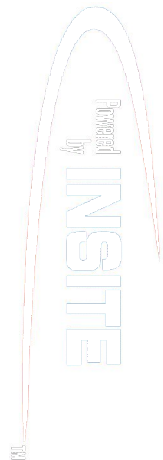


**PCG Pressure Case Gamma
PCD Pressure Case Directional**


Country		: USA						
Field		: Wattenberg						
Location		: Lat: 40° 26' 28.43" North Long: 104° 23' 38.76" West						
Well		: Wells Ranch AA35-65-1BHNC						
Company		: Noble Energy						
Rig		: H&P 343						
LOCATION		Latitude : 40° 26' 28.43" North Longitude : 104° 23' 38.76" West		Company : Noble Energy Rig : H&P 343 Well : Wells Ranch AA35-65-1BHNC Field : Wattenberg Country : USA API Number : 05-123-38661				
		UTM Easting = 3,307,809,300 ft UTM Northing = 1,405,499,850 ft						
Permanent Datum		: Ground Level		Elevation : 4774.00 ft		Other Services		
Log Measured From		: Drill Floor		24.00 ft Above Permanent Datum		Directional Drilling		
Drilling Measured From		: Drill Floor		MD LOG		KB N/A DF 4798.00 ft GL 4774.00 ft WD N/A		
Depth Logged		: 635.00 ft To 10,946.00 ft		Unit No. : 11610115		Job No. : CA-XX-0901018822		
Date Logged		: 13-Feb-14 To 20-Feb-14		Plot Type : Final				
Total Depth MD		: 10,946.00 ft TVD : 6,650.78 ft		Plot Date : 10-Mar-14				
Spud Date		: 14-Feb-14						
Run No.		Borehole Record (MD)		Run No.		Borehole Record (MD)		
		Size	From	To		Size	From	To
2		8.750 in	635.00 ft	5,959.00 ft				
3		8.750 in	5,959.00 ft	6,974.00 ft				
4		8.750 in	6,974.00 ft	9,948.00 ft				
5		8.750 in	9,948.00 ft	10,946.00 ft				
0410		8.750 in	11,180.36 ft	SURFACE		Size	Casing Record (MD)	
							From	To
						9.625 in	36.60 lbpf SURFACE	625.00 ft
						7.000 in	34.70 lbpf SURFACE	6,964.00 ft

WELL INFORMATION

MWD Run Number	100	200	300	400	
Date run completed	15-Feb-14	16-Feb-14	19-Feb-14	20-Feb-14	
Rig Bit Number	2	3	4	5	
Bit Size (in)	8.750	8.750	8.750	8.750	
Tool Nominal OD (in)	6.750	6.750	4.750	4.750	
Log Start Depth (MD, ft)	635.00	5,959.00	6,974.00	9,949.00	
Log End Depth (MD, ft)	5,959.00	6,974.00	9,949.00	10,946.00	
Drill or Wipe	Drill	Drill	Drill	Drill	
Drill/Wipe Start Date and Time	14-Feb-14 21:30	15-Feb-14 23:00	18-Feb-14 02:15	19-Feb-14 22:00	
Drill/Wipe End Date and Time	15-Feb-14 13:30	16-Feb-14 09:30	19-Feb-14 08:00	20-Feb-14 06:00	
Min Inc (deg) @ Depth (MD, ft)	0.21 @ 708.00	0.63 @ 5,997.00	87.23 @ 8,653.00	88.61 @ 10,644.00	
Max Inc (deg) @ Depth (MD, ft)	8.85 @ 3,725.00	82.85 @ 6,921.00	91.36 @ 9,506.00	92.13 @ 10,454.00	
Bit TFA(in2) / Bit Type	0.98 / PDC	1.24 / PDC	0.98 / PDC	0.98 / PDC	
Flow Rate (gpm)	588.18	540.00	299.47	300.00	
Max AV (fpm) / CV (fpm) @ MWD	434.0 / 500.0	477.0 / 245.0	393.0 / 400.0	390.0 / 400.0	
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel	
Density (ppg) / Viscosity (spqt)	8.80 / 28.00	10.25 / 36.00	9.30 / 32.00	9.50 / 35.00	
Filtrate CL (ppm)	2,300.00	2,500.00	2,800.00	3,000.00	
pH / Fluid Loss (mptm)	10.20 / 44	9.40 / 8	9.40 / 9	9.60 / 9	
PV (cP) / YP (Ihf2)	2 / 2.00	10 / 10.00	6 / 4.00	7 / 8.00	
% Solids / % Sand	2.2 / .35	8.20 / 0.25	4.6 / .25	5.70 / 0.25	
% Oil / Oil:Water Ratio	N/A / N/A	NA / NA	NA / NA	NA / NA	
Rm @ Measured Temp (degF)	N/A @ N/A	NA @ NA	NA @ NA	NA @ NA	
Rmf @ Measured Temp (degF)	N/A @ N/A	NA @ NA	NA @ NA	NA @ NA	
Rmc @ Measured Temp (degF)	N/A @ N/A	NA @ NA	NA @ NA	NA @ NA	

Max Tool Temp (degF) / Source	412.20 / PCM	412.20 / PCM	212.92 / PCM	217.00 / PCM	
Rm @ Max Tool Temp (degF)	N/A @ N/A	NA @ NA	NA @ NA	NA @ NA	
Lead MWD Engineer	Gary Eifert	Gary Eifert	Gary Eifert	Gary Eifert	
Customer Representative	Johnny Sanchez	Johnny Sanchez	Johnny Sanchez	Johnny Sanchez	

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM	PCM	
Software Version	5.84	5.84	5.84	5.84	
Sub Serial Number	11342275	11342275	12134685	12134685	
Insert Serial Number	10997273	10997273	11619995	10997273	
Date and Time Initialized	14-Feb-14 16:03	01-Jan-70 00:00	16-Feb-14 18:36	19-Feb-14 13:05	
Date and Time Read	16-Feb-14 14:47	16-Feb-14 15:10	19-Feb-14 17:05	20-Feb-14 14:02	
ECMB SW Version	N/A	N/A	N/A	N/A	

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC	PCDC	
Distance From Bit (ft)	56.00	53.00	63.00	64.00	
Software Version	6.21	6.21	6.21	6.21	
Sub Serial Number	11342275	11342275	12134685	12134685	
Sonde Serial Number	11477956	11477956	11833228	11477956	
Sensor ID Number	N/A	N/A	N/A	N/A	
Toolface Offset (deg)	343.96	343.52	311.60	205.61	

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG	PCG	
Distance From Bit (ft)	48.80	46.62	56.70	57.28	
Recorded Sample Period (sec)	10	10	10	10	
Software Version	8.15	8.15	8.15	8.15	
Sub Serial Number	11342275	11342275	12134685	12134685	
Insert/Sonde Serial Number	12037425	12037425	11681019	12037425	

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

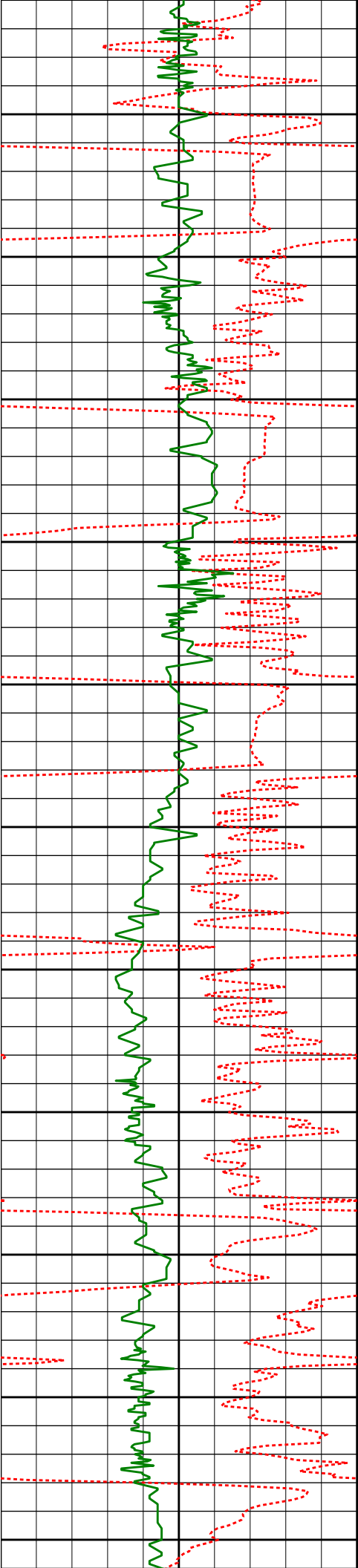
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HALLIBURTON

MD Main Log 1:600

Average Rate of Penetration ROPA						
1K0						
feet per hr						
PCG Gamma Ray BCorr PGRC		Measured	Depth	Inc	Azi.	TVD
0200		Depth (ft) 1:600				
api						
		3000'				
		3050'				
		3066'	5.61°	326.23°	3060.23'	74.01'
		3100'				
		3150'				
		3160'	6.30°	325.65°	3153.73'	79.70'
		3200'				
		3250'				
		3254'	6.65°	325.98°	3247.13'	85.90'



3300'

3350'

3400'

3450'

3500'

3550'

3600'

3650'

3700'

3750'

3800'

3349'

6.40°

324.52°

3341.51'

92.29'

3442'

7.57°

309.34°

3433.83'

100.26'

3536'

7.48°

311.99°

3527.02'

109.82'

3631'

8.46°

308.14°

3621.10'

120.14'

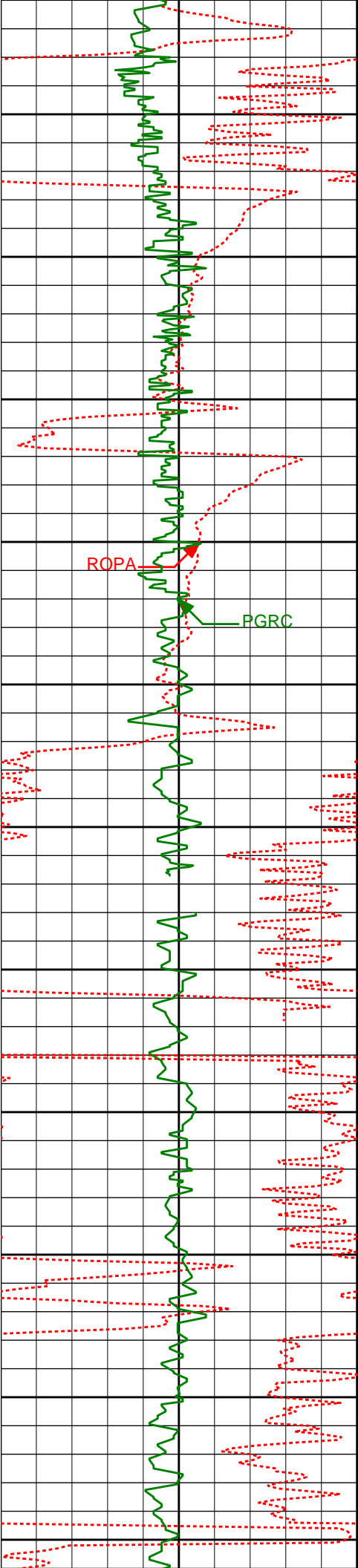
3725'

8.85°

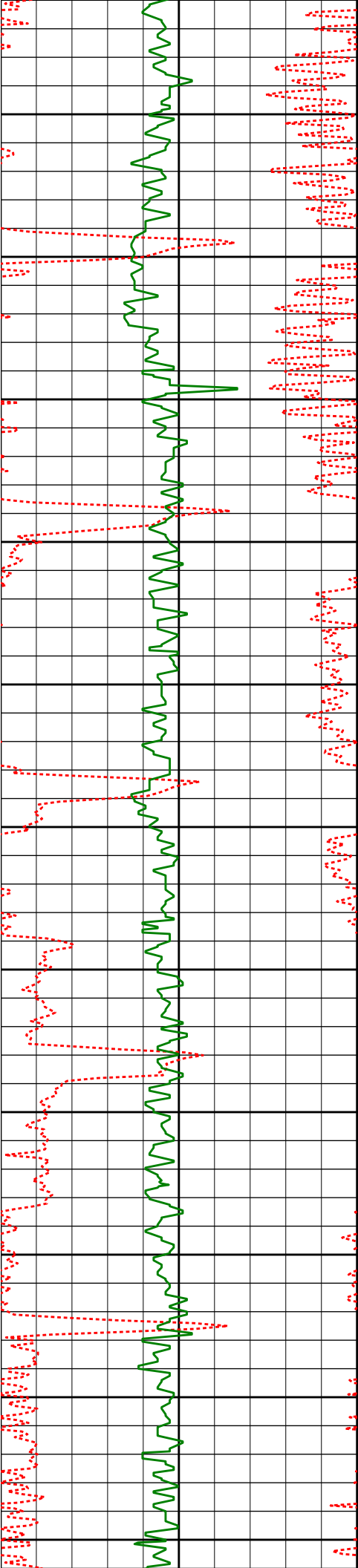
311.96°

3714.03'

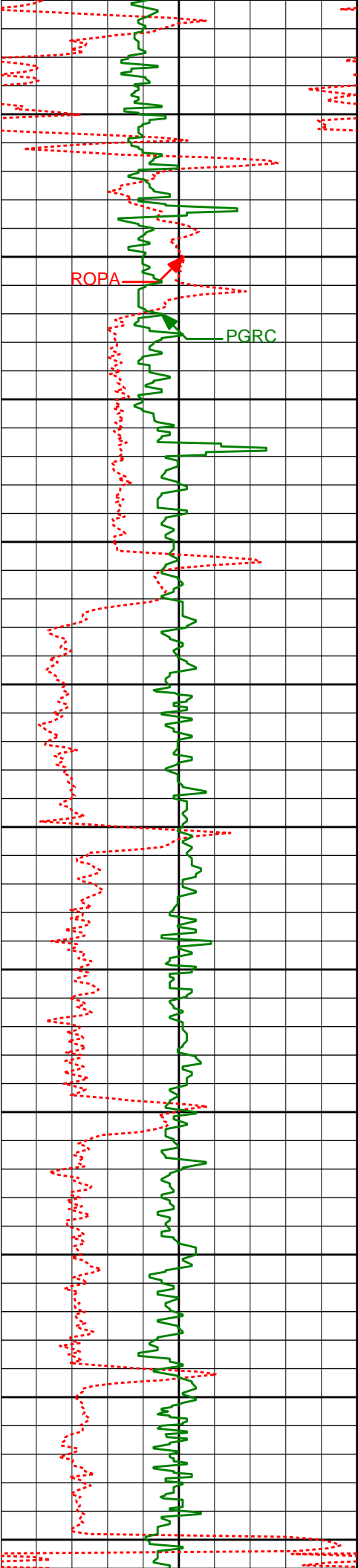
131.21'



3819'	8.06°	317.82°	3807.01'	141.28'
3850'				
3900'				
3914'	5.41°	327.56°	3901.35'	148.40'
3950'				
4000'				
4007'	1.42°	332.12°	3994.17'	151.42'
4050'				
4100'				
4102'	0.70°	122.65°	4089.16'	151.50'
4150'				
4200'				
4197'	0.75°	123.13°	4184.15'	150.47'
4250'				
4292'	0.68°	108.86°	4279.14'	149.41'
4300'				
4350'				



4387'	0.50°	71.13°	4374.14'	148.48'
4400'				
4450'				
4482'	0.70°	28.84°	4469.13'	147.82'
4500'				
4550'				
4577'	1.39°	36.21°	4564.12'	146.90'
4600'				
4650'				
4671'	1.47°	43.23°	4658.09'	145.46'
4700'				
4750'				
4766'	0.68°	126.59°	4753.07'	144.18'
4800'				
4850'				
4861'	1.06°	184.98°	4848.06'	143.77'
4900'				



4950'

4955'

0.98°

186.38°

4942.05'

143.89'

5000'

5050'

5050'

0.78°

165.78°

5037.04'

143.78'

5100'

5150'

5200'

5240'

0.74°

148.19°

5227.02'

142.76'

5250'

5300'

5335'

0.83°

134.67°

5322.01'

141.92'

5350'

5400'

5430'

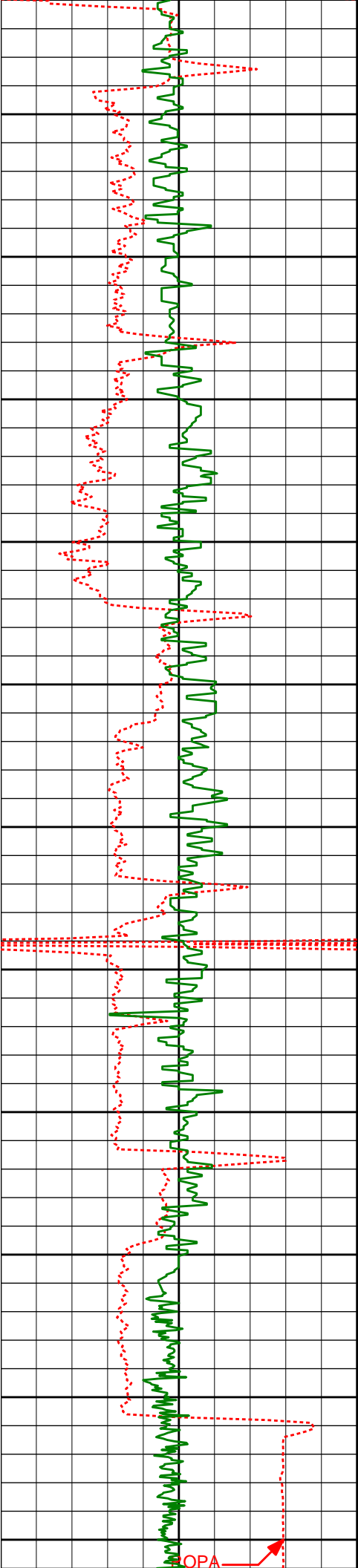
0.33°

146.85°

5417.01'

141.26'

5450'



5500'

5525'

0.59°

140.08°

5512.00'

140.78'

5550'

5600'

5619'

0.48°

128.94°

5606.00'

140.14'

5650'

5700'

5713'

0.54°

134.00°

5700.00'

139.50'

5750'

5800'

5808'

0.54°

139.01°

5794.99'

138.87'

5850'

5900'

5903'

0.62°

127.08°

5889.99'

138.15'

5950'

Run200

6000'

5997'

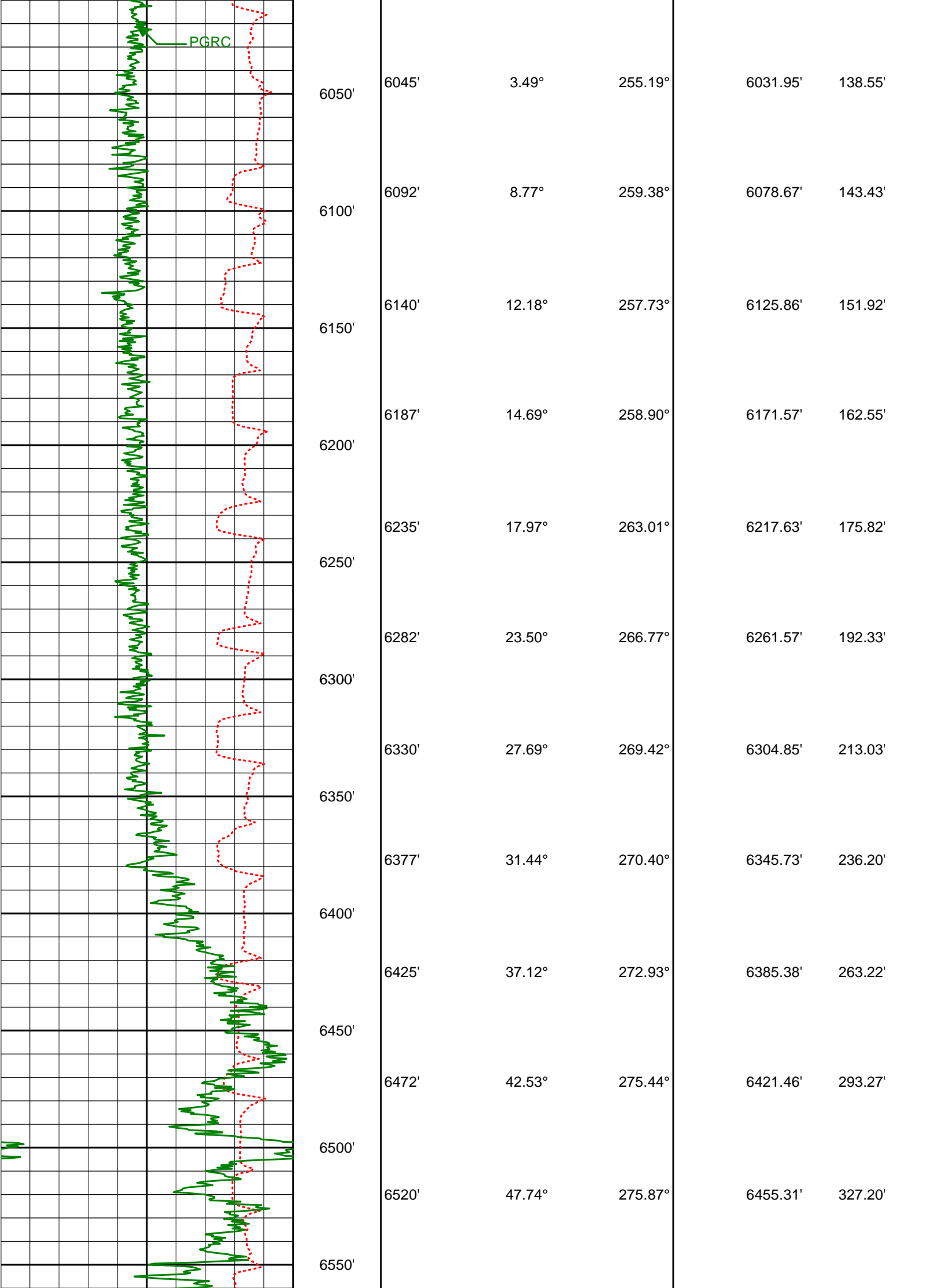
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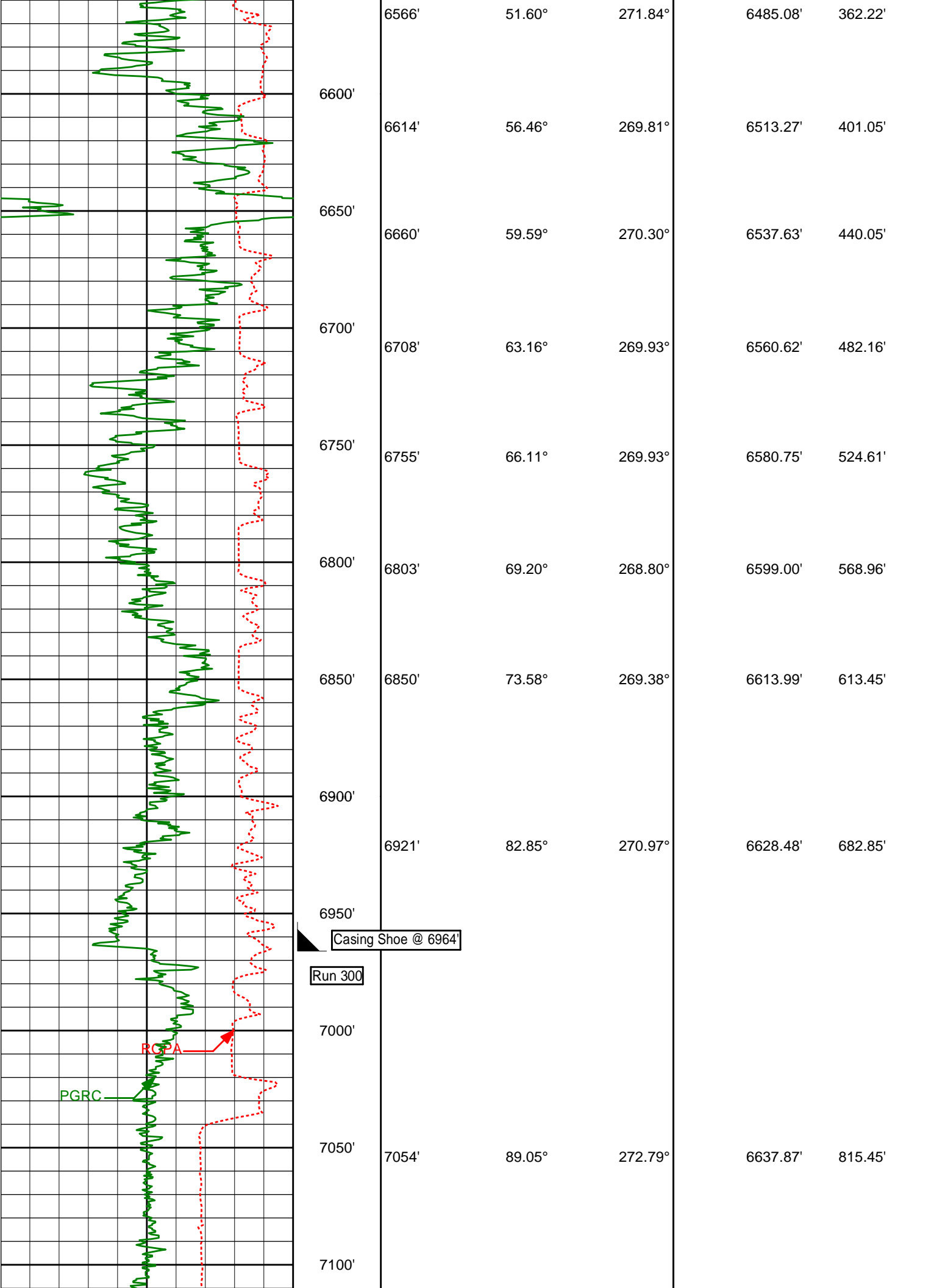
133.13°

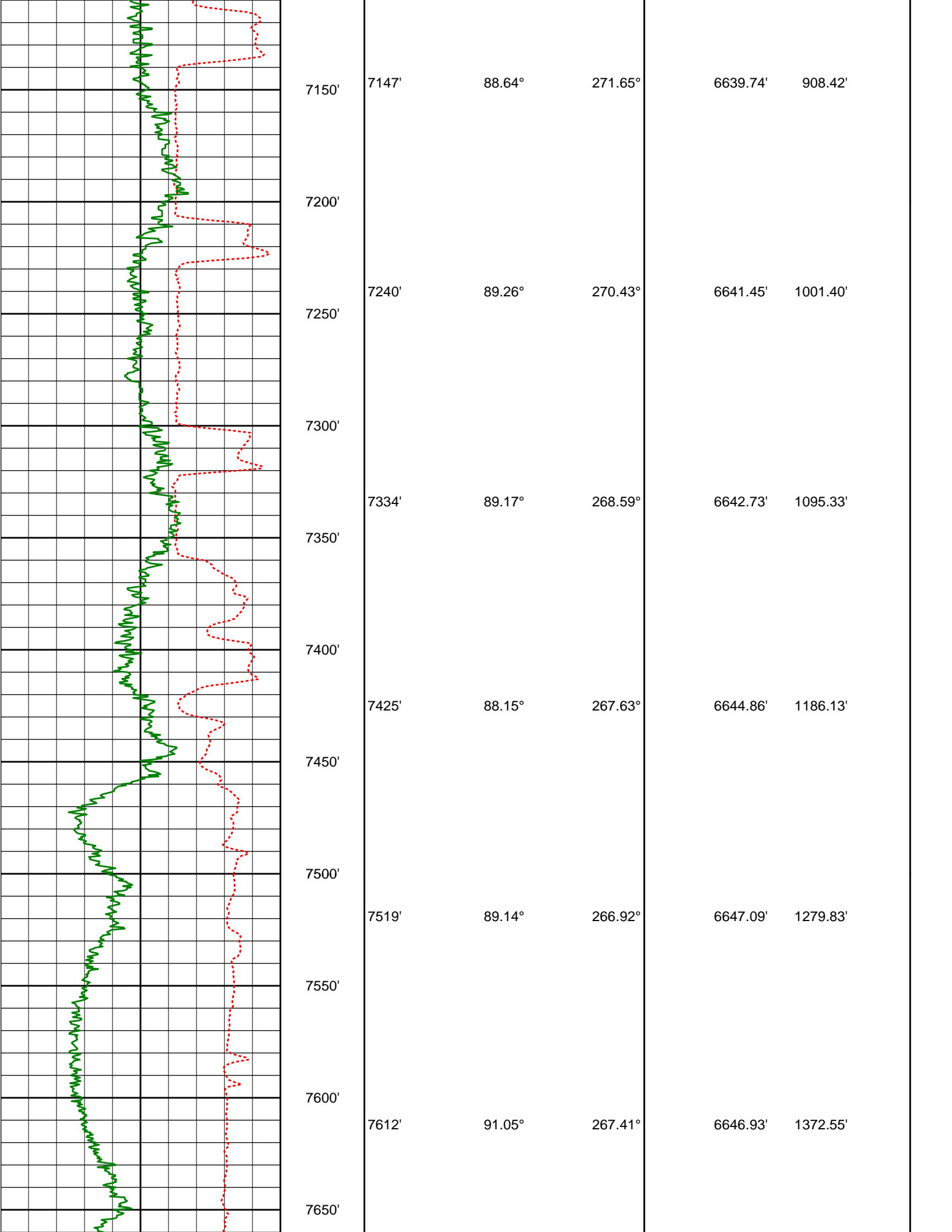
5983.98'

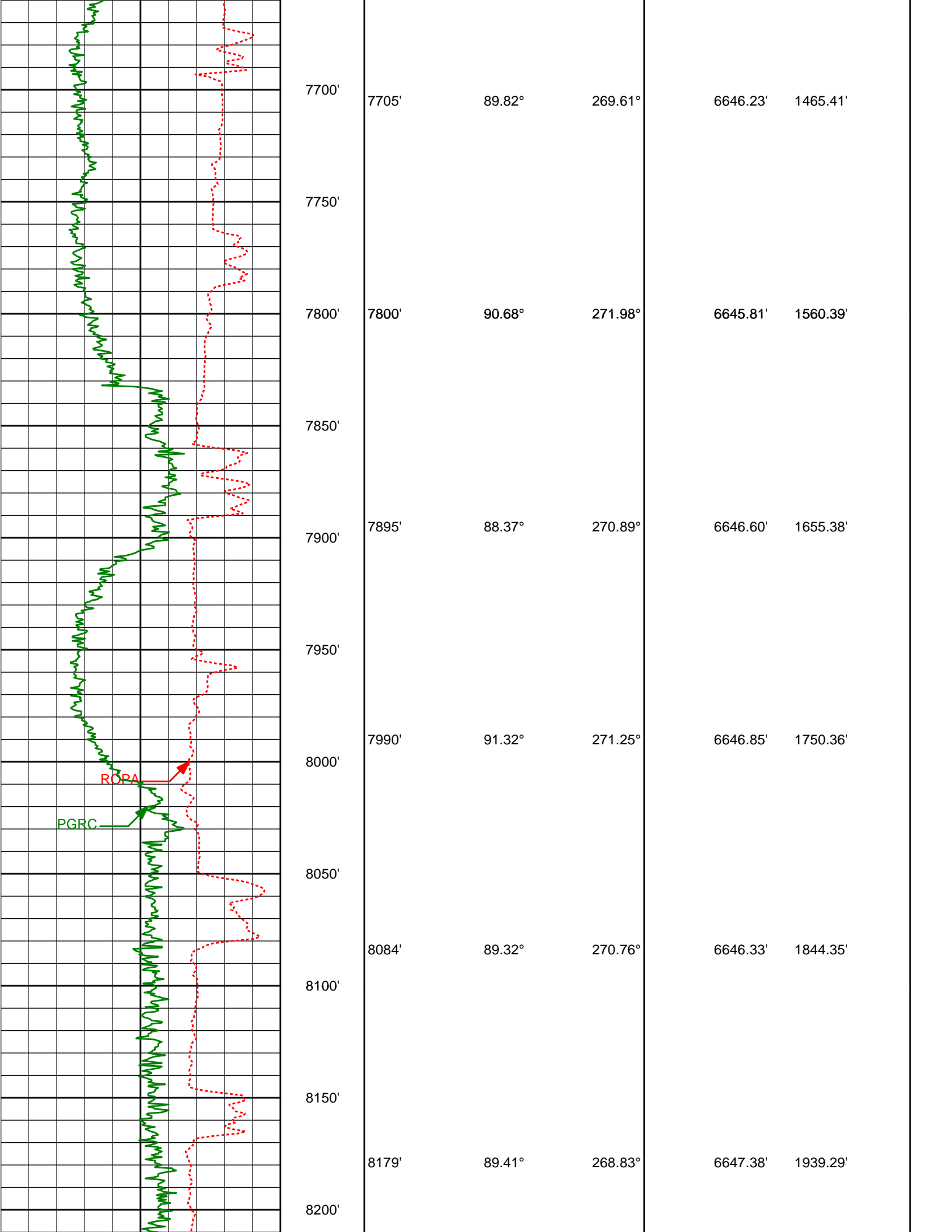
137.35'

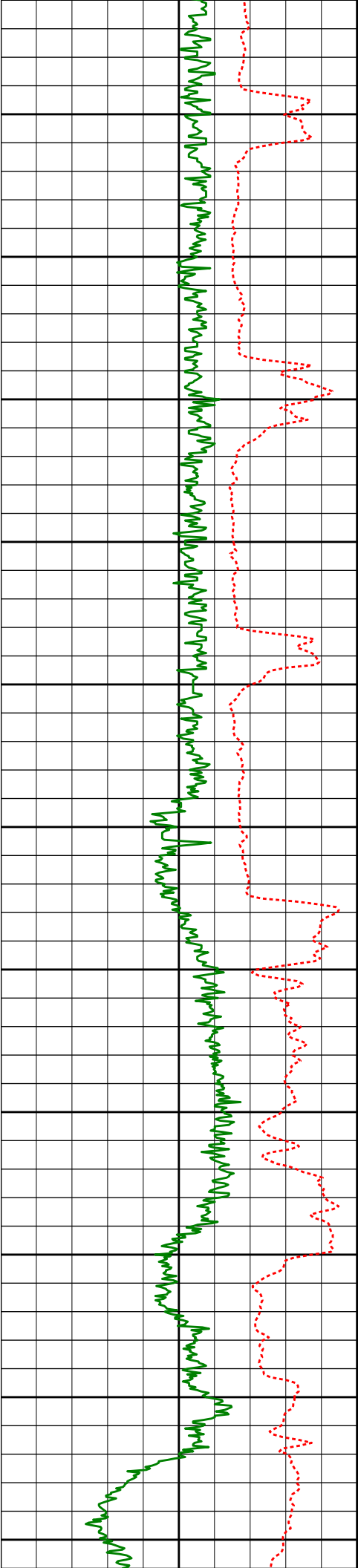
OPA











8250'

8274'

89.57°

269.75°

6648.23'

2034.21'

8300'

8350'

8369'

89.17°

268.26°

6649.27'

2129.10'

8400'

8450'

8464'

90.40°

267.80°

6649.63'

2223.92'

8500'

8550'

8558'

90.62°

268.32°

6648.79'

2317.73'

8600'

8650'

8653'

87.23°

265.72°

6650.58'

2412.39'

8700'

8750'

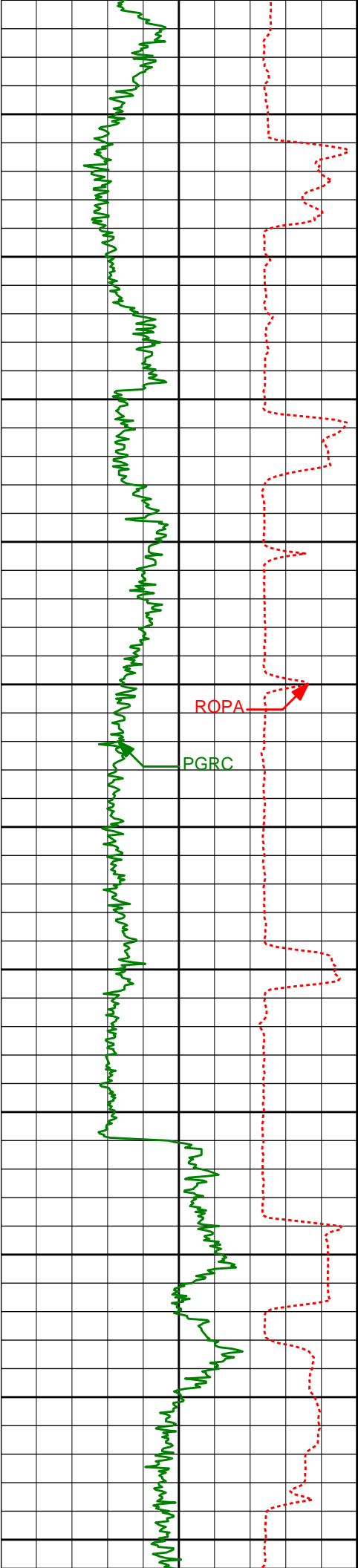
8748'

87.78°

265.44°

6654.71'

2506.78'



8800'

8850'

8900'

8950'

9000'

9050'

9100'

9150'

9200'

9250'

9300'

8843'

90.25°

268.97°

6656.34'

2601.46'

8938'

89.07°

268.58°

6656.91'

2696.34'

9032'

90.74°

269.59°

6657.06'

2790.25'

9127'

91.29°

269.98°

6655.38'

2885.19'

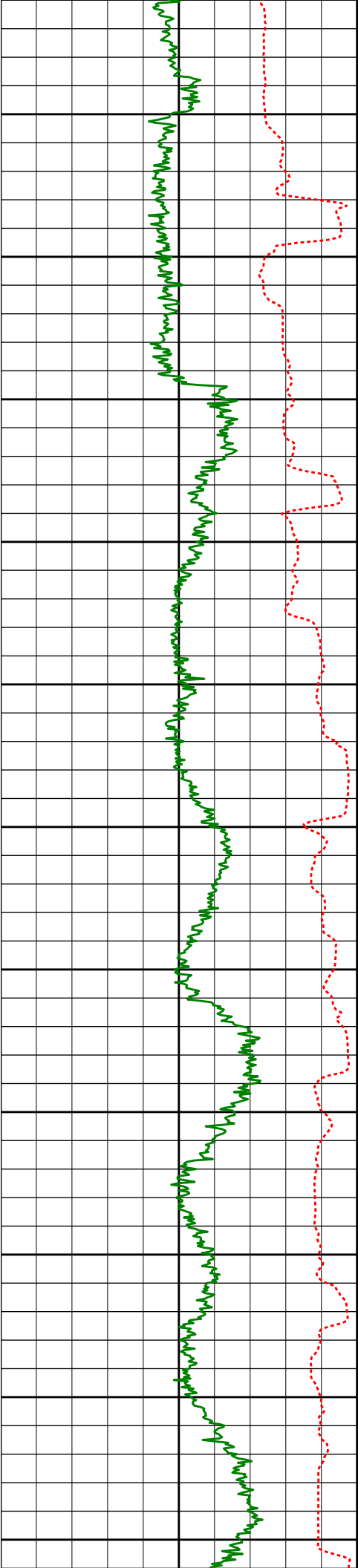
9222'

88.92°

269.19°

6655.21'

2980.12'



9350'

9400'

9450'

9500'

9550'

9600'

9650'

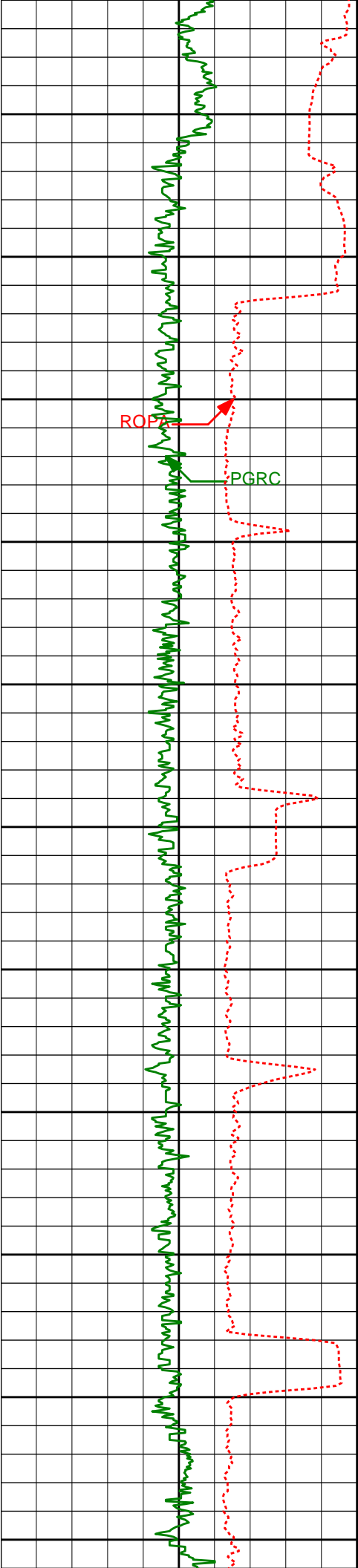
9700'

9750'

9800'

9850'

9317'	89.54°	267.84°	6656.48'	3074.97'
9411'	90.68°	268.61°	6656.30'	3168.80'
9506'	91.36°	266.53°	6654.61'	3263.55'
9601'	91.17°	268.39°	6652.52'	3358.27'
9696'	88.92°	269.65°	6652.44'	3453.17'
9791'	90.00°	269.75°	6653.34'	3548.11'



9900'

9950'

10000'

10050'

10100'

10150'

10200'

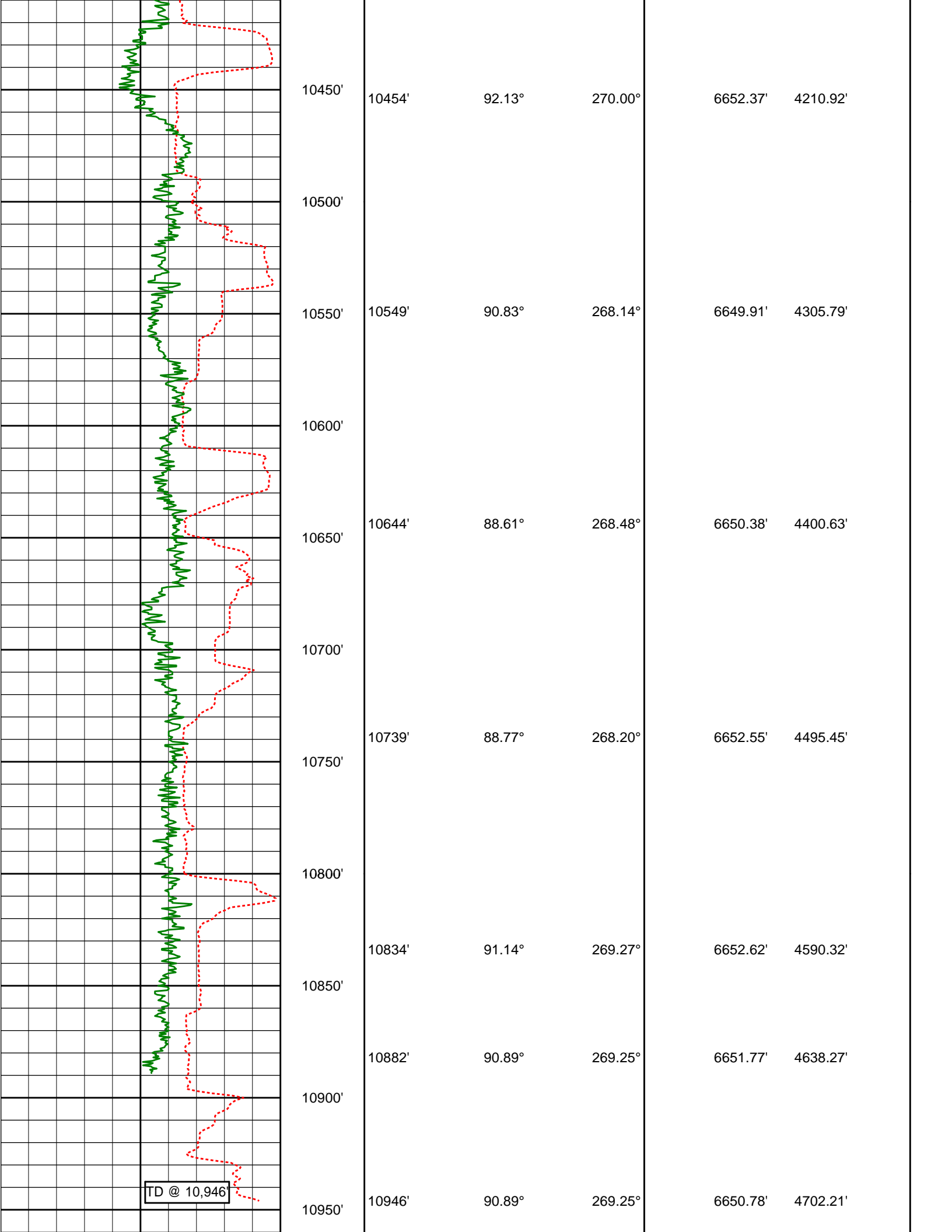
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10300'

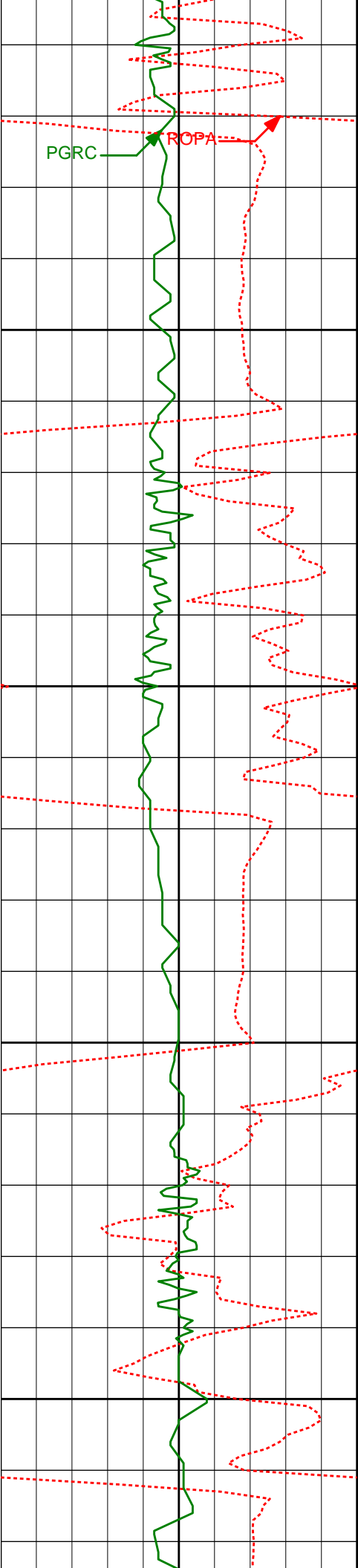
10350'

10400'

9886'	87.81°	272.11°	6655.15'	3643.08'
9980'	89.88°	271.25°	6657.05'	3737.05'
10075'	90.31°	271.22°	6656.89'	3832.05'
10170'	89.81°	271.11°	6656.79'	3927.04'
10265'	89.75°	271.33°	6657.15'	4022.04'
10360'	91.97°	270.16°	6655.73'	4117.01'



[illegible]



3150'

3160'

6.30°

325.65°

3153.73'

79.70'

3200'

3250'

3254'

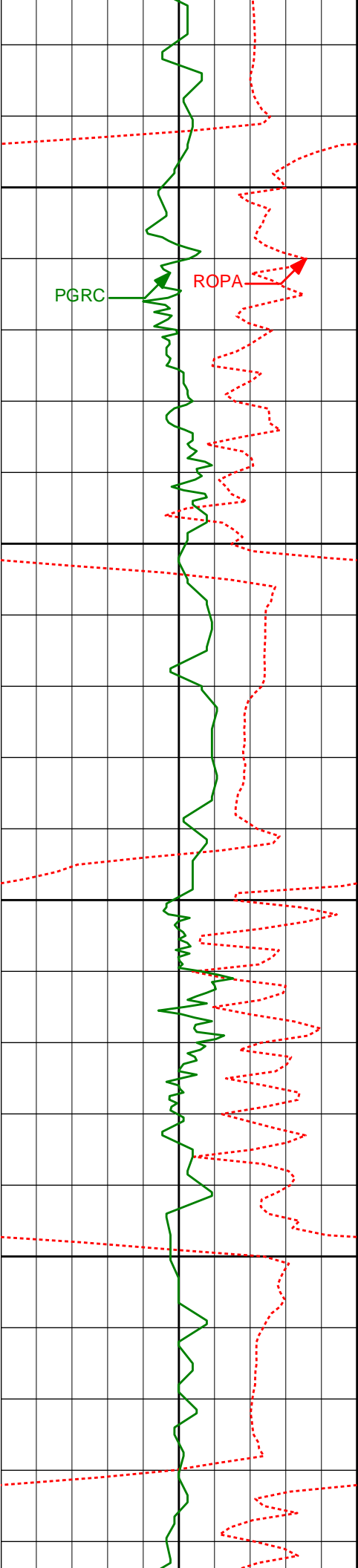
6.65°

325.98°

3247.13'

85.90'

3300'



3350'

3349'

6.40°

324.52°

3341.51'

92.29'

3400'

3442'

7.57°

309.34°

3433.83'

100.26'

3450'

3500'

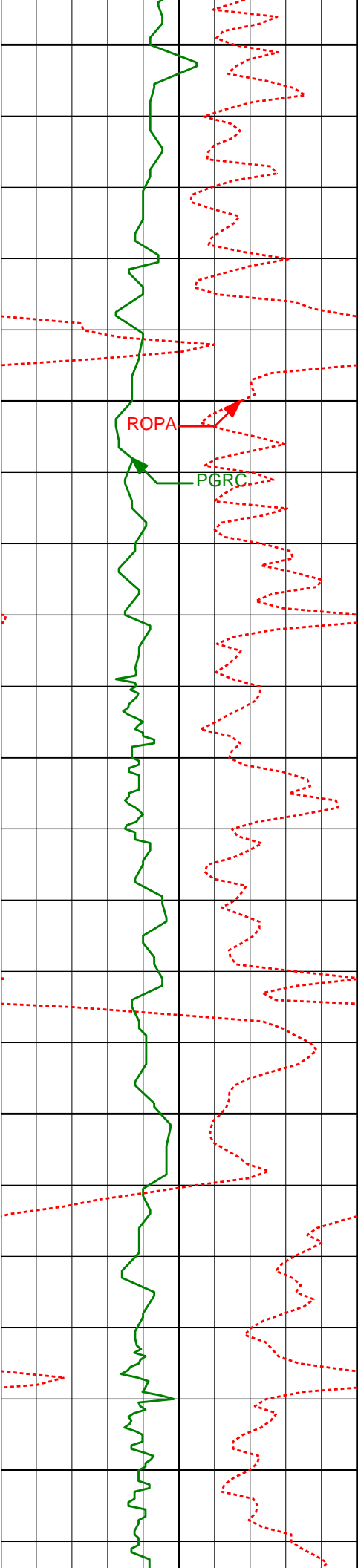
3536'

7.48°

311.99°

3527.02'

109.82'



3550'

3600'

3650'

3700'

3750'

ROPA

PGRC

3631'

8.46°

308.14°

3621.10'

120.14'

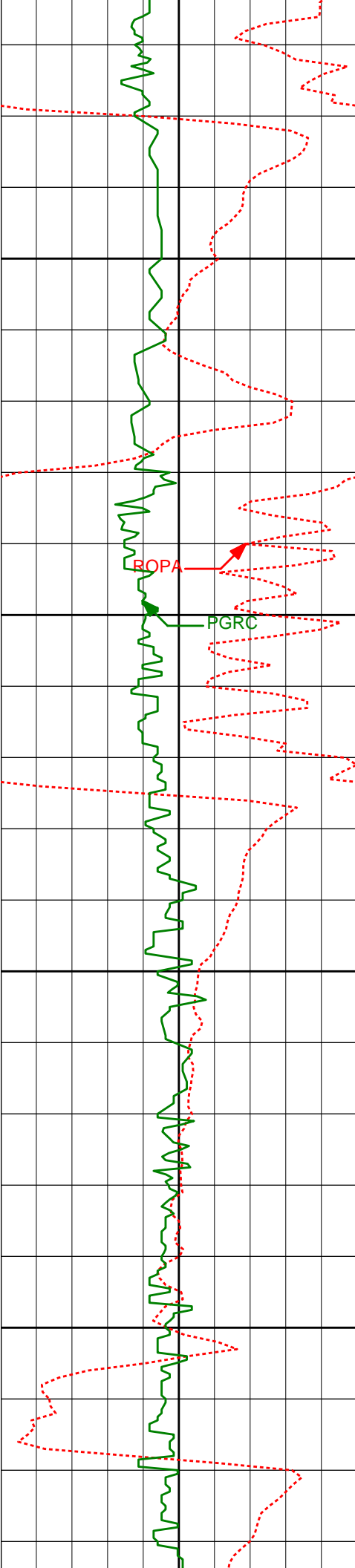
3725'

8.85°

311.96°

3714.03'

131.21'



3800'

3819'

8.06°

317.82°

3807.01'

141.28'

3850'

3900'

3914'

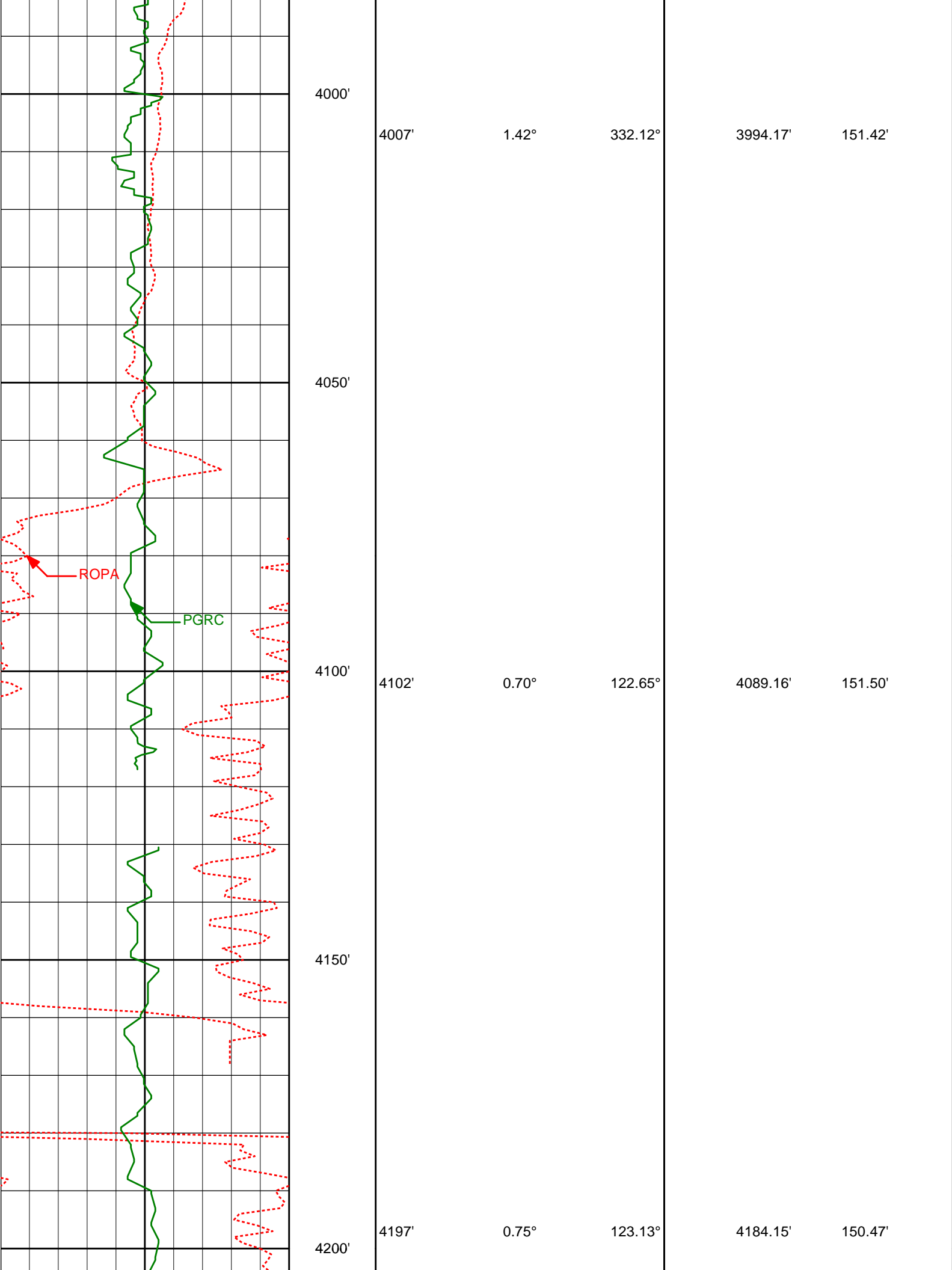
5.41°

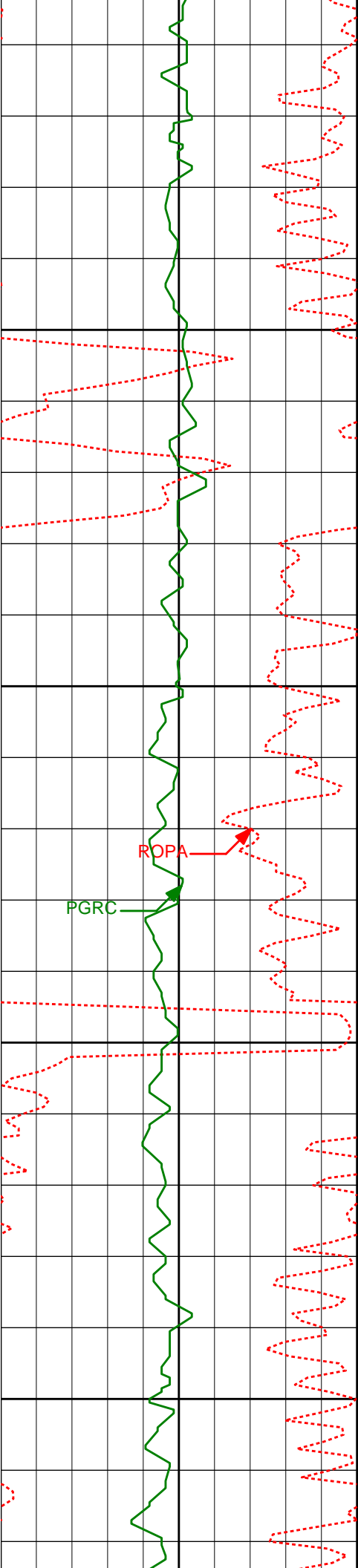
327.56°

3901.35'

148.40'

3950'





4250'

4292'

0.68°

108.86°

4279.14'

149.41'

4300'

ROPA

PGRC

4350'

4387'

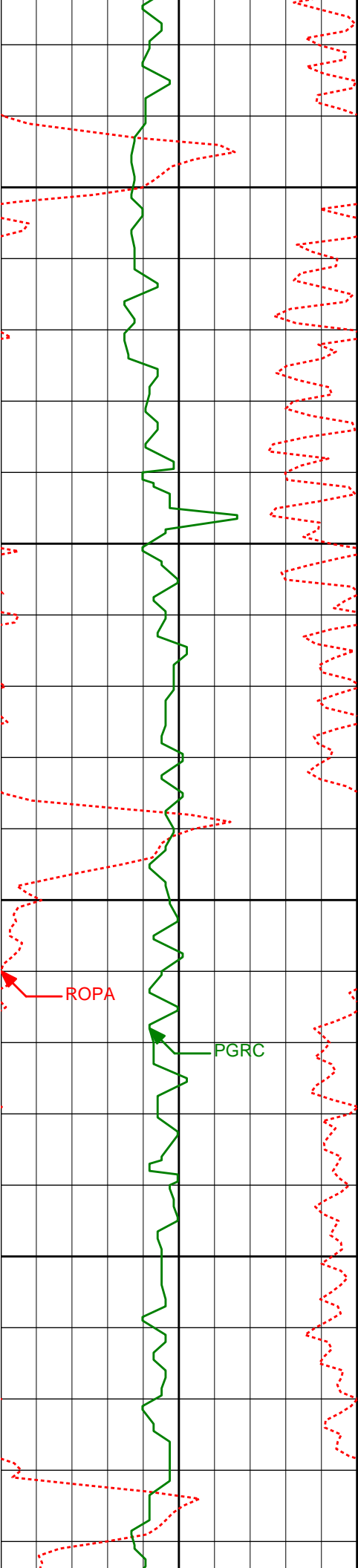
0.50°

71.13°

4374.14'

148.48'

4400'



4450'

4482'

0.70°

28.84°

4469.13'

147.82'

4500'

4550'

ROPA

PGRC

4577'

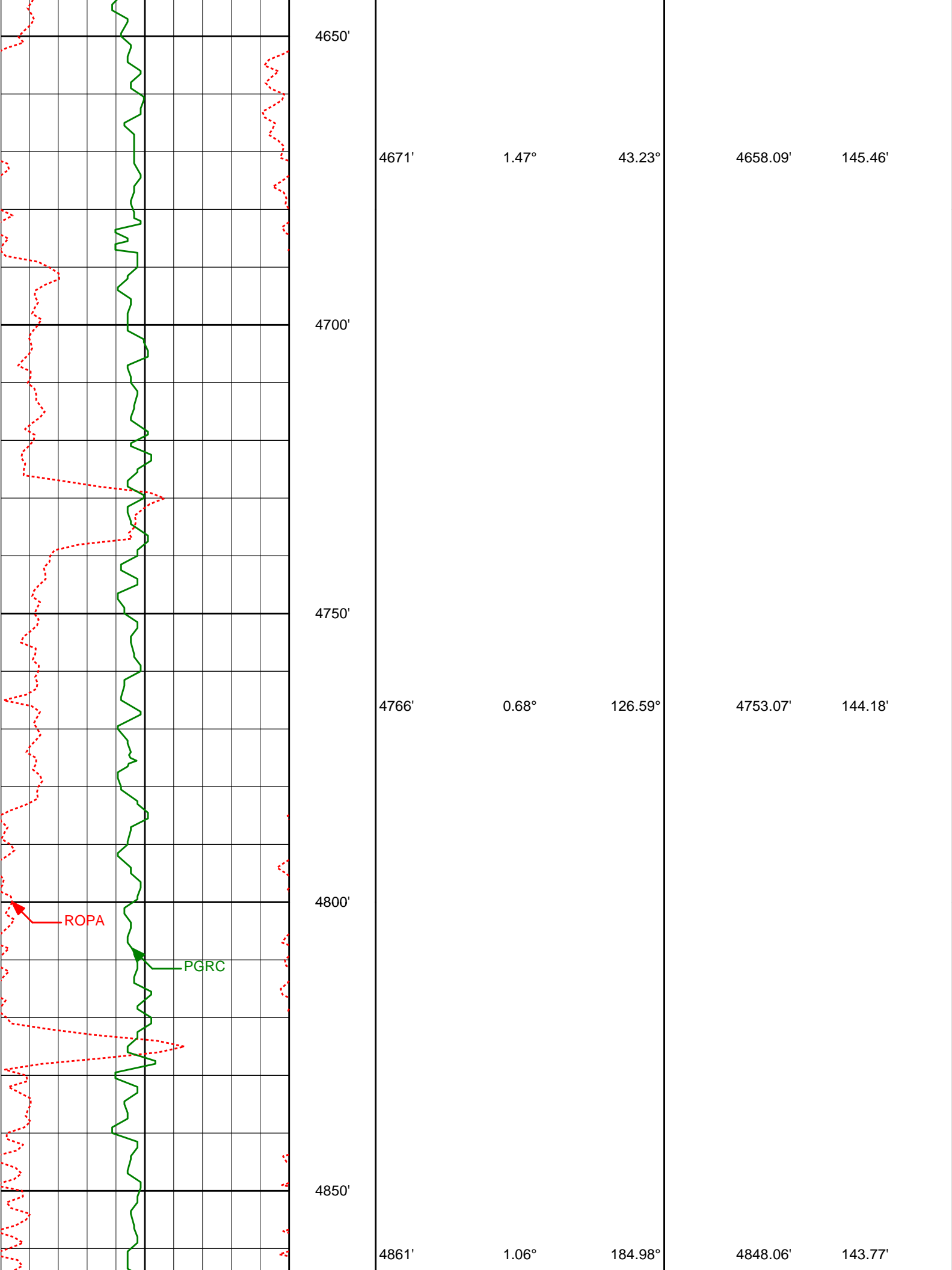
1.39°

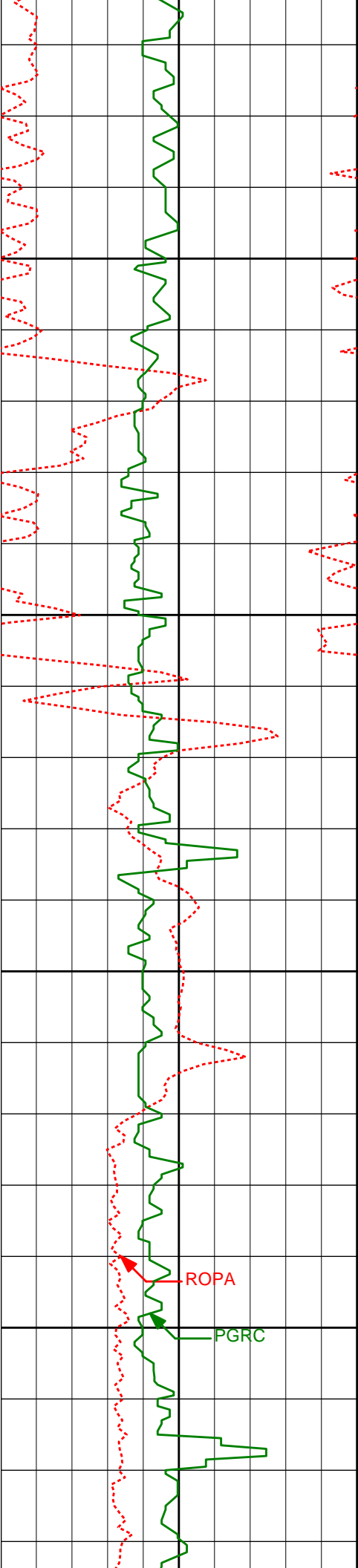
36.21°

4564.12'

146.90'

4600'





4900'

4950'

5000'

5050'

4955'

5050'

0.98°

0.78°

186.38°

165.78°

4942.05'

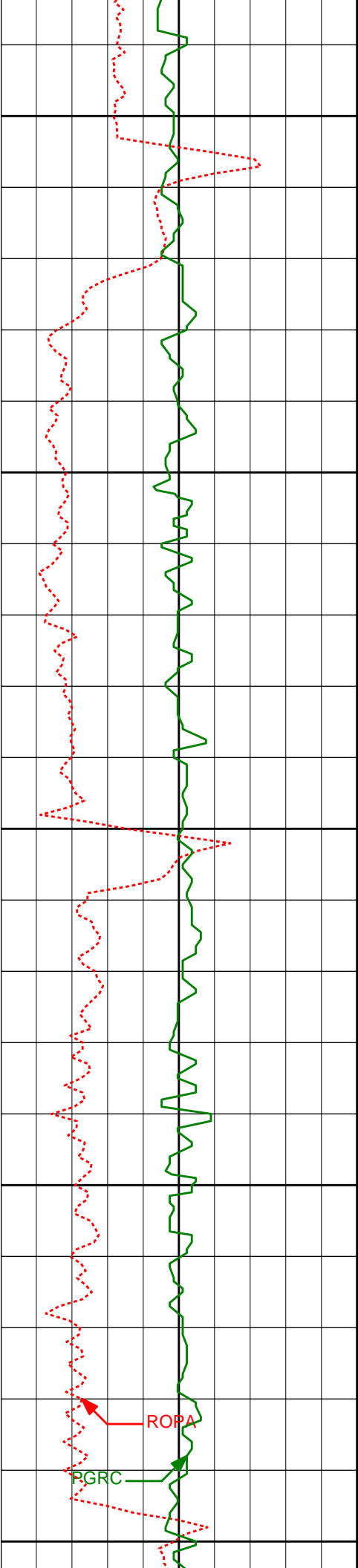
5037.04'

143.89'

143.78'

ROPA

PGRC



5100'

5150'

5200'

5250'

5300'

5240'

0.74°

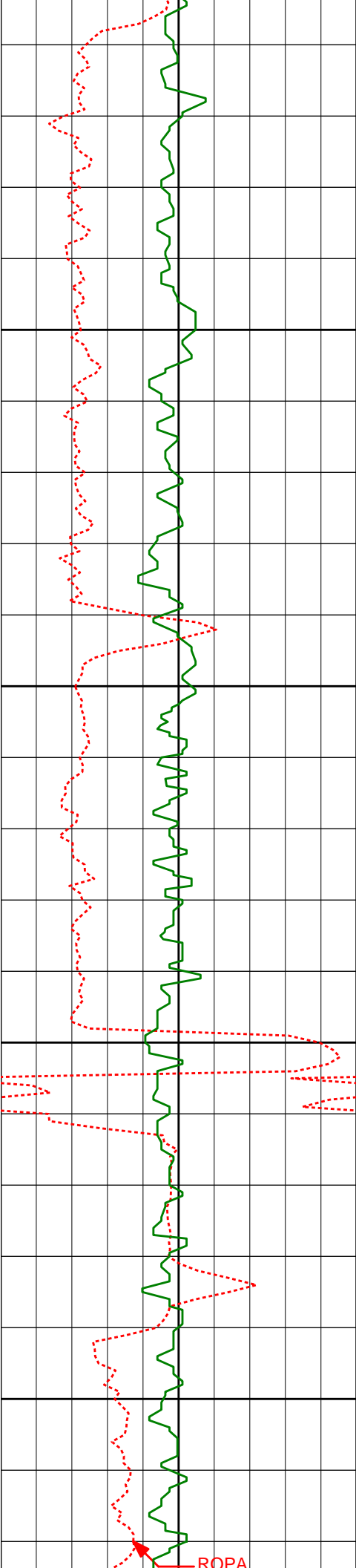
148.19°

5227.02'

142.76'

ROPA

RGRC



5335'	0.83°	134.67°	5322.01'	141.92'
-------	-------	---------	----------	---------

5350'

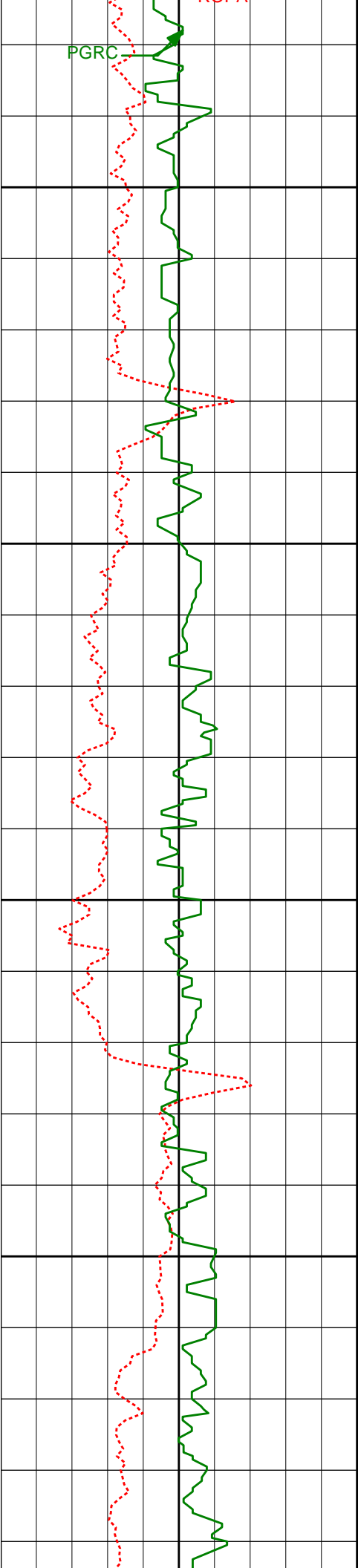
5400'

5430'	0.33°	146.85°	5417.01'	141.26'
-------	-------	---------	----------	---------

5450'

5500'

ROPA



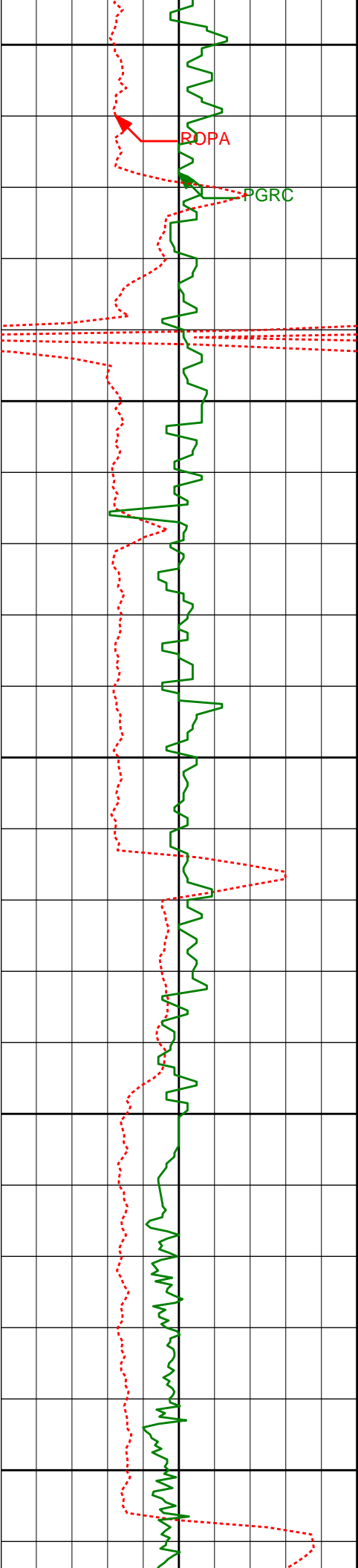
5550'

5600'

5650'

5700'

5525'	0.59°	140.08°	5512.00'	140.78'
5619'	0.48°	128.94°	5606.00'	140.14'
5713'	0.54°	134.00°	5700.00'	139.50'



5750'

ROPA

PGRC

5800'

5808'

0.54°

139.01°

5794.99'

138.87'

5850'

5900'

5903'

0.62°

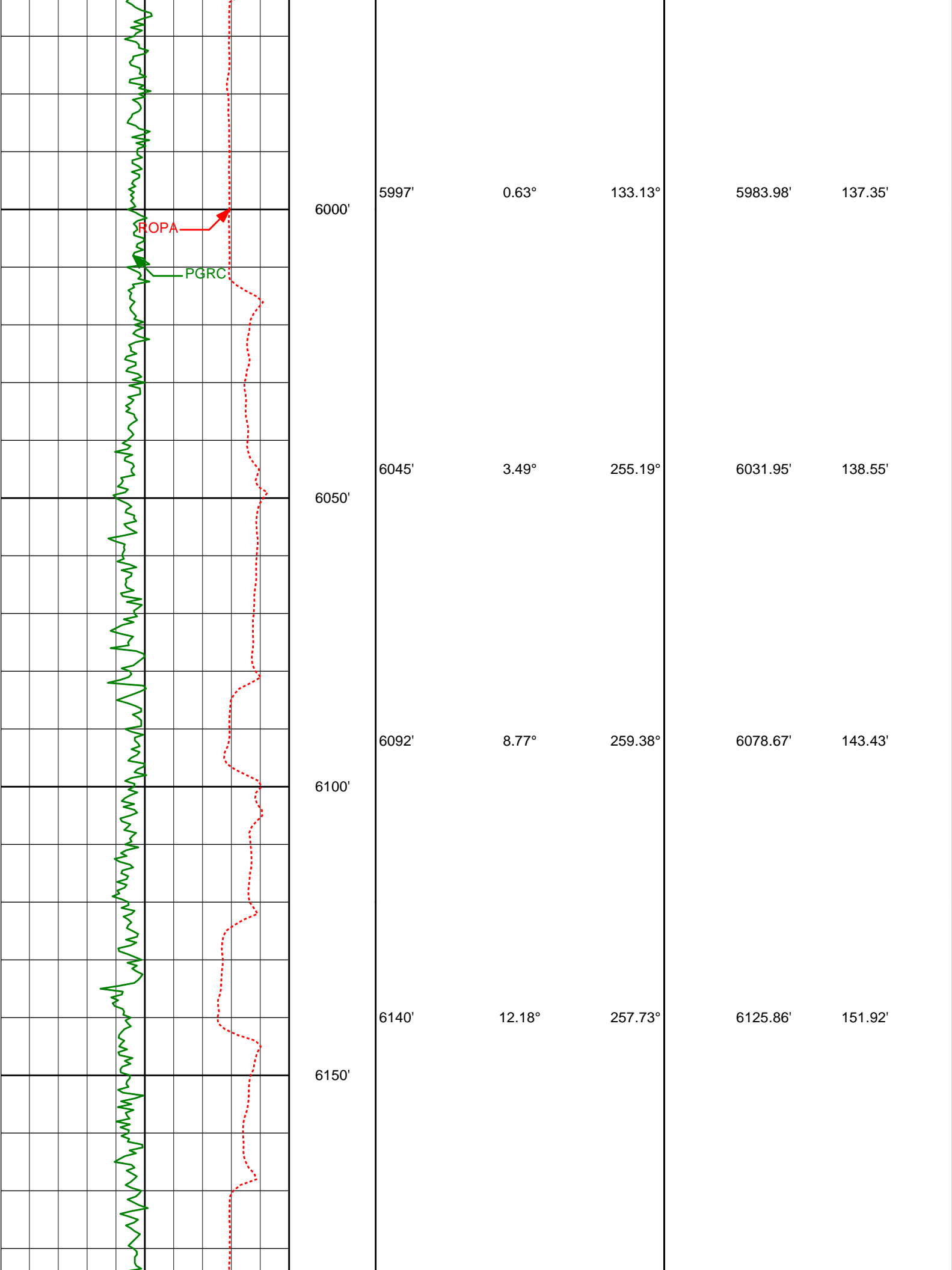
127.08°

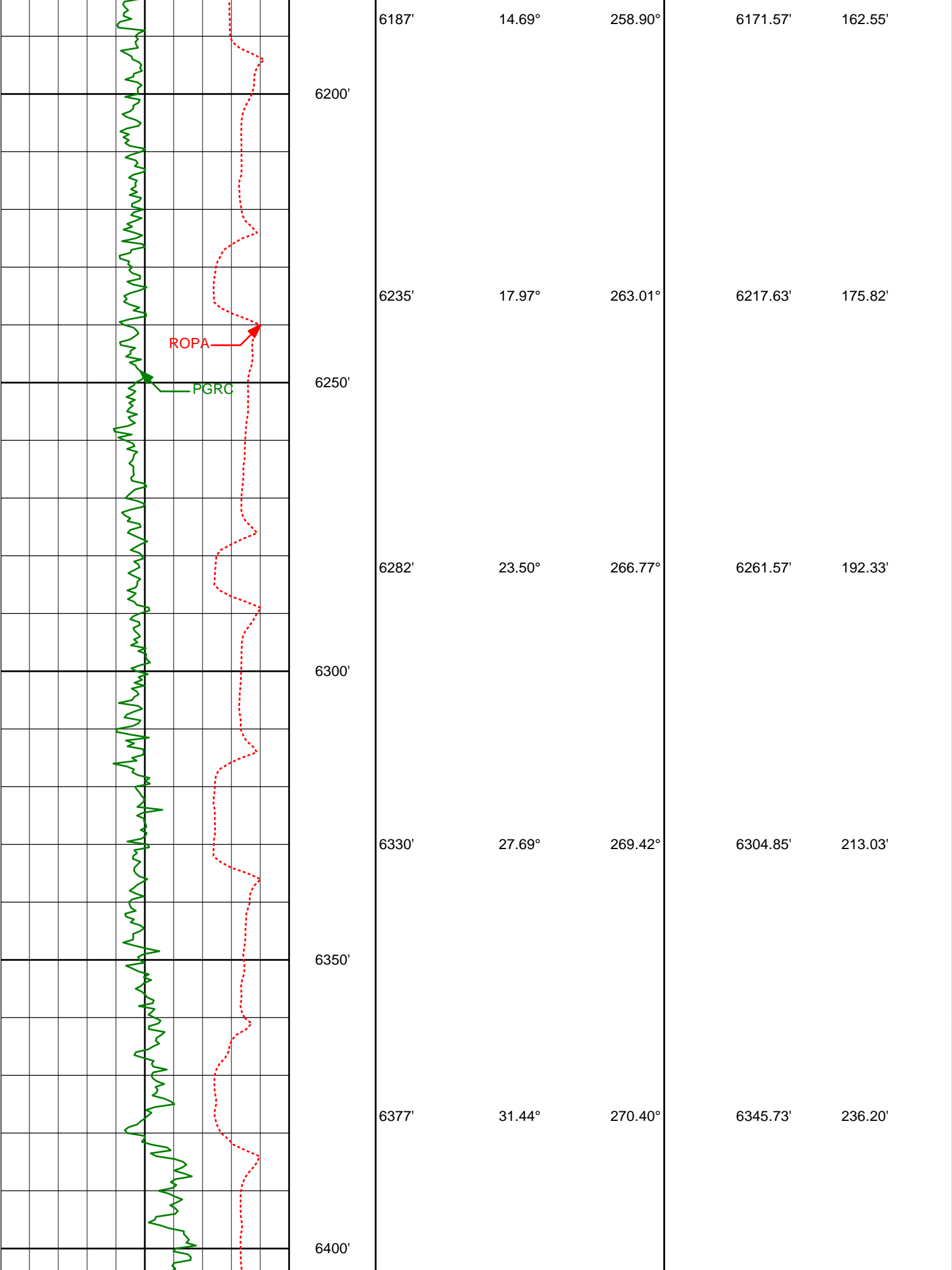
5889.99'

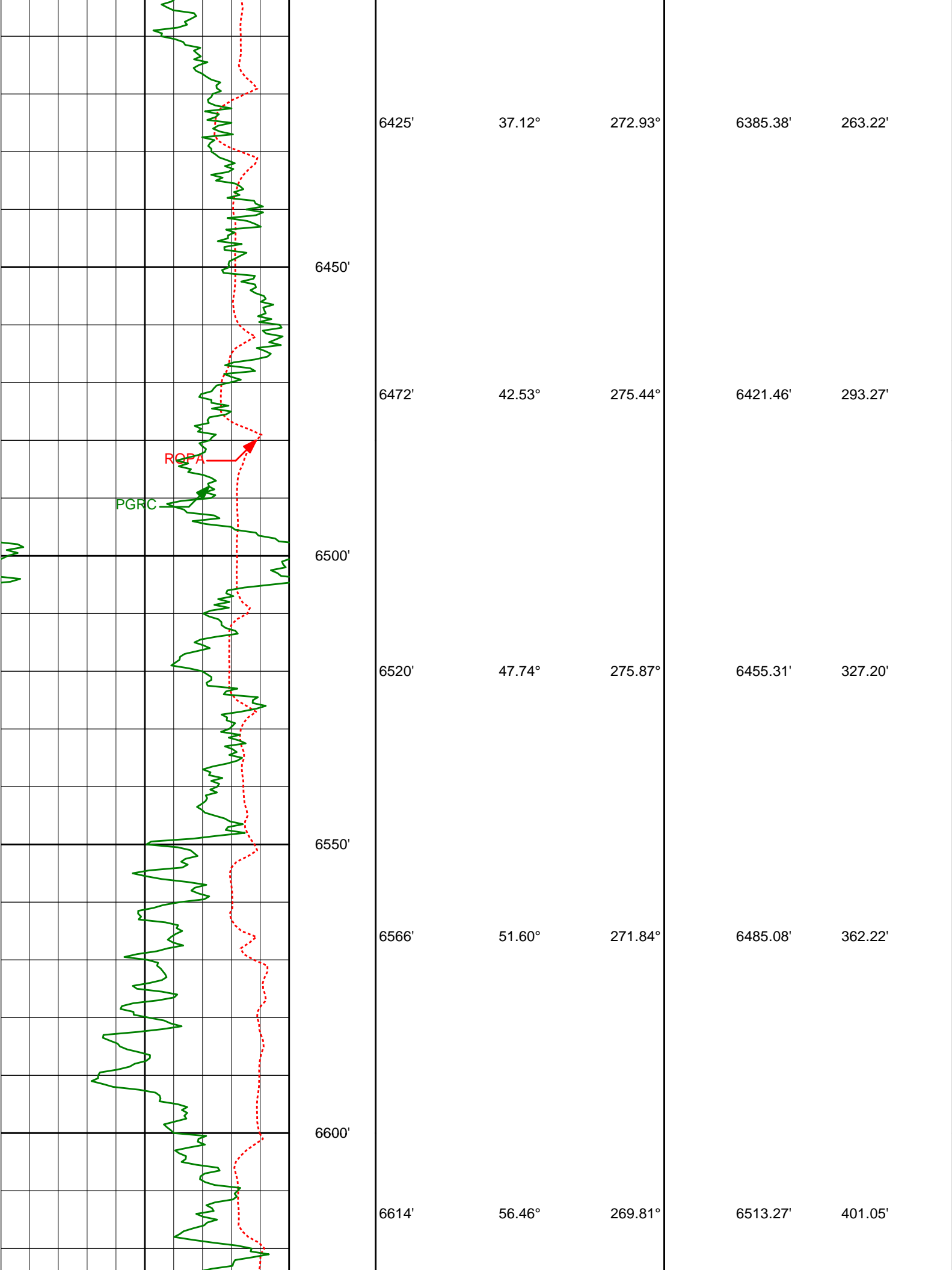
138.15'

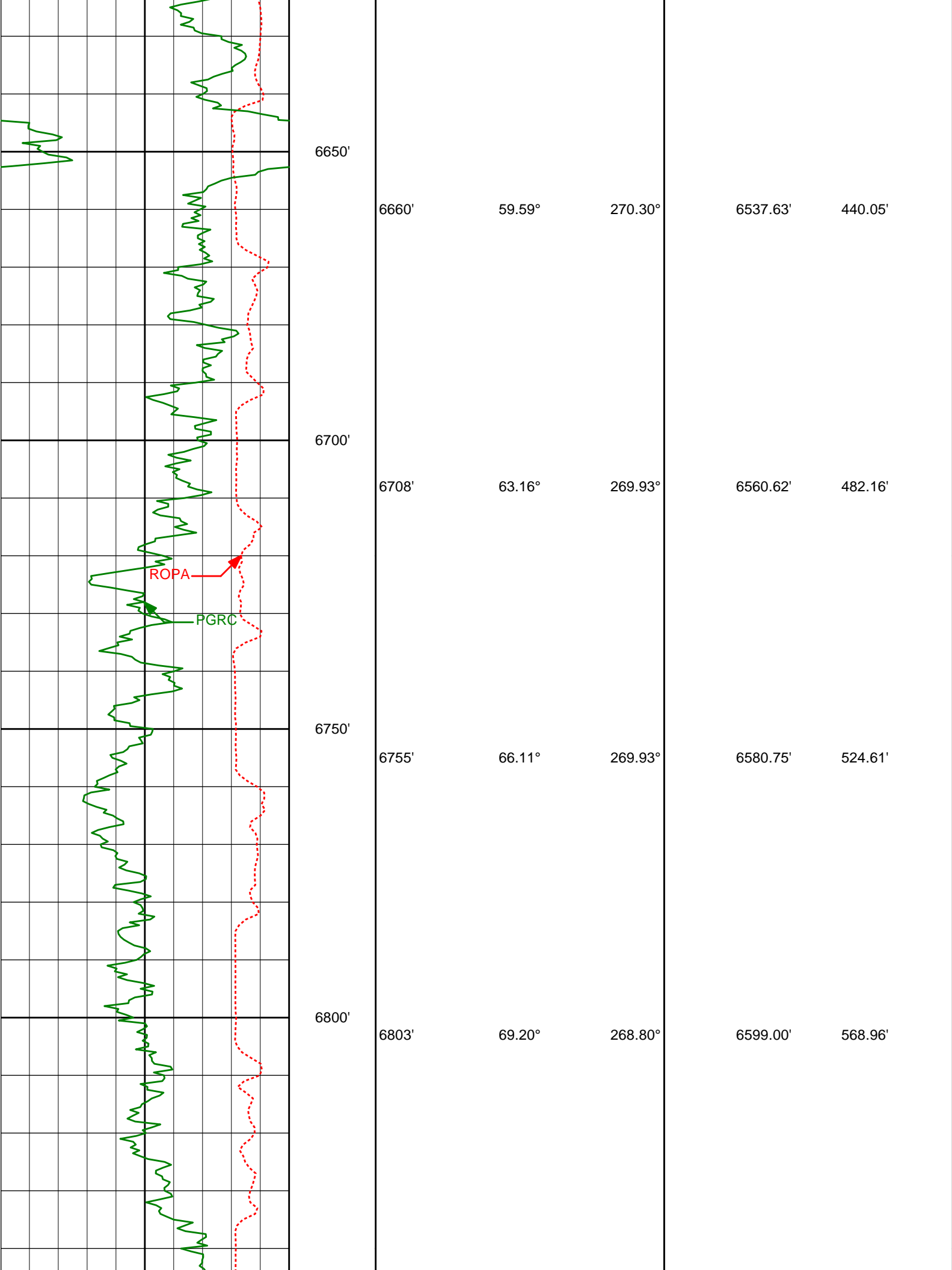
5950'

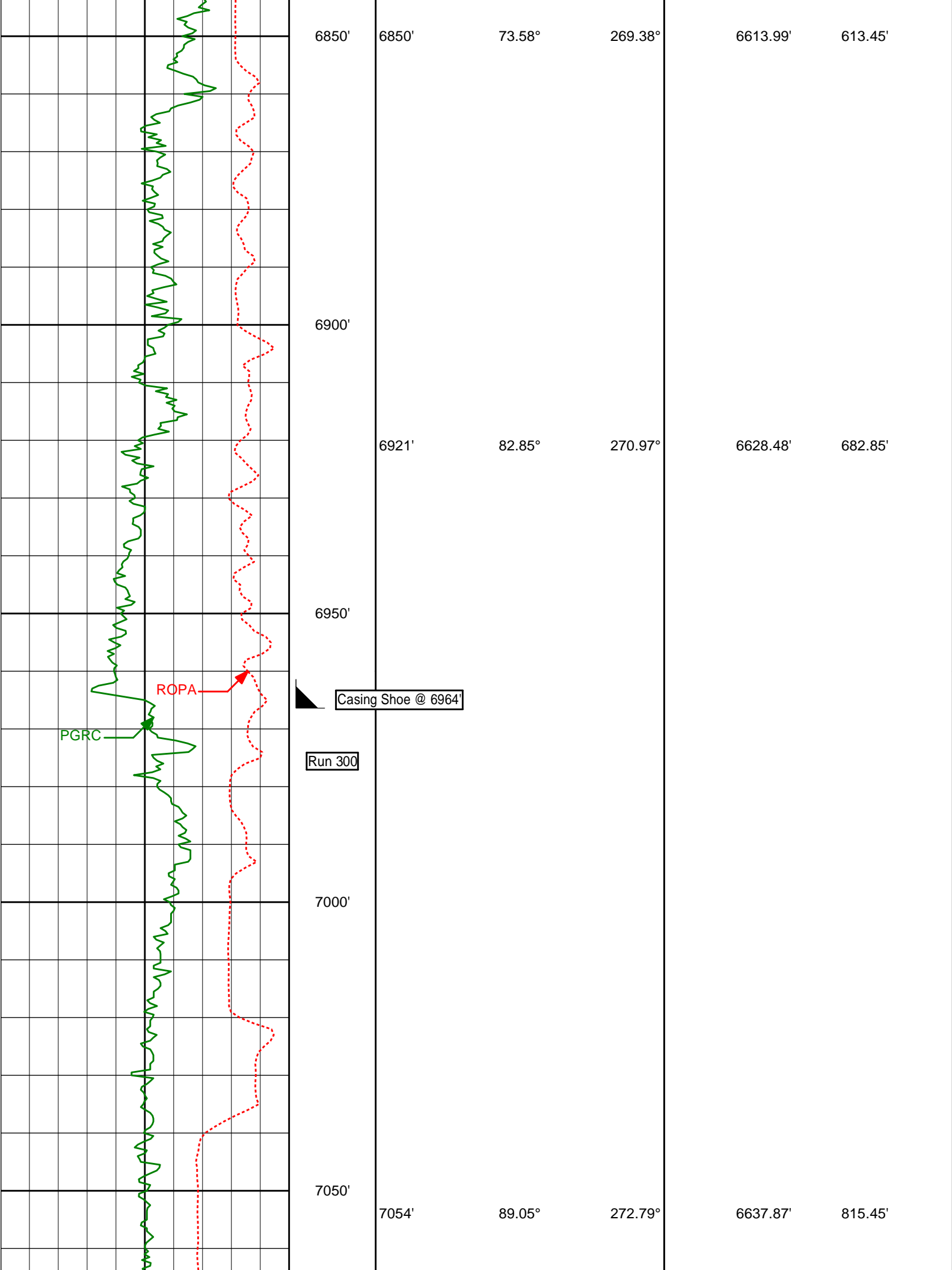
Run200

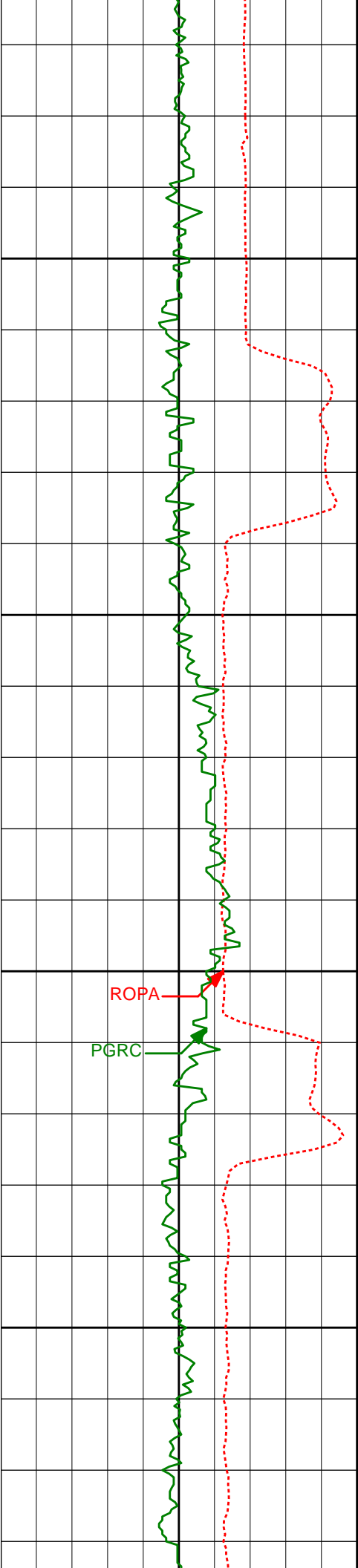












7100'

7150'

7200'

7250'

ROPA

PGRC

7147'

88.64°

271.65°

6639.74'

908.42'

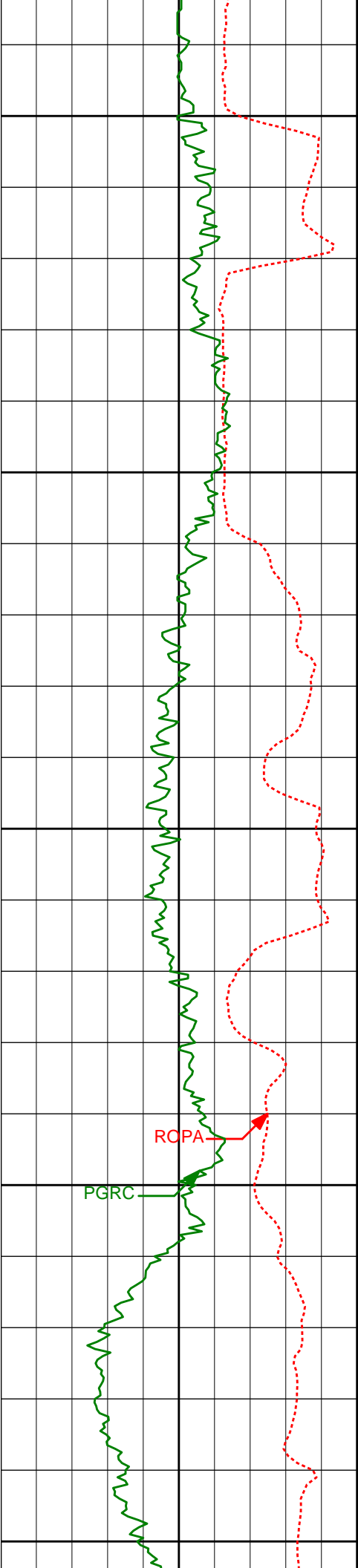
7240'

89.26°

270.43°

6641.45'

1001.40'



7300'

7334'

89.17°

268.59°

6642.73'

1095.33'

7350'

7400'

7425'

88.15°

267.63°

6644.86'

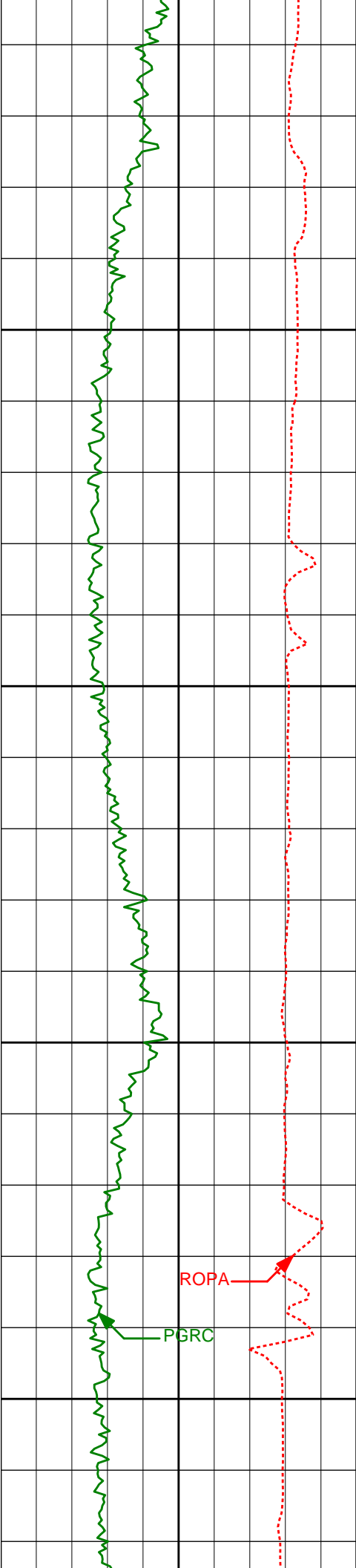
1186.13'

7450'

7500'

ROPA

PGRC



7550'

7600'

7650'

7700'

7519'

89.14°

266.92°

6647.09'

1279.83'

7612'

91.05°

267.41°

6646.93'

1372.55'

7705'

89.82°

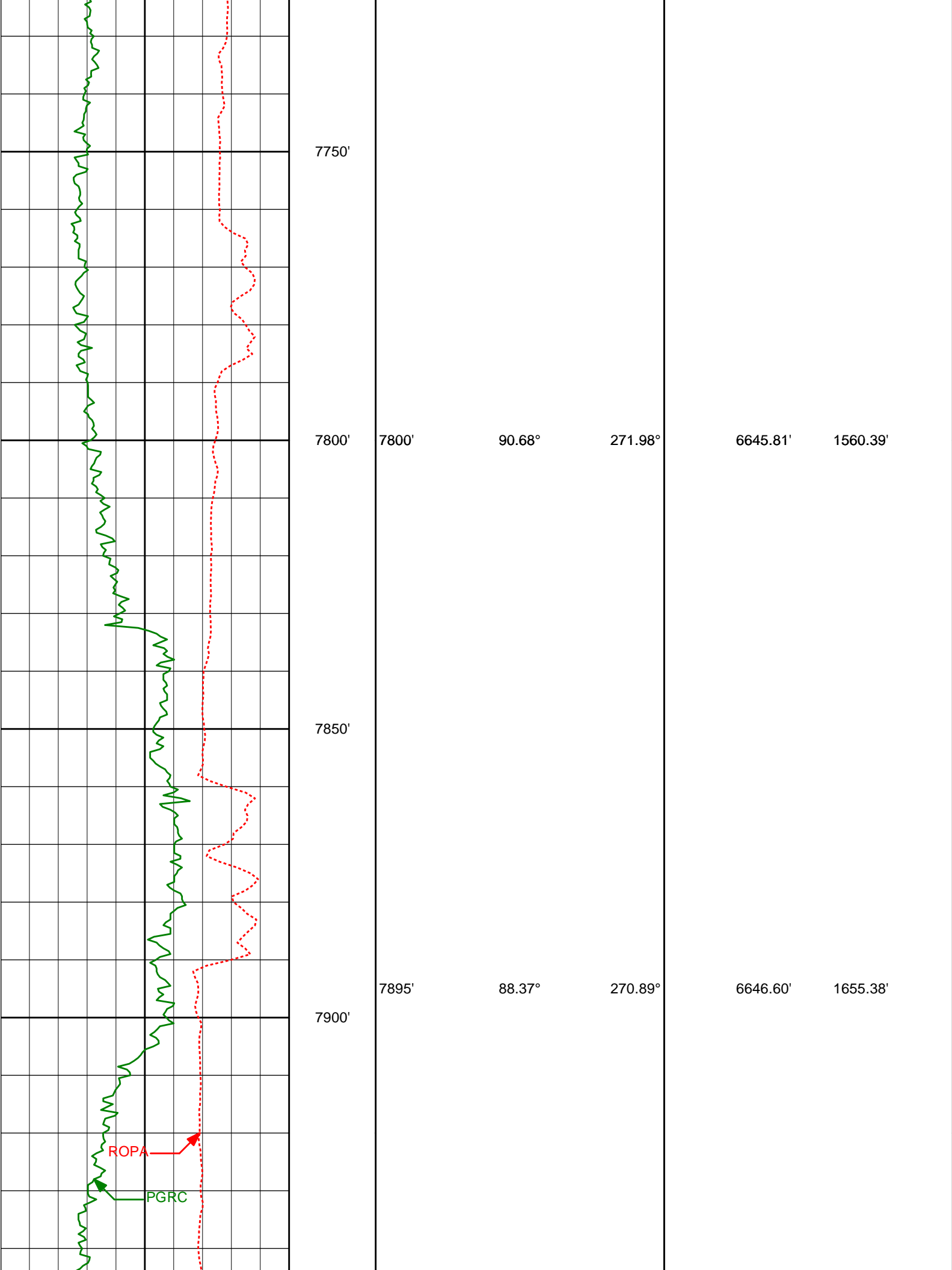
269.61°

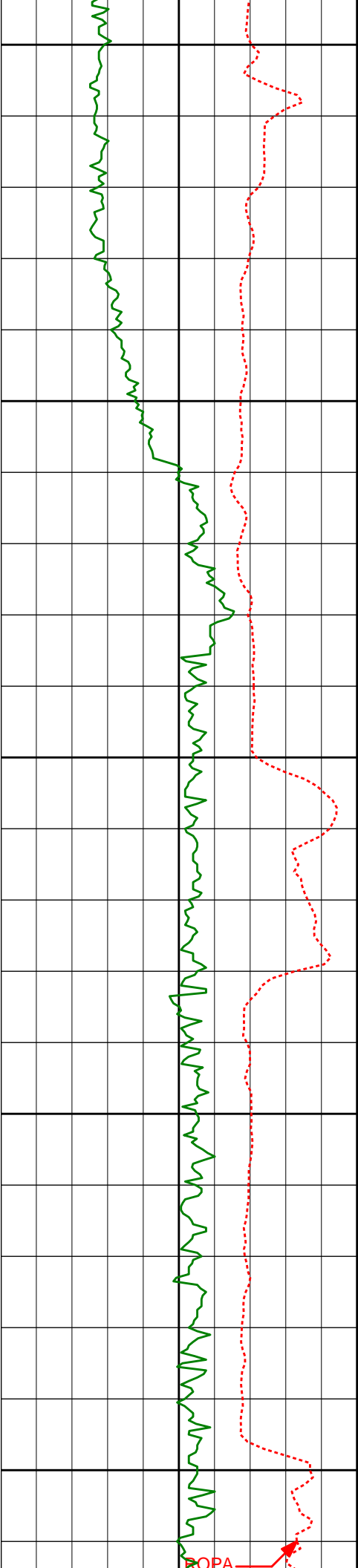
6646.23'

1465.41'

ROPA

PGRC





7950'

7990'

91.32°

271.25°

6646.85'

1750.36'

8000'

8050'

8084'

89.32°

270.76°

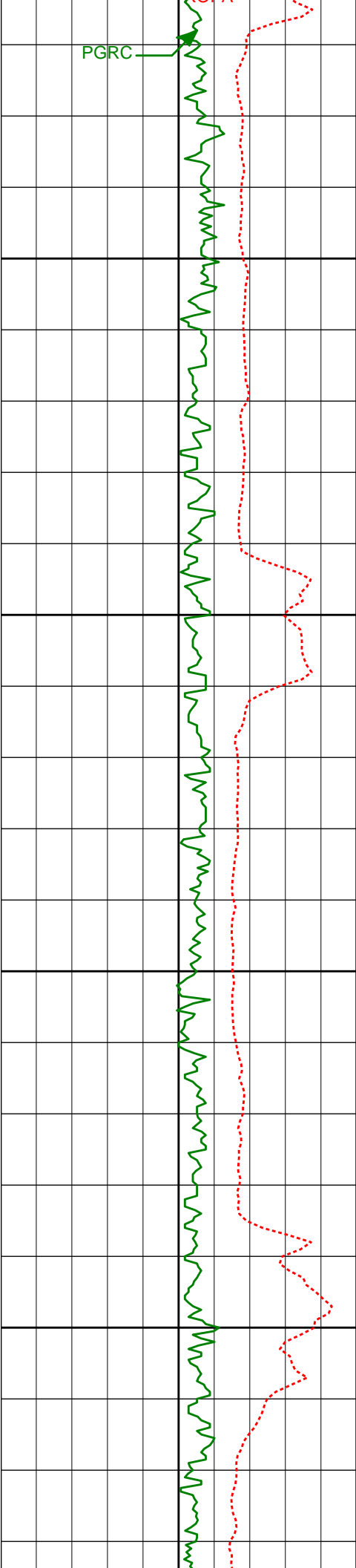
6646.33'

1844.35'

8100'

8150'

POPA



8179'

89.41°

268.83°

6647.38'

1939.29'

8274'

89.57°

269.75°

6648.23'

2034.21'

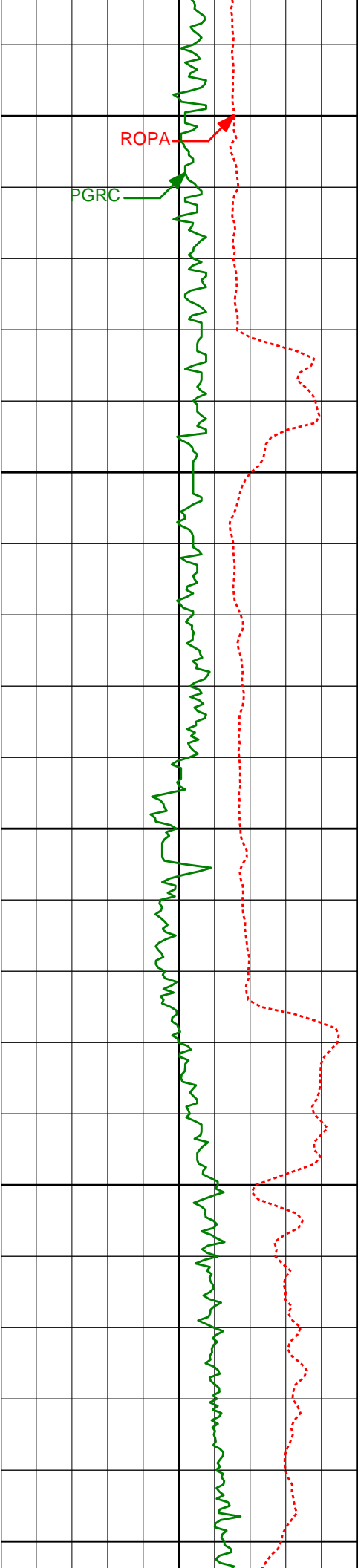
8369'

89.17°

268.26°

6649.27'

2129.10'



8400'

8450'

8500'

8550'

8600'

8464'

90.40°

267.80°

6649.63'

2223.92'

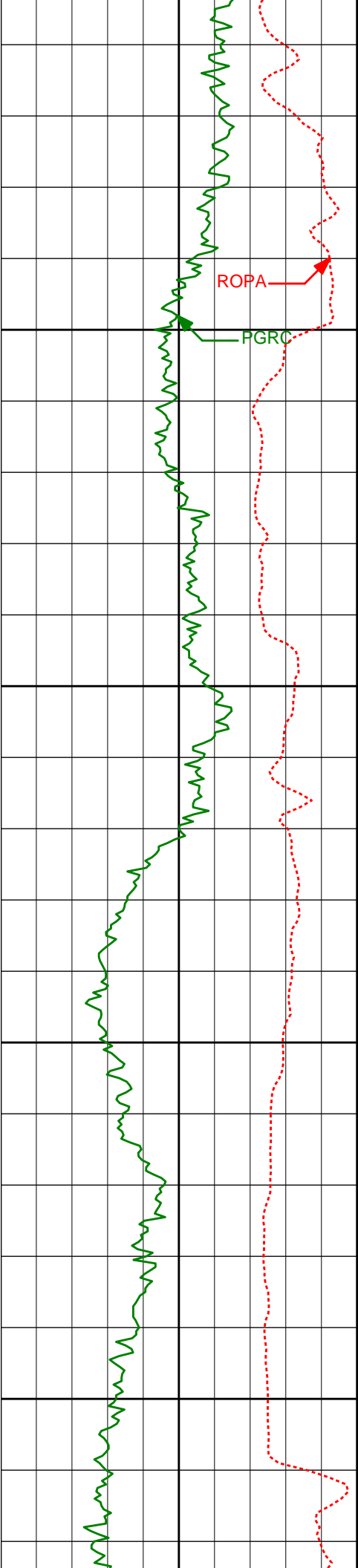
8558'

90.62°

268.32°

6648.79'

2317.73'



8650'

8653'

87.23°

265.72°

6650.58'

2412.39'

8700'

8750'

8748'

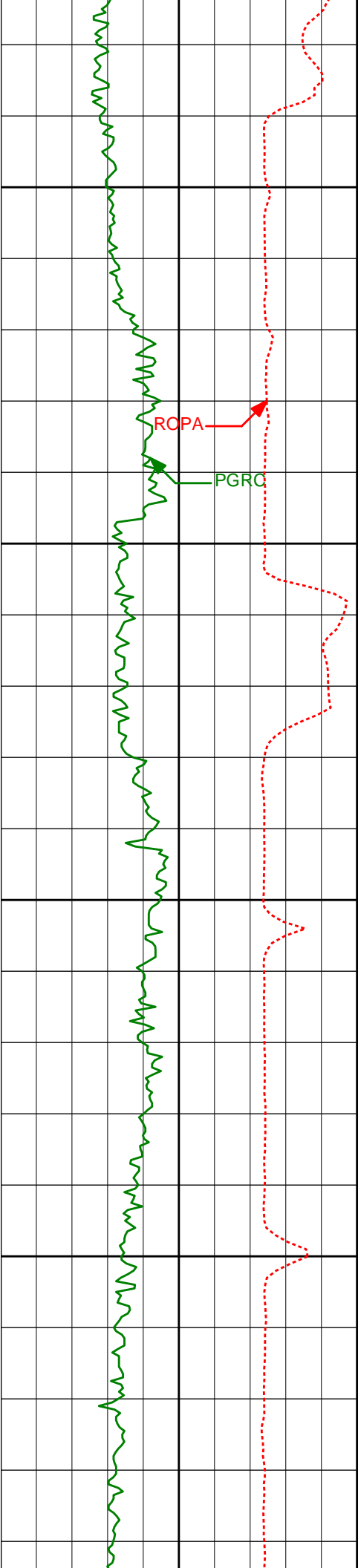
87.78°

265.44°

6654.71'

2506.78'

8800'



8843'	90.25°	268.97°	6656.34'	2601.46'
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8850'

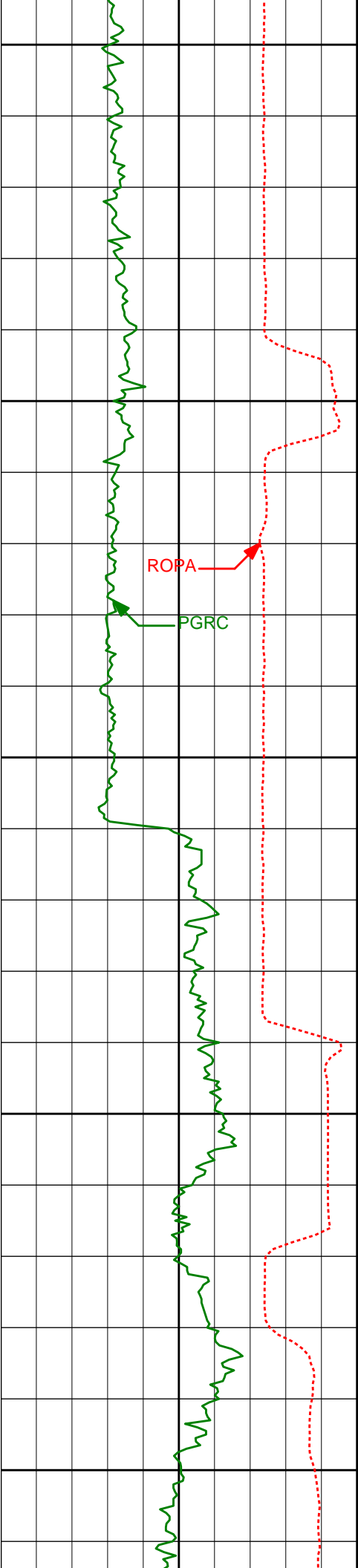
8900'

8938'	89.07°	268.58°	6656.91'	2696.34'
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8950'

9000'

9032'	90.74°	269.59°	6657.06'	2790.25'
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9050'

9100'

9150'

9200'

9250'

ROPA

PGRC

9127'

91.29°

269.98°

6655.38'

2885.19'

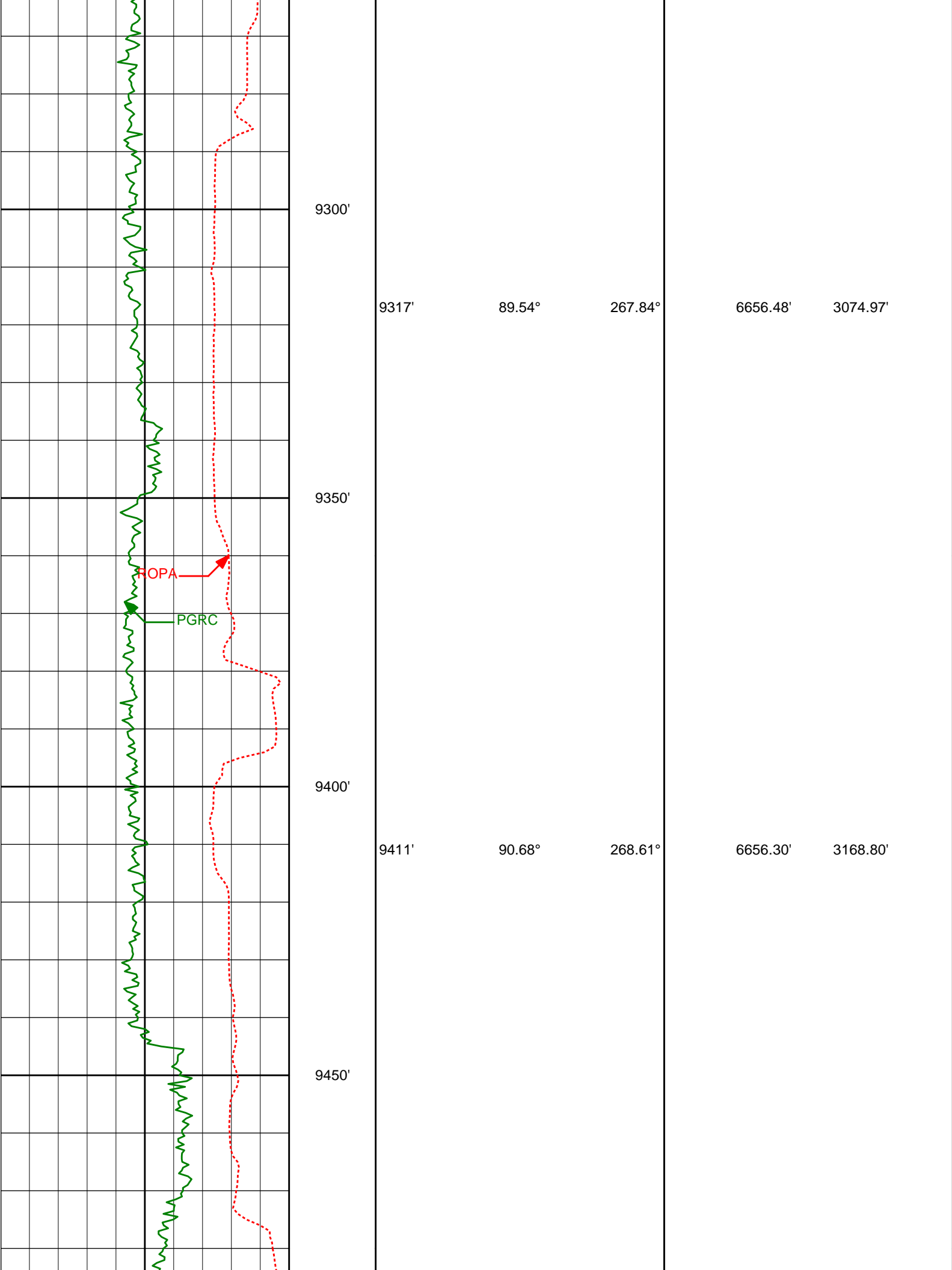
9222'

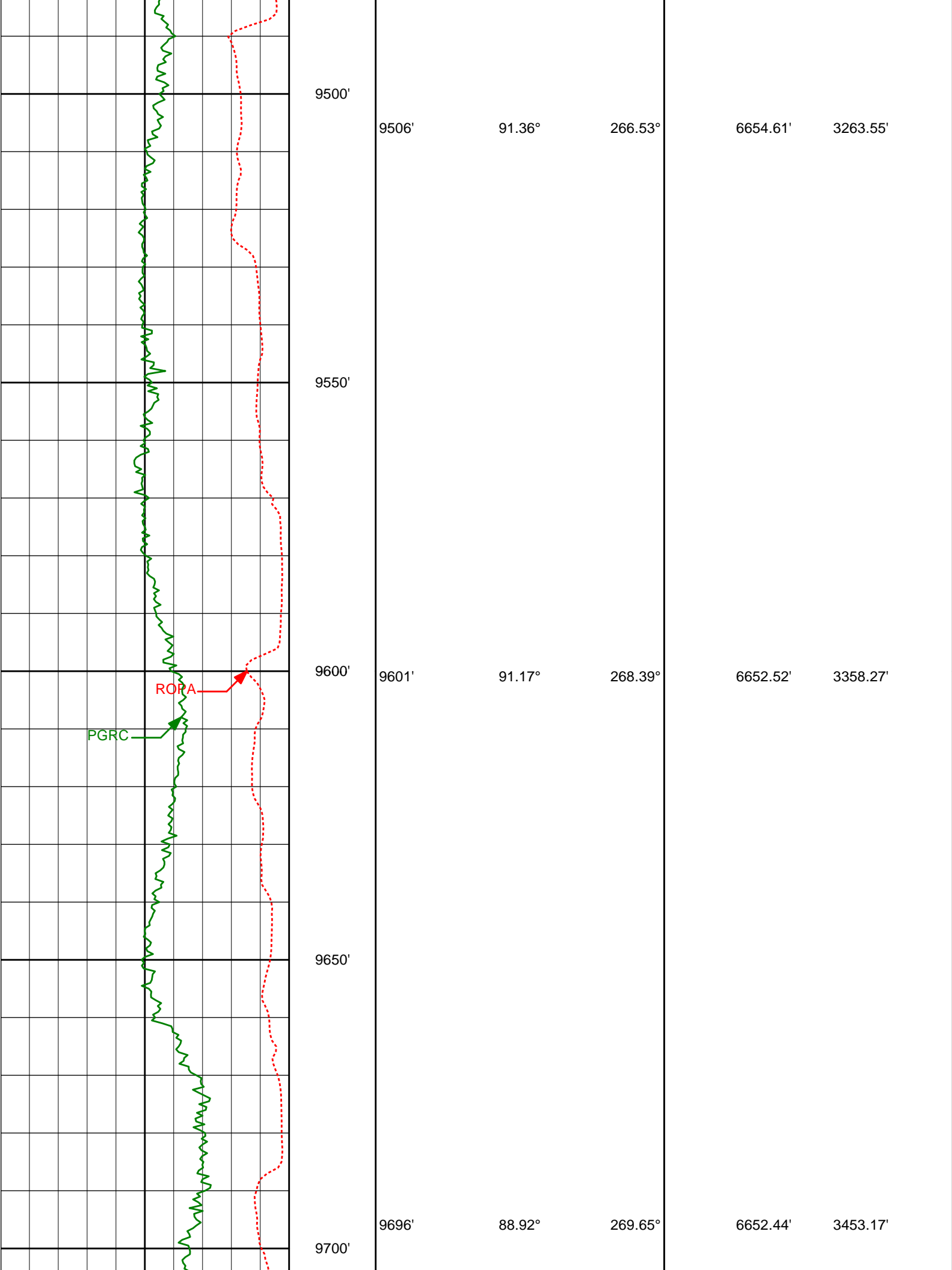
88.92°

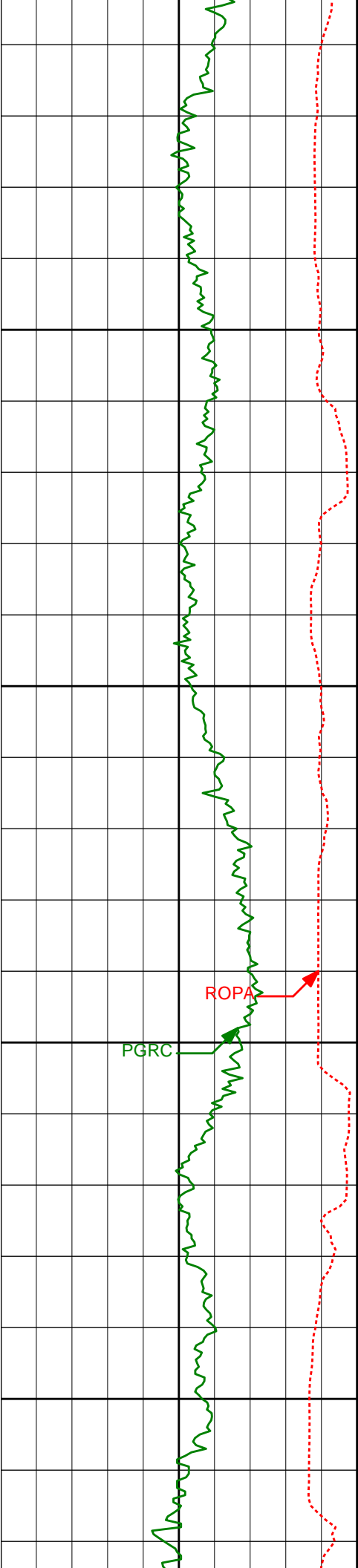
269.19°

6655.21'

2980.12'







9750'

9800'

9850'

9900'

9791'

90.00°

269.75°

6653.34'

3548.11'

9886'

87.81°

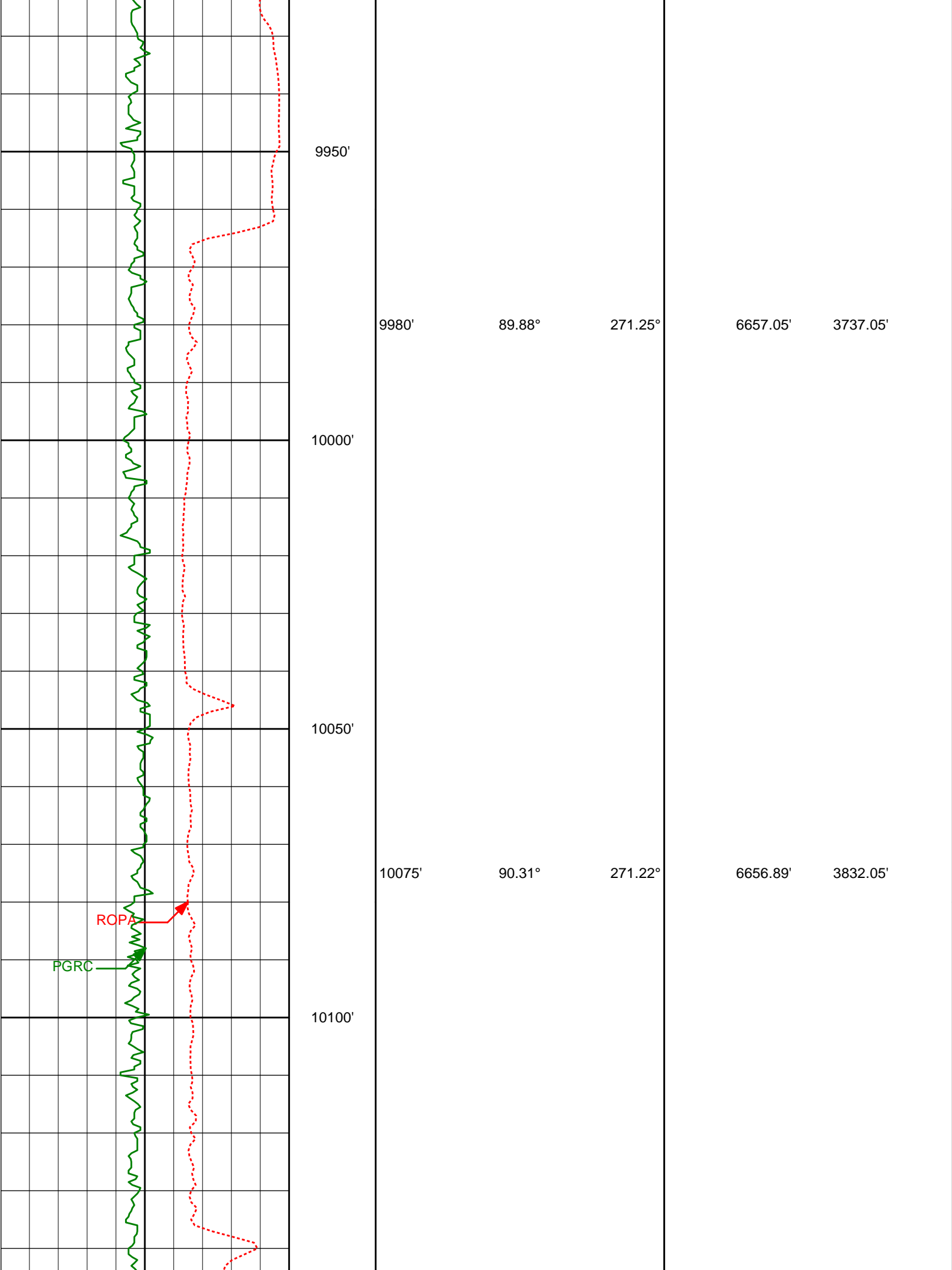
272.11°

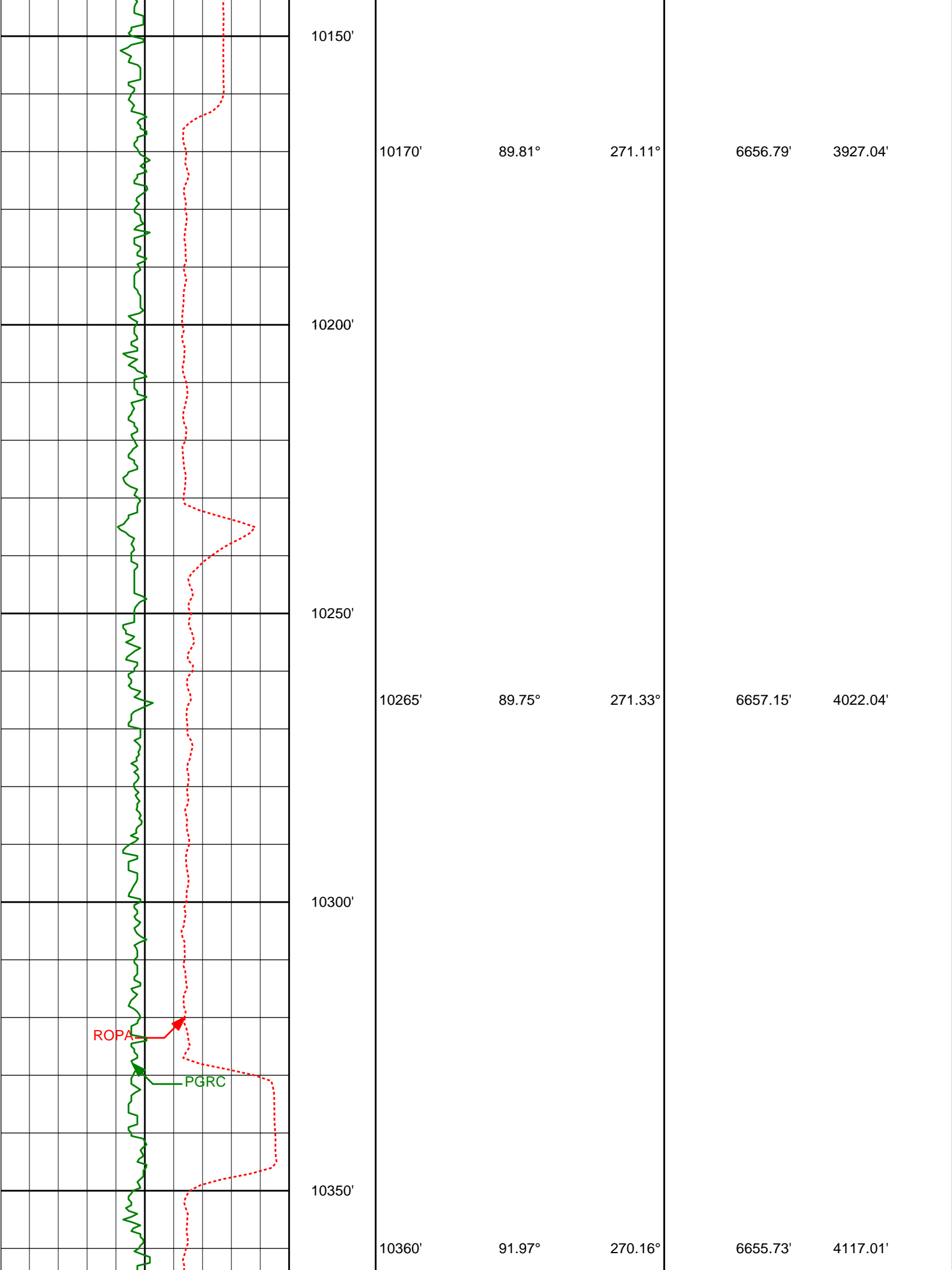
6655.15'

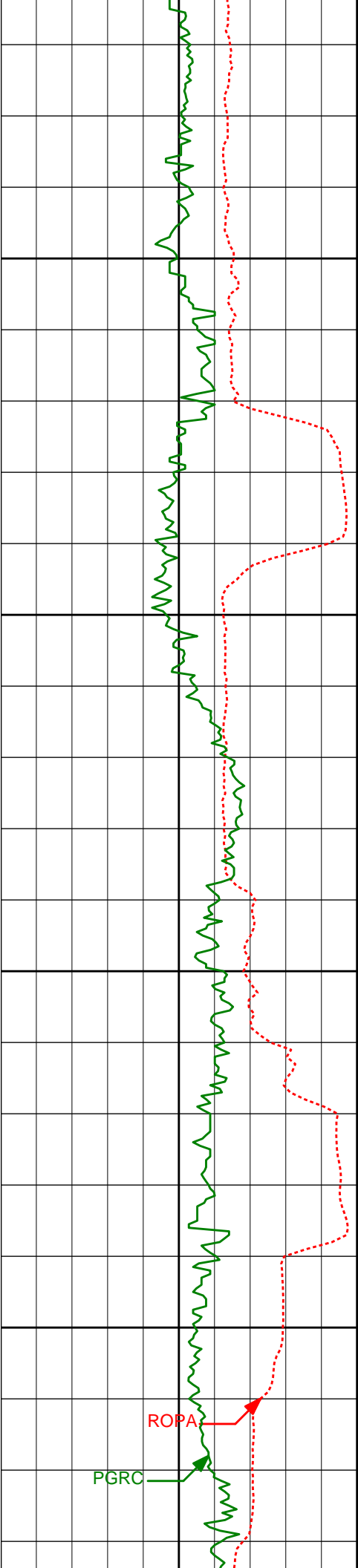
3643.08'

PGRC

ROPA







10400'

10450'

10500'

10550'

10454'

92.13°

270.00°

6652.37'

4210.92'

10549'

90.83°

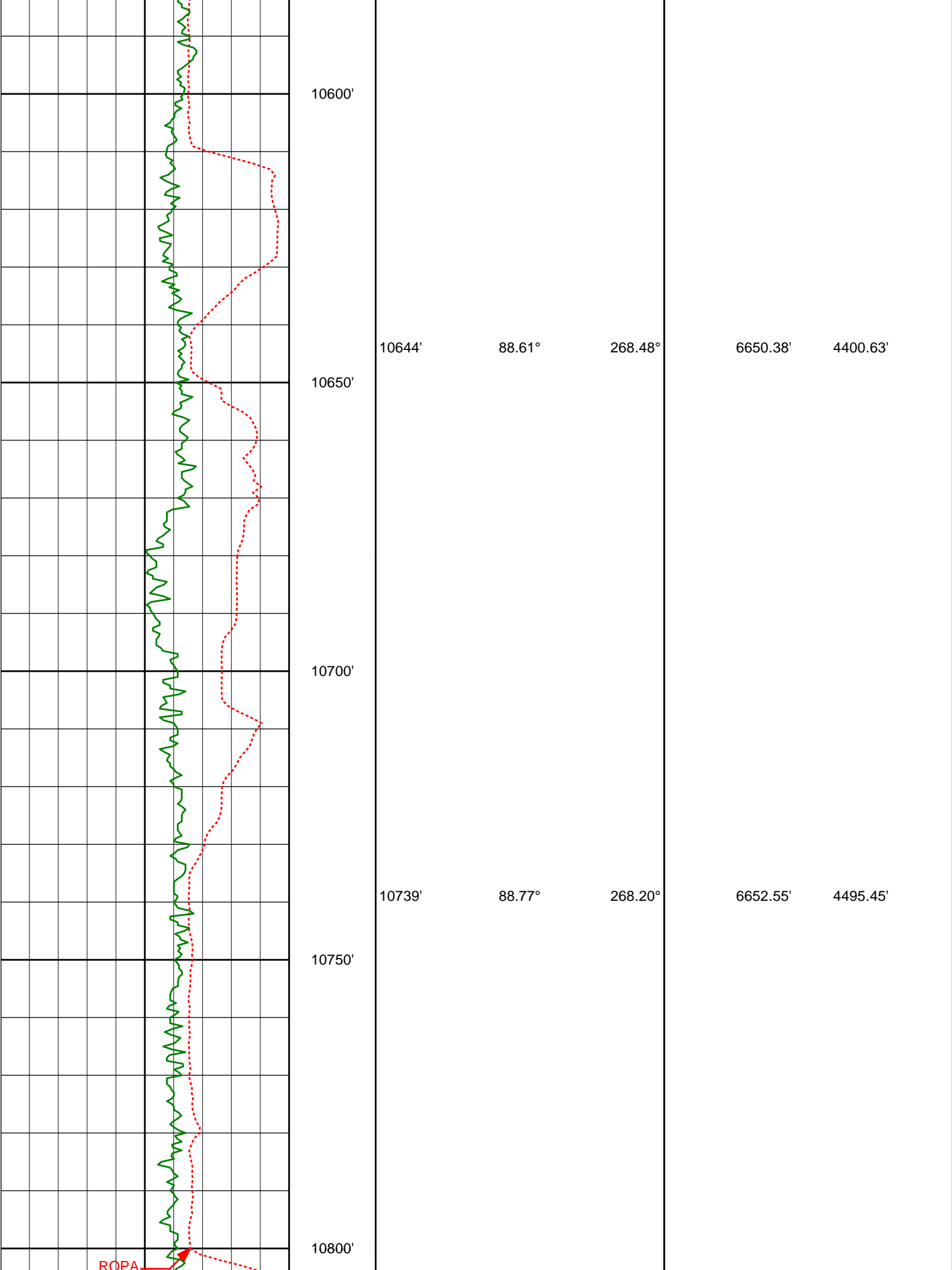
268.14°

6649.91'

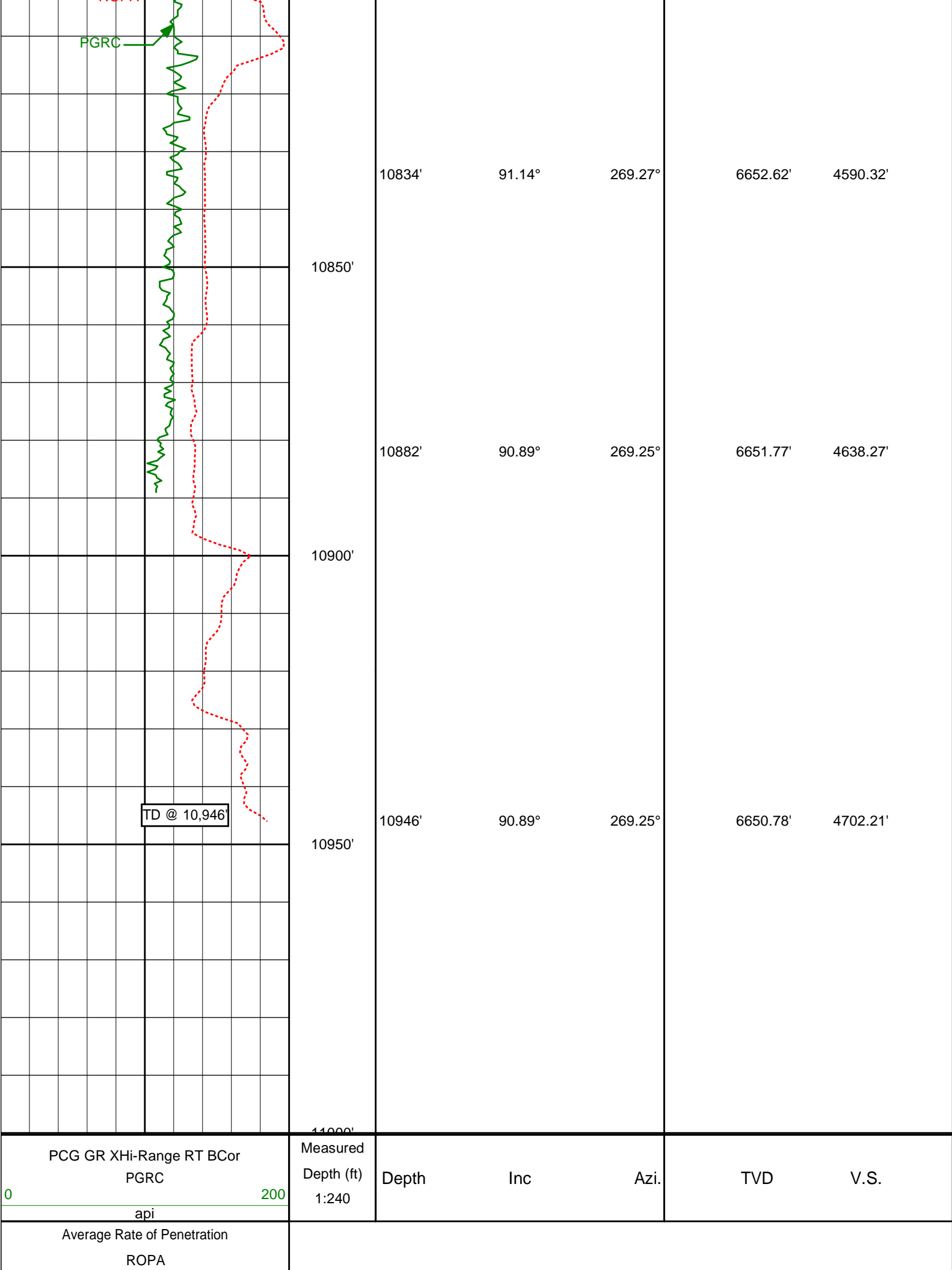
4305.79'

ROPA

PGRC



ROPA



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch AA35-65-1BHNC
Wattenberg
Weld Colorado
USA
CA-XX-0901018822

The first two surveys at 355' and 600' 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
355.00	0.60	249.63	354.99	0.65 S	1.74 W	1.72	0.17
600.00	0.60	50.03	599.99	0.27 S	1.96 W	1.95	0.48
708.00	0.21	18.77	707.99	0.28 N	1.46 W	1.47	0.40
802.00	0.46	339.08	801.98	0.80 N	1.54 W	1.57	0.35
988.00	1.05	355.93	987.97	3.19 N	1.93 W	2.02	0.34
1082.00	0.97	357.82	1081.95	4.85 N	2.02 W	2.16	0.09
1173.00	1.01	358.83	1172.94	6.42 N	2.07 W	2.25	0.05
1360.00	0.91	1.32	1359.91	9.55 N	2.07 W	2.33	0.06
1548.00	0.96	350.82	1547.89	12.60 N	2.29 W	2.64	0.09
1643.00	1.05	352.59	1642.87	14.25 N	2.52 W	2.92	0.10
1737.00	1.05	333.80	1736.86	15.88 N	3.02 W	3.46	0.36
1832.00	1.14	343.31	1831.84	17.56 N	3.67 W	4.16	0.21
1927.00	1.03	343.14	1926.82	19.28 N	4.19 W	4.73	0.12
2022.00	2.91	312.83	2021.77	21.74 N	6.21 W	6.81	2.20
2118.00	2.48	314.08	2117.66	24.84 N	9.49 W	10.18	0.45
2212.00	3.60	307.20	2211.53	28.04 N	13.30 W	14.08	1.25
2307.00	5.05	309.51	2306.25	32.50 N	18.90 W	19.80	1.54
2402.00	5.91	322.51	2400.82	39.05 N	25.10 W	26.18	1.58
2497.00	7.00	322.20	2495.22	47.50 N	31.63 W	32.94	1.15
2592.00	7.10	321.36	2589.50	56.66 N	38.84 W	40.41	0.15
2687.00	5.84	321.50	2683.89	65.03 N	45.52 W	47.31	1.33
2782.00	6.73	323.18	2778.32	73.27 N	51.86 W	53.89	0.96
2876.00	6.92	323.95	2871.65	82.26 N	58.49 W	60.77	0.22
2971.00	7.71	327.97	2965.88	92.29 N	65.24 W	67.79	0.99
3066.00	5.61	326.23	3060.23	101.55 N	71.20 W	74.01	2.22
3160.00	6.30	325.65	3153.73	109.63 N	76.67 W	79.70	0.74
3254.00	6.65	325.98	3247.13	118.40 N	82.62 W	85.90	0.37
3349.00	6.40	324.52	3341.51	127.27 N	88.77 W	92.29	0.32
3442.00	7.57	309.34	3433.83	135.37 N	96.52 W	100.26	2.34
3536.00	7.48	311.99	3527.02	143.39 N	105.86 W	109.82	0.38
3631.00	8.46	308.14	3621.10	151.84 N	115.95 W	120.14	1.17
3725.00	8.85	311.96	3714.03	160.95 N	126.77 W	131.21	0.74
3819.00	8.06	317.82	3807.01	170.67 N	136.57 W	141.28	1.24
3914.00	5.41	327.56	3901.35	179.38 N	143.44 W	148.40	3.03
4007.00	1.42	332.12	3994.17	184.10 N	146.34 W	151.42	4.30
4102.00	0.70	122.65	4089.16	184.83 N	146.40 W	151.50	2.17
4197.00	0.75	123.13	4184.15	184.18 N	145.39 W	150.47	0.05
4292.00	0.68	108.86	4279.14	183.66 N	144.33 W	149.41	0.20
4387.00	0.50	71.13	4374.14	183.61 N	143.41 W	148.48	0.44
4482.00	0.70	28.84	4469.13	184.25 N	142.74 W	147.82	0.50
4577.00	1.39	36.21	4564.12	185.69 N	141.78 W	146.90	0.74
4671.00	1.47	43.23	4658.09	187.49 N	140.28 W	145.46	0.20
4766.00	0.68	126.59	4753.07	188.04 N	138.99 W	144.18	1.63
4861.00	1.06	184.98	4848.06	186.83 N	138.61 W	143.77	0.96
4955.00	0.98	186.38	4942.05	185.16 N	138.78 W	143.89	0.09
5050.00	0.78	165.78	5037.04	183.73 N	138.71 W	143.78	0.39
5240.00	0.74	148.19	5227.02	181.43 N	137.74 W	142.76	0.12
5335.00	0.83	134.67	5322.01	180.43 N	136.93 W	141.92	0.22
5430.00	0.33	146.85	5417.01	179.71 N	136.29 W	141.26	0.54

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 271.60 DEGREES (GRID)
A TOTAL CORRECTION OF 7.63 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 10946.00 FEET
IS 4702.21 FEET ALONG 271.59 DEGREES (GRID)**

Final survey is a straight line projection to TD.

Date Printed:09 March 2014