

PCGK: Pressure Case Gamma

PCDC: Pressure Case Directional



| | | |
|--|--|--|
| <div> <div>Country : USA</div> <div>Field : Wattenberg</div> <div>Location : Lat: 40°24' 55.04" North Long: 104°31' 27.26" West</div> <div>Well : Trebor B11-66-1HN</div> <div>Company : Noble Energy</div> <div>Rig : H & P 315</div> <div> <div>LOCATION</div> <div> <div>Latitude : 40°24' 55.04" North Longitude : 104°31' 27.26" West</div> <div>UTM Easting = 3,271,692.804 ft UTM Northing = 1,395,624.937 ft</div> </div> <div>Other Services Directional Drilling</div> </div> </div> | <div> <div>Permanent Datum : Ground Level</div> <div>Elevation : 4601.00 ft</div> </div> | <div> <div>Elev. KB N/A</div> <div>DF 4627.00 ft</div> <div>GL 4601.00 ft</div> <div>WD N/A</div> </div> |
| | <div> <div>Log Measured From : Drill Floor</div> <div>26.00 ft Above Permanent Datum</div> </div> | <div> <div>TVD LOG</div> </div> |
| | <div> <div>Drilling Measured From : Drill Floor</div> </div> | |
| | <div> <div>Depth Logged : 664.98 ft To 6,578.23 ft</div> </div> | <div> <div>Unit No. : 11610113</div> <div>Job No. :CA-XX-0900484412</div> </div> |
| | <div> <div>Date Logged : 28-Jun-13 To 29-Jun-13</div> </div> | <div> <div>Plot Type : Final</div> </div> |
| | <div> <div>Total Depth MD : 7,015.00 ft TVD : 6,578.23 ft</div> </div> | <div> <div>Plot Date : 01-Jul-13</div> </div> |
| | <div> <div>Spud Date : 26-Jun-13</div> </div> | |
| | <div> <div>Run No.</div> <div> <div>Size</div> <div>From</div> <div>To</div> </div> </div> | <div> <div>Run No.</div> <div> <div>Size</div> <div>From</div> <div>To</div> </div> </div> |
| | <div> <div>2</div> <div>8,750 in</div> <div>664.98 ft</div> <div>5,896.53 ft</div> </div> | <div> <div>2</div> <div>8,750 in</div> <div>664.98 ft</div> <div>5,896.53 ft</div> </div> |
| | <div> <div>3</div> <div>8,750 in</div> <div>5,896.53 ft</div> <div>6,578.23 ft</div> </div> | <div> <div>3</div> <div>8,750 in</div> <div>5,896.53 ft</div> <div>6,578.23 ft</div> </div> |
| | <div> <div>Casing Record (TVD)</div> <div> <div>Size</div> <div>Weight</div> <div>From</div> <div>To</div> </div> </div> | <div> <div>Casing Record (TVD)</div> <div> <div>Size</div> <div>Weight</div> <div>From</div> <div>To</div> </div> </div> |
| | <div> <div>7,000 in</div> <div>26.00 lbpf</div> <div>SURFACE</div> <div>6,577.91 ft</div> </div> | <div> <div>7,000 in</div> <div>26.00 lbpf</div> <div>SURFACE</div> <div>6,577.91 ft</div> </div> |

WELL INFORMATION

| | | | | |
|----------------------------------|------------------|------------------|--|--|
| MWD Run Number | 100 | 200 | | |
| Date run completed | 28-Jun-13 | 29-Jun-13 | | |
| Rig Bit Number | 2 | 3 | | |
| Bit Size (in) | 8.750 | 8.750 | | |
| Tool Nominal OD (in) | 6.750 | 6.750 | | |
| Log Start Depth (TVD, ft) | 664.98 | 5,896.53 | | |
| Log End Depth (TVD, ft) | 5,896.53 | 6,578.23 | | |
| Drill or Wipe | Drill | Drill | | |
| Drill/Wipe Start Date and Time | 27-Jun-13 17:30 | 28-Jun-13 20:45 | | |
| Drill/Wipe End Date and Time | 29-Jun-13 11:45 | 29-Jun-13 11:50 | | |
| Min Inc (deg) @ Depth (TVD, ft) | .32 @ 717.97 | .31 @ 5,894.53 | | |
| Max Inc (deg) @ Depth (TVD, ft) | 17.19 @ 3,601.52 | 84.28 @ 6,574.61 | | |
| Bit TFA(in2) / Bit Type | .75 / PDC | .75 / PDC | | |
| Flow Rate (gpm) | 593.79 | 578.21 | | |
| Max AV (fpm) / CV (fpm) @ MWD | N/A / N/A | N/A / N/A | | |
| Fluid Type | Fresh Water Gel | Fresh Water Gel | | |
| Density (ppg) / Viscosity (spqt) | 8.90 / 30.00 | 10.40 / 35.00 | | |
| Filtrate CL (ppm) | 1,100.00 | 1,100.00 | | |
| pH / Fluid Loss (mptm) | 9.40 / 0 | 9.10 / 8 | | |
| PV (cP) / YP (Ihf2) | 4 / 5.00 | 11 / 9.00 | | |
| % Solids / % Sand | 3.4 / 0.30 | 10.70 / 0.25 | | |
| % Oil / Oil:Water Ratio | N/A / N/A | N/A / N/A | | |
| Rm @ Measured Temp (degF) | N/A @ N/A | N/A @ N/A | | |
| Rmf @ Measured Temp (degF) | N/A @ N/A | N/A @ N/A | | |
| Rmc @ Measured Temp (degF) | N/A @ N/A | N/A @ N/A | | |

| | | | | | |
|-------------------------------|------------------|------------------|--|--|--|
| Max Tool Temp (degF) / Source | 158.60 / PCM | 177.64 / PCM | | | |
| Rm @ Max Tool Temp (degF) | N/A @ N/A | N/A @ N/A | | | |
| Lead MWD Engineer | Henry Schmeidler | Henry Schmeidler | | | |
| Customer Representative | Bryant Dear | Bryant Dear | | | |

SENSOR INFORMATION

Downhole Processor Information

| | | | | | |
|---------------------------|-----------------|-----------------|--|--|--|
| Tool Type | PCM | PCM | | | |
| Software Version | 5.84 | 5.84 | | | |
| Sub Serial Number | 11341333 | 11341333 | | | |
| Insert Serial Number | 11680798 | 11680798 | | | |
| Date and Time Initialized | 27-Jun-13 02:08 | 27-Jun-13 02:08 | | | |
| Date and Time Read | 29-Jun-13 18:20 | 29-Jun-13 17:55 | | | |
| ECMB SW Version | N/A | N/A | | | |

Directional Sensor Information

| | | | | | |
|------------------------|----------|----------|--|--|--|
| Tool Type | PCDC | PCDC | | | |
| Distance From Bit (ft) | 53.91 | 52.38 | | | |
| Software Version | 6.21 | 6.21 | | | |
| Sub Serial Number | 11341333 | 11341333 | | | |
| Sonde Serial Number | 11297515 | 11297515 | | | |
| Sensor ID Number | N/A | N/A | | | |
| Toolface Offset (deg) | 312.14 | 171.48 | | | |

Gamma Ray Sensor Information

| | | | | | |
|------------------------------|----------|----------|--|--|--|
| Tool Type | PCG | PCG | | | |
| Distance From Bit (ft) | 48.91 | 47.38 | | | |
| Recorded Sample Period (sec) | 10 | 10 | | | |
| Software Version | 8.15 | 8.15 | | | |
| Sub Serial Number | 11341333 | 11341333 | | | |
| Insert/Sonde Serial Number | 11681023 | 11681023 | | | |

REMARKS

1. All depths are calibrated to the driller's pipe tally and are measured from the Rig drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
 - ROPA: Average Rate of Penetration is real time data.
 - PGRC: Smooth Pressure Case Gamma Ray Borehole corrected is recorded data.
4. The following smoothing parameters have been applied to the data:
 - All 2" (1:600) logs - 1 ft. interval, 3 ft. coercion distance.
 - All 5" (1:240) logs - .5 ft. interval, .6 ft. coercion distance.
5. INSITE version 7.4.20

WARRANTY

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Sperry Drilling Services

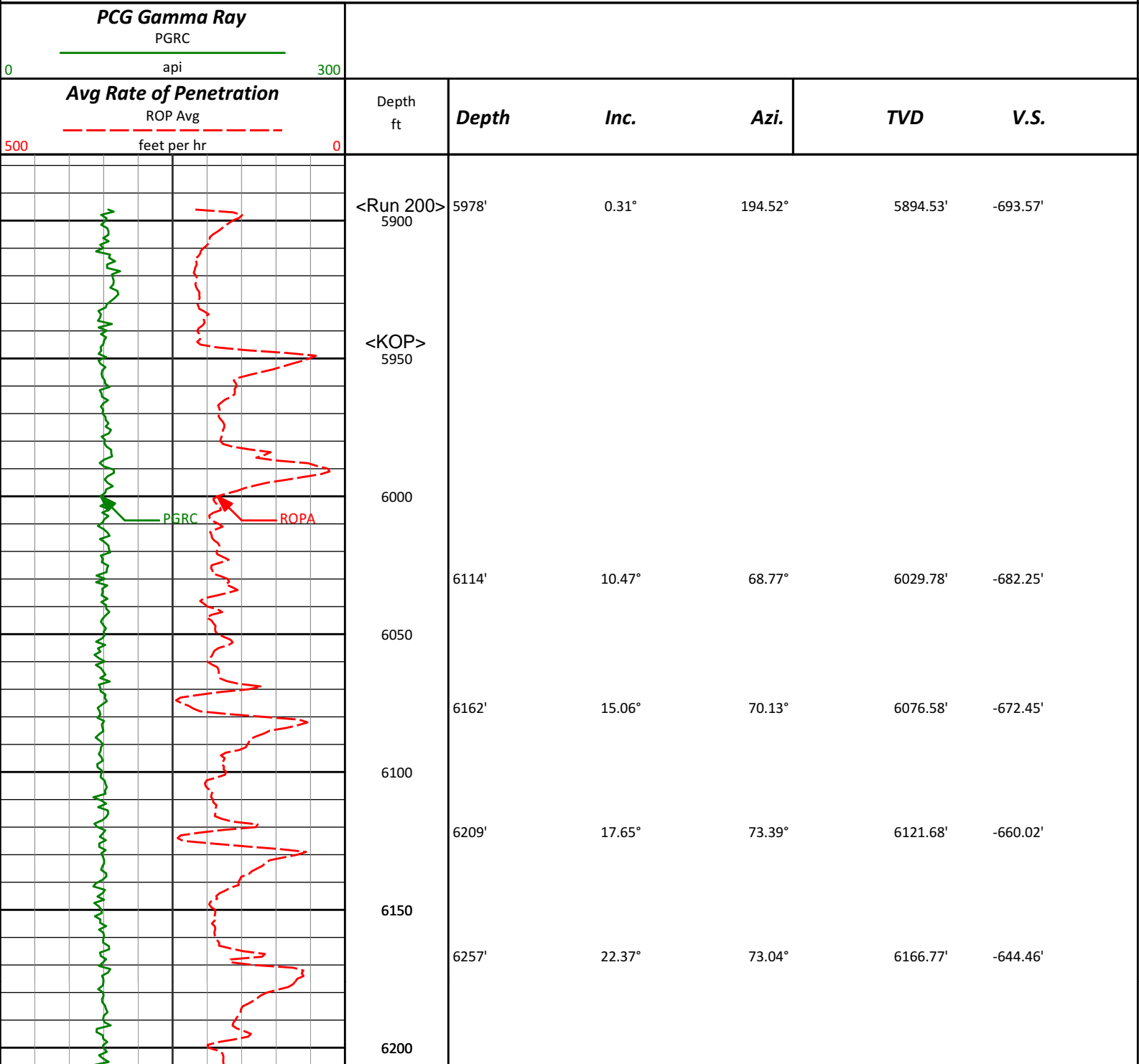
TVD Detail Log 1:600

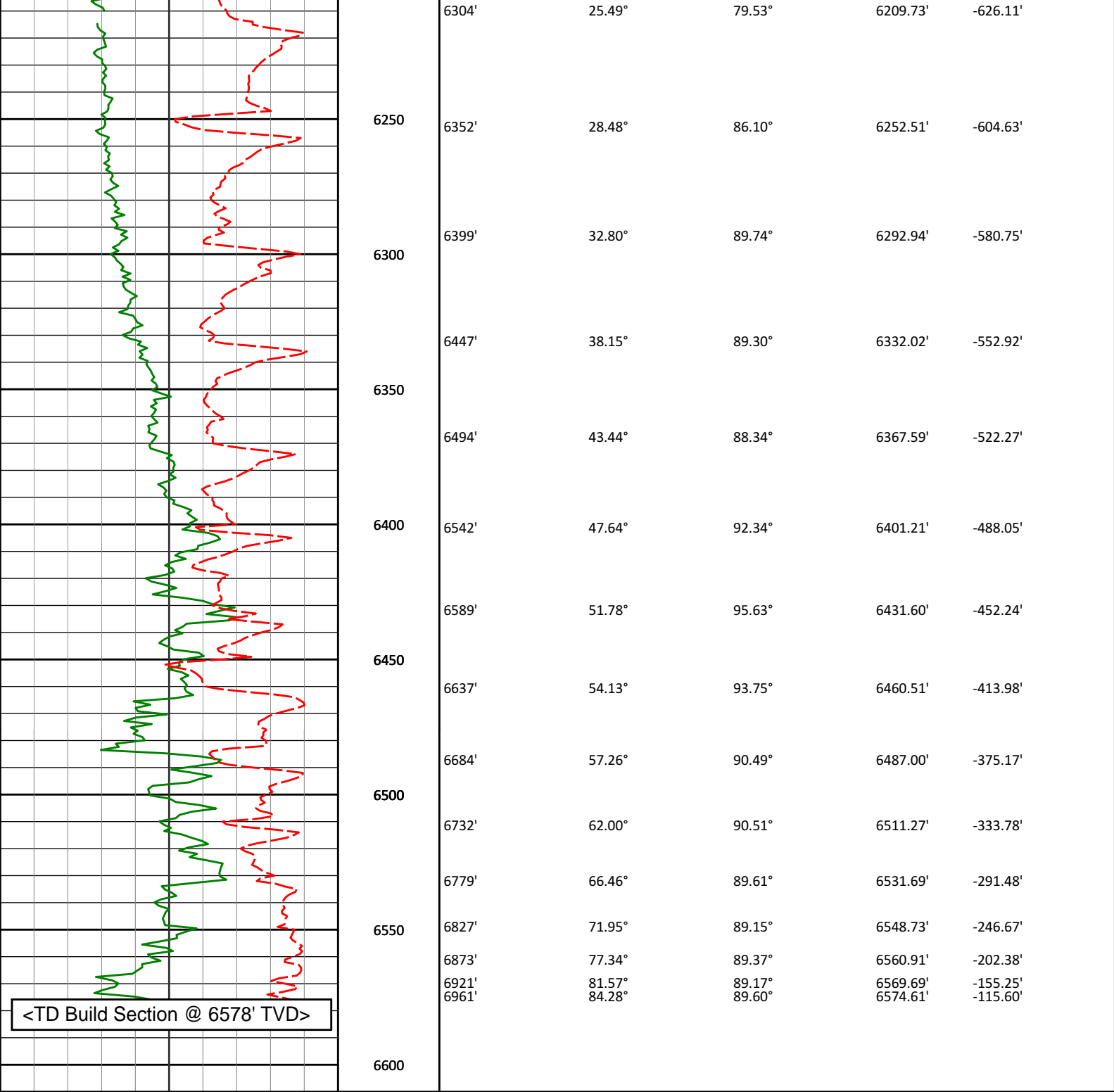
Noble Energy, Inc

Trebor B11-66-1HN

H&P 315

T5N R64W



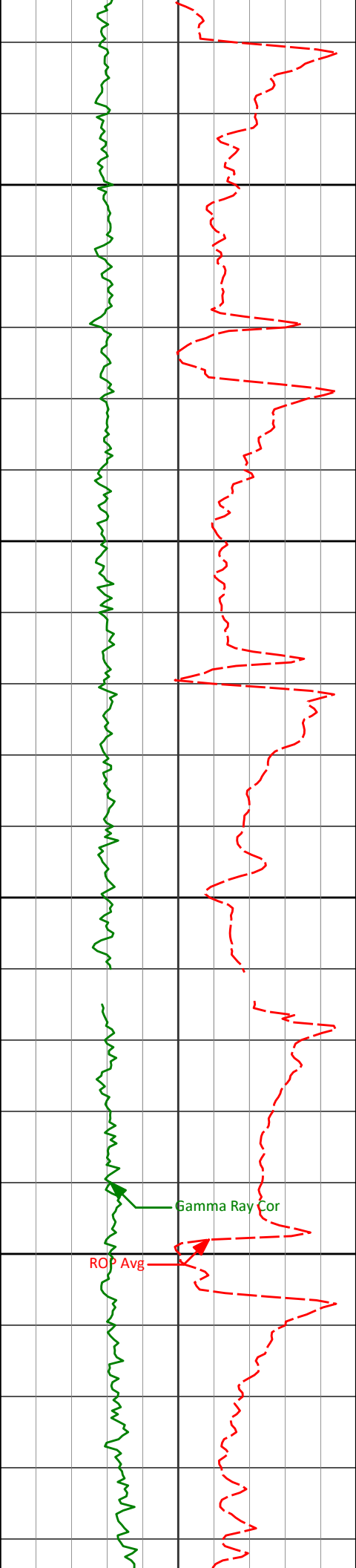


| | | | | | | |
|--|-------------|-------|------|------|-----|------|
| <div><div>Avg Rate of Penetration</div><div>ROP Avg</div><div>500</div><div>feet per hr</div><div>0</div></div> <div><div>PCG Gamma Ray</div><div>PGRC</div><div>0</div><div>api</div><div>300</div></div> | Depth ft | Depth | Inc. | Azi. | TVD | V.S. |
|--|-------------|-------|------|------|-----|------|

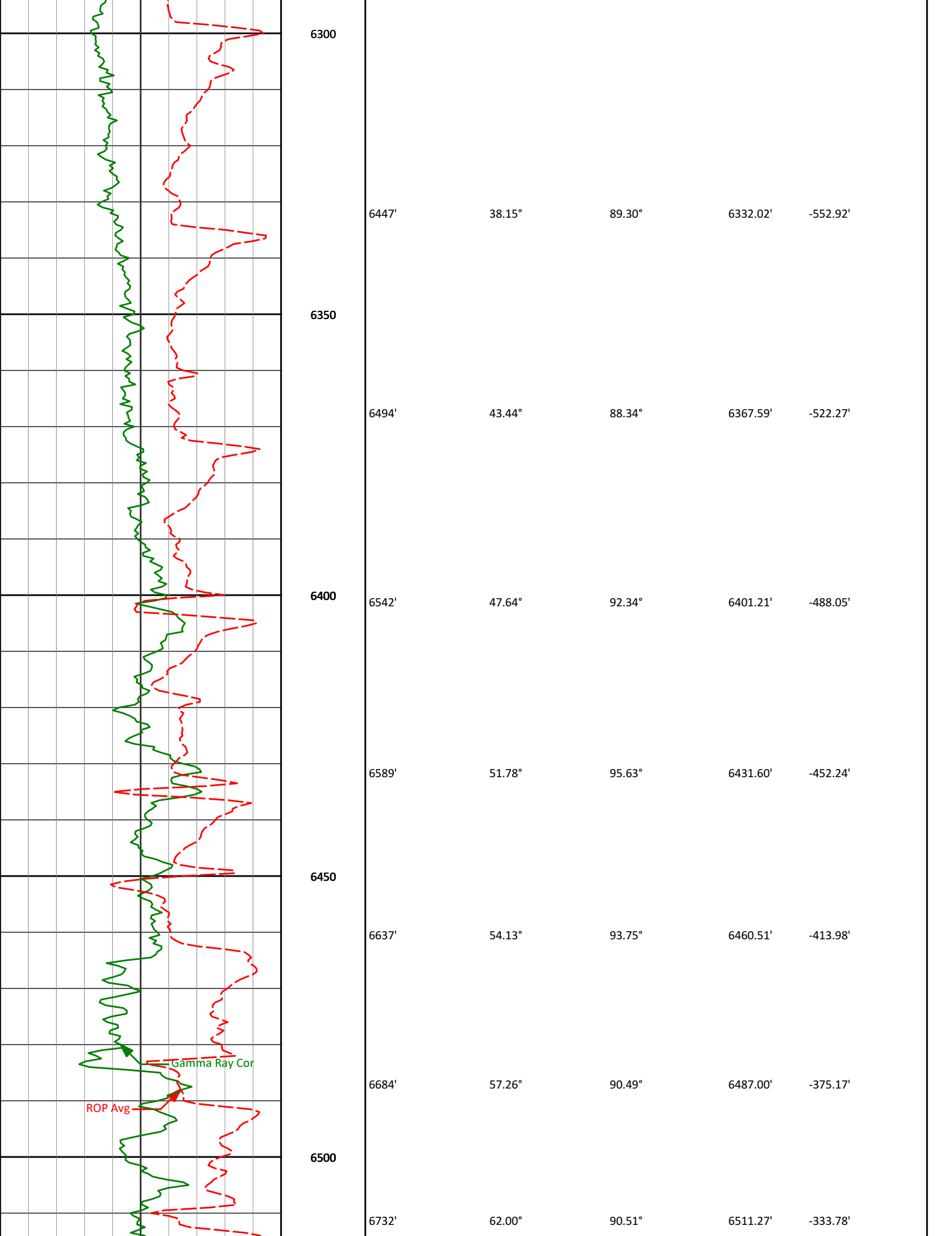
HALLIBURTON

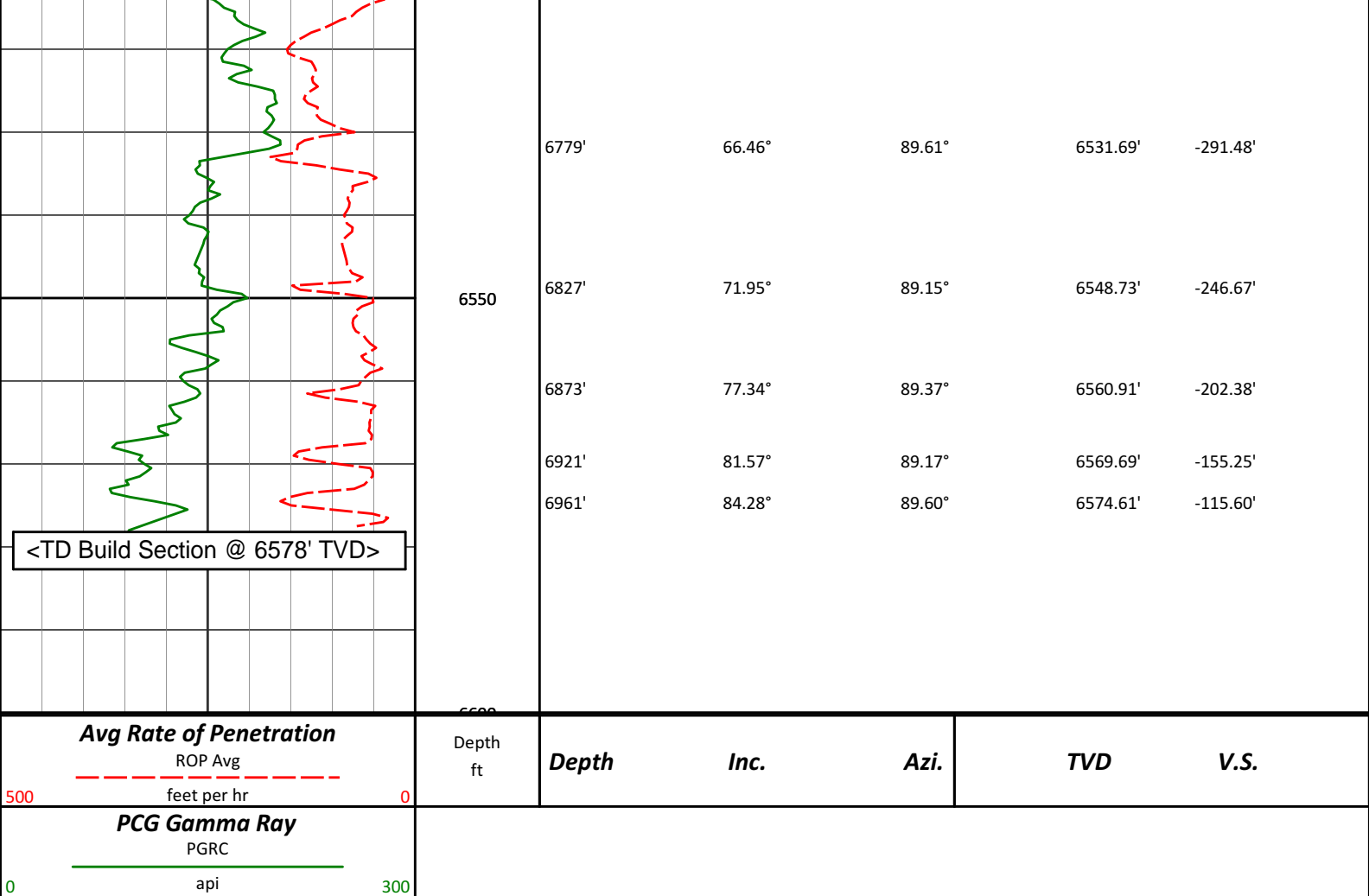
Sperry Drilling Services

TVD Detail Log 1:240



| | | | | |
|-------|--------|--------|----------|----------|
| 6162' | 15.06° | 70.13° | 6076.58' | -672.45' |
| 6100 | | | | |
| 6209' | 17.65° | 73.39° | 6121.68' | -660.02' |
| 6150 | | | | |
| 6257' | 22.37° | 73.04° | 6166.77' | -644.46' |
| 6200 | | | | |
| 6304' | 25.49° | 79.53° | 6209.73' | -626.11' |
| 6250 | | | | |
| 6352' | 28.48° | 86.10° | 6252.51' | -604.63' |
| 6399' | 32.80° | 89.74° | 6292.94' | -580.75' |





HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Trebor B11-66-1HN
Wattenberg
Weld Colorado
USA
CA-XX-0900484412

Surface surveys at 305 ft and 613 ft have had azimuths corrected to grid north, but were not taken by Halliburton.

Last survey is a projection from 6961 ft MD to TD at 7015 ft MD.

| Measured Depth (feet) | Inclination (degrees) | Direction (degrees) | Vertical Depth (feet) | Latitude (feet) | Departure (feet) | Vertical Section (feet) | Dogleg (deg/100ft) |
|-----------------------|-----------------------|---------------------|-----------------------|-----------------|------------------|-------------------------|--------------------|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 N | 0.00 E | 0.00 | TIE-IN |
| 305.00 | 0.70 | 78.56 | 304.99 | 0.37 N | 1.83 E | 1.81 | 0.23 |
| 613.00 | 0.60 | 3.56 | 612.98 | 2.35 N | 3.77 E | 3.69 | 0.26 |
| 718.00 | 0.32 | 353.71 | 717.97 | 3.19 N | 3.77 E | 3.66 | 0.28 |
| 811.00 | 2.16 | 290.53 | 810.95 | 4.07 N | 2.10 E | 1.97 | 2.19 |
| 904.00 | 1.43 | 269.61 | 903.90 | 4.67 N | 0.70 W | -0.85 | 1.04 |
| 997.00 | 2.05 | 283.09 | 996.86 | 5.04 N | 3.48 W | -3.65 | 0.79 |
| 1089.00 | 1.02 | 250.98 | 1088.83 | 5.15 N | 5.86 W | -6.02 | 1.42 |
| 1183.00 | 1.52 | 254.22 | 1182.81 | 4.53 N | 7.85 W | -7.99 | 0.54 |
| 1275.00 | 0.76 | 202.03 | 1274.79 | 3.64 N | 9.25 W | -9.37 | 1.32 |
| 1368.00 | 0.62 | 192.81 | 1367.78 | 2.58 N | 9.59 W | -9.67 | 0.19 |
| 1463.00 | 0.69 | 168.16 | 1462.78 | 1.51 N | 9.59 W | -9.64 | 0.30 |
| 1558.00 | 0.77 | 208.93 | 1557.77 | 0.40 N | 9.78 W | -9.79 | 0.54 |
| 1653.00 | 0.69 | 197.70 | 1652.76 | 0.71 S | 10.26 W | -10.24 | 0.17 |
| 1748.00 | 0.54 | 236.03 | 1747.76 | 1.50 S | 10.81 W | -10.75 | 0.45 |
| 1843.00 | 2.65 | 226.56 | 1842.71 | 3.26 S | 12.78 W | -12.66 | 2.23 |

| | | | | | | | |
|---------|-------|--------|---------|----------|----------|---------|-------|
| 1938.00 | 2.79 | 262.73 | 1937.61 | 5.07 S | 16.66 W | -16.49 | 1.78 |
| 2033.00 | 6.05 | 250.04 | 2032.32 | 7.07 S | 23.67 W | -23.42 | 3.56 |
| 2128.00 | 6.69 | 265.06 | 2126.74 | 9.25 S | 33.88 W | -33.56 | 1.87 |
| 2223.00 | 8.01 | 259.06 | 2220.96 | 10.99 S | 45.90 W | -45.51 | 1.61 |
| 2318.00 | 9.23 | 265.41 | 2314.89 | 12.85 S | 59.99 W | -59.53 | 1.63 |
| 2412.00 | 11.06 | 263.67 | 2407.41 | 14.45 S | 76.47 W | -75.95 | 1.97 |
| 2507.00 | 11.70 | 260.69 | 2500.55 | 17.01 S | 95.03 W | -94.41 | 0.91 |
| 2602.00 | 13.91 | 255.30 | 2593.18 | 21.47 S | 115.58 W | -114.81 | 2.64 |
| 2697.00 | 15.64 | 256.33 | 2685.04 | 27.39 S | 139.07 W | -138.09 | 1.84 |
| 2792.00 | 15.49 | 255.88 | 2776.55 | 33.52 S | 163.82 W | -162.62 | 0.20 |
| 2887.00 | 14.77 | 254.60 | 2868.26 | 39.83 S | 187.80 W | -186.37 | 0.84 |
| 2982.00 | 15.46 | 252.95 | 2959.97 | 46.75 S | 211.58 W | -209.91 | 0.86 |
| 3077.00 | 13.15 | 251.92 | 3052.02 | 53.82 S | 233.96 W | -232.05 | 2.45 |
| 3172.00 | 14.10 | 254.15 | 3144.35 | 60.34 S | 255.36 W | -253.22 | 1.14 |
| 3267.00 | 14.56 | 254.86 | 3236.39 | 66.62 S | 278.02 W | -275.66 | 0.52 |
| 3362.00 | 15.04 | 257.19 | 3328.24 | 72.47 S | 301.57 W | -299.00 | 0.80 |
| 3457.00 | 14.95 | 258.63 | 3420.00 | 77.62 S | 325.60 W | -322.85 | 0.40 |
| 3551.00 | 16.25 | 258.73 | 3510.54 | 82.58 S | 350.39 W | -347.46 | 1.38 |
| 3646.00 | 17.19 | 257.67 | 3601.52 | 88.17 S | 377.14 W | -374.01 | 1.04 |
| 3741.00 | 16.50 | 256.01 | 3692.45 | 94.43 S | 403.94 W | -400.59 | 0.89 |
| 3836.00 | 14.77 | 250.50 | 3783.93 | 101.74 S | 428.45 W | -424.84 | 2.40 |
| 3931.00 | 13.36 | 250.84 | 3876.08 | 109.38 S | 450.24 W | -446.36 | 1.49 |
| 4026.00 | 14.41 | 251.68 | 3968.31 | 116.70 S | 471.83 W | -467.70 | 1.13 |
| 4121.00 | 14.39 | 254.06 | 4060.32 | 123.66 S | 494.40 W | -490.03 | 0.62 |
| 4216.00 | 15.20 | 257.38 | 4152.17 | 129.62 S | 517.90 W | -513.32 | 1.23 |
| 4311.00 | 13.13 | 255.98 | 4244.28 | 134.96 S | 540.53 W | -535.76 | 2.21 |
| 4406.00 | 13.91 | 261.21 | 4336.65 | 139.32 S | 562.28 W | -557.36 | 1.53 |
| 4500.00 | 13.91 | 262.68 | 4427.89 | 142.48 S | 584.66 W | -579.61 | 0.38 |
| 4595.00 | 11.37 | 268.35 | 4520.59 | 144.21 S | 605.35 W | -600.23 | 2.97 |
| 4690.00 | 12.37 | 254.20 | 4613.57 | 147.25 S | 624.50 W | -619.28 | 3.23 |
| 4785.00 | 12.37 | 246.57 | 4706.38 | 154.06 S | 643.63 W | -638.17 | 1.72 |
| 4880.00 | 10.54 | 244.30 | 4799.48 | 161.88 S | 660.80 W | -655.07 | 1.98 |
| 4975.00 | 8.77 | 238.68 | 4893.13 | 169.41 S | 674.82 W | -668.83 | 2.11 |
| 5070.00 | 6.68 | 228.27 | 4987.27 | 176.86 S | 685.13 W | -678.89 | 2.64 |
| 5165.00 | 4.60 | 213.93 | 5081.81 | 183.70 S | 691.38 W | -684.91 | 2.63 |
| 5260.00 | 1.80 | 208.91 | 5176.65 | 188.16 S | 694.23 W | -687.61 | 2.96 |
| 5354.00 | 1.52 | 197.35 | 5270.61 | 190.65 S | 695.31 W | -688.61 | 0.46 |
| 5450.00 | 1.34 | 222.60 | 5366.58 | 192.69 S | 696.45 W | -689.68 | 0.68 |
| 5734.00 | 0.62 | 212.27 | 5650.54 | 196.43 S | 699.52 W | -692.62 | 0.26 |
| 5924.00 | 0.67 | 197.90 | 5840.53 | 198.36 S | 700.41 W | -693.45 | 0.09 |
| 5978.00 | 0.31 | 194.52 | 5894.53 | 198.80 S | 700.55 W | -693.57 | 0.67 |
| 6114.00 | 10.47 | 68.77 | 6029.78 | 194.67 S | 689.09 W | -682.25 | 7.83 |
| 6162.00 | 15.06 | 70.13 | 6076.58 | 190.97 S | 679.15 W | -672.45 | 9.58 |
| 6209.00 | 17.65 | 73.39 | 6121.68 | 186.86 S | 666.58 W | -660.02 | 5.84 |
| 6257.00 | 22.37 | 73.04 | 6166.77 | 182.11 S | 650.86 W | -644.46 | 9.84 |
| 6304.00 | 25.49 | 79.53 | 6209.73 | 177.66 S | 632.35 W | -626.11 | 8.68 |
| 6352.00 | 28.48 | 86.10 | 6252.51 | 175.00 S | 610.77 W | -604.63 | 8.79 |
| 6399.00 | 32.80 | 89.74 | 6292.94 | 174.18 S | 586.84 W | -580.75 | 10.00 |
| 6447.00 | 38.15 | 89.30 | 6332.02 | 173.94 S | 559.00 W | -552.92 | 11.16 |
| 6494.00 | 43.44 | 88.34 | 6367.59 | 173.30 S | 528.31 W | -522.27 | 11.33 |
| 6542.00 | 47.64 | 92.34 | 6401.21 | 173.54 S | 494.07 W | -488.05 | 10.58 |
| 6589.00 | 51.78 | 95.63 | 6431.60 | 176.06 S | 458.33 W | -452.24 | 10.30 |
| 6637.00 | 54.13 | 93.75 | 6460.51 | 179.19 S | 420.15 W | -413.98 | 5.81 |
| 6684.00 | 57.26 | 90.49 | 6487.00 | 180.60 S | 381.36 W | -375.17 | 8.78 |
| 6732.00 | 62.00 | 90.51 | 6511.27 | 180.96 S | 339.96 W | -333.78 | 9.88 |
| 6779.00 | 66.46 | 89.61 | 6531.69 | 181.00 S | 297.65 W | -291.48 | 9.64 |
| 6827.00 | 71.95 | 89.15 | 6548.73 | 180.51 S | 252.80 W | -246.67 | 11.47 |
| 6873.00 | 77.34 | 89.37 | 6560.91 | 179.94 S | 208.46 W | -202.38 | 11.73 |
| 6921.00 | 81.57 | 89.17 | 6569.69 | 179.34 S | 161.28 W | -155.25 | 8.82 |
| 6961.00 | 84.28 | 89.60 | 6574.61 | 178.91 S | 121.59 W | -115.60 | 6.86 |
| 7015.00 | 88.05 | 90.00 | 6578.23 | 178.73 S | 67.73 W | -61.76 | 7.02 |

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 91.90 DEGREES (GRID)

A TOTAL CORRECTION OF 7.86 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 7015.00 FEET
IS 191.13 FEET ALONG 200.75 DEGREES (GRID)

Date Printed:30 June 2013