

PCGC : Pressure Case Gamma
PCDC: Pressure Case Directional



1 : 600 / 1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	01-Mar-13	02-Mar-13	10-Mar-13		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.750	6.750	4.750		
Log Start Depth (MD, ft)	633.00	5,893.00	7,028.00		
Log End Depth (MD, ft)	5,893.00	7,028.00	17,000.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	28-Feb-13 23:30	02-Mar-13 04:15	04-Mar-13 01:30		
Drill/Wipe End Date and Time	01-Mar-13 19:30	02-Mar-13 18:00	09-Mar-13 16:00		
Min Inc (deg) @ Depth (MD, ft)	.14 @ 3,653.00	10.35 @ 5,910.00	86.08 @ 14,388.00		
Max Inc (deg) @ Depth (MD, ft)	10.73 @ 5,646.00	83.04 @ 6,974.00	92.62 @ 12,964.00		
Bit TFA(in2) / Bit Type	.75 / PDC	.75 / PDC	.83 / PDC		
Flow Rate (gpm)	590.22	585.98	289.06		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	N/A / N/A		
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	8.70 / 31.00	10.50 / 37.00	9.14 / 33.00		
Filtrate CL (ppm)	1,600.00	1,600.00	1,600.00		
pH / Fluid Loss (mptm)	9.40 / 12	9.30 / 9	8.90 / 7		
PV (cP) / YP (lbf2)	4 / 4.00	13 / 13.00	8 / 9.00		
% Solids / % Sand	2.6 / 0.50	6.5 / 0.30	5.00 / 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 (deg F) @ 100 ft	115.00 / 100 ft	170.00 / 100 ft	245.00 / 100 ft		

Max Tool Temp (degF) / Source	145.90 / PCM	172.78 / PCM	247.20 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Henry Schmeidler	Henry Schmeidler	Henry Schmeidler		
Customer Representative	Dave Nielsen	Dave Nielsen	Dave Nielsen		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.76	5.76	5.76		
Sub Serial Number	11341344	11341344	11671371		
Insert Serial Number	11400850	11400850	11680726		
Date and Time Initialized	28-Feb-13 06:49	28-Feb-13 06:49	03-Mar-13 17:59		
Date and Time Read	03-Mar-13 00:06	01-Jan-70 00:00	10-Mar-13 03:07		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	55.31	52.16	61.14		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11341344	11341344	11671371		
Sonde Serial Number	11062118	11062118	11638601		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	268.93	38.88	102.10		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	50.31	47.16	56.16		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11341344	11341344	11671371		
Insert/Sonde Serial Number	11680985	11680985	11293318		

REMARKS

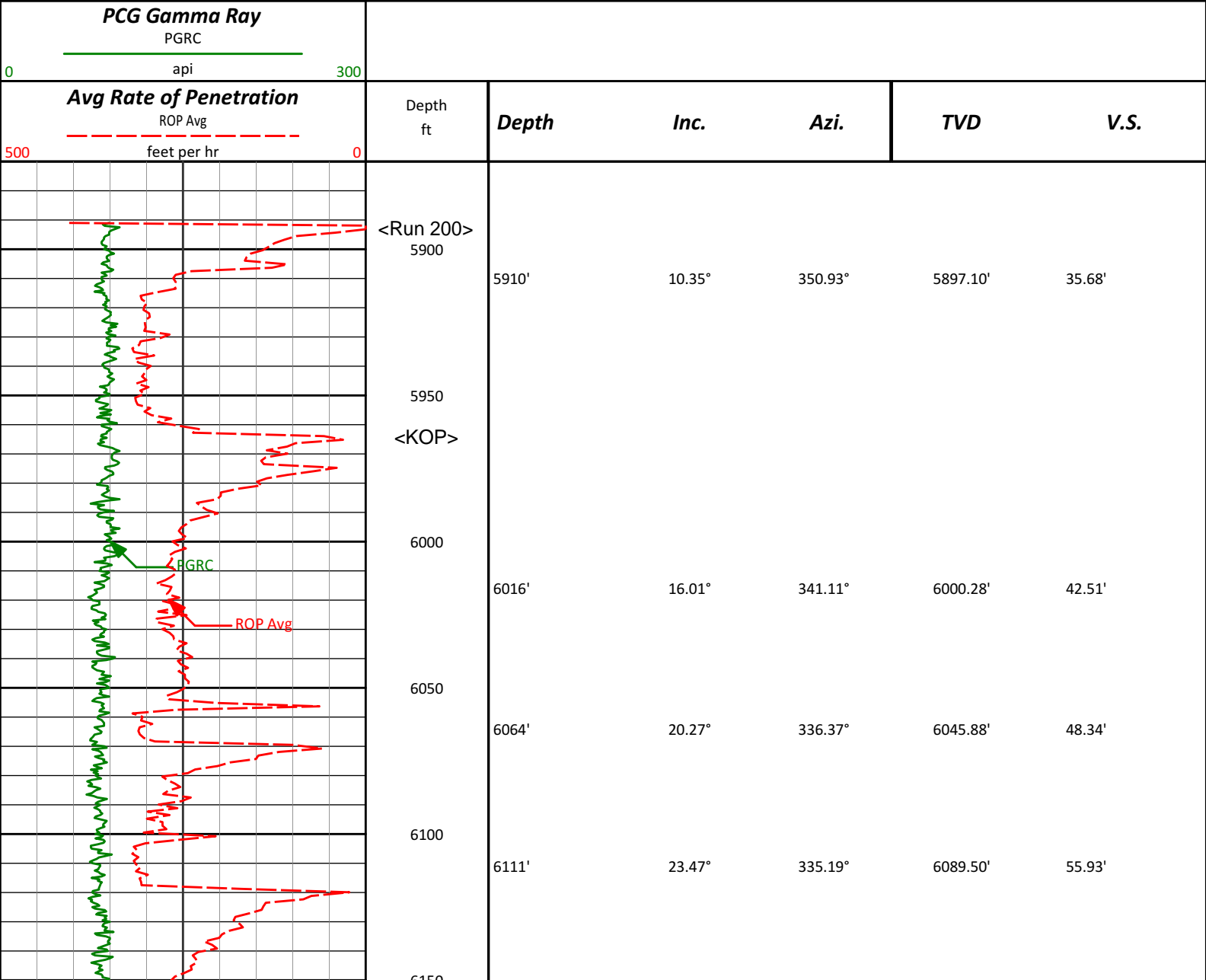
1. All depths are calibrated to the driller's pipe tally and are measured from the rig drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
 - ROPA: Average Rate of Penetration is real time data.
 - PGRC: Smooth Pressure Case Gamma Ray Borehole corrected is recorded data.
4. The following smoothing parameters have been applied to the data:
 - All 2" (1:600) logs - 1 ft. interval, 3 ft. coercion distance.
 - All 5" (1:240) logs - .5 ft. interval, .6 ft. coercion distance.
5. INSITE version 7.4.2
6. End of Run 200. Gap between build and lateral section is due to Gamma sensor measure point to bit distance during the build run. Last Gamma datapoint is at 6981 ft MD. Gamma cannot be measured accurately within cased hole, and collection resumes after drilling through cement at 7028 ft MD.

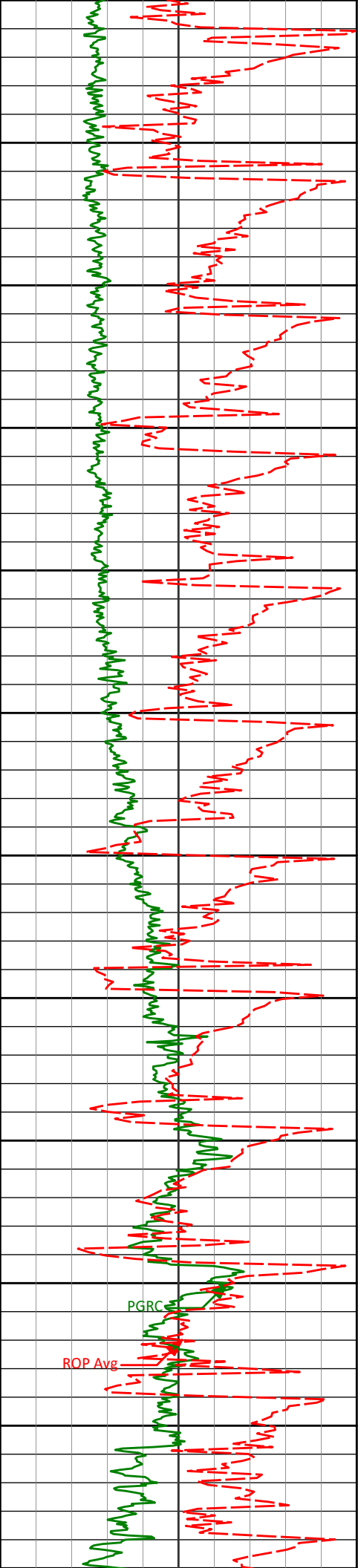
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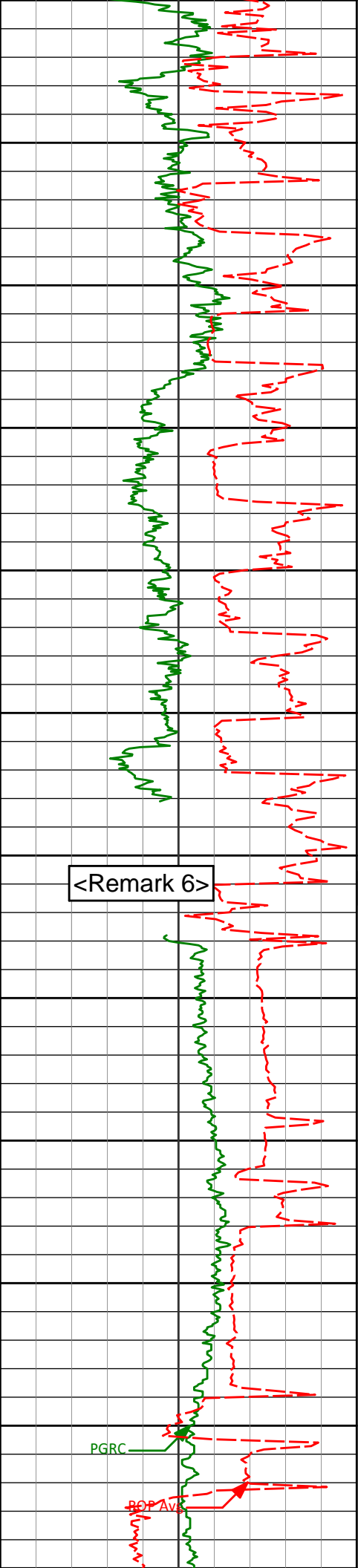
HALLIBURTON
Sperry Drilling Services
MD Main Log 1:600

Noble Energy, Inc
Lucci State B03-69-HNL
H&P 315
T5N R64W

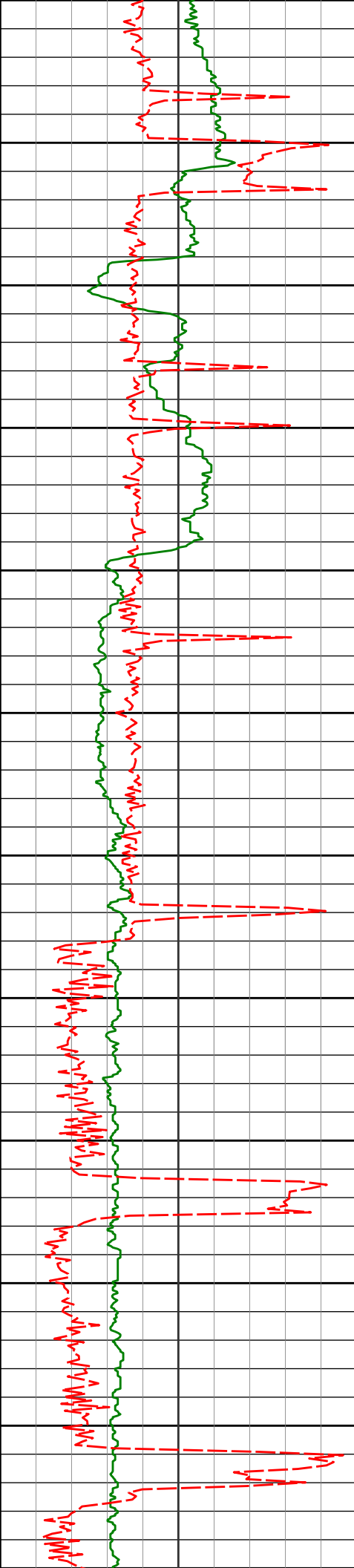




6150	6159'	27.02°	331.97°	6132.91'	65.53'
6200	6206'	30.99°	327.90°	6174.01'	77.48'
6250	6254'	34.20°	320.92°	6214.46'	93.08'
6300	6301'	37.14°	316.63°	6252.64'	111.68'
6350	6349'	38.21°	309.17°	6290.65'	133.64'
6400	6396'	37.61°	299.98°	6327.76'	157.76'
6450	6444'	41.26°	297.62°	6364.83'	184.85'
6500	6491'	45.35°	295.79°	6399.03'	214.00'
6550	6539'	48.03°	290.45°	6431.96'	246.45'
6600	6586'	50.43°	284.85°	6462.67'	280.61'
6650	6634'	55.28°	284.22°	6491.64'	317.87'
6700	6681'	59.09°	281.02°	6517.11'	356.61'



6700					
	6729'	63.75°	278.60°	6540.07'	398.30'
6750					
	6775'	68.01°	279.25°	6558.87'	439.92'
6800					
	6823'	72.77°	279.95°	6574.97'	484.66'
6850					
	6870'	76.40°	278.10°	6587.46'	529.57'
6900					
	6918'	78.01°	274.65°	6598.10'	576.19'
6950					
	6974'	83.04°	273.16°	6607.31'	631.36'
7000	<7" casing set at 7018' MD>				
<Run 300>					
7050					
7100					
	7126'	88.98°	271.09°	6617.89'	782.90'
7150					
7200					
	7221'	89.17°	269.85°	6619.42'	877.88'
7250					



7250
7300
7350
7400
7450
7500
7550
7600
7650
7700
7750
7800

7316'

88.30°

268.41°

6621.52'

972.77'

7411'

89.20°

267.70°

6623.59'

1067.58'

7506'

89.32°

266.79°

6624.82'

1162.32'

7601'

89.54°

267.30°

6625.76'

1257.03'

7696'

90.68°

270.38°

6625.58'

1351.92'

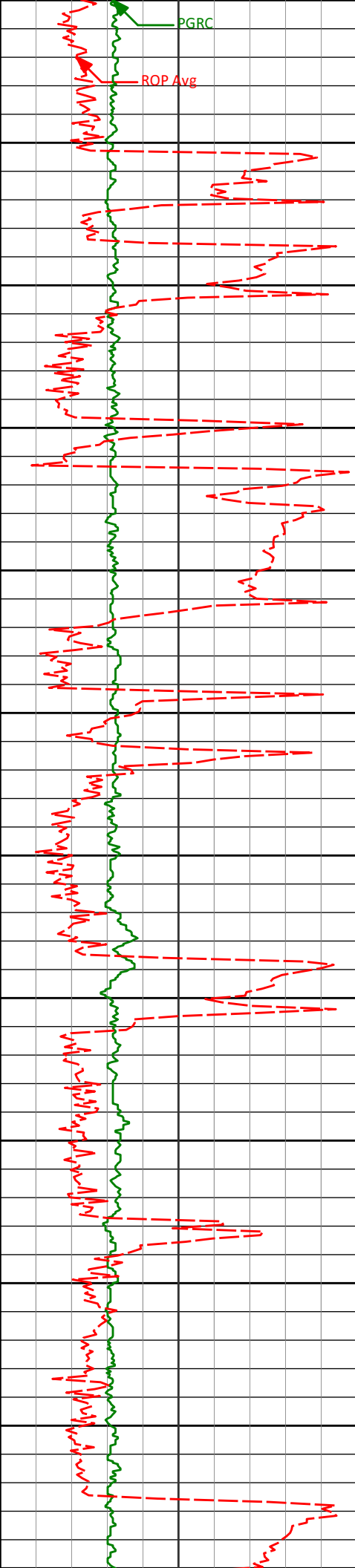
7790'

90.34°

271.25°

6624.74'

1445.91'



7800
7850
7900
7950
8000
8050
8100
8150
8200
8250
8300
8350

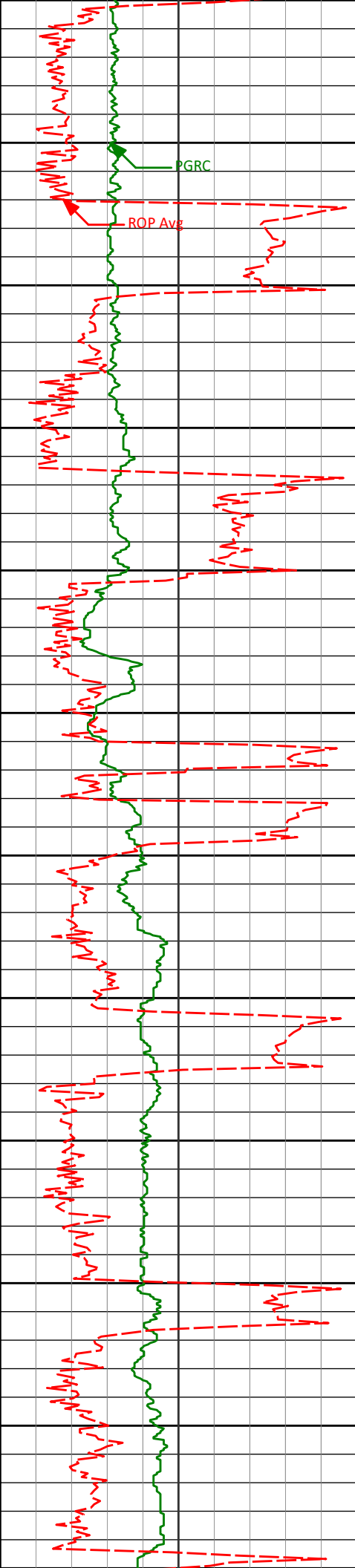
7885' 90.37° 271.31° 6624.15' 1540.91'

7980' 89.85° 269.29° 6623.97' 1635.88'

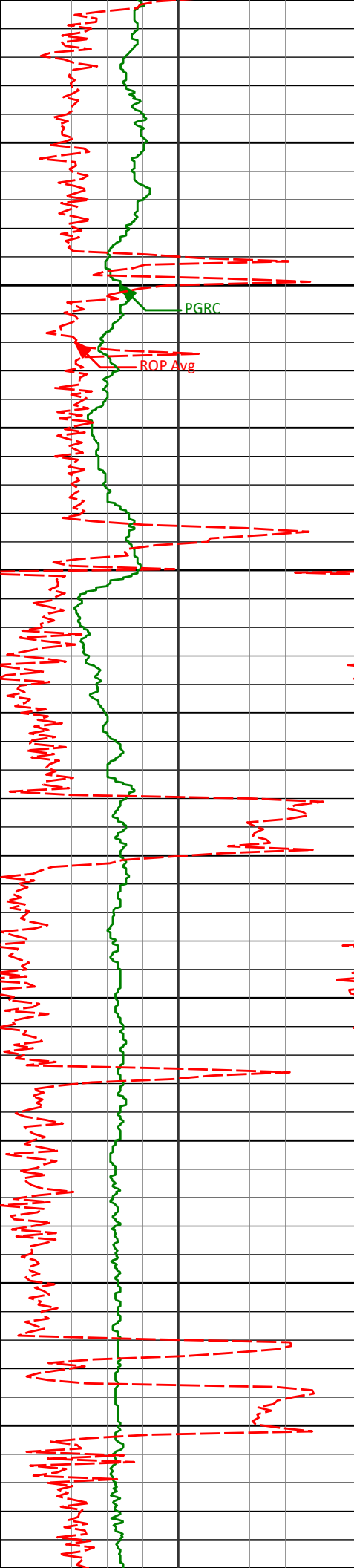
8075' 89.63° 268.18° 6624.40' 1730.77'

8170' 88.27° 267.09° 6626.14' 1825.54'

8265' 89.63° 269.12° 6627.88' 1920.36'



8350	8360'	89.60°	269.39°	6628.52'	2015.28'
8400					
8450	8455'	89.04°	268.79°	6629.65'	2110.20'
8500					
8550	8549'	86.98°	266.63°	6632.92'	2203.93'
8600					
8650	8644'	88.03°	266.65°	6637.05'	2298.50'
8700					
8750	8739'	88.95°	267.53°	6639.55'	2393.19'
8800					
8850	8834'	91.29°	268.37°	6639.35'	2488.01'
8900					



8900
8950
9000
9050
9100
9150
9200
9250
9300
9350
9400
9450

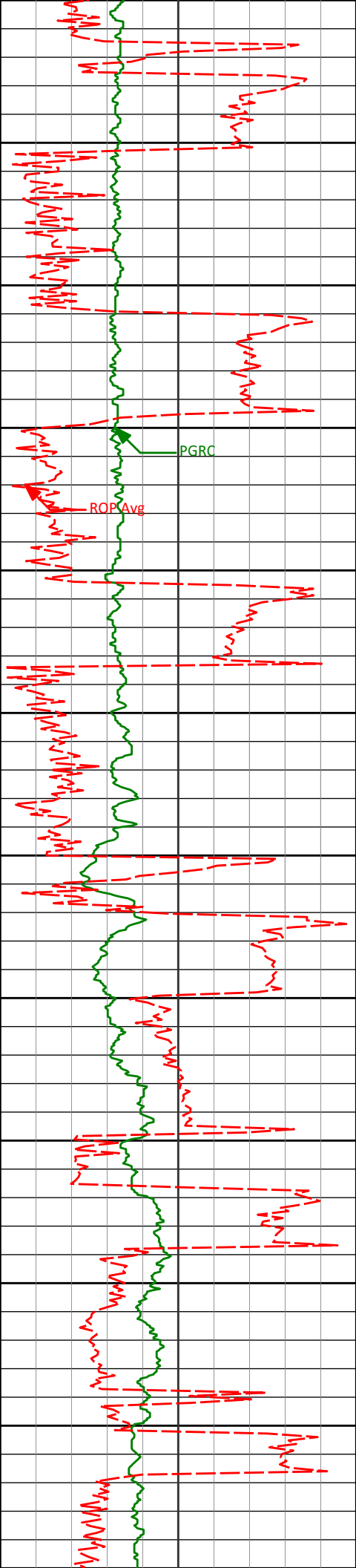
8929'
9023'
9118'
9213'
9308'
9403'

91.36°
91.20°
92.04°
89.60°
89.69°
89.41°

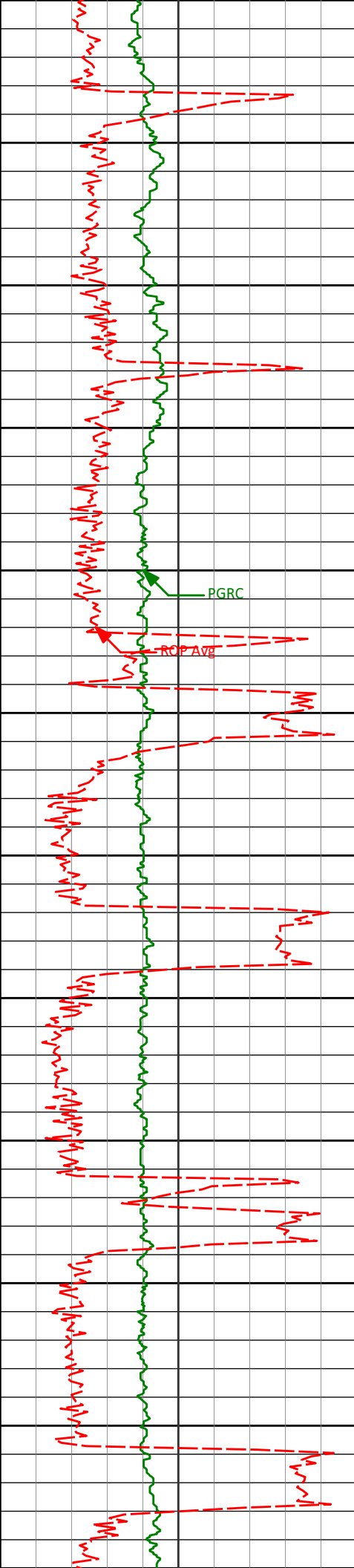
268.72°
269.24°
269.91°
268.98°
270.73°
271.82°

6637.16'
6635.06'
6632.37'
6631.01'
6631.60'
6632.35'

2582.86'
2676.75'
2771.66'
2866.58'
2961.54'
3056.54'



9450					
9500	9498'	89.63°	271.71°	6633.14'	3151.53'
9550					
9600	9593'	89.63°	270.09°	6633.76'	3246.52'
9650					
9700	9688'	87.35°	268.32°	6636.26'	3341.41'
9750					
9800	9783'	87.07°	267.23°	6640.89'	3436.10'
9850					
9900	9877'	88.61°	267.40°	6644.43'	3529.78'
9950					
10000	9972'	89.91°	267.22°	6645.66'	3624.53'



10000
10050
10100
10150
10200
10250
10300
10350
10400
10450
10500
10550

10067'

90.96°

268.46°

6644.93'

3719.33'

10162'

89.01°

266.92°

6644.96'

3814.12'

10257'

89.60°

267.79°

6646.11'

3908.87'

10352'

90.12°

268.14°

6646.34'

4003.69'

10447'

90.00°

267.86°

6646.24'

4098.52'

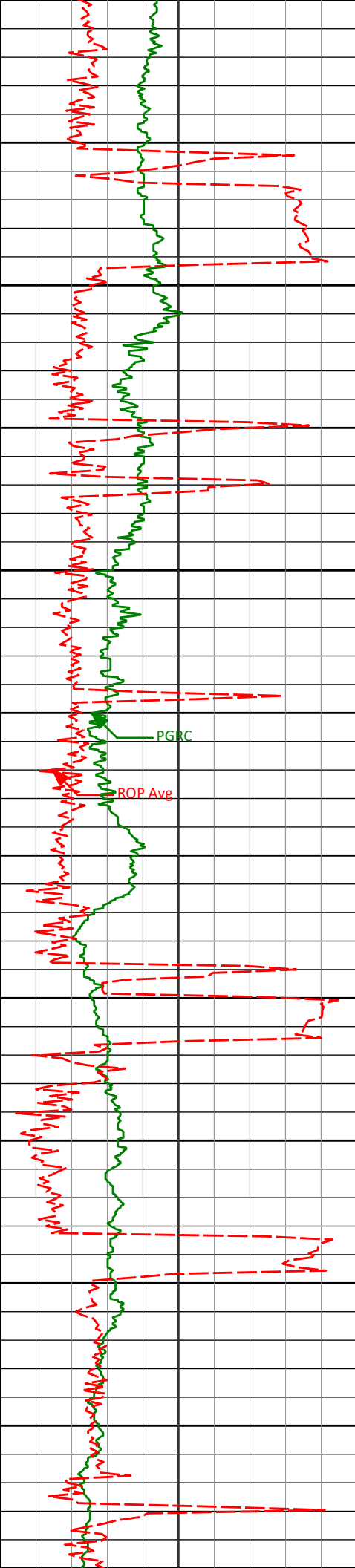
10542'

90.18°

267.09°

6646.09'

4193.29'



10550
10600
10650
10700
10750
10800
10850
10900
10950
11000
11050
11100

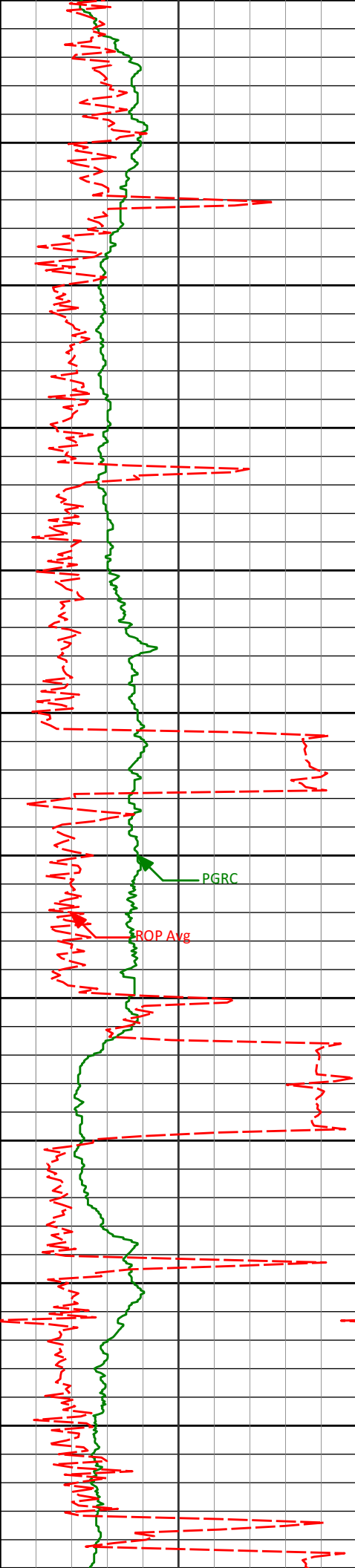
10637'
10732'
10827'
10922'
11017'

91.54°
91.32°
91.82°
91.11°
89.01°

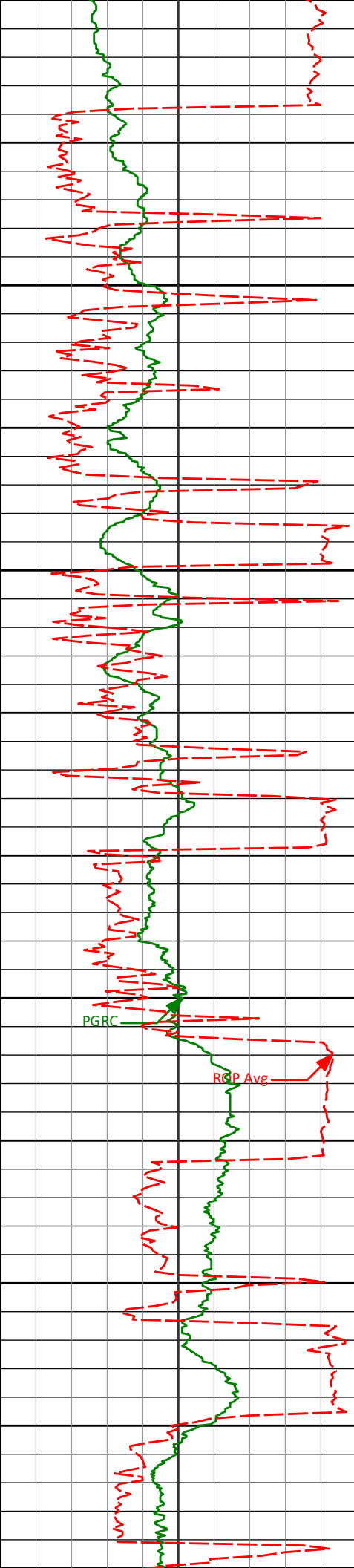
268.45°
268.73°
268.51°
268.93°
269.59°

6644.67'
6642.30'
6639.70'
6637.27'
6637.17'

4288.08'
4382.93'
4477.78'
4572.64'
4667.56'

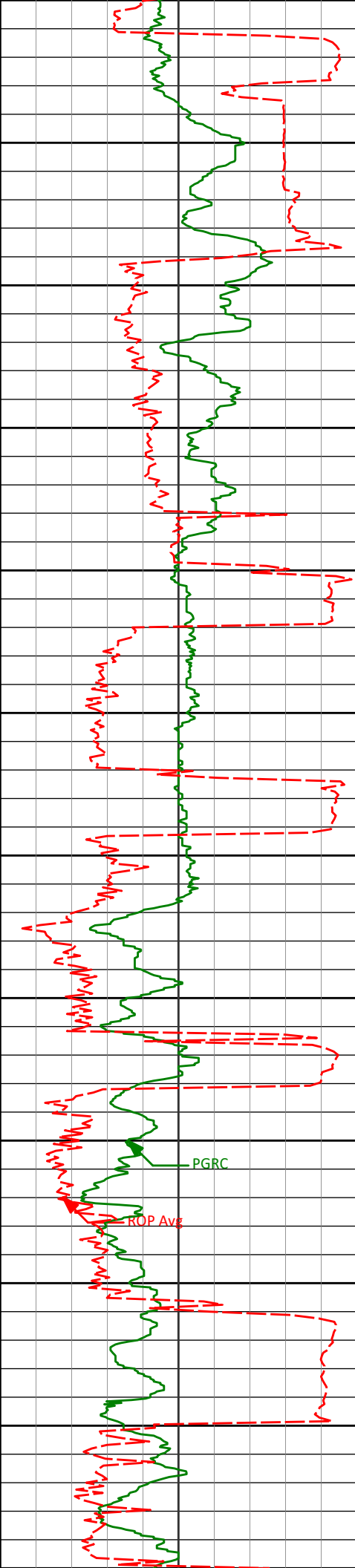


11100	11110'	89.48°	269.45°	6638.39'	4760.50'
11150					
11200	11202'	90.06°	269.81°	6638.76'	4852.46'
11250					
11300	11295'	91.60°	271.81°	6637.41'	4945.43'
11350					
11400	11387'	90.28°	271.42°	6635.91'	5037.42'
11450					
11500	11480'	89.60°	271.82°	6636.00'	5130.42'
11550					
11600	11574'	89.54°	271.90°	6636.71'	5224.41'
11650					



11650
11700
11750
11800
11850
11900
11950
12000
12050
12100
12150
12200

11666'	88.68°	269.12°	6638.14'	5316.38'
11758'	86.82°	268.45°	6641.75'	5408.20'
11851'	86.61°	267.96°	6647.08'	5500.90'
11943'	86.73°	267.47°	6652.42'	5592.55'
12037'	88.15°	268.27°	6656.62'	5686.27'
12129'	90.06°	267.94°	6658.06'	5778.10'



12200
12250
12300
12350
12400
12450
12500
12550
12600
12650
12700
12750

12222'

90.77°

267.71°

6657.38'

5870.91'

12315'

90.28°

267.31°

6656.53'

5963.68'

12408'

90.03°

267.38°

6656.28'

6056.45'

12501'

90.06°

268.55°

6656.21'

6149.27'

12593'

89.11°

269.23°

6656.87'

6241.18'

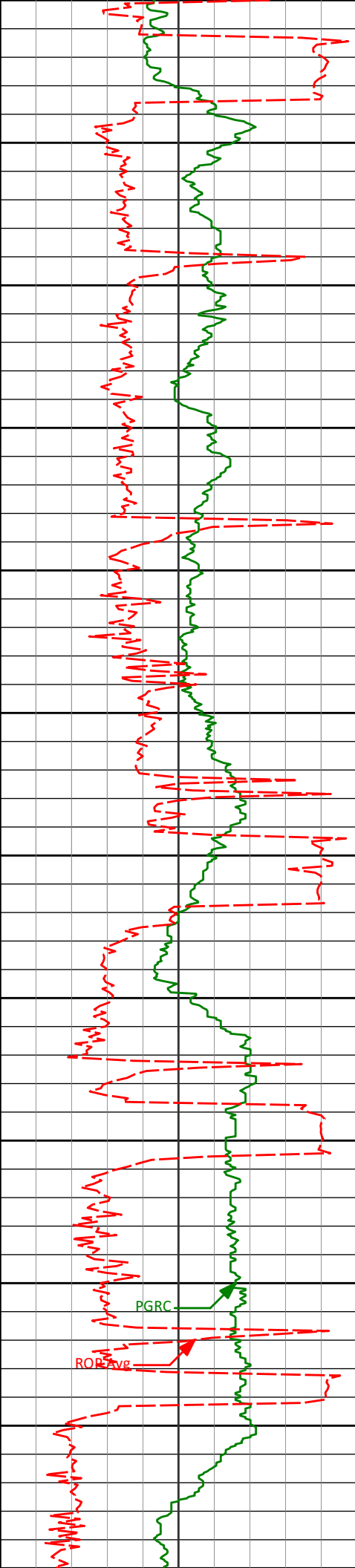
12685'

90.43°

269.94°

6657.24'

6333.12'



12750
12800
12850
12900
12950
13000
13050
13100
13150
13200
13250
13300

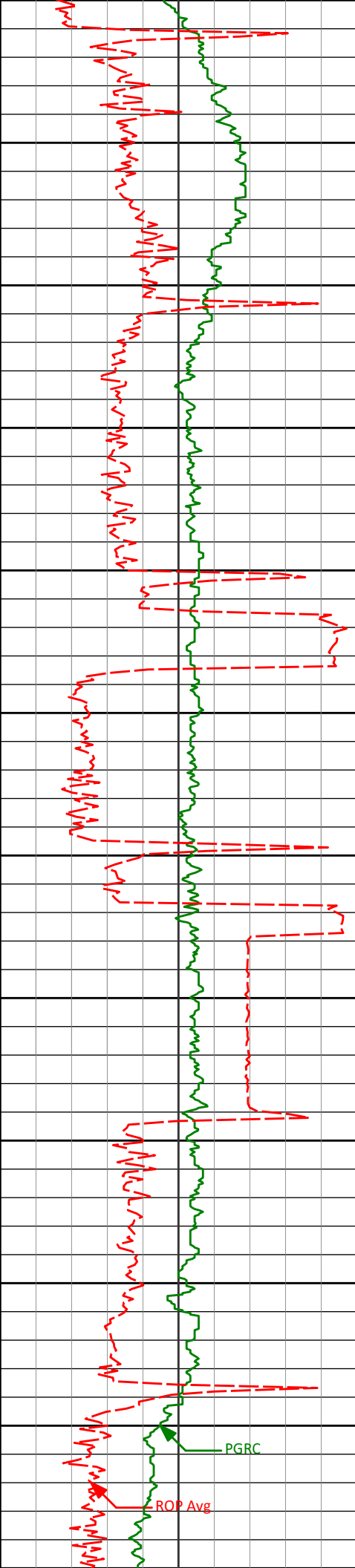
12778'
12870'
12964'
13059'
13154'
13249'

91.73°
91.66°
92.62°
92.13°
90.89°
89.66°

268.71°
268.17°
267.70°
268.01°
267.99°
267.71°

6655.49'
6652.77'
6649.26'
6645.32'
6642.82'
6642.36'

6426.04'
6517.87'
6611.63'
6706.36'
6801.15'
6895.96'



13300
13350
13400
13450
13500
13550
13600
13650
13700
13750
13800
13850

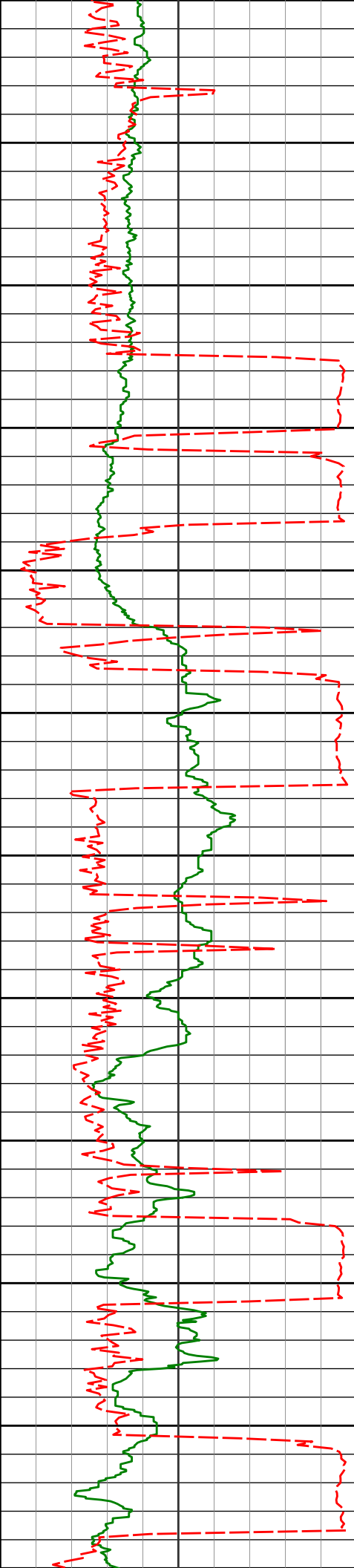
13344'
13439'
13534'
13629'
13724'
13819'

89.97°
90.56°
90.68°
90.12°
89.97°
89.29°

267.62°
267.19°
268.63°
269.27°
268.83°
268.48°

6642.67'
6642.23'
6641.21'
6640.55'
6640.47'
6641.09'

6990.75'
7085.52'
7180.33'
7275.23'
7370.15'
7465.03'



13850

13900

13950

14000

14050

14100

14150

14200

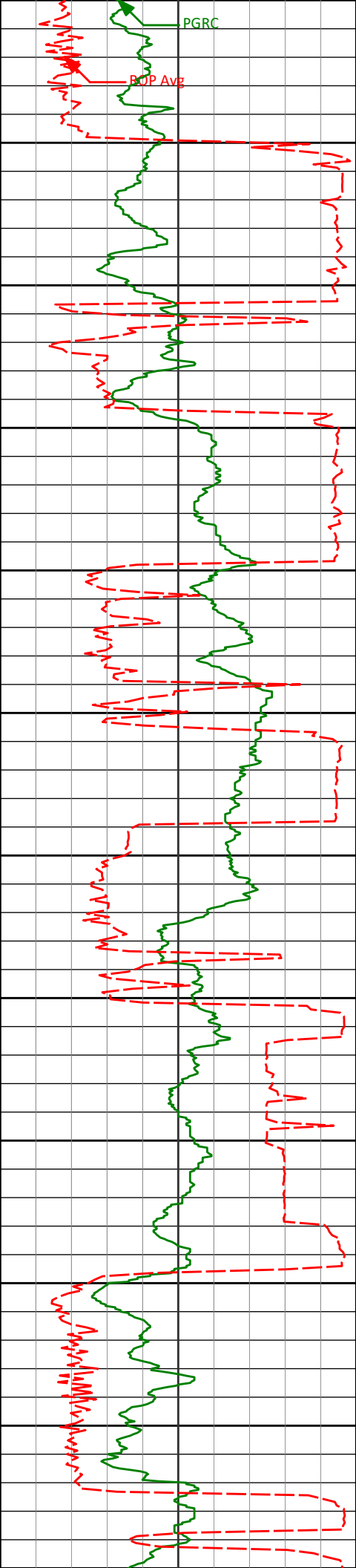
14250

14300

14350

14400

13914'	92.25°	268.25°	6639.81'	7559.88'
14009'	92.59°	268.01°	6635.80'	7654.63'
14104'	89.45°	267.51°	6634.11'	7749.41'
14198'	87.59°	267.26°	6636.54'	7843.14'
14293'	86.67°	268.09°	6641.29'	7937.81'
14388'	86.08°	268.69°	6647.30'	8032.48'



14400
14450
14500
14550
14600
14650
14700
14750
14800
14850
14900

14483'

86.14°

270.18°

6653.74'

8127.20'

14578'

88.36°

271.88°

6658.30'

8222.08'

14673'

89.51°

271.01°

6660.07'

8317.06'

14768'

89.81°

270.45°

6660.63'

8412.05'

14863'

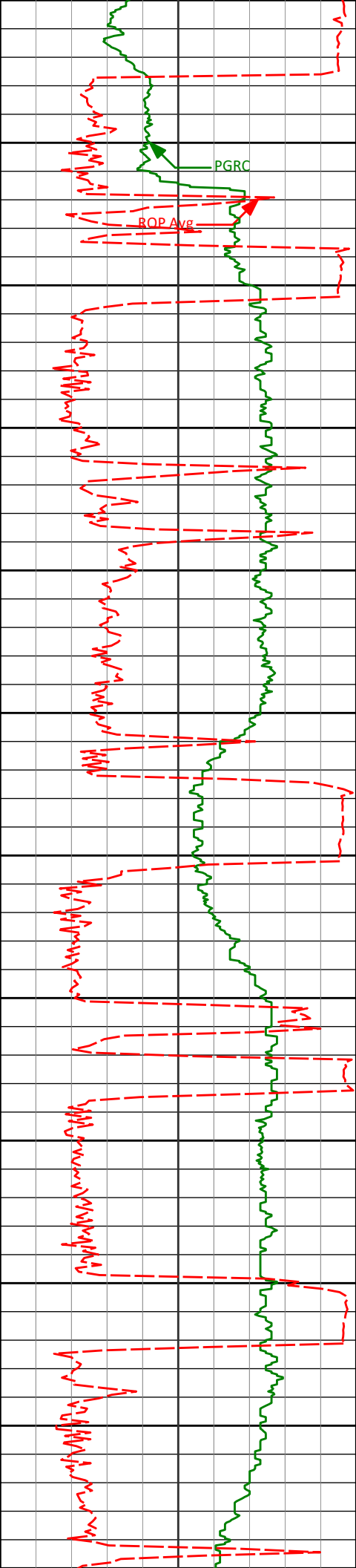
89.45°

270.30°

6661.25'

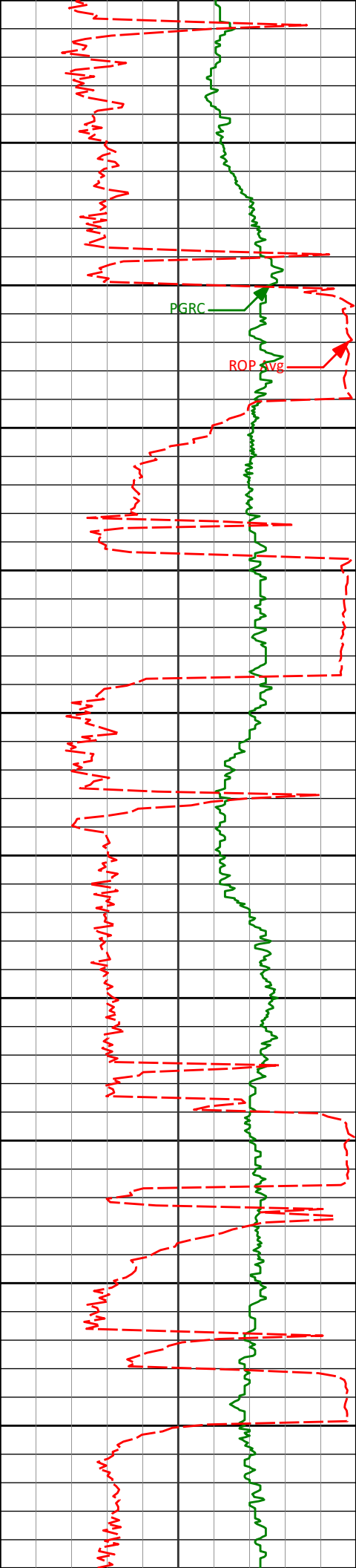
8507.03'

14950



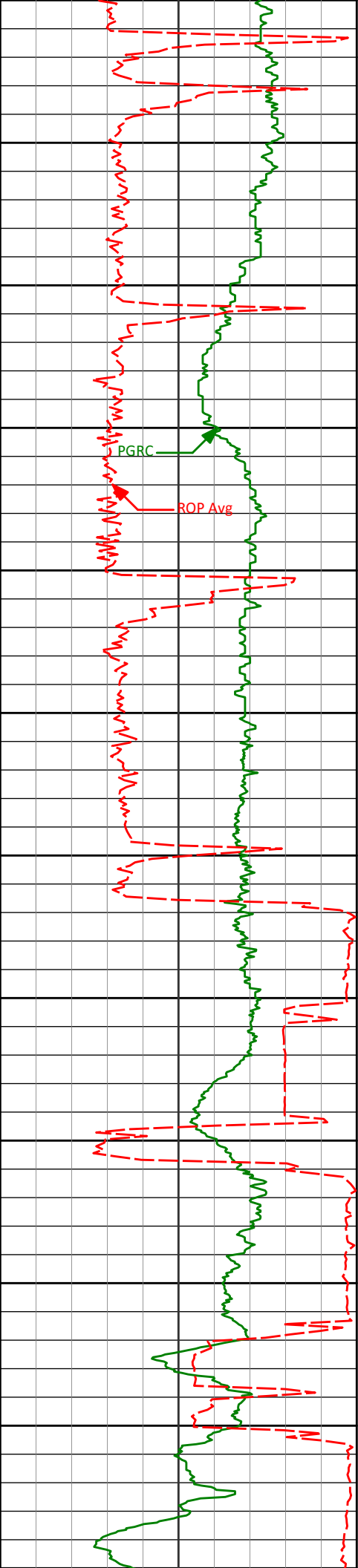
14950
15000
15050
15100
15150
15200
15250
15300
15350
15400
15450
15500

14958'	90.06°	270.03°	6661.65'	8602.01'
15053'	91.63°	269.99°	6660.25'	8696.97'
15148'	92.56°	270.42°	6656.78'	8791.88'
15243'	90.22°	269.99°	6654.47'	8886.82'
15337'	89.17°	269.14°	6654.97'	8980.77'
15432'	90.56°	268.93°	6655.20'	9075.68'

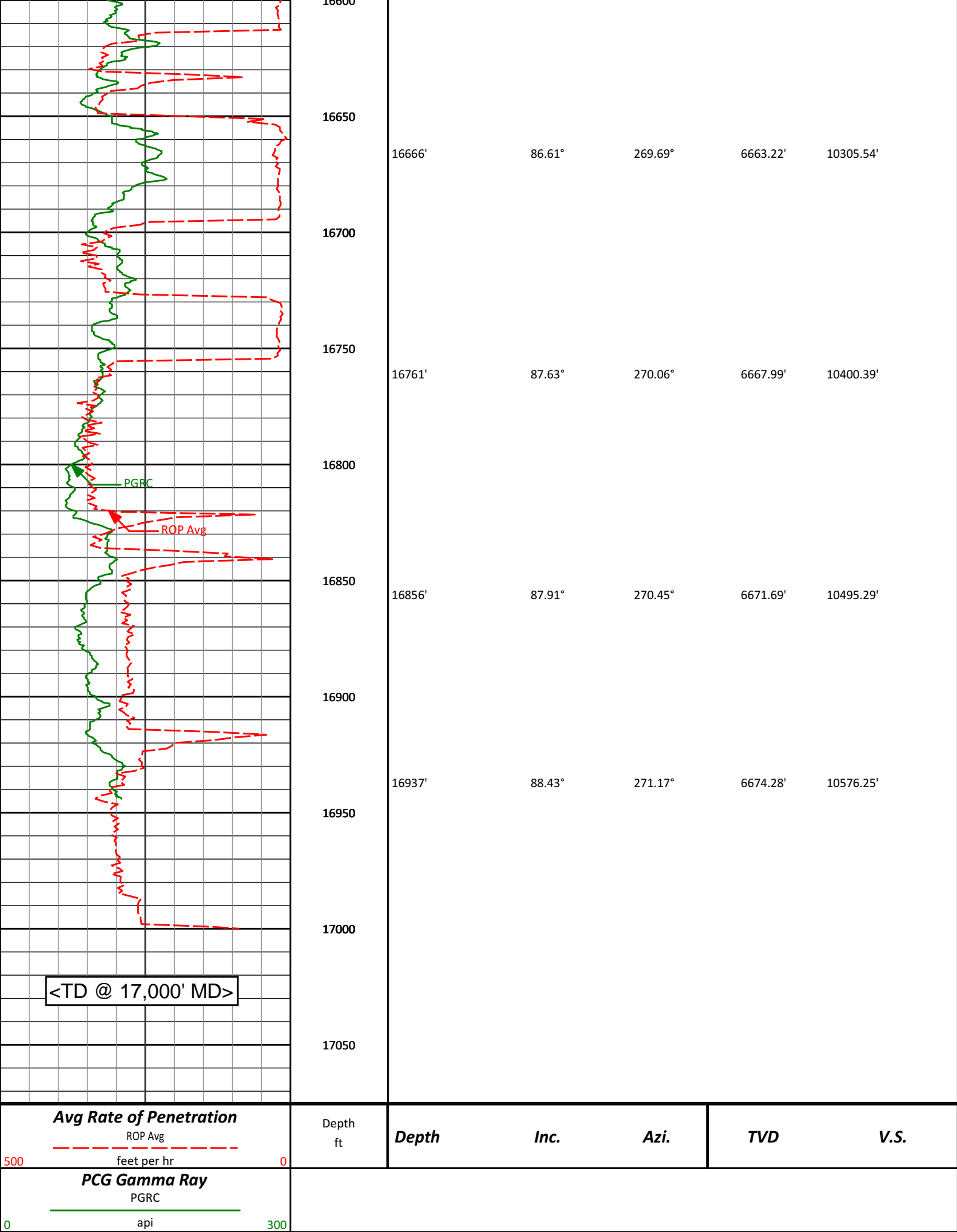


15500
15550
15600
15650
15700
15750
15800
15850
15900
15950
16000
16050

15527'	89.63°	269.02°	6655.04'	9170.59'
15622'	89.11°	268.69°	6656.08'	9265.49'
15717'	90.40°	268.22°	6656.49'	9360.35'
15812'	89.48°	268.48°	6656.59'	9455.21'
15907'	90.34°	268.47°	6656.74'	9550.08'
16002'	90.77°	267.48°	6655.82'	9644.90'



16050					
16100	16097'	91.11°	267.12°	6654.26'	9739.64'
16150					
16200	16192'	91.48°	267.07°	6652.11'	9834.34'
16250					
16300	16287'	90.46°	265.77°	6650.51'	9928.96'
16350					
16400	16382'	88.55°	263.51°	6651.33'	10023.28'
16450					
16500	16477'	87.81°	264.27°	6654.34'	10117.40'
16550					
16600	16571'	87.41°	266.96°	6658.26'	10210.82'



<TD @ 17,000' MD>

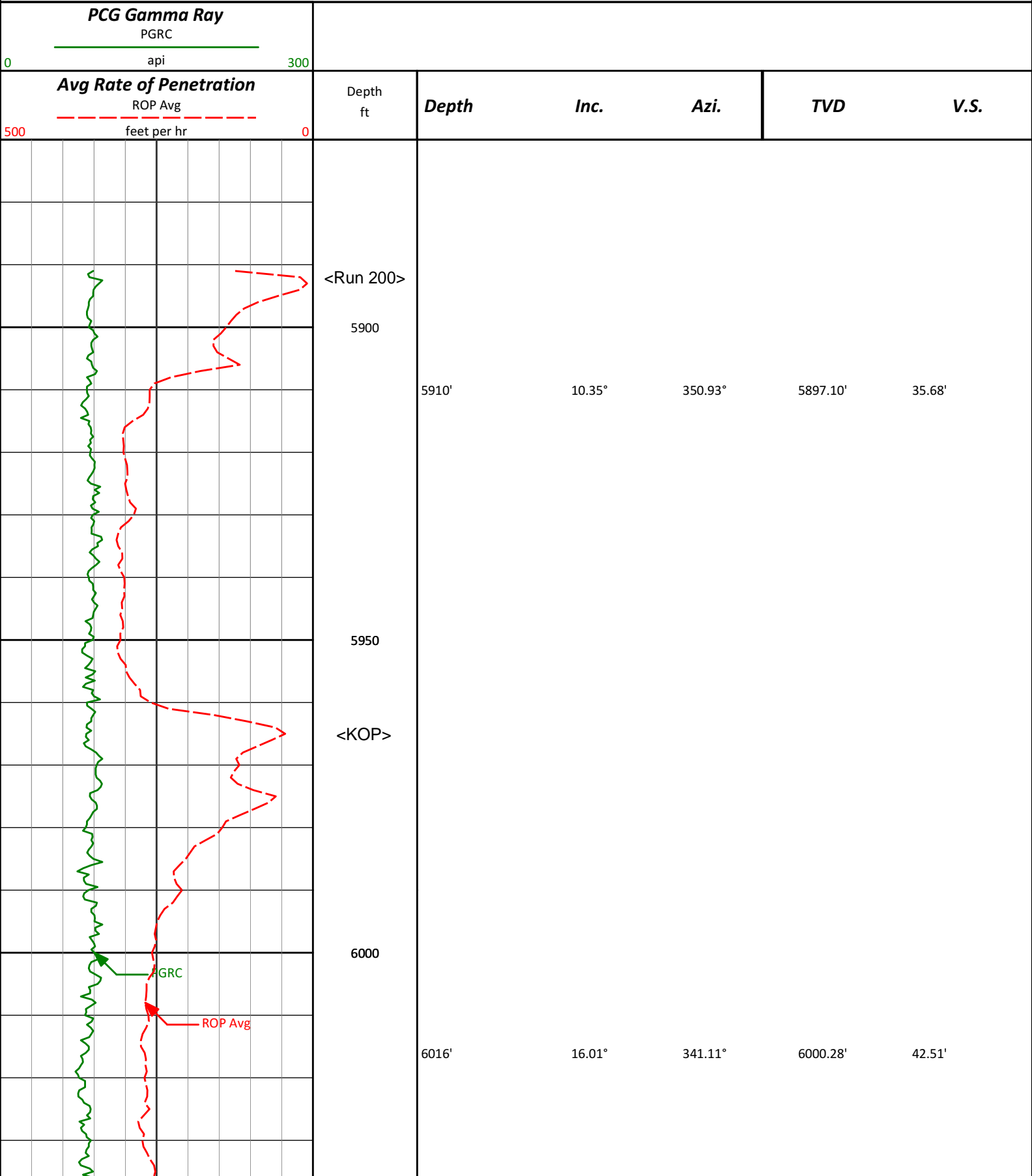
Avg Rate of Penetration
ROP Avg
feet per hr
PCG Gamma Ray
PGRC
api

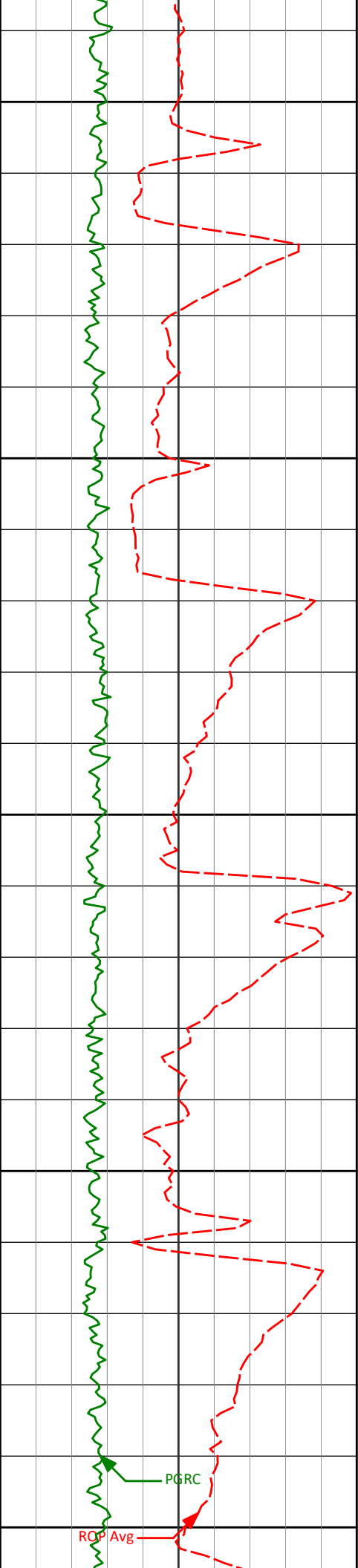
Depth ft **Depth** **Inc.** **Azi.** **TVD** **V.S.**

Sperry Drilling Services

MD Detail Log 1:240

Noble Energy, Inc
Lucci State B03-69-HNL
H&P 315
T5N R64W





6050

6064'

20.27°

336.37°

6045.88'

48.34'

6100

6111'

23.47°

335.19°

6089.50'

55.93'

6150

6159'

27.02°

331.97°

6132.91'

65.53'

6200

6206'

30.99°

327.90°

6174.01'

77.48'

6250

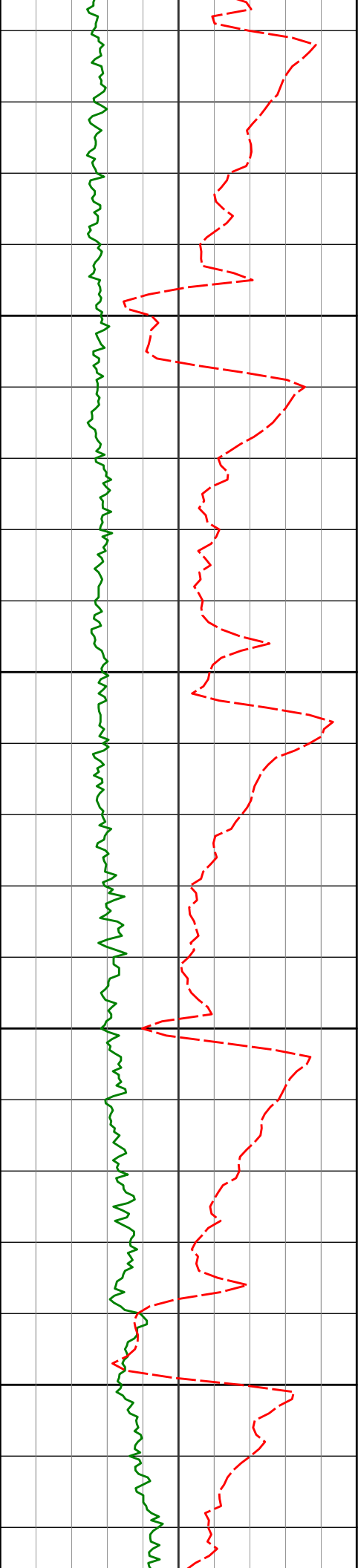
6254'

34.20°

320.92°

6214.46'

93.08'



6300

6301'

37.14°

316.63°

6252.64'

111.68'

6350

6349'

38.21°

309.17°

6290.65'

133.64'

6400

6396'

37.61°

299.98°

6327.76'

157.76'

6450

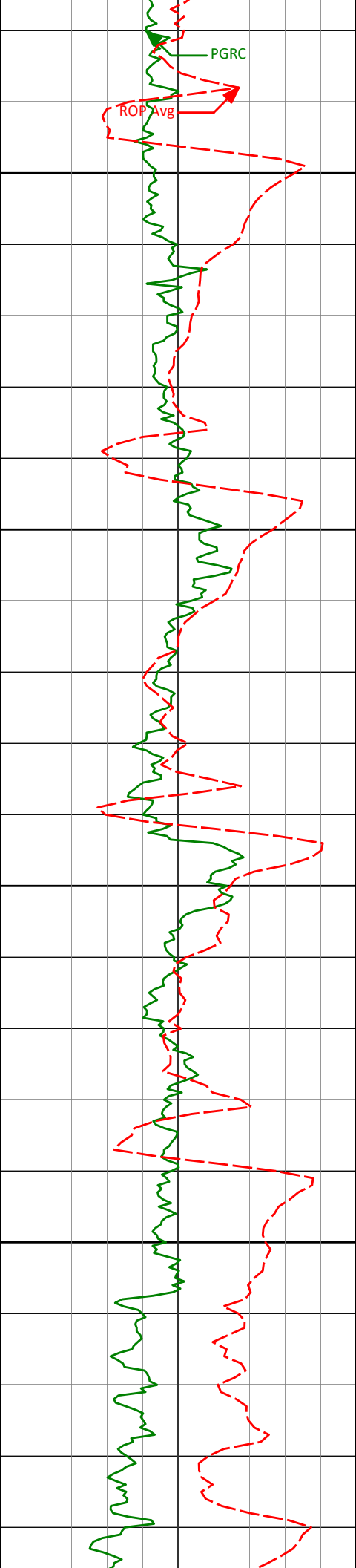
6444'

41.26°

297.62°

6364.83'

184.85'



6500

6550

6600

6650

6491'

45.35°

295.79°

6399.03'

214.00'

6539'

48.03°

290.45°

6431.96'

246.45'

6586'

50.43°

284.85°

6462.67'

280.61'

6634'

55.28°

284.22°

6491.64'

317.87'

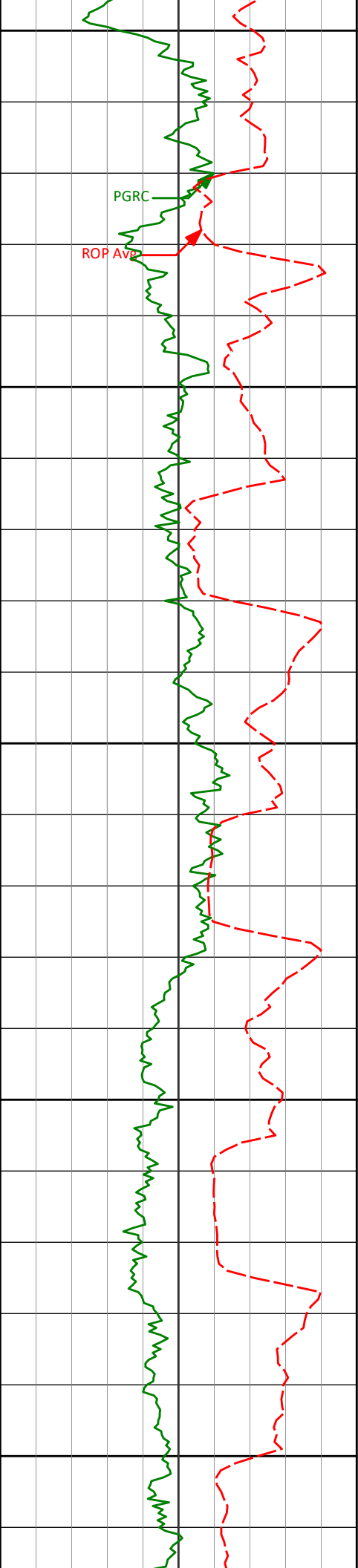
6681'

59.09°

281.02°

6517.11'

356.61'



6700

6729'

63.75°

278.60°

6540.07'

398.30'

6750

6775'

68.01°

279.25°

6558.87'

439.92'

6800

6823'

72.77°

279.95°

6574.97'

484.66'

6850

6870'

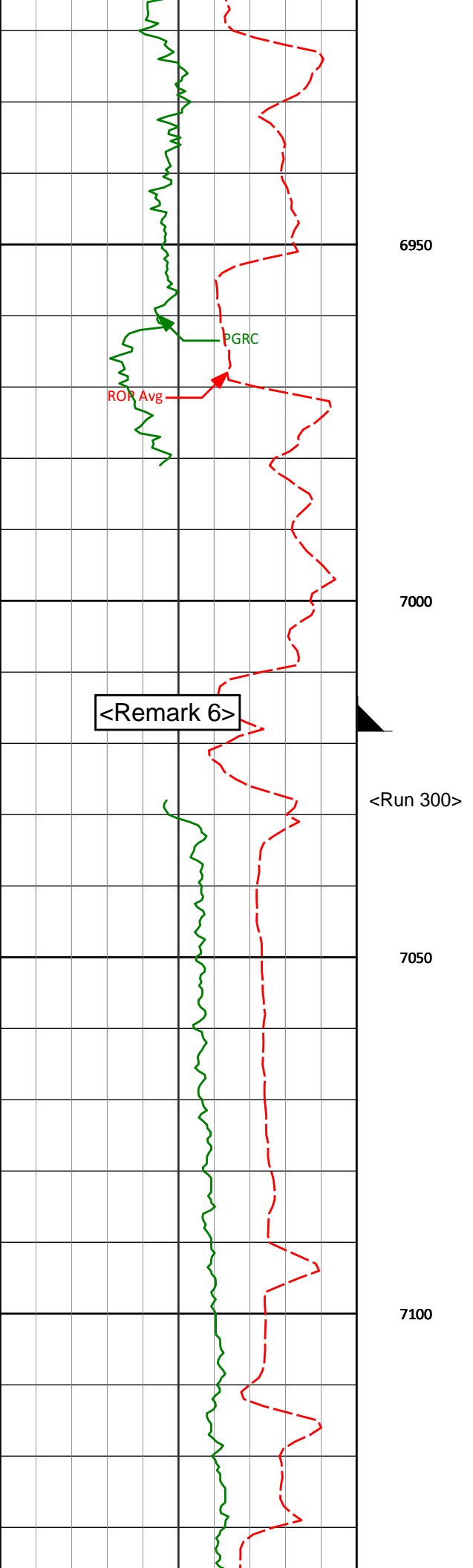
76.40°

278.10°

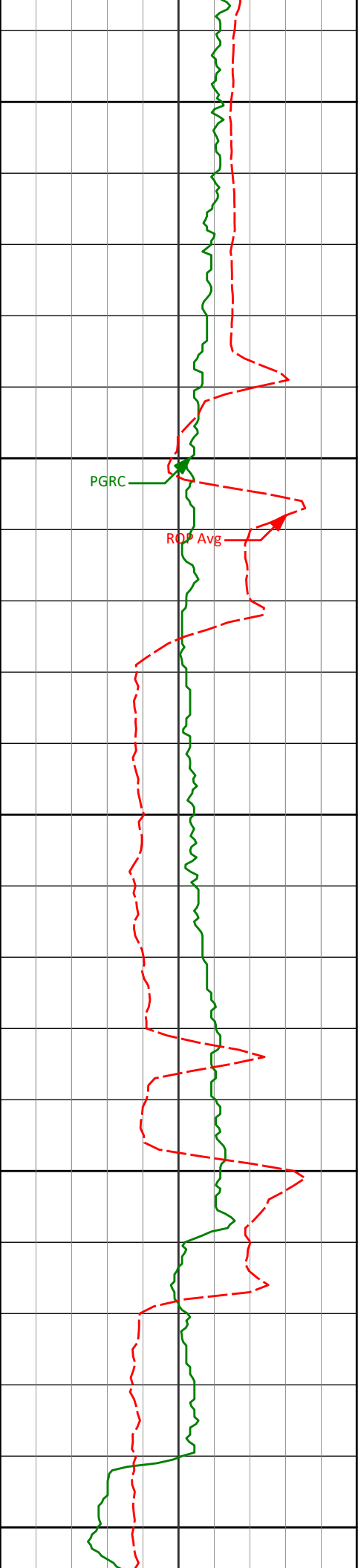
6587.46'

529.57'

6900



6918'	78.01°	274.65°	6598.10'	576.19'
6950				
6974'	83.04°	273.16°	6607.31'	631.36'
7000				
<Remark 6>	<7" casing set at 7018' MD>			
<Run 300>				
7050				
7100				
7126'	88.98°	271.09°	6617.89'	782.90'



7150

7200

7250

7300

7350

PGRC

ROP Avg

7221'

89.17°

269.85°

6619.42'

877.88'

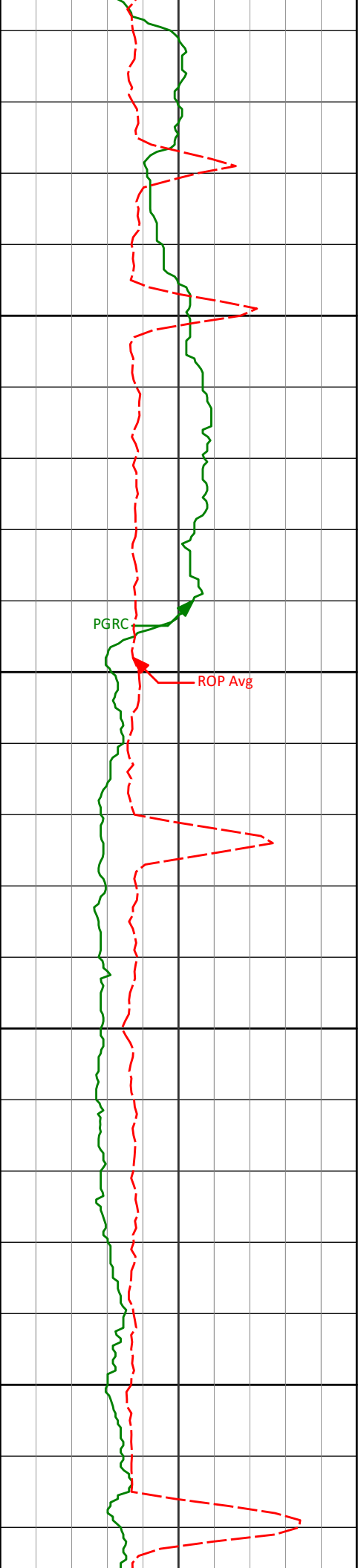
7316'

88.30°

268.41°

6621.52'

972.77'



7400

7411'

89.20°

267.70°

6623.59'

1067.58'

7450

7500

7506'

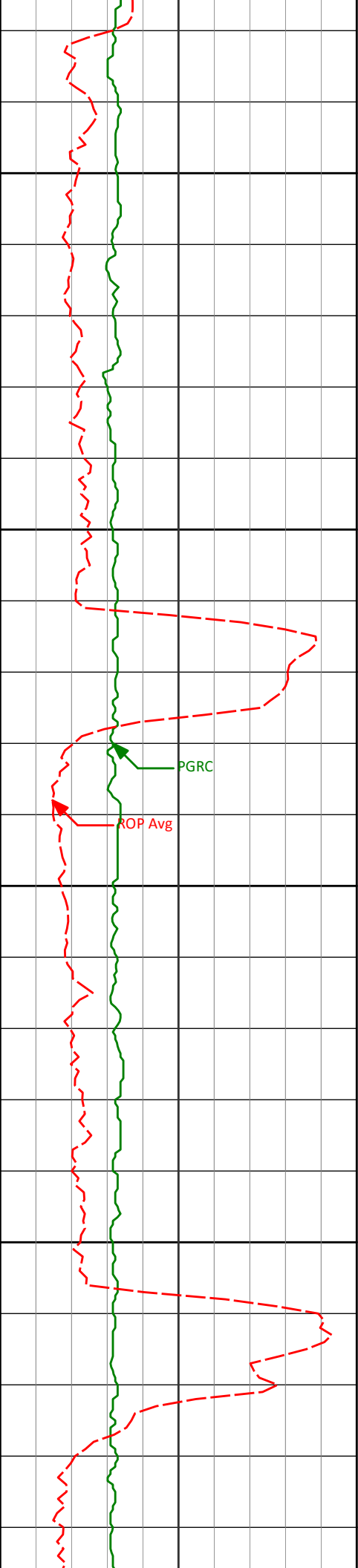
89.32°

266.79°

6624.82'

1162.32'

7550



7600

7601'

89.54°

267.30°

6625.76'

1257.03'

7650

7700

7696'

90.68°

270.38°

6625.58'

1351.92'

7750

7790'

90.34°

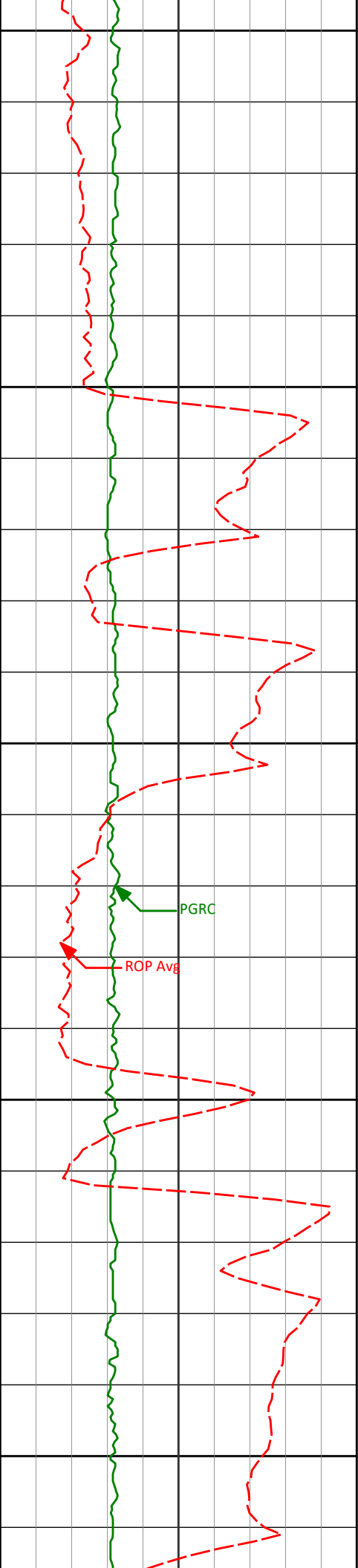
271.25°

6624.74'

1445.91'

PGRC

ROP Avg



7800

7850

7900

7950

8000

7885'

90.37°

271.31°

6624.15'

1540.91'

7980'

89.85°

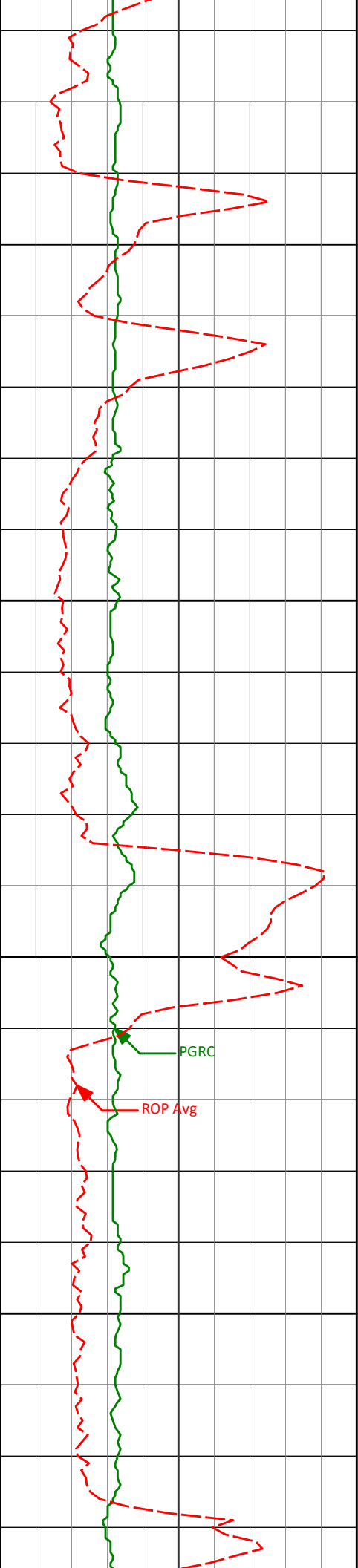
269.29°

6623.97'

1635.88'

PGRC

ROP Avg



8050

8075'

89.63°

268.18°

6624.40'

1730.77'

8100

8150

PGRC

ROP Avg

8170'

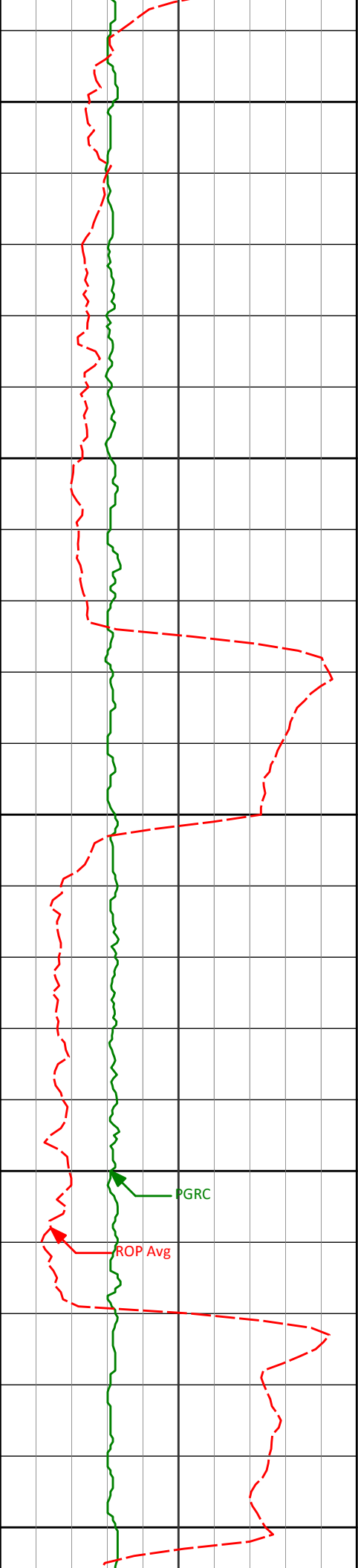
88.27°

267.09°

6626.14'

1825.54'

8200



8250

8265'

89.63°

269.12°

6627.88'

1920.36'

8300

8350

8360'

89.60°

269.39°

6628.52'

2015.28'

8400

PGRC

ROP Avg

8450

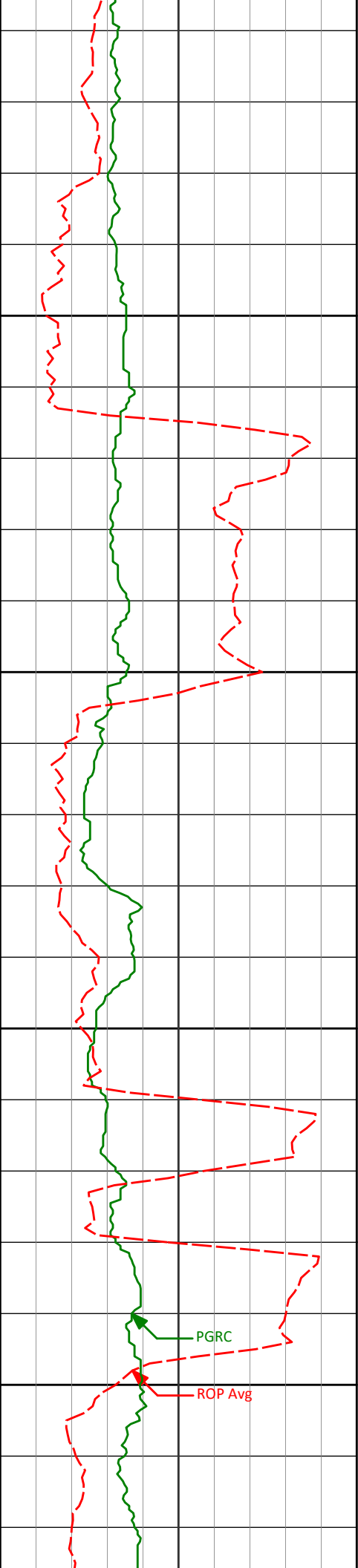
8455'

89.04°

268.79°

6629.65'

2110.20'



8500

8550

8600

8650

8549'

86.98°

266.63°

6632.92'

2203.93'

8644'

88.03°

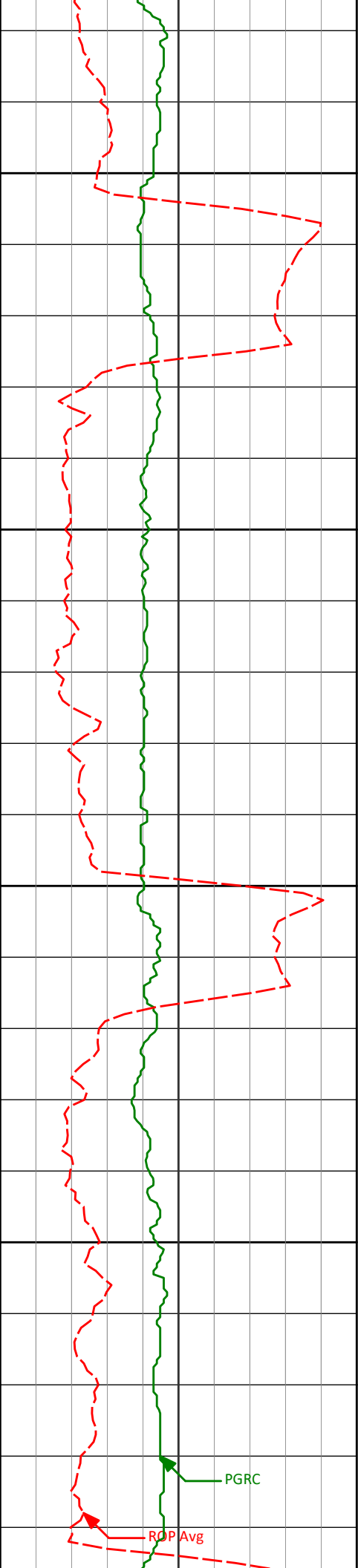
266.65°

6637.05'

2298.50'

PGRC

ROP Avg



8700

8739'

88.95°

267.53°

6639.55'

2393.19'

8750

8800

8834'

91.29°

268.37°

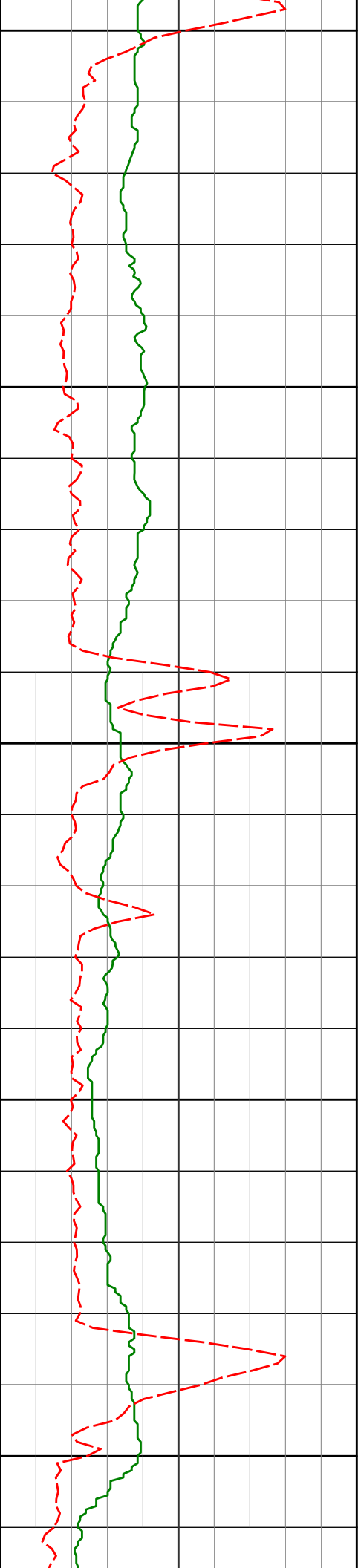
6639.35'

2488.01'

8850

PGRC

ROP Avg



8900

8929'

91.36°

268.72°

6637.16'

2582.86'

8950

9000

9023'

91.20°

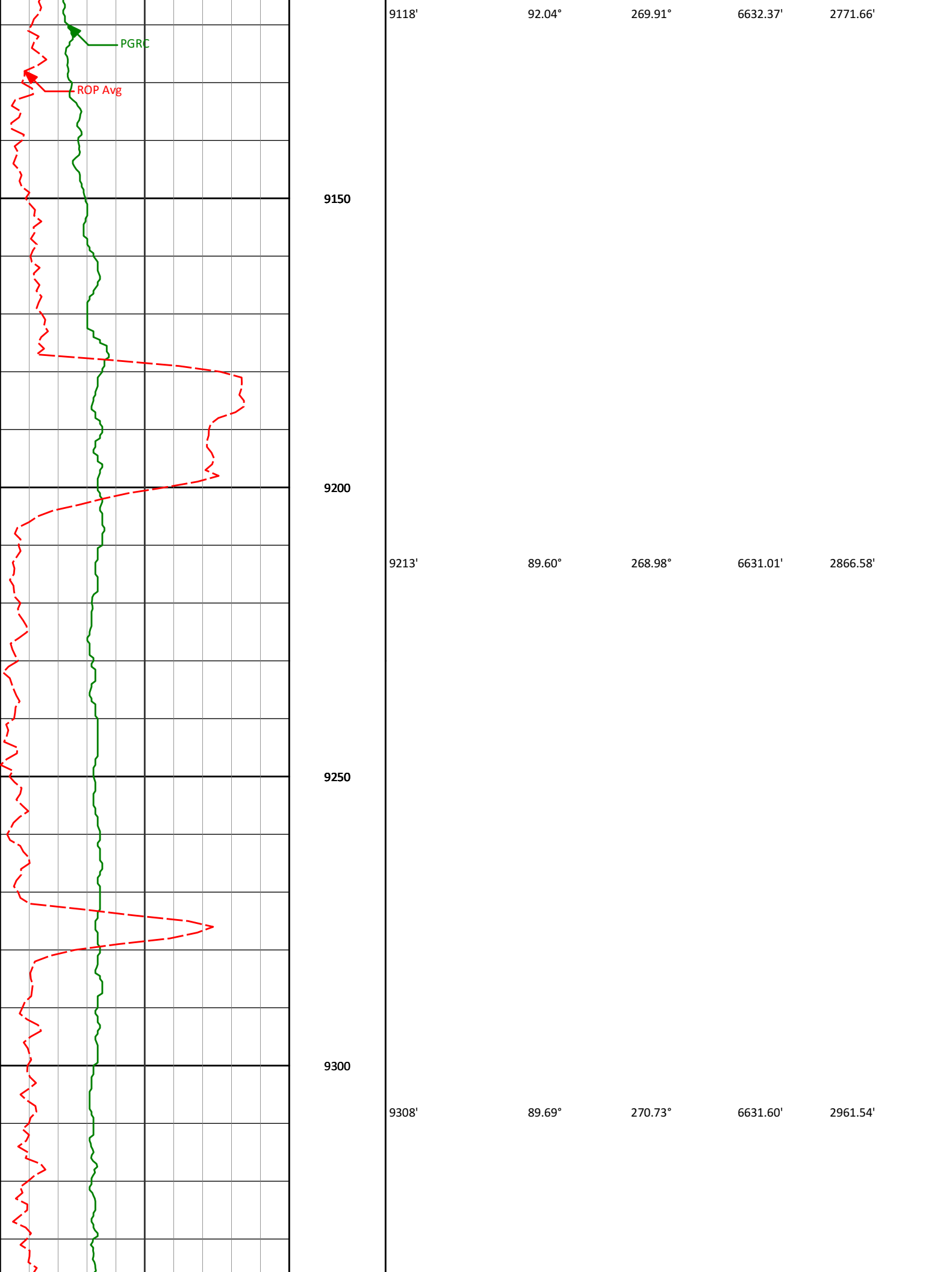
269.24°

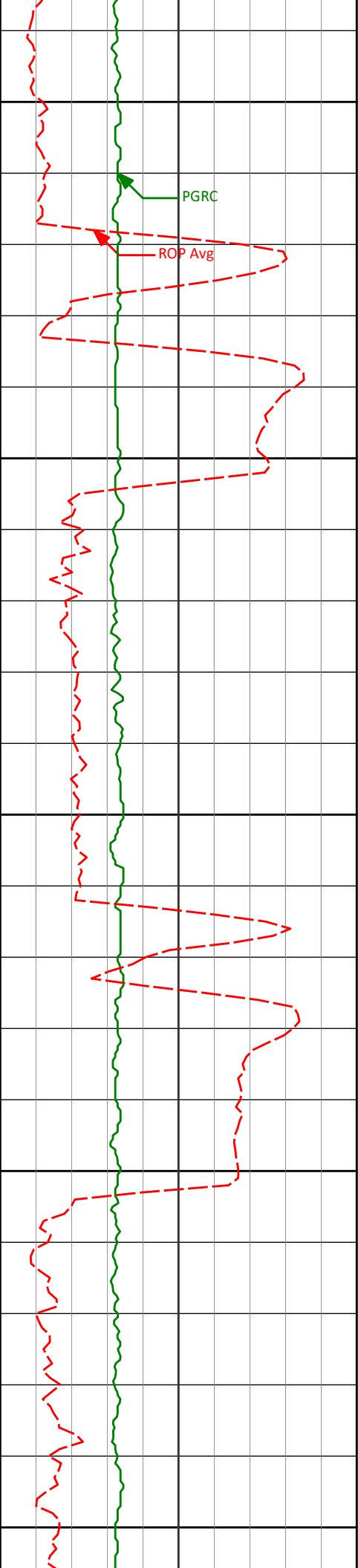
6635.06'

2676.75'

9050

9100





9350

PGRC

ROP Avg

9400

9403'

89.41°

271.82°

6632.35'

3056.54'

9450

9500

9498'

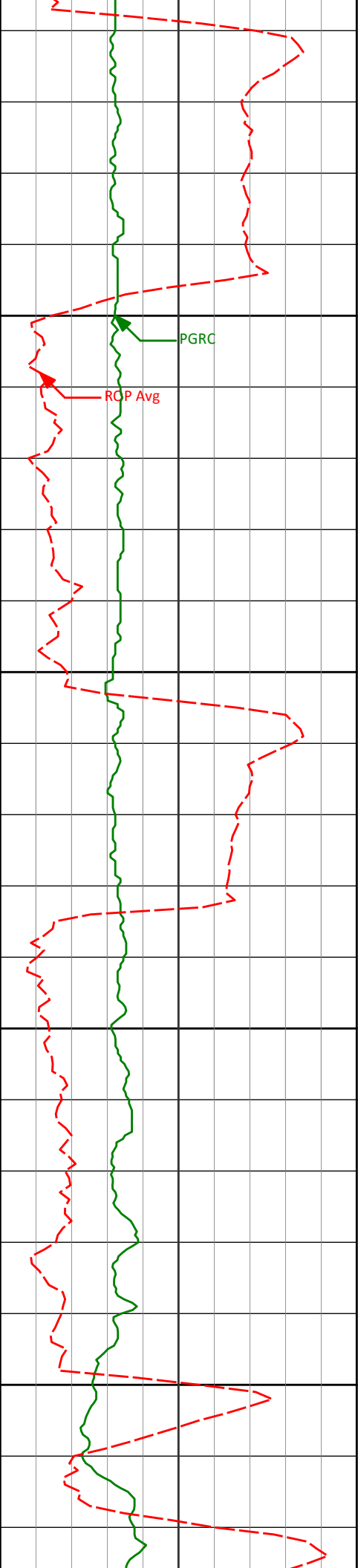
89.63°

271.71°

6633.14'

3151.53'

9550



9600

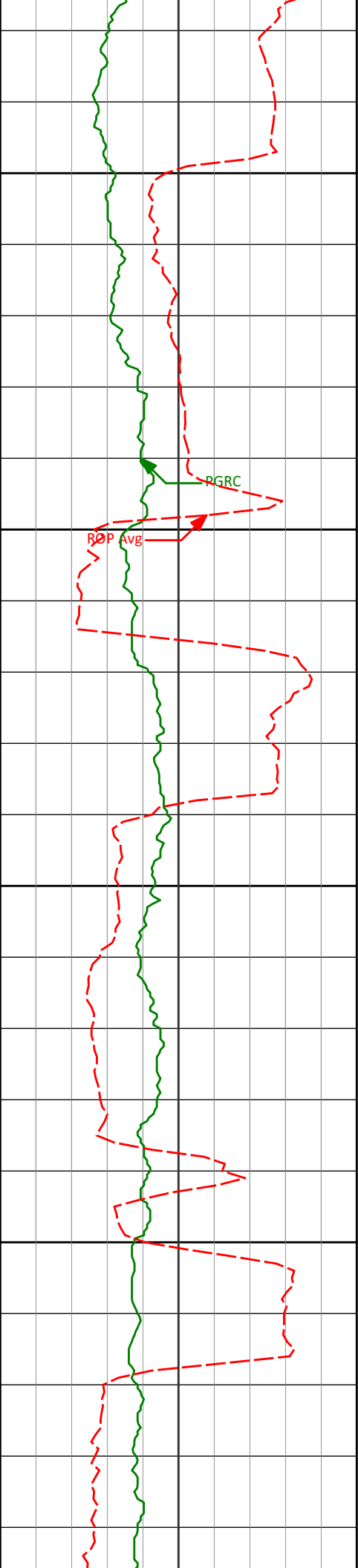
9650

9700

9750

9593'	89.63°	270.09°	6633.76'	3246.52'
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9688'	87.35°	268.32°	6636.26'	3341.41'
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9800

9850

9900

9950

9783'

87.07°

267.23°

6640.89'

3436.10'

9877'

88.61°

267.40°

6644.43'

3529.78'

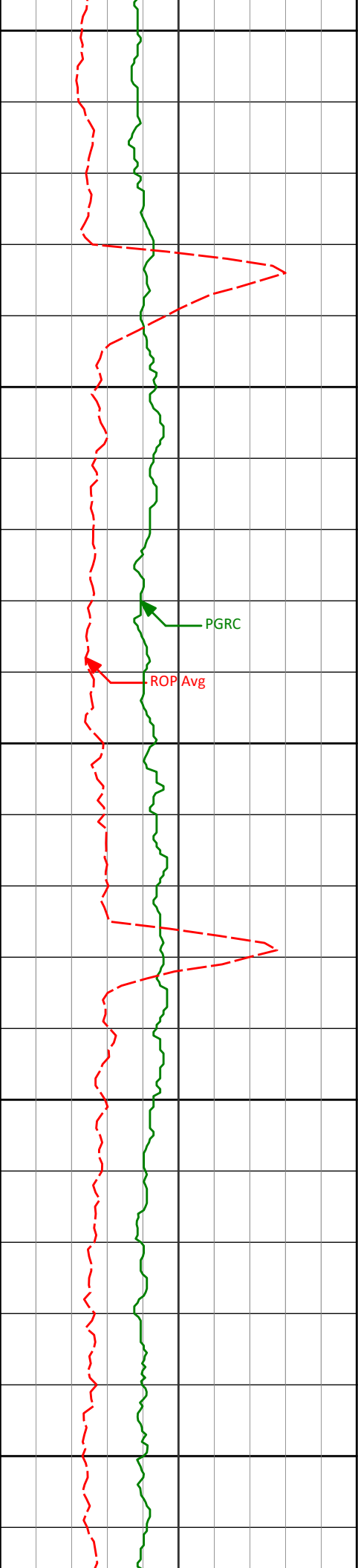
9972'

89.91°

267.22°

6645.66'

3624.53'



10000

10050

10100

10150

10200

10067'

90.96°

268.46°

6644.93'

3719.33'

ROP Avg

PGRC

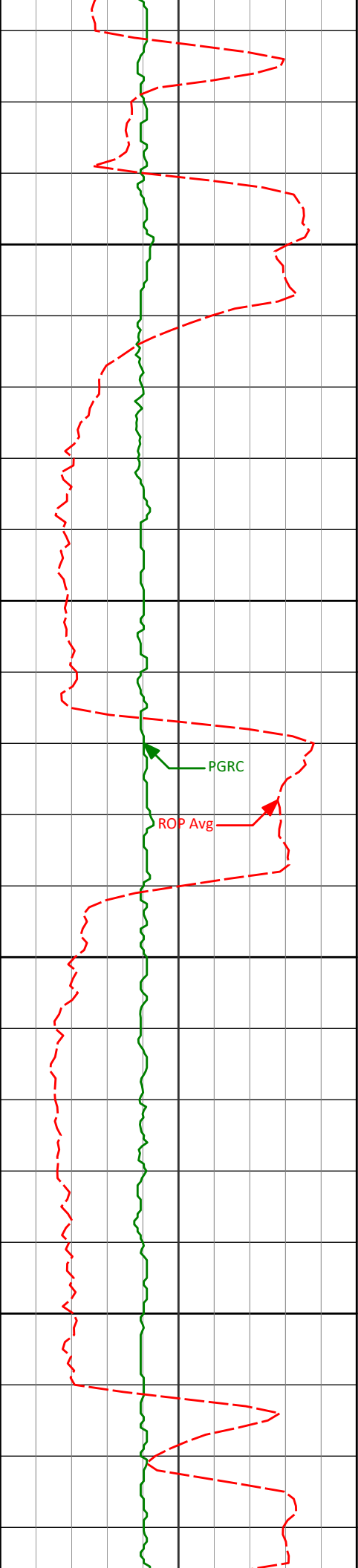
10162'

89.01°

266.92°

6644.96'

3814.12'



10250

10257'

89.60°

267.79°

6646.11'

3908.87'

10300

PGRC

ROP Avg

10350

10352'

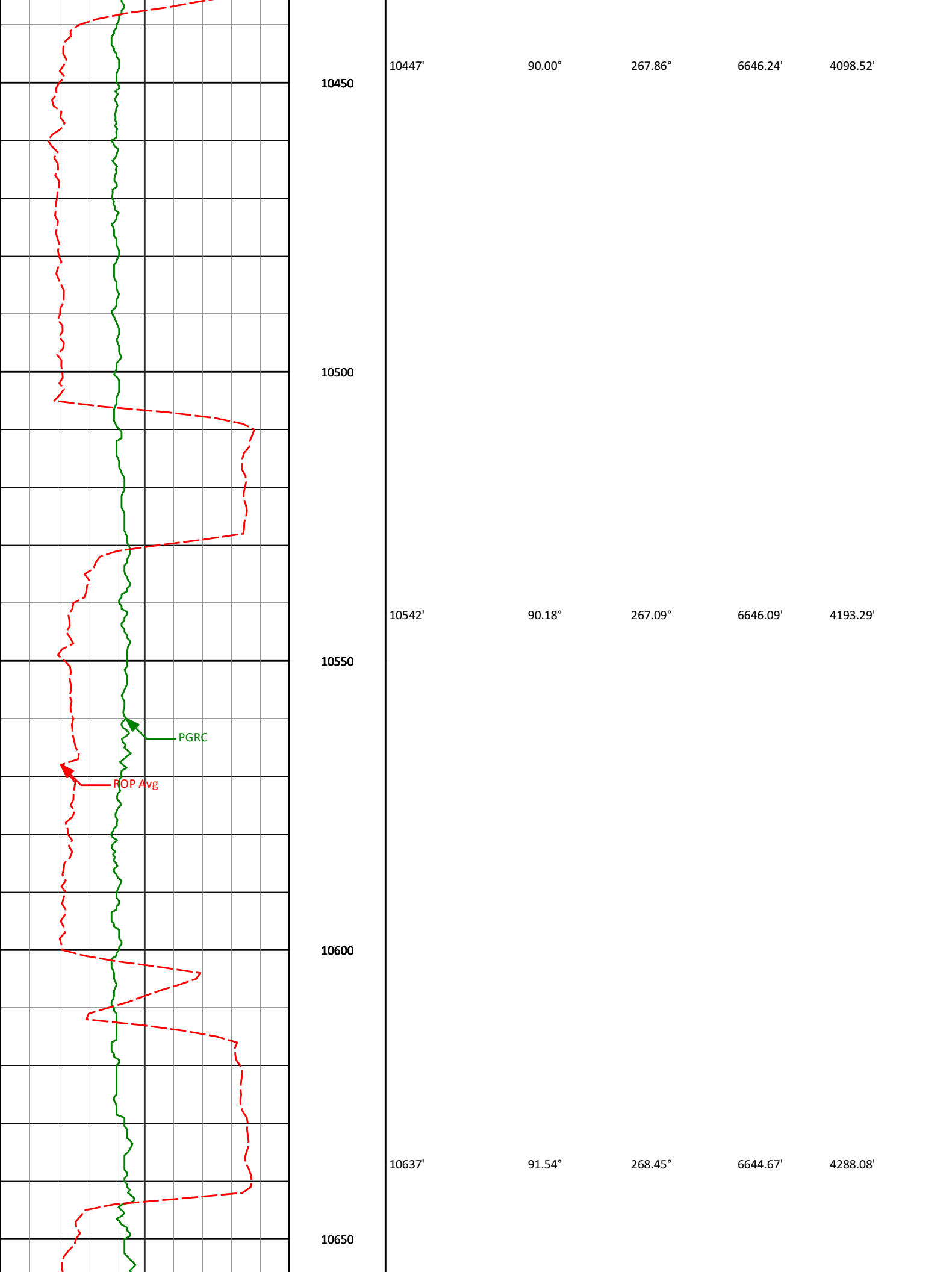
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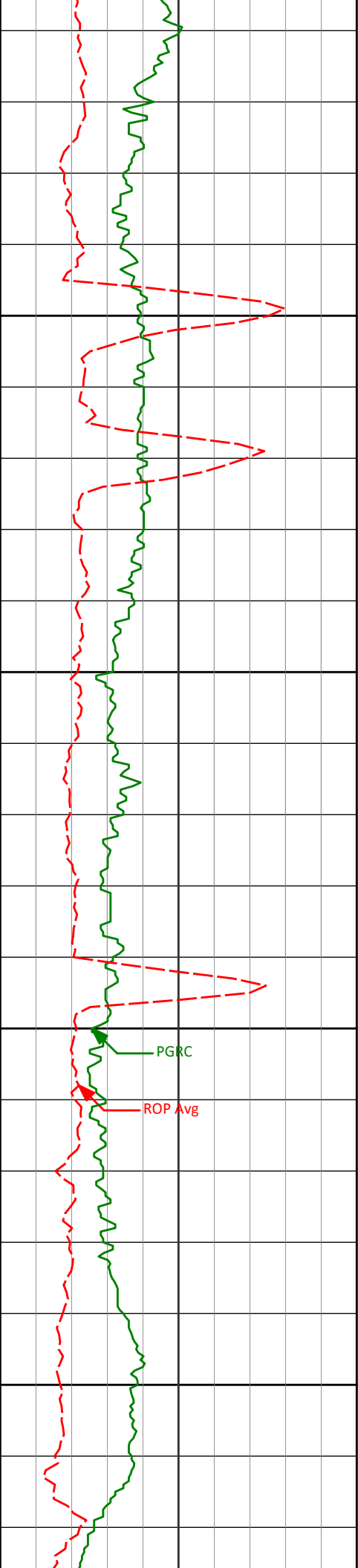
268.14°

6646.34'

4003.69'

10400





10700

10750

10800

10850

10732'

91.32°

268.73°

6642.30'

4382.93'

10827'

91.82°

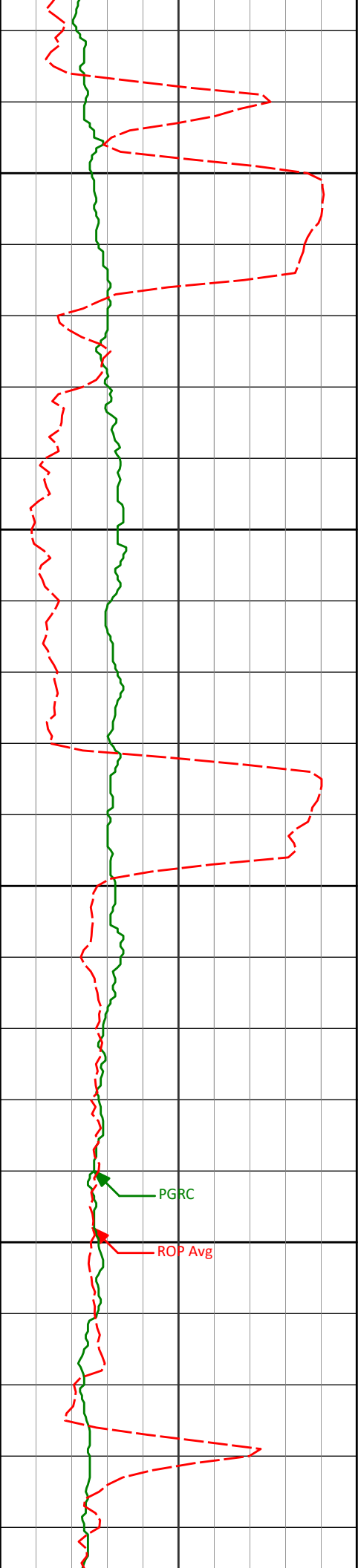
268.51°

6639.70'

4477.78'

PGRC

ROP Avg



10900

10922'

91.11°

268.93°

6637.27'

4572.64'

10950

11000

11017'

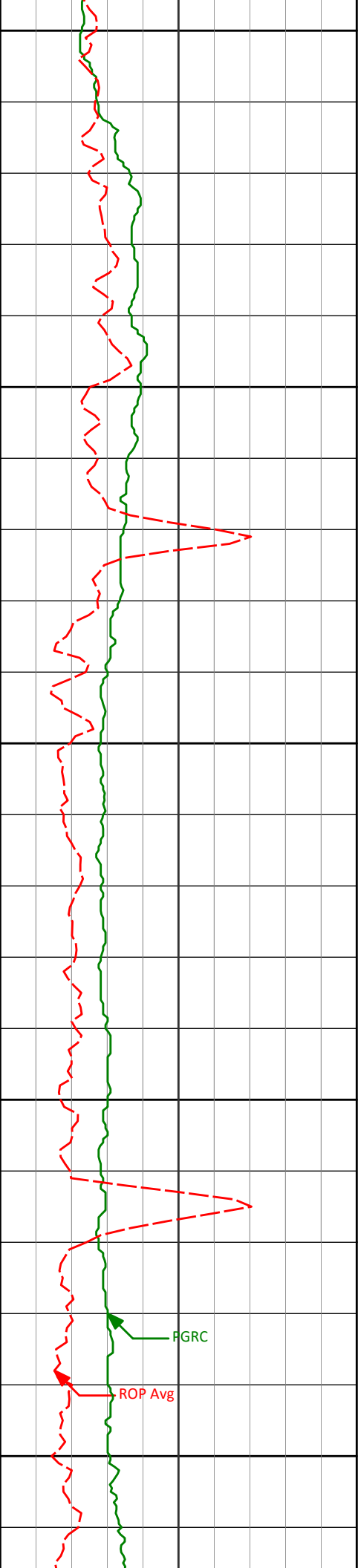
89.01°

269.59°

6637.17'

4667.56'

11050



11100

11110'

89.48°

269.45°

6638.39'

4760.50'

11150

11200

11202'

90.06°

269.81°

6638.76'

4852.46'

11250

11300

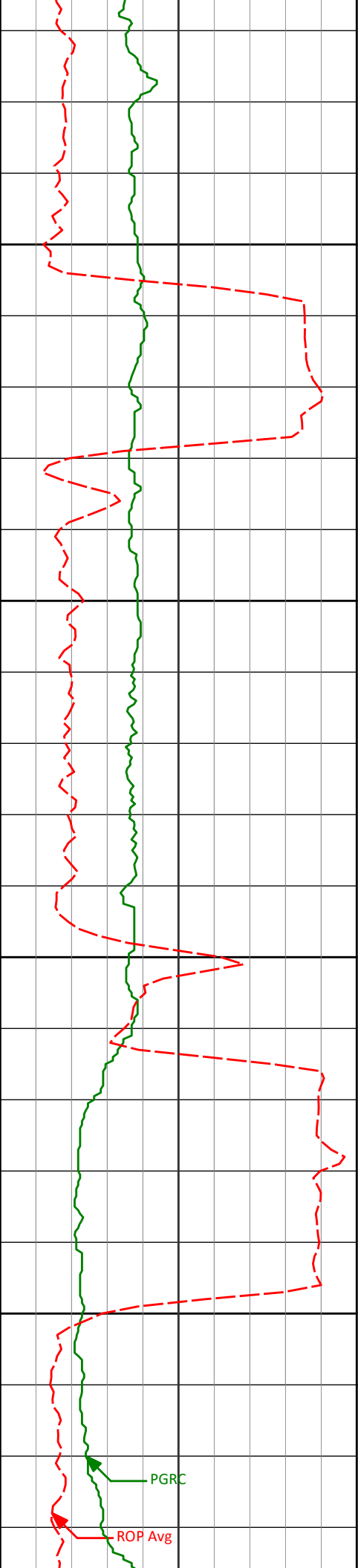
11295'

91.60°

271.81°

6637.41'

4945.43'



11350

11387'

90.28°

271.42°

6635.91'

5037.42'

11400

11450

11480'

89.60°

271.82°

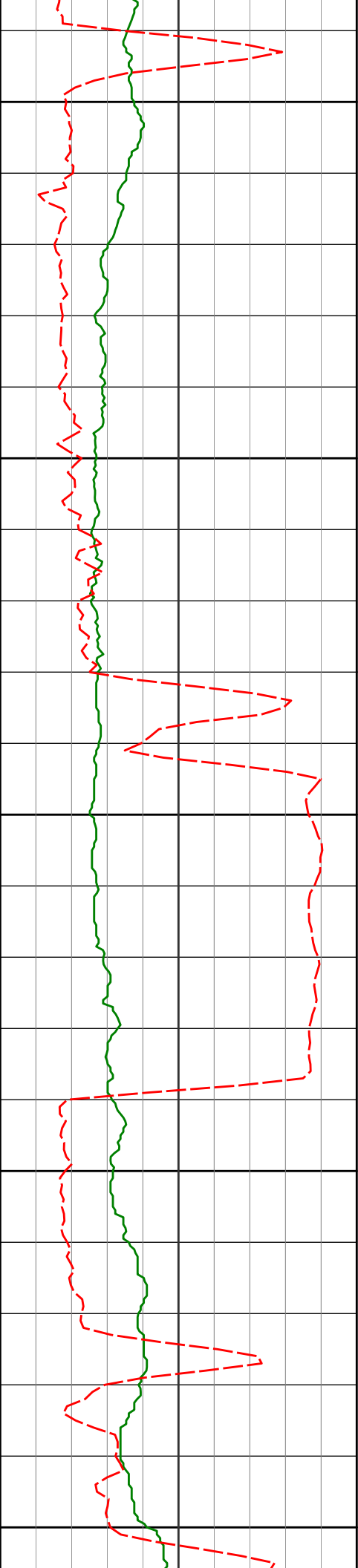
6636.00'

5130.42'

11500

PGRC

ROP Avg



11550

11574'

89.54°

271.90°

6636.71'

5224.41'

11600

11650

11666'

88.68°

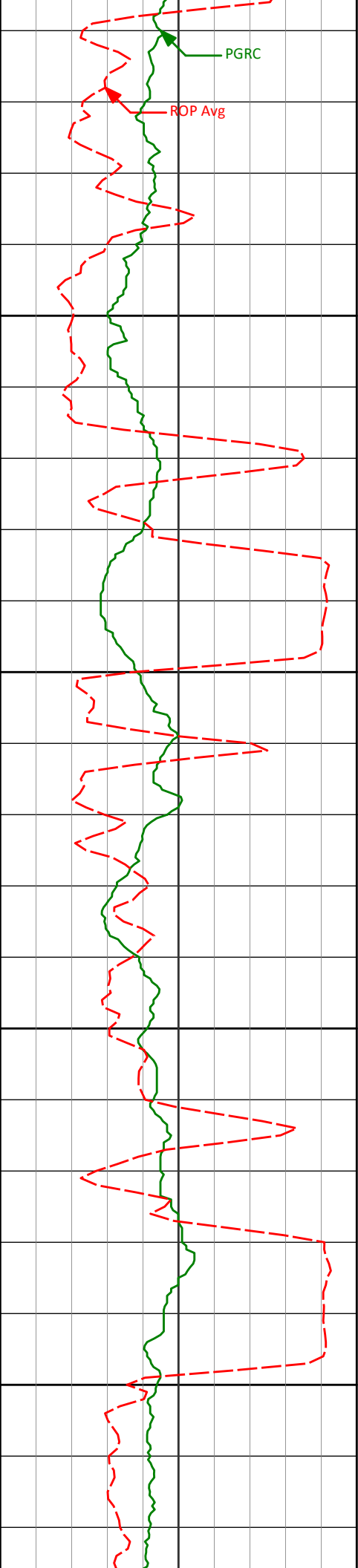
269.12°

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5316.38'

11700

11750



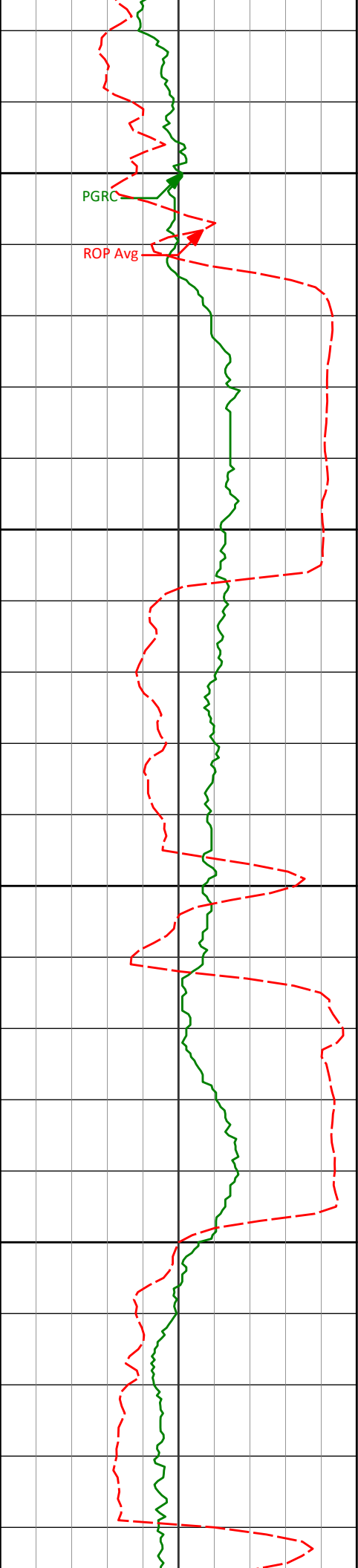
11800

11850

11900

11950

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11851'	86.61°	267.96°	6647.08'	5500.90'
11943'	86.73°	267.47°	6652.42'	5592.55'



12000

12037'

88.15°

268.27°

6656.62'

5686.27'

12050

12100

12129'

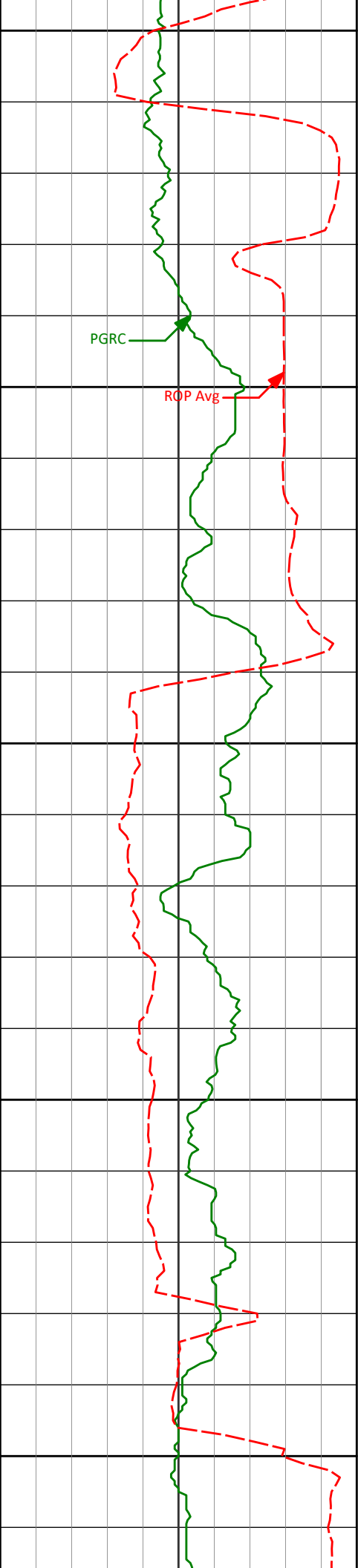
90.06°

267.94°

6658.06'

5778.10'

12150



12200

12222'

90.77°

267.71°

6657.38'

5870.91'

12250

12300

12315'

90.28°

267.31°

6656.53'

5963.68'

12350

12400

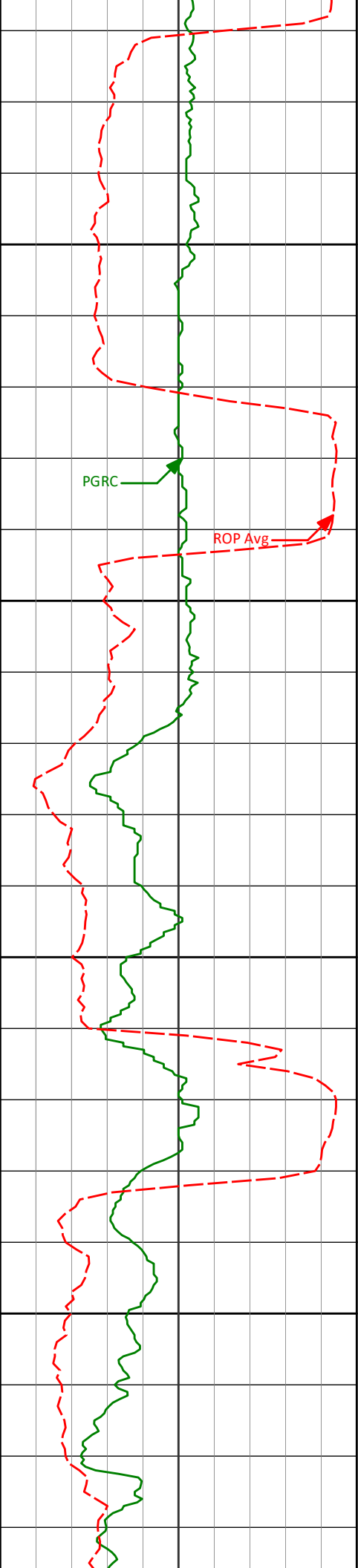
12408'

90.03°

267.38°

6656.28'

6056.45'



12450

PGRC

ROP Avg

12500

12550

12600

12501'

90.06°

268.55°

6656.21'

6149.27'

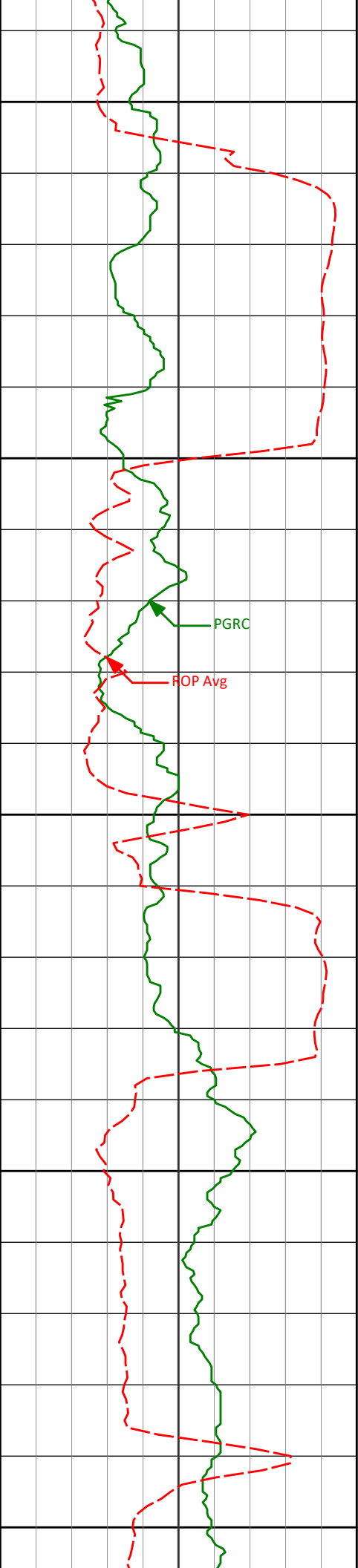
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269.23°

6656.87'

6241.18'



12650

12685'

90.43°

269.94°

6657.24'

6333.12'

12700

12750

12800

12850

12778'

91.73°

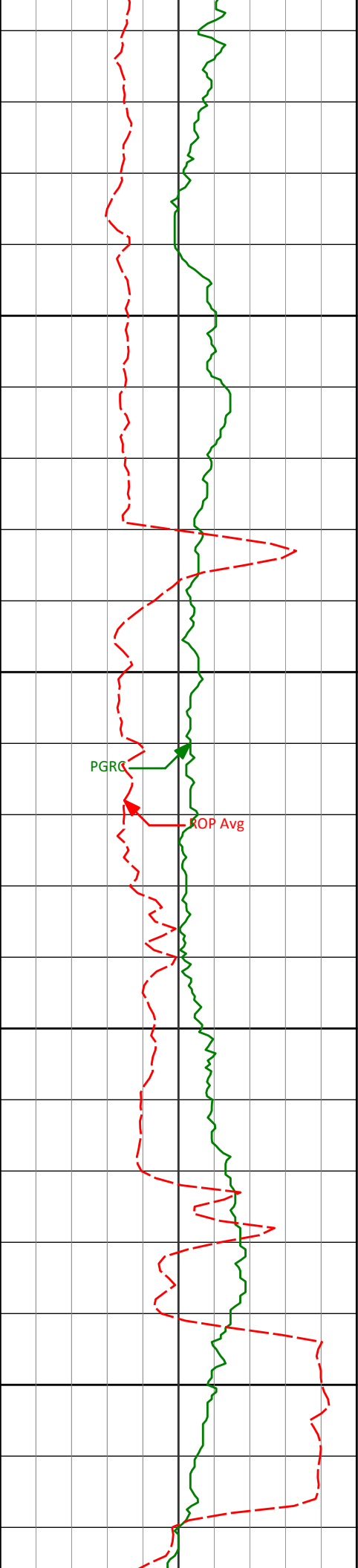
268.71°

6655.49'

6426.04'

PGRC

ROP Avg



12870'

91.66°

268.17°

6652.77'

6517.87'

12900

12950

12964'

92.62°

267.70°

6649.26'

6611.63'

13000

13050

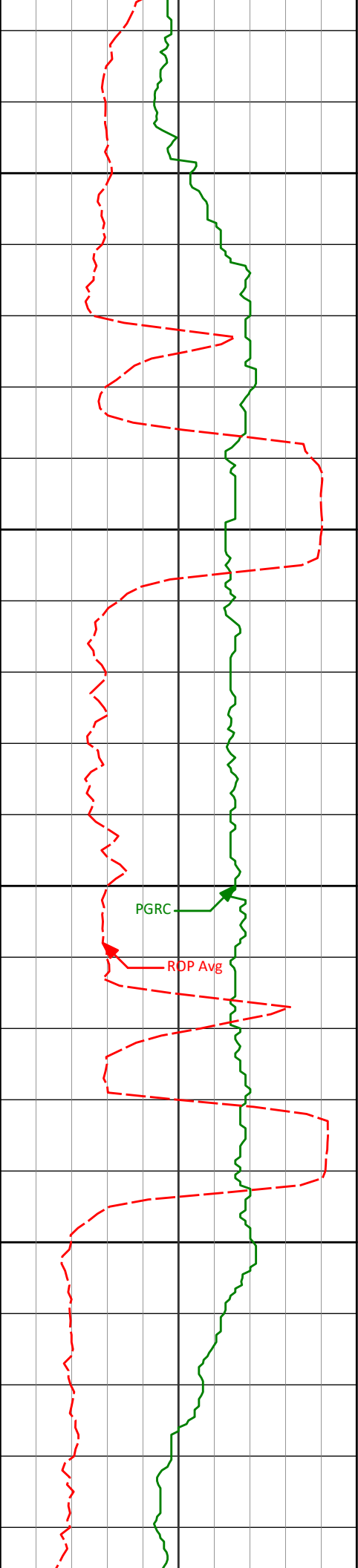
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92.13°

268.01°

6645.32'

6706.36'



13100

13150

13200

13250

13154'

90.89°

267.99°

6642.82'

6801.15'

PGRC

RDP Avg

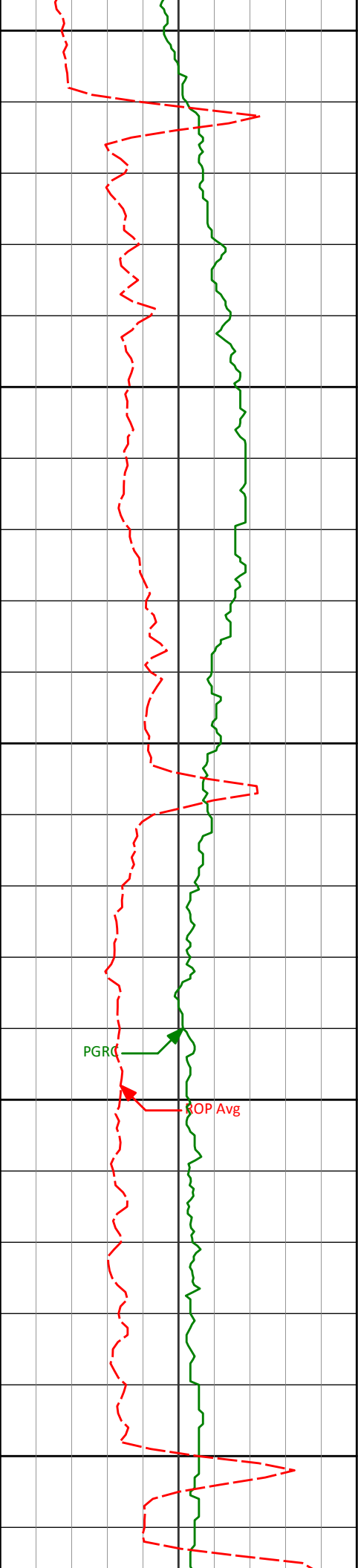
13249'

89.66°

267.71°

6642.36'

6895.96'



13300

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89.97°

267.62°

6642.67'

6990.75'

13350

13400

13439'

90.56°

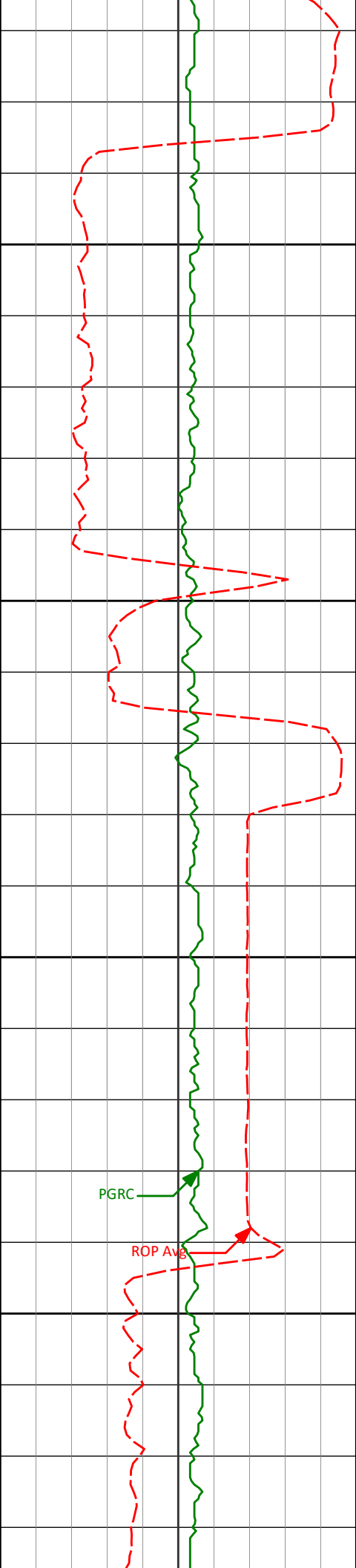
267.19°

6642.23'

7085.52'

13450

13500



13550

13600

13650

13700

PGRC

ROP Avg

13534'

90.68°

268.63°

6641.21'

7180.33'

13629'

90.12°

269.27°

6640.55'

7275.23'

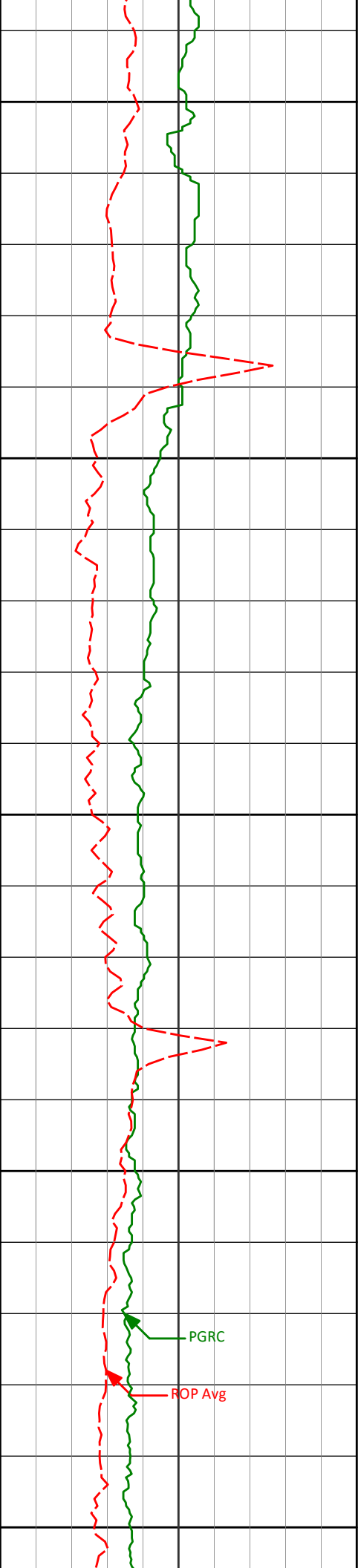
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89.97°

268.83°

6640.47'

7370.15'



13750

13800

13850

13900

13950

13819'

89.29°

268.48°

6641.09'

7465.03'

13914'

92.25°

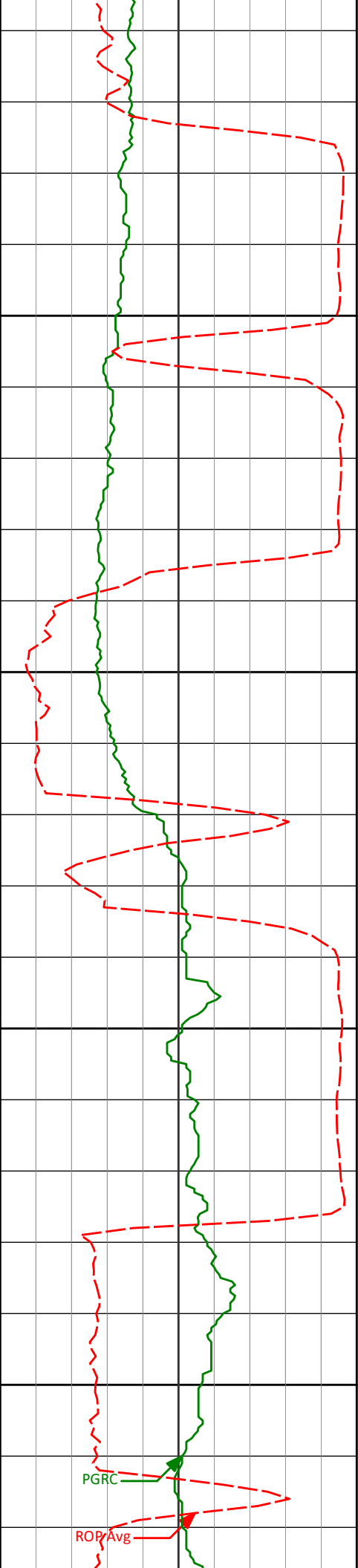
268.25°

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7559.88'

PGRC

ROP Avg



14000

14009'

92.59°

268.01°

6635.80'

7654.63'

14050

14100

14104'

89.45°

267.51°

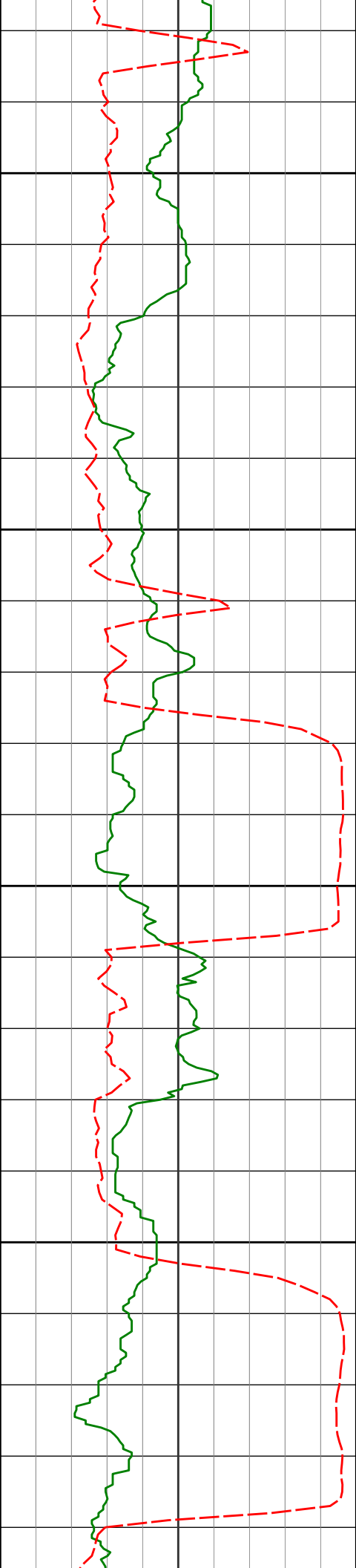
6634.11'

7749.41'

14150

PGRC

ROP Avg



14200

14250

14300

14350

14198'

14293'

14388'

87.59°

86.67°

86.08°

267.26°

268.09°

268.69°

6636.54'

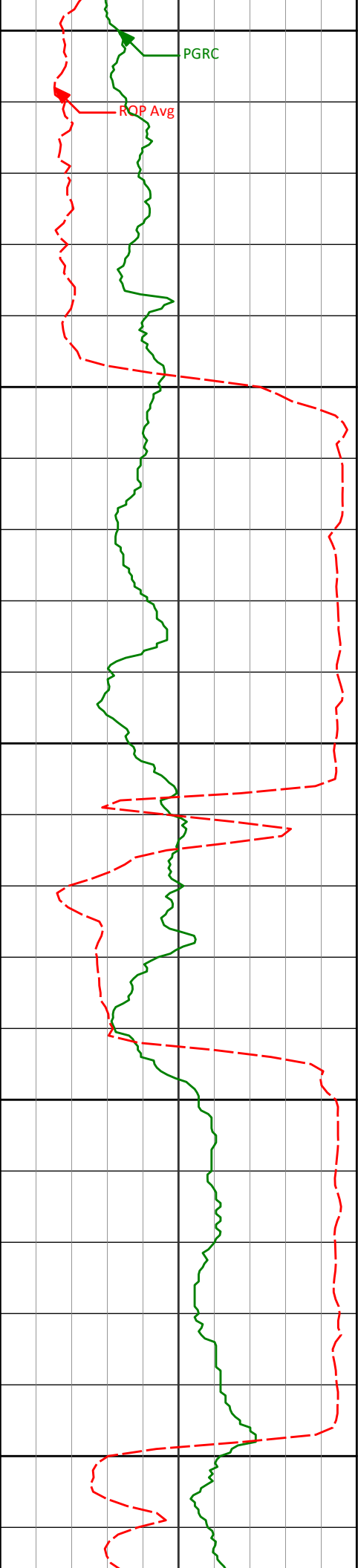
6641.29'

6647.30'

7843.14'

7937.81'

8032.48'



14400

PGRC

ROP Avg

14450

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86.14°

270.18°

6653.74'

8127.20'

14500

14550

14578'

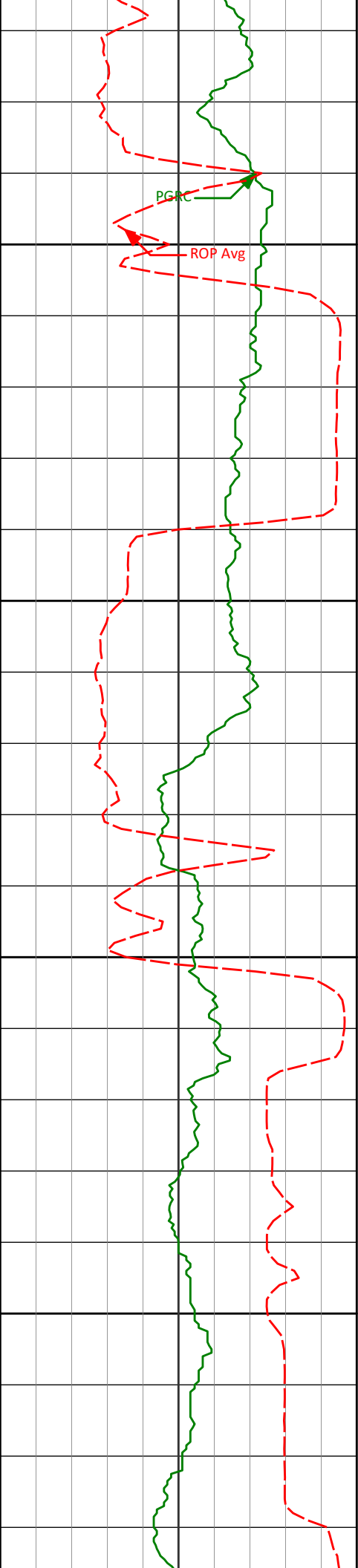
88.36°

271.88°

6658.30'

8222.08'

14600



14650

14673'

89.51°

271.01°

6660.07'

8317.06'

14700

14750

14768'

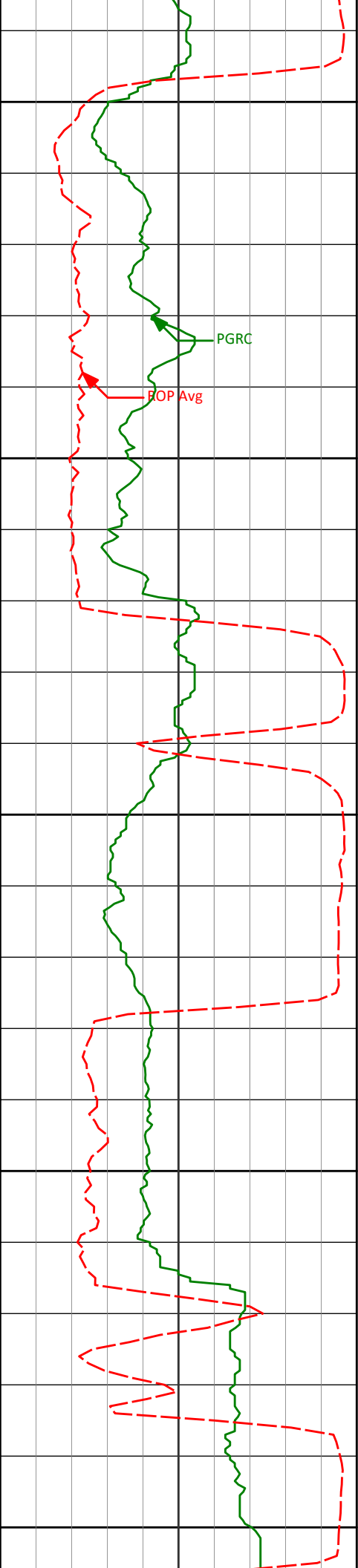
89.81°

270.45°

6660.63'

8412.05'

14800



14850

14863'

89.45°

270.30°

6661.25'

8507.03'

PGRC

ROP Avg

14900

14950

14958'

90.06°

270.03°

6661.65'

8602.01'

15000

15050

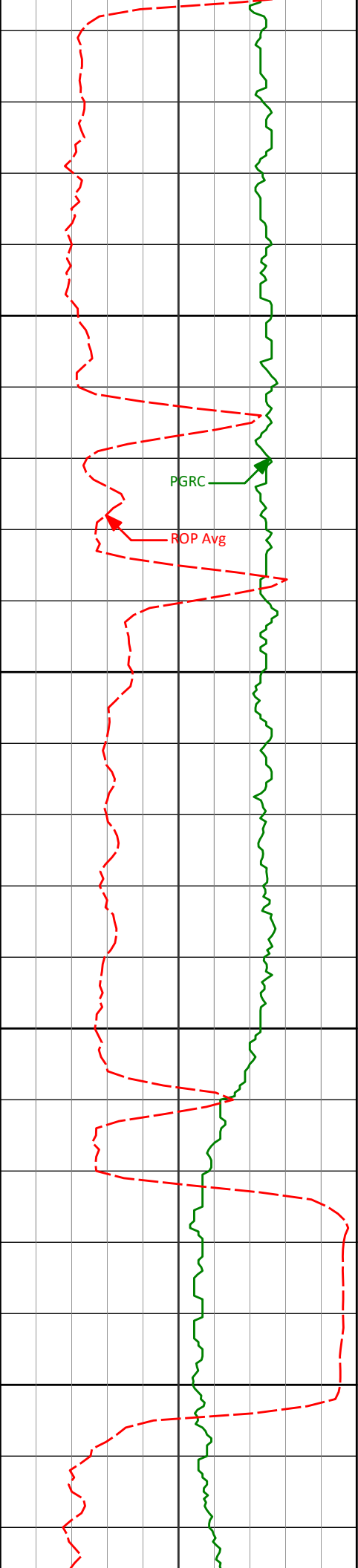
15053'

91.63°

269.99°

6660.25'

8696.97'



15100

15150

15200

15250

15148'

92.56°

270.42°

6656.78'

8791.88'

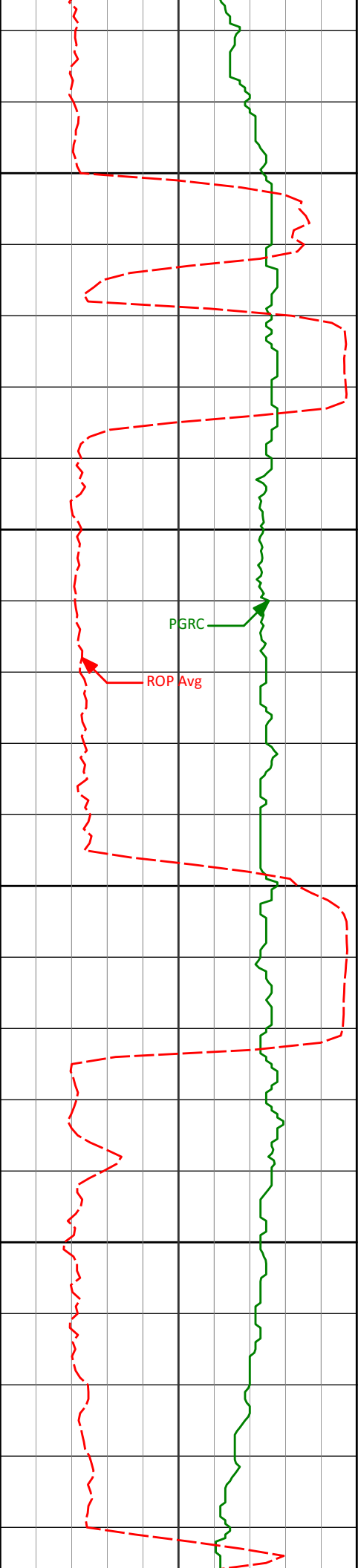
15243'

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269.99°

6654.47'

8886.82'



15300

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269.14°

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8980.77'

15350

PGRC

ROP Avg

15400

15432'

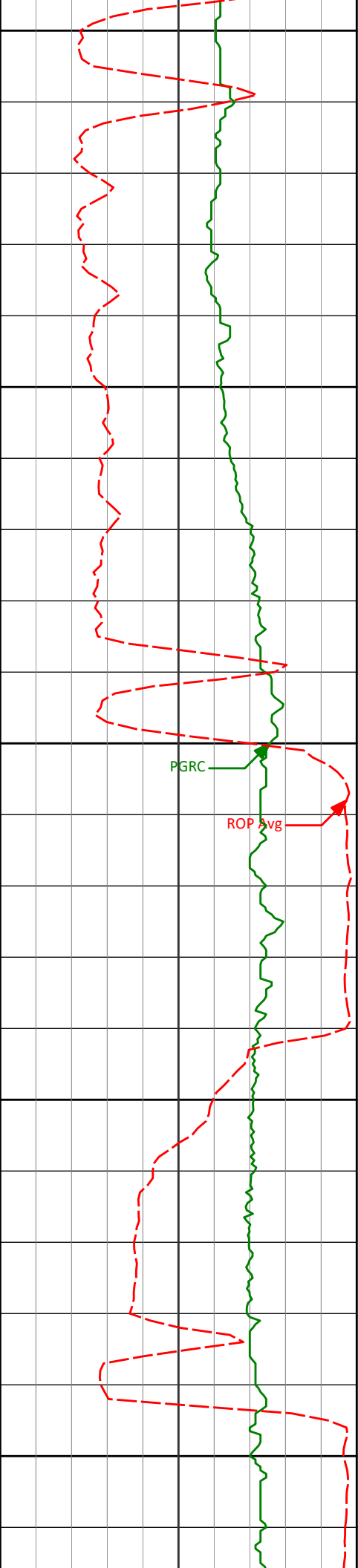
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9075.68'

15450



15500

15527'

89.63°

269.02°

6655.04'

9170.59'

15550

15600

PGRC

ROP Avg

15622'

89.11°

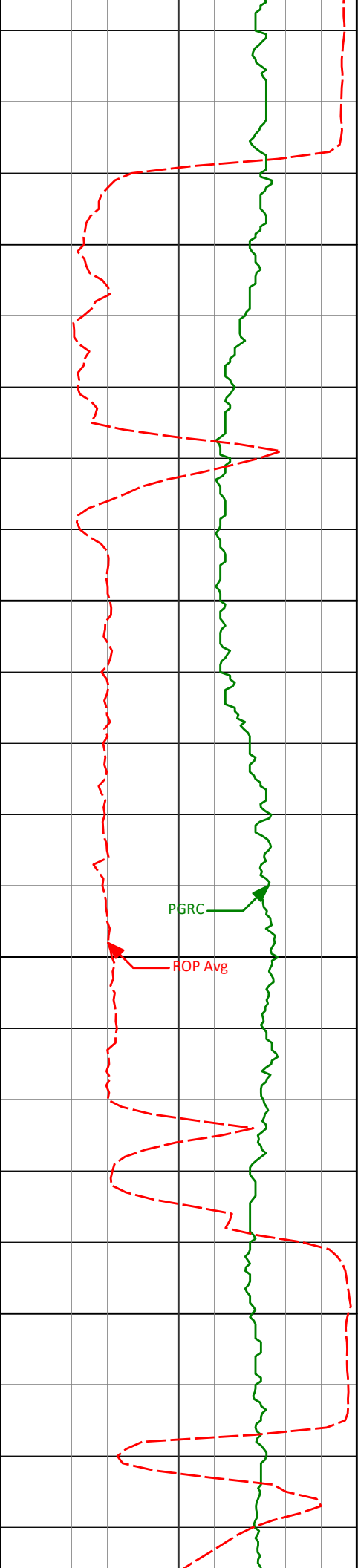
268.69°

6656.08'

9265.49'

15650

15700



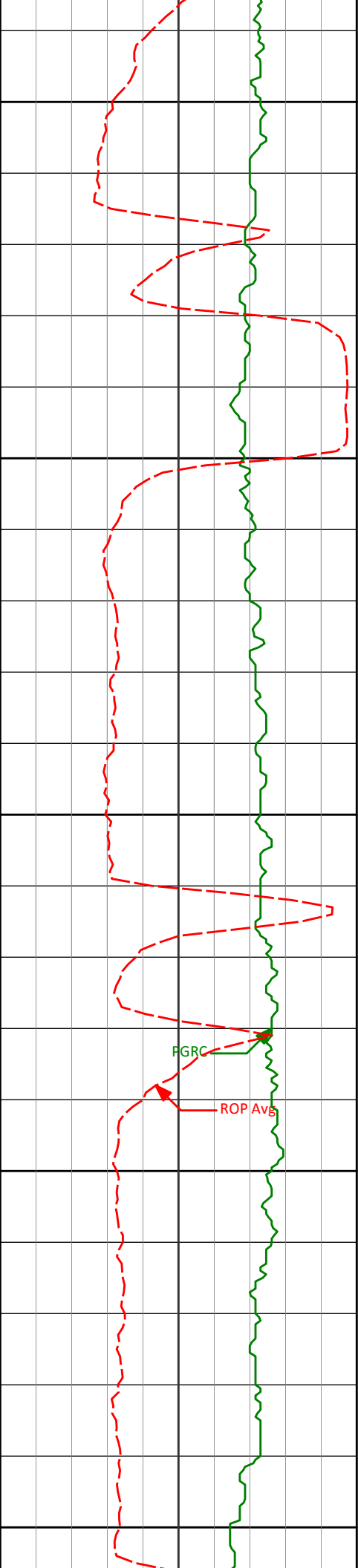
15750

15800

15850

15900

15717'	90.40°	268.22°	6656.49'	9360.35'
15812'	89.48°	268.48°	6656.59'	9455.21'
15907'	90.34°	268.47°	6656.74'	9550.08'



15950

16000

16050

16100

16150

16002'

90.77°

267.48°

6655.82'

9644.90'

16097'

91.11°

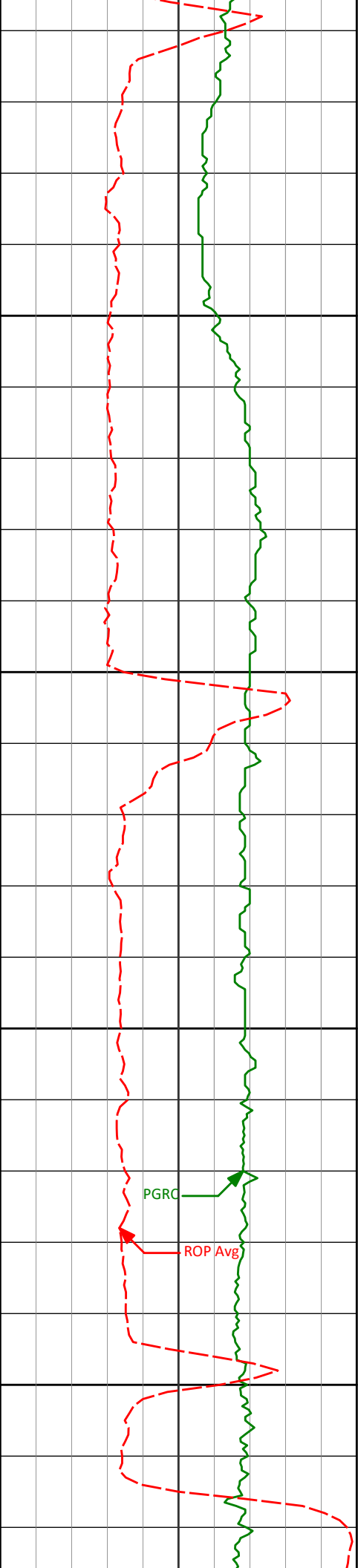
267.12°

6654.26'

9739.64'

PGRC

ROP Avg



16200

16250

16300

16350

16192'

91.48°

267.07°

6652.11'

9834.34'

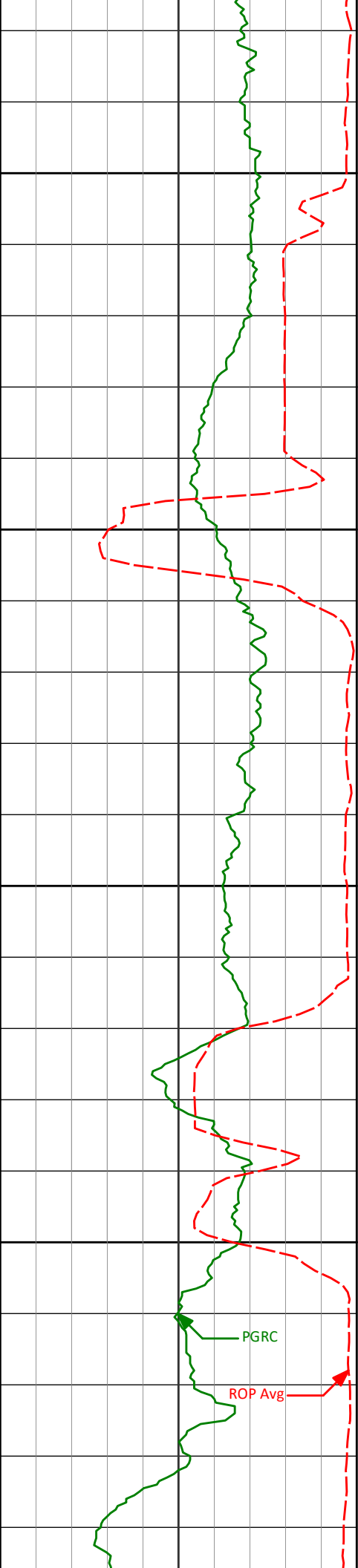
16287'

90.46°

265.77°

6650.51'

9928.96'



16382'

88.55°

263.51°

6651.33'

10023.28'

16400

16450

16477'

87.81°

264.27°

6654.34'

10117.40'

16500

16550

PGRC

ROP Avg

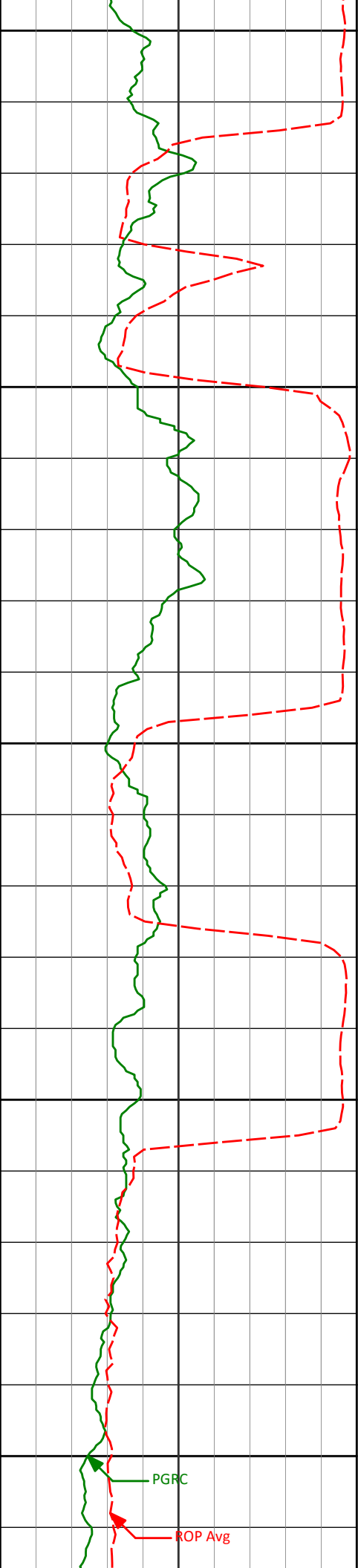
16571'

87.41°

266.96°

6658.26'

10210.82'



16600

16650

16700

16750

16800

16666'

86.61°

269.69°

6663.22'

10305.54'

16761'

87.63°

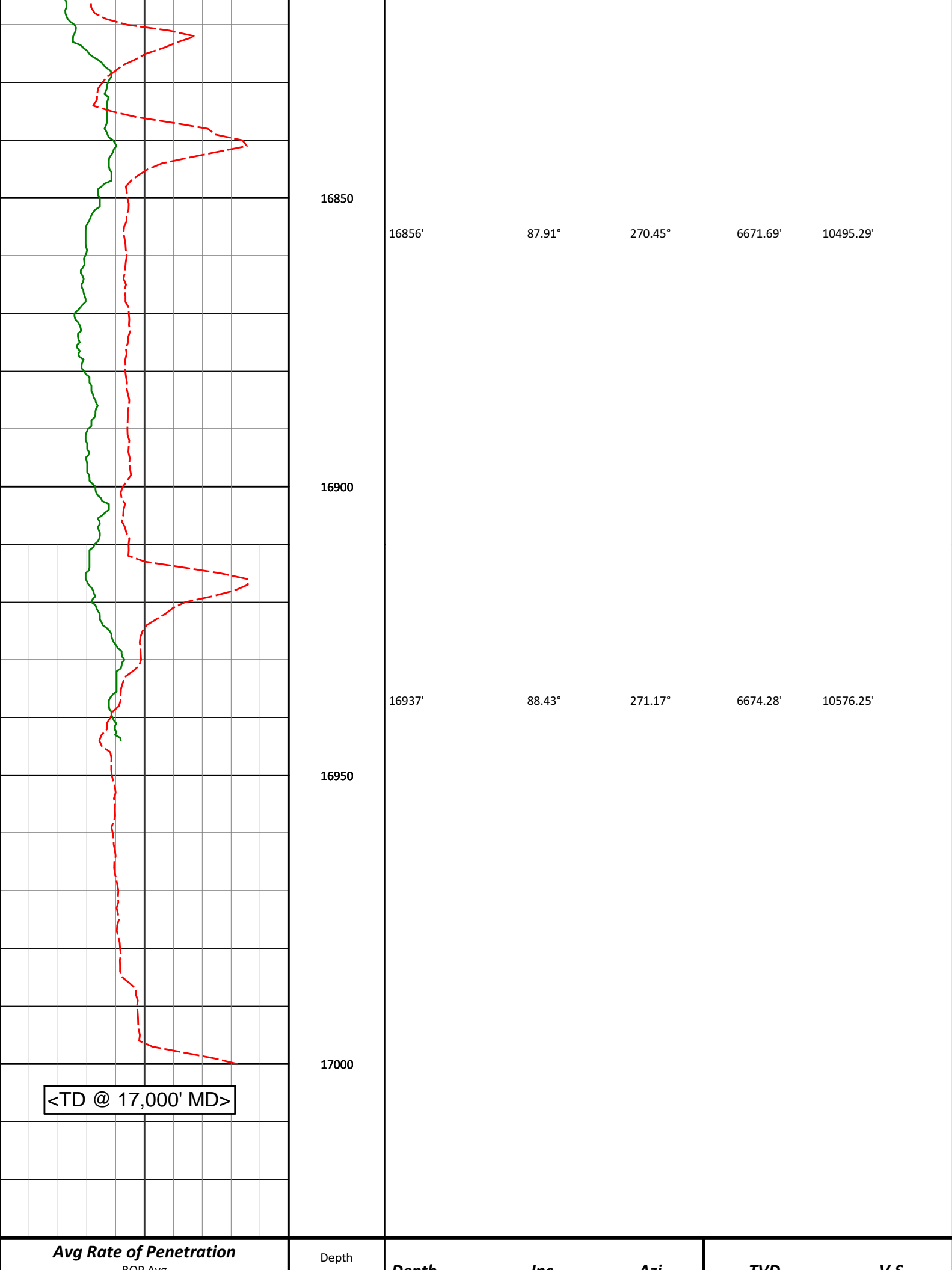
270.06°

6667.99'

10400.39'

PGRC

ROP Avg



<TD @ 17,000' MD>

Avg Rate of Penetration

Depth

Depth

Inc

Azi

TVD

V.S

500	ROP Avg feet per hr	0	ft	Depth	Inc.	Azi.	TVD	V.S.
PCG Gamma Ray PGRC								
0	api	300						



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Lucci State B03-69-HNL
Wattenberg
Weld Colorado
USA
CA-XX-0900166419

Survey depth 633 ft created to tie surveys onto bottom of the surface casing shoe.

Last survey is a projection from 16937 ft MD to TD at 17000 ft MD.

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
633.00	0.00	0.00	633.00	0.00 N	0.00 E	0.00	TIE-IN
720.00	0.51	157.30	720.00	0.36 S	0.15 E	-0.16	0.59
997.00	0.50	194.21	996.99	2.67 S	0.33 E	-0.40	0.12
1280.00	0.51	135.40	1279.98	4.76 S	0.91 E	-1.03	0.18
1565.00	0.65	136.78	1564.96	6.84 S	2.91 E	-3.08	0.05
1850.00	1.52	144.64	1849.91	11.10 S	6.20 E	-6.48	0.31
1945.00	0.67	212.07	1944.90	12.60 S	6.64 E	-6.95	1.48
2040.00	1.21	273.01	2039.88	13.02 S	5.34 E	-5.67	1.12
2135.00	0.98	283.02	2134.87	12.78 S	3.55 E	-3.87	0.31
2419.00	1.02	307.60	2418.83	10.69 S	0.82 W	0.55	0.15
2704.00	0.70	287.59	2703.79	8.62 S	4.49 W	4.27	0.15
2988.00	1.64	247.71	2987.74	9.64 S	9.91 W	9.66	0.42
3083.00	1.39	274.22	3082.70	10.07 S	12.31 W	12.05	0.77
3178.00	0.87	286.10	3177.68	9.78 S	14.16 W	13.90	0.60
3463.00	2.31	245.93	3462.57	11.53 S	21.48 W	21.18	0.61
3558.00	1.01	263.91	3557.53	12.39 S	24.06 W	23.74	1.46
3653.00	0.14	302.14	3652.53	12.42 S	24.99 W	24.67	0.95
3748.00	1.59	42.35	3747.52	11.39 S	24.20 W	23.90	1.71
3843.00	1.35	31.24	3842.48	9.46 S	22.73 W	22.49	0.39
4127.00	1.44	342.56	4126.41	3.19 S	22.07 W	21.98	0.41
4412.00	2.06	337.01	4411.28	4.94 N	25.14 W	25.26	0.22
4697.00	2.79	329.77	4696.02	15.64 N	30.63 W	31.02	0.28
4792.00	3.22	352.70	4790.89	20.29 N	32.13 W	32.64	1.33
4887.00	3.81	358.10	4885.71	26.09 N	32.58 W	33.23	0.71
4982.00	5.72	359.11	4980.38	33.98 N	32.75 W	33.60	2.01
5077.00	6.83	0.64	5074.81	44.36 N	32.77 W	33.88	1.18
5172.00	7.32	358.01	5169.09	56.06 N	32.91 W	34.32	0.62
5267.00	7.45	4.99	5263.30	68.24 N	32.59 W	34.30	0.95
5362.00	9.31	5.17	5357.28	82.03 N	31.36 W	33.42	1.96
5456.00	8.98	1.74	5450.09	96.93 N	30.45 W	32.89	0.68
5551.00	9.34	7.59	5543.88	111.99 N	29.21 W	32.03	1.05
5646.00	10.73	3.33	5637.42	128.46 N	27.68 W	30.92	1.66
5741.00	10.32	358.57	5730.83	145.79 N	27.37 W	31.05	1.01
5836.00	10.30	350.04	5824.30	162.67 N	29.06 W	33.16	1.61
5910.00	10.35	350.93	5897.10	175.75 N	31.25 W	35.68	0.23
6016.00	16.01	341.11	6000.28	199.00 N	37.49 W	42.51	5.72
6064.00	20.27	336.37	6045.88	212.89 N	42.97 W	48.34	9.39
6111.00	23.47	335.19	6089.50	228.85 N	50.16 W	55.93	6.87
6159.00	27.02	331.97	6132.91	247.16 N	59.30 W	65.53	7.93
6206.00	30.99	327.90	6174.01	266.84 N	70.75 W	77.48	9.43
6254.00	34.20	320.92	6214.46	287.79 N	85.83 W	93.08	10.29
6301.00	37.14	316.63	6252.64	308.37 N	103.91 W	111.68	8.21
6349.00	38.21	309.17	6290.65	328.29 N	125.38 W	133.64	9.75
6396.00	37.61	299.98	6327.76	344.65 N	149.09 W	157.76	12.07
6444.00	41.26	297.62	6364.83	359.31 N	175.81 W	184.85	8.22

6491.00	45.35	295.79	6399.03	373.78 N	204.61 W	214.00	9.10
6539.00	48.03	290.45	6431.96	387.45 N	236.72 W	246.45	9.83
6586.00	50.43	284.85	6462.67	398.20 N	270.62 W	280.61	10.37
6634.00	55.28	284.22	6491.64	407.79 N	307.65 W	317.87	10.16
6681.00	59.09	281.02	6517.11	416.40 N	346.18 W	356.61	9.92
6729.00	63.75	278.60	6540.07	423.56 N	387.71 W	398.30	10.67
6775.00	68.01	279.25	6558.87	430.07 N	429.17 W	439.92	9.35
6823.00	72.77	279.95	6574.97	437.62 N	473.74 W	484.66	10.01
6870.00	76.40	278.10	6587.46	444.72 N	518.48 W	529.57	8.60
6918.00	78.01	274.65	6598.10	449.91 N	564.99 W	576.19	7.77
6974.00	83.04	273.16	6607.31	453.66 N	620.08 W	631.36	9.36
7126.00	88.98	271.09	6617.89	459.27 N	771.53 W	782.90	4.14
7221.00	89.17	269.85	6619.42	460.05 N	866.51 W	877.88	1.32
7316.00	88.30	268.41	6621.52	458.61 N	961.47 W	972.77	1.77
7411.00	89.20	267.70	6623.59	455.39 N	1056.40 W	1067.58	1.21
7506.00	89.32	266.79	6624.82	450.82 N	1151.28 W	1162.32	0.97
7601.00	89.54	267.30	6625.76	445.92 N	1246.15 W	1257.03	0.58
7696.00	90.68	270.38	6625.58	444.00 N	1341.11 W	1351.92	3.46
7790.00	90.34	271.25	6624.74	445.34 N	1435.10 W	1445.91	0.99
7885.00	90.37	271.31	6624.15	447.46 N	1530.07 W	1540.91	0.07
7980.00	89.85	269.29	6623.97	447.96 N	1625.07 W	1635.88	2.20
8075.00	89.63	268.18	6624.40	445.86 N	1720.04 W	1730.77	1.19
8170.00	88.27	267.09	6626.14	441.94 N	1814.94 W	1825.54	1.83
8265.00	89.63	269.12	6627.88	438.80 N	1909.86 W	1920.36	2.57
8360.00	89.60	269.39	6628.52	437.56 N	2004.85 W	2015.28	0.29
8455.00	89.04	268.79	6629.65	436.06 N	2099.84 W	2110.20	0.86
8549.00	86.98	266.63	6632.92	432.30 N	2193.69 W	2203.93	3.17
8644.00	88.03	266.65	6637.05	426.74 N	2288.44 W	2298.50	1.11
8739.00	88.95	267.53	6639.55	421.92 N	2383.28 W	2393.19	1.34
8834.00	91.29	268.37	6639.35	418.52 N	2478.21 W	2488.01	2.62
8929.00	91.36	268.72	6637.16	416.11 N	2573.16 W	2582.86	0.38
9023.00	91.20	269.24	6635.06	414.44 N	2667.12 W	2676.75	0.58
9118.00	92.04	269.91	6632.37	413.73 N	2762.08 W	2771.66	1.13
9213.00	89.60	268.98	6631.01	412.81 N	2857.05 W	2866.58	2.75
9308.00	89.69	270.73	6631.60	412.57 N	2952.05 W	2961.54	1.84
9403.00	89.41	271.82	6632.35	414.68 N	3047.02 W	3056.54	1.18
9498.00	89.63	271.71	6633.14	417.61 N	3141.97 W	3151.53	0.26
9593.00	89.63	270.09	6633.76	419.10 N	3236.95 W	3246.52	1.71
9688.00	87.35	268.32	6636.26	417.79 N	3331.90 W	3341.41	3.04
9783.00	87.07	267.23	6640.89	414.10 N	3426.72 W	3436.10	1.18
9877.00	88.61	267.40	6644.43	409.70 N	3520.54 W	3529.78	1.65
9972.00	89.91	267.22	6645.66	405.24 N	3615.43 W	3624.53	1.38
10067.00	90.96	268.46	6644.93	401.66 N	3710.36 W	3719.33	1.71
10162.00	89.01	266.92	6644.96	397.83 N	3805.27 W	3814.12	2.62
10257.00	89.60	267.79	6646.11	393.45 N	3900.16 W	3908.87	1.11
10352.00	90.12	268.14	6646.34	390.08 N	3995.10 W	4003.69	0.66
10447.00	90.00	267.86	6646.24	386.76 N	4090.04 W	4098.52	0.32
10542.00	90.18	267.09	6646.09	382.58 N	4184.95 W	4193.29	0.83
10637.00	91.54	268.45	6644.67	378.88 N	4279.86 W	4288.08	2.02
10732.00	91.32	268.73	6642.30	376.54 N	4374.80 W	4382.93	0.37
10827.00	91.82	268.51	6639.70	374.26 N	4469.74 W	4477.78	0.57
10922.00	91.11	268.93	6637.27	372.13 N	4564.68 W	4572.64	0.87
11017.00	89.01	269.59	6637.17	370.91 N	4659.67 W	4667.56	2.32
11110.00	89.48	269.45	6638.39	370.13 N	4752.66 W	4760.50	0.53
11202.00	90.06	269.81	6638.76	369.53 N	4844.66 W	4852.46	0.74
11295.00	91.60	271.81	6637.41	370.85 N	4937.63 W	4945.43	2.71
11387.00	90.28	271.42	6635.91	373.44 N	5029.58 W	5037.42	1.50
11480.00	89.60	271.82	6636.00	376.07 N	5122.54 W	5130.42	0.85
11574.00	89.54	271.90	6636.71	379.12 N	5216.49 W	5224.41	0.11
11666.00	88.68	269.12	6638.14	379.94 N	5308.46 W	5316.38	3.16
11758.00	86.82	268.45	6641.75	377.99 N	5400.37 W	5408.20	2.15
11851.00	86.61	267.96	6647.08	375.08 N	5493.17 W	5500.90	0.57
11943.00	86.73	267.47	6652.42	371.42 N	5584.94 W	5592.55	0.55
12037.00	88.15	268.27	6656.62	367.93 N	5678.78 W	5686.27	1.73
12129.00	90.06	267.94	6658.06	364.89 N	5770.71 W	5778.10	2.11
12222.00	90.77	267.71	6657.38	361.36 N	5863.64 W	5870.91	0.80
12315.00	90.28	267.31	6656.53	357.32 N	5956.55 W	5963.68	0.68
12408.00	90.03	267.38	6656.28	353.01 N	6049.45 W	6056.45	0.28
12501.00	90.06	268.55	6656.21	349.71 N	6142.39 W	6149.27	1.26
12593.00	89.11	269.23	6656.87	347.93 N	6234.37 W	6241.18	1.27
12685.00	90.43	269.94	6657.24	347.26 N	6326.36 W	6333.12	1.63
12778.00	91.73	269.71	6655.40	346.47 N	6418.34 W	6425.04	1.93

12778.00	91.73	268.71	6635.49	348.17 N	6419.34 W	6426.04	1.92
12870.00	91.66	268.17	6652.77	343.66 N	6511.26 W	6517.87	0.59
12964.00	92.62	267.70	6649.26	340.28 N	6605.13 W	6611.63	1.14
13059.00	92.13	268.01	6645.32	336.72 N	6699.98 W	6706.36	0.61
13154.00	90.89	267.99	6642.82	333.41 N	6794.89 W	6801.15	1.31
13249.00	89.66	267.71	6642.36	329.85 N	6889.82 W	6895.96	1.33
13344.00	89.97	267.62	6642.67	325.98 N	6984.74 W	6990.75	0.34
13439.00	90.56	267.19	6642.23	321.67 N	7079.64 W	7085.52	0.76
13534.00	90.68	268.63	6641.21	318.21 N	7174.57 W	7180.33	1.52
13629.00	90.12	269.27	6640.55	316.47 N	7269.55 W	7275.23	0.90
13724.00	89.97	268.83	6640.47	314.89 N	7364.54 W	7370.15	0.49
13819.00	89.29	268.48	6641.09	312.66 N	7459.51 W	7465.03	0.81
13914.00	92.25	268.25	6639.81	309.95 N	7554.45 W	7559.88	3.13
14009.00	92.59	268.01	6635.80	306.86 N	7649.32 W	7654.63	0.44
14104.00	89.45	267.51	6634.11	303.14 N	7744.22 W	7749.41	3.35
14198.00	87.59	267.26	6636.54	298.86 N	7838.08 W	7843.14	2.00
14293.00	86.67	268.09	6641.29	295.01 N	7932.88 W	7937.81	1.30
14388.00	86.08	268.69	6647.30	292.34 N	8027.66 W	8032.48	0.88
14483.00	86.14	270.18	6653.74	291.41 N	8122.43 W	8127.20	1.57
14578.00	88.36	271.88	6658.30	293.12 N	8217.30 W	8222.08	2.94
14673.00	89.51	271.01	6660.07	295.51 N	8312.25 W	8317.06	1.52
14768.00	89.81	270.45	6660.63	296.72 N	8407.24 W	8412.05	0.67
14863.00	89.45	270.30	6661.25	297.34 N	8502.23 W	8507.03	0.41
14958.00	90.06	270.03	6661.65	297.62 N	8597.23 W	8602.01	0.70
15053.00	91.63	269.99	6660.25	297.63 N	8692.22 W	8696.97	1.65
15148.00	92.56	270.42	6656.78	297.97 N	8787.15 W	8791.88	1.08
15243.00	90.22	269.99	6654.47	298.31 N	8882.12 W	8886.82	2.50
15337.00	89.17	269.14	6654.97	297.60 N	8976.11 W	8980.77	1.44
15432.00	90.56	268.93	6655.20	296.00 N	9071.09 W	9075.68	1.48
15527.00	89.63	269.02	6655.04	294.30 N	9166.08 W	9170.59	0.98
15622.00	89.11	268.69	6656.08	292.40 N	9261.05 W	9265.49	0.65
15717.00	90.40	268.22	6656.49	289.84 N	9356.02 W	9360.35	1.45
15812.00	89.48	268.48	6656.59	287.10 N	9450.98 W	9455.21	1.01
15907.00	90.34	268.47	6656.74	284.58 N	9545.94 W	9550.08	0.91
16002.00	90.77	267.48	6655.82	281.22 N	9640.88 W	9644.90	1.14
16097.00	91.11	267.12	6654.26	276.74 N	9735.76 W	9739.64	0.52
16192.00	91.48	267.07	6652.11	271.93 N	9830.61 W	9834.34	0.39
16287.00	90.46	265.77	6650.51	266.00 N	9925.41 W	9928.96	1.74
16382.00	88.55	263.51	6651.33	257.13 N	10019.98 W	10023.28	3.11
16477.00	87.81	264.27	6654.34	247.02 N	10114.39 W	10117.40	1.12
16571.00	87.41	266.96	6658.26	239.84 N	10208.02 W	10210.82	2.89
16666.00	86.61	269.69	6663.22	237.07 N	10302.84 W	10305.54	2.99
16761.00	87.63	270.06	6667.99	236.86 N	10397.72 W	10400.39	1.14
16856.00	87.91	270.45	6671.69	237.28 N	10492.65 W	10495.29	0.51
16937.00	88.43	271.17	6674.28	238.43 N	10573.60 W	10576.25	1.10
17000.00	88.43	271.17	6676.00	239.71 N	10636.56 W	10639.22	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 271.45 DEGREES (GRID)
A TOTAL CORRECTION OF 7.91 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 17000.00 FEET
IS 10639.26 FEET ALONG 271.29 DEGREES (GRID)**