

PCDC - Pressure Case Directional
PCGK - Pressure Case Gamma

1 : 240

Country		: USA		<div>Company : Noble Energy</div> <div>Rig : H&P 322</div> <div>Well : Wells Ranch USX AA27-62-1HN</div> <div>Field : Wattenberg</div> <div>Country : USA</div> <div>API Number : 05-123-37143</div>			
Field		: Wattenberg					
Location		: Lat: 40° 27' 14.76" North Long: 104° 25' 54.44" West					
Well		: Wells Ranch USX AA27-62-1HN					
Company		: Noble Energy					
Rig		: H&P 322					
LOCATION				<div>Latitude : 40° 27' 14.76" North Longitude : 104° 25' 54.44" West</div> <div>UTM Easting = 3297263.250 ft UTM Northing = 1410059.467 ft</div>			
Permanent Datum		: Ground Level		Elevation : 4794.00 ft		Elev. KB N/A	
Log Measured From		: Drill Floor		24.00 ft Above Permanent Datum		DF 4818.00 ft GL 4794.00 ft WD N/A	
Drilling Measured From : Drill Floor				MD LOG			
Depth Logged		: 640.00 ft To 11,434.00 ft		Unit No. : 11210425		Job No. :CA-XX-0900577110	
Date Logged		: 20-Jul-13 To 27-Jul-13		Plot Type : Final			
Total Depth MD		: 11,434.00 ft TVD : 6,651.44 ft		Plot Date : 27-Jul-13			
Spud Date		: 19-Jul-13					
Run No.	Borehole Record (MD)			Run No.	Borehole Record (MD)		
	Size	From	To		Size	From	To
2	8.750 in	640.00 ft	5334.00 ft				
3	8.750 in	5334.00 ft	7206.00 ft				
4	6.125 in	7206.00 ft	11434.00 ft				

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	21-Jul-13	23-Jul-13	27-Jul-13		
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)	640.00	5,334.00	7,206.00		
Log End Depth (MD, ft)	5,334.00	7,206.00	11,434.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	20-Jul-13 13:30	21-Jul-13 21:30	24-Jul-13 03:54		
Drill/Wipe End Date and Time	21-Jul-13 15:00	23-Jul-13 04:00	26-Jul-13 17:58		
Min Inc (deg) @ Depth (MD, ft)	.19 @ 1,860.00	8.70 @ 5,466.00	83.18 @ 7,234.00		
Max Inc (deg) @ Depth (MD, ft)	14.07 @ 3,948.00	82.09 @ 7,151.00	92.74 @ 7,613.00		
Bit TFA(in2) / Bit Type	.75 / PDC	.86 / PDC	.46 / PDC		
Flow Rate (gpm)	559.94	571.00	270.00		
Max AV (fpm) / CV (fpm) @ MWD	427.3 / 427.3	427.3 / 427.3	529.2 / 529.2		
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	8.45 / 27.00	10.33 / 37.00	9.80 / 36.00		
Filtrate CL (ppm)	1,700.00	1,700.00	2,100.00		
pH / Fluid Loss (mptm)	9.20 / N/A	10.30 / N/A	8.80 / N/A		
PV (cP) / YP (lbf/ft2)	1 / 4.00	12 / 11.00	9 / 8.00		
% Solids / % Sand	2.50 / 0.30	11.20 / 0.50	7.00 / 0.30		
% 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 (degF) / Source	141.70 / PCM	171.20 / PCM	221.80 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Osahon Igunbor	Osahon Igunbor	Osahon Igunbor		
Customer Representative	Charles Colver	Charles Colver	Jeremy Stolz		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.84	5.84	5.84		
Sub Serial Number	11341342	11341342	12145497		
Insert Serial Number	11620316	11620316	11400938		
Date and Time Initialized	18-Jul-13 17:32	18-Jul-13 17:32	23-Jul-13 07:54		
Date and Time Read	23-Jul-13 09:42	23-Jul-13 09:35	27-Jul-13 04:34		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	58.00	55.00	63.00		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11341342	11341342	12145497		
Sonde Serial Number	11638498	11638498	11638621		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	304.33	138.02	155.80		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	51.18	48.42	56.55		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11341342	11341342	12145497		
Insert/Sonde Serial Number	11579809	11579809	11579852		

REMARKS

1. All depths are measured depths and are calibrated to the driller's pipe tally and are measured from the 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.

4. The Following smoothing parameters have been applied to the data"

PGXR (Gamma Ray CG):

Interval Resolution: 0.5 feet

Coercion Distance: 0.6 feet

Gap Fill: 3.0 feet

ROPA (Rate of Penetration):

Interval Resolution: 0.5 feet

Coercion Distance: 1.2 feet

WARRANTY

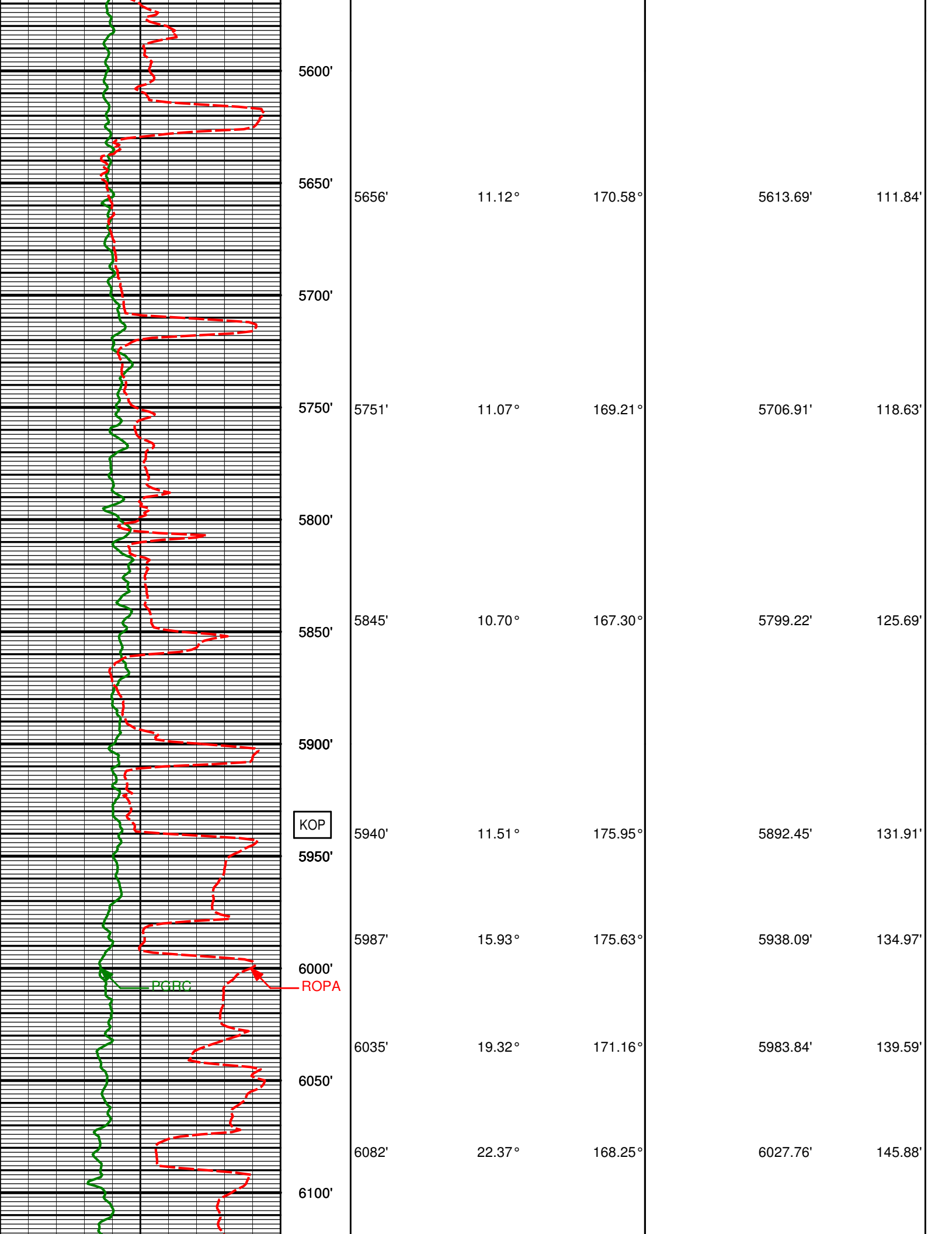
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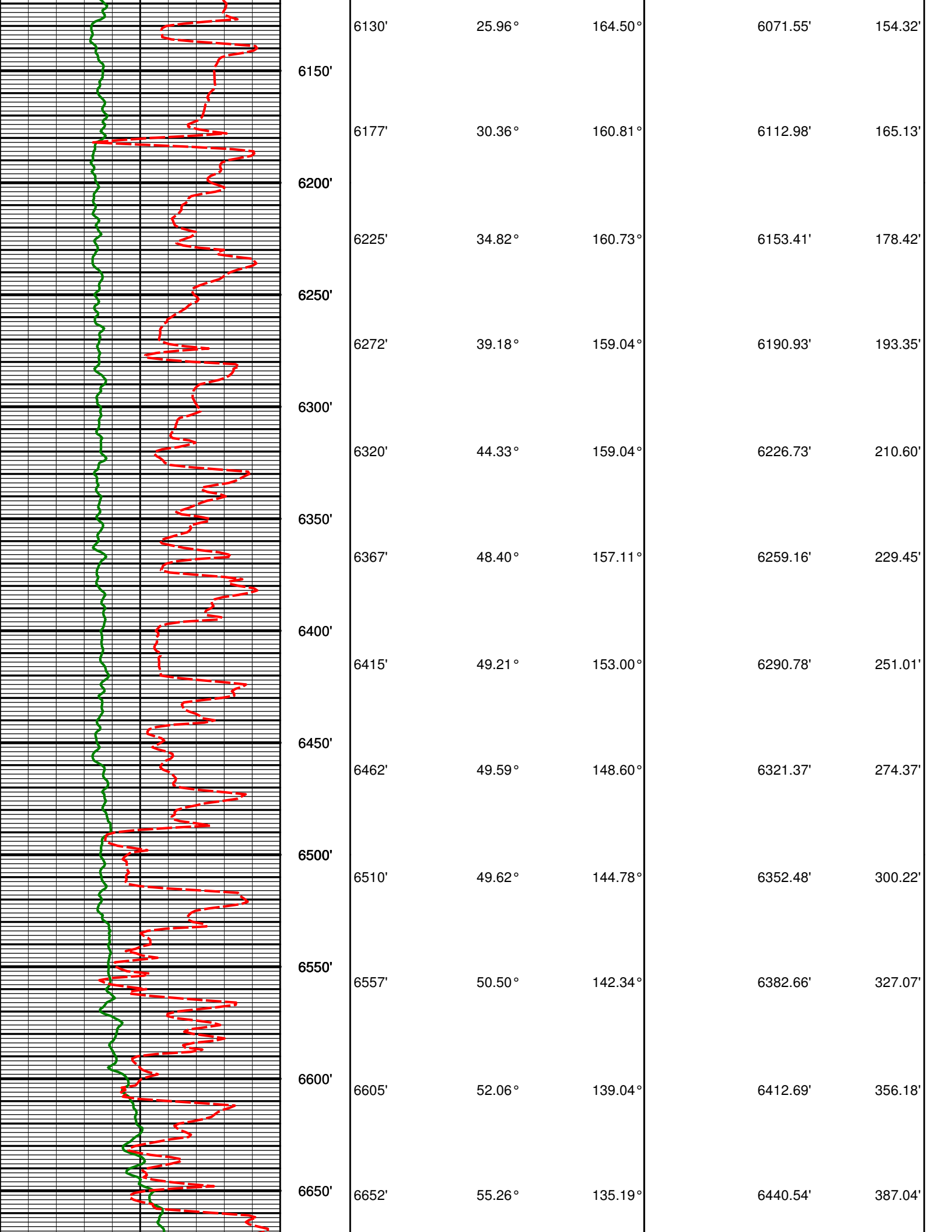
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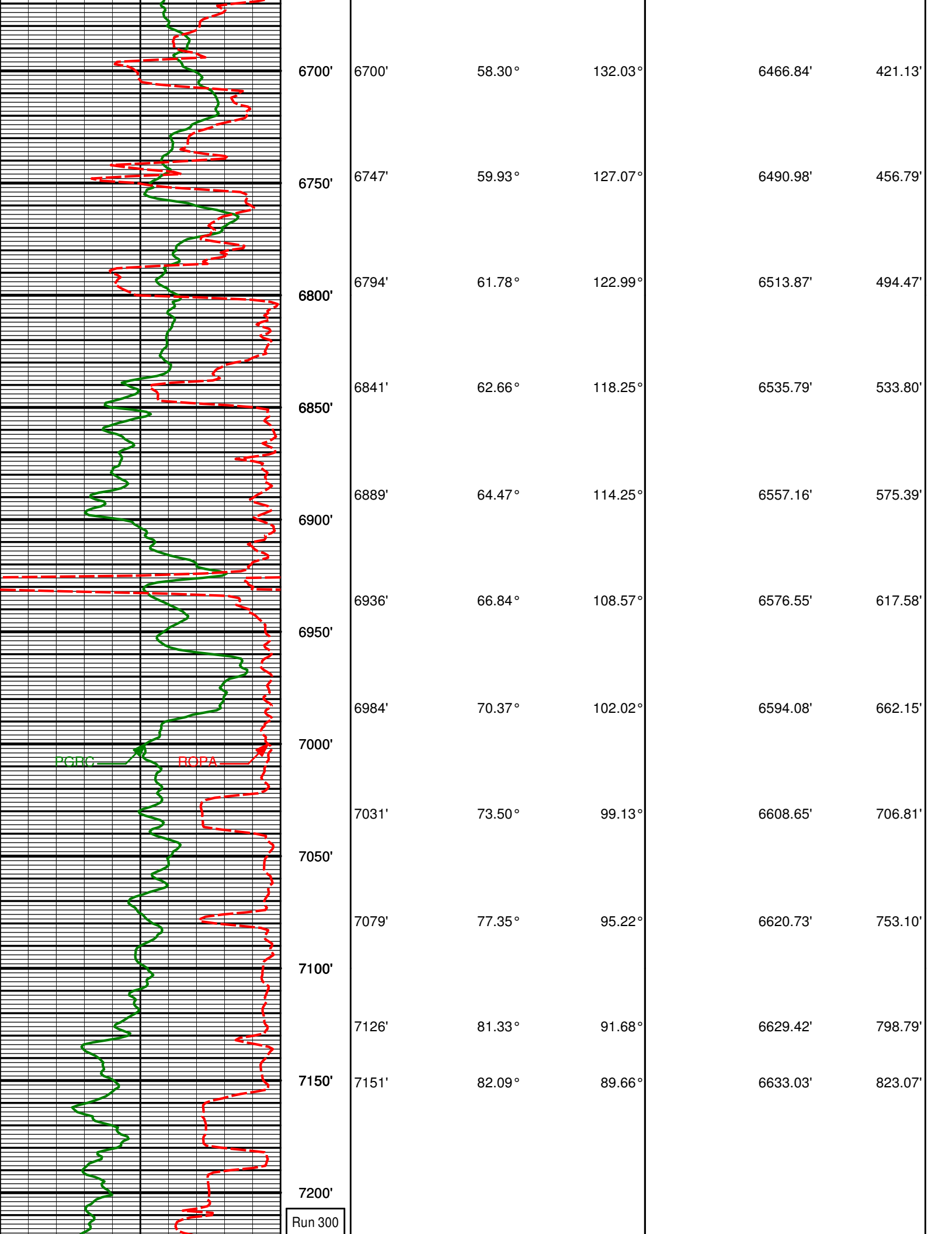
HALLIBURTON

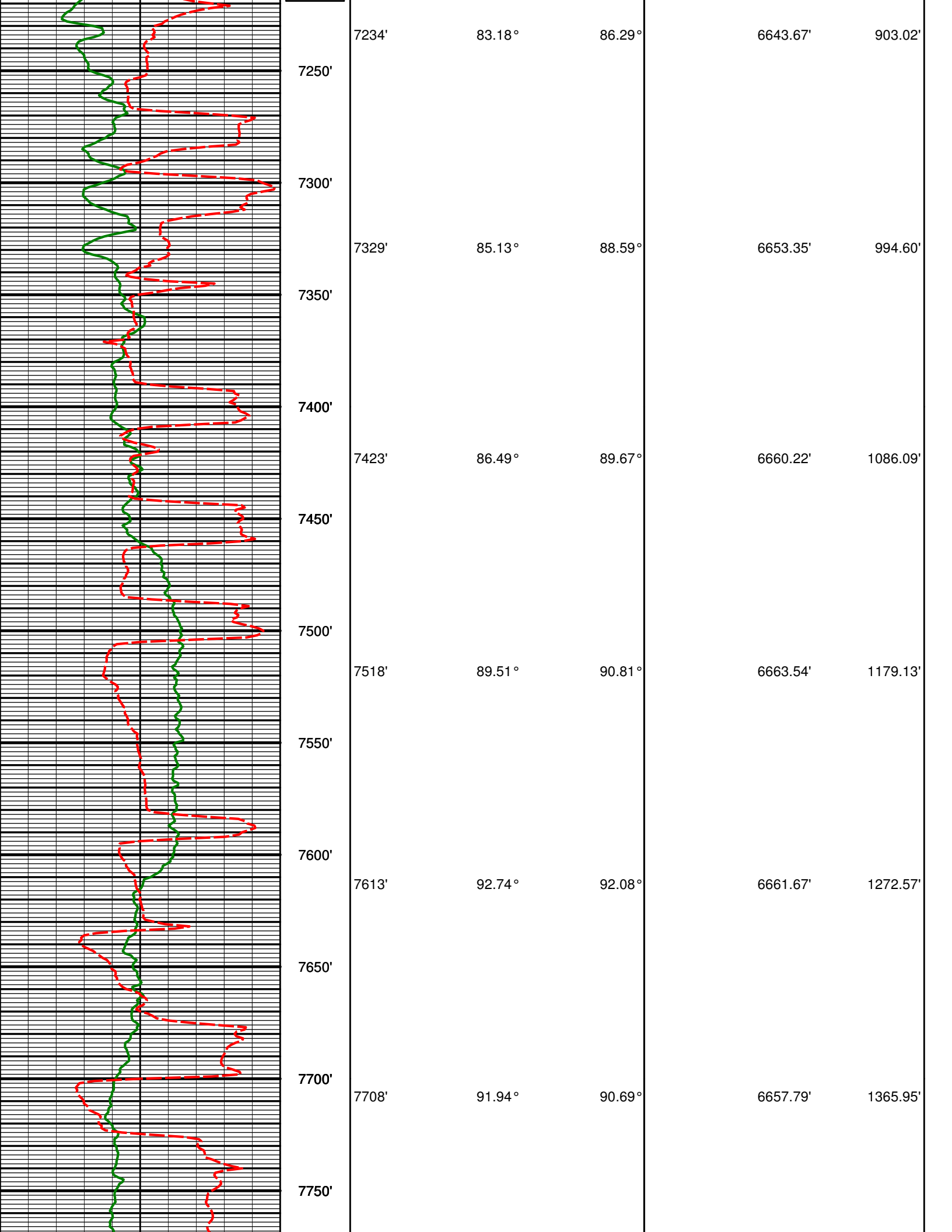
MD Detail Log 1:600

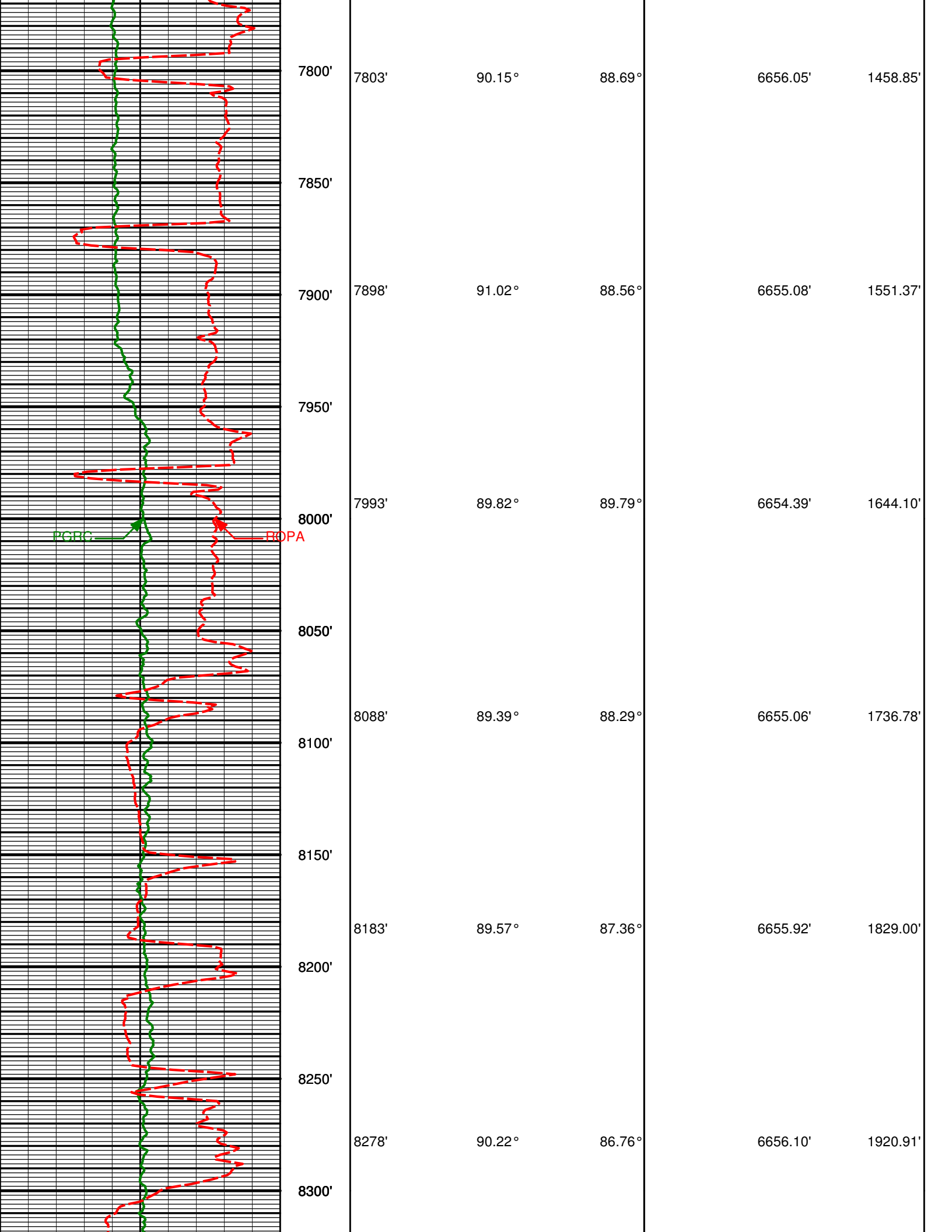
Gamma Ray (PGRC) (Api)						
0300						
Avg Rate of Penetration feet per hr		Feet				
6000						
		Depth	Inc	Azm	TVD	Vsec
		5300'				
		Run 200				
		5350'				
		5371'	10.18°	164.45°	5333.02'	92.64'
		5400'				
		5450'				
		5466'	8.70°	168.61°	5426.74'	99.31'
		5500'				
		5550'				
		5561'	10.60°	170.19°	5520.39'	105.33'

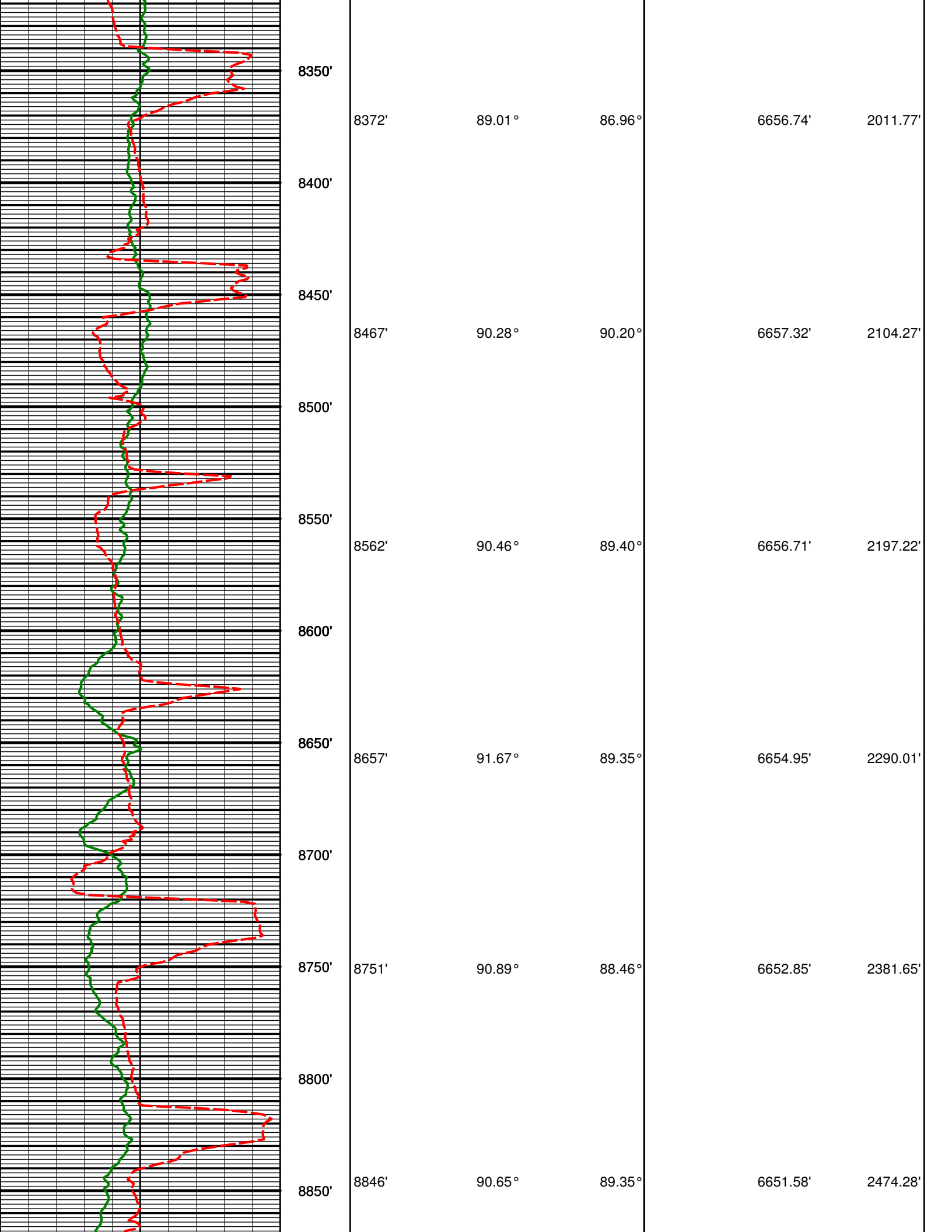


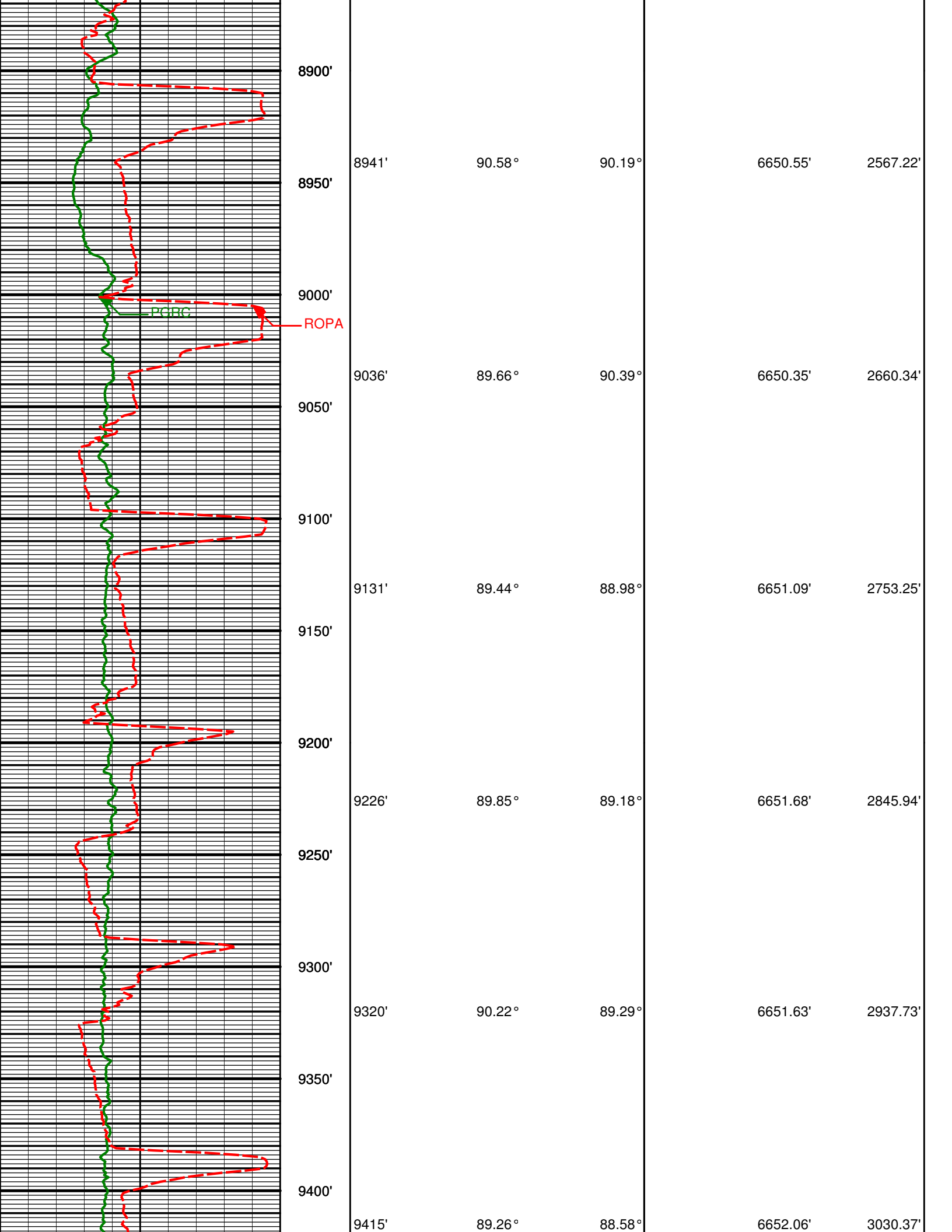


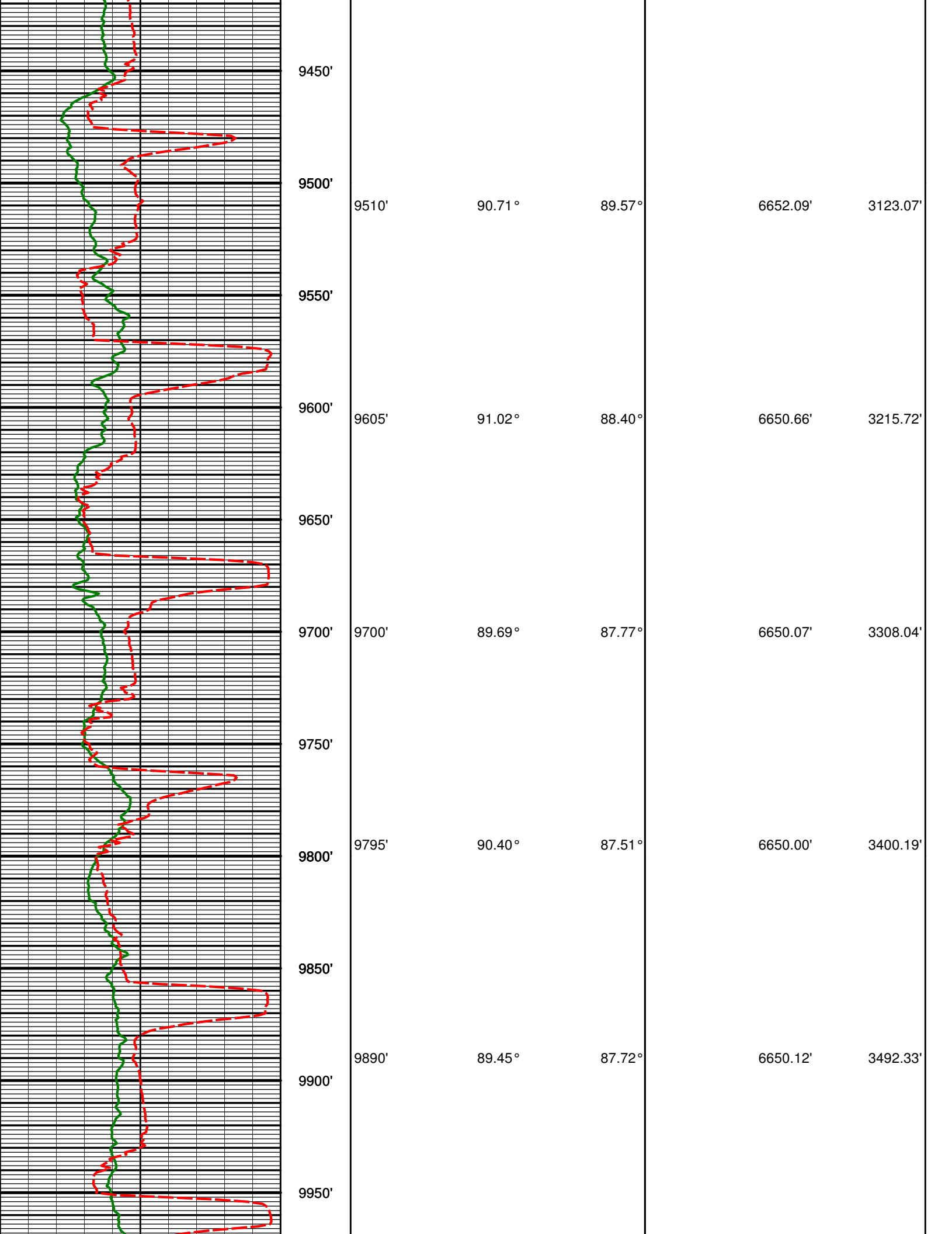


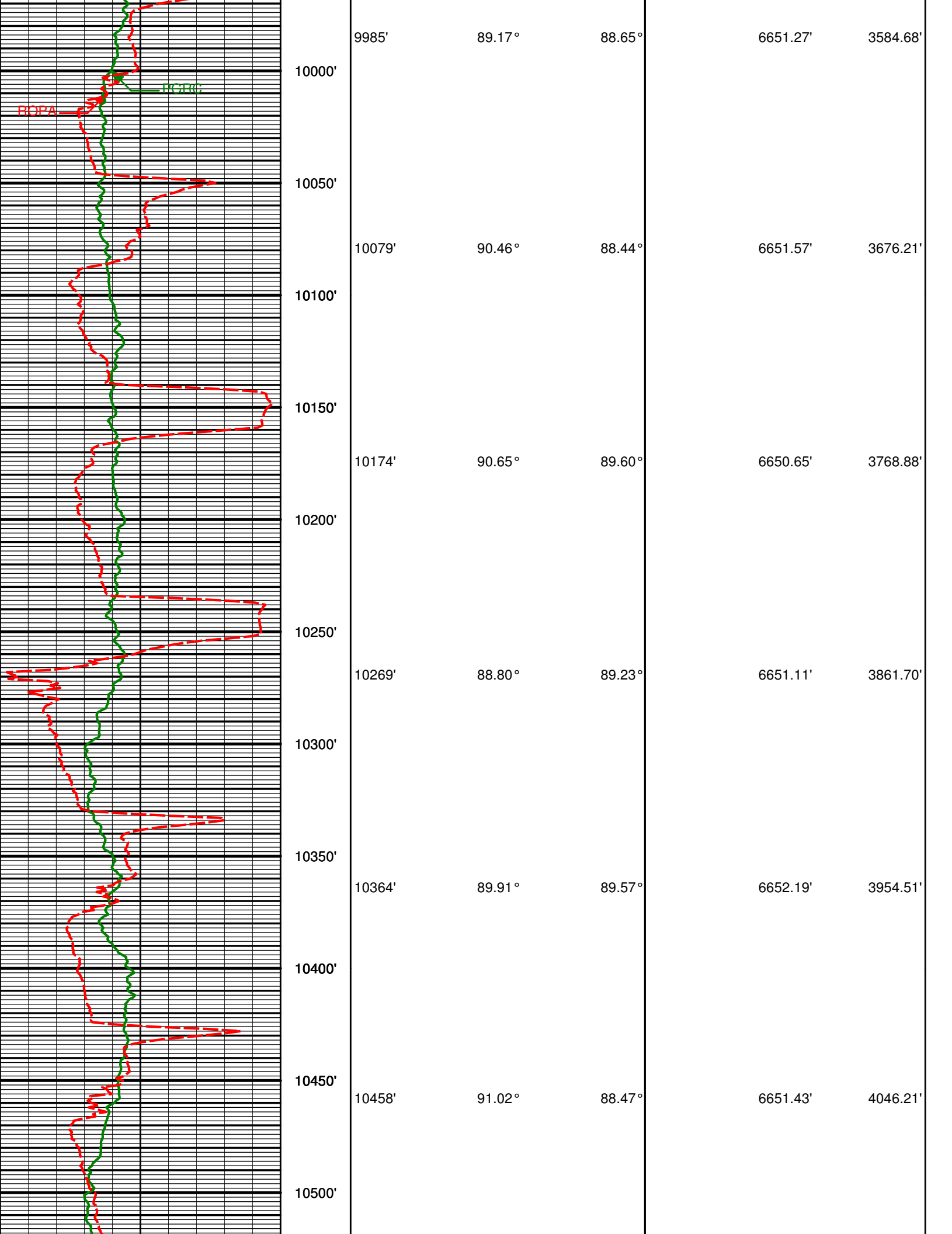


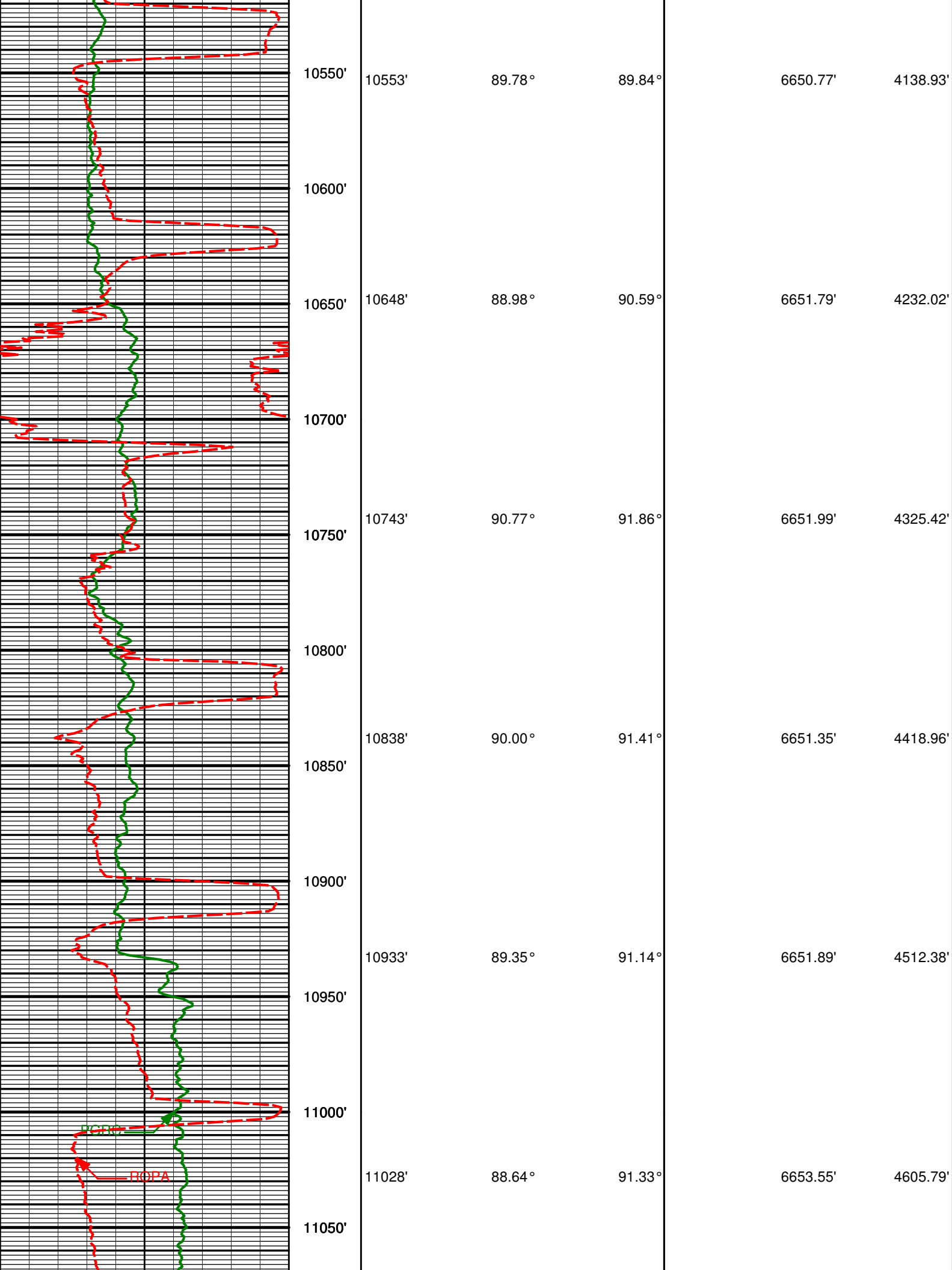




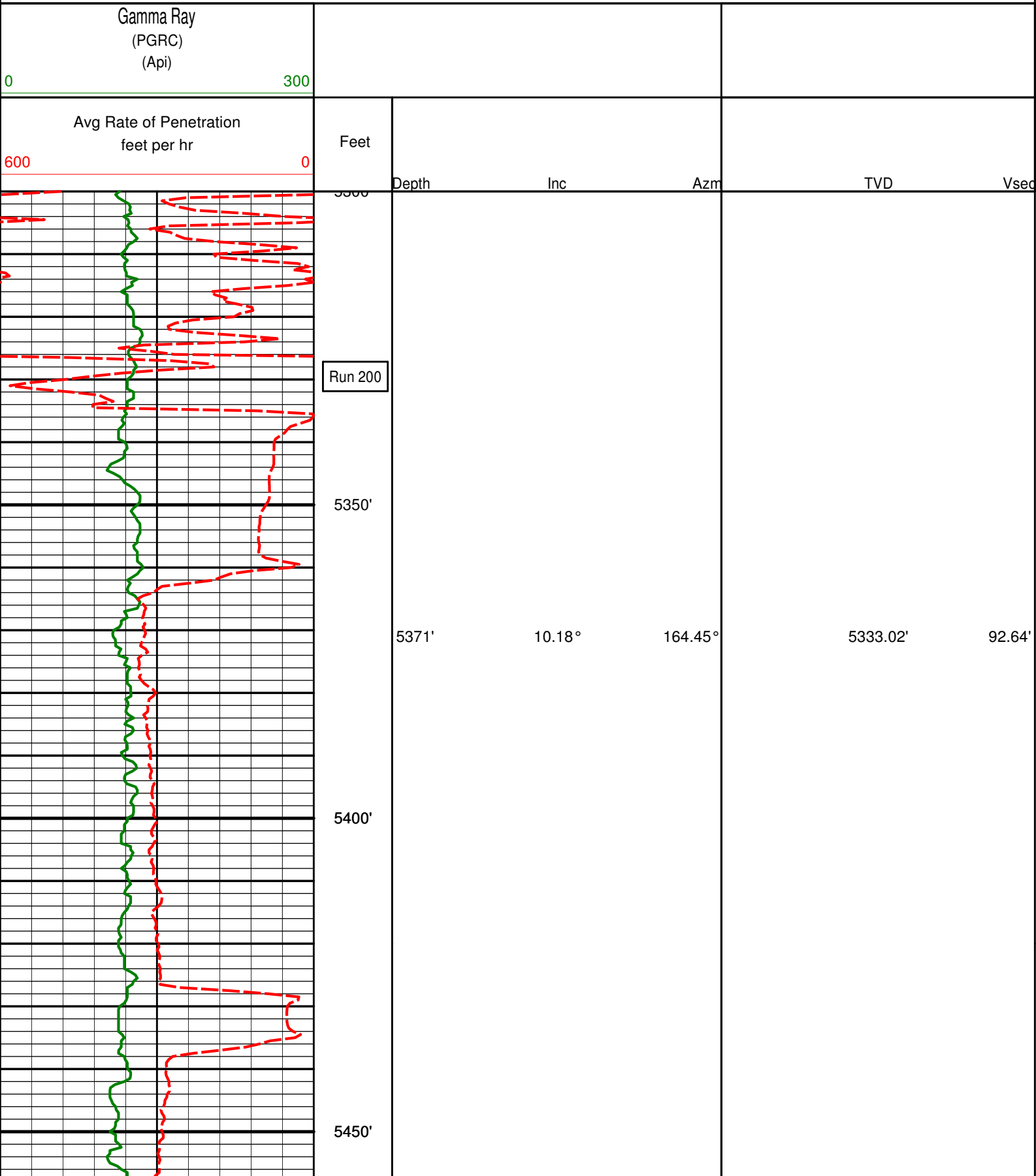


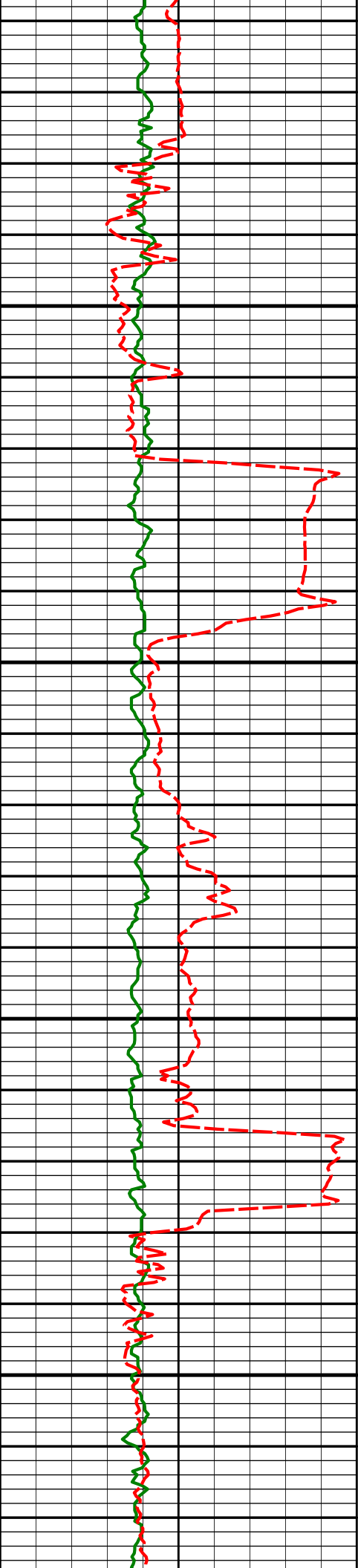






MD Detail Log 1:240





5500'

5550'

5600'

5650'

5466'

8.70°

168.61°

5426.74'

99.31'

5561'

10.60°

170.19°

5520.39'

105.33'

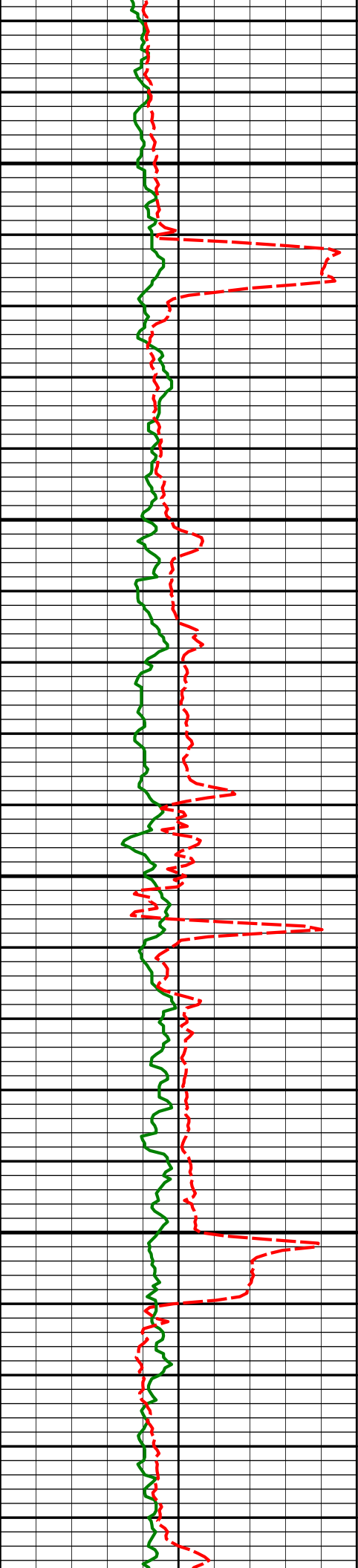
5656'

11.12°

170.58°

5613.69'

111.84'



5700'

5750'

5800'

5850'

5751'

11.07°

169.21°

5706.91'

118.63'

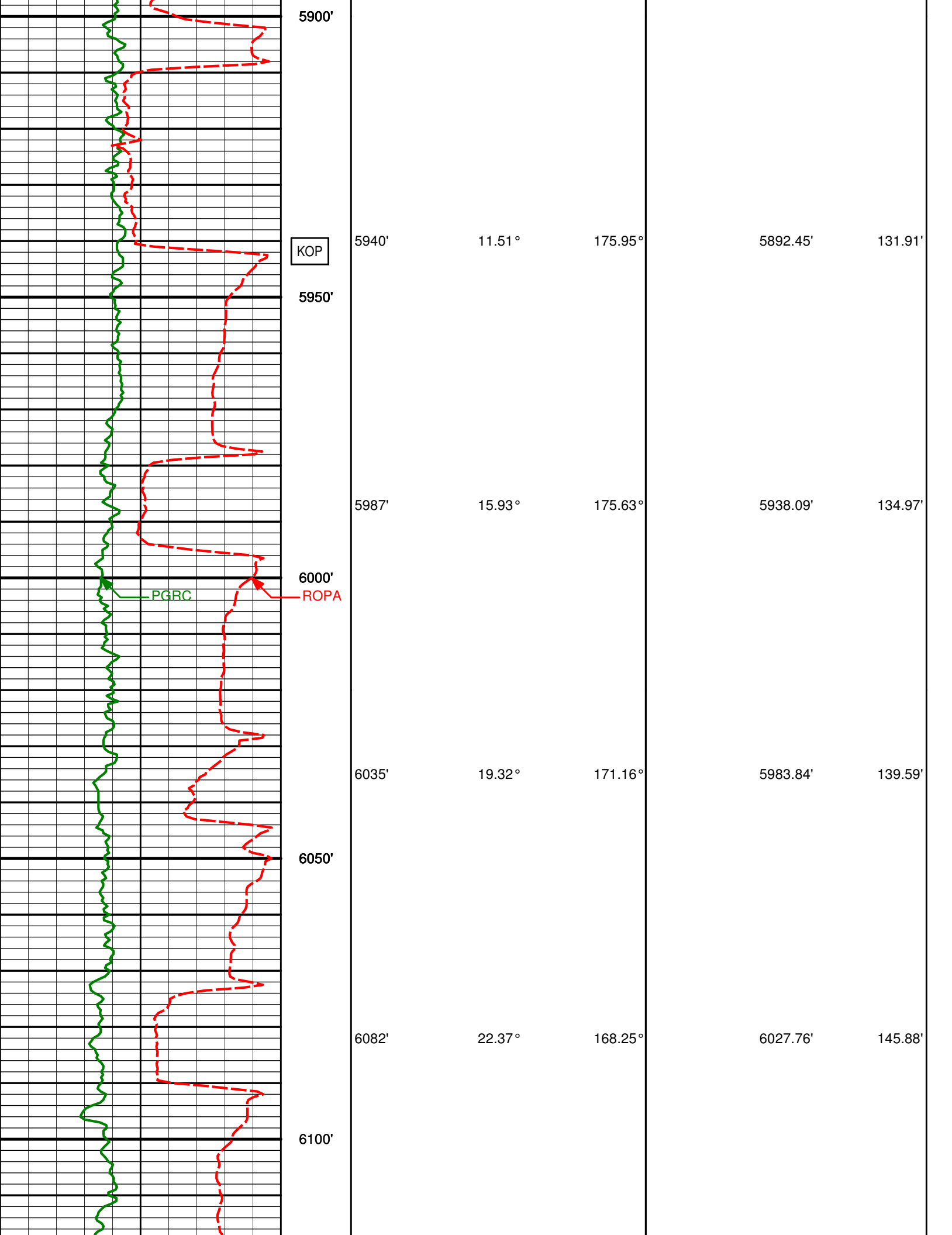
5845'

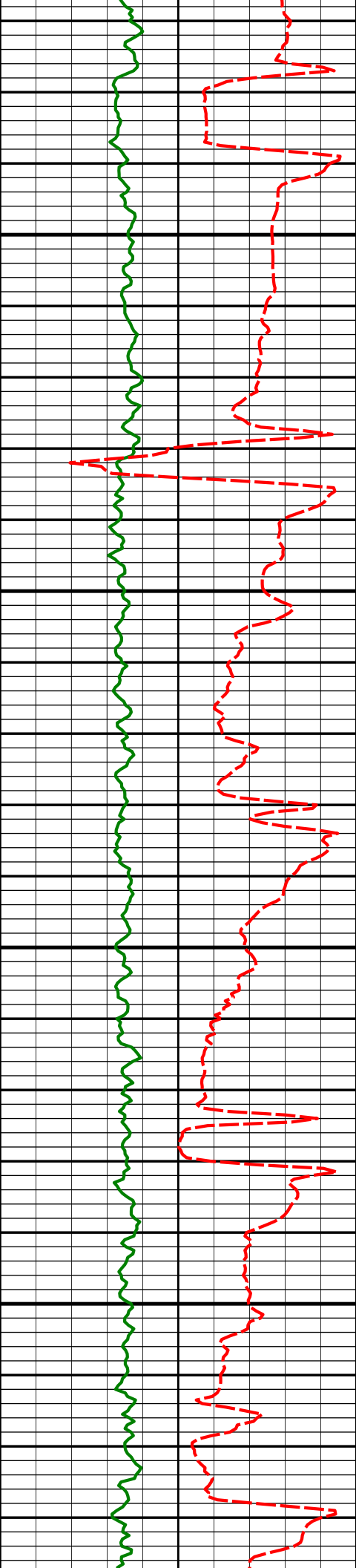
10.70°

167.30°

5799.22'

125.69'





6150'

6200'

6250'

6300'

6130'

6177'

6225'

6272'

6320'

25.96°

30.36°

34.82°

39.18°

44.33°

164.50°

160.81°

160.73°

159.04°

159.04°

6071.55'

6112.98'

6153.41'

6190.93'

6226.73'

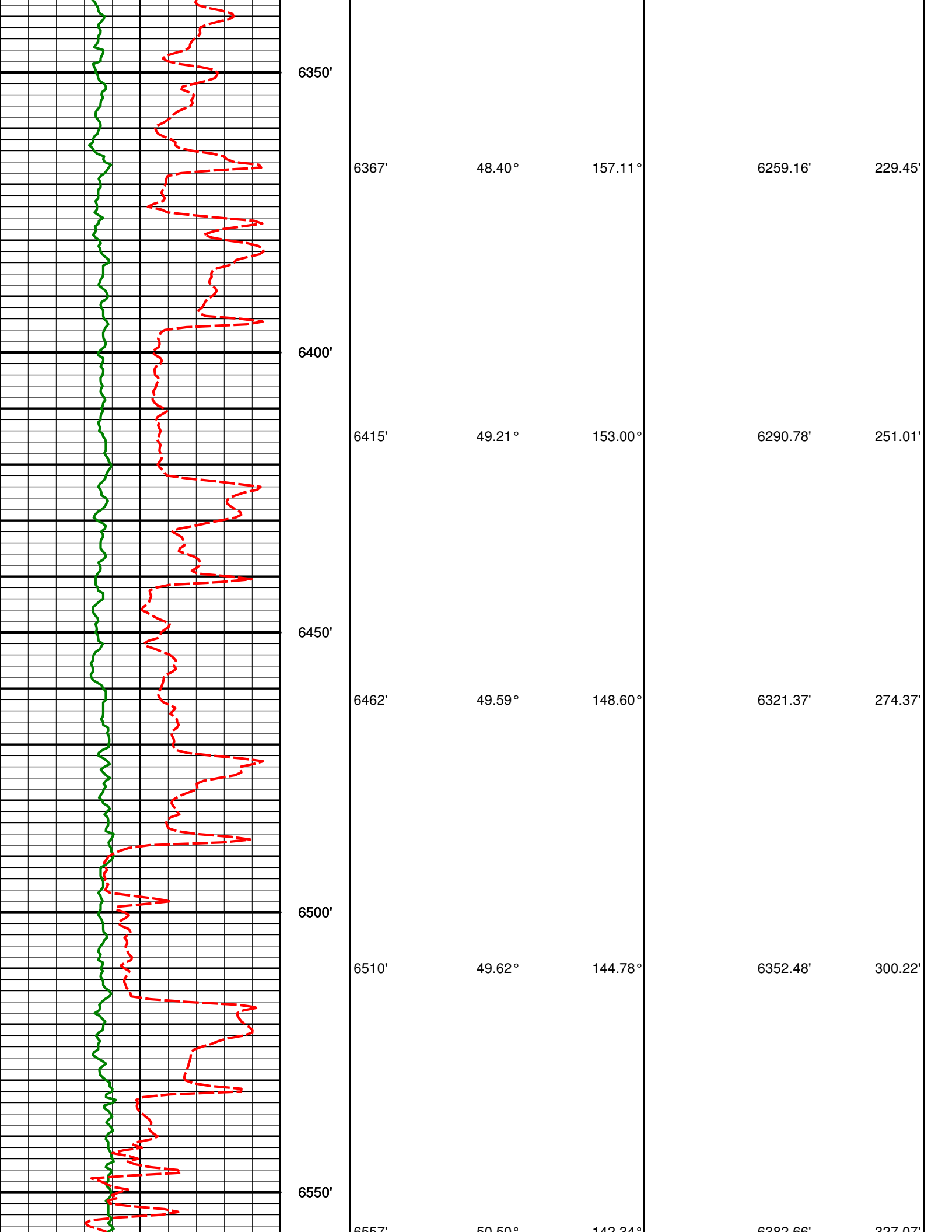
154.32'

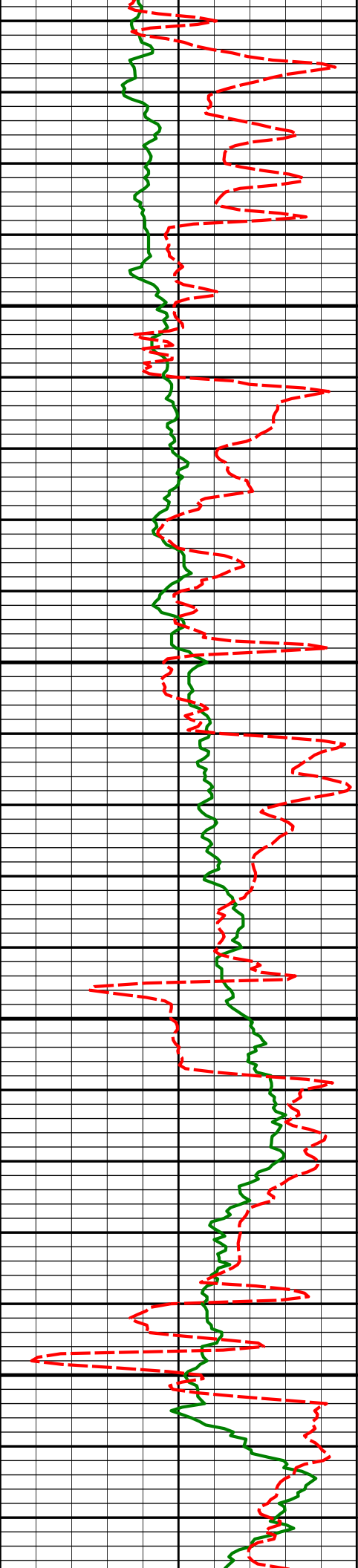
165.13'

178.42'

193.35'

210.60'





6600'

6605'

52.06°

139.04°

6412.69'

356.18'

6650'

6652'

55.26°

135.19°

6440.54'

387.04'

6700'

6700'

58.30°

132.03°

6466.84'

421.13'

6750'

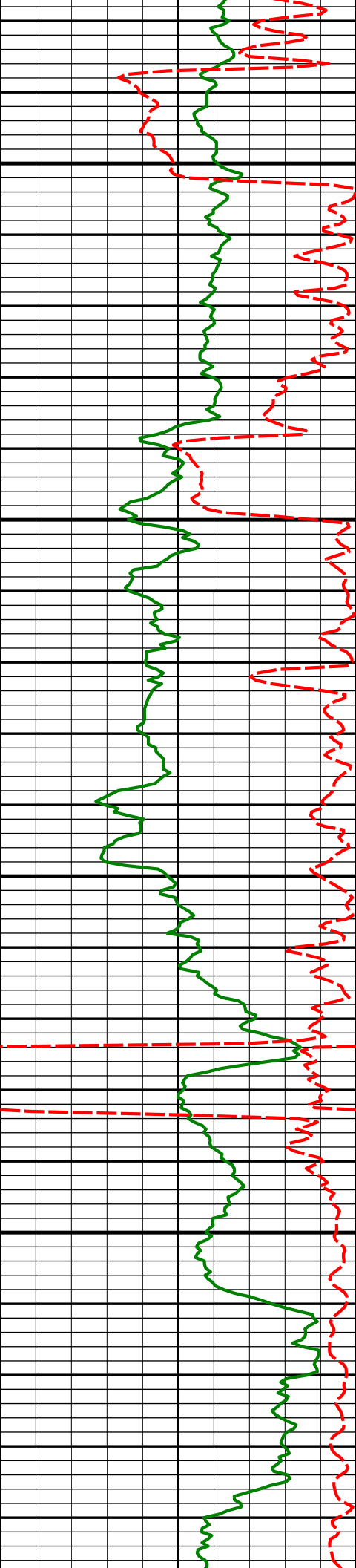
6747'

59.93°

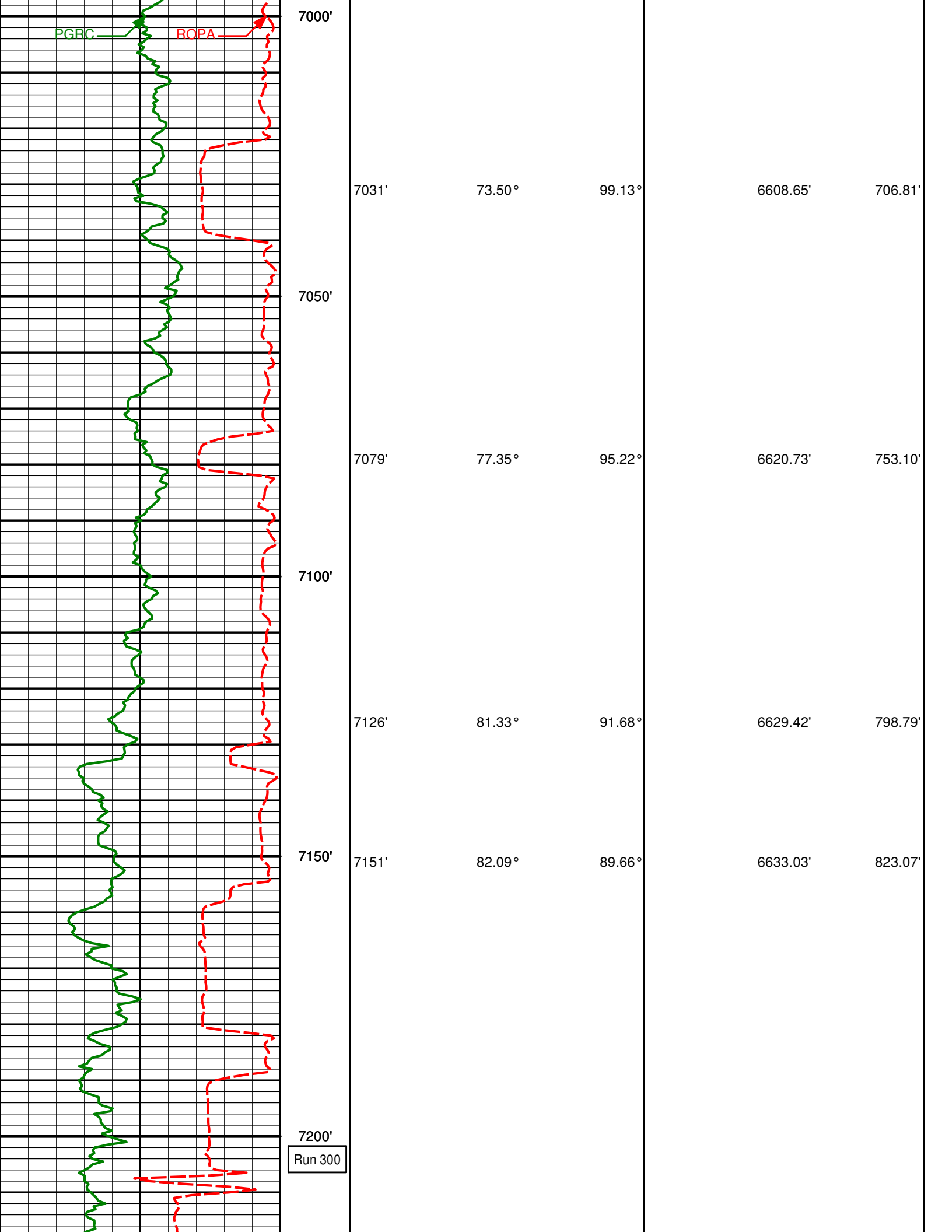
127.07°

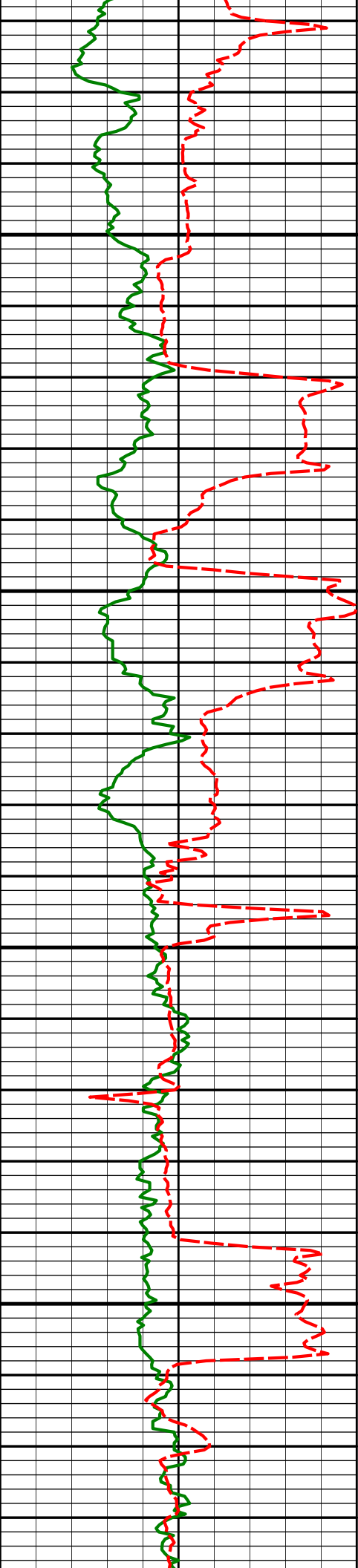
6490.98'

456.79'



6794'	61.78°	122.99°	6513.87'	494.47'
6800'				
6841'	62.66°	118.25°	6535.79'	533.80'
6850'				
6889'	64.47°	114.25°	6557.16'	575.39'
6900'				
6936'	66.84°	108.57°	6576.55'	617.58'
6950'				
6984'	70.37°	102.02°	6594.08'	662.15'





7234'

83.18°

86.29°

6643.67'

903.02'

7250'

7300'

7329'

85.13°

88.59°

6653.35'

994.60'

7350'

7400'

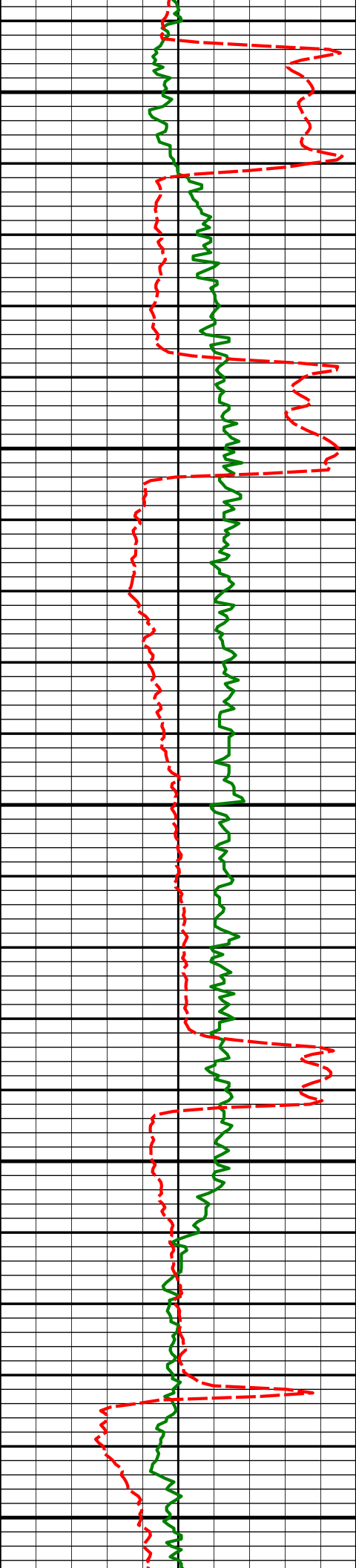
7423'

86.49°

89.67°

6660.22'

1086.09'



7450'

7500'

7550'

7600'

7650'

7518'

89.51°

90.81°

6663.54'

1179.13'

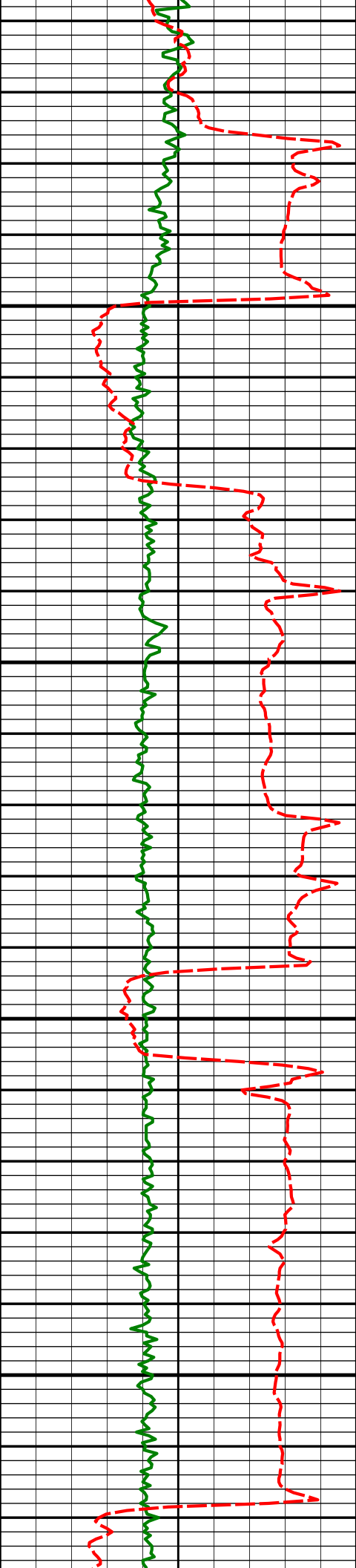
7613'

92.74°

92.08°

6661.67'

1272.57'



7700'

7708'

91.94°

90.69°

6657.79'

1365.95'

7750'

7800'

7803'

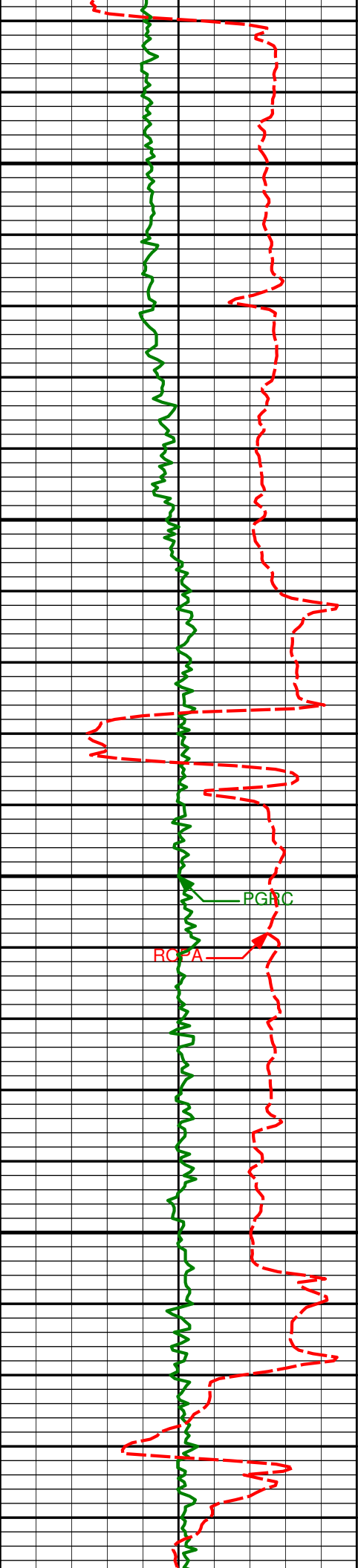
90.15°

88.69°

6656.05'

1458.85'

7850'



7900'

7950'

8000'

8050'

7898'

7993'

8088'

91.02°

89.82°

89.39°

88.56°

89.79°

88.29°

6655.08'

6654.39'

6655.06'

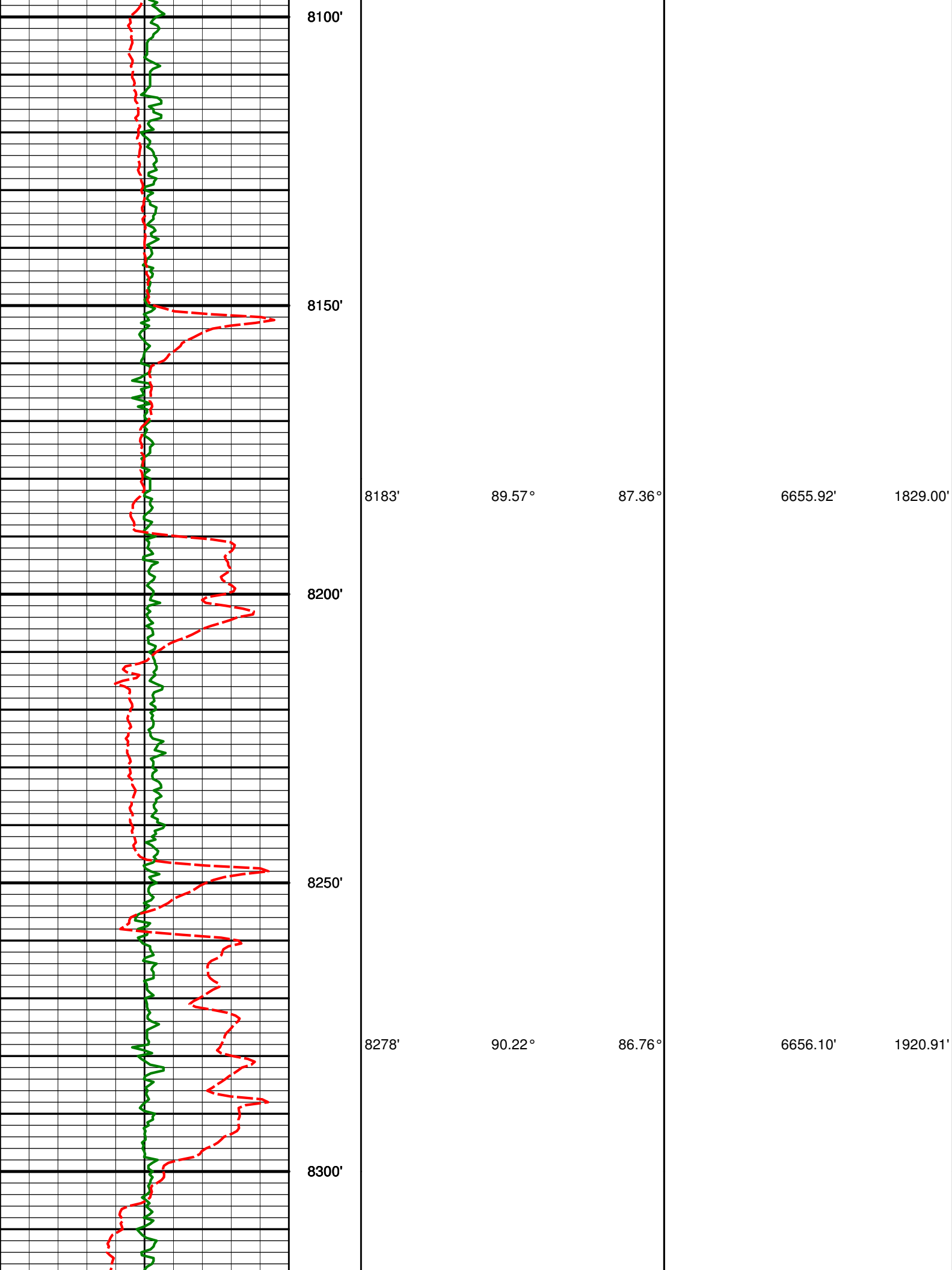
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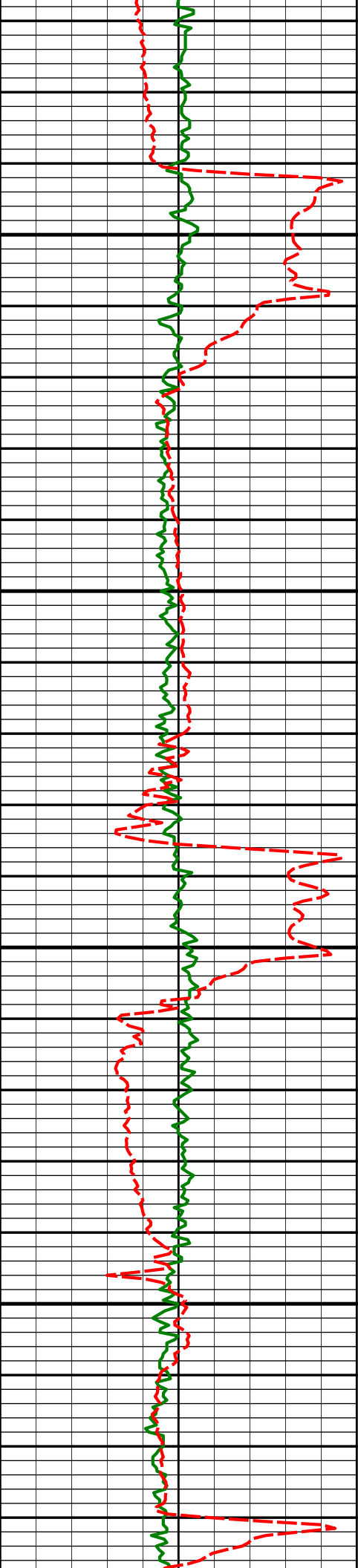
1644.10'

1736.78'

PGHC

RCPA





8350'

8372'

89.01°

86.96°

6656.74'

2011.77'

8400'

8450'

8467'

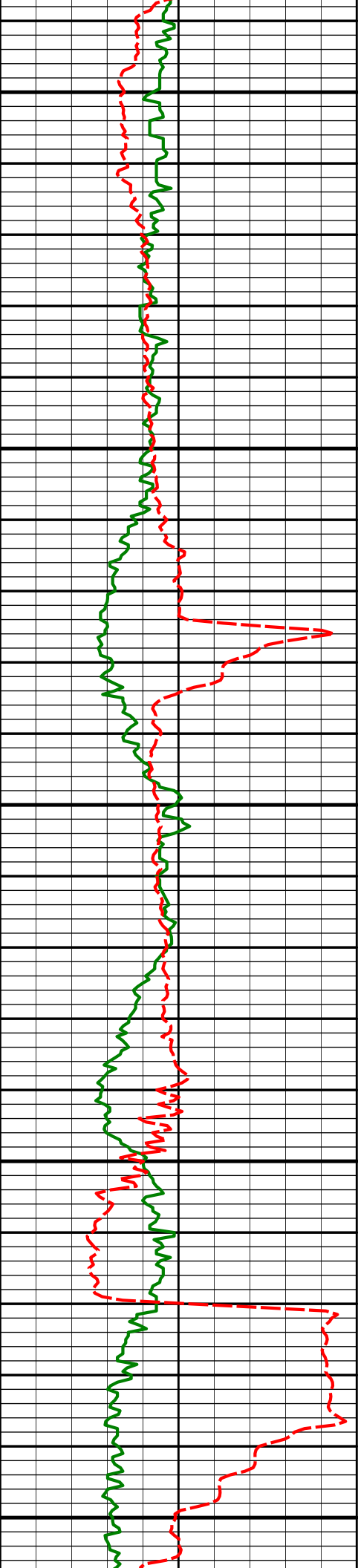
90.28°

90.20°

6657.32'

2104.27'

8500'



8550'

8562'

90.46°

89.40°

6656.71'

2197.22'

8600'

8650'

8657'

91.67°

89.35°

6654.95'

2290.01'

8700'

8750'

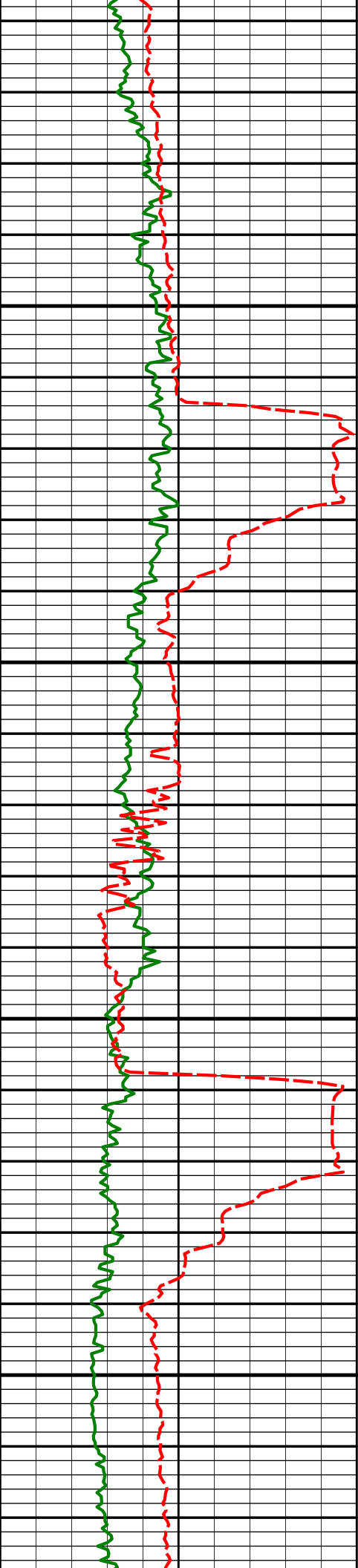
8751'

90.89°

88.46°

6652.85'

2381.65'



8800'

8850'

8900'

8950'

8846'

90.65°

89.35°

6651.58'

2474.28'

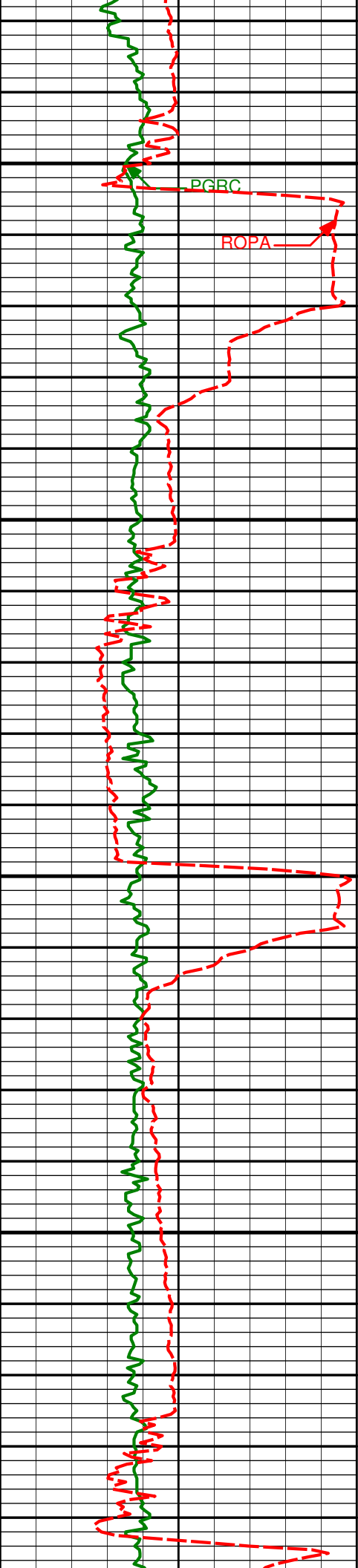
8941'

90.58°

90.19°

6650.55'

2567.22'



9000'

9050'

9100'

9150'

9036'

89.66°

90.39°

6650.35'

2660.34'

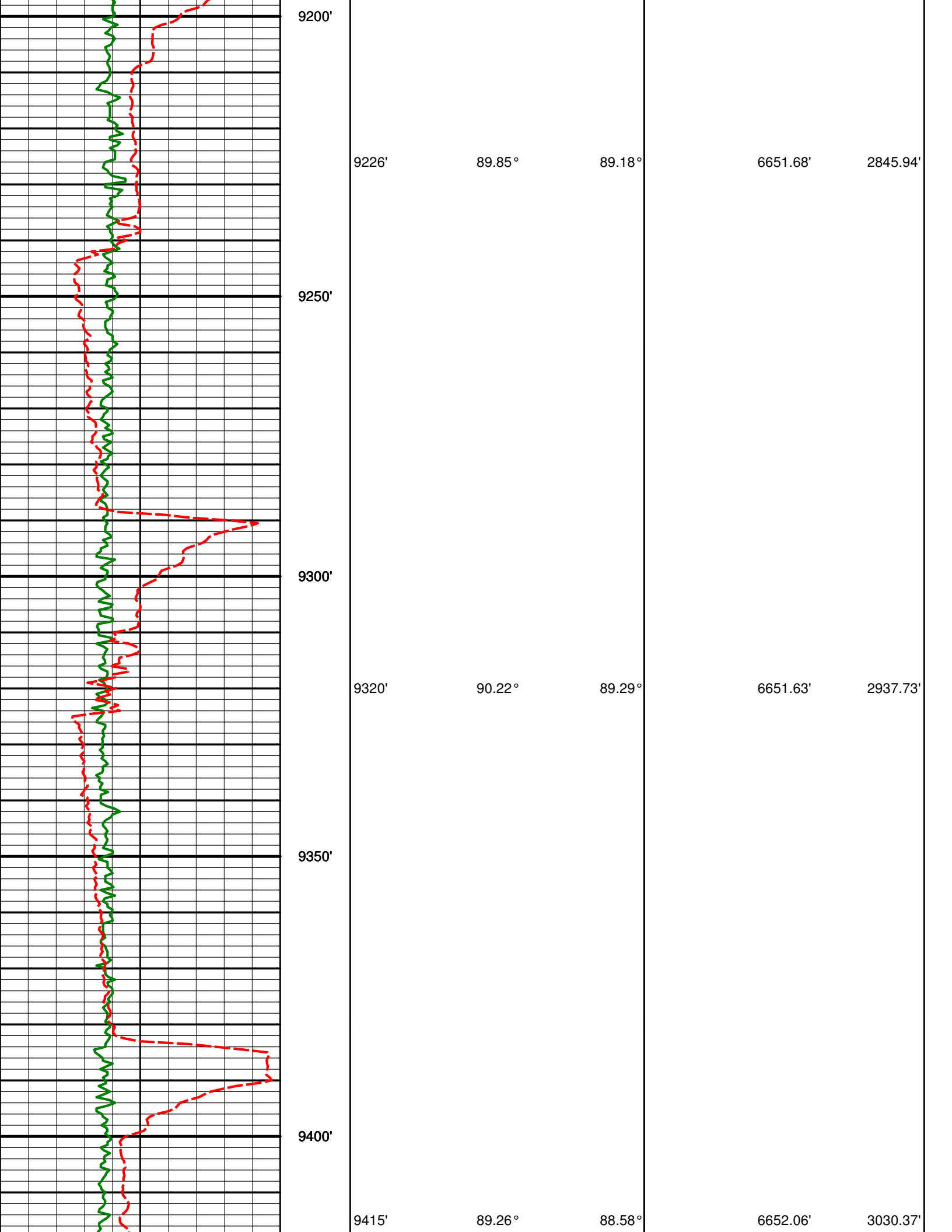
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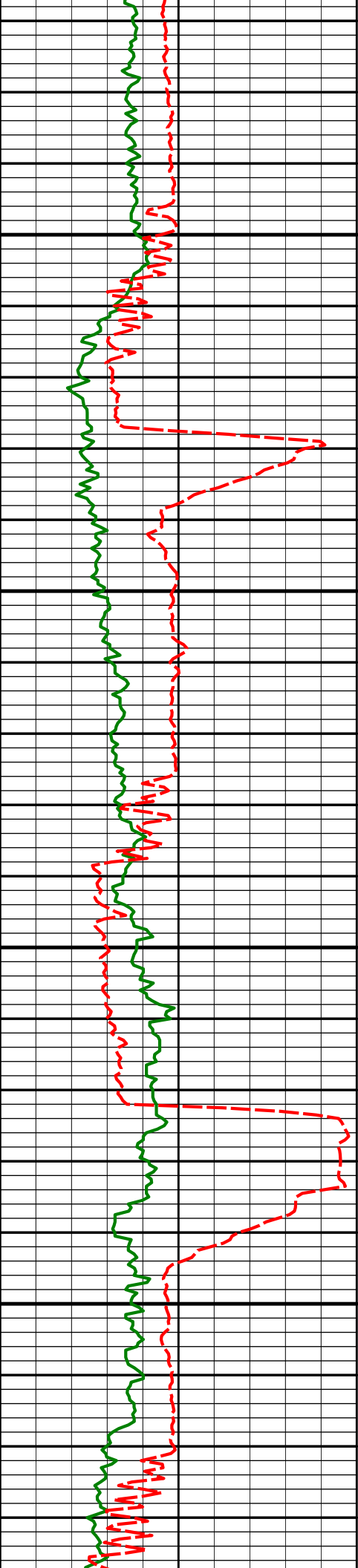
89.44°

88.98°

6651.09'

2753.25'





9450'

9500'

9550'

9600'

9510'

90.71°

89.57°

6652.09'

3123.07'

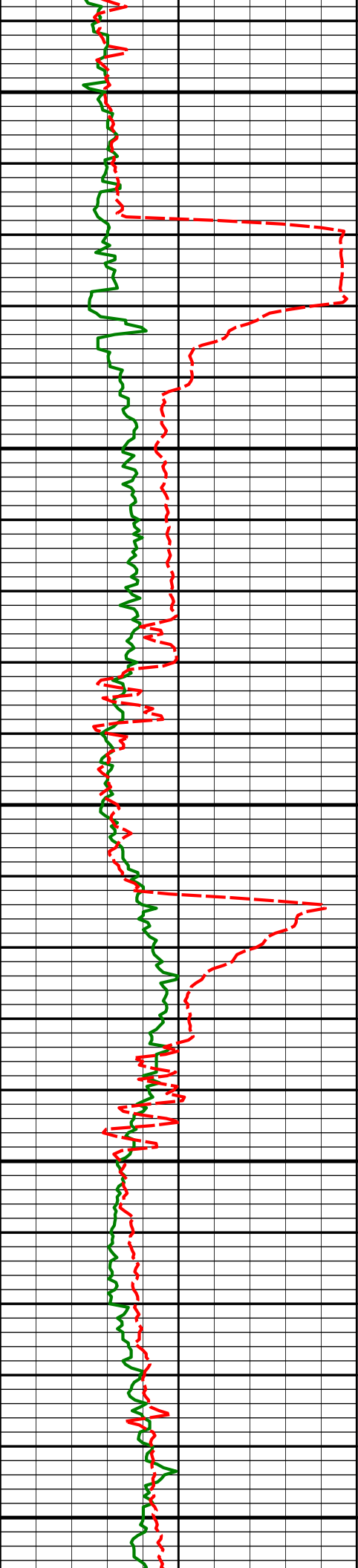
9605'

91.02°

88.40°

6650.66'

3215.72'



9650'

9700'

9750'

9800'

9850'

9700'

9795'

89.69°

90.40°

87.77°

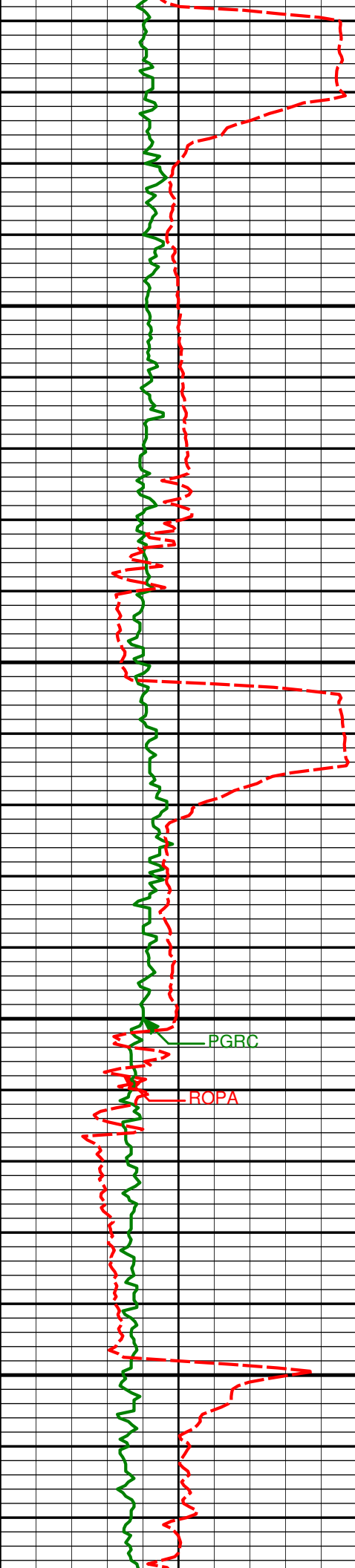
87.51°

6650.07'

6650.00'

3308.04'

3400.19'



9890'

89.45°

87.72°

6650.12'

3492.33'

9900'

9950'

9985'

89.17°

88.65°

6651.27'

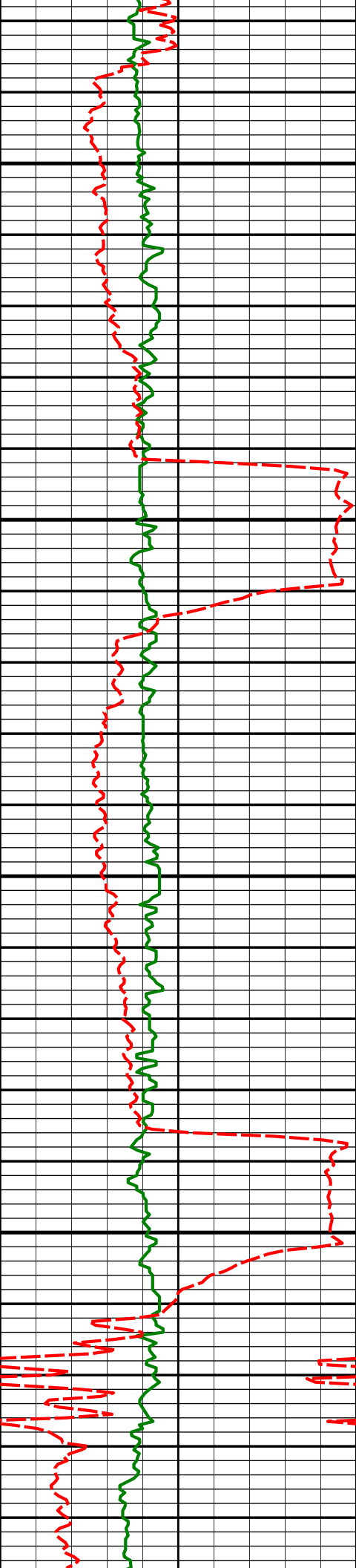
3584.68'

10000'

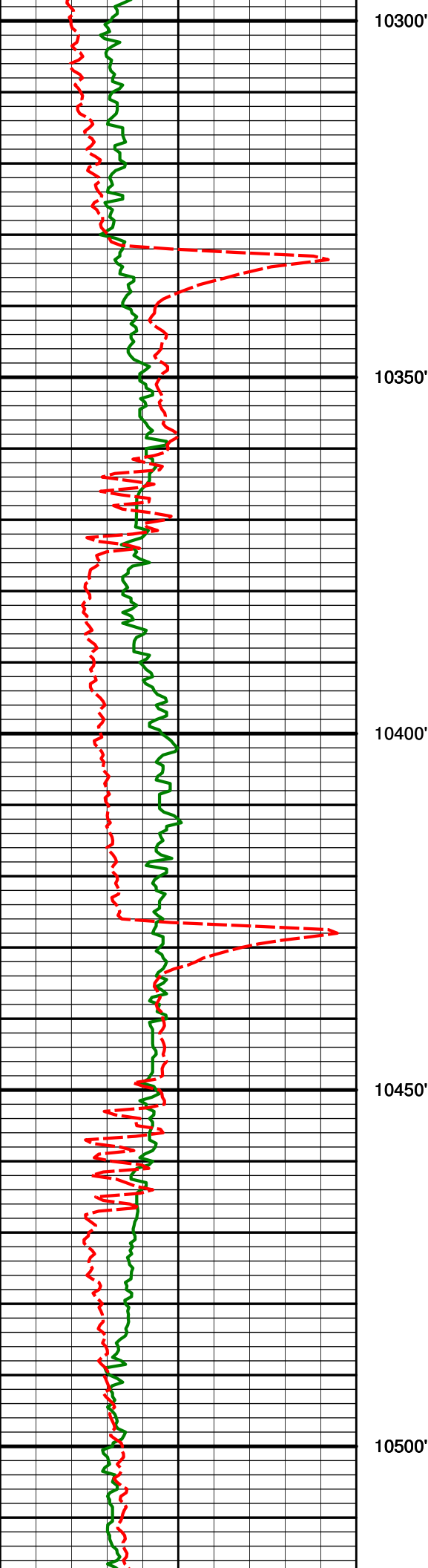
PGRC

ROPA

10050'



10079'	90.46°	88.44°	6651.57'	3676.21'
10100'				
10150'				
10174'	90.65°	89.60°	6650.65'	3768.88'
10200'				
10250'				
10269'	88.80°	89.23°	6651.11'	3861.70'



10364'

89.91°

89.57°

6652.19'

3954.51'

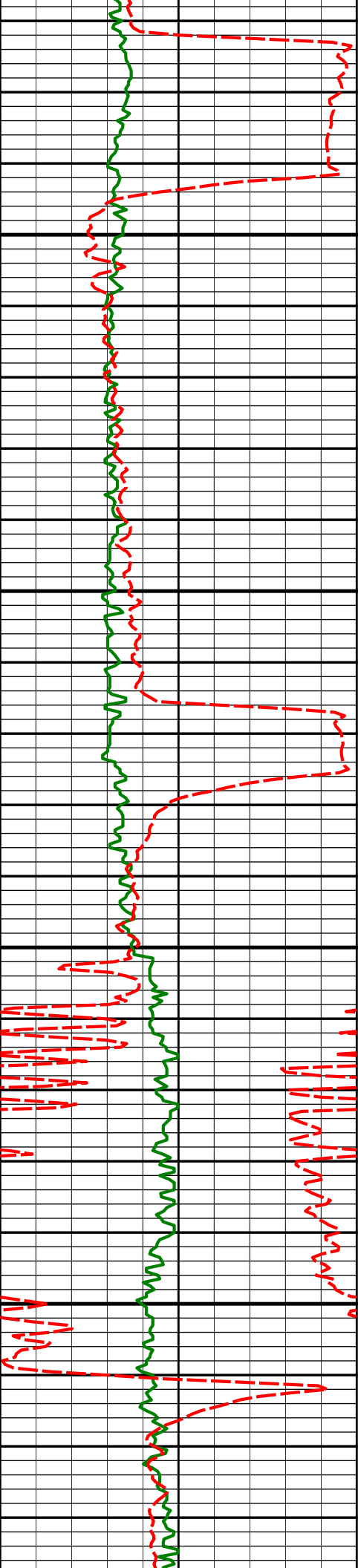
10458'

91.02°

88.47°

6651.43'

4046.21'



10550'

10553'

89.78°

89.84°

6650.77'

4138.93'

10600'

10650'

10648'

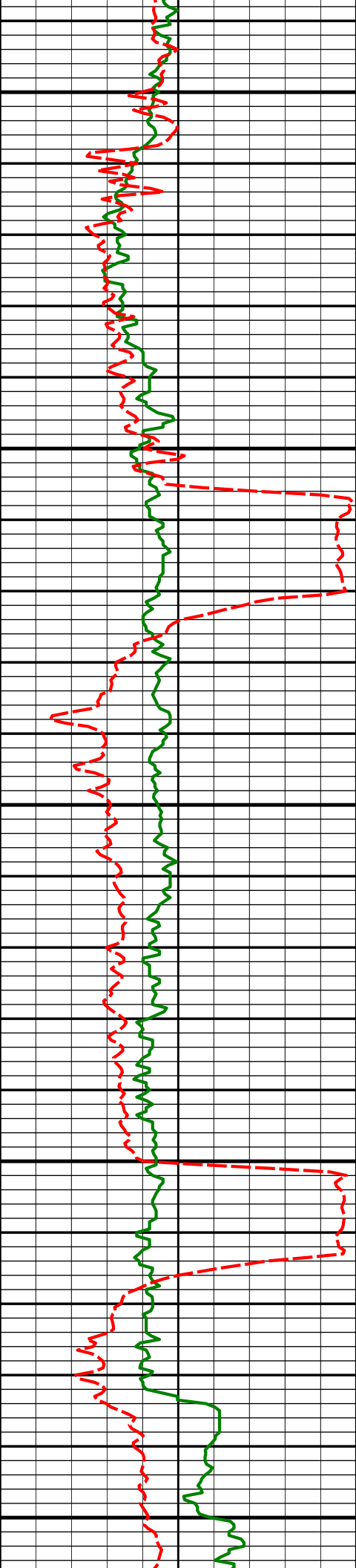
88.98°

90.59°

6651.79'

4232.02'

10700'



10750'

10800'

10850'

10900'

10950'

10743'

90.77°

91.86°

6651.99'

4325.42'

10838'

90.00°

91.41°

6651.35'

4418.96'

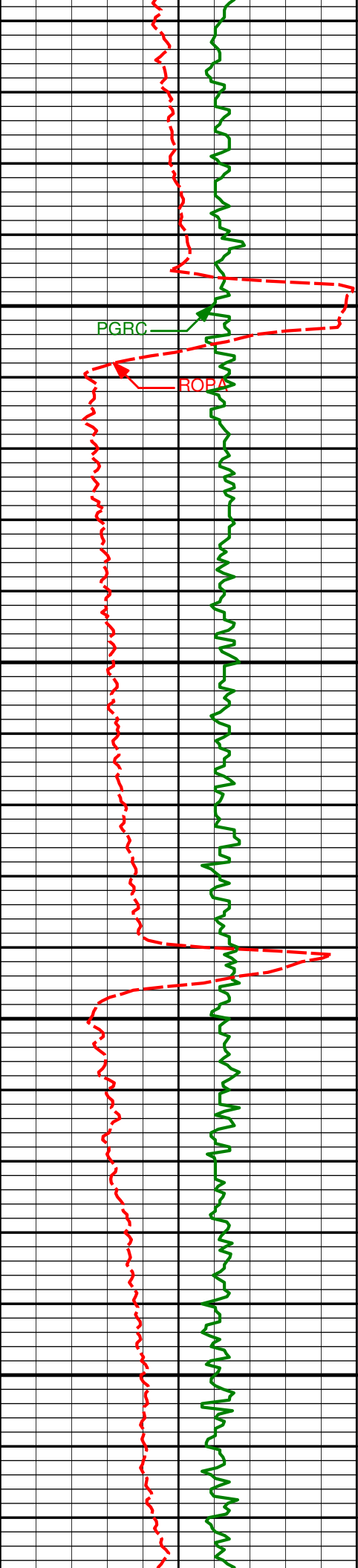
10933'

89.35°

91.14°

6651.89'

4512.38'



11000'

11050'

11100'

11150'

PGRC

ROPA

11028'

88.64°

91.33°

6653.55'

4605.79'

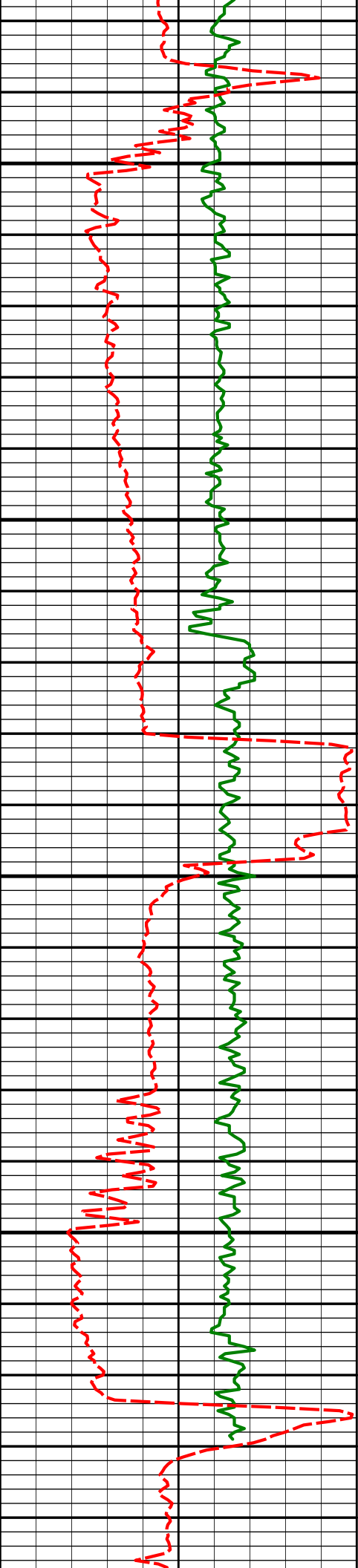
11123'

89.44°

90.75°

6655.13'

4699.13'



11200'

11250'

11300'

11350'

11218'

90.55°

90.97°

6655.14'

4792.43'

11313'

90.65°

89.82°

6654.14'

4885.58'

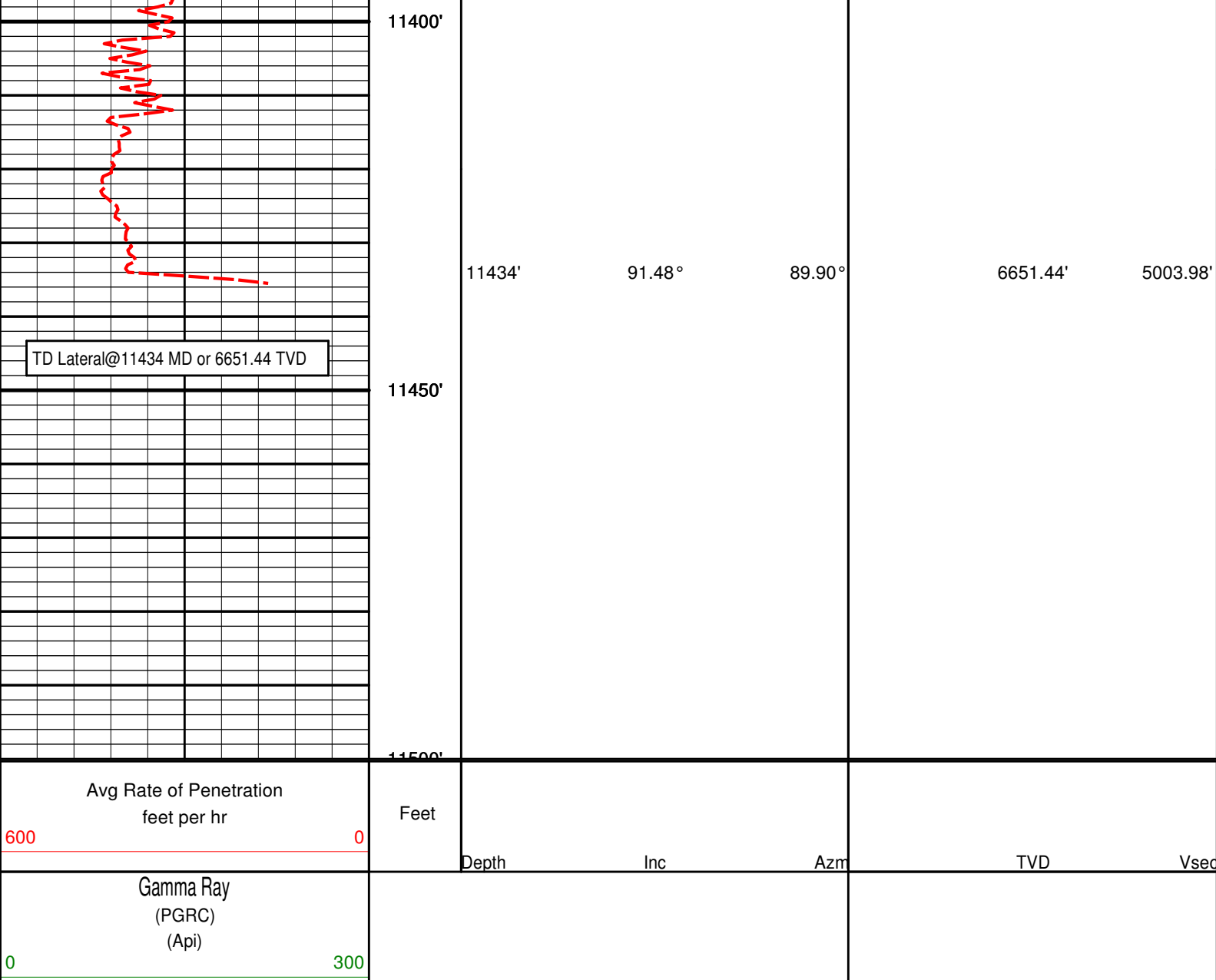
11371'

91.48°

89.90°

6653.06'

4942.33'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch USX AA27-62-1HN
Wattenberg
Weld Colorado
USA
CA-XX-0900577110

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
281.00	0.10	7.90	281.00	0.24 N	0.03 E	-0.02	0.04
485.00	0.60	266.00	485.00	0.34 N	1.01 W	-1.06	0.31
615.00	0.50	230.10	614.99	0.07 S	2.12 W	-2.06	0.27
732.00	0.32	259.47	731.99	0.45 S	2.84 W	-2.68	0.23
825.00	0.29	241.06	824.99	0.62 S	3.30 W	-3.11	0.11
918.00	0.50	250.97	917.98	0.86 S	3.89 W	-3.63	0.23
1011.00	0.62	242.76	1010.98	1.22 S	4.72 W	-4.37	0.15
1104.00	0.69	232.04	1103.97	1.80 S	5.60 W	-5.12	0.15
1197.00	0.88	153.94	1196.97	2.78 S	5.73 W	-5.05	1.07

1290.00	1.02	146.16	1289.95	4.11 S	4.96 W	-4.02	0.21
1480.00	0.99	150.07	1479.93	6.93 S	3.20 W	-1.73	0.04
1575.00	1.14	140.51	1574.91	8.37 S	2.19 W	-0.45	0.25
1670.00	1.18	133.52	1669.89	9.77 S	0.88 W	1.12	0.15
1765.00	0.43	11.56	1764.88	10.09 S	0.10 W	1.95	1.53
1860.00	0.19	257.66	1859.88	9.78 S	0.19 W	1.80	0.56
1954.00	0.64	311.43	1953.88	9.47 S	0.74 W	1.20	0.59
2049.00	1.25	332.32	2048.87	8.19 S	1.62 W	0.07	0.73
2144.00	0.33	333.37	2143.86	7.03 S	2.23 W	-0.76	0.98
2239.00	0.63	316.29	2238.85	6.41 S	2.71 W	-1.35	0.35
2334.00	0.98	300.54	2333.84	5.62 S	3.77 W	-2.55	0.43
2429.00	2.57	260.24	2428.80	5.57 S	6.57 W	-5.30	2.03
2524.00	2.36	238.83	2523.71	6.94 S	10.34 W	-8.72	0.99
2619.00	3.58	217.04	2618.59	10.32 S	13.80 W	-11.42	1.73
2714.00	5.46	202.57	2713.29	16.86 S	17.32 W	-13.54	2.31
2809.00	7.15	203.61	2807.71	26.45 S	21.42 W	-15.61	1.77
2903.00	8.10	199.38	2900.88	38.06 S	25.96 W	-17.70	1.18
2998.00	9.33	193.02	2994.78	51.88 S	29.92 W	-18.77	1.65
3093.00	9.18	184.39	3088.55	66.94 S	32.23 W	-17.97	1.47
3188.00	9.53	177.38	3182.29	82.35 S	32.45 W	-15.06	1.26
3283.00	9.86	174.43	3275.93	98.31 S	31.30 W	-10.70	0.62
3378.00	10.41	172.14	3369.45	114.91 S	29.34 W	-5.41	0.72
3473.00	7.32	177.06	3463.31	129.46 S	27.85 W	-1.00	3.35
3568.00	8.22	172.25	3557.43	142.23 S	26.63 W	2.80	1.17
3663.00	8.99	173.14	3651.36	156.33 S	24.82 W	7.42	0.81
3758.00	11.52	175.13	3744.84	173.16 S	23.13 W	12.50	2.69
3853.00	13.32	172.32	3837.61	193.46 S	20.86 W	18.84	2.00
3948.00	14.07	170.39	3929.91	215.69 S	17.47 W	26.67	0.92
4043.00	12.20	166.14	4022.42	236.82 S	13.14 W	35.20	2.21
4137.00	10.80	165.21	4114.53	254.98 S	8.51 W	43.42	1.50
4232.00	8.81	170.05	4208.14	270.75 S	4.98 W	50.07	2.27
4327.00	9.03	174.40	4302.00	285.34 S	3.00 W	54.98	0.75
4422.00	8.60	175.40	4395.87	299.84 S	1.70 W	59.19	0.48
4517.00	9.07	173.76	4489.75	314.36 S	0.32 W	63.49	0.56
4612.00	9.24	174.03	4583.54	329.39 S	1.29 E	68.11	0.19
4707.00	8.14	174.06	4677.44	343.67 S	2.78 E	72.47	1.16
4802.00	7.99	172.87	4771.50	356.91 S	4.29 E	76.64	0.24
4897.00	8.35	182.46	4865.54	370.35 S	4.82 E	79.88	1.48
4992.00	9.09	187.67	4959.45	384.68 S	3.52 E	81.52	1.14
5087.00	10.42	185.43	5053.07	400.66 S	1.70 E	82.99	1.45
5182.00	10.29	180.85	5146.53	417.70 S	0.77 E	85.53	0.88
5276.00	8.51	184.77	5239.26	433.02 S	0.06 E	87.95	2.01
5371.00	10.18	164.45	5333.02	448.12 S	1.73 E	92.64	3.86
5466.00	8.70	168.61	5426.74	463.25 S	5.40 E	99.31	1.71
5561.00	10.60	170.19	5520.39	478.91 S	8.31 E	105.33	2.02
5656.00	11.12	170.58	5613.69	496.56 S	11.29 E	111.84	0.55
5751.00	11.07	169.21	5706.91	514.56 S	14.50 E	118.63	0.28
5845.00	10.70	167.30	5799.22	531.94 S	18.11 E	125.69	0.55
5940.00	11.51	175.95	5892.45	549.99 S	20.72 E	131.91	1.95
5987.00	15.93	175.63	5938.09	561.10 S	21.54 E	134.97	9.41
6035.00	19.32	171.16	5983.84	575.52 S	23.26 E	139.59	7.61
6082.00	22.37	168.25	6027.76	591.96 S	26.28 E	145.88	6.83
6130.00	25.96	164.50	6071.55	611.03 S	30.95 E	154.32	8.14
6177.00	30.36	160.81	6112.98	632.18 S	37.61 E	165.13	10.07
6225.00	34.82	160.73	6153.41	656.58 S	46.12 E	178.42	9.29
6272.00	39.18	159.04	6190.93	683.13 S	55.87 E	193.35	9.52
6320.00	44.33	159.04	6226.73	712.97 S	67.30 E	210.60	10.74
6367.00	48.40	157.11	6259.16	744.51 S	80.02 E	229.45	9.13
6415.00	49.21	153.00	6290.78	777.24 S	95.25 E	251.01	6.67
6462.00	49.59	148.60	6321.37	808.38 S	112.65 E	274.37	7.15
6510.00	49.62	144.78	6352.48	838.92 S	132.72 E	300.22	6.07
6557.00	50.50	142.34	6382.66	867.90 S	154.13 E	327.07	4.40
6605.00	52.06	139.04	6412.69	896.86 S	177.86 E	356.18	6.27
6652.00	55.26	135.19	6440.54	924.57 S	203.63 E	387.04	9.48
6700.00	58.30	132.03	6466.84	952.25 S	232.71 E	421.13	8.40
6747.00	59.93	127.07	6490.98	977.90 S	263.80 E	456.79	9.69
6794.00	61.78	122.99	6513.87	1001.45 S	297.41 E	494.47	8.55
6841.00	62.66	118.25	6535.79	1022.61 S	333.19 E	533.80	9.11
6889.00	64.47	114.25	6557.16	1041.61 S	371.73 E	575.39	8.35
6936.00	66.84	108.57	6576.55	1057.21 S	411.57 E	617.58	12.11
6984.00	70.37	102.02	6594.08	1068.96 S	454.65 E	662.15	14.68
7031.00	73.50	99.13	6608.65	1077.14 S	498.57 E	706.81	9.87

7031.00	73.50	99.13	6606.65	1077.14 S	496.37 E	706.81	8.87
7079.00	77.35	95.22	6620.73	1082.93 S	544.65 E	753.10	11.24
7126.00	81.33	91.68	6629.42	1085.70 S	590.73 E	798.79	11.23
7151.00	82.09	89.66	6633.03	1085.99 S	615.47 E	823.07	8.58
7234.00	83.18	86.29	6643.67	1083.08 S	697.72 E	903.02	4.23
7329.00	85.13	88.59	6653.35	1078.86 S	792.12 E	994.60	3.16
7423.00	86.49	89.67	6660.22	1077.43 S	885.86 E	1086.09	1.85
7518.00	89.51	90.81	6663.54	1077.83 S	980.78 E	1179.13	3.40
7613.00	92.74	92.08	6661.67	1080.23 S	1075.72 E	1272.57	3.66
7708.00	91.94	90.69	6657.79	1082.53 S	1170.61 E	1365.95	1.69
7803.00	90.15	88.69	6656.05	1082.01 S	1265.58 E	1458.85	2.82
7898.00	91.02	88.56	6655.08	1079.72 S	1360.55 E	1551.37	0.92
7993.00	89.82	89.79	6654.39	1078.35 S	1455.54 E	1644.10	1.81
8088.00	89.39	88.29	6655.06	1076.76 S	1550.52 E	1736.78	1.64
8183.00	89.57	87.36	6655.92	1073.15 S	1645.44 E	1829.00	1.00
8278.00	90.22	86.76	6656.10	1068.28 S	1740.32 E	1920.91	0.93
8372.00	89.01	86.96	6656.74	1063.13 S	1834.17 E	2011.77	1.30
8467.00	90.28	90.20	6657.32	1060.78 S	1929.13 E	2104.27	3.66
8562.00	90.46	89.40	6656.71	1060.45 S	2024.12 E	2197.22	0.87
8657.00	91.67	89.35	6654.95	1059.41 S	2119.10 E	2290.01	1.27
8751.00	90.89	88.46	6652.85	1057.62 S	2213.06 E	2381.65	1.26
8846.00	90.65	89.35	6651.58	1055.81 S	2308.03 E	2474.28	0.97
8941.00	90.58	90.19	6650.55	1055.43 S	2403.02 E	2567.22	0.88
9036.00	89.66	90.39	6650.35	1055.91 S	2498.02 E	2660.34	1.00
9131.00	89.44	88.98	6651.09	1055.38 S	2593.01 E	2753.25	1.50
9226.00	89.85	89.18	6651.68	1053.86 S	2688.00 E	2845.94	0.47
9320.00	90.22	89.29	6651.63	1052.61 S	2781.99 E	2937.73	0.41
9415.00	89.26	88.58	6652.06	1050.84 S	2876.97 E	3030.37	1.25
9510.00	90.71	89.57	6652.09	1049.31 S	2971.96 E	3123.07	1.84
9605.00	91.02	88.40	6650.66	1047.62 S	3066.93 E	3215.72	1.27
9700.00	89.69	87.77	6650.07	1044.45 S	3161.87 E	3308.04	1.54
9795.00	90.40	87.51	6650.00	1040.53 S	3256.79 E	3400.19	0.80
9890.00	89.45	87.72	6650.12	1036.57 S	3351.71 E	3492.33	1.03
9985.00	89.17	88.65	6651.27	1033.56 S	3446.65 E	3584.68	1.03
10079.00	90.46	88.44	6651.57	1031.17 S	3540.62 E	3676.21	1.40
10174.00	90.65	89.60	6650.65	1029.54 S	3635.60 E	3768.88	1.24
10269.00	88.80	89.23	6651.11	1028.57 S	3730.59 E	3861.70	1.98
10364.00	89.91	89.57	6652.19	1027.58 S	3825.57 E	3954.51	1.22
10458.00	91.02	88.47	6651.43	1025.97 S	3919.55 E	4046.21	1.66
10553.00	89.78	89.84	6650.77	1024.57 S	4014.54 E	4138.93	1.94
10648.00	88.98	90.59	6651.79	1024.93 S	4109.53 E	4232.02	1.16
10743.00	90.77	91.86	6651.99	1026.95 S	4204.50 E	4325.42	2.31
10838.00	90.00	91.41	6651.35	1029.66 S	4299.46 E	4418.96	0.94
10933.00	89.35	91.14	6651.89	1031.78 S	4394.43 E	4512.38	0.74
11028.00	88.64	91.33	6653.55	1033.83 S	4489.40 E	4605.79	0.77
11123.00	89.44	90.75	6655.13	1035.56 S	4584.37 E	4699.13	1.04
11218.00	90.55	90.97	6655.14	1036.99 S	4679.35 E	4792.43	1.19
11313.00	90.65	89.82	6654.14	1037.64 S	4774.35 E	4885.58	1.22
11371.00	91.48	89.90	6653.06	1037.50 S	4832.33 E	4942.33	1.44
11434.00	91.48	89.90	6651.44	1037.39 S	4895.31 E	5003.98	0.00

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 101.71 DEGREES (GRID)
A TOTAL CORRECTION OF 7.74 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11434.00 FEET
IS 5004.03 FEET ALONG 101.96 DEGREES (GRID)**

Tie-In @ Surface

Surveys at 281 ft, 485 ft, and 615 ft were taken and provided by HP 322 while they were drilling the surface hole.