

PCGK: Pressure Case Gamma
PCDC: Pressure Case Directional

[illegible]

WELL INFORMATION

MWD Run Number	200	300	400		
Date run completed	09-Jul-14	11-Jul-14	12-Jul-14		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.750	6.750	4.750		
Log Start Depth (MD, ft)	658.00	5,399.00	6,437.00		
Log End Depth (MD, ft)	5,398.00	6,437.00	10,397.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	08-Jul-14 10:15	09-Jul-14 06:50	10-Jul-14 22:00		
Drill/Wipe End Date and Time	08-Jul-14 23:45	09-Jul-14 20:00	12-Jul-14 03:00		
Min Inc (deg) @ Depth (MD, ft)	0.07 @ 996.00	0.73 @ 5,432.00	85.53 @ 6,460.00		
Max Inc (deg) @ Depth (MD, ft)	10.87 @ 2,212.00	89.17 @ 6,437.00	96.34 @ 10,397.00		
Bit TFA(in2) / Bit Type	0.74 / PDC	0.86 / PDC	0.75 / PDC		
Flow Rate (gpm)	588.17	550.00	285.00		
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		
Density (ppg) / Viscosity (spqt)	9.10 / 27.00	10.55 / 40.00	10.20 / 36.00		
Filtrate CL (ppm)	200.00	200.00	200.00		
pH / Fluid Loss (mptm)	8.60 / 40	8.90 / 40	9.00 / 35		
PV (cP) / YP (lbf2)	1 / 1.00	13 / 10.00	10 / 8.00		
% Solids / % Sand	.9 / 0	10.60 / 0.10	9.90 / 0.10		
% 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 (in F) / S	450.00 / PDM	420.00 / PDM	331.00 / PDM		

Max Tool Temp (degF) / Source	150.10 / PCM	162.80 / PCM	221.80 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Juan Pablo Centeno	Juan Pablo Centeno	Juan Pablo Centeno		
Customer Representative	Justin Fields	Justin Fields	Justin Fields		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.93	5.93	5.93		
Sub Serial Number	245494	245494	11670083		
Insert Serial Number	11620315	11620315	12001048		
Date and Time Initialized	07-Jul-14 20:29	01-Jan-70 00:00	09-Jul-14 23:12		
Date and Time Read	10-Jul-14 01:01	10-Jul-14 01:06	12-Jul-14 10:51		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	53.91	52.03	61.94		
Software Version	6.21	6.21	6.21		
Sub Serial Number	245494	245494	11670083		
Sonde Serial Number	11638628	11638628	11297623		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	195.65	262.30	15.95		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	48.81	46.93	56.84		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	245494	245494	11670083		
Insert/Sonde Serial Number	11579806	11579806	11293276		

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 8.0.0
6. Gamma presented inside casing/cement from 6370 ft. MD to 6427 ft. MD.

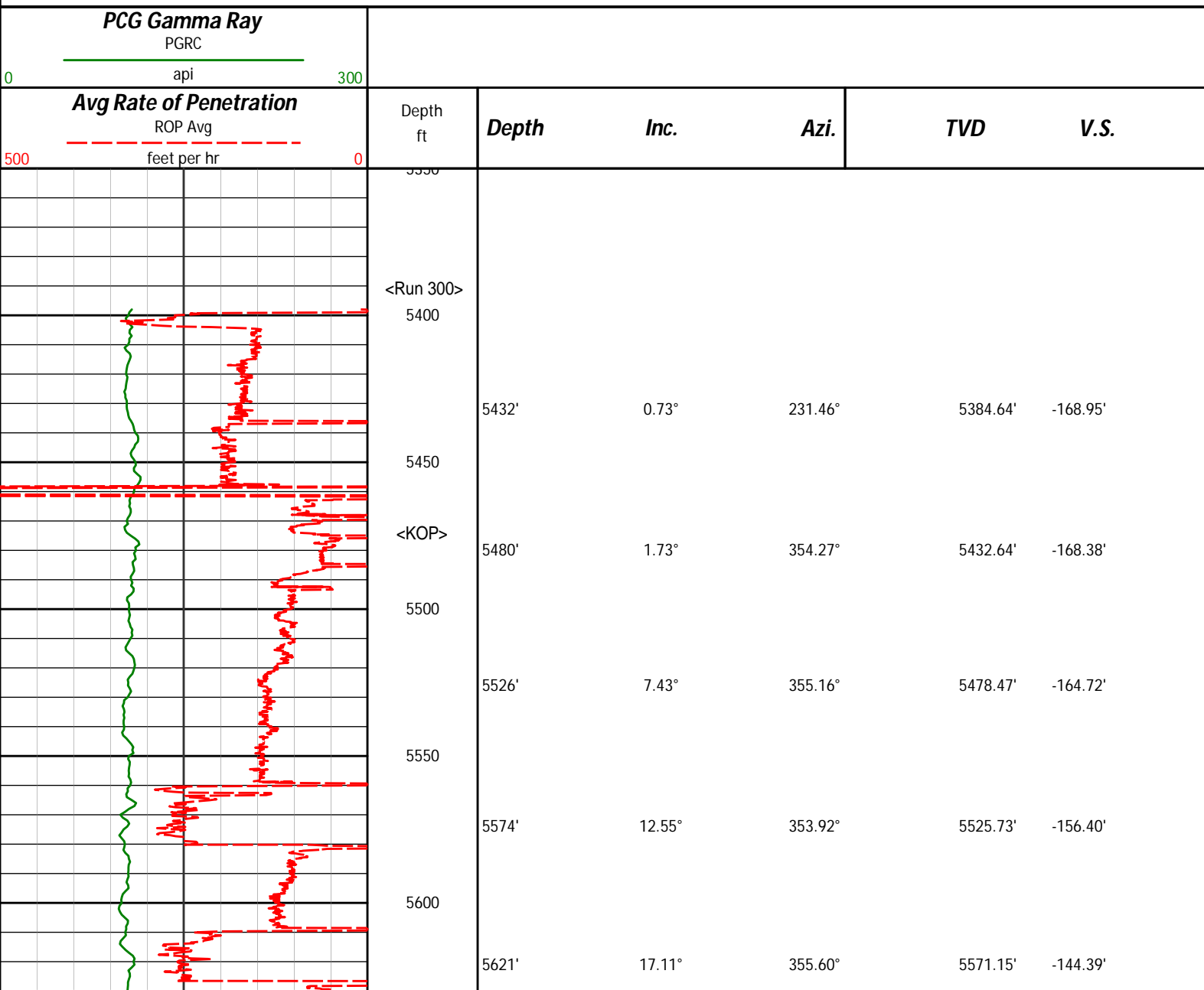
WARRANTY

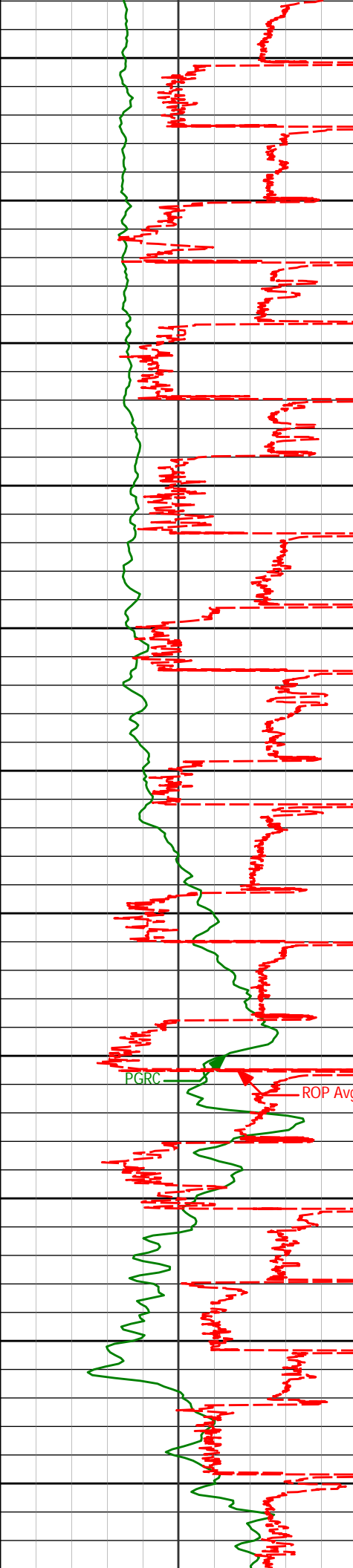
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HALLIBURTON Sperry Drilling Services

MD Main Log 1:600

Noble Energy
Cutthroat LC28-75-1AHNB
H&P 273
T9N, R59W





5650

5669'	21.34°	357.92°	5616.47'	-128.66'
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5700

5716'	25.45°	358.81°	5659.59'	-110.14'
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5750

5764'	28.00°	359.01°	5702.46'	-88.73'
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5800

5811'	30.64°	358.50°	5743.43'	-65.89'
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5850

5859'	34.28°	358.95°	5783.93'	-40.33'
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5900

5906'	38.24°	359.68°	5821.82'	-12.78'
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5950

5954'	43.13°	0.29°	5858.20'	18.16'
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6000

6001'	47.87°	359.67°	5891.14'	51.32'
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6050

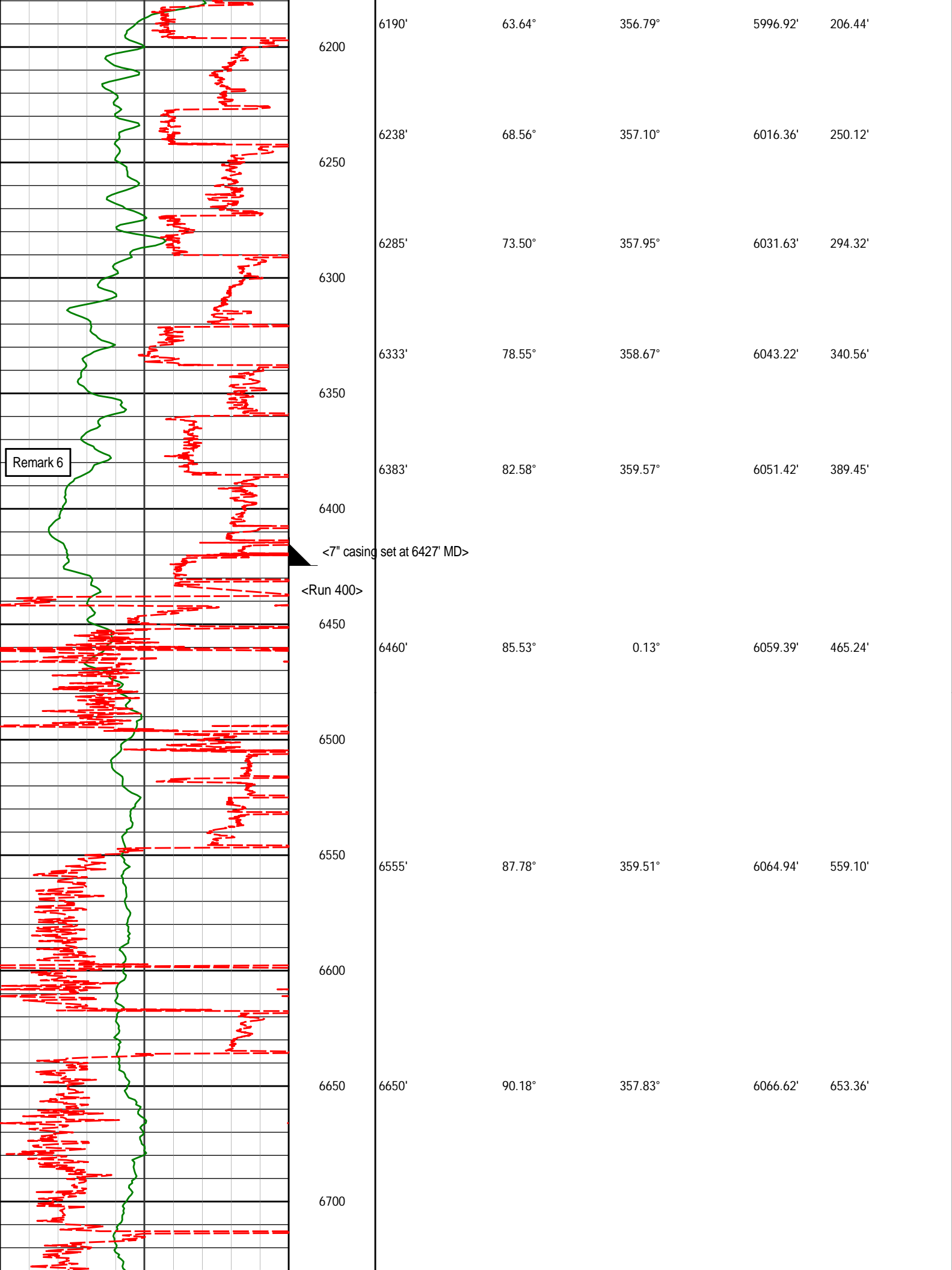
6049'	52.78°	359.01°	5921.77'	87.92'
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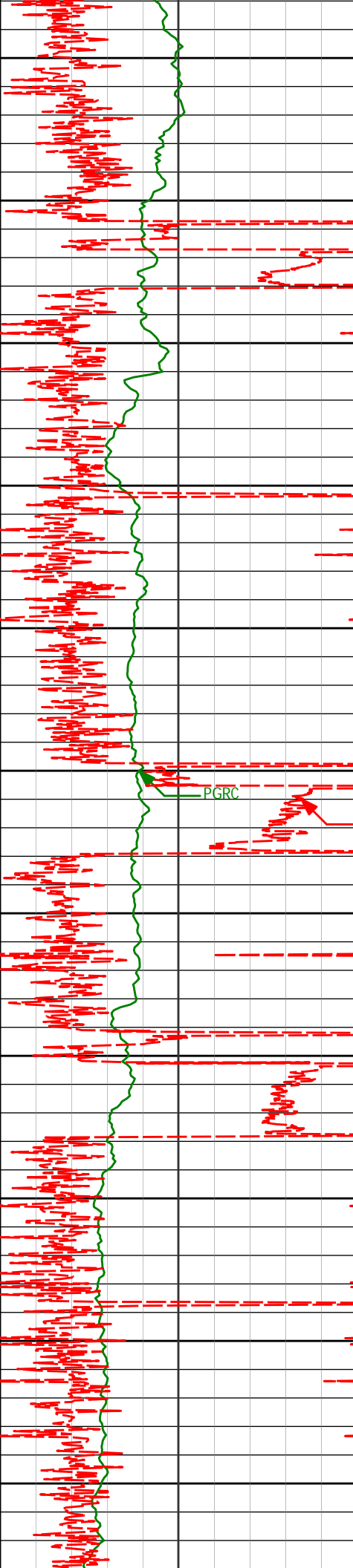
6100

6096'	56.13°	357.31°	5949.09'	125.91'
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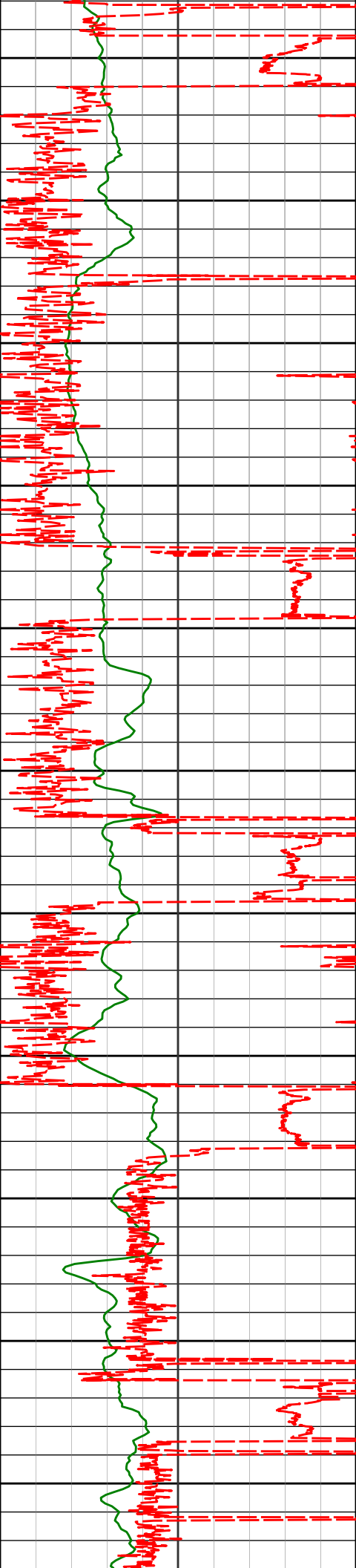
6150

6144'	58.99°	356.27°	5974.84'	166.25'
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6750	6745'	91.48°	357.26°	6065.24'	747.84'
6800					
6850	6840'	90.22°	357.50°	6063.84'	842.35'
6900					
6950	6934'	90.77°	356.57°	6063.03'	935.92'
7000					
7050	7029'	89.75°	357.87°	6062.59'	1030.47'
7100					
7150	7124'	89.66°	1.05°	6063.08'	1124.57'
7200					
7250	7219'	90.93°	2.42°	6062.59'	1218.08'



7300

7314'

90.06°

0.82°

6061.78'

1311.63'

7350

7400

7409'

91.11°

0.92°

6060.81'

1405.39'

7450

7500

7503'

90.80°

3.53°

6059.24'

1497.76'

7550

7600

7598'

90.22°

3.52°

6058.39'

1590.72'

7650

7700

7693'

88.98°

1.73°

6059.06'

1683.96'

7750

7800

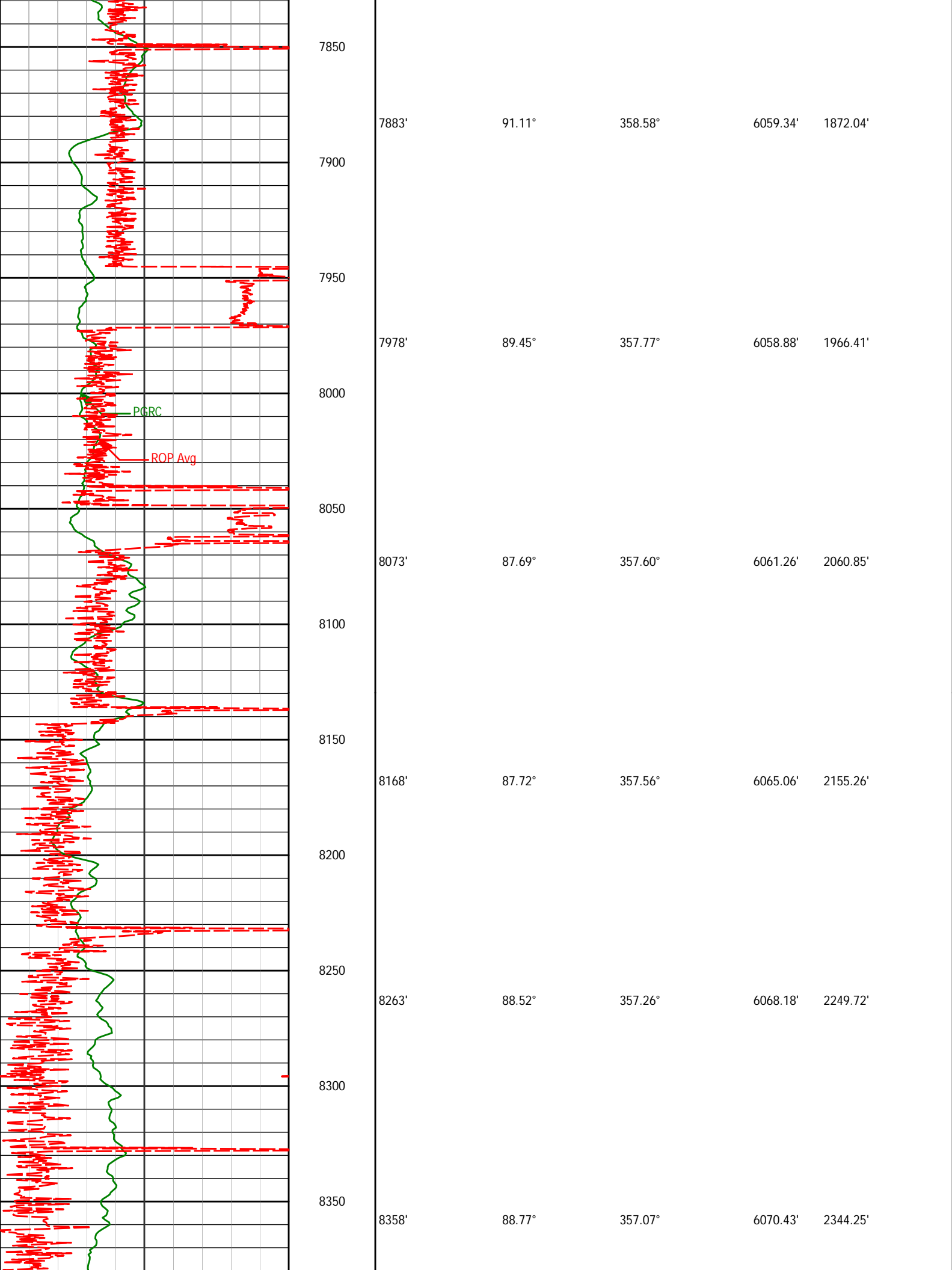
7788'

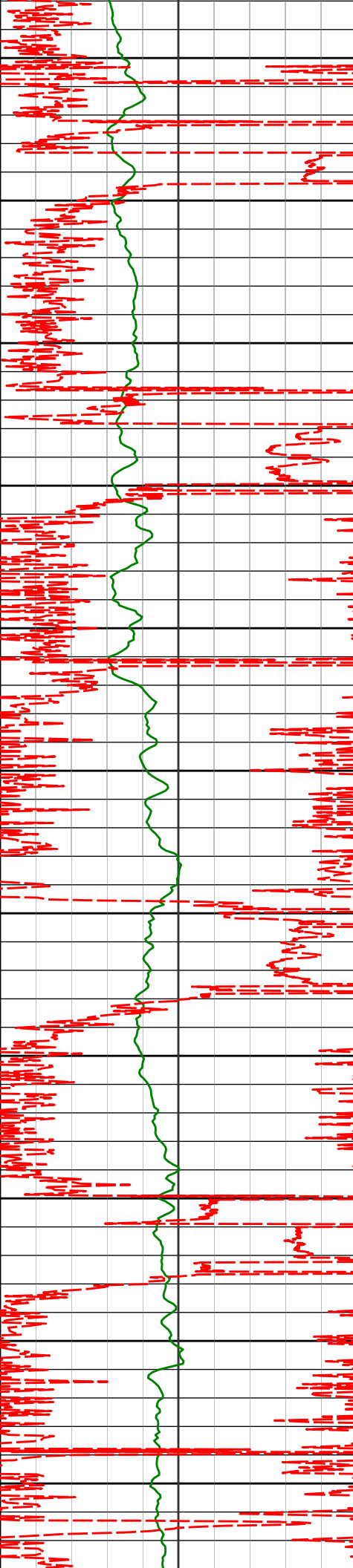
89.78°

359.25°

6060.08'

1777.81'





8400

8450

8500

8550

8600

8650

8700

8750

8800

8850

8900

8453'	91.26°	357.79°	6070.40'	2438.75'
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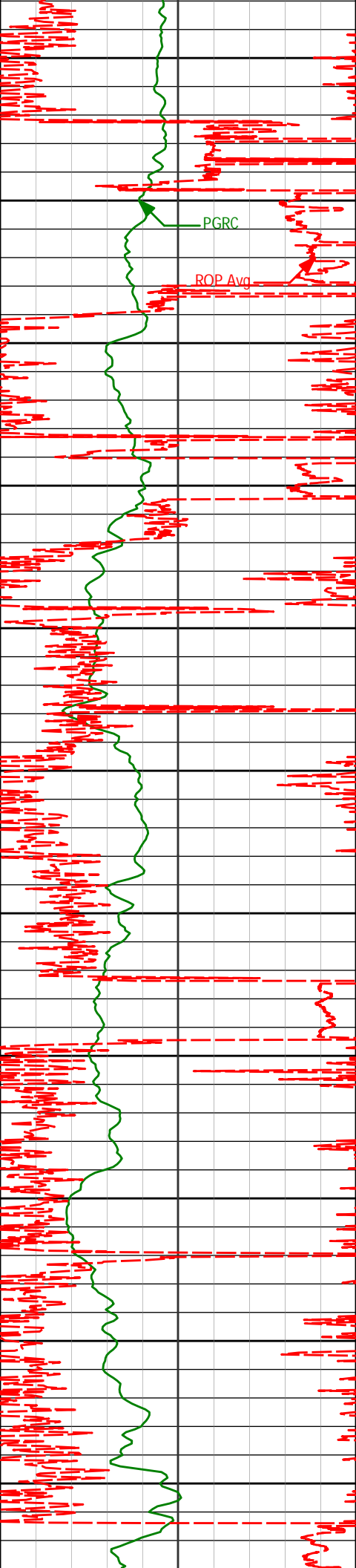
8547'	88.03°	356.59°	6070.99'	2532.29'
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8642'	87.78°	356.82°	6074.46'	2626.86'
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8737'	89.11°	356.86°	6077.04'	2721.43'
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8832'	89.94°	358.06°	6077.84'	2815.93'
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8927'	90.09°	356.47°	6077.81'	2910.46'
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8950

9000

9050

9100

9150

9200

9250

9300

9350

9400

9450

9021'

91.79°

0.19°

6076.27'

3003.79'

9116'

90.52°

1.01°

6074.35'

3097.60'

9211'

91.88°

0.83°

6072.36'

3191.33'

9306'

90.80°

1.18°

6070.14'

3285.03'

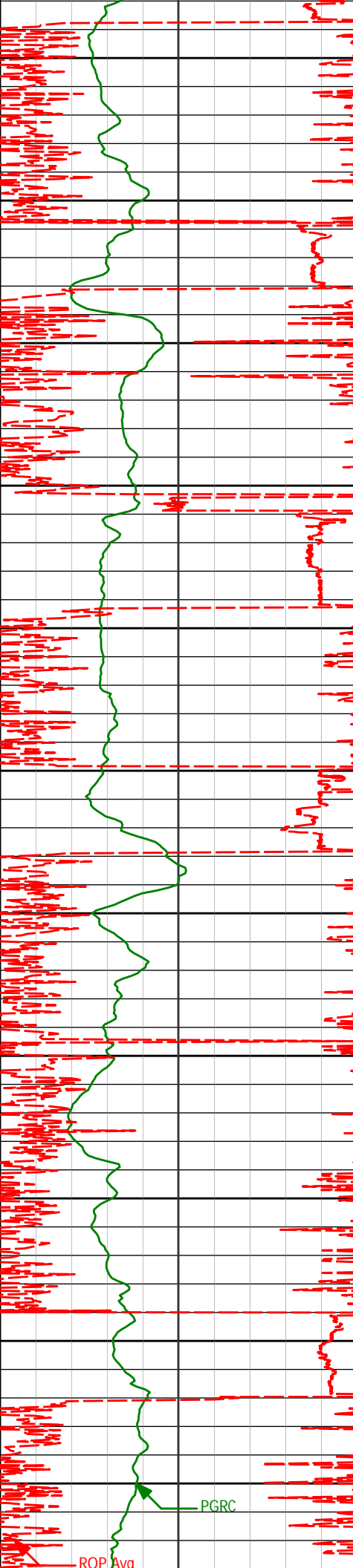
9401'

92.56°

1.16°

6067.35'

3378.67'

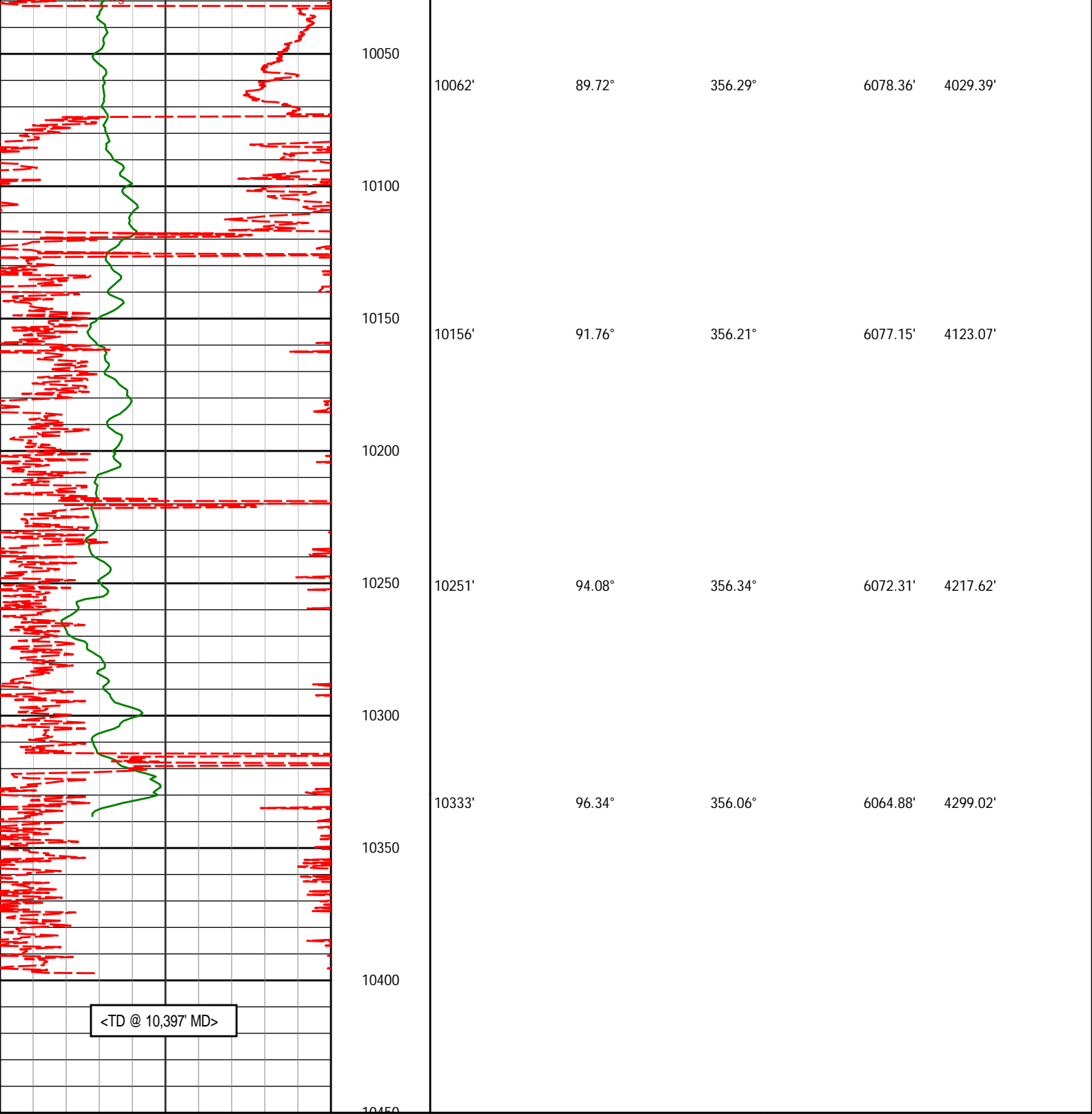


9500
9550
9600
9650
9700
9750
9800
9850
9900
9950
10000

9496'	91.54°	2.11°	6063.95'	3472.16'
9590'	90.52°	3.16°	6062.26'	3564.41'
9685'	88.80°	3.77°	6062.82'	3657.38'
9780'	86.95°	1.35°	6060.35'	3750.38'
9875'	86.61°	1.37°	6071.69'	3844.06'
9967'	87.72°	358.84°	6076.24'	3934.93'

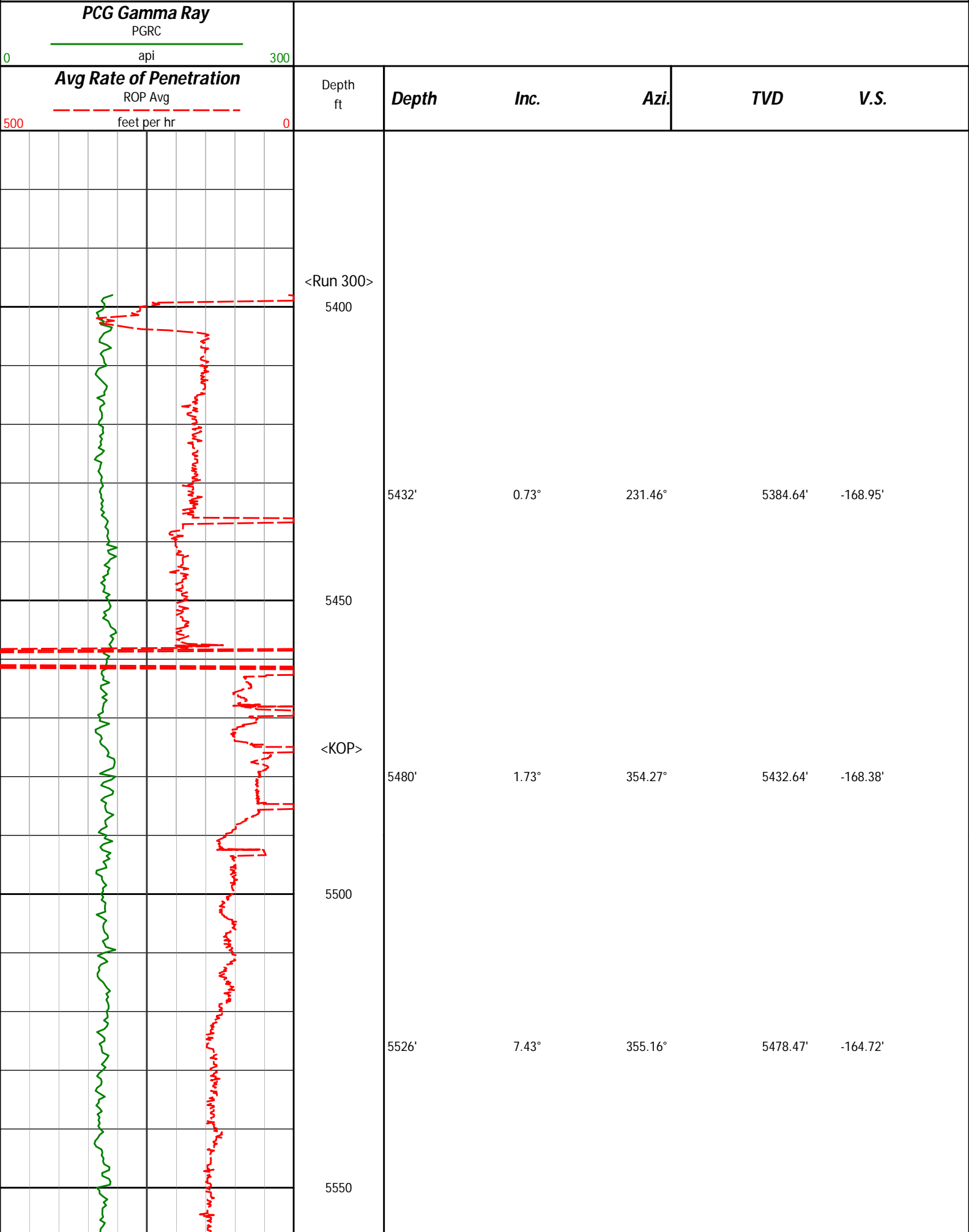
PGRC

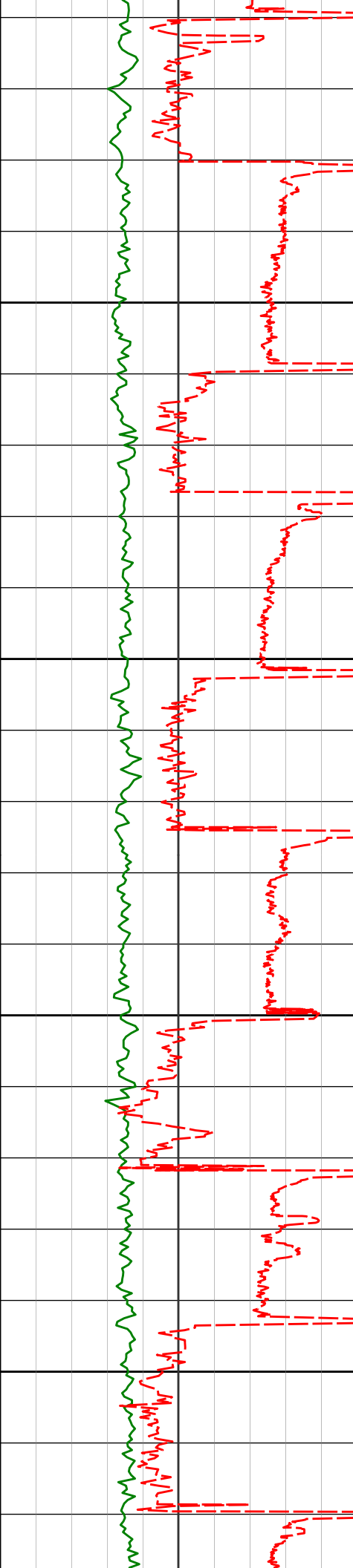
ROP Avg



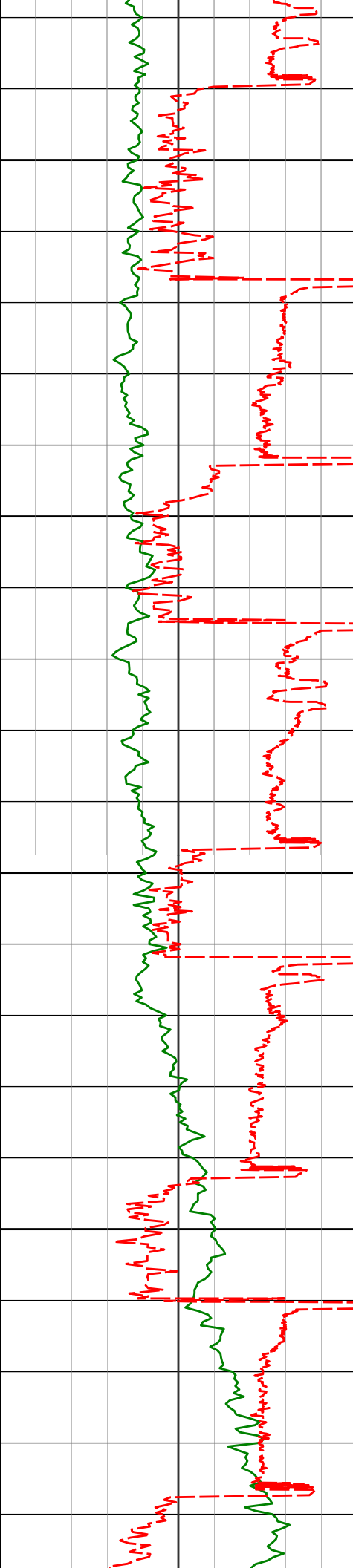
Avg Rate of Penetration ROP Avg feet per hr		Depth ft	Depth	Inc.	Azi.	TVD	V.S.
PCG Gamma Ray PGRC api							

HALLIBURTON
Sperry Drilling Services
MD Detail Log 1:240





5574'	12.55°	353.92°	5525.73'	-156.40'
5600				
5621'	17.11°	355.60°	5571.15'	-144.39'
5650				
5669'	21.34°	357.92°	5616.47'	-128.66'
5700				
5716'	25.45°	358.81°	5659.59'	-110.14'
5750				
5764'	28.00°	359.01°	5702.46'	-88.73'



5800

5811'

30.64°

358.50°

5743.43'

-65.89'

5850

5859'

34.28°

358.95°

5783.93'

-40.33'

5900

5906'

38.24°

359.68°

5821.82'

-12.78'

5950

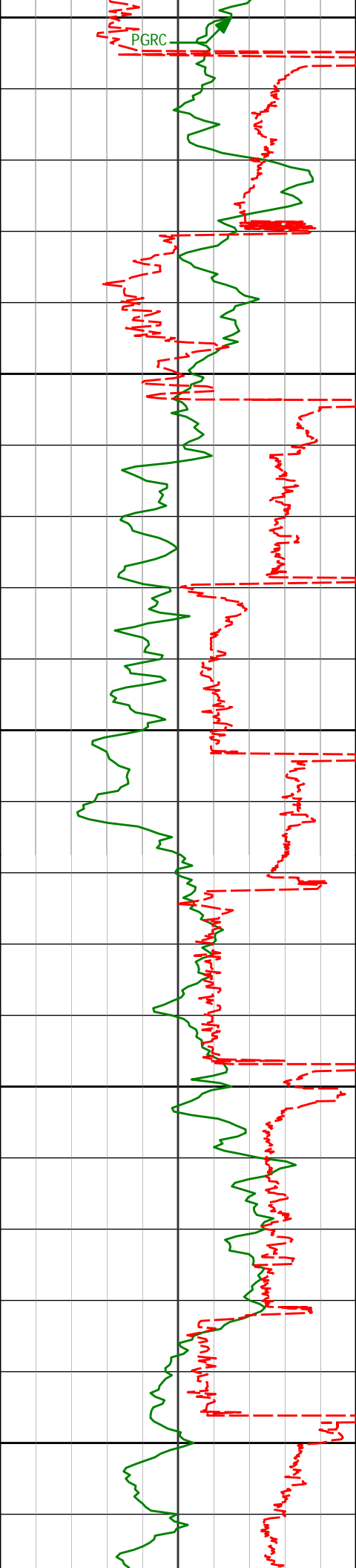
5954'

43.13°

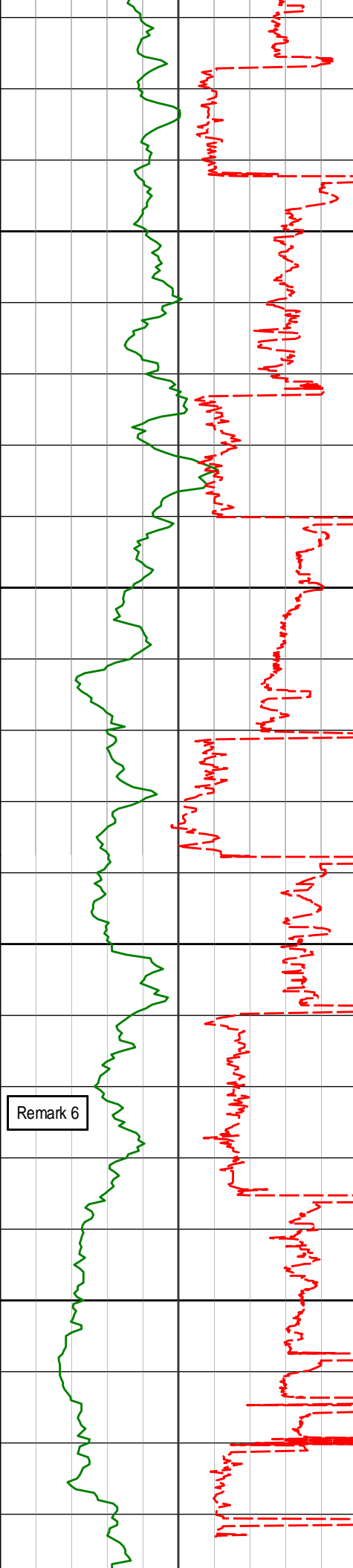
0.29°

5858.20'

18.16'



6000	6001'	47.87°	359.67°	5891.14'	51.32'
6050	6049'	52.78°	359.01°	5921.77'	87.92'
6100	6096'	56.13°	357.31°	5949.09'	125.91'
6150	6144'	58.99°	356.27°	5974.84'	166.25'
6200	6190'	63.64°	356.79°	5996.92'	206.44'



6250

6300

6350

6400

6238'

68.56°

357.10°

6016.36'

250.12'

6285'

73.50°

357.95°

6031.63'

294.32'

6333'

78.55°

358.67°

6043.22'

340.56'

6383'

82.58°

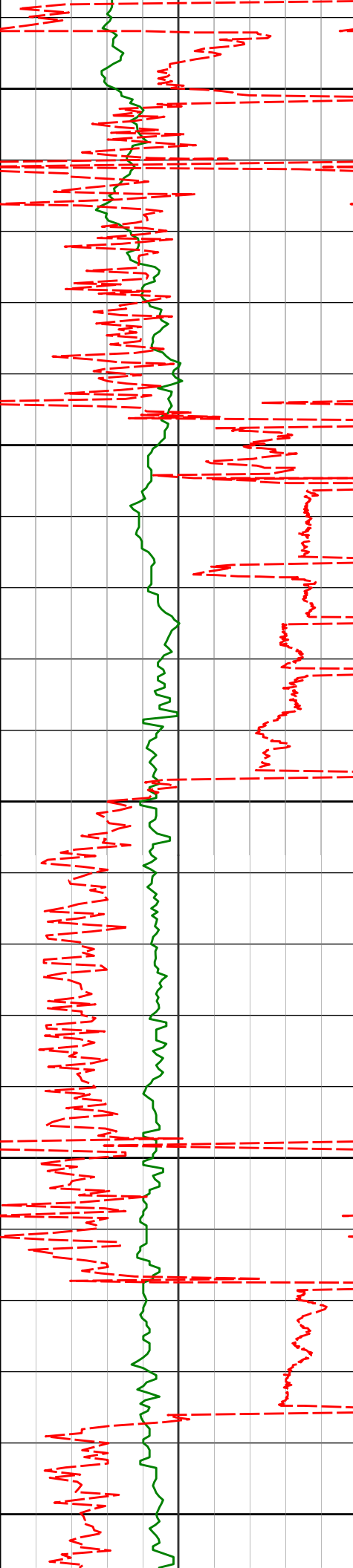
359.57°

6051.42'

389.45'

Remark 6

<7" casing set at 6427' MD>



<Run 400>

6450

6460'

85.53°

0.13°

6059.39'

465.24'

6500

6550

6555'

87.78°

359.51°

6064.94'

559.10'

6600

6650

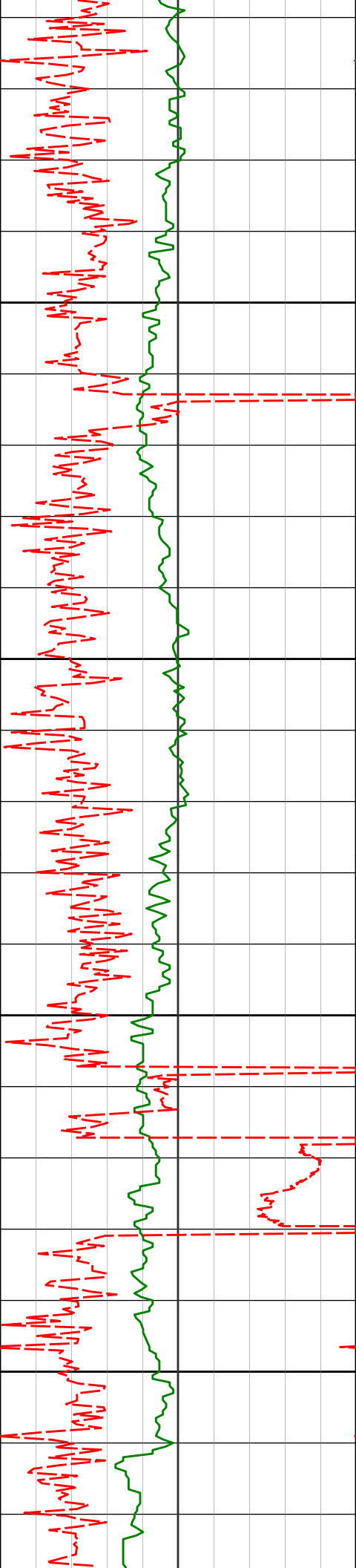
6650'

90.18°

357.83°

6066.62'

653.36'



6700

6750

6800

6850

6745'

91.48°

357.26°

6065.24'

747.84'

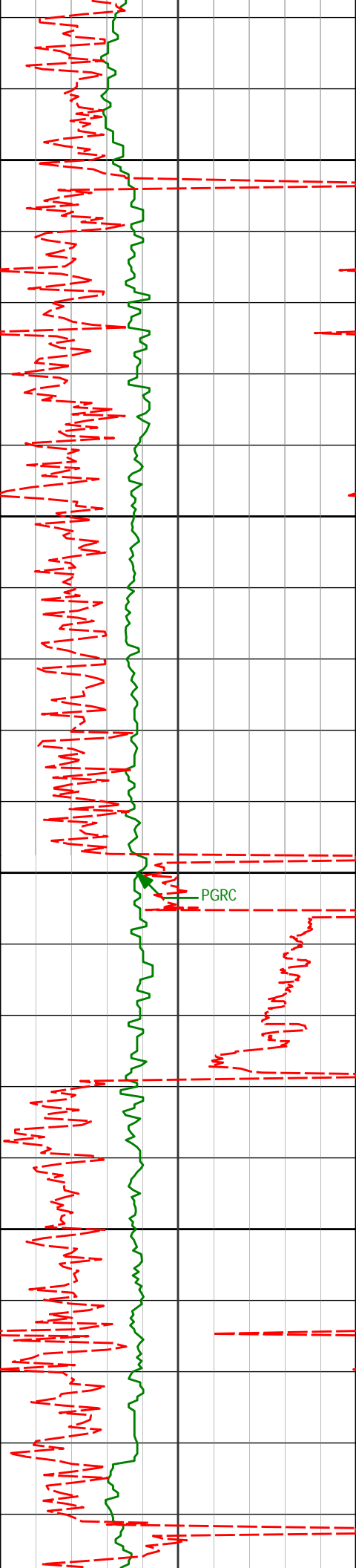
6840'

90.22°

357.50°

6063.84'

842.35'



6900

6934'

90.77°

356.57°

6063.03'

935.92'

6950

7000

7029'

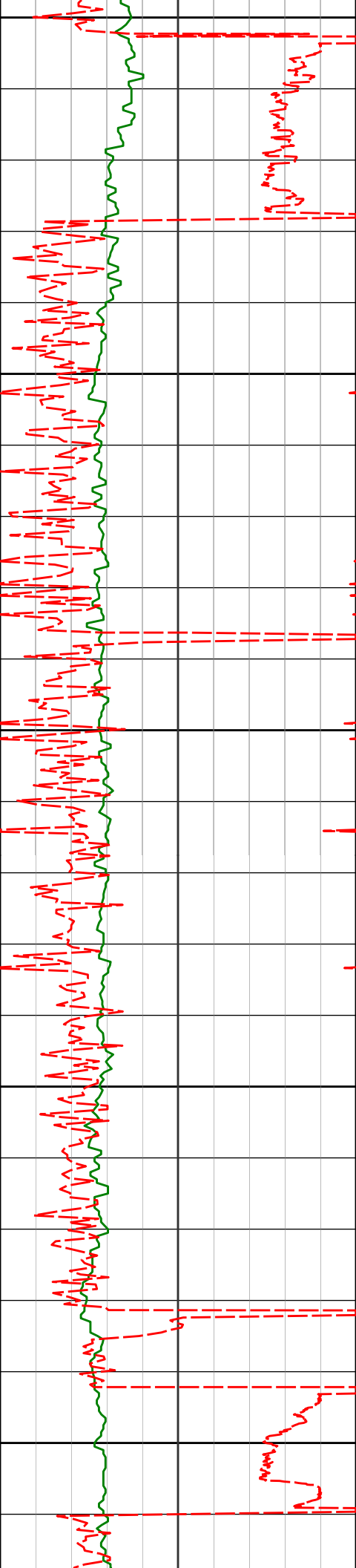
89.75°

357.87°

6062.59'

1030.47'

7050



7100

7124'

89.66°

1.05°

6063.08'

1124.57'

7150

7200

7219'

90.93°

2.42°

6062.59'

1218.08'

7250

7300

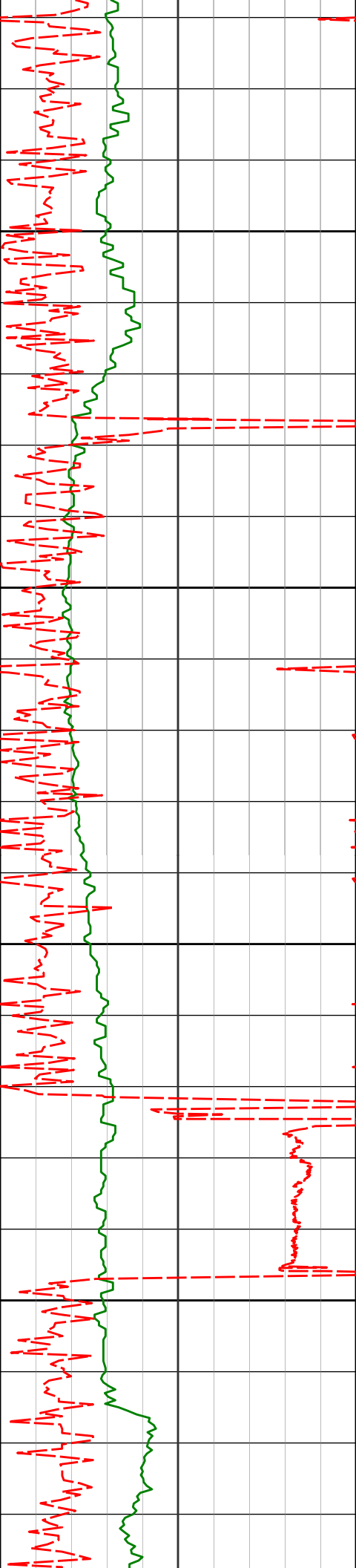
7314'

90.06°

0.82°

6061.78'

1311.63'



7350

7400

7450

7500

7409'

91.11°

0.92°

6060.81'

1405.39'

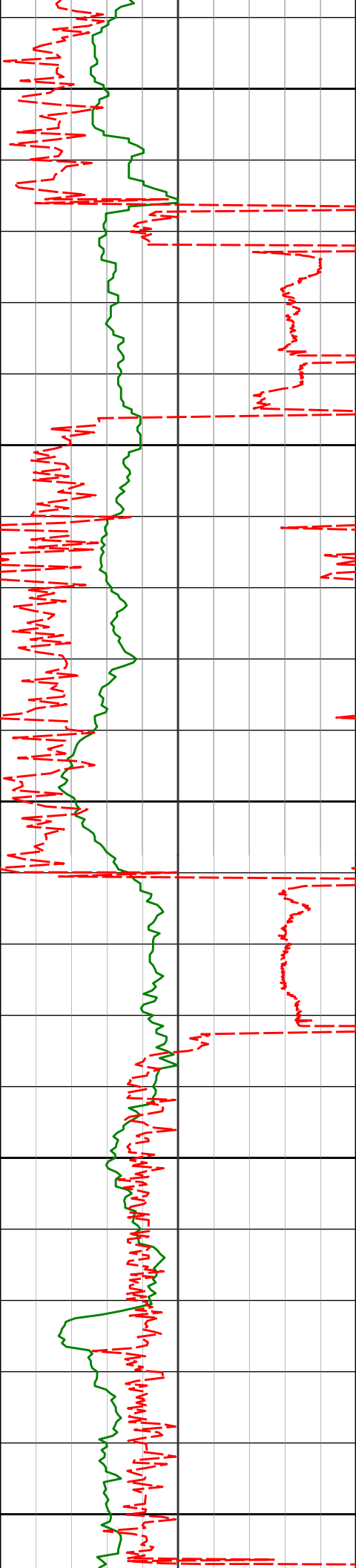
7503'

90.80°

3.53°

6059.24'

1497.76'



7550

7600

7650

7700

7750

7598'

90.22°

3.52°

6058.39'

1590.72'

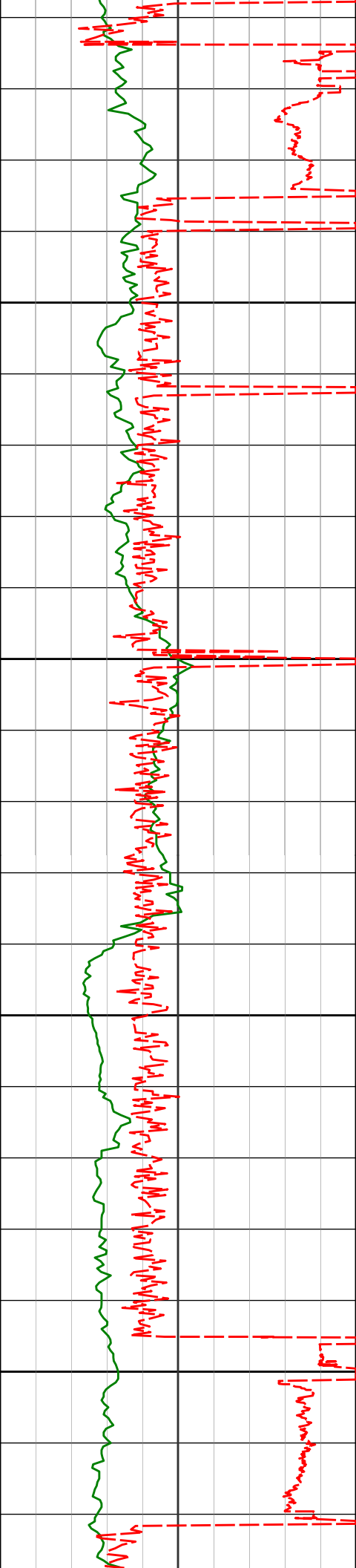
7693'

88.98°

1.73°

6059.06'

1683.96'



7788'

89.78°

359.25°

6060.08'

1777.81'

7800

7850

7883'

91.11°

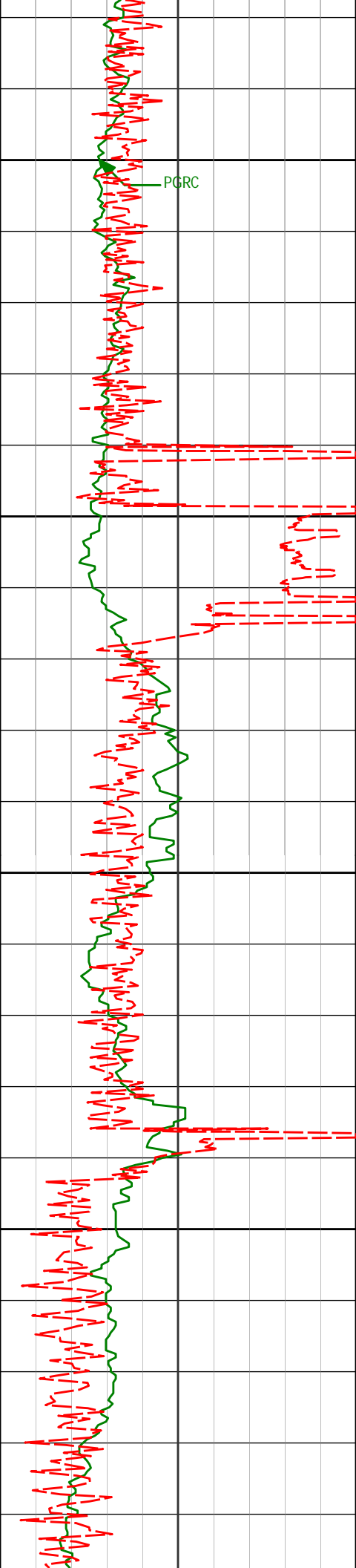
358.58°

6059.34'

1872.04'

7900

7950



8000

8050

8100

8150

8073'

87.69°

357.60°

6061.26'

2060.85'

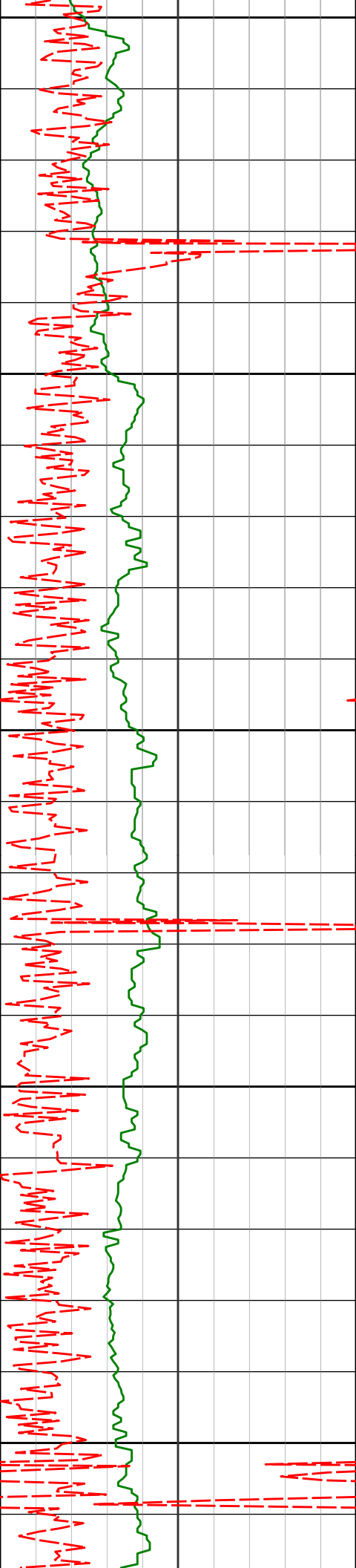
8168'

87.72°

357.56°

6065.06'

2155.26'



8200

8250

8300

8350

8400

8263'

88.52°

357.26°

6068.18'

2249.72'

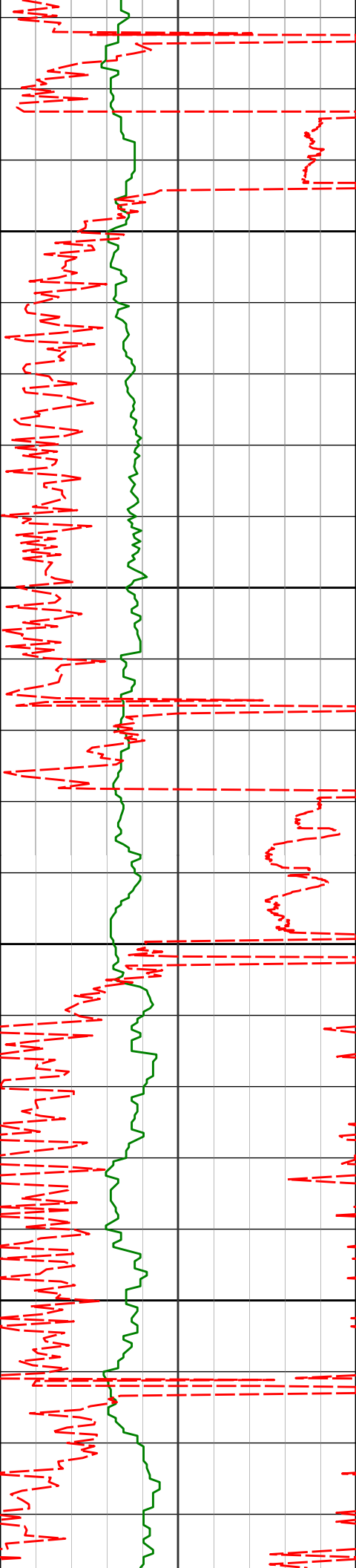
8358'

88.77°

357.07°

6070.43'

2344.25'



8450

8453'

91.26°

357.79°

6070.40'

2438.75'

8500

8550

8547'

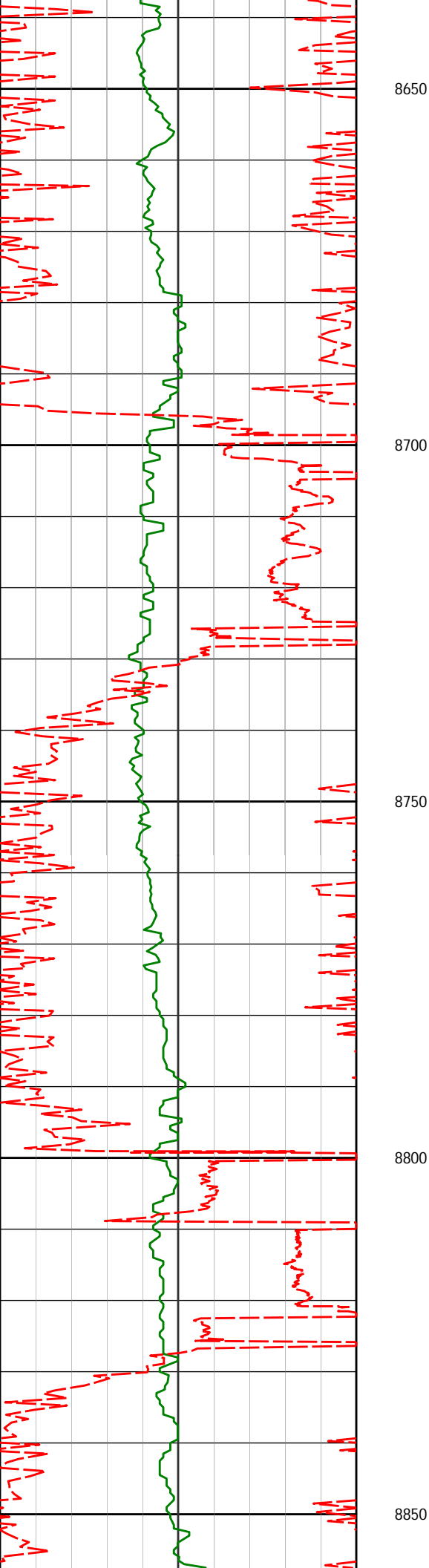
88.03°

356.59°

6070.99'

2532.29'

8600



8642'

87.78°

356.82°

6074.46'

2626.86'

8650

8700

8737'

89.11°

356.86°

6077.04'

2721.43'

8750

8800

8832'

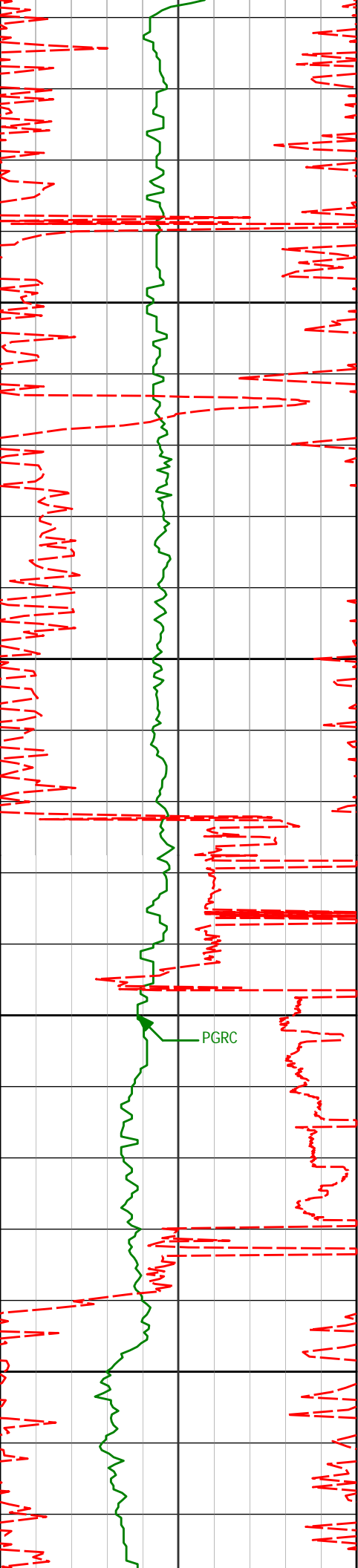
89.94°

358.06°

6077.84'

2815.93'

8850



8900

8927'

90.09°

356.47°

6077.81'

2910.46'

8950

9000

9021'

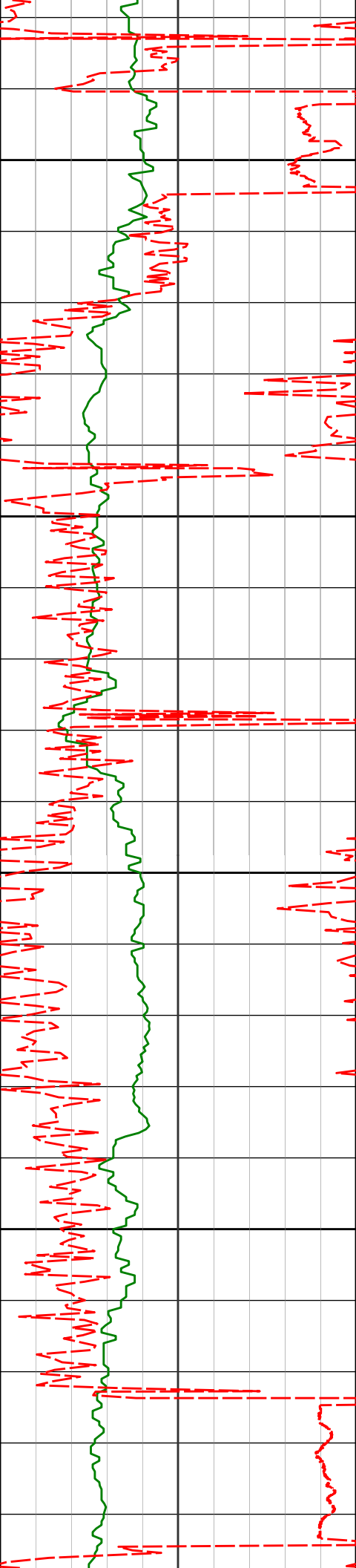
91.79°

0.19°

6076.27'

3003.79'

9050



9100

9116'

90.52°

1.01°

6074.35'

3097.60'

9150

9200

9211'

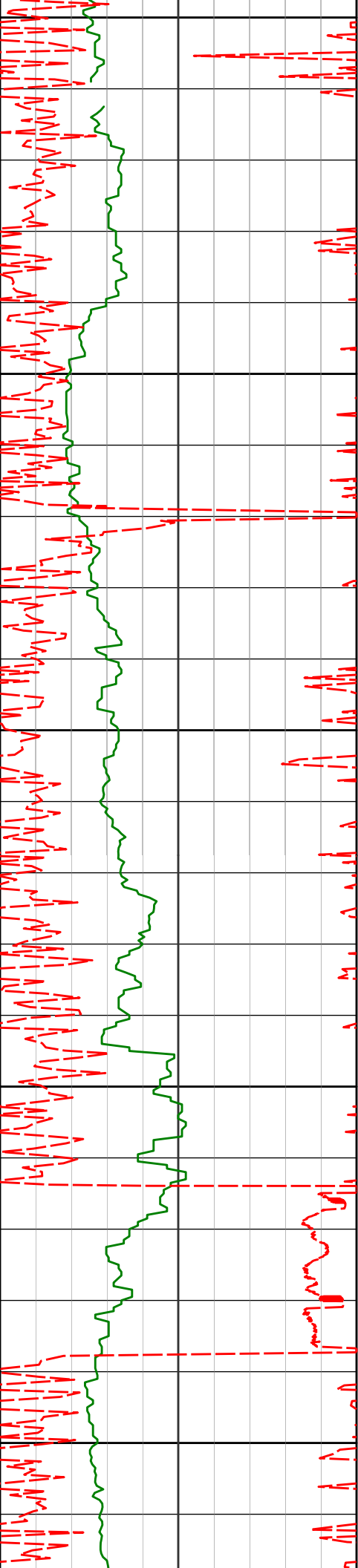
91.88°

0.83°

6072.36'

3191.33'

9250



9300

9306'

90.80°

1.18°

6070.14'

3285.03'

9350

9400

9401'

92.56°

1.16°

6067.35'

3378.67'

9450

9500

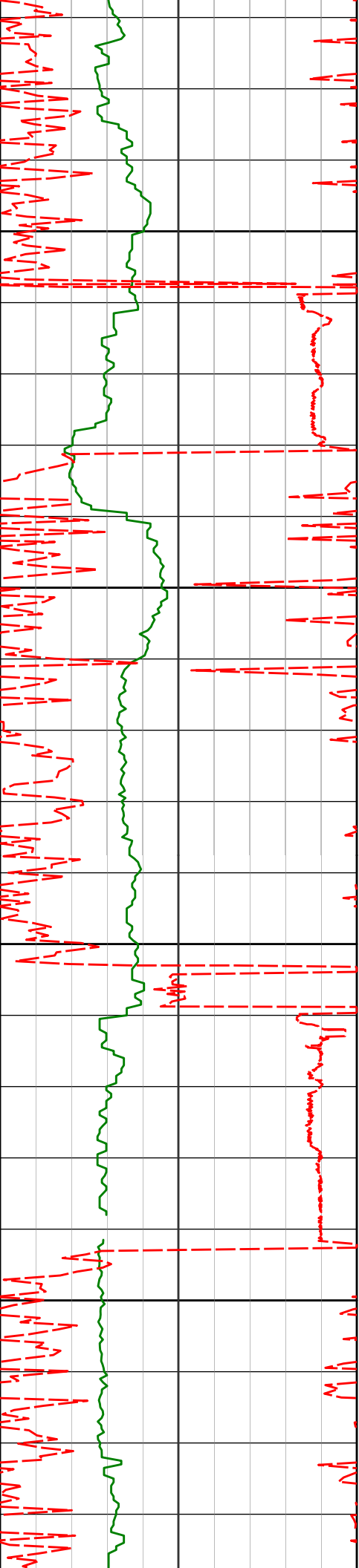
9496'

91.54°

2.11°

6063.95'

3472.16'



9550

9590'

90.52°

3.16°

6062.26'

3564.41'

9600

9650

9685'

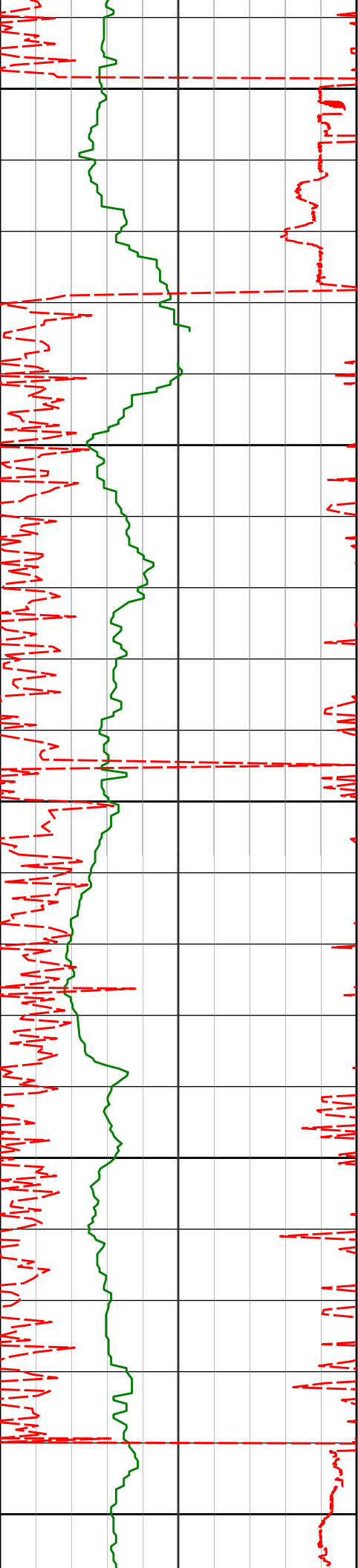
88.80°

3.77°

6062.82'

3657.38'

9700



9750

9780'

86.95°

1.35°

6066.35'

3750.58'

9800

9850

9875'

86.61°

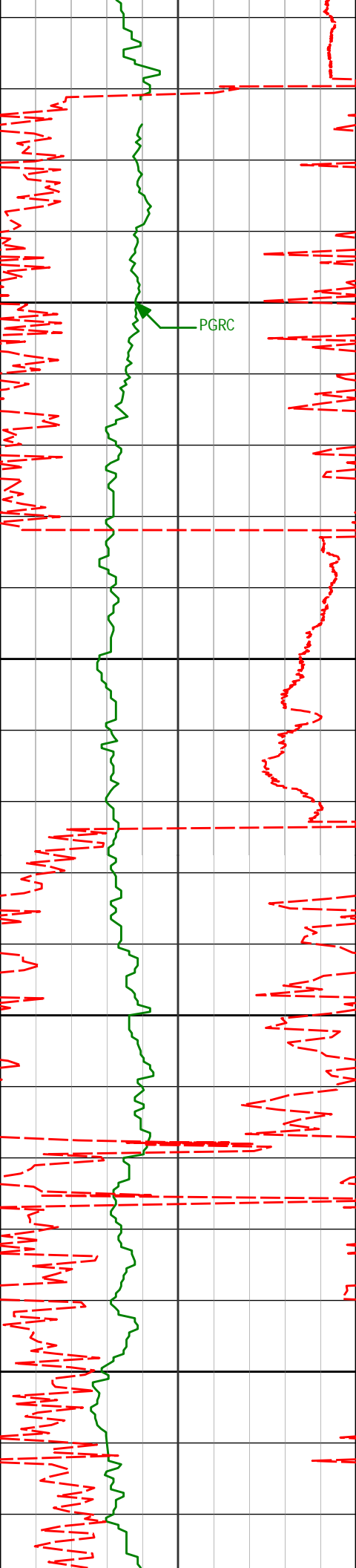
1.37°

6071.69'

3844.06'

9900

9950



9967'

87.72°

358.84°

6076.24'

3934.93'

10000

10050

10062'

89.72°

356.29°

6078.36'

4029.39'

10100

10150

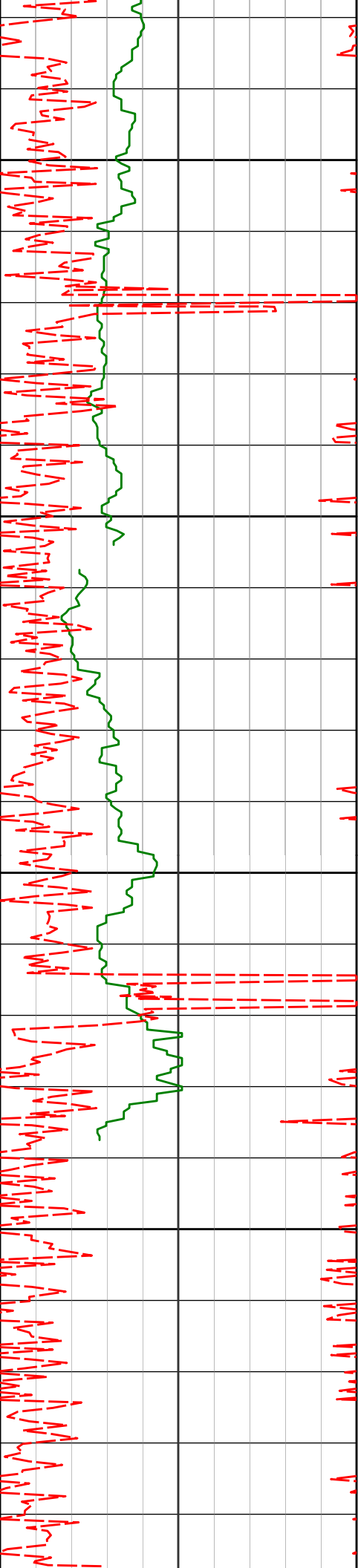
10156'

91.76°

356.21°

6077.15'

4123.07'



10200

10250

10300

10350

10251'

94.08°

356.34°

6072.31'

4217.62'

10333'

96.34°

356.06°

6064.88'

4299.02'

<div><div><TD @ 10,397' MD></div></div>										10400											
										10450											
<div><div><div>Avg Rate of Penetration</div><div>ROP Avg</div><div>500</div><div>feet per hr</div><div>0</div></div></div>										Depth ft		DepthInc.Azi.			TVD		V.S.				
<div><div><div>PCG Gamma Ray</div><div>PGRC</div><div>0</div><div>api</div><div>300</div></div></div>																					

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Cutthroat LC28-75-1AHNB
Wattenberg
Weld Colorado
USA
CA-XX-0901399595

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
378.00	0.10	194.54	378.00	0.32 S	0.08 W	-0.30	0.03
654.00	0.40	300.34	654.00	0.07 S	0.97 W	0.08	0.16
717.00	0.28	317.55	717.00	0.16 N	1.27 W	0.34	0.24
810.00	0.28	325.21	810.00	0.51 N	1.55 W	0.74	0.04
996.00	0.07	55.22	995.99	0.95 N	1.72 W	1.19	0.15
1274.00	0.59	103.97	1273.99	0.70 N	0.19 W	0.72	0.20
1367.00	2.15	236.06	1366.97	0.39 S	1.17 W	-0.22	2.77
1460.00	3.87	231.90	1459.84	3.30 S	5.09 W	-2.52	1.87
1553.00	5.64	234.93	1552.52	7.86 S	11.30 W	-6.13	1.92
1646.00	8.00	245.72	1644.85	13.14 S	20.93 W	-9.95	2.88
1738.00	9.43	245.05	1735.79	18.96 S	33.60 W	-13.86	1.56
1833.00	9.10	246.50	1829.55	25.24 S	47.56 W	-18.04	0.43
1928.00	10.10	245.72	1923.22	31.66 S	62.04 W	-22.28	1.05
2022.00	9.68	244.55	2015.82	38.45 S	76.69 W	-26.86	0.49
2117.00	10.87	244.22	2109.30	45.77 S	91.96 W	-31.88	1.25
2212.00	10.87	244.71	2202.59	53.50 S	108.13 W	-37.17	0.10
2307.00	10.69	243.51	2295.92	61.25 S	124.11 W	-42.51	0.31
2402.00	10.43	243.82	2389.31	68.98 S	139.71 W	-47.88	0.28
2497.00	10.16	249.97	2482.78	75.64 S	155.30 W	-52.20	1.19
2686.00	10.10	251.45	2668.83	86.62 S	186.68 W	-58.49	0.14
2781.00	10.50	244.99	2762.30	92.93 S	202.43 W	-62.44	1.29
2876.00	10.43	244.63	2855.72	100.28 S	218.04 W	-67.43	0.10
2971.00	10.15	244.05	2949.20	107.62 S	233.33 W	-72.47	0.31
3066.00	9.69	243.26	3042.78	114.88 S	248.01 W	-77.51	0.50
3161.00	9.07	244.52	3136.51	121.70 S	261.91 W	-82.23	0.69
3256.00	9.96	242.64	3230.20	128.70 S	275.96 W	-87.11	0.99
3350.00	9.78	241.78	3322.81	136.21 S	290.21 W	-92.46	0.24
3445.00	10.00	240.68	3416.40	144.06 S	304.51 W	-98.14	0.31
3541.00	10.38	241.09	3510.88	152.32 S	319.35 W	-104.16	0.40
3636.00	10.13	247.54	3604.37	159.66 S	334.56 W	-109.19	1.23

3636.00	10.12	247.31	3604.37	159.86 S	334.36 W	-109.19	1.23
3730.00	10.40	248.15	3696.86	165.97 S	350.07 W	-113.18	0.32
3825.00	9.43	245.33	3790.44	172.41 S	365.10 W	-117.36	1.14
3920.00	9.85	243.21	3884.10	179.33 S	379.43 W	-122.11	0.58
4015.00	9.19	243.30	3977.79	186.40 S	393.46 W	-127.07	0.70
4110.00	8.39	242.39	4071.68	193.02 S	406.38 W	-131.73	0.85
4205.00	8.96	245.18	4165.59	199.33 S	419.23 W	-136.11	0.75
4299.00	9.45	245.92	4258.38	205.55 S	432.91 W	-140.26	0.54
4394.00	8.96	246.52	4352.16	211.68 S	446.81 W	-144.30	0.53
4489.00	8.34	246.78	4446.08	217.34 S	459.93 W	-147.99	0.65
4584.00	7.85	246.28	4540.13	222.67 S	472.21 W	-151.48	0.52
4679.00	7.21	246.16	4634.31	227.69 S	483.60 W	-154.78	0.68
4773.00	6.48	247.41	4727.64	232.11 S	493.89 W	-157.65	0.79
4868.00	6.10	249.64	4822.07	235.93 S	503.57 W	-160.02	0.48
4963.00	5.58	246.23	4916.57	239.55 S	512.53 W	-162.29	0.66
5058.00	5.29	248.61	5011.15	243.01 S	520.84 W	-164.51	0.39
5153.00	3.79	244.98	5105.85	245.93 S	527.77 W	-166.39	1.60
5248.00	2.53	252.77	5200.70	247.88 S	532.62 W	-167.61	1.40
5342.00	0.95	233.39	5294.65	248.97 S	535.23 W	-168.30	1.77
5432.00	0.73	231.46	5384.64	249.77 S	536.28 W	-168.95	0.25
5480.00	1.73	354.27	5432.64	249.24 S	536.59 W	-168.38	4.60
5526.00	7.43	355.16	5478.47	245.59 S	536.91 W	-164.72	12.40
5574.00	12.55	353.92	5525.73	237.30 S	537.72 W	-156.40	10.69
5621.00	17.11	355.60	5571.15	225.32 S	538.79 W	-144.39	9.73
5669.00	21.34	357.92	5616.47	209.55 S	539.65 W	-128.66	8.96
5716.00	25.45	358.81	5659.59	190.90 S	540.17 W	-110.14	8.79
5764.00	28.00	359.01	5702.46	169.32 S	540.58 W	-88.73	5.32
5811.00	30.64	358.50	5743.43	146.31 S	541.09 W	-65.89	5.64
5859.00	34.28	358.95	5783.93	120.56 S	541.66 W	-40.33	7.60
5906.00	38.24	359.68	5821.82	92.76 S	541.98 W	-12.78	8.48
5954.00	43.13	0.29	5858.20	61.48 S	541.98 W	18.16	10.21
6001.00	47.87	359.67	5891.14	27.97 S	542.00 W	51.32	10.13
6049.00	52.78	359.01	5921.77	8.96 N	542.43 W	87.92	10.30
6096.00	56.13	357.31	5949.09	47.18 N	543.67 W	125.91	7.71
6144.00	58.99	356.27	5974.84	87.62 N	545.94 W	166.25	6.22
6190.00	63.64	356.79	5996.92	127.89 N	548.38 W	206.44	10.17
6238.00	68.56	357.10	6016.36	171.69 N	550.71 W	250.12	10.26
6285.00	73.50	357.95	6031.63	216.08 N	552.63 W	294.32	10.65
6333.00	78.55	358.67	6043.22	262.63 N	554.00 W	340.56	10.63
6383.00	82.58	359.57	6051.42	311.94 N	554.76 W	389.45	8.26
6460.00	85.53	0.13	6059.39	388.51 N	554.96 W	465.24	3.89
6555.00	87.78	359.51	6064.94	483.34 N	555.25 W	559.10	2.46
6650.00	90.18	357.83	6066.62	578.29 N	557.45 W	653.36	3.09
6745.00	91.48	357.26	6065.24	673.19 N	561.53 W	747.84	1.49
6840.00	90.22	357.50	6063.84	768.08 N	565.87 W	842.35	1.36
6934.00	90.77	356.57	6063.03	861.95 N	570.72 W	935.92	1.15
7029.00	89.75	357.87	6062.59	956.83 N	575.33 W	1030.47	1.73
7124.00	89.66	1.05	6063.08	1051.82 N	576.23 W	1124.57	3.36
7219.00	90.93	2.42	6062.59	1146.77 N	573.35 W	1218.08	1.96
7314.00	90.06	0.82	6061.78	1241.72 N	570.66 W	1311.63	1.91
7409.00	91.11	0.92	6060.81	1336.70 N	569.22 W	1405.39	1.11
7503.00	90.80	3.53	6059.24	1430.61 N	565.58 W	1497.76	2.79
7598.00	90.22	3.52	6058.39	1525.43 N	559.74 W	1590.72	0.62
7693.00	88.98	1.73	6059.06	1620.32 N	555.40 W	1683.96	2.29
7788.00	89.78	359.25	6060.08	1715.30 N	554.58 W	1777.81	2.74
7883.00	91.11	358.58	6059.34	1810.28 N	556.38 W	1872.04	1.56
7978.00	89.45	357.77	6058.88	1905.23 N	559.40 W	1966.41	1.95
8073.00	87.69	357.60	6061.26	2000.12 N	563.23 W	2060.85	1.86
8168.00	87.72	357.56	6065.06	2094.96 N	567.24 W	2155.26	0.05
8263.00	88.52	357.26	6068.18	2189.81 N	571.52 W	2249.72	0.90
8358.00	88.77	357.07	6070.43	2284.67 N	576.22 W	2344.25	0.33
8453.00	91.26	357.79	6070.40	2379.56 N	580.48 W	2438.75	2.74
8547.00	88.03	356.59	6070.99	2473.43 N	585.09 W	2532.29	3.67
8642.00	87.78	356.82	6074.46	2568.21 N	590.56 W	2626.86	0.35
8737.00	89.11	356.86	6077.04	2663.03 N	595.79 W	2721.43	1.40
8832.00	89.94	358.06	6077.84	2757.93 N	600.00 W	2815.93	1.53
8927.00	90.09	356.47	6077.81	2852.82 N	604.53 W	2910.46	1.68
9021.00	91.79	0.19	6076.27	2946.75 N	607.27 W	3003.79	4.35
9116.00	90.52	1.01	6074.35	3041.72 N	606.27 W	3097.60	1.59
9211.00	91.88	0.83	6072.36	3136.68 N	604.74 W	3191.33	1.44
9306.00	90.80	1.18	6070.14	3231.64 N	603.07 W	3285.03	1.19
9401.00	92.56	1.16	6067.35	3326.58 N	601.13 W	3378.67	1.85
9496.00	91.54	2.11	6063.95	3421.48 N	598.43 W	3472.16	1.46
9590.00	90.52	3.16	6062.26	3515.36 N	594.11 W	3564.41	1.56
9685.00	88.80	3.77	6062.82	3610.18 N	588.37 W	3657.38	1.93

9780.00	86.95	1.35	6066.35	3705.01 N	584.12 W	3750.58	3.21
9875.00	86.61	1.37	6071.69	3799.83 N	581.87 W	3844.06	0.36
9967.00	87.72	358.84	6076.24	3891.71 N	581.71 W	3934.93	3.00
10062.00	89.72	356.29	6078.36	3986.59 N	585.74 W	4029.39	3.41
10156.00	91.76	356.21	6077.15	4080.37 N	591.88 W	4123.07	2.17
10251.00	94.08	356.34	6072.31	4175.04 N	598.04 W	4217.62	2.44
10333.00	96.34	356.06	6064.88	4256.52 N	603.45 W	4299.02	2.78
10397.00	96.34	356.06	6057.81	4319.98 N	607.82 W	4362.44	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 DIRECTION OF 351.62 DEGREES (GRID)
A TOTAL CORRECTION OF 7.14 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 10397.00 FEET
IS 4362.53 FEET ALONG 351.99 DEGREES (GRID)**

Surface surveys at 378 ft and 654 ft have had azimuth corrected to grid north, but were not taken by Halliburton.

Last survey is a projection from 10333 ft MD to TD at 10397 ft MD.

Date Printed:13 July 2014