

NASH #54Y  
 SHL: 1822' FNL & 909' FWL  
 BHL: 7' FNL & 7' FEL  
 SEC 13, T23S, R29E  
 EDDY CO. NM  
 API# 30-025-42344  
 XTO WELL ID# 21595

30-015-42311

20" CONDUCTOR @ 97'  
 CMT'D W/111SX READY MIX  
 TO SURF, CALC.  
 26" HOLE.

ELEV. GL: 2985'  
 KB: 3002'  
 AGL: 17'

17 1/2" HOLE  
 13-3/8" 40#, H-40, CSG @ 285' CMT  
 W/350 SX. CIRC 31 SX TO SURF,  
 CBL.

TOC @ 240' (CBL)

12-1/4" HOLE

9-5/8", 36#, J-55, CSG SET @ 3107' CMT  
 W/1250 SX. CIRC 341 SX TO SURF, CBL.

#### CEMENTED NCS SLEEVES

| Sleeve | Depth | Sleeve | Depth |
|--------|-------|--------|-------|
| 1      | 13742 | 19     | 10340 |
| 2      | 13517 | 20     | 10155 |
| 3      | 13337 | 21     | 9930  |
| 4      | 13162 | 22     | 9746  |
| 5      | 12982 | 23     | 9575  |
| 6      | 12763 | 24     | 9395  |
| 7      | 12585 | 25     | 9213  |
| 8      | 12405 | 26     | 8993  |
| 9      | 12233 | 27     | 8813  |
| 10     | 12048 | 28     | 8630  |
| 11     | 11831 | 29     | 8458  |
| 12     | 11652 | 30     | 8284  |
| 13     | 11467 | 31     | 8065  |
| 14     | 11282 | 32     | 7881  |
| 15     | 11103 | 33     | 7698  |
| 16     | 10877 | 34     | 7527  |
| 17     | 10692 | 35     | 7349  |
| 18     | 10520 |        |       |

8-3/4" HOLE

7" CSG MKR JT @ 5515'

4-1/2" 11.6# P-110 LINER F/6 777'-13,832'  
 R7" VERSA FLEX HANGER W/8" PBR @ 6,777'  
 CEMENTED WITH 535 SX.

TOL @ 6777' MD (TVD = 6632' @ 51°)

4-1/2" CSG MKR JT @ N/A

EOL: 13,832'  
 TVD: 6,710'  
 TD : 13,872'  
 PBTD: 13,790'

KOP @ 6000'  
 CURVE F/6000'-7300'

6-1/8" OH F/7,118'-13,872'

7", 26#, HCP-110, CSG SET @ 7,118' (TVD = 6,775' @ 67°)  
 CMT W 300 SX TUNED LIGHT. 550 SX ECONOCEM DOWN BRADEN HEAD.  
 24" MJ @ 5515'.

FS @ 13,832'  
 FC @ 13,791'  
 LC @ 13,790'

Operator: XTO Energy  
Well/Lease: Nash 54Y  
County: Eddy

NM OIL CONSERVATION  
ARTESIA DISTRICT

DEC 23 2014

RECEIVED

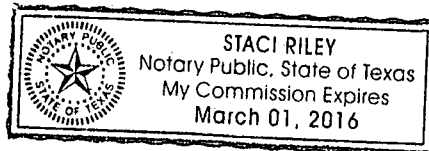
STATE OF NEW MEXICO  
DEVIATION REPORT

| <u>Footage</u> | <u>Degree</u> |
|----------------|---------------|
| 265            | 0.50          |
| 450            | 0.00          |
| 889            | 0.50          |
| 1276           | 1.00          |
| 1747           | 1.75          |
| 2031           | 1.00          |
| 2220           | 0.75          |
| 2409           | 1.00          |
| 2784           | 3.00          |
| 2879           | 3.50          |
| 2910           | 3.00          |
| 2974           | 2.00          |
| 3068           | 1.50          |
| 3355           | 1.00          |
| 3823           | 0.75          |
| 4293           | 0.50          |
| 4765           | 0.25          |
| 5239           | 0.50          |
| 5968           | 0.37          |
| 5999           | 1.25          |
| 6030           | 3.57          |

Signed By: Charles Walsh  
Charles Walsh, Division Manager  
Pioneer Drilling Company

Appeared before me on June 19, 2014.

Staci Riley  
Notary Public



# HALLIBURTON

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3950 Interwood South Parkway • Houston, TX 77032

PHONE 281.986.4400 • FAX 281.986.4499

## State of New Mexico, Eddy County

I, Ike Iwegbue, certify that I am employed by Halliburton Energy Services, Inc. (aka Sperry Drilling) and that on the dates of 24-April-14 through 19-May-14. I did conduct or supervise the taking of a DGWD directional survey for the Well from a depth of 5936' MD to a depth of 13722' MD. This data is true, correct, complete and within the limitations of the tools as set forth by Halliburton Energy Services, Inc. (aka Sperry Drilling). I am authorized and qualified to make this report and this survey was conducted at the request of XTO Energy, for the Nash Unit 54Y Well, API No. 30-015-42311-0000 in Eddy County, New Mexico. I have reviewed this report and find that it conforms to the principles and procedures as set forth by Halliburton Energy Services, Inc. (aka Sperry Drilling).



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Ike Iwegbue  
Field Engineer

**XTO Energy**

**Nash Unit 54Y**

**Eddy County, NM**

**Pioneer 33**

**API# 30-015-42311-0000**

**NM OIL CONSERVATION**  
ARTESIA DISTRICT

**DEC 23 2014**

**RECEIVED**

**April 24, 2014 – May 19, 2014**

**HD-XX-0901220260**

**Sperry Drilling**

**MWD Survey Report**

**Submitted by Ike Iwegbue**

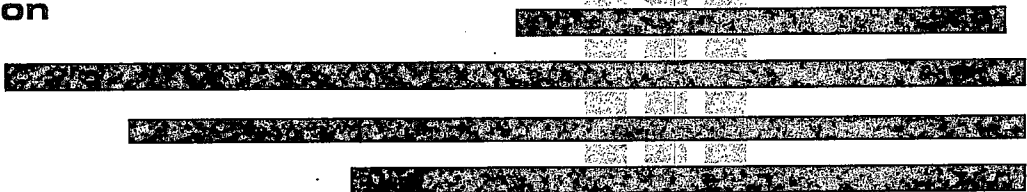
3950 Interwood South Parkway

Houston, TX 77032

Ph: 281.986.4400

**HALLIBURTON**

**Drilling and Formation  
Evaluation**



## DIRECTIONAL SURVEY DATA

## Tie-in

0.00

0.00

0.00

0.00

0.00 N

0.00 E

| Measured Depth<br>(ft) | Inclination<br>(deg) | Direction<br>(deg) | Vertical Depth<br>(ft) | Latitude<br>(ft) | Departure<br>(ft) | Vertical Section<br>(ft) | Dogleg<br>(%/100') |
|------------------------|----------------------|--------------------|------------------------|------------------|-------------------|--------------------------|--------------------|
| 100.00                 | 0.34                 | 9.12               | 100.00                 | 0.29 N           | 0.05 E            | 0.13                     | 0.34               |
| 200.00                 | 0.30                 | 53.92              | 200.00                 | 0.74 N           | 0.31 E            | 0.17                     | 0.25               |
| 300.00                 | 0.27                 | 34.45              | 300.00                 | 1.09 N           | 0.65 E            | 0.08                     | 0.10               |
| 400.00                 | 0.44                 | 57.57              | 399.99                 | 1.49 N           | 1.11 E            | -0.06                    | 0.22               |
| 500.00                 | 0.29                 | 58.74              | 499.99                 | 1.83 N           | 1.65 E            | -0.32                    | 0.15               |
| 600.00                 | 0.29                 | 48.65              | 599.99                 | 2.12 N           | 2.05 E            | -0.48                    | 0.05               |
| 700.00                 | 0.18                 | 126.69             | 699.99                 | 2.20 N           | 2.37 E            | -0.70                    | 0.31               |
| 800.00                 | 0.56                 | 84.54              | 799.99                 | 2.15 N           | 2.98 E            | -1.23                    | 0.44               |
| 900.00                 | 0.49                 | 88.31              | 899.98                 | 2.21 N           | 3.90 E            | -1.95                    | 0.08               |
| 1000.00                | 0.68                 | 106.44             | 999.98                 | 2.05 N           | 4.89 E            | -2.86                    | 0.26               |
| 1100.00                | 0.84                 | 118.08             | 1,099.97               | 1.54 N           | 6.11 E            | -4.15                    | 0.22               |
| 1200.00                | 1.07                 | 110.36             | 1,199.96               | 0.87 N           | 7.63 E            | -5.78                    | 0.26               |
| 1300.00                | 1.34                 | 115.27             | 1,299.94               | 0.05 N           | 9.56 E            | -7.84                    | 0.29               |
| 1400.00                | 1.72                 | 120.49             | 1,399.90               | 1.21 S           | 11.91 E           | -10.49                   | 0.40               |
| 1500.00                | 2.18                 | 127.47             | 1,499.84               | 3.13 S           | 14.72 E           | -13.88                   | 0.52               |
| 1600.00                | 2.58                 | 125.38             | 1,599.75               | 5.59 S           | 18.06 E           | -18.04                   | 0.41               |
| 1700.00                | 1.91                 | 132.89             | 1,699.68               | 8.03 S           | 21.12 E           | -21.94                   | 0.73               |
| 1800.00                | 1.50                 | 120.00             | 1,799.63               | 9.82 S           | 23.47 E           | -24.89                   | 0.56               |
| 1900.00                | 1.22                 | 119.10             | 1,899.61               | 10.99 S          | 25.54 E           | -27.25                   | 0.28               |
| 2000.00                | 1.11                 | 120.55             | 1,999.58               | 12.00 S          | 27.30 E           | -29.28                   | 0.11               |
| 2100.00                | 0.74                 | 115.93             | 2,099.57               | 12.77 S          | 28.72 E           | -30.88                   | 0.38               |
| 2200.00                | 0.67                 | 120.84             | 2,199.56               | 13.36 S          | 29.80 E           | -32.10                   | 0.09               |
| 2300.00                | 0.98                 | 120.66             | 2,299.55               | 14.09 S          | 31.04 E           | -33.54                   | 0.31               |
| 2400.00                | 1.52                 | 126.21             | 2,399.53               | 15.31 S          | 32.84 E           | -35.72                   | 0.55               |
| 2500.00                | 1.45                 | 117.01             | 2,499.50               | 16.67 S          | 35.04 E           | -38.30                   | 0.25               |
| 2600.00                | 1.66                 | 123.45             | 2,599.46               | 18.04 S          | 37.37 E           | -41.00                   | 0.27               |
| 2700.00                | 2.15                 | 129.64             | 2,699.40               | 20.04 S          | 40.03 E           | -44.32                   | 0.53               |
| 2800.00                | 2.88                 | 137.54             | 2,799.31               | 23.09 S          | 43.17 E           | -48.64                   | 0.81               |
| 2900.00                | 2.88                 | 138.03             | 2,899.18               | 26.81 S          | 46.54 E           | -53.53                   | 0.02               |
| 3000.00                | 2.49                 | 142.15             | 2,999.07               | 30.39 S          | 49.56 E           | -58.05                   | 0.43               |
| 3100.00                | 1.53                 | 147.37             | 3,099.01               | 33.23 S          | 51.61 E           | -61.35                   | 0.98               |
| 3200.00                | 1.10                 | 137.16             | 3,198.98               | 35.06 S          | 52.98 E           | -63.52                   | 0.49               |
| 3300.00                | 0.93                 | 138.83             | 3,298.97               | 36.38 S          | 54.17 E           | -65.24                   | 0.17               |
| 3400.00                | 0.95                 | 134.12             | 3,398.95               | 37.56 S          | 55.30 E           | -66.85                   | 0.08               |
| 3500.00                | 0.72                 | 141.48             | 3,498.94               | 38.63 S          | 56.29 E           | -68.27                   | 0.25               |
| 3600.00                | 0.72                 | 146.08             | 3,598.93               | 39.65 S          | 57.03 E           | -69.45                   | 0.06               |
| 3700.00                | 0.44                 | 153.75             | 3,698.93               | 40.51 S          | 57.55 E           | -70.37                   | 0.29               |
| 3800.00                | 0.46                 | 145.15             | 3,798.93               | 41.18 S          | 57.95 E           | -71.09                   | 0.07               |
| 3900.00                | 0.55                 | 149.08             | 3,898.92               | 41.93 S          | 58.42 E           | -71.90                   | 0.10               |
| 4000.00                | 0.39                 | 170.15             | 3,998.92               | 42.67 S          | 58.73 E           | -72.57                   | 0.23               |
| 4100.00                | 0.49                 | 162.09             | 4,098.92               | 43.42 S          | 58.92 E           | -73.15                   | 0.12               |

## DIRECTIONAL SURVEY DATA

| Measured Depth<br>(ft) | Inclination<br>(deg) | Direction<br>(deg) | Vertical Depth<br>(ft) | Latitude<br>(ft) | Departure<br>(ft) | Vertical Section<br>(ft) | Dogleg<br>(%/100') |
|------------------------|----------------------|--------------------|------------------------|------------------|-------------------|--------------------------|--------------------|
| 4200.00                | 0.36                 | 174.36             | 4,198.91               | 44.13 S          | 59.08 E           | -73.70                   | 0.16               |
| 4300.00                | 0.37                 | 182.28             | 4,298.91               | 44.77 S          | 59.10 E           | -74.07                   | 0.05               |
| 4400.00                | 0.28                 | 174.24             | 4,398.91               | 45.34 S          | 59.11 E           | -74.40                   | 0.10               |
| 4500.00                | 0.36                 | 203.30             | 4,498.91               | 45.87 S          | 59.01 E           | -74.62                   | 0.18               |
| 4600.00                | 0.26                 | 168.32             | 4,598.91               | 46.38 S          | 58.93 E           | -74.85                   | 0.21               |
| 4700.00                | 0.24                 | 192.48             | 4,698.91               | 46.80 S          | 58.93 E           | -75.09                   | 0.11               |
| 4800.00                | 0.34                 | 210.71             | 4,798.90               | 47.26 S          | 58.74 E           | -75.19                   | 0.13               |
| 4900.00                | 0.44                 | 217.59             | 4,898.90               | 47.82 S          | 58.35 E           | -75.19                   | 0.11               |
| 5000.00                | 0.32                 | 217.68             | 4,998.90               | 48.35 S          | 57.94 E           | -75.16                   | 0.12               |
| 5100.00                | 0.34                 | 189.09             | 5,098.90               | 48.86 S          | 57.73 E           | -75.27                   | 0.16               |
| 5200.00                | 0.47                 | 205.13             | 5,198.90               | 49.53 S          | 57.51 E           | -75.47                   | 0.17               |
| 5300.00                | 0.48                 | 195.61             | 5,298.89               | 50.30 S          | 57.22 E           | -75.68                   | 0.08               |
| 5400.00                | 0.62                 | 200.11             | 5,398.89               | 51.21 S          | 56.92 E           | -75.95                   | 0.15               |
| 5500.00                | 0.65                 | 192.04             | 5,498.88               | 52.28 S          | 56.62 E           | -76.30                   | 0.09               |
| 5600.00                | 0.49                 | 207.86             | 5,598.88               | 53.21 S          | 56.30 E           | -76.57                   | 0.22               |
| 5700.00                | 0.39                 | 213.65             | 5,698.87               | 53.87 S          | 55.91 E           | -76.63                   | 0.11               |
| 5800.00                | 0.55                 | 217.10             | 5,798.87               | 54.54 S          | 55.43 E           | -76.61                   | 0.16               |
| 5871.00                | 0.51                 | 207.97             | 5,869.87               | 55.09 S          | 55.08 E           | -76.64                   | 0.13               |
| 5936.00                | 0.68                 | 226.74             | 5,934.86               | 55.61 S          | 54.66 E           | -76.59                   | 0.39               |
| 5968.00                | 0.37                 | 205.62             | 5,966.86               | 55.83 S          | 54.48 E           | -76.57                   | 1.11               |
| 5999.00                | 1.25                 | 289.46             | 5,997.86               | 55.81 S          | 54.12 E           | -76.26                   | 4.08               |
| 6030.00                | 3.57                 | 291.82             | 6,028.83               | 55.34 S          | 52.90 E           | -74.99                   | 7.49               |
| 6060.00                | 6.18                 | 296.22             | 6,058.72               | 54.27 S          | 50.59 E           | -72.48                   | 8.79               |
| 6092.00                | 9.00                 | 302.95             | 6,090.44               | 52.15 S          | 46.94 E           | -68.28                   | 9.22               |
| 6123.00                | 12.09                | 304.95             | 6,120.91               | 48.97 S          | 42.24 E           | -62.60                   | 10.04              |
| 6155.00                | 14.78                | 304.84             | 6,152.03               | 44.72 S          | 36.14 E           | -55.17                   | 8.41               |
| 6187.00                | 17.20                | 304.92             | 6,182.79               | 39.68 S          | 28.91 E           | -46.35                   | 7.55               |
| 6218.00                | 19.60                | 305.42             | 6,212.20               | 34.04 S          | 20.92 E           | -36.57                   | 7.77               |
| 6249.00                | 21.63                | 304.81             | 6,241.22               | 27.76 S          | 11.99 E           | -25.66                   | 6.57               |
| 6281.00                | 23.82                | 304.98             | 6,270.73               | 20.69 S          | 1.85 E            | -13.30                   | 6.86               |
| 6312.00                | 25.66                | 304.35             | 6,298.88               | 13.32 S          | 8.82 W            | -0.32                    | 5.98               |
| 6344.00                | 28.17                | 305.02             | 6,327.42               | 5.07 S           | 20.73 W           | 14.16                    | 7.92               |
| 6375.00                | 30.80                | 305.01             | 6,354.40               | 3.68 N           | 33.22 W           | 29.42                    | 8.48               |
| 6406.00                | 33.53                | 305.24             | 6,380.64               | 13.18 N          | 46.72 W           | 45.92                    | 8.83               |
| 6438.00                | 36.51                | 304.39             | 6,406.84               | 23.66 N          | 61.80 W           | 64.28                    | 9.41               |
| 6469.00                | 39.39                | 304.57             | 6,431.28               | 34.45 N          | 77.51 W           | 83.34                    | 9.32               |
| 6501.00                | 41.88                | 305.31             | 6,455.56               | 46.38 N          | 94.59 W           | 104.18                   | 7.91               |
| 6533.00                | 43.75                | 305.20             | 6,479.04               | 58.94 N          | 112.35 W          | 125.93                   | 5.86               |
| 6565.00                | 46.29                | 305.52             | 6,501.66               | 72.04 N          | 130.81 W          | 148.56                   | 7.96               |
| 6596.00                | 48.81                | 305.41             | 6,522.58               | 85.31 N          | 149.44 W          | 171.43                   | 8.13               |
| 6628.00                | 50.15                | 305.01             | 6,543.37               | 99.33 N          | 169.31 W          | 195.75                   | 4.30               |
| 6659.00                | 50.65                | 304.58             | 6,563.13               | 112.96 N         | 188.93 W          | 219.64                   | 1.92               |
| 6691.00                | 51.09                | 304.72             | 6,583.33               | 127.07 N         | 209.34 W          | 244.46                   | 1.42               |
| 6722.00                | 50.98                | 304.80             | 6,602.82               | 140.82 N         | 229.14 W          | 268.56                   | 0.41               |
| 6753.00                | 50.61                | 304.68             | 6,622.42               | 154.51 N         | 248.88 W          | 292.58                   | 1.22               |

## DIRECTIONAL SURVEY DATA

| Measured Depth<br>(ft) | Inclination<br>(deg) | Direction<br>(deg) | Vertical Depth<br>(ft) | Latitude<br>(ft) | Departure<br>(ft) | Vertical Section<br>(ft) | Dogleg<br>(%/100) |
|------------------------|----------------------|--------------------|------------------------|------------------|-------------------|--------------------------|-------------------|
| 6785.00                | 51.42                | 304.84             | 6,642.55               | 168.69 N         | 269.32 W          | 317.45                   | 2.58              |
| 6816.00                | 53.56                | 304.85             | 6,661.42               | 182.74 N         | 289.50 W          | 342.04                   | 6.90              |
| 6848.00                | 55.58                | 304.78             | 6,679.97               | 197.62 N         | 310.91 W          | 368.12                   | 6.30              |
| 6879.00                | 58.59                | 304.76             | 6,696.82               | 212.46 N         | 332.28 W          | 394.14                   | 9.72              |
| 6911.00                | 62.79                | 304.53             | 6,712.48               | 228.32 N         | 355.23 W          | 422.04                   | 13.15             |
| 6943.00                | 65.33                | 304.66             | 6,726.47               | 244.66 N         | 378.92 W          | 450.81                   | 7.93              |
| 6974.00                | 67.84                | 304.81             | 6,738.79               | 260.87 N         | 402.29 W          | 479.25                   | 8.10              |
| 7005.00                | 70.55                | 304.76             | 6,749.80               | 277.40 N         | 426.09 W          | 508.23                   | 8.75              |
| 7037.00                | 73.14                | 304.37             | 6,759.77               | 294.65 N         | 451.13 W          | 538.63                   | 8.19              |
| 7068.00                | 75.49                | 303.94             | 6,768.15               | 311.40 N         | 475.82 W          | 568.48                   | 7.68              |
| 7129.00                | 77.04                | 303.97             | 6,782.63               | 344.50 N         | 524.97 W          | 627.73                   | 2.55              |
| 7160.00                | 79.72                | 304.47             | 6,788.88               | 361.57 N         | 550.08 W          | 658.09                   | 8.77              |
| 7192.00                | 82.72                | 305.44             | 6,793.76               | 379.69 N         | 575.99 W          | 689.71                   | 9.86              |
| 7224.00                | 84.51                | 306.76             | 6,797.32               | 398.43 N         | 601.69 W          | 721.50                   | 6.95              |
| 7256.00                | 86.23                | 306.92             | 6,799.90               | 417.55 N         | 627.21 W          | 753.37                   | 5.39              |
| 7288.00                | 88.37                | 306.87             | 6,801.41               | 436.74 N         | 652.77 W          | 785.31                   | 6.69              |
| 7320.00                | 90.37                | 306.18             | 6,801.76               | 455.79 N         | 678.49 W          | 817.29                   | 6.61              |
| 7351.00                | 91.76                | 305.83             | 6,801.18               | 474.01 N         | 703.56 W          | 848.27                   | 4.61              |
| 7446.00                | 94.60                | 304.96             | 6,795.92               | 528.94 N         | 780.88 W          | 943.11                   | 3.13              |
| 7478.00                | 95.09                | 305.05             | 6,793.21               | 547.23 N         | 806.99 W          | 974.99                   | 1.56              |
| 7510.00                | 94.07                | 304.13             | 6,790.66               | 565.34 N         | 833.25 W          | 1006.89                  | 4.31              |
| 7542.00                | 94.32                | 304.09             | 6,788.32               | 583.23 N         | 859.68 W          | 1038.80                  | 0.80              |
| 7573.00                | 92.87                | 303.85             | 6,786.38               | 600.52 N         | 885.34 W          | 1069.74                  | 4.75              |
| 7606.00                | 91.26                | 303.61             | 6,785.19               | 618.83 N         | 912.76 W          | 1102.71                  | 4.92              |
| 7637.00                | 89.94                | 303.26             | 6,784.87               | 635.91 N         | 938.63 W          | 1133.70                  | 4.41              |
| 7669.00                | 88.55                | 303.00             | 6,785.29               | 653.40 N         | 965.42 W          | 1165.69                  | 4.40              |
| 7700.00                | 88.43                | 302.98             | 6,786.10               | 670.27 N         | 991.42 W          | 1196.66                  | 0.41              |
| 7732.00                | 89.45                | 303.10             | 6,786.70               | 687.71 N         | 1,018.24 W        | 1228.64                  | 3.20              |
| 7827.00                | 90.68                | 302.80             | 6,786.59               | 739.39 N         | 1,097.95 W        | 1323.60                  | 1.34              |
| 7922.00                | 90.86                | 303.25             | 6,785.31               | 791.15 N         | 1,177.60 W        | 1418.55                  | 0.51              |
| 8018.00                | 86.61                | 302.76             | 6,787.43               | 843.42 N         | 1,258.07 W        | 1514.46                  | 4.46              |
| 8113.00                | 88.21                | 302.91             | 6,791.72               | 894.88 N         | 1,337.81 W        | 1609.31                  | 1.69              |
| 8208.00                | 87.94                | 302.98             | 6,794.91               | 946.52 N         | 1,417.48 W        | 1704.22                  | 0.30              |
| 8240.00                | 88.12                | 302.80             | 6,796.01               | 963.88 N         | 1,444.34 W        | 1736.18                  | 0.82              |
| 8272.00                | 89.20                | 303.95             | 6,796.76               | 981.48 N         | 1,471.05 W        | 1768.17                  | 4.94              |
| 8303.00                | 89.97                | 304.02             | 6,796.98               | 998.81 N         | 1,496.76 W        | 1799.16                  | 2.49              |
| 8335.00                | 90.68                | 303.92             | 6,796.80               | 1,016.69 N       | 1,523.30 W        | 1831.16                  | 2.23              |
| 8367.00                | 90.86                | 303.94             | 6,796.37               | 1,034.55 N       | 1,549.84 W        | 1863.15                  | 0.58              |
| 8398.00                | 91.29                | 304.07             | 6,795.79               | 1,051.88 N       | 1,575.54 W        | 1894.15                  | 1.45              |
| 8430.00                | 91.23                | 303.78             | 6,795.08               | 1,069.74 N       | 1,602.08 W        | 1926.13                  | 0.95              |
| 8462.00                | 90.74                | 302.99             | 6,794.53               | 1,087.34 N       | 1,628.80 W        | 1958.12                  | 2.90              |
| 8494.00                | 91.02                | 304.14             | 6,794.04               | 1,105.03 N       | 1,655.46 W        | 1990.11                  | 3.68              |
| 8514.00                | 91.11                | 304.95             | 6,793.67               | 1,116.37 N       | 1,671.93 W        | 2010.11                  | 4.08              |
| 8610.00                | 90.12                | 305.50             | 6,792.64               | 1,171.73 N       | 1,750.35 W        | 2106.10                  | 1.18              |
| 8706.00                | 90.86                | 304.24             | 6,791.81               | 1,226.61 N       | 1,829.11 W        | 2202.09                  | 1.53              |

## DIRECTIONAL SURVEY DATA

| Measured Depth<br>(ft) | Inclination<br>(deg) | Direction<br>(deg) | Vertical Depth<br>(ft) | Latitude<br>(ft) | Departure<br>(ft) | Vertical Section<br>(ft) | Dogleg<br>(%/100) |
|------------------------|----------------------|--------------------|------------------------|------------------|-------------------|--------------------------|-------------------|
| 8801.00                | 89.60                | 303.60             | 6,791.43               | 1,279.63 N       | 1,907.94 W        | 2297.08                  | 1.49              |
| 8897.00                | 89.94                | 302.10             | 6,791.81               | 1,331.70 N       | 1,988.58 W        | 2393.03                  | 1.60              |
| 8991.00                | 90.29                | 302.01             | 6,791.63               | 1,381.60 N       | 2,068.25 W        | 2486.93                  | 0.39              |
| 9087.00                | 91.51                | 302.86             | 6,790.12               | 1,433.08 N       | 2,149.26 W        | 2582.84                  | 1.55              |
| 9182.00                | 91.97                | 303.40             | 6,787.23               | 1,484.97 N       | 2,228.78 W        | 2677.76                  | 0.75              |
| 9277.00                | 94.23                | 304.06             | 6,782.10               | 1,537.64 N       | 2,307.67 W        | 2772.60                  | 2.47              |
| 9372.00                | 92.47                | 304.47             | 6,776.55               | 1,591.03 N       | 2,386.05 W        | 2867.43                  | 1.90              |
| 9467.00                | 91.11                | 304.92             | 6,773.59               | 1,645.08 N       | 2,464.11 W        | 2962.38                  | 1.51              |
| 9500.00                | 91.17                | 304.59             | 6,772.93               | 1,663.89 N       | 2,491.22 W        | 2995.38                  | 1.03              |
| 9563.00                | 89.66                | 304.76             | 6,772.47               | 1,699.73 N       | 2,543.03 W        | 3058.37                  | 2.41              |
| 9659.00                | 90.37                | 306.51             | 6,772.45               | 1,755.65 N       | 2,621.05 W        | 3154.35                  | 1.97              |
| 9754.00                | 91.91                | 304.95             | 6,770.56               | 1,811.11 N       | 2,698.15 W        | 3249.31                  | 2.30              |
| 9849.00                | 91.08                | 304.61             | 6,768.08               | 1,865.28 N       | 2,776.16 W        | 3344.28                  | 0.94              |
| 9945.00                | 89.60                | 304.20             | 6,767.52               | 1,919.52 N       | 2,855.36 W        | 3440.28                  | 1.60              |
| 10041.00               | 92.04                | 308.13             | 6,766.15               | 1,976.14 N       | 2,932.84 W        | 3536.21                  | 4.82              |
| 10135.00               | 93.30                | 308.60             | 6,761.77               | 2,034.42 N       | 3,006.46 W        | 3629.91                  | 1.43              |
| 10231.00               | 91.76                | 307.60             | 6,757.53               | 2,093.59 N       | 3,081.93 W        | 3725.64                  | 1.91              |
| 10326.00               | 88.49                | 306.19             | 6,757.33               | 2,150.62 N       | 3,157.89 W        | 3820.55                  | 3.75              |
| 10421.00               | 89.57                | 306.64             | 6,758.94               | 2,207.01 N       | 3,234.33 W        | 3915.50                  | 1.23              |
| 10517.00               | 89.82                | 307.07             | 6,759.46               | 2,264.59 N       | 3,311.14 W        | 4011.42                  | 0.52              |
| 10612.00               | 89.66                | 307.35             | 6,759.89               | 2,322.03 N       | 3,386.80 W        | 4106.33                  | 0.33              |
| 10707.00               | 92.10                | 308.39             | 6,758.43               | 2,380.34 N       | 3,461.78 W        | 4201.16                  | 2.79              |
| 10802.00               | 91.26                | 306.91             | 6,755.64               | 2,438.34 N       | 3,536.96 W        | 4295.99                  | 1.79              |
| 10897.00               | 89.20                | 306.53             | 6,755.26               | 2,495.14 N       | 3,613.10 W        | 4390.93                  | 2.21              |
| 10992.00               | 90.00                | 306.73             | 6,755.93               | 2,551.82 N       | 3,689.34 W        | 4485.87                  | 0.87              |
| 11088.00               | 90.00                | 305.08             | 6,755.93               | 2,608.11 N       | 3,767.10 W        | 4581.84                  | 1.72              |
| 11183.00               | 90.52                | 306.42             | 6,755.49               | 2,663.61 N       | 3,844.20 W        | 4676.82                  | 1.51              |
| 11279.00               | 85.43                | 305.80             | 6,758.88               | 2,720.13 N       | 3,921.68 W        | 4772.70                  | 5.35              |
| 11374.00               | 85.98                | 305.18             | 6,765.99               | 2,775.13 N       | 3,998.81 W        | 4867.42                  | 0.87              |
| 11469.00               | 89.85                | 303.72             | 6,769.45               | 2,828.82 N       | 4,077.09 W        | 4962.34                  | 4.35              |
| 11564.00               | 92.20                | 305.45             | 6,767.76               | 2,882.73 N       | 4,155.28 W        | 5057.31                  | 3.07              |
| 11659.00               | 92.87                | 304.17             | 6,763.56               | 2,936.91 N       | 4,233.20 W        | 5152.22                  | 1.52              |
| 11768.00               | 94.50                | 305.08             | 6,756.56               | 2,998.71 N       | 4,322.70 W        | 5260.99                  | 1.71              |
| 11863.00               | 92.87                | 304.77             | 6,750.46               | 3,052.98 N       | 4,400.43 W        | 5355.79                  | 1.75              |
| 11957.00               | 93.12                | 304.83             | 6,745.56               | 3,106.55 N       | 4,477.52 W        | 5449.66                  | 0.27              |
| 12052.00               | 91.24                | 303.53             | 6,741.95               | 3,159.88 N       | 4,556.05 W        | 5544.58                  | 2.40              |
| 12147.00               | 89.23                | 304.35             | 6,741.57               | 3,212.92 N       | 4,634.86 W        | 5639.57                  | 2.28              |
| 12241.00               | 89.94                | 304.63             | 6,742.25               | 3,266.15 N       | 4,712.33 W        | 5733.56                  | 0.81              |
| 12336.00               | 90.00                | 306.06             | 6,742.30               | 3,321.10 N       | 4,789.82 W        | 5828.56                  | 1.50              |
| 12431.00               | 90.03                | 305.60             | 6,742.27               | 3,376.71 N       | 4,866.84 W        | 5923.54                  | 0.48              |
| 12525.00               | 90.93                | 306.62             | 6,741.49               | 3,432.11 N       | 4,942.78 W        | 6017.50                  | 1.44              |
| 12620.00               | 90.62                | 306.57             | 6,740.21               | 3,488.74 N       | 5,019.04 W        | 6112.44                  | 0.33              |
| 12714.00               | 90.89                | 307.96             | 6,738.97               | 3,545.65 N       | 5,093.85 W        | 6206.33                  | 1.50              |
| 12809.00               | 91.66                | 308.19             | 6,736.85               | 3,604.22 N       | 5,168.61 W        | 6301.14                  | 0.85              |
| 12904.00               | 92.34                | 308.30             | 6,733.53               | 3,662.99 N       | 5,243.17 W        | 6395.90                  | 0.72              |



## DIRECTIONAL SURVEY DATA

| Measured Depth<br>(ft) | Inclination<br>(deg) | Direction<br>(deg) | Vertical Depth<br>(ft) | Latitude<br>(ft) | Departure<br>(ft) | Vertical Section<br>(ft) | Dogleg<br>(in/100') |
|------------------------|----------------------|--------------------|------------------------|------------------|-------------------|--------------------------|---------------------|
| 12998.00               | 90.59                | 305.79             | 6,731.13               | 3,719.60 N       | 5,318.16 W        | 6489.78                  | 3.26                |
| 13092.00               | 92.34                | 306.02             | 6,728.73               | 3,774.71 N       | 5,394.27 W        | 6583.72                  | 1.88                |
| 13187.00               | 92.25                | 306.07             | 6,724.93               | 3,830.56 N       | 5,471.02 W        | 6678.62                  | 0.11                |
| 13281.00               | 89.91                | 305.19             | 6,723.15               | 3,885.31 N       | 5,547.40 W        | 6772.58                  | 2.66                |
| 13376.00               | 92.49                | 306.43             | 6,721.16               | 3,940.88 N       | 5,624.42 W        | 6867.53                  | 3.02                |
| 13471.00               | 90.37                | 304.86             | 6,718.79               | 3,996.21 N       | 5,701.59 W        | 6962.48                  | 2.78                |
| 13565.00               | 90.43                | 305.10             | 6,718.13               | 4,050.10 N       | 5,778.61 W        | 7056.48                  | 0.27                |
| 13659.00               | 91.61                | 305.50             | 6,716.46               | 4,104.41 N       | 5,855.31 W        | 7150.45                  | 1.32                |
| 13672.00               | 92.09                | 306.73             | 6,716.04               | 4,112.07 N       | 5,865.81 W        | 7163.44                  | 10.13               |
| 13722.00               | 92.09                | 306.73             | 6,714.22               | 4,141.95 N       | 5,905.86 W        | 7213.38                  | 0.01                |

## SURVEY FOOTER

SURVEYS ARE CALCULATED USING THE SHORT COLLAR METHOD.  
WELL ASSUMED VERTICAL AT THE WELLHEAD.  
SURVEYS FROM 100'MD TO 5871'MD PROVIDED BY VAUGHN ENERGY SERVICES.  
SURVEYS FROM 5936'MD TO 13672'MD PROVIDED BY SPERRY DRILLING.  
SURVEY AT 13672' MD PROJECTED TO TD AT 13722' MD.  
SPERRY DRILLING ENGINEERS: IKE IWEBUE, JONATHAN PINKSTON, PAUL WASHER

## DIRECTIONAL SURVEY DATA NOTES

- Calculation based on minimum curvature method.
- Survey coordinates relative to well system reference point.
- TVD values given relative to drilling measurement point.
- Vertical section relative to well head.
- Vertical section is computed along a direction of 304.68 degrees (Grid)
- A total correction of 7.32 deg from Magnetic north to Grid north has been applied
- Horizontal displacement is relative to the well head.
- Horizontal displacement (closure) at 13,722.00 feet is 7,213.52 feet along 305.04 degrees (Grid)

## WARRANTY

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