

PCGC : Pressure Case Gamma
PCDC: Pressure Case Directional



1 : 600 / 1 : 240

| | | | | | | | | | |
|---|--|----------|--|-------------|--------------------------------|--------------|---------------|-------------|--|
| Company : Noble Energy | | | | | | | | | |
| Rig : H&P 315 | | | | | | | | | |
| Well : Wells Ranch AE18-63-1HN | | | | | | | | | |
| Field : Wattenberg | | | | | | | | | |
| Country : USA | | | | | | | | | |
| API Number : 0512335648 | | | | | | | | | |
| LOCATION | | | | | Other Services | | | | |
| Latitude : 40°28' 58.26" North | | | | | Directional Drilling | | | | |
| Longitude : 104°22' 28.67" West | | | | | | | | | |
| UTM Easting = 3,313,035.59 ft | | | | | | | | | |
| UTM Northing = 1,420,729.06 ft | | | | | | | | | |
| Permanent Datum : Ground Level | | | | | Elevation : 4832.00 ft | | Elev. | | |
| Log Measured From : Drill Floor | | | | | 24.00 ft Above Permanent Datum | | KB N/A | | |
| Drilling Measured From : Drill Floor | | | | | MD LOG | | DF 4856.00 ft | | |
| | | | | | | | GL 4832.00 ft | | |
| | | | | | | | WD N/A | | |
| Depth Logged : 643.00 ft To 11,142.00 ft | | | | | Unit No. : 11610113 | | | | |
| Date Logged : 03-Dec-12 To 09-Dec-12 | | | | | Job No. :CA-XX-0009957677 | | | | |
| Total Depth MD : 11,142.00 ft TVD : 6,602.89 ft | | | | | Plot Type : Final | | | | |
| Spud Date : 03-Dec-12 | | | | | Plot Date : 09-Dec-12 | | | | |
| Borehole Record (MD) | | | | | | | | | |
| Run No. | | Size | | From | | To | | Run No. | |
| 2 | | 8.750 in | | 643.00 ft | | 4,922.00 ft | | | |
| 3 | | 8.750 in | | 4,922.00 ft | | 7,048.00 ft | | | |
| 4 | | 6.130 in | | 7,048.00 ft | | 11,142.00 ft | | | |
| Casing Record (MD) | | | | | | | | | |
| | | Size | | Weight | | From | | To | |
| | | 7.000 in | | 26.00 lbpf | | SURFACE | | 7,038.00 ft | |
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WELL INFORMATION

| | | | | | |
|---|------------------|------------------|-------------------|--|--|
| MWD Run Number | 100 | 200 | 300 | | |
| Date run completed | 05-Dec-12 | 06-Dec-12 | 09-Dec-12 | | |
| Rig Bit Number | 2 | 3 | 4 | | |
| Bit Size (in) | 8.750 | 8.750 | 6.130 | | |
| Tool Nominal OD (in) | 6.750 | 6.750 | 4.750 | | |
| Log Start Depth (MD, ft) | 643.00 | 4,922.00 | 7,048.00 | | |
| Log End Depth (MD, ft) | 4,922.00 | 7,048.00 | 11,142.00 | | |
| Drill or Wipe | Drill | Drill | Drill | | |
| Drill/Wipe Start Date and Time | 04-Dec-12 11:50 | 05-Dec-12 09:30 | 07-Dec-12 08:20 | | |
| Drill/Wipe End Date and Time | 05-Dec-12 02:40 | 06-Dec-12 08:30 | 08-Dec-12 13:40 | | |
| Min Inc (deg) @ Depth (MD, ft) | .22 @ 1,270.00 | .20 @ 5,341.00 | 88.22 @ 10,638.00 | | |
| Max Inc (deg) @ Depth (MD, ft) | 12.84 @ 3,067.00 | 88.30 @ 6,995.00 | 94.19 @ 11,080.00 | | |
| Bit TFA(in2) / Bit Type | .75 / PDC | .75 / PDC | .46 / PDC | | |
| Flow Rate (gpm) | 590.00 | 595.00 | 258.00 | | |
| Max AV (fpm) / CV (fpm) @ MWD | N/A / N/A | N/A / N/A | N/A / N/A | | |
| Fluid Type | Fresh Water Gel | Fresh Water Gel | Fresh Water Gel | | |
| Density (ppg) / Viscosity (spqt) | 8.85 / 29.00 | 10.35 / 35.00 | 9.25 / 33.00 | | |
| Filtrate CL (ppm) | 1,400.00 | 1,400.00 | 1,500.00 | | |
| pH / Fluid Loss (mptm) | 10.60 / 0 | 9.00 / 8 | 10.20 / 11 | | |
| PV (cP) / YP (lbf2) | 4 / 4.00 | 10 / 10.00 | 6 / 4.00 | | |
| % Solids / % Sand | 5.1 / 0.30 | 10.9 / 0.20 | 5.1 / 0.20 | | |
| % Oil / Oil:Water Ratio | N/A / N/A | N/A / N/A | N/A / N/A | | |
| Rm @ Measured Temp (degF) | N/A @ N/A | N/A @ N/A | N/A @ N/A | | |
| Rmf @ Measured Temp (degF) | N/A @ N/A | N/A @ N/A | N/A @ N/A | | |
| Rmc @ Measured Temp (degF) | N/A @ N/A | N/A @ N/A | N/A @ N/A | | |
| Max Tool Temp (deg F) @ 100 ft | 122.00 / PDM | 170.70 / PDM | 200.00 / PDM | | |

| | | | | | |
|-------------------------------|------------------|------------------|------------------|--|--|
| Max Tool Temp (degF) / Source | 139.96 / PCM | 172.78 / PCM | 226.08 / PCM | | |
| Rm @ Max Tool Temp (degF) | N/A @ 139.96 | N/A @ 172.78 | N/A @ 226.08 | | |
| Lead MWD Engineer | Henry Schmeidler | Henry Schmeidler | Henry Schmeidler | | |
| Customer Representative | Dave Nielsen | Dave Nielsen | Dave Nielsen | | |

SENSOR INFORMATION

Downhole Processor Information

| | | | | | |
|---------------------------|-----------------|-----------------|-----------------|--|--|
| Tool Type | PCM | PCM | PCM | | |
| Software Version | 5.76 | 5.76 | 5.76 | | |
| Sub Serial Number | 11404299 | 11404299 | 11750419 | | |
| Insert Serial Number | 11619985 | 11680751 | 11620311 | | |
| Date and Time Initialized | 04-Dec-12 01:39 | 05-Dec-12 05:11 | 06-Dec-12 18:23 | | |
| Date and Time Read | 05-Dec-12 08:02 | 06-Dec-12 13:00 | 09-Dec-12 02:32 | | |
| ECMB SW Version | N/A | N/A | N/A | | |

Directional Sensor Information

| | | | | | |
|------------------------|----------|----------|----------|--|--|
| Tool Type | PCDC | PCDC | PCDC | | |
| Distance From Bit (ft) | 53.46 | 51.28 | 60.11 | | |
| Software Version | 6.21 | 6.21 | 6.21 | | |
| Sub Serial Number | 11404299 | 11404299 | 11750419 | | |
| Sonde Serial Number | 11297517 | 11638497 | 1168536 | | |
| Sensor ID Number | N/A | N/A | N/A | | |
| Toolface Offset (deg) | 186.92 | 332.63 | 270.57 | | |

Gamma Ray Sensor Information

| | | | | | |
|------------------------------|----------|----------|----------|--|--|
| Tool Type | PCG | PCG | PCG | | |
| Distance From Bit (ft) | 48.66 | 46.48 | 55.31 | | |
| Recorded Sample Period (sec) | 10 | 10 | 10 | | |
| Software Version | 8.15 | 8.15 | 8.15 | | |
| Sub Serial Number | 11404299 | 11404299 | 11750419 | | |
| Insert/Sonde Serial Number | 11293301 | 11680975 | 11293307 | | |

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 7.3.5
6. End of Run 200. Gap between build and lateral section is due to Gamma sensor measure point to bit distance during the build run. Last Gamma datapoint is at 7003 ft. MD. Gamma cannot be measured within cased hole, and collection resumes after drilling through cement at 7049 ft MD.

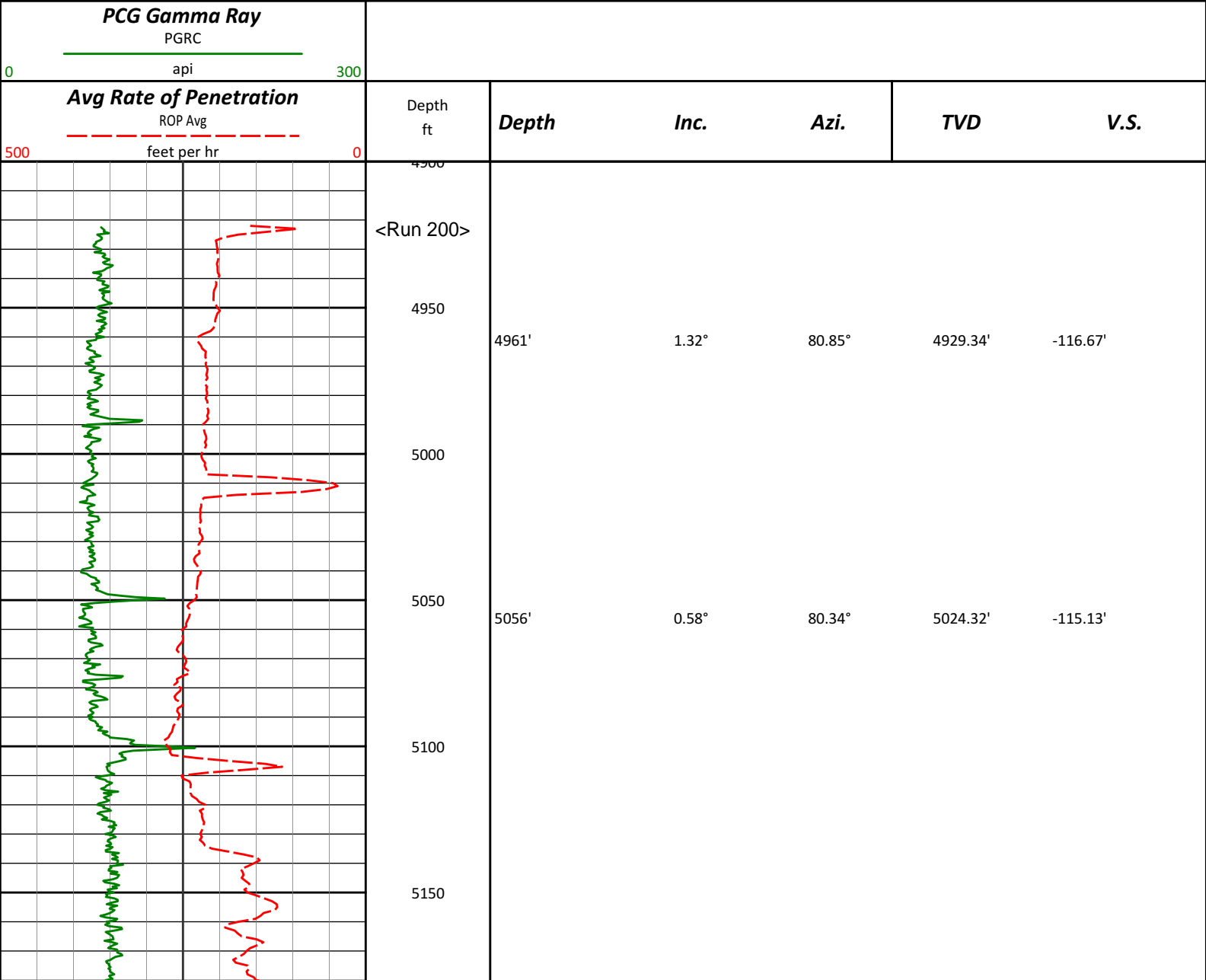
WARRANTY

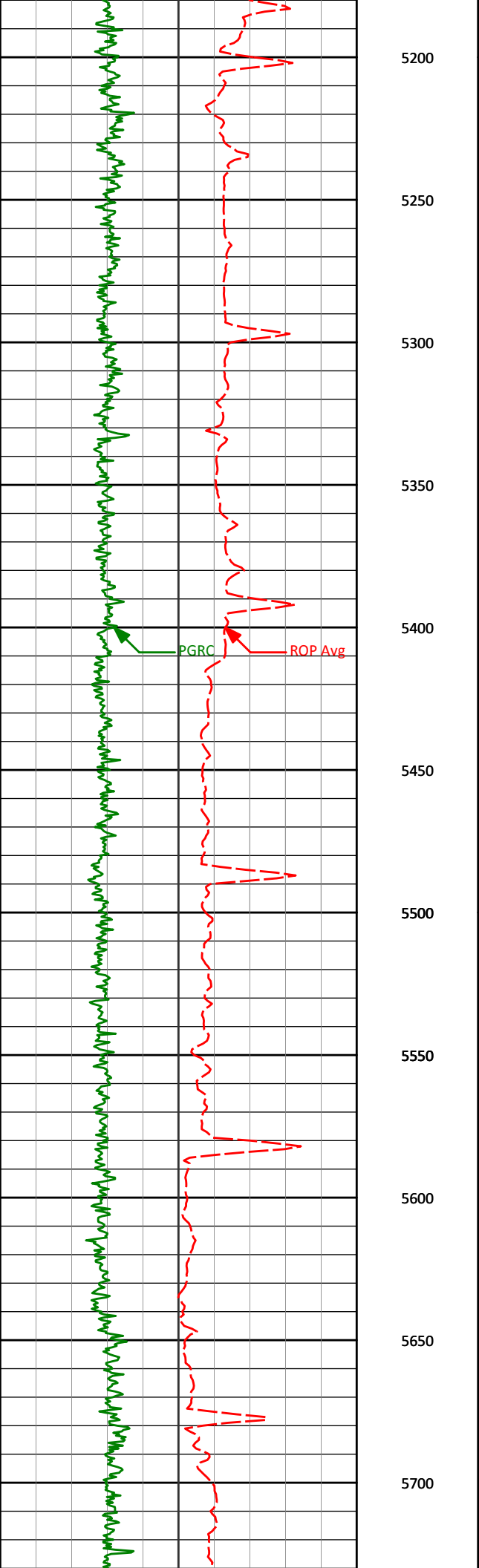
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Sperry Drilling Services

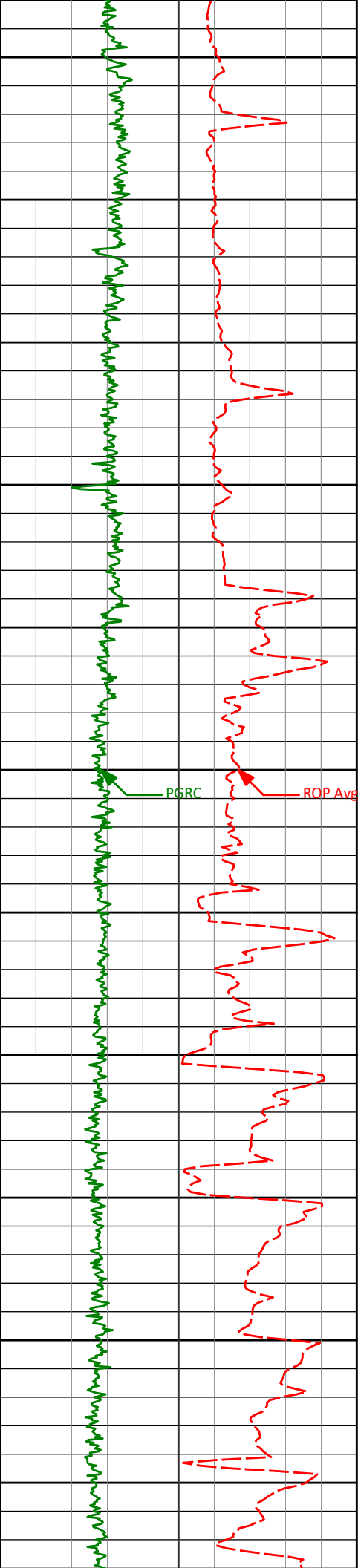
MD Main Log 1:600

Noble Energy, Inc
Wells Ranch AE18-63-1HN
H&P 315
T6N R62W





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| 5341' | 0.20° | 229.50° | 5309.32' | -114.06' |
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<KOP>

5750

5800

5850

5900

5950

6000

6050

6100

6150

6200

6250

5884'

0.74°

116.10°

5852.29'

-110.61'

6005'

8.90°

81.19°

5972.77'

-100.69'

6053'

12.70°

81.66°

6019.91'

-91.86'

6099'

14.73°

81.98°

6064.59'

-81.13'

6147'

17.55°

85.64°

6110.70'

-67.93'

6194'

21.69°

89.16°

6154.96'

-52.21'

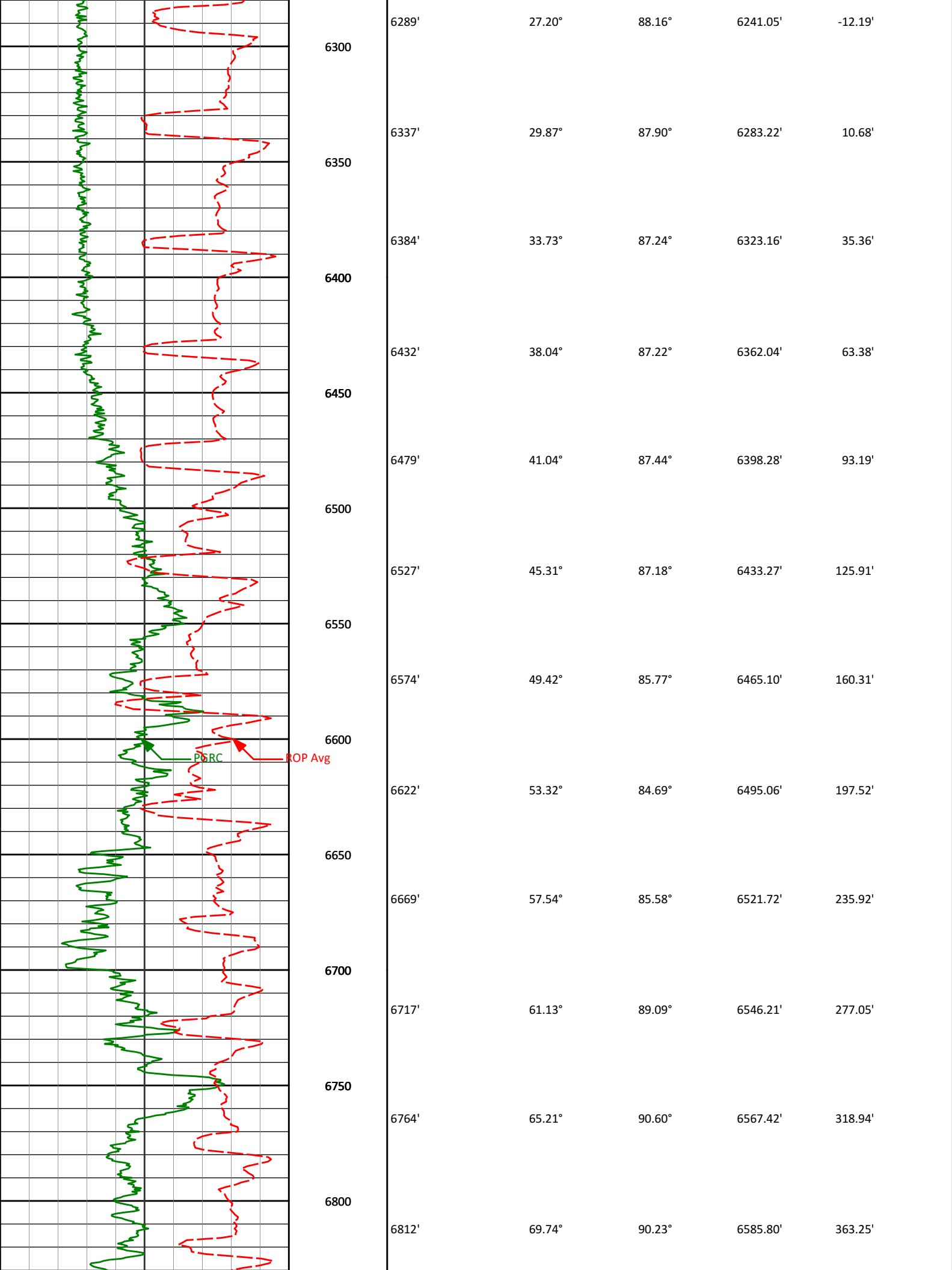
6242'

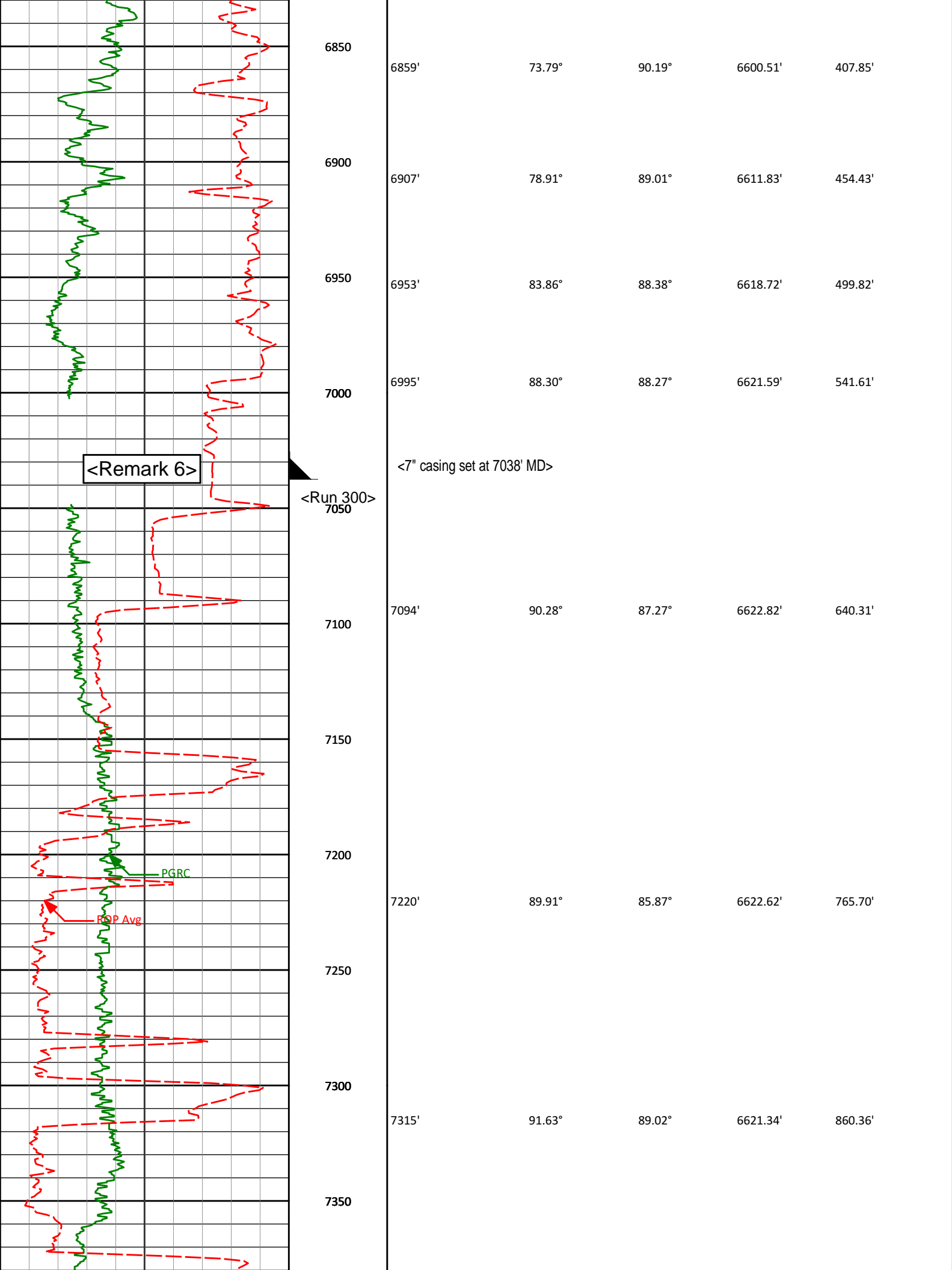
25.51°

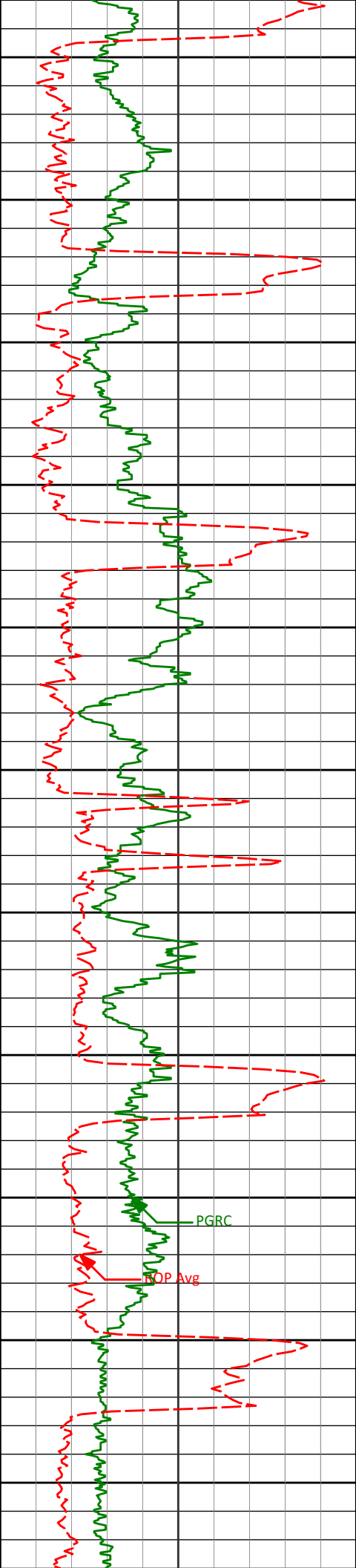
89.65°

6198.94'

-33.02'







7400

7410'

90.46°

87.80°

6619.60'

955.13'

7450

7500

7505'

90.09°

89.24°

6619.14'

1049.94'

7550

7600

7600'

89.11°

89.16°

6619.81'

1144.81'

7650

7700

7695'

89.97°

89.14°

6620.57'

1239.67'

7750

7800

7790'

91.05°

87.73°

6619.73'

1334.46'

7850

7900

7885'

90.15°

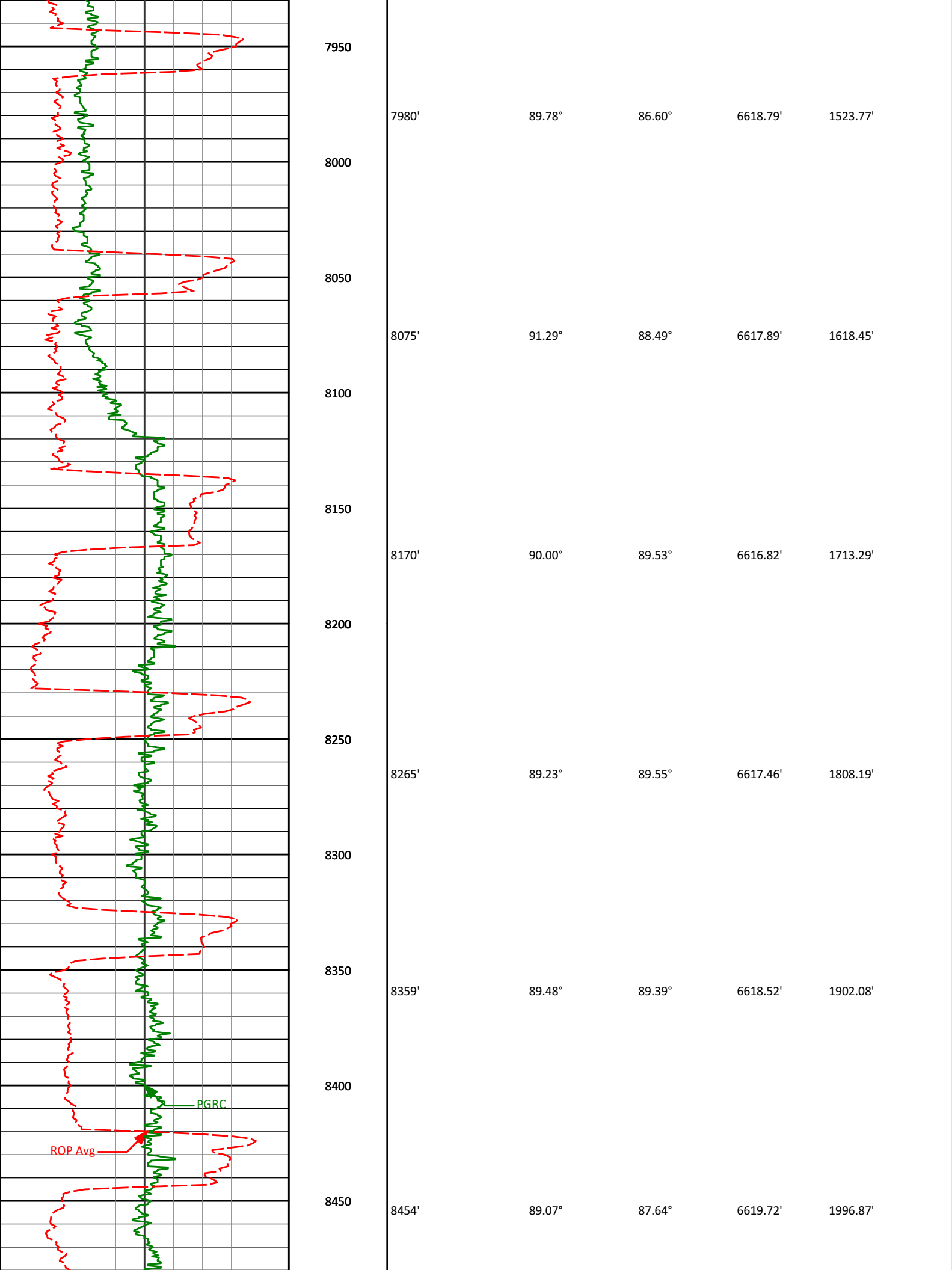
87.44°

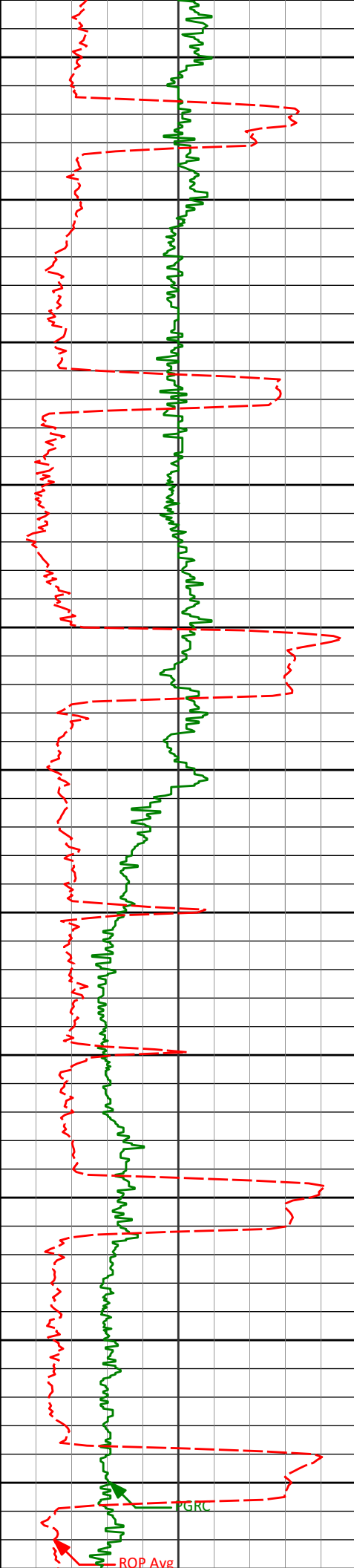
6618.74'

1429.15'

PGRC

ROP Avg





8500

8550

8600

8650

8700

8750

8800

8850

8900

8950

9000

8549'

89.97°

85.61°

6620.51'

2091.42'

8644'

90.95°

87.54°

6619.75'

2185.96'

8739'

88.64°

87.00°

6620.08'

2280.60'

8834'

90.62°

86.68°

6620.69'

2375.19'

8929'

90.18°

86.58°

6620.03'

2469.74'

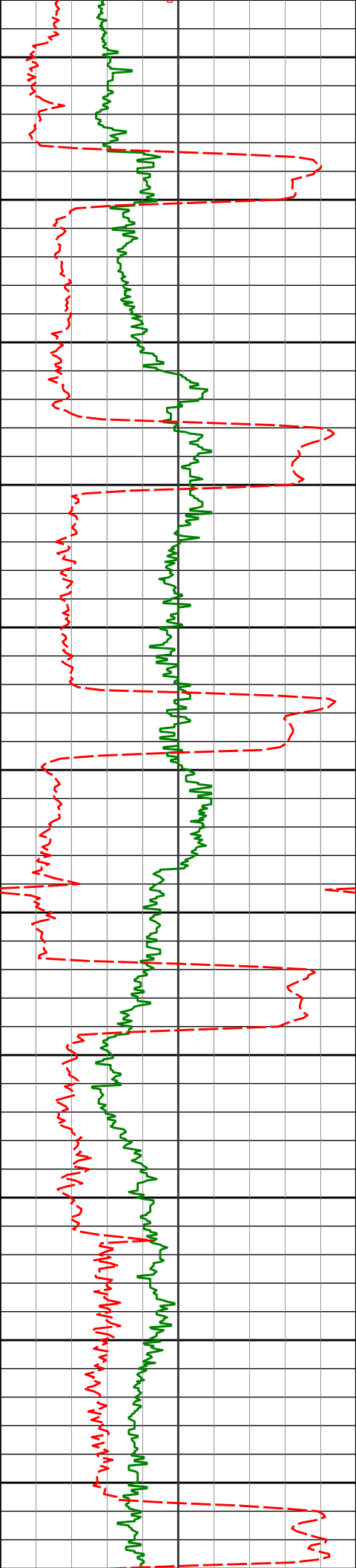
9024'

90.43°

88.32°

6619.52'

2564.41'



9050

9100

9150

9200

9250

9300

9350

9400

9450

9500

9550

9119'

91.42°

89.05°

6617.98'

2659.22'

9214'

90.00°

89.37°

6616.81'

2754.09'

9309'

90.12°

88.80°

6616.71'

2848.95'

9404'

88.52°

87.97°

6617.83'

2943.73'

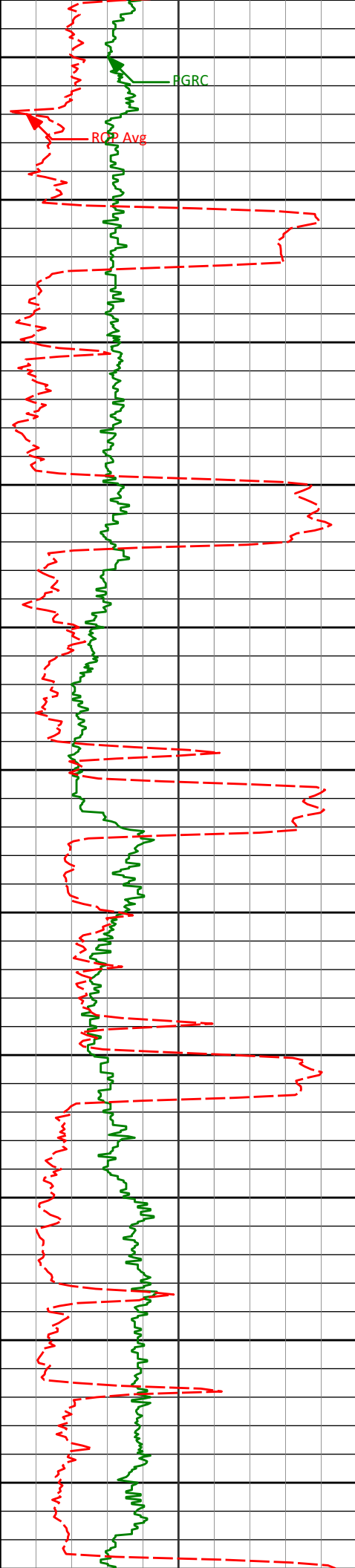
9499'

90.18°

87.84°

6618.90'

3038.46'



9600

9650

9700

9750

9800

9850

9900

9950

10000

10050

10100

9594'

89.88°

86.62°

6618.85'

3133.11'

9688'

91.70°

90.19°

6617.56'

3226.87'

9783'

89.29°

89.35°

6616.74'

3321.78'

9878'

89.20°

89.49°

6617.99'

3416.66'

9973'

89.14°

89.54°

6619.37'

3511.55'

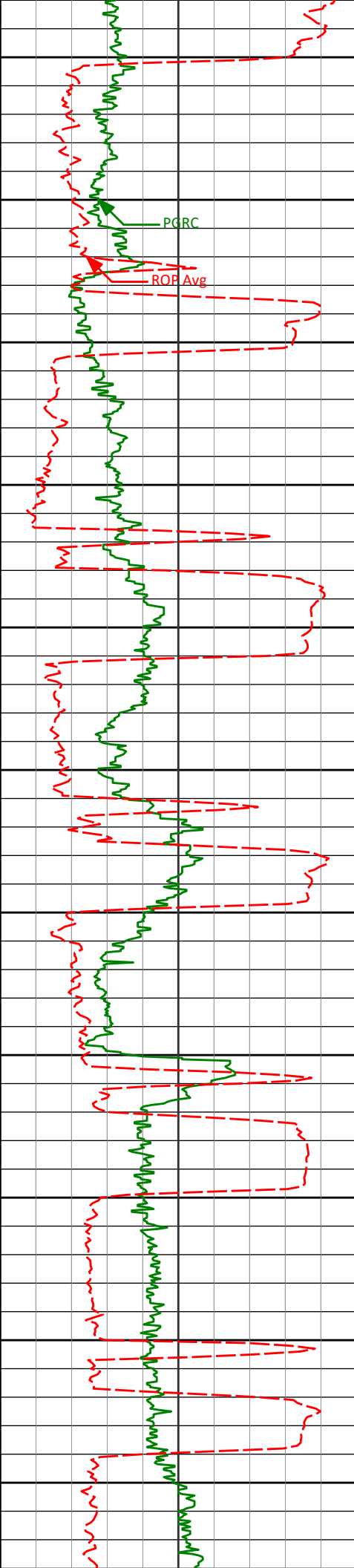
10068'

90.62°

89.42°

6619.57'

3606.44'



10150

10163'

90.74°

87.93°

6618.45'

3701.26'

10200

10250

10258'

91.20°

87.45°

6616.84'

3795.95'

10300

10350

10353'

90.31°

87.51°

6615.58'

3890.63'

10400

10450

10448'

90.28°

87.90°

6615.10'

3985.34'

10500

10550

10543'

89.75°

87.41°

6615.07'

4080.04'

10600

10650

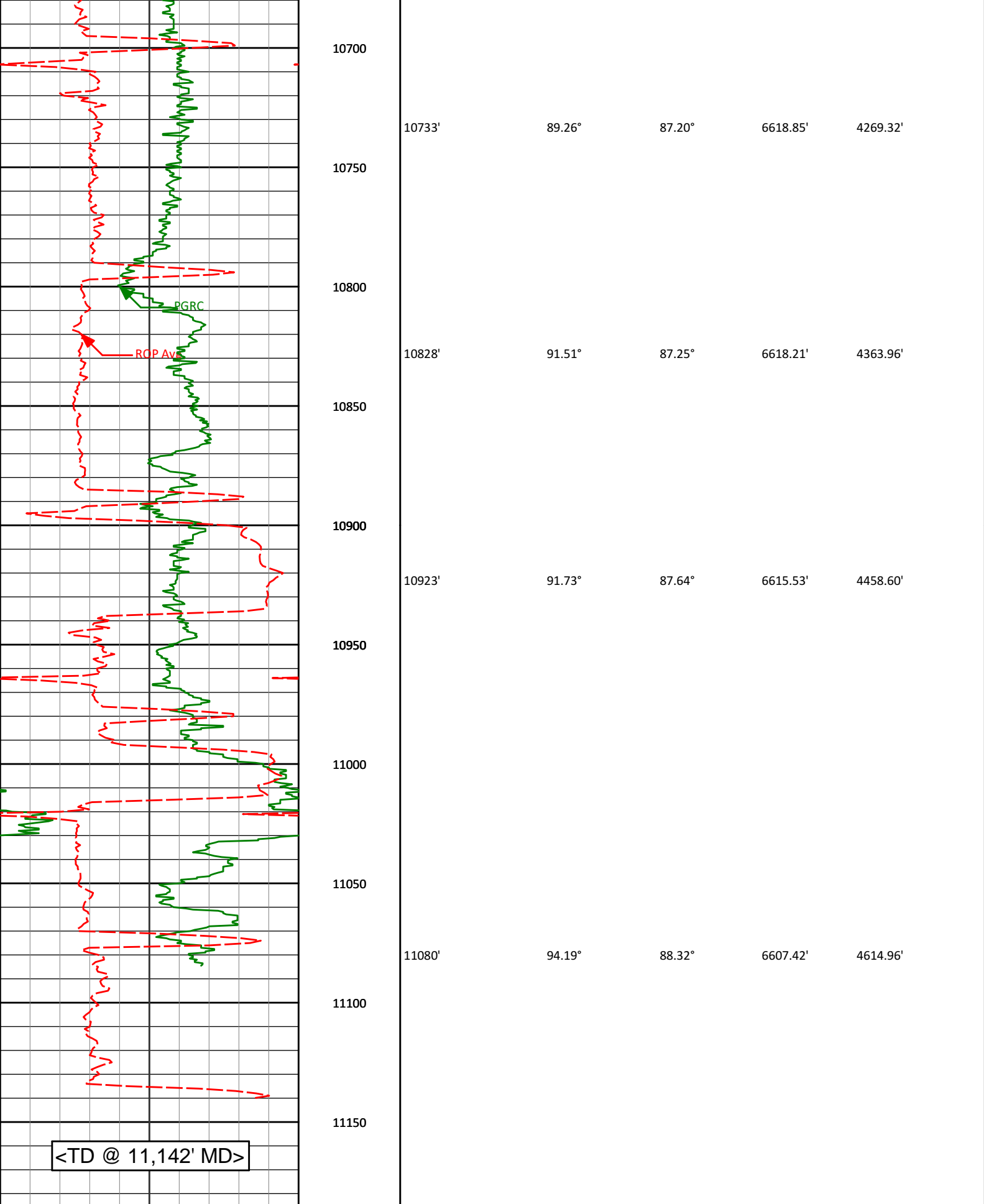
10638'

88.22°

87.38°

6616.76'

4174.69'



<TD @ 11,142' MD>

Avg Rate of Penetration

ROP Avg

500 feet per hr 0

Depth
ft

Depth

Inc.

Azi.

TVD

V.S.

PCG Gamma Ray

PGRC

HALLIBURTON

Sperry Drilling Services

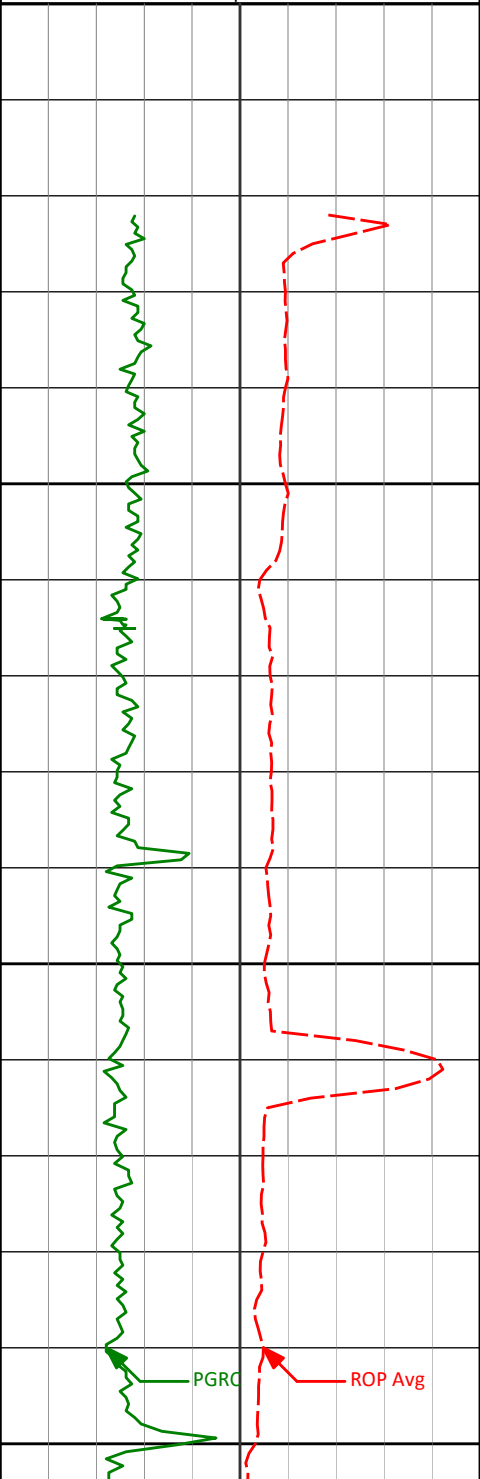
MD Detail Log 1:240

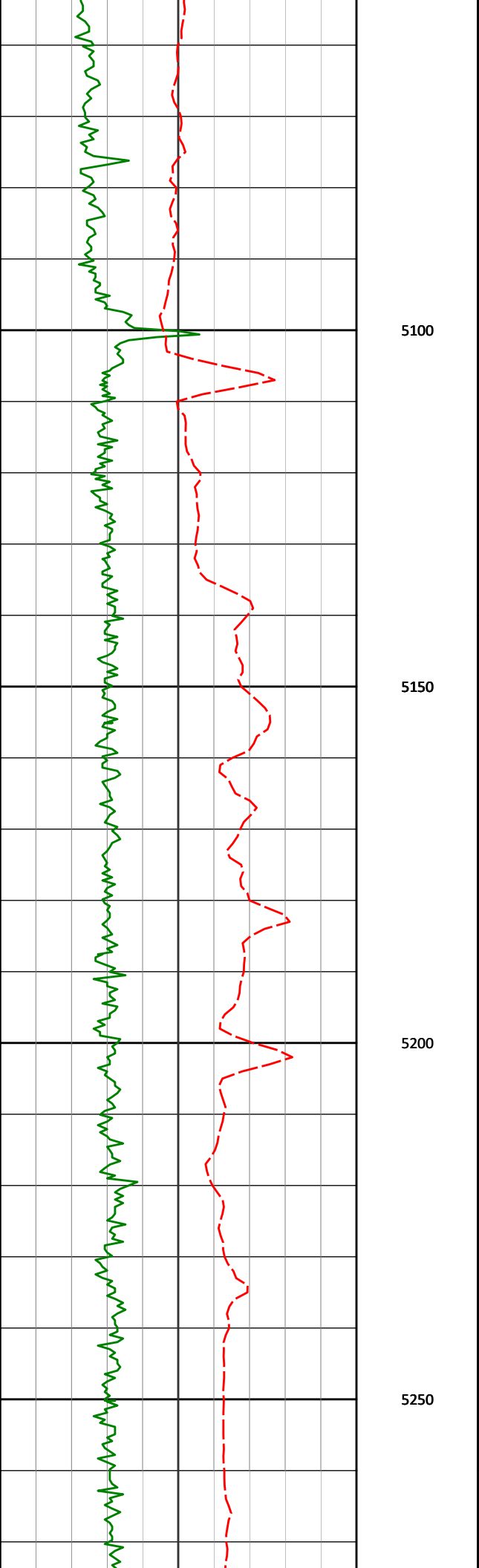
Noble Energy, Inc

Wells Ranch AE18-63-1HN

H&P 315

T6N R62W

| PCG Gamma Ray PGRC | | | | | | |
|--|-------------|-------------|-------|-------|--------|----------|
| 0 | api | 300 | | | | |
| Avg Rate of Penetration ROP Avg | | Depth ft | Depth | Inc. | Azi. | TVD |
| 500 | feet per hr | 0 | | | | V.S. |
|  | | 4900 | | | | |
| | | | | | | |
| | | | | | | |
| | | <Run 200> | | | | |
| | | | | | | |
| | | 4950 | | | | |
| | | | 4961' | 1.32° | 80.85° | 4929.34' |
| | | | | | | -116.67' |
| | | | | | | |
| | | 5000 | | | | |
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| | | | | | | |
| | | 5050 | | | | |



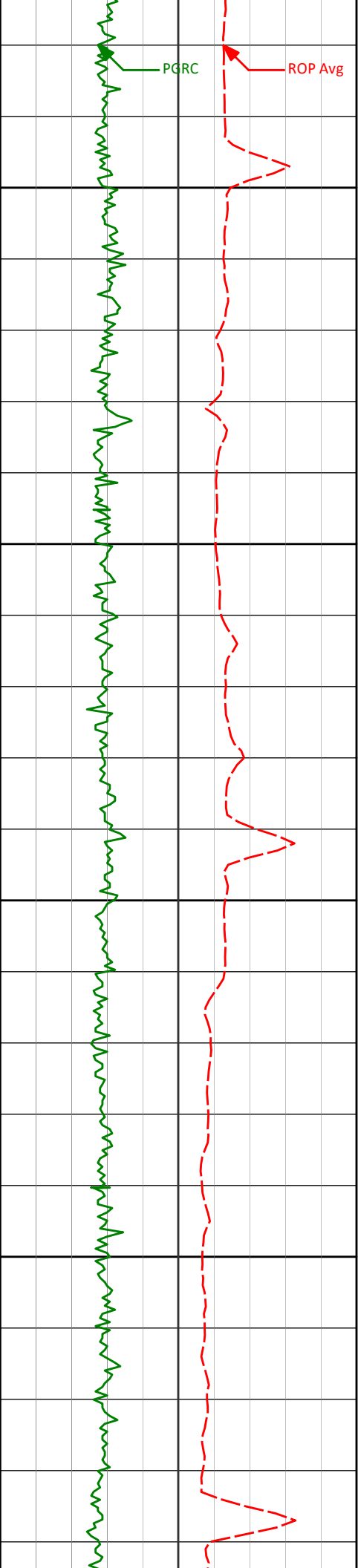
5056'

0.58°

80.34°

5024.32'

-115.13'



5300

5350

5400

5450

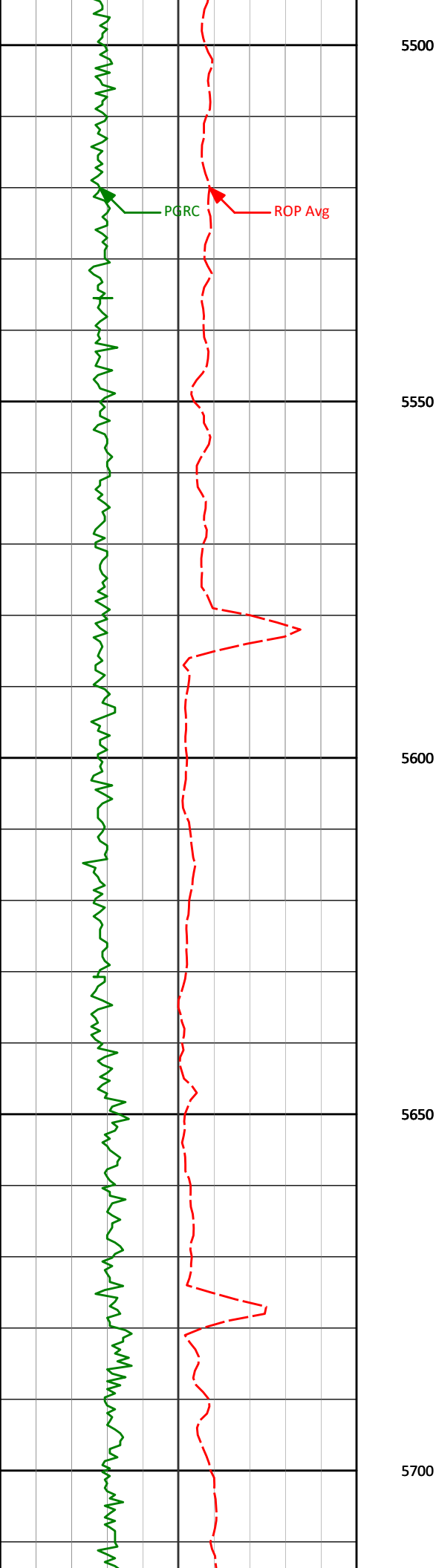
5341'

0.20°

229.50°

5309.32'

-114.06'



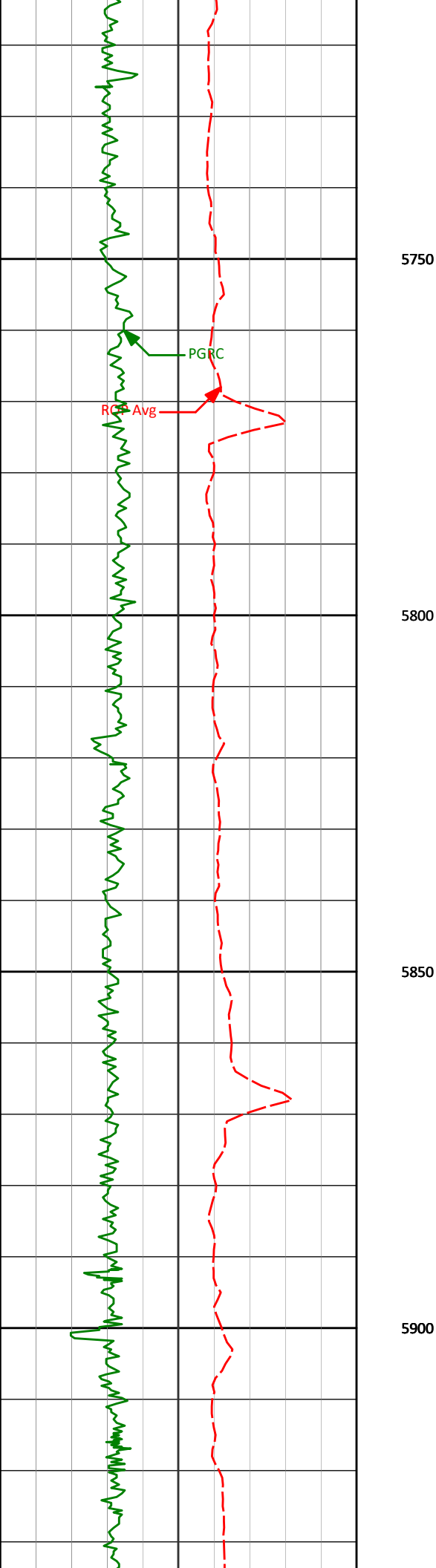
5625'

0.73°

140.57°

5593.31'

-113.23'



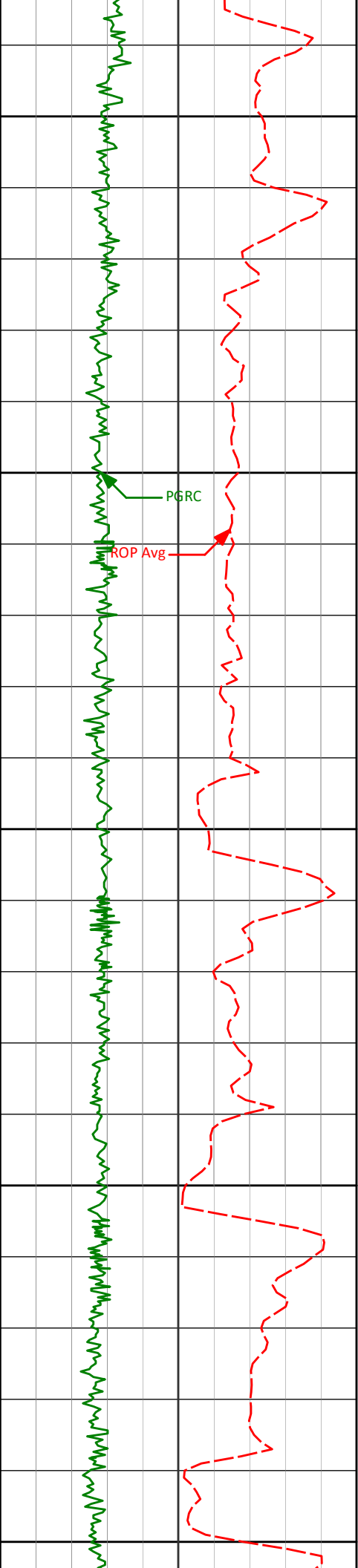
5884'

0.74°

116.10°

5852.29'

-110.61'



<KOP>

5950

6000

6050

6100

6150

6005'

8.90°

81.19°

5972.77'

-100.69'

6053'

12.70°

81.66°

6019.91'

-91.86'

6099'

14.73°

81.98°

6064.59'

-81.13'

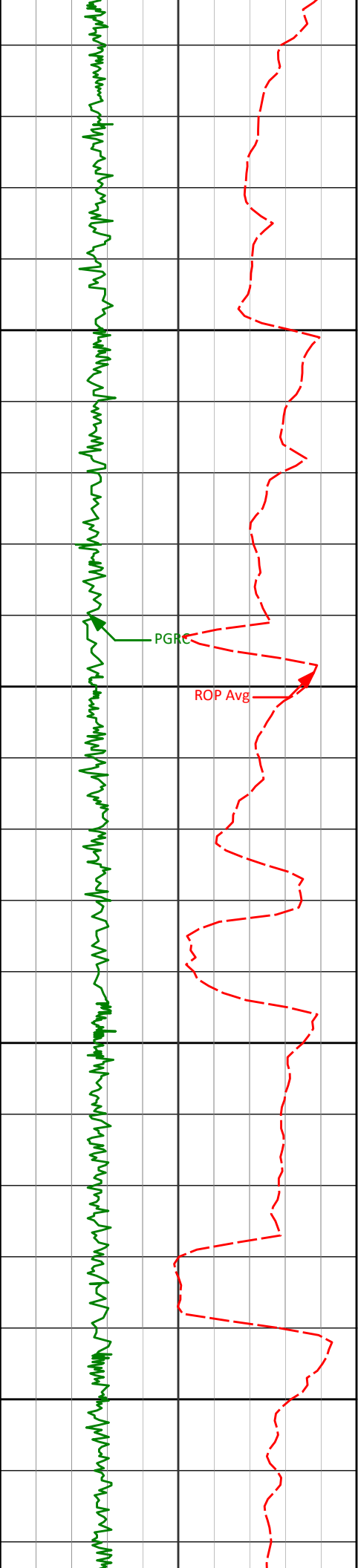
6147'

17.55°

85.64°

6110.70'

-67.93'



6200

6250

6300

6350

6194'

21.69°

89.16°

6154.96'

-52.21'

6242'

25.51°

89.65°

6198.94'

-33.02'

6289'

27.20°

88.16°

6241.05'

-12.19'

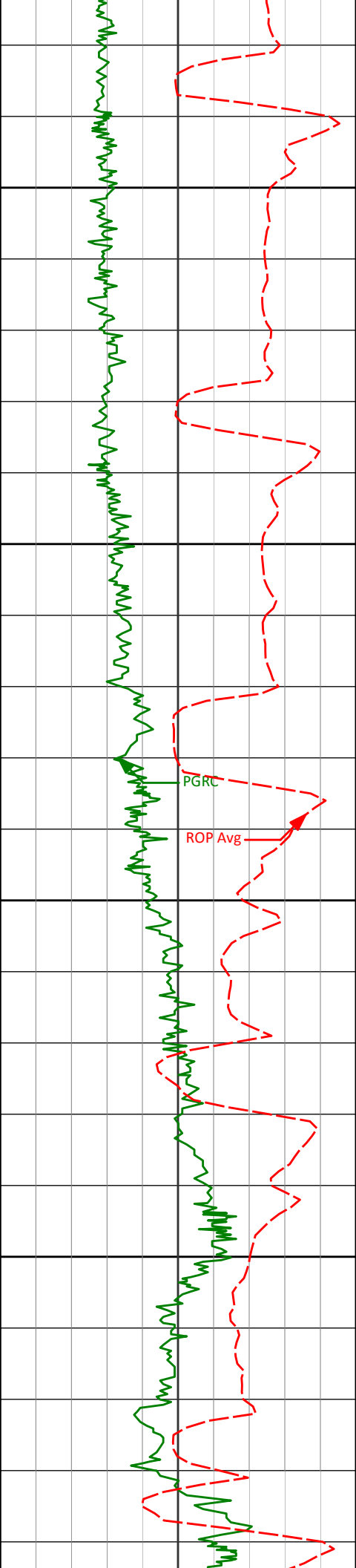
6337'

29.87°

87.90°

6283.22'

10.68'



6384'

33.73°

87.24°

6323.16'

35.36'

6400

6432'

38.04°

87.22°

6362.04'

63.38'

6450

6479'

41.04°

87.44°

6398.28'

93.19'

6500

6527'

45.31°

87.18°

6433.27'

125.91'

6550

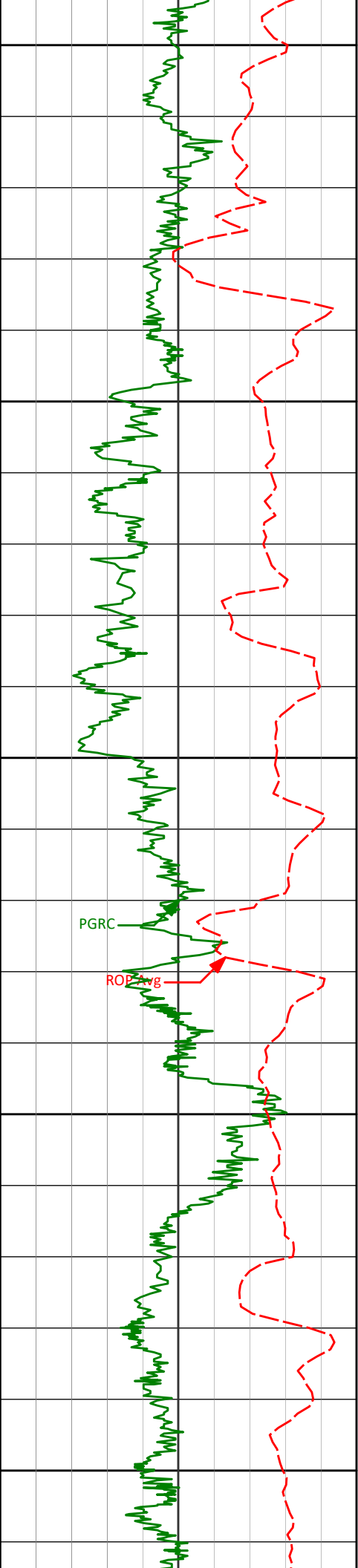
6574'

49.42°

85.77°

6465.10'

160.31'



6600

6622'

53.32°

84.69°

6495.06'

197.52'

6650

6669'

57.54°

85.58°

6521.72'

235.92'

6700

6717'

61.13°

89.09°

6546.21'

277.05'

PGRC

ROP Avg

6750

6764'

65.21°

90.60°

6567.42'

318.94'

6800

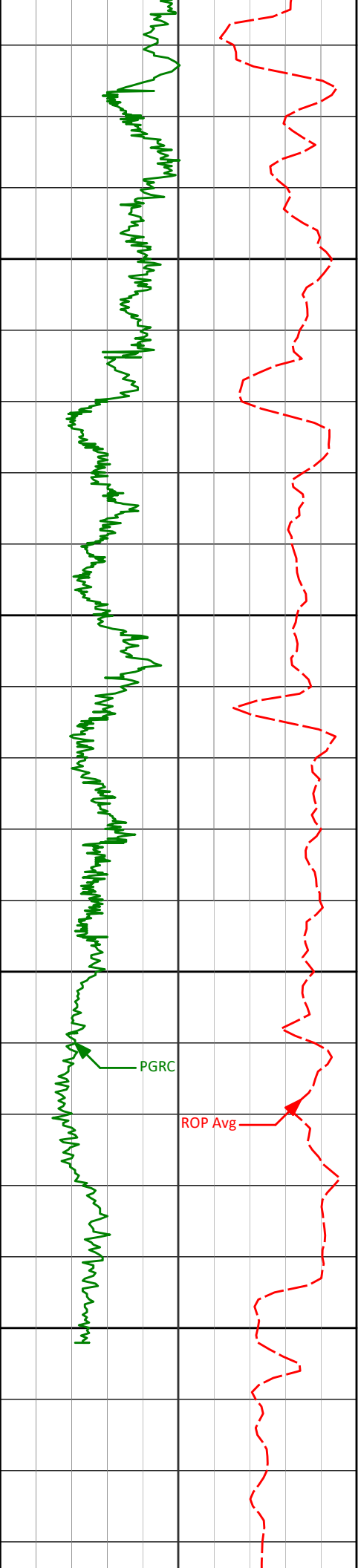
6812'

69.74°

90.23°

6585.80'

363.25'



6850

6859'

73.79°

90.19°

6600.51'

407.85'

6900

6907'

78.91°

89.01°

6611.83'

454.43'

6950

6953'

83.86°

88.38°

6618.72'

499.82'

7000

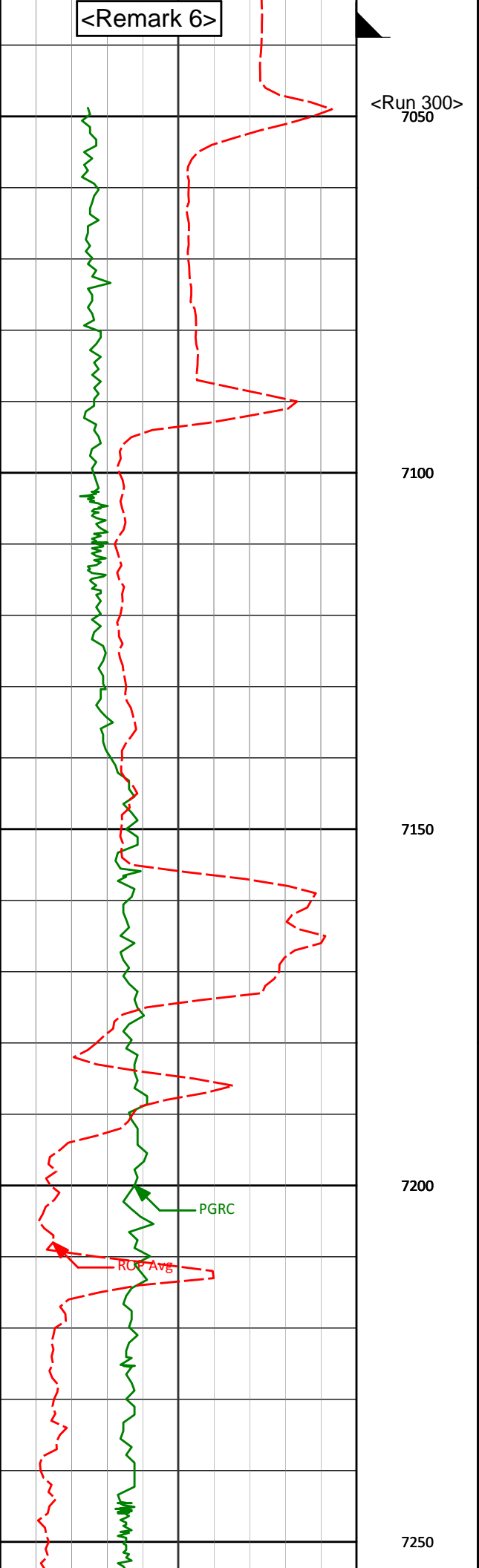
6995'

88.30°

88.27°

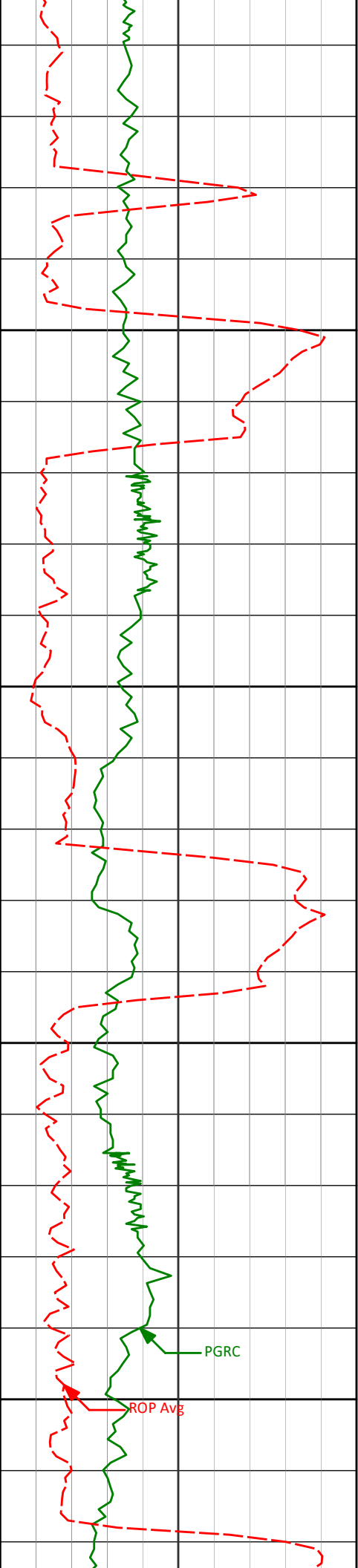
6621.59'

541.61'



<7" casing set at 7038' MD>

| | | | | |
|-------|--------|--------|----------|---------|
| 7094' | 90.28° | 87.27° | 6622.82' | 640.31' |
| 7220' | 89.91° | 85.87° | 6622.62' | 765.70' |



7300

7315'

91.63°

89.02°

6621.34'

860.36'

7350

7400

7410'

90.46°

87.80°

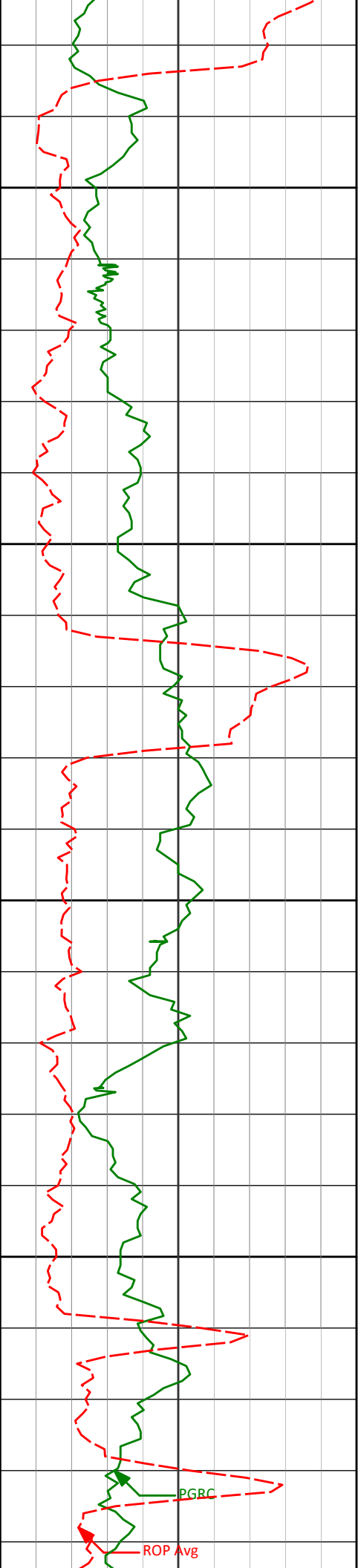
6619.60'

955.13'

7450

PGRC

ROP Avg



7500

7550

7600

7650

7505'

7600'

90.09°

89.11°

89.24°

89.16°

6619.14'

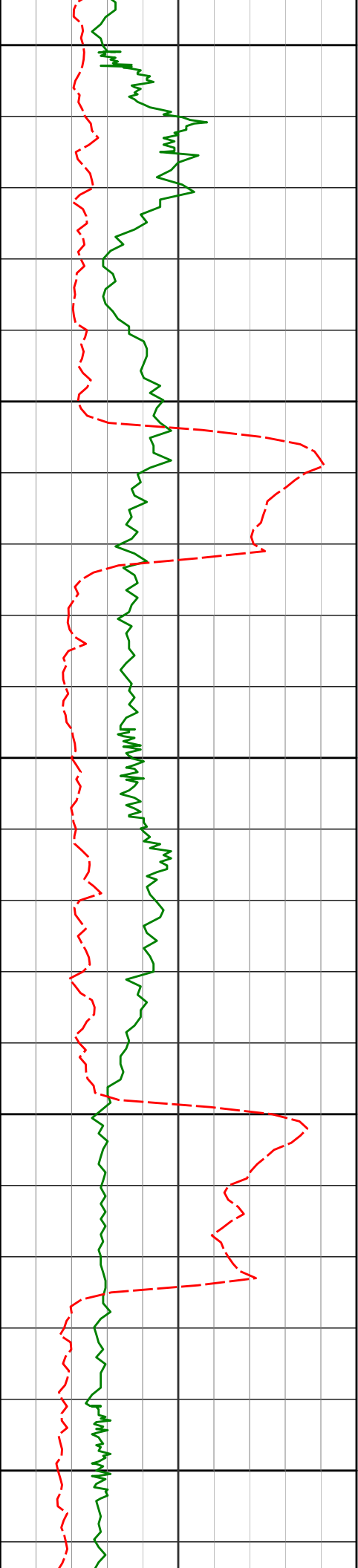
6619.81'

1049.94'

1144.81'

PGRC

ROP Avg



7700

7750

7800

7850

7900

7695'

89.97°

89.14°

6620.57'

1239.67'

7790'

91.05°

87.73°

6619.73'

1334.46'

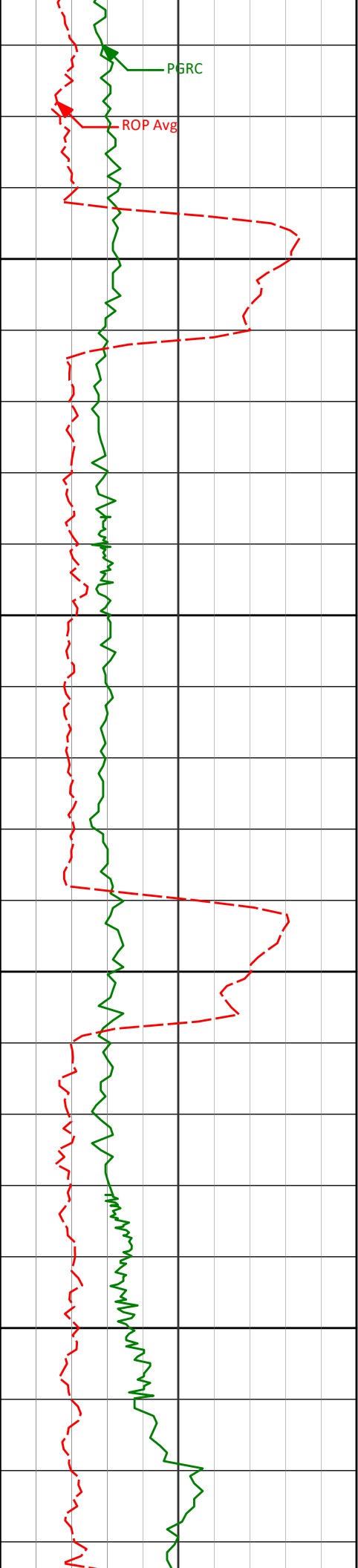
7885'

90.15°

87.44°

6618.74'

1429.15'



7950

7980'

89.78°

86.60°

6618.79'

1523.77'

8000

8050

8075'

91.29°

88.49°

6617.89'

1618.45'

8100



8150

PGRC

ROP Avg

8200

8250

8300

8350

8170'

90.00°

89.53°

6616.82'

1713.29'

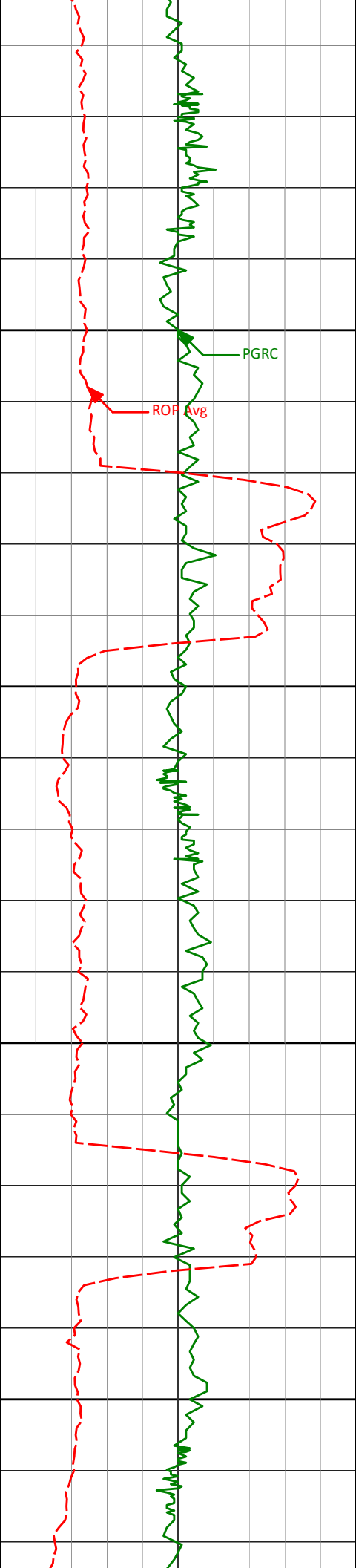
8265'

89.23°

89.55°

6617.46'

1808.19'



8400

8450

8500

8550

8359'

89.48°

89.39°

6618.52'

1902.08'

8454'

89.07°

87.64°

6619.72'

1996.87'

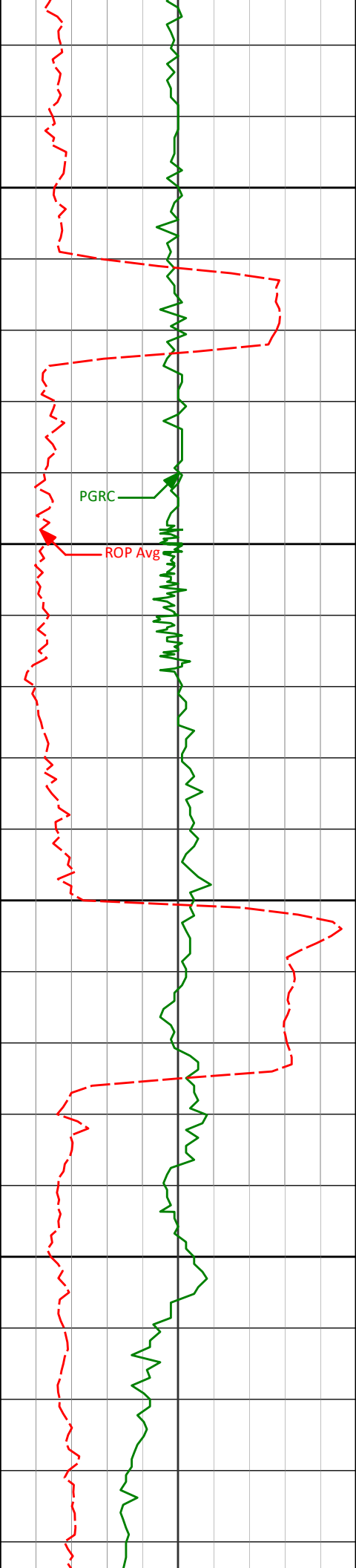
8549'

89.97°

85.61°

6620.51'

2091.42'



8600

8650

8700

8750

8644'

90.95°

87.54°

6619.75'

2185.96'

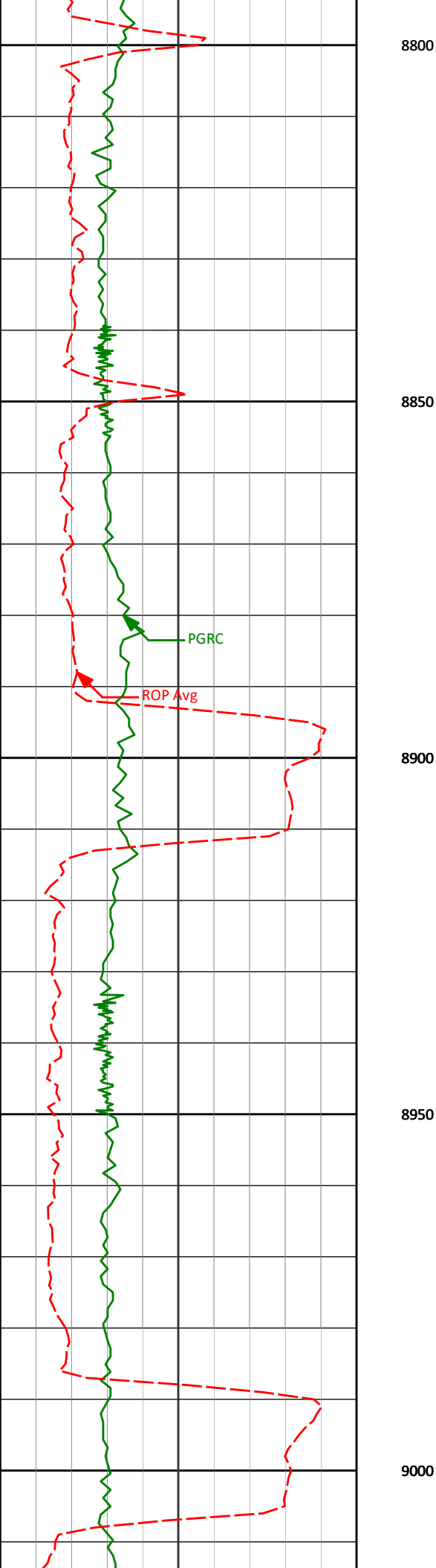
8739'

88.64°

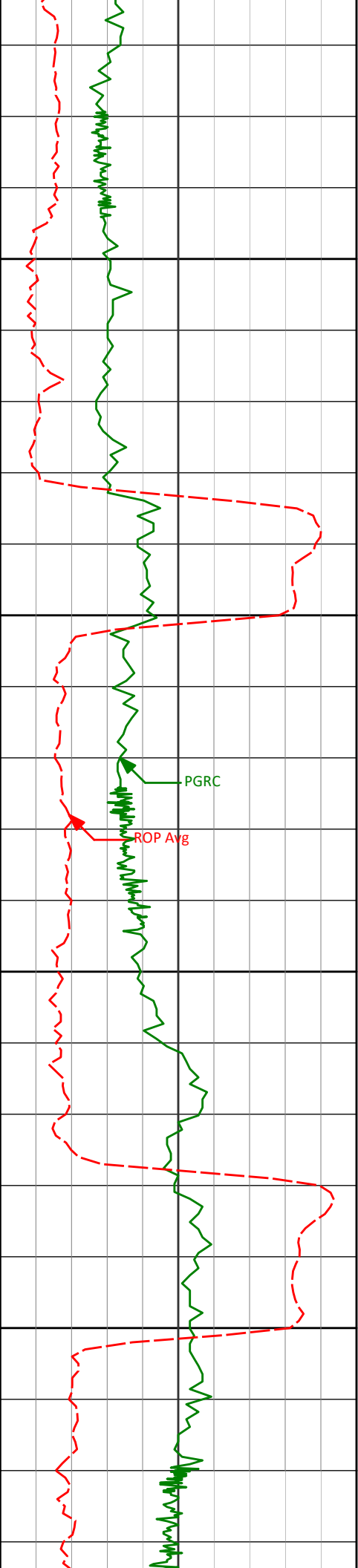
87.00°

6620.08'

2280.60'



| | | | | |
|-------|--------|--------|----------|----------|
| 8834' | 90.62° | 86.68° | 6620.69' | 2375.19' |
| 8929' | 90.18° | 86.58° | 6620.03' | 2469.74' |



9024'

90.43°

88.32°

6619.52'

2564.41'

9050

9100

9119'

91.42°

89.05°

6617.98'

2659.22'

PGRC

ROP Avg

9150

9200

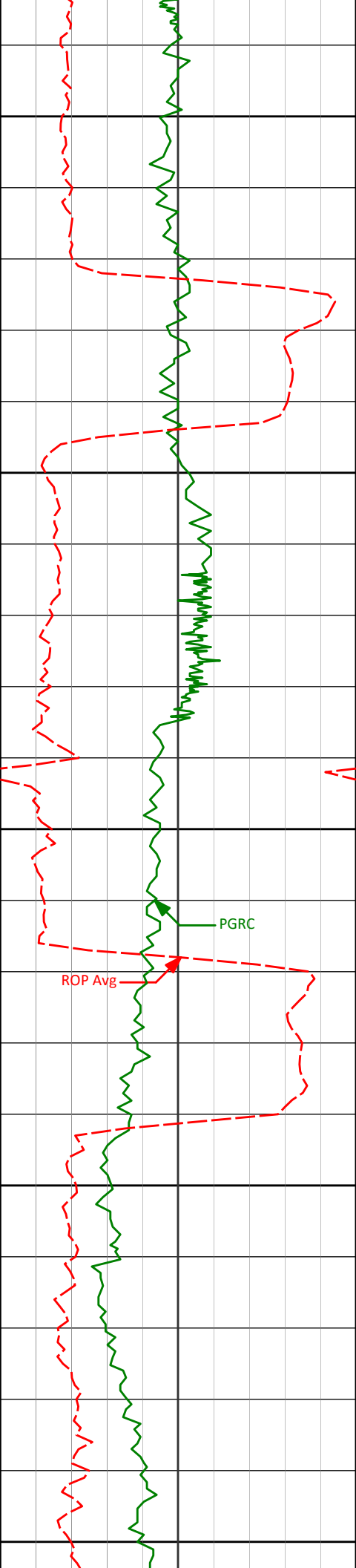
9214'

90.00°

89.37°

6616.81'

2754.09'



9250

9300

9350

9400

9450

9309'

90.12°

88.80°

6616.71'

2848.95'

9404'

88.52°

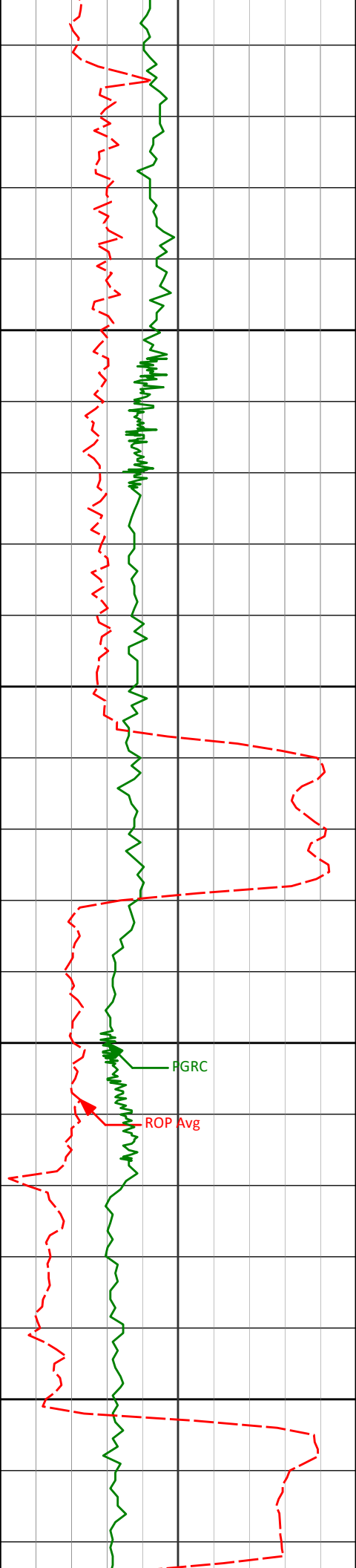
87.97°

6617.83'

2943.73'

ROP Avg

PGRC



9500

9550

9600

9650

9499'

90.18°

87.84°

6618.90'

3038.46'

9594'

89.88°

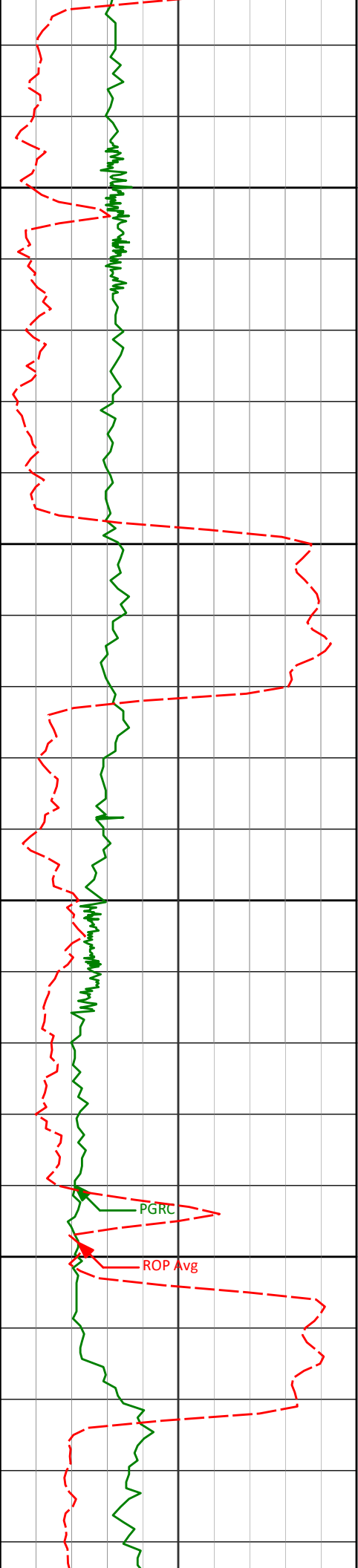
86.62°

6618.85'

3133.11'

FGRC

ROP Avg



9700

9750

9800

9850

9688'

91.70°

90.19°

6617.56'

3226.87'

9783'

89.29°

89.35°

6616.74'

3321.78'

9878'

89.20°

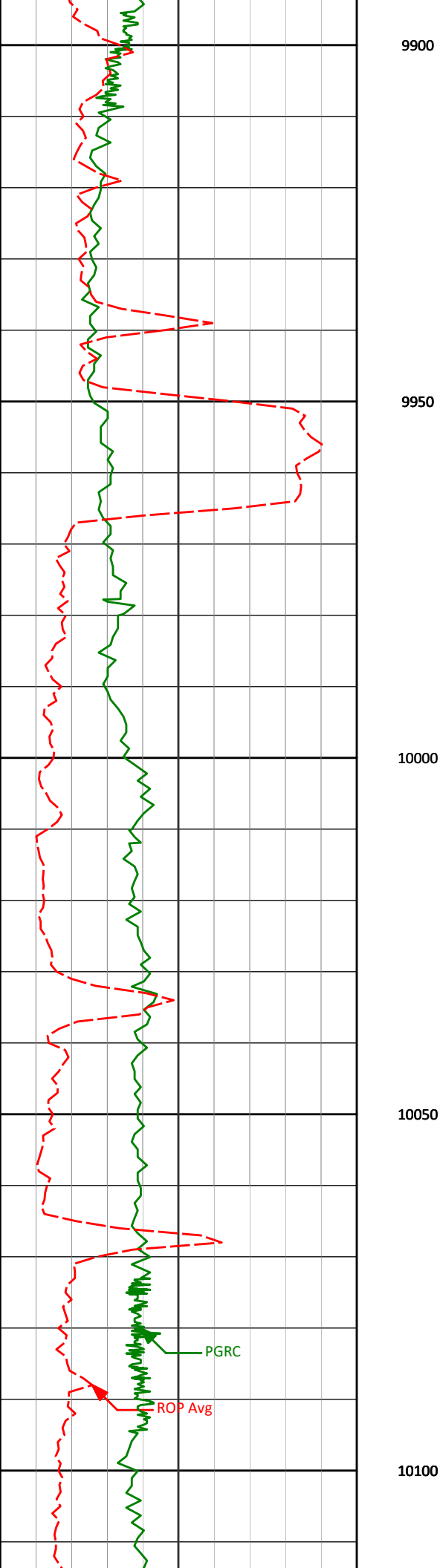
89.49°

6617.99'

3416.66'

PGRC

ROP Avg



9973'

89.14°

89.54°

6619.37'

3511.55'

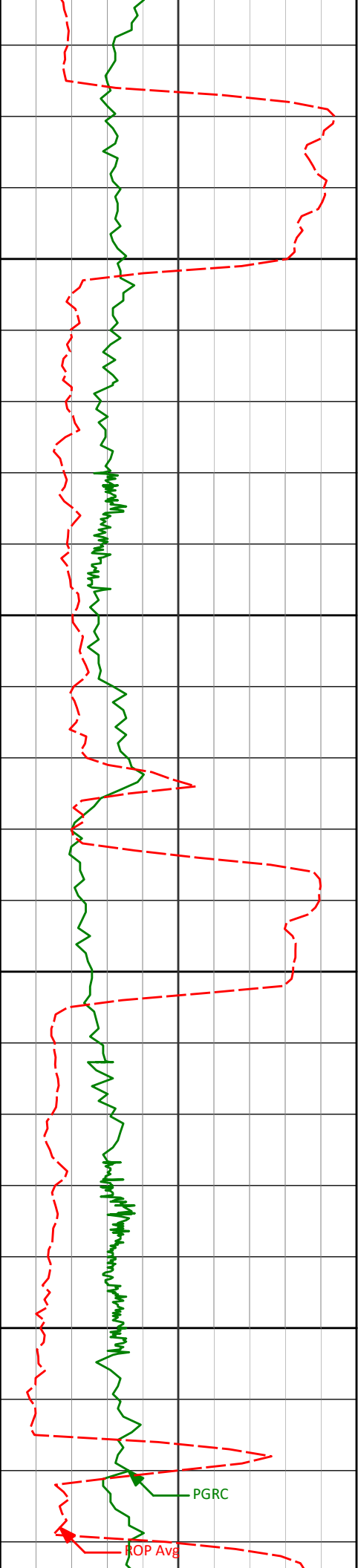
10068'

90.62°

89.42°

6619.57'

3606.44'



10150

10200

10250

10300

10163'

90.74°

87.93°

6618.45'

3701.26'

10258'

91.20°

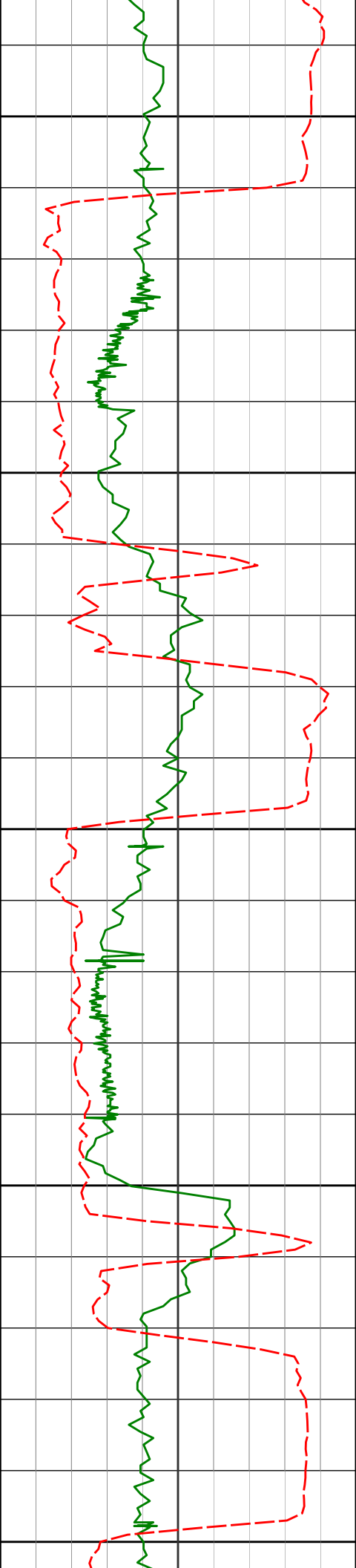
87.45°

6616.84'

3795.95'

PGRC

ROP Avg



10350

10353'

90.31°

87.51°

6615.58'

3890.63'

10400

10450

10448'

90.28°

87.90°

6615.10'

3985.34'

10500

10550

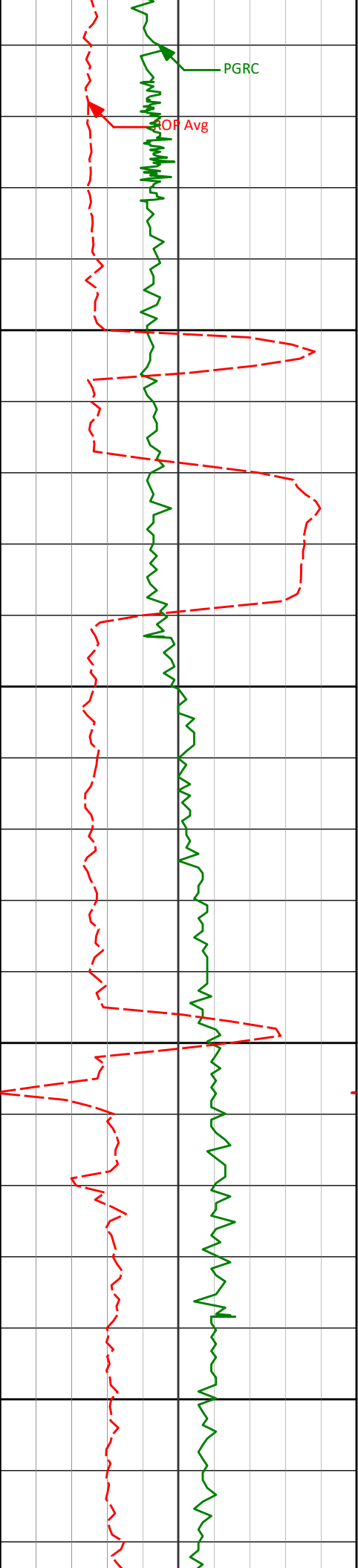
10543'

89.75°

87.41°

6615.07'

4080.04'



PGRC

ROP Avg

10600

10650

10700

10750

10638'

88.22°

87.38°

6616.76'

4174.69'

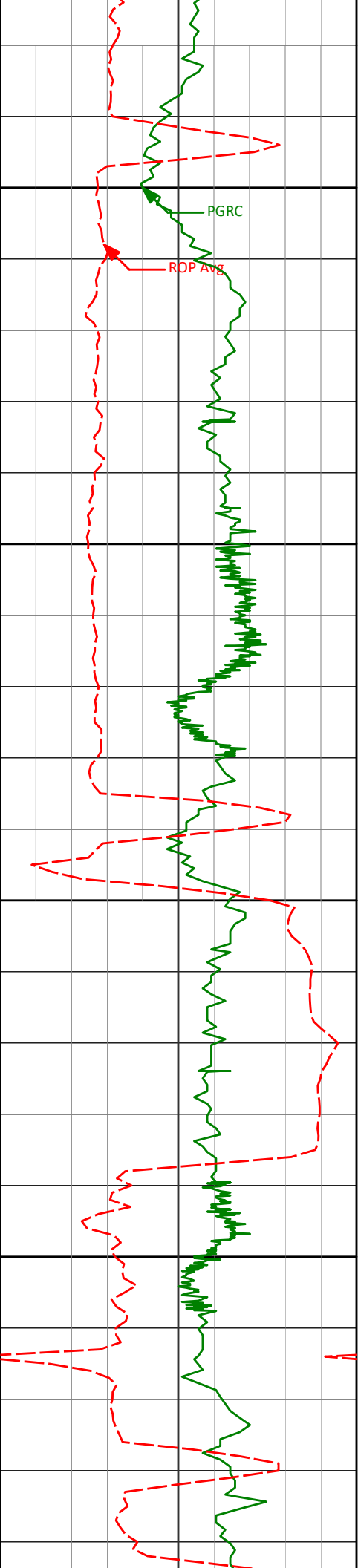
10733'

89.26°

87.20°

6618.85'

4269.32'



10800

10828'

91.51°

87.25°

6618.21'

4363.96'

10850

10900

10923'

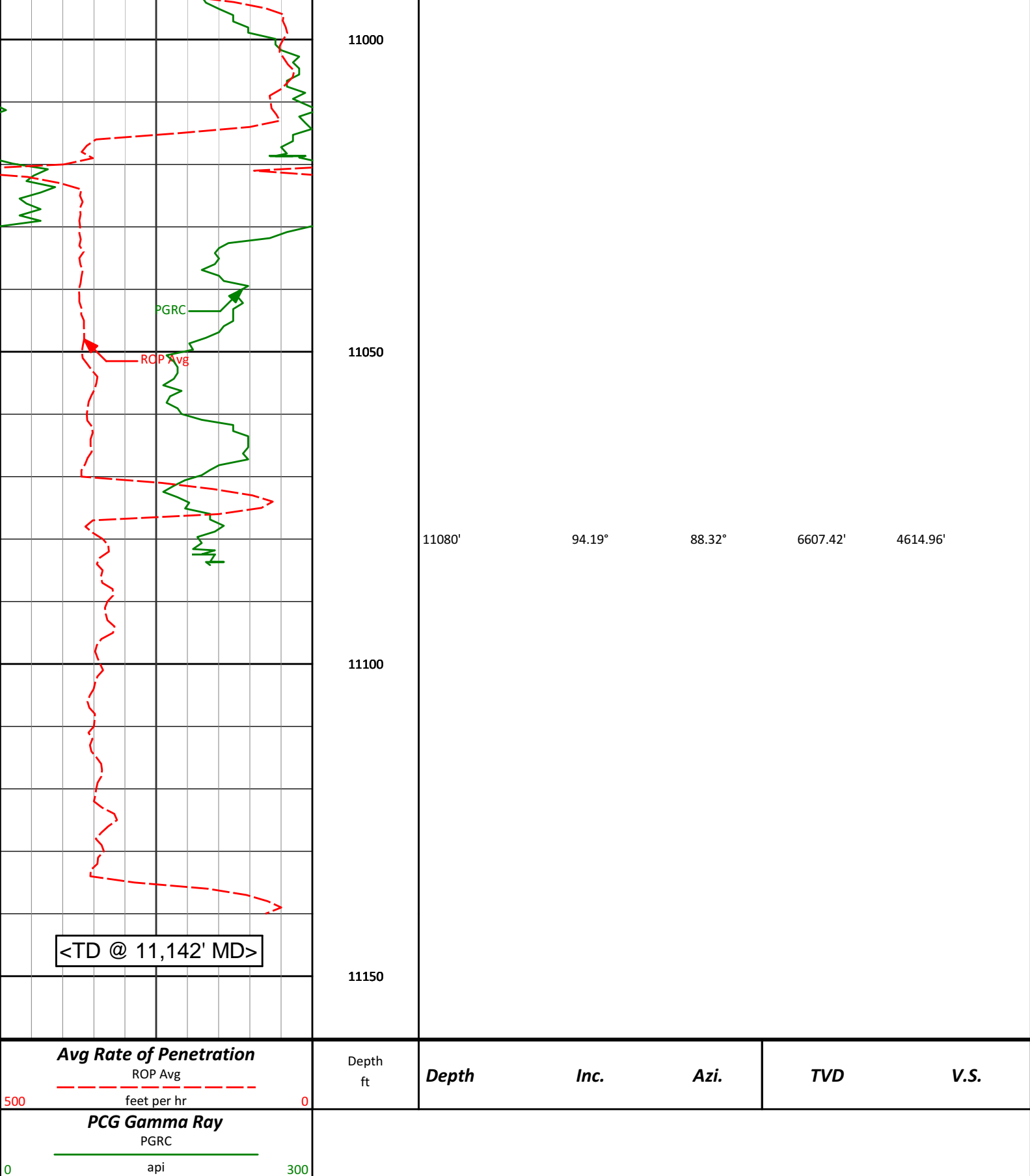
91.73°

87.64°

6615.53'

4458.60'

10950



HALLIBURTON

DIRECTIONAL SURVEY REPORT

**Noble Energy
Wells Ranch AE18-63-1HN
Wattenberg**

Wattenberg
Weld Colorado
USA
CA-XX-0009957677
Survey depth 633 ft created to tie surveys onto bottom of the surface casing shoe.
Last survey is a projection to TD.

| <i>Measured Depth (feet)</i> | <i>Inclination (degrees)</i> | <i>Direction (degrees)</i> | <i>Vertical Depth (feet)</i> | <i>Latitude (feet)</i> | <i>Departure (feet)</i> | <i>Vertical Section (feet)</i> | <i>Dogleg (deg/100ft)</i> |
|--------------------------------------|----------------------------------|--------------------------------|--------------------------------------|----------------------------|-----------------------------|--|-------------------------------|
| 633.00 | 0.00 | 0.00 | 633.00 | 0.00 N | 0.00 E | 0.00 | TIE-IN |
| 714.00 | 0.65 | 342.65 | 714.00 | 0.44 N | 0.14 W | -0.15 | 0.80 |
| 807.00 | 0.50 | 323.63 | 806.99 | 1.27 N | 0.54 W | -0.58 | 0.26 |
| 900.00 | 0.97 | 318.09 | 899.99 | 2.18 N | 1.30 W | -1.38 | 0.51 |
| 992.00 | 1.96 | 290.18 | 991.96 | 3.30 N | 3.30 W | -3.42 | 1.29 |
| 1084.00 | 2.00 | 291.61 | 1083.90 | 4.44 N | 6.27 W | -6.43 | 0.07 |
| 1177.00 | 0.56 | 221.60 | 1176.88 | 4.70 N | 8.08 W | -8.25 | 2.03 |
| 1270.00 | 0.22 | 180.93 | 1269.88 | 4.18 N | 8.38 W | -8.54 | 0.45 |
| 1362.00 | 0.80 | 239.15 | 1361.87 | 3.68 N | 8.94 W | -9.07 | 0.77 |
| 1457.00 | 0.53 | 261.33 | 1456.87 | 3.27 N | 9.95 W | -10.06 | 0.39 |
| 1552.00 | 0.62 | 239.80 | 1551.86 | 2.95 N | 10.82 W | -10.93 | 0.24 |
| 1646.00 | 0.59 | 252.57 | 1645.86 | 2.55 N | 11.72 W | -11.81 | 0.15 |
| 1741.00 | 0.72 | 291.94 | 1740.85 | 2.63 N | 12.74 W | -12.83 | 0.48 |
| 1836.00 | 2.84 | 239.56 | 1835.80 | 1.66 N | 15.32 W | -15.37 | 2.59 |
| 1931.00 | 3.37 | 255.04 | 1930.67 | 0.26 S | 20.05 W | -20.03 | 1.04 |
| 2026.00 | 4.85 | 254.82 | 2025.42 | 2.03 S | 26.62 W | -26.53 | 1.55 |
| 2121.00 | 5.69 | 244.82 | 2120.02 | 5.08 S | 34.76 W | -34.54 | 1.31 |
| 2215.00 | 7.26 | 239.95 | 2213.42 | 10.04 S | 44.12 W | -43.71 | 1.77 |
| 2310.00 | 8.71 | 233.22 | 2307.49 | 17.35 S | 55.08 W | -54.38 | 1.81 |
| 2405.00 | 9.39 | 218.94 | 2401.32 | 27.69 S | 65.71 W | -64.62 | 2.46 |
| 2500.00 | 10.01 | 209.12 | 2494.97 | 40.94 S | 74.61 W | -73.00 | 1.86 |
| 2594.00 | 9.94 | 196.31 | 2587.56 | 55.86 S | 80.86 W | -78.69 | 2.36 |
| 2689.00 | 11.14 | 194.71 | 2680.96 | 72.61 S | 85.49 W | -82.68 | 1.30 |
| 2784.00 | 11.34 | 188.36 | 2774.14 | 90.72 S | 89.18 W | -85.68 | 1.32 |
| 2878.00 | 11.97 | 190.40 | 2866.20 | 109.46 S | 92.28 W | -88.07 | 0.80 |
| 2973.00 | 12.57 | 188.98 | 2959.03 | 129.36 S | 95.67 W | -90.71 | 0.70 |
| 3067.00 | 12.84 | 193.34 | 3050.73 | 149.63 S | 99.68 W | -93.94 | 1.06 |
| 3162.00 | 11.97 | 193.66 | 3143.51 | 169.47 S | 104.44 W | -97.95 | 0.92 |
| 3257.00 | 10.80 | 189.51 | 3236.64 | 187.81 S | 108.24 W | -101.05 | 1.50 |
| 3352.00 | 10.87 | 193.36 | 3329.95 | 205.31 S | 111.78 W | -103.92 | 0.77 |
| 3447.00 | 9.35 | 194.36 | 3423.47 | 221.51 S | 115.76 W | -107.29 | 1.61 |
| 3541.00 | 7.63 | 180.54 | 3516.45 | 235.15 S | 117.72 W | -108.73 | 2.83 |
| 3636.00 | 7.60 | 188.66 | 3610.61 | 247.67 S | 118.72 W | -109.26 | 1.13 |
| 3731.00 | 9.20 | 193.46 | 3704.59 | 261.26 S | 121.43 W | -111.46 | 1.83 |
| 3826.00 | 10.02 | 199.20 | 3798.26 | 276.46 S | 125.92 W | -115.36 | 1.33 |
| 3921.00 | 9.96 | 193.94 | 3891.82 | 292.23 S | 130.62 W | -119.46 | 0.96 |
| 4016.00 | 8.97 | 186.58 | 3985.53 | 307.56 S | 133.44 W | -121.70 | 1.64 |
| 4111.00 | 5.83 | 185.54 | 4079.73 | 319.72 S | 134.76 W | -122.56 | 3.30 |
| 4206.00 | 2.62 | 188.37 | 4174.46 | 326.68 S | 135.54 W | -123.08 | 3.39 |
| 4300.00 | 0.54 | 97.83 | 4268.42 | 328.87 S | 135.42 W | -122.87 | 2.85 |
| 4585.00 | 1.46 | 168.33 | 4553.38 | 332.61 S | 133.36 W | -120.67 | 0.48 |
| 4869.00 | 0.81 | 54.16 | 4837.35 | 334.98 S | 131.00 W | -118.22 | 0.68 |
| 4961.00 | 1.32 | 80.85 | 4929.34 | 334.44 S | 129.43 W | -116.67 | 0.76 |
| 5056.00 | 0.58 | 80.34 | 5024.32 | 334.18 S | 127.87 W | -115.13 | 0.77 |
| 5341.00 | 0.20 | 229.50 | 5309.32 | 334.26 S | 126.81 W | -114.06 | 0.27 |
| 5625.00 | 0.73 | 140.57 | 5593.31 | 335.96 S | 126.04 W | -113.23 | 0.26 |
| 5884.00 | 0.74 | 116.10 | 5852.29 | 337.96 S | 123.50 W | -110.61 | 0.12 |
| 6005.00 | 8.90 | 81.19 | 5972.77 | 336.87 S | 113.53 W | -100.69 | 6.86 |
| 6053.00 | 12.70 | 81.66 | 6019.91 | 335.54 S | 104.64 W | -91.86 | 7.92 |
| 6099.00 | 14.73 | 81.98 | 6064.59 | 333.99 S | 93.85 W | -81.13 | 4.42 |
| 6147.00 | 17.55 | 85.64 | 6110.70 | 332.59 S | 80.58 W | -67.93 | 6.25 |
| 6194.00 | 21.69 | 89.16 | 6154.96 | 331.92 S | 64.83 W | -52.21 | 9.16 |
| 6242.00 | 25.51 | 89.65 | 6198.94 | 331.73 S | 45.61 W | -33.02 | 7.97 |
| 6289.00 | 27.20 | 88.16 | 6241.05 | 331.32 S | 24.75 W | -12.19 | 3.86 |
| 6337.00 | 29.87 | 87.90 | 6283.22 | 330.53 S | 1.84 W | 10.68 | 5.56 |
| 6384.00 | 33.73 | 87.24 | 6323.16 | 329.47 S | 22.90 E | 35.36 | 8.25 |
| 6432.00 | 38.04 | 87.22 | 6362.04 | 328.11 S | 50.99 E | 63.38 | 8.99 |
| 6479.00 | 41.04 | 87.44 | 6398.28 | 326.72 S | 80.88 E | 93.19 | 6.39 |
| 6527.00 | 45.31 | 87.18 | 6433.27 | 325.17 S | 113.68 E | 125.91 | 8.91 |
| 6574.00 | 49.42 | 85.77 | 6465.10 | 323.03 S | 148.18 E | 160.31 | 9.02 |
| 6622.00 | 53.32 | 84.69 | 6495.06 | 319.90 S | 185.54 E | 197.52 | 8.31 |

| | | | | | | | |
|----------|-------|-------|---------|----------|-----------|---------|-------|
| 6669.00 | 57.54 | 85.58 | 6521.72 | 316.63 S | 224.09 E | 235.92 | 9.10 |
| 6717.00 | 61.13 | 89.09 | 6546.21 | 314.73 S | 265.32 E | 277.05 | 9.78 |
| 6764.00 | 65.21 | 90.60 | 6567.42 | 314.63 S | 307.25 E | 318.94 | 9.14 |
| 6812.00 | 69.74 | 90.23 | 6585.80 | 314.95 S | 351.58 E | 363.25 | 9.46 |
| 6859.00 | 73.79 | 90.19 | 6600.51 | 315.11 S | 396.21 E | 407.85 | 8.62 |
| 6907.00 | 78.91 | 89.01 | 6611.83 | 314.78 S | 442.83 E | 454.43 | 10.93 |
| 6953.00 | 83.86 | 88.38 | 6618.72 | 313.74 S | 488.29 E | 499.82 | 10.85 |
| 6995.00 | 88.30 | 88.27 | 6621.59 | 312.52 S | 530.16 E | 541.61 | 10.57 |
| 7094.00 | 90.28 | 87.27 | 6622.82 | 308.67 S | 629.07 E | 640.31 | 2.24 |
| 7220.00 | 89.91 | 85.87 | 6622.62 | 301.14 S | 754.84 E | 765.70 | 1.15 |
| 7315.00 | 91.63 | 89.02 | 6621.34 | 296.91 S | 849.72 E | 860.36 | 3.78 |
| 7410.00 | 90.46 | 87.80 | 6619.60 | 294.27 S | 944.67 E | 955.13 | 1.78 |
| 7505.00 | 90.09 | 89.24 | 6619.14 | 291.82 S | 1039.63 E | 1049.94 | 1.56 |
| 7600.00 | 89.11 | 89.16 | 6619.81 | 290.49 S | 1134.62 E | 1144.81 | 1.04 |
| 7695.00 | 89.97 | 89.14 | 6620.57 | 289.08 S | 1229.61 E | 1239.67 | 0.91 |
| 7790.00 | 91.05 | 87.73 | 6619.73 | 286.49 S | 1324.56 E | 1334.46 | 1.87 |
| 7885.00 | 90.15 | 87.44 | 6618.74 | 282.48 S | 1419.47 E | 1429.15 | 0.99 |
| 7980.00 | 89.78 | 86.60 | 6618.79 | 277.55 S | 1514.34 E | 1523.77 | 0.96 |
| 8075.00 | 91.29 | 88.49 | 6617.89 | 273.48 S | 1609.24 E | 1618.45 | 2.54 |
| 8170.00 | 90.00 | 89.53 | 6616.82 | 271.83 S | 1704.22 E | 1713.29 | 1.75 |
| 8265.00 | 89.23 | 89.55 | 6617.46 | 271.07 S | 1799.22 E | 1808.19 | 0.81 |
| 8359.00 | 89.48 | 89.39 | 6618.52 | 270.19 S | 1893.21 E | 1902.08 | 0.31 |
| 8454.00 | 89.07 | 87.64 | 6619.72 | 267.73 S | 1988.16 E | 1996.87 | 1.89 |
| 8549.00 | 89.97 | 85.61 | 6620.51 | 262.14 S | 2082.99 E | 2091.42 | 2.33 |
| 8644.00 | 90.95 | 87.54 | 6619.75 | 256.46 S | 2177.81 E | 2185.96 | 2.28 |
| 8739.00 | 88.64 | 87.00 | 6620.08 | 251.94 S | 2272.69 E | 2280.60 | 2.50 |
| 8834.00 | 90.62 | 86.68 | 6620.69 | 246.71 S | 2367.54 E | 2375.19 | 2.10 |
| 8929.00 | 90.18 | 86.58 | 6620.03 | 241.13 S | 2462.38 E | 2469.74 | 0.47 |
| 9024.00 | 90.43 | 88.32 | 6619.52 | 236.91 S | 2557.28 E | 2564.41 | 1.85 |
| 9119.00 | 91.42 | 89.05 | 6617.98 | 234.74 S | 2652.24 E | 2659.22 | 1.29 |
| 9214.00 | 90.00 | 89.37 | 6616.81 | 233.43 S | 2747.22 E | 2754.09 | 1.53 |
| 9309.00 | 90.12 | 88.80 | 6616.71 | 231.91 S | 2842.21 E | 2848.95 | 0.61 |
| 9404.00 | 88.52 | 87.97 | 6617.83 | 229.23 S | 2937.16 E | 2943.73 | 1.90 |
| 9499.00 | 90.18 | 87.84 | 6618.90 | 225.77 S | 3032.09 E | 3038.46 | 1.76 |
| 9594.00 | 89.88 | 86.62 | 6618.85 | 221.18 S | 3126.97 E | 3133.11 | 1.33 |
| 9688.00 | 91.70 | 90.19 | 6617.56 | 218.56 S | 3220.91 E | 3226.87 | 4.27 |
| 9783.00 | 89.29 | 89.35 | 6616.74 | 218.18 S | 3315.90 E | 3321.78 | 2.68 |
| 9878.00 | 89.20 | 89.49 | 6617.99 | 217.22 S | 3410.88 E | 3416.66 | 0.18 |
| 9973.00 | 89.14 | 89.54 | 6619.37 | 216.41 S | 3505.87 E | 3511.55 | 0.08 |
| 10068.00 | 90.62 | 89.42 | 6619.57 | 215.55 S | 3600.86 E | 3606.44 | 1.56 |
| 10163.00 | 90.74 | 87.93 | 6618.45 | 213.35 S | 3695.83 E | 3701.26 | 1.57 |
| 10258.00 | 91.20 | 87.45 | 6616.84 | 209.52 S | 3790.74 E | 3795.95 | 0.70 |
| 10353.00 | 90.31 | 87.51 | 6615.58 | 205.35 S | 3885.64 E | 3890.63 | 0.94 |
| 10448.00 | 90.28 | 87.90 | 6615.10 | 201.54 S | 3980.56 E | 3985.34 | 0.42 |
| 10543.00 | 89.75 | 87.41 | 6615.07 | 197.66 S | 4075.48 E | 4080.04 | 0.76 |
| 10638.00 | 88.22 | 87.38 | 6616.76 | 193.34 S | 4170.36 E | 4174.69 | 1.62 |
| 10733.00 | 89.26 | 87.20 | 6618.85 | 188.84 S | 4265.23 E | 4269.32 | 1.12 |
| 10828.00 | 91.51 | 87.25 | 6618.21 | 184.25 S | 4360.11 E | 4363.96 | 2.37 |
| 10923.00 | 91.73 | 87.64 | 6615.53 | 180.02 S | 4454.98 E | 4458.60 | 0.47 |
| 11080.00 | 94.19 | 88.32 | 6607.42 | 174.50 S | 4611.66 E | 4614.96 | 1.63 |
| 11142.00 | 94.19 | 88.32 | 6602.89 | 172.69 S | 4673.47 E | 4676.65 | 0.01 |

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 CLOSURE OF 92.12 DEGREES (GRID)
A TOTAL CORRECTION OF 7.79 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11142.00 FEET
IS 4676.66 FEET ALONG 92.12 DEGREES (GRID)**