motor from 1260m to 1359.7m. RPM 40, WOB 15klb Torque 4600 CFM 2400 Mist at 20gpm with 0.2% foam mix

Day #21 (23 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	DM		00:00	00:30	0.50	1,360.0	Drilled ahead 8 1/2" hole with down hole motor from 1359.7m to 1360m. ROP has slowed rapidly and motor is stalling out with only a few psi diff pressure.
PH	P	FLTG		00:30	01:15	0.75	1,360.0	Circulated hole clean, Conduct gas flow test , to small to measure
PH	P	CMD		01:15	02:30	1.25	1,360.0	Killed well at 450 gpm with 8.8ppg mud, circulated btms up at 270gpm, take SCRs
PH	P	HT		02:30	03:15	0.75	1,360.0	Flow check, Remove rotating head and install bell nipple
PH	P	TOB		03:15	10:45	7.50	1,360.0	POOH with 8 1/2" bit and directional BHA, from 1360m to surface. Flush motor and lay out moter , Bit
PH	P	HT		10:45	11:15	0.50	1,360.0	Make up combo tool & remove wear bushing
PH	P	PT		11:15	18:00	6.75	1,360.0	Install new rubber seal on test plug, install test plug & back out pup joint. Line up for and pressure test on BOP, low 200psi 5 mins, 2000psi high 10mins
PH	P	PT		18:00	18:15	0.25	1,360.0	Install wear bushing and pressure test upper kelly cock
PH	P	HT		18:15	18:30	0.25	1,360.0	Break down pressure test assembly.
PH	P	RS		18:30	19:00	0.50	1,360.0	Rig Service
PH	P	HBHA		19:00	22:15	3.25	1,360.0	Strap and caliper BHA #7, Make up bit D/H motor , surface test motor and scribe in hole. Install MWD tools
PH	P	TIB		22:15	24:00	1.75	1,360.0	Continued to RIH with 8 1/2" bit D/H motor and directional BHA, from surface to 139m
Day #22 (24 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	TIB		00:00	02:00	2.00	1,360.0	Continued to RIH with 8 1/2" bit D/H motor and directional BHA, from 139m to 544m
PH	P	SC		02:00	04:15	2.25	1,360.0	Held PJSM , Hang blocks, slip and cut 60 FT of drill line, un hang blocks.
PH	P	TIB		04:15	08:30	4.25	1,360.0	Continued to RIH with 8 1/2" bit D/H motor and directional BHA, from 544m to 1300m
PH	P	HT		08:30	09:00	0.50	1,360.0	Removed bell nipple and installed rotating head
PH	P	RW		09:00	11:15	2.25	1,360.0	Reamed and washed from 1300m down to 1360m

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Day #22 (24 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	DM		11:15	12:15	1.00	1,362.0	Drilled ahead 8 1/2" hole with down hole motor from 1360m to 1362m. with mud only 2m ROP.
PH	P	CIR		12:15	13:15	1.00	1,362.0	Unload well and blow clean with air and mist.
PH	P	DM		13:15	24:00	10.75	1,408.0	Drilled ahead 8 1/2" hole with down hole motor from 1362m to 1408m. RPM 40, WOB 20klb Torque 5600 CFM 2400 Mist at 20gpm with 0.2% fom mix

Day #23 (25 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	DM		00:00	06:45	6.75	1,439.0	Drilled ahead 8 1/2" hole with down hole motor from 1408m to 1439m. RPM 40, WOB 20klb Torque 5600 CFM 2400 Mist at 20gpm with 0.2% fom mix
PH	P	CIR		06:45	07:30	0.75	1,439.0	Circulated hole clean & perform gas flow test.
PH	P	DM		07:30	13:15	5.75	1,455.0	Drilled ahead 8 1/2" hole with down hole motor from 1439m to 1455m. RPM 40, WOB 20klb Torque 5600 CFM 2400 Mist at 20gpm with 0.2% fom mix
PH	P	CIR		13:15	13:30	0.25	1,455.0	Circulared hole clean.
PH	P	CIR		13:30	16:30	3.00	1,455.0	Turn of the Air compressors, Line up Mud pumps and fill the well with 8.7ppg mud and kill the well, shut well in and monitor pressures.
PH	P	HT		16:30	17:00	0.50	1,455.0	PJSM with Elite and crew, remove rotating headand install Bell nipple.
PH	P	CIR		17:00	17:15	0.25	1,455.0	Conduct SCR's @ 1455m, M/P#1 40sts/180psi, 60stks / 300psi, M/P #2 43stks 200psi , 60stks / 300psi.
PH	P	DM		17:15	24:00	6.75	1,466.0	Drilled ahead 8 1/2" hole with Mud & down hole motor from 1455m to 1466m. RPM 35, WOB 21klb Torque 5100 GPM 415

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Day #24 (26 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	DM		00:00	07:00	7.00	1,478.0	Drilled ahead 8 1/2" hole with Mud & down hole motor from 1466m to 1478m. slide F/1475m to 1478m RPM 35, WOB 25klb Torque 5700 GPM 505
PH	P	CIR		07:00	07:30	0.50	1,478.0	Circulate BTMS up.
PH	P	TOB		07:30	13:30	6.00	1,478.0	PJSM, Flow check, POOH F/1478m to 180m
PH	P	HBHA		13:30	17:00	3.50	1,478.0	POOH BHA from 180m to surface, inspect flust, laying out, D/H motor, dog sub & bit
PH	P	HBHA		17:00	18:15	1.25	1,478.0	Pick up and make up D/H motor , dog sub and new BIT, and surface test.
PH	P	HBHA		18:15	20:15	2.00	1,478.0	RIH from surface to 180m, fill pipe
PH	P	RS		20:15	20:45	0.50	1,478.0	Rig Service
PH	P	TIB		20:45	24:00	3.25	1,478.0	RIH from 180m to 1318m, filling pipe every 20 stands.
Day #25 (27 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	TIB		00:00	00:45	0.75	1,478.0	Continue RIH from 1318m to 1416m
PH	P	RW		00:45	02:15	1.50	1,478.0	Wash and Ream from 1416m to 1478m.
PH	P	DM		02:15	12:00	9.75	1,513.0	Drilled ahead 8 1/2" hole with Mud & down hole motor from 1478m to 1513m. RPM 30, WOB 15klb Torque 6200 GPM 550 SPP 1650
PH	P	DM		12:00	24:00	12.00	1,539.0	Drilled ahead 8 1/2" hole with Mud & down hole motor from 1513m to 1539m. RPM 30, WOB 26klb Torque 6200 GPM 550 SPP 1870

Day #26 (28 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	DM		00:00	16:30	16.50	1,572.0	Drilled ahead 8 1/2" hole with Mud & down hole motor from 1539m to 1572m. RPM 30, WOB 26klb Torque 6200 GPM 550 SPP 1870
PH	P	CIR		16:30	17:00	0.50	1,572.0	Circulated BTMs up and hole clean at shakers.
PH	P	RS		17:00	17:30	0.50	1,572.0	Rig Service
PH	P	TO		17:30	24:00	6.50	1,572.0	PJSM, flow check, POOH with 8 1/2" Directional assembly from 1572m to 149m. Flow checks on bottom, at 9-5/8 Shoe and at BHA.
Day #27 (29 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PH	P	TO		00:00	02:30	2.50	1,572.0	POOH from 149m to surface, laid down Bit, Mud motor.
EP	P	SM		02:30	02:45	0.25	1,572.0	Held PJSM with crew and Schlumberger Wire Line.
EP	P	LOG		02:45	03:30	0.75	1,572.0	Rigged up Schlumberger Wireline and prepared tools for Logging run #1.
EP	P	LOG		03:30	04:45	1.25	1,572.0	Picked up and Made up Schlumberger Tools. Loaded Radio active sources.
EP	P	LOG		04:45	10:45	6.00	1,572.0	Monitor the well on Trip Tank while RIH Logging run #1. (PEX-HMGS) Tools below RT at 05:00hrs, Tools on bottom at 06:15hrs, Tools at surface at 09:30hrs. Broke and laid down Tools.
EP	P	LOG		10:45	12:30	1.75	1,572.0	Prepared Tools for Run #2. Picked up and made up Schlumberger Tools.
EP	P	LOG		10:45	12:30	1.75	1,572.0	Prepare and make up Logging Tools for run #2.
EP	P	LOG		12:30	13:15	0.75	1,572.0	Monitor the well on Trip Tank while RIH Logging run #2. (FMT-Sonic Scanner). Tools below surface 12:30hrs. Tools at surface 13:15hrs.
EP	P	LOG		12:30	24:00	11.50	1,572.0	Monitor the well on Trip Tank while RIH Logging run #2. (FMT-SONIC SCANNER) Tools below RT at 17:00hrs, Tools on bottom at 18:30hrs, Tools at surface at 22:00hrs. Break and Laid down Tools.

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Day #27 (29 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
EP	P	LOG		12:30	12:30	0.00	1,572.0	Monitor the well on Trip Tank while RIH Logging run #2. (FMT-SONIC SCANNER) Tools below RT at 12:15hrs, Tools at surface at 13:15hrs. Tested Tool at 150m, Tool not working, POOH to replace faulty tool. Broke and laid down Tools.
EP	U	LOG		13:15	16:45	3.50	1,572.0	Tool not working, Laid down and replaced Tool.
EP	P	LOG		16:45	23:30	6.75	1,572.0	Monitor the well on Trip Tank while RIH Logging run #2. (FMT-Sonic Scanner). Tools below surface 17:10hrs. Tools on bottom 18:15hrs. Tools at surface 22:00hrs. Break and laid down tools.
EP	P	LOG		23:30	24:00	0.50	1,572.0	Prepared Tools for Run #3. Picked up and made up Schlumberger Tools.
Day #28 (30 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
EP	P	LOG		00:00	03:15	3.25	1,572.0	Prepared Tools for Run #3. Picked up and made up Schlumberger Tools.
EP	P	LOG		03:15	06:00	2.75	1,572.0	Monitor the well on Trip Tank while RIH Logging run #3. (CFR). Tools below surface 03:15hrs. Tool Stuck at 1475m.
EP	U	LOG		05:00	06:00	1.00	1,572.0	Attempt to free Logging tools. Cant go up or down. Try to free for next 2 hrs. Maximum pull = 8000.
Day #28 (30 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
EP	P	LOG		00:00	03:15	3.25	1,572.0	Prepared and made up Logging Tools for run #3.
EP	P	LOG		03:15	04:45	1.50	1,572.0	Monitor the well on Trip Tank while RIH Logging run #3. (CFR) Tools below RT at 03:00hrs. Tools become stuck on the way in at 1475m. Can not move up or down.
EP	U	LOG		04:45	15:00	10.25	1,572.0	Attempt to free stuck tools with maximum pull 8000 ft/lbs, (NO GO). Wait on Fishing gear to arrive on to Lease.
EP	U	LOG		15:00	17:45	2.75	1,572.0	Disconnect Wire Line from Stuck Tools. Rig down Wire Line sheaves.

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Day #28 (30 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
EP	U	FSH		17:45	18:00	0.25	1,572.0	Held PJSM with all crew and Schlumberger (Run in hole with overshot and latch on to Fish).
EP	U	FSH		18:00	23:00	5.00	1,572.0	Pick up and make up Fishing Tools. RIH to 1444m. Fill Drill String on the way in.
EP	U	FSH		23:00	24:00	1.00	1,572.0	Circulate and attempt to latch on to Fish from 1444m to 1465m.
Day #29 (31 Dec 2013)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
EP	U	FSH		00:00	02:00	2.00	1,572.0	Tag Fish at 1465m, Latch unsuccessful, Follow fish to Bottom at 1557m. Confirmed latched and bursted the rupture disk with 2000psi pump pressure. Picked up on Drill string gaining extra weight on the weight indicator.
EP	U	FSH		02:00	06:00	4.00	1,572.0	POOH with Fish from 1557m to 644m.
EP	U	FSH		06:00	07:45	1.75	1,572.0	Continue POOH with recovered Tools until top of Fish at surface.
EP	U	FSH		07:45	09:00	1.25	1,572.0	Wait on Schlumberger to prepare for breaking and laying out Logging Tools.
EP	U	HT		09:00	09:45	0.75	1,572.0	Removed radio active sources. Break and laid down Logging tools.
EP	U	HT		09:45	11:30	1.75	1,572.0	Schlumberger inspect and service Logging tools.
EP	P	RS		11:30	12:00	0.50	1,572.0	Rig Service.
EP	U	HT		12:00	17:00	5.00	1,572.0	Schlumberger inspect and service Logging tools.
EP	U	SM		17:00	17:15	0.25	1,572.0	Held PJSM with crews and Schlumberger.
EP	U	HT		17:15	19:00	1.75	1,572.0	Rig up Wire Line sheaves. Pick up and Make up Wire line Logging Tools.
EP	U	LOG		19:00	20:30	1.50	1,572.0	Monitor Well on Trip tank while RIH with Wire Line logging tools Run #3. (CMR-ELS). Tools below Rotary Table at 19:15hrs. Tools on Bottom at 20:30hrs.
EP	P	LOG		20:30	24:00	3.50	1,572.0	Monitor well on Trip tank while Logging Run #3. (CMR-ELS).

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Day #30 (01 Jan 2014)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
EP	P	LOG		00:00	06:00	6.00	1,572.0	Monitor well on Trip tank while Logging Run #4. (CMR-GR). Tools at surface at 05:00hrs. Break and lay down Tools.
EP	P	HT		06:00	07:30	1.50	1,572.0	Picked up and made up Wireline Logging tools Run #5.
EP	P	LOG		07:30	22:30	15.00	1,572.0	Monitor well on Trip tank while Logging Run #5. (MDT). Tools below Rotary Table at 07:15hrs.
EP	P	LOG		22:30	23:00	0.50	1,572.0	Tools unable to go past 1484m. (No Go). Decision made to cancel the last 15 points MDT Logging as they were low priority.
EP	P	HT		23:00	24:00	1.00	1,572.0	POOH with Wire line Tools. Tools at surface 23:30hrs. Break and Laid down Tools.
Day #31 (02 Jan 2014)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
EP	P	HT		00:00	01:30	1.50	1,572.0	POOH and lay down Wire line Logging tools.
EP	P	HT		01:30	02:00	0.50	1,572.0	Rig down Wire line logging sheaves.
EP	P	SM		02:00	02:30	0.50	1,572.0	House keeping on Rig floor. Held PJSM.
PH	P	WT		02:30	08:45	6.25	1,572.0	Pick up and make 8-1/2" bit. RIH with BHA for Wiper trip from surface to 1456m MD.
PH	P	RW		08:45	09:30	0.75	1,572.0	Wash and ream from 1456m MD to TD at 1572m MD.
PH	P	CHC		09:30	10:30	1.00	1,572.0	Circulate 2 x Bottoms up and confirm hole clean at the Shakers.
PH	P	SM		10:30	10:45	0.25	1,572.0	Flow Check and held PJSM.
PH	P	TO		10:45	19:00	8.25	1,572.0	Tripped out of hole. Break and laid down Bit and NB Stab.
PH	P	SM		19:00	19:30	0.50	1,572.0	Held PJSM with crew, Geoservice and Pro Test.
EP1	P	HT		19:30	23:30	4.00	1,572.0	Pick up and Make up DST Tools for RUN #1.
EP1	P	TI		23:30	24:00	0.50	1,572.0	Trip in hole with DST Tools from surface to 125m at 1-1/2min / stand.
Day #32 (03 Jan 2014)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
EP1	P	TI		00:00	03:00	3.00	1,572.0	Trip in hole with DST Tools from 125m to 1060m at 1-1/2min / stand.

Day #32 (03 Jan 2014)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
EP1	P	TI		03:00	05:15	2.25	1,572.0	Trip in hole with DST Tools from 1060m to 1525.46mTD at 2-1/2min / stand. (Drill Stem Test interval 1493m - 1521.78m).
EP1	P	SM		05:15	05:30	0.25	1,572.0	Held PJSM with crew and Schlumberger Wire Line.
EP1	P	HT		05:30	06:00	0.50	1,572.0	Rig up Wire Line Sheaves. Pick up and Make up Logging tools.
EP1	P	LOG		06:00	07:30	1.50	1,572.0	RIh Correlation Tools confirm packer setting depths. (Good). (Correlation Log). Tools below RT at 05:25hrs, Tools at surface at 07:30hrs.
EP1	P	HT		07:30	08:00	0.50	1,572.0	Break and lay down Logging Tools, Rig down Wire Line sheaves.
EP1	P	SM		08:00	08:15	0.25	1,572.0	Held PJSM with Pro Test, Geoservice and crews.
EP1	P	DST		08:15	08:45	0.50	1,572.0	Pick up and Make up DST head, surface lines and choke manifold.
EP1	P	PT		08:45	09:15	0.50	1,572.0	Test DST head and Pressure Test surface lines back to separator, 1500psi / 5mins, (Good).
EP1	P	DST		09:15	10:10	0.92	1,572.0	Pick up to packer setting depths (1493mMD - 1521.78mMD). Take string weights up and down. Inflate Packers. Pick up 15k overpull and confirm packers inflated and set, (Good). Set down weight to 95k.
EP1	P	DST		10:10	14:10	4.00	1,572.0	Open Tool for 4hrs. Light blow back at top of bucket 0psi for first 20 minutes, followed by very light blow at top of bucket for the remainder of the flow.
EP1	P	DST		14:10	18:10	4.00	1,572.0	Shut Tool for 4hrs.
EP1	P	DST		18:10	19:25	1.25	1,572.0	Held PJSM with Pro Test, crew, Geoservice. Test both mud pumps. Deflate Packers and work string free with max 205k up weight. Allow Packers to relax. Tools stuck due to packers not deflating. Work string down to 70k and up in segments 100k - 225k - 250k, pulled free.
EP1	P	DST		19:25	19:45	0.33	1,572.0	Drop bar and chase fluid in annulus until near balanced. Space out and close Annular. Reverse circulate full string volume. Collect samples at test choke manifold on Rig floor (water contaminated mud). At 594 strokes = 8.8ppg. At 619 strokes = 8.8ppg.
EP1	P	DST		19:45	20:15	0.50	1,572.0	Open Annular Rig down hoses, Test head, Test choke manifold and surface lines. Clean and flush all lines and equipment.

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Day #32 (03 Jan 2014)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
EP1	P	DST		20:15	21:30	1.25	1,572.0	POOH and lay down 2 x pup joints. Circulate 1 -1/2 times hole volume 7500 strokes.
EP1	P	DST		21:30	24:00	2.50	1,572.0	Controlled Trip out of hole from 1525mMD to 1041mMD.
Day #33 (04 Jan 2014)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
EP1	P	DST		00:00	04:00	4.00	1,572.0	Controlled Trip out of the hole from 1041mMD to 47mMD.
EP1	P	DST		04:00	07:15	3.25	1,572.0	PJSM. Break and service DST tools. Recover recorders. Download charts. M/up tools for DST #2, shuffle BHA to suit. Tidy rig floor laying down equipment not required.
EP1	P	DST		07:15	08:30	1.25	1,572.0	RIH w/ DST tools to 197m, monitoring displacement via trip sheet and blow back from string. Schlumberger installing pip tags between DC's and X/O.
EP1	P	SM		08:30	09:45	1.25	1,572.0	Carry out emergency response drill under supervision of Santos EHS personnel. Simulated heart attack of one IP and head injury of another IP at the same time but different locations. RFDS paramedic attended. Debrief meeting held with all personnel. Well secured and monitored during the entire exersize.
EP1	P	DST		09:45	14:30	4.75	1,572.0	Continue to RIH w/ DST tools f/ 197m to 1499m, monitoring displacement via trip sheet and blow back from string.
EP1	P	DST		14:30	17:00	2.50	1,572.0	PJSM w/ Schlumberger. R/up wireline equipment, correlate, R/dwn and lay out wireline equipment.
EP1	P	DST		17:00	24:00	7.00	1,572.0	PJSM w/ Pro-Test. R/up DST head manifold and lines. Pressure test surface equipment to 1500psi/5min-Good test. Perform DST #2, interval 1493.34m to 1475m MDRT. Tool open @ 19:18hrs for 4 hr flow. Weak steady consistent blow in top of bucket observed at surface. After 33 mins flowing blow hose 3" in bucket and steady through out the flow. Tool closed @ 23:18hrs for 4 hr shut in. Monitor well fluid level for duration of the test.
Day #34 (05 Jan 2014)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
EP1	P	DST		00:00	03:20	3.33	1,572.0	Tool closed for 4 hr shut in. Monitor well fluid level for duration of the test.

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Day #34 (05 Jan 2014)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
EP1	P	DST		03:20	04:45	1.42	1,572.0	Held PJSM with Pro Test, crew, Geoservice. Test both mud pumps. Deflate Packers and work string free with max 205k up weight. Allow Packers to relax. Drop bar and chase fluid in annulus until near balanced. Spaced out and closed Annular. Reverse circulate 1-1/2 x string volume total 771 stks. Collect samples at test choke manifold on Rig floor. Recovered 1bbl Of 8.5ppg water cut mud with oil film, followed by 3bbls of 8.5ppg water cut mud with trace of fluorescence. Open Annular, Rig down hoses, Test head, the Test choke manifold and surface lines. Clean and flush all lines and equipment.
EP1	P	DST		04:45	05:30	0.75	1,572.0	POOH 1 x Stand DP from 1497m to 1489m. Circulate 1-1/2 x hole volume.
EP1	P	DST		05:30	10:30	5.00	1,572.0	Flow Check. Controlled POOH with DST Tools from 1489m to 177m, (Recovered Pip Tags). Continued to POOH from 177m to 49m.
EP1	P	DST		10:30	10:45	0.25	1,572.0	Held PJSM with crew, Pro test discuss break out and lay down DST Tools.
EP1	P	DST		10:45	13:15	2.50	1,572.0	Break, clean and lay down DST Tools as per Pro Test.
EP1	P	BT		13:15	14:45	1.50	1,572.0	Housekeeping on Rig floor. Pick up and Make up Combo Tool and retrieve Wear Bushing.
EP	P	BT		14:45	16:45	2.00	1,572.0	Rig up and perform Fortnightly Pressure Test on BOP.
EP1	P	RR		16:45	17:15	0.50	1,572.0	Fix leaking check valve.
EP1	P	BT		17:15	18:00	0.75	1,572.0	Continue with Fortnightly Pressure test on BOP. Rig down and lay out Test assembly.
EP1	P	WT		18:00	22:30	4.50	1,572.0	Make up Wiper trip BHA and RIH to 9-5/8" Shoe at 554m.
EP1	P	RS		22:30	23:00	0.50	1,572.0	Rig Service.
EP1	P	SC		23:00	24:00	1.00	1,572.0	Slip and cut Drilling Line.
Day #35 (06 Jan 2014)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
EP1	P	WT		00:00	02:45	2.75	1,572.0	RIH Wiper trip from 554m to 1550m.
EP1	P	CHC		02:45	04:30	1.75	1,572.0	Wash last stand to bottom from 1550m to TD at 1572m. . Circulate 2 x bottoms up until hole clean at shakers. Held PJSM with crew (lay down drill pipe sideways.)

Day #35 (06 Jan 2014)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PC	P	LDP		04:30	11:00	6.50	1,572.0	Flow Check, (Static). Trip out to lay down Drill pipe sideways from 1572m to the BHA at 133m. Flow checks at 1565m, 1472m, 850m, 550m.
PC	P	TI		11:00	11:30	0.50	1,572.0	RIH excess Drill pipe stands in the derrick from 133m to 521m.
PC	P	LDP		11:30	16:30	5.00	1,572.0	Flow Check, (Static). Trip out to lay down Drill pipe and BHA sideways from 521m to surface. Flow checks at 521m, 132m.
PC	P	RRC		16:30	18:45	2.25	1,572.0	Housekeeping on Rig floor and catwalk. Prepare 5.5" casing running equipment. Change out Bail links, elevators. Align Bail links.
PC	P	SM		18:45	19:00	0.25	1,572.0	Held PJSM with Volant, Drill Quip, Geoservice, Mud Engineer and crew, (Running Casing).
PC	P	RRC		19:00	20:30	1.50	1,572.0	Pick up 1st joint, rih and make up Volant and Wecat Tool. Adjust and set torque values 7400 ft/lbs = 1900psi.
PC	P	RC		20:30	21:00	0.50	1,572.0	Make up 5.5" Shoe and float collar and test, (good).
PC	P	RC		21:00	24:00	3.00	1,572.0	RIH 5.5" Casing as per Casing Tally from surface to 291m.
Day #36 (07 Jan 2014)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PC	P	RC		00:00	07:15	7.25	1,572.0	RIH 5.5" Casing as per Casing Tally from 291m to 1548m. Wash last 2 joints f/ 1548m to 1572m.
PC	P	CIC		07:15	10:00	2.75	1,572.0	Circulate and reciprocate casing/hole clean @ 400gpm. While circulating, SLB complete preparation of cement mix fluids, spot bulkers and R/up bulker lines. PJSM w/ SLB Cementers.
PC	P	HT		10:00	10:15	0.25	1,572.0	Break out and lay down Volante casing tool.
PC	P	CMC		10:15	13:30	3.25	1,572.0	Rig up cement head and cement lines. Pump 10 bbl H2O. Pressure test surface lines to 3K/10min-good test. Pump further 30bbl H2O spacer. Drop bottom plug, load top plug. Mix and pump 128bbbls of 11.8ppg Lead Slurry and 147bbbls of 12ppg Tail slurry. Flush lines. Drop top plug. Displace with 119.5bbbls of 8.8 ppg brine. Bumped plug w/ 1211psi @ 1.6bpm. Pressure test casing to 2250psi / 10min-good test. Bled back .9bbl. Floats holding. Good returns throughout the job. 13.5bbl cement to surface.
PC	P	CMC		13:30	14:15	0.75	1,572.0	Rig down cement lines. Flush BOP and associated equipment w/ H2O.

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Day #36 (07 Jan 2014)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
PC	P	CMC		14:15	14:30	0.25	1,572.0	Install and set slip and seal assembly w/ 71k.
PC	P	CMC		14:30	15:00	0.50	1,572.0	Rig down and lay down cement head.
PC	P	NUB		15:00	18:30	3.50	1,572.0	PJSM. R/down RFCD Blooie line, RFCD Manifold and return line. Remove choke line. Unbolt RFCD and rotate to allow stack to be lifted high enough for casing rough cut. P/ U BOP Slings and lift stack.
PC	P	NUB		18:30	19:00	0.50	1,572.0	Rough cut 5 1/2" casing. L/D cut off joint.
PC	P	NUB		19:00	20:00	1.00	1,572.0	PJSM. Remove RFCD.
PC	P	NUB		20:00	21:00	1.00	1,572.0	Install BOP trolley beam. Remove spacer spool. Place BOP on trolley. Remove trolley.
PC	P	WH		21:00	22:00	1.00	1,572.0	GE Remove drilling adaptor spool. Clean out mud tanks.
PC	P	WH		22:00	22:30	0.50	1,572.0	Final cut casing.
PC	P	WH		22:30	24:00	1.50	1,572.0	GE Install tubing spool. Pressure test same. Connection 3000 psi 10 mins OK. Between seals 2000 psi 10 mins OK. Breakout WeCatt tool. Rig down TDS.
Day #37 (08 Jan 2014)								
PHSE	CLS	OP	RC	From	To	Hrs	Depth (m)	Activity Description
S	P	HT		00:00	03:00	3.00	1,572.0	Rig down and lay out TDS. Release Rig to West Mereenie 20 @ 03:00 hrs.

APPENDIX XII: RIG SPECIFICATIONS

Exhibit A - Rig Equipment & Inventory
Ensign Rig 918

1. Rig 918 Specifications

	Component	Description
1.	Draw works	<p>One (1) Ideco Hydrair H-725-D double drum with V-80 Parmac hydromatic brake, PASON automatic drilling control.</p> <p>Max. Single line pull – 50,000 lbs (low gear), 27,000 lbs (high gear).</p> <p>Main drum 18” diameter, grooved for 1 1/8” drilling line</p> <p>Driven by two (2) compounded Caterpillar 3406 DITA engines, with National C-195-80 FH torque converters</p>
2.	Brake (auxiliary) Brake (Main drum)	<p>V-80 Parmac hydromatic brake. With dedicated water supply tank & Two (2) Dedicated feed pumps.</p> <p>44” diameter x 8-1/2” width.</p>
3.	Substructure	<p>One (1) Ideco 260 ton telescoping substructure.</p> <p>Capacity: 320,000 lbs. on rotary beams and 265,000 lb. on setback area, (loaded concurrently).</p> <p>Height 11 feet for transport, telescopes to provide 16 feet high substructure.</p> <p>Skid mounted on base 11’6” wide x 39’10” long plated on top with 1/4” floor plate and bottom with 1/4” plate seal welded, eliminating need for rig matting.</p> <p>Floor dimensions 14’7 x 22’0”, 13’9” rotary beams to ground.</p> <p>Floor plate on set-back area includes mousehole and Rathole.</p> <p>End of set-back area removable and walkways fold to allow fixed moving width of 13’0”.</p> <p>Master skid, 10’0” wide x 47’7” long to suit drawworks, compound, engines, wireline spool and mast.</p> <p>Pony Base, 10’0” wide x 47’7” long for master skid support base, with mast hinge support and levelling jack brackets. Plated on bottom with 1/4” plate seal welded, eliminating need for rig matting.</p>

	Component	Description																
4.	Mast	<p>Ideco KM-117-358-AH Kwik Lift telescoping mast, 117' clear height from ground to underside of crown, capable of making mousehole connections, Crown-O-Matic safety device installed.</p> <p>Height above ground: 119 ft.</p> <p>Static hook rating externally guyed:</p> <table> <tr> <td>10 lines to block</td> <td>358,000 lbs.</td> </tr> <tr> <td>8 lines to block</td> <td>341,000 lbs.</td> </tr> <tr> <td>6 lines to block</td> <td>273,000 lbs.</td> </tr> </table> <p>Static hook rating internally guyed:</p> <table> <tr> <td>10 lines to block</td> <td>337,000 lbs.</td> </tr> <tr> <td>8 lines to block</td> <td>320,000 lbs.</td> </tr> <tr> <td>6 lines to block</td> <td>260,000 lbs.</td> </tr> </table> <p>Wind rating with full pipe setback:</p> <table> <tr> <td>Internally guyed</td> <td>54 mph</td> </tr> <tr> <td>Externally guyed</td> <td>75 mph</td> </tr> </table> <p>Racking platform capacity in 60 foot doubles with 4.1/2 in O.D. drill pipe (6.1/8 Tool joints) 11,760 feet.</p>	10 lines to block	358,000 lbs.	8 lines to block	341,000 lbs.	6 lines to block	273,000 lbs.	10 lines to block	337,000 lbs.	8 lines to block	320,000 lbs.	6 lines to block	260,000 lbs.	Internally guyed	54 mph	Externally guyed	75 mph
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6 lines to block	260,000 lbs.																	
Internally guyed	54 mph																	
Externally guyed	75 mph																	
5.	Power system and generators	Two (2) Caterpillar C15, 455 kW, 60 Hz, 3Φ 480V generating sets.																
6.	Rig lighting	<p>Clipsal lighting system with fluorescent lights for mast, buildings and Metal Halide / Sodium lights for floor, pipe racks, cellar, engine, pump and mud tank areas.</p> <p>All lighting fixtures zone rated in accordance with API RP 500 and QLD Petroleum Regulation 1966.</p>																
7.	Casing stabbing board	Ideco manually adjustable casing stabbing board.																
8.	Rotary table –	<p>Ideco LR-275-K, 27 1/2" opening with master bushing removed and API dimension from centre-line table to centre-line drive sprocket of 53.1/4".</p> <p>Serial no. 648.</p> <p>Load Rating:</p> <table> <tr> <td>Dead load</td> <td>1,140,000 lbs.</td> </tr> <tr> <td>Rotating load</td> <td>710,000 lbs.</td> </tr> </table> <p>Torque Rating:</p> <table> <tr> <td>Continuous</td> <td>5,060 ft-lbs.</td> </tr> <tr> <td>Intermittent</td> <td>10,120 ft-lbs.</td> </tr> </table> <p>RPM Rating:</p> <table> <tr> <td>Continuous</td> <td>122</td> </tr> <tr> <td>Intermittent</td> <td>218</td> </tr> </table> <p>One (1) set Varco MSPC master casing bushing c/w API insert bowls #2 & #3.</p>	Dead load	1,140,000 lbs.	Rotating load	710,000 lbs.	Continuous	5,060 ft-lbs.	Intermittent	10,120 ft-lbs.	Continuous	122	Intermittent	218				
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9.	Travelling blocks & hook	<p>American Block D36E265 unitised Travelling Block and hook.</p> <p>Load Rating: 530,000 lbs.</p>																
10.	Swivel	<p>National P-300</p> <p>Rated Capacity:</p> <p>Working Load: 600,000 lbs.</p> <p>Bearing Load: 386,000 lbs @ 100 RPM</p>																

	Component	Description
11.	Drill line	3,500' of 1-1/8" IWRC, 6 x 19 strand. Single line strength 130,000 lbs. Hoist lines strung: ten (10). Wireline safety factor at max drawworks pull: 2.57.
12.	Catwalk	One (1) set of two (2) pieces - Steel decked unit, 48' long x 6' wide x 3'6" high.
13.	Pipe racks	Six (6) only Tumble type, each 39 ft. long.
14.	Winches	One (1) Pullmaster (M12-3-97-11 Model) Mounted on Drawworks One (1) Ingersoll Rand HU 40, Air Operated Service Winch (mounted on rig floor).
15.	Man rider winch	MR 30 FLG, mounted on rig floor.
16.	Mud pumps	Two (2) Emsco F-800 triplex, 6-3/4" x 9" stroke with Hydril K 10-5000 pulsation dampeners, and Retsco reset relief valves. Max Rated intermittent RPM @ 800 HP: 150 rpm One pump powered by two (2) Caterpillar 3408 TAC engines and other powered by one (1) CAT C27 engine. Total: 800hp. One (1) pump fitted with automatic transmission to allow Slow Circulating Rates at 40spm. Liner sizes I: 6 – 1/2", 2121 psi max, 3.88 gal / stroke , 5- 1/2" , 2600 psi max.
17.	Mud tank and agitator system	One (1) Suction Tank 13.4m long x 2.9m wide x 2.0m deep. On 3 runner oilfield skid overall length 14m, overall height 3.24m with handrails up. Compartmentalised: Suction Tank Compartment #1: 150 bbls. One (1) Harrisburg Model MA-10 agitator. One (1) 2" gun line. Suction Tank Compartment #2: 150 bbls. One (1) Harrisburg Model MA-10 agitator. One (1) 2" gun line. Pill Tank: 72 bbls. One (1) Harrisburg Model MA-5 agitator. One (1) 2" gun line. One (1) Shaker Tank 13.4m long x 2.9m wide x 2.0m deep. On 3 runner oilfield skid overall length 14m, overall height 3.24m with handrails up. Compartmentalised: Settling Tank: 240 bbls. One (1) Harrisburg Model MA-10 agitator. Two (2) 2" gun lines. Desilter Tank: 124 bbls. One (1) 2" gun line. Sand Trap: 19 bbls. Trip Tank: 36 bbls. One (1) 2" gun line. Tanks configured in L-shaped arrangement to minimise earthworks and allow for flexible and timely rig down and mobilise.

	Component	Description
18.	Mud cleaning equipment	Two (2) Derrick FLC 514 Linear & Elliptical Shale Shakers 1 X Harrisburg Style 12 x 5" Cone Desilter. Approx output of 960gpm. Driven by Mission magnum 5"x 6"x11" centrifugal pump complete with 50HP 415V 60Hz explosion proof motor
19.	Mud mixing equipment	Two (2) Harrisburg Model 178 8" x 6" Centrifugal pumps powered by 60 HP, 1750 RPM, 3Φ electric induction motors. Two (2) Independent and interchangeable 10" x 6" mixing hoppers, c/w venturi and discharge system to each suction tank compartment. Three (3) 7.5 HP, Harrisburg Model MA-7-1/2 agitators. 1 each in each suction tank and 1 in the settling tank. One (1) 5 HP, Harrisburg Model MA-5 agitator, located in the pill tank.
20.	H P mud lines and stand pipe	5855 psi rated 4" XXS mud pump discharge & delivery lines. 3-1/2" id 5000 psi working pressure, 10,000 psi test pressure shock hoses. 5855 psi rated 4" XXS standpipe. 3-1/2" id 5000 psi working pressure, 10,000 psi test pressure, 55' long Kelly hose. 2" id 5000 psi working pressure, 10,000 psi test pressure, 30' long Casing washdown hose.
21.	Stand pipe manifold	2" 5000 psi gate valve to kill line. 2" 5000 psi gate valve to bleed off line. Bleed off line runs into return trough. 2" 5000 psi gate valve to casing fill up & Circulating line. 4" 5000 psi Master gate valve. 5000 psi Pressure Gauge (Flanged Parking meter Style) on standpipe. Provision to tie in T-piece for air delivery and non-return valve. T-piece at ground level on delivery line to shock hose allows for 1502 tie in for pressure sensors to choke manifold and drilling console.
22.	Riser and flowline	One (1) 16" top-hole drilling riser, with 12" flowline outlet and 2" trip fill up & 2" Kill line. One (1) 12" enclosed flowline. C/w 12" greenwood union for riser / bell nipple connection and discharge flows directly into shale shaker header boxes. Complete with flowline jetting hose.

	Component	Description
23.	Drillers control panel	One (1) drillers operation console consisting of, 2 x mud pump throttles, 1 x Wabco Mud Pump #1 gear selector, Drawworks brake, Parmac Hydromatic brake , Trip tank pump switch, cathead selector and control for make up / break out. Drawworks & Pump Emergency shutdowns, Drawworks Transmission, Rotary clutch. Hydraulic winch control and .Kelly spinner control (reversible). One (1) display system incorporating, PASON SIDEKICK & PIT-BULL digital display and interface, Martin Decker weight indicator, Rotary torque gauge, Standpipe pressure gauge, Casing pressure gauge, line pull gauge, air pressure.
24.	Auto drilling system	One (1) Pason Automatic Drilling Control System, with operator controllable weight on bit setting.
25.	Well control equipment	PASON level monitoring & Flow show system. Koomey type 80 BOP closing unit with drillfloor remote control panel. Choke Manifold & HCR choke line valve. Stabbing valves, grey valve. Calibrated trip tank.
26.	BOP Closing Unit	Koomey Model 120LS type 80. Mounted on the end of the water tank. 3000 psi, 120 gallon accumulator equipped with 16 x 11 gallon bottles. UP2RB5AR model "P" 5 station control manifold. Model UFT-15B triplex charging pump with 15 HP, 60 Hz electric motor. Model U7A26 dual air pump package, capacity 6.4 gpm @ 3000 psi.
27.	Choke manifold	5000 PSI choke manifold with one (1) 3" Swaco 5000 psi hydraulic actuated super choke and one (1) 3" Flocon 5000 psi adjustable manual choke.
28.	Choke line valves	One (1) 4-1/16" Cameron Type "F" 5000 psi HCR Valve One (1) 4-1/16" Cameron Type "F" 5000 psi manual valve
29.	Kill line valves	Two (2) 2-1/16" 5000 psi Gate Valves One (1) 2-1/16" Flo-con check valve
30.	BOP's	1 each Shaffer LWS (or equivalent) double ram Blow Out Preventer. 11" x 5000 Psi studded top and bottom flanges. 4 Outlets 3.1/8" x 5000 Psi flanged. Complete with all studs, nuts and ring gaskets. Rams to suit double gate BOP, complete with spare sealing rubbers: CSO, 4-1/2", 5 1/2", 7", 7.5/8" One (1) Shaffer (or equivalent) spherical Annular Blow-out preventer , 11" x 5000 psi

	Component	Description
31.	BOP control panel	Model A5GRV air operated master remote control panel with 5 valves for operation of BOP's and hydraulic gate valve. 1 valve for operation of bypass valve and 150' remote control hose. Gauges indicating air pressure (system control), manifold pressure and regulated annular closing pressure.
32.	Super Choke Control remote panel	Swaco Super Choke Remote Panel. Air operation over hydraulic actuation. Casing Pressure gauge, Drill pipe Pressure gauge, pump stroke counter display, choke position gauge, hydraulic regulator, air supply valve and choke open/closed lever.
33.	BOP storage & transport system	BOP stored on test stump trolley within the sub-base. BOP removable from subbase for transportation on oilfield skid
34.	BOP testing stump	One (1) 11" 3000 psi BOP test stump c/w test port. Mounted on BOP storage/transport trolley in sub base, driller's side, below open rig floor area. One (1) 11" x 5000psi BOP test stump
35.	BOP handling system	One (1) BOP rail and trolley handling system. Lifting Slings & lifting frame under annular BOP.
36.	BOP cup tester	One (1) Cameron 4" IF type "F" Cup tester.
37.	Drillpipe safety valves	One (1) 4" IF Gray Inside BOP valve. One (1) 4" IF 2-1/4" bore stabbing valve.
38.	Float valves	One (1) Baker SPD Model "F" 4R float valve. One (1) Baker SPD Model "F" 5F6R float valve. Totco Baffle rings to suit the above.
39.	HP pressure testing unit	One (1) Stewart & Stevenson 10,000 psi dual air pump, high pressure test unit. Tank is marked for recording pumped volume.
40.	Flare line	One hundred and fifty (150) feet of 3-1/2" tubing,
41.	Mud / gas separator	One (1) x 48" mechanical "poor-boy" mud-gas separator, c/w domed top & bottom ends, 4" delivery line from choke manifold, 6" mud discharge line to shale shakers, 12' mud seal, 2" fill-up inlet with ball valve, 4" dump valve, 0 to 15psi Pressure gauge, 150' of 8" vent line run from 2' above top of vessel to ground level to flare pit.
42.	Degasser	One (1) centrifugal sea-flow vacuum degasser, driven by 7.5 HP, 1740 RPM, 3Φ electric induction motor.
43.	Drilling adapter spools	One (1) spacer spool, 11" 3000 psi x 11" 3000psi, 23" high. One (1) spacer spool, 11" 5000 psi x 11" 5000psi, 23" high. One (1) mud cross spool, 11" 5,000 psi x 11" 3000 psi, with 2 1/16" x 5000 psi and 3 1/8" x 5000 psi side outlets, 23" high.
44.	Drill string circulating heads	One (1) 4" IF x 1502 X/O circulating sub.

	Component	Description
45.	Stabilisers & Roller Reamers	Nil
46.	Drilling Jars	Nil
47.	Pipe bins	Three (3) only skid mounted 10' wide x 34' long, 3.6' high, for contractors tubulars. One (1) only skid mounted pipe bin for hauling client tubulars and equipment.
48.	Kelly drive, spinner & Kelly	Varco 27HDP pin drive roller Kelly Bushing with 4-1/4" Square rollers and safety guard. One (1) only, Varco Model 6800 hydraulic Kelly Spinner, 1200 ft-lb stall torque. One (1) 4-1/4" square Kelly 38' long, 35' working length. 4" IF tool joint connection bottom.
49.	Kelly cocks	One (1) Hydril Kelly Guard 5000psi unit, 6 5/8" REG L.H. connections upper kelly cock. One (1)MM 4" IF lower kelly cock, with crossovers to suit drill collars
50.	Top drive system	N/A.
51.	Mud saver	Kelly-kan mud bucket with a complete set of sized seals to suit contractors drilling string.
52.	Handling tools for drill string	One (1) set 4 1/2" BJ Drill Pipe Elevators, 350T. One (1) set 4-1/2" Varco SDXL drill pipe slips c/w dies for 4 1/2" pipe. One (1) set 3 1/2" SDML Drill pipe slips One (1) set Varco DCS-R Drill Collar Slips, c/w inserts and dies for pipe diameter 4.3/4" – 7". One (1) Varco MP-R multi-purpose safety clamp, c/w links and dies to suit tubulars 4" – 10-1/2". One (1) set VARCO HT-65 Safety Tongs, c/w jaws to suit 3-1/2" to 11 1/4" tubulars. One (1) set Varco DCS-L Drill Collar slips c/w dies for pipe diameter 6 3/4" to 8 1/4"
53.	Handling tools for casing	One (1) only Farr Model LW-13625 (13 5/8") hydraulic Power Tong. C/w Jaws for 4", 4.1/2", 5 1/2", 7", 7 5/8" 8 5/8", 9 5/8" Casing. Suitable jaws for VARCO HT-65 manual back up tong for 3-1/2" to 11 1/4" tubulars. One (1) only VARCO 5-1/2" SMX 150 Ton Side door Casing elevators One (1) only BJ 5-1/2" 5 Ton Single joint elevators One (1) set 5-1/2" VARCO SDX Casing slips One (1) only VARCO 7" SLX 150 Ton Side door Casing elevators One (1) set 7" VARCO CMS-XL Casing Slips One (1) only 7" 5 Ton single joint casing elevators. One (1) set 9 5/8" AOT SLX 150 ton Side door Casing Elevators One (1) set 9 5/8" 5 ton AOT single joint elevators One (1) set 9 5/8" Varco CMS-XL Casing slips
54.	Handling tools for tubing	Elevators and slips for 2.7/8" tubing.

	Component	Description
55.	Casing thread protectors	1 X 4 ½" Klampon Casing Protectors 3 X 5 ½" Klampon Casing Protectors 2 X 7" Klampon Casing Protectors 3 X 9 5/8" Klampon Casing Protectors
56.	Drillstring, casing and tubing drifts	None
57.	Chrome tubing running equipment	None
58.	Fishing equipment	One (1) only 8 1/8" Bowen F.S. series 150 overshot. One (1) only 6 ¼" Bowen Type "Z" Hydraulic Jar. One (1) only 5" OD Reverse Circulating Junk basket Grapple assemblies to fish down hole equipment furnished by the contractor.
59.	Rig instrumentation and recording system	One (1) Martin Decker type "FS" weight indicator c/w Hercules Model 118 wireline anchor and E542 compression load sensor. One (1) Martin Decker type "FA9" Rotary indicator assembly. Three (3) 2" Martin Decker GM6A pressure sensor units. One (1) Martin Decker H6D (B) series tong line pull indicator system
60.	Kick detection system	Via PASON monitoring system with audible alarms, field programmable for deviation in flow sensor position, mud totaliser, trip tank movement.
61.	Trip tank monitoring	One (1) Trip tank 2.9m W x 1.0m L x 2.0m H. (Capacity: 36 barrels), monitored through PASON system & mechanical trip tank gauge.
62.	Portable gas detector system	One (1) Micro Clip GasAlert portable gas detector with CO, H2S, O2, LEL (combustible) indicators.
63.	Mud testing equipment	Baroid Portable Rig Lab #821, consisting of the following major components: Mud Balance, Marsh Funnel, 1000 ml measuring cup, Stop watch, Filter Press, thermometer, indicator paper and solutions.
64.	Eye wash station & chemical shower	One (1) emergency shower and eye wash station mounted on the suction tank near the chemical mixing area. & Caustic mixing area.on Shaker tank. Three (3) portable eye wash stations, located on the rig floor, on the mud tanks and at the tradesmen's workshop.
65.	Rig internal communications system	Five (5) station Gaitronics TS958 rig phone system. Three (3) Uniden 40 channel, handheld UHF radios for Rig Move co-ordination.

	Component	Description
66.	Compressors	ONE (1) Sullair model 10B-25, 125 psi, 105 cfm, rotary screw air compressor driven by 25 HP, 1750 RPM, 3Φ electric induction motor, with 3' diameter x 4' long air receivers. ONE (1) Sullair model 3009A, 125 to 135Psi working pressure, 40 HP, 1765 RPM @ 60 Ht. One (1) Swan SVU-203 Proair Cold start compressor, Powered by Yanmar L70-AE
67.	High pressure washer	One (1) Spitwater WS2S2 water blaster pump, driven by 7 HP, 1450 RPM, 3Φ electric induction motor. Operating pressure 2,500 psi (regulated), max pressure 3,000 psi.
68.	Doghouse	One (1) Dog house 12' x 8', Air-Conditioned with Rig Floor Tool kit, instrumentation and recording devices. Self-elevating on transport skid.
69.	Store rooms & Workshops.	Two (2) 40' skid mounted whitehouse consisting of the following: One (1) 20' x 8' spares and oilfield consumables store. One (1) 10' toolhouse and Derrickhand's parts store. One (1) 10' Air-conditioned Rubber consumables store. One (1) 15' Mechanics workshop One (1) Tradesman's Parts Storage. One (1) welder's workshop. One (1) Electricians Workshop
70.	Rig floor fans	Nil
71.	Wire line unit	SAME AS ITEM 100
72.	Welding equipment	One (1) welders workshop (on Store room skid) complete with toolbox, pedestal drill, vice, bench grinder and work bench. Full set of welder's safety equipment. One (1) 30 foot Steel storage Skid. 1 x Portable Diesel Welding Machine One (1) set of Oxy-Acetylene.
73.	Hand tools	One (1) complete Rig Floor Tool Kit. One (1) complete Mechanic Tool Kit. One (1) complete Electricians Tool Kit.
74.	Fuel storage tanks	One (1) Fuel Storage Tank – 42000 Litres, with oil storage tank. One (1) Day tank – 12,000Ltrs mounted above water tank,
75.	Water storage tanks	One (1) Steel unit 33' x 10' x 8' high (capacity:457 barrels) w/- two (2) only 2 ½" x 2" water pumps mounted power by 10 HP electric motors, mounted on end of skid.
76.	Oil and lubricants storage	Two (2) waste oil tanks, Cap. 600 litres each. One (1) four compartment oil storage tank (Incorporated into 42k fuel storage tank)

	Component	Description
77.	Drill water transfer pump	One (1) 2" x 3" Harrisburg 118 centrifugal pump, driven by 10 HP, 1450 RPM, 3Φ electric induction motor.
78.	Sump water transfer pump	SAME AS ITEM 77
79.	Fire extinguishers	One (1) set extinguishers required to comply with State Regulations, comprising one (1) 50 kg dry powder and an assortment of personal 5 & 9 kg dry powder, CO2 and Foam for rig and camp. 2 kitchen fire blankets and 2 camp hose reels.
80.	Breathing apparatus	Eight (8) Escape set, 10 minute SCBA evacuation breathing apparatus. Located on mud tanks and in dog house.
81.	Safety equipment	One (1) set of safety signs, including site entrance, PPE, non smoking, muster points, parking areas, high pressure, man in mast, overhead work and location specific hazard and warning signs. One (1) derrick escape geronimo. Two (2) lifting stretchers. Two (2) lifting harness. Five (5) safety harnesses with lanyard. Two (2) crown mounted fall arrester, One (1) sub base mounted fall arrester. One (1) sub-base lanyard runner for multiple men safe work on BOP's. One (1) derrick climbing static line. One (1) emergency response plan. One (1) Confined Space Rescue Gantry for Mudtank Rescue. One (1) Confined Space Rescue Stretcher. One (1) Height rescue kit
82.	Alarm system	Personal smoke detectors installed in all rig site sleeping quarters. One (1) Bender IR475LY-60 ground fault monitor. Driller activated horn. Remote horn – Rig Managers office. Emergency shutdown system – located at the Rig managers office.
83.	Onsite forklift	One (1) Volvo L90 front end loader c/w bucket, forklift tynes and lifting jib (stinger).
84.	Contractors vehicles	One (1) ISUZU 4 x 4 utility light truck vehicle fitted with radio communications. One (1) Nissan Patrol 4 x 4 crew wagon fitted with radio communications.
85.	Rig moving equipment	Removed from rig
86.	Garbage Bailer	One (1) Elephants foot grocery carton bailer.
87.	First Aid equipment	One (1) small first aid kit per vehicle and in Rig Manager's office, Dog House & Smoko shack

	Component	Description
88.	Crown Block	Crossover type Crown Block with 1 x 42" diameter and 5 x 36" diameter sheaves to suit 1-1/8" wire rope line. Crown fitted with Bumper block (Timbers enclosed by Mesh) Capacity: 10 lines to block 358,000 lbs. 8 lines to block 343,000 lbs. 6 lines to block 315,000 lbs.
89.	Catheads Contingency catheads if required	Hydraulic, Meyers Engineering make up (IH-564) and breakout (IH-565) Ram type catheads mounted in the mast. REMOVED FROM RIG CIRCA 2002
90.	Elevator Links.	One (1) set Joy 350T elevator links. 108" long x 2-3/4" diameter.
91.	Pipe Spinner	One (1) only Grayspin Mark 10 Suitable for 2-7/8" to 7" tubulars.
92.	Wireline Survey Unit	One (1) only Mathey hydraulic drive retriever unit, c/w 0.092" slickline wire & depth measuring meter.

2. Wellsite Accommodation Specifications

	Component	Description
1.	Offices for Wellsite personnel	One (1) fully furnished well site office unit comprising of 1 x Company Representative office, 1 x Rig Manager's office, 1 x Tradespersons office.
2.	Offices and accommodation for Wellsite personnel	One (1) accommodation unit with one (1) bedroom facility for Rig Manager with ensuite, one (1) bedroom facility for Company Representative with shared bathroom, one (1) bedroom facility for nominated company personnel with shared bathroom. One (1) fully furnished well site accommodation and office unit comprising one office, one mud lab and two bedrooms with shared ensuite for two (2) designated personnel.
3.	Air conditioning equipment	All Wellsite Accommodation & offices equipped with Air-conditioning
4.	Contractors communications system	One (1) Australian Sat Services Sat Phone One (1) Canon MP830 scanner, photocopier. One (1) IBM laptop computer. One (1) Digital camera.
5.	Rig crew rest area	One (1) Skid Mounted unit.
6.	Septic unit	1 x KJM Domestic Wastewater septic unit (or equivalent) at wellsite accommodation unit.

3. Camp Specifications

	Component	Description
1.	Power generation system	Two (2) Caterpillar 3306 diesel prime movers and generator sets fully skid mounted and portable.
2.	Air conditioning equipment	All rooms, kitchen and diner have individual air conditioners with individual controls. Rated for desert conditions.
3.	Kitchen facilities	Fully equipped, self contained kitchen to cater for in excess of 38 persons on a 24 hour basis. CAMP EQUIPMENT: 1 – 38 Person camp fully furnished with shared en-suite facilities per two rooms, fully air conditioned with recreation room. 1 – Camp Support Unit comprising generators, fuel and water tanks and camp equipment
4.	Food storage facilities	1 – Cooler/Freezer/Storeroom. And dry goods storage areas. Ice Machine.
5.	Dining facilities	Dining room is capable of sitting 18 persons at any one time.
6.	Laundry facilities	Full laundry is provided to support the operations. Fully equipped with Maytag washers and dryers.
7.	Toilet & washroom facilities	All rooms in the camp are fully furnished and contain 2 x beds per room with shared ensuite facilities per two rooms. 1 x Spare Toilet and shower
8.	Female facilities	As above. As all rooms have ensuite facilities, all rooms can accommodate either males or females.
9.	Entertainment facilities	Air conditioned: * Recreational room with large screen TV, DVD player and lounge chairs. * Computer room and library
10.	Camp communications system	1 – Full UHF communications system between camp and the rig and support vehicles is provided. Equipped with Telephone & Wireless Internet Access.
11.	Fuel storage tank	14000 Litre tank. Skid mounted.
12.	Potable water storage tank	1 x 24000 litres, 1 x 23000ltrs
13.	General water storage tank	AS ABOVE

	Component	Description
14.	Fire extinguishers	To meet legislative requirements. Each room is equipped with local and remote indicating / alarm 240 V and battery back up smoke detectors.
15.	First Aid equipment	1 – Comprehensive first aid box is maintained in the kitchen area. All camp staff are first aiders.
16.	Septic system	Quick connecting PVC drain lines feed all septic wastes to Operator supplied septic unit

NOTE: At Contractor's discretion any of the foregoing items may be replaced by equipment of equivalent or greater capacity.

ENCLOSURE I: COMPOSITE LOG

ENCLOSURE II: MUDLOG

ENCLOSURE III: DEPTH STRUCTURE MAP

ENCLOSURE IV: WELL EVALUATION SUMMARY PLOT