

PCG Pressure Case Gamma PCD Pressure Case Directional

[illegible]

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	27-Jul-12	28-Jul-12	01-Aug-12		
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)	658.00	5,980.00	7,180.00		
Log End Depth (MD, ft)	5,980.00	7,180.00	11,068.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	25-Jul-12 21:45	27-Jul-12 11:30	29-Jul-12 22:15		
Drill/Wipe End Date and Time	27-Jul-12 01:30	28-Jul-12 13:45	31-Jul-12 23:00		
Min Inc (deg) @ Depth (MD, ft)	0 @ 658.00	3.94 @ 6,013.00	86.23 @ 7,287.00		
Max Inc (deg) @ Depth (MD, ft)	17.94 @ 3,929.00	81.07 @ 7,128.00	94.11 @ 8,141.00		
Bit TFA(in2) / Bit Type	.75 / PDC	.86 / PDC	.46 / PDC		
Flow Rate (gpm)	599.00	562.40	270.00		
Max AV (fpm) / CV (fpm) @ MWD	417.4 / NA	373.8 / NA	401.4 / N/A		
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	9.00 / 28.00	9.80 / 35.00	9.40 / 32.00		
Filtrate CL (ppm)	2,200.00	2,700.00	1,900.00		
pH / Fluid Loss (mptm)	8.60 / 0	9.00 / 0	9.30 / 0		
PV (cP) / YP (lhf2)	4 / 2.00	10 / 10.00	9 / 7.00		
% Solids / % Sand	3.00 / 0.25	6.00 / 0.30	5.20 / 0.35		
% Oil / Oil:Water Ratio	0 / 0:97	0 / 0:89.8	0 / 0:93		
Rm @ Measured Temp (degF)	NA @ NA	NA @ NA	N/A @ N/A		
Rmf @ Measured Temp (degF)	NA @ NA	NA @ NA	N/A @ N/A		
Rmc @ Measured Temp (degF)	NA @ NA	NA @ NA	N/A @ N/A		
Max Tool Temp (degF) / Source	158.60 / PCM	171.20 / PCM	221.80 / PCM		
Rm @ Max Tool Temp (degF)	NA @ NA	NA @ NA	N/A @ N/A		
Lead MWD Engineer	Ryan Brunkhorst	Ryan Brunkhorst	Ryan Brunkhorst		
Customer Representative	Matt Settles	Matt Settles	Matt Settles		

SENSOR INFORMATION

Downhole Processor Information					
Tool Type	PCM	PCM	PCM		
Software Version	5.76	5.76	5.76		
Sub Serial Number	11254819	11254819	11768597		
Insert Serial Number	11227552	11227552	11227552		
Date and Time Initialized	25-Jul-12 10:47	25-Jul-12 10:47	29-Jul-12 12:17		
Date and Time Read	28-Jul-12 20:38	28-Jul-12 20:46	01-Aug-12 10:35		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information					
Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	56.00	52.00	60.00		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11254819	11254819	11768597		
Sonde Serial Number	11478013	11478013	11478013		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	91.99	267.66	132.39		

Gamma Ray Sensor Information					
Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	48.95	45.10	52.62		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11254819	11254819	11768597		
Insert/Sonde Serial Number	11681023	11681023	11681023		

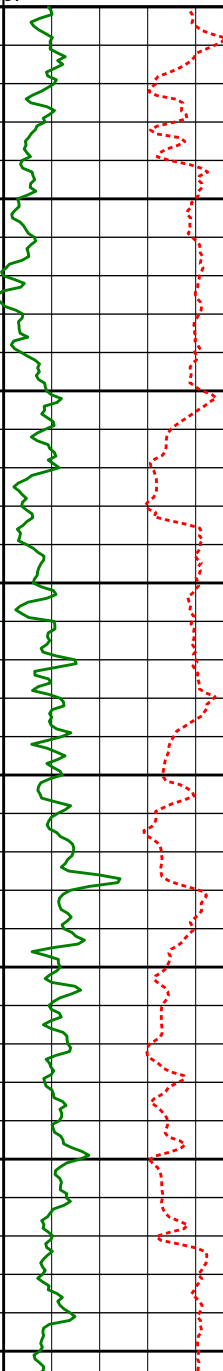
REMARKS
<p>1. All depths are measured bit depths, referenced to the Driller's pipe tally and are measured from the Drill Floor, unless otherwise specified.</p> <p>2. No depth corrections have been made for pipe stretch or compression.</p> <p>3. Critical annual velocities are calculated using the "Power Law" model for water based fluids and the "Bingham Plastic" model for oil and synthetic based fluids.</p> <p>4. All data presented is recorded data unless otherwise specified.</p> <p>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</p> <p>6. INSITE version 7.3.40</p>

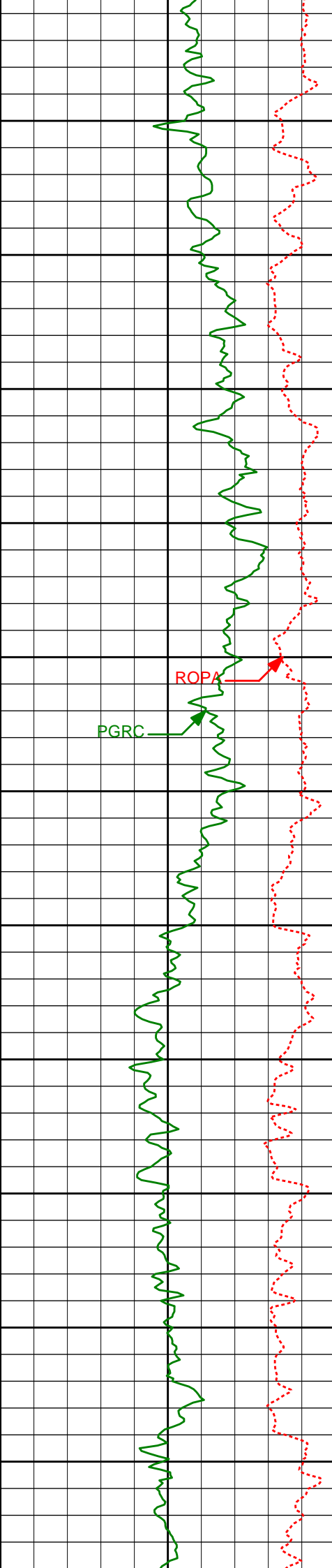
WARRANTY
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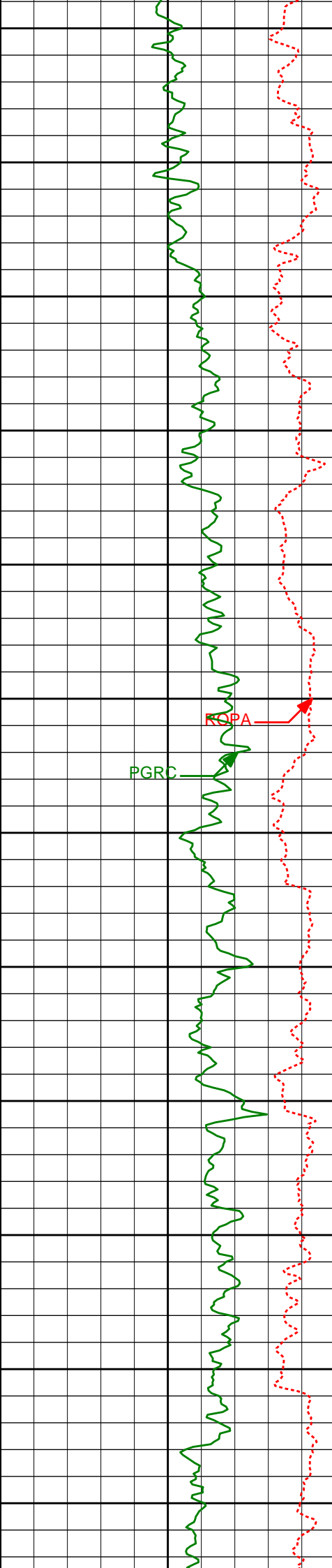
HALLIBURTON

MD Main Log 1:600

Average Rate of Penetration ROPA						
1K	0					
feet per hr						
Gamma Ray PGRC		Measured Depth (ft) 1:600	Depth	Inc	Azi.	TVD V.S.
0	200					
api						
		3000'				
		3050'				
		3078'		12.66°	22.45°	3071.89' -18.93'
		3100'				
		3150'				
		3173'		14.42°	22.79°	3164.25' -26.47'
		3200'				
		3250'				
		3268'		13.33°	22.63°	3256.48' -34.23'
		3300'				
		3350'				



	3362'	13.61°	28.48°	3347.89'	-42.70'
3400'					
3450'	3457'	11.93°	29.24°	3440.54'	-51.92'
3500'					
3550'	3551'	13.60°	29.41°	3532.21'	-61.20'
3600'					
3650'	3646'	15.33°	27.69°	3624.20'	-71.49'
3700'					
3750'	3741'	17.02°	26.53°	3715.43'	-82.37'
3800'					
3850'	3835'	17.47°	26.00°	3805.21'	-93.47'
3900'					
	3929'	17.94°	24.98°	3894.75'	-104.49'



3950'

4000'

4050'

4100'

4150'

4200'

4250'

4300'

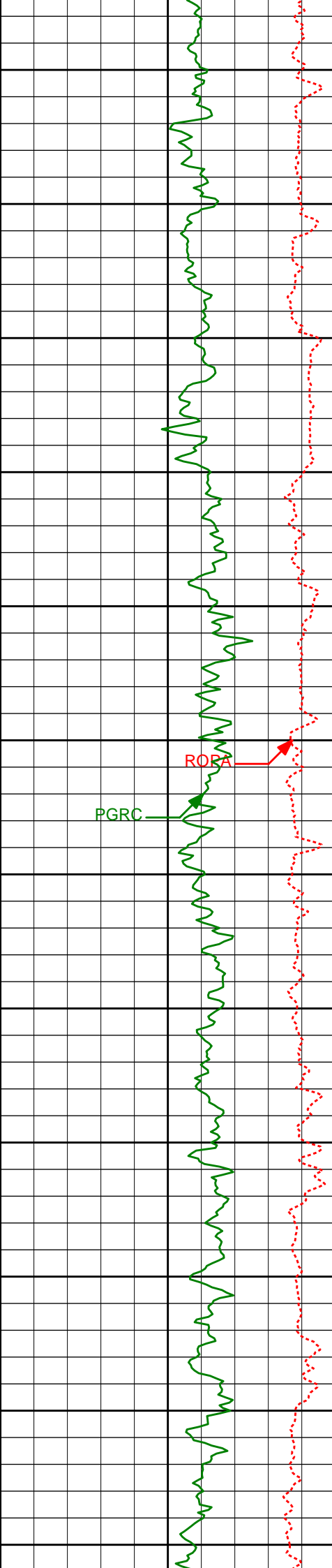
4350'

4400'

4450'

4500'

4024'	17.29°	25.90°	3985.30'	-115.56'
4119'	15.40°	25.74°	4076.45'	-126.02'
4214'	12.92°	28.29°	4168.56'	-135.51'
4308'	9.61°	30.06°	4260.74'	-143.62'
4403'	7.25°	32.16°	4354.70'	-150.20'
4498'	5.09°	31.13°	4449.15'	-155.13'



4550'

4592'	2.81°	26.70°	4542.92'	-158.05'
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4600'

4650'

4687'	1.65°	25.27°	4637.85'	-159.52'
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4700'

4750'

4782'	2.31°	264.17°	4732.82'	-158.14'
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4800'

ROPA

PGRC

4850'

4876'	2.48°	253.32°	4826.73'	-154.35'
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4900'

4950'

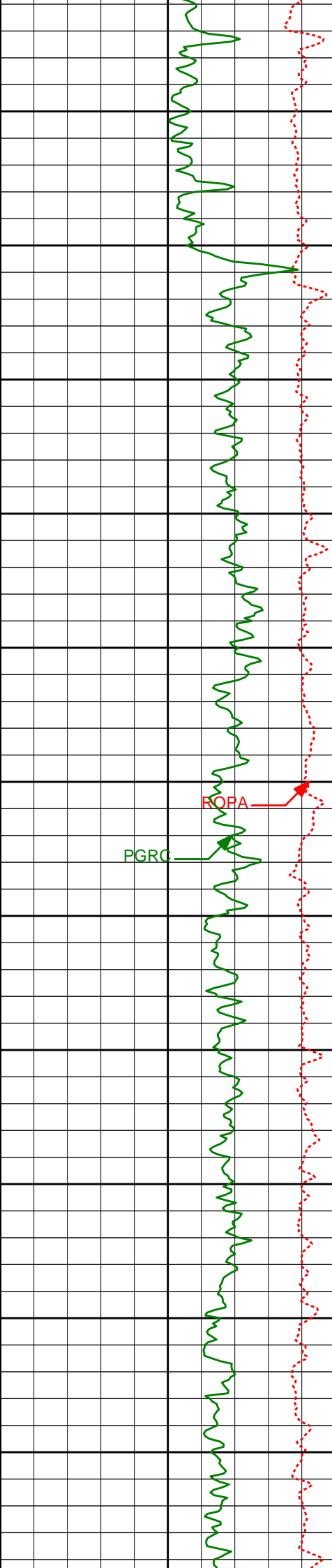
4971'	2.11°	215.99°	4921.66'	-151.46'
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5000'

5050'

5066'	2.94°	194.39°	5016.57'	-150.02'
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5100'



5150'

5161'

3.12°

196.73°

5111.44'

-148.90'

5200'

5250'

5255'

2.69°

179.05°

5205.32'

-148.43'

5300'

5350'

5350'

3.44°

189.46°

5300.18'

-148.24'

5400'

ROPA

PGRC

5450'

5444'

2.75°

194.59°

5394.05'

-147.46'

5500'

5550'

5539'

2.40°

182.53°

5488.95'

-147.00'

5600'

5650'

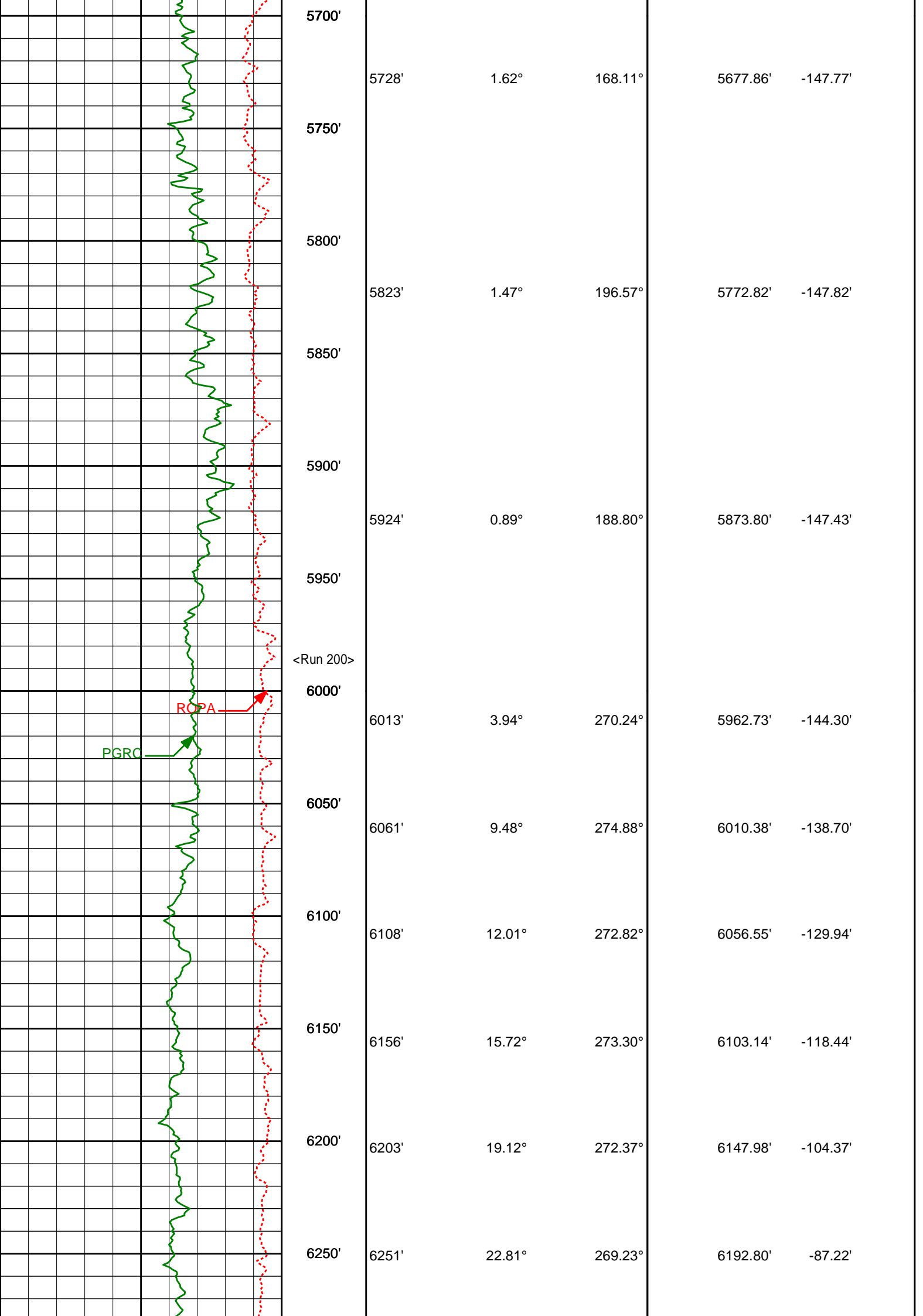
5634'

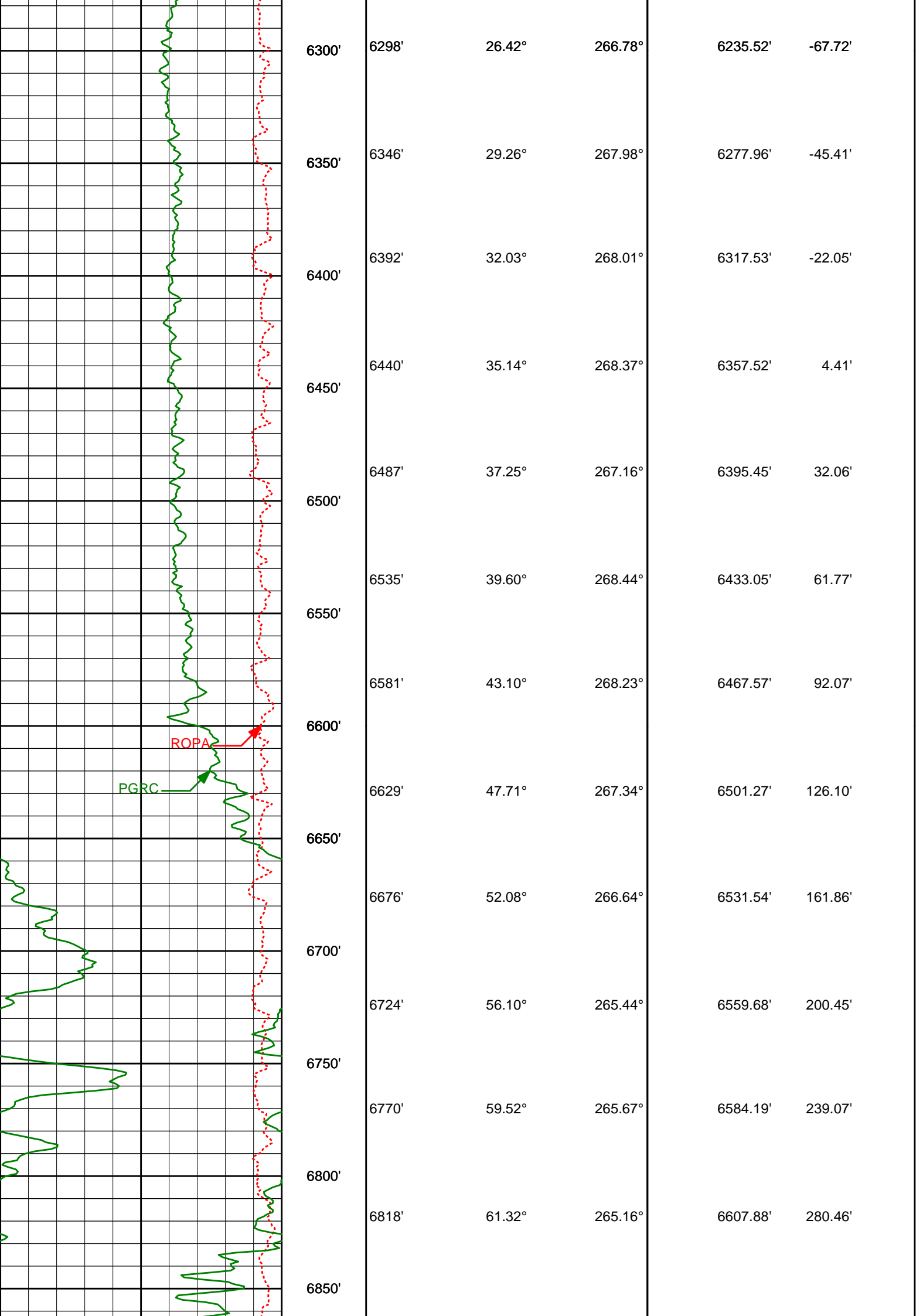
1.57°

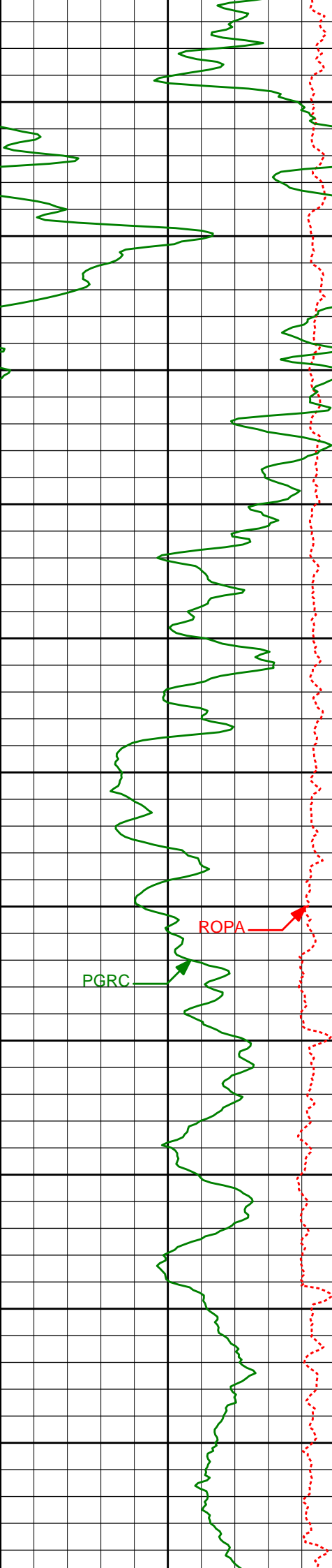
173.35°

5583.89'

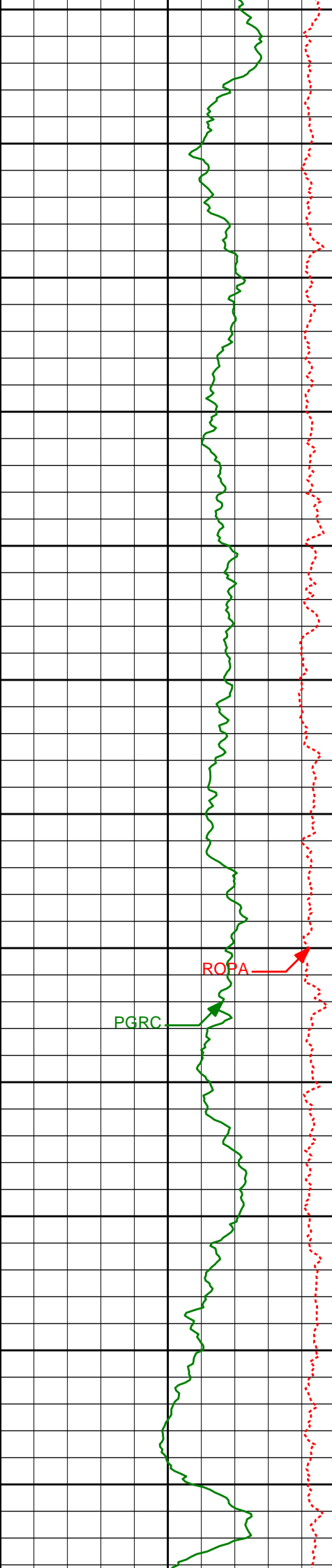
-147.22'



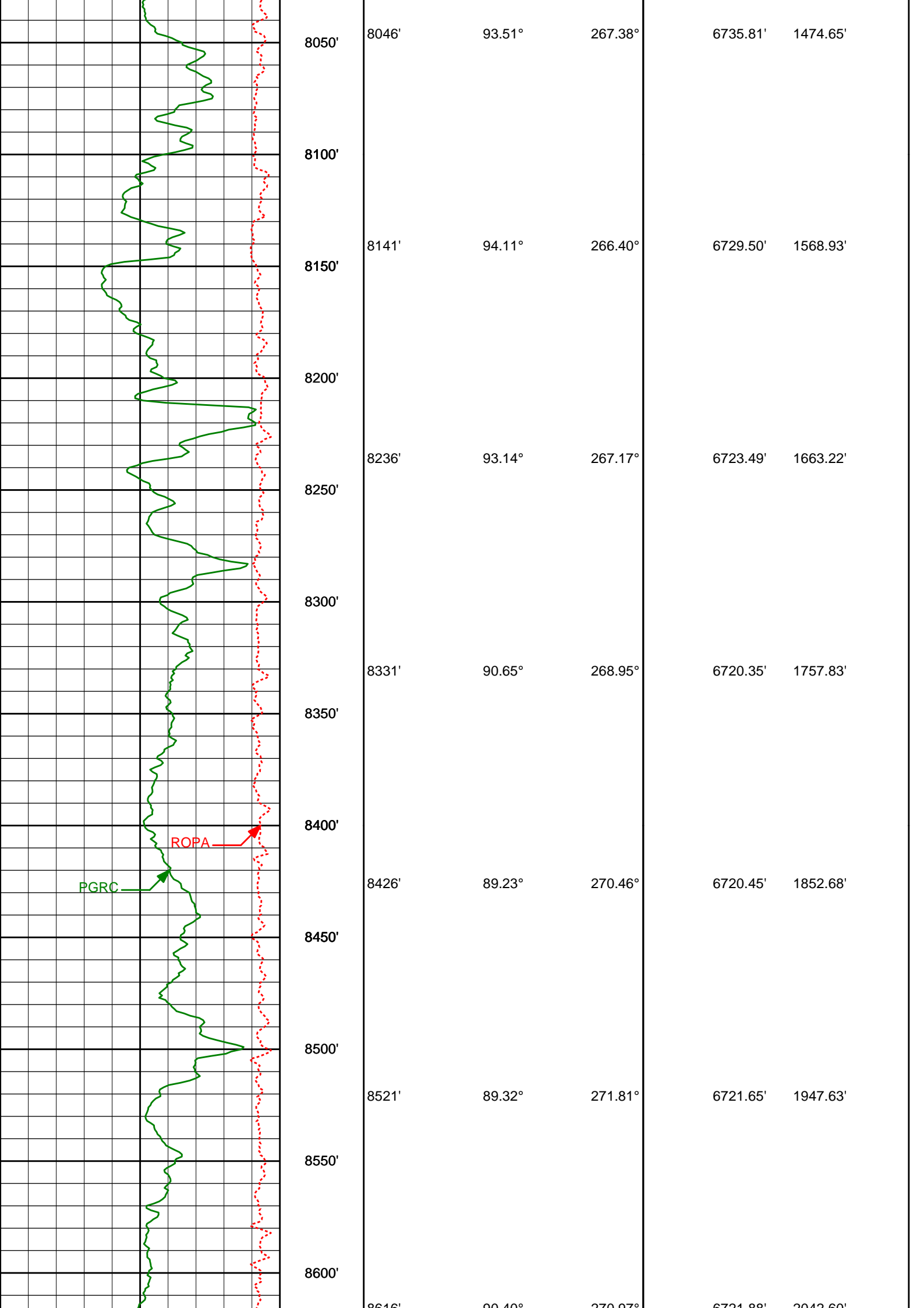


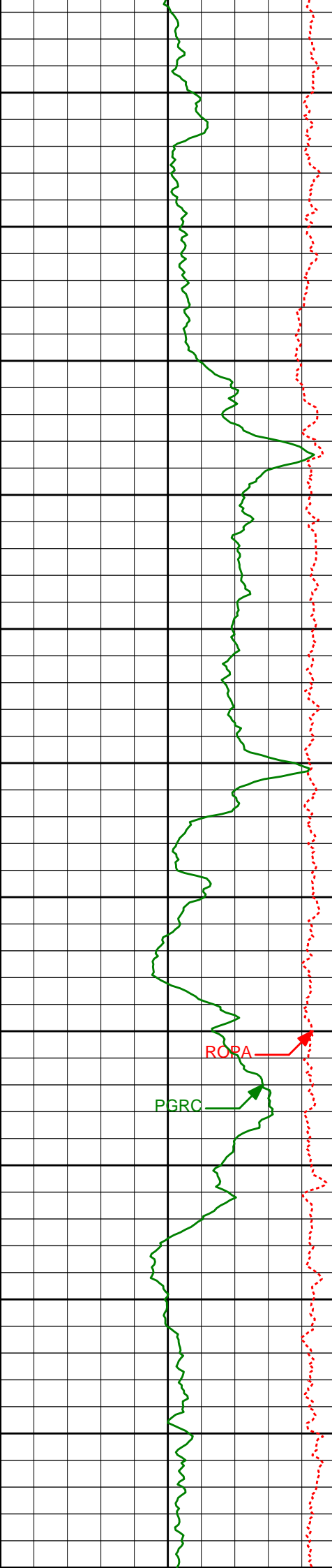


6900'	6865'	63.58°	265.80°	6629.62'	321.79'
	6913'	64.97°	266.01°	6650.45'	364.72'
6950'	6960'	67.62°	267.48°	6669.34'	407.51'
7000'	7008'	70.16°	268.33°	6686.63'	452.12'
7050'	7054'	73.49°	269.35°	6700.98'	495.71'
7100'	7102'	78.24°	268.49°	6712.69'	542.14'
	7128'	81.07°	268.43°	6717.36'	567.64'
7150'					
<div><div></div>Casing Set @ MD 7,170'</div>					
<Run 300>					
7200'					
7250'					
7300'	7287'	86.23°	266.45°	6734.94'	724.91'
7350'					
7400'	7382'	90.19°	267.17°	6737.90'	819.33'

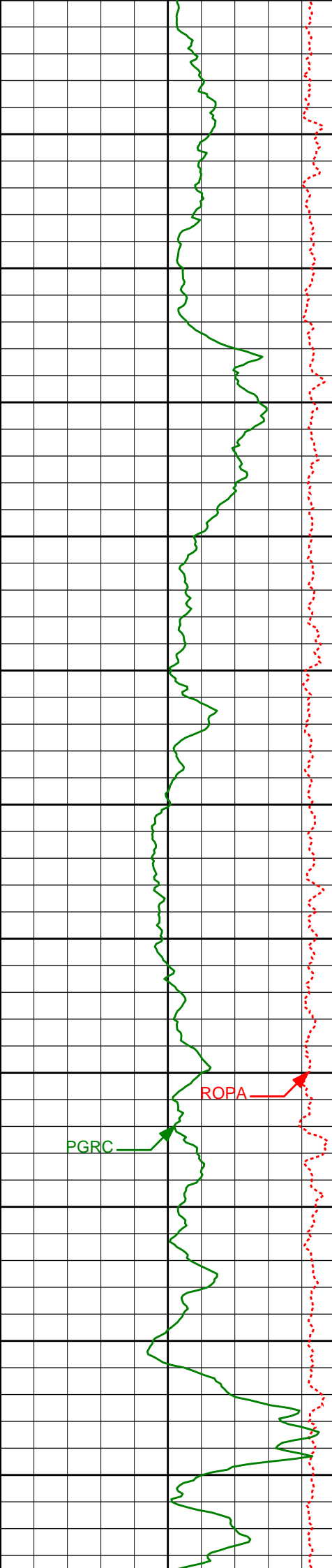


7450'				
7477'	90.65°	265.80°	6737.21'	913.75'
7500'				
7550'				
7571'	89.94°	264.46°	6736.73'	1006.91'
7600'				
7650'				
7666'	89.78°	261.42°	6736.96'	1100.49'
7700'				
7750'				
7761'	89.38°	260.62°	6737.65'	1193.49'
7800'				
7850'				
7856'	89.29°	262.15°	6738.75'	1286.60'
7900'				
7950'				
7951'	90.37°	264.97°	6739.03'	1380.35'
8000'				

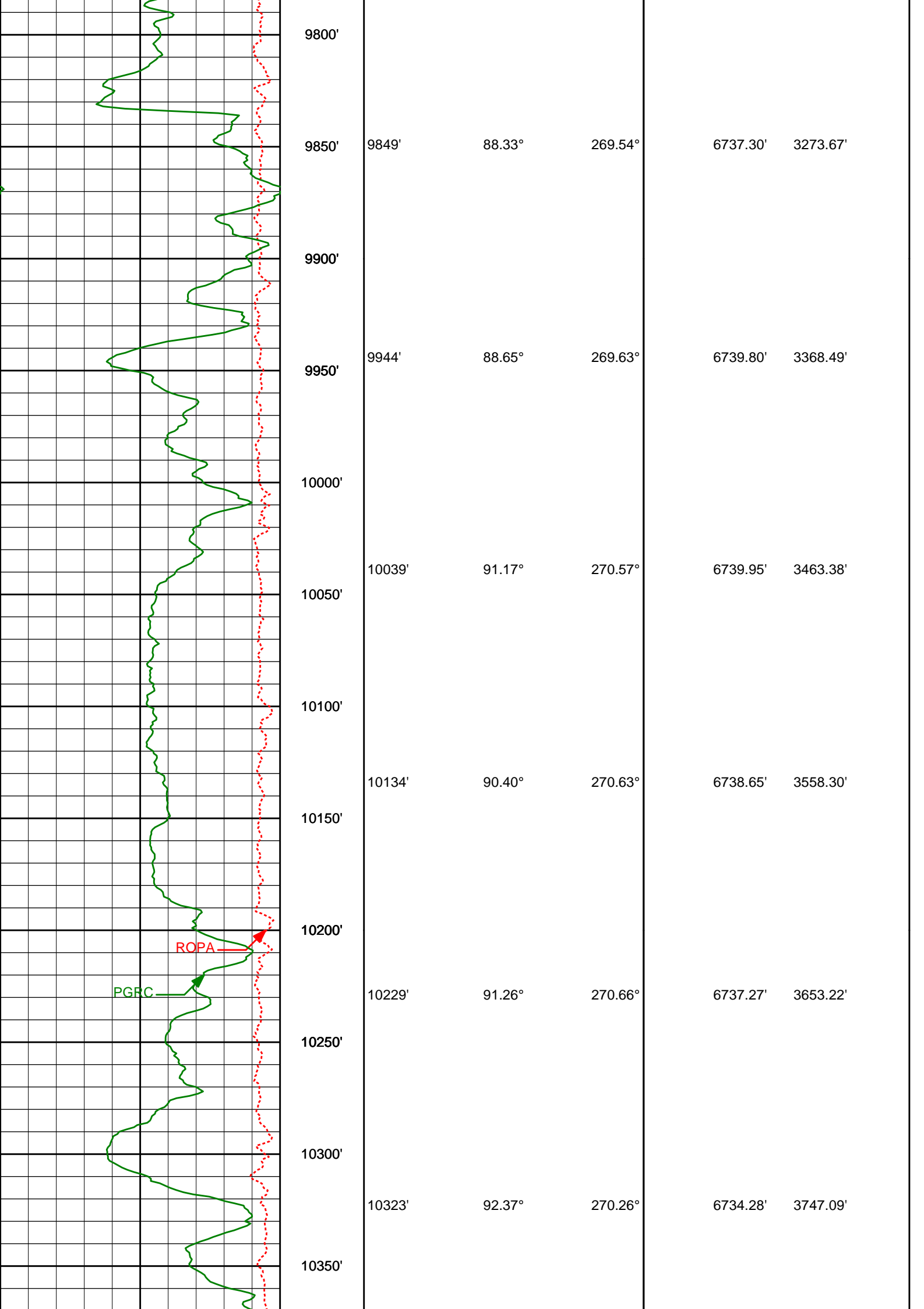


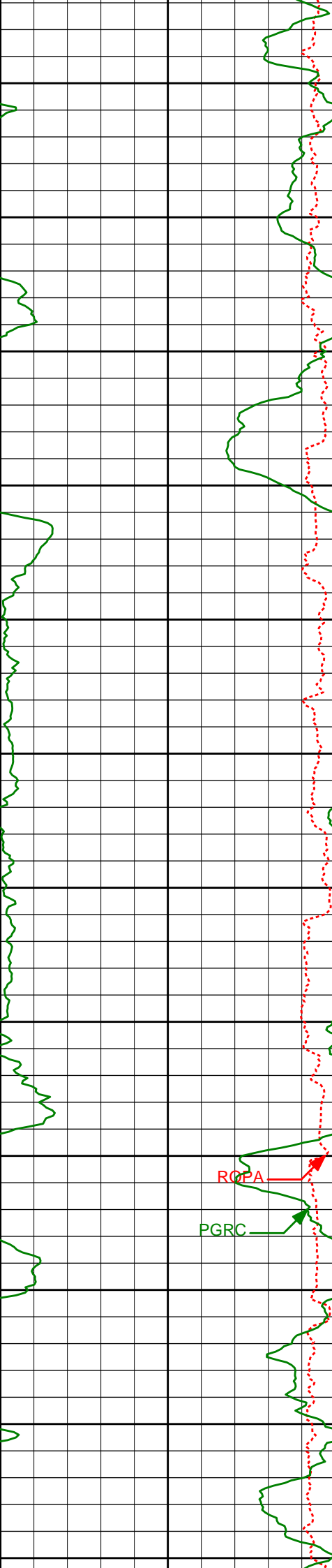


	8616'	90.40°	270.97°	6721.88'	2042.60'
8650'					
8700'					
	8711'	90.37°	271.20°	6721.24'	2137.56'
8750'					
8800'					
	8806'	89.85°	271.74°	6721.06'	2232.53'
8850'					
8900'					
	8901'	87.78°	271.05°	6723.03'	2327.48'
8950'					
9000'					
	8996'	88.43°	270.48°	6726.18'	2422.36'
9050'					
9100'					
	9090'	90.80°	270.96°	6726.81'	2516.29'
9150'					
9200'					
	9185'	89.88°	270.58°	6726.25'	2611.23'



9280'	90.34°	269.94°	6726.07'	2706.14'
9300'				
9350'				
9375'	88.74°	268.80°	6726.84'	2800.96'
9400'				
9450'				
9470'	87.78°	268.62°	6729.73'	2895.67'
9500'				
9550'				
9565'	90.65°	269.46°	6731.03'	2990.45'
9600'				
9650'				
9659'	88.76°	268.78°	6731.51'	3084.25'
9700'				
9750'				
9754'	87.96°	268.28°	6734.23'	3178.94'





10400'

10418'	92.78°	269.12°	6730.01'	3841.85'
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10450'

10500'

10513'	93.12°	268.20°	6725.12'	3936.48'
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10550'

10600'

10608'	90.92°	266.18°	6721.77'	4030.96'
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10650'

10700'

10703'	89.54°	265.48°	6721.39'	4125.25'
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10750'

10800'

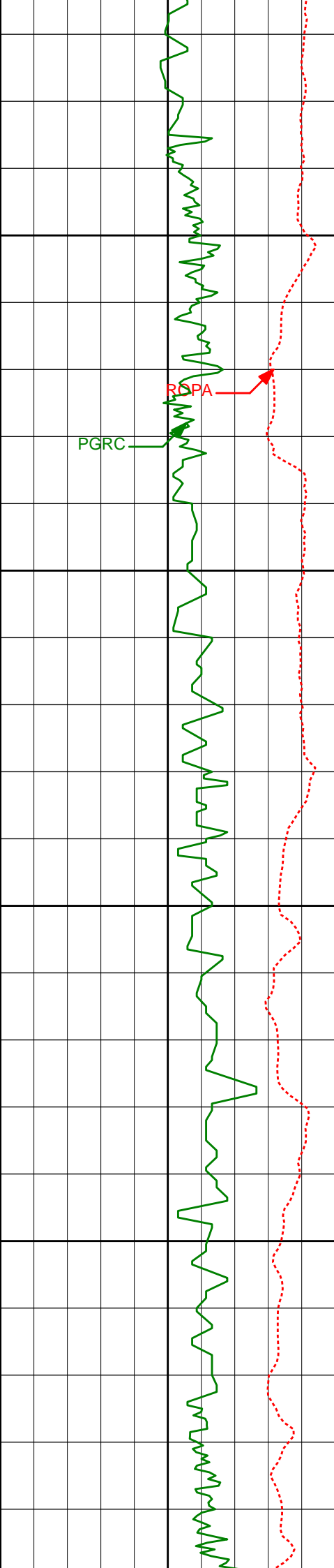
10797'	86.36°	264.24°	6724.76'	4218.28'
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10850'

10900'

10892'	87.19°	264.93°	6730.10'	4312.15'
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10950'



3100'

3150'

3200'

3250'

3078'

12.66°

22.45°

3071.89'

-18.93'

3173'

14.42°

22.79°

3164.25'

-26.47'

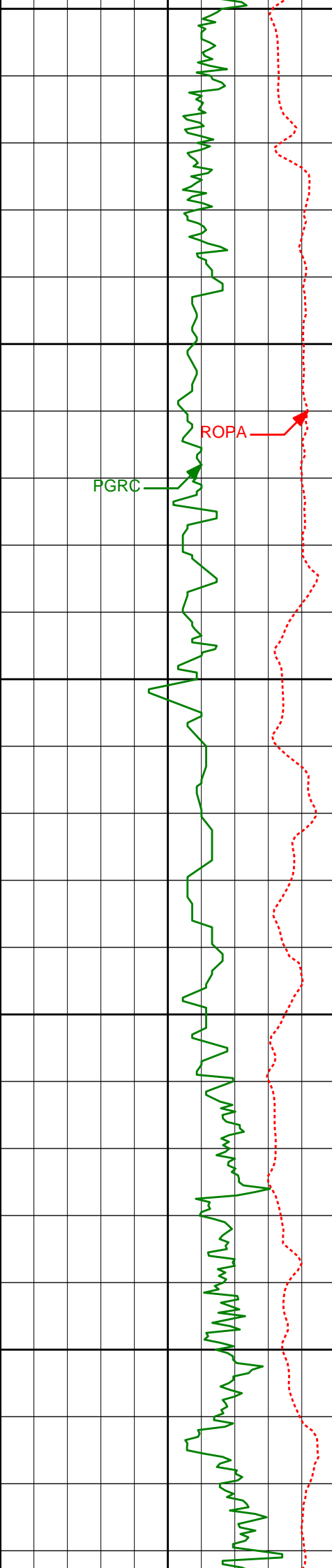
3268'

13.33°

22.63°

3256.48'

-34.23'



3300'

3350'

3400'

3450'

3500'

3362'

13.61°

28.48°

3347.89'

-42.70'

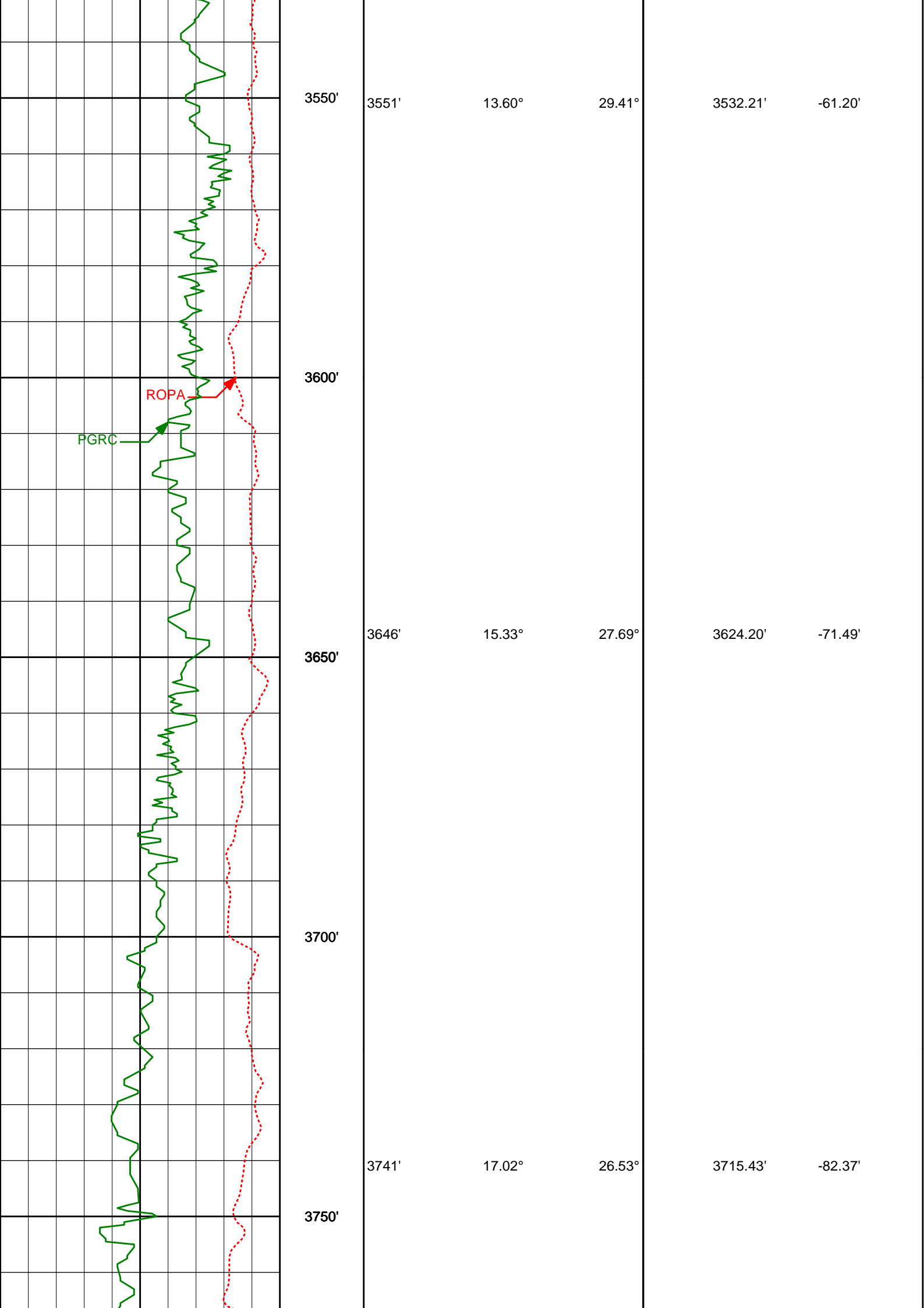
3457'

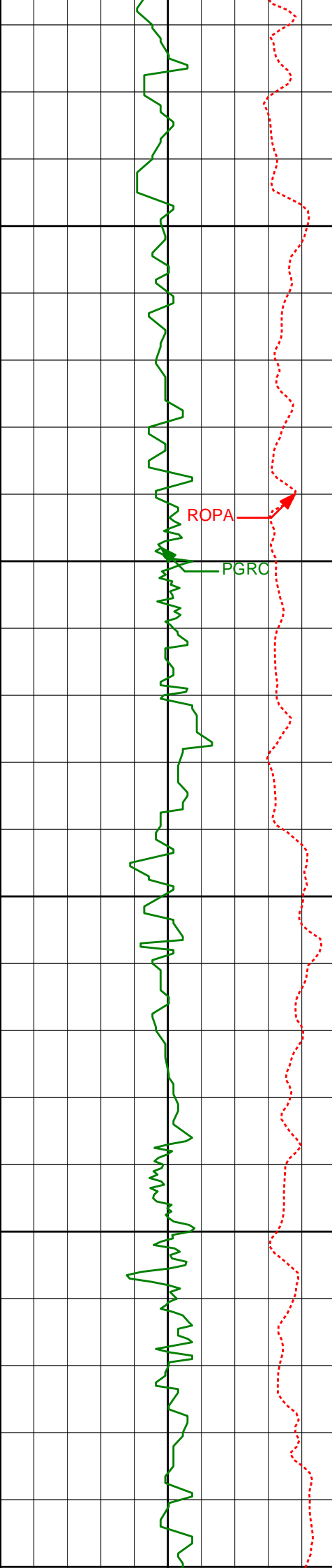
11.93°

29.24°

3440.54'

-51.92'





3800'

3835'

17.47°

26.00°

3805.21'

-93.47'

ROPA

PGRO

3850'

3900'

3929'

17.94°

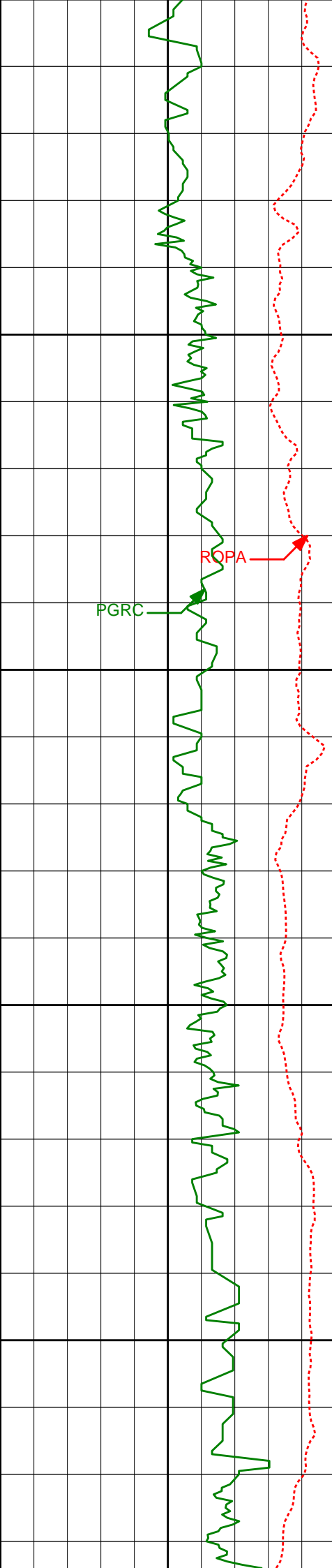
24.98°

3894.75'

-104.49'

3950'

4000'



4000'

4050'

4100'

4150'

4200'

4024'

17.29°

25.90°

3985.30'

-115.56'

4119'

15.40°

25.74°

4076.45'

-126.02'

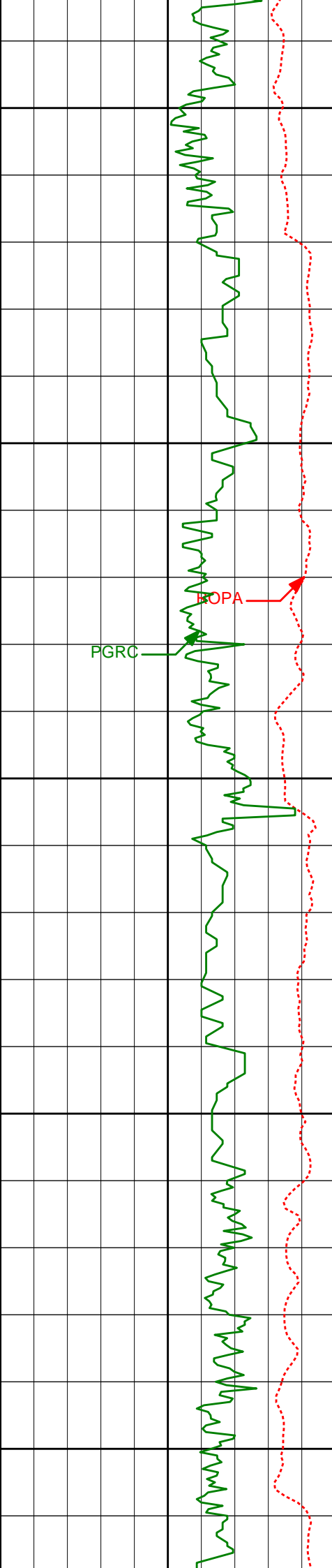
4214'

12.92°

28.29°

4168.56'

-135.51'



4250'

4300'

4350'

4400'

4450'

4308'

9.61°

30.06°

4260.74'

-143.62'

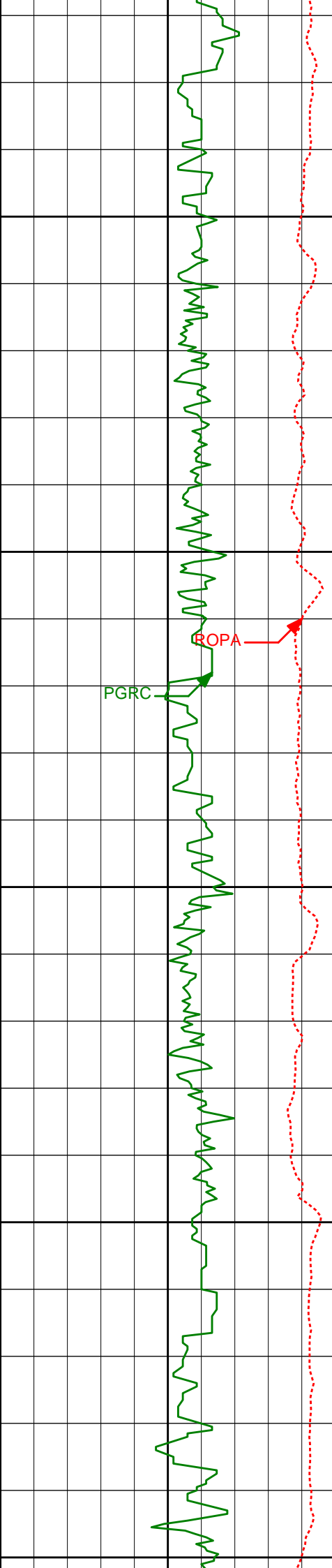
4403'

7.25°

32.16°

4354.70'

-150.20'



4500'

4550'

4600'

4650'

4700'

4498'

5.09°

31.13°

4449.15'

-155.13'

4592'

2.81°

26.70°

4542.92'

-158.05'

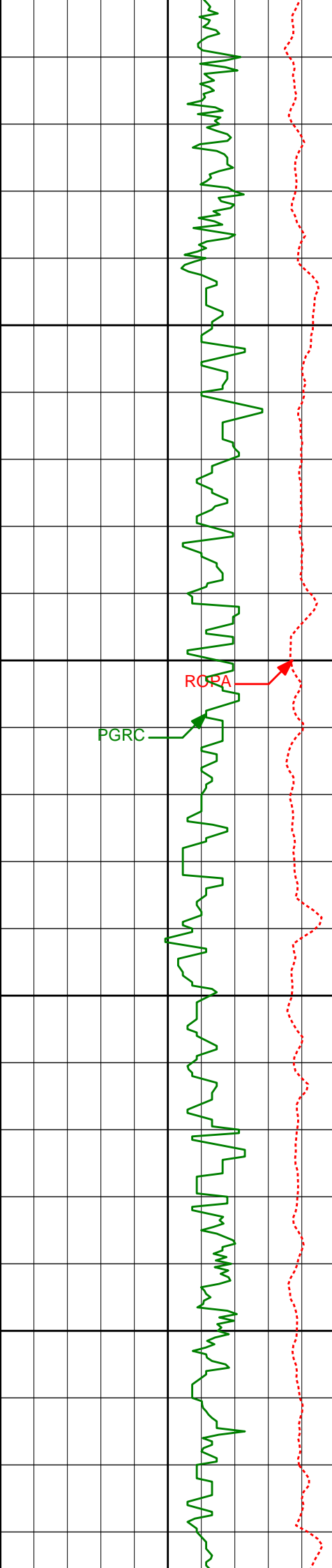
4687'

1.65°

25.27°

4637.85'

-159.52'



4750'

4782'

2.31°

264.17°

4732.82'

-158.14'

4800'

ROPA

PGRC

4850'

4876'

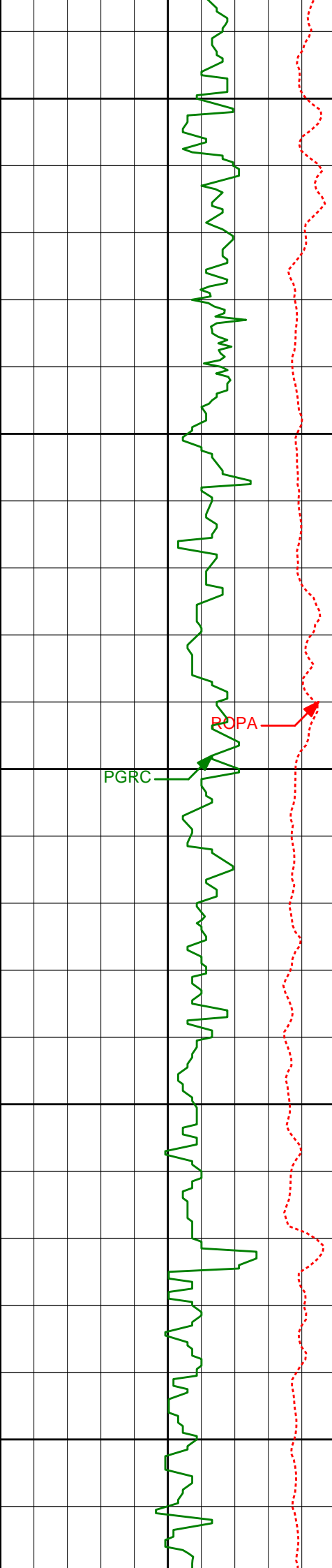
2.48°

253.32°

4826.73'

-154.35'

4900'



4950'

4971'

2.11°

215.99°

4921.66'

-151.46'

5000'

ROPA

PGRC

5050'

5066'

2.94°

194.39°

5016.57'

-150.02'

5100'

5150'

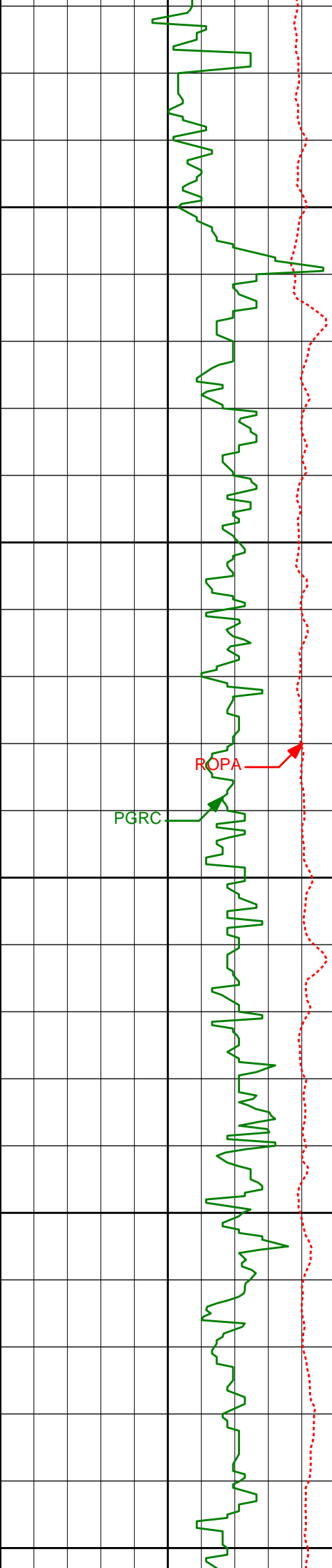
5161'

3.12°

196.73°

5111.44'

-148.90'



5200'

5250'

5300'

5350'

5400'

5255'

2.69°

179.05°

5205.32'

-148.43'

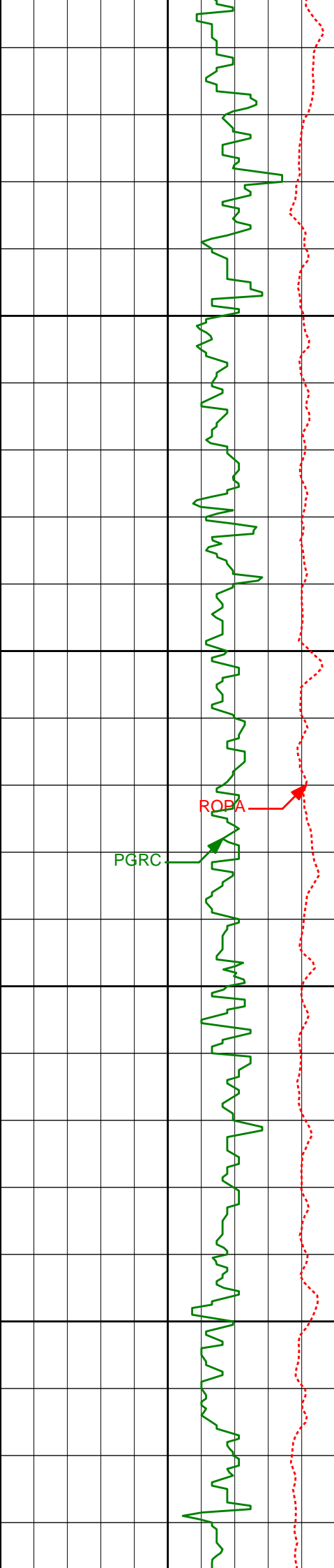
5350'

3.44°

189.46°

5300.18'

-148.24'



5450'

5500'

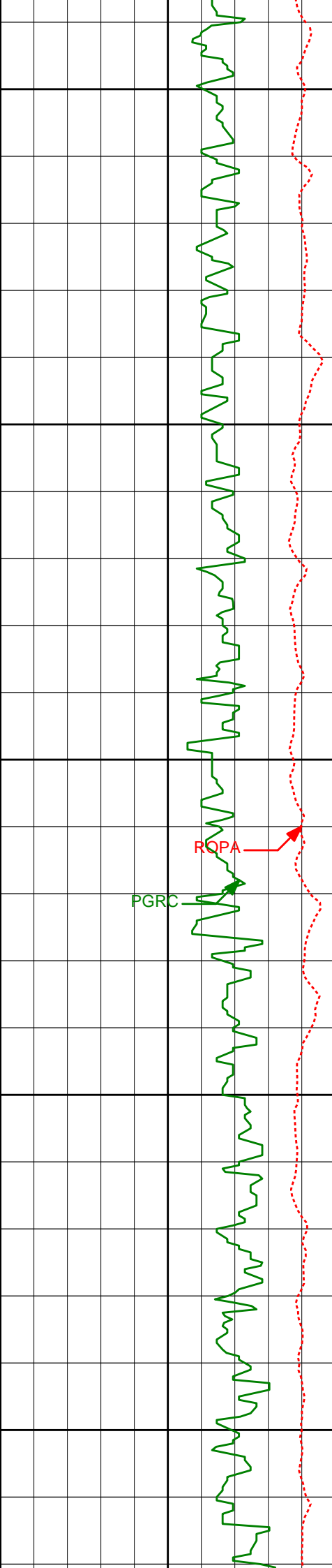
5550'

5600'

5444'	2.75°	194.59°	5394.05'	-147.46'
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5539'	2.40°	182.53°	5488.95'	-147.00'
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5634'	1.57°	173.35°	5583.89'	-147.22'
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5650'

5700'

5750'

5800'

5850'

5728'

1.62°

168.11°

5677.86'

-147.77'

PGRC

ROPA

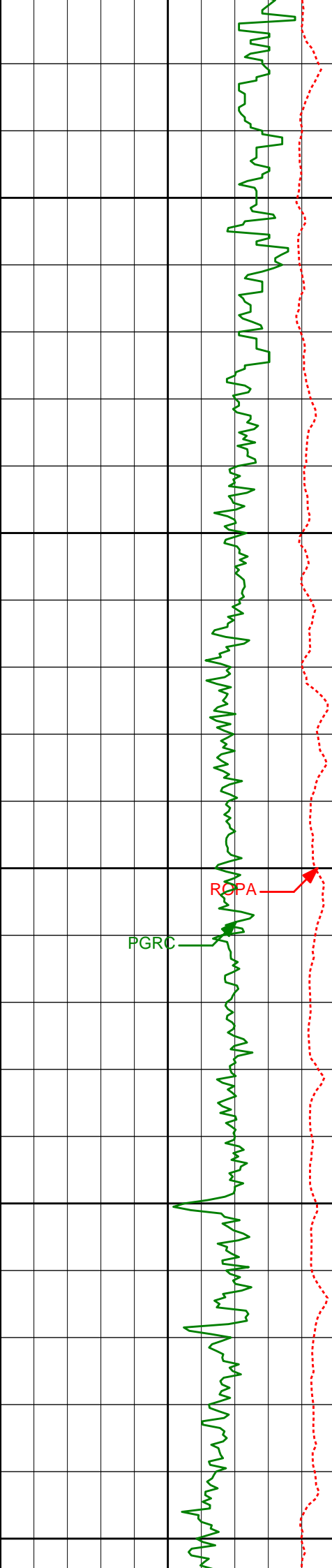
5823'

1.47°

196.57°

5772.82'

-147.82'



5900'

5924'

0.89°

188.80°

5873.80'

-147.43'

5950'

<Run 200>

6000'

ROPA

PGRC

6013'

3.94°

270.24°

5962.73'

-144.30'

6050'

6061'

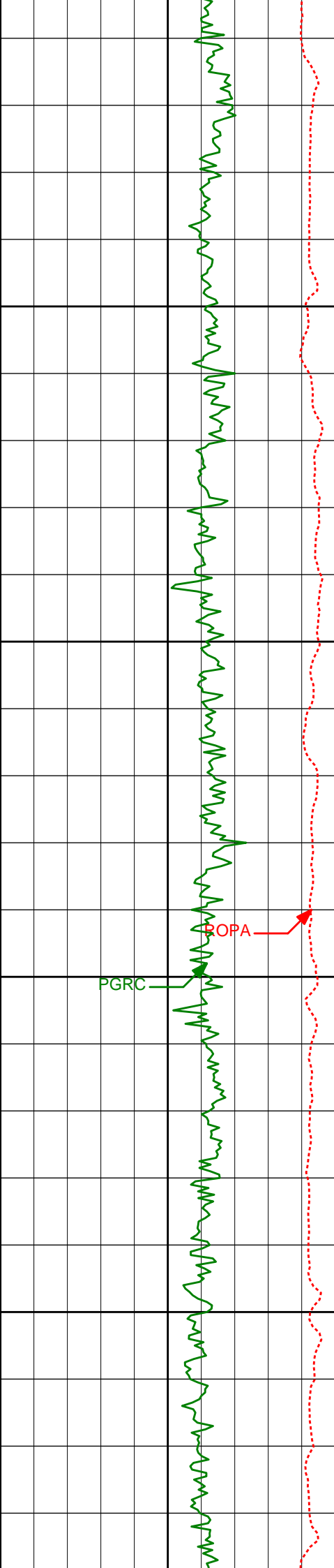
9.48°

274.88°

6010.38'

-138.70'

6100'



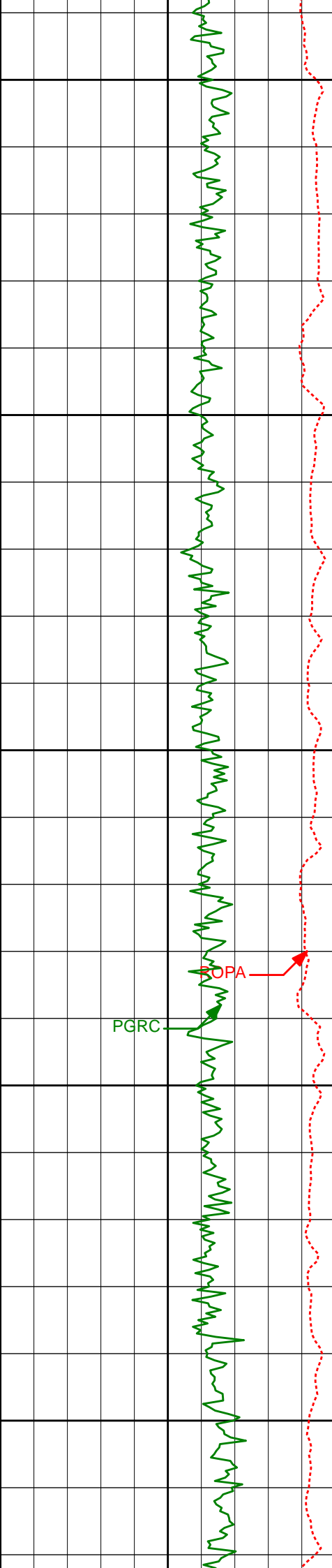
6150'

6200'

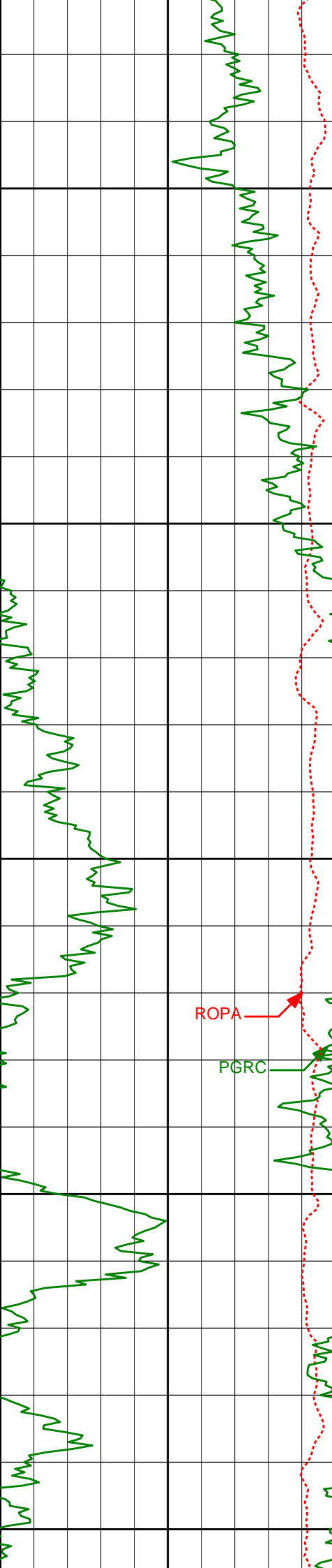
6250'

6300'

6108'	12.01°	272.82°	6056.55'	-129.94'
6156'	15.72°	273.30°	6103.14'	-118.44'
6203'	19.12°	272.37°	6147.98'	-104.37'
6251'	22.81°	269.23°	6192.80'	-87.22'
6298'	26.42°	266.78°	6235.52'	-67.72'



6350'	6346'	29.26°	267.98°	6277.96'	-45.41'
6400'	6392'	32.03°	268.01°	6317.53'	-22.05'
6450'	6440'	35.14°	268.37°	6357.52'	4.41'
6500'	6487'	37.25°	267.16°	6395.45'	32.06'
6550'	6535'	39.60°	268.44°	6433.05'	61.77'



6600'

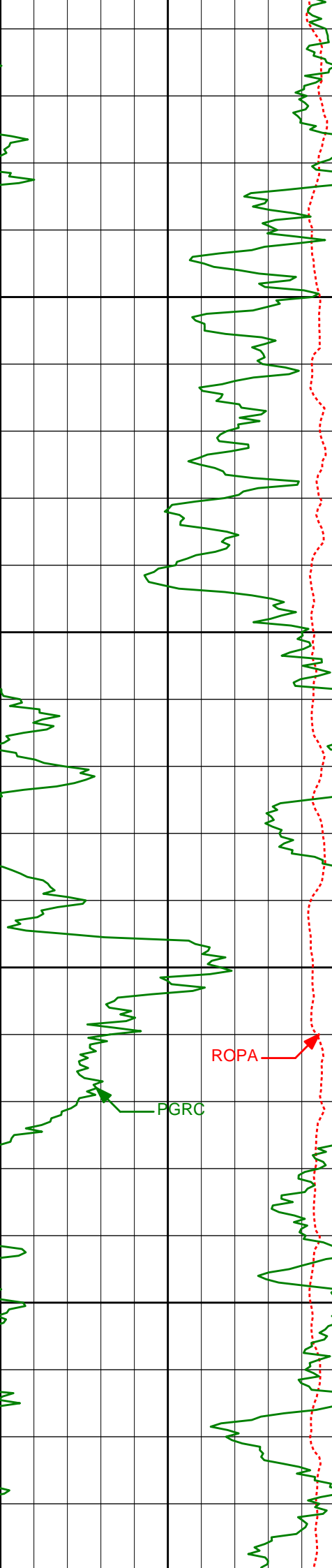
6650'

6700'

6750'

6800'

6581'	43.10°	268.23°	6467.57'	92.07'
6629'	47.71°	267.34°	6501.27'	126.10'
6676'	52.08°	266.64°	6531.54'	161.86'
6724'	56.10°	265.44°	6559.68'	200.45'
6770'	59.52°	265.67°	6584.19'	239.07'



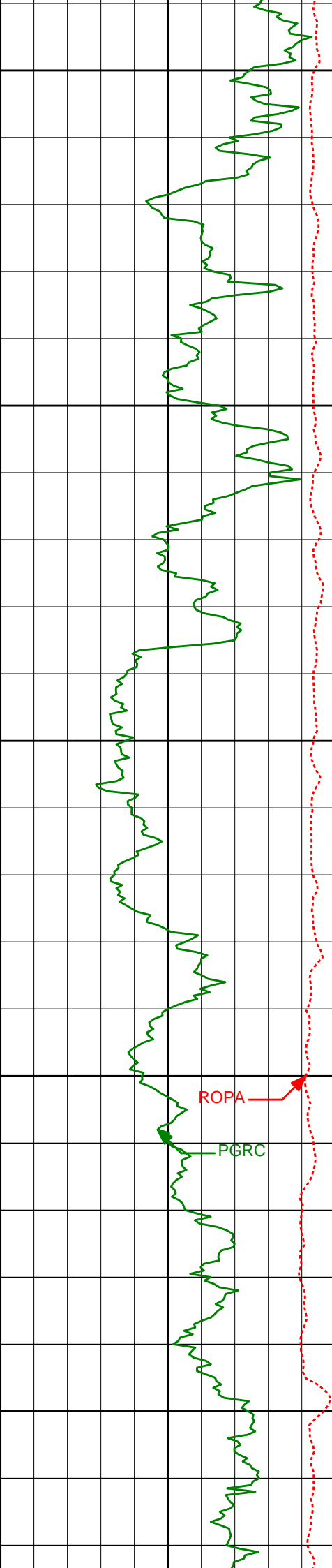
6850'

6900'

6950'

7000'

6818'	61.32°	265.16°	6607.88'	280.46'
6865'	63.58°	265.80°	6629.62'	321.79'
6913'	64.97°	266.01°	6650.45'	364.72'
6960'	67.62°	267.48°	6669.34'	407.51'
7008'	70.16°	268.33°	6686.63'	452.12'



7050'

7054'

73.49°

269.35°

6700.98'

495.71'

7100'

7102'

78.24°

268.49°

6712.69'

542.14'

7128'

81.07°

268.43°

6717.36'

567.64'

7150'

Casing Set @ 7,170'

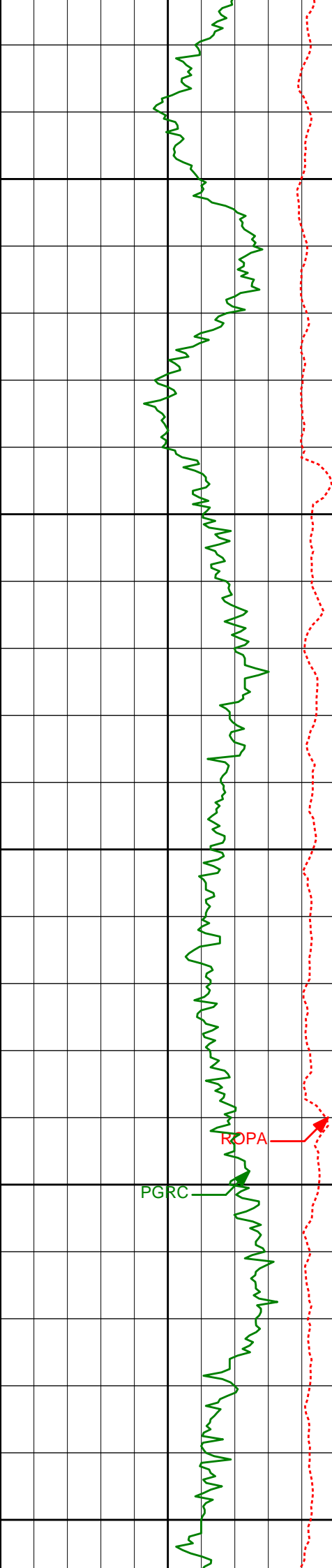
<Run 300>

7200'

ROPA

PGRC

7250'



7300'

7350'

7400'

7450'

7500'

7287'

86.23°

266.45°

6734.94'

724.91'

7382'

90.19°

267.17°

6737.90'

819.33'

7477'

90.65°

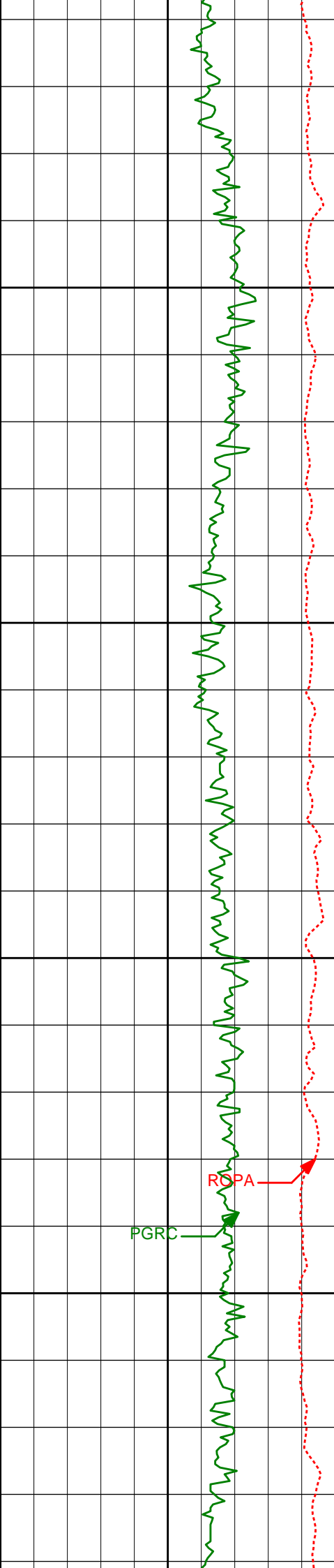
265.80°

6737.21'

913.75'

PGRC

ROPA



7550'

7571'

89.94°

264.46°

6736.73'

1006.91'

7600'

7650'

7666'

89.78°

261.42°

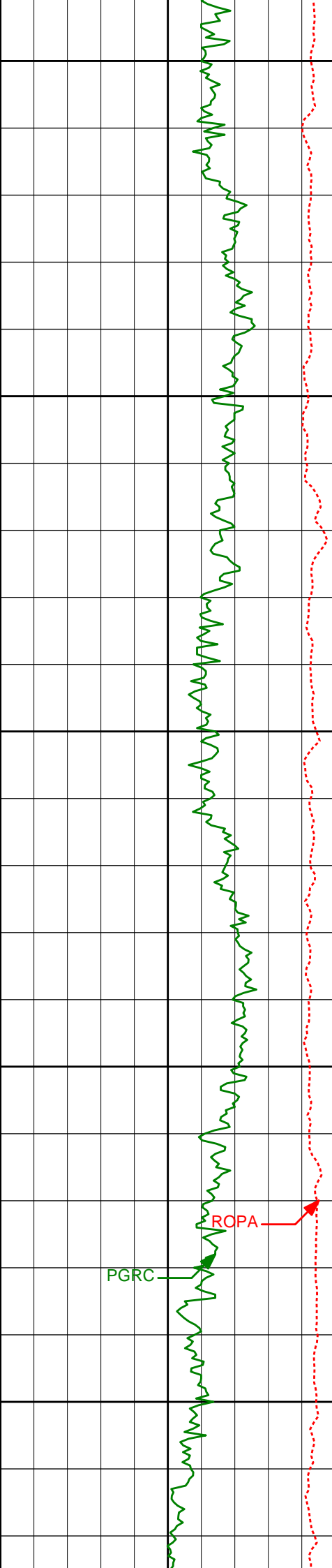
6736.96'

1100.49'

7700'

PGRC

ROPA



7750'

7761'

89.38°

260.62°

6737.65'

1193.49'

7800'

7850'

7856'

89.29°

262.15°

6738.75'

1286.60'

7900'

7950'

7951'

90.37°

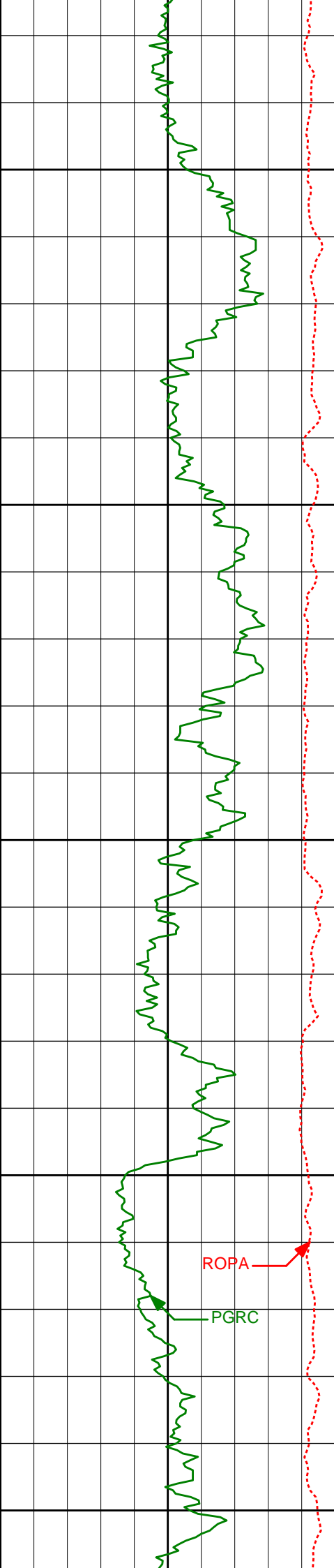
264.97°

6739.03'

1380.35'

PGRC

ROPA



8000'

8050'

8100'

8150'

8200'

8046'

93.51°

267.38°

6735.81'

1474.65'

8141'

94.11°

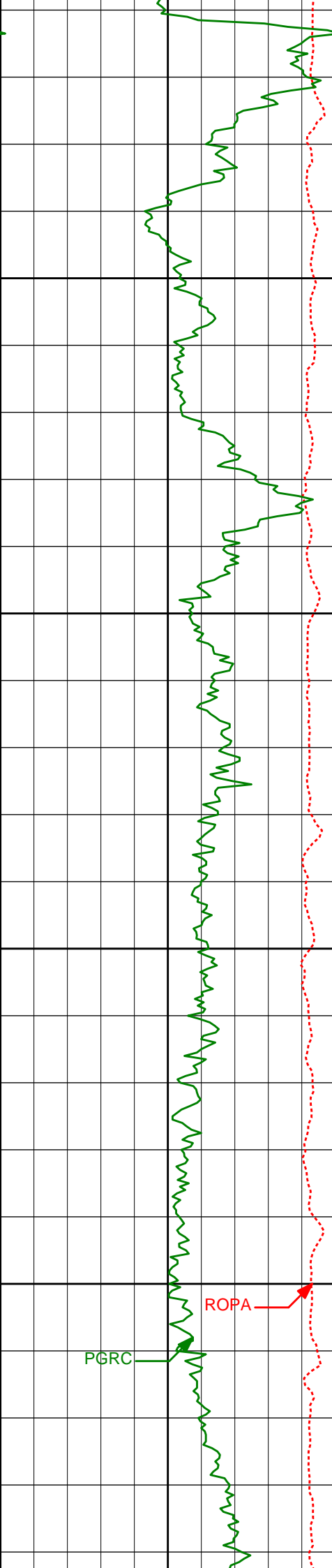
266.40°

6729.50'

1568.93'

ROPA

PGRC



8236'	93.14°	267.17°	6723.49'	1663.22'
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8250'

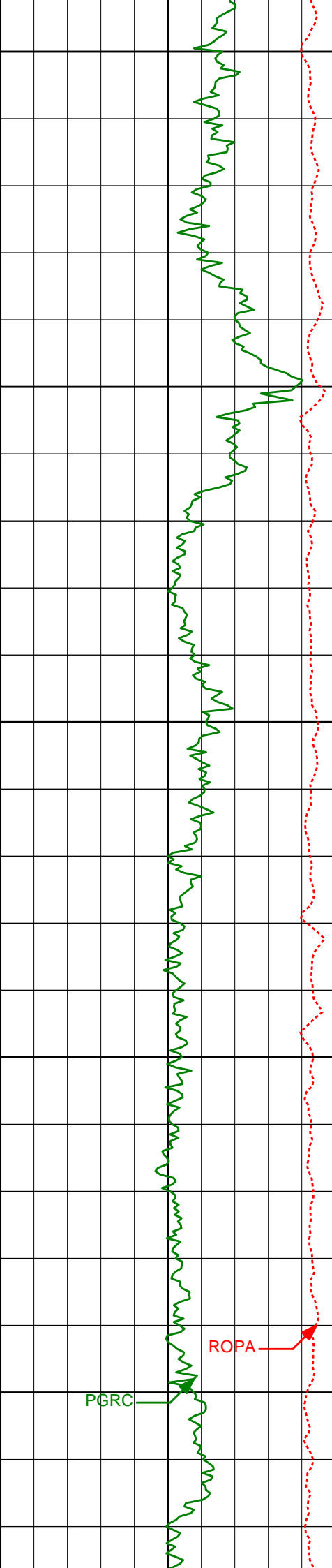
8300'

8331'	90.65°	268.95°	6720.35'	1757.83'
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8350'

8400'

8426'	89.23°	270.46°	6720.45'	1852.68'
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8450'

8500'

8550'

8600'

8650'

8521'

89.32°

271.81°

6721.65'

1947.63'

8616'

90.40°

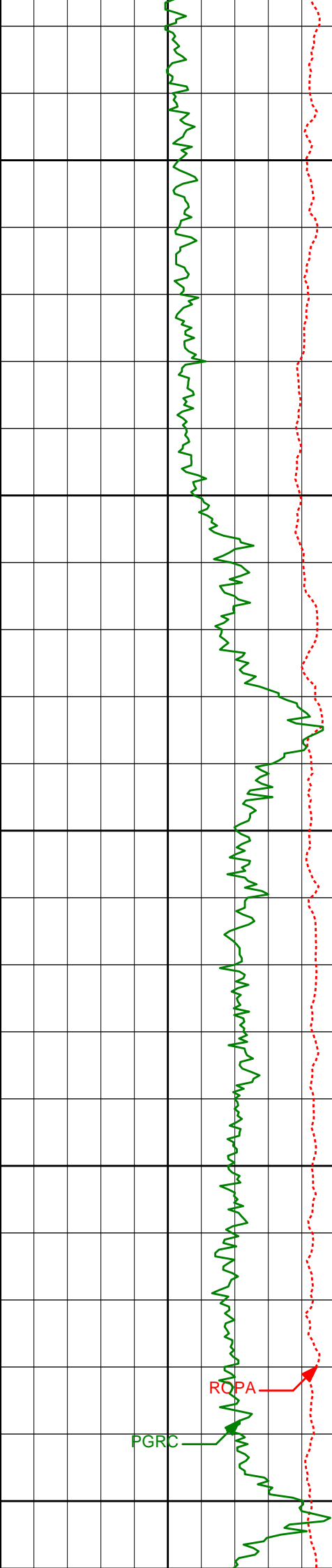
270.97°

6721.88'

2042.60'

PGRC

ROPA



8700'

8711'

90.37°

271.20°

6721.24'

2137.56'

8750'

8800'

8806'

89.85°

271.74°

6721.06'

2232.53'

8850'

8900'

8901'

87.78°

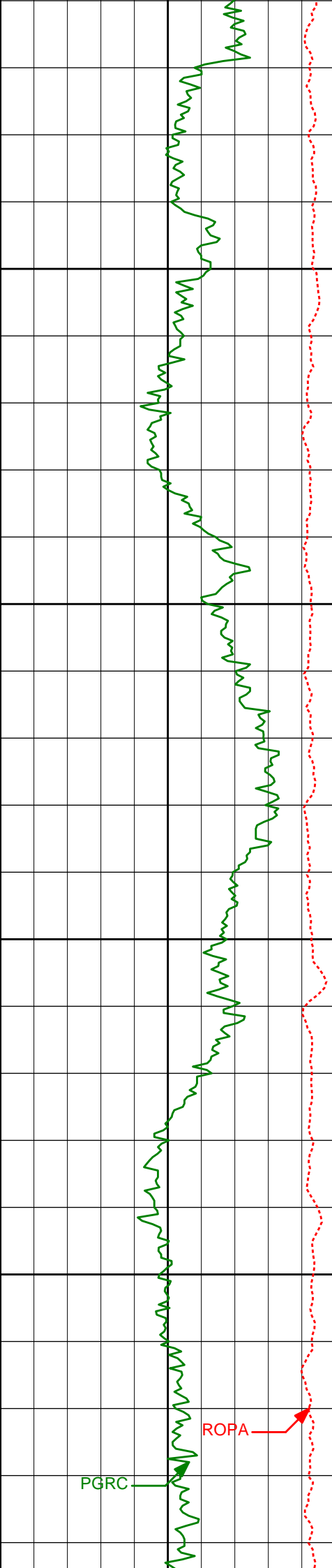
271.05°

6723.03'

2327.48'

PGRC

ROPA



8950'

9000'

9050'

9100'

8996'

88.43°

270.48°

6726.18'

2422.36'

9090'

90.80°

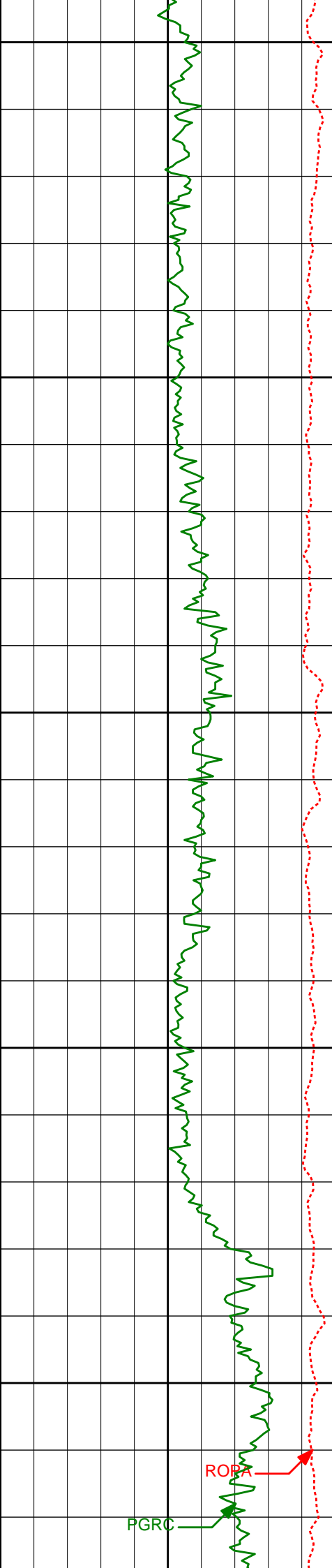
270.96°

6726.81'

2516.29'

PGRC

ROPA



9150'

9185'

89.88°

270.58°

6726.25'

2611.23'

9200'

9250'

9280'

90.34°

269.94°

6726.07'

2706.14'

9300'

9350'

PGRC

ROPA

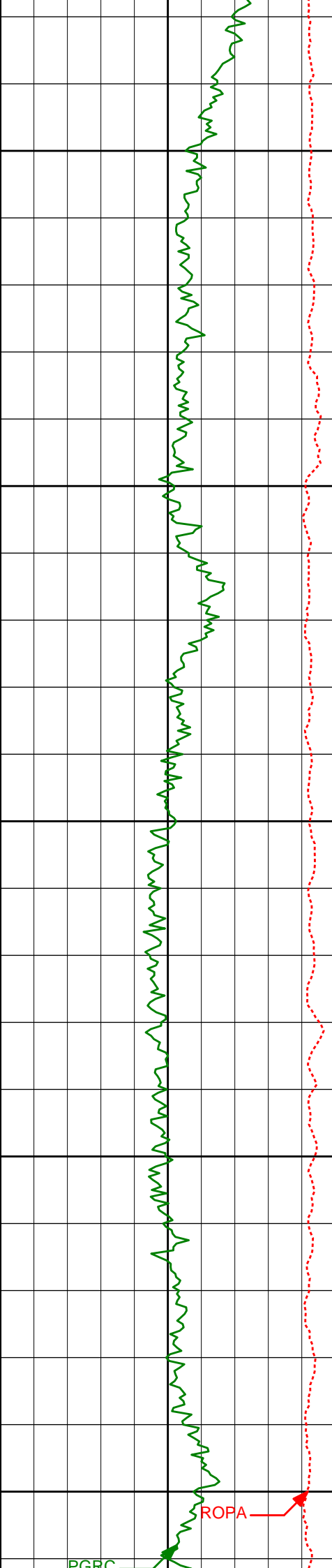
9375'

88.74°

268.80°

6726.84'

2800.96'



9400'

9450'

9500'

9550'

9600'

9470'

87.78°

268.62°

6729.73'

2895.67'

9565'

90.65°

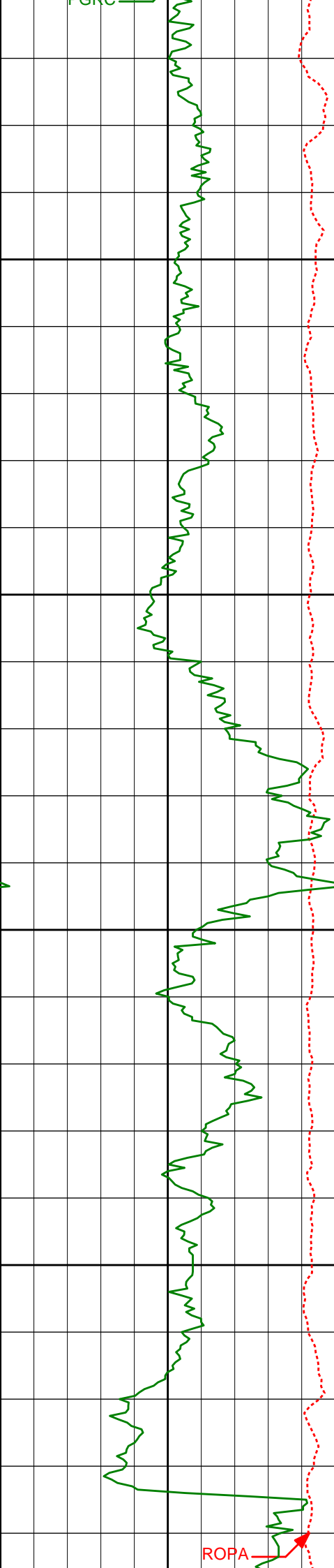
269.46°

6731.03'

2990.45'

PGRC

ROFA



9650'

9659'

88.76°

268.78°

6731.51'

3084.25'

9700'

9750'

9754'

87.96°

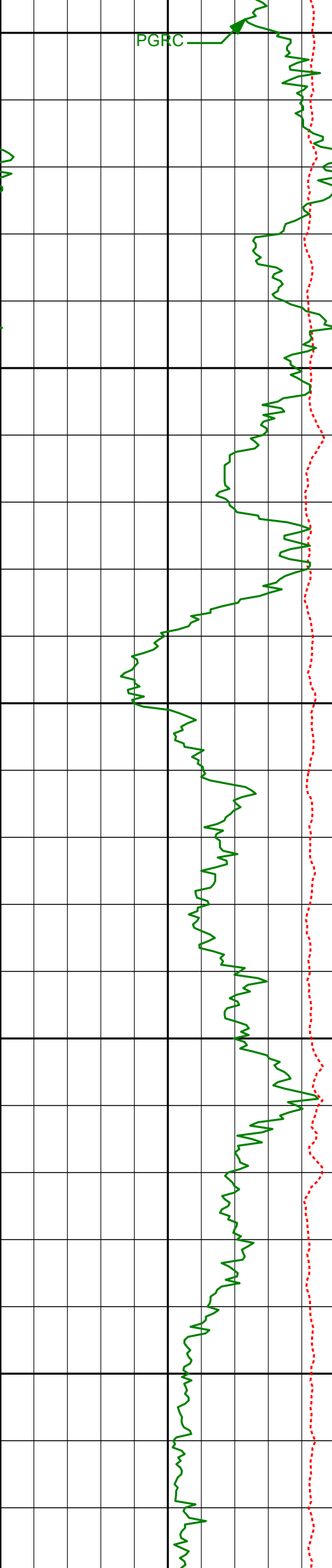
268.28°

6734.23'

3178.94'

9800'

ROPA



9850'

9900'

9950'

10000'

10050'

9849'

9944'

10039'

88.33°

88.65°

91.17°

269.54°

269.63°

270.57°

6737.30'

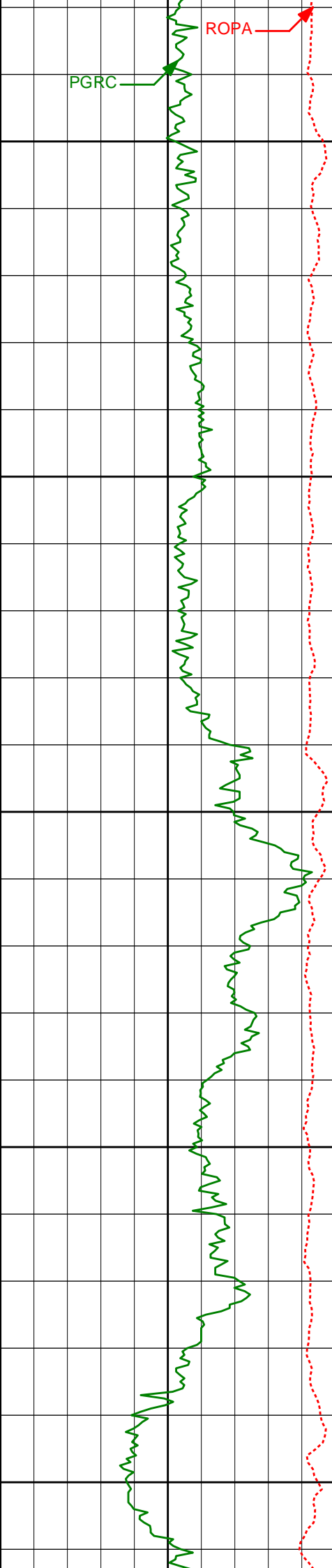
6739.80'

6739.95'

3273.67'

3368.49'

3463.38'



ROPA

PGRC

10100'

10150'

10200'

10250'

10300'

10134'

90.40°

270.63°

6738.65'

3558.30'

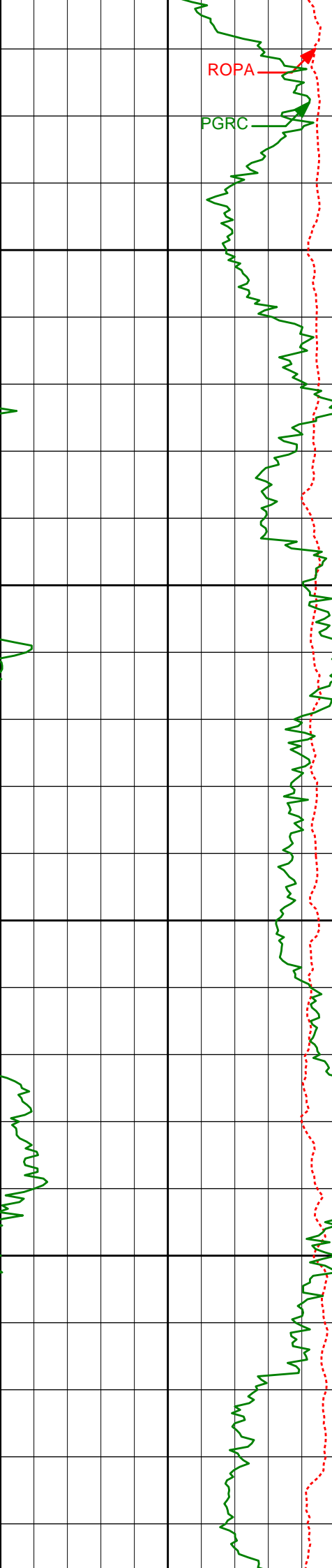
10229'

91.26°

270.66°

6737.27'

3653.22'



10350'

10400'

10450'

10500'

10323'

92.37°

270.26°

6734.28'

3747.09'

10418'

92.78°

269.12°

6730.01'

3841.85'

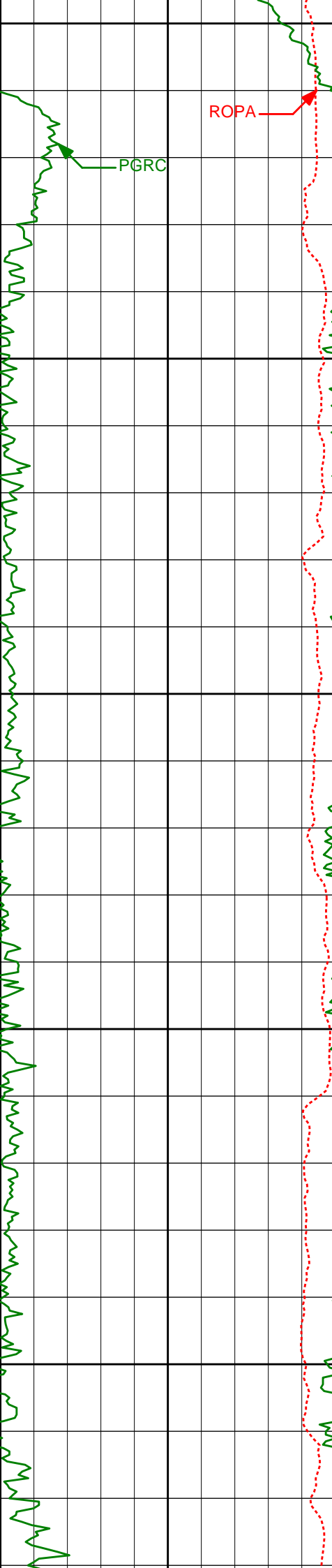
10513'

93.12°

268.20°

6725.12'

3936.48'



10550'

ROPA

PGRC

10600'

10608'

90.92°

266.18°

6721.77'

4030.96'

10650'

10700'

10703'

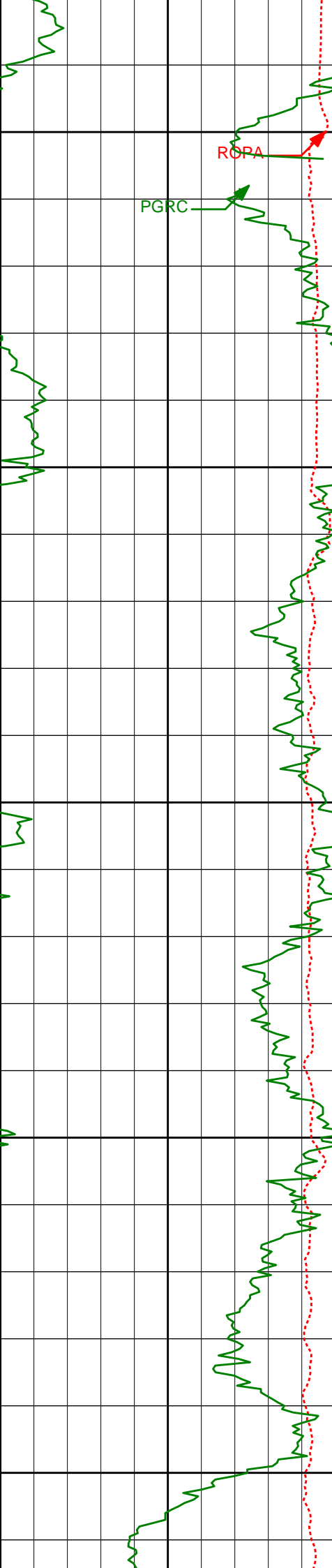
89.54°

265.48°

6721.39'

4125.25'

10750'



10800'

10797'

86.36°

264.24°

6724.76'

4218.28'

10850'

10900'

10892'

87.19°

264.93°

6730.10'

4312.15'

10950'

11000'

10987'

87.96°

264.96°

6734.11'

4406.18'

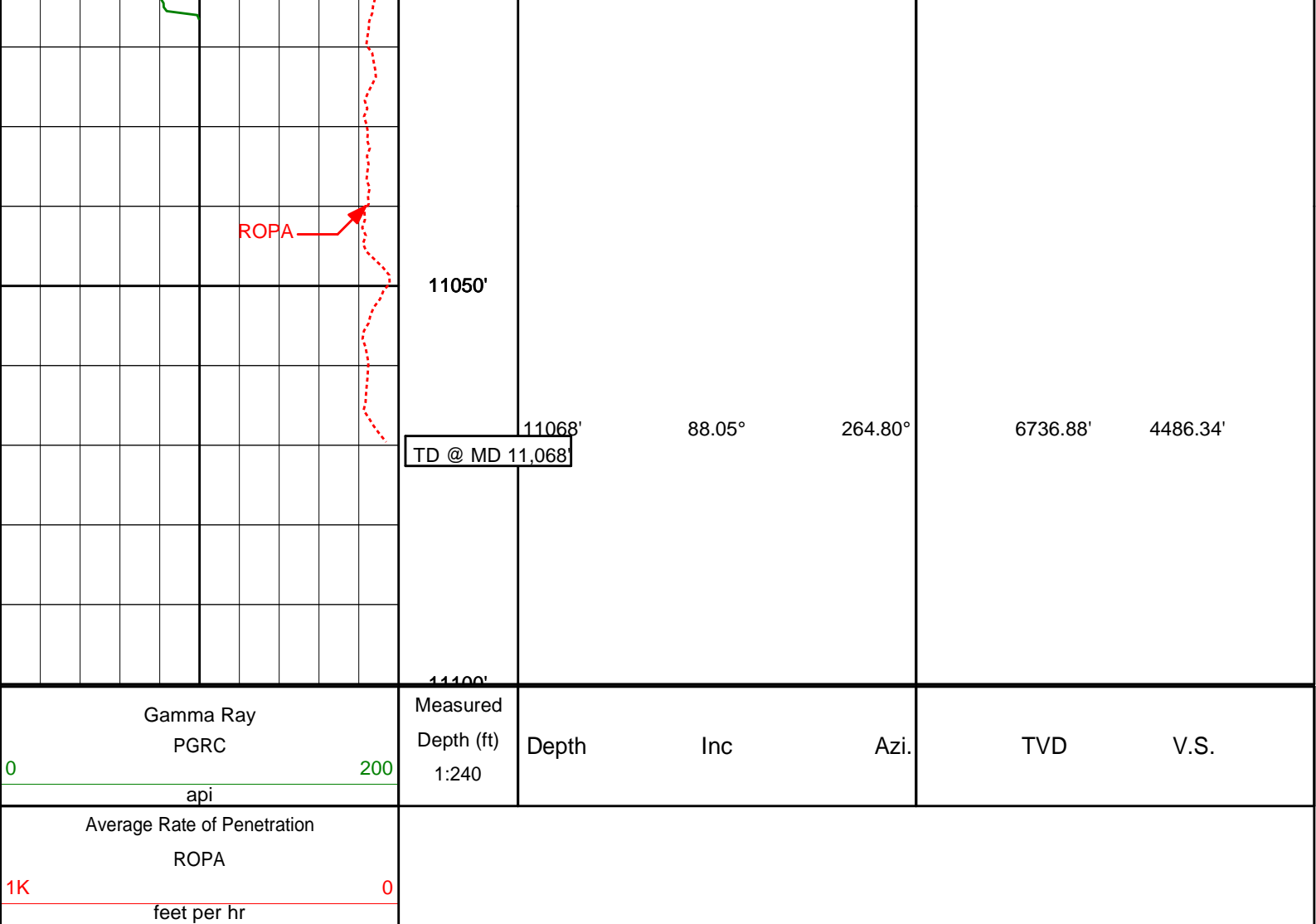
11008'

88.05°

264.80°

6734.84'

4426.96'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch AE06-68-1HN
Wattenburg
Weld CO
U.S.A.
CA-XX-0009650356

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
658.00	0.00	0.00	658.00	0.00 N	0.00 E	0.00	0.00
808.00	0.52	163.90	808.00	0.65 S	0.19 E	-0.22	0.34
900.00	0.44	163.91	899.99	1.39 S	0.40 E	-0.47	0.08
992.00	0.57	188.25	991.99	2.18 S	0.43 E	-0.54	0.27
1087.00	0.58	149.95	1086.99	3.06 S	0.61 E	-0.76	0.40
1181.00	0.62	193.58	1180.98	3.98 S	0.73 E	-0.92	0.48
1276.00	0.70	204.18	1275.98	5.01 S	0.37 E	-0.61	0.15
1560.00	0.93	211.57	1559.95	8.55 S	1.55 W	1.13	0.09
1655.00	0.68	282.34	1654.94	9.09 S	2.50 W	2.05	1.00
1749.00	0.83	263.62	1748.93	9.05 S	3.72 W	3.27	0.31
1844.00	0.74	204.92	1843.92	9.68 S	4.67 W	4.19	0.82
1939.00	0.81	288.84	1938.92	10.02 S	5.56 W	5.06	1.09
2032.00	0.80	298.20	2031.91	9.50 S	6.75 W	6.28	0.14
2132.00	1.66	280.05	2131.89	8.91 S	8.80 W	8.35	0.93
2227.00	1.01	316.35	2226.86	8.07 S	10.73 W	10.32	1.09
2322.00	1.20	17.50	2321.85	6.51 S	11.01 W	10.68	1.20
2416.00	2.46	28.42	2415.80	3.79 S	9.75 W	9.55	1.38
2510.00	4.11	30.47	2509.64	0.89 N	7.08 W	7.12	1.75
2605.00	5.12	22.58	2604.33	7.73 N	3.73 W	4.10	1.25

2700.00	6.45	24.09	2698.84	16.51 N	0.07 E	0.73	1.41
2795.00	7.51	24.29	2793.14	27.04 N	4.80 E	-3.48	1.11
2889.00	8.61	20.29	2886.21	39.24 N	9.77 E	-7.84	1.32
2983.00	10.73	20.90	2978.87	54.02 N	15.34 E	-12.68	2.26
3078.00	12.66	22.45	3071.89	71.91 N	22.47 E	-18.93	2.05
3173.00	14.42	22.79	3164.25	92.43 N	31.03 E	-26.47	1.86
3268.00	13.33	22.63	3256.48	113.45 N	39.82 E	-34.23	1.15
3362.00	13.61	28.48	3347.89	133.17 N	49.27 E	-42.70	1.48
3457.00	11.93	29.24	3440.54	151.56 N	59.39 E	-51.92	1.77
3551.00	13.60	29.41	3532.21	169.67 N	69.57 E	-61.20	1.77
3646.00	15.33	27.69	3624.20	190.52 N	80.89 E	-71.49	1.88
3741.00	17.02	26.53	3715.43	214.09 N	92.94 E	-82.37	1.81
3835.00	17.47	26.00	3805.21	239.08 N	105.28 E	-93.47	0.51
3929.00	17.94	24.98	3894.75	264.89 N	117.57 E	-104.49	0.60
4024.00	17.29	25.90	3985.30	290.85 N	129.92 E	-115.56	0.74
4119.00	15.40	25.74	4076.45	314.92 N	141.57 E	-126.02	1.99
4214.00	12.92	28.29	4168.56	335.64 N	152.09 E	-135.51	2.70
4308.00	9.61	30.06	4260.74	351.68 N	161.00 E	-143.62	3.54
4403.00	7.25	32.16	4354.70	363.62 N	168.16 E	-150.20	2.50
4498.00	5.09	31.13	4449.15	372.31 N	173.53 E	-155.13	2.28
4592.00	2.81	26.70	4542.92	377.94 N	176.72 E	-158.05	2.44
4687.00	1.65	25.27	4637.85	381.26 N	178.35 E	-159.52	1.23
4782.00	2.31	264.17	4732.82	382.30 N	177.03 E	-158.14	3.65
4876.00	2.48	253.32	4826.73	381.53 N	173.20 E	-154.35	0.51
4971.00	2.11	215.99	4921.66	379.52 N	170.20 E	-151.46	1.59
5066.00	2.94	194.39	5016.57	375.74 N	168.57 E	-150.02	1.32
5161.00	3.12	196.73	5111.44	370.90 N	167.22 E	-148.90	0.23
5255.00	2.69	179.05	5205.32	366.25 N	166.52 E	-148.43	1.05
5350.00	3.44	189.46	5300.18	361.21 N	166.09 E	-148.24	0.99
5444.00	2.75	194.59	5394.05	356.24 N	165.05 E	-147.46	0.79
5539.00	2.40	182.53	5488.95	352.04 N	164.39 E	-147.00	0.68
5634.00	1.57	173.35	5583.89	348.76 N	164.46 E	-147.22	0.93
5728.00	1.62	168.11	5677.86	346.17 N	164.88 E	-147.77	0.16
5823.00	1.47	196.57	5772.82	343.68 N	164.81 E	-147.82	0.82
5924.00	0.89	188.80	5873.80	341.66 N	164.32 E	-147.43	0.59
6013.00	3.94	270.24	5962.73	340.99 N	161.15 E	-144.30	4.39
6061.00	9.48	274.88	6010.38	341.33 N	155.56 E	-138.70	11.59
6108.00	12.01	272.82	6056.55	341.90 N	146.82 E	-129.94	5.43
6156.00	15.72	273.30	6103.14	342.52 N	135.34 E	-118.44	7.75
6203.00	19.12	272.37	6147.98	343.21 N	121.28 E	-104.37	7.26
6251.00	22.81	269.23	6192.80	343.41 N	104.12 E	-87.22	8.03
6298.00	26.42	266.78	6235.52	342.69 N	84.56 E	-67.72	7.99
6346.00	29.26	267.98	6277.96	341.68 N	62.17 E	-45.41	6.02
6392.00	32.03	268.01	6317.53	340.86 N	38.74 E	-22.05	6.02
6440.00	35.14	268.37	6357.52	340.02 N	12.21 E	4.41	6.49
6487.00	37.25	267.16	6395.45	338.93 N	15.52 W	32.06	4.76
6535.00	39.60	268.44	6433.05	337.80 N	45.33 W	61.77	5.17
6581.00	43.10	268.23	6467.57	336.91 N	75.70 W	92.07	7.60
6629.00	47.71	267.34	6501.27	335.58 N	109.84 W	126.10	9.69
6676.00	52.08	266.64	6531.54	333.69 N	145.73 W	161.86	9.39
6724.00	56.10	265.44	6559.68	330.99 N	184.51 W	200.45	8.60
6770.00	59.52	265.67	6584.19	327.97 N	223.31 W	239.07	7.44
6818.00	61.32	265.16	6607.88	324.63 N	264.92 W	280.46	3.88
6865.00	63.58	265.80	6629.62	321.35 N	306.46 W	321.79	4.94
6913.00	64.97	266.01	6650.45	318.26 N	349.59 W	364.72	2.93
6960.00	67.62	267.48	6669.34	315.82 N	392.55 W	407.51	6.33
7008.00	70.16	268.33	6686.63	314.19 N	437.29 W	452.12	5.54
7054.00	73.49	269.35	6700.98	313.31 N	480.98 W	495.71	7.55
7102.00	78.24	268.49	6712.69	312.43 N	527.51 W	542.14	10.05
7128.00	81.07	268.43	6717.36	311.74 N	553.07 W	567.64	10.89
7287.00	86.23	266.45	6734.94	304.68 N	710.88 W	724.91	3.48
7382.00	90.19	267.17	6737.90	299.40 N	805.67 W	819.33	4.23
7477.00	90.65	265.80	6737.21	293.58 N	900.48 W	913.75	1.52
7571.00	89.94	264.46	6736.73	285.60 N	994.14 W	1006.91	1.61
7666.00	89.78	261.42	6736.96	273.93 N	1088.41 W	1100.49	3.21
7761.00	89.38	260.62	6737.65	259.10 N	1182.24 W	1193.49	0.94
7856.00	89.29	262.15	6738.75	244.87 N	1276.16 W	1286.60	1.61
7951.00	90.37	264.97	6739.03	234.21 N	1370.55 W	1380.35	3.18
8046.00	93.51	267.38	6735.81	227.87 N	1465.26 W	1474.65	4.17
8141.00	94.11	266.40	6729.50	222.73 N	1559.91 W	1568.93	1.21
8236.00	93.14	267.17	6723.49	217.41 N	1654.57 W	1663.22	1.30
8331.00	90.65	268.95	6720.35	214.20 N	1749.45 W	1757.83	3.22
8426.00	89.23	270.46	6720.45	213.71 N	1844.45 W	1852.68	2.18
8521.00	89.32	271.81	6721.65	215.59 N	1939.42 W	1947.63	1.43
8616.00	90.40	270.97	6721.88	217.89 N	2034.39 W	2042.60	1.44
8711.00	90.37	271.20	6721.24	219.69 N	2129.37 W	2137.56	0.24

8806.00	89.85	271.74	6721.06	222.12 N	2224.34 W	2232.53	0.79
8901.00	87.78	271.05	6723.03	224.43 N	2319.28 W	2327.48	2.29
8996.00	88.43	270.48	6726.18	225.70 N	2414.22 W	2422.36	0.91
9090.00	90.80	270.96	6726.81	226.89 N	2508.20 W	2516.29	2.58
9185.00	89.88	270.58	6726.25	228.16 N	2603.19 W	2611.23	1.05
9280.00	90.34	269.94	6726.07	228.59 N	2698.19 W	2706.14	0.83
9375.00	88.74	268.80	6726.84	227.55 N	2793.18 W	2800.96	2.07
9470.00	87.78	268.62	6729.73	225.41 N	2888.11 W	2895.67	1.02
9565.00	90.65	269.46	6731.03	223.82 N	2983.08 W	2990.45	3.14
9659.00	88.76	268.78	6731.51	222.37 N	3077.06 W	3084.25	2.13
9754.00	87.96	268.28	6734.23	219.94 N	3171.99 W	3178.94	0.99
9849.00	88.33	269.54	6737.30	218.14 N	3266.92 W	3273.67	1.38
9944.00	88.65	269.63	6739.80	217.46 N	3361.88 W	3368.49	0.34
10039.00	91.17	270.57	6739.95	217.62 N	3456.87 W	3463.38	2.84
10134.00	90.40	270.63	6738.65	218.62 N	3551.86 W	3558.30	0.81
10229.00	91.26	270.66	6737.27	219.69 N	3646.84 W	3653.22	0.91
10323.00	92.37	270.26	6734.28	220.44 N	3740.79 W	3747.09	1.25
10418.00	92.78	269.12	6730.01	219.92 N	3835.69 W	3841.85	1.27
10513.00	93.12	268.20	6725.12	217.70 N	3930.54 W	3936.48	1.03
10608.00	90.92	266.18	6721.77	213.04 N	4025.35 W	4030.96	3.14
10703.00	89.54	265.48	6721.39	206.13 N	4120.10 W	4125.25	1.63
10797.00	86.36	264.24	6724.76	197.72 N	4213.65 W	4218.28	3.63
10892.00	87.19	264.93	6730.10	188.77 N	4308.07 W	4312.15	1.14
10987.00	87.96	264.96	6734.11	180.41 N	4402.62 W	4406.18	0.81
11008.00	88.05	264.80	6734.84	178.54 N	4423.52 W	4426.96	0.89
11068.00	88.05	264.80	6736.88	173.10 N	4483.24 W	4486.34	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 272.80 DEGREES (GRID)
A TOTAL CORRECTION OF 7.81 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11068.00 FEET
IS 4486.58 FEET ALONG 272.21 DEGREES (GRID)**