

PCG Pressure Case Gamma

[illegible]

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	09-Feb-14	10-Feb-14	12-Feb-14		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.750	6.750	4.75		
Log Start Depth (MD, ft)	632.00	5,926.00	6,846.00		
Log End Depth (MD, ft)	5,926.00	6,846.00	11,065.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	08-Feb-14 08:00	09-Feb-14 14:30	11-Feb-14 09:15		
Drill/Wipe End Date and Time	09-Feb-14 05:00	10-Feb-14 01:30	12-Feb-14 08:30		
Min Inc (deg) @ Depth (MD, ft)	0.11 @ 4,583.00	3.28 @ 6,004.00	88.71 @ 9,980.00		
Max Inc (deg) @ Depth (MD, ft)	10.16 @ 3,162.00	88.27 @ 6,793.00	91.23 @ 11,001.00		
Bit TFA(in2) / Bit Type	1.24 / PDC	1.24 / PDC	0.98 / PDC		
Flow Rate (gpm)	600.00	549.00	300.00		
Max AV (fpm) / CV (fpm) @ MWD	350 / 400	350 / 350	350 / 400		
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	8.90 / 29.00	10.20 / 34.00	9.10 / 33.00		
Filtrate CL (ppm)	1200	1200	1100		
pH / Fluid Loss (mptm)	8 / 32	8 / 32	9.60 / 10		
PV (cP) / YP (lbf2)	5 / 3.00	7 / 4.00	6 / 6.00		
% Solids / % Sand	2.70 / 2.70	2 / 0.25	3.70 / 0.20		
% 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) @ 10000' / 20000' / 30000'	100.00 / 100.00 / 100.00	100.00 / 100.00 / 100.00	204.00 / 100.00 / 100.00		

Max Tool Temp (degF) / Source	160.83 / PCM	160.83 / PCM	221.80 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Adam Sampson	Adam Sampson	Adam Sampson		
Customer Representative	Matt Settles	Matt Settles	Matt Settles		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.84	5.84	5.84		
Sub Serial Number	11342275	11342275	12134685		
Insert Serial Number	11619995	11619995	10997273		
Date and Time Initialized	06-Feb-14 16:48	01-Jan-70 00:00	10-Feb-14 07:34		
Date and Time Read	10-Feb-14 05:58	10-Feb-14 06:03	12-Feb-14 17:35		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	56.00	53.00	64.00		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11342275	11342275	12134685		
Sonde Serial Number	11833228	11833228	11477956		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	235.94	320.00	299.37		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	49.63	46.31	57.39		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11342275	11342275	12134685		
Insert/Sonde Serial Number	11681019	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 7.4.2

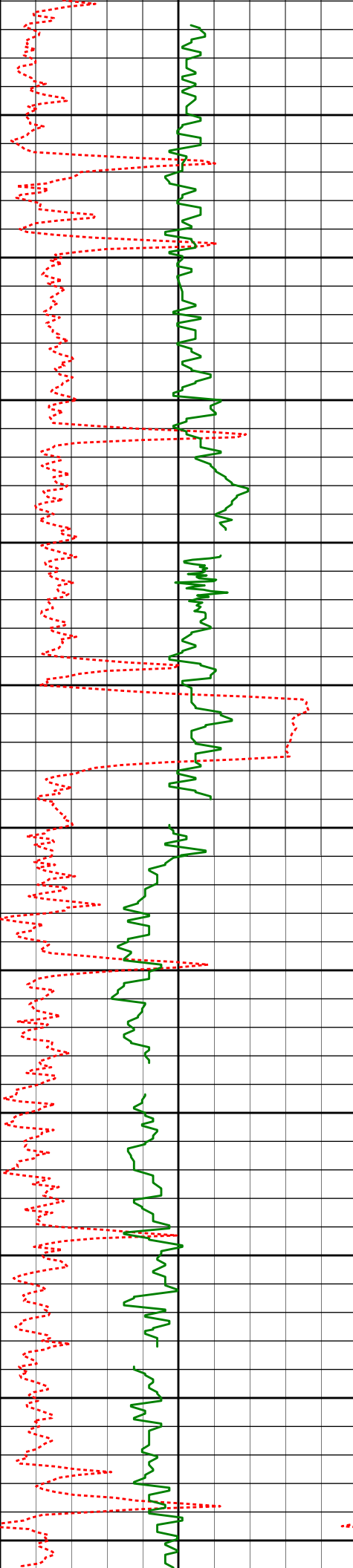
WARRANTY

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MD Main Log 1:600

Average Rate of Penetration ROPA						
1K0						
feet per hr						
PCG Gamma Ray BCorr PGRC		Measured Depth (ft) 1:600	Depth	Inc	Azi.	TVDV.S.
0200						
api						
		3067'	9.77°	336.49°	3052.04'	119.21'
		3162'	10.16°	336.69°	3145.60'	126.54'
		3257'	8.69°	330.78°	3239.32'	134.10'



3300'

3350'

3400'

3450'

3500'

3550'

3600'

3650'

3700'

3750'

3800'

3352'

7.91°

325.76°

3333.32'

141.90'

3447'

7.80°

319.93°

3427.43'

150.27'

3541'

7.78°

328.91°

3520.57'

158.20'

3636'

8.06°

328.86°

3614.66'

165.56'

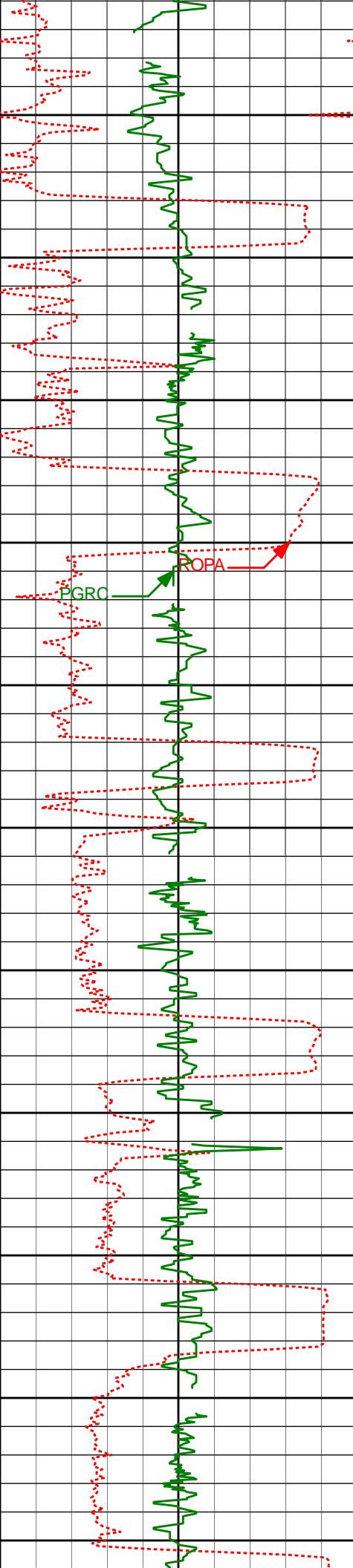
3731'

8.75°

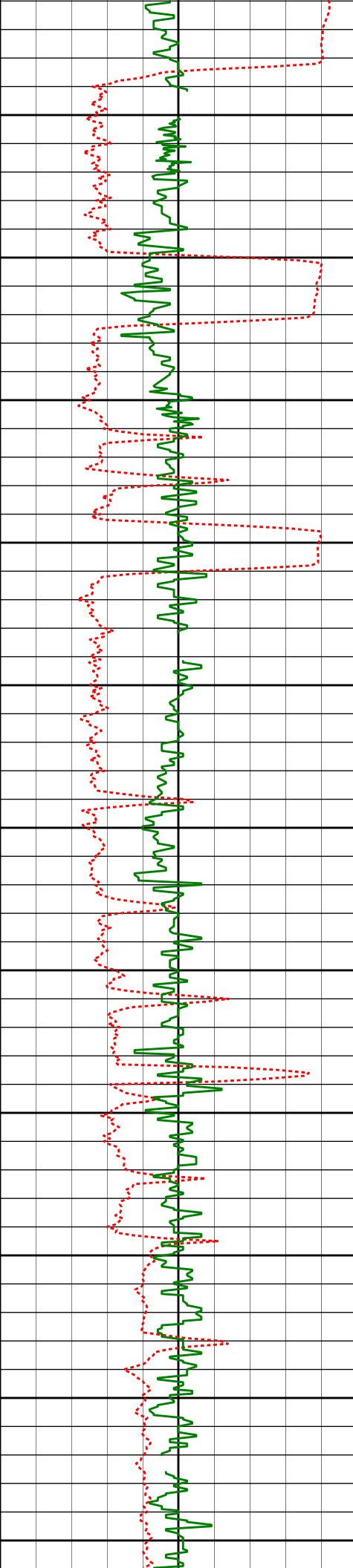
329.57°

3708.64'

173.29'



3825'	9.50°	328.53°	3801.45'	181.63'
3850'				
3900'				
3920'	10.07°	338.00°	3895.08'	189.60'
3950'				
4000'				
4015'	7.75°	341.25°	3988.93'	195.50'
4050'				
4100'				
4110'	6.45°	343.68°	4063.19'	199.65'
4150'				
4200'				
4204'	5.11°	342.02°	4176.71'	202.91'
4250'				
4300'				
4299'	2.97°	339.83°	4271.47'	205.40'
4350'				



4400'

4394'

2.18°

7.40°

4366.38'

206.23'

4450'

4489'

1.16°

78.27°

4461.35'

205.17'

4500'

4550'

4583'

0.11°

199.38°

4555.34'

204.27'

4600'

4650'

4678'

0.26°

59.05°

4650.34'

204.12'

4700'

4750'

4773'

0.37°

251.12°

4745.34'

204.23'

4800'

4850'

4868'

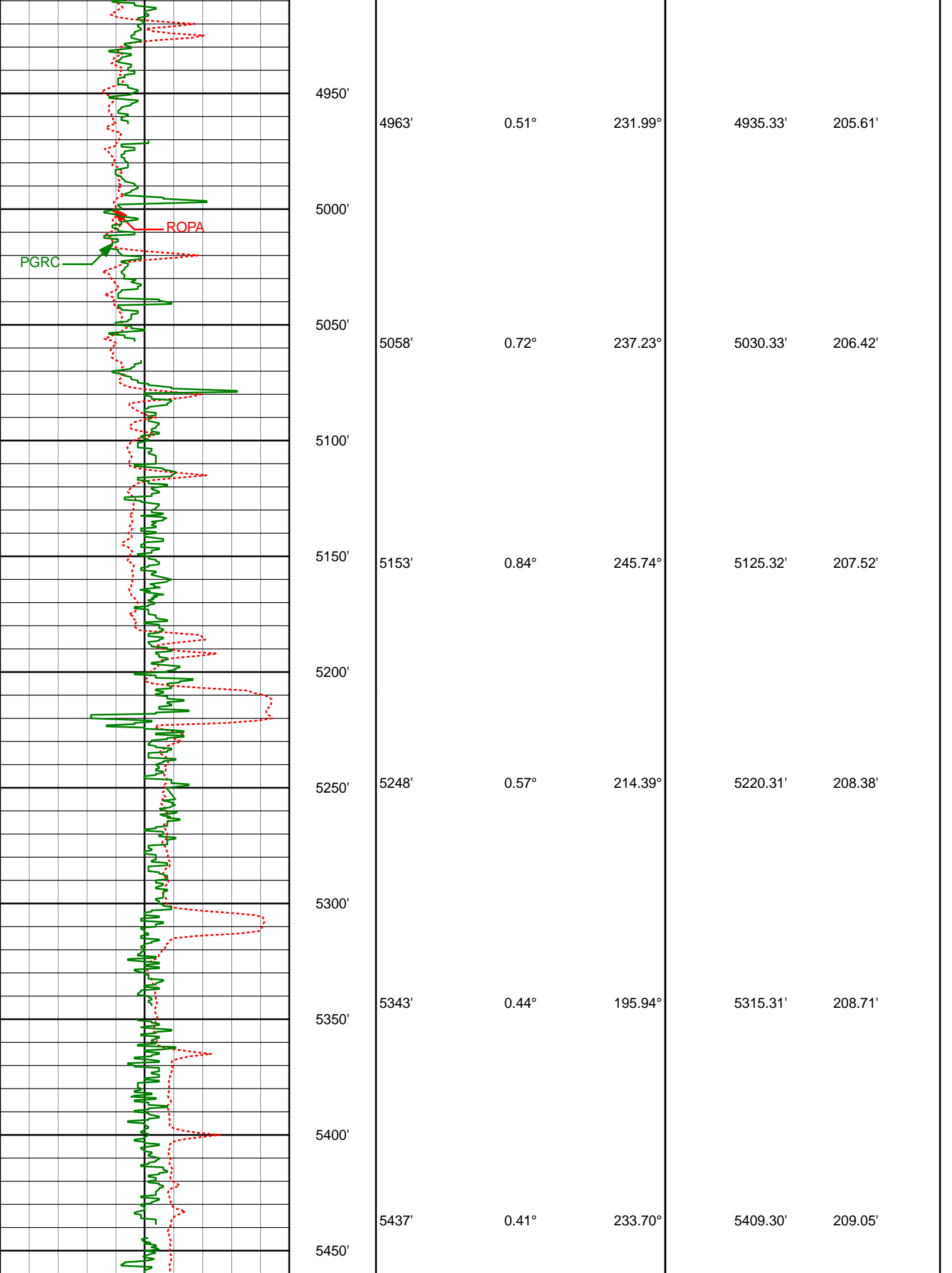
0.66°

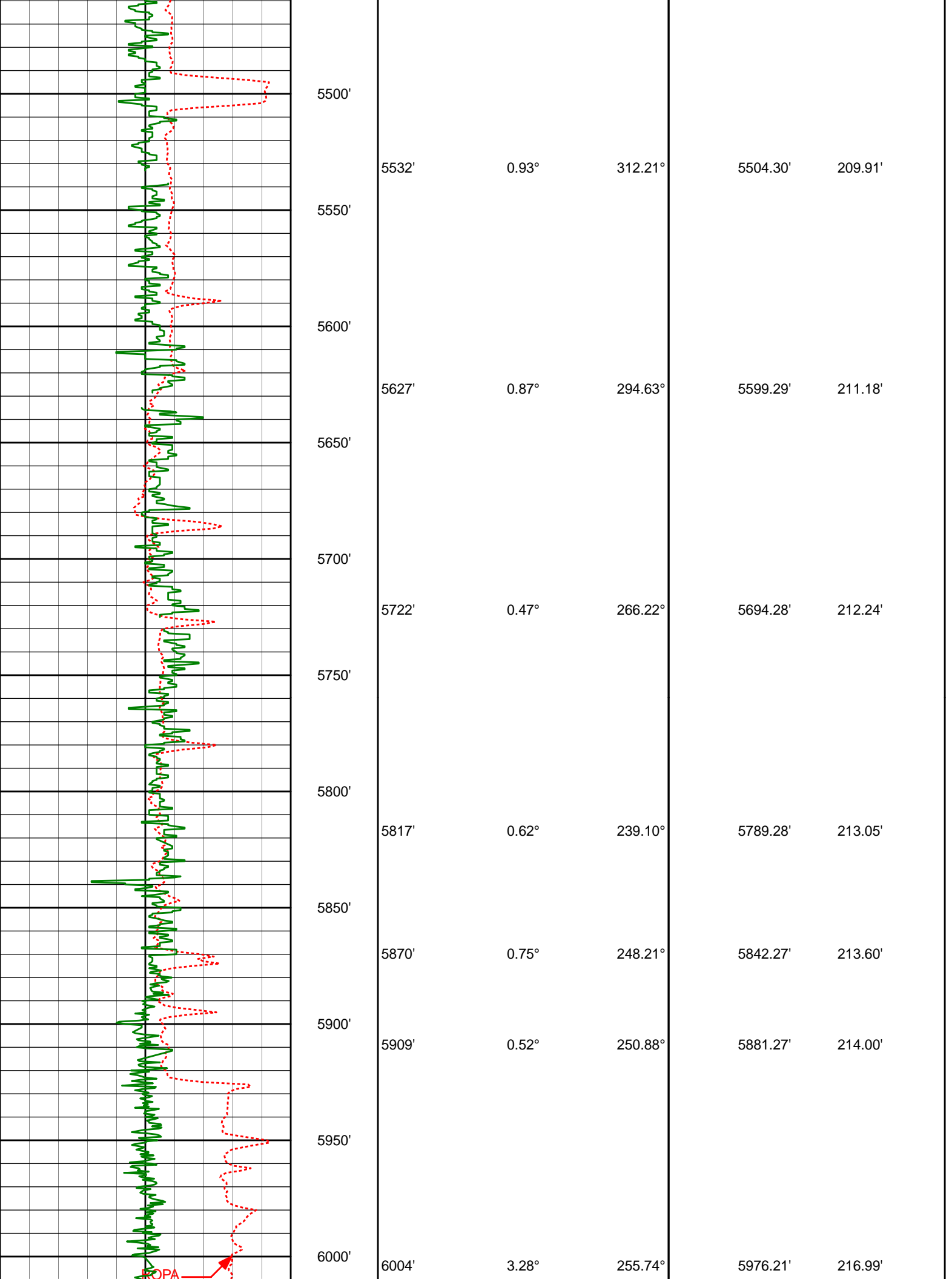
228.88°

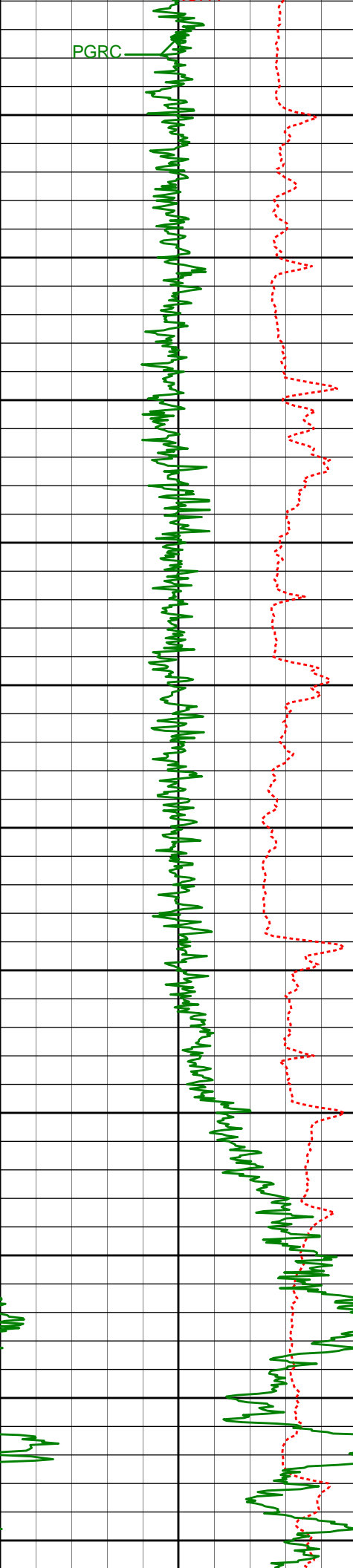
4840.34'

204.90'

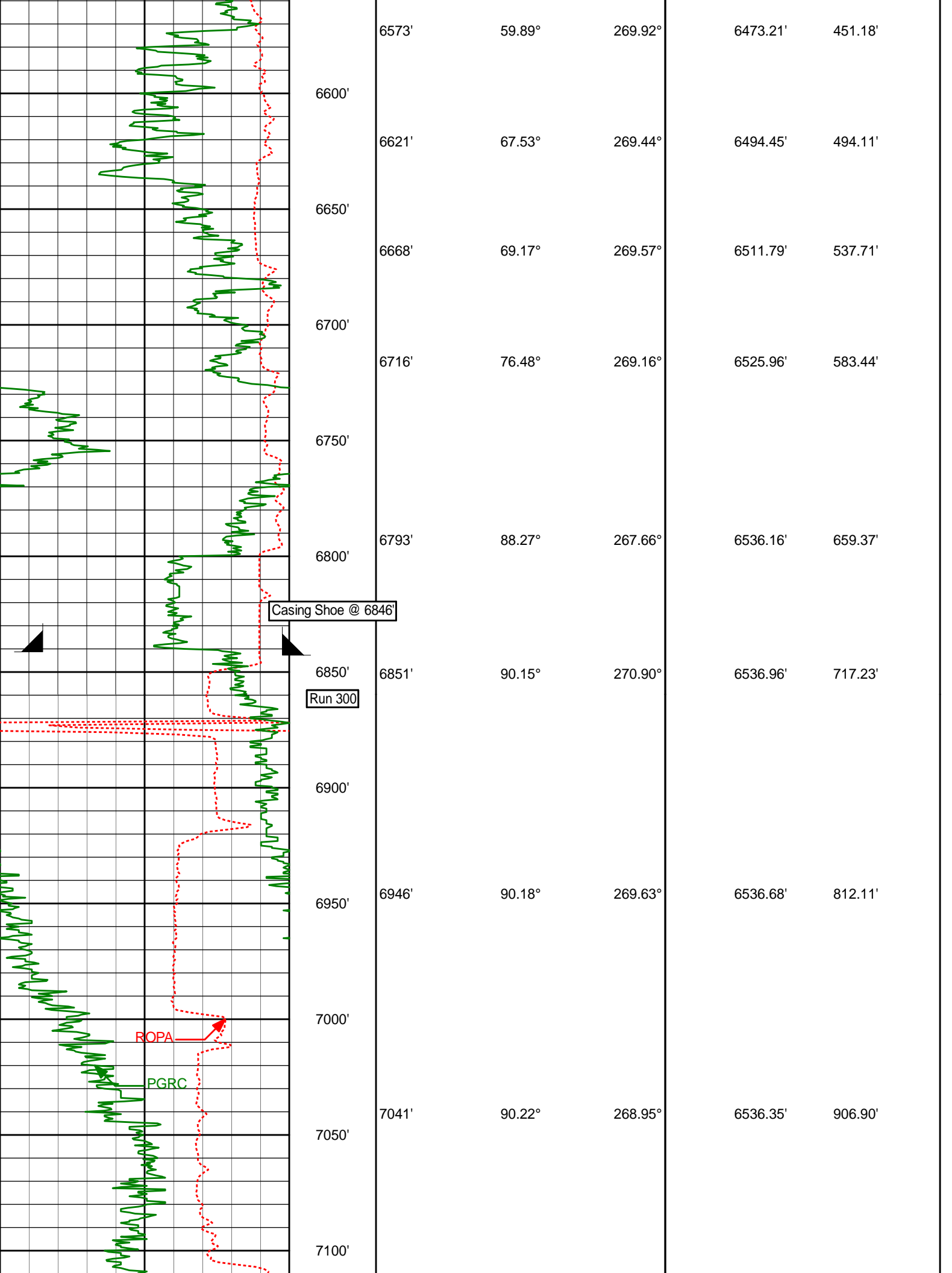
4900'

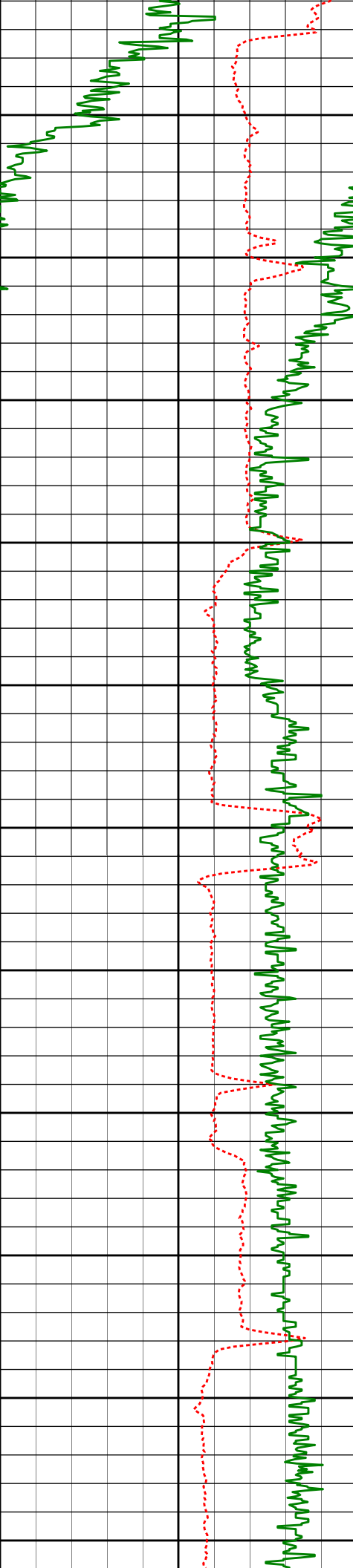




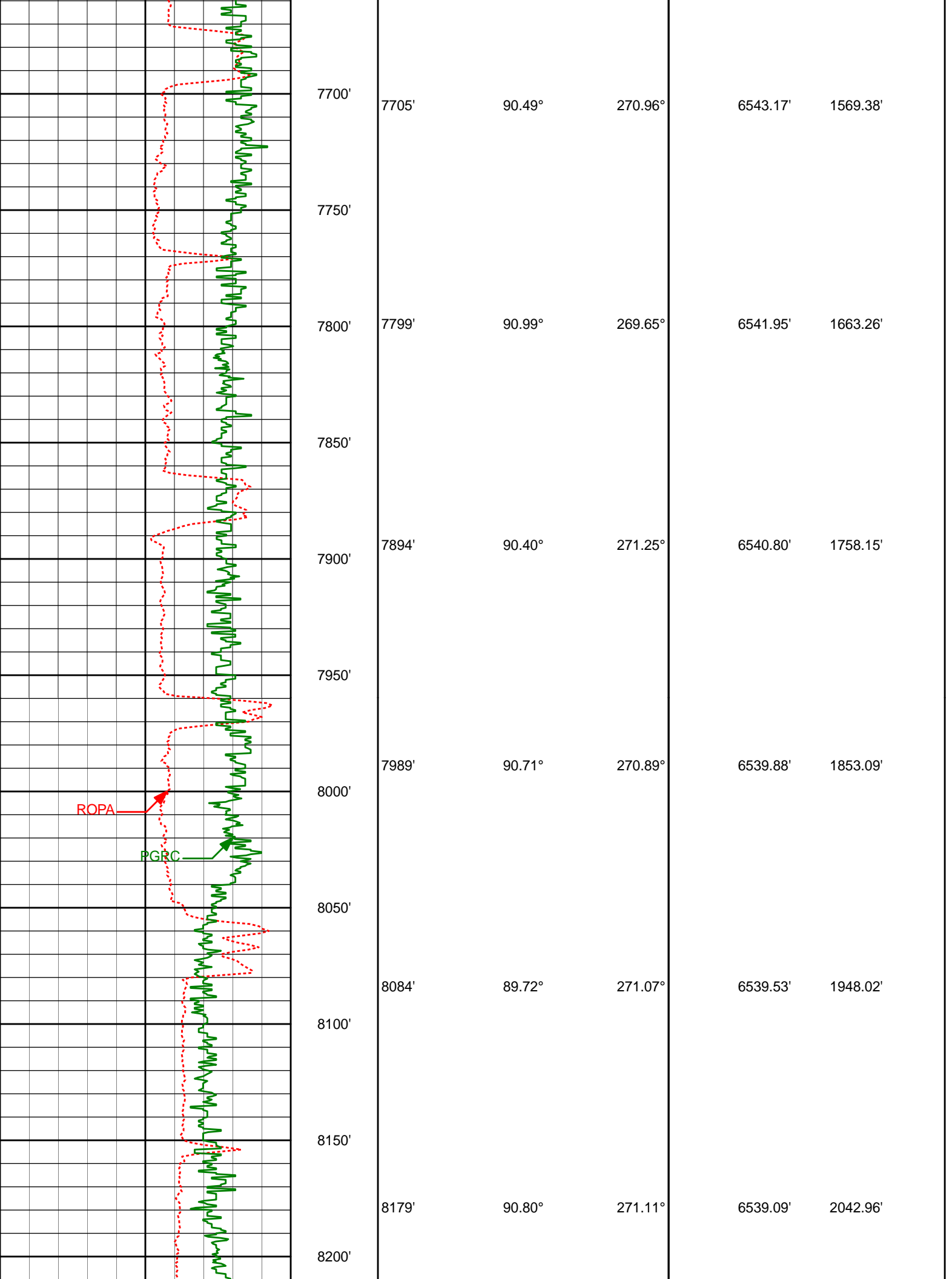


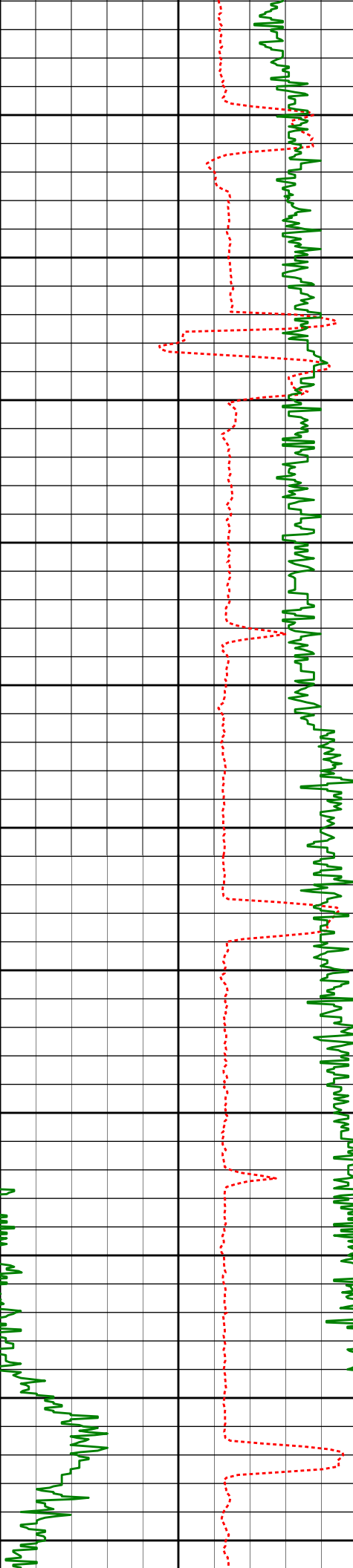
6050'					
6100'	6099'	13.92°	263.23°	6070.01'	230.89'
6150'					
6200'	6194'	15.57°	255.14°	6161.89'	254.28'
6250'					
6300'	6288'	19.36°	268.26°	6251.57'	281.83'
6350'	6337'	24.97°	271.93°	6296.93'	300.28'
6400'	6383'	29.55°	271.78°	6337.81'	321.34'
6450'					
6500'	6478'	43.02°	268.38°	6414.22'	377.32'
6550'					





7136'	88.73°	269.11°	6537.22'	1001.66'
7150'				
7200'				
7230'	88.74°	269.04°	6539.30'	1095.41'
7250'				
7300'				
7325'	88.98°	268.10°	6541.19'	1190.10'
7350'				
7400'				
7420'	89.63°	270.04°	6542.34'	1284.85'
7450'				
7500'				
7515'	89.63°	269.66°	6542.95'	1379.70'
7550'				
7600'				
7610'	89.81°	269.24°	6543.42'	1474.51'
7650'				





8250'

8273'

89.85°

270.11°

6538.56'

2136.87'

8300'

8350'

8369'

89.38°

269.27°

6539.21'

2232.70'

8400'

8450'

8463'

90.34°

269.14°

6539.44'

2326.49'

8500'

8550'

8558'

89.72°

269.09°

6539.39'

2421.26'

8600'

8650'

8653'

90.18°

269.18°

6539.47'

2516.04'

8700'

8750'

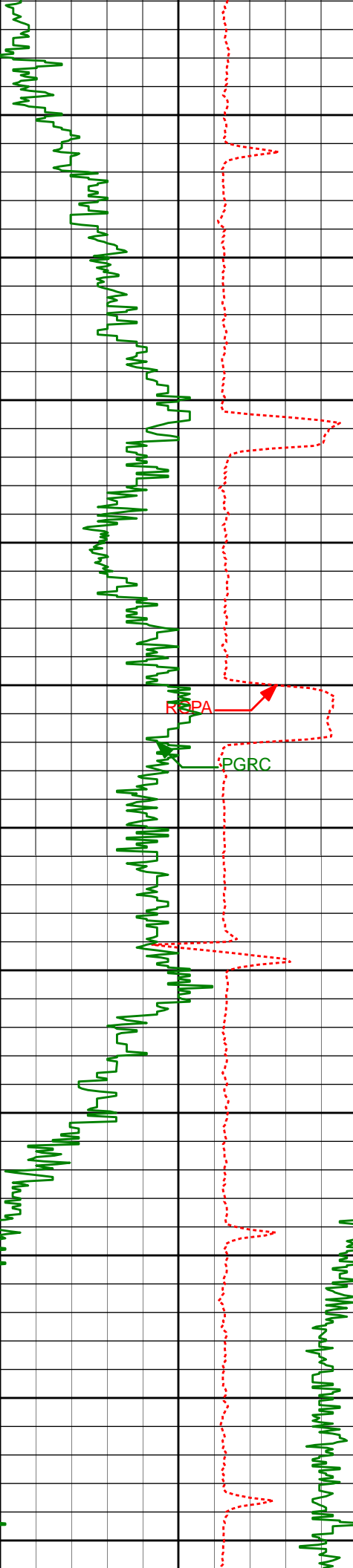
8748'

89.57°

269.66°

6539.68'

2610.84'



8800'

8842'

90.06°

270.55°

6539.98'

2704.72'

8850'

8900'

8937'

89.69°

271.14°

6540.19'

2799.64'

8950'

9000'

9032'

89.85°

269.81°

6540.57'

2894.54'

9050'

9100'

9127'

88.99°

269.09°

6541.53'

2989.35'

9150'

9200'

9221'

89.60°

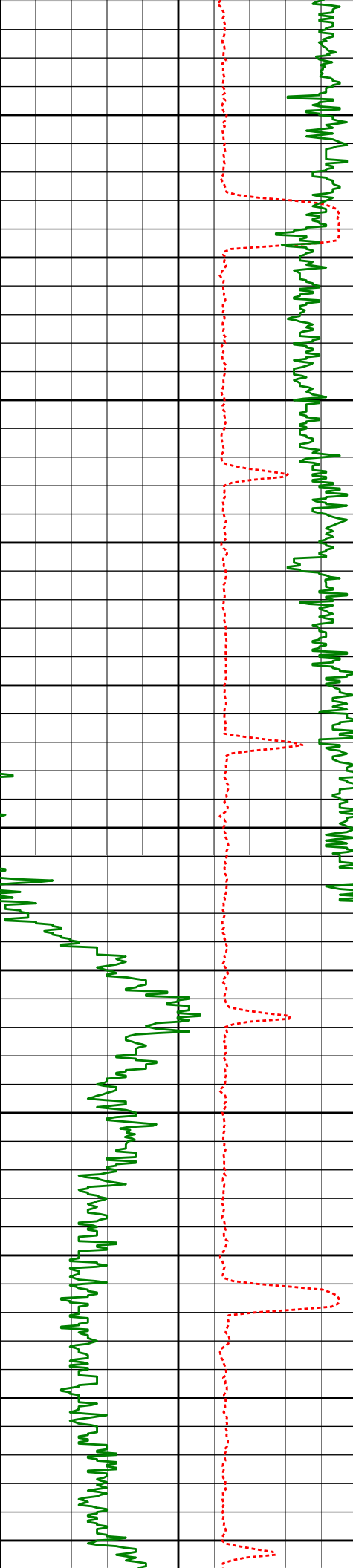
269.60°

6542.69'

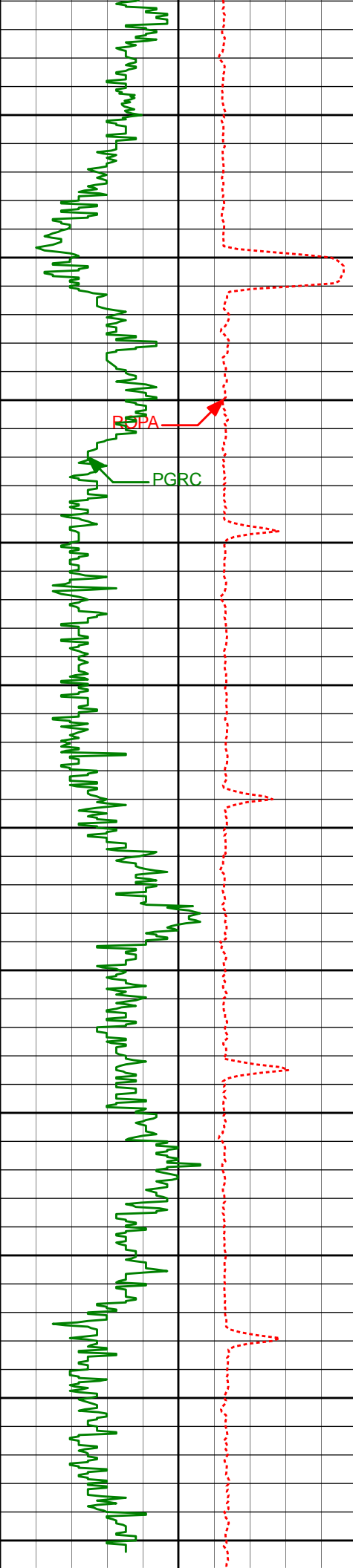
3083.14'

9250'

9300'



9316'	89.66°	270.30°	6543.30'	3178.00'
9350'				
9400'				
9411'	90.34°	268.55°	6543.30'	3272.80'
9450'				
9500'				
9506'	90.09°	267.98°	6542.94'	3367.47'
9550'				
9600'	90.34°	268.02°	6542.59'	3461.10'
9650'				
9695'	90.80°	268.33°	6541.65'	3555.75'
9750'				
9790'	89.66°	268.66°	6541.27'	3650.44'
9800'				
9850'				



9900'

9950'

10000'

10050'

10100'

10150'

10200'

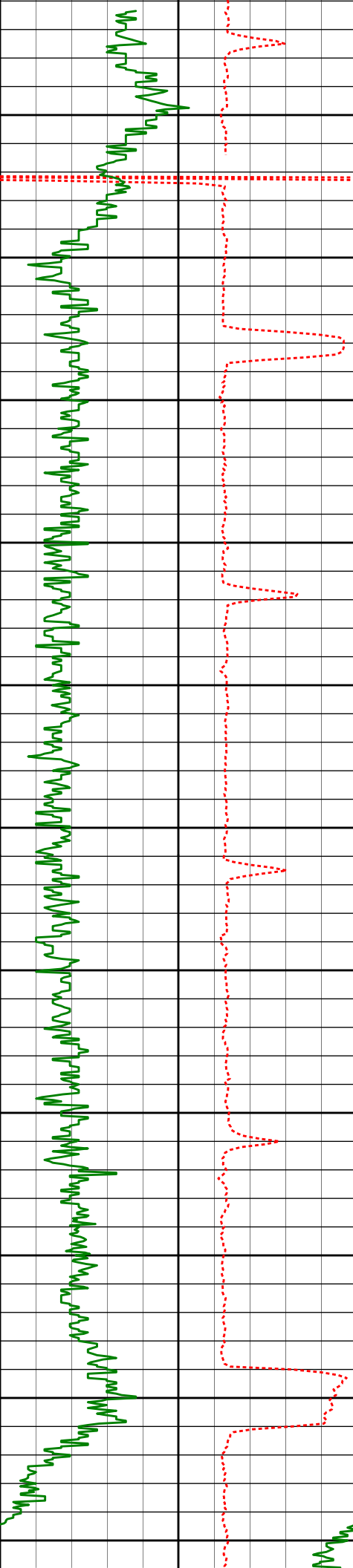
10250'

10300'

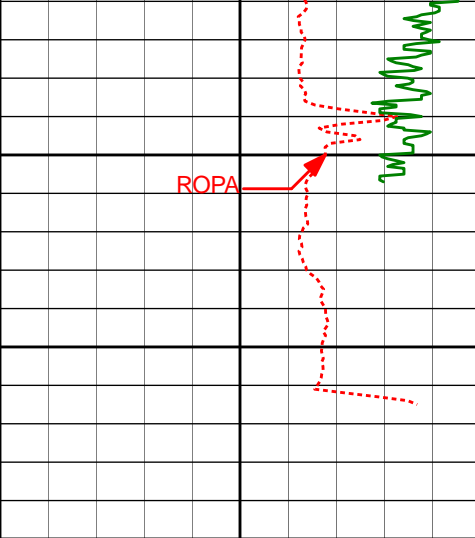
10350'

10400'

9885'	90.43°	268.71°	6541.19'	3745.16'
9980'	88.71°	269.13°	6541.90'	3839.91'
10075'	89.23°	269.05°	6543.61'	3934.66'
10170'	89.35°	269.20°	6544.79'	4029.43'
10265'	90.55°	269.88°	6544.87'	4124.25'
10360'	90.80°	269.63°	6543.75'	4219.08'

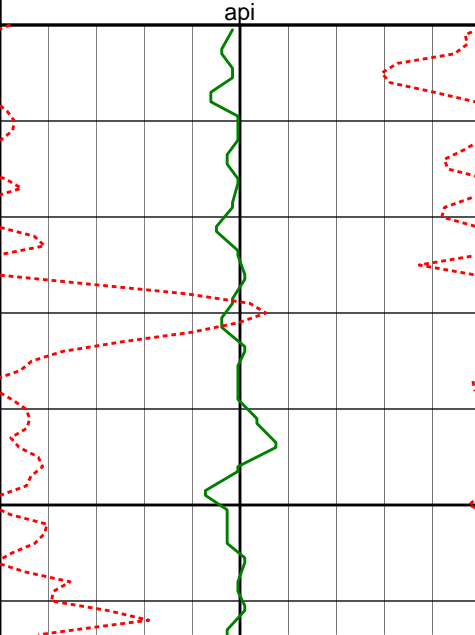


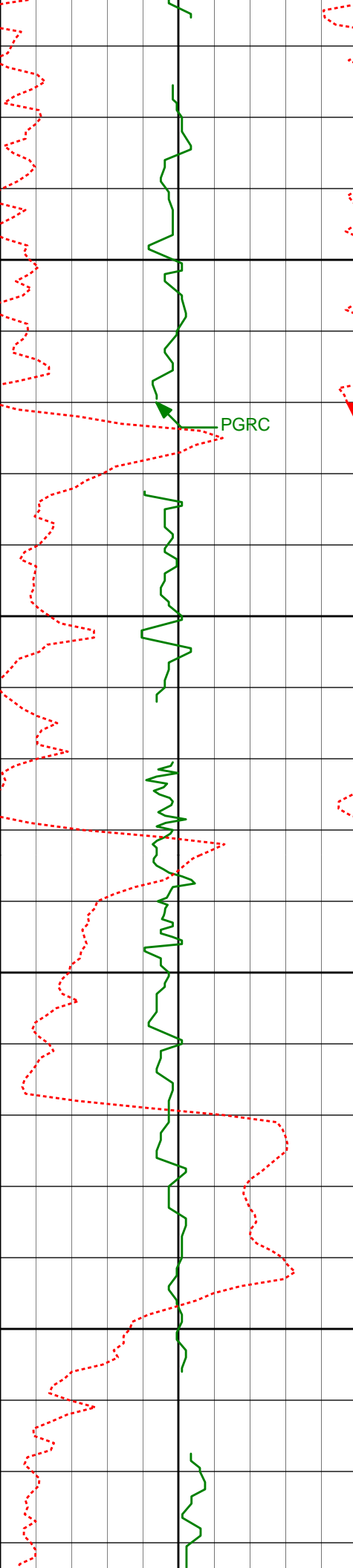
10450'	10454'	91.11°	269.37°	6542.19'	4312.88'
10500'					
10550'	10549'	89.66°	269.92°	6541.55'	4407.71'
10600'					
10650'	10644'	89.72°	269.28°	6542.06'	4502.53'
10700'					
10750'	10739'	89.97°	268.60°	6542.32'	4597.29'
10800'					
10850'	10834'	90.12°	267.51°	6542.24'	4691.92'
10900'					
10950'	10928'	90.80°	269.28°	6541.49'	4785.60'

	11000'	11001'	91.23°	269.34°	6540.20'	4858.43'
	11050'					
	<div>TD Well 11065'</div> 11065'	11065'	91.23°	269.34°	6538.82'	4922.28'
<div>PCG Gamma Ray BCorr</div> <div>PGRC</div> <div>0200</div> <div>api</div>	Measured Depth (ft) 1:600	Depth	Inc	Azi.	TVD	V.S.
<div>Average Rate of Penetration</div> <div>ROPA</div> <div>1K0</div> <div>feet per hr</div>						

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MD Main Log 1:240

<div>Average Rate of Penetration</div> <div>ROPA</div> <div>1K0</div> <div>feet per hr</div>						
<div>PCG Gamma Ray BCorr</div> <div>PGRC</div> <div>0200</div> <div>api</div>	Measured Depth (ft) 1:240	Depth	Inc	Azi.	TVD	V.S.
	3000'					
	3050'					



3100'

3150'

3200'

3250'

3067'

9.77°

336.49°

3052.04'

119.21'

PGRC

ROPA

3162'

10.16°

336.69°

3145.60'

126.54'

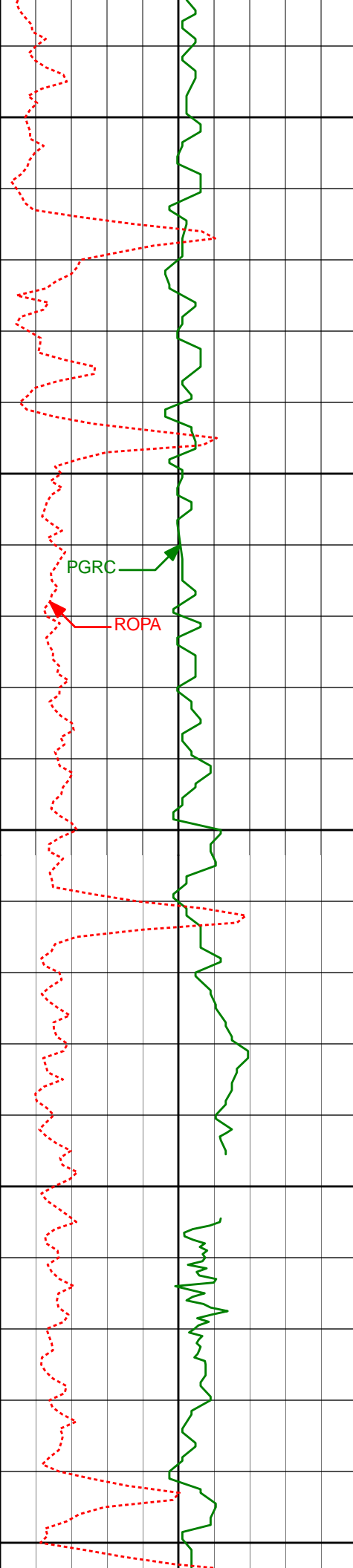
3257'

8.69°

330.78°

3239.32'

134.10'



3300'

3350'

3400'

3450'

3500'

3352'

7.91°

325.76°

3333.32'

141.90'

PGRC

ROPA

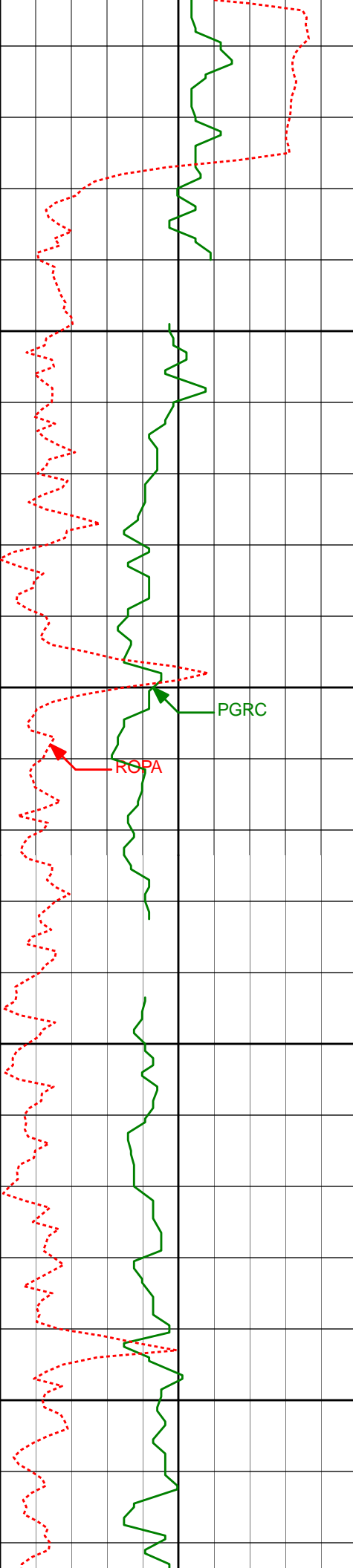
3447'

7.80°

319.93°

3427.43'

150.27'



3541'	7.78°	328.91°	3520.57'	158.20'
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3550'

3600'

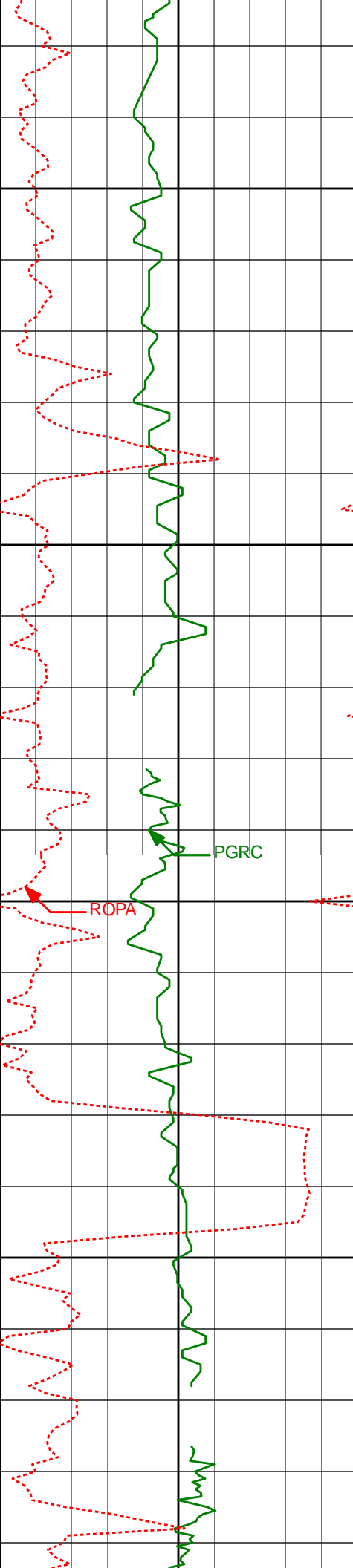
PGRC

ROPA

3636'	8.06°	328.86°	3614.66'	165.56'
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3650'

3700'



3750'

3800'

3850'

3900'

3731'

8.75°

329.57°

3708.64'

173.29'

3825'

9.50°

328.53°

3801.45'

181.63'

3920'

10.07°

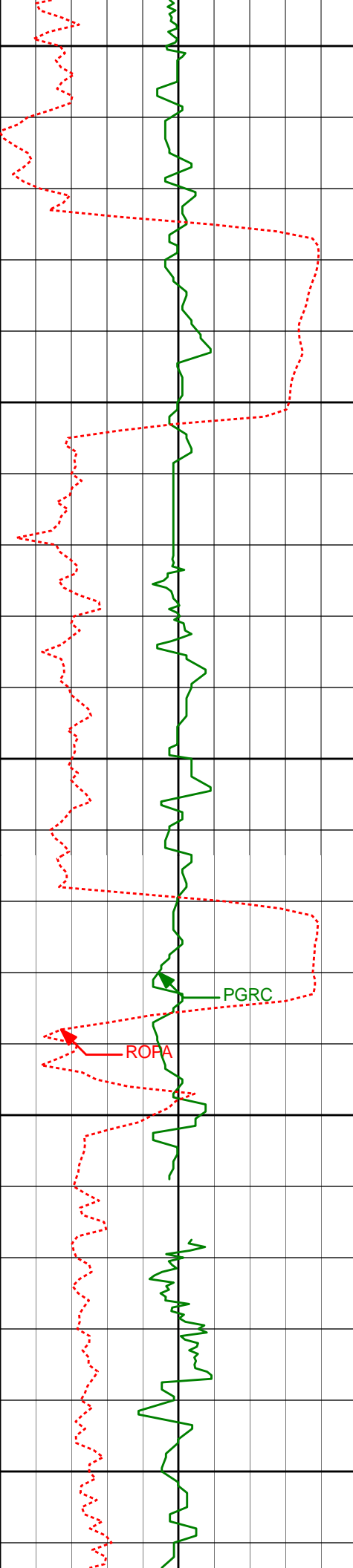
338.00°

3895.08'

189.60'

PGRC

ROPA



3950'

4000'

4050'

4100'

4150'

4015'

7.75°

341.25°

3988.93'

195.50'

PGRC

ROPA

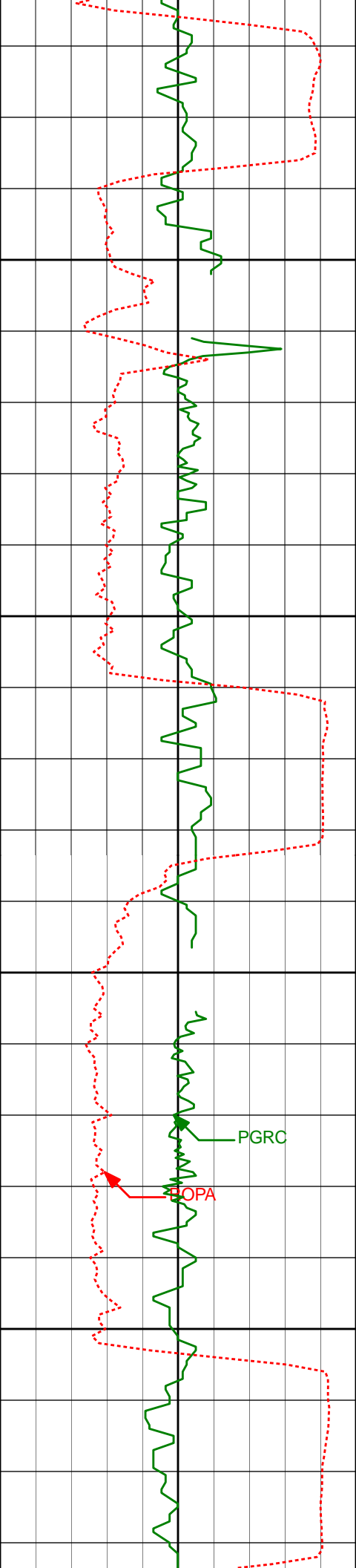
4110'

6.45°

343.68°

4083.19'

199.65'



4200'

4250'

4300'

4350'

4204'

5.11°

342.02°

4176.71'

202.91'

4299'

2.97°

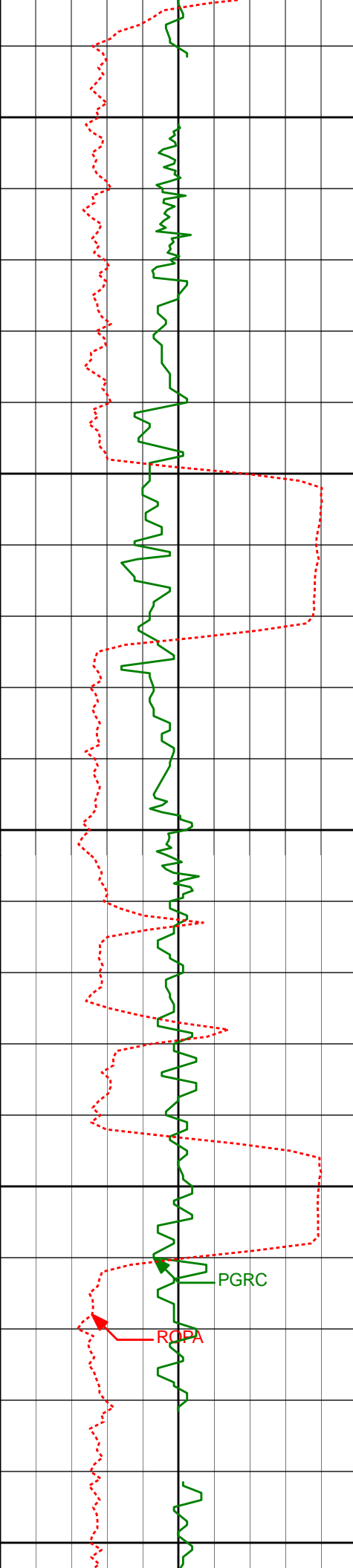
339.83°

4271.47'

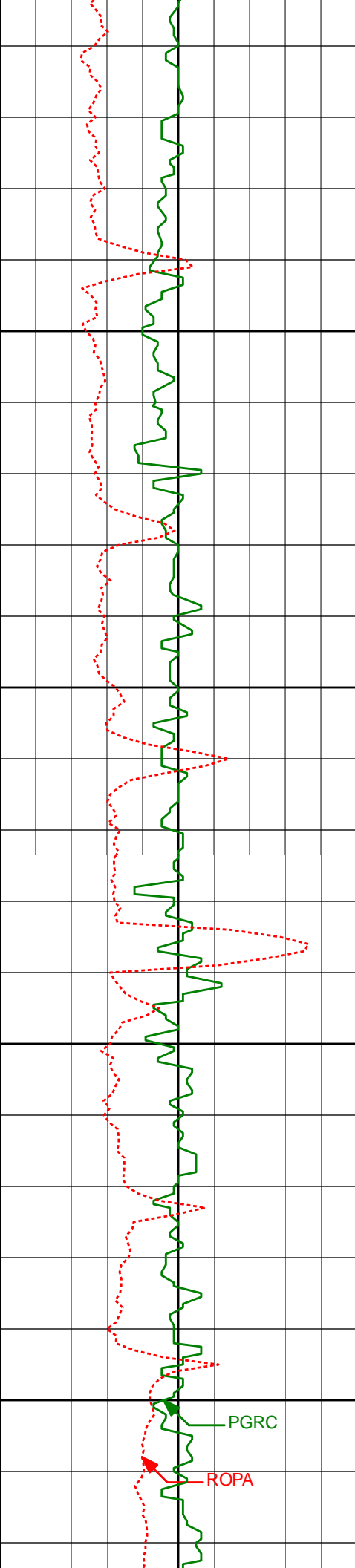
205.40'

PGRC

BOPA



4394'	2.18°	7.40°	4366.38'	206.23'
4400'				
4450'				
4489'	1.16°	78.27°	4461.35'	205.17'
4500'				
4550'				
4583'	0.11°	199.38°	4555.34'	204.27'
4600'				



4650'

4678'

0.26°

59.05°

4650.34'

204.12'

4700'

4750'

4773'

0.37°

251.12°

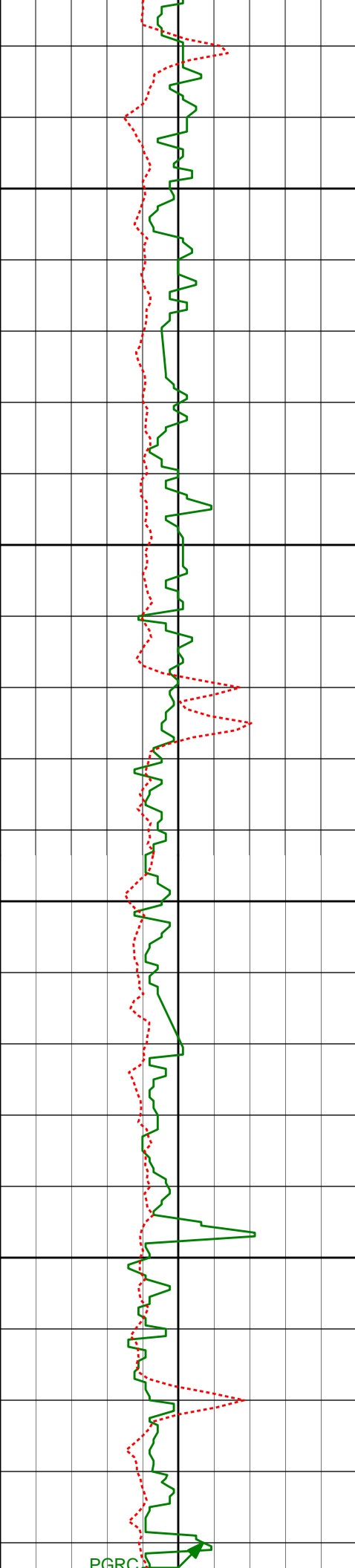
4745.34'

204.23'

4800'

PGRC

ROPA



4850'

4868'

0.66°

228.88°

4840.34'

204.90'

4900'

4950'

4963'

0.51°

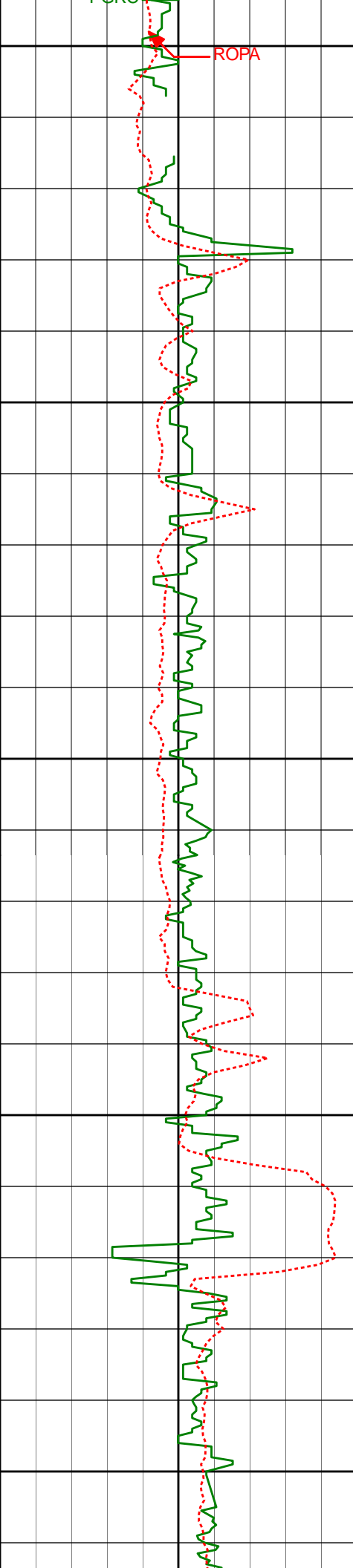
231.99°

4935.33'

205.61'

5000'

PGRC



5050'

5058'

0.72°

237.23°

5030.33'

206.42'

5100'

5150'

5153'

0.84°

245.74°

5125.32'

207.52'

5200'

5250'

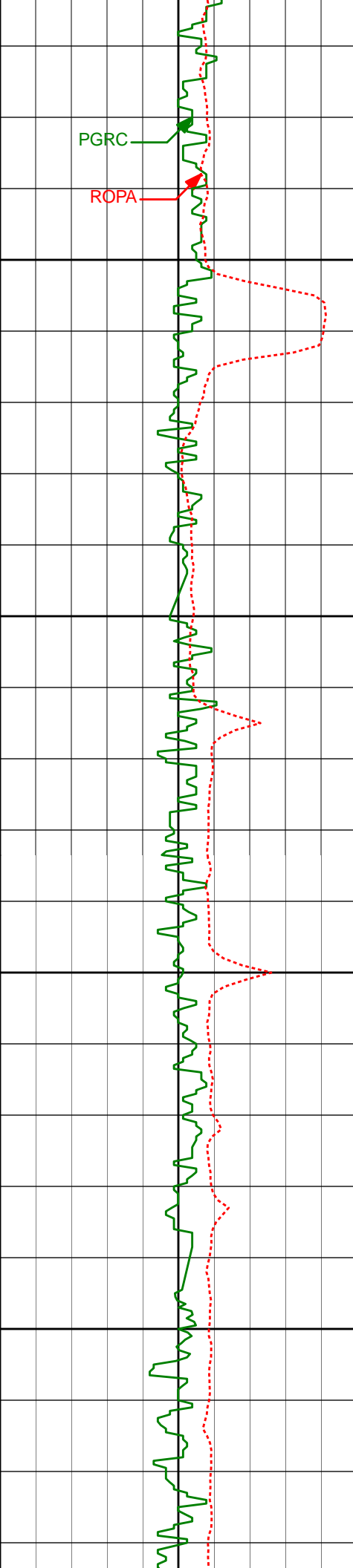
5248'

0.57°

214.39°

5220.31'

208.38'



PGRC

ROPA

5300'

5350'

5400'

5450'

5343'

0.44°

195.94°

5315.31'

208.71'

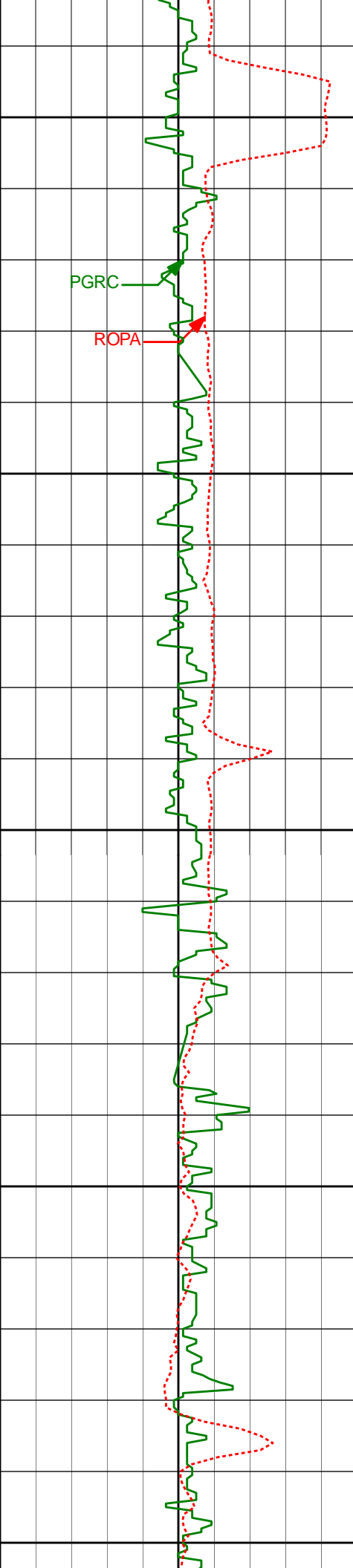
5437'

0.41°

233.70°

5409.30'

209.05'



5500'

PGRC

ROPA

5550'

5600'

5650'

5700'

5532'

0.93°

312.21°

5504.30'

209.91'

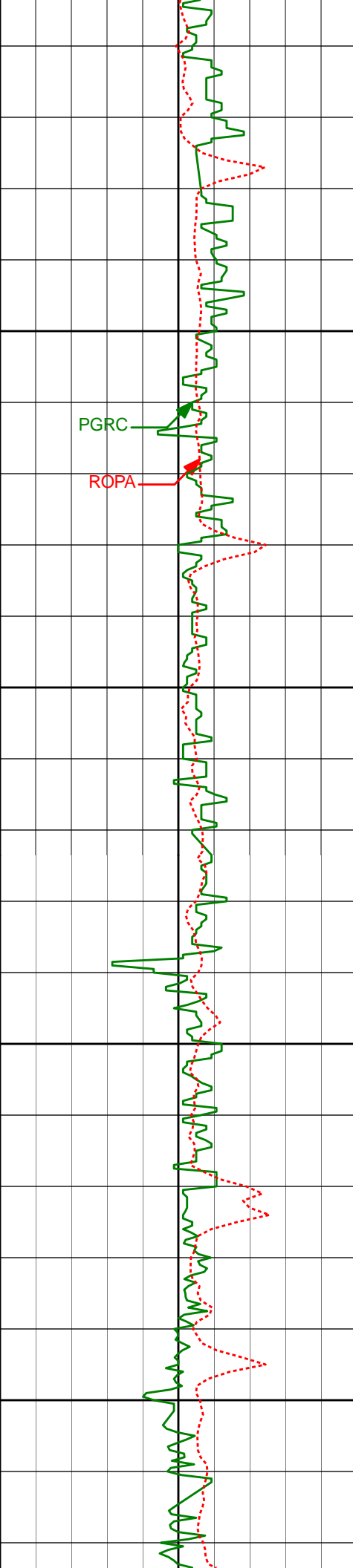
5627'

0.87°

294.63°

5599.29'

211.18'



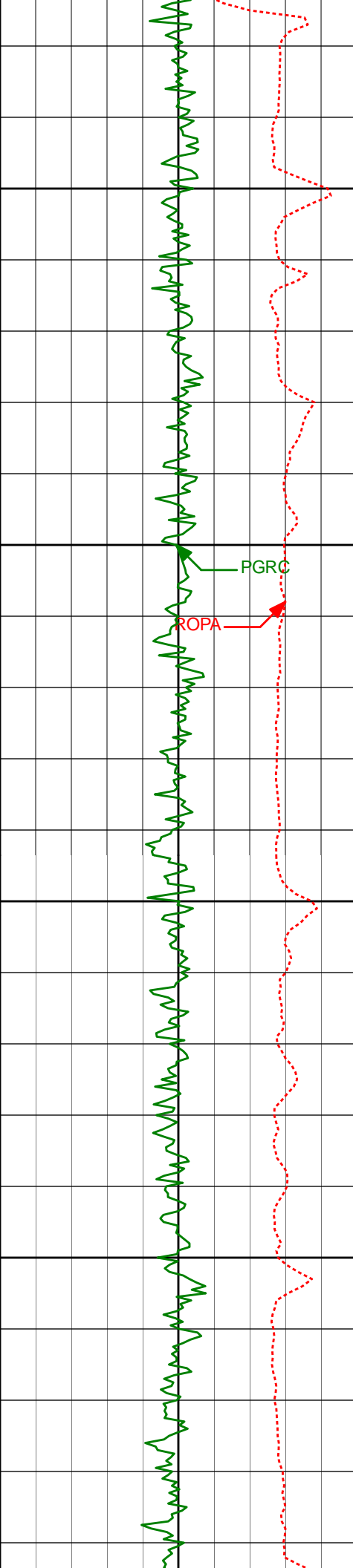
5750'

5800'

5850'

5900'

5722'	0.47°	266.22°	5694.28'	212.24'
5817'	0.62°	239.10°	5789.28'	213.05'
5870'	0.75°	248.21°	5842.27'	213.60'
5909'	0.52°	250.88°	5881.27'	214.00'



5950'

6000'

6050'

6100'

PGRC

ROPA

6004'

3.28°

255.74°

5976.21'

216.99'

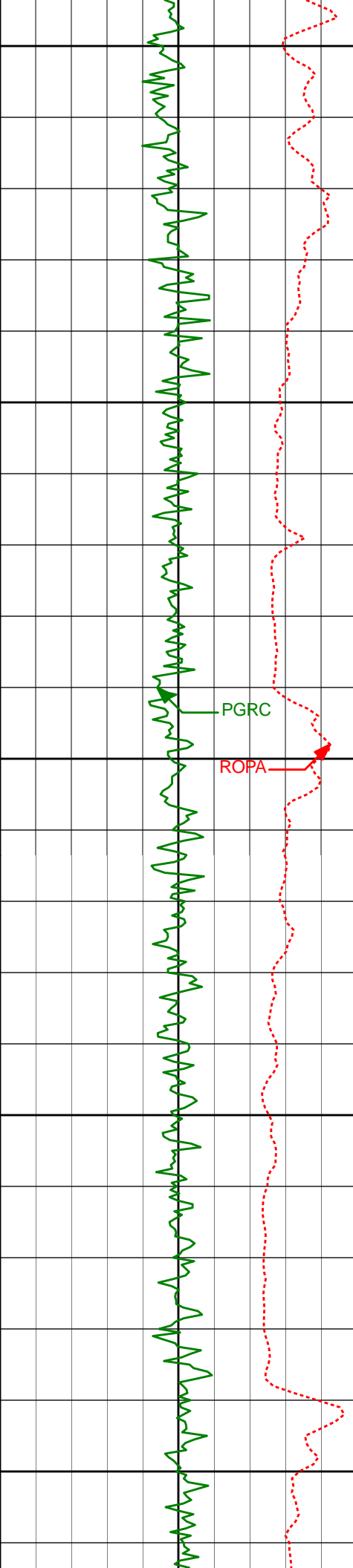
6099'

13.92°

263.23°

6070.01'

230.89'



6150'

6194'

15.57°

255.14°

6161.89'

254.28'

6200'

PGRC

ROPA

6250'

6288'

19.36°

268.26°

6251.57'

281.83'

6300'

6337'

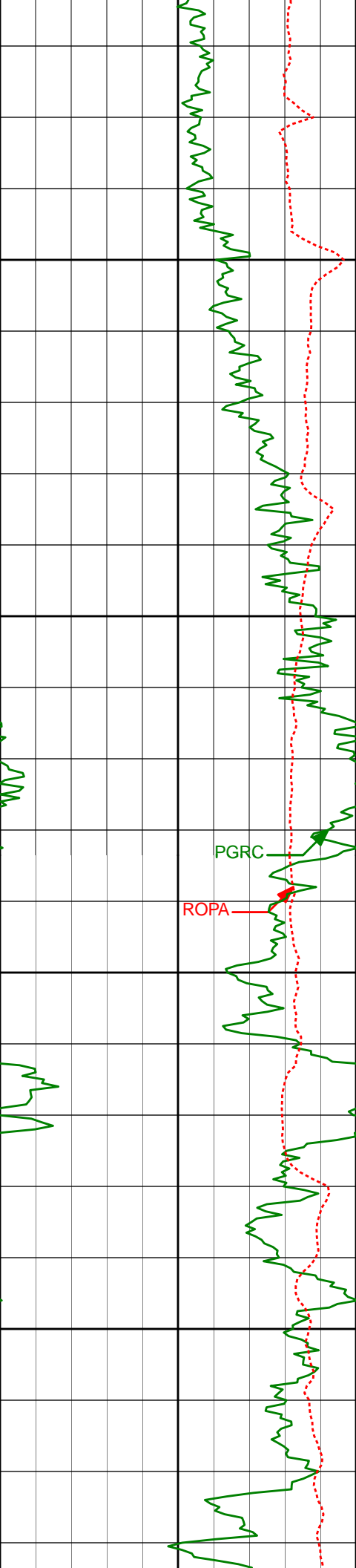
24.97°

271.93°

6296.93'

300.28'

6350'



6400'

6450'

6500'

6550'

PGRC

ROPA

6383'

29.55°

271.78°

6337.81'

321.34'

6478'

43.02°

268.38°

6414.22'

377.32'

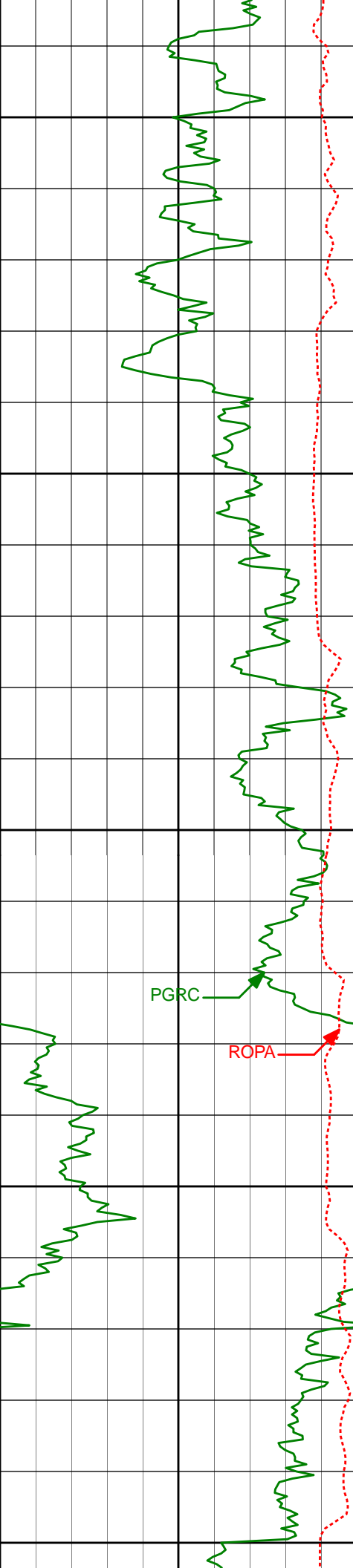
6573'

59.89°

269.92°

6473.21'

451.18'



6600'

6621'

67.53°

269.44°

6494.45'

494.11'

6650'

6668'

69.17°

269.57°

6511.79'

537.71'

6700'

6716'

76.48°

269.16°

6525.96'

583.44'

PGRC

ROPA

6750'

6793'

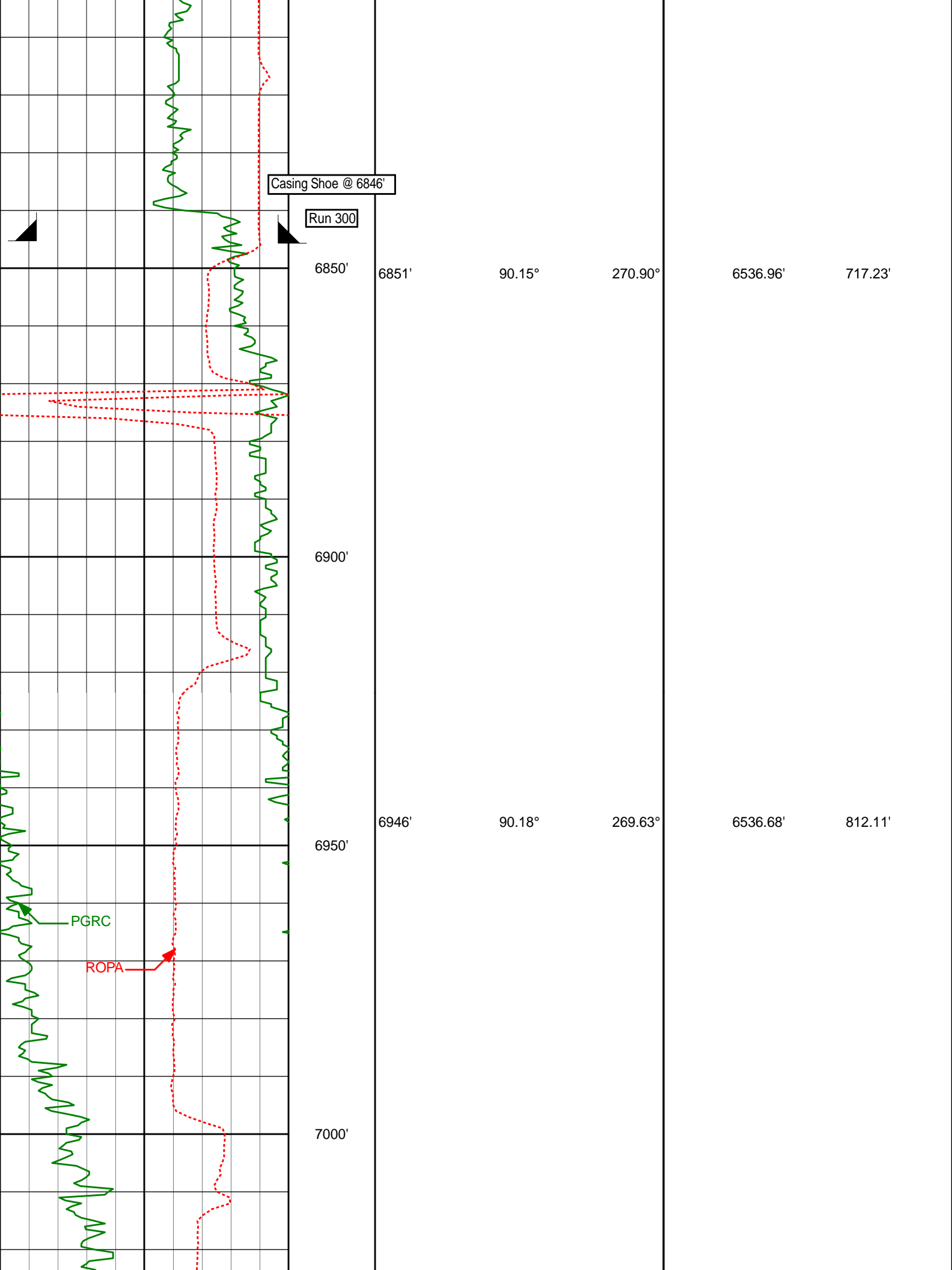
88.27°

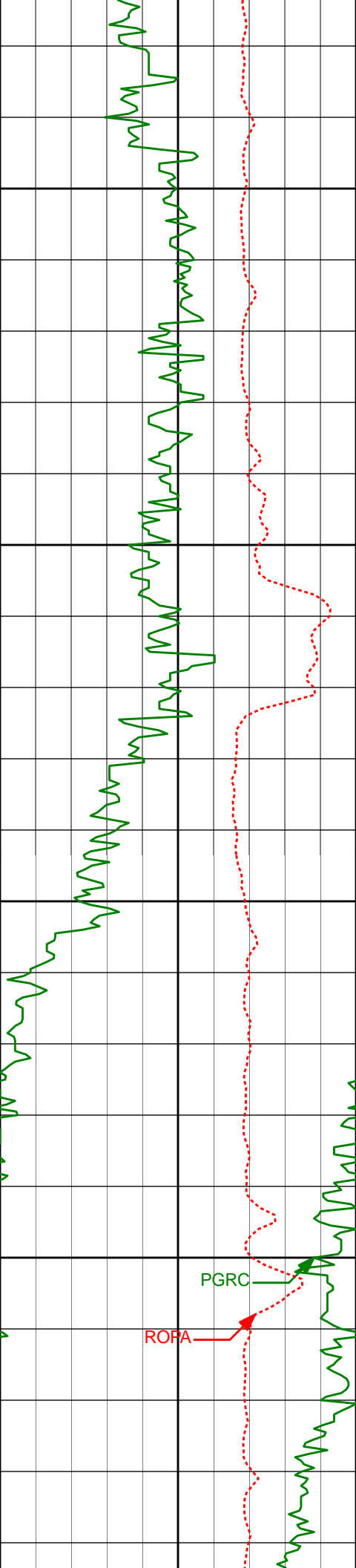
267.66°

6536.16'

659.37'

6800'





7050'

7100'

7150'

7200'

7041'

90.22°

268.95°

6536.35'

906.90'

7136'

88.73°

269.11°

6537.22'

1001.66'

7230'

88.74°

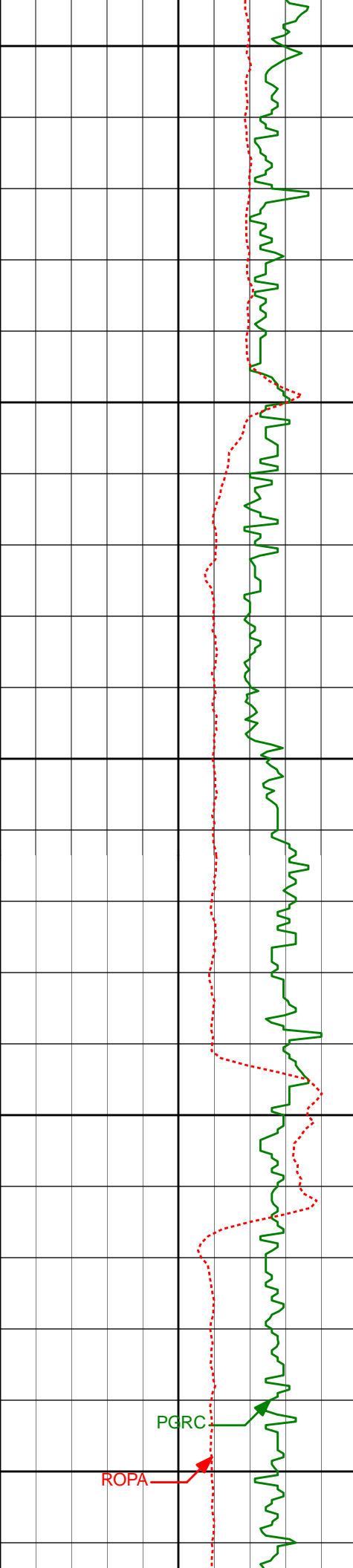
269.04°

6539.30'

1095.41'

PGRC

ROPA



7250'

7300'

7350'

7400'

7450'

7325'

88.98°

268.10°

6541.19'

1190.10'

7420'

89.63°

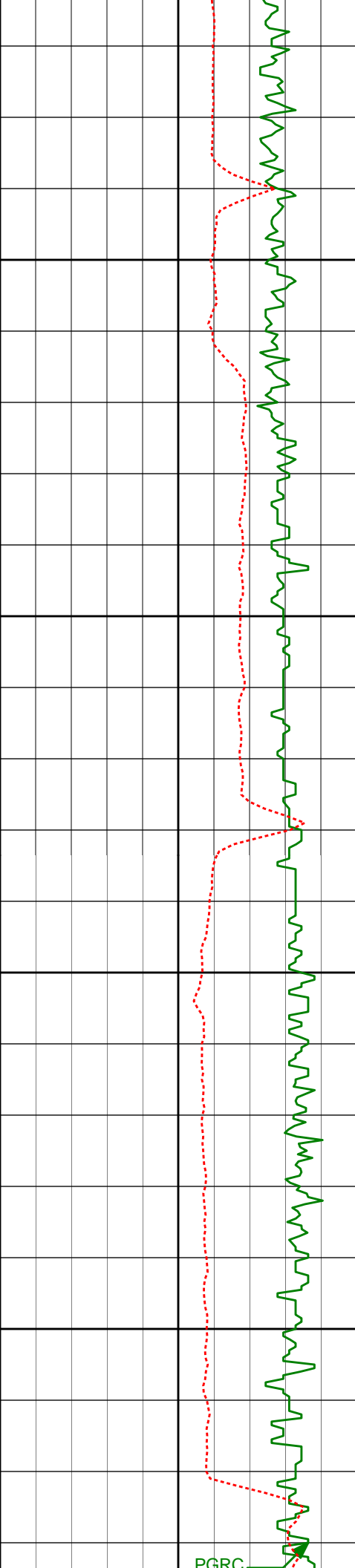
270.04°

6542.34'

1284.85'

PGRC

ROPA



7500'

7515'

89.63°

269.66°

6542.95'

1379.70'

7550'

7600'

7610'

89.81°

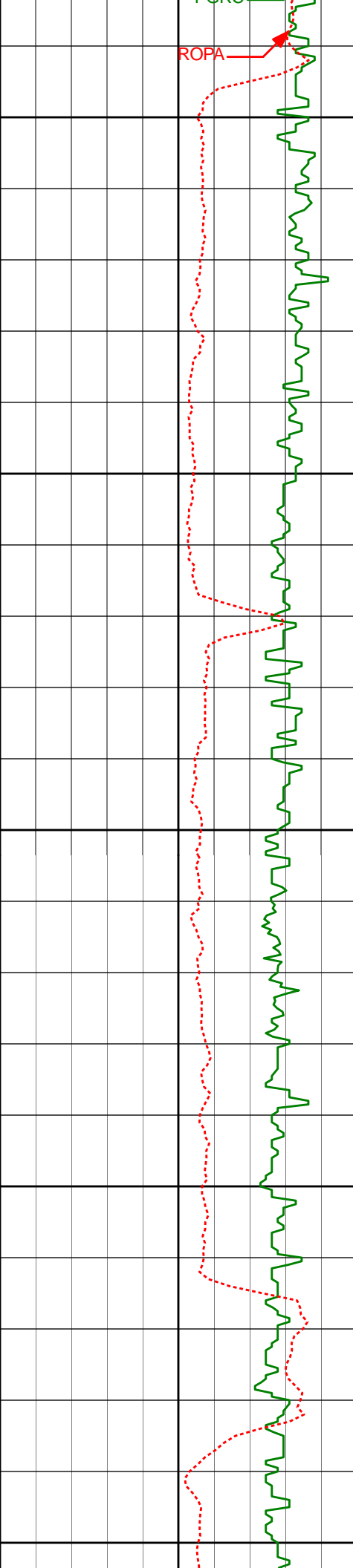
269.24°

6543.42'

1474.51'

7650'

PGRC



7700'

7750'

7800'

7850'

7900'

7705'

7799'

7894'

90.49°

90.99°

90.40°

270.96°

269.65°

271.25°

6543.17'

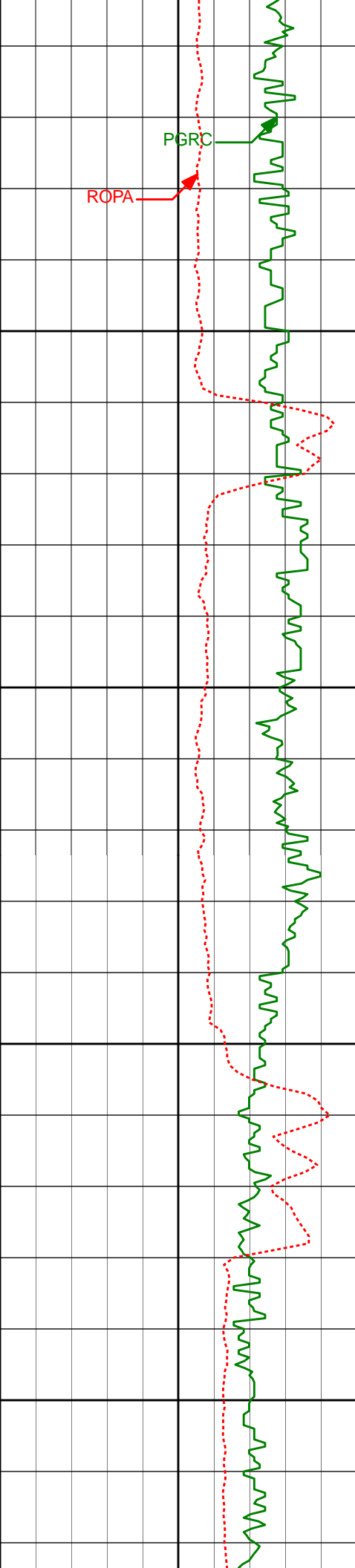
6541.95'

6540.80'

1569.38'

1663.26'

1758.15'



7950'

7989'

90.71°

270.89°

6539.88'

1853.09'

8000'

8050'

8084'

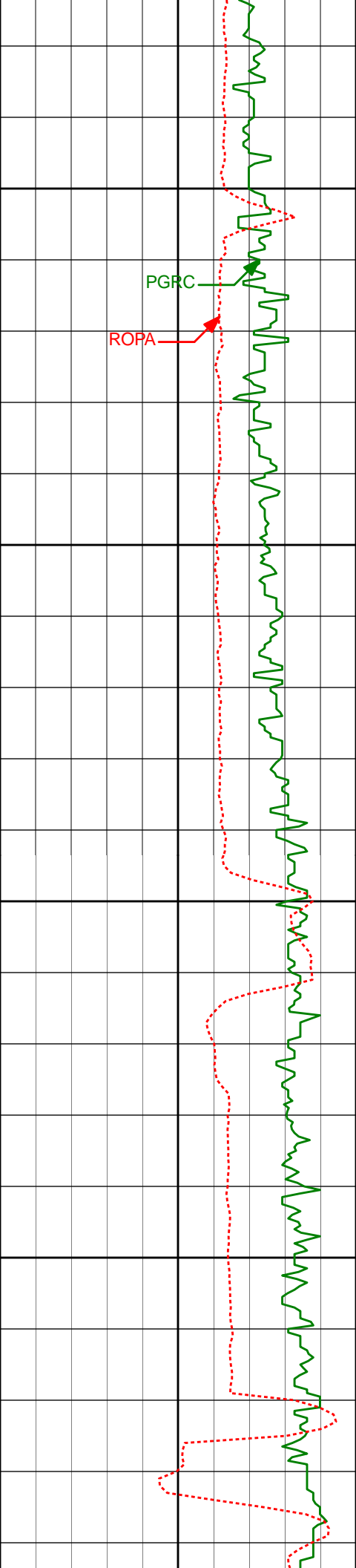
89.72°

271.07°

6539.53'

1948.02'

8100'



8150'

PGRC

ROPA

8200'

8250'

8300'

8179'

90.80°

271.11°

6539.09'

2042.96'

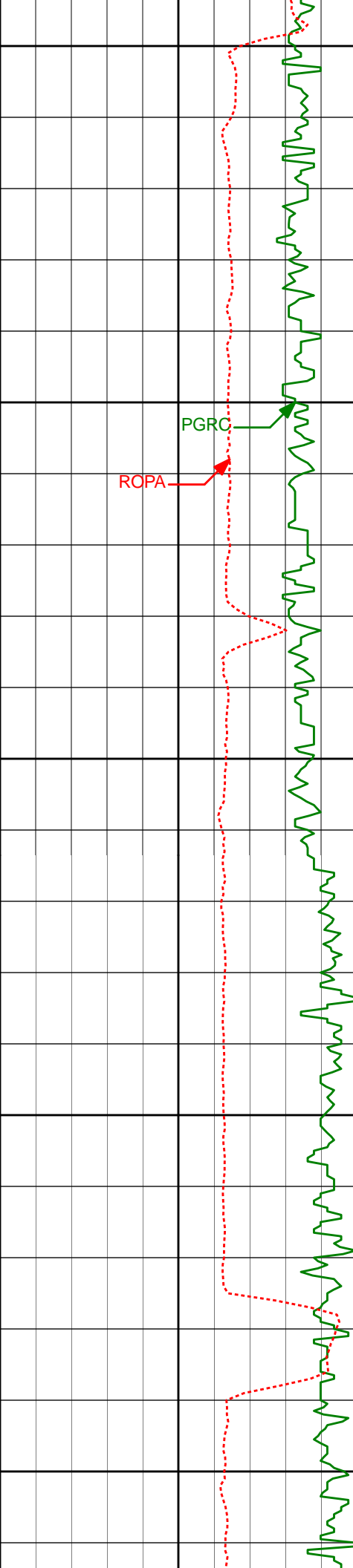
8273'

89.85°

270.11°

6538.56'

2136.87'



8350'

8369'

89.38°

269.27°

6539.21'

2232.70'

8400'

PGRC

ROPA

8450'

8463'

90.34°

269.14°

6539.44'

2326.49'

8500'

8550'

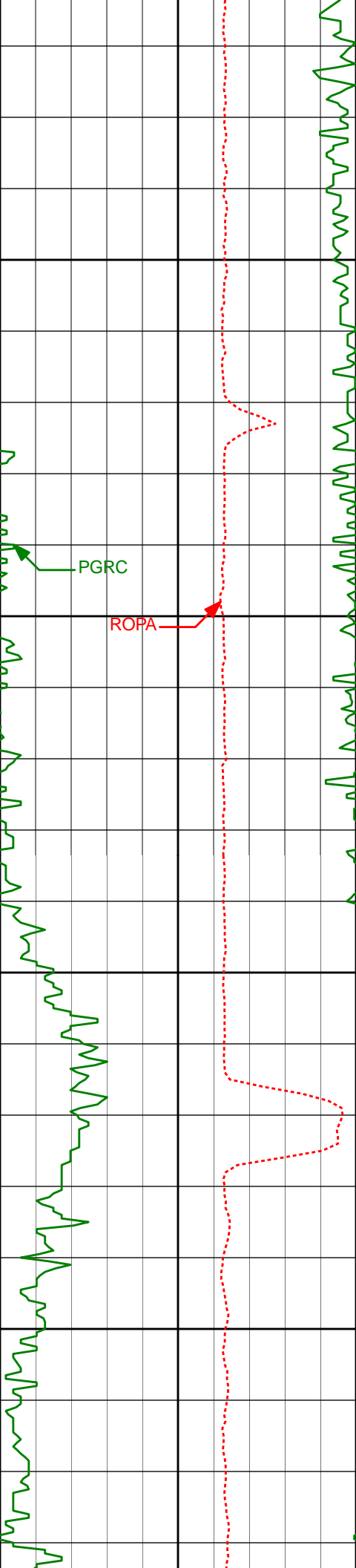
8558'

89.72°

269.09°

6539.39'

2421.26'



8600'

8650'

8700'

8750'

8653'

90.18°

269.18°

6539.47'

2516.04'

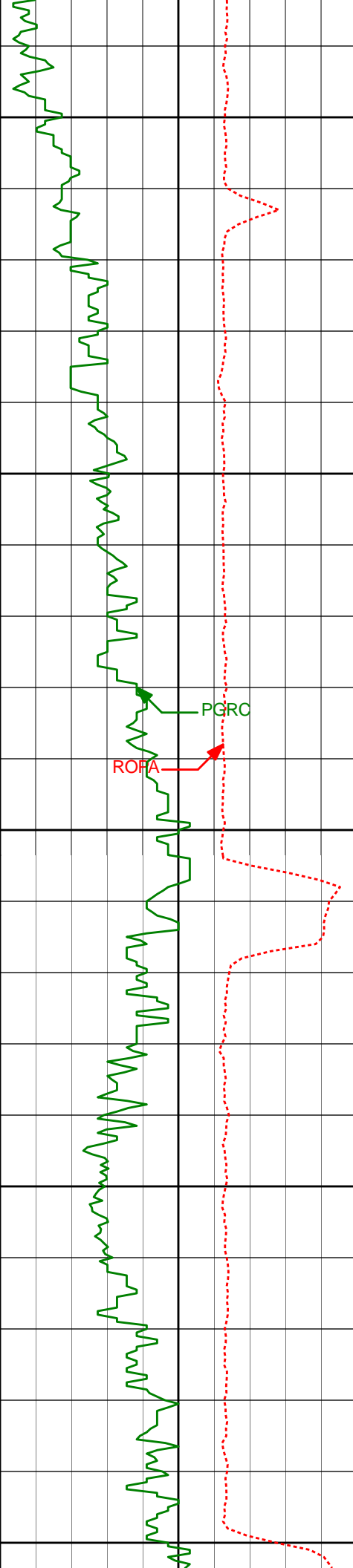
8748'

89.57°

269.66°

6539.68'

2610.84'



8800'

8842'

90.06°

270.55°

6539.98'

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8850'

PGRC

ROPA

8900'

8937'

89.69°

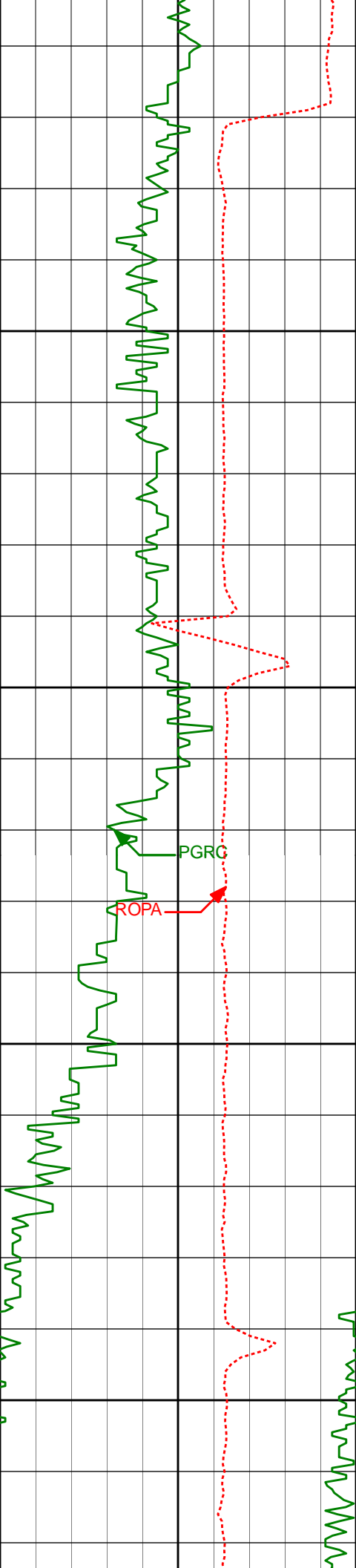
271.14°

6540.19'

2799.64'

8950'

9000'



9032'

9050'

9100'

9150'

9200'

9032'

89.85°

269.81°

6540.57'

2894.54'

9127'

88.99°

269.09°

6541.53'

2989.35'

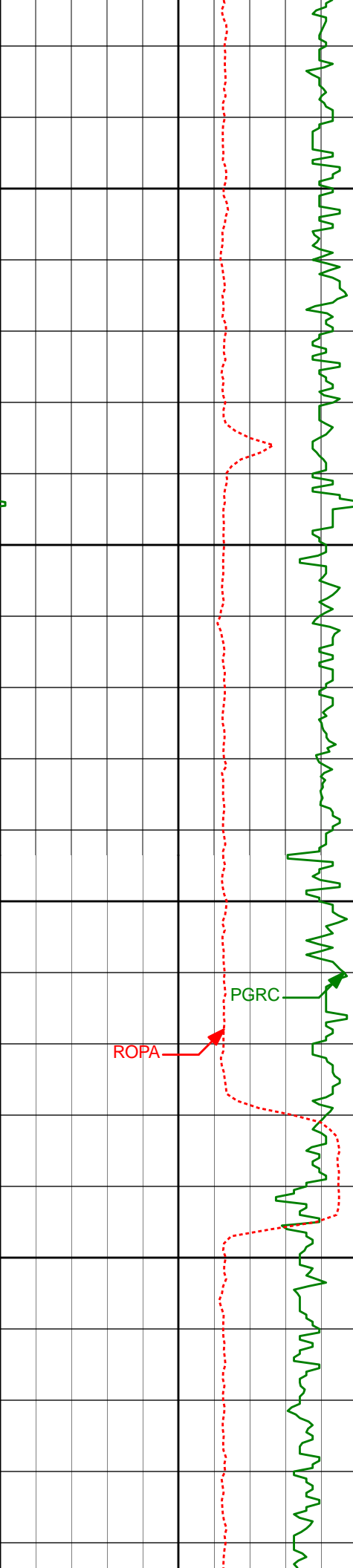
9221'

89.60°

269.60°

6542.69'

3083.14'



9250'

9300'

9350'

9400'

PGRC

ROPA

9316'

89.66°

270.30°

6543.30'

3178.00'

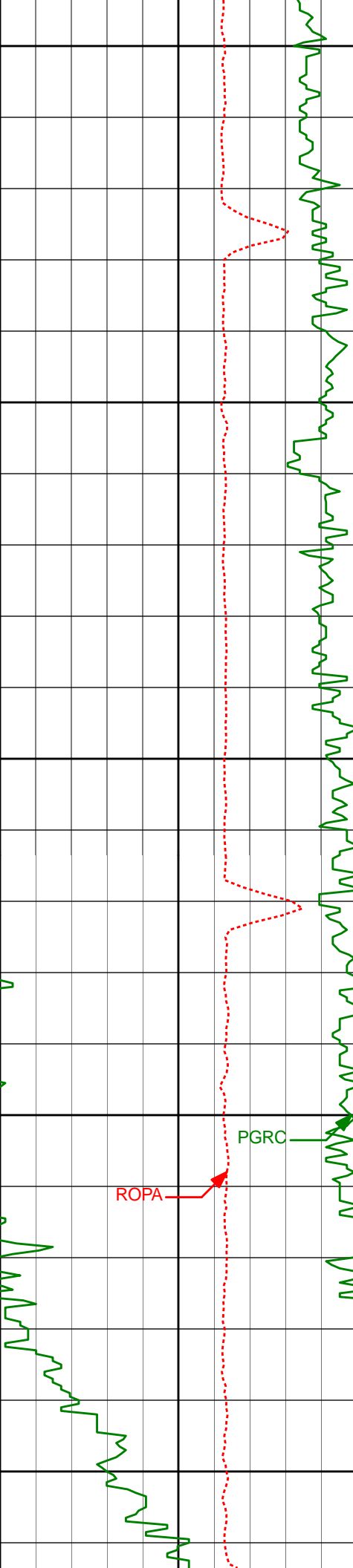
9411'

90.34°

268.55°

6543.30'

3272.80'



9450'

9500'

9550'

9600'

9650'

9506'

90.09°

267.98°

6542.94'

3367.47'

9600'

90.34°

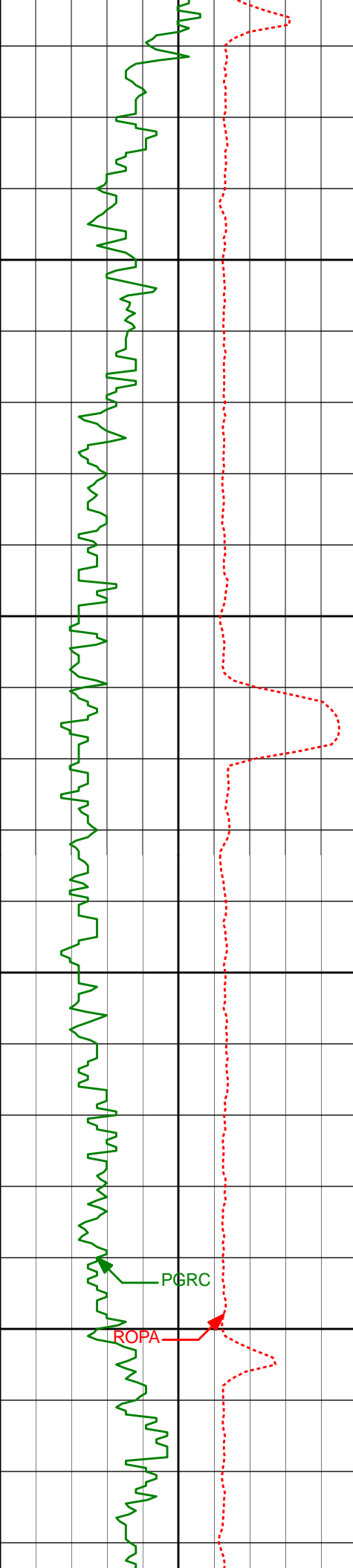
268.02°

6542.59'

3461.10'

ROP

PGRC



9700'

9750'

9800'

9850'

9695'

90.80°

268.33°

6541.65'

3555.75'

9790'

89.66°

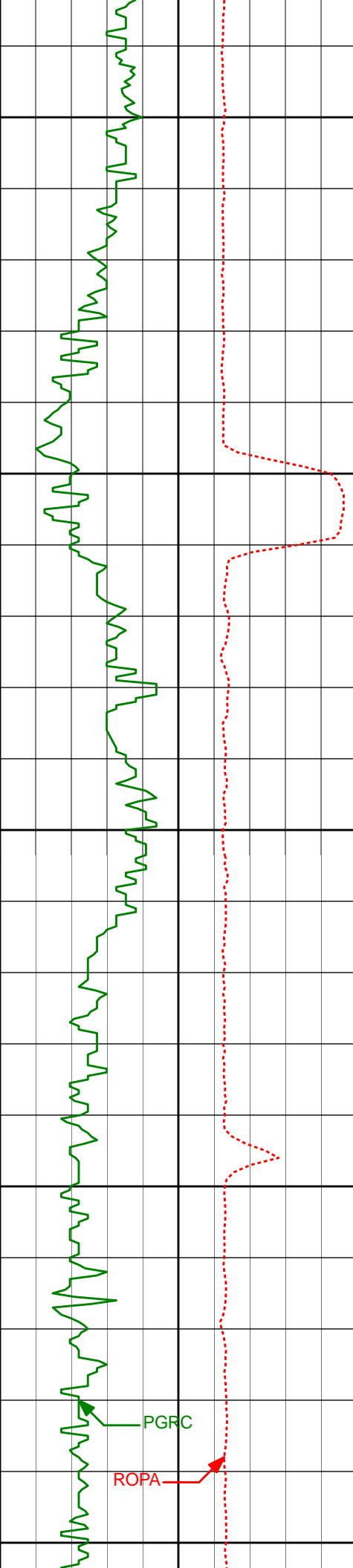
268.66°

6541.27'

3650.44'

PGRC

ROPA



9900'

9950'

10000'

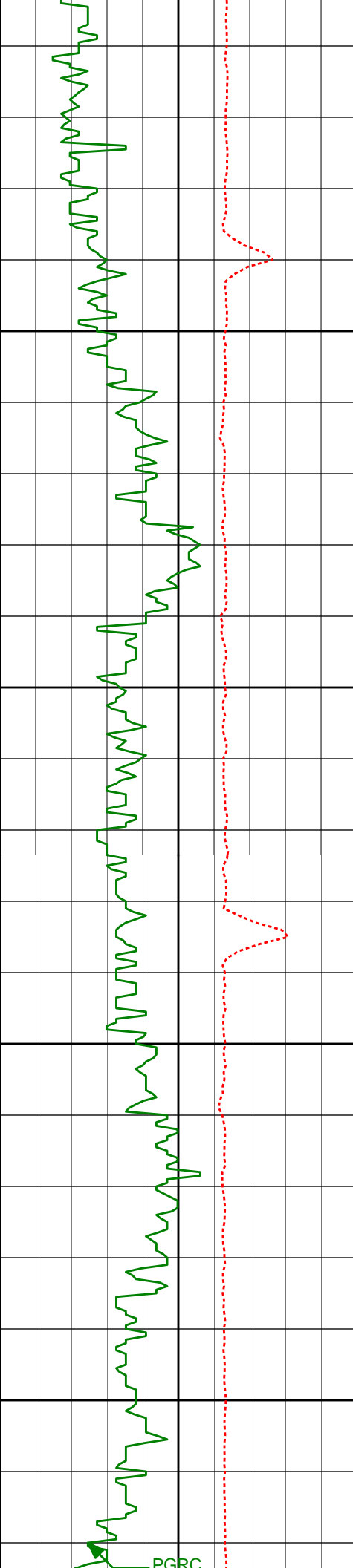
10050'

10100'

9885'	90.43°	268.71°	6541.19'	3745.16'
9980'	88.71°	269.13°	6541.90'	3839.91'
10075'	89.23°	269.05°	6543.61'	3934.66'

PGRC

ROPA



10150'

10170'

89.35°

269.20°

6544.79'

4029.43'

10200'

10250'

10265'

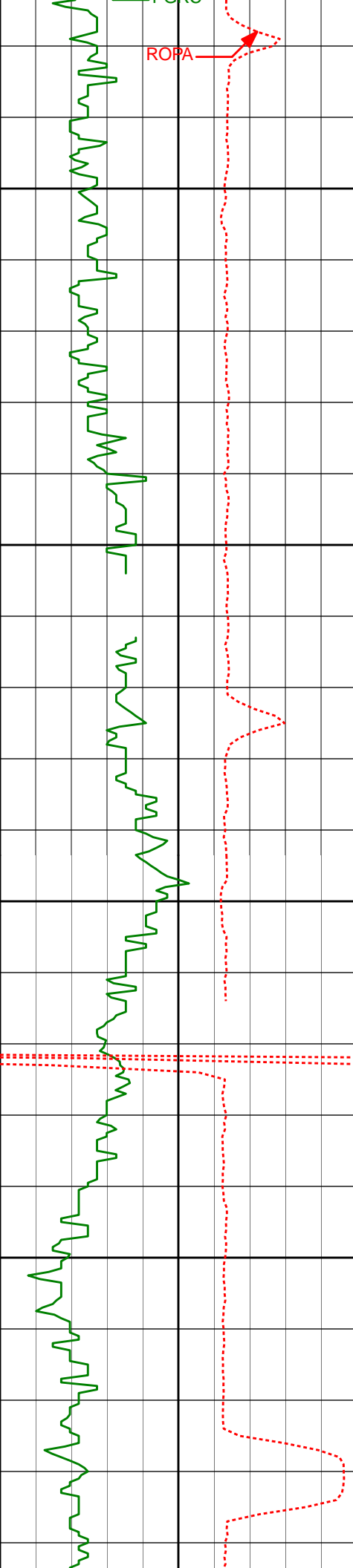
90.55°

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6544.87'

4124.25'

10300'



10350'

10360'

90.80°

269.63°

6543.75'

4219.08'

10400'

10450'

10454'

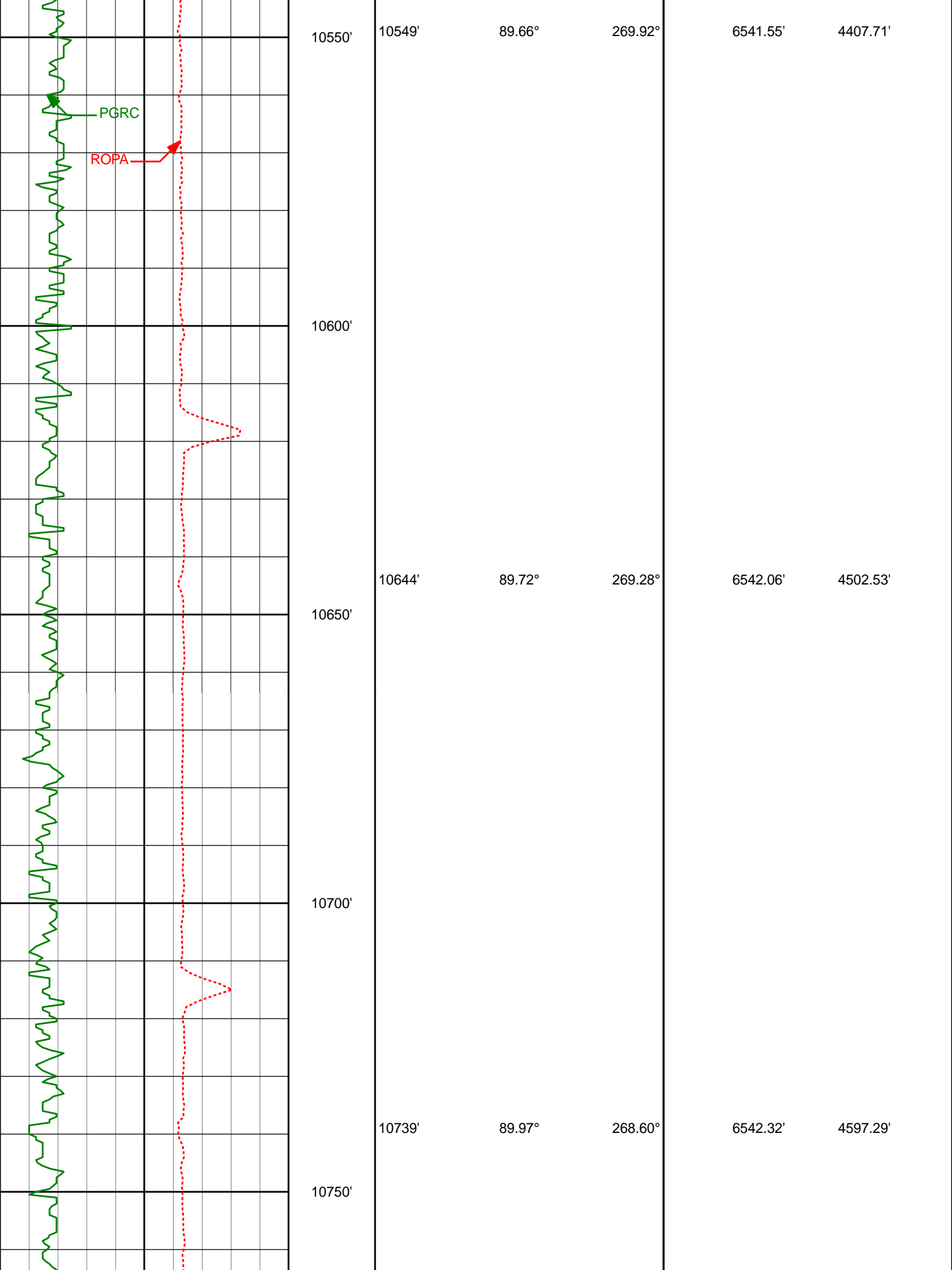
91.11°

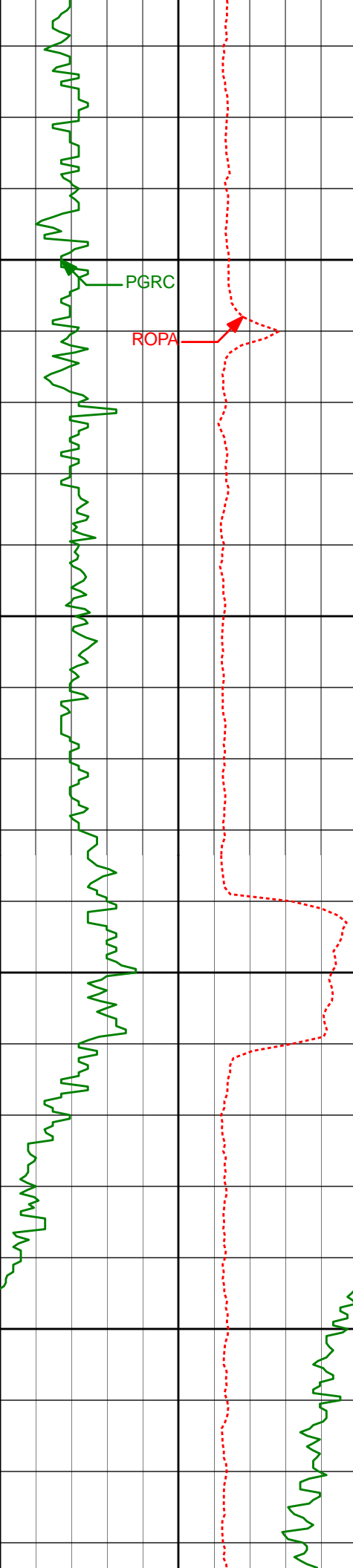
269.37°

6542.19'

4312.88'

10500'





10800'

PGRC

ROPA

10850'

10900'

10950'

10834'

90.12°

267.51°

6542.24'

4691.92'

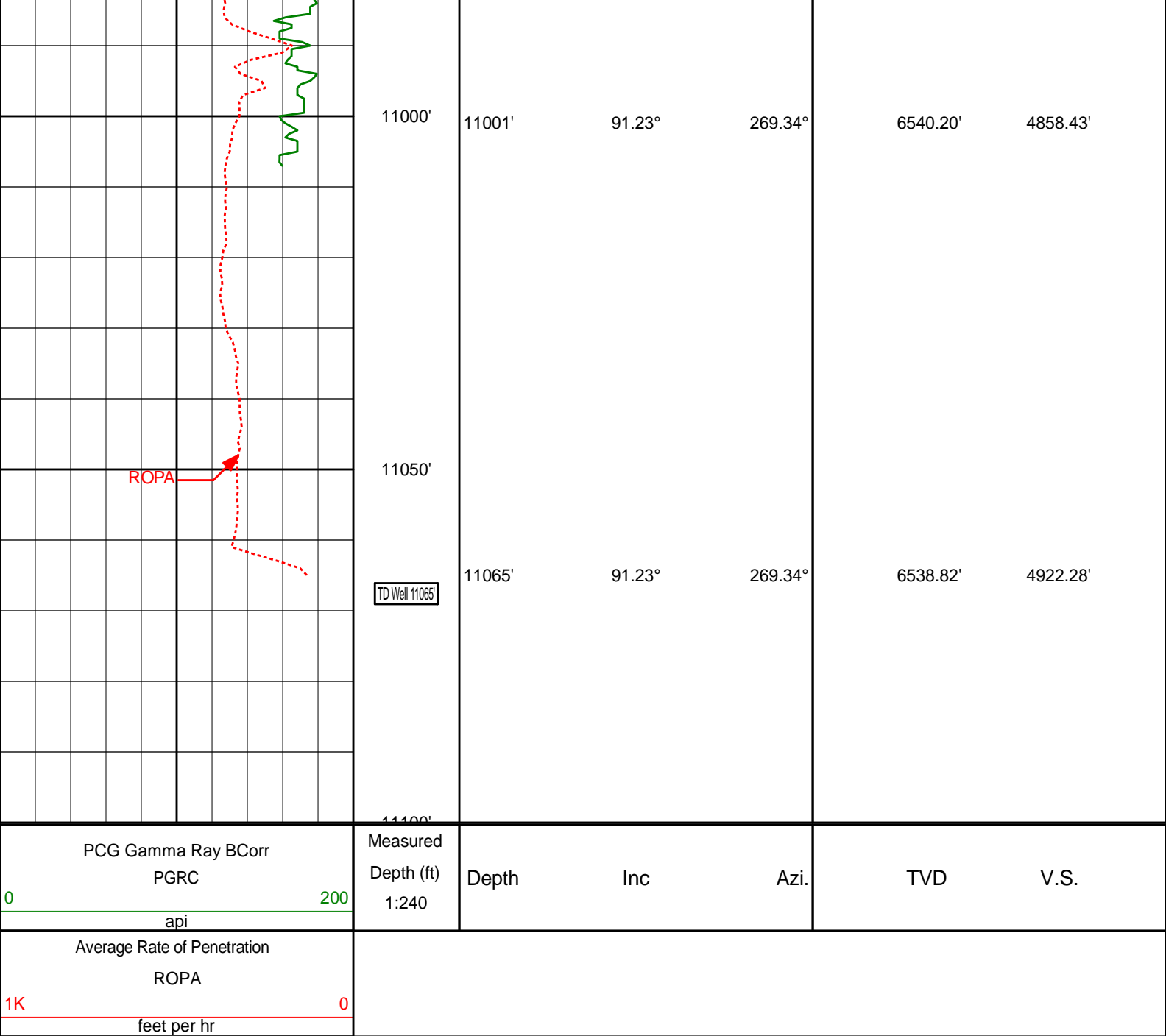
10928'

90.80°

269.28°

6541.49'

4785.60'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch AA35-65-1AHNA
Wattenberg
Weld Colorado
USA
CA-XX-0901017395
Tie into surface

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
709.00	0.69	232.29	708.98	2.61 S	3.38 W	3.23	0.10
803.00	0.89	234.74	802.97	3.38 S	4.42 W	4.23	0.22
896.00	0.97	251.74	895.96	4.04 S	5.76 W	5.53	0.31
989.00	0.94	238.12	988.95	4.69 S	7.15 W	6.89	0.25

	1082.00	0.86	240.26	1081.94	5.44 S	8.41 W	8.10	0.09
	1174.00	0.76	258.92	1173.93	5.90 S	9.61 W	9.28	0.30
	1267.00	0.86	269.09	1266.92	6.03 S	10.91 W	10.57	0.19
	1454.00	0.93	250.58	1453.90	6.56 S	13.74 W	13.37	0.16
	1549.00	0.91	250.20	1548.88	7.07 S	15.18 W	14.78	0.02
	1644.00	0.59	211.38	1643.88	7.74 S	16.14 W	15.71	0.61
	1738.00	0.24	255.88	1737.87	8.20 S	16.59 W	16.12	0.48
	1833.00	3.10	325.75	1832.83	6.13 S	18.23 W	17.87	3.19
	1928.00	5.64	334.12	1927.54	0.20 N	21.71 W	21.69	2.75
	2023.00	7.07	329.29	2021.96	9.42 N	26.73 W	27.20	1.61
	2118.00	9.31	330.57	2115.98	21.14 N	33.50 W	34.58	2.37
	2213.00	9.78	331.70	2209.67	34.94 N	41.10 W	42.91	0.53
	2308.00	9.74	330.42	2303.29	49.03 N	48.89 W	51.45	0.23
	2403.00	9.31	328.68	2396.98	62.59 N	56.85 W	60.12	0.54
	2498.00	9.13	327.55	2490.76	75.51 N	64.89 W	68.84	0.27
	2593.00	9.27	327.82	2584.53	88.35 N	73.01 W	77.64	0.15
	2688.00	9.33	329.44	2678.29	101.46 N	81.00 W	86.32	0.28
	2782.00	9.11	328.26	2771.07	114.35 N	88.79 W	94.78	0.31
	2877.00	9.56	327.53	2864.81	127.40 N	96.98 W	103.66	0.49
	2972.00	9.97	336.50	2958.44	141.60 N	104.50 W	111.93	1.66
	3067.00	9.77	336.49	3052.04	156.53 N	110.99 W	119.21	0.21
	3162.00	10.16	336.69	3145.60	171.61 N	117.52 W	126.54	0.41
	3257.00	8.69	330.78	3239.32	185.57 N	124.34 W	134.10	1.85
	3352.00	7.91	325.76	3333.32	197.24 N	131.52 W	141.90	1.12
	3447.00	7.80	319.93	3427.43	207.58 N	139.35 W	150.27	0.85
	3541.00	7.78	328.91	3520.57	217.91 N	146.74 W	158.20	1.29
	3636.00	8.06	328.86	3614.66	229.12 N	153.51 W	165.56	0.29
	3731.00	8.75	329.57	3708.64	241.05 N	160.61 W	173.29	0.73
	3825.00	9.50	328.53	3801.45	253.83 N	168.28 W	181.63	0.82
	3920.00	10.07	338.00	3895.08	268.22 N	175.49 W	189.60	1.79
	4015.00	7.75	341.25	3988.93	281.98 N	180.66 W	195.50	2.50
	4110.00	6.45	343.68	4083.19	293.17 N	184.22 W	199.65	1.40
	4204.00	5.11	342.02	4176.71	302.22 N	186.99 W	202.91	1.44
	4299.00	2.97	339.83	4271.47	308.56 N	189.15 W	205.40	2.26
	4394.00	2.18	7.40	4366.38	312.66 N	189.76 W	206.23	1.52
	4489.00	1.16	78.27	4461.35	314.65 N	188.59 W	205.17	2.22
	4583.00	0.11	199.38	4555.34	314.75 N	187.69 W	204.27	1.30
	4678.00	0.26	59.05	4650.34	314.78 N	187.53 W	204.12	0.37
	4773.00	0.37	251.12	4745.34	314.79 N	187.64 W	204.23	0.66
	4868.00	0.66	228.88	4840.34	314.33 N	188.34 W	204.90	0.37
	4963.00	0.51	231.99	4935.33	313.71 N	189.08 W	205.61	0.16
	5058.00	0.72	237.23	5030.33	313.13 N	189.92 W	206.42	0.23
	5153.00	0.84	245.74	5125.32	312.52 N	191.06 W	207.52	0.18
	5248.00	0.57	214.39	5220.31	311.84 N	191.96 W	208.38	0.49
	5343.00	0.44	195.94	5315.31	311.10 N	192.32 W	208.71	0.22
	5437.00	0.41	233.70	5409.30	310.56 N	192.70 W	209.05	0.29
	5532.00	0.93	312.21	5504.30	310.87 N	193.54 W	209.91	0.99
	5627.00	0.87	294.63	5599.29	311.69 N	194.77 W	211.18	0.30
	5722.00	0.47	266.22	5694.28	311.97 N	195.81 W	212.24	0.54
	5817.00	0.62	239.10	5789.28	311.68 N	196.64 W	213.05	0.31
	5870.00	0.75	248.21	5842.27	311.40 N	197.21 W	213.60	0.32
	5909.00	0.52	250.88	5881.27	311.25 N	197.61 W	214.00	0.59
	6004.00	3.28	255.74	5976.21	310.44 N	200.66 W	216.99	2.91
	6099.00	13.92	263.23	6070.01	308.41 N	214.68 W	230.89	11.24
	6194.00	15.57	255.14	6161.89	303.80 N	238.35 W	254.28	2.77
	6288.00	19.36	268.26	6251.57	300.09 N	266.14 W	281.83	5.79
	6337.00	24.97	271.93	6296.93	300.19 N	284.61 W	300.28	11.79
	6383.00	29.55	271.78	6337.81	300.87 N	305.66 W	321.34	9.96
	6478.00	43.02	268.38	6414.22	300.68 N	361.74 W	377.32	14.33
	6573.00	59.89	269.92	6473.21	299.70 N	435.76 W	451.18	17.80
	6621.00	67.53	269.44	6494.45	299.45 N	478.76 W	494.11	15.94
	6668.00	69.17	269.57	6511.79	299.07 N	522.44 W	537.71	3.50
	6716.00	76.48	269.16	6525.96	298.56 N	568.27 W	583.44	15.25
	6793.00	88.27	267.66	6536.16	296.43 N	644.42 W	659.37	15.43
	6851.00	90.15	270.90	6536.96	295.71 N	702.40 W	717.23	6.46
	6946.00	90.18	269.63	6536.68	296.15 N	797.40 W	812.11	1.34
	7041.00	90.22	268.95	6536.35	294.97 N	892.39 W	906.90	0.72
	7136.00	88.73	269.11	6537.22	293.36 N	987.37 W	1001.66	1.58
	7230.00	88.74	269.04	6539.30	291.84 N	1081.33 W	1095.41	0.08
	7325.00	88.98	268.10	6541.19	289.47 N	1176.28 W	1190.10	1.02
	7420.00	89.63	270.04	6542.34	287.93 N	1271.26 W	1284.85	2.15
	7515.00	89.63	269.66	6542.95	287.68 N	1366.26 W	1379.70	0.40
	7610.00	89.81	269.24	6543.42	286.77 N	1461.25 W	1474.51	0.48
	7705.00	90.49	270.96	6543.17	286.94 N	1556.25 W	1569.38	1.95
	7799.00	90.99	269.65	6541.95	287.44 N	1650.23 W	1663.26	1.49

7894.00	90.40	271.25	6540.80	288.18 N	1745.22 W	1758.15	1.79
7989.00	90.71	270.89	6539.88	289.96 N	1840.20 W	1853.09	0.50
8084.00	89.72	271.07	6539.53	291.58 N	1935.18 W	1948.02	1.06
8179.00	90.80	271.11	6539.09	293.39 N	2030.16 W	2042.96	1.14
8273.00	89.85	270.11	6538.56	294.39 N	2124.16 W	2136.87	1.47
8369.00	89.38	269.27	6539.21	293.87 N	2220.15 W	2232.70	1.00
8463.00	90.34	269.14	6539.44	292.56 N	2314.14 W	2326.49	1.03
8558.00	89.72	269.09	6539.39	291.10 N	2409.13 W	2421.26	0.65
8653.00	90.18	269.18	6539.47	289.66 N	2504.12 W	2516.04	0.49
8748.00	89.57	269.66	6539.68	288.70 N	2599.11 W	2610.84	0.82
8842.00	90.06	270.55	6539.98	288.87 N	2693.11 W	2704.72	1.08
8937.00	89.69	271.14	6540.19	290.27 N	2788.10 W	2799.64	0.73
9032.00	89.85	269.81	6540.57	291.06 N	2883.09 W	2894.54	1.41
9127.00	88.99	269.09	6541.53	290.15 N	2978.08 W	2989.35	1.18
9221.00	89.60	269.60	6542.69	289.08 N	3072.07 W	3083.14	0.85
9316.00	89.66	270.30	6543.30	288.99 N	3167.06 W	3178.00	0.74
9411.00	90.34	268.55	6543.30	288.04 N	3262.06 W	3272.80	1.98
9506.00	90.09	267.98	6542.94	285.16 N	3357.01 W	3367.47	0.66
9600.00	90.34	268.02	6542.59	281.88 N	3450.95 W	3461.10	0.27
9695.00	90.80	268.33	6541.65	278.86 N	3545.90 W	3555.75	0.58
9790.00	89.66	268.66	6541.27	276.36 N	3640.86 W	3650.44	1.25
9885.00	90.43	268.71	6541.19	274.18 N	3735.84 W	3745.16	0.81
9980.00	88.71	269.13	6541.90	272.39 N	3830.82 W	3839.91	1.86
10075.00	89.23	269.05	6543.61	270.88 N	3925.79 W	3934.66	0.55
10170.00	89.35	269.20	6544.79	269.43 N	4020.77 W	4029.43	0.20
10265.00	90.55	269.88	6544.87	268.67 N	4115.76 W	4124.25	1.45
10360.00	90.80	269.63	6543.75	268.26 N	4210.76 W	4219.08	0.37
10454.00	91.11	269.37	6542.19	267.44 N	4304.74 W	4312.88	0.43
10549.00	89.66	269.92	6541.55	266.85 N	4399.73 W	4407.71	1.63
10644.00	89.72	269.28	6542.06	266.19 N	4494.73 W	4502.53	0.68
10739.00	89.97	268.60	6542.32	264.43 N	4589.71 W	4597.29	0.76
10834.00	90.12	267.51	6542.24	261.21 N	4684.65 W	4691.92	1.16
10928.00	90.80	269.28	6541.49	258.58 N	4778.61 W	4785.60	2.02
11001.00	91.23	269.34	6540.20	257.70 N	4851.59 W	4858.43	0.59
11065.00	91.23	269.34	6538.82	256.96 N	4915.57 W	4922.28	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 273.07 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 11065.00 FEET
IS 4922.29 FEET ALONG 272.99 DEGREES (GRID)

Final Survey Projected to TD