

PCG Pressure Case Gamma PCD Pressure Case Directional

[illegible]

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	08-Dec-13	09-Dec-13	14-Dec-13		
Rig Bit Number	0100	0200	0300		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.750	6.750	4.75		
Log Start Depth (MD, ft)	762.00	5,926.00	6,990.00		
Log End Depth (MD, ft)	5,926.00	6,990.00	16,225.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	07-Dec-13 19:07	09-Dec-13 04:00	11-Dec-13 06:00		
Drill/Wipe End Date and Time	08-Dec-13 19:00	09-Dec-13 14:30	14-Dec-13 09:00		
Min Inc (deg) @ Depth (MD, ft)	0.29 @ 5,438.00	3.38 @ 6,009.00	88.09 @ 7,329.00		
Max Inc (deg) @ Depth (MD, ft)	15.00 @ 3,733.00	82.15 @ 6,936.00	92.62 @ 9,795.00		
Bit TFA(in2) / Bit Type	0.91 / PDC	1.24 / PDC	0.98 / PDC		
Flow Rate (gpm)	598.01	589.50	280.00		
Max AV (fpm) / CV (fpm) @ MWD	350 / 400	350 / 350	427.0 / 400		
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	8.60 / 29.00	9.40 / 37.00	9.20 / 32.00		
Filtrate CL (ppm)	1200	1200	2,000.00		
pH / Fluid Loss (mptm)	8 / 32	8 / 32	9.00 / 0		
PV (cP) / YP (lbf2)	4 / 3.00	9 / 9.00	6 / 5.00		
% Solids / % Sand	1.40 / 0.25	4.9 / .25	3.3 / 0.15		
% Oil / Oil:Water Ratio	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		
Rmf @ Measured Temp (degF)	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		
Max Tool Temp (degF) / S	150.10 / PDM	150.70 / PDM	210.00 / PDM		

Max Tool Temp (degF) / Source	150.10 / PCM	158.70 / PCM	242.28 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Adam Sampson	Adam Sampson	Adam Sampson		
Customer Representative	Matt Settles	Matt Settles	Matt Settles		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.84	5.84	5.84		
Sub Serial Number	11341340	11341340	11670105		
Insert Serial Number	11227525	11227525	11400989		
Date and Time Initialized	06-Dec-13 19:22	06-Dec-13 19:22	10-Dec-13 13:44		
Date and Time Read	10-Dec-13 02:13	10-Dec-13 02:38	14-Dec-13 16:39		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	56.00	54.00	67.00		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11341340	11341340	11670105		
Sonde Serial Number	11062040	11062040	11478007		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	235.94	135.80	76.55		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	49.52	47.49	60.31		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11341340	11341340	11670105		
Insert/Sonde Serial Number	12037422	12037422	11293391		

REMARKS

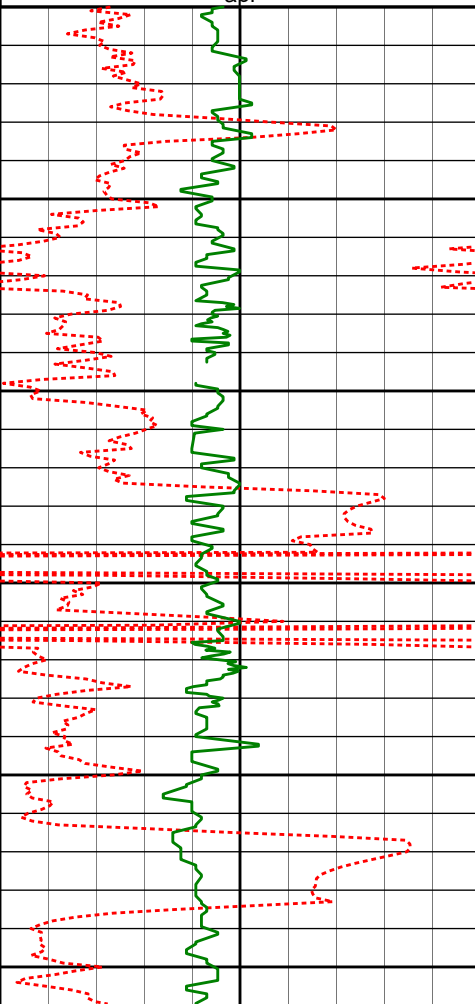
1. All depths are measured bit depths, referenced to the Driller's pipe tally and are measured from the Drill Floor, unless otherwise specified.
2. No depth corrections have been made for pipe stretch or compression.
3. Critical annual velocities are calculated using the "Power Law" model for water based fluids and the "Bingham Plastic" model for oil and synthetic based fluids.
4. All data presented is recorded data unless otherwise specified.
5. The following smoothing parameters have been applied to the data:
PGRC (Corrected Gamma Ray):
Interval Resolution: 0.5 ft
Interval Distance: 0.6 ft
Gap Fill: 3.0 ft
ROPA (Average Rate of Penetration)
Interval Resolution: 0.5 ft
Interval Distance: 1.2 ft
Gap Fill: 3.0 ft
6. INSITE version 7.4.2

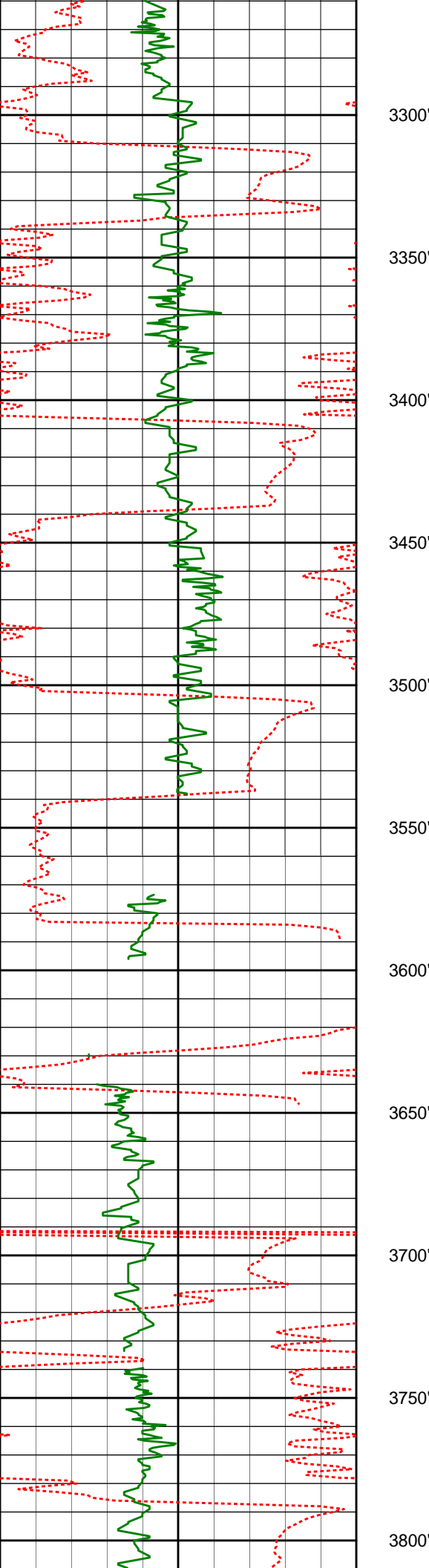
WARRANTY

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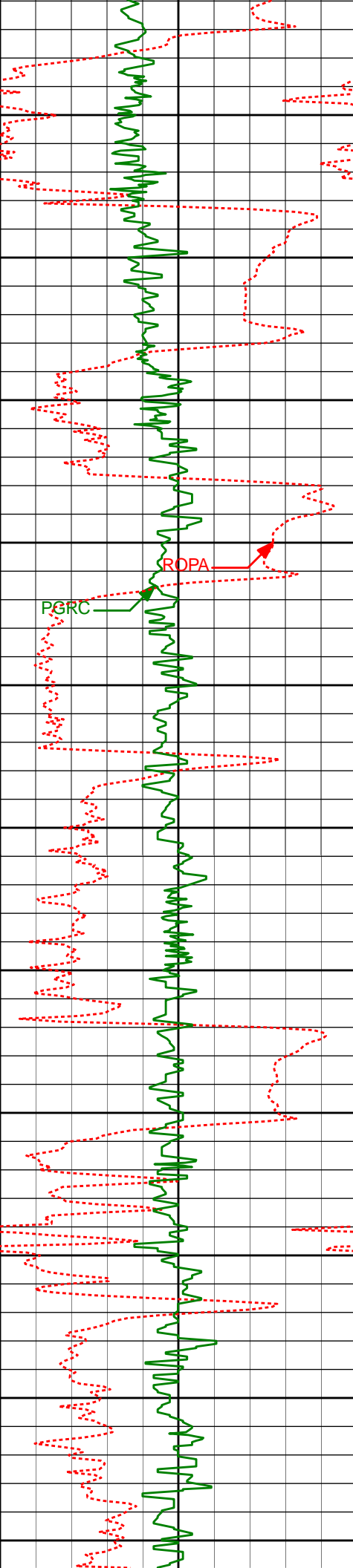
HALLIBURTON

MD Main Log 1:600

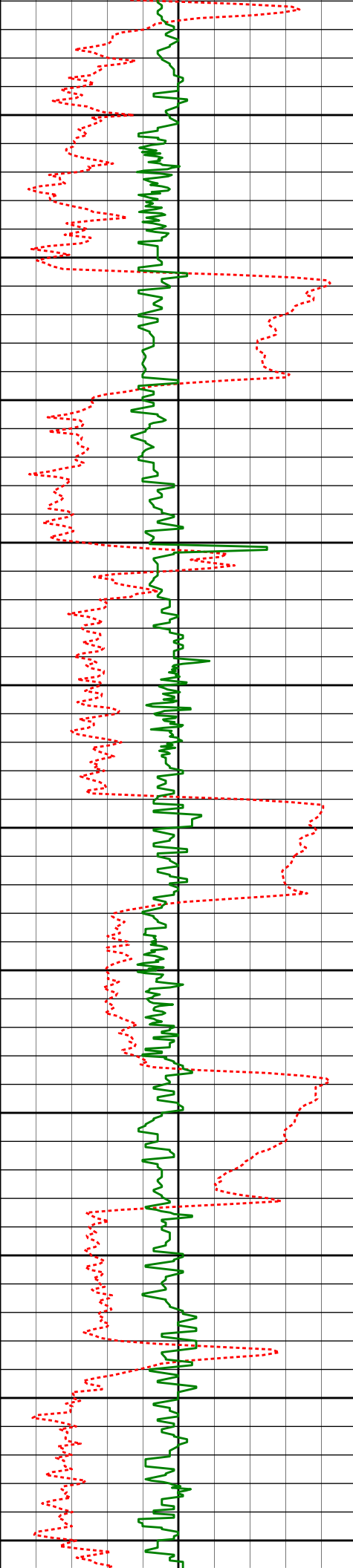
Average Rate of Penetration ROPA						
1K0						
feet per hr						
PCG Gamma Ray BCorr PGRC		Measured Depth (ft) 1:600	Depth	Inc	Azi.	TVDV.S.
0200						
api						
		3000'				
		3050'				
		3069'	12.50°	178.24°	3044.97'	4.95'
		3100'				
		3150'				
		3164'	12.19°	179.84°	3137.77'	5.92'
		3200'				
		3250'				
		3259'	11.67°	179.89°	3230.72'	6.57'



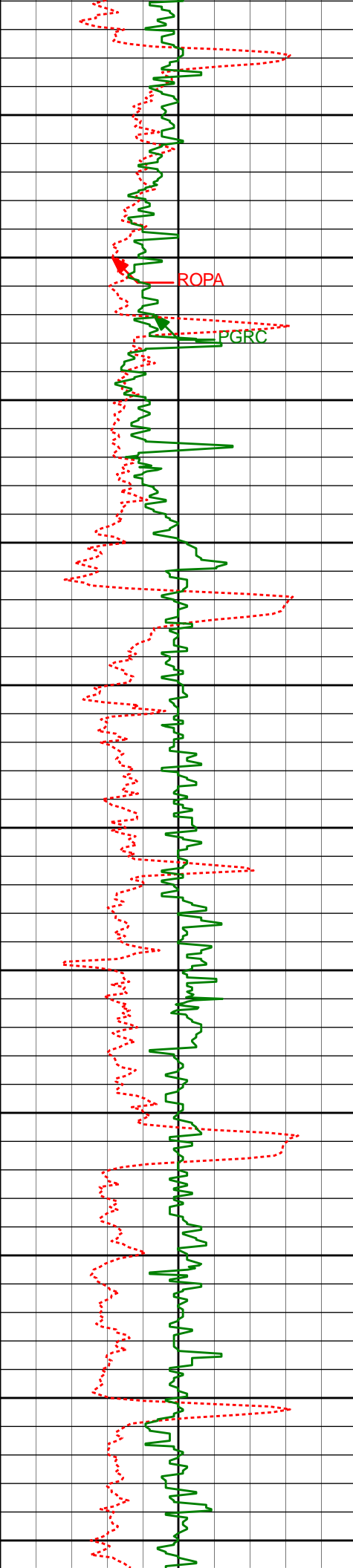
3299'	11.07°	179.03°	3299.72'	6.97'
3354'	10.00°	182.65°	3324.02'	6.76'
3449'	9.78°	178.08°	3417.61'	7.15'
3543'	10.07°	181.22°	3510.21'	7.73'
3638'	12.36°	176.76°	3603.39'	8.70'
3733'	15.00°	175.22°	3695.69'	10.99'



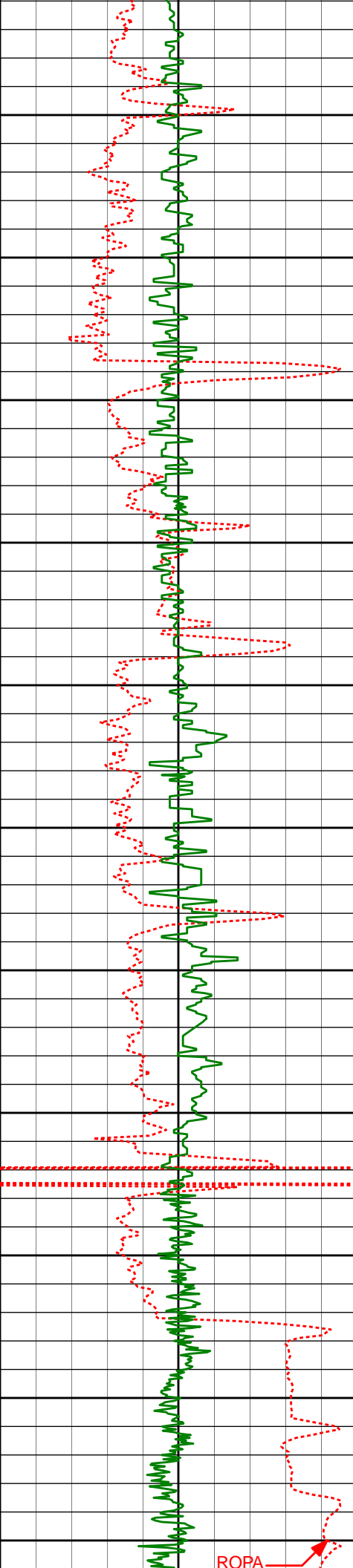
3828'	13.50°	173.14°	3787.76'	14.05'
3850'				
3900'				
3923'	11.15°	166.36°	3880.57'	18.15'
3950'				
4000'				
4018'	8.77°	176.11°	3974.14'	21.30'
4050'				
4100'				
4112'	8.43°	171.27°	4067.08'	23.26'
4150'				
4200'				
4207'	5.87°	183.93°	4161.34'	24.35'
4250'				
4300'				
4302'	4.51°	179.33°	4255.95'	24.32'
4350'				



4400'	4397'	3.83°	176.73°	4350.70'	24.76'
4450'					
4500'	4491'	2.47°	196.13°	4444.56'	24.53'
4550'					
4600'	4586'	2.52°	205.87°	4539.47'	23.17'
4650'					
4700'	4681'	3.10°	233.43°	4634.36'	20.30'
4750'					
4800'	4776'	1.07°	268.25°	4729.29'	17.40'
4850'					
4900'	4871'	0.94°	261.96°	4824.28'	15.75'



4950'				
4966'	0.83°	240.00°	4919.27'	14.39'
5000'				
5050'				
5060'	0.99°	221.87°	5013.25'	13.29'
5100'				
5150'				
5155'	1.03°	234.31°	5108.24'	12.09'
5200'				
5250'				
5300'				
5343'	1.08°	279.88°	5296.21'	8.99'
5350'				
5400'				
5438'	0.29°	202.63°	5391.20'	8.02'
5450'				



5500'

5550'

5600'

5627'

0.74°

136.13°

5580.20'

8.72'

5650'

5700'

5722'

0.83°

132.13°

5675.19'

9.68'

5750'

5800'

5817'

0.71°

121.48°

5770.18'

10.72'

5850'

5870'

0.52°

152.60°

5823.18'

11.12'

5900'

5950'

6000'

6004'

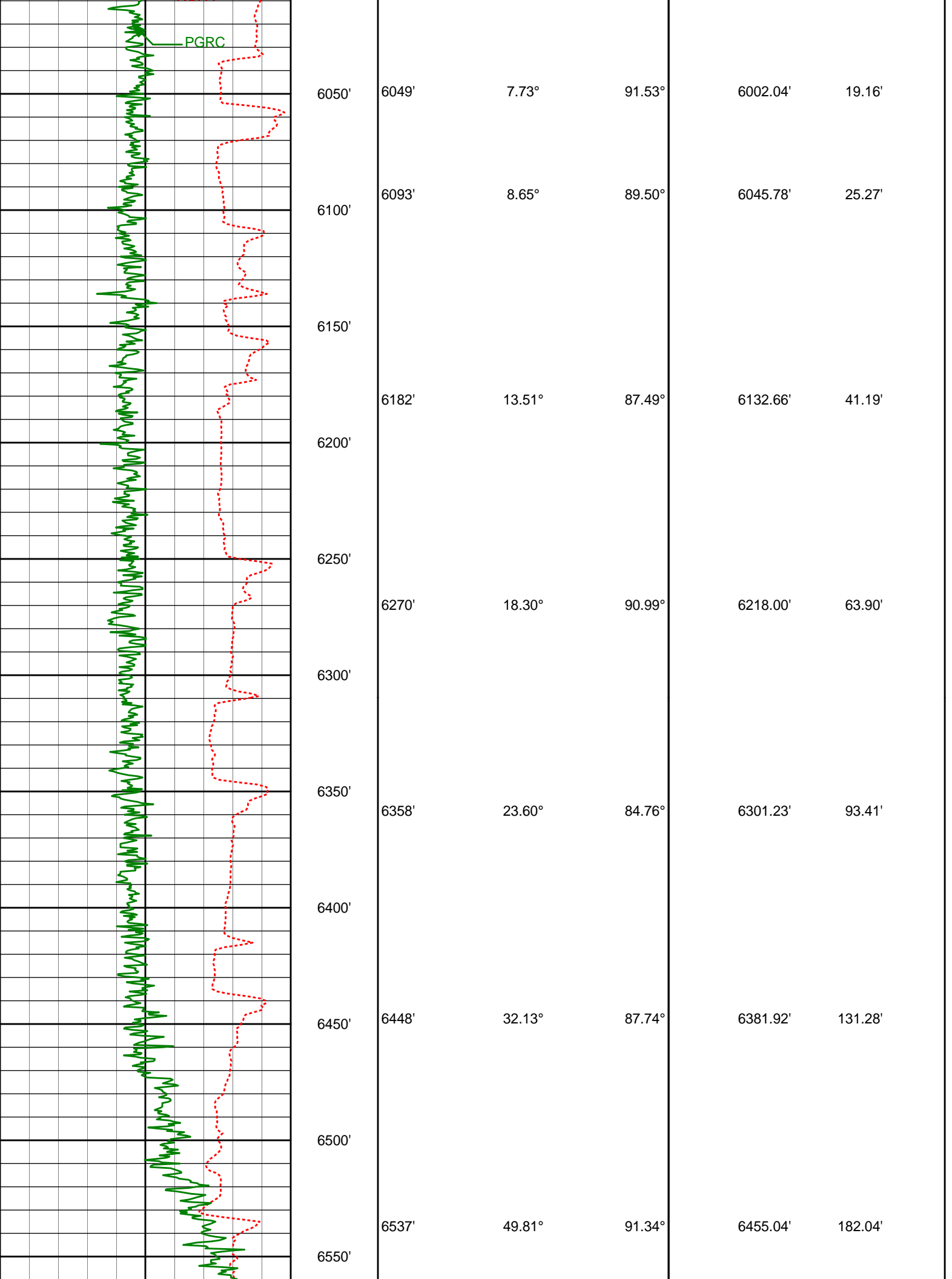
3.38°

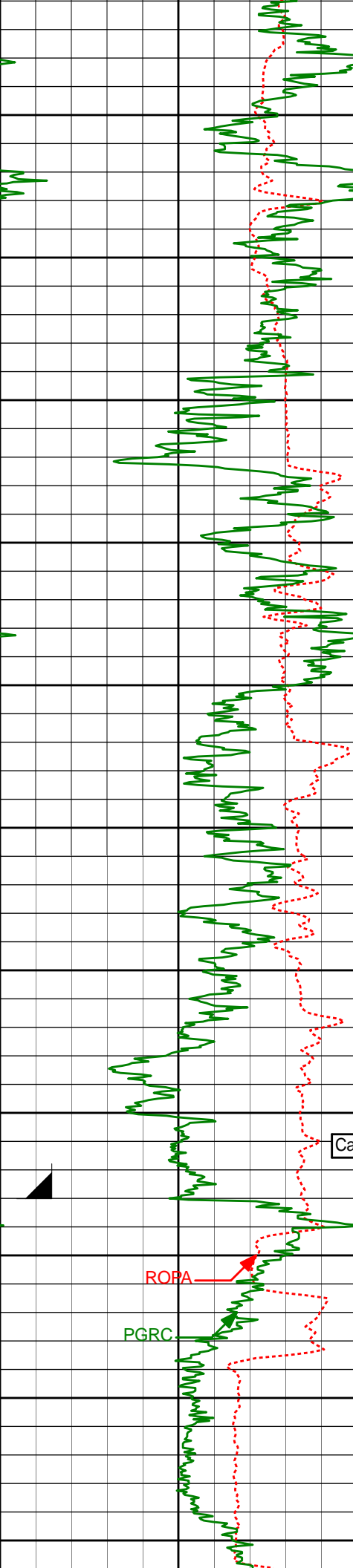
93.89°

5957.10'

15.24'

ROPA





6600'

6626'

59.97°

93.95°

6512.65'

250.01'

6650'

6700'

6715'

59.84°

91.29°

6558.49'

325.46'

6750'

6800'

6804'

67.76°

89.00°

6602.36'

403.20'

6850'

6875'

82.15°

89.34°

6631.14'

468.48'

6900'

6950'

Casing Shoe @ 6980'

Run 300

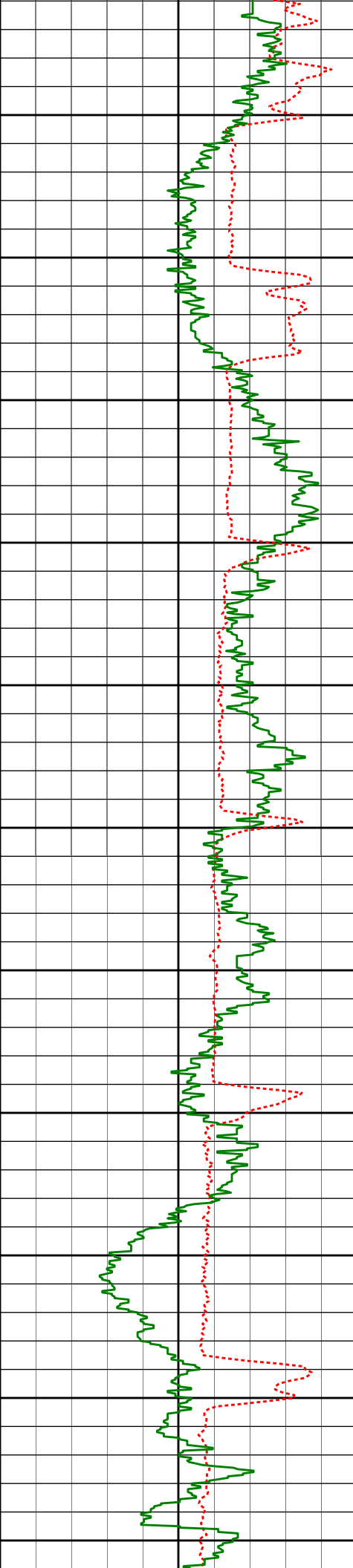
7000'

ROPA

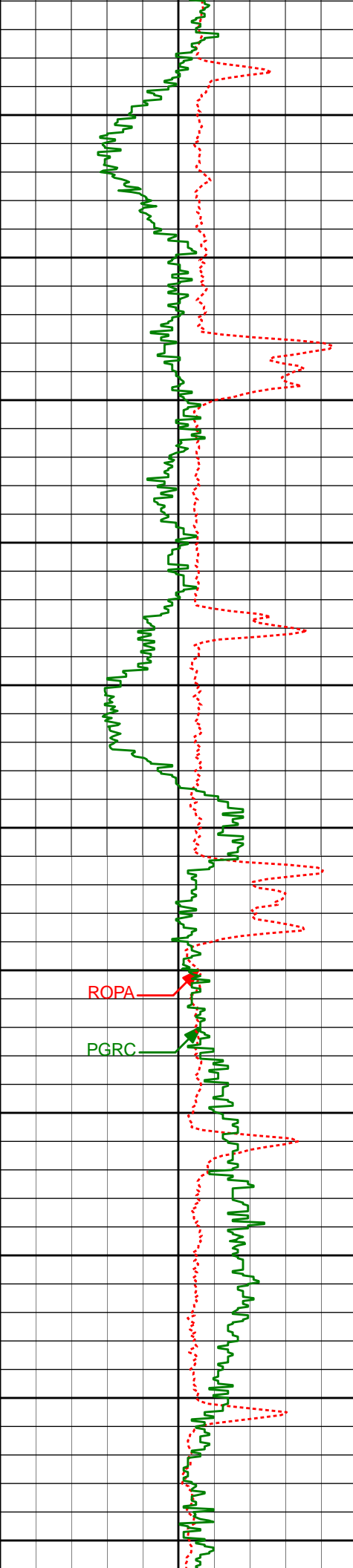
PGRC

7050'

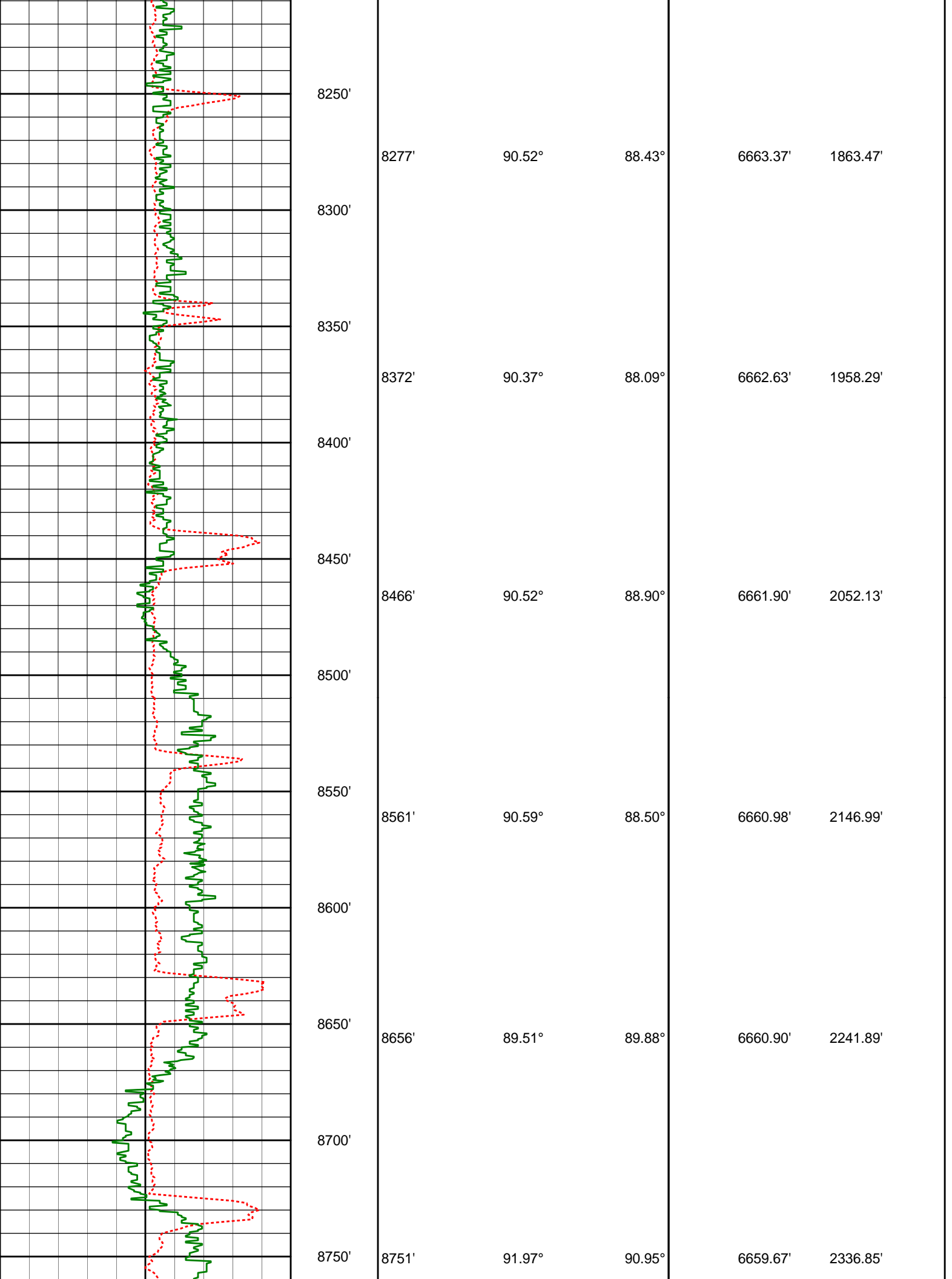
7100'

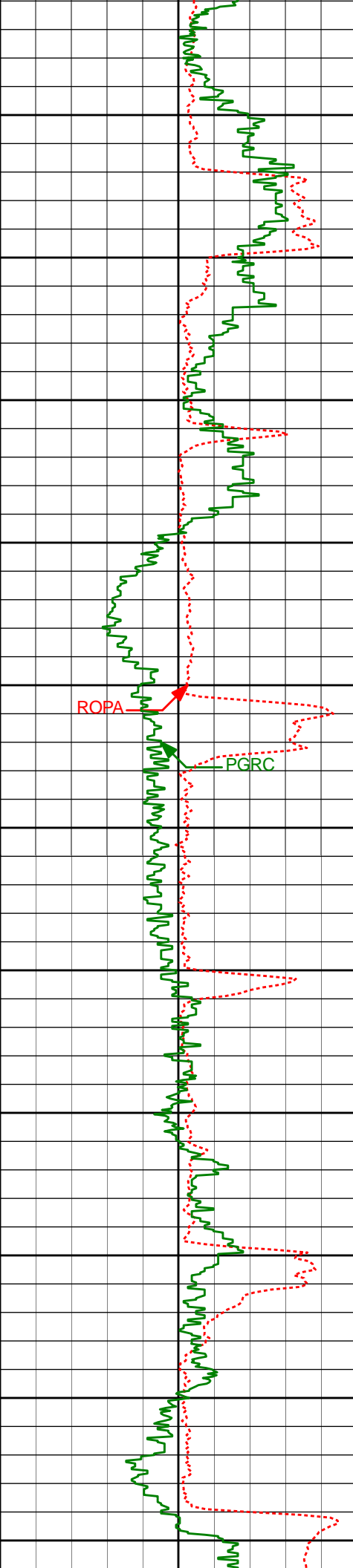


7139'	91.02°	85.42°	6657.49'	729.17'
7150'				
7200'				
7234'	88.12°	86.23°	6658.21'	823.65'
7250'				
7300'				
7329'	88.09°	86.29°	6661.35'	918.16'
7350'				
7400'				
7423'	88.09°	86.42°	6664.48'	1011.69'
7450'				
7500'				
7518'	88.24°	85.70°	6667.52'	1106.17'
7550'				
7600'				
7613'	89.63°	86.79°	6669.29'	1200.71'
7650'				



7700'	7708'	90.15°	86.59°	6669.47'	1295.34'
7750'					
7800'	7803'	91.30°	87.75°	6668.27'	1390.02'
7850'					
7900'	7897'	91.76°	89.20°	6665.76'	1483.83'
7950'					
8000'	7992'	90.00°	90.09°	6664.30'	1578.75'
8050'					
8100'	8087'	89.78°	89.71°	6664.48'	1673.70'
8150'					
8200'	8182'	90.52°	88.90°	6664.23'	1768.61'





8800'

8850'

8900'

8950'

9000'

9050'

9100'

9150'

9200'

9250'

9300'

8846'

89.04°

90.51°

6658.84'

2431.82'

8941'

88.89°

90.51°

6660.55'

2526.78'

9036'

90.15°

90.21°

6661.35'

2621.75'

9131'

89.94°

90.43°

6661.27'

2716.72'

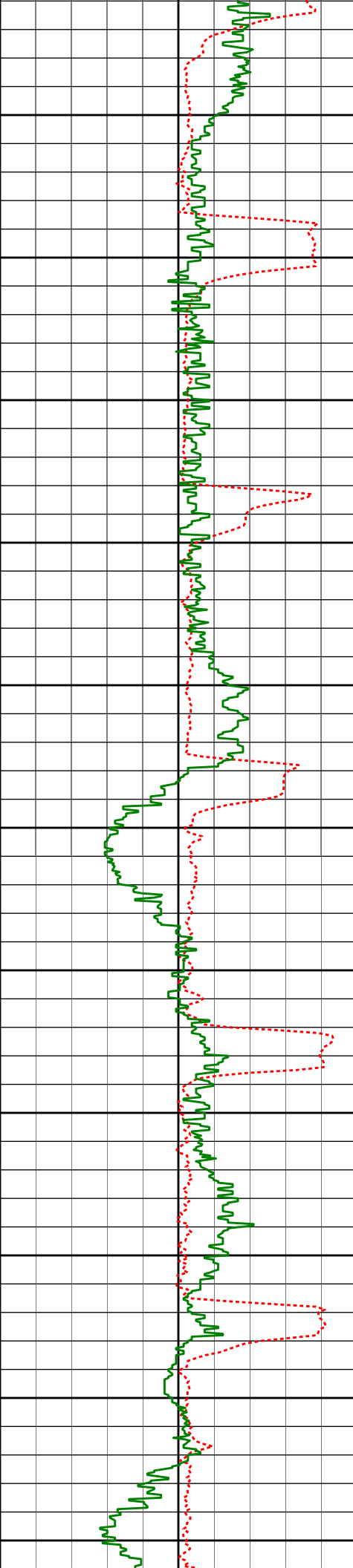
9225'

91.94°

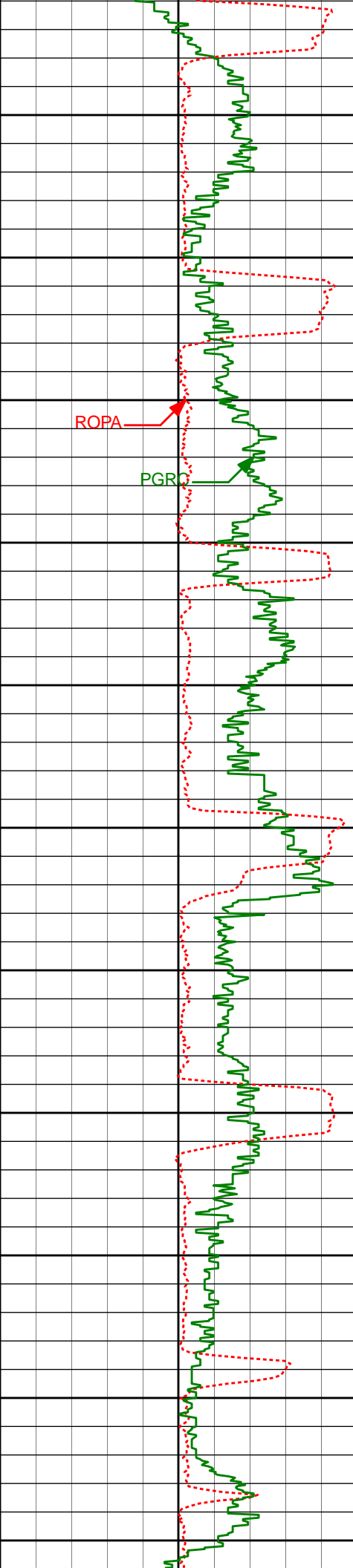
90.17°

6659.73'

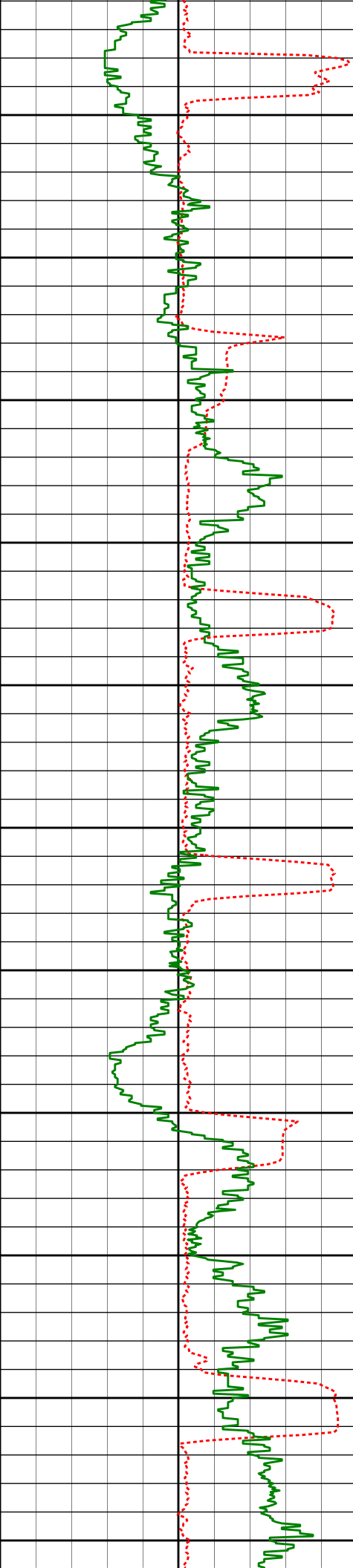
2810.67'



9320'	91.36°	89.07°	6657.00'	2905.56'
9350'				
9400'				
9415'	89.41°	88.69°	6656.36'	3000.44'
9450'				
9500'				
9510'	89.78°	88.69°	6657.03'	3095.30'
9550'				
9600'	89.66°	88.22°	6657.49'	3190.14'
9650'				
9700'	90.34°	87.48°	6657.49'	3284.92'
9750'				
9795'	92.62°	88.60°	6655.04'	3379.68'
9800'				
9850'				



9889'	91.88°	88.28°	6651.35'	3473.45'
9900'				
9950'				
9984'	90.86°	89.81°	6649.08'	3568.31'
10000'				
10050'				
10079'	91.60°	88.02°	6647.04'	3663.16'
10100'				
10150'				
10174'	91.32°	88.95°	6644.62'	3757.98'
10200'				
10250'				
10269'	88.52°	88.13°	6644.75'	3852.82'
10300'				
10350'				
10364'	88.86°	87.84°	6646.92'	3947.59'
10400'				



10450'

10500'

10550'

10600'

10650'

10700'

10750'

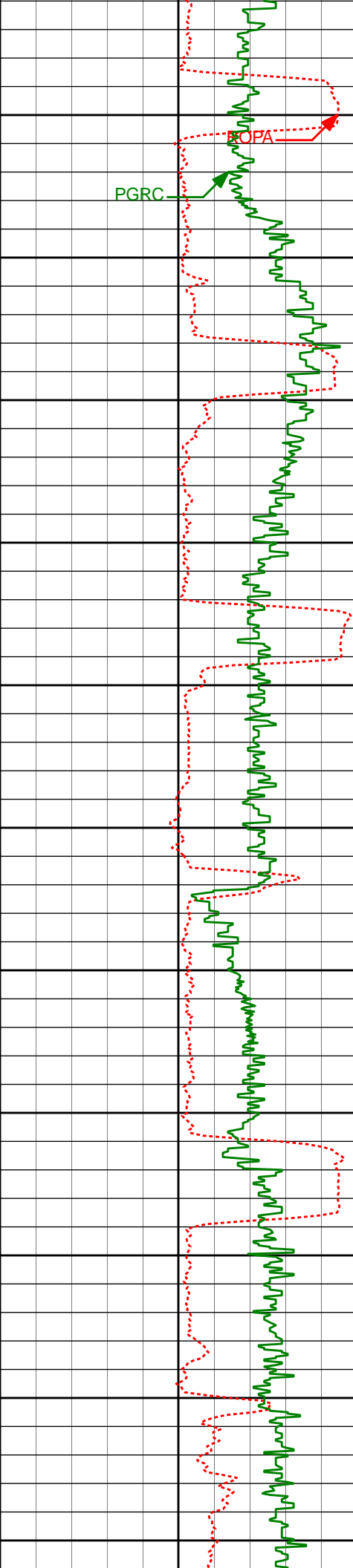
10800'

10850'

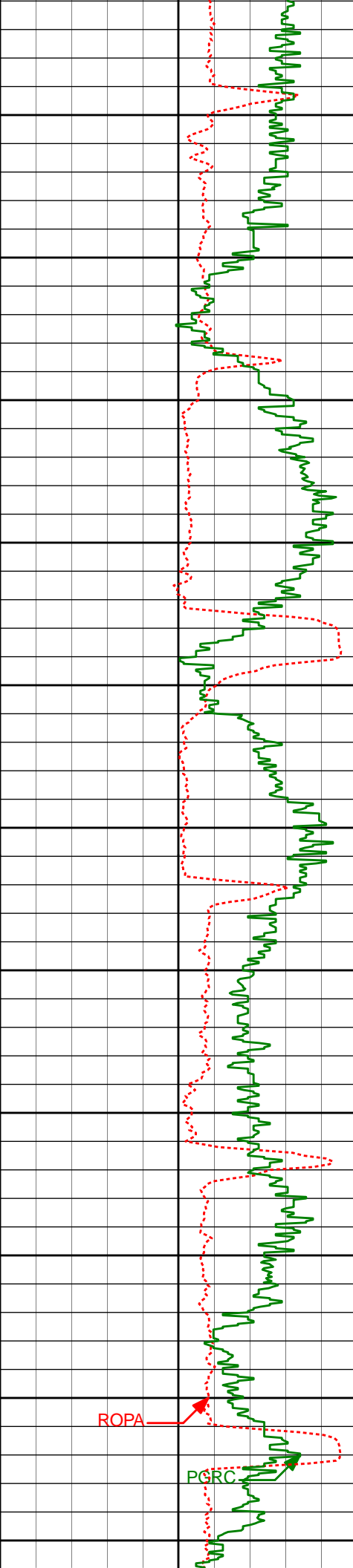
10900'

10950'

10459'	89.51°	88.10°	6648.27'	4042.37'
10551'	89.48°	88.09°	6649.08'	4134.18'
10643'	90.89°	87.76°	6648.79'	4225.97'
10736'	91.57°	88.63°	6646.79'	4318.76'
10828'	92.56°	87.86°	6643.48'	4410.53'
10921'	91.79°	89.08°	6639.95'	4503.31'



11000'	11014'	91.57°	90.34°	6637.22'	4596.21'
11050'					
11100'	11107'	90.77°	90.35°	6635.32'	4689.16'
11150'					
11200'	11200'	89.54°	90.71°	6635.07'	4782.13'
11250'					
11300'	11292'	90.89°	91.37°	6634.72'	4874.12'
11350'					
11400'	11385'	89.17°	88.78°	6634.68'	4967.07'
11450'					
11500'	11477'	89.48°	88.51°	6635.76'	5058.93'



11550'

11571'

89.97°

88.16°

6636.21'

5152.76'

11600'

11650'

11664'

91.14°

88.22°

6635.31'

5245.57'

11700'

11750'

11758'

89.48°

87.82°

6634.80'

5339.37'

11800'

11850'

11851'

89.38°

87.24°

6635.73'

5432.11'

11900'

11950'

11943'

89.08°

87.38°

6636.96'

5523.82'

12000'

12036'

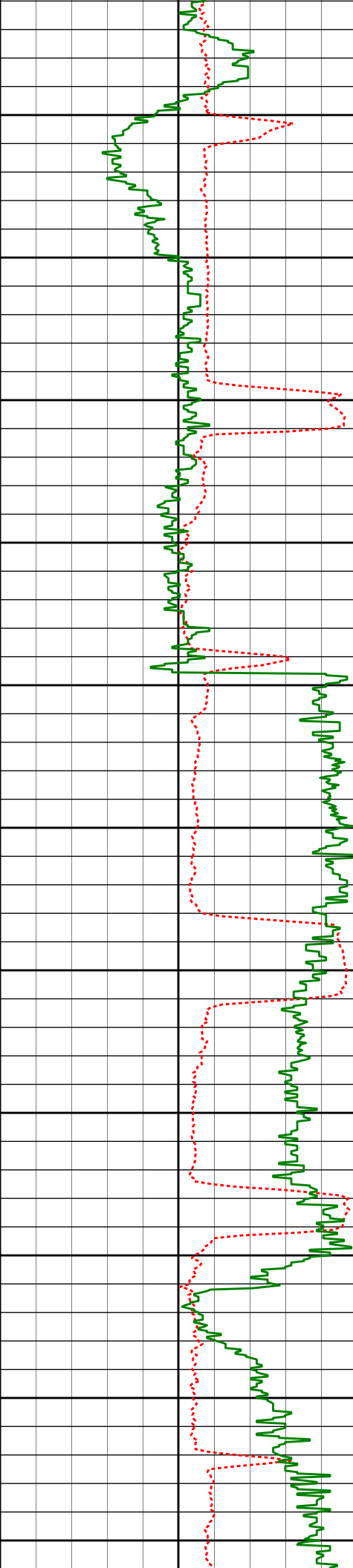
90.34°

87.60°

6637.43'

5616.56'

12050'



12100'

12130'

90.06°

87.30°

6637.11'

5710.30'

12150'

12200'

12222'

91.27°

87.22°

6636.04'

5802.00'

12250'

12300'

12314'

92.31°

87.31°

6633.16'

5893.68'

12350'

12400'

12407'

90.62°

88.93°

6630.79'

5986.45'

12450'

12500'

12499'

90.34°

89.97°

6630.02'

6078.37'

12550'

12600'

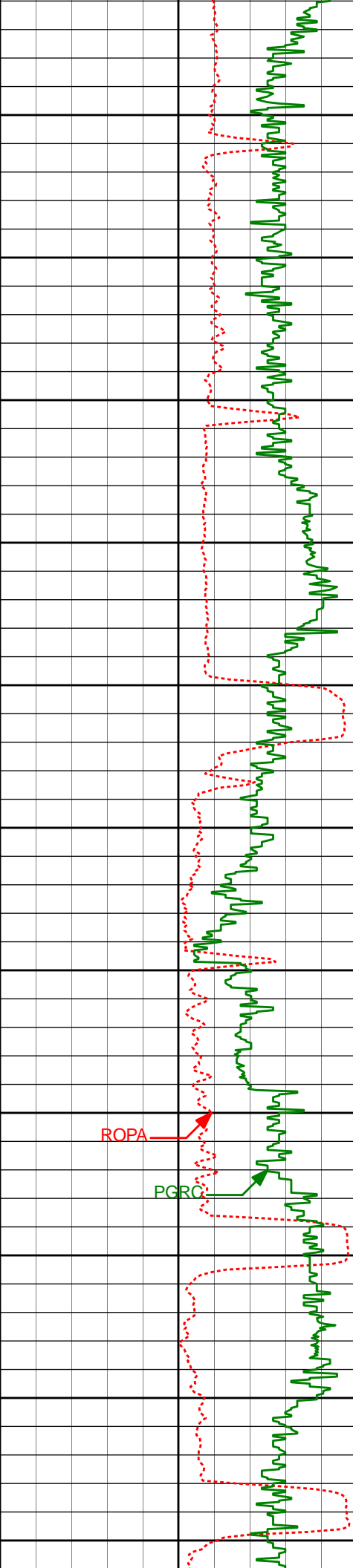
12591'

90.37°

89.43°

6629.45'

6170.31'



12650'

12700'

12750'

12800'

12850'

12900'

12950'

13000'

13050'

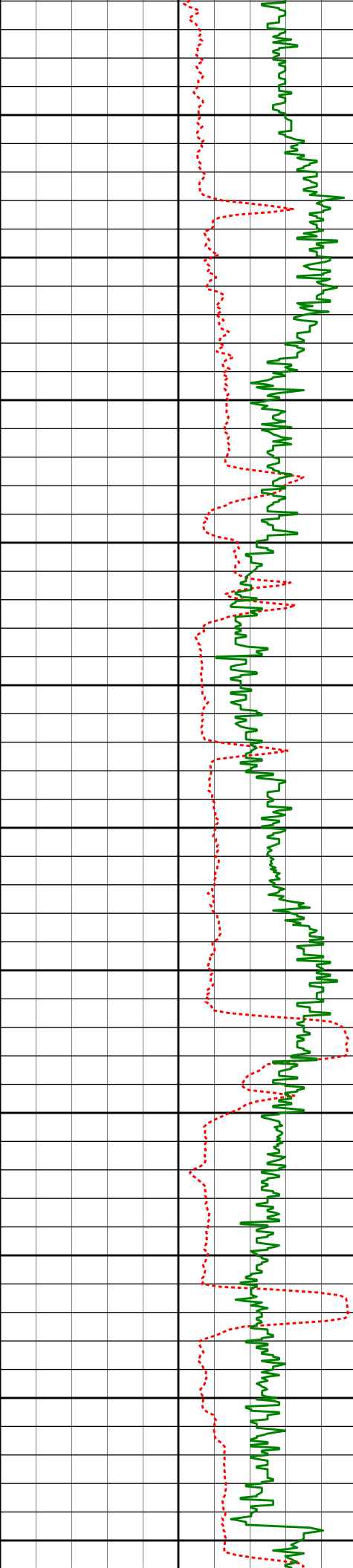
13100'

13150'

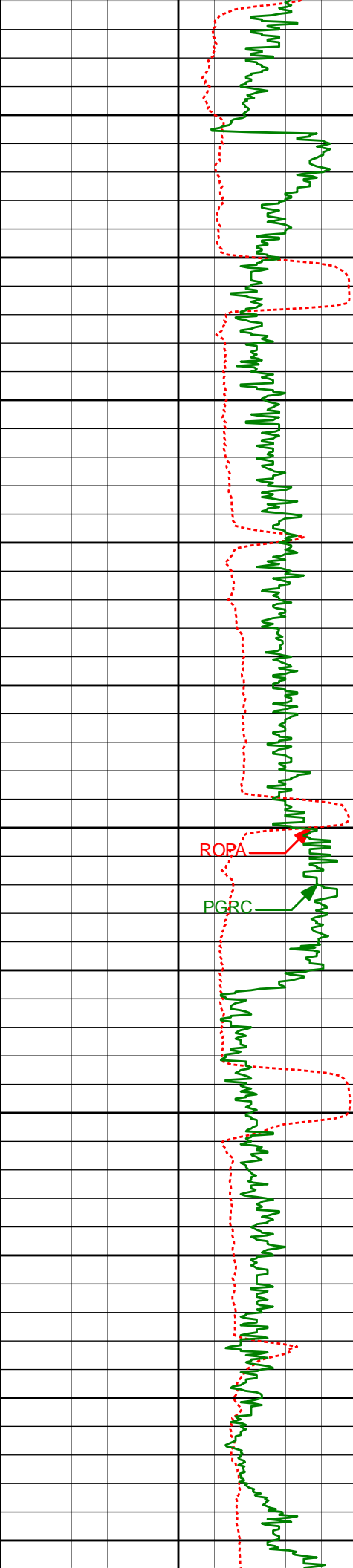
12686'	91.02°	89.13°	6628.29'	6265.21'
12781'	91.45°	88.64°	6626.25'	6360.07'
12875'	90.80°	89.51°	6624.40'	6453.95'
12970'	91.63°	89.39°	6622.39'	6548.85'
13065'	91.17°	90.32°	6620.06'	6643.77'

ROPA

PGRC



13200'	13165'	89.26°	89.82°	6619.69'	6743.72'
13250'	13260'	89.38°	89.49°	6620.82'	6838.65'
13300'					
13350'	13355'	89.78°	89.35°	6621.51'	6933.56'
13400'					
13450'	13450'	91.33°	89.39°	6620.59'	7028.48'
13500'					
13550'	13545'	90.77°	89.57°	6618.85'	7123.38'
13600'					
13650'	13640'	90.19°	89.71°	6618.06'	7218.31'
13700'					



13750'

13800'

13850'

13900'

13950'

14000'

14050'

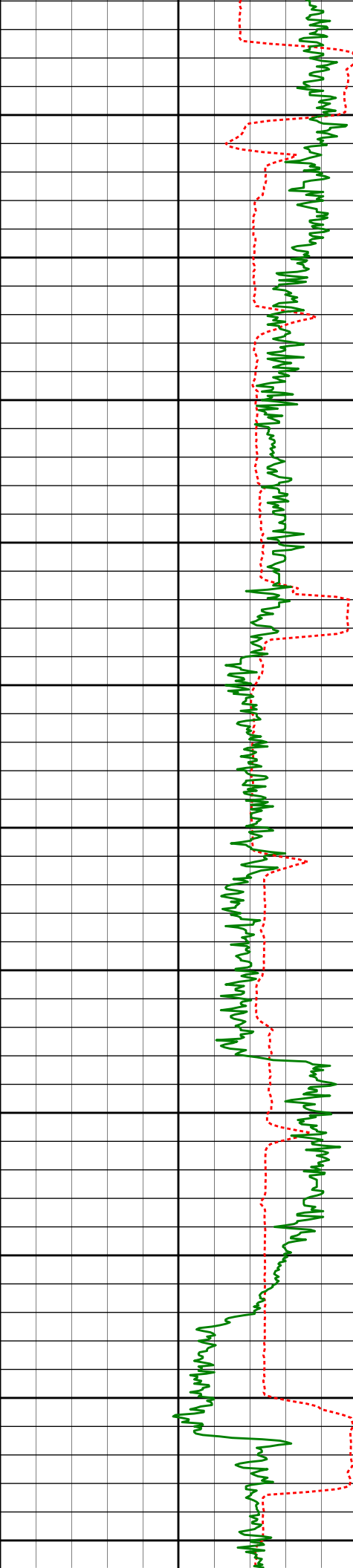
14100'

14150'

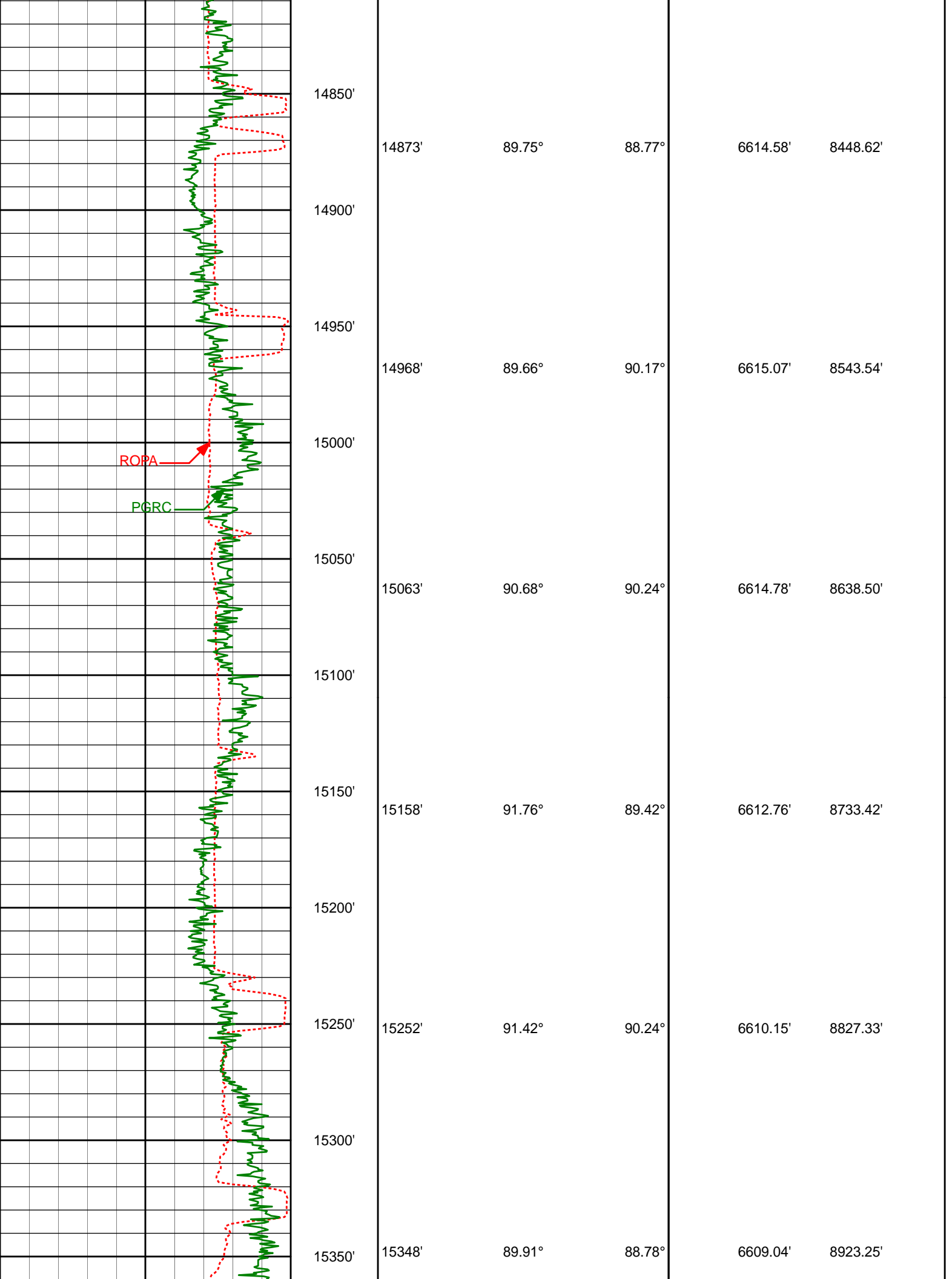
14200'

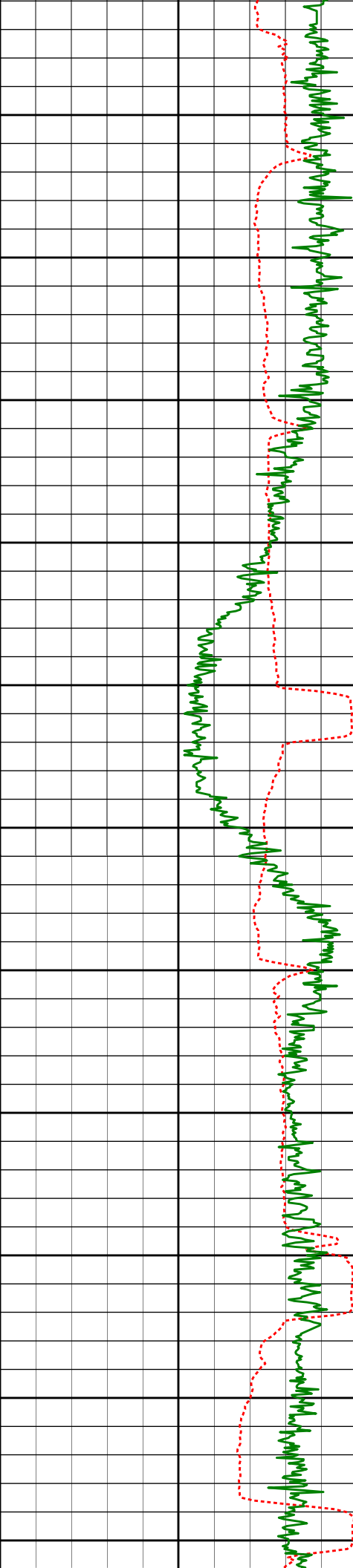
14250'

13735'	91.67°	89.65°	6616.51'	7313.24'
13829'	89.85°	88.27°	6615.27'	7407.11'
13924'	90.34°	87.84°	6615.11'	7501.91'
14019'	88.80°	87.01°	6615.82'	7596.63'
14114'	90.25°	89.31°	6616.61'	7691.43'
14209'	91.79°	89.48°	6614.92'	7786.33'



14300'	14304'	89.23°	88.58°	6614.07'	7881.21'
14350'					
14400'	14399'	90.15°	88.01°	6614.59'	7976.04'
14450'					
14500'	14494'	89.04°	87.57°	6615.26'	8070.81'
14550'					
14600'	14589'	89.85°	87.35°	6616.18'	8165.53'
14650'					
14700'	14683'	90.74°	85.61°	6615.70'	8259.13'
14750'					
14800'	14778'	90.43°	88.19°	6614.73'	8353.77'





15400'

15442'

90.52°

89.07°

6608.69'

9017.13'

15450'

15500'

15537'

91.64°

88.93°

6606.90'

9112.00'

15550'

15600'

15632'

90.59°

88.77°

6605.05'

9206.86'

15650'

15700'

15727'

91.60°

88.27°

6603.23'

9301.69'

15750'

15800'

15822'

89.88°

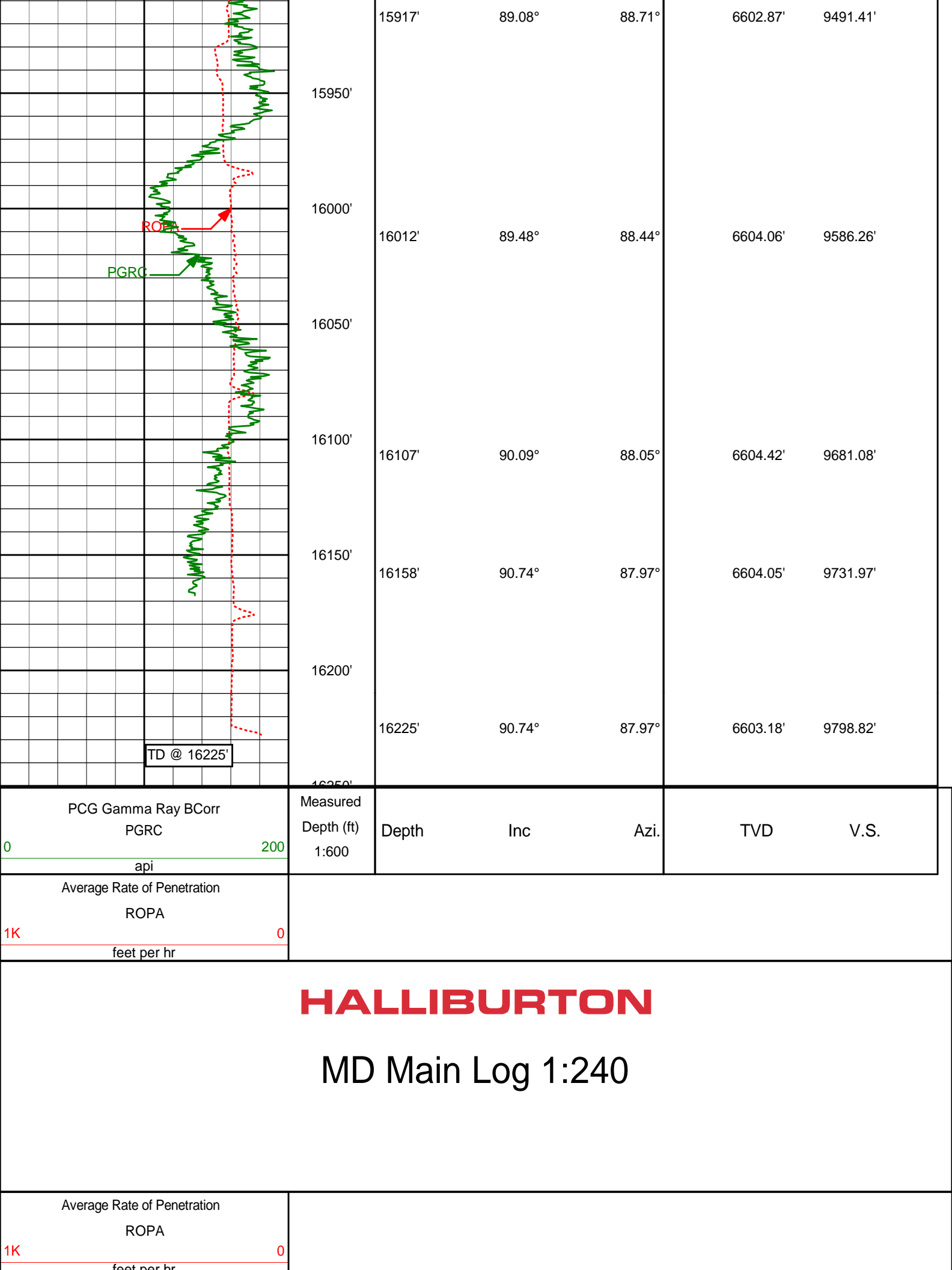
89.05°

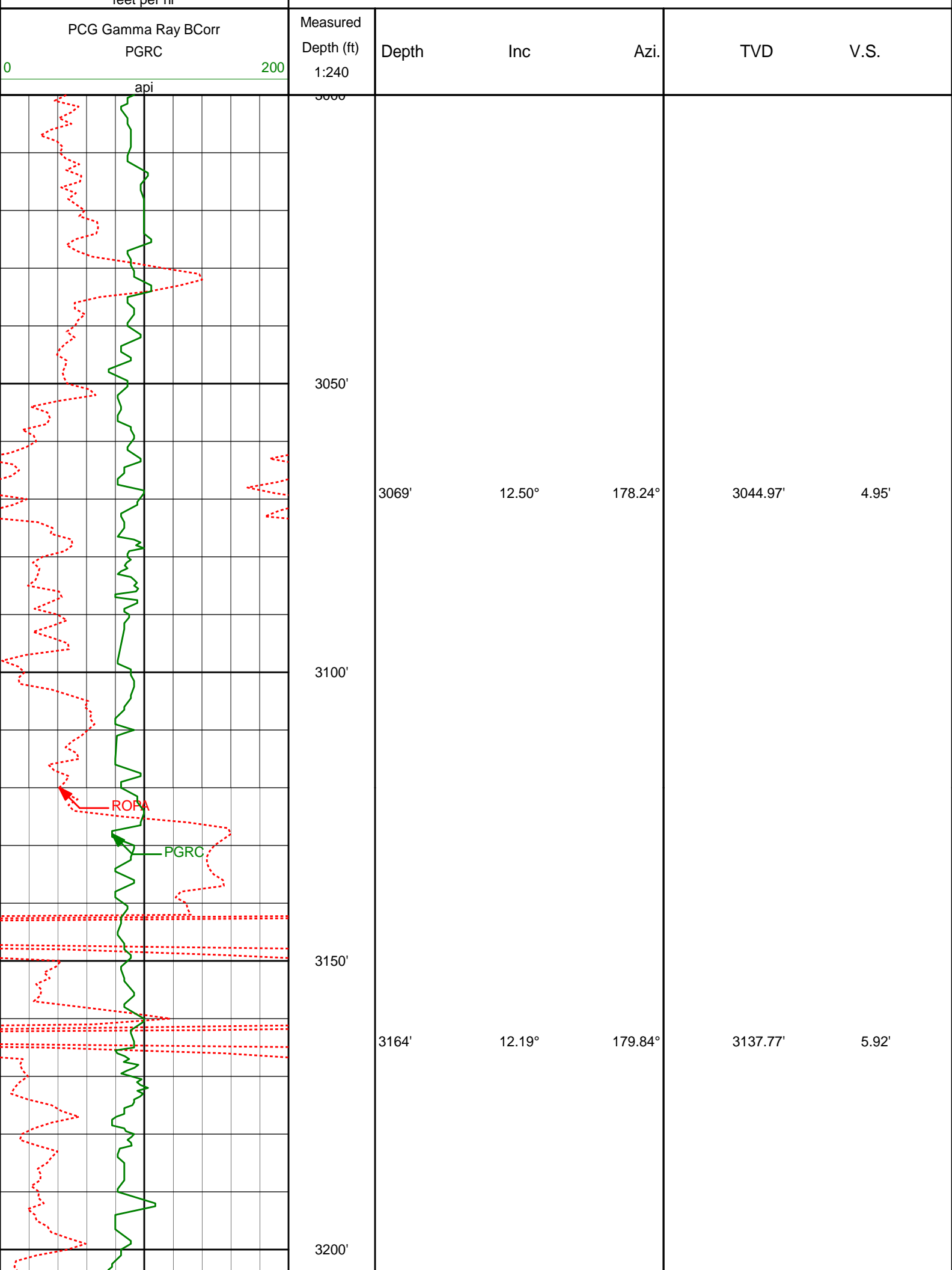
6602.00'

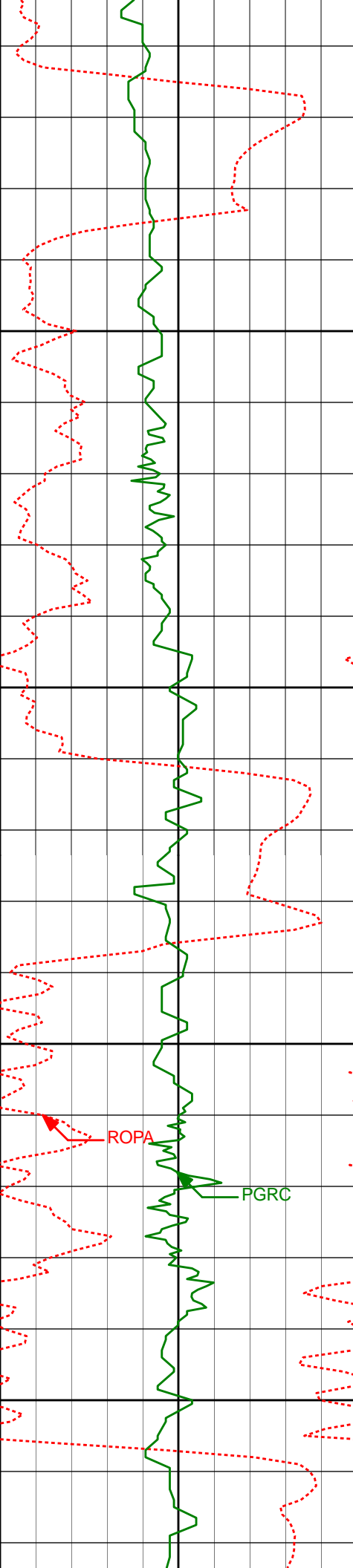
9396.54'

15850'

15900'







3250'

3300'

3350'

3400'

3259'

11.67°

179.89°

3230.72'

6.57'

3354'

10.00°

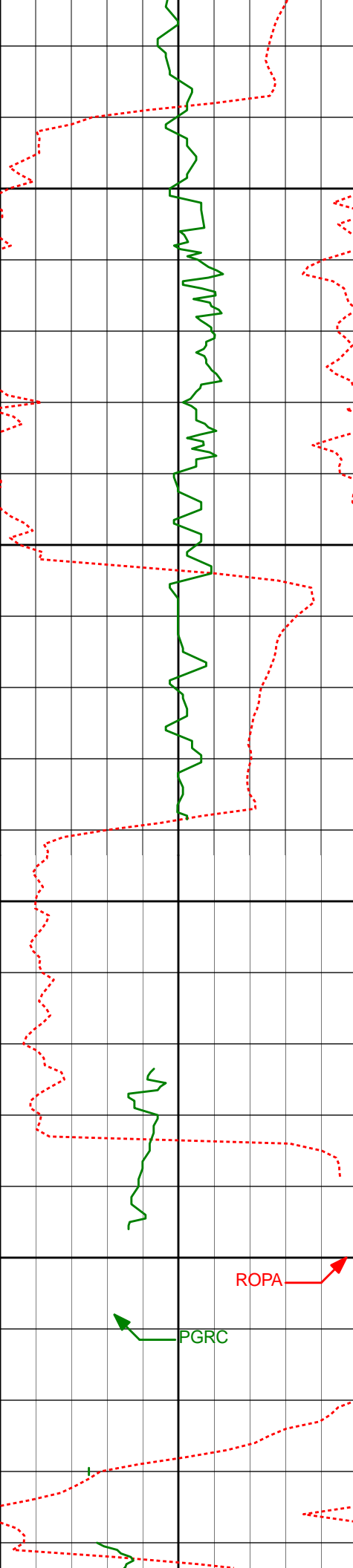
182.65°

3324.02'

6.76'

ROPA

PGRC



3450'

3500'

3550'

3600'

3449'

3543'

3638'

9.78°

10.07°

12.36°

178.08°

181.22°

176.76°

3417.61'

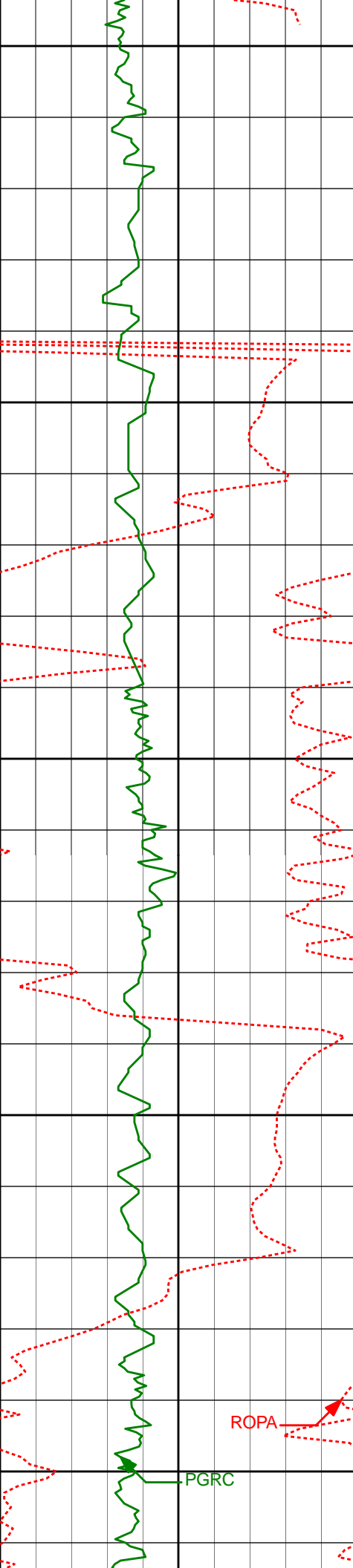
3510.21'

3603.39'

7.15'

7.73'

8.70'



3650'

3700'

3750'

3800'

3850'

3733'

15.00°

175.22°

3695.69'

10.99'

3828'

13.50°

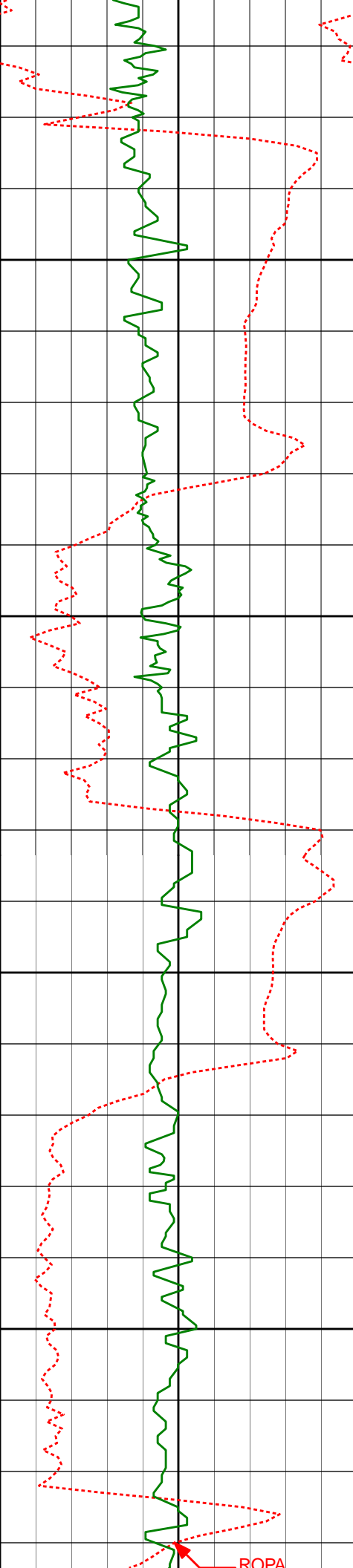
173.14°

3787.76'

14.05'

ROPA

PGRC



3900'

3923'

11.15°

166.36°

3880.57'

18.15'

3950'

4000'

4018'

8.77°

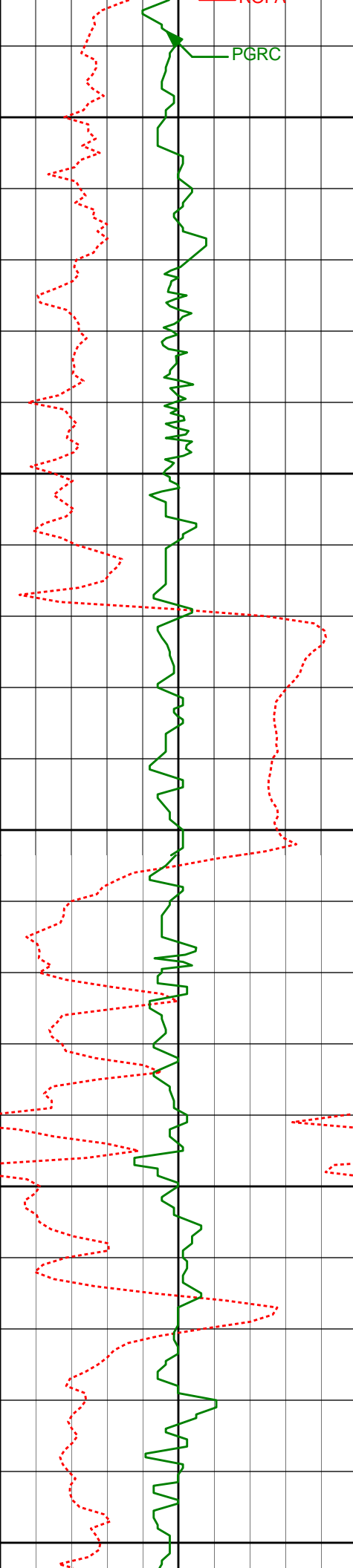
176.11°

3974.14'

21.30'

4050'

ROPA



4100'

4112'

8.43°

171.27°

4067.08'

23.26'

4150'

4200'

4207'

5.87°

183.93°

4161.34'

24.35'

4250'

4300'

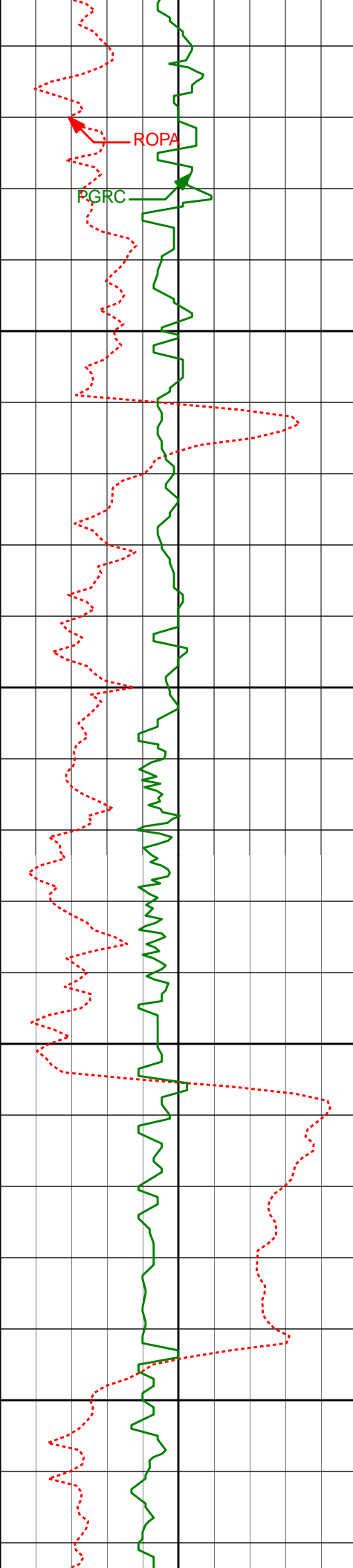
4302'

4.51°

179.33°

4255.95'

24.32'



ROPA

PGRC

4350'

4400'

4450'

4500'

4397'

3.83°

176.73°

4350.70'

24.76'

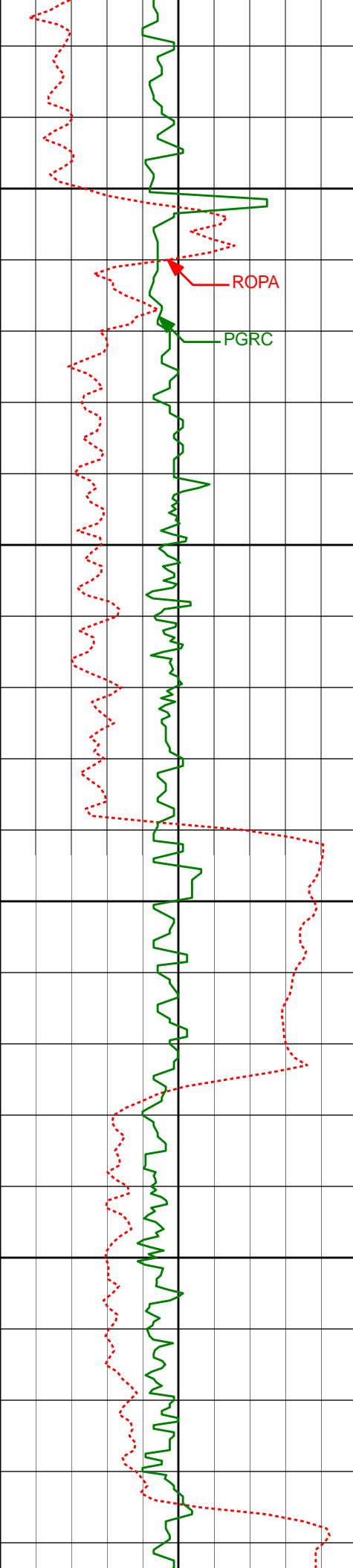
4491'

2.47°

196.13°

4444.56'

24.53'



4550'

ROPA

PGRC

4600'

4650'

4700'

4586'

2.52°

205.87°

4539.47'

23.17'

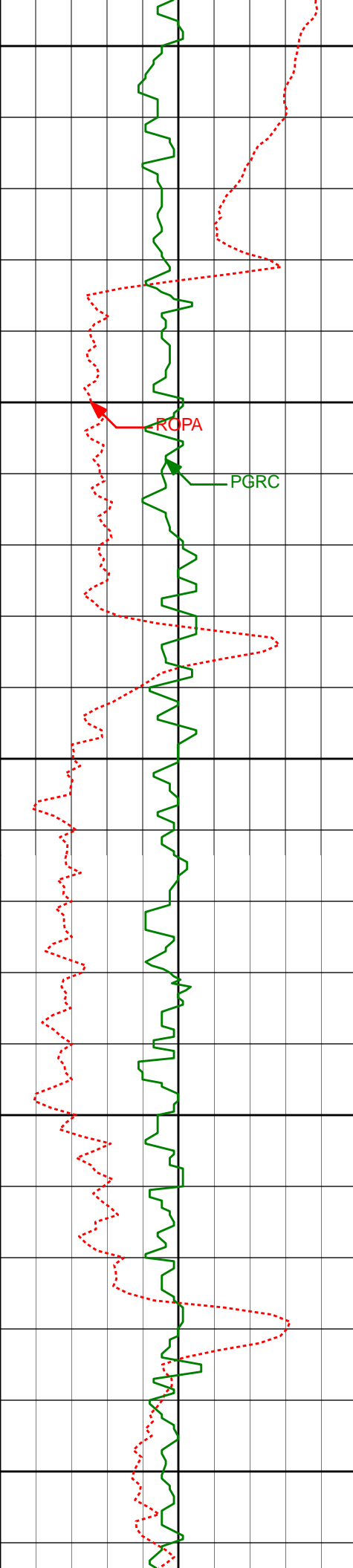
4681'

3.10°

233.43°

4634.36'

20.30'



4750'

4776'

1.07°

268.25°

4729.29'

17.40'

4800'

RCPA

PGRC

4850'

4871'

0.94°

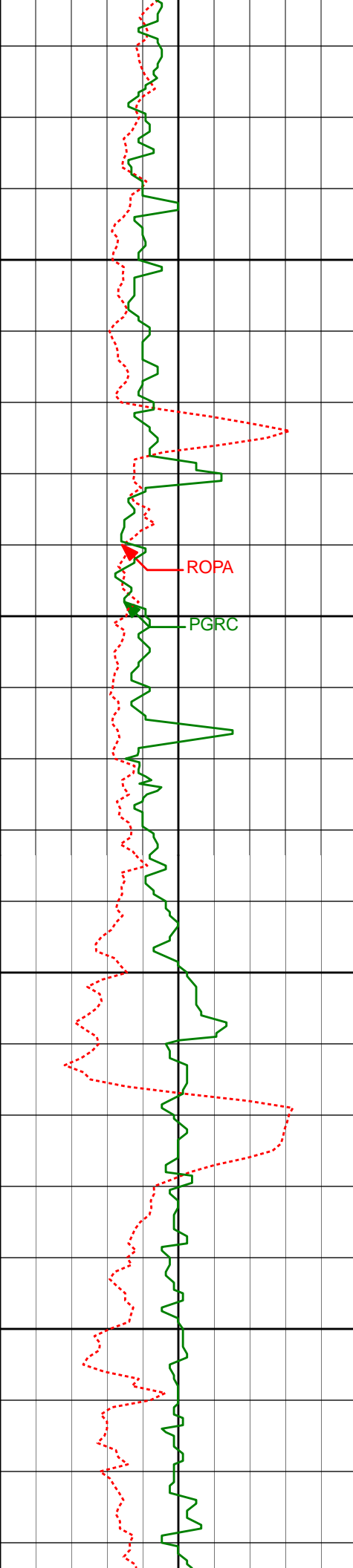
261.96°

4824.28'

15.75'

4900'

4950'



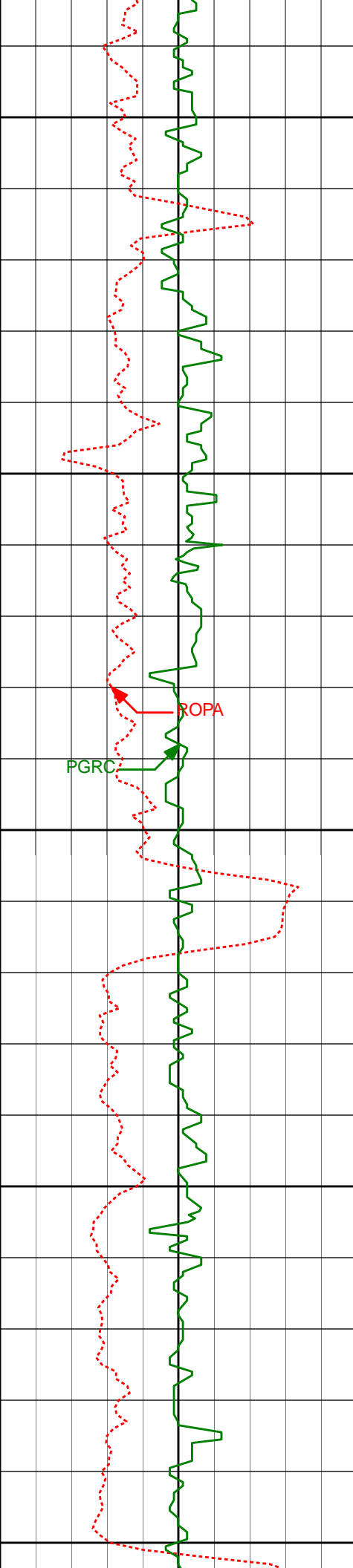
5000'

5050'

5100'

5150'

4966'	0.83°	240.00°	4919.27'	14.39'
5060'	0.99°	221.87°	5013.25'	13.29'
5155'	1.03°	234.31°	5108.24'	12.09'



5200'

5250'

5300'

5350'

5400'

PGRC

ROPA

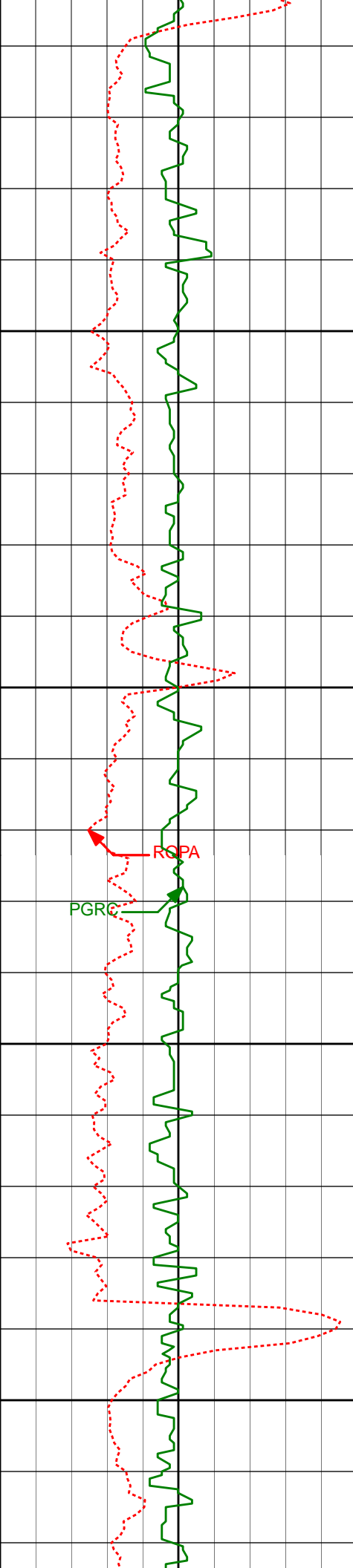
5343'

1.08°

279.88°

5296.21'

8.99'



5450'

5500'

5550'

5600'

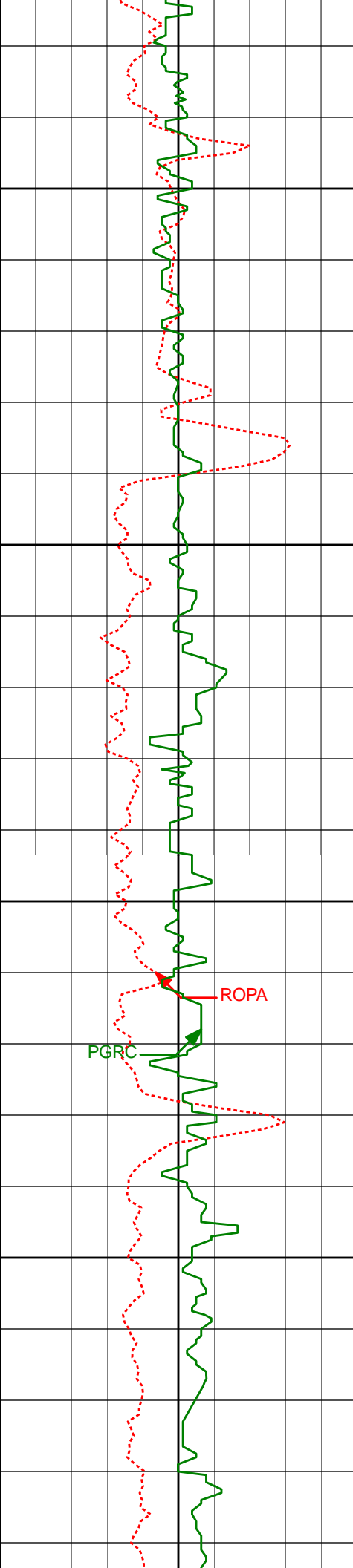
5438'

0.29°

202.63°

5391.20'

8.02'



5650'

5700'

5750'

5800'

ROP

PGRC

5627'

0.74°

136.13°

5580.20'

8.72'

5722'

0.83°

132.13°

5675.19'

9.68'

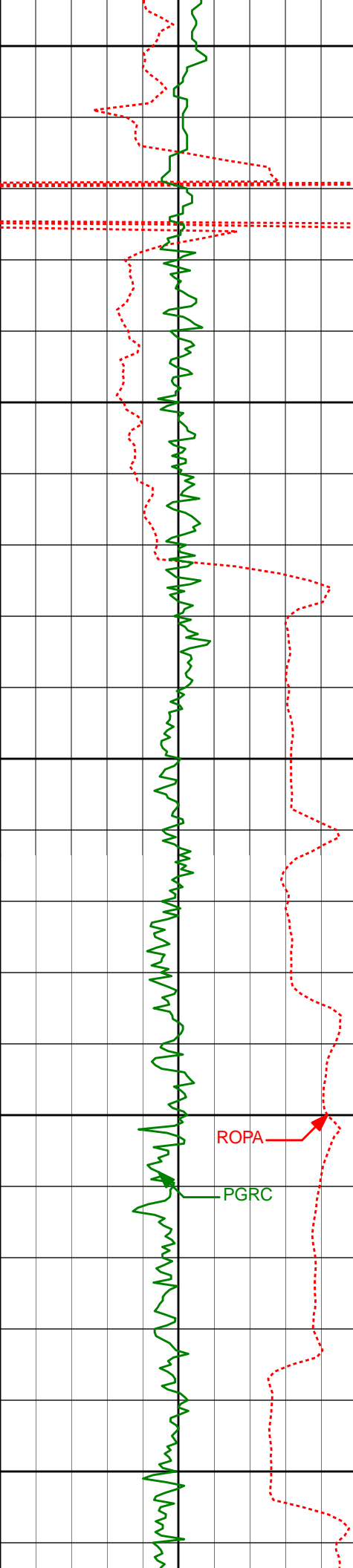
5817'

0.71°

121.48°

5770.18'

10.72'



5850'

5870'

0.52°

152.60°

5823.18'

11.12'

5900'

5950'

6000'

6004'

3.38°

93.89°

5957.10'

15.24'

6050'

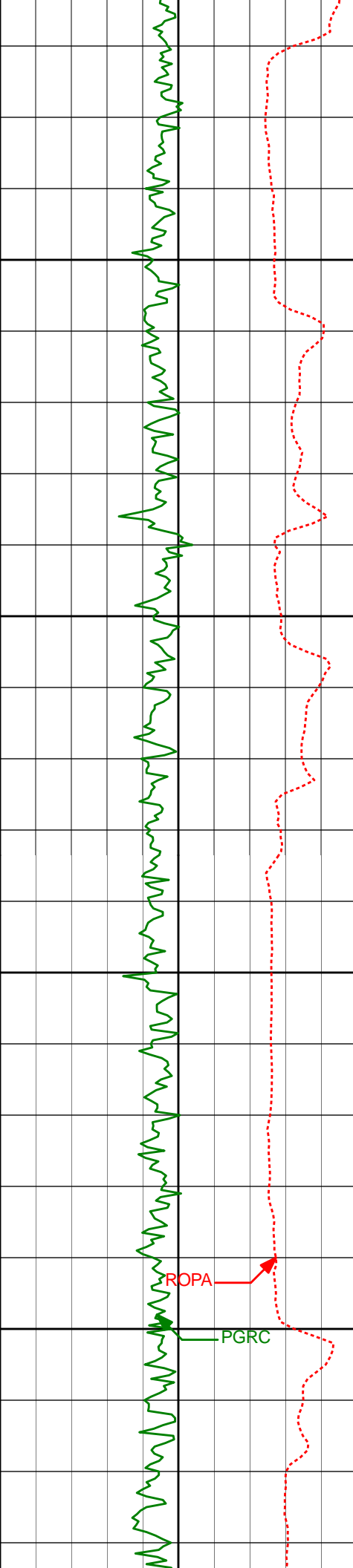
6049'

7.73°

91.53°

6002.04'

19.16'



6100'

6150'

6200'

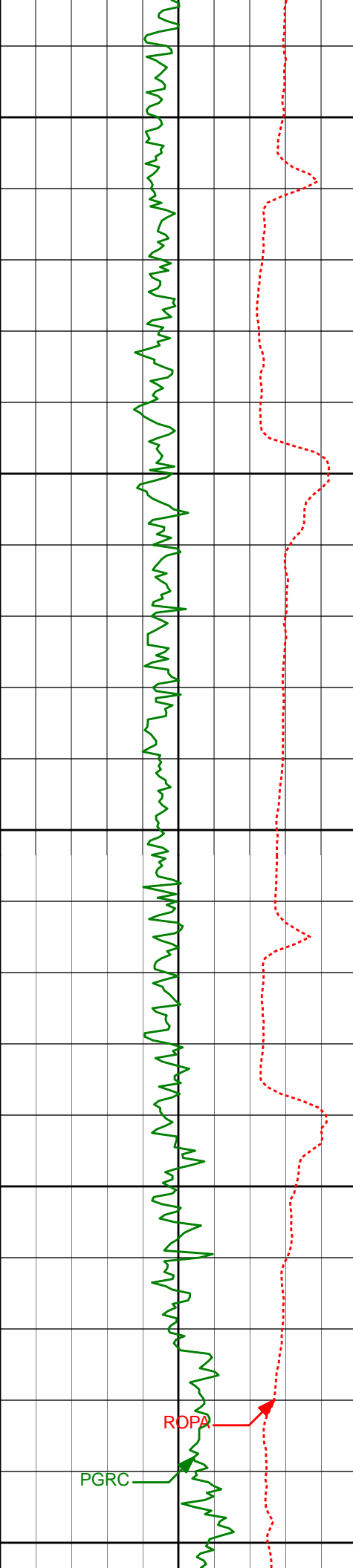
6250'

ROPA
PGRC

6093'	8.65°	89.50°	6045.78'	25.27'
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6182'	13.51°	87.49°	6132.66'	41.19'
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6270'	18.30°	90.99°	6218.00'	63.90'
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6300'

6350'

6400'

6450'

6500'

6358'

23.60°

84.76°

6301.23'

93.41'

6448'

32.13°

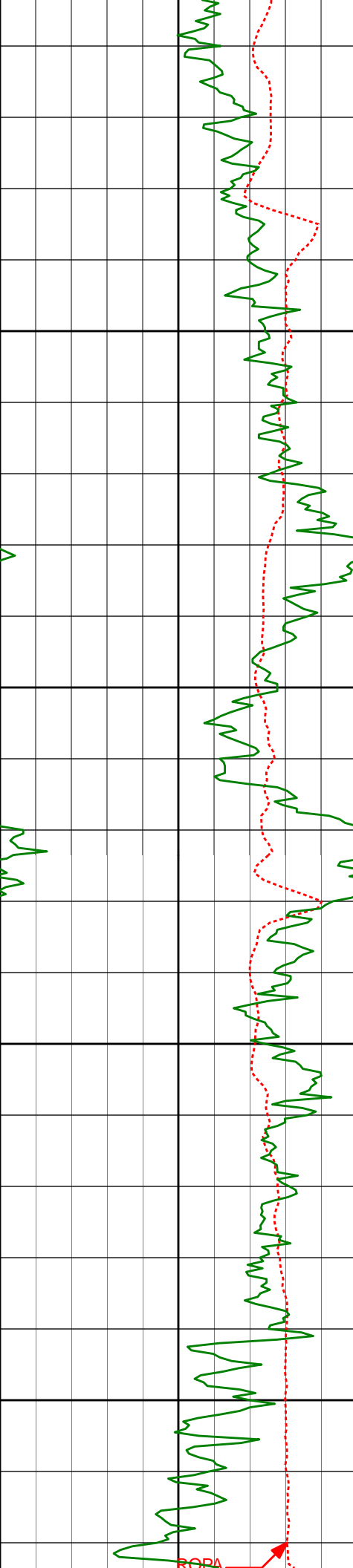
87.74°

6381.92'

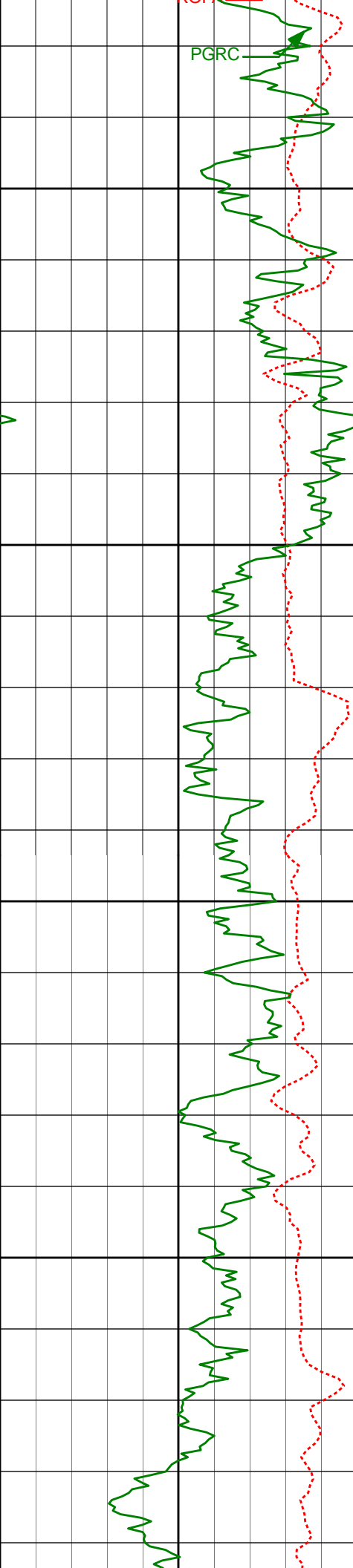
131.28'

ROPA

PGRC



6537'	49.81°	91.34°	6455.04'	182.04'
6550'				
6600'				
6626'	59.97°	93.95°	6512.65'	250.01'
6650'				
6700'				
6715'	59.84°	91.29°	6558.49'	325.46'



6750'

6800'

6850'

6900'

6804'

67.76°

89.00°

6602.36'

403.20'

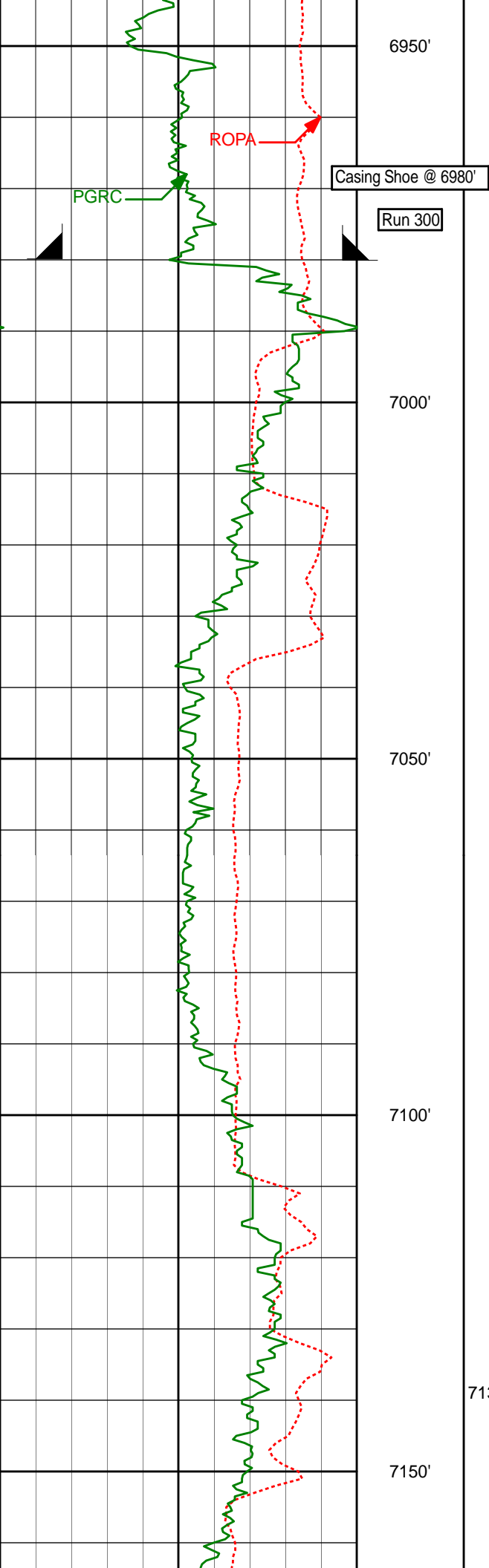
6875'

82.15°

89.34°

6631.14'

468.48'



7139'

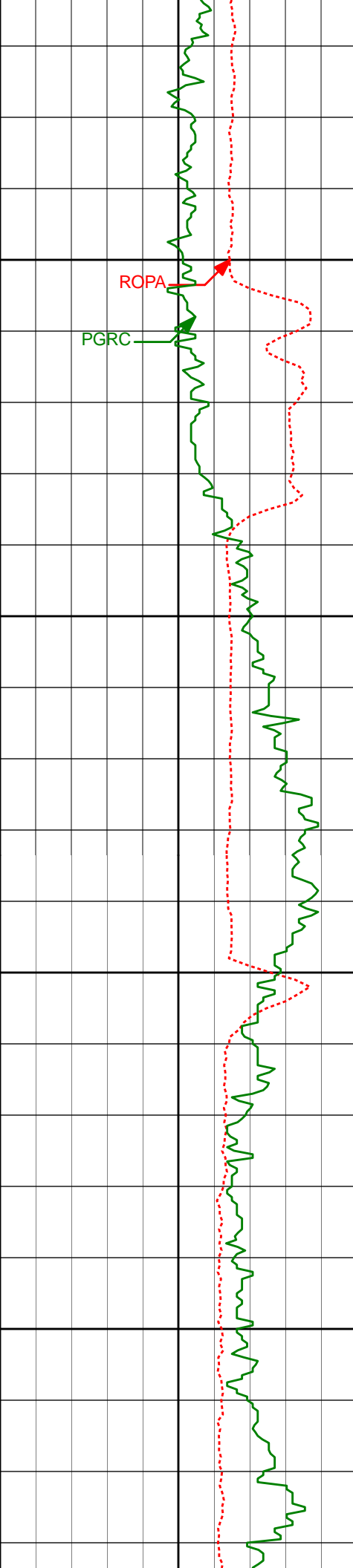
91.02°

85.42°

6657.49'

729.17'

7150'



7200'

7250'

7300'

7350'

7234'

88.12°

86.23°

6658.21'

823.65'

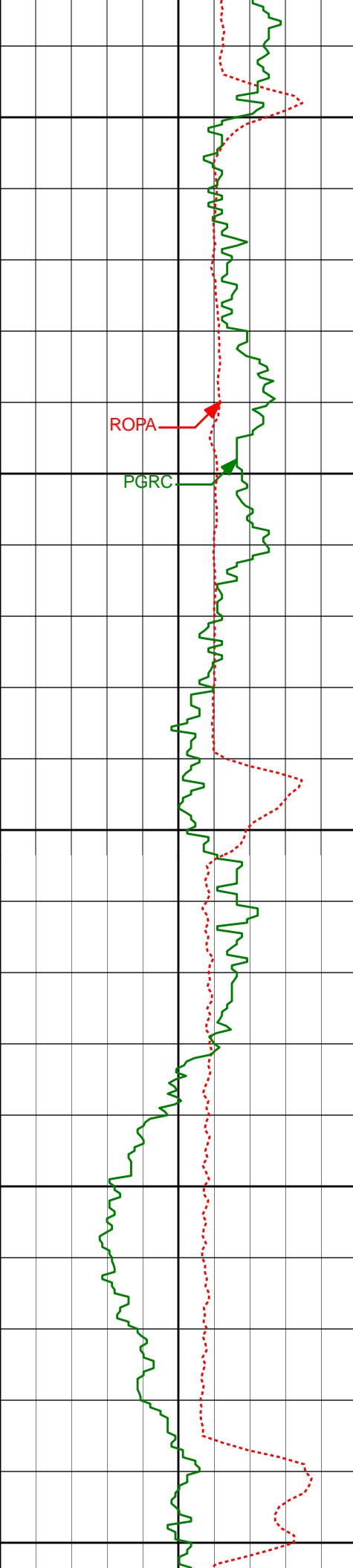
7329'

88.09°

86.29°

6661.35'

918.16'



7400'

7423'

88.09°

86.42°

6664.48'

1011.69'

ROPA

PGRC

7450'

7500'

7518'

88.24°

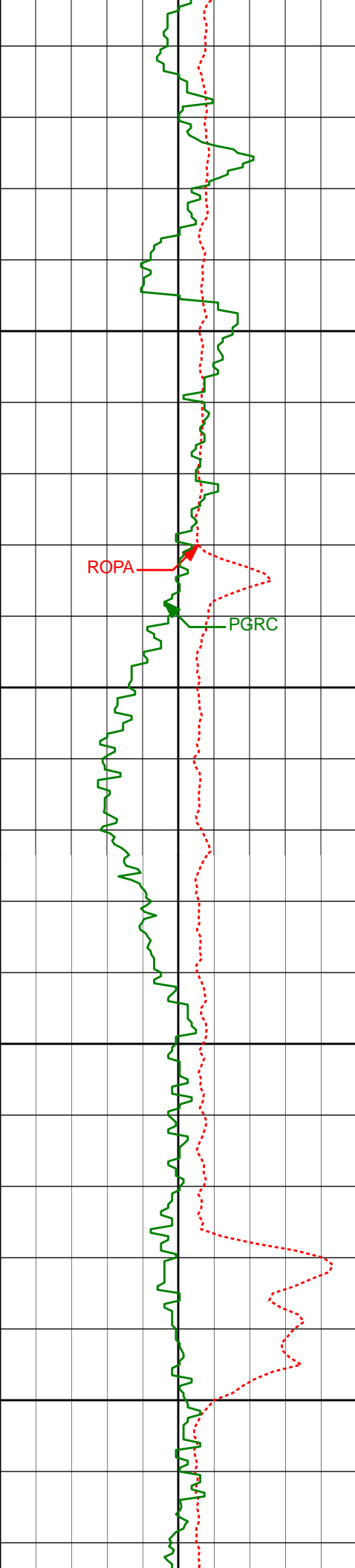
85.70°

6667.52'

1106.17'

7550'

7600'



7650'

7700'

7750'

7800'

7613'

89.63°

86.79°

6669.29'

1200.71'

7708'

90.15°

86.59°

6669.47'

1295.34'

7803'

91.30°

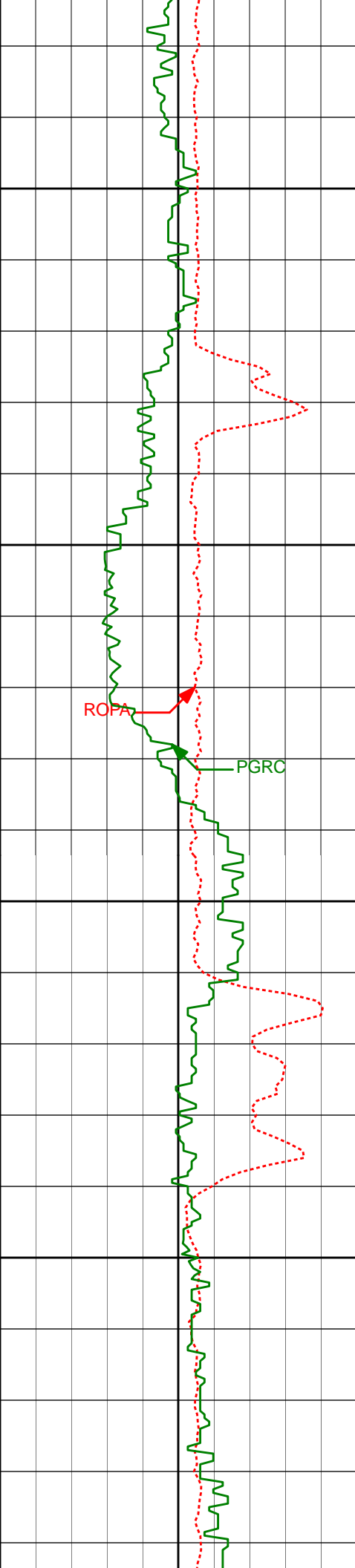
87.75°

6668.27'

1390.02'

ROPA

PGRC



7850'

7900'

7950'

8000'

7897'

91.76°

89.20°

6665.76'

1483.83'

7992'

90.00°

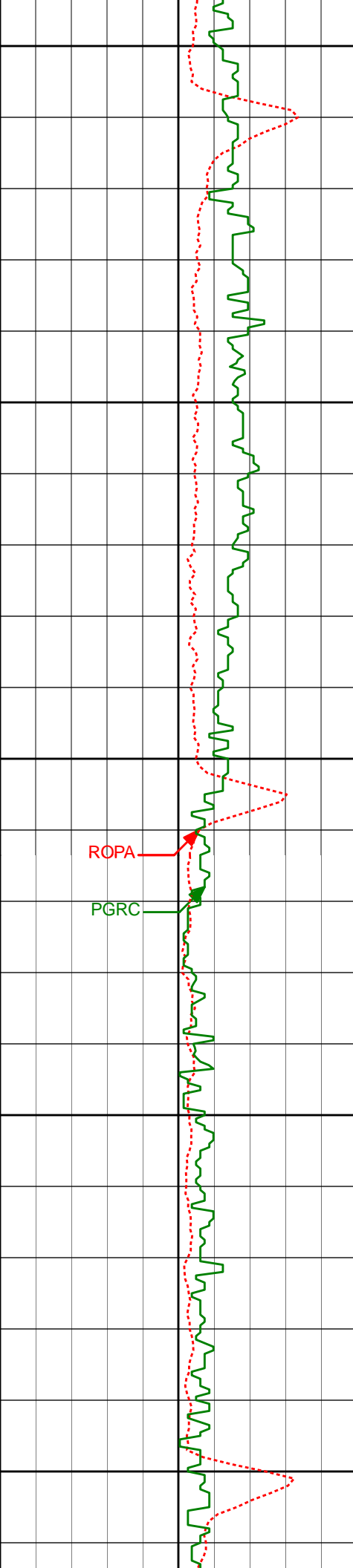
90.09°

6664.30'

1578.75'

ROFA

PGRC



8050'

8087'

89.78°

89.71°

6664.48'

1673.70'

8100'

8150'

ROPA

PGRC

8182'

90.52°

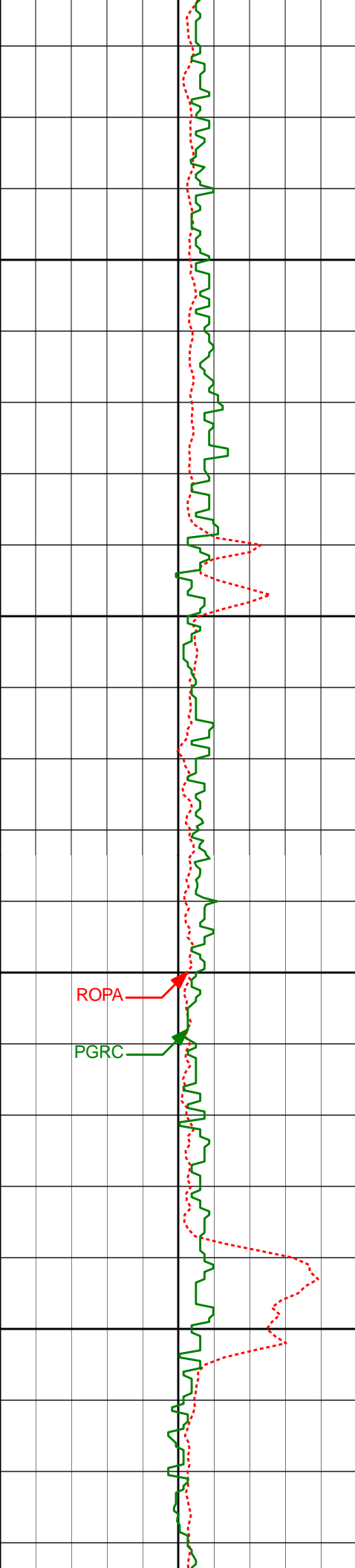
88.90°

6664.23'

1768.61'

8200'

8250'



8300'

8350'

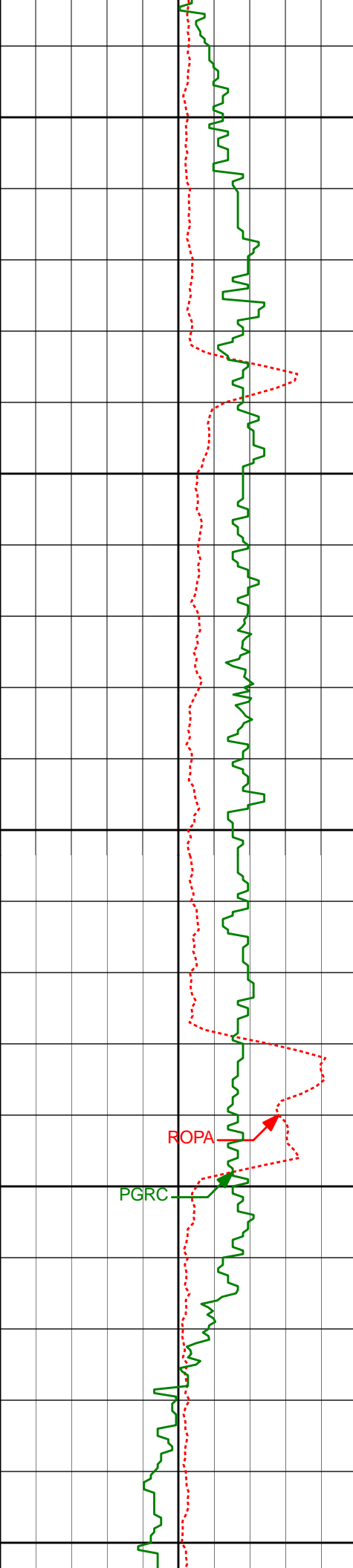
8400'

8450'

ROPA

PGRC

8277'	90.52°	88.43°	6663.37'	1863.47'
8372'	90.37°	88.09°	6662.63'	1958.29'
8466'	90.52°	88.90°	6661.90'	2052.13'



8500'

8550'

8600'

8650'

8700'

8561'

90.59°

88.50°

6660.98'

2146.99'

8656'

89.51°

89.88°

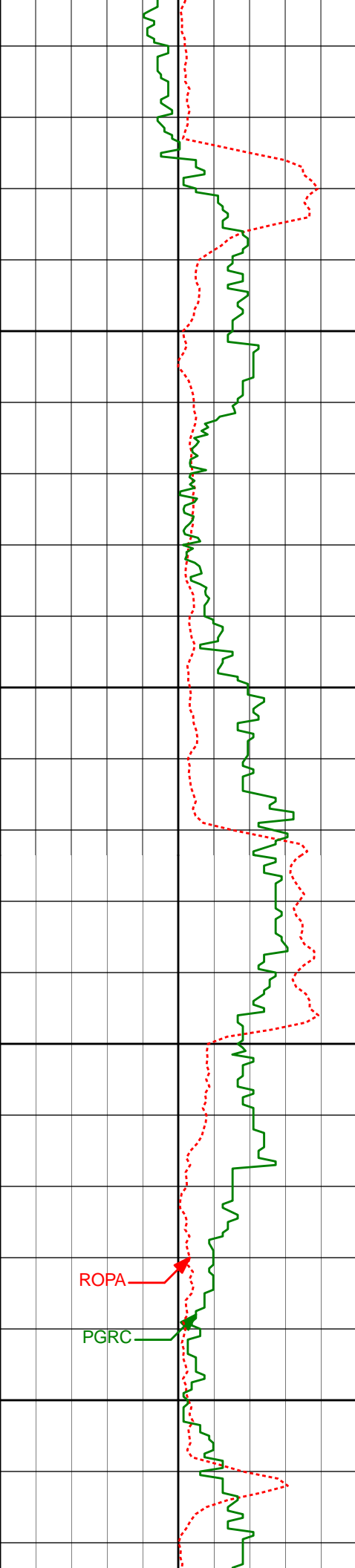
6660.90'

2241.89'

ROPA

PGRC





8750'

8751'

91.97°

90.95°

6659.67'

2336.85'

8800'

8850'

8846'

89.04°

90.51°

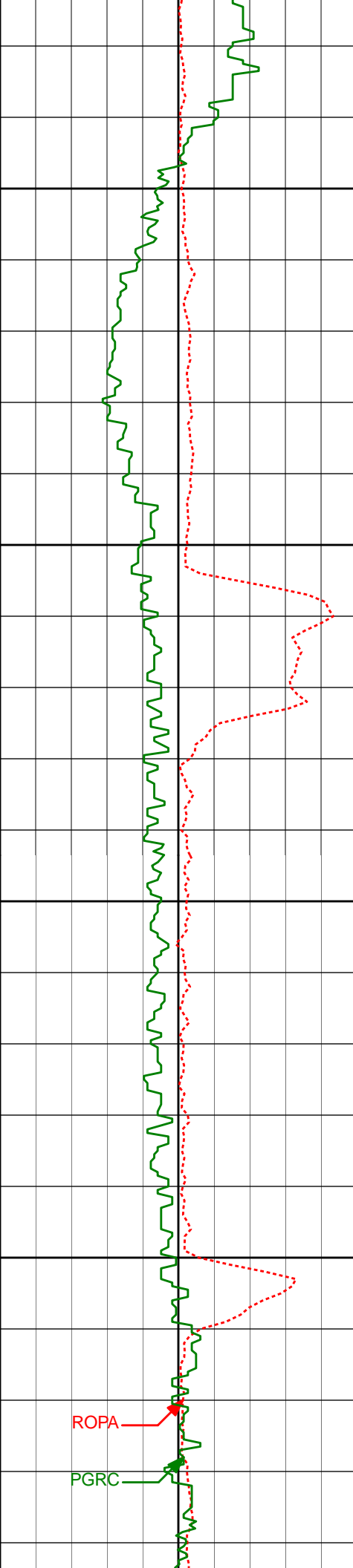
6658.84'

2431.82'

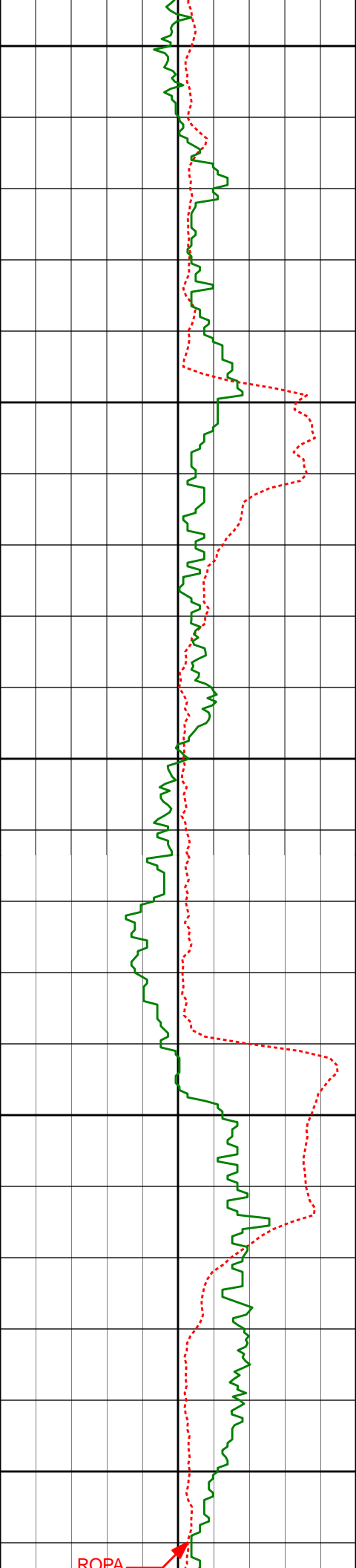
8900'

ROPA

PGRC



8941'	88.89°	90.51°	6660.55'	2526.78'
8950'				
9000'				
9036'	90.15°	90.21°	6661.35'	2621.75'
9050'				
9100'				
9131'	89.94°	90.43°	6661.27'	2716.72'



9150'

9200'

9250'

9300'

9350'

9225'

91.94°

90.17°

6659.73'

2810.67'

9320'

91.36°

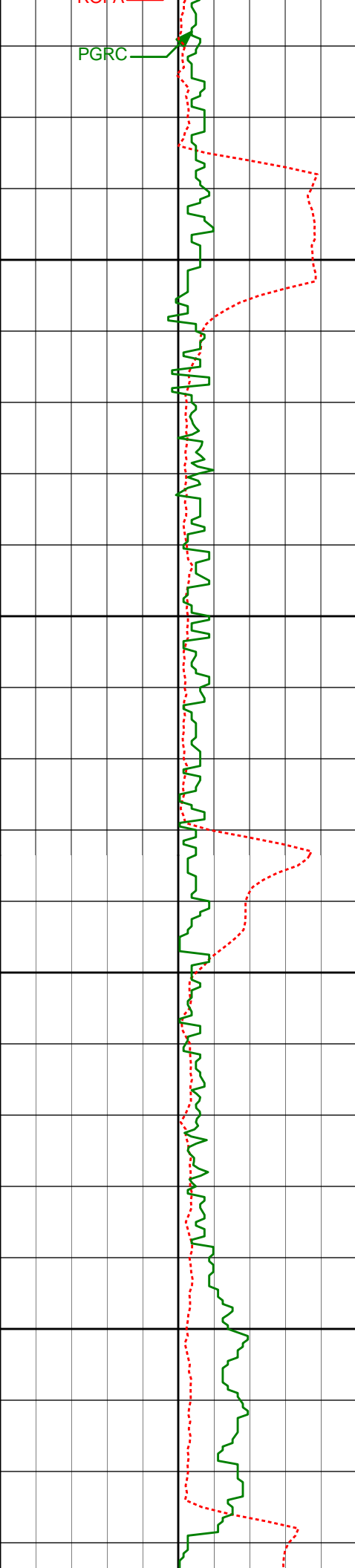
89.07°

6657.00'

2905.56'

ROPA





9400'

9415'

89.41°

88.69°

6656.36'

3000.44'

9450'

9500'

9510'

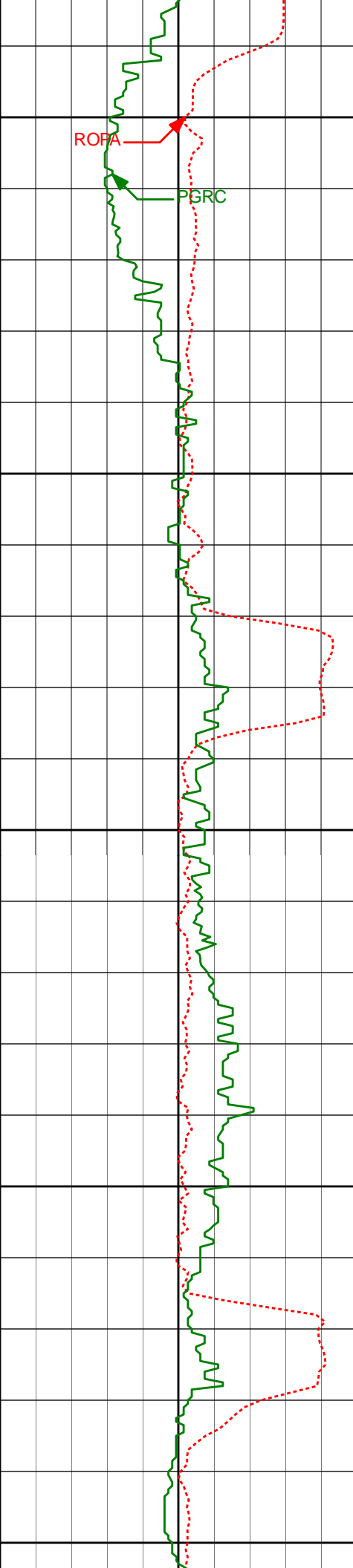
89.78°

88.69°

6657.03'

3095.30'

9550'



9600'

9605'

89.66°

88.22°

6657.49'

3190.14'

9650'

9700'

9700'

90.34°

87.48°

6657.49'

3284.92'

9750'

9795'

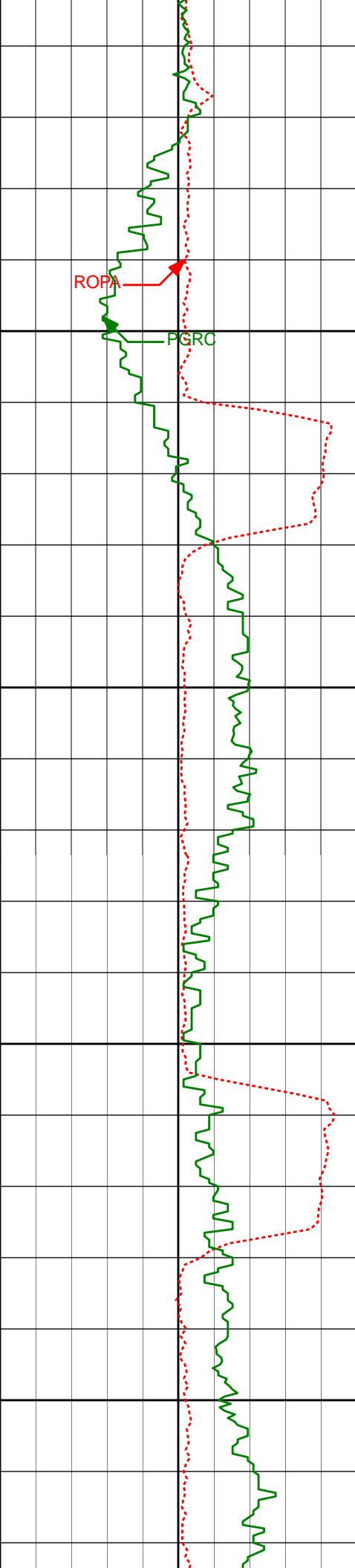
92.62°

88.60°

6655.04'

3379.68'

9800'



ROPA

PGRC

9850'

9900'

9950'

10000'

9889'

91.88°

88.28°

6651.35'

3473.45'

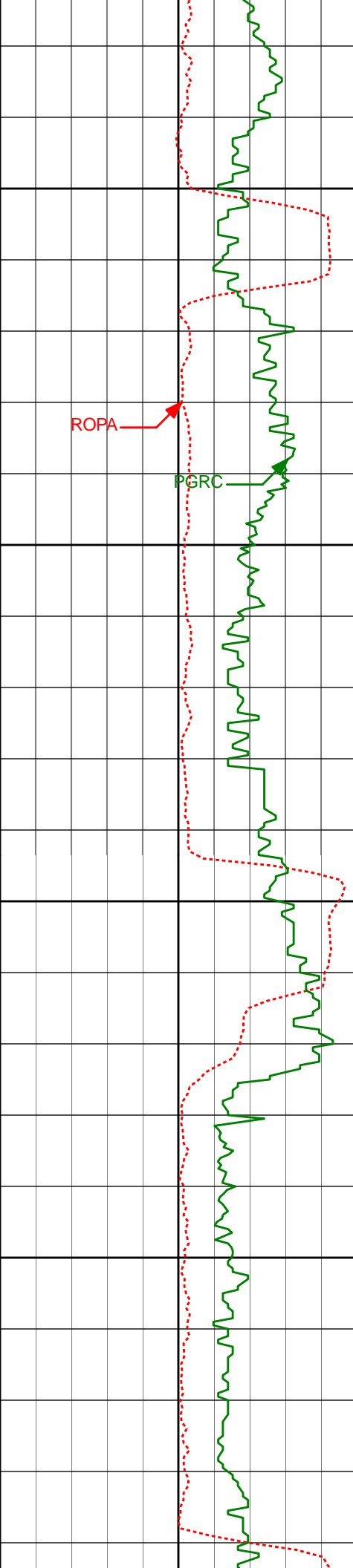
9984'

90.86°

89.81°

6649.08'

3568.31'



10050'

10100'

10150'

10200'

10079'

91.60°

88.02°

6647.04'

3663.16'

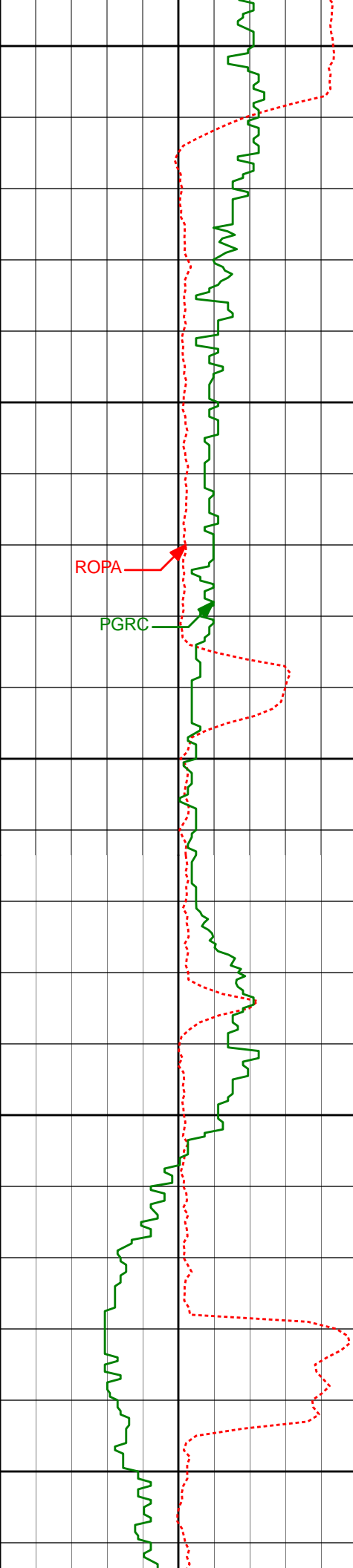
10174'

91.32°

88.95°

6644.62'

3757.98'



10250'

10269'

88.52°

88.13°

6644.75'

3852.82'

10300'

ROPA

PGRC

10350'

10364'

88.86°

87.84°

6646.92'

3947.59'

10400'

10450'

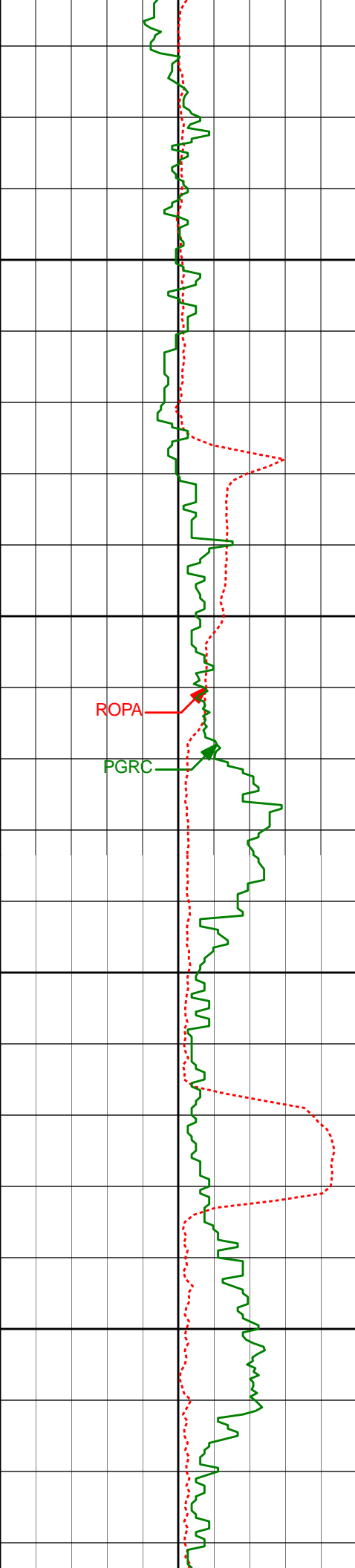
10459'

89.51°

88.10°

6648.27'

4042.37'



10500'

10550'

10600'

10650'

10551'

10643'

89.48°

90.89°

88.09°

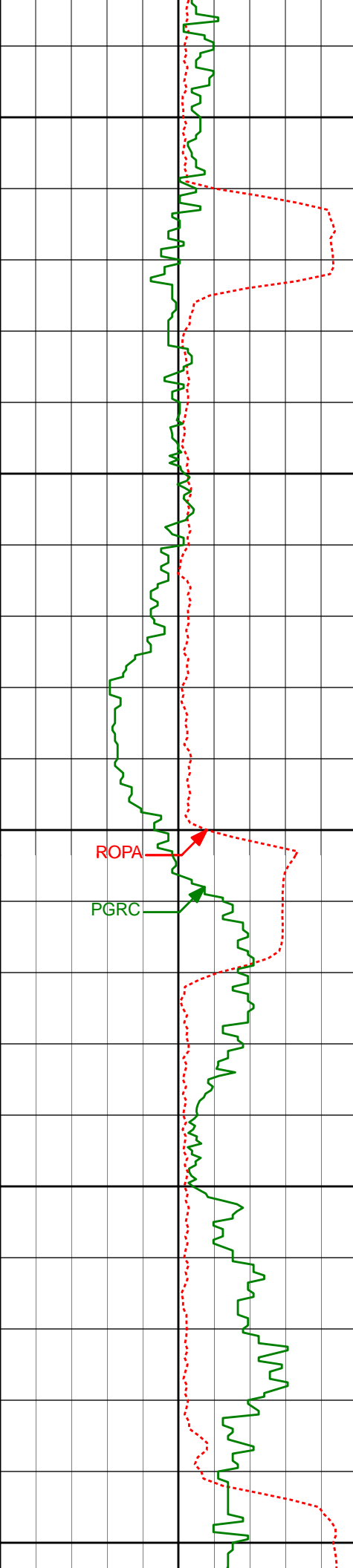
87.76°

6649.08'

6648.79'

4134.18'

4225.97'



10700'

10736'

91.57°

88.63°

6646.79'

4318.76'

10750'

10800'

ROPA

PGRC

10828'

92.56°

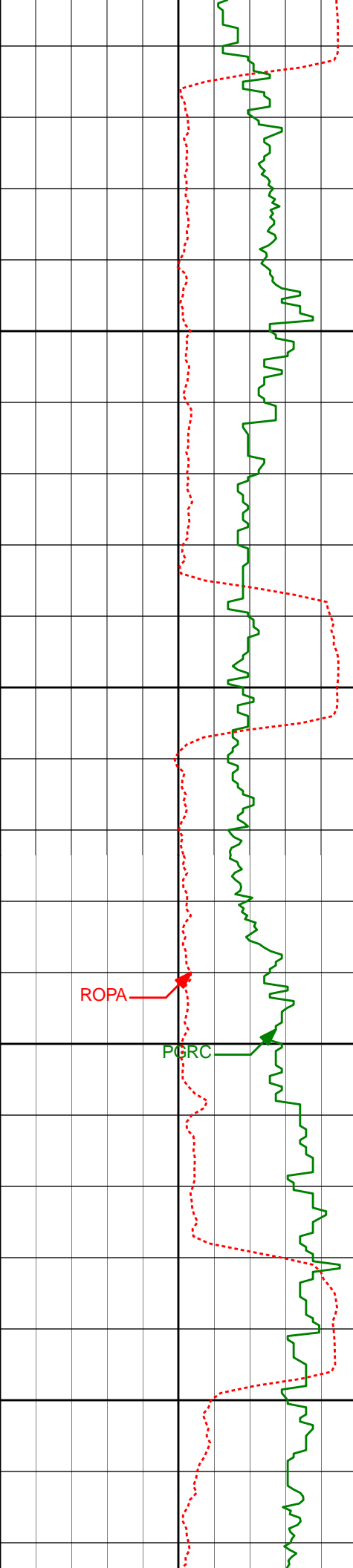
87.86°

6643.48'

4410.53'

10850'

10900'



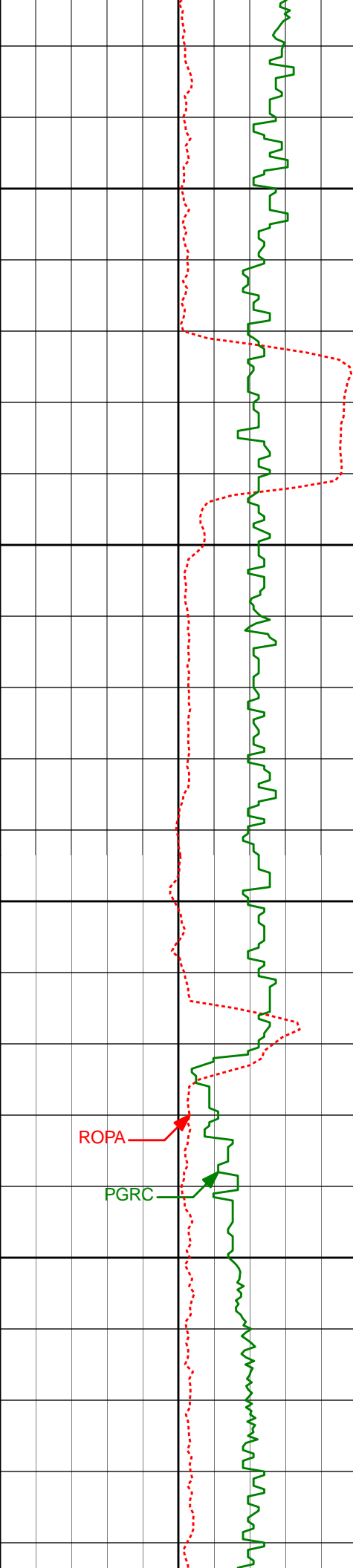
10950'

11000'

11050'

11100'

10921'	91.79°	89.08°	6639.95'	4503.31'
11014'	91.57°	90.34°	6637.22'	4596.21'
11107'	90.77°	90.35°	6635.32'	4689.16'



11150'

11200'

11250'

ROPA

PGRC

11300'

11200'

11292'

89.54°

90.89°

90.71°

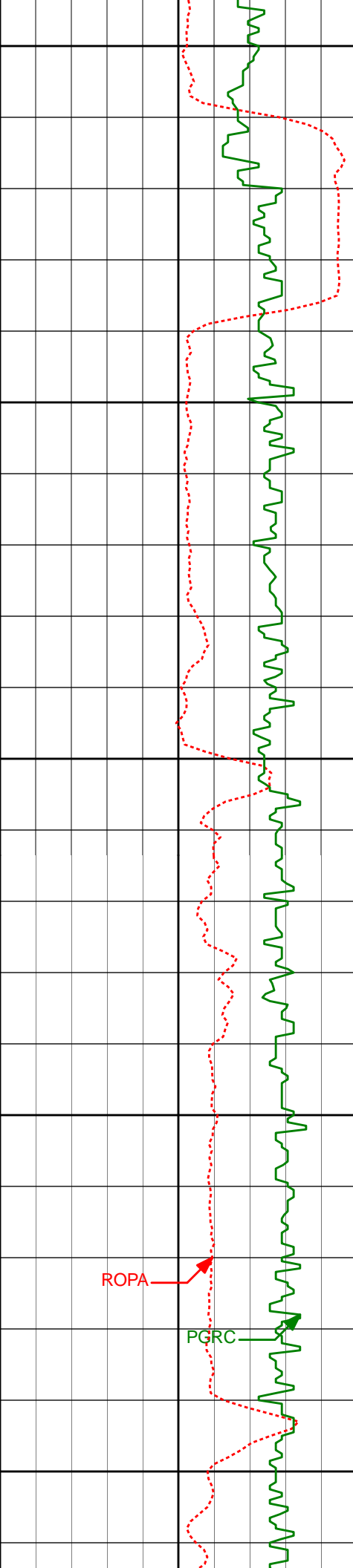
91.37°

6635.07'

6634.72'

4782.13'

4874.12'



11350'

11385'

89.17°

88.78°

6634.68'

4967.07'

11400'

11450'

11477'

89.48°

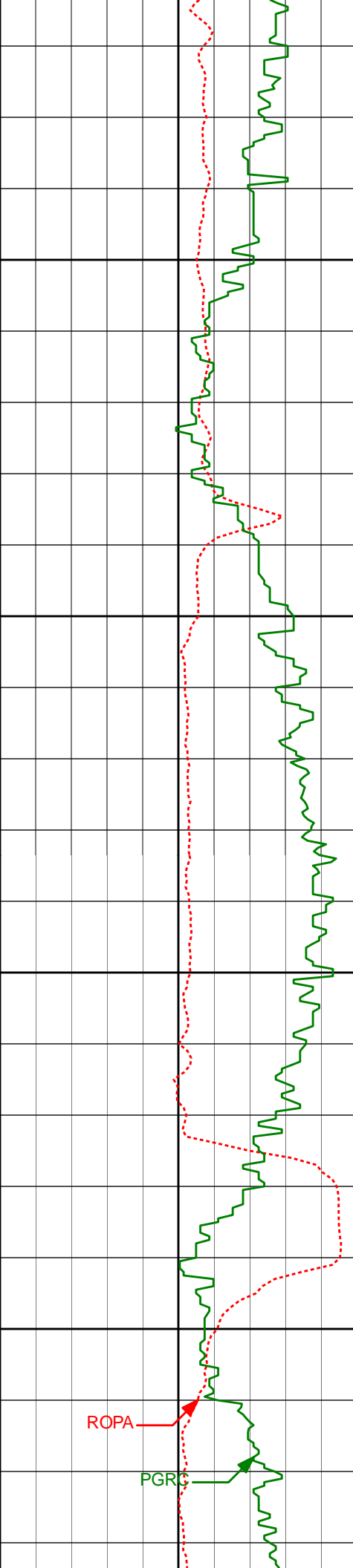
88.51°

6635.76'

5058.93'

11500'

11550'



11600'

11650'

11700'

11750'

11571'

89.97°

88.16°

6636.21'

5152.76'

11664'

91.14°

88.22°

6635.31'

5245.57'

11758'

89.48°

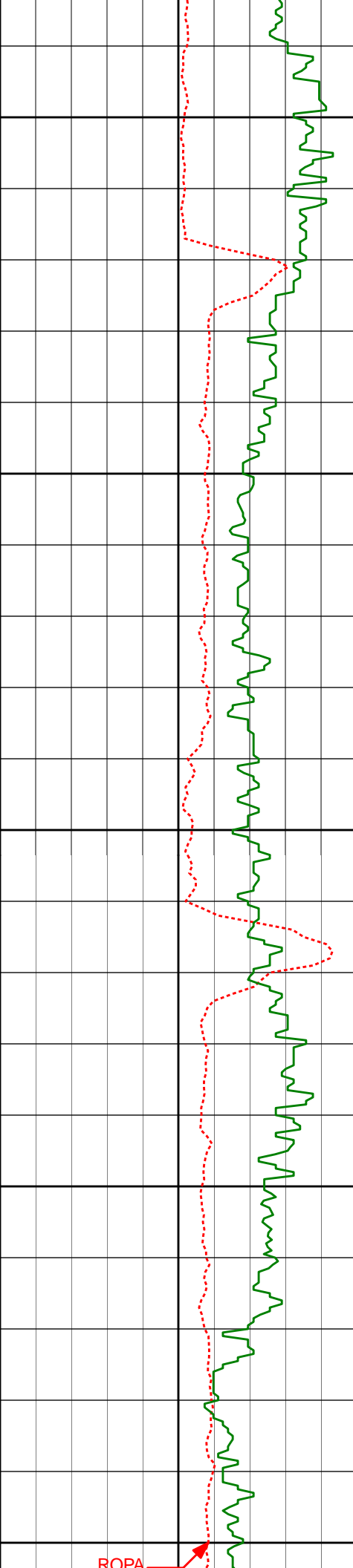
87.82°

6634.80'

5339.37'

ROPA

PGRC



11800'

11850'

11900'

11950'

12000'

11851'

89.38°

87.24°

6635.73'

5432.11'

11943'

89.08°

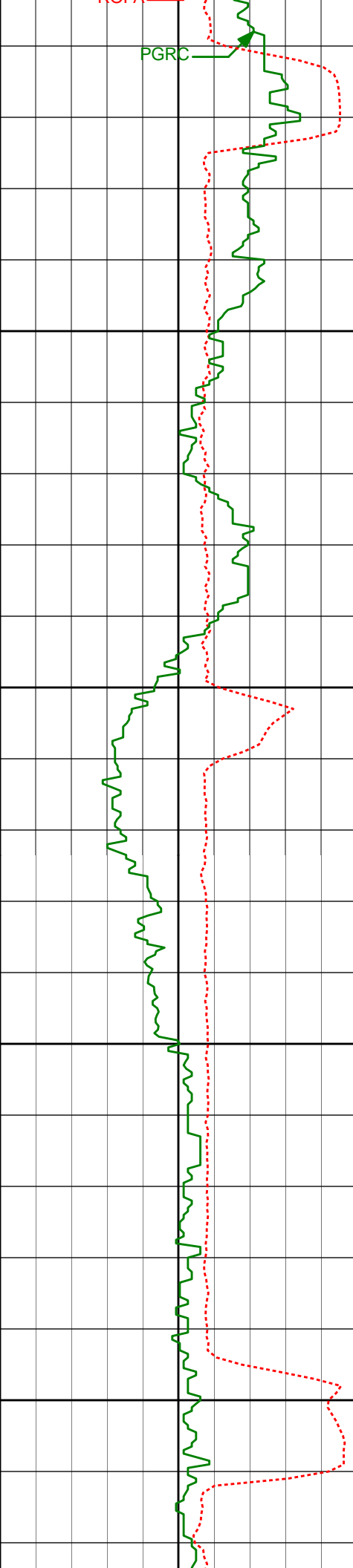
87.38°

6636.96'

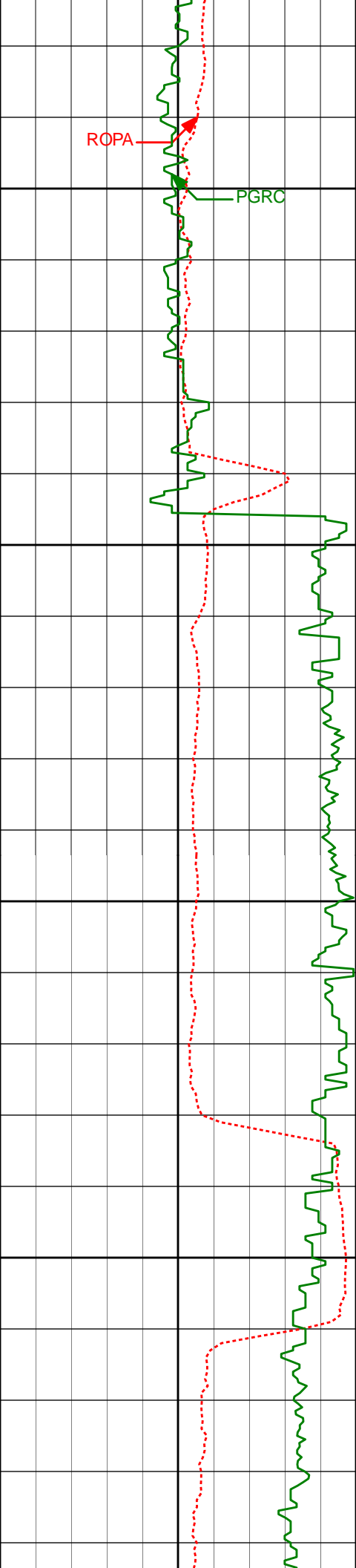
5523.82'

ROPA





12036'	90.34°	87.60°	6637.43'	5616.56'
12050'				
12100'				
12130'	90.06°	87.30°	6637.11'	5710.30'
12150'				
12200'				
12222'	91.27°	87.22°	6636.04'	5802.00'



ROPA

PGRC

12250'

12300'

12350'

12400'

12314'

92.31°

87.31°

6633.16'

5893.68'

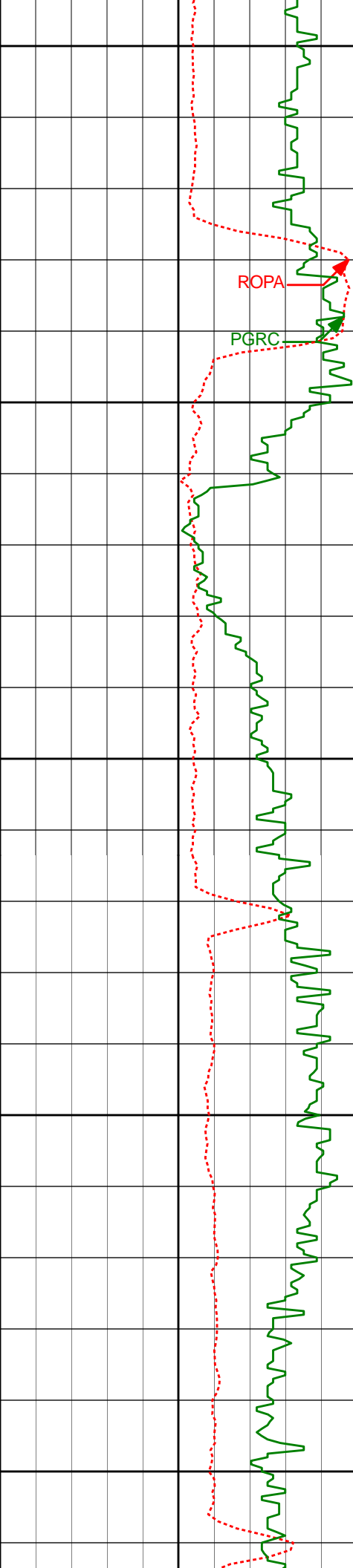
12407'

90.62°

88.93°

6630.79'

5986.45'



12450'

ROPA

PGRC

12500'

12550'

12600'

12650'

12499'

90.34°

89.97°

6630.02'

6078.37'

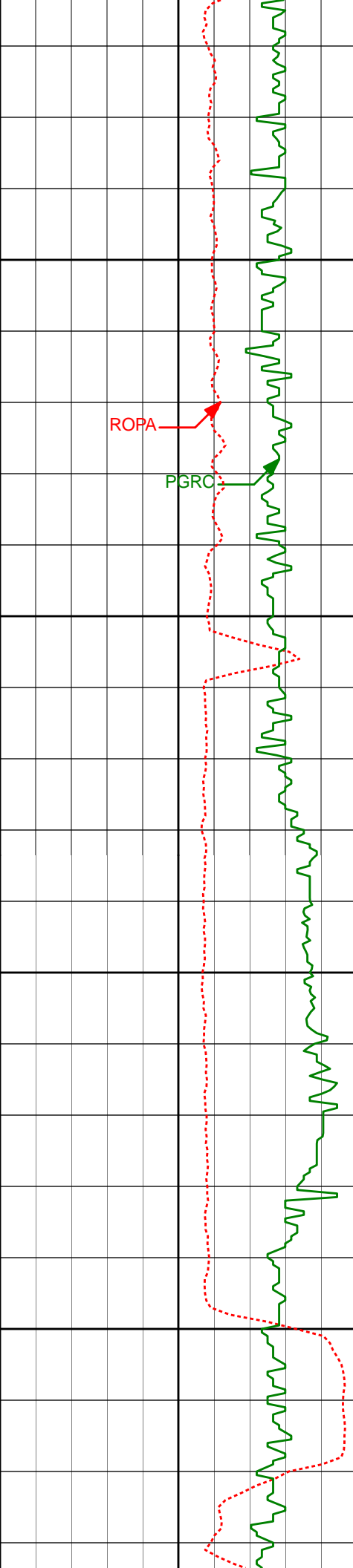
12591'

90.37°

89.43°

6629.45'

6170.31'



12700'

12750'

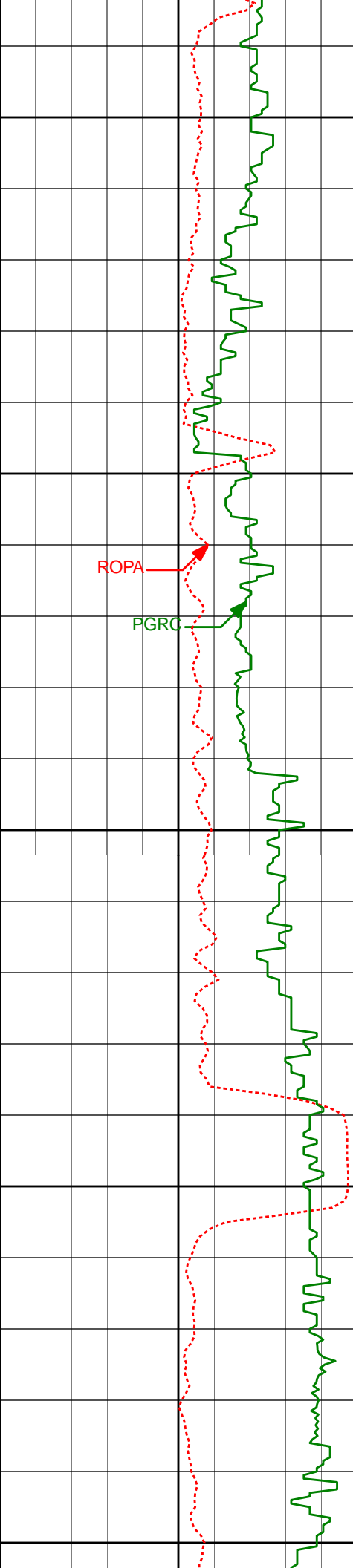
12800'

12850'

12686'	91.02°	89.13°	6628.29'	6265.21'
--------	--------	--------	----------	----------

12781'	91.45°	88.64°	6626.25'	6360.07'
--------	--------	--------	----------	----------

12875'	90.80°	89.51°	6624.40'	6453.95'
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12900'

12950'

13000'

13050'

13100'

ROPA

PGRC

12970'

91.63°

89.39°

6622.39'

6548.85'

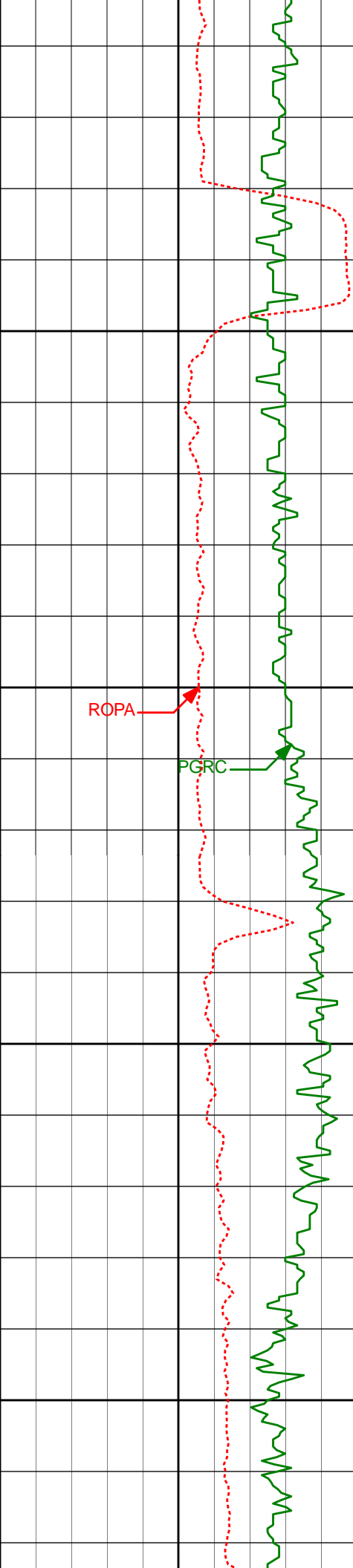
13065'

91.17°

90.32°

6620.06'

6643.77'



13150'

13165'

89.26°

89.82°

6619.69'

6743.72'

13200'

ROPA

PGRC

13250'

13260'

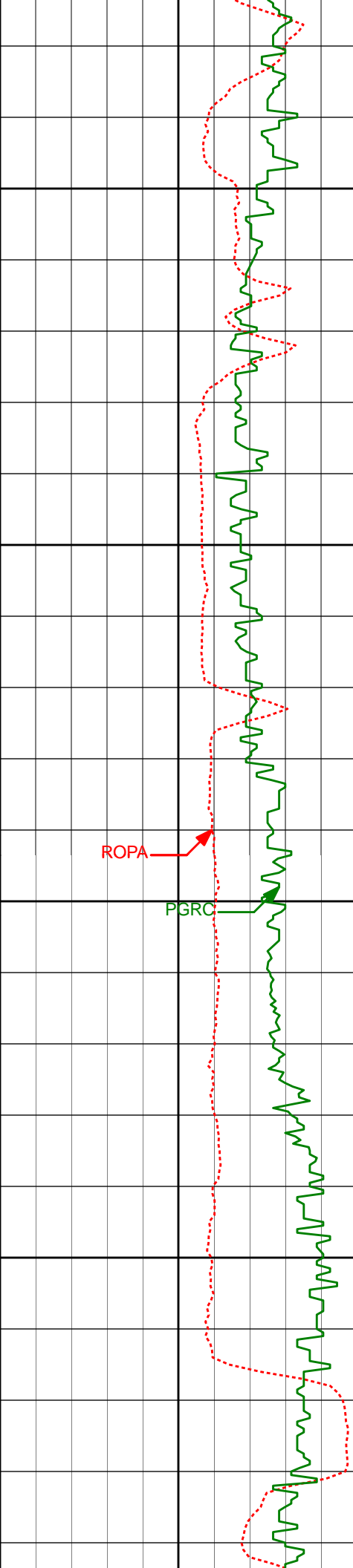
89.38°

89.49°

6620.82'

6838.65'

13300'



13350'

13400'

13450'

13500'

13355'

89.78°

89.35°

6621.51'

6933.56'

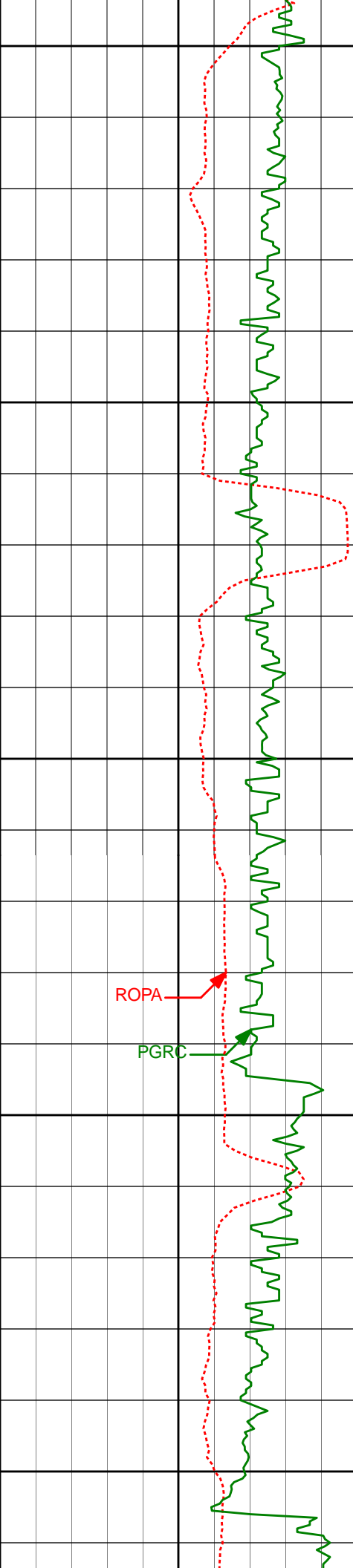
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91.33°

89.39°

6620.59'

7028.48'



13550'

13600'

13650'

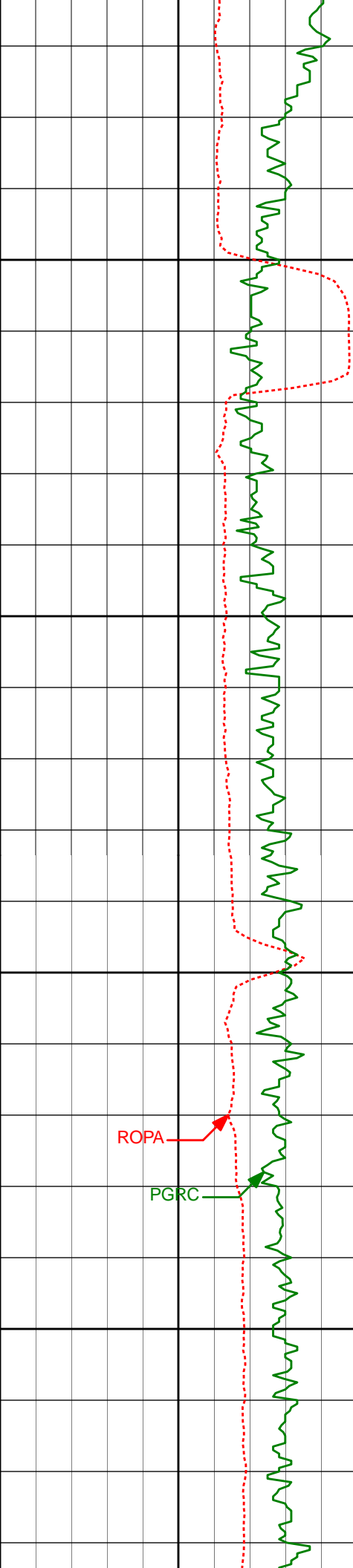
13700'

13750'

ROPA

PGRC

13545'	90.77°	89.57°	6618.85'	7123.38'
13640'	90.19°	89.71°	6618.06'	7218.31'
13735'	91.67°	89.65°	6616.51'	7313.24'



13800'

13850'

13900'

13950'

ROPA

PGRC

13829'

89.85°

88.27°

6615.27'

7407.11'

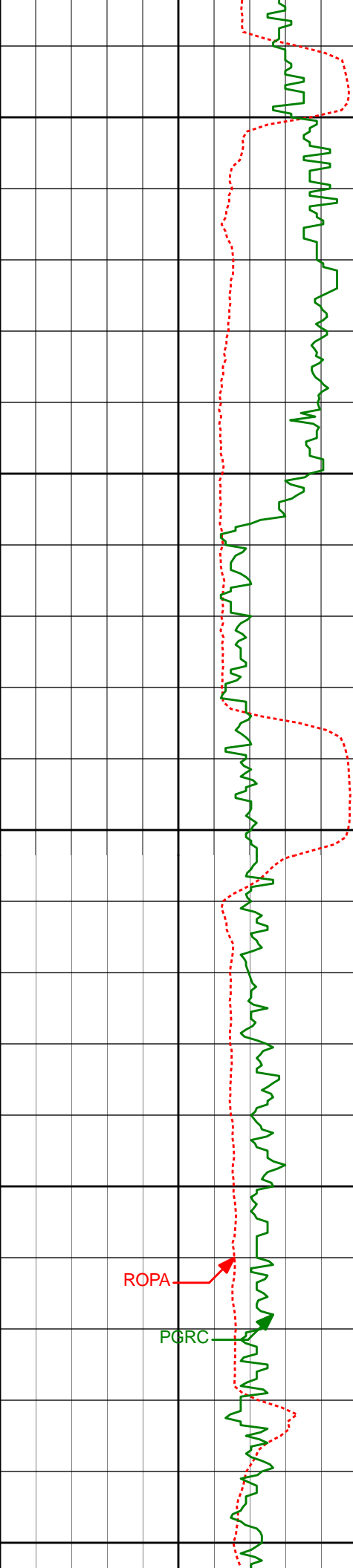
13924'

90.34°

87.84°

6615.11'

7501.91'



14000'

14019'

88.80°

87.01°

6615.82'

7596.63'

14050'

14100'

14114'

90.25°

89.31°

6616.61'

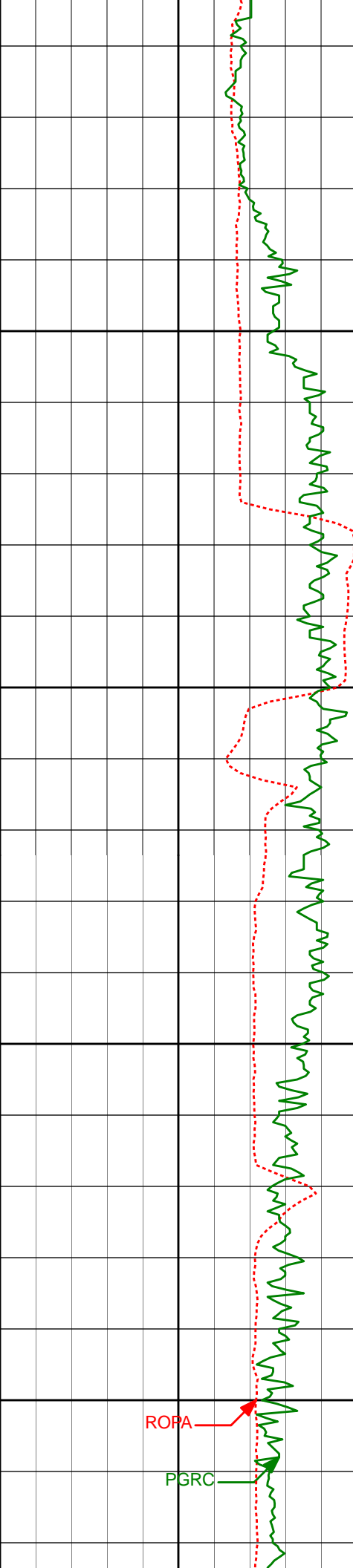
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14150'

ROPA

PGRC

14200'



14250'

14300'

14350'

14400'

14209'

91.79°

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6614.92'

7786.33'

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89.23°

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7881.21'

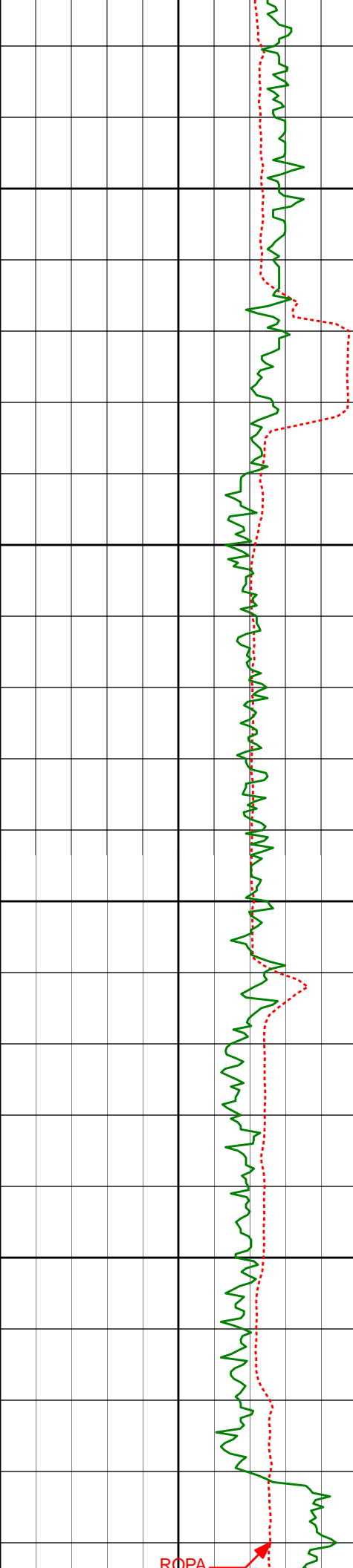
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90.15°

88.01°

6614.59'

7976.04'



14450'

14500'

14550'

14600'

14494'

89.04°

87.57°

6615.26'

8070.81'

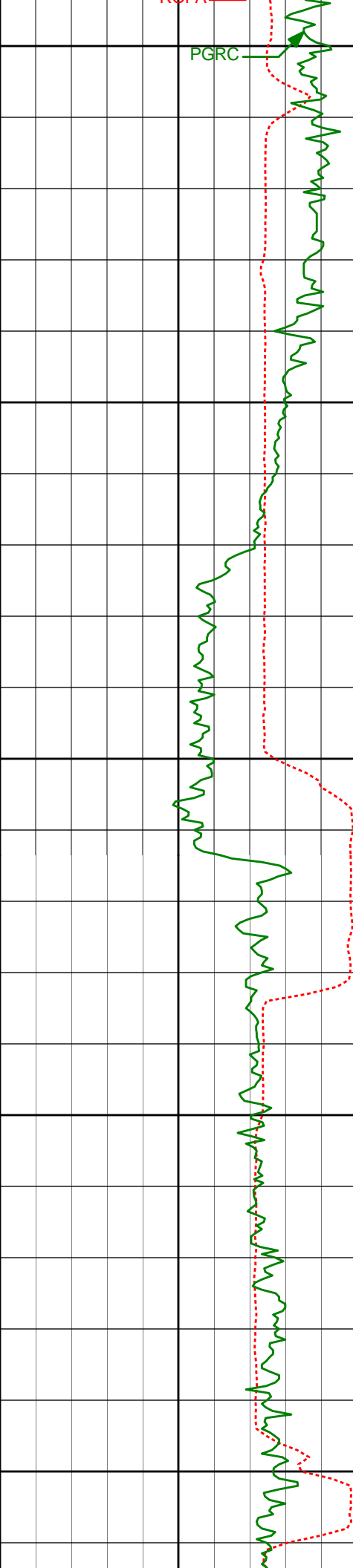
14589'

89.85°

87.35°

6616.18'

8165.53'



PGRC

K0.7A

14650'

14700'

14750'

14800'

14850'

14683'

90.74°

85.61°

6615.70'

8259.13'

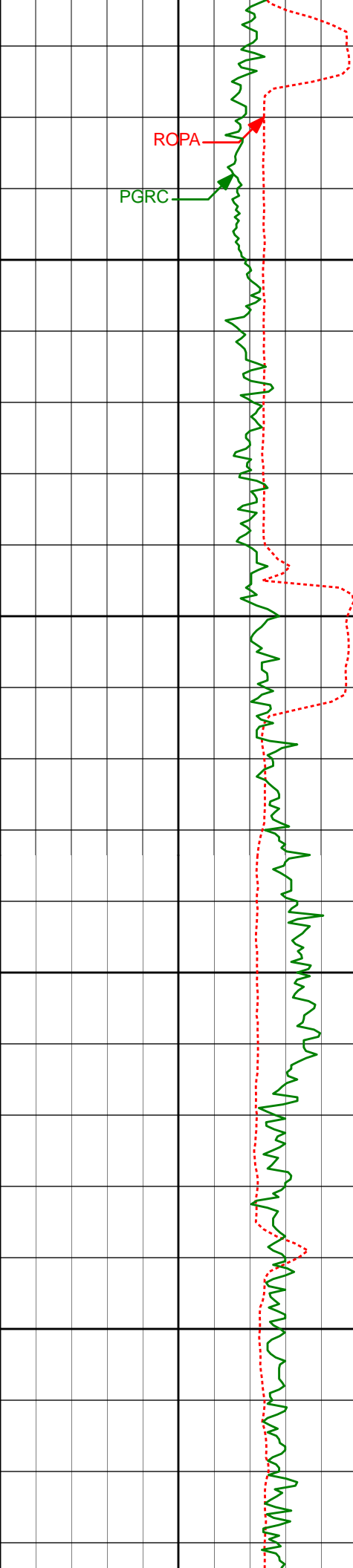
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90.43°

88.19°

6614.73'

8353.77'



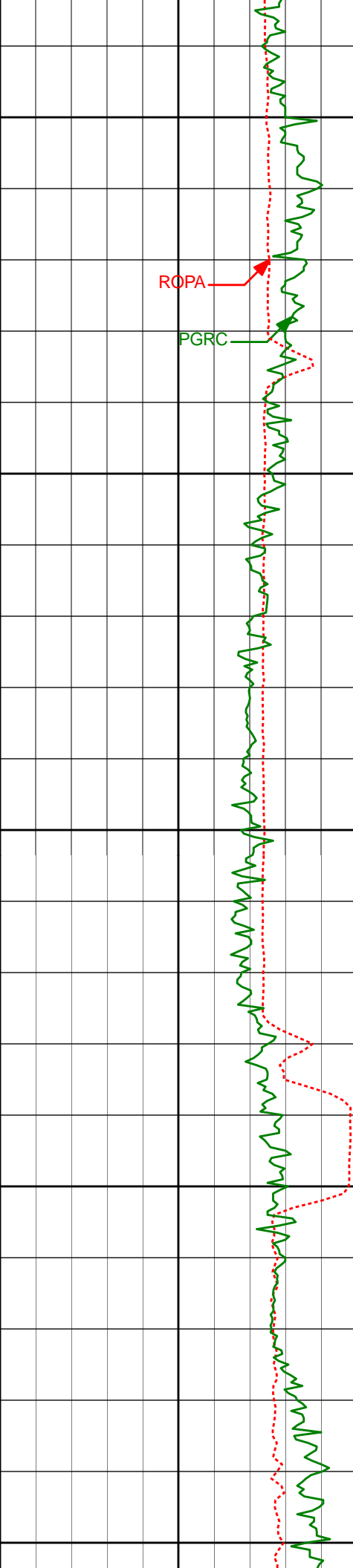
14900'

14950'

15000'

15050'

14873'	89.75°	88.77°	6614.58'	8448.62'
14968'	89.66°	90.17°	6615.07'	8543.54'
15063'	90.68°	90.24°	6614.78'	8638.50'



15100'

ROPA

PGRC

15150'

15200'

15250'

15300'

15158'

91.76°

89.42°

6612.76'

8733.42'

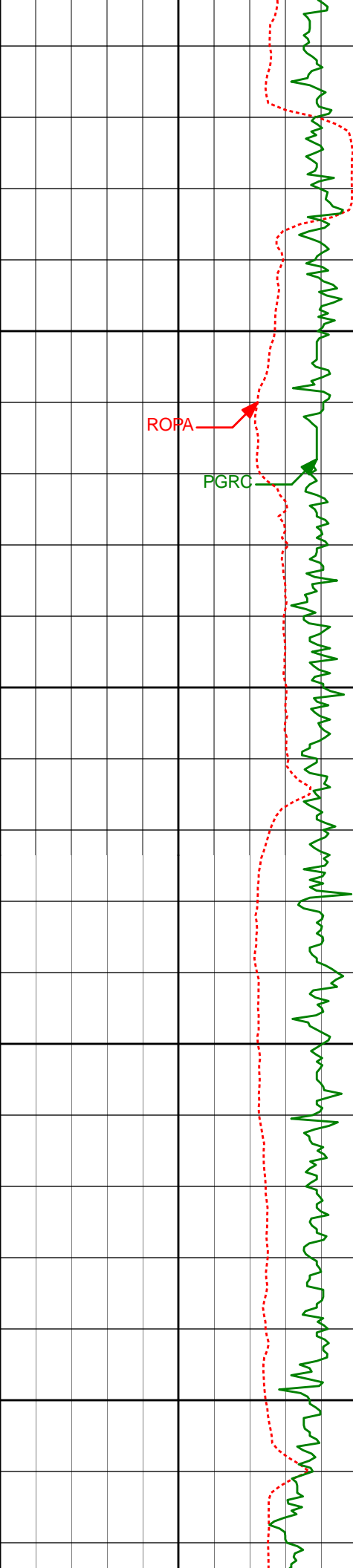
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91.42°

90.24°

6610.15'

8827.33'



15350'

15348'

89.91°

88.78°

6609.04'

8923.25'

15400'

15450'

15500'

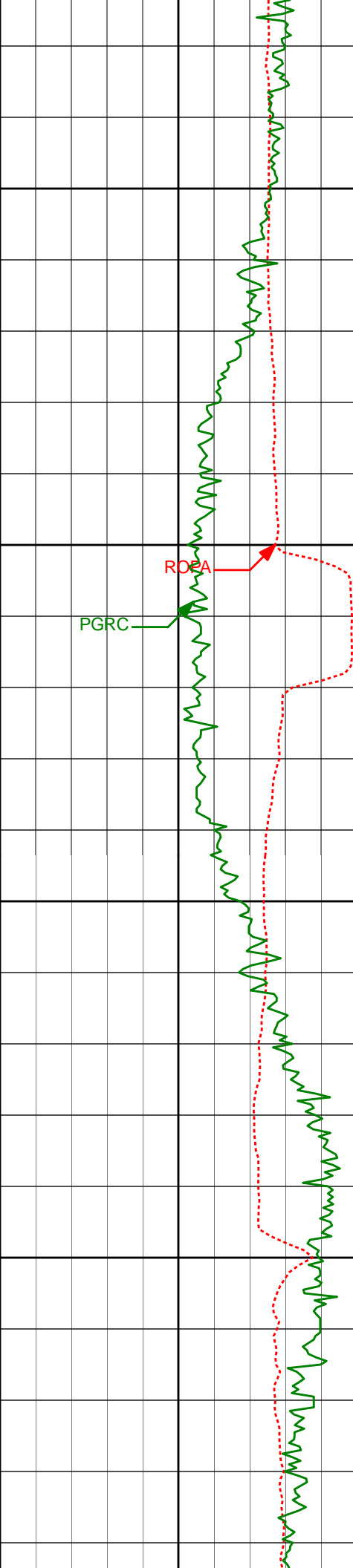
15442'

90.52°

89.07°

6608.69'

9017.13'



15537'

91.64°

88.93°

6606.90'

9112.00'

15550'

15600'

15632'

90.59°

88.77°

6605.05'

9206.86'

15650'

15700'

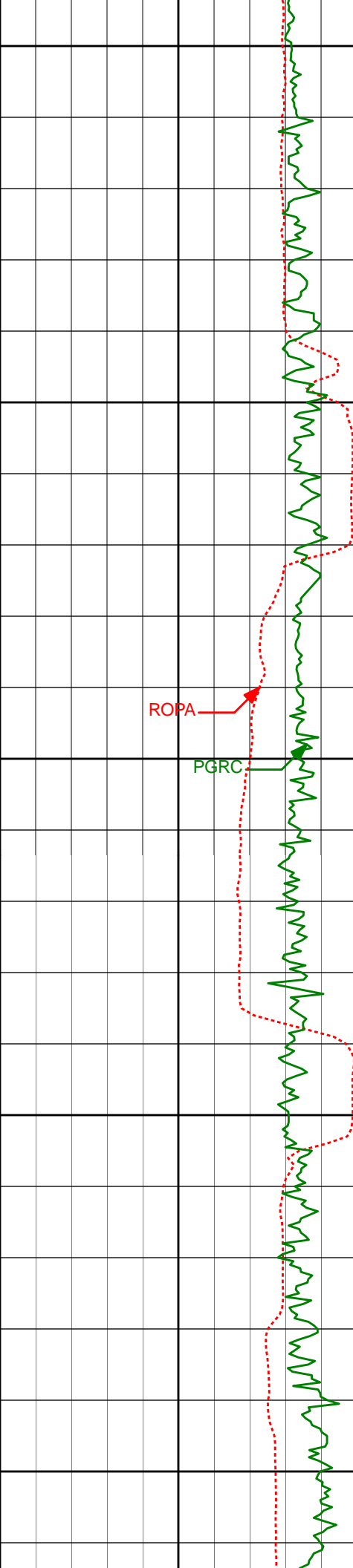
15727'

91.60°

88.27°

6603.23'

9301.69'



15750'

15800'

15822'

89.88°

89.05°

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9396.54'

ROPA

PGRC

15850'

15900'

15917'

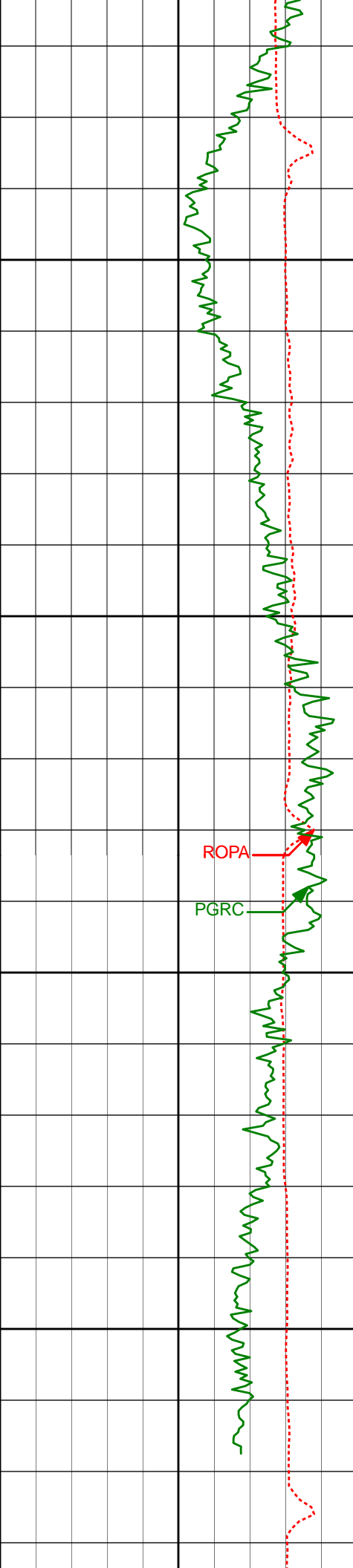
89.08°

88.71°

6602.87'

9491.41'

15950'



16000'

16050'

16100'

16150'

ROPA

PGRC

16012'

89.48°

88.44°

6604.06'

9586.26'

16107'

90.09°

88.05°

6604.42'

9681.08'

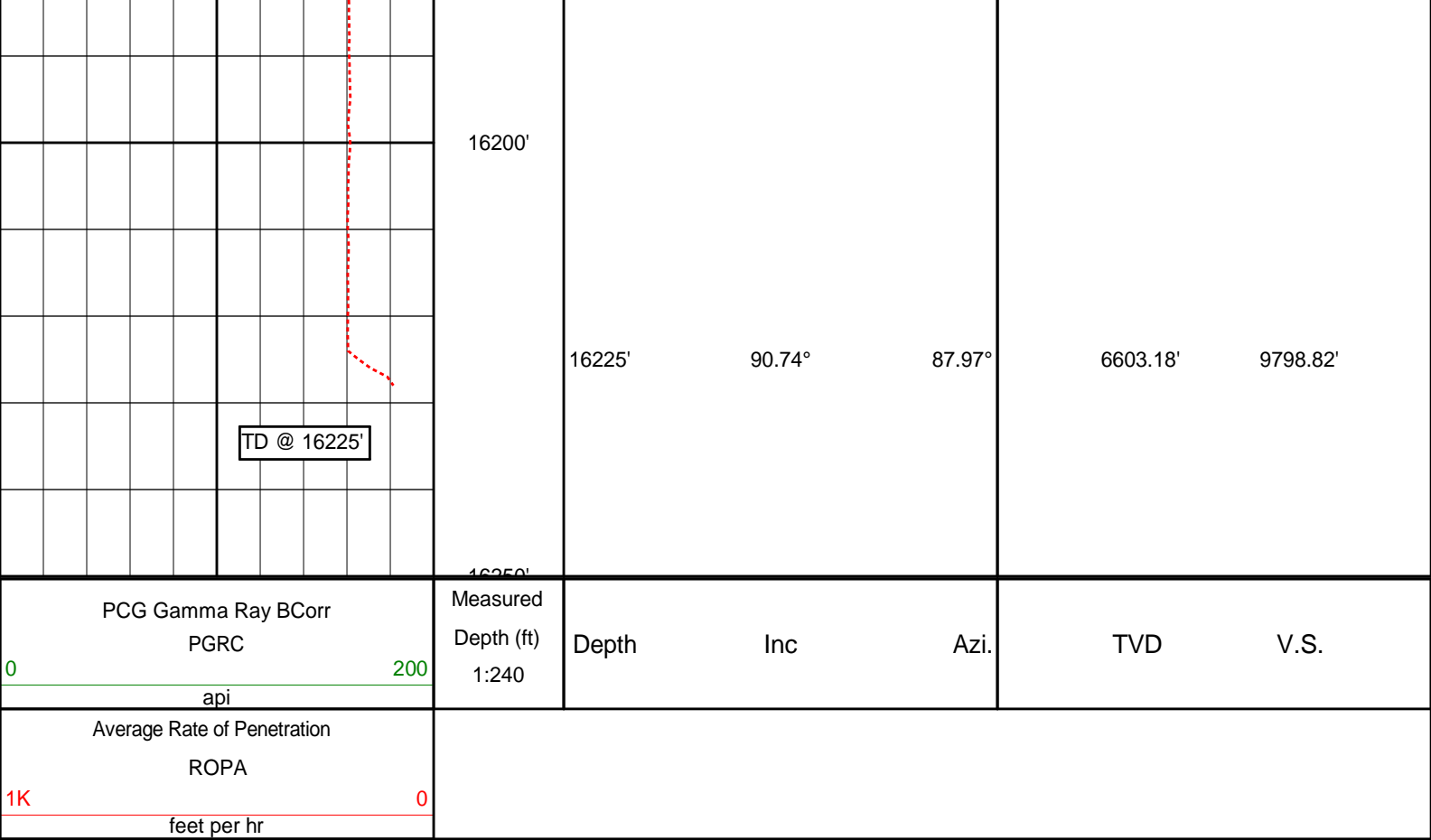
16158'

90.74°

87.97°

6604.05'

9731.97'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
NCLP PC AA04-64-1HN
Wattenberg
Weld Colorado
USA
CA-XX-0900859741
Tie into existing surveys at 379' and 750' provided by HP

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
379.00	0.90	187.52	378.98	2.95 S	0.39 W	-0.30	0.24
750.00	1.40	147.92	749.91	9.68 S	1.64 E	1.93	0.25
812.00	0.91	163.35	811.90	10.79 S	2.18 E	2.51	0.93
904.00	0.97	154.82	903.89	12.20 S	2.72 E	3.09	0.17
997.00	0.92	126.66	996.88	13.36 S	3.65 E	4.06	0.50
1090.00	1.09	113.10	1089.86	14.15 S	5.07 E	5.50	0.31
1183.00	1.08	110.30	1182.85	14.80 S	6.70 E	7.15	0.06
1277.00	0.42	29.35	1276.84	14.81 S	7.70 E	8.15	1.17
1464.00	0.42	22.85	1463.83	13.58 S	8.30 E	8.72	0.03
1556.00	0.87	213.83	1555.83	13.85 S	8.05 E	8.47	1.40
1649.00	1.55	227.43	1648.81	15.29 S	6.73 E	7.19	0.79
1744.00	3.43	201.34	1743.72	18.80 S	4.75 E	5.32	2.26
1839.00	5.03	192.74	1838.46	25.51 S	2.79 E	3.58	1.81
1933.00	6.48	193.80	1931.98	34.68 S	0.62 E	1.68	1.55
2027.00	8.63	188.79	2025.16	46.80 S	1.72 W	-0.29	2.39
2122.00	10.12	183.55	2118.89	62.18 S	3.33 W	-1.42	1.81
2216.00	11.39	185.90	2211.24	79.66 S	4.80 W	-2.35	1.43
2311.00	10.68	178.70	2304.49	97.79 S	5.56 W	-2.55	1.63
2406.00	10.42	182.45	2397.88	115.17 S	5.73 W	-2.19	0.77
2500.00	12.11	179.50	2490.07	133.53 S	6.00 W	-1.90	1.90
2595.00	12.37	176.15	2582.91	153.64 S	5.23 W	-0.51	0.80
2690.00	12.45	173.87	2675.93	174.21 S	4.25 W	-0.22	0.22

2690.00	12.45	178.87	2675.69	174.04 S	4.35 W	1.00	0.62
2785.00	12.81	180.69	2768.39	194.80 S	4.27 W	1.71	0.56
2879.00	13.03	178.35	2860.01	215.82 S	4.09 W	2.54	0.60
2974.00	13.69	178.83	2952.44	237.76 S	3.56 W	3.75	0.70
3069.00	12.50	178.24	3044.97	259.28 S	3.01 W	4.95	1.26
3164.00	12.19	179.84	3137.77	279.58 S	2.67 W	5.92	0.49
3259.00	11.67	179.89	3230.72	299.22 S	2.62 W	6.57	0.55
3354.00	10.00	182.65	3324.02	317.07 S	2.98 W	6.76	1.84
3449.00	9.78	178.08	3417.61	333.37 S	3.10 W	7.15	0.86
3543.00	10.07	181.22	3510.21	349.57 S	3.00 W	7.73	0.65
3638.00	12.36	176.76	3603.39	368.03 S	2.60 W	8.70	2.58
3733.00	15.00	175.22	3695.69	390.43 S	1.01 W	10.99	2.81
3828.00	13.50	173.14	3787.76	413.70 S	1.34 E	14.05	1.67
3923.00	11.15	166.36	3880.57	433.64 S	4.83 E	18.15	2.90
4018.00	8.77	176.11	3974.14	449.79 S	7.49 E	21.30	3.06
4112.00	8.43	171.27	4067.08	463.75 S	9.02 E	23.26	0.85
4207.00	5.87	183.93	4161.34	475.48 S	9.75 E	24.35	3.15
4302.00	4.51	179.33	4255.95	484.07 S	9.46 E	24.32	1.50
4397.00	3.83	176.73	4350.70	490.97 S	9.68 E	24.76	0.74
4491.00	2.47	196.13	4444.56	496.05 S	9.30 E	24.53	1.82
4586.00	2.52	205.87	4539.47	499.89 S	7.82 E	23.17	0.45
4681.00	3.10	233.43	4634.36	503.30 S	4.85 E	20.30	1.53
4776.00	1.07	268.25	4729.29	504.86 S	1.90 E	17.40	2.43
4871.00	0.94	261.96	4824.28	505.00 S	0.24 E	15.75	0.18
4966.00	0.83	240.00	4919.27	505.45 S	1.13 W	14.39	0.37
5060.00	0.99	221.87	5013.25	506.40 S	2.26 W	13.29	0.35
5155.00	1.03	234.31	5108.24	507.50 S	3.50 W	12.09	0.23
5343.00	1.08	279.88	5296.21	508.19 S	6.62 W	8.99	0.44
5438.00	0.29	202.63	5391.20	508.25 S	7.59 W	8.02	1.11
5627.00	0.74	136.13	5580.20	509.58 S	6.93 W	8.72	0.36
5722.00	0.83	132.13	5675.19	510.48 S	6.00 W	9.68	0.11
5817.00	0.71	121.48	5770.18	511.25 S	4.99 W	10.72	0.20
5870.00	0.52	152.60	5823.18	511.63 S	4.59 W	11.12	0.71
6009.00	3.38	93.89	5962.09	512.47 S	0.22 W	15.52	2.26
6057.00	7.73	91.53	6009.85	512.65 S	4.43 E	20.17	9.07
6104.00	8.65	89.50	6056.37	512.71 S	11.12 E	26.86	2.05
6198.00	13.51	87.49	6148.59	512.17 S	29.17 E	44.89	5.19
6292.00	18.30	90.99	6238.97	511.94 S	54.91 E	70.61	5.19
6386.00	23.60	84.76	6326.74	510.47 S	88.43 E	104.07	6.11
6481.00	32.13	87.74	6410.65	507.74 S	132.69 E	148.23	9.10
6576.00	49.81	91.34	6482.10	507.59 S	194.71 E	210.21	18.77
6671.00	59.97	93.95	6536.68	511.28 S	272.23 E	287.80	10.93
6765.00	59.84	91.29	6583.82	515.00 S	353.46 E	369.11	2.45
6860.00	67.76	89.00	6625.73	515.15 S	438.62 E	454.24	8.61
6936.00	82.15	89.34	6645.41	514.10 S	511.82 E	527.37	18.94
7139.00	91.02	85.42	6657.49	504.82 S	714.00 E	729.17	4.77
7234.00	88.12	86.23	6658.21	497.90 S	808.74 E	823.65	3.17
7329.00	88.09	86.29	6661.35	491.71 S	903.48 E	918.16	0.07
7423.00	88.09	86.42	6664.48	485.74 S	997.24 E	1011.69	0.14
7518.00	88.24	85.70	6667.52	479.21 S	1091.97 E	1106.17	0.77
7613.00	89.63	86.79	6669.29	472.99 S	1186.74 E	1200.71	1.86
7708.00	90.15	86.59	6669.47	467.51 S	1281.58 E	1295.34	0.59
7803.00	91.30	87.75	6668.27	462.82 S	1376.46 E	1390.02	1.72
7897.00	91.76	89.20	6665.76	460.32 S	1470.39 E	1483.83	1.62
7992.00	90.00	90.09	6664.30	459.73 S	1565.37 E	1578.75	2.08
8087.00	89.78	89.71	6664.48	459.56 S	1660.37 E	1673.70	0.46
8182.00	90.52	88.90	6664.23	458.41 S	1755.36 E	1768.61	1.15
8277.00	90.52	88.43	6663.37	456.20 S	1850.33 E	1863.47	0.49
8372.00	90.37	88.09	6662.63	453.31 S	1945.28 E	1958.29	0.39
8466.00	90.52	88.90	6661.90	450.84 S	2039.25 E	2052.13	0.88
8561.00	90.59	88.50	6660.98	448.69 S	2134.22 E	2146.99	0.43
8656.00	89.51	89.88	6660.90	447.34 S	2229.21 E	2241.89	1.84
8751.00	91.97	90.95	6659.67	448.03 S	2324.19 E	2336.85	2.82
8846.00	89.04	90.51	6658.84	449.24 S	2419.16 E	2431.82	3.12
8941.00	88.89	90.51	6660.55	450.09 S	2514.15 E	2526.78	0.16
9036.00	90.15	90.21	6661.35	450.68 S	2609.14 E	2621.75	1.36
9131.00	89.94	90.43	6661.27	451.22 S	2704.14 E	2716.72	0.32
9225.00	91.94	90.17	6659.73	451.71 S	2798.12 E	2810.67	2.15
9320.00	91.36	89.07	6657.00	451.08 S	2893.07 E	2905.56	1.31
9415.00	89.41	88.69	6656.36	449.22 S	2988.05 E	3000.44	2.09
9510.00	89.78	88.69	6657.03	447.05 S	3083.02 E	3095.30	0.39
9605.00	89.66	88.22	6657.49	444.49 S	3177.99 E	3190.14	0.51
9700.00	90.34	87.48	6657.49	440.92 S	3272.92 E	3284.92	1.06
9795.00	92.62	88.60	6655.04	437.68 S	3367.82 E	3379.68	2.67
9889.00	91.88	88.28	6651.35	435.12 S	3461.71 E	3473.45	0.86

9984.00	90.86	89.81	6649.08	433.54 S	3556.67 E	3568.31	1.94
10079.00	91.60	88.02	6647.04	431.74 S	3651.63 E	3663.16	2.04
10174.00	91.32	88.95	6644.62	429.23 S	3746.56 E	3757.98	1.02
10269.00	88.52	88.13	6644.75	426.81 S	3841.52 E	3852.82	3.07
10364.00	88.86	87.84	6646.92	423.47 S	3936.44 E	3947.59	0.47
10459.00	89.51	88.10	6648.27	420.10 S	4031.37 E	4042.37	0.74
10551.00	89.48	88.09	6649.08	417.04 S	4123.31 E	4134.18	0.03
10643.00	90.89	87.76	6648.79	413.71 S	4215.25 E	4225.97	1.57
10736.00	91.57	88.63	6646.79	410.78 S	4308.18 E	4318.76	1.19
10828.00	92.56	87.86	6643.48	407.97 S	4400.08 E	4410.53	1.36
10921.00	91.79	89.08	6639.95	405.49 S	4492.97 E	4503.31	1.55
11014.00	91.57	90.34	6637.22	405.02 S	4585.93 E	4596.21	1.37
11107.00	90.77	90.35	6635.32	405.58 S	4678.91 E	4689.16	0.86
11200.00	89.54	90.71	6635.07	406.44 S	4771.90 E	4782.13	1.38
11292.00	90.89	91.37	6634.72	408.11 S	4863.88 E	4874.12	1.63
11385.00	89.17	88.78	6634.68	408.23 S	4956.87 E	4967.07	3.34
11477.00	89.48	88.51	6635.76	406.05 S	5048.84 E	5058.93	0.45
11571.00	89.97	88.16	6636.21	403.32 S	5142.80 E	5152.76	0.64
11664.00	91.14	88.22	6635.31	400.38 S	5235.75 E	5245.57	1.26
11758.00	89.48	87.82	6634.80	397.14 S	5329.68 E	5339.37	1.82
11851.00	89.38	87.24	6635.73	393.13 S	5422.59 E	5432.11	0.63
11943.00	89.08	87.38	6636.96	388.81 S	5514.48 E	5523.82	0.36
12036.00	90.34	87.60	6637.43	384.74 S	5607.39 E	5616.56	1.38
12130.00	90.06	87.30	6637.11	380.56 S	5701.30 E	5710.30	0.44
12222.00	91.27	87.22	6636.04	376.16 S	5793.18 E	5802.00	1.32
12314.00	92.31	87.31	6633.16	371.77 S	5885.03 E	5893.68	1.13
12407.00	90.62	88.93	6630.79	368.72 S	5977.95 E	5986.45	2.52
12499.00	90.34	89.97	6630.02	367.84 S	6069.94 E	6078.37	1.17
12591.00	90.37	89.43	6629.45	367.36 S	6161.93 E	6170.31	0.59
12686.00	91.02	89.13	6628.29	366.16 S	6256.92 E	6265.21	0.75
12781.00	91.45	88.64	6626.25	364.32 S	6351.88 E	6360.07	0.69
12875.00	90.80	89.51	6624.40	362.80 S	6445.85 E	6453.95	1.16
12970.00	91.63	89.39	6622.39	361.89 S	6540.82 E	6548.85	0.88
13065.00	91.17	90.32	6620.06	361.65 S	6635.79 E	6643.77	1.09
13165.00	89.26	89.82	6619.69	361.77 S	6735.78 E	6743.72	1.97
13260.00	89.38	89.49	6620.82	361.20 S	6830.78 E	6838.65	0.37
13355.00	89.78	89.35	6621.51	360.24 S	6925.77 E	6933.56	0.45
13450.00	91.33	89.39	6620.59	359.19 S	7020.76 E	7028.48	1.63
13545.00	90.77	89.57	6618.85	358.33 S	7115.74 E	7123.38	0.62
13640.00	90.19	89.71	6618.06	357.73 S	7210.73 E	7218.31	0.63
13735.00	91.67	89.65	6616.51	357.20 S	7305.71 E	7313.24	1.56
13829.00	89.85	88.27	6615.27	355.49 S	7399.68 E	7407.11	2.43
13924.00	90.34	87.84	6615.11	352.27 S	7494.63 E	7501.91	0.69
14019.00	88.80	87.01	6615.82	348.00 S	7589.53 E	7596.63	1.84
14114.00	90.25	89.31	6616.61	344.95 S	7684.46 E	7691.43	2.86
14209.00	91.79	89.48	6614.92	343.95 S	7779.44 E	7786.33	1.63
14304.00	89.23	88.58	6614.07	342.34 S	7874.41 E	7881.21	2.86
14399.00	90.15	88.01	6614.59	339.52 S	7969.37 E	7976.04	1.14
14494.00	89.04	87.57	6615.26	335.85 S	8064.29 E	8070.81	1.26
14589.00	89.85	87.35	6616.18	331.64 S	8159.20 E	8165.53	0.88
14683.00	90.74	85.61	6615.70	325.87 S	8253.01 E	8259.13	2.08
14778.00	90.43	88.19	6614.73	320.73 S	8347.86 E	8353.77	2.74
14873.00	89.75	88.77	6614.58	318.21 S	8442.83 E	8448.62	0.94
14968.00	89.66	90.17	6615.07	317.34 S	8537.82 E	8543.54	1.48
15063.00	90.68	90.24	6614.78	317.68 S	8632.82 E	8638.50	1.08
15158.00	91.76	89.42	6612.76	317.39 S	8727.79 E	8733.42	1.43
15252.00	91.42	90.24	6610.15	317.12 S	8821.75 E	8827.33	0.94
15348.00	89.91	88.78	6609.04	316.29 S	8917.74 E	8923.25	2.19
15442.00	90.52	89.07	6608.69	314.53 S	9011.72 E	9017.13	0.72
15537.00	91.64	88.93	6606.90	312.87 S	9106.69 E	9112.00	1.19
15632.00	90.59	88.77	6605.05	310.97 S	9201.65 E	9206.86	1.12
15727.00	91.60	88.27	6603.23	308.51 S	9296.60 E	9301.69	1.19
15822.00	89.88	89.05	6602.00	306.29 S	9391.56 E	9396.54	1.99
15917.00	89.08	88.71	6602.87	304.44 S	9486.54 E	9491.41	0.91
16012.00	89.48	88.44	6604.06	302.07 S	9581.50 E	9586.26	0.51
16107.00	90.09	88.05	6604.42	299.16 S	9676.46 E	9681.08	0.76
16158.00	90.74	87.97	6604.05	297.39 S	9727.42 E	9731.97	1.28
16225.00	90.74	87.97	6603.18	295.02 S	9794.38 E	9798.82	0.00

VERTICAL SECTION RELATIVE TO WELL HEAD
VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 91.76 DEGREES (GRID)
A TOTAL CORRECTION OF 7.72 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 16225.00 FEET
IS 9798.82 FEET ALONG 91.73 DEGREES (GRID)

Final Survey Projected to TD

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