

PCGC : Pressure Case Gamma
PCDC: Pressure Case Directional

1 : 600 / 1 : 240

Country		: USA					
Field		: Wattenberg					
Location		: Lat: 40° 46' 29.89" North Long: 103° 50' 12.12" West					
Well		: Sharpe State LD02-77HN					
Company		: Noble Energy					
Rig		: H&P 273					
LOCATION							
		Latitude : 40° 46' 29.89" North Longitude : 103° 50' 12.12" West		Other Services			
		UTM Easting = 3,460,656.880 ft UTM Northing = 1,529,487.830 ft		Directional Drilling			
Permanent Datum		: Ground Level		Elev. KB N/A			
Log Measured From		: Drill Floor		24.00 ft Above Permanent Datum DF 4772.00 ft GL 4748.00 ft WD N/A			
Drilling Measured From		: Drill Floor		MD LOG			
Depth Logged		: 1,240.00 ft To 9,665.00 ft		Unit No. : 11703717 Job No. : CA-XX-0901957153			
Date Logged		: 24-Dec-14 To 29-Dec-14					
Total Depth MD		: 9,665.00 ft TVD: 5,615.47 ft		Plot Type : Final			
Spud Date		: 22-Dec-14		Plot Date : 29-Dec-14			
Run No.	Borehole Record (MD)		Run No.	Borehole Record (MD)			
	Size	From		To	Size	From	To
	2	8,750 in		1,240.00 ft	4,815.00 ft		
	3	8,750 in		4,815.00 ft	6,003.00 ft		
4	6,125 in	6,003.00 ft	9,665.00 ft	Casing Record (MD)			
				Size	Weight	From	To
				7.000 in	26.00 lbpf	SURFACE	5,998.00 ft

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	25-Dec-14	26-Dec-14	29-Dec-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)	1,240.00	4,815.00	6,003.00		
Log End Depth (MD, ft)	4,815.00	6,003.00	9,665.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	25-Dec-14 01:26	25-Dec-14 21:15	28-Dec-14 06:40		
Drill/Wipe End Date and Time	25-Dec-14 12:20	26-Dec-14 11:30	29-Dec-14 02:15		
Min Inc (deg) @ Depth (MD, ft)	0.04 @ 1,292.00	7.01 @ 4,810.00	85.99 @ 6,137.00		
Max Inc (deg) @ Depth (MD, ft)	6.89 @ 4,762.00	84.44 @ 5,950.00	93.27 @ 6,516.00		
Bit TFA(in2) / Bit Type	0.91 / PDC	0.91 / PDC	0.75 / PDC		
Flow Rate (gpm)	582.00	581.62	300.00		
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)	9.10 / 36.00	10.50 / 35.00	10.05 / 37.00		
Filtrate CL (ppm)	200.00	200.00	200.00		
pH / Fluid Loss (mptm)	8.10 / 0	8.20 / 0	9.00 / 14		
PV (cP) / YP (lbf2)	10 / 8.00	7 / 7.00	10 / 8.00		
% Solids / % Sand	10.2 / .1	6.6 / .1	10 / .1		
% 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	168.00 / PGM	170.00 / PGM	210.10 / PGM		

Max Tool Temp (degF) / Source	129.00 / PCM	158.60 / PCM	213.40 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Paul Kock	Paul Kock	Paul Kock		
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	11303511	11303511	12365886		
Insert Serial Number	11055866	11055866	11619999		
Date and Time Initialized	24-Dec-14 12:33	24-Dec-14 12:33	27-Dec-14 06:20		
Date and Time Read	26-Dec-14 17:11	26-Dec-14 17:19	29-Dec-14 09:46		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	53.00	53.00	62.00		
Software Version	6.21	6.21	6.33		
Sub Serial Number	11303511	11303511	12365886		
Sonde Serial Number	12177554	12177554	11833216		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	5.30	317.60	354.70		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	46.53	45.90	54.85		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11303511	11303511	12365886		
Insert/Sonde Serial Number	11293319	11293319	11579811		

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 8.0.20
6. Gamma presented inside casing/cement from 5957 ft. MD to 6003 ft. MD.

WARRANTY

HALLIBURTON WILL USE ITS BEST EFFORTS TO FURNISH CUSTOMERS WITH ACCURATE INFORMATION AND INTERPRETATIONS THAT ARE PART OF, AND INCIDENT TO, THE SERVICES PROVIDED. HOWEVER, HALLIBURTON CANNOT AND DOES NOT WARRANT THE ACCURACY OR CORRECTNESS OF SUCH INFORMATION AND INTERPRETATIONS. UNDER NO CIRCUMSTANCES SHOULD ANY SUCH INFORMATION OR INTERPRETATION BE RELIED UPON AS THE SOLE BASIS FOR ANY DRILLING, COMPLETION, PRODUCTION, OR FINANCIAL DECISION OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING VENTURE, DRILLING RIG OR ITS CREW OR ANY OTHER THIRD PARTY. THE CUSTOMER HAS FULL RESPONSIBILITY FOR ALL DRILLING, COMPLETION AND PRODUCTION OPERATION. HALLIBURTON MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE SERVICES RENDERED. IN NO EVENT WILL HALLIBURTON BE LIABLE FOR FAILURE TO OBTAIN ANY PARTICULAR RESULTS OR FOR ANY DAMAGES, INCLUDING, BUT NOT LIMITED TO, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, RESULTING FROM THE USE OF ANY INFORMATION OR INTERPRETATION PROVIDED BY HALLIBURTON.

HALLIBURTON

Sperry Drilling Services

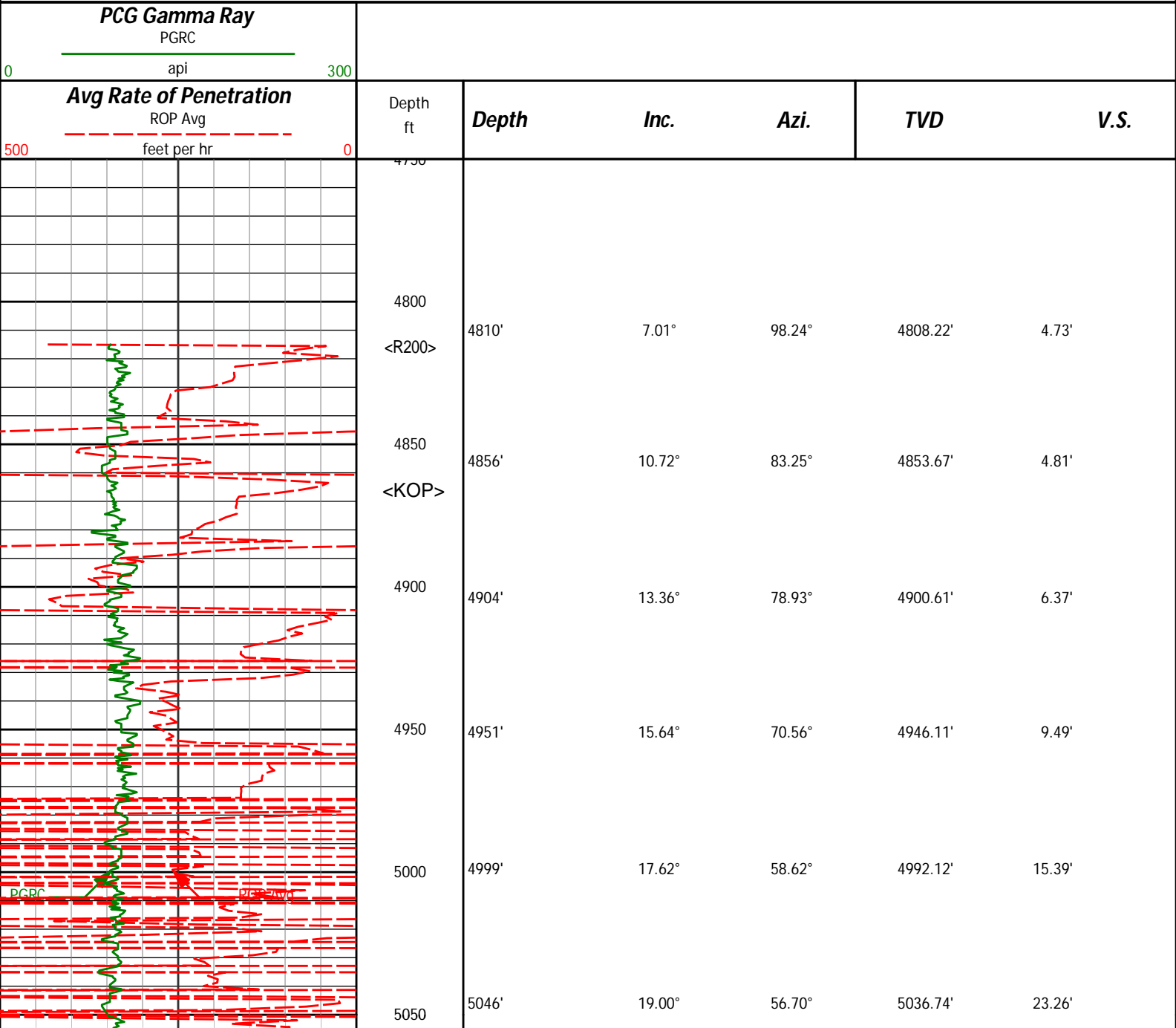
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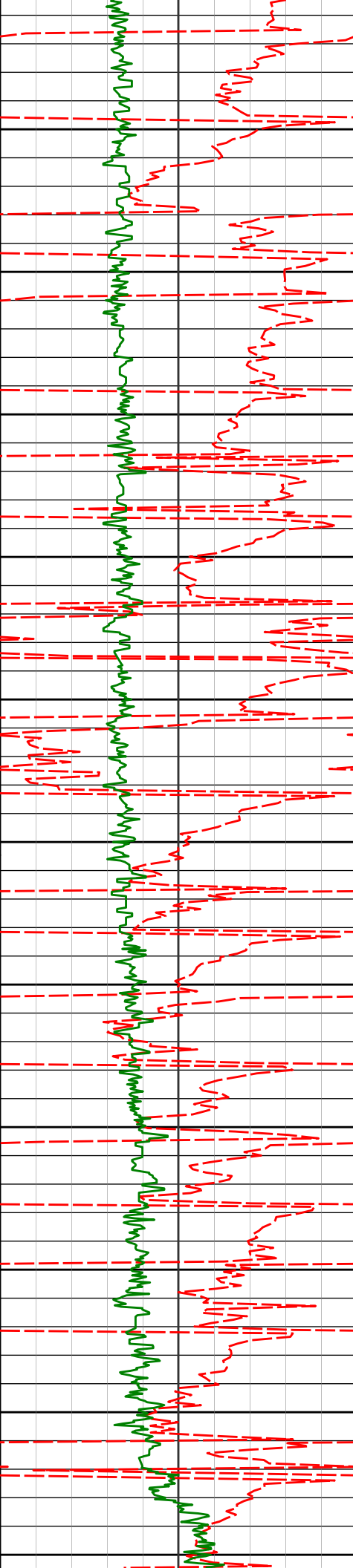
Noble Energy, Inc

Sharpe State LD02-77HN

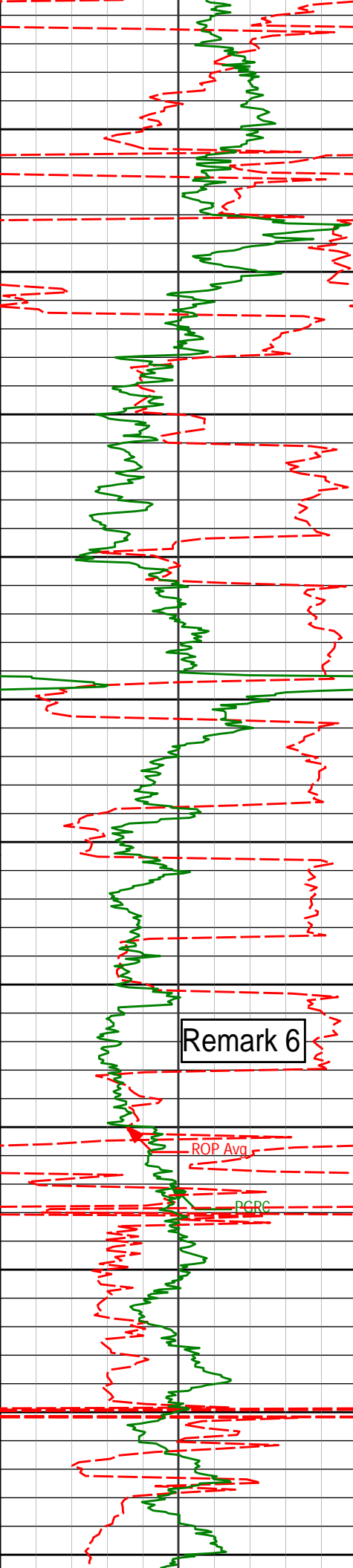
H&P 273

T9N R58W

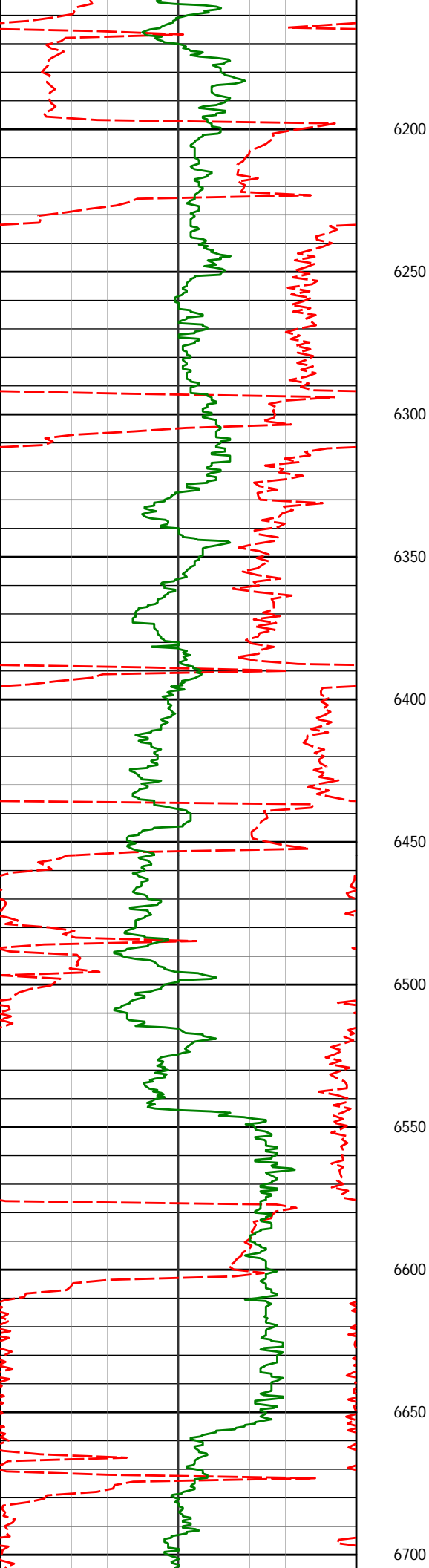




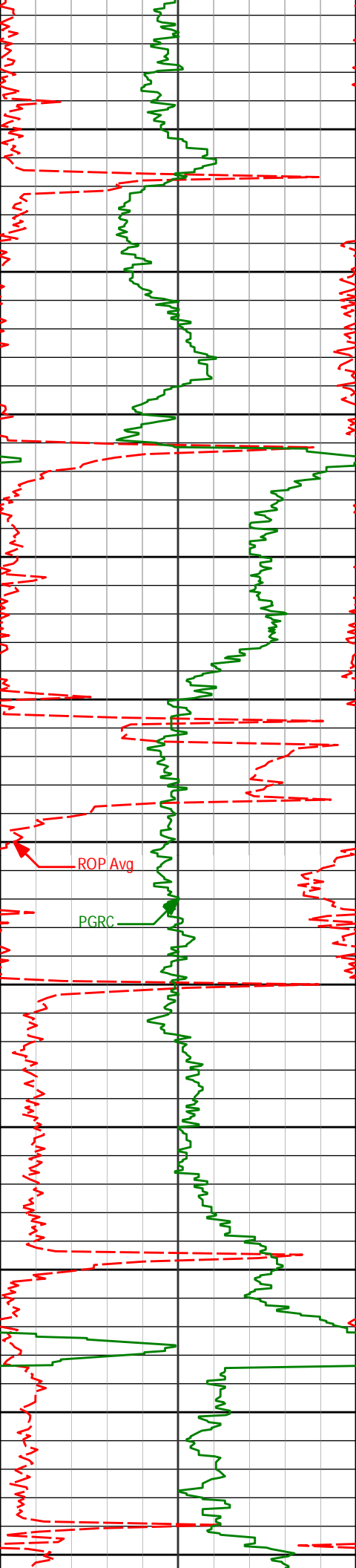
5100	5094'	20.11°	49.25°	5081.98'	32.90'
5150	5140'	24.05°	40.83°	5124.60'	45.13'
5200	5188'	25.13°	38.47°	5168.25'	60.48'
5250	5236'	26.63°	29.31°	5211.45'	77.81'
5300	5284'	29.48°	23.39°	5253.81'	98.02'
5350	5331'	31.21°	17.93°	5294.38'	120.20'
5400	5379'	34.63°	9.90°	5334.69'	145.47'
5450	5425'	37.21°	4.79°	5371.95'	172.21'
5500	5473'	37.83°	359.09°	5410.03'	201.39'
5550	5520'	41.28°	356.85°	5446.26'	231.29'
5600	5568'	46.86°	354.06°	5480.74'	264.56'



5615'	53.89°	353.93°	5510.70'	300.55'
5650				
5663'	61.58°	355.83°	5536.30'	340.95'
5700				
5710'	62.73°	357.54°	5558.26'	382.45'
5750				
5758'	64.68°	357.71°	5579.52'	425.44'
5800				
5805'	69.13°	357.75°	5597.96'	468.64'
5850				
5853'	74.41°	357.29°	5612.97'	514.17'
5900				
5900'	79.19°	357.36°	5623.70'	559.87'
5950				
5950'	84.44°	358.66°	5630.81'	609.32'
Remark 6				
6000				
<Run 300>				
6043'	87.13°	359.38°	5637.64'	702.05'
6050				
6100				
6137'	85.99°	358.77°	5643.28'	795.87'
6150				



6232'	89.97°	358.86°	5646.62'	890.78'
6327'	92.22°	358.79°	5644.81'	985.74'
6421'	93.21°	358.29°	5640.36'	1079.61'
6516'	93.27°	358.63°	5635.00'	1174.43'
6610'	90.52°	358.46°	5631.89'	1268.35'



6750

6800

6850

6900

6950

7000

7050

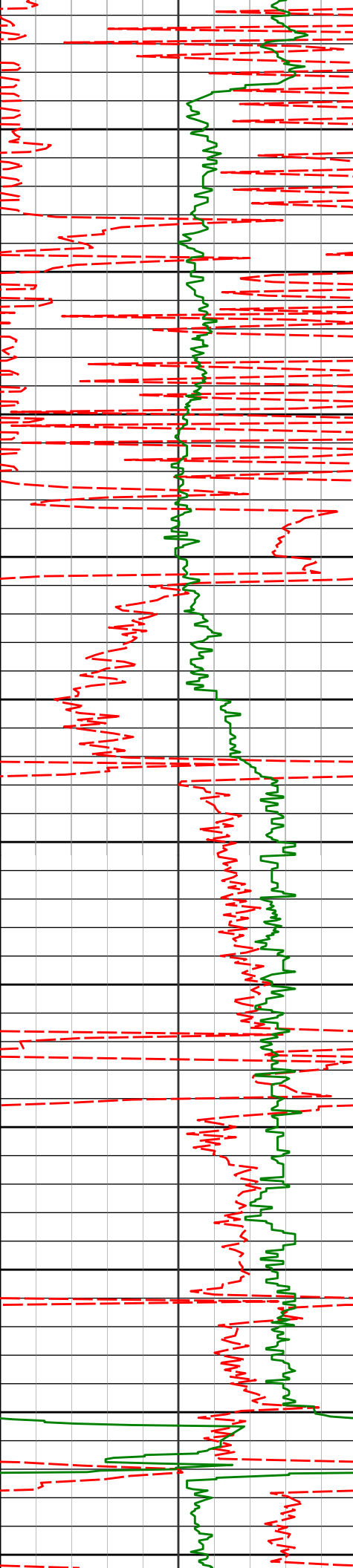
7100

7150

7200

7250

6703'	89.82°	357.98°	5631.81'	1503.31'
6800'	88.89°	357.42°	5632.68'	1458.23'
6894'	88.21°	357.38°	5635.06'	1552.12'
6989'	90.99°	357.50°	5635.72'	1647.02'
7083'	90.15°	357.17°	5634.78'	1740.93'
7176'	90.68°	357.26°	5634.11'	1833.83'



7271'	91.60°	356.55°	5632.22'	1928.68'
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7300

7350

7365'	90.86°	355.73°	5630.19'	2022.46'
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7400

7450

7460'	91.76°	358.89°	5628.02'	2117.33'
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7500

7550

7600

7650

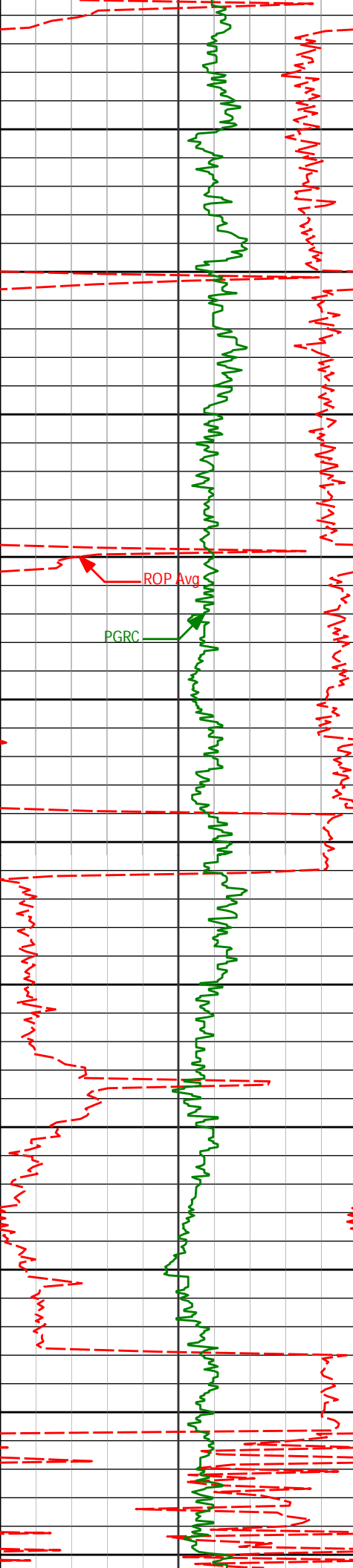
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7700

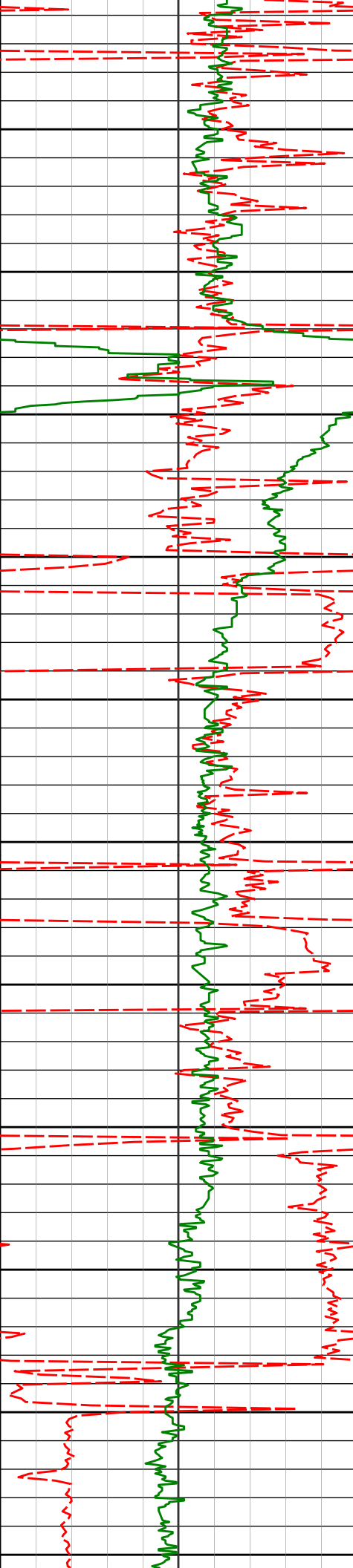
7750

7744'	90.65°	357.30°	5621.56'	2401.10'
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7800



7839'	91.05°	357.13°	5620.15'	2495.99'
7850				
7900				
7950				
8000				
8028'	90.43°	354.88°	5617.72'	2684.54'
8050				
8100				
8123'	90.68°	357.27°	5616.80'	2779.32'
8150				
8200				
8218'	90.83°	356.91°	5615.54'	2874.20'
8250				
8300				
8313'	87.66°	358.01°	5616.80'	2969.10'
8350				



8400
8407'
8450
8500
8502'
8550
8597'
8600
8650
8692'
8700
8750
8787'
8800
8850
8882'
8900

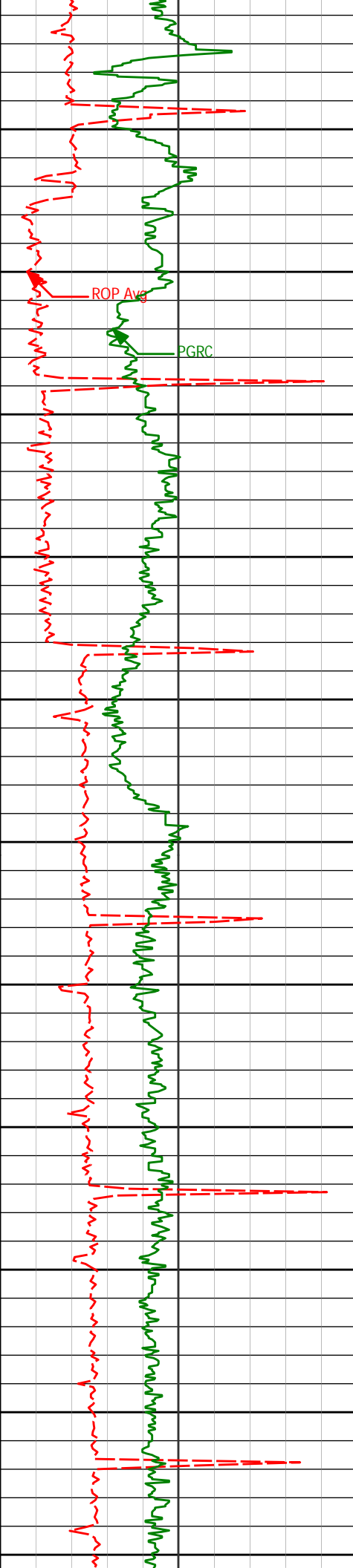
8407'
8502'
8597'
8692'
8787'
8882'

87.17°
86.18°
88.33°
90.25°
90.89°
90.71°

357.41°
356.74°
356.89°
0.25°
0.69°
0.46°

5621.04'
5626.56'
5631.11'
5632.28'
5631.34'
5630.01'

3062.94'
3157.66'
3252.42'
3347.37'
3442.36'
3537.34'



8950

8977'

90.77°

359.40°

5628.78'

3632.33'

9000

ROP Avg

PGRC

9050

9071'

91.11°

358.84°

5627.24'

3726.31'

9100

9150

9166'

91.39°

358.51°

5625.17'

3821.27'

9200

9250

9261'

91.88°

358.53°

5622.46'

3916.20'

9300

9350

9356'

91.48°

357.67°

5619.68'

4011.12'

9400

9450

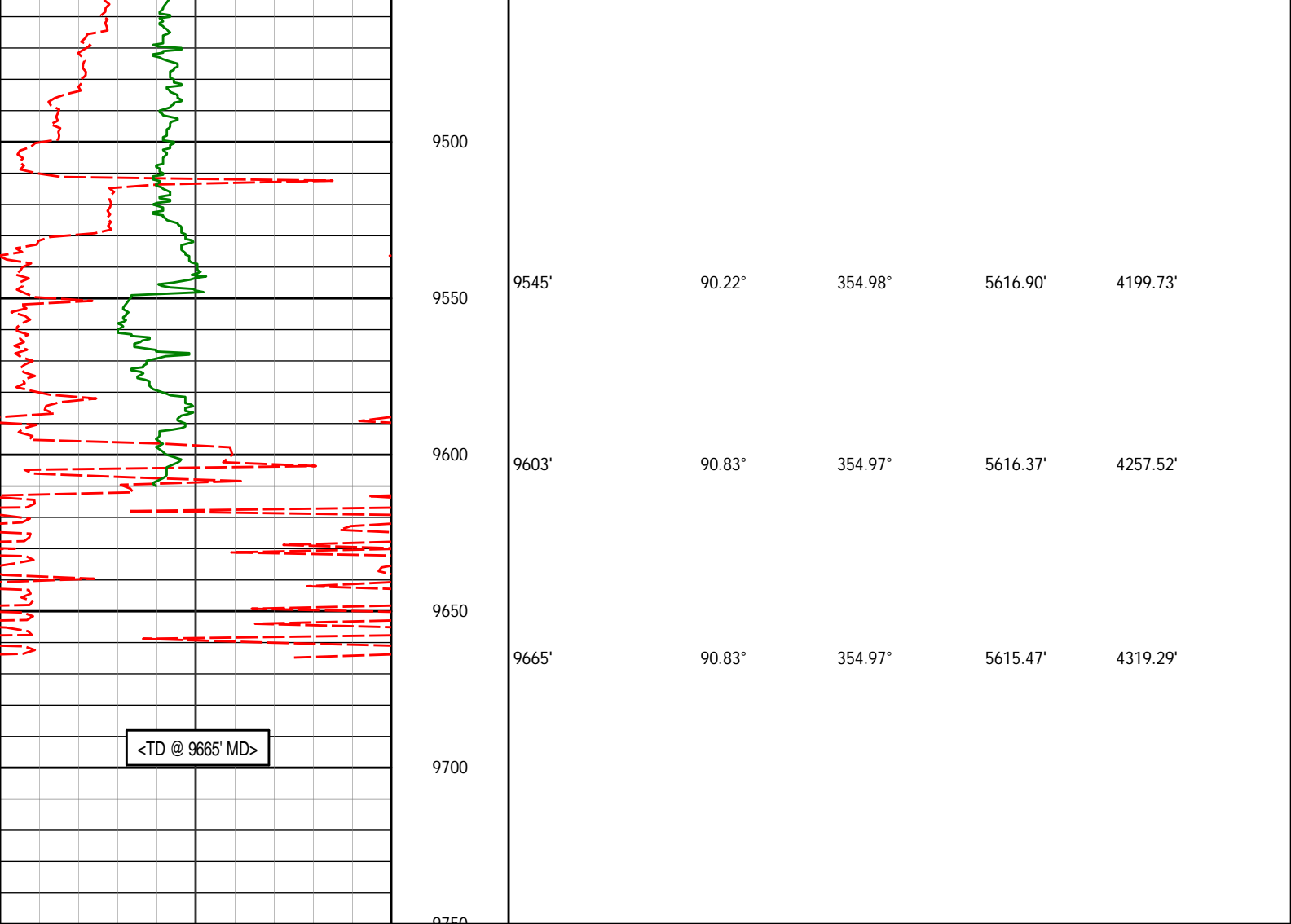
9451'

90.83°

356.43°

5617.76'

4105.98'

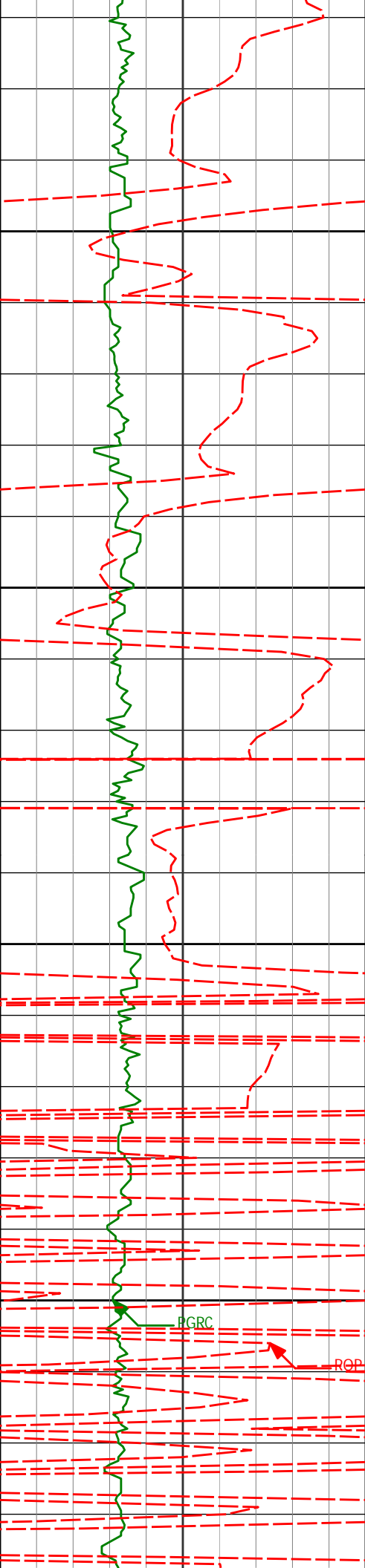


<div><div>Avg Rate of Penetration</div><div>ROP Avg</div><div>feet per hr</div><div>5000</div></div>		Depth ft	Depth	Inc.	Azi.	TVD	V.S.
<div><div>PCG Gamma Ray</div><div>PGRC</div><div>api</div><div>0300</div></div>							

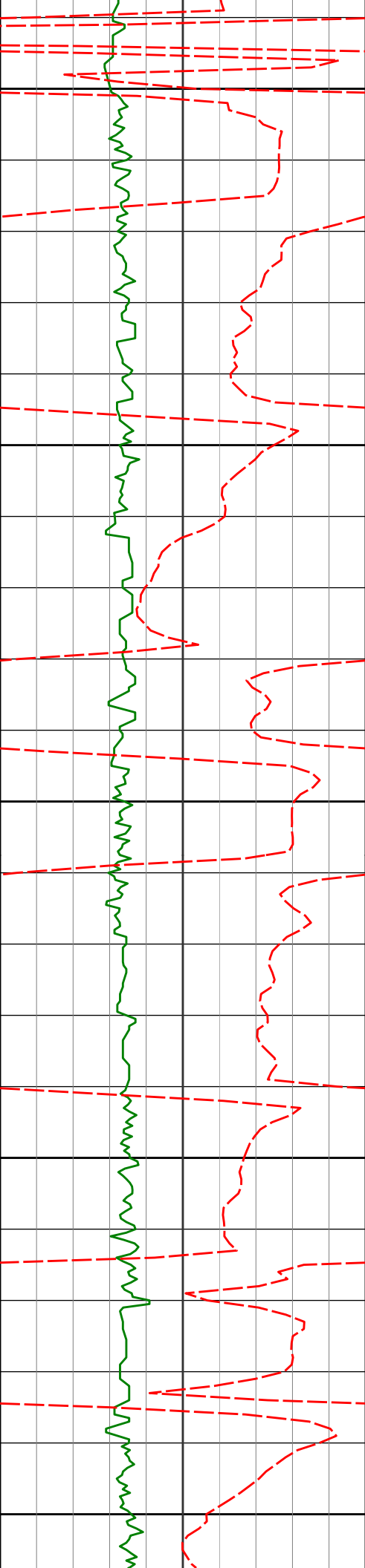
HALLIBURTON
Sperry Drilling Services
MD Detail Log 1:240

Noble Energy, Inc
Sharpe State LD02-77HN
H&P 273
T9N R58W

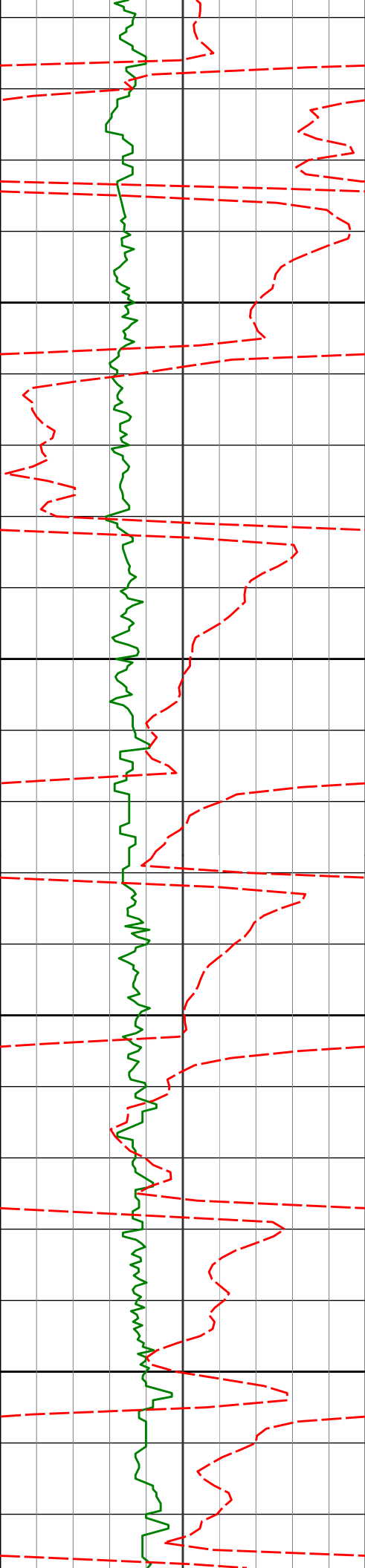
<div><div>PCG Gamma Ray</div><div>PGRC</div><div>api</div><div>0300</div></div>																			
<div><div>Avg Rate of Penetration</div><div>ROP Avg</div><div>feet per hr</div><div>5000</div></div>										Depth ft	DepthInc.Azi.			TVDV.S.					
<div><div><Run 200></div></div>										4810'	7.01°98.24°			4808.22'4.73'					



4850				
4856'	10.72°	83.25°	4853.67'	4.81'
<KOP>				
4900				
4904'	13.36°	78.93°	4900.61'	6.37'
4950				
4951'	15.64°	70.56°	4946.11'	9.49'
5000				
4999'	17.62°	58.62°	4992.12'	15.39'



5046'	19.00°	56.70°	5036.74'	23.26'
5094'	20.11°	49.25°	5081.98'	32.90'
5140'	24.05°	40.83°	5124.60'	45.13'
5188'	25.13°	38.47°	5168.25'	60.48'
5236'	26.63°	29.31°	5211.45'	77.81'



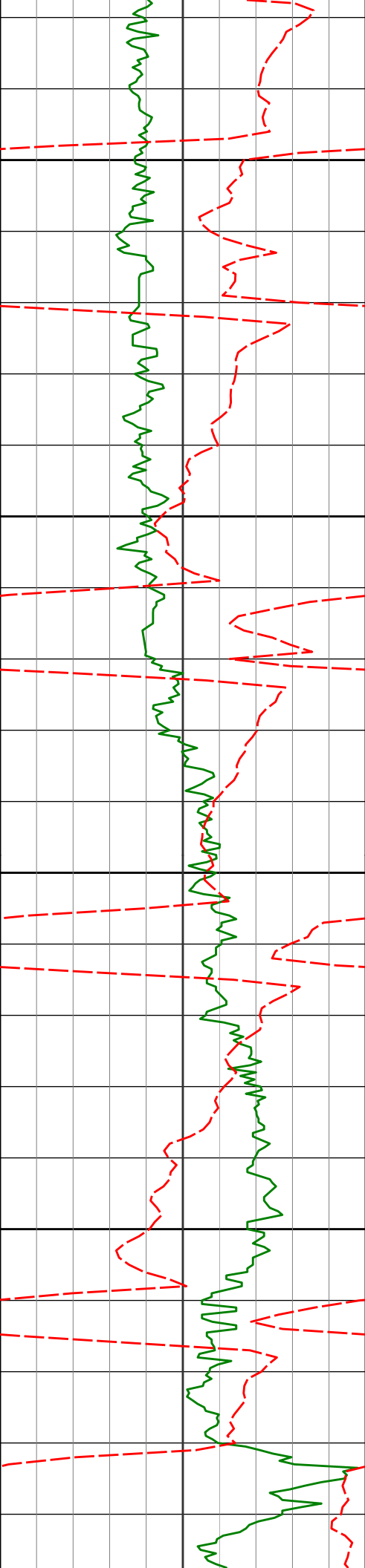
5300

5350

5400

5450

5284'	29.48°	23.39°	5253.81'	98.02'
5331'	31.21°	17.93°	5294.38'	120.20'
5379'	34.63°	9.90°	5334.69'	145.47'
5425'	37.21°	4.79°	5371.95'	172.21'
5473'	37.83°	359.09°	5410.03'	201.39'



5500

5520'

41.28°

356.85°

5446.26'

231.29'

5550

5568'

46.86°

354.06°

5480.74'

264.56'

5600

5615'

53.89°

353.93°

5510.70'

300.55'

5650

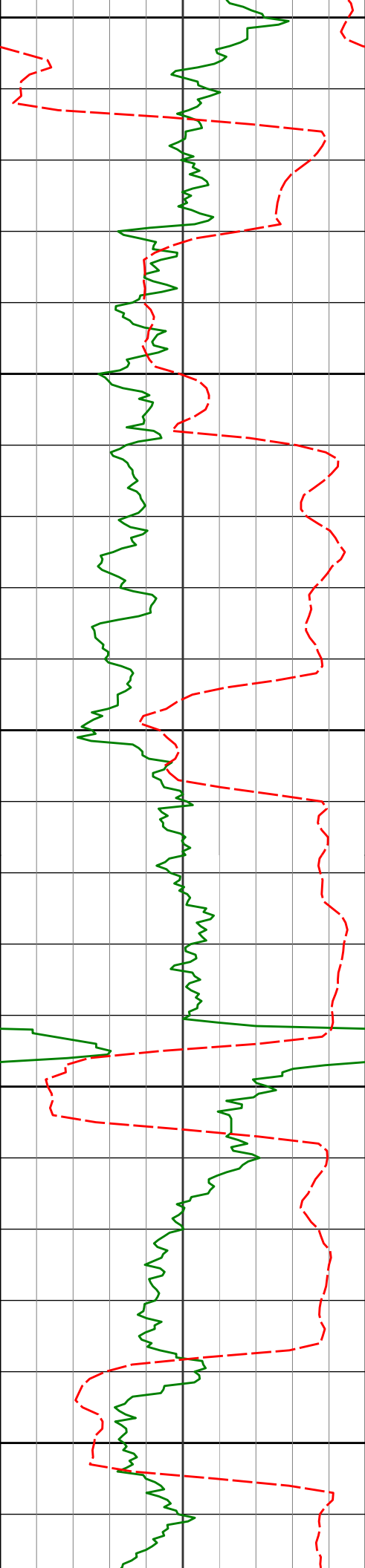
5663'

61.58°

355.83°

5536.30'

340.95'



5700

5710'

62.73°

357.54°

5558.26'

382.45'

5750

5758'

64.68°

357.71°

5579.52'

425.44'

5800

5805'

69.13°

357.75°

5597.96'

468.64'

5850

5853'

74.41°

357.29°

5612.97'

514.17'

5900

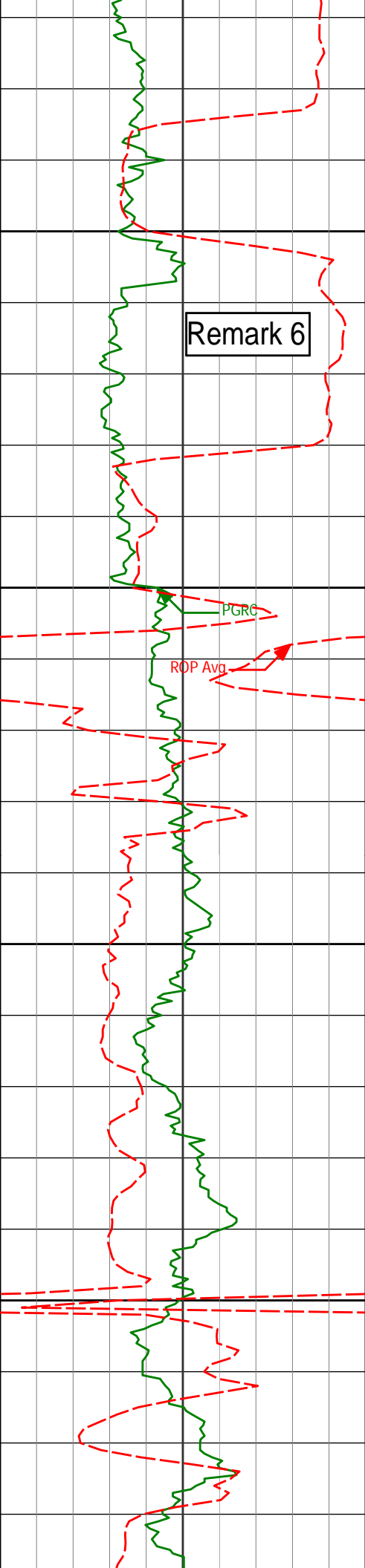
5900'

79.19°

357.36°

5623.70'

559.87'



5950

5950'

84.44°

358.66°

5630.81'

609.32'

6000

6043'

87.13°

359.38°

5637.64'

702.05'

6050

6100

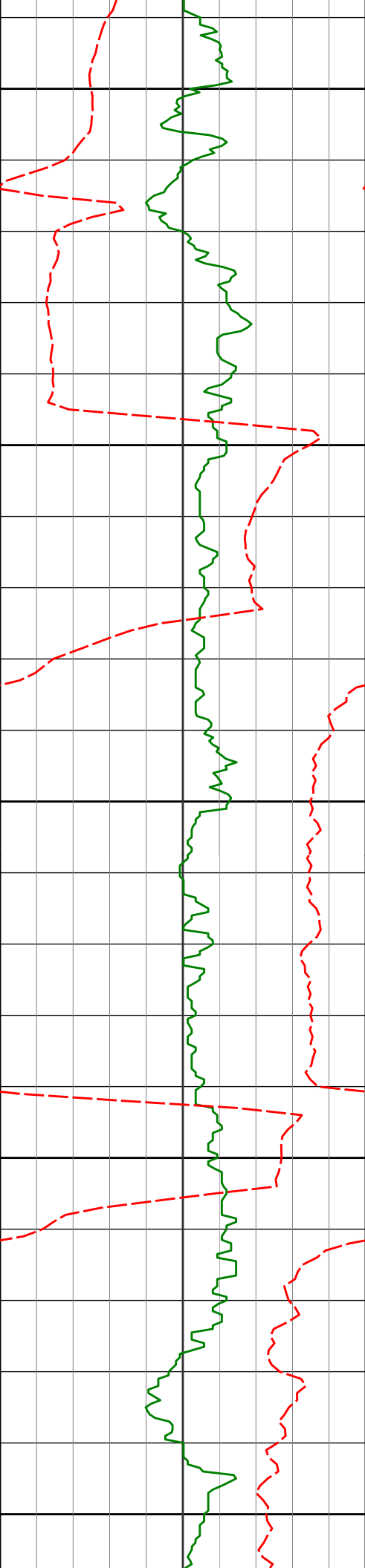
6137'

85.99°

358.77°

5643.28'

795.87'



6150

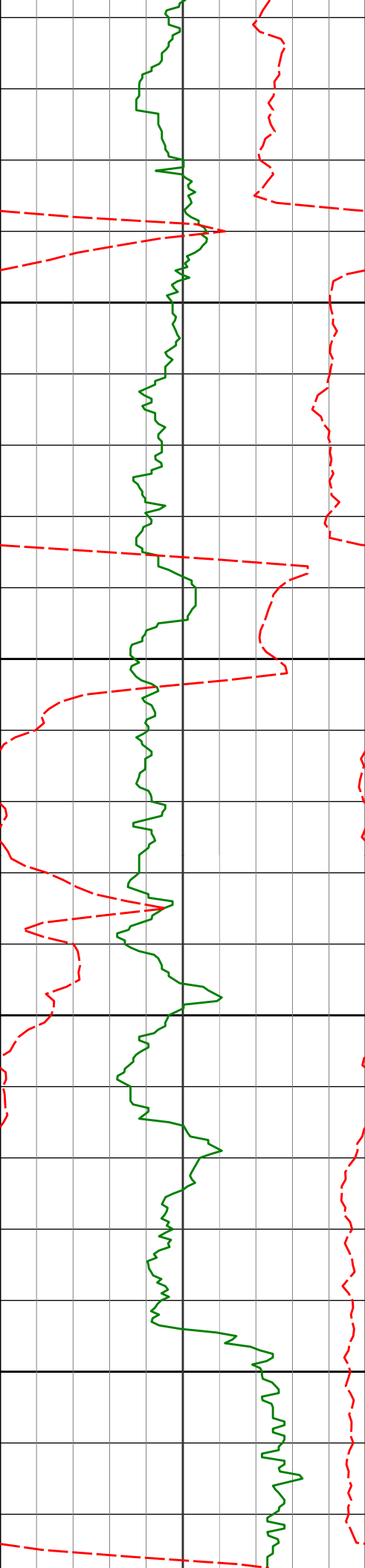
6200

6250

6300

6350

6150'	89.97°	358.86°	5646.62'	890.78'
6232'	89.97°	358.86°	5646.62'	890.78'
6250'	89.97°	358.86°	5646.62'	890.78'
6300'	89.97°	358.86°	5646.62'	890.78'
6327'	92.22°	358.79°	5644.81'	985.74'
6350'	92.22°	358.79°	5644.81'	985.74'



6400

6421'

93.21°

358.29°

5640.36'

1079.61'

6450

6500

6516'

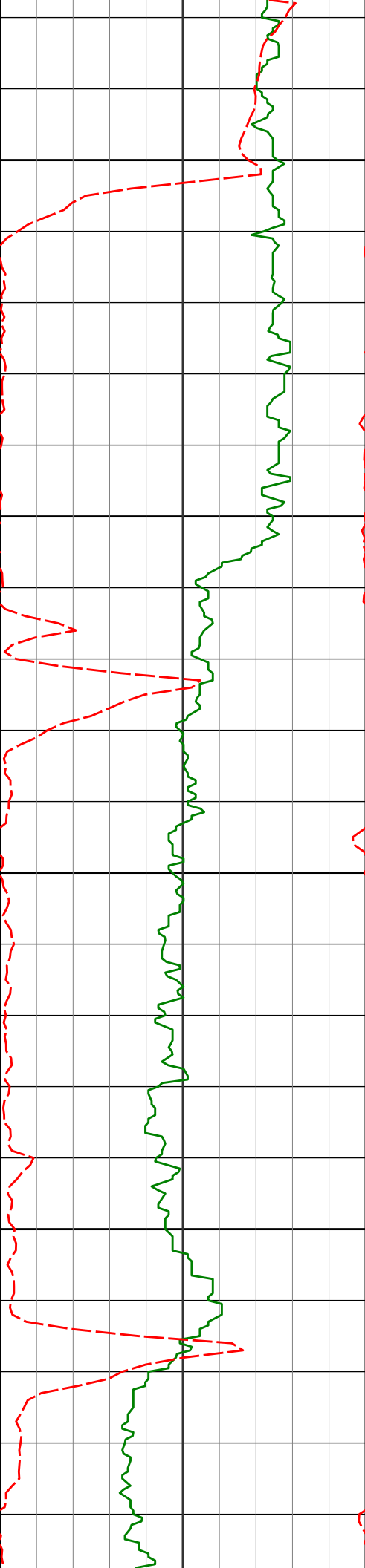
93.27°

358.63°

5635.00'

1174.43'

6550



6600

6610'

90.52°

358.46°

5631.89'

1268.35'

6650

6700

6705'

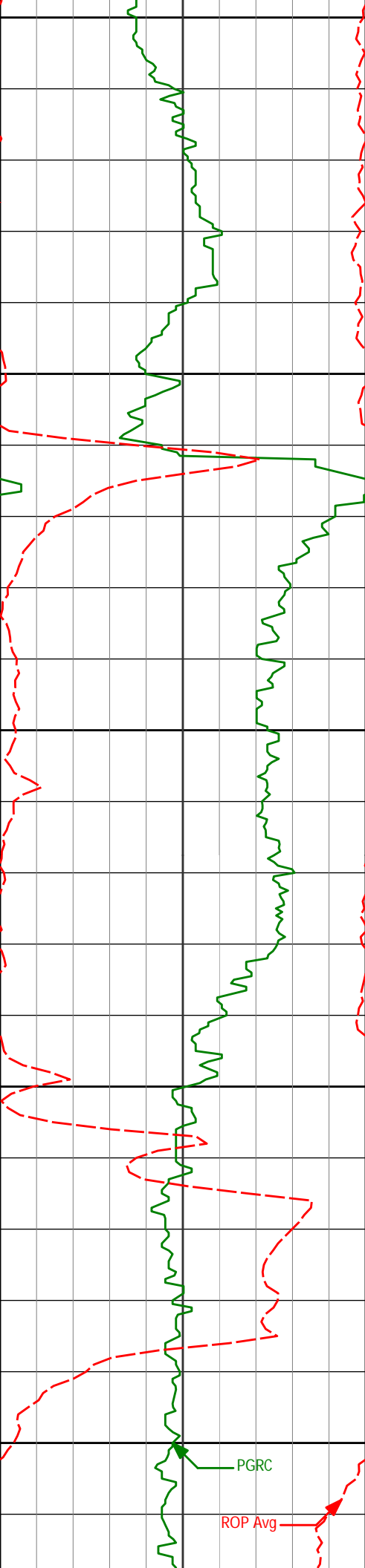
89.82°

357.98°

5631.61'

1363.31'

6750



6800

6850

6900

6950

7000

6800'

6894'

6989'

88.89°

88.21°

90.99°

357.42°

357.38°

357.50°

5632.68'

5635.06'

5635.72'

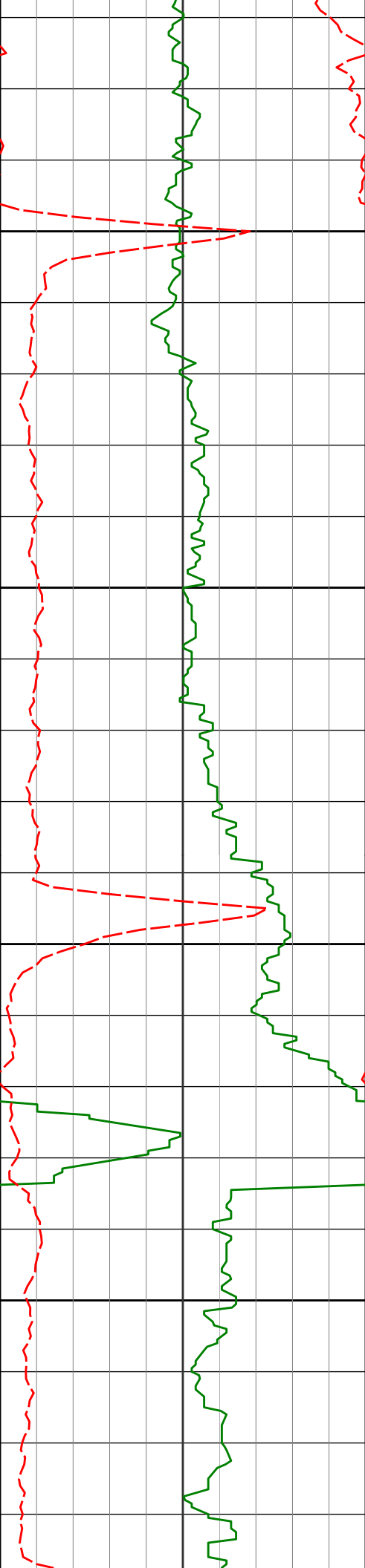
1458.23'

1552.12'

1647.02'

PGRC

ROP Avg



7050

7083'

90.15°

357.17°

5634.78'

1740.93'

7100

7150

7176'

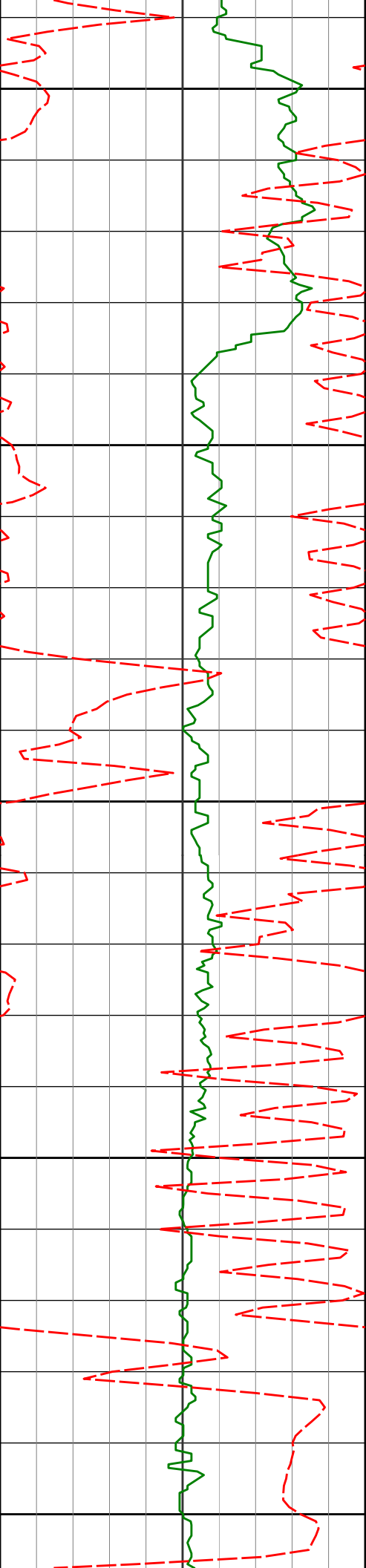
90.68°

357.26°

5634.11'

1833.83'

7200



7250

7271'

91.60°

356.55°

5632.22'

1928.68'

7300

7350

7365'

90.86°

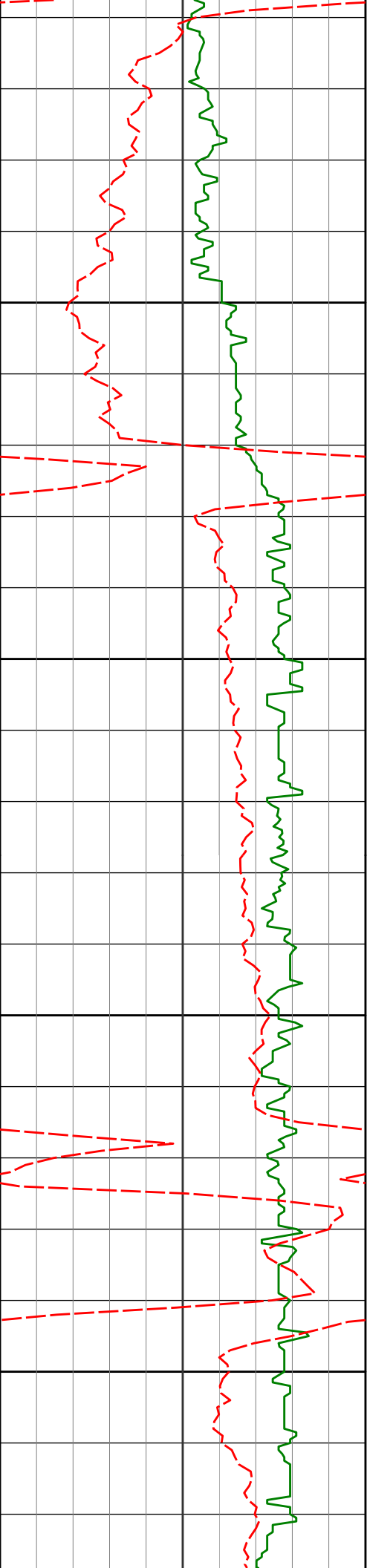
355.73°

5630.19'

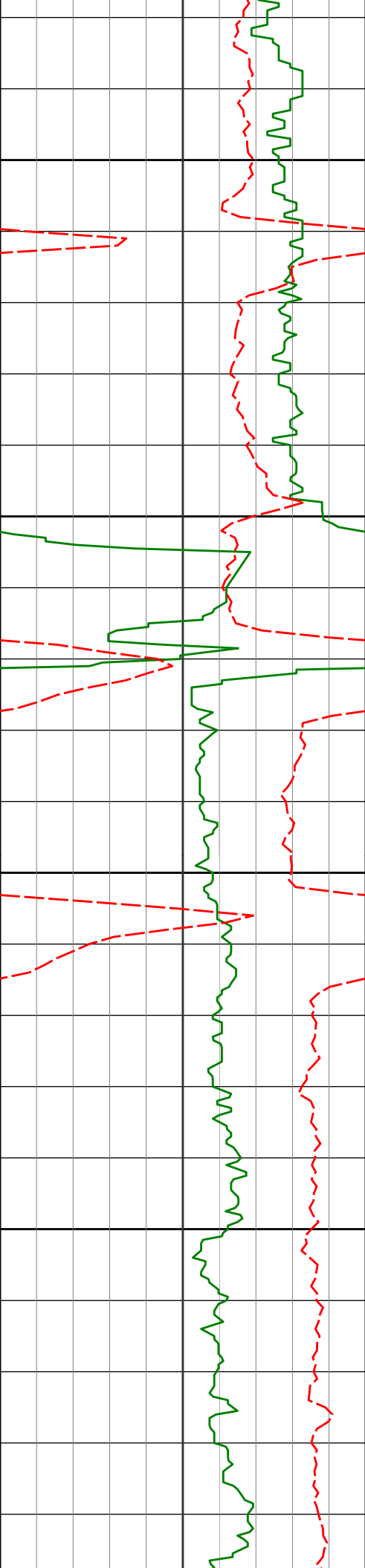
2022.46'

7400

7450



7460'	91.76°	358.89°	5628.02'	2117.33'
7500				
7550				
7555'	92.19°	358.68°	5624.75'	2212.26'
7600				
7650				
7649'	90.52°	357.58°	5622.53'	2306.19'



7700

7744'

90.65°

357.30°

5621.56'

2401.10'

7750

7800

7839'

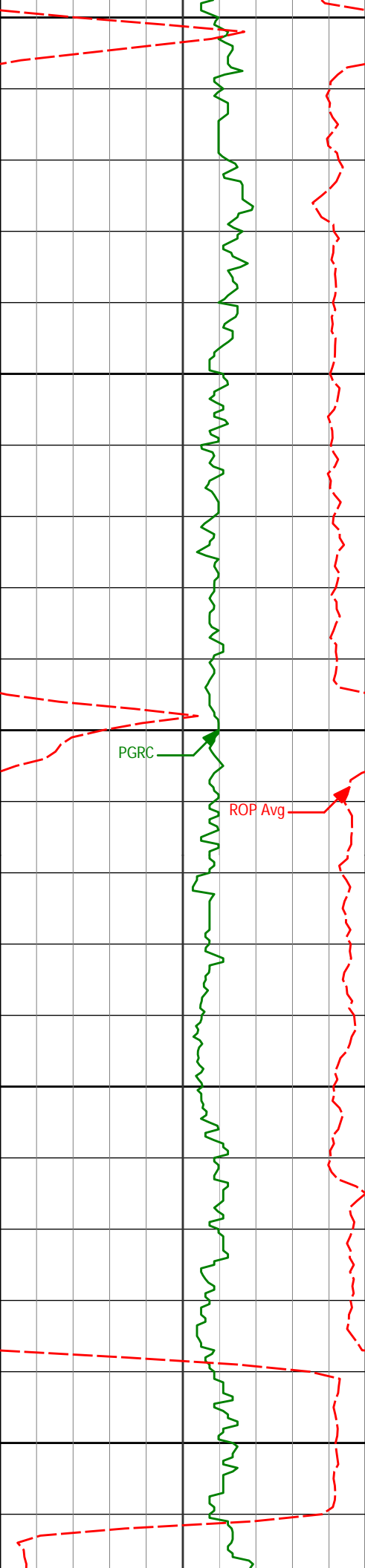
91.05°

357.13°

5620.15'

2495.99'

7850



7900

7950

8000

8050

8100

PGRC

ROP Avg

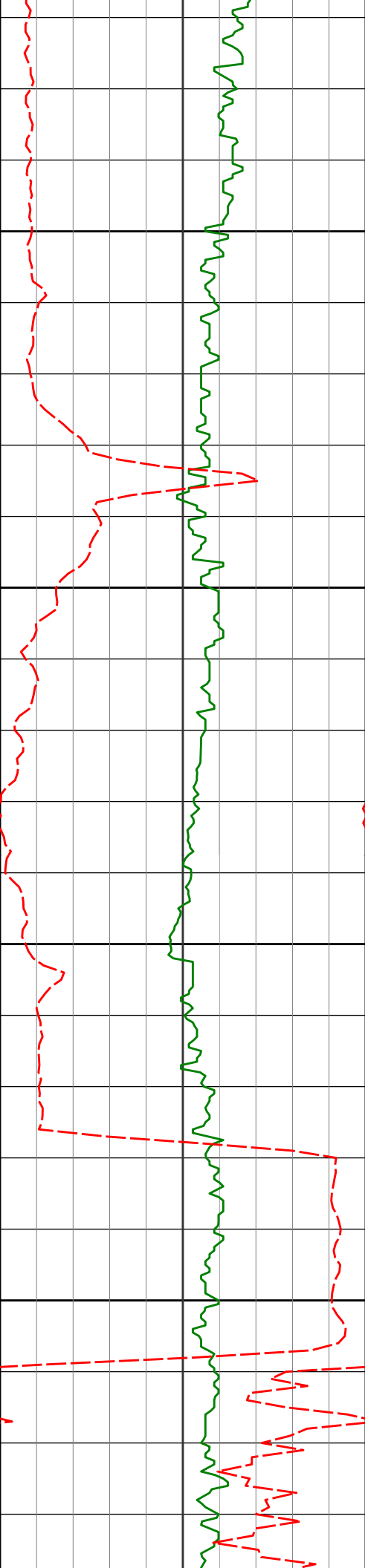
8028'

90.43°

354.88°

5617.72'

2684.54'



8150

8200

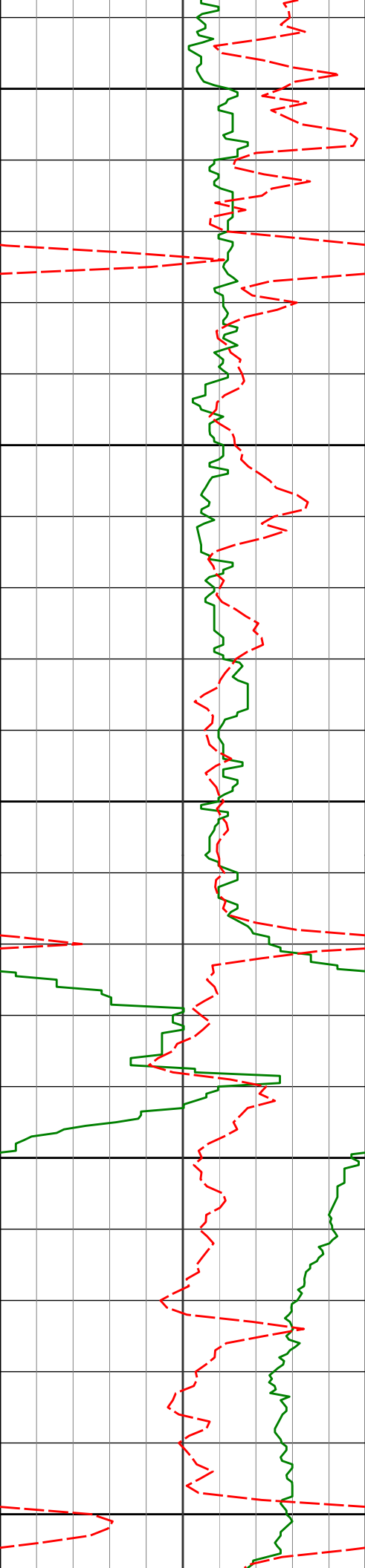
8250

8300

8123'	90.68°	357.27°	5616.80'	2779.32'
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8218'	90.83°	356.91°	5615.54'	2874.20'
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8313'	87.66°	358.01°	5616.80'	2969.10'
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8350

8400

8450

8500

8550

8407'

87.17°

357.41°

5621.04'

3062.94'

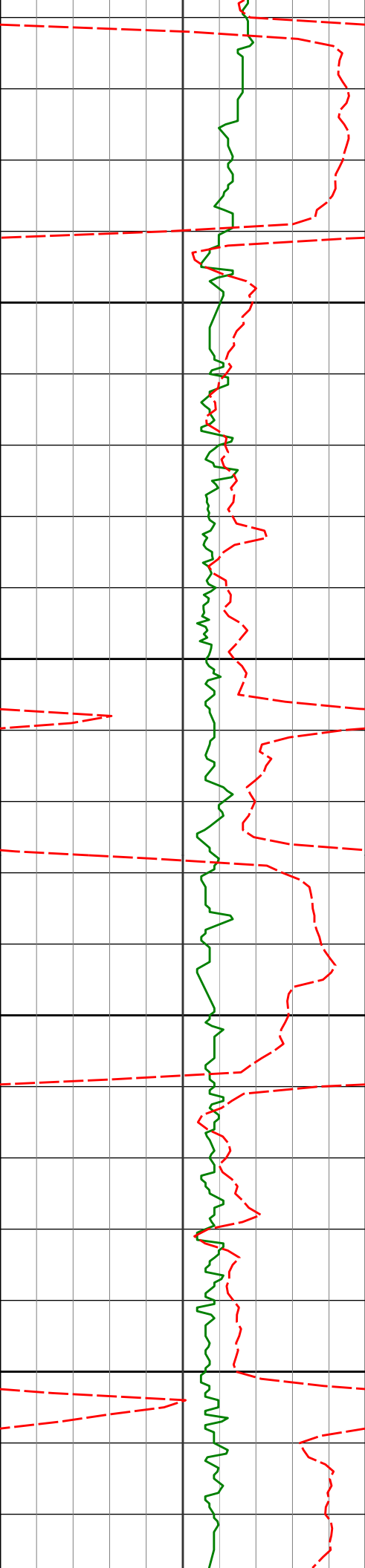
8502'

86.18°

356.74°

5626.56'

3157.66'



8600

8650

8700

8750

8597'

88.33°

356.89°

5631.11'

3252.42'

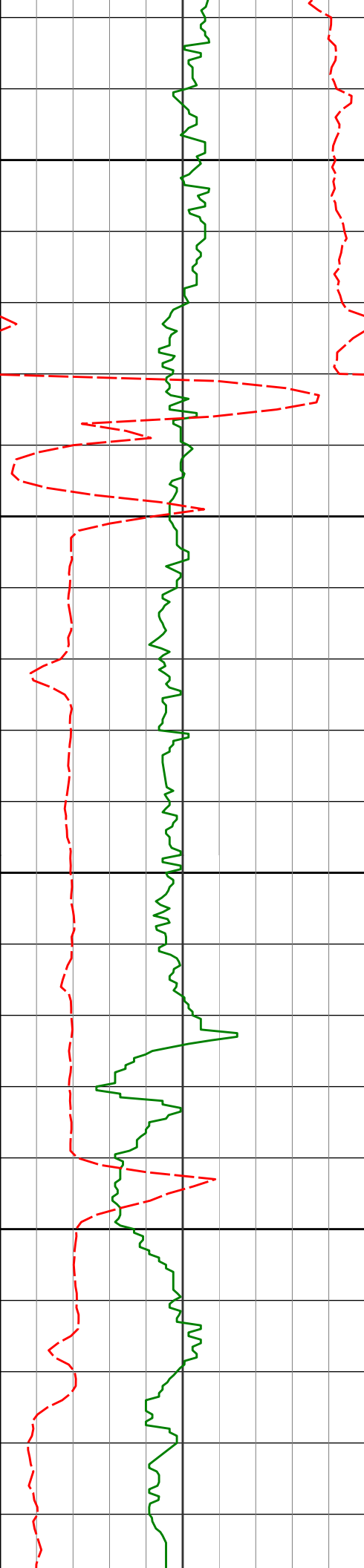
8692'

90.25°

0.25°

5632.28'

3347.37'



8800

8850

8900

8950

8787'

90.89°

0.69°

5631.34'

3442.36'

8882'

90.71°

0.46°

5630.01'

3537.34'

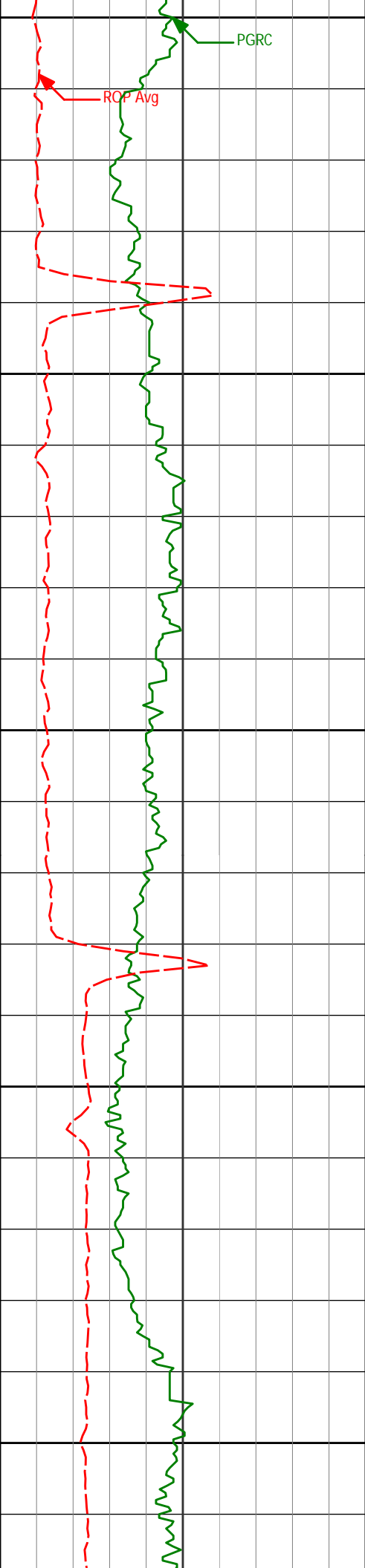
8977'

90.77°

359.40°

5628.78'

3632.33'



9000

9050

9100

9150

9200

9071'

91.11°

358.84°

5627.24'

3726.31'

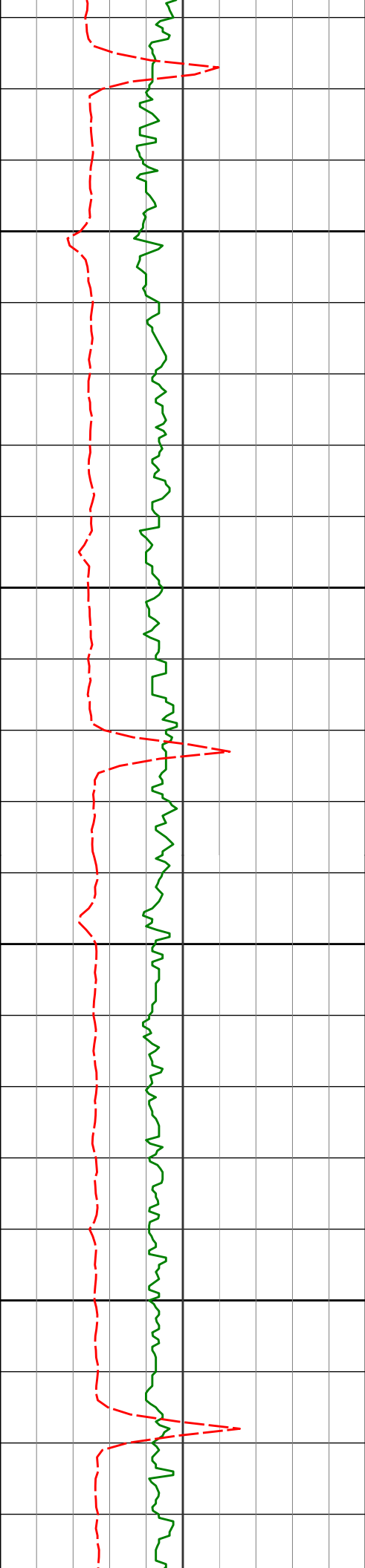
9166'

91.39°

358.51°

5625.17'

3821.27'



9250

9261'

91.88°

358.53°

5622.46'

3916.20'

9300

9350

9356'

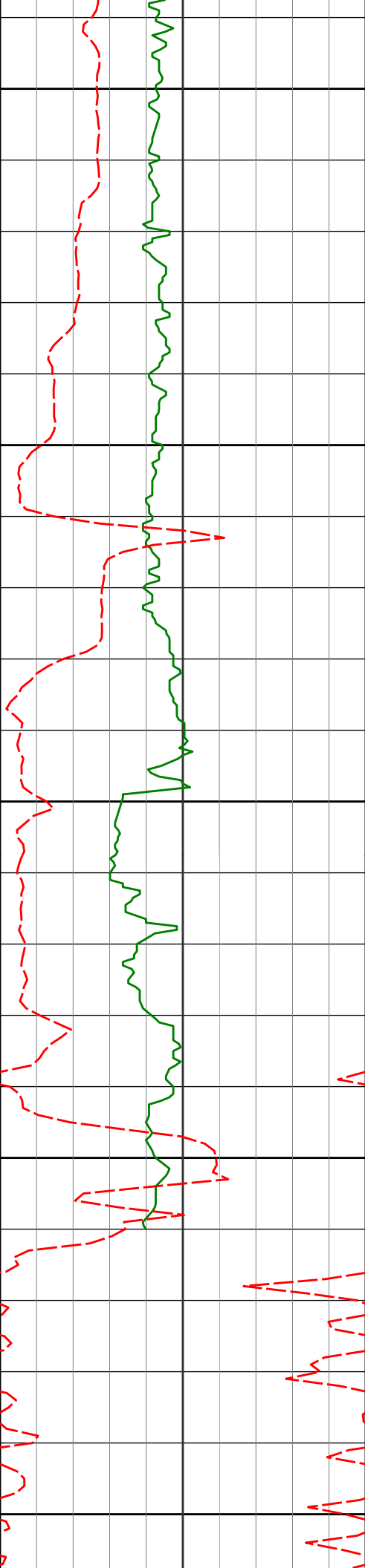
91.48°

357.67°

5619.68'

4011.12'

9400



9450

9451'

90.83°

356.43°

5617.76'

4105.98'

9500

9545'

90.22°

354.98°

5616.90'

4199.73'

9550

9600

9603'

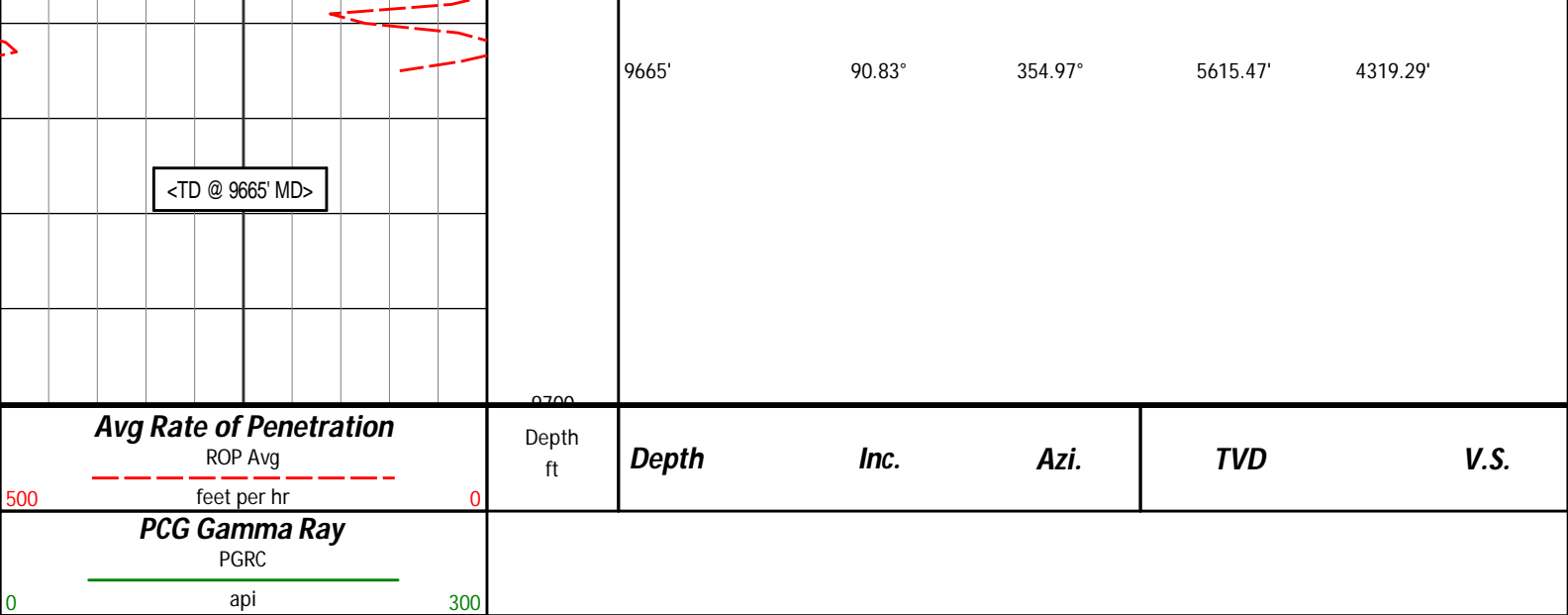
90.83°

354.97°

5616.37'

4257.52'

9650



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Sharpe State LD02-77HN
Wattenberg
Weld Colorado
USA
CA-XX-0901957153

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
474.00	0.50	270.33	473.99	0.01 N	2.07 W	0.02	0.11
846.00	0.30	64.33	845.99	0.44 N	2.81 W	0.45	0.21
1292.00	0.04	200.38	1291.99	0.79 N	1.82 W	0.80	0.07
1570.00	0.64	157.91	1569.98	0.75 S	1.27 W	-0.75	0.22
1662.00	1.13	159.47	1661.97	2.08 S	0.76 W	-2.08	0.53
1847.00	1.53	143.48	1846.92	5.77 S	1.35 E	-5.78	0.29
2033.00	1.82	146.41	2032.84	10.23 S	4.46 E	-10.24	0.16
2126.00	0.76	115.00	2125.82	11.72 S	5.84 E	-11.73	1.33
2218.00	1.39	74.69	2217.80	11.68 S	7.47 E	-11.70	1.03
2312.00	1.23	78.36	2311.78	11.18 S	9.56 E	-11.20	0.19
2496.00	1.25	67.14	2495.73	10.00 S	13.34 E	-10.04	0.13
2588.00	1.31	69.88	2587.71	9.25 S	15.25 E	-9.29	0.10
2681.00	2.32	54.64	2680.66	7.79 S	17.78 E	-7.84	1.19
2774.00	2.23	55.05	2773.59	5.67 S	20.80 E	-5.73	0.10
2869.00	1.11	11.30	2868.55	3.71 S	22.49 E	-3.77	1.71
3058.00	0.66	340.80	3057.53	0.89 S	22.49 E	-0.95	0.34
3152.00	0.99	350.09	3151.52	0.42 N	22.18 E	0.36	0.37
3436.00	0.78	11.16	3435.49	4.71 N	22.13 E	4.65	0.13
3531.00	0.90	21.12	3530.48	6.03 N	22.52 E	5.97	0.20
3626.00	1.19	13.50	3625.46	7.68 N	23.02 E	7.62	0.34
3720.00	1.05	6.33	3719.44	9.49 N	23.34 E	9.43	0.21
3910.00	1.49	313.09	3909.40	12.91 N	21.73 E	12.85	0.63
4005.00	2.17	312.37	4004.35	14.96 N	19.50 E	14.91	0.72
4100.00	1.73	298.56	4099.30	16.86 N	16.91 E	16.82	0.67
4194.00	1.89	277.43	4193.25	17.74 N	14.12 E	17.70	0.73
4289.00	1.18	221.81	4288.22	17.22 N	11.92 E	17.18	1.65
4383.00	1.88	245.27	4382.19	15.85 N	9.87 E	15.82	0.99
4478.00	2.46	205.70	4477.13	13.36 N	7.57 E	13.34	1.65
4573.00	1.33	158.78	4572.08	10.50 N	7.08 E	10.48	1.93
4668.00	3.75	112.93	4666.98	8.26 N	10.34 E	8.23	3.14
4762.00	6.89	102.54	4760.57	5.84 N	18.68 E	5.79	3.47
4810.00	7.01	98.24	4808.22	4.79 N	24.39 E	4.73	1.11
4856.00	10.72	83.25	4853.67	4.89 N	31.41 E	4.81	9.43
4904.00	13.36	78.93	4900.61	6.48 N	41.29 E	6.37	5.81

4904.00	15.30	70.53	4900.01	0.48 N	41.29 E	0.37	5.81
4951.00	15.64	70.56	4946.11	9.64 N	52.60 E	9.49	6.57
4999.00	17.62	58.62	4992.12	15.57 N	64.90 E	15.39	8.21
5046.00	19.00	56.70	5036.74	23.48 N	77.37 E	23.26	3.21
5094.00	20.11	49.25	5081.98	33.15 N	90.16 E	32.90	5.68
5140.00	24.05	40.83	5124.60	45.42 N	102.29 E	45.13	10.98
5188.00	25.13	38.47	5168.25	60.80 N	115.02 E	60.48	3.04
5236.00	26.63	29.31	5211.45	78.17 N	126.64 E	77.81	8.88
5284.00	29.48	23.39	5253.81	98.40 N	136.60 E	98.02	8.30
5331.00	31.21	17.93	5294.38	120.60 N	144.94 E	120.20	6.92
5379.00	34.63	9.90	5334.69	145.89 N	151.12 E	145.47	11.55
5425.00	37.21	4.79	5371.95	172.64 N	154.53 E	172.21	8.59
5473.00	37.83	359.09	5410.03	201.83 N	155.51 E	201.39	7.34
5520.00	41.28	356.85	5446.26	231.73 N	154.43 E	231.29	7.95
5568.00	46.86	354.06	5480.74	264.98 N	151.74 E	264.56	12.31
5615.00	53.89	353.93	5510.70	300.96 N	147.95 E	300.55	14.97
5663.00	61.58	355.83	5536.30	341.36 N	144.36 E	340.95	16.36
5710.00	62.73	357.54	5558.26	382.84 N	141.96 E	382.45	4.04
5758.00	64.68	357.71	5579.52	425.84 N	140.18 E	425.44	4.07
5805.00	69.13	357.75	5597.96	469.03 N	138.47 E	468.64	9.48
5853.00	74.41	357.29	5612.97	514.56 N	136.49 E	514.17	11.03
5900.00	79.19	357.36	5623.70	560.25 N	134.36 E	559.87	10.17
5950.00	84.44	358.66	5630.81	609.69 N	132.64 E	609.32	10.82
6043.00	87.13	359.38	5637.64	702.42 N	131.05 E	702.05	2.99
6137.00	85.99	358.77	5643.28	796.24 N	129.54 E	795.87	1.38
6232.00	89.97	358.86	5646.62	891.14 N	127.57 E	890.78	4.19
6327.00	92.22	358.79	5644.81	986.10 N	125.62 E	985.74	2.37
6421.00	93.21	358.29	5640.36	1079.96 N	123.22 E	1079.61	1.18
6516.00	93.27	358.63	5635.00	1174.77 N	120.68 E	1174.43	0.37
6610.00	90.52	358.46	5631.89	1268.68 N	118.29 E	1268.35	2.93
6705.00	89.82	357.98	5631.61	1363.63 N	115.34 E	1363.31	0.90
6800.00	88.89	357.42	5632.68	1458.55 N	111.52 E	1458.23	1.13
6894.00	88.21	357.38	5635.06	1552.42 N	107.26 E	1552.12	0.72
6989.00	90.99	357.50	5635.72	1647.32 N	103.02 E	1647.02	2.92
7083.00	90.15	357.17	5634.78	1741.21 N	98.65 E	1740.93	0.95
7176.00	90.68	357.26	5634.11	1834.10 N	94.13 E	1833.83	0.57
7271.00	91.60	356.55	5632.22	1928.94 N	89.01 E	1928.68	1.23
7365.00	90.86	355.73	5630.19	2022.70 N	82.67 E	2022.46	1.18
7460.00	91.76	358.89	5628.02	2117.56 N	78.22 E	2117.33	3.46
7555.00	92.19	358.68	5624.75	2212.48 N	76.20 E	2212.26	0.51
7649.00	90.52	357.58	5622.53	2306.40 N	73.13 E	2306.19	2.12
7744.00	90.65	357.30	5621.56	2401.30 N	68.89 E	2401.10	0.32
7839.00	91.05	357.13	5620.15	2496.18 N	64.27 E	2495.99	0.46
8028.00	90.43	354.88	5617.72	2684.69 N	51.11 E	2684.54	1.24
8123.00	90.68	357.27	5616.80	2779.45 N	44.61 E	2779.32	2.52
8218.00	90.83	356.91	5615.54	2874.32 N	39.78 E	2874.20	0.41
8313.00	87.66	358.01	5616.80	2969.21 N	35.57 E	2969.10	3.54
8407.00	87.17	357.41	5621.04	3063.04 N	31.82 E	3062.94	0.83
8502.00	86.18	356.74	5626.56	3157.75 N	26.98 E	3157.66	1.26
8597.00	88.33	356.89	5631.11	3252.49 N	21.71 E	3252.42	2.28
8692.00	90.25	0.25	5632.28	3347.44 N	19.35 E	3347.37	4.07
8787.00	90.89	0.69	5631.34	3442.43 N	20.13 E	3442.36	0.82
8882.00	90.71	0.46	5630.01	3537.41 N	21.09 E	3537.34	0.31
8977.00	90.77	359.40	5628.78	3632.40 N	20.98 E	3632.33	1.12
9071.00	91.11	358.84	5627.24	3726.38 N	19.53 E	3726.31	0.70
9166.00	91.39	358.51	5625.17	3821.33 N	17.33 E	3821.27	0.45
9261.00	91.88	358.53	5622.46	3916.26 N	14.87 E	3916.20	0.52
9356.00	91.48	357.67	5619.68	4011.17 N	11.72 E	4011.12	1.00
9451.00	90.83	356.43	5617.76	4106.02 N	6.82 E	4105.98	1.47
9545.00	90.22	354.98	5616.90	4199.75 N	0.22 W	4199.73	1.68
9603.00	90.83	354.97	5616.37	4257.52 N	5.30 W	4257.52	1.06
9665.00	90.83	354.97	5615.47	4319.28 N	10.74 W	4319.29	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 359.84 DEGREES (GRID)
A TOTAL CORRECTION OF 6.93 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.

HORIZONTAL DISPLACEMENT(CLOSURE) AT 9665.00 FEET
IS 4319.29 FEET ALONG 359.86 DEGREES (GRID)

Surface surveys at 474 ft and 846 ft have had azimuths corrected to grid north, but were not taken by Halliburton.

Last survey is a projection from 9603 ft MD to TD at 9665 ft MD.

Date Printed:29 December 2014