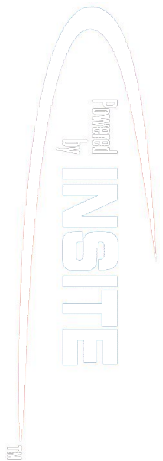


PCD-C Pressure Case Directional
DGR Dual Gamma Ray



1 : 240

Country	: USA
Field	: Wattenburg
Location	: Lat: 40° 9' 13.28" North Long: 104° 40' 49.36" West
Well	: Nichols 1N-5HZ
Company	: Anadarko Petroleum Corp.
Rig	: H&P 308
LOCATION	
Latitude : 40° 9' 13.28" North Longitude : 104° 40' 49.36" West UTM Easting = 3,229,099.31 ft UTM Northing = 1,299,891.35 ft	
Company	: Anadarko Petroleum Corp.
Rig	: H&P 308
Well	: Nichols 1N-5HZ
Field	: Wattenburg
Country	: USA
API Number	: 05-123-35877
Permanent Datum	: Ground Level
Log Measured From	: Drill Floor
Drilling Measured From	: Drill Floor
Depth Logged	: 859.00 ft To 14,151.00 ft
Date Logged	: 28-Dec-12 To 05-Jan-13
Total Depth MD	: 14,151.00 ft TVD: 7,031.16 ft
Spud Date	: 28-Dec-12
Unit No.	: 11610114
Job No.	: CA-XX-0009810738
Plot Type	: Final
Plot Date	: 18-Jan-13
Run No.	Size From To
100	8.750 in 859.00 ft 969.00 ft
200	8.750 in 969.00 ft 6,743.00 ft
300	8.750 in 6,743.00 ft 7,416.00 ft
400	6.125 in 7,416.00 ft 14,151.00 ft
Run No.	Size From To
	9.625 in 32.00 lbpft SURFACE 859.00 ft
	7.000 in 26.00 lbpft SURFACE 7,403.00 ft

WELL INFORMATION					
MWD Run Number	100	200	300	400	
Date run completed	28-Dec-12	30-Dec-12	31-Dec-12	05-Jan-13	
Rig Bit Number	100	200	300	400	
Bit Size (in)	8.750	8.750	8.750	6.125	
Tool Nominal OD (in)	6.750	6.750	6.750	4.750	
Log Start Depth (MD, ft)	859.00	969.00	6,743.00	7,416.00	
Log End Depth (MD, ft)	969.00	6,743.00	7,416.00	14,151.00	
Drill or Wipe	Drill	Drill	Drill	Drill	
Drill/Wipe Start Date and Time	28-Dec-12 13:35	28-Dec-12 19:00	30-Dec-12 21:40	02-Jan-13 07:30	
Drill/Wipe End Date and Time	28-Dec-12 16:15	30-Dec-12 11:30	31-Dec-12 15:15	04-Jan-13 20:20	
Min Inc (deg) @ Depth (MD, ft)	.24 @ 825.00	.07 @ 6,094.00	14.12 @ 6,756.00	89.51 @ 7,528.00	
Max Inc (deg) @ Depth (MD, ft)	.24 @ 825.00	11.14 @ 6,725.00	83.44 @ 7,356.00	89.75 @ 7,433.00	
Bit TFA(in2) / Bit Type	.52 / Tricone	.86 / PDC	.75 / Tricone	.61 / PDC	
Flow Rate (gpm)	400.00	575.00	550.00	285.00	
Max AV (fpm) / CV (fpm) @ MWD	473.0 /	473.0 / N/A	N/A / N/A	533.0 / N/A	
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel	
Density (ppg) / Viscosity (spqt)	8.40 / 28.00	8.50 / 27.00	10.00 / 39.00	9.80 / 36.00	
Filtrate CL (ppm)	1,400.00	1,000.00	1,100.00	2,400.00	
pH / Fluid Loss (mptm)	8.00 / 8.00	8.10 / 8.30	8.20 / 8.20	8.50 / 8.50	
PV (cP) / YP (lbf2)	2 / 1.00	2 / 1.00	12 / 11.00	10 / 8.00	
% Solids / % Sand	.25 / N/A	1.6 / N/A	8.4 / .25	8 / .1	
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	N/A / N/A	N/A / N/A	
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	
Max Tool Temp (degF) / Source	167.97 / PCM	167.97 / PCM	165.58 / PCM	250.82 / HCIM	
Rm @ Max Tool Temp (degF)	N/A @ 167.97	N/A @ N/A	N/A @ 165.58	N/A @ 250.82	
Lead MWD Engineer	Ryan White	Ryan White	Ryan White	Ryan White	
Customer Representative	Levi Hancock	Levi Hancock	Levi Hancock	Levi Hancock	

SENSOR INFORMATION					
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Downhole Processor Information					
Tool Type	PCM	PCM	PCM	HCIM	
Software Version	5.76	5.76	5.76	88.47	
Sub Serial Number	11341350	11341350	11341350	11512741	
Insert Serial Number	11620299	11620299	11400833	10951820	
Date and Time Initialized	23-Dec-12 15:48	01-Jan-70 00:00	30-Dec-12 04:36	02-Jan-13 02:06	
Date and Time Read	30-Dec-12 17:37	30-Dec-12 17:43	31-Dec-12 21:38	05-Jan-13 05:16	
ECMB SW Version	N/A	N/A	N/A	N/A	

Directional Sensor Information					
Tool Type	PCDC	PCDC	PCDC	PCDC	
Distance From Bit (ft)	47.35	47.35	47.55	42.10	
Software Version	6.21	6.21	6.21	6.21	
Sub Serial Number	11341350	11341350	11341350	10743045	
Sonde Serial Number	11638601	11638601	11145688	11145688	
Sensor ID Number	N/A	N/A	N/A	N/A	
Toolface Offset (deg)	173.83	179.20	293.77	254.58	

Gamma Ray Sensor Information					
Tool Type	PCG	PCG	PCG	DGR	
Distance From Bit (ft)	52.30	52.30	52.50	63.64	
Recorded Sample Period (sec)	10	10	10	8	
Software Version	8.15	8.15	8.15	N/A	
Sub Serial Number	11341350	11341350	11341350	11512741	
Insert/Sonde Serial Number	11292593	11292593	11681051	10449262	

Resistivity Sensor Information					
Tool Type				Slim P4	
Distance From Bit (ft)				56.68	
Recorded Sample Period (sec)				6	
Software Version				5.55	
Sub Serial Number				11233610	
Receiver Insert Serial Number				109250	
Transmitter Insert Serial Number				247851	
Receiver Orientation				Down	

Pulser Controller Sensor Information					
Tool Type	PCM	PCM	PCM	PCM	
Software Version	5.76	5.76	5.76	8.04	
PIC Software Version	1.40	1.40	1.40		
Sub/HOC Serial Number	11341350	11341350	11341350	10507567	
Insert/Probe/Module SN	11620299	11620299	11400833	11400833	
Battery Serial Number	N/A	N/A	N/A	N/A	
Valve Insert SN	N/A	N/A	N/A	N/A	
DC Insert Serial Number	N/A	N/A	N/A	N/A	
Choke Size (32nd)	N/A	N/A	N/A	N/A	
Driver Current (amps)	N/A	N/A	N/A	N/A	
Driver SMI Current (amps)	N/A	N/A	N/A	N/A	
Boot Strap Version	4,130.00	4,130.00	4,130.00		

DDSr-DGR Sensor Information					
Tool Type				DDSr-DGR	
Distance From Bit (ft)				66.58	
Recorded Sample Period (sec)				12	
Software Version				10.72	

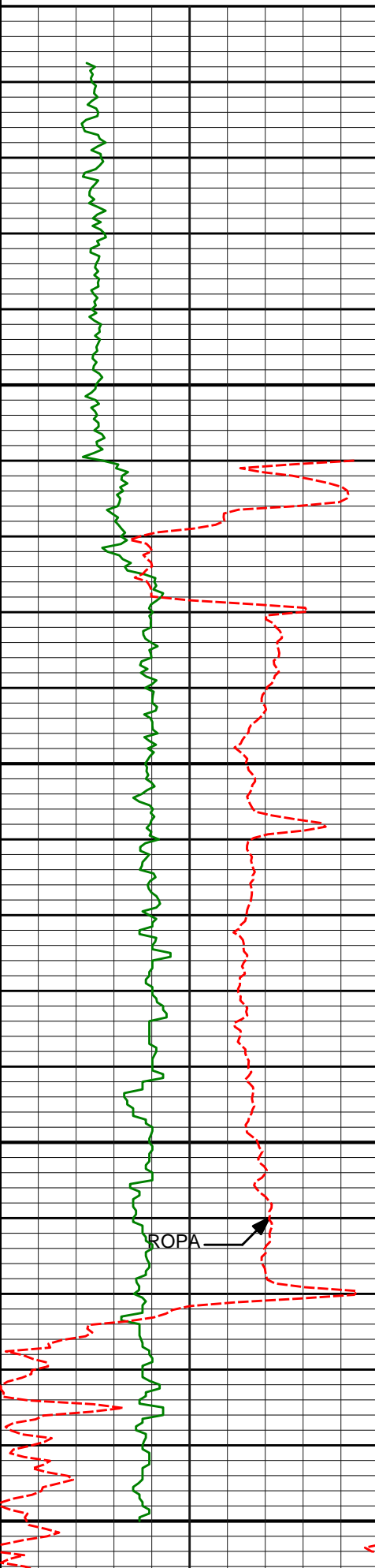
Sub Serial Number				11512741	
Insert Serial Number				11032885	
Sensor ID Number				5608	

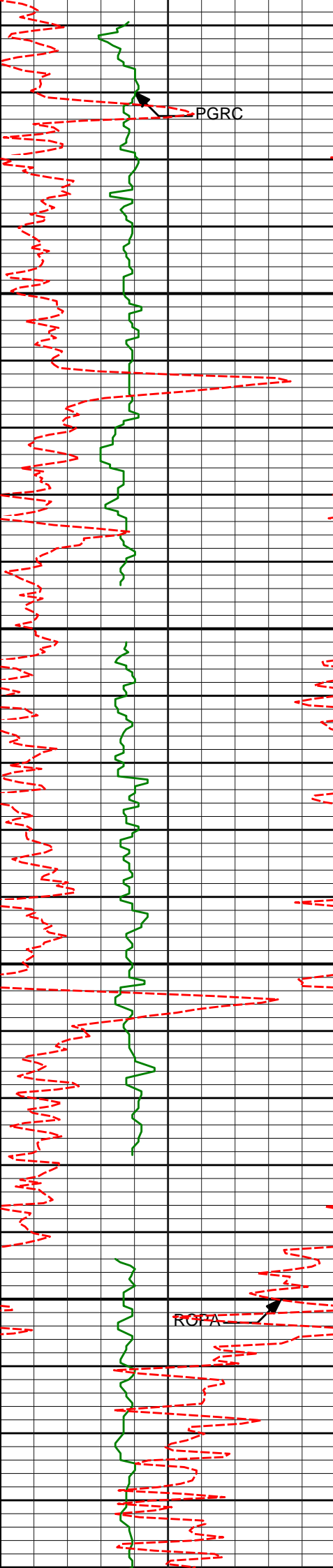
REMARKS
<div> 1. All depths are measured bit depths, referenced to the driller's pipe tally and are measured from the drill floor, unless otherwise specified. 2. No depth corrections have been made for pipe stretch or compression. 3. Critical annular velocities are calculated using the "Power Law" model 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: <div> <div>PGRC (Corrected Gamma Ray):</div> <div>Interval Resolution: 0.5 ft</div> <div>Interval Distance: 0.6 ft</div> <div>Gap Fill: 3.0 ft</div> <div>ROPA (Average Rate of Penetration):</div> <div>Interval Resolution: 0.5 ft</div> <div>Interval Distance: 1.2 ft</div> <div>Gap Fill : 3.0 ft</div> </div> 6. INSITE version 7.4.10 </div>

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<div> <div> <div>HALLIBURTON</div> <div>Sperry Drilling</div> </div> <div>MD 1:240 Detail Log</div> </div>
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<div> <div> <div>Avg Rate of Penetration</div> <div>(ROPA)</div> <div>500 feet per hr</div> <div>0</div> </div> </div>	
--	--

Gamma Ray KclBh (DGRC)							
0	250						
PCG Gamma Ray BCorr (PGRC)		Depth ft	DEPTH	INC	AZI	TVD	VS
0	250	1 : 240					
		800	<div>920'</div> <div>0.50°</div> <div>282.91°</div> <div>919.99'</div> <div>2.64'</div>				
		850					
		900					
		950					
		1000					



1050

1100

1150

1200

PGRC

ROPA

1012'

0.51°

322.12°

1011.99'

3.06'

1104'

0.54°

300.27°

1103.98'

3.62'

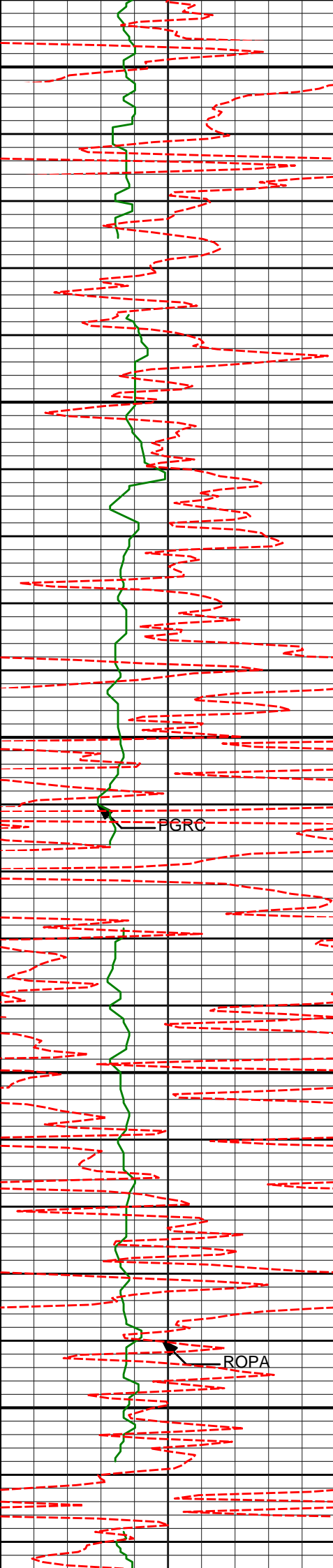
1196'

0.48°

284.82°

1195.98'

3.95'



1250

1300

1350

1400

1450

PGRC

ROPA

1288'

0.37°

295.79°

1287.98'

4.19'

1380'

0.92°

269.65°

1379.97'

4.34'

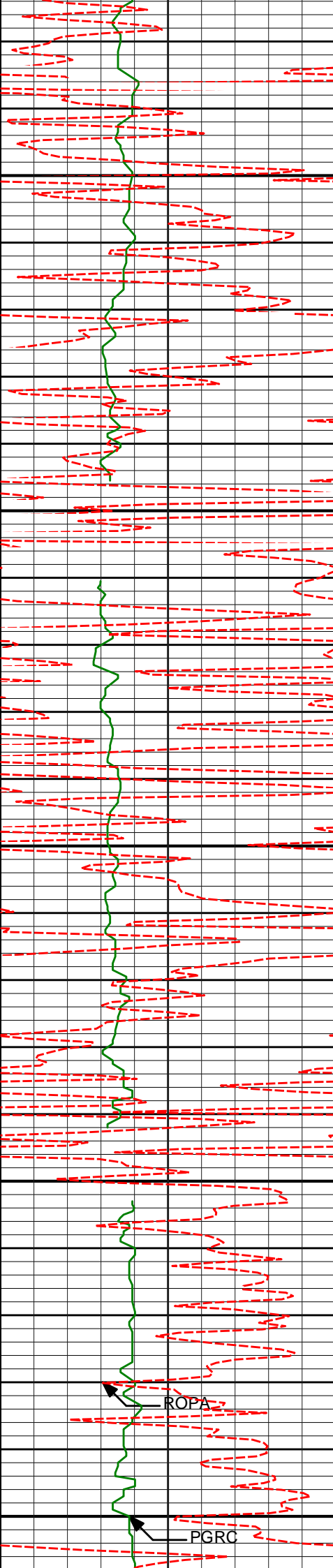
1471'

0.72°

288.66°

1470.96'

4.54'



1500

1550

1600

1650

1700

1563'

0.87°

310.09°

1562.95'

5.20'

1655'

0.83°

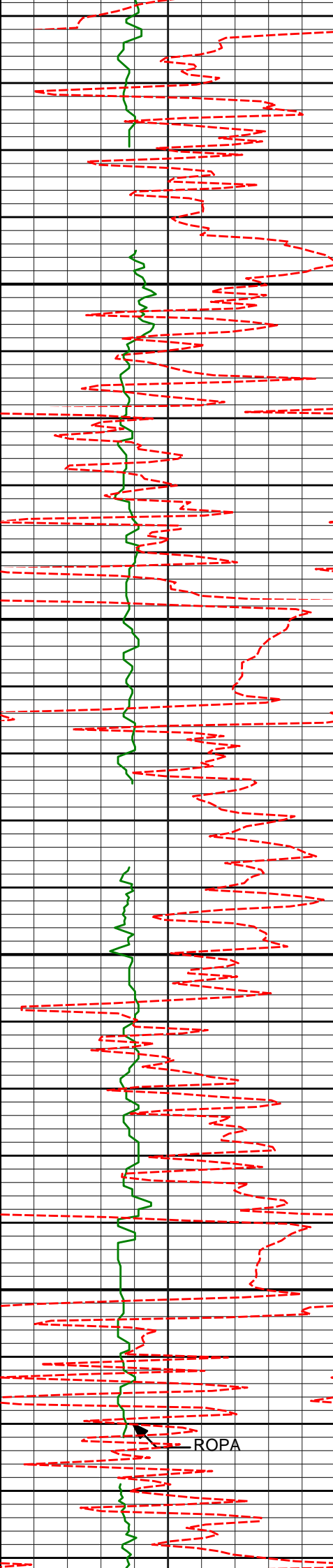
298.26°

1654.94'

5.98'

ROPA

PGRC



1750

1800

1850

1900

ROPA

1747'

1.10°

301.25°

1746.93'

6.78'

1839'

1.76°

271.48°

1838.90'

7.32'

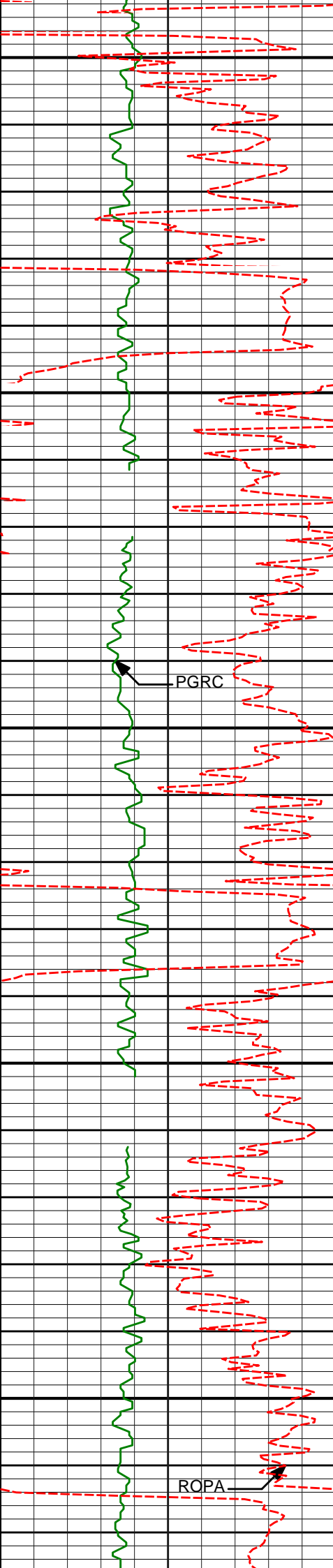
1931'

2.61°

252.10°

1930.83'

6.79'



1950

2000

2050

2100

2150

2023'

3.44°

252.22°

2022.71'

5.39'

PGRC

2114'

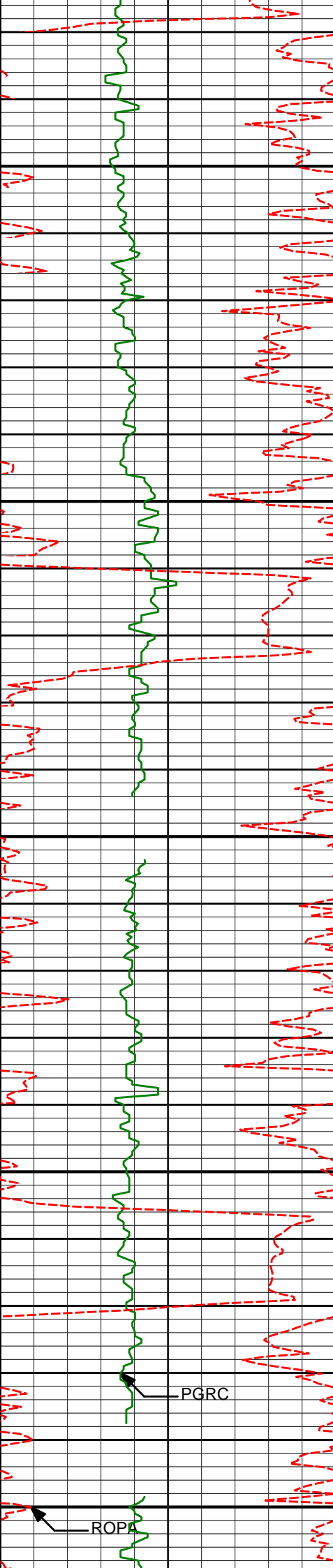
4.20°

247.30°

2113.50'

3.39'

ROPA



2200

2209'

4.55°

236.18°

2208.23'

0.08'

2250

2300

2304'

4.81°

239.41°

2302.91'

-3.92'

2350

2400

2399'

5.22°

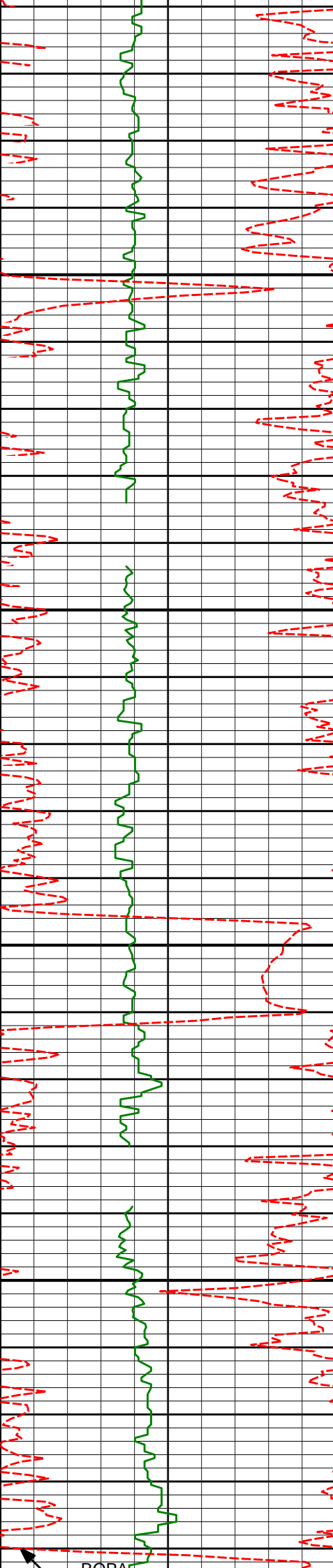
241.97°

2397.55'

-7.83'

PGRC

ROPA



2450

2500

2550

2600

2494'

4.86°

239.05°

2492.18'

-11.78'

2588'

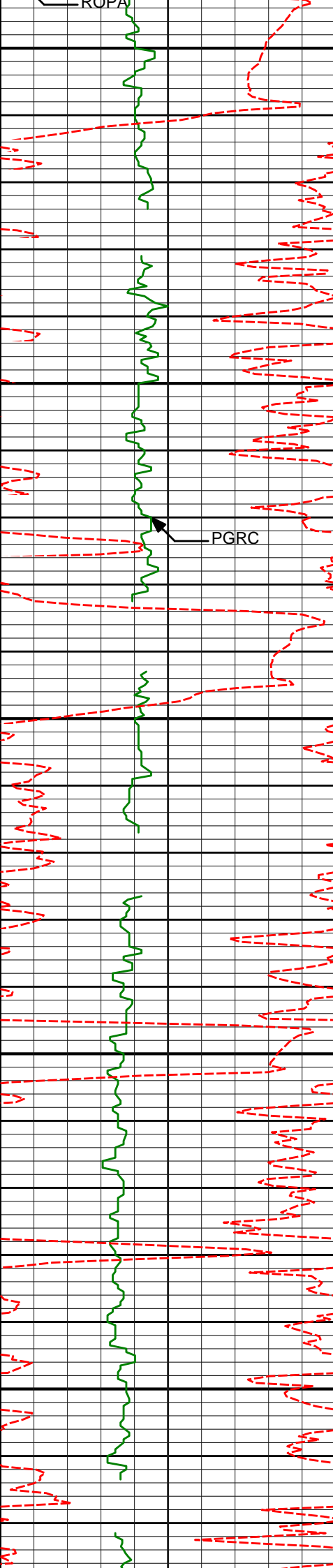
4.87°

231.48°

2585.84'

-16.18'

DORA



2650

2683'

5.81°

225.41°

2680.43'

-21.92'

2700

PGRC

2750

2778'

5.32°

235.48°

2774.98'

-27.65'

2800

2850

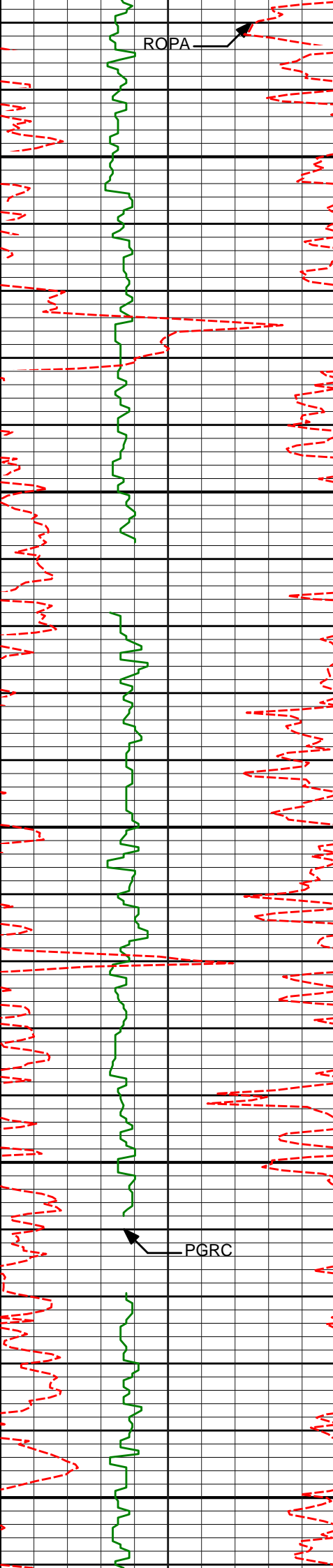
2872'

5.34°

239.76°

2868.58'

-32.17'



ROPA

2900

2950

2967'

5.41°

240.69°

2963.16'

-36.44'

3000

3050

3062'

4.97°

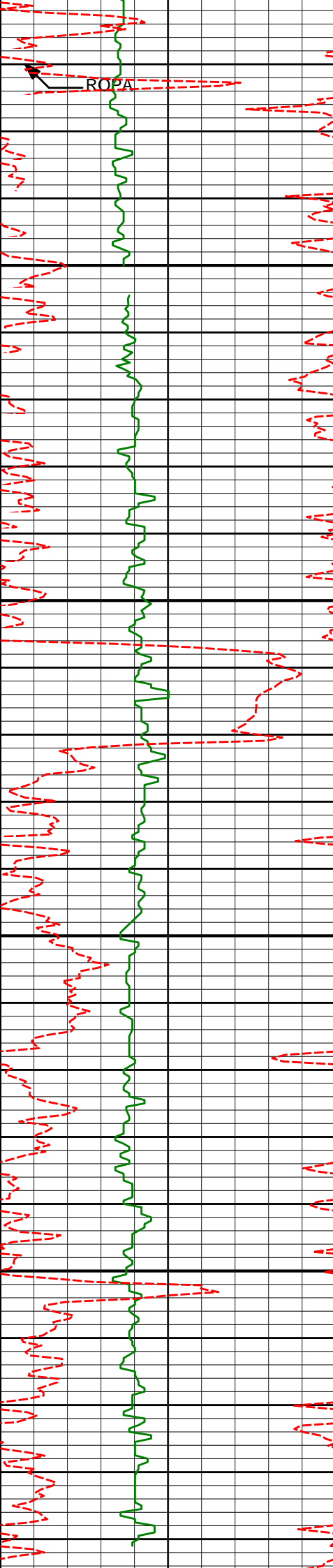
239.22°

3057.77'

-40.58'

3100

PGRC



3150

3157'

4.49°

240.70°

3152.45'

-44.37'

3200

3250

3252'

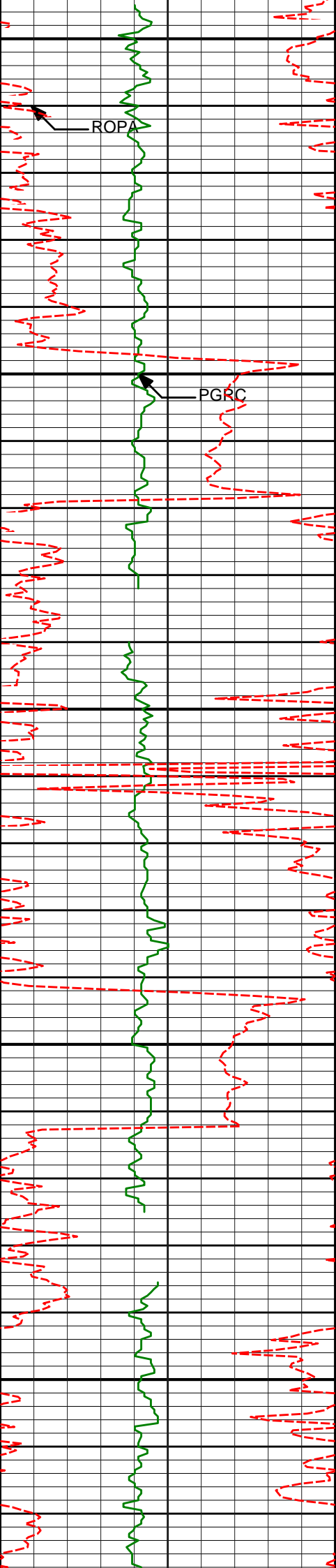
4.77°

250.36°

3247.14'

-47.38'

3300



3350

3400

3450

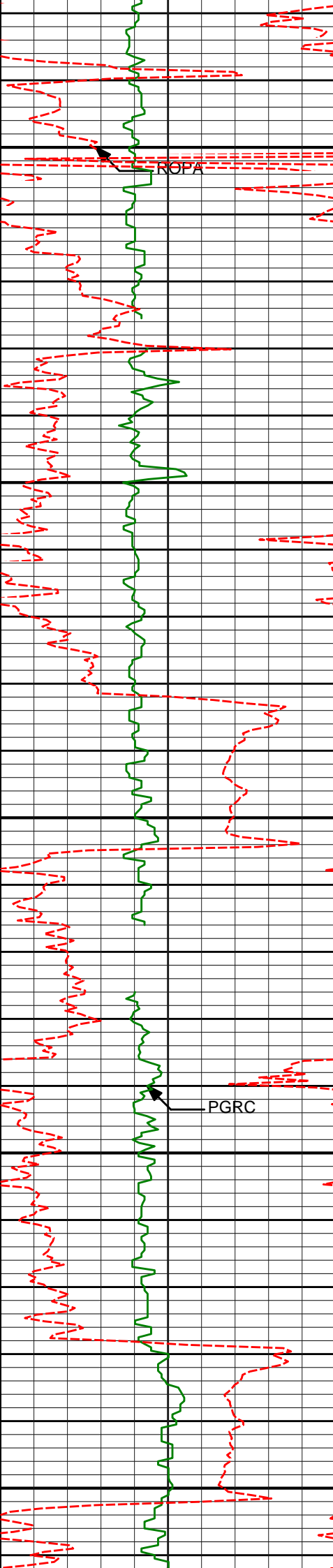
3500

3550

ROPA

PGRC

3347'	4.43°	256.32°	3341.83'	-49.43'
3442'	4.47°	254.63°	3436.55'	-51.13'
3536'	5.11°	243.79°	3530.22'	-53.80'



ROPA

PGRC

3600

3650

3700

3750

3800

3631'

4.07°

248.16°

3624.91'

-56.78'

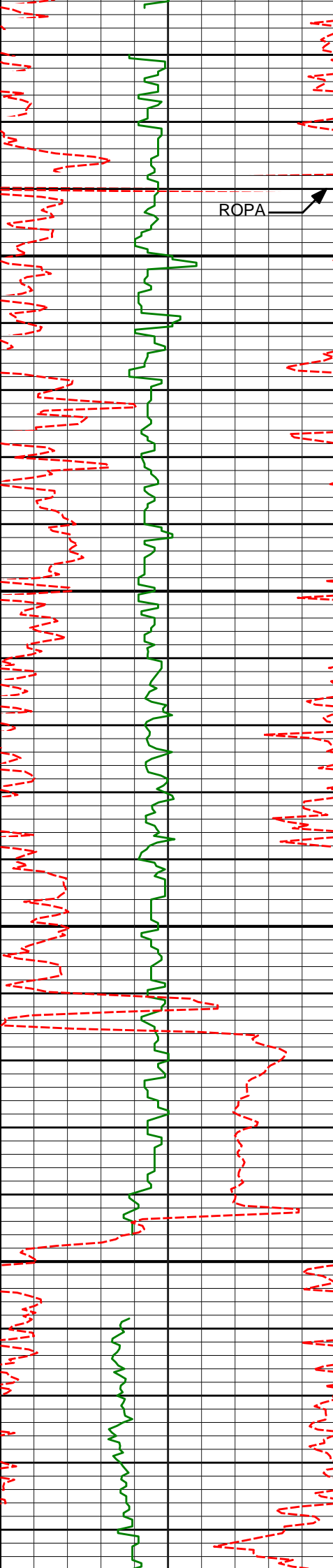
3726'

4.18°

240.50°

3719.67'

-59.61'



3820'	5.10°	230.72°	3813.36'	-63.82'
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3850

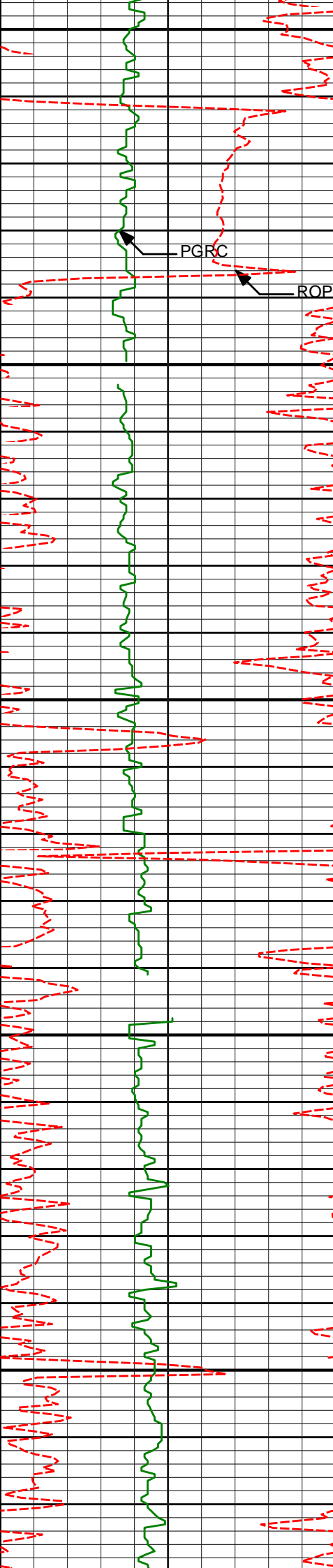
3900

3915'	3.94°	237.38°	3908.07'	-68.12'
-------	-------	---------	----------	---------

3950

4000

4010'	4.95°	235.24°	4002.78'	-72.10'
-------	-------	---------	----------	---------



4050

PGRC

ROPA

4100

4105'

6.53°

233.67°

4097.30'

-77.48'

4150

4200

4200'

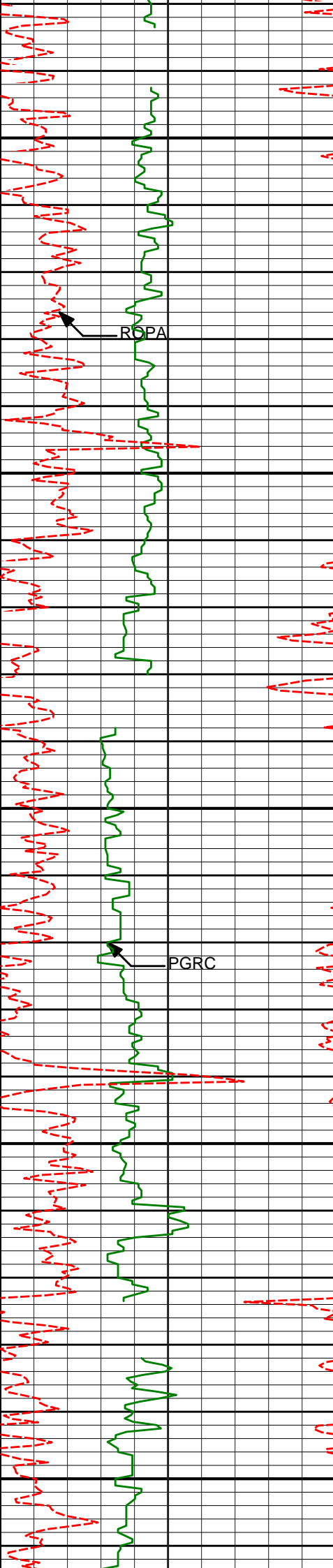
6.39°

237.56°

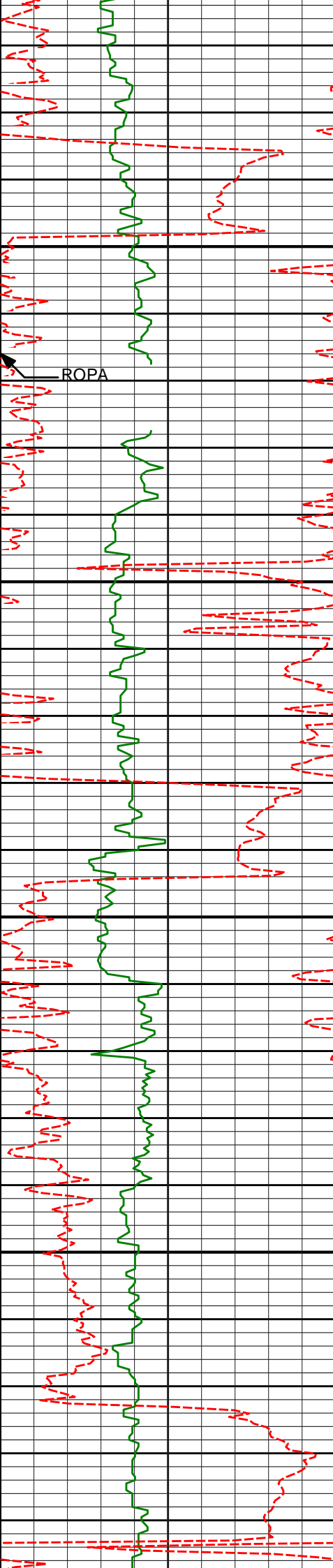
4191.70'

-83.34'

4250



4300	4294'	6.25°	238.22°	4285.12'	-88.66'
4350					
4400	4389'	5.06°	244.76°	4379.66'	-93.00'
4450					
4500	4484'	4.55°	252.05°	4474.33'	-95.80'



4550

ROPA

4578'

3.06°

238.49°

4568.12'

-98.14'

4600

4650

4673'

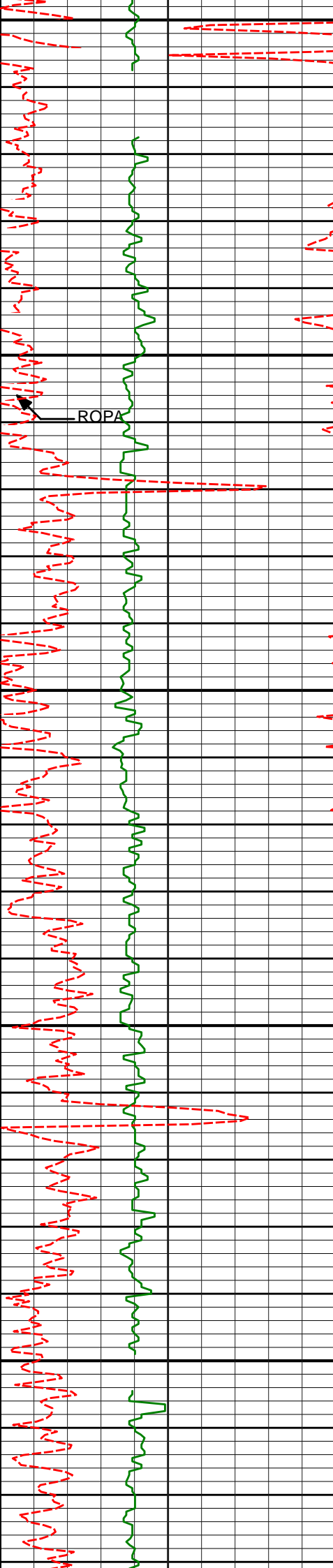
2.21°

235.79°

4663.02'

-100.42'

4700



4750

4767'

0.56°

309.27°

4756.99'

-101.11'

4800

4850

4862'

0.80°

10.77°

4851.99'

-100.16'

4900

4950

4957'

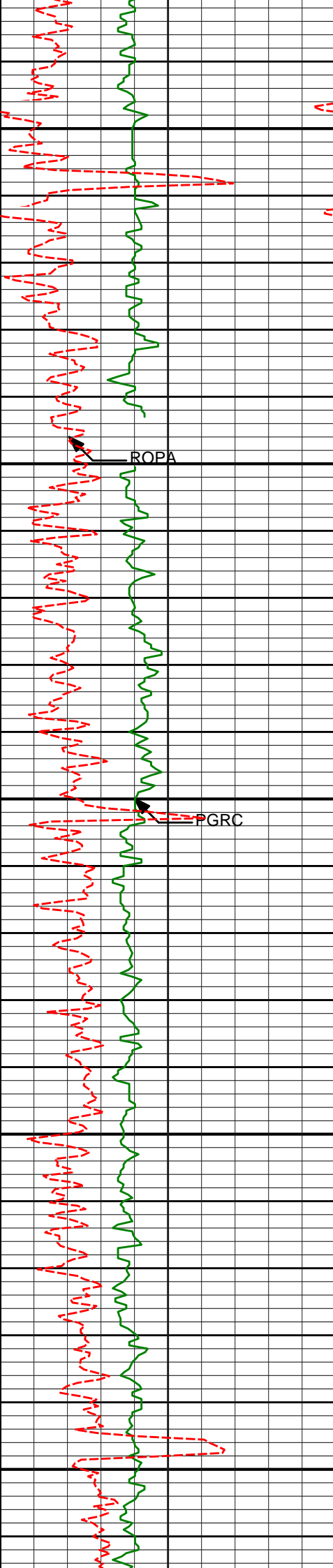
1.51°

10.55°

4946.97'

-98.28'

ROPA



5000

5050

5100

5150

5200

ROPA

PGRC

5052'

1.45°

5.17°

5041.94'

-95.87'

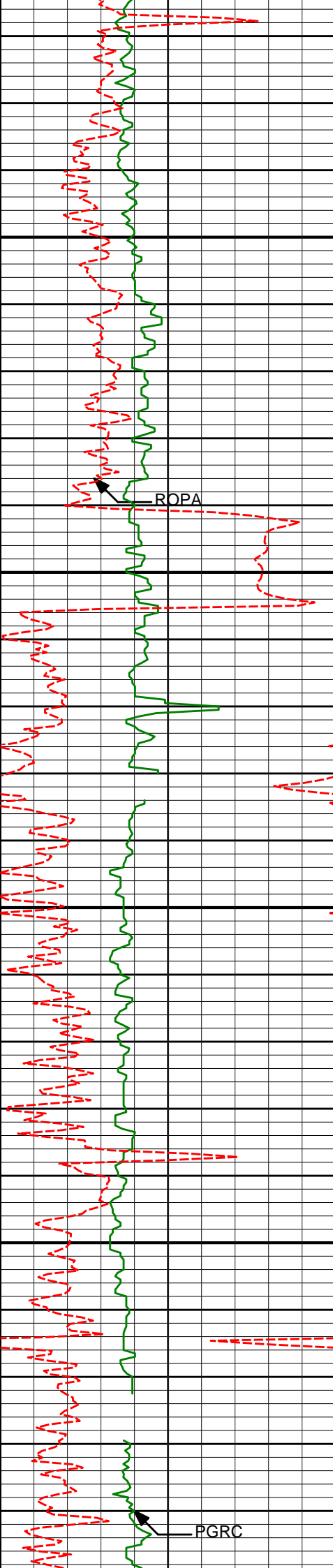
5146'

1.17°

342.25°

5135.91'

-93.77'



5250

5300

5350

5400

5241'

1.19°

2.65°

5230.89'

-91.85'

ROPA

5336'

1.22°

32.22°

5325.87'

-90.03'

5431'

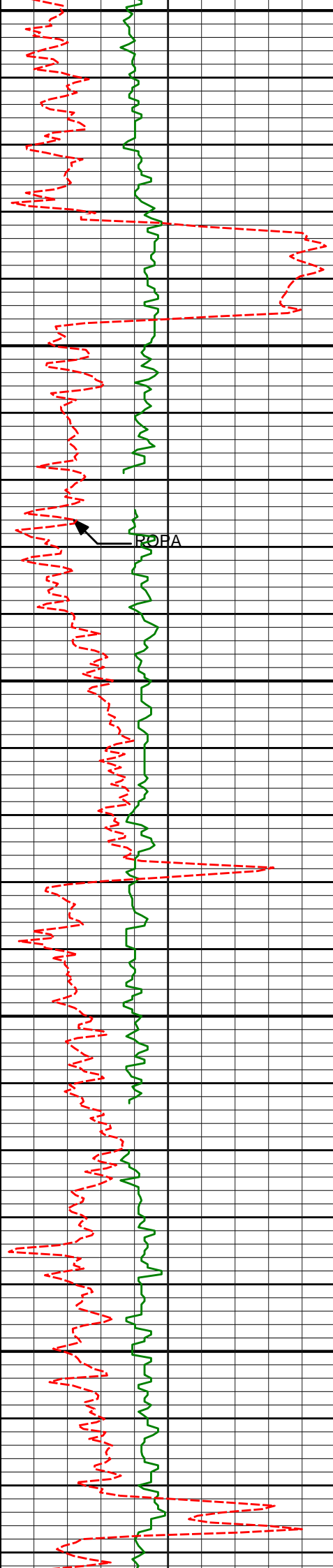
1.81°

34.53°

5420.84'

-87.96'

PGRC



5450

5500

5550

5600

5650

5525'

0.79°

18.27°

5514.81'

-86.14'

5620'

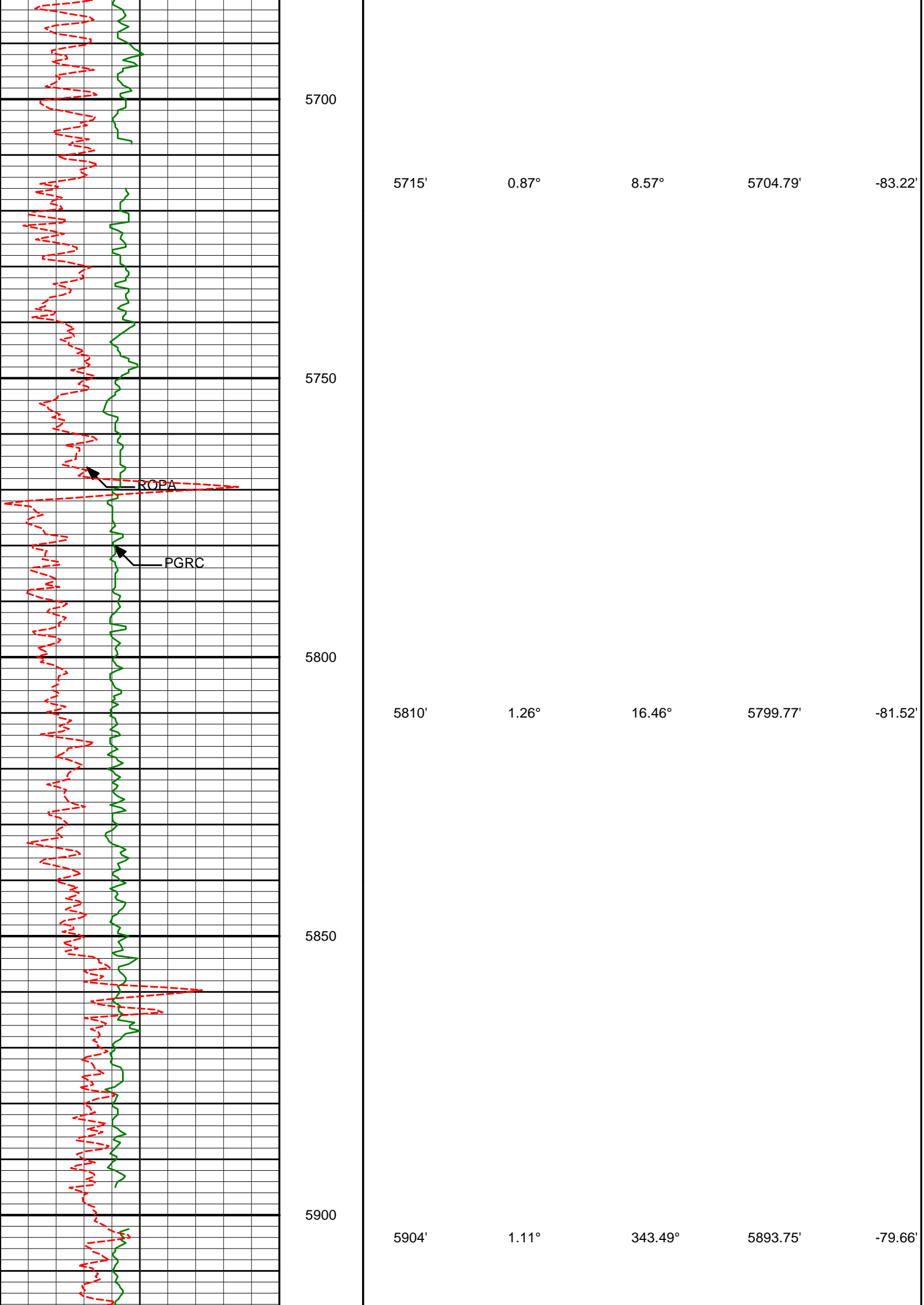
1.07°

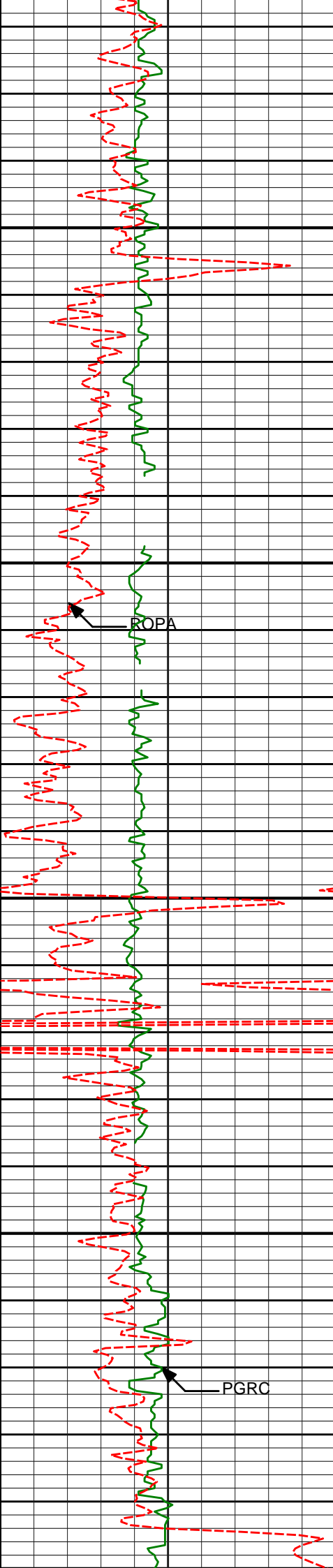
25.32°

5609.80'

-84.72'

ROFA





5950

6000

6050

6100

6150

5999'

0.43°

344.75°

5988.74'

-78.42'

6094'

0.07°

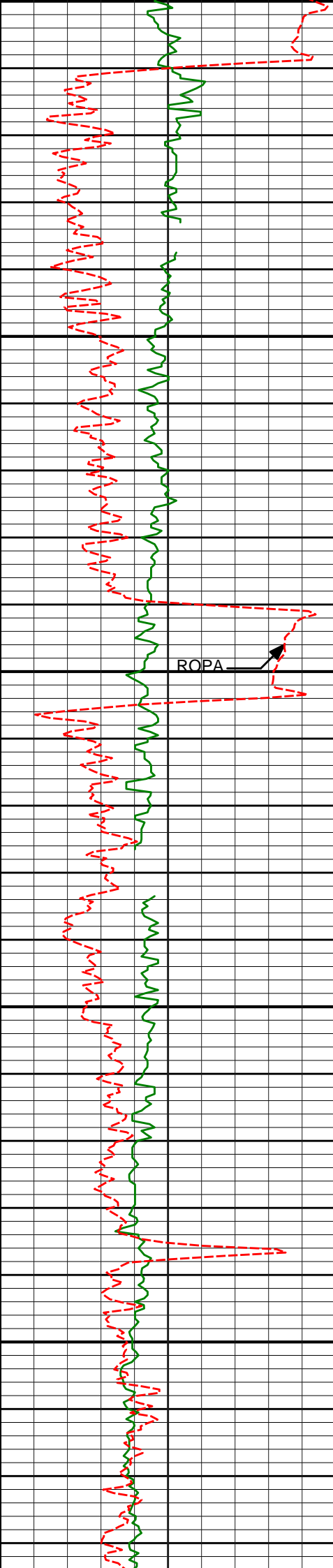
180.87°

6083.74'

-78.13'

ROPA

PGRC



6150

6188'

0.84°

185.39°

6177.74'

-78.87'

6200

6250

ROPA

6283'

1.27°

185.41°

6272.72'

-80.61'

6300

6350

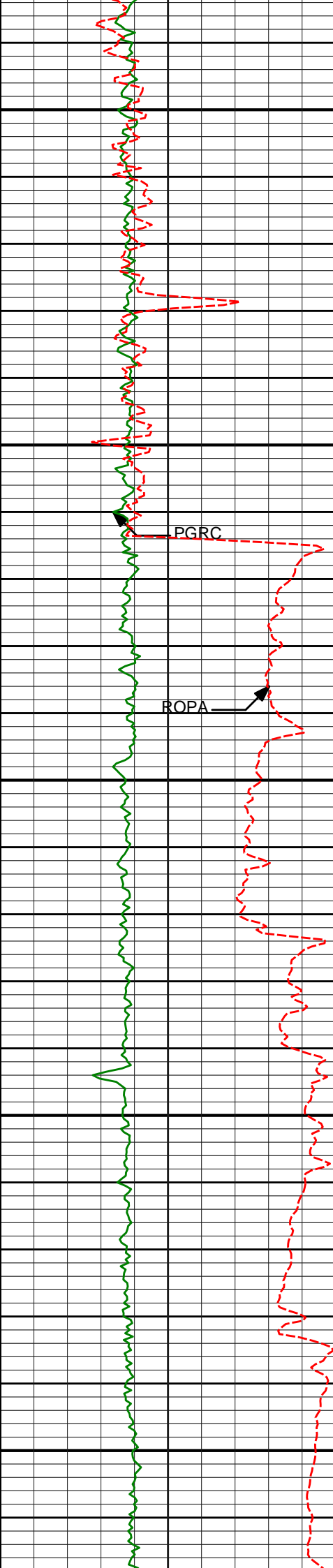
6378'

1.07°

199.28°

6367.70'

-82.48'



6400

6450

6500

6550

6600

PGRC

ROPA

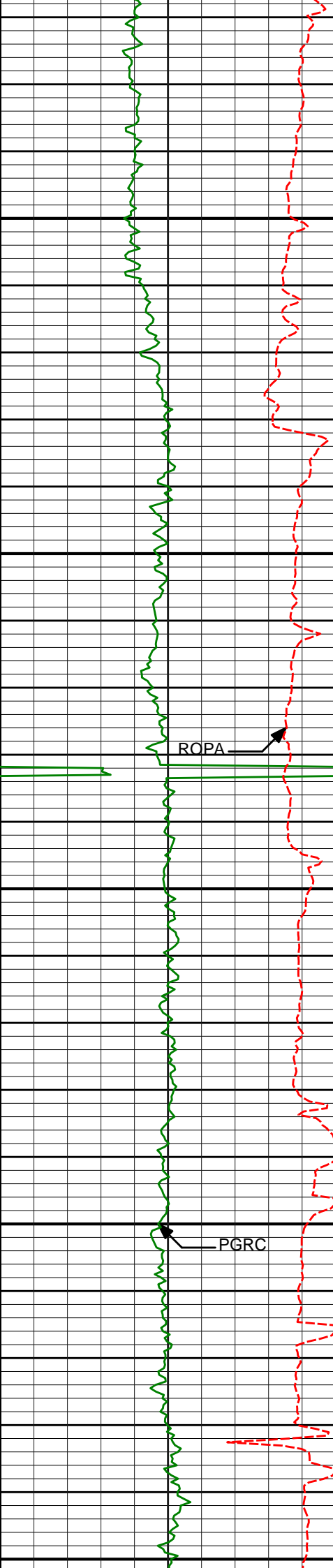
6473'	0.53°	336.39°	6462.70'	-82.91'
-------	-------	---------	----------	---------

6504'	1.22°	356.96°	6493.69'	-82.44'
-------	-------	---------	----------	---------

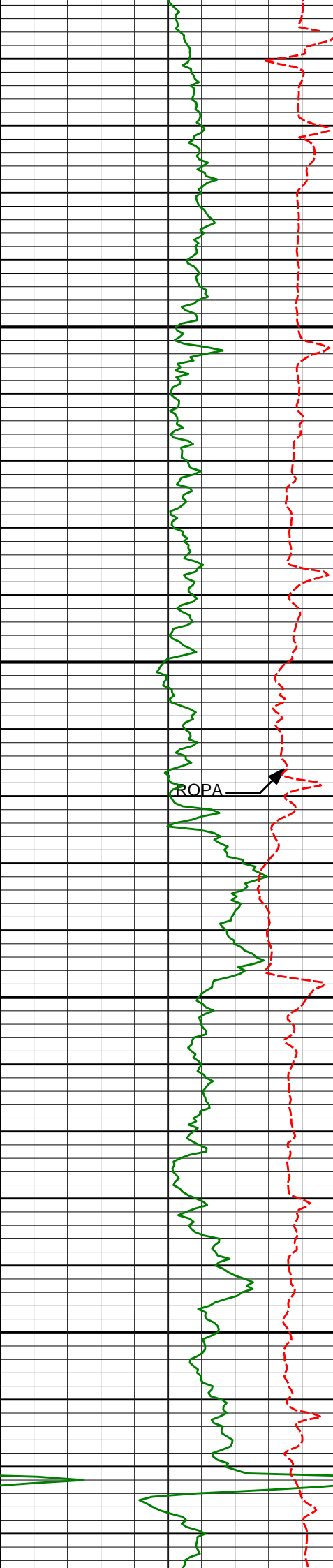
6536'	1.74°	356.61°	6525.68'	-81.62'
-------	-------	---------	----------	---------

6568'	3.00°	355.72°	6557.66'	-80.30'
-------	-------	---------	----------	---------

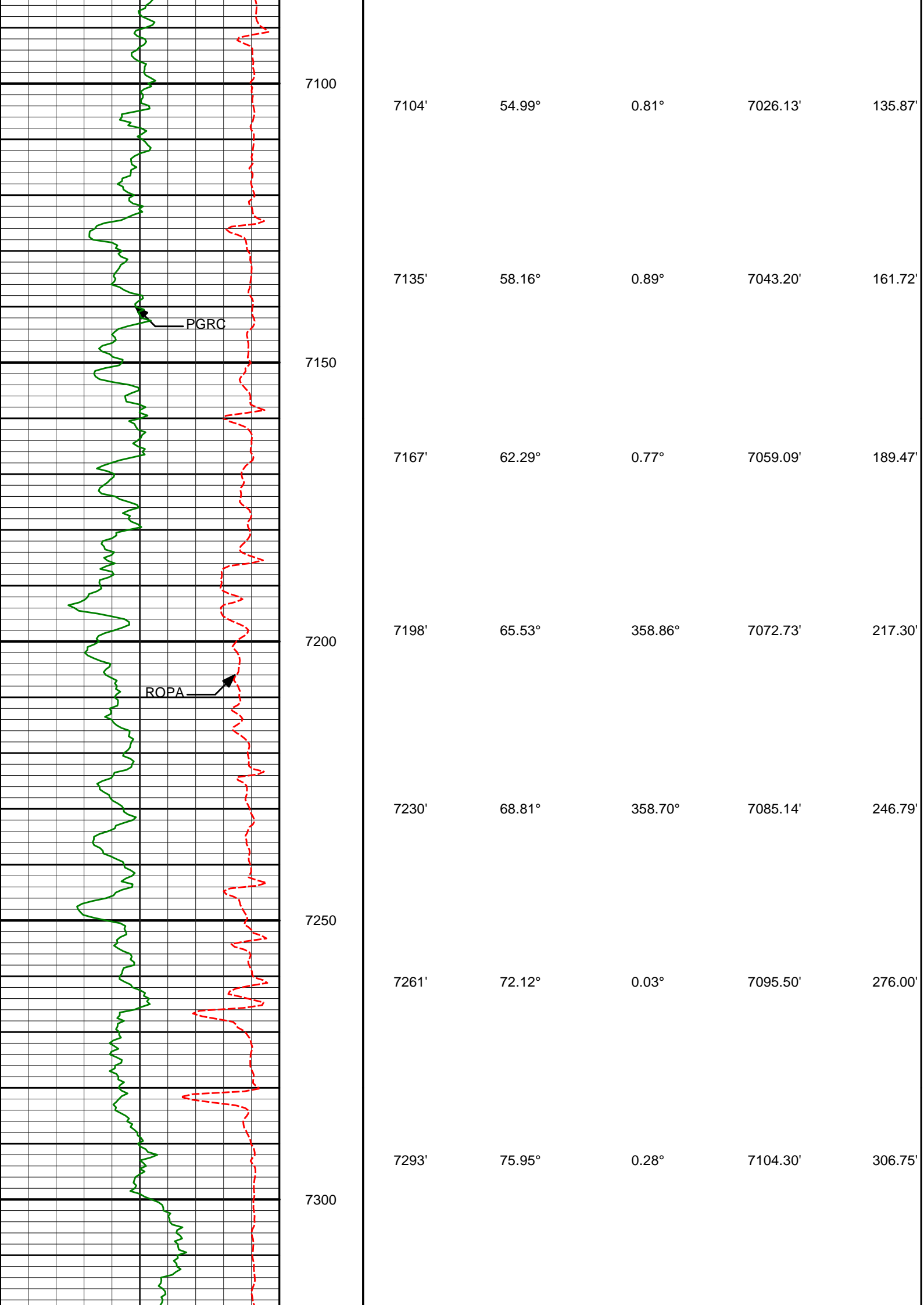
6599'	4.64°	351.26°	6588.59'	-78.25'
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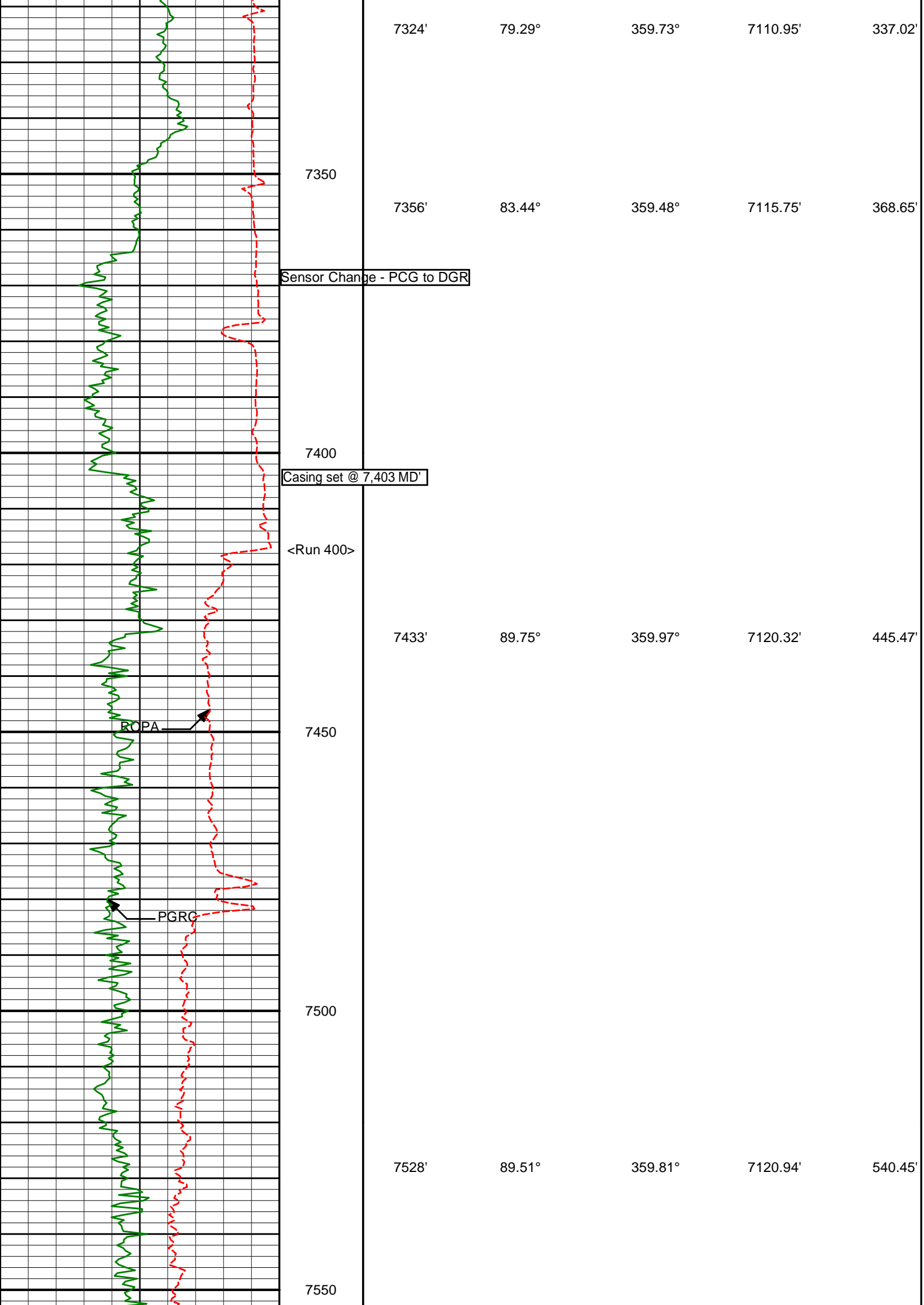


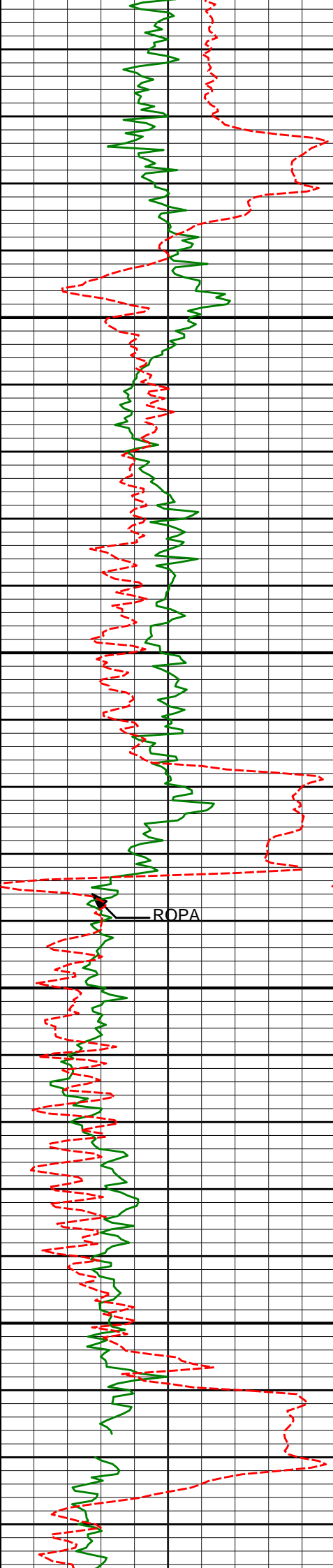
6631'	6.40°	353.00°	6620.44'	-75.20'
6650				
6662'	7.80°	353.47°	6651.20'	-71.38'
6694'	9.34°	352.27°	6682.84'	-66.64'
6700				
6725'	11.14°	352.10°	6713.34'	-61.17'
<Run 300>				
6750				
6756'	14.12°	353.00°	6743.59'	-54.43'
6788'	17.57°	353.56°	6774.37'	-45.74'
6800				
6819'	21.19°	354.90°	6803.61'	-35.48'
6850				
6851'	24.67°	356.48°	6833.08'	-23.04'



6851'	24.07°	350.40°	6855.03'	-23.04'
6883'	28.14°	357.98°	6861.73'	-8.82'
6914'	31.72°	358.66°	6888.60'	6.65'
6946'	35.42°	359.03°	6915.25'	24.34'
6977'	39.61°	359.74°	6939.84'	43.21'
7009'	43.43°	359.45°	6963.79'	64.42'
7041'	46.75°	359.95°	6986.38'	87.08'
7072'	50.74°	0.24°	7006.82'	110.37'







7600

7650

7700

7750

7622'

89.81°

359.93°

7121.49'

634.43'

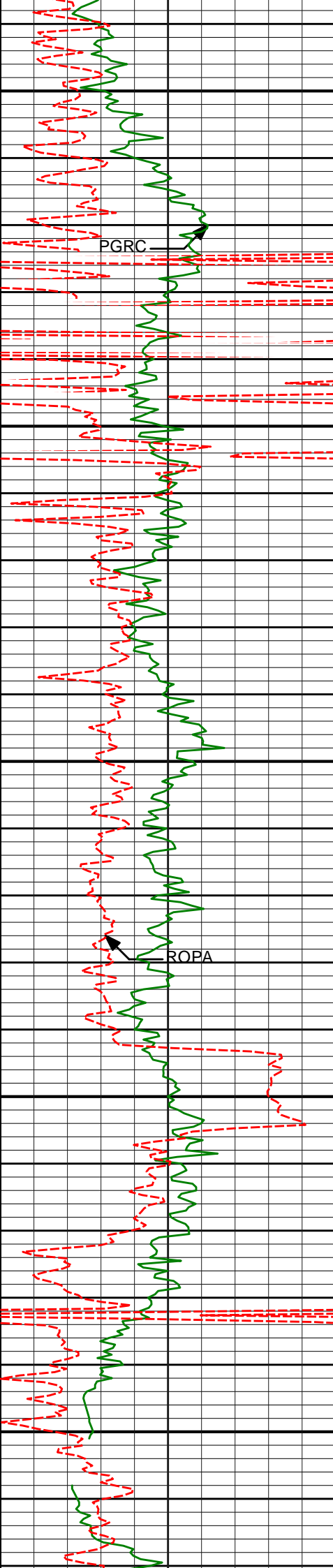
7714'

90.74°

0.21°

7121.05'

726.41'



7800

7806'

92.04°

0.84°

7118.82'

818.34'

PGRC

7850

7900

7898'

92.53°

0.15°

7115.15'

910.23'

ROPA

7950

8000

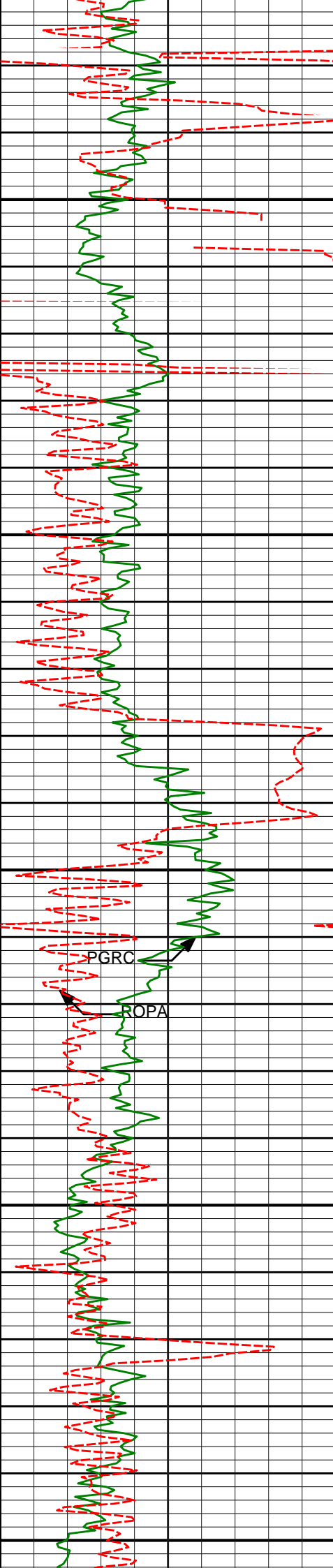
7990'

91.85°

0.97°

7111.62'

1002.12'



8050

8082'

92.35°

0.38°

7108.25'

1094.01'

8100

8150

PGRC

ROPA

8174'

91.54°

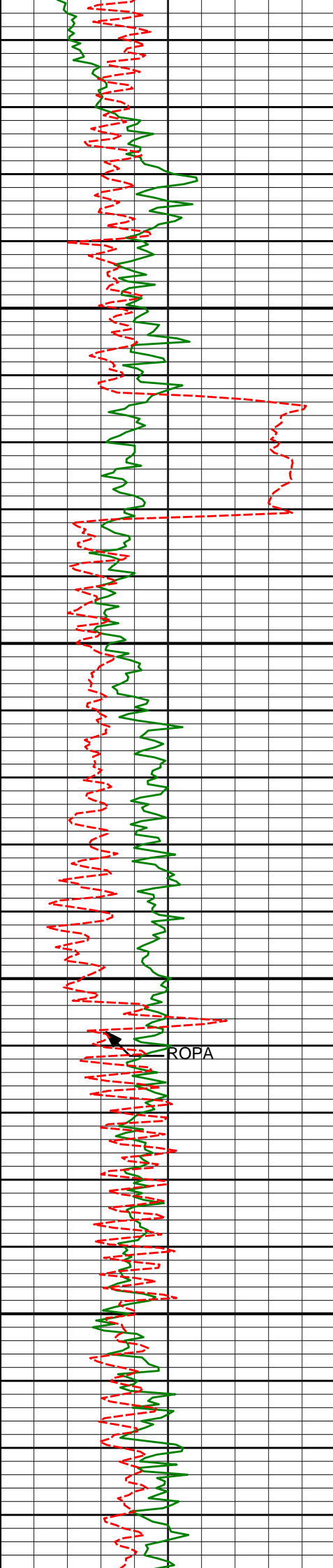
1.06°

7105.13'

1185.90'

8200

8250



8300

8350

8400

8450

ROPA

8266'

92.04°

0.85°

7102.25'

1277.80'

8357'

90.49°

0.91°

7100.24'

1368.71'

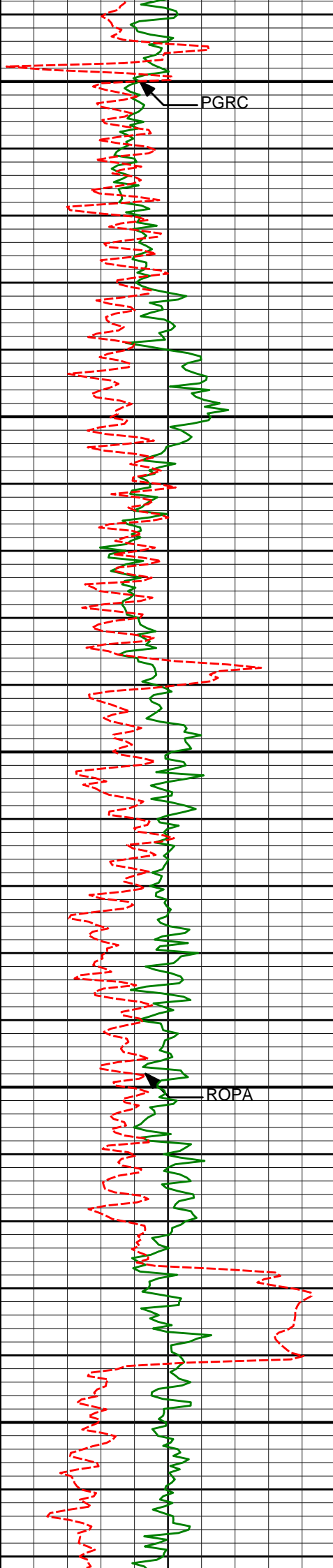
8449'

90.37°

0.90°

7099.55'

1460.65'



8500

PGRC

8541'

90.49°

0.47°

7098.86'

1552.60'

8550

8600

8633'

90.49°

359.76°

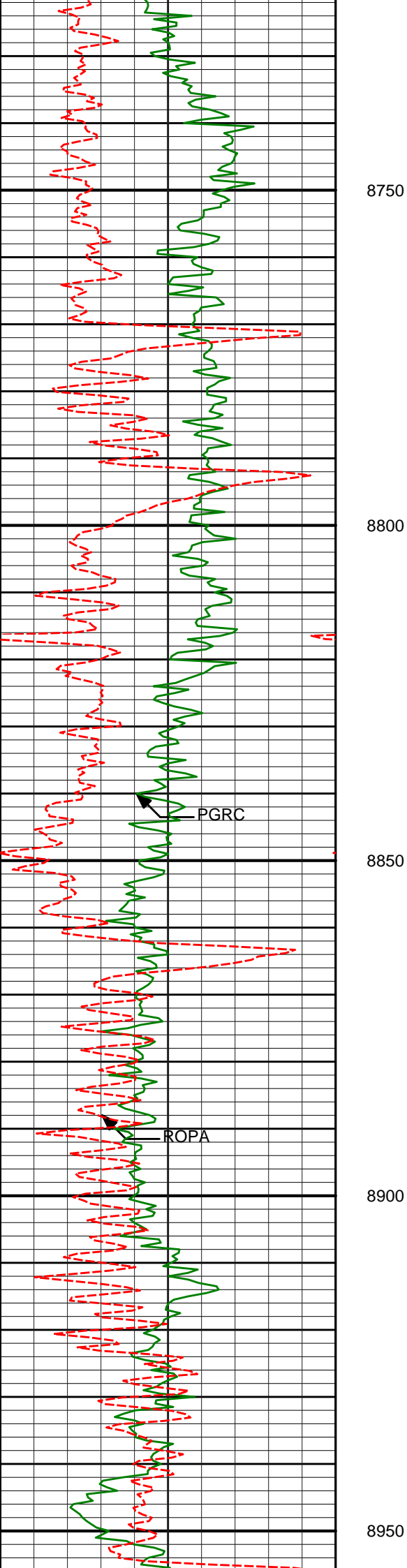
7098.06'

1644.57'

8650

ROPA

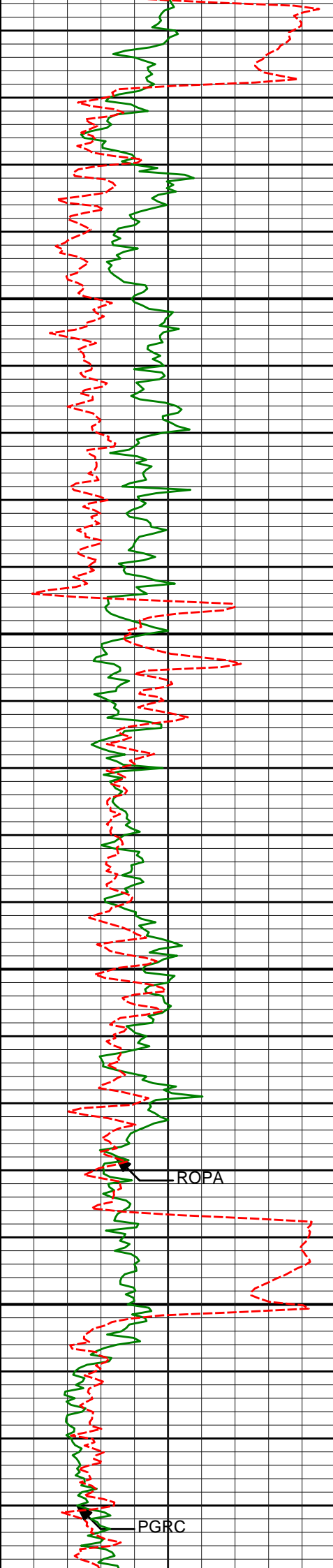
8700



8725'	90.43°	1.67°	7097.32'	1736.52'
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8817'	90.19°	1.05°	7096.82'	1828.43'
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8909'	90.43°	0.61°	7096.32'	1920.37'
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9000

9050

9100

9150

ROPA

PGRC

9001'

89.69°

0.99°

7096.22'

2012.31'

9093'

91.05°

0.84°

7095.63'

2104.25'

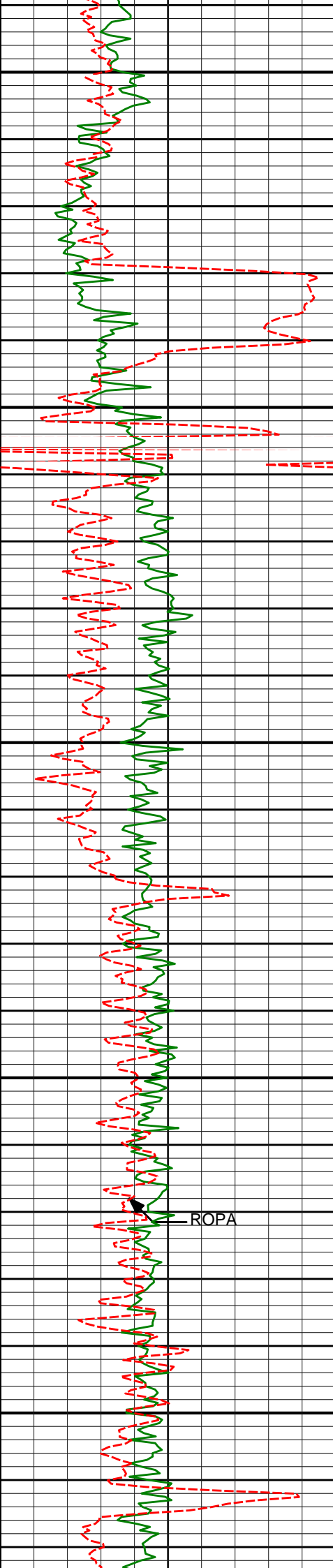
9184'

90.12°

1.66°

7094.70'

2195.16'



9200

9250

9300

9350

9400

9276'

88.76°

2.04°

7095.59'

2287.03'

9368'

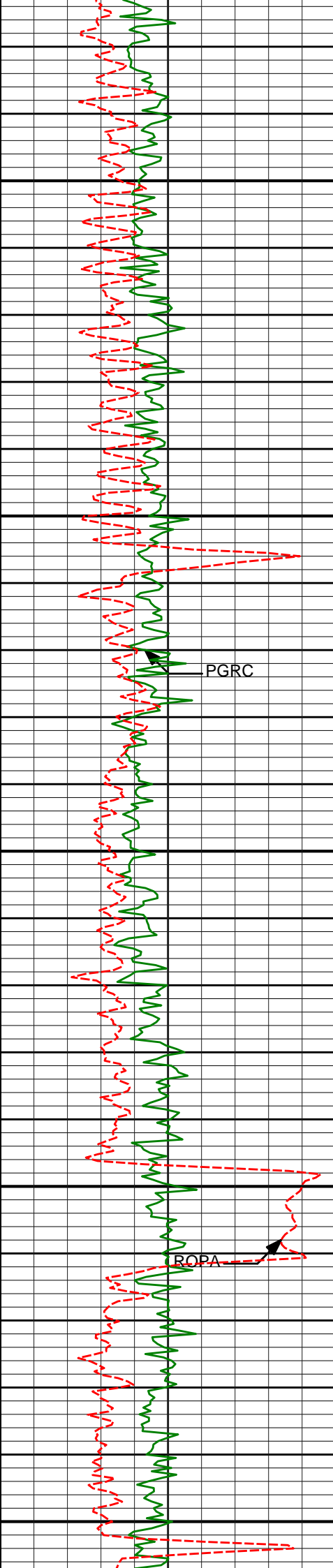
88.83°

1.60°

7097.53'

2378.88'

ROPA



9450

9459'

88.95°

1.51°

7099.30'

2469.76'

9500

PGRC

9550

9551'

88.83°

1.27°

7101.08'

2561.66'

9600

ROPA

9643'

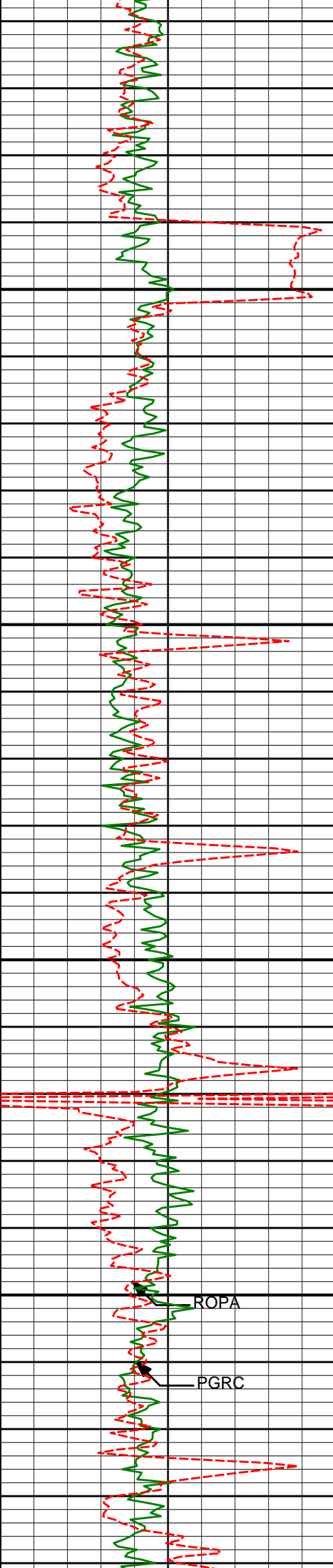
90.37°

0.55°

7101.72'

2653.59'

9650



9700

9750

9800

9850

ROPA

PGRC

9735'

91.73°

0.17°

7100.04'

2745.54'

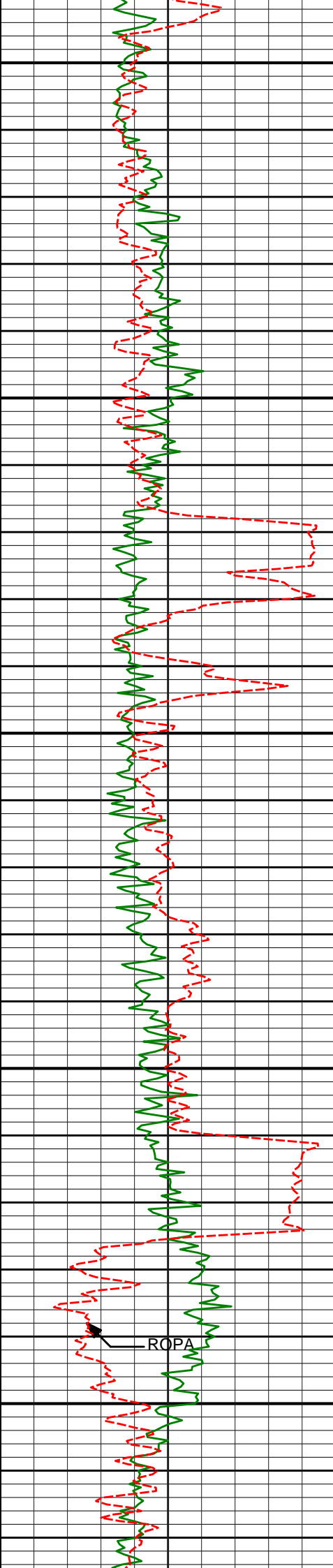
9827'

91.98°

0.16°

7097.06'

2837.47'



9900

9919'

91.92°

359.73°

7093.94'

2929.40'

9950

10000

10011'

90.43°

0.78°

7092.05'

3021.34'

10050

10100

10103'

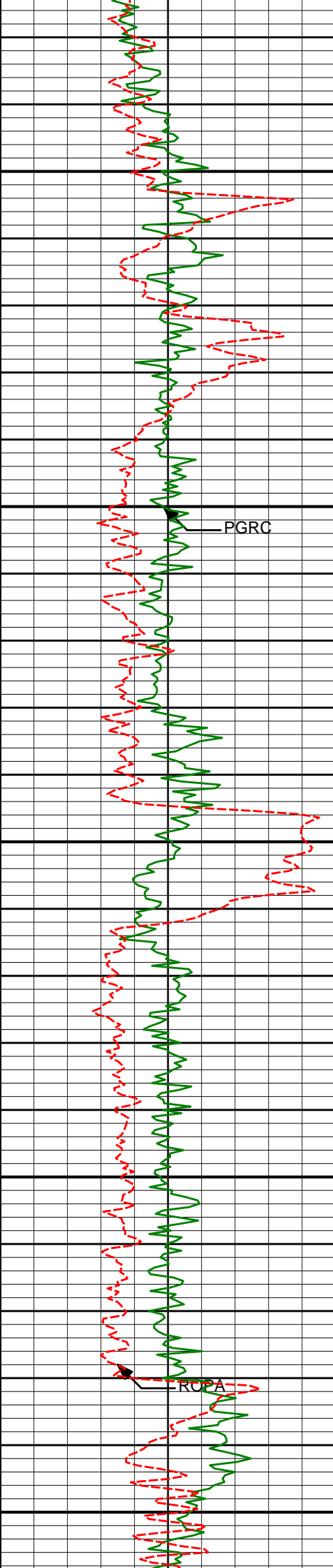
91.92°

0.11°

7090.17'

3113.29'

ROPA



10150

10200

10250

10300

10350

10195'

91.98°

359.89°

7087.04'

3205.21'

10287'

91.05°

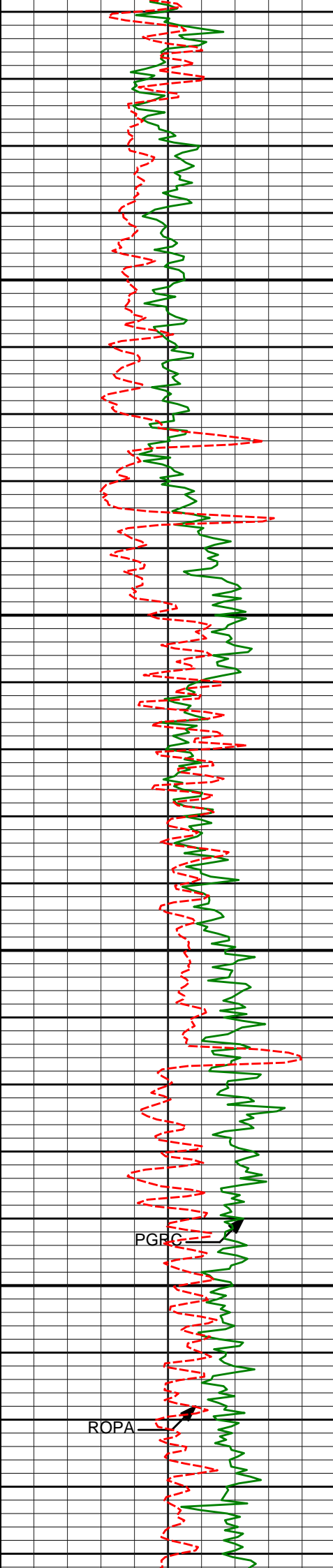
0.66°

7084.61'

3297.15'

PGRC

RCOA



10400

10450

10500

10550

PGRC

ROPA

10378'

91.05°

0.44°

7082.94'

3388.10'

10470'

91.17°

359.99°

7081.16'

3480.05'

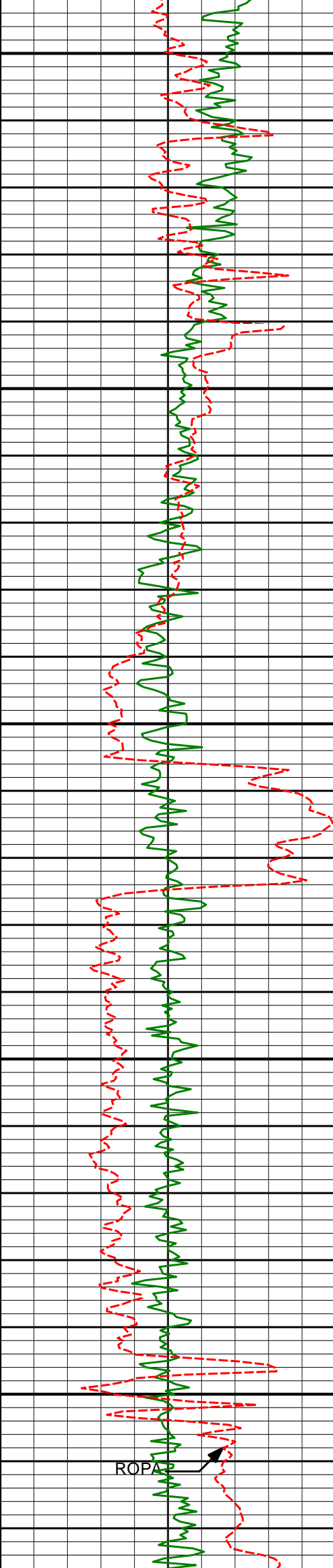
10565'

91.24°

359.58°

7079.16'

3575.02'



10600

10650

10700

10750

10800

10659'

91.54°

359.10°

7076.88'

3668.99'

10754'

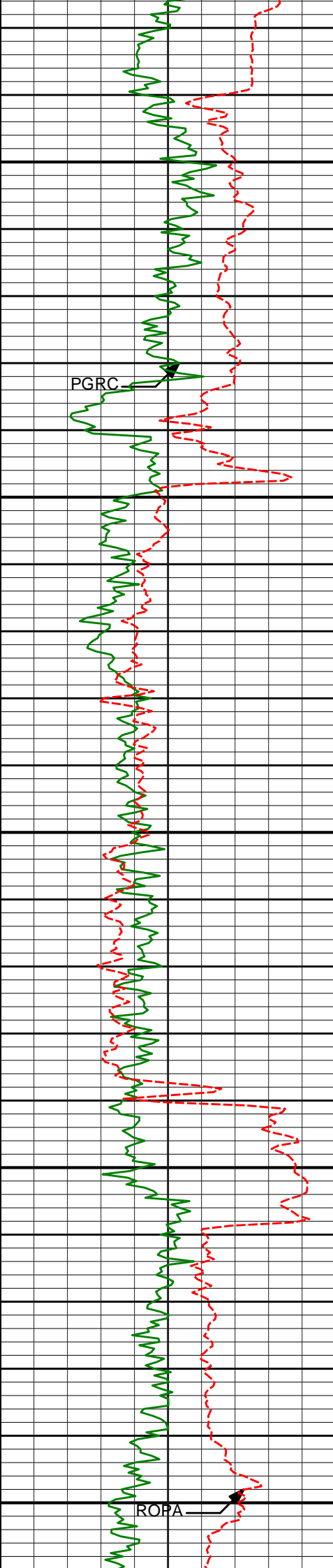
91.79°

1.11°

7074.12'

3763.92'

ROPA



10850

10849'

91.79°

0.44°

7071.14'

3858.82'

PGRC

10900

10944'

91.85°

0.39°

7068.12'

3953.73'

10950

11000

11038'

91.24°

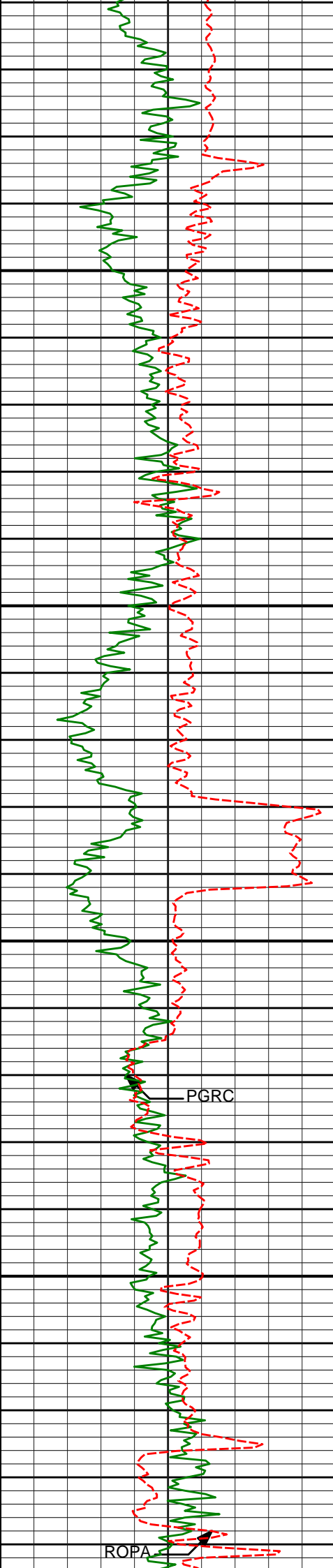
2.01°

7065.59'

4047.62'

ROPA

11050



11100

11150

11200

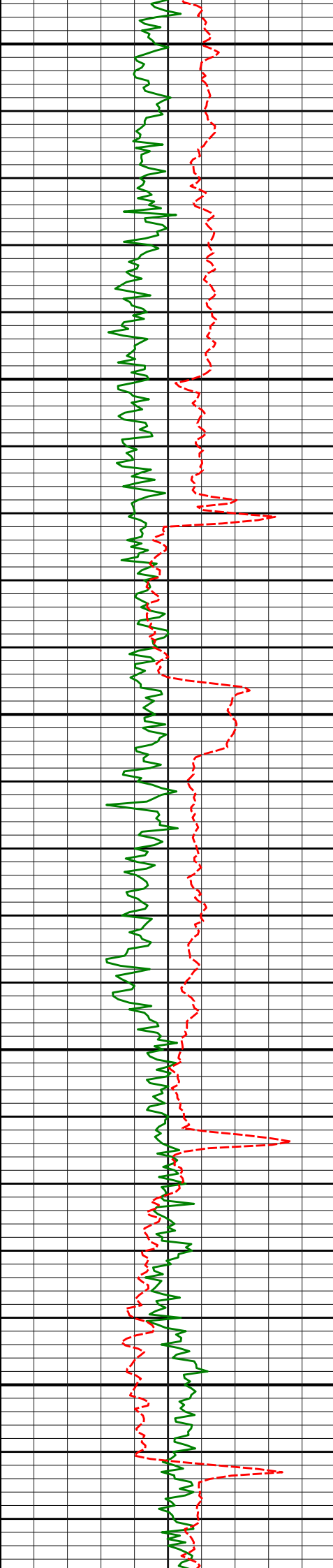
11250

PGRC

ROPA

11133'	91.17°	1.73°	7063.59'	4142.46'
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11228'	89.94°	1.57°	7062.67'	4237.34'
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11300

11323'

89.75°

1.44°

7062.93'

4332.24'

11350

11400

11418'

89.75°

1.04°

7063.34'

4427.15'

11450

11500

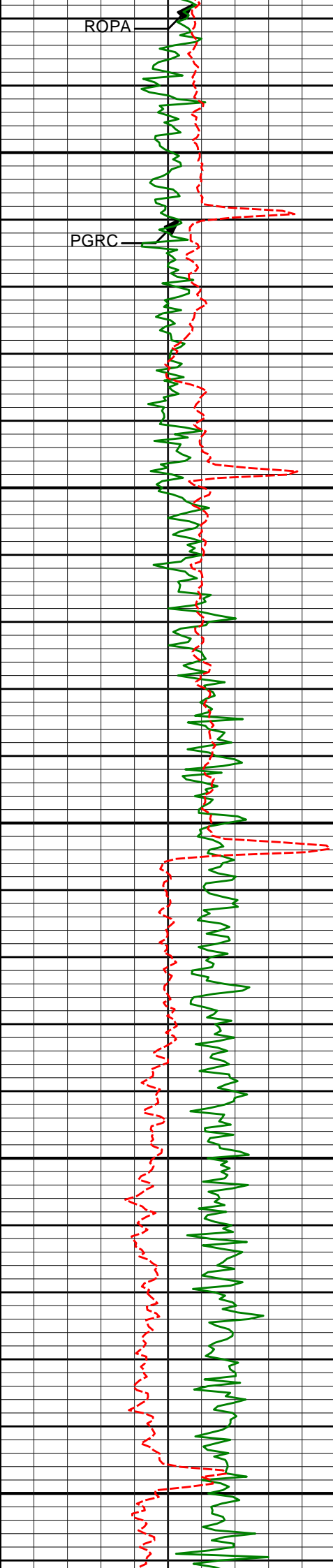
11513'

89.94°

1.05°

7063.59'

4522.08'



11550

11600

11650

11700

11750

11608'

89.88°

0.43°

7063.75'

4617.03'

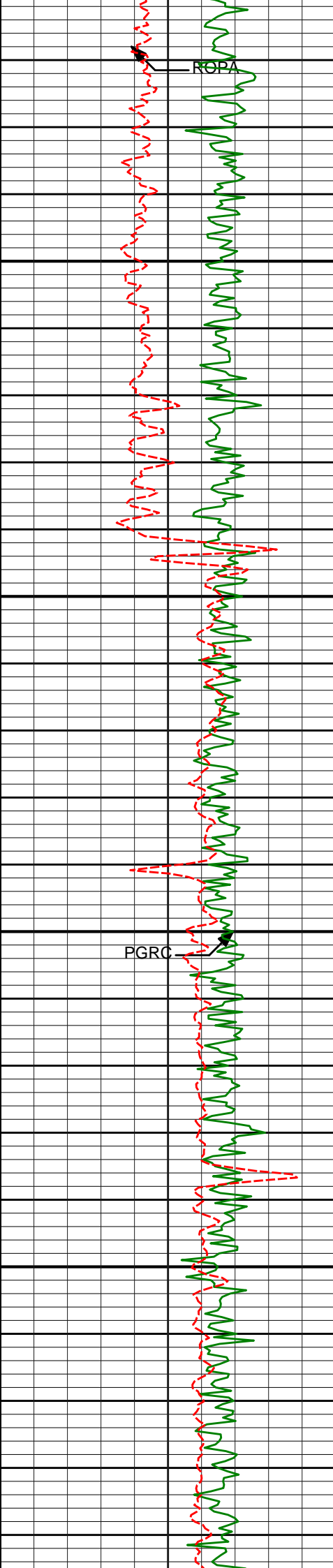
11702'

90.00°

359.99°

7063.85'

4711.00'



11800

11850

11900

11950

11797'

90.31°

0.14°

7063.59'

4805.98'

11892'

90.93°

0.87°

7062.57'

4900.93'

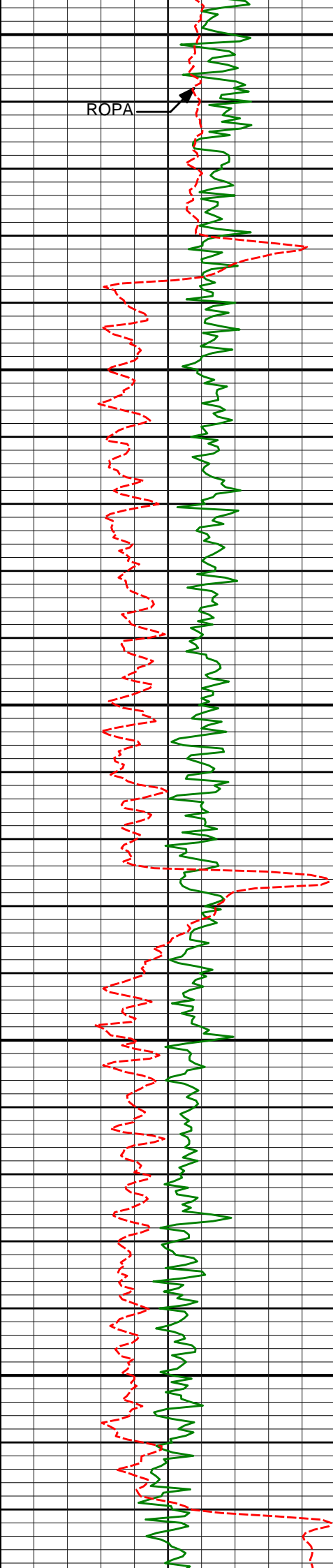
11987'

91.23°

0.78°

7060.78'

4995.86'



12000

ROPA

12050

12081'

90.80°

0.18°

7059.11'

5089.81'

12100

12150

12176'

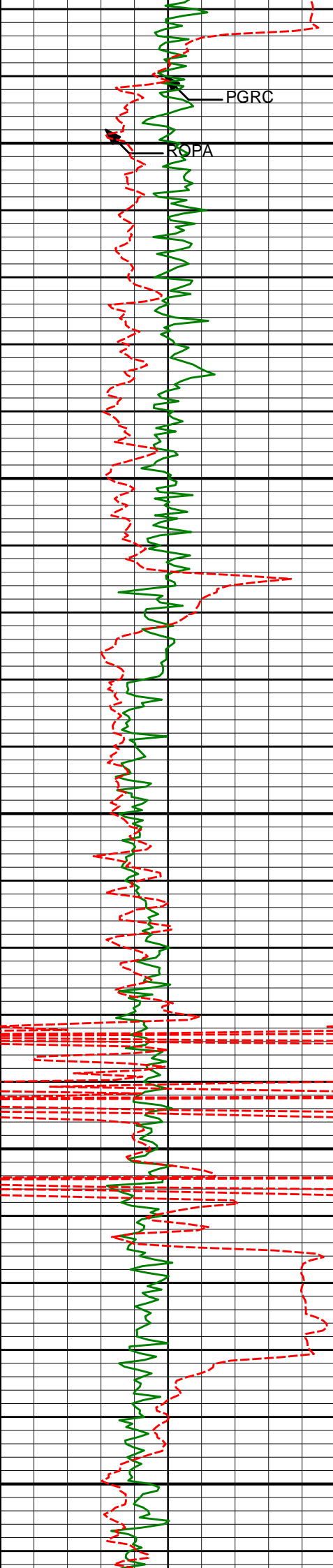
90.37°

359.41°

7058.13'

5184.79'

12200



12250

12300

12350

12400

12450

12271'

91.92°

358.86°

7056.24'

5279.76'

12365'

91.85°

358.59°

7053.15'

5373.71'

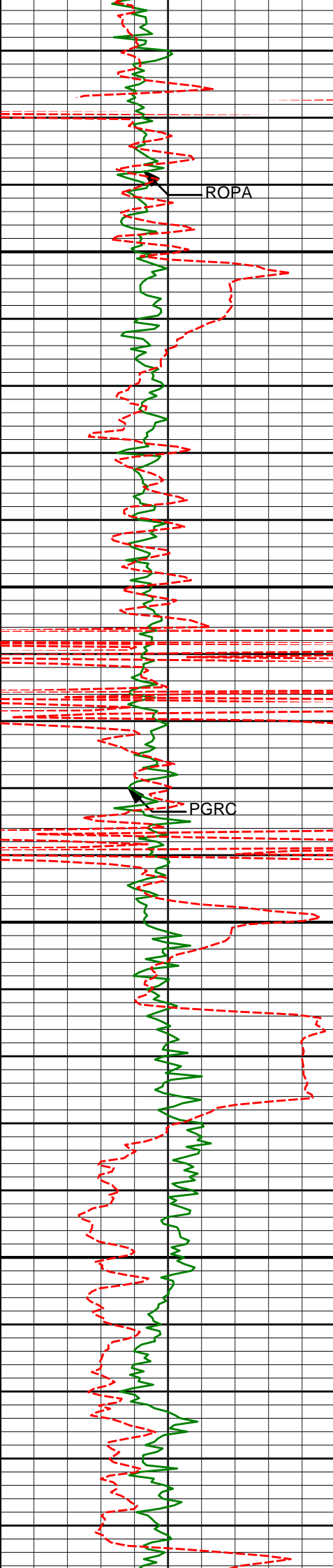
12460'

90.93°

0.24°

7050.84'

5468.68'



12500

12550

12600

12650

12555'

90.49°

359.95°

7049.66'

5563.65'

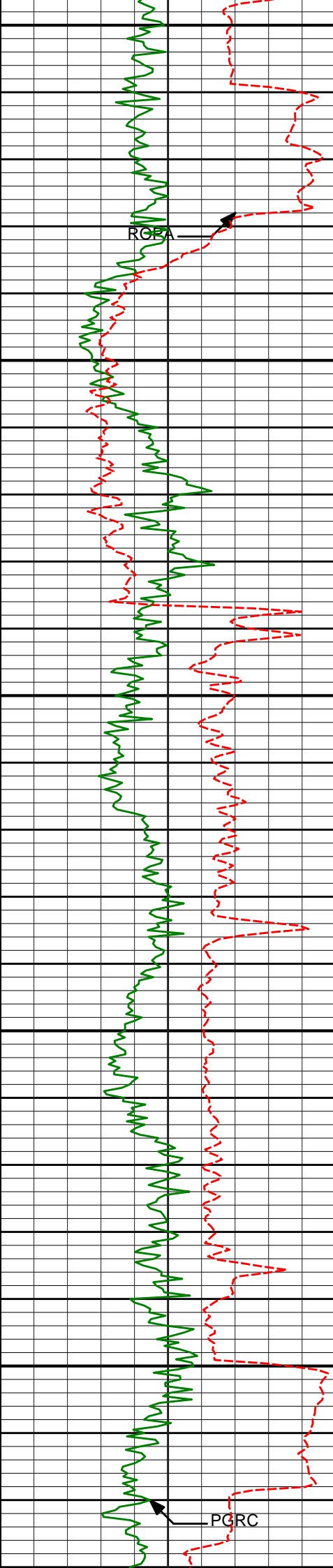
12649'

92.04°

359.97°

7047.58'

5657.60'



12700

12750

12800

12850

12900

PGRA

PGRC

12744'

93.09°

1.71°

7043.33'

5752.44'

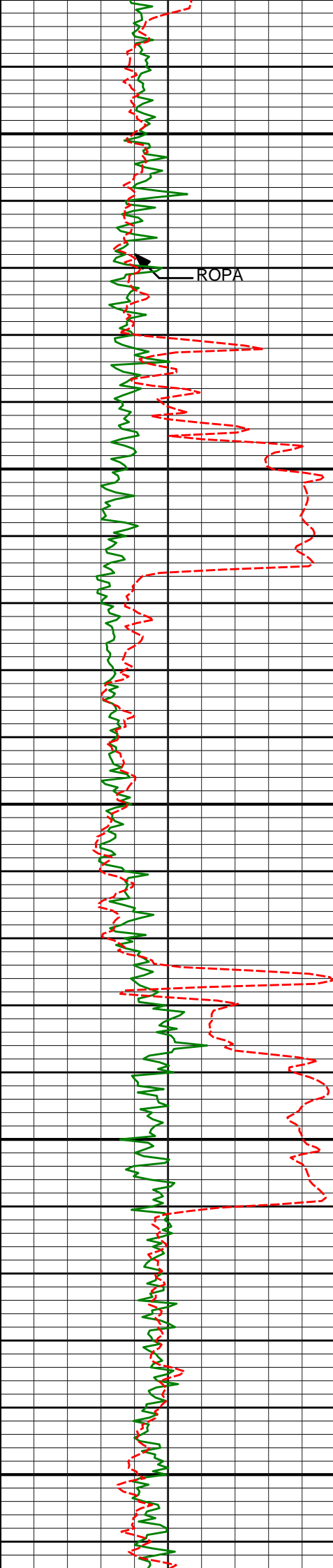
12839'

93.40°

1.12°

7037.95'

5847.19'



12950

13000

13050

13100

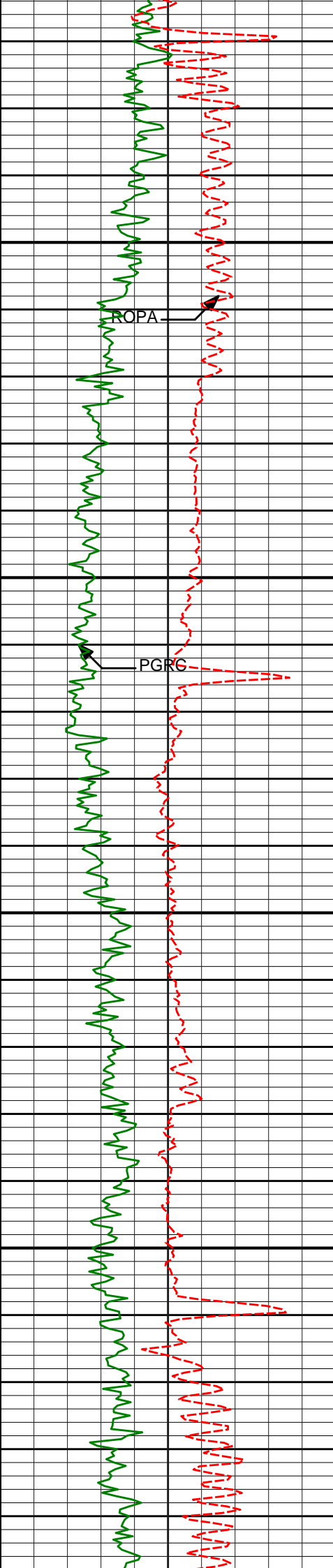
13150

ROPA

12934'	92.41°	1.47°	7033.14'	5941.98'
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13029'	91.17°	2.43°	7030.17'	6036.79'
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13124'	89.69°	1.83°	7029.45'	6131.63'
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13200

13250

13300

13350

ROPA

PGRC

13219'

90.00°

2.47°

7029.70'

6226.47'

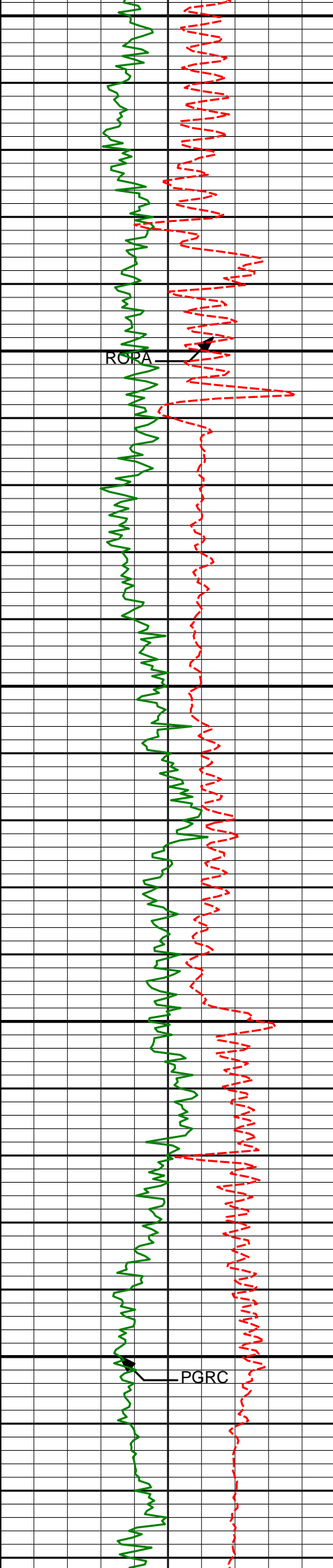
13313'

90.49°

2.47°

7029.30'

6320.28'



13400

13408'

90.99°

2.42°

7028.07'

6415.09'

13450

ROBA

13500

13503'

91.30°

2.19°

7026.17'

6509.90'

13550

13600

13598'

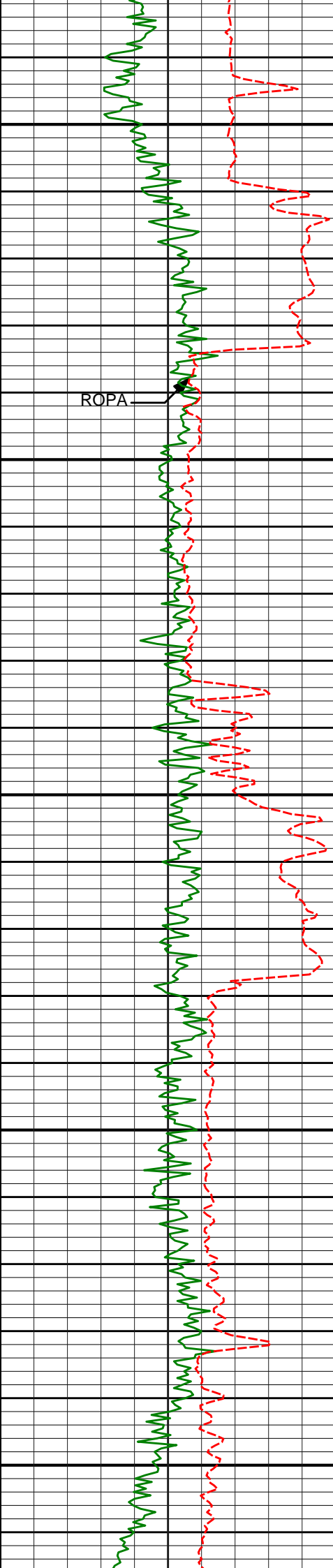
91.79°

2.01°

7023.61'

6604.71'

PGRC



13650

13700

13750

13800

13850

ROPA

13692'

90.62°

1.99°

7021.63'

6698.54'

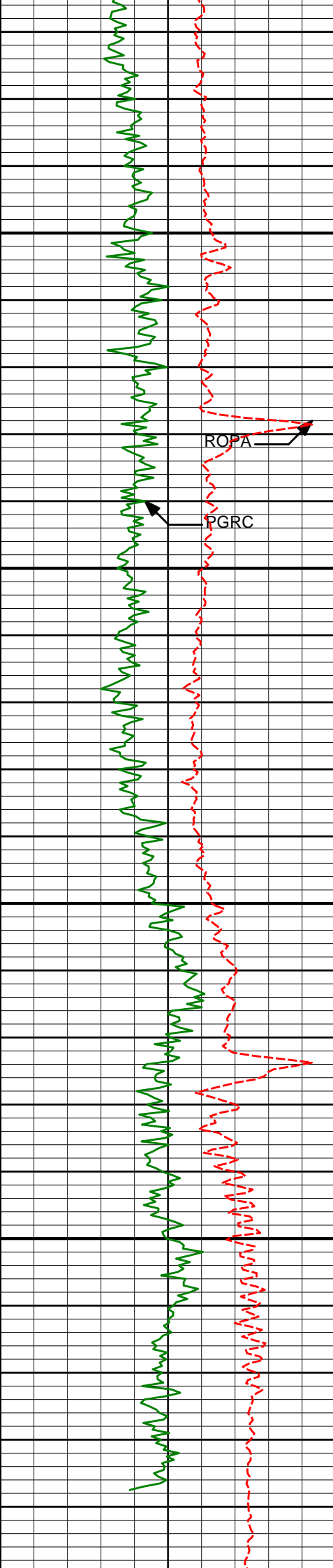
13787'

88.14°

1.24°

7022.66'

6793.42'



13900

13950

14000

14050

13882'

88.27°

0.79°

7025.63'

6888.30'

13977'

88.64°

0.41°

7028.20'

6983.22'

14071'

89.07°

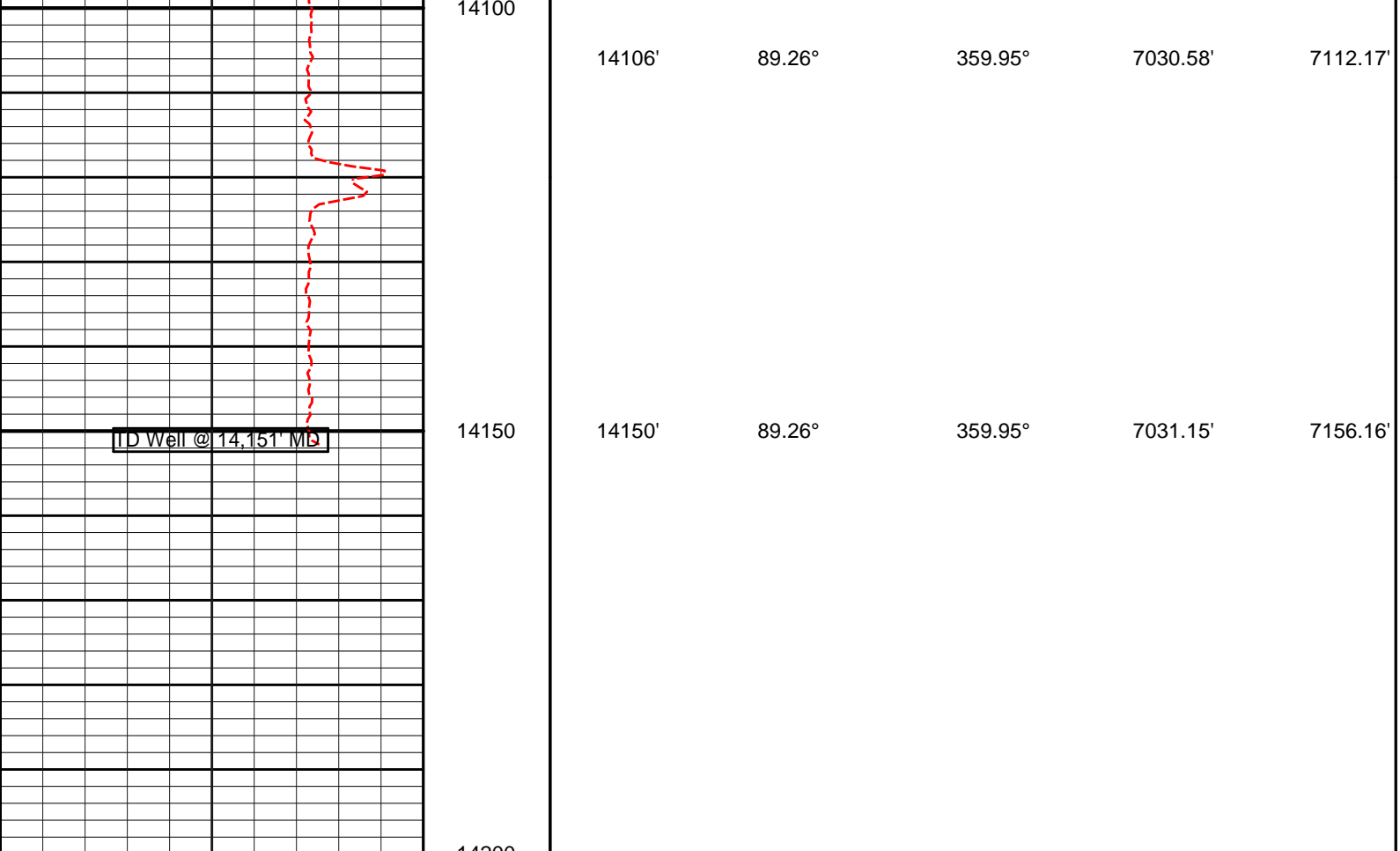
359.74°

7030.07'

7077.18'

ROPA

PGRC



PCG Gamma Ray BCorr (PGRC) api	Depth ft 1 : 240	DEPTH	INC	AZI	TVD	VS
0 250						
Gamma Ray KclBh (DGRC) api						
0 250						
Avg Rate of Penetration (ROPA) feet per hr						
500 0						

HALLIBURTON

Sperry Drilling

MD 1:240 Detail Log



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corp.

Nichols 1N-5HZ

Wattenburg

Weld Colorado

USA

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
825.00	0.24	93.37	824.99	2.57 N	0.77 E	2.55	TIE-IN
920.00	0.50	282.91	919.99	2.65 N	0.57 E	2.64	0.77
1012.00	0.51	322.12	1011.99	3.06 N	0.07 W	3.06	0.37
1104.00	0.54	300.27	1103.98	3.60 N	0.70 W	3.62	0.22
1196.00	0.48	284.82	1195.98	3.92 N	1.45 W	3.95	0.17
1288.00	0.37	295.79	1287.98	4.15 N	2.09 W	4.19	0.15
1380.00	0.92	269.65	1379.97	4.28 N	3.09 W	4.34	0.66
1471.00	0.72	288.66	1470.96	4.45 N	4.37 W	4.54	0.37
1563.00	0.87	310.09	1562.95	5.09 N	5.45 W	5.20	0.36
1655.00	0.83	298.26	1654.94	5.85 N	6.57 W	5.98	0.19
1747.00	1.10	301.25	1746.93	6.63 N	7.91 W	6.78	0.30
1839.00	1.76	271.48	1838.90	7.12 N	10.08 W	7.32	1.06
1931.00	2.61	252.10	1930.83	6.51 N	13.49 W	6.79	1.21
2023.00	3.44	252.22	2022.71	5.03 N	18.11 W	5.39	0.91
2114.00	4.20	247.30	2113.50	2.91 N	23.79 W	3.39	0.91
2209.00	4.55	236.18	2208.23	0.53 S	30.13 W	0.08	0.96
2304.00	4.81	239.41	2302.91	4.66 S	36.69 W	-3.92	0.39
2399.00	5.22	241.97	2397.55	8.72 S	43.93 W	-7.83	0.49
2494.00	4.86	239.05	2492.18	12.82 S	51.20 W	-11.78	0.47
2588.00	4.87	231.48	2585.84	17.35 S	57.73 W	-16.18	0.68
2683.00	5.81	225.41	2680.43	23.23 S	64.30 W	-21.92	1.15
2778.00	5.32	235.48	2774.98	29.10 S	71.35 W	-27.65	1.15
2872.00	5.34	239.76	2868.58	33.77 S	78.73 W	-32.17	0.42
2967.00	5.41	240.69	2963.16	38.19 S	86.45 W	-36.44	0.12
3062.00	4.97	239.22	3057.77	42.49 S	93.90 W	-40.58	0.48
3157.00	4.49	240.70	3152.45	46.42 S	100.67 W	-44.37	0.52
3252.00	4.77	250.36	3247.14	49.57 S	107.64 W	-47.38	0.87
3347.00	4.43	256.32	3341.83	51.76 S	114.92 W	-49.43	0.62
3442.00	4.47	254.63	3436.55	53.61 S	122.06 W	-51.13	0.15
3536.00	5.11	243.79	3530.22	56.43 S	129.34 W	-53.80	1.17
3631.00	4.07	248.16	3624.91	59.55 S	136.26 W	-56.78	1.16
3726.00	4.18	240.50	3719.67	62.51 S	142.40 W	-59.61	0.59
3820.00	5.10	230.72	3813.36	66.84 S	148.61 W	-63.82	1.29
3915.00	3.94	237.38	3908.07	71.27 S	154.63 W	-68.12	1.33
4010.00	4.95	235.24	4002.78	75.37 S	160.75 W	-72.10	1.08
4105.00	6.53	233.67	4097.30	80.91 S	168.48 W	-77.48	1.67
4200.00	6.39	237.56	4191.70	86.95 S	177.29 W	-83.34	0.49
4294.00	6.25	238.22	4285.12	92.45 S	186.05 W	-88.66	0.16
4389.00	5.06	244.76	4379.66	96.96 S	194.24 W	-93.00	1.43
4484.00	4.55	252.05	4474.33	99.90 S	201.61 W	-95.80	0.83
4578.00	3.06	238.49	4568.12	102.36 S	207.29 W	-98.14	1.84
4673.00	2.21	235.79	4663.02	104.71 S	210.96 W	-100.42	0.90
4767.00	0.56	309.27	4756.99	105.44 S	212.82 W	-101.11	2.25
4862.00	0.80	10.77	4851.99	104.49 S	213.05 W	-100.16	0.77
4957.00	1.51	10.55	4946.97	102.61 S	212.70 W	-98.28	0.74
5052.00	1.45	5.17	5041.94	100.19 S	212.36 W	-95.87	0.16
5146.00	1.17	342.25	5135.91	98.09 S	212.55 W	-93.77	0.62
5241.00	1.19	2.65	5230.89	96.18 S	212.80 W	-91.85	0.44
5336.00	1.22	32.22	5325.87	94.34 S	212.22 W	-90.03	0.65
5431.00	1.81	34.53	5420.84	92.25 S	210.83 W	-87.96	0.62
5525.00	0.79	18.27	5514.81	90.41 S	209.78 W	-86.14	1.14
5620.00	1.07	25.32	5609.80	88.98 S	209.19 W	-84.72	0.31
5715.00	0.87	8.57	5704.79	87.46 S	208.71 W	-83.22	0.36
5810.00	1.26	16.46	5799.77	85.75 S	208.30 W	-81.52	0.44
5904.00	1.11	343.49	5893.75	83.89 S	208.27 W	-79.66	0.73
5999.00	0.43	344.75	5988.74	82.66 S	208.63 W	-78.42	0.72
6094.00	0.07	180.87	6083.74	82.38 S	208.72 W	-78.13	0.52
6188.00	0.84	185.39	6177.74	83.12 S	208.79 W	-78.87	0.82
6283.00	1.27	185.41	6272.72	84.85 S	208.95 W	-80.61	0.45
6378.00	1.07	199.28	6367.70	86.74 S	209.34 W	-82.48	0.36
6473.00	0.53	336.39	6462.70	87.17 S	209.81 W	-82.91	1.58
6504.00	1.22	356.96	6493.69	86.71 S	209.88 W	-82.44	2.40
6536.00	1.74	356.61	6525.68	85.89 S	209.93 W	-81.62	1.63
6568.00	3.00	355.72	6557.66	84.57 S	210.02 W	-80.30	3.94
6599.00	4.64	351.26	6588.59	82.52 S	210.27 W	-78.25	5.37
6631.00	6.40	353.00	6620.44	79.48 S	210.69 W	-75.20	5.52
6662.00	7.80	353.47	6651.20	75.67 S	211.14 W	-71.38	4.53
6694.00	9.34	352.27	6682.84	70.94 S	211.73 W	-66.64	4.85
6725.00	11.14	352.10	6713.34	65.48 S	212.48 W	-61.17	5.81
6756.00	14.12	353.00	6743.59	58.76 S	213.35 W	-54.43	9.64

6788.00	17.57	353.56	6774.37	50.09 S	214.37 W	-45.74	10.80
6819.00	21.19	354.90	6803.61	39.85 S	215.40 W	-35.48	11.74
6851.00	24.67	356.48	6833.08	27.42 S	216.32 W	-23.04	11.04
6883.00	28.14	357.98	6861.73	13.21 S	217.00 W	-8.82	11.06
6914.00	31.72	358.66	6888.60	2.25 N	217.45 W	6.65	11.59
6946.00	35.42	359.03	6915.25	19.93 N	217.80 W	24.34	11.58
6977.00	39.61	359.74	6939.84	38.81 N	218.00 W	43.21	13.60
7009.00	43.43	359.45	6963.79	60.02 N	218.15 W	64.42	11.94
7041.00	46.75	359.95	6986.38	82.68 N	218.27 W	87.08	10.44
7072.00	50.74	0.24	7006.82	105.98 N	218.23 W	110.37	12.88
7104.00	54.99	0.81	7026.13	131.48 N	217.99 W	135.87	13.37
7135.00	58.16	0.89	7043.20	157.35 N	217.60 W	161.72	10.22
7167.00	62.29	0.77	7059.09	185.11 N	217.20 W	189.47	12.90
7198.00	65.53	358.86	7072.73	212.95 N	217.30 W	217.30	11.83
7230.00	68.81	358.70	7085.14	242.43 N	217.93 W	246.79	10.27
7261.00	72.12	0.03	7095.50	271.64 N	218.25 W	276.00	11.40
7293.00	75.95	0.28	7104.30	302.40 N	218.16 W	306.75	12.00
7324.00	79.29	359.73	7110.95	332.67 N	218.16 W	337.02	10.91
7356.00	83.44	359.48	7115.75	364.30 N	218.38 W	368.65	12.99
7433.00	89.75	359.97	7120.32	441.13 N	218.75 W	445.47	8.22
7528.00	89.51	359.81	7120.94	536.13 N	218.94 W	540.45	0.31
7622.00	89.81	359.93	7121.49	630.12 N	219.16 W	634.43	0.35
7714.00	90.74	0.21	7121.05	722.12 N	219.04 W	726.41	1.05
7806.00	92.04	0.84	7118.82	814.09 N	218.20 W	818.34	1.57
7898.00	92.53	0.15	7115.15	906.01 N	217.41 W	910.23	0.93
7990.00	91.85	0.97	7111.62	997.94 N	216.52 W	1002.12	1.16
8082.00	92.35	0.38	7108.25	1089.87 N	215.44 W	1094.01	0.83
8174.00	91.54	1.06	7105.13	1181.81 N	214.29 W	1185.90	1.14
8266.00	92.04	0.85	7102.25	1273.75 N	212.76 W	1277.80	0.58
8357.00	90.49	0.91	7100.24	1364.71 N	211.35 W	1368.71	1.70
8449.00	90.37	0.90	7099.55	1456.70 N	209.90 W	1460.65	0.13
8541.00	90.49	0.47	7098.86	1548.69 N	208.79 W	1552.60	0.48
8633.00	90.49	359.76	7098.06	1640.69 N	208.60 W	1644.57	0.77
8725.00	90.43	1.67	7097.32	1732.67 N	207.46 W	1736.52	2.07
8817.00	90.19	1.05	7096.82	1824.64 N	205.27 W	1828.43	0.72
8909.00	90.43	0.61	7096.32	1916.63 N	203.94 W	1920.37	0.55
9001.00	89.69	0.99	7096.22	2008.62 N	202.65 W	2012.31	0.91
9093.00	91.05	0.84	7095.63	2100.61 N	201.19 W	2104.25	1.49
9184.00	90.12	1.66	7094.70	2191.58 N	199.20 W	2195.16	1.36
9276.00	88.76	2.04	7095.59	2283.52 N	196.23 W	2287.03	1.53
9368.00	88.83	1.60	7097.53	2375.46 N	193.31 W	2378.88	0.48
9459.00	88.95	1.51	7099.30	2466.41 N	190.84 W	2469.76	0.16
9551.00	88.83	1.27	7101.08	2558.36 N	188.61 W	2561.66	0.29
9643.00	90.37	0.55	7101.72	2650.34 N	187.15 W	2653.59	1.85
9735.00	91.73	0.17	7100.04	2742.32 N	186.57 W	2745.54	1.53
9827.00	91.98	0.16	7097.06	2834.28 N	186.30 W	2837.47	0.27
9919.00	91.92	359.73	7093.94	2926.22 N	186.39 W	2929.40	0.48
10011.00	90.43	0.78	7092.05	3018.20 N	185.98 W	3021.34	1.98
10103.00	91.92	0.11	7090.17	3110.17 N	185.26 W	3113.29	1.77
10195.00	91.98	359.89	7087.04	3202.12 N	185.26 W	3205.21	0.25
10287.00	91.05	0.66	7084.61	3294.09 N	184.82 W	3297.15	1.31
10378.00	91.05	0.44	7082.94	3385.07 N	183.95 W	3388.10	0.25
10470.00	91.17	359.99	7081.16	3477.05 N	183.61 W	3480.05	0.51
10565.00	91.24	359.58	7079.16	3572.03 N	183.97 W	3575.02	0.43
10659.00	91.54	359.10	7076.88	3665.99 N	185.05 W	3668.99	0.61
10754.00	91.79	1.11	7074.12	3760.95 N	184.88 W	3763.92	2.13
10849.00	91.79	0.44	7071.14	3855.89 N	183.60 W	3858.82	0.71
10944.00	91.85	0.39	7068.12	3950.84 N	182.91 W	3953.73	0.08
11038.00	91.24	2.01	7065.59	4044.78 N	180.95 W	4047.62	1.85
11133.00	91.17	1.73	7063.59	4139.71 N	177.85 W	4142.46	0.30
11228.00	89.94	1.57	7062.67	4234.66 N	175.11 W	4237.34	1.31
11323.00	89.75	1.44	7062.93	4329.63 N	172.61 W	4332.24	0.24
11418.00	89.75	1.04	7063.34	4424.61 N	170.55 W	4427.15	0.42
11513.00	89.94	1.05	7063.59	4519.59 N	168.82 W	4522.08	0.20
11608.00	89.88	0.43	7063.75	4614.58 N	167.59 W	4617.03	0.65
11702.00	90.00	359.99	7063.85	4708.58 N	167.24 W	4711.00	0.49
11797.00	90.31	0.14	7063.59	4803.58 N	167.14 W	4805.98	0.36
11892.00	90.93	0.87	7062.57	4898.57 N	166.30 W	4900.93	1.01
11987.00	91.23	0.78	7060.78	4993.54 N	164.94 W	4995.86	0.34
12081.00	90.80	0.18	7059.11	5087.53 N	164.15 W	5089.81	0.79
12176.00	90.37	359.41	7058.13	5182.52 N	164.50 W	5184.79	0.93
12271.00	91.92	358.86	7056.24	5277.49 N	165.93 W	5279.76	1.73
12365.00	91.85	358.59	7053.15	5371.41 N	168.02 W	5373.71	0.30
12460.00	90.93	0.24	7050.84	5466.37 N	168.99 W	5468.68	1.99
12555.00	90.49	359.95	7049.66	5561.37 N	168.84 W	5563.65	0.55
12649.00	92.04	359.97	7047.59	5655.34 N	168.94 W	5657.60	1.64

12649.00	92.04	359.97	7047.58	5655.34 N	168.91 W	5657.60	1.64
12744.00	93.09	1.71	7043.33	5750.23 N	167.53 W	5752.44	2.14
12839.00	93.40	1.12	7037.95	5845.05 N	165.19 W	5847.19	0.70
12934.00	92.41	1.47	7033.14	5939.90 N	163.04 W	5941.98	1.10
13029.00	91.17	2.43	7030.17	6034.80 N	159.81 W	6036.79	1.65
13124.00	89.69	1.83	7029.45	6129.72 N	156.28 W	6131.63	1.69
13219.00	90.00	2.47	7029.70	6224.66 N	152.73 W	6226.47	0.75
13313.00	90.49	2.47	7029.30	6318.57 N	148.68 W	6320.28	0.53
13408.00	90.99	2.42	7028.07	6413.47 N	144.63 W	6415.09	0.52
13503.00	91.30	2.19	7026.17	6508.38 N	140.82 W	6509.90	0.40
13598.00	91.79	2.01	7023.61	6603.28 N	137.34 W	6604.71	0.55
13692.00	90.62	1.99	7021.63	6697.20 N	134.07 W	6698.54	1.25
13787.00	88.14	1.24	7022.66	6792.15 N	131.40 W	6793.42	2.72
13882.00	88.27	0.79	7025.63	6887.09 N	129.72 W	6888.30	0.49
13977.00	88.64	0.41	7028.20	6982.05 N	128.72 W	6983.22	0.56
14071.00	89.07	359.74	7030.07	7076.03 N	128.60 W	7077.18	0.85
14106.00	89.26	359.95	7030.58	7111.02 N	128.69 W	7112.17	0.79
14150.00	89.26	359.95	7031.15	7155.02 N	128.73 W	7156.16	0.01

CALCULATION BASED ON MINIMUM CURVATURE METHOD

**SURVEY COORDINATES RELATIVE TO WELL SYSTEM REFERENCE POINT
TVD VALUES GIVEN RELATIVE TO DRILLING MEASUREMENT POINT**

**VERTICAL SECTION RELATIVE TO WELL HEAD
VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 358.84 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.64 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 14150.00 FEET
IS 7156.18 FEET ALONG 358.97 DEGREES (TRUE)**

Final survey is a projection to bit.