PCG Pressure Case Gamma
PCD Pressure Case Directional

HALLIBURTON | Sperry Drilling

Company : **Noble Energy**
Rig : **H&P 343**
Well : **Wells Ranch USX AA23-67HN**
Field : **Wattenburg**
Country : **USA**
API Number : **05-123-37172**

Country	: **USA**
Field	: **Wattenburg**
Location	: **Lat: 40° 28' 34.46" North** **Long: 104° 23' 36.96" West**
Well	: **Wells Ranch USX AA23-67HN**
Company	: **Noble Energy**
Rig	: **H&P 343**

LOCATION

Latitude : **40° 28' 34.46" North**
Longitude : **104° 23' 36.96" West**
UTM Easting = **3,307,789.550 ft**
UTM Northing = **1,418,254.770 ft**

Other Services
Directional Drilling

Elev. KB **NA**
DF **4817.00 ft**
GL **4793.00 ft**
WD **NA**

Permanent Datum : **Ground Level** Elevation : **4793.00 ft**
Log Measured From : **Drill Floor** **24.00 ft** Above Permanent Datum
Drilling Measured From : **Drill Floor**

MD LOG

Depth Logged : **673.00 ft** To **11,155.00 ft**
Date Logged : **27-Jun-13** To **02-Jul-13**
Total Depth MD : **11,155.00 ft** TVD : **6,707.22 ft**
Spud Date : **27-Jun-13**

Unit No. : **11610115**
Plot Type : **Final**
Plot Date : **03-Jul-13**

Job No. :**CA-XX-090054014**

Borehole Record (MD)

Run No.	Size	From	To
2	8.750 in	673.00 ft	5,923.00 ft
3	8.750 in	5,923.00 ft	7,075.00 ft
4	6.125 in	7,075.00 ft	11,155.00 ft

Borehole Record (MD)

Run No.	Size	From	To

Casing Record (MD)

Size	Weight	From	To
9.625 in	36.00 lbpf	SURFACE	663.00 ft
7.000 in	26.00 lbpf	SURFACE	7,065.00 ft

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	28-Jun-13	29-Jun-13	02-Jul-13		
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)	673.00	5,923.00	7,075.00		
Log End Depth (MD, ft)	5,923.00	7,075.00	11,155.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	28-Jun-13 00:00	29-Jun-13 00:00	01-Jul-13 00:15		
Drill/Wipe End Date and Time	28-Jun-13 15:30	29-Jun-13 16:30	02-Jul-13 08:30		
Min Inc (deg) @ Depth (MD, ft)	0 @ 663.00	8.07 @ 6,017.00	86.27 @ 7,108.00		
Max Inc (deg) @ Depth (MD, ft)	13.45 @ 2,315.00	83.86 @ 7,019.00	91.94 @ 7,724.00		
Bit TFA(in2) / Bit Type	.86 / PDC	.86 / PDC	.46 / PDC		
Flow Rate (gpm)	573.05	515.00	270.00		
Max AV (fpm) / CV (fpm) @ MWD	300.0 / NA	300.0 / NA	401.0 / NA		
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	8.65 / 27.00	10.80 / 13.00	10.08 / 32.00		
Filtrate CL (ppm)	1,900.00	2,200.00	2,400.00		
pH / Fluid Loss (mptm)	9.70 / NA	9.60 / NA	9.70 / NA		
PV (cP) / YP (lhf2)	6 / 1.00	13 / 12.00	8 / 6.00		
% Solids / % Sand	2.8 / 0.25	4.3 / 0.25	5.7 / 0.15		
% Oil / Oil:Water Ratio	0 / 0:95	0 / 0:95	0 / 0:95		
Rm @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA		
Rmf @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA		
Rmc @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA		

Max Tool Temp (degF) / Source	150.10 / PCM	171.10 / PCM	226.10 / PCM		
Rm @ Max Tool Temp (degF)	NA @ NA	NA @ NA	NA @ NA		
Lead MWD Engineer	Gary Eifert	Gary Eifert	Gary Eifert		
Customer Representative	Johnny Sanchez	Johnny Sanchez	Johnny Sanchez		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.84	5.84	5.84		
Sub Serial Number	11342299	11342299	11750423		
Insert Serial Number	11620299	11620299	11227556		
Date and Time Initialized	27-Jun-13 17:08	01-Jan-70 00:00	29-Jun-13 18:22		
Date and Time Read	29-Jun-13 23:41	29-Jun-13 23:32	02-Jul-13 19:32		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	57.00	56.00	63.00		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11342299	11342299	11750423		
Sonde Serial Number	11297588	11297588	10860251		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	80.23	239.64	108.15		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	50.11	49.36	56.67		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11342299	11342299	11750423		
Insert/Sonde Serial Number	11293433	11293433	11680997		

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

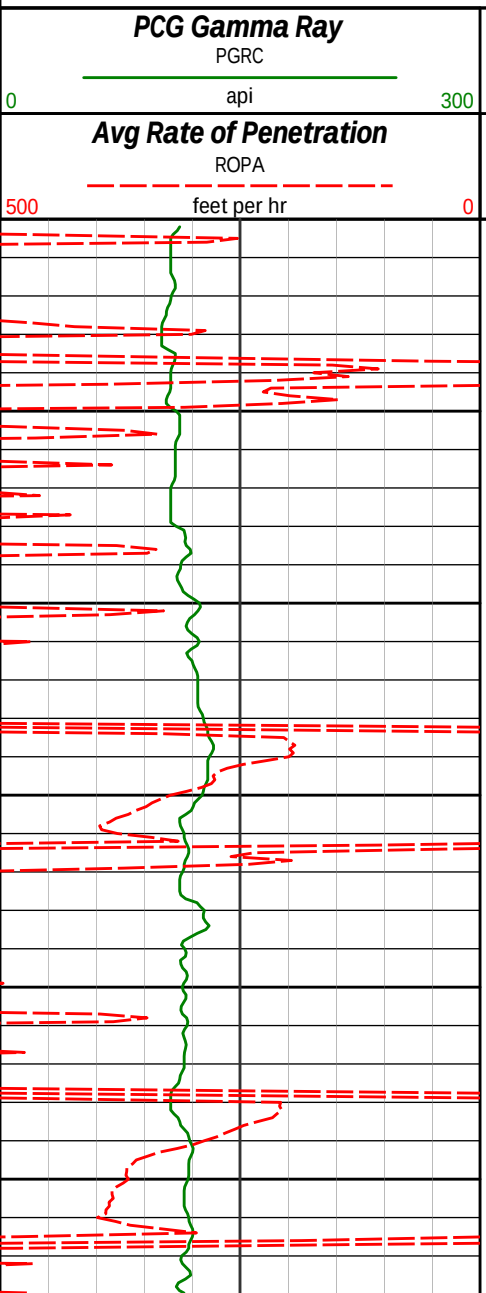
HALLIBURTON WILL USE ITS BEST EFFORTS TO FURNISH CUSTOMERS WITH ACCURATE INFORMATION AND INTERPRETATIONS THAT ARE PART OF, AND INCIDENT TO, THE SERVICES PROVIDED. HOWEVER, HALLIBURTON CANNOT AND DOES NOT WARRANT THE ACCURACY OR CORRECTNESS OF SUCH INFORMATION AND INTERPRETATIONS. UNDER NO CIRCUMSTANCES SHOULD ANY SUCH INFORMATION OR INTERPRETATION BE RELIED UPON AS THE SOLE BASIS FOR ANY DRILLING, COMPLETION, PRODUCTION, OR FINANCIAL DECISION OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING VENTURE, DRILLING RIG OR ITS CREW OR ANY OTHER THIRD PARTY. THE CUSTOMER HAS FULL RESPONSIBILITY FOR ALL DRILLING, COMPLETION AND PRODUCTION OPERATION. HALLIBURTON MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE SERVICES RENDERED. IN NO EVENT WILL HALLIBURTON BE LIABLE FOR FAILURE TO OBTAIN ANY PARTICULAR RESULTS OR FOR ANY DAMAGES, INCLUDING, BUT NOT LIMITED TO, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, RESULTING FROM THE USE OF ANY INFORMATION OR INTERPRETATION PROVIDED BY HALLIBURTON.

HALLIBURTON

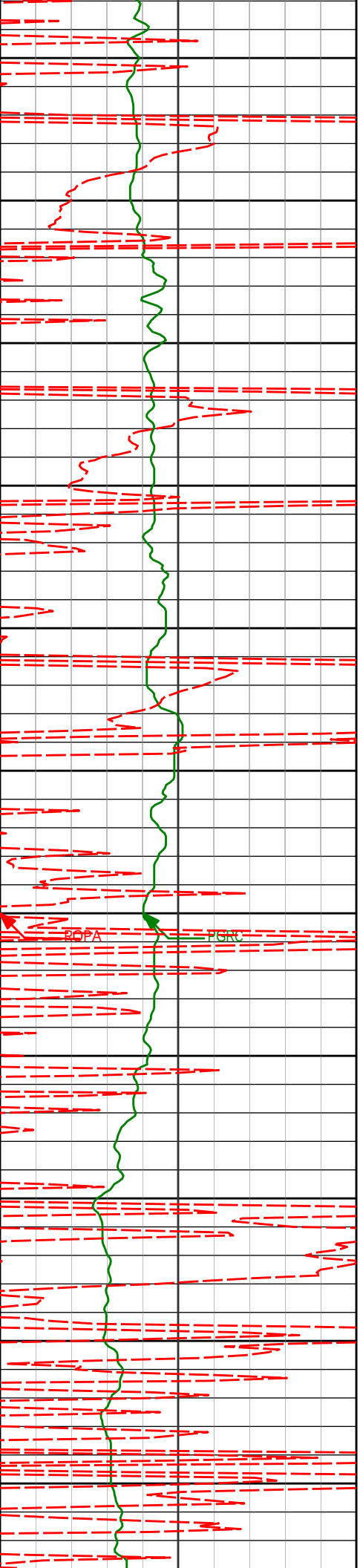
Sperry Drilling Services

MD Main Log 1:600

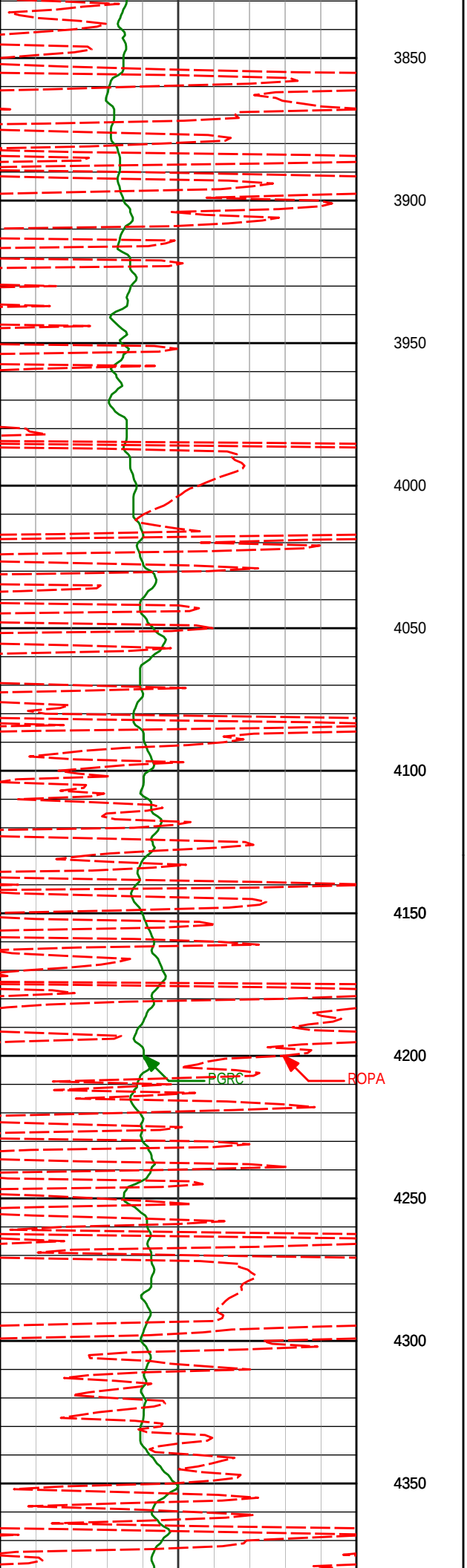
Noble Energy
Wells Ranch USX AA23-67HN
H&P 343
T6N-R63W



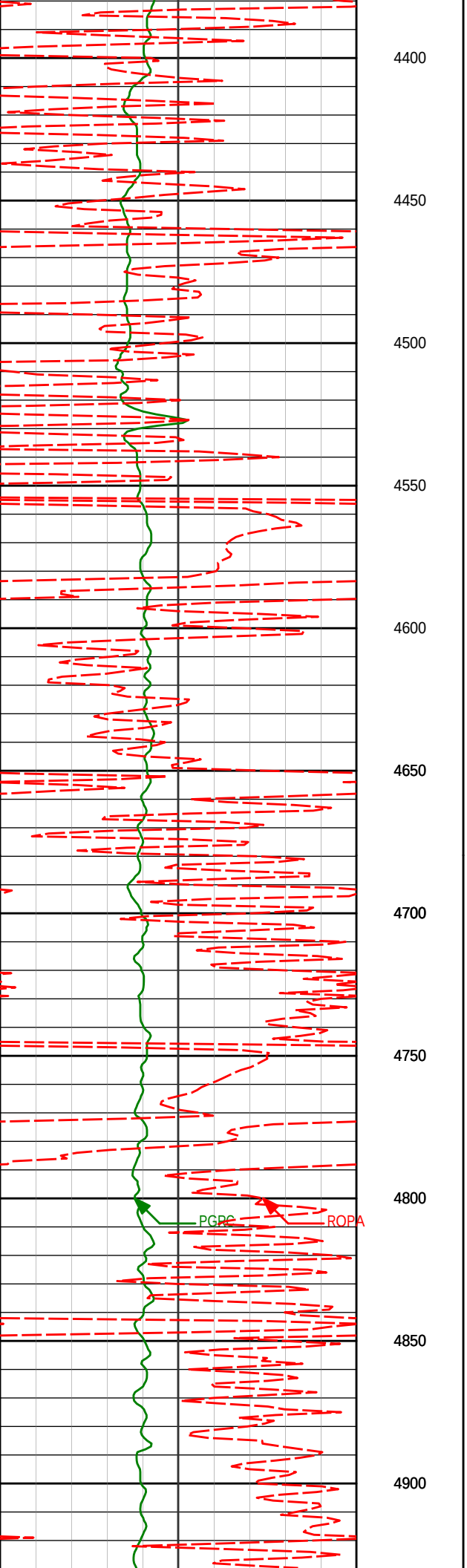
Depth ft	Depth	Inc.	Azi.	TVD	V.S.
3050					
	3075'	10.58°	229.43°	3047.39'	234.67'
3100					
3150					
	3170'	10.89°	236.39°	3140.73'	249.30'
3200					
3250					
	3265'	7.23°	233.44°	3234.53'	262.02'



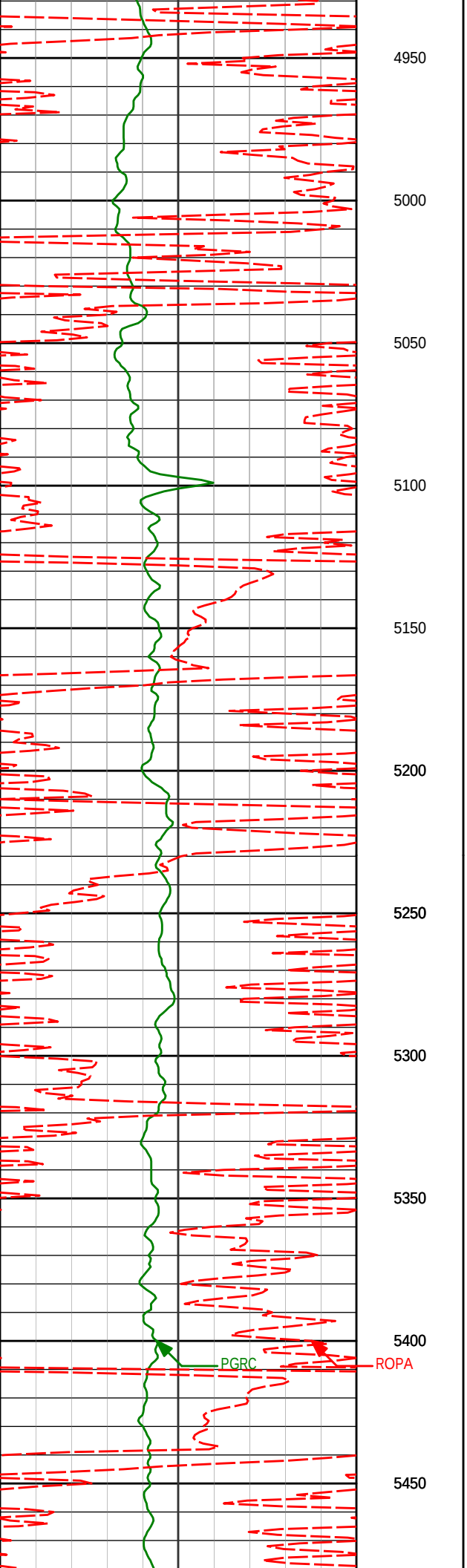
3360'	2.98°	250.90°	3329.14'	269.38'
3455'	1.10°	249.95°	3424.07'	272.62'
3550'	2.12°	40.46°	3519.06'	272.29'
3740'	2.58°	48.24°	3708.90'	266.54'



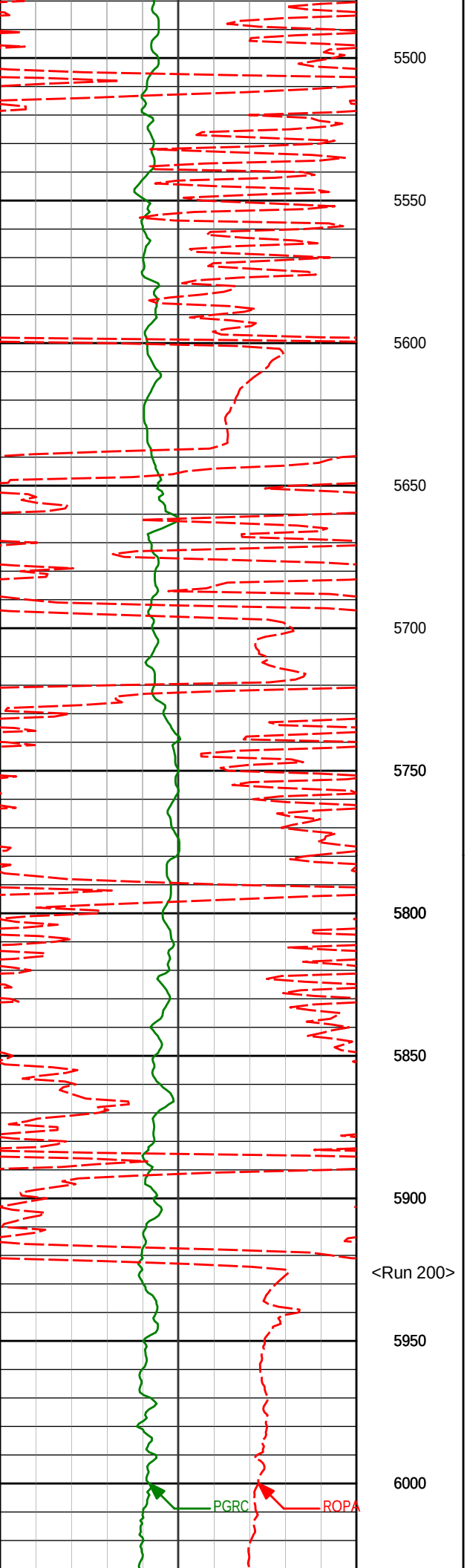
3835'	3.05°	42.69°	3803.78'	263.07'
3930'	2.66°	41.98°	3898.66'	259.70'
4025'	0.89°	95.24°	3993.62'	257.41'
4120'	1.30°	89.58°	4088.60'	255.60'
4215'	1.79°	110.17°	4183.57'	253.17'
4310'	1.03°	145.43°	4278.54'	251.36'



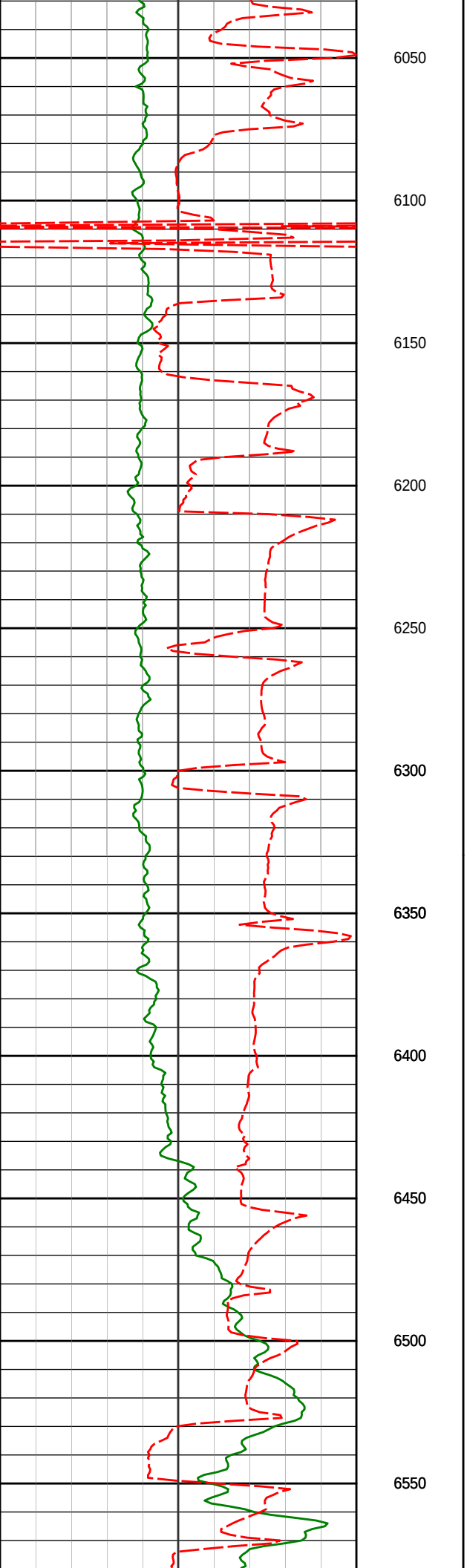
4405'	1.98°	168.16°	4373.51'	250.66'
4500'	1.64°	162.88°	4468.46'	250.08'
4595'	1.54°	174.73°	4563.42'	249.70'
4690'	1.24°	149.35°	4658.40'	249.17'
4785'	0.85°	75.11°	4753.38'	248.00'
4880'	1.75°	106.61°	4848.36'	245.94'



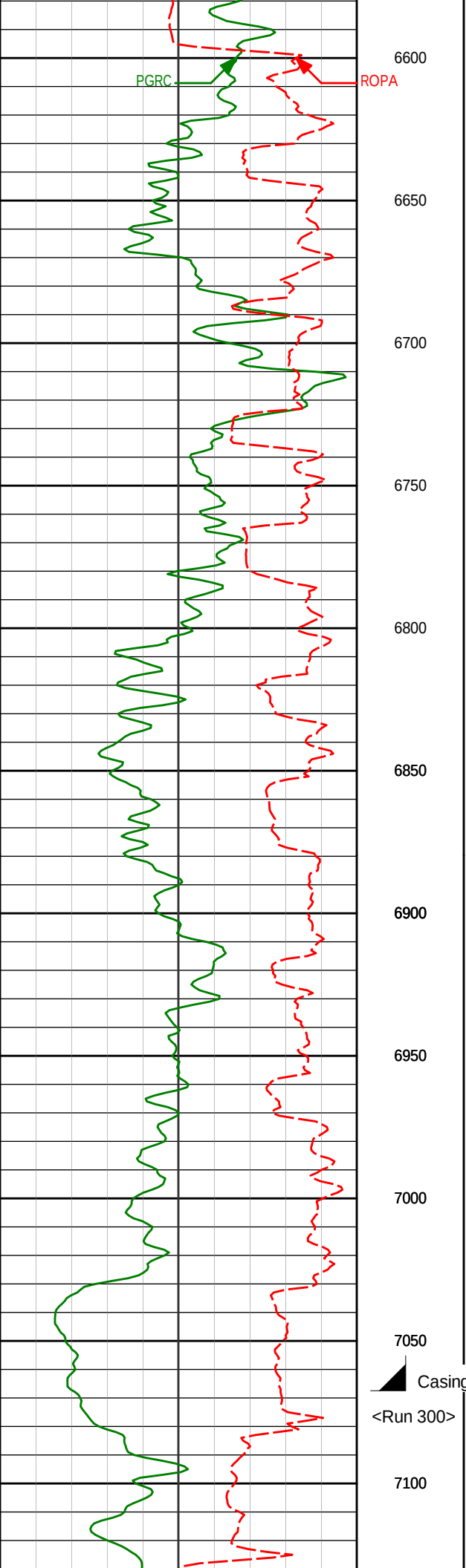
4975'	1.85°	104.72°	4943.31'	243.11'
5070'	2.09°	101.82°	5038.26'	239.98'
5260'	0.59°	187.23°	5228.21'	236.80'
5355'	1.50°	164.09°	5323.19'	236.61'
5449'	0.52°	346.94°	5417.19'	236.41'



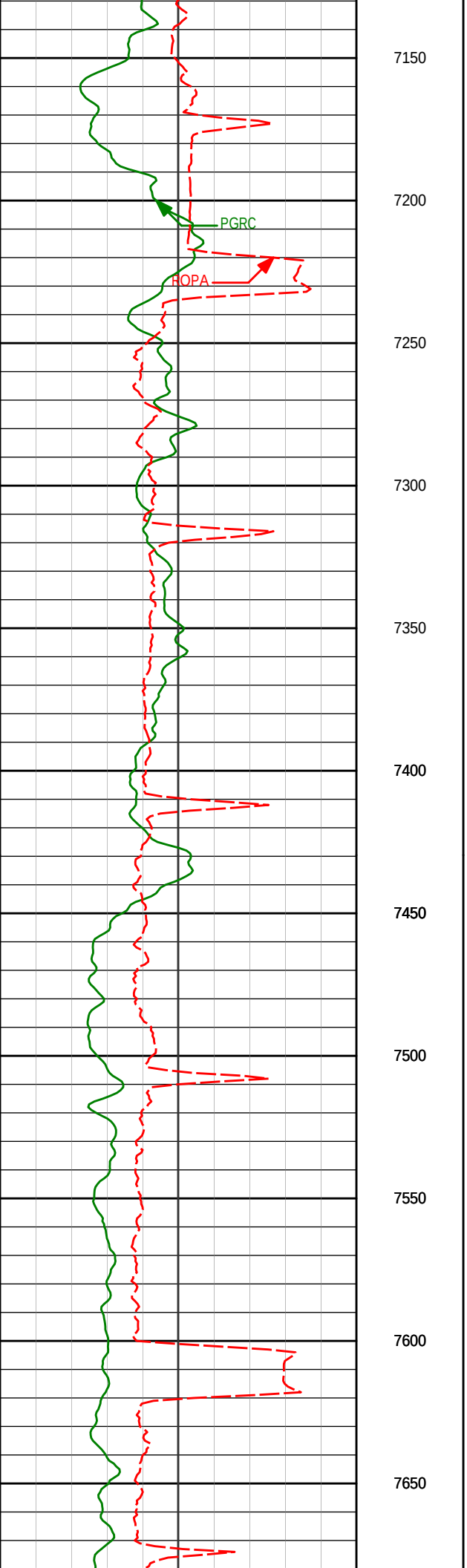
5544'	2.70°	102.43°	5512.15'	234.33'
5639'	1.20°	75.92°	5607.10'	231.20'
5734'	1.11°	309.15°	5702.09'	230.90'
5829'	1.01°	300.48°	5797.07'	232.28'
5866'	0.76°	345.99°	5834.07'	232.60'
5922'	0.64°	346.84°	5890.06'	232.73'
6017'	8.07°	272.68°	5984.74'	239.47'



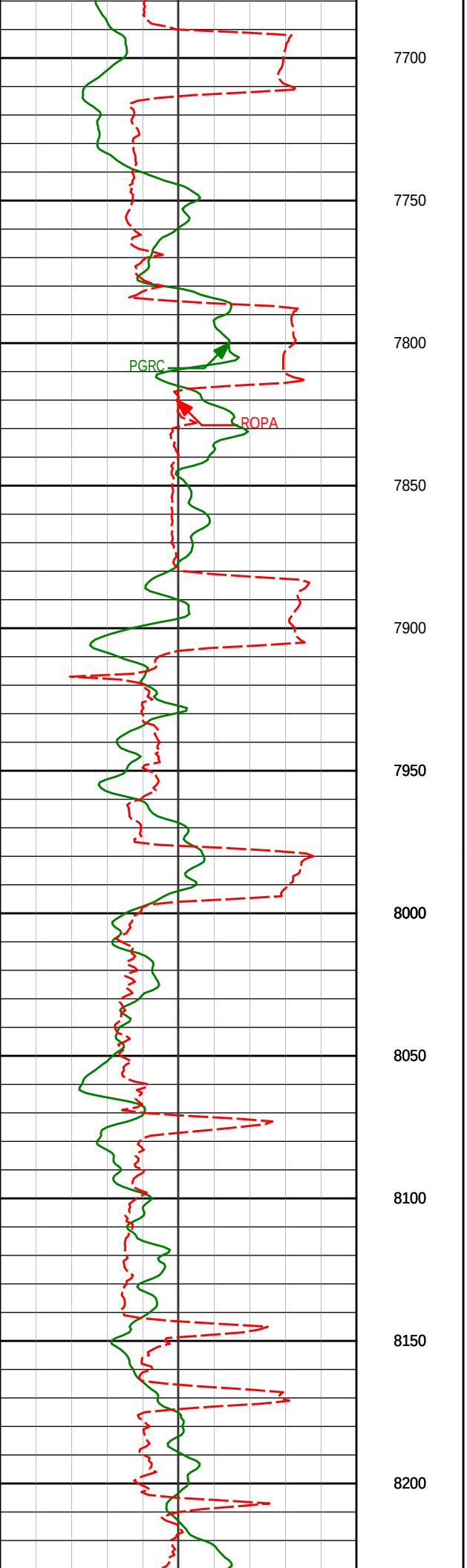
6065'	13.50°	268.75°	6031.88'	248.43'
6112'	14.61°	268.76°	6077.47'	259.84'
6160'	15.56°	267.51°	6123.81'	272.33'
6207'	16.87°	271.23°	6168.94'	285.43'
6255'	20.07°	272.99°	6214.47'	300.57'
6302'	23.56°	272.92°	6258.09'	317.94'
6396'	33.21°	273.60°	6340.69'	362.31'
6444'	39.18°	272.39°	6379.41'	390.49'
6491'	44.17°	272.27°	6414.50'	421.60'
6539'	46.98°	272.06°	6448.10'	455.74'



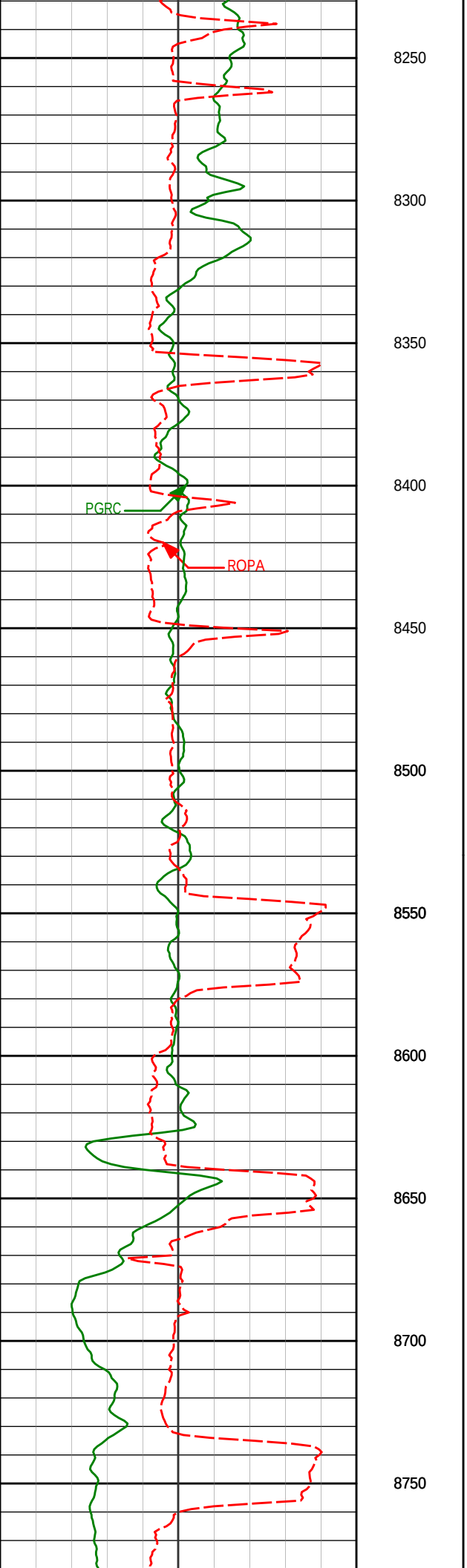
6586'	49.21°	270.94°	6479.49'	490.61'
6634'	52.05°	267.29°	6509.94'	527.67'
6681'	56.36°	266.88°	6537.42'	565.79'
6729'	60.16°	268.03°	6562.66'	606.60'
6776'	63.34°	268.68°	6584.91'	647.99'
6824'	66.80°	269.05°	6605.14'	691.48'
6871'	69.47°	269.71°	6622.64'	735.06'
6919'	73.46°	269.79°	6637.89'	780.51'
6966'	77.44°	269.61°	6649.70'	825.94'
7019'	83.86°	269.32°	6658.31'	878.16'
7108'	86.27°	269.47°	6665.96'	966.75'



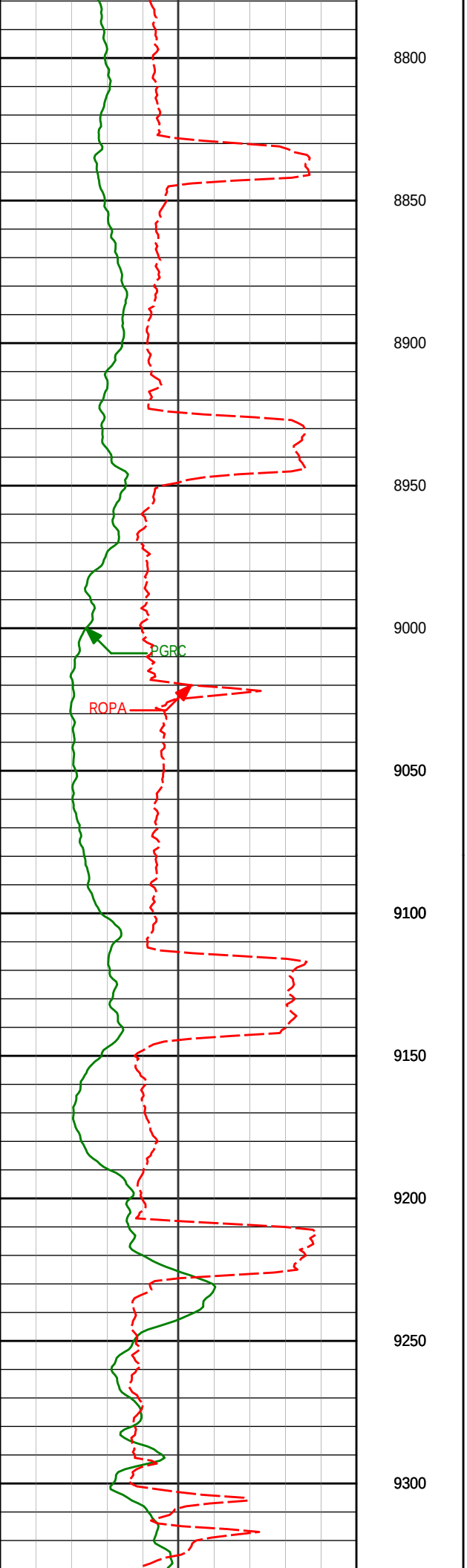
7150	7155'	86.80°	269.66°	6668.80'	1013.62'
7200					
7250	7250'	86.64°	269.68°	6674.24'	1108.36'
7300					
7350	7345'	87.81°	270.06°	6678.84'	1203.12'
7400					
7450	7440'	88.68°	270.24°	6681.75'	1297.94'
7500					
7550	7534'	89.72°	270.97°	6683.06'	1391.74'
7600					
7650	7629'	91.08°	270.84°	6682.40'	1486.51'



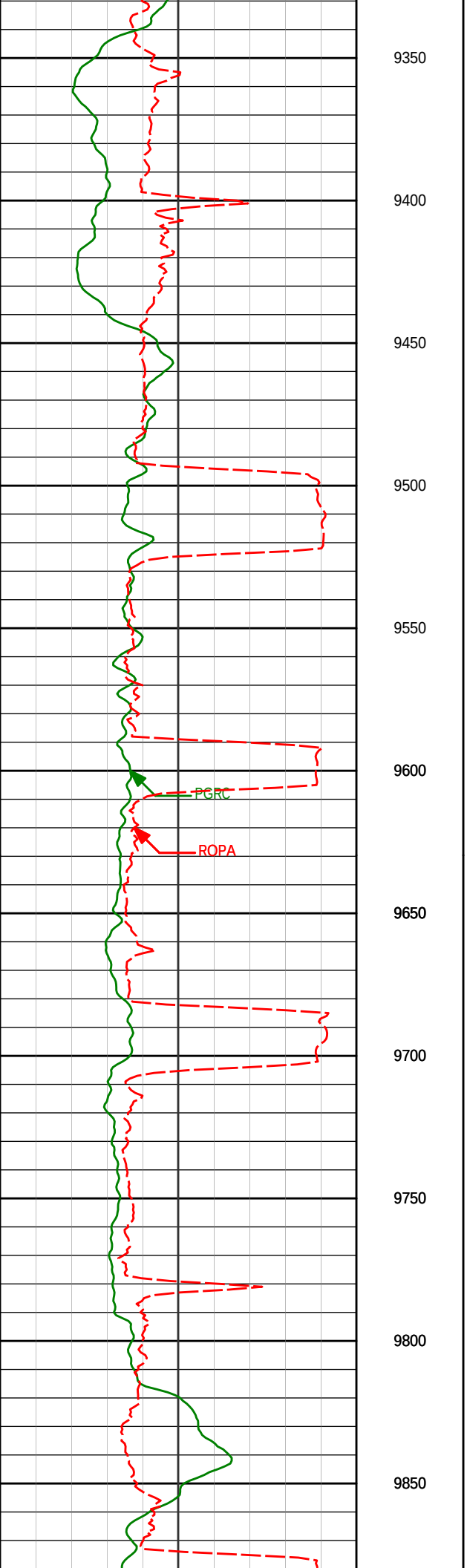
7724'	91.94°	269.46°	6679.90'	1581.33'
7819'	90.56°	269.36°	6677.83'	1676.22'
7914'	88.92°	267.50°	6678.26'	1771.19'
8009'	87.72°	267.16°	6681.05'	1866.14'
8103'	88.12°	267.65°	6684.46'	1960.08'
8198'	88.55°	268.82°	6687.22'	2055.01'



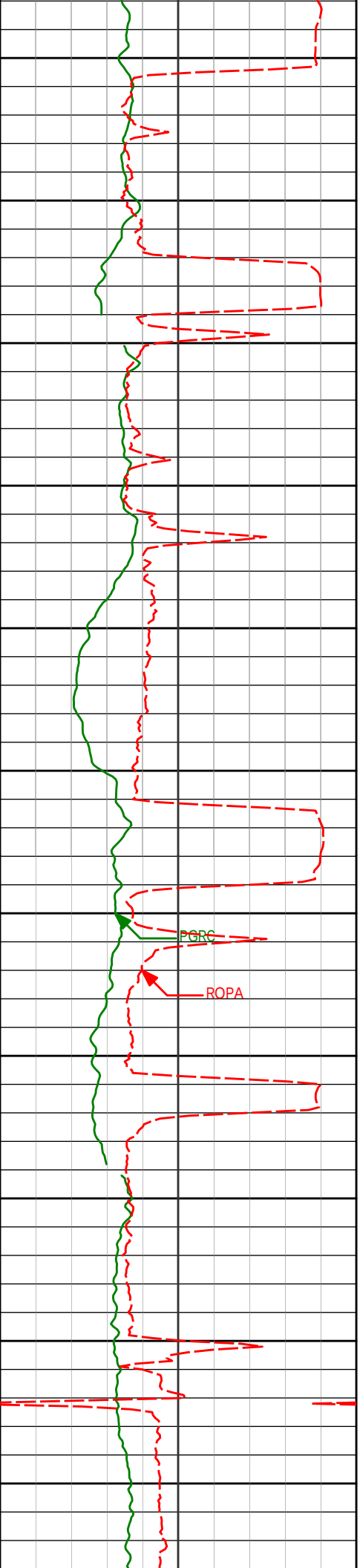
8293'	88.98°	269.79°	6689.26'	2149.91'
8388'	89.57°	269.51°	6690.47'	2244.80'
8483'	91.57°	271.36°	6689.52'	2339.62'
8577'	89.94°	268.99°	6688.28'	2433.46'
8673'	90.31°	268.22°	6688.07'	2529.42'
8768'	88.55°	267.42°	6689.02'	2624.40'



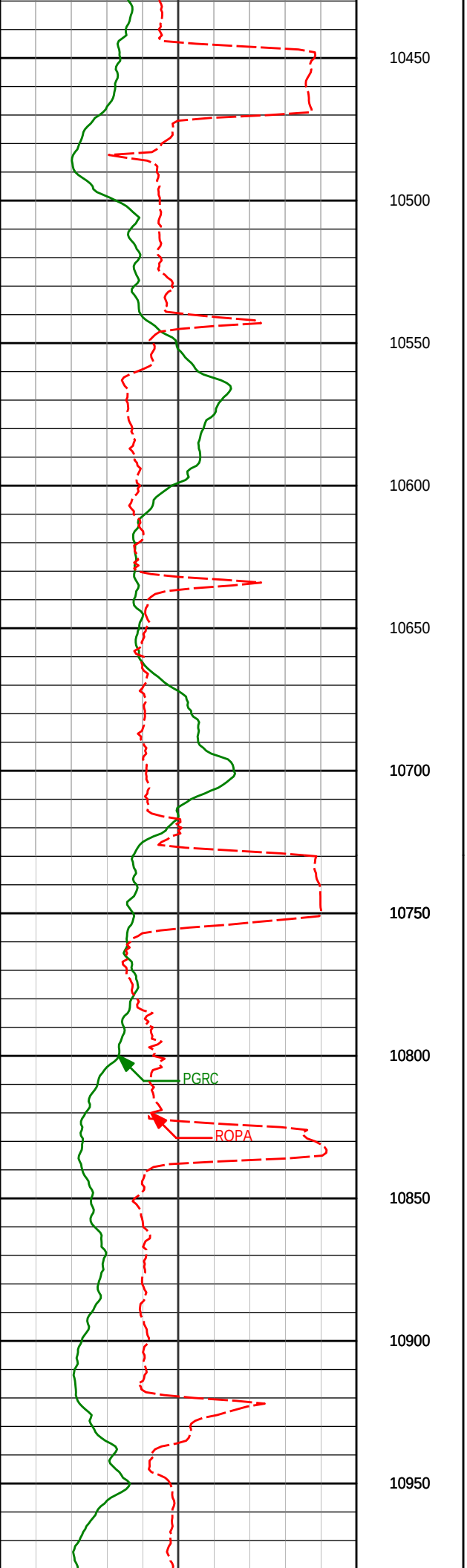
8863'	89.01°	268.84°	6691.04'	2719.36'
8957'	88.37°	269.16°	6693.19'	2813.27'
9052'	90.31°	269.46°	6694.29'	2908.19'
9147'	88.64°	269.74°	6695.16'	3003.08'
9242'	87.62°	268.78°	6698.25'	3097.95'



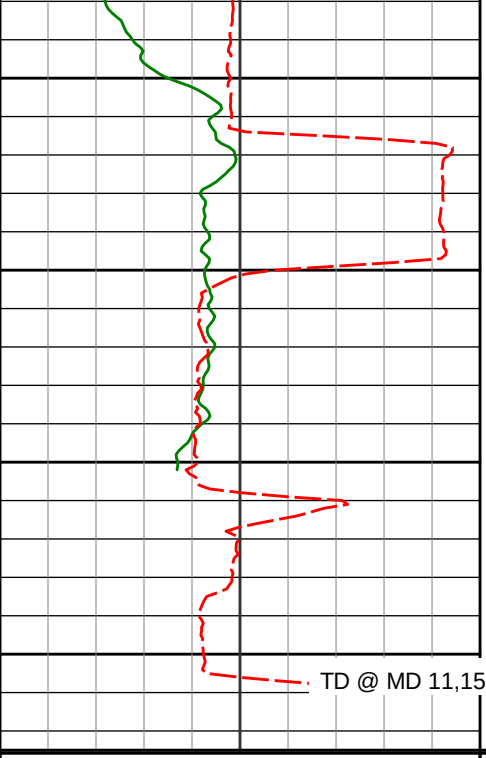
9337'	88.74°	269.43°	6701.26'	3192.84'
9432'	90.31°	269.76°	6702.06'	3287.74'
9527'	89.14°	269.10°	6702.52'	3382.65'
9621'	89.51°	267.55°	6703.63'	3476.61'
9716'	88.95°	267.25°	6704.91'	3571.60'
9811'	91.33°	268.39°	6704.68'	3666.58'



9905'	89.51°	268.10°	6703.99'	3760.55'
10000'	88.86°	268.25°	6705.35'	3855.52'
10095'	90.68°	268.11°	6705.73'	3950.50'
10190'	89.69°	269.64°	6705.43'	4045.44'
10285'	89.08°	269.96°	6706.45'	4140.33'
10380'	90.06°	270.17°	6707.16'	4235.19'



10475'	87.56°	268.48°	6709.13'	4330.08'
10570'	88.30°	268.96°	6712.56'	4424.97'
10665'	90.86°	270.14°	6713.25'	4519.86'
10760'	90.49°	269.67°	6712.12'	4614.74'
10855'	89.78°	268.44°	6711.90'	4709.67'
10950'	91.48°	268.76°	6710.85'	4804.63'



Depth ft	Depth	Inc.	Azi.	TVD	V.S.
	11045'	90.59°	267.99°	6709.14'	4899.58'
	11092'	91.11°	267.82°	6708.44'	4946.57'
	11155'	91.11°	267.82°	6707.22'	5009.55'

Avg Rate of Penetration
ROPA
500 feet per hr 0

PCG Gamma Ray
PGRC
0 api 300

HALLIBURTON

Sperry Drilling Services

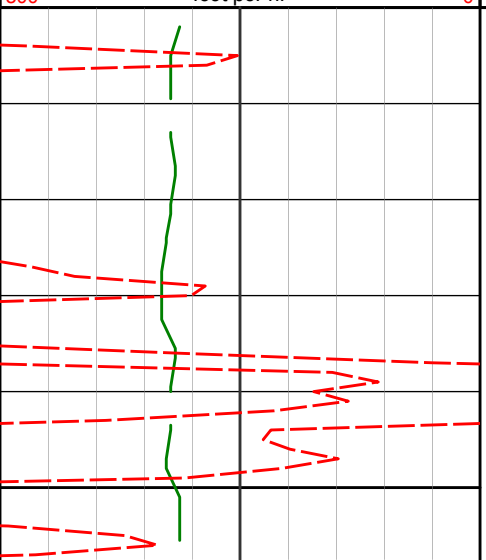
MD Detail Log 1:240

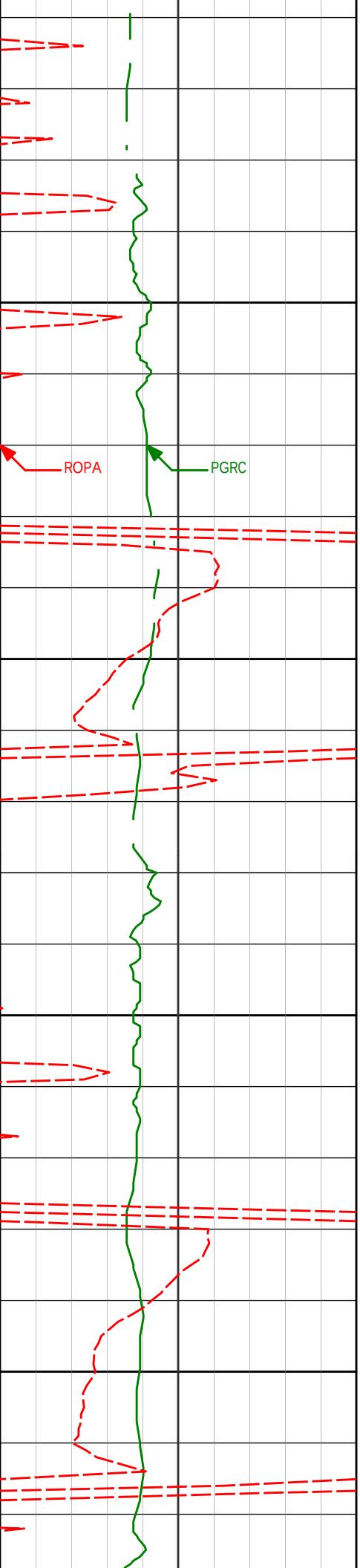
Noble Energy
Wells Ranch USX AA23-67HN
H&P 343
T6N-R63W

PCG Gamma Ray
PGRC
0 api 300

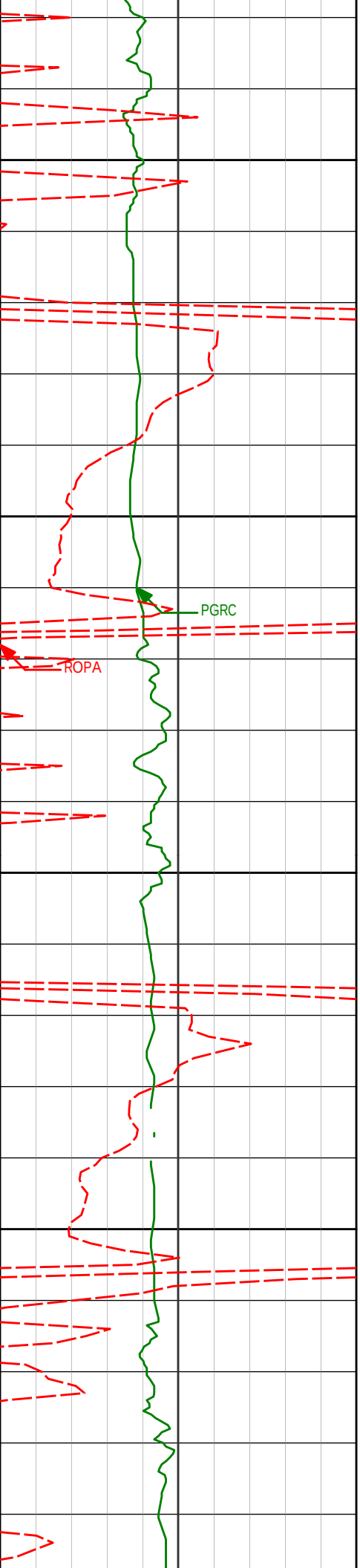
Avg Rate of Penetration
ROPA
500 feet per hr 0

Depth ft	Depth	Inc.	Azi.	TVD	V.S.

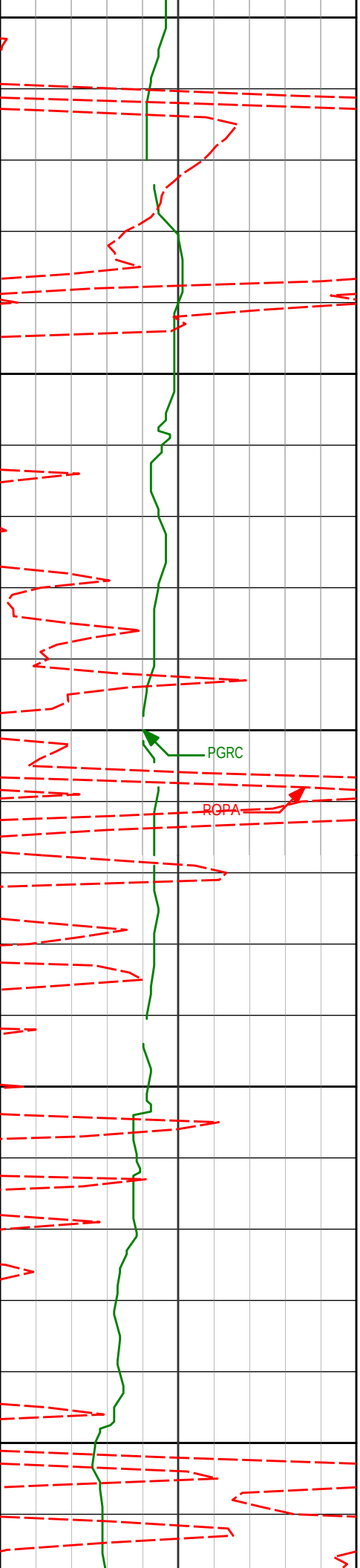




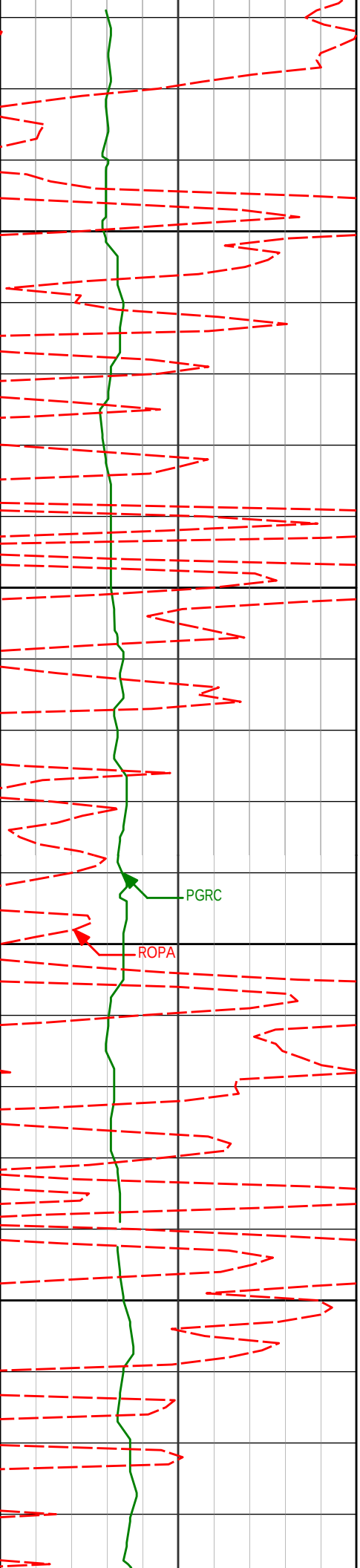
3075'	10.58°	229.43°	3047.39'	234.67'
3170'	10.89°	236.39°	3140.73'	249.30'
3265'	7.23°	233.44°	3234.53'	262.02'



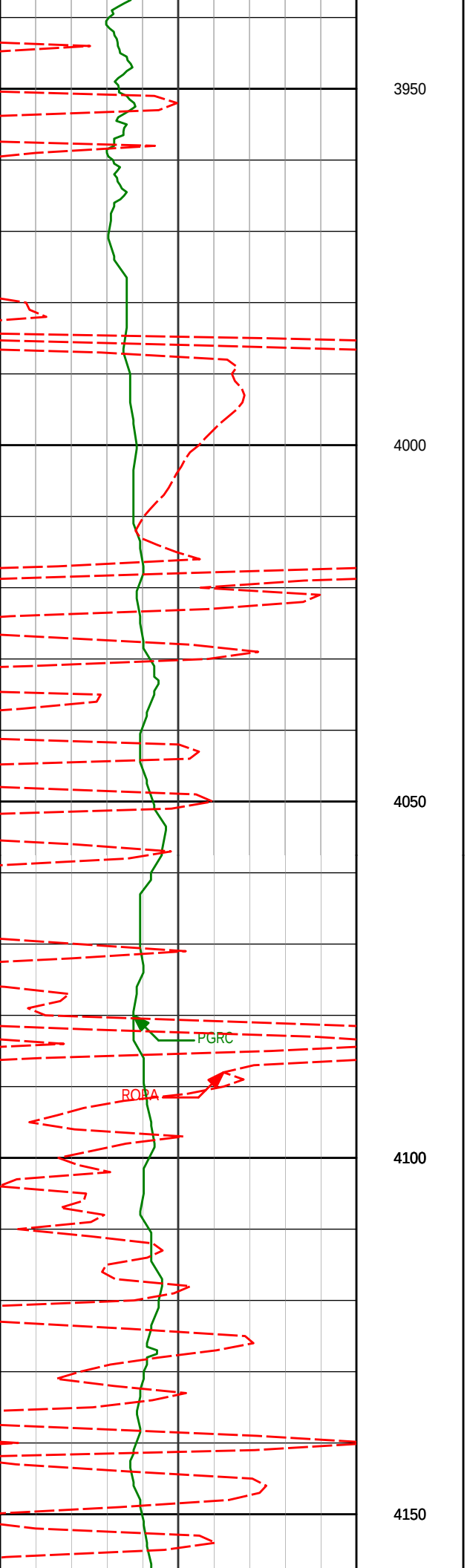
3360'	2.98°	250.90°	3329.14'	269.38'
3455'	1.10°	249.95°	3424.07'	272.62'



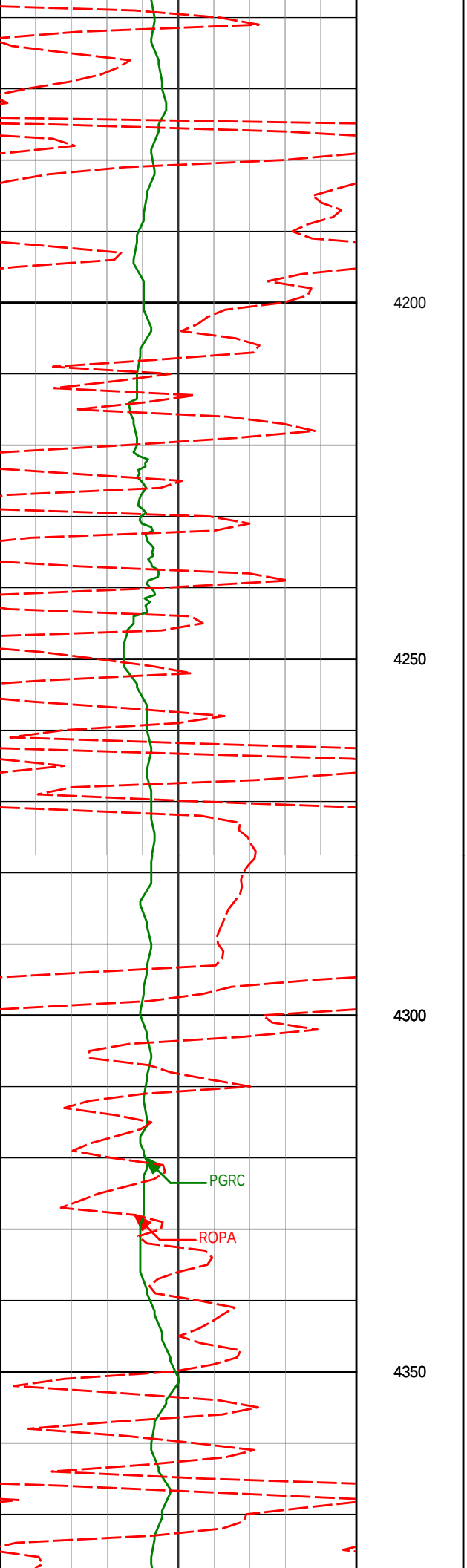
3550	3550'	2.12°	40.46°	3519.06'	272.29'



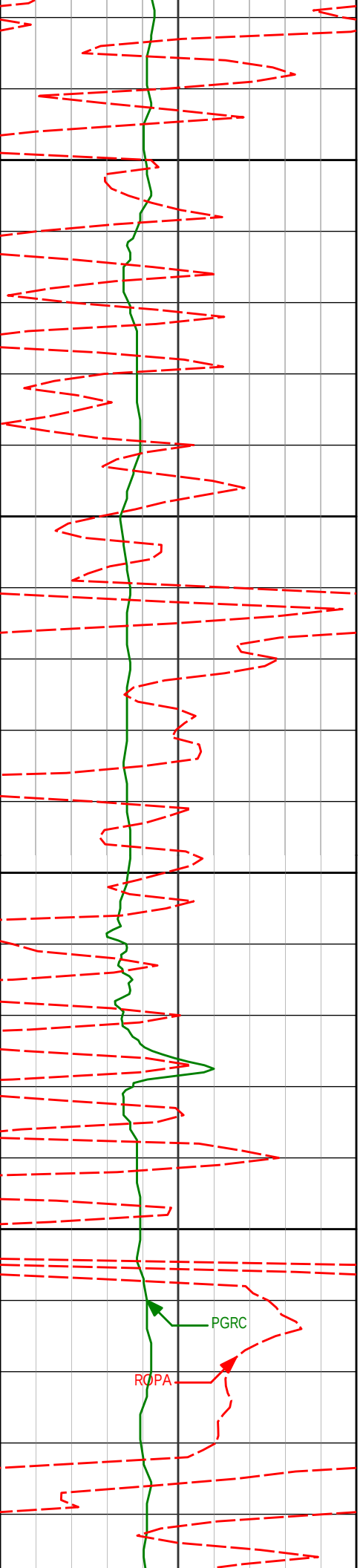
3740'	2.58°	48.24°	3708.90'	266.54'
3835'	3.05°	42.69°	3803.78'	263.07'
3930'	2.66°	41.98°	3898.66'	259.70'



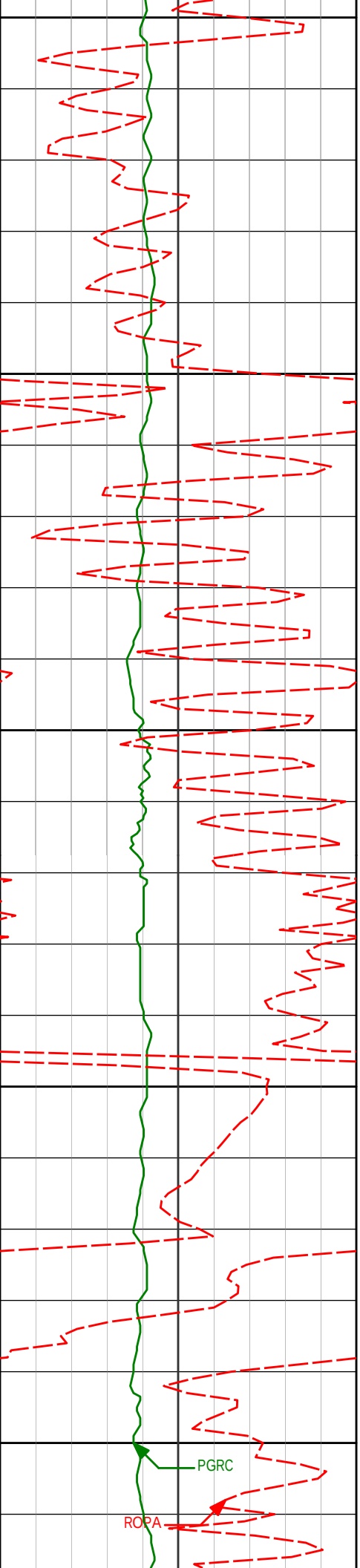
4025'	0.89°	95.24°	3993.62'	257.41'
4120'	1.30°	89.58°	4088.60'	255.60'



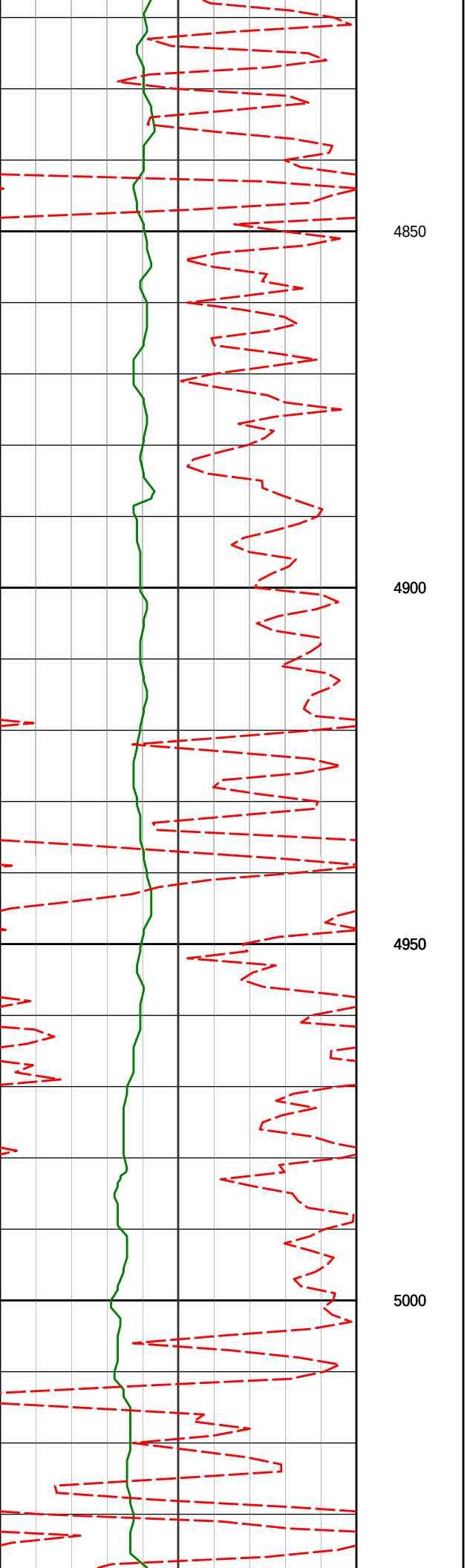
4215'	1.79°	110.17°	4183.57'	253.17'
4310'	1.03°	145.43°	4278.54'	251.36'



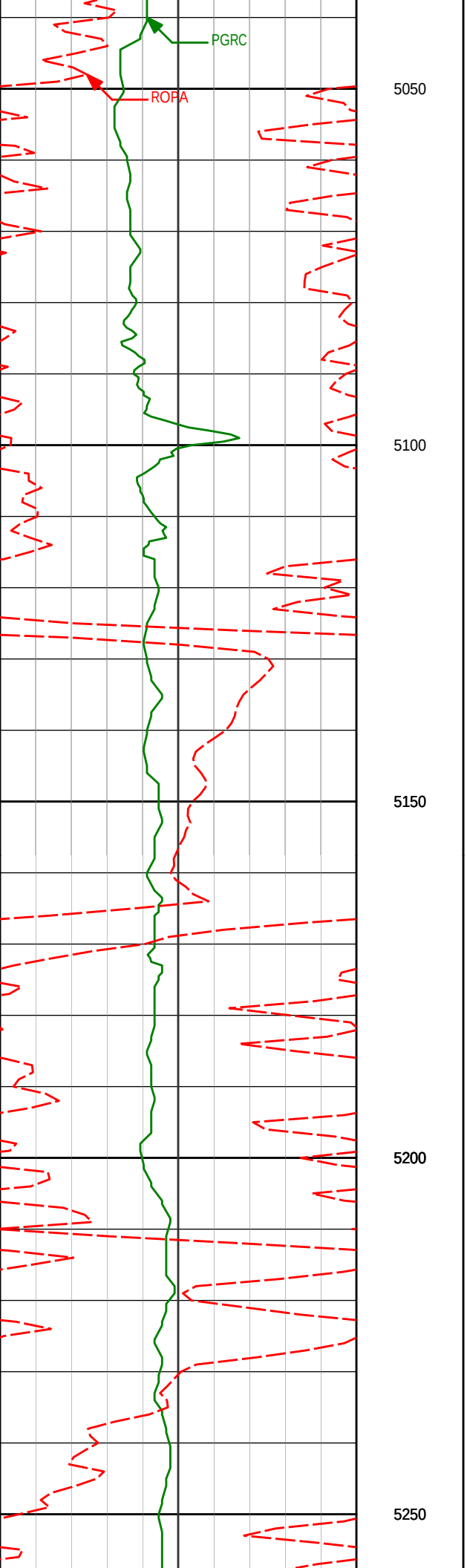
4405'	1.98°	168.16°	4373.51'	250.66'
4500'	1.64°	162.88°	4468.46'	250.08'
4595'	1.54°	174.73°	4563.42'	249.70'



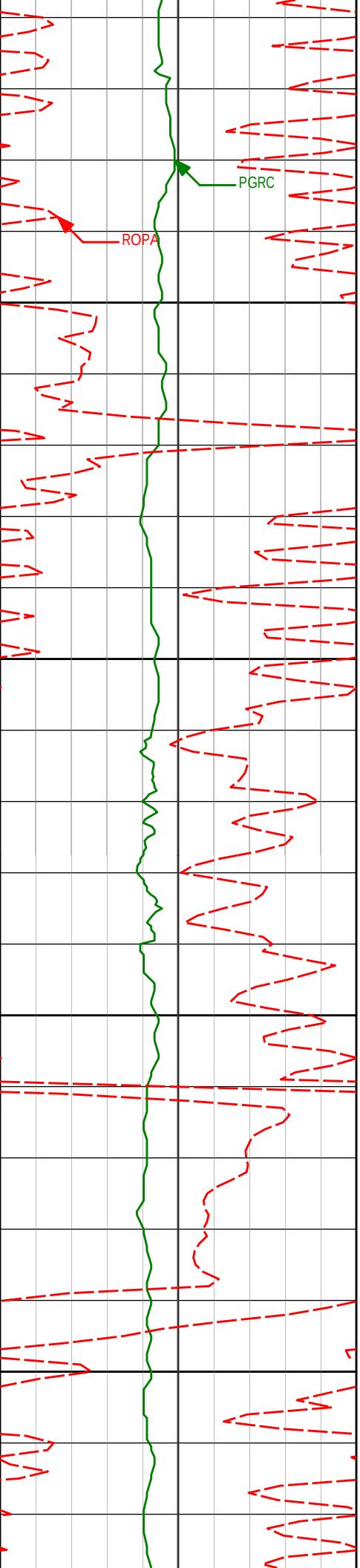
4690'	1.24°	149.35°	4658.40'	249.17'
4785'	0.85°	75.11°	4753.38'	248.00'



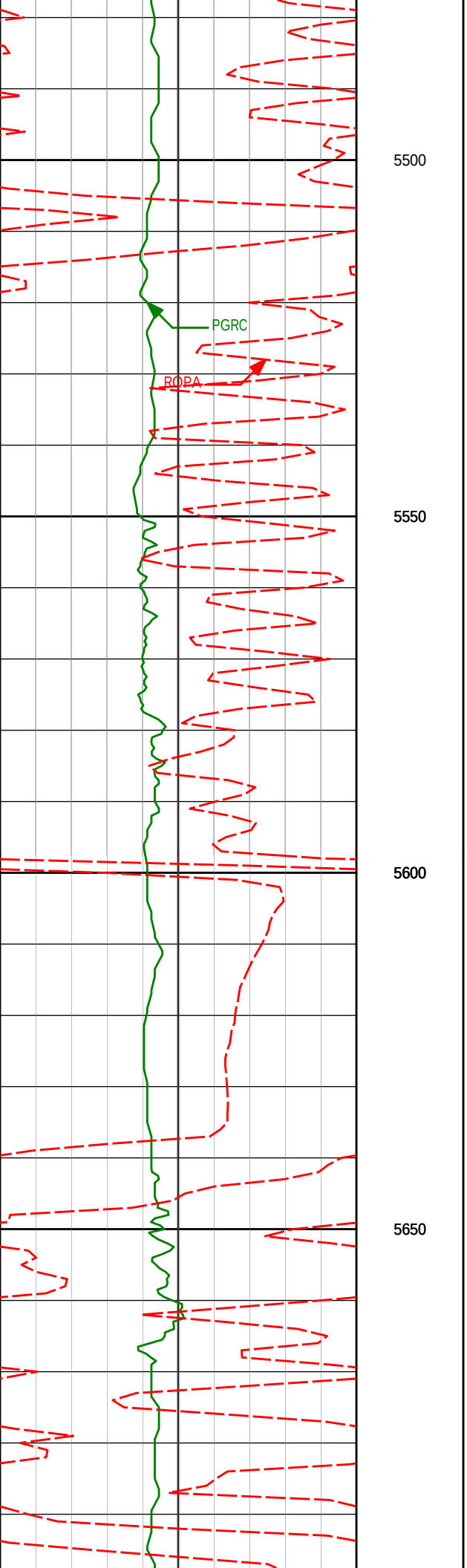
4880'	1.75°	106.61°	4848.36'	245.94'
4975'	1.85°	104.72°	4943.31'	243.11'



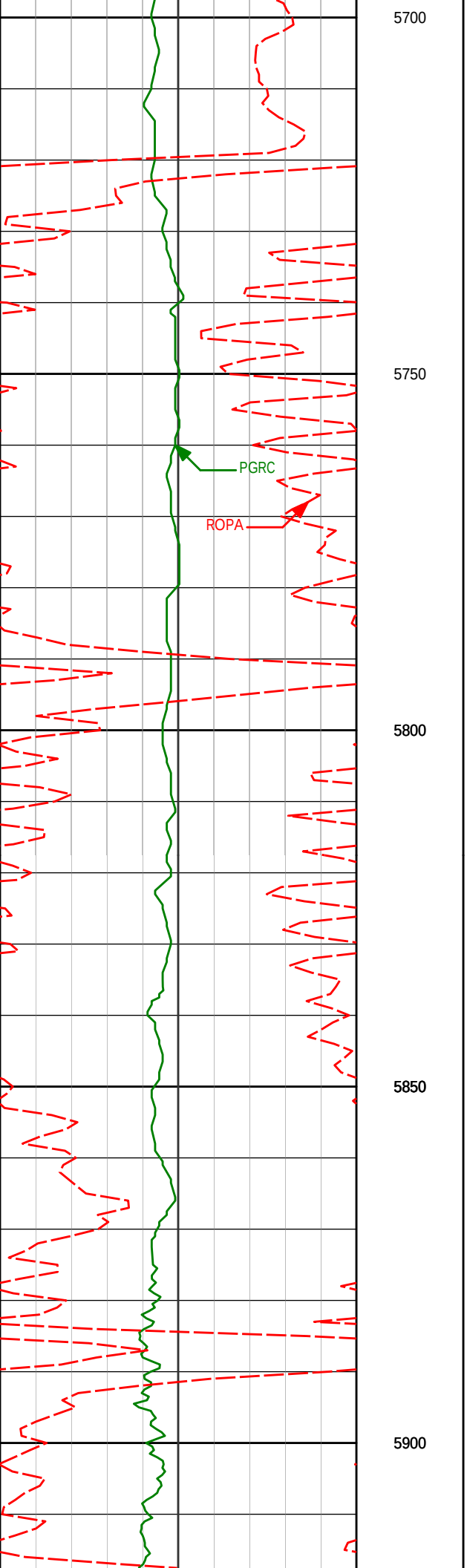
5070'	2.09°	101.82°	5038.26'	239.98'



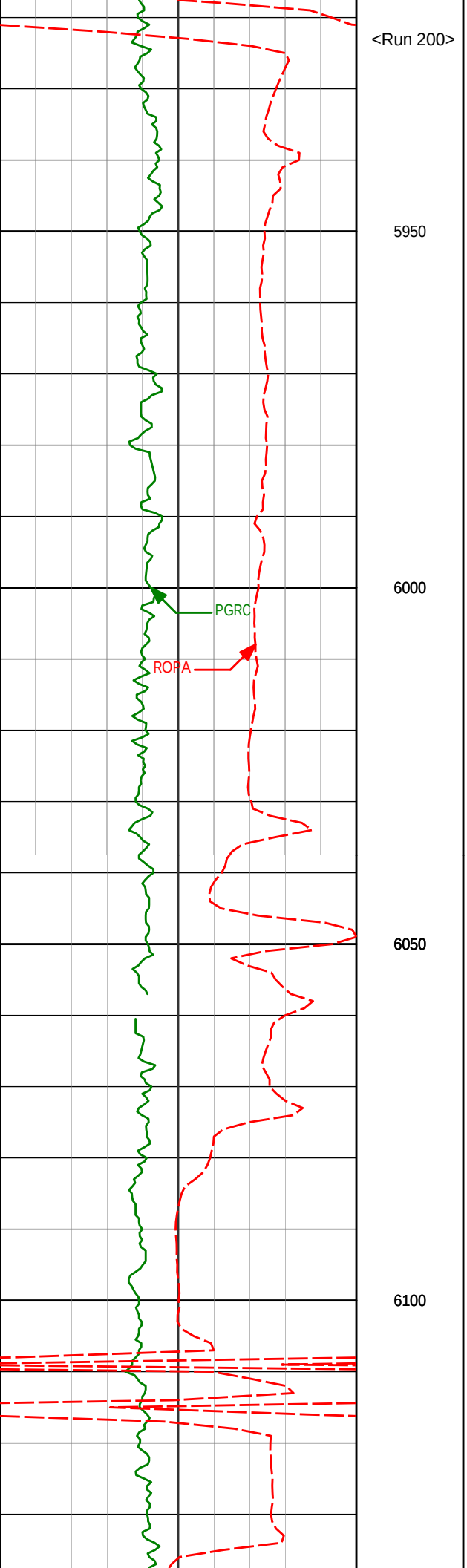
5260'	0.59°	187.23°	5228.21'	236.80'
5355'	1.50°	164.09°	5323.19'	236.61'
5449'	0.52°	346.94°	5417.19'	236.41'



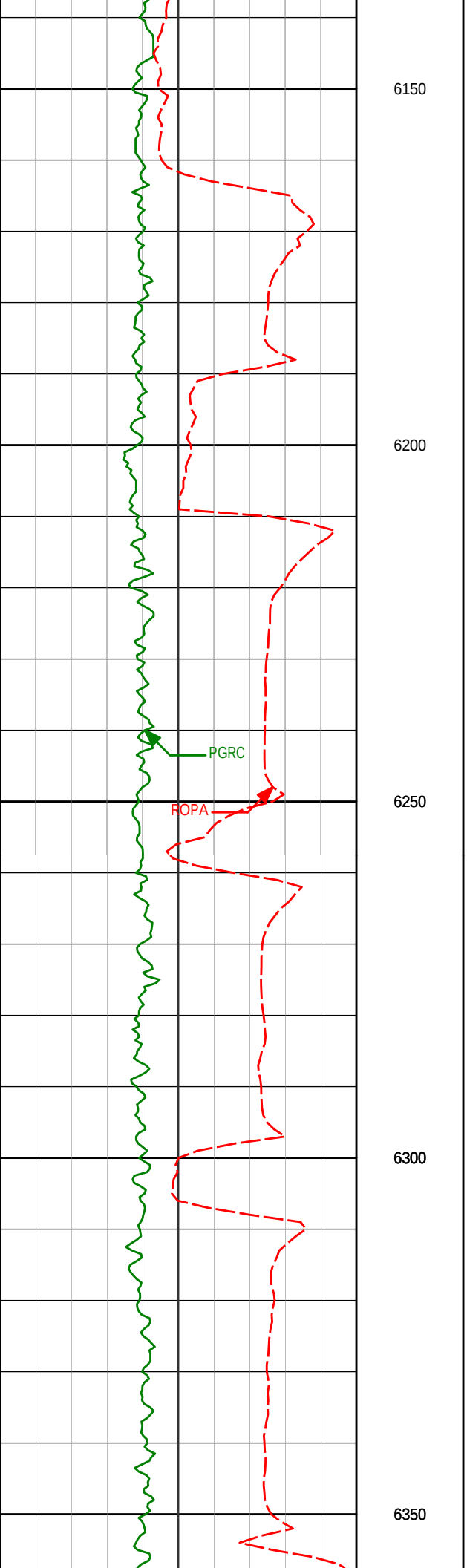
5544'	2.70°	102.43°	5512.15'	234.33'
5639'	1.20°	75.92°	5607.10'	231.20'



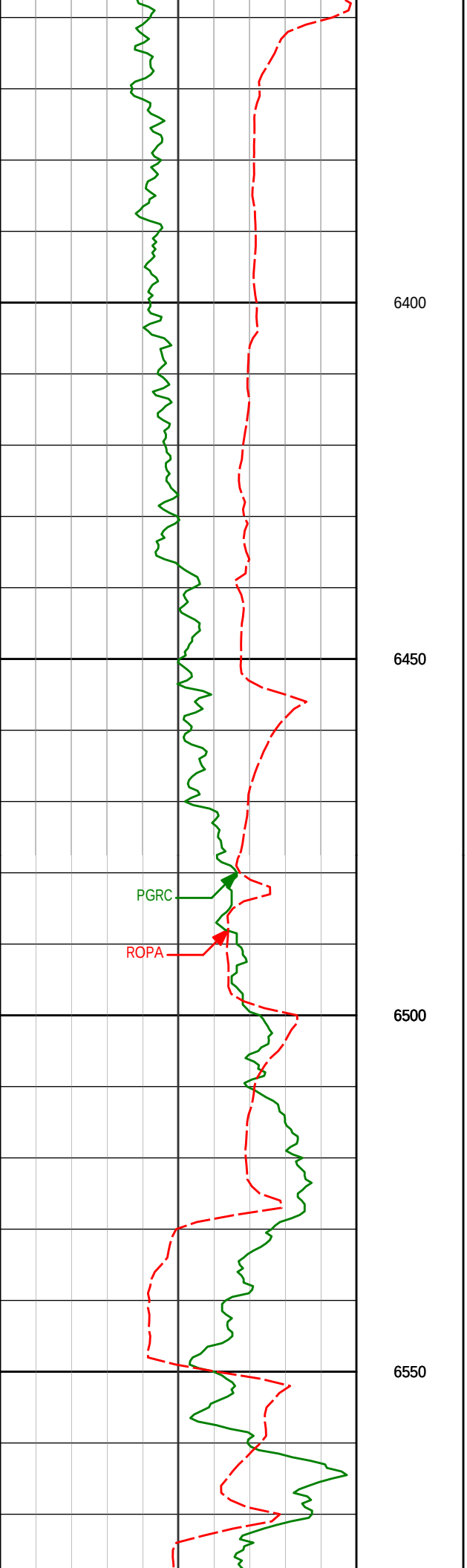
5734'	1.11°	309.15°	5702.09'	230.90'
5829'	1.01°	300.48°	5797.07'	232.28'
5866'	0.76°	345.99°	5834.07'	232.60'



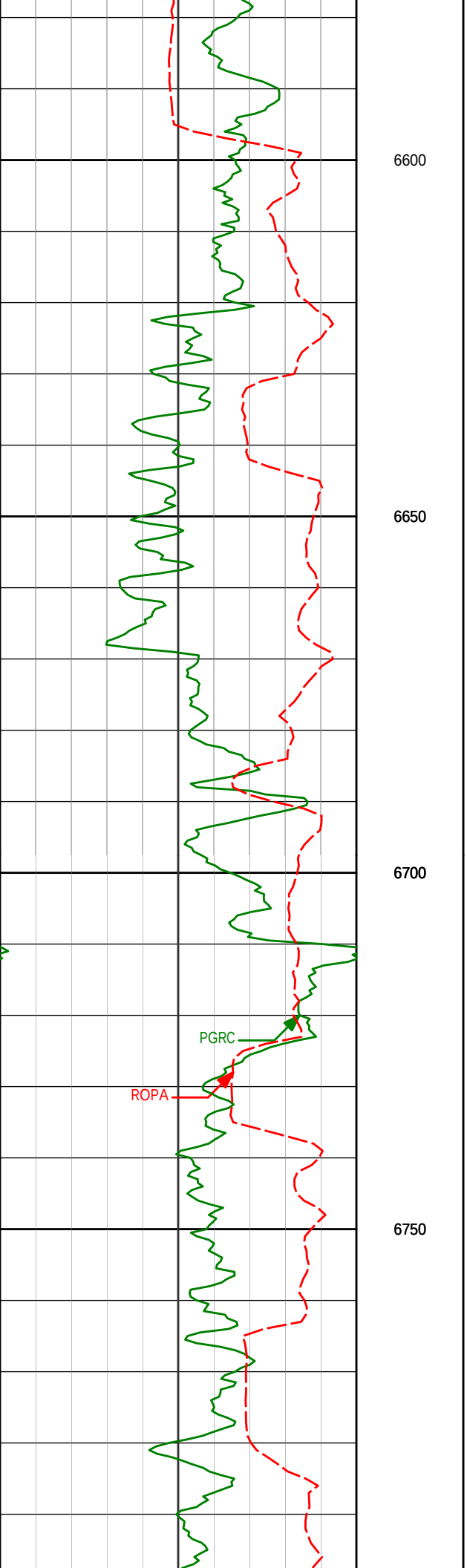
5922'	0.64°	346.84°	5890.06'	232.73'
6017'	8.07°	272.68°	5984.74'	239.47'
6065'	13.50°	268.75°	6031.88'	248.43'
6112'	14.61°	268.76°	6077.47'	259.84'



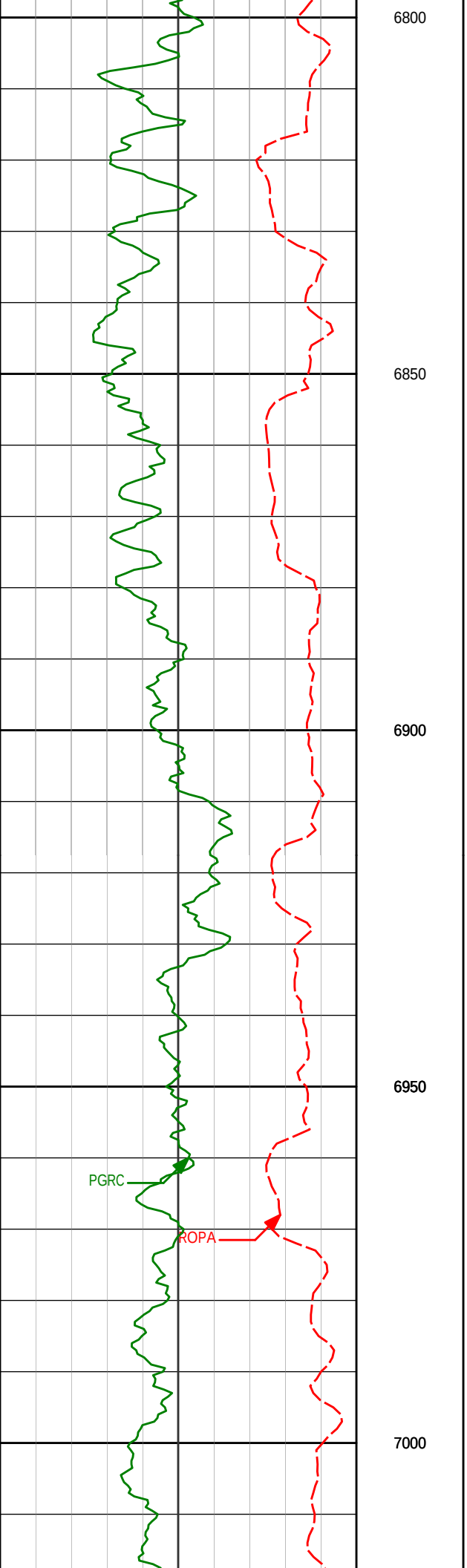
6160'	15.56°	267.51°	6123.81'	272.33'
6207'	16.87°	271.23°	6168.94'	285.43'
6255'	20.07°	272.99°	6214.47'	300.57'
6302'	23.56°	272.92°	6258.09'	317.94'



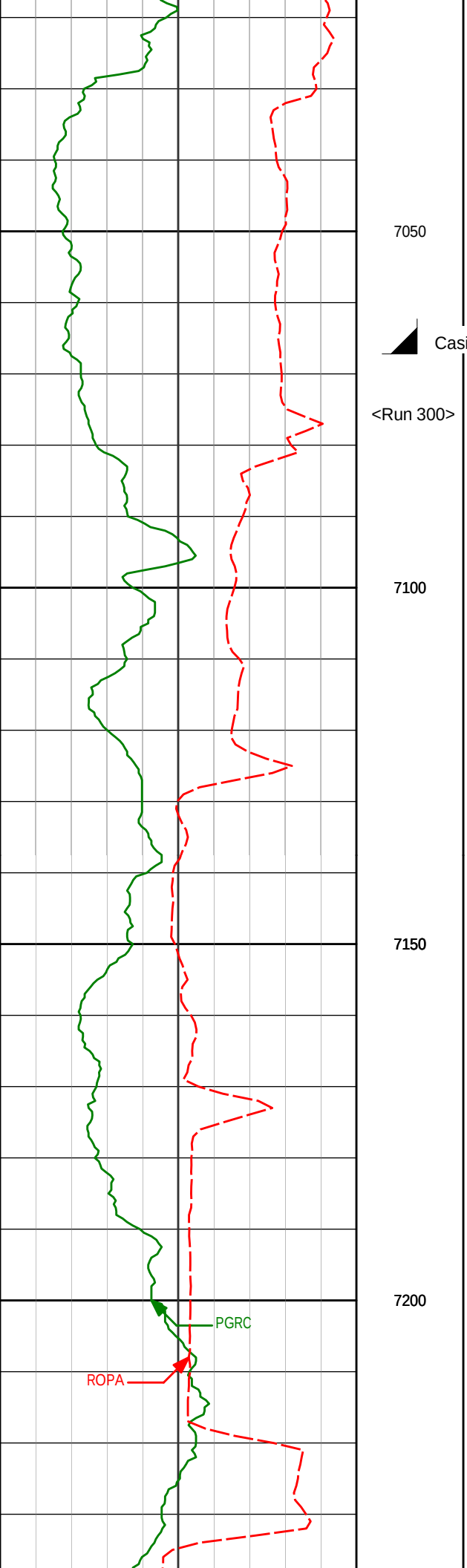
6396'	33.21°	273.60°	6340.69'	362.31'
6444'	39.18°	272.39°	6379.41'	390.49'
6491'	44.17°	272.27°	6414.50'	421.60'
6539'	46.98°	272.06°	6448.10'	455.74'



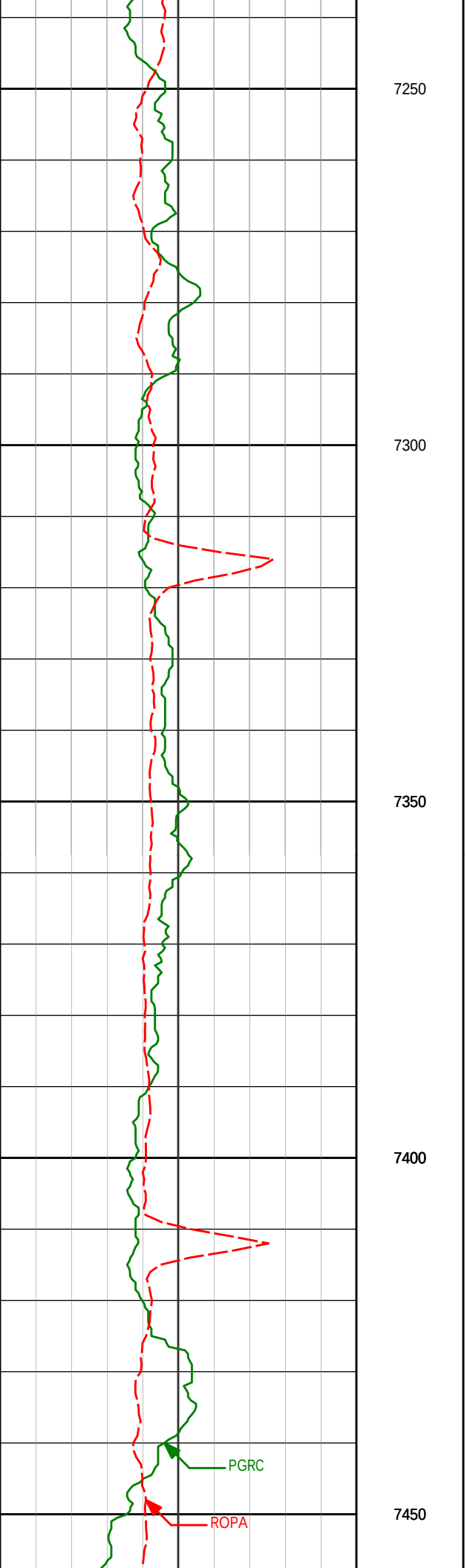
6586'	49.21°	270.94°	6479.49'	490.61'
6634'	52.05°	267.29°	6509.94'	527.67'
6681'	56.36°	266.88°	6537.42'	565.79'
6729'	60.16°	268.03°	6562.66'	606.60'
6776'	63.34°	268.68°	6584.91'	647.99'



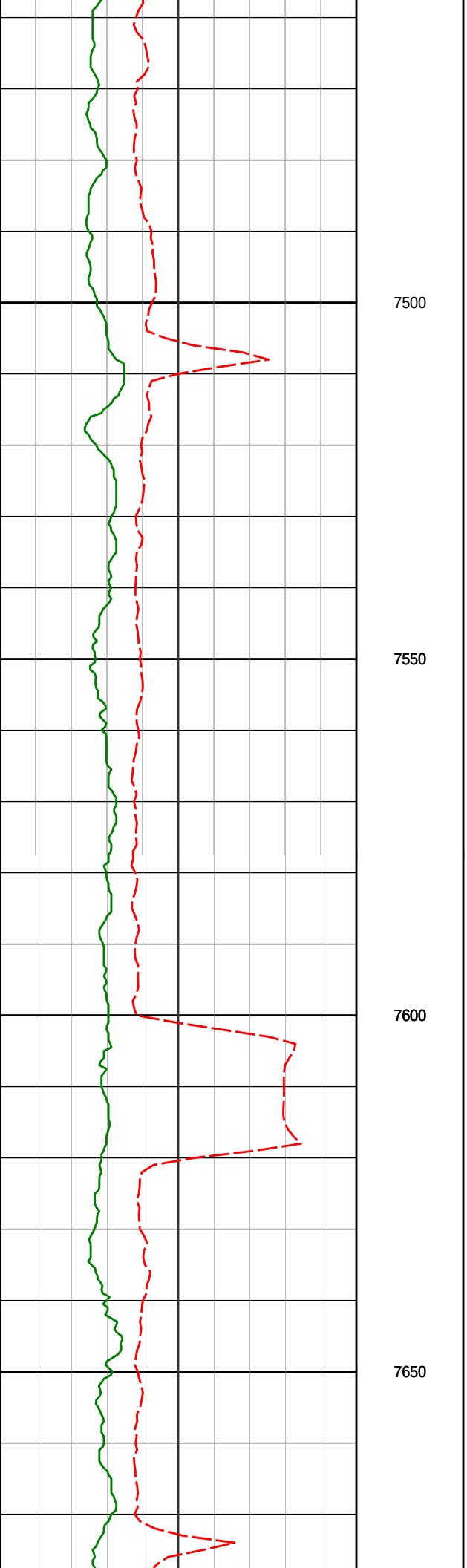
6824'	66.80°	269.05°	6605.14'	691.48'
6871'	69.47°	269.71°	6622.64'	735.06'
6919'	73.46°	269.79°	6637.89'	780.51'
6966'	77.44°	269.61°	6649.70'	825.94'



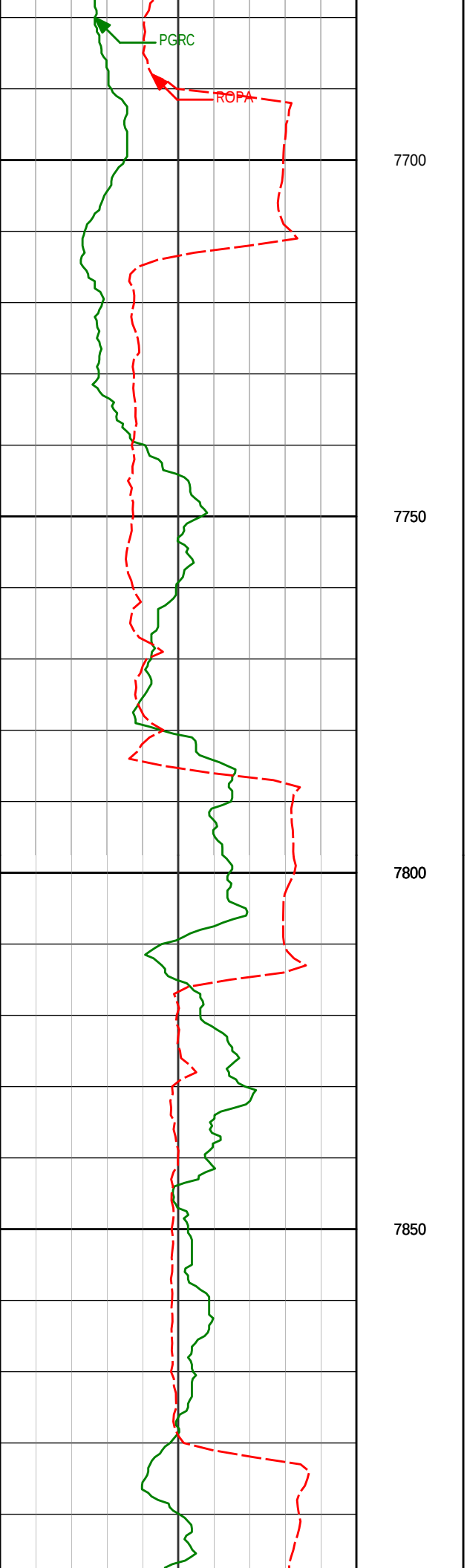
7019'	83.86°	269.32°	6658.31'	878.16'
7050				
Casing Set @ 7,065' MD				
<Run 300>				
7100				
7108'	86.27°	269.47°	6665.96'	966.75'
7150				
7155'	86.80°	269.66°	6668.80'	1013.62'
7200				



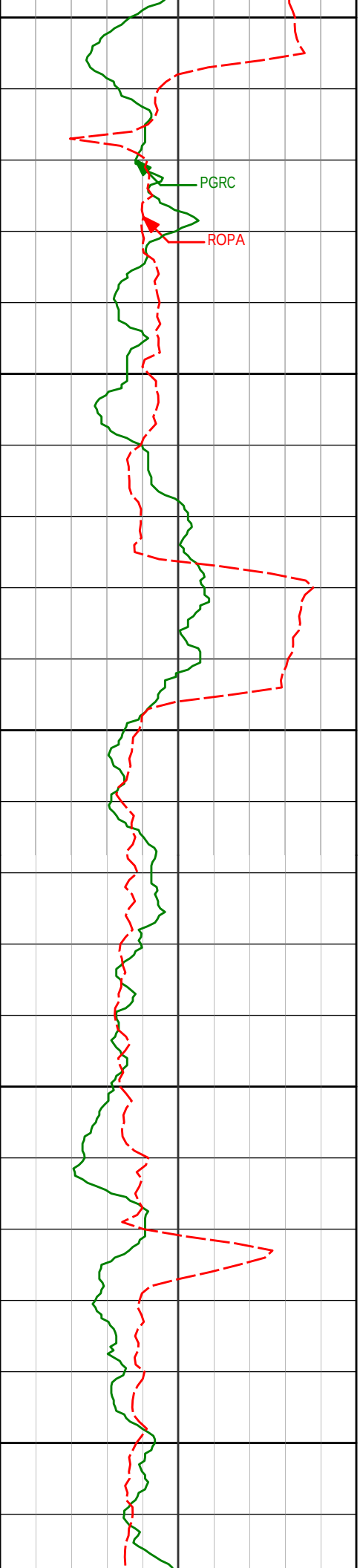
7250	7250'	86.64°	269.68°	6674.24'	1108.36'
7300					
	7345'	87.81°	270.06°	6678.84'	1203.12'
7350					
7400					
	7440'	88.68°	270.24°	6681.75'	1297.94'
7450					



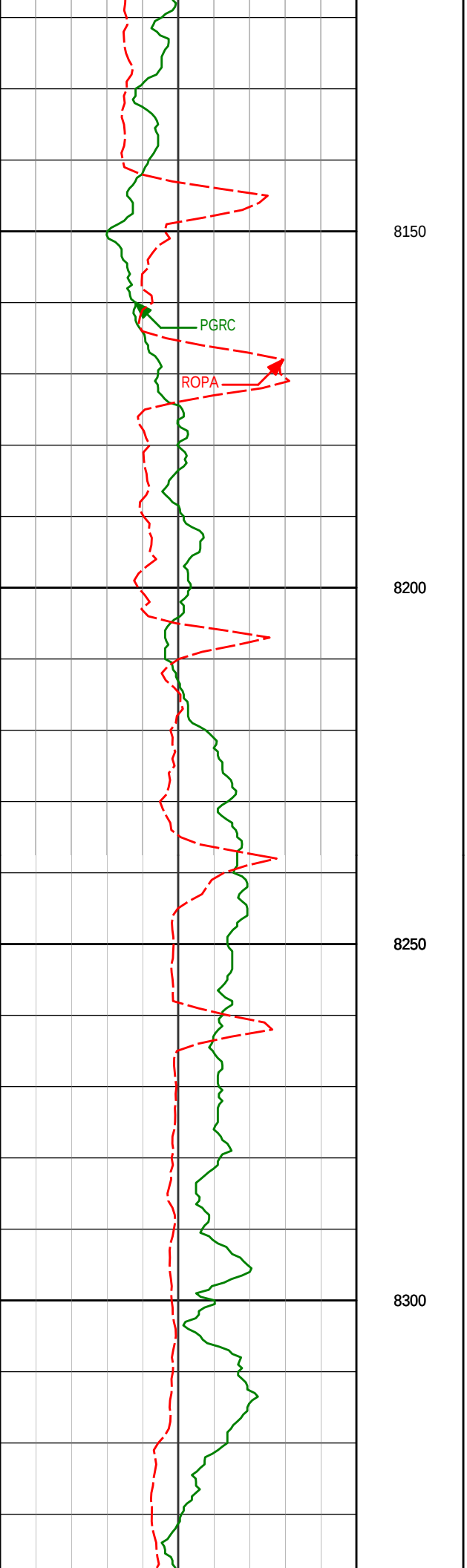
7534'	89.72°	270.97°	6683.06'	1391.74'
7629'	91.08°	270.84°	6682.40'	1486.51'



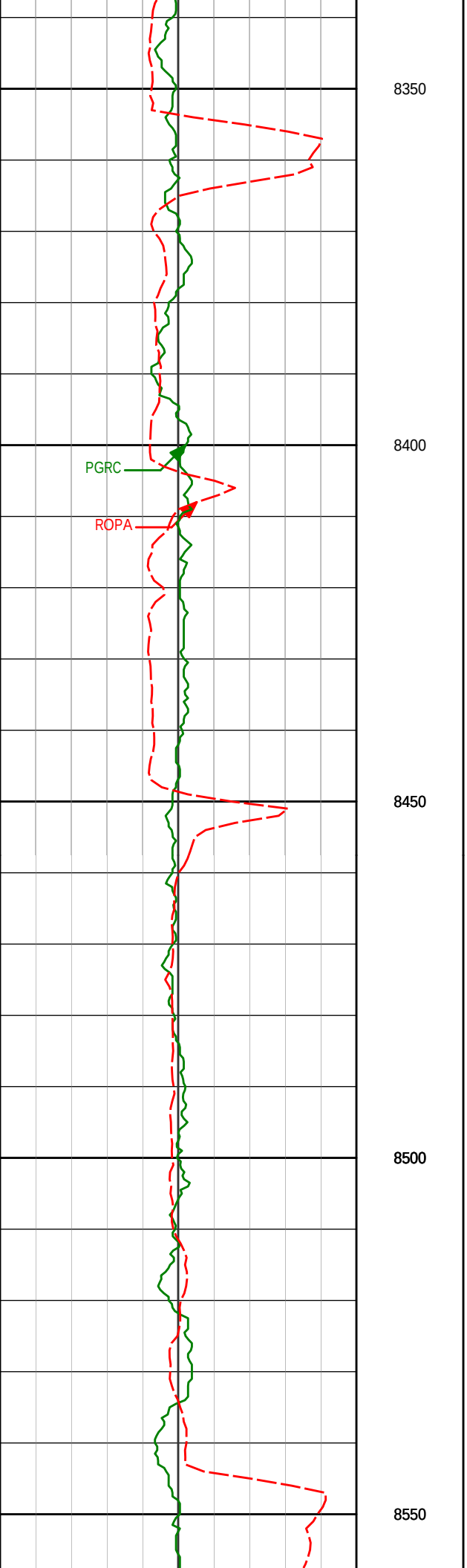
7724'	91.94°	269.46°	6679.90'	1581.33'
7819'	90.56°	269.36°	6677.83'	1676.22'



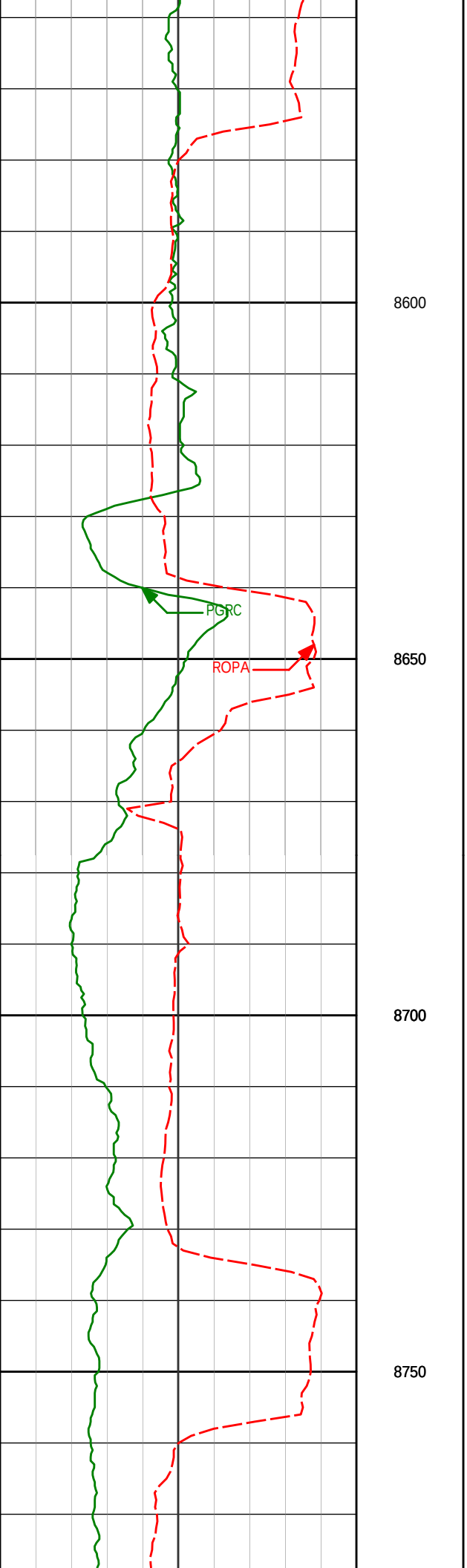
7914'	88.92°	267.50°	6678.26'	1771.19'
8009'	87.72°	267.16°	6681.05'	1866.14'
8103'	88.12°	267.65°	6684.46'	1960.08'



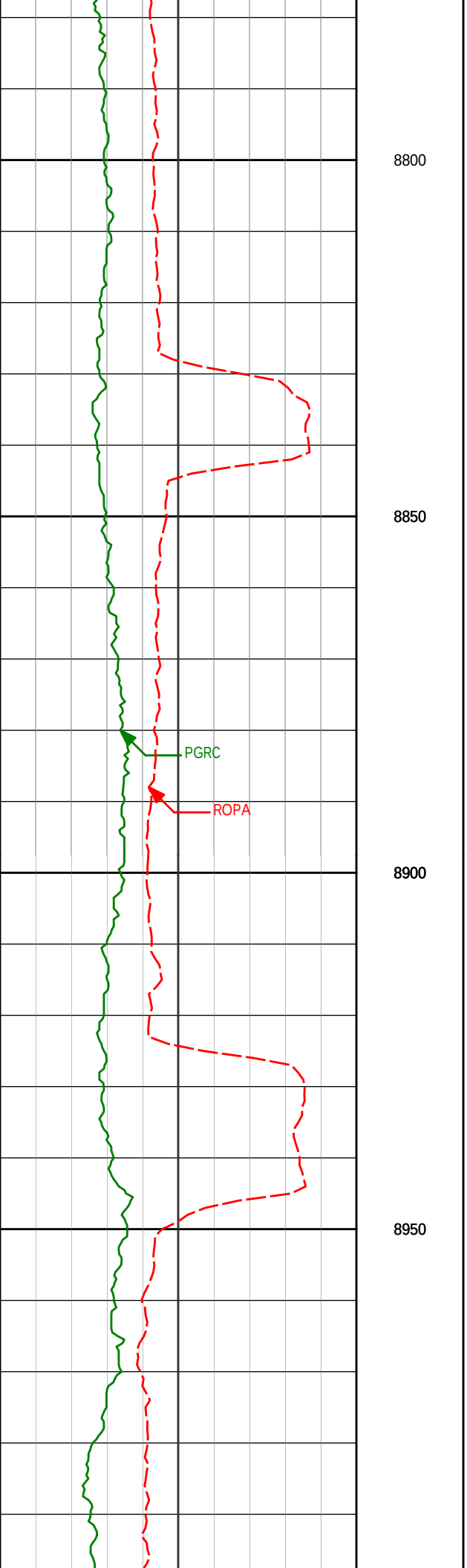
8198'	88.55°	268.82°	6687.22'	2055.01'
8293'	88.98°	269.79°	6689.26'	2149.91'



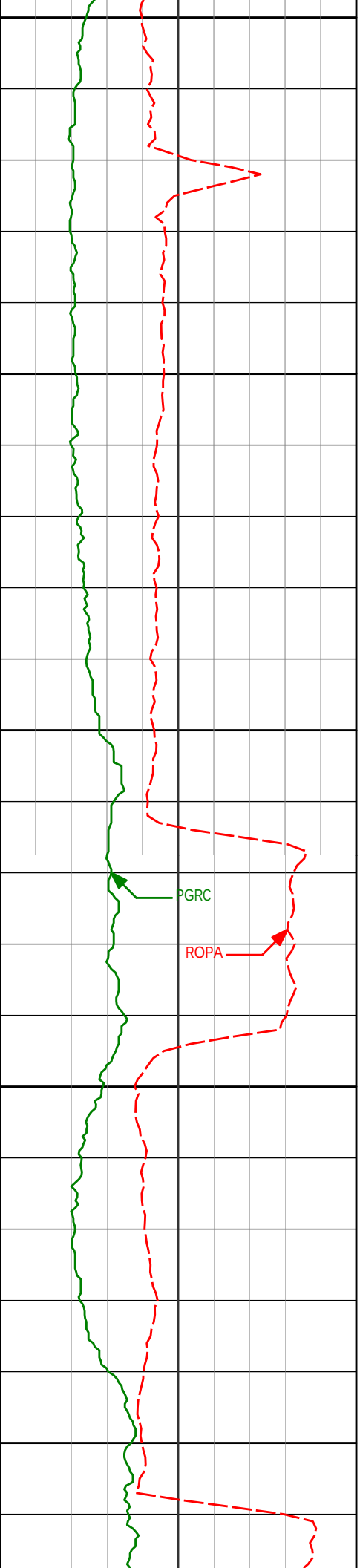
8388'	89.57°	269.51°	6690.47'	2244.80'
8483'	91.57°	271.36°	6689.52'	2339.62'



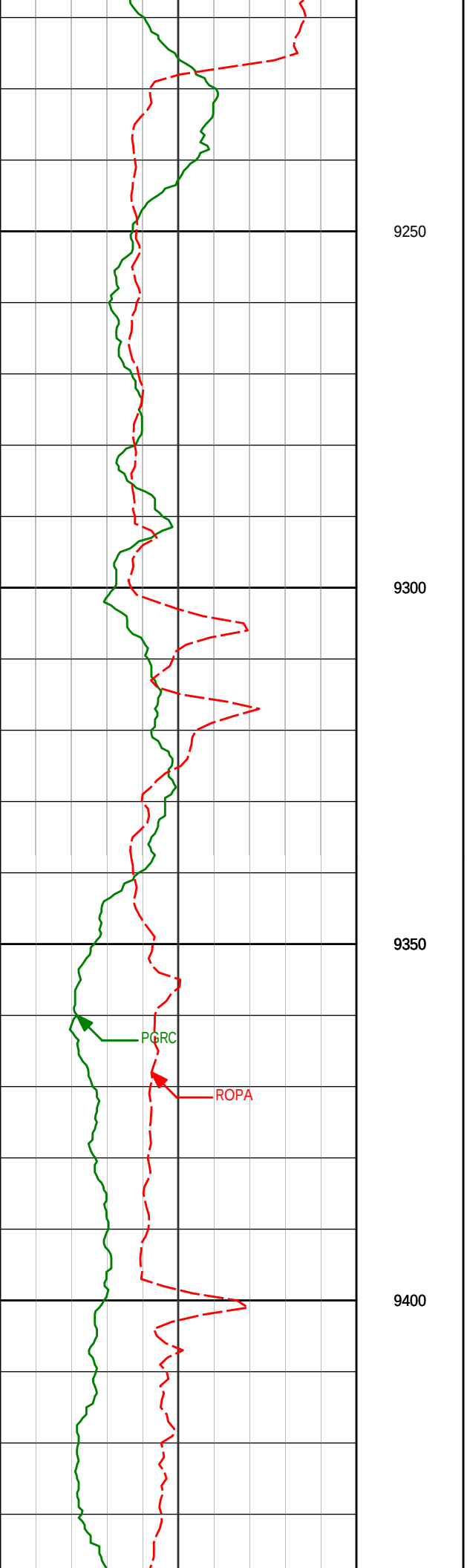
8577'	89.94°	268.99°	6688.28'	2433.46'
8673'	90.31°	268.22°	6688.07'	2529.42'
8768'	88.55°	267.42°	6689.02'	2624.40'



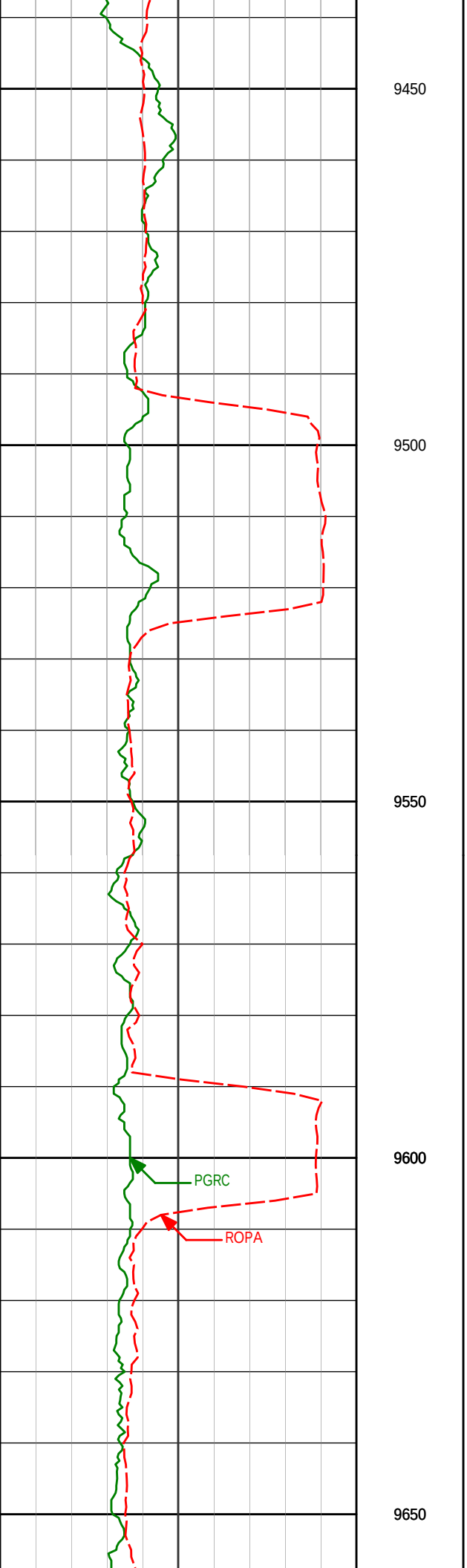
8863'	89.01°	268.84°	6691.04'	2719.36'
8957'	88.37°	269.16°	6693.19'	2813.27'



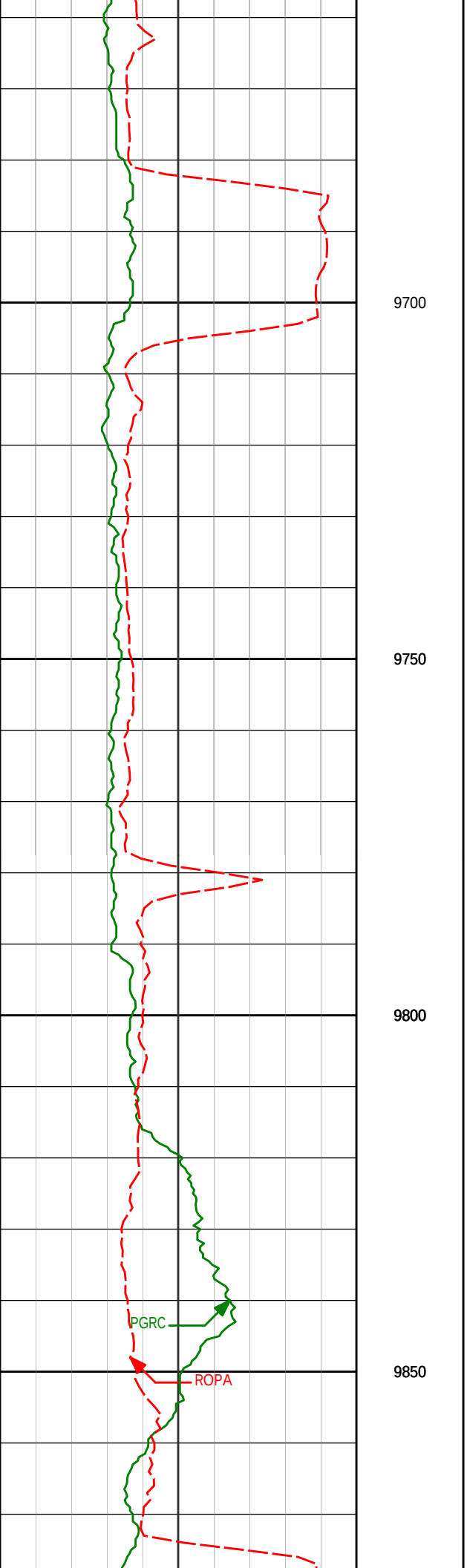
9052'	90.31°	269.46°	6694.29'	2908.19'
9147'	88.64°	269.74°	6695.16'	3003.08'



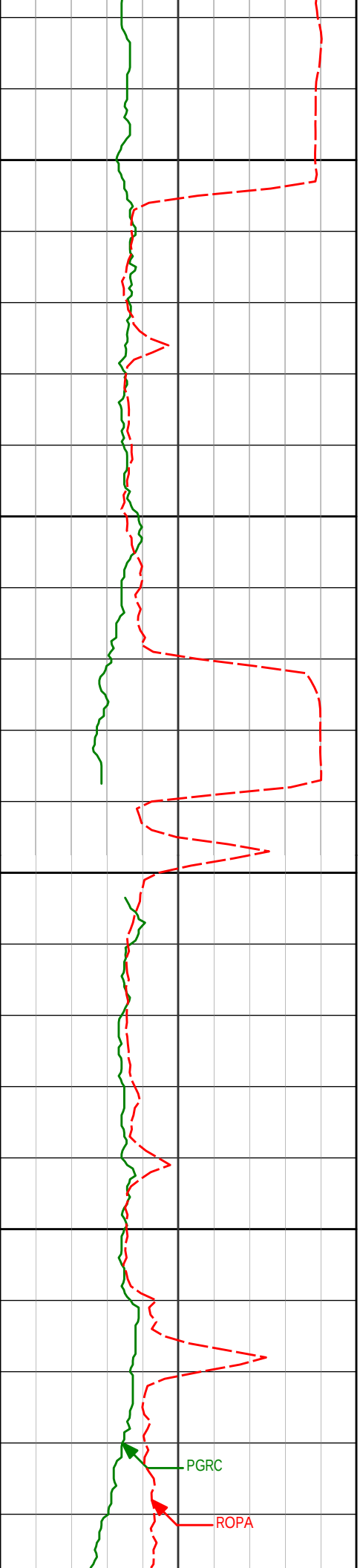
9242'	87.62°	268.78°	6698.25'	3097.95'
9337'	88.74°	269.43°	6701.26'	3192.84'
9432'	90.31°	269.76°	6702.06'	3287.74'



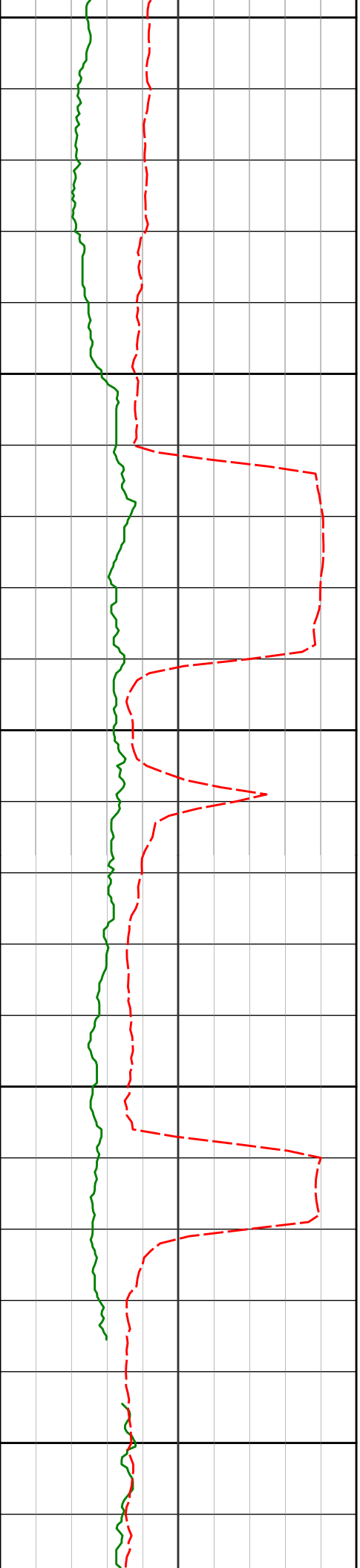
9527'	89.14°	269.10°	6702.52'	3382.65'
9621'	89.51°	267.55°	6703.63'	3476.61'



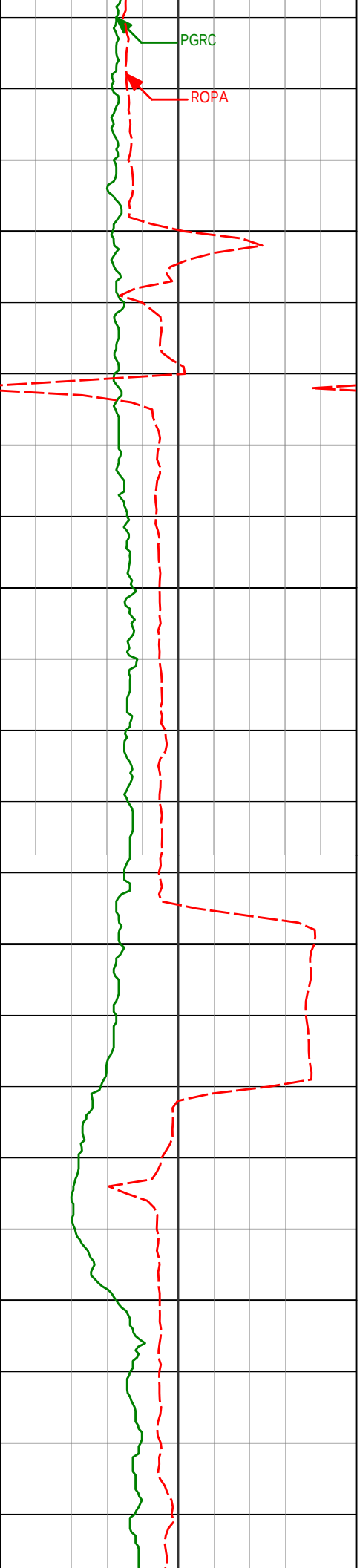
9716'	88.95°	267.25°	6704.91'	3571.60'
9811'	91.33°	268.39°	6704.68'	3666.58'



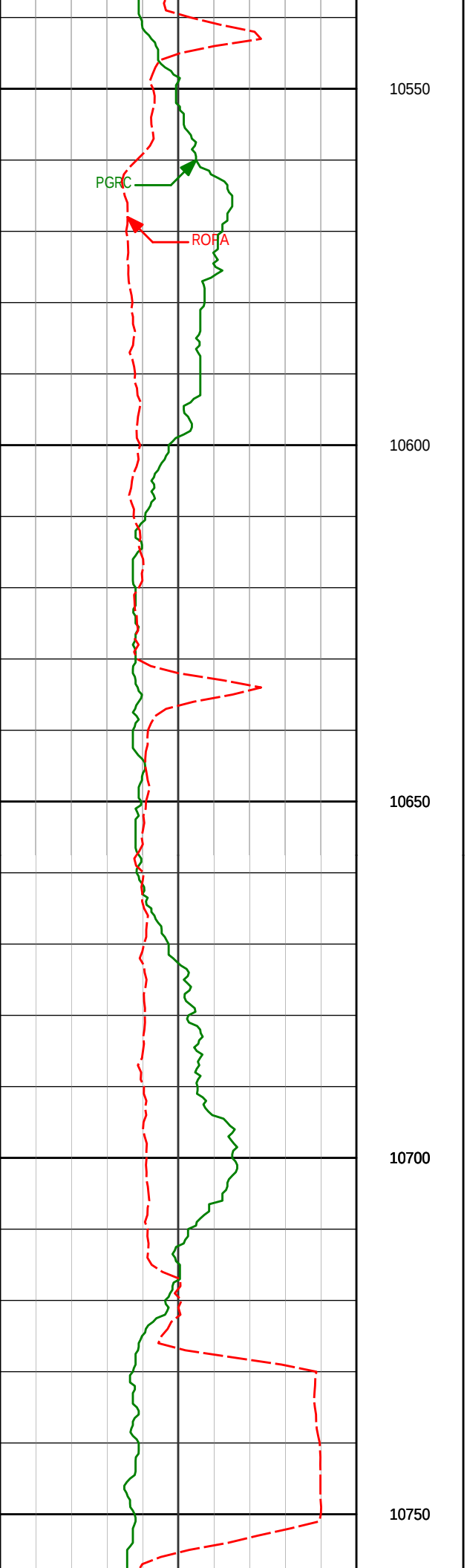
9905'	89.51°	268.10°	6703.99'	3760.55'
10000'	88.86°	268.25°	6705.35'	3855.52'
10095'	90.68°	268.11°	6705.73'	3950.50'



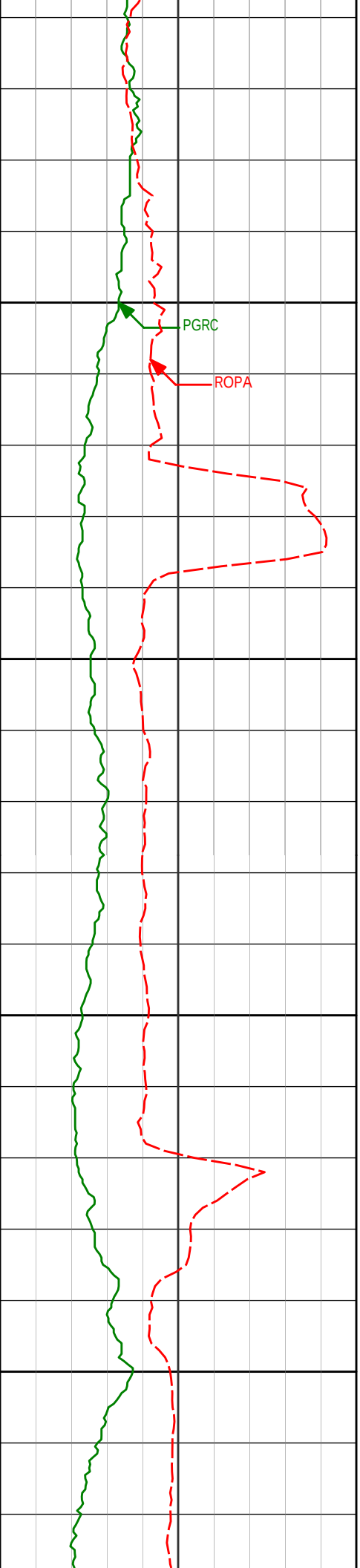
10190'	89.69°	269.64°	6705.43'	4045.44'
10285'	89.08°	269.96°	6706.45'	4140.33'



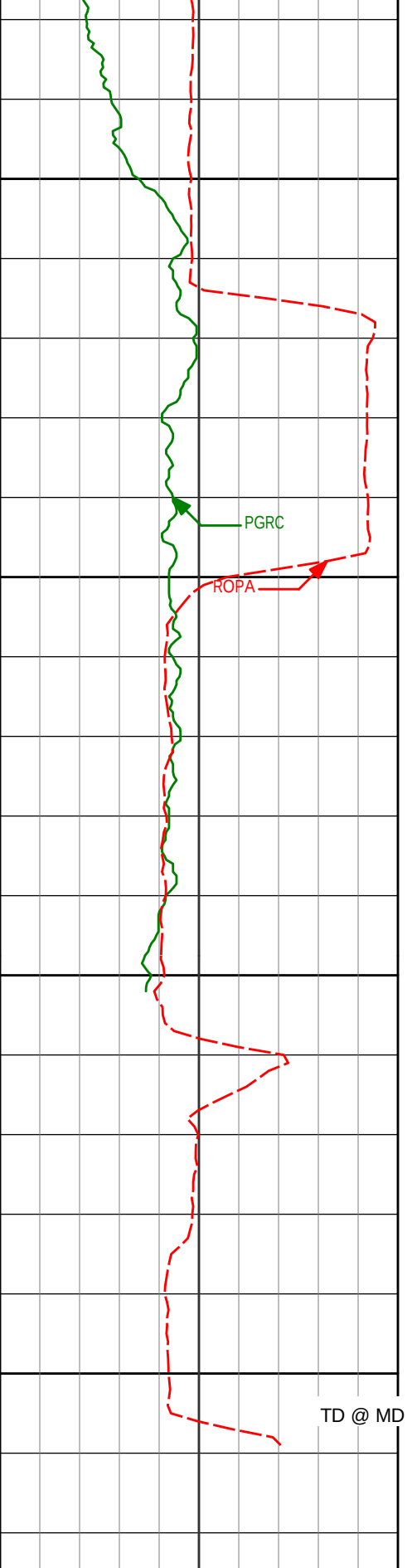
10380'	90.06°	270.17°	6707.16'	4235.19'
10475'	87.56°	268.48°	6709.13'	4330.08'



10570'	88.30°	268.96°	6712.56'	4424.97'
10665'	90.86°	270.14°	6713.25'	4519.86'



10760'	90.49°	269.67°	6712.12'	4614.74'
10855'	89.78°	268.44°	6711.90'	4709.67'
10950'	91.48°	268.76°	6710.85'	4804.63'



Depth	Inc.	Azi.	TVD	V.S.
11045'	90.59°	267.99°	6709.14'	4899.58'
11092'	91.11°	267.82°	6708.44'	4946.57'
11155'	91.11°	267.82°	6707.22'	5009.55'

Avg Rate of Penetration
ROPA
500 feet per hr 0

PCG Gamma Ray
PGRC
0 api 300

Depth
ft

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch USX AA23-67HN
Wattenburg
Weld Colorado
USA
CA-XX-0900544014

Surveys are tied to the surface shoe at 663' MD and assume an inclination and azimuth of zero.The final survey is a straight-line projection to bit.

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
663.00	0.00	0.00	663.00	0.00 N	0.00 E	0.00	0.00
717.00	0.04	106.02	717.00	0.01 S	0.02 E	-0.02	0.08
811.00	0.18	274.29	811.00	0.00 S	0.10 W	0.10	0.24
903.00	0.19	314.15	903.00	0.12 N	0.36 W	0.35	0.14
995.00	0.38	319.18	995.00	0.45 N	0.67 W	0.64	0.20
1088.00	0.37	321.42	1088.00	0.92 N	1.05 W	1.00	0.02
1274.00	0.24	298.19	1273.99	1.57 N	1.77 W	1.69	0.10
1367.00	0.28	340.75	1366.99	1.88 N	2.02 W	1.92	0.21
1460.00	0.22	359.42	1459.99	2.28 N	2.10 W	1.98	0.11
1555.00	4.01	253.28	1554.92	1.51 N	5.28 W	5.20	4.29
1650.00	5.96	241.14	1649.55	1.82 S	12.79 W	12.86	2.33
1745.00	7.20	238.85	1743.93	7.29 S	22.20 W	22.55	1.33
1840.00	8.42	239.61	1838.04	13.89 S	33.30 W	33.99	1.29
1935.00	9.97	228.86	1931.82	22.82 S	45.50 W	46.64	2.43
2030.00	12.12	236.23	2025.06	33.78 S	59.99 W	61.68	2.70
2125.00	11.92	229.69	2117.99	45.67 S	75.76 W	78.05	1.45
2220.00	11.74	227.61	2210.97	58.53 S	90.39 W	93.32	0.49
2315.00	13.45	228.22	2303.68	72.41 S	105.76 W	109.41	1.80
2410.00	12.48	226.78	2396.26	86.80 S	121.48 W	125.85	1.07
2505.00	12.77	229.24	2488.96	100.68 S	136.91 W	141.99	0.64
2600.00	12.09	229.64	2581.73	113.97 S	152.44 W	158.20	0.72
2695.00	12.48	234.60	2674.56	126.36 S	168.39 W	174.77	1.18
2790.00	11.69	232.25	2767.46	138.20 S	184.36 W	191.34	0.98
2885.00	10.87	231.86	2860.62	149.62 S	199.02 W	206.58	0.87
2980.00	10.43	230.68	2953.98	160.60 S	212.72 W	220.83	0.52
3075.00	10.58	229.43	3047.39	171.72 S	225.99 W	234.67	0.29
3170.00	10.89	236.39	3140.73	182.36 S	240.09 W	249.30	1.40
3265.00	7.23	233.44	3234.53	190.89 S	252.37 W	262.02	3.88
3360.00	2.98	250.90	3329.14	195.27 S	259.51 W	269.38	4.72
3455.00	1.10	249.95	3424.07	196.39 S	262.70 W	272.62	1.98
3550.00	2.12	40.46	3519.06	195.37 S	262.42 W	272.29	3.29
3740.00	2.58	48.24	3708.90	189.85 S	256.96 W	266.54	0.29
3835.00	3.05	42.69	3803.78	186.57 S	253.65 W	263.07	0.58
3930.00	2.66	41.98	3898.66	183.07 S	250.46 W	259.70	0.42
4025.00	0.89	95.24	3993.62	181.50 S	248.25 W	257.41	2.36
4120.00	1.30	89.58	4088.60	181.56 S	246.44 W	255.60	0.44
4215.00	1.79	110.17	4183.57	182.07 S	243.97 W	253.17	0.77
4310.00	1.03	145.43	4278.54	183.28 S	242.10 W	251.36	1.18
4405.00	1.98	168.16	4373.51	185.58 S	241.28 W	250.66	1.16
4500.00	1.64	162.88	4468.46	188.48 S	240.55 W	250.08	0.39
4595.00	1.54	174.73	4563.42	191.05 S	240.03 W	249.70	0.36
4690.00	1.24	149.35	4658.40	193.21 S	239.38 W	249.17	0.71
4785.00	0.85	75.11	4753.38	193.92 S	238.18 W	248.00	1.37
4880.00	1.75	106.61	4848.36	194.15 S	236.10 W	245.94	1.18
4975.00	1.85	104.72	4943.31	194.96 S	233.23 W	243.11	0.12
5070.00	2.09	101.82	5038.26	195.70 S	230.05 W	239.98	0.27
5260.00	0.59	187.23	5228.21	197.38 S	226.78 W	236.80	1.12
5355.00	1.50	164.09	5323.19	199.06 S	226.50 W	236.61	1.04
5449.00	0.52	346.94	5417.19	199.83 S	226.26 W	236.41	2.16

5544.00	2.70	102.43	5512.15	199.88 S	224.17 W	234.33	3.12
5639.00	1.20	75.92	5607.10	200.12 S	221.03 W	231.20	1.80
5734.00	1.11	309.15	5702.09	199.30 S	220.78 W	230.90	2.17
5829.00	1.01	300.48	5797.07	198.30 S	222.21 W	232.28	0.20
5866.00	0.76	345.99	5834.07	197.89 S	222.55 W	232.60	1.95
5922.00	0.64	346.84	5890.06	197.23 S	222.71 W	232.73	0.21
6017.00	8.07	272.68	5984.74	196.40 S	229.51 W	239.47	8.34
6065.00	13.50	268.75	6031.88	196.36 S	238.48 W	248.43	11.39
6112.00	14.61	268.76	6077.47	196.61 S	249.89 W	259.84	2.37
6160.00	15.56	267.51	6123.81	197.02 S	262.37 W	272.33	2.09
6207.00	16.87	271.23	6168.94	197.15 S	275.49 W	285.43	3.56
6255.00	20.07	272.99	6214.47	196.57 S	290.68 W	300.57	6.78
6302.00	23.56	272.92	6258.09	195.67 S	308.12 W	317.94	7.43
6396.00	33.21	273.60	6340.69	193.09 S	352.69 W	362.31	10.27
6444.00	39.18	272.39	6379.41	191.63 S	380.98 W	390.49	12.52
6491.00	44.17	272.27	6414.50	190.36 S	412.20 W	421.60	10.61
6539.00	46.98	272.06	6448.10	189.07 S	446.45 W	455.74	5.87
6586.00	49.21	270.94	6479.49	188.16 S	481.42 W	490.61	5.06
6634.00	52.05	267.29	6509.94	188.76 S	518.51 W	527.67	8.34
6681.00	56.36	266.88	6537.42	190.70 S	556.57 W	565.79	9.21
6729.00	60.16	268.03	6562.66	192.50 S	597.34 W	606.60	8.17
6776.00	63.34	268.68	6584.91	193.69 S	638.72 W	647.99	6.87
6824.00	66.80	269.05	6605.14	194.55 S	682.24 W	691.48	7.24
6871.00	69.47	269.71	6622.64	195.02 S	725.85 W	735.06	5.83
6919.00	73.46	269.79	6637.89	195.22 S	771.35 W	780.51	8.31
6966.00	77.44	269.61	6649.70	195.46 S	816.83 W	825.94	8.48
7019.00	83.86	269.32	6658.31	195.95 S	869.10 W	878.16	12.13
7108.00	86.27	269.47	6665.96	196.88 S	957.76 W	966.75	2.71
7155.00	86.80	269.66	6668.80	197.24 S	1004.67 W	1013.62	1.19
7250.00	86.64	269.68	6674.24	197.79 S	1099.51 W	1108.36	0.16
7345.00	87.81	270.06	6678.84	198.01 S	1194.40 W	1203.12	1.30
7440.00	88.68	270.24	6681.75	197.75 S	1289.35 W	1297.94	0.93
7534.00	89.72	270.97	6683.06	196.76 S	1383.34 W	1391.74	1.35
7629.00	91.08	270.84	6682.40	195.26 S	1478.32 W	1486.51	1.43
7724.00	91.94	269.46	6679.90	195.01 S	1573.28 W	1581.33	1.71
7819.00	90.56	269.36	6677.83	195.99 S	1668.25 W	1676.22	1.46
7914.00	88.92	267.50	6678.26	198.59 S	1763.21 W	1771.19	2.60
8009.00	87.72	267.16	6681.05	203.02 S	1858.06 W	1866.14	1.31
8103.00	88.12	267.65	6684.46	207.27 S	1951.90 W	1960.08	0.67
8198.00	88.55	268.82	6687.22	210.20 S	2046.82 W	2055.01	1.32
8293.00	88.98	269.79	6689.26	211.35 S	2141.79 W	2149.91	1.11
8388.00	89.57	269.51	6690.47	211.92 S	2236.78 W	2244.80	0.68
8483.00	91.57	271.36	6689.52	211.20 S	2331.76 W	2339.62	2.87
8577.00	89.94	268.99	6688.28	210.92 S	2425.74 W	2433.46	3.06
8673.00	90.31	268.22	6688.07	213.26 S	2521.71 W	2529.42	0.89
8768.00	88.55	267.42	6689.02	216.88 S	2616.64 W	2624.40	2.03
8863.00	89.01	268.84	6691.04	219.98 S	2711.56 W	2719.36	1.56
8957.00	88.37	269.16	6693.19	221.62 S	2805.52 W	2813.27	0.77
9052.00	90.31	269.46	6694.29	222.76 S	2900.50 W	2908.19	2.07
9147.00	88.64	269.74	6695.16	223.43 S	2995.49 W	3003.08	1.78
9242.00	87.62	268.78	6698.25	224.65 S	3090.43 W	3097.95	1.48
9337.00	88.74	269.43	6701.26	226.14 S	3185.37 W	3192.84	1.36
9432.00	90.31	269.76	6702.06	226.81 S	3280.36 W	3287.74	1.69
9527.00	89.14	269.10	6702.52	227.76 S	3375.35 W	3382.65	1.41
9621.00	89.51	267.55	6703.63	230.50 S	3469.30 W	3476.61	1.69
9716.00	88.95	267.25	6704.91	234.80 S	3564.20 W	3571.60	0.66
9811.00	91.33	268.39	6704.68	238.42 S	3659.12 W	3666.58	2.77
9905.00	89.51	268.10	6703.99	241.29 S	3753.07 W	3760.55	1.96
10000.00	88.86	268.25	6705.35	244.32 S	3848.01 W	3855.52	0.70
10095.00	90.68	268.11	6705.73	247.33 S	3942.96 W	3950.50	1.92
10190.00	89.69	269.64	6705.43	249.20 S	4037.94 W	4045.44	1.91
10285.00	89.08	269.96	6706.45	249.54 S	4132.93 W	4140.33	0.73
10380.00	90.06	270.17	6707.16	249.43 S	4227.93 W	4235.19	1.06
10475.00	87.56	268.48	6709.13	250.56 S	4322.89 W	4330.08	3.17
10570.00	88.30	268.96	6712.56	252.68 S	4417.80 W	4424.97	0.93
10665.00	90.86	270.14	6713.25	253.43 S	4512.79 W	4519.86	2.97
10760.00	90.49	269.67	6712.12	253.58 S	4607.78 W	4614.74	0.63
10855.00	89.78	268.44	6711.90	255.15 S	4702.76 W	4709.67	1.50
10950.00	91.48	268.76	6710.85	257.47 S	4797.73 W	4804.63	1.82
11045.00	90.59	267.99	6709.14	260.17 S	4892.67 W	4899.58	1.24
11092.00	91.11	267.82	6708.44	261.89 S	4939.63 W	4946.57	1.17
11155.00	91.11	267.82	6707.22	264.28 S	5002.58 W	5009.55	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 267.00 DEGREES (GRID)
A TOTAL CORRECTION OF 7.70 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11155.00 FEET
IS 5009.55 FEET ALONG 266.98 DEGREES (GRID)

Date Printed:02 July 2013