

PCGK : Pressure Case Gamma
PCDC: Pressure Case Directional

1 : 600 / 1 : 240

Country : USA			
Field : Wattenberg			
Location : Lat: 40°29' 27.74" North Long: 104°22' 28.42" West			
Well : Wells Ranch AE18-67-1HN			
Company : Noble Energy			
Rig : H&P 315			
LOCATION			
Latitude : 40°29' 27.74" North Longitude : 104°22' 28.42" West			
UTM Easting = 3,313,017.05 ft UTM Northing = 1,423,712.31 ft			
Other Services Directional Drilling			
Company : Noble Energy			
Rig : H&P 315			
Well : Wells Ranch AE18-67-1HN			
Field : Wattenberg			
Country : USA			
API Number : 0512335645			
Permanent Datum : Ground Level			
Elevation : 4848.00 ft			
Log Measured From : Drill Floor			
24.00 ft Above Permanent Datum			
Drilling Measured From : Drill Floor			
Elev. KB N/A			
DF 4872.00 ft			
GL 4848.00 ft			
WD N/A			
Depth Logged : 632.00 ft To 11,159.00 ft			
Date Logged : 24-Oct-12 To 31-Oct-12			
Total Depth MD : 11,159.00 ft TVD : 6,637.19 ft			
Spud Date : 24-Oct-12			
Unit No. : 11610113			
Job No. : CA-XX-0009860519			
Plot Type : Final			
Plot Date : 01-Nov-12			
Run No.			
Size			
From			
To			
8.750 in			
632.00 ft			
5,980.00 ft			
8.750 in			
5,980.00 ft			
7,045.00 ft			
6.130 in			
7,045.00 ft			
11,159.00 ft			
Run No.			
Size			
From			
To			
7.000 in			
26.00 lppf			
SURFACE			
7,034.00 ft			

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	27-Oct-12	28-Oct-12	31-Oct-12		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	8.750	6.130		
Tool Nominal OD (in)	6.750	6.750	4.750		
Log Start Depth (MD, ft)	632.00	5,980.00	7,045.00		
Log End Depth (MD, ft)	5,980.00	7,045.00	11,159.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	26-Oct-12 06:00	27-Oct-12 08:40	29-Oct-12 17:15		
Drill/Wipe End Date and Time	26-Oct-12 23:10	28-Oct-12 11:10	31-Oct-12 07:15		
Min Inc (deg) @ Depth (MD, ft)	0 @ 622.00	11.78 @ 6,013.00	87.90 @ 10,707.00		
Max Inc (deg) @ Depth (MD, ft)	11.87 @ 5,732.00	88.49 @ 7,045.00	91.70 @ 8,428.00		
Bit TFA(in2) / Bit Type	.75 / PDC	.75 / PDC	.46 / PDC		
Flow Rate (gpm)	591.00	536.00	270.00		
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)	9.00 / 28.00	10.50 / 35.00	9.32 / 33.00		
Filtrate CL (ppm)	1,500.00	1,300.00	1,400.00		
pH / Fluid Loss (mptm)	9.20 / 0	9.10 / 8	9.20 / 9		
PV (cP) / YP (lbf2)	1 / 4.00	9 / 10.00	7 / 7.00		
% Solids / % Sand	3 / 0.25	10.2 / 0.25	5.7 / 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) / Source	145.90 / PCM	172.78 / PCM	228.74 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ 145.90	N/A @ 172.78	N/A @ 228.74		
Lead MWD Engineer	Henry Schmeidler	Henry Schmeidler	Henry Schmeidler		
Customer Representative	Martin Suarez	Martin Suarez	Martin Suarez		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.76	5.76	5.76		
Sub Serial Number	246130	246130	11854094		
Insert Serial Number	11680744	11680744	11680777		
Date and Time Initialized	25-Oct-12 06:44	25-Oct-12 06:44	28-Oct-12 22:04		
Date and Time Read	28-Oct-12 16:57	28-Oct-12 16:51	31-Oct-12 17:33		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	55.81	53.39	59.89		
Software Version	6.21	6.21	6.21		
Sub Serial Number	246130	246130	11854094		
Sonde Serial Number	11478107	11478107	11833231		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	306.56	248.53	32.52		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	51.01	48.59	55.09		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	246130	246130	11854094		
Insert/Sonde Serial Number	11579845	11579845	11680968		

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 7.4.01
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 6997 ft. MD. Gamma cannot be measured within cased hole, and collection resumes after drilling through cement at 7045 ft. MD.

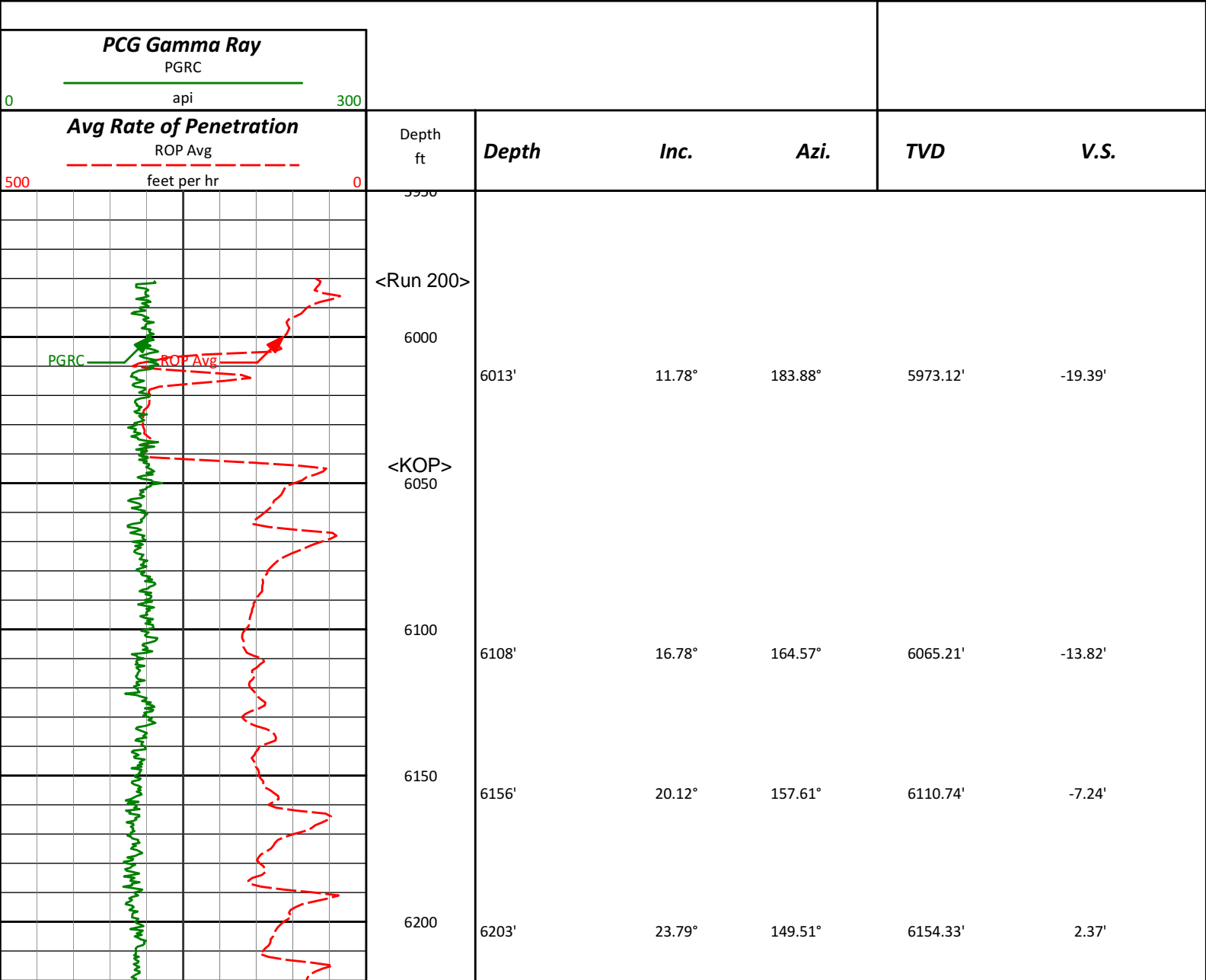
WARRANTY

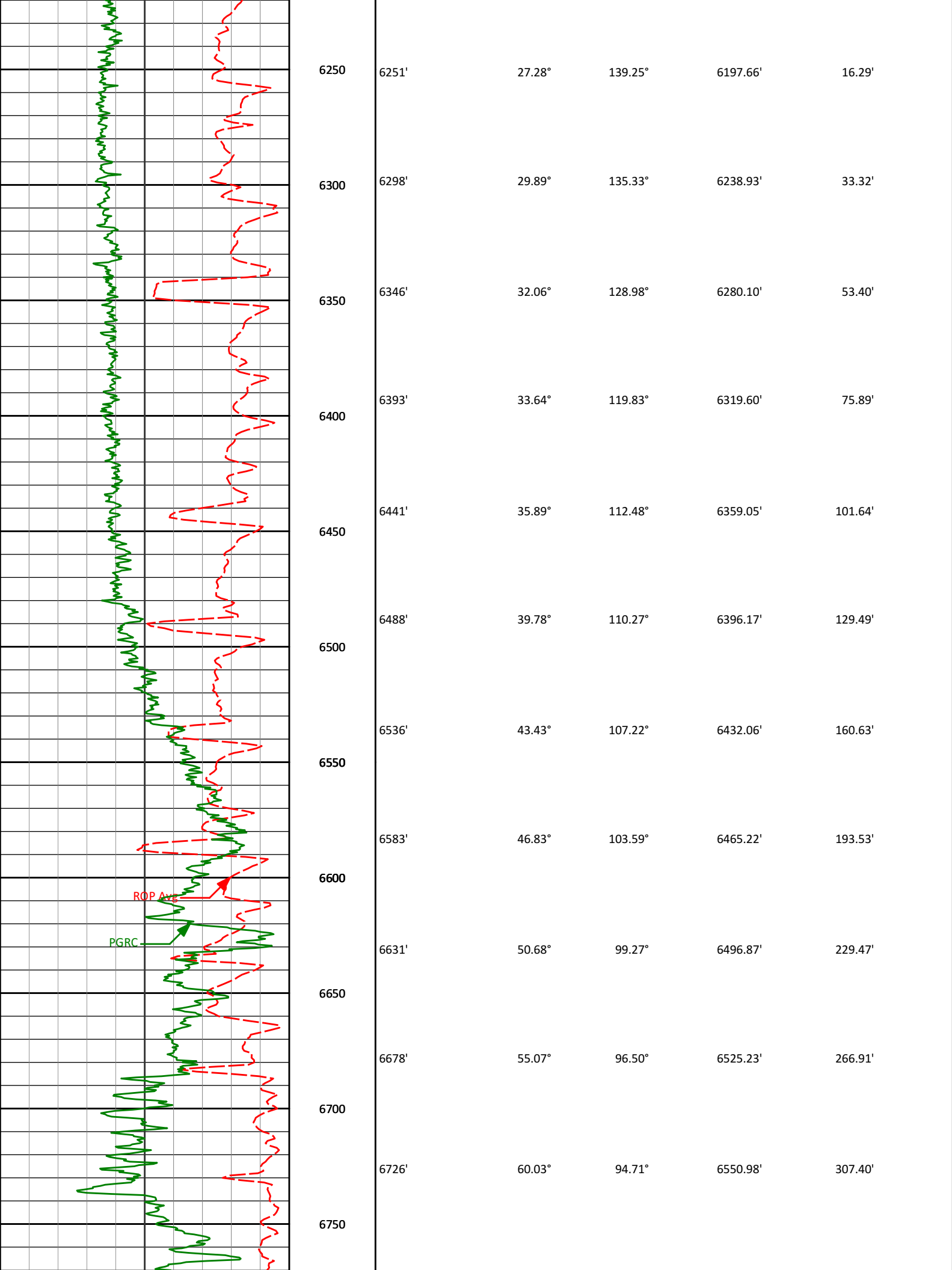
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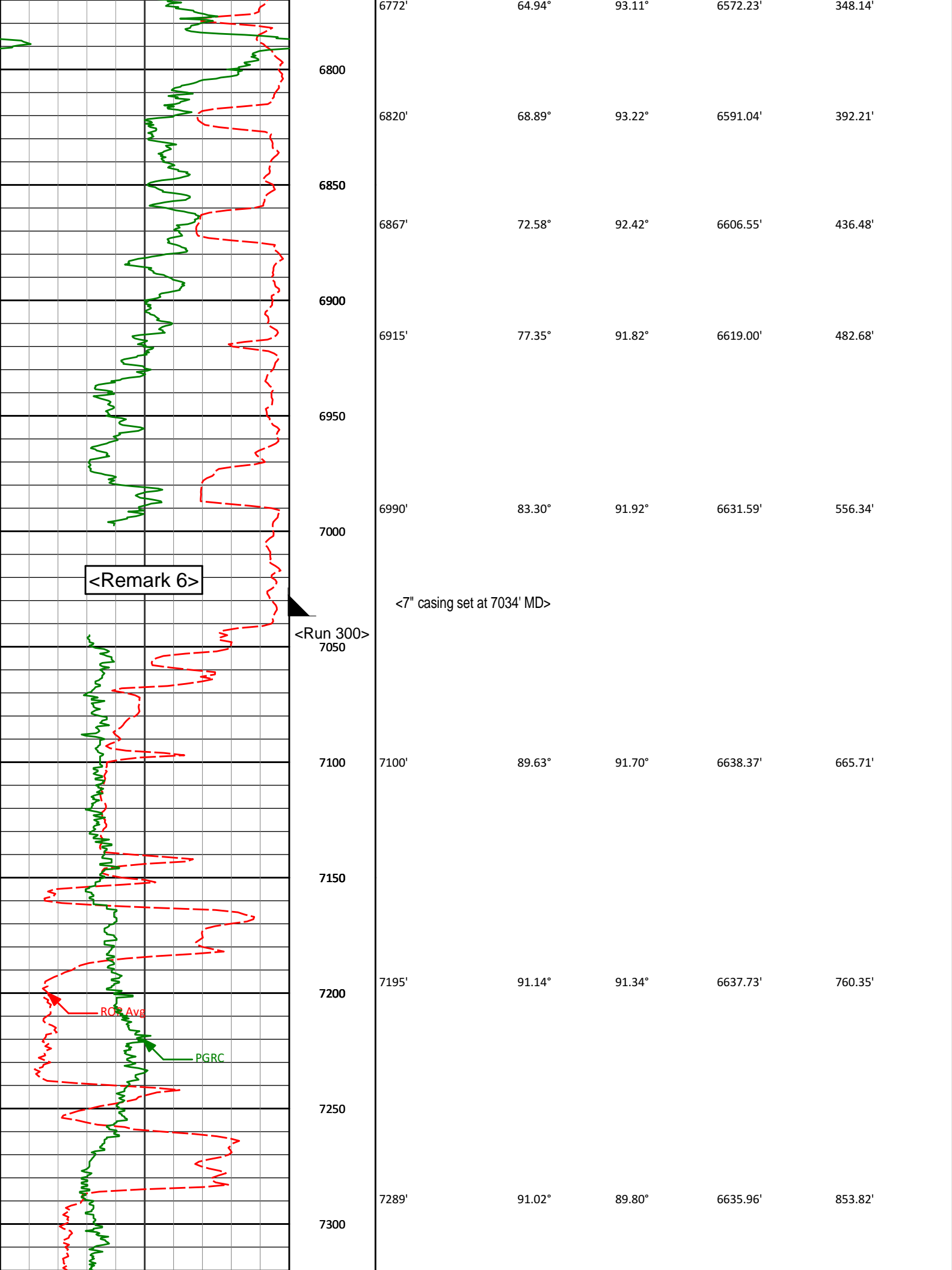
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Sperry Drilling Services

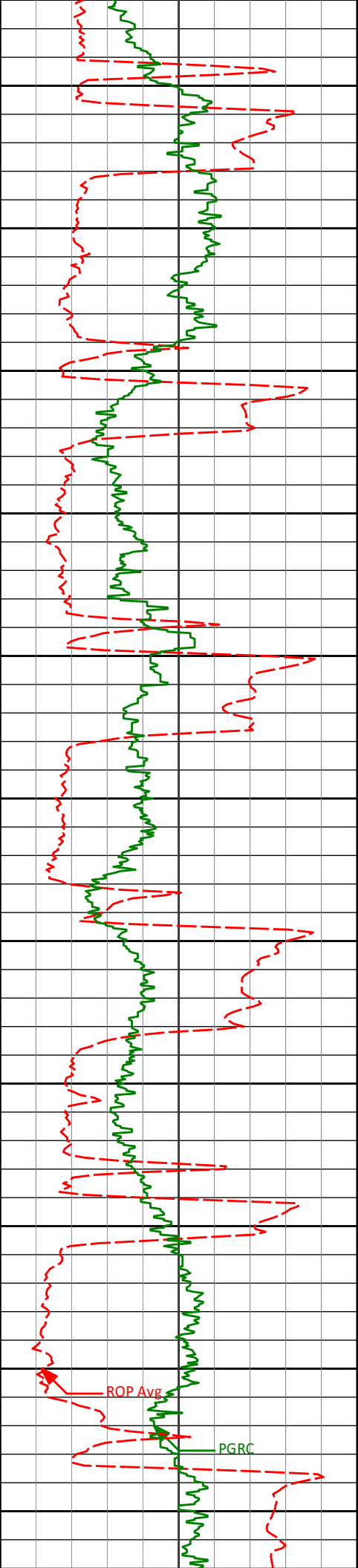
MD Main Log 1:600

Noble Energy, Inc
Wells Ranch AE18-67-1HN
H&P 315
T6N R62W









7350

7384'

90.74°

88.00°

6634.51'

947.98'

7400

7450

7479'

91.08°

87.60°

6633.00'

1041.87'

7500

7550

7574'

91.32°

87.91°

6631.01'

1135.74'

7600

7650

7669'

90.12°

88.73°

6629.82'

1229.77'

7700

7750

7764'

90.25°

89.14°

6629.51'

1323.94'

7800

7850

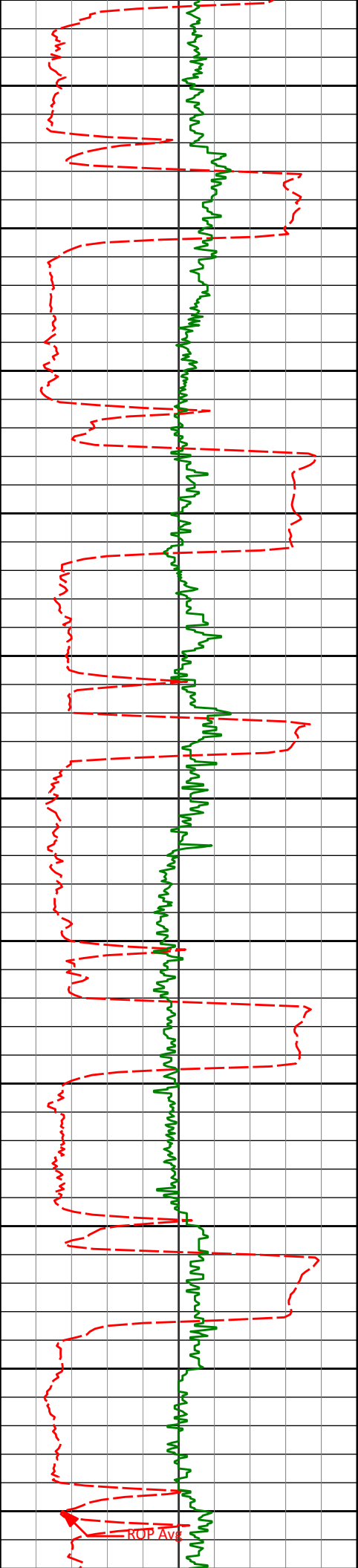
7859'

90.28°

88.28°

6629.08'

1418.06'



7900

7950

8000

8050

8100

8150

8200

8250

8300

8350

8400

7954'

8049'

8143'

8238'

8333'

89.94°

89.66°

88.43°

90.18°

89.54°

88.37°

87.04°

86.93°

88.18°

89.96°

6628.90'

6629.23'

6630.80'

6631.95'

6632.18'

1512.10'

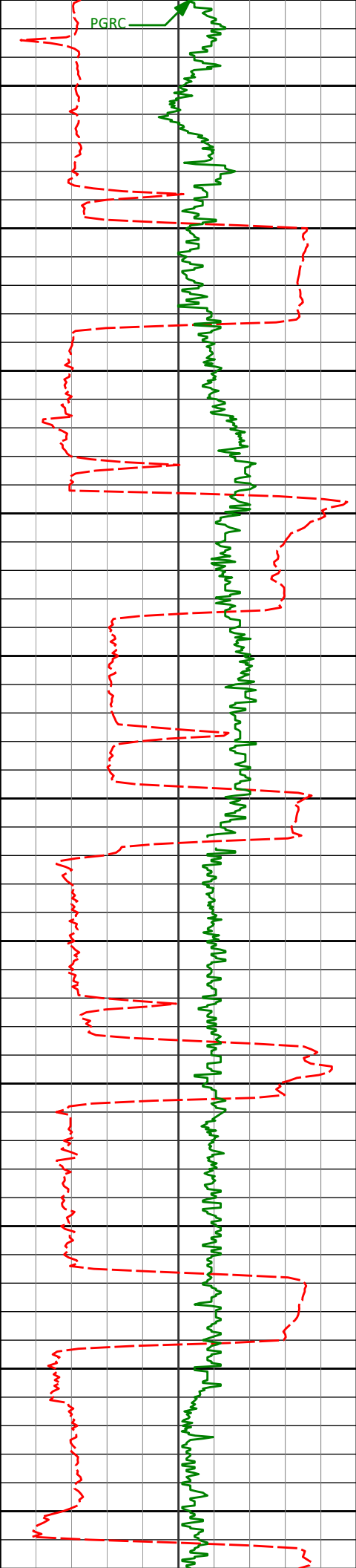
1605.98'

1698.67'

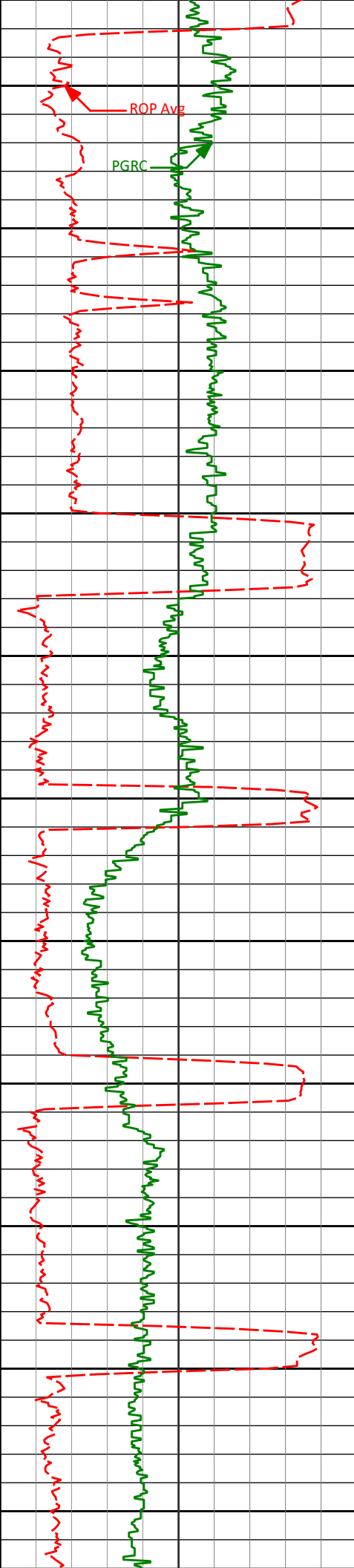
1792.50'

1886.70'

ROP Avg



8428'	91.70°	90.37°	6631.16'	1981.11'
8450				
8500				
8523'	91.66°	89.63°	6628.37'	2075.46'
8550				
8600				
8618'	90.37°	89.99°	6626.69'	2169.79'
8650				
8700				
8713'	89.26°	89.26°	6627.00'	2264.11'
8750				
8800				
8808'	89.94°	87.21°	6627.66'	2358.11'
8850				
8900				
8903'	88.92°	87.43°	6628.61'	2451.89'
8950				



9000

8998'

88.06°

87.70°

6631.11'

2545.70'

9050

9100

9093'

90.06°

88.81°

6632.67'

2639.70'

9150

9200

9187'

88.70°

88.34°

6633.68'

2732.80'

9250

9300

9282'

89.29°

88.36°

6635.35'

2826.82'

9350

9400

9377'

89.48°

87.95°

6636.37'

2920.81'

9450

9500

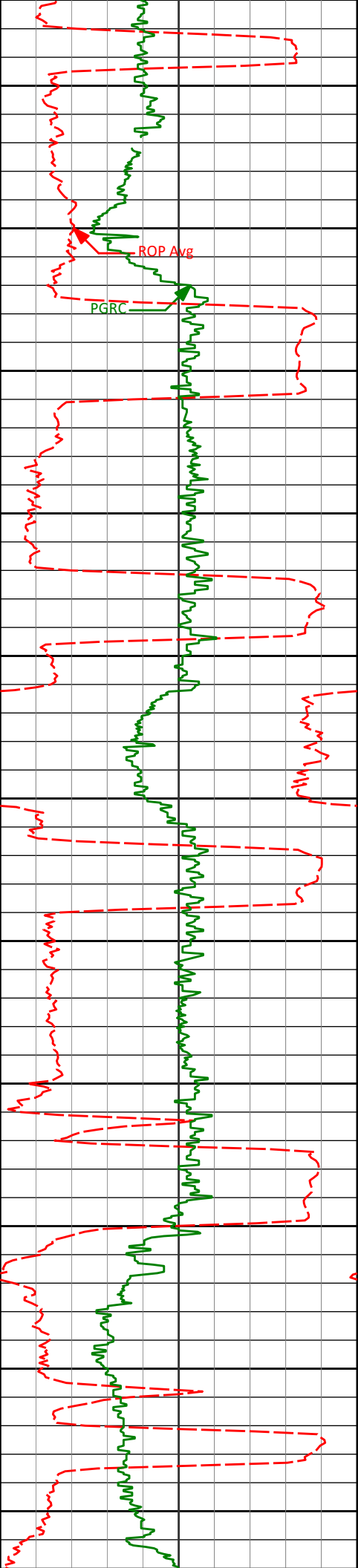
9472'

89.85°

88.34°

6636.93'

3014.80'



9550

9567'

91.63°

88.94°

6635.71'

3108.90'

9600

ROP Avg

PGRC

9650

9662'

90.19°

88.65°

6634.20'

3203.02'

9700

9750

9757'

89.45°

88.42°

6634.51'

3297.11'

9800

9850

9852'

90.22°

90.09°

6634.79'

3391.34'

9900

9950

9947'

89.01°

89.95°

6635.43'

3485.73'

10000

10050

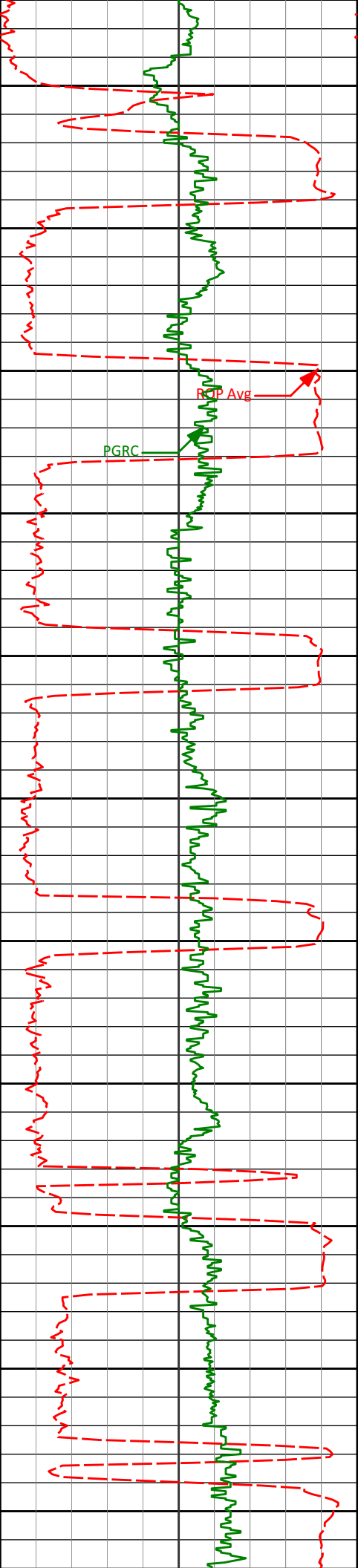
10042'

90.71°

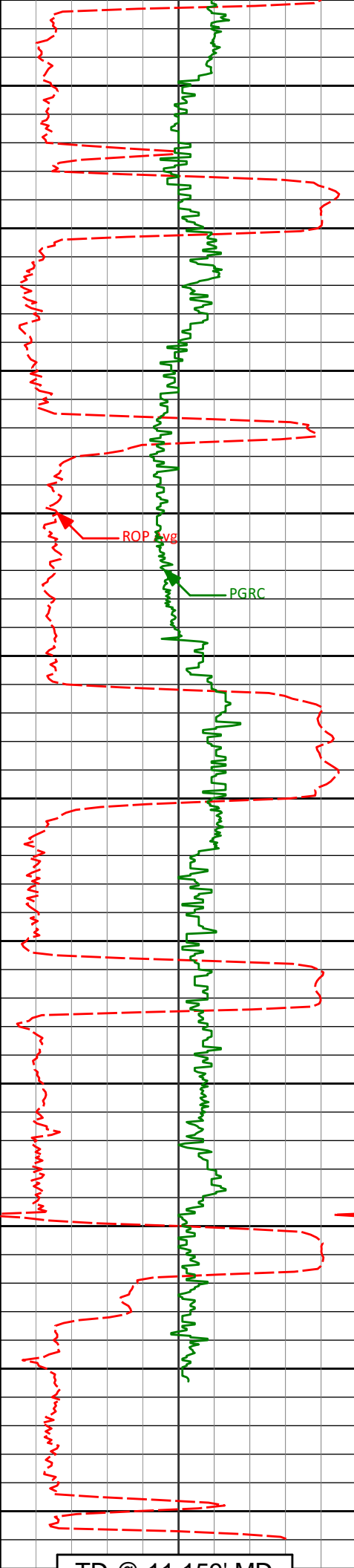
90.14°

6635.66'

3580.13'



10100				
10137'	91.63°	90.15°	6633.71'	3674.52'
10150				
10200				
10232'	90.06°	88.71°	6632.31'	3768.79'
10250				
10300				
10327'	88.89°	87.91°	6633.17'	3862.81'
10350				
10400				
10422'	90.31°	89.19°	6633.84'	3956.89'
10450				
10500				
10517'	90.96°	89.83°	6632.79'	4051.18'
10550				
10600				
10612'	89.14°	89.45°	6632.71'	4145.49'



10650

10700

10750

10800

10850

10900

10950

11000

11050

11100

11150

10707'

87.90°

89.02°

6635.17'

4239.69'

10801'

90.37°

88.42°

6636.58'

4332.81'

10896'

89.57°

88.41°

6636.64'

4426.87'

10991'

89.78°

87.81°

6637.17'

4520.85'

11097'

90.09°

87.52°

6637.29'

4625.59'

11159'

90.09°

87.52°

6637.19'

4686.83'

<TD @ 11,159 MD>																			

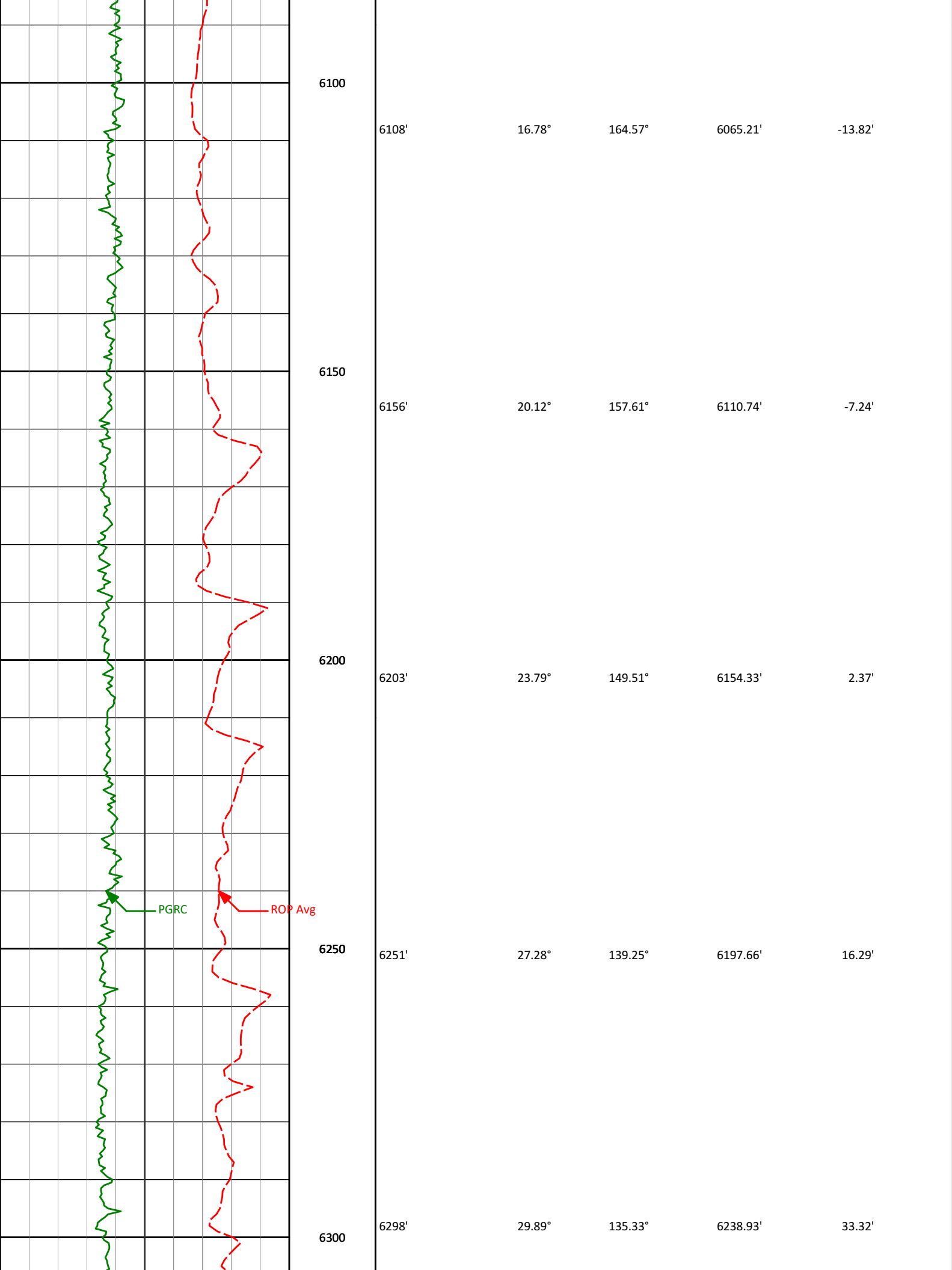
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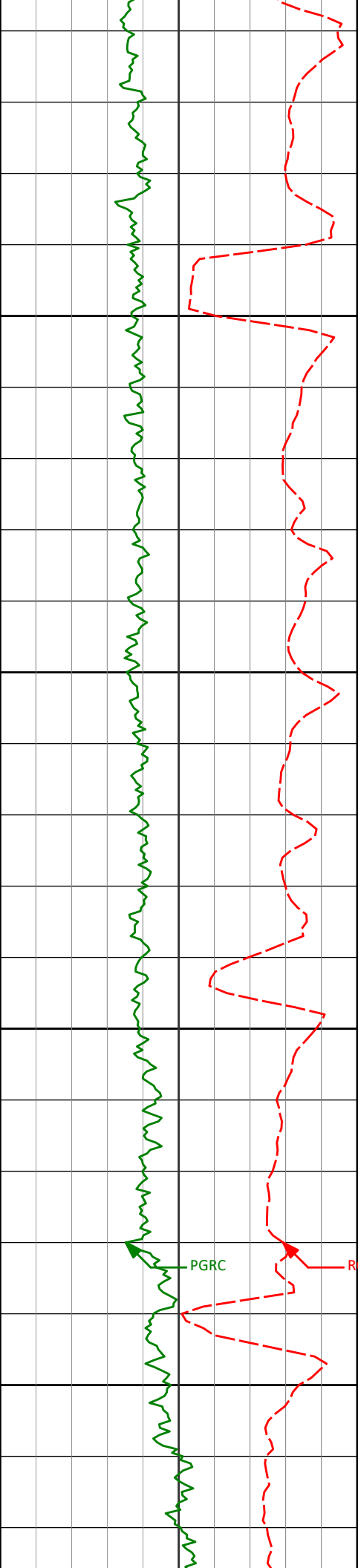
Sperry Drilling Services

MD Detail Log 1:240

Noble Energy, Inc
Wells Ranch AE18-67-1HN
H&P 315
T6N R62W

<div>PCG Gamma Ray</div> <div>PGRC</div> <div>0300</div> <div>api</div>							
<div>Avg Rate of Penetration</div> <div>ROP Avg</div> <div>5000</div> <div>feet per hr</div>		Depth ft	Depth	Inc.	Azi.	TVD	V.S.
<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><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6350

6346'

32.06°

128.98°

6280.10'

53.40'

6393'

33.64°

119.83°

6319.60'

75.89'

6400

6441'

35.89°

112.48°

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101.64'

6450

6488'

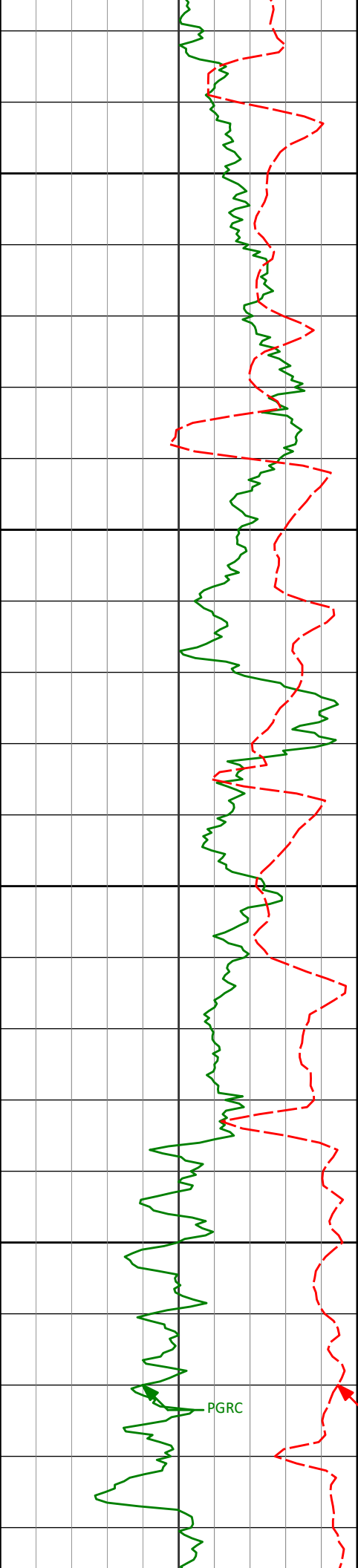
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110.27°

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129.49'

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6550

6600

6650

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PGRC

ROP Avg

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43.43°

107.22°

6432.06'

160.63'

6583'

46.83°

103.59°

6465.22'

193.53'

6631'

50.68°

99.27°

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229.47'

6678'

55.07°

96.50°

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266.91'

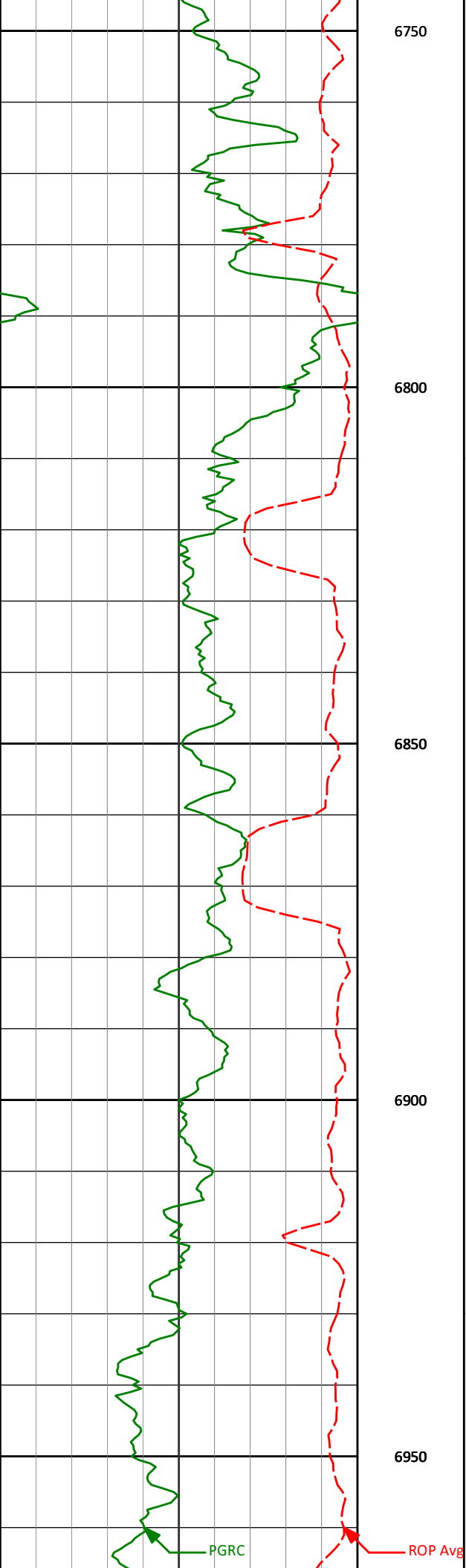
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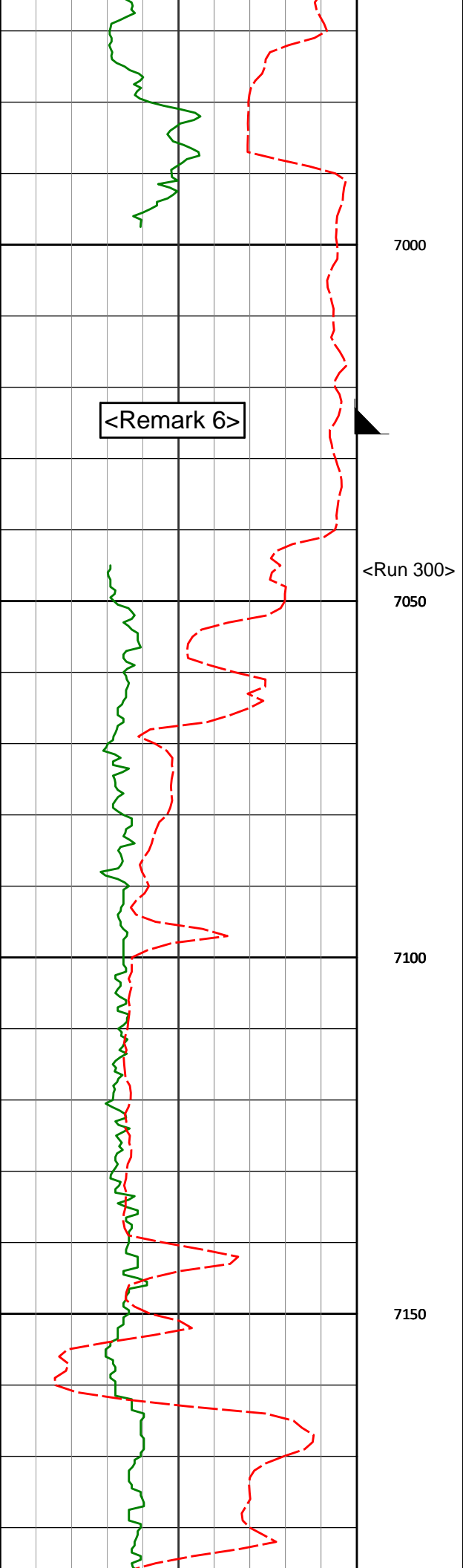
94.71°

6550.98'

307.40'



6750				
6772'	64.94°	93.11°	6572.23'	348.14'
6800				
6820'	68.89°	93.22°	6591.04'	392.21'
6850				
6867'	72.58°	92.42°	6606.55'	436.48'
6900				
6915'	77.35°	91.82°	6619.00'	482.68'
6950				



6990'

83.30°

91.92°

6631.59'

556.34'

<7" casing set at 7034' MD>

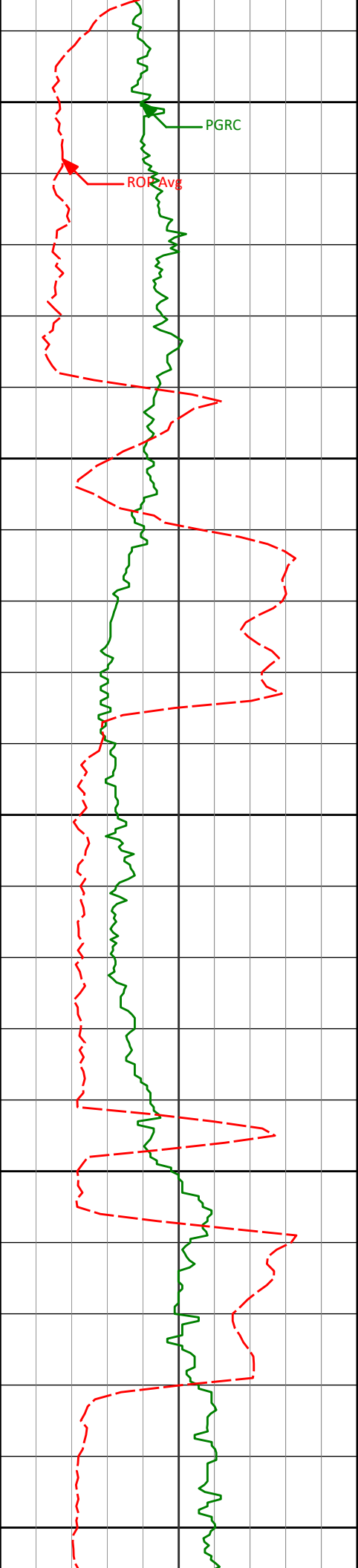
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91.70°

6638.37'

665.71'



7195'

91.14°

91.34°

6637.73'

760.35'

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7250

7289'

91.02°

89.80°

6635.96'

853.82'

7300

7350

7384'

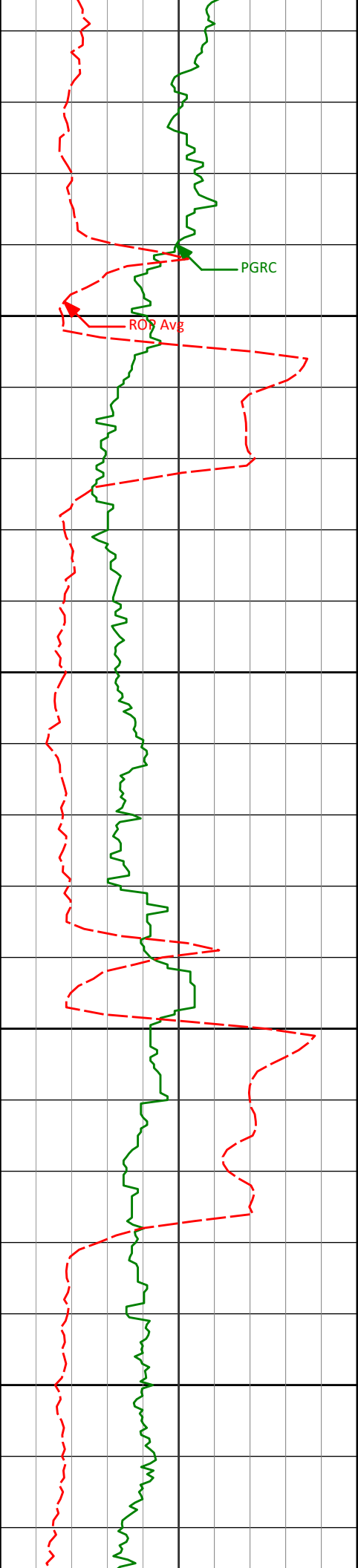
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88.00°

6634.51'

947.98'

7400



PGRC

ROY Avg

7450

7479'

91.08°

87.60°

6633.00'

1041.87'

7500

7550

7574'

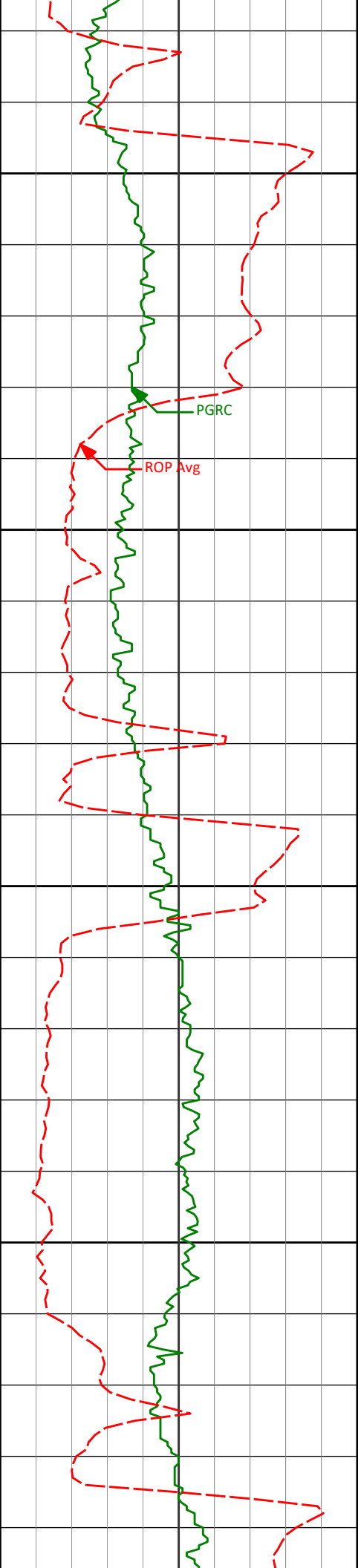
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87.91°

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1135.74'

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7650

7669'

90.12°

88.73°

6629.82'

1229.77'

PGRC

ROP Avg

7700

7750

7764'

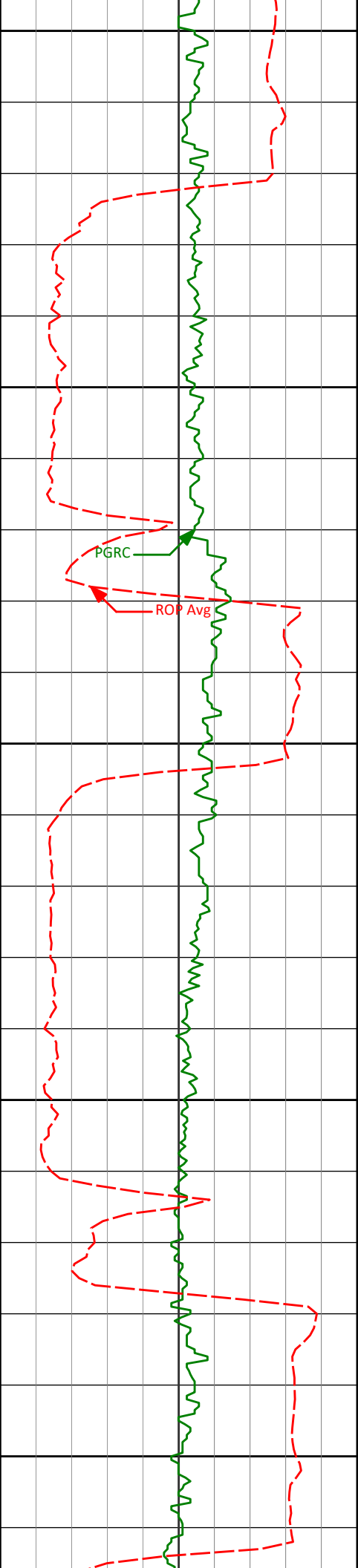
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7800



7850

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88.28°

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7900

7950

7954'

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1512.10'

8000

8050

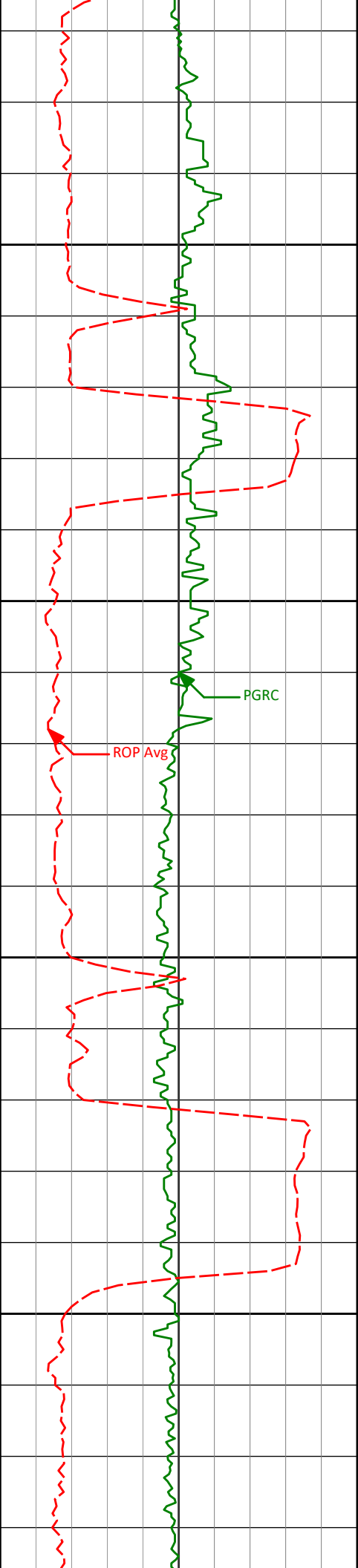
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87.04°

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1605.98'



8100

8143'

88.43°

86.93°

6630.80'

1698.67'

8150

PGRC

ROP Avg

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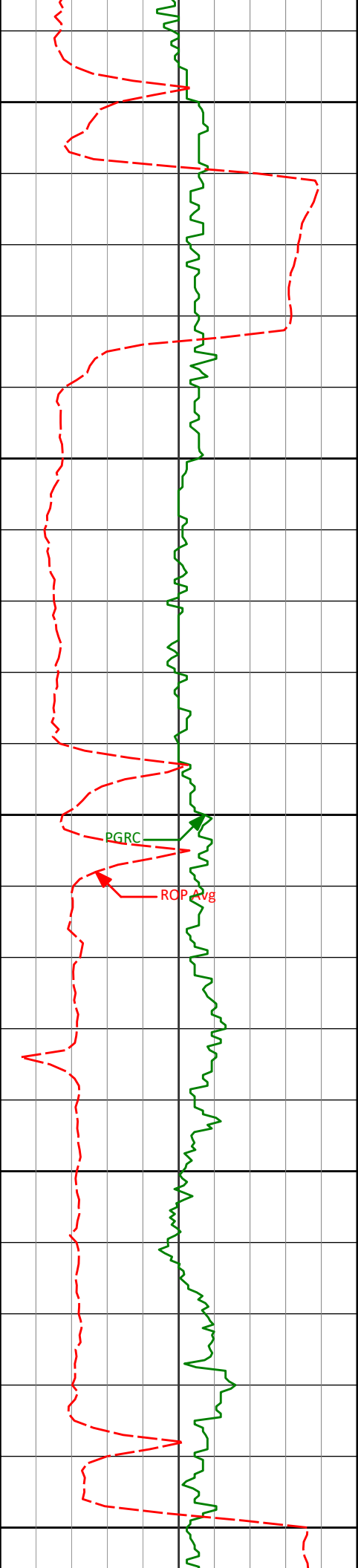
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1792.50'

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8300

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8350

8400

8428'

91.70°

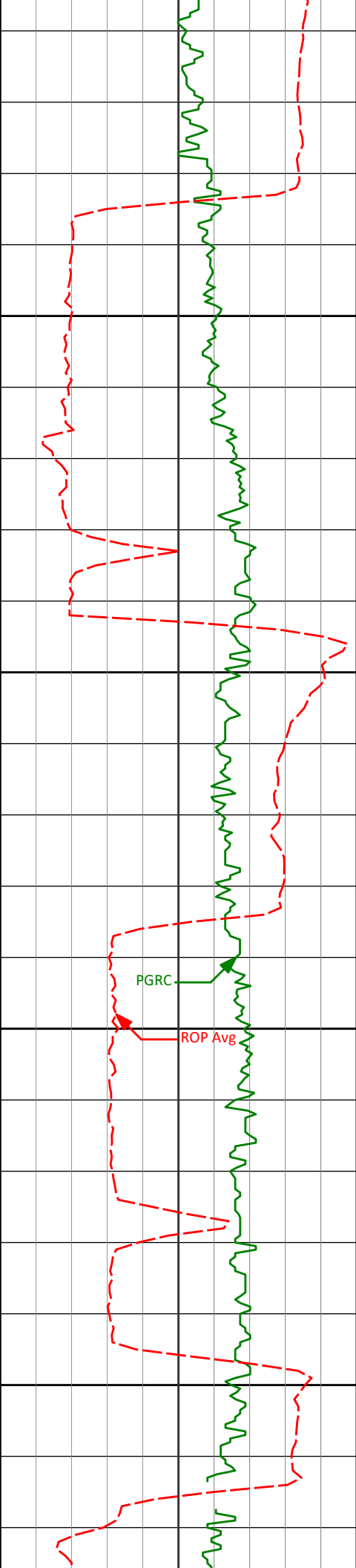
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8618'

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8650

8700

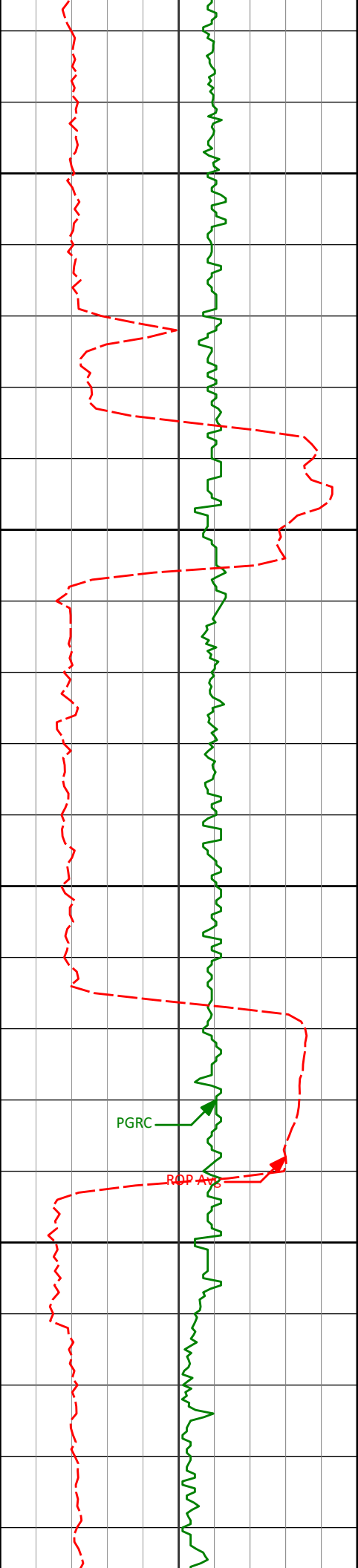
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89.26°

6627.00'

2264.11'



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8850

8900

PGRC

RDP Avg

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87.21°

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2358.11'

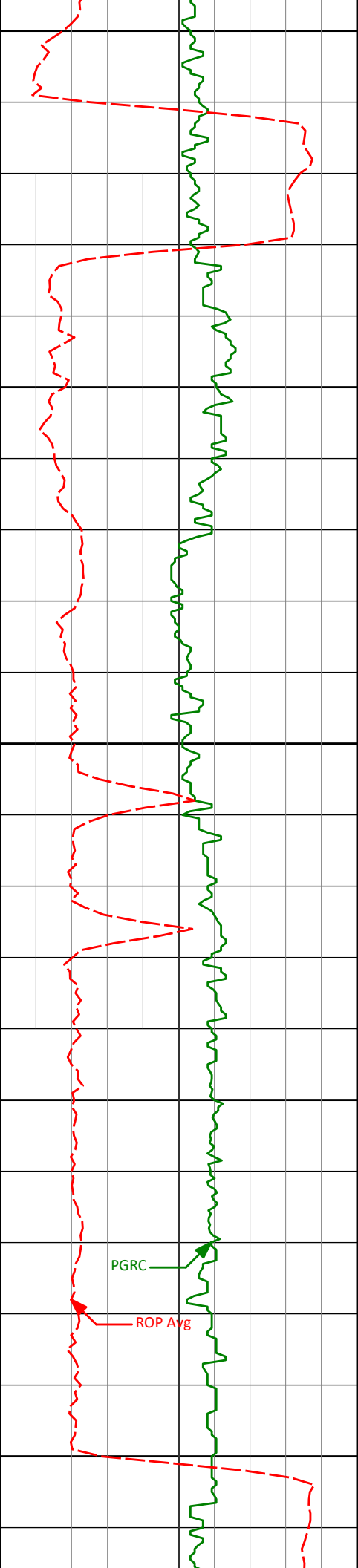
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2451.89'



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9093'

90.06°

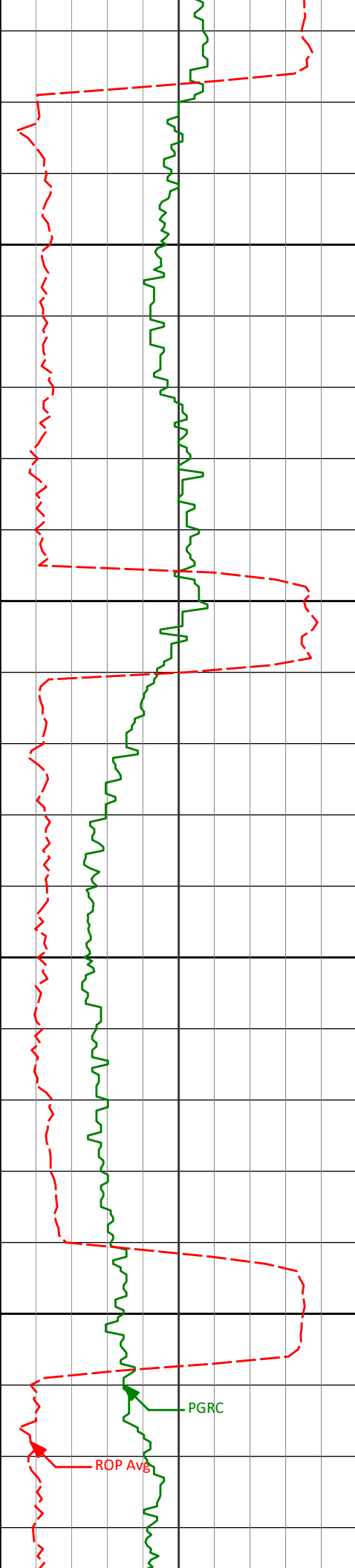
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2639.70'

PGRC

ROP Avg



9200

9250

9300

9350

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2732.80'

9282'

89.29°

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2826.82'

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89.48°

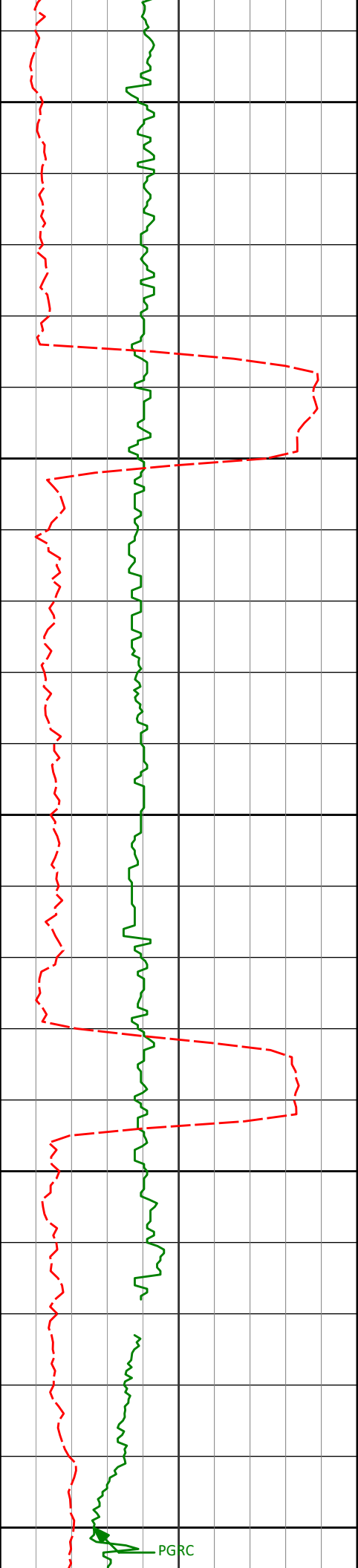
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PGRC

ROP Avg



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9450

9500

9550

9600

9472'

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88.34°

6636.93'

3014.80'

9567'

91.63°

88.94°

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9650

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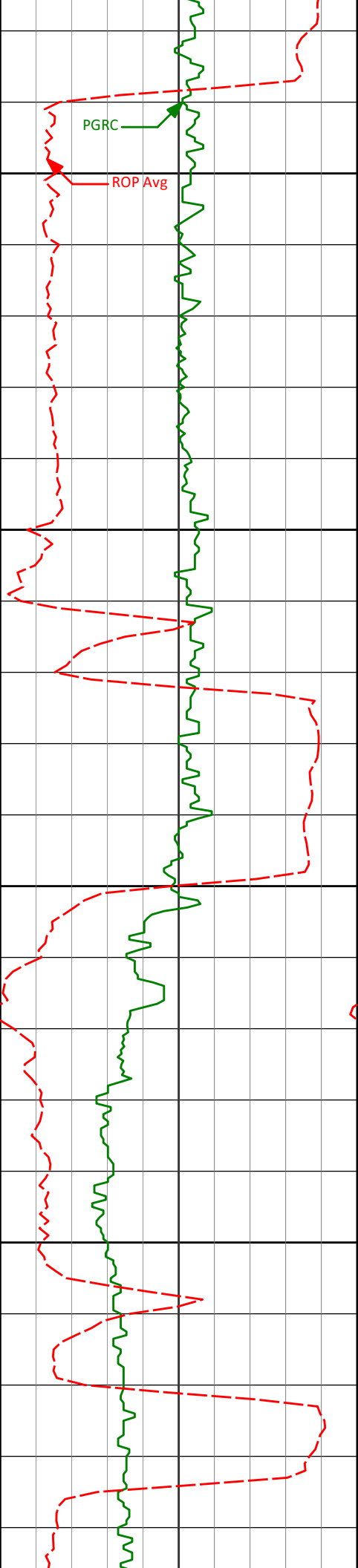
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3297.11'

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9850

9852'

90.22°

90.09°

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9900

9950

9947'

89.01°

89.95°

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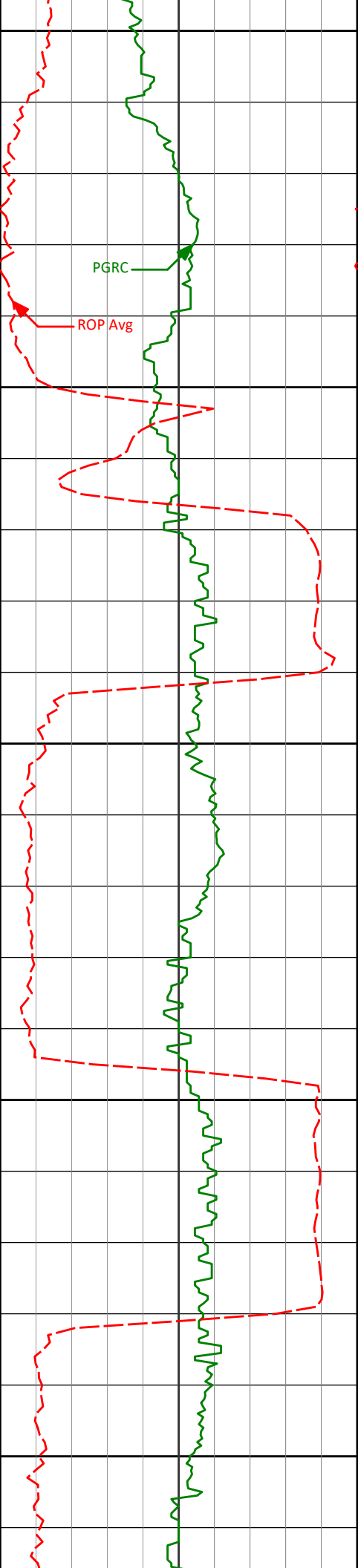
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90.14°

6635.66'

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10050

10100

10150

10200

10250

10137'

91.63°

90.15°

6633.71'

3674.52'

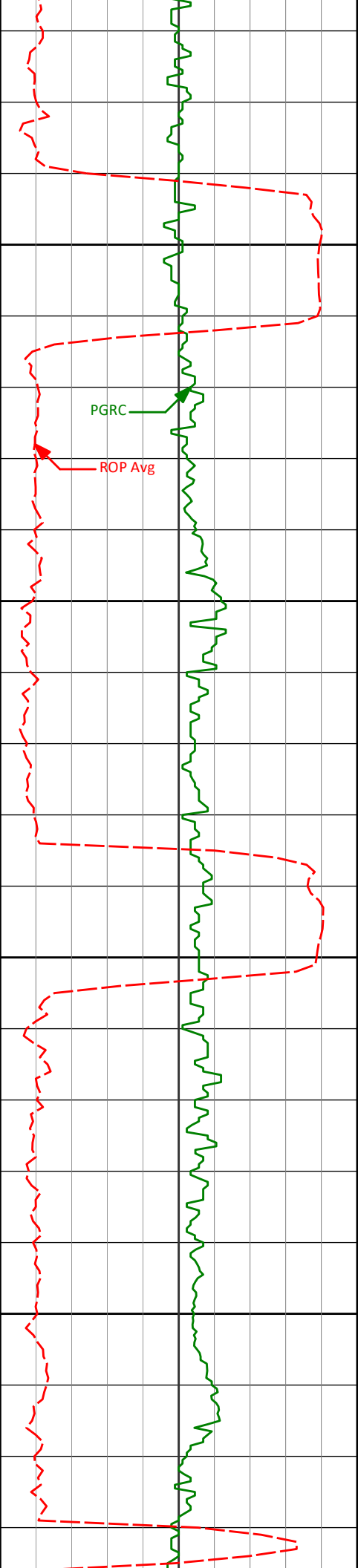
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90.06°

88.71°

6632.31'

3768.79'



10300

10350

10400

10450

10327'

10422'

88.89°

90.31°

87.91°

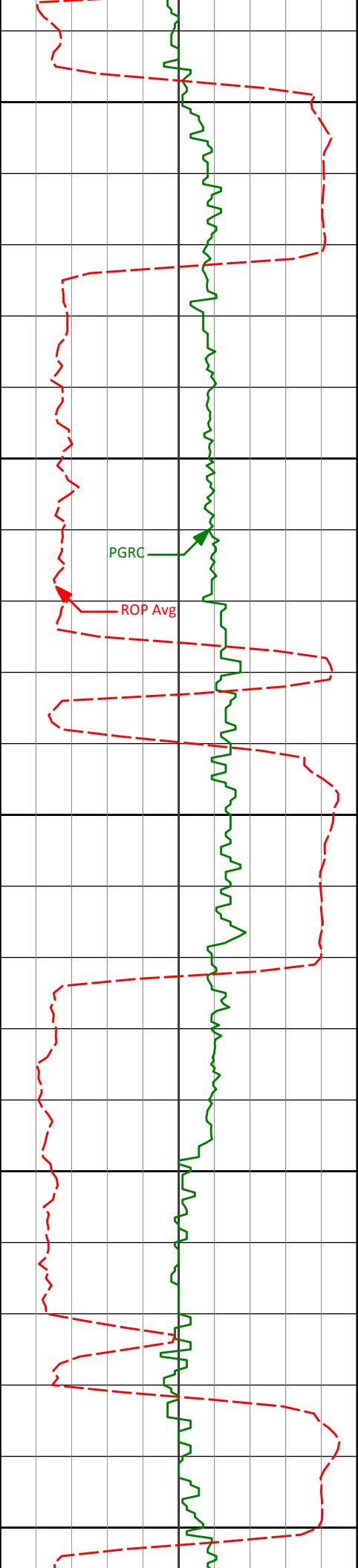
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6633.84'

3862.81'

3956.89'



10500

10517'

90.96°

89.83°

6632.79'

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10550

PGRC

ROP Avg

10600

10612'

89.14°

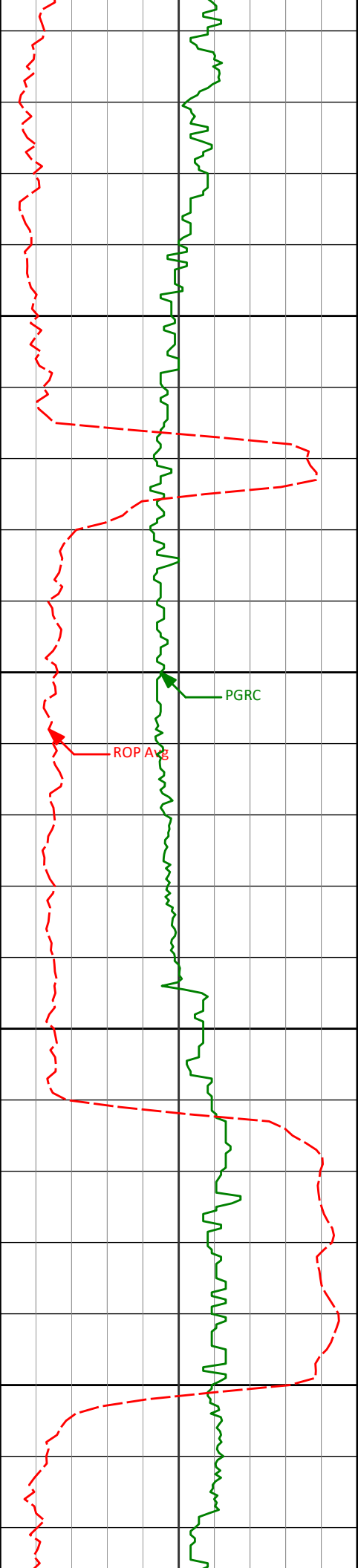
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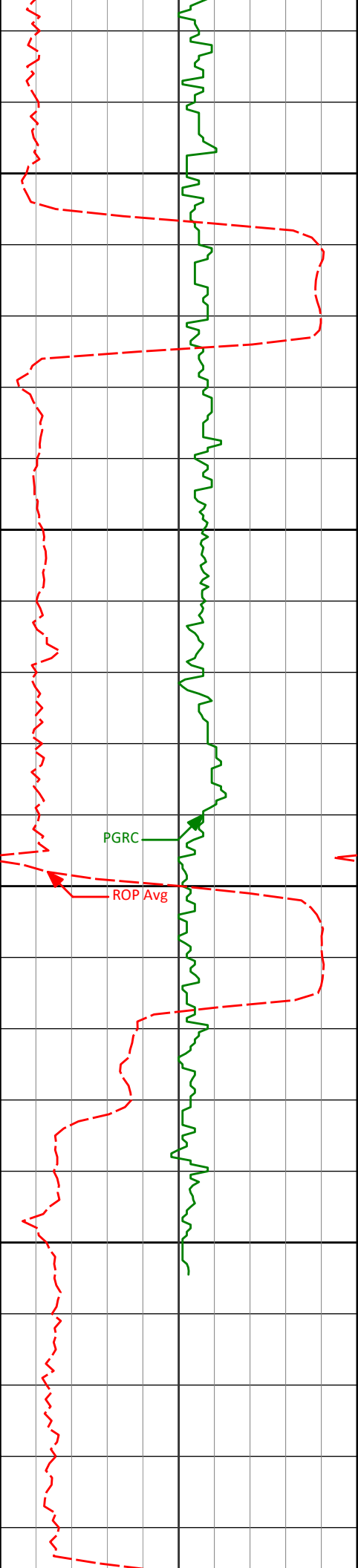
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10801'	90.37°	88.42°	6636.58'	4332.81'
10896'	89.57°	88.41°	6636.64'	4426.87'



10950

11000

11050

11100

10991'

89.78°

87.81°

6637.17'

4520.85'

11097'

90.09°

87.52°

6637.29'

4625.59'

5447.00	11.37	191.06	5418.67	312.80 S	59.14 W	-23.35	0.79
5542.00	11.85	187.87	5511.73	331.65 S	62.27 W	-24.33	0.84
5637.00	11.48	187.22	5604.76	350.70 S	64.80 W	-24.68	0.41
5732.00	11.87	181.93	5697.80	369.84 S	66.32 W	-24.02	1.20
5827.00	11.70	179.17	5790.80	389.24 S	66.51 W	-22.01	0.62
5922.00	11.08	183.39	5883.93	407.99 S	66.90 W	-20.29	1.10
6013.00	11.78	183.88	5973.12	425.98 S	68.05 W	-19.39	0.78
6108.00	16.78	164.57	6065.21	448.90 S	65.05 W	-13.82	7.20
6156.00	20.12	157.61	6110.74	463.22 S	60.07 W	-7.24	8.33
6203.00	23.79	149.51	6154.33	478.88 S	52.17 W	2.37	10.10
6251.00	27.28	139.25	6197.66	495.56 S	40.07 W	16.29	11.72
6298.00	29.89	135.33	6238.93	512.06 S	24.80 W	33.32	6.84
6346.00	32.06	128.98	6280.10	528.58 S	6.48 W	53.40	8.16
6393.00	33.64	119.83	6319.60	542.92 S	14.52 E	75.89	11.08
6441.00	35.89	112.48	6359.05	554.92 S	39.07 E	101.64	9.89
6488.00	39.78	110.27	6396.17	565.40 S	65.91 E	129.49	8.76
6536.00	43.43	107.22	6432.06	575.61 S	96.09 E	160.63	8.70
6583.00	46.83	103.59	6465.22	584.42 S	128.19 E	193.53	9.06
6631.00	50.68	99.27	6496.87	591.53 S	163.55 E	229.47	10.49
6678.00	55.07	96.50	6525.23	596.65 S	200.66 E	266.91	10.45
6726.00	60.03	94.71	6550.98	600.59 S	240.96 E	307.40	10.81
6772.00	64.94	93.11	6572.23	603.35 S	281.65 E	348.14	11.12
6820.00	68.89	93.22	6591.04	605.79 S	325.73 E	392.21	8.21
6867.00	72.58	92.42	6606.55	607.97 S	370.03 E	436.48	8.02
6915.00	77.35	91.82	6619.00	609.68 S	416.34 E	482.68	10.03
6990.00	83.30	91.92	6631.59	612.09 S	490.20 E	556.34	7.93
7100.00	89.63	91.70	6638.37	615.56 S	599.88 E	665.71	5.76
7195.00	91.14	91.34	6637.73	618.07 S	694.85 E	760.35	1.64
7289.00	91.02	89.80	6635.96	619.01 S	788.82 E	853.82	1.64
7384.00	90.74	88.00	6634.51	617.19 S	883.79 E	947.98	1.92
7479.00	91.08	87.60	6633.00	613.54 S	978.71 E	1041.87	0.55
7574.00	91.32	87.91	6631.01	609.82 S	1073.61 E	1135.74	0.42
7669.00	90.12	88.73	6629.82	607.03 S	1168.56 E	1229.77	1.53
7764.00	90.25	89.14	6629.51	605.27 S	1263.54 E	1323.94	0.45
7859.00	90.28	88.28	6629.08	603.13 S	1358.52 E	1418.06	0.90
7954.00	89.94	88.37	6628.90	600.35 S	1453.48 E	1512.10	0.37
8049.00	89.66	87.04	6629.23	596.55 S	1548.40 E	1605.98	1.44
8143.00	88.43	86.93	6630.80	591.61 S	1642.25 E	1698.67	1.31
8238.00	90.18	88.18	6631.95	587.56 S	1737.16 E	1792.50	2.26
8333.00	89.54	89.96	6632.18	586.02 S	1832.14 E	1886.70	1.99
8428.00	91.70	90.37	6631.16	586.29 S	1927.13 E	1981.11	2.31
8523.00	91.66	89.63	6628.37	586.29 S	2022.09 E	2075.46	0.78
8618.00	90.37	89.99	6626.69	585.97 S	2117.07 E	2169.79	1.41
8713.00	89.26	89.26	6627.00	585.35 S	2212.06 E	2264.11	1.40
8808.00	89.94	87.21	6627.66	582.42 S	2307.01 E	2358.11	2.28
8903.00	88.92	87.43	6628.61	577.98 S	2401.90 E	2451.89	1.10
8998.00	88.06	87.70	6631.11	573.95 S	2496.78 E	2545.70	0.95
9093.00	90.06	88.81	6632.67	571.06 S	2591.72 E	2639.70	2.41
9187.00	88.70	88.34	6633.68	568.72 S	2685.68 E	2732.80	1.53
9282.00	89.29	88.36	6635.35	565.99 S	2780.63 E	2826.82	0.62
9377.00	89.48	87.95	6636.37	562.93 S	2875.57 E	2920.81	0.48
9472.00	89.85	88.34	6636.93	559.85 S	2970.52 E	3014.80	0.57
9567.00	91.63	88.94	6635.71	557.59 S	3065.48 E	3108.90	1.98
9662.00	90.19	88.65	6634.20	555.59 S	3160.44 E	3203.02	1.55
9757.00	89.45	88.42	6634.51	553.16 S	3255.41 E	3297.11	0.81
9852.00	90.22	90.09	6634.79	551.93 S	3350.40 E	3391.34	1.93
9947.00	89.01	89.95	6635.43	551.97 S	3445.40 E	3485.73	1.27
10042.00	90.71	90.14	6635.66	552.04 S	3540.39 E	3580.13	1.80
10137.00	91.63	90.15	6633.71	552.29 S	3635.37 E	3674.52	0.97
10232.00	90.06	88.71	6632.31	551.34 S	3730.35 E	3768.79	2.25
10327.00	88.89	87.91	6633.17	548.54 S	3825.30 E	3862.81	1.50
10422.00	90.31	89.19	6633.84	546.13 S	3920.27 E	3956.89	2.01
10517.00	90.96	89.83	6632.79	545.31 S	4015.26 E	4051.18	0.96
10612.00	89.14	89.45	6632.71	544.71 S	4110.25 E	4145.49	1.96
10707.00	87.90	89.02	6635.17	543.44 S	4205.21 E	4239.69	1.37
10801.00	90.37	88.42	6636.58	541.34 S	4299.16 E	4332.81	2.70
10896.00	89.57	88.41	6636.64	538.71 S	4394.13 E	4426.87	0.84
10991.00	89.78	87.81	6637.17	535.57 S	4489.07 E	4520.85	0.67
11097.00	90.09	87.52	6637.29	531.25 S	4594.99 E	4625.59	0.40
11159.00	90.09	87.52	6637.19	528.57 S	4656.93 E	4686.83	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 CLOSURE OF 96.48 DEGREES (GRID)
A TOTAL CORRECTION OF 7.80 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11159.00 FEET
IS 4686.83 FEET ALONG 96.48 DEGREES (GRID)**

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