

PCGC: Pressure Case Gamma



1 : 600 / 1 : 240

[illegible]

WELL INFORMATION

| | | | | | |
|----------------------------------|-----------------|------------------|--|--|--|
| MWD Run Number | 200 | 300 | | | |
| Date run completed | 08-Jun-14 | 09-Jun-14 | | | |
| 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) | 639.96 | 5,514.79 | | | |
| Log End Depth (TVD, ft) | 5,514.79 | 6,200.95 | | | |
| Drill or Wipe | Drill | Drill | | | |
| Drill/Wipe Start Date and Time | 07-Jun-14 15:40 | 08-Jun-14 12:55 | | | |
| Drill/Wipe End Date and Time | 08-Jun-14 04:15 | 09-Jun-14 05:25 | | | |
| Min Inc (deg) @ Depth (TVD, ft) | 0.09 @ 5,054.41 | 7.13 @ 5,523.72 | | | |
| Max Inc (deg) @ Depth (TVD, ft) | 6.93 @ 5,432.41 | 85.83 @ 6,198.51 | | | |
| Bit TFA(in2) / Bit Type | 0.74 / PDC | 0.91 / PDC | | | |
| Flow Rate (gpm) | 581.73 | 550.00 | | | |
| Max AV (fpm) / CV (fpm) @ MWD | N/A / N/A | N/A / N/A | | | |
| Fluid Type | Polymer | Polymer | | | |
| Density (ppg) / Viscosity (spqt) | 9.50 / 27.00 | 10.40 / 37.00 | | | |
| Filtrate CL (ppm) | 200.00 | 200.00 | | | |
| pH / Fluid Loss (mptm) | 8.50 / 0 | 8.10 / 9 | | | |
| PV (cP) / YP (lbf2) | 1 / 1.00 | 15 / 11.00 | | | |
| % Solids / % Sand | 2 / .1 | 11.40 / 0.15 | | | |
| % 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 (in) Temp (degF) | 152.10 / 152.10 | 152.00 / 152.00 | | | |

| | | | | | |
|-------------------------------|---------------|---------------|--|--|--|
| Max Tool Temp (degF) / Source | 150.10 / PCM | 158.60 / PCM | | | |
| Rm @ Max Tool Temp (degF) | N/A @ N/A | N/A @ N/A | | | |
| Lead MWD Engineer | Paul Kock | Paul Kock | | | |
| Customer Representative | Justin Fields | Justin Fields | | | |

SENSOR INFORMATION

Downhole Processor Information

| | | | | | |
|---------------------------|-----------------|-----------------|--|--|--|
| Tool Type | PCM | PCM | | | |
| Software Version | 5.84 | 5.84 | | | |
| Sub Serial Number | 11404264 | 11404264 | | | |
| Insert Serial Number | 11620315 | 11620315 | | | |
| Date and Time Initialized | 07-Jun-14 04:53 | 07-Jun-14 04:53 | | | |
| Date and Time Read | 09-Jun-14 12:01 | 09-Jun-14 12:04 | | | |
| ECMB SW Version | N/A | N/A | | | |

Directional Sensor Information

| | | | | | |
|------------------------|----------|----------|--|--|--|
| Tool Type | PCDC | PCDC | | | |
| Distance From Bit (ft) | 52.99 | 52.05 | | | |
| Software Version | 6.21 | 6.21 | | | |
| Sub Serial Number | 11404264 | 11404264 | | | |
| Sonde Serial Number | 11638628 | 11638628 | | | |
| Sensor ID Number | N/A | N/A | | | |
| Toolface Offset (deg) | 299.13 | 60.53 | | | |

Gamma Ray Sensor Information

| | | | | | |
|------------------------------|----------|----------|--|--|--|
| Tool Type | PCG | PCG | | | |
| Distance From Bit (ft) | 47.89 | 46.95 | | | |
| Recorded Sample Period (sec) | 10 | 10 | | | |
| Software Version | 8.15 | 8.15 | | | |
| Sub Serial Number | 11404264 | 11404264 | | | |
| Insert/Sonde Serial Number | 11579806 | 11579806 | | | |

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:
 - 2" (1:600) log - 1 ft. interval, 3 ft. coercion distance, 5 ft. gap fill.
 - 5" (1:240) log for ROP - 0.5 ft. interval, 1.2 ft. coercion distance, 3 ft. gap fill.
 - 5" (1:240) log for Gamma Ray - 0.5 ft. interval, 0.6 ft. coercion distance, 3 ft. gap fill.
5. INSITE version 8.0.20

WARRANTY

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Sperry Drilling Services

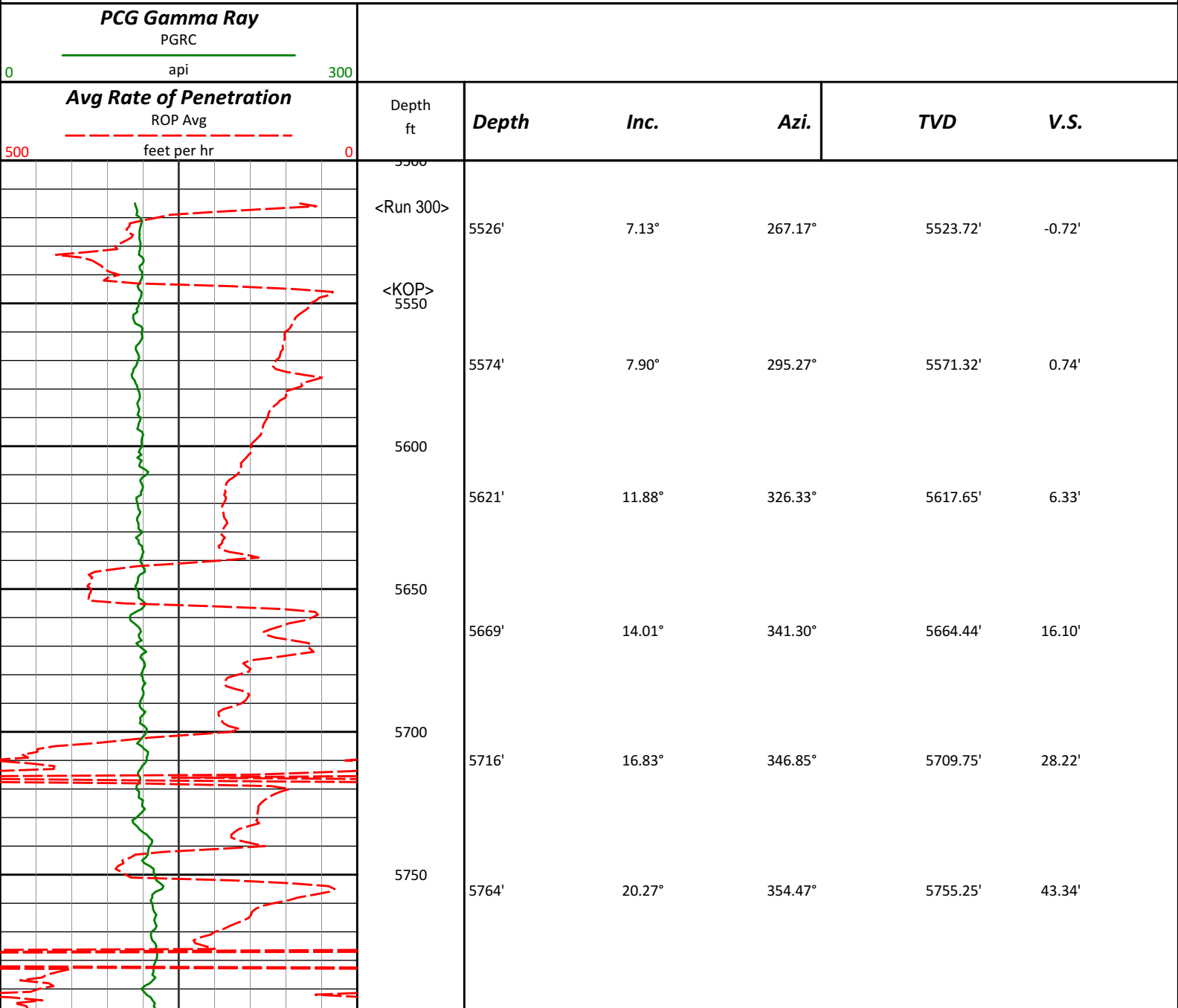
TVD Main Log 1:600

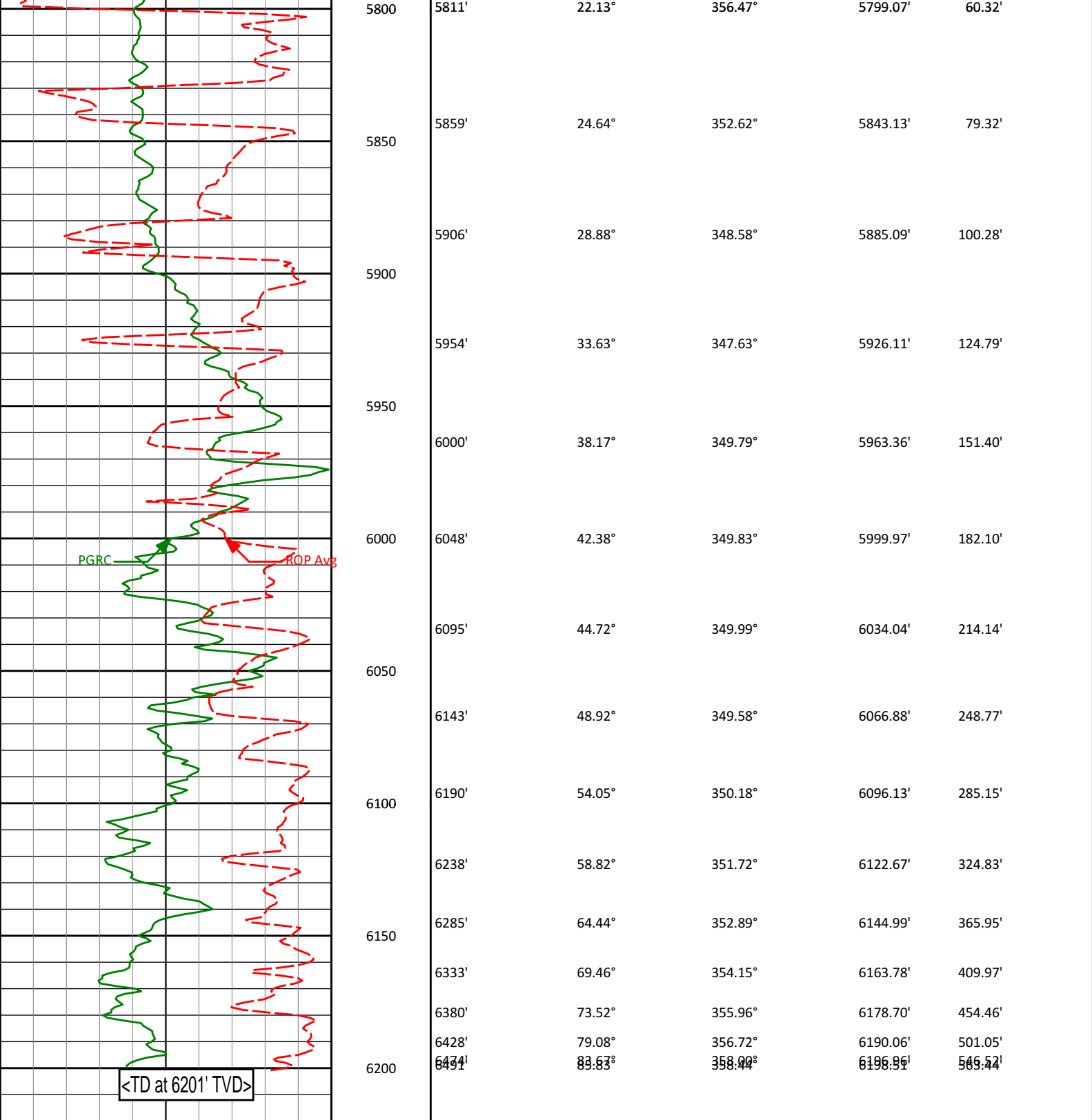
Noble Energy

Tina LC29-75-1HNA

H&P 273

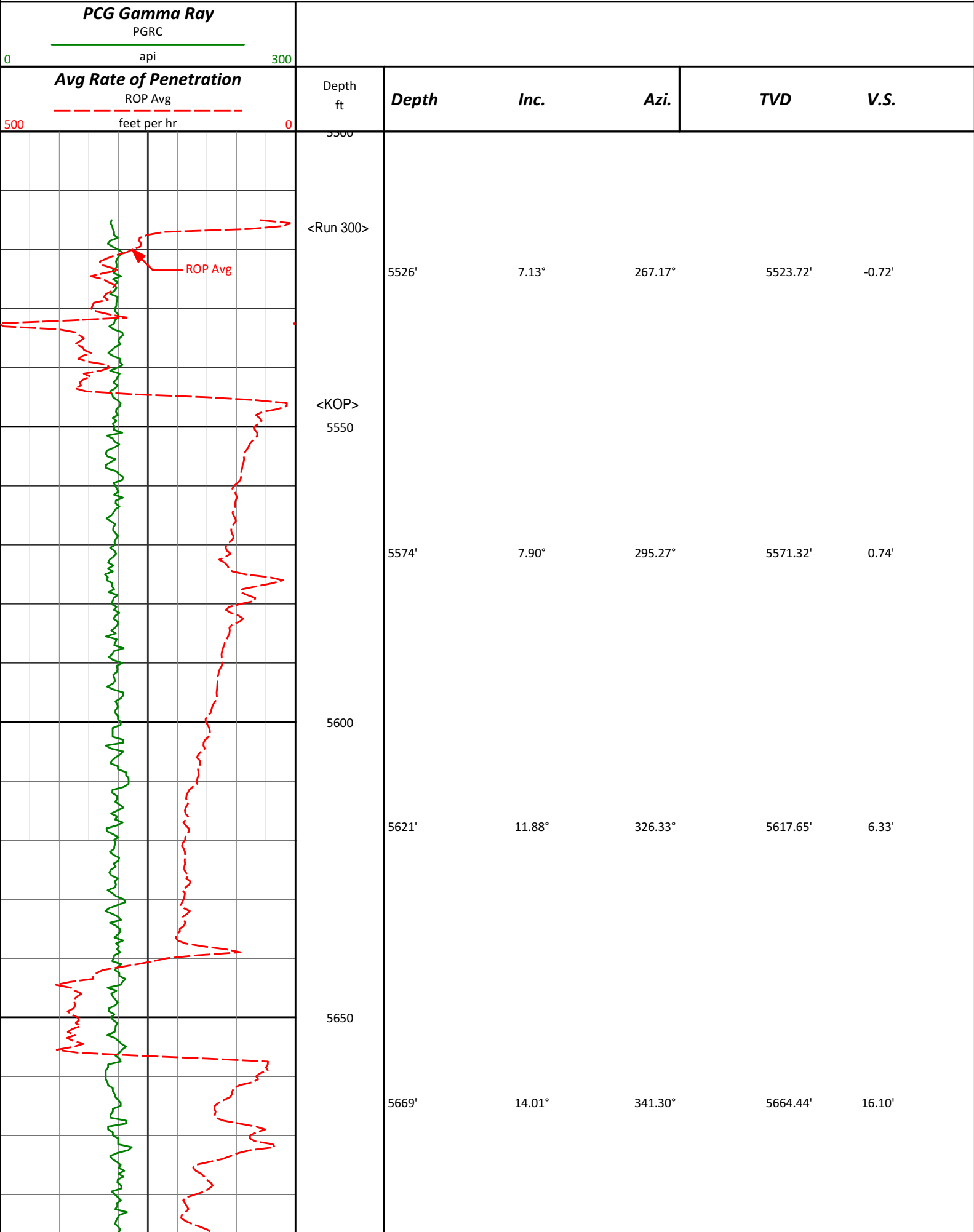
T9N, R59W

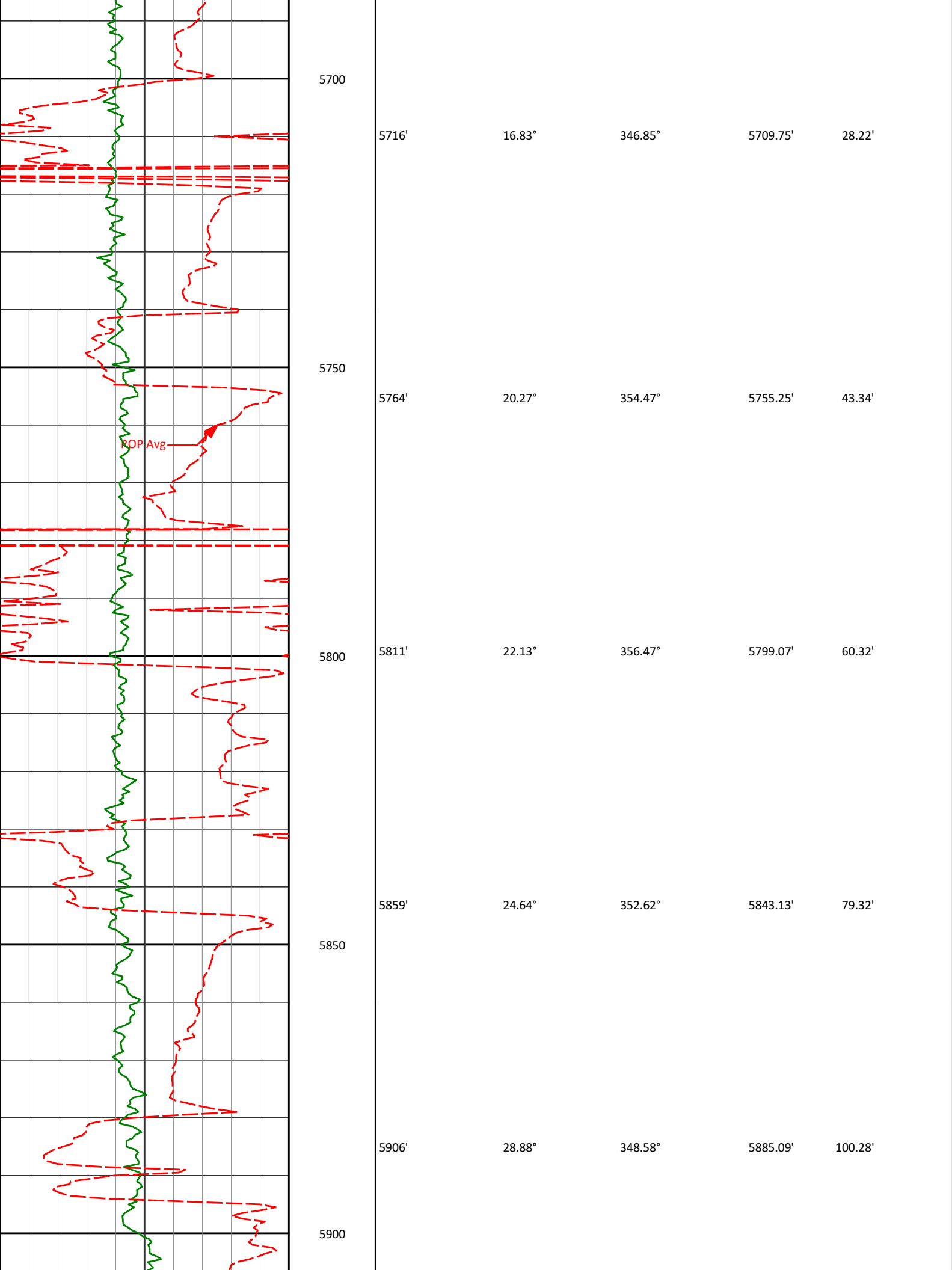


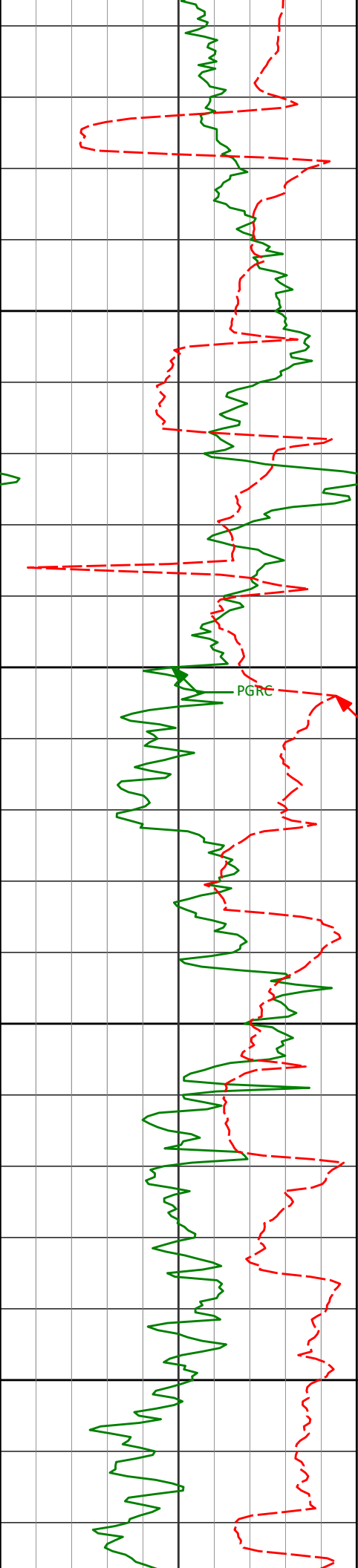


| Avg Rate of Penetration ROP Avg feet per hr | | Depth ft | Depth | Inc. | Azi. | TVD | V.S. |
|---|-----|-------------|-------|------|------|-----|------|
| 500 | 0 | | | | | | |
| PCG Gamma Ray PGRC api | | | | | | | |
| 0 | 300 | | | | | | |

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Sperry Drilling Services
TVD Detail Log 1:240







5950

6050

6100

5954'

6000'

6048'

6095'

6143'

6190'

6238'

33.63°

38.17°

42.38°

44.72°

48.92°

54.05°

58.82°

347.63°

349.79°

349.83°

349.99°

349.58°

350.18°

351.72°

5926.11'

5963.36'

5999.97'

6034.04'

6066.88'

6096.13'

6122.67'

124.79'

151.40'

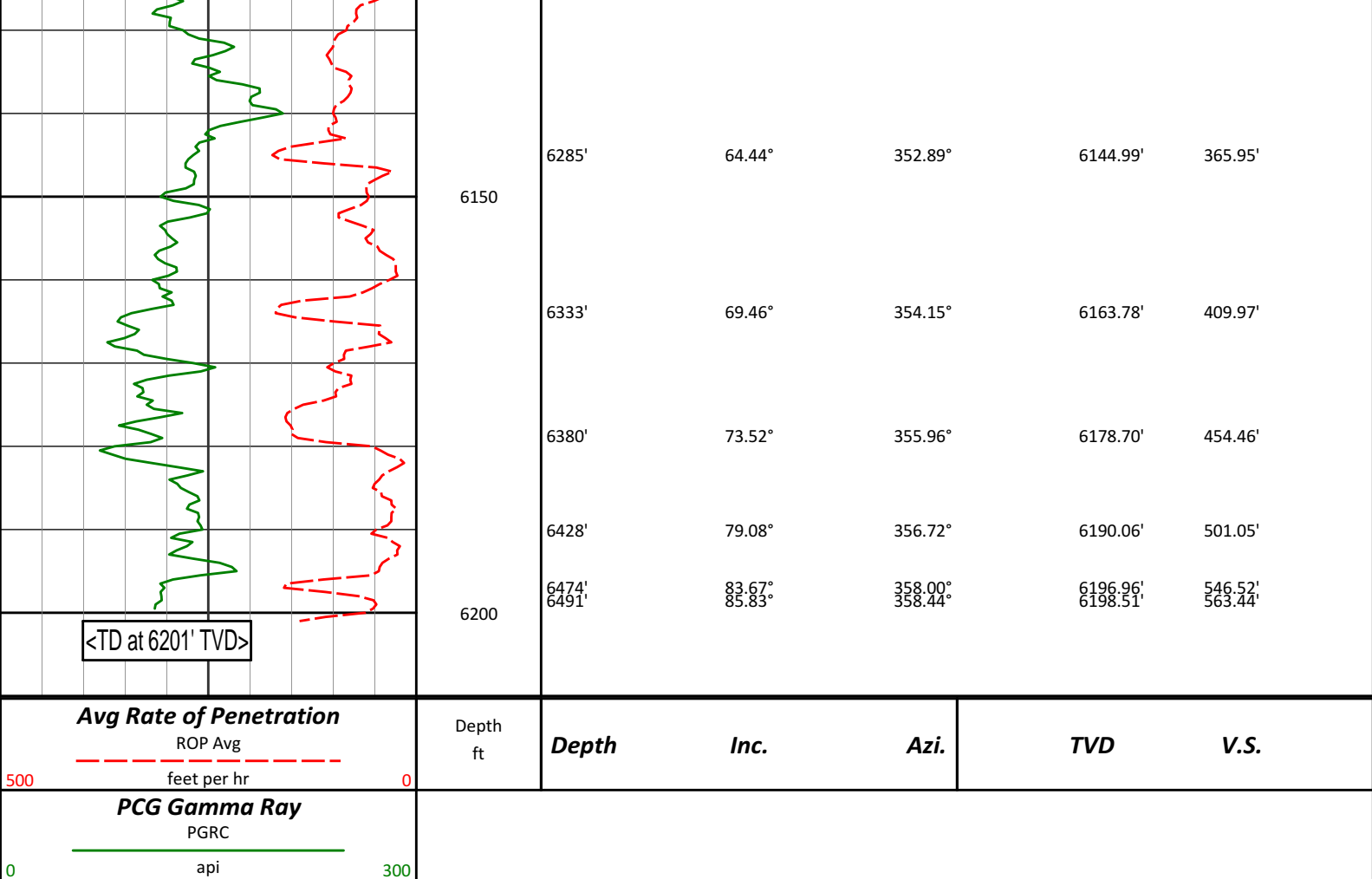
182.10'

214.14'

248.77'

285.15'

324.83'



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DIRECTIONAL SURVEY REPORT

Noble Energy
Tina LC29-75-1HNA
Wattenberg
Weld Colorado
USA

CA-XX-0901286893

Surveys are IFR1 and MSA corrected.

| 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 |
| 280.00 | 1.00 | 98.18 | 279.99 | 0.35 S | 2.42 E | -0.43 | 0.36 |
| 627.00 | 0.20 | 116.78 | 626.96 | 1.05 S | 5.96 E | -1.25 | 0.23 |
| 716.00 | 0.24 | 163.31 | 715.96 | 1.30 S | 6.15 E | -1.50 | 0.20 |
| 809.00 | 0.33 | 202.14 | 808.96 | 1.73 S | 6.10 E | -1.93 | 0.22 |
| 995.00 | 0.28 | 212.74 | 994.96 | 2.61 S | 5.66 E | -2.80 | 0.04 |
| 1180.00 | 0.22 | 216.89 | 1179.96 | 3.28 S | 5.20 E | -3.45 | 0.03 |
| 1365.00 | 0.11 | 239.58 | 1364.96 | 3.65 S | 4.83 E | -3.81 | 0.07 |
| 1551.00 | 0.10 | 201.03 | 1550.96 | 3.89 S | 4.62 E | -4.04 | 0.04 |
| 1737.00 | 0.23 | 261.55 | 1736.96 | 4.10 S | 4.19 E | -4.24 | 0.11 |
| 1831.00 | 0.18 | 286.29 | 1830.96 | 4.09 S | 3.86 E | -4.21 | 0.11 |
| 1926.00 | 0.14 | 142.76 | 1925.96 | 4.14 S | 3.79 E | -4.26 | 0.32 |
| 2020.00 | 0.34 | 164.23 | 2019.95 | 4.50 S | 3.94 E | -4.62 | 0.23 |
| 2115.00 | 0.32 | 162.16 | 2114.95 | 5.02 S | 4.09 E | -5.15 | 0.02 |
| 2210.00 | 0.42 | 175.92 | 2209.95 | 5.62 S | 4.20 E | -5.75 | 0.14 |
| 2399.00 | 0.71 | 186.77 | 2398.94 | 7.47 S | 4.11 E | -7.60 | 0.16 |
| 2494.00 | 0.76 | 175.52 | 2493.93 | 8.69 S | 4.09 E | -8.82 | 0.16 |
| 2589.00 | 0.81 | 175.96 | 2588.93 | 9.98 S | 4.19 E | -10.12 | 0.05 |
| 2684.00 | 0.78 | 173.19 | 2683.92 | 11.30 S | 4.31 E | -11.43 | 0.05 |

| | | | | | | | |
|---------|-------|--------|---------|----------|----------|--------|-------|
| 2554.00 | 0.93 | 175.15 | 2555.02 | 11.85 | 4.02 E | -11.43 | 0.35 |
| 2778.00 | 0.94 | 168.88 | 2777.91 | 12.69 S | 4.54 E | -12.83 | 0.18 |
| 2968.00 | 0.74 | 187.38 | 2967.89 | 15.43 S | 4.68 E | -15.58 | 0.18 |
| 3063.00 | 0.77 | 189.83 | 3062.88 | 16.67 S | 4.49 E | -16.81 | 0.05 |
| 3158.00 | 1.00 | 197.41 | 3157.87 | 18.09 S | 4.13 E | -18.22 | 0.27 |
| 3252.00 | 1.43 | 162.67 | 3251.85 | 19.99 S | 4.24 E | -20.12 | 0.89 |
| 3347.00 | 1.32 | 149.07 | 3346.82 | 22.06 S | 5.15 E | -22.22 | 0.36 |
| 3537.00 | 0.47 | 48.33 | 3536.80 | 23.42 S | 6.86 E | -23.64 | 0.78 |
| 3727.00 | 0.28 | 48.29 | 3726.80 | 22.60 S | 7.79 E | -22.84 | 0.10 |
| 3822.00 | 0.36 | 43.49 | 3821.79 | 22.22 S | 8.17 E | -22.48 | 0.09 |
| 3916.00 | 0.19 | 20.31 | 3915.79 | 21.86 S | 8.43 E | -22.13 | 0.21 |
| 4011.00 | 1.08 | 350.49 | 4010.79 | 20.83 S | 8.33 E | -21.10 | 0.97 |
| 4106.00 | 1.31 | 341.82 | 4105.77 | 18.92 S | 7.85 E | -19.17 | 0.31 |
| 4201.00 | 1.40 | 330.65 | 4200.74 | 16.88 S | 6.94 E | -17.10 | 0.29 |
| 4296.00 | 1.58 | 326.71 | 4295.71 | 14.77 S | 5.65 E | -14.95 | 0.22 |
| 4391.00 | 2.06 | 323.44 | 4390.66 | 12.30 S | 3.91 E | -12.43 | 0.52 |
| 4486.00 | 2.14 | 337.44 | 4485.60 | 9.29 S | 2.22 E | -9.36 | 0.55 |
| 4581.00 | 2.00 | 326.73 | 4580.54 | 6.27 S | 0.63 E | -6.29 | 0.43 |
| 4675.00 | 2.04 | 346.71 | 4674.48 | 3.27 S | 0.66 W | -3.25 | 0.75 |
| 4770.00 | 0.96 | 353.31 | 4769.44 | 0.83 S | 1.14 W | -0.80 | 1.15 |
| 4865.00 | 0.99 | 336.52 | 4864.43 | 0.71 N | 1.56 W | 0.76 | 0.30 |
| 4960.00 | 1.05 | 332.36 | 4959.42 | 2.23 N | 2.29 W | 2.31 | 0.10 |
| 5055.00 | 0.09 | 194.49 | 5054.41 | 2.93 N | 2.71 W | 3.02 | 1.18 |
| 5150.00 | 2.68 | 257.04 | 5149.38 | 2.36 N | 4.90 W | 2.52 | 2.78 |
| 5244.00 | 3.47 | 261.95 | 5243.24 | 1.47 N | 9.85 W | 1.79 | 0.89 |
| 5339.00 | 5.31 | 258.65 | 5337.96 | 0.20 N | 17.01 W | 0.76 | 1.95 |
| 5434.00 | 6.93 | 264.74 | 5432.41 | 1.19 S | 27.03 W | -0.30 | 1.83 |
| 5526.00 | 7.13 | 267.17 | 5523.72 | 1.98 S | 38.26 W | -0.72 | 0.39 |
| 5574.00 | 7.90 | 295.27 | 5571.32 | 0.72 S | 44.22 W | 0.74 | 7.74 |
| 5621.00 | 11.88 | 326.33 | 5617.65 | 4.69 N | 49.83 W | 6.33 | 13.87 |
| 5669.00 | 14.01 | 341.30 | 5664.44 | 14.31 N | 54.43 W | 16.10 | 8.24 |
| 5716.00 | 16.83 | 346.85 | 5709.75 | 26.33 N | 57.80 W | 28.22 | 6.77 |
| 5764.00 | 20.27 | 354.47 | 5755.25 | 41.38 N | 60.19 W | 43.34 | 8.75 |
| 5811.00 | 22.13 | 356.47 | 5799.07 | 58.32 N | 61.52 W | 60.32 | 4.25 |
| 5859.00 | 24.64 | 352.62 | 5843.13 | 77.27 N | 63.36 W | 79.32 | 6.12 |
| 5906.00 | 28.88 | 348.58 | 5885.09 | 98.12 N | 66.87 W | 100.28 | 9.81 |
| 5954.00 | 33.63 | 347.63 | 5926.11 | 122.48 N | 72.01 W | 124.79 | 9.95 |
| 6000.00 | 38.17 | 349.79 | 5963.36 | 148.93 N | 77.26 W | 151.40 | 10.25 |
| 6048.00 | 42.38 | 349.83 | 5999.97 | 179.46 N | 82.75 W | 182.10 | 8.77 |
| 6095.00 | 44.72 | 349.99 | 6034.04 | 211.34 N | 88.42 W | 214.14 | 4.98 |
| 6143.00 | 48.92 | 349.58 | 6066.88 | 245.78 N | 94.63 W | 248.77 | 8.77 |
| 6190.00 | 54.05 | 350.18 | 6096.13 | 281.97 N | 101.09 W | 285.15 | 10.96 |
| 6238.00 | 58.82 | 351.72 | 6122.67 | 321.46 N | 107.36 W | 324.83 | 10.29 |
| 6285.00 | 64.44 | 352.89 | 6144.99 | 362.43 N | 112.89 W | 365.95 | 12.16 |
| 6333.00 | 69.46 | 354.15 | 6163.78 | 406.30 N | 117.86 W | 409.97 | 10.73 |
| 6380.00 | 73.52 | 355.96 | 6178.70 | 450.69 N | 121.69 W | 454.46 | 9.38 |
| 6428.00 | 79.08 | 356.72 | 6190.06 | 497.21 N | 124.66 W | 501.05 | 11.68 |
| 6474.00 | 83.67 | 358.00 | 6196.96 | 542.63 N | 126.76 W | 546.52 | 10.35 |
| 6491.00 | 85.83 | 358.44 | 6198.51 | 559.55 N | 127.28 W | 563.44 | 12.96 |
| 6545.00 | 89.00 | 359.00 | 6200.95 | 613.47 N | 128.49 W | 617.38 | 5.96 |

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 358.11 DEGREES (GRID)
A TOTAL CORRECTION OF 7.20 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6545.00 FEET
IS 626.79 FEET ALONG 348.17 DEGREES (GRID)**

Surface surveys at 280 ft and 627 ft have had azimuths corrected to grid north, but were not taken by Halliburton.

Final survey is a projection from 6491' MD to TD at 6545' MD.