

**PCGK : Pressure Case Gamma**  
**PCDC: Pressure Case Directional**

**1 : 600 / 1 : 240**

Country : <b>USA</b>		Field : <b>Wattenberg</b>	
Location : <b>Lat: 40° 31' 24.89" North</b> <b>Long: 104° 23' 16.58" West</b>		Well : <b>Crow Creek State AC36-77HN</b>	
Company : <b>Noble Energy</b>		Rig : <b>H&amp;P 315</b>	
LOCATION		Company : <b>Noble Energy</b> Rig : <b>H&amp;P 315</b> Well : <b>Crow Creek State AC36-77HN</b> Field : <b>Wattenberg</b> Country : <b>USA</b> API Number : <b>05-123-37131</b>	
Latitude : <b>40° 31' 24.89" North</b> Longitude : <b>104° 23' 16.58" West</b> UTM Easting = <b>3,309,147.834 ft</b> UTM Northing = <b>1,435,519.565 ft</b>		Other Services <b>Directional Drilling</b>	
Permanent Datum : <b>Ground Level</b>	Elevation : <b>4788.00 ft</b>	Elev. KB <b>N/A</b>	
Log Measured From : <b>Drill Floor</b>	<b>24.00 ft</b> Above Permanent Datum	DF <b>4812.00 ft</b>	
Drilling Measured From : <b>Drill Floor</b>	<b>MD LOG</b>	GL <b>4788.00 ft</b>	
Elev. WD <b>N/A</b>			
Depth Logged : <b>649.00 ft</b> To <b>11,083.00 ft</b>	Unit No. : <b>11610113</b>	Job No. : <b>CA-XX-0900758848</b>	
Date Logged : <b>26-Sep-13</b> To <b>05-Oct-13</b>	Plot Type : <b>Final</b>		
Total Depth MD : <b>11,083.00 ft</b> TVD : <b>6,651.76 ft</b>	Plot Date : <b>05-Oct-13</b>		
Spud Date : <b>27-Sep-13</b>			
Run No.	Borehole Record (MD)	Run No.	Borehole Record (MD)
2	Size 8.750 in From 649.00 ft To 5,974.00 ft	Size	To
3	8.750 in 5,974.00 ft 7,006.00 ft		
4	6.125 in 7,006.00 ft 11,083.00 ft		
		Casing Record (MD)	
		Size 7.000 in Weight 26.00 lbp/ft From SURFACE To 7,002.00 ft	

**WELL INFORMATION**

MWD Run Number	100	200	300		
Date run completed	30-Sep-13	01-Oct-13	04-Oct-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)	649.00	5,974.00	7,006.00		
Log End Depth (MD, ft)	5,974.00	7,006.00	11,083.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	28-Sep-13 18:30	30-Sep-13 10:05	02-Oct-13 14:15		
Drill/Wipe End Date and Time	29-Sep-13 22:20	01-Oct-13 00:45	04-Oct-13 10:20		
Min Inc (deg) @ Depth (MD, ft)	0.09 @ 1,743.00	0.22 @ 5,980.00	86.55 @ 9,029.00		
Max Inc (deg) @ Depth (MD, ft)	14.30 @ 3,071.00	81.40 @ 6,952.00	92.99 @ 9,314.00		
Bit TFA(in2) / Bit Type	0.77 / PDC	.75 / PDC	0.75 / PDC		
Flow Rate (gpm)	580.53	560.81	290.98		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	N/A / N/A		
Fluid Type	Native/Spud Mud	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	8.98 / 33.00	10.45 / 37.00	9.30 / 35.00		
Filtrate CL (ppm)	1,400.00	1,200.00	1,800.00		
pH / Fluid Loss (mptm)	9.40 / 0	9.10 / 10	8.80 / 8		
PV (cP) / YP (Ihf2)	9 / 7.00	11 / 11.00	10 / 4.00		
% Solids / % Sand	3.7 / 0.20	9.1 / .2	4.7 / 0.20		
% 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	170.37 / PCM	170.37 / PCM	218.14 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Schmeidler	Schmeidler	Schmeidler		
Customer Representative	Martiin Suarez	Martiin Suarez	Martin Suarez		

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.84	5.84	5.84		
Sub Serial Number	11404299	11404299	12134682		
Insert Serial Number	11680895	11680895	12001055		
Date and Time Initialized	27-Sep-13 20:52	27-Sep-13 20:52	02-Oct-13 00:07		
Date and Time Read	01-Oct-13 08:42	01-Oct-13 08:35	04-Oct-13 22:55		
ECMB SW Version	N/A	N/A	N/A		

### Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	54.64	52.08	59.68		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11404299	11404299	12134682		
Sonde Serial Number	11638477	11638477	12177609		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	98.74	115.03	176.22		

### Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	49.64	47.08	54.70		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11404299	11404299	12134682		
Insert/Sonde Serial Number	11292594	11292594	11293274		

## 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 8.0.0

## WARRANTY

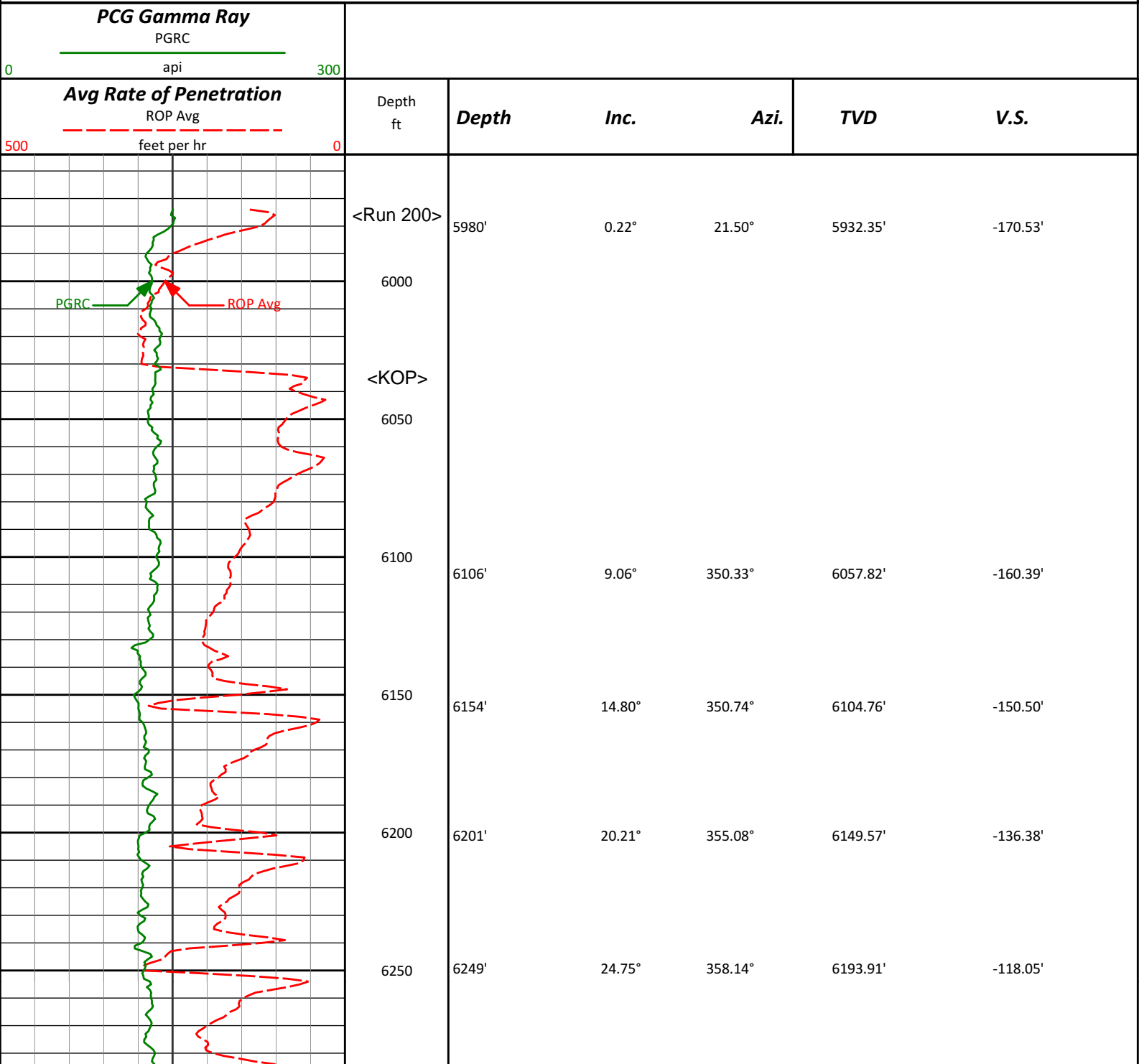
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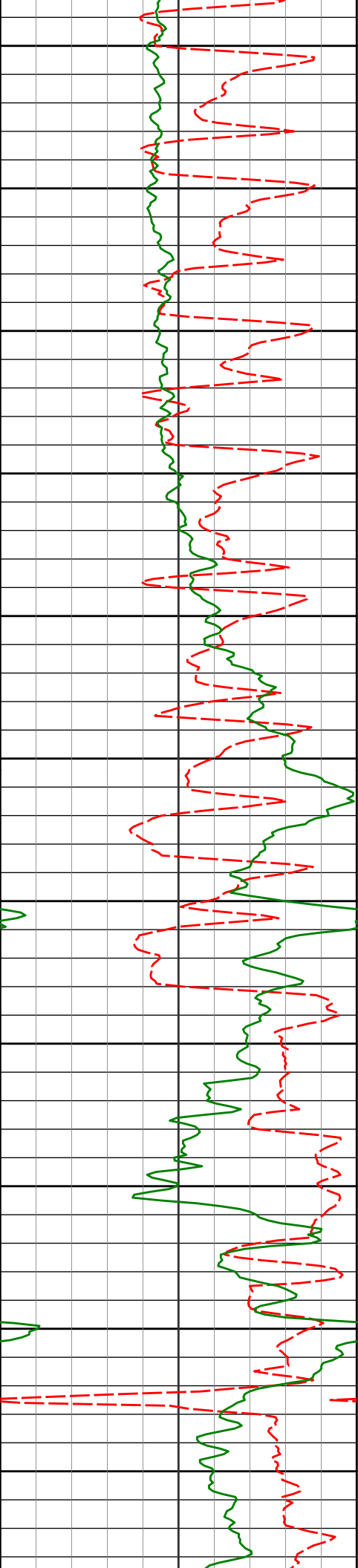
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HALLIBURTON  
Sperry Drilling Services

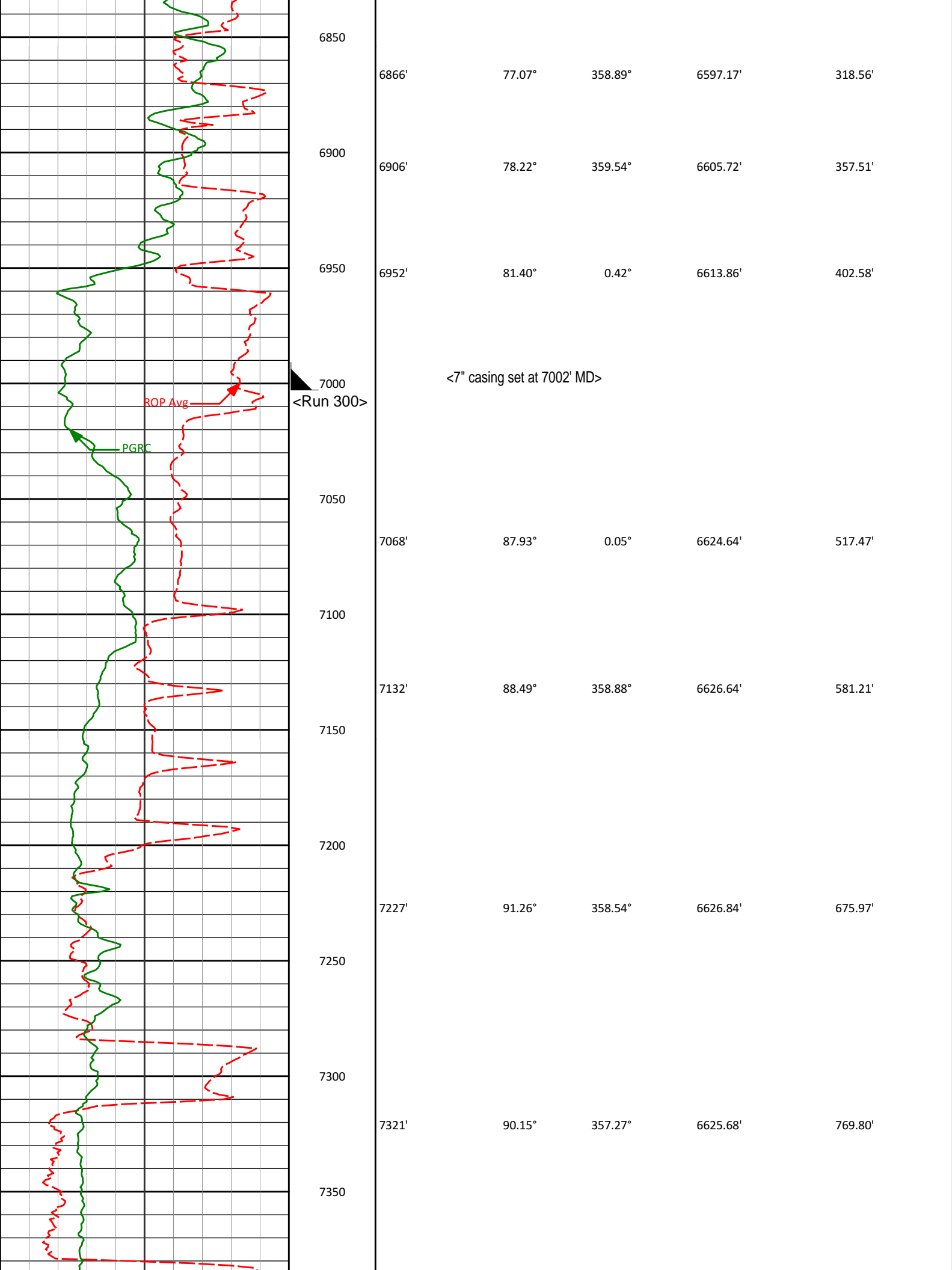
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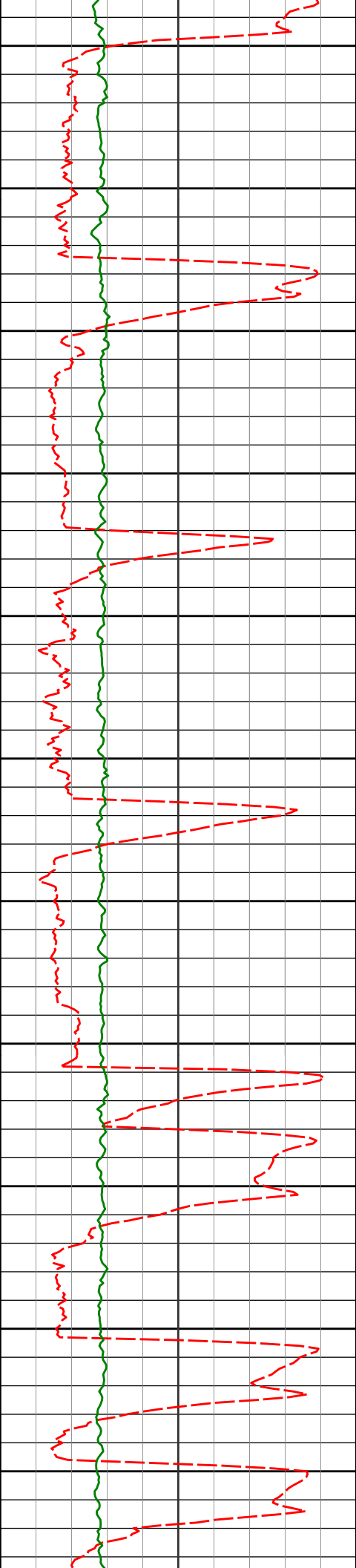
Noble Energy, Inc  
Crow Creek State AC36-77HN  
H&P 315  
T7N R63W





6300	6296'	27.65°	0.52°	6236.08'	-97.38'
6350	6344'	30.71°	0.60°	6277.98'	-74.10'
6400	6391'	34.06°	0.20°	6317.67'	-49.06'
6450	6439'	36.26°	359.69°	6356.91'	-21.54'
6500	6486'	40.96°	359.45°	6393.62'	7.68'
6550	6534'	46.22°	0.34°	6428.38'	40.62'
6600	6581'	49.71°	3.10°	6459.85'	75.25'
6650	6629'	50.71°	4.23°	6490.57'	111.67'
6700	6676'	54.47°	5.05°	6519.12'	148.43'
6750	6724'	58.54°	4.31°	6545.60'	187.84'
6800	6771'	64.88°	1.75°	6567.87'	228.76'
	6819'	73.10°	359.32°	6585.07'	273.29'





7400

7416'

89.08°

358.86°

6626.32'

864.63'

7450

7500

7511'

88.89°

1.01°

6628.01'

959.20'

7550

7600

7606'

88.55°

2.16°

6630.13'

1053.48'

7650

7700

7701'

89.29°

4.14°

6631.92'

1147.42'

7750

7800

7796'

90.34°

5.73°

6632.22'

1240.89'

7850

7900

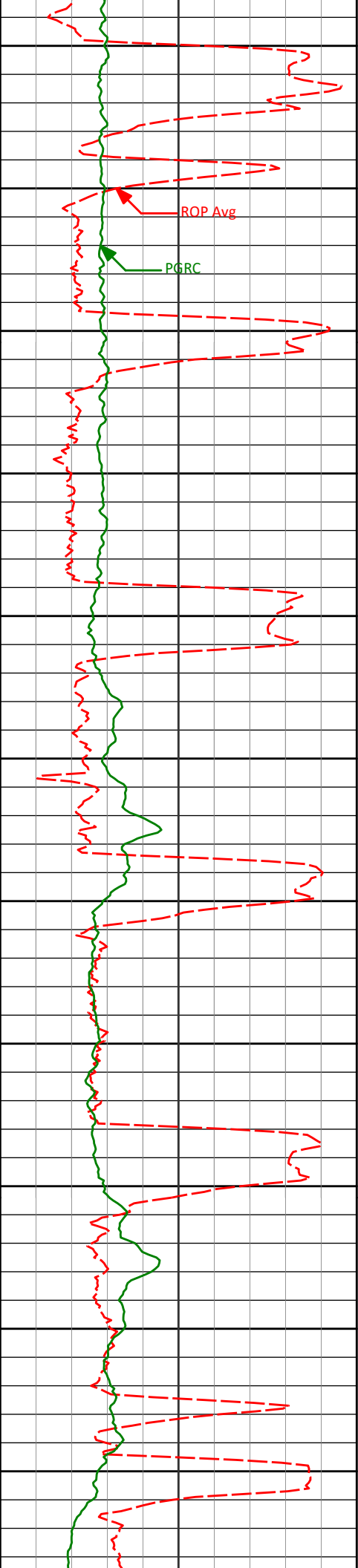
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5.55°

6631.56'

1334.14'



7950

7986'

89.41°

2.00°

6631.66'

1427.92'

8000

8050

8080'

88.95°

2.16°

6633.00'

1521.13'

8100

8150

8175'

87.29°

358.70°

6636.12'

1615.57'

8200

8250

8270'

87.84°

357.50°

6640.15'

1710.31'

8300

8350

8365'

91.23°

357.58°

6640.92'

1805.18'

8400

8450

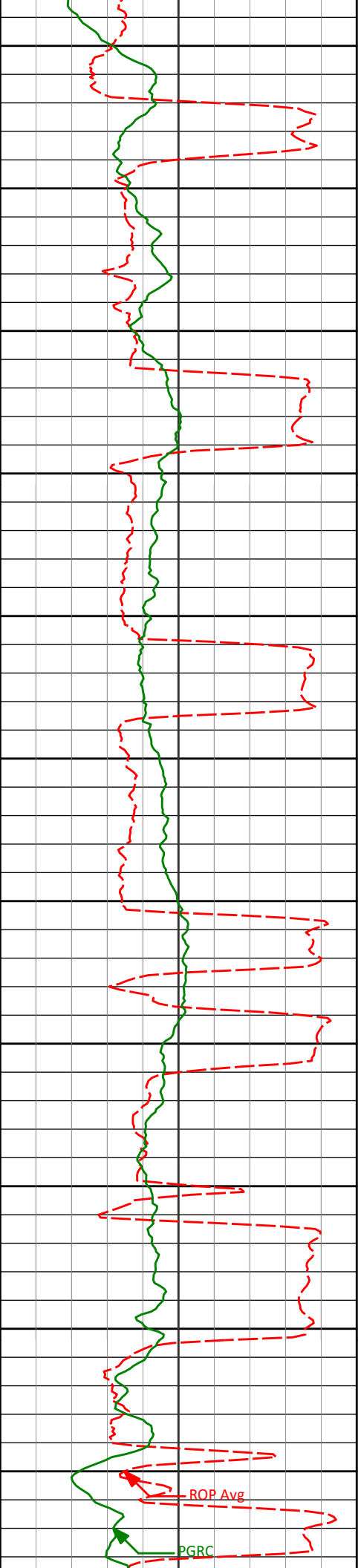
8460'

91.05°

356.54°

6639.03'

1900.07'



8500

8550

8600

8650

8700

8750

8800

8850

8900

8950

9000

8555'

92.37°

357.29°

6636.19'

1994.95'

8650'

91.17°

356.89°

6633.25'

2089.82'

8745'

90.71°

356.80°

6631.69'

2184.74'

8840'

90.12°

357.30°

6631.00'

2279.65'

8935'

88.36°

358.94°

6632.26'

2374.46'

9029'

86.55°

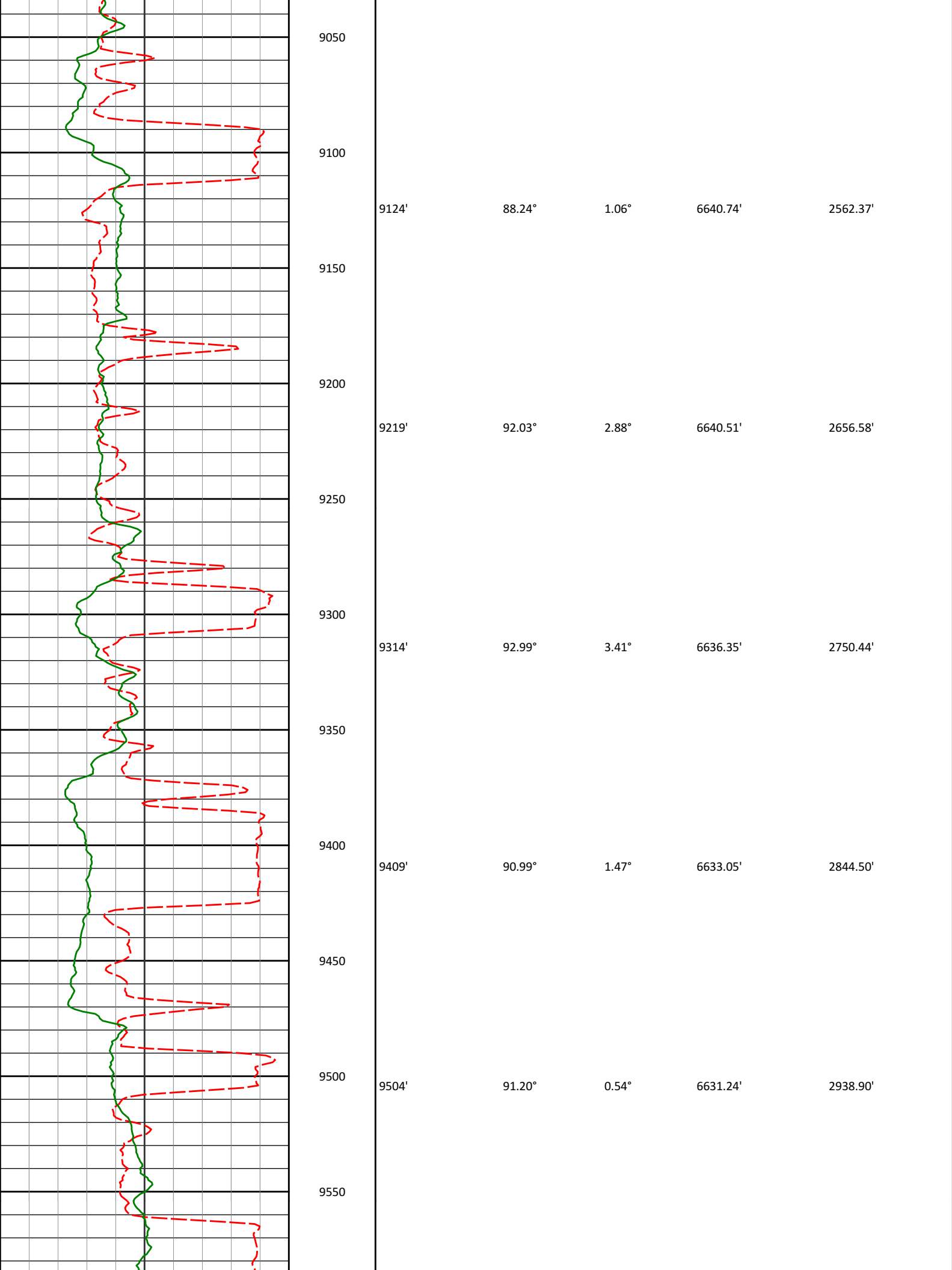
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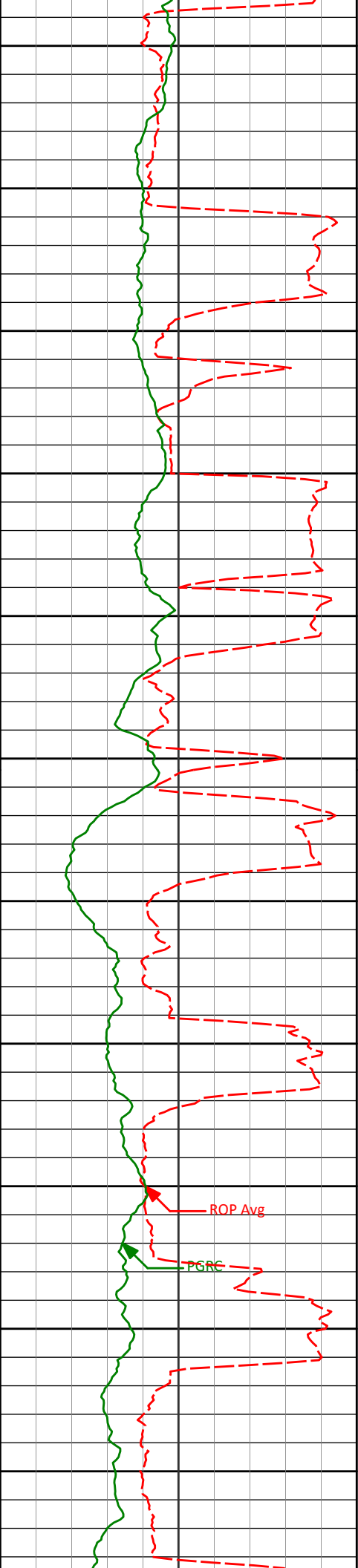
6636.43'

2468.01'

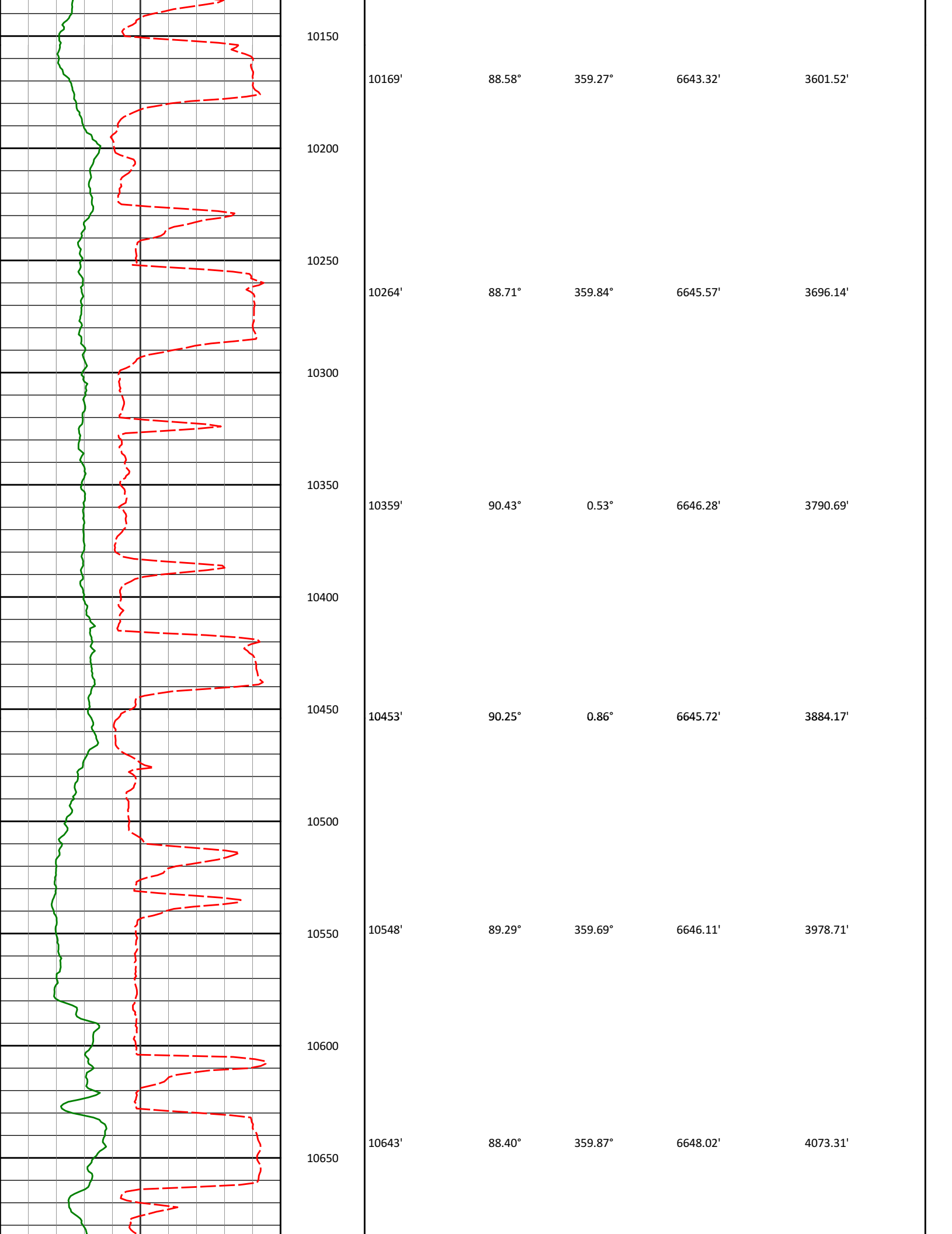
ROP Avg

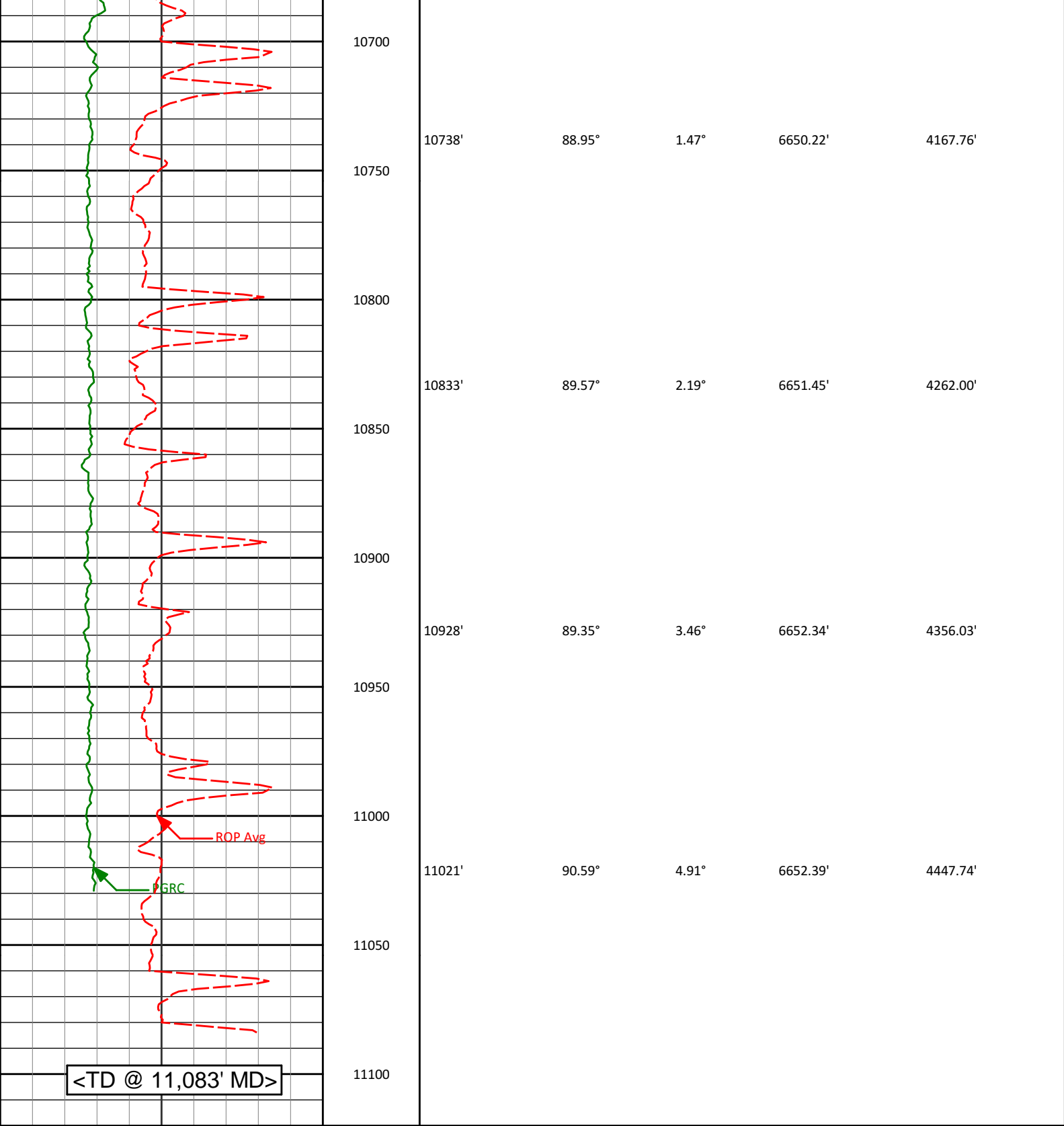
PGRC



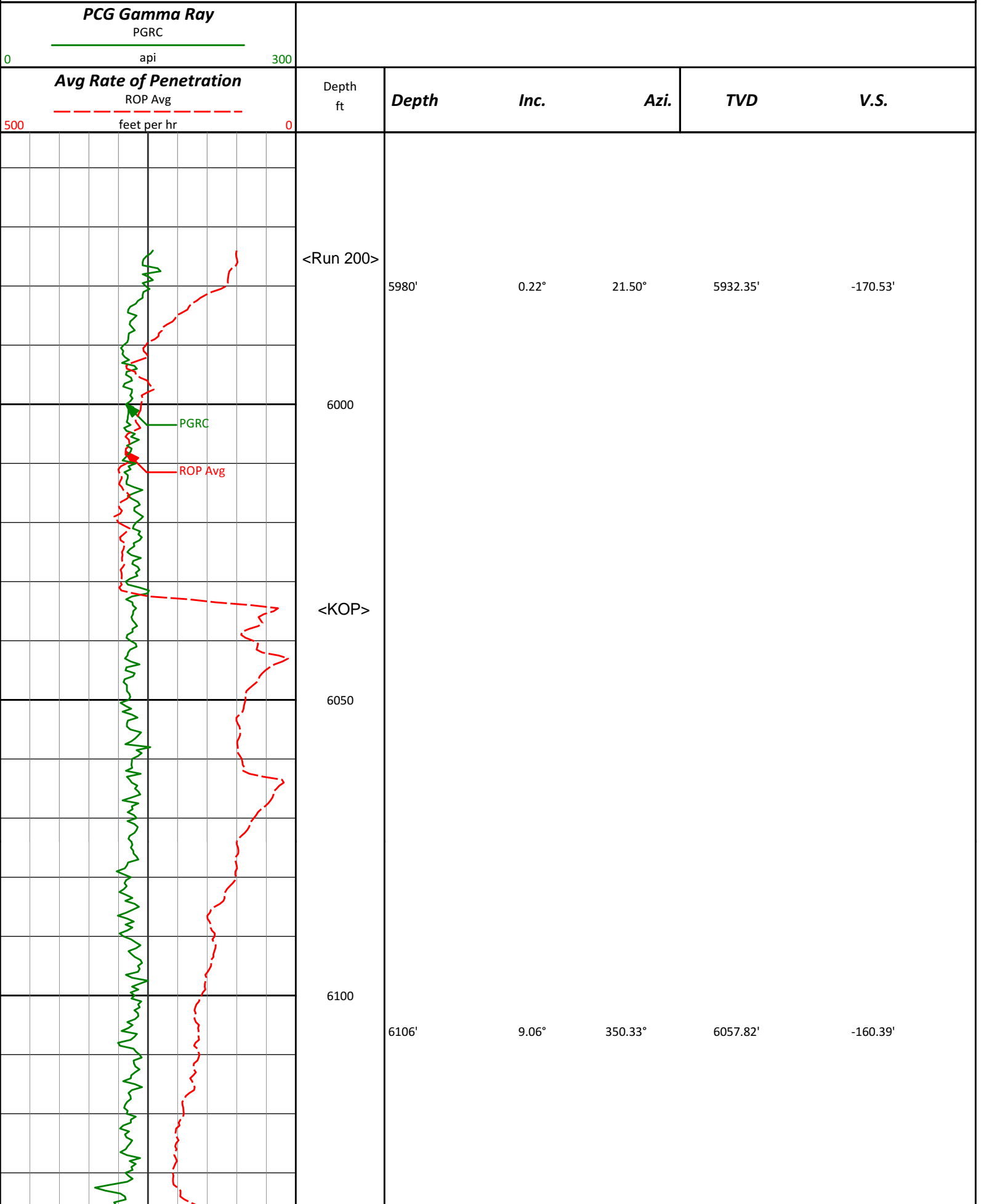


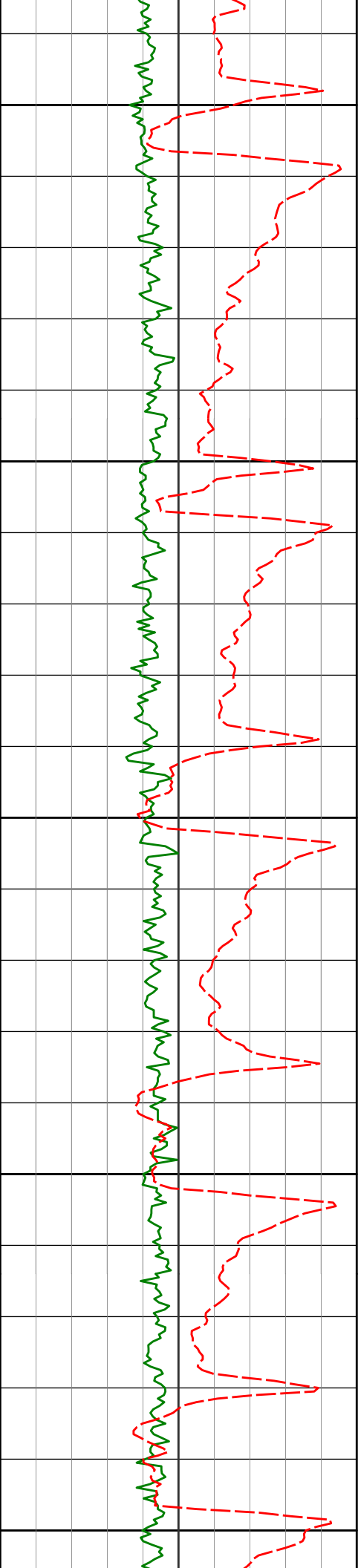
9600	9599'	90.59°	359.11°	6629.75'	3033.50'
9650					
9700	9694'	90.52°	358.71°	6628.83'	3128.23'
9750					
9800	9789'	87.19°	357.92°	6630.73'	3223.01'
9850					
9900	9884'	87.16°	359.22°	6635.41'	3317.67'
9950					
10000	9979'	87.11°	358.88°	6640.16'	3412.27'
10050					
10100	10074'	90.25°	0.07°	6642.35'	3506.89'





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





6150

6154'

14.80°

350.74°

6104.76'

-150.50'

6200

6201'

20.21°

355.08°

6149.57'

-136.38'

6250

6249'

24.75°

358.14°

6193.91'

-118.05'

6300

6296'

27.65°

0.52°

6236.08'

-97.38'

6350

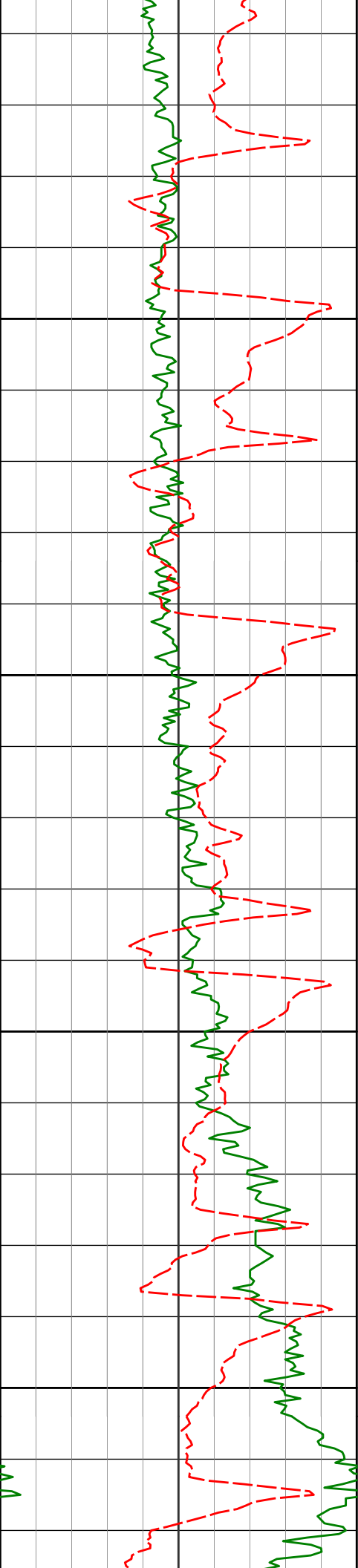
6344'

30.71°

0.60°

6277.98'

-74.10'



6400

6450

6500

6550

6391'

34.06°

0.20°

6317.67'

-49.06'

6439'

36.26°

359.69°

6356.91'

-21.54'

6486'

40.96°

359.45°

6393.62'

7.68'

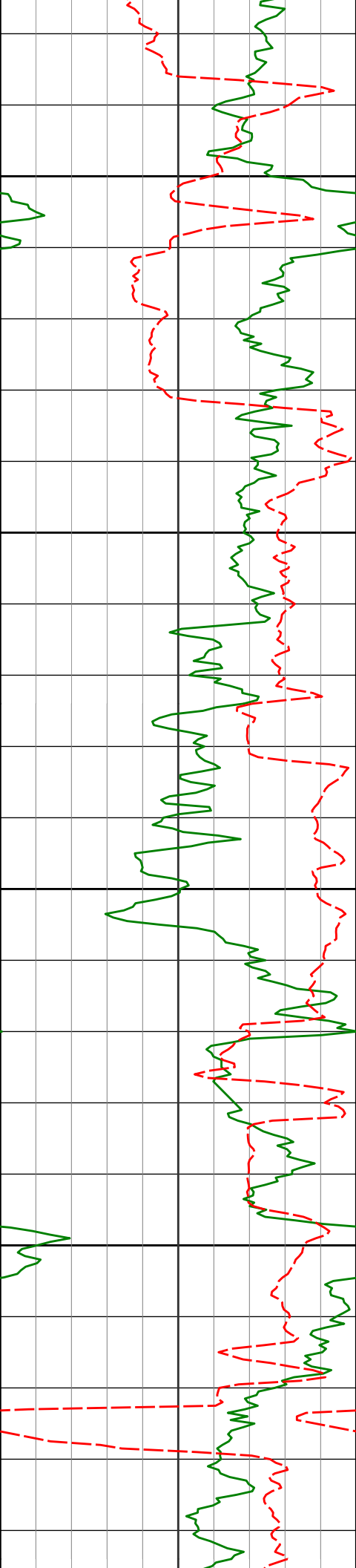
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46.22°

0.34°

6428.38'

40.62'



6581'

49.71°

3.10°

6459.85'

75.25'

6600

6629'

50.71°

4.23°

6490.57'

111.67'

6650

6676'

54.47°

5.05°

6519.12'

148.43'

6700

6724'

58.54°

4.31°

6545.60'

187.84'

6750

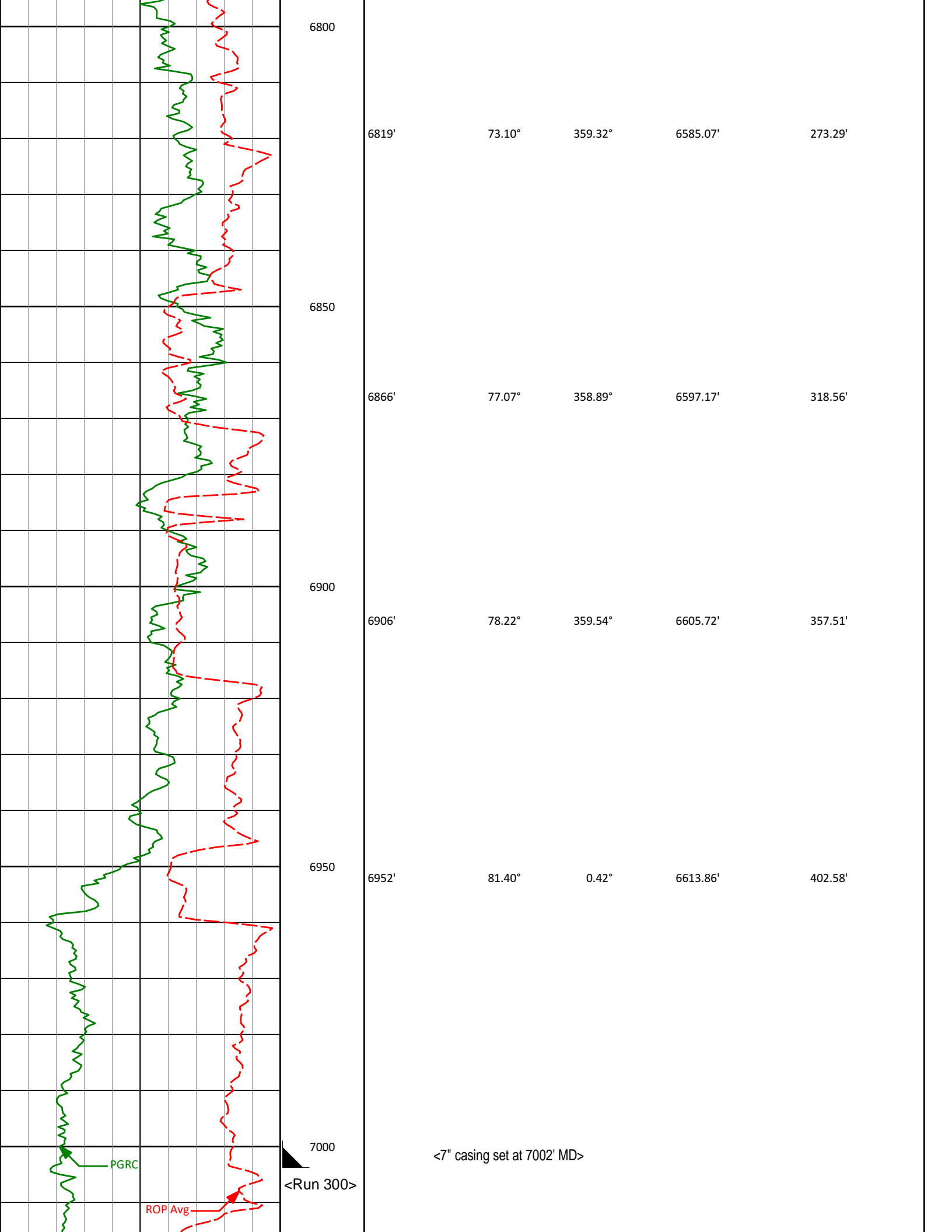
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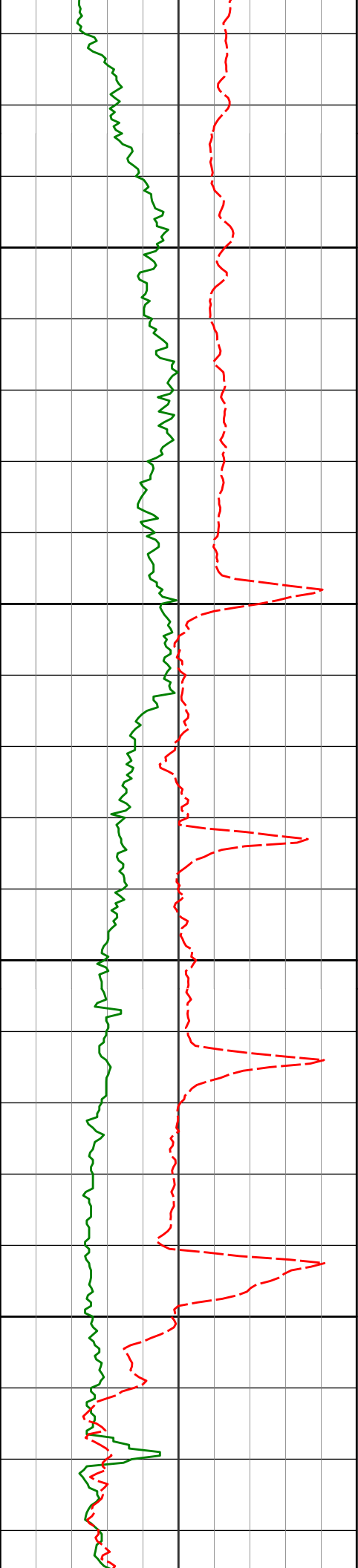
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1.75°

6567.87'

228.76'





7050

7068'

87.93°

0.05°

6624.64'

517.47'

7100

7132'

88.49°

358.88°

6626.64'

581.21'

7150

7200

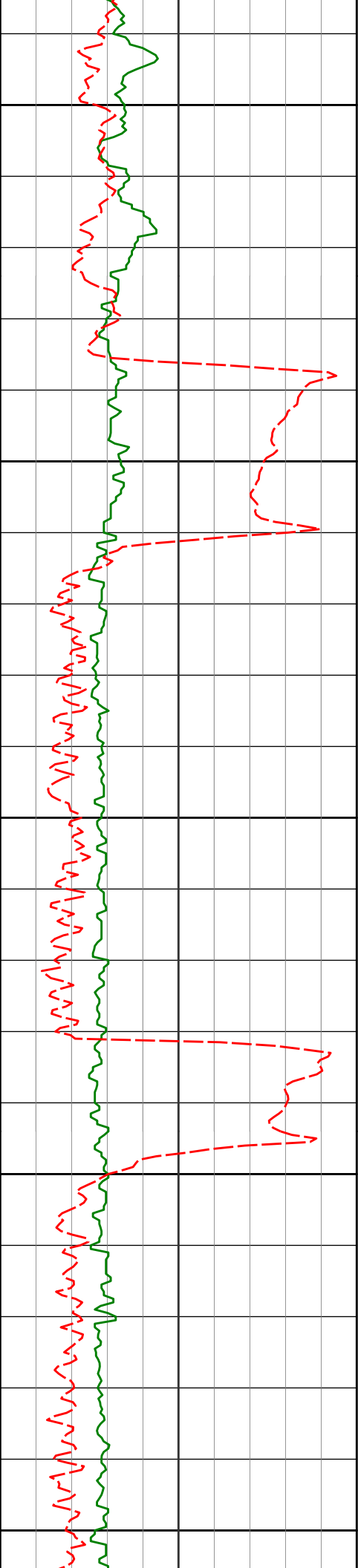
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91.26°

358.54°

6626.84'

675.97'



7250

7300

7350

7400

7450

7321'

90.15°

357.27°

6625.68'

769.80'

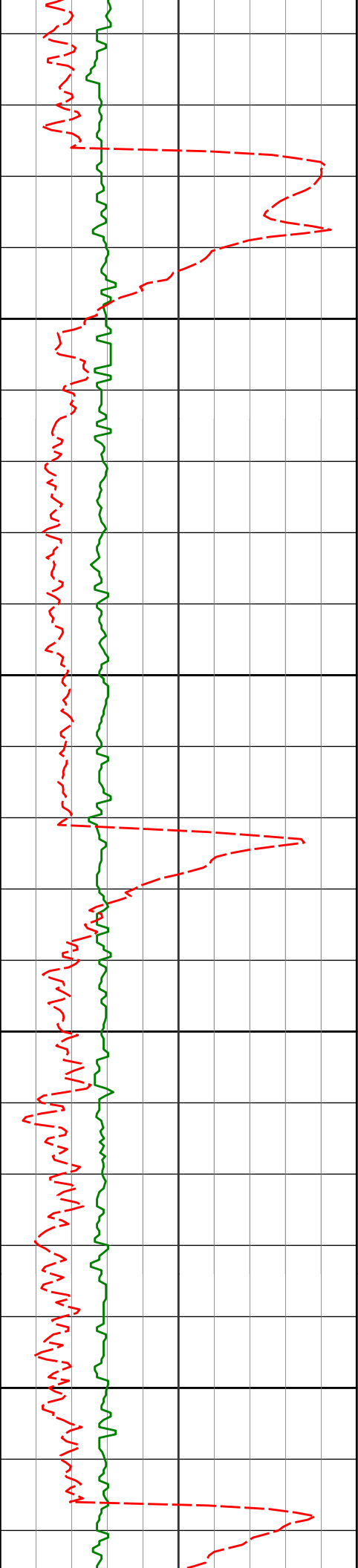
7416'

89.08°

358.86°

6626.32'

864.63'



7500

7511'

88.89°

1.01°

6628.01'

959.20'

7550

7600

7606'

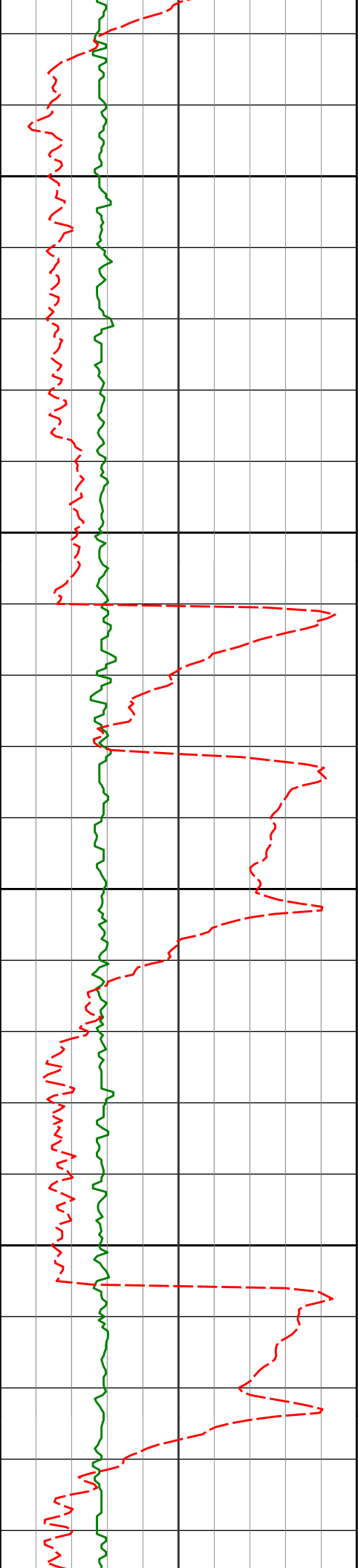
88.55°

2.16°

6630.13'

1053.48'

7650



7700

7701'

89.29°

4.14°

6631.92'

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7750

7800

7796'

90.34°

5.73°

6632.22'

1240.89'

7850

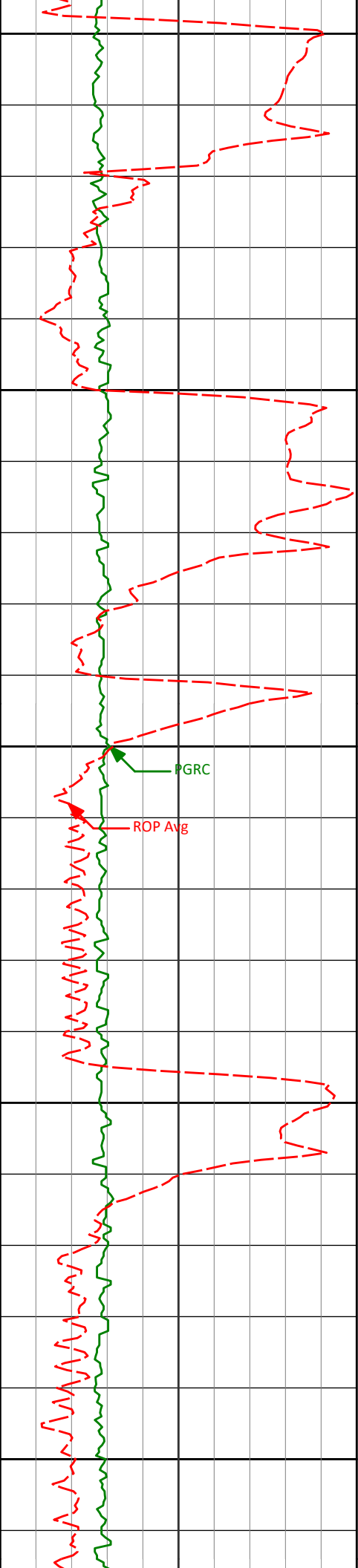
7891'

90.46°

5.55°

6631.56'

1334.14'



7900

7950

8000

8050

8100

7986'

89.41°

2.00°

6631.66'

1427.92'

8080'

88.95°

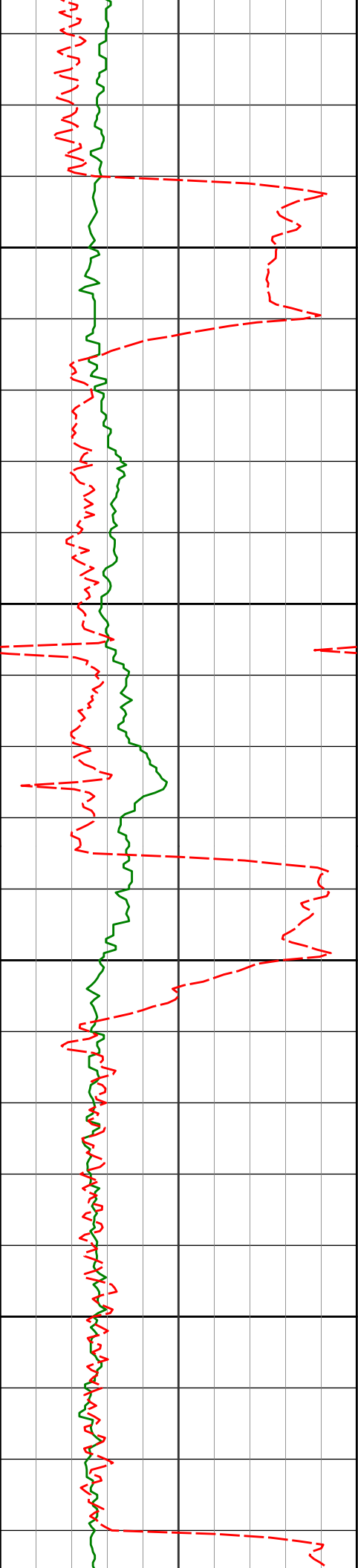
2.16°

6633.00'

1521.13'

GRC

ROP Avg



8150

8175'

87.29°

358.70°

6636.12'

1615.57'

8200

8250

8270'

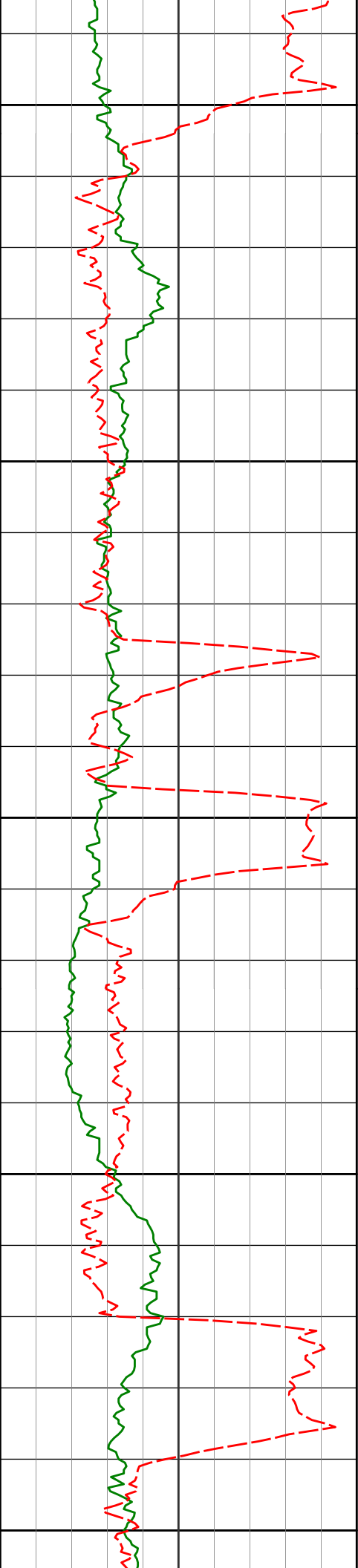
87.84°

357.50°

6640.15'

1710.31'

8300



8350

8365'

91.23°

357.58°

6640.92'

1805.18'

8400

8450

8460'

91.05°

356.54°

6639.03'

1900.07'

8500

8550

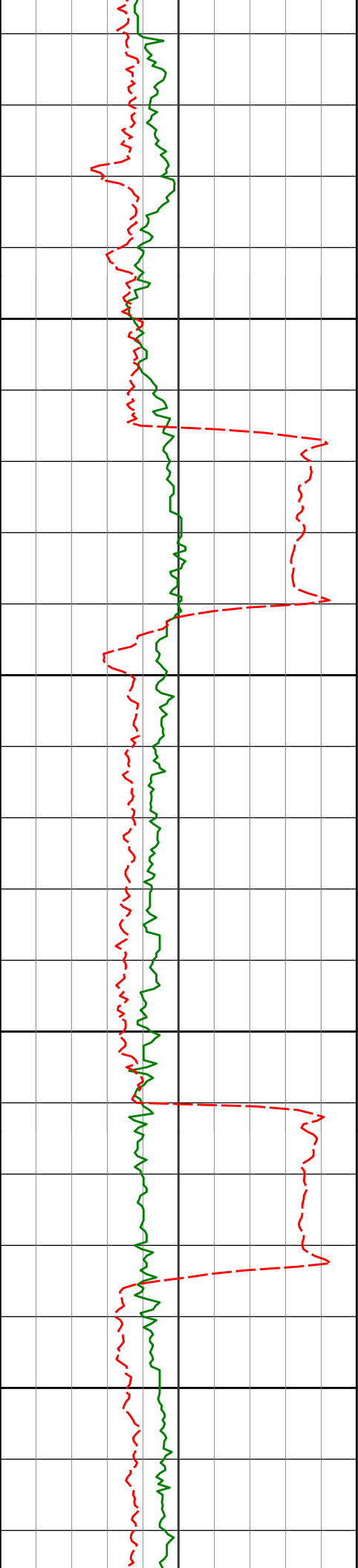
8555'

92.37°

357.29°

6636.19'

1994.95'



8600

8650

8700

8750

8550	92.97	337.23	6630.13	1994.93
8650'	91.17°	356.89°	6633.25'	2089.82'
8745'	90.71°	356.80°	6631.69'	2184.74'



8800

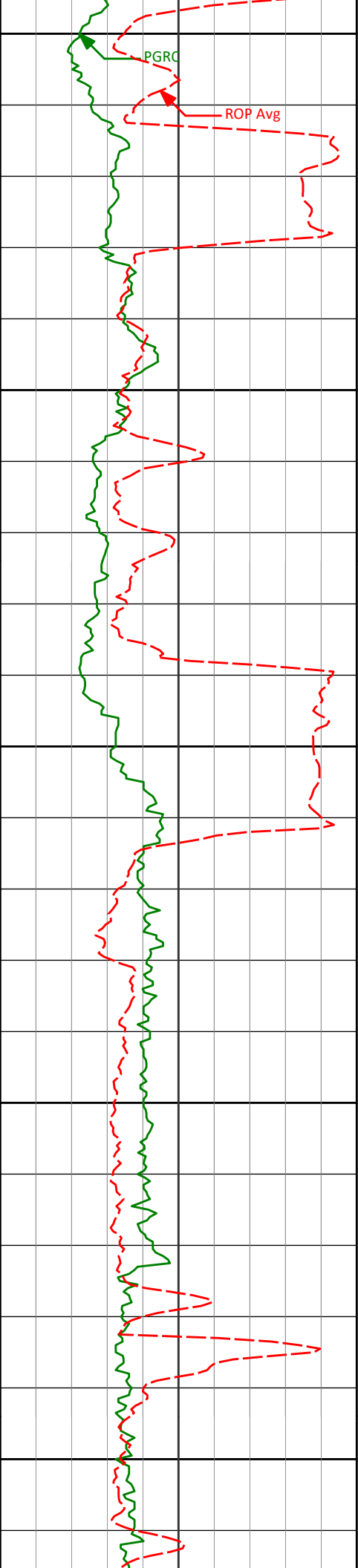
8840'      90.12°      357.30°      6631.00'      2279.65'

8850

8900

8935'      88.36°      358.94°      6632.26'      2374.46'

8950



9000

9050

9100

9150

9200

9029'

86.55°

0.35°

6636.43'

2468.01'

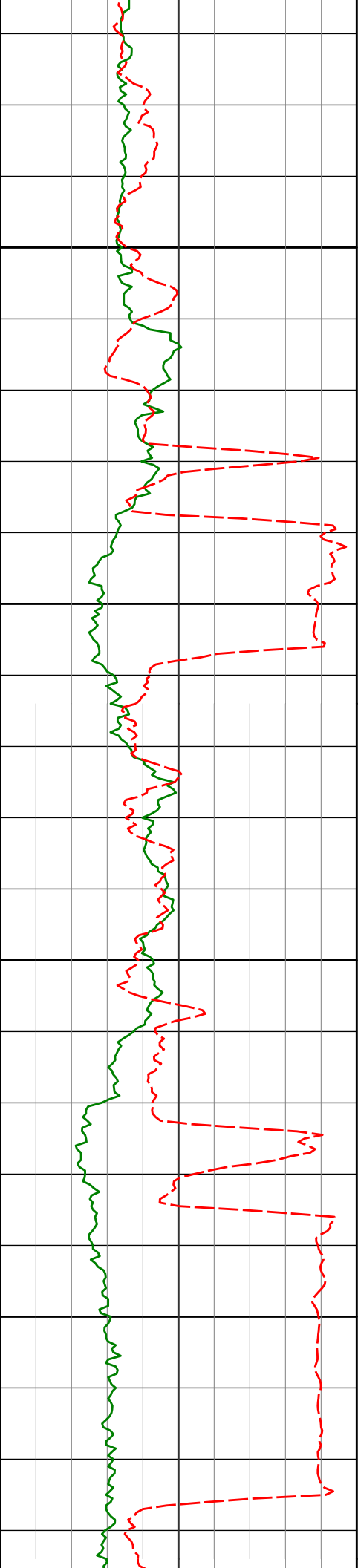
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88.24°

1.06°

6640.74'

2562.37'



9219'

92.03°

2.88°

6640.51'

2656.58'

9250

9300

9314'

92.99°

3.41°

6636.35'

2750.44'

9350

9400

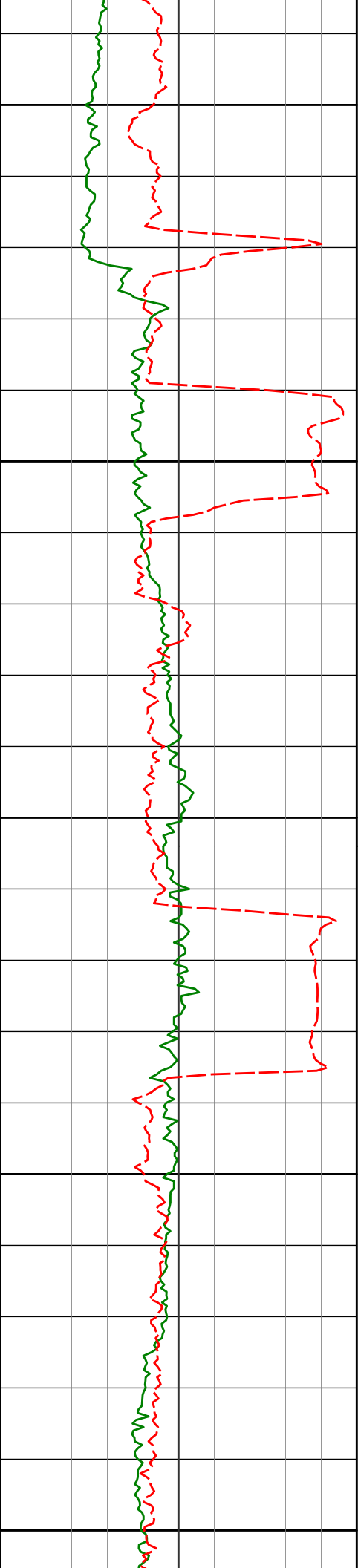
9409'

90.99°

1.47°

6633.05'

2844.50'



9450

9500

9550

9600

9650

9504'

91.20°

0.54°

6631.24'

2938.90'

9599'

90.59°

359.11°

6629.75'

3033.50'



9700

9750

9800

9850

9694'

90.52°

358.71°

6628.83'

3128.23'

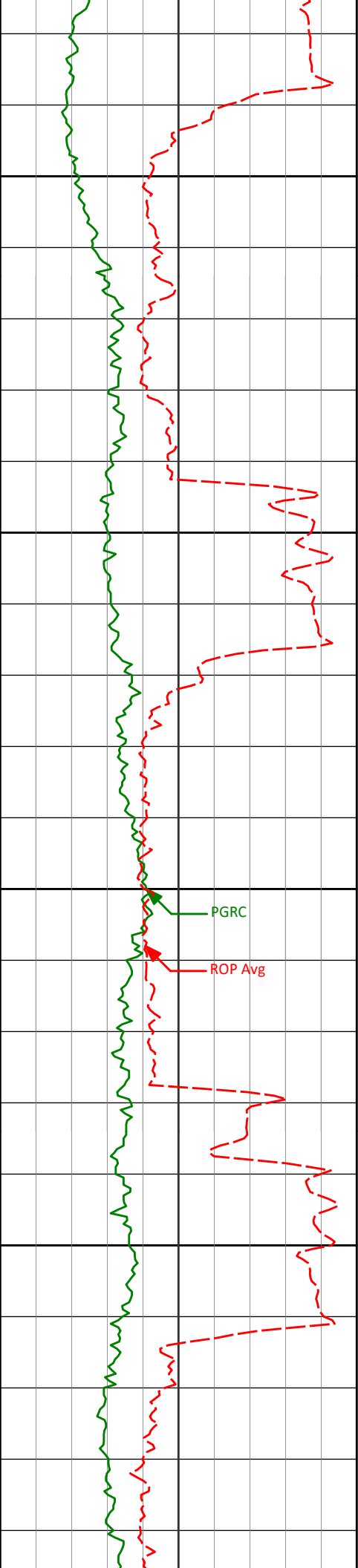
9789'

87.19°

357.92°

6630.73'

3223.01'



9884'

87.16°

359.22°

6635.41'

3317.67'

9900

9950

9979'

87.11°

358.88°

6640.16'

3412.27'

10000

PGRC

ROP Avg

10050

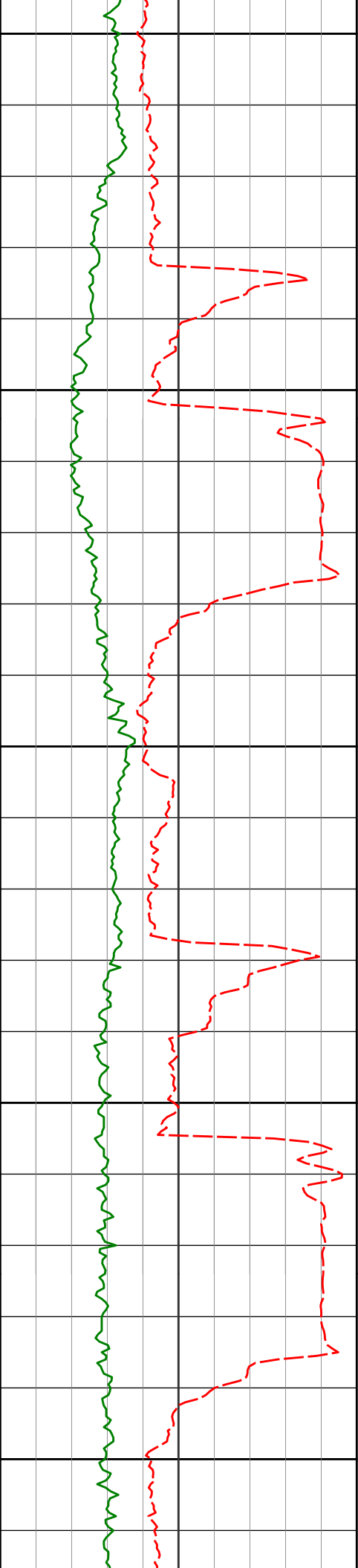
10074'

90.25°

0.07°

6642.35'

3506.89'



10100

10150

10200

10250

10300

10169'

88.58°

359.27°

6643.32'

3601.52'

10264'

88.71°

359.84°

6645.57'

3696.14'



10350

10359'

90.43°

0.53°

6646.28'

3790.69'

10400

10450

10453'

90.25°

0.86°

6645.72'

3884.17'

10500



10550

10600

10650

10700

10750

10548'

10643'

10738'

89.29°

88.40°

88.95°

359.69°

359.87°

1.47°

6646.11'

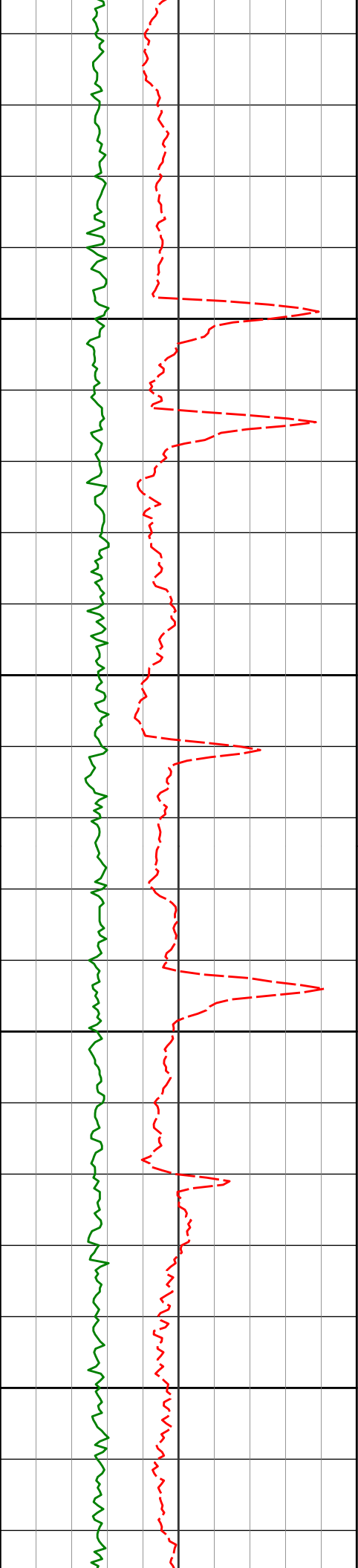
6648.02'

6650.22'

3978.71'

4073.31'

4167.76'



10800

10833'

89.57°

2.19°

6651.45'

4262.00'

10850

10900

10928'

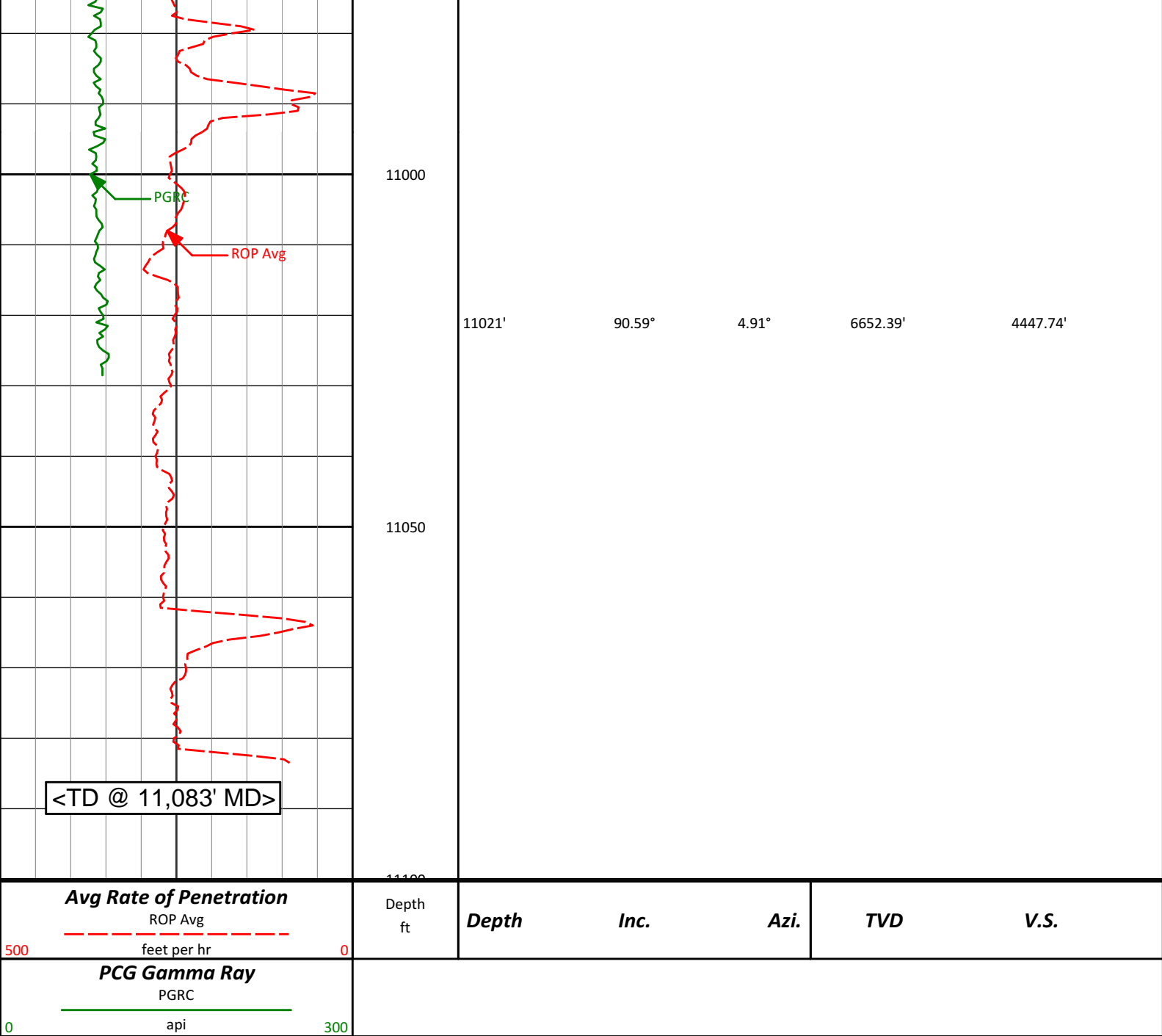
89.35°

3.46°

6652.34'

4356.03'

10950



**HALLIBURTON**

**DIRECTIONAL SURVEY REPORT**

Noble Energy  
Crow Creek State AC36-77HN  
Wattenberg  
Weld Colorado  
USA  
CA-XX-0900758848

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
327.00	0.60	246.17	326.99	0.69 S	1.57 W	-0.54	0.18
600.00	0.70	273.27	599.98	1.17 S	4.54 W	-0.75	0.12
716.00	0.65	264.12	715.97	1.20 S	5.91 W	-0.65	0.10
808.00	0.22	275.44	807.97	1.24 S	6.60 W	-0.62	0.48
900.00	0.54	240.39	899.96	1.44 S	7.15 W	-0.76	0.42

993.00	0.17	254.08	992.96	1.69 S	7.66 W	-0.97	0.41
1085.00	0.35	264.03	1084.96	1.76 S	8.07 W	-1.00	0.21
1179.00	0.48	266.25	1178.96	1.81 S	8.75 W	-0.99	0.14
1273.00	0.92	260.53	1272.95	1.96 S	9.89 W	-1.03	0.47
1365.00	0.52	246.03	1364.94	2.25 S	11.00 W	-1.22	0.47
1458.00	0.66	243.40	1457.94	2.67 S	11.87 W	-1.55	0.15
1553.00	0.57	250.84	1552.93	3.07 S	12.80 W	-1.86	0.13
1648.00	0.38	236.83	1647.93	3.39 S	13.51 W	-2.12	0.23
1743.00	0.09	178.89	1742.93	3.64 S	13.77 W	-2.34	0.36
1838.00	2.75	257.79	1837.89	4.20 S	16.00 W	-2.69	2.88
1933.00	3.73	244.05	1932.74	6.03 S	21.00 W	-4.05	1.31
2028.00	4.67	246.07	2027.49	8.95 S	27.31 W	-6.37	1.00
2123.00	6.14	229.26	2122.07	13.84 S	34.69 W	-10.54	2.26
2218.00	8.31	230.84	2216.31	21.48 S	43.86 W	-17.30	2.29
2312.00	9.52	234.39	2309.17	30.30 S	55.45 W	-25.00	1.42
2407.00	11.32	243.04	2402.61	39.10 S	70.15 W	-32.39	2.50
2502.00	11.80	246.22	2495.68	47.25 S	87.35 W	-38.90	0.84
2597.00	13.66	250.64	2588.34	54.88 S	106.83 W	-44.68	2.21
2692.00	13.69	249.81	2680.65	62.48 S	127.97 W	-50.28	0.21
2787.00	13.41	246.96	2773.01	70.67 S	148.65 W	-56.50	0.76
2882.00	13.63	247.75	2865.37	79.22 S	169.15 W	-63.11	0.30
2976.00	13.78	249.08	2956.70	87.41 S	189.86 W	-69.33	0.37
3071.00	14.30	248.79	3048.86	95.70 S	211.37 W	-75.57	0.55
3166.00	13.13	248.31	3141.15	103.93 S	232.34 W	-81.82	1.24
3261.00	11.87	247.72	3233.89	111.62 S	251.41 W	-87.70	1.34
3356.00	11.48	249.06	3326.93	118.71 S	269.27 W	-93.08	0.50
3451.00	11.45	248.09	3420.03	125.61 S	286.85 W	-98.31	0.20
3546.00	11.46	245.49	3513.14	133.04 S	304.20 W	-104.10	0.54
3641.00	12.67	245.51	3606.04	141.28 S	322.27 W	-110.61	1.28
3736.00	13.03	242.23	3698.66	150.59 S	341.23 W	-118.12	0.86
3831.00	14.00	240.34	3791.03	161.26 S	360.69 W	-126.93	1.12
3926.00	12.79	242.88	3883.44	171.74 S	380.04 W	-135.56	1.42
4021.00	9.98	240.64	3976.56	180.57 S	396.57 W	-142.81	2.99
4116.00	8.35	244.39	4070.35	187.59 S	409.97 W	-148.55	1.83
4211.00	7.09	237.53	4164.49	193.72 S	421.14 W	-153.61	1.65
4306.00	5.13	244.66	4258.94	198.69 S	429.93 W	-157.74	2.20
4400.00	2.35	241.44	4352.73	201.41 S	435.43 W	-159.93	2.97
4495.00	0.78	257.90	4447.70	202.48 S	437.76 W	-160.78	1.70
4780.00	1.36	216.78	4732.65	205.59 S	441.68 W	-163.51	0.33
5065.00	2.89	170.16	5017.46	215.37 S	442.47 W	-173.18	0.77
5160.00	1.33	117.68	5112.40	218.25 S	441.09 W	-176.17	2.46
5254.00	1.09	355.65	5206.39	217.86 S	440.19 W	-175.87	2.26
5539.00	0.44	222.20	5491.38	215.95 S	441.12 W	-173.88	0.50
5824.00	1.00	4.18	5776.36	214.27 S	441.67 W	-172.15	0.48
5980.00	0.22	21.50	5932.35	212.62 S	441.45 W	-170.53	0.51
6106.00	9.06	350.33	6057.82	202.59 S	443.03 W	-160.39	7.04
6154.00	14.80	350.74	6104.76	192.80 S	444.66 W	-150.50	11.96
6201.00	20.21	355.08	6149.57	178.78 S	446.32 W	-136.38	11.82
6249.00	24.75	358.14	6193.91	160.46 S	447.36 W	-118.05	9.77
6296.00	27.65	0.52	6236.08	139.72 S	447.58 W	-97.38	6.57
6344.00	30.71	0.60	6277.98	116.32 S	447.35 W	-74.10	6.37
6391.00	34.06	0.20	6317.67	91.15 S	447.18 W	-49.06	7.15
6439.00	36.26	359.69	6356.91	63.51 S	447.21 W	-21.54	4.61
6486.00	40.96	359.45	6393.62	34.19 S	447.43 W	7.68	10.02
6534.00	46.22	0.34	6428.38	1.11 S	447.48 W	40.62	11.02
6581.00	49.71	3.10	6459.85	33.77 N	446.41 W	75.25	8.60
6629.00	50.71	4.23	6490.57	70.58 N	444.05 W	111.67	2.77
6676.00	54.47	5.05	6519.12	107.78 N	441.03 W	148.43	8.12
6724.00	58.54	4.31	6545.60	147.67 N	437.77 W	187.84	8.59
6771.00	64.88	1.75	6567.87	188.97 N	435.61 W	228.76	14.30
6819.00	73.10	359.32	6585.07	233.73 N	435.22 W	273.29	17.76
6866.00	77.07	358.89	6597.17	279.13 N	435.93 W	318.56	8.51
6906.00	78.22	359.54	6605.72	318.20 N	436.47 W	357.51	3.27
6952.00	81.40	0.42	6613.86	363.47 N	436.48 W	402.58	7.16
7068.00	87.93	0.05	6624.64	478.90 N	436.02 W	517.47	5.65
7132.00	88.49	358.88	6626.64	542.87 N	436.62 W	581.21	2.02
7227.00	91.26	358.54	6626.84	637.84 N	438.76 W	675.97	2.94
7321.00	90.15	357.27	6625.68	731.76 N	442.19 W	769.80	1.79
7416.00	89.08	358.86	6626.32	826.70 N	445.40 W	864.63	2.02
7511.00	88.89	1.01	6628.01	921.68 N	445.51 W	959.20	2.27
7606.00	88.55	2.16	6630.13	1016.62 N	442.88 W	1053.48	1.27

7701.00	89.29	4.14	6631.92	1111.45 N	437.66 W	1147.42	2.22
7796.00	90.34	5.73	6632.22	1206.10 N	429.49 W	1240.89	2.01
7891.00	90.46	5.55	6631.56	1300.63 N	420.15 W	1334.14	0.24
7986.00	89.41	2.00	6631.66	1395.41 N	413.90 W	1427.92	3.90
8080.00	88.95	2.16	6633.00	1489.34 N	410.50 W	1521.13	0.52
8175.00	87.29	358.70	6636.12	1584.27 N	409.78 W	1615.57	4.03
8270.00	87.84	357.50	6640.15	1679.13 N	412.92 W	1710.31	1.39
8365.00	91.23	357.58	6640.92	1774.02 N	417.00 W	1805.18	3.57
8460.00	91.05	356.54	6639.03	1868.88 N	421.86 W	1900.07	1.11
8555.00	92.37	357.29	6636.19	1963.70 N	426.97 W	1994.95	1.60
8650.00	91.17	356.89	6633.25	2058.53 N	431.79 W	2089.82	1.33
8745.00	90.71	356.80	6631.69	2153.37 N	437.02 W	2184.74	0.50
8840.00	90.12	357.30	6631.00	2248.24 N	441.91 W	2279.65	0.81
8935.00	88.36	358.94	6632.26	2343.17 N	445.03 W	2374.46	2.53
9029.00	86.55	0.35	6636.43	2437.07 N	445.62 W	2468.01	2.45
9124.00	88.24	1.06	6640.74	2531.96 N	444.45 W	2562.37	1.93
9219.00	92.03	2.88	6640.51	2626.89 N	441.19 W	2656.58	4.43
9314.00	92.99	3.41	6636.35	2721.65 N	435.98 W	2750.44	1.15
9409.00	90.99	1.47	6633.05	2816.50 N	431.94 W	2844.50	2.94
9504.00	91.20	0.54	6631.24	2911.46 N	430.29 W	2938.90	1.00
9599.00	90.59	359.11	6629.75	3006.45 N	430.58 W	3033.50	1.64
9694.00	90.52	358.71	6628.83	3101.43 N	432.39 W	3128.23	0.42
9789.00	87.19	357.92	6630.73	3196.35 N	435.18 W	3223.01	3.61
9884.00	87.16	359.22	6635.41	3291.21 N	437.55 W	3317.67	1.37
9979.00	87.11	358.88	6640.16	3386.08 N	439.11 W	3412.27	0.36
10074.00	90.25	0.07	6642.35	3481.03 N	439.98 W	3506.89	3.54
10169.00	88.58	359.27	6643.32	3576.02 N	440.53 W	3601.52	1.95
10264.00	88.71	359.84	6645.57	3670.99 N	441.27 W	3696.14	0.62
10359.00	90.43	0.53	6646.28	3765.98 N	440.96 W	3790.69	1.95
10453.00	90.25	0.86	6645.72	3859.98 N	439.83 W	3884.17	0.40
10548.00	89.29	359.69	6646.11	3954.97 N	439.38 W	3978.71	1.59
10643.00	88.40	359.87	6648.02	4049.95 N	439.75 W	4073.31	0.96
10738.00	88.95	1.47	6650.22	4144.91 N	438.64 W	4167.76	1.78
10833.00	89.57	2.19	6651.45	4239.86 N	435.61 W	4262.00	1.00
10928.00	89.35	3.46	6652.34	4334.74 N	430.93 W	4356.03	1.35
11021.00	90.59	4.91	6652.39	4427.48 N	424.15 W	4447.74	2.05
11083.00	90.59	4.91	6651.76	4489.25 N	418.84 W	4508.75	0.01

**CALCULATION BASED ON MINIMUM CURVATURE METHOD**

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

**VERTICAL SECTION RELATIVE TO WELL HEAD  
VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 354.65 DEGREES (GRID)  
A TOTAL CORRECTION OF 7.67 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11083.00 FEET  
IS 4508.75 FEET ALONG 354.67 DEGREES (GRID)**

Surface surveys at 327 ft and 600 ft have had azimuths corrected to grid north, but were not taken by Halliburton.

Last survey is a projection from 11021 ft MD to TD at 11083 ft MD.