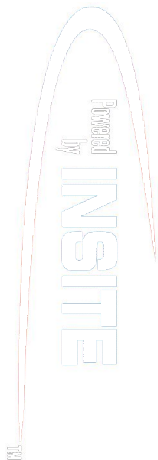


PCDC - Pressure Case Directional
PCGK - Pressure Case Gamma

1 : 240

Country : USA			
Field : Wattenburg			
Location : Lat: 40° 7' 9.07" North Long: 104° 51' 38.11" West			
Well : Small Eyed 14N-35HZ			
Company : Anadarko			
Rig : H&P 308			
LOCATION		Company : Anadarko Rig : H&P 308 Well : Small Eyed 14N-35HZ Field : Wattenburg Country : USA API Number : 05123393510000	
Latitude : 40° 7' 9.07" North Longitude : 104° 51' 38.11" West UTM Easting = 3,178,819.790 ft UTM Northing = 1,286,907.800 ft			
Permanent Datum : Ground Level		Elevation : 4963.00 ft	
Log Measured From : Drill Floor		25.00 ft Above Permanent Datum	
Drilling Measured From : Drill Floor		MD LOG	
Depth Logged : 1,330.00 ft To 17,717.00 ft		Unit No. : 11581670	
Date Logged : 19-Aug-14 To 10-Sep-14		Job No. : CA-XX-0901442852	
Total Depth MD : 17,717.00 ft TVD: 7,378.65 ft		Plot Type : Final	
Spud Date : 19-Aug-14		Plot Date : 15-Sep-14	
Run No.	Borehole Record (MD)		To
	Size	From	
0100	8.750 in	1,330.00 ft	7,760.00 ft
0200	6.125 in	7,760.00 ft	17,717.00 ft

WELL INFORMATION

MWD Run Number	100	200		
Date run completed	23-Aug-14	10-Sep-14		
Rig Bit Number	0100	0200		
Bit Size (in)	8.750	6.125		
Tool Nominal OD (in)	6.750	4.750		
Log Start Depth (MD, ft)	1,330.00	7,760.00		
Log End Depth (MD, ft)	7,760.00	17,717.00		
Drill or Wipe	Drill	Drill		
Drill/Wipe Start Date and Time	20-Aug-14 22:30	04-Sep-14 20:00		
Drill/Wipe End Date and Time	22-Aug-14 19:30	09-Sep-14 19:15		
Min Inc (deg) @ Depth (MD, ft)	0.15 @ 5,803.00	88.15 @ 16,057.00		
Max Inc (deg) @ Depth (MD, ft)	81.47 @ 7,707.00	91.88 @ 8,114.00		
Bit TFA(in2) / Bit Type	PDC / 1.84	PDC / 1.53		
Flow Rate (gpm)	588.18	297.54		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A		
Fluid Type	Native/Spud Mud	Mineral Oil Bas		
Density (ppg) / Viscosity (spqt)	9.45 / 58.00	8.75 / 57.00		
Filtrate CL (ppm)	0.00	317,701.00		
pH / Fluid Loss (mptm)	9.60 / 35	N/A / N/A		
PV (cP) / YP (lhf2)	17 / 25.00	18 / 12.00		
% Solids / % Sand	0 / 0.10	1.2 / 0.10		
% Oil / Oil:Water Ratio	N/A / N/A	56.80 / 40:60		
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A		
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A		
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A		

Max Tool Temp (degF) / Source	177.64 / PCM	242.28 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ 177.64	N/A @ 242.28			
Lead MWD Engineer	Jonathan Parrish	Caleb Jones			
Customer Representative	Tim Bundy	Rick Oman			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.93	5.93			
Sub Serial Number	11404284	12177823			
Insert Serial Number	11680794	11400840			
Date and Time Initialized	19-Aug-14 02:15	02-Sep-14 21:55			
Date and Time Read	23-Aug-14 02:27	10-Sep-14 11:29			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	53.00	54.00			
Software Version	6.21	6.21			
Sub Serial Number	11404284	12177823			
Sonde Serial Number	11902194	12177531			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	320.40	347.21			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	55.52	56.68			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11404284	12177823			
Insert/Sonde Serial Number	11681029	12071277			

REMARKS

1. Depths are Measured Depths, referenced to Driller's pipe tally, and measure from the rig floor.
2. No depth corrections have been made for pipe stretch or compression.
3. Critical annular velocities are calculated using the Power Law model for water based fluids and the Bingham Plastic model for oil based fluids.
4. All data presented is recorded 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):

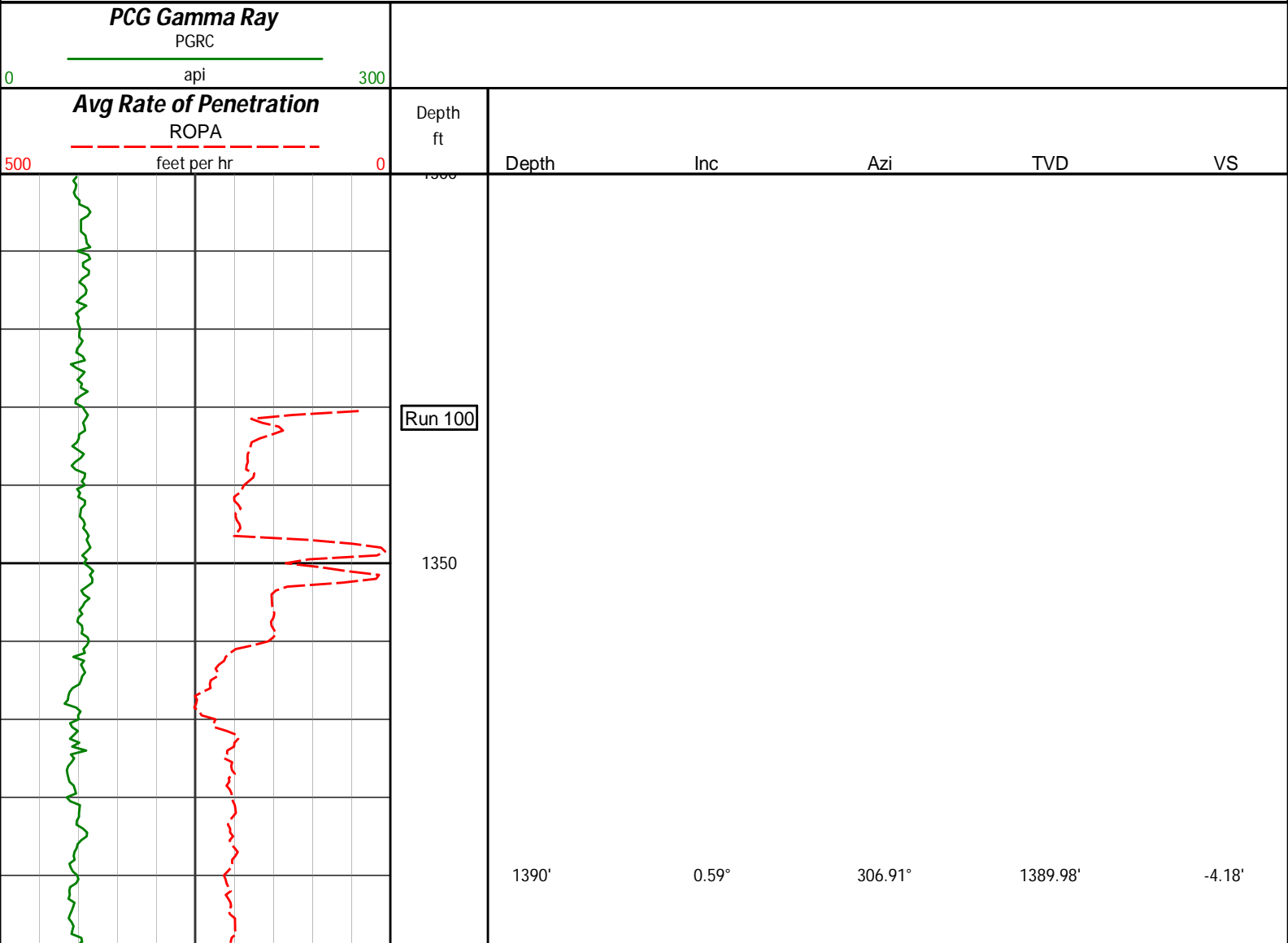
Interval Resolution: 0.5 ft
Interval Distance: 1.2 ft
Gap Fill: 3.0 ft

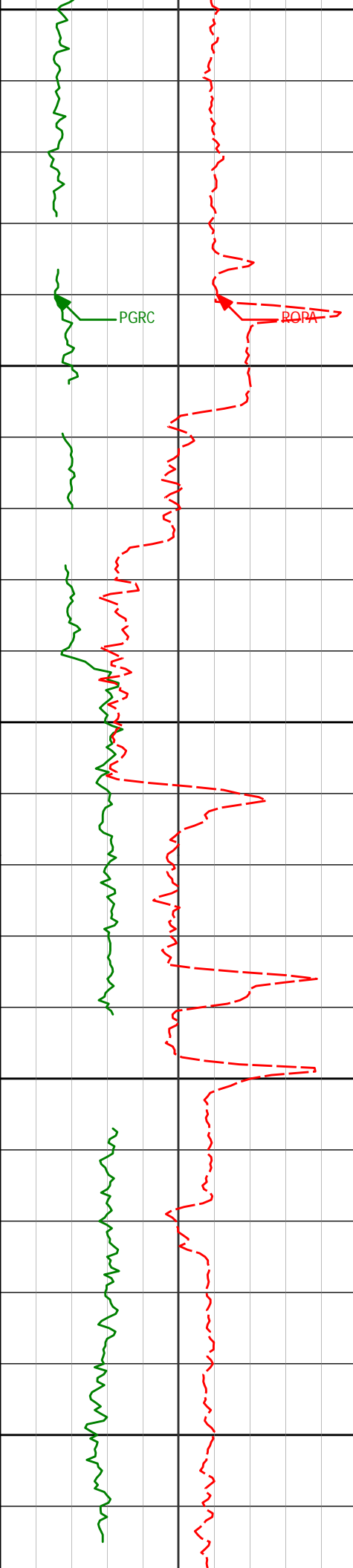
WARRANTY

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 Detail Log 1:240

Anadarko Petroleum Corp.
Small Eyed 14N-35HZ
H&P 308
Sec. 23-T2N-R67W





1400
1450
1500
1550
1600

1482'

0.51°

288.24°

1481.97'

-4.59'

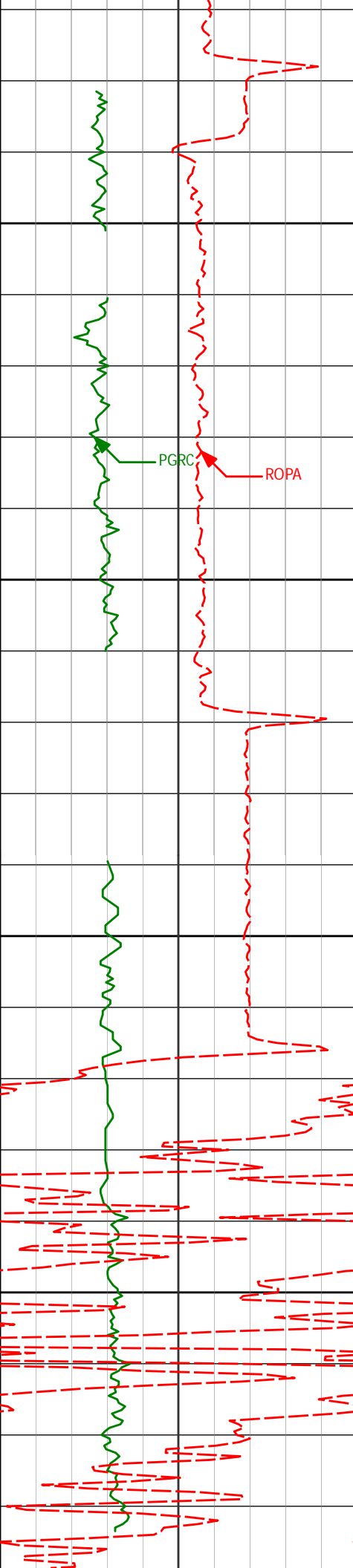
1574'

0.50°

315.12°

1573.97'

-5.01'



1650

1666'

0.49°

310.85°

1665.97'

-5.55'

1700

1750

1758'

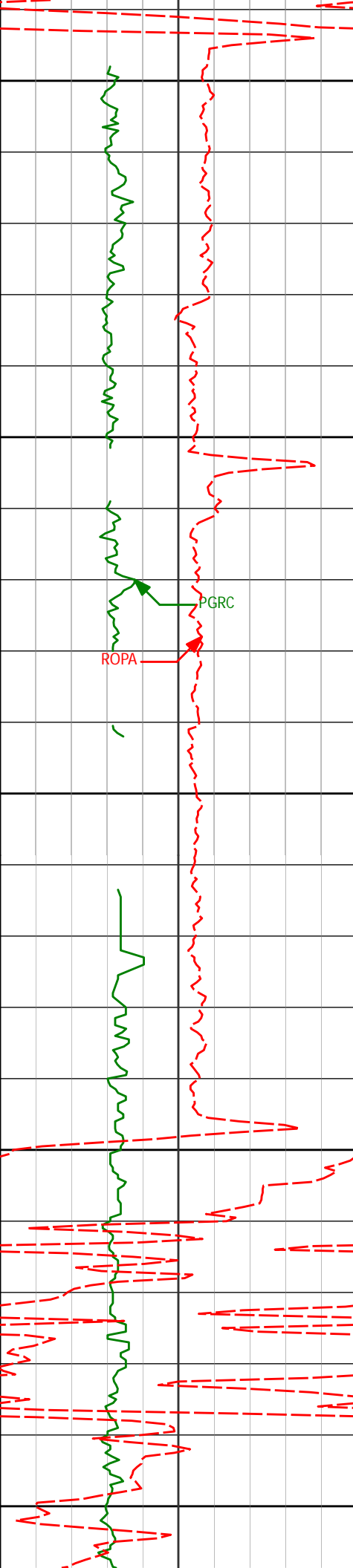
0.83°

305.10°

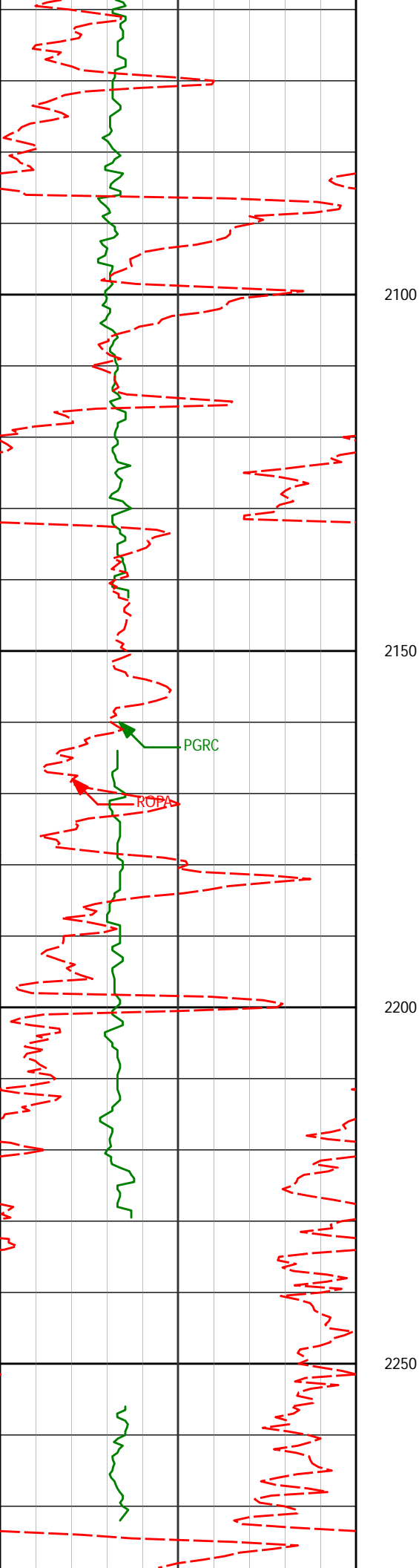
1757.96'

-6.19'

1800



1850	1851'	0.69°	265.74°	1850.95'	-6.54'
1900					
1944'	0.70°	264.10°	1943.94'	-6.44'	
1950					
2000					
2036'	0.62°	265.57°	2035.94'	-6.35'	
2050					



2128'

0.48°

249.62°

2127.93'

-6.18'

2150

2200

2220'

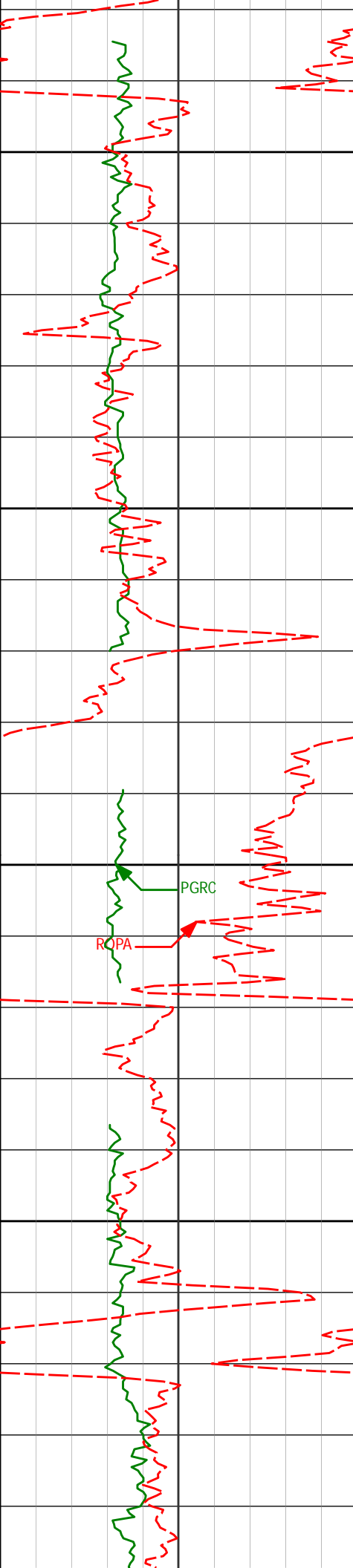
0.55°

227.76°

2219.93'

-5.75'

2250



2300

2313'

0.61°

224.46°

2312.93'

-5.09'

2350

2400

2404'

0.81°

225.78°

2403.92'

-4.30'

2450

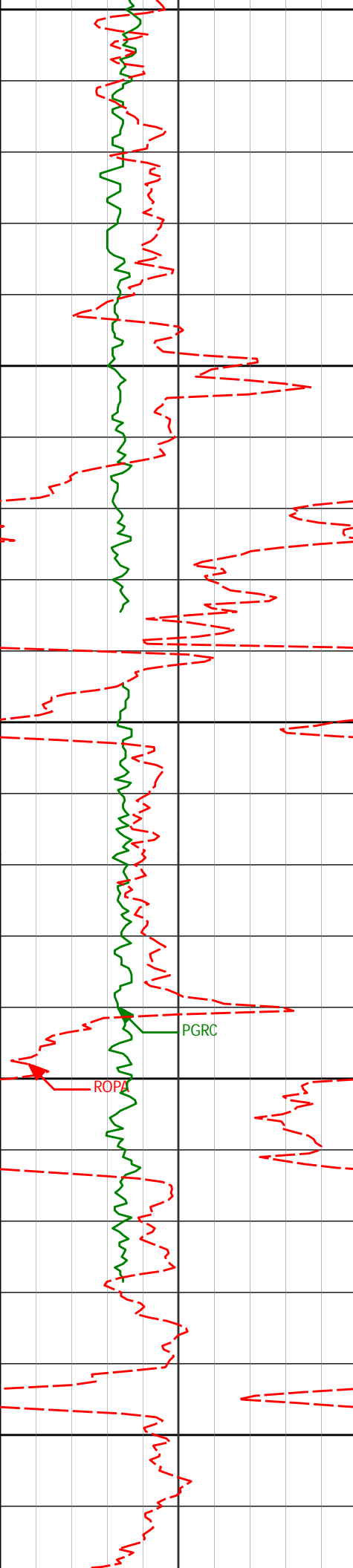
2496'

0.81°

182.85°

2495.91'

-3.20'



2500

2550

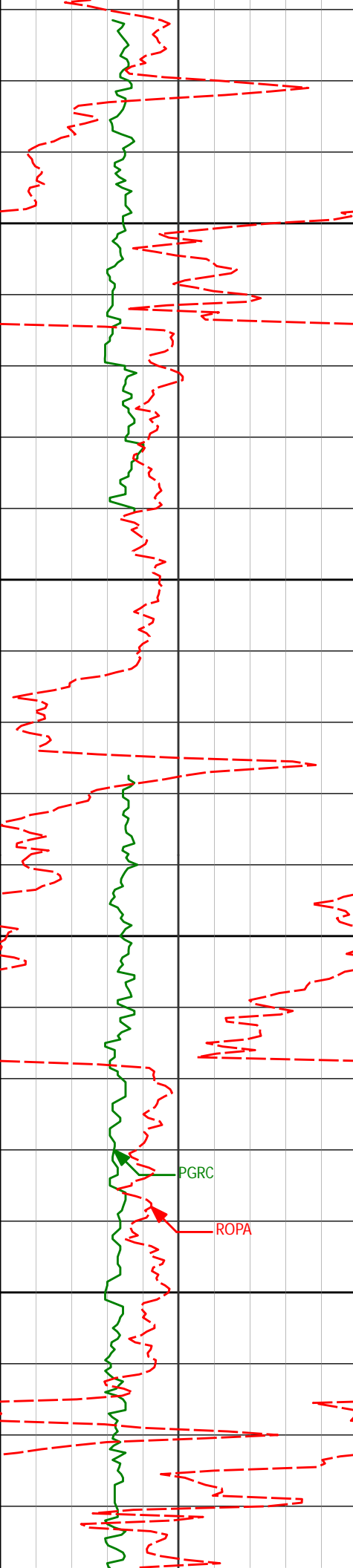
2600

2650

2700

2589' 0.84° 178.73° 2588.90' -1.86'

2681' 1.05° 189.64° 2680.89' -0.35'



2750

2800

2850

2900

2776'

0.87°

212.09°

2775.88'

1.11'

2870'

0.90°

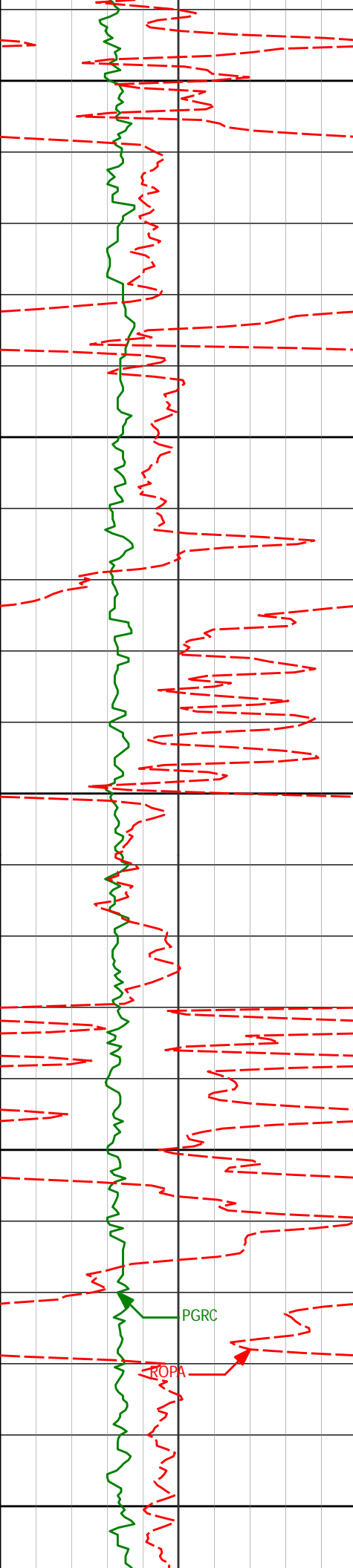
223.40°

2869.86'

2.25'

PGRC

ROPA



2950

2965'

0.83°

229.63°

2964.85'

3.24'

3000

3050

3060'

0.81°

232.90°

3059.84'

4.09'

3100

PGRC

ROPA

3150

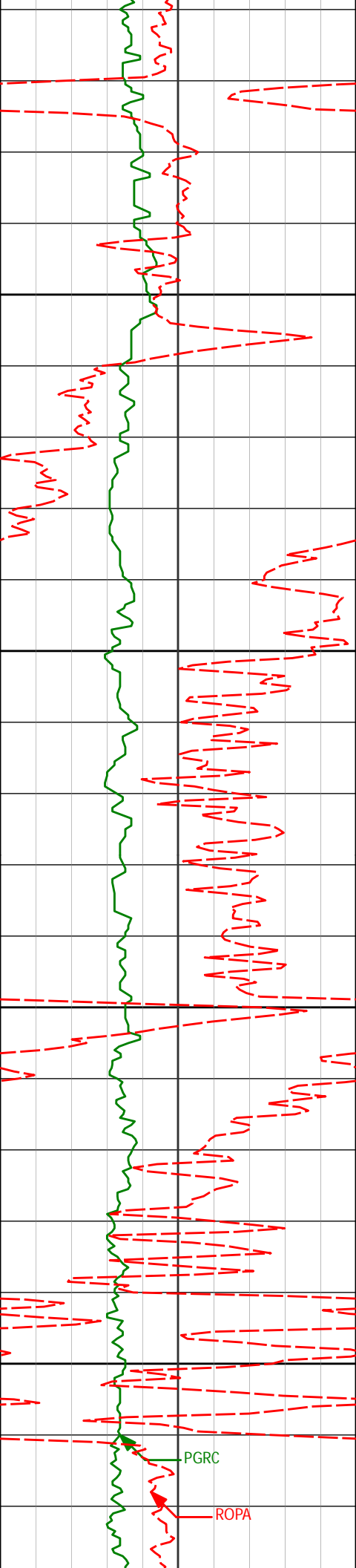
3154'

0.59°

213.67°

3153.84'

4.89'



3200

3250

3300

3350

3249'

0.92°

216.65°

3248.83'

5.91'

3343'

1.03°

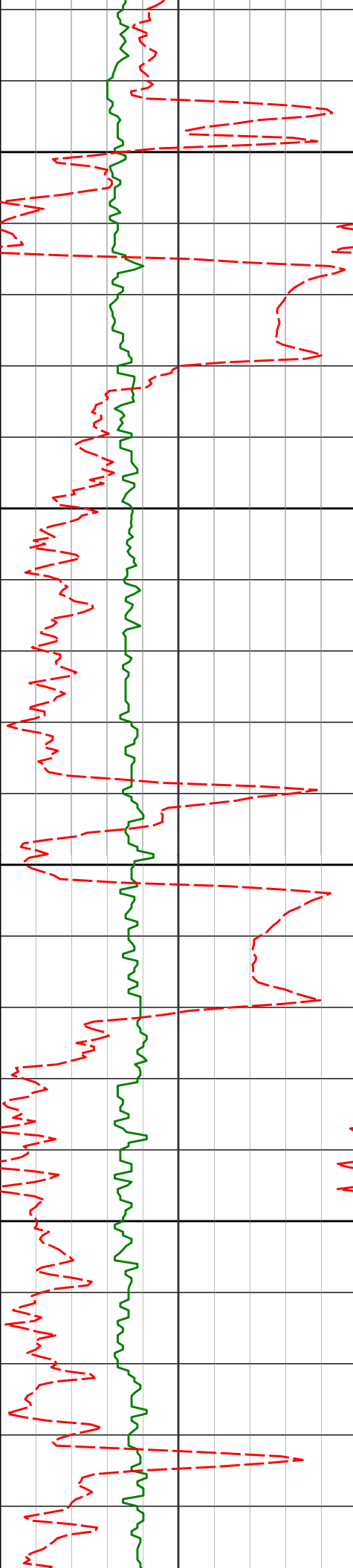
218.88°

3342.81'

7.17'

PGRC

ROPA



3400

3450

3500

3550

3438'

1.60°

267.92°

3437.79'

7.88'

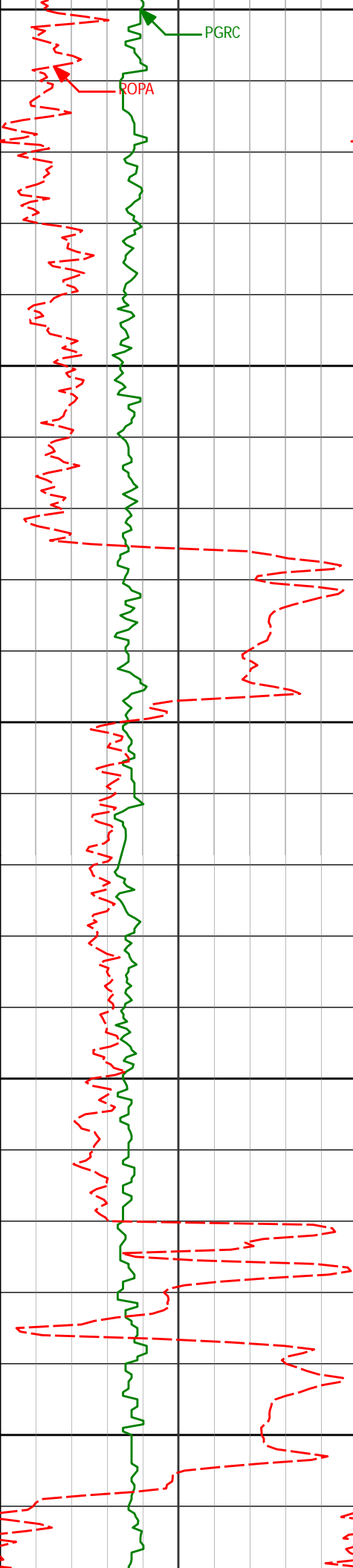
3533'

3.65°

272.09°

3532.69'

7.81'



3600

PGR

ROPA

3627'

3.32°

270.30°

3626.51'

7.68'

3650

3700

3722'

5.44°

267.78°

3721.23'

7.82'

3750

3800

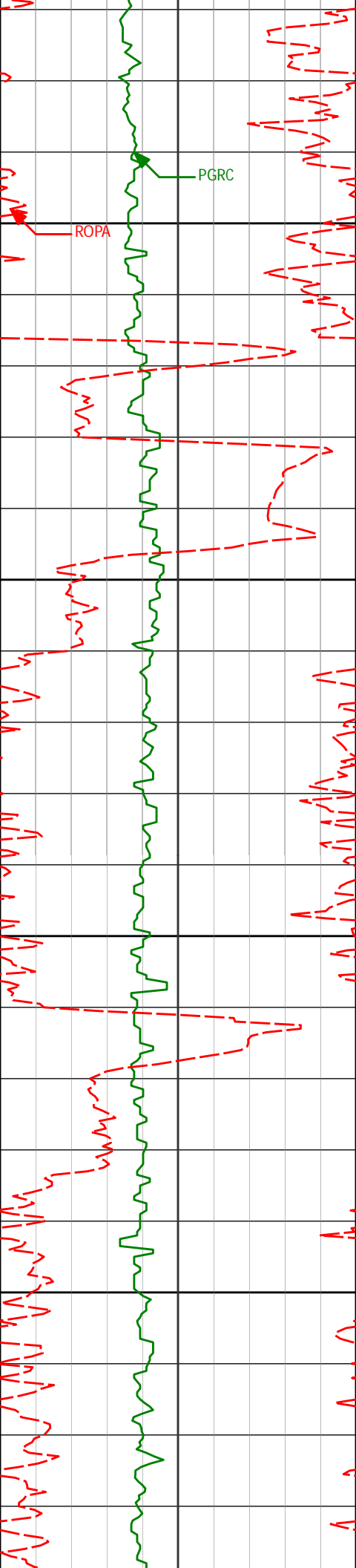
3817'

6.00°

274.70°

3815.76'

7.57'



3850

3900

3950

4000

3911'

7.07°

278.35°

3909.15'

6.31'

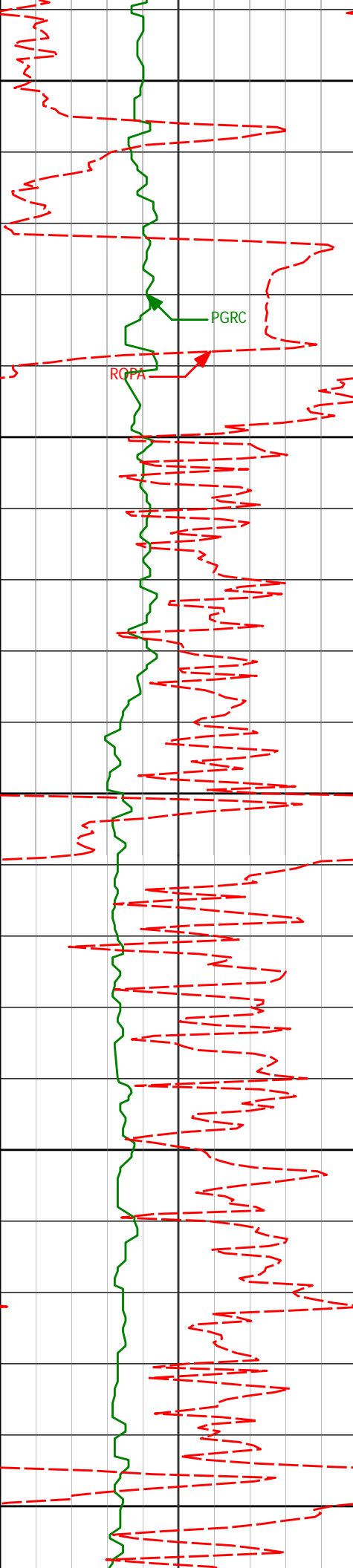
4006'

6.58°

275.90°

4003.47'

4.88'



4050

PGRC

RCFA

4100

4100'

8.44°

274.99°

4096.66'

3.71'

4150

4200

4250

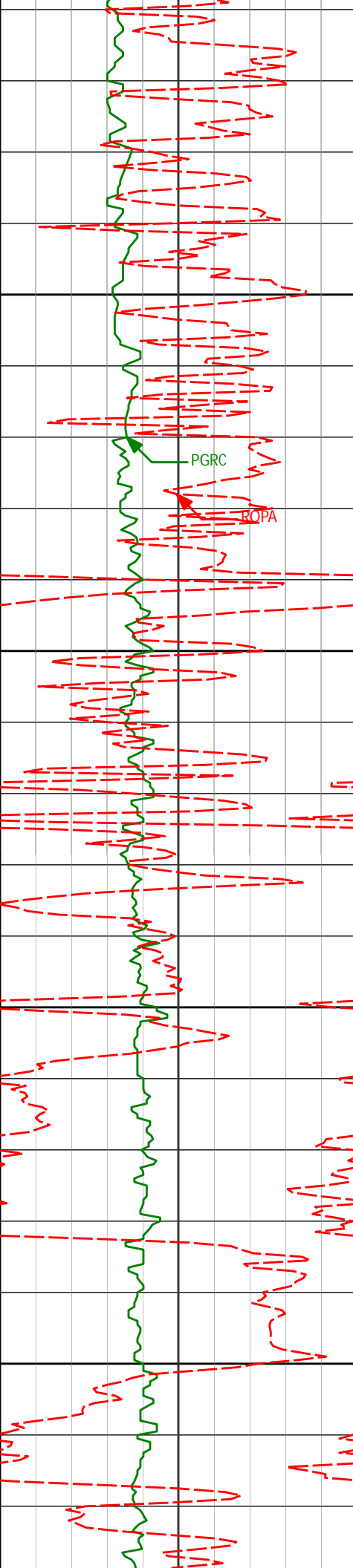
4195'

7.59°

274.35°

4190.73'

2.60'



4289'	7.15°	272.81°	4283.96'	1.83'
-------	-------	---------	----------	-------

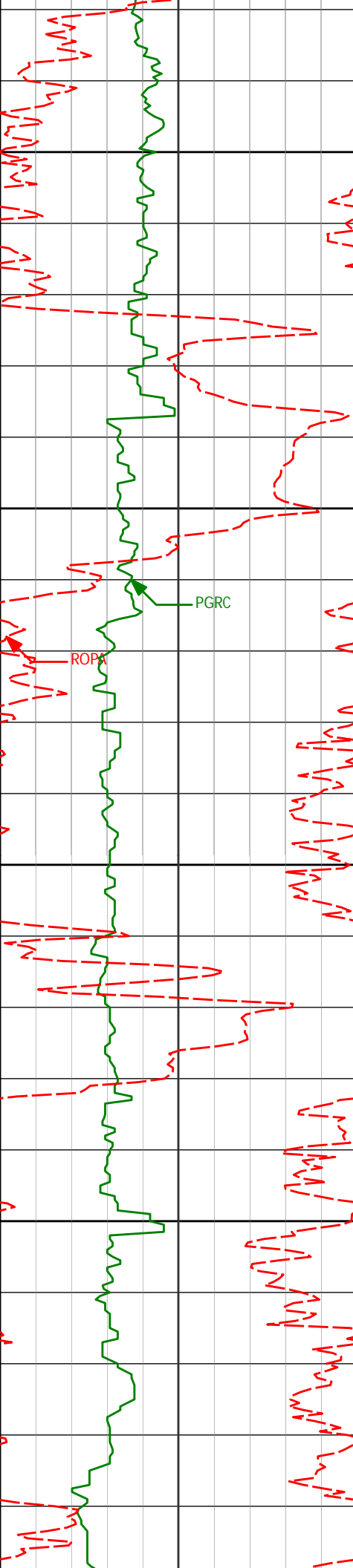
4300

4350

4384'	6.68°	268.84°	4378.27'	1.63'
-------	-------	---------	----------	-------

4400

4450



4500

4550

4600

4650

PGRC

ROPA

4573'

7.73°

275.70°

4565.86'

-0.30'

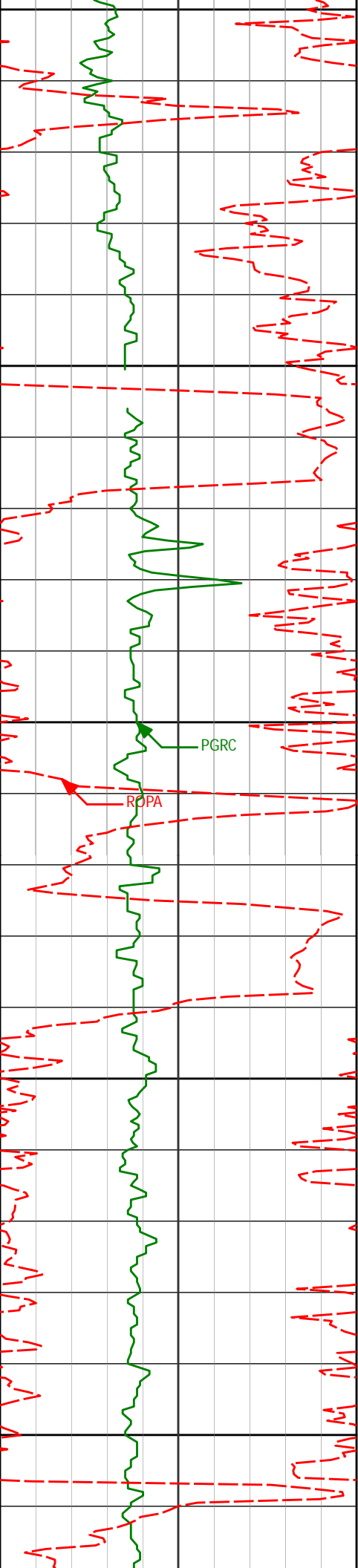
4668'

7.80°

275.23°

4659.99'

-1.54'



4700

4750

4800

4850

4900

4762'

7.50°

274.59°

4753.15'

-2.63'

PGRC

ROPA

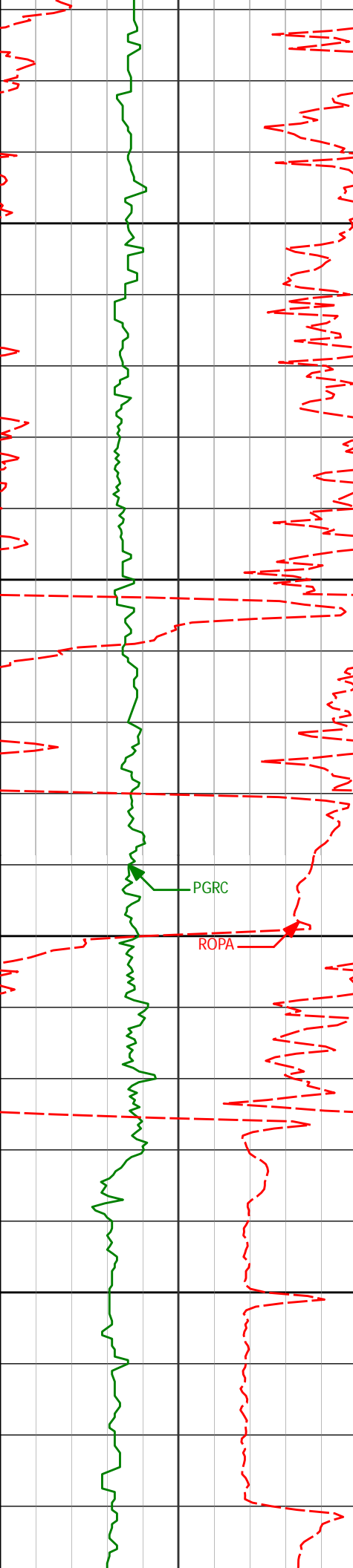
4857'

5.75°

267.15°

4847.51'

-2.91'



4950

4952'

5.21°

262.23°

4942.08'

-2.11'

5000

PGRC

ROPA

5050

5046'

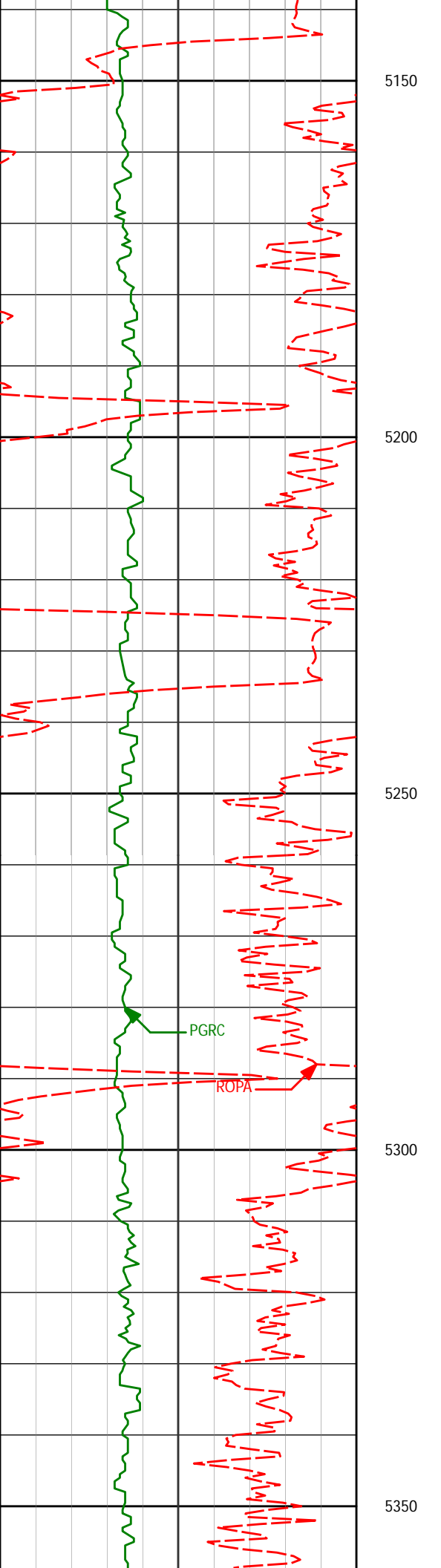
2.80°

260.82°

5035.84'

-1.18'

5100



5141'	1.24°	240.14°	5130.78'	-0.30'
-------	-------	---------	----------	--------

5150

5200

5235'

1.00°

188.74°

5224.77'

1.01'

5250

PGRC

ROPA

5300

5330'

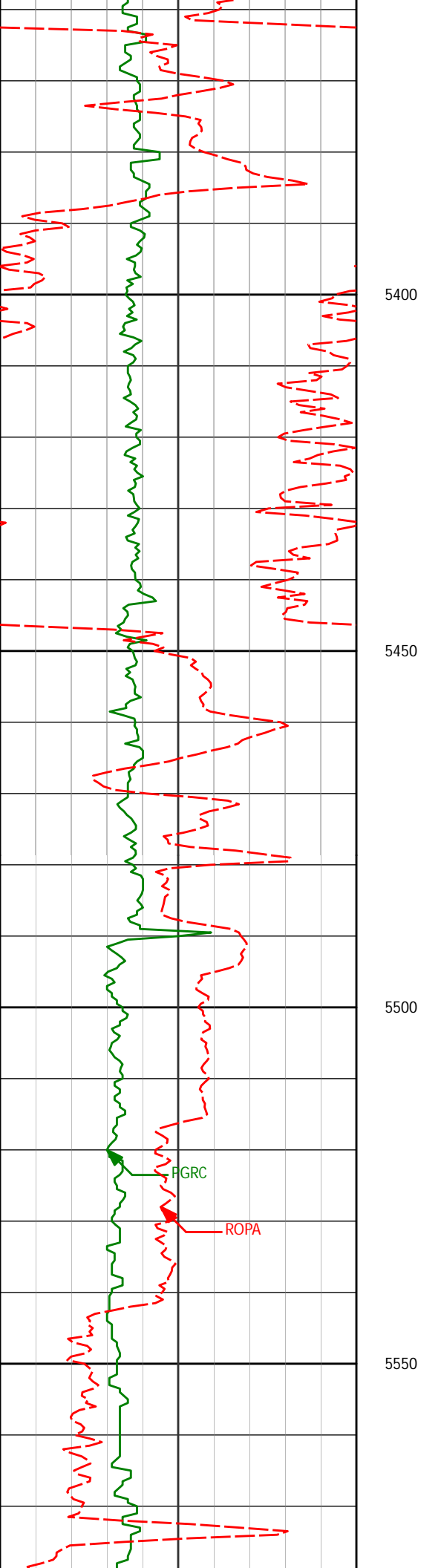
0.62°

179.47°

5319.76'

2.35'

5350



5424'

0.50°

189.26°

5413.75'

3.26'

5450

5500

5519'

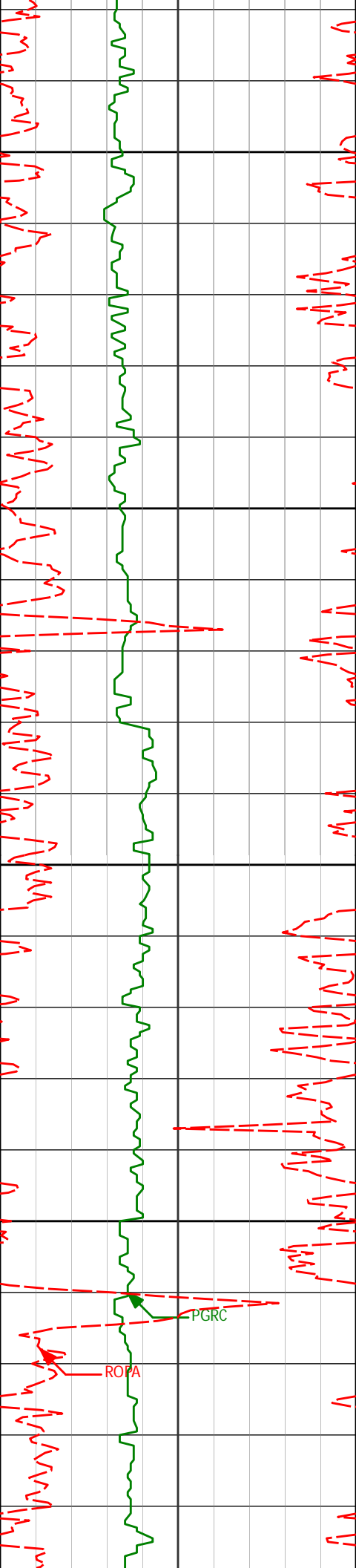
0.66°

172.73°

5508.75'

4.21'

5550



5600

5614'

0.59°

186.57°

5603.74'

5.24'

5650

5700

5708'

0.22°

161.91°

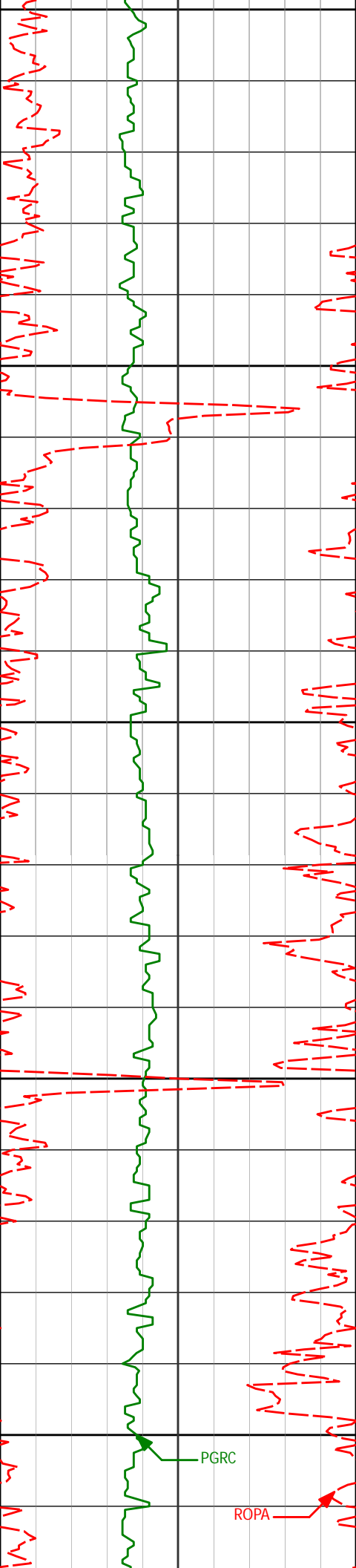
5697.74'

5.89'

5750

PGRC

ROPA



5800

5803'

0.15°

134.50°

5792.74'

6.15'

5850

5900

5898'

0.26°

239.08°

5887.74'

6.35'

5950

6000

PGRC

ROPA

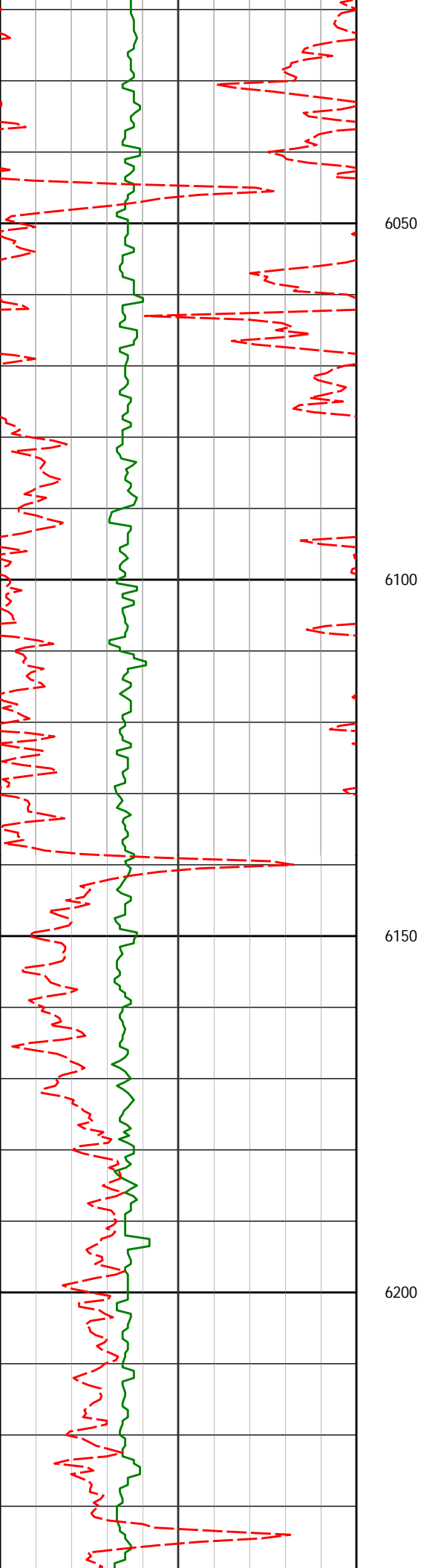
5992'

0.30°

254.72°

5981.74'

6.53'



6050

6087'

0.31°

243.71°

6076.74'

6.70'

6100

6150

6181'

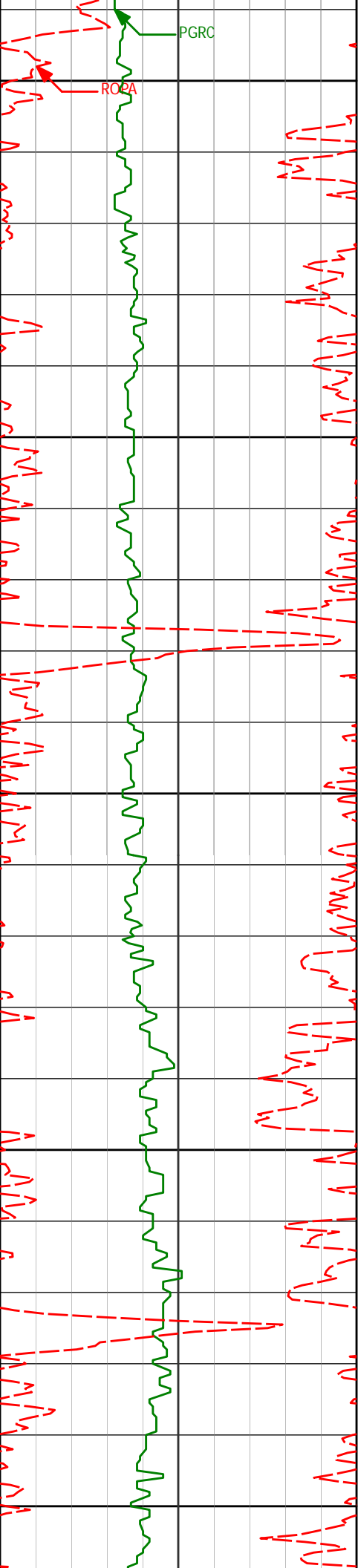
0.38°

239.66°

6170.74'

6.97'

6200



6250

6276'

0.64°

260.78°

6265.73'

7.22'

6300

6350

6370'

0.65°

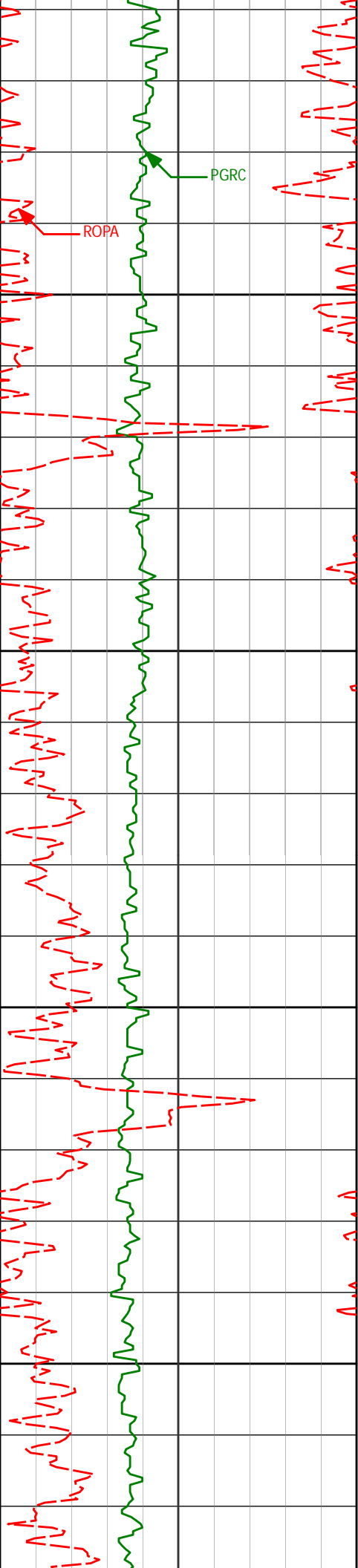
267.62°

6359.73'

7.32'

6400

6450



6465'

0.57°

264.76°

6454.72'

7.39'

6500

6550

6559'

0.53°

250.97°

6548.72'

7.57'

6600

6650

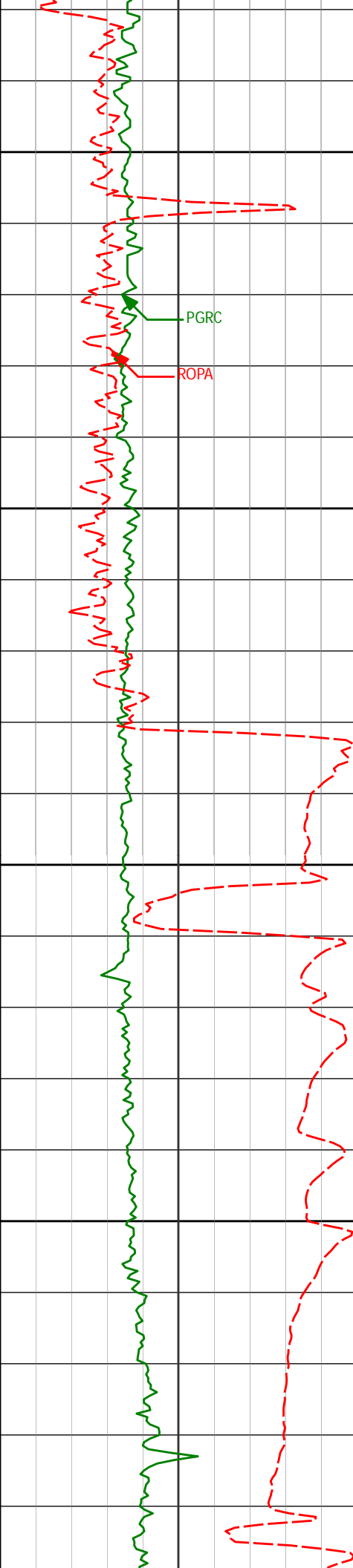
6654'

0.49°

257.39°

6643.71'

7.80'



6700

PGRC

ROPA

6750

6749'

0.46°

274.67°

6738.71'

7.85'

6800

6796'

1.75°

172.02°

6785.70'

8.55'

6850

6843'

6.89°

167.81°

6832.55'

12.02'

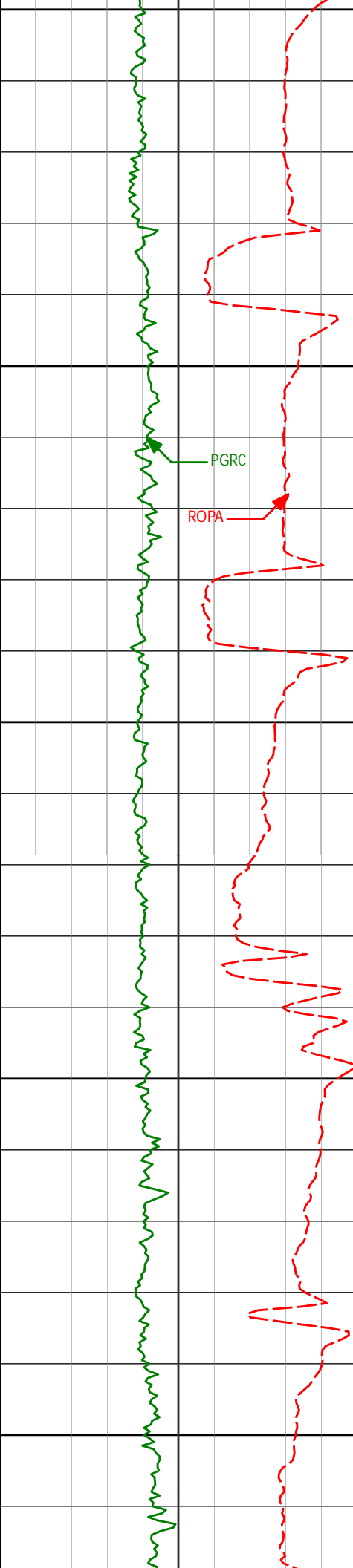
6890'

12.74°

170.79°

6878.84'

19.90'



6900

6938'

17.21°

168.27°

6925.20'

32.09'

6950

PGRC

ROPA

6985'

21.30°

167.05°

6969.56'

47.23'

7000

7032'

26.61°

169.47°

7012.50'

65.92'

7050

7079'

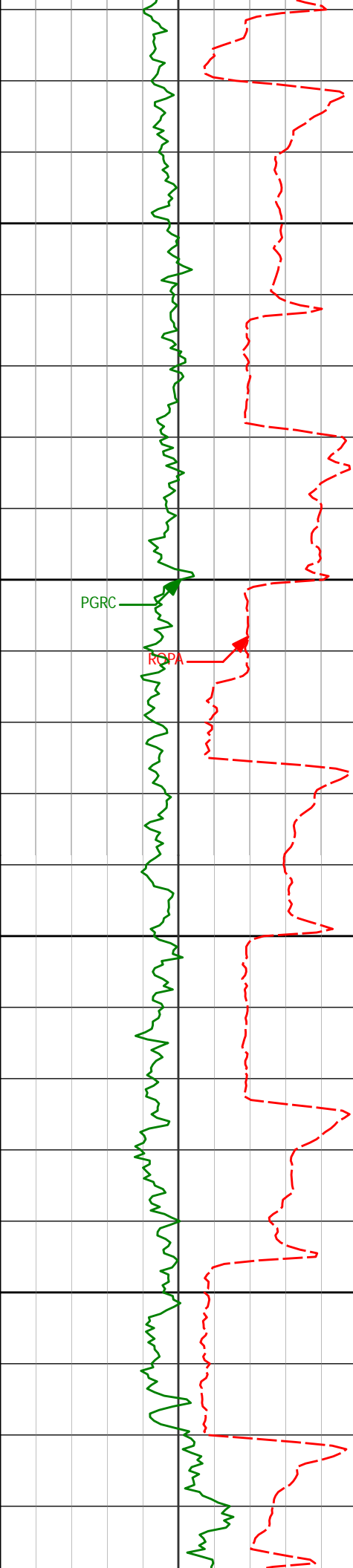
32.10°

171.74°

7053.45'

88.65'

7100



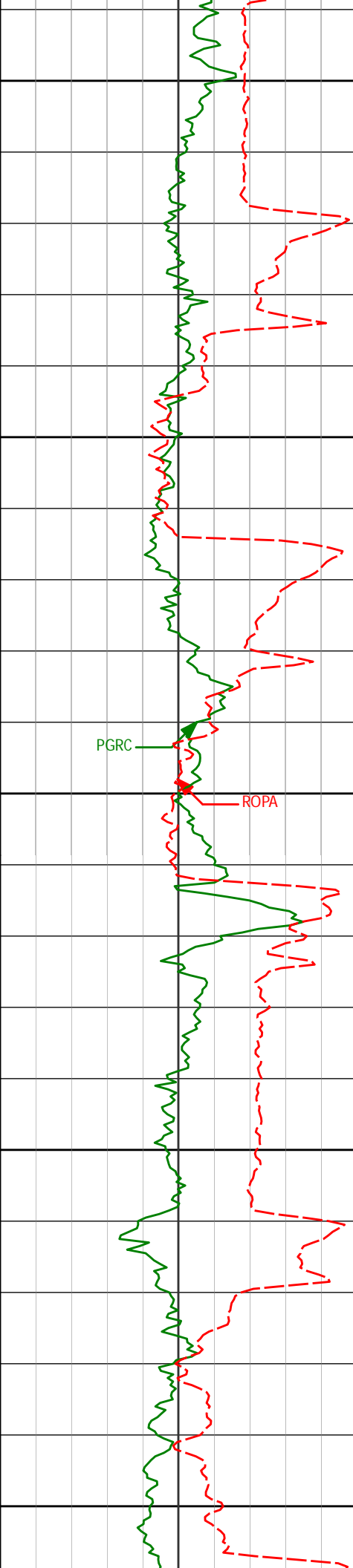
7150

7200

7250

7300

7127'	38.65°	173.55°	7092.57'	116.20'
7174'	43.11°	175.12°	7128.10'	146.81'
7222'	46.47°	176.02°	7162.16'	180.52'
7269'	50.39°	177.24°	7193.34'	215.62'
7316'	54.40°	178.65°	7222.02'	252.83'



7350

7363'

57.51°

179.73°

7248.33'

291.76'

7400

7411'

61.17°

179.96°

7272.80'

333.04'

PGRC

ROPA

7450

7458'

64.46°

180.23°

7294.27'

374.85'

7500

7506'

67.55°

180.71°

7313.79'

418.69'

7550

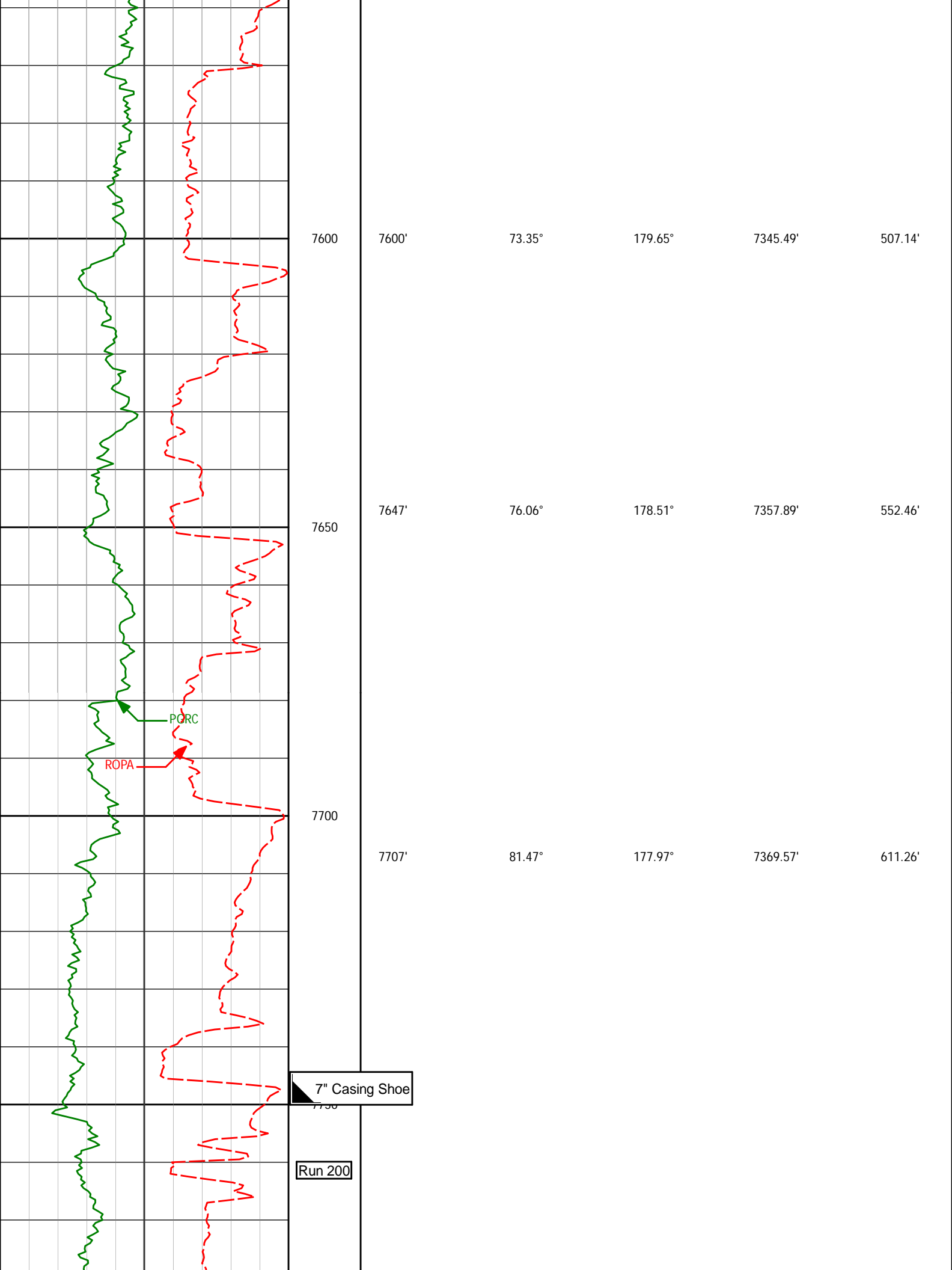
7553'

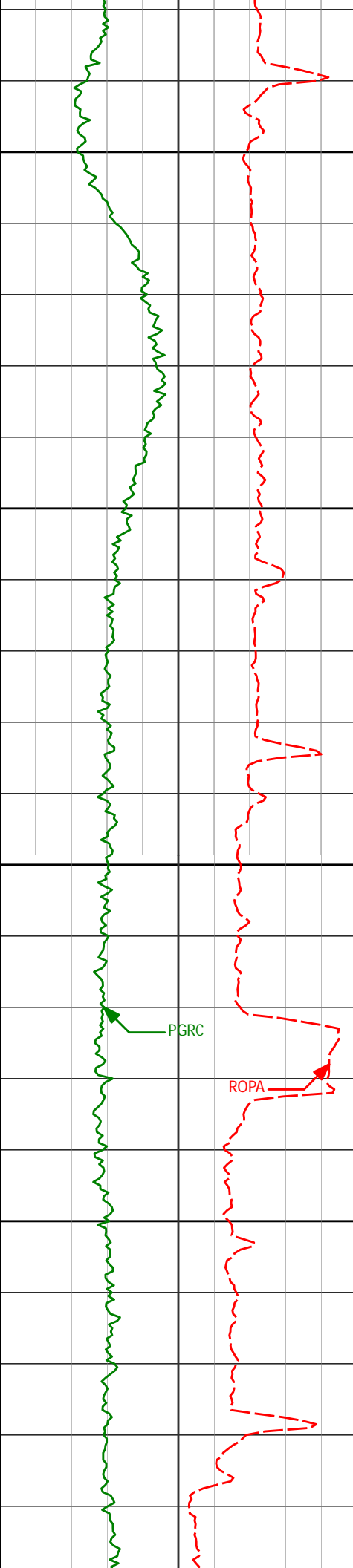
70.11°

180.45°

7330.76'

462.51'





7800

7850

7900

7950

7830'

88.30°

180.09°

7380.53'

733.68'

7925'

89.97°

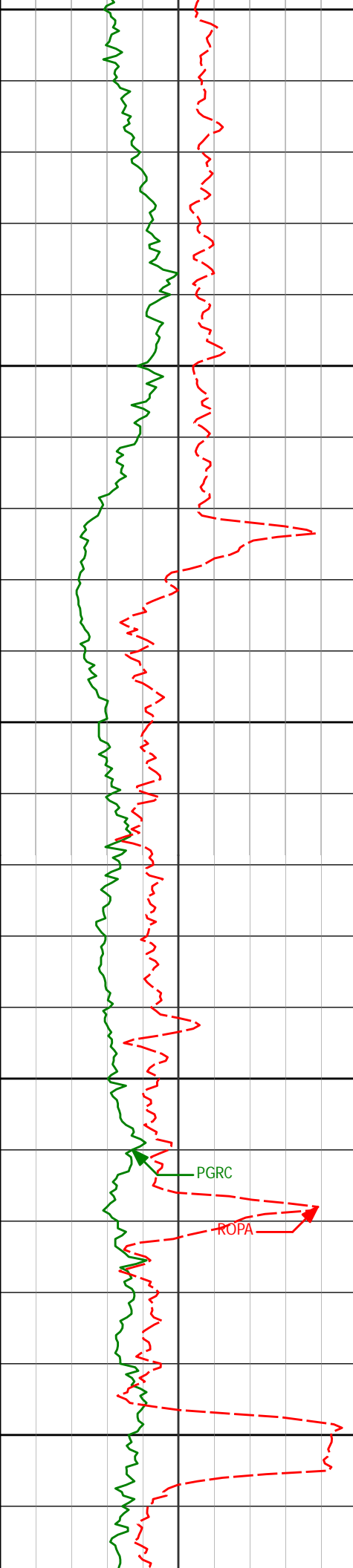
180.32°

7381.97'

828.67'

PGRC

ROPA



8000

8050

8100

8150

8200

8019'

91.33°

179.92°

7380.90'

922.66'

8114'

91.88°

179.54°

7378.24'

1017.62'

8208'

91.57°

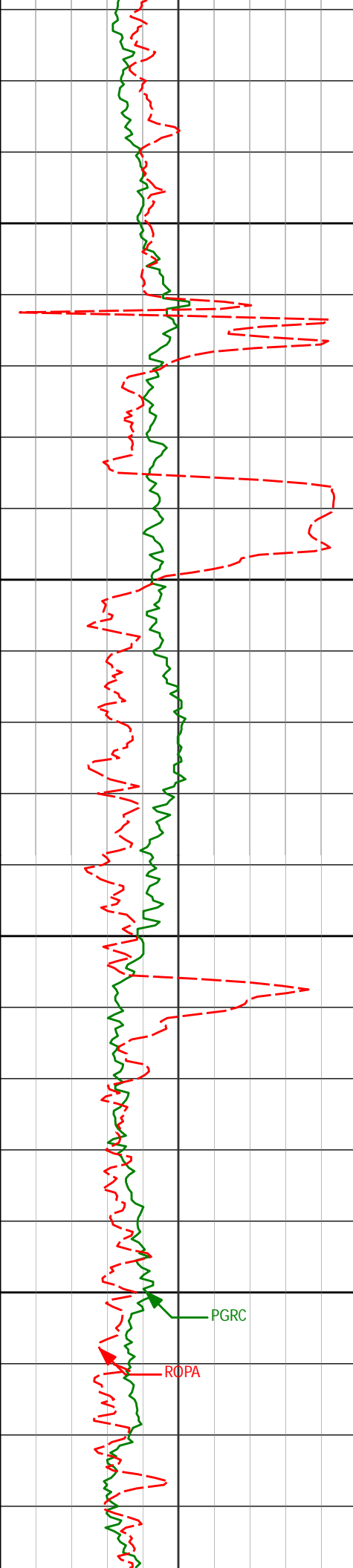
179.41°

7375.41'

1111.57'

PGRC

ROPA



8250

8300

8350

8400

8302'

90.83°

179.18°

7373.44'

1205.55'

8397'

91.73°

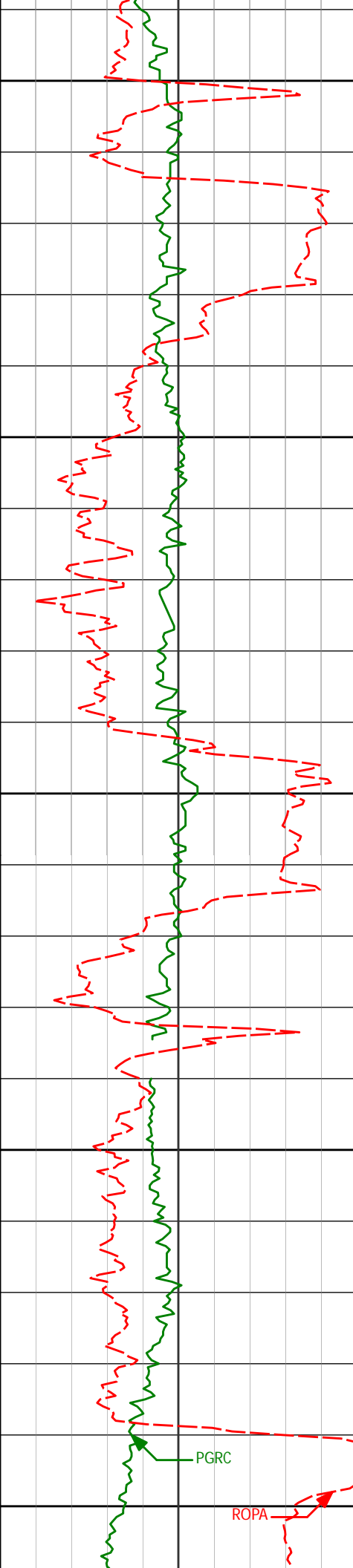
178.91°

7371.32'

1300.51'

PGRC

ROPA



8450

8492'

91.45°

179.38°

7368.68'

1395.47'

8500

8550

8586'

91.30°

179.18°

7366.43'

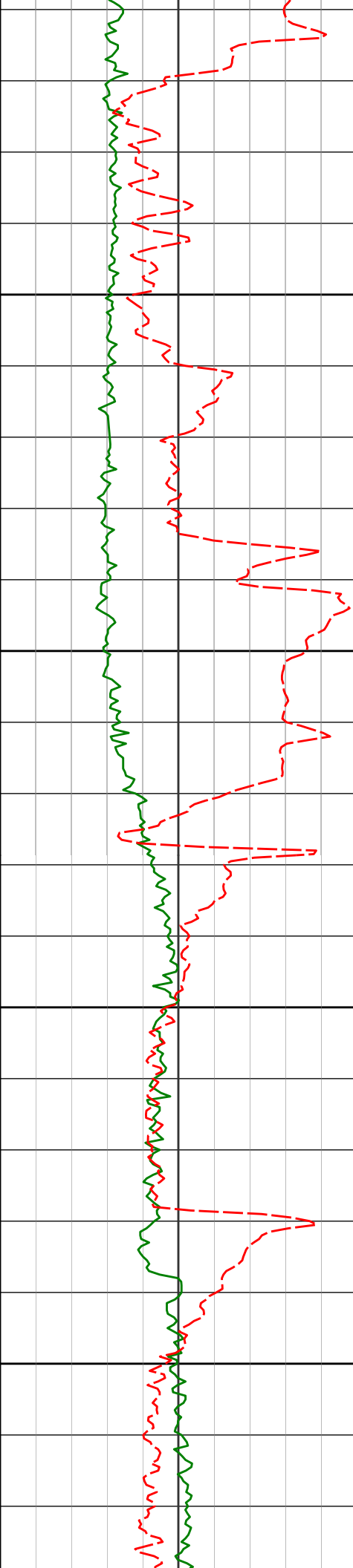
1489.43'

8600

8650

PGRC

ROPA



8700

8750

8800

8850

8681'

90.25°

179.18°

7365.14'

1584.42'

8775'

88.80°

180.53°

7365.92'

1678.41'

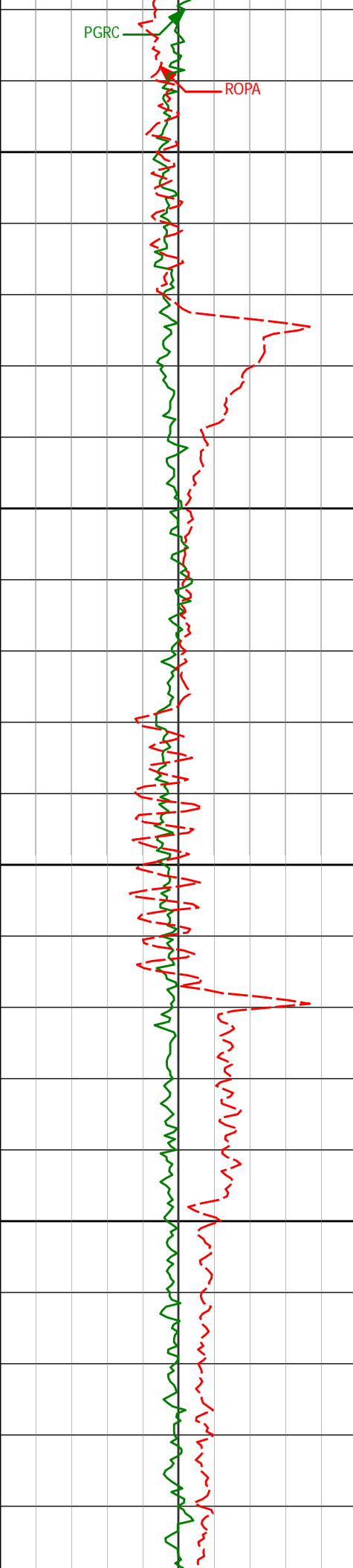
8869'

88.86°

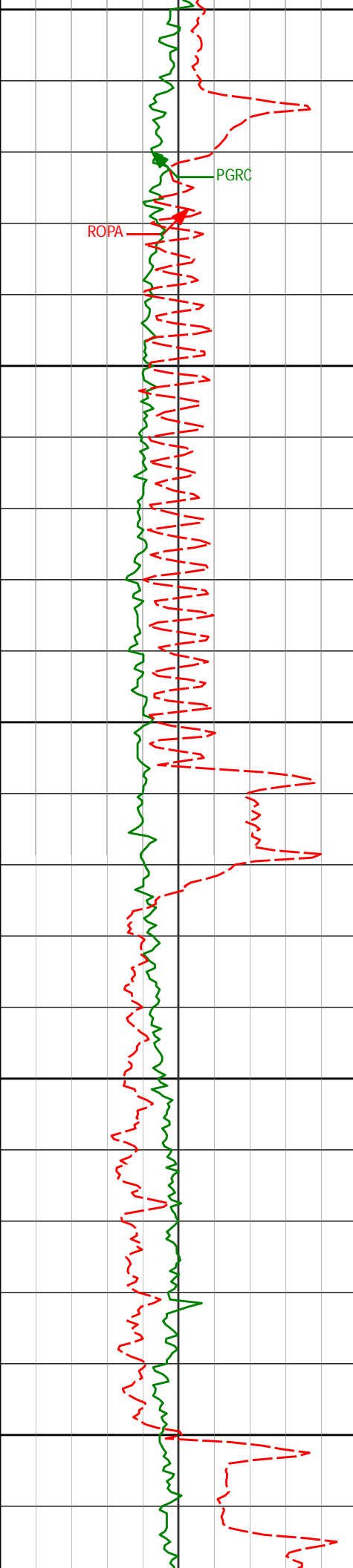
179.69°

7367.84'

1772.39'



8963'	89.11°	179.80°	7369.51'	1866.37'
9058'	89.60°	180.09°	7370.58'	1961.36'



9100

PGR

ROPA

9150

9152'

89.66°

180.16°

7371.18'

2055.36'

9200

9250

9246'

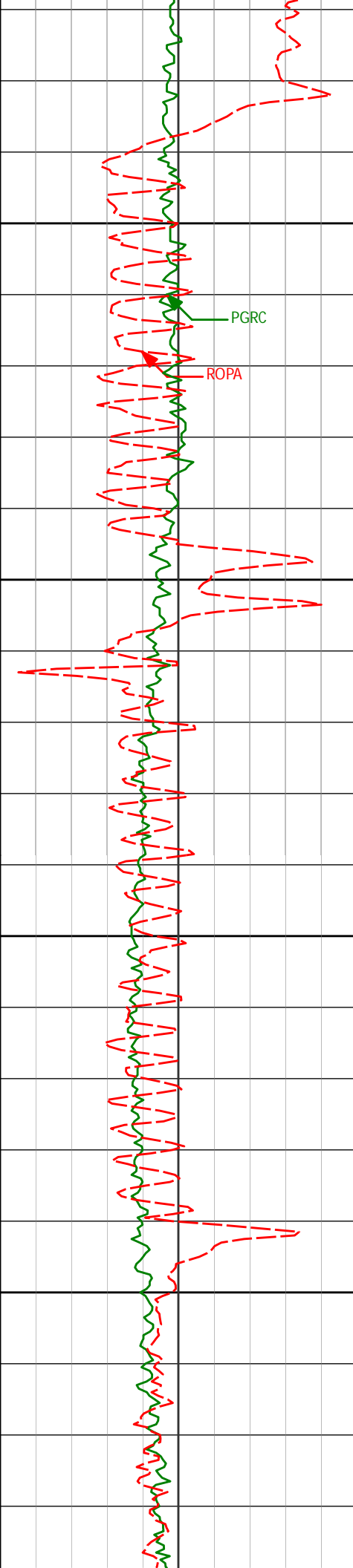
90.52°

179.51°

7371.04'

2149.36'

9300



9350

9400

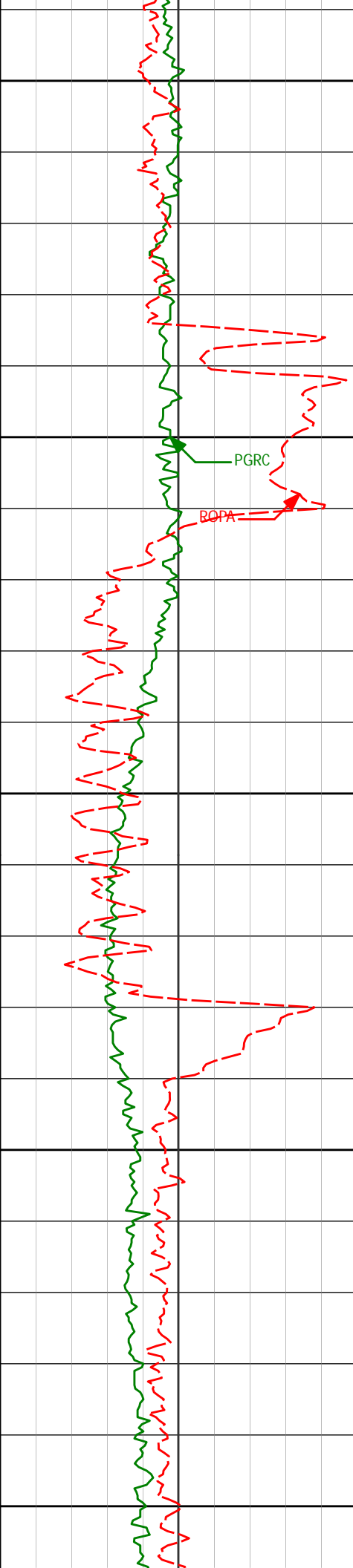
9450

9500

9340'	89.20°	179.68°	7371.27'	2243.36'
-------	--------	---------	----------	----------

9434'	89.66°	179.66°	7372.20'	2337.35'
-------	--------	---------	----------	----------

9529'	90.58°	179.53°	7372.00'	2432.35'
-------	--------	---------	----------	----------



9550

9600

9650

9700

9750

PGRC

BOPA

9623'

88.70°

179.12°

7372.59'

2526.34'

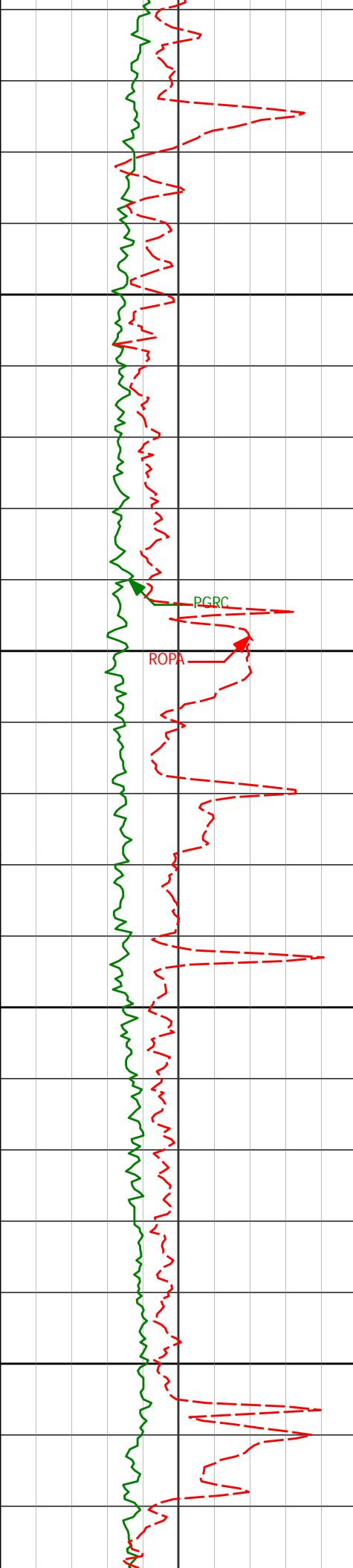
9717'

89.23°

179.18°

7374.29'

2620.31'



9800

9811'

89.51°

178.76°

7375.33'

2714.30'

9850

PGRC

ROPA

9900

9906'

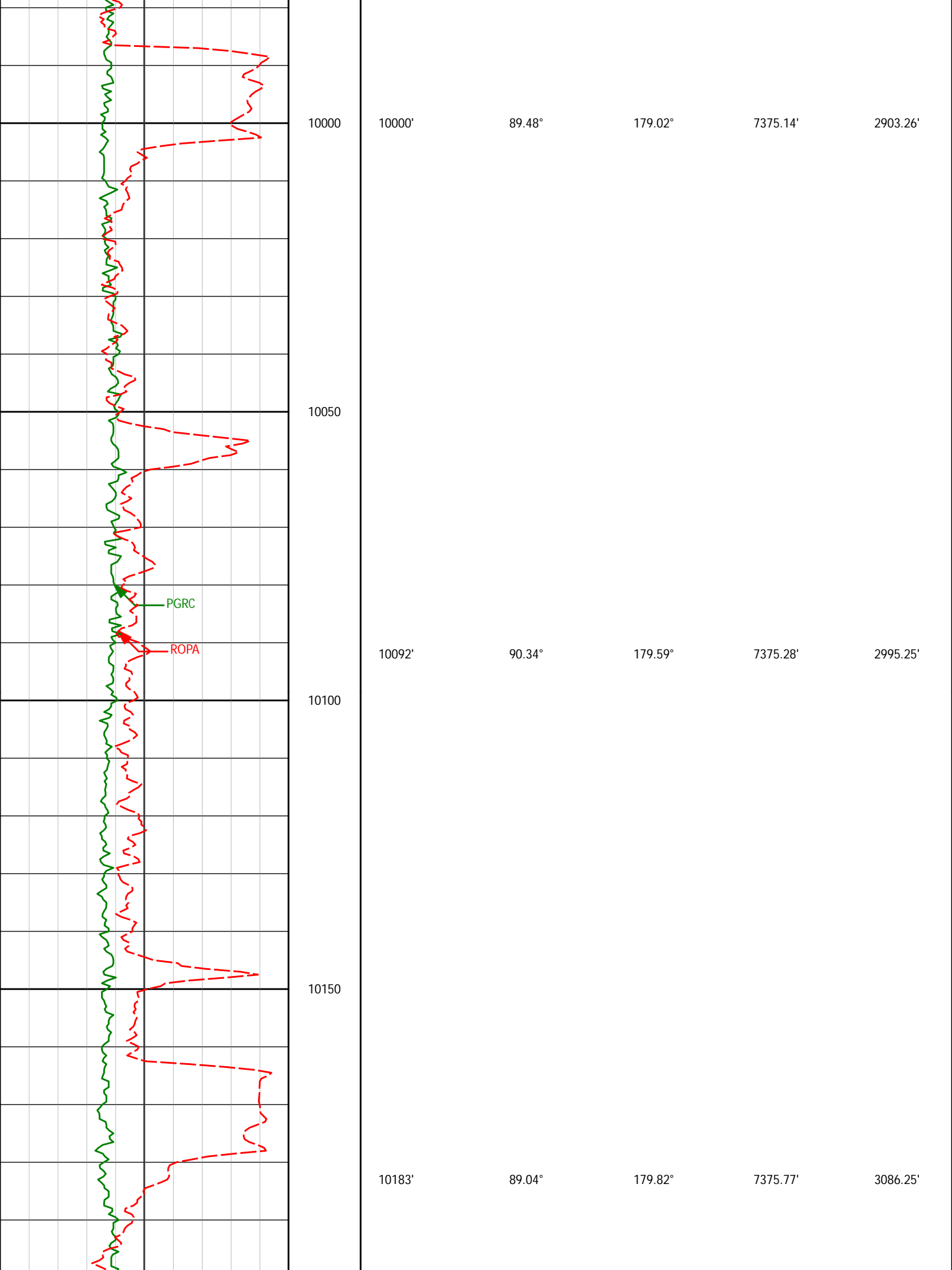
90.62°

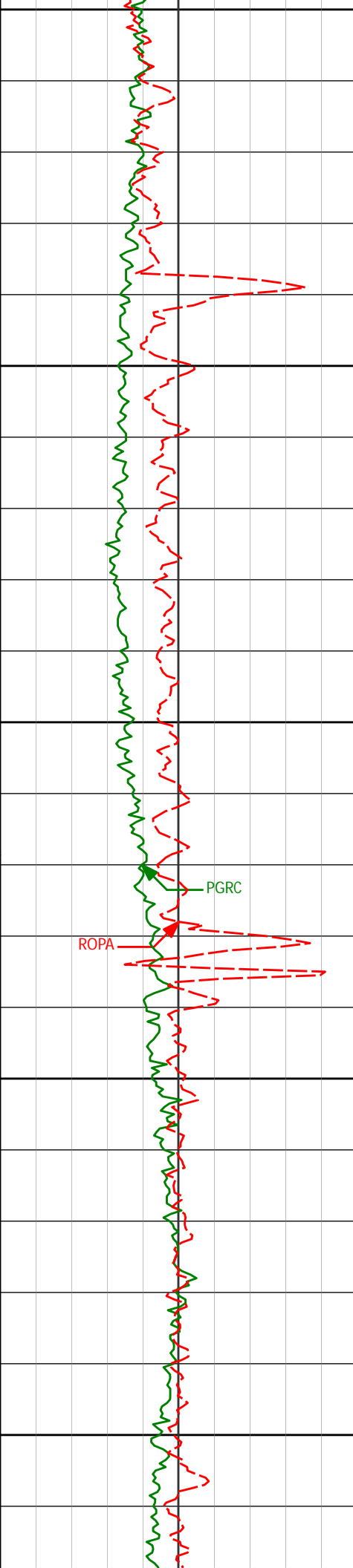
178.66°

7375.22'

2809.27'

9950





10200

10250

10300

10350

10400

10275'

89.63°

180.25°

7376.84'

3178.24'

PGRC

ROPA

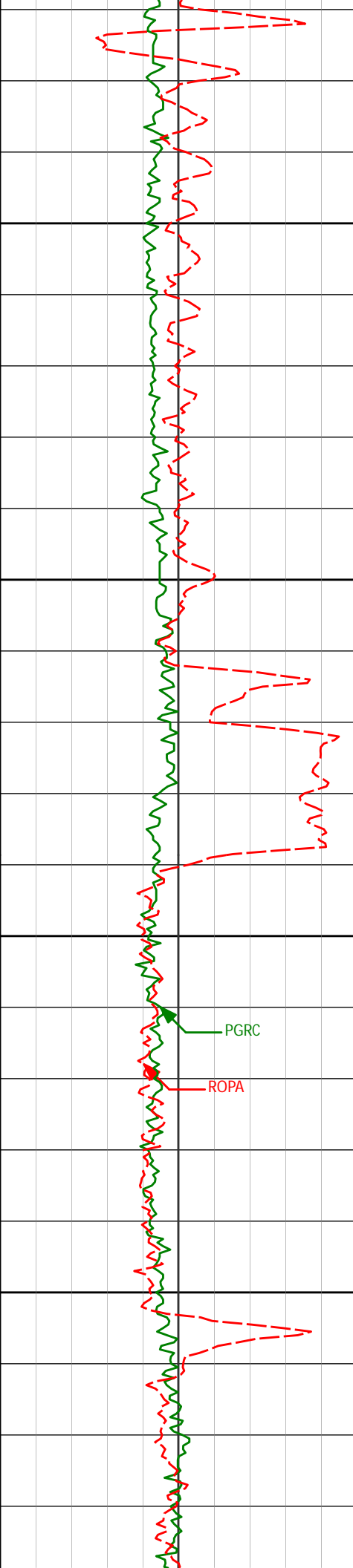
10367'

89.78°

180.25°

7377.31'

3270.24'



10450

10500

10550

10600

10458'

90.28°

179.44°

7377.27'

3361.23'

10550'

88.98°

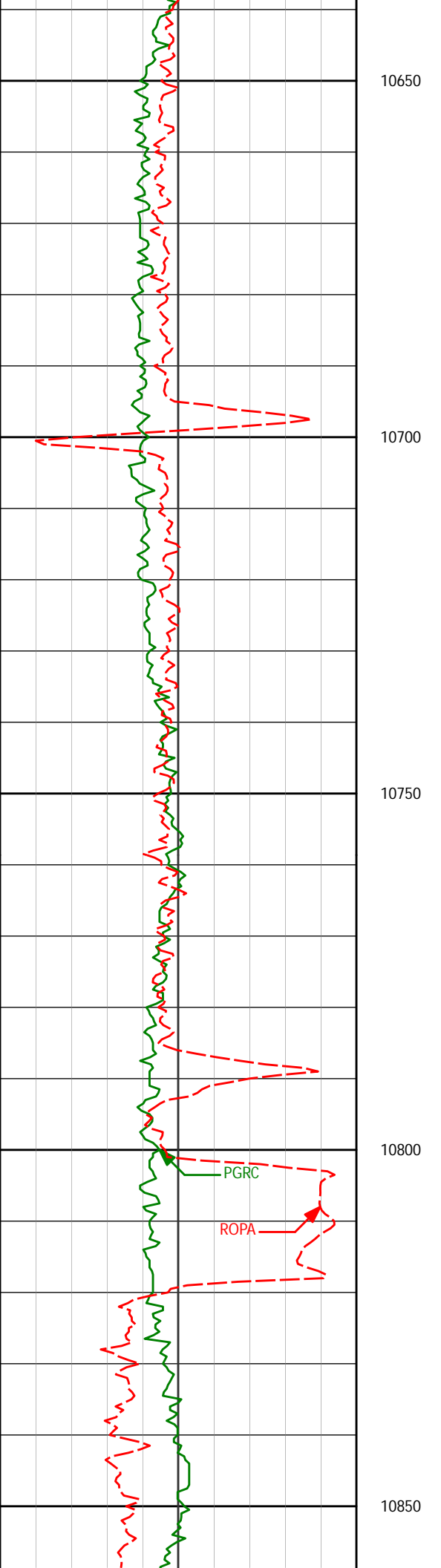
180.20°

7377.86'

3453.23'

PGRC

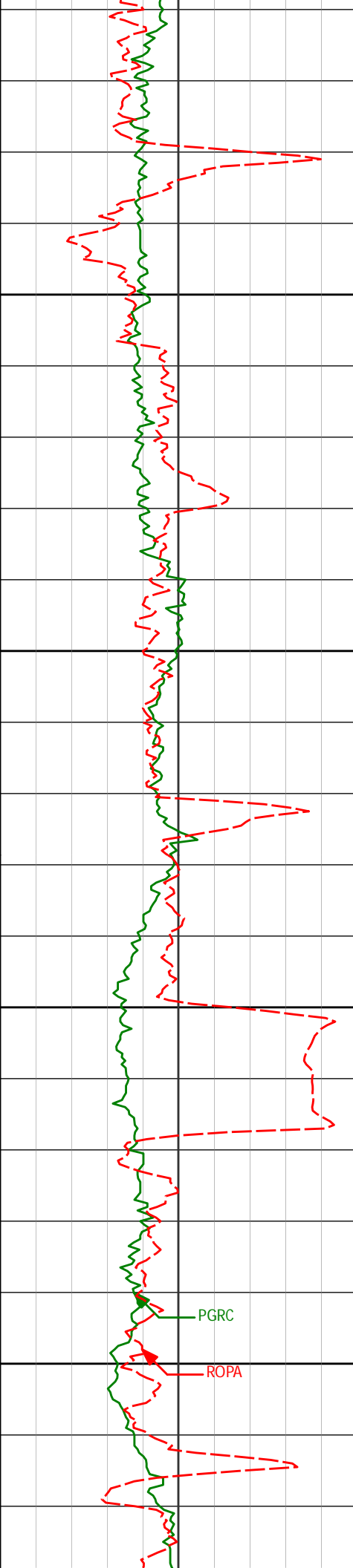
ROPA



10641'	89.32°	180.64°	7379.21'	3544.22'
--------	--------	---------	----------	----------

10733'	90.52°	180.54°	7379.34'	3636.21'
--------	--------	---------	----------	----------

10825'	89.60°	181.87°	7379.24'	3728.18'
--------	--------	---------	----------	----------



10900

10917'

90.52°

181.59°

7379.15'

3820.13'

10950

11000

11009'

89.88°

181.21°

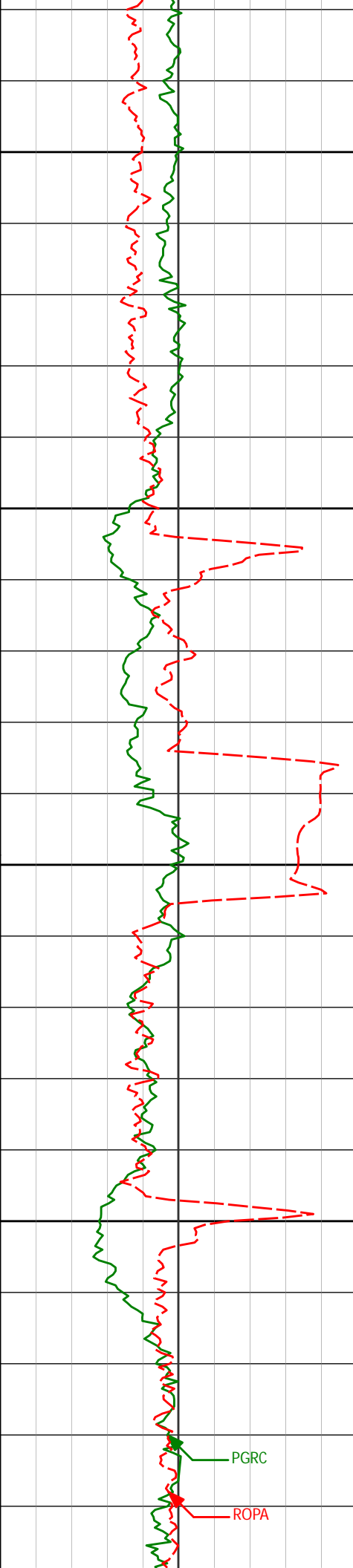
7378.82'

3912.10'

11050

PGRC

ROPA



11100

11101'

90.37°

180.57°

7378.62'

4004.08'

11150

11200

11194'

89.32°

180.06°

7378.88'

4097.08'

11250

11287'

89.32°

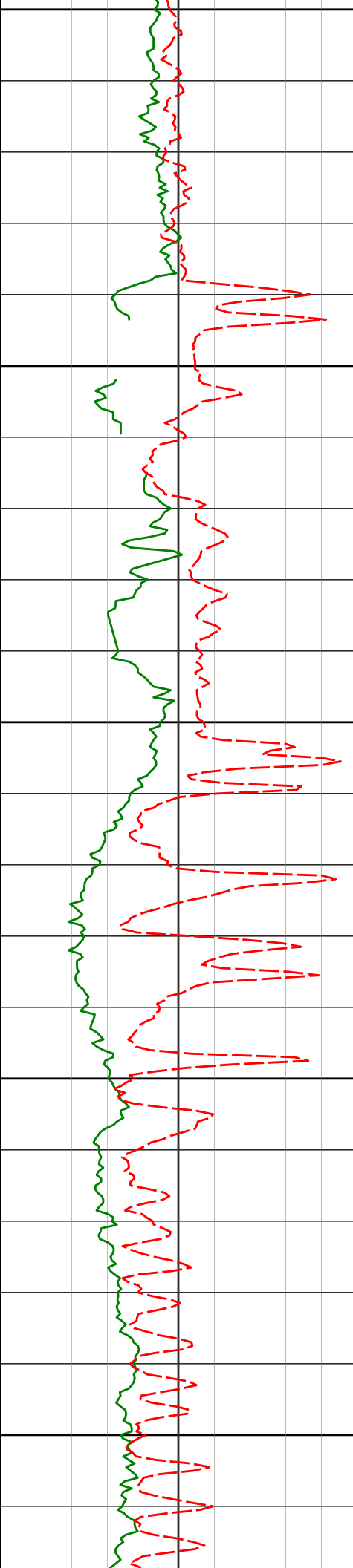
179.70°

7379.98'

4190.07'

PGRC

ROPA



11300

11350

11400

11450

11500

11379'

89.97°

179.57°

7380.55'

4282.07'

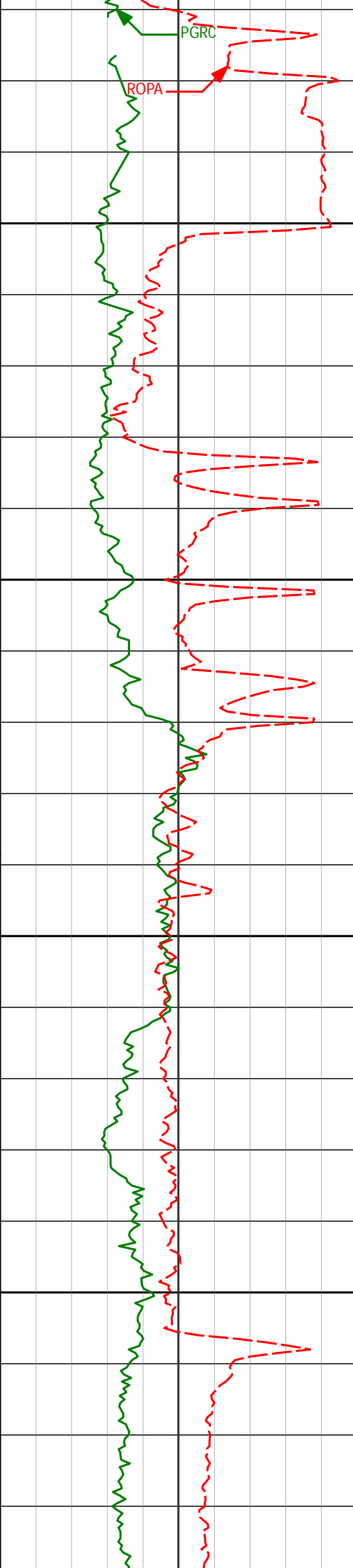
11471'

90.77°

178.52°

7379.96'

4374.06'



11550

11563'

89.20°

178.43°

7379.98'

4466.02'

11600

11650

11656'

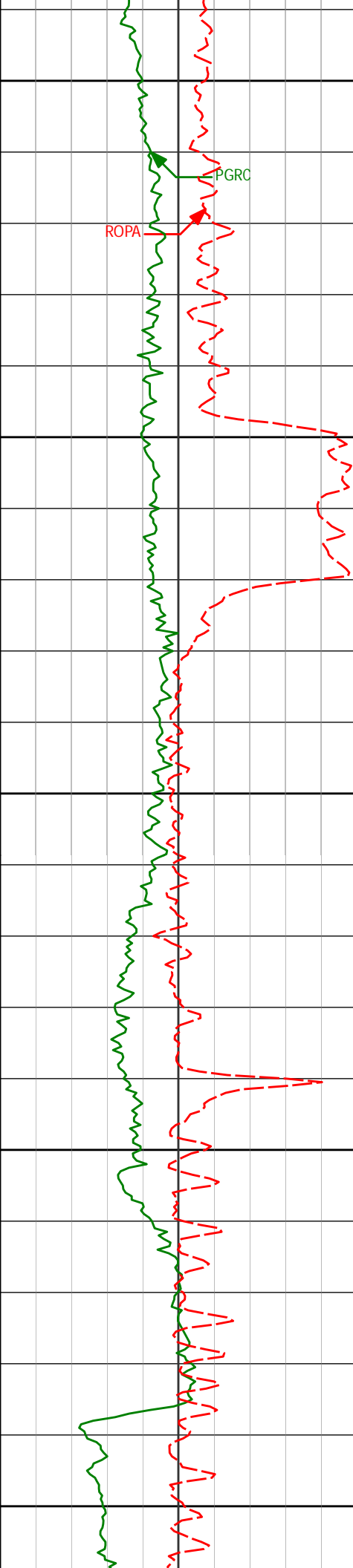
89.66°

177.69°

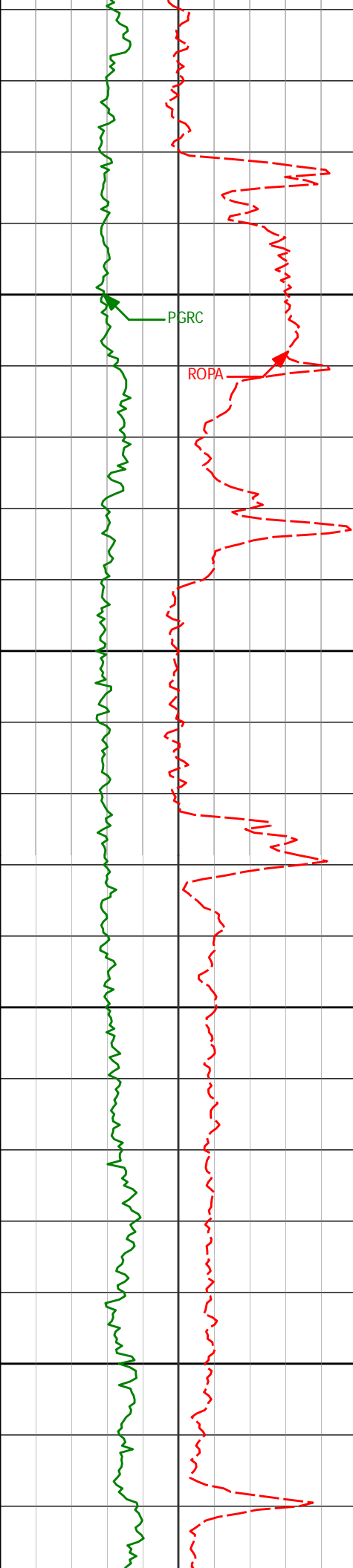
7380.90'

4558.97'

11700



11750	11747'	89.75°	177.32°	7381.37'	4649.89'
11800					
11850	11839'	89.17°	179.44°	7382.24'	4741.85'
11900					
11950	11932'	89.66°	179.05°	7383.19'	4834.84'



12000

12024'

90.37°

179.31°

7383.17'

4926.83'

12050

12100

12115'

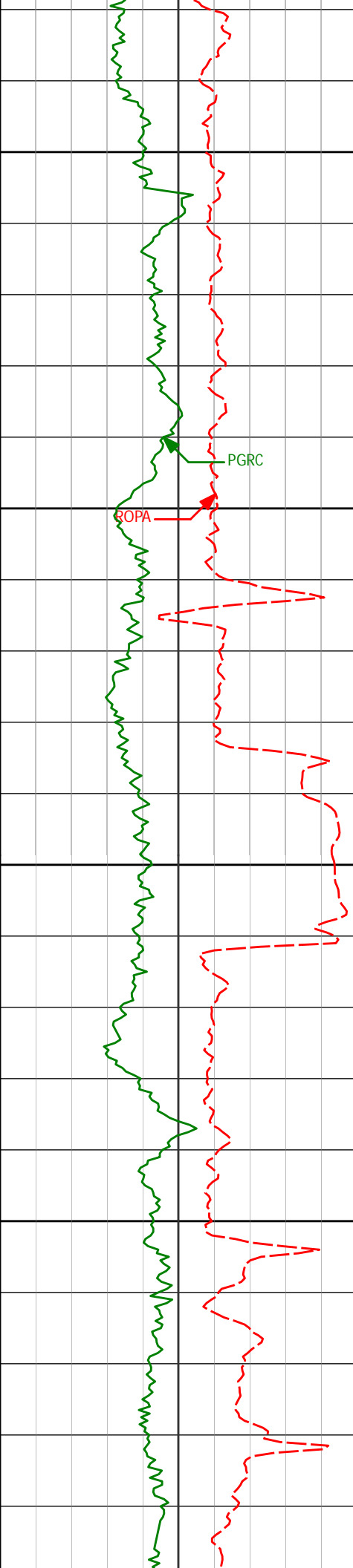
90.37°

178.39°

7382.58'

5017.81'

12150



12200

12206'

90.40°

177.35°

7381.97'

5108.75'

12250

12300

12299'

90.34°

179.02°

7381.31'

5201.70'

12350

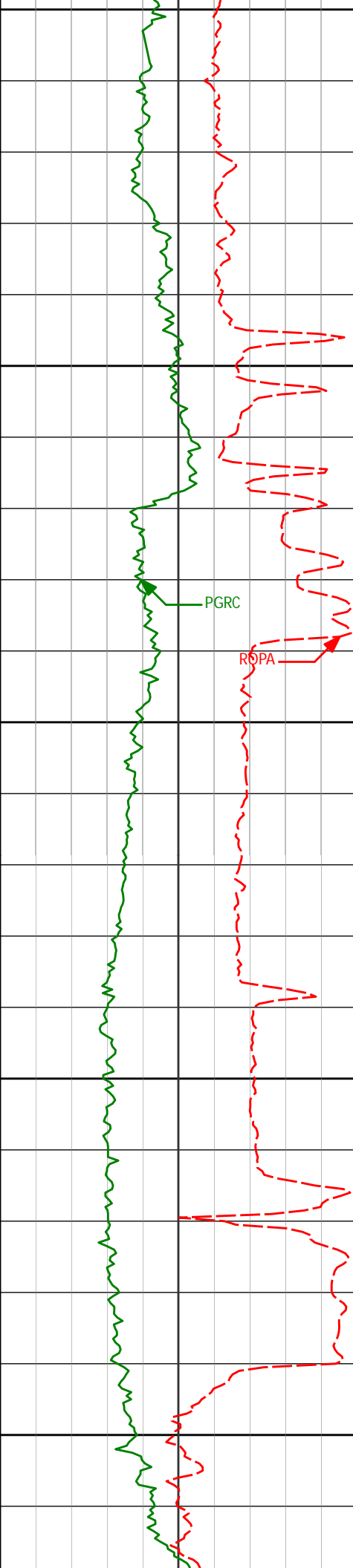
12390'

90.86°

179.87°

7380.41'

5292.69'



12400

12450

12500

12550

12600

PGRC

RSPA

12482'

89.69°

179.28°

7379.97'

5384.69'

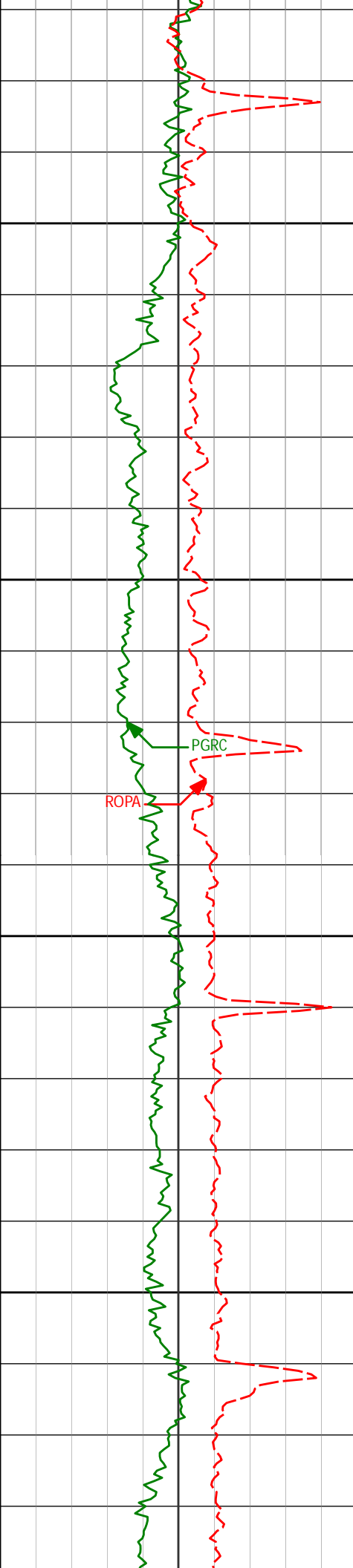
12574'

89.20°

179.91°

7380.86'

5476.68'



12650

12665'

89.14°

180.55°

7382.18'

5567.67'

12700

12750

12758'

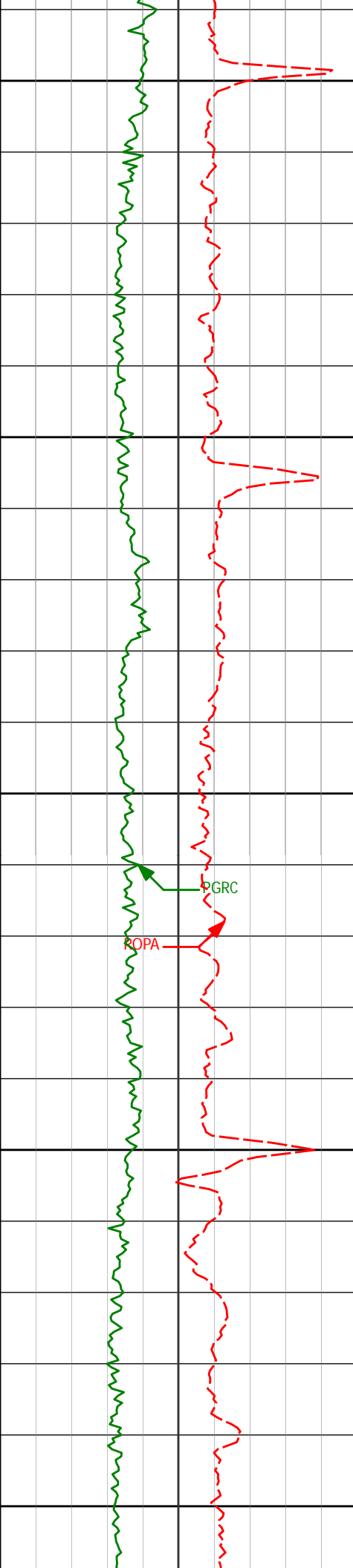
89.20°

180.75°

7383.53'

5660.65'

12800



12850

12900

12950

13000

13050

12852'

12946'

13040'

89.41°

89.17°

89.45°

181.11°

180.46°

179.84°

7384.67'

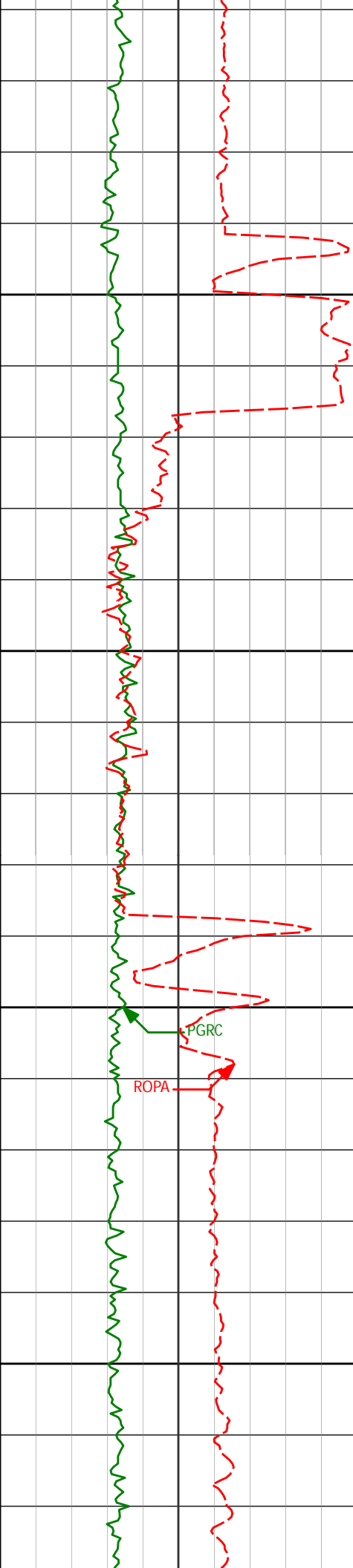
7385.83'

7386.97'

5754.63'

5848.61'

5942.60'



13100

13134'

90.09°

181.06°

7387.34'

6036.60'

13150

13200

PGRC

ROPA

13228'

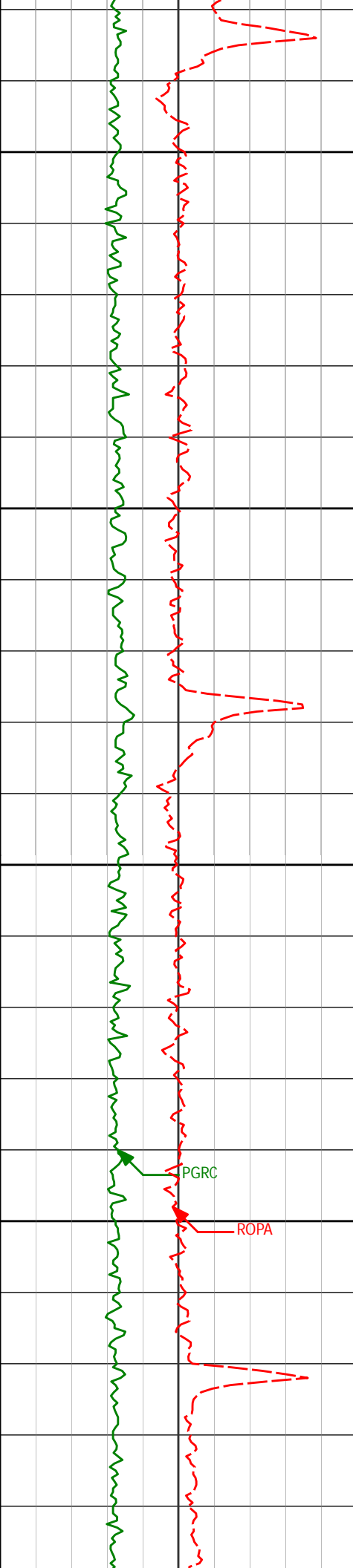
89.69°

180.70°

7387.52'

6130.58'

13250



13300

13322'

90.03°

181.24°

7387.75'

6224.57'

13350

13400

13417'

89.78°

179.93°

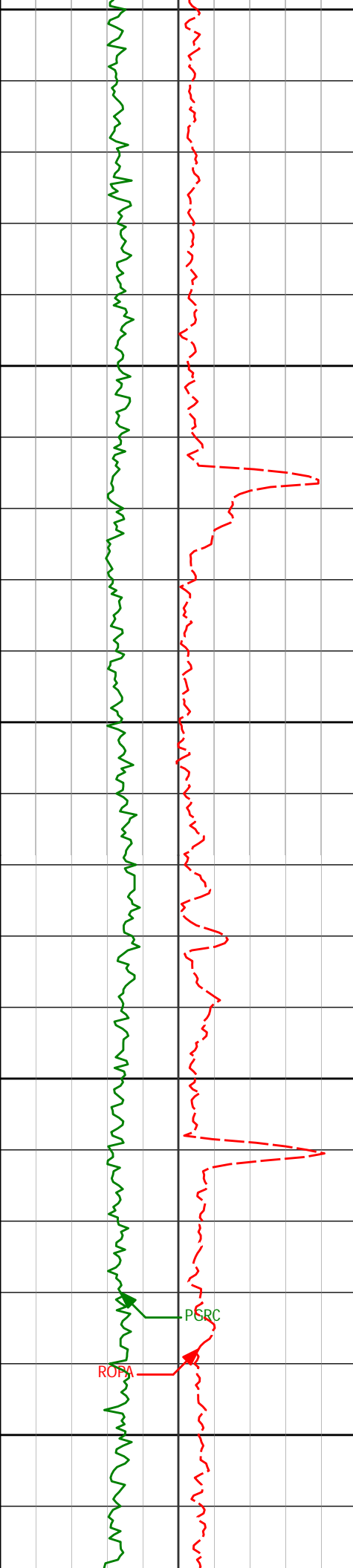
7387.91'

6319.56'

13450

PGRC

ROPA



13500

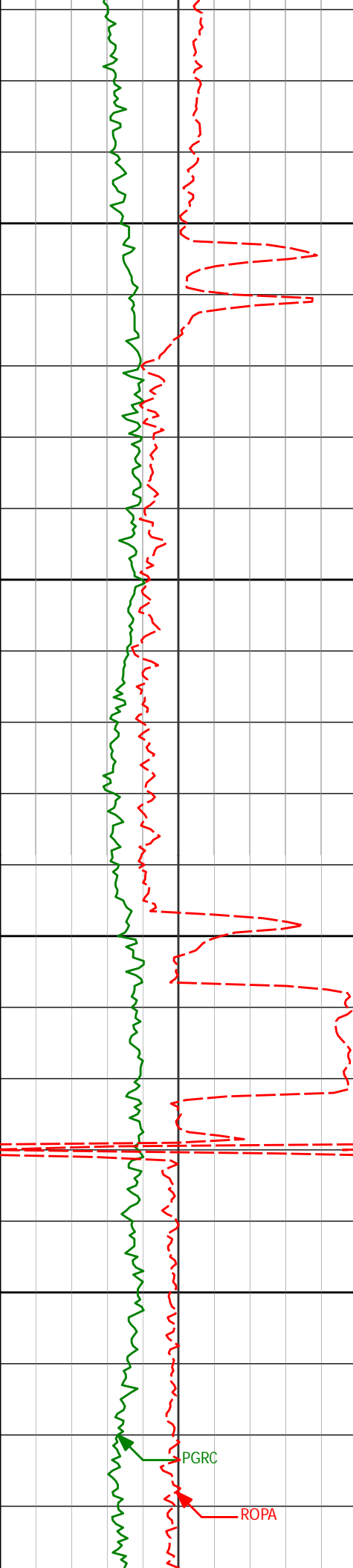
13550

13600

13650

13700

13510'	90.00°	179.48°	7388.09'	6412.56'
13604'	90.58°	180.18°	7387.61'	6506.55'
13699'	90.00°	179.76°	7387.13'	6601.55'



13750

13793'

89.63°

178.76°

7387.44'

6695.54'

13800

13850

13887'

89.91°

180.09°

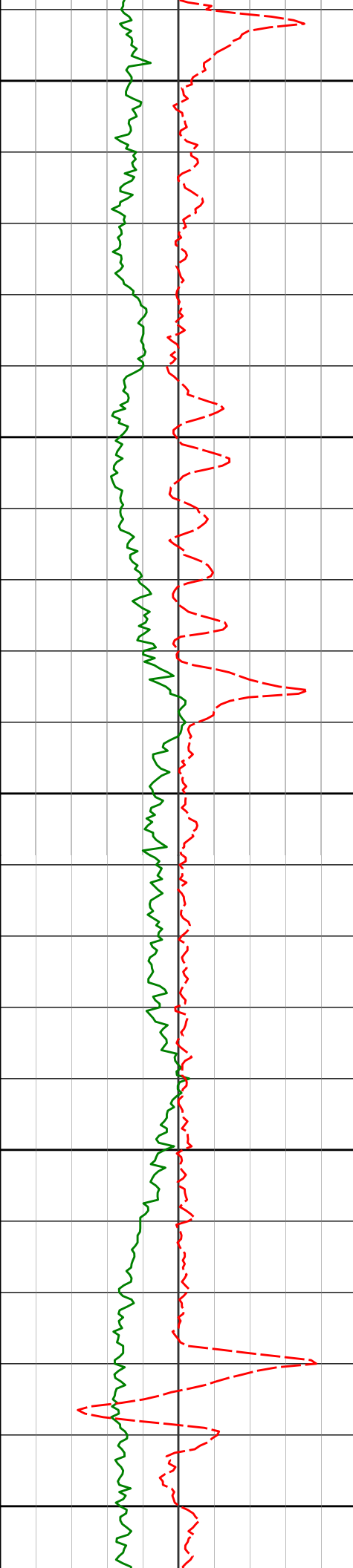
7387.81'

6789.54'

13900

PGRC

ROPA



13950

13981'

90.65°

180.89°

7387.35'

6883.53'

14000

14050

14076'

90.83°

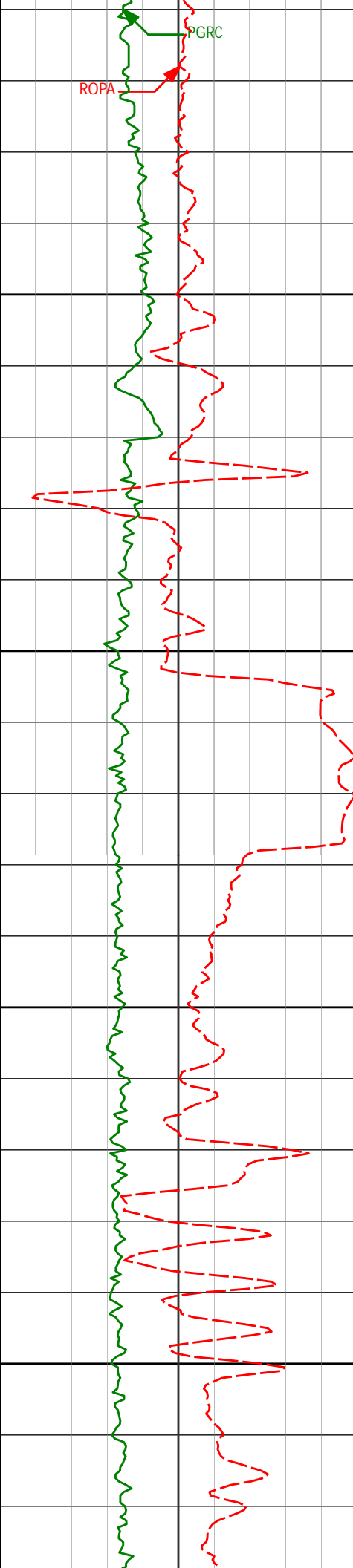
179.92°

7386.13'

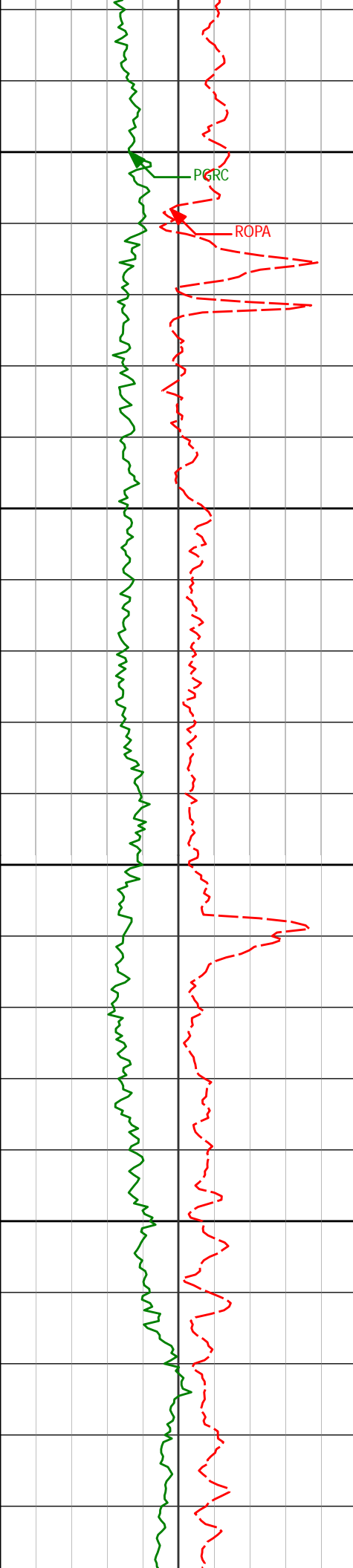
6978.52'

14100

14150



14170'	91.60°	180.02°	7384.13'	7072.50'
14200				
14250				
14265'	90.22°	179.72°	7382.63'	7167.48'
14300				
14350				
14359'	89.48°	179.49°	7382.87'	7261.48'



14400

PERC

ROPA

14450

14454'

90.31°

178.78°

7383.05'

7356.47'

14500

14550

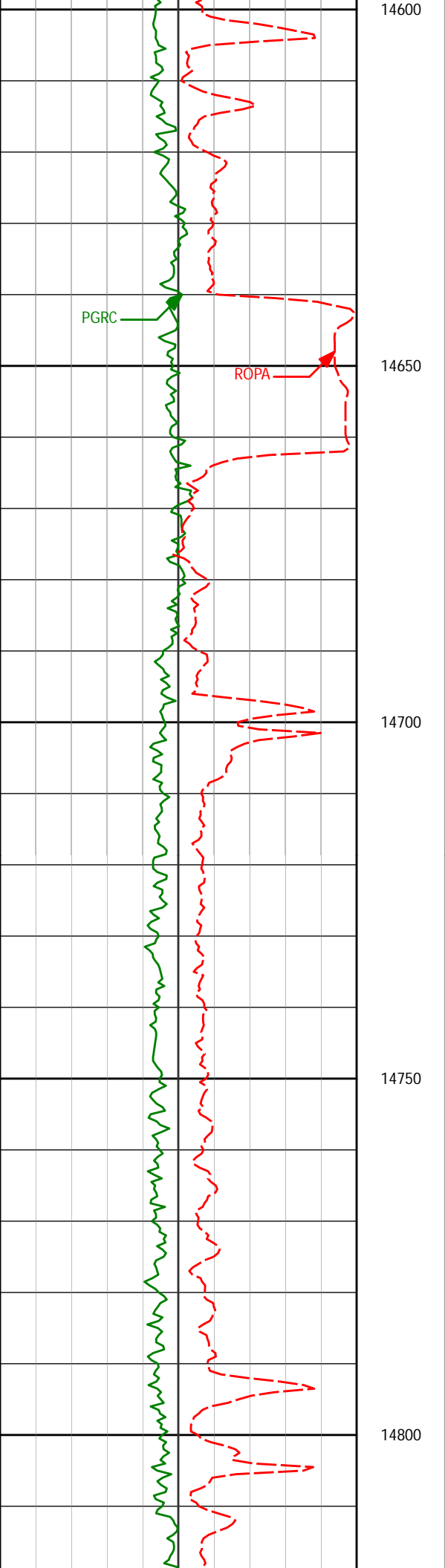
14549'

90.98°

178.78°

7381.98'

7451.44'



14643'

90.12°

180.06°

7381.07'

7545.43'

14650

14700

14738'

89.54°

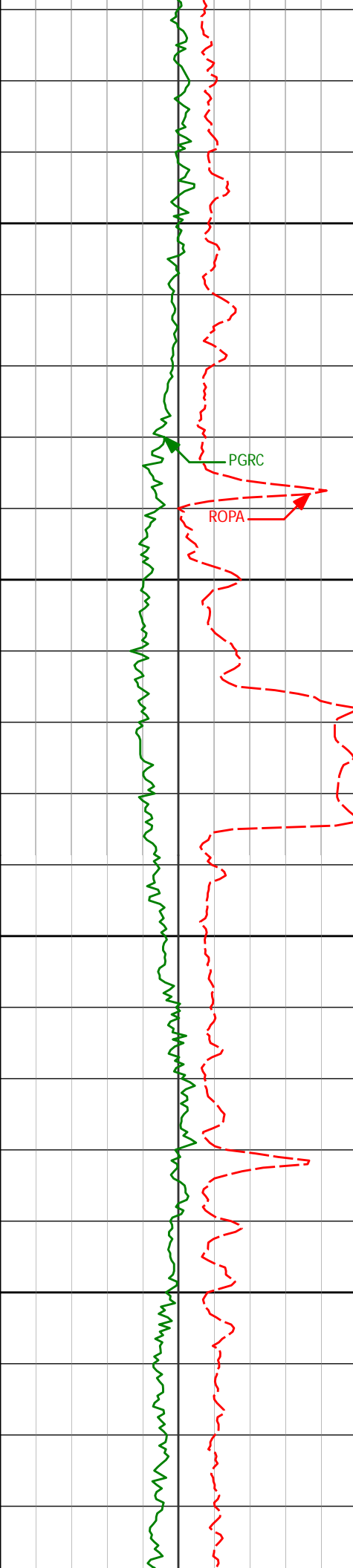
180.35°

7381.36'

7640.43'

14750

14800



14850

14900

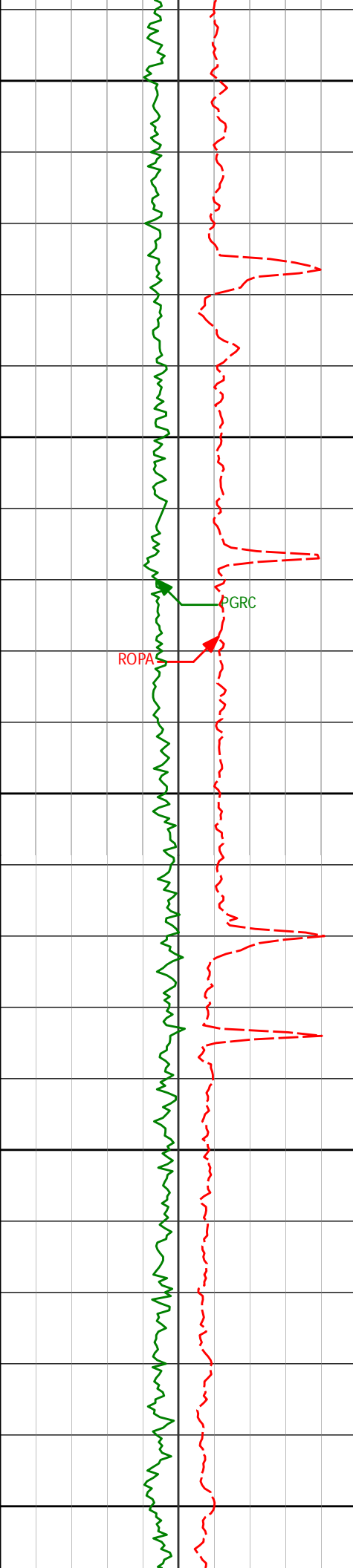
14950

15000

14832'	90.06°	179.50°	7381.68'	7734.43'
--------	--------	---------	----------	----------

14926'	88.86°	179.69°	7382.57'	7828.42'
--------	--------	---------	----------	----------

15020'	88.52°	180.15°	7384.72'	7922.40'
--------	--------	---------	----------	----------



15050

15100

15150

15200

15250

15114'

89.72°

179.66°

7386.16'

8016.38'

PGRC

ROPA

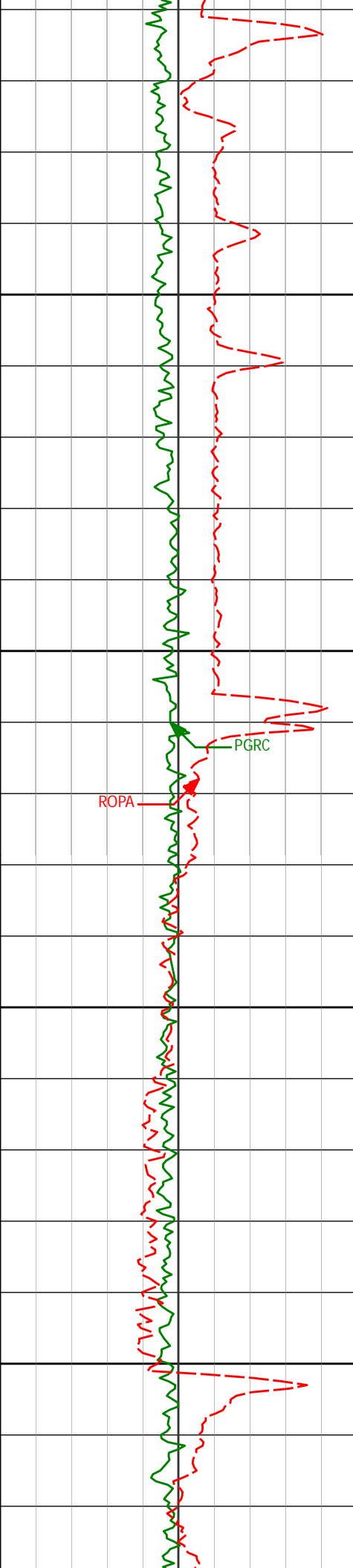
15208'

89.94°

179.04°

7386.44'

8110.38'



15300

15302'

90.22°

178.42°

7386.31'

8204.36'

15350

PGRC

ROPa

15400

15397'

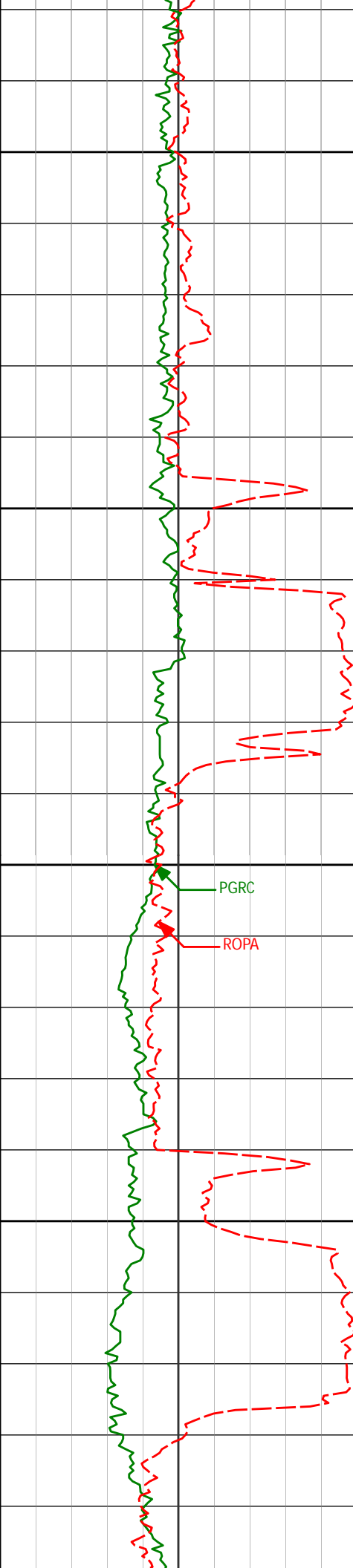
89.88°

178.43°

7386.23'

8299.33'

15450



15491'

15500

15550

15586'

15600

15650

15680'

15491'

89.81°

176.67°

7386.48'

8393.24'

15586'

91.30°

178.29°

7385.56'

8488.15'

PGRC

ROPA

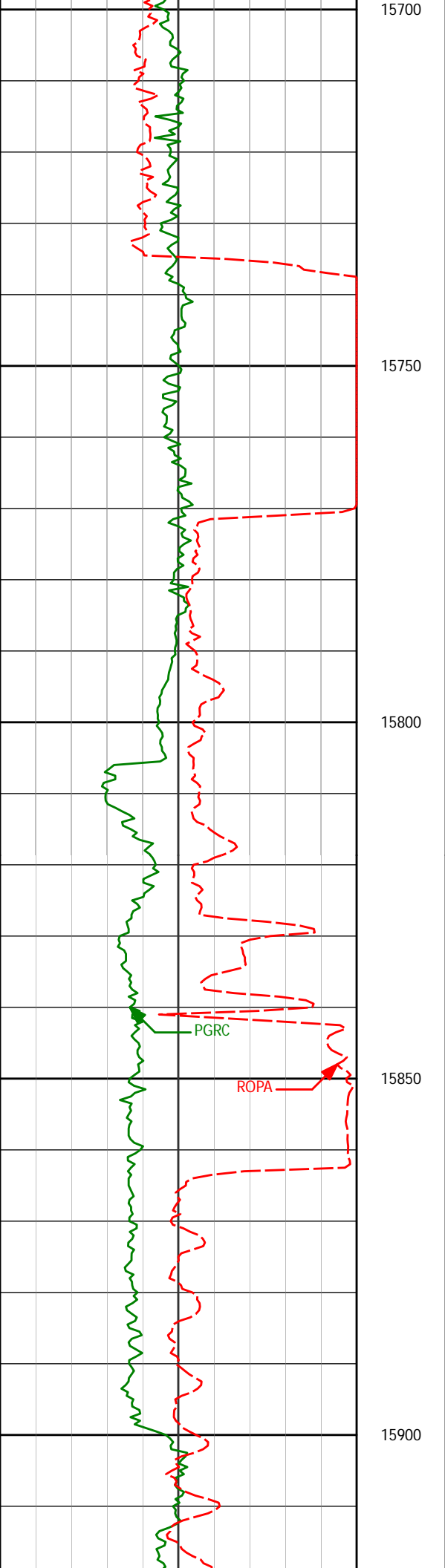
15680'

90.65°

179.87°

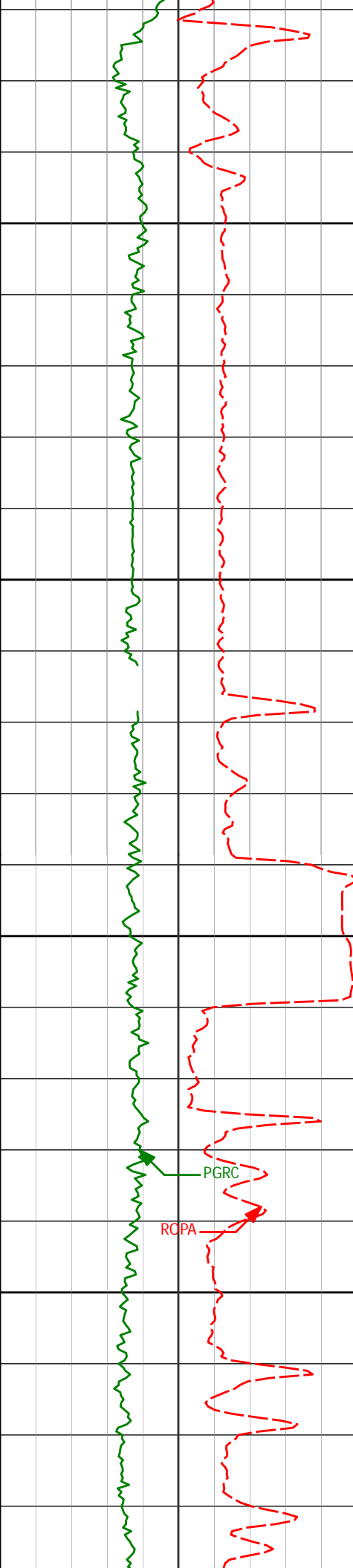
7383.96'

8582.12'



15775' 91.05° 179.59° 7382.55' 8677.11'

15869' 89.29° 179.81° 7382.27' 8771.11'



15950

15963'

89.85°

180.08°

7382.98'

8865.10'

16000

16050

16057'

88.15°

181.06°

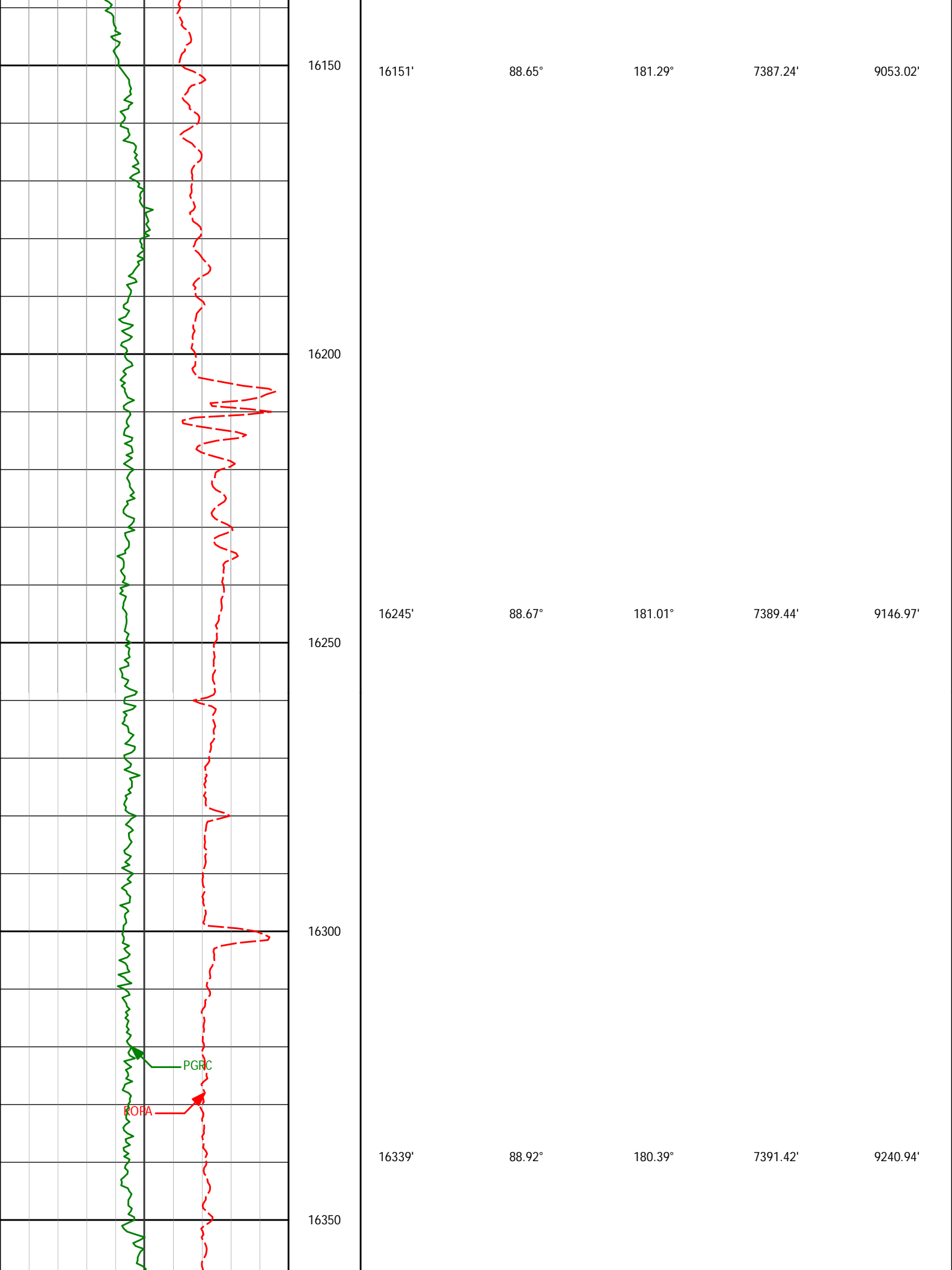
7384.62'

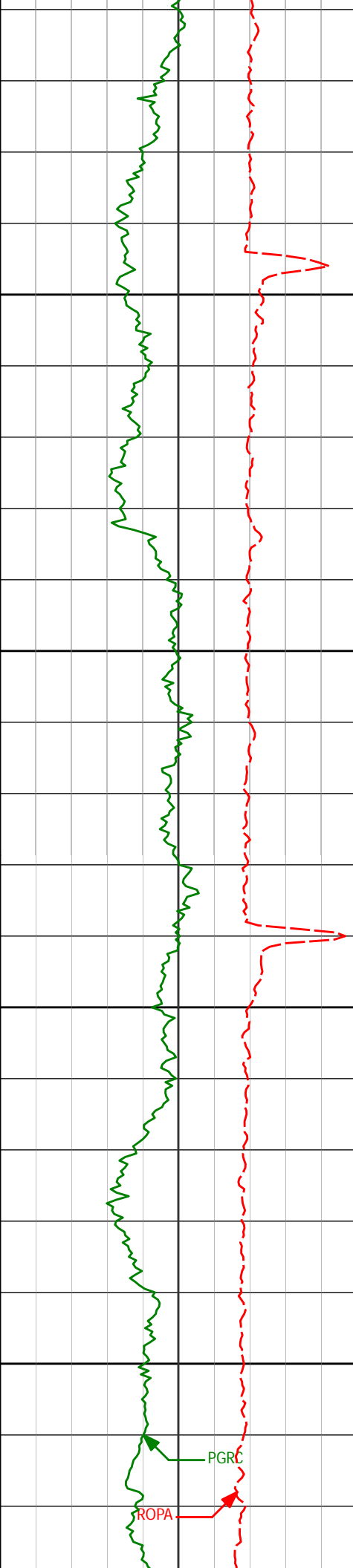
8959.08'

16100

PGRC

RCPA





16400

16433'

16450

16500

16528'

16550

89.54°

179.91°

7392.68'

9334.93'

90.28°

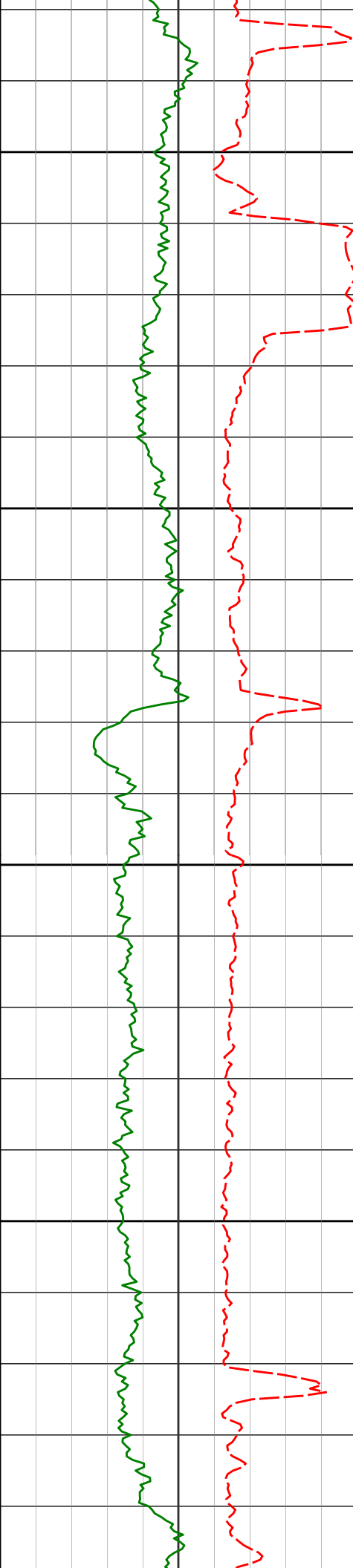
178.98°

7392.83'

9429.92'

PGRC

ROPA



16600

16623'

90.74°

179.94°

7391.99'

9524.92'

16650

16700

16717'

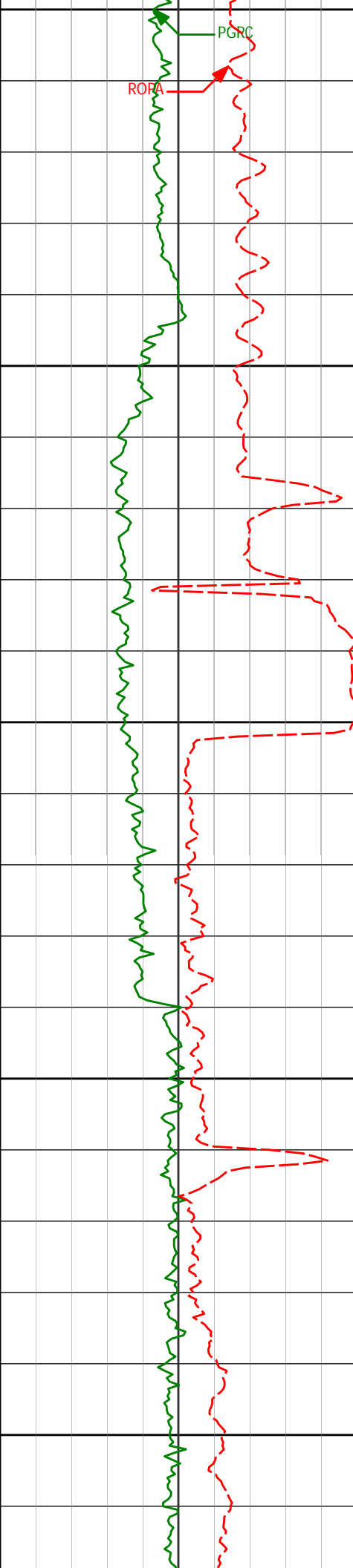
91.36°

179.64°

7390.26'

9618.90'

16750



16800

16850

16900

16950

17000

16812'

91.70°

178.84°

7387.73'

9713.86'

16907'

90.86°

179.64°

7385.61'

9808.83'

17002'

90.99°

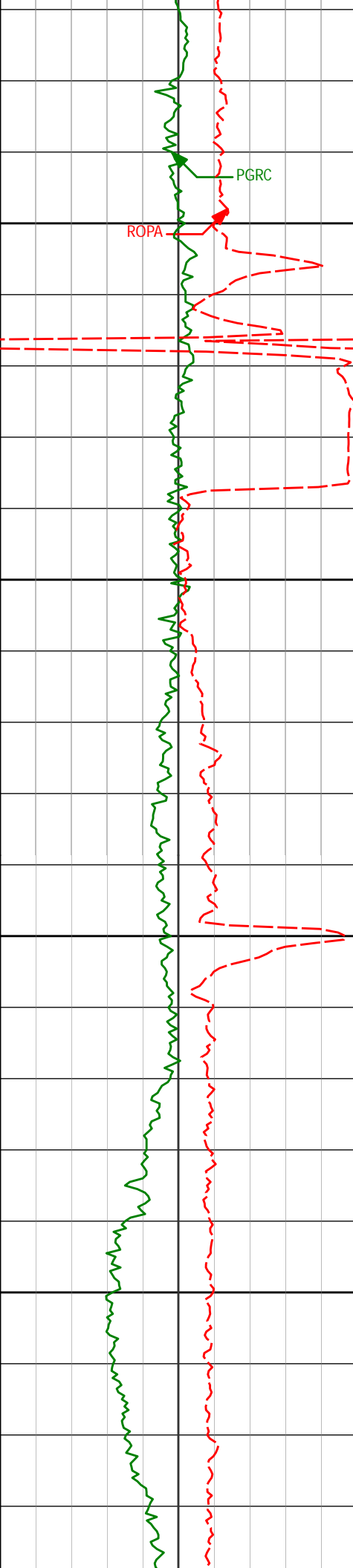
179.70°

7384.07'

9903.81'

PGRC

RORA



17050

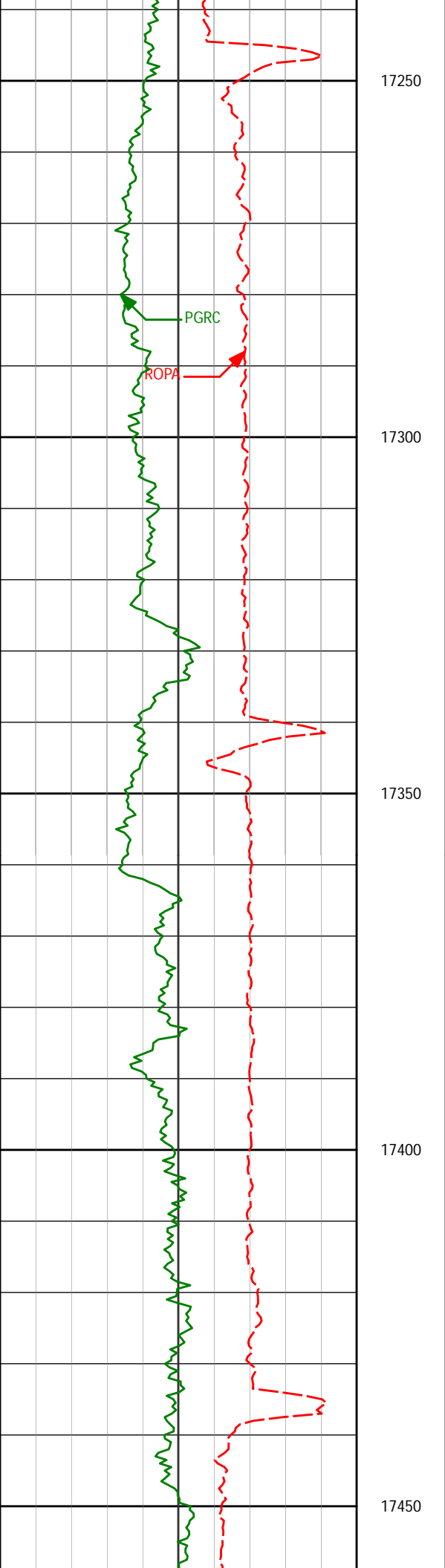
17100

17150

17200

17097'	89.32°	180.84°	7383.81'	9998.81'
--------	--------	---------	----------	----------

17192'	89.48°	180.33°	7384.81'	10093.79'
--------	--------	---------	----------	-----------



17287'

89.91°

179.88°

7385.32'

10188.79'

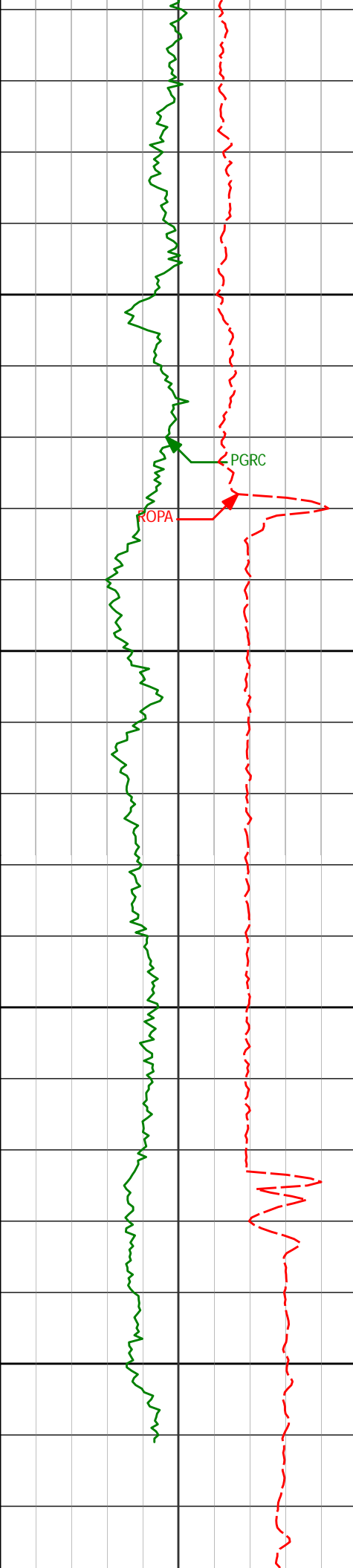
17382'

90.25°

178.96°

7385.18'

10283.79'



17500

17550

17600

17650

17477'

90.65°

178.50°

7384.44'

10378.76'

17572'

91.48°

178.84°

7382.67'

10473.72'

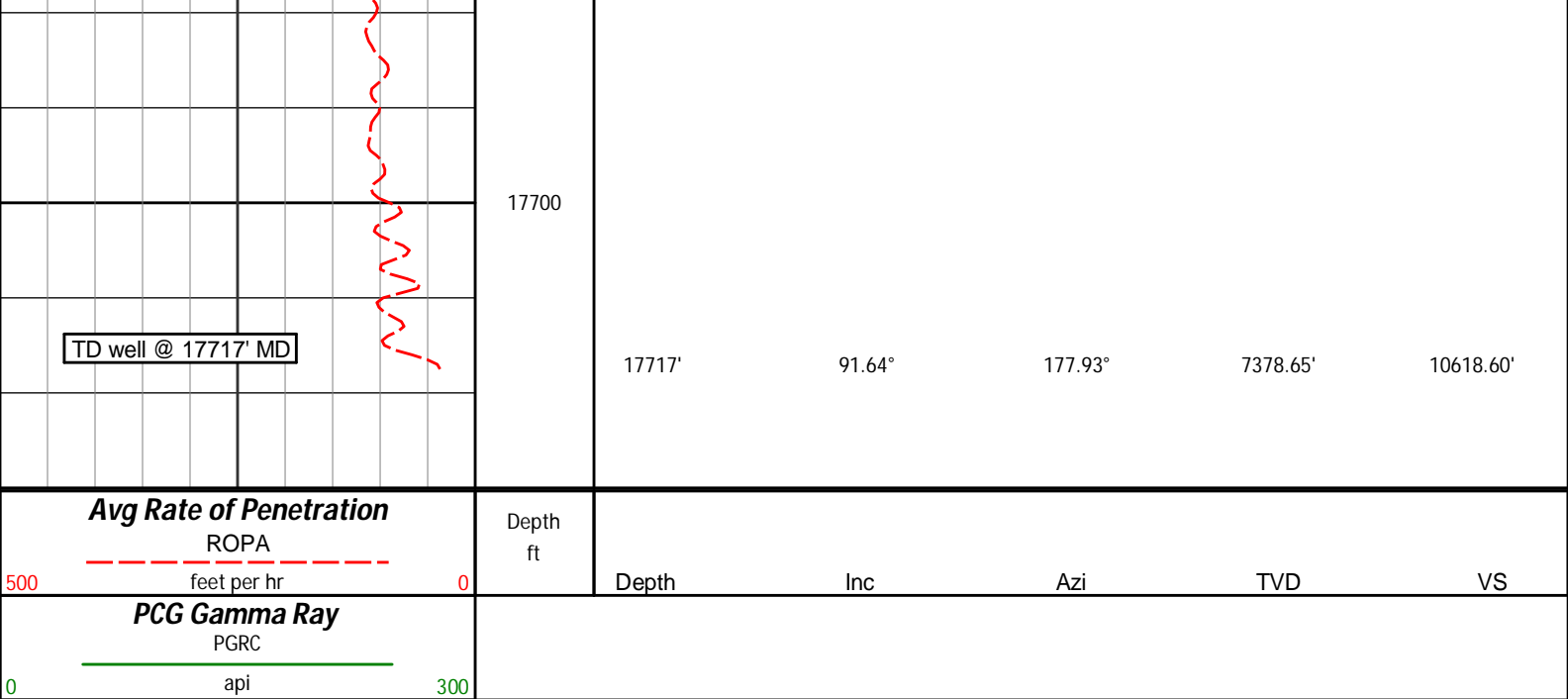
17663'

91.64°

177.93°

7380.19'

10564.66'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Anadarko
Small Eyed 14N-35HZ
Wattenburg
Weld Colorado
USA
CA-XX-0901442852

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
1208.00	0.16	20.03	1207.98	3.37 N	3.44 W	-3.38	TIE-IN
1390.00	0.59	306.91	1389.98	4.17 N	4.10 W	-4.18	0.31
1482.00	0.51	288.24	1481.97	4.58 N	4.87 W	-4.59	0.21
1574.00	0.50	315.12	1573.97	5.00 N	5.54 W	-5.01	0.26
1666.00	0.49	310.85	1665.97	5.54 N	6.12 W	-5.55	0.04
1758.00	0.83	305.10	1757.96	6.18 N	6.97 W	-6.19	0.38
1851.00	0.69	265.74	1850.95	6.52 N	8.08 W	-6.54	0.57
1944.00	0.70	264.10	1943.94	6.42 N	9.20 W	-6.44	0.02
2036.00	0.62	265.57	2035.94	6.33 N	10.25 W	-6.35	0.09
2128.00	0.48	249.62	2127.93	6.16 N	11.11 W	-6.18	0.22
2220.00	0.55	227.76	2219.93	5.72 N	11.80 W	-5.75	0.23
2313.00	0.61	224.46	2312.93	5.07 N	12.48 W	-5.09	0.07
2404.00	0.81	225.78	2403.92	4.28 N	13.28 W	-4.30	0.22
2496.00	0.81	182.85	2495.91	3.17 N	13.78 W	-3.20	0.64
2589.00	0.84	178.73	2588.90	1.84 N	13.79 W	-1.86	0.07
2681.00	1.05	189.64	2680.89	0.33 N	13.92 W	-0.35	0.30
2776.00	0.87	212.09	2775.88	1.14 S	14.45 W	1.11	0.44
2870.00	0.90	223.40	2869.86	2.28 S	15.33 W	2.25	0.19
2965.00	0.83	229.63	2964.85	3.27 S	16.37 W	3.24	0.12
3060.00	0.81	232.90	3059.84	4.12 S	17.43 W	4.09	0.05
3154.00	0.59	213.67	3153.84	4.92 S	18.23 W	4.89	0.34
3249.00	0.92	216.65	3248.83	5.94 S	18.96 W	5.91	0.35
3343.00	1.03	218.88	3342.81	7.20 S	19.94 W	7.17	0.12
3438.00	1.60	267.92	3437.79	7.92 S	21.80 W	7.88	1.27
3533.00	3.65	272.09	3532.69	7.85 S	26.15 W	7.81	2.17
3627.00	3.32	270.30	3626.51	7.73 S	31.86 W	7.68	0.37
3722.00	5.44	267.78	3721.23	7.89 S	39.11 W	7.82	2.24
3817.00	6.00	274.70	3815.76	7.66 S	48.56 W	7.57	0.93
3911.00	7.07	278.35	3909.15	6.42 S	59.18 W	6.31	1.22
4006.00	6.58	275.90	4003.47	5.01 S	70.38 W	4.88	0.60
4100.00	8.44	274.99	4096.66	3.85 S	82.61 W	3.71	1.98

4195.00	7.59	274.35	4190.73	2.77 S	95.81 W	2.60	0.90
4289.00	7.15	272.81	4283.96	2.01 S	107.84 W	1.83	0.51
4384.00	6.68	268.84	4378.27	1.84 S	119.27 W	1.63	0.71
4479.00	6.79	277.03	4472.61	1.26 S	130.37 W	1.03	1.02
4573.00	7.73	275.70	4565.86	0.05 N	142.17 W	-0.30	1.02
4668.00	7.80	275.23	4659.99	1.27 N	154.95 W	-1.54	0.10
4762.00	7.50	274.59	4753.15	2.34 N	167.42 W	-2.63	0.33
4857.00	5.75	267.15	4847.51	2.60 N	178.35 W	-2.91	2.05
4952.00	5.21	262.23	4942.08	1.78 N	187.38 W	-2.11	0.75
5046.00	2.80	260.82	5035.84	0.84 N	193.88 W	-1.18	2.57
5141.00	1.24	240.14	5130.78	0.04 S	197.06 W	-0.30	1.79
5235.00	1.00	188.74	5224.77	1.36 S	198.07 W	1.01	1.06
5330.00	0.62	179.47	5319.76	2.69 S	198.19 W	2.35	0.42
5424.00	0.50	189.26	5413.75	3.61 S	198.25 W	3.26	0.16
5519.00	0.66	172.73	5508.75	4.56 S	198.25 W	4.21	0.24
5614.00	0.59	186.57	5603.74	5.59 S	198.23 W	5.24	0.17
5708.00	0.22	161.91	5697.74	6.24 S	198.23 W	5.89	0.43
5803.00	0.15	134.50	5792.74	6.50 S	198.09 W	6.15	0.12
5898.00	0.26	239.08	5887.74	6.70 S	198.18 W	6.35	0.35
5992.00	0.30	254.72	5981.74	6.87 S	198.60 W	6.53	0.09
6087.00	0.31	243.71	6076.74	7.05 S	199.07 W	6.70	0.06
6181.00	0.38	239.66	6170.74	7.32 S	199.57 W	6.97	0.08
6276.00	0.64	260.78	6265.73	7.57 S	200.37 W	7.22	0.33
6370.00	0.65	267.62	6359.73	7.67 S	201.42 W	7.32	0.08
6465.00	0.57	264.76	6454.72	7.74 S	202.43 W	7.39	0.09
6559.00	0.53	250.97	6548.72	7.92 S	203.30 W	7.57	0.15
6654.00	0.49	257.39	6643.71	8.15 S	204.11 W	7.80	0.07
6749.00	0.46	274.67	6738.71	8.21 S	204.89 W	7.85	0.15
6796.00	1.75	172.02	6785.70	8.91 S	204.98 W	8.55	4.05
6843.00	6.89	167.81	6832.55	12.38 S	204.28 W	12.02	10.95
6890.00	12.74	170.79	6878.84	20.25 S	202.86 W	19.90	12.49
6938.00	17.21	168.27	6925.20	32.44 S	200.57 W	32.09	9.41
6985.00	21.30	167.05	6969.56	47.57 S	197.24 W	47.23	8.74
7032.00	26.61	169.47	7012.50	66.25 S	193.40 W	65.92	11.49
7079.00	32.10	171.74	7053.45	88.98 S	189.68 W	88.65	11.92
7127.00	38.65	173.55	7092.57	116.53 S	186.16 W	116.20	13.82
7174.00	43.11	175.12	7128.10	147.13 S	183.14 W	146.81	9.74
7222.00	46.47	176.02	7162.16	180.84 S	180.54 W	180.52	7.12
7269.00	50.39	177.24	7193.34	215.93 S	178.48 W	215.62	8.56
7316.00	54.40	178.65	7222.02	253.14 S	177.16 W	252.83	8.86
7363.00	57.51	179.73	7248.33	292.07 S	176.62 W	291.76	6.89
7411.00	61.17	179.96	7272.80	333.35 S	176.51 W	333.04	7.64
7458.00	64.46	180.23	7294.27	375.15 S	176.58 W	374.85	7.02
7506.00	67.55	180.71	7313.79	419.00 S	176.94 W	418.69	6.50
7553.00	70.11	180.45	7330.76	462.82 S	177.38 W	462.51	5.47
7600.00	73.35	179.65	7345.49	507.45 S	177.42 W	507.14	7.08
7647.00	76.06	178.51	7357.89	552.77 S	176.69 W	552.46	6.22
7707.00	81.47	177.97	7369.57	611.57 S	174.88 W	611.26	9.06
7830.00	88.30	180.09	7380.53	733.98 S	172.82 W	733.68	5.81
7925.00	89.97	180.32	7381.97	828.97 S	173.16 W	828.67	1.77
8019.00	91.33	179.92	7380.90	922.96 S	173.35 W	922.66	1.51
8114.00	91.88	179.54	7378.24	1017.92 S	172.91 W	1017.62	0.70
8208.00	91.57	179.41	7375.41	1111.88 S	172.04 W	1111.57	0.36
8302.00	90.83	179.18	7373.44	1205.85 S	170.89 W	1205.55	0.82
8397.00	91.73	178.91	7371.32	1300.81 S	169.30 W	1300.51	0.99
8492.00	91.45	179.38	7368.68	1395.76 S	167.89 W	1395.47	0.58
8586.00	91.30	179.18	7366.43	1489.73 S	166.71 W	1489.43	0.27
8681.00	90.25	179.18	7365.14	1584.71 S	165.35 W	1584.42	1.11
8775.00	88.80	180.53	7365.92	1678.70 S	165.11 W	1678.41	2.11
8869.00	88.86	179.69	7367.84	1772.68 S	165.29 W	1772.39	0.90
8963.00	89.11	179.80	7369.51	1866.66 S	164.87 W	1866.37	0.29
9058.00	89.60	180.09	7370.58	1961.66 S	164.78 W	1961.36	0.60
9152.00	89.66	180.16	7371.18	2055.65 S	164.99 W	2055.36	0.10
9246.00	90.52	179.51	7371.04	2149.65 S	164.71 W	2149.36	1.15
9340.00	89.20	179.68	7371.27	2243.65 S	164.05 W	2243.36	1.42
9434.00	89.66	179.66	7372.20	2337.64 S	163.51 W	2337.35	0.49
9529.00	90.58	179.53	7372.00	2432.64 S	162.84 W	2432.35	0.98
9623.00	88.70	179.12	7372.59	2526.62 S	161.73 W	2526.34	2.05
9717.00	89.23	179.18	7374.29	2620.60 S	160.34 W	2620.31	0.57
9811.00	89.51	178.76	7375.33	2714.58 S	158.65 W	2714.30	0.54
9906.00	90.62	178.66	7375.22	2809.55 S	156.51 W	2809.27	1.17
10000.00	89.48	179.02	7375.14	2903.53 S	154.60 W	2903.26	1.27
10092.00	90.34	179.59	7375.28	2995.52 S	153.49 W	2995.25	1.12
10183.00	89.04	179.82	7375.77	3086.52 S	153.02 W	3086.25	1.45
10275.00	88.88	180.05	7376.24	3178.51 S	150.28 W	3178.24	2.78

10275.00	89.63	180.25	7376.84	3178.51 S	153.08 W	3178.24	0.79
10367.00	89.78	180.25	7377.31	3270.51 S	153.48 W	3270.24	0.16
10458.00	90.28	179.44	7377.27	3361.51 S	153.23 W	3361.23	1.05
10550.00	88.98	180.20	7377.86	3453.50 S	152.94 W	3453.23	1.64
10641.00	89.32	180.64	7379.21	3544.49 S	153.61 W	3544.22	0.61
10733.00	90.52	180.54	7379.34	3636.48 S	154.56 W	3636.21	1.31
10825.00	89.60	181.87	7379.24	3728.46 S	156.49 W	3728.18	1.76
10917.00	90.52	181.59	7379.15	3820.42 S	159.27 W	3820.13	1.05
11009.00	89.88	181.21	7378.82	3912.39 S	161.52 W	3912.10	0.81
11101.00	90.37	180.57	7378.62	4004.38 S	162.94 W	4004.08	0.88
11194.00	89.32	180.06	7378.88	4097.37 S	163.46 W	4097.08	1.26
11287.00	89.32	179.70	7379.98	4190.37 S	163.26 W	4190.07	0.39
11379.00	89.97	179.57	7380.55	4282.36 S	162.68 W	4282.07	0.72
11471.00	90.77	178.52	7379.96	4374.34 S	161.14 W	4374.06	1.43
11563.00	89.20	178.43	7379.98	4466.31 S	158.69 W	4466.02	1.71
11656.00	89.66	177.69	7380.90	4559.25 S	155.55 W	4558.97	0.94
11747.00	89.75	177.32	7381.37	4650.16 S	151.58 W	4649.89	0.42
11839.00	89.17	179.44	7382.24	4742.12 S	148.98 W	4741.85	2.39
11932.00	89.66	179.05	7383.19	4835.10 S	147.76 W	4834.84	0.67
12024.00	90.37	179.31	7383.17	4927.09 S	146.44 W	4926.83	0.82
12115.00	90.37	178.39	7382.58	5018.07 S	144.61 W	5017.81	1.01
12206.00	90.40	177.35	7381.97	5109.00 S	141.23 W	5108.75	1.14
12299.00	90.34	179.02	7381.37	5201.95 S	138.29 W	5201.70	1.80
12390.00	90.86	179.87	7380.41	5292.94 S	137.41 W	5292.69	1.09
12482.00	89.69	179.28	7379.97	5384.94 S	136.72 W	5384.69	1.42
12574.00	89.20	179.91	7380.86	5476.93 S	136.07 W	5476.68	0.87
12665.00	89.14	180.55	7382.18	5567.92 S	136.44 W	5567.67	0.71
12758.00	89.20	180.75	7383.53	5660.90 S	137.49 W	5660.65	0.22
12852.00	89.41	181.11	7384.67	5754.88 S	139.02 W	5754.63	0.44
12946.00	89.17	180.46	7385.83	5848.87 S	140.31 W	5848.61	0.74
13040.00	89.45	179.84	7386.97	5942.86 S	140.55 W	5942.60	0.72
13134.00	90.09	181.06	7387.34	6036.85 S	141.29 W	6036.60	1.47
13228.00	89.69	180.70	7387.52	6130.84 S	142.73 W	6130.58	0.57
13322.00	90.03	181.24	7387.75	6224.83 S	144.33 W	6224.57	0.68
13417.00	89.78	179.93	7387.91	6319.82 S	145.30 W	6319.56	1.40
13510.00	90.00	179.48	7388.09	6412.82 S	144.82 W	6412.56	0.54
13604.00	90.58	180.18	7387.61	6506.82 S	144.54 W	6506.55	0.97
13699.00	90.00	179.76	7387.13	6601.81 S	144.49 W	6601.55	0.75
13793.00	89.63	178.76	7387.44	6695.80 S	143.27 W	6695.54	1.13
13887.00	89.91	180.09	7387.81	6789.80 S	142.33 W	6789.54	1.45
13981.00	90.65	180.89	7387.35	6883.79 S	143.13 W	6883.53	1.16
14076.00	90.83	179.92	7386.13	6978.78 S	143.81 W	6978.52	1.04
14170.00	91.60	180.02	7384.13	7072.76 S	143.76 W	7072.50	0.83
14265.00	90.22	179.72	7382.63	7167.74 S	143.54 W	7167.48	1.49
14359.00	89.48	179.49	7382.87	7261.74 S	142.89 W	7261.48	0.82
14454.00	90.31	178.78	7383.05	7356.73 S	141.46 W	7356.47	1.15
14549.00	90.98	178.78	7381.98	7451.70 S	139.44 W	7451.44	0.71
14643.00	90.12	180.06	7381.07	7545.69 S	138.48 W	7545.43	1.64
14738.00	89.54	180.35	7381.36	7640.69 S	138.82 W	7640.43	0.68
14832.00	90.06	179.50	7381.68	7734.68 S	138.70 W	7734.43	1.06
14926.00	88.86	179.69	7382.57	7828.68 S	138.04 W	7828.42	1.29
15020.00	88.52	180.15	7384.72	7922.65 S	137.91 W	7922.40	0.61
15114.00	89.72	179.66	7386.16	8016.64 S	137.75 W	8016.38	1.38
15208.00	89.94	179.04	7386.44	8110.63 S	136.68 W	8110.38	0.70
15302.00	90.22	178.42	7386.31	8204.61 S	134.60 W	8204.36	0.72
15397.00	89.88	178.43	7386.23	8299.57 S	131.99 W	8299.33	0.36
15491.00	89.81	176.67	7386.48	8393.48 S	127.97 W	8393.24	1.87
15586.00	91.30	178.29	7385.56	8488.38 S	123.79 W	8488.15	2.32
15680.00	90.65	179.87	7383.96	8582.35 S	122.28 W	8582.12	1.82
15775.00	91.05	179.59	7382.55	8677.34 S	121.84 W	8677.11	0.51
15869.00	89.29	179.81	7382.27	8771.33 S	121.34 W	8771.11	1.89
15963.00	89.85	180.08	7382.98	8865.33 S	121.25 W	8865.10	0.66
16057.00	88.15	181.06	7384.62	8959.31 S	122.19 W	8959.08	2.09
16151.00	88.65	181.29	7387.24	9053.25 S	124.12 W	9053.02	0.59
16245.00	88.67	181.01	7389.44	9147.20 S	126.00 W	9146.97	0.30
16339.00	88.92	180.39	7391.42	9241.18 S	127.15 W	9240.94	0.71
16433.00	89.54	179.91	7392.68	9335.17 S	127.40 W	9334.93	0.83
16528.00	90.28	178.98	7392.83	9430.16 S	126.48 W	9429.92	1.25
16623.00	90.74	179.94	7391.99	9525.15 S	125.58 W	9524.92	1.12
16717.00	91.36	179.64	7390.26	9619.13 S	125.24 W	9618.90	0.73
16812.00	91.70	178.84	7387.73	9714.09 S	123.98 W	9713.86	0.91
16907.00	90.86	179.64	7385.61	9809.06 S	122.72 W	9808.83	1.22
17002.00	90.99	179.70	7384.07	9904.04 S	122.17 W	9903.81	0.15
17097.00	89.32	180.84	7383.81	9999.04 S	122.62 W	9998.81	2.13
17192.00	89.48	180.33	7384.81	10094.03 S	123.59 W	10093.79	0.56

17287.00	89.91	179.88	7385.32	10189.02 S	123.76 W	10188.79	0.66
17382.00	90.25	178.96	7385.18	10284.02 S	122.80 W	10283.79	1.03
17477.00	90.65	178.50	7384.44	10378.99 S	120.69 W	10378.76	0.64
17572.00	91.48	178.84	7382.67	10473.95 S	118.49 W	10473.72	0.94
17663.00	91.64	177.93	7380.19	10564.88 S	115.93 W	10564.66	1.01
17717.00	91.64	177.93	7378.65	10618.82 S	113.98 W	10618.60	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 179.90 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.58 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 17717.00 FEET
IS 10619.43 FEET ALONG 180.61 DEGREES (TRUE)**

Directional surveys tied onto Gyro's @ 1208' MD. Final Survey is a straightline projection to bit.

Date Printed:15 September 2014