

PCGC : Pressure Case Gamma



1:600 / 1:240

[illegible]

WELL INFORMATION

MWD Run Number	100	200	300	400	500
Date run completed	13-Jun-13	14-Jun-13	19-Jun-13	19-Jun-13	21-Jun-13
Rig Bit Number	200	300	400	500	600
Bit Size (in)	8.750	8.750	6.125	6.125	6.125
Tool Nominal OD (in)	6.750	6.750	4.750	4.750	4.750
Log Start Depth (MD, ft)	790.00	5,976.00	7,067.00	13,404.00	13,454.00
Log End Depth (MD, ft)	5,976.00	7,067.00	13,404.00	13,454.00	14,095.00
Drill or Wipe	Drill	Drill	Drill	Drill	Drill
Drill/Wipe Start Date and Time	12-Jun-13 02:15	13-Jun-13 09:00	15-Jun-13 20:10	19-Jun-13 12:30	20-Jun-13 09:00
Drill/Wipe End Date and Time	12-Jun-13 23:15	14-Jun-13 04:45	18-Jun-13 17:00	19-Jun-13 13:40	20-Jun-13 20:30
Min Inc (deg) @ Depth (MD, ft)	.03 @ 994.00	1.29 @ 6,032.00	86.94 @ 8,723.00	90.68 @ 13,341.00	85.40 @ 13,911.00
Max Inc (deg) @ Depth (MD, ft)	15.86 @ 2,786.00	88.40 @ 7,067.00	92.41 @ 9,276.00	90.68 @ 13,341.00	92.07 @ 13,626.00
Bit TFA(in2) / Bit Type	.78 / PDC	.75 / PDC	.75 / PDC	.75 / PDC	.75 / PDC
Flow Rate (gpm)	628.42	514.40	287.77	300.00	270.00
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	N/A / N/A	N/A / N/A	N/A / N/A
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel
Density (ppg) / Viscosity (spqt)	8.80 / 29.00	9.35 / 33.00	9.20 / 34.00	9.20 / 33.00	9.20 / 33.00
Filtrate CL (ppm)	1,300.00	1,300.00	1,200.00	1,200.00	1,000.00
pH / Fluid Loss (mptm)	10.60 / 0	9.50 / 7	9.10 / 7	9.00 / 8	8.90 / 0
PV (cP) / YP (lbf2)	4 / 3.00	8 / 8.00	10 / 10.00	9 / 8.00	9 / 8.00
% Solids / % Sand	2.7 / 0.25	5.50 / 0.40	5.7 / 0.40	5.5 / .3	5.5 / .3
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	N/A / N/A	N/A / N/A	N/A / N/A
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A
Max Tool Temp (in) Temp (degF)	152.00 / 152.00	170.70 / 170.70	217.70 / 217.70	216.00 / 216.00	215.00 / 215.00

Max Tool Temp (degF) / Source	158.60 / PCM	172.78 / PCM	247.78 / PCM	242.28 / PCM	245.03 / PCM
Rm @ Max Tool Temp (degF)	N/A @ 158.60	N/A @ 172.78	N/A @ 247.78	N/A @ 242.28	N/A @ 245.03
Lead MWD Engineer	Henry Schmeidler	Henry Schmeidler	Henry Schmeidler	Henry Schmeidler	Henry Schmeidler
Customer Representative	Martin Suarez	Martin Suarez	Bryant Dear	Bryant Dear	Bryant Dear

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM	PCM	PCM
Software Version	5.84	5.84	5.84	5.84	5.84
Sub Serial Number	11341333	11341333	11675320	11675320	11675320
Insert Serial Number	11400829	11400829	11227512	11400829	11227512
Date and Time Initialized	11-Jun-13 16:51	11-Jun-13 16:51	15-Jun-13 04:00	18-Jun-13 20:55	19-Jun-13 21:46
Date and Time Read	14-Jun-13 14:29	14-Jun-13 14:21	19-Jun-13 02:59	20-Jun-13 02:17	21-Jun-13 07:11
ECMB SW Version	N/A	N/A	N/A	N/A	N/A

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC	PCDC	PCDC
Distance From Bit (ft)	56.60	52.11	61.34	61.34	61.21
Software Version	6.21	6.21	6.21	6.21	6.21
Sub Serial Number	11341333	11341333	11675320	11675320	11675320
Sonde Serial Number	11638536	11638536	11297515	11638536	11297515
Sensor ID Number	N/A	N/A	N/A	N/A	N/A
Toolface Offset (deg)	57.86	193.31	234.69	229.88	181.89

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG	PCG	PCG
Distance From Bit (ft)	51.60	47.11	56.36	56.36	56.23
Recorded Sample Period (sec)	10	10	10	10	10
Software Version	8.15	8.15	8.15	8.15	8.15
Sub Serial Number	11341333	11341333	11675320	11675320	11675320
Insert/Sonde Serial Number	11293345	11293345	11680997	11293345	11680997

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 7.4.20
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 7019 ft. MD. Gamma cannot be measured within cased hole, and collection resumes after drilling through cement at 7067 ft MD.

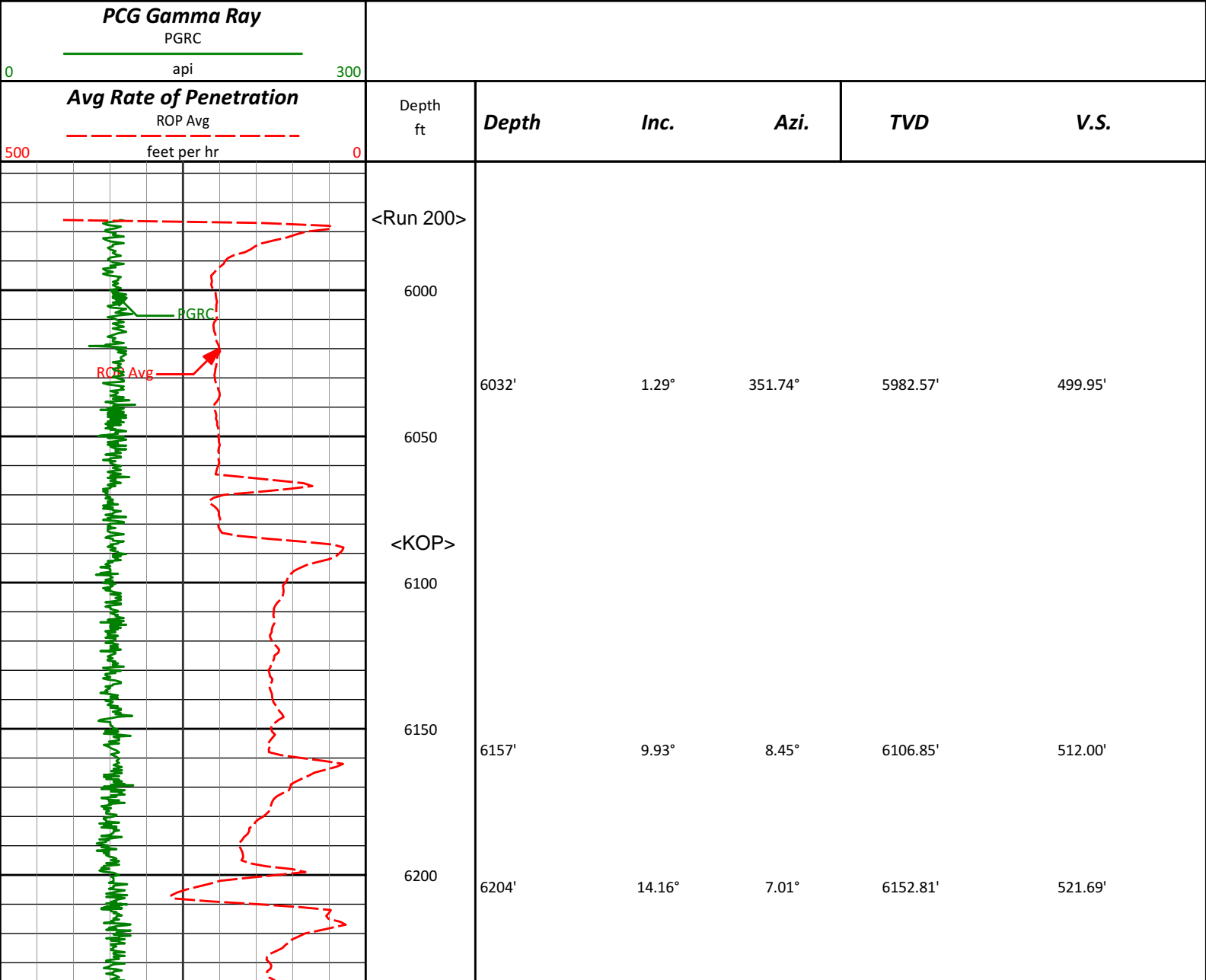
WARRANTY

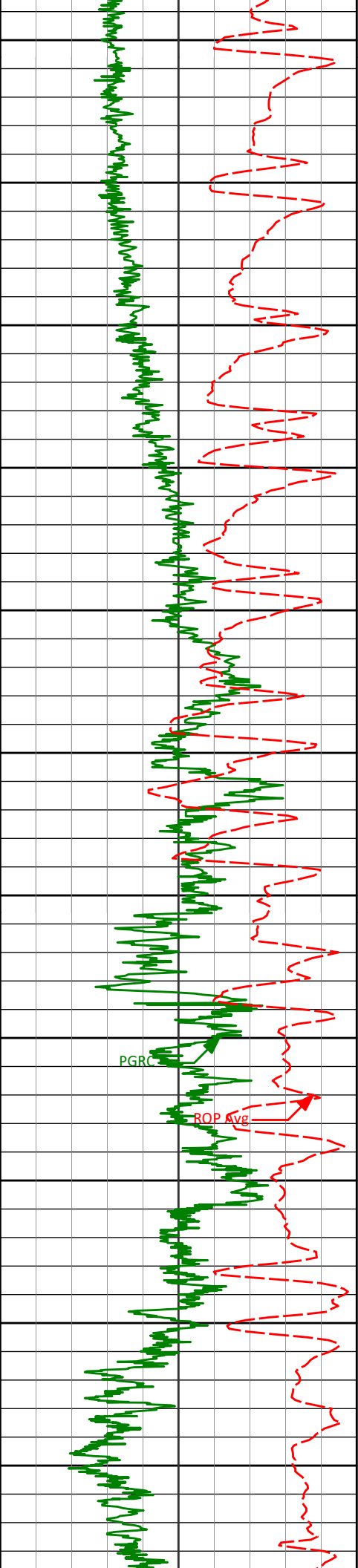
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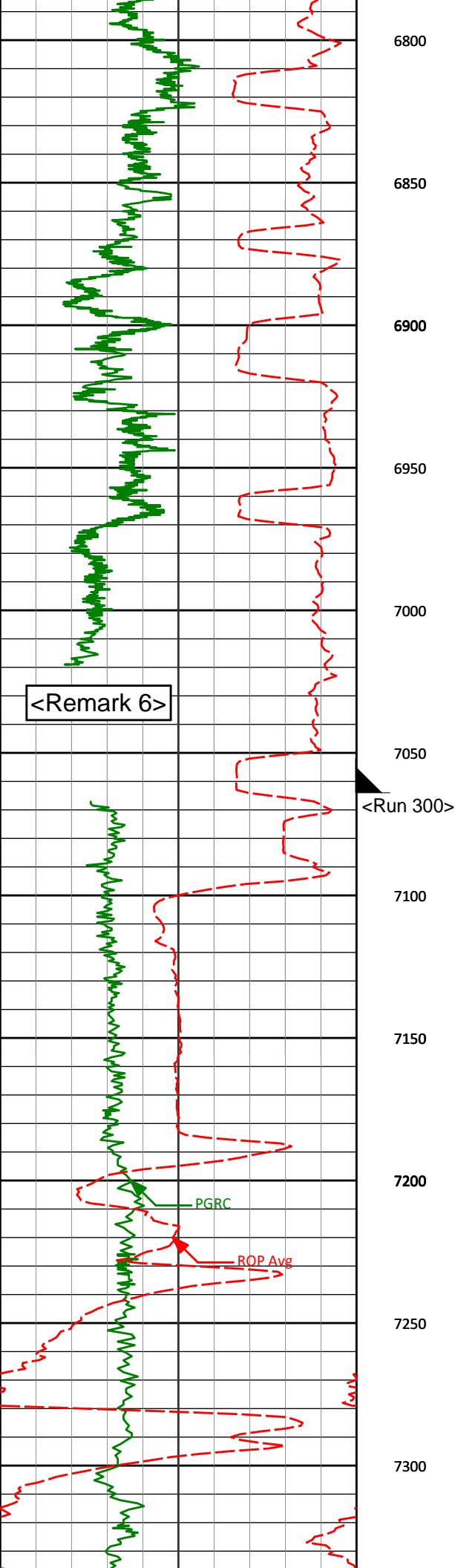
MD Main Log 1:600

Noble Energy, Inc
Leeroy B11-79HNM
H&P 315
T5N R64W

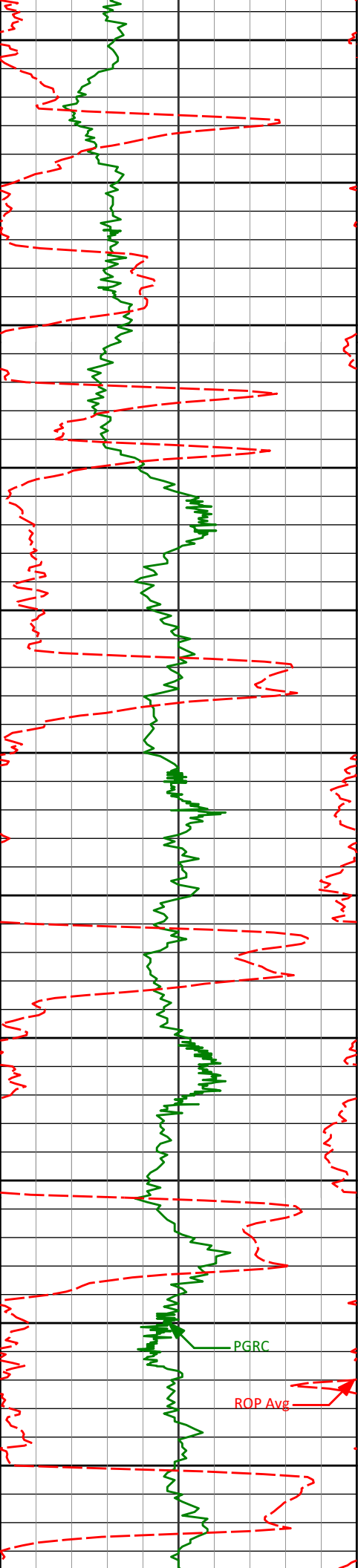




6250	6252'	17.53°	7.09°	6198.98'	534.66'
6300	6299'	21.00°	5.19°	6243.34'	550.04'
6350	6347'	25.32°	3.52°	6287.46'	568.83'
6400	6394'	29.80°	3.89°	6329.12'	590.49'
6450	6442'	34.08°	3.30°	6369.84'	615.79'
6500	6488'	37.55°	2.90°	6407.14'	642.63'
6550	6536'	41.52°	2.77°	6444.15'	673.10'
6600	6583'	45.49°	0.45°	6478.24'	705.41'
6650	6631'	49.08°	1.51°	6510.79'	740.64'
6700	6678'	53.38°	2.17°	6540.22'	777.23'
6750	6726'	56.40°	2.09°	6567.82'	816.43'
	6773'	62.15°	2.53°	6591.82'	856.74'



6800				
6821'	66.90°	1.92°	6612.46'	899.98'
6850				
6868'	71.34°	359.97°	6629.21'	943.85'
6900				
6916'	73.64°	358.14°	6643.65'	989.62'
6950				
6963'	77.98°	357.15°	6655.17'	1035.17'
7000				
7013'	84.00°	358.22°	6663.00'	1084.52'
7050	<7" casing set at 7061' MD>			
	<Run 300>			
7100				
7126'	88.71°	358.67°	6670.18'	1197.25'
7150				
7200				
7221'	88.12°	357.58°	6672.81'	1292.21'
7250				
7300				
7316'	91.02°	358.78°	6673.52'	1387.19'



7350
7400
7450
7500
7550
7600
7650
7700
7750
7800
7850

7410'
7505'
7600'
7695'
7790'

91.20°
91.30°
91.17°
90.55°
87.44°

358.01°
357.87°
357.86°
358.60°
358.52°

6671.70'
6669.63'
6667.58'
6666.16'
6667.82'

1481.17'
1576.13'
1671.10'
1766.08'
1861.05'

PGRC

ROP Avg

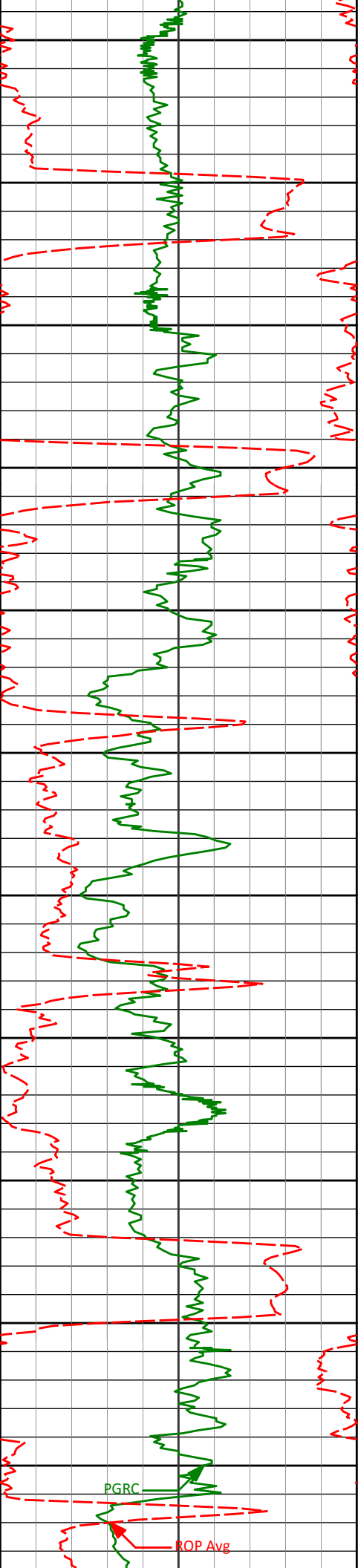
7885'

87.13°

359.58°

6672.32'

1955.94'



7900

7950

7980'

8000

8050

8075'

8100

8150

8167'

8200

8250

8261'

8300

8350

8353'

8400

PGRC

ROP Avg

87.44°

0.56°

6676.82'

2050.81'

89.41°

1.41°

6679.43'

2145.71'

90.80°

0.71°

6679.27'

2237.63'

92.28°

0.29°

6676.74'

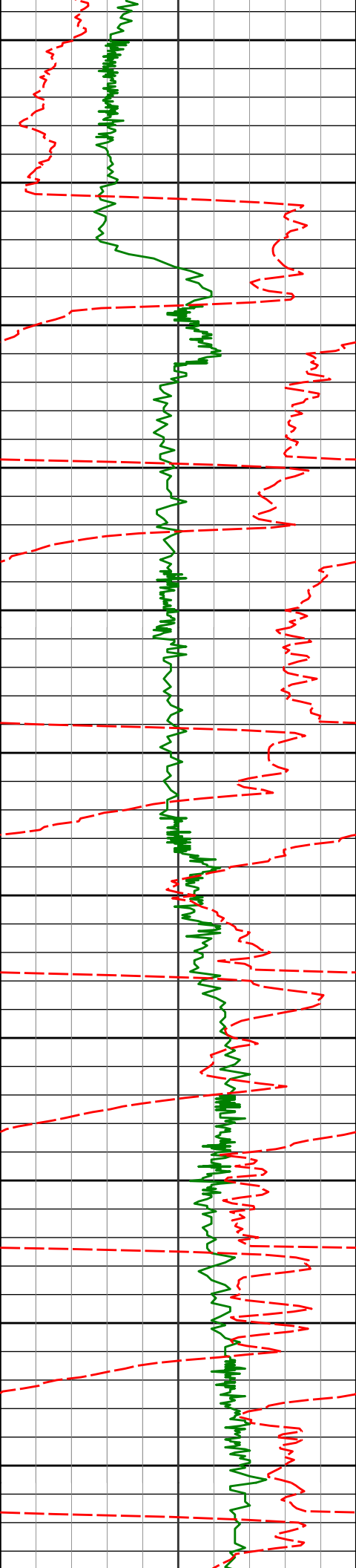
2331.56'

90.62°

0.22°

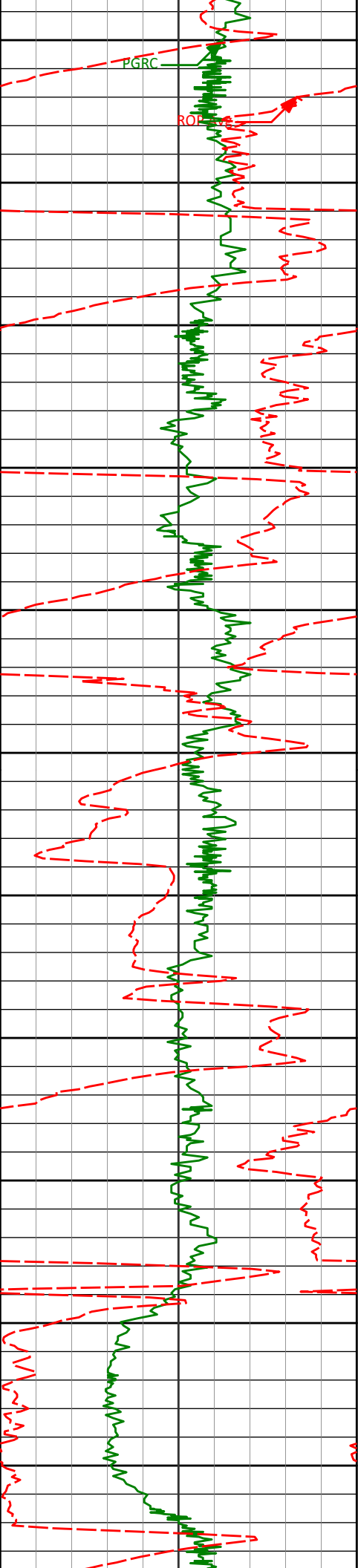
6674.41'

2423.50'

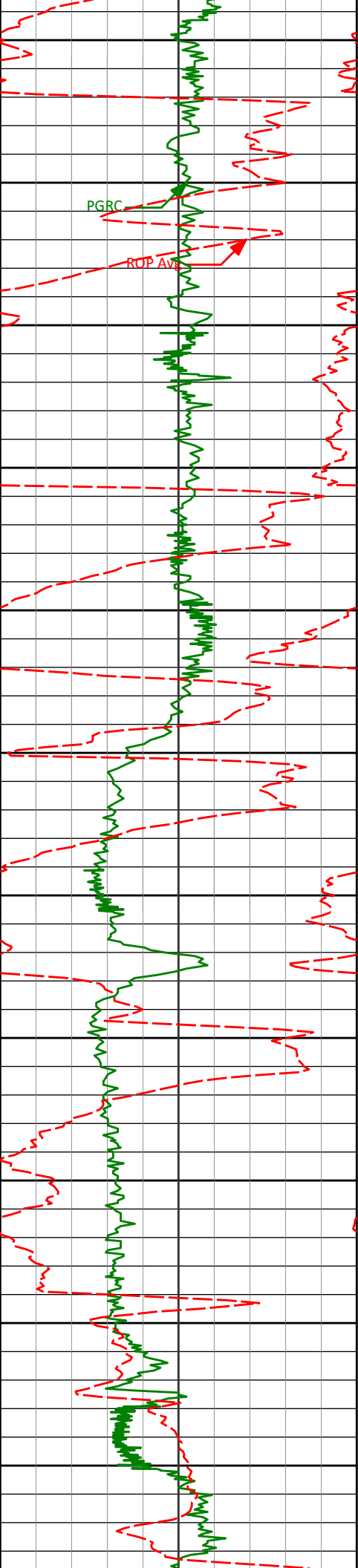


8450
8500
8550
8600
8650
8700
8750
8800
8850
8900
8950

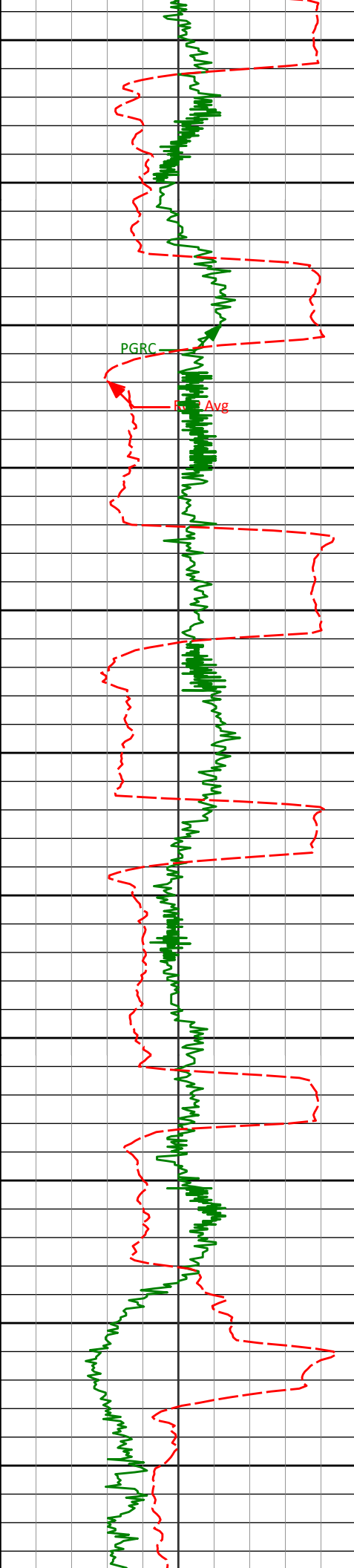
8446'	91.20°	358.32°	6672.93'	2516.48'
8538'	89.26°	359.73°	6672.56'	2608.47'
8630'	88.49°	1.01°	6674.37'	2700.42'
8723'	86.94°	359.70°	6678.08'	2793.30'
8815'	88.67°	1.01°	6681.60'	2885.20'
8907'	88.12°	2.11°	6684.18'	2977.06'



9000	9000'	89.66°	4.17°	6685.98'	3069.77'
9050					
9100	9092'	89.69°	3.41°	6686.50'	3161.43'
9150					
9200	9184'	91.97°	3.46°	6685.17'	3253.11'
9250					
9300	9276'	92.41°	2.83°	6681.65'	3344.79'
9350					
9400	9368'	90.62°	0.90°	6679.22'	3436.62'
9450					
9500	9460'	89.72°	359.97°	6678.95'	3528.58'



9550	9555'	88.43°	359.36°	6680.48'	3623.56'
9600					
9650	9648'	89.91°	0.35°	6681.83'	3716.53'
9700					
9750	9740'	90.43°	359.57°	6681.56'	3808.51'
9800					
9850	9833'	89.69°	0.17°	6681.46'	3901.49'
9900					
9950	9925'	90.46°	359.40°	6681.34'	3993.48'
10000					
10050	10020'	88.43°	357.30°	6682.26'	4088.46'



10100

10115'

87.94°

358.51°

6685.27'

4183.40'

10150

10200

10210'

88.89°

359.28°

6687.90'

4278.36'

10250

10300

10305'

90.31°

359.43°

6688.56'

4373.35'

10350

10400

10400'

90.56°

359.51°

6687.84'

4468.34'

10450

10500

10495'

90.62°

0.14°

6686.86'

4563.32'

10550

10600

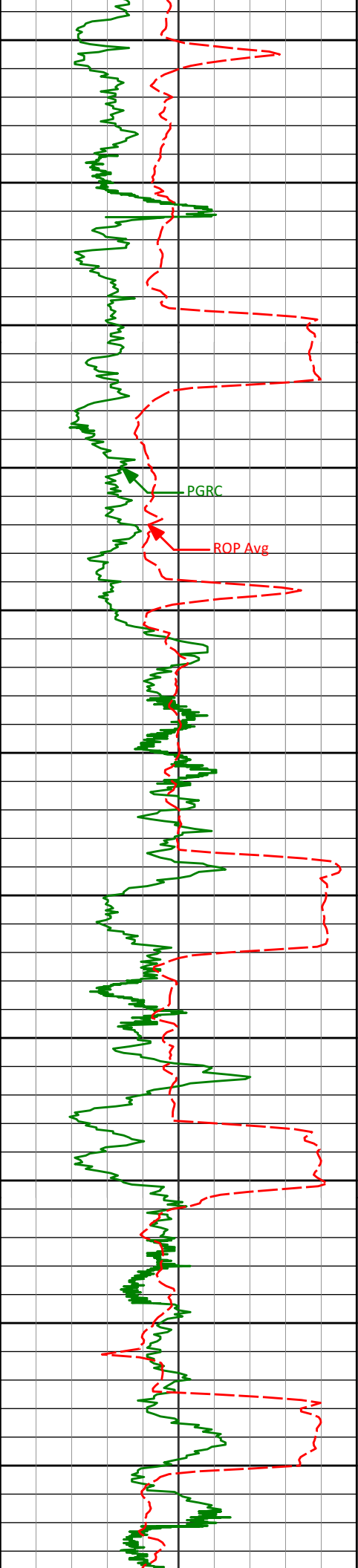
10590'

91.05°

0.17°

6685.48'

4658.29'



10650

10685'

91.29°

358.87°

6683.54'

4753.26'

10700

10750

10780'

89.94°

358.72°

6682.52'

4848.25'

10800

PGRC

ROP Avg

10850

10875'

90.80°

357.40°

6681.90'

4943.24'

10900

10950

10969'

91.05°

358.09°

6680.39'

5037.21'

11000

11050

11064'

90.52°

358.08°

6679.08'

5132.19'

11100

11150

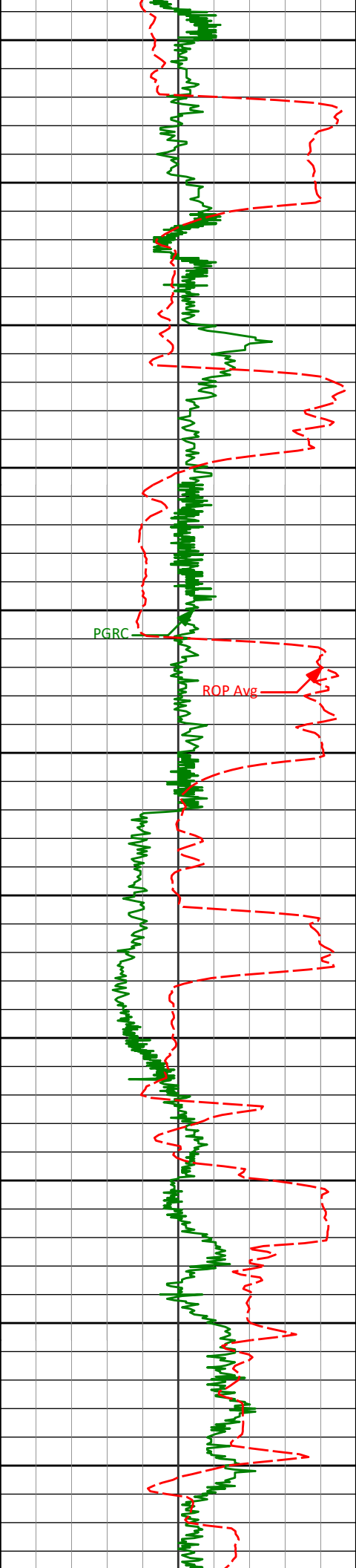
11159'

88.98°

359.06°

6679.50'

5227.18'



11200

11250

11300

11350

11400

11450

11500

11550

11600

11650

11700

11254'

88.21°

1.12°

6681.83'

5322.13'

11349'

87.78°

1.44°

6685.15'

5416.98'

11444'

89.63°

2.79°

6687.30'

5511.80'

11538'

89.75°

2.08°

6687.81'

5605.61'

11633'

90.80°

2.40°

6687.35'

5700.44'

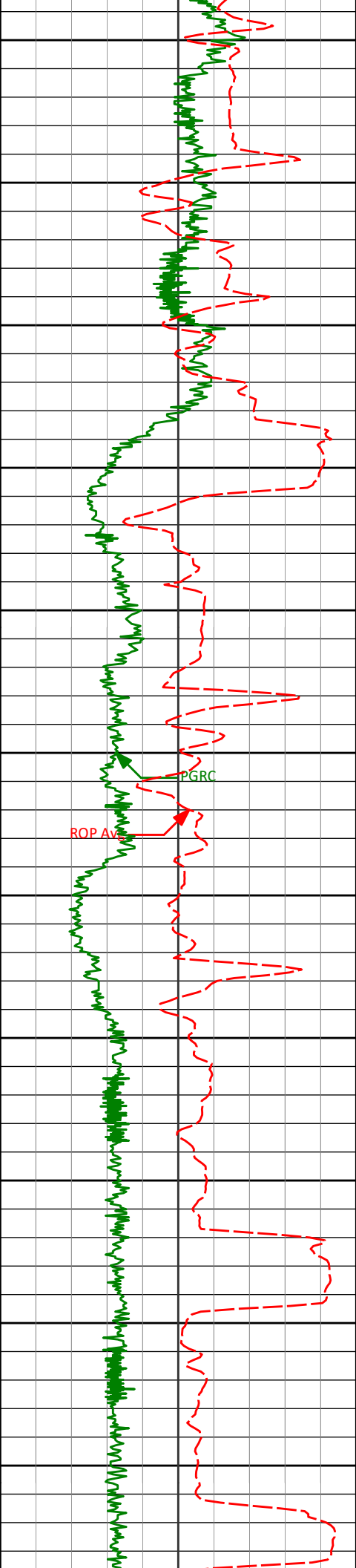
11728'

90.65°

1.25°

6686.15'

5795.30'



11750

11800

11850

11900

11950

12000

12050

12100

12150

12200

12250

11823'

89.78°

0.31°

6685.79'

5890.25'

11918'

90.80°

0.78°

6685.31'

5985.20'

12013'

90.59°

0.08°

6684.16'

6080.16'

12107'

90.56°

359.02°

6683.22'

6174.14'

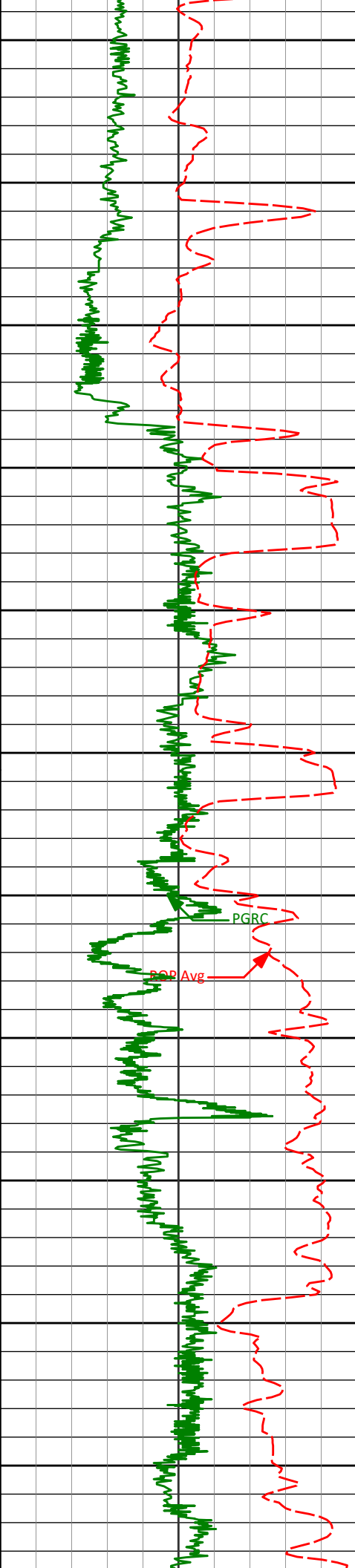
12202'

87.77°

359.28°

6684.60'

6269.12'



12300

12350

12400

12450

12500

12550

12600

12650

12700

12750

12800

12297'

12392'

12487'

12582'

12677'

12771'

89.88°

89.20°

89.41°

89.23°

90.40°

89.91°

359.18°

357.92°

358.96°

359.48°

358.79°

358.51°

6686.55'

6687.31'

6688.46'

6689.59'

6689.90'

6689.64'

6364.09'

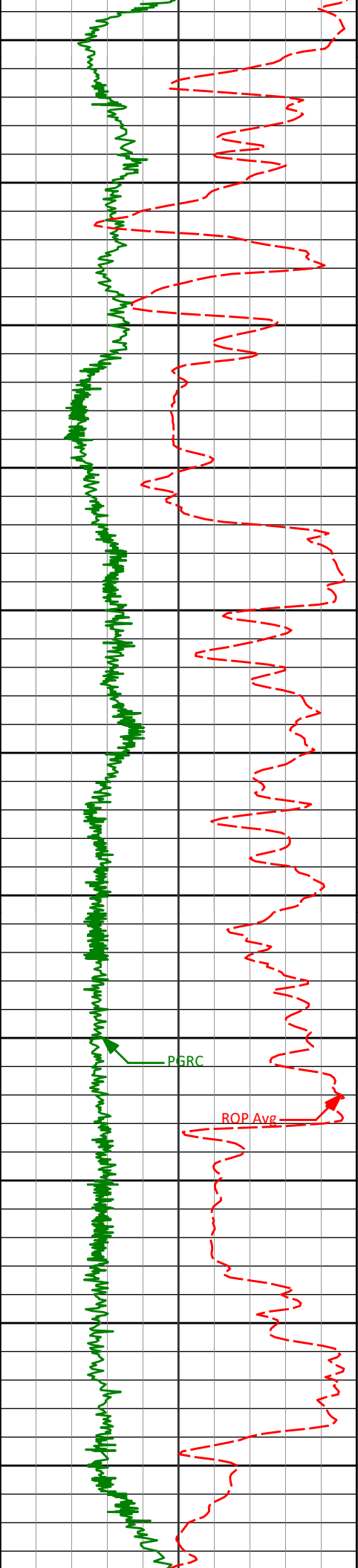
6459.09'

6554.08'

6649.07'

6744.06'

6838.06'



12850

12866'

90.18°

359.68°

6689.57'

6933.06'

12900

12950

12961'

89.26°

359.59°

6690.03'

7028.05'

13000

13050

13056'

91.05°

0.79°

6689.78'

7123.02'

13100

13150

13151'

89.29°

2.14°

6689.49'

7217.91'

13200

13250

13246'

88.98°

5.27°

6690.93'

7312.55'

13300

13350

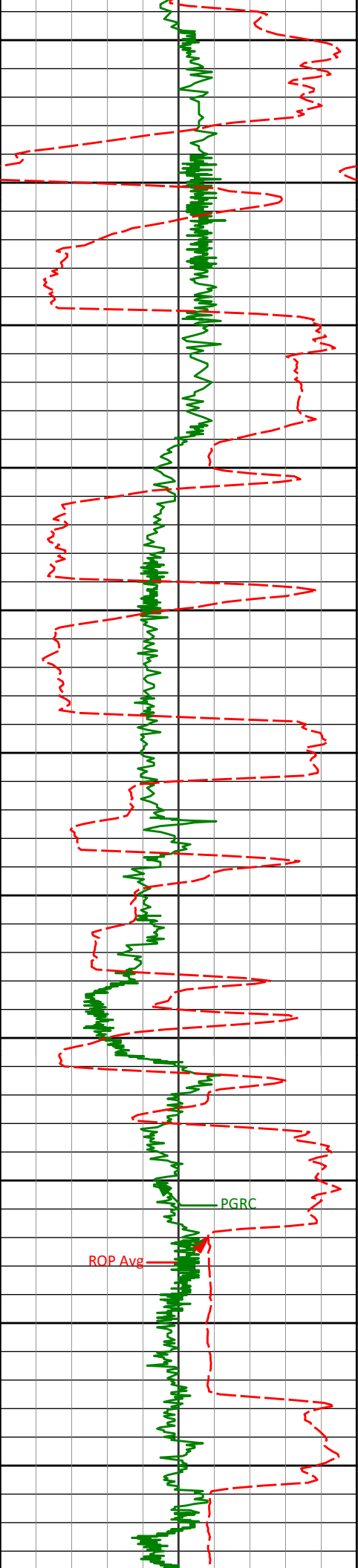
13341'

90.68°

5.55°

6691.21'

7406.92'



13400
<Run 400>

13436'

89.69°

3.85°

6690.90'

7501.42'

13450
<Run 500>

13500

13531'

91.36°

0.95°

6690.03'

7596.22'

13550

13600

13626'

92.07°

0.87°

6687.19'

7691.11'

13650

13700

13721'

91.11°

359.06°

6684.55'

7786.05'

13750

13800

PGR

ROP Avg

13816'

89.66°

356.79°

6683.92'

7881.03'

13850

13900

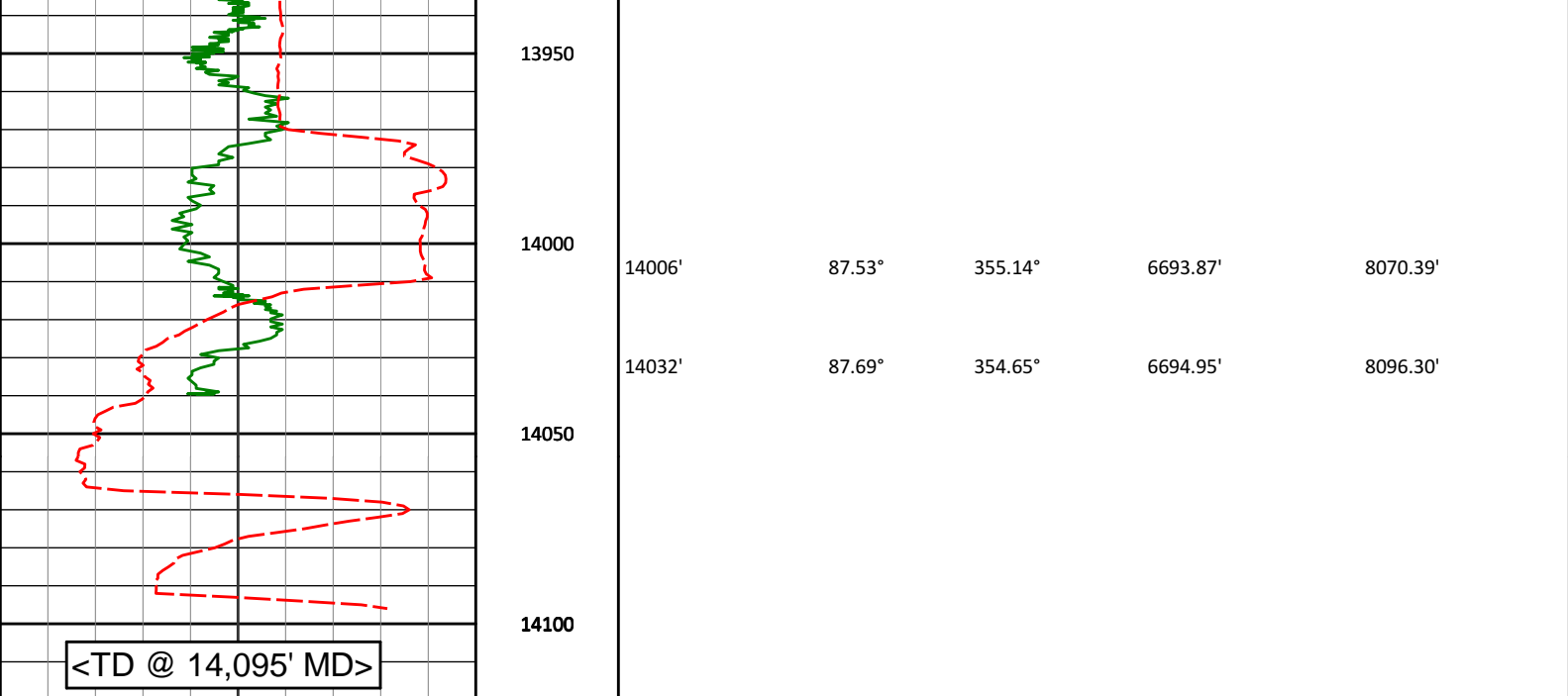
13911'

85.40°

354.90°

6688.01'

7975.78'



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

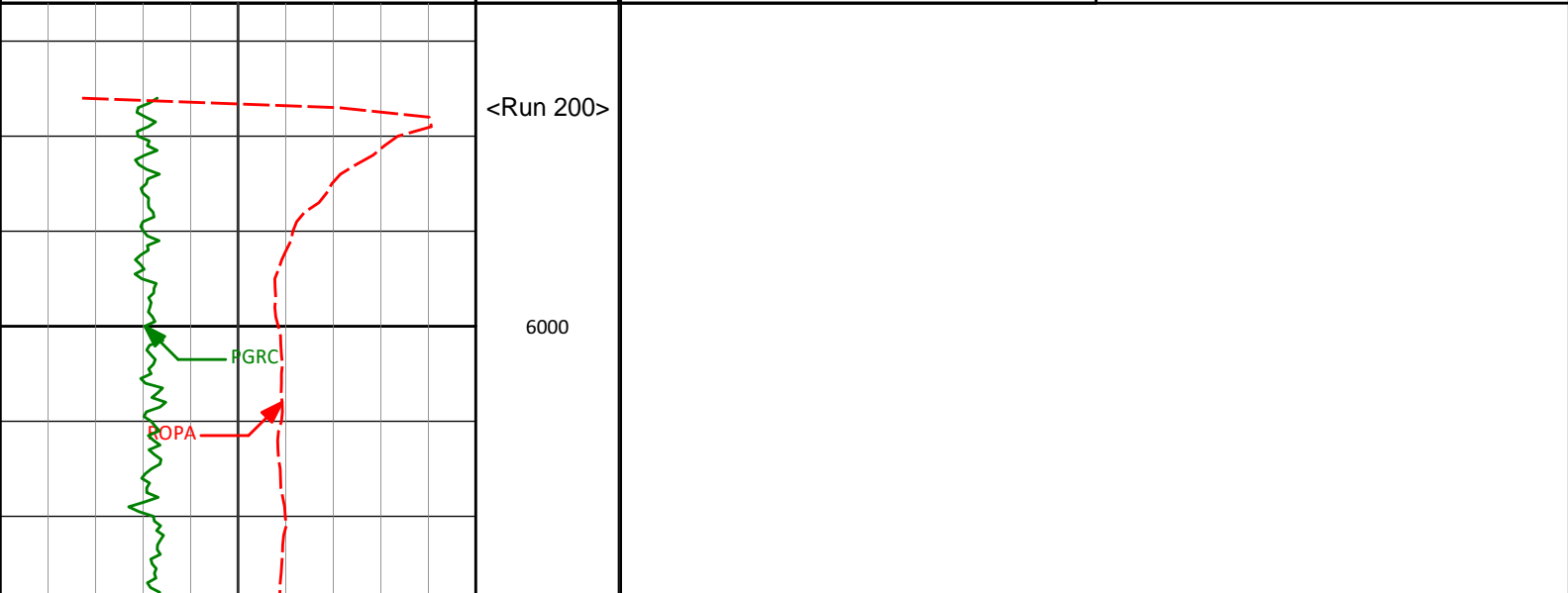
HALLIBURTON

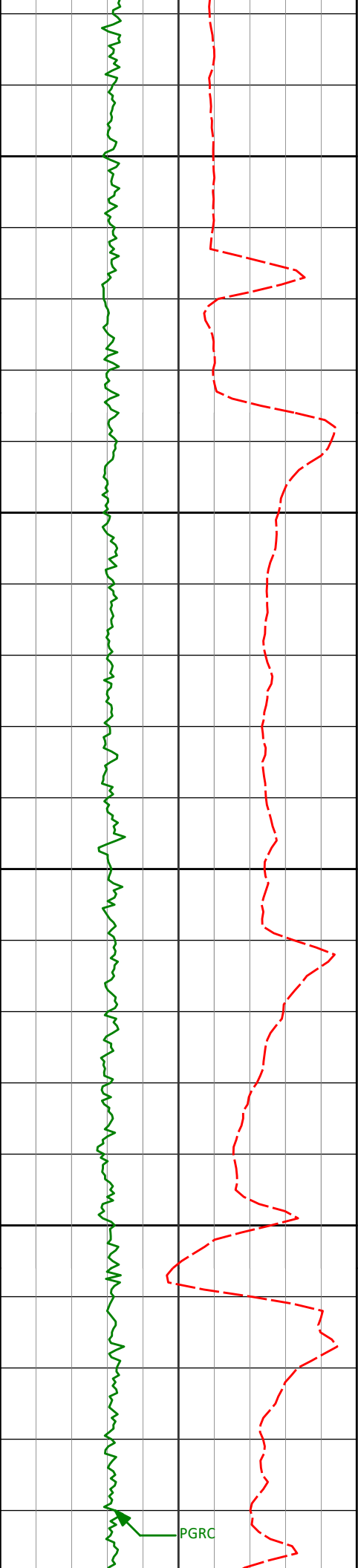
Sperry Drilling Services

MD Detail Log 1:240

Noble Energy, Inc
Leeroy B11-79HNM
H&P 315
T5N R64W

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





<KOP>

6032'	1.29°	351.74°	5982.57'	499.95'
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6050

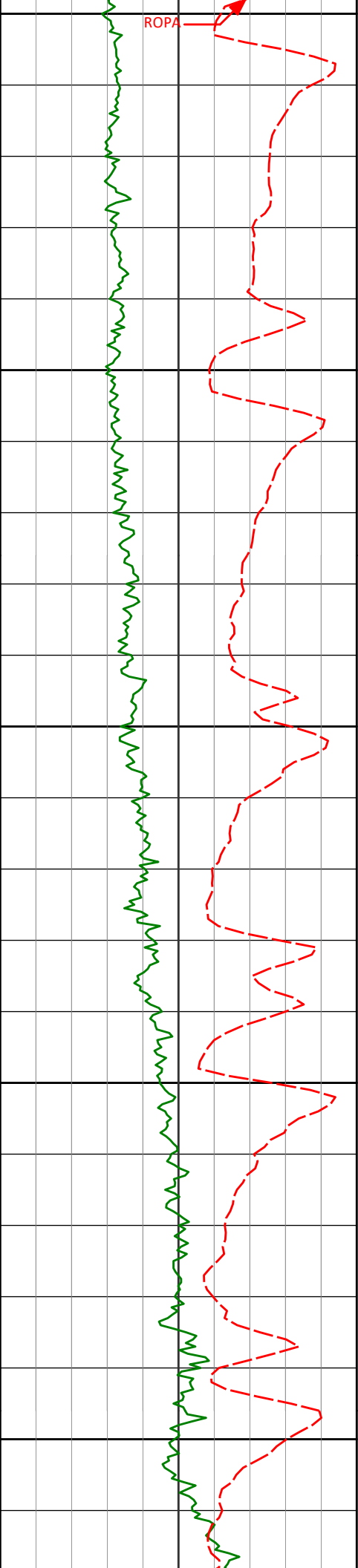
6100

6150

6157'	9.93°	8.45°	6106.85'	512.00'
-------	-------	-------	----------	---------

6200

6204'	14.16°	7.01°	6152.81'	521.69'
-------	--------	-------	----------	---------



6250

6252'

17.53°

7.09°

6198.98'

534.66'

6300

6299'

21.00°

5.19°

6243.34'

550.04'

6350

6347'

25.32°

3.52°

6287.46'

568.83'

6400

6394'

29.80°

3.89°

6329.12'

590.49'

6450

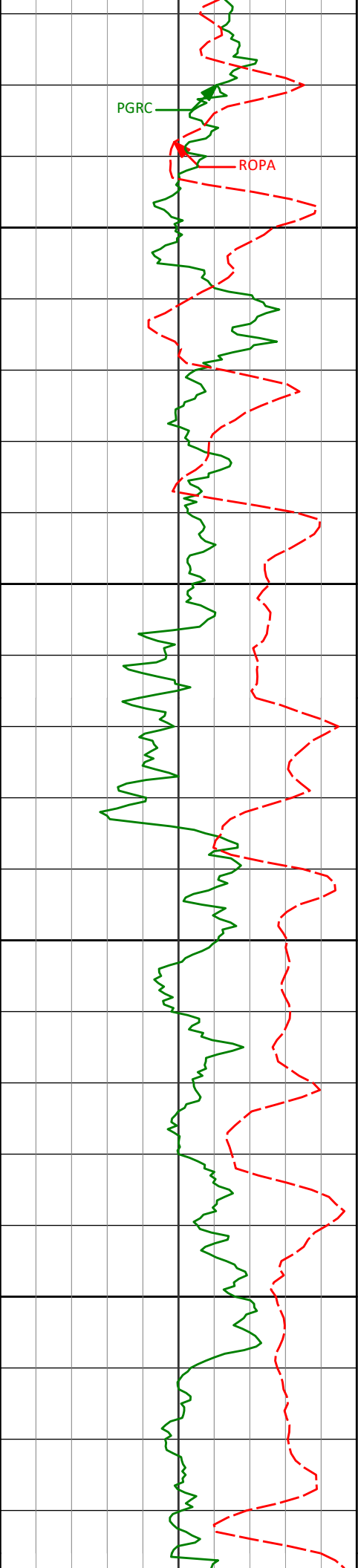
6442'

34.08°

3.30°

6369.84'

615.79'



6500

6550

6600

6650

6488'

37.55°

2.90°

6407.14'

642.63'

6536'

41.52°

2.77°

6444.15'

673.10'

6583'

45.49°

0.45°

6478.24'

705.41'

6631'

49.08°

1.51°

6510.79'

740.64'

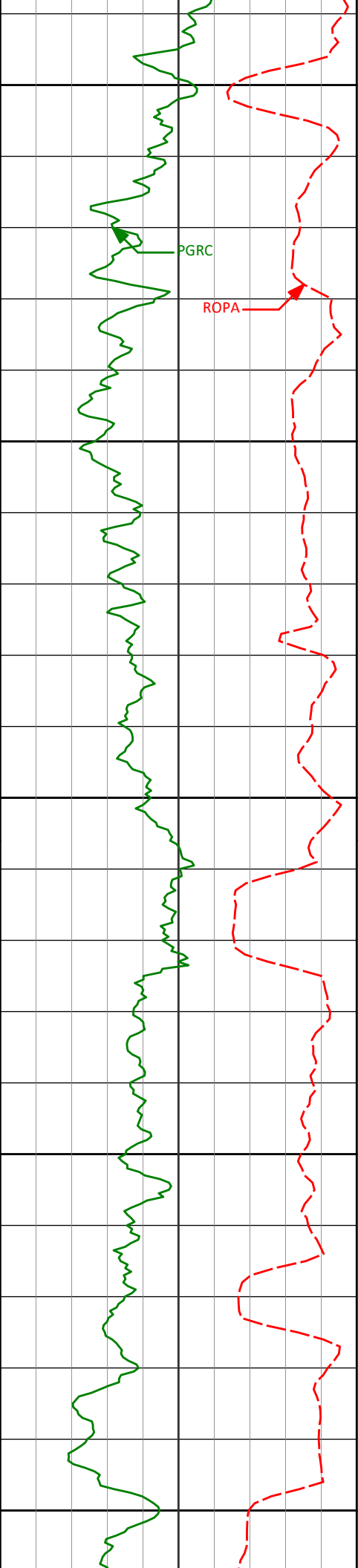
6678'

53.38°

2.17°

6540.22'

777.23'



6700

6726'

56.40°

2.09°

6567.82'

816.43'

6750

6773'

62.15°

2.53°

6591.82'

856.74'

6800

6821'

66.90°

1.92°

6612.46'

899.98'

6850

6868'

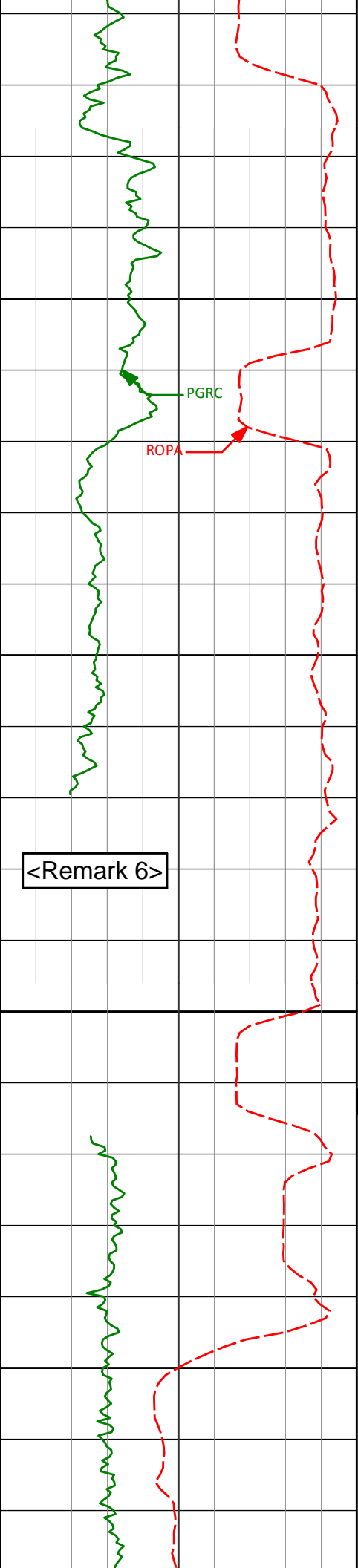
71.34°

359.97°

6629.21'

943.85'

6900



6916' 73.64° 358.14° 6643.65' 989.62'

6950

6963' 77.98° 357.15° 6655.17' 1035.17'

ROPA

PGR

7000

7013' 84.00° 358.22° 6663.00' 1084.52'

<Remark 6>

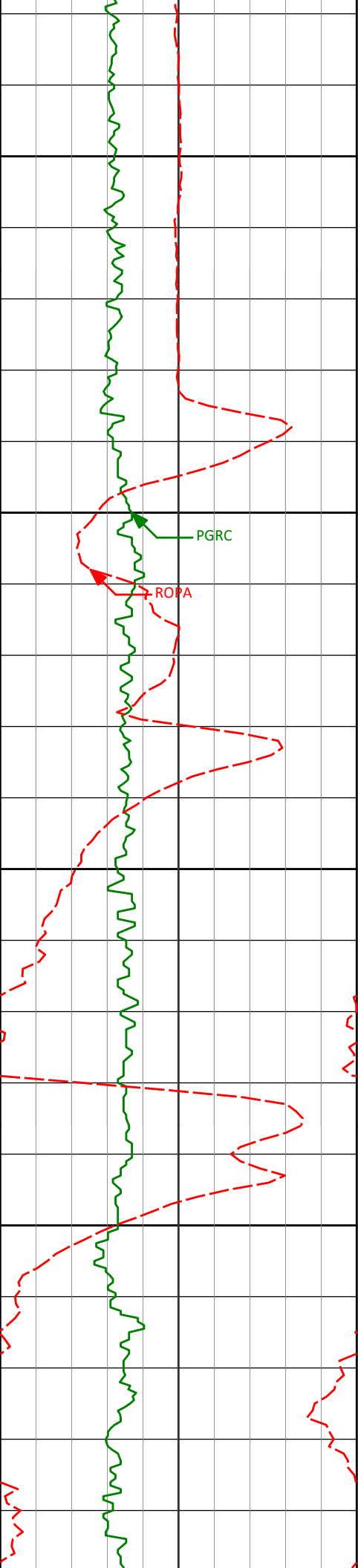
7050

<7" casing set at 7061' MD>

<Run 300>

7100

7126' 88.71° 358.67° 6670.18' 1197.25'



7150

7200

7250

7300

7221'

88.12°

357.58°

6672.81'

1292.21'

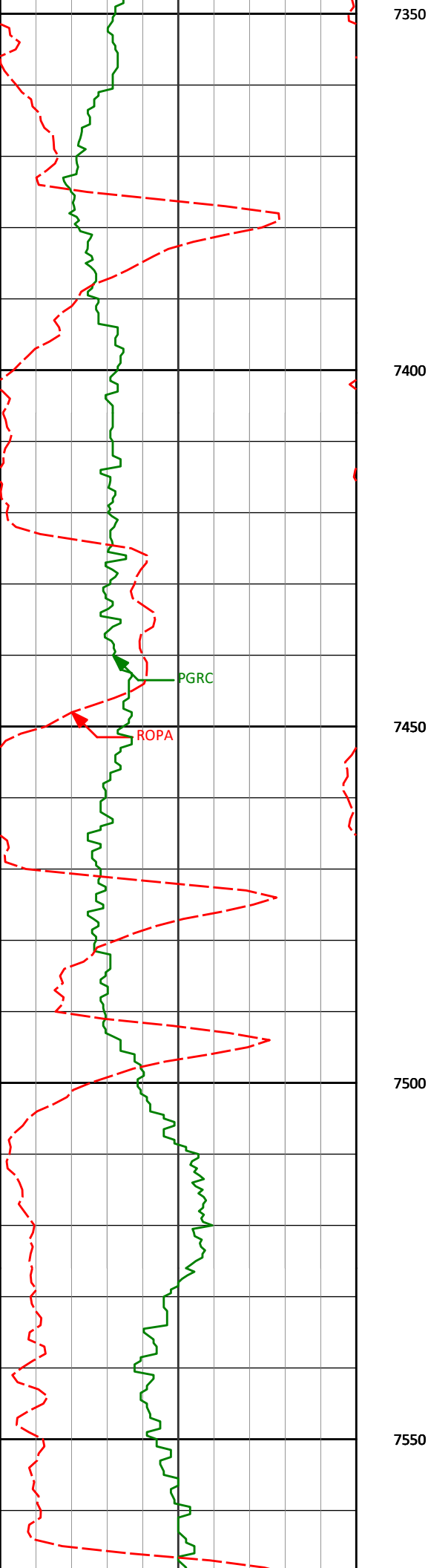
7316'

91.02°

358.78°

6673.52'

1387.19'



7410'

91.20°

358.01°

6671.70'

1481.17'

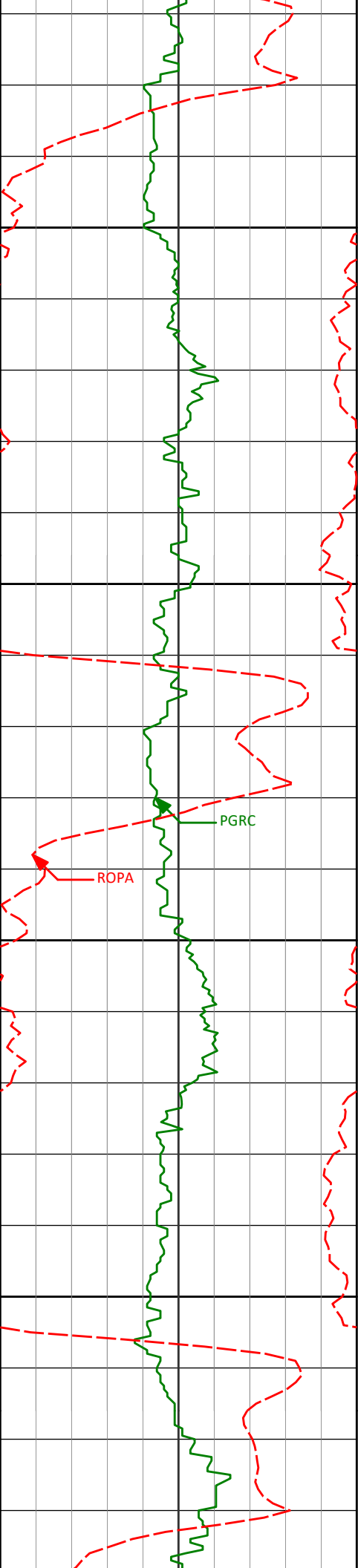
7505'

91.30°

357.87°

6669.63'

1576.13'



7600

7600'

91.17°

357.86°

6667.58'

1671.10'

7650

7700

7750

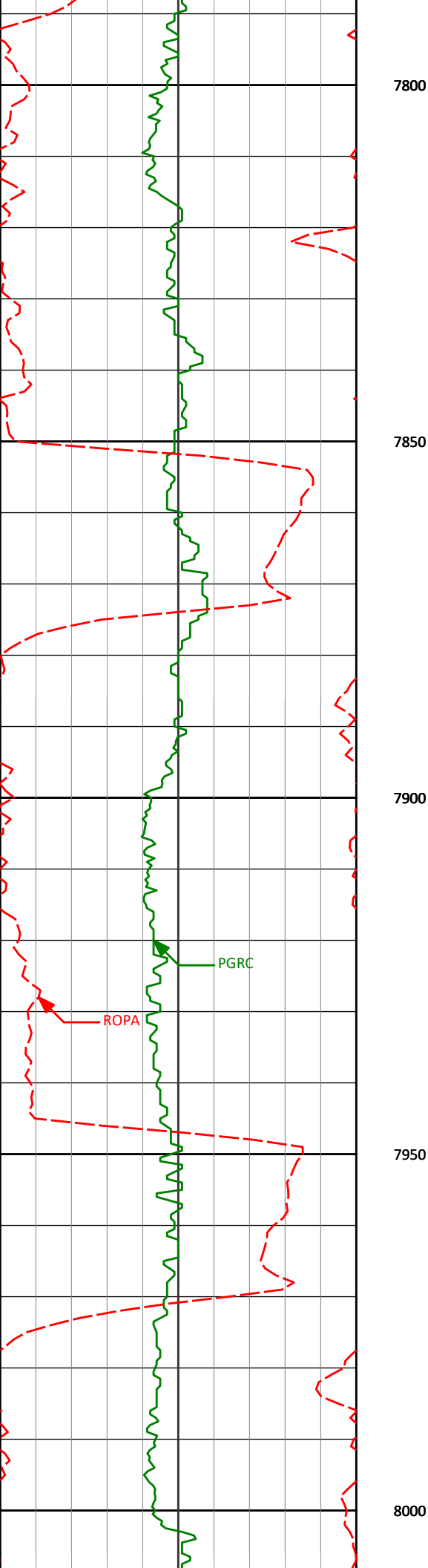
7695'

90.55°

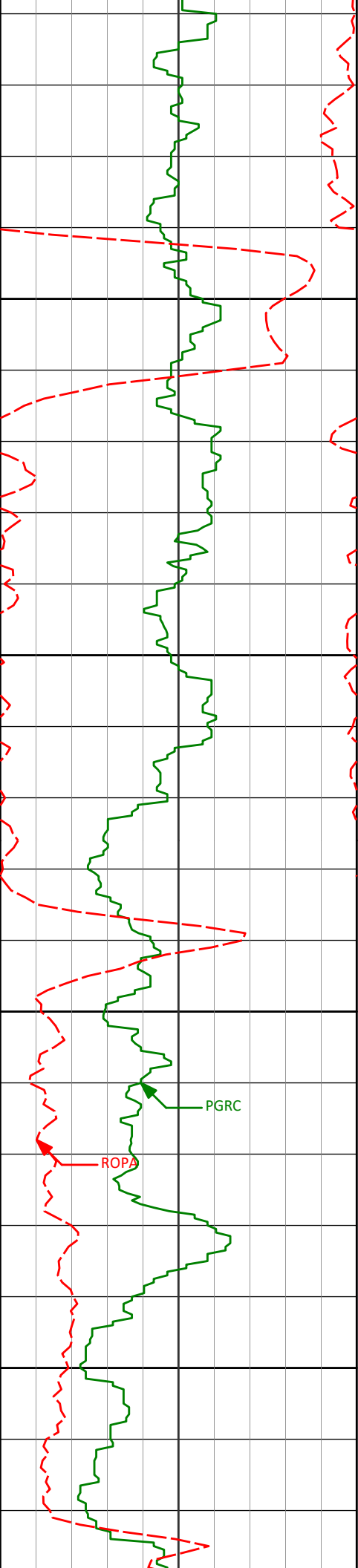
358.60°

6666.16'

1766.08'



7790'	87.44°	358.52°	6667.82'	1861.05'
7800				
7850				
7885'	87.13°	359.58°	6672.32'	1955.94'
7900				
7950				
7980'	87.44°	0.56°	6676.82'	2050.81'



8050

8075'

89.41°

1.41°

6679.43'

2145.71'

8100

8150

8167'

90.80°

0.71°

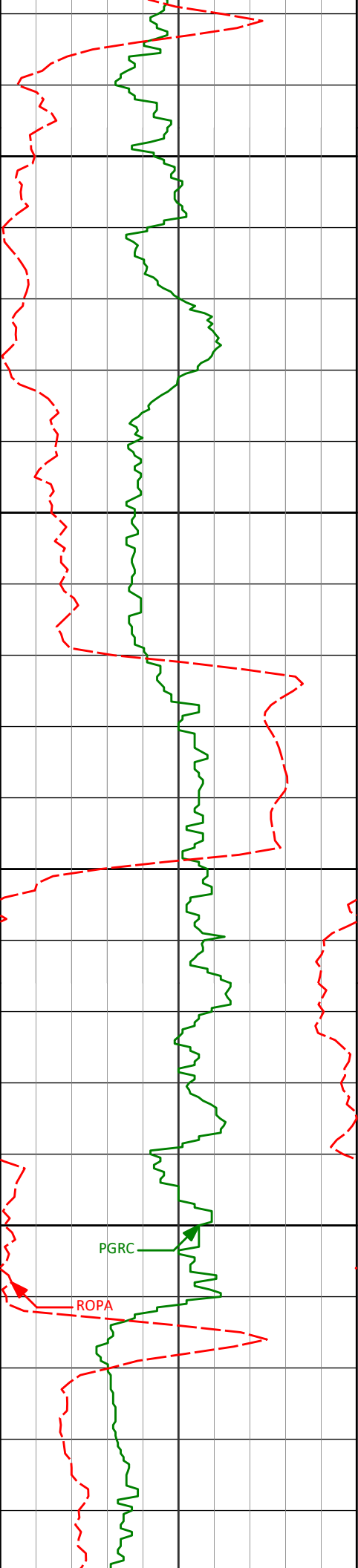
6679.27'

2237.63'

8200

PGRC

ROPA



8250

8261'	92.28°	0.29°	6676.74'	2331.56'
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8300

8350

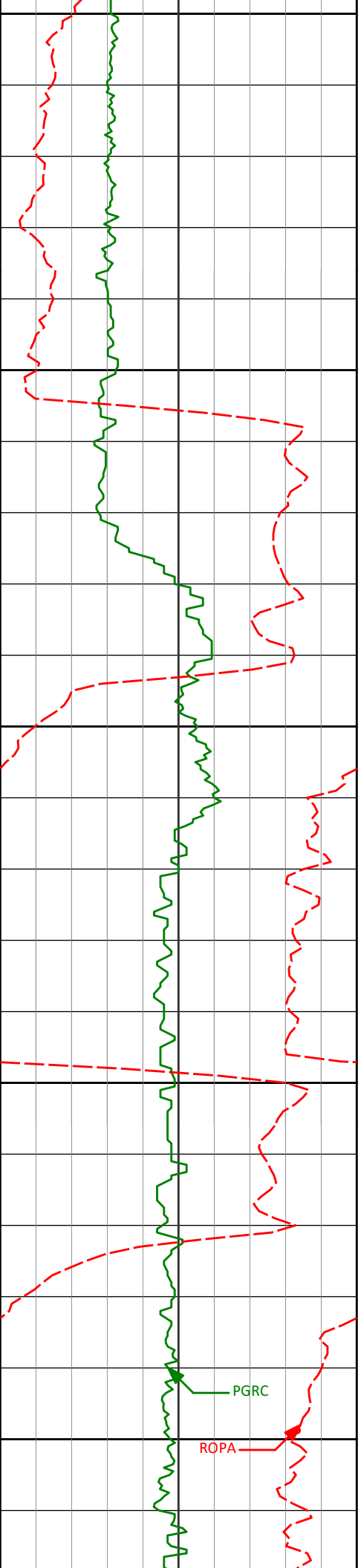
8353'	90.62°	0.22°	6674.41'	2423.50'
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8400

PGRC

ROPA

8446'	91.20°	358.32°	6672.93'	2516.48'
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8450

8500

8550

8600

8650

8538'

89.26°

359.73°

6672.56'

2608.47'

8630'

88.49°

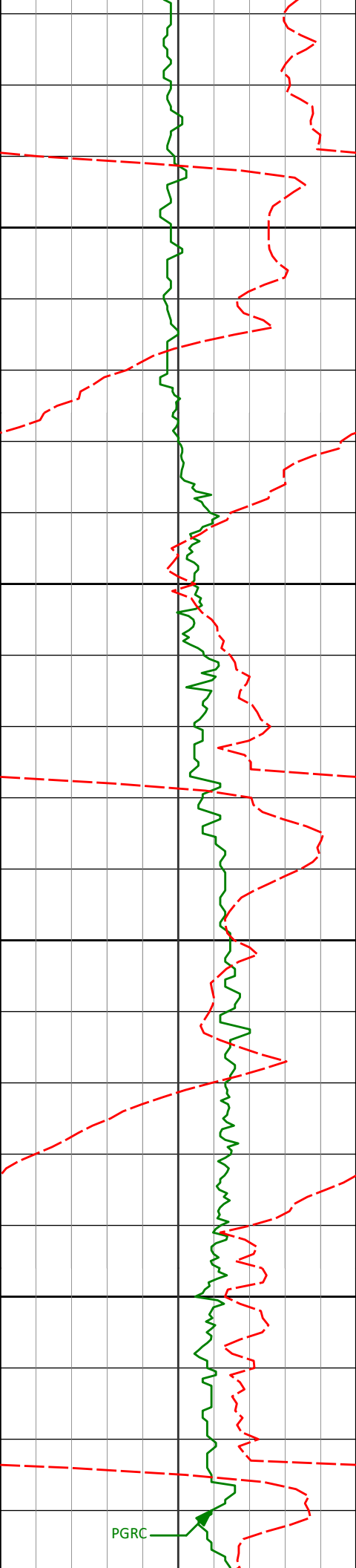
1.01°

6674.37'

2700.42'

PGRC

ROPA



8700

8723'

86.94°

359.70°

6678.08'

2793.30'

8750

8800

8815'

88.67°

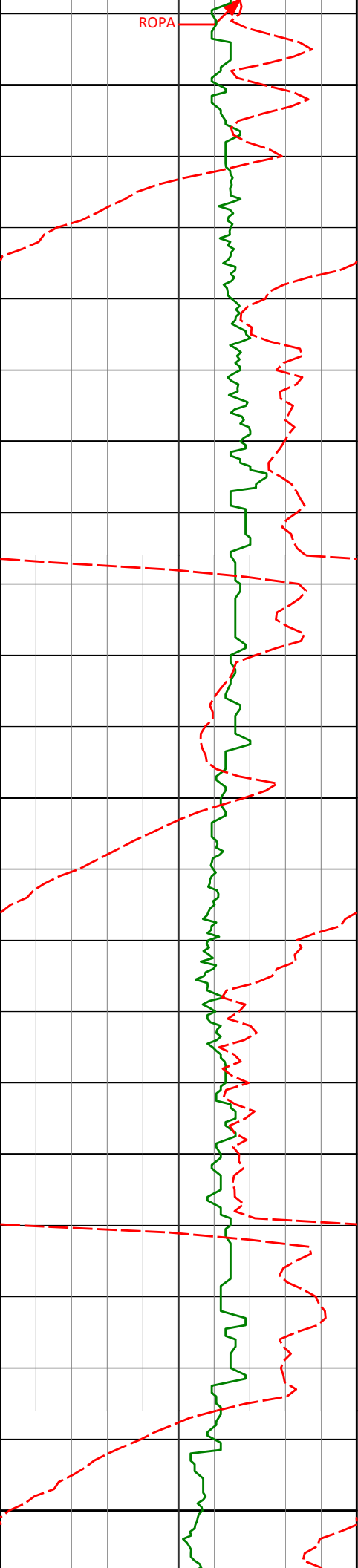
1.01°

6681.60'

2885.20'

8850

PGRC



8900

8907'

88.12°

2.11°

6684.18'

2977.06'

8950

9000

9000'

89.66°

4.17°

6685.98'

3069.77'

9050

9100

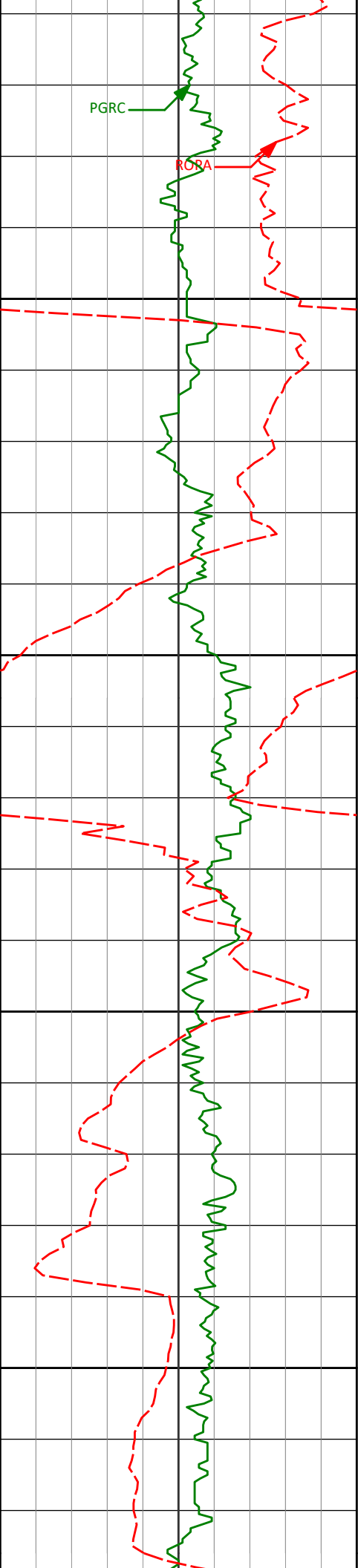
9092'

89.69°

3.41°

6686.50'

3161.43'



9150

9200

9250

9300

9184'

91.97°

3.46°

6685.17'

3253.11'

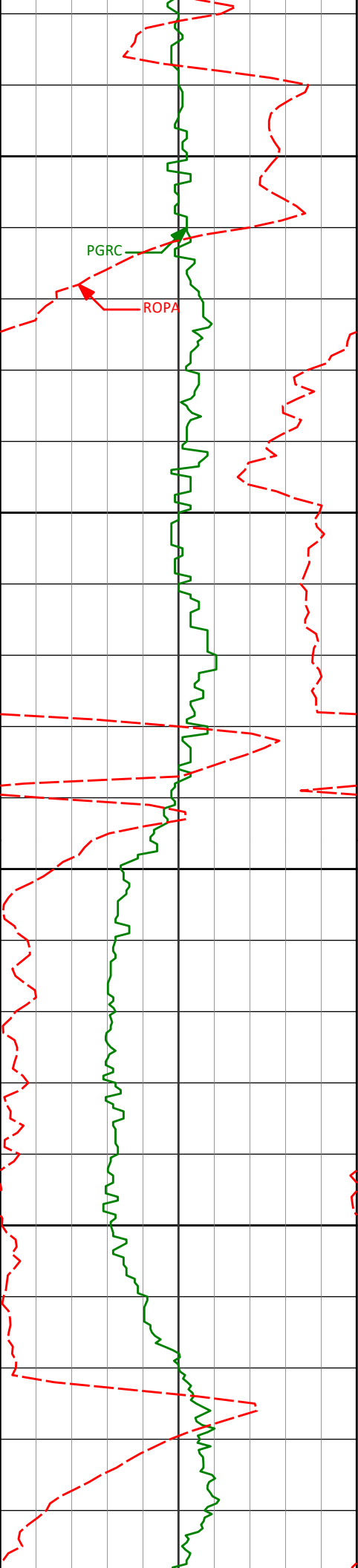
9276'

92.41°

2.83°

6681.65'

3344.79'



9350

9368'

90.62°

0.90°

6679.22'

3436.62'

9400

9450

9460'

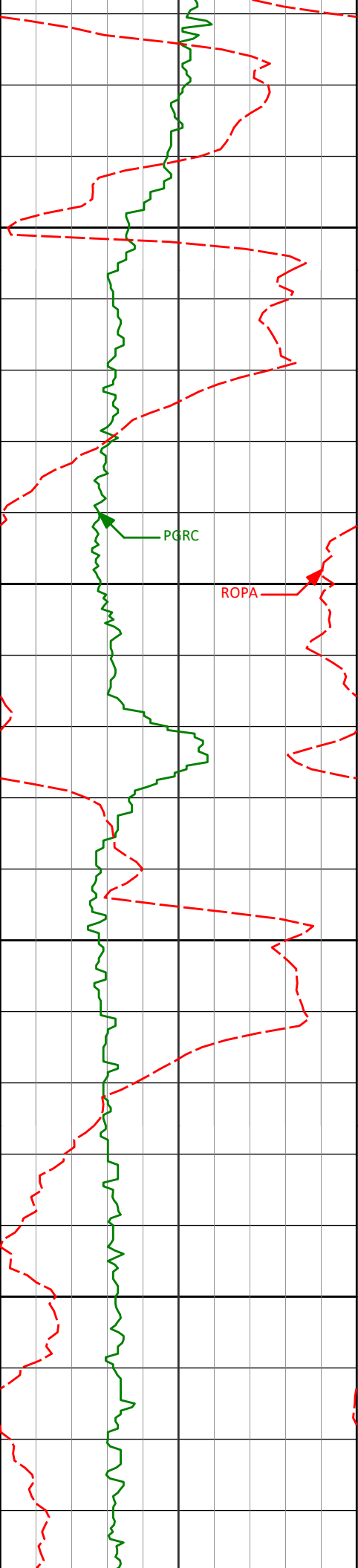
89.72°

359.97°

6678.95'

3528.58'

9500



9800

9850

9900

9950

9833'

89.69°

0.17°

6681.46'

3901.49'

PGRC

ROPA

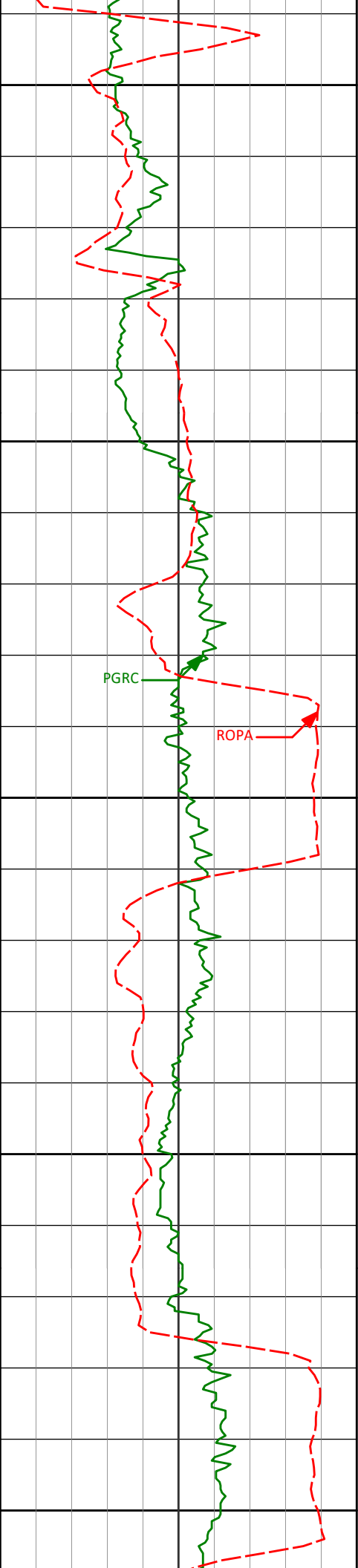
9925'

90.46°

359.40°

6681.34'

3993.48'



10000

10020'

88.43°

357.30°

6682.26'

4088.46'

10050

PGRC

ROPA

10100

10115'

87.94°

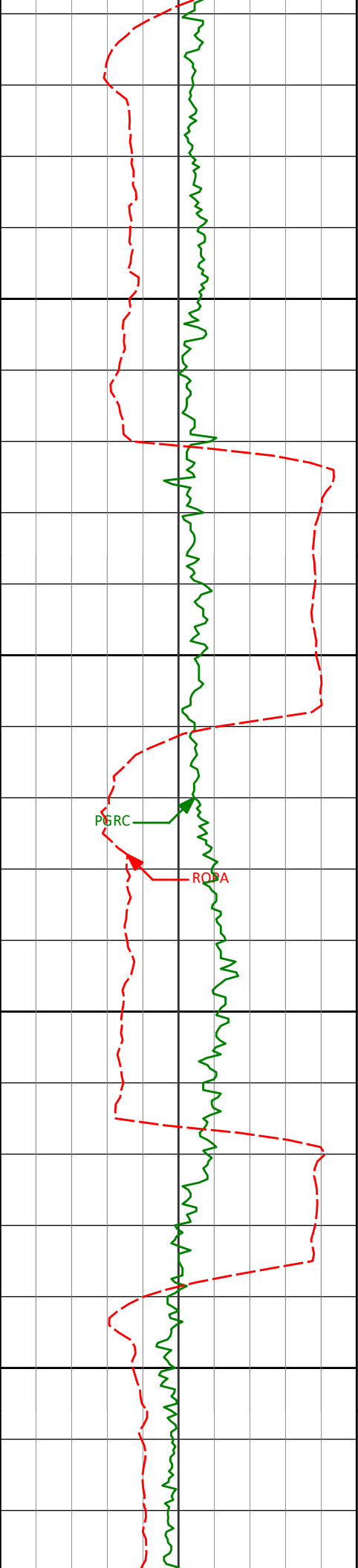
358.51°

6685.27'

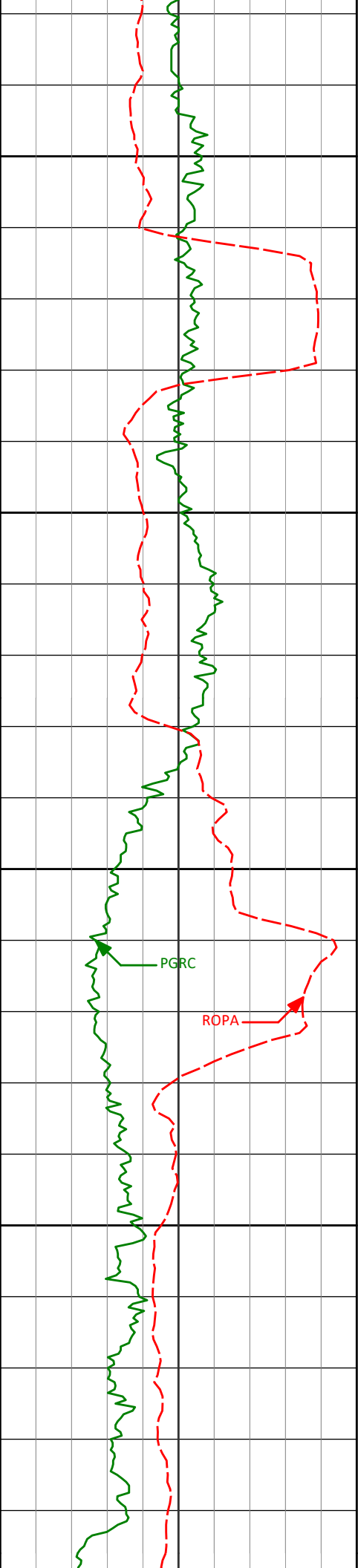
4183.40'

10150

10200



	10210'	88.89°	359.28°	6687.90'	4278.36'
10250					
10300					
10305'	10305'	90.31°	359.43°	6688.56'	4373.35'
10350					
10400	10400'	90.56°	359.51°	6687.84'	4468.34'



10450

10500

10550

10600

10495'

90.62°

0.14°

6686.86'

4563.32'

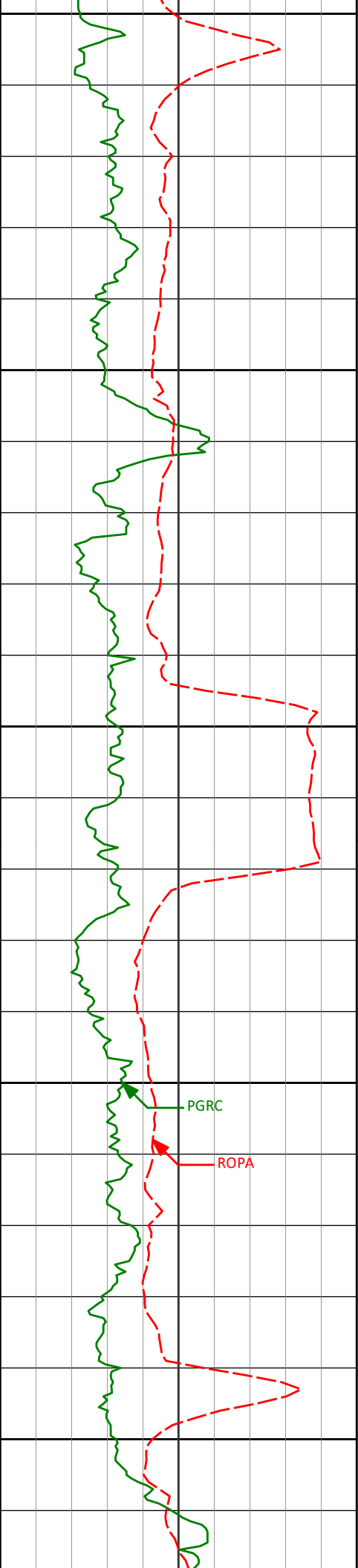
10590'

91.05°

0.17°

6685.48'

4658.29'



10650

10685'

91.29°

358.87°

6683.54'

4753.26'

10700

10750

10780'

89.94°

358.72°

6682.52'

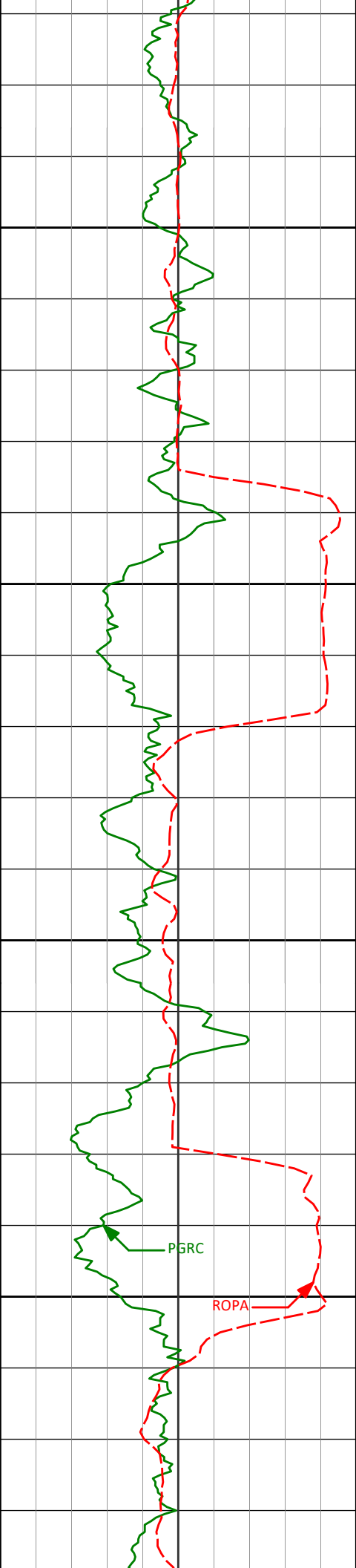
4848.25'

10800

PGRC

ROPA

10850



10875'

90.80°

357.40°

6681.90'

4943.24'

10900

10950

10969'

91.05°

358.09°

6680.39'

5037.21'

11000

11050

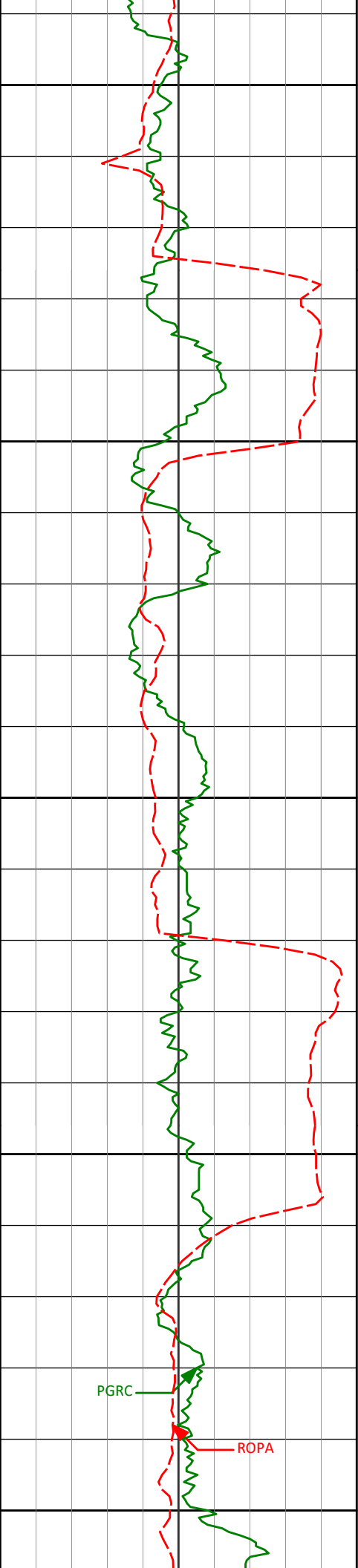
11064'

90.52°

358.08°

6679.08'

5132.19'



11100

11150

11200

11250

11300

11159'

88.98°

359.06°

6679.50'

5227.18'

11254'

88.21°

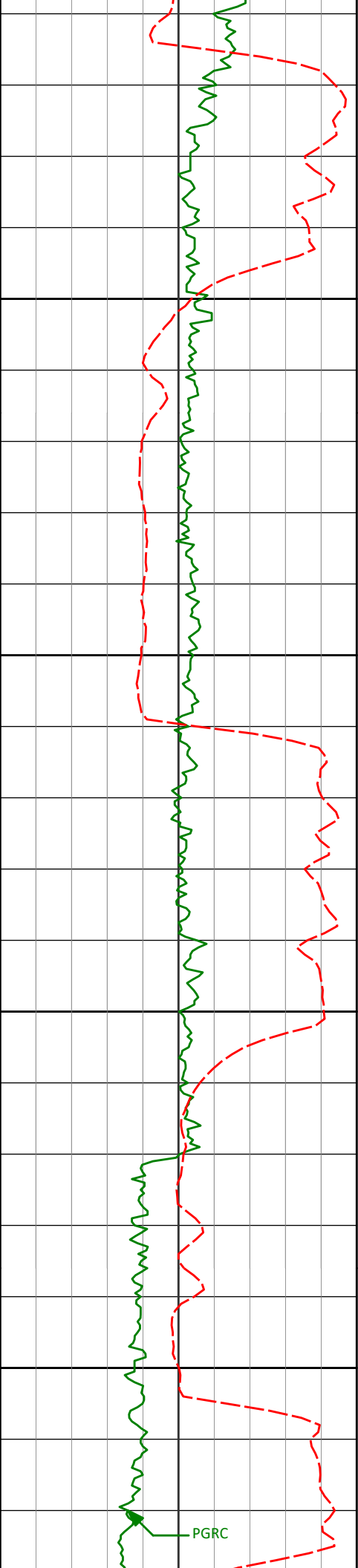
1.12°

6681.83'

5322.13'

PGRC

ROPA



11350

11400

11450

11500

11349'

11444'

87.78°

89.63°

1.44°

2.79°

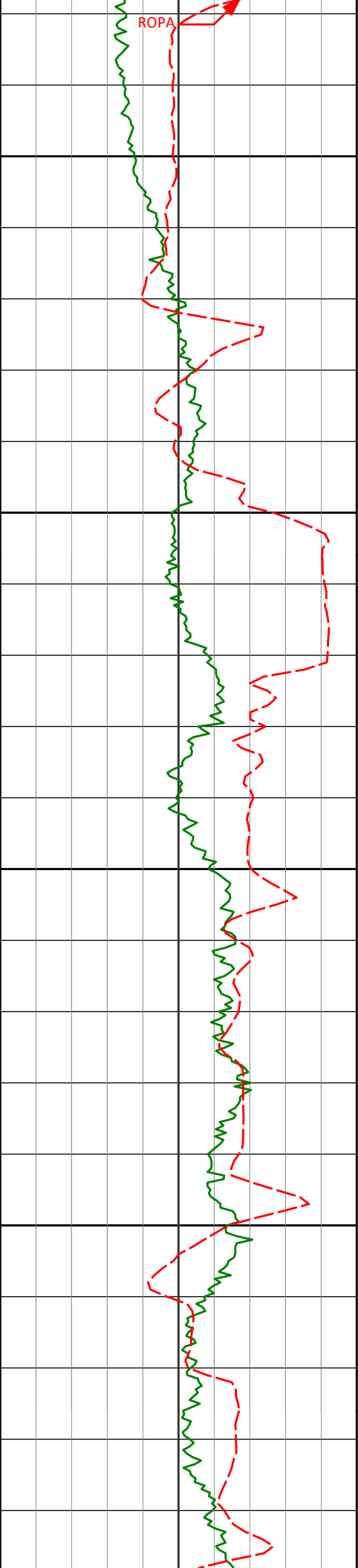
6685.15'

6687.30'

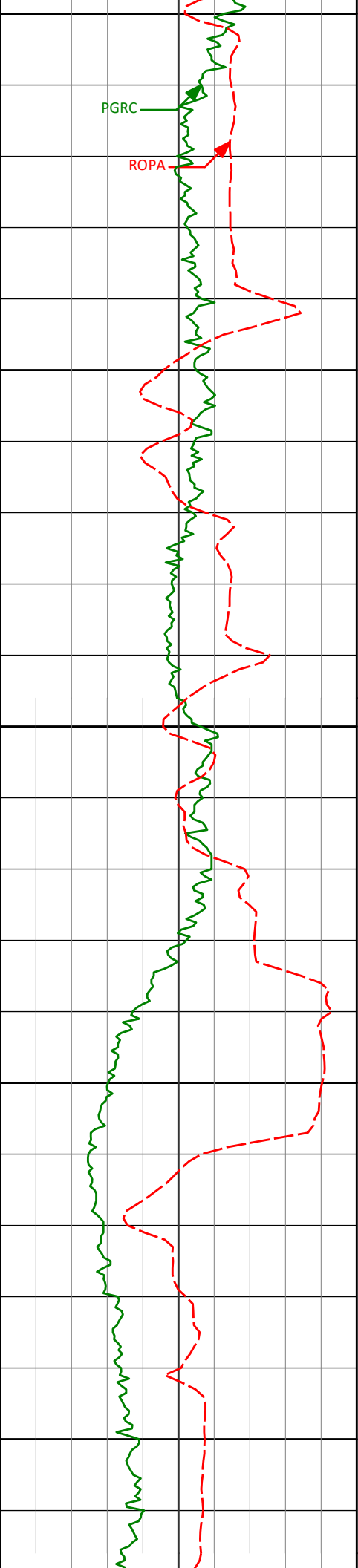
5416.98'

5511.80'

PGRC



	11538'	89.75°	2.08°	6687.81'	5605.61'
11550					
11600					
	11633'	90.80°	2.40°	6687.35'	5700.44'
11650					
11700					
	11728'	90.65°	1.25°	6686.15'	5795.30'



11750

11800

11850

11900

11950

11823'

89.78°

0.31°

6685.79'

5890.25'

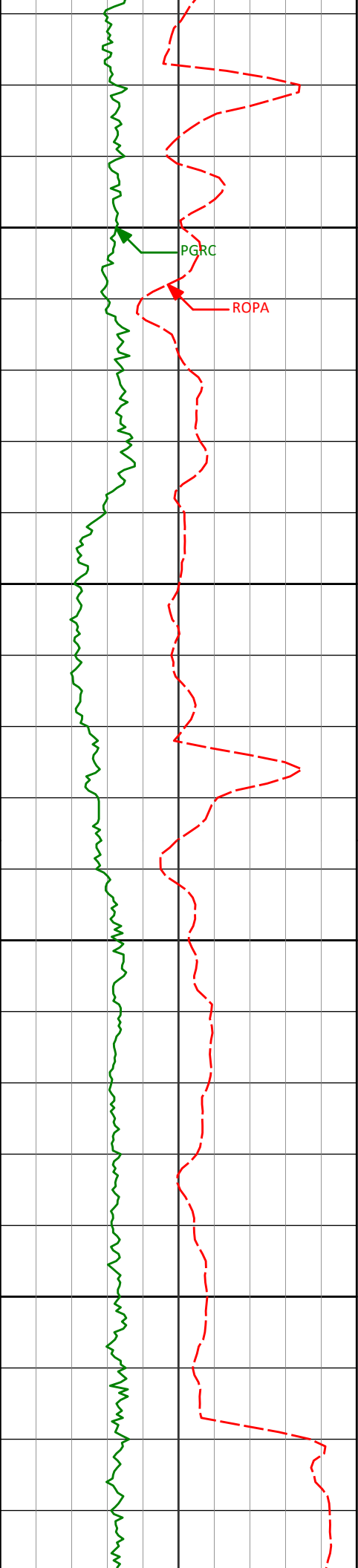
11918'

90.80°

0.78°

6685.31'

5985.20'



12013'

90.59°

0.08°

6684.16'

6080.16'

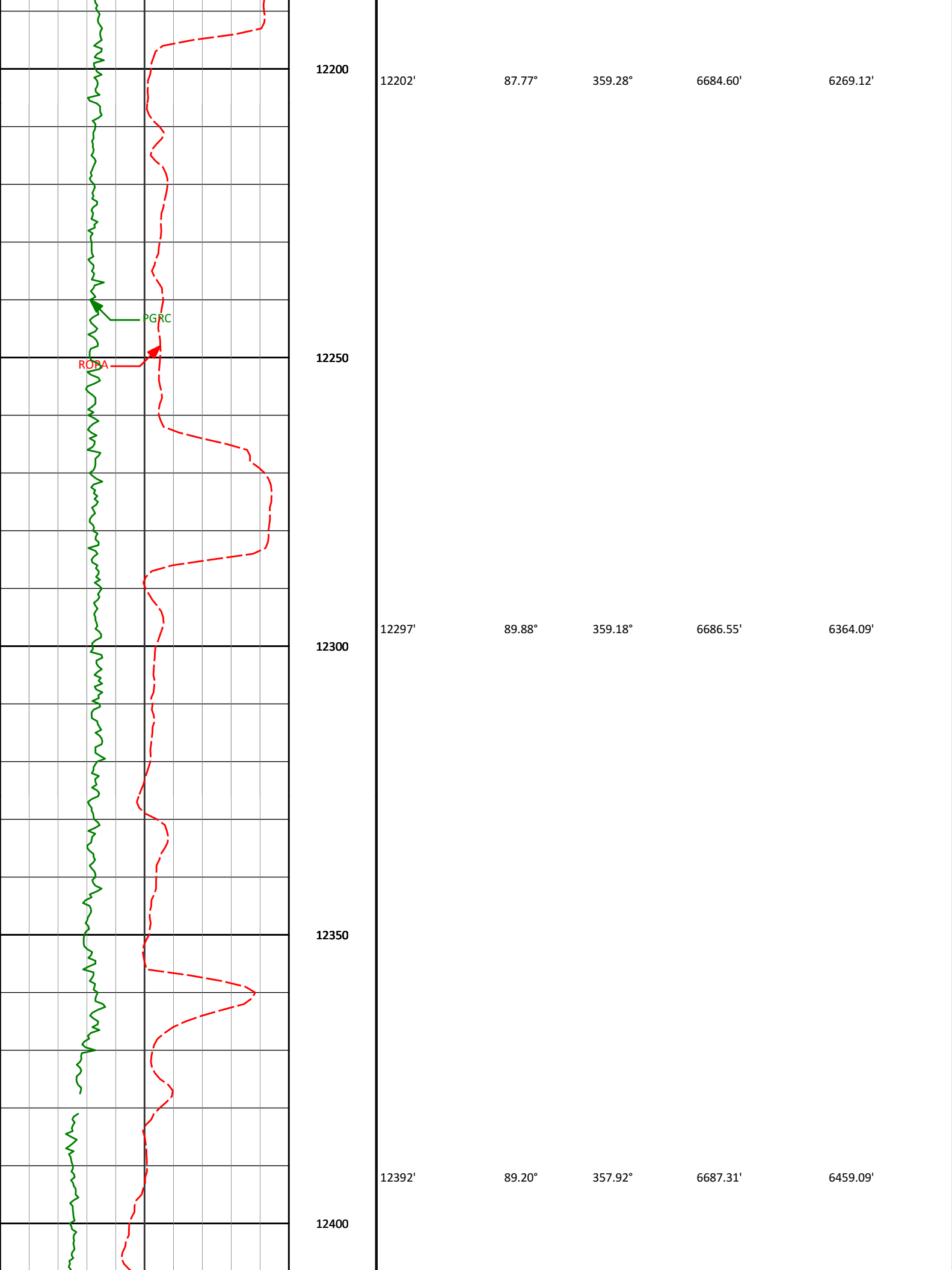
12107'

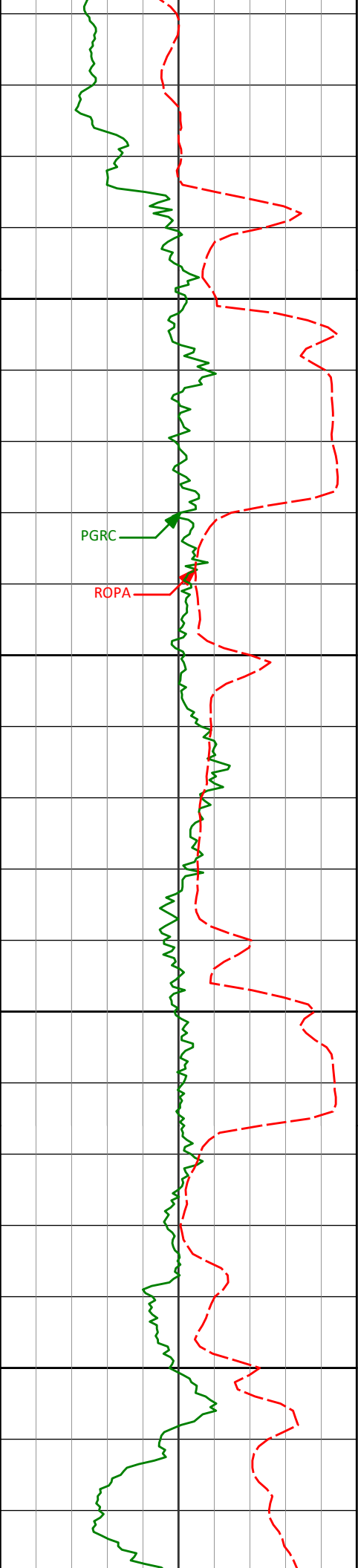
90.56°

359.02°

6683.22'

6174.14'





12450

12487'

89.41°

358.96°

6688.46'

6554.08'

12500

12550

12582'

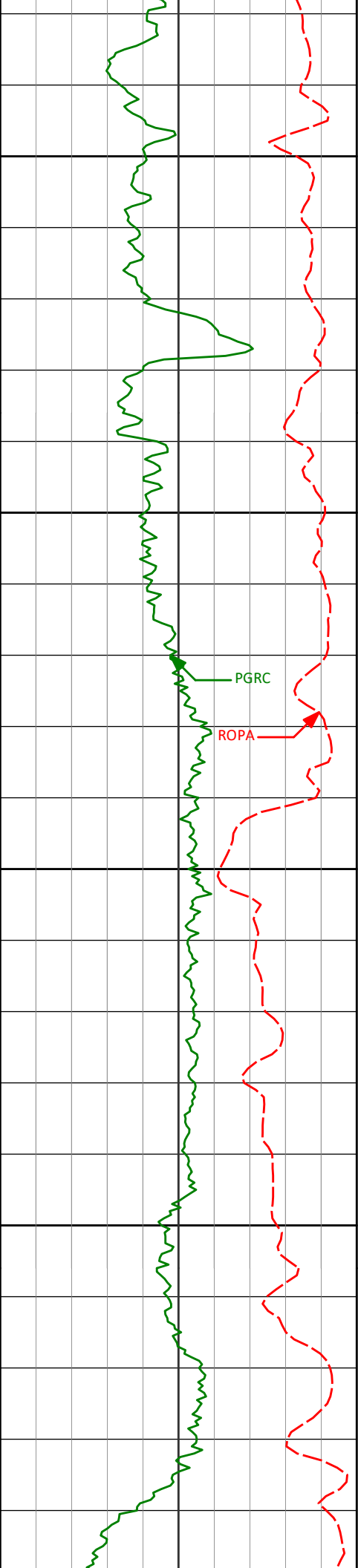
89.23°

359.48°

6689.59'

6649.07'

12600



12650

12677'

90.40°

358.79°

6689.90'

6744.06'

12700

PGRC

ROPA

12750

12771'

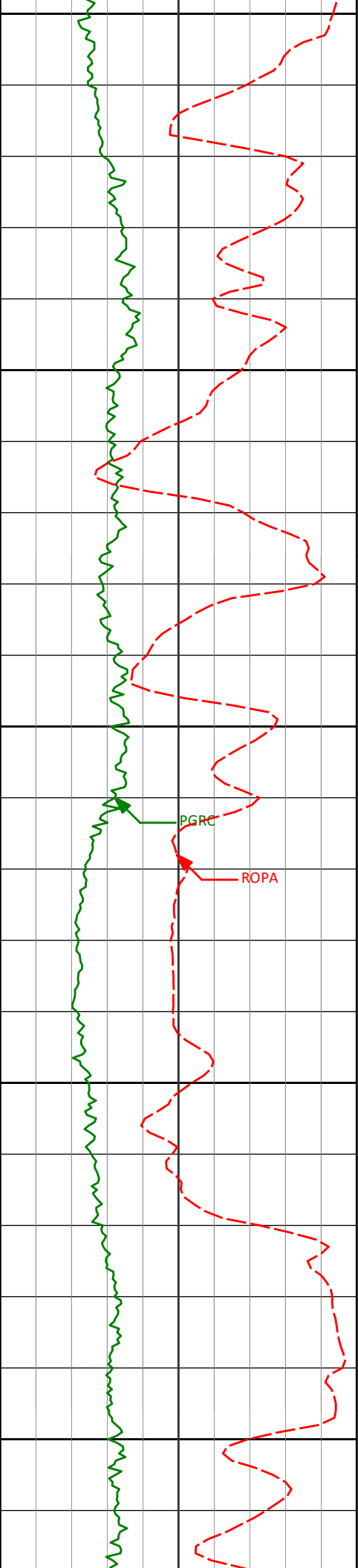
89.91°

358.51°

6689.64'

6838.06'

12800



12850

12866'

90.18°

359.68°

6689.57'

6933.06'

12900

12950

12961'

89.26°

359.59°

6690.03'

7028.05'

13000

13050

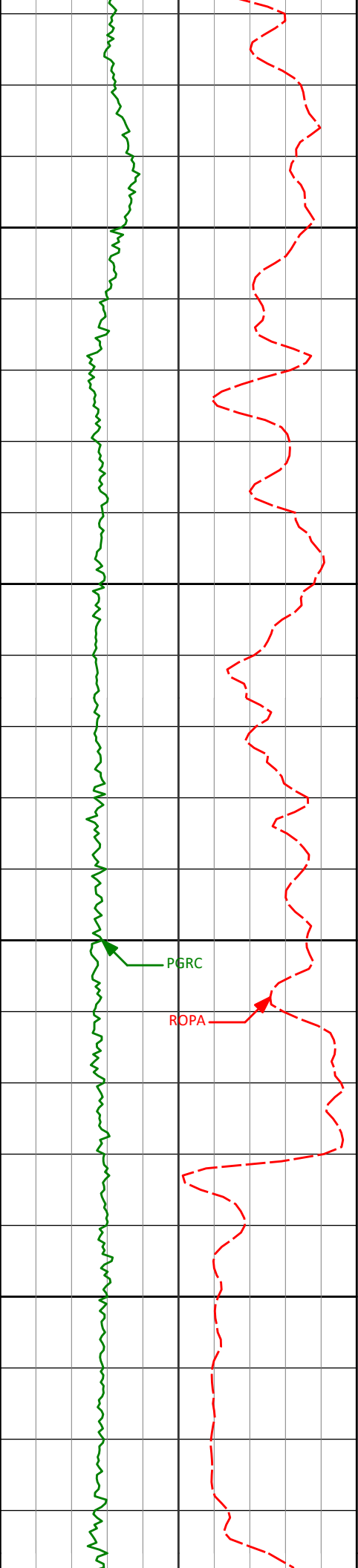
13056'

91.05°

0.79°

6689.78'

7123.02'



13100

13150

13200

13250

PGRC

ROPA

13151'

89.29°

2.14°

6689.49'

7217.91'

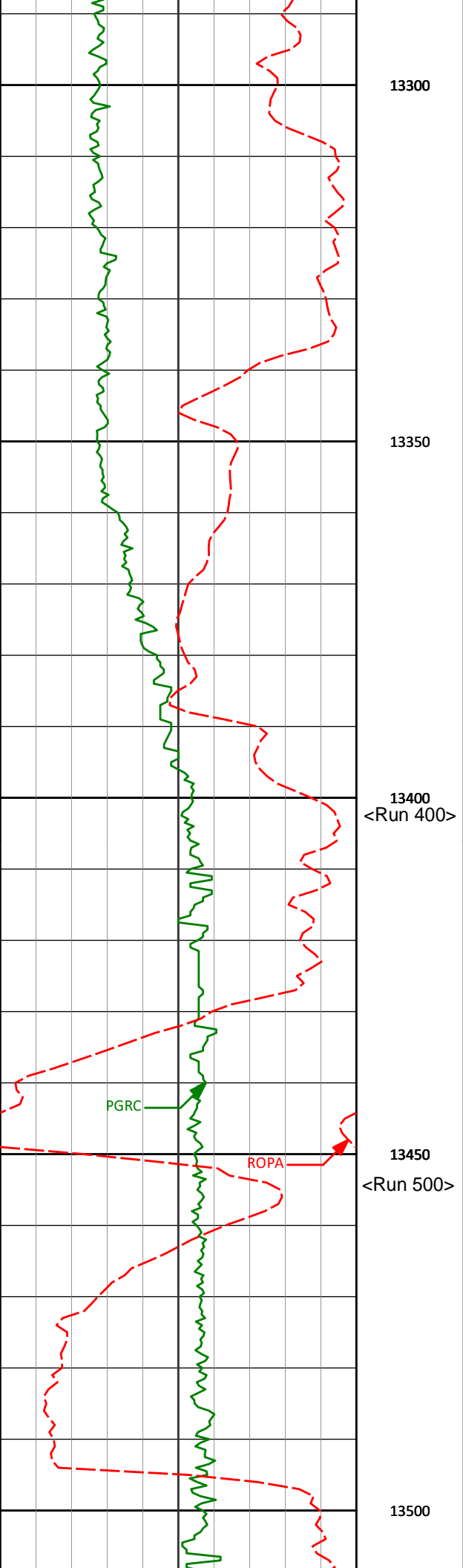
13246'

88.98°

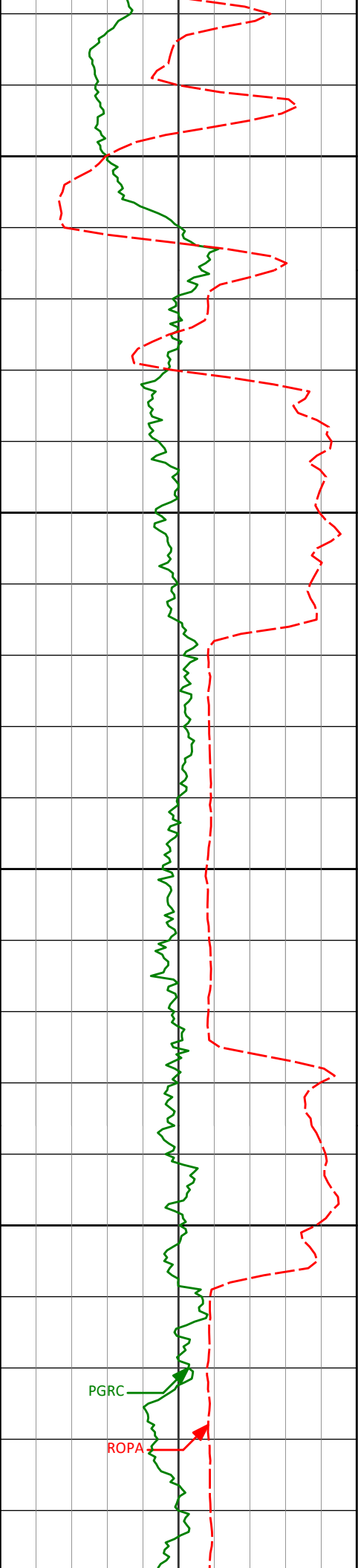
5.27°

6690.93'

7312.55'



13300				
13341'	90.68°	5.55°	6691.21'	7406.92'
13350				
13400				
<Run 400>				
13436'	89.69°	3.85°	6690.90'	7501.42'
13450				
<Run 500>				
13500				



13750

13800

13850

13900

13816'

89.66°

356.79°

6683.92'

7881.03'

PGRC

ROPA

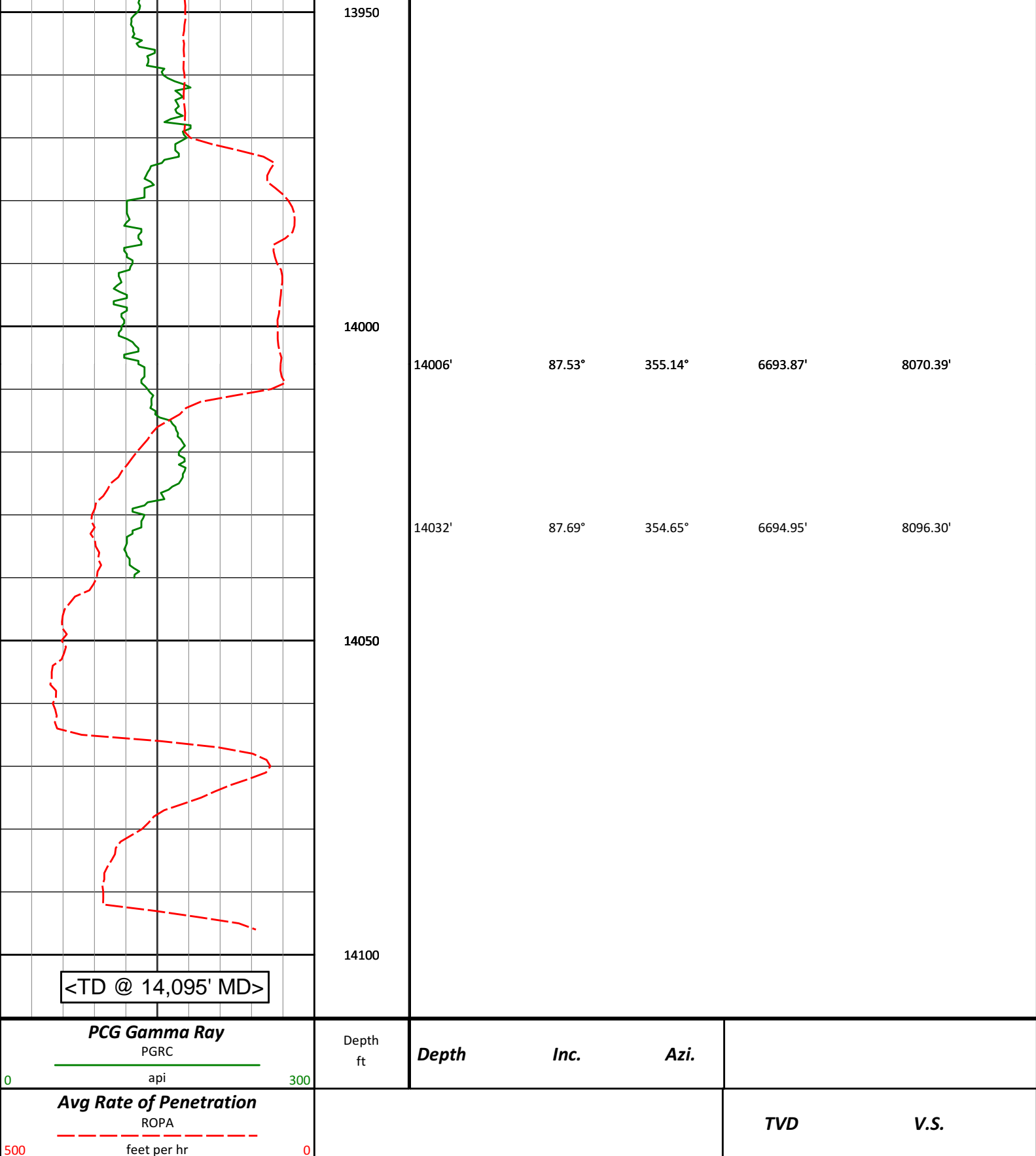
13911'

85.40°

354.90°

6688.01'

7975.78'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
 Leeroy B11-79HNM
 Wattenberg
 Weld Colorado

USA CA-XX-0900481583 Surface surveys at 260 ft, 508 ft and 754 ft have had azimuths corrected to grid north, but were not taken by Halliburton. Last survey is a projection from 14032 ft MD to TD at 14095 ft MD.							
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
260.00	0.30	315.00	260.00	0.48 N	0.48 W	0.49	0.12
508.00	0.20	329.80	508.00	1.31 N	1.16 W	1.34	0.05
754.00	0.20	359.60	753.99	2.11 N	1.38 W	2.14	0.04
901.00	0.21	82.68	900.99	2.41 N	1.11 W	2.43	0.19
994.00	0.03	267.19	993.99	2.43 N	0.97 W	2.45	0.26
1086.00	0.25	239.87	1085.99	2.32 N	1.16 W	2.35	0.24
1178.00	0.54	302.39	1177.99	2.46 N	1.70 W	2.49	0.52
1270.00	1.05	278.71	1269.98	2.82 N	2.90 W	2.87	0.65
1362.00	1.39	277.53	1361.96	3.09 N	4.84 W	3.19	0.37
1457.00	1.25	288.71	1456.94	3.57 N	6.97 W	3.71	0.31
1552.00	1.23	319.38	1551.92	4.68 N	8.61 W	4.85	0.69
1647.00	4.76	340.15	1646.77	9.16 N	10.62 W	9.38	3.83
1742.00	6.39	343.57	1741.32	17.94 N	13.45 W	18.21	1.75
1837.00	8.74	345.72	1835.49	30.01 N	16.73 W	30.34	2.49
1932.00	10.74	342.30	1929.11	45.44 N	21.20 W	45.86	2.19
2027.00	9.83	341.60	2022.59	61.56 N	26.45 W	62.09	0.97
2122.00	12.30	343.74	2115.81	78.98 N	31.84 W	79.61	2.64
2217.00	10.64	342.32	2208.91	97.05 N	37.34 W	97.78	1.77
2312.00	13.30	339.43	2301.84	115.64 N	43.84 W	116.50	2.87
2407.00	13.30	340.18	2394.29	136.15 N	51.39 W	137.16	0.18
2501.00	11.12	338.48	2486.16	154.76 N	58.38 W	155.91	2.35
2596.00	11.71	344.99	2579.28	172.59 N	64.24 W	173.86	1.49
2691.00	14.63	347.35	2671.78	193.61 N	69.36 W	194.98	3.12
2786.00	15.86	347.43	2763.43	217.99 N	74.82 W	219.46	1.29
2881.00	13.70	349.87	2855.28	241.74 N	79.62 W	243.30	2.37
2976.00	14.23	349.25	2947.48	264.28 N	83.78 W	265.93	0.58
3071.00	13.44	349.48	3039.72	286.61 N	87.97 W	288.33	0.83
3166.00	11.44	351.10	3132.48	306.77 N	91.44 W	308.56	2.14
3261.00	10.09	342.65	3225.82	324.03 N	95.38 W	325.89	2.18
3356.00	10.70	348.14	3319.26	340.60 N	99.68 W	342.55	1.22
3451.00	10.61	349.60	3412.62	357.84 N	103.07 W	359.85	0.30
3546.00	9.38	354.07	3506.18	374.14 N	105.45 W	376.20	1.53
3641.00	9.78	341.00	3599.87	389.47 N	108.88 W	391.59	2.32
3736.00	11.43	342.14	3693.24	406.06 N	114.39 W	408.29	1.75
3831.00	10.87	343.36	3786.45	423.60 N	119.84 W	425.94	0.64
3926.00	9.74	338.85	3879.91	439.68 N	125.31 W	442.13	1.46
4020.00	8.09	331.67	3972.78	452.92 N	131.31 W	455.48	2.11
4115.00	7.08	334.66	4066.95	464.09 N	136.99 W	466.77	1.14
4210.00	5.56	338.91	4161.37	473.68 N	141.15 W	476.44	1.67
4305.00	3.79	2.29	4256.05	481.11 N	142.69 W	483.90	2.70
4400.00	1.55	53.08	4350.96	485.02 N	141.53 W	487.79	3.22
4495.00	1.34	81.71	4445.93	485.95 N	139.41 W	488.68	0.78
4780.00	1.65	280.24	4730.89	487.16 N	140.15 W	489.90	1.04
4875.00	1.98	281.14	4825.84	487.72 N	143.10 W	490.52	0.35
4970.00	2.10	279.61	4920.78	488.33 N	146.43 W	491.20	0.14
5065.00	2.16	253.87	5015.72	488.13 N	149.87 W	491.06	1.00
5160.00	1.18	260.87	5110.68	487.47 N	152.55 W	490.46	1.05
5444.00	0.85	310.49	5394.64	488.38 N	157.04 W	491.46	0.32
5729.00	0.91	356.97	5679.61	492.01 N	158.77 W	495.12	0.24
5919.00	0.83	19.07	5869.59	494.82 N	158.40 W	497.92	0.18
6032.00	1.29	351.74	5982.57	496.85 N	158.31 W	499.95	0.59
6157.00	9.93	8.45	6106.85	508.93 N	156.93 W	512.00	6.96
6204.00	14.16	7.01	6152.81	518.64 N	155.63 W	521.69	9.02
6252.00	17.53	7.09	6198.98	531.65 N	154.02 W	534.66	7.02
6299.00	21.00	5.19	6243.34	547.07 N	152.39 W	550.04	7.50
6347.00	25.32	3.52	6287.46	565.88 N	150.98 W	568.83	9.10
6394.00	29.80	3.89	6329.12	587.58 N	149.57 W	590.49	9.54
6442.00	34.08	3.30	6369.84	612.92 N	147.98 W	615.79	8.94
6488.00	37.55	2.90	6407.14	639.79 N	146.53 W	642.63	7.56
6536.00	41.52	2.77	6444.15	670.30 N	145.02 W	673.10	8.27
6583.00	45.49	0.45	6478.24	702.63 N	144.14 W	705.41	9.10
6631.00	49.08	1.54	6510.70	733.80 N	143.50 W	719.64	7.65

6631.00	49.08	1.31	6510.79	737.89 N	143.52 W	740.84	7.85
6678.00	53.38	2.17	6540.22	774.51 N	142.34 W	777.23	9.21
6726.00	56.40	2.09	6567.82	813.74 N	140.88 W	816.43	6.29
6773.00	62.15	2.53	6591.82	854.09 N	139.25 W	856.74	12.26
6821.00	66.90	1.92	6612.46	897.38 N	137.57 W	899.98	9.96
6868.00	71.34	359.97	6629.21	941.28 N	136.86 W	943.85	10.21
6916.00	73.64	358.14	6643.65	987.04 N	137.62 W	989.62	6.01
6963.00	77.98	357.15	6655.17	1032.56 N	139.50 W	1035.17	9.46
7013.00	84.00	358.22	6663.00	1081.87 N	141.49 W	1084.52	12.22
7126.00	88.71	358.67	6670.18	1194.57 N	144.54 W	1197.25	4.19
7221.00	88.12	357.58	6672.81	1289.48 N	147.65 W	1292.21	1.30
7316.00	91.02	358.78	6673.52	1384.42 N	150.67 W	1387.19	3.30
7410.00	91.20	358.01	6671.70	1478.37 N	153.30 W	1481.17	0.84
7505.00	91.30	357.87	6669.63	1573.28 N	156.71 W	1576.13	0.18
7600.00	91.17	357.86	6667.58	1668.19 N	160.25 W	1671.10	0.14
7695.00	90.55	358.60	6666.16	1763.14 N	163.19 W	1766.08	1.02
7790.00	87.44	358.52	6667.82	1858.08 N	165.57 W	1861.05	3.27
7885.00	87.13	359.58	6672.32	1952.96 N	167.15 W	1955.94	1.16
7980.00	87.44	0.56	6676.82	2047.85 N	167.03 W	2050.81	1.08
8075.00	89.41	1.41	6679.43	2142.80 N	165.40 W	2145.71	2.26
8167.00	90.80	0.71	6679.27	2234.78 N	163.70 W	2237.63	1.69
8261.00	92.28	0.29	6676.74	2328.74 N	162.88 W	2331.56	1.64
8353.00	90.62	0.22	6674.41	2420.70 N	162.47 W	2423.50	1.81
8446.00	91.20	358.32	6672.93	2513.68 N	163.65 W	2516.48	2.14
8538.00	89.26	359.73	6672.56	2605.66 N	165.22 W	2608.47	2.61
8630.00	88.49	1.01	6674.37	2697.64 N	164.62 W	2700.42	1.62
8723.00	86.94	359.70	6678.08	2790.56 N	164.05 W	2793.30	2.18
8815.00	88.67	1.01	6681.60	2882.48 N	163.48 W	2885.20	2.36
8907.00	88.12	2.11	6684.18	2974.41 N	160.97 W	2977.06	1.34
9000.00	89.66	4.17	6685.98	3067.24 N	155.88 W	3069.77	2.77
9092.00	89.69	3.41	6686.50	3159.04 N	149.80 W	3161.43	0.83
9184.00	91.97	3.46	6685.17	3250.86 N	144.29 W	3253.11	2.48
9276.00	92.41	2.83	6681.65	3342.65 N	139.24 W	3344.79	0.83
9368.00	90.62	0.90	6679.22	3434.56 N	136.25 W	3436.62	2.86
9460.00	89.72	359.97	6678.95	3526.56 N	135.55 W	3528.58	1.41
9555.00	88.43	359.36	6680.48	3621.54 N	136.11 W	3623.56	1.50
9648.00	89.91	0.35	6681.83	3714.53 N	136.34 W	3716.53	1.91
9740.00	90.43	359.57	6681.56	3806.53 N	136.41 W	3808.51	1.02
9833.00	89.69	0.17	6681.46	3899.53 N	136.62 W	3901.49	1.02
9925.00	90.46	359.40	6681.34	3991.52 N	136.96 W	3993.48	1.18
10020.00	88.43	357.30	6682.26	4086.47 N	139.70 W	4088.46	3.07
10115.00	87.94	358.51	6685.27	4181.36 N	143.17 W	4183.40	1.37
10210.00	88.89	359.28	6687.90	4276.30 N	145.00 W	4278.36	1.29
10305.00	90.31	359.43	6688.56	4371.29 N	146.07 W	4373.35	1.50
10400.00	90.56	359.51	6687.84	4466.28 N	146.95 W	4468.34	0.28
10495.00	90.62	0.14	6686.86	4561.28 N	147.24 W	4563.32	0.67
10590.00	91.05	0.17	6685.48	4656.27 N	146.98 W	4658.29	0.45
10685.00	91.29	358.87	6683.54	4751.24 N	147.78 W	4753.26	1.39
10780.00	89.94	358.72	6682.52	4846.21 N	149.78 W	4848.25	1.43
10875.00	90.80	357.40	6681.90	4941.15 N	152.99 W	4943.24	1.66
10969.00	91.05	358.09	6680.39	5035.07 N	156.69 W	5037.21	0.78
11064.00	90.52	358.08	6679.08	5130.01 N	159.86 W	5132.19	0.56
11159.00	88.98	359.06	6679.50	5224.97 N	162.24 W	5227.18	1.92
11254.00	88.21	1.12	6681.83	5319.94 N	162.09 W	5322.13	2.31
11349.00	87.78	1.44	6685.15	5414.85 N	159.97 W	5416.98	0.56
11444.00	89.63	2.79	6687.30	5509.76 N	156.46 W	5511.80	2.41
11538.00	89.75	2.08	6687.81	5603.67 N	152.47 W	5605.61	0.77
11633.00	90.80	2.40	6687.35	5698.60 N	148.75 W	5700.44	1.16
11728.00	90.65	1.25	6686.15	5793.54 N	145.73 W	5795.30	1.22
11823.00	89.78	0.31	6685.79	5888.53 N	144.44 W	5890.25	1.35
11918.00	90.80	0.78	6685.31	5983.52 N	143.53 W	5985.20	1.18
12013.00	90.59	0.08	6684.16	6078.51 N	142.82 W	6080.16	0.77
12107.00	90.56	359.02	6683.22	6172.50 N	143.56 W	6174.14	1.13
12202.00	87.77	359.28	6684.60	6267.47 N	144.97 W	6269.12	2.95
12297.00	89.88	359.18	6686.55	6362.44 N	146.24 W	6364.09	2.22
12392.00	89.20	357.92	6687.31	6457.40 N	148.65 W	6459.09	1.51
12487.00	89.41	358.96	6688.46	6552.36 N	151.23 W	6554.08	1.12
12582.00	89.23	359.48	6689.59	6647.34 N	152.53 W	6649.07	0.58
12677.00	90.40	358.79	6689.90	6742.33 N	153.96 W	6744.06	1.43
12771.00	89.91	358.51	6689.64	6836.30 N	156.18 W	6838.06	0.60
12866.00	90.18	359.68	6689.57	6931.29 N	157.68 W	6933.06	1.26
12961.00	89.26	359.59	6690.03	7026.28 N	158.28 W	7028.05	0.97

13056.00	91.05	0.79	6689.78	7121.28 N	157.97 W	7123.02	2.27
13151.00	89.29	2.14	6689.49	7216.24 N	155.54 W	7217.91	2.33
13246.00	88.98	5.27	6690.93	7311.02 N	149.40 W	7312.55	3.31
13341.00	90.68	5.55	6691.21	7405.59 N	140.44 W	7406.92	1.81
13436.00	89.69	3.85	6690.90	7500.27 N	132.66 W	7501.42	2.07
13531.00	91.36	0.95	6690.03	7595.17 N	128.68 W	7596.22	3.52
13626.00	92.07	0.87	6687.19	7690.11 N	127.17 W	7691.11	0.75
13721.00	91.11	359.06	6684.55	7785.07 N	127.23 W	7786.05	2.16
13816.00	89.66	356.79	6683.92	7880.00 N	130.67 W	7881.03	2.84
13911.00	85.40	354.90	6688.01	7974.63 N	137.54 W	7975.78	4.90
14006.00	87.53	355.14	6693.87	8069.09 N	145.78 W	8070.39	2.26
14032.00	87.69	354.65	6694.95	8094.96 N	148.09 W	8096.30	1.98
14095.00	87.69	354.65	6697.49	8157.64 N	153.96 W	8159.08	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 358.84 DEGREES (GRID)
A TOTAL CORRECTION OF 7.90 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 14095.00 FEET
IS 8159.09 FEET ALONG 358.92 DEGREES (GRID)**

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