HALLIBURTON | Sperry Drilling

PCG Pressure Case Gamma
PCD Pressure Case Directional

Company : **Noble Energy**
Rig : **H&P 343**
Well : **Marie D04-74-1HN**
Field : **Wattenberg**
Country : **USA**
API Number : **05-123-38305**

Country	: **USA**
Field	: **Wattenberg**
Location	: **Lat: 40° 14' 52.48" North** **Long: 104° 33' 11.27" West**
Well	: **Marie D04-74-1HN**
Company	: **Noble Energy**
Rig	: **H&P 343**

LOCATION

Latitude : **40° 14' 52.48" North**
Longitude : **104° 33' 11.27" West**
UTM Easting = **3,264,299.690 ft**
UTM Northing = **1,334,566.430 ft**

Other Services
Directional Drilling

Elev. KB **N/A**
DF **4744.00 ft**
GL **4720.00 ft**
WD **N/A**

Permanent Datum : **Ground Level** Elevation : **4720.00 ft**
Log Measured From : **Drill Floor** **24.00 ft** Above Permanent Datum
Drilling Measured From : **Drill Floor**

MD LOG

Depth Logged : **687.00 ft** To **11,217.00 ft**
Date Logged : **21-Dec-13** To **06-Jan-14**
Total Depth MD : **11,217.00 ft** TVD: **6,771.68 ft**
Spud Date : **22-Dec-13**

Unit No. : **11610115**
Plot Type : **Final**
Plot Date : **09-Jan-14**
Job No. :**CA-XX-0900918600**

Borehole Record (MD)

Run No.	Size	From	To
2	8.750 in	687.00 ft	6,126.00 ft
7	8.750 in	6,126.00 ft	6,205.00 ft
8	8.750 in	6,205.00 ft	7,203.00 ft
9	6.125 in	7,203.00 ft	11,217.00 ft

Run No.

Size
9.625 in
7.000 in

Casing Record (MD)

Weight	From	To
36.00 lbpf	SURFACE	677.00 ft
26.00 lbpf	SURFACE	7,193.00 ft

Borehole Record (MD)

Size	From	To

WELL INFORMATION

MWD Run Number	100	600	700	800	
Date run completed	25-Dec-13	02-Jan-14	03-Jan-14	06-Jan-14	
Rig Bit Number	2	7	8	9	
Bit Size (in)	8.750	8.750	8.750	6.125	
Tool Nominal OD (in)	6.750	6.750	6.750	4.750	
Log Start Depth (MD, ft)	687.00	6,126.00	6,205.00	7,203.00	
Log End Depth (MD, ft)	7,130.00	6,205.00	7,203.00	11,217.00	
Drill or Wipe	Drill	Drill	Drill	Drill	
Drill/Wipe Start Date and Time	24-Dec-13 00:45	02-Jan-14 04:15	02-Jan-14 18:00	04-Jan-14 15:15	
Drill/Wipe End Date and Time	25-Dec-13 00:45	02-Jan-14 11:45	03-Jan-14 08:15	05-Jan-14 20:30	
Min Inc (deg) @ Depth (MD, ft)	0.13 @ 6,385.00	1.93 @ 6,149.00	10.96 @ 6,243.00	87.53 @ 10,456.00	
Max Inc (deg) @ Depth (MD, ft)	10.38 @ 2,119.00	7.03 @ 6,195.00	85.13 @ 7,150.00	93.64 @ 10,836.00	
Bit TFA(in2) / Bit Type	0.98 / PDC	0.92 / Tri Cone	0.98 / PDC	0.98 / PDC	
Flow Rate (gpm)	588.64	425.00	557.35	294.03	
Max AV (fpm) / CV (fpm) @ MWD	473.0 / 500.0	417.0 / 400.0	375.0 / 425.0	350.0 / 350.0	
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel	
Density (ppg) / Viscosity (spqt)	9.60 / 35.00	9.60 / 40.00	9.60 / 40.00	9.15 / 35.00	
Filtrate CL (ppm)	1,300.00	1,900.00	2,000.00	2,900.00	
pH / Fluid Loss (mptm)	9.30 / 8	10.50 / 10	10.20 / 8	10.00 / 61	
PV (cP) / YP (lhf2)	9 / 7.00	13 / 9.00	10 / 10.00	9 / 9.00	
% Solids / % Sand	5.0 / 0.25	6.2 / .1	6 / .15	2.7 / 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	
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	177.64 / PCM	412.20 / PCM	412.20 / PCM	145.09 / 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	Matt Settles	Matt Settles	Matt Settles	

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM	PCM	
Software Version	5.84	5.84	5.84	5.84	
Sub Serial Number	11341330	11341330	11341330	12310743	
Insert Serial Number	11400989	10997273	10997273	11400989	
Date and Time Initialized	23-Dec-13 01:21	01-Jan-70 00:00	01-Jan-70 00:00	04-Jan-14 04:53	
Date and Time Read	26-Dec-13 15:23	03-Jan-14 15:06	03-Jan-14 15:13	07-Jan-14 15:36	
ECMB SW Version	N/A	N/A	N/A	N/A	

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC	PCDC	
Distance From Bit (ft)	55.00	56.00	53.00	65.00	
Software Version	6.21	6.21	6.21	6.21	
Sub Serial Number	11341330	11341330	11341330	12310743	
Sonde Serial Number	11478007	11477956	11477956	11478007	
Sensor ID Number	N/A	N/A	N/A	N/A	
Toolface Offset (deg)	242.03	246.54	335.50	49.06	

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG	PCG	
Distance From Bit (ft)	47.97	49.77	45.87	57.89	
Recorded Sample Period (sec)	10	10	10	10	
Software Version	8.15	8.15	8.15	8.15	
Sub Serial Number	1341330	1341330	1341330	12310743	
Insert/Sonde Serial Number	11293391	12037425	12037425	11293391	

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

WARRANTY

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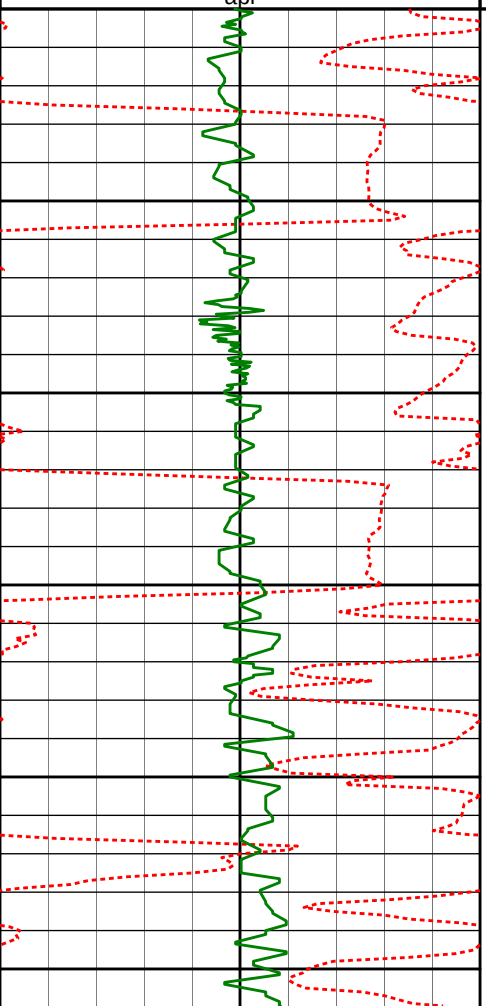
HALLIBURTON

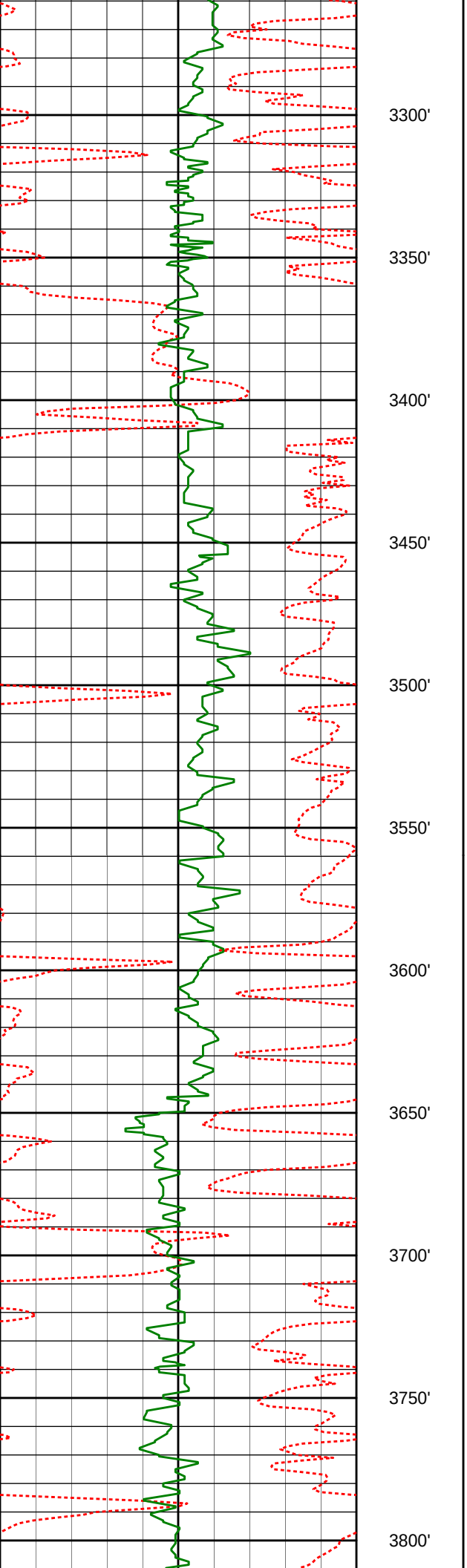
MD Main Log 1:600

Average Rate of Penetration
ROPA
1K 0
feet per hr

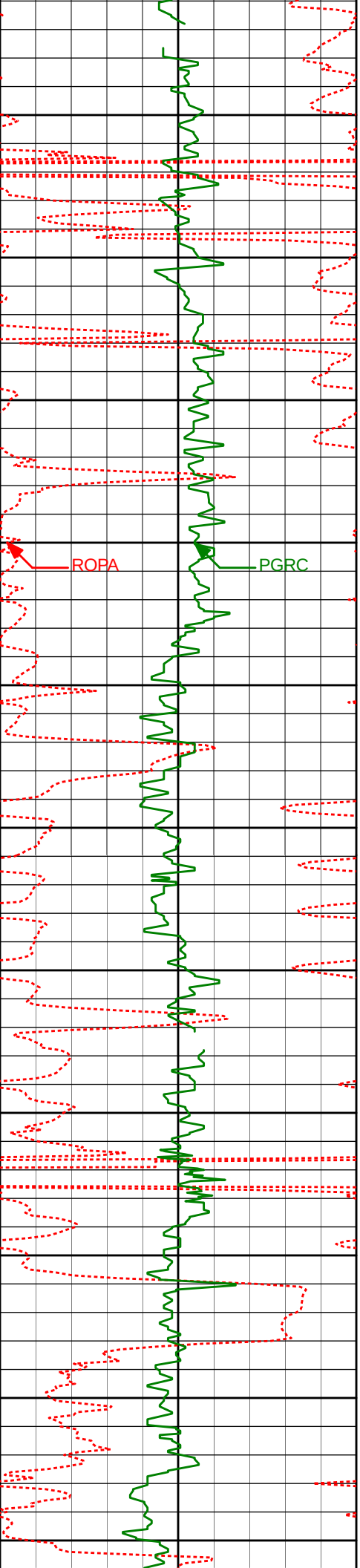
PCG Gamma Ray BCorr
PGRC
0 200
api



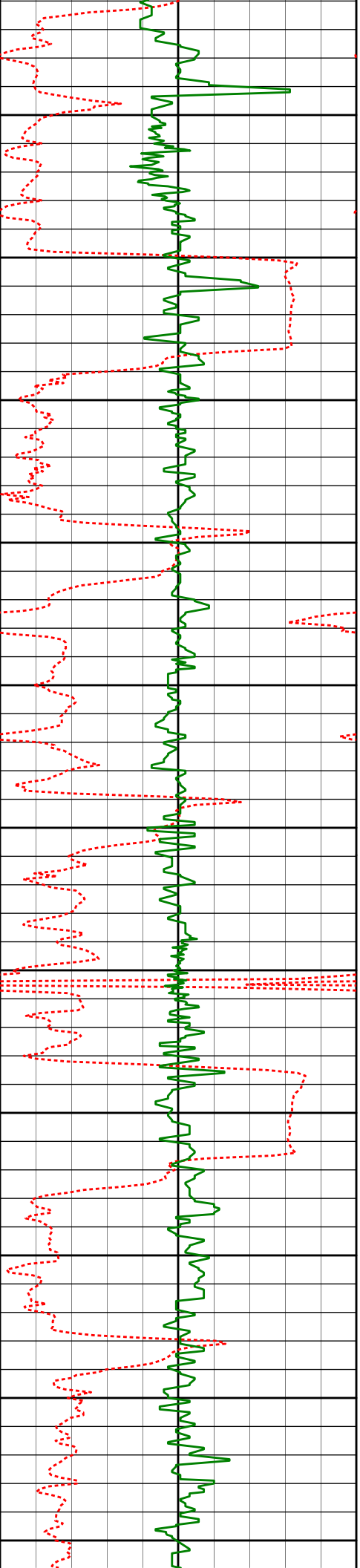
Measured Depth (ft) 1:600	Depth	Inc	Azi.	TVD	V.S.
	3067'	3.12°	138.43°	3050.62'	-143.03'
	3162'	0.57°	131.82°	3145.57'	-145.22'
	3257'	0.71°	99.12°	3240.56'	-145.60'



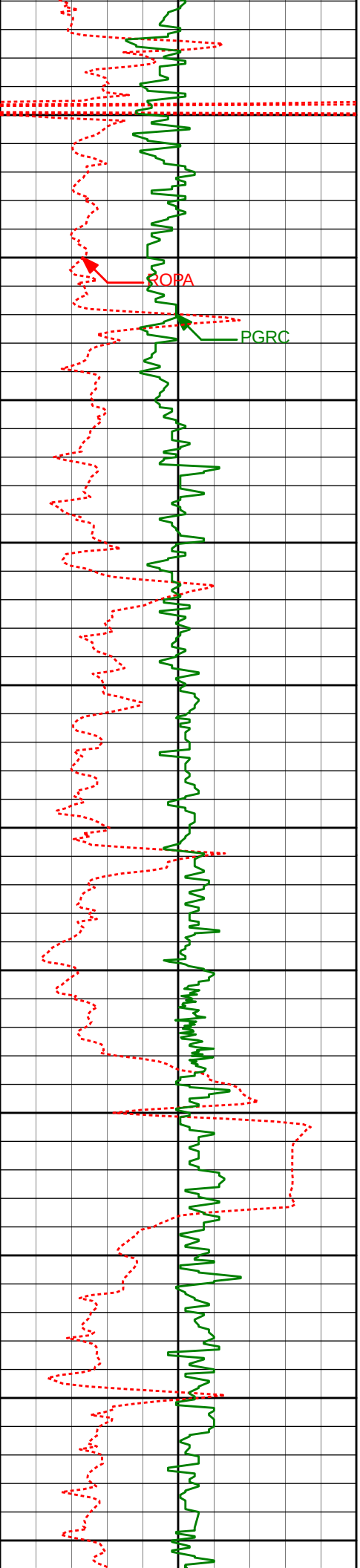
3352'	0.24°	189.77°	3335.56'	-145.87'
3446'	0.81°	324.08°	3429.55'	-145.54'
3541'	1.09°	334.68°	3524.54'	-144.20'
3636'	1.07°	301.34°	3619.53'	-142.96'
3731'	0.81°	292.61°	3714.51'	-142.28'



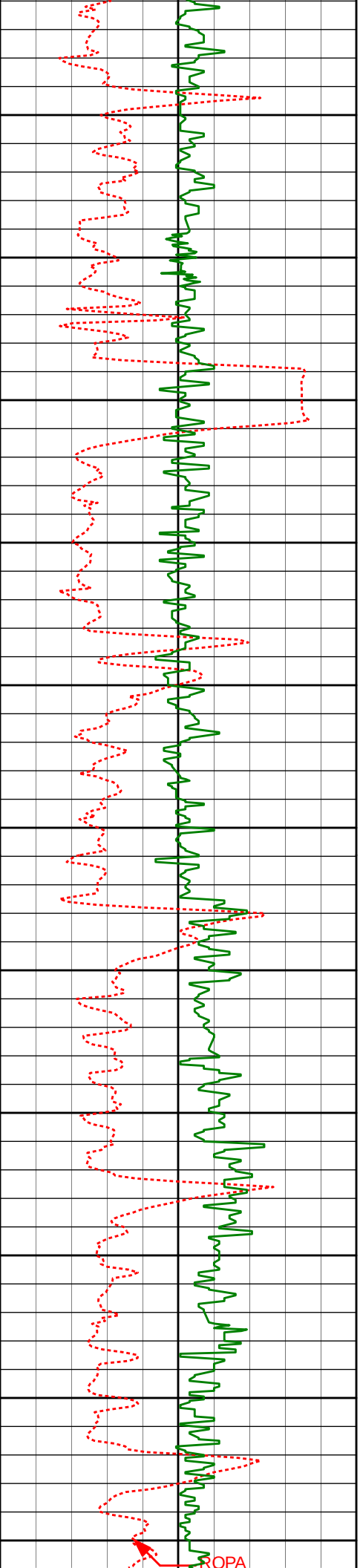
3825'	1.30°	299.40°	3808.50'	-141.55'
3920'	1.13°	302.52°	3903.47'	-140.57'
4015'	0.97°	323.20°	3998.46'	-139.46'
4110	0.71	337.67	4093.45	-138.30
4205'	0.84°	357.43°	4188.44'	-137.07'
4300'	0.79°	47.40°	4283.43'	-135.92'



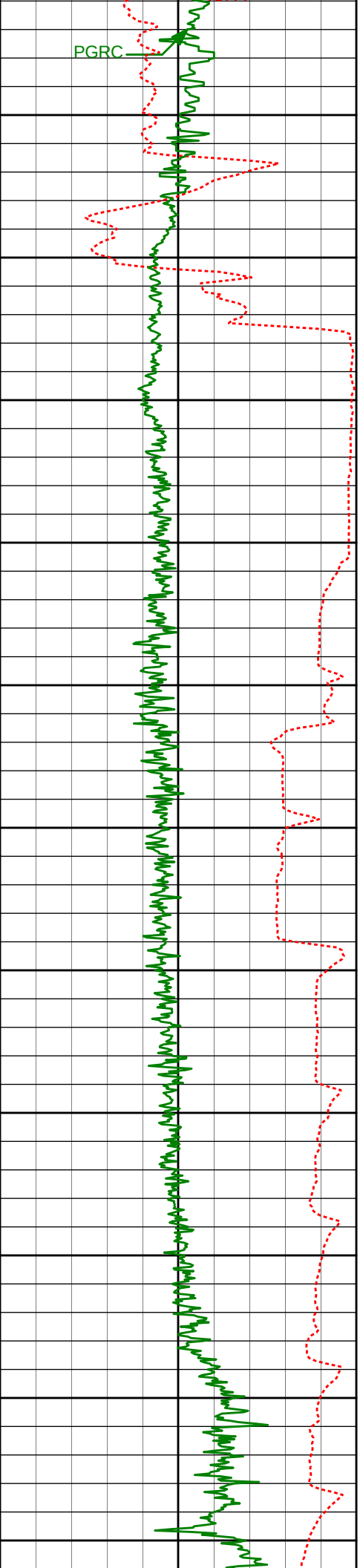
4395'	0.65°	28.27°	4378.42'	-134.97'
4490'	1.03°	109.12°	4473.42'	-134.75'
4584'	0.86°	94.18°	4567.40'	-135.03'
4679'	0.84°	84.06°	4662.39'	-134.97'
4869'	1.33°	131.43°	4852.36'	-136.19'



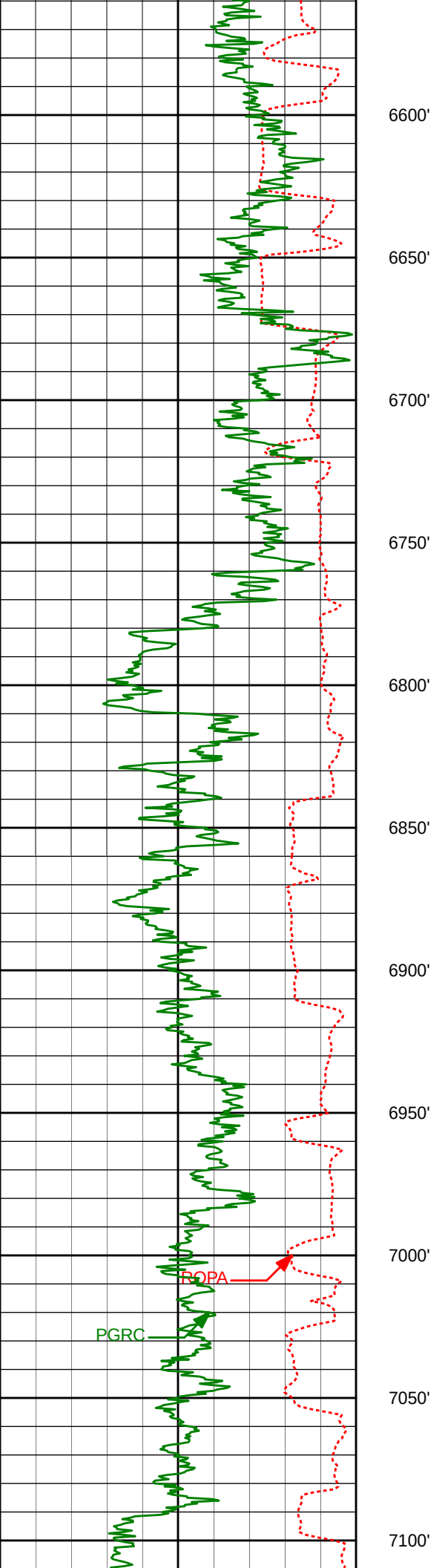
4950'					
	4964'	1.41°	121.07°	4947.34'	-137.47'
5000'					
5050'					
	5058'	1.34°	122.05°	5041.31'	-138.59'
5100'					
5150'					
5200'					
5250'					
	5248'	1.64°	96.51°	5231.25'	-139.94'
5300'					
5350'					
	5343'	1.79°	163.60°	5326.21'	-141.46'
5400'					
5450'					
	5438'	1.94°	165.67°	5421.16'	-144.42'



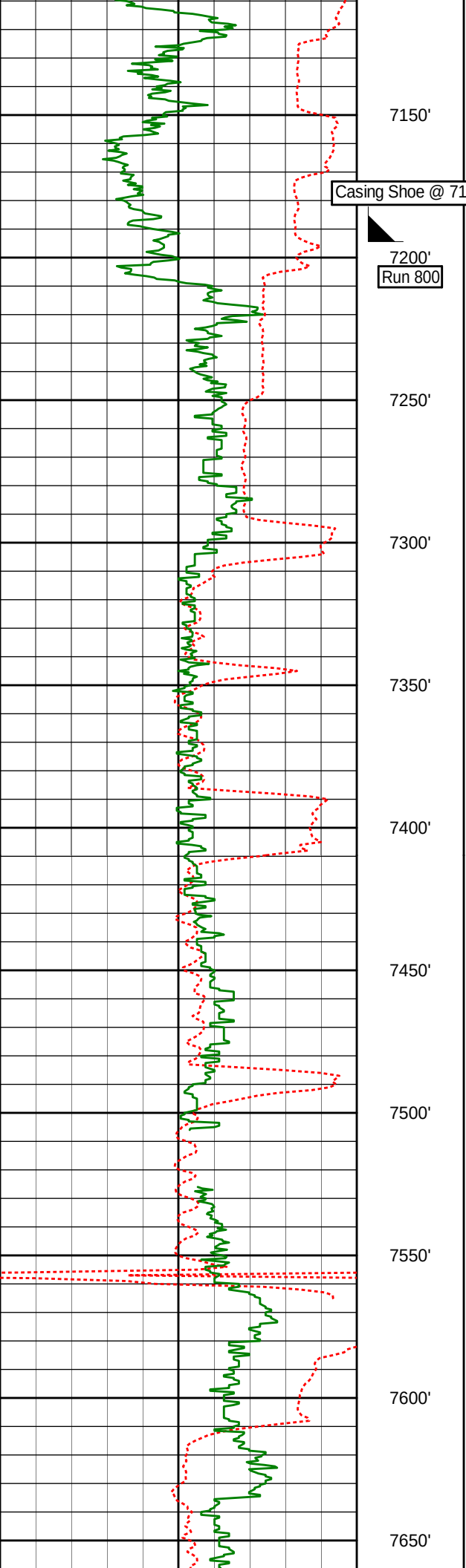
5532'	1.49°	183.32°	5515.12'	-147.17'
5627'	1.20°	224.84°	5610.10'	-149.13'
5722'	1.21°	219.09°	5705.08'	-150.66'
5817'	1.21°	229.95°	5800.05'	-152.12'
5912'	1.11°	232.80°	5895.03'	-153.37'
6007'	0.91°	211.53°	5990.02'	-154.61'



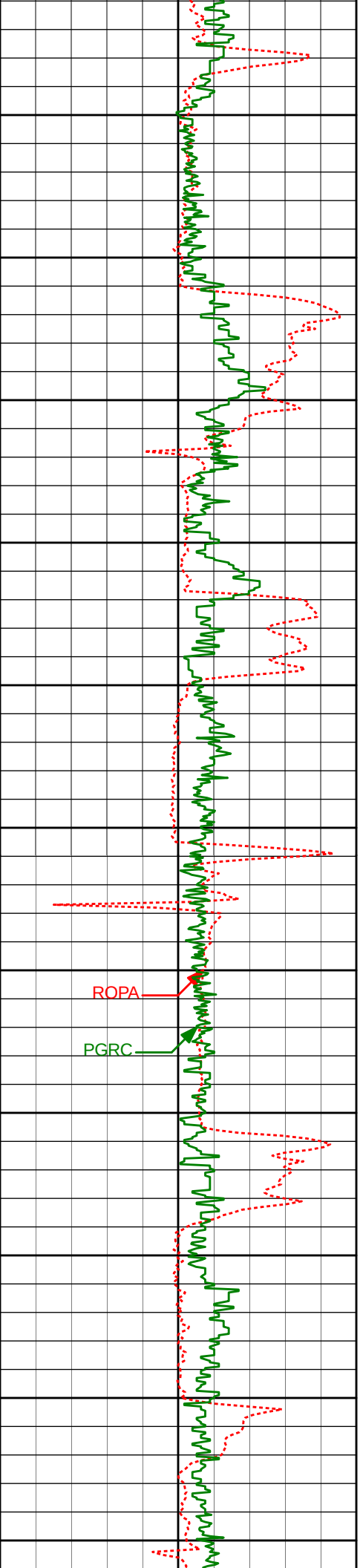
6050'					
6100'	6101'	0.61°	209.81°	6084.01'	-155.69'
Run 600					
6150'	6149'	1.93°	90.80°	6132.00'	-155.91'
	6195'	7.03°	71.55°	6177.85'	-154.92'
6200'					
Run700					
	6243'	10.96°	44.13°	6225.27'	-150.54'
6250'					
	6290'	12.09°	35.80°	6271.32'	-143.16'
6300'					
	6338'	11.36°	31.62°	6318.32'	-134.89'
6350'					
	6384'	15.95°	24.90°	6363.01'	-125.15'
6400'					
	6432'	21.36°	16.16°	6408.49'	-110.61'
6450'					
	6479'	27.44°	9.32°	6451.28'	-91.57'
6500'					
	6527'	34.95°	4.16°	6492.31'	-66.83'
6550'					



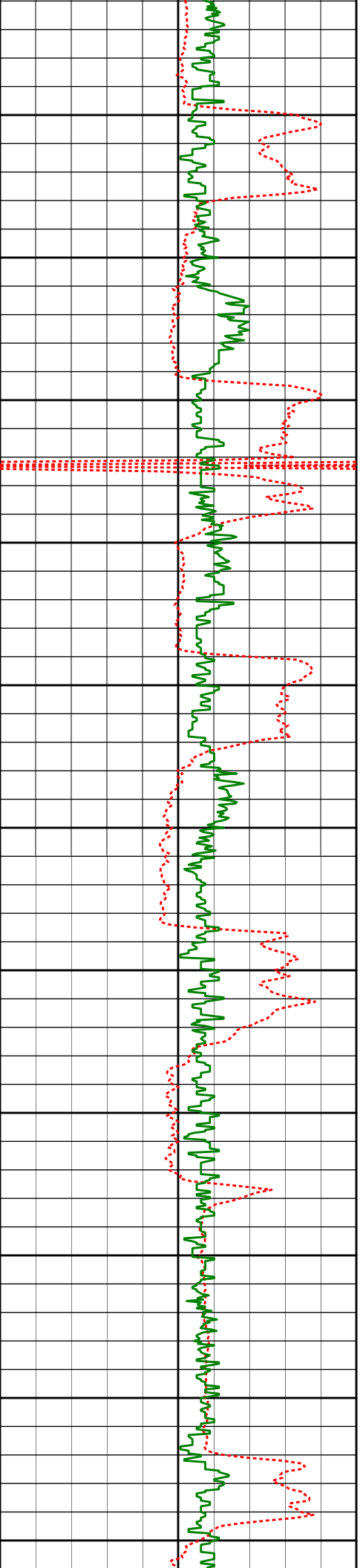
6574'	39.88°	0.59°	6529.64'	-38.29'
6622'	40.92°	358.44°	6566.19'	-7.21'
6668'	42.02°	357.78°	6600.66'	23.19'
6716'	47.09°	357.56°	6634.85'	56.77'
6763'	53.11°	356.55°	6664.98'	92.69'
6811'	59.96°	357.00°	6691.44'	132.56'
6858'	62.70°	356.83°	6713.98'	173.65'
6906'	63.90°	356.62°	6735.55'	216.37'
6953'	69.29°	357.74°	6754.21'	259.35'
7001'	73.89°	358.25°	6769.37'	304.78'
7048'	76.97°	358.67°	6781.19'	350.19'
7096'	81.30°	359.25°	6790.24'	397.27'



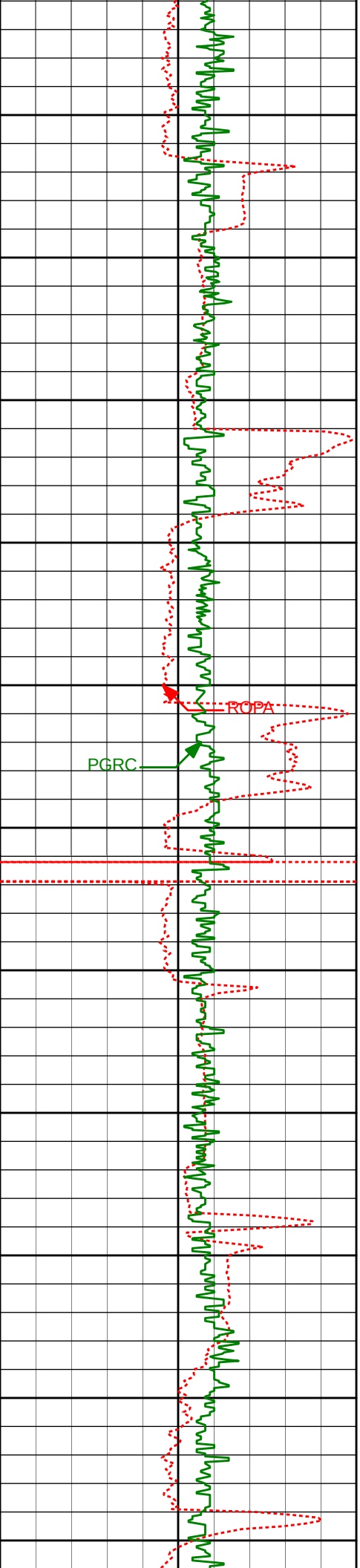
7150'	85.13°	358.50°	6796.61'	450.81'	
7330'	88.77°	356.36°	6806.19'	630.01'	
7425'	89.94°	356.87°	6807.26'	724.62'	
7519'	90.71°	356.26°	6806.73'	818.24'	
7614'	89.51°	356.74°	6806.55'	912.84'	



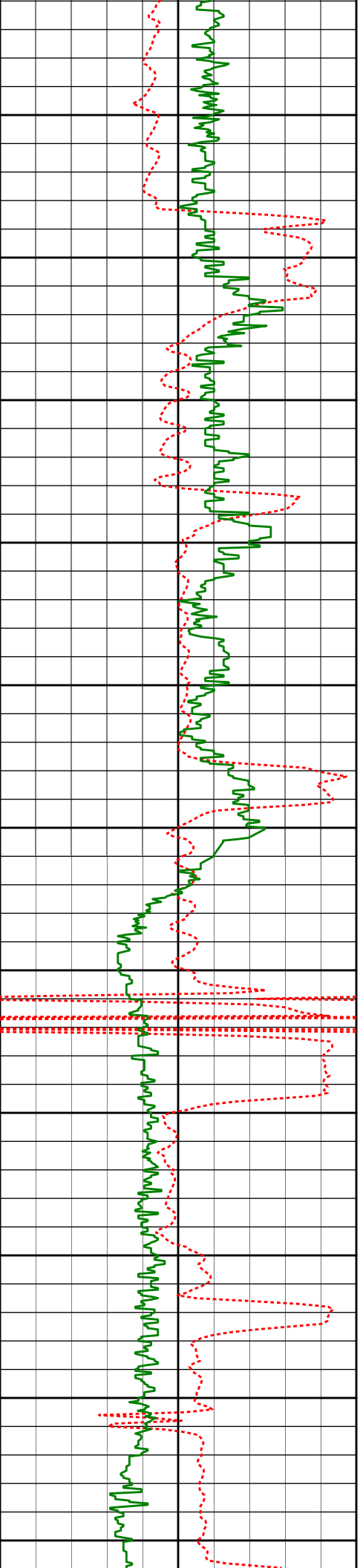
7700'	7708'	89.75°	356.69°	6807.16'	1006.48'
7750'					
7800'	7803'	92.44°	359.77°	6805.34'	1101.27'
7850'					
7900'	7898'	89.75°	0.17°	6803.53'	1196.20'
7950'					
8000'	7993'	90.15°	2.82°	6803.60'	1291.19'
8050'					
8100'	8088'	90.12°	1.29°	6803.38'	1386.18'
8150'					
8200'	8183'	90.28°	3.63°	6803.04'	1481.17'



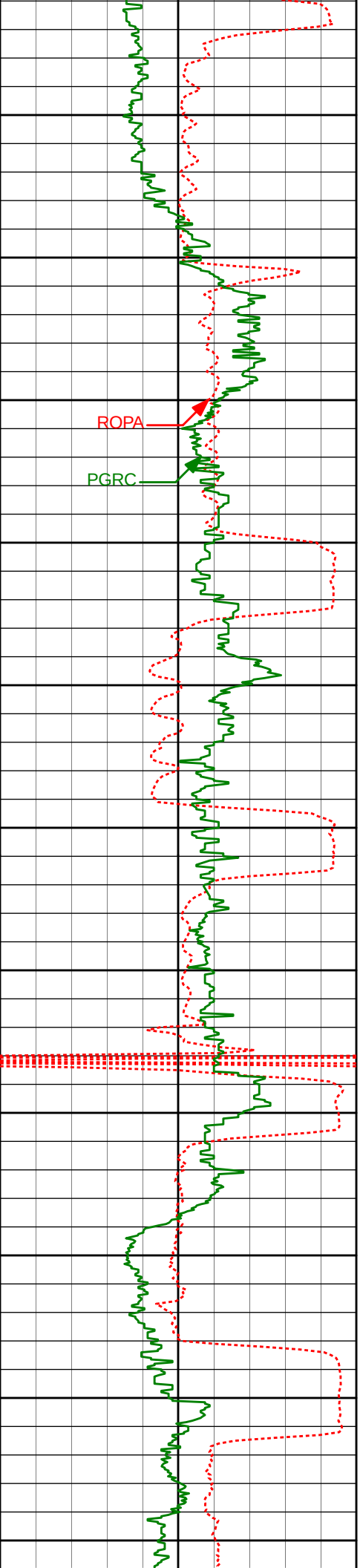
8277'	90.12°	4.91°	6802.71'	1575.07'
8372'	90.15°	2.17°	6802.48'	1670.02'
8467'	89.97°	1.61°	6802.38'	1765.01'
8562'	90.52°	358.58°	6801.97'	1859.96'
8657'	90.49°	358.93°	6801.13'	1954.83'
8751'	90.37°	357.22°	6800.42'	2048.63'



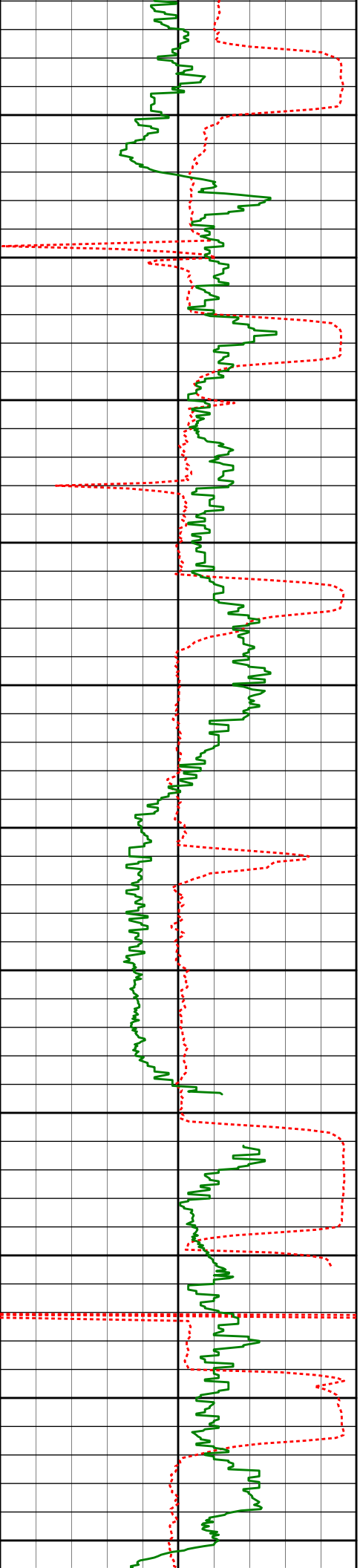
8846'	90.59°	359.83°	6799.63'	2143.47'
8941'	90.59°	359.36°	6798.65'	2238.40'
9036'	90.55°	357.52°	6797.71'	2333.24'
9131'	90.68°	358.86°	6796.69'	2428.05'
9226'	90.59°	358.50°	6795.64'	2522.91'



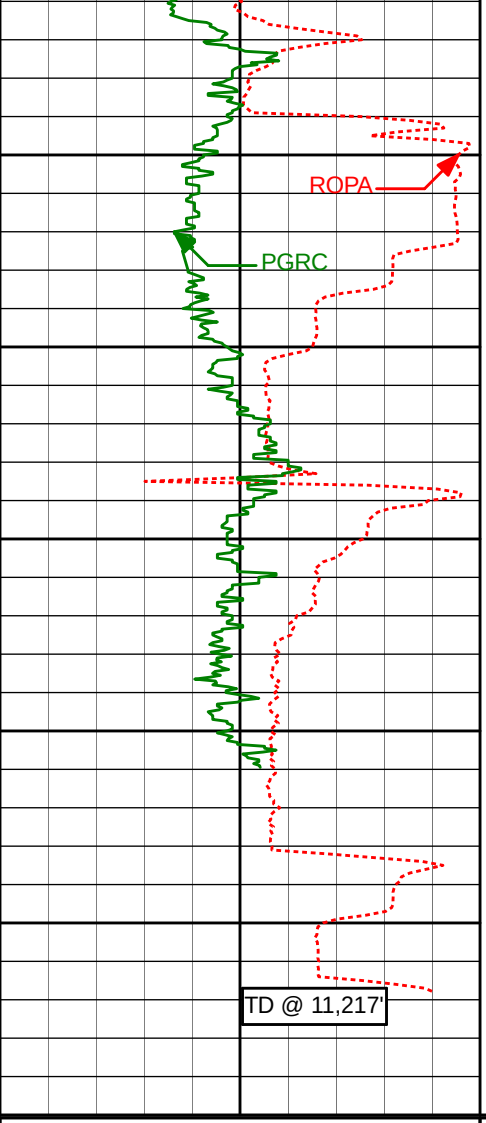
9321'	90.59°	0.41°	6794.67'	2617.82'
9415'	89.20°	358.61°	6794.84'	2711.75'
9510'	88.58°	357.44°	6796.69'	2806.53'
9605'	89.07°	355.43°	6798.63'	2901.10'
9700'	90.12°	357.23°	6799.29'	2995.67'
9794'	91.57°	356.62°	6797.90'	3089.32'



9889'	90.96°	358.17°	6795.81'	3184.03'
9984'	92.06°	355.95°	6793.31'	3278.67'
10078'	92.00°	357.54°	6789.98'	3372.25'
10173'	90.18°	358.01°	6788.17'	3467.00'
10268'	90.77°	357.87°	6787.38'	3561.79'
10362'	91.76°	0.60°	6785.30'	3655.67'



10456'	87.53°	359.23°	6785.88'	3749.60'
10551'	88.89°	359.74°	6788.85'	3844.48'
10646'	89.88°	359.95°	6789.87'	3939.42'
10741'	90.71°	356.82°	6789.39'	4034.24'
10836'	93.64°	359.23°	6785.78'	4128.96'
10931'	93.18°	0.51°	6780.13'	4223.74'



Measured Depth (ft) 1:600	Depth	Inc	Azi.	TVD	V.S.
11000'					
	11026'	90.59°	1.69°	6777.01'	4318.67'
11050'					
11100'					
11150'	11152'	92.10°	0.75°	6774.06'	4444.63'
11200'					
	11217'	92.10°	0.75°	6771.68'	4509.57'

PCG Gamma Ray BCorr
PGRC
0 200
api

Average Rate of Penetration
ROPA
1K 0
feet per hr

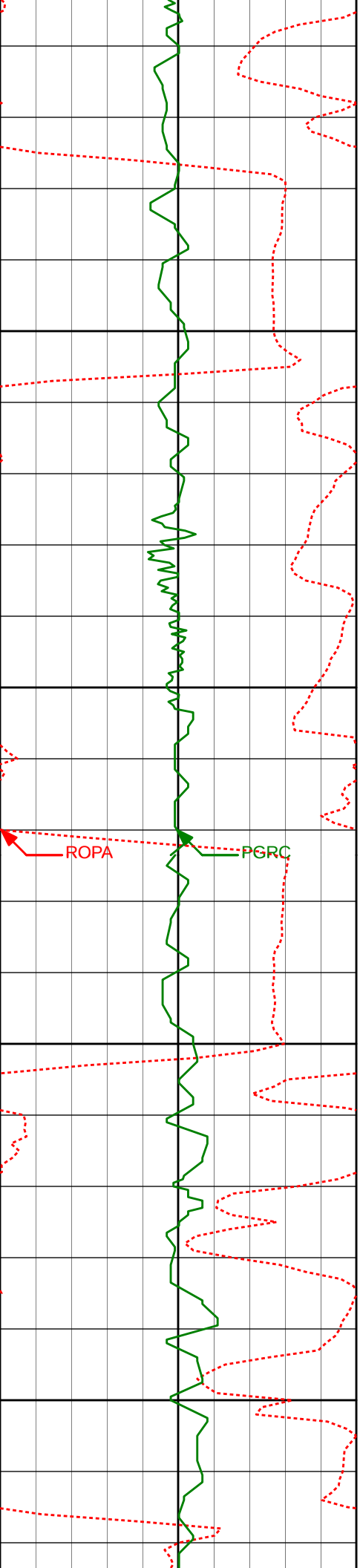
HALLIBURTON

MD Main Log 1:240

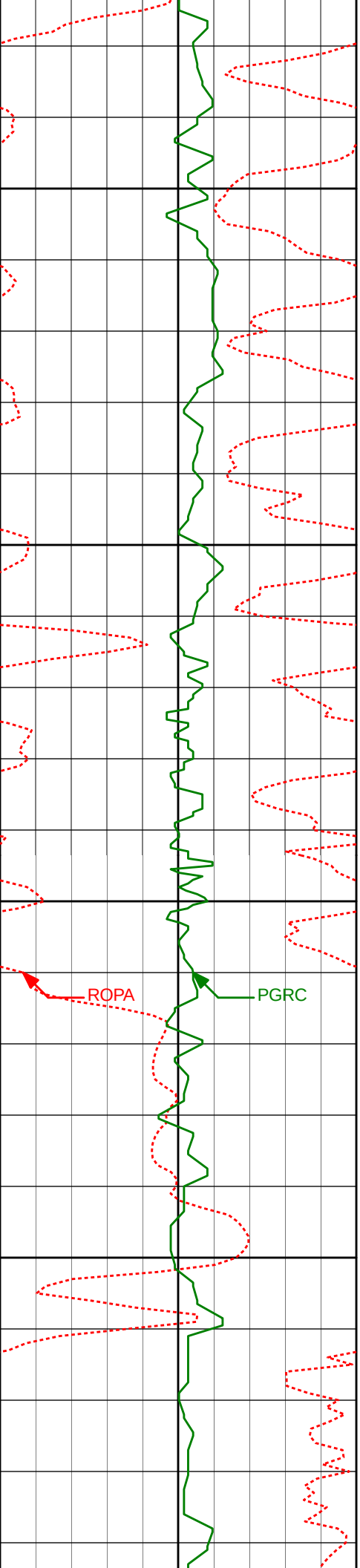
Average Rate of Penetration
ROPA
1K 0
feet per hr

PCG Gamma Ray BCorr
PGRC
0 200
api

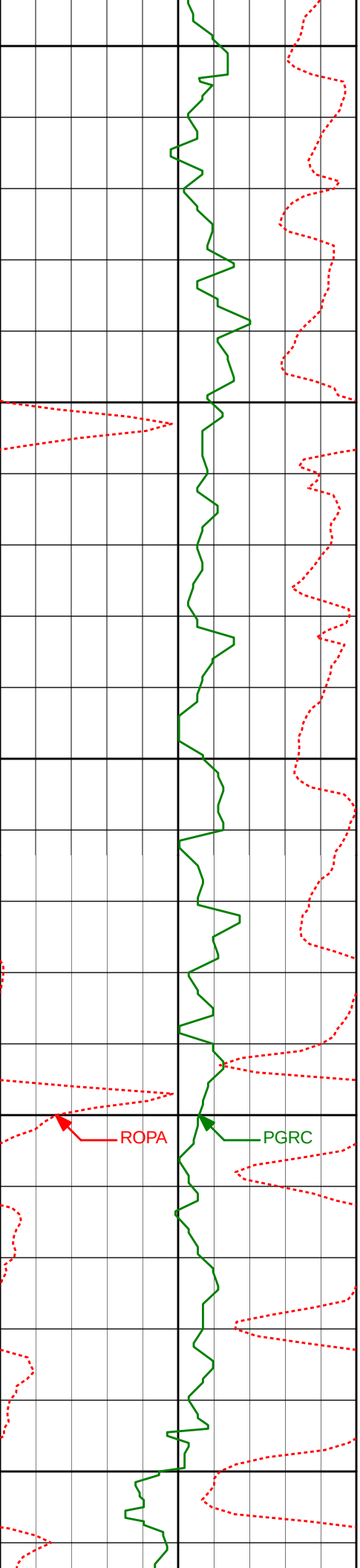
Measured Depth (ft) 1:240	Depth	Inc	Azi.	TVD	V.S.
5000					



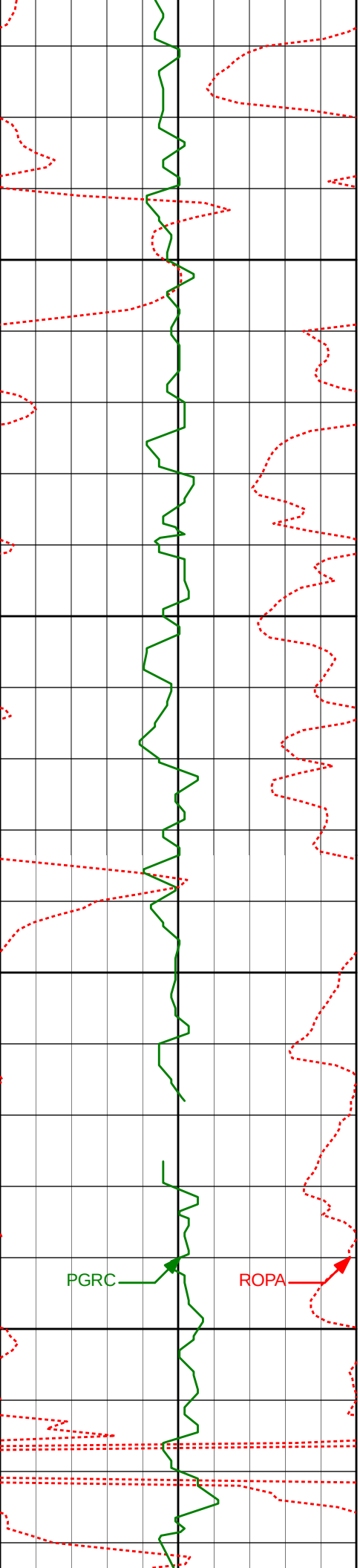
3067'	3.12°	138.43°	3050.62'	-143.03'
3162'	0.57°	131.82°	3145.57'	-145.22'



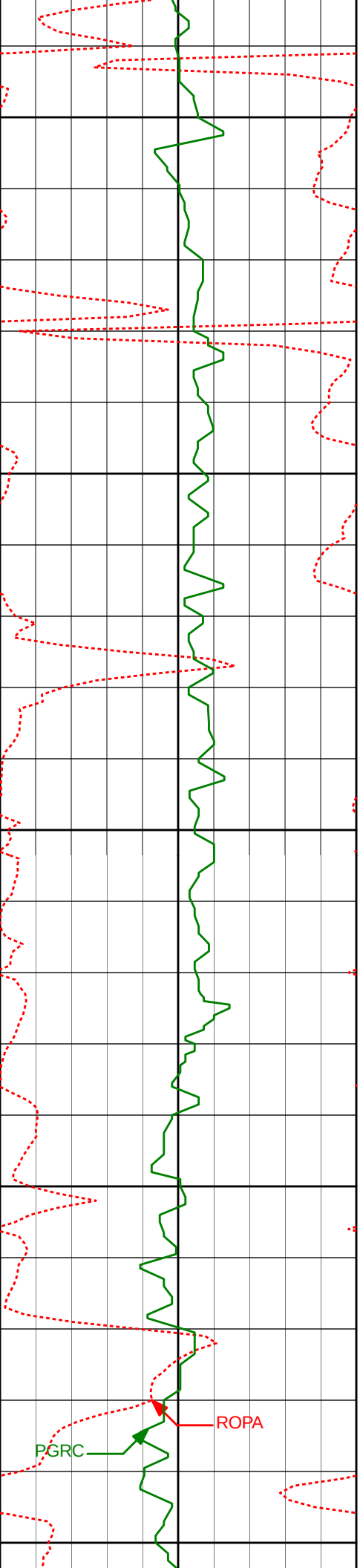
3257'	0.71°	99.12°	3240.56'	-145.60'
3352'	0.24°	189.77°	3335.56'	-145.87'



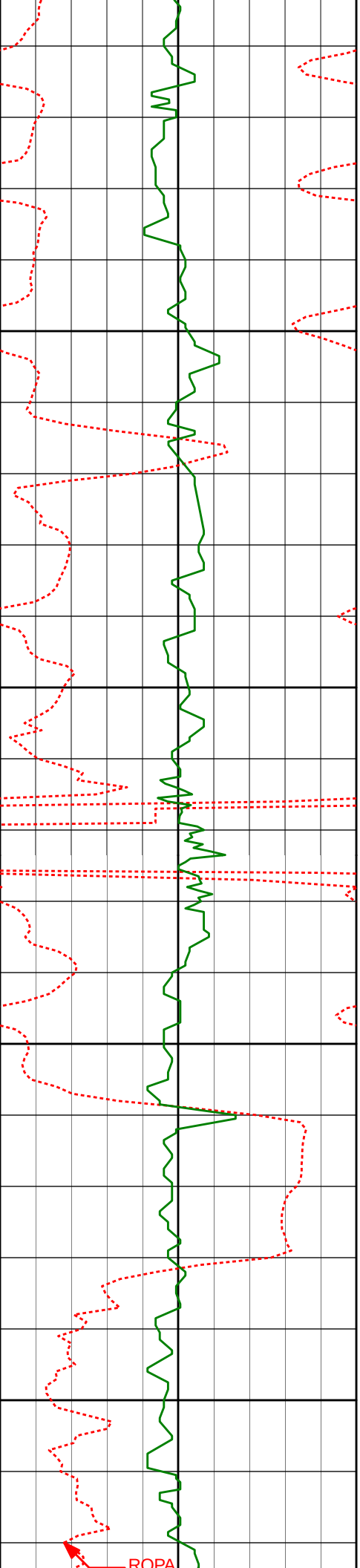
3446'	0.81°	324.08°	3429.55'	-145.54'
3541'	1.09°	334.68°	3524.54'	-144.20'
3636'	1.07°	301.34°	3619.53'	-142.96'



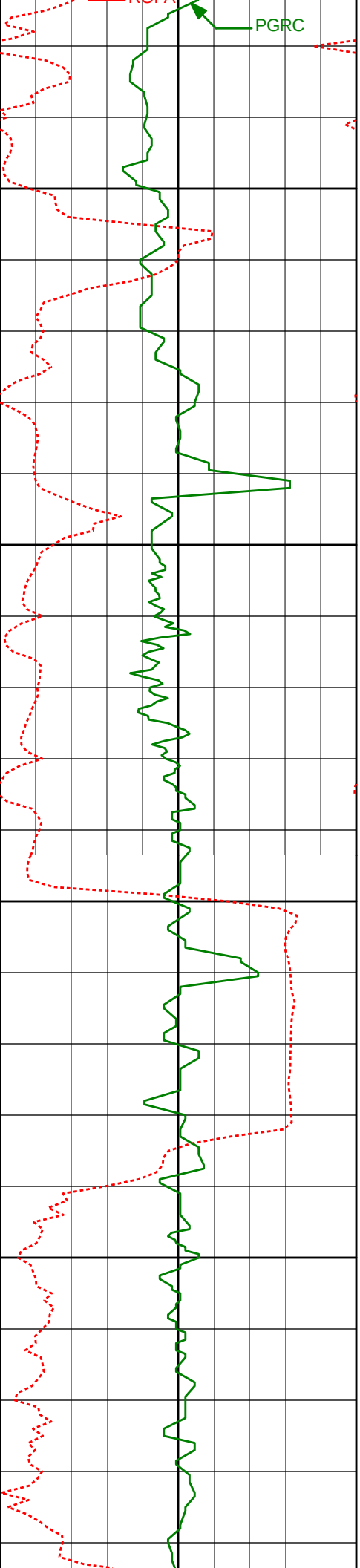
3731'	0.81°	292.61°	3714.51'	-142.28'
3825'	1.30°	299.40°	3808.50'	-141.55'



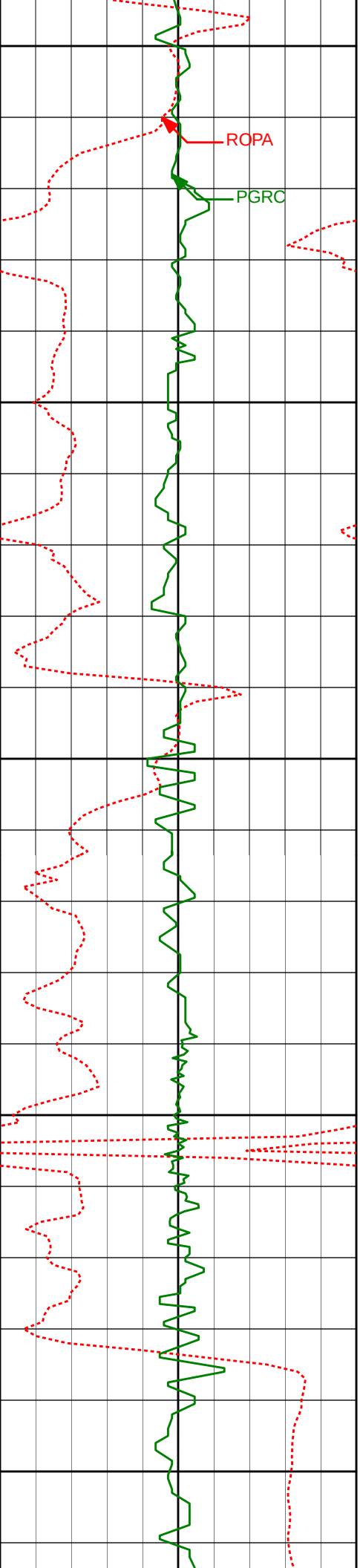
3920'	1.13°	302.52°	3903.47'	-140.57'
4015'	0.97°	323.20°	3998.46'	-139.46'



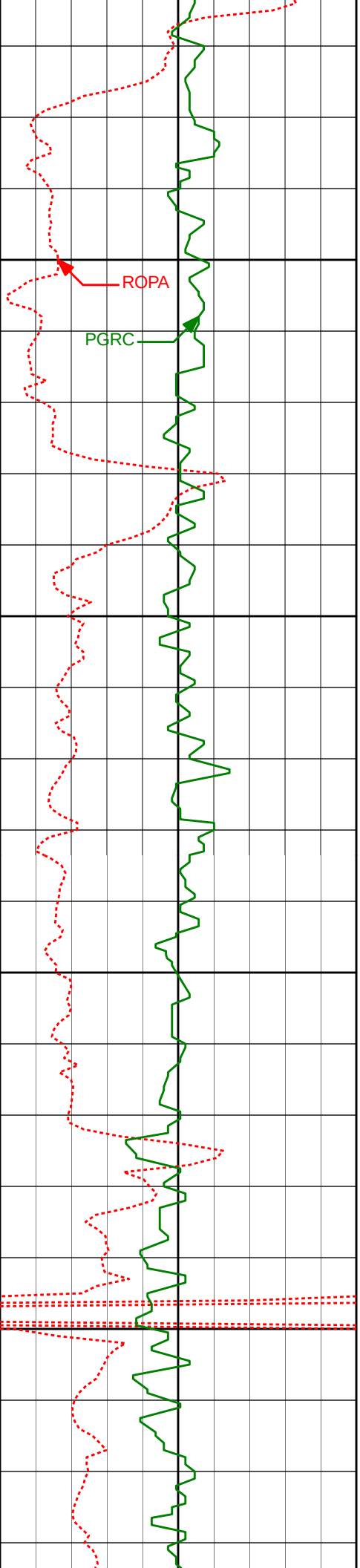
4110'	0.71°	337.67°	4093.45'	-138.30'
4205'	0.84°	357.43°	4188.44'	-137.07'
4300'	0.79°	47.40°	4283.43'	-135.92'



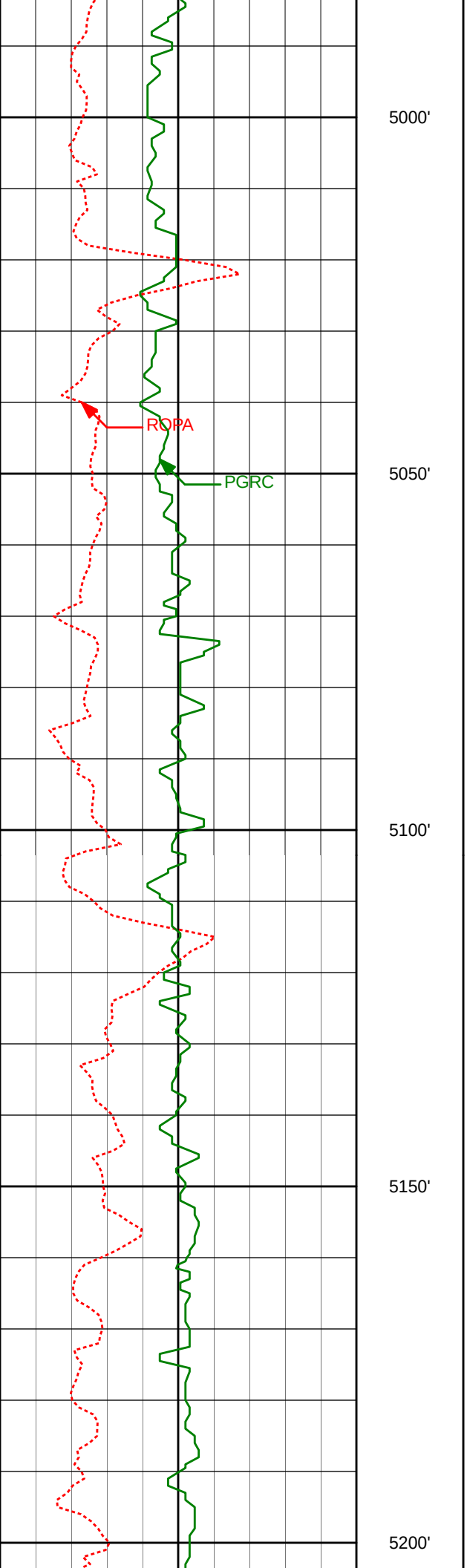
4395'	0.65°	28.27°	4378.42'	-134.97'
4490'	1.03°	109.12°	4473.42'	-134.75'



4550'				
4584'	0.86°	94.18°	4567.40'	-135.03'
4600'				
4650'				
4679'	0.84°	84.06°	4662.39'	-134.97'
4700'				
4750'				



4869'	1.33°	131.43°	4852.36'	-136.19'
4964'	1.41°	121.07°	4947.34'	-137.47'



5000'

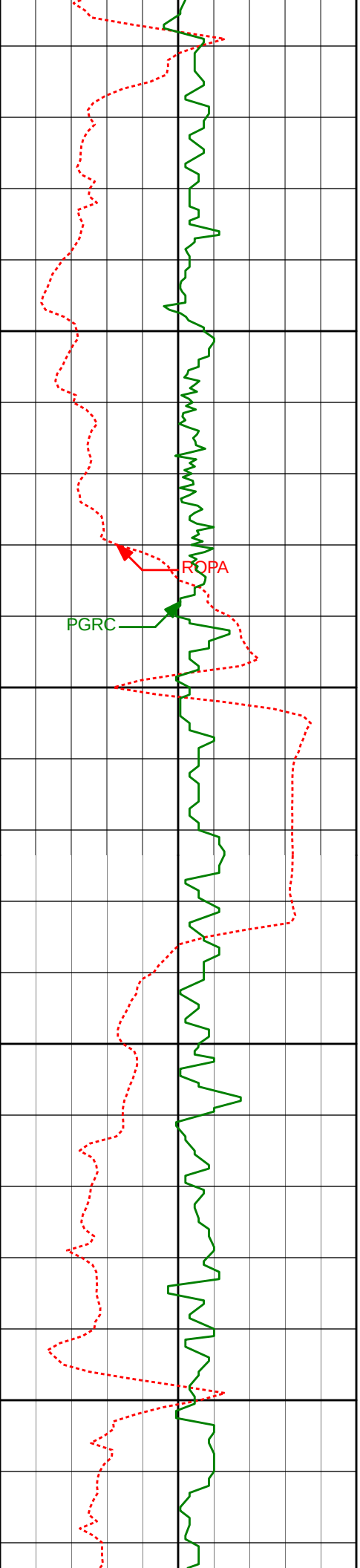
5050'

5058'	1.34°	122.05°	5041.31'	-138.59'

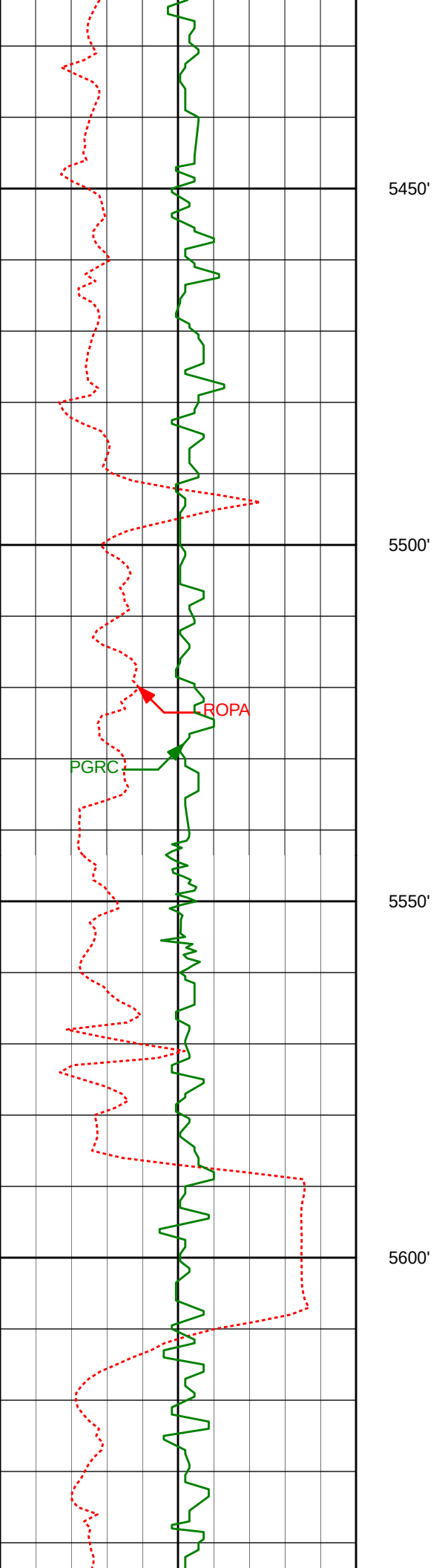
5100'

5150'

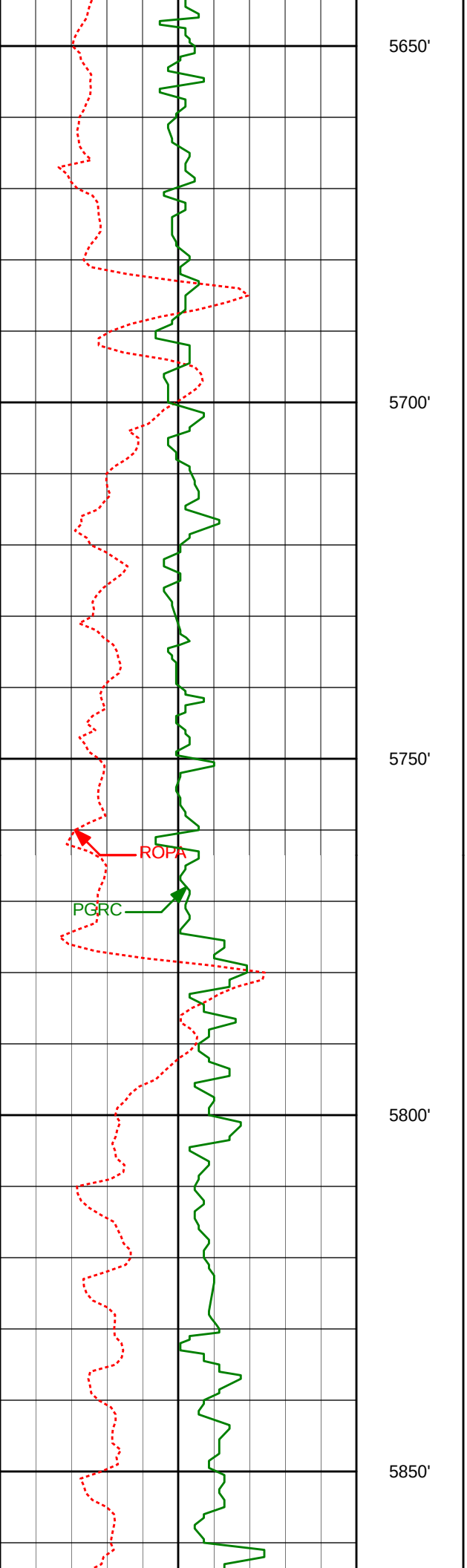
5200'



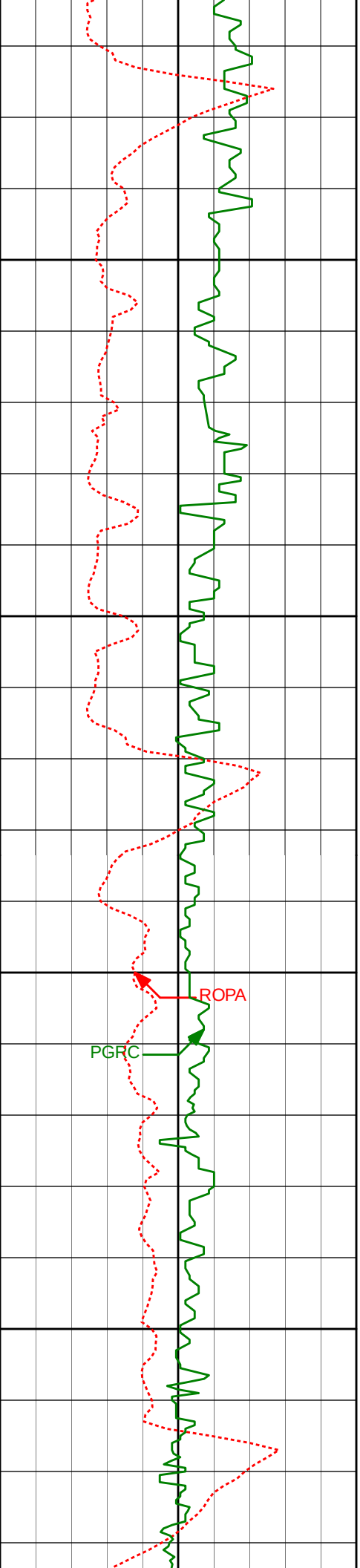
5250'	5248'	1.64°	96.51°	5231.25'	-139.94'
5300'					
5350'	5343'	1.79°	163.60°	5326.21'	-141.46'
5400'					



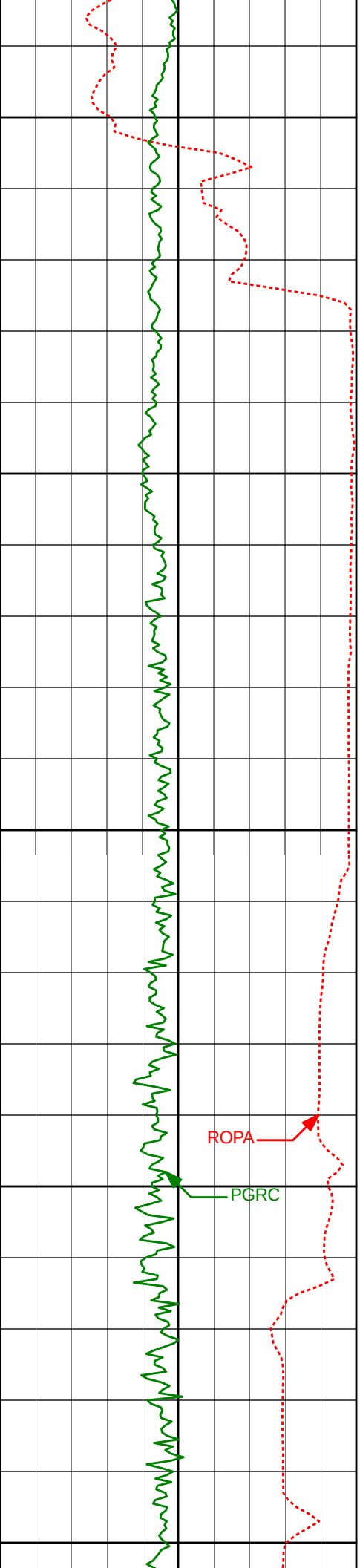
5438'	1.94°	165.67°	5421.16'	-144.42'
5532'	1.49°	183.32°	5515.12'	-147.17'
5627'	1.20°	224.84°	5610.10'	-149.13'



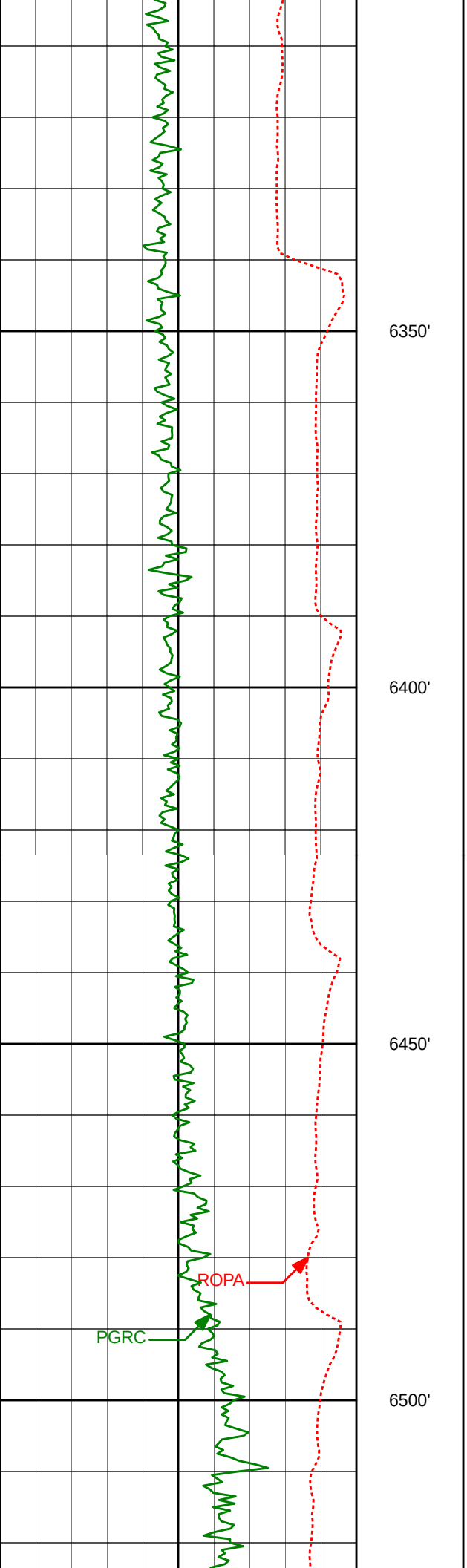
5722'	1.21°	219.09°	5705.08'	-150.66'
5817'	1.21°	229.95°	5800.05'	-152.12'



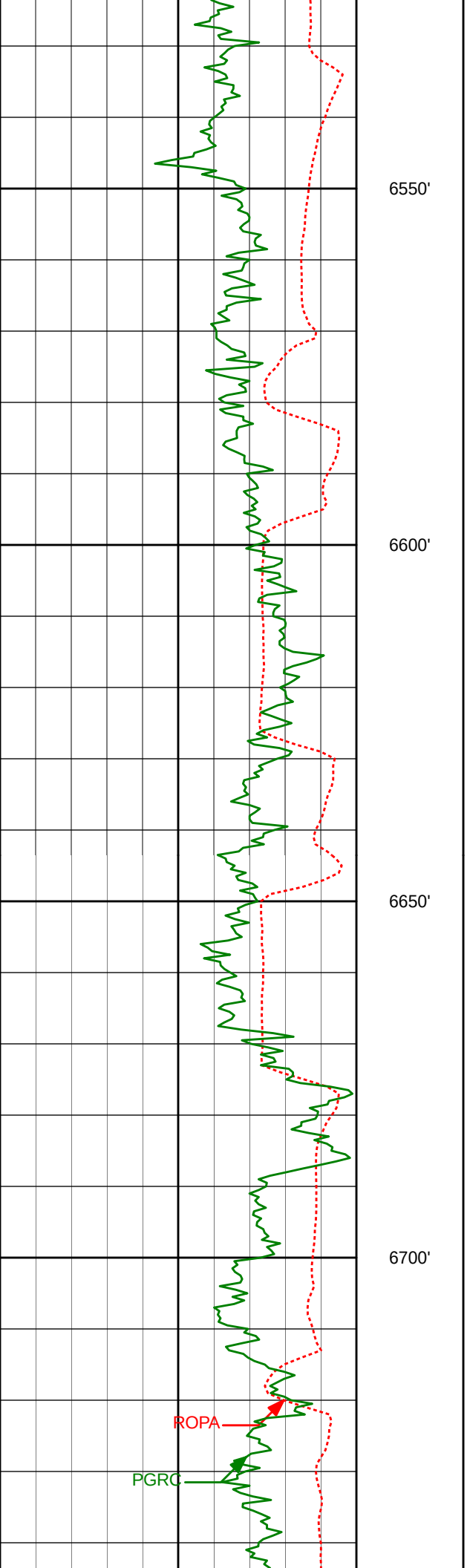
5912'	1.11°	232.80°	5895.03'	-153.37'
6007'	0.91°	211.53°	5990.02'	-154.61'



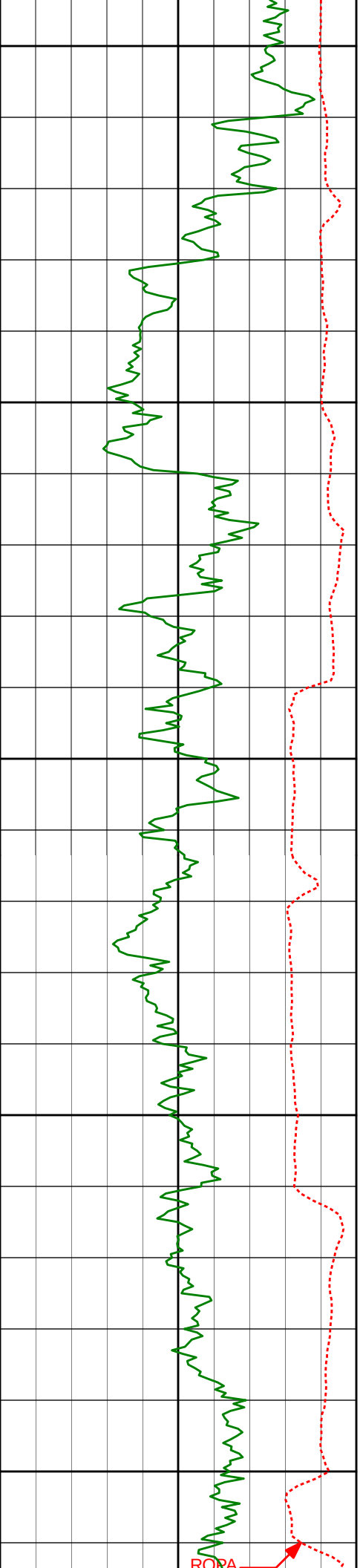
6101'	0.61°	209.81°	6084.01'	-155.69'
6149'	1.93°	90.80°	6132.00'	-155.91'
6195'	7.03°	71.55°	6177.85'	-154.92'
6243'	10.96°	44.13°	6225.27'	-150.54'
6290'	12.09°	35.80°	6271.32'	-143.16'



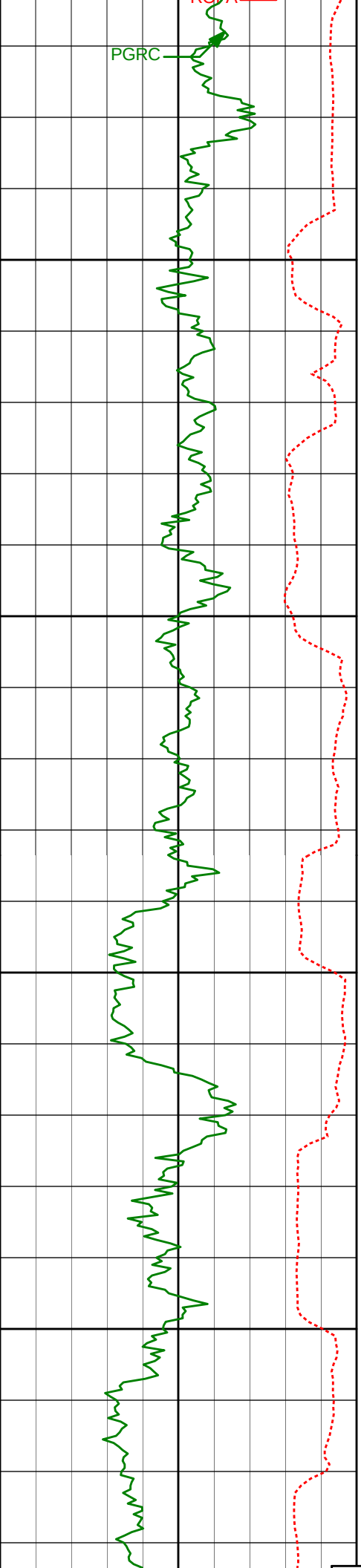
6338'	11.36°	31.62°	6318.32'	-134.89'
6384'	15.95°	24.90°	6363.01'	-125.15'
6432'	21.36°	16.16°	6408.49'	-110.61'
6479'	27.44°	9.32°	6451.28'	-91.57'



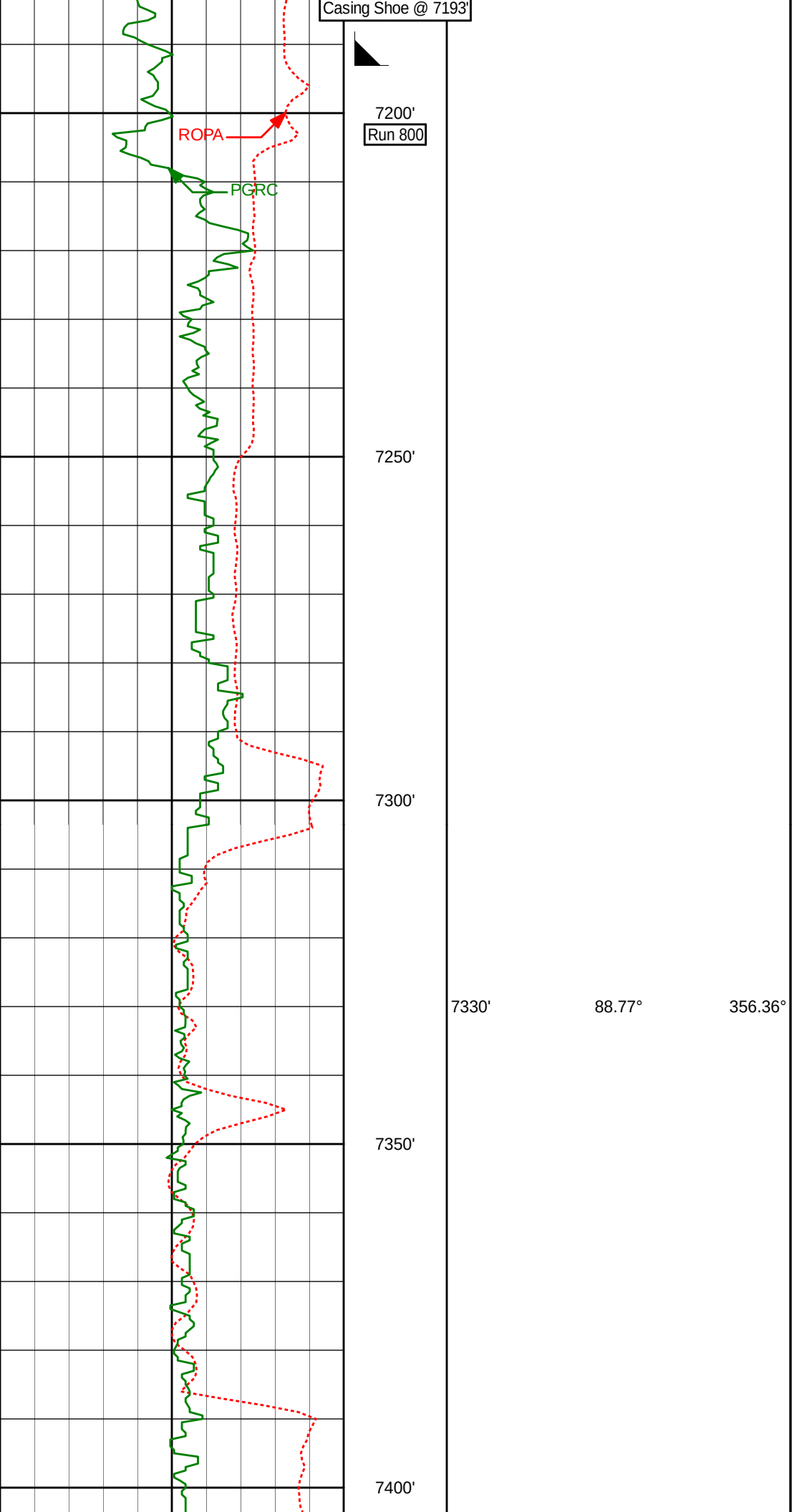
6527'	34.95°	4.16°	6492.31'	-66.83'
6574'	39.88°	0.59°	6529.64'	-38.29'
6622'	40.92°	358.44°	6566.19'	-7.21'
6668'	42.02°	357.78°	6600.66'	23.19'
6716'	47.09°	357.56°	6634.85'	56.77'



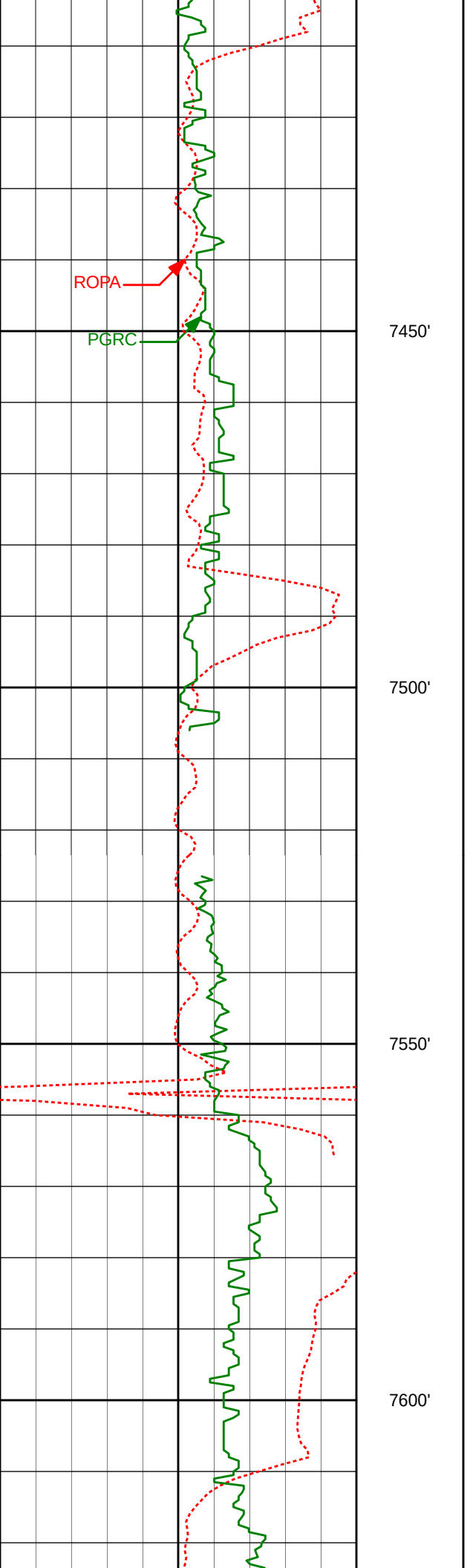
6763'	53.11°	356.55°	6664.98'	92.69'
6811'	59.96°	357.00°	6691.44'	132.56'
6858'	62.70°	356.83°	6713.98'	173.65'
6906'	63.90°	356.62°	6735.55'	216.37'
6953'	69.29°	357.74°	6754.21'	259.35'



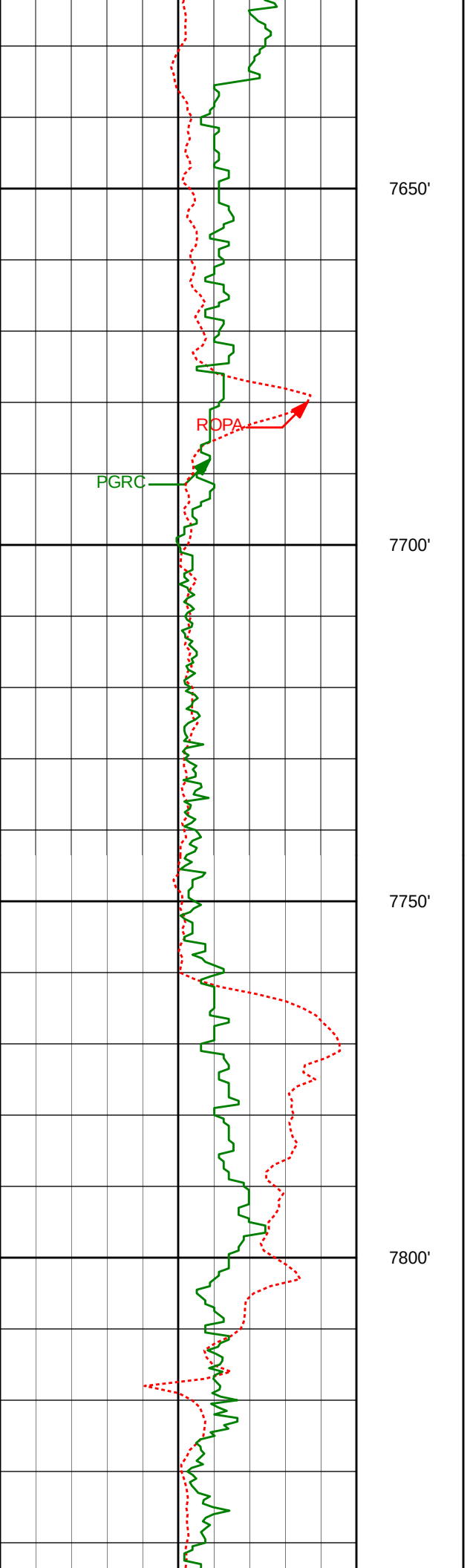
7000'	7001'	73.89°	358.25°	6769.37'	304.78'
7050'	7048'	76.97°	358.67°	6781.19'	350.19'
7100'	7096'	81.30°	359.25°	6790.24'	397.27'
7150'	7150'	85.13°	358.50°	6796.61'	450.81'



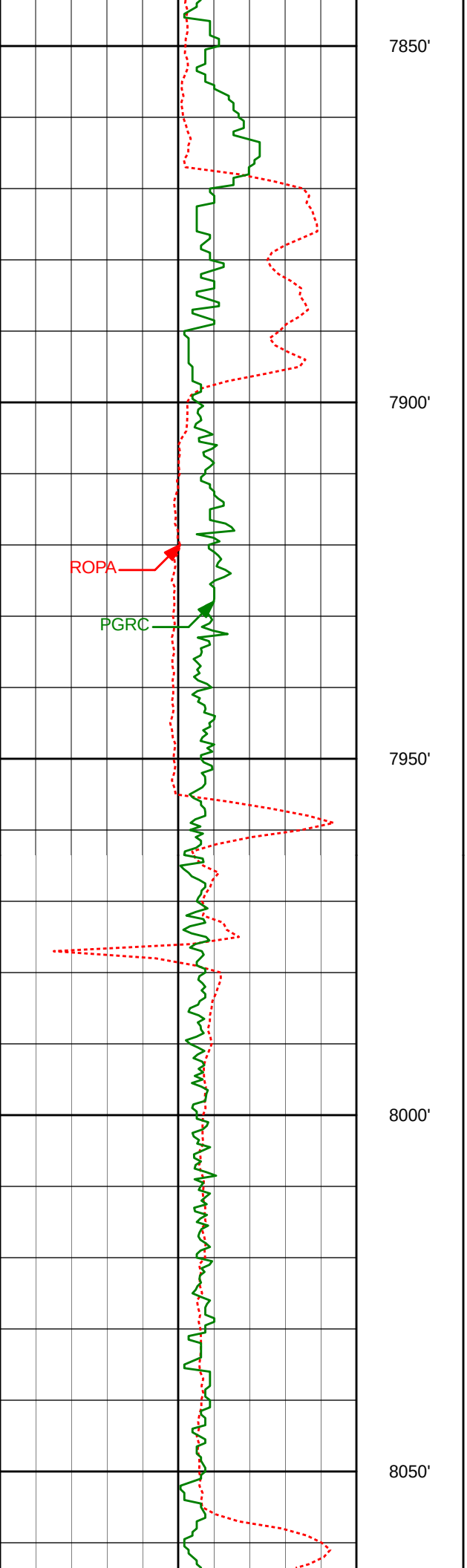
7330'	88.77°	356.36°	6806.19'	630.01'



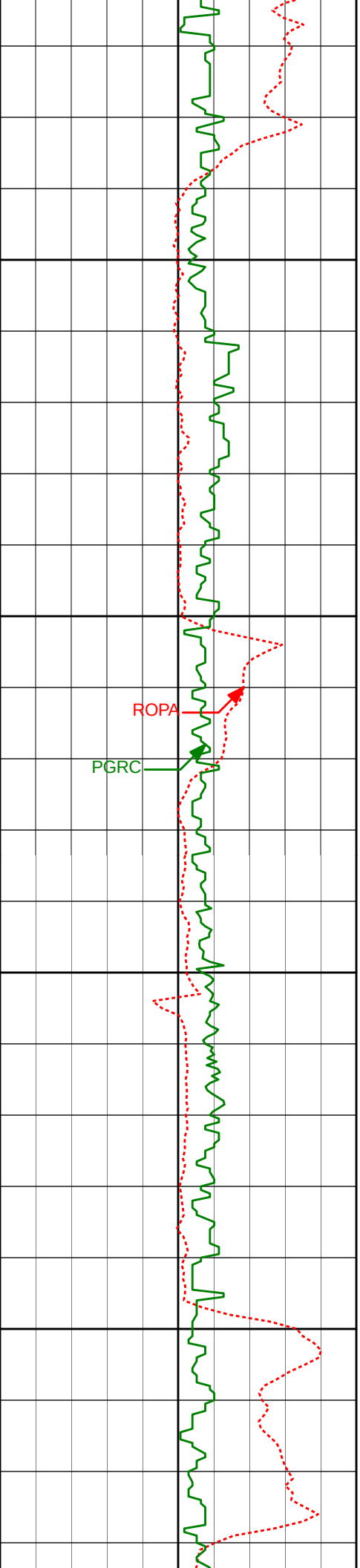
7425'	89.94°	356.87°	6807.26'	724.62'
7519'	90.71°	356.26°	6806.73'	818.24'
7614'	89.51°	356.74°	6806.55'	912.84'



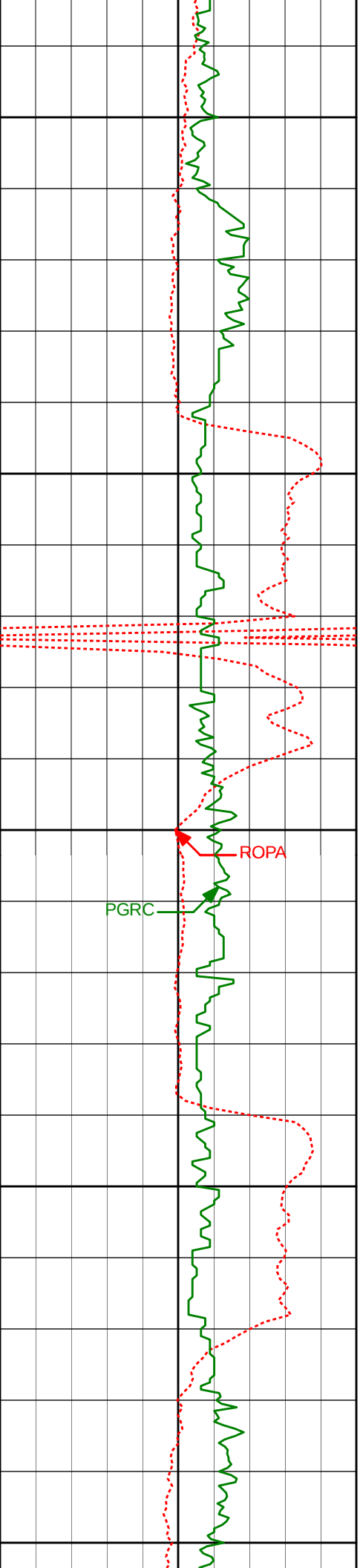
7708'	89.75°	356.69°	6807.16'	1006.48'
7803'	92.44°	359.77°	6805.34'	1101.27'



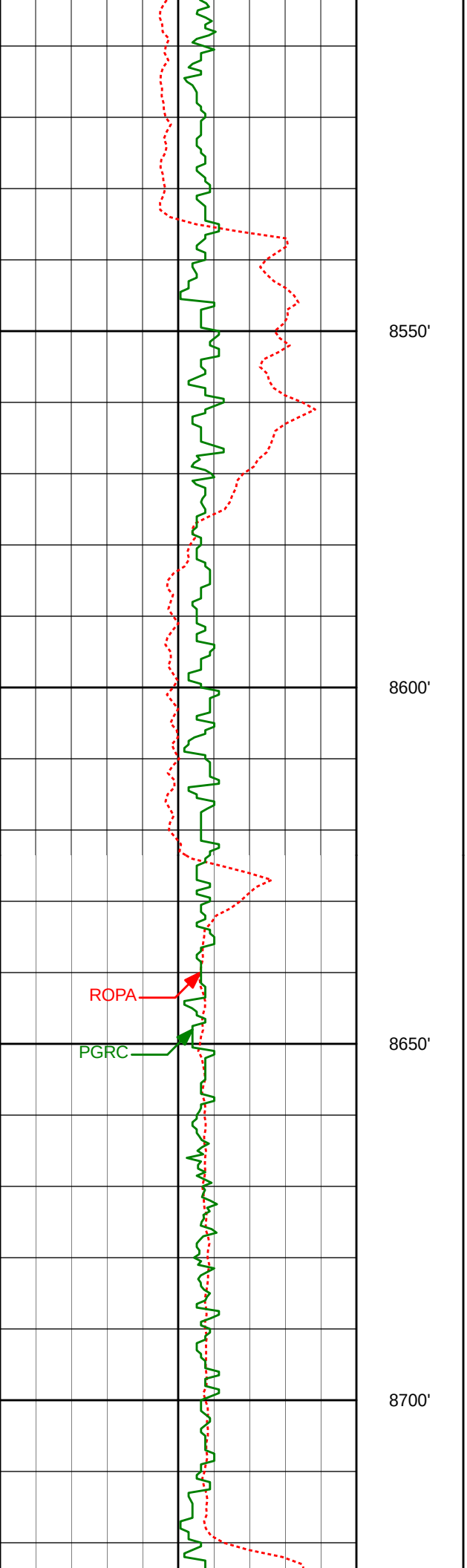
7898'	89.75°	0.17°	6803.53'	1196.20'
7993'	90.15°	2.82°	6803.60'	1291.19'



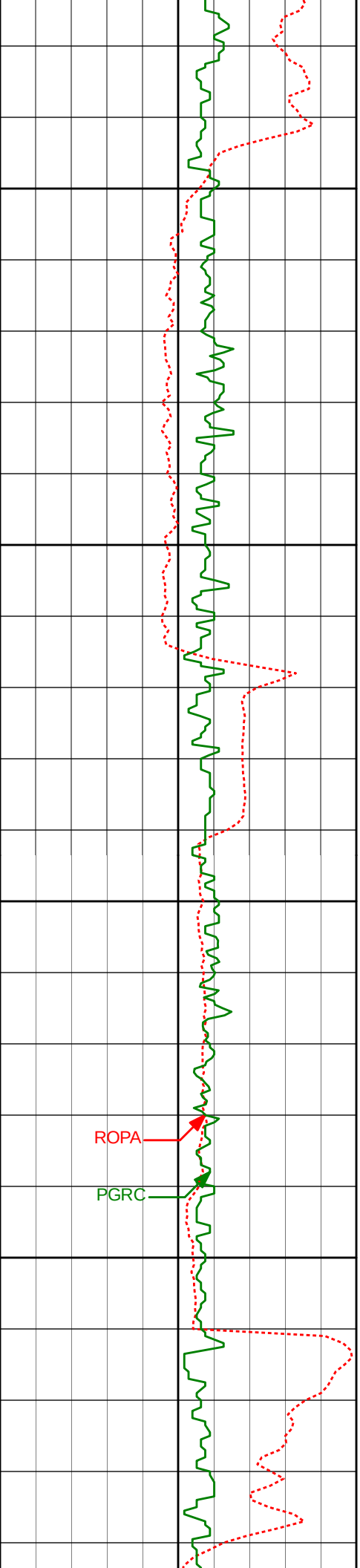
8088'	90.12°	1.29°	6803.38'	1386.18'
8183'	90.28°	3.63°	6803.04'	1481.17'
8277'	90.12°	4.91°	6802.71'	1575.07'



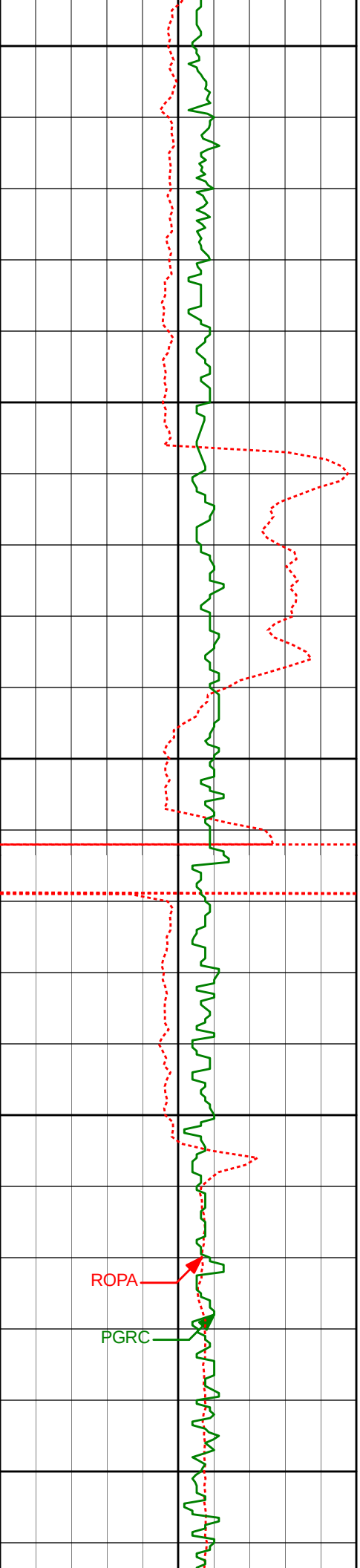
8372'	90.15°	2.17°	6802.48'	1670.02'
8467'	89.97°	1.61°	6802.38'	1765.01'



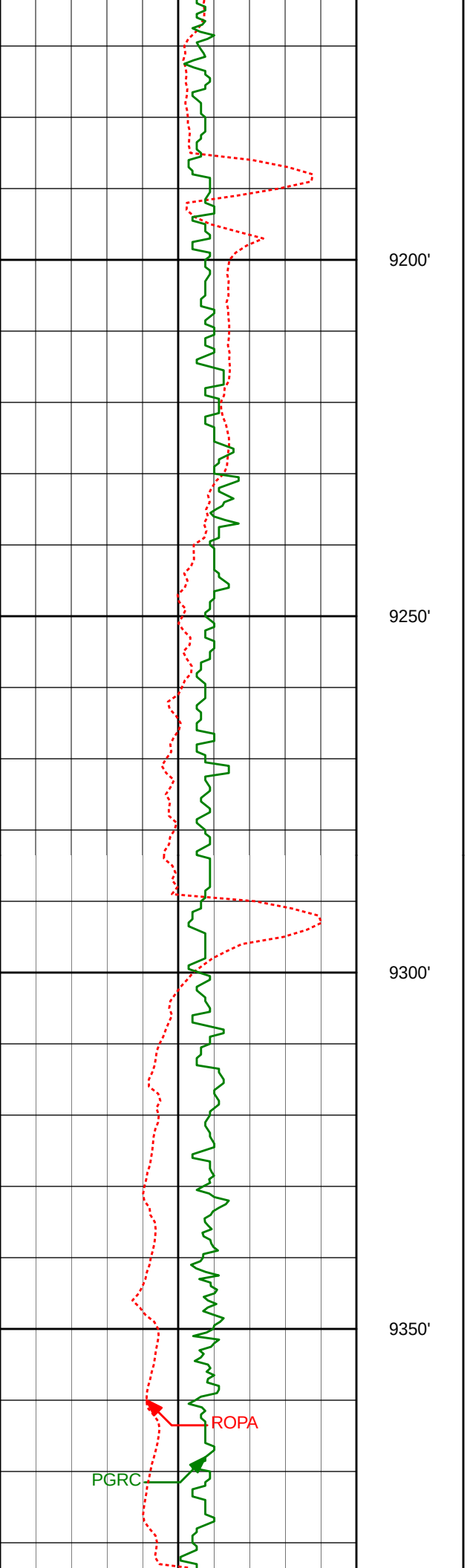
8550'					
	8562'	90.52°	358.58°	6801.97'	1859.96'
8600'					
8650'					
	8657'	90.49°	358.93°	6801.13'	1954.83'
8700'					



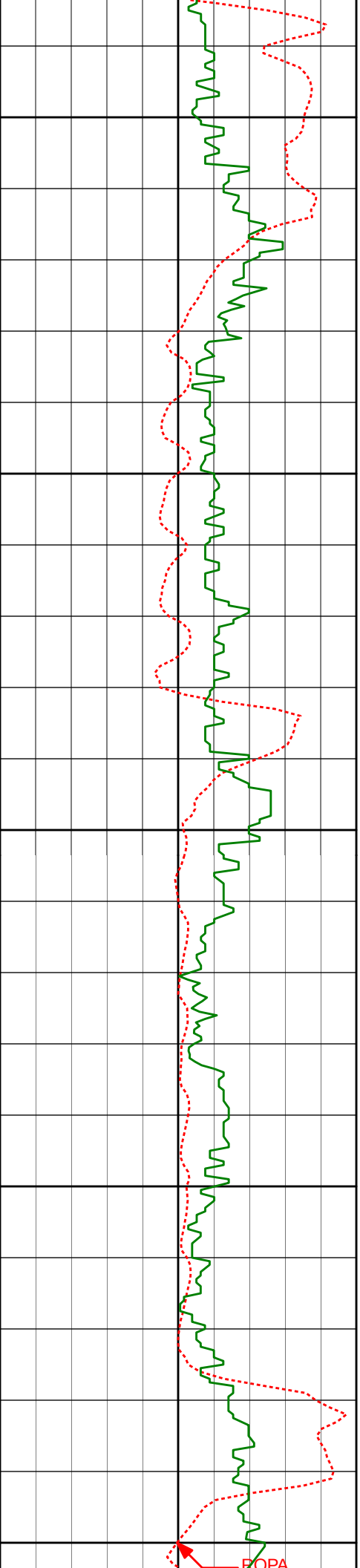
8750'	8751'	90.37°	357.22°	6800.42'	2048.63'
8800'					
	8846'	90.59°	359.83°	6799.63'	2143.47'
8850'					
8900'					
	8941'	90.59°	359.36°	6798.65'	2238.40'



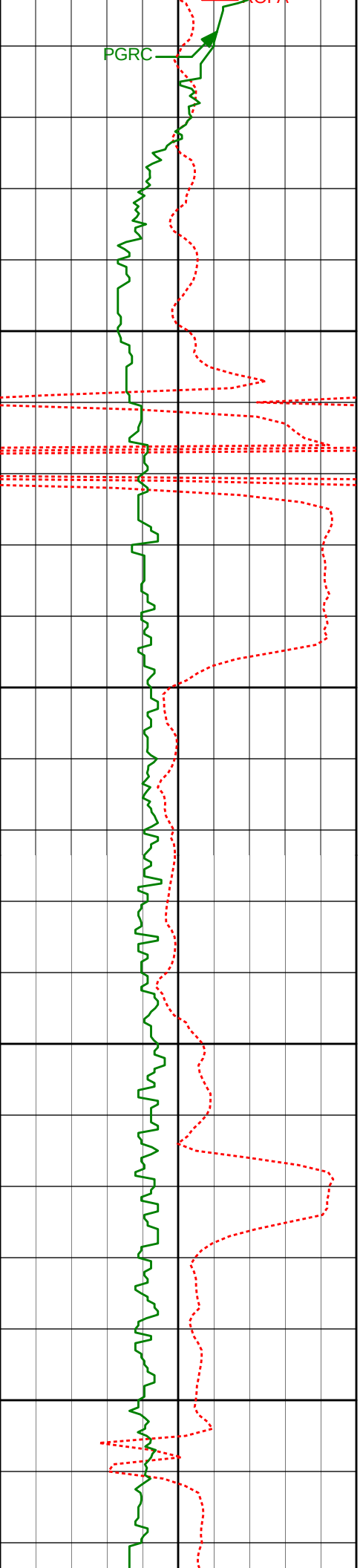
9036'	90.55°	357.52°	6797.71'	2333.24'
9131'	90.68°	358.86°	6796.69'	2428.05'



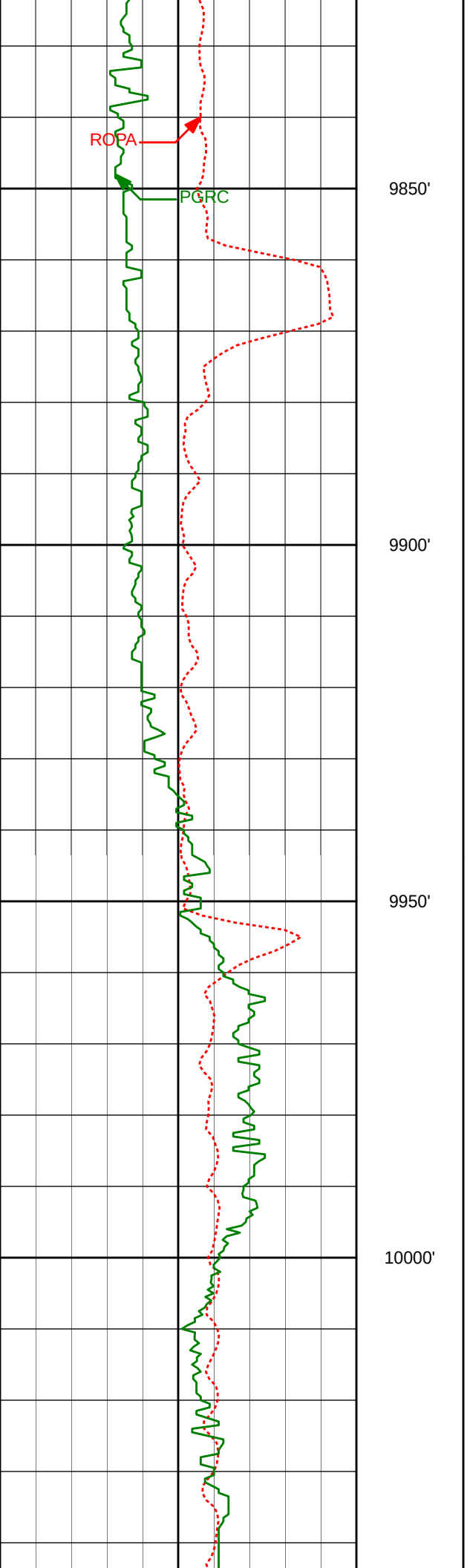
9226'	90.59°	358.50°	6795.64'	2522.91'
9321'	90.59°	0.41°	6794.67'	2617.82'



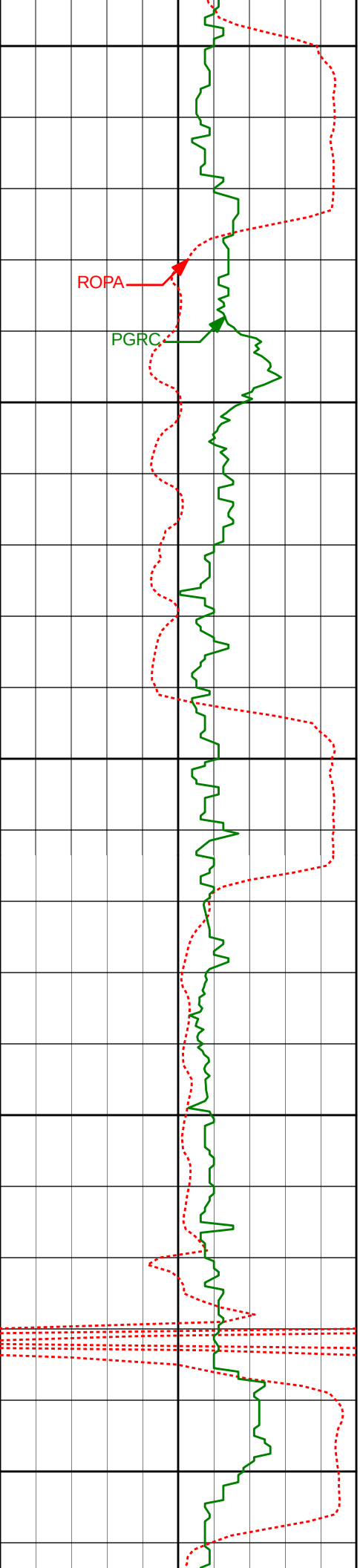
9415'	89.20°	358.61°	6794.84'	2711.75'
9510'	88.58°	357.44°	6796.69'	2806.53'



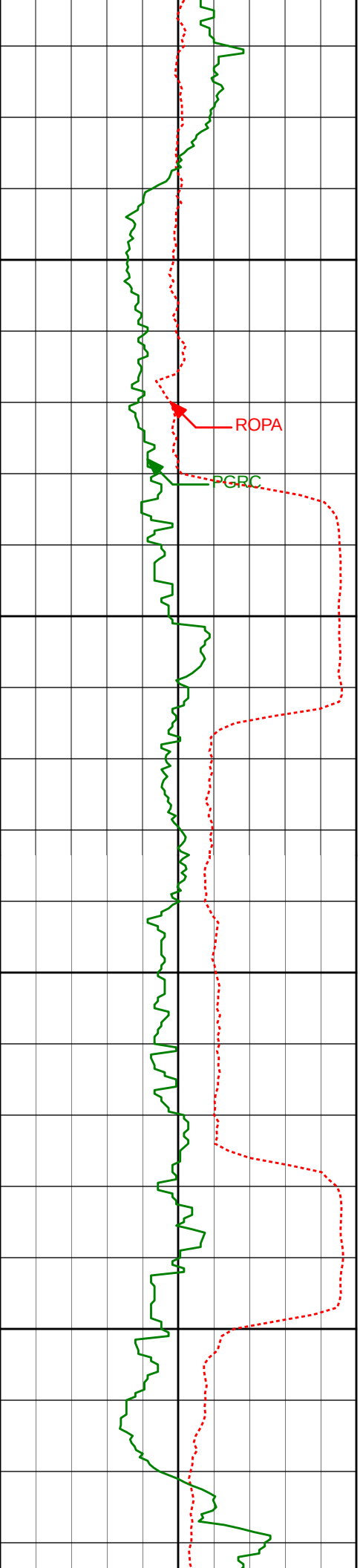
	9605'	89.07°	355.43°	6798.63'	2901.10'
9650'					
9700'	9700'	90.12°	357.23°	6799.29'	2995.67'
9750'					
	9794'	91.57°	356.62°	6797.90'	3089.32'
9800'					



9889'	90.96°	358.17°	6795.81'	3184.03'
9984'	92.06°	355.95°	6793.31'	3278.67'



10078'	92.00°	357.54°	6789.98'	3372.25'
10173'	90.18°	358.01°	6788.17'	3467.00'



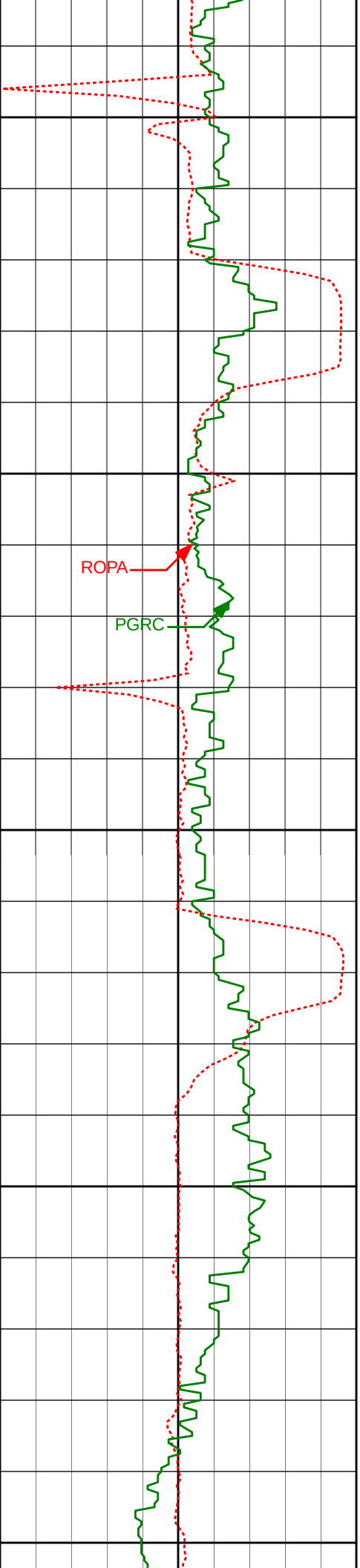
10268'	90.77°	357.87°	6787.38'	3561.79'
10362'	91.76°	0.60°	6785.30'	3655.67'
10456'	87.53°	359.23°	6785.88'	3749.60'

10300'

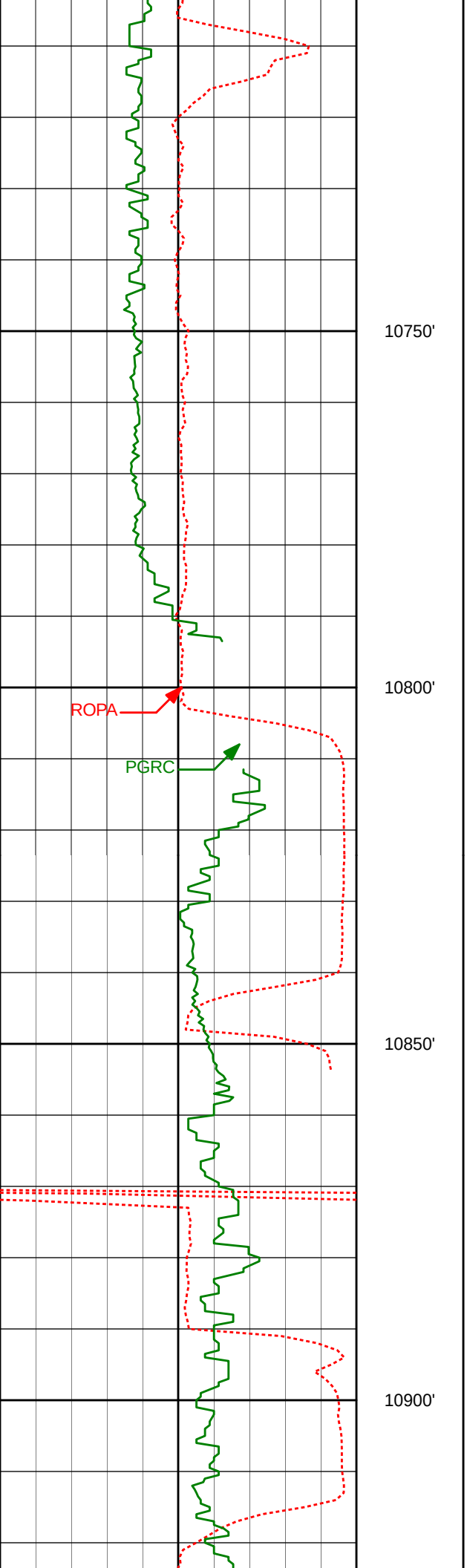
10350'

10400'

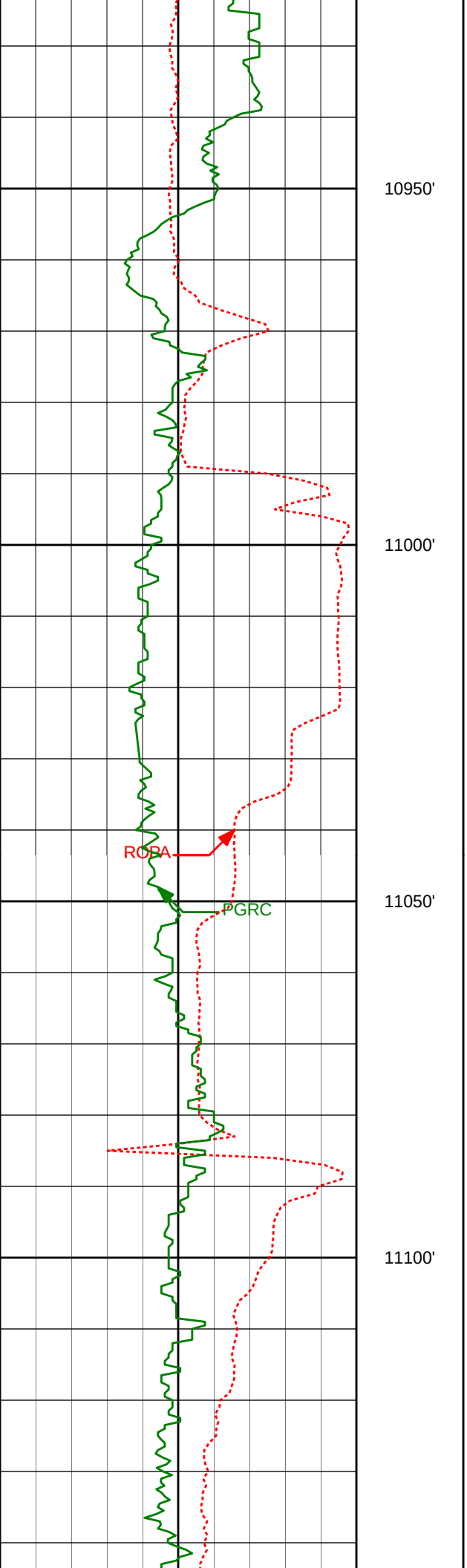
10450'



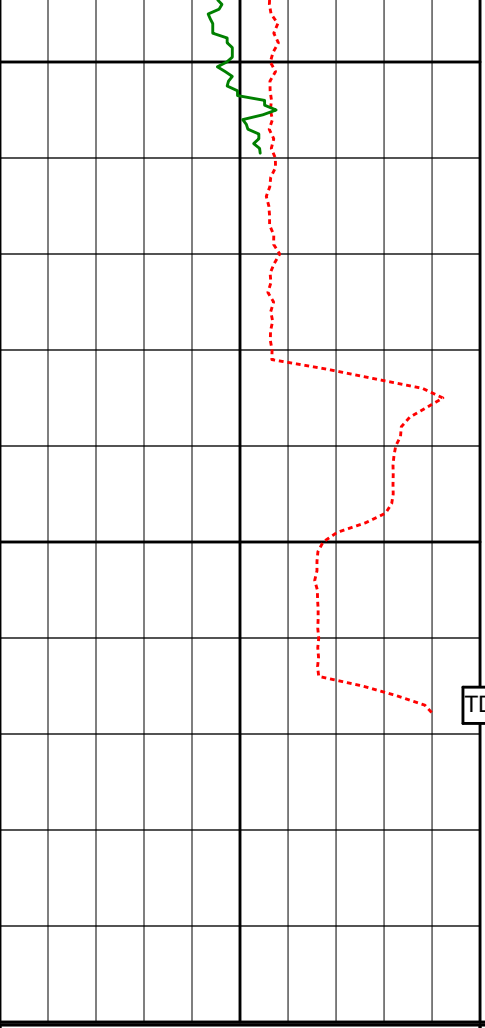
10551'	88.89°	359.74°	6788.85'	3844.48'
10646'	89.88°	359.95°	6789.87'	3939.42'



10741'	90.71°	356.82°	6789.39'	4034.24'
10836'	93.64°	359.23°	6785.78'	4128.96'



10931'	93.18°	0.51°	6780.13'	4223.74'
11026'	90.59°	1.69°	6777.01'	4318.67'



11150'	11152'	92.10°	0.75°	6774.06'	4444.63'
11200'					
TD @ 11,217'	11217'	92.10°	0.75°	6771.68'	4509.57'

PCG Gamma Ray BCorr PGRC 0 200 api	Measured Depth (ft) 1:240	Depth	Inc	Azi.	TVD	V.S.
Average Rate of Penetration ROPA 1K 0 feet per hr						

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Marie D04-74-1HN
Wattenberg
Weld Colorado
USA
CA-XX-0900918600
Tie into existing surveys at 362' and 661' 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
362.00	0.60	44.02	361.99	1.36 N	1.32 E	1.40	0.17
661.00	0.70	45.02	660.97	3.78 N	3.70 E	3.89	0.03
808.00	1.08	45.13	807.96	5.39 N	5.32 E	5.55	0.26
900.00	0.74	64.95	899.94	6.26 N	6.47 E	6.45	0.50
992.00	0.92	63.98	991.93	6.83 N	7.67 E	7.06	0.20
1085.00	1.07	86.26	1084.92	7.22 N	9.22 E	7.49	0.44
1177.00	0.73	201.19	1176.91	6.73 N	9.86 E	7.02	1.66
1270.00	0.76	191.65	1269.91	5.57 N	9.52 E	5.86	0.14

1362.00	1.11	187.35	1361.89	4.09 N	9.29 E	4.37	0.39
1456.00	1.43	180.17	1455.87	2.01 N	9.16 E	2.29	0.38
1551.00	3.06	167.31	1550.80	1.65 S	9.72 E	-1.36	1.79
1645.00	4.31	158.66	1644.60	7.39 S	11.56 E	-7.04	1.45
1740.00	6.24	144.87	1739.20	14.94 S	15.83 E	-14.46	2.42
1834.00	7.31	139.27	1832.54	23.65 S	22.67 E	-22.96	1.33
1929.00	8.30	132.33	1926.66	32.85 S	31.68 E	-31.88	1.44
2024.00	9.58	133.43	2020.50	42.90 S	42.49 E	-41.60	1.36
2119.00	10.38	133.82	2114.07	54.27 S	54.41 E	-52.60	0.84
2213.00	9.70	128.88	2206.63	65.10 S	66.69 E	-63.06	1.16
2308.00	9.98	128.09	2300.23	75.20 S	79.40 E	-72.77	0.32
2403.00	10.06	125.65	2393.78	85.12 S	92.62 E	-82.28	0.46
2498.00	9.70	129.44	2487.37	95.04 S	105.54 E	-91.81	0.78
2593.00	8.73	127.08	2581.15	104.47 S	117.48 E	-100.87	1.09
2688.00	9.84	133.99	2674.90	114.46 S	129.07 E	-110.51	1.65
2782.00	9.70	130.40	2767.54	125.17 S	140.89 E	-120.86	0.67
2877.00	7.58	136.54	2861.46	134.91 S	151.30 E	-130.28	2.43
2972.00	5.08	141.78	2955.87	142.76 S	158.21 E	-137.92	2.69
3067.00	3.12	138.43	3050.62	148.01 S	162.53 E	-143.03	2.08
3162.00	0.57	131.82	3145.57	150.26 S	164.60 E	-145.22	2.70
3257.00	0.71	99.12	3240.56	150.66 S	165.53 E	-145.60	0.41
3352.00	0.24	189.77	3335.56	150.95 S	166.08 E	-145.87	0.79
3446.00	0.81	324.08	3429.55	150.61 S	165.66 E	-145.54	1.06
3541.00	1.09	334.68	3524.54	149.25 S	164.88 E	-144.20	0.35
3636.00	1.07	301.34	3619.53	147.97 S	163.73 E	-142.96	0.65
3731.00	0.81	292.61	3714.51	147.25 S	162.36 E	-142.28	0.31
3825.00	1.30	299.40	3808.50	146.47 S	160.81 E	-141.55	0.53
3920.00	1.13	302.52	3903.47	145.44 S	159.08 E	-140.57	0.19
4015.00	0.97	323.20	3998.46	144.29 S	157.81 E	-139.46	0.43
4110.00	0.71	337.67	4093.45	143.11 S	157.11 E	-138.30	0.35
4205.00	0.84	357.43	4188.44	141.87 S	156.85 E	-137.07	0.31
4300.00	0.79	47.40	4283.43	140.73 S	157.30 E	-135.92	0.72
4395.00	0.65	28.27	4378.42	139.81 S	158.04 E	-134.97	0.29
4490.00	1.03	109.12	4473.42	139.61 S	159.11 E	-134.75	1.19
4584.00	0.86	94.18	4567.40	139.94 S	160.61 E	-135.03	0.32
4679.00	0.84	84.06	4662.39	139.92 S	162.01 E	-134.97	0.16
4869.00	1.33	131.43	4852.36	141.24 S	165.05 E	-136.19	0.52
4964.00	1.41	121.07	4947.34	142.57 S	166.88 E	-137.47	0.27
5058.00	1.34	122.05	5041.31	143.75 S	168.80 E	-138.59	0.08
5248.00	1.64	96.51	5231.25	145.24 S	173.38 E	-139.94	0.38
5343.00	1.79	163.60	5326.21	146.81 S	175.15 E	-141.46	2.00
5438.00	1.94	165.67	5421.16	149.80 S	175.97 E	-144.42	0.18
5532.00	1.49	183.32	5515.12	152.56 S	176.29 E	-147.17	0.73
5627.00	1.20	224.84	5610.10	154.50 S	175.52 E	-149.13	1.05
5722.00	1.21	219.09	5705.08	155.99 S	174.19 E	-150.66	0.13
5817.00	1.21	229.95	5800.05	157.41 S	172.79 E	-152.12	0.24
5912.00	1.11	232.80	5895.03	158.61 S	171.29 E	-153.37	0.12
6007.00	0.91	211.53	5990.02	159.81 S	170.15 E	-154.61	0.45
6101.00	0.61	209.81	6084.01	160.89 S	169.51 E	-155.69	0.33
6149.00	1.93	90.80	6132.00	161.12 S	170.20 E	-155.91	4.76
6195.00	7.03	71.55	6177.85	160.24 S	173.64 E	-154.92	11.40
6243.00	10.96	44.13	6225.27	156.03 S	179.61 E	-150.54	11.91
6290.00	12.09	35.80	6271.32	148.83 S	185.60 E	-143.16	4.28
6338.00	11.36	31.62	6318.32	140.72 S	191.02 E	-134.89	2.34
6384.00	15.95	24.90	6363.01	131.13 S	196.06 E	-125.15	10.54
6432.00	21.36	16.16	6408.49	116.74 S	201.27 E	-110.61	12.66
6479.00	27.44	9.32	6451.28	97.81 S	205.41 E	-91.57	14.25
6527.00	34.95	4.16	6492.31	73.15 S	208.21 E	-66.83	16.59
6574.00	39.88	0.59	6529.64	44.63 S	209.34 E	-38.29	11.46
6622.00	40.92	358.44	6566.19	13.53 S	209.07 E	-7.21	3.62
6668.00	42.02	357.78	6600.66	16.92 N	208.06 E	23.19	2.59
6716.00	47.09	357.56	6634.85	50.56 N	206.69 E	56.77	10.57
6763.00	53.11	356.55	6664.98	86.55 N	204.82 E	92.69	12.90
6811.00	59.96	357.00	6691.44	126.50 N	202.58 E	132.56	14.29
6858.00	62.70	356.83	6713.98	167.68 N	200.36 E	173.65	5.85
6906.00	63.90	356.62	6735.55	210.49 N	197.90 E	216.37	2.53
6953.00	69.29	357.74	6754.21	253.56 N	195.79 E	259.35	11.66
7001.00	73.89	358.25	6769.37	299.06 N	194.20 E	304.78	9.64
7048.00	76.97	358.67	6781.19	344.52 N	192.98 E	350.19	6.61
7096.00	81.30	359.25	6790.24	391.64 N	192.13 E	397.27	9.10
7150.00	85.13	358.50	6796.61	445.25 N	191.07 E	450.81	7.23
7330.00	88.77	356.36	6806.19	624.77 N	183.02 E	630.01	2.34
7425.00	89.94	356.87	6807.26	719.60 N	177.41 E	724.62	1.34
7519.00	90.71	356.26	6806.73	813.42 N	171.78 E	818.24	1.05
7614.00	89.51	356.74	6806.55	908.25 N	165.99 E	913.84	1.36

7614.00	89.51	356.74	6806.55	908.25 N	165.99 E	912.84	1.36
7708.00	89.75	356.69	6807.16	1002.09 N	160.60 E	1006.48	0.27
7803.00	92.44	359.77	6805.34	1097.01 N	157.67 E	1101.27	4.30
7898.00	89.75	0.17	6803.53	1191.98 N	157.63 E	1196.20	2.86
7993.00	90.15	2.82	6803.60	1286.94 N	160.10 E	1291.19	2.81
8088.00	90.12	1.29	6803.38	1381.88 N	163.51 E	1386.18	1.61
8183.00	90.28	3.63	6803.04	1476.78 N	167.58 E	1481.17	2.47
8277.00	90.12	4.91	6802.71	1570.52 N	174.58 E	1575.07	1.38
8372.00	90.15	2.17	6802.48	1665.33 N	180.45 E	1670.02	2.89
8467.00	89.97	1.61	6802.38	1760.27 N	183.58 E	1765.01	0.62
8562.00	90.52	358.58	6801.97	1855.26 N	183.74 E	1859.96	3.25
8657.00	90.49	358.93	6801.13	1950.24 N	181.67 E	1954.83	0.37
8751.00	90.37	357.22	6800.42	2044.18 N	178.51 E	2048.63	1.83
8846.00	90.59	359.83	6799.63	2139.13 N	176.07 E	2143.47	2.76
8941.00	90.59	359.36	6798.65	2234.13 N	175.40 E	2238.40	0.50
9036.00	90.55	357.52	6797.71	2329.08 N	172.81 E	2333.24	1.93
9131.00	90.68	358.86	6796.69	2424.03 N	169.81 E	2428.05	1.41
9226.00	90.59	358.50	6795.64	2519.00 N	167.62 E	2522.91	0.39
9321.00	90.59	0.41	6794.67	2613.98 N	166.71 E	2617.82	2.01
9415.00	89.20	358.61	6794.84	2707.97 N	165.91 E	2711.75	2.41
9510.00	88.58	357.44	6796.69	2802.90 N	162.63 E	2806.53	1.40
9605.00	89.07	355.43	6798.63	2897.69 N	156.72 E	2901.10	2.18
9700.00	90.12	357.23	6799.29	2992.48 N	150.64 E	2995.67	2.20
9794.00	91.57	356.62	6797.90	3086.34 N	145.60 E	3089.32	1.67
9889.00	90.96	358.17	6795.81	3181.21 N	141.28 E	3184.03	1.76
9984.00	92.06	355.95	6793.31	3276.05 N	136.41 E	3278.67	2.61
10078.00	92.00	357.54	6789.98	3369.83 N	131.07 E	3372.25	1.69
10173.00	90.18	358.01	6788.17	3464.74 N	127.38 E	3467.00	1.98
10268.00	90.77	357.87	6787.38	3559.67 N	123.97 E	3561.79	0.63
10362.00	91.76	0.60	6785.30	3653.63 N	122.71 E	3655.67	3.09
10456.00	87.53	359.23	6785.88	3747.61 N	122.57 E	3749.60	4.73
10551.00	88.89	359.74	6788.85	3842.55 N	121.72 E	3844.48	1.52
10646.00	89.88	359.95	6789.87	3937.55 N	121.46 E	3939.42	1.06
10741.00	90.71	356.82	6789.39	4032.49 N	118.79 E	4034.24	3.41
10836.00	93.64	359.23	6785.78	4127.35 N	115.52 E	4128.96	3.99
10931.00	93.18	0.51	6780.13	4222.18 N	115.30 E	4223.74	1.43
11026.00	90.59	1.69	6777.01	4317.10 N	117.12 E	4318.67	3.00
11152.00	92.10	0.75	6774.06	4443.04 N	119.80 E	4444.63	1.41
11217.00	92.10	0.75	6771.68	4507.99 N	120.65 E	4509.57	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 1.73 DEGREES (GRID)
A TOTAL CORRECTION OF 7.82 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11217.00 FEET
IS 4509.60 FEET ALONG 1.53 DEGREES (GRID)

Final Survey Projected to TD

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