

PCG Pressure Case Gamma PCD Pressure Case Directional

[illegible]

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	14-Jun-14	15-Jun-14	21-Jun-14		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.750	6.750	4.700		
Log Start Depth (MD, ft)	840.00	5,926.00	6,957.00		
Log End Depth (MD, ft)	5,926.00	6,957.00	16,306.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	13-Jun-14 14:30	14-Jun-14 16:00	16-Jun-14 14:00		
Drill/Wipe End Date and Time	14-Jun-14 08:45	15-Jun-14 04:30	20-Jun-14 17:00		
Min Inc (deg) @ Depth (MD, ft)	0.11 @ 1,548.00	0.28 @ 5,949.00	85.59 @ 11,734.00		
Max Inc (deg) @ Depth (MD, ft)	8.72 @ 3,156.00	83.23 @ 6,906.00	93.39 @ 8,169.00		
Bit TFA(in2) / Bit Type	0.91 / PDC	1.24 / PDC	0.98 / PDC		
Flow Rate (gpm)	600.00	595.31	297.39		
Max AV (fpm) / CV (fpm) @ MWD	417.0 / 0.0	417.0 / 0.0	414.0 / 0.0		
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	8.60 / 29.00	10.30 / 38.00	9.50 / 35.00		
Filtrate CL (ppm)	2,700.00	2,500.00	2,200.00		
pH / Fluid Loss (mptm)	9.00 / 12	9.80 / 0	9.40 / 8		
PV (cP) / YP (lbf2)	3 / 4.00	12 / 11.00	9 / 11.00		
% Solids / % Sand	2.20 / 0.25	10.4 / .15	4.90 / 0.05		
% Oil / Oil:Water Ratio	NA / NA	NA / NA	1.50 / NA		
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 (in F) / S	170.40 / PDM	170.07 / PDM	200.51 / PDM		

Max Tool Temp (degF) / Source	150.10 / PCM	170.37 / PCM	239.54 / PCM		
Rm @ Max Tool Temp (degF)	NA @ 150.10	NA @ 170.37	NA @ 239.54		
Lead MWD Engineer	William Lawrence	William Lawrence	William Lawrence		
Customer Representative	Johnny Sanchez	Johnny Sanchez	Matt Settles		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.84	5.84	5.93		
Sub Serial Number	11341339	11341339	12334774		
Insert Serial Number	11227556	11227556	11400994		
Date and Time Initialized	12-Jun-14 14:59	01-Jan-70 00:00	15-Jun-14 14:24		
Date and Time Read	15-Jun-14 09:18	15-Jun-14 09:32	21-Jun-14 09:23		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	53.00	51.00	64.00		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11341339	11341339	12334774		
Sonde Serial Number	11297584	11297584	11062120		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	188.49	253.33	37.82		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	46.25	44.00	57.26		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11341339	11341339	12334774		
Insert/Sonde Serial Number	11579843	11579843	11579775		

REMARKS

1. All depths are measured 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

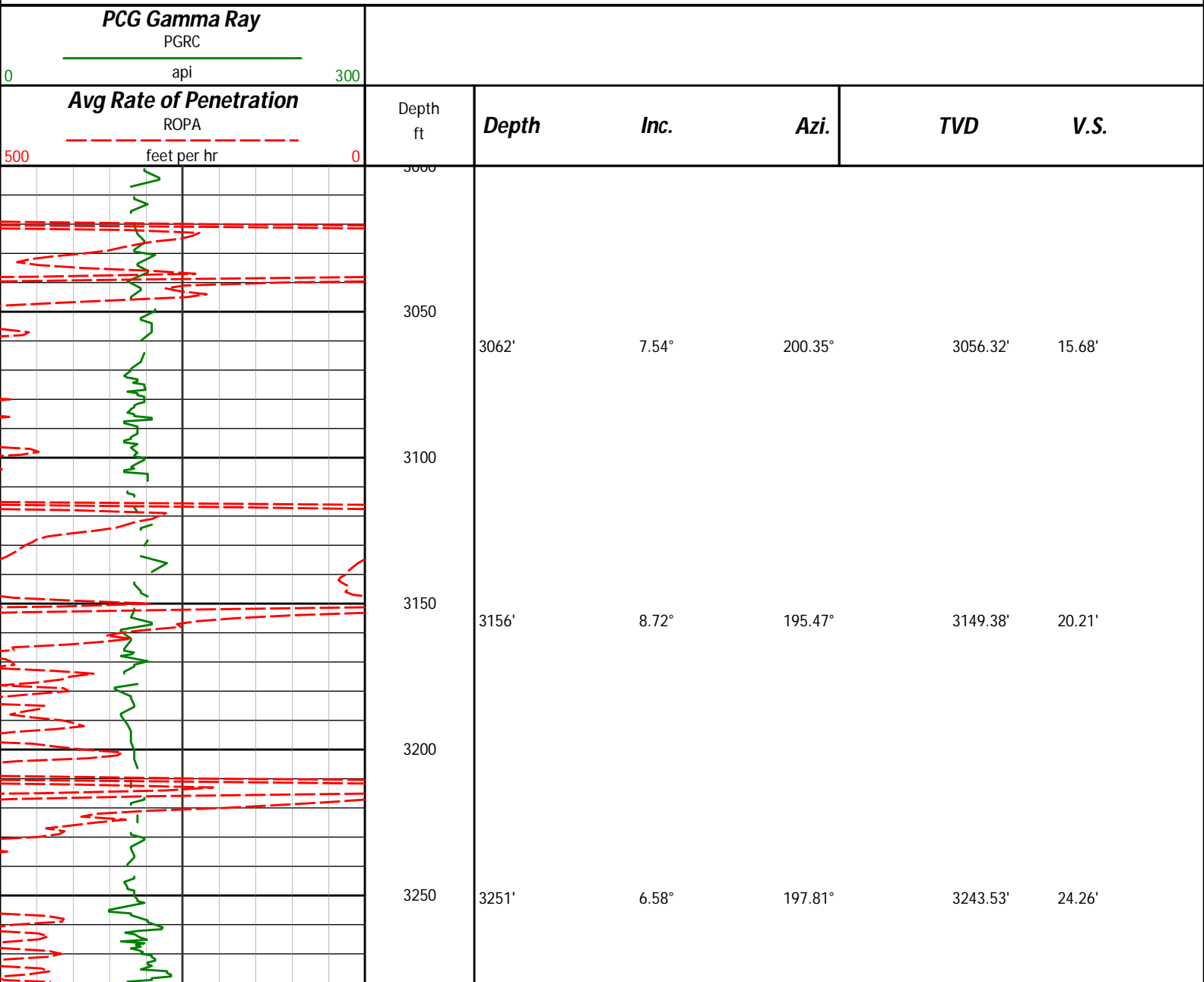
WARRANTY

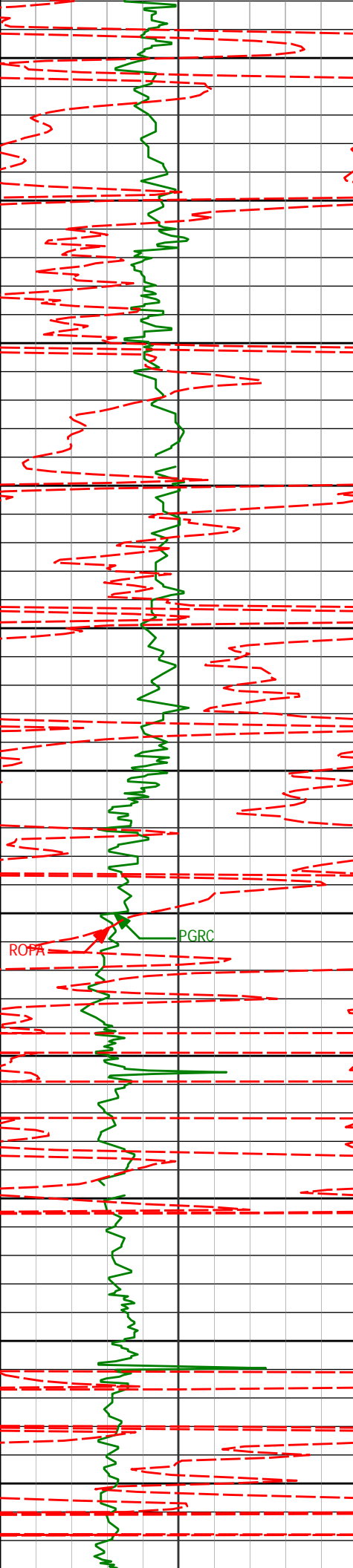
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HALLIBURTON Sperry Drilling Services

MD Main Log 1:600

Noble Energy
NCLP AA06-66-1BHNA
H&P 343
T6N-R63W





3300

3350

3400

3450

3500

3550

3600

3650

3700

3750

3800

3345'

6.22°

193.87°

3336.94'

27.52'

3440'

7.06°

182.83°

3431.31'

29.46'

3535'

5.76°

177.66°

3525.71'

29.96'

3629'

6.23°

189.66°

3619.20'

31.00'

3724'

5.72°

193.54°

3713.69'

33.34'

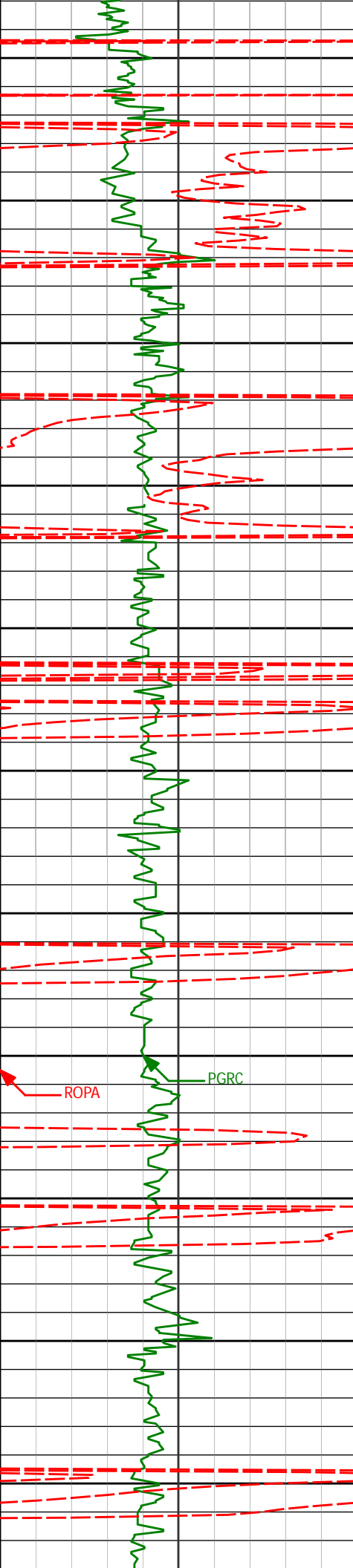
3819'

5.46°

202.07°

3808.24'

36.49'



3850

3900

3950

4000

4050

4100

4150

4200

4250

4300

4350

3913'

4.23°

210.50°

3901.90'

40.20'

4007'

1.07°

232.17°

3995.79'

42.79'

4101'

0.92°

232.67°

4089.77'

44.12'

4195'

0.62°

249.41°

4183.77'

45.22'

4290'

0.52°

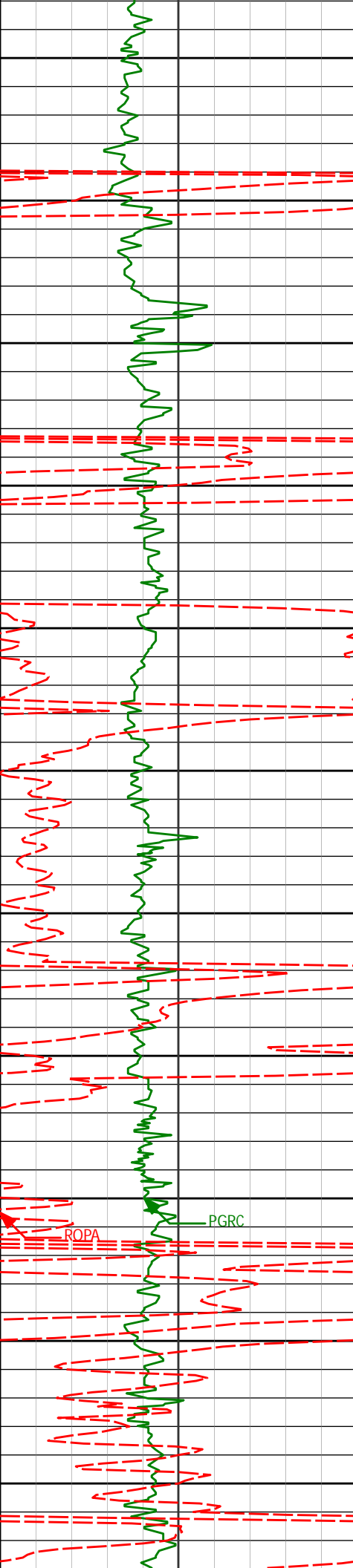
134.08°

4278.76'

45.41'

ROPA

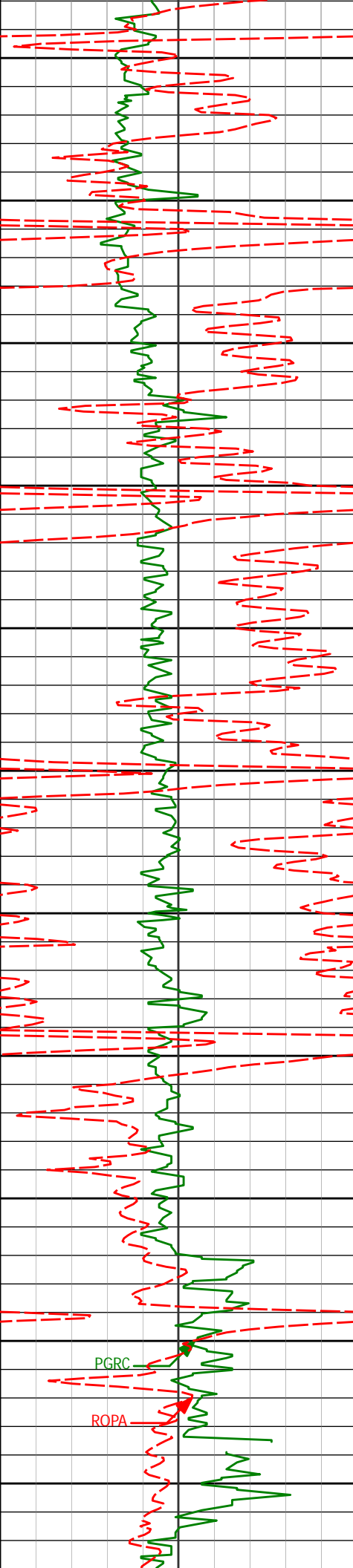
PGRC



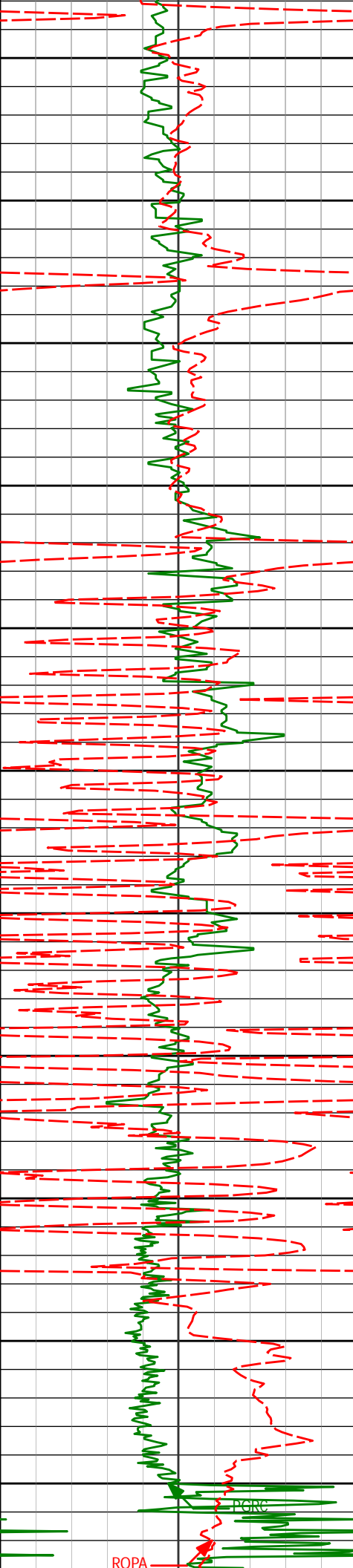
4385'	0.92°	120.47°	4373.76'	44.47'
4400				
4450				
4480'	1.02°	124.83°	4468.74'	43.15'
4500				
4550				
4574'	0.84°	180.67°	4562.73'	42.52'
4600				
4650				
4669'	0.63°	183.90°	4657.72'	42.61'
4700				
4750				
4763'	0.86°	184.35°	4751.72'	42.74'
4800				
4850				
4858'	0.26°	158.25°	4846.71'	42.75'
4900				

POPA

PGRC



4950	4953'	0.87°	157.15°	4941.71'	42.43'
5000					
5050	5048'	0.86°	156.46°	5036.69'	41.91'
5100					
5150	5143'	0.61°	133.20°	5131.69'	41.30'
5200					
5250	5238'	0.33°	193.01°	5226.68'	41.02'
5300					
5350	5332'	0.85°	177.78°	5320.68'	41.09'
5400					
5450	5427'	1.10°	175.91°	5415.67'	41.06'



5500

5550

5600

5650

5700

5750

5800

5850

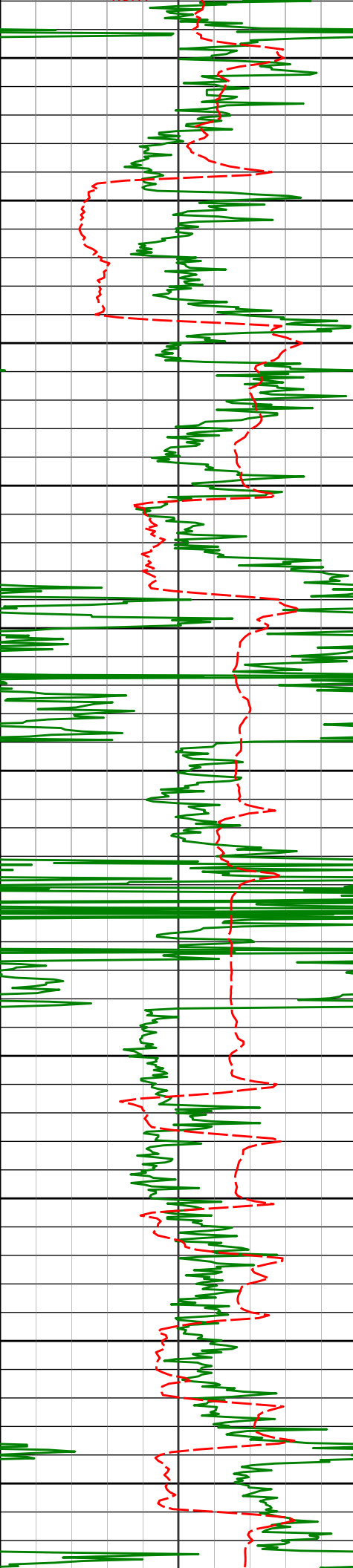
5900

5950

6000

Run 200

5522'	0.93°	189.17°	5510.65'	41.18'
5616'	0.96°	186.95°	5604.64'	41.45'
5711'	0.90°	237.68°	5699.63'	42.23'
5806'	0.74°	192.84°	5794.62'	43.03'
5873'	0.11°	243.25°	5861.62'	43.20'
5949'	0.28°	237.31°	5937.62'	43.47'
5995'	2.06°	259.96°	5983.60'	44.38'



6050

6100

6150

6200

6250

6300

6350

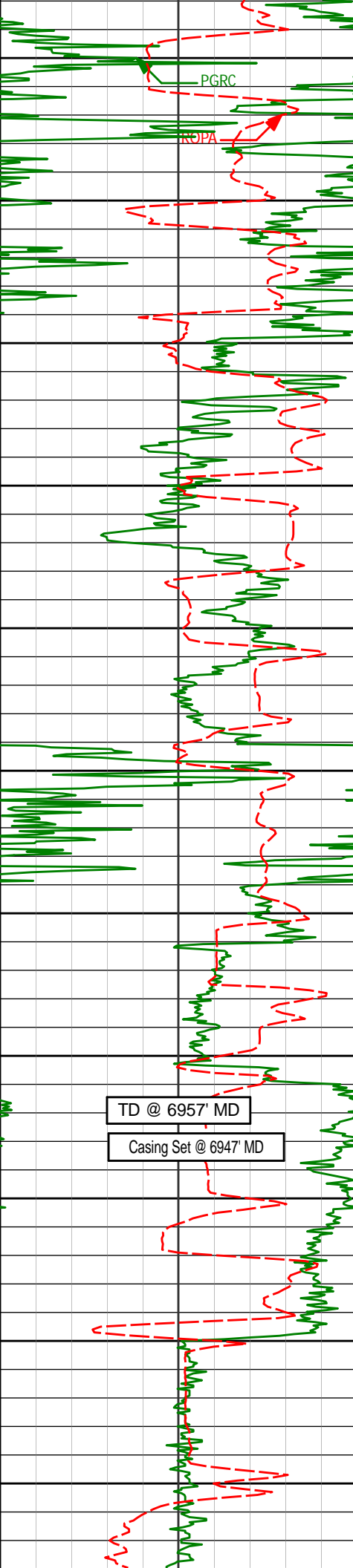
6400

6450

6500

6550

6043'	9.16°	265.01°	6031.34'	49.06'
6090'	14.66°	264.43°	6077.31'	58.74'
6185'	19.68°	260.22°	6168.05'	86.62'
6280'	25.86°	269.37°	6255.64'	123.23'
6374'	37.25°	270.07°	6335.61'	172.31'
6469'	47.48°	270.11°	6405.70'	236.19'
6563'	52.91°	270.55°	6465.86'	308.30'



6600

PGRC

ROPA

6650

6658'

60.71°

271.93°

6517.83'

387.60'

6700

6750

6753'

68.62°

272.08°

6558.44'

473.16'

6800

6850

6848'

75.27°

271.27°

6587.87'

563.22'

6900

6906'

83.23°

271.01°

6598.68'

620.06'

6950

TD @ 6957' MD

Casing Set @ 6947' MD

7000

7031'

85.93°

270.41°

6610.49'

744.33'

7050

7100

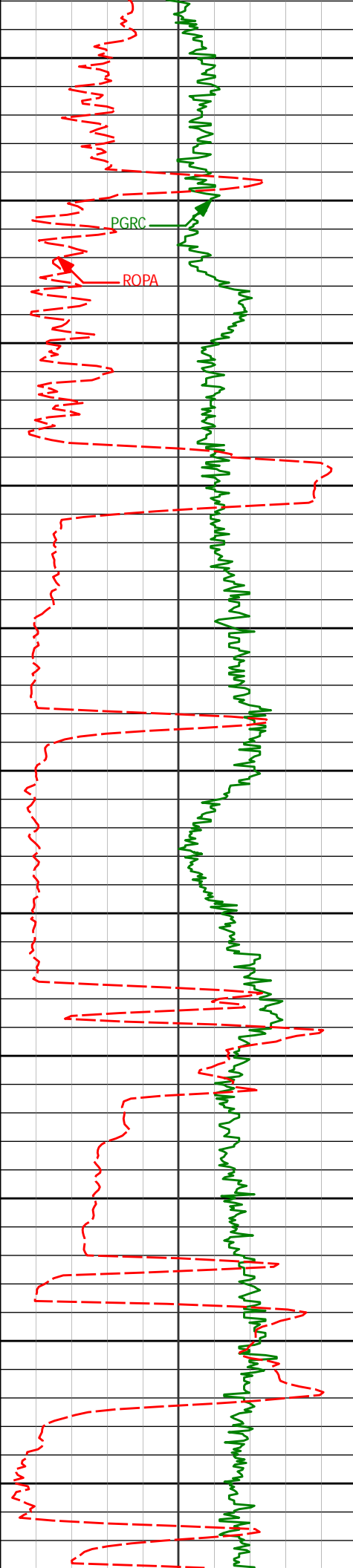
7126'

87.16°

269.61°

6616.21'

839.08'



7150

7200

7250

7300

7350

7400

7450

7500

7550

7600

7650

7221'

86.89°

268.87°

6621.14'

933.92'

7316'

88.00°

268.08°

6625.38'

1028.82'

7411'

87.60°

267.10°

6629.02'

1123.75'

7506'

89.32°

266.63°

6631.58'

1218.70'

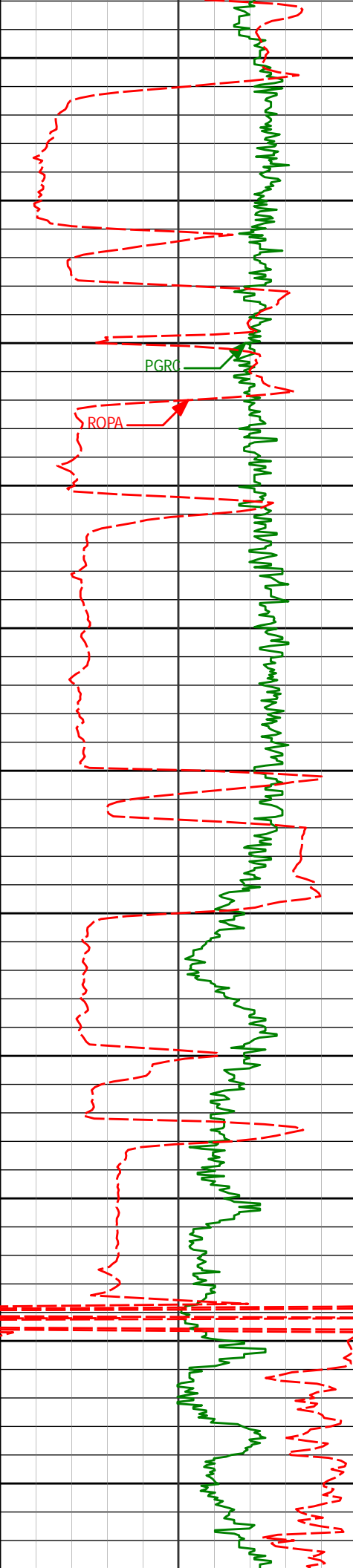
7601'

89.57°

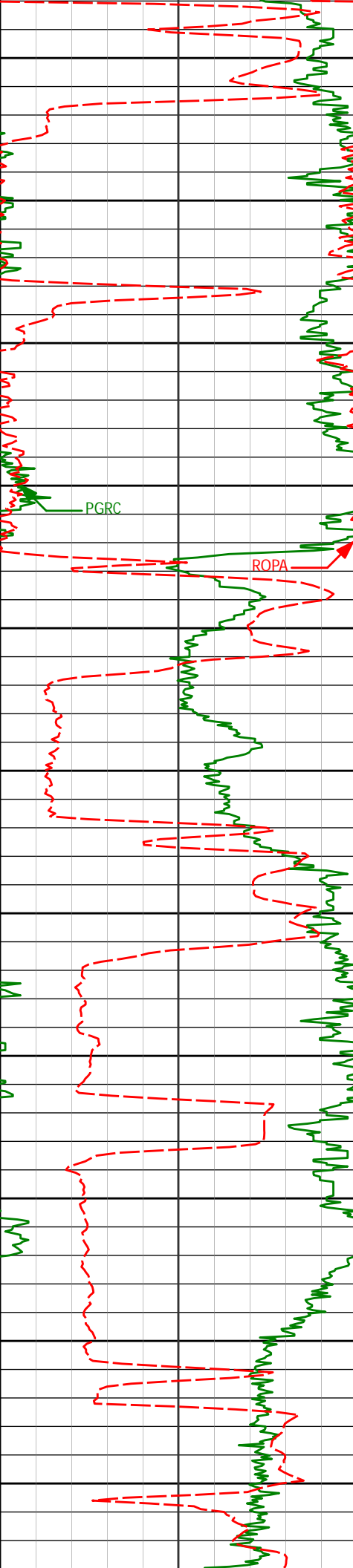
266.97°

6632.50'

1313.68'



7700	7696'	89.91°	267.52°	6632.93'	1408.67'
7750					
7800	7791'	89.51°	269.31°	6633.41'	1503.66'
7850					
7900	7886'	88.58°	270.22°	6634.99'	1598.59'
7950					
8000	7980'	90.40°	271.34°	6635.83'	1692.44'
8050					
8100	8075'	91.60°	271.21°	6634.17'	1787.24'
8150					
8200	8169'	93.39°	270.15°	6630.08'	1881.03'



8250

8264'

91.85°

269.23°

6625.74'

1975.87'

8300

8350

8359'

92.19°

267.95°

6622.39'

2070.80'

8400

PGRC

ROPA

8450

8453'

91.08°

268.57°

6619.71'

2164.76'

8500

8550

8547'

89.91°

269.64°

6618.90'

2258.73'

8600

8650

8642'

90.22°

269.28°

6618.79'

2353.69'

8700

8750

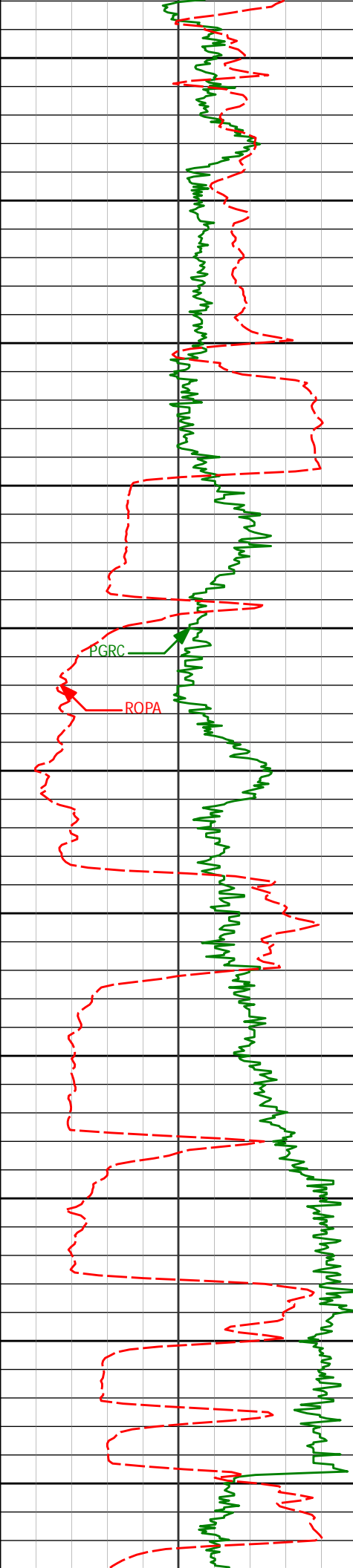
8736'

88.03°

268.25°

6620.22'

2447.65'



8800

8831'

87.75°

266.85°

6623.72'

2542.59'

8850

8900

8925'

90.49°

268.62°

6625.16'

2636.56'

8950

9000

9020'

91.94°

267.75°

6623.15'

2731.54'

9050

9100

9114'

90.22°

268.66°

6621.38'

2825.51'

9150

9200

9209'

90.37°

267.51°

6620.89'

2920.51'

9250

9300

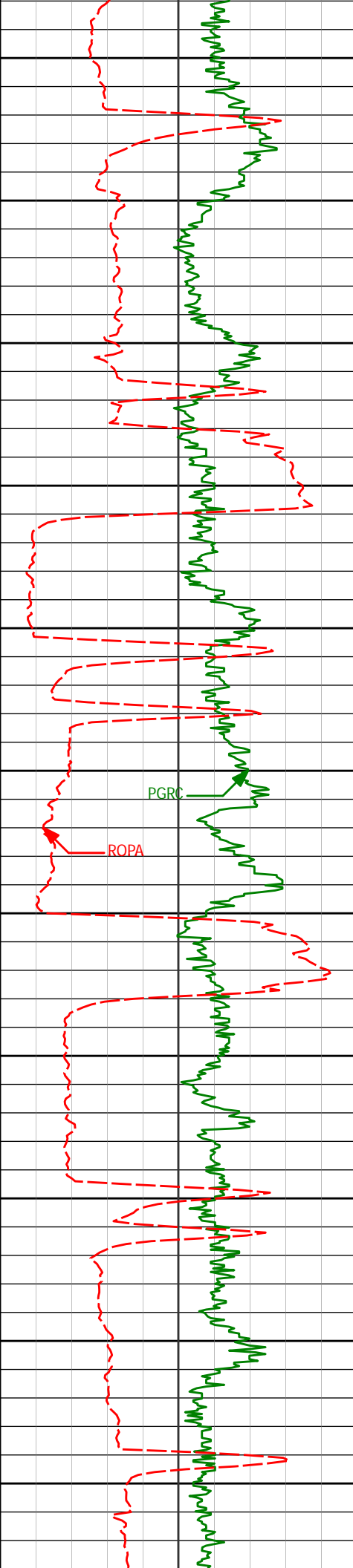
9303'

87.81°

267.65°

6622.38'

3014.49'



9350

9400

9450

9500

9550

9600

9650

9700

9750

9800

9850

9397'	86.73°	267.21°	6626.86'	3108.38'
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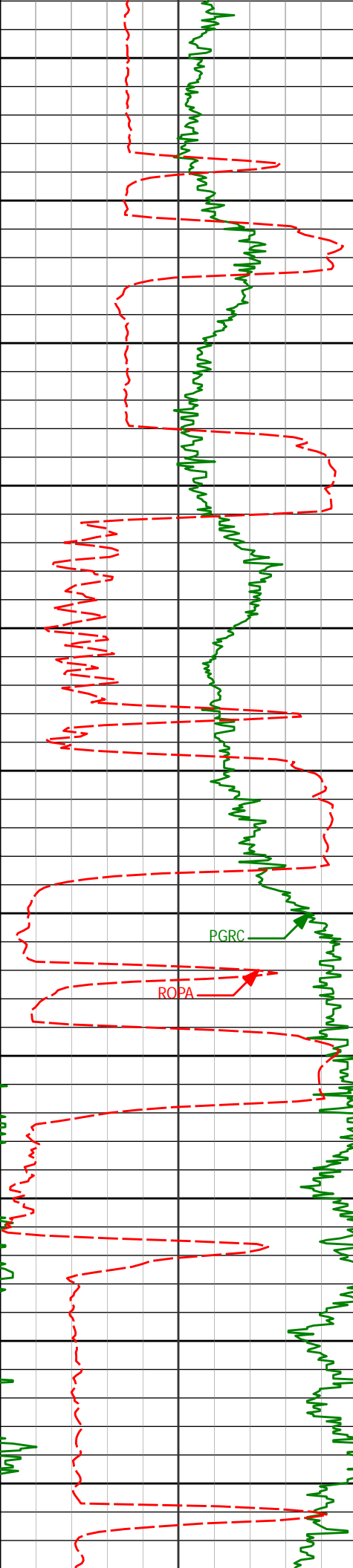
9492'	86.39°	268.29°	6632.56'	3203.20'
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9587'	86.02°	268.51°	6638.85'	3297.99'
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9681'	88.64°	269.03°	6643.23'	3391.87'
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9776'	90.43°	268.74°	6644.00'	3486.84'
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9871'	91.32°	267.87°	6642.55'	3581.83'
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9900

9950

10000

10050

10100

10150

10200

10250

10300

10350

10400

9965'

92.34°

268.27°

6639.54'

3675.77'

10060'

90.25°

267.78°

6637.40'

3770.74'

10155'

90.62°

268.46°

6636.68'

3865.74'

10249'

89.32°

271.39°

6636.73'

3959.66'

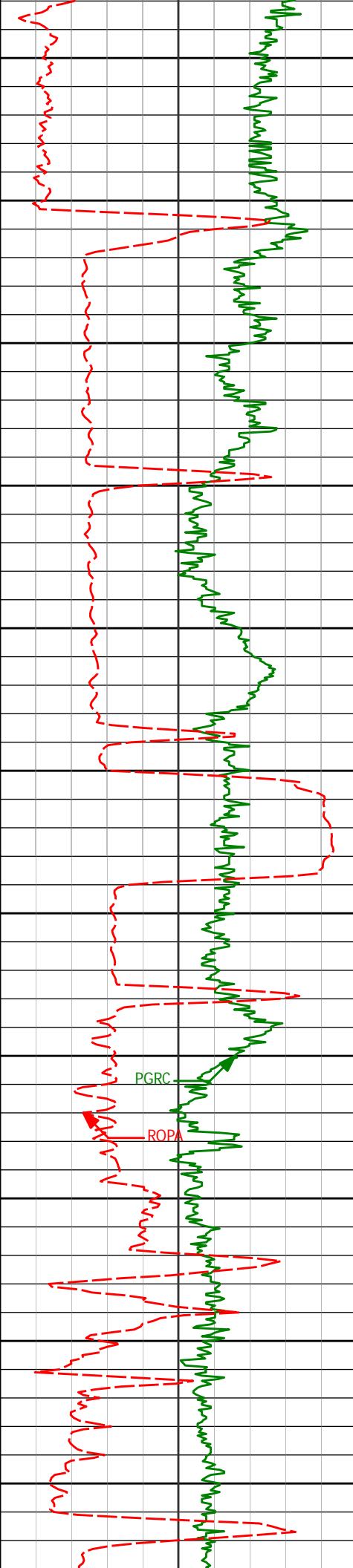
10343'

89.29°

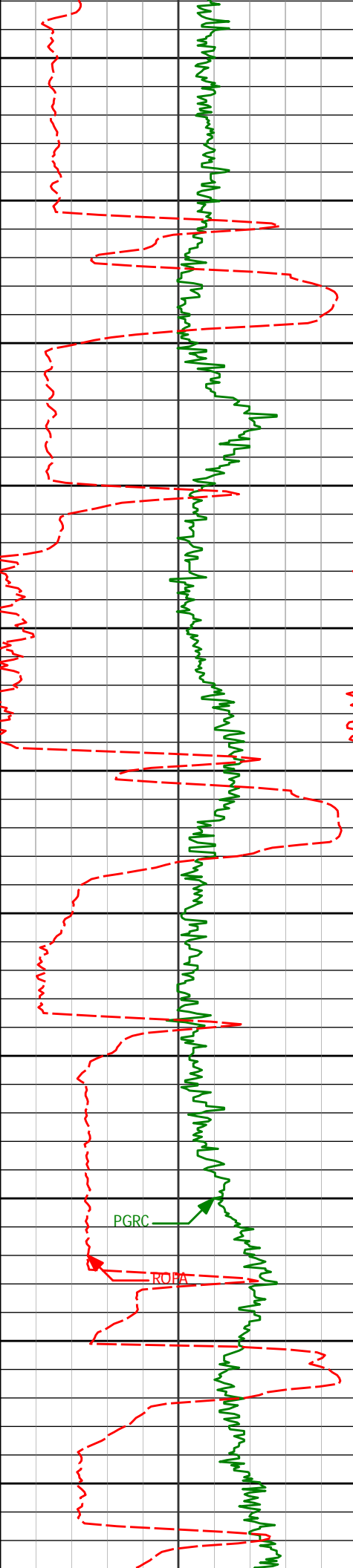
271.31°

6637.87'

4053.47'



10450	10435'	89.32°	269.93°	6638.98'	4145.35'
10500					
10550	10527'	89.78°	268.96°	6639.70'	4237.31'
10600					
10650	10620'	90.00°	267.80°	6639.88'	4330.30'
10700					
10750	10713'	90.25°	268.74°	6639.68'	4423.30'
10800					
10850	10806'	89.69°	270.48°	6639.73'	4516.25'
10900					
10950	10898'	89.08°	269.08°	6640.72'	4608.18'



11000

11050

11100

11150

11200

11250

11300

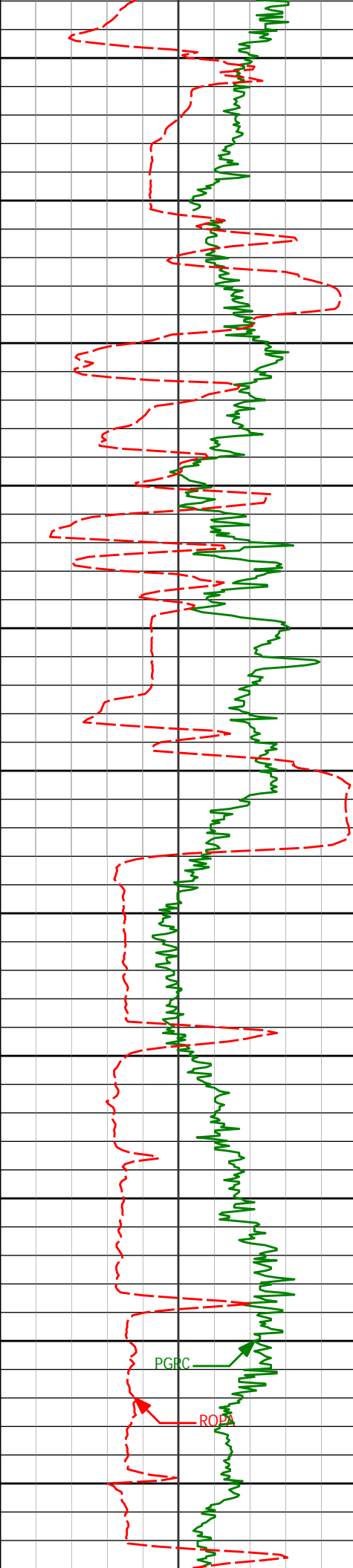
11350

11400

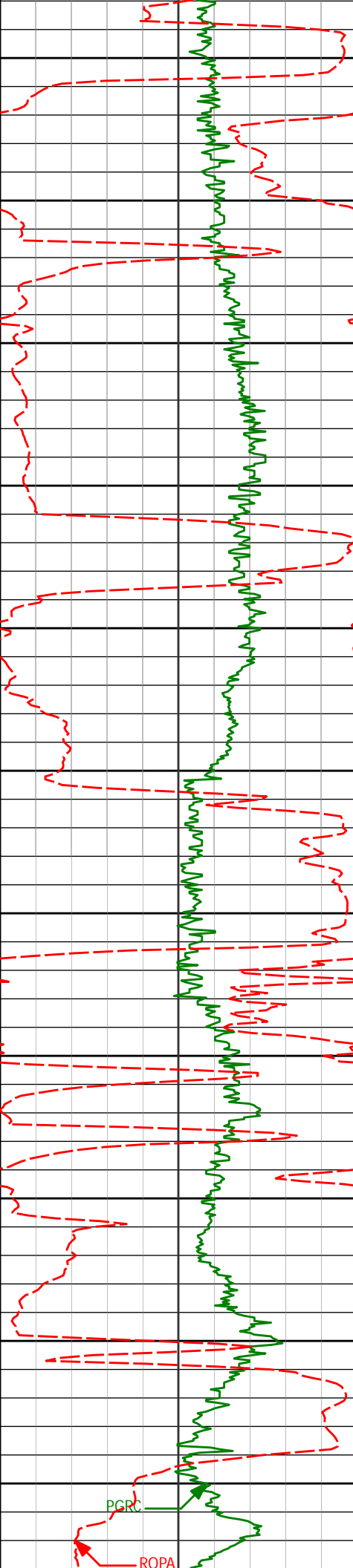
11450

11500

10991'	89.69°	268.49°	6641.71'	4701.16'
11083'	89.78°	269.43°	6642.14'	4793.14'
11175'	90.34°	269.17°	6642.04'	4885.11'
11268'	88.95°	269.67°	6642.62'	4978.07'
11361'	88.89°	268.94°	6644.37'	5071.02'
11455'	88.80°	268.93°	6646.27'	5164.98'



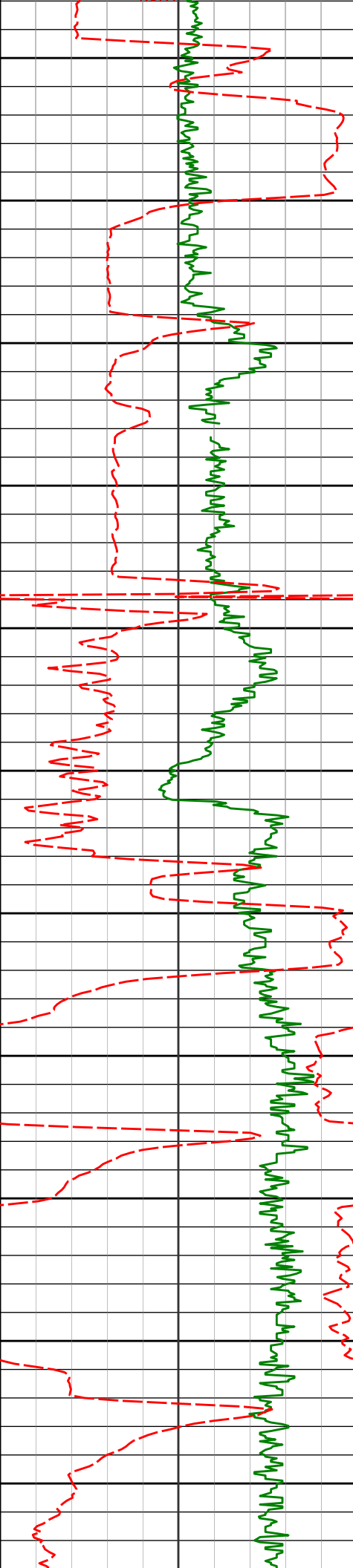
11550	11546'	86.89°	267.52°	6649.69'	5255.91'
11600					
11650	11641'	87.29°	268.17°	6654.51'	5350.78'
11700					
11750	11734'	85.59°	267.46°	6660.29'	5443.60'
11800					
11850	11828'	86.82°	269.23°	6666.51'	5537.38'
11900					
11950	11920'	87.63°	268.04°	6670.96'	5629.26'
12000					
12050	12011'	87.87°	267.24°	6674.54'	5720.19'



12100	12103'	88.43°	268.05°	6677.51'	5812.14'
12150					
12200	12198'	88.30°	267.25°	6680.22'	5907.10'
12250					
12300	12293'	89.66°	265.92°	6681.91'	6002.06'
12350					
12400	12388'	90.95°	268.60°	6681.40'	6097.05'
12450					
12500	12482'	92.10°	268.68°	6678.90'	6191.00'
12550					
12600	12577'	92.16°	269.52°	6675.37'	6285.91'

PGRC

ROPA



12650

12671'

90.80°

271.32°

6672.94'

6379.77'

12700

12750

12766'

90.25°

271.94°

6672.07'

6474.56'

12800

12850

12866'

90.99°

270.61°

6670.99'

6574.36'

12900

12950

12961'

90.03°

270.20°

6670.14'

6669.26'

13000

13050

13056'

89.75°

269.72°

6670.33'

6764.19'

13100

13150

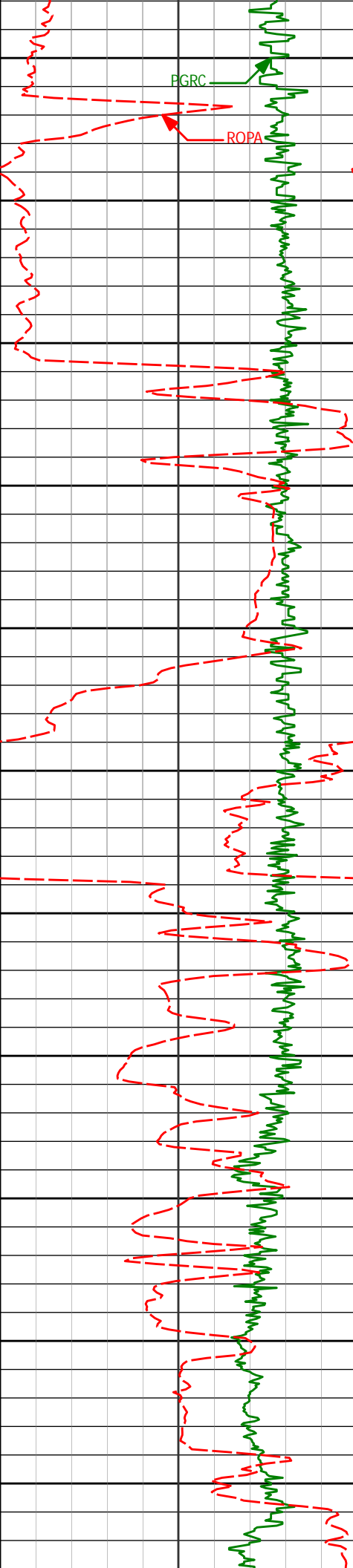
13151'

89.94°

269.36°

6670.58'

6859.15'



13200

13250

13300

13350

13400

13450

13500

13550

13600

13650

13700

13246'

90.71°

268.87°

6670.04'

6954.12'

13341'

89.41°

268.43°

6669.94'

7049.10'

13436'

89.94°

267.59°

6670.48'

7144.10'

13530'

88.83°

267.02°

6671.49'

7238.09'

13625'

88.21°

265.88°

6673.95'

7333.03'

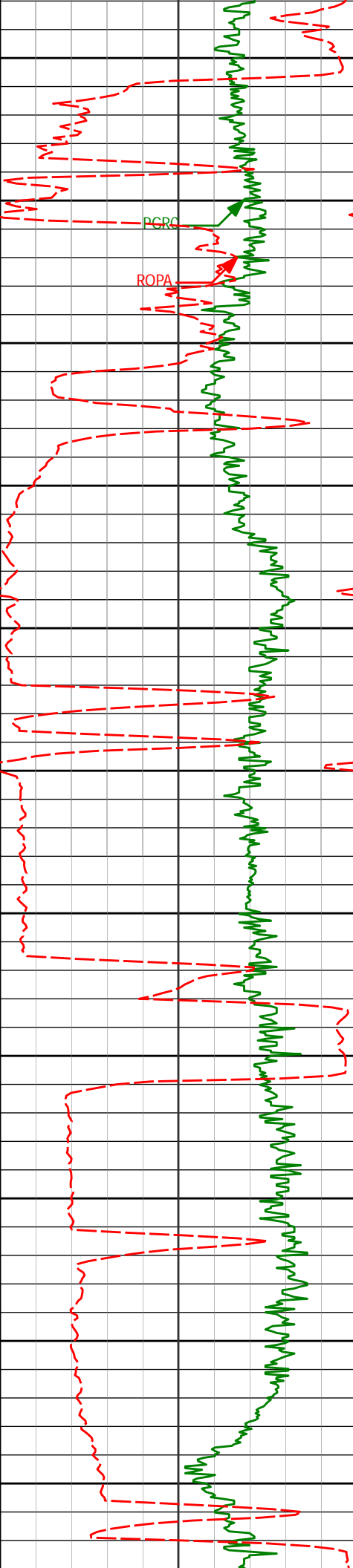
13719'

89.17°

267.56°

6676.10'

7426.98'



13750

13800

13850

13900

13950

14000

14050

14100

14150

14200

14250

13814'

89.69°

268.45°

6677.04'

7521.98'

13909'

90.55°

269.11°

6676.84'

7616.96'

14004'

90.68°

267.95°

6675.82'

7711.95'

14099'

90.74°

269.72°

6674.64'

7806.92'

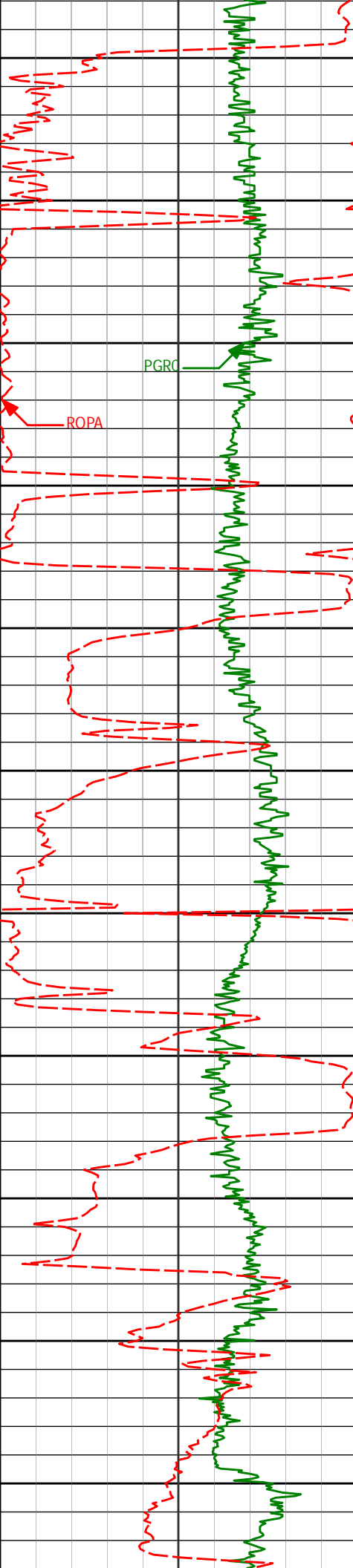
14194'

90.89°

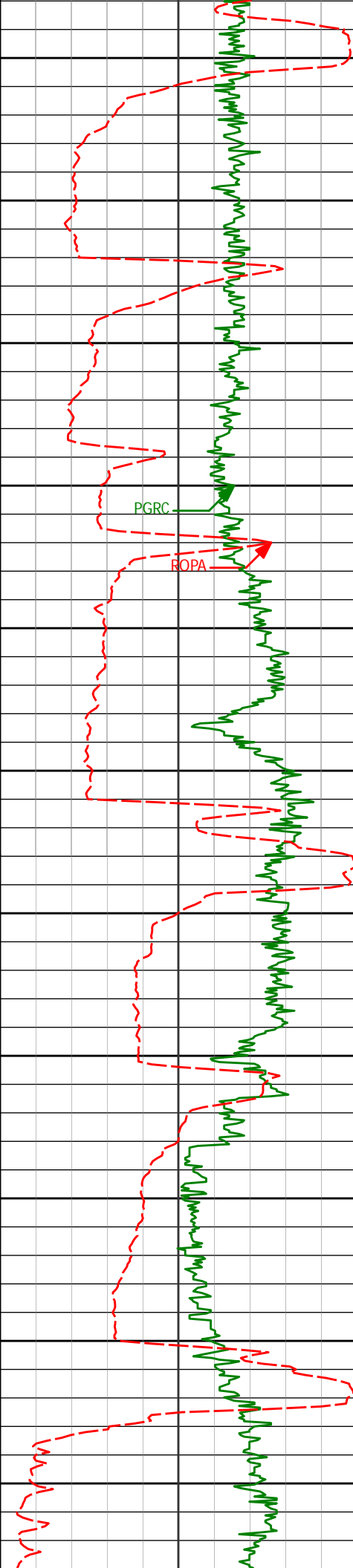
268.85°

6673.29'

7901.88'



14289'	89.48°	269.23°	6672.99'	7996.85'
14300				
14350				
14384'	89.66°	267.58°	6673.70'	8091.84'
14400				
14450				
14479'	89.69°	267.86°	6674.24'	8186.84'
14500				
14550				
14574'	89.57°	267.39°	6674.85'	8281.84'
14600				
14650				
14669'	89.88°	269.68°	6675.31'	8376.82'
14700				
14750				
14764'	90.86°	269.23°	6674.69'	8471.78'
14800				



14850

14859'

89.75°

269.63°

6674.19'

8566.74'

14900

14950

14953'

89.08°

268.44°

6675.15'

8660.71'

15000

PGRC

ROPA

15050

15048'

88.74°

267.52°

6676.96'

8755.69'

15100

15150

15143'

89.05°

268.46°

6678.79'

8850.67'

15200

15250

15238'

89.29°

267.68°

6680.16'

8945.66'

15300

15350

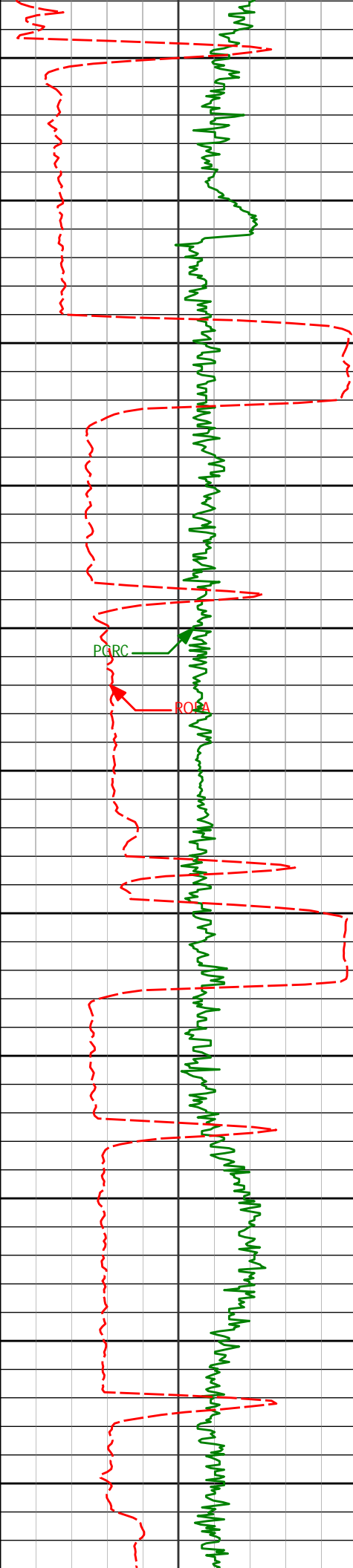
15333'

91.36°

270.96°

6679.63'

9040.60'



15400

15427'

91.97°

269.73°

6676.89'

9134.47'

15450

15500

15522'

90.28°

271.24°

6675.03'

9229.34'

15550

15600

15617'

90.86°

270.52°

6674.08'

9324.19'

15650

15700

15712'

88.86°

272.08°

6674.32'

9419.01'

15750

15800

15807'

88.64°

271.90°

6676.39'

9513.73'

15850

15900

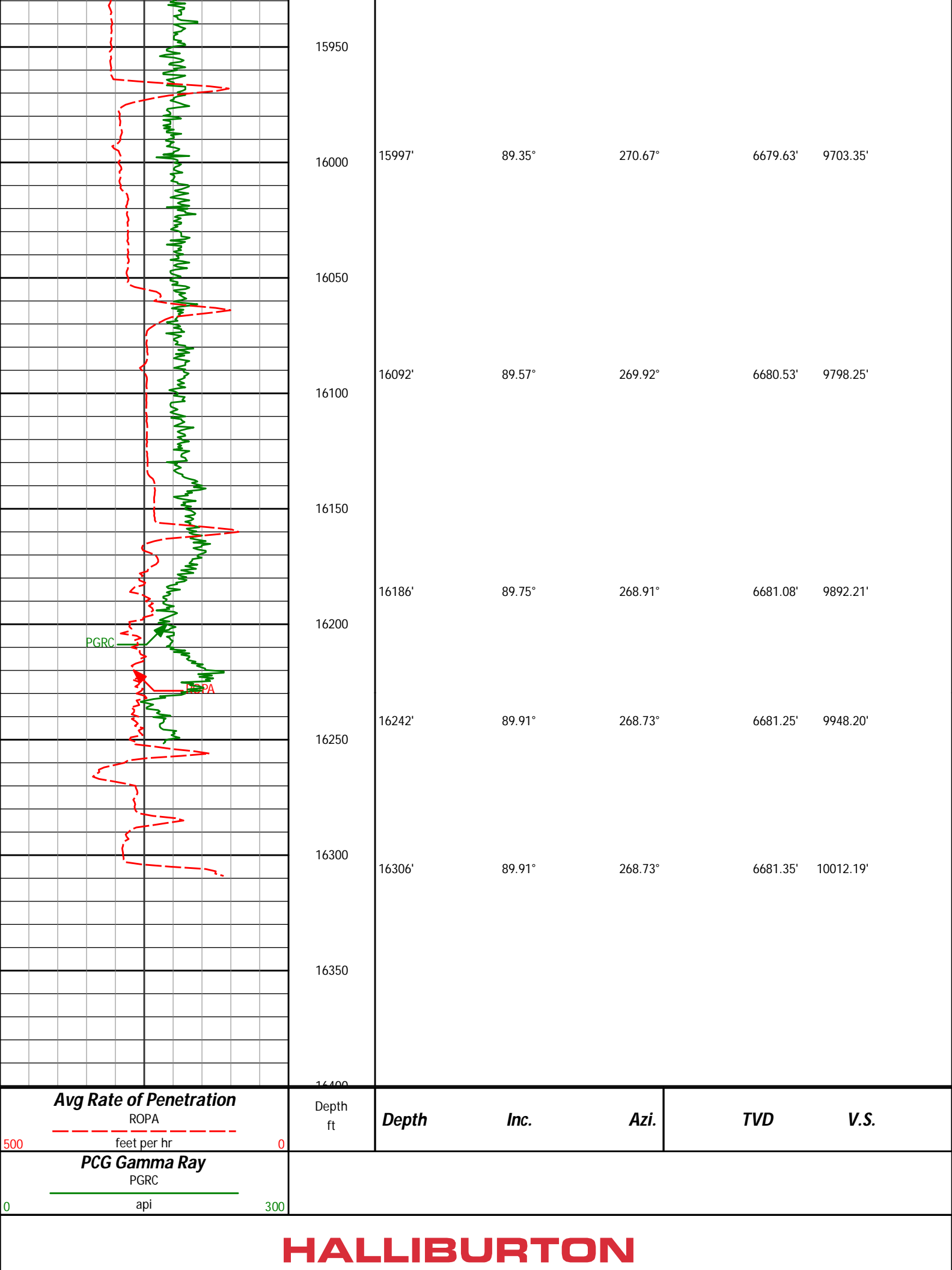
15902'

89.05°

271.25°

6678.30'

9608.50'



Sperry Drilling Services

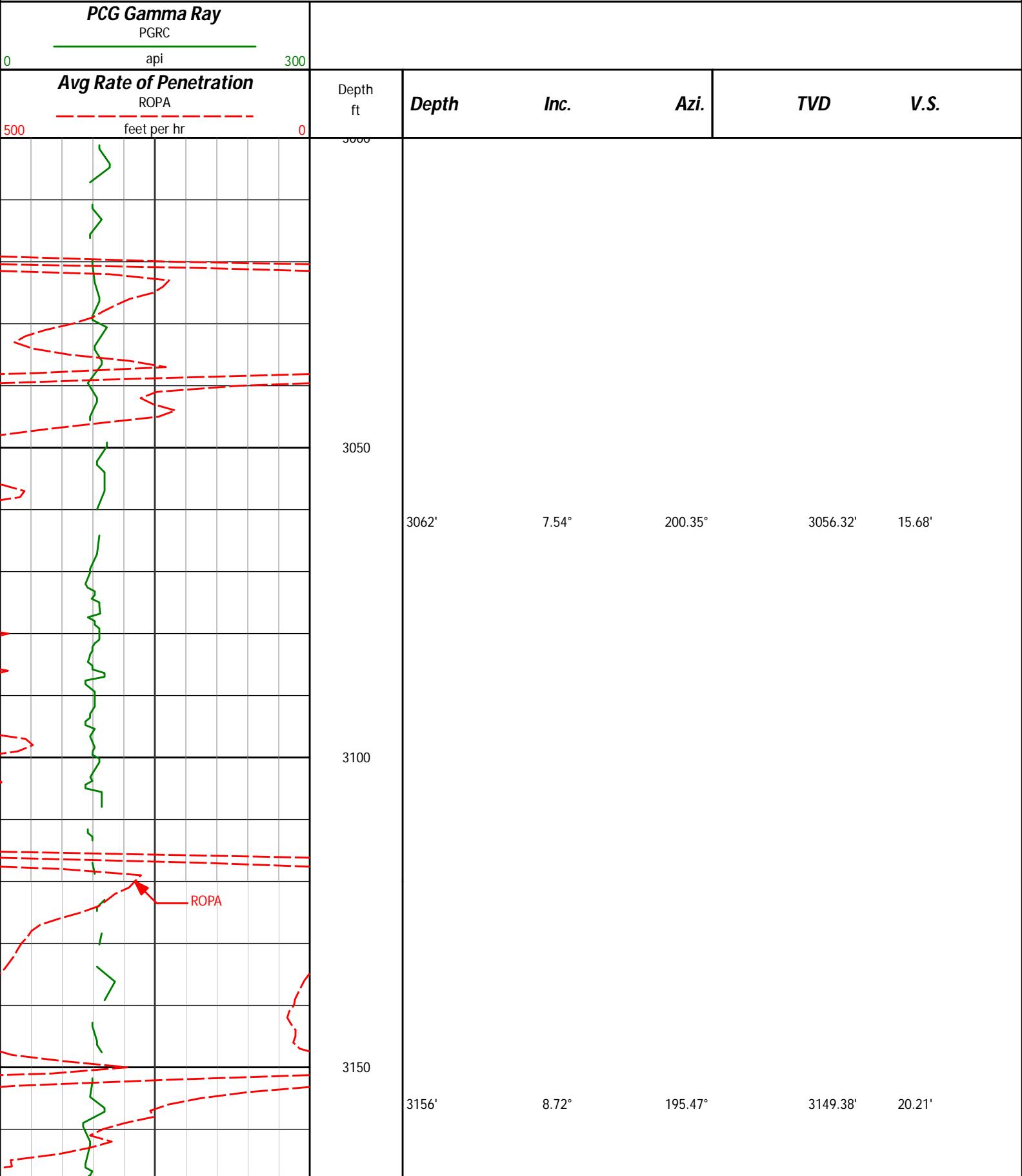
MD Detail Log 1:240

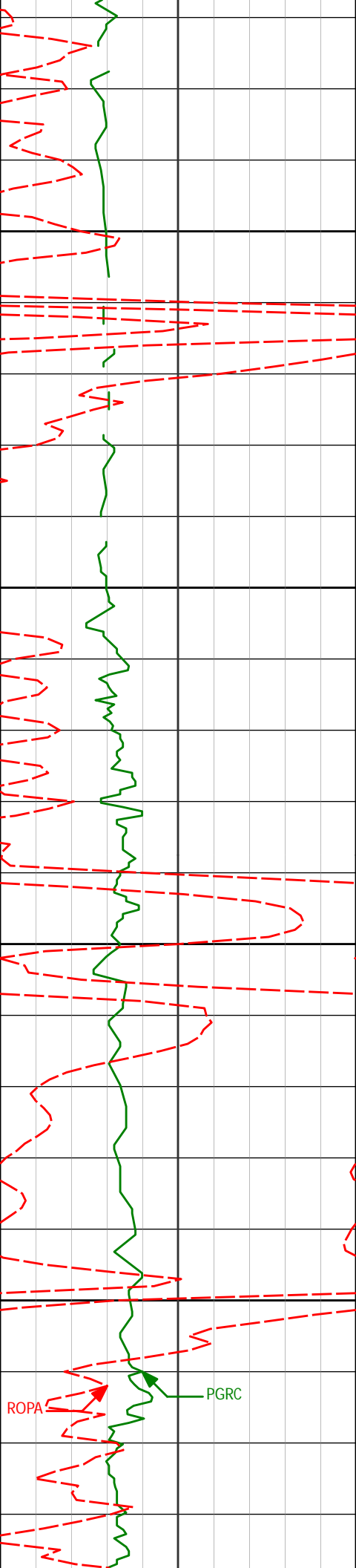
Noble Energy

NCLP AA06-66-1BHNA

H&P 343

T6N-R63W





3200

3250

3300

3350

3251'

6.58°

197.81°

3243.53'

24.26'

3345'

6.22°

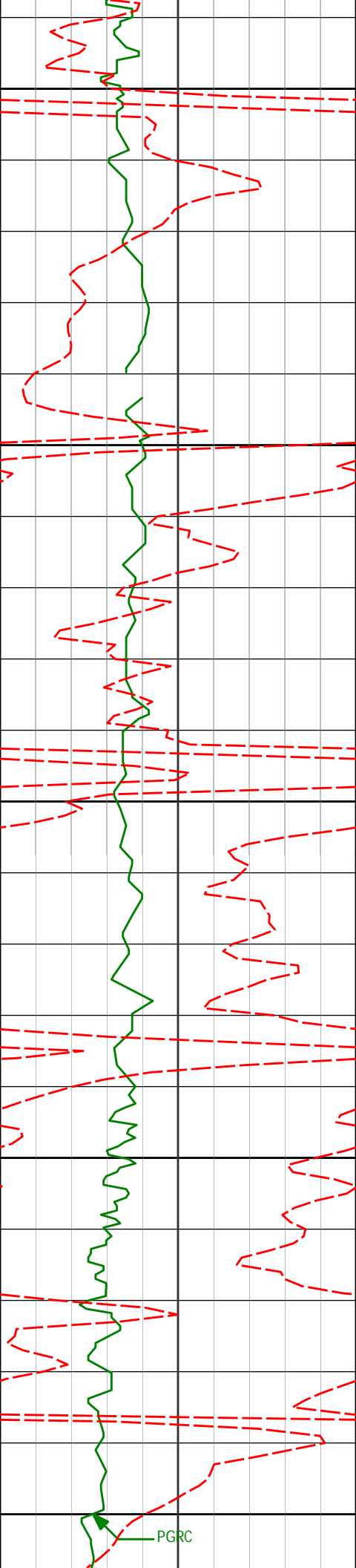
193.87°

3336.94'

27.52'

ROPA

PGRC



3400

3440'

7.06°

182.83°

3431.31'

29.46'

3450

3500

3535'

5.76°

177.66°

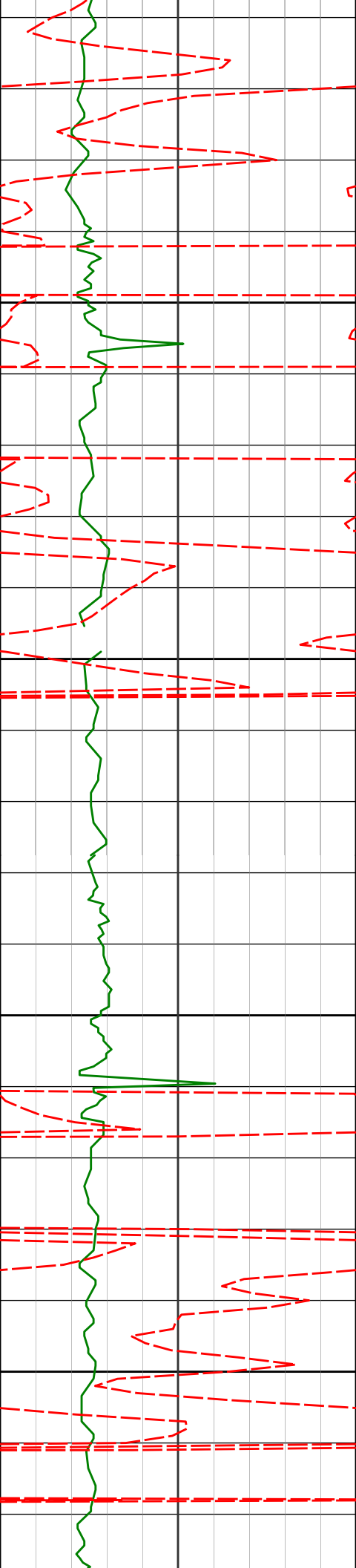
3525.71'

29.96'

3550

3600

PGRC



3629'

6.23°

189.66°

3619.20'

31.00'

3650

3700

3724'

5.72°

193.54°

3713.69'

33.34'

3750

3800

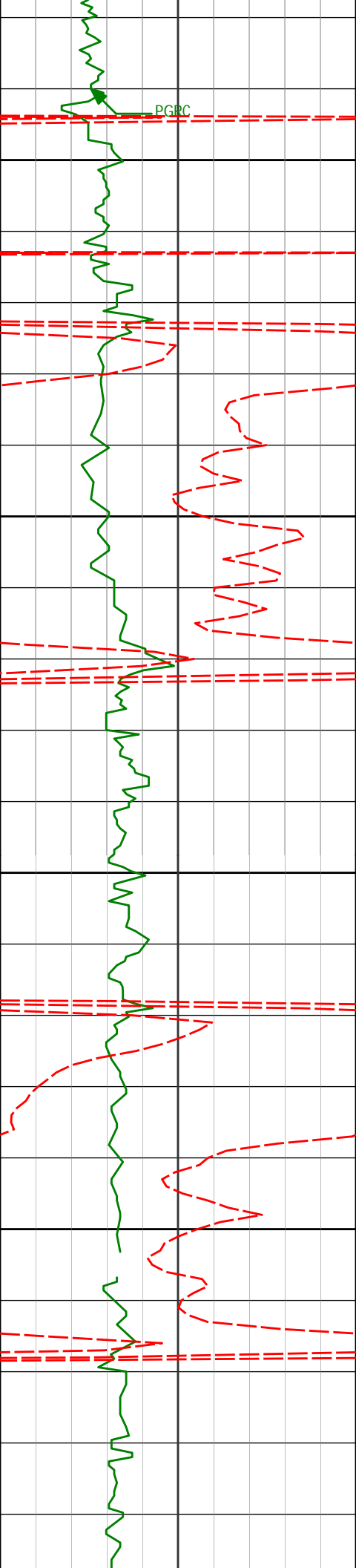
3819'

5.46°

202.07°

3808.24'

36.49'



PGRC

3850

3900

3950

4000

3913'

4.23°

210.50°

3901.90'

40.20'

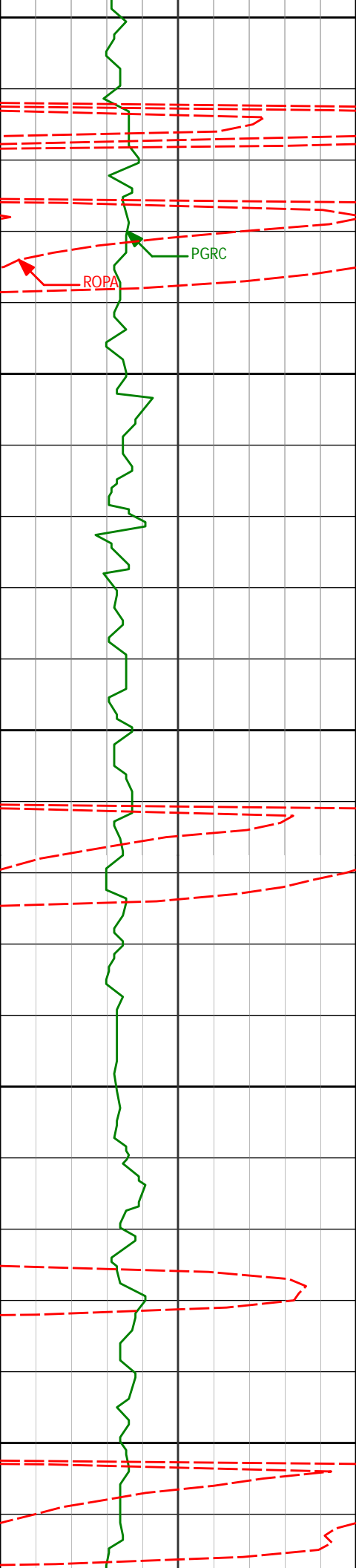
4007'

1.07°

232.17°

3995.79'

42.79'



4050

4100

4150

4200

4250

4101'

0.92°

232.67°

4089.77'

44.12'

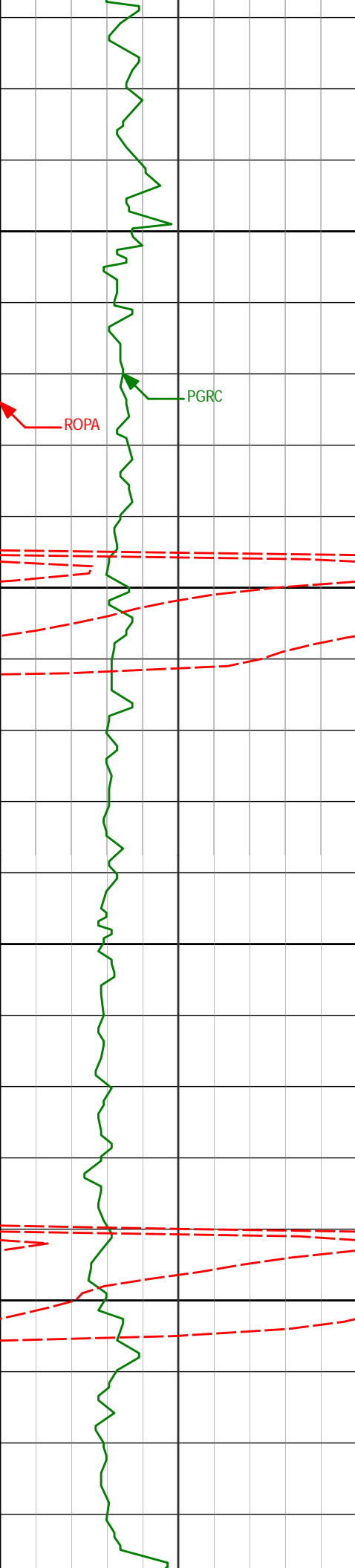
4195'

0.62°

249.41°

4183.77'

45.22'



4290'

0.52°

134.08°

4278.76'

45.41'

4300

PGRC

ROPA

4350

4385'

0.92°

120.47°

4373.76'

44.47'

4400

4450

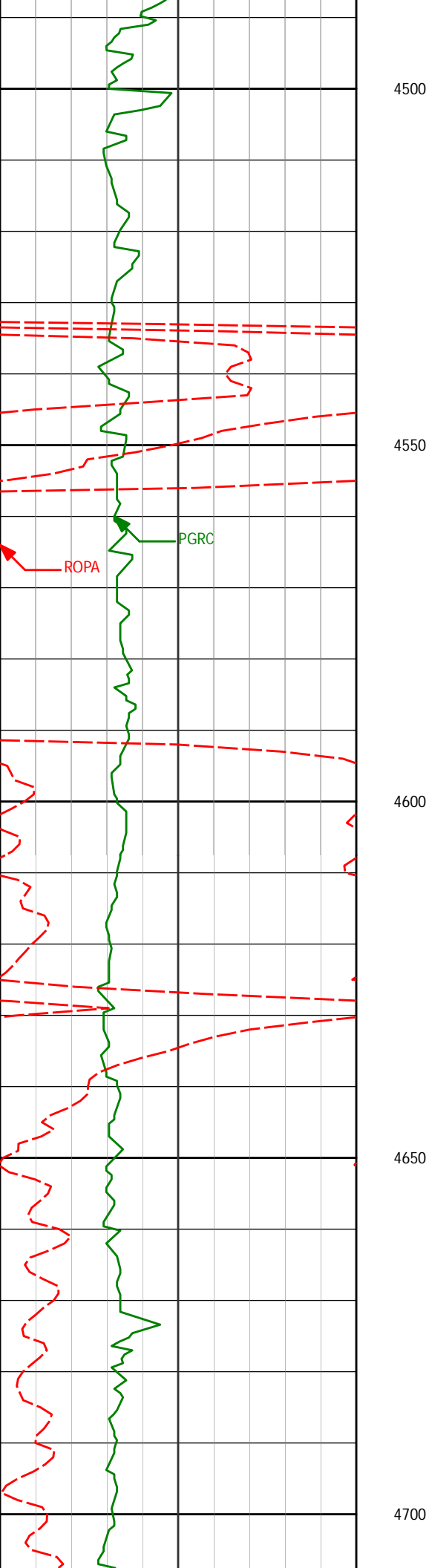
4480'

1.02°

124.83°

4468.74'

43.15'



4574'

0.84°

180.67°

4562.73'

42.52'

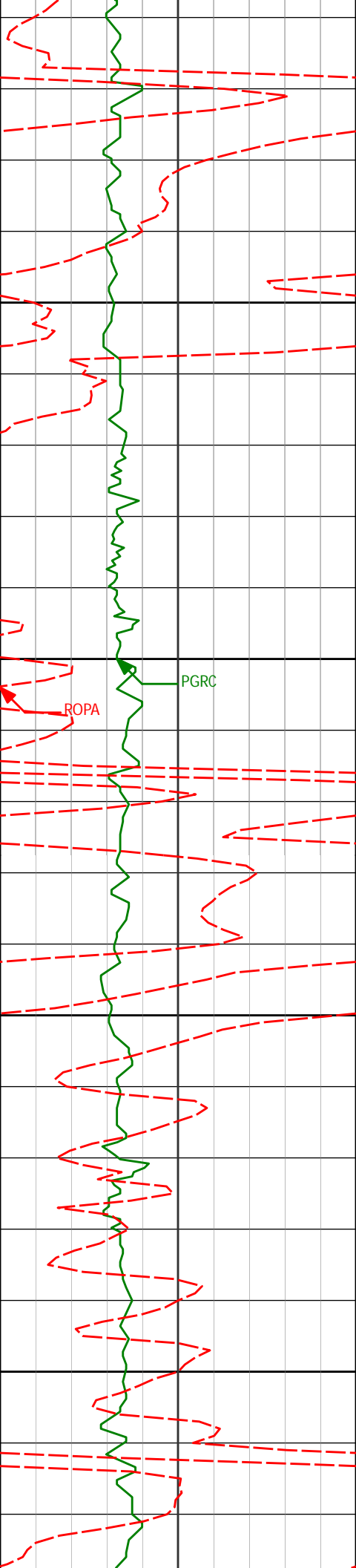
4669'

0.63°

183.90°

4657.72'

42.61'



4750

4763'

0.86°

184.35°

4751.72'

42.74'

4800

PGRC

ROPA

4850

4858'

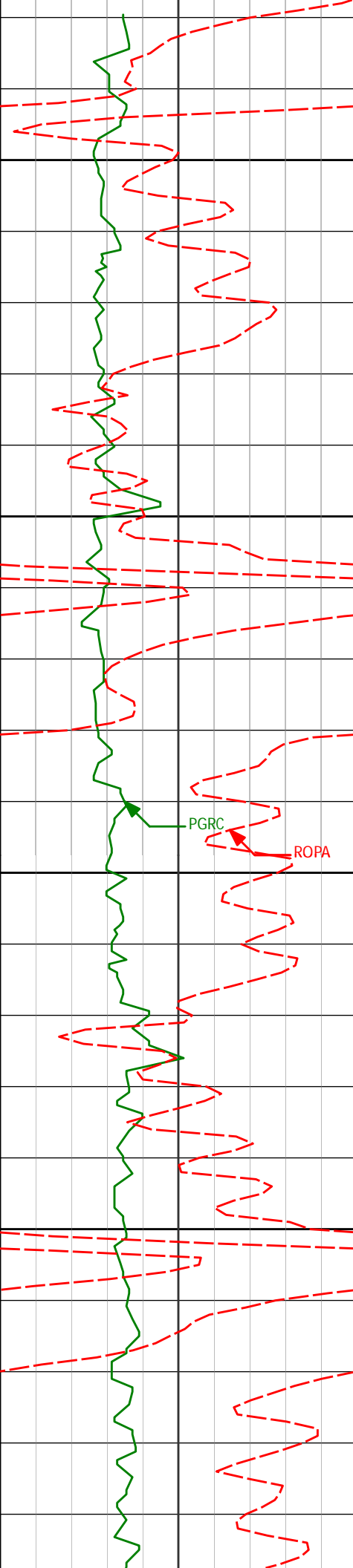
0.26°

158.25°

4846.71'

42.75'

4900



4950

5000

5050

5100

4953'

0.87°

157.15°

4941.71'

42.43'

5048'

0.86°

156.46°

5036.69'

41.91'

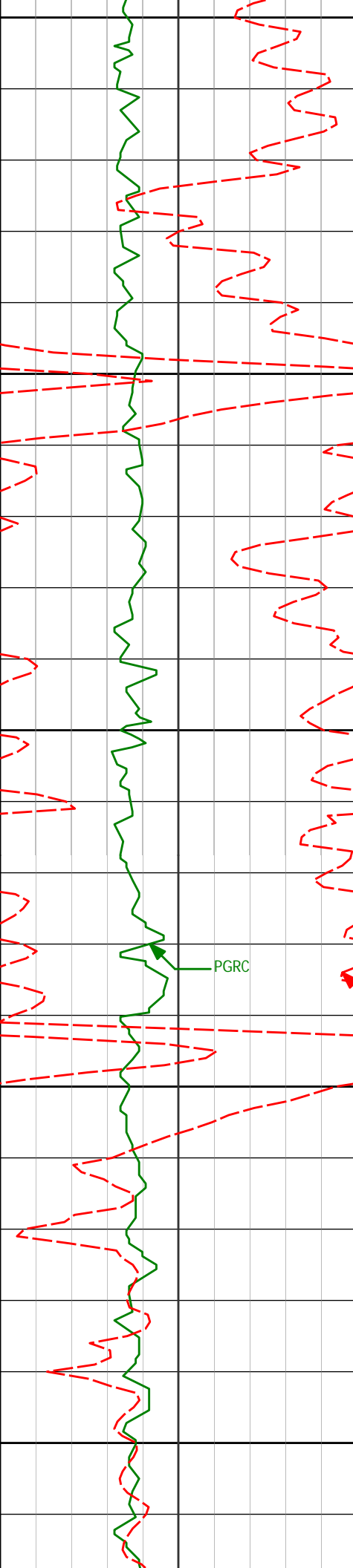
5143'

0.61°

133.20°

5131.69'

41.30'



5150

5200

5250

5300

5350

5238'

0.33°

193.01°

5226.68'

41.02'

5332'

0.85°

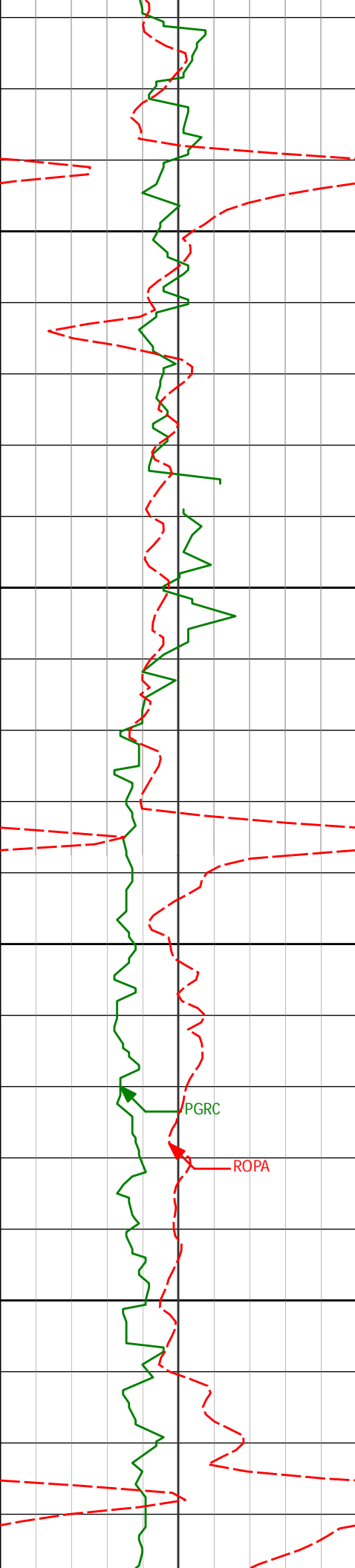
177.78°

5320.68'

41.09'

PGRC

ROPA



5400

5427'

1.10°

175.91°

5415.67'

41.06'

5450

5500

5522'

0.93°

189.17°

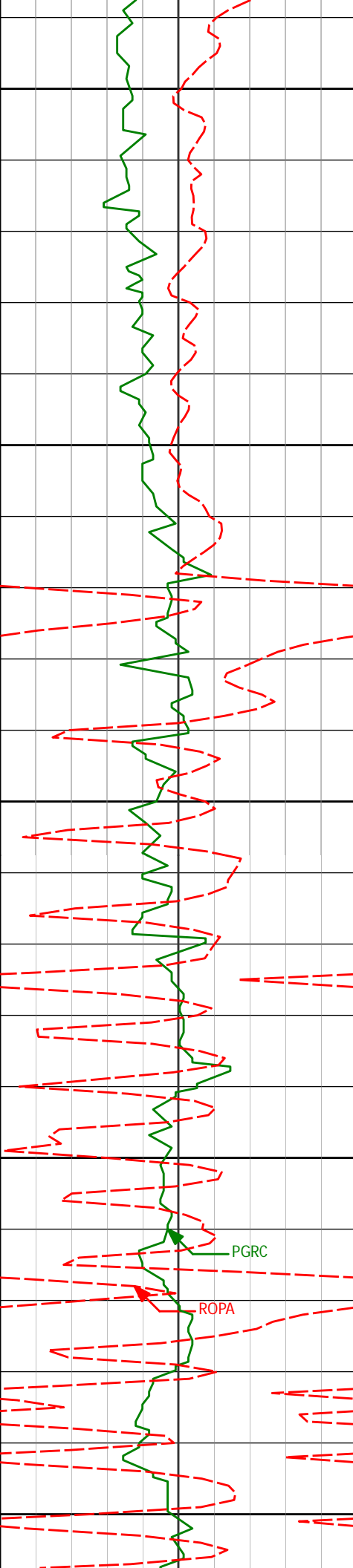
5510.65'

41.18'

5550

PGRC

ROPA



5600

5616'

0.96°

186.95°

5604.64'

41.45'

5650

5700

5711'

0.90°

237.68°

5699.63'

42.23'

5750

PGRC

ROPA

5800

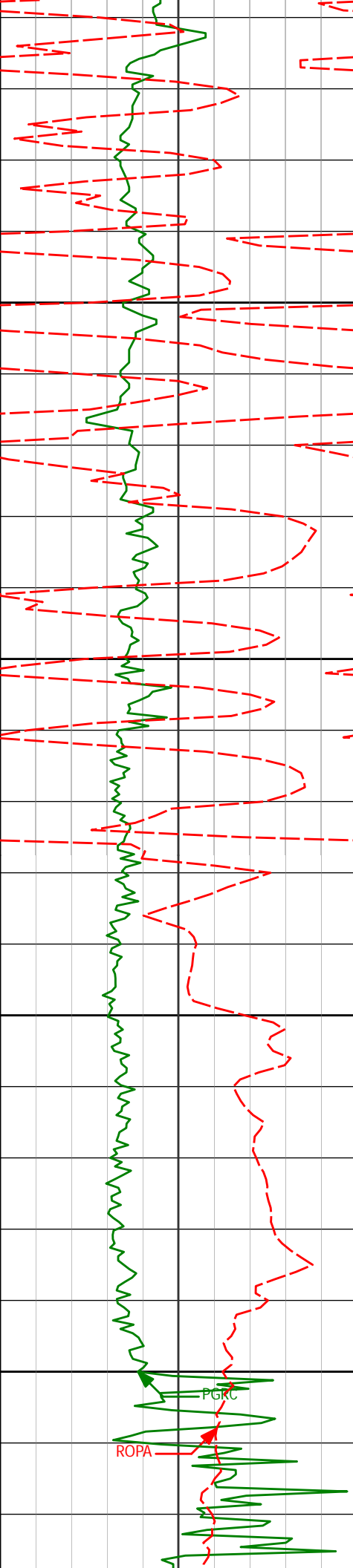
5806'

0.74°

192.84°

5794.62'

43.03'



5850

5873'

0.11°

243.25°

5861.62'

43.20'

5900

Run 200

5950

5949'

0.28°

237.31°

5937.62'

43.47'

6000

5995'

2.06°

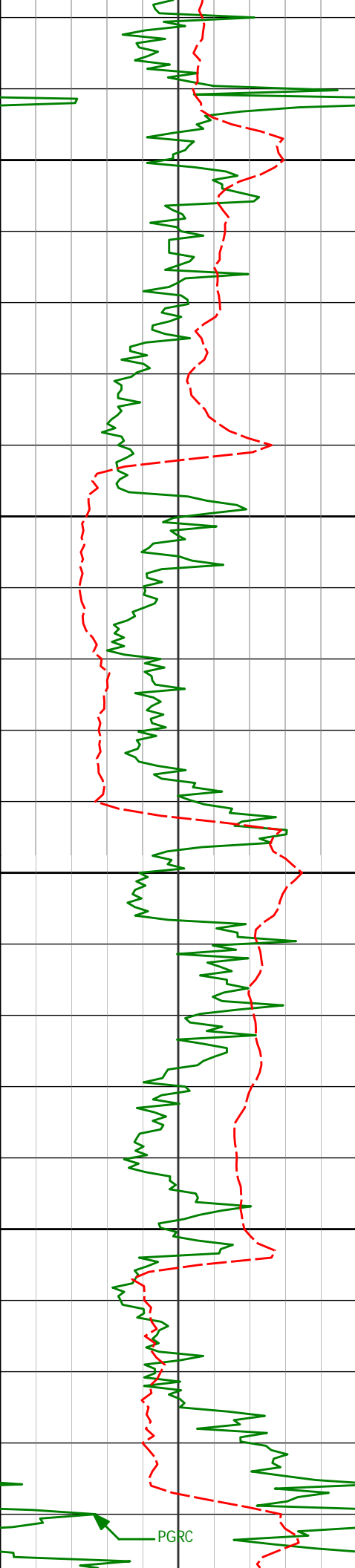
259.96°

5983.60'

44.38'

ROPA

PGRC



6050

6100

6150

6200

6043'

9.16°

265.01°

6031.34'

49.06'

6090'

14.66°

264.43°

6077.31'

58.74'

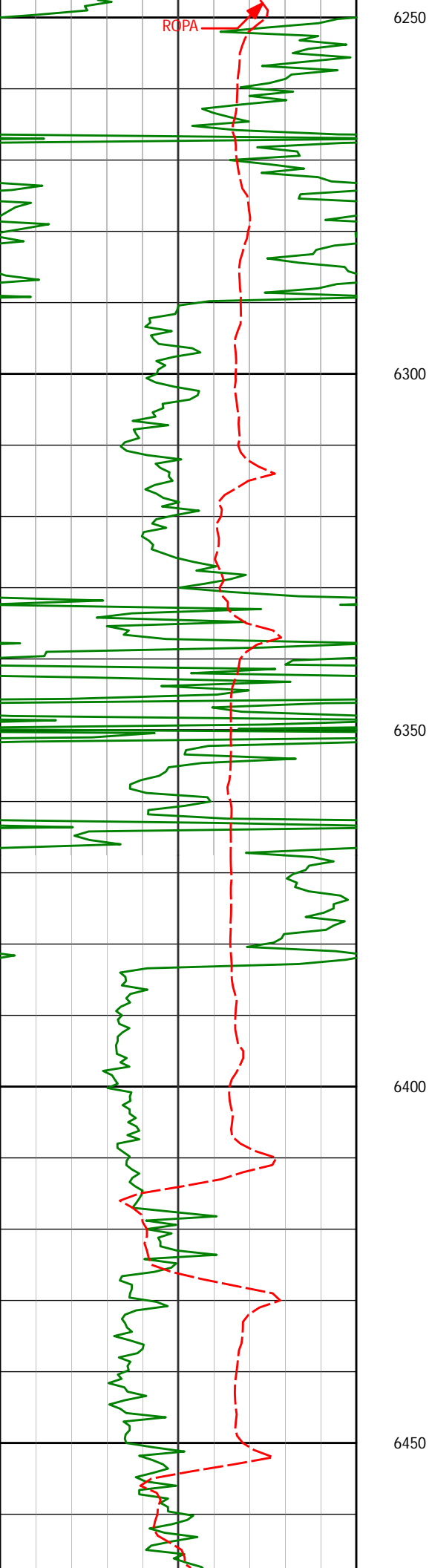
6185'

19.68°

260.22°

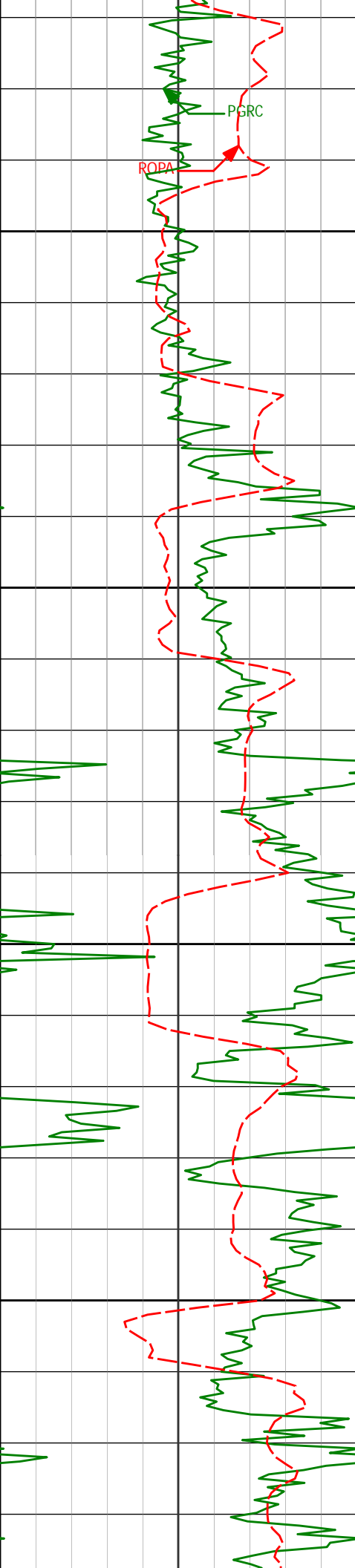
6168.05'

86.62'



6280' 25.86° 269.37° 6255.64' 123.23'

6374' 37.25° 270.07° 6335.61' 172.31'



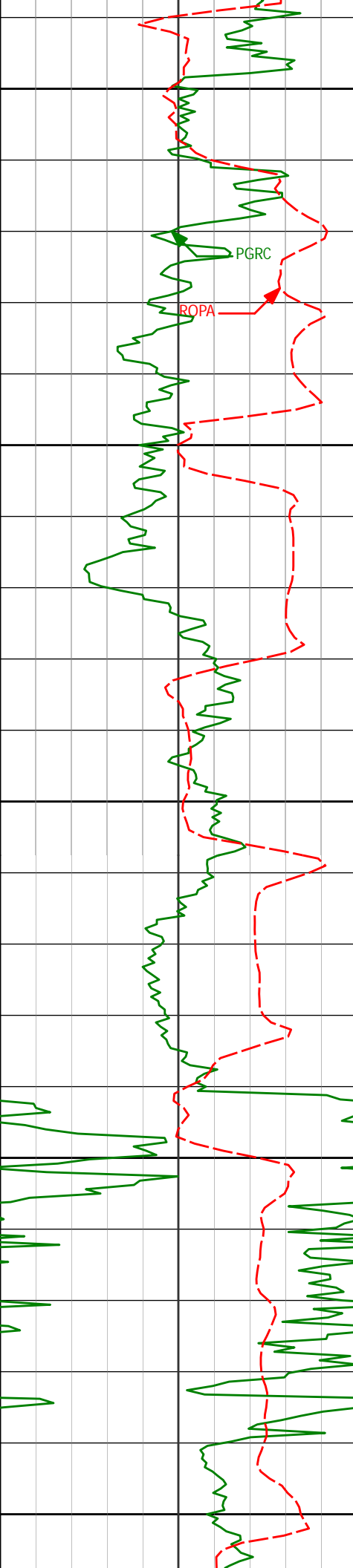
6500

6550

6600

6650

6469'	47.48°	270.11°	6405.70'	236.19'
6563'	52.91°	270.55°	6465.86'	308.30'
6658'	60.71°	271.93°	6517.83'	387.60'



6700

6750

6800

6850

6900

6753'

68.62°

272.08°

6558.44'

473.16'

6848'

75.27°

271.27°

6587.87'

563.22'

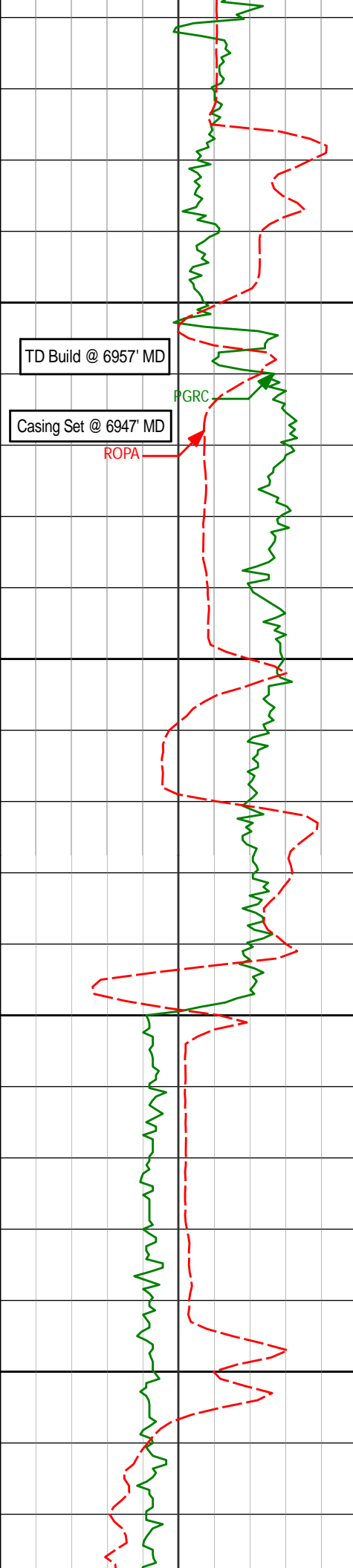
6906'

83.23°

271.01°

6598.68'

620.06'



TD Build @ 6957' MD

Casing Set @ 6947' MD

PGRC

ROPA

Run 300

6950

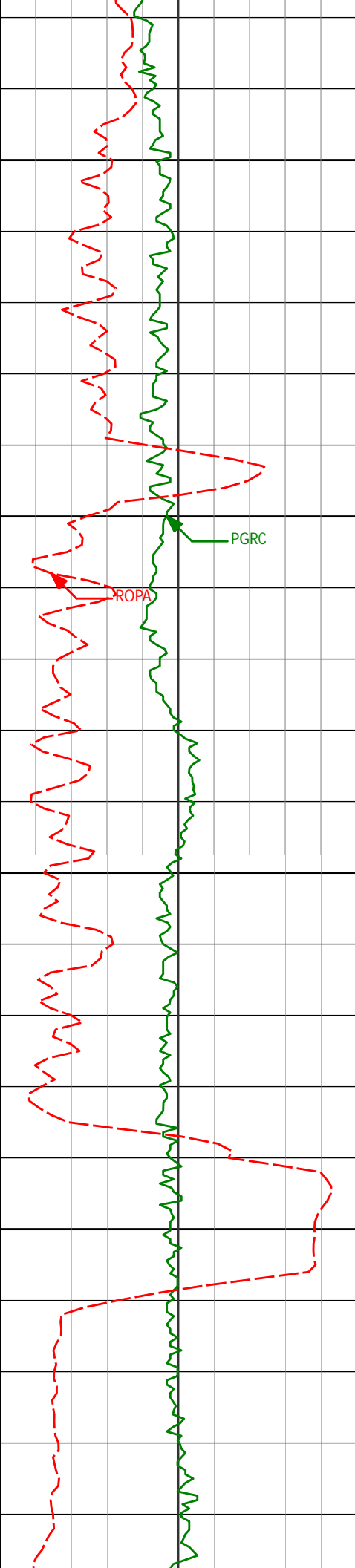
7000

7050

7100

7031' 85.93° 270.41° 6610.49' 744.33'

7126' 87.16° 269.61° 6616.21' 839.08'



7150

7200

7250

7300

7221'

86.89°

268.87°

6621.14'

933.92'

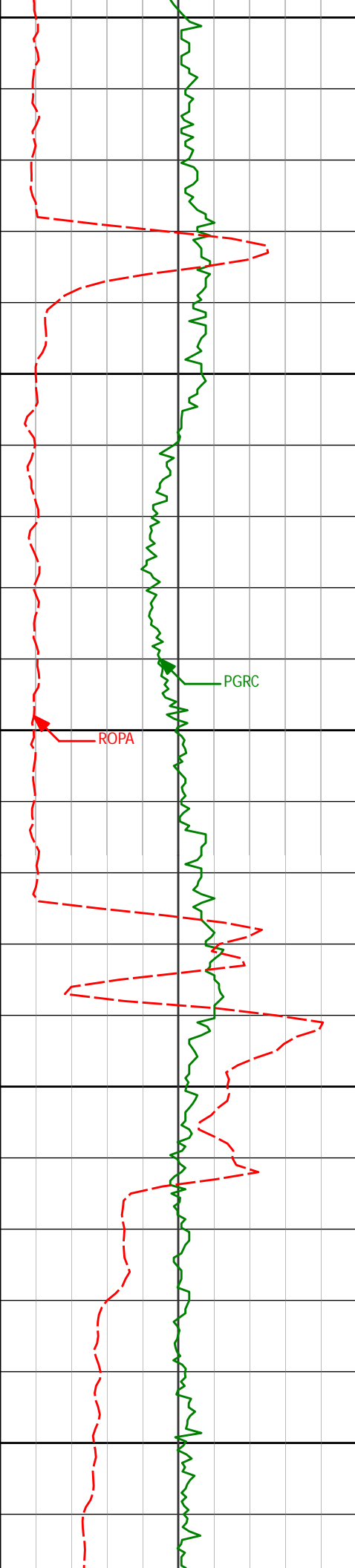
7316'

88.00°

268.08°

6625.38'

1028.82'



7350

7400

7450

7500

7550

7411'

87.60°

267.10°

6629.02'

1123.75'

PGRC

ROPa

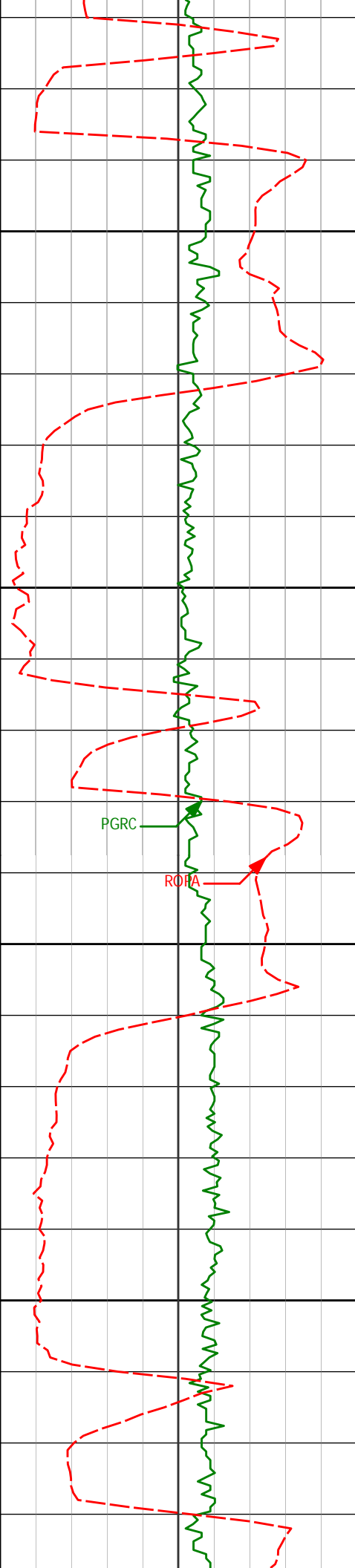
7506'

89.32°

266.63°

6631.58'

1218.70'



7600

7601'

89.57°

266.97°

6632.50'

1313.68'

7650

PGRC

ROPA

7700

7696'

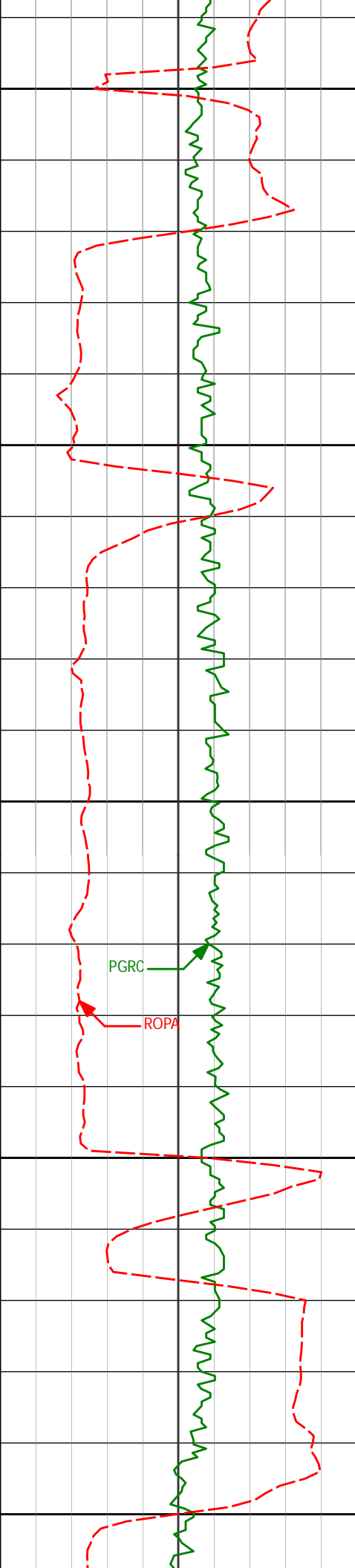
89.91°

267.52°

6632.93'

1408.67'

7750



7791'	89.51°	269.31°	6633.41'	1503.66'
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7800

7850

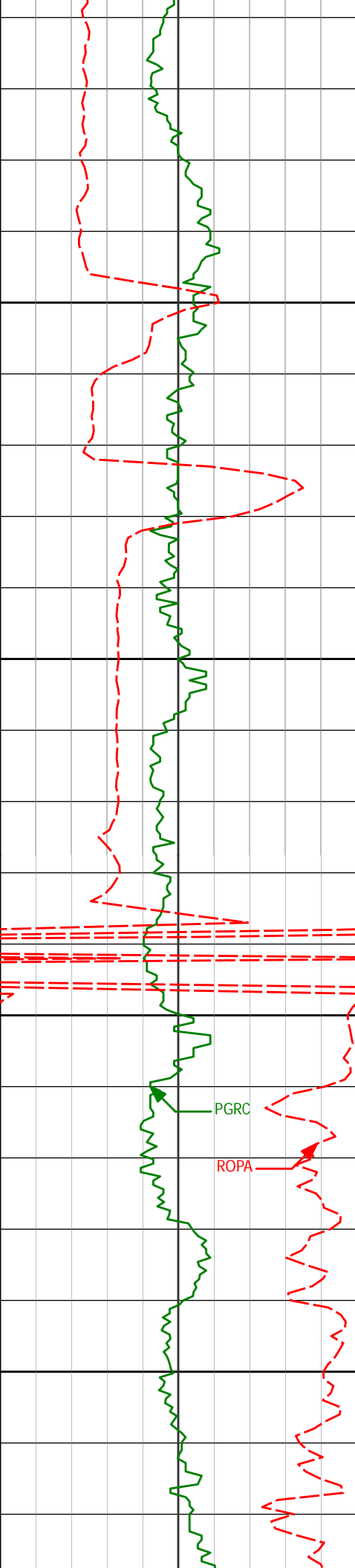
7886'	88.58°	270.22°	6634.99'	1598.59'
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7900

7950

7980'	90.40°	271.54°	6635.83'	1692.44'
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8000



8050

8075'

91.60°

271.21°

6634.17'

1787.24'

8100

8150

PGRC

ROPA

8169'

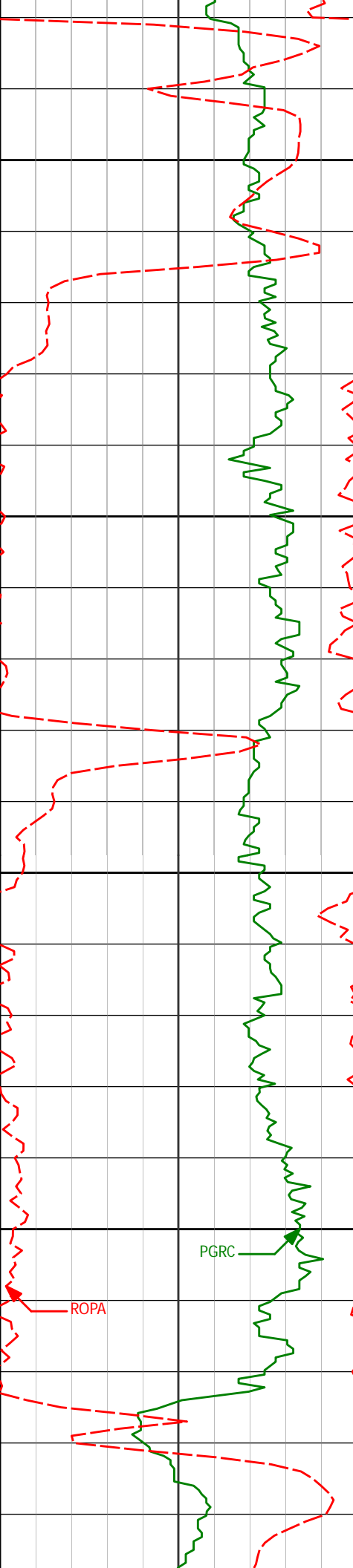
93.39°

270.15°

6630.08'

1881.03'

8200



8250

8300

8350

8400

8264'

91.85°

269.23°

6625.74'

1975.87'

8359'

92.19°

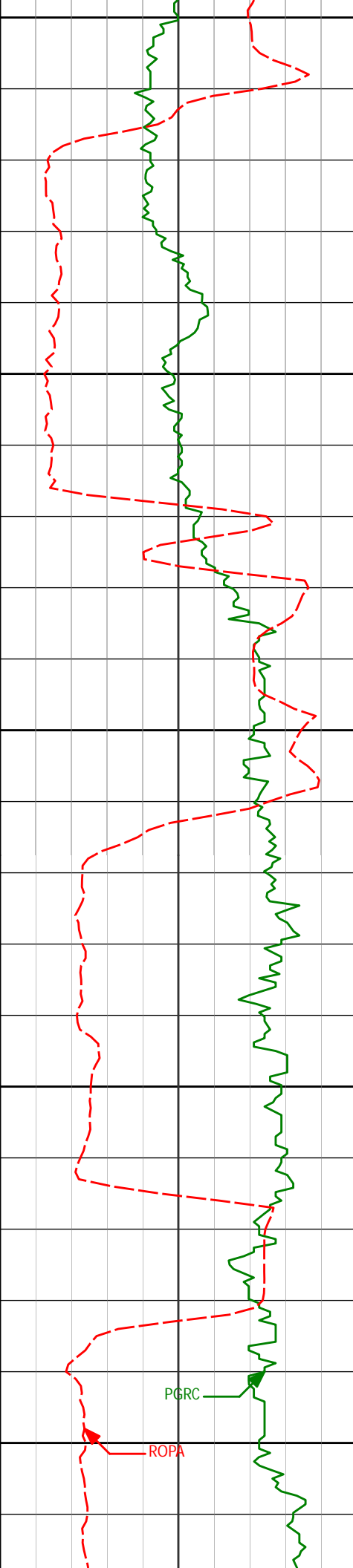
267.95°

6622.39'

2070.80'

PGRC

ROPA



8450

8453'

91.08°

268.57°

6619.71'

2164.76'

8500

8550

8547'

89.91°

269.64°

6618.90'

2258.73'

8600

8650

8642'

90.22°

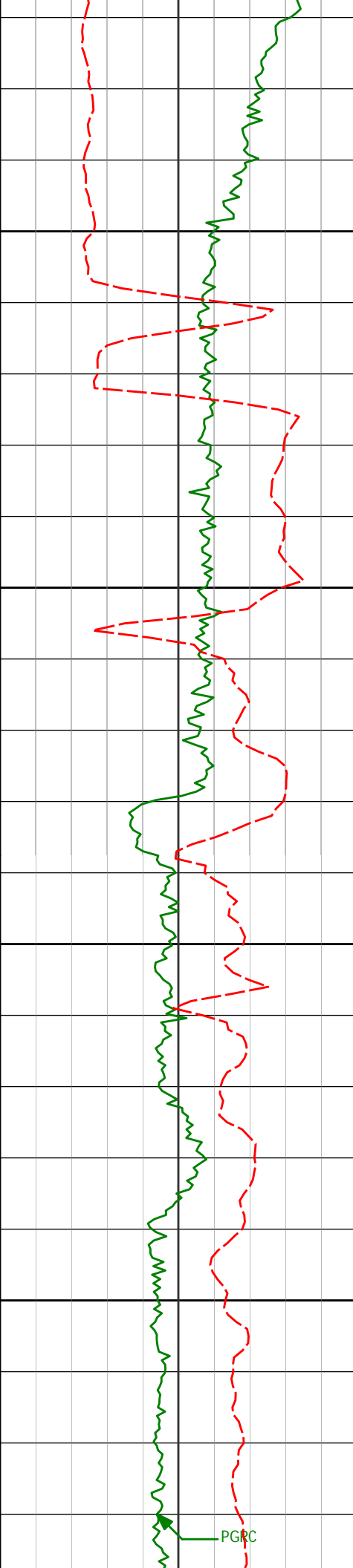
269.28°

6618.79'

2353.69'

PGRC

ROPA



8700

8750

8800

8850

8736'

88.03°

268.25°

6620.22'

2447.65'

8831'

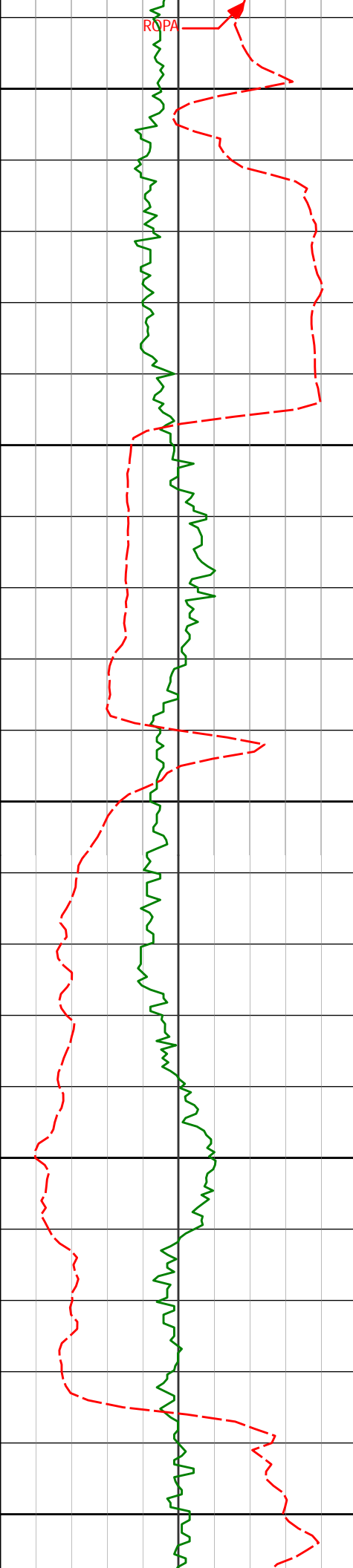
87.75°

266.85°

6623.72'

2542.59'

PGRC



8900

8925'

90.49°

268.62°

6625.16'

2636.56'

8950

9000

9020'

91.94°

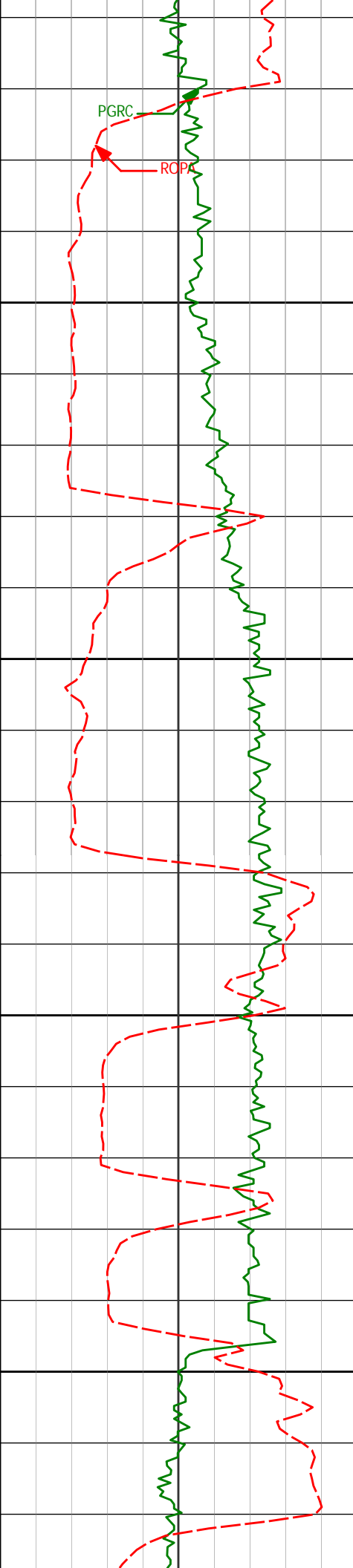
267.75°

6623.15'

2731.54'

9050

9100



9114'	90.22°	268.66°	6621.38'	2825.51'
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9150

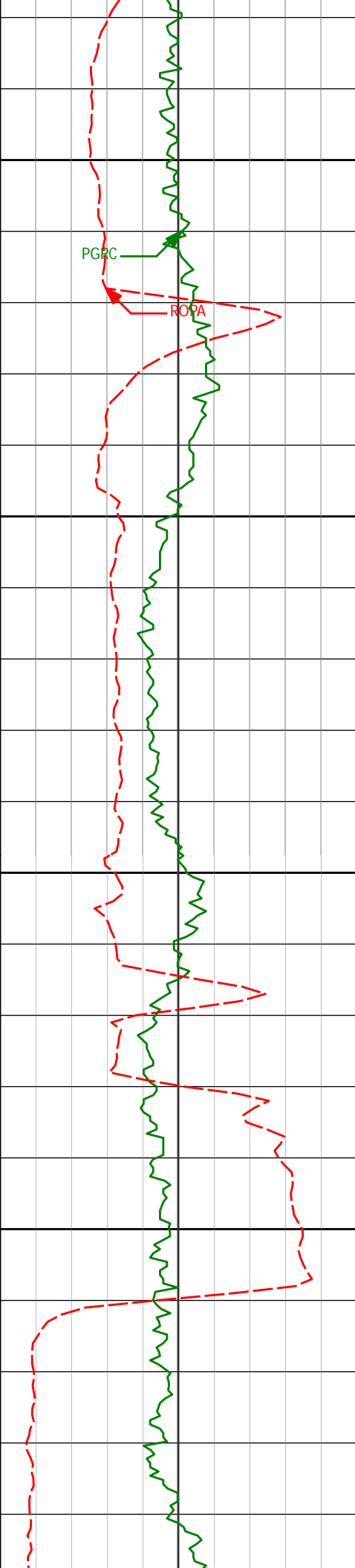
9200

9209'	90.37°	267.51°	6620.89'	2920.51'
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9250

9300

9303'	87.81°	267.65°	6622.38'	3014.49'
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9350

9400

9450

9500

9397'

86.73°

267.21°

6626.86'

3108.38'

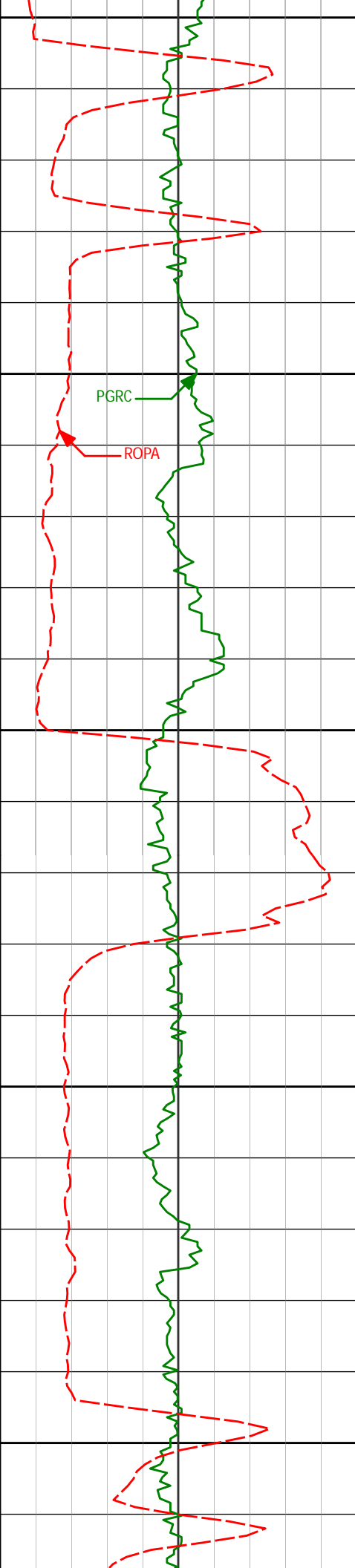
9492'

86.39°

268.29°

6632.56'

3203.20'



9550

9587'

86.02°

268.51°

6638.85'

3297.99'

9600

PGRC

ROPA

9650

9681'

88.64°

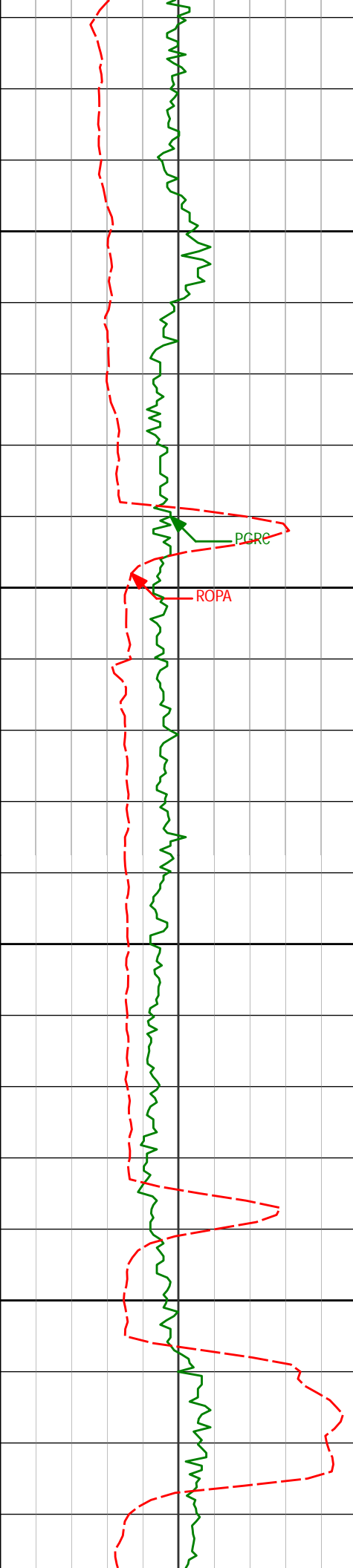
269.03°

6643.23'

3391.87'

9700

9750



9776'	90.43°	268.74°	6644.00'	3486.84'
-------	--------	---------	----------	----------

9800

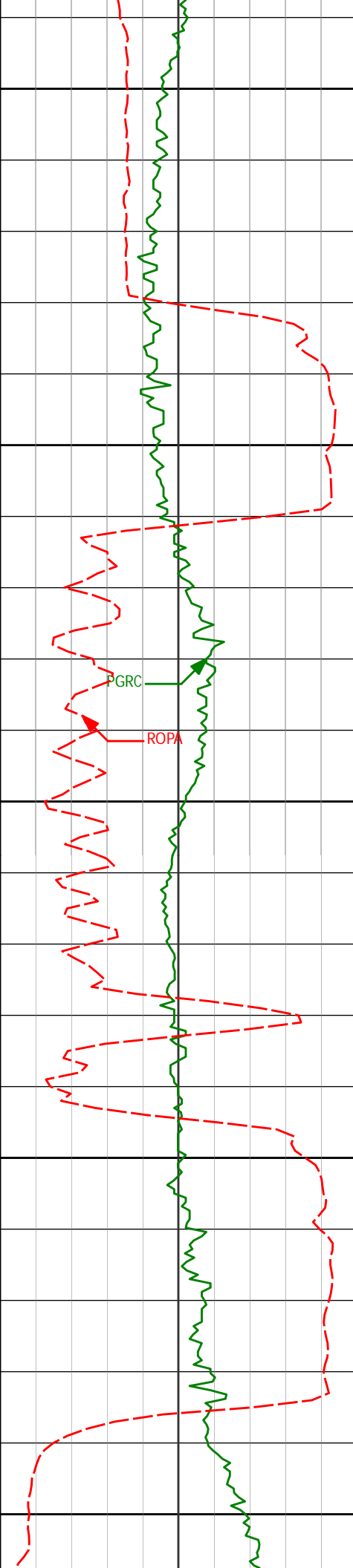
9850

9871'	91.32°	267.87°	6642.55'	3581.83'
-------	--------	---------	----------	----------

9900

9950

9965'	92.34°	268.27°	6639.54'	3675.77'
-------	--------	---------	----------	----------



10000

10050

10100

10150

10200

10060'

90.25°

267.78°

6637.40'

3770.74'

GRC

ROPA

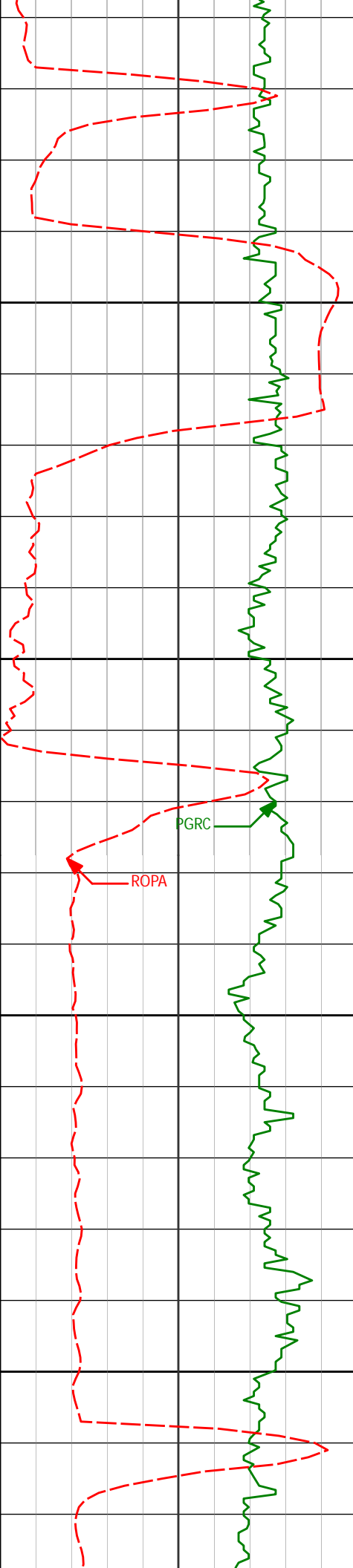
10155'

90.62°

268.46°

6636.68'

3865.74'



10250

10300

10350

10400

10249'

10343'

89.32°

89.29°

271.39°

271.31°

6636.73'

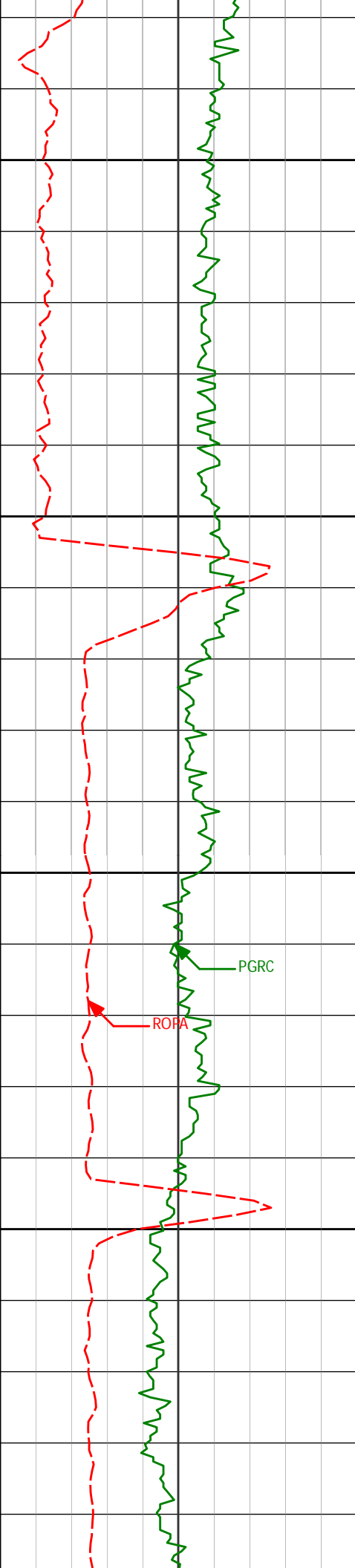
6637.87'

3959.66'

4053.47'

PGRC

ROPA



10435'

89.32°

269.93°

6638.98'

4145.35'

10527'

89.78°

268.96°

6639.70'

4237.31'

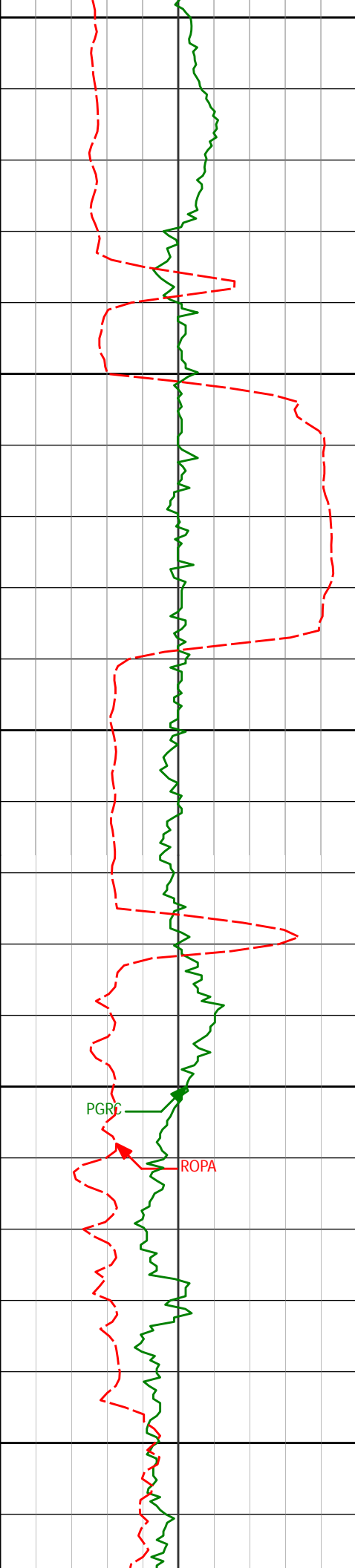
10620'

90.00°

267.80°

6639.88'

4330.30'



10650

10700

10750

10800

10850

10713'

90.25°

268.74°

6639.68'

4423.30'

10806'

89.69°

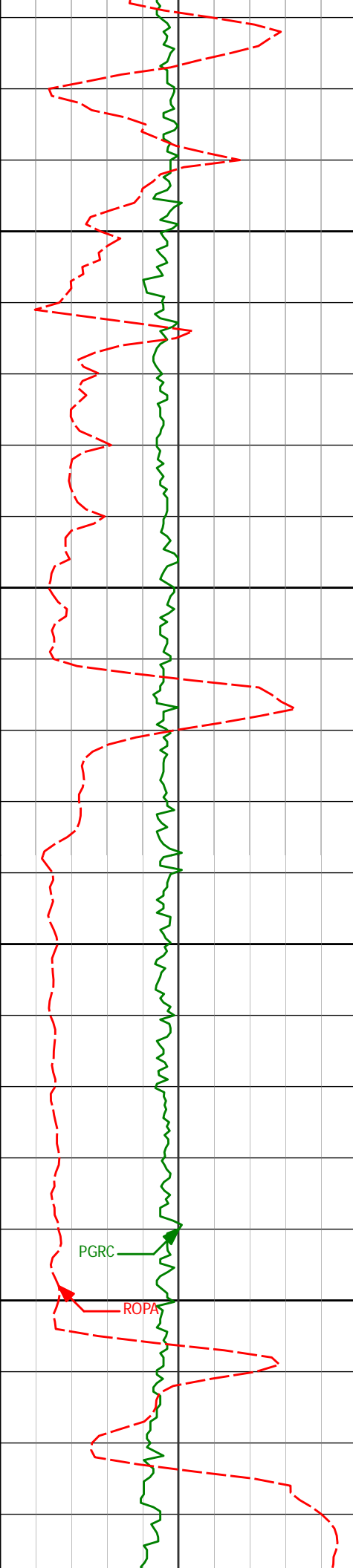
270.48°

6639.73'

4516.25'

PGRC

ROPA



10900

10950

11000

11050

10898'

10991'

11083'

89.08°

89.69°

89.78°

269.08°

268.49°

269.43°

6640.72'

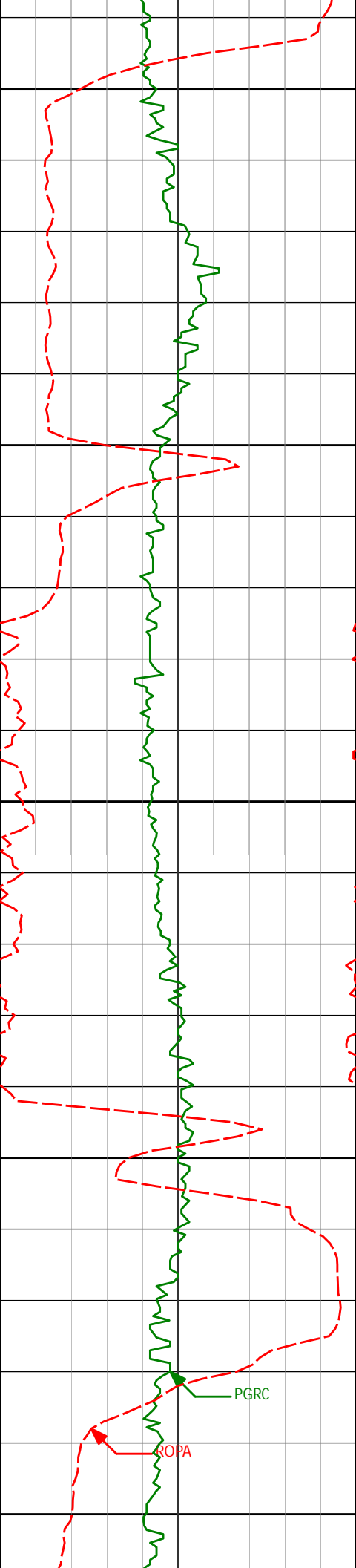
6641.71'

6642.14'

4608.18'

4701.16'

4793.14'



11100

11150

11200

11250

11300

11175'

90.34°

269.17°

6642.04'

4885.11'

11268'

88.95°

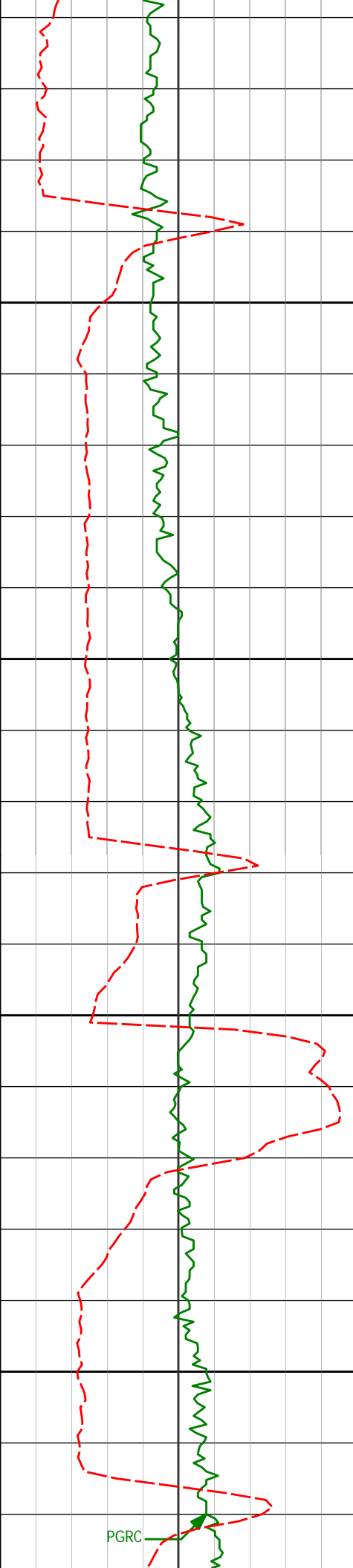
269.67°

6642.62'

4978.07'

PGRC

ROPA



11350

11361'

88.89°

268.94°

6644.37'

5071.02'

11400

11450

11455'

88.80°

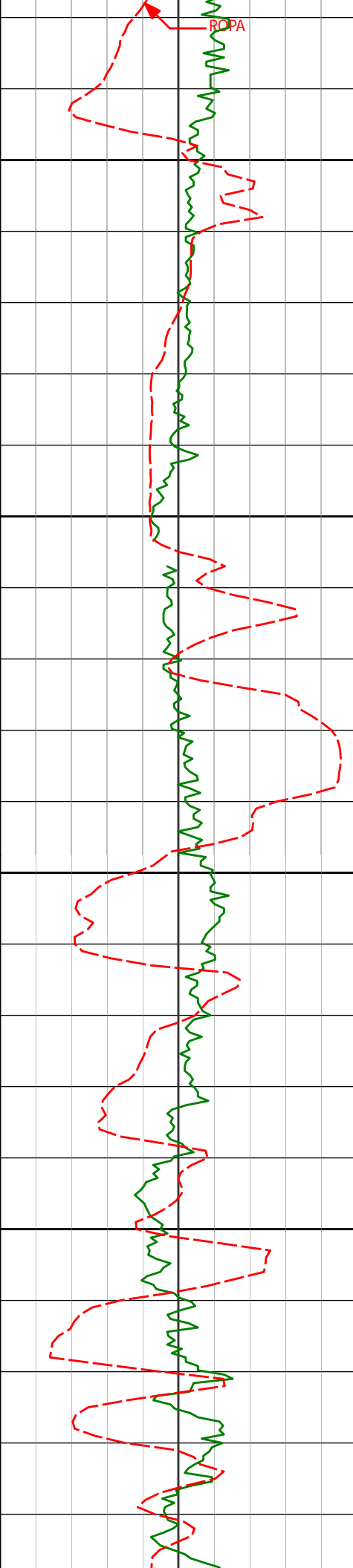
268.93°

6646.27'

5164.98'

11500

PGRC



11550

11600

11650

11700

11546'

86.89°

267.52°

6649.69'

5255.91'

11641'

87.29°

268.17°

6654.51'

5350.78'

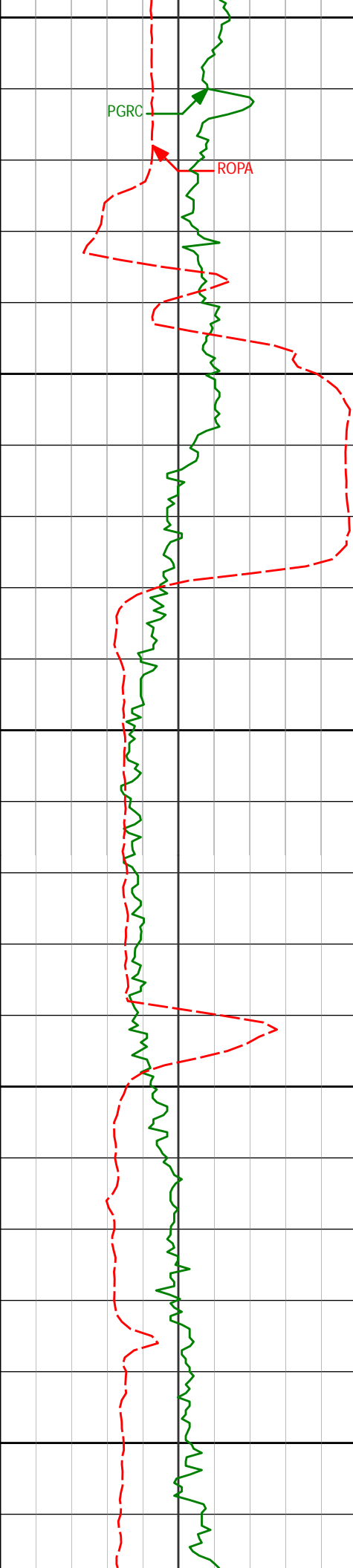
11734'

85.59°

267.46°

6660.29'

5443.60'



11750

PGRC

ROPA

11800

11828'

86.82°

269.23°

6666.51'

5537.38'

11850

11900

11920'

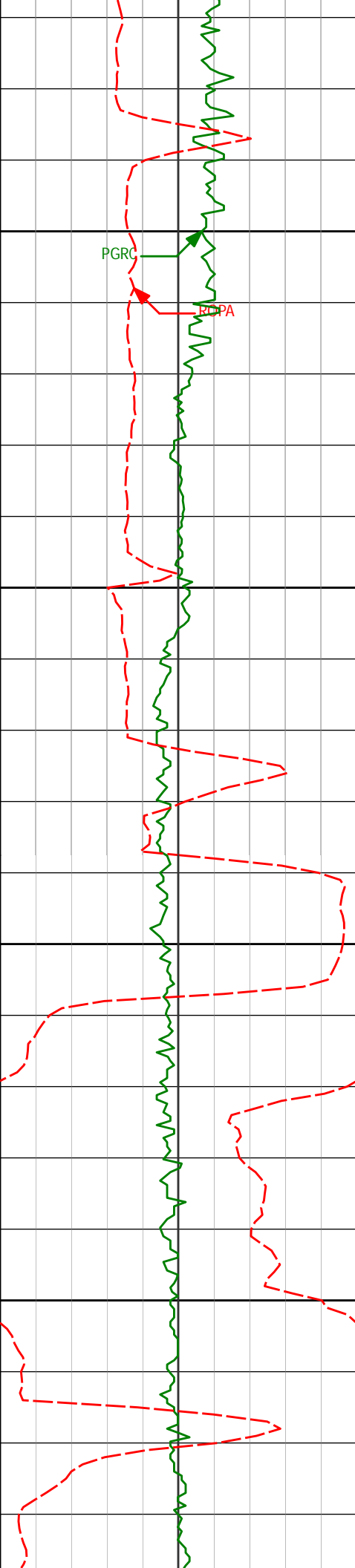
87.63°

268.04°

6670.96'

5629.26'

11950



12000

PGRC

RCPA

12050

12100

12150

12011'

87.87°

267.24°

6674.54'

5720.19'

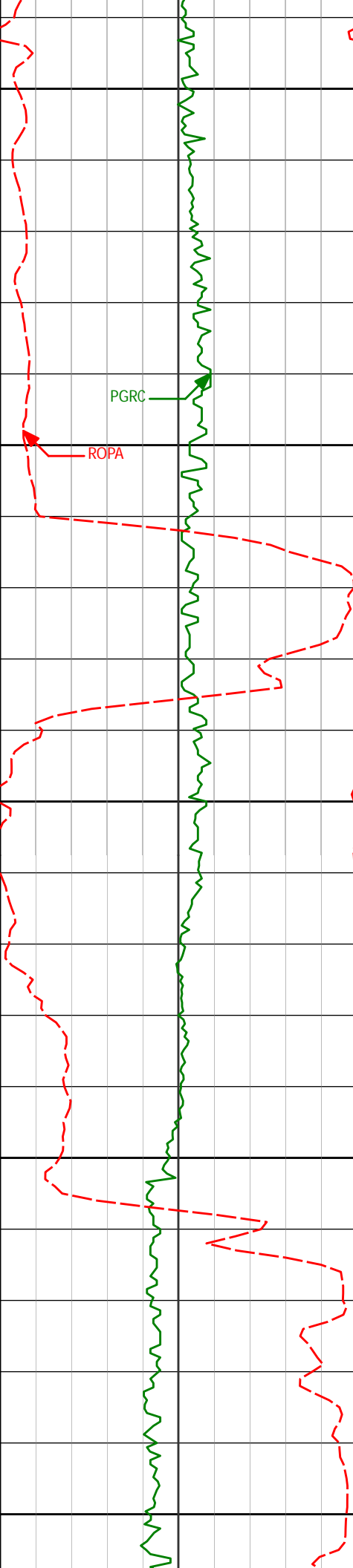
12103'

88.43°

268.05°

6677.51'

5812.14'



12200

12250

12300

12350

12400

12198'

88.30°

267.25°

6680.22'

5907.10'

12293'

89.66°

265.92°

6681.91'

6002.06'

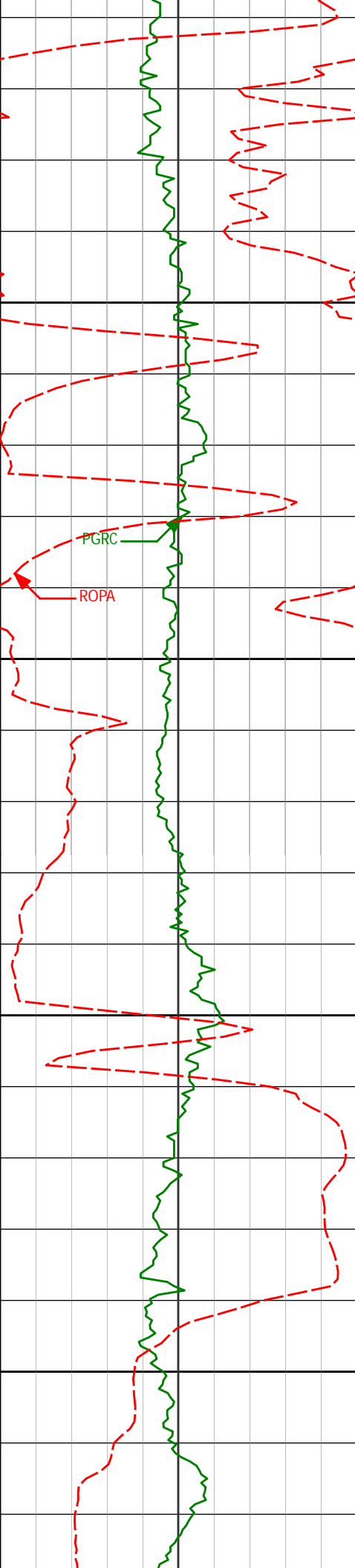
12388'

90.95°

268.60°

6681.40'

6097.05'



12450

12482'

92.10°

268.68°

6678.90'

6191.00'

12500

12550

12577'

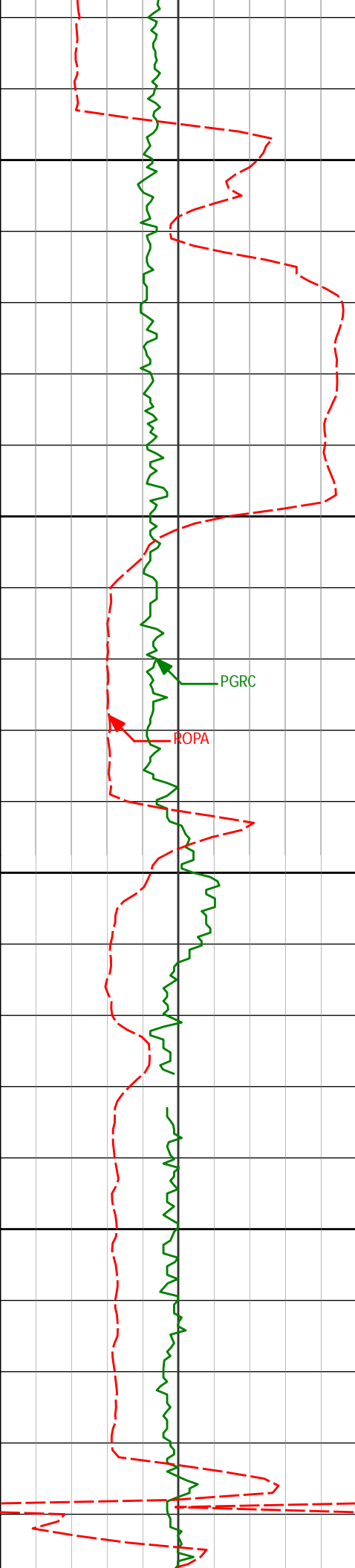
92.16°

269.52°

6675.37'

6285.91'

12600



12650

12671'

90.80°

271.32°

6672.94'

6379.77'

12700

PGRC

ROPA

12750

12766'

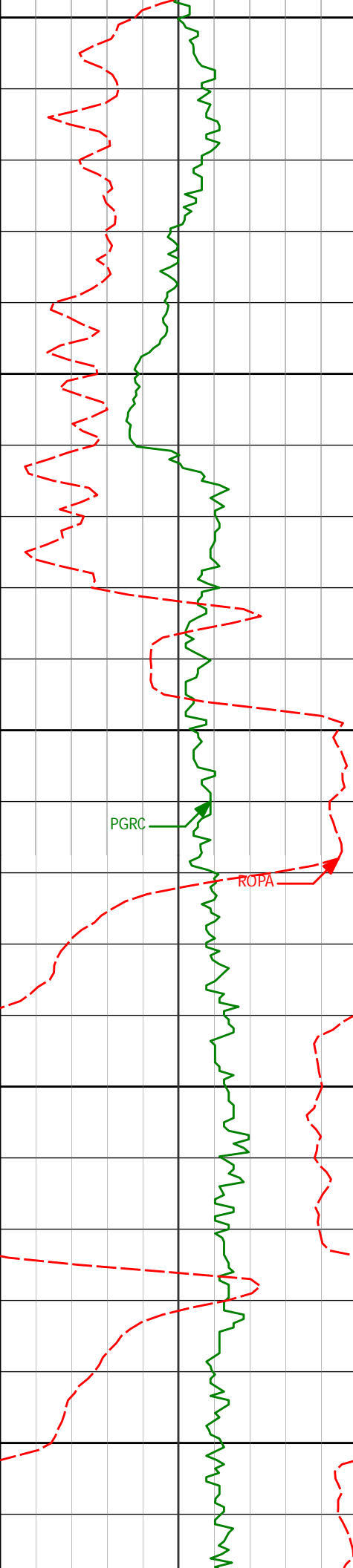
90.25°

271.94°

6672.07'

6474.56'

12800



12850

12866'

90.99°

270.61°

6670.99'

6574.36'

12900

12950

12961'

90.03°

270.20°

6670.14'

6669.26'

13000

13050

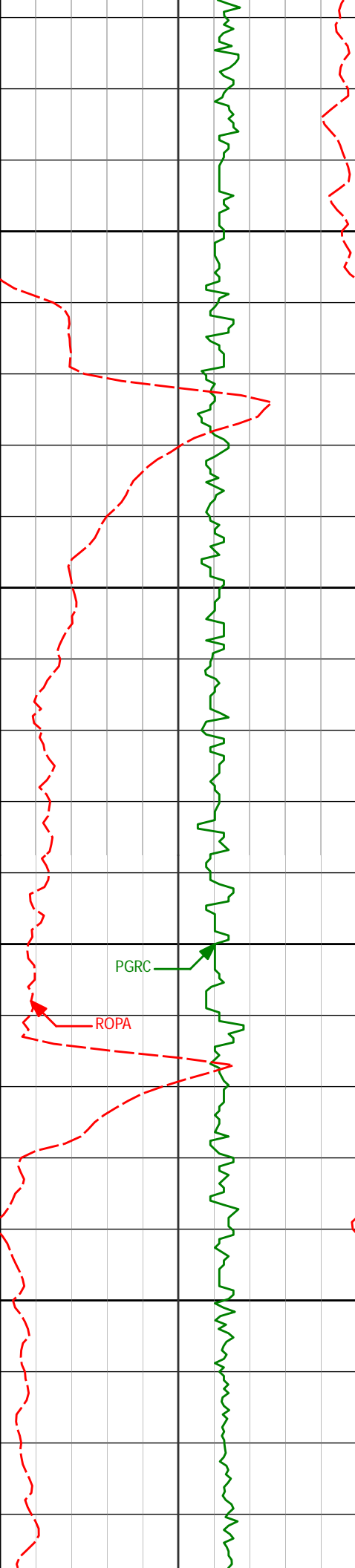
13056'

89.75°

269.72°

6670.33'

6764.19'



13100

13150

13200

13250

13151'

89.94°

269.36°

6670.58'

6859.15'

PGRC

ROPA

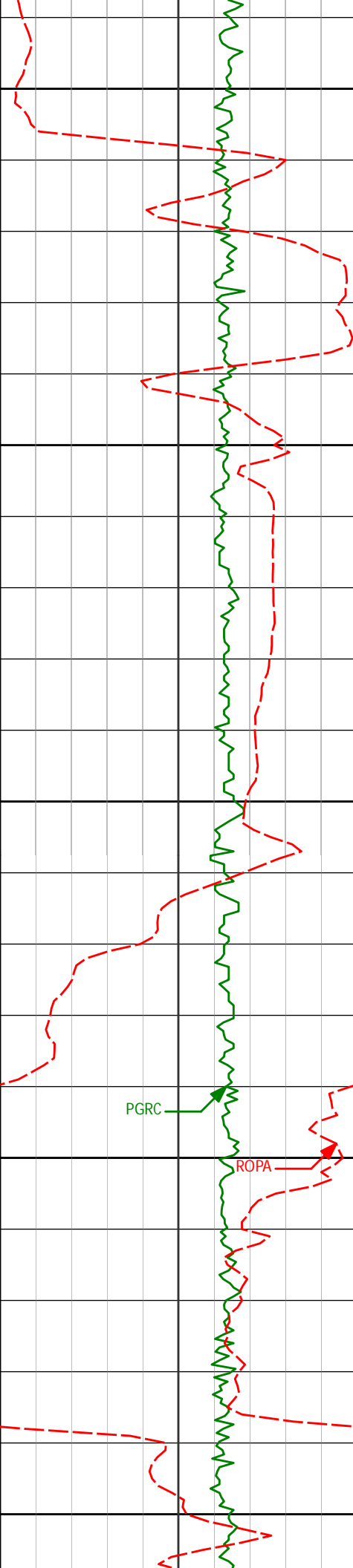
13246'

90.71°

268.87°

6670.04'

6954.12'



13300

13341'

89.41°

268.43°

6669.94'

7049.10'

13350

13400

13436'

89.94°

267.59°

6670.48'

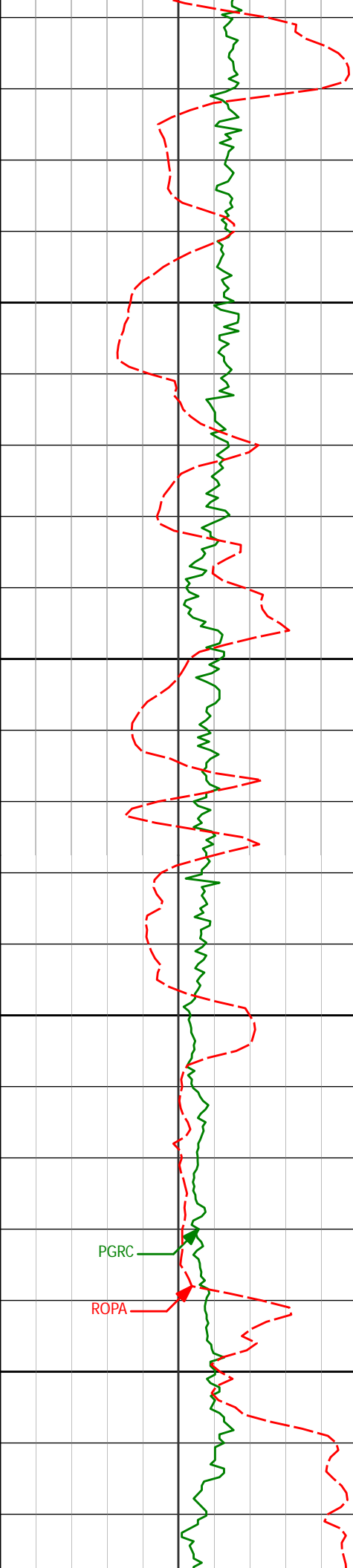
7144.10'

13450

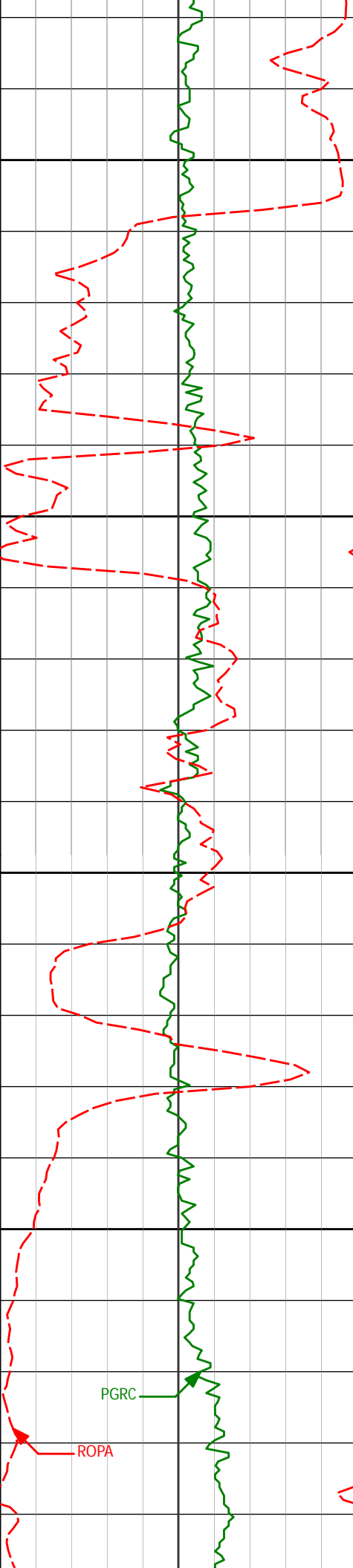
13500

PGRC

ROPA



13530'	88.83°	267.02°	6671.49'	7238.09'
13550				
13600				
13625'	88.21°	265.88°	6673.95'	7333.03'
13650				
13700				
13719'	89.17°	267.56°	6676.10'	7426.98'



13750

13800

13850

13900

13814'

89.69°

268.45°

6677.04'

7521.98'

13909'

90.55°

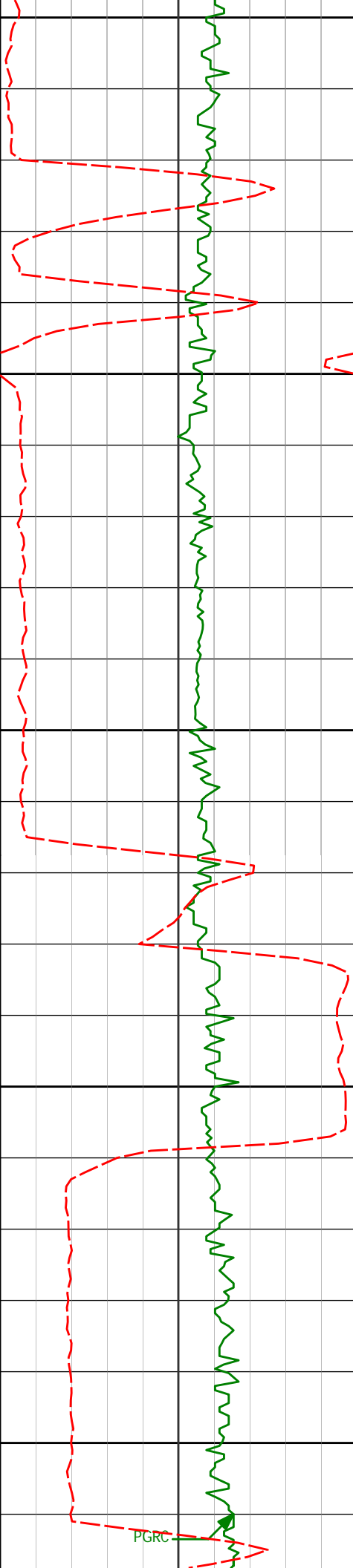
269.11°

6676.84'

7616.96'

PGRC

ROPA



13950

14000

14050

14100

14150

14004'

90.68°

267.95°

6675.82'

7711.95'

14099'

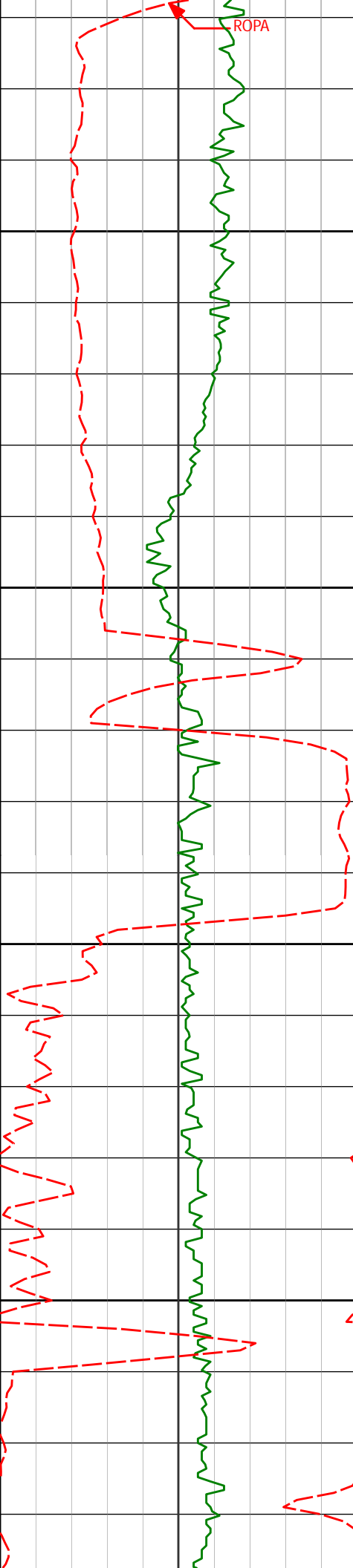
90.74°

269.72°

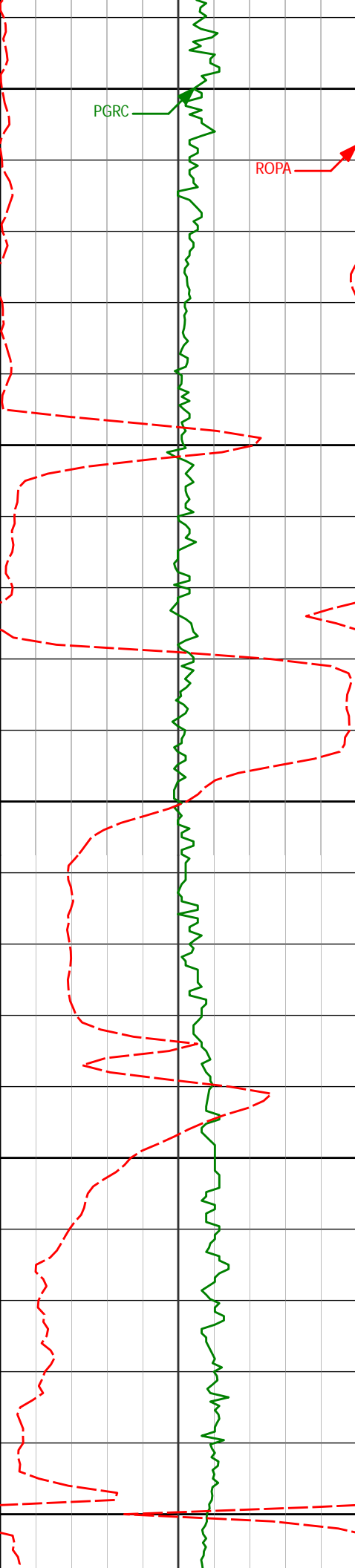
6674.64'

7806.92'

PGRC



14194'	90.89°	268.85°	6673.29'	7901.88'
14200				
14250				
14289'	89.48°	269.23°	6672.99'	7996.85'
14300				
14350				
14384'	89.66°	267.58°	6673.70'	8091.84'



14400

14450

14500

14550

14600

14479'

89.69°

267.86°

6674.24'

8186.84'

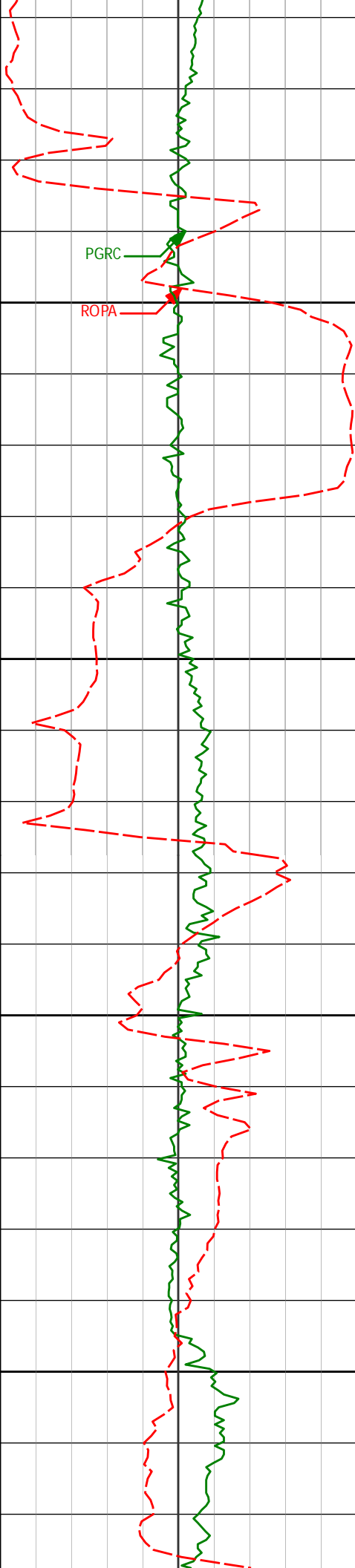
14574'

89.57°

267.39°

6674.85'

8281.84'



14650

14669'

89.88°

269.68°

6675.31'

8376.82'

14700

14750

14764'

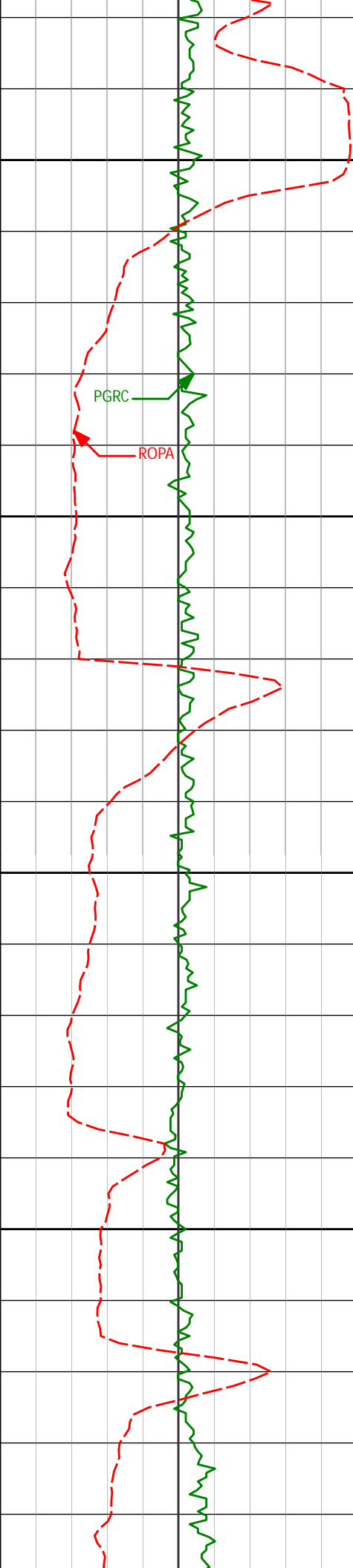
90.86°

269.23°

6674.69'

8471.78'

14800



14850

14859'

89.75°

269.63°

6674.19'

8566.74'

14900

14950

14953'

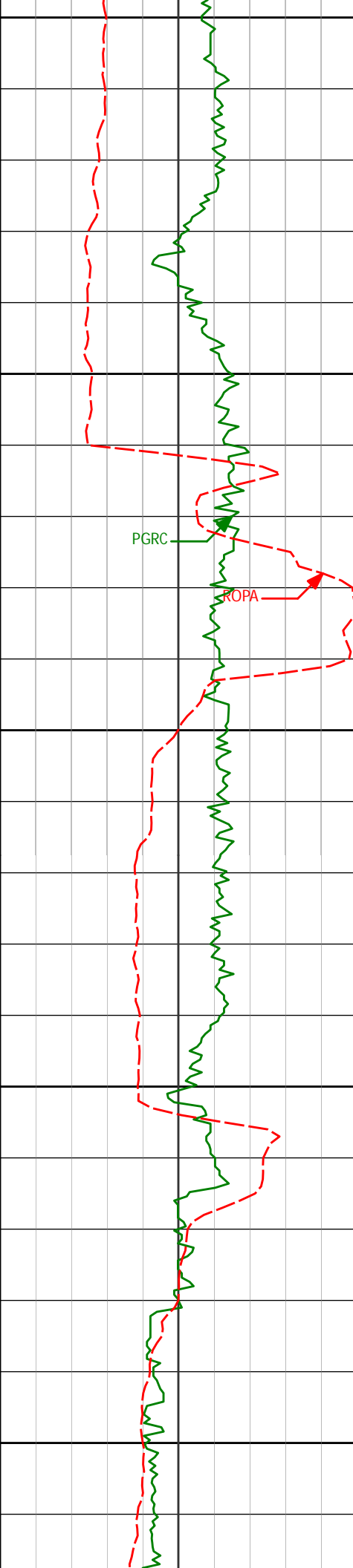
89.08°

268.44°

6675.15'

8660.71'

15000



15050

15100

15150

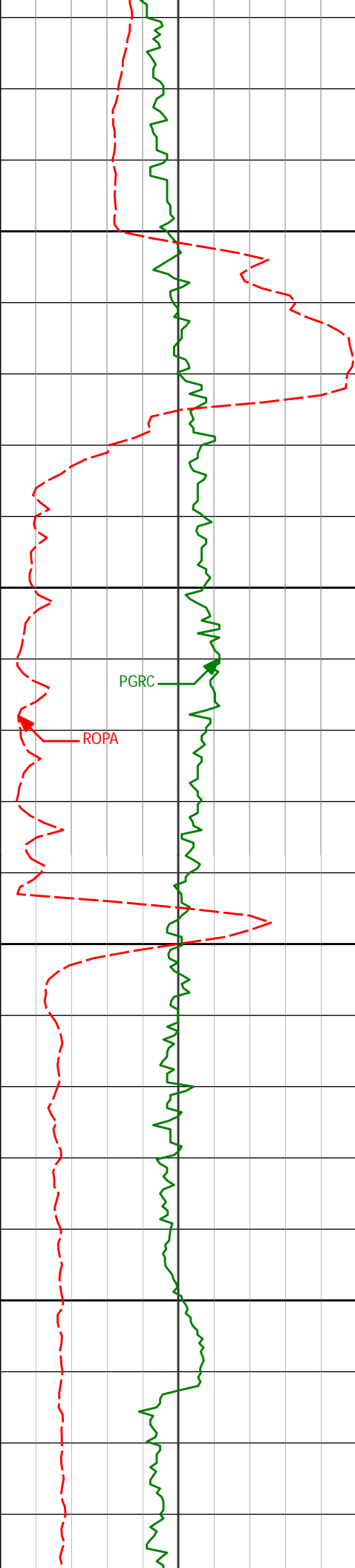
15200

15250

PGRC

ROPA

15048'	88.74°	267.52°	6676.96'	8755.69'
15143'	89.05°	268.46°	6678.79'	8850.67'
15238'	89.29°	267.68°	6680.16'	8945.66'



15300

15350

15400

15450

15333'

91.36°

270.96°

6679.63'

9040.60'

15427'

91.97°

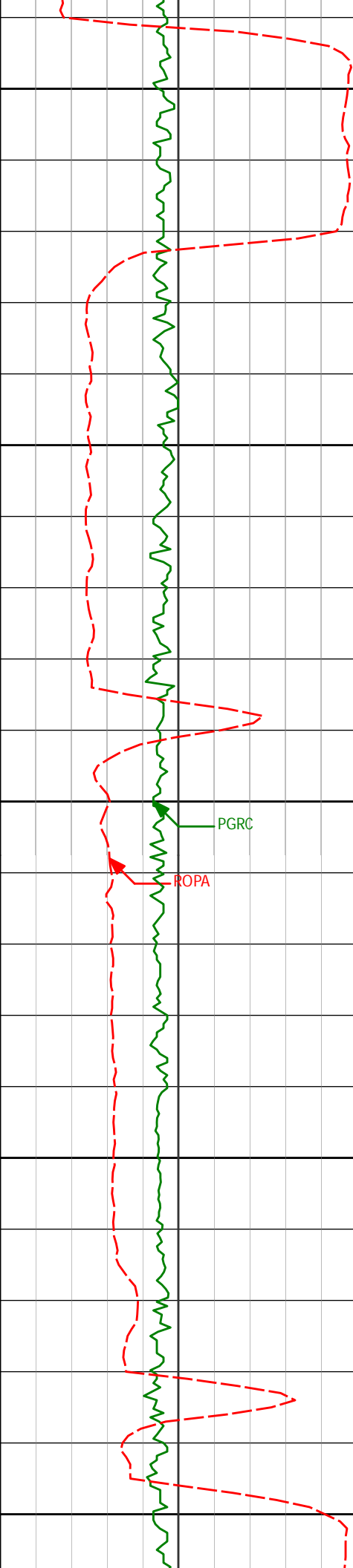
269.73°

6676.89'

9134.47'

PGRC

ROPA



15500

15522'

90.28°

271.24°

6675.03'

9229.34'

15550

15600

PGRC

ROPA

15617'

90.86°

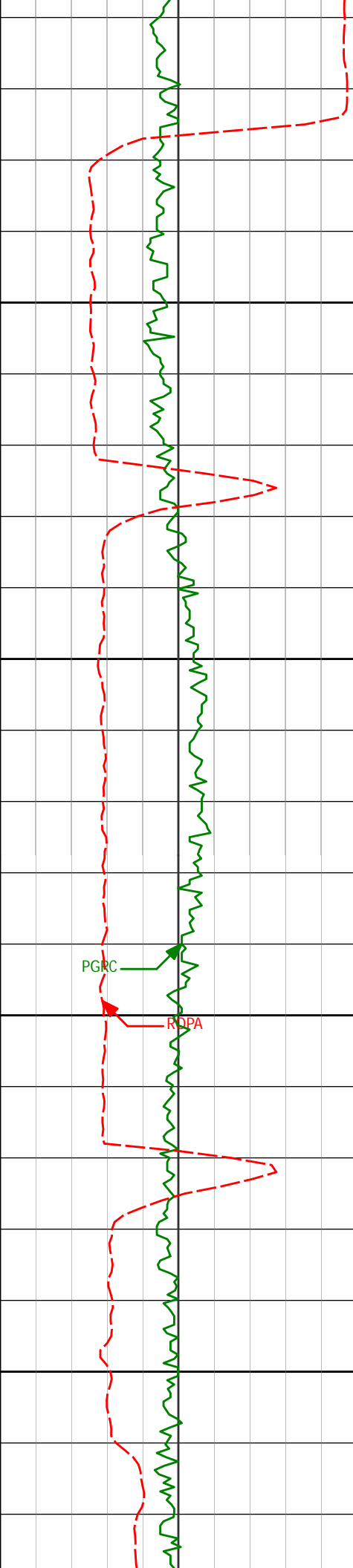
270.52°

6674.08'

9324.19'

15650

15700



15712'	88.86°	272.08°	6674.32'	9419.01'
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15750

15800

15807'	88.64°	271.90°	6676.39'	9513.73'
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15850

15900

15902'	89.05°	271.25°	6678.30'	9608.50'
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15950

16000

16050

16100

PGRC

ROPA

15997'

89.35°

270.67°

6679.63'

9703.35'

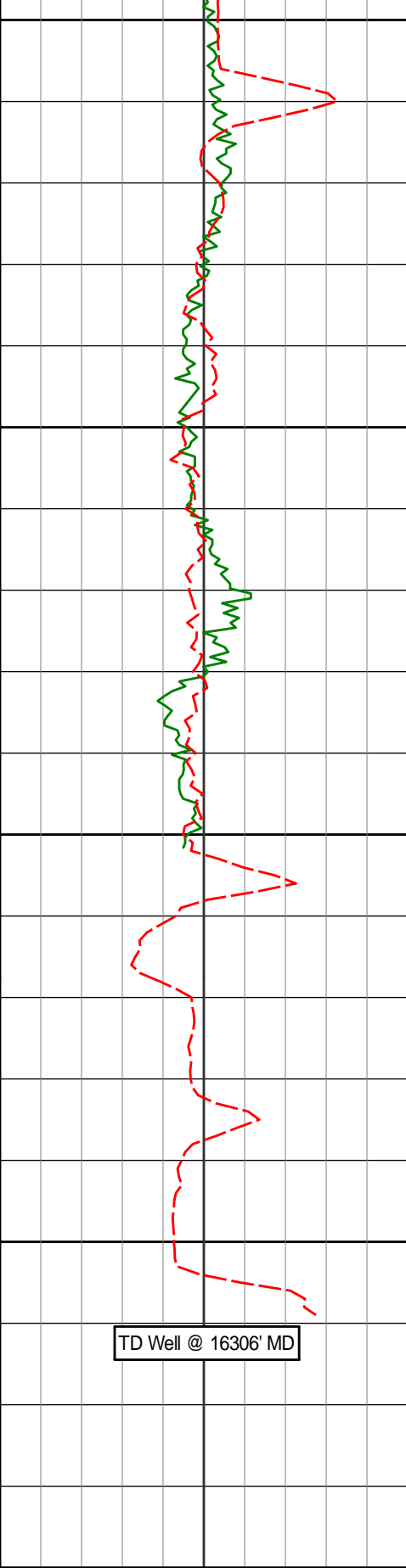
16092'

89.57°

269.92°

6680.53'

9798.25'



16150

16186'

89.75°

268.91°

6681.08'

9892.21'

16200

16242'

89.91°

268.73°

6681.25'

9948.20'

16250

16300

16306'

89.91°

268.73°

6681.35'

10012.19'

Avg Rate of Penetration

ROPA

feet per hr

500

0

PCG Gamma Ray

PGRC

—————

api

0

300

Depth
ft

Depth

Inc.

Azi.

TVD

V.S.

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble
NCLP AA06-66-1BHNA
Wattenburg
Weld Colorado
USA
CA-XX-0901285465

The first three surveys at 355', 550' and 830' were provided by HP.

<i>Measured Depth (feet)</i>	<i>Inclination (degrees)</i>	<i>Direction (degrees)</i>	<i>Vertical Depth (feet)</i>	<i>Latitude (feet)</i>	<i>Departure (feet)</i>	<i>Vertical Section (feet)</i>	<i>Dogleg (deg/100ft)</i>
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
355.00	1.20	359.06	354.97	3.72 N	0.06 W	-0.08	0.34
550.00	1.20	62.86	549.94	6.69 N	1.72 E	-1.98	0.65
830.00	0.40	68.66	829.91	8.38 N	5.24 E	-5.56	0.29
895.00	0.88	0.08	894.91	8.96 N	5.45 E	-5.80	1.27
987.00	0.98	8.38	986.89	10.45 N	5.57 E	-5.97	0.18
1175.00	1.06	7.62	1174.86	13.76 N	6.03 E	-6.56	0.04
1266.00	1.15	14.75	1265.85	15.48 N	6.38 E	-6.97	0.18
1360.00	1.29	18.64	1359.83	17.40 N	6.96 E	-7.62	0.17
1454.00	0.29	63.04	1453.82	18.51 N	7.51 E	-8.22	1.17
1548.00	0.11	63.01	1547.82	18.66 N	7.80 E	-8.51	0.19
1737.00	0.52	162.81	1736.81	17.92 N	8.22 E	-8.90	0.29
1832.00	0.56	146.08	1831.81	17.12 N	8.60 E	-9.26	0.17
1926.00	0.28	121.27	1925.81	16.62 N	9.05 E	-9.69	0.35
2020.00	0.33	142.98	2019.81	16.29 N	9.41 E	-10.03	0.13
2114.00	0.43	141.09	2113.80	15.79 N	9.80 E	-10.40	0.11
2209.00	1.10	185.51	2208.79	14.61 N	9.93 E	-10.49	0.89
2304.00	2.00	199.00	2303.76	12.13 N	9.31 E	-9.77	1.02
2398.00	3.36	191.92	2397.65	7.89 N	8.20 E	-8.50	1.49
2492.00	5.09	190.95	2491.40	1.10 N	6.84 E	-6.88	1.84
2587.00	6.96	188.09	2585.87	8.74 S	5.23 E	-4.89	1.99
2682.00	7.54	190.88	2680.11	20.56 S	3.25 E	-2.45	0.71
2777.00	8.40	196.17	2774.19	33.34 S	0.14 E	1.15	1.19
2872.00	8.37	199.91	2868.18	46.51 S	4.15 W	5.94	0.57
2967.00	8.05	198.70	2962.20	59.31 S	8.64 W	10.92	0.38
3062.00	7.54	200.35	3056.32	71.46 S	12.94 W	15.68	0.59
3156.00	8.72	195.47	3149.38	84.11 S	16.98 W	20.21	1.45
3251.00	6.58	197.81	3243.53	96.23 S	20.57 W	24.26	2.28
3345.00	6.22	193.87	3336.94	106.30 S	23.44 W	27.52	0.60
3440.00	7.06	182.83	3431.31	117.13 S	24.96 W	29.46	1.60
3535.00	5.76	177.66	3525.71	127.72 S	25.05 W	29.96	1.50
3629.00	6.23	189.66	3619.20	137.47 S	25.72 W	31.00	1.42
3724.00	5.72	193.54	3713.69	147.15 S	27.69 W	33.34	0.68
3819.00	5.46	202.07	3808.24	155.94 S	30.50 W	36.49	0.92
3913.00	4.23	210.50	3901.90	163.07 S	33.94 W	40.20	1.51
4007.00	1.07	232.17	3995.79	166.60 S	36.39 W	42.79	3.47
4101.00	0.92	232.67	4089.77	167.60 S	37.68 W	44.12	0.16
4195.00	0.62	249.41	4183.77	168.23 S	38.76 W	45.22	0.40
4290.00	0.52	134.08	4278.76	168.71 S	38.93 W	45.41	1.02
4385.00	0.92	120.47	4373.76	169.40 S	37.96 W	44.47	0.46
4480.00	1.02	124.83	4468.74	170.27 S	36.61 W	43.15	0.13
4574.00	0.84	180.67	4562.73	171.44 S	35.93 W	42.52	0.94
4669.00	0.63	183.90	4657.72	172.65 S	35.98 W	42.61	0.23
4763.00	0.86	184.35	4751.72	173.87 S	36.07 W	42.74	0.24
4858.00	0.26	158.25	4846.71	174.78 S	36.04 W	42.75	0.67
4953.00	0.87	157.15	4941.71	175.65 S	35.68 W	42.43	0.64
5048.00	0.86	156.46	5036.69	176.97 S	35.12 W	41.91	0.02
5143.00	0.61	133.20	5131.69	177.97 S	34.46 W	41.30	0.40
5238.00	0.33	193.01	5226.68	178.58 S	34.15 W	41.02	0.56
5332.00	0.85	177.78	5320.68	179.54 S	34.19 W	41.09	0.57
5427.00	1.10	175.91	5415.67	181.15 S	34.10 W	41.06	0.27
5522.00	0.93	189.17	5510.65	182.82 S	34.15 W	41.18	0.30
5616.00	0.96	186.95	5604.64	184.36 S	34.37 W	41.45	0.05
5711.00	0.90	237.68	5699.63	185.55 S	35.10 W	42.23	0.84
5806.00	0.74	192.84	5794.62	186.54 S	35.86 W	43.03	0.68

5800.00	0.74	152.04	5794.02	180.34 S	35.00 W	43.03	0.00
5873.00	0.11	243.25	5861.62	187.00 S	36.02 W	43.20	1.01
5900.00	0.22	246.31	5888.62	187.03 S	36.09 W	43.27	0.41
5949.00	0.28	237.31	5937.62	187.13 S	36.28 W	43.47	0.15
5995.00	2.06	259.96	5983.60	187.33 S	37.18 W	44.38	3.92
6043.00	9.16	265.01	6031.34	187.82 S	41.85 W	49.06	14.81
6090.00	14.66	264.43	6077.31	188.72 S	51.50 W	58.74	11.70
6185.00	19.68	260.22	6168.05	192.61 S	79.25 W	86.62	5.44
6280.00	25.86	269.37	6255.64	195.56 S	115.77 W	123.23	7.48
6374.00	37.25	270.07	6335.61	195.75 S	164.88 W	172.31	12.12
6469.00	47.48	270.11	6405.70	195.65 S	228.82 W	236.19	10.77
6563.00	52.91	270.55	6465.86	195.22 S	301.00 W	308.30	5.79
6658.00	60.71	271.93	6517.83	193.46 S	380.42 W	387.60	8.30
6753.00	68.62	272.08	6558.44	190.45 S	466.16 W	473.16	8.33
6848.00	75.27	271.27	6587.87	187.83 S	556.39 W	563.22	7.05
6906.00	83.23	271.01	6598.68	186.69 S	613.32 W	620.06	13.73
7031.00	85.93	270.41	6610.49	185.15 S	737.74 W	744.33	2.21
7126.00	87.16	269.61	6616.21	185.14 S	832.56 W	839.08	1.54
7221.00	86.89	268.87	6621.14	186.40 S	927.42 W	933.92	0.83
7316.00	88.00	268.08	6625.38	188.92 S	1022.29 W	1028.82	1.43
7411.00	87.60	267.10	6629.02	192.91 S	1117.14 W	1123.75	1.11
7506.00	89.32	266.63	6631.58	198.11 S	1211.96 W	1218.70	1.88
7601.00	89.57	266.97	6632.50	203.41 S	1306.81 W	1313.68	0.44
7696.00	89.91	267.52	6632.93	207.98 S	1401.69 W	1408.67	0.68
7791.00	89.51	269.31	6633.41	210.60 S	1496.65 W	1503.66	1.93
7886.00	88.58	270.22	6634.99	210.99 S	1591.64 W	1598.59	1.37
7980.00	90.40	271.54	6635.83	209.55 S	1685.62 W	1692.44	2.39
8075.00	91.60	271.21	6634.17	207.27 S	1780.57 W	1787.24	1.31
8169.00	93.39	270.15	6630.08	206.16 S	1874.47 W	1881.03	2.21
8264.00	91.85	269.23	6625.74	206.67 S	1969.37 W	1975.87	1.89
8359.00	92.19	267.95	6622.39	209.01 S	2064.28 W	2070.80	1.39
8453.00	91.08	268.57	6619.71	211.86 S	2158.19 W	2164.76	1.35
8547.00	89.91	269.64	6618.90	213.33 S	2252.18 W	2258.73	1.69
8642.00	90.22	269.28	6618.79	214.22 S	2347.17 W	2353.69	0.50
8736.00	88.03	268.25	6620.22	216.25 S	2441.13 W	2447.65	2.57
8831.00	87.75	266.85	6623.72	220.31 S	2535.98 W	2542.59	1.50
8925.00	90.49	268.62	6625.16	224.02 S	2629.88 W	2636.56	3.47
9020.00	91.94	267.75	6623.15	227.03 S	2724.81 W	2731.54	1.78
9114.00	90.22	268.66	6621.38	229.97 S	2818.74 W	2825.51	2.07
9209.00	90.37	267.51	6620.89	233.15 S	2913.68 W	2920.51	1.22
9303.00	87.81	267.65	6622.38	237.11 S	3007.58 W	3014.49	2.73
9397.00	86.73	267.21	6626.86	241.32 S	3101.38 W	3108.38	1.24
9492.00	86.39	268.29	6632.56	245.05 S	3196.13 W	3203.20	1.19
9587.00	86.02	268.51	6638.85	247.69 S	3290.89 W	3297.99	0.45
9681.00	88.64	269.03	6643.23	249.71 S	3384.75 W	3391.87	2.84
9776.00	90.43	268.74	6644.00	251.56 S	3479.73 W	3486.84	1.91
9871.00	91.32	267.87	6642.55	254.37 S	3574.68 W	3581.83	1.31
9965.00	92.34	268.27	6639.54	257.53 S	3668.57 W	3675.77	1.17
10060.00	90.25	267.78	6637.40	260.81 S	3763.49 W	3770.74	2.26
10155.00	90.62	268.46	6636.68	263.92 S	3858.43 W	3865.74	0.81
10249.00	89.32	271.39	6636.73	264.05 S	3952.42 W	3959.66	3.41
10343.00	89.29	271.31	6637.87	261.83 S	4046.39 W	4053.47	0.09
10435.00	89.32	269.93	6638.98	260.84 S	4138.37 W	4145.35	1.50
10527.00	89.78	268.96	6639.70	261.73 S	4230.36 W	4237.31	1.17
10620.00	90.00	267.80	6639.88	264.36 S	4323.32 W	4330.30	1.27
10713.00	90.25	268.74	6639.68	267.16 S	4416.28 W	4423.30	1.05
10806.00	89.69	270.48	6639.73	267.80 S	4509.27 W	4516.25	1.97
10898.00	89.08	269.08	6640.72	268.15 S	4601.27 W	4608.18	1.66
10991.00	89.69	268.49	6641.71	270.12 S	4694.24 W	4701.16	0.91
11083.00	89.78	269.43	6642.14	271.79 S	4786.22 W	4793.14	1.03
11175.00	90.34	269.17	6642.04	272.92 S	4878.21 W	4885.11	0.67
11268.00	88.95	269.67	6642.62	273.86 S	4971.21 W	4978.07	1.59
11361.00	88.89	268.94	6644.37	274.99 S	5064.18 W	5071.02	0.79
11455.00	88.80	268.93	6646.27	276.73 S	5158.15 W	5164.98	0.10
11546.00	86.89	267.52	6649.69	279.55 S	5249.03 W	5255.91	2.61
11641.00	87.29	268.17	6654.51	283.12 S	5343.84 W	5350.78	0.80
11734.00	85.59	267.46	6660.29	286.65 S	5436.59 W	5443.60	1.98
11828.00	86.82	269.23	6666.51	289.36 S	5530.34 W	5537.38	2.29
11920.00	87.63	268.04	6670.96	291.55 S	5622.20 W	5629.26	1.56
12011.00	87.87	267.24	6674.54	295.30 S	5713.05 W	5720.19	0.92
12103.00	88.43	268.05	6677.51	299.07 S	5804.93 W	5812.14	1.07
12198.00	88.30	267.25	6680.22	302.97 S	5899.81 W	5907.10	0.85
12293.00	89.66	265.92	6681.91	308.63 S	5994.62 W	6002.06	2.00
12388.00	90.95	268.60	6681.40	313.17 S	6089.50 W	6097.05	3.13
12482.00	92.10	268.68	6678.90	315.40 S	6183.44 W	6191.00	1.23

12577.00	92.16	269.52	6675.37	316.89 S	6278.36 W	6285.91	0.89
12671.00	90.80	271.32	6672.94	316.20 S	6372.32 W	6379.77	2.40
12766.00	90.25	271.94	6672.07	313.50 S	6467.28 W	6474.56	0.87
12866.00	90.99	270.61	6670.99	311.27 S	6567.24 W	6574.36	1.52
12961.00	90.03	270.20	6670.14	310.60 S	6662.24 W	6669.26	1.10
13056.00	89.75	269.72	6670.33	310.67 S	6757.24 W	6764.19	0.58
13151.00	89.94	269.36	6670.58	311.43 S	6852.23 W	6859.15	0.43
13246.00	90.71	268.87	6670.04	312.90 S	6947.22 W	6954.12	0.96
13341.00	89.41	268.43	6669.94	315.13 S	7042.19 W	7049.10	1.44
13436.00	89.94	267.59	6670.48	318.43 S	7137.13 W	7144.10	1.05
13530.00	88.83	267.02	6671.49	322.85 S	7231.02 W	7238.09	1.33
13625.00	88.21	265.88	6673.95	328.73 S	7325.80 W	7333.03	1.37
13719.00	89.17	267.56	6676.10	334.11 S	7419.62 W	7426.98	2.06
13814.00	89.69	268.45	6677.04	337.42 S	7514.56 W	7521.98	1.09
13909.00	90.55	269.11	6676.84	339.44 S	7609.53 W	7616.96	1.14
14004.00	90.68	267.95	6675.82	341.88 S	7704.49 W	7711.95	1.23
14099.00	90.74	269.72	6674.64	343.81 S	7799.46 W	7806.92	1.86
14194.00	90.89	268.85	6673.29	344.99 S	7894.45 W	7901.88	0.93
14289.00	89.48	269.23	6672.99	346.58 S	7989.43 W	7996.85	1.54
14384.00	89.66	267.58	6673.70	349.23 S	8084.39 W	8091.84	1.75
14479.00	89.69	267.86	6674.24	353.01 S	8179.31 W	8186.84	0.30
14574.00	89.57	267.39	6674.85	356.95 S	8274.23 W	8281.84	0.51
14669.00	89.88	269.68	6675.31	359.37 S	8369.19 W	8376.82	2.43
14764.00	90.86	269.23	6674.69	360.28 S	8464.18 W	8471.78	1.14
14859.00	89.75	269.63	6674.19	361.22 S	8559.17 W	8566.74	1.24
14953.00	89.08	268.44	6675.15	362.81 S	8653.15 W	8660.71	1.45
15048.00	88.74	267.52	6676.96	366.15 S	8748.07 W	8755.69	1.03
15143.00	89.05	268.46	6678.79	369.49 S	8843.00 W	8850.67	1.04
15238.00	89.29	267.68	6680.16	372.68 S	8937.93 W	8945.66	0.86
15333.00	91.36	270.96	6679.63	373.81 S	9032.91 W	9040.60	4.08
15427.00	91.97	269.73	6676.89	373.25 S	9126.86 W	9134.47	1.46
15522.00	90.28	271.24	6675.03	372.44 S	9221.83 W	9229.34	2.39
15617.00	90.86	270.52	6674.08	370.98 S	9316.82 W	9324.19	0.97
15712.00	88.86	272.08	6674.32	368.83 S	9411.78 W	9419.01	2.67
15807.00	88.64	271.90	6676.39	365.53 S	9506.70 W	9513.73	0.30
15902.00	89.05	271.25	6678.30	362.92 S	9601.65 W	9608.50	0.81
15997.00	89.35	270.67	6679.63	361.33 S	9696.63 W	9703.35	0.69
16092.00	89.57	269.92	6680.53	360.84 S	9791.62 W	9798.25	0.82
16186.00	89.75	268.91	6681.08	361.80 S	9885.61 W	9892.21	1.09
16242.00	89.91	268.73	6681.25	362.95 S	9941.60 W	9948.20	0.43
16306.00	89.91	268.73	6681.35	364.37 S	10005.58 W	10012.19	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 267.79 DEGREES (GRID)
A TOTAL CORRECTION OF 7.47 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 16306.00 FEET
IS 10012.22 FEET ALONG 267.91 DEGREES (GRID)

Final survey is a straight line projection to TD.