

PCG Pressure Case Gamma PCD Pressure Case Directional

[illegible]

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	24-Nov-14	24-Nov-14	27-Nov-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)	1,239.00	5,695.00	5,808.00		
Log End Depth (MD, ft)	5,695.00	5,808.00	10,303.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	23-Nov-14 01:30	24-Nov-14 08:30	25-Nov-14 18:45		
Drill/Wipe End Date and Time	23-Nov-14 23:30	24-Nov-14 11:45	27-Nov-14 01:45		
Min Inc (deg) @ Depth (MD, ft)	0.09 @ 1,571.00	88.18 @ 5,754.00	88.46 @ 8,737.00		
Max Inc (deg) @ Depth (MD, ft)	67.92 @ 5,637.00	88.18 @ 5,754.00	92.68 @ 5,909.00		
Bit TFA(in2) / Bit Type	1.21 / PDC	1.21 / PDC	0.98 / PDC		
Flow Rate (gpm)	643.44	600.00	298.94		
Max AV (fpm) / CV (fpm) @ MWD	451.2 / NA	451.2 / NA	N/A / N/A		
Fluid Type	Native/Spud Mud	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	9.70 / 39.00	11.15 / 41.00	9.85 / 36.00		
Filtrate CL (ppm)	2,600.00	2,600.00	2,800.00		
pH / Fluid Loss (mptm)	9.60 / 6	9.40 / 5	9.00 / 9		
PV (cP) / YP (lbf2)	12 / 11.00	16 / 13.00	9 / 11.00		
% Solids / % Sand	7.2 / 0.40	13.7 / 0.15	7.7 / 0.20		
% Oil / Oil:Water Ratio	N/A / N/A	NA / NA	N/A / N/A		
Rm @ Measured Temp (degF)	N/A @ N/A	NA @ NA	N/A @ N/A		
Rmf @ Measured Temp (degF)	N/A @ N/A	NA @ NA	N/A @ N/A		
Rmc @ Measured Temp (degF)	N/A @ N/A	NA @ NA	N/A @ N/A		
Max Tool Temp (in F) / S	128.00 / PCM	128.00 / PCM	225.00 / PCM		

Max Tool Temp (degF) / Source	163.20 / PCM	163.20 / PCM	205.00 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	NA @ NA	N/A @ N/A		
Lead MWD Engineer	Brett Vandergon	Brett Vandergon	Brett Vandergon		
Customer Representative	Seth Mulherin	Seth Mulherin	Seth Mulherin		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.93	5.93	5.93		
Sub Serial Number	11404285	11404285	11675316		
Insert Serial Number	11619985	11619985	11226936		
Date and Time Initialized	22-Nov-14 12:17	01-Jan-70 00:00	24-Nov-14 17:45		
Date and Time Read	24-Nov-14 16:49	24-Nov-14 16:58	27-Nov-14 11:00		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	58.00	54.00	56.00		
Software Version	6.21	6.21	6.33		
Sub Serial Number	11404285	11404285	11675316		
Sonde Serial Number	11478016	11478016	10993517		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	70.46	336.00	200.48		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	51.54	46.97	49.38		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11404285	11404285	11675316		
Insert/Sonde Serial Number	11293259	11293259	12071296		

REMARKS

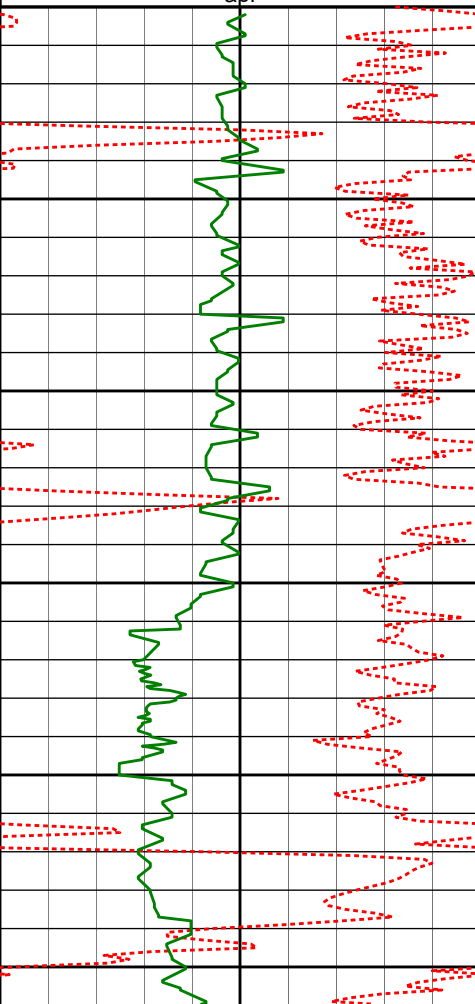
1. All depths are measured bit depths, referenced to the Driller's pipe tally and are measured from the Drill Floor, unless otherwise specified.
2. No depth corrections have been made for pipe stretch or compression.
3. Critical annual velocities are calculated using the "Power Law" model for water based fluids and the "Bingham Plastic" model for oil and synthetic based fluids.
4. All data presented is recorded data unless otherwise specified.
5. The following smoothing parameters have been applied to the data:
PGRC (Corrected Gamma Ray):
Interval Resolution: 0.5 ft
Interval Distance: 0.6 ft
Gap Fill: 3.0 ft
ROPA (Average Rate of Penetration)
Interval Resolution: 0.5 ft
Interval Distance: 1.2 ft
Gap Fill: 3.0 ft
6. INSITE version 8.0.2

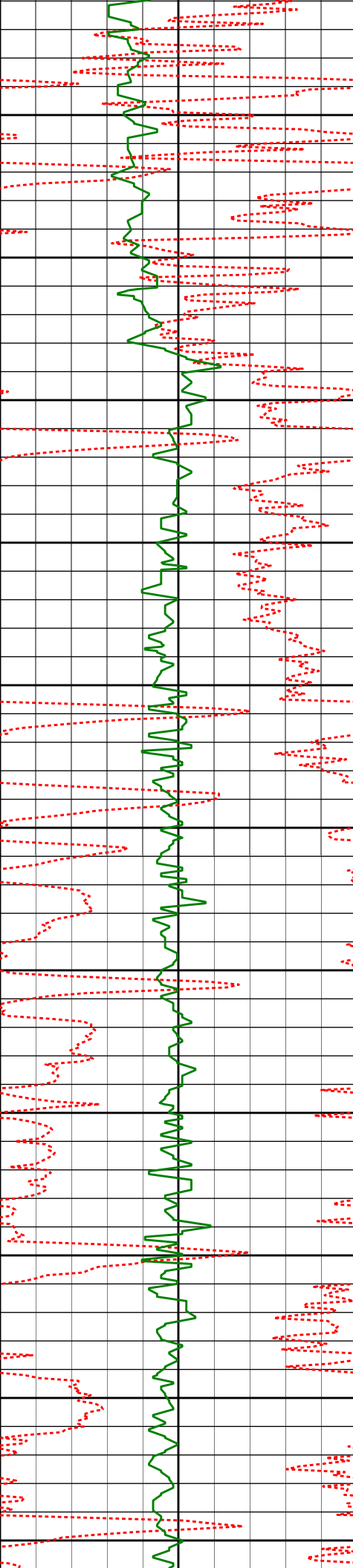
WARRANTY

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HALLIBURTON

MD Main Log 1:600

Average Rate of Penetration ROPA						
1K0						
feet per hr						
PCG Gamma Ray BCorr PGRC		Measured Depth (ft)	Inc	Azi.	TVD	V.S.
0200		1:600	Depth			
api						
		3000'				
		3050'				
		3069'	1.21°	227.17°	3068.92'	8.22'
		3100'				
		3150'				
		3165'	1.28°	221.99°	3164.89'	9.70'
		3200'				
		3250'				
		3259'	0.15°	324.79°	3258.89'	10.38'



3300'

3350'

3400'

3450'

3500'

3550'

3600'

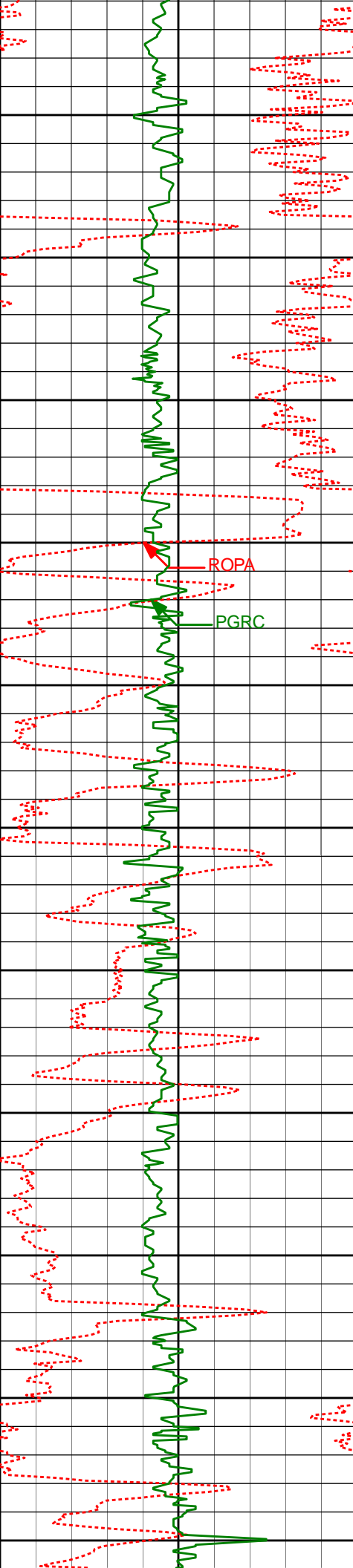
3650'

3700'

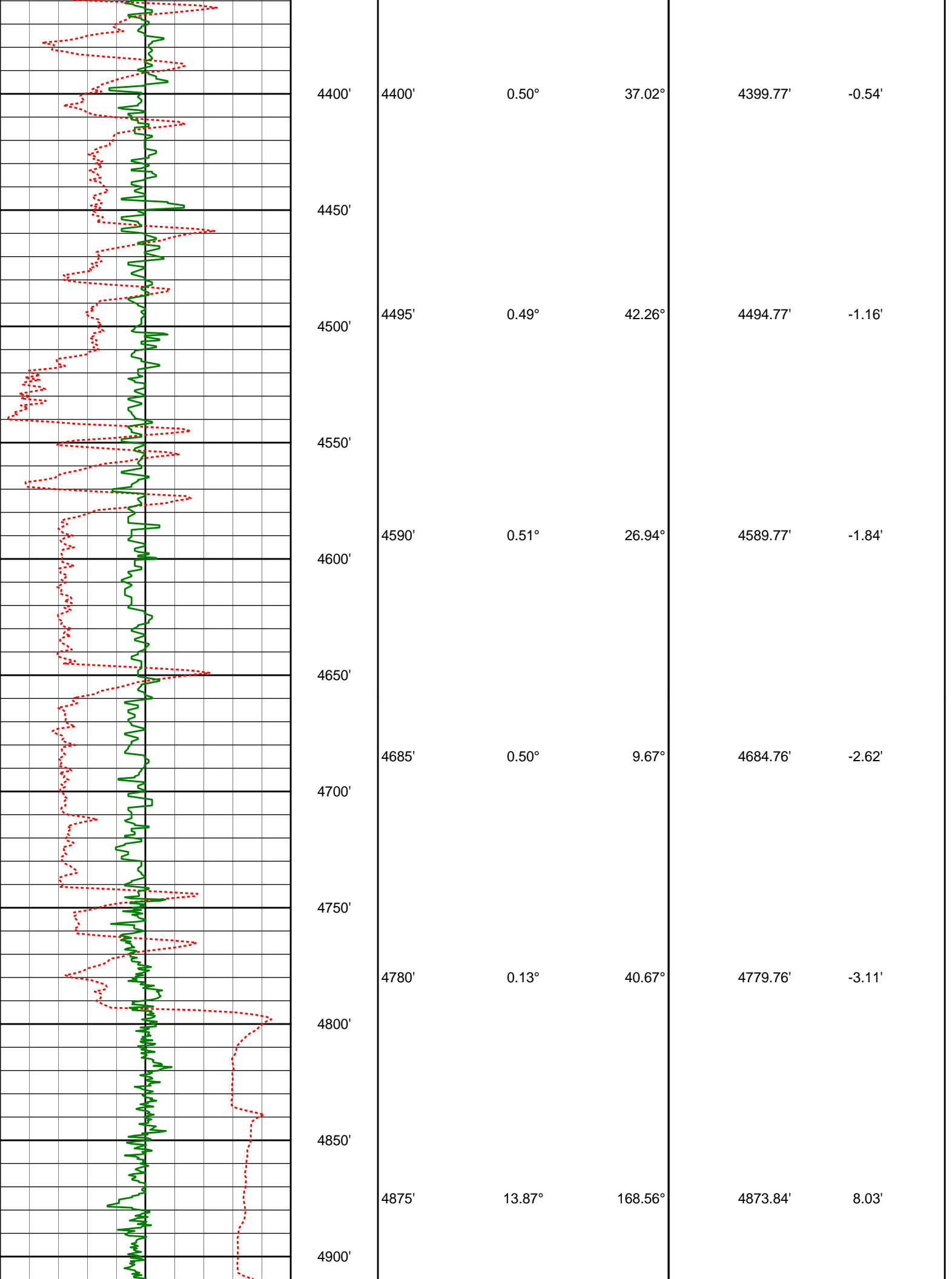
3750'

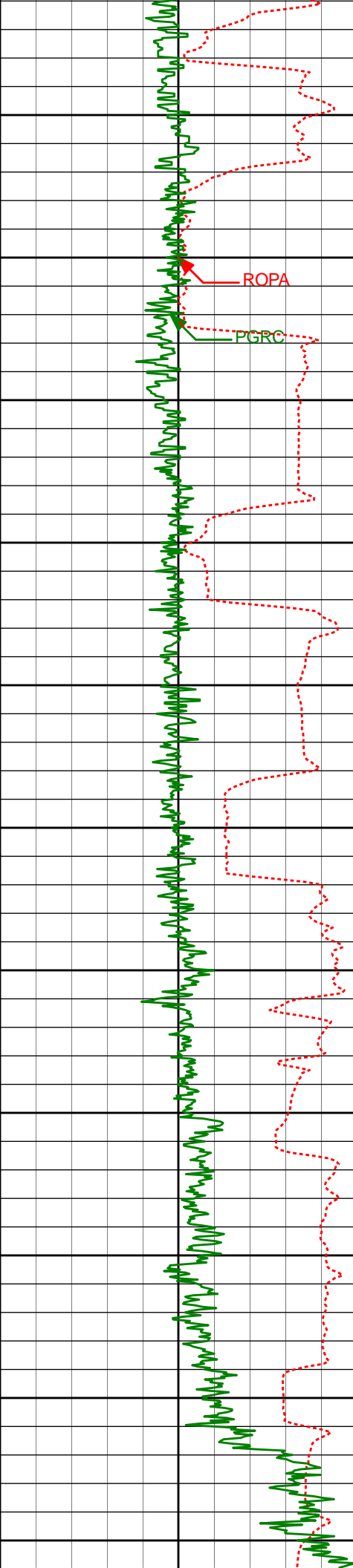
3800'

3299'	0.15°	324.75°	3299.85'	10.55'
3355'	0.29°	332.93°	3354.89'	10.06'
3450'	0.25°	338.51°	3449.88'	9.65'
3545'	0.91°	5.47°	3544.88'	8.71'
3640'	1.10°	347.95°	3639.86'	7.07'
3735'	1.11°	349.93°	3734.85'	5.27'



3830'	1.20°	336.76°	3829.83'	3.45'
3850'				
3900'				
3925'	1.12°	338.55°	3924.81'	1.67'
3950'				
4000'				
4020'	0.77°	101.06°	4019.80'	0.92'
4050'				
4100'				
4115'	0.87°	97.18°	4114.79'	1.14'
4150'				
4200'				
4210'	0.75°	56.74°	4209.78'	0.89'
4250'				
4300'				
4305'	0.57°	35.72°	4304.78'	0.17'
4350'				





4950'

4971'

21.36°

172.23°

4965.28'

36.68'

5000'

ROPA

PGRC

5050'

5066'

27.59°

172.23°

5051.70'

75.68'

5100'

5150'

5161'

34.47°

174.99°

5133.06'

124.33'

5200'

5250'

5256'

37.69°

181.15°

5209.86'

180.18'

5300'

5350'

5351'

44.14°

183.21°

5281.61'

242.30'

5400'

5450'

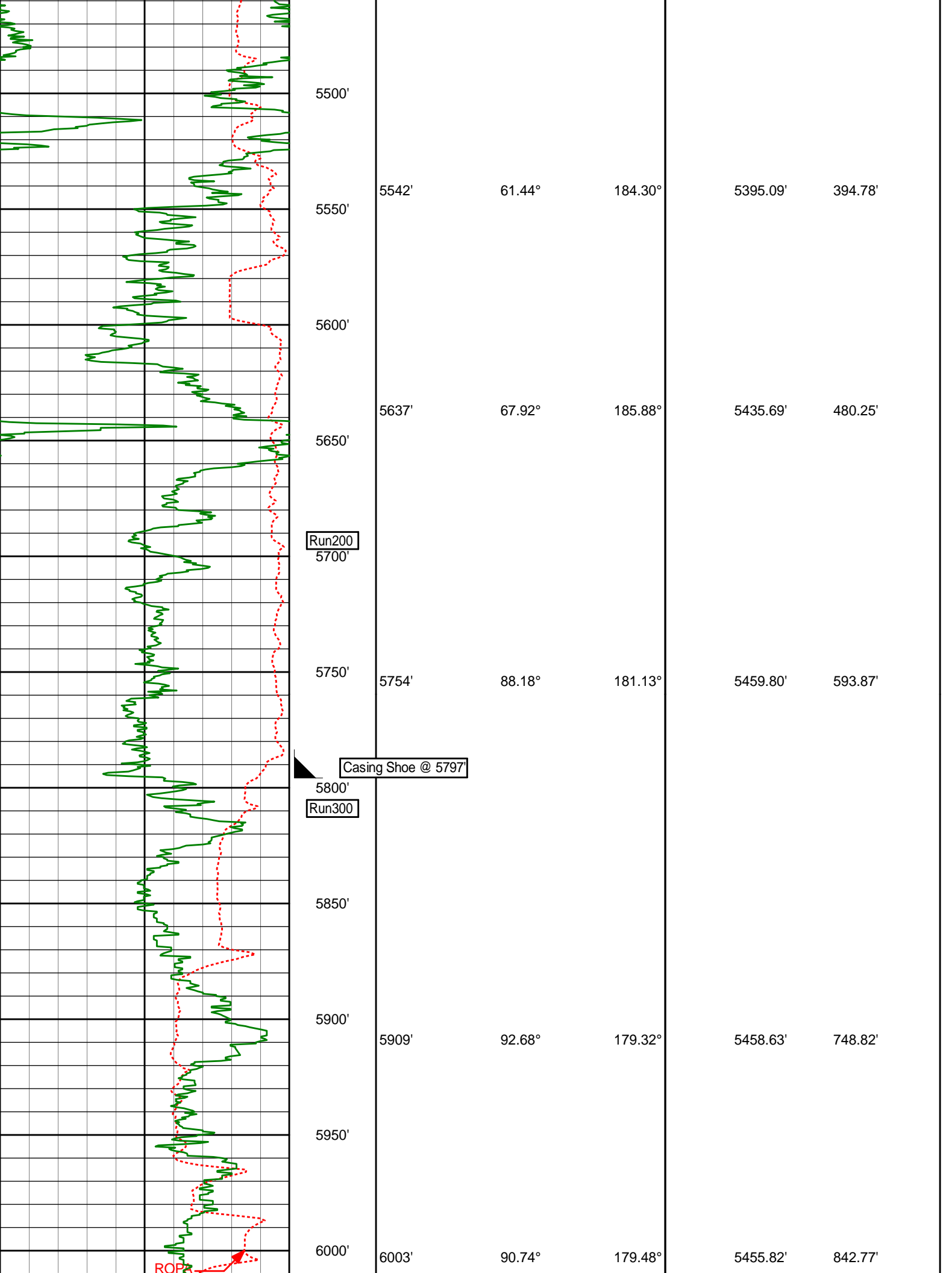
5447'

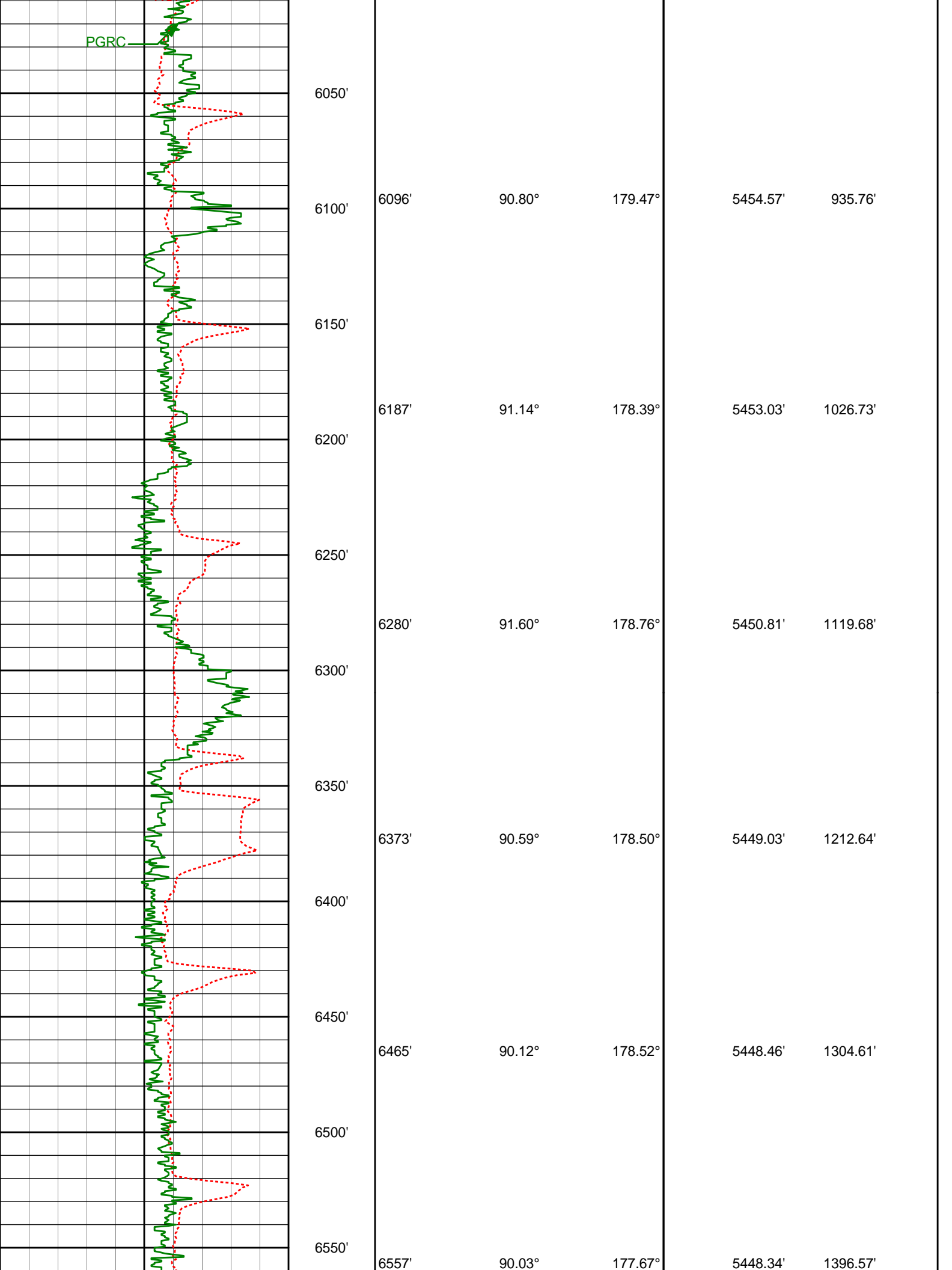
54.03°

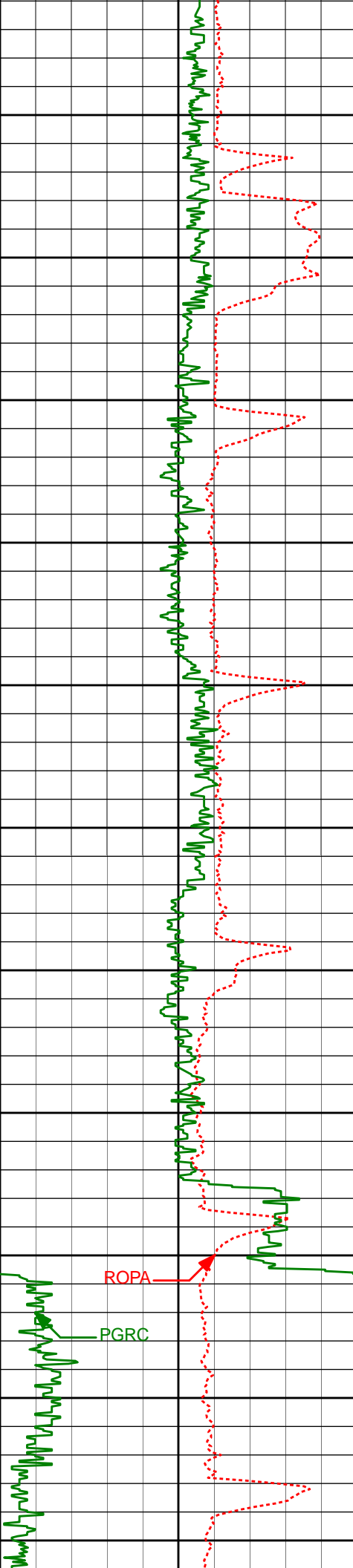
182.37°

5344.41'

314.66'







6600'

6650'

6700'

6750'

6800'

6850'

6900'

6950'

7000'

7050'

7100'

6650'

6743'

6835'

6930'

7025'

90.46°

90.74°

90.92°

90.96°

90.86°

178.83°

180.19°

179.88°

180.28°

178.91°

5447.94'

5446.96'

5445.63'

5444.07'

5442.56'

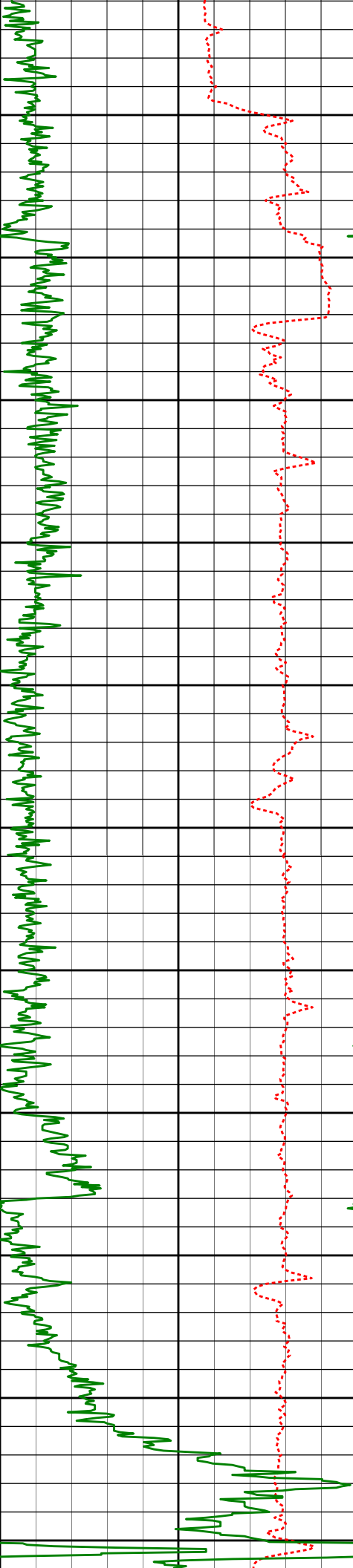
1489.53'

1582.52'

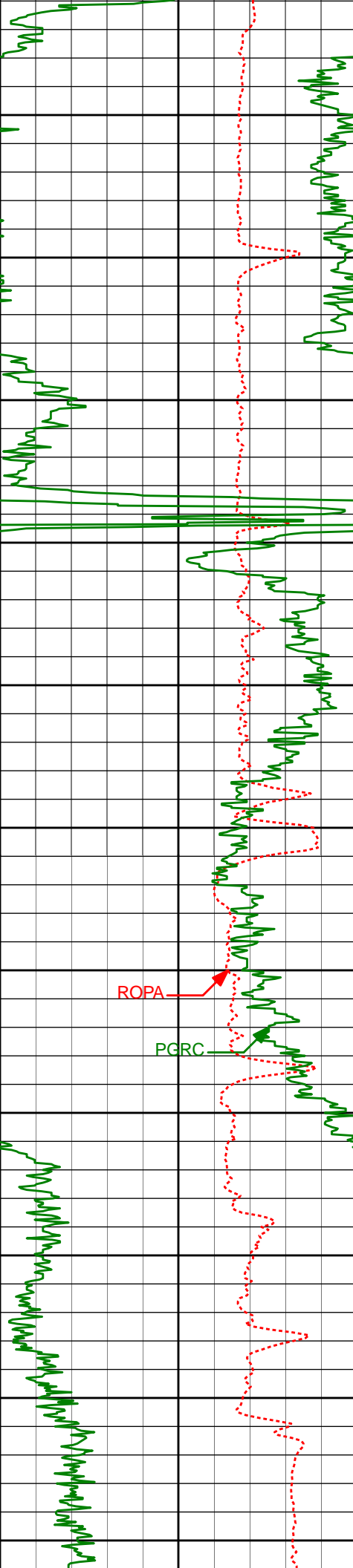
1674.51'

1769.49'

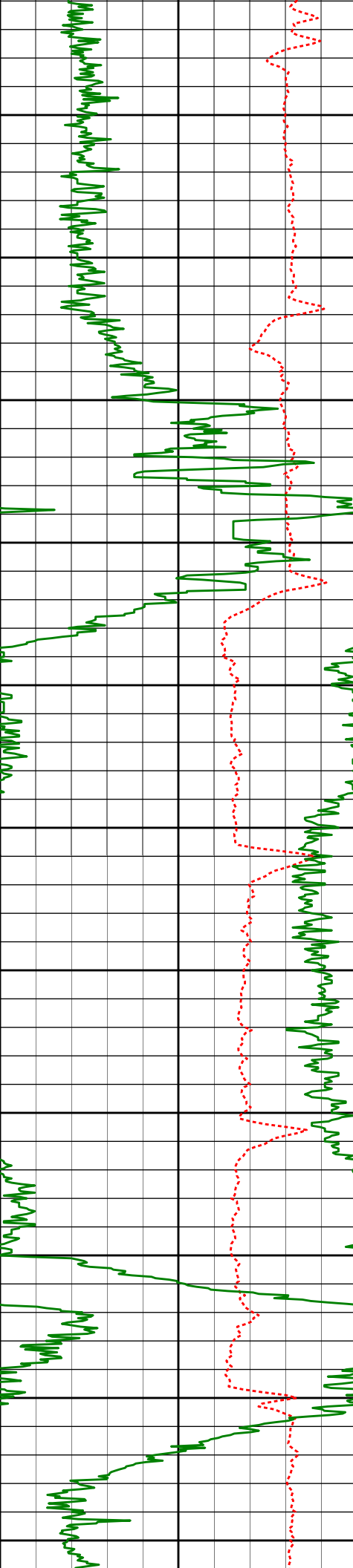
1864.48'



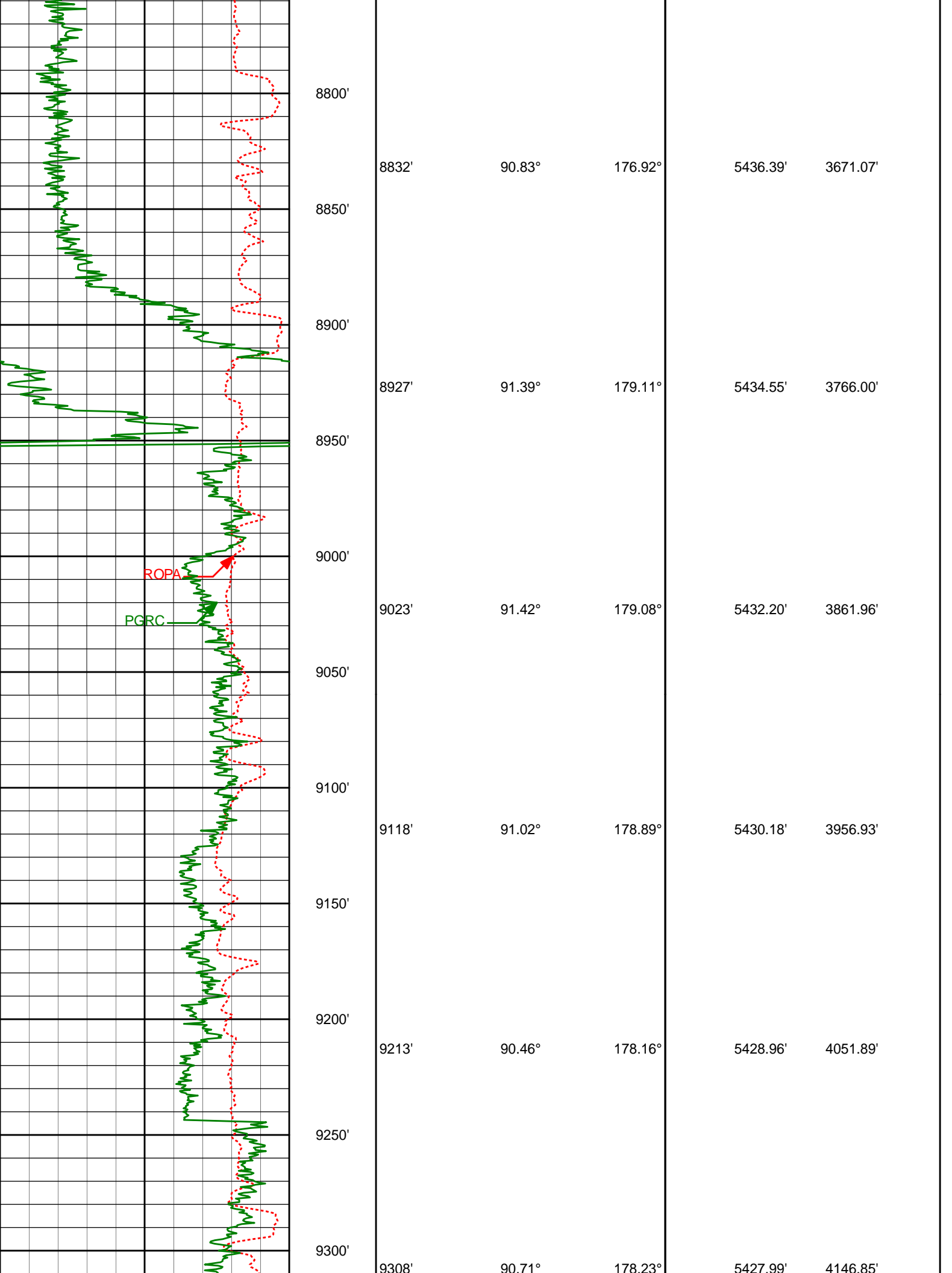
7120'	7120'	90.92°	178.78°	5441.08'	1959.45'
7150'					
7200'					
7216'	7216'	90.49°	180.97°	5439.90'	2055.44'
7250'					
7300'					
7311'	7311'	90.18°	182.40°	5439.34'	2150.39'
7350'					
7400'					
7406'	7406'	90.00°	181.55°	5439.18'	2245.32'
7450'					
7500'					
7501'	7501'	89.91°	180.50°	5439.26'	2340.30'
7550'					
7600'					
7596'	7596'	89.78°	180.59°	5439.52'	2435.29'
7650'					

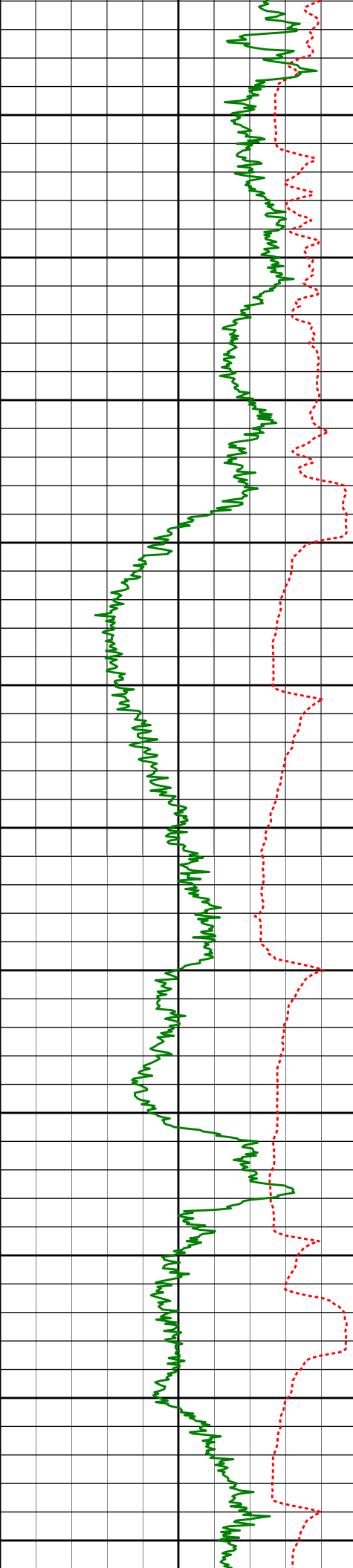


7691'	90.06°	181.64°	5439.64'	2530.27'
7700'				
7750'				
7786'	89.75°	180.43°	5439.80'	2625.25'
7800'				
7850'				
7881'	89.45°	180.57°	5440.46'	2720.24'
7900'				
7950'				
7976'	90.62°	180.95°	5440.41'	2815.23'
8000'				
8071'	91.05°	180.27°	5439.03'	2910.21'
8100'				
8150'				
8166'	91.14°	180.49°	5437.22'	3005.19'
8200'				



8250'	8261'	90.65°	180.54°	5435.73'	3100.17'
8300'					
8350'	8357'	90.40°	179.66°	5434.86'	3196.16'
8400'					
8450'	8452'	90.62°	179.83°	5434.01'	3291.16'
8500'					
8550'	8547'	90.00°	180.14°	5433.50'	3386.16'
8600'					
8650'	8642'	89.38°	179.98°	5434.01'	3481.15'
8700'					
8750'	8737'	88.46°	179.22°	5435.80'	3576.13'





9350'

9400'

9450'

9500'

9550'

9600'

9650'

9700'

9750'

9800'

9850'

9403'

91.29°

178.23°

5426.33'

4241.79'

9498'

91.02°

180.61°

5424.41'

4336.77'

9593'

91.72°

179.37°

5422.14'

4431.73'

9688'

92.25°

179.85°

5418.84'

4526.68'

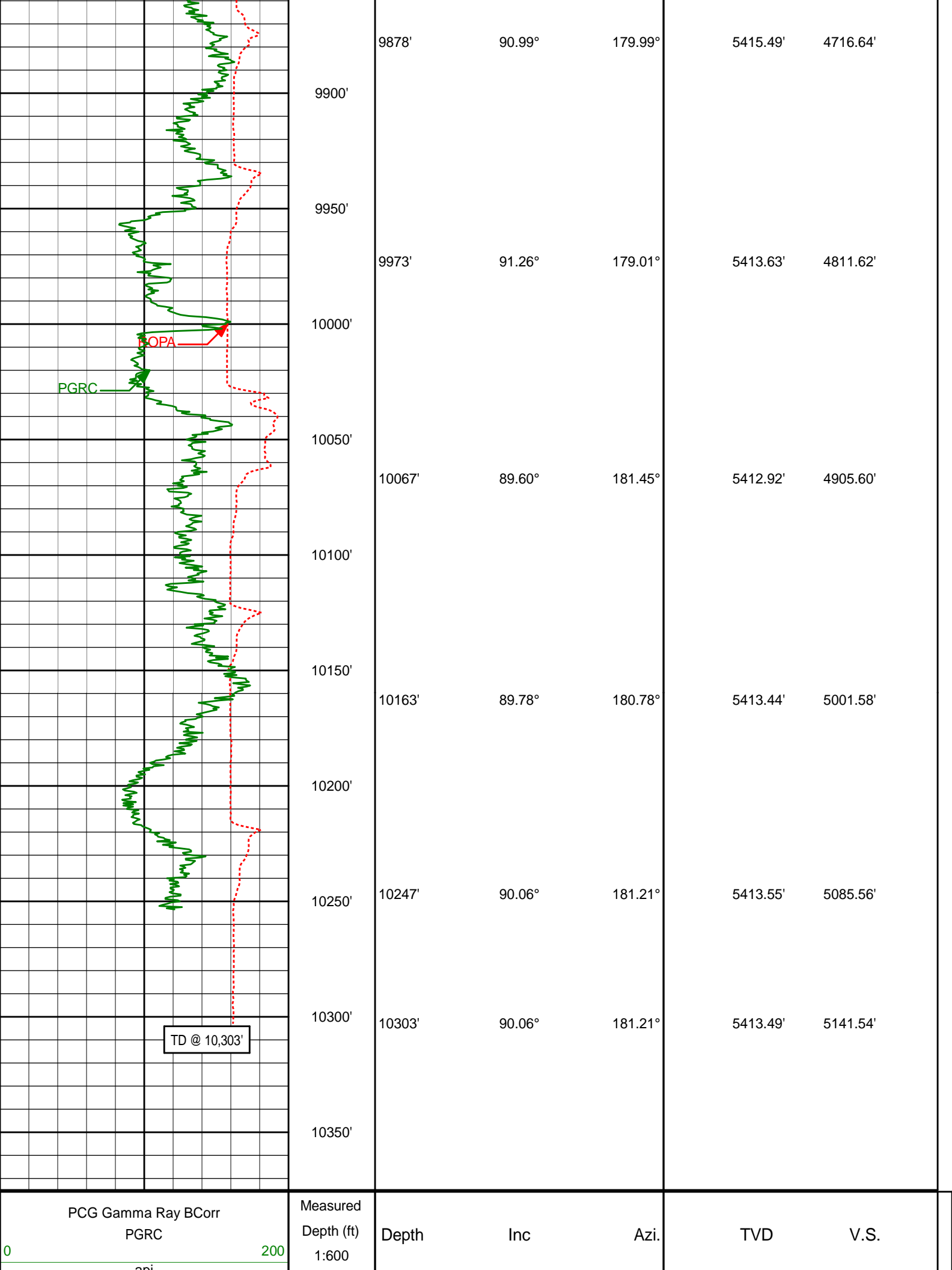
9783'

90.40°

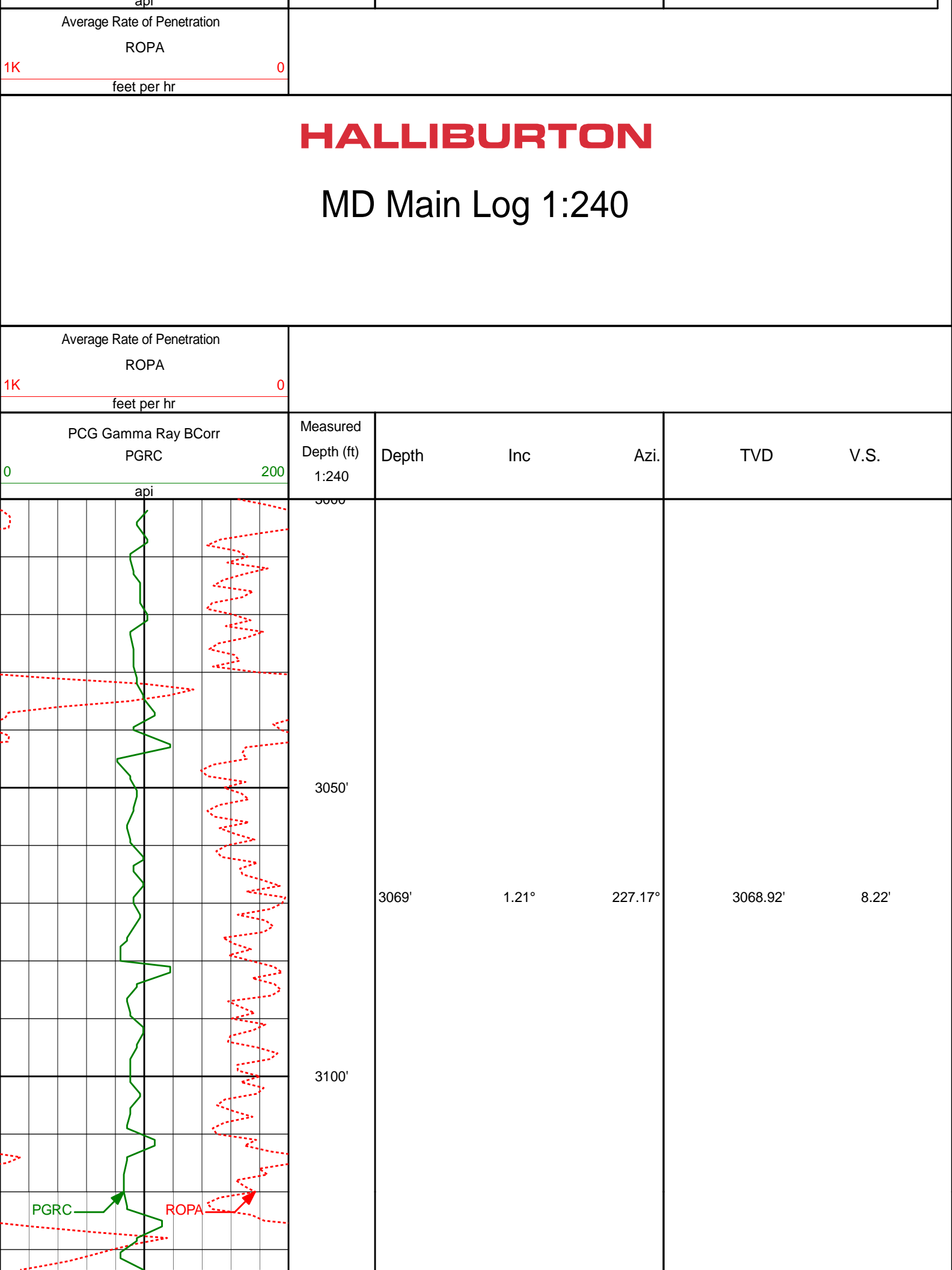
180.27°

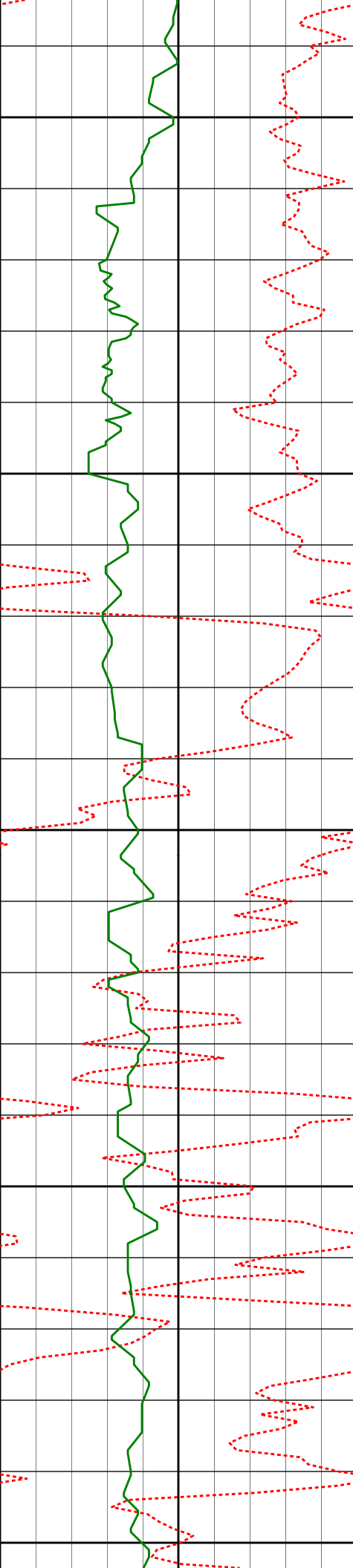
5416.64'

4621.65'



PCG Gamma Ray BCorr PGRC		Measured Depth (ft) 1:600	Depth Inc Azi.			TVD V.S.	
0	200						





3150'

3165'

1.28°

221.99°

3164.89'

9.70'

3200'

3250'

3259'

0.15°

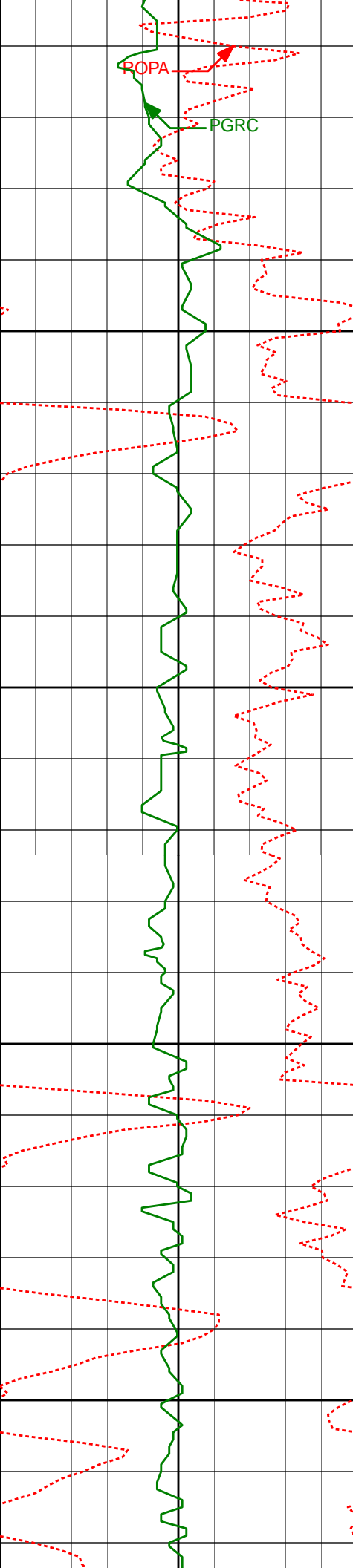
324.79°

3258.89'

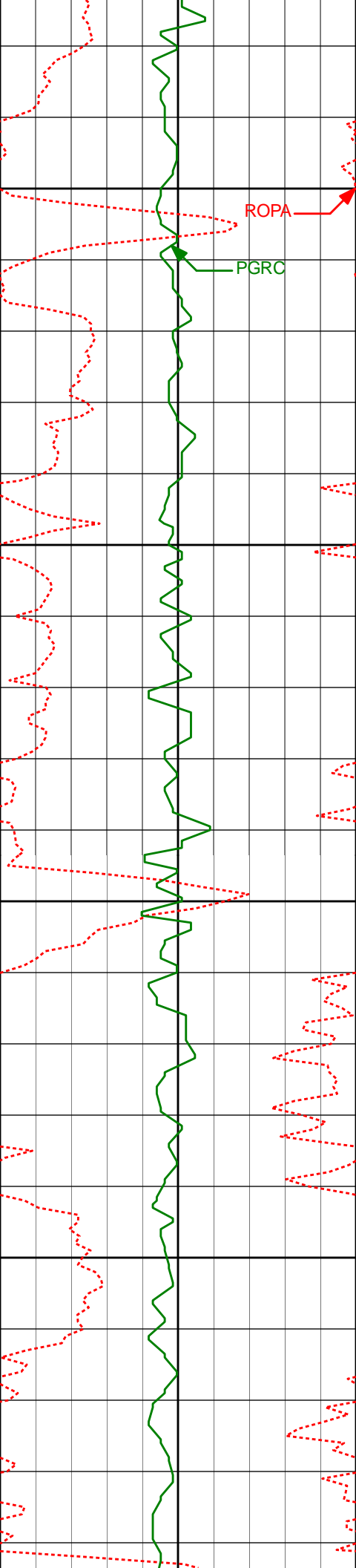
10.38'

3300'

3350'



3355'	0.29°	332.93°	3354.89'	10.06'
3450'	0.25°	338.51°	3449.88'	9.65'
3545'	0.91°	5.47°	3544.88'	8.71'



3600'

3640'

1.10°

347.95°

3639.86'

7.07'

3650'

3700'

3735'

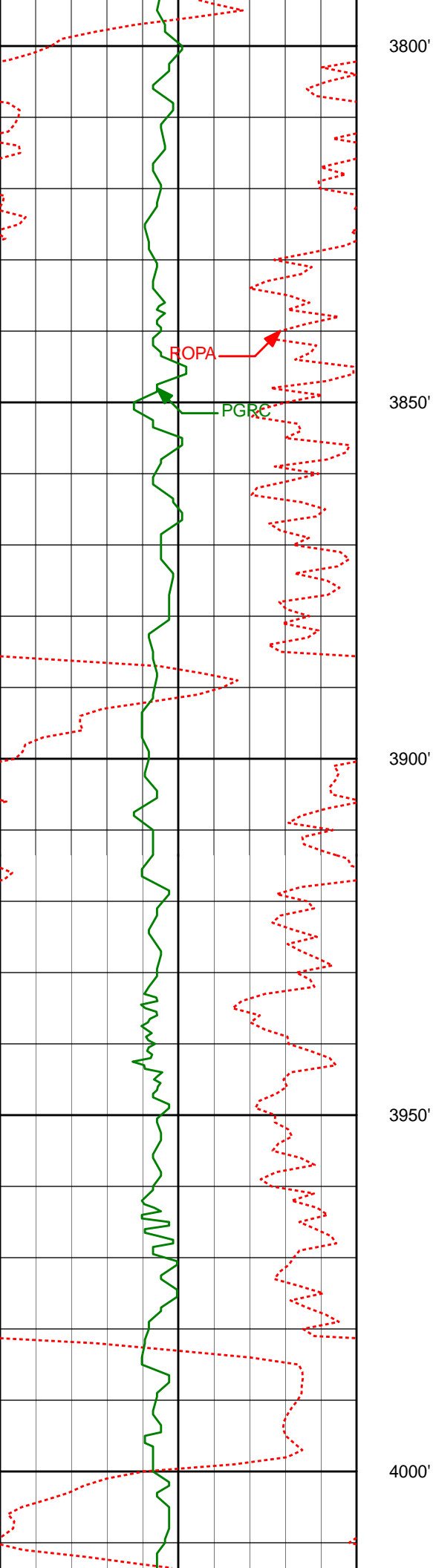
1.11°

349.93°

3734.85'

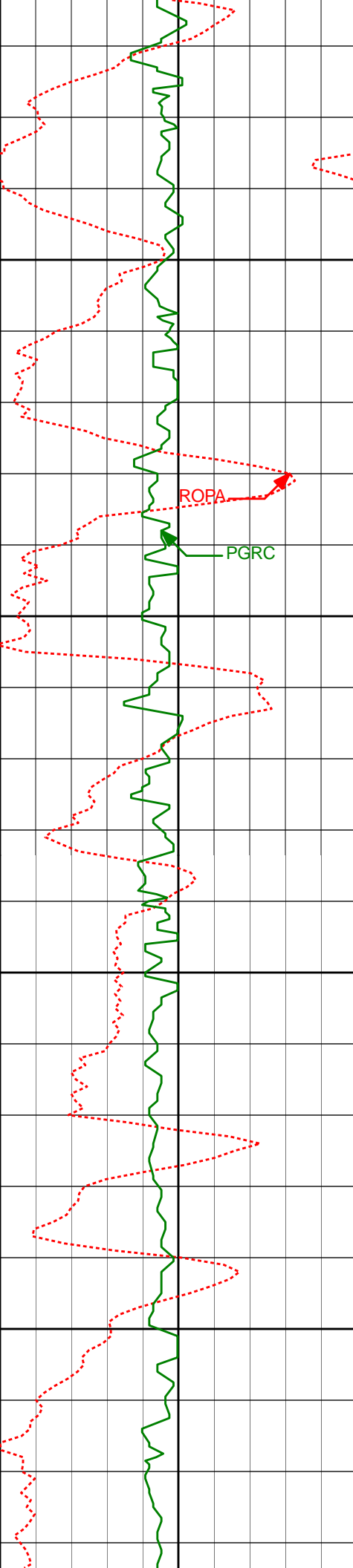
5.27'

3750'



3830'	1.20°	336.76°	3829.83'	3.45'
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3925'	1.12°	338.55°	3924.81'	1.67'
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4020'

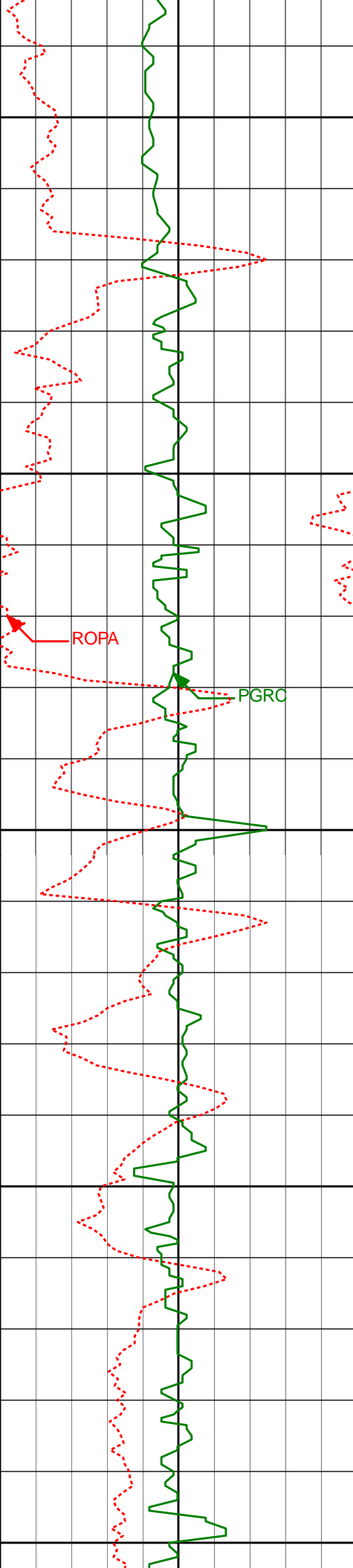
4050'

4100'

4150'

4200'

4020'	0.77°	101.06°	4019.80'	0.92'
4115'	0.87°	97.18°	4114.79'	1.14'
4210'	0.75°	56.74°	4209.78'	0.89'



4250'

4300'

4350'

4400'

4450'

4305'

0.57°

35.72°

4304.78'

0.17'

ROPA

PGRC

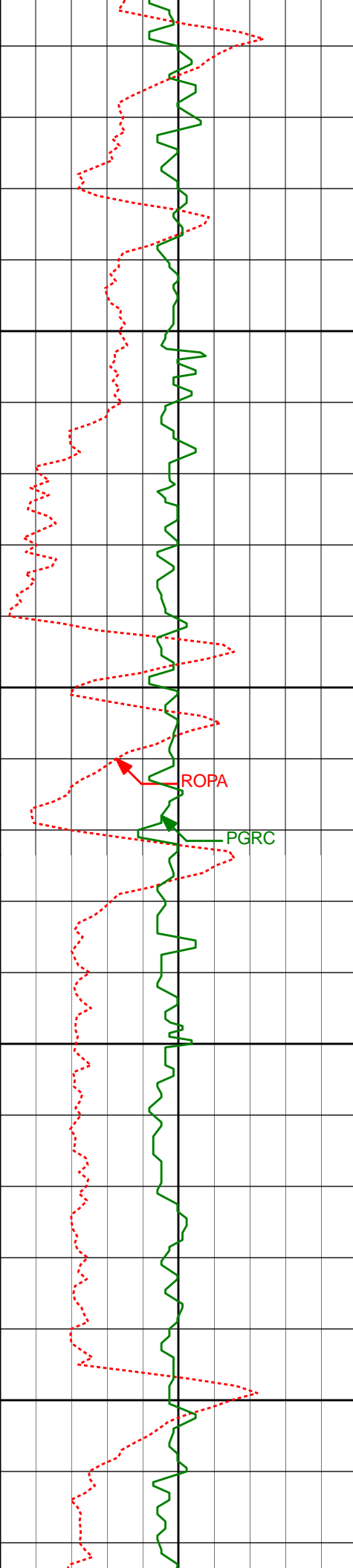
4400'

0.50°

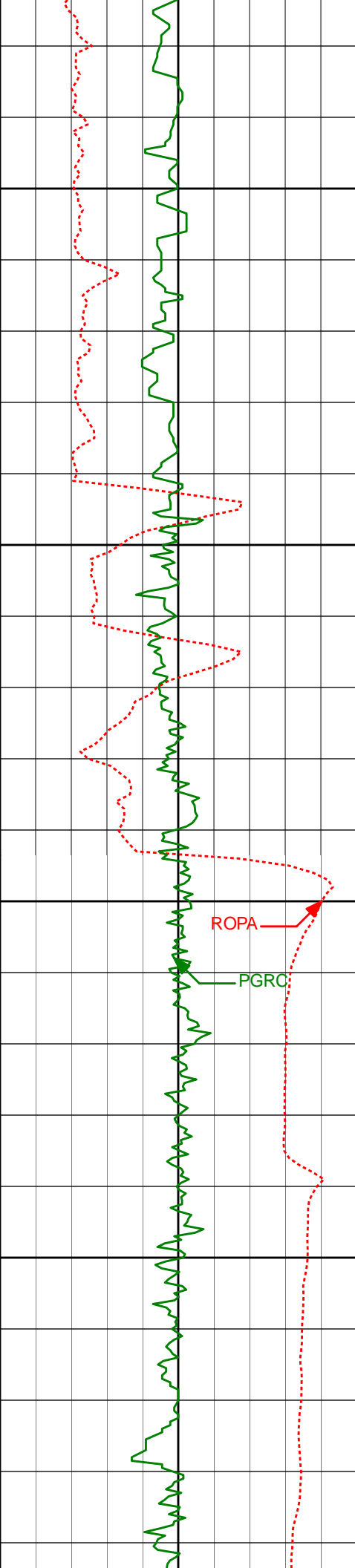
37.02°

4399.77'

-0.54'



4495'	0.49°	42.26°	4494.77'	-1.16'
4500'				
4550'				
4590'	0.51°	26.94°	4589.77'	-1.84'
4600'				
4650'				



4700'

4750'

4800'

4850'

ROPA

PGRO

4685'

0.50°

9.67°

4684.76'

-2.62'

4780'

0.13°

40.67°

4779.76'

-3.11'

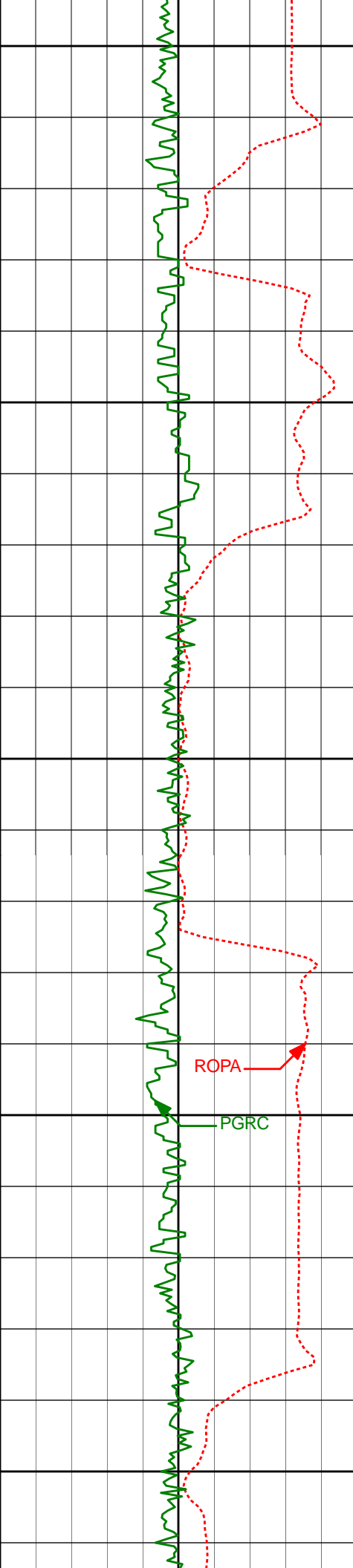
4875'

13.87°

168.56°

4873.84'

8.03'



4900'

4950'

5000'

5050'

5100'

4971'

21.36°

172.23°

4965.28'

36.68'

ROPA

PGRC

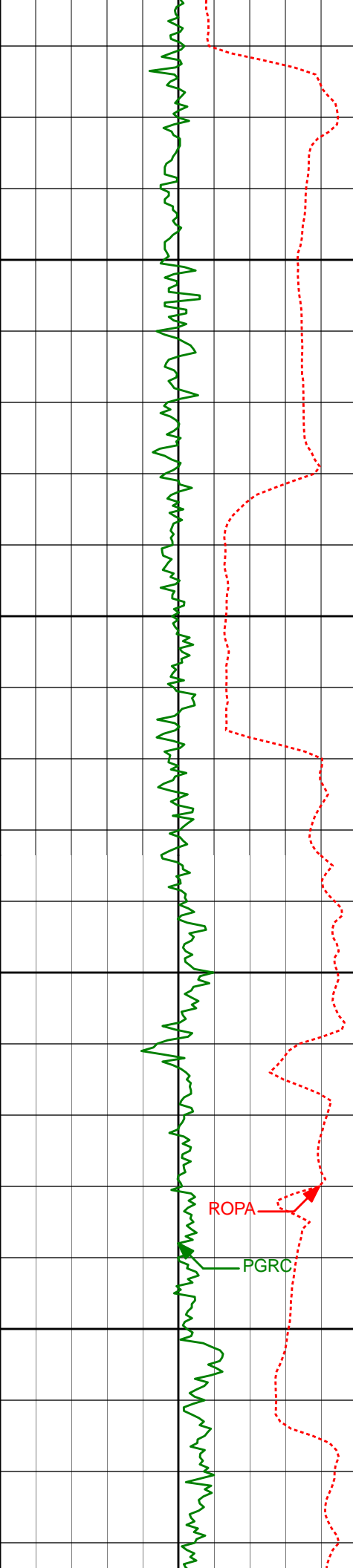
5066'

27.59°

172.23°

5051.70'

75.68'



5150'

5161'

34.47°

174.99°

5133.06'

124.33'

5200'

5250'

5256'

37.69°

181.15°

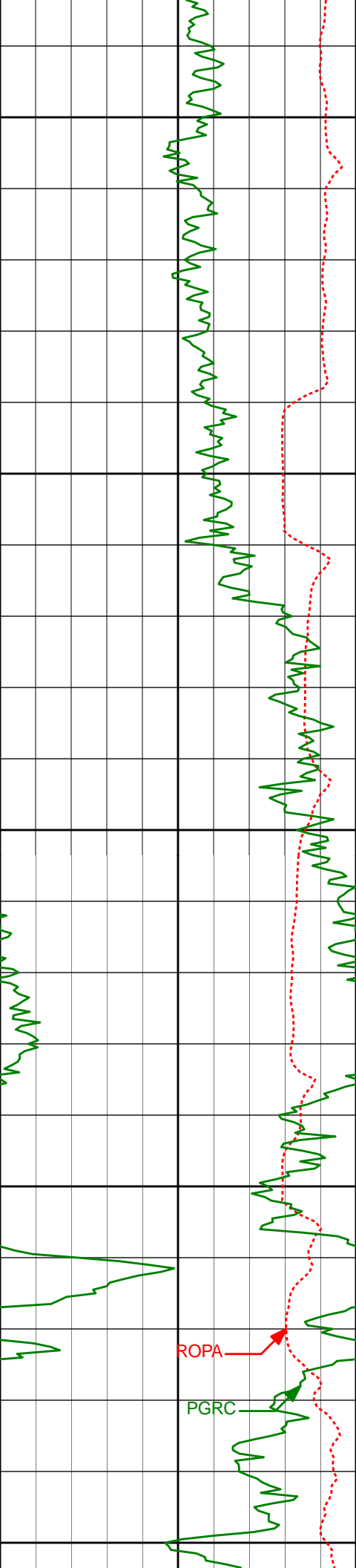
5209.86'

180.18'

5300'

ROPA

PGRC



5350'

5351'

44.14°

183.21°

5281.61'

242.30'

5400'

5450'

5447'

54.03°

182.37°

5344.41'

314.66'

5500'

5550'

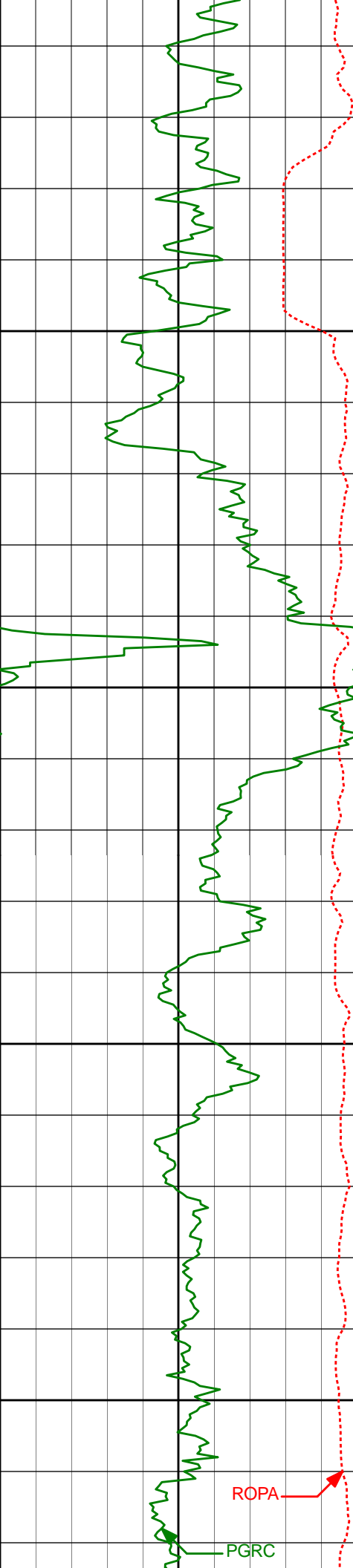
5542'

61.44°

184.30°

5395.09'

394.78'



5600'

5637'

67.92°

185.88°

5435.69'

480.25'

5650'

Run200

5700'

5750'

5754'

88.18°

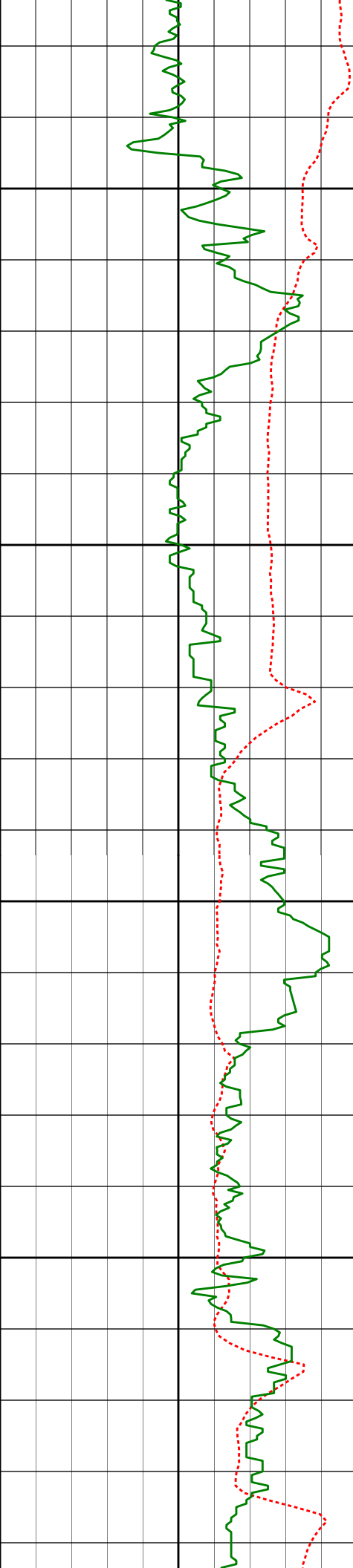
181.13°

5459.80'

593.87'

ROPA

PGRC



Casing Shoe @ 5797'

Run300

5800'

5850'

5900'

5950'

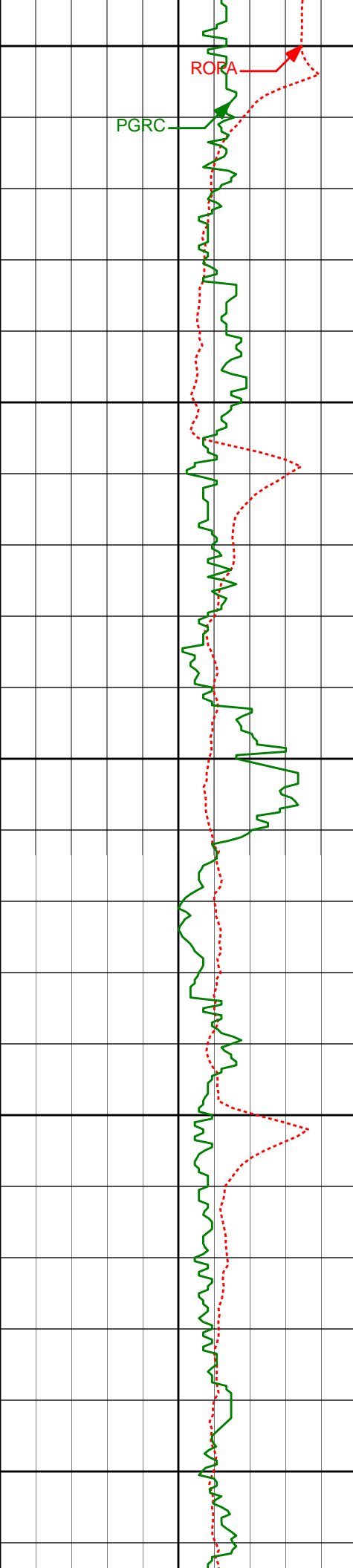
5909'

92.68°

179.32°

5458.63'

748.82'



6000'

6003'

90.74°

179.48°

5455.82'

842.77'

6050'

6100'

6096'

90.80°

179.47°

5454.57'

935.76'

6150'

6200'

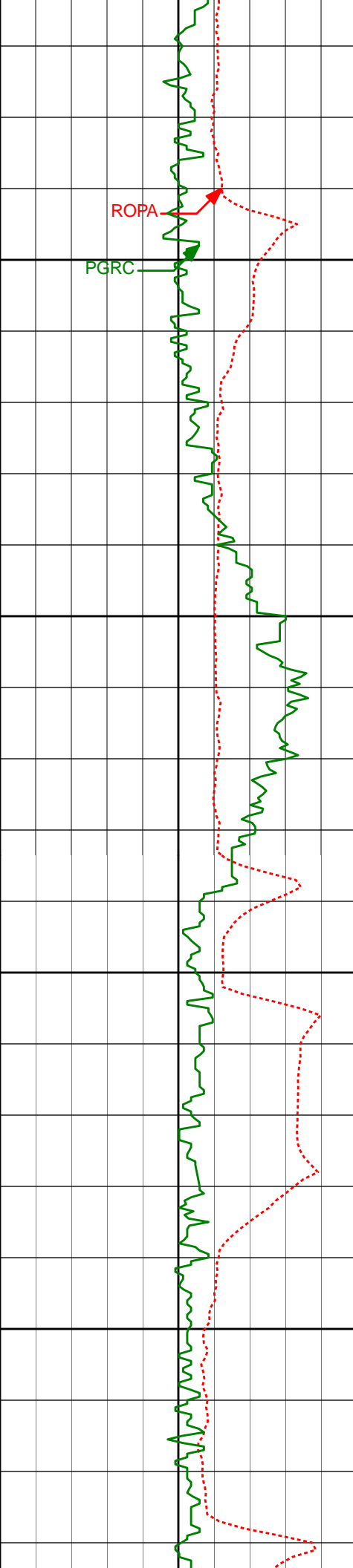
6187'

91.14°

178.39°

5453.03'

1026.73'



6250'

6300'

6350'

6400'

6280'

91.60°

178.76°

5450.81'

1119.68'

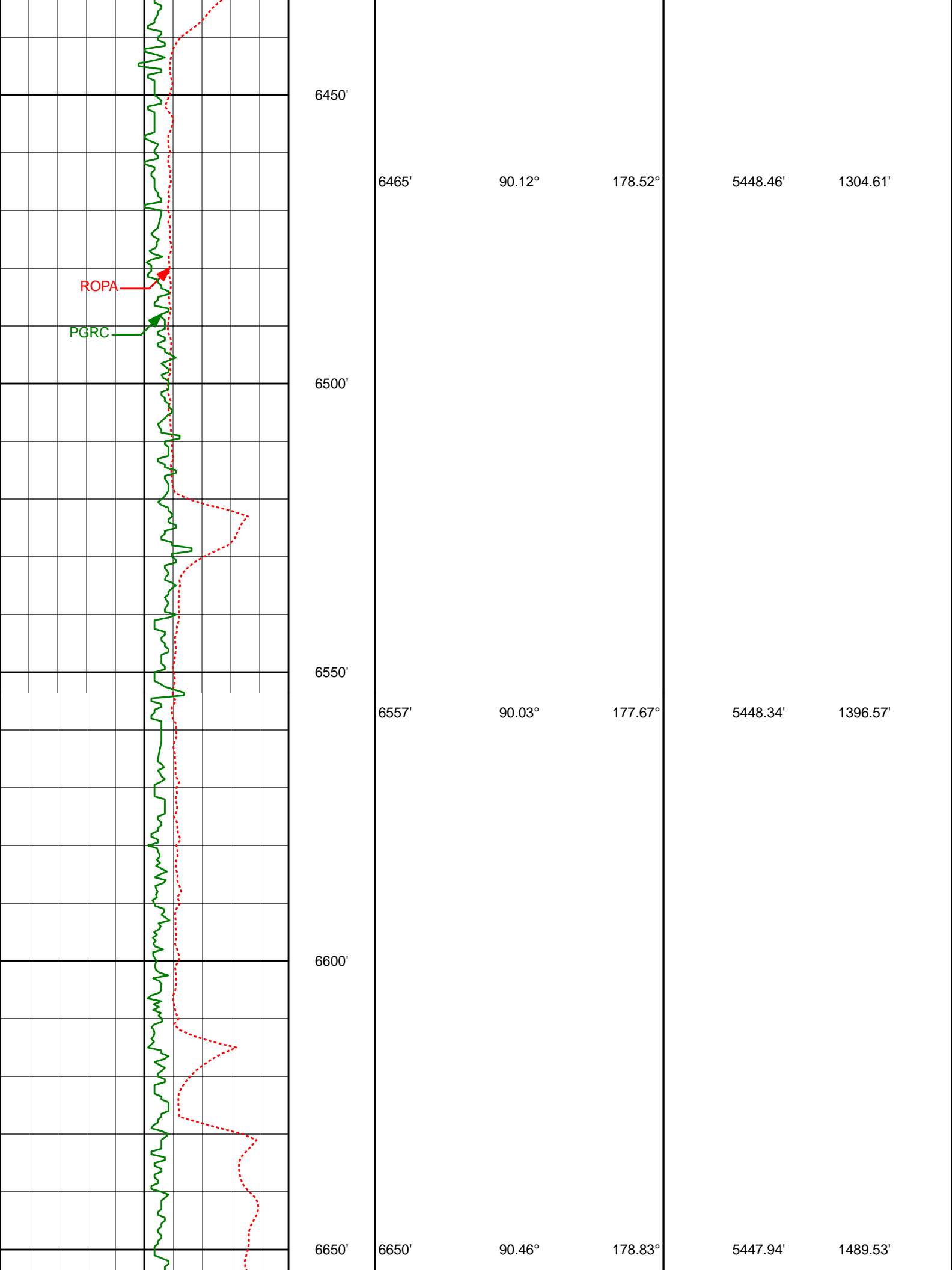
6373'

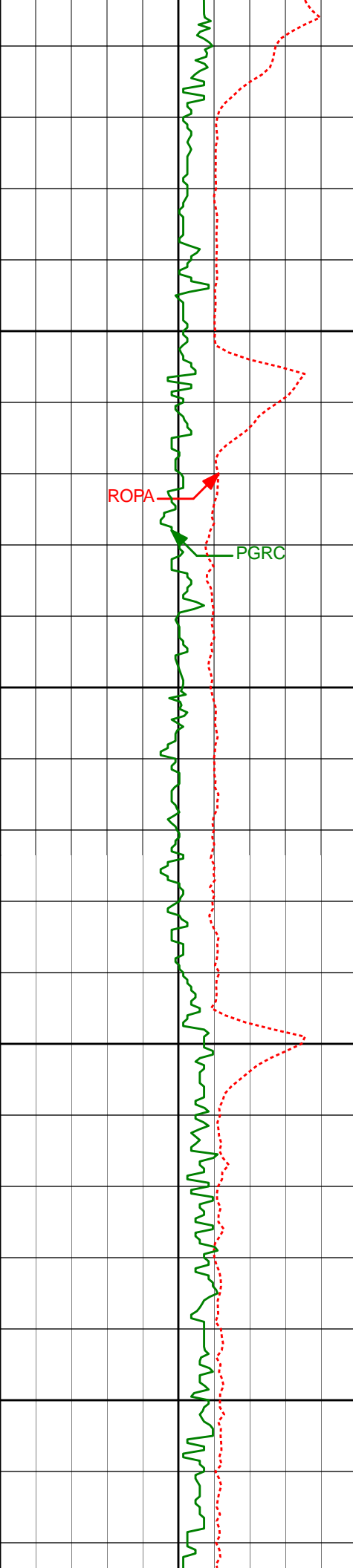
90.59°

178.50°

5449.03'

1212.64'





6700'

6750'

6800'

6850'

ROPA

PGRC

6743'

90.74°

180.19°

5446.96'

1582.52'

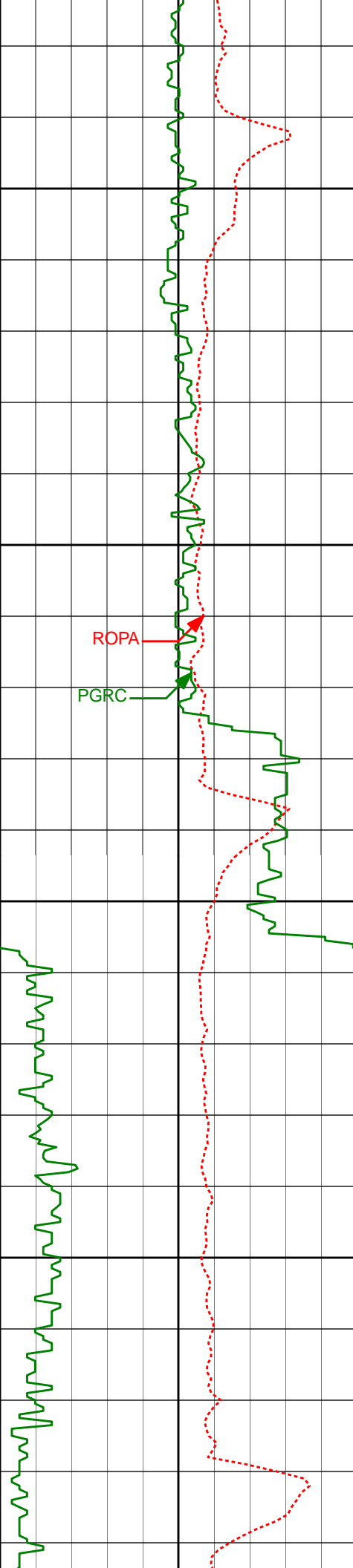
6835'

90.92°

179.88°

5445.63'

1674.51'



6900'

6930'

90.96°

180.28°

5444.07'

1769.49'

6950'

ROPA

PGRC

7000'

7025'

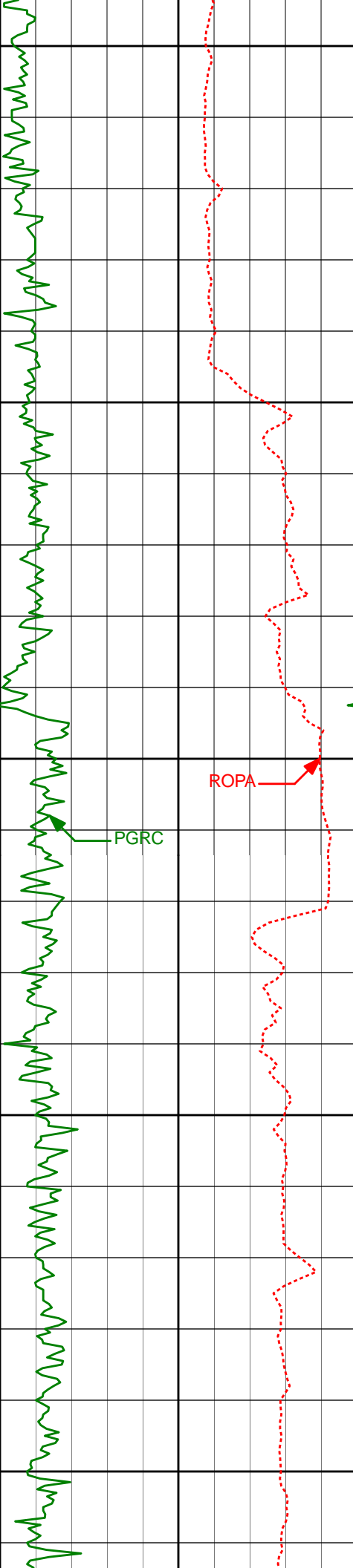
90.86°

178.91°

5442.56'

1864.48'

7050'



7100'

7120'

90.92°

178.78°

5441.08'

1959.45'

7150'

7200'

ROPA

PGRC

7216'

90.49°

180.97°

5439.90'

2055.44'

7250'

7300'

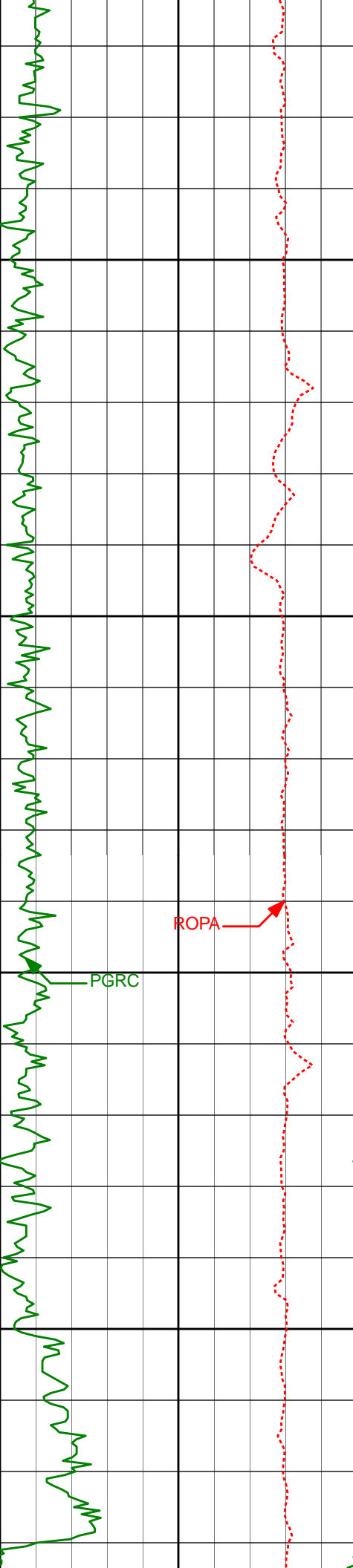
7311'

90.18°

182.40°

5439.34'

2150.39'



7350'

7400'

7450'

7500'

7406'

7501'

90.00°

89.91°

181.55°

180.50°

5439.18'

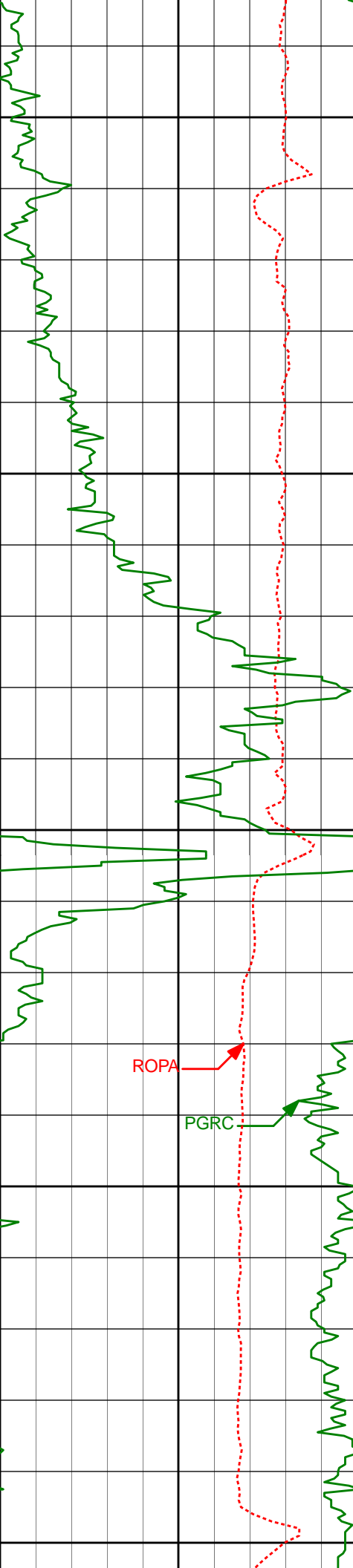
5439.26'

2245.32'

2340.30'

ROPA

PGRC



7550'

7600'

7650'

7700'

7750'

ROPA



PGRC



7596'

89.78°

180.59°

5439.52'

2435.29'

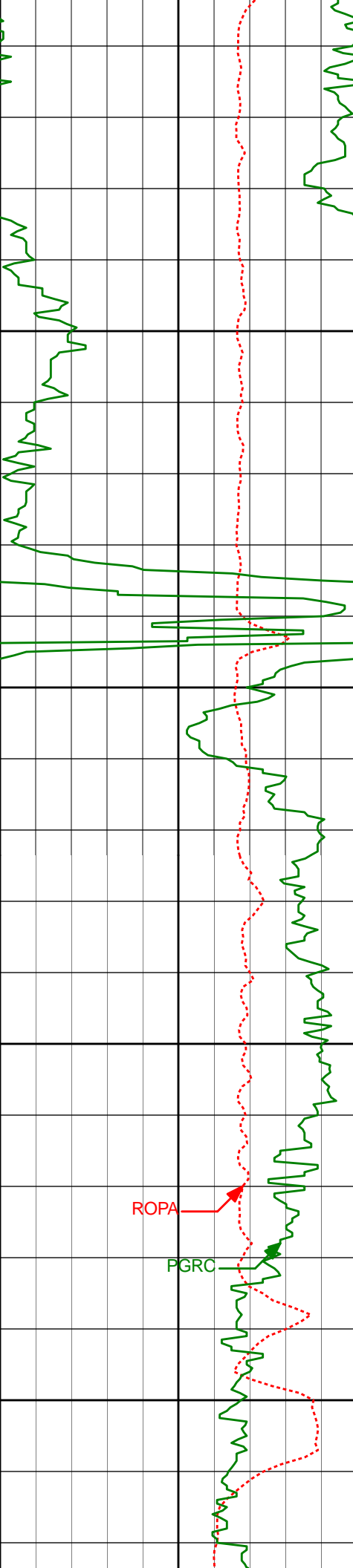
7691'

90.06°

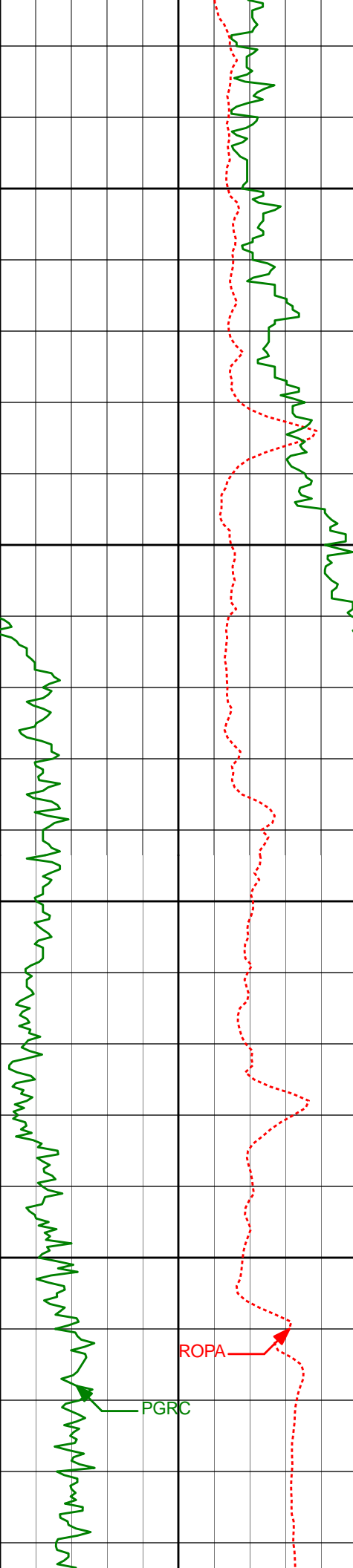
181.64°

5439.64'

2530.27'



7786'	89.75°	180.43°	5439.80'	2625.25'
7800'				
7850'				
7881'	89.45°	180.57°	5440.46'	2720.24'
7900'				
7950'				



8000'

8050'

8100'

8150'

ROPA

PGRC

7976'

90.62°

180.95°

5440.41'

2815.23'

8071'

91.05°

180.27°

5439.03'

2910.21'

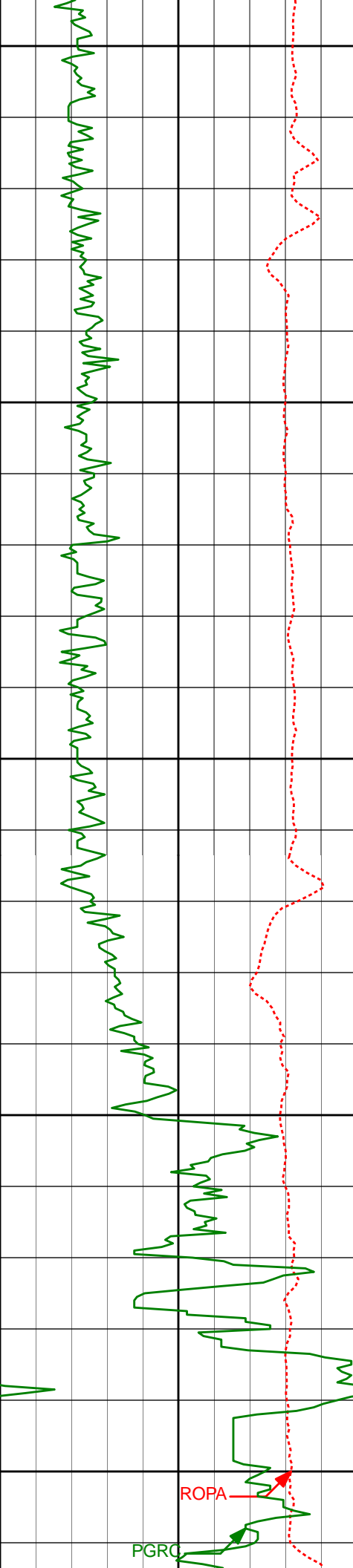
8166'

91.14°

180.49°

5437.22'

3005.19'



8200'

8250'

8300'

8350'

8400'

8261'

90.65°

180.54°

5435.73'

3100.17'

8357'

90.40°

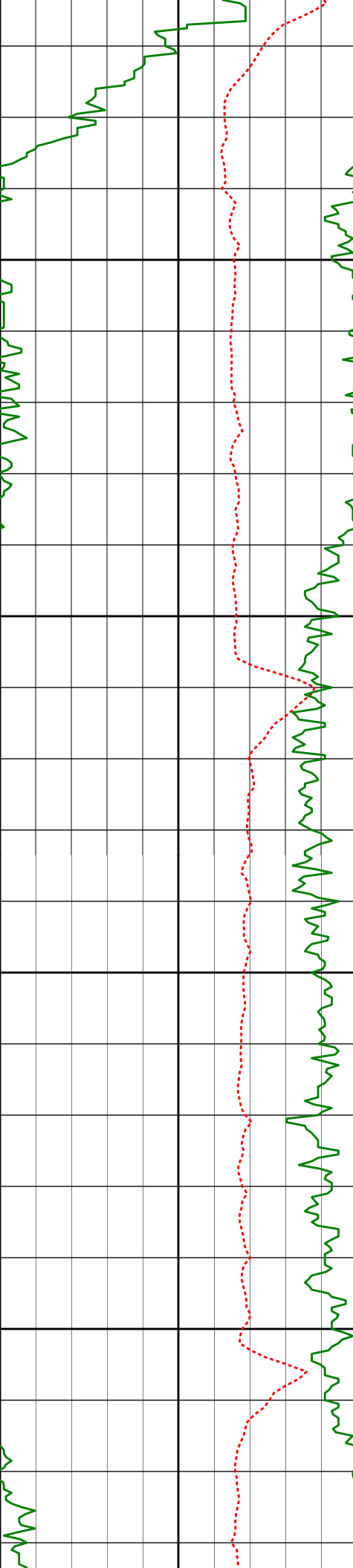
179.66°

5434.86'

3196.16'

ROPA

PGRC



8450'

8500'

8550'

8600'

8452'

8547'

90.62°

90.00°

179.83°

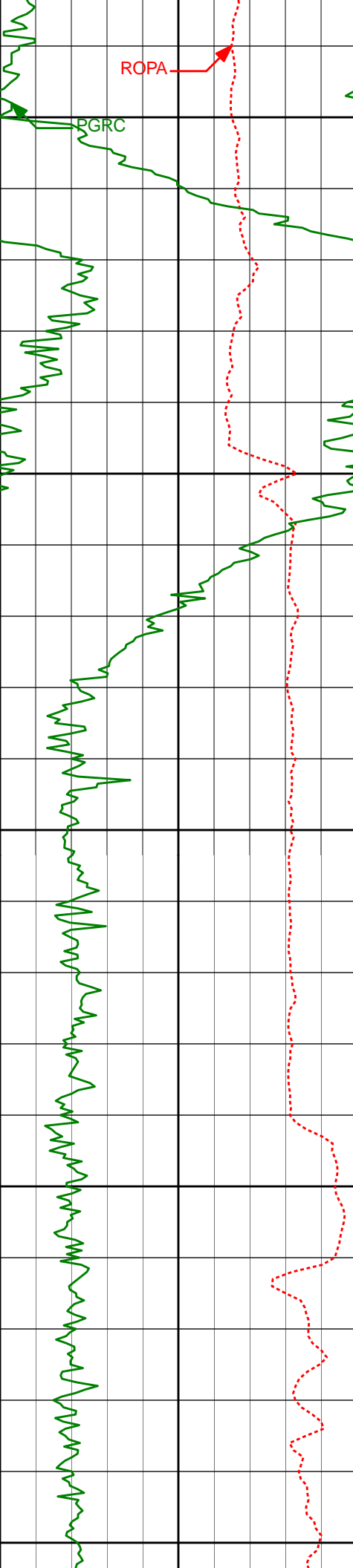
180.14°

5434.01'

5433.50'

3291.16'

3386.16'



8650'

8700'

8750'

8800'

8850'

8642'

89.38°

179.98°

5434.01'

3481.15'

8737'

88.46°

179.22°

5435.80'

3576.13'

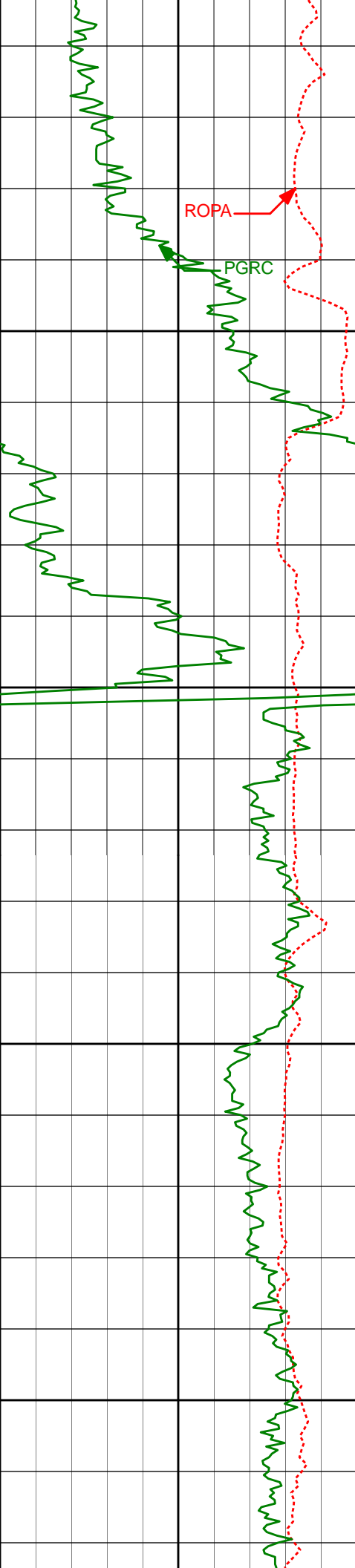
8832'

90.83°

176.92°

5436.39'

3671.07'



ROPA

PGRC

8900'

8950'

9000'

9050'

8927'

91.39°

179.11°

5434.55'

3766.00'

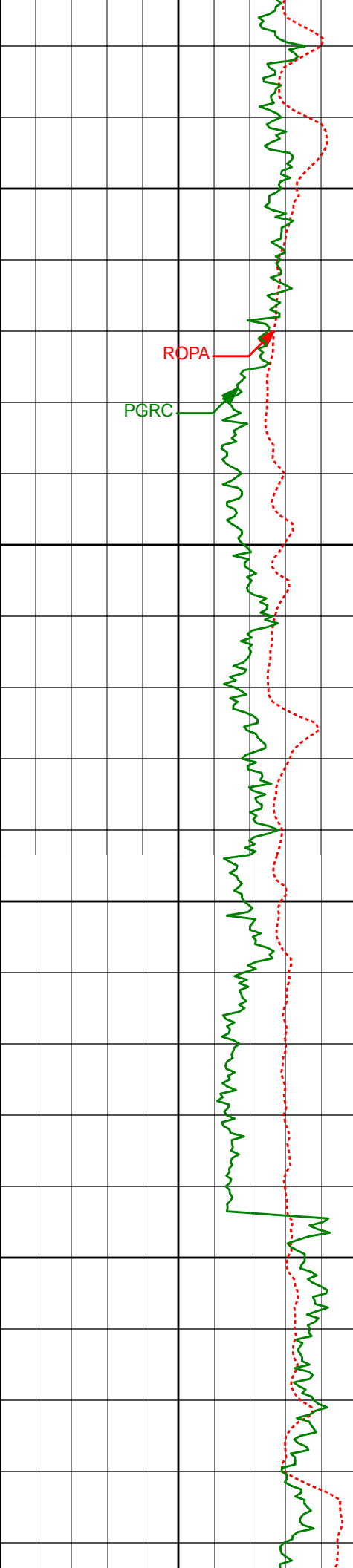
9023'

91.42°

179.08°

5432.20'

3861.96'



9100'

9118'

91.02°

178.89°

5430.18'

3956.93'

ROP

PGRC

9150'

9200'

9213'

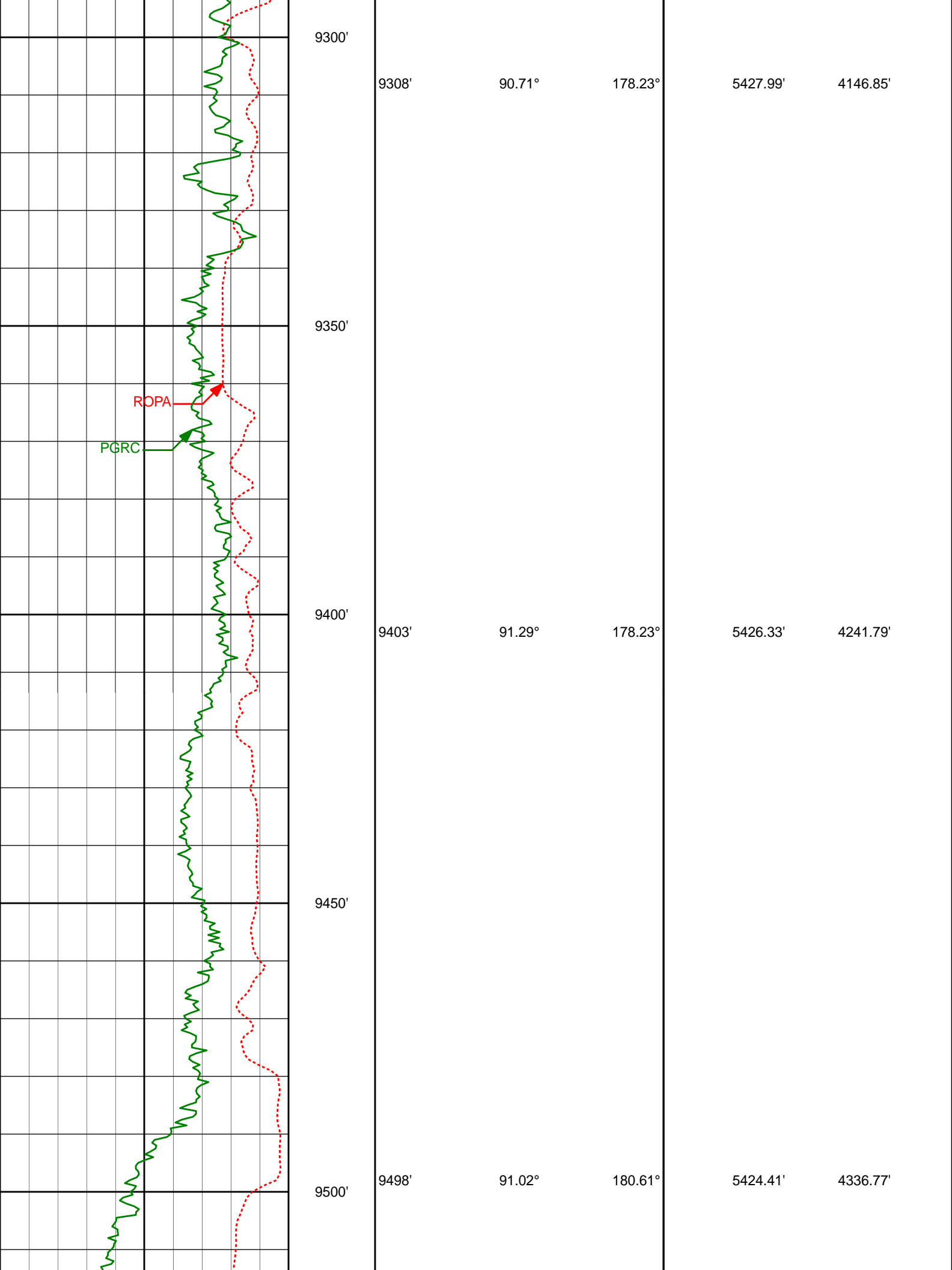
90.46°

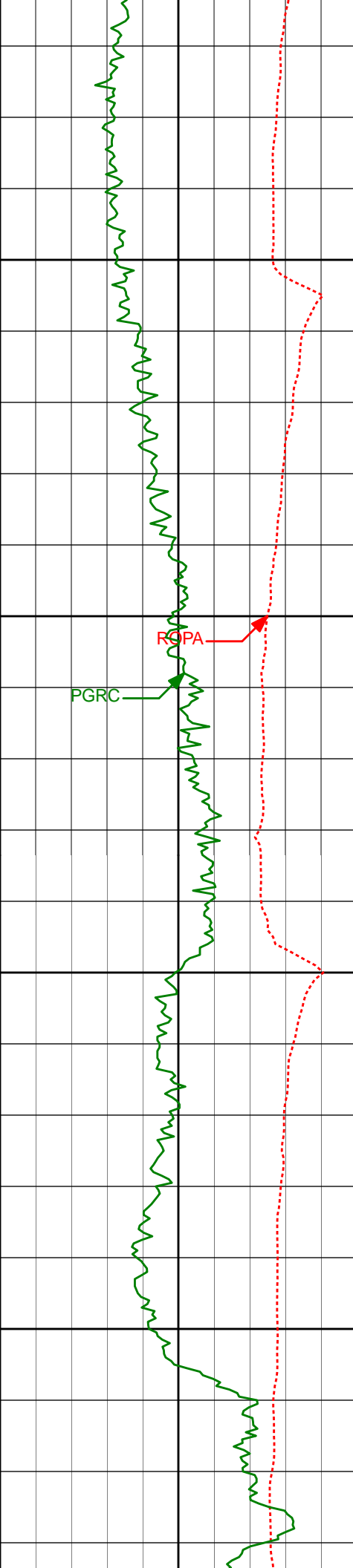
178.16°

5428.96'

4051.89'

9250'





9550'

9593'

91.72°

179.37°

5422.14'

4431.73'

9600'

PGRC

ROPA

9650'

9688'

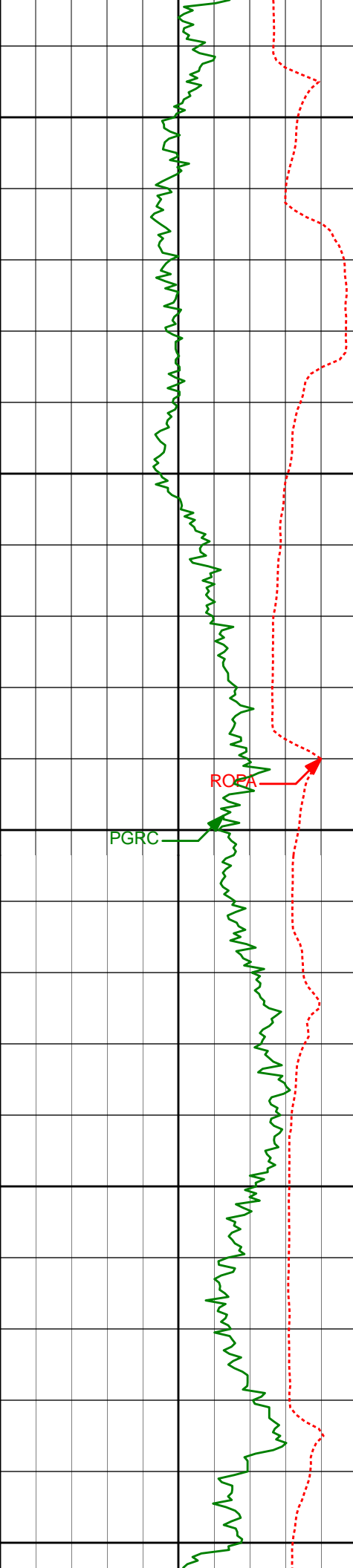
92.25°

179.85°

5418.84'

4526.68'

9700'



9750'

9783'

90.40°

180.27°

5416.64'

4621.65'

9800'

9850'

9878'

90.99°

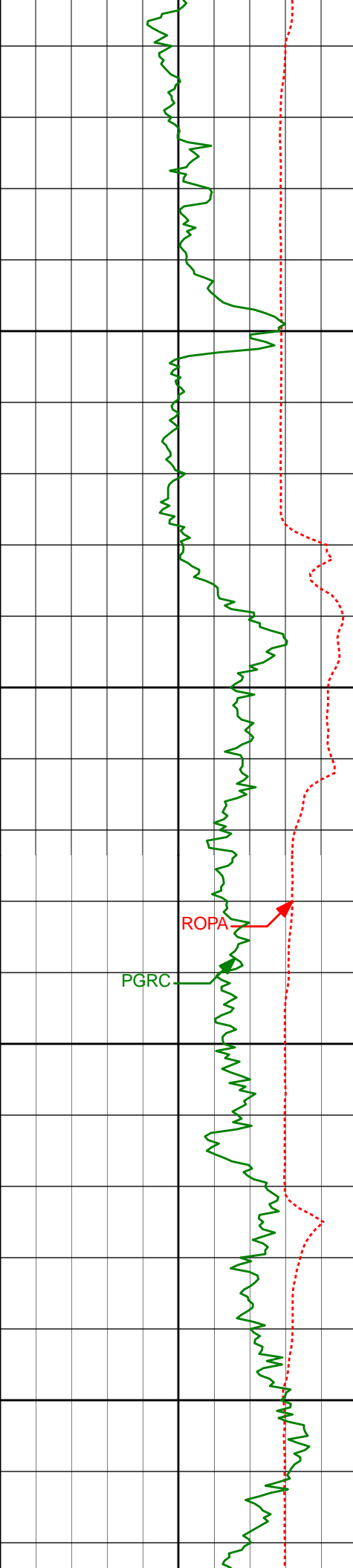
179.99°

5415.49'

4716.64'

9900'

9950'



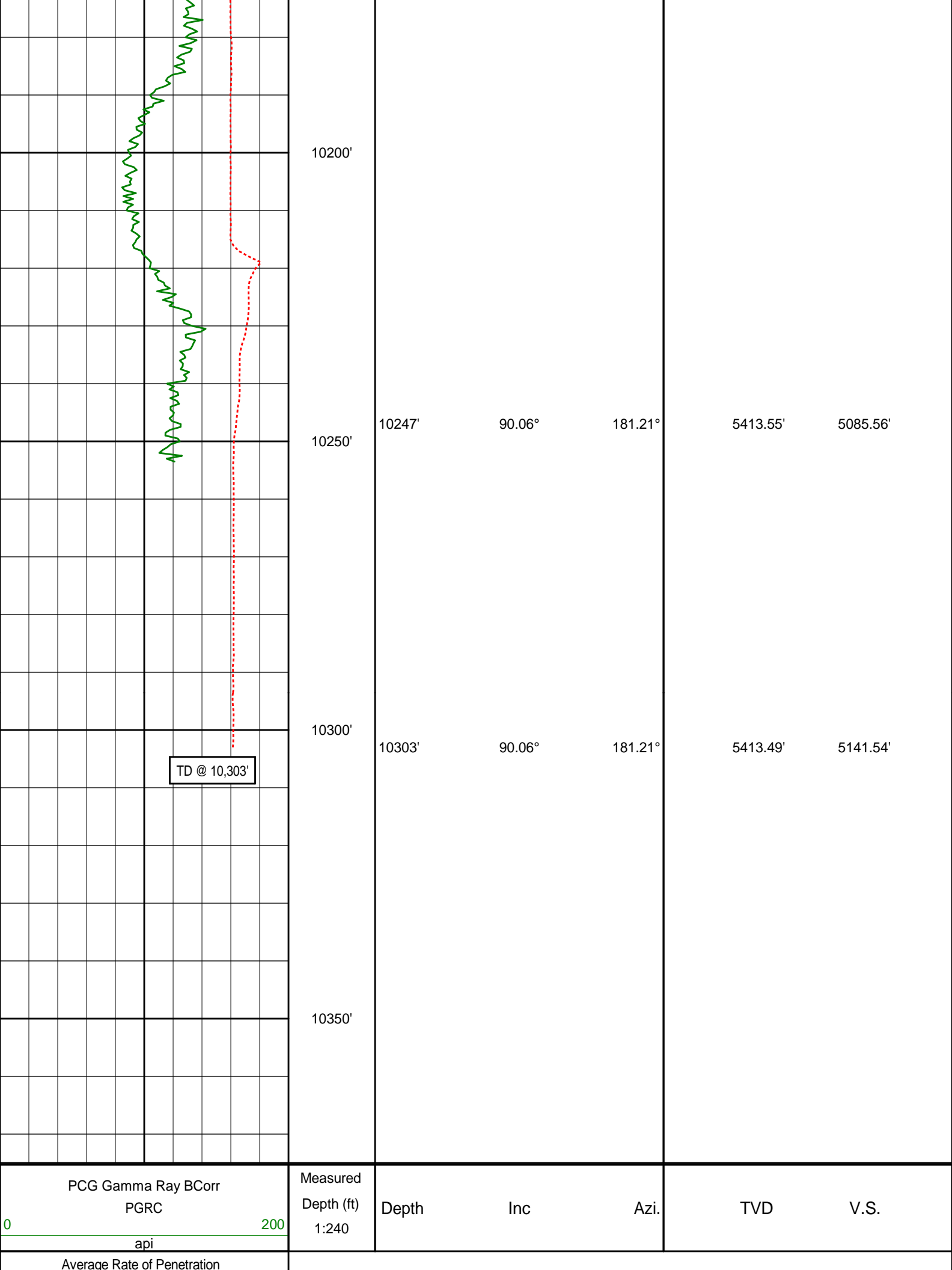
10000'

10050'

10100'

10150'

9973'	91.26°	179.01°	5413.63'	4811.62'
10067'	89.60°	181.45°	5412.92'	4905.60'
10163'	89.78°	180.78°	5413.44'	5001.58'



PCG Gamma Ray BCorr
PGRC

0200

api

Average Rate of Penetration

Measured
Depth (ft)
1:240

Depth

Inc

Azi.

TVD

V.S.

	ROPA	
1K		0
	feet per hr	

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
McCaffrey State LD12-75-1BHN
Wattenberg
Weld Colorado
USA
CA-XX-0901768089

The first three surveys at 455', 734' and 1012' are provided by HP.

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
455.00	0.40	254.11	455.00	0.43 S	1.53 W	0.43	0.09
734.00	0.70	173.71	733.99	2.40 S	2.28 W	2.39	0.27
1012.00	0.60	122.11	1011.97	4.86 S	0.86 W	4.86	0.21
1292.00	0.33	144.07	1291.96	6.30 S	0.86 E	6.30	0.11
1385.00	0.36	138.33	1384.96	6.73 S	1.21 E	6.73	0.05
1477.00	0.31	128.51	1476.96	7.10 S	1.60 E	7.11	0.08
1571.00	0.09	143.26	1570.96	7.32 S	1.84 E	7.33	0.24
1664.00	0.19	135.60	1663.96	7.49 S	2.00 E	7.49	0.10
1756.00	0.19	101.49	1755.96	7.63 S	2.25 E	7.63	0.12
1848.00	0.19	62.27	1847.96	7.58 S	2.53 E	7.59	0.14
1941.00	0.21	24.05	1940.96	7.36 S	2.74 E	7.36	0.14
2033.00	0.22	33.60	2032.96	7.06 S	2.91 E	7.06	0.04
2126.00	0.22	96.13	2125.95	6.92 S	3.19 E	6.93	0.25
2219.00	0.51	70.98	2218.95	6.81 S	3.76 E	6.82	0.35
2311.00	0.26	32.31	2310.95	6.49 S	4.26 E	6.50	0.38
2403.00	0.32	356.49	2402.95	6.06 S	4.35 E	6.07	0.20
2499.00	0.36	358.19	2498.95	5.49 S	4.33 E	5.50	0.04
2594.00	0.26	48.97	2593.95	5.05 S	4.48 E	5.06	0.30
2689.00	0.31	174.56	2688.95	5.17 S	4.67 E	5.18	0.54
2784.00	0.32	220.48	2783.94	5.62 S	4.52 E	5.64	0.26
2879.00	0.44	218.33	2878.94	6.11 S	4.13 E	6.12	0.13
2974.00	1.00	227.01	2973.93	6.97 S	3.29 E	6.98	0.60
3069.00	1.21	227.17	3068.92	8.22 S	1.95 E	8.22	0.22
3165.00	1.28	221.99	3164.89	9.70 S	0.49 E	9.70	0.14
3259.00	0.15	324.79	3258.89	10.38 S	0.29 W	10.38	1.41
3355.00	0.29	332.93	3354.89	10.06 S	0.48 W	10.06	0.15
3450.00	0.25	338.51	3449.88	9.65 S	0.66 W	9.65	0.05
3545.00	0.91	5.47	3544.88	8.71 S	0.66 W	8.71	0.73
3640.00	1.10	347.95	3639.86	7.07 S	0.78 W	7.07	0.38
3735.00	1.11	349.93	3734.85	5.27 S	1.14 W	5.27	0.04
3830.00	1.20	336.76	3829.83	3.45 S	1.69 W	3.45	0.29
3925.00	1.12	338.55	3924.81	1.67 S	2.42 W	1.67	0.08
4020.00	0.77	101.06	4019.80	0.93 S	2.13 W	0.92	1.76
4115.00	0.87	97.18	4114.79	1.14 S	0.79 W	1.14	0.12
4210.00	0.75	56.74	4209.78	0.89 S	0.45 E	0.89	0.60
4305.00	0.57	35.72	4304.78	0.17 S	1.25 E	0.17	0.32
4400.00	0.50	37.02	4399.77	0.54 N	1.77 E	-0.54	0.07
4495.00	0.49	42.26	4494.77	1.17 N	2.29 E	-1.16	0.05
4590.00	0.51	26.94	4589.77	1.84 N	2.75 E	-1.84	0.14
4685.00	0.50	9.67	4684.76	2.63 N	3.01 E	-2.62	0.16
4780.00	0.13	40.67	4779.76	3.12 N	3.15 E	-3.11	0.41
4875.00	13.87	168.56	4873.84	8.02 S	5.49 E	8.03	14.68
4971.00	21.36	172.23	4965.28	36.66 S	10.14 E	36.68	7.89
5066.00	27.59	172.23	5051.70	75.64 S	15.46 E	75.68	6.55
5161.00	34.47	174.99	5133.06	124.28 S	20.78 E	124.33	7.39
5256.00	37.69	181.15	5209.86	180.12 S	22.55 E	180.18	5.10
5351.00	44.14	183.21	5281.61	242.26 S	20.11 E	242.30	6.94
5447.00	54.03	182.37	5344.41	314.63 S	16.62 E	314.66	10.32
5542.00	61.44	184.30	5395.09	394.76 S	11.89 E	394.78	7.99
5637.00	67.92	185.88	5435.69	480.24 S	4.25 E	480.25	6.98

5754.00	88.18	181.13	5459.80	593.88 S	2.53 W	593.87	17.76
5909.00	92.68	179.32	5458.63	748.83 S	3.14 W	748.82	3.13
6003.00	90.74	179.48	5455.82	842.77 S	2.15 W	842.77	2.07
6096.00	90.80	179.47	5454.57	935.76 S	1.29 W	935.76	0.07
6187.00	91.14	178.39	5453.03	1026.73 S	0.41 E	1026.73	1.25
6280.00	91.60	178.76	5450.81	1119.68 S	2.72 E	1119.68	0.64
6373.00	90.59	178.50	5449.03	1212.63 S	4.95 E	1212.64	1.13
6465.00	90.12	178.52	5448.46	1304.60 S	7.34 E	1304.61	0.50
6557.00	90.03	177.67	5448.34	1396.55 S	10.40 E	1396.57	0.93
6650.00	90.46	178.83	5447.94	1489.50 S	13.25 E	1489.53	1.33
6743.00	90.74	180.19	5446.96	1582.49 S	14.04 E	1582.52	1.50
6835.00	90.92	179.88	5445.63	1674.48 S	13.99 E	1674.51	0.40
6930.00	90.96	180.28	5444.07	1769.47 S	13.86 E	1769.49	0.43
7025.00	90.86	178.91	5442.56	1864.45 S	14.52 E	1864.48	1.44
7120.00	90.92	178.78	5441.08	1959.42 S	16.44 E	1959.45	0.15
7216.00	90.49	180.97	5439.90	2055.40 S	16.64 E	2055.44	2.32
7311.00	90.18	182.40	5439.34	2150.36 S	13.85 E	2150.39	1.54
7406.00	90.00	181.55	5439.18	2245.30 S	10.58 E	2245.32	0.92
7501.00	89.91	180.50	5439.26	2340.29 S	8.88 E	2340.30	1.10
7596.00	89.78	180.59	5439.52	2435.28 S	7.98 E	2435.29	0.16
7691.00	90.06	181.64	5439.64	2530.26 S	6.13 E	2530.27	1.15
7786.00	89.75	180.43	5439.80	2625.24 S	4.42 E	2625.25	1.32
7881.00	89.45	180.57	5440.46	2720.24 S	3.60 E	2720.24	0.36
7976.00	90.62	180.95	5440.41	2815.23 S	2.34 E	2815.23	1.30
8071.00	91.05	180.27	5439.03	2910.21 S	1.33 E	2910.21	0.84
8166.00	91.14	180.49	5437.22	3005.19 S	0.70 E	3005.19	0.25
8261.00	90.65	180.54	5435.73	3100.18 S	0.15 W	3100.17	0.52
8357.00	90.40	179.66	5434.86	3196.17 S	0.32 W	3196.16	0.96
8452.00	90.62	179.83	5434.01	3291.17 S	0.10 E	3291.16	0.29
8547.00	90.00	180.14	5433.50	3386.16 S	0.12 E	3386.16	0.73
8642.00	89.38	179.98	5434.01	3481.16 S	0.02 E	3481.15	0.67
8737.00	88.46	179.22	5435.80	3576.14 S	0.68 E	3576.13	1.26
8832.00	90.83	176.92	5436.39	3671.07 S	3.88 E	3671.07	3.48
8927.00	91.39	179.11	5434.55	3765.99 S	7.16 E	3766.00	2.38
9023.00	91.42	179.08	5432.20	3861.95 S	8.67 E	3861.96	0.05
9118.00	91.02	178.89	5430.18	3956.92 S	10.35 E	3956.93	0.47
9213.00	90.46	178.16	5428.96	4051.87 S	12.80 E	4051.89	0.96
9308.00	90.71	178.23	5427.99	4146.82 S	15.79 E	4146.85	0.27
9403.00	91.29	178.23	5426.33	4241.76 S	18.72 E	4241.79	0.62
9498.00	91.02	180.61	5424.41	4336.73 S	19.68 E	4336.77	2.52
9593.00	91.72	179.37	5422.14	4431.70 S	19.70 E	4431.73	1.50
9688.00	92.25	179.85	5418.84	4526.64 S	20.34 E	4526.68	0.75
9783.00	90.40	180.27	5416.64	4621.61 S	20.24 E	4621.65	2.00
9878.00	90.99	179.99	5415.49	4716.60 S	20.03 E	4716.64	0.69
9973.00	91.26	179.01	5413.63	4811.58 S	20.86 E	4811.62	1.07
10067.00	89.60	181.45	5412.92	4905.57 S	20.48 E	4905.60	3.15
10163.00	89.78	180.78	5413.44	5001.55 S	18.61 E	5001.58	0.73
10247.00	90.06	181.21	5413.55	5085.53 S	17.16 E	5085.56	0.62
10303.00	90.06	181.21	5413.49	5141.52 S	15.97 E	5141.54	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 179.87 DEGREES (GRID)
A TOTAL CORRECTION OF 6.91 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 10303.00 FEET
IS 5141.55 FEET ALONG 179.82 DEGREES (GRID)**

Final survey is a straight line projection to TD.