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## SANTOS LIMITED

(A.B.N. 80007 550 923)

# WEST MEREENIE 19

# WELL COMPLETION REPORT

Prepared By:
Simon Ostler
June, 2014

# WEST MEREENIE 19 WCR

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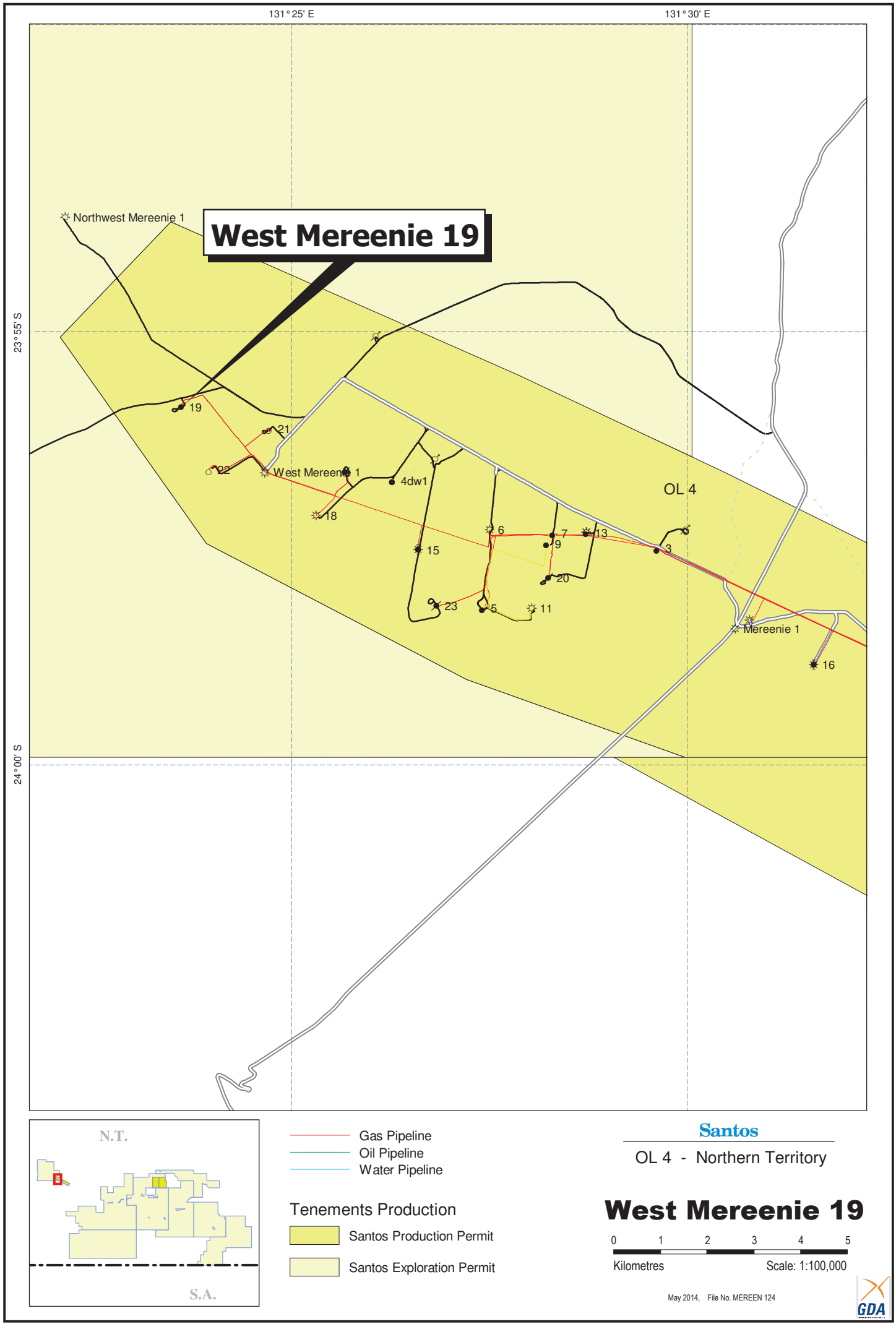
# LOCATION MAP


131° 25' E
131° 30' E
23° 55' S
24° 00' S
Northwest Mereenie 1
West Mereenie 19
19
21
22
West Mereenie 1
4dw1
18
15
6
7
9
13
3
20
23
5
11
OL 4
Mereenie 1
16
N.T.
S.A.
Gas Pipeline
Oil Pipeline
Water Pipeline
Tenements Production
Santos Production Permit
Santos Exploration Permit
Santos
OL 4 - Northern Territory
West Mereenie 19
0 1 2 3 4 5
Kilometres
Scale: 1:100,000
May 2014, File No. MEREEN 124
GDA

# WELL DATA CARD

| | | | | | |
|---|---|---|---|---|---|
| **WELL:** WEST MEREENIE 19 | **WELL CATEGORY:** Appraisal | **SPUD:** 02:00 hrs 01/07/2013 with rig Boart Longyear WW07 | | | |
| | **WELL INTENT:** Oil and Gas | **RIG RELEASE TOP HOLE:** 24:00 hrs 10/07/2013 | | | |
| **LAT:** 23º 55' 52.28" S **LONG:** 131º 23' 36.46" E **(GDA 94)** | | **RE-ENTRY:** 14:45 hrs 19/11/2013 with rig Ensign 918 | | | |
| **SEISMIC LOCATION:** Line M87-02, SP 1344 | | **T.D.:** 02:00 hrs 01/12/2013 | | | |
| **ELEVATION GND:** 731.35 m **RT:** 736.50 m | | **RIG RELEASED:** 13:30 hrs 11/12/2013 **COMPLT:** 29/04/2014 | | | |
| **BLOCK / LICENCE:** Mereenie Block / OL 4, Northern Territory | | **RIG: Top Hole:** Boart Longyear WW07 **Bottom Hole:** Ensign 918 | | | |
| **TD:** 1512 m **(Logger Extrap.)**, 1511 m **(Driller)** | | **STATUS:** Single Completion Oil Well (SCO) | | | |
| **PBTD:** 1495 m **(Driller)** **TOP HOLE TD:** 523 m **(Driller)** | | | | | |
| **TYPE STRUCTURE:** Anticline | | **HOLE O.D** | **CSG SIZE** | **SHOE DEPTH** | **TYPE** |
| **TYPE COMPLETION:** Conventional 2 3/8" 4.7 lb/ft J55 EUE | | 12 ¼" to 523m | 9 5/8" | 520m (D&L) | K-55 BT&C 36# |
| **ZONES:** Pacoota P3-120/130 | | 8 ¾" to 1248m | 5 ½" | - | - |
| | | 8 ½" to 1511m | 5 ½" | 1507.9m (D) | L-80 BT&C 17# |

| AGE | FORMATION OR ZONE TOPS | LOGGER DEPTHS (m) | | THICKNESS TVD (m) | PROG (H) or (L) |
|---|---|---|---|---|---|
| | | MD (RT) | TVD (SS) | | |
| EARLY DEVONIAN TO SILURIAN | MEREENIE SANDSTONE | 5.2 | +731.4 | 401.8 | - |
| LATE ORDOVICIAN | CARMICHAEL SANDSTONE | 407.0 | +329.5 | 90.0 | 2.5 m L |
| LATE ORDOVICIAN | UPPER STOKES SILTSTONE | 497.0 | +239.5 | 285.4 | 16.5 m H |
| MID ORDOVICIAN | LOWER STOKES SILTSTONE | 782.4 | -45.4 | 78.6 | 11.6 m H |
| MID ORDOVICIAN | UPPER STAIRWAY SANDSTONE | 861.3 | -124.0 | 65.1 | 11.0 m H |
| MID ORDOVICIAN | MIDDLE STAIRWAY SANDSTONE | 926.6 | -189.1 | 116.2 | 8.1 m L |
| MID ORDOVICIAN | LOWER STAIRWAY SANDSTONE 2 | 1043.2 | -305.3 | 58.4 | 0.3 m L |
| MID ORDOVICIAN | LOWER STAIRWAY SANDSTONE 1 | 1101.7 | -363.6 | 29.3 | 0.6 m L |
| EARLY ORDOVICIAN | HORN VALLEY SILTSTONE | 1131.1 | -393.0 | 80.4 | 1.0 m H |
| EARLY ORDOVICIAN | PACOOTA SANDSTONE P1 | 1211.7 | -473.3 | 108.6 | 0.3 m L |
| EARLY ORDOVICIAN | PACOOTA SANDSTONE P2 | 1320.7 | -581.9 | 72.2 | 2.1 m H |
| EARLY ORDOVICIAN | PACOOTA SANDSTONE P3 | 1393.2 | -654.0 | 88.3 | 1.0 m L |
| EARLY ORDOVICIAN | PACOOTA SANDSTONE P3-120/130 | 1427.3 | -688.0 | - | 1.0 m L |
| EARLY ORDOVICIAN | PACOOTA SANDSTONE P4 | 1481.9 | -742.3 | 29.0+ | 8.3 m L |
| | **TOTAL DEPTH (Logger Extrap.)** | **1512.0** | **-771.3** | | |

| LOG INTERPRETATION (Category 1 – Proved Producibility) | | | | | PERFORATIONS (60° phase, 6 spf) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **FORMATION / SAND** | **INTERVAL (m)** | **NET PAY (m)** | **$Ø_T$ %** | **$SW_T$ %** | **FORMATION** | | **INTERVAL (m)** | | |
| **GAS** | | | | | Pacoota P3-120/130 | | 1431 - 1449 | | |
| Upper Stairway Sandstone | 898.8 - 926.6 | 4.57 | 8.2 | 49.5 | | | | | |
| Pacoota P1-80 | 1237.1 - 1244.4 | 3.92 | 6.8 | 16.5 | | | | | |
| Pacoota P1-210 | 1273.3 - 1281.5 | 0.61 | 6.7 | 8.9 | | | | | |
| Pacoota P1-280 | 1296.7 - 1302.2 | 1.98 | 7.5 | 9.5 | | | | | |
| Pacoota P1-310 | 1302.2 - 1315.3 | 1.87 | 6.4 | 15.7 | | | | | |
| Pacoota P1-350 | 1315.3 - 1320.7 | 0.61 | 5.5 | 13.7 | | | | | |
| **TOTAL GAS** | | **13.56** | **7.2** | **27.5** | | | | | |
| | | | | | | | | | |
| **OIL** | | | | | **CORES CUT** | | | | |
| Pacoota P3-120/130 | 1427.3 - 1445.9 | **0.38** | **9.0** | **45.8** | **FM.** | **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** | 1 / 1 | | 63.3°C / 23.75 hrs | **PRESSURE SURVEY** | 1 / 4 | | 61.6°C / 75.25 hrs |
| GR-HGNS | | 1497 - surf. | | GR-MDT | | 913 - 1465.8 | 50: 18 valid, 15 |
| HRLA | | 1507 - 520 | | | | | curtailed, 17 seal |
| MCFL | | 1496 - 520 | | | | | fail. 1x4L sample. |
| CNL | | 1499 - 520 | | | | | 5 x 0.42 L samples. |
| TLD | | 1501 - 520 | | | | | |
| SP | | 1484 - 520 | | **SIDEWALL CORES** | 1 / 5 | | 61°C / 100.75 hrs |
| | | | | GR-MSCT | | 1445.7 - 1135.7 | Cut 26: recovered |
| **FMI-SSCAN** | 1 / 2 | | 61.2°C / 32 hrs | | | | 25, lost 1. |
| FMI | | 1512 - 850 | | | | | |
| SSCAN | | 1512 - 850 | | **SIDEWALL CORES** | 1 / 6 | | |
| | | | | GR-MSCT | | 1102.6 - 862.9 | Cut 24: recovered |
| **ECS-CMR** | 1 / 3 | | 64.3°C / 41 hrs | | | | 24. |
| ECS | | 1512 - 850 | | | | | |
| CMR | | 1512 - 850 | | **DST CORRELATION** | 1 / 7 | | DST 1 |
| | | | | GR-CCL | | 1295 - 1200 | |
| | | | | | | | |

**FORMATION TESTS**

| No. | INTERVAL (m) | FORMATION | FLOW (mins) | SHUT IN (mins) | OUTSIDE GAUGE IP / FP (psia) | SIP (psia) | MAX SURF PRESS (psia) | FLUID TO SURF (mins) | TC/ BC (“) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1391.6 – 1433.3 (D)<br>1391.7 – 1433.4 (L) | Pacoota P3 | 360 | 110 | 30.1 / 28.5 | 191 | 0 | NFTS | 0.5/1 | Rec: 1 bbl. Rat-hole mud and 1.5 bbl SWCM and trace OCM. |

**SUMMARY:**

**Location**

West Mereenie 19 was drilled as a vertical oil and gas appraisal well in OL 4, Northern Territory. It is located along the ridge of the western nose of the field, down-dip of the producing West Mereenie 1 gas well. The well was situated 2.3 km north-west of West Mereenie 1 and 4.8 km south-east of Northwest Mereenie 1.

**Objectives**

The primary targets of West Mereenie 19 were the oil reservoirs of the Pacoota P3 (120/130, 190/230/250) sandstone. Best sand development in offsets was within P3-130. West Mereenie 19 was planned to intersect the P3-120/130 sequence 100' below OGOC. A key objective is to establish an OWC (or LKO/HKW) on the western nose of the field. Drilling results will help define the structural extent of the western nose and scale of potential follow-up drills. Secondary targets were for oil within the Pacoota P3 (10/7/90/150) and Pacoota P4 reservoirs, with gas from the Pacoota P1 reservoirs and from the Lower Stairway Formation. Contingent upon West Mereenie 19 mean case success, up to 4 wells will be required to fully develop the West Mereenie Nose area. The location of the first follow up will be determined by reservoir quality of primary and secondary P3 objectives and post drill structural mapping. There are both up-dip & down-dip step-out locations and nose-flank locations to consider. The main risk factors for West Mereenie 19 were identified as structural uncertainty and the Pacoota P3 oil column height.

**Results of Drilling**

West Mereenie 19 was spudded at 02:00 hours on 1st July, 2013. The Boart Longyear rig WW7 drilled a 12 ¾" surface hole vertically to 523m. A string of 9 5/8" casing (36 # K55 BTC) was run and cemented with the shoe at 520m (D). The well was suspended for further deepening at 24:00 hours on 10th July, 2013 and the rig released.

The well was re-entered at 14:45 hours on 19th November, 2013 with Ensign rig 918. An 8 ¾" production hole was air drilled vertically to 1248m. From 1248m an 8 ½" production hole was mud drilled to T.D. of 1511m (D) with numerous bit changes, reached at 02:00 hours on 1st December, 2013. After performing a wiper trip to the surface casing shoe, then pulling out of hole to surface, the following suite of Schlumberger wire-line logs were run: 1) PEX (GR-HGNS-HRLA-MCFL-CNL-TLD-SP); 2) FMI-SSCAN; Run 3) ECS-CMR; Run 4) MDT-GR (50 points: 18 valid, 15 curtailed, 17 seal failures); Run 5) GR-MSCT (26 cut: 25 recovered, 1 lost); Run 6) GR-MSCT (24 cut: 24 recovered). After the completion of logging a full wiper trip was completed. An inflate straddle DST was attempted over the upper 40m of the Pacoota P3 sandstone from 1391.7m to 1433.4m. There was no flow of fluid or gas to surface, with a recovery of rat-hole mud with slightly water cut and trace oil cut mud.

During air drilling the first occurrence of significant gas flow came from 924m, just above the Middle Stairway Sandstone. The well flowed from 2.5 to 3.6 MMcfd throughout the Middle and Lower Stairway Sandstones until the flare went out and the well was killed at 1094m due to a wash-out in the blooie line. The blooie line was repaired and the fluid was unloaded from the well. From 1130m to 1230m in the Horn Valley Siltstone to the top of the Pacoota P1 Sandstone, there was a continuous gas flow of between 2.5 to 3.0 MMcfd. From 1230m to 1243m the well flow increased to 10.5 to 11.5 MMcfd from the top of the Pacoota P1 sandstone until the well was killed at 1243m due to another wash-out in the blooie line. The remainder of the well was rotary drilled with mud.

The primary target Pacoota P3 sandstone top was intersected 1.0m low to prognosis and 100.7m low relative to West Mereenie 1**.** The reservoir was a moderately developed fine to occasionally medium grained sandstone, with a minor fluorescence show and associated rich, elevated gas levels within the upper 2m of sequence. No further significant fluorescence or gas shows were observed through the Pacoota P3 or Pacoota P4 Sandstone in West Mereenie 19. MDT points within the Pacoota P3 120/130 and 150 sands were indicative of tight reservoirs, with only poor mobilities. Reservoir pressures were close to virgin within the Pacoota P3 120/130 sands.

Formations were penetrated both high and low to prognosis, ranging from the Pacoota P4 sandstone which was penetrated 8.3m low to prognosis, to the Upper Stokes Siltstone which was 16.5m high to prognosis. All formation tops were intersected significantly down-dip of the nearby West Mereenie 1, ranging from 79m low (Upper Stokes Siltstone) to 106.4m low (Pacoota P4).

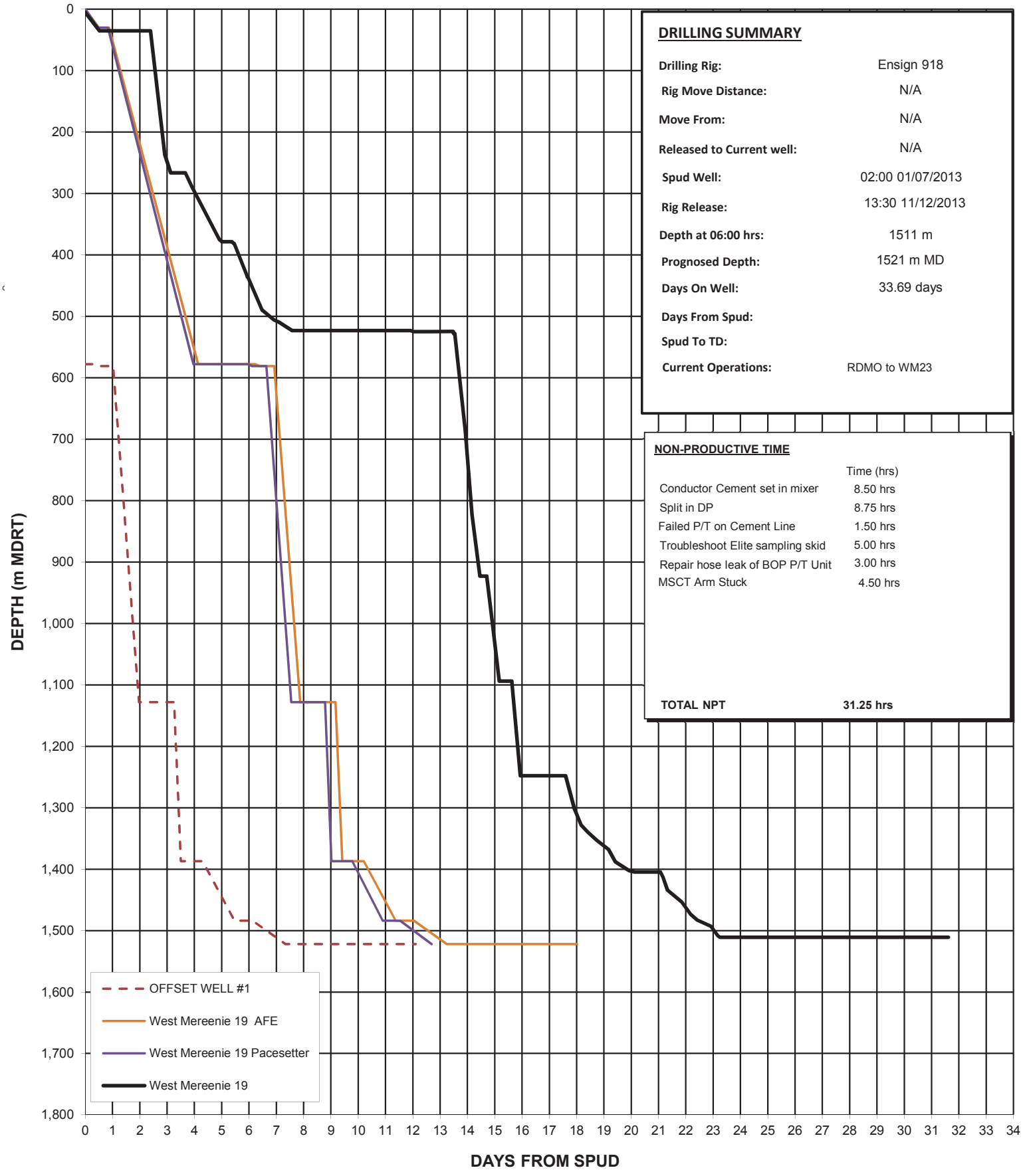
**Status**

A string of 5 ½" production casing was run in hole and cemented with the shoe at 1507.9m. Ensign 918 was released from West Mereenie 19 on the 11th of December, 2013. The well was completed as a 'Single Completion Oil Well' (SCO) in April, 2014 with conventional 2 3/8" 4.7 lb/ft J55 EUE tubing The Pacoota P3-120/130 sands were perforated from 1431m to 1449m with a 3 ½" TCP 60° phase 6 spf gun and HMX 23g charges .

**Author:** S. Ostler | **Date:** June, 2014

# TIME vs DEPTH CURVE

# West Mereenie 19
## TIME DEPTH CURVE




**DRILLING SUMMARY**

| | |
|---|---|
| **Drilling Rig:** | Ensign 918 |
| **Rig Move Distance:** | N/A |
| **Move From:** | N/A |
| **Released to Current well:** | N/A |
| **Spud Well:** | 02:00 01/07/2013 |
| **Rig Release:** | 13:30 11/12/2013 |
| **Depth at 06:00 hrs:** | 1511 m |
| **Prognosed Depth:** | 1521 m MD |
| **Days On Well:** | 33.69 days |
| **Days From Spud:** | |
| **Spud To TD:** | |
| **Current Operations:** | RDMO to WM23 |

**NON-PRODUCTIVE TIME**

| | Time (hrs) |
|---|---|
| Conductor Cement set in mixer | 8.50 hrs |
| Split in DP | 8.75 hrs |
| Failed P/T on Cement Line | 1.50 hrs |
| Troubleshoot Elite sampling skid | 5.00 hrs |
| Repair hose leak of BOP P/T Unit | 3.00 hrs |
| MSCT Arm Stuck | 4.50 hrs |
| **TOTAL NPT** | **31.25 hrs** |

# WELL HISTORY

## 1. GENERAL DATA

| | |
|---|---|
| Well Name: | West Mereenie 19 |
| Well Classification: | Oil / Gas Appraisal |
| Participation Factor: | Santos Group 100% |
| Block: | Mereenie |
| Licence: | OL 4 |
| Operator: | Santos Ltd. |
| Surveyed Location: (ANS, MGA 94) | Latitude: 23° 55' 52.28" S<br>Longitude: 131° 23' 36.46" E |
| Surveyed Elevation: (AHD)<br>Seismic Location: | Ground Level: 731.35 m<br>Rotary Table: 736.50 m<br>SP 1344 on Line M87-02 |
| Total Depth | Driller: 1511 m<br>Logger (Extrapolated): 1512 m |
| Status: | Cased and completed as a 'Single Completion Oil Well' - Pacoota Sandstone P3 oil producer. |

## 2. DRILLING DATA

Date Drilling Commenced: 02:00 hours, 1st July, 2013. Rig: Boart Longyear WW07 to 523m.

Date Rig Release Top Hole Section: 24:00 hours, 10th July, 2013.

Date Re-entry: 14:45 hours, 19th November, 2013. Rig: Ensign Drilling Rig 918.

Date Drilling Completed: 02:00 hours, 1st December, 2013.

Date Rig Released: 13:30 hours, 11th December, 2013.

Rig Specifications (Ensign 918): Refer to Appendix XIII.

## 3. DRILLING SUMMARY

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

West Mereenie 19 commenced operations at 02:00 hours on the 1st of July, 2013. A 12 ¼" surface hole was air hammer drilled to 523m with rig Boart Longyear WW7. The well was re-entered at 14:45 hours on the 19th of November, 2013 with rig Ensign 918. A 8 ¾" production hole was air hammer drilled to 1248m, then 8 ½" hole was rotary mud drilled to 1511m (T.D.).

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

**TABLE I: CASING, HOLE, AND CEMENT DETAILS**

| BIT SIZE | DEPTH | CASING SIZE | CASING DEPTH | JNTS | CASING TYPE | CEMENT |
|---|---|---|---|---|---|---|
| | | 17 ½" | 30 m | | Conductor | |
| 12 ¼" Hammer (air/mist) | 523 m | 9 5/8" | 520 m | 45 | 36 # K-55 BTC | Lead: 77 bbls class A cement @ 11.8 ppg slurry. Tail: 25 bbls class A cement @ 15.6 ppg slurry. |
| 8 ¾" Hammer (air/mist) | 1248 m | | | | | |
| 8 ½ " PDC (mud) | 1511 m | 5 ½" | 1507.9 m | 124 | 17# L-80 BTC | Lead: 86 bbls class A cement @ 11.8 ppg slurry. Tail: 154 bbls class Litecrete cement @ 12.0 ppg slurry. |

**TABLE II: SUMMARY OF MUD SYSTEMS**

| MUD TYPE | INTERVAL (m) |
|---|---|
| Air/foam mist (15-20 gallons/min water) | Surface – 523 |
| Air/foam mist (30 gallons/min water) | 523 - 1248 |
| 6% NaCl/Polymer | 1248 - 1511 |

### (b) Lost Time

Specific lost time details for West Mereenie 19 are found in Appendix XII – Drilling Summary. West Mereenie 19 was drilled, evaluated and cased in a total of approximately 29 days, which included 7.5 days to drill and case surface hole to 523m with rig Boart Longyear WW7. The well was programmed to take a total of 18 days to drill, evaluate, case and suspend.

## (c) Water Supply

Make up water was trucked from West Mereenie 15 water bore, 6 km to the south-east of the well.

## (d) Mudlogging Services

Geoservice provided Mudlogging services for production hole only. Samples were collected, washed and described at 15m intervals from surface to 615m and 765m to 855m, at 6m intervals from 855m to 924m. Samples were collected, washed and described at 3m intervals from 1248m to 1511m (T.D).

From 615m to 765m, no samples were collected due to blooie-line sampler blockage. From 924m to 1248m, no samples were collected due to personnel safety concerns with a significant blooie-line gas flare. From 1248m to T.D., samples were collected from the mud shakers (rotary mud drilling),

All samples were checked for oil shows using an ultraviolet fluoroscope. Gas levels and compositions were monitored from 520m to TD using a FID total gas detector and FID gas chromatograph. Other parameters monitored included rate of penetration, mud pit levels, rotary torque, hook load/weight on bit and pump strokes. There were no instrument failures noted while drilling West Mereenie 19, although the blooie-line gas collection trap was occasionally swamped with water/foam and cuttings, resulting in lower gas readings.

## (e) Testing

One open hole Drill Stem Test (DST) was attempted at West Mereenie 19. Full DST results are available in Appendix VII of this report).

**TABLE III: OPEN HOLE FLOW TEST RESULTS**

| DST | INTERVAL / TEST TYPE | TESTING Co. | RESULTS |
|---|---|---|---|
| 1 (I.S.) | 1391.6m - 1433.3m (D)<br>1391.7m - 1433.4m (L) | Pro-Test | NFTS.<br>Rec: 1.0 bbl. RHM and 1.5 bbls. SWCM with trace oil. |

There were also six open hole flow tests run as summarised in the table below.

## TABLE IV: SUMMARY OF FLOW TEST OPERATIONS

| FLOW-TEST DEPTH | GAS FLOW RATE | MUD LOG GAS PEAK (Composition) |
|---|---|---|
| | Gas flare commenced @ 924m. | |
| 924m | **Middle Stairway Sandstone.**<br>Maximum gas flare rate = 2.5 MMcfd. (3-4m long flare). | 2192 U<br>(81/12/4/2/1) |
| 966m | **Middle Stairway Sandstone.**<br>Maximum gas flare rate = 3.0 MMcfd. (3-4m long flare). | 1197 U<br>(81/12/4/2/1) |
| 985m | **Middle Stairway Sandstone.**<br>Maximum gas flare rate = 3.6 MMcfd. (3-4m long flare). | 1685 U<br>(81/12/4/2/1) |
| 994m - 1094m | Flow meter washed out and un-readable. | 1730 U @ 1076m<br>(81/12/4/2/1) |
| 1100m - 1129m | Flare out. No flow readings possible due to un-burnt gas in area. | Gas detector swamped. |
| 1129m | **Lower Stairway Sandstone 1.**<br>Maximum gas flare rate = 2.5 MMcfd. | Gas detector swamped. |
| 1182m | **Horn Valley Siltstone.**<br>Maximum gas flare rate = 2.75 MMcfd. | 1198 U @ 1173m<br>(82/12/4/1/1) |
| 1215m | **Pacoota P1-40 Sandstone.**<br>Maximum gas flare rate = 2.7 MMcfd. | 1078 U @ 1208m<br>(82/12/4/1/1) |
| 1218m | **Pacoota P1-40 Sandstone.**<br>Maximum gas flare rate = 3.0 MMcfd. | 300 U<br>(82/12/4/1/1) |
| 1225m | **Pacoota P1-40 Sandstone.**<br>Maximum gas flare rate = 2.7 MMcfd. | 100 U @ 1220m<br>(82/12/4/1/1) |
| 1243m - 1248m | **Pacoota P1-80 Sandstone.**<br>Maximum gas flare rate = 11.5 MMcfd @ 1248m.<br>(significant increase to 8-10m gas flare). | 3807 U @ 1248m<br>(80/13/4/2/1) |
| 1248m | Pipe washed out in flow meter skid. Shut in and kill well with mud. | |

### (f) Coring

No Full Hole Cores were cut at West Mereenie 19.

### (g) Electric Logging

One suite of electric logs was run in West Mereenie 19, as detailed below:

## TABLE V: ELECTRIC LOGGING SUMMARY

| TYPE OF LOG | SUITE / RUN | INTERVAL (m) | BHT / TIME / REMARKS |
|---|---|---|---|
| **PEX** | 1 / 1 | | 63.3°C / 23.75 hours |
| GR-HGNS | | 1497 - surface | |
| HRLA | | 1507 - 520 | |
| MCFL | | 1496 - 520 | |
| CNL | | 1499 - 520 | |
| TLD | | 1501 - 520 | |
| SP | | 1484 - 520 | |
| | | | |
| **FMI-SSCAN** | 1 / 2 | | 61.2°C / 32 hours |
| FMI | | 1512 - 850 | |
| SSCAN | | 1512 - 850 | |
| | | | |
| **ECS-CMR** | 1 / 3 | | 64.3°C / 41 hours |
| ECS | | 1512 - 850 | |
| CMR | | 1512 - 850 | |
| | | | |
| **PRESSURE SURVEY** | 1 / 4 | | 61.6°C / 75.25 hours |
| GR-MDT | | 913 - 1465.8 | 50 points: 18 valid, |
| | | | 15 curtailed, 17 seal fail. |
| | | | 1 x 4 L sample. |
| | | | 5 x 0.42 L samples |
| | | | |
| **SIDEWALL CORES** | 1 / 5 | | 61°C/100.75 hrs |
| GR-MSCT | | 1445.7 - 1135.7 | Cut 26: Recovered 25, lost 1. |
| | | | |
| | | | |
| **SIDEWALL CORES** | 1 / 6 | | |
| GR-MSCT | | 1102.6 - 862.9 | Cut 24: Recovered 24. |
| | | | |
| **DST CORRELATION** | 1 / 7 | | |
| GR-CCL | | 1295 - 1200 | |
| | | | |

### (h) Geothermal Gradient

An Extrapolated Bottom Hole Temperature of 64.8° C was calculated for West Mereenie 19 with a temperature gradient of 2.91°C/100m. See Appendix V for full details.

### (i) Hole Deviation

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

## (j) Velocity Survey

No Velocity Survey was run in West Mereenie 19.

## (k) Completion Summary

West Mereenie 19 was cased and suspended as a possible Stairway Sandstone and Pacoota Sandstone P1 gas well and Pacoota Sandstone P3 oil well. Production casing consisted of 124 joints of 17# L-80 BT&C, 5 ½" casing was run to a depth of 1507.9m and cemented.

The well was completed as a 'Single Completion Oil Well' (SCO) in April, 2014 with conventional 2 3/8" 4.7 lb/ft J55 EUE tubing The Pacoota P3-120/130 sands were perforated from 1431m to 1449m with a 3 ½" TCP 60° phase 6 spf gun and HMX 23g charges .

# GEOLOGY

## 1. PRE-DRILLING SUMMARY (After Well Proposal)

West Mereenie 19 was drilled as a vertical oil and gas appraisal well in OL 4, Northern Territory. It is located along the ridge of the western nose of the field, down-dip of the producing West Mereenie 1 gas well. The well was situated 2.3 km north-west of West Mereenie 1 and 4.8 km south-east of Northwest Mereenie 1. The primary targets of West Mereenie 19 were the oil reservoirs of the Pacoota P3 (120/130, 190/230/250) sandstone. Best sand development in offsets is in P3-130. West Mereenie 19 was planned to intersect the P3-120/130 sequence 100' below OGOC.

## 2. DRILLING RATIONALE (After Well Proposal)

A key objective is to establish an OWC (or LKO/HKW) on the western nose of the field. Drilling results will help define the structural extent of the western nose and scale of potential follow-up drills. Secondary targets were for oil within the Pacoota P3 (10/7/90/150) and Pacoota P4 reservoirs, with gas from the Pacoota P1 reservoirs and from the Lower Stairway Formation.

Contingent upon West Mereenie 19 mean case success, up to 4 wells will be required to fully develop the West Mereenie Nose area. The location of the first follow up will be determined by reservoir quality of primary and secondary P3 objectives and post drill structural mapping. There are both up-dip & down-dip step-out locations and nose-flank locations to consider. The main risk factors for West Mereenie 19 were identified as structural uncertainty and the Pacoota P3 oil column height.

The first objective of the drilling campaign was to appraise reservoir extent and fluid limits within the central and western areas of the Pacoota oil reservoirs and to bring oil on production in these undeveloped 2P oil reserves. Another objective of this campaign was to evaluate unconventional hydrocarbon resources in the Mereenie Field. These include recoverable gas from tight sandstones and organic shales in the Stairway Sandstone, Pacoota Sandstone and Horn Valley Siltstone.

## 3. RESULTS OF DRILLING

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

The stratigraphic sequence penetrated at West Mereenie 19 is summarised in the table below and discussed briefly following the table. Lithological descriptions of the cuttings samples collected at West Mereenie 19 are included as Appendix 1(a).

## TABLE VI: WEST MEREENIE 19 STRATIGRAPHY

| AGE | FORMATIONS | DEPTH MDRT (m) | ELEV. TVDSS (m) | THICK TVD (m) |
|---|---|---|---|---|
| L.SILURIAN-MID DEVONIAN | MEREENIE SANDSTONE | 5.2 | +731.4 | 401.8 |
| LATE ORDOVICIAN | CARMICHAEL SANDSTONE | 407.0 | +329.5 | 90.0 |
| MID-LATE ORDOVICIAN | UPPER STOKES SILTSTONE | 497.0 | +239.5 | 285.4 |
| MID ORDOVICIAN | LOWER STOKES SILTSTONE | 782.4 | -45.4 | 78.6 |
| MID ORDOVICIAN | UPPER STAIRWAY SANDSTONE | 861.3 | -124.0 | 65.1 |
| MID ORDOVICIAN | MIDDLE STAIRWAY SANDSTONE | 926.6 | -189.1 | 116.2 |
| MID ORDOVICIAN | LOWER STAIRWAY SANDSTONE 2. | 1043.2 | -305.3 | 58.4 |
| MID ORDOVICIAN | LOWER STAIRWAY SANDSTONE 1. | 1101.7 | -363.6 | 29.3 |
| EARLY ORDOVICIAN | HORN VALLEY SILTSTONE | 1131.1 | -393.0 | 80.4 |
| EARLY ORDOVICIAN | PACOOTA SANDSTONE P1 | 1211.7 | -473.3 | 108.6 |
| EARLY ORDOVICIAN | PACOOTA SANDSTONE P2 | 1320.7 | -581.9 | 72.2 |
| EARLY ORDOVICIAN | PACOOTA SANDSTONE P3 | 1393.2 | -654.0 | 88.3 |
| EARLY ORDOVICIAN | PACOOTA SANDSTONE P3-120/130 | 1427.3 | -688.0 | - |
| LATE CAMBRIAN-E. ORD. | PACOOTA SANDSTONE P4 | 1481.9 | -742.3 | 29.0+ |
| | **TOTAL DEPTH (Logger Extrap.)** | **1512.0** | **-771.3** | |

Samples were collected, washed and described at 15m intervals from surface to 615m and 765m to 855m, at 6m intervals from 855m to 924m. Samples were collected, washed and described at 3m intervals from 1248m to 1511m (T.D.).

A brief summary of the section penetrated in West Mereenie 19 (with associated depositional environments) is found below. For more detailed lithological descriptions refer to Appendix I (a).

Total depth for West Mereenie 19 was reached at 1512.0m (-771.3m TVDSS), 29.0m into the **PACOOTA SANDSTONE P4** (Late Cambrian to Early Ordovician). The section consists of a sequence of very fine to occasionally medium grained sandstone with minor interbedded argillaceous to carbonaceous siltstone. The sedimentary sequence is indicative of a low to occasionally moderate energy, marine shore-face to estuarine/tidal flat environment of deposition.

The overlying **PACOOTA SANDSTONE P3** (Early Ordovician) unit is thought to have initially been deposited in a bed load fluvial depositional environment that passed into deposition in a shoreface environment as relative sea level rose. The lower part of the P3 unit, the P3-120 and below, is representative of a the bed load fluvial deposition and consists of sandstone, very fine to medium grained, sub rounded, moderately well sorted, quartzose, with common iron staining, abundant quartz overgrowths and occasional lithic grains. Siliceous cement is common and porosity is described as poor.

The upper P3, a shoreface sandstone is predominantly very fine to fine grained, sub angular to sub rounded, well sorted with occasional lithic grains and quartz overgrowths. Siliceous cement is common and visual porosity is poor.

The **PACOOTA SANDSTONE P2** (Early Ordovician) is represented by a sequence of interbedded sandstones and siltstones deposited in a nearshore/shoreface environment. The sandstone is predominantly clear but also translucent, very fine to medium grained, predominantly fine grained, sub angular to sub rounded, quartzose with occasional lithic inclusions. Quartz overgrowths and siliceous cement are common, porosity is generally poor to fair. The siltstones and medium grey, argillaceous micromicaceous with rare fossil fragments. The siltstones are indurated and hard.

The **PACOOTA SANDSTONE P1** (Early Ordovician) is lithologically similar to the P2 and is represented by interbedded sandstones and siltstones. The sandstone is white to light grey, very fine to fine grained, sub angular, moderately well sorted, quartzose, with common lithics, pyritic with rare dolomitic cement and common siliceous cement and poor porosity. The siltstone is light to medium grey, argillaceous, possibly dolomitic, with rare lithic inclusions and occasional disseminated pyrite.

The **HORN VALLEY SILTSTONE** (Early Ordovician) overlies the Pacoota Sandstone and is interpreted to have been deposited in a euxinic environment. The formation consists of dark grey pyritic siltstone. The Horn Valley siltstone is thought to be the source rock for the Mereenie Field hydrocarbons.

Overlying the Horn Valley Siltstone is the **STAIRWAY SANDSTONE** (Middle Ordovician), a sequence of interbedded sandstones and siltstones interpreted to have been laid down in an intertidal depositional environment. The siltstones are medium grey to medium grey brown, arenaceous but grading to argillaceous in parts, lithic with rare glauconitic inclusions. The sandstones are clear to predominantly white, very fine to fine grained, generally sub rounded, well sorted, quartzose with abundant siliceous cement and poor to very poor porosity.

Shallow marine depositional conditions predominated during deposition of the **STOKES FORMATION** (Mid to Late Ordovician) which overlies the Stairway Sandstone. The Stokes Formation consists of siltstone with interbeds of sandstone. The siltstone is brick red brown to brown, greenish grey to grey and also brownish grey. The lithology is generally argillaceous, with recrystalised silica forming a very hard, brittle indurated rock. The sandstone is white to light grey, very fine to fine grained, grading to arenaceous siltstone in parts, sub rounded well sorted, quartzose with abundant siliceous cement and poor porosity.

The **CARMICHAEL SANDSTONE** (Late Ordovician) overlies the Stokes Formation and was deposited in estuarine conditions. The formation is represented by a sequence of sandstones with thin interbeds of siltstone. The sandstones are clear to translucent, medium grained with common iron staining. They are quartzose with abundant siliceous cement and poor porosity. The siltstone interbeds are described as red brown to medium brown in colour, argillaceous, with occasional lithic and feldspathic inclusions.

The **MEREENIE SANDSTONE** (Late Silurian to Mid Devonian) outcrops at the West Mereenie 19 location and overlies the Carmichael Sandstone. Deposition initially commenced under shallow marine conditions but as the relative sea level dropped, aeolian conditions predominated. The sandstone is described as clear, translucent, medium grained, sub rounded to rounded, quartzose with abundant quartz overgrowths and silica cement.

## (b) Stratigraphic Prognosis

West Mereenie 19 was drilled as a vertical oil exploration well in OL 4, Northern Territory. The well was situated 2.3 km north-west of West Mereenie 1 and 4.8 km south-east of Northwest Mereenie 1. The well deviation tolerance at the Patchawarra and Tirrawarra targets was within a 50 m radius in all directions.

The depth prognosis and well results for Pelican 13 are tabled below. All depths quoted in Table VII are Logger's Depths:

**TABLE VII: ACTUAL VERSUS PROGNOSED DEPTHS AND THICKNESSES WEST MEREENIE 19 (all depths in mSS)**

| FORMATION | PROG SS DEPTH (m) | ACT SS DEPTH (m) | DEPTH DIFF (m) H/L | PROG THICK TVD (m) | ACT THICK TVD (m) | THICK DIFF (m) |
|---|---|---|---|---|---|---|
| MEREENIE SANDSTONE | +731.4 | +731.4 | - | 399.4 | 401.8 | +2.4 |
| CARMICHAEL SANDSTONE | +332.0 | +329.5 | 2.5 L | 109.0 | 90.0 | -19.0 |
| UPPER STOKES SILTSTONE | +223.0 | +239.5 | 16.5 H | 280.0 | 285.4 | +5.4 |
| LOWER STOKES SILTSTONE | -57.0 | -45.4 | 11.6 H | 78.0 | 78.6 | +0.6 |
| UPPER STAIRWAY SANDSTONE | -135.0 | -124.0 | 11.0 H | 46.0 | 65.1 | +19.1 |
| MID. STAIRWAY SANDSTONE | -181.0 | -189.1 | 8.1 L | 124.0 | 116.2 | -7.8 |
| L. STAIRWAY SANDSTONE 2. | -305.0 | -305.3 | 0.3 L | 58.0 | 58.4 | +0.4 |
| L. STAIRWAY SANDSTONE 1. | -363.0 | -363.6 | 0.6 L | 31.0 | 29.3 | -1.7 |
| HORN VALLEY SILTSTONE | -394.0 | -393.0 | 1.0 H | 79.0 | 80.4 | +1.4 |
| PACOOTA SANDSTONE P1 | -473.0 | -473.3 | 0.3 L | 111.0 | 108.6 | -2.4 |
| PACOOTA SANDSTONE P2 | -584.0 | -581.9 | 2.1 H | 69.0 | 72.2 | +3.2 |
| PACOOTA SANDSTONE P3 | -653.0 | -654.0 | 1.0 L | 81.0 | 88.3 | +7.3 |
| PACOOTA SST. P3-120/130 | -687.0 | -688.0 | 1.0 L | - | - | - |
| PACOOTA SANDSTONE P4 | -734.0 | -742.3 | 8.3 L | 51.0+ | 29.0+ | - |
| **TOTAL DEPTH (Logger Extrap.)** | **-785.0** | **-771.3** | | | | |

The stratigraphic sequence intersected in West Mereenie 19 was as prognosed. Formation tops were intersected both high and low to prognosis, ranging from 8.3m low (Pacoota Sandstone P4), to 16.5m high (Upper Stokes Siltstone). Formation thicknesses were within acceptable range limits to that prognosed, except for the Upper Stairway Sandstone, which was 19.1m or 42% thicker than expected. The primary target Pacoota P3 Sandstone was penetrated 1.0m low to prognosis. All formation tops were intersected significantly down dip of West Mereenie 1.

**(c) Hydrocarbon Summary** (Measured Depths)

Total gas was recorded from 520m MDRT to 1511m MDRT (T.D.) 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). All samples were checked for oil shows using ultraviolet fluorescence.

**Surface to the base of the Upper Stairway Sandstone**

No fluorescence was recorded during the drilling of the section from surface to the upper Stairway Sandstone. This is consistent with the offset wells adjacent to West Mereenie 19. Trace gas was first recorded from 549m in the middle section of the Upper Stokes Siltstone. This minor gas level (10-40 ppm of methane) persisted throughout the Stokes Formation and the majority of the Upper Stairway Sandstone. As the basal reservoir of the Upper Stairway Sandstone was penetrated by the air-mist hammer drill at 924m, a continuous gas flare was noted at the blooie line. The Total Gas Detector indicated 2192 units measured through the gas sample lines. The composition of this gas was noted as (81/12/4/2/1). A flow test conducted in this reservoir section at 924m resulted in a measured flow rate of 2.5 MMCFD.

**Middle Stairway Sandstone to the base of the Horn Valley Siltstone**

This flow rate as well as total measured gas and composition continued with minor significant variation as the well was air drilled through the Middle Stairway Sandstone, Lower Stairway Sandstone 1 and 2 and the Horn Valley Siltstone. The flow meter on the skid became washed out from 994m to 1094m, with no gas flow rates possible. A fairly continuous 3-4m long gas flare was present throughout. The most significant result was the 122.8m lowering of the proven limit for the Basal Upper Stairway section from -64m TVDSS in West Mereenie 15, down to -186.8m TVDSS in West Mereenie 19. 4.57 m of proved (Category 1) gas pay was intersected in this sand. The reservoirs of the Lower Stairway Sandstone 1 and 2 were ascribed a total of 3.16m proved/probable (Category 2) gas pay. The following table details the maximum gas peaks/composition and gas flow rates within the various units.

| FLOW TEST DEPTH | GAS FLOW RATE | MUD LOG GAS PEAK (Composition) |
|---|---|---|
| 924m | **Upper Stairway Sandstone (base).** Maximum gas flare rate = 2.5 MMcfd. (3-4m long continuous flare). | 2192 U (81/12/4/2/1) |
| 966m | **Middle Stairway Sandstone.** Maximum gas flare rate = 3.0 MMcfd. (3-4m long continuous flare). | 1197 U (81/12/4/2/1) |
| 985m | **Middle Stairway Sandstone.** Maximum gas flare rate = 3.6 MMcfd. (3-4m long continuous flare). | 1685 U (81/12/4/2/1) |
| 994m - 1094m | **Middle Stairway to Lower Stairway Sandstone 2.** Flow meter washed out and un-readable. (3-4m long continuous flare). | 1730 U @ 1076m (81/12/4/2/1) |
| 1100m - 1129m | **Lower Stairway Sandstone 1.** Flare out. No flow readings due to un-burnt gas in area. | Gas detector swamped by fluid. |
| 1129m | **Lower Stairway Sandstone 1.** Maximum gas flare rate = 2.5 MMcfd. | Gas detector swamped by fluid. |
| 1182m | **Horn Valley Siltstone.** Maximum gas flare rate = 2.75 MMcfd. | 1198 U @ 1173m (82/12/4/1/1) |

**Pacoota Sandstone P1**

The sandstone reservoirs of the Pacoota P1 were considered to be secondary gas targets at West Mereenie 19. The upper 36m of the Pacoota Sandstone P1 was drilled with air and exhibited a continuous gas flare at the blooie line. The Pacoota P1-40 reservoir displayed a moderate gas flare of 4m and calculated gas flow rates of 2.7-3.0 MMcfd. The P1-40 sand was only ascribed 0.11m of marginal (category 3) gas pay.

A substantial increase in the gas flare from 4m to 10m from the blooie line was noted from 1243m. A continuous strong flare and a flow rate of 11.5 MMCFD was calculated. The total gas detector also indicated a big increase from approximately 300 units to 3807 units. The gas composition changed slightly to (80/13/4/2/1). This is coincident with the penetration of the P1-80 reservoir unit. This test confirmed a substantial incremental gas flow from the P1-80. Log analysis ascribed 4.31 m of proved (Category 1) gas pay to the P1-80 sand.

Drilling continued through the lower part of the P1-80 to 1248m, where the well was shut in due to a wash-out in the blooie line. The remainder of the well was rotary mud drilled. The following table details the maximum gas peaks/composition and gas flow rates within the air drilled Pacoota P1 Sandstone units

| FLOW TEST DEPTH | GAS FLOW RATE | MUD LOG GAS PEAK (Composition) |
|---|---|---|
| 1215m | **Pacoota P1 Sandstone (P1-40).** Maximum gas flare rate = 2.7 MMcfd. (3-4m flare). | 1078 U @ 1208m (82/12/4/1/1) |
| 1218m | **Pacoota P1 Sandstone (P1-40).** Maximum gas flare rate = 3.0 MMcfd. (3-4m flare). | 300 U (82/12/4/1/1) |
| 1225m | **Pacoota P1 Sandstone (P1-40).** Maximum gas flare rate = 2.7 MMcfd (3-4m flare). | 100 U @ 1220m (82/12/4/1/1) |
| 1243m - 1248m | **Pacoota P1 Sandstone (P1-80).** Maximum gas flare rate = 11.5 MMcfd @ 1248m (significant increase to 8-10m gas flare). | 3807 U @ 1248m (80/13/4/2/1) |
| 1248m | Pipe washed out in flow meter skid. Shut in and kill well with mud. | |

From 1248m the well was rotary mud drilled. The remainder of the Pacoota P1 section comprised four significant sandstone gas reservoirs, (P1-210, P1-280, P1-310 and P1-350). Mud gas levels throughout these sands ranged from 40 U (69/14/11/4/2) in the P1-350 sand to 480 U (72/17/7/2/2) in the P1-210 sand. Log analysis ascribed 5.07 m of proved (Category 1) gas pay to these sands. No fluorescence was observed in any of the Pacoota P1 section.

**Pacoota Sandstone P2**

The Pacoota Sandstone P2, essentially a non reservoir section was rotary mud drilled. The section comprises dominantly siltstone with interbedded tight, fine grained sandstone. Mud gas levels were generally low and ranged from 8 U (76/16/6/2) in the upper section, and gradually decreased to less than 1 U (77/16/7) at the base of the unit. The Pacoota P2 section was ascribed 1.07m of marginal (category 3) gas pay. No fluorescence was observed in the Pacoota P2 section.

**Pacoota Sandstone P3**

The P3 represents the most significant oil producing reservoir in flank wells on the Mereenie Anticline.
The primary targets of West Mereenie 19 were the oil reservoirs of the Pacoota P3 (120/130, 190/230/250) sandstone. West Mereenie 19 was planned to intersect the P3-120/130 sequence 100' below OGOC. A key objective was to establish an OWC (or LKO/HKW) on the western nose of the field. Secondary targets were for oil within the Pacoota P3 (10/7/90/150).

The primary target Pacoota P3 sandstone top was intersected 1.0m TVD low to prognosis and 100.7m low relative to West Mereenie 1**.** The P3-10 reservoir was a moderately developed fine to occasionally medium grained sandstone. The upper 2m of reservoir displayed a minor fluorescence show from 1393.2m to 1395.2m. It was described as: 10-20% of dim to moderately bright yellow green, pin-point to patchy fluorescence, with a very slow diffuse cut and thin dull yellow ring residue. There was an associated gas peak of 80 U (33/22/21/14/10) over a background of 1 U (77/16/7). Log analysis ascribes only 0.61m of marginal (Category 3) oil pay to the reservoir.

The underlying P3-70, P3-90, P3-120/130 reservoirs comprised very fine to fine and occasionally medium grained sandstone. They displayed relatively low gas levels from 1 U (69/17/9/5) up to 12 U (45/19/15/11/10) with no fluorescence observed. West Mereenie 19 intersected the P3-120/130 sequence some 135', (41.2m) below the OGOC. MDT points within the Pacoota P3 120/130 and 150 sands were indicative of tight reservoirs, with only poor mobilities. Reservoir pressures were close to virgin within the Pacoota P3 120/130 sands. Post logging, one open-hole drill stem test was conducted across the upper Pacoota P3 section (excluding the more permeable section of the P3-120/130) with no fluids to surface. Test recovered 1 bbl of rat hole mud & 1.5 bbls of slightly water cut mud (with minor green fluorescence). Liquid was also recovered from the P3-120/130 sands via the MDT-Saturn probe module. All water samples were analysed and proved to be mud filtrate. As a consequence the fluid type in the P3-120/130 reservoirs is inconclusive and will be further evaluated in the cased hole. Log analysis ascribes 0.38m of proved (Category 1) oil pay to the reservoir.

The basal Pacoota P3-150, P3-190 and P3-230 sands displayed relatively low gas levels from less than 1 U (74/17/9) up to 4 U (60/16/12/8/4) with no fluorescence observed. Log analysis deems these sands to be water saturated.

**Pacoota Sandstone P4**

The Pacoota P4 reservoir was considered to be a secondary oil target at West Mereenie 19. The sand displayed relatively low gas levels from less than 1 U (76/16/8) up to 4 U (57/19/12/8/4) with no fluorescence observed. Log analysis deems these sands to be tight/water saturated. The well was terminated at 1512m MDRT, 29.0m TVD into the Pacoota Sandstone P4.

## 4. SUMMARY

West Mereenie 19 was drilled as a vertical oil and gas appraisal well in OL 4, Northern Territory. It is located along the ridge of the western nose of the field, down-dip of the producing West Mereenie 1 gas well. The well was situated 2.3 km north-west of West Mereenie 1 and 4.8 km south-east of Northwest Mereenie 1.

The primary targets of West Mereenie 19 were the oil reservoirs of the Pacoota P3 (120/130, 190/230/250) sandstone. Best sand development in offsets was within P3-130. West Mereenie 19 was planned to intersect the P3-120/130 sequence 100' below OGOC. A key objective is to establish an OWC (or LKO/HKW) on the western nose of the field. Drilling results will help define the structural extent of the western nose and scale of potential follow-up drills. Secondary targets were for oil within the Pacoota P3 (10/7/90/150) and Pacoota P4 reservoirs, with gas from the Pacoota P1 reservoirs and from the Lower Stairway Formation. Contingent upon West Mereenie 19 mean case success, up to 4 wells will be required to fully develop the West Mereenie Nose area. The location of the first follow up will be determined by reservoir quality of primary and secondary P3 objectives and post drill structural mapping. There are both up-dip & down-dip step-out locations and nose-flank locations to consider. The main risk factors for West Mereenie 19 were identified as structural uncertainty and the Pacoota P3 oil column height.

West Mereenie 19 was spudded at 02:00 hours on 1st July, 2013. The Boart Longyear rig WW7 drilled a 12 ¾" surface hole vertically to 523m. A string of 9 5/8" casing (36 # K55 BTC) was run and cemented with the shoe at 520m (D). The well was suspended for further deepening at 24:00 hours on 10th July, 2013 and the rig released.

The well was re-entered at 14:45 hours on 19th November, 2013 with Ensign rig 918. An 8 ¾" production hole was air drilled vertically to 1248m. From 1248m an 8 ½" production hole was mud drilled to T.D. of 1511m (D) with numerous bit changes, reached at 02:00 hours on 1st December, 2013. After performing a wiper trip to the surface casing shoe, then pulling out of hole to surface, the following suite of Schlumberger wire-line logs were run: 1) PEX (GR-HGNS-HRLA-MCFL-CNL-TLD-SP); 2) FMI-SSCAN; Run 3) ECS-CMR; Run 4) MDT-GR (50 points: 18 valid, 15 curtailed, 17 seal failures); Run 5) GR-MSCT (26 cut: 25 recovered, 1 lost); Run 6) GR-MSCT (24 cut: 24 recovered). After the completion of logging a full wiper trip was completed. An inflate straddle DST was attempted over the upper 40m of the Pacoota P3 sandstone from 1391.7m to 1433.4m. There was no flow of fluid or gas to surface, with a recovery of rat-hole mud with slightly water cut and trace oil cut mud.

During air drilling the first occurrence of significant gas flow came from 924m, just above the Middle Stairway Sandstone. The well flowed from 2.5 to 3.6 MMcfd throughout the Middle and Lower Stairway Sandstones until the flare went out and the well was killed at 1094m due to a wash-out in the blooie line. The blooie line was repaired and the fluid was unloaded from the well. From 1130m to 1230m in the Horn Valley Siltstone to the top of the Pacoota P1 Sandstone, there was a continuous gas flow of between 2.5 to 3.0 MMcfd. From 1230m to 1243m the well flow increased to 10.5 to 11.5 MMcfd from the top of the Pacoota P1 sandstone until the well was killed at 1243m due to another wash-out in the blooie line. The remainder of the well was rotary drilled with mud.

The primary target Pacoota P3 sandstone top was intersected 1.0m low to prognosis and 100.7m low relative to West Mereenie 1**.** The reservoir was a moderately developed fine to occasionally medium grained sandstone, with a minor fluorescence show and associated rich, elevated gas levels within the upper 2m of sequence. No further significant fluorescence or gas shows were observed through the Pacoota P3 or Pacoota P4 Sandstone in West Mereenie 19. MDT points within the Pacoota P3 120/130 and 150 sands were indicative of tight reservoirs, with only poor mobilities. Reservoir pressures were close to virgin within the Pacoota P3 120/130 sands.

Formations were penetrated both high and low to prognosis, ranging from the Pacoota P4 sandstone which was penetrated 8.3m low to prognosis, to the Upper Stokes Siltstone which was 16.5m high to prognosis. All formation tops were intersected significantly down-dip of the nearby West Mereenie 1, ranging from 79m low (Upper Stokes Siltstone) to 106.4m low (Pacoota P4).

A string of 5 ½" production casing was run in hole and cemented with the shoe at 1507.9m. Ensign 918 was released from West Mereenie 19 on the 11th of December, 2013. The well was completed as a 'Single Completion Oil Well' (SCO) in April, 2014 with conventional 2 3/8" 4.7 lb/ft J55 EUE tubing The Pacoota P3-120/130 sands were perforated from 1431m to 1449m with a 3 ½" TCP 60° phase 6 spf gun and HMX 23g charges .

## 5. REFERENCES


Schumacher G. & Grasso C. West Mereenie 19 Well Proposal, Santos Ltd., 2013 (unpublished).

Operations Geology. West Mereenie 17 Well Completion Report, Santos Ltd., 2001 (unpublished).

# APPENDIX I: SAMPLE DESCRIPTIONS

# APPENDIX I (a): CUTTINGS

# APPENDIX I (a): CUTTINGS

Samples were collected, washed and described at 15m intervals from surface to 615m and 765m to 855m, at 6m intervals from 855m to 924m. Samples were collected, washed and described at 3m intervals from 1248m to 1511m (T.D.). All samples were checked for oil shows using ultraviolet fluorescence.

From 615m to 765m, no samples were collected due to blooie-line sampler blockage. From 924m to 1248m, no samples were collected due to personnel safety concerns with a significant blooie-line gas flare. From 1248m to T.D., samples were collected from the mud shakers (rotary mud drilling),

**MEREENIE SANDSTONE**
EARLY DEVONIAN TO SILURIAN
**From 5.2m to 407.0m**
Thickness: 401.8m TVD

| | |
|---|---|
| 5.2m – 304m | No samples. |
| 304m – 335m | **SANDSTONE WITH MINOR SILTSTONE INTERBEDS**<br>SANDSTONE: translucent, pale grey, pale brown, minor orange red staining, very fine to fine, minor medium, moderately well sorted, sub-rounded to sub-angular, strong siliceous cement, minor off white and pale pink argillaceous matrix, sucrose texture, moderately hard to hard, very poor visual porosity. SILTSTONE: off white, buff, argillaceous, arenaceous in part, siliceous, hard to brittle, platy to sub-blocky. |
| 335m – 375m | **SANDSTONE WITH MINOR SILTSTONE INTERBEDS**<br>SANDSTONE: translucent, pale red brown, pale red grey, pink, very fine to fine, well sorted, sub-rounded to sub-angular, strong siliceous cement, minor pale pink to pale grey argillaceous matrix, moderately hard to hard, very poor visual porosity. SILTSTONE: red brown, purple brown, minor grey, argillaceous, arenaceous in part, siliceous, trace lithics, hard, sub-blocky to blocky. |
| 375m – 407m | **SANDSTONE WITH MINOR SILTSTONE INTERBEDS**<br>SANDSTONE: Translucent, pale red brown, pale red grey, pink, very fine to fine, well sorted, sub-rounded to sub-angular, strong siliceous cement, minor pale pink to pale grey argillaceous matrix, hard, occasionally moderately hard, very poor visual porosity. SILTSTONE: red brown, minor grey, argillaceous, siliceous, trace lithics, hard, sub-blocky to sub-fissile. |

**CARMICHAEL SANDSTONE**
LATE ORDOVICIAN
**From 407.0m to 497.0m**
Thickness: 90.0m TVD

| | |
|---|---|
| 407m – 450m | **MASSIVE SANDSTONE**<br>SANDSTONE: translucent, pale red brown, pale red grey, pink orange, very fine to fine, well sorted, sub-rounded to sub-angular, strong siliceous cement, minor pale pink orange to pale grey argillaceous matrix, hard, trace moderately hard, very poor visual porosity. |

450m – 497m **MASSIVE SANDSTONE WITH MINOR SILTSTONE INTERBEDS**
SANDSTONE: Translucent, pale red brown, pale red grey, pink orange, very fine to fine, well sorted, sub-rounded to sub-angular, strong siliceous cement, trace strong calcareous cement, minor pale pink orange to pale grey argillaceous matrix, hard, minor moderately hard, very poor visual porosity. SILTSTONE: red brown, purple brown, argillaceous, siliceous, hard, sub-fissile.

**UPPER STOKES SILTSTONE**
LATE ORDOVICIAN
**From 497.0m to 782.4m**
Thickness: 285.4m TVD

497m – 525m **MASSIVE SILTSTONE WITH MINOR SANDSTONE INTERBEDS**
SILTSTONE: (1) red brown, mottled light grey in part, argillaceous, trace arenaceous, siliceous, occasional lithics, hard to occasionally brittle, occasionally moderately hard, sub-fissile to occasionally sub blocky. (2) light grey, green grey, arenaceous, siliceous, hard, sub-blocky to sub-fissile. SANDSTONE: translucent, pale grey, off white, very fine to fine, well sorted, sub rounded to sub angular, strong siliceous cement, trace weak calcareous cement, minor pale grey to off white silty matrix, hard, minor moderately hard, very poor visual porosity.

525m - 782.4m **DOMINANT SILTSTONE WITH MINOR SANDSTONE**.
SILTSTONE: red brown, dark red, minor grey mottling, occasionally grey, argillaceous, very finely arenaceous in parts, minor micro-micaceous, firm to moderately hard, blocky to sub fissile. SANDSTONE: clear to translucent, off white, frosted in part, very fine to minor coarse, predominantly fine, moderately well sorted, sub angular to occasionally sub rounded, moderately strong siliceous cement, clean, minor loose quartz, very poor to tight visual porosity, no fluorescence.

**LOWER STOKES SILTSTONE**
MID ORDOVICIAN
**From 782.4m to 861.3m**
Thickness: 78.6m TVD

782.4m - 861.3m **MASSIVE SILTSTONE**.
SILTSTONE: predominantly medium grey, minor red brown, argillaceous, very finely arenaceous in parts, commonly siliceous, minor micro-micaceous, dolomitic in parts, moderately hard to hard, sub blocky to blocky.

**UPPER STAIRWAY SANDSTONE**
MID ORDOVICIAN
**From 861.3m to 926.6m**
Thickness: 65.1m TVD

861.3m - 924m **DOMINANT SANDSTONE WITH MINOR SILTSTONE.**
SANDSTONE: clear to translucent, off white, frosted in part, very fine to minor medium, predominantly fine, moderately well sorted, sub angular to occasionally sub rounded, moderately strong to strong siliceous cement, clean, minor loose quartz, siliceous overgrowths in part, very poor to tight visual porosity, no fluorescence. SILTSTONE: light to medium grey, minor red brown, argillaceous, very finely arenaceous in parts, siliceous in part, firm to moderately hard, blocky to sub blocky.

924m - 926.6m No samples due to sample dump line blockages and unsafe area to collect samples due to continuous gas emissions.

**MIDDLE STAIRWAY SANDSTONE**
MID ORDOVICIAN
**From 926.6m to 1043.2m**
Thickness: 116.2m TVD

926.6m - 1043.2m No samples due to sample dump line blockages and unsafe area to collect samples due to continuous gas emissions.

**LOWER STAIRWAY SANDSTONE 2**
MID ORDOVICIAN
**From 1043.2m to 1101.7m**
Thickness: 58.4m TVD

1043.2m - 1101.7m No samples due sample dump line blockages and unsafe area to collect samples due to continuous gas emissions.

**LOWER STAIRWAY SANDSTONE 1**
MID ORDOVICIAN
**From 1101.7m to 1131.1m**
Thickness: 29.3m TVD

1101.7m - 1131.1m No samples due sample dump line blockages and unsafe area to collect samples due to continuous gas emissions.

**HORN VALLEY SILTSTONE**
EARLY ORDOVICIAN
**From 1131.1m to 1211.7m**
Thickness: 80.4m TVD

1131.1m - 1211.7m No samples due sample dump line blockages and unsafe area to collect samples due to continuous gas emissions.

**PACOOTA SANDSTONE P1**
EARLY ORDOVICIAN
**From 1211.7m to 1320.7m**
Thickness: 108.6m TVD

1211.7m - 1248m No samples due sample dump line blockages and unsafe area to collect samples due to continuous gas emissions.

1248m - 1261m **SANDSTONE WITH COMMON INTERBEDDED SILTSTONE.**
SANDSTONE: translucent, off white to pale grey, pale brownish grey, frosted in part, very fine to fine, well sorted, sub angular, moderately strong to strong siliceous cement, occasional pyritic cement, some siliceous overgrowths, clean, moderately hard aggregates, minor loose quartz, very poor to tight visual porosity, no fluorescence. SILTSTONE: medium to dark grey, dark grey brown, argillaceous, minor micro-micaceous, firm to moderately hard, sub blocky to sub fissile.

1261m - 1303.5m **DOMINANT SANDSTONE WITH MINOR INTERBEDDED SILTSTONE.**
SANDSTONE: clear to translucent, off white, frosted in part, very fine to predominantly fine, occasionally medium to coarse, moderate to occasionally poorly sorted, sub angular to occasionally sub rounded, firm to moderately strong siliceous cement, rare pyritic cement, clean, minor loose quartz, siliceous overgrowths in part, very poor to tight visual porosity, no fluorescence. SILTSTONE: light to medium grey, occasionally dark brownish grey, argillaceous to siliceous in part, micro-micaceous in part, minor carbonaceous material, firm to brittle, moderately hard, sub blocky to occasionally fissile.

1303.5m - 1320.7m **DOMINANT SANDSTONE WITH VERY MINOR SILTSTONE.**
SANDSTONE: clear to translucent, off white, very pale brown, very fine to minor medium, predominantly fine, grades to siliceous SILTSTONE in part, moderately well sorted, angular to sub angular, occasionally sub rounded, moderately strong to strong siliceous cement, clean, minor loose quartz, siliceous overgrowths in part, rare pyrite nodules, moderately hard to hard aggregates, very poor to tight visual porosity, no fluorescence. SILTSTONE: medium to dark brown, grey brown, argillaceous to commonly arenaceous, siliceous in part, occasional pyritic veining, some carbonaceous material, moderately hard to hard, sub blocky to occasionally sub fissile.

**PACOOTA SANDSTONE P2**
EARLY ORDOVICIAN
**From 1320.7m to 1393.2m**
Thickness: 72.2m TVD

1320.7m - 1380m **DOMINANT SANDSTONE WITH INTERBEDDED SILTSTONE.**
SANDSTONE: clear to translucent, off white, very pale brown, very fine to minor medium to rare coarse, predominantly fine, moderately well sorted, angular to sub angular, occasionally sub rounded, moderately strong to strong siliceous cement, clean, minor loose quartz, siliceous overgrowths in part, rare pyrite nodules, moderately hard to hard aggregates, very poor to tight visual porosity, no fluorescence. SILTSTONE: medium to dark brown, grey brown, argillaceous to commonly arenaceous, siliceous in part, carbonaceous material, moderately hard to brittle, sub blocky to occasionally sub fissile..

1380m - 1383m **SANDSTONE**.
SANDSTONE: clear to translucent, off white, very fine to fine, commonly medium to minor coarse, moderate to poorly sorted in part, sub angular, occasionally sub rounded, firm to moderately strong siliceous cement, clean, minor loose quartz, siliceous overgrowths in part, locally common lithic specks, moderately hard aggregates, very poor to tight visual porosity, no fluorescence.

1383m - 1393.2m **SANDSTONE WITH TRACE SILTSTONE.**
SANDSTONE: clear to translucent, off white, very pale grey, very fine to fine, occasionally medium to rare coarse, moderately well sorted, angular to sub angular, occasionally sub rounded, moderately strong to strong siliceous cement, clean, minor loose quartz, siliceous overgrowths in part, rare pyrite nodules, moderately hard to friable aggregates, some loose fractured quartz grains, very poor to poor visual porosity, no fluorescence.

**PACOOTA SANDSTONE P3**
EARLY ORDOVICIAN
**From 1393.2m to 1481.9m**
Thickness: 88.3m TVD

1393.2m - 1400m **THICK SANDSTONE.**
SANDSTONE: clear to translucent, off white, predominantly fine to occasionally medium, moderate well sorted, sub angular to sub rounded, firm to moderately strong siliceous cement, clean, minor loose quartz, siliceous overgrowths in part, minor lithic specks, moderately hard aggregates, very poor to tight visual porosity, fluorescence: 1393.2m-1395.2m: 10-20% dim to moderately bright yellow green, pin-point to patchy fluorescence, very slow diffuse cut, thin dull yellow ring residue

1400m - 1410.5m **SANDSTONE WITH TRACE SILTSTONE.**
SANDSTONE: clear to translucent, off white, very fine to predominantly fine, becoming medium with depth, occasionally coarse, moderately well sorted, angular to sub angular, occasionally sub rounded, firm to moderately strong siliceous cement, trace red brown argillaceous matrix, locally common loose quartz, minor lithic specks, friable to moderately hard aggregates, very poor to tight visual porosity, no fluorescence. SILTSTONE: medium to dark grey, dark grey brown, argillaceous to very finely arenaceous, minor micro-micaceous, firm to moderately hard, sub fissile to fissile.

1410.5m - 1432m **SANDSTONE WITH MINOR INTERBEDDED SILTSTONE.**
SANDSTONE: clear to translucent, occasionally red staining, frosted in parts, very fine to fine, predominantly medium, moderately well sorted, sub angular to sub rounded, moderately strong to strong siliceous cement, locally common red argillaceous matrix, some loose quartz, grades to arenaceous SILTSTONE in part, minor lithic specks, moderately hard aggregates, very poor to tight visual porosity, no fluorescence. SILTSTONE: medium to dark red brown, grey brown, argillaceous to commonly arenaceous, siliceous in part, firm to moderately hard, sub fissile to sub blocky.

1432m - 1443m **SANDSTONE WITH MINOR INTERBEDDED SILTSTONE.**
SANDSTONE: clear to translucent, occasionally red staining, frosted in parts, very fine to fine aggregates, medium in part, moderately well sorted, sub angular to occasionally angular, sub angular to occasionally angular, moderately strong siliceous cement with siliceous overgrowths, nil matrix, some loose quartz fragments, minor lithic specks, moderately hard very fine aggregates, very poor visual porosity, no fluorescence. SILTSTONE: medium to very dark grey, black, minor dark brown, argillaceous, carbonaceous, firm to moderately hard, sub blocky to fissile.

1443m - 1456m **SANDSTONE WITH TRACE SILTSTONE.**
SANDSTONE: clear to translucent, off white, very fine to predominantly fine, occasionally medium, moderately well sorted, angular to sub angular, minor sub rounded, firm to weak siliceous cement, trace red brown argillaceous matrix, locally common loose quartz, minor lithic specks, friable to moderately hard aggregates, poor to tight visual and inferred porosity, no fluorescence. SILTSTONE: medium to dark grey, dark grey brown, argillaceous to very finely arenaceous, micro-micaceous, firm to moderately hard, sub fissile to fissile.

1456m - 1462m **SILTSTONE WITH MINOR SANDSTONE.**
SILTSTONE: red, red-brown, red-beds, argillaceous to very finely arenaceous, commonly micro-micaceous, lithic specks, firm to moderately hard, soft and dispersive in parts, sub blocky. SANDSTONE: clear to translucent, off white to very pale grey, very fine to fine, moderately well sorted, angular to sub angular, firm to moderately strong siliceous cement, grades to arenaceous SILTSTONE in parts, trace red brown argillaceous matrix, minor lithic specks, moderately hard aggregates, poor to tight visual porosity, no fluorescence.

1462m - 1476.5m **SANDSTONE WITH MINOR SILTSTONE**.
SANDSTONE: clear to translucent, off white, very fine to predominantly fine, occasionally medium, moderately well sorted, angular to sub angular, minor sub rounded, firm to weak siliceous cement, trace red brown argillaceous matrix, locally common loose quartz, minor lithic specks, friable to moderately hard aggregates, poor to tight visual and inferred porosity, no fluorescence. SILTSTONE: red-brown, red-beds, argillaceous to very finely arenaceous, commonly micro-micaceous, lithic specks, firm to moderately hard, sub blocky.

1476.5m - 1481.9m **SANDSTONE.**
SANDSTONE: clear to translucent, off white, very fine to predominantly fine, occasionally medium, moderately well sorted, angular to sub angular, minor sub rounded, firm to moderately strong siliceous cement, some siliceous overgrowths, nil matrix, loose quartz, minor lithic specks, friable to moderately hard aggregates, poor to tight visual and inferred porosity, no fluorescence.

**PACOOTA SANDSTONE P4**
EARLY ORDOVICIAN
**From 1481.9m to 1512.0m T.D.**
Thickness: 29.0m+ TVD

| | |
|---|---|
| 1481.9m - 1492m | **SANDSTONE WITH TRACE SILTSTONE.**<br>SANDSTONE: clear to translucent, off white, very fine to predominantly fine, occasionally medium, moderately well sorted, angular to sub angular, sub rounded in parts, firm to strong siliceous cement, some siliceous overgrowths, nil matrix, locally common loose quartz, minor lithic specks, friable to moderately hard aggregates, poor to tight visual and inferred porosity, no fluorescence. SILTSTONE: medium to dark grey, black, siliceous to very finely arenaceous, micro-micaceous, moderately hard, sub blocky to sub fissile. |
| 1492m - 1512m T.D. | **SANDSTONE WITH MINOR SILTSTONE.**<br>SANDSTONE: clear to translucent, off white, predominantly fine, occasionally medium, moderate to poorly sorted, angular to sub angular, sub rounded in parts, firm to strong siliceous cement, some siliceous overgrowths, nil matrix, locally common loose quartz, minor lithic specks, friable to moderately hard aggregates, poor to tight visual and some moderate inferred porosity, no fluorescence. SILTSTONE: medium to dark grey, black, siliceous to very finely arenaceous, micro-micaceous, moderately hard, sub blocky to sub fissile. |

# APPENDIX I (b): HYDROCARBON SHOW REPORTS

SANTOS LIMITED

# OIL SHOW EVALUATION REPORT

WELL: WEST MEREENIE 19
INTERVAL: 1392m-1394m
FORMATION: PACOOTA SANDSTONE P3

GEOLOGIST: SIMON OSTLER
DATE: 28-11-13

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| C1 ppm | **2k** | 5k | 25k | 30k | 40k | 50k | 100k | 150k | 200k | >250k |
| C2+ ppm | 100 | 500 | 1k | 2k | 3k | **4k** | 6k | 7.5k | 14k | >15k |
| Porosity Ø | tight | | **very poor** | **poor** | | Fair inf. | | good | | |
| % with fluorescence | Trace | **10** | **20** | 30 | 40 | 50 | 60 | 70 | 80 | >90 |
| Fluorescence appearance | Trace | | **spotted** | **pinpoint** | | streaked | patchy | even | | solid |
| Brightness of fluorescence | v. dull | | **dull** | | dim | | **m.bright** | bright | v. bright | glowing |
| Type of cut | trace | slow crush cut | crush cut | instant crush cut | **very slow diffuse** | slow blooming cut | moderate blooming | moderate streaming | fast streaming | instant |
| Residue on spot plate | trace | heavy trace | v. thin ring | **thin ring** | thick ring | v. thick ring | thin film | mod. film | thick film | solid |
| Show rating | trace | | very poor | **poor** | fair | | good | | | |
| Comments: | 10-20% of dim to moderately bright spotted to pin-point **yellow/green** fluorescence. Thin dull **yellow** ring residue.<br>Within fine to occasionally medium grained sandstones of the upper P3-10 of the Pacoota Sandstone P3. | | | | | | | | | |

# APPENDIX I(c): SIDEWALL CORE DATA

SANTOS LIMITED

## ROTARY SIDEWALL CORE DESCRIPTION

**WELL:** WEST MEREENIE 19 **DATE:** 05/12/13 **PAGE:** 1

**MCORE** SUITE 1: RUN 5 and 6 **CORES CUT:** 50 **CORES REC:** 49

**GEOLOGIST:** D. Adderley / S. Ostler

| CORE NO. | DEPTH (m) | REC. mm | FORMATION | LITH. | COLOUR | GRAIN SIZE | HYDR. INDIC. (Y/N) | SUPPLEMENTARY INFORMATION |
|---|---|---|---|---|---|---|---|---|
| 1 | 1445.7 | 45 | Pacoota P3 | Sandstone | Red brown | Very fine to fine | N | SANDSTONE: pale red brown, grey mottling, very fine to fine grained, very well sorted, sub angular, very strong siliceous cement, minor off white argillaceous matrix, hard, very poor visual porosity, no fluorescence. |
| 2 | 1436.5 | 50 | Pacoota P3 | Sandstone | Dark red to purple | Very fine to fine | N | SANDSTONE: dark red brown, purple, very fine to fine grained, very well sorted, sub angular, very strong siliceous cement, trace off white argillaceous matrix, minor red lithics, very hard, tight visual porosity, no fluorescence. |
| 3 | 1400.0 | 50 | Pacoota P3 | Sandstone | Light grey | fine to medium | N | SANDSTONE: off white to light grey, fine to medium grained, moderately well sorted, sub angular, very strong siliceous cement, minor off white argillaceous matrix, very hard, tight visual porosity, no fluorescence. |
| 4 | 1387.2 | 50 | Pacoota P2 | Sandstone | Grey | fine to medium | N | SANDSTONE: light grey to grey, fine to minor medium grained, moderately well sorted, sub angular, very strong siliceous cement, minor to locally common off white argillaceous matrix, quartzitic micro-veining, very hard, tight visual porosity, no fluorescence. |
| 5 | 1378.9 | 45 | Pacoota P2 | Sandstone | Grey and black streaks | fine | N | SANDSTONE: off white to light grey, fine grained, moderately well sorted, sub angular, very strong siliceous cement, minor off white argillaceous matrix, common micro-laminations of dark grey siltstone, disseminated pyrite in part, very hard, tight visual porosity, no fluorescence. |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 6 | 1367.9 | 47 | Pacoota P2 | Sandstone | Grey and black streaks | fine | N | SANDSTONE: off white to light grey, fine grained, moderately well sorted, sub angular, very strong siliceous cement, minor off white argillaceous matrix, common micro-laminations of dark grey siltstone, red lithics, disseminated pyrite in part, very hard, tight visual porosity, no fluorescence. |
| 7 | 1369.5 | 50 | Pacoota P2 | Sandstone | Grey to dark grey | Very fine to fine | N | SANDSTONE: off white to light grey, very fine to fine grained, moderately well sorted, sub angular, very strong siliceous cement, minor off white argillaceous matrix, common micro-laminations of dark grey siltstone, common dark grey lithics, very hard, tight visual porosity, no fluorescence. |
| 8 | 1351.7 | 48 | Pacoota P2 | Sandstone | Light grey | Very fine | N | SANDSTONE: off white to light grey, very fine, moderately well sorted, sub angular, strong cement, minor light grey argillaceous matrix, common disseminated pyrite, common silty micro-laminations, micro-flow cross beds, some micro-slumping structures, hard, very poor visual porosity, no fluorescence. |
| 9 | 1335.3 | 45 | Pacoota P2 | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, black, argillaceous, minor very fine arenaceous laminations, localised disseminated pyrite, hard, sub fissile. |
| 10 | 1325.0 | 47 | Pacoota P2 | Sandstone | Pale grey | Very fine | N | SANDSTONE: pale grey, very fine, well sorted, sub angular very strong cement, silicified and grades to Quartzite, very hard, nil visual porosity, no fluorescence. |
| 11 | 1296.4 | 47 | Pacoota P1 | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, black, argillaceous, common very fine arenaceous laminations, micro-flow structures, localised disseminated pyrite, hard, sub fissile. |
| 12 | 1281.4 | 48 | Pacoota P1 | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, grey black, argillaceous, trace micro micaceous, hard, sub fissile. |
| 13 | 1252.7 | 48 | Pacoota P1 | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, grey black, argillaceous, trace very fine arenaceous, localised pyrite nodules and trace veining, minor micro micaceous, hard, sub fissile. |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 14 | 1244.6 | 47 | Pacoota P1 | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, grey black, argillaceous, trace very fine arenaceous, minor micro micaceous, hard, sub fissile. |
| 15 | 1236.7 | 50 | Pacoota P1 | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, grey black, argillaceous, trace very fine arenaceous laminations, minor micro micaceous, hard, sub fissile. |
| 16 | 1229.8 | 47 | Pacoota P1 | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, grey black, minor light grey, argillaceous, trace very fine arenaceous laminations, micro-flow structures, localised disseminated pyrite, minor micro micaceous, hard, sub fissile. |
| 17 | 1204.0 | 50 | Horn Valley Siltstone | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, grey black, argillaceous, minor micro micaceous, hard, sub fissile. |
| 18 | 1198.5 | 50 | Horn Valley Siltstone | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, grey black, argillaceous, localised disseminated pyrite, minor micro micaceous, hard, sub fissile. |
| 19 | 1193.8 | 47 | Horn Valley Siltstone | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, light grey, argillaceous, trace very fine arenaceous laminations, micro-flow structures, localised disseminated pyrite, minor micro micaceous, hard, sub fissile. |
| 20 | 1185.7 | 48 | Horn Valley Siltstone | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, rare light grey, argillaceous, trace very fine arenaceous laminations, micro-flow structures, localised disseminated pyrite, minor micro micaceous, hard, sub fissile. |
| 21 | 1176.0 | 50 (2 piece) | Horn Valley Siltstone | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, grey black, argillaceous, minor micro micaceous, hard, sub fissile. |
| 22 | 1171.4 | 50 | Horn Valley Siltstone | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, grey black, argillaceous, minor pyrite nodules, minor micro micaceous, hard, sub fissile. |
| 23 | 1169.5 | 50 | Horn Valley Siltstone | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, grey black, argillaceous, trace pyrite nodules, minor micro micaceous, hard, sub fissile. |
| 24 | 1156.4 | 50 (2 piece) | Horn Valley Siltstone | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, grey black, argillaceous, minor micro micaceous, hard, sub fissile. |

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|---|---|---|---|---|---|---|---|---|
| 25 | 1145.1 | 50 | Horn Valley Siltstone | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, grey black, argillaceous, trace pyrite nodules, minor micro micaceous, hard, sub fissile. |
| 26 | 1135.7 | - | Horn Valley Siltstone | - | - | - | - | Lost in hole with stuck coring bit. |
| 27 | 1102.6 | 46 | Lower Stairway Sandstone 1 | Siltstone | Dark grey | - | N | SILTSTONE: dark to occasionally medium grey, argillaceous to arenaceous, commonly micro micaceous, hard, sub fissile. |
| 28 | 1100.0 | 50 | Lower Stairway Sandstone 2 | Siltstone | Dark grey | - | N | SILTSTONE: light to medium grey, argillaceous to dominantly arenaceous, commonly micro micaceous, hard, sub fissile. |
| 29 | 1095.5 | 42 | Lower Stairway Sandstone 2 | Sandstone | Medium grey | Very fine to fine | N | SANDSTONE: light grey to off white, very fine to fine, well sorted, sub angular, moderate to strong cement, common to abundant light grey to off white argillaceous matrix, occasionally micro micaceous, trace lithics, occasional carbonaceous inclusions, hard, very poor to tight visual porosity, no fluorescence. |
| 30 | 1093.5 | 50 | Lower Stairway Sandstone 2 | Sandstone | Medium grey | Very fine to fine | N | SANDSTONE: light grey to off white, very fine to fine, well sorted, sub angular, moderate to strong cement, occasional to common light grey to off white argillaceous matrix, occasional lithics, hard, very poor to tight visual porosity, no fluorescence. |
| 31 | 1074.9 | 45 | Lower Stairway Sandstone 2 | Siltstone | Medium grey | - | N | SILTSTONE: medium grey, arenaceous, grading to very fine Sandstone in part, trace disseminated pyrite, minor micro micaceous, hard, sub fissile. |
| 32 | 1040.1 | 23 | Middle Stairway Sandstone | Siltstone | Very dark grey | - | N | SILTSTONE: dark to very dark grey, minor grey black, argillaceous, commonly micro micaceous, minor lithics, hard, sub fissile. |
| 33 | 1030.2 | 42 (broken) | Middle Stairway Sandstone | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, grey black, argillaceous, locally arenaceous, trace pyrite inclusions, minor micro micaceous, hard, sub fissile. |
| 34 | 1021.2 | 30 (broken) | Middle Stairway Sandstone | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, grey black, argillaceous, locally arenaceous, occasional lithics, common to abundant micro micaceous, hard, sub fissile. |

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|---|---|---|---|---|---|---|---|---|
| 35 | 1018.6 | 50 | Middle Stairway Sandstone | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, grey black, occasionally medium grey, argillaceous, arenaceous laminations, grading to very fine Sandstone in part, occasionally micro micaceous, hard, sub fissile. |
| 36 | 1014.1 | 48 | Middle Stairway Sandstone | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, grey black, occasionally medium grey, argillaceous, common arenaceous laminations, grading to very fine Sandstone in part, generally micro micaceous, hard, sub fissile. |
| 37 | 1001.2 | 47 | Middle Stairway Sandstone | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, grey black, occasionally medium grey, argillaceous, common arenaceous laminations, rare grading to very fine Sandstone, commonly micro micaceous, hard, sub fissile. |
| 38 | 988.0 | 42 | Middle Stairway Sandstone | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, occasionally medium grey, argillaceous, common arenaceous laminations, minor micro micaceous, hard, sub fissile. |
| 39 | 981.2 | 43 | Middle Stairway Sandstone | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, grey black, argillaceous, rare micro micaceous, hard, sub fissile. |
| 40 | 966.9 | 44 | Middle Stairway Sandstone | Sandstone | Medium grey | Very fine | N | SANDSTONE: light to medium grey, occasionally off white, very fine, very well sorted, sub angular, moderate to strong cement, minor light grey argillaceous matrix, trace lithics, hard, very poor to tight visual porosity, no fluorescence. |
| 41 | 962.7 | 48 | Middle Stairway Sandstone | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, grey black, argillaceous, minor micro micaceous, hard, sub fissile. |
| 42 | 955.9 | 44 | Middle Stairway Sandstone | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, grey black, argillaceous, rare arenaceous, commonly micro micaceous, hard, sub fissile. |
| 43 | 943.7 | 45 | Middle Stairway Sandstone | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, grey black, argillaceous, rare arenaceous, occasionally micro micaceous, hard, sub fissile. |
| 44 | 930.2 | 42 | Middle Stairway Sandstone | Siltstone | Very dark grey | - | N | SILTSTONE: very dark grey, argillaceous, occasionally arenaceous, localised very fine Sandstone bands, occasionally micro micaceous, hard, sub fissile. |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 45 | 922.8 | 43 | Upper Stairway Sandstone | Sandstone | Medium grey | Very fine | N | SANDSTONE: light to medium grey, occasionally off white, very fine, very well sorted, sub angular, moderate to strong cement, minor light grey argillaceous matrix, hard, very poor to tight visual porosity, no fluorescence. |
| 46 | 920.7 | 44 | Upper Stairway Sandstone | Sandstone | Medium grey | Very fine | Y (Gas odour) | SANDSTONE: light to medium grey, very fine to medium, dominantly fine, moderately sorted, sub angular to angular, moderate to strong cement, rare light grey argillaceous matrix, hard, very poor to poor visual porosity, no fluorescence (strong gas odour). |
| 47 | 915.3 | 22 | Upper Stairway Sandstone | Sandstone | Light grey | Very fine | Y (Fluor) | SANDSTONE: light grey, very fine, very well sorted, angular, moderate to strong cement, trace light grey argillaceous matrix, hard, very poor to tight visual porosity, dull green fluorescence (no cut performed to retain core integrity). |
| 48 | 888.9 | 43 | Upper Stairway Sandstone | Sandstone | Medium grey | Very fine | N | SANDSTONE: medium grey, very fine to dominantly fine, moderately well sorted, sub angular to angular, moderate to strong cement, rare light grey argillaceous matrix, hard, very poor to poor visual porosity, no fluorescence. |
| 49 | 868.7 | 43 | Upper Stairway Sandstone | Siltstone | Dark brown grey | - | N | SILTSTONE: very dark grey, brown red laminations in part, argillaceous, minor micro micaceous, hard, sub fissile. |
| 50 | 862.9 | 45 | Upper Stairway Sandstone | Siltstone | Dark green grey | - | N | SILTSTONE: Dark grey to dark green grey, argillaceous to arenaceous, occasional Sandstone inclusions, occasional lithics, hard, sub fissile. |

# APPENDIX II: PALYNOLOGY REPORT

No Palynology Report was prepared for West Mereenie 19.

# APPENDIX III: CORE DATA

No Full Hole Cores were cut in West Mereenie 19.

# APPENDIX IV: LOG INTERPRETATION

# APPENDIX IV (a): LOG ANALYSIS

# West Mereenie 19

# Log Analysis

Carmine Grasso
March 2014
EA – Development Victoria/Mereenie

# WEST MEREENIE 19

# LOG ANALYSIS

## 1. SUMMARY

West Mereenie 19 was drilled as a vertical Pacoota P3 Sandstone oil appraisal well in the Mereenie field. Top hole section was drilled to 523m MD in July 2013 by the Boart Longyear WW07 rig, re-entered in November 2013 by the Ensign 918 rig and reached a TD of 1511m MD in December 2013. West Mereenie 19 is located along the ridge of the western nose, down dip of the producing West Mereenie 1 gas well. Primary well objective was to intersect the P3-120/130 sequence approximately 100ft below OGOC in order to establish an OWC (or LKO/HKW) on the western nose. 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 ECS-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, notable gas flows were recorded. Significant flows of 3.6 MMscf/d @ 985m from the basal section of the Upper Stairway Sandstone and 11.5 MMscf/d @ 1248m from the Pacoota P1-80 sand. Post logging, one open-hole drill stem test was conducted across the upper Pacoota P3 section (excluding the more permeable section of the P3-120/130) with no fluids to surface. Test recovered 1 BBL of rat hole mud & 1.5 BBLs of slightly water cut mud (with minor green fluorescence). Liquid was also recovered from the P3-120/130 sands via the MDT-Saturn probe module. All water samples were analysed and proved to be mud filtrate. As a consequence the fluid type in the P3-120/130 reservoirs is inconclusive and will be further evaluated in the cased hole.

This is the final evaluation of West Mereenie 19 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 2.4 m of potential (Category 2) oil pay was intersected in this well, along with 13.6 m of proved (Category 1) gas pay. Most significant result was the 122.8m lowering of the proven limit for the Basal Upper Stairway section from 64m TVDss in West Mereenie 15 to 186.8m TVDss in West Mereenie 19. A total of 26.1 m 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 1 below.

## TABLE 1(a): Oil Pay

## (DENSITY POROSITY / ARCHIE SW)

| INTERVAL (loggers depth) (mMD) | | NET SAND (mMD) | NET PAY (mMD) | AVE $\varnothing_T$ (%) | AVE $SW_T$ (%) | AVE Kint (md) | NET PAY INTERVALS / REMARKS |
|---|---|---|---|---|---|---|---|
| **Pacoota P3-10** (1393.2 - 1415.7) | Cat 1 | | | | | | OGOC intersected within the basal 4m section of the overlying P2 Section. Minor oil fluores. across top 2m of this zone. DST 1*: |
| | Cat 2 | | | | | | |
| | Cat 3 | 0.61 | 0.61 | 6.1 | 18.5 | 1.63 | |
| **Pacoota P3-70** (1415.7 - 1420.0) | Cat 1 | | | | | | No Fluorescence & low gas readings |
| | Cat 2 | | | | | | |
| | Cat 3 | | | | | | |
| **Pacoota P3-90** (1420.0 - 1427.3) | Cat 1 | | | | | | No Fluorescence & low gas readings |
| | Cat 2 | | | | | | |
| | Cat 3 | | | | | | |
| **Pacoota P3-120/130** (1427.3 - 1445.9) | Cat 1 | 0.38 | 0.38 | 9.0 | 45.8 | 8.91 | DST 1*: Recovered mud filtrate No proven net oil pay, only possible pay To be cased hole tested |
| | Cat 2 | 2.34 | 2.34 | 7.6 | 53.0 | 2.95 | |
| | Cat 3 | 4.45 | 4.45 | 7.1 | 53.3 | 1.97 | |
| **Pacoota P3-150** (1445.9 - 1456.7) | Cat 1 | | | | | | No Fluorescence & low gas readings |
| | Cat 2 | | | | | | |
| | Cat 3 | | | | | | |
| **Pacoota P3-190** (1456.7 - 1469.0) | Cat 1 | | | | | | No Fluorescence & low gas readings Zone assumed to be wet. |
| | Cat 2 | 0.31 | 0.00 | 7.6 | 57.2 | 1.14 | |
| | Cat 3 | 1.11 | 0.00 | 7.3 | 56.8 | 0.86 | |
| **Pacoota P3 – 230** (1469.0 - 1481.9) | | | | | | | No Fluorescence & low gas readings Zone assumed to be wet |
| | | 1.18 | 0.00 | 8.1 | 60.9 | 1.62 | |
| | | 2.29 | 0.00 | 7.7 | 65.0 | 1.20 | |
| **Pacoota P4** (1481.9 - 1511) | Cat 1 | | | | | | No Fluorescence & low gas readings |
| | Cat 2 | | | | | | |
| | Cat 3 | | | | | | |
| **TOTALS** | Cat 1 | **0.38** | **0.38** | **9.0** | **45.8** | **8.91** | |
| | Cat 2 | **3.83** | **2.39** | **7.6** | **52.9** | **2.94** | |
| | Cat 3 | **8.46** | **5.06** | **6.9** | **49.6** | **1.93** | |

** DST 1 covered the Pacoota P3-10/70/90/uppermost P3-120*
*Lower P3-130 sampled via MDT Saturn probe and recovered mud filtrate*

## TABLE 1(b): Gas Pay

## (DENSITY POROSITY/ARCHIE SW)

| INTERVAL (loggers depth) (mMD) | | NET SAND (mMD) | NET PAY (mMD) | AVE $\varnothing_T$ (%) | AVE $SW_T$ (%) | AVE Kint (md) | NET PAY INTERVALS / REMARKS |
|---|---|---|---|---|---|---|---|
| **Upper Stairway (top)** (861.3 - 898.8) | Cat 1 | | | | | | Blocked Geoservices gas sampler on Blooie Line above 924m MD |
| | Cat 2 | | | | | | |
| | Cat 3 | | | | | | |
| **Basal Upper STW** (898.8 - 926.6) | Cat 1 | 4.57 | 4.57 | 8.2 | 49.5 | 1.42 | Gas flare commenced @ 924m MD (3 to 4ft Long continuous flare). GTS @ 2.5 MMscf/d Max. rate of 3.6 MMscf/d |
| | Cat 2 | 10.02 | 10.02 | 7.4 | 53.9 | 0.79 | |
| | Cat 3 | 11.62 | 11.62 | 7.3 | 54.7 | 0.69 | |
| **Lower Stairway 2** (1043.2 - 1101.7) | Cat 1 | | | | | | No gas flows on western flank Sw calculations are anomalously high based on height above the FWL |
| | Cat 2 | 2.13 | 2.13 | 7.7 | 88.1 | 0.28 | |
| | Cat 3 | 3.24 | 3.24 | 7.4 | 90.5 | 0.21 | |
| **Lower Stairway 1** (1101.7 - 1131.1) | Cat 1 | | | | | | No gas flows on western flank Gas peaks recorded on mudlog |
| | Cat 2 | 1.03 | 1.03 | 7.4 | 53.0 | 0.24 | |
| | Cat 3 | 2.55 | 2.55 | 6.7 | 54.3 | 0.14 | |
| **Pacoota P1-40** (1211.7 - 1232.2) | Cat 1 | | | | | | Gas flow recorded in crestal West Mereenie 18 well-bore. Gas peak recorded on mudlog |
| | Cat 2 | | | | | | |
| | Cat 3 | 0.11 | 0.11 | 6.6 | 45.8 | .05 | |
| **Pacoota P1-80** (1237.1 - 1244.4) | Cat 1 | 3.92 | 3.92 | 6.8 | 16.5 | 3.31 | GTS @ 11.5 MMscf/d (8 to 10ft significant flare). Well switched over from air-drilled to mud-drilled due to hole in blooie line |
| | Cat 2 | 4.27 | 4.27 | 6.7 | 17.2 | 3.07 | |
| | Cat 3 | 4.31 | 4.31 | 6.7 | 17.4 | 3.04 | |
| **Pacoota P1-200** (1264.3 - 1273.3) | Cat 1 | | | | | | Gas peaks recorded |
| | Cat 2 | | | | | | |
| | Cat 3 | 0.42 | 0.42 | 6.0 | 38.8 | 0.11 | |
| **Pacoota P1-210** (1273.3 - 1281.5) | Cat 1 | 0.61 | 0.61 | 6.7 | 8.9 | 12.92 | Gas peaks recorded Two valid pressure points taken across zone |
| | Cat 2 | 2.59 | 2.59 | 6.0 | 25.1 | 3.30 | |
| | Cat 3 | 3.24 | 3.24 | 6.0 | 27.5 | 2.66 | |
| **Pacoota P1-240** (1281.5 - 1296.7) | Cat 1 | | | | | | Gas peaks recorded |
| | Cat 2 | | | | | | |
| | Cat 3 | | | | | | |
| **Pacoota P1-280** (1296.7 - 1302.2) | Cat 1 | 1.98 | 1.98 | 7.5 | 9.5 | 17.95 | Zone severely depleted due to production |
| | Cat 2 | 2.13 | 2.13 | 7.2 | 9.8 | 16.73 | |
| | Cat 3 | 2.17 | 2.17 | 7.2 | 9.9 | 16.43 | |
| **Pacoota P1-310** (1302.2 - 1315.3) | Cat 1 | 1.87 | 1.87 | 6.4 | 15.7 | 2.67 | Gas peaks recorded |
| | Cat 2 | 2.52 | 2.52 | 6.0 | 17.5 | 2.03 | |
| | Cat 3 | 2.71 | 2.71 | 5.9 | 18.1 | 1.89 | |
| **Pacoota P1-350** (1315.3 - 1320.7) | Cat 1 | 0.61 | 0.61 | 5.5 | 13.7 | 1.97 | Gas peaks recorded |
| | Cat 2 | 1.45 | 1.45 | 5.2 | 20.3 | 0.95 | |
| | Cat 3 | 1.68 | 1.68 | 5.2 | 21.4 | 0.83 | |
| **Pacoota P2** (1320.7 - 1393.2) | Cat 1 | | | | | | OGOC intersected within the basal 4m section of the P2 |
| | Cat 2 | | | | | | |
| | Cat 3 | 1.07 | 1.07 | 6.3 | 51.3 | 0.45 | |
| **TOTALS** | Cat 1 | **13.56** | **13.56** | **7.2** | **27.5** | **5.09** | |
| | Cat 2 | **26.14** | **26.14** | **6.9** | **40.5** | **2.78** | |
| | Cat 3 | **33.11** | **33.11** | **6.8** | **44.0** | **2.22** | |

## 2. GENERAL DATA

### (a) Introduction

Open hole logs were acquired in one suite at a total depth of 1512m MD. Details of the logging run appear below:

**TABLE 2(a) - Logs Run**

| RUN | MNEMONICS | INTERVAL (mMD) | REMARKS |
|---|---|---|---|
| 1 | **PEX** | | Where Density and PEF logs were severely affected by bad hole conditions, sonic was used in the analysis. |
| | GR | surface - 1497 | |
| | CGR | 520 - 1497 | |
| | SGR | 520 - 1497 | |
| | SP | 520 - 1484 | |
| | CALI | 520 - 1507 | |
| | RXOZ | 520 - 1507 | |
| | RLA1/2/3/4/5 | 520 - 1507 | |
| | TNPH | 520 - 1499 | |
| | RHOZ | 520 - 1499 | |
| | PEFZ | 520 - 1499 | |
| | HDRA | 520 - 1499 | |
| 2 | **GR-FMI-SSCAN** | | |
| | FMI | 850 - 1512 | |
| | DTCO | 850 - 1512 | |
| | DTSM | 850 - 1512 | |
| | DTST | 850 - 1512 | |
| 3 | **GR-ECS-CMR** | 850 - 1512 | |
| 4 | **GR-MDT** | 915.5 - 1465.8 | 50 tests attempted, 5 with Saturn probe. |
| 5 / 6 | **GR-MSCT** | 862.9 - 1445.7 | MSCT No: 26 Lost in hole with stuck coring bit. |

### (b) Cores and Sidewall Cores

No full hole cores were taken from West Mereenie 19. However, 50 rotary sidewall cores were attempted with 49 recovered.

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

Nine Open-hole flow tests and one open-hole drill stem test were successfully conducted in West Mereenie 19 (Table 2c), with the results tabulated below:

50 pressure tests were attempted with 18 good, 15 curtailed and 17 seal failures. 3 samples were taken utilising the Saturn probe across the P3-120/130 and P2 sections for fluid analysis.

### TABLE 2(c) – OFT Results

| OFT | DEPTH* from (mMD) | DEPTH* to (mMD) | HOLE SIZE | REMARKS |
|---|---|---|---|---|
| 1 | 523 | 924 | 8 3/4 in | Gas @ 2.5 MMCFD (3 to 4m long continuous flare) |
| 2 | 523 | 966 | 8 3/4 in | Gas @ 3.0 MMCFD (3 to 4m long continuous flare) |
| 3 | 523 | 985 | 8 3/4 in | Gas @ 3.6 MMCFD (3 to 4m long continuous flare) |
| 4 | 523 | 1129 | 8 3/4 in | Gas @ 2.5 MMCFD (gas detector swamped by fluid) |
| 5 | 523 | 1182 | 8 3/4 in | Gas @ 2.75 MMCFD |
| 6 | 523 | 1215 | 8 3/4 in | Gas @ 2.7 MMCFD |
| 7 | 523 | 1218 | 8 3/4 in | Gas @ 3.0 MMCFD |
| 8 | 523 | 1225 | 8 3/4 in | Gas @ 2.7 MMCFD |
| 9 | 523 | 1243 | 8 3/4 in | Gas @ 10.5 MMCFD) |
| 10 | 523 | 1248 | 8 3/4 in | Gas @ 11.5 MMCFD (8 to 10m long continuous flare) |

* Depth in Drillers

### TABLE 2(c) - DST Results

| DST | INTERVAL (mMD) | FORMATION | REMARKS |
|---|---|---|---|
| 1 | 1391.6 - 1433.4 (D)<br>1391.7 - 1433.5 (L) | P3-120/130 | DST 1: NFTS<br>Reverse Circulate: 1bbl rat hole mud and 1.5bbls slightly water cut 9.1ppg mud (with minor dispersed green fluorescence – no hydrocarbon odour). Sample chamber contained oil cut mud. ~2mm of oil separated out on top of sample tin (green fluorescence). |

(L) = Loggers Depth
(D) = Drillers Depth

## 3. HOLE CONDITIONS

### (a) Drilling Overview

9-5/8" surface casing in West Mereenie 19 was set at 523m. West Mereenie 19 was then drilled with an 8-3/4" bit to 1248m and then an 8-1/2" bit to a total depth of 1512m. Intervals of air and mud drilling are summarized below.

**TABLE 3 – Drilling Fluid Type**

| INTERVAL (m) | FLUID TYPE | COMMENTS |
|---|---|---|
| 523 - 1248 | Air-Mist Drilled | Well killed at 1094 m & again at 1248m due to hole in blooie line. |
| 1248 - 1511 | Mud Drilled | |

### (b) Hole Conditions

Hole conditions in this well-bore are generally good over the majority of the hole. There is significant bad hole across the top half of the Pacoota P2 sandstone, but is not considered significant as this section is view as an unconventional opportunity.

### (c) Bore Hole Fluids

At the time of logging the mud properties of West Mereenie 19 were as follows:

**TABLE 4 – Mud Properties**

| PARAMETERS | SUITE 1 |
|---|---|
| KCl | 0 % |
| NaCl | 6% |
| MW | 9.5 ppg |
| Rm | 0.107 Ωm @ 25° C |
| Rmf | 0.089 Ωm @ 25° C |
| Rmc | 0.119 Ωm @ 25° 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 |
|---|---|---|---|
| 63.3 @ 1494m | 1507 | PEX-HNGS-HRLA, Nuclear Curves | 23 hours 45 minutes |
| 61.2 @ 1487m | 1512 | FMI-SSCAN | 32 hours |
| 64.3 @ 1495m | 1512 | ECS-CMR+ | 41 hours |
| 61.6 @ 1471m | 1466 | MDT-GR | 75 hours 15 minutes |
| 61 @ 1449m | 1446 | GR-MSCT | 100 hours 45 minutes |

## 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 | 0.35 | 1.0 |
| Stairway (Middle/Lower) | 2.664 | 0.70 | 1.0 |
| Horn Valley Shale | 2.68 | 0.85 | 1.0 |
| Pacoota P1-40 | 2.66 | 0.50 | 1.0 |
| Pacoota P1-60 | 2.66 | 0.50 | 1.0 |
| Pacoota P1-80 | 2.643 | 0.70 | 1.0 |
| Pacoota P1-110 | 2.644 | 0.50 | 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 | 0.50 | 1.0 |
| Pacoota P1-240 | 2.644 | 0.50 | 1.0 |
| Pacoota P1-280 | 2.67 | 0.50 | 1.0 |
| Pacoota P1-310 | 2.654 | 0.50 | 1.0 |
| Pacoota P1-350 | 2.667 | 0.50 | 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 | 0.85 | 1.0 |
| Pacoota P3-150 | 2.641 | 0.85 | 1.0 |
| Pacoota P3-190/230/250 | 2.634 | 0.85 | 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 | 0.1 | 0.1 | 0.1 |
| 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

| | High Perm (1P) | | Conventional (2P) | | Low Perm (3P) | |
|---|---|---|---|---|---|---|
| Parameter | Cut Off | Ka equ. | Cut Off | Ka equ. | Cut Off | Ka equ. |
| Log ∅ | 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

| | High Perm (1P) | | Conventional (2P) | | Low Perm (3P) | |
|---|---|---|---|---|---|---|
| Parameter | Cut Off | Ka equ. | Cut Off | Ka equ. | Cut Off | Ka equ. |
| Log ∅ | 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

| | High Perm (1P) | | Conventional (2P) | | Low Perm (3P) | |
|---|---|---|---|---|---|---|
| Parameter | Cut Off | Ka equ. | Cut Off | Ka equ. | Cut Off | Ka equ. |
| Log ∅ | 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

| | High Perm (1P) | | Conventional (2P) | | Low Perm (3P) | |
|---|---|---|---|---|---|---|
| Parameter | Cut Off | Ka equ. | Cut Off | Ka equ. | Cut Off | Ka equ. |
| Log ∅ | 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

| | High Perm (1P) | | Conventional (2P) | | Low Perm (3P) | |
|---|---|---|---|---|---|---|
| Parameter | Cut Off | Ka equ. | Cut Off | Ka equ. | Cut Off | Ka equ. |
| Log ∅ | 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 ($\phi$t) and effective ($\phi$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.

# Vsh_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 (ϕtcmr)
CMRP_3MS = Effective porosity from CMR (ϕecmr)
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)

```
*****************************************
*                                       *
*     Pay Summary Report for GASPAY1    *
*                                       *
*    Project : madd_drilling            *
*    User id : graca                    *
*    Date    : 18-Mar-2014 12:12:08     *
*                                       *
*****************************************
```

| 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_19] | | | | | | | | | |
| 861.300 | 898.765 | 37.465 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 898.765 | 926.600 | 27.835 | 4.572 | 0.164 | 6.512 | 0.082 | 0.495 | 0.071 | 1.424 |
| [Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 926.600 | 1043.200 | 116.600 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: LOWER STAIRWAY 2; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1043.200 | 1101.700 | 58.500 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: LOWER STAIRWAY 1; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1101.700 | 1131.100 | 29.400 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: HORN VALLEY SILSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1131.100 | 1211.700 | 80.600 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-40; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1211.700 | 1232.200 | 20.500 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-60; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1232.200 | 1237.100 | 4.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-80; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1237.100 | 1244.400 | 7.300 | 3.924 | 0.538 | 12.974 | 0.068 | 0.165 | 0.062 | 3.306 |

| 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_19] | | | | | | | | | |
| 1244.400 | 1254.400 | 10.000 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-120/180; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1254.400 | 1264.300 | 9.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-200; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1264.300 | 1273.300 | 9.000 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-210; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1273.300 | 1281.500 | 8.200 | 0.610 | 0.074 | 7.875 | 0.067 | 0.089 | 0.057 | 12.918 |
| [Interval: PACOOTA P1-240; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1281.500 | 1296.700 | 15.200 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-280; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1296.700 | 1302.200 | 5.500 | 1.981 | 0.360 | 35.556 | 0.074 | 0.095 | 0.068 | 17.947 |
| [Interval: PACOOTA P1-310; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1302.200 | 1315.300 | 13.100 | 1.867 | 0.143 | 4.980 | 0.064 | 0.157 | 0.056 | 2.668 |
| [Interval: PACOOTA P1-350; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1315.300 | 1320.700 | 5.400 | 0.610 | 0.113 | 1.196 | 0.055 | 0.137 | 0.048 | 1.962 |
| [Interval: PACOOTA SST. P2; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1320.700 | 1388.330 | 67.630 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: OGOC; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1388.330 | 1393.200 | 4.870 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA SST. P3; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1393.200 | 1415.700 | 22.500 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-70; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1415.700 | 1420.000 | 4.300 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-90; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1420.000 | 1427.300 | 7.300 | 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_MEREENIE_19] | | | | | | | | | |
| 1427.300 | 1445.900 | 18.600 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-150; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1445.900 | 1456.700 | 10.800 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-190; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1456.700 | 1469.000 | 12.300 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-230/250; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1469.000 | 1481.900 | 12.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA SST. P4; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1481.900 | 1511.000 | 29.100 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Well WEST_MEREENIE_19] | | | | | | | | | |
| 861.300 | 1511.000 | 649.700 | 13.564 | 0.021 | 69.094 | 0.072 | 0.275 | 0.065 | 5.094 |

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

```
*****************************************
*                                       *
*     Pay Summary Report for GASPAY2    *
*                                       *
*    Project : madd_drilling            *
*    User id : graca                    *
*    Date    : 18-Mar-2014 12:12:08     *
*                                       *
*****************************************
```

| 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_19] | | | | | | | | | |
| 861.300 | 898.765 | 37.465 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 898.765 | 926.600 | 27.835 | 10.020 | 0.360 | 7.908 | 0.074 | 0.539 | 0.062 | 0.789 |
| [Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 926.600 | 1043.200 | 116.600 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: LOWER STAIRWAY 2; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1043.200 | 1101.700 | 58.500 | 2.134 | 0.036 | 0.588 | 0.077 | 0.881 | 0.064 | 0.276 |
| [Interval: LOWER STAIRWAY 1; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1101.700 | 1131.100 | 29.400 | 1.029 | 0.035 | 0.242 | 0.074 | 0.530 | 0.056 | 0.235 |
| [Interval: HORN VALLEY SILSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1131.100 | 1211.700 | 80.600 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-40; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1211.700 | 1232.200 | 20.500 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-60; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1232.200 | 1237.100 | 4.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-80; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1237.100 | 1244.400 | 7.300 | 4.267 | 0.585 | 13.079 | 0.067 | 0.172 | 0.061 | 3.065 |

| 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_19] | | | | | | | | | |
| 1244.400 | 1254.400 | 10.000 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-120/180; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1254.400 | 1264.300 | 9.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-200; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1264.300 | 1273.300 | 9.000 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-210; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1273.300 | 1281.500 | 8.200 | 2.591 | 0.316 | 8.543 | 0.060 | 0.251 | 0.050 | 3.297 |
| [Interval: PACOOTA P1-240; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1281.500 | 1296.700 | 15.200 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-280; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1296.700 | 1302.200 | 5.500 | 2.134 | 0.388 | 35.685 | 0.072 | 0.098 | 0.066 | 16.725 |
| [Interval: PACOOTA P1-310; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1302.200 | 1315.300 | 13.100 | 2.515 | 0.192 | 5.110 | 0.060 | 0.175 | 0.051 | 2.032 |
| [Interval: PACOOTA P1-350; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1315.300 | 1320.700 | 5.400 | 1.448 | 0.268 | 1.368 | 0.052 | 0.203 | 0.042 | 0.945 |
| [Interval: PACOOTA SST. P2; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1320.700 | 1388.330 | 67.630 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: OGOC; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1388.330 | 1393.200 | 4.870 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA SST. P3; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1393.200 | 1415.700 | 22.500 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-70; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1415.700 | 1420.000 | 4.300 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-90; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1420.000 | 1427.300 | 7.300 | 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_MEREENIE_19] | | | | | | | | | |
| 1427.300 | 1445.900 | 18.600 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-150; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1445.900 | 1456.700 | 10.800 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-190; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1456.700 | 1469.000 | 12.300 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-230/250; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1469.000 | 1481.900 | 12.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA SST. P4; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1481.900 | 1511.000 | 29.100 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Well WEST_MEREENIE_19] | | | | | | | | | |
| 861.300 | 1511.000 | 649.700 | 26.137 | 0.040 | 72.524 | 0.069 | 0.405 | 0.059 | 2.775 |

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

```
*****************************************
*                                       *
*     Pay Summary Report for GASPAY3    *
*                                       *
*    Project : madd_drilling            *
*    User id : graca                    *
*    Date    : 18-Mar-2014 12:12:08     *
*                                       *
*****************************************
```

| 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_19] | | | | | | | | | |
| 861.300 | 898.765 | 37.465 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 898.765 | 926.600 | 27.835 | 11.620 | 0.417 | 8.027 | 0.073 | 0.547 | 0.060 | 0.691 |
| [Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 926.600 | 1043.200 | 116.600 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: LOWER STAIRWAY 2; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1043.200 | 1101.700 | 58.500 | 3.238 | 0.055 | 0.665 | 0.074 | 0.905 | 0.062 | 0.205 |
| [Interval: LOWER STAIRWAY 1; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1101.700 | 1131.100 | 29.400 | 2.553 | 0.087 | 0.345 | 0.067 | 0.543 | 0.049 | 0.135 |
| [Interval: HORN VALLEY SILSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1131.100 | 1211.700 | 80.600 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-40; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1211.700 | 1232.200 | 20.500 | 0.114 | 0.006 | 0.006 | 0.066 | 0.458 | 0.051 | 0.054 |
| [Interval: PACOOTA P1-60; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1232.200 | 1237.100 | 4.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-80; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1237.100 | 1244.400 | 7.300 | 4.305 | 0.590 | 13.081 | 0.067 | 0.174 | 0.061 | 3.038 |

| 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_19] | | | | | | | | | |
| 1244.400 | 1254.400 | 10.000 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-120/180; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1254.400 | 1264.300 | 9.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-200; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1264.300 | 1273.300 | 9.000 | 0.419 | 0.047 | 0.047 | 0.060 | 0.388 | 0.049 | 0.112 |
| [Interval: PACOOTA P1-210; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1273.300 | 1281.500 | 8.200 | 3.238 | 0.395 | 8.605 | 0.060 | 0.275 | 0.049 | 2.657 |
| [Interval: PACOOTA P1-240; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1281.500 | 1296.700 | 15.200 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-280; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1296.700 | 1302.200 | 5.500 | 2.172 | 0.395 | 35.687 | 0.072 | 0.099 | 0.065 | 16.433 |
| [Interval: PACOOTA P1-310; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1302.200 | 1315.300 | 13.100 | 2.705 | 0.206 | 5.122 | 0.059 | 0.181 | 0.050 | 1.894 |
| [Interval: PACOOTA P1-350; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1315.300 | 1320.700 | 5.400 | 1.676 | 0.310 | 1.386 | 0.052 | 0.214 | 0.041 | 0.827 |
| [Interval: PACOOTA SST. P2; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1320.700 | 1388.330 | 67.630 | 1.067 | 0.016 | 0.484 | 0.063 | 0.513 | 0.051 | 0.454 |
| [Interval: OGOC; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1388.330 | 1393.200 | 4.870 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA SST. P3; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1393.200 | 1415.700 | 22.500 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-70; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1415.700 | 1420.000 | 4.300 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-90; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1420.000 | 1427.300 | 7.300 | 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_MEREENIE_19] | | | | | | | | | |
| 1427.300 | 1445.900 | 18.600 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-150; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1445.900 | 1456.700 | 10.800 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-190; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1456.700 | 1469.000 | 12.300 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-230/250; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1469.000 | 1481.900 | 12.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA SST. P4; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1481.900 | 1511.000 | 29.100 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Well WEST_MEREENIE_19] | | | | | | | | | |
| 861.300 | 1511.000 | 649.700 | 33.109 | 0.051 | 73.457 | 0.068 | 0.440 | 0.056 | 2.219 |

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

```
*****************************************
*                                       *
*     Pay Summary Report for OILPAY1    *
*                                       *
*    Project : madd_drilling            *
*    User id : graca                    *
*    Date    : 18-Mar-2014 12:12:08     *
*                                       *
*****************************************
```

| 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_19] | | | | | | | | | |
| 861.300 | 898.765 | 37.465 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 898.765 | 926.600 | 27.835 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 926.600 | 1043.200 | 116.600 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: LOWER STAIRWAY 2; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1043.200 | 1101.700 | 58.500 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: LOWER STAIRWAY 1; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1101.700 | 1131.100 | 29.400 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: HORN VALLEY SILSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1131.100 | 1211.700 | 80.600 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-40; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1211.700 | 1232.200 | 20.500 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-60; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1232.200 | 1237.100 | 4.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-80; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1237.100 | 1244.400 | 7.300 | 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 P1-110; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1244.400 | 1254.400 | 10.000 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-120/180; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1254.400 | 1264.300 | 9.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-200; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1264.300 | 1273.300 | 9.000 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-210; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1273.300 | 1281.500 | 8.200 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-240; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1281.500 | 1296.700 | 15.200 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-280; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1296.700 | 1302.200 | 5.500 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-310; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1302.200 | 1315.300 | 13.100 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-350; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1315.300 | 1320.700 | 5.400 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA SST. P2; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1320.700 | 1388.330 | 67.630 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: OGOC; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1388.330 | 1393.200 | 4.870 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA SST. P3; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1393.200 | 1415.700 | 22.500 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-70; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1415.700 | 1420.000 | 4.300 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-90; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1420.000 | 1427.300 | 7.300 | 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_MEREENIE_19] | | | | | | | | | |
| [Interval: PACOOTA SST. P3 (120/130); Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1427.300 | 1445.900 | 18.600 | 0.381 | 0.020 | 3.396 | 0.090 | 0.458 | 0.089 | 8.913 |
| [Interval: P3-150; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1445.900 | 1456.700 | 10.800 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-190; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1456.700 | 1469.000 | 12.300 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-230/250; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1469.000 | 1481.900 | 12.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA SST. P4; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1481.900 | 1511.000 | 29.100 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Well WEST_MEREENIE_19] | | | | | | | | | |
| 861.300 | 1511.000 | 649.700 | 0.381 | 0.001 | 3.396 | 0.090 | 0.458 | 0.089 | 8.913 |

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

```
*****************************************
*                                       *
*     Pay Summary Report for OILPAY2    *
*                                       *
*    Project : madd_drilling            *
*    User id : graca                    *
*    Date    : 18-Mar-2014 12:12:08     *
*                                       *
*****************************************
```

| 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_19] | | | | | | | | | |
| 861.300 | 898.765 | 37.465 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 898.765 | 926.600 | 27.835 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 926.600 | 1043.200 | 116.600 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: LOWER STAIRWAY 2; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1043.200 | 1101.700 | 58.500 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: LOWER STAIRWAY 1; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1101.700 | 1131.100 | 29.400 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: HORN VALLEY SILSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1131.100 | 1211.700 | 80.600 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-40; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1211.700 | 1232.200 | 20.500 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-60; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1232.200 | 1237.100 | 4.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-80; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1237.100 | 1244.400 | 7.300 | 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 P1-110; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1244.400 | 1254.400 | 10.000 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-120/180; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1254.400 | 1264.300 | 9.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-200; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1264.300 | 1273.300 | 9.000 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-210; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1273.300 | 1281.500 | 8.200 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-240; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1281.500 | 1296.700 | 15.200 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-280; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1296.700 | 1302.200 | 5.500 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-310; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1302.200 | 1315.300 | 13.100 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-350; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1315.300 | 1320.700 | 5.400 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA SST. P2; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1320.700 | 1388.330 | 67.630 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: OGOC; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1388.330 | 1393.200 | 4.870 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA SST. P3; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1393.200 | 1415.700 | 22.500 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-70; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1415.700 | 1420.000 | 4.300 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-90; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1420.000 | 1427.300 | 7.300 | 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_MEREENIE_19] | | | | | | | | | |
| 1427.300 | 1445.900 | 18.600 | 2.362 | 0.127 | 6.968 | 0.076 | 0.530 | 0.071 | 2.950 |
| [Interval: P3-150; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1445.900 | 1456.700 | 10.800 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-190; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1456.700 | 1469.000 | 12.300 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-230/250; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1469.000 | 1481.900 | 12.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA SST. P4; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1481.900 | 1511.000 | 29.100 | 0.000 | 0.000 | 0.000 | - | - | - | - |

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

```
*****************************************
*                                       *
*     Pay Summary Report for OILPAY3    *
*                                       *
*    Project : madd_drilling            *
*    User id : graca                    *
*    Date    : 18-Mar-2014 12:12:08     *
*                                       *
*****************************************
```

| 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_19] | | | | | | | | | |
| 861.300 | 898.765 | 37.465 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 898.765 | 926.600 | 27.835 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 926.600 | 1043.200 | 116.600 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: LOWER STAIRWAY 2; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1043.200 | 1101.700 | 58.500 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: LOWER STAIRWAY 1; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1101.700 | 1131.100 | 29.400 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: HORN VALLEY SILSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1131.100 | 1211.700 | 80.600 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-40; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1211.700 | 1232.200 | 20.500 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-60; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1232.200 | 1237.100 | 4.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-80; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1237.100 | 1244.400 | 7.300 | 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 P1-110; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1244.400 | 1254.400 | 10.000 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-120/180; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1254.400 | 1264.300 | 9.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-200; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1264.300 | 1273.300 | 9.000 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-210; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1273.300 | 1281.500 | 8.200 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-240; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1281.500 | 1296.700 | 15.200 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-280; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1296.700 | 1302.200 | 5.500 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-310; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1302.200 | 1315.300 | 13.100 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-350; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1315.300 | 1320.700 | 5.400 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA SST. P2; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1320.700 | 1388.330 | 67.630 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: OGOC; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1388.330 | 1393.200 | 4.870 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA SST. P3; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1393.200 | 1415.700 | 22.500 | 0.610 | 0.027 | 0.995 | 0.061 | 0.185 | 0.060 | 1.632 |
| [Interval: P3-70; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1415.700 | 1420.000 | 4.300 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-90; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1420.000 | 1427.300 | 7.300 | 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_MEREENIE_19] | | | | | | | | | |
| 1427.300 | 1445.900 | 18.600 | 4.450 | 0.239 | 8.752 | 0.071 | 0.533 | 0.065 | 1.967 |
| [Interval: P3-150; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1445.900 | 1456.700 | 10.800 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-190; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1456.700 | 1469.000 | 12.300 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-230/250; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1469.000 | 1481.900 | 12.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA SST. P4; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1481.900 | 1511.000 | 29.100 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Well WEST_MEREENIE_19] | | | | | | | | | |
| 861.300 | 1511.000 | 649.700 | 5.059 | 0.008 | 9.764 | 0.069 | 0.496 | 0.064 | 1.927 |

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

```
*****************************************
*                                       *
*       Pay Summary Report for SAND1    *
*                                       *
*    Project : madd_drilling            *
*    User id : graca                    *
*    Date    : 18-Mar-2014 12:12:08     *
*                                       *
*****************************************
```

| 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_19] | | | | | | | | | |
| 861.300 | 898.765 | 37.465 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 898.765 | 926.600 | 27.835 | 4.572 | 0.164 | 6.512 | 0.082 | 0.495 | 0.071 | 1.424 |
| [Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 926.600 | 1043.200 | 116.600 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: LOWER STAIRWAY 2; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1043.200 | 1101.700 | 58.500 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: LOWER STAIRWAY 1; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1101.700 | 1131.100 | 29.400 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: HORN VALLEY SILSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1131.100 | 1211.700 | 80.600 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-40; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1211.700 | 1232.200 | 20.500 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-60; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1232.200 | 1237.100 | 4.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-80; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1237.100 | 1244.400 | 7.300 | 3.924 | 0.538 | 12.974 | 0.068 | 0.165 | 0.062 | 3.306 |

| 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_19] | | | | | | | | | |
| 1244.400 | 1254.400 | 10.000 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-120/180; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1254.400 | 1264.300 | 9.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-200; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1264.300 | 1273.300 | 9.000 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-210; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1273.300 | 1281.500 | 8.200 | 0.610 | 0.074 | 7.875 | 0.067 | 0.089 | 0.057 | 12.918 |
| [Interval: PACOOTA P1-240; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1281.500 | 1296.700 | 15.200 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-280; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1296.700 | 1302.200 | 5.500 | 1.981 | 0.360 | 35.556 | 0.074 | 0.095 | 0.068 | 17.947 |
| [Interval: PACOOTA P1-310; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1302.200 | 1315.300 | 13.100 | 1.867 | 0.143 | 4.980 | 0.064 | 0.157 | 0.056 | 2.668 |
| [Interval: PACOOTA P1-350; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1315.300 | 1320.700 | 5.400 | 0.610 | 0.113 | 1.196 | 0.055 | 0.137 | 0.048 | 1.962 |
| [Interval: PACOOTA SST. P2; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1320.700 | 1388.330 | 67.630 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: OGOC; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1388.330 | 1393.200 | 4.870 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA SST. P3; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1393.200 | 1415.700 | 22.500 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-70; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1415.700 | 1420.000 | 4.300 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-90; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1420.000 | 1427.300 | 7.300 | 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_MEREENIE_19] | | | | | | | | | |
| 1427.300 | 1445.900 | 18.600 | 0.381 | 0.020 | 3.396 | 0.090 | 0.458 | 0.089 | 8.913 |
| [Interval: P3-150; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1445.900 | 1456.700 | 10.800 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-190; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1456.700 | 1469.000 | 12.300 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-230/250; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1469.000 | 1481.900 | 12.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA SST. P4; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1481.900 | 1511.000 | 29.100 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Well WEST_MEREENIE_19] | | | | | | | | | |
| 861.300 | 1511.000 | 649.700 | 13.945 | 0.021 | 72.490 | 0.073 | 0.281 | 0.065 | 5.198 |

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

```
*****************************************
*                                       *
*       Pay Summary Report for SAND2    *
*                                       *
*    Project : madd_drilling            *
*    User id : graca                    *
*    Date    : 18-Mar-2014 12:12:08     *
*                                       *
*****************************************
```

| 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_19] | | | | | | | | | |
| 861.300 | 898.765 | 37.465 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 898.765 | 926.600 | 27.835 | 10.020 | 0.360 | 7.908 | 0.074 | 0.539 | 0.062 | 0.789 |
| [Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 926.600 | 1043.200 | 116.600 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: LOWER STAIRWAY 2; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1043.200 | 1101.700 | 58.500 | 2.134 | 0.036 | 0.588 | 0.077 | 0.881 | 0.064 | 0.276 |
| [Interval: LOWER STAIRWAY 1; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1101.700 | 1131.100 | 29.400 | 1.029 | 0.035 | 0.242 | 0.074 | 0.530 | 0.056 | 0.235 |
| [Interval: HORN VALLEY SILSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1131.100 | 1211.700 | 80.600 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-40; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1211.700 | 1232.200 | 20.500 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-60; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1232.200 | 1237.100 | 4.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-80; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1237.100 | 1244.400 | 7.300 | 4.267 | 0.585 | 13.079 | 0.067 | 0.172 | 0.061 | 3.065 |

| 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_19] | | | | | | | | | |
| 1244.400 | 1254.400 | 10.000 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-120/180; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1254.400 | 1264.300 | 9.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-200; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1264.300 | 1273.300 | 9.000 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-210; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1273.300 | 1281.500 | 8.200 | 2.591 | 0.316 | 8.543 | 0.060 | 0.251 | 0.050 | 3.297 |
| [Interval: PACOOTA P1-240; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1281.500 | 1296.700 | 15.200 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-280; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1296.700 | 1302.200 | 5.500 | 2.134 | 0.388 | 35.685 | 0.072 | 0.098 | 0.066 | 16.725 |
| [Interval: PACOOTA P1-310; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1302.200 | 1315.300 | 13.100 | 2.515 | 0.192 | 5.110 | 0.060 | 0.175 | 0.051 | 2.032 |
| [Interval: PACOOTA P1-350; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1315.300 | 1320.700 | 5.400 | 1.448 | 0.268 | 1.368 | 0.052 | 0.203 | 0.042 | 0.945 |
| [Interval: PACOOTA SST. P2; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1320.700 | 1388.330 | 67.630 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: OGOC; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1388.330 | 1393.200 | 4.870 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA SST. P3; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1393.200 | 1415.700 | 22.500 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-70; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1415.700 | 1420.000 | 4.300 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-90; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1420.000 | 1427.300 | 7.300 | 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_MEREENIE_19] | | | | | | | | | |
| 1427.300 | 1445.900 | 18.600 | 2.362 | 0.127 | 6.968 | 0.076 | 0.530 | 0.071 | 2.950 |
| [Interval: P3-150; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1445.900 | 1456.700 | 10.800 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-190; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1456.700 | 1469.000 | 12.300 | 0.305 | 0.025 | 0.347 | 0.076 | 0.572 | 0.074 | 1.137 |
| [Interval: P3-230/250; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1469.000 | 1481.900 | 12.900 | 1.181 | 0.092 | 1.914 | 0.081 | 0.609 | 0.077 | 1.621 |
| [Interval: PACOOTA SST. P4; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1481.900 | 1511.000 | 29.100 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Well WEST_MEREENIE_19] | | | | | | | | | |
| 861.300 | 1511.000 | 649.700 | 29.985 | 0.046 | 81.753 | 0.070 | 0.427 | 0.061 | 2.726 |

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

```
*****************************************
*                                       *
*       Pay Summary Report for SAND3    *
*                                       *
*    Project : madd_drilling            *
*    User id : graca                    *
*    Date    : 18-Mar-2014 12:12:08     *
*                                       *
*****************************************
```

| 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_19] | | | | | | | | | |
| 861.300 | 898.765 | 37.465 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: BASAL UPPER STAIRWAY SANDSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 898.765 | 926.600 | 27.835 | 11.620 | 0.417 | 8.027 | 0.073 | 0.547 | 0.060 | 0.691 |
| [Interval: MIDDLE STAIRWAY SANDSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 926.600 | 1043.200 | 116.600 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: LOWER STAIRWAY 2; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1043.200 | 1101.700 | 58.500 | 3.238 | 0.055 | 0.665 | 0.074 | 0.905 | 0.062 | 0.205 |
| [Interval: LOWER STAIRWAY 1; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1101.700 | 1131.100 | 29.400 | 2.553 | 0.087 | 0.345 | 0.067 | 0.543 | 0.049 | 0.135 |
| [Interval: HORN VALLEY SILSTONE; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1131.100 | 1211.700 | 80.600 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-40; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1211.700 | 1232.200 | 20.500 | 0.114 | 0.006 | 0.006 | 0.066 | 0.458 | 0.051 | 0.054 |
| [Interval: PACOOTA P1-60; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1232.200 | 1237.100 | 4.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-80; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1237.100 | 1244.400 | 7.300 | 4.305 | 0.590 | 13.081 | 0.067 | 0.174 | 0.061 | 3.038 |

| 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_19] | | | | | | | | | |
| 1244.400 | 1254.400 | 10.000 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-120/180; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1254.400 | 1264.300 | 9.900 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-200; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1264.300 | 1273.300 | 9.000 | 0.419 | 0.047 | 0.047 | 0.060 | 0.388 | 0.049 | 0.112 |
| [Interval: PACOOTA P1-210; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1273.300 | 1281.500 | 8.200 | 3.238 | 0.395 | 8.605 | 0.060 | 0.275 | 0.049 | 2.657 |
| [Interval: PACOOTA P1-240; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1281.500 | 1296.700 | 15.200 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA P1-280; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1296.700 | 1302.200 | 5.500 | 2.172 | 0.395 | 35.687 | 0.072 | 0.099 | 0.065 | 16.433 |
| [Interval: PACOOTA P1-310; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1302.200 | 1315.300 | 13.100 | 2.705 | 0.206 | 5.122 | 0.059 | 0.181 | 0.050 | 1.894 |
| [Interval: PACOOTA P1-350; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1315.300 | 1320.700 | 5.400 | 1.676 | 0.310 | 1.386 | 0.052 | 0.214 | 0.041 | 0.827 |
| [Interval: PACOOTA SST. P2; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1320.700 | 1388.330 | 67.630 | 1.067 | 0.016 | 0.484 | 0.063 | 0.513 | 0.051 | 0.454 |
| [Interval: OGOC; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1388.330 | 1393.200 | 4.870 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: PACOOTA SST. P3; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1393.200 | 1415.700 | 22.500 | 0.610 | 0.027 | 0.995 | 0.061 | 0.185 | 0.060 | 1.632 |
| [Interval: P3-70; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1415.700 | 1420.000 | 4.300 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-90; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1420.000 | 1427.300 | 7.300 | 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_MEREENIE_19] | | | | | | | | | |
| 1427.300 | 1445.900 | 18.600 | 4.450 | 0.239 | 8.752 | 0.071 | 0.533 | 0.065 | 1.967 |
| [Interval: P3-150; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1445.900 | 1456.700 | 10.800 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Interval: P3-190; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1456.700 | 1469.000 | 12.300 | 1.105 | 0.090 | 0.954 | 0.073 | 0.568 | 0.070 | 0.864 |
| [Interval: P3-230/250; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1469.000 | 1481.900 | 12.900 | 2.286 | 0.177 | 2.749 | 0.077 | 0.650 | 0.072 | 1.202 |
| [Interval: PACOOTA SST. P4; Well: WEST_MEREENIE_19] | | | | | | | | | |
| 1481.900 | 1511.000 | 29.100 | 0.000 | 0.000 | 0.000 | - | - | - | - |
| [Well WEST_MEREENIE_19] | | | | | | | | | |
| 861.300 | 1511.000 | 649.700 | 41.559 | 0.064 | 86.924 | 0.068 | 0.464 | 0.059 | 2.091 |

# APPENDIX IV (b): FMT PRESSURE SURVEY DATA

## Santos

## PRESSURE SURVEY

**Well:** **West Mereenie 19** RT: 736.5 m Gauge Type : Quartz **Page :** 1
**Witness:** Simon Ostler / Dave Adderley Last circulated at : 01/12/2013 02:15 hrs Probe/Packer Type : XL Strain **Date :** 3/12/2013
**Engineer:** Adiya Kozybakova / Victor Mobaya

**Note: Depths from Suite 1 / Run 1**

| | FORMATION | DEPTH RT MD m | DEPTH SUBSEA m | TEST RESULTS | | | | | | | INTERPRETATION | | | | | COMMENTS | STRAIN GAUGE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 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 | FLUID TYPE | HYDRO BEFORE PSIG | INITIAL DRAWDOWN PSIG | FINAL BUILD UP PSIG | FORM PRESS PSIG | HYDRO AFTER PSIG | File |
| | **CORRELATION PASS 1** | **970** | **-233.5** | | | | | | | | | | | | | | | | | | | **14** |
| 1 | Upper Stairway Sst. | 915.5 | -179.0 | 1490.6 | | | | 1490.6 | 49 | | | | | | | Seal Failure | 1487.2 | | | | 1487.3 | 17 |
| 2 | Upper Stairway Sst. | 913 | -176.5 | 1487.2 | | | | 1486.2 | 47.1 | | | | | | | Seal Failure | 1482.7 | | | | 1482.7 | 20 |
| 3 | Upper Stairway Sst. | 915.7 | -179.2 | 1490.6 | | | | 1490.6 | 49 | | | | | | | Seal Failure | 1486.9 | | | | 1486.8 | 21 |
| | **TOOL/PACKER CHECK** | **1181** | **-444.5** | | | | | | | | | | | | | | | | | | | **26** |
| | **CORRELATION PASS 2** | **970** | **-233.5** | | | | | | | | | | | | | | | | | | | **30** |
| 4 | Upper Stairway Sst. | 920.6 | -184.1 | 1498.3 | 1231.2 | 1407.8 | 1407.8 | 1498.3 | 51.5 | 3.95 | N | 45 | <1 | G | | Good | 1494.5 | 1225.1 | 1402.7 | 1402.7 | 1494.6 | 31 |
| | **CORRELATION PASS 3** | **1150** | **-413.5** | | | | | | | | | | | | | | | | | | | **35** |
| 5 | Lower Stairway 2 | 1072.3 | -335.8 | 1743.4 | | | | 1743.3 | 53.7 | | | | | | | Lost Seal | 1739.5 | | | | 1739.6 | 36 |
| 6 | Lower Stairway 2 | 1072.1 | -335.6 | 1743.1 | | | | 1743.1 | 53.2 | | N | | | | | Seal Failure | 1739.4 | | | | 1739.3 | 37 |
| 7 | Lower Stairway 1 | 1115.7 | -379.2 | 1813.6 | | | | 1813.6 | 53.7 | | N | | | | | Seal Failure | 1809.7 | | | | 1809.8 | 38 |
| | **CORRELATION PASS 4** | **1300** | **-563.5** | | | | | | | | | | | | | | | | | | | **40** |
| 8 | Pacoota P1 | 1222.6 | -486.1 | 1986.7 | | | | 1986.7 | 55.9 | | | | | | | Seal Failure | 1982.8 | | | | 1982.8 | 41 |
| 9 | Pacoota P1-80 | 1238.8 | -502.3 | 2013 | 1400.1 | 1514.3 | 1514.3 | 2012.8 | 57.2 | 8.6 | N | 25 | <1 | R | | Good | 1994.5 | 1393.1 | 1495.6 | 1495.6 | 1994.5 | 42 |
| 10 | Pacoota P1-80 | 1241.3 | -504.8 | 2016.9 | | | | 2016.9 | 57.2 | | | | | | | Seal Failure | 1998.4 | | | | 1998.4 | 43 |
| 11 | Pacoota P1-80 | 1242.2 | -505.7 | 2018.3 | | | | 2018.3 | 57.5 | | | | | | | Seal Failure | 1999.7 | | | | 1999.7 | 45 |
| 12 | Pacoota P1-210 | 1273.7 | -537.2 | 2068.9 | 1277.7 | 1839.1 | 1839.1 | 2068.7 | 58.9 | 0.4 | N | 25 | <1 | G | | Good | 2065 | 1226 | 1835.4 | 1835.4 | 2065.1 | 48 |
| 13 | Pacoota P1-210 | 1273.55 | -537.1 | 2068.4 | 1484.9 | 1833.8 | 1833.8 | 2068.4 | 59.4 | 0.7 | N | 27 | <1 | G | | Good | 2064.7 | 1434.7 | 1830.1 | 1830.1 | 2064.7 | 49 |
| 14 | Pacoota P1-280 | 1299.7 | -563.2 | 2110.9 | 283.9 | 593.6 | 593.6 | 2110.6 | 59.8 | 0.9 | N | 15 | <1 | R | | Good | 2107.3 | 223.3 | 588.5 | 588.5 | 2107.4 | 50 |
| 15 | Pacoota P1-280 | 1298 | -561.5 | 2108.1 | 805 | 1467.3 | | 2108 | 60 | | N | 7 | 7 | S | | Curtailed | 2104.3 | 747.2 | 1465.4 | | 2104.5 | 51 |
| 16 | Pacoota P1-310 | 1309.4 | -572.9 | 2126.6 | 196.9 | 777.3 | | 2126.5 | 60.1 | | N | 3 | 100 | S | | Curtailed | 2122.4 | 174.9 | 797 | | 2123 | 53 |
| 17 | Pacoota P1-350 | 1316.5 | -580.0 | 2138.1 | | | | 2138.1 | 61.3 | | | 10 | | | | Lost Seal | 2134.6 | | | | 2134.5 | 54 |
| 18 | Pacoota P1-350 | 1317.7 | -581.2 | 2140.1 | 384.6 | | | 2140 | 61.3 | | N | 11 | | S | | Curtailed (Pressure dropping?) | 2136.54 | 1468.9 | 1791.1 | | 2136.55 | 55 |
| | **CORRELATION PASS 5** | **1390** | | | | | | | | | | | | | | **Add +0.2m** | | | | | | **57** |
| 19 | Pacoota P2 | 1358.4 | -621.9 | 2205.9 | 1511.8 | 1848.5 | 1848.5 | 2205.8 | 61.8 | 0.65 | N | 27 | <1 | S | | Good | 2202.3 | 1467.2 | 1844.7 | 1844.7 | 2202.4 | 58 |
| 20 | Pacoota P2 | 1387.3 | -650.8 | 2252.7 | | | | 2252.7 | 62.2 | | | 6 | | | | Seal Failure | 2249.1 | | | | 2249 | 59 |
| 21 | Pacoota P3-10 | 1396.3 | -659.8 | 2267.4 | | | | 2267.4 | 61.2 | | | 6 | | | | Seal Failure | 2263.8 | | | | 2263.9 | 60 |
| 22 | Pacoota P3-10 | 1400 | -663.5 | 2273.4 | | | | 2273.4 | 61.4 | | | 5 | | | | Seal Failure | 2269.9 | | | | 2270 | 61 |
| 23 | Pacoota P3-10 | 1399.9 | -663.4 | 2273.3 | | | | 2273.3 | 61.5 | | | 6 | | | | Seal Failure | 2269.7 | | | | 2269.7 | 62 |
| 24 | Pacoota P3-10 | 1400.1 | -663.6 | 2273.6 | | | | 2273.6 | 61.6 | | | 5 | | | | Seal Failure | 2270.1 | | | | 2270.1 | 63 |
| 25 | Pacoota P3-10 | 1405.8 | -669.3 | 2282.8 | 136.2 | 1549.9 | | 2282.6 | 61.8 | | N | 14 | 130 | S | | Curtailed | 2279.3 | 122.1 | 1577.5 | | 2279.3 | 64 |
| | **CORRELATION PASS 6** | **1460** | | | | | | | | | | | | | | **Add +0.2m** | | | | | | **66** |
| 26 | Pacoota P3-70 | 1417 | -680.5 | 2300.7 | 175.8 | 600.6 | | 2300.6 | 62.1 | | N | 12 | 30 | S | | Curtailed | 2297.3 | 149.1 | 595 | | 2297.3 | 67 |
| 27 | Pacoota P3-90 | 1426.7 | -690.2 | 2316.7 | 154.2 | 2200.2 | | 2316.6 | 62.5 | | N | 42 | 11 | S | SC | Curtailed - Super Charged | 2313.3 | 134.3 | 2198.9 | | 2313.3 | 68 |
| 28 | Pacoota P3-90 | 1426.8 | -690.3 | 2316.9 | 100.9 | 374 | | 2316.7 | 62.7 | | N | 6 | 80 | S | | Curtailed | 2313.4 | 86.8 | 369.9 | | 2313.6 | 69 |
| 29 | Pacoota P3-120/130 | 1430.9 | -694.4 | 2323.5 | 75.5 | 360.8 | | 2323.5 | 62.9 | | N | 20 | 20 | S | | Curtailed | 2320.2 | 62.1 | 363.5 | | 2320.3 | 70 |
| 30 | Pacoota P3-120/130 | 1432.7 | -696.2 | 2326.3 | 168.6 | 887.1 | | 2326.3 | 63.1 | | N | 20 | 30 | S | | Curtailed | 2323 | 151.2 | 881.1 | | 2323.1 | 71 |
| 31 | Pacoota P3-120/130 | 1432.8 | -696.3 | 2326.3 | 491.2 | 1159 | | 2326.3 | 63.2 | | N | 15 | 40 | S | | Curtailed | 2323 | 446.5 | 1160.2 | | 2323.1 | 72 |
| 32 | Pacoota P3-120/130 | 1434 | -697.5 | 2328.6 | 493 | 984.9 | | 2328.4 | 63.3 | | N | 12 | 27 | S | | Curtailed | 2325.2 | 451.3 | 985.4 | | 2325.2 | 73 |
| 33 | Pacoota P3-120/130 | 1434.1 | -697.6 | 2328.6 | 520.3 | 760.8 | | 2328.6 | 63.3 | | N | 6 | 57 | S | | Curtailed | 2325.3 | 472 | 756.2 | | 2325.4 | 75 |
| 34 | Pacoota P3-120/130 | 1436.2 | -699.7 | 2332.1 | 1544.1 | 1861.3 | 1861.3 | 2332 | 63.3 | 0.79 | N | 21 | <1 | G | | Good | 2328.8 | 1468.9 | 1875.7 | 1875.7 | 2328.8 | 76 |
| 35 | Pacoota P3-120/130 | 1438.2 | -701.7 | 2335.3 | 1781 | 1872.2 | 1872.2 | 2335.3 | 63.4 | 0.47 | N | 32 | <1 | S | | Good | 2332 | 1746.6 | 1868.6 | 1868.6 | 2332 | 77 |
| 36 | Pacoota P3-120/130 | 1438.7 | -702.2 | 2336.1 | 781.4 | 1896.3 | 1896.3 | 2335.9 | 63.7 | 0.07 | N | 39 | <1 | S | | Good | 2332.8 | 726 | 1893 | 1893 | 2332.5 | 78 |

## Santos

## PRESSURE SURVEY

**Well:** **West Mereenie 19** RT: 736.5 m Gauge Type : Quartz **Page :** 1
**Witness:** Simon Ostler / Dave Adderley Last circulated at : 01/12/2013 02:15 hrs Probe/Packer Type : XL Strain **Date :** 3/12/2013
**Engineer:** Adiya Kozybakova / Victor Mobaya

**Note: Depths from Suite 1 / Run 1**

| | FORMATION | DEPTH RT MD m | DEPTH SUBSEA m | TEST RESULTS | | | | | | | INTERPRETATION | | | | | COMMENTS | STRAIN GAUGE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 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 | FLUID TYPE | HYDRO BEFORE PSIG | INITIAL DRAWDOWN PSIG | FINAL BUILD UP PSIG | FORM PRESS PSIG | HYDRO AFTER PSIG | File |
| | **CORRELATION PASS 7** | **1500** | | | | | | | | | | | | | | **Add +0.3m** | | | | | | **80** |
| 37 | Pacoota P3-150 | 1445.7 | -709.2 | 2347.2 | 1190.9 | 1861.9 | 1861.9 | 2347.1 | 62.6 | 0.79 | N | 12 | <1 | G | | Good | 2343.9 | 1179.9 | 1858.3 | 1858.3 | 2343.8 | 81 |
| 38 | Pacoota P3-150 | 1444.8 | -708.3 | 2345.8 | 1692.1 | 1858.5 | 1858.5 | 2345.7 | 63.7 | 4.07 | N | 8 | <1 | G | | Good | 2342.5 | 1686.9 | 1854.8 | 1854.8 | 2342.5 | 82 |
| 39 | Pacoota P3-150 | 1443.9 | -707.4 | 2344.3 | 1718.6 | 1857.2 | 1857.2 | 2344.2 | 63.6 | 4.6 | N | 8 | <1 | G | | Good | 2340.9 | 1704.9 | 1853.6 | 1853.6 | 2340.9 | 83 |
| 40 | Pacoota P3-150 | 1448.1 | -711.6 | 2351.1 | 667.8 | 1877.8 | | 2351 | 63.6 | | N | 19 | 24 | S | | Curtailed | 2347.8 | 571.2 | 1881.1 | | 2347.8 | 84 |
| 41 | Pacoota P3-190 | 1453.1 | -716.6 | 2359.3 | | | | 2359.3 | 63.6 | | | 6 | | | | Seal Failure | 2356 | | | | 2355.9 | 85 |
| 42 | Pacoota P3-190 | 1455.8 | -719.3 | 2363.7 | 607 | 2082.8 | | 2363.6 | 63.7 | | N | 21 | 7 | S | | Curtailed | 2360.4 | 662.2 | 2080.8 | | 2360.3 | 86 |
| 43 | Pacoota P3-190 | 1456.2 | -719.7 | 2364.4 | 808.8 | 2049.6 | 2049.6 | 2364.2 | 64 | 0.43 | N | 38 | <1 | S | | Good | 2360.9 | 773.2 | 2046.1 | 2046.1 | 2360.9 | 87 |
| 44 | Pacoota P3 | 1465.8 | -729.3 | 2379.9 | 810 | 1866.1 | 1866.1 | 2379.9 | 64.1 | 0.51 | N | 15 | <1 | S | | Good | 2376.7 | 752.5 | 1862.3 | 1862.3 | 2376.6 | 88 |
| 45 | Pacoota P3-190 | 1453.2 | -716.7 | 2359.4 | | | | 2359.3 | 64.1 | | | 5 | | | | Seal Failure | 2356.1 | | | | 2356 | 89 |
| | **CORRELATION PASS 8** | **1500** | | | | | | | | | | | | | | **Add +0.2m** | | | | | | **90** |
| 46 | Pacoota P3-150 | 1444.7 | -708.2 | 2341.6 | 1397.3 | 1854.5 | 1854.5 | 2341.8 | 62.4 | 0.48 | N | 5 | <1 | G | | Saturn probe sample 1a 1b | 2348.2 | 1398.2 | 1861.6 | 1861.6 | 2348.3 | 93 |
| 47 | Pacoota P3-120/130 | 1436.3 | -699.8 | 2327.5 | 550.8 | 1825.8 | 1854.5 | n/a | 62.2 | 0.1 | N | 5 | <1 | G | | Saturn probe sample 2a 2b | 2339 | 558.1 | 1832.3 | 1832.3 | n/a | 96 |
| | **CORRELATION PASS 9** | | | | | | | | | | | | | | | **Add +0.1m** | | | | | | **7** |
| 48 | Pacoota P2 | 1358.5 | -622.0 | 2201.2 | 154.8 | 1717.7 | 1717.7 | 2202.2 | 59.9 | 0.28 | N | 175 | <1 | S | | Saturn probe sample 3a 3b | 2207.7 | 162.5 | 1726 | 1726 | 2208.6 | 8 |
| | **CORRELATION PASS 10** | **1220** | | | | | | | | | | | | | | **Add +0.1m** | | | | | | **10** |
| 49 | Horn Valley Siltstone | 1139.8 | -403.3 | 1847 | 39.1 | 50.9 | | 1854.6 | 55.3 | | L | 5 | 2 | VS | | Curtailed (Saturn Probe) | 1853.9 | 47.8 | 59.4 | | 1858.6 | 11 |
| | **CORRELATION PASS 11** | **1450** | | | | | | | | | | | | | | **Add +0.2m** | | | | | | **13** |
| 50 | Pacoota P3-10 | 1405.8 | -669.3 | 2277.8 | 99.4 | 2115.1 | 2115.1 | 2278.6 | 60.4 | 0 | N | 94 | <1 | S | | Good 0.3psi/min Saturn Probe | 2284 | 107.9 | 2122.1 | 2122.1 | 2285.3 | 14 |

| | | |
|---|---|---|
| Expected Temp Gradient: | 2.6 | deg C/100m |
| Expected Water Gradient: | 0.433 | psi/ft |
| Mud Weight : | 9.4 | ppg |
| Mud Gradient: | 0.4888 | 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** | | **72** |
| **Total Tests** | | **50** |
| **Good Tests** | | **18** |
| **Curtailed Tests** | | **15** |
| **Seal Failures** | | **17** |
| **Samples** | | **3** |
| **Correlation Passes :** | | **11** |

*** Note that deration of tests and point selection was done by Schlumberger not the WSG.**

# APPENDIX IV(c): FIELD ELECTRIC LOG REPORT

# Santos

## FIELD ELECTRIC LOG REPORT

| | | | | | |
|---|---|---|---|---|---|
| **WELL:** | West Meerenie 19 | | **GEOLOGIST:** | Simon Ostler | |
| **LOGGING ENGINEER:** | A.Kozybakova V.Mokaya | | | David Adderley | |
| **RUN NO:** | 1, 2, 3, 4, 5. | | | | |
| **DRILLER DEPTH:** | 1511m | | **LOGGER'S DEPTH:** | 1512m | |
| **ARRIVED ON SITE:** | 1/12/2013 | | | | |
| **ACTUAL LOG TIME:** | 62.25 | hrs | **LOST TIME LOGGER'S:** | 0.0 | hrs |
| **TOTAL TIME:** | 100.00 | hrs | **LOST TIME OTHERS:** | 4.50 | hrs |

| **TYPE OF LOG** | **PLATFORM EXPRESS** | **FMI-SONIC SCANNER** | **ECS-CMR** |
|---|---|---|---|
| **TIME CIRC STOPPED** | 02.15 hrs 01-December-13 | 02.15 hrs 01-December-13 | 02:15 hrs 01-December-13 |
| **TIME TOOL RIG UP** | 22:15 hrs 01-Dec-13 | 06:00 hrs 02-Dec-13 | 15:00 hrs 02-Dec-13 |
| **TIME RUN IN HOLE** | 00:00 hrs 02-Dec-13 | 07:45 hrs 02-Dec-13 | 16:15 hrs 02-Dec-13 |
| **TIME ON BOTTOM/ START LOG** | 02:00 hrs 02-Dec-13 | 09:30 hrs 02-Dec-13 | 19:00 hrs 02-Dec-13 |
| **TIME TOOL RIG DOWN** | 06:00 hrs 02-Dec-13 | 15:00 hrs 02-Dec-13 | 02:30 hrs 03-Dec-13 |
| **TOTAL TIME** | 7:45 | 9:00 | 11:30 |
| | | | |
| **TYPE OF LOG** | **MDT** | **MSCT** | **MSCT** |
| **TIME CIRC STOPPED** | 02:15 hrs 01-December-13 | 02:15 hrs 01-December-13 | 02:15 hrs 01-December-13 |
| **TIME TOOL RIG UP** | 02:30 hrs 03-Dec-13 | 03:00 hrs 05-Dec-13 | 14:30 hrs 05-Dec-13 |
| **TIME RUN IN HOLE** | 05:45 hrs 03-Dec-13 | 06:15 hrs 05-Dec-13 | 17:30 hrs 05-Dec-13 |
| **TIME ON BOTTOM/ START LOG** | 07:15 hrs 03-Dec-13 | 07:00 hrs 05-Dec-13 | 18:15 hrs 05-Dec-13 |
| **TIME TOOL RIG DOWN** | 03:00 hrs 05-Dec-13 | 14:30 hrs 05-Dec-13 | 00:15 hrs 06-Dec-13 |
| **TOTAL TIME** | 48.50 | 11:30 | 9.75 |

| **TYPE OF LOG** | **FROM** | **TO** | **TIME SINCE LAST CIRC** | **COMMENTS/REPEAT SECTION** | **BHT** |
|---|---|---|---|---|---|
| **Run 1: PEX-HNGS-HRLA** | | | | | |
| GR-HGNS | 1497m | Surface | 23.75 hrs | | 63.3 °C |
| HRLA | 1507m | 520m | | | at 1494m |
| MCFL | 1496m | 520m | | | |
| CNL | 1499m | 520m | | | |
| TLD | 1501m | 520m | | | |
| SP | 1484m | 520m | | | |
| **Run 2: FMI-SSCAN** | 1512m | 850m | 32 hrs | SSCAN in full acquisition mode<br>100m repeat section: T.D-1400m | 61.2 °C<br>at 1487m |
| **Run 3: ECS-CMR** | 1512m | 850m | 41 hrs | | 64.3 °C<br>at 1495m |
| **Run 4: MDT-GR** | 913m | 1465.8m | 75.25 hrs | 50 points: 18 good, 15 curtailed,<br>17 seal failures | 61.6 °C<br>at 1471m |
| **Run 5: GR-MSCT** | 1445.7m | 1135.7 | 100.75 hrs | 26 cores cut. Rec: 25, 1 lost. | 61.0 °C<br>at 1449m |
| **Run 6: GR-MSCT** | 1102.6 | 862.9 | - | 24 cores cut. Rec: 24. | - |
| **Run 7: GR-CCL** | 1295m | 1200m | - | Pip tag response very weak | - |

| **MUD DATA** | | | | | | |
|---|---|---|---|---|---|---|
| **MUD SYSTEM:** | | NaCl Polymer | **MW:** | 9.5 | | |
| **Rm:** | 0.107 Ohm.M @ 25° C | | **FV** | 33 | | |
| **Rmf:** | 0.089 Ohm.M @ 25° C | | **PV/YP:** | *6/12 | | |
| **Rmc:** | 0.119 Ohm.M @ 25° C | | **FL:** | 8.8 | pH: | 9.0 |

**REMARKS / RECOMMENDATIONS:**

1) No wireline jars were available for any logging runs
2) No communication device between the wireline unit and the rig floor was provided to aid rig up/down - Schlumberger relied on hand signals.
3) No telephone was available in the wireline unit.
4) On 40 degree day the airconditioners in the wireline unit could not keep up - had to have the doors open to try to cool down.

**Run 1: Platform Express**

1) Depth control as per Schlumberger standard procedures involved: Zeroing at surface. Applying no correction while RIH recording down log. Recording short up log at TD with calipers open. Depth shift correction to get on depth with the down log. Record main pass up from TD to surface without any further depth corrections.
2) Following this procedure 1.2m was added at TD to tie into down log. Loggers TD was 1512m (1511m drillers). Surface casing shoe on main pass was 519.5m (520m drillers).
3) High Resolution data was recorded from TD to 850m, standard resolution recorded from 850m to surface.
4) Several washed out zones particularly in the P2 (over 10”), the P3 primary target is generally good. No tight hole was observed in Run 1:PEX.
5) After log caliper shift of +0.3" was performed to match surface casing ID.

**Run 2: FMI-Sonic Scanner**

1) Depth contol tied into GR from run 1.
2) Logging aquistion speed predominantly 1000'/hr.

**Run 3: ECS-CMR**

1) Depth contol tied into GR from run 1.
2) Calibrate ECS by logging up within casing for 25 mins.
3) Tune CMR @ 1238.8m in permeable sandstone on the way in the hole.

**Run 4: MDT**

1) Depth contol tied into GR from run 1.
2) Instructions for running of the MDT tests and sampling came from Schlumberger in town, not the WSGs.
3) Opportunities existed to save time by changing pressure stabilisation criteria and curtailing tests earlier when appropriate.
4) 1klb overpull pulling off sample point 1, 2klbs overpull pulling off sample point 2, no overpull pulling off sample point 3.

**Run 5: MSCT**

1) Depth contol tied into GR from run 1.
2) Core 26 was cut then failed to retract. 1 hr and 10 mins. were spent trying to retrieve the core to no avail. The core bit and shaft were broken off with 4000 lbs pull. The logging string was POOH and replaced on surface with a complete back-up MSCT string. 25 cores recovered.

**Run 6: MSCT**

1) Depth contol tied into GR from run 1.
1) The remaining 24 cores were cut with the back-up MSCT coring bit, 24 cores recovered (A total 49 of 50 cores recovered).

**Run 7: GR-CCL (DST 1)**

1) Pip tag found at 1265.5m, needed to move pipe up 2.6m to setting depth.
2) Pip tag response very low, string depth confirmed with double CCL response at crossover and by supressed GR response when reading through drill collars versus through heavy weight drill pipe.

**LOST TIME BREAKDOWN:**

Run 4: May have been able to save time by changing pressure stabilisation criteria and curtailing tests earlier when appropriate - no lost time recorded.
Run 5: MSCT core barrel stuck on core 26, arm broken off and left in hole. POOH and continued with backup tool - **4.5hrs lost time other.**

**WELLSITE LOG QUALITY CONTRL CHECKS**

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

| LOG TYPE | PEX | FMI-SSCAN | MDT | COMMENTS | |
|---|---|---|---|---|---|
| Casing Check | Y | | Y | | |
| Scale Check | Y | Y | Y | | |
| Depth Casing Total | Y | Y | | Loggers found SCS @ 519.5m. | |
| Calibration OK | Y | Y | Y | Drillers SCS depth= 520m. | |
| Repeatability | Y | Y | | | |
| Logging Speed | 6-17m/min | 5m/min | n/a | | |
| Offset well repeatabilty | Y | | | | |
| Noisy/Missing Data | N | N | N | | |
| Rm Measurenment | Y | Y | Y | | |
| LLS/LLD/Check | Y | | | | |
| PERF/RHOB Check | Y | | | | |
| Caliper Check | Y | | Y | 0.3" added to caliper log to match casing ID. | |
| Log Header/Tail | Y | | | | |
| Comments | | | | | |
| Print/Film Quality | Y | Y | Y | | |

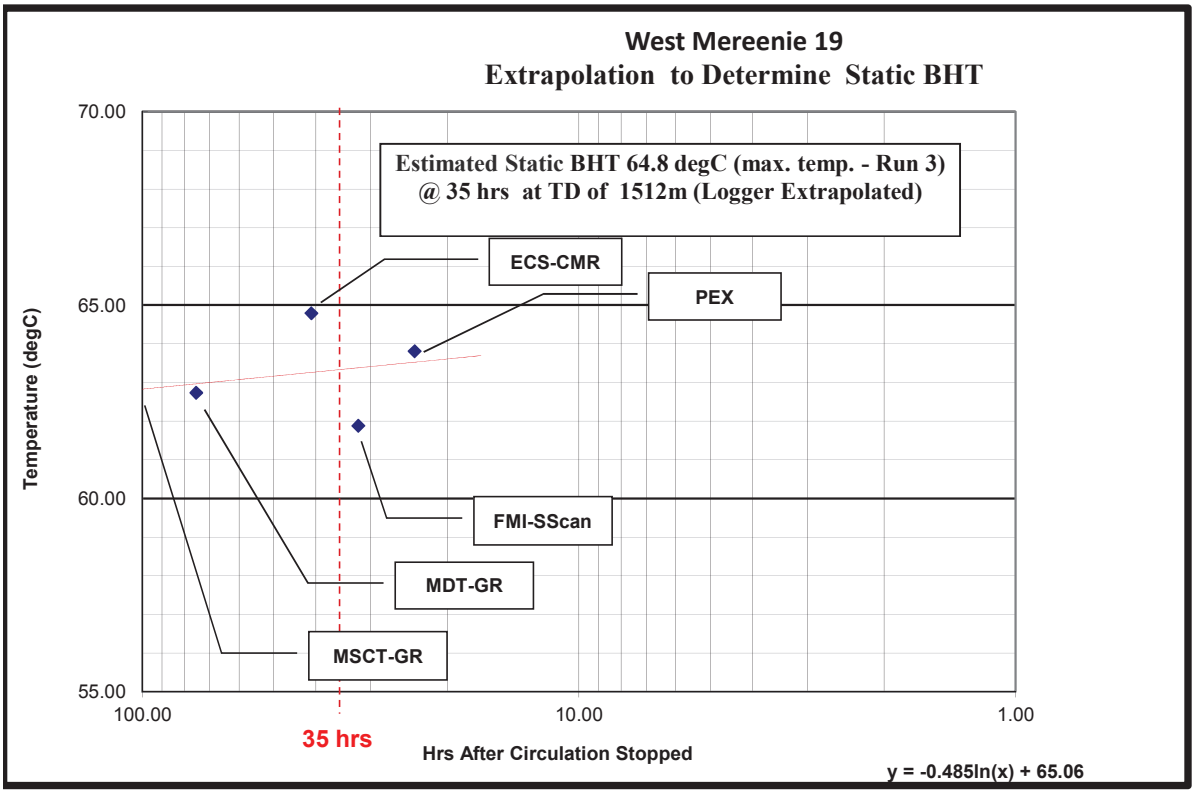
**COMMENTS: No lost time loggers occurred, job was performed well. Could possibly optimise time better during MDT points.**

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

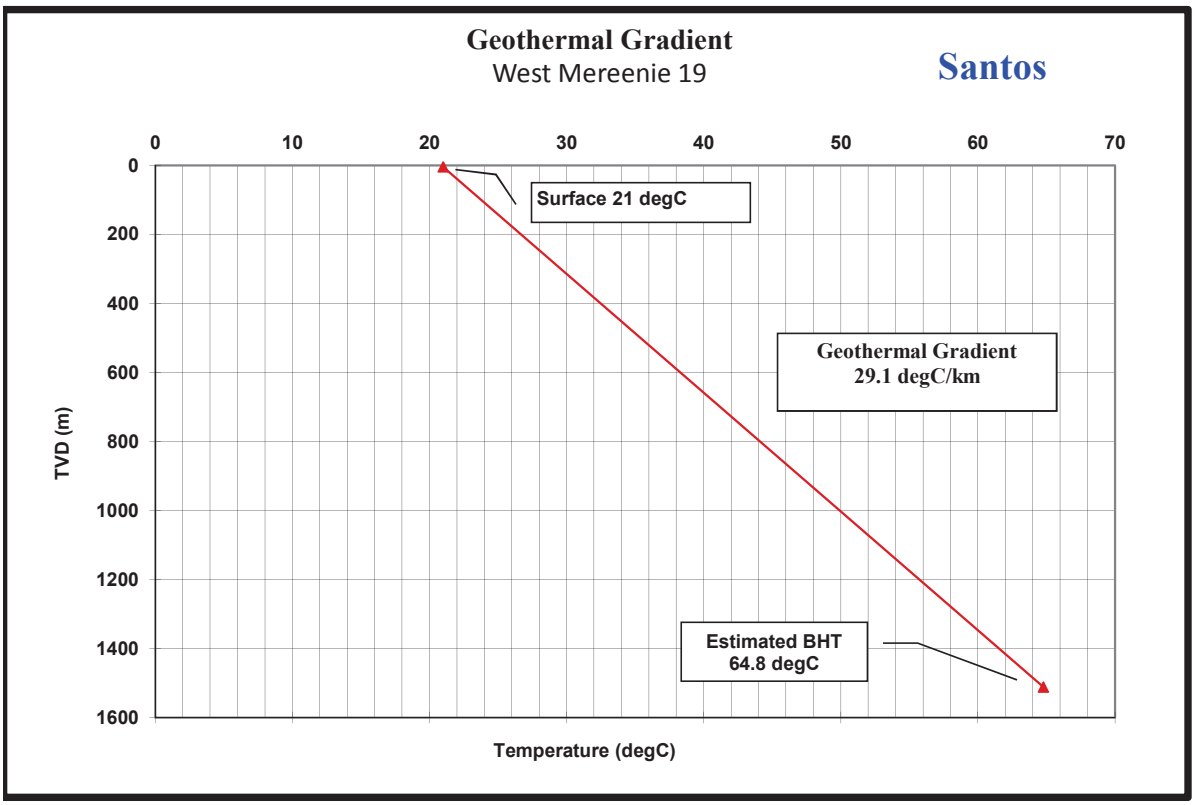
# APPENDIX V: GEOTHERMAL GRADIENT

A Temperature Gradient of 2.91°C/100m, with a BHT of 64.8°C was calculated for West Mereenie 19.

| | Max Recorded Temp (degC) | Depth Recorded (m) | Time Since Circulation. (hrs) | Total Depth (m) | Estimated BHT (degC) |
|---|---|---|---|---|---|
| Run 1 | 63.3 | 1494 | 23.75 | 1512 | 63.81 |
| Run 2 | 61.2 | 1487 | 32.00 | 1512 | 61.88 |
| Run 3 | 64.3 | 1495 | 41.00 | 1512 | 64.79 |
| Run 4 | 61.6 | 1471 | 75.25 | 1512 | 62.73 |
| Run 5 | 61.0 | 1449 | 100.75 | 1512 | 62.74 |




| | | | | |
|---|---|---|---|---|
| STATIC BHT @ 35 hrs | 64.8 | °C @ | 1512 | m |
| SURFACE TEMP. | 21 | °C @ | 5 | m |
| Geothermal Gradient for Suite 2 | | 29.06 | °C/km | |



# APPENDIX VI: DEVIATION DATA

PATHFINDER
A Schlumberger Company

Santos

# Santos - West Mereenie 19 FINAL Survey Geodetic Report

**(Def Survey)**

| | | | |
|---|---|---|---|
| **Report Date:** | December 02, 2013 - 10:25 AM | **Survey / DLS Computation:** | Minimum Curvature / Lubinski |
| **Client:** | Santos | **Vertical Section Azimuth:** | 0.000 ° (Grid North) |
| **Field:** | Mereenie | **Vertical Section Origin:** | 0.000 m, 0.000 m |
| **Structure / Slot:** | West Mereenie 19 / West Mereenie 19 | **TVD Reference Datum:** | RKB |
| **Well:** | West Mereenie 19 | **TVD Reference Elevation:** | 736.490 m above AHD |
| **Borehole:** | West Mereenie 19 | **Seabed / Ground Elevation:** | 731.340 m above AHD |
| **UWI / API#:** | Unknown / Unknown | **Magnetic Declination:** | 4.152 ° |
| **Survey Name:** | Santos - West Mereenie 19 FINAL | **Total Gravity Field Strength:** | 997.8935mgn (9.80665 Based) |
| **Survey Date:** | December 02, 2013 | **Gravity Model:** | GARM |
| **Tort / AHD / DDI / ERD Ratio:** | 21.682 ° / 81.238 m / 3.763 / 0.054 | **Total Magnetic Field Strength:** | 53352.420 nT |
| **Coordinate Reference System:** | GDA94/MGA94 Zone 52 | **Magnetic Dip Angle:** | -55.965 ° |
| **Location Lat / Long:** | S 23° 55' 52.29000", E 131° 23' 36.46000" | **Declination Date:** | November 21, 2013 |
| **Location Grid N/E Y/X:** | N 7351326.586 m, E 743618.631 m | **Magnetic Declination Model:** | HDGM 2013 |
| **CRS Grid Convergence Angle:** | -0.9714 ° | **North Reference:** | Grid North |
| **Grid Scale Factor:** | 1.00033314 | **Grid Convergence Used:** | -0.9714 ° |
| **Version / Patch:** | 2.7.998.0 | **Total Corr Mag North->Grid North:** | 5.1233 ° |
| | | **Local Coord Referenced To:** | Structure Reference Point |

| Comments | MD (m) | Incl (°) | Azim Grid (°) | TVD (m) | TVDSS (m) | VSEC (m) | NS (m) | EW (m) | DLS (°/30m) | Northing (m) | Easting (m) | Latitude (N/S ° ' ") | Longitude (E/W ° ' ") |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| West Mereenie 19 Tie-In | 0.00 | 0.00 | 0.00 | 0.00 | -736.49 | 0.00 | 0.00 | 0.00 | N/A | 7351326.59 | 743618.63 | S 23 55 52.29 | E 131 23 36.46 |
| | 5.00 | 0.60 | 46.23 | 5.00 | -731.49 | 0.02 | 0.02 | 0.02 | 3.60 | 7351326.60 | 743618.65 | S 23 55 52.29 | E 131 23 36.46 |
| | 10.00 | 0.50 | 45.72 | 10.00 | -726.49 | 0.05 | 0.05 | 0.05 | 0.60 | 7351326.64 | 743618.68 | S 23 55 52.29 | E 131 23 36.46 |
| | 15.00 | 0.46 | 65.18 | 15.00 | -721.49 | 0.08 | 0.08 | 0.09 | 1.00 | 7351326.66 | 743618.72 | S 23 55 52.29 | E 131 23 36.46 |
| | 20.00 | 0.48 | 72.25 | 20.00 | -716.49 | 0.09 | 0.09 | 0.13 | 0.37 | 7351326.68 | 743618.76 | S 23 55 52.29 | E 131 23 36.46 |
| | 25.00 | 0.44 | 76.33 | 25.00 | -711.49 | 0.10 | 0.10 | 0.16 | 0.31 | 7351326.69 | 743618.79 | S 23 55 52.29 | E 131 23 36.47 |
| | 30.00 | 0.47 | 79.39 | 30.00 | -706.49 | 0.11 | 0.11 | 0.20 | 0.23 | 7351326.70 | 743618.83 | S 23 55 52.29 | E 131 23 36.47 |
| | 35.00 | 0.46 | 92.05 | 35.00 | -701.49 | 0.11 | 0.11 | 0.24 | 0.62 | 7351326.70 | 743618.87 | S 23 55 52.29 | E 131 23 36.47 |
| | 40.00 | 0.42 | 98.53 | 40.00 | -696.49 | 0.11 | 0.11 | 0.28 | 0.38 | 7351326.70 | 743618.91 | S 23 55 52.29 | E 131 23 36.47 |
| | 45.00 | 0.43 | 109.21 | 45.00 | -691.49 | 0.10 | 0.10 | 0.32 | 0.48 | 7351326.69 | 743618.95 | S 23 55 52.29 | E 131 23 36.47 |
| | 50.00 | 0.45 | 118.86 | 50.00 | -686.49 | 0.08 | 0.08 | 0.35 | 0.46 | 7351326.67 | 743618.98 | S 23 55 52.29 | E 131 23 36.47 |
| | 55.00 | 0.47 | 123.56 | 55.00 | -681.49 | 0.06 | 0.06 | 0.39 | 0.26 | 7351326.65 | 743619.02 | S 23 55 52.29 | E 131 23 36.47 |
| | 60.00 | 0.47 | 137.00 | 60.00 | -676.49 | 0.04 | 0.04 | 0.42 | 0.66 | 7351326.62 | 743619.05 | S 23 55 52.29 | E 131 23 36.47 |
| | 65.00 | 0.51 | 143.59 | 65.00 | -671.49 | 0.00 | 0.00 | 0.44 | 0.41 | 7351326.59 | 743619.08 | S 23 55 52.29 | E 131 23 36.48 |
| | 70.00 | 0.56 | 149.24 | 70.00 | -666.49 | -0.03 | -0.03 | 0.47 | 0.44 | 7351326.55 | 743619.10 | S 23 55 52.29 | E 131 23 36.48 |
| | 75.00 | 0.60 | 145.91 | 75.00 | -661.49 | -0.08 | -0.08 | 0.50 | 0.31 | 7351326.51 | 743619.13 | S 23 55 52.29 | E 131 23 36.48 |
| | 80.00 | 0.52 | 137.58 | 80.00 | -656.49 | -0.12 | -0.12 | 0.53 | 0.68 | 7351326.47 | 743619.16 | S 23 55 52.29 | E 131 23 36.48 |
| | 85.00 | 0.60 | 160.24 | 85.00 | -651.49 | -0.16 | -0.16 | 0.55 | 1.40 | 7351326.43 | 743619.18 | S 23 55 52.29 | E 131 23 36.48 |
| | 90.00 | 0.53 | 162.50 | 90.00 | -646.49 | -0.20 | -0.20 | 0.57 | 0.44 | 7351326.38 | 743619.20 | S 23 55 52.30 | E 131 23 36.48 |
| | 95.00 | 0.58 | 163.92 | 95.00 | -641.49 | -0.25 | -0.25 | 0.58 | 0.31 | 7351326.34 | 743619.21 | S 23 55 52.30 | E 131 23 36.48 |
| | 100.00 | 0.58 | 166.60 | 100.00 | -636.49 | -0.30 | -0.30 | 0.59 | 0.16 | 7351326.29 | 743619.23 | S 23 55 52.30 | E 131 23 36.48 |
| | 105.00 | 0.61 | 169.82 | 105.00 | -631.49 | -0.35 | -0.35 | 0.60 | 0.27 | 7351326.24 | 743619.24 | S 23 55 52.30 | E 131 23 36.48 |
| | 110.00 | 0.61 | 162.42 | 110.00 | -626.49 | -0.40 | -0.40 | 0.62 | 0.47 | 7351326.18 | 743619.25 | S 23 55 52.30 | E 131 23 36.48 |
| | 115.00 | 0.26 | 114.21 | 115.00 | -621.49 | -0.43 | -0.43 | 0.64 | 2.87 | 7351326.15 | 743619.27 | S 23 55 52.30 | E 131 23 36.48 |
| | 120.00 | 0.20 | 93.99 | 120.00 | -616.49 | -0.44 | -0.44 | 0.65 | 0.60 | 7351326.15 | 743619.29 | S 23 55 52.30 | E 131 23 36.48 |
| | 125.00 | 0.19 | 130.99 | 125.00 | -611.49 | -0.44 | -0.44 | 0.67 | 0.74 | 7351326.14 | 743619.30 | S 23 55 52.30 | E 131 23 36.48 |
| | 130.00 | 0.18 | 160.96 | 130.00 | -606.49 | -0.46 | -0.46 | 0.68 | 0.58 | 7351326.13 | 743619.31 | S 23 55 52.30 | E 131 23 36.48 |
| | 135.00 | 0.11 | 84.91 | 135.00 | -601.49 | -0.46 | -0.46 | 0.69 | 1.12 | 7351326.12 | 743619.32 | S 23 55 52.30 | E 131 23 36.48 |
| | 140.00 | 0.22 | 148.26 | 140.00 | -596.49 | -0.47 | -0.47 | 0.70 | 1.18 | 7351326.12 | 743619.33 | S 23 55 52.30 | E 131 23 36.48 |
| | 145.00 | 0.10 | 345.61 | 145.00 | -591.49 | -0.47 | -0.47 | 0.70 | 1.90 | 7351326.11 | 743619.33 | S 23 55 52.31 | E 131 23 36.49 |
| | 150.00 | 0.11 | 355.35 | 150.00 | -586.49 | -0.47 | -0.47 | 0.70 | 0.12 | 7351326.12 | 743619.33 | S 23 55 52.30 | E 131 23 36.48 |
| | 155.00 | 0.17 | 303.08 | 155.00 | -581.49 | -0.46 | -0.46 | 0.69 | 0.81 | 7351326.13 | 743619.32 | S 23 55 52.30 | E 131 23 36.48 |
| | 160.00 | 0.15 | 91.82 | 160.00 | -576.49 | -0.45 | -0.45 | 0.69 | 1.85 | 7351326.13 | 743619.32 | S 23 55 52.30 | E 131 23 36.48 |
| | 165.00 | 0.25 | 109.19 | 165.00 | -571.49 | -0.46 | -0.46 | 0.71 | 0.70 | 7351326.13 | 743619.34 | S 23 55 52.30 | E 131 23 36.49 |
| | 170.00 | 0.12 | 90.82 | 170.00 | -566.49 | -0.46 | -0.46 | 0.72 | 0.85 | 7351326.13 | 743619.36 | S 23 55 52.30 | E 131 23 36.49 |
| | 175.00 | 0.17 | 121.24 | 175.00 | -561.49 | -0.46 | -0.46 | 0.74 | 0.54 | 7351326.12 | 743619.37 | S 23 55 52.30 | E 131 23 36.49 |
| | 180.00 | 0.10 | 41.65 | 180.00 | -556.49 | -0.46 | -0.46 | 0.75 | 1.09 | 7351326.12 | 743619.38 | S 23 55 52.30 | E 131 23 36.49 |
| | 185.00 | 0.11 | 9.05 | 185.00 | -551.49 | -0.46 | -0.46 | 0.75 | 0.36 | 7351326.13 | 743619.38 | S 23 55 52.30 | E 131 23 36.49 |
| | 190.00 | 0.13 | 35.69 | 190.00 | -546.49 | -0.45 | -0.45 | 0.75 | 0.35 | 7351326.14 | 743619.38 | S 23 55 52.30 | E 131 23 36.49 |
| | 195.00 | 0.15 | 65.00 | 195.00 | -541.49 | -0.44 | -0.44 | 0.76 | 0.44 | 7351326.15 | 743619.39 | S 23 55 52.30 | E 131 23 36.49 |
| | 200.00 | 0.26 | 68.17 | 200.00 | -536.49 | -0.43 | -0.43 | 0.78 | 0.66 | 7351326.15 | 743619.41 | S 23 55 52.30 | E 131 23 36.49 |
| | 205.00 | 0.26 | 67.33 | 205.00 | -531.49 | -0.42 | -0.42 | 0.80 | 0.02 | 7351326.16 | 743619.43 | S 23 55 52.30 | E 131 23 36.49 |
| | 210.00 | 0.30 | 74.78 | 210.00 | -526.49 | -0.42 | -0.42 | 0.82 | 0.32 | 7351326.17 | 743619.45 | S 23 55 52.30 | E 131 23 36.49 |
| | 215.00 | 0.31 | 73.17 | 215.00 | -521.49 | -0.41 | -0.41 | 0.85 | 0.08 | 7351326.18 | 743619.48 | S 23 55 52.30 | E 131 23 36.49 |
| | 220.00 | 0.39 | 87.16 | 219.99 | -516.50 | -0.40 | -0.40 | 0.88 | 0.70 | 7351326.18 | 743619.51 | S 23 55 52.30 | E 131 23 36.49 |
| | 225.00 | 0.40 | 88.91 | 224.99 | -511.50 | -0.40 | -0.40 | 0.91 | 0.09 | 7351326.18 | 743619.54 | S 23 55 52.30 | E 131 23 36.49 |
| | 230.00 | 0.52 | 160.37 | 229.99 | -506.50 | -0.42 | -0.42 | 0.94 | 3.28 | 7351326.16 | 743619.57 | S 23 55 52.30 | E 131 23 36.49 |
| | 235.00 | 0.45 | 152.12 | 234.99 | -501.50 | -0.46 | -0.46 | 0.95 | 0.59 | 7351326.12 | 743619.59 | S 23 55 52.30 | E 131 23 36.49 |
| | 240.00 | 0.47 | 140.98 | 239.99 | -496.50 | -0.50 | -0.50 | 0.98 | 0.55 | 7351326.09 | 743619.61 | S 23 55 52.31 | E 131 23 36.49 |
| | 245.00 | 0.47 | 148.53 | 244.99 | -491.50 | -0.53 | -0.53 | 1.00 | 0.37 | 7351326.06 | 743619.63 | S 23 55 52.31 | E 131 23 36.50 |
| | 250.00 | 0.40 | 204.34 | 249.99 | -486.50 | -0.56 | -0.56 | 1.00 | 2.47 | 7351326.02 | 743619.63 | S 23 55 52.31 | E 131 23 36.50 |
| | 255.00 | 0.43 | 176.39 | 254.99 | -481.50 | -0.60 | -0.60 | 1.00 | 1.22 | 7351325.99 | 743619.63 | S 23 55 52.31 | E 131 23 36.50 |
| | 260.00 | 0.45 | 159.56 | 259.99 | -476.50 | -0.63 | -0.63 | 1.01 | 0.78 | 7351325.95 | 743619.64 | S 23 55 52.31 | E 131 23 36.50 |
| | 265.00 | 0.46 | 152.72 | 264.99 | -471.50 | -0.67 | -0.67 | 1.02 | 0.33 | 7351325.92 | 743619.65 | S 23 55 52.31 | E 131 23 36.50 |
| | 270.00 | 0.47 | 142.93 | 269.99 | -466.50 | -0.71 | -0.71 | 1.04 | 0.48 | 7351325.88 | 743619.67 | S 23 55 52.31 | E 131 23 36.50 |
| | 275.00 | 0.55 | 129.51 | 274.99 | -461.50 | -0.74 | -0.74 | 1.07 | 0.86 | 7351325.85 | 743619.71 | S 23 55 52.31 | E 131 23 36.50 |
| | 280.00 | 0.50 | 124.26 | 279.99 | -456.50 | -0.76 | -0.76 | 1.11 | 0.42 | 7351325.82 | 743619.74 | S 23 55 52.31 | E 131 23 36.50 |
| | 285.00 | 0.52 | 119.50 | 284.99 | -451.50 | -0.79 | -0.79 | 1.15 | 0.28 | 7351325.80 | 743619.78 | S 23 55 52.31 | E 131 23 36.50 |
| | 290.00 | 0.53 | 113.76 | 289.99 | -446.50 | -0.81 | -0.81 | 1.19 | 0.32 | 7351325.78 | 743619.82 | S 23 55 52.32 | E 131 23 36.50 |
| | 295.00 | 0.53 | 116.74 | 294.99 | -441.50 | -0.83 | -0.83 | 1.23 | 0.17 | 7351325.76 | 743619.86 | S 23 55 52.32 | E 131 23 36.50 |
| | 300.00 | 0.52 | 114.25 | 299.99 | -436.50 | -0.85 | -0.85 | 1.27 | 0.15 | 7351325.74 | 743619.90 | S 23 55 52.32 | E 131 23 36.51 |
| | 305.00 | 0.52 | 114.33 | 304.99 | -431.50 | -0.87 | -0.87 | 1.31 | 0.00 | 7351325.72 | 743619.95 | S 23 55 52.32 | E 131 23 36.51 |
| | 310.00 | 0.53 | 116.89 | 309.99 | -426.50 | -0.89 | -0.89 | 1.36 | 0.15 | 7351325.70 | 743619.99 | S 23 55 52.32 | E 131 23 36.51 |
| | 315.00 | 0.54 | 116.60 | 314.99 | -421.50 | -0.91 | -0.91 | 1.40 | 0.06 | 7351325.68 | 743620.03 | S 23 55 52.32 | E 131 23 36.51 |
| | 320.00 | 0.54 | 115.56 | 319.99 | -416.50 | -0.93 | -0.93 | 1.44 | 0.06 | 7351325.66 | 743620.07 | S 23 55 52.32 | E 131 23 36.51 |
| | 325.00 | 0.55 | 115.51 | 324.99 | -411.50 | -0.95 | -0.95 | 1.48 | 0.06 | 7351325.64 | 743620.11 | S 23 55 52.32 | E 131 23 36.51 |
| | 330.00 | 0.65 | 99.14 | 329.99 | -406.50 | -0.96 | -0.96 | 1.53 | 1.18 | 7351325.62 | 743620.16 | S 23 55 52.32 | E 131 23 36.51 |
| | 335.00 | 0.62 | 105.16 | 334.99 | -401.50 | -0.98 | -0.98 | 1.59 | 0.44 | 7351325.61 | 743620.22 | S 23 55 52.32 | E 131 23 36.52 |
| | 340.00 | 0.66 | 107.01 | 339.99 | -396.50 | -0.99 | -0.99 | 1.64 | 0.27 | 7351325.60 | 743620.27 | S 23 55 52.32 | E 131 23 36.52 |
| | 345.00 | 0.63 | 106.53 | 344.99 | -391.50 | -1.01 | -1.01 | 1.69 | 0.18 | 7351325.58 | 743620.32 | S 23 55 52.32 | E 131 23 36.52 |
| | 350.00 | 0.60 | 109.73 | 349.99 | -386.50 | -1.02 | -1.02 | 1.74 | 0.27 | 7351325.56 | 743620.38 | S 23 55 52.32 | E 131 23 36.52 |
| | 355.00 | 0.59 | 107.90 | 354.99 | -381.50 | -1.04 | -1.04 | 1.79 | 0.13 | 7351325.55 | 743620.43 | S 23 55 52.32 | E 131 23 36.52 |
| | 360.00 | 0.58 | 107.04 | 359.99 | -376.50 | -1.06 | -1.06 | 1.84 | 0.08 | 7351325.53 | 743620.47 | S 23 55 52.32 | E 131 23 36.53 |
| | 365.00 | 0.58 | 105.95 | 364.99 | -371.50 | -1.07 | -1.07 | 1.89 | 0.07 | 7351325.52 | 743620.52 | S 23 55 52.32 | E 131 23 36.53 |
| | 370.00 | 0.57 | 104.80 | 369.99 | -366.50 | -1.08 | -1.08 | 1.94 | 0.09 | 7351325.50 | 743620.57 | S 23 55 52.32 | E 131 23 36.53 |
| | 375.00 | 0.67 | 102.13 | 374.99 | -361.50 | -1.10 | -1.10 | 1.99 | 0.62 | 7351325.49 | 743620.62 | S 23 55 52.32 | E 131 23 36.53 |
| | 380.00 | 0.66 | 102.64 | 379.99 | -356.50 | -1.11 | -1.11 | 2.05 | 0.07 | 7351325.48 | 743620.68 | S 23 55 52.32 | E 131 23 36.53 |
| | 385.00 | 0.68 | 111.28 | 384.99 | -351.50 | -1.13 | -1.13 | 2.10 | 0.62 | 7351325.46 | 743620.74 | S 23 55 52.33 | E 131 23 36.54 |
| | 390.00 | 0.72 | 101.90 | 389.99 | -346.50 | -1.14 | -1.14 | 2.16 | 0.73 | 7351325.44 | 743620.79 | S 23 55 52.33 | E 131 23 36.54 |
| | 395.00 | 0.71 | 102.34 | 394.99 | -341.50 | -1.16 | -1.16 | 2.22 | 0.07 | 7351325.43 | 743620.86 | S 23 55 52.33 | E 131 23 36.54 |
| | 400.00 | 0.64 | 108.39 | 399.99 | -336.50 | -1.17 | -1.17 | 2.28 | 0.60 | 7351325.42 | 743620.91 | S 23 55 52.33 | E 131 23 36.54 |
| | 405.00 | 0.78 | 96.02 | 404.99 | -331.50 | -1.18 | -1.18 | 2.34 | 1.24 | 7351325.40 | 743620.97 | S 23 55 52.33 | E 131 23 36.54 |
| | 410.00 | 0.73 | 99.19 | 409.99 | -326.50 | -1.19 | -1.19 | 2.41 | 0.39 | 7351325.39 | 743621.04 | S 23 55 52.33 | E 131 23 36.55 |
| | 415.00 | 0.77 | 107.17 | 414.99 | -321.50 | -1.21 | -1.21 | 2.47 | 0.67 | 7351325.38 | 743621.10 | S 23 55 52.33 | E 131 23 36.55 |
| | 420.00 | 0.62 | 111.16 | 419.98 | -316.51 | -1.23 | -1.23 | 2.53 | 0.95 | 7351325.36 | 743621.16 | S 23 55 52.33 | E 131 23 36.55 |
| | 425.00 | 0.65 | 118.94 | 424.98 | -311.51 | -1.25 | -1.25 | 2.58 | 0.55 | 7351325.34 | 743621.21 | S 23 55 52.33 | E 131 23 36.55 |
| | 430.00 | 0.71 | 106.06 | 429.98 | -306.51 | -1.27 | -1.27 | 2.63 | 0.98 | 7351325.31 | 743621.26 | S 23 55 52.33 | E 131 23 36.55 |
| | 435.00 | 0.63 | 108.45 | 434.98 | -301.51 | -1.29 | -1.29 | 2.69 | 0.51 | 7351325.30 | 743621.32 | S 23 55 52.33 | E 131 23 36.56 |
| | 440.00 | 0.62 | 116.55 | 439.98 | -296.51 | -1.31 | -1.31 | 2.74 | 0.53 | 7351325.28 | 743621.37 | S 23 55 52.33 | E 131 23 36.56 |
| | 445.00 | 0.64 | 113.24 | 444.98 | -291.51 | -1.33 | -1.33 | 2.79 | 0.25 | 7351325.25 | 743621.42 | S 23 55 52.33 | E 131 23 36.56 |
| | 450.00 | 0.73 | 102.53 | 449.98 | -286.51 | -1.35 | -1.35 | 2.84 | 0.94 | 7351325.23 | 743621.48 | S 23 55 52.33 | E 131 23 36.56 |
| | 455.00 | 0.75 | 99.28 | 454.98 | -281.51 | -1.36 | -1.36 | 2.91 | 0.28 | 7351325.22 | 743621.54 | S 23 55 52.33 | E 131 23 36.56 |
| | 460.00 | 0.48 | 117.72 | 459.98 | -276.51 | -1.38 | -1.38 | 2.96 | 1.99 | 7351325.21 | 743621.59 | S 23 55 52.33 | E 131 23 36.57 |
| | 465.00 | 0.58 | 117.99 | 464.98 | -271.51 | -1.40 | -1.40 | 3.00 | 0.60 | 7351325.19 | 743621.63 | S 23 55 52.33 | E 131 23 36.57 |
| | 470.00 | 0.70 | 109.76 | 469.98 | -266.51 | -1.42 | -1.42 | 3.05 | 0.91 | 7351325.16 | 743621.68 | S 23 55 52.33 | E 131 23 36.57 |
| | 475.00 | 0.74 | 92.51 | 474.98 | -261.51 | -1.43 | -1.43 | 3.11 | 1.32 | 7351325.15 | 743621.74 | S 23 55 52.33 | E 131 23 36.57 |
| | 480.00 | 0.46 | 65.04 | 479.98 | -256.51 | -1.43 | -1.43 | 3.16 | 2.36 | 7351325.16 | 743621.79 | S 23 55 52.33 | E 131 23 36.57 |
| | 485.00 | 0.49 | 43.89 | 484.98 | -251.51 | -1.40 | -1.40 | 3.20 | 1.06 | 7351325.18 | 743621.83 | S 23 55 52.33 | E 131 23 36.57 |
| | 490.00 | 0.66 | 44.42 | 489.98 | -246.51 | -1.37 | -1.37 | 3.23 | 1.02 | 7351325.22 | 743621.86 | S 23 55 52.33 | E 131 23 36.58 |
| | 495.00 | 0.65 | 34.70 | 494.98 | -241.51 | -1.32 | -1.32 | 3.27 | 0.67 | 7351325.26 | 743621.90 | S 23 55 52.33 | E 131 23 36.58 |

| Comments | MD (m) | Incl (°) | Azim Grid (°) | TVD (m) | TVDSS (m) | VSEC (m) | NS (m) | EW (m) | DLS (°/30m) | Northing (m) | Easting (m) | Latitude (N/S ° ' ") | Longitude (E/W ° ' ") |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 500.00 | 0.79 | 6.49 | 499.98 | -236.51 | -1.27 | -1.27 | 3.29 | 2.26 | 7351325.32 | 743621.92 | S 23 55 52.33 | E 131 23 36.58 |
| | 505.00 | 0.75 | 352.72 | 504.98 | -231.51 | -1.20 | -1.20 | 3.29 | 1.13 | 7351325.39 | 743621.92 | S 23 55 52.33 | E 131 23 36.58 |
| | 510.00 | 0.30 | 322.29 | 509.98 | -226.51 | -1.16 | -1.16 | 3.27 | 3.09 | 7351325.43 | 743621.91 | S 23 55 52.33 | E 131 23 36.58 |
| | 549.70 | 1.01 | 84.62 | 549.68 | -186.81 | -1.04 | -1.04 | 3.56 | 0.90 | 7351325.54 | 743622.19 | S 23 55 52.32 | E 131 23 36.59 |
| | 660.30 | 3.52 | 71.75 | 660.18 | -76.31 | 0.11 | 0.11 | 7.75 | 0.69 | 7351326.70 | 743626.39 | S 23 55 52.28 | E 131 23 36.73 |
| | 696.90 | 4.09 | 70.52 | 696.70 | -39.79 | 0.90 | 0.90 | 10.05 | 0.47 | 7351327.49 | 743628.69 | S 23 55 52.26 | E 131 23 36.81 |
| | 733.10 | 4.39 | 69.42 | 732.80 | -3.69 | 1.82 | 1.82 | 12.57 | 0.26 | 7351328.41 | 743631.20 | S 23 55 52.22 | E 131 23 36.90 |
| | 771.00 | 4.92 | 67.61 | 770.58 | 34.09 | 2.95 | 2.95 | 15.43 | 0.44 | 7351329.53 | 743634.06 | S 23 55 52.19 | E 131 23 37.00 |
| | 835.30 | 5.10 | 70.21 | 834.63 | 98.14 | 4.96 | 4.96 | 20.67 | 0.14 | 7351331.55 | 743639.30 | S 23 55 52.12 | E 131 23 37.19 |
| | 873.00 | 5.19 | 70.82 | 872.18 | 135.69 | 6.09 | 6.09 | 23.85 | 0.08 | 7351332.68 | 743642.49 | S 23 55 52.08 | E 131 23 37.30 |
| | 913.50 | 4.92 | 71.61 | 912.52 | 176.03 | 7.24 | 7.24 | 27.23 | 0.21 | 7351333.83 | 743645.87 | S 23 55 52.04 | E 131 23 37.42 |
| | 970.40 | 4.79 | 75.31 | 969.22 | 232.73 | 8.61 | 8.61 | 31.84 | 0.18 | 7351335.20 | 743650.49 | S 23 55 51.99 | E 131 23 37.58 |
| | 1008.10 | 4.61 | 77.33 | 1006.79 | 270.30 | 9.35 | 9.35 | 34.85 | 0.19 | 7351335.94 | 743653.49 | S 23 55 51.97 | E 131 23 37.69 |
| | 1049.40 | 4.31 | 76.14 | 1047.97 | 311.48 | 10.08 | 10.08 | 37.97 | 0.23 | 7351336.67 | 743656.61 | S 23 55 51.94 | E 131 23 37.80 |
| | 1087.30 | 4.00 | 75.13 | 1085.77 | 349.28 | 10.76 | 10.76 | 40.63 | 0.25 | 7351337.35 | 743659.28 | S 23 55 51.92 | E 131 23 37.89 |
| | 1251.90 | 5.01 | 79.83 | 1249.86 | 513.37 | 13.50 | 13.50 | 53.25 | 0.20 | 7351340.10 | 743671.90 | S 23 55 51.82 | E 131 23 38.33 |
| | 1290.10 | 5.32 | 79.30 | 1287.90 | 551.41 | 14.13 | 14.13 | 56.64 | 0.25 | 7351340.72 | 743675.29 | S 23 55 51.80 | E 131 23 38.45 |
| | 1330.80 | 5.49 | 78.91 | 1328.42 | 591.93 | 14.85 | 14.85 | 60.40 | 0.13 | 7351341.44 | 743679.05 | S 23 55 51.77 | E 131 23 38.59 |
| | 1368.00 | 5.49 | 78.91 | 1365.45 | 628.96 | 15.54 | 15.54 | 63.89 | 0.00 | 7351342.13 | 743682.55 | S 23 55 51.75 | E 131 23 38.71 |
| | 1369.10 | 5.58 | 78.03 | 1366.55 | 630.06 | 15.56 | 15.56 | 64.00 | 3.37 | 7351342.15 | 743682.65 | S 23 55 51.75 | E 131 23 38.71 |
| | 1409.30 | 5.41 | 79.74 | 1406.56 | 670.07 | 16.30 | 16.30 | 67.77 | 0.18 | 7351342.89 | 743686.43 | S 23 55 51.72 | E 131 23 38.85 |
| | 1447.00 | 5.58 | 79.61 | 1444.09 | 707.60 | 16.95 | 16.95 | 71.33 | 0.14 | 7351343.54 | 743689.98 | S 23 55 51.70 | E 131 23 38.97 |
| | 1485.90 | 5.71 | 81.55 | 1482.80 | 746.31 | 17.57 | 17.57 | 75.10 | 0.18 | 7351344.17 | 743693.76 | S 23 55 51.68 | E 131 23 39.10 |
| | 1491.50 | 5.71 | 81.24 | 1488.37 | 751.88 | 17.66 | 17.66 | 75.65 | 0.17 | 7351344.25 | 743694.31 | S 23 55 51.67 | E 131 23 39.12 |
| Mereenie 19 Projection to TD | 1511.00 | 5.71 | 81.24 | 1507.77 | 771.28 | 17.95 | 17.95 | 77.57 | 0.00 | 7351344.55 | 743696.23 | S 23 55 51.66 | E 131 23 39.19 |

**Survey Type:** Def Survey

**Survey Error Model:** ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma

**Survey Program:**

| Description | Part | MD From (m) | MD To (m) | EOU Freq (m) | Hole Size (in) | Casing Diameter (in) | Survey Tool Type | Borehole / Survey |
|---|---|---|---|---|---|---|---|---|
| | 1 | 0.000 | 5.150 | Act Stns | 12.250 | 9.625 | SLB_NSG+BATTERY-Depth Only | West Mereenie 19 / Santos - West Mereenie 19 FINAL |
| | 1 | 5.150 | 520.000 | Act Stns | 12.250 | 9.625 | SLB_NSG+BATTERY | West Mereenie 19 / Santos - West Mereenie 19 FINAL |
| | 1 | 520.000 | 1491.500 | Act Stns | 8.500 | 7.000 | SLB_MWD-STD | West Mereenie 19 / Santos - West Mereenie 19 FINAL |
| | 1 | 1491.500 | 1511.000 | Act Stns | 8.500 | 7.000 | SLB_BLIND+TREND | West Mereenie 19 / Santos - West Mereenie 19 FINAL |

PATHFINDER
A Schlumberger Company

# Santos

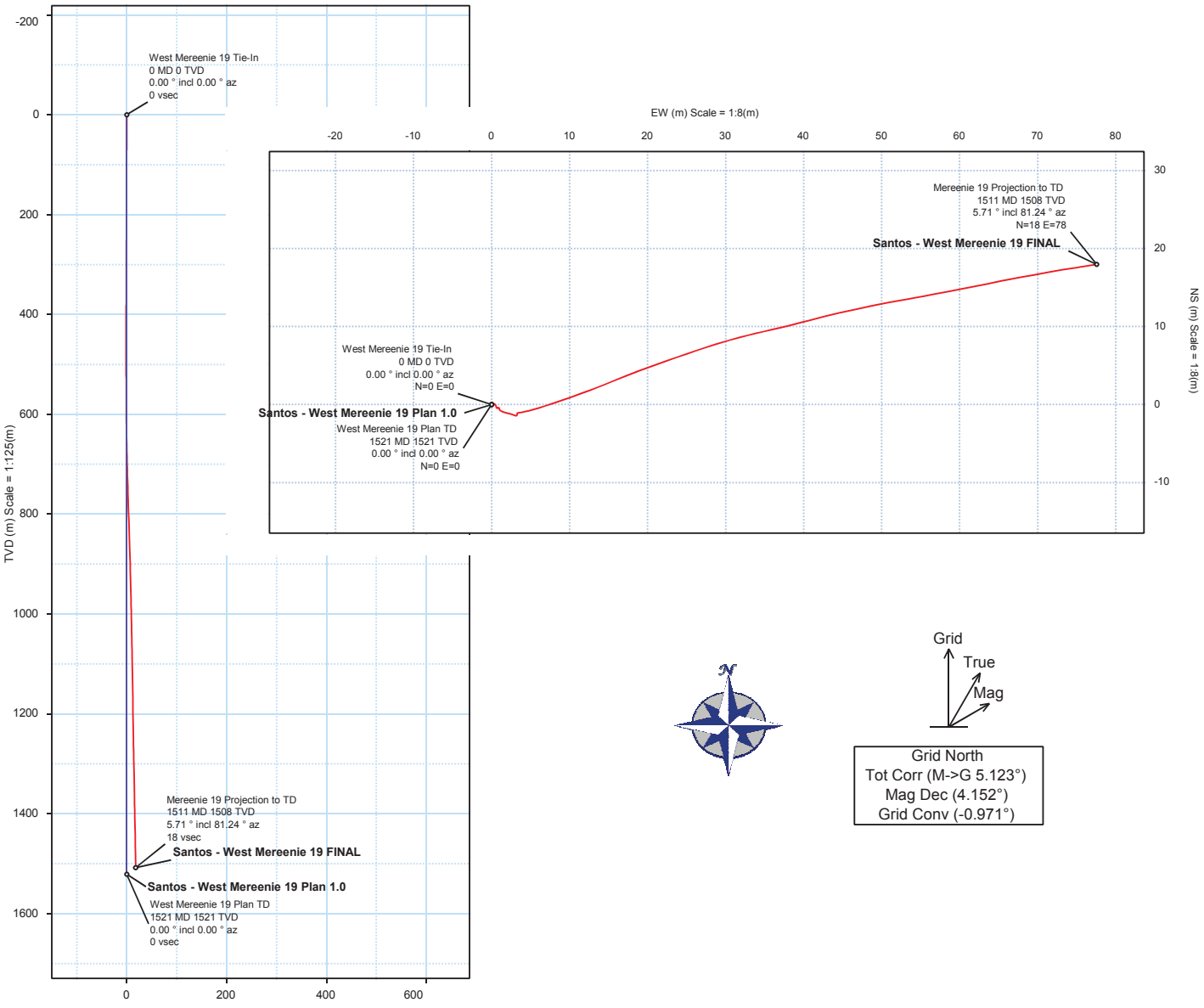
Santos

| Borehole: | Well: | Field: | Structure: |
|---|---|---|---|
| West Mereenie 19 | West Mereenie 19 | Mereenie | West Mereenie 19 |

**Gravity & Magnetic Parameters**
Model: HDGM 2013 Dip: -55.965° Date: 11/21/2013
MagDec: 4.152° FS: 53352.42nT Gravity FS: 997.893mgn (9.80665 Based)

**Surface Location** Geocentric Datum of Australia 1994/Map Grid of Australia zone 52
Lat: S 23 55 52.29 Northing: 7351326.586 m Grid Conv: -0.971°
Lon: E 131 23 36.46 Easting: 743618.631m Scale Fact: 1

**Miscellaneous**
Slot: West Mereenie 19 TVD Ref: RKB(736.49m above AHD)
Plan: Santos - West Mereenie 19 FINAL




Vertical Section (m) Azim = 0° Scale = 1:125(m) Origin = 0N/-S, 0E/-W







Grid North
Tot Corr (M->G 5.123°)
Mag Dec (4.152°)
Grid Conv (-0.971°)

Critical Points

| Critical Point | MD | INCL | AZIM | TVD | VSEC | N(+)/S(-) | E(+)/W(-) | DLS |
|---|---|---|---|---|---|---|---|---|
| West Mereenie 19 Tie-In | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Mereenie 19 Projection to TD | 1511.00 | 5.71 | 81.24 | 1507.77 | 17.95 | 17.95 | 77.57 | 0.00 |

| PART | Seq. | Survey Tool/ Survey Tool Code | Vendor/Tool | Hole Size (in) | Casing Size (in) | MD From (m) | MD To (m) | Survey Frequency (m) | EOU Size (Semi Major) (m) | EOU Size (Semi Minor) (m) | Comments/ Contingency |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | SLB_NSG+BATTERY-Depth Only | | 12.25 | 9.625 | 0 | 5.15 | Act Stns | 0.16 | 0.16 | |
| 1 | 2 | SLB_NSG+BATTERY | | 12.25 | 9.625 | 5.15 | 520 | Act Stns | 1.21 | 0.36 | |
| 1 | 3 | SLB_MWD-STD | | 8.5 | 7 | 520 | 549.7 | Act Stns | 1.18 | 0.36 | |
| 1 | 4 | SLB_MWD-STD | | 8.5 | 7 | 549.7 | 660.3 | 1/30 | 1.24 | 0.6 | |
| 1 | 5 | SLB_MWD-STD | | 8.5 | 7 | 660.3 | 1087.3 | Act Stns | 1.5 | 1.1 | |
| 1 | 6 | SLB_MWD-STD | | 8.5 | 7 | 1087.3 | 1251.9 | 1/30 | 1.83 | 1.46 | |
| 1 | 7 | SLB_MWD-STD | | 8.5 | 7 | 1251.9 | 1491.5 | Act Stns | 2.46 | 1.96 | |
| 1 | 8 | SLB_BLIND+TREND | | 8.5 | 7 | 1491.5 | 1511 | Act Stns | 3.59 | 2.49 | |

DEC **CONTROLLED**

| | |
|---|---|
| Plan ref | Santos - West Mereenie 19 FINAL |
| Drawing ref | |
| Copy number | of 1 |
| Date | 12/2/2013 |

| | | |
|---|---|---|
| 1 | Client OK | |
| 2 | Client OK | |
| 3 | Check by | Ewan Mitchell |
| 4 | Drawn by | Jessica Ortiz |

Copy number for

# APPENDIX VII: DRILL STEM TEST DATA

# Santos

## DRILL STEM TEST REPORT – DST 1

| | | | |
|---|---|---|---|
| **WELL:** | West Mereenie 19 | **DST NO: 1** | DATE: 07-12-13 |
| **INTERVAL:** | (L) 1391.7m – 1433.4m | **FORMATION:** | Pacoota Sandstone P3 |
| | (D) 1391.6m – 1433.3m | **CIRC STOPPED:** | 09:30 hrs 06-12-13 |
| **TESTING CO.** | Pro-Test Pty Ltd. | **HOURS SINCE CIRC:** | 30.25hrs |
| **TEST TYPE:** | Conventional Inflate Straddle | **SEPARATOR** | Yes |
| **CUSHION:** | N/A | **Rmf:** | 0.164 ohm @ 75° F |
| | | **Rw: (Cushion)** | N/A |
| **GEOLOGIST:** | D. Adderley | **Tracer:** | N/A |

## REMARKS

| ELAPSED TIME (MIN) | | REMARKS / PRESSURES | ELAPSED TIME (MIN) | | REMARKS / PRESSURES |
|---|---|---|---|---|---|
| 11:30 07/12/13 | | GR-CCL correlation – pip tag @ 1265.5m | 16:46 | 56 | Very weak blow top of bucket |
| 14:52 | | Rotate to inflate, packer did not hold | 17:18 | 88 | No blow in bucket |
| 15:24 | | Rotate again (0.3m higher) | 18:18 | 148 | Weak blow top of bucket |
| 15:50 | 0 | Weight down, tool indications of opening | 20:25 | 275 | Intermittent weak blow top of bucket |
| 16:07 | 17 | Pick up – recycle hydraulic to confirm opening | 22:00 | 370 | Shut in tool |
| 16:11 | 21 | Weight down, tool indications of opening | 23:50 | 480 | Release packer |
| 16:13 | 23 | Drain water from DST surface lines | 00:18 08/12/13 | | Drop bar and reverse circulated |
| 16:15 | 25 | Strong blow bottom of bucket – 0.6psi | 00:43 | | 360ppm CO2 observed, fluid to surface |
| 16:21 | 31 | Moderate blow mid bucket | 00:45 | | Sample slightly water cut mud |
| 16:28 | 38 | One inch of weak blow top of bucket | 02:25 | | Pull out of hole |

## 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 | 360/110 | 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” |

## FIELD DOWNHOLE PRESSURE DATA

| | | RECOVERY (1248) | INSIDE (1221) | OUTSIDE (1198/1186) | TIME (mins) |
|---|---|---|---|---|---|
| DEPTH | M | 1379.63 | 1385.44 | 1392.43 | |
| INITIAL HYDRO. | PSI | 1.5psi | 2205.2psi | 2214.3psi | |
| INITIAL FLOW | PSI | | 16.8psi | 30.1psi | 15:50hrs (0) |
| FINAL FLOW | PSI | | 21.3psi | 28.5psi | 16:09hrs (19) |
| INITIAL SHUT-IN | PSI | 12.0psi | 25.3psi | 34.5psi | 16:13hrs (23) |
| FINAL SHUT-IN | PSI | 28.0psi | 181.8psi | 191.0psi | 00:03hrs (493) |
| FINAL HYDRO. | PSI | 2159.1psi | 2204.3psi | 2212.7psi | |
| TEMPERATURE | °F | 58.7°C | 58.8°C | 59.0°C | |

**WELL:** West Mereenie 19 **DST NO:** 1 **DATE:** 07-12-13

# RECOVERY

| | |
|---|---|
| **REVERSE CIRCULATED** | **X** |
| **PULLED** | |

| | | |
|---|---|---|
| **1** | **REVERSE CIRCULATED** | Recovered 1bbl (36m) rat hole mud and 1.5bbls (59m) slightly water cut 9.1ppg mud (with minor dispersed green fluorescence – no hydrocarbon odour), (mud system weight 9.3ppg) |
| **2** | **CHART RECOVERY** | 18m of fluid, based on 9.1ppg measured during reverse circulation (27.6psi increase) |

# 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 | Slightly water cut mud,<br>Sampled 00:45hrs, 08-12-2013 | 0.2 ohm.m | Minor dispersed green fluorescence,<br>no hydrocarbon odour |
| 2 | Oil cut mud<br>Sampled 09:30hrs, 08-12-2013 | - | Recovered from sample chamber. Oil film on top has green fluorescence. |

**FILTRATE**

| SAMPLE NO. | TYPE | Rw / Rm | REMARKS |
|---|---|---|---|
| 3 | Mud filtrate | 0.164 ohm.m | Filtrate from last circulation, Sampled 09:30hrs, 06-12-2013 |

**Remarks:**

- **DST #1: 1391.7m-1433.4m (L).**
- **Wiper trip performed prior to DST #1, after wire-line logging.**
- **Santos Drilling tank number 011 and test separator number 002 on site for test – not utilised.**
- **Schlumberger wire-line correlation, pip tag found at 1265.5m. String needed to move up 2.6m to setting depth.**
- **Pip tag response very low, string depth confirmed with double CCL response at crossover and by supressed GR response when reading through drill collars versus through heavy weight drill pipe.**
- **Overpull observed when picking up after correlation, worked free.**
- **Packers skidded up 0.3m after initial inflation. Packers held after second inflation. Test performed 0.3m high to plan due to packers skidding up the hole.**
- **15:50hrs tools showed indication of opening, no bubbles in bucket. Recycle tools after 20 minutes, drill string indication of opening again at 16:11hrs, no indication in bubble bucket. Suspected water in DST lines, drain surface lines of water – immediate strong blow bottom of bucket (0.6psi) 16:15hrs. Blow rapidly decreased over 20 minutes to weak blow top of bucket (0.1psi). Intermittent weak blow for remaining duration of flow period (0.0psi)**
- **Reverse circulation recovered 1bbl rat hole mud and 1.5bbls slightly water cut 9.1ppg mud (with minor dispersed green fluorescence – no hydrocarbon odour), (mud system weight 9.3ppg).**
- **Sample chamber contained oil cut mud. ~2mm of oil separated out on top of sample tin (green fluorescence).**

# DST Field Report

**Date Issued: 8 Dec 2013**

## Field Copy

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

Australian - Accredited - Committed

## Well Information

| | | | | | |
|---|---|---|---|---|---|
| **Test Number:** | 1 | **Well Name:** | West Mereenie 19 | **Formation:** | Pacoota Sandstone.P3 |
| **Date:** | 7/12/2013 | **Customer:** | Santos | **Test Interval:** | 1392.00mRT-1433.71mRT |
| **Job Number:** | 525-SAN-IF | **Drilling Rig:** | Ensign 918 | **Well TD:** | 1511.00mRT |
| **Test Type:** | Inflate Straddle | **Permit / Lease:** | NTOL4 | **Interval Length:** | 41.71m |
| **km's to Rig:** | 2710 | **State:** | NT | **Zero Reference:** | RT |
| **Company Man:** | Darryl Whitbread | **Test Result:** | Successful | **DST Supervisor:** | Simon Withers |
| **Night Co. Man:** | Graham Blue | | | **DST Supervisor:** | Ed Stewart |
| **WSG:** | David Adderley | **Tool String:** | IF1 | | |
| **Mobilised by:** | Pedro Neale | **Pump:** | 3 | | |

| | | | Qty & OD | ID |
|---|---|---|---|---|
| Main Hole Size / Element Size: | 8.5" / 6.75" | | | |
| OH Size at Top / Btm Element: | 8.5" / 8.5" | Drill Pipe: | 4" | 3.24" |
| Total Time Spent Rotating: | 30 mins | Heviwaite: | 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: | 9.4ppg / Salt Base | |
| Caliper Log Run: | Yes | DST Tool Wt: | ? klbs | |
| Caliper Type: | FMI | Total String Wt: | 130 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: | 1379.93mRT | 1385.74mRT | 1392.73mRT |
| Initial Hydrostatic: | 1.52 psig | 2205.18 psig | 2214.29 psig |
| Start of Pre Flow: | | 16.81 psig | 30.12 psig |
| End of Pre Flow: | | 21.32 psig | 28.46 psig |
| Initial Shut In: | 11.98 psig | 25.25 psig | 34.45 psig |
| Start of Main Flow: | | 19.92 psig | 23.49 psig |
| End of Main Flow: | | 38.29 psig | 47.44 psig |
| Final Shut In: | 27.96 psig | 181.78 psig | 191.04 psig |
| Final Hydrostatic: | 2159.14 psig | 2204.34 psig | 2212.68 psig |
| Maximum Temp. during Test: | 58.7 °C | 58.8 °C | 59 °C |

| | Start | Finish | | Duration | | Weight to function tool |
|---|---|---|---|---|---|---|
| Pre Flow: | 15:50 | 16:09 | hrs | 19 | mins | 25 klbs |
| Initial Shut In: | 16:09 | 16:13 | hrs | 4 | mins | |
| Main Flow: | 16:13 | 22:03 | hrs | 350 | mins | 25 klbs |
| Final Shut In: | 22:03 | 0:03 | hrs | 120 | mins | |

Pre Flow Description

No bubbles when the tool first opened then a few random bubbles after. Cycle hydraulic tool.

Main Flow Description

No bubbles when the tool first opened . Drained water from surface line. Immediate strong blow to the bottom of the bucket. Five minutes into the flow the bubbles started to die. After 60 minutes the bubbles had died back to very weak on the surface of the bucket and remained the same for the rest of the flow period.

Total Fluid Recovered: 17m 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

Sample Chamber Contents: Oil cut rat hole mud Sample Chamber Pressure: 5 psig

| | | | |
|---|---|---|---|
| ☑ Drop Bar Released | ☑ Impact Type Circ. Sub Activated | ☑ Hollow Shear Pin Recovered | ☐ Closed Chamber |
| ☑ Well Circulated before POOH | ☐ Pressure Type Circ. Sub Activated | ☐ Pulled to Fluid then Circulated | ☐ EMRT Run |

Top Packer Re-use / Condition: Yes - Good

Bottom Packer Re-use / Condition: Yes - Good

# DST Field Report

**Date Issued: 8 Dec 2013**

**Field Copy**

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

## Drill Stem Test Information

Comments

Final flow - Small amount of water was found in the line between the head and the manifold. A quick flush and we got a bubble flow. This trapped water was the reason we didn't see the expected flow on the first attempt at opening the tool. Recovery based on a fuild weight of 9.1ppg which was measured when reverse circulating.

## Sequence of Events

| | | | | | |
|---|---|---|---|---|---|
| 30 Nov 2013 | 08:30 hrs | Test crew depart base / previous well. | 2 Dec 2013 | 17:00 hrs | Test crew arrive at rig / camp. |
| | 13:00 hrs | Shatter back window on wagon due to loose stones | | 15:36 hrs | Stop rotating / Check seat with 15klbs overpull |
| | 19:00 hrs | Arrive at Longreach ( Albert Park Motor Inn ) | | 15:40 hrs | Set down 25klbs weight to open tool |
| 1 Dec 2013 | 06:30 hrs | Depart Longreach | | 15:50 hrs | Tool open |
| | 21:30 hrs | Arrive at Tennant Creek ( Bluestone Motor Inn ) | | | Very little bubble flow in the bucket |
| 2 Dec 2013 | 07:00 hrs | Depart Tennant Creek | | 16:09 hrs | Pick up 15klbs over SW & close tool for the shut in |
| | 11:50 hrs | Arrive at Alice Springs | | 16:10 hrs | Set down 25klbs weight to open tool |
| | 12:00 hrs | Get rear window replaced | | 16:13 hrs | Tool open |
| | 13:30 hrs | Depart Alice Springs | | | Water in hose to manifold affecting bubble hose |
| | 17:00 hrs | Arrive at Mereenie ( Ensign 918 camp ) | | | Clear water from bubble hose (see comments) |
| 3 Dec 2013 | 08:00 hrs | Meet Pedro Neale / Complete Induction | | 16:17 hrs | Strong blow bottom of the bucket |
| | 09:30 hrs | Check out ProTest container | | 21:57 hrs | Pick up 15klbs over SW & close tool for the shut in |
| | 11:00 hrs | Arrive at Ensign 918 / Complete induction | | 22:03 hrs | Tool closed |
| | 12:20 hrs | Return to camp | | 23:50 hrs | Set down 10klbs with RH turn to equalise pressure |
| 4 Dec 2013 | | Waiting on Logging / Final decision | | | Pick up to neutral to allow elements to deflate |
| 5 Dec 2013 | 08:00 hrs | Go to rig and go over tools | | 00:00 hrs | Crew change / PJSM- Reverse/Conventional circ |
| | 10:30 hrs | Go to service container ( Set it up ) | | 00:00 hrs | Check free / Sticking |
| | 12:30 hrs | Return to camp | | 00:03 hrs | Set down 10klbs with RH turn to equalise pressure |
| | 16:00 hrs | Install flare system / Function test. | | | Pick up to neutral to allow elements to deflate |
| 6 Dec 2013 | 08:00 hrs | Go to rig for update | | 00:10 hrs | Work pipe to check tools are free |
| | 09:00 hrs | Return to camp | | 00:18 hrs | Drop bar, activate impact sub |
| | 10:40 hrs | Arrive at rig | | 00:20 hrs | Commence reverse circulation |
| | | Adjust pipe tally ( 1392 - 1433.71 mtrs ) | | 00:35 hrs | Close BOP at 33.5 bbls |
| | 11:40 hrs | Return to camp | | 00:38 hrs | Start pumping |
| | 16:30 hrs | Arrive at rig / Add 1.56mtr pup joint. | | 00:45 hrs | Fluid at 565 strks / 36.2 bbls |
| | 17:30 hrs | Return to camp | | 00:50 hrs | Stop pumping 635 strks / 40.7 bbls |
| | 22:30 hrs | Arrive at rig | | 00:55 hrs | Rig out head and surface equipment |
| | 22:47 hrs | Start gauges | | 01:30 hrs | Complete breaking down surface equipment |
| | 00:30 hrs | PJSM - Making up tools | | 01:37 hrs | Commence forward circulation |
| 7 Dec 2013 | 01:00 hrs | Start making up tools | | 02:00 hrs | Return to camp |
| | 04:30 hrs | Complete making up tools | | 06:25 hrs | Arrive at rig |
| | | Pipe count ( 16 DC / 60 HWDP / 96 DP in derrick ) | | 06:45 hrs | PJSM - B/D DST tools |
| | 04:15 hrs | Return to camp | | 06:50 hrs | Commence B/D of DST tools |
| | 09:30 hrs | Arrive at rig | | 10:50 hrs | Complete B/D of DST tools & compile reports |
| | 10:00 hrs | SLB correlation | | | |
| | 12:00 hrs | PJSM-Rig up Surface equipment / Pressure testing | | | Tools to be taken to Mereenie laydown yard for |
| | 12:30 hrs | Rig up surface equipment | | | service and pressure testing. |
| | 13:00 hrs | Pressure test to 1500 psi / Good | | | |
| | 13:10 hrs | Purge surface lines with air | | | |
| | 13:20 hrs | Adjust stick up by 2.6 mtrs / String stuck / Work free | | | |
| | | String weights - Static:130klbs ↑:135klbs ↓:124klbs | | | |
| | 14:40 hrs | PJSM - Conducting the DST | | | |
| | 14:57 hrs | Start rotating at 60rpm then slow rotation to 48 rpm | | | |
| | 15:20 hrs | Stop rotating / Check seat | | | |
| | | Packers sliding with 12klbs overpull | | | |
| | 15:26 hrs | Rotate at 40rpm to inflate elements | | | |

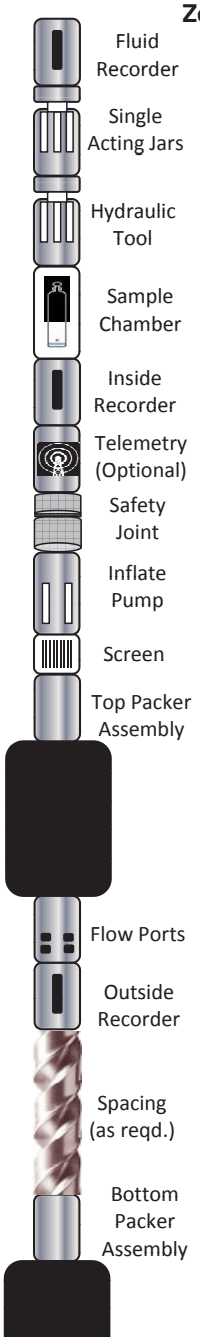
# Test Tool Tally

## Field Copy

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

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 1 | **Well Name:** | West Mereenie 19 | **Formation:** | Pacoota Sandstone.P3 |
| **Date:** | 7/12/2013 | **Customer:** | Santos | **Test Interval:** | 1392.00mRT-1433.71mRT |
| **Job No:** | 525-SAN-IF | **Drilling Rig:** | Ensign 918 | **Well TD:** | 1511.00mRT |
| **Test Type:** | Inflate Straddle | **Permit:** | NTOL4 | **Interval Length:** | 41.71m |

| | | | | | |
|---|---|---|---|---|---|
| **Ground Level:** | 731.34m | **Cushion Type:** | N/A | **DST Supervisor:** | Simon Withers |
| **RT Level:** | 736.49m | **Cushion Wt:** | N/Appg | **Company Man:** | Darryl Whitbread |
| **Zero Reference:** | RT | **Cushion Amount:** | N/Am | **WSG:** | David Adderley |

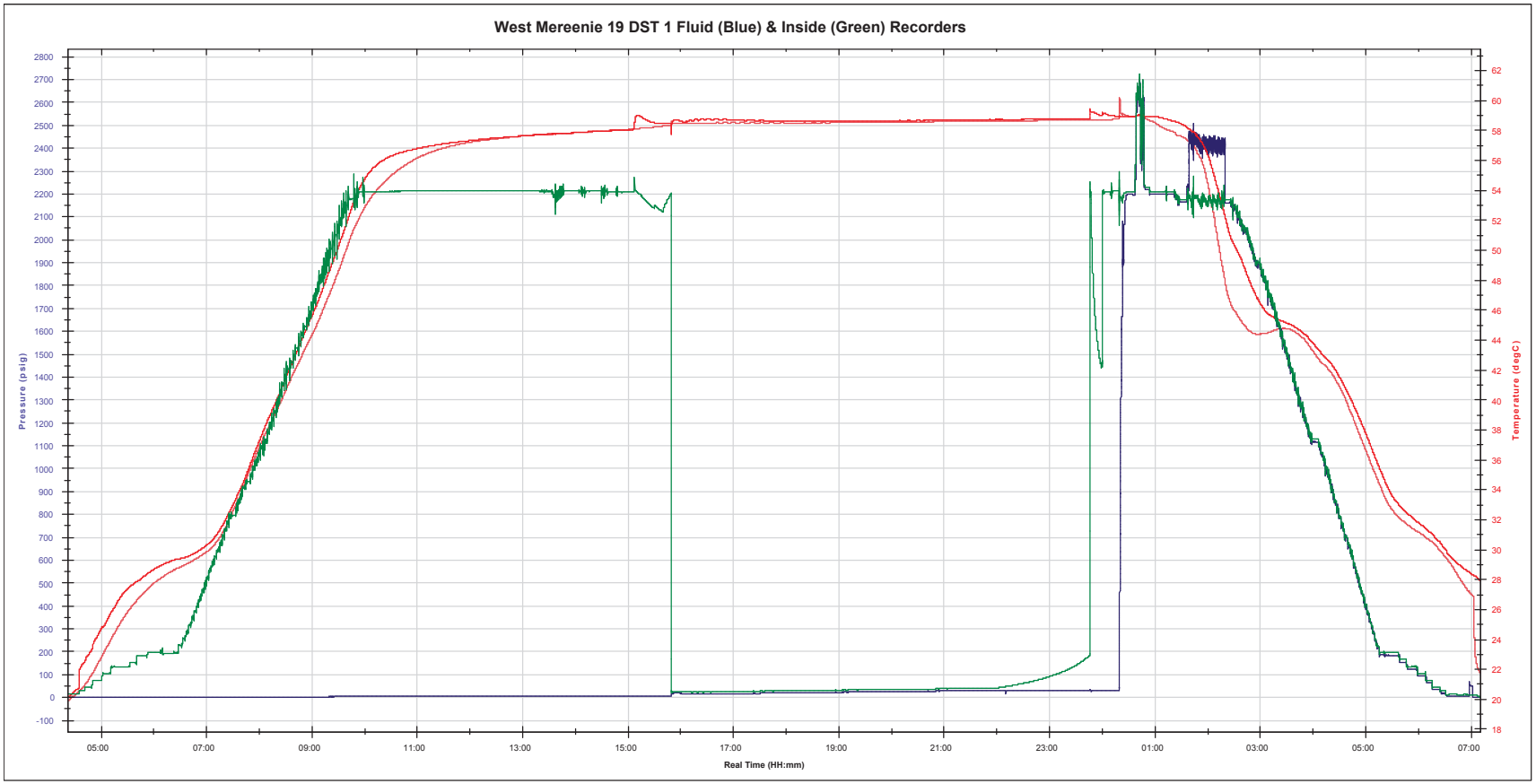



| Description | | | Qty | ID | OD | Length | Depth | bbls/ft | bbls |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| Drill Pipe | | | 2 | 3.24 | 4 | 19.42 | -3.45 | 0.01020 | 0.6 |
| Pup Joint | | | 1 | 3.24 | 4 | 1.56 | 15.97 | 0.01020 | 0.1 |
| Drill Pipe | | | 70 | 3.24 | 4 | 679.23 | 17.53 | 0.01020 | 22.7 |
| | | | | | | | | | |
| HWDP | | | 60 | 2.5625 | 4 | 565.04 | 696.76 | 0.00638 | 11.8 |
| Rig XO | | | 1 | | | 1.13 | 1261.80 | | |
| Pip Tag | | | | | | | ***1262.93*** | | |
| Drill Collars | | | 11 | 2.8125 | 6.5 | 104.22 | 1262.93 | 0.00768 | 2.6 |
| Circulating Sub | | | CS29 | | | 0.37 | 1367.15 | **Total:** | **37.9bbls** |
| Drill Collars | | | 1 | 2.8125 | 6.5 | 9.48 | 1367.52 | **Stks:** | **602** |
| Circulating Sub | | | CS04 | | | 0.43 | 1377.00 | | |
| XO Sub | | | | | | 0.30 | 1377.43 | | |
| Bumper Sub | | | | | | 2.20 | 1377.73 | | |
| Fluid Recorder | Serial #: 1248 | | | | | 0.81 | 1379.93 | | |
| Testing Jars | | | | | | 1.86 | 1380.74 | | |
| Hydraulic Tool | | | | | | 1.94 | 1382.60 | | |
| Sample Chamber | | | | | | 1.20 | 1384.54 | | |
| Inside Recorder | Serial #: 1221 | | | | | 0.29 | 1385.74 | | |
| Safety Joint | | | | | | 0.69 | 1386.03 | | |
| Pump | | | | | | 2.57 | 1386.72 | | |
| Screen | | | | | | 1.05 | 1389.29 | | |
| Top Packer (Element Serial #: IPI-6.75-07) | | | | | | 1.66 | 1390.34 | | |
| **PACKER SEAL DEPTH** | | | | | | | **1392.00 mRT** | | |
| Stick Down | | | | | | 0.73 | 1392.00 | | |
| Outside Recorder | Serial #: 1198/1186 | | | | | 0.97 | 1392.73 | | |
| XO Sub | | | | | | 0.29 | 1393.70 | | |
| Drill Collars | | | 4 | 2.8125 | 6.5 | 37.90 | 1393.99 | | |
| XO Sub | | | | | | 0.34 | 1431.89 | | |
| Spacing | | | 1x1mtr | | | 1.00 | 1432.23 | | |
| Stick Up | | | | | | 0.48 | 1433.23 | | |
| **PACKER SEAL DEPTH** | | | | | | | **1433.71 mRT** | | |
| Bottom Packer (Element Serial #: IPI-6.75-08) | | | | | | 1.78 | 1433.71 | | |
| Drag Spring | | | | | | 1.90 | 1435.49 | | |
| **Bottom of Tool String** | | | | | | | 1437.39 | | |

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

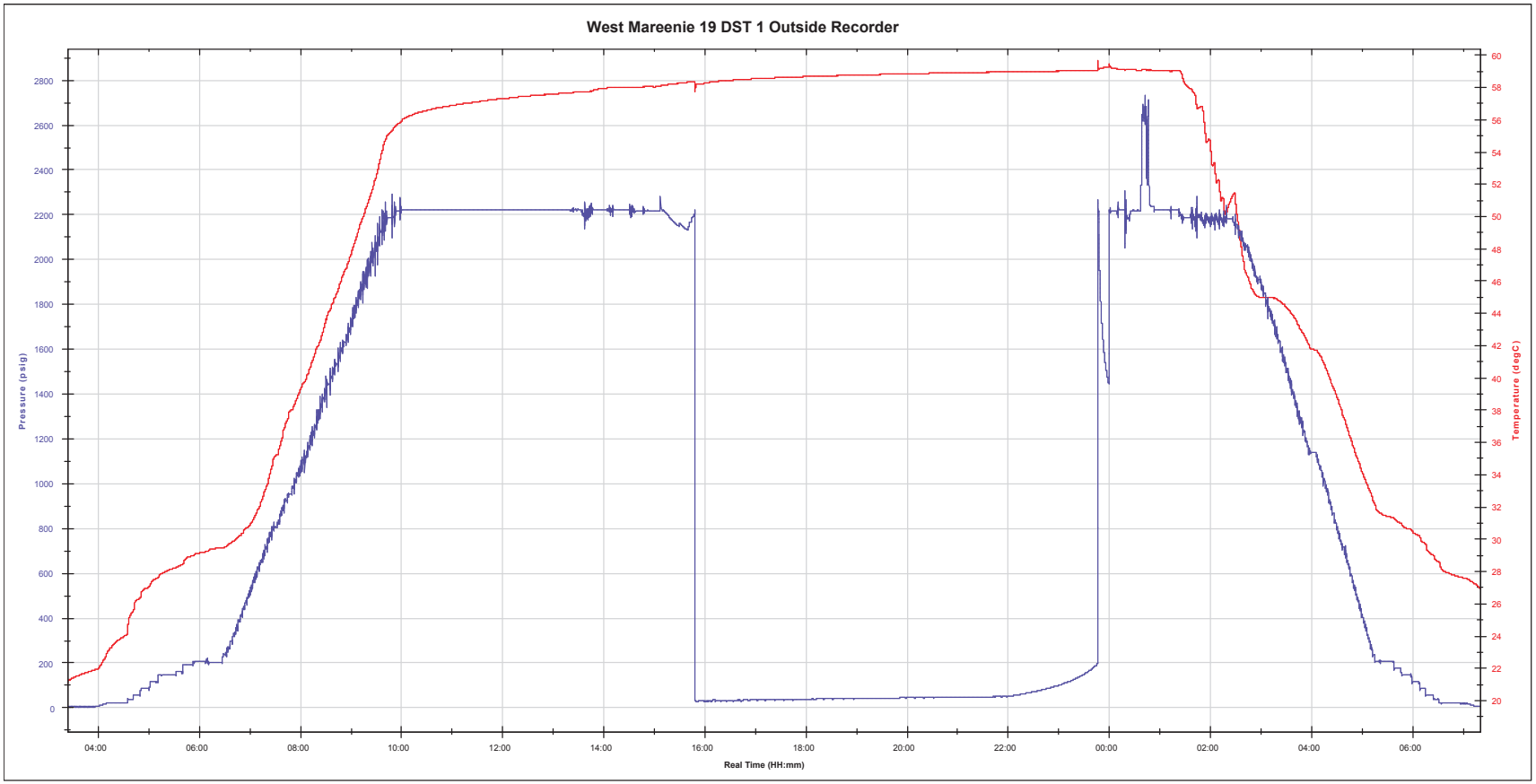
DataCan

| | | | |
|---|---|---|---|
| **Test Date:** | 07/12/2013 - 08/12/2013 | **Serial Number:** | P1221 |
| **Max Pressure:** | 2719.301 psig | **Max Temperature:** | 59.397 degC |



DataCan

| | | | |
|---|---|---|---|
| **Test Date:** | 07/12/2013 - 08/12/2013 | **Serial Number:** | P1198 |
| **Max Pressure:** | 2728.132 psig | **Max Temperature:** | 59.616 degC |



# APPENDIX VIII: FLOW TEST DATA

Santos

# West Mereenie 19

## GAS FLOW SUMMARY

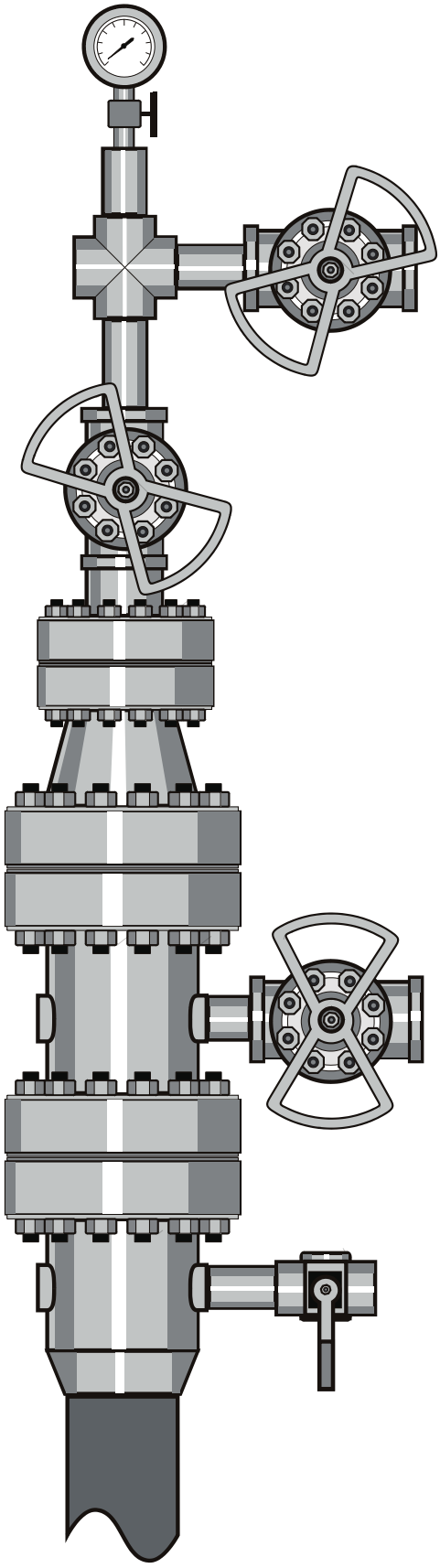
| | | | |
|---|---|---|---|
| **Date:** | 24th November 2013 | **Licence / State:** | OL 4 / N.T |
| **Days From re-entry:** | 5 | **Rig:** | Ensign 918 |
| **Current Hole Size:** | 8.75” | **GL:** | 731.34m |
| | | **RT:** | 736.50m |

| FLOW TEST DEPTH | GAS FLOW RATE | MUD LOG GAS PEAK (Composition) |
|---|---|---|
| | Gas flare commenced @ 924m. | |
| 924m | **Middle Stairway Sandstone.**<br>Maximum gas flare rate = 2.5 MMcfd. (3-4m long continuous flare). | 2192 U<br>(81/12/4/2/1) |
| 966m | **Middle Stairway Sandstone.**<br>Maximum gas flare rate = 3.0 MMcfd. (3-4m long continuous flare). | 1197 U<br>(81/12/4/2/1) |
| 985m | **Middle Stairway Sandstone.**<br>Maximum gas flare rate = 3.6 MMcfd. (3-4m long continuous flare). | 1685 U<br>(81/12/4/2/1) |
| 994m-1094m | Flow meter washed out and un-readable. | 1730 U @ 1076m<br>(81/12/4/2/1) |
| 1100m-1129m | Flare out. No flow readings possible due to un-burnt gas in area. | Gas detector swamped by fluid. |
| 1129m | **Lower Stairway Sandstone 1.**<br>Maximum gas flare rate = 2.5 MMcfd. | Gas detector swamped by fluid. |
| 1182m | **Horn Valley Siltstone.**<br>Maximum gas flare rate = 2.75 MMcfd. | 1198 U @ 1173m<br>(82/12/4/1/1) |
| 1215m | **Pacoota P1 Sandstone.**<br>Maximum gas flare rate = 2.7 MMcfd. | 1078 U @ 1208m<br>(82/12/4/1/1) |
| 1218m | **Pacoota P1 Sandstone.**<br>Maximum gas flare rate = 3.0 MMcfd. | 300 U<br>(82/12/4/1/1) |
| 1225m | **Pacoota P1 Sandstone (P 14).**<br>Maximum gas flare rate = 2.7 MMcfd. | 100 U @ 1220m<br>(82/12/4/1/1) |
| 1243m-1248m | **Pacoota P1 Sandstone (P 18).**<br>Maximum gas flare rate = 11.5 MMcfd @ 1248m.<br>(significant increase to 8-10m gas flare). | 3807 U @ 1248m<br>(80/13/4/2/1) |
| 1248m | Pipe washed out in flow meter skid. Shut in and kill well with mud. | |

# Test Information

| | | | |
|---|---|---|---|
| **Operator** | Santos | | |
| **Representative** | | | |
| **Well Name** | Santos Meerernie 19 | | |
| **Surface Location** | | | |
| **Downhole Location** | | | |
| **License** | | | |
| **Formation** | | | |
| **Fluid Type** | Gas | | |
| **Type** | | | |
| **Ground Elevation** | | ft. (SL) | |
| **Kelly Bushing Elevation** | | ft. (SL) | |
| **Drill Leg** | 1 | | |
| **Producing Through:** | Tubing | | |
| **Tubing Size** | | in. | |
| **Tubing Weight** | | lbm/ft | |
| **Casing Size** | | in. | |
| **Casing Weight** | | lbm/ft | |
| **Test Type** | Gas Lift | | |
| **Test Duration** | Thu May 08 2014 - Sun May 18 2014 | | |
| **Service Company** | Farley Riggs | | |
| **Job #** | 561-14-SWT | | |
| **Test Unit #** | Separator H | | |
| **Field Contact** | | | |
| **Supervisor Contact** | Uriah Nickerson | **Phone** | 08 7088 7247 |
| **Production Interval (Top)** | | ft.(KB) | |
| **Production Interval (Base)** | | ft.(KB) | |
| **Test Totals:** | | | |
| **Produced Gas** | 1.1234 | MMcf | |
| **Produced Water** | 249.0 | bbl | |

**Remarks:**



# Test Data

| | Test Time | | | Well: Santos Meerernie 19 | | | | | Orifice | | | | | | Volume | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Date | Time | Note | Tubing Press | Casing Press | Flow Temp | Choke Size | Surface Casing | Static Press | Diff | MR Temp | Plate Size | Rate | Cum Gas | Fluid Gain | BSW | Sand Cut | pH | Water Salinity | Water Rate | Water Cum | Oil Rate | Oil Cum | LF RCV (Wtr) | LF LTR (Wtr) | Produced Wtr |
| | dd/mm/yyyy | hh:mm | | psig | psig | °C | 1/64 | psig | psig | inH2O | °C | in. | MMcf/d | MMcf | (I) bbl | % | % | | ppm | bbl/d | bbl | bbl/d | bbl | bbl | bbl | bbl |
| 1 | 08/05/2014 | 12:00 | Begin moving equipment from WM 24 to WM 19. | | | | | | | | | | | | | | | | | | | | | | |
| 2 | | 12:00 | Farley Riggs Saftey meeting. | | | | | | | | | | | | | | | | | | | | | | |
| 3 | | 18:00 | Cross shift safety meeting. | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 09/05/2014 | 06:00 | | -10 | -10 | | | | | | | | | | | | | | | | | | | 0.0 | |
| 5 | | 06:00 | Surface casing = 966 PSI | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | 10:00 | Purge gas supply line. Set supply gas pressure to 650 PSI. | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | 12:00 | Bleed of surface casing, leave open to vent. | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | 12:00 | | -10 | -10 | | 96.0 | | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.00 | | | | | | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 |
| 9 | | 12:00 | Open to flow on a 96/64" choke. Open supply gas into casing at 650 PSI. | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | 12:01 | Fluid to surface 100% water. | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | 12:30 | | 2 | 664 | | 96.0 | | | | | 0.000 | | | | | | | | | | | | | |
| 12 | | 13:00 | | 3 | 700 | 25 | 96.0 | | | | | 0.000 | | | 16.35 | 100 | 0.0 | 10 | 108000 | 392.4 | 16.4 | 0.0 | 0.0 | 0.0 | 0.0 | 16.4 |
| 13 | | 13:00 | Increase gas suppy pressure to 800 PSI. | | | | | | | | | | | | | | | | | | | | | | |
| 14 | | 13:30 | | 3 | 785 | 24 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | |
| 15 | | 14:00 | | 3 | 779 | 24 | 96.0 | | | | | 0.000 | | | 10.30 | 100 | 0.0 | 10 | 108000 | 247.2 | 26.6 | 0.0 | 0.0 | 0.0 | 0.0 | 26.6 |
| 16 | | 14:30 | | 3 | 800 | 28 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | |
| 17 | | 15:00 | | 3 | 793 | 30 | 96.0 | | | | | 0.000 | | | 1.40 | 100 | 0.0 | 9 | 98000 | 33.6 | 28.1 | 0.0 | 0.0 | 0.0 | 0.0 | 28.1 |
| 18 | | 15:30 | | 3 | 790 | 30 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | |
| 19 | | 16:00 | | 3 | 785 | 30 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 28.1 | 0.0 | 0.0 | 0.0 | 0.0 | 28.1 |
| 20 | | 16:00 | No fluid gain for the hour, increase supply gas to 950 PSI. | | | | | | | | | | | | | | | | | | | | | | |
| 21 | | 16:00 | Take one litre fluid sample. | | | | | | | | | | | | | | | | | | | | | | |
| 22 | | 16:30 | | 2 | 950 | 28 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | |
| 23 | | 17:00 | | 2 | 950 | 28 | 96.0 | | | | | 0.000 | | | 7.00 | 100 | 0.0 | 9 | 98000 | 168.0 | 35.0 | 0.0 | 0.0 | 0.0 | 0.0 | 35.0 |
| 24 | | 17:30 | | 2 | 950 | 28 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | |
| 25 | | 18:00 | | 2 | 950 | 28 | 96.0 | | | | | 0.000 | | | 0.62 | 100 | 0.0 | 9 | 98000 | 14.9 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 26 | | 18:30 | | 1 | 950 | 28 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | |
| 27 | | 19:00 | | 0 | 950 | 28 | 96.0 | | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 28 | | 19:00 | No fluid gain for the hour, shut in tubing to allow pressure to build. | | | | | | | | | | | | | | | | | | | | | | |
| 29 | | 19:30 | | 0 | 950 | | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | |
| 30 | | 20:00 | | 0 | 950 | | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | |
| 31 | | 20:00 | Shut in gas supply line to casing to monitor leak off pressures. | | | | | | | | | | | | | | | | | | | | | | |
| 32 | | 20:05 | | 0 | 948 | | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | |
| 33 | | 20:10 | | 0 | 947 | | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | |
| 34 | | 20:15 | | 0 | 947 | | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | |
| 35 | | 20:30 | | 0 | 947 | | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | |
| 36 | | 20:45 | | 0 | 944 | | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | |
| 37 | | 21:00 | | 0 | 943 | | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | |
| 38 | | 21:30 | | 0 | 943 | | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | |
| 39 | | 22:00 | | 3 | 943 | | 96.0 | | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 40 | | 22:00 | Open to flow on a 96/64" choke. Re open supply gas to casing. Attempt to initiate flow. | | | | | | | | | | | | | | | | | | | | | | |
| 41 | | 22:30 | | 0 | 944 | 26 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | |
| 42 | | 23:00 | | 0 | 944 | 26 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 43 | | 23:30 | | 0 | 944 | 25 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | |
| 44 | 10/05/2014 | 00:00 | | 0 | 944 | 25 | 96.0 | | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 45 | | 00:00 | No fluid gain for the period, shut in tubing to allow pressure to build. | | | | | | | | | | | | | | | | | | | | | | |
| 46 | | 00:30 | | 0 | 944 | | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | |
| 47 | | 01:00 | | 0 | 944 | | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | |

# Test Data

| | Test Time | | | Well: Santos Meerernie 19 | | | | | Orifice | | | | | | Volume | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Date | Time | Note | Tubing Press | Casing Press | Flow Temp | Choke Size | Surface Casing | Static Press | Diff | MR Temp | Plate Size | Rate | Cum Gas | Fluid Gain | BSW | Sand Cut | pH | Water Salinity | Water Rate | Water Cum | Oil Rate | Oil Cum | LF RCV (Wtr) | LF LTR (Wtr) | Produced Wtr |
| | dd/mm/yyyy | hh:mm | | psig | psig | °C | 1/64 | psig | psig | inH2O | °C | in. | MMcf/d | MMcf | (I) bbl | % | % | | ppm | bbl/d | bbl | bbl/d | bbl | bbl | bbl | bbl |
| 48 | 10/05/2014 | 01:30 | | 0 | 944 | | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 49 | | 02:00 | | 0 | 944 | | 96.0 | | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 50 | | 02:00 | Open to flow on a 96/64" choke. Tubing static, well to remain open to allow tubing to unload. | | | | | | | | | | | | | | | | | | | | | | | |
| 51 | | 02:30 | | 0 | 944 | | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 52 | | 03:00 | | 0 | 944 | 24 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 53 | | 03:30 | | 0 | 944 | 24 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 54 | | 04:00 | | 0 | 944 | 24 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 55 | | 04:30 | | 0 | 944 | 23 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 56 | | 05:00 | | 0 | 944 | 22 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 57 | | 05:30 | | 0 | 944 | 22 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 58 | | 06:00 | | 0 | 944 | 22 | 96.0 | | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 59 | | 06:00 | ***** Daily Summary *****<br>Daily gas produced = 0.000 MMcf<br>Cum gas Produced = 0.000 MMcf<br>Daily oil produced = 0.0 bbl<br>Cum oil Produced = 0.0 bbl<br>Daily water recovered = 35.7 bbl<br>Cum water recovered = 35.7 bbl | | | | | | | | | | | | | | | | | | | | | | | |
| 60 | | | | | | | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 61 | | 06:00 | Shut in at manifold. | | | | | | | | | | | | | | | | | | | | | | | |
| 62 | | 06:30 | | 0 | 944 | 23 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 63 | | 07:00 | | 0 | 944 | 23 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 64 | | 07:00 | Open to flow on a 96/64" choke. | | | | | | | | | | | | | | | | | | | | | | | |
| 65 | | 07:30 | | 0 | 944 | 23 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 66 | | 08:00 | | 0 | 944 | 24 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 67 | | 08:00 | Bleed casing pressure to 650 PSI, tubing open to vent. | | | | | | | | | | | | | | | | | | | | | | | |
| 68 | | 08:30 | | 0 | 650 | 25 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 69 | | 09:00 | | 0 | 650 | 24 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 70 | | 09:00 | Increase casing supply gas pressure to 950 PSI. | | | | | | | | | | | | | | | | | | | | | | | |
| 71 | | 09:30 | | 0 | 950 | 25 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 72 | | 10:00 | | 0 | 950 | 25 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 73 | | 10:00 | No fluid produced, tubing is still dead. Bleed casing to zero. | | | | | | | | | | | | | | | | | | | | | | | |
| 74 | | 10:30 | | 0 | 0 | 26 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 75 | | 11:00 | | 0 | 0 | 26 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 76 | | 11:30 | | 0 | 0 | 26 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 77 | | 12:00 | | 0 | 0 | 27 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 78 | | 12:00 | Open supply gas to casing. | | | | | | | | | | | | | | | | | | | | | | | |
| 79 | | 12:30 | | 0 | 950 | 27 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 80 | | 13:00 | | 0 | 950 | 27 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 81 | | 13:30 | | 0 | 950 | 27 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 82 | | 14:00 | | 0 | 950 | 27 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 83 | | 14:00 | Shut in at manifold. Equilize tubing and casing. | | | | | | | | | | | | | | | | | | | | | | | |
| 84 | | 14:05 | | 950 | 950 | | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 85 | | 14:05 | Open tubing to flow on a 96/64" choke. | | | | | | | | | | | | | | | | | | | | | | | |
| 86 | | 14:30 | | 0 | 950 | 28 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 87 | | 15:00 | | 0 | 950 | 28 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 88 | | 15:30 | | 0 | 950 | 27 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |

# Test Data

| | Test Time | | | Well: Santos Meerernie 19 | | | | | Orifice | | | | | | Volume | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Date | Time | Note | Tubing Press | Casing Press | Flow Temp | Choke Size | Surface Casing | Static Press | Diff | MR Temp | Plate Size | Rate | Cum Gas | Fluid Gain | BSW | Sand Cut | pH | Water Salinity | Water Rate | Water Cum | Oil Rate | Oil Cum | LF RCV (Wtr) | LF LTR (Wtr) | Produced Wtr |
| | dd/mm/yyyy | hh:mm | | psig | psig | °C | 1/64 | psig | psig | inH2O | °C | in. | MMcf/d | MMcf | (I) bbl | % | % | | ppm | bbl/d | bbl | bbl/d | bbl | bbl | bbl | bbl |
| 89 | 10/05/2014 | 16:00 | | 0 | 950 | 27 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 90 | | 16:30 | | 0 | 950 | 27 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 91 | | 17:00 | | 0 | 950 | 26 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 92 | | 17:30 | | 0 | 950 | 26 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 93 | | 18:00 | | 0 | 950 | 25 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 94 | | 18:30 | | 0 | 949 | 25 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 95 | | 19:00 | | 0 | 949 | 25 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 96 | | 19:30 | | 0 | 949 | 25 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 97 | | 20:00 | | 0 | 948 | 25 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 98 | | 20:30 | | 0 | 947 | 24 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 99 | | 21:00 | | 0 | 947 | 23 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 100 | | 21:30 | | 0 | 947 | 23 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 101 | | 22:00 | | 0 | 947 | 22 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 102 | | 22:30 | | 0 | 947 | 22 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 103 | | 23:00 | | 0 | 947 | 21 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 104 | | 23:30 | | 0 | 947 | 21 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 105 | 11/05/2014 | 00:00 | | 0 | 947 | 21 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 106 | | 00:30 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 107 | | 01:00 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 108 | | 01:30 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 109 | | 02:00 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 110 | | 02:30 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 111 | | 03:00 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 112 | | 03:30 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 113 | | 04:00 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 114 | | 04:30 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 115 | | 05:00 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 116 | | 05:30 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 117 | | 06:00 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 118 | | | ***** Daily Summary *****<br>Daily gas produced = 0.000 MMcf<br>Cum gas Produced = 0.000 MMcf<br>Daily oil produced = 0.0 bbl<br>Cum oil Produced = 0.0 bbl<br>Daily water recovered = 0.0 bbl<br>Cum water recovered = 35.7 bbl | | | | | | | | | | | | | | | | | | | | | | | |
| 119 | | 06:30 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 120 | | 07:00 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 121 | | 07:30 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 122 | | 08:00 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 123 | | 08:30 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 124 | | 09:00 | | 0 | 948 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 125 | | 09:30 | | 0 | 948 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 126 | | 10:00 | | 0 | 948 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 127 | | 10:30 | | 0 | 948 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 128 | | 11:00 | | 0 | 948 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 129 | | 11:30 | | 0 | 948 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |

# Test Data

| | Test Time | | | Well: Santos Meerernie 19 | | | | | Orifice | | | | | | Volume | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Date | Time | Note | Tubing Press | Casing Press | Flow Temp | Choke Size | Surface Casing | Static Press | Diff | MR Temp | Plate Size | Rate | Cum Gas | Fluid Gain | BSW | Sand Cut | pH | Water Salinity | Water Rate | Water Cum | Oil Rate | Oil Cum | LF RCV (Wtr) | LF LTR (Wtr) | Produced Wtr |
| | dd/mm/yyyy | hh:mm | | psig | psig | °C | 1/64 | psig | psig | inH2O | °C | in. | MMcf/d | MMcf | (I) bbl | % | % | | ppm | bbl/d | bbl | bbl/d | bbl | bbl | bbl | bbl |
| 130 | 11/05/2014 | 12:00 | | 0 | 948 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 131 | | 12:30 | | 0 | 948 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 132 | | 13:00 | | 0 | 948 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 133 | | 13:30 | | 0 | 948 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 134 | | 14:00 | | 0 | 948 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 135 | | 14:00 | Drop two soap sticks down tubing. Equilize tubing and casing to 948 PSI. Manifold shut in. | | | | | | | | | | | | | | | | | | | | | | | |
| 136 | | 14:30 | | 948 | 948 | | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 137 | | 15:00 | | 645 | 948 | | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 138 | | 15:00 | Open to flow on a 96/64" choke. | | | | | | | | | | | | | | | | | | | | | | | |
| 139 | | 15:30 | | 0 | 948 | 21 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 140 | | 16:00 | | 0 | 948 | 21 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 141 | | 16:30 | | 0 | 948 | 21 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 142 | | 17:00 | | 0 | 948 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 143 | | 17:30 | | 0 | 948 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 144 | | 18:00 | | 0 | 948 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 145 | | 18:00 | Drop two soap sticks down tubing. | | | | | | | | | | | | | | | | | | | | | | | |
| 146 | | 18:30 | | 0 | 948 | 20 | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 147 | | 19:00 | | 0 | 948 | 20 | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 148 | | 19:30 | | 0 | 948 | 20 | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 149 | | 20:00 | | 0 | 948 | 20 | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 150 | | 20:30 | | 0 | 948 | 20 | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 151 | | 21:00 | | 0 | 948 | 20 | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 152 | | 21:30 | | 0 | 948 | 20 | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 153 | | 22:00 | | 0 | 947 | 20 | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 154 | | 22:30 | | 0 | 946 | 20 | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 155 | | 23:00 | | 0 | 946 | 20 | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 156 | | 23:30 | | 0 | 946 | 20 | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 157 | 12/05/2014 | 00:00 | | 0 | 946 | 20 | 0.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 158 | | 00:00 | Open to flow on a 96/64" choke. | | | | | | | | | | | | | | | | | | | | | | | |
| 159 | | 00:30 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 160 | | 01:00 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 161 | | 01:30 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 162 | | 02:00 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 163 | | 02:30 | | 0 | 946 | 21 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 164 | | 03:00 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 165 | | 03:30 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 166 | | 04:00 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 167 | | 04:30 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 168 | | 05:00 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 169 | | 05:30 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 170 | | 06:00 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |

# Test Data

| | Test Time | | | Well: Santos Meerernie 19 | | | | | Orifice | | | | | | Volume | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Date | Time | Note | Tubing Press | Casing Press | Flow Temp | Choke Size | Surface Casing | Static Press | Diff | MR Temp | Plate Size | Rate | Cum Gas | Fluid Gain | BSW | Sand Cut | pH | Water Salinity | Water Rate | Water Cum | Oil Rate | Oil Cum | LF RCV (Wtr) | LF LTR (Wtr) | Produced Wtr |
| | dd/mm/yyyy | hh:mm | | psig | psig | °C | 1/64 | psig | psig | inH2O | °C | in. | MMcf/d | MMcf | (I) bbl | % | % | | ppm | bbl/d | bbl | bbl/d | bbl | bbl | bbl | bbl |
| 171 | 12/05/2014 | 06:00 | ***** Daily Summary ***** Daily gas produced = 0.000 MMcf Cum gas Produced = 0.000 MMcf Daily oil produced = 0.0 bbl Cum oil Produced = 0.0 bbl Daily water recovered = 0.0 bbl Cum water recovered = 35.7 bbl | | | | | | | | | | | | | | | | | | | | | | |
| 172 | | 06:30 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 173 | | 07:00 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 174 | | 07:30 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 175 | | 08:00 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 176 | | 08:30 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 177 | | 09:00 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 178 | | 09:30 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 179 | | 10:00 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 180 | | 10:30 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 181 | | 11:00 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 182 | | 11:30 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 183 | | 12:00 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 184 | | 12:30 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 185 | | 13:00 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 186 | | 13:30 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 187 | | 14:00 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 188 | | 14:30 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 189 | | 15:00 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 190 | | 15:30 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 191 | | 16:00 | | 0 | 948 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 192 | | 16:30 | | 0 | 948 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 193 | | 17:00 | | 0 | 948 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 194 | | 17:30 | | 0 | 948 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 195 | | 18:00 | | 0 | 947 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 196 | | 18:30 | | 0 | 946 | 19 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 197 | | 19:00 | | 0 | 946 | 19 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 198 | | 19:30 | | 0 | 946 | 19 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 199 | | 20:00 | | 0 | 946 | 19 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 200 | | 20:30 | | 0 | 946 | 19 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 201 | | 21:00 | | 0 | 946 | 19 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 202 | | 21:30 | | 0 | 946 | 18 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 203 | | 22:00 | | 0 | 946 | 18 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 204 | | 22:30 | | 0 | 946 | 18 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 205 | | 23:00 | | 0 | 946 | 18 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 206 | | 23:30 | | 0 | 945 | 17 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 207 | 13/05/2014 | 00:00 | | 0 | 945 | 17 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 208 | | 00:30 | | 0 | 945 | 17 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 209 | | 01:00 | | 0 | 945 | 17 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 210 | | 01:30 | | 0 | 946 | 17 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 211 | | 02:00 | | 0 | 946 | 17 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |

# Test Data

| | Test Time | | | Well: Santos Meerernie 19 | | | | | Orifice | | | | | | Volume | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Date | Time | Note | Tubing Press | Casing Press | Flow Temp | Choke Size | Surface Casing | Static Press | Diff | MR Temp | Plate Size | Rate | Cum Gas | Fluid Gain | BSW | Sand Cut | pH | Water Salinity | Water Rate | Water Cum | Oil Rate | Oil Cum | LF RCV (Wtr) | LF LTR (Wtr) | Produced Wtr |
| | dd/mm/yyyy | hh:mm | | psig | psig | °C | 1/64 | psig | psig | inH2O | °C | in. | MMcf/d | MMcf | (I) bbl | % | % | | ppm | bbl/d | bbl | bbl/d | bbl | bbl | bbl | bbl |
| 212 | 13/05/2014 | 02:30 | | 0 | 946 | 17 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 213 | | 03:00 | | 0 | 946 | 17 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 214 | | 03:30 | | 0 | 946 | 17 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 215 | | 04:00 | | 0 | 946 | 17 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 216 | | 04:30 | | 0 | 946 | 17 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 217 | | 05:00 | | 0 | 946 | 17 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 218 | | 05:30 | | 0 | 946 | 17 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 219 | | 06:00 | | 0 | 946 | 17 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 220 | | 06:00 | ***** Daily Summary *****<br>Daily gas produced = 0.000 MMcf<br>Cum gas Produced = 0.000 MMcf<br>Daily oil produced = 0.0 bbl<br>Cum oil Produced = 0.0 bbl<br>Daily water recovered = 0.0 bbl<br>Cum water recovered = 35.7 bbl | | | | | | | | | | | | | | | | | | | | | | | |
| 221 | | 06:30 | | 0 | 946 | 17 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 222 | | 07:00 | | 0 | 946 | 17 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 223 | | 07:30 | | 0 | 946 | 17 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 224 | | 08:00 | | 0 | 946 | 18 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 225 | | 08:30 | | 0 | 946 | 18 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 226 | | 09:00 | | 0 | 946 | 18 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 227 | | 09:30 | | 0 | 946 | 18 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 228 | | 10:00 | | 0 | 946 | 18 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 229 | | 10:30 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 230 | | 11:00 | | 0 | 946 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 231 | | 11:30 | | 0 | 946 | 21 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 232 | | 12:00 | | 0 | 945 | 21 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 233 | | 12:30 | | 0 | 945 | 21 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 234 | | 13:00 | | 0 | 945 | 21 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 235 | | 13:30 | | 0 | 945 | 21 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 236 | | 14:00 | | 0 | 945 | 21 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 237 | | 14:30 | | 0 | 945 | 21 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 238 | | 15:00 | | 0 | 945 | 21 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 239 | | 15:30 | | 0 | 945 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 240 | | 16:00 | | 0 | 945 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 241 | | 16:30 | | 0 | 944 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 242 | | 17:00 | | 0 | 944 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 243 | | 17:30 | | 0 | 944 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 244 | | 18:00 | | 0 | 944 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 245 | | 18:30 | | 0 | 944 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 246 | | 19:00 | | 0 | 944 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 247 | | 19:30 | | 0 | 944 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 248 | | 20:00 | | 0 | 944 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 249 | | 20:30 | | 0 | 944 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 250 | | 21:00 | | 0 | 944 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 251 | | 21:30 | | 0 | 944 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 252 | | 22:00 | | 0 | 944 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 253 | | 22:30 | | 0 | 944 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |

# Test Data

| | Test Time | | | Well: Santos Meerernie 19 | | | | | Orifice | | | | | | Volume | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Date | Time | Note | Tubing Press | Casing Press | Flow Temp | Choke Size | Surface Casing | Static Press | Diff | MR Temp | Plate Size | Rate | Cum Gas | Fluid Gain | BSW | Sand Cut | pH | Water Salinity | Water Rate | Water Cum | Oil Rate | Oil Cum | LF RCV (Wtr) | LF LTR (Wtr) | Produced Wtr |
| | dd/mm/yyyy | hh:mm | | psig | psig | °C | 1/64 | psig | psig | inH2O | °C | in. | MMcf/d | MMcf | (I) bbl | % | % | | ppm | bbl/d | bbl | bbl/d | bbl | bbl | bbl | bbl |
| 254 | 13/05/2014 | 23:00 | | 0 | 944 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 255 | | 23:30 | | 0 | 944 | 20 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 256 | 14/05/2014 | 00:00 | | 0 | 944 | 20 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 257 | | 00:30 | | 0 | 944 | 19 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 258 | | 01:00 | | 0 | 945 | 19 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 259 | | 01:30 | | 0 | 945 | 19 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 260 | | 02:00 | | 0 | 945 | 19 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 261 | | 02:30 | | 0 | 945 | 18 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 262 | | 03:00 | | 0 | 945 | 18 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 263 | | 03:30 | | 0 | 945 | 18 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 264 | | 04:00 | | 0 | 945 | 18 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 265 | | 04:30 | | 0 | 945 | 18 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 266 | | 05:00 | | 0 | 945 | 18 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 267 | | 05:30 | | 0 | 945 | 18 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 268 | | 06:00 | | 0 | 945 | 18 | 96.0 | | | | | 0.000 | | | 0.00 | 100 | 0.0 | | | 0.0 | 35.7 | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 |
| 269 | | 06:00 | ***** Daily Summary *****<br>Daily gas produced = 0.000 MMcf<br>Cum gas Produced = 0.000 MMcf<br>Daily oil produced = 0.0 bbl<br>Cum oil Produced = 0.0 bbl<br>Daily water recovered = 0.0 bbl<br>Cum water recovered = 35.7 bbl | | | | | | | | | | | | | | | | | | | | | | | | |
| 270 | | | | | | | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 271 | | 06:30 | | 0 | 945 | 18 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 272 | | 07:00 | | 0 | 945 | 18 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 273 | | 07:30 | | 0 | 945 | 18 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 274 | | 08:00 | | 0 | 945 | 18 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 275 | | 08:15 | | 75 | 1050 | 18 | 96.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 276 | | 08:15 | Well is starting to unload. Foamy fluid from soap sticks. Decrease choke to 48/64" | | | | | | | | | | | | | | | | | | | | | | | |
| 277 | | 08:30 | | 152 | 1024 | 26 | 48.0 | | | | | 0.000 | | | | 100 | 0.0 | | | | | | | | | |
| 278 | | 08:30 | Gas returns to surface divert flow thru separator. | | | | | | | | | | | | | | | | | | | | | | | |
| 279 | | 09:00 | | 51 | 1024 | 27 | 48.0 | | 0 | 0 | 0 | 1.500 | 0.000 | 0.000 | 28.60 | 100 | 0.0 | 7 | 72000 | 228.8 | 64.3 | 0.0 | 0.0 | 0.0 | 0.0 | 64.3 |
| 280 | | 09:30 | | 100 | 1024 | 30 | 48.0 | | 14 | 24 | 27 | 1.500 | 0.342 | 0.007 | | 100 | 0.0 | | | | | | | | | |
| 281 | | 10:00 | | 85 | 1024 | 30 | 48.0 | | 14 | 24 | 26 | 1.500 | 0.342 | 0.014 | 20.10 | 100 | 0.0 | 7 | 90000 | 482.4 | 84.4 | 0.0 | 0.0 | 0.0 | 0.0 | 84.4 |
| 282 | | 10:30 | | 73 | 1002 | 33 | 48.0 | | 14 | 23 | 26 | 1.500 | 0.335 | 0.021 | | 100 | 0.0 | | | | | | | | | |
| 283 | | 11:00 | | 70 | 1020 | 30 | 48.0 | | 13 | 24 | 26 | 1.500 | 0.336 | 0.028 | 5.50 | 100 | 0.0 | 7 | 78000 | 132.0 | 89.9 | 0.0 | 0.0 | 0.0 | 0.0 | 89.9 |
| 284 | | 11:30 | | 48 | 950 | 30 | 48.0 | | 13 | 26 | 26 | 1.500 | 0.350 | 0.035 | | 100 | 0.0 | | | | | | | | | |
| 285 | | 12:00 | | 51 | 983 | 30 | 48.0 | | 14 | 24 | 27 | 1.500 | 0.342 | 0.043 | 4.70 | 100 | 0.0 | 7 | 84000 | 112.8 | 94.6 | 0.0 | 0.0 | 0.0 | 0.0 | 94.6 |
| 286 | | 12:00 | No oil in samples. | | | | | | | | | | | | | | | | | | | | | | | |
| 287 | | 12:30 | | 56 | 1020 | 30 | 48.0 | | 14 | 25 | 28 | 1.500 | 0.348 | 0.050 | | 100 | 0.0 | | | | | | | | | |
| 288 | | 13:00 | | 54 | 1009 | 30 | 48.0 | | 14 | 24 | 29 | 1.500 | 0.341 | 0.057 | 3.10 | 100 | 0.0 | 7 | 90000 | 74.4 | 97.7 | 0.0 | 0.0 | 0.0 | 0.0 | 97.7 |
| 289 | | 13:30 | | 47 | 1004 | 30 | 48.0 | | 14 | 25 | 29 | 1.500 | 0.348 | 0.064 | | 100 | 0.0 | | | | | | | | | |
| 290 | | 14:00 | | 46 | 1004 | 30 | 48.0 | | 14 | 24 | 30 | 1.500 | 0.340 | 0.071 | 2.52 | 100 | 0.0 | 7 | 88000 | 60.5 | 100.2 | 0.0 | 0.0 | 0.0 | 0.0 | 100.2 |
| 291 | | 14:30 | | 46 | 1004 | 31 | 48.0 | | 14 | 25 | 31 | 1.500 | 0.347 | 0.079 | | 100 | 0.0 | | | | | | | | | |
| 292 | | 15:00 | | 46 | 1006 | 32 | 48.0 | | 14 | 25 | 31 | 1.500 | 0.347 | 0.086 | 2.52 | 100 | 0.0 | 7 | 94000 | 60.5 | 102.7 | 0.0 | 0.0 | 0.0 | 0.0 | 102.7 |
| 293 | | 15:00 | Drop casing supply pressure to +/- 950 PSI. | | | | | | | | | | | | | | | | | | | | | | | |
| 294 | | 15:30 | | 46 | 995 | 32 | 48.0 | | 14 | 25 | 31 | 1.500 | 0.347 | 0.093 | | 100 | 0.0 | | | | | | | | | |
| 295 | | 16:00 | | 41 | 947 | 32 | 48.0 | | 12 | 24 | 31 | 1.500 | 0.327 | 0.100 | 1.57 | 100 | 0.0 | 7 | 82000 | 37.7 | 104.3 | 0.0 | 0.0 | 0.0 | 0.0 | 104.3 |

# Test Data

| | Test Time | | | Well: Santos Meerernie 19 | | | | | Orifice | | | | | | Volume | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Date | Time | Note | Tubing Press | Casing Press | Flow Temp | Choke Size | Surface Casing | Static Press | Diff | MR Temp | Plate Size | Rate | Cum Gas | Fluid Gain | BSW | Sand Cut | pH | Water Salinity | Water Rate | Water Cum | Oil Rate | Oil Cum | LF RCV (Wtr) | LF LTR (Wtr) | Produced Wtr |
| | dd/mm/yyyy | hh:mm | | psig | psig | °C | 1/64 | psig | psig | inH2O | °C | in. | MMcf/d | MMcf | (I) bbl | % | % | | ppm | bbl/d | bbl | bbl/d | bbl | bbl | bbl | bbl |
| 296 | 14/05/2014 | 16:00 | Take one litre water sample. | | | | | | | | | | | | | | | | | | | | | | |
| 297 | | 16:30 | | 40 | 936 | 30 | 48.0 | | 12 | 23 | 30 | 1.500 | 0.320 | 0.107 | | 100 | 0.0 | | | | | | | | |
| 298 | | 16:30 | Decrease casing supply pressure to +/- 900 PSI. | | | | | | | | | | | | | | | | | | | | | | |
| 299 | | 17:00 | | 39 | 936 | 31 | 48.0 | | 12 | 23 | 28 | 1.500 | 0.322 | 0.113 | 2.04 | 100 | 0.0 | 8 | 76000 | 49.0 | 106.3 | 0.0 | 0.0 | 0.0 | 0.0 | 106.3 |
| 300 | | 17:00 | Decrease casing supply pressure to +/- 850 PSI | | | | | | | | | | | | | | | | | | | | | | |
| 301 | | 17:30 | | 37 | 871 | 30 | 48.0 | | 11 | 23 | 28 | 1.500 | 0.315 | 0.120 | | 100 | 0.0 | | | | | | | | |
| 302 | | 18:00 | | 36 | 865 | 28 | 48.0 | | 10 | 20 | 27 | 1.500 | 0.288 | 0.126 | 1.90 | 100 | 0.0 | 8 | 70000 | 45.6 | 108.2 | 0.0 | 0.0 | 0.0 | 0.0 | 108.2 |
| 303 | | 18:00 | No oil in samples. | | | | | | | | | | | | | | | | | | | | | | |
| 304 | | 18:30 | | 36 | 845 | 28 | 48.0 | | 10 | 20 | 26 | 1.500 | 0.288 | 0.132 | | 100 | 0.0 | | | | | | | | |
| 305 | | 19:00 | | 36 | 848 | 27 | 48.0 | | 10 | 20 | 25 | 1.500 | 0.289 | 0.138 | 1.42 | 100 | 0.0 | 7 | 67000 | 34.1 | 109.6 | 0.0 | 0.0 | 0.0 | 0.0 | 109.6 |
| 306 | | 19:30 | | 36 | 848 | 27 | 48.0 | | 10 | 19 | 24 | 1.500 | 0.282 | 0.144 | | 100 | 0.0 | | | | | | | | |
| 307 | | 20:00 | | 35 | 848 | 26 | 48.0 | | 10 | 18 | 23 | 1.500 | 0.275 | 0.150 | 1.26 | 100 | 0.0 | 7 | 70000 | 30.2 | 110.9 | 0.0 | 0.0 | 0.0 | 0.0 | 110.9 |
| 308 | | 20:30 | | 35 | 848 | 26 | 48.0 | | 10 | 17 | 23 | 1.500 | 0.267 | 0.156 | | 100 | 0.0 | | | | | | | | |
| 309 | | 21:00 | | 35 | 848 | 26 | 48.0 | | 10 | 17 | 22 | 1.500 | 0.268 | 0.161 | 2.52 | 100 | 0.0 | 7 | 59000 | 60.5 | 113.4 | 0.0 | 0.0 | 0.0 | 0.0 | 113.4 |
| 310 | | 21:30 | | 35 | 848 | 26 | 48.0 | | 10 | 18 | 22 | 1.500 | 0.275 | 0.167 | | 100 | 0.0 | | | | | | | | |
| 311 | | 22:00 | | 35 | 848 | 26 | 48.0 | | 10 | 19 | 21 | 1.500 | 0.283 | 0.173 | 1.32 | 100 | 0.0 | 7 | 58000 | 31.7 | 114.7 | 0.0 | 0.0 | 0.0 | 0.0 | 114.7 |
| 312 | | 22:30 | | 35 | 848 | 25 | 48.0 | | 10 | 19 | 20 | 1.500 | 0.284 | 0.179 | | 100 | 0.0 | | | | | | | | |
| 313 | | 23:00 | | 35 | 848 | 25 | 48.0 | | 10 | 19 | 20 | 1.500 | 0.284 | 0.185 | 2.14 | 100 | 0.0 | 7 | 55000 | 51.4 | 116.9 | 0.0 | 0.0 | 0.0 | 0.0 | 116.9 |
| 314 | | 23:30 | | 35 | 849 | 25 | 48.0 | | 10 | 18 | 20 | 1.500 | 0.276 | 0.190 | | 100 | 0.0 | | | | | | | | |
| 315 | 15/05/2014 | 00:00 | | 35 | 849 | 25 | 48.0 | | 10 | 18 | 20 | 1.500 | 0.276 | 0.196 | 1.26 | 100 | 0.0 | 7 | 55000 | 30.2 | 118.1 | 0.0 | 0.0 | 0.0 | 0.0 | 118.1 |
| 316 | | 00:00 | H2S Pull = 0.00 ppm CO2 Pull = 0% Detected by RAE technology. | | | | | | | | | | | | | | | | | | | | | | |
| 317 | | 00:00 | No oil in samples. | | | | | | | | | | | | | | | | | | | | | | |
| 318 | | 00:30 | | 35 | 849 | 25 | 48.0 | | 10 | 18 | 20 | 1.500 | 0.276 | 0.202 | | 100 | 0.0 | | | | | | | | |
| 319 | | 01:00 | | 35 | 840 | 25 | 48.0 | | 10 | 18 | 19 | 1.500 | 0.277 | 0.208 | 3.14 | 100 | 0.0 | 7 | 55000 | 75.4 | 121.3 | 0.0 | 0.0 | 0.0 | 0.0 | 121.3 |
| 320 | | 01:30 | | 35 | 849 | 24 | 48.0 | | 10 | 19 | 19 | 1.500 | 0.284 | 0.214 | | 100 | 0.0 | | | | | | | | |
| 321 | | 02:00 | | 34 | 851 | 24 | 48.0 | | 10 | 18 | 18 | 1.500 | 0.277 | 0.219 | 2.20 | 100 | 0.0 | 7 | 60000 | 52.8 | 123.5 | 0.0 | 0.0 | 0.0 | 0.0 | 123.5 |
| 322 | | 02:30 | | 35 | 852 | 24 | 48.0 | | 10 | 18 | 19 | 1.500 | 0.277 | 0.225 | | 100 | 0.0 | | | | | | | | |
| 323 | | 03:00 | | 34 | 852 | 24 | 48.0 | | 10 | 18 | 19 | 1.500 | 0.277 | 0.231 | 1.89 | 100 | 0.0 | 7 | 58000 | 45.4 | 125.4 | 0.0 | 0.0 | 0.0 | 0.0 | 125.4 |
| 324 | | 03:30 | | 33 | 852 | 24 | 48.0 | | 10 | 18 | 19 | 1.500 | 0.277 | 0.237 | | 100 | 0.0 | | | | | | | | |
| 325 | | 04:00 | | 33 | 853 | 23 | 48.0 | | 10 | 18 | 18 | 1.500 | 0.277 | 0.242 | 1.89 | 100 | 0.0 | 7 | 60000 | 45.4 | 127.3 | 0.0 | 0.0 | 0.0 | 0.0 | 127.3 |
| 326 | | 04:00 | Take one litre water sample. | | | | | | | | | | | | | | | | | | | | | | |
| 327 | | 04:30 | | 33 | 853 | 24 | 48.0 | | 11 | 17 | 19 | 1.500 | 0.275 | 0.248 | | 100 | 0.0 | | | | | | | | |
| 328 | | 05:00 | | 33 | 853 | 24 | 48.0 | | 10 | 17 | 19 | 1.500 | 0.269 | 0.254 | 1.57 | 100 | 0.0 | 7 | 54000 | 37.7 | 128.8 | 0.0 | 0.0 | 0.0 | 0.0 | 128.8 |
| 329 | | 05:30 | | 34 | 852 | 23 | 48.0 | | 9 | 18 | 18 | 1.500 | 0.271 | 0.260 | | 100 | 0.0 | | | | | | | | |
| 330 | | 06:00 | | 35 | 852 | 24 | 48.0 | | 9 | 17 | 18 | 1.500 | 0.263 | 0.265 | 1.42 | 100 | 0.0 | 7 | 55000 | 34.1 | 130.3 | 0.0 | 0.0 | 0.0 | 0.0 | 130.3 |
| 331 | | 06:00 | ***** Daily Summary *****<br>Daily gas produced = 0.265 MMcf<br>Cum gas Produced = 0.265 MMcf<br>Daily oil produced = 0.0 bbl<br>Cum oil Produced = 0.0 bbl<br>Daily water recovered = 94.6 bbl<br>Cum water recovered = 130.3 bbl | | | | | | | | | | | | | | | | | | | | | | |
| 332 | | 06:30 | | 34 | 851 | 22 | 48.0 | | 9 | 17 | 17 | 1.500 | 0.264 | 0.271 | | 100 | 0.0 | | | | | | | | |
| 333 | | 07:00 | | 34 | 851 | 22 | 48.0 | | 9 | 17 | 17 | 1.500 | 0.264 | 0.276 | 1.73 | 100 | 0.0 | 7 | 55000 | 41.5 | 132.0 | 0.0 | 0.0 | 0.0 | 0.0 | 132.0 |
| 334 | | 07:30 | | 35 | 851 | 23 | 48.0 | | 8 | 17 | 17 | 1.500 | 0.258 | 0.282 | | 100 | 0.0 | | | | | | | | |
| 335 | | 08:00 | | 35 | 851 | 24 | 48.0 | | 8 | 17 | 18 | 1.500 | 0.257 | 0.287 | 1.89 | 100 | 0.0 | 7 | 58000 | 45.4 | 133.9 | 0.0 | 0.0 | 0.0 | 0.0 | 133.9 |
| 336 | | 08:30 | | 35 | 851 | 26 | 48.0 | | 8 | 18 | 18 | 1.500 | 0.265 | 0.292 | | 100 | 0.0 | | | | | | | | |
| 337 | | 09:00 | | 35 | 851 | 26 | 48.0 | | 8 | 18 | 20 | 1.500 | 0.264 | 0.298 | 1.26 | 100 | 0.0 | 7 | 56000 | 30.2 | 135.1 | 0.0 | 0.0 | 0.0 | 0.0 | 135.1 |

# Test Data

| | Test Time | | | Well: Santos Meerernie 19 | | | | | Orifice | | | | | | Volume | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Date | Time | Note | Tubing Press | Casing Press | Flow Temp | Choke Size | Surface Casing | Static Press | Diff | MR Temp | Plate Size | Rate | Cum Gas | Fluid Gain | BSW | Sand Cut | pH | Water Salinity | Water Rate | Water Cum | Oil Rate | Oil Cum | LF RCV (Wtr) | LF LTR (Wtr) | Produced Wtr |
| | dd/mm/yyyy | hh:mm | | psig | psig | °C | 1/64 | psig | psig | inH2O | °C | in. | MMcf/d | MMcf | (I) bbl | % | % | | ppm | bbl/d | bbl | bbl/d | bbl | bbl | bbl | bbl |
| 338 | 15/05/2014 | 09:30 | | 35 | 856 | 27 | 48.0 | | 8 | 18 | 21 | 1.500 | 0.264 | 0.303 | | 100 | 0.0 | | | | | | | | | |
| 339 | | 10:00 | | 35 | 858 | 28 | 48.0 | | 8 | 18 | 22 | 1.500 | 0.263 | 0.309 | 2.20 | 100 | 0.0 | 7 | 56000 | 52.8 | 137.3 | 0.0 | 0.0 | 0.0 | 0.0 | 137.3 |
| 340 | | 10:30 | | 35 | 858 | 28 | 48.0 | | 9 | 18 | 24 | 1.500 | 0.268 | 0.314 | | 100 | 0.0 | | | | | | | | | |
| 341 | | 11:00 | | 35 | 857 | 29 | 48.0 | | 9 | 19 | 25 | 1.500 | 0.275 | 0.320 | 1.90 | 100 | 0.0 | 7 | 55000 | 45.6 | 139.2 | 0.0 | 0.0 | 0.0 | 0.0 | 139.2 |
| 342 | | 11:30 | | 35 | 857 | 29 | 48.0 | | 9 | 19 | 26 | 1.500 | 0.275 | 0.326 | | 100 | 0.0 | | | | | | | | | |
| 343 | | 12:00 | | 35 | 857 | 28 | 48.0 | | 9 | 19 | 26 | 1.500 | 0.275 | 0.331 | 1.42 | 100 | 0.0 | 7 | 56000 | 34.1 | 140.7 | 0.0 | 0.0 | 0.0 | 0.0 | 140.7 |
| 344 | | 12:00 | H2S Pull = 0.00 ppm CO2 Pull = 0% Detected by RAE technology. | | | | | | | | | | | | | | | | | | | | | | | |
| 345 | | 12:00 | No oil in samples. | | | | | | | | | | | | | | | | | | | | | | | |
| 346 | | 12:30 | | 35 | 856 | 29 | 48.0 | | 9 | 19 | 27 | 1.500 | 0.275 | 0.337 | | 100 | 0.0 | | | | | | | | | |
| 347 | | 13:00 | | 35 | 855 | 29 | 48.0 | | 9 | 19 | 28 | 1.500 | 0.274 | 0.343 | 1.73 | 100 | 0.0 | 7 | 56000 | 41.5 | 142.4 | 0.0 | 0.0 | 0.0 | 0.0 | 142.4 |
| 348 | | 13:30 | | 35 | 855 | 30 | 48.0 | | 9 | 20 | 28 | 1.500 | 0.281 | 0.349 | | 100 | 0.0 | | | | | | | | | |
| 349 | | 14:00 | | 35 | 855 | 31 | 48.0 | | 9 | 20 | 29 | 1.500 | 0.281 | 0.355 | 2.20 | 100 | 0.0 | 7 | 56000 | 52.8 | 144.6 | 0.0 | 0.0 | 0.0 | 0.0 | 144.6 |
| 350 | | 14:30 | | 36 | 856 | 32 | 48.0 | | 9 | 20 | 29 | 1.500 | 0.281 | 0.360 | | 100 | 0.0 | | | | | | | | | |
| 351 | | 15:00 | | 36 | 856 | 32 | 48.0 | | 9 | 20 | 29 | 1.500 | 0.281 | 0.366 | 1.57 | 100 | 0.0 | 7 | 56000 | 37.7 | 146.2 | 0.0 | 0.0 | 0.0 | 0.0 | 146.2 |
| 352 | | 15:30 | | 36 | 857 | 32 | 48.0 | | 9 | 20 | 30 | 1.500 | 0.280 | 0.372 | | 100 | 0.0 | | | | | | | | | |
| 353 | | 16:00 | | 36 | 858 | 32 | 48.0 | | 9 | 20 | 30 | 1.500 | 0.280 | 0.378 | 1.89 | 100 | 0.0 | 7 | 56000 | 45.4 | 148.0 | 0.0 | 0.0 | 0.0 | 0.0 | 148.0 |
| 354 | | 16:30 | | 36 | 858 | 32 | 48.0 | | 9 | 20 | 29 | 1.500 | 0.281 | 0.384 | | 100 | 0.0 | | | | | | | | | |
| 355 | | 17:00 | | 36 | 858 | 31 | 48.0 | | 9 | 20 | 29 | 1.500 | 0.281 | 0.390 | 1.54 | 100 | 0.0 | 7 | 56000 | 37.0 | 149.6 | 0.0 | 0.0 | 0.0 | 0.0 | 149.6 |
| 356 | | 17:30 | | 36 | 858 | 31 | 48.0 | | 9 | 20 | 28 | 1.500 | 0.281 | 0.395 | | 100 | 0.0 | | | | | | | | | |
| 357 | | 18:00 | | 36 | 858 | 30 | 48.0 | | 9 | 20 | 28 | 1.500 | 0.281 | 0.401 | 1.84 | 100 | 0.0 | 7 | 56000 | 44.2 | 151.4 | 0.0 | 0.0 | 0.0 | 0.0 | 151.4 |
| 358 | | 18:30 | | 35 | 858 | 29 | 48.0 | | 9 | 19 | 27 | 1.500 | 0.275 | 0.407 | | 100 | 0.0 | | | | | | | | | |
| 359 | | 19:00 | | 35 | 857 | 28 | 48.0 | | 9 | 19 | 26 | 1.500 | 0.275 | 0.413 | 1.42 | 100 | 0.0 | 7 | 56000 | 34.1 | 152.8 | 0.0 | 0.0 | 0.0 | 0.0 | 152.8 |
| 360 | | 19:30 | | 35 | 856 | 26 | 48.0 | | 9 | 19 | 24 | 1.500 | 0.276 | 0.419 | | 100 | 0.0 | | | | | | | | | |
| 361 | | 20:00 | | 35 | 856 | 25 | 48.0 | | 9 | 18 | 23 | 1.500 | 0.269 | 0.424 | 2.36 | 100 | 0.0 | 7 | 56000 | 56.6 | 155.2 | 0.0 | 0.0 | 0.0 | 0.0 | 155.2 |
| 362 | | 20:30 | | 35 | 855 | 24 | 48.0 | | 9 | 18 | 22 | 1.500 | 0.269 | 0.430 | | 100 | 0.0 | | | | | | | | | |
| 363 | | 21:00 | | 35 | 855 | 23 | 48.0 | | 9 | 18 | 21 | 1.500 | 0.270 | 0.436 | 1.10 | 100 | 0.0 | 7 | 56000 | 26.4 | 156.3 | 0.0 | 0.0 | 0.0 | 0.0 | 156.3 |
| 364 | | 21:30 | | 35 | 857 | 24 | 48.0 | | 9 | 18 | 20 | 1.500 | 0.270 | 0.441 | | 100 | 0.0 | | | | | | | | | |
| 365 | | 22:00 | | 34 | 857 | 24 | 48.0 | | 9 | 18 | 20 | 1.500 | 0.270 | 0.447 | 1.57 | 100 | 0.0 | 7 | 58000 | 37.7 | 157.9 | 0.0 | 0.0 | 0.0 | 0.0 | 157.9 |
| 366 | | 22:30 | | 34 | 857 | 24 | 48.0 | | 9 | 18 | 19 | 1.500 | 0.271 | 0.452 | | 100 | 0.0 | | | | | | | | | |
| 367 | | 23:00 | | 34 | 857 | 24 | 48.0 | | 9 | 18 | 19 | 1.500 | 0.271 | 0.458 | 1.89 | 100 | 0.0 | 7 | 60000 | 45.4 | 159.8 | 0.0 | 0.0 | 0.0 | 0.0 | 159.8 |
| 368 | | 23:30 | | 34 | 857 | 23 | 48.0 | | 9 | 18 | 19 | 1.500 | 0.271 | 0.464 | | 100 | 0.0 | | | | | | | | | |
| 369 | 16/05/2014 | 00:00 | | 34 | 857 | 22 | 48.0 | | 9 | 18 | 18 | 1.500 | 0.271 | 0.469 | 1.26 | 100 | 0.0 | 7 | 53000 | 30.2 | 161.0 | 0.0 | 0.0 | 0.0 | 0.0 | 161.0 |
| 370 | | 00:00 | H2S Pull = 0.00 ppm CO2 Pull = 0% Detected by RAE technology. | | | | | | | | | | | | | | | | | | | | | | | |
| 371 | | 00:00 | No oil in samples. | | | | | | | | | | | | | | | | | | | | | | | |
| 372 | | 00:30 | | 34 | 856 | 23 | 48.0 | | 9 | 18 | 18 | 1.500 | 0.271 | 0.475 | | 100 | 0.0 | | | | | | | | | |
| 373 | | 01:00 | | 34 | 856 | 23 | 48.0 | | 9 | 18 | 18 | 1.500 | 0.271 | 0.481 | 1.73 | 100 | 0.0 | 7 | 50000 | 41.5 | 162.8 | 0.0 | 0.0 | 0.0 | 0.0 | 162.8 |
| 374 | | 01:30 | | 34 | 856 | 23 | 48.0 | | 9 | 18 | 19 | 1.500 | 0.271 | 0.486 | | 100 | 0.0 | | | | | | | | | |
| 375 | | 02:00 | | 34 | 856 | 24 | 48.0 | | 9 | 17 | 18 | 1.500 | 0.263 | 0.492 | 1.57 | 100 | 0.0 | 7 | 50000 | 37.7 | 164.3 | 0.0 | 0.0 | 0.0 | 0.0 | 164.3 |
| 376 | | 02:30 | | 34 | 855 | 23 | 48.0 | | 9 | 17 | 18 | 1.500 | 0.263 | 0.497 | | 100 | 0.0 | | | | | | | | | |
| 377 | | 03:00 | | 34 | 853 | 21 | 48.0 | | 9 | 17 | 18 | 1.500 | 0.263 | 0.503 | 1.73 | 100 | 0.0 | 7 | 54000 | 41.5 | 166.1 | 0.0 | 0.0 | 0.0 | 0.0 | 166.1 |
| 378 | | 03:30 | | 35 | 854 | 20 | 48.0 | | 10 | 16 | 18 | 1.500 | 0.261 | 0.508 | | 100 | 0.0 | | | | | | | | | |
| 379 | | 04:00 | | 34 | 854 | 20 | 48.0 | | 10 | 16 | 17 | 1.500 | 0.262 | 0.514 | 1.73 | 100 | 0.0 | 7 | 54000 | 41.5 | 167.8 | 0.0 | 0.0 | 0.0 | 0.0 | 167.8 |
| 380 | | 04:30 | | 34 | 853 | 20 | 48.0 | | 10 | 16 | 17 | 1.500 | 0.262 | 0.519 | | 100 | 0.0 | | | | | | | | | |
| 381 | | 05:00 | | 34 | 855 | 21 | 48.0 | | 12 | 16 | 17 | 1.500 | 0.273 | 0.525 | 2.04 | 100 | 0.0 | 7 | 52000 | 49.0 | 169.8 | 0.0 | 0.0 | 0.0 | 0.0 | 169.8 |
| 382 | | 05:30 | | 34 | 854 | 21 | 48.0 | | 11 | 16 | 17 | 1.500 | 0.267 | 0.530 | | 100 | 0.0 | | | | | | | | | |
| 383 | | 06:00 | | 34 | 854 | 21 | 48.0 | | 11 | 16 | 17 | 1.500 | 0.267 | 0.536 | 1.89 | 100 | 0.0 | 7 | 52000 | 45.4 | 171.7 | 0.0 | 0.0 | 0.0 | 0.0 | 171.7 |

# Test Data

| | Test Time | | | Well: Santos Meerernie 19 | | | | | Orifice | | | | | | Volume | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Date | Time | Note | Tubing Press | Casing Press | Flow Temp | Choke Size | Surface Casing | Static Press | Diff | MR Temp | Plate Size | Rate | Cum Gas | Fluid Gain | BSW | Sand Cut | pH | Water Salinity | Water Rate | Water Cum | Oil Rate | Oil Cum | LF RCV (Wtr) | LF LTR (Wtr) | Produced Wtr |
| | dd/mm/yyyy | hh:mm | | psig | psig | °C | 1/64 | psig | psig | inH2O | °C | in. | MMcf/d | MMcf | (I) bbl | % | % | | ppm | bbl/d | bbl | bbl/d | bbl | bbl | bbl | bbl |
| 384 | 16/05/2014 | 06:00 | ***** Daily Summary ***** Daily gas produced = 0.271 MMcf Cum gas Produced = 0.536 MMcf Daily oil produced = 0.0 bbl Cum oil Produced = 0.0 bbl Daily water recovered = 41.5 bbl Cum water recovered = 171.7 bbl | | | | | | | | | | | | | | | | | | | | | | |
| 385 | | 06:30 | | 34 | 854 | 22 | 48.0 | | 11 | 17 | 16 | 1.500 | 0.276 | 0.542 | | 100 | 0.0 | | | | | | | | |
| 386 | | 07:00 | | 34 | 854 | 21 | 48.0 | | 11 | 17 | 16 | 1.500 | 0.276 | 0.547 | 1.26 | 100 | 0.0 | 7 | 52000 | 30.2 | 173.0 | 0.0 | 0.0 | 0.0 | 0.0 | 173.0 |
| 387 | | 07:30 | | 34 | 854 | 22 | 48.0 | | 11 | 17 | 16 | 1.500 | 0.276 | 0.553 | | 100 | 0.0 | | | | | | | | |
| 388 | | 08:00 | | 34 | 854 | 22 | 48.0 | | 11 | 17 | 17 | 1.500 | 0.276 | 0.559 | 2.20 | 100 | 0.0 | 7 | 54000 | 52.8 | 175.2 | 0.0 | 0.0 | 0.0 | 0.0 | 175.2 |
| 389 | | 08:30 | | 34 | 854 | 23 | 48.0 | | 11 | 17 | 17 | 1.500 | 0.276 | 0.565 | | 100 | 0.0 | | | | | | | | |
| 390 | | 09:00 | | 34 | 854 | 24 | 48.0 | | 11 | 17 | 18 | 1.500 | 0.275 | 0.570 | 1.26 | 100 | 0.0 | 7 | 53000 | 30.2 | 176.4 | 0.0 | 0.0 | 0.0 | 0.0 | 176.4 |
| 391 | | 09:30 | | 36 | 854 | 25 | 48.0 | | 12 | 18 | 20 | 1.500 | 0.288 | 0.576 | | 100 | 0.0 | | | | | | | | |
| 392 | | 10:00 | | 36 | 852 | 26 | 48.0 | | 12 | 18 | 21 | 1.500 | 0.287 | 0.582 | 1.89 | 100 | 0.0 | 7 | 54000 | 45.4 | 178.3 | 0.0 | 0.0 | 0.0 | 0.0 | 178.3 |
| 393 | | 10:30 | | 35 | 854 | 28 | 48.0 | | 7 | 26 | 22 | 1.500 | 0.310 | 0.588 | | 100 | 0.0 | | | | | | | | |
| 394 | | 11:00 | | 35 | 855 | 28 | 48.0 | | 7 | 26 | 23 | 1.500 | 0.309 | 0.595 | 1.42 | 100 | 0.0 | 7 | 54000 | 34.1 | 179.7 | 0.0 | 0.0 | 0.0 | 0.0 | 179.7 |
| 395 | | 11:30 | | 35 | 858 | 29 | 48.0 | | 7 | 26 | 24 | 1.500 | 0.308 | 0.601 | | 100 | 0.0 | | | | | | | | |
| 396 | | 12:00 | | 35 | 860 | 28 | 48.0 | | 7 | 26 | 25 | 1.500 | 0.308 | 0.608 | 1.42 | 100 | 0.0 | 7 | 54000 | 34.1 | 181.2 | 0.0 | 0.0 | 0.0 | 0.0 | 181.2 |
| 397 | | 12:00 | H2S Pull = 0.00 ppm CO2 Pull = 0% Detected by RAE technology. | | | | | | | | | | | | | | | | | | | | | | |
| 398 | | 12:00 | No oil in samples. | | | | | | | | | | | | | | | | | | | | | | |
| 399 | | 12:30 | | 35 | 859 | 28 | 48.0 | | 7 | 24 | 26 | 1.500 | 0.295 | 0.614 | | 100 | 0.0 | | | | | | | | |
| 400 | | 13:00 | | 35 | 860 | 28 | 48.0 | | 7 | 24 | 27 | 1.500 | 0.295 | 0.620 | 2.20 | 100 | 0.0 | 7 | 52000 | 52.8 | 183.4 | 0.0 | 0.0 | 0.0 | 0.0 | 183.4 |
| 401 | | 13:30 | | 35 | 860 | 29 | 48.0 | | 7 | 24 | 29 | 1.500 | 0.294 | 0.626 | | 100 | 0.0 | | | | | | | | |
| 402 | | 14:00 | | 35 | 860 | 30 | 48.0 | | 7 | 24 | 28 | 1.500 | 0.294 | 0.632 | 1.57 | 100 | 0.0 | 7 | 53000 | 37.7 | 184.9 | 0.0 | 0.0 | 0.0 | 0.0 | 184.9 |
| 403 | | 14:30 | | 35 | 860 | 31 | 48.0 | | 7 | 24 | 29 | 1.500 | 0.294 | 0.638 | | 100 | 0.0 | | | | | | | | |
| 404 | | 15:00 | | 35 | 860 | 30 | 48.0 | | 7 | 24 | 29 | 1.500 | 0.294 | 0.645 | 1.42 | 100 | 0.0 | 7 | 54000 | 34.1 | 186.4 | 0.0 | 0.0 | 0.0 | 0.0 | 186.4 |
| 405 | | 15:30 | | 35 | 861 | 30 | 48.0 | | 7 | 24 | 29 | 1.500 | 0.294 | 0.651 | | 100 | 0.0 | | | | | | | | |
| 406 | | 16:00 | | 35 | 861 | 31 | 48.0 | | 7 | 24 | 29 | 1.500 | 0.294 | 0.657 | 1.73 | 100 | 0.0 | 7 | 54000 | 41.5 | 188.1 | 0.0 | 0.0 | 0.0 | 0.0 | 188.1 |
| 407 | | 16:30 | | 35 | 864 | 30 | 48.0 | | 7 | 24 | 29 | 1.500 | 0.294 | 0.663 | | 100 | 0.0 | | | | | | | | |
| 408 | | 17:00 | | 35 | 865 | 29 | 48.0 | | 7 | 24 | 28 | 1.500 | 0.294 | 0.669 | 1.73 | 100 | 0.0 | 7 | 54000 | 41.5 | 189.8 | 0.0 | 0.0 | 0.0 | 0.0 | 189.8 |
| 409 | | 17:30 | | 35 | 865 | 29 | 48.0 | | 7 | 24 | 27 | 1.500 | 0.295 | 0.675 | | 100 | 0.0 | | | | | | | | |
| 410 | | 18:00 | | 35 | 865 | 29 | 48.0 | | 7 | 24 | 26 | 1.500 | 0.295 | 0.681 | 1.89 | 100 | 0.0 | 7 | 54000 | 45.4 | 191.7 | 0.0 | 0.0 | 0.0 | 0.0 | 191.7 |
| 411 | | 18:30 | | 35 | 863 | 28 | 48.0 | | 7 | 24 | 25 | 1.500 | 0.296 | 0.688 | | 100 | 0.0 | | | | | | | | |
| 412 | | 19:00 | | 35 | 862 | 27 | 48.0 | | 7 | 24 | 24 | 1.500 | 0.296 | 0.694 | 1.89 | 100 | 0.0 | 7 | 53000 | 45.4 | 193.6 | 0.0 | 0.0 | 0.0 | 0.0 | 193.6 |
| 413 | | 19:30 | | 34 | 861 | 26 | 48.0 | | 7 | 23 | 23 | 1.500 | 0.290 | 0.700 | | 100 | 0.0 | | | | | | | | |
| 414 | | 20:00 | | 34 | 861 | 26 | 48.0 | | 7 | 23 | 22 | 1.500 | 0.291 | 0.706 | 1.89 | 100 | 0.0 | 7 | 53000 | 45.4 | 195.5 | 0.0 | 0.0 | 0.0 | 0.0 | 195.5 |
| 415 | | 20:30 | | 34 | 861 | 25 | 48.0 | | 7 | 23 | 21 | 1.500 | 0.291 | 0.712 | | 100 | 0.0 | | | | | | | | |
| 416 | | 21:00 | | 34 | 861 | 25 | 48.0 | | 7 | 23 | 21 | 1.500 | 0.291 | 0.718 | 1.42 | 100 | 0.0 | 7 | 54000 | 34.1 | 196.9 | 0.0 | 0.0 | 0.0 | 0.0 | 196.9 |
| 417 | | 21:30 | | 34 | 861 | 25 | 48.0 | | 7 | 23 | 20 | 1.500 | 0.292 | 0.724 | | 100 | 0.0 | | | | | | | | |
| 418 | | 22:00 | | 34 | 861 | 25 | 48.0 | | 7 | 23 | 20 | 1.500 | 0.292 | 0.730 | 1.42 | 100 | 0.0 | 7 | 54000 | 34.1 | 198.3 | 0.0 | 0.0 | 0.0 | 0.0 | 198.3 |
| 419 | | 22:30 | | 34 | 860 | 24 | 48.0 | | 7 | 23 | 20 | 1.500 | 0.292 | 0.736 | | 100 | 0.0 | | | | | | | | |
| 420 | | 23:00 | | 34 | 860 | 24 | 48.0 | | 7 | 23 | 20 | 1.500 | 0.292 | 0.742 | 1.73 | 100 | 0.0 | 7 | 56000 | 41.5 | 200.0 | 0.0 | 0.0 | 0.0 | 0.0 | 200.0 |
| 421 | | 23:30 | | 34 | 860 | 24 | 48.0 | | 7 | 23 | 20 | 1.500 | 0.292 | 0.748 | | 100 | 0.0 | | | | | | | | |
| 422 | 17/05/2014 | 00:00 | | 34 | 860 | 24 | 48.0 | | 8 | 24 | 20 | 1.500 | 0.305 | 0.755 | 1.26 | 100 | 0.0 | 7 | 56000 | 30.2 | 201.3 | 0.0 | 0.0 | 0.0 | 0.0 | 201.3 |
| 423 | | 00:00 | H2S Pull = 0.00 ppm CO2 Pull = 0% Detected by RAE technology. | | | | | | | | | | | | | | | | | | | | | | |
| 424 | | 00:00 | No oil in samples. | | | | | | | | | | | | | | | | | | | | | | |
| 425 | | 00:30 | | 34 | 860 | 24 | 48.0 | | 7 | 24 | 20 | 1.500 | 0.298 | 0.761 | | 100 | 0.0 | | | | | | | | |

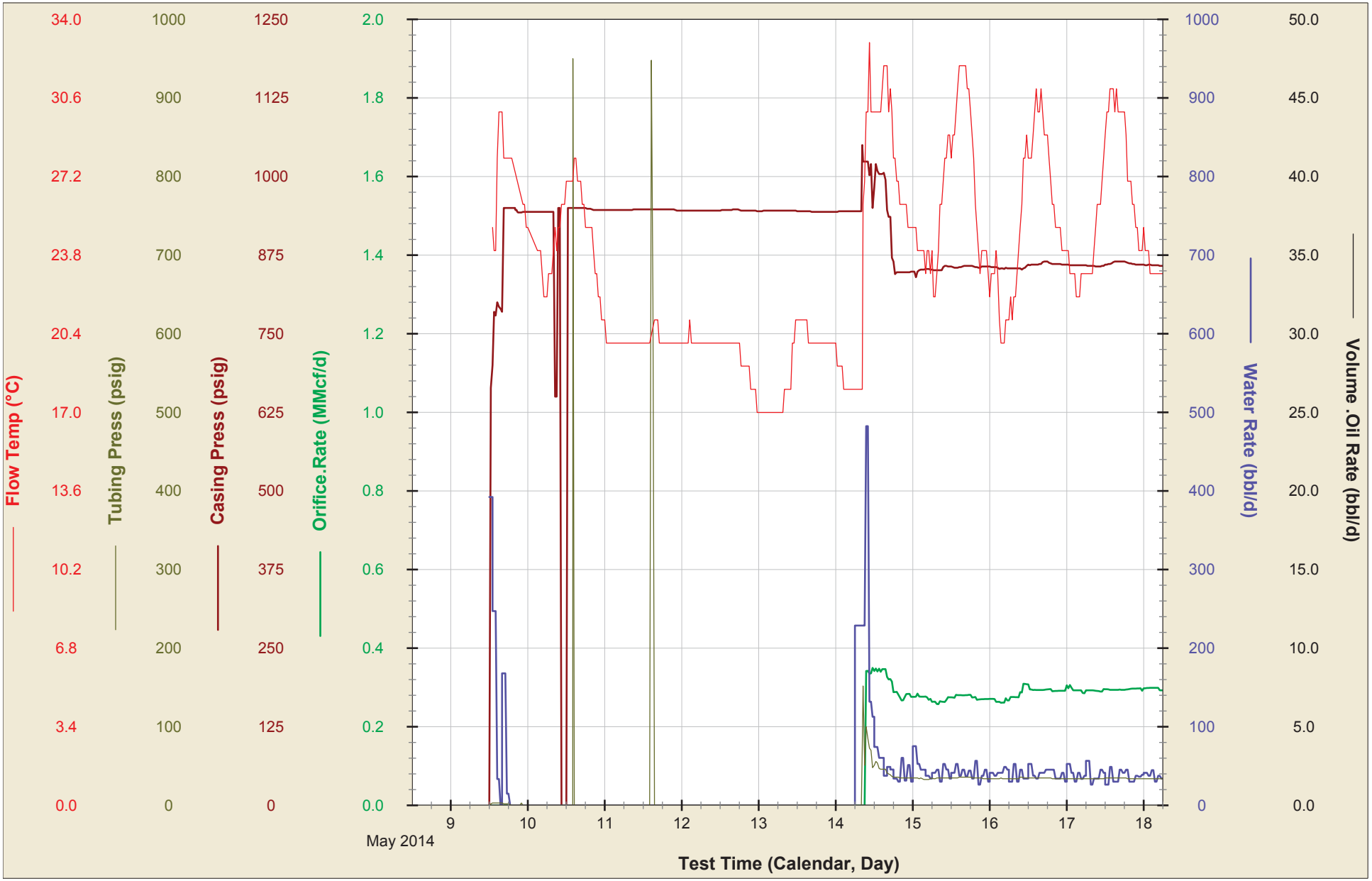
# Test Data

| | Test Time | | | Well: Santos Meerernie 19 | | | | | Orifice | | | | | | Volume | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Date | Time | Note | Tubing Press | Casing Press | Flow Temp | Choke Size | Surface Casing | Static Press | Diff | MR Temp | Plate Size | Rate | Cum Gas | Fluid Gain | BSW | Sand Cut | pH | Water Salinity | Water Rate | Water Cum | Oil Rate | Oil Cum | LF RCV (Wtr) | LF LTR (Wtr) | Produced Wtr |
| | dd/mm/yyyy | hh:mm | | psig | psig | °C | 1/64 | psig | psig | inH2O | °C | in. | MMcf/d | MMcf | (I) bbl | % | % | | ppm | bbl/d | bbl | bbl/d | bbl | bbl | bbl | bbl |
| 426 | 17/05/2014 | 01:00 | | 34 | 859 | 23 | 48.0 | | 9 | 23 | 19 | 1.500 | 0.306 | 0.767 | 2.20 | 100 | 0.0 | 7 | 56000 | 52.8 | 203.5 | 0.0 | 0.0 | 0.0 | 0.0 | 203.5 |
| 427 | | 01:30 | | 34 | 859 | 23 | 48.0 | | 8 | 23 | 19 | 1.500 | 0.299 | 0.774 | | 100 | 0.0 | | | | | | | | | |
| 428 | | 02:00 | | 34 | 859 | 23 | 48.0 | | 7 | 23 | 18 | 1.500 | 0.293 | 0.780 | 1.73 | 100 | 0.0 | 7 | 56000 | 41.5 | 205.2 | 0.0 | 0.0 | 0.0 | 0.0 | 205.2 |
| 429 | | 02:30 | | 34 | 859 | 23 | 48.0 | | 7 | 23 | 18 | 1.500 | 0.293 | 0.786 | | 100 | 0.0 | | | | | | | | | |
| 430 | | 03:00 | | 34 | 859 | 22 | 48.0 | | 7 | 23 | 18 | 1.500 | 0.293 | 0.792 | 1.26 | 100 | 0.0 | 7 | 56000 | 30.2 | 206.5 | 0.0 | 0.0 | 0.0 | 0.0 | 206.5 |
| 431 | | 03:30 | | 34 | 859 | 22 | 48.0 | | 7 | 23 | 18 | 1.500 | 0.293 | 0.798 | | 100 | 0.0 | | | | | | | | | |
| 432 | | 04:00 | | 34 | 859 | 22 | 48.0 | | 7 | 23 | 18 | 1.500 | 0.293 | 0.804 | 1.73 | 100 | 0.0 | 7 | 58000 | 41.5 | 208.2 | 0.0 | 0.0 | 0.0 | 0.0 | 208.2 |
| 433 | | 04:30 | | 34 | 859 | 23 | 48.0 | | 7 | 23 | 18 | 1.500 | 0.293 | 0.810 | | 100 | 0.0 | | | | | | | | | |
| 434 | | 05:00 | | 34 | 859 | 23 | 48.0 | | 7 | 22 | 18 | 1.500 | 0.286 | 0.816 | 1.41 | 100 | 0.0 | 7 | 58000 | 33.8 | 209.6 | 0.0 | 0.0 | 0.0 | 0.0 | 209.6 |
| 435 | | 05:30 | | 34 | 859 | 23 | 48.0 | | 6 | 23 | 18 | 1.500 | 0.286 | 0.822 | | 100 | 0.0 | | | | | | | | | |
| 436 | | 06:00 | | 34 | 859 | 23 | 48.0 | | 7 | 23 | 18 | 1.500 | 0.293 | 0.828 | 1.57 | 100 | 0.0 | 7 | 58000 | 37.7 | 211.2 | 0.0 | 0.0 | 0.0 | 0.0 | 211.2 |
| 437 | | 06:00 | ***** Daily Summary *****<br>Daily gas produced = 0.292 MMcf<br>Cum gas Produced = 0.828 MMcf<br>Daily oil produced = 0.0 bbl<br>Cum oil Produced = 0.0 bbl<br>Daily water recovered = 39.5 bbl<br>Cum water recovered = 211.2 bbl | | | | | | | | | | | | | | | | | | | | | | | |
| 438 | | 06:30 | | 34 | 858 | 23 | 48.0 | | 7 | 23 | 18 | 1.500 | 0.293 | 0.834 | | 100 | 0.0 | | | | | | | | | |
| 439 | | 07:00 | | 34 | 858 | 23 | 48.0 | | 7 | 23 | 18 | 1.500 | 0.293 | 0.840 | 2.36 | 100 | 0.0 | 7 | 58000 | 56.6 | 213.6 | 0.0 | 0.0 | 0.0 | 0.0 | 213.6 |
| 440 | | 07:30 | | 34 | 858 | 23 | 48.0 | | 7 | 23 | 18 | 1.500 | 0.293 | 0.847 | | 100 | 0.0 | | | | | | | | | |
| 441 | | 08:00 | | 34 | 858 | 23 | 48.0 | | 7 | 23 | 18 | 1.500 | 0.293 | 0.853 | 1.10 | 100 | 0.0 | 7 | 58000 | 26.4 | 214.7 | 0.0 | 0.0 | 0.0 | 0.0 | 214.7 |
| 442 | | 08:30 | | 34 | 858 | 24 | 48.0 | | 7 | 23 | 19 | 1.500 | 0.292 | 0.859 | | 100 | 0.0 | | | | | | | | | |
| 443 | | 09:00 | | 34 | 857 | 25 | 48.0 | | 7 | 23 | 20 | 1.500 | 0.292 | 0.865 | 1.42 | 100 | 0.0 | 7 | 56000 | 34.1 | 216.1 | 0.0 | 0.0 | 0.0 | 0.0 | 216.1 |
| 444 | | 09:30 | | 34 | 857 | 26 | 48.0 | | 7 | 23 | 21 | 1.500 | 0.291 | 0.871 | | 100 | 0.0 | | | | | | | | | |
| 445 | | 10:00 | | 34 | 857 | 26 | 48.0 | | 7 | 23 | 22 | 1.500 | 0.291 | 0.877 | 1.42 | 100 | 0.0 | 7 | 54000 | 34.1 | 217.5 | 0.0 | 0.0 | 0.0 | 0.0 | 217.5 |
| 446 | | 10:30 | | 34 | 857 | 26 | 48.0 | | 7 | 23 | 24 | 1.500 | 0.290 | 0.883 | | 100 | 0.0 | | | | | | | | | |
| 447 | | 11:00 | | 34 | 858 | 27 | 48.0 | | 7 | 23 | 24 | 1.500 | 0.290 | 0.889 | 1.89 | 100 | 0.0 | 7 | 54000 | 45.4 | 219.4 | 0.0 | 0.0 | 0.0 | 0.0 | 219.4 |
| 448 | | 11:30 | | 34 | 858 | 28 | 48.0 | | 7 | 24 | 24 | 1.500 | 0.296 | 0.895 | | 100 | 0.0 | | | | | | | | | |
| 449 | | 12:00 | | 35 | 860 | 29 | 48.0 | | 7 | 24 | 25 | 1.500 | 0.296 | 0.901 | 1.73 | 100 | 0.0 | 7 | 54000 | 41.5 | 221.1 | 0.0 | 0.0 | 0.0 | 0.0 | 221.1 |
| 450 | | 12:00 | H2S Pull = 0.00 ppm CO2 Pull = 0% Detected by RAE technology. | | | | | | | | | | | | | | | | | | | | | | | |
| 451 | | 12:00 | No oil in samples. | | | | | | | | | | | | | | | | | | | | | | | |
| 452 | | 12:30 | | 35 | 860 | 30 | 48.0 | | 7 | 24 | 25 | 1.500 | 0.296 | 0.907 | | 100 | 0.0 | | | | | | | | | |
| 453 | | 13:00 | | 35 | 861 | 30 | 48.0 | | 7 | 24 | 26 | 1.500 | 0.295 | 0.914 | 1.10 | 100 | 0.0 | 7 | 54000 | 26.4 | 222.2 | 0.0 | 0.0 | 0.0 | 0.0 | 222.2 |
| 454 | | 13:30 | | 35 | 861 | 31 | 48.0 | | 7 | 24 | 28 | 1.500 | 0.294 | 0.920 | | 100 | 0.0 | | | | | | | | | |
| 455 | | 14:00 | | 35 | 862 | 31 | 48.0 | | 7 | 24 | 28 | 1.500 | 0.294 | 0.926 | 2.04 | 100 | 0.0 | 7 | 53000 | 49.0 | 224.3 | 0.0 | 0.0 | 0.0 | 0.0 | 224.3 |
| 456 | | 14:30 | | 35 | 864 | 31 | 48.0 | | 7 | 24 | 28 | 1.500 | 0.294 | 0.932 | | 100 | 0.0 | | | | | | | | | |
| 457 | | 15:00 | | 35 | 865 | 30 | 48.0 | | 7 | 24 | 28 | 1.500 | 0.294 | 0.938 | 1.26 | 100 | 0.0 | 7 | 54000 | 30.2 | 225.5 | 0.0 | 0.0 | 0.0 | 0.0 | 225.5 |
| 458 | | 15:30 | | 35 | 865 | 31 | 48.0 | | 7 | 24 | 28 | 1.500 | 0.294 | 0.944 | | 100 | 0.0 | | | | | | | | | |
| 459 | | 16:00 | | 35 | 865 | 30 | 48.0 | | 7 | 24 | 28 | 1.500 | 0.294 | 0.950 | 1.26 | 100 | 0.0 | 7 | 54000 | 30.2 | 226.8 | 0.0 | 0.0 | 0.0 | 0.0 | 226.8 |
| 460 | | 16:30 | | 35 | 865 | 30 | 48.0 | | 7 | 24 | 27 | 1.500 | 0.295 | 0.957 | | 100 | 0.0 | | | | | | | | | |
| 461 | | 17:00 | | 35 | 865 | 30 | 48.0 | | 7 | 24 | 28 | 1.500 | 0.294 | 0.963 | 1.89 | 100 | 0.0 | 7 | 54000 | 45.4 | 228.7 | 0.0 | 0.0 | 0.0 | 0.0 | 228.7 |
| 462 | | 17:30 | | 35 | 865 | 30 | 48.0 | | 7 | 24 | 28 | 1.500 | 0.294 | 0.969 | | 100 | 0.0 | | | | | | | | | |
| 463 | | 18:00 | | 35 | 865 | 30 | 48.0 | | 7 | 24 | 28 | 1.500 | 0.294 | 0.975 | 1.73 | 100 | 0.0 | 7 | 54000 | 41.5 | 230.4 | 0.0 | 0.0 | 0.0 | 0.0 | 230.4 |
| 464 | | 18:30 | | 35 | 864 | 29 | 48.0 | | 7 | 24 | 27 | 1.500 | 0.295 | 0.981 | | 100 | 0.0 | | | | | | | | | |
| 465 | | 19:00 | | 34 | 863 | 27 | 48.0 | | 7 | 24 | 26 | 1.500 | 0.295 | 0.987 | 1.89 | 100 | 0.0 | 7 | 55000 | 45.4 | 232.3 | 0.0 | 0.0 | 0.0 | 0.0 | 232.3 |
| 466 | | 19:30 | | 34 | 862 | 27 | 48.0 | | 7 | 24 | 24 | 1.500 | 0.296 | 0.993 | | 100 | 0.0 | | | | | | | | | |

# Test Data

| | Test Time | | | Well: Santos Meerernie 19 | | | | | Orifice | | | | | | Volume | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Date | Time | Note | Tubing Press | Casing Press | Flow Temp | Choke Size | Surface Casing | Static Press | Diff | MR Temp | Plate Size | Rate | Cum Gas | Fluid Gain | BSW | Sand Cut | pH | Water Salinity | Water Rate | Water Cum | Oil Rate | Oil Cum | LF RCV (Wtr) | LF LTR (Wtr) | Produced Wtr |
| | dd/mm/yyyy | hh:mm | | psig | psig | °C | 1/64 | psig | psig | inH2O | °C | in. | MMcf/d | MMcf | (I) bbl | % | % | | ppm | bbl/d | bbl | bbl/d | bbl | bbl | bbl | bbl |
| 467 | 17/05/2014 | 20:00 | | 34 | 862 | 27 | 48.0 | | 7 | 24 | 23 | 1.500 | 0.297 | 1.000 | 1.26 | 100 | 0.0 | 7 | 55000 | 30.2 | 233.6 | 0.0 | 0.0 | 0.0 | 0.0 | 233.6 |
| 468 | | 20:30 | | 34 | 861 | 26 | 48.0 | | 7 | 24 | 22 | 1.500 | 0.297 | 1.006 | | 100 | 0.0 | | | | | | | | | |
| 469 | | 21:00 | | 34 | 861 | 26 | 48.0 | | 7 | 24 | 22 | 1.500 | 0.297 | 1.012 | 1.26 | 100 | 0.0 | 7 | 55000 | 30.2 | 234.8 | 0.0 | 0.0 | 0.0 | 0.0 | 234.8 |
| 470 | | 21:30 | | 34 | 860 | 25 | 48.0 | | 7 | 24 | 22 | 1.500 | 0.297 | 1.018 | | 100 | 0.0 | | | | | | | | | |
| 471 | | 22:00 | | 34 | 860 | 25 | 48.0 | | 7 | 24 | 21 | 1.500 | 0.298 | 1.024 | 1.57 | 100 | 0.0 | 7 | 55000 | 37.7 | 236.4 | 0.0 | 0.0 | 0.0 | 0.0 | 236.4 |
| 472 | | 22:30 | | 34 | 860 | 24 | 48.0 | | 7 | 24 | 21 | 1.500 | 0.298 | 1.031 | | 100 | 0.0 | | | | | | | | | |
| 473 | | 23:00 | | 34 | 860 | 24 | 48.0 | | 7 | 24 | 20 | 1.500 | 0.298 | 1.037 | 1.52 | 100 | 0.0 | 7 | 55000 | 36.5 | 237.9 | 0.0 | 0.0 | 0.0 | 0.0 | 237.9 |
| 474 | | 23:30 | | 34 | 860 | 24 | 48.0 | | 7 | 23 | 20 | 1.500 | 0.292 | 1.043 | | 100 | 0.0 | | | | | | | | | |
| 475 | 18/05/2014 | 00:00 | | 34 | 860 | 25 | 48.0 | | 7 | 24 | 20 | 1.500 | 0.298 | 1.049 | 1.63 | 100 | 0.0 | 7 | 55000 | 39.1 | 239.5 | 0.0 | 0.0 | 0.0 | 0.0 | 239.5 |
| 476 | | 00:00 | H2S Pull = 0.00 ppm CO2 Pull = 0% Detected by RAE technology. | | | | | | | | | | | | | | | | | | | | | | | |
| 477 | | 00:00 | No oil in samples. | | | | | | | | | | | | | | | | | | | | | | | |
| 478 | | 00:30 | | 34 | 859 | 24 | 48.0 | | 7 | 24 | 20 | 1.500 | 0.298 | 1.055 | | 100 | 0.0 | | | | | | | | | |
| 479 | | 01:00 | | 34 | 859 | 24 | 48.0 | | 7 | 24 | 19 | 1.500 | 0.299 | 1.061 | 1.73 | 100 | 0.0 | 7 | 56000 | 41.5 | 241.3 | 0.0 | 0.0 | 0.0 | 0.0 | 241.3 |
| 480 | | 01:30 | | 34 | 860 | 24 | 48.0 | | 7 | 24 | 19 | 1.500 | 0.299 | 1.068 | | 100 | 0.0 | | | | | | | | | |
| 481 | | 02:00 | | 34 | 860 | 23 | 48.0 | | 7 | 24 | 18 | 1.500 | 0.299 | 1.074 | 1.57 | 100 | 0.0 | 7 | 56000 | 37.7 | 242.8 | 0.0 | 0.0 | 0.0 | 0.0 | 242.8 |
| 482 | | 02:30 | | 34 | 859 | 23 | 48.0 | | 7 | 24 | 18 | 1.500 | 0.299 | 1.080 | | 100 | 0.0 | | | | | | | | | |
| 483 | | 03:00 | | 34 | 859 | 23 | 48.0 | | 7 | 24 | 18 | 1.500 | 0.299 | 1.086 | 1.87 | 100 | 0.0 | 7 | 55000 | 44.9 | 244.7 | 0.0 | 0.0 | 0.0 | 0.0 | 244.7 |
| 484 | | 03:30 | | 34 | 859 | 23 | 48.0 | | 7 | 24 | 18 | 1.500 | 0.299 | 1.093 | | 100 | 0.0 | | | | | | | | | |
| 485 | | 04:00 | | 34 | 859 | 23 | 48.0 | | 7 | 24 | 18 | 1.500 | 0.299 | 1.099 | 1.26 | 100 | 0.0 | 7 | 54000 | 30.2 | 246.0 | 0.0 | 0.0 | 0.0 | 0.0 | 246.0 |
| 486 | | 04:30 | | 34 | 859 | 23 | 48.0 | | 7 | 24 | 18 | 1.500 | 0.299 | 1.105 | | 100 | 0.0 | | | | | | | | | |
| 487 | | 05:00 | | 34 | 858 | 23 | 48.0 | | 7 | 23 | 18 | 1.500 | 0.293 | 1.111 | 1.57 | 100 | 0.0 | 7 | 54000 | 37.7 | 247.5 | 0.0 | 0.0 | 0.0 | 0.0 | 247.5 |
| 488 | | 05:30 | | 34 | 858 | 23 | 48.0 | | 7 | 23 | 18 | 1.500 | 0.293 | 1.117 | | 100 | 0.0 | | | | | | | | | |
| 489 | | 06:00 | | 34 | 858 | 23 | 48.0 | | 7 | 23 | 18 | 1.500 | 0.293 | 1.123 | 1.42 | 100 | 0.0 | 7 | 54000 | 34.1 | 249.0 | 0.0 | 0.0 | 0.0 | 0.0 | 249.0 |
| 490 | | 06:00 | ***** Daily Summary *****<br>Daily gas produced = 0.295 MMcf<br>Cum gas Produced = 1.123 MMcf<br>Daily oil produced = 0.0 bbl<br>Cum oil Produced = 0.0 bbl<br>Daily water recovered = 37.7 bbl<br>Cum water recovered = 249.0 bbl | | | | | | | | | | | | | | | | | | | | | | | |

# West Mereenie 19



# APPENDIX IX: HYDROCARBON ANALYSIS

No Hydrocarbon Analysis was prepared for West Mereenie 19.

# APPENDIX X: WATER ANALYSIS

# Certificate of Analysis

Santos Limited
GPO Box 2319
ADELAIDE SA 5000
Australia

**Attention:** David Schubert

| | |
|---|---|
| **Project Name** | **13PEAD0016125** |
| Collected by | client |
| Client Ref: | 849485-609 |

| **Customer Sample ID** | | **West Mereenie-19** | **West Mereenie-19** | **West Mereenie-19** |
|---|---|---|---|---|
| **Description** | | **Sample 1 of 2** | **Sample 2 of 2** | **Sample 1 of 1** |
| **Date Collected** | | **05/12/2013** | **05/12/2013** | **05/12/2013** |
| **Time Collected** | | **09:00hrs** | **10:40hrs** | **06:00hrs** |
| **Date Received** | | **10/12/2013** | **10/12/2013** | **10/12/2013** |
| **Sample Type** | | **Water** | **Water** | **Mud Filtrate** |
| **WATER ANALYSIS** | | | | |
| Test/Reference | Unit | | | |
| **PROPERTIES:** APHA 4500-H+ A,B | | | | |
| pH at Measured Temp. | | 6.7 | 6.8 | 7.3 |
| Measured Temp. | °C | 21.7 | 21.1 | 21.5 |
| **PROPERTIES:** APHA 2510 A,B | | | | |
| Electrical Conductivity @ 25°C | µS/cm | 110000 | 110000 | 130000 |
| Resistivity @ 25°C | M.Ohm | 0.09 | 0.09 | 0.08 |
| **ANIONS mg/L** P3100-PW-004 | | | | |
| Hydroxide as OH* | mg/L | <1 | <1 | <1 |
| Carbonate as CO3* | mg/L | <1 | <1 | <1 |
| Bicarbonate as HCO3* | mg/L | 300 | 370 | 650 |
| **ANIONS mg/L** APHA 4110 | | | | |
| Chloride as Cl | mg/L | 54000 | 45000 | 53000 |
| Nitrate as NO3 | mg/L | <0.1 | <0.1 | <0.1 |
| Sulphate as SO4 | mg/L | 2600 | 2200 | 1200 |
| Total Anions | mg/L | 57000 | 48000 | 55000 |
| **ANIONS meq/L** P3100-PW-004 | | | | |
| Hydroxide as OH* | meq/L | <0.01 | <0.01 | <0.01 |
| Carbonate as CO3* | meq/L | <0.01 | <0.01 | <0.01 |
| Bicarbonate as HCO3* | meq/L | 5 | 6 | 11 |
| **ANIONS meq/L** APHA 1050 A | | | | |
| Chloride as Cl* | meq/L | 1500 | 1300 | 1500 |
| Nitrate as NO3* | meq/L | <0.01 | <0.01 | <0.01 |
| Sulphate as SO4* | meq/L | 55 | 46 | 25 |
| Total Anions* | meq/L | 1600 | 1300 | 1500 |
| **CATIONS Dissolved mg/L** APHA 3120 | | | | |
| Potassium as K | mg/L | 400 | 300 | 240 |
| Sodium as Na | mg/L | 31000 | 33000 | 38000 |
| Calcium as Ca | mg/L | 1000 | 730 | 370 |
| Iron as Fe | mg/L | 1 | <0.1 | 0.70 |
| Magnesium as Mg | mg/L | 110 | 52 | 48 |
| **CATIONS mg/L** APHA 3120 | | | | |
| Total Cations | mg/L | 33000 | 34000 | 39000 |
| **CATIONS meq/L** APHA 1050 A | | | | |
| Potassium as K* | meq/L | 10 | 8 | 6 |

| Customer Sample ID | | West Mereenie-19 | West Mereenie-19 | West Mereenie-19 |
|---|---|---|---|---|
| Description | | Sample 1 of 2 | Sample 2 of 2 | Sample 1 of 1 |
| Date Collected | | 05/12/2013 | 05/12/2013 | 05/12/2013 |
| Time Collected | | 09:00hrs | 10:40hrs | 06:00hrs |
| Date Received | | 10/12/2013 | 10/12/2013 | 10/12/2013 |
| Sample Type | | Water | Water | Mud Filtrate |
| **WATER ANALYSIS** | | | | |
| Test/Reference | Unit | | | |
| Sodium as Na* | meq/L | 1400 | 1400 | 1700 |
| Calcium as Ca* | meq/L | 50 | 37 | 19 |
| Iron as Fe* | meq/L | 0.06 | <0.01 | 0.04 |
| Magnesium as Mg* | meq/L | 9 | 4 | 4 |
| Total Cations* | meq/L | 1400 | 1500 | 1700 |
| **DERIVED PARAMETERS** APHA 4110 & 3120 | | | | |
| Ion balance (Diff * 100/Sum) | % | 5 | 5 | 5 |
| Acceptance Criteria | % | 5 | 5 | 5 |
| Satisfactory | | Yes | Yes | Yes |
| **DERIVED PARAMETERS** APHA 2320 A,B | | | | |
| Total Alkalinity (calc as CaCO3) | mg/L | 250 | 300 | 530 |
| **DERIVED PARAMETERS** APHA 4110 & 3120 | | | | |
| Total Cations + Anions | mg/L | 89000 | 82000 | 93000 |
| **DERIVED PARAMETERS** APHA 2340 B | | | | |
| Hardness (calc as CaCO3) | mg/L | 2900 | 2000 | 1100 |
| **DERIVED PARAMETERS** APHA 2540 A,B,C,D | | | | |
| Calculated Total Dissolved Solids | mg/L | 71000 | 72000 | 81000 |

**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.



*The samples were not collected by Laboratory staff.*

# APPENDIX XI: WELL LOCATION SURVEY

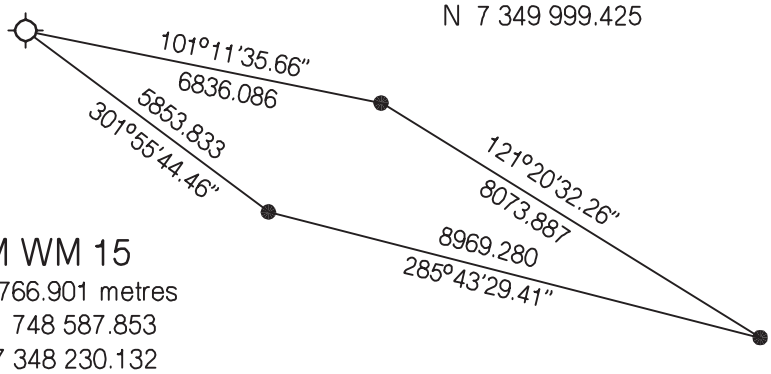
GDA 94

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


| | | | |
|---|---|---|---|
| Well Name | WEST MEREENIE #19 | | |
| Region | ALICE SPRINGS | | |
| Spheroid | GRS80 ELLIPSOID | MGA 94 | ZONE 52 |
| Latitude | 23°55'52.2847" | Grid Reference (metres) | |
| Longitude | 131°23'36.4567" | Easting | 743 618.540 |
| Convergence | +0°58'16.90" | Northing | 7 351 326.750 |

WEST MEREENIE #19

BM F33
EL 760.270 metres
E 750 326.171
N 7 349 999.425




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

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 | 731.35 |
| | B H | 731.33 |

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

Authority for Elevations BM WM 16
Adopted Elevation of Authority 786.774

Installed and Levelled by FYFE PTY LTD
ACN 062 592 465

Date 12th March 2014

Date 28th March 2014

File Reference 10630WE19

REGISTERED SURVEYOR

# APPENDIX XII: DRILLING SUMMARY

# WEST MEREENIE 19

## (01 Jul 2013 - 11 Dec 2013)

## Field - Mereenie

# FINAL WELL REPORT

## Santos Ltd

# Section 1 : Well Summary

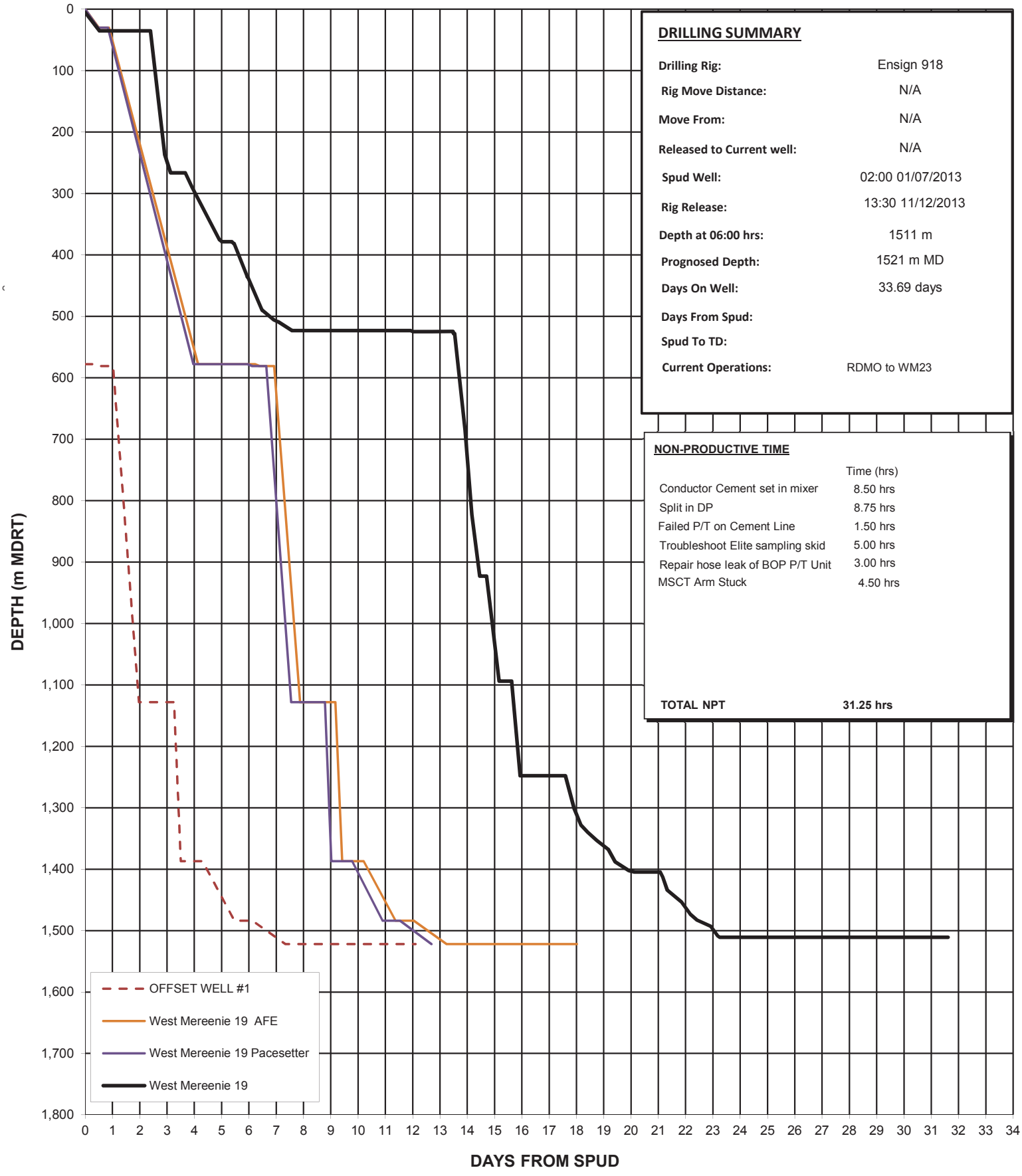
- Summary Sheet
- Time vs Depth Curves

# Well Summary

| | |
|---|---|
| Well Objective | :Vertical Well to appraise reservoir quality and fluid contacts on the western nose of the field. Potential for 3-6 follow-up drills pending the results from West Mereenie 19. |

| | |
|---|---|
| Country | :Australia |
| Field | :Mereenie |
| Block | :- |
| Well | :WEST MEREENIE 19 |
| Well Type | :Appraisal |
| Operating Company | :Santos Ltd |
| Rig | :Ensign 918 |
| Permit | :- |
| Licence | :NT OL4 |
| Latitude | :23 Deg 55 Min 52.28 Sec |
| Longitude | :131 Deg 23 Min 36.46 Sec |
| RT to GL: | :5.15 m RT GL |
| GL Elevation | :731.35 m |
| Planned TD | :1,521.0 m |
| Actual TD | :1,511.0 m |
| Spud Date / Time | :01 Jul 2013 / 02:00 |
| TD Reached Date / Time | :01 Dec 2013 / 02:00 |
| Rig Released Date / Time | :11 Dec 2013 / 13:30 |
| Total Days Since Spud | :34.23 |
| Total Days on Operations | :34.23 |

# West Mereenie 19
## TIME DEPTH CURVE




**DRILLING SUMMARY**

| | |
|---|---|
| **Drilling Rig:** | Ensign 918 |
| **Rig Move Distance:** | N/A |
| **Move From:** | N/A |
| **Released to Current well:** | N/A |
| **Spud Well:** | 02:00 01/07/2013 |
| **Rig Release:** | 13:30 11/12/2013 |
| **Depth at 06:00 hrs:** | 1511 m |
| **Prognosed Depth:** | 1521 m MD |
| **Days On Well:** | 33.69 days |
| **Days From Spud:** | |
| **Spud To TD:** | |
| **Current Operations:** | RDMO to WM23 |

**NON-PRODUCTIVE TIME**

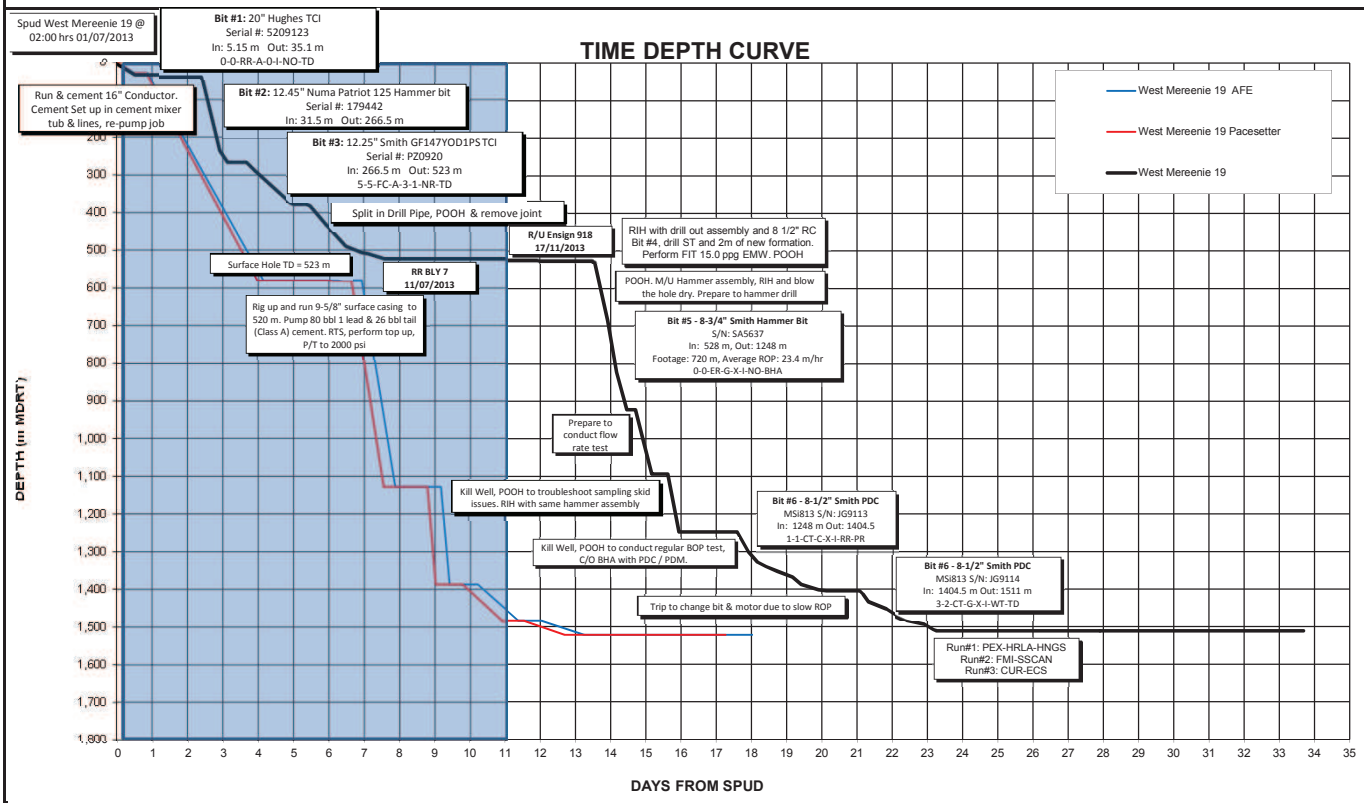
| | Time (hrs) |
|---|---|
| Conductor Cement set in mixer | 8.50 hrs |
| Split in DP | 8.75 hrs |
| Failed P/T on Cement Line | 1.50 hrs |
| Troubleshoot Elite sampling skid | 5.00 hrs |
| Repair hose leak of BOP P/T Unit | 3.00 hrs |
| MSCT Arm Stuck | 4.50 hrs |
| **TOTAL NPT** | **31.25 hrs** |

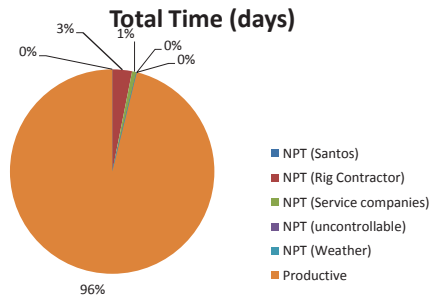
| | |
|---|---|
| **Well:** | **West Mereenie 19** |
| **Date:** | 11/06/2014 Day 34 |
| **Operator:** | Santos |
| **Rig:** | Ensign 918 |
| **Location:** | Amadeus Basin |
| **AFE:** | 5601046 |

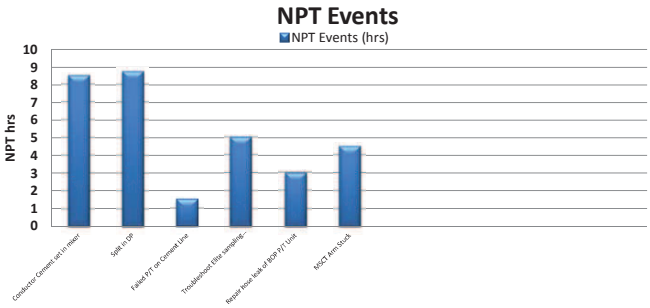
**Operations Summary (24 hours through midnight):**
N/Down BOP. Install tubing spool. R/D TDS. Release Rig to West Mereenie 23 @ 13:30 hrs

**06:00 Update:**
RDMO to WM23

**Forecast:**
RDMO to WM23




**Drilling Performance**

| | AFE | Daily Actual | Cum Actual | Estimated Final |
|---|---|---|---|---|
| Surface Hole Days | 5.8 | | 9.9 | 9.9 |
| Total Well Days | 18.0 | | 33.7 | 43.7 |
| Total Well Spud to TD (Days) | 13.2 | | 30.7 | 38.7 |
| Total Well Spud to Rig Release (Days) | 18.0 | | 30.7 | 40.7 |
| Measured Depth (m) | 1,521 | | 1,511 | 1,521 |
| Drilled Interval (m) Last 30Hrs | | N/A | | |
| AVG ROP (m/hr) - Last 30Hrs | | N/A | | |

| | Target | Actual |
|---|---|---|
| LTI | 0 | 0 |
| ADI | 0 | 0 |
| MTI | 0 | 0 |
| FAC | 0 | 0 |
| NMI | 0 | 0 |

| | Target | Actual |
|---|---|---|
| Contained Spills | 0 | 0 |
| Uncontained Spills | 0 | 0 |

**Happy Hour Targets Summary**

| High Return Targets | AFE | Time (days) Pacesetter | Time (days) Actual | Efficiency (days) Potential | Efficiency (days) Actual |
|---|---|---|---|---|---|
| 1. Surface Hole | 3.7 | 3.6 | 5.2 | -0.5 | +1.5 |
| 2. Surface Casing | 1.6 | 1.6 | 1.6 | -0.3 | +0.0 |
| 3. Production Hole | 7.9 | 7.5 | | -0.2 | |

**Happy Hour Performance Summary**

| | |
|---|---|
| AFE | 18.0 days |
| Happy Hour Target | 17.3 days |
| Actual | |
| **Happy Hour Variance** | |

**Comments on Costs/NPT:**
* BLY Rig 7 - 18.75hrs Total NPT
* Ensign 918 - 8 hrs NPT to date

# Section 2 : Well History

## - Well History Report

# Well History

| # | Date | Depth (m) | 24 Hour Summary |
|---|---|---|---|
| 1 | 01 Jul 2013 | 35.1 | Drill 20" conductor hole to 35.15 RKB (Ensign 918 ), circ. hole clean, POOH, lay out BHA, rig & run 20" conductor csg., spot on bottom, run tremmie line to bottom, spot Calcium Chloride / cmt. hot mix, flush out tremmie line w/ water, POOH, WOC |
| 2 | 02 Jul 2013 | 35.1 | Wait on hot mix cmt. to set, ok. mix cmt. to cmt. conductor, pump problems, unable to continue pumping cmt., shut down operations, Down Time for 8-1/2hrs, cmt. conductor, WOC, install diverter line flange & diverter, Assemble blooie line |
| 3 | 03 Jul 2013 | 236.1 | Respot trailer & equip, Spot compressor truck & connect lines to rig, Place spill mats under rig and compressor truck, Strap, load and make up 12 1/4" Air Hammer BHA, Drill ahead 35.1m thru to 236.1m, Airlifting approx 160 - 180gpm @ 236.1m |
| 4 | 04 Jul 2013 | 289.9 | Drill ahead f/ 236.1 to 266m, Circ hole clean, POOH, break down and layout<br>12 1/4" air hammer & BHA, Nipple down diverter & blooie line, Nipple up flow line & discharge hoses for DTFR drilling, Strap & make up 12 1/4" Smith (617Y) tricone bit & BHA, RIH tag bottom at 266,<br>Break circ ease bit in & drill ahead f/ 266 to 289.9m |
| 5 | 05 Jul 2013 | 375.0 | Drilling ahead f/ 289.9 to 375m,<br>Rabbit & strap 9 5/8" casing, Prepare & service equip for csg |
| 6 | 06 Jul 2013 | 432.0 | Drill ahead f/375 to 378.5m,<br>Water unloading at surface from diverter,<br>POOH, pressurise each conection trying to locate leak in string.<br>Remove damaged Drill pipe<br>Pressurise remaining in hole drillpipe & BHA to confirm no further leaks.<br>Blockage found in air side of drillpipe<br>POOH to DC, remove cuttings & remove inner tube from DC,<br>RIH & install airlift xover sub in drillpipe 90m above HHA<br>RIH to 378.5 & continue drill ahead 12 1/4" f/ 378.5 to 432m |
| 7 | 07 Jul 2013 | 506.0 | Drilling 12 1/4" Surface hole f/ 432 to 506m<br>Cont load out non requirered equipment f/ MW19 to MW21 (next site)<br>Make up SCH1 Braden Head to landing jnt w/ GE rep supervision |
| 8 | 08 Jul 2013 | 523.0 | Drill ahead 12 1/4" hole f/ 506 to 523m, circulate hole clean. Commence POOH, Due to wet weather setting in shut down POOH operations to clean out mud system tanks & fill with water for cementing operations while conditions still allow water transporter to deliver water to site<br>Cont POOH to BHA, commence break out and lay down BHA |
| 9 | 09 Jul 2013 | 523.0 | POOH. lay down BHA, rig and run 9-5/8" surface csg., set shoe at 520m, rig up to cmt. csg. |
| 10 | 10 Jul 2013 | 523.0 | Circ well with water, Cement 9 5/8" casing,13bbls Cmt returns at surface, Bump plug 600psi pressure up to 2000 psi hold 10 min, bleed back 2 bbls Casing top up job mix & pump 18bbls, Cmt slumping, remix & pump 5bbls, cement to surface, slumped, pump further 7 x 1bbl mixes in 11 mins, cmt cont to drop away,Nipple down cement head and lines, Back out landing jnt, Rig down, load out non essential equipment, Travel to Santos yard pick up sx cmt, Mix and pump w/ BLY cement unit, 87 sx cmt w/ 1bg calcium chloride, WOC to cure tag cmt with tape at 25m, Mix & pump 84 sx cmt w/ 1bg calcium chloride (14.9 ppg), Tag cement with tape at 3m, mix & pump 15sx cmt (15.3ppg)w/ 8 kg calcium chloride , cmt back to surface, Install spin ring and Tbg head, Release rig, well suspension pending install of 7-1/16" companion flange, Tear down & load up for rig move |

| # | Date | Depth (m) | 24 Hour Summary |
|---|---|---|---|
| 11 | 11 Jul 2013 | 523.0 | Continue Rig move to West Mereenie 21.<br>Install and pressure test 7-1/16" 5000 psi companion flange. |
| 12 | 18 Nov 2013 | 522.6 | Rig up and prepare to drill. Drilled Mousehole. Sourced new Hydraulic pump and fitted tested okay. Pick up all tubulars and racked back in Derrick. |
| 13 | 19 Nov 2013 | 522.6 | Racked back all tubulars in Derrick. (Drill pipe, HWDP and DC). |
| 14 | 20 Nov 2013 | 522.6 | POOH with slick assembly. (Held PJSM with all personell on site regarding RIH hammer BHA, unloading the well and air drilling.) RIH to 518m. Unloaded well. Prepare to Drill UB. Decision made to start drilling at daylight hours 06:00 in the morning. Key personell out of hours and spent some time training new driller and crew with TDS that arrived today. |
| 15 | 21 Nov 2013 | 823.0 | 24:00hrs to 06:00hrs Waited on daylight. Unloaded well and blew hole dry. Air hammer drilled from525m to 823m. |
| 16 | 22 Nov 2013 | 1,094.0 | Air Hammer drill 8-3/4" hole from 823m to Midnight depth = 1094m TVD =1093.15m. |
| 17 | 23 Nov 2013 | 1,248.2 | Killed the well. Remove Sample catching skid with wash out and re align the Blooey line. Unloaded Well and blew hole dry. Air hammer drill 8-3/4" hole from 1094m to 1248m. (Due to another wash out in Gas monitoring skid on Blooie line) Killed Well. POOH from 1248m to 1153m. |
| 18 | 24 Nov 2013 | 1,248.2 | Completed POOH, Lay down Hammer assembly. Completed weekly Pressure Test on BOP and associated well control equipment. Jacked back Mast to hole center to suit TDS. |
| 19 | 25 Nov 2013 | 1,328.0 | Picked up 8-1/2" bit, Mud motor BHA, RIH to 1248m. Drill ahead 8/1-2" hole to 1328m. |
| 20 | 26 Nov 2013 | 1,368.0 | Drilled ahead 8/1-2" hole. |
| 21 | 27 Nov 2013 | 1,404.5 | Drilled ahead 8/1-2" hole to 1404.5m. POOH. |
| 22 | 28 Nov 2013 | 1,413.0 | Completed POOH to surface. Changed bit, changed Mud motor. RIH, Drill ahead 8-1/2" hole. |
| 23 | 29 Nov 2013 | 1,473.0 | Drilled 8-1/2" Hole. |
| 24 | 30 Nov 2013 | 1,508.0 | Drilled 8-1/2" hole |
| 25 | 01 Dec 2013 | 1,511.0 | Drilled to 8-1/2" TD. Completed weekly BOP Test. Rig up and prepare for Log Run #1. |
| 26 | 02 Dec 2013 | 1,511.0 | Completed wire Line Logging Runs #1 and 2. Wire Line Logging Run #3. |
| 27 | 03 Dec 2013 | 1,511.0 | Completed Wire Line Logging Run #3. Wire Line Logging Run #4. |
| 28 | 04 Dec 2013 | 1,511.0 | Wire Line Logging Run #4. |
| 29 | 05 Dec 2013 | 1,511.0 | Completed Wire Line Logging Runs #4, and Run #5. |
| 30 | 06 Dec 2013 | 1,511.0 | RIH. Circulate and condition hole. POOH. Prepare pick up DST Tools. |

| Wellname: WEST MEREENIE 19 | Operation Co: Santos Ltd | Rig: Ensign 918 |
|---|---|---|

| # | Date | Depth (m) | 24 Hour Summary |
|---|---|---|---|
| 31 | 07 Dec 2013 | 1,511.0 | RIH w/ DST Tools. Wireline correlate to depth. Perform DST. |
| 32 | 08 Dec 2013 | 1,511.0 | Continue POOH f/ DST. RIH. Circulate. POOH Sideways. |
| 33 | 09 Dec 2013 | 1,511.0 | POOH Sideways. Change out pipe rams. M/U Shoe track. RIH w/ Csg. |
| 34 | 10 Dec 2013 | 1,511.0 | Continue RIH w/ 5 1/2" casing. Circulate. Cement casing. Lift BOP. Rough cut. N/D BOP. |
| 35 | 11 Dec 2013 | 1,511.0 | N/Down BOP. Install tubing spool. R/D TDS. Release Rig to West Mereenie 23 @ 13:30 hrs |

# Section 3 : Drilling Data

## - Mud Record

| Wellname: WEST MEREENIE 19 | Drilling Co: Santos Ltd | Rig: Ensign 918 |
|---|---|---|

**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 (%) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 Jul 2013 - 14:30 | Gel. water based | 35.1 | | 8.40 | 70 | | | / / | | | | | | | | | | |
| 02 Jul 2013 - 14:30 | Gel. water based | 35.1 | | 8.40 | 70 | | | / / | | | | | | | | | | |
| 03 Jul 2013 - 14:30 | Gel. water based | 35.1 | | 8.40 | 70 | | | / / | | | | | | | | | | |
| 04 Jul 2013 - 14:30 | Gel. water based | 35.1 | | 8.40 | 70 | | | / / | | | | | | | | | | |
| 05 Jul 2013 - 14:30 | Gel. water based | 35.1 | | 8.40 | 70 | | | / / | | | | | | | | | | |
| 06 Jul 2013 - 14:30 | Gel. water based | 35.1 | | 8.40 | 70 | | | / / | | | | | | | | | | |
| 07 Jul 2013 - 14:30 | Gel. water based | 35.1 | | 8.40 | 70 | | | / / | | | | | | | | | | |
| 08 Jul 2013 - 14:30 | Gel. water based | 35.1 | | 8.40 | 70 | | | / / | | | | | | | | | | |
| 09 Jul 2013 - 14:30 | Gel. water based | 35.1 | | 8.40 | 70 | | | / / | | | | | | | | | | |
| 10 Jul 2013 - 14:30 | Gel. water based | 35.1 | | 8.40 | 70 | | | / / | | | | | | | | | | |
| 11 Jul 2013 - 14:30 | Gel. water based | 35.1 | | 8.40 | 70 | | | / / | | | | | | | | | | |
| 25 Nov 2013 - 23:45 | Water Base Mud | 1,300.0 | 39.0 | 9.00 | 39 | 4 | 7 | 2 / 5 / 7 | 9.6 | 0.0 | 4.00 | | 5.0 | 9 | 47,000 | 40.0 | 0.0 | |
| 26 Nov 2013 - 23:45 | Water Base Mud | 1,361.0 | 49.0 | 9.00 | 49 | 6 | 11 | 4 / 7 / 9 | 9.0 | 0.0 | | | 4.0 | 9 | 54,000 | 140.0 | 0.0 | |
| 27 Nov 2013 - 22:00 | Water Base Mud | 1,404.0 | 120.0 | 9.00 | 33 | 6 | 11 | 5 / 7 / 8 | 7.8 | 0.0 | 5.00 | 0.10 | 3.0 | 9 | 55,000 | 280.0 | 0.0 | |
| 28 Nov 2013 - 23:30 | Water Base Mud | 1,410.0 | 120.0 | 9.00 | 33 | 6 | 12 | 4 / 6 / 7 | 7.8 | 0.0 | 5.00 | 0.25 | 3.0 | 9 | 55,000 | 280.0 | 0.0 | |
| 29 Nov 2013 - 23:50 | Water Base Mud | 1,473.0 | 122.0 | 9.10 | 32 | 6 | 11 | 4 / 5 / 6 | 8.6 | 0.0 | 5.00 | | 2.5 | 9 | 54,000 | 240.0 | 0.0 | |
| 30 Nov 2013 - 23:50 | Water Base Mud | 1,509.0 | 122.0 | 9.50 | 33 | 6 | 12 | 4 / 6 / 7 | 8.8 | 0.0 | 5.00 | | 2.5 | 9 | 54,000 | 240.0 | 0.0 | |
| 01 Dec 2013 - 18:00 | Water Base Mud | 1,511.0 | | 9.40 | 33 | 7 | 11 | 4 / 5 / 6 | 9.0 | 0.0 | 5.00 | | 2.5 | 9 | 54,000 | 240.0 | 0.0 | |
| 02 Dec 2013 - 16:00 | Water Base Mud | 1,511.0 | | 9.40 | 33 | 7 | 11 | 4 / 5 / 6 | 9.0 | 0.0 | 5.00 | | 2.5 | 9 | 54,000 | 240.0 | 0.0 | |
| 03 Dec 2013 - 16:00 | Water Base Mud | 1,511.0 | | 9.40 | 33 | 7 | 11 | 4 / 5 / 6 | 9.0 | 0.0 | 5.00 | | 2.5 | 9 | 54,000 | 240.0 | 0.0 | |
| 04 Dec 2013 - 17:00 | Water Base Mud | 1,511.0 | | 9.10 | 33 | 7 | 11 | 4 / 5 / 6 | 9.0 | 0.0 | 5.00 | | 2.5 | 9 | 54,000 | 240.0 | 0.0 | |
| 05 Dec 2013 - 17:30 | Water Base Mud | 1,511.0 | 30.0 | 9.10 | 33 | 7 | 11 | 4 / 5 / 6 | 9.0 | 0.0 | 5.00 | | 2.5 | 9 | 54,000 | 240.0 | 0.0 | |
| 06 Dec 2013 - 09:00 | Water Base Mud | 1,511.0 | 30.0 | 9.30 | 34 | 8 | 10 | 5 / 6 / 7 | 11.2 | 0.0 | 5.00 | | 2.5 | 9 | 50,000 | 360.0 | 0.0 | |
| 07 Dec 2013 - 09:00 | Water Base Mud | 1,511.0 | 30.0 | 9.30 | 34 | 8 | 10 | 5 / 6 / 7 | 11.2 | 0.0 | 5.00 | | 2.5 | 9 | 50,000 | 360.0 | 0.0 | |
| 08 Dec 2013 - 09:00 | Water Base Mud | 1,511.0 | 30.0 | 9.30 | 34 | 8 | 10 | 5 / 6 / 7 | 11.2 | 0.0 | 5.00 | | 2.5 | 9 | 50,000 | 360.0 | 0.0 | |

| Wellname: WEST MEREENIE 19 | Drilling Co: Santos Ltd | Rig: Ensign 918 |
|---|---|---|

**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 (%) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 09 Dec 2013 - 09:00 | Water Base Mud | 1,511.0 | 30.0 | 9.30 | 34 | 8 | 10 | 5 / 6 / 7 | 11.2 | 0.0 | 5.00 | | 2.5 | 9 | 50,000 | 360.0 | 0.0 | |
| 10 Dec 2013 - 09:00 | Water Base Mud | 1,511.0 | 30.0 | 9.30 | 34 | 8 | 10 | 5 / 6 / 7 | 11.2 | 0.0 | 5.00 | | 2.5 | 9 | 50,000 | 360.0 | 0.0 | |
| 11 Dec 2013 - 09:00 | Water Base Mud | 1,511.0 | 30.0 | 9.30 | 34 | 8 | 10 | 5 / 6 / 7 | 11.2 | 0.0 | 5.00 | | 2.5 | 9 | 50,000 | 360.0 | 0.0 | |

# Section 4 : Casing And Cementing Summary

## - Casing & Cementing Report

| Wellname: WEST MEREENIE 19 | Operation Co: Santos Ltd | Rig: Ensign 918 |
|---|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Casing Type:** | Surface Casing | Originated By: | Brian Marriott | Checked By: | Matthew Howard | Date: | 09 Jul 2013 |
| Hole Size: | 12 1/4 in | Casing Size: | 9 5/8 in | GL-RT: | 5.15m | Contractor: | |
| Total Depth MD: | 523.00m | Total Depth TVD: | 523.00m | Casing Depth MD: | 520.0m | Casing Depth TVD: | 520.00m |
| PRE-FLUSH | 10.0bbl@ 8.3ppg | | | SPACER | @ | | |
| Additives: | | | | Additives: | | | |
| Water Source | | | | | | | |

| CEMENT | | ADDITIVES | % | Amount | Units |
|---|---|---|---|---|---|
| LEAD SLURRY : | 178sack | D020 | | 251.00 | lbs |
| Brand / Class: | ABC / A | D047 | | 1.80 | gal |
| Slurry Yield: | 2.52ft³/sack | D075 | | 46.60 | gal |
| Mixwater Req't: | 14.90gal/sack | | | | |
| Actual Slurry Pumped: | 80.0bbl | | | | |
| Density: | 11.8ppg | | | | |
| Cement Top (MD): | 138.0m | | | | |
| TAIL SLURRY : | 123sack | D047 | | 1.00 | gal |
| Brand / Class: | ABC / A | D080 | | 40.00 | gal |
| Slurry Yield: | 1.19ft³/sack | | | | |
| Mixwater Req't: | 5.00gal/sack | | | | |
| Actual Slurry Pumped: | 26.0bbl | | | | |
| Density: | 15.6ppg | | | | |
| Cement Top (MD): | 419.0m | | | | |

| DISPLACEMENT | | | |
|---|---|---|---|
| Theoretical Displ. From Avg Caliper ID: | 130.0bbl | Fluid: | Water @ 8.3ppg |
| Actual Displ. From Tubs: | 131.0bbl @ 6.0bbl/min | Bumped Plug with: | 600psi |
| Actual Displ. From Barrel Counter: | 136.0bbl | Pressure Tested To: | 2,000psi |
| Actual Displ. From Tank Dip: | | Bleed Back: | 2.0bbl |
| | | Displaced via: | Schlumberger |

| ACTIVITY | Time/Date |
|---|---|
| Start Running csg. | 13:15 9/7/07 |
| Casing On Bottom | 23:15 9/7/07 |
| Start Circulation | 01:20 10/7/07 |
| Start Pressure Test | 01:30 10/7/07 |
| Pump Preflush | 02:45 10/7/07 |
| Start Mixing | 02:50 10/7/07 |
| Finish Mixing | 04:10 10/7/07 |
| Start Displacing | 04:25 10/7/07 |
| Stop Displ./Bump | 05:10 10/7/07 |
| Pressure Test | 05:20 10/7/07 |

Returns to Surface: 0.0bbl mud,13.0bbl cmt

Casing Action During — Preflush : No Action Taken; Cement : No Action Taken; Displacement : No Action Taken

Top Up Job run: Yes — 80 sack of class A

Plug Set: — Make: Topco — Type: Non rotating

Centralizer Type: Bow — Centralizer Placement Depth: 516m, 510m, 495m, 484m, 473m, 462m, 40m, #2 x cmt. basket at 36m

Wiper Plug Top: Yes

Wiper Plug Bottom: Yes

| CASING AND EQUIPMENT DETAILS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Stick Up | | | | | | | 5.15m | |
| No. Joints | OD | Wt | Grade | Comment | Thread | Length | From | To |
| 1 | | | | Shoe | BTC | 0.50m | 5.15m | 5.65m |
| 1 | 9.625in | 36.0lbs/ft | K55 | Pup jnt. w/ shoe attached | BTC | 5.95m | 5.65m | 11.60m |
| 1 | | | | Float collar | BTC | 0.47m | 11.60m | 12.07m |
| 1 | 9.625in | 36.0lbs/ft | K55 | Pup jnt. w/ float collar attached | BTC | 5.92m | 12.07m | 17.99m |
| 45 | 9.625in | 36.0lbs/ft | K55 | 45 | BTC | 498.68m | 17.99m | 516.67m |
| 1 | | | | Braden Head w/ landing jnt. | | 3.29m | 516.67m | 519.96m |

| | | | |
|---|---|---|---|
| Theoretical Bouyed wt. of casing: | 54.0klb | Bradenhead Height above GL: | 0.00m |
| Casing wt. prior to landing csg: | | 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): | | Tubing Spool Size: | 11" 3k flange bottom x 7-1/16" 5k studded top |
| Landing wt. (after cementing and pressure bleed off): | 0.0klb | Setting Slips: | |
| Thread Dope Used : | Bestolife 2000 | | |
| Cementing Job Remarks: | Poor results when attempting to press. test chicksan lines to 3000psi. Continuouse leaks.<br>Total of 1-1/2hrs down time.<br>Cmt. to surface at 118bbls into diplacment. (13bbls cmt. to surface)<br>RIH w/ stinger to comfirm how far cmt. had slumped after the pumping had stopped.<br>Mix & pump 18bbls, 80sx cmt. > slumped, pump additional 5bbls, cmt. > slumped, > pump 7 x 1 bbls cmt. top up over 11 min.<br><br>Top up job additional chemicals;<br>13 gal. D080 dispersent > 3 gal D047 antifoam. | | |

| Wellname: WEST MEREENIE 19 | Operation Co: Santos Ltd | Rig: Ensign 918 |
|---|---|---|

| **Casing Type:** Production Casing | Originated By: Darryl and Blue | Checked By: | Date: 10 Dec 2013 |
|---|---|---|---|
| Hole Size: 8 1/2 in | Casing Size: 5 1/2 in | GL-RT: 5.15m | Contractor: |
| Total Depth MD: 1,511.00m | Total Depth TVD: | Casing Depth MD: 1,507.9m | Casing Depth TVD: |
| PRE-FLUSH @ | | SPACER 20.0bbl @ 8.3ppg | |
| Additives: | | Additives: | |
| Water Source | | | |

| CEMENT | | ADDITIVES | % | Amount | Units |
|---|---|---|---|---|---|
| LEAD SLURRY : | 150sack | Anti Foam | | 0.01 | gal/sk |
| Brand / Class: | ABC / G | | | | VBWOB |
| Slurry Yield: | 2.55ft³/sack | D020 Extender | 1.50 | | BWOB |
| Mixwater Req't: | 15.25gal/sack | D075Extender | | 0.25 | gal/sk |
| Actual Slurry Pumped: | 68.0bbl | | | | VBWOB |
| Density: | 11.8ppg | | | | |
| Cement Top (MD): | 0.0m | | | | |
| TAIL SLURRY : | 742sack | Anti Foam | | 0.02 | gal/sk |
| Brand / Class: | ABC / LiteCRETE | | | | VBWOB |
| Slurry Yield: | 1.68ft³/sack | D124 Extender | | 22.00 | lb/sk |
| Mixwater Req't: | 4.74gal/sack | | | | WBWOB |
| Actual Slurry Pumped: | 222.0bbl | D145A | | 0.15 | gal/sk |
| Density: | 12.0ppg | Dispersant | | | VBWOB |
| Cement Top (MD): | 370.0m | Gas Control Agent | | 0.70 | gal/sk VBWOB |

| DISPLACEMENT | | | |
|---|---|---|---|
| Theoretical Displ. From Avg Caliper ID: | 114.2bbl | Fluid: | Brine @ 9.3ppg |
| Actual Displ. From Tubs: | 114.5bbl @ 3.0bbl/min | Bumped Plug with: | 1,220psi |
| Actual Displ. From Barrel Counter: | 115.8bbl | Pressure Tested To: | 2,000psi |
| Actual Displ. From Tank Dip: | 114.5bbl | Bleed Back: | 0.7bbl |
| | | Displaced via: | SLB Cementing unit |

| ACTIVITY | Time/Date |
|---|---|
| Start Running csg. | 23:59 9/12/07 |
| Casing On Bottom | 09:20 10/12/07 |
| Start Circulation | 09:20 10/12/07 |
| Start Pressure Test | 11:30 10/12/07 |
| Pump Preflush | 11:35 10/12/07 |
| Start Mixing | 12:00 10/12/07 |
| Finish Mixing | 13:20 10/12/07 |
| Start Displacing | 13:30 10/12/07 |
| Stop Displ./Bump | 13:50 10/12/07 |
| Pressure Test | 14:00 10/12/07 |

Returns to Surface: 243.0bbl mud,26.5bbl cmt

Casing Action During Preflush : Reciprocate Cement : Reciprocate Displacement : Reciprocate

Top Up Job run: No of class

Plug Set: Make: Top-Co Type: Wiper

Centralizer Type: Centralizer Placement Depth:

Wiper Plug Top: Yes

Wiper Plug Bottom: Yes

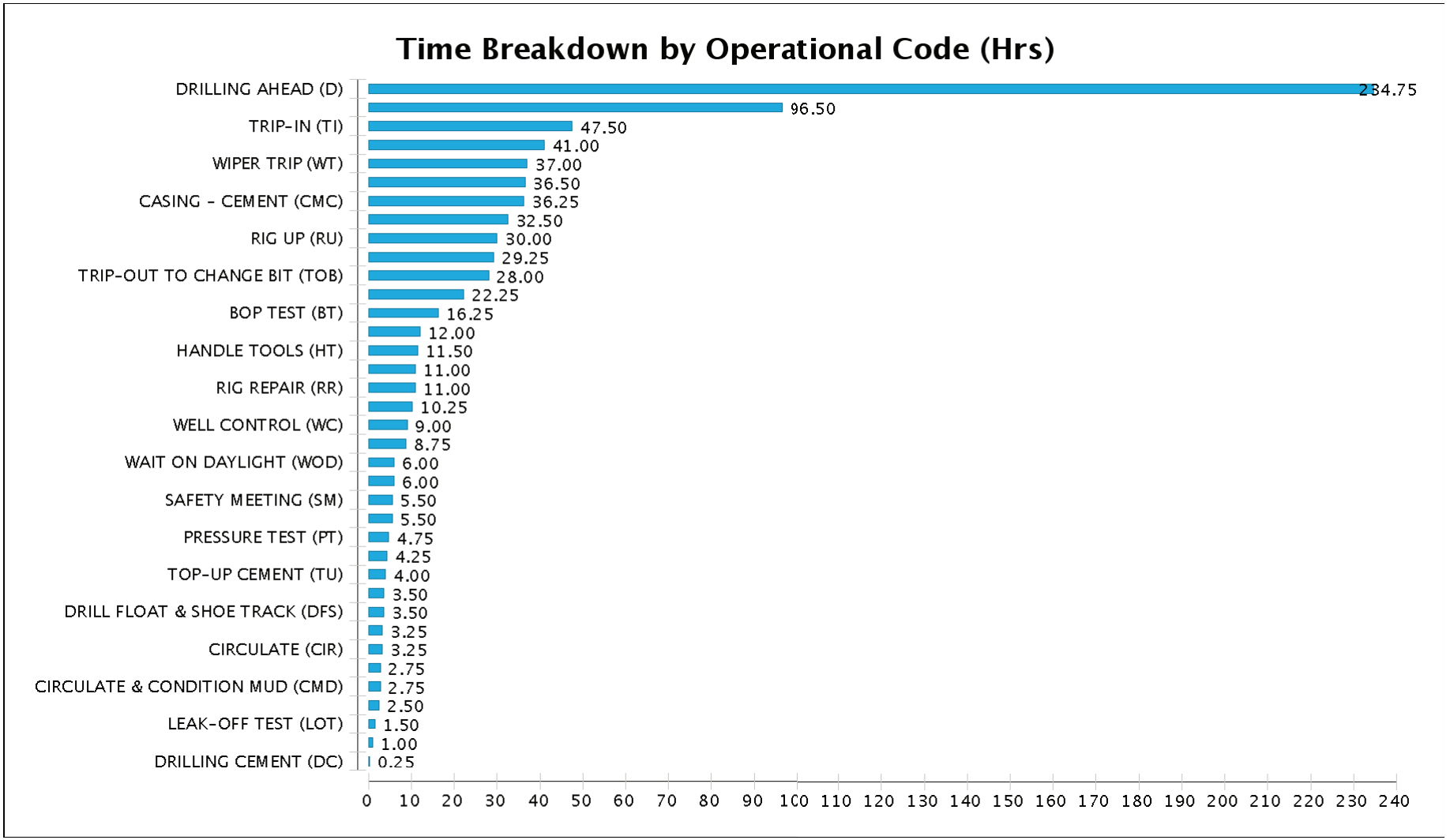
| CASING AND EQUIPMENT DETAILS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Stick Up | | | | | | | -1.10m | |
| No. Joints | OD | Wt | Grade | Comment | Thread | Length | From | To |
| 1 | 5.500in | 17.0lbs/ft | L80 | Landing Joint | JFE Bear | 12.06m | -1.10m | 10.96m |
| 4 | 5.500in | 17.0lbs/ft | L80 | | JFE Bear | 48.31m | 10.96m | 59.27m |
| 1 | 5.500in | 17.0lbs/ft | L80 | Pup Joint | JFE Bear | 3.04m | 59.27m | 62.31m |
| 1 | 5.500in | 17.0lbs/ft | L80 | | JFE Bear | 12.06m | 62.31m | 74.37m |
| 1 | 5.500in | 17.0lbs/ft | L80 | Pup Joint | JFE Bear | 3.04m | 74.37m | 77.41m |
| 108 | 5.500in | 17.0lbs/ft | L80 | | JFE Bear | 1,302.96m | 77.41m | 1,380.37m |
| 1 | 5.500in | 17.0lbs/ft | L80 | Marker Joint | JFE Bear | 3.04m | 1,380.37m | 1,383.41m |
| 7 | 5.500in | 17.0lbs/ft | L80 | | JFE Bear | 84.51m | 1,383.41m | 1,467.92m |
| 1 | 5.500in | 17.0lbs/ft | L80 | Marker Joint | JFE Bear | 3.04m | 1,467.92m | 1,470.96m |
| 2 | 5.500in | 17.0lbs/ft | L80 | | JFE Bear | 24.15m | 1,470.96m | 1,495.11m |
| 1 | | | | Float Collar | JFE Bear | 0.30m | 1,495.11m | 1,495.41m |
| 1 | 5.500in | 17.0lbs/ft | L80 | | JFE Bear | 12.08m | 1,495.41m | 1,507.49m |
| 1 | | | | Float Shoe | JFE Bear | 0.40m | 1,507.49m | 1,507.89m |

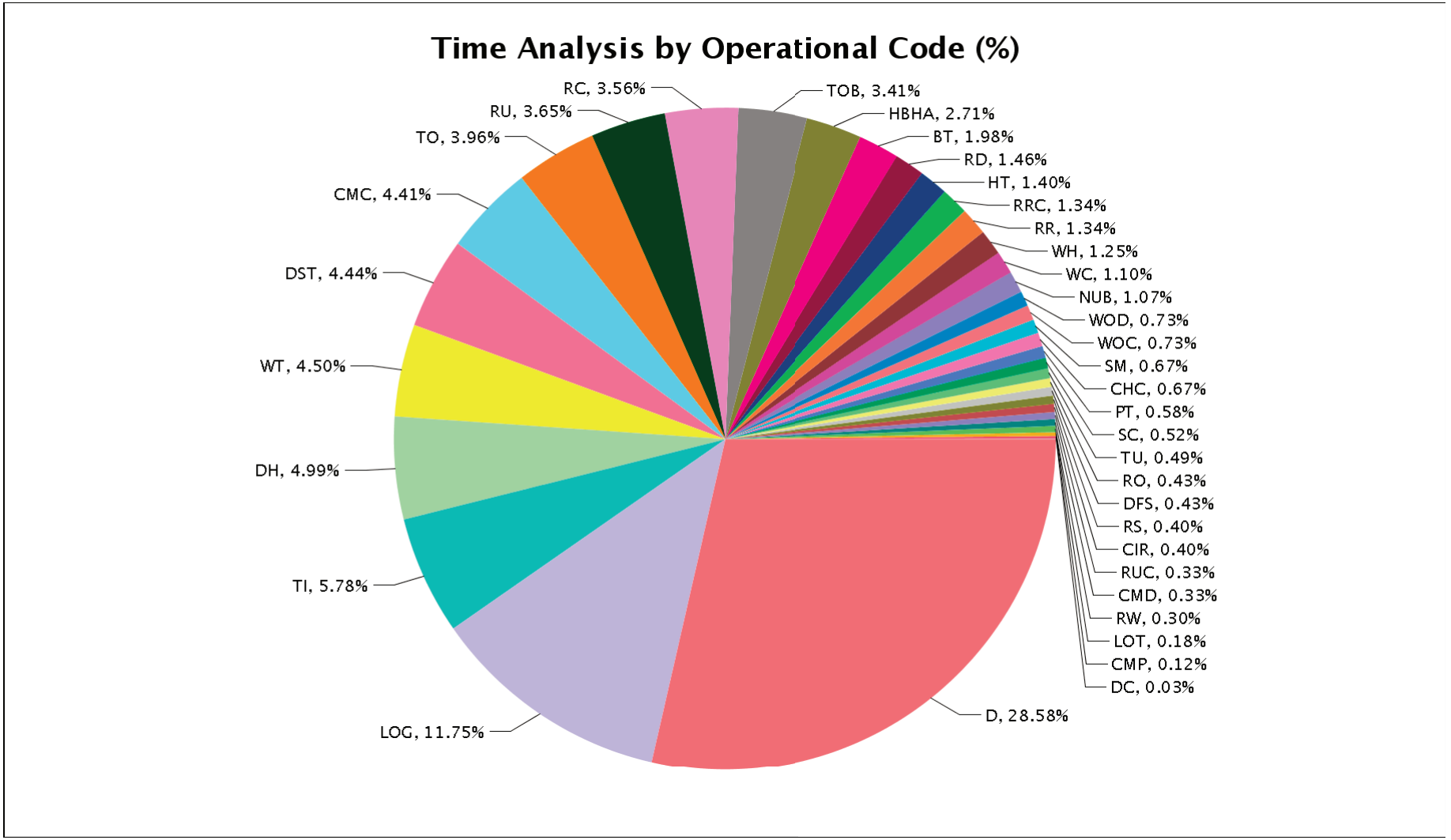
| | | | |
|---|---|---|---|
| Theoretical Bouyed wt. of casing: | 68.0klb | Bradenhead Height above GL: | 0.00m |
| Casing wt. prior to landing csg: | 76.0klb | Bradenhead Description / Length: | 11" 5k psi GE SCH1 top x 9-5/8" BTC Box bottom/ |
| Actual wt. of casing (last joint run-block wt): | 94.0klb | Tubing Spool Size: | 11" 5K X 7 1/16" 3K |
| Landing wt. (after cementing and pressure bleed off): | 64.0klb | Setting Slips: | 81.0klb |
| Thread Dope Used : | Bestolife 2000 | | |
| Cementing Job Remarks: | Full returns throughout the job. Cement to surface 88bbl into displacement. 26.5bbl cement to surface | | |

# Section 5 : Time Analysis Data

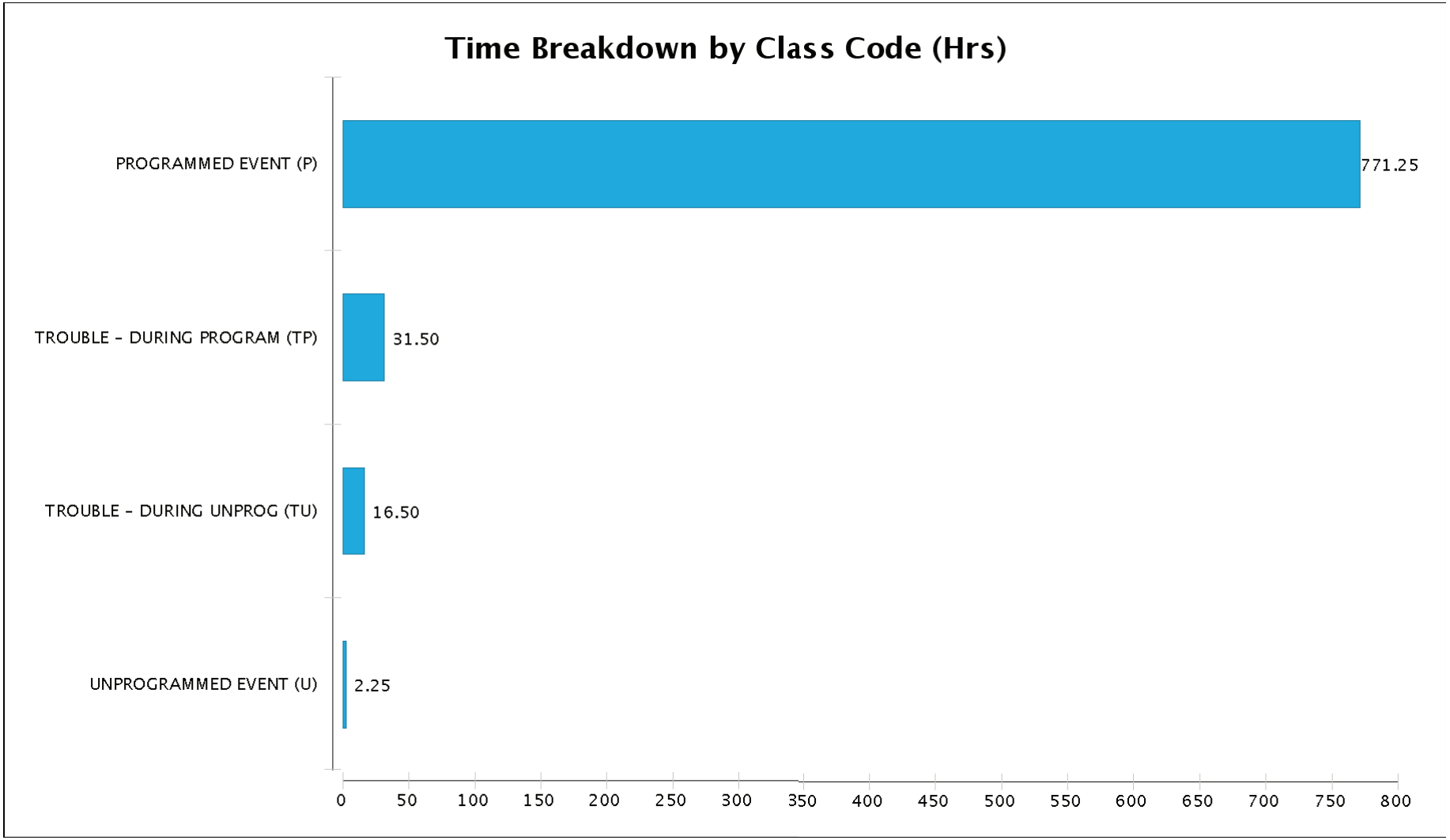
- Time Overview
- Trouble Time Summary
- Activity Report

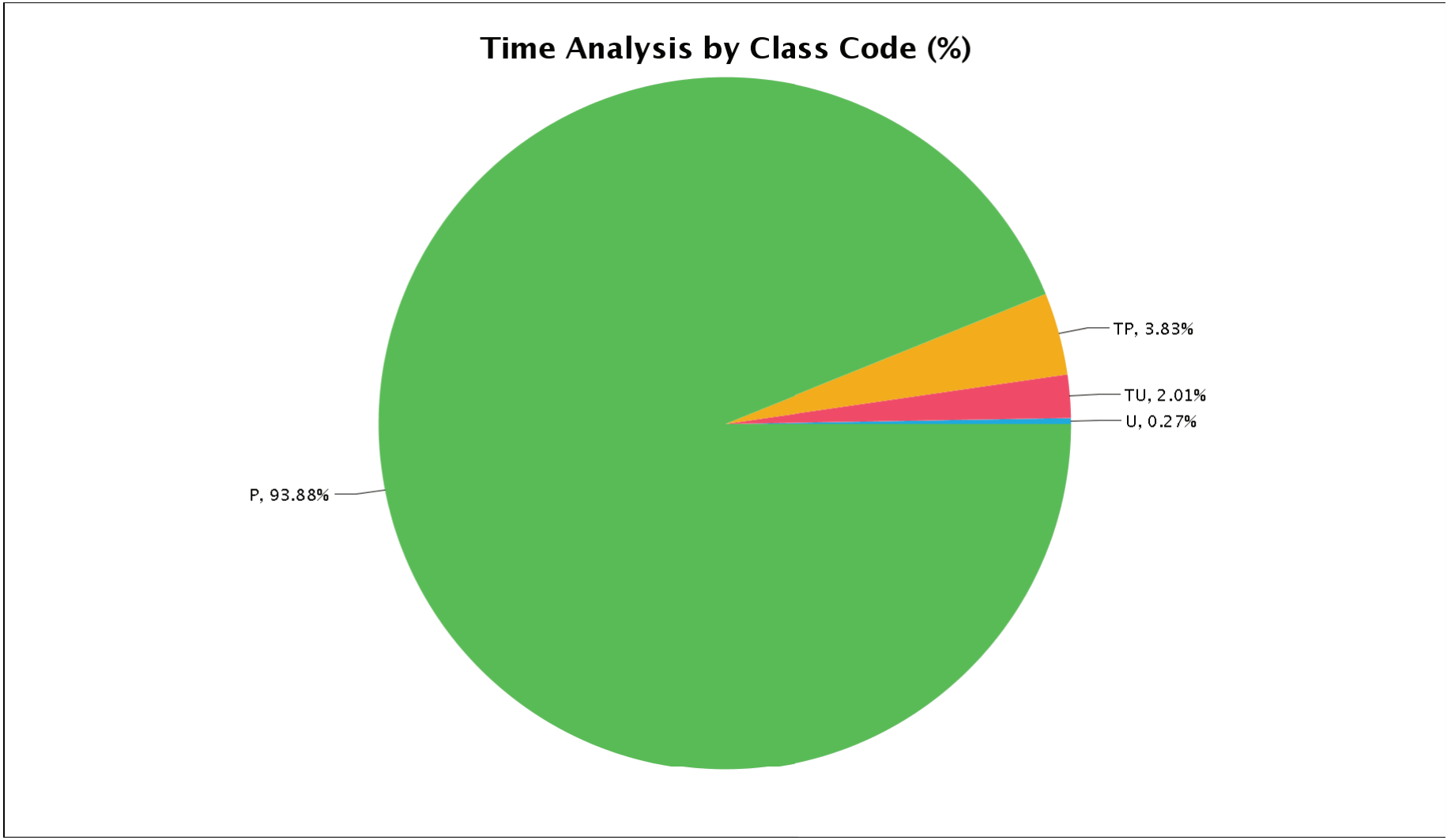
## Time Analysis



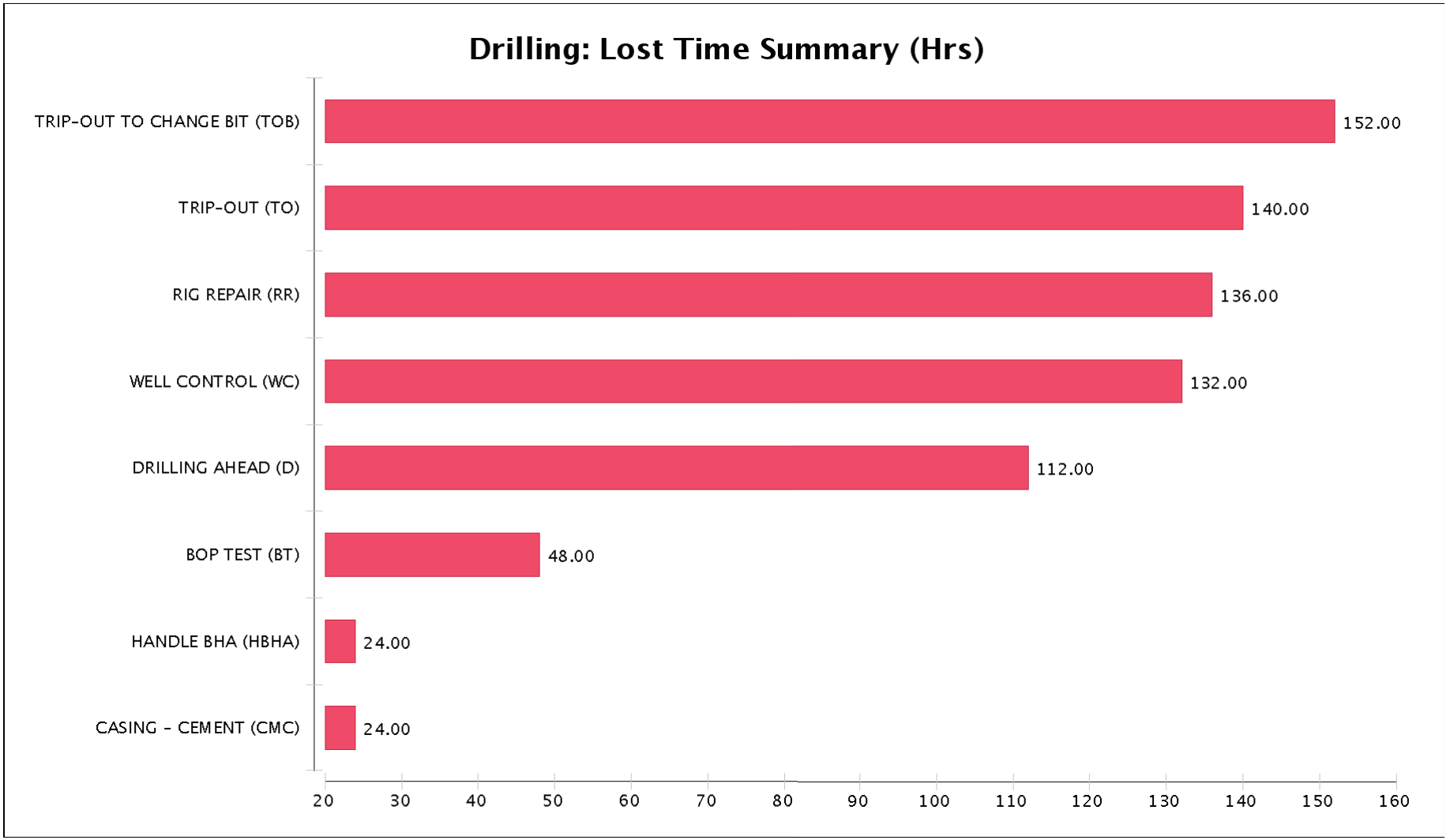

Time Analysis by Operational Code (%)
RC, 3.56%
TOB, 3.41%
RU, 3.65%
HBHA, 2.71%
TO, 3.96%
BT, 1.98%
RD, 1.46%
CMC, 4.41%
HT, 1.40%
RRC, 1.34%
RR, 1.34%
DST, 4.44%
WH, 1.25%
WC, 1.10%
NUB, 1.07%
WOD, 0.73%
WT, 4.50%
WOC, 0.73%
SM, 0.67%
CHC, 0.67%
DH, 4.99%
PT, 0.58%
SC, 0.52%
TU, 0.49%
RO, 0.43%
DFS, 0.43%
TI, 5.78%
RS, 0.40%
CIR, 0.40%
RUC, 0.33%
CMD, 0.33%
RW, 0.30%
LOT, 0.18%
CMP, 0.12%
DC, 0.03%
D, 28.58%
LOG, 11.75%

| Wellname: WEST MEREENIE 19 | Drilling Co: Santos Ltd | Rig: Ensign 918 |
|---|---|---|

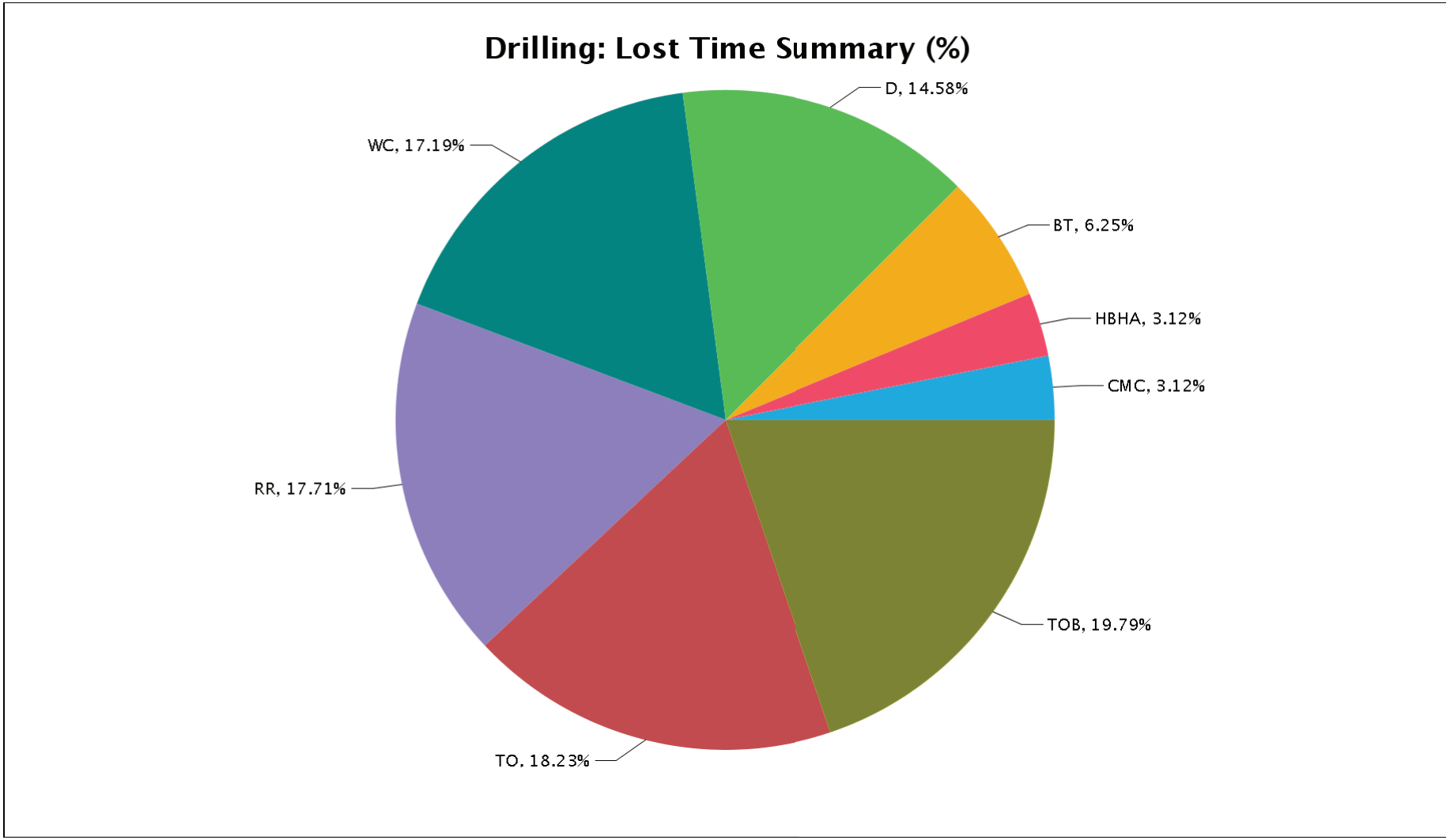


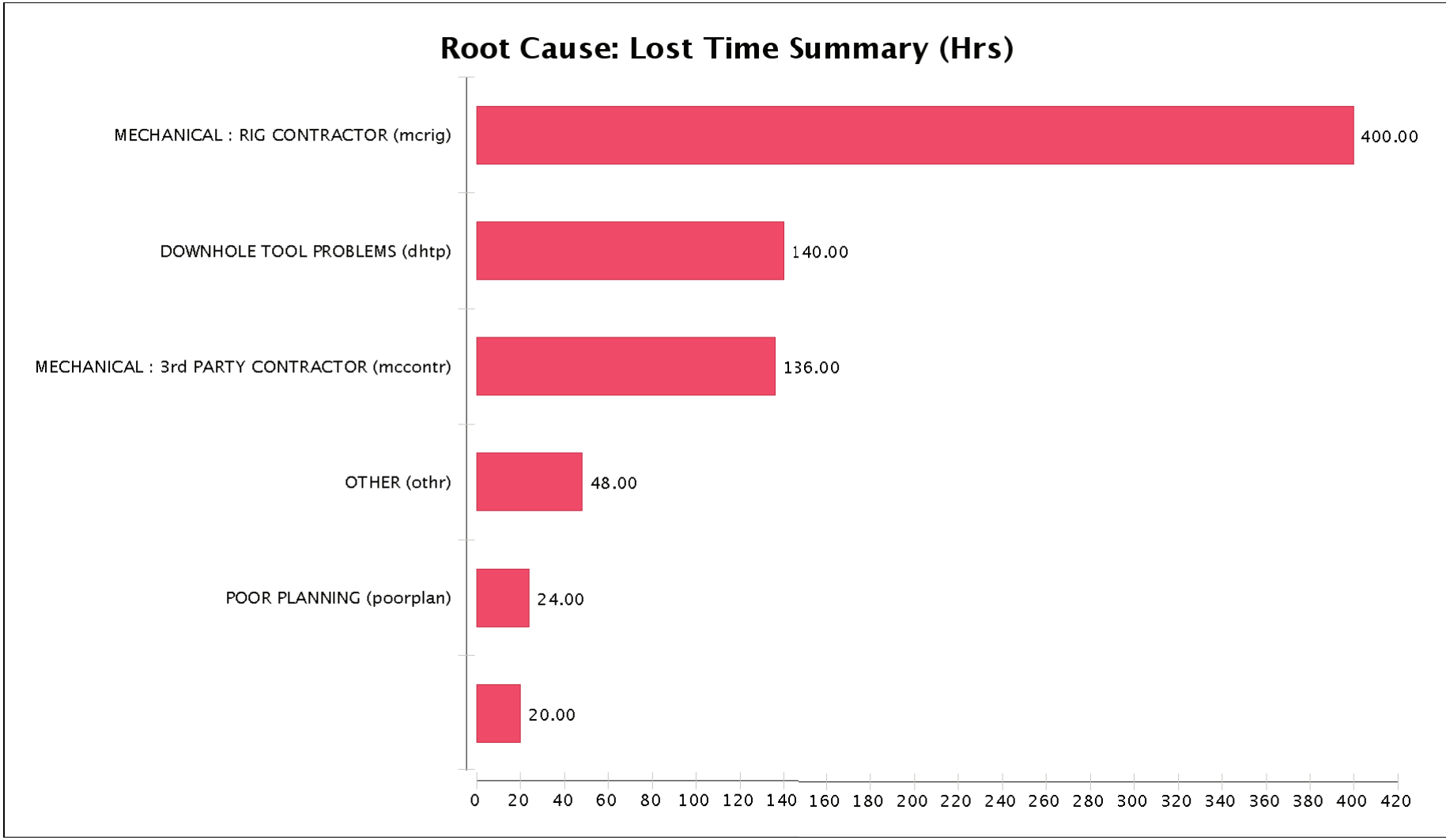


## Trouble Time Analysis

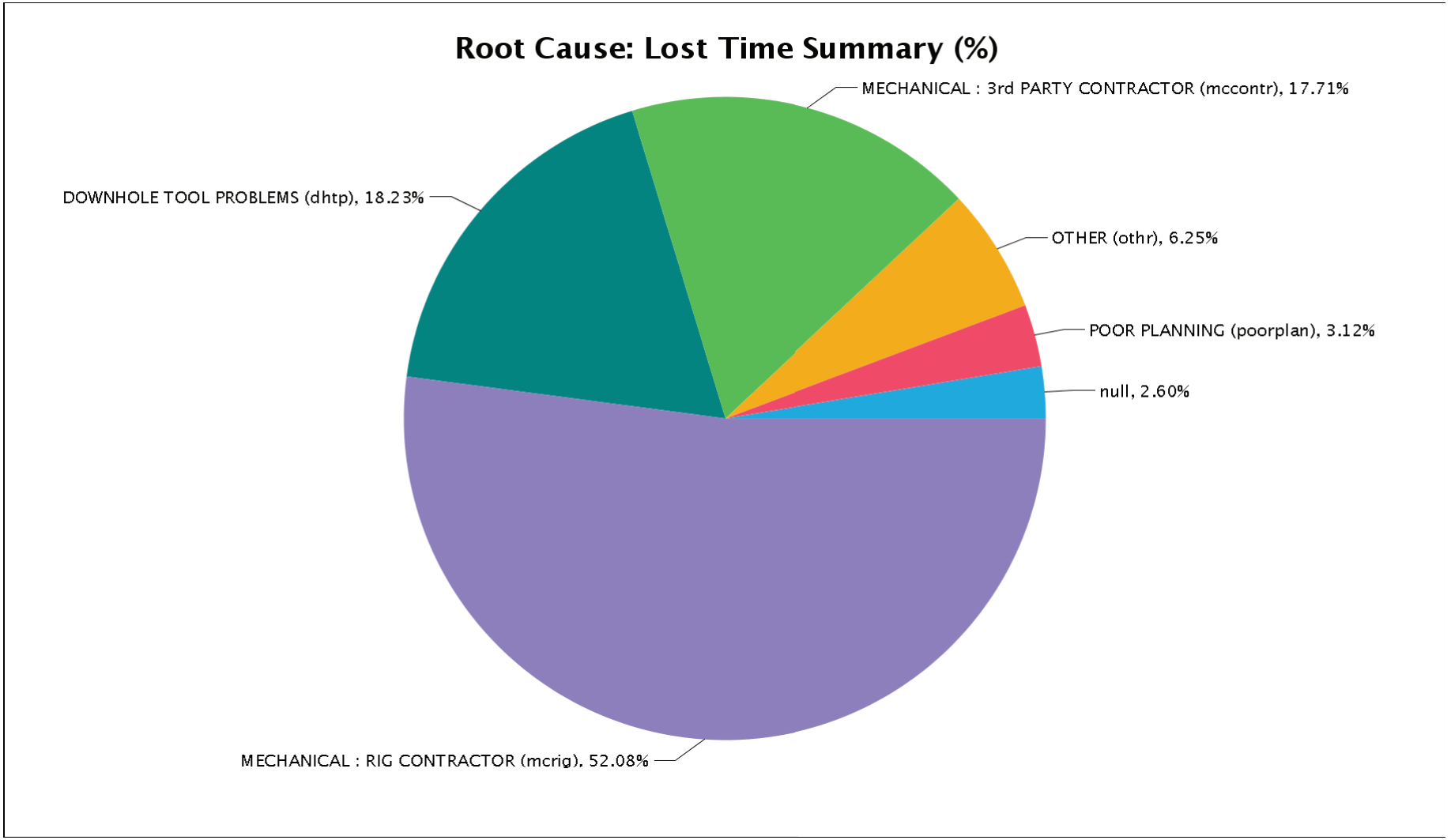


| Wellname: WEST MEREENIE 19 | Drilling Co: Santos Ltd | Rig: Ensign 918 |
|---|---|---|

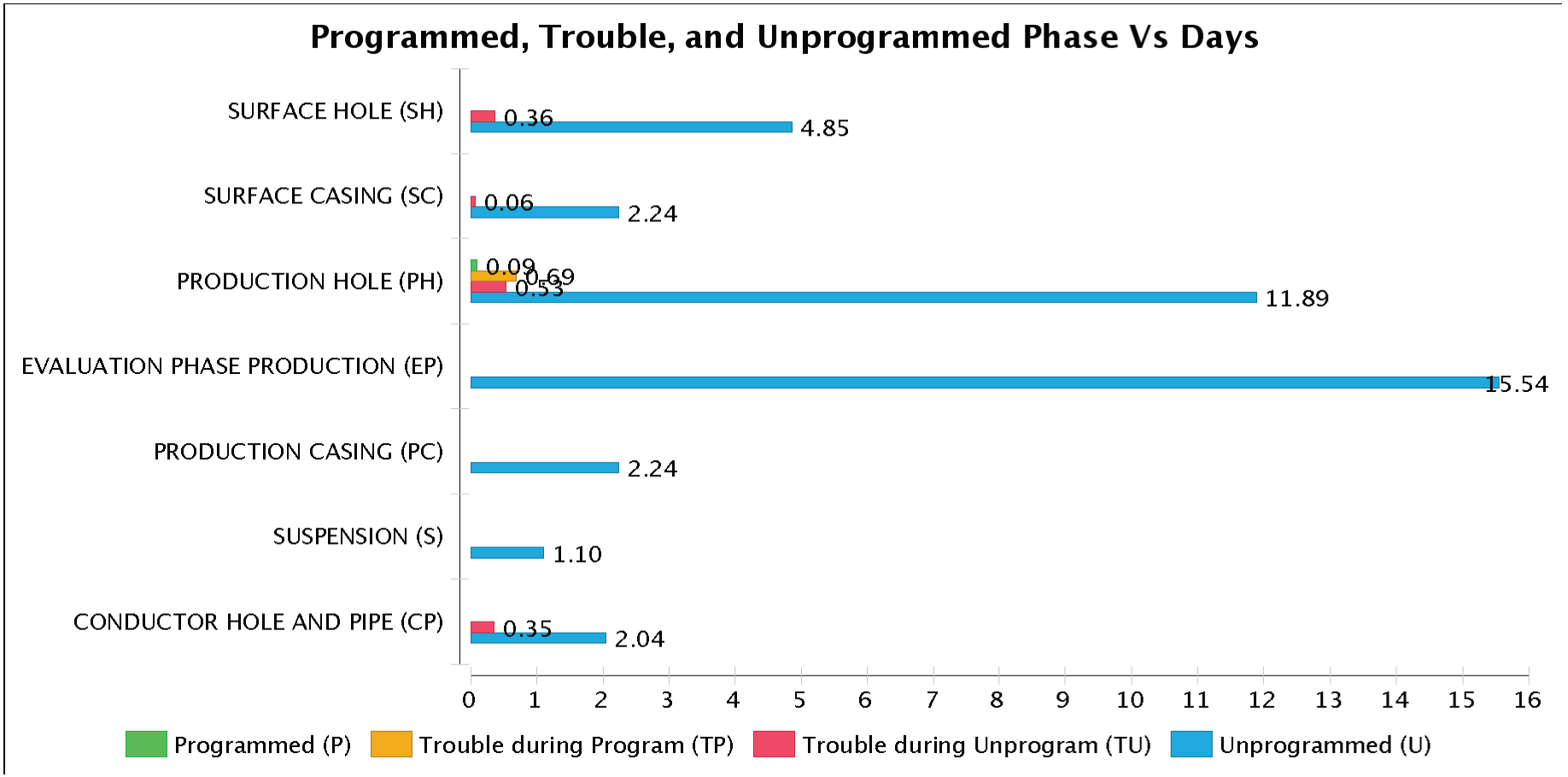



Root Cause: Lost Time Summary (Hrs)
MECHANICAL : RIG CONTRACTOR (mcrig)
400.00
DOWNHOLE TOOL PROBLEMS (dhtp)
140.00
MECHANICAL : 3rd PARTY CONTRACTOR (mccontr)
136.00
OTHER (othr)
48.00
POOR PLANNING (poorplan)
24.00
20.00
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420

| Wellname: WEST MEREENIE 19 | Drilling Co: Santos Ltd | Rig: Ensign 918 |
|---|---|---|



## Time Breakdown by Phase



**Total Time on Operations :42.00 d**

**Total Productive Time :39.91 d**

**Total Lost Time :2.00 d**

**Total Unprogrammed Time :0.09 d**

# Time Analysis Data

| Date | Phase | Operation | NPT (h) | Depth (m) | Description of Programmed Trouble Time |
|---|---|---|---|---|---|
| 02 Jul 2013 | CP | RIG REPAIR (RR) | 6.50 | 35.1 | "Down Time"<br>Cmt. unit , hopper, hoses full of Cmt.<br>Pull tremmie pipe, full of cmt., lay out same.<br>Strip down & clean out Cmt. pump, hopper & lines.<br>Re-assemble cmt. unit<br>Test run unit after disassembling & clean out. ok |
| 02 Jul 2013 | CP | RIG REPAIR (RR) | 1.00 | 35.1 | Position BLY cmt. unit as close to the conductor as possible. ( previouse position was 15met. f/ conductor, cmt. discharge hose was too long)<br>Note. hyd driven cmt. unit hoses are too short to spot the unit along side the conductor. (order new hyd. hoses) |
| 02 Jul 2013 | CP | RIG REPAIR (RR) | 1.00 | 35.1 | RIH w/ tremmie pipe to 15m., take wt., work down, POOH, confirmed cmt. at 15m w/ sample plug, RIH w/ tremmie pipe to 15m<br>Break circ.. Write up & discuss proceedure |
| 06 Jul 2013 | SH | TRIP-OUT (TO) | 1.75 | 378.5 | Down time;<br>Diagnosing problem of water unloading f/ divertor, Possible split in drillpipe |
| 06 Jul 2013 | SH | TRIP-OUT (TO) | 3.25 | 378.5 | Down Time;<br>PJSM, POOH to find / locate air leak in drill pipe.<br>Pressurise each connection while POOH to locate leak.<br>Located leak on d.p. jnt. #40, @ 320 met.<br>Appears to be a manufacturing problem, weld cracked just below & around the tool jnt. (photo sent in) |
| 06 Jul 2013 | SH | TRIP-OUT (TO) | 1.00 | 378.5 | PJSM, Pressure up drill pipe / BHA left in the hole to check for possible additional leaks, blockage in the air side of drillpipe. Cont. POOH to D.C.s to clear cuttings blockage, Remove inner tube f/ DC.s. |
| 06 Jul 2013 | SH | TRIP-OUT (TO) | 2.75 | 378.5 | PJSM, RIH, install air lift x-o sub in drill pipe @ 90m above BHA, to reduce air pressure in drill string, cont. RIH to bottom @ 378.5m |
| 10 Jul 2013 | SC | CASING - CEMENT (CMC) | 1.50 | 523.0 | Cementers, pump 5bbls water ahead, pressure test lines to 3000 psi, no test, replace seal in chicksan, re-test, failed, re-hammer up all chicksan unions, re-test a total of #4 times to get acceptable pressure test. |
| 23 Nov 2013 | PH | DRILLING AHEAD (D) | 2.00 | 1,094.0 | Flare line flame went out. Reignite flare. Discovered washout in Blooey line. Decision made to Kill the well with 50bbl Brine Spacer and Kill mud and then fix wash out. |
| 23 Nov 2013 | PH | WELL CONTROL (WC) | 1.50 | 1,094.0 | Held PJSM with crews, ADA, OCR discussed procedure to Kill the well. Proceed to kill the well. Discovered faulty valve in the stand pipe line and unable to Kill the well. Put Well back on air, reciprocate and work string. |
| 23 Nov 2013 | PH | WELL CONTROL (WC) | 1.50 | 1,094.0 | Make risk assessment and new JHA to remove 4" valve from Stand pipe line. Proceed to change out valve. Pressure test new 4" Valve. |
| 23 Nov 2013 | PH | WELL CONTROL (WC) | 1.25 | 1,094.0 | Held PJSM. Lined up and proceeded to Kill the well. Pumped 40bbls of 9.4ppg brine at 700gpm. Then pumped 8.8ppg at 590gpm, total strokes 3380. Shut Well in and monitored pressures through choke manifold. Well static. Lined up and circulated through poorboy. |

| Date | Phase | Operation | NPT (h) | Depth (m) | Description of Programmed Trouble Time |
|---|---|---|---|---|---|
| 23 Nov 2013 | PH | DRILLING AHEAD (D) | 3.00 | 1,094.0 | While circulating through poorboy, remove sample skid, hook up Blooie line, reignite flare line. Repair and install 4" valve. |
| 23 Nov 2013 | PH | DRILLING AHEAD (D) | 1.00 | 1,094.0 | Displace well to water and recover mud to Mud tanks. Flush poorboy. |
| 23 Nov 2013 | PH | DRILLING AHEAD (D) | 0.75 | 1,094.0 | Unload Well and blow hole dry. |
| 23 Nov 2013 | PH | DRILLING AHEAD (D) | 0.25 | 1,248.0 | Discovered wash out in Gas sample skid. Brought air package to half drilling rate. Reciprocated and circulated while updated Kill sheets. |
| 23 Nov 2013 | PH | WELL CONTROL (WC) | 2.00 | 1,248.0 | Mud pump #1 down. (Pop off and blocked screens). Callibrated choke gauges. Switch to Mud pump #2. |
| 23 Nov 2013 | PH | WELL CONTROL (WC) | 2.00 | 1,248.0 | Circulate through poorboy and finish killing Well. Circulate and condition mud. Held PJSM and prepared to POOH. Remove bushings and diverter head. |
| 24 Nov 2013 | PH | TRIP-OUT TO CHANGE BIT (TOB) | 8.00 | 1,248.0 | Continued POOH from 1153m to BHA. (Unable to continue air drilling operations due to washed gas flow tester in blooie line) |
| 24 Nov 2013 | PH | HANDLE BHA (HBHA) | 1.50 | 1,248.0 | Break and lay down BHA tools. |
| 24 Nov 2013 | PH | BOP TEST (BT) | 3.00 | 1,248.0 | Repair hose on pressure test unit. Retest blind rams to achieve good test. |
| 28 Nov 2013 | PH | TRIP-OUT TO CHANGE BIT (TOB) | 1.50 | 1,404.5 | Rig shut down due to low fuel. |

# Activity Record

| Day #1 (01 Jul 2013) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **PHSE** | **CLS** | **OP** | **RC** | **From** | **To** | **Hrs** | **Depth (m)** | **Activity Description** |
| CP | P | D | | 02:00 | 12:45 | 10.75 | 35.1 | Spud well at 02:00hrs.<br>Drill 20" conductor hole to 30 met.<br>WOB = 10 to 20k > RPM = 38 to 50 > GPM = 420 to 520 |
| CP | P | CHC | | 12:45 | 14:30 | 1.75 | 35.1 | Circ. bottoms up & hole clean, increasing Vis to 70 + -, |
| CP | P | TO | | 14:30 | 16:45 | 2.25 | 35.1 | POOH, no problems, hole good. lay out BHA. |
| CP | P | RRC | | 16:45 | 18:15 | 1.50 | 35.1 | Rack 16" csg. on Load Safe.<br>Rig to run conductor csg. |
| CP | P | RC | | 18:15 | 20:45 | 2.50 | 35.1 | Run 30m x 16" conductor pipe to 35.15m. RKB Ensign 918.<br>Weld jnt's together, spot on bottom TOC at GL |
| CP | P | RUC | | 20:45 | 22:30 | 1.75 | 35.1 | Prepare for cementing, Run 40mm OD tremmie pipe to approx 1.5m above bottom of hole |
| CP | P | CMP | | 22:30 | 23:30 | 1.00 | 35.1 | Mix cement 2.25bbls, Hot mix (4% Calc. Chloride in 15.1 ppg cmt) Tremmie cement, Plug approx 5m, displace lines and pipe, Flush hoses & pump, POOH tremmie pipe |
| CP | P | WOC | | 23:30 | 24:00 | 0.50 | 35.1 | WOC<br>Raise confined space permit.<br>Clean out cellar floor ready for cementing |
| **Day #2 (02 Jul 2013)** | | | | | | | | |
| **PHSE** | **CLS** | **OP** | **RC** | **From** | **To** | **Hrs** | **Depth (m)** | **Activity Description** |
| CP | P | WOC | | 00:00 | 02:00 | 2.00 | 35.1 | WOC<br>Raise confined space permit.<br>Clean out cellar floor ready for cementing |
| CP | P | WOC | | 02:00 | 04:15 | 2.25 | 35.1 | RIH w/ 40mm tremmie pipe to cmt. annulus to surface.<br>Attempt to circ., no success, pipe blocked, POOH, clear blockage, RIH. |
| CP | P | WOC | | 04:15 | 05:30 | 1.25 | 35.1 | Break circ. thru. tremmie pipe, ok<br>Mix 60 x 20kg sx cmt., 1 sx Calc. Cloride. to 15.0ppg<br>Commence to pump cmt., pump stalling under pressure, line blocked, presently fault finding pump problem & clearing line.<br>Operation shut down. |

**Day #2 (02 Jul 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| CP | TP | RR | mcrig | 05:30 | 12:00 | 6.50 | 35.1 | "Down Time"<br>Cmt. unit , hopper, hoses full of Cmt.<br>Pull tremmie pipe, full of cmt., lay out same.<br>Strip down & clean out Cmt. pump, hopper & lines.<br>Re-assemble cmt. unit<br>Test run unit after disassembling & clean out. ok |
| CP | P | SM | | 12:00 | 12:30 | 0.50 | 35.1 | Toolbox & safety meeting with new on coming crew. |
| CP | TP | RR | mcrig | 12:30 | 13:30 | 1.00 | 35.1 | Position BLY cmt. unit as close to the conductor as possible. ( previouse position was 15met. f/ conductor, cmt. discharge hose was too long)<br>Note. hyd driven cmt. unit hoses are too short to spot the unit along side the conductor. (order new hyd. hoses) |
| CP | TP | RR | mcrig | 13:30 | 14:30 | 1.00 | 35.1 | RIH w/ tremmie pipe to 15m., take wt., work down, POOH, confirmed cmt. at 15m w/ sample plug, RIH w/ tremmie pipe to 15m<br>Break circ.. Write up & discuss proceedure |
| CP | P | CMC | | 14:30 | 17:30 | 3.00 | 35.1 | "Rig back in operation"<br>Check alignment / level of 16" conductor,<br>Mix 300 gal , 69 x 20kg sx cmt., 1 sx Calc. Cloride. to 15.0ppg, pump same. good returns<br>POOH w/ tremmie pipe.<br>Wash & clean up cmt. tub hoses & sand guzzler pump.<br>Mix Santos supplied Concrete Mix & spot on cellar floor.<br>Wait on cmt. to set, check sample , ok. |
| CP | P | CMC | | 17:30 | 23:30 | 6.00 | 35.1 | Raise permit to weld Deverter flange, Review SOP,s and complete JSA, Weld flange to 16" conductor csg, Install diverter & blooie line |
| CP | P | HT | | 23:30 | 24:00 | 0.50 | 35.1 | Restore rig floor area remove unnessesary items / Hazards, Respotting pump trailer to allow driller to have a view of pump, shaker & mud trailer equip. |

**Day #3 (03 Jul 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| CP | P | RU | | 00:00 | 08:00 | 8.00 | 35.1 | Re-spot pump trailer, Place spill mats under equipment, assemble hyd. & discharge hose, spot truck mounted sullair compressor, place spill mats under same, Strapping 12.4" Hammer & BHA |
| CP | P | HBHA | | 08:00 | 11:15 | 3.25 | 35.1 | PJSM, Make up 12.4" Hammer, BHA & RIH, tag top of Cmt. @ 31m |
| CP | P | DC | | 11:15 | 11:30 | 0.25 | 35.1 | Drill Cmt. f/ 31m to 35.15 met. |

| Day #3 (03 Jul 2013) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **PHSE** | **CLS** | **OP** | **RC** | **From** | **To** | **Hrs** | **Depth (m)** | **Activity Description** |
| SH | P | D | | 11:30 | 24:00 | 12.50 | 236.1 | Drill / Air Hammer 12.4" hole f/ 35.15 to 236.1m,<br>Start making water from187m approx 20gpm increasing to approx 160 - 180gpm by 236.1m<br>(Air imput 2300 cfm @ 350psi) |
| **Day #4 (04 Jul 2013)** | | | | | | | | |
| **PHSE** | **CLS** | **OP** | **RC** | **From** | **To** | **Hrs** | **Depth (m)** | **Activity Description** |
| SH | P | D | | 00:00 | 05:15 | 5.25 | 266.5 | Drill ahead f/ 236.1 to 266.5m,<br>Water aprox 200 gpm,<br>(Air imput 2300 cfm @ 350psi) |
| SH | P | CHC | | 05:15 | 05:30 | 0.25 | 266.5 | Circ to clean hole, |
| SH | P | TOB | | 05:30 | 10:30 | 5.00 | 266.5 | POOH, Break out & lay down BHA<br>Lay out Air Hammer & divertor discharge line to sump |
| SH | P | RU | | 10:30 | 12:00 | 1.50 | 266.5 | Make up flowline & discharge hoses for flood reverse, strap BHA |
| SH | P | TI | | 12:00 | 18:00 | 6.00 | 266.5 | Make up 12-1/4" Smith (617Y) tricone bit, BHA, RIH, tag at 266.5m, no fill. |
| SH | P | D | | 18:00 | 24:00 | 6.00 | 289.9 | Break circ, Ease bit in & drill ahead f/ 266.5 to 289.9m, Drilling ahead |
| **Day #5 (05 Jul 2013)** | | | | | | | | |
| **PHSE** | **CLS** | **OP** | **RC** | **From** | **To** | **Hrs** | **Depth (m)** | **Activity Description** |
| SH | P | D | | 00:00 | 24:00 | 24.00 | 375.0 | Drilling ahead 12-1/4" surface hole f/ 289.9 to 375M |
| **Day #6 (06 Jul 2013)** | | | | | | | | |
| **PHSE** | **CLS** | **OP** | **RC** | **From** | **To** | **Hrs** | **Depth (m)** | **Activity Description** |
| SH | P | RS | | 00:00 | 00:15 | 0.25 | 375.0 | Rig service |
| SH | P | D | | 00:15 | 02:15 | 2.00 | 378.5 | Drill ahead 12-1/4" surface hole f/ 375 to 378.5m.<br>Water unloading from top of diverter, Stop drilling op's. |
| SH | TP | TO | dhtp | 02:15 | 04:00 | 1.75 | 378.5 | Down time;<br>Diagnosing problem of water unloading f/ divertor,<br>Possible split in drillpipe |
| SH | TP | TO | dhtp | 04:00 | 07:15 | 3.25 | 378.5 | Down Time;<br>PJSM, POOH to find / locate air leak in drill pipe.<br>Pressurise each connection while POOH to locate leak.<br>Located leak on d.p. jnt. #40, @ 320 met.<br>Appears to be a manufacturing problem, weld cracked just below & around the tool jnt. (photo sent in) |

**Day #6 (06 Jul 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| SH | TP | TO | dhtp | 07:15 | 08:15 | 1.00 | 378.5 | PJSM, Pressure up drill pipe / BHA left in the hole to check for possible additional leaks, blockage in the air side of drillpipe. Cont. POOH to D.C.s to clear cuttings blockage, Remove inner tube f/ DC.s. |
| SH | TP | TO | dhtp | 08:15 | 11:00 | 2.75 | 378.5 | PJSM, RIH, install air lift x-o sub in drill pipe @ 90m above BHA, to reduce air pressure in drill string, cont. RIH to bottom @ 378.5m |
| SH | P | D | | 11:00 | 12:45 | 1.75 | 381.5 | Rig back in operation;<br>Drill 12-1/4" surface hole f/ 378.5 to 381.50 |
| SH | P | RS | | 12:45 | 13:00 | 0.25 | 381.5 | Rig service |
| SH | P | D | | 13:00 | 24:00 | 11.00 | 432.0 | Drill 12-1/4" surface hole f/ 381.50m to 432m |

**Day #7 (07 Jul 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| SH | P | D | | 00:00 | 00:45 | 0.75 | 436.0 | Drill ahead 12 1/4" hole f/ 432 to 436m |
| SH | P | RS | | 00:45 | 01:00 | 0.25 | 436.0 | Rig service |
| SH | P | D | | 01:00 | 13:30 | 12.50 | 490.0 | Drill ahead 12 1/4" hole f/ 436 to 490m |
| SH | P | RS | | 13:30 | 13:45 | 0.25 | 490.0 | Rig service |
| SH | P | D | | 13:45 | 24:00 | 10.25 | 506.0 | Drill ahead 12 1/4" surface hole f/ 490m to 506m |

**Day #8 (08 Jul 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| SH | P | D | | 00:00 | 03:45 | 3.75 | 509.0 | Drilling ahead 12 1/4" surface hole f/ 506 to 509m |
| SH | P | RS | | 03:45 | 04:00 | 0.25 | 509.0 | Rig service |
| SH | P | D | | 04:00 | 16:00 | 12.00 | 523.0 | Drilling ahead 12 1/4" Surface hole 509 to 523m<br>Upper Stokes Formation top at 497m 16m high.<br>Spot sample @ 507m. = 80% siltstone<br>Spot sample @ 510m. = 90% siltstone<br>Spot sample @ 513m. = 90% siltstone<br>Spot sample @ 516m. = 100% siltstone / Tr Sandstone<br>Spot sample @ 519m. = 80% siltstone<br>Spot sample @ 522m. = 90% siltstone |
| SH | P | CHC | | 16:00 | 16:15 | 0.25 | 523.0 | Circ. hole clean |
| SH | P | RS | | 16:15 | 16:30 | 0.25 | 523.0 | Rig service |
| SH | P | CHC | | 16:30 | 16:45 | 0.25 | 523.0 | Circ. hole clean |

| Day #8 (08 Jul 2013) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **PHSE** | **CLS** | **OP** | **RC** | **From** | **To** | **Hrs** | **Depth (m)** | **Activity Description** |
| SC | P | TO | | 16:45 | 18:15 | 1.50 | 523.0 | POOH to 448m |
| SC | P | RUC | | 18:15 | 19:15 | 1.00 | 523.0 | Due to wet weather coming in, shut down POOH operations to clean out mud active tanks to take on water for cementing operations.<br><br>Spot Schlumberger cmt. truck, cmt. bulker & water tanker |
| SC | P | TO | | 19:15 | 22:15 | 3.00 | 523.0 | Cont. POOH to BHA |
| SC | P | HBHA | | 22:15 | 24:00 | 1.75 | 523.0 | POOH, Break out and lay down 12 1/4" BHA, 59m still in hole |
| **Day #9 (09 Jul 2013)** | | | | | | | | |
| **PHSE** | **CLS** | **OP** | **RC** | **From** | **To** | **Hrs** | **Depth (m)** | **Activity Description** |
| SC | P | HBHA | | 00:00 | 02:30 | 2.50 | 523.0 | Cont POOH,breakout and laydown of BHA |
| SC | P | HBHA | | 02:30 | 03:15 | 0.75 | 523.0 | Remove Rotary head end of 8" Kelly Hose, for unobstructed use of Jib line |
| SC | P | HBHA | | 03:15 | 03:45 | 0.50 | 523.0 | Break out & lay down last of BHA |
| SC | P | RRC | | 03:45 | 08:30 | 4.75 | 523.0 | Clear rig floor, remove Diverter and DTFR flow lines in preparation for casing, Cut 16" conductor csg, 24" below top of cellar @ G.L., install csg. landing ring & stitch weld in same.<br><br>Operation hampered by rain, sump continually filling up with water, install sand guzzler pump to cellar, pump out while making cut & welding operations to csg. landing ring. Lease is 65% flooded w/ water. |
| SC | P | RRC | | 08:30 | 11:45 | 3.25 | 523.0 | Rig up to run surface casing.<br><br>Continual rain, wind & cold hammpered operations. |
| SC | P | RRC | | 11:45 | 12:15 | 0.50 | 523.0 | PJSM with both crews |
| SC | P | RRC | | 12:15 | 13:15 | 1.00 | 523.0 | Cont. rig up to run 9-5/8" surface csg. |
| SC | P | RC | | 13:15 | 23:30 | 10.25 | 523.0 | PJSM, Pick up shoe & float jnt., baker lock same, fill with water & check flow path, cont. run a total of 47 x K55 x 36lb /ft x BTC x 9-5/8" surface csg.. p.u. landing jnt. w/ SCH 1 Braden Head & land shoe at 520met.<br><br>Note; cmt. baskets were set in 12-1/4" hole (not between conductor & 9-5/8" csg.) as they were 9-5/8" to 13-3/8" baskets) |

| Day #9 (09 Jul 2013) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **PHSE** | **CLS** | **OP** | **RC** | **From** | **To** | **Hrs** | **Depth (m)** | **Activity Description** |
| SC | P | CMC | | 23:30 | 24:00 | 0.50 | 523.0 | Load plugs, OCR confirm, install bottom plug in csg., Head up Schlumberger Cmt. head |
| **Day #10 (10 Jul 2013)** | | | | | | | | |
| **PHSE** | **CLS** | **OP** | **RC** | **From** | **To** | **Hrs** | **Depth (m)** | **Activity Description** |
| SC | P | CMC | | 00:00 | 01:15 | 1.25 | 523.0 | PJSM, cont. head up cementers,<br>Complete hydrateing the gel mixing water |
| SC | TP | CMC | mccontr | 01:15 | 02:45 | 1.50 | 523.0 | Cementers, pump 5bbls water ahead, pressure test lines to 3000 psi, no test, replace seal in chicksan, re-test, failed, re-hammer up all chicksan unions, re-test a total of # 4 times to get acceptable pressure test. |
| SC | P | CMC | | 02:45 | 05:30 | 2.75 | 523.0 | Mix & pump 80bbls (178sx) of Lead cmt. at 11.8ppg, followed by 26bbls of Tail at 15.6ppg, release top plug, displace 130bbls of water,<br>Cement returns to surface @ 118bbls into displacement ( 13bbls cmt. to surface )<br>Bump plug w/ 600psi, pressure up to 2000psi for 10 min., good test, bleed back 2 bbls, float holding, prepare for top up job |
| SC | P | CMC | | 05:30 | 07:00 | 1.50 | 523.0 | PJSM, run stinger into conductor, perform top up, mix pump 18bbls, cmt. to surface, slumped & dropped away, re -mix & pump 5bbls , cmt. to surface > slumped > mix & pump 7 x 1bbl top ups over 11 minutes |
| SC | P | CMC | | 07:00 | 08:15 | 1.25 | 523.0 | Remove cmt. head, back out landing jnt., install hole cover, clear rig floor, |
| SC | P | CMC | | 08:15 | 20:00 | 11.75 | 523.0 | Rig down. Load out non essential equip.<br>Run tape in hole between 16" conductor & 9-5/8" csg. to confirm the top of cmt. Nil cmt. on baskets<br>Travell to Santos yard & pick up sx of cmt. for top up job.<br>Prepare BLY cmt. hopper, mix 87 sx of cmt. w/ Calcium Chloride & spot hot mix on top of cmt. basket.<br>While WOC. Prepare spin flange & Tbg head.<br>Check cmt. samples, firm, run tape to 25m, tag top of hot mix cmt.<br>Perform second cmt. hot mix top up job, fill csg. w/ cmt. to landing ring. |
| SC | P | TU | | 20:00 | 24:00 | 4.00 | 523.0 | Complete final top up 1.7bbls (15ppg), 15sx w/ 8kg calcium chloride, Cement at surface & holding, Remove stinger & clean cement lines,<br>Install spin flange & Tbg head,<br>Rig release.<br>Final well suspension pending installation of 7-1/16" 5000psi Companion Flange.<br>Drilling Program @ 24:00 hours<br>10/07/2013 |

| Day #10 (10 Jul 2013) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **PHSE** | **CLS** | **OP** | **RC** | **From** | **To** | **Hrs** | **Depth (m)** | **Activity Description** |
| SC | P | CMC | | 22:15 | 22:15 | 0.00 | 523.0 | Cementers, pump 5bbls water ahead, pressure test lines to 3000 psi, no test, replace seal in chicksan, re-test, failed, re-hammer up all chicksan unions, re-test a total of # 4 times to get acceptable pressure test. |
| **Day #11 (11 Jul 2013)** | | | | | | | | |
| **PHSE** | **CLS** | **OP** | **RC** | **From** | **To** | **Hrs** | **Depth (m)** | **Activity Description** |
| S | P | RD | | 00:00 | 12:00 | 12.00 | 523.0 | Move rig off & park up, Pack up mud system and lines, Load out equipment to next site, West Mereenie 21 |
| S | P | WH | | 12:00 | 18:00 | 6.00 | 523.0 | Install 7-1/16" 5000 psi companion flange. Pressure test to 2000 psi for 10 min - Good test. |
| **Day #12 (18 Nov 2013)** | | | | | | | | |
| **PHSE** | **CLS** | **OP** | **RC** | **From** | **To** | **Hrs** | **Depth (m)** | **Activity Description** |
| PH | P | RR | | 00:00 | 01:30 | 1.50 | 522.6 | No hydraulics to Rig due to damaged hydraulic pumps. Sourced new Hydraulic pump and installed. General housekeeping and maintenance around Rig. |
| PH | P | HBHA | | 01:30 | 02:30 | 1.00 | 522.6 | Held PJSM. Laid out 12-1/4" Bit and Drill collar. Preared rig floor and catwalk to pick up drill pipe. |
| PH | P | TI | | 02:30 | 06:45 | 4.25 | 522.6 | Held PJSM. Picked up 26 stands of 4" Drill pipe and RIH. |
| PH | P | TO | | 06:45 | 08:45 | 2.00 | 522.6 | Held PJSM. POOH and racked back 26 stands of 4" Drill pipe. |
| PH | P | RU | | 08:45 | 09:45 | 1.00 | 522.6 | Calibrated Rig Smart system. |
| PH | P | TI | | 09:45 | 13:00 | 3.25 | 522.6 | Picked up 30 stands of 4" Drill pipe and RIH. |
| PH | P | TO | | 13:00 | 14:45 | 1.75 | 522.6 | Held PJSM. POOH and racked back 30 stands of 4" Drill pipe. |
| PH | P | TI | | 14:45 | 18:15 | 3.50 | 522.6 | Held PJSM. Picked up 30 stands of 4" HWDP and RIH. |
| PH | P | TO | | 18:15 | 19:45 | 1.50 | 522.6 | Held PJSM. POOH and racked back 30 stands of 4" HWDP. |
| PH | P | TI | | 19:45 | 20:30 | 0.75 | 522.6 | Picked up 5 stands of 4" HWDP and RIH. |
| PH | P | TO | | 20:30 | 20:45 | 0.25 | 522.6 | POOH and racked back 5 stands of 4" HWDP. |
| PH | P | TI | | 20:45 | 21:30 | 0.75 | 522.6 | Make up combination tool, run and install wear bushing. Lay out combination tool. |
| PH | P | TI | | 21:30 | 24:00 | 2.50 | 522.6 | Held PJSM. Changed out elevators. Pick up 5 stands of 6.5 " Drill collars and RIH. |

**Day #13 (19 Nov 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| PH | P | TI | | 00:00 | 01:30 | 1.50 | 522.6 | Held PJSM. Continued picking up 3 stands of 6.5" Drill collars and RIH. |
| PH | P | TO | | 01:30 | 03:00 | 1.50 | 522.6 | Held PJSM. POOH and racked back 8 stands of 6.5" Drill collars. |
| PH | P | RU | | 03:00 | 06:00 | 3.00 | 522.6 | Clear drill floor of non essential equipment. Pick up Pipe Spinner and install on Rig floor. |
| PH | P | SM | | 06:00 | 06:15 | 0.25 | 522.6 | Stand down safety meeting. OCR and crew discussing body positioning with the new layout on drill floor. |
| PH | P | HBHA | | 06:15 | 12:45 | 6.50 | 522.6 | Make up clean out assembly BHA #1. and RIH from surface to 485m. |
| PH | P | RS | | 12:45 | 13:15 | 0.50 | 522.6 | Rig Service |
| PH | U | RR | | 13:15 | 14:15 | 1.00 | 522.6 | Changed out hydraulic hose on service loop. |
| PH | P | TI | | 14:15 | 14:45 | 0.50 | 522.6 | Wash down and Tag top of cement at 512m. |
| PH | P | DFS | | 14:45 | 18:15 | 3.50 | 522.6 | Drill out cement, float and shoe track from 512m to 520m. |
| PH | P | D | | 18:15 | 20:15 | 2.00 | 524.6 | Drill 5m of new formation from 520m to 525m |
| PH | P | CMD | | 20:15 | 20:30 | 0.25 | 524.6 | Circulate 1 x bottoms up. |
| PH | P | LOT | | 20:30 | 22:00 | 1.50 | 524.6 | Held PJSM. Racked back one stand and conducted a Formation Integrity Test to 600psi / 10 mins with 8.3ppg Mud. MAMD = 15.0ppg. |
| PH | P | TOB | | 22:00 | 24:00 | 2.00 | 524.6 | Flow checked for 10 min's. Held PJSM. POOH to change BHA from 525m to 170m. |

**Day #14 (20 Nov 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| PH | P | TOB | | 00:00 | 04:00 | 4.00 | 524.6 | Continued to POOH from 170m to surface. Break and laid down 8-3/4" Tricone bit. |
| PH | P | SM | | 04:00 | 04:30 | 0.50 | 524.6 | Held safety meeting with all personnel on the rig Discussed next operations RIH with Hammer BHA, unloading the well and drilling UB. |
| PH | P | TI | | 04:30 | 12:30 | 8.00 | 524.6 | Pick up tools. Surface test Hammer (Good). RIH with BHA #2 Hammer bit from surface to 518m. |
| PH | P | SM | | 12:30 | 13:30 | 1.00 | 524.6 | Held PJSM with all crews, third party and discuss air drilling programme. |

**Day #14 (20 Nov 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| PH | P | RU | | 13:30 | 17:15 | 3.75 | 524.6 | Nipple up and install rubber element in to Rotating head. |
| PH | P | RU | | 17:15 | 19:15 | 2.00 | 524.6 | Install Master Bushing and prepare to unload the Well and blow dry. |
| PH | P | RU | | 19:15 | 24:00 | 4.75 | 524.6 | Decision made not to start drilling until 06:00 am tomorrow. Some key Third party members out of hours. New crew arrived today and Driller has no experience with TDS. TDS technician training new driller how to use TDS. Decision made to change the way mud was transferred from Mud tanks to air package. A truck is arriving first thing tomorrow morning and will be parked next to air package where mud can be transfered in to Mist tanks easier and safer. Welding new Ubolt to flow line to make more secure. Removing Lay flap hose between Mud tanks and air package. Refilled the well with fresh water. |

**Day #15 (21 Nov 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| PH | P | WOD | | 00:00 | 06:00 | 6.00 | 524.6 | Decision made not to start drilling until 06:00 am tomorrow. Some key Third party members out of hours. New crew arrived today and Driller has no experience with TDS. TDS technician training new driller how to use TDS. Decision made to change the way mud was transferred from Mud tanks to air package. A truck is arriving first thing tomorrow morning and will be parked next to air package where mud can be transfered in to Mist tanks easier and safer. Welding new Ubolt to flow line to make more secure. Removing Lay flap hose between Mud tanks and air package. Refilled the well with fresh water. |
| PH | P | CHC | | 06:00 | 07:30 | 1.50 | 524.6 | Unload and blow well dry. Spot Tanker next to Air package for mixing into mist tank. |
| PH | P | DH | | 07:30 | 08:00 | 0.50 | 528.0 | Air Hammer drill 8-3/4" hole from 524.6m to 528m. |
| PH | P | CHC | | 08:00 | 09:00 | 1.00 | 528.0 | Pick up off bottom. Bring on 4th Compressor, compare CFM for hole cleaning capabilities. |
| PH | P | DH | | 09:00 | 18:00 | 9.00 | 685.0 | Air Hammer drill 8-3/4" hole from 524.6m to 685m. Average ROP = 18m/hr with connections. |
| PH | P | DH | | 18:00 | 24:00 | 6.00 | 823.0 | Air Hammer drill 8-3/4" hole from 685m to 823m. Average ROP = 23m/hr with connections. 3000 - 6000 ft/lbs Torque. 50 RPM. 5-7k WOB. 500psi air pressure. |

**Day #16 (22 Nov 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| PH | P | DH | | 00:00 | 07:00 | 7.00 | 923.0 | Air Hammer drill 8-3/4" hole from 823m to 923m. Average ROP = 23m/hr with connections.<br>3000 - 6000 ft/lbs Torque. 50 RPM. 5-7k WOB. 500psi air pressure. CFM = 3000. |
| PH | P | CIR | | 07:00 | 09:30 | 2.50 | 923.0 | Controled gas at surface 923m. Picked up and spaced out to monitor pressures. Attempt to ignite Flare. (Ignitor not working, troubleshoot and replaced faulty spark plugs.) Ignited flare, brought air back on line with mist. Circulated and reciprocated drill string while wait on orders as to drill ahead. Decision made no need to collect samples due to a safety reason, and to drill ahead. |
| PH | P | RO | | 09:30 | 13:00 | 3.50 | 923.0 | While bringing on Booster to drilling pressure The Booster cut out. Mechanic, Electrican with ADA trouble shoot and fixed problem. |
| PH | P | DH | | 13:00 | 18:00 | 5.00 | 1,000.0 | Air Hammer drill 8-3/4" hole from 923m to 1000m. Average ROP = 15.4m/hr with connections.<br>3000 - 8000 ft/lbs Torque. 50-60 RPM. 5-7k WOB. 500psi air pressure. CFM = 3000. |
| PH | P | DH | | 18:00 | 24:00 | 6.00 | 1,094.0 | Air Hammer drill 8-3/4" hole from 1000m to 1094m. Average ROP = 15.4m/hr with connections.<br>3000 - 8000 ft/lbs Torque. 50-60 RPM. 5-7k WOB. 500psi air pressure. CFM = 3000. |

**Day #17 (23 Nov 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| PH | TP | D | mccontr | 00:00 | 02:00 | 2.00 | 1,094.0 | Flare line flame went out. Reignite flare. Discovered washout in Blooey line. Decision made to Kill the well with 50bbl Brine Spacer and Kill mud and then fix wash out. |
| PH | TU | WC | othr | 02:00 | 03:30 | 1.50 | 1,094.0 | Held PJSM with crews, ADA, OCR discussed procedure to Kill the well. Proceed to kill the well. Discovered faulty valve in the stand pipe line and unable to Kill the well. Put Well back on air, reciprocate and work string. |
| PH | TU | WC | othr | 03:30 | 05:00 | 1.50 | 1,094.0 | Make risk assessment and new JHA to remove 4" valve from Stand pipe line. Proceed to change out valve. Pressure test new 4" Valve. |
| PH | TP | WC | | 05:00 | 06:15 | 1.25 | 1,094.0 | Held PJSM. Lined up and proceeded to Kill the well. Pumped 40bbls of 9.4ppg brine at 700gpm. Then pumped 8.8ppg at 590gpm, total strokes 3380. Shut Well in and monitored pressures through choke manifold. Well static. Lined up and circulated through poorboy. |
| PH | TP | D | mccontr | 06:15 | 09:15 | 3.00 | 1,094.0 | While circulating through poorboy, remove sample skid, hook up Blooie line, reignite flare line. Repair and install 4" valve. |

**Day #17 (23 Nov 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| PH | TP | D | mccontr | 09:15 | 10:15 | 1.00 | 1,094.0 | Displace well to water and recover mud to Mud tanks. Flush poorboy. |
| PH | TP | D | mccontr | 10:15 | 11:00 | 0.75 | 1,094.0 | Unload Well and blow hole dry. |
| PH | P | DH | | 11:00 | 18:30 | 7.50 | 1,248.0 | Air Hammer drill 8-3/4" hole from 1094.0m to 1248m. 5k WOB, 50 RPM, 6000 ft/lbs TORQUE. |
| PH | TP | D | mccontr | 18:30 | 18:45 | 0.25 | 1,248.0 | Discovered wash out in Gas sample skid. Brought air package to half drilling rate. Reciprocated and circulated while updated Kill sheets. |
| PH | U | SM | | 18:45 | 19:15 | 0.50 | 1,248.0 | Held PJSM re Killing the Well. |
| PH | U | WC | | 19:15 | 20:00 | 0.75 | 1,248.0 | Pumped 1050 strokes of fresh water at 610gpm, chase and pump 4200 strokes at 685gpm.<br>Stop pumping and shut in Well. |
| PH | TU | WC | mcrig | 20:00 | 22:00 | 2.00 | 1,248.0 | Mud pump #1 down. (Pop off and blocked screens). Callibrated choke gauges. Switch to Mud pump #2. |
| PH | TU | WC | mcrig | 22:00 | 24:00 | 2.00 | 1,248.0 | Circulate through poorboy and finish killing Well. Circulate and condition mud. Held PJSM and prepared to POOH. Remove bushings and diverter head. |

**Day #18 (24 Nov 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| PH | TU | TOB | mcrig | 00:00 | 08:00 | 8.00 | 1,248.0 | Continued POOH from 1153m to BHA. (Unable to continue air drilling operations due to washed gas flow tester in blooie line) |
| PH | TU | HBHA | mcrig | 08:00 | 09:30 | 1.50 | 1,248.0 | Break and lay down BHA tools. |
| PH | P | BT | | 09:30 | 10:30 | 1.00 | 1,248.0 | P/up and Mup combination test tool assy. Drain BOP, loosen tie in bolts and recover wear bushing. Break out combination test tool, flip and M/up for pressure testing. |
| PH | P | BT | | 10:30 | 12:00 | 1.50 | 1,248.0 | PJSM. Open WPTW. R/up pressure test unit and commence weekly pressure testing of BOP and all associated equipment. |
| PH | P | SM | | 12:00 | 12:30 | 0.50 | 1,248.0 | PJSM, review SOP. Open WPTW. |
| PH | P | BT | | 12:30 | 15:00 | 2.50 | 1,248.0 | Continue with weekly pressure testing of BOP and all associated equipment. |
| PH | TP | BT | mcrig | 15:00 | 18:00 | 3.00 | 1,248.0 | Repair hose on pressure test unit. Retest blind rams to achieve good test. |

| Day #18 (24 Nov 2013) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **PHSE** | **CLS** | **OP** | **RC** | **From** | **To** | **Hrs** | **Depth (m)** | **Activity Description** |
| PH | P | RU | | 18:00 | 23:00 | 5.00 | 1,248.0 | Continue with weekly pressure testing of BOP and all associated equipment. Break out and lay down pressure test assy. |
| PH | P | RU | | 23:00 | 24:00 | 1.00 | 1,248.0 | Install Wear bushing. Fit elevators. Jack Mast back and center over hole to suit TDS. |
| **Day #19 (25 Nov 2013)** | | | | | | | | |
| **PHSE** | **CLS** | **OP** | **RC** | **From** | **To** | **Hrs** | **Depth (m)** | **Activity Description** |
| PH | P | TI | | 00:00 | 07:00 | 7.00 | 1,248.0 | Make up 8.5 PDC Bit, Mud motor BHA, RIH from Surface to 520m, changing out elevators and R/up pipe spinner @ 202m. |
| PH | P | RS | | 07:00 | 07:15 | 0.25 | 1,248.0 | Rig service |
| PH | P | TI | | 07:15 | 10:00 | 2.75 | 1,248.0 | Continue to RIH from 520m to 1230m with no obstructions. |
| PH | P | RW | | 10:00 | 10:15 | 0.25 | 1,248.0 | Wash last stand to TD from 1230m to tag at 1248m, no fill on bottom. |
| PH | P | D | | 10:15 | 18:00 | 7.75 | 1,301.0 | Drill 8-1/2" hole from 1248m to 1301m. Av ROP = 7.1m/hr. (17 WOB, 40-50 RPM, 450 GPM.)<br>Inc = 5.32deg, AZ = 79.3, TVD = 1269.8m. |
| PH | P | D | | 18:00 | 24:00 | 6.00 | 1,328.0 | Drill 8-1/2" hole from 1301m to 1328.0m. Av ROP = 4.5m/hr. (17 WOB, 40-50 RPM, 450 GPM.)<br>Inc = 5.32deg, AZ = 79.3, TVD = 1325.6m. |
| **Day #20 (26 Nov 2013)** | | | | | | | | |
| **PHSE** | **CLS** | **OP** | **RC** | **From** | **To** | **Hrs** | **Depth (m)** | **Activity Description** |
| PH | P | D | | 00:00 | 06:00 | 6.00 | 1,340.0 | Drill 8-1/2" hole from 1328m to 1340m. Av ROP = 2.0m/hr. (17-20 WOB, 40-70 RPM, 450 GPM.)<br>Inc = 5.3deg, AZ = 79.3, TVD = 1339m. |
| PH | P | D | | 06:00 | 13:45 | 7.75 | 1,353.0 | Drill 8-1/2" hole from 1340m to 1353m. Av ROP = 1.7m/hr. (17-20 WOB, 40-70 RPM, 450 GPM)<br>Inc = 5.3deg, AZ = 79.3, TVD = 1351m. |
| PH | P | D | | 13:45 | 24:00 | 10.25 | 1,368.0 | MP #1 offline and has a washed out Module. Drilled with MP#2 only.<br>Drill 8-1/2" hole from 1353m to 1368.0m. Av ROP = 1.4m/hr. (20 - 25 WOB, 50 RPM, 350 GPM)<br>Inc = 5.49deg, AZ = 78.91, TVD = 1365.6m. |

**Day #21 (27 Nov 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| PH | P | D | | 00:00 | 06:00 | 6.00 | 1,388.0 | MP #1 fixed. Two pumps on line.<br>Drill 8-1/2" hole from 1368m to 1388m. Av ROP = 3.3m/hr. (20-25k WOB, 60-70 RPM, 500 GPM)<br>Inc = 5.49deg, AZ = 78.91, TVD = 1385m. |
| PH | P | D | | 06:00 | 18:00 | 12.00 | 1,402.3 | Drill 8-1/2" hole from 1388m to 1402.33m. Av ROP = 1.1m/hr. (30-34k WOB, 30-60 RPM, 450 GPM)<br>Inc = 5.49deg, AZ = 79.0, TVD = 1400.55m. |
| PH | P | D | | 18:00 | 23:15 | 5.25 | 1,404.5 | Drill 8-1/2" hole from 1402.33m to 1404.48m. Av ROP = 0.3m/hr. (34k WOB, 40-60 RPM, 450 GPM)<br>Inc = 5.4deg, AZ = 79.0, TVD = m. |
| PH | P | SM | | 23:15 | 23:30 | 0.25 | 1,404.5 | Because of low ROP the decision was made to POOH and change bit. Flow checked Well (Static). Held PJSM with crew, TDS technician and Mud Engineer. |
| PH | P | TOB | | 23:30 | 24:00 | 0.50 | 1,404.5 | Trip out of hole from 1404m to 1380m. |

**Day #22 (28 Nov 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| PH | P | TOB | | 00:00 | 06:00 | 6.00 | 1,404.5 | Trip out of hole from 1380m to 133m. |
| PH | TP | TOB | poorplan | 06:00 | 07:30 | 1.50 | 1,404.5 | Rig shut down due to low fuel. |
| PH | P | TOB | | 07:30 | 08:30 | 1.00 | 1,404.5 | Continue to POOH f/ 133m to 38m, laying down drilling jar. |
| PH | P | HBHA | | 08:30 | 09:45 | 1.25 | 1,404.5 | POOH BHA tools, break out filter sub and inspect. Lay down NMDC. Inspect stabilizer. Inspect and test motor. Break out bit. Service and lay down motor. |
| PH | P | HBHA | | 09:45 | 10:15 | 0.50 | 1,404.5 | Discuss way forward with DE. Decision made to c/out bit and motor. |
| PH | P | HBHA | | 10:15 | 10:45 | 0.50 | 1,404.5 | Break out DOG sub and bit. Service and lay down motor. |
| PH | P | RS | | 10:45 | 11:15 | 0.50 | 1,404.5 | Rig service. |
| PH | P | HBHA | | 11:15 | 13:30 | 2.25 | 1,404.5 | Make up 8-1/2" bit, Dog sub and Mud motor. Surface test Mud motor (Good). |
| PH | P | TI | | 13:30 | 17:00 | 3.50 | 1,404.5 | Trip in hole with 8-1/2" BHA from surface to 209m. |
| PH | P | CIR | | 17:00 | 17:30 | 0.50 | 1,404.5 | Fill up drill string and break circulation. Rig up Pipe spinner. |
| PH | P | TI | | 17:30 | 20:45 | 3.25 | 1,404.5 | Trip in hole with 8-1/2" BHA from 209m to 1366m. |
| PH | P | RW | | 20:45 | 21:45 | 1.00 | 1,404.5 | Wash last two stands from 1366m to tag bottom at 1404.5m. |

| Day #22 (28 Nov 2013) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **PHSE** | **CLS** | **OP** | **RC** | **From** | **To** | **Hrs** | **Depth (m)** | **Activity Description** |
| PH | P | D | | 21:45 | 24:00 | 2.25 | 1,413.0 | As per OCR instructions.<br>Drill from 1404.5m to 1405m with 5k WOB - 50 RPM - 450 GPM.<br>Drill from 1405m to 1406m with 10k WOB - 50 RPM - 450 GPM.<br>Drill from 1406m to 1408m with 15k WOB - 80 RPM - 450 GPM.<br>Drill from 1408m to 1413m with 25k WOB - 80 RPM - 550 GPM.<br>Av ROP = 4.0m/hr. |
| **Day #23 (29 Nov 2013)** | | | | | | | | |
| **PHSE** | **CLS** | **OP** | **RC** | **From** | **To** | **Hrs** | **Depth (m)** | **Activity Description** |
| PH | P | D | | 00:00 | 03:45 | 3.75 | 1,434.0 | Drilled from 1413m to 1434m with 25k WOB - 80 RPM - 550 GPM.<br>Av ROP = 5.6m/hr.<br>Survey at 1409m = Inc =5.41, Az = 79.74, TVD = 1406m. |
| PH | P | D | | 03:45 | 16:15 | 12.50 | 1,453.0 | Mud Pump #2 has washed liner. Isolate and fix.<br>Mud Pump #1 Drilled from 1434m to 1453m with 20k WOB - 80 RPM - 320 GPM.<br>Av ROP = 1.5m/hr. |
| PH | P | D | | 16:15 | 24:00 | 7.75 | 1,473.0 | Both pumps back on line.<br>With two Mud pumps Drilled from 1453m to 1473m with 35k WOB - 70 RPM - 550 GPM.<br>Av ROP = 2.5m/hr.<br>Survey at 1447m = Inc =5.58drg, Az = 79.61, TVD = 1446m. |
| **Day #24 (30 Nov 2013)** | | | | | | | | |
| **PHSE** | **CLS** | **OP** | **RC** | **From** | **To** | **Hrs** | **Depth (m)** | **Activity Description** |
| PH | P | D | | 00:00 | 06:00 | 6.00 | 1,483.0 | Drilled from 1473m to 1483m with 34k WOB - 70 RPM - 550 GPM.<br>Av ROP = 1.6m/hr. Inc = 5.58, Az = 79.61, TVD = 1480m. |
| PH | P | D | | 06:00 | 18:00 | 12.00 | 1,493.0 | Drilled from 1483m to 1493m with 34k WOB - 70 RPM - 550 GPM.<br>Av ROP = 0.8m/hr. Inc = 5.58, Az = 79.61, TVD = 1489m. |
| PH | P | D | | 18:00 | 24:00 | 6.00 | 1,508.0 | Drilled from 1493m to 1508m with 34k WOB - 70 RPM - 550 GPM.<br>Av ROP = 2.5m/hr. Inc = 5.71, Az = 81.55, TVD = 1504.6m. |

**Day #25 (01 Dec 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| PH | P | D | | 00:00 | 02:00 | 2.00 | 1,511.0 | Drilled from 1508m to 8-1/2" Section TD at 1511m with 34k WOB - 70 RPM - 550 GPM.<br>Av ROP = 1.5m/hr. Inc = 5.71, Az = 81.24, TVD = 1508m. |
| PH | P | CHC | | 02:00 | 02:30 | 0.50 | 1,511.0 | Circulated 1 x Bottoms up. Held PJSM and prepared to POOH. |
| PH | P | CIR | | 02:30 | 02:45 | 0.25 | 1,511.0 | Flow checked for 15mins. (Static) |
| EP | P | TO | | 02:45 | 06:00 | 3.25 | 1,511.0 | Tripped out of hole from 1511m to 680m. |
| EP | P | TO | | 06:00 | 07:15 | 1.25 | 1,511.0 | Continued to trip out of hole from 680m to 200m. |
| EP | P | TO | | 07:15 | 12:45 | 5.50 | 1,511.0 | 15min Flow Check. Changed elevators and POOH w/ BHA. Inspect and lay down X/O's S/Stab, Mud motor. Grade bit. |
| EP | P | BT | | 12:45 | 15:00 | 2.25 | 1,511.0 | Completed Weekly Pressure test on Choke Manifold. |
| EP | P | BT | | 15:00 | 17:15 | 2.25 | 1,511.0 | Completed Weekly Pressure test on BOP. |
| EP | P | BT | | 17:15 | 18:15 | 1.00 | 1,511.0 | Broke and laid down Pressure test assembly. Ran and installed Wear Bushing. |
| EP | P | BT | | 18:15 | 21:00 | 2.75 | 1,511.0 | Made up and completed Pressure testing Rig floor Safety valves. Rigged down test assembly. Housekeeping on Rig floor. |
| EP | P | SM | | 21:00 | 21:30 | 0.50 | 1,511.0 | Held PJSM with all personell involved with WireLine Logging. Discussed and reviewed Schlumberger and Ensign Procedures with JHAs. Identified rectified any Hazards. Discussed Rigging up Wireline Sheaves, Forklift usage, Handling Schlumberger tools, Communication and barriers, Monitoring well on Trip tank, Maintain good housekeeping through out the job. Discussed Well control. |
| EP | P | HT | | 21:30 | 24:00 | 2.50 | 1,511.0 | Rigged up Schlumberger Wireline Logging equipment and tools. |

**Day #26 (02 Dec 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| EP | P | LOG | | 00:00 | 04:45 | 4.75 | 1,511.0 | RIH Wireline Logging Run #1. PEX-HRLA-HNGS, RADIOACTIVE RUN.<br>Tools below rotary table at 00:15hrs. Tools on bottom at 01:45hrs. Tools at surface at 04:30hrs.<br>Remove radioactive sources. (Static Losses 0.25 bbl/hr).<br>Wire Line TD = 1512m MD. Drillers TD = 1511m MD. |
| PH | P | LOG | | 04:45 | 05:00 | 0.25 | 1,511.0 | Break and lay down Wire line Log tools. |

| Day #26 (02 Dec 2013) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **PHSE** | **CLS** | **OP** | **RC** | **From** | **To** | **Hrs** | **Depth (m)** | **Activity Description** |
| EP | P | LOG | | 05:00 | 07:30 | 2.50 | 1,511.0 | Schlumberger prepare tools. Pick up and make up Wire line logging tools for Run #2. |
| EP | P | LOG | | 07:30 | 13:30 | 6.00 | 1,511.0 | RIH Wireline Logging Run #2. FMI-SSCAN<br>Tools below rotary table at 07:30hrs. Tools on bottom at 09:30hrs. Tools at surface at 13:30hrs.<br>(Static Losses 0.25 bbl/hr). |
| EP | P | LOG | | 13:30 | 14:30 | 1.00 | 1,511.0 | Break and lay down Wire line Log tools. |
| EP | P | LOG | | 14:30 | 16:30 | 2.00 | 1,511.0 | Schlumberger prepare tools. Pick up and make up Wire line logging tools for Run #3. |
| EP | P | LOG | | 16:30 | 24:00 | 7.50 | 1,511.0 | RIH Wireline Logging Run #3, (CUR-ECS)<br>Tools below rotary table at 16:30hrs. Tools on bottom at 17:45hrs.<br>(Static Losses 0.25 bbl/hr). |
| **Day #27 (03 Dec 2013)** | | | | | | | | |
| **PHSE** | **CLS** | **OP** | **RC** | **From** | **To** | **Hrs** | **Depth (m)** | **Activity Description** |
| EP | P | LOG | | 00:00 | 01:15 | 1.25 | 1,511.0 | Wire Line Logging Run #3 (CUR-ECS) Tools at surface 01:15hrs. |
| PH | P | LOG | | 01:15 | 03:00 | 1.75 | 1,511.0 | Break and lay down Wire line Log tools. Take photo's of Magnet and recover any metal. |
| EP | P | LOG | | 03:00 | 05:45 | 2.75 | 1,511.0 | Schlumberger prepare and measure tools. Pick up and make up Wire line logging tools for Run #4. |
| EP | P | LOG | | 05:45 | 24:00 | 18.25 | 1,511.0 | RIH Wireline Logging Run #4. MDT<br>Tools below rotary table at 06:00hrs. Tools on bottom at 08:15hrs.<br>(Static Losses 0.20 bbl/hr). |
| **Day #28 (04 Dec 2013)** | | | | | | | | |
| **PHSE** | **CLS** | **OP** | **RC** | **From** | **To** | **Hrs** | **Depth (m)** | **Activity Description** |
| EP | P | LOG | | 00:00 | 18:00 | 18.00 | 1,511.0 | Continue with Wireline Logging Run #4. MDT<br>(Static Losses 0.20 bbl/hr). |
| EP | P | LOG | | 18:00 | 24:00 | 6.00 | 1,511.0 | Continue with Wireline Logging Run #4. MDT<br>(Static Losses 0.20 bbl/hr). |
| **Day #29 (05 Dec 2013)** | | | | | | | | |
| **PHSE** | **CLS** | **OP** | **RC** | **From** | **To** | **Hrs** | **Depth (m)** | **Activity Description** |
| EP | P | LOG | | 00:00 | 01:45 | 1.75 | 1,511.0 | Continue with Wireline Logging Run #4. MDT. Tools at surface at 01:40hrs.<br>(Static Losses 0.20 bbl/hr). |

**Day #29 (05 Dec 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| EP | P | LOG | | 01:45 | 04:00 | 2.25 | 1,511.0 | Break and lay down Wire line Log tools. |
| EP | P | LOG | | 04:00 | 04:30 | 0.50 | 1,511.0 | Schlumberger prepare tools. Pick up and make up Wire line logging tools for Run #5. |
| EP | P | LOG | | 04:30 | 13:45 | 9.25 | 1,511.0 | RIH Wireline Logging Run #5. MSCT<br>Tools below rotary table at 04:30hrs.<br>(Static Losses 0.20 bbl/hr). |
| EP | P | LOG | | 13:45 | 15:00 | 1.25 | 1,511.0 | Tools stuck at 1135.7m. Un able to retract arm with sample.<br>Decision made to Pull to 2700lbs and free. Pulled 2300lbs to free MSCT. |
| EP | P | LOG | | 15:00 | 16:15 | 1.25 | 1,511.0 | Schlumberger POOH to inspect MSCT. Tools at surface at 16:20. |
| EP | P | LOG | | 16:15 | 17:45 | 1.50 | 1,511.0 | Change out MSCT to new one, calibrated and tested. |
| EP | P | LOG | | 17:45 | 23:30 | 5.75 | 1,511.0 | RIH Wireline Logging Run #5. MSCT<br>Tools below rotary table at 17:45hrs. Tools at surface at 23:30hrs.<br>(Static Losses 0.20 bbl/hr). |
| EP | P | LOG | | 23:30 | 24:00 | 0.50 | 1,511.0 | Break and lay down Wire line Logging tools. |

**Day #30 (06 Dec 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| EP | P | LOG | | 00:00 | 00:30 | 0.50 | 1,511.0 | Break and lay down Wire line Logging tools. Rig down and lay out Schlumberger sheaves. |
| EP | P | SM | | 00:30 | 00:45 | 0.25 | 1,511.0 | Held PJSM, reviewed procedure for Tripping in. |
| EP | P | WT | | 00:45 | 05:45 | 5.00 | 1,511.0 | Make up 8-1/2" used PDC Bit. RIH from surface to 1117<br>Fill string every 10 stands. |
| EP | P | RW | | 05:45 | 06:15 | 0.50 | 1,511.0 | Break circulation. Wash and ream f/ 1117m to 1156m to ensure lost MSCT arm does not interfere with DST packers. |
| EP | P | WT | | 06:15 | 07:00 | 0.75 | 1,511.0 | Continue to RIH f/ 1156m to 1446m |
| EP | P | RW | | 07:00 | 07:45 | 0.75 | 1,511.0 | Break circulation. Wash f/ 1446m to bottom @ 1511m |
| EP | P | CMD | | 07:45 | 09:15 | 1.50 | 1,511.0 | Circulte hole clean / condition mud. Reciprocate pipe. Record SCR's. |
| EP | P | WT | | 09:15 | 12:00 | 2.75 | 1,511.0 | Flow check. POOH f/ 1511m to 503m. |

**Day #30 (06 Dec 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| EP | P | SC | | 12:00 | 13:00 | 1.00 | 1,511.0 | Open PTW. Review JSA. Hold PJSM. Hang block hanging lines. Hang blocks. |
| EP | P | SC | | 13:00 | 15:00 | 2.00 | 1,511.0 | Slip and cut 60' drilling line. |
| EP | P | SC | | 15:00 | 16:15 | 1.25 | 1,511.0 | Unhang blocks / remove block hanging lines.Recalibrate block height. |
| EP | P | WT | | 16:15 | 23:00 | 6.75 | 1,511.0 | Continue POOH f/ 503m to surface. L/D 4 Each galled drilled collars. |
| EP | P | DST | | 23:00 | 24:00 | 1.00 | 1,511.0 | Prep floor for pick up DST Tools. |

**Day #31 (07 Dec 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| EP | P | DST | | 00:00 | 00:30 | 0.50 | 1,511.0 | Load catwalk w/ DST Tools.Strap new drill collars. Cycle mud pumps through mud kill line. |
| EP | P | DST | | 00:30 | 04:45 | 4.25 | 1,511.0 | PJSM w/ Pro-Test. Make up DST Tools. |
| EP | P | DST | | 04:45 | 10:15 | 5.50 | 1,511.0 | RIH f/ 70m to 1439m. |
| EP | P | DST | | 10:15 | 12:45 | 2.50 | 1,511.0 | PJSM w/ Schulmberger.R/U SLB. Correlation run. R/D SLB tools and sheaves. |
| EP | P | DST | | 12:45 | 13:30 | 0.75 | 1,511.0 | Work string free. String weight 132k/lb. Max overpull 50k. |
| EP | P | DST | | 13:30 | 14:45 | 1.25 | 1,511.0 | R/U DST Surface equipment. Pressure test same 1500 psi/ 10mins OK. |
| EP | P | DST | | 14:45 | 24:00 | 9.25 | 1,511.0 | PJSM w/ Pro-Test. Rotate@ 60 rpm/2min, 50 rpm/18min. Test packers set. Packers seat fail. Rotate further 45 rpm / 10 min. Confirm packers set interval 1391.7m to 1433.4m. Tool open @ 15:50 hrs. Close tool @ 22:00 hrs. Deflate packers @ 23:50 hrs. |

**Day #32 (08 Dec 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| EP | P | DST | | 00:00 | 01:00 | 1.00 | 1,511.0 | PJSM. Drop bar.Fill annulus total of 33.5 bbls to equalize. Close annular preventor pump further 7 bbls until 9.3 ppg mud @ bubble hose. Recovery f/ reverse circulation 1 bbl rathole mud followed by 1.5 bbls slightly water cut mud. |
| EP | P | DST | | 01:00 | 01:30 | 0.50 | 1,511.0 | Rig down DST test manifold and head. |
| EP | P | DST | | 01:30 | 02:30 | 1.00 | 1,511.0 | POOH 1 Stand Drill pipe. L/D Pup joint. Circulate conventionally 1.5 x hole volume. |

**Day #32 (08 Dec 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| EP | P | DST | | 02:30 | 06:45 | 4.25 | 1,511.0 | POOH f/ DST. |
| EP | P | DST | | 06:45 | 09:45 | 3.00 | 1,511.0 | PJSM. Breakout and L/D DST Tools. |
| EP | P | DST | | 09:45 | 10:15 | 0.50 | 1,511.0 | Rack 2 stands DC's in mast. |
| EP | P | DST | | 10:15 | 11:00 | 0.75 | 1,511.0 | L/D remaing DST Tools. |
| EP | P | DST | | 11:00 | 11:30 | 0.50 | 1,511.0 | Clear rig floor. |
| EP | P | SM | | 11:30 | 12:15 | 0.75 | 1,511.0 | Weekly Safety Meeting. |
| EP | P | SM | | 12:15 | 12:45 | 0.50 | 1,511.0 | R/U to RIH for wiper trip. |
| EP | P | WT | | 12:45 | 17:00 | 4.25 | 1,511.0 | RIH f/ Surface to 229m. |
| EP | P | RS | | 17:00 | 17:30 | 0.50 | 1,511.0 | Rig Service. |
| EP | P | WT | | 17:30 | 22:15 | 4.75 | 1,511.0 | Continue RIH f/ 229m to 1511m. Wash f/ 1486m. |
| EP | P | CMD | | 22:15 | 23:15 | 1.00 | 1,511.0 | Circulate bottoms up.Reciprocate pipe. |
| PC | P | WT | | 23:15 | 24:00 | 0.75 | 1,511.0 | Prepare floor to lay out pipe sideways. POOH Sideways. |

**Day #33 (09 Dec 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| PC | P | WT | | 00:00 | 07:30 | 7.50 | 1,511.0 | POOH Sideways w / drill pipe and HWDP. |
| PC | P | WT | | 07:30 | 08:00 | 0.50 | 1,511.0 | Clean floor. Change out elevators. Install Kelly pull back post. |
| PC | P | WT | | 08:00 | 10:45 | 2.75 | 1,511.0 | Continue POOH laying down Drill collars.Break out bit. |
| PC | P | WT | | 10:45 | 12:00 | 1.25 | 1,511.0 | Breakout 8 stands of drill pipe f/ mast. |
| PC | P | PT | | 12:00 | 13:00 | 1.00 | 1,511.0 | M/U Combination tool. Retrieve wear bushing. |
| PC | P | PT | | 13:00 | 14:30 | 1.50 | 1,511.0 | Flush BOP. M/U Test plug assembly. |
| PC | P | PT | | 14:30 | 15:30 | 1.00 | 1,511.0 | PJSM. Change out rams to 5 1/2" |
| PC | P | PT | | 15:30 | 15:45 | 0.25 | 1,511.0 | Pressure test bonnett seals. 200psi low / 5 mins. 2000 psi high / 10 mins OK. |
| PC | P | PT | | 15:45 | 16:45 | 1.00 | 1,511.0 | L/D Test plug. |
| PC | P | RC | | 16:45 | 20:00 | 3.25 | 1,511.0 | R/U Floor / TDS to run 5 1/2" casing. |

**Day #33 (09 Dec 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| PC | P | RC | | 20:00 | 21:30 | 1.50 | 1,511.0 | M/U Volante casing running tool. Break in threads. |
| PC | P | RC | | 21:30 | 22:45 | 1.25 | 1,511.0 | Calibrate weCATT casing torque system. |
| PC | P | RC | | 22:45 | 23:30 | 0.75 | 1,511.0 | M/U Shoe Track. Test floats.OK. |
| PC | P | RC | | 23:30 | 24:00 | 0.50 | 1,511.0 | Reinstall Volante Running tool packer cup. |

**Day #34 (10 Dec 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| PC | P | RC | | 00:00 | 09:15 | 9.25 | 1,511.0 | Continue run 5 1/2" casing. Wash last joint to bottom @ 1509m. |
| PC | P | CMC | | 09:15 | 10:30 | 1.25 | 1,511.0 | Circulate 2 x bottoms up. |
| PC | P | CMC | | 10:30 | 11:00 | 0.50 | 1,511.0 | PJSM w/ cementers. Rig down Volant casing running tool. |
| PC | P | CMC | | 11:00 | 15:00 | 4.00 | 1,511.0 | Rig up cement head and cement lines.Pump 5 bbl H2O. Pressure test surface lines to 3K. Pump further 15bbl H2O spacer. Drop bottom plug, load top plug.<br>Mix and pump 68bbls of 11.8ppg Lead Slurry and 222bbls of 12ppg Tail slurry. Flush lines. Drop top plug. Displace with 114.5bbls of 9.3 ppg brine. Bumped plug w/ 1220psi. Pressure test casing to 2000psi / 10min. Bleed back .7 bbl. Floats holding. Good returns throughout the job.26.5 bbl cement to surface. Rig down cement lines. Flush BOP. |
| PC | P | CMC | | 15:00 | 15:45 | 0.75 | 1,511.0 | Set slip and seal assembly w/ 90K . |
| PC | P | CMC | | 15:45 | 16:00 | 0.25 | 1,511.0 | Rig down cement head. |
| PC | P | NUB | | 16:00 | 22:30 | 6.50 | 1,511.0 | PJSM. R/D RFCD Blooie line, RFCD Manifold and return line. Remove choke line. Unbolt RFCD and rotate to allow stack to be lifted high enough for rough cut.P/U BOP Slings and lift stack. |
| PC | P | NUB | | 22:30 | 23:00 | 0.50 | 1,511.0 | Rough cut 5 1/2" casing. L/D Landing joint. |
| PC | P | NUB | | 23:00 | 24:00 | 1.00 | 1,511.0 | PJSM. Remove RFCD. |

**Day #35 (11 Dec 2013)**

| PHSE | CLS | OP | RC | From | To | Hrs | Depth (m) | Activity Description |
|---|---|---|---|---|---|---|---|---|
| PC | P | NUB | | 00:00 | 00:45 | 0.75 | 1,511.0 | Install BOP trolley beam. Remove spacer spool. Place BOP on trolley. Remove trolley. |
| PC | P | WH | | 00:45 | 01:30 | 0.75 | 1,511.0 | GE Remove drilling adaptor spool. Clean out mud tanks. |
| PC | P | WH | | 01:30 | 02:00 | 0.50 | 1,511.0 | Final cut casing. |

| Day #35 (11 Dec 2013) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **PHSE** | **CLS** | **OP** | **RC** | **From** | **To** | **Hrs** | **Depth (m)** | **Activity Description** |
| PC | P | WH | | 02:00 | 05:00 | 3.00 | 1,511.0 | GE Install tubing spool. Pressure test same. Connection 3000 psi 10 mins OK. Between seals 2000 psi 10 mins OK. |
| S | P | HT | | 05:00 | 06:00 | 1.00 | 1,511.0 | Breakout WeCatt tool. Rig down TDS. |
| S | P | HT | | 06:00 | 13:30 | 7.50 | 1,511.0 | Rig down and lay out TDS and all associated equipment. Release rig. |

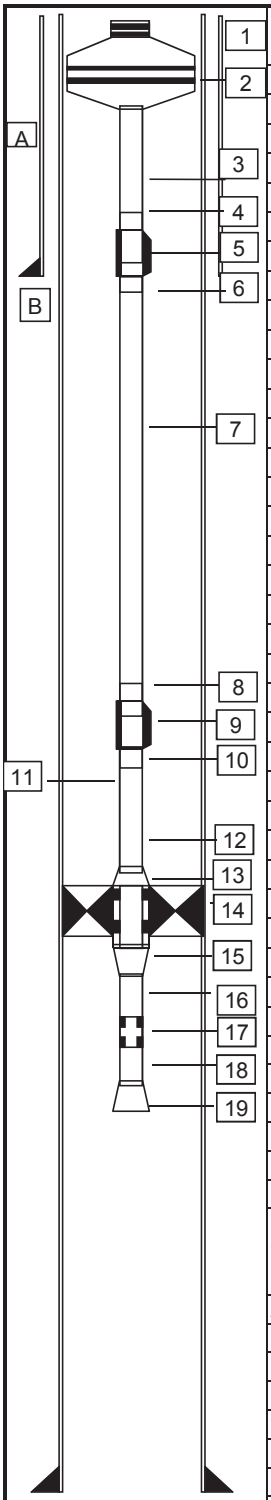
# PETROLEUM ENGINEERING DEPARTMENT
## DOWNHOLE COMPLETION

Santos
Santos Ltd A.C.N 007 550 923

**WELL:West Mereenie 19** **DATE: 29/04/2014**

**REVISED: 29/04/2014**






| No | DESCRIPTION | LENGTH (m) | DEPTH RT (m) | MIN ID (in) | MAX OD (in) |
|---|---|---|---|---|---|
| 1 | R.T. to top of THS | 4.59 | | | |
| 2 | 2-3/8" EUE WG tubing hanger, TC 1A-EN, c/w 2" HBPV profile | 0.27 | 4.59 | 1.94 | 7.0625 |
| 3 | 72 joints 2-3/8" 4.7 lb/ft J55 EUE tubing | 694.74 | 4.86 | 1.995 | 3.063 |
| 4 | 6ft pup joint 2-3/8" 4.7 lb/ft J55 EUE | 1.76 | 699.60 | 1.901 | 3.063 |
| 5 | 2-3/8" EUE KBMM SPM (fitted with 1" IPO valve, set P = 500 psi) | 2.09 | 701.36 | 1.995 | 4.236 |
| 6 | 10ft pup joint 2-3/8" 4.7 lb/ft J55 EUE | 2.96 | 703.45 | 1.995 | 3.063 |
| 7 | 72 joints 2-3/8" 4.7 lb/ft J55 EUE | 685.58 | 706.41 | 1.995 | 3.063 |
| 8 | 6ft pup joint 2-3/8" 4.7 lb/ft J55 EUE | 1.76 | 1391.99 | 1.995 | 3.063 |
| 9 | 2-3/8" EUE KBMM SPM (fitted with 1" orifice valve 12/64" orifice) | 2.09 | 1393.75 | 1.995 | 4.236 |
| 10 | 6ft pup joint 2-3/8" 4.7 lb/ft J55 EUE | 1.76 | 1395.84 | 1.995 | 3.063 |
| 11 | 1 x joint 2-3/8" 4.7 lb/ft J55 EUE | 9.65 | 1397.60 | 1.995 | 3.063 |
| 12 | 6ft pup joint 2-3/8" 4.7 lb/ft J55 EUE | 1.76 | 1407.25 | 1.995 | 3.125 |
| 13 | Crossover 2-3/8" box x 2-7/8" EUE pin | 0.20 | 1409.01 | 1.995 | 3.063 |
| 14 | PLS Retrievable packer 5-1/2" x 2-7/8" EUE, **40 k shear** (COE 1399.91 m) | 1.24 | 1409.21 | 2.416 | 4.5 |
| 15 | Crossover 2-7/8" box x 2-3/8" EUE pin | 0.21 | 1410.45 | 1.995 | 3.063 |
| 16 | 1 joint 2-3/8" 4.7 lb/ft J55 EUE | 9.67 | 1410.66 | 1.995 | 3.063 |
| 17 | 2-3/8" Otis XN nipple 1.875" landing profile, 1.791" No Go | 0.43 | 1420.33 | 1.791 | 3.063 |
| 18 | 2ft pup joint 2-3/8" 4.7 lb/ft J55 EUE | 0.64 | 1420.76 | 1.995 | 3.063 |
| 19 | re-entry guide 2-3/8" EUE x 2-7/8" Blank | 0.30 | 1421.40 | 1.963 | 2.875 |
| | End of tubing | | 1421.70 | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| A | Surface Casing 9-5/8" 36 lb/ft K-55 BTC | | 519.96 | | |
| B | Production Casing 5-1/2" 17# L80 JFE Bear | | 1507.89 | | |
| | Top of cement logged at 974 m | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| PERFORATION INTERVALS: | | GUN: | | | | CHARGES: | | FRAC: |
|---|---|---|---|---|---|---|---|---|
| FORMATION | INTERVAL (mRT) | SIZE | TYPE | Phase | SPF | TYPE | WT(g) | Y ? |
| | | | | | | | | |
| Pacoota P3-120/130 | 1431 - 1449 | 3-1/2" | TCP | 60° | 6 | HMX | 23 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

**REMARKS:** Bottom 89jts used

Top SPM - Schlumberger Camco 1" BK IPO valve 1" port & BK2 latch (SN 1053AF01), set at 500psi

Bottom SPM - Schlumberger Camco 1" BKO-3 orifice valve 12/64" port & BK 2 latch (SN 669AF01)

ANNULUS FLUID: NA - Gas lift

INDICATED STRING WEIGHT: 21,000lbs

CALCULATED STRING WEIGHT: 21,900 lb

SLACK-OFF WEIGHT: 3,000 lbs

TENSION:

| | | | | |
|---|---|---|---|---|
| NOT TO SCALE | | WELLSITE SUPERVISOR: Pat Badiou / Kate Turner | | |
| PROPOSED: | | DATE OF INSTALLATION: 29/04/2014 | | |
| RECOMPLETION: | | DRAFTED BY: | H Sheppard | DATE: 28/04/2014 |
| COMPLETION: | X | REVISED BY: | | DATE: |
| OTHER: | | CHECKED BY: | | DATE: |

E-Line 1485.95 mkb
HUD: 2014-03-30
PBTD: 1495 m (driller)

# APPENDIX XIII: RIG SPECIFICATIONS

ENSIGN
International Energy Services

# Exhibit A - Rig Equipment & Inventory
# Ensign Rig 918

## 1. Rig 918 Specifications

| | Component | Description |
|---|---|---|
| 1. | Draw works | One (1) Ideco Hydrair H-725-D double drum with V-80 Parmac hydromatic brake, PASON automatic drilling control.<br>Max. Single line pull – 50,000 lbs (low gear), 27,000 lbs (high gear).<br>Main drum 18" diameter, grooved for 1 1/8" drilling line<br>Driven by two (2) compounded Caterpillar 3406 DITA engines, with National C-195-80 FH torque converters |
| 2. | Brake (auxiliary)<br>Brake (Main drum) | V-80 Parmac hydromatic brake. With dedicated water supply tank & Two (2) Dedicated feed pumps.<br>44" diameter x 8-1/2" width. |
| 3. | Substructure | One (1) Ideco 260 ton telescoping substructure.<br>Capacity: 320,000 lbs. on rotary beams and 265,000 lb. on setback area, (loaded concurrently).<br>Height 11 feet for transport, telescopes to provide 16 feet high substructure.<br>Skid mounted on base 11'6" wide x 39'10" long plated on top with ¼" floor plate and bottom with ¼" plate seal welded, eliminating need for rig matting.<br>Floor dimensions 14'7 x 22'0", 13'9" rotary beams to ground.<br>Floor plate on set-back area includes mousehole and Rathole.<br>End of set-back area removable and walkways fold to allow fixed moving width of 13'0".<br>Master skid, 10'0" wide x 47'7" long to suit drawworks, compound, engines, wireline spool and mast.<br>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 ¼" plate seal welded, eliminating need for rig matting. |

| | Component | Description |
|---|---|---|
| 4. | Mast | 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.<br>Height above ground: 119 ft.<br>Static hook rating externally guyed:<br>10 lines to block 358,000 lbs.<br>8 lines to block 341,000 lbs.<br>6 lines to block 273,000 lbs.<br><br>Static hook rating internally guyed:<br>10 lines to block 337,000 lbs.<br>8 lines to block 320,000 lbs.<br>6 lines to block 260,000 lbs.<br><br>Wind rating with full pipe setback:<br>Internally guyed 54 mph<br>Externally guyed 75 mph<br>Racking platform capacity in 60 foot doubles with 4.1/2 in O.D. drill pipe (6.1/8 Tool joints) 11,760 feet. |
| 5. | Power system and generators | Two (2) Caterpillar C15, 455 kW, 60 Hz, 3Φ 480V generating sets. |
| 6. | Rig lighting | 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.<br>All lighting fixtures zone rated in accordance with API RP 500 and QLD Petroleum Regulation 1966. |
| 7. | Casing stabbing board | Ideco manually adjustable casing stabbing board. |
| 8. | Rotary table – | Ideco LR-275-K, 27 ½" opening with master bushing removed and API dimension from centre-line table to centre-line drive sprocket of 53.1/4".<br>Serial no. 648.<br>Load Rating:<br>Dead load 1,140,000 lbs.<br>Rotating load 710,000 lbs.<br>Torque Rating:<br>Continuous 5,060 ft-lbs.<br>Intermittent 10,120 ft-lbs.<br>RPM Rating:<br>Continuous 122<br>Intermittent 218<br>One (1) set Varco MSPC master casing bushing c/w API insert bowls #2 & #3. |
| 9. | Travelling blocks & hook | American Block D36E265 unitised Travelling Block and hook.<br>Load Rating: 530,000 lbs. |
| 10. | Swivel | National P-300<br>Rated Capacity:<br>Working Load: 600,000 lbs.<br>Bearing Load: 386,000 lbs @ 100 RPM |

| | Component | Description |
|---|---|---|
| 11. | Drill line | 3,500' of 1-1/8" IWRC, 6 x 19 strand. Single line strength 130,000 lbs.<br>Hoist lines strung: ten (10).<br>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<br>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.<br>Max Rated intermittent RPM @ 800 HP: 150 rpm<br>One pump powered by two (2) Caterpillar 3408 TAC engines and other powered by one (1) CAT C27 engine. Total: 800hp.<br>One (1) pump fitted with automatic transmission to allow Slow Circulating Rates at 40spm.<br>Liner sizes I: 6 – ½", 2121 psi max, 3.88 gal / stroke , 5- ½" , 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.<br>Compartmentalised:<br>Suction Tank Compartment #1: 150 bbls. One (1) Harrisburg Model MA-10 agitator. One (1) 2" gun line.<br>Suction Tank Compartment #2: 150 bbls. One (1) Harrisburg Model MA-10 agitator. One (1) 2" gun line.<br>Pill Tank: 72 bbls. One (1) Harrisburg Model MA-5 agitator. One (1) 2" gun line.<br>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.<br>Compartmentalised:<br>Settling Tank: 240 bbls. One (1) Harrisburg Model MA-10 agitator. Two (2) 2" gun lines.<br>Desilter Tank: 124 bbls. One (1) 2" gun line.<br>Sand Trap: 19 bbls.<br>Trip Tank: 36 bbls. One (1) 2" gun line.<br>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<br>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.<br>Two (2) Independent and interchangeable 10" x 6"mixing hoppers, c/w venturi and discharge system to each suction tank compartment.<br>Three (3) 7.5 HP, Harrisburg Model MA-7-1/2 agitators. 1 each in each suction tank and 1 in the settling tank.<br>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.<br>3-1/2" id 5000 psi working pressure, 10,000 psi test pressure shock hoses.<br>5855 psi rated 4" XXS standpipe.<br>3-1/2" id 5000 psi working pressure, 10,000 psi test pressure, 55' long Kelly hose.<br>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.<br>2" 5000 psi gate valve to bleed off line. Bleed off line runs into return trough.<br>2" 5000 psi gate valve to casing fill up & Circulating line.<br>4" 5000 psi Master gate valve.<br>5000 psi Pressure Gauge (Flanged Parking meter Style) on standpipe.<br>Provision to tie in T-piece for air delivery and non-return valve.<br>T-piece at ground level on delivery line to shock hose allows for 1502 tie in for pressure sensators 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.<br>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).<br>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.<br>Koomey type 80 BOP closing unit with drillfloor remote control panel.<br>Choke Manifold & HCR choke line valve.<br>Stabbing valves, grey valve.<br>Calibrated trip tank. |
| 26. | BOP Closing Unit | Koomey Model 120LS type 80. Mounted on the end of the water tank.<br>3000 psi, 120 gallon accumulator equipped with 16 x 11 gallon bottles.<br>UP2RB5AR model “P” 5 station control manifold.<br>Model UFT-15B triplex charging pump with 15 HP, 60 Hz electric motor.<br>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<br>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<br>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.<br>Rams to suit double gate BOP, complete with spare sealing rubbers:<br>CSO, 4-1/2”, 5 ½”, 7”, 7.5/8”<br>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.<br>1 valve for operation of bypass valve and 150' remote control hose.<br>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.<br>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.<br>One (1) 11" x 5000psi BOP test stump |
| 35. | BOP handling system | One (1) BOP rail and trolley handling system.<br>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.<br>One (1) 4" IF 2-1/4" bore stabbing valve. |
| 38. | Float valves | One (1) Baker SPD Model "F" 4R float valve.<br>One (1) Baker SPD Model "F" 5F6R float valve.<br>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.<br>One (1) spacer spool, 11" 5000 psi x 11" 5000psi, 23" high.<br>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.<br>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.<br>One (1) only, Varco Model 6800 hydraulic Kelly Spinner, 1200 ft-lb stall torque.<br>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.<br>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.<br>One (1) set 4-1/2" Varco SDXL drill pipe slips c/w dies for 4 1/2" pipe.<br>One (1) set 3 ½" SDML Drill pipe slips<br>One (1) set Varco DCS-R Drill Collar Slips, c/w inserts and dies for pipe diameter 4.3/4" – 7".<br>One (1) Varco MP-R multi-purpose safety clamp, c/w links and dies to suit tubulars 4" – 10-1/2".<br>One (1) set VARCO HT-65 Safety Tongs, c/w jaws to suit 3-1/2" to 11 ¼" tubulars.<br>One (1) set Varco DCS-L Drill Collar slips c/w dies for pipe diameter 6 ¾" to 8 ¼" |
| 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 ½", 7", 7 5/8" 8 5/8", 9 5/8" Casing.<br>Suitable jaws for VARCO HT-65 manual back up tong for 3-1/2" to 11 ¼" tubulars.<br>One (1) only VARCO 5-1/2" SMX 150 Ton Side door Casing elevators<br>One (1) only BJ 5-1/2" 5 Ton Single joint elevators<br>One (1) set 5-1/2" VARCO SDX Casing slips<br>One (1) only VARCO 7" SLX 150 Ton Side door Casing elevators<br>One (1) set 7" VARCO CMS-XL Casing Slips<br>One (1) only 7" 5 Ton single joint casing elevators.<br>One (1) set 9 5/8" AOT SLX 150 ton Side door Casing Elevators<br>One (1) set 9 5/8" 5 ton AOT single joint elevators<br>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<br>3 X 5 ½" Klampon Casing Protectors<br>2 X 7" Klampon Casing Protectors<br>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.<br>One (1) only 6 ¼" Bowen Type "Z" Hydraulic Jar.<br>One (1) only 5" OD Reverse Circulating Junk basket<br>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.<br>One (1) Martin Decker type "FA9" Rotary indicator assembly.<br>Three (3) 2" Martin Decker GM6A pressure sensator units.<br>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:<br>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.<br>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.<br>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.<br>ONE (1) Sullair model 3009A, 125 to 135Psi working pressure, 40 HP, 1765 RPM @ 60 Ht.<br>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:<br>One (1) 20' x 8' spares and oilfield consumables store.<br>One (1) 10' toolhouse and Derrickhand's parts store.<br>One (1) 10' Air-conditioned Rubber consumables store.<br>One (1) 15' Mechanics workshop<br>One (1) Tradesman's Parts Storage.<br>One (1) welder's workshop.<br>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.<br>Full set of welder's safety equipment.<br>One (1) 30 foot Steel storage Skid.<br>1 x Portable Diesel Welding Machine<br>One (1) set of Oxy-Acetylene. |
| 73. | Hand tools | One (1) complete Rig Floor Tool Kit.<br>One (1) complete Mechanic Tool Kit.<br>One (1) complete Electricians Tool Kit. |
| 74. | Fuel storage tanks | One (1) Fuel Storage Tank – 42000 Litres, with oil storage tank.<br>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.<br>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.<br>One (1) derrick escape geronimo.<br>Two (2) lifting stretchers.<br>Two (2) lifting harness.<br>Five (5) safety harnesses with lanyard.<br>Two (2) crown mounted fall arrester, One (1) sub base mounted fall arrester.<br>One (1) sub-base lanyard runner for multiple men safe work on BOP's.<br>One (1) derrick climbing static line.<br>One (1) emergency response plan.<br>One (1) Confined Space Rescue Gantry for Mudtank Rescue.<br>One (1) Confined Space Rescue Stretcher.<br>One (1) Height rescue kit |
| 82. | Alarm system | Personal smoke detectors installed in all rig site sleeping quarters.<br>One (1) Bender IR475LY-60 ground fault monitor.<br>Driller activated horn.<br>Remote horn – Rig Managers office.<br>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.<br>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)<br>Capacity:<br>10 lines to block 358,000 lbs.<br>8 lines to block 343,000 lbs.<br>6 lines to block 315,000 lbs. |
| 89. | Catheads<br><br>Contingency catheads if required | Hydraulic, Meyers Engineering make up (IH-564) and breakout (IH-565) Ram type catheads mounted in the mast.<br>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.<br>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<br>One (1) Canon MP830 scanner, photocopier.<br>One (1) IBM laptop computer.<br>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.<br>CAMP EQUIPMENT:<br>1 – 38 Person camp fully furnished with shared en-suite facilities per two rooms, fully air conditioned with recreation room.<br>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.<br>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:<br>* Recreational room with large screen TV, DVD player and lounge chairs.<br>* 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