

PCGK : Pressure Case Gamma
PCDC: Pressure Case Directional

1 : 600 / 1 : 240

Country		: USA			
Field		: Wattenberg			
Location		: Lat: 40° 18' 20.23" North Long: 104° 28' 20.60" West			
Well		: Sater CC18-74-1HN			
Company		: Noble Energy			
Rig		: H&P 315			
LOCATION		Latitude : 40° 18' 20.23" North Longitude : 104° 28' 20.60" West		Other Services	
		UTM Easting = 3,286,592.049 ft UTM Northing = 1,355,838.997 ft		Directional Drilling	
Permanent Datum		: Ground Level		Elev. KB N/A	
Log Measured From		: Drill Floor		24.00 ft Above Permanent Datum	
Drilling Measured From		: Drill Floor		MD LOG	
Depth Logged		: 630.00 ft To 11,637.00 ft		Unit No. : 11610113	
Date Logged		: 30-Mar-14 To 08-Apr-14		Job No. : CA-XX-0901120860	
Total Depth MD		: 11,637.00 ft TVD: 6,552.17 ft		Plot Type : Final	
Spud Date		: 30-Mar-14		Plot Date : 05-Apr-14	
Run No.		Borehole Record (MD)		Run No.	
		Size From To		Size From To	
0200		8.750 in 630.00 ft 5,942.00 ft			
0300		8.750 in 5,942.00 ft 7,134.00 ft			
0400		6.125 in 7,134.00 ft 11,637.00 ft			
				Casing Record (MD)	
				Size Weight From To	
				7.000 in 26.00 lbpf SURFACE 7,129.00 ft	

Max Tool Temp (degF) / Source	153.79 / PCM	160.83 / PCM	231.42 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Henry Schmeidler	Henry Schmeidler	Henry Schmeidler		
Customer Representative	Martin Suarez	Steve Record	Steve Record		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.84	5.84	5.76		
Sub Serial Number	11404274	11404274	12310753		
Insert Serial Number	11680783	11680102	11680102		
Date and Time Initialized	30-Mar-14 18:48	01-Apr-14 09:24	03-Apr-14 07:01		
Date and Time Read	01-Apr-14 13:53	02-Apr-14 14:27	05-Apr-14 16:17		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	55.32	52.37	57.88		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11404274	11404274	12310753		
Sonde Serial Number	11478196	11638618	11478196		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	137.87	275.95	124.79		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	50.32	47.37	52.90		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11404274	11404274	12310753		
Insert/Sonde Serial Number	11293410	11293354	11293354		

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
6. Gamma presented inside casing/cement from 7087 ft. MD to 7129 ft. MD.

WARRANTY

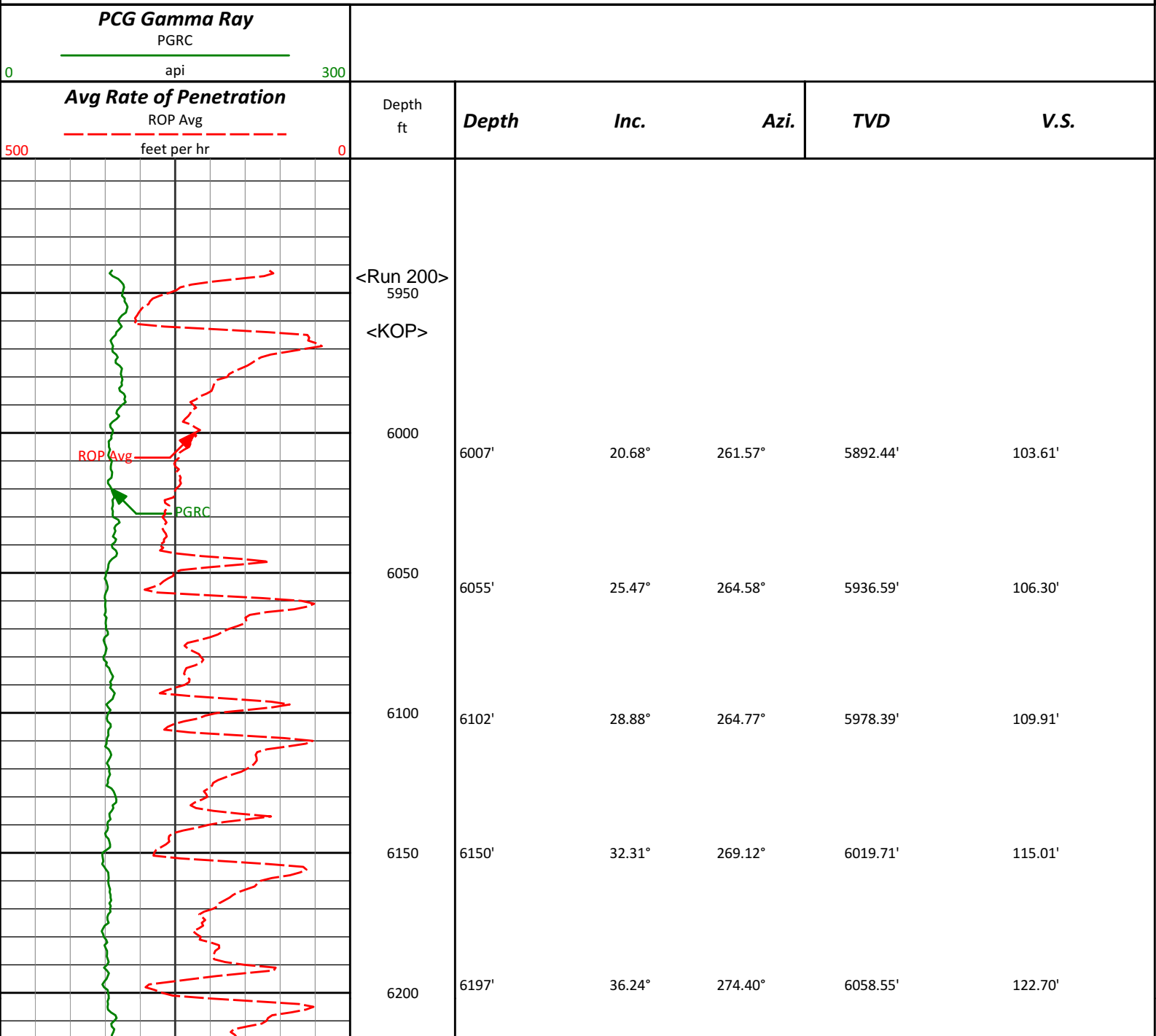
HALLIBURTON WILL USE ITS BEST EFFORTS TO FURNISH CUSTOMERS WITH ACCURATE INFORMATION AND INTERPRETATIONS

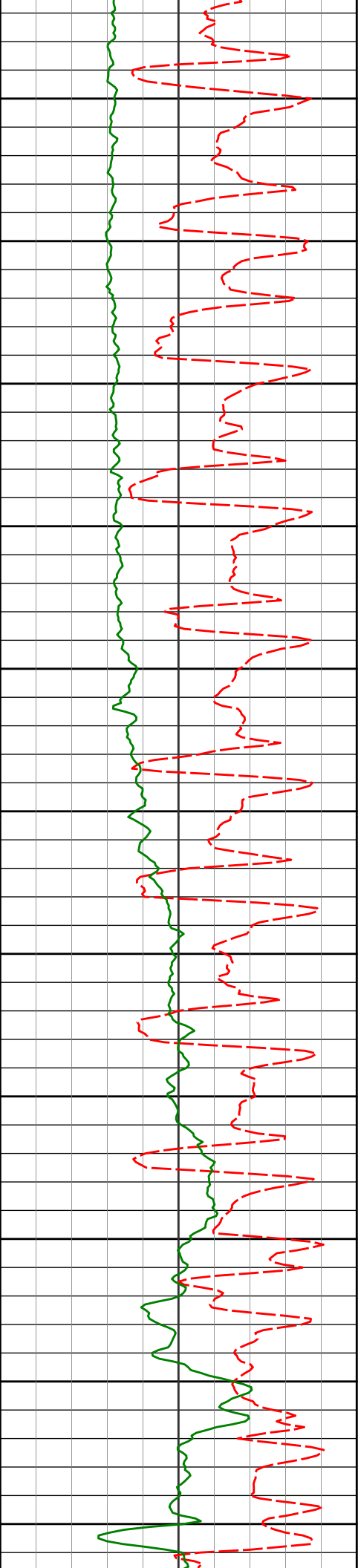
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HALLIBURTON
Sperry Drilling Services

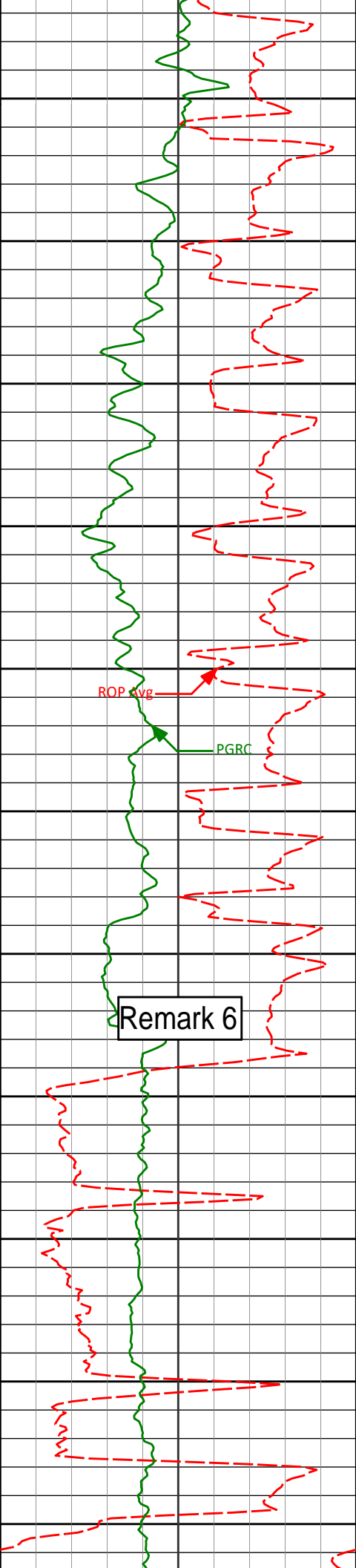
MD Main Log 1:600

Noble Energy, Inc
Sater CC18-74-1HN
H&P 315
T4N R63W

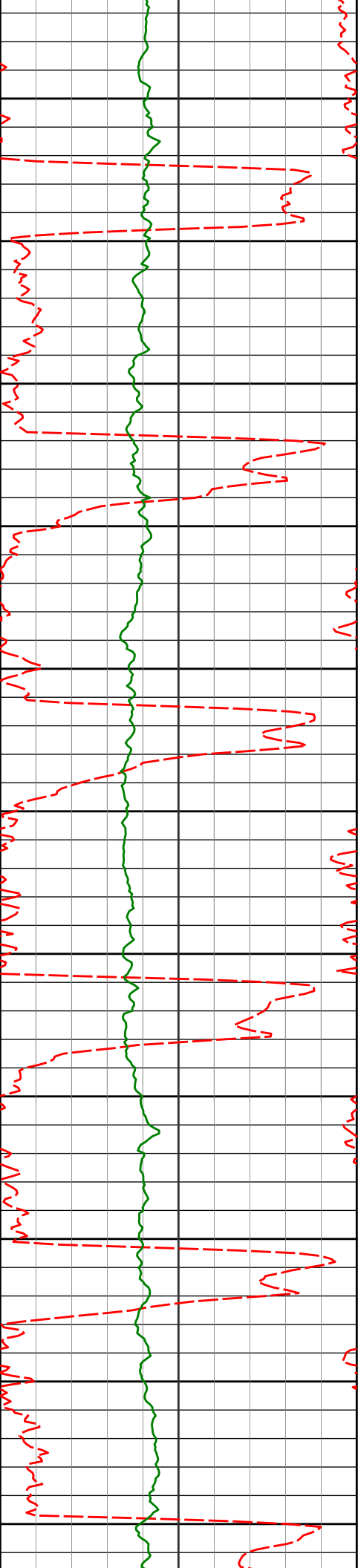




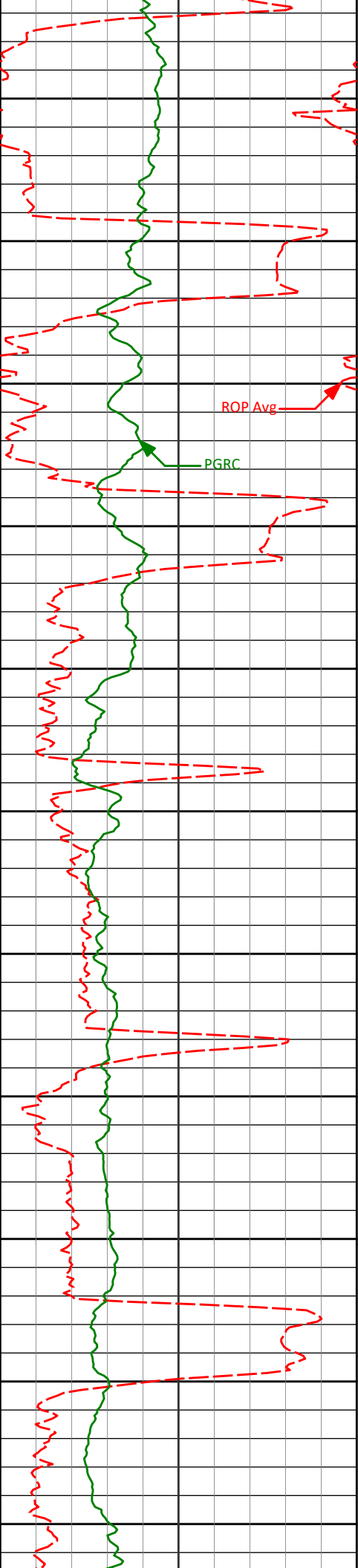
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6300	6292'	38.20°	290.40°	6133.88'	149.66'
6350	6340'	37.89°	294.99°	6171.69'	167.74'
6400	6387'	38.01°	301.75°	6208.77'	187.57'
6450	6435'	41.45°	307.79°	6245.69'	211.01'
6500	6482'	44.55°	313.87°	6280.07'	237.53'
6550	6530'	45.78°	319.78°	6313.93'	267.52'
6600	6576'	47.59°	325.15°	6345.50'	298.42'
6650	6624'	50.74°	328.16°	6376.88'	332.89'
6700	6671'	54.39°	330.85°	6405.45'	368.85'
6750	6719'	58.08°	334.62°	6432.13'	407.83'
	6766'	61.68°	338.03°	6455.71'	449.91'



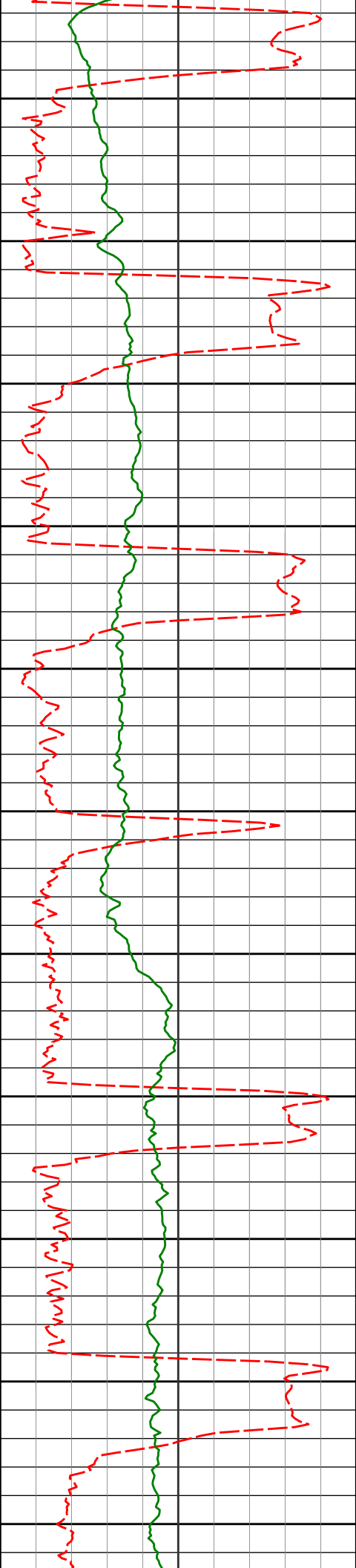
6766'	61.69°	338.03°	6455.71'	448.01'
6800				
6814'	65.33°	342.03°	6477.12'	490.79'
6850				
6861'	68.02°	345.82°	6495.74'	533.93'
6900				
6909'	70.69°	349.41°	6512.67'	578.79'
6950				
6956'	74.08°	351.89°	6526.88'	623.36'
7000				
7004'	77.96°	353.52°	6538.48'	669.50'
7050				
7050'	82.28°	354.70°	6546.37'	714.23'
7080'	84.63°	355.58°	6549.79'	743.57'
7100				
Remark 6	<7" casing set at 7129' MD>			
<Run 300>				
7150				
7200				
7222'	90.74°	359.17°	6555.52'	882.06'
7250				
7300				



7317'	90.80°	359.10°	6554.25'	974.17'
7412'	89.14°	357.79°	6554.30'	1066.56'
7507'	89.91°	358.95°	6555.09'	1158.98'
7601'	90.03°	359.75°	6555.14'	1250.04'
7696'	88.21°	359.57°	6556.60'	1341.93'
7791'	89.26°	359.34°	6558.69'	1433.89'



7900	7886'	89.60°	359.85°	6559.64'	1525.82'
7950					
8000	7981'	89.01°	0.37°	6560.79'	1617.52'
8050					
8100	8076'	89.23°	1.88°	6562.24'	1708.77'
8150					
8200	8171'	90.49°	1.45°	6562.47'	1799.77'
8250	8266'	90.52°	0.11°	6561.63'	1891.18'
8300					
8350	8360'	90.59°	0.72°	6560.72'	1981.79'
8400					



8450

8455'

91.63°

2.51°

6558.88'

2072.79'

8500

8550

8550'

91.33°

1.19°

6556.43'

2163.68'

8600

8650

8645'

90.03°

2.20°

6555.30'

2254.66'

8700

8750

8740'

90.52°

3.22°

6554.84'

2345.14'

8800

8850

8835'

91.02°

1.81°

6553.56'

2435.72'

8900

8950

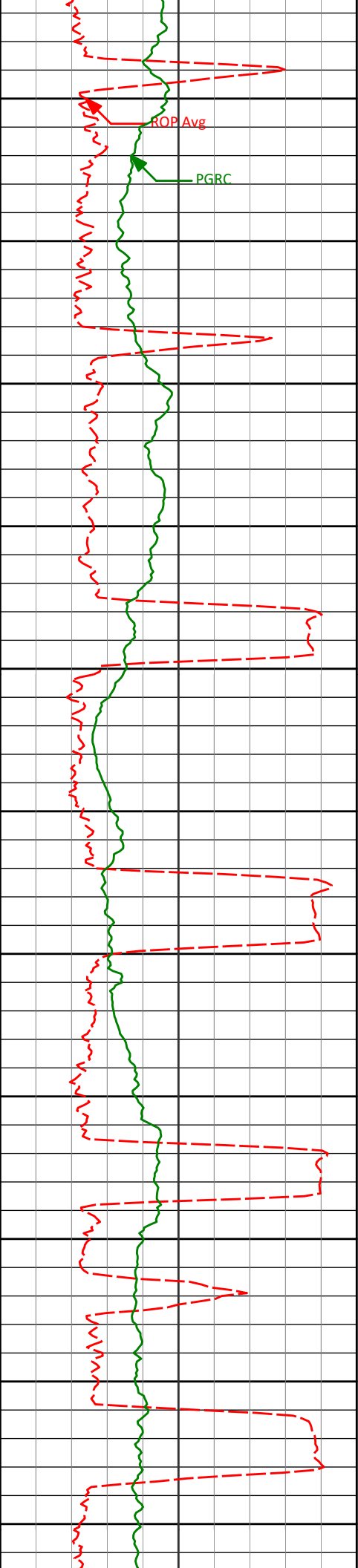
8930'

88.95°

2.63°

6553.59'

2526.45'



9000

9025'

89.29°

2.26°

6555.05'

2617.07'

9050

9100

9120'

91.57°

1.77°

6554.33'

2707.90'

9150

9200

9214'

90.68°

2.27°

6552.49'

2797.75'

9250

9300

9309'

90.22°

0.12°

6551.74'

2888.97'

9350

9400

9404'

88.98°

0.49°

6552.41'

2980.59'

9450

9500

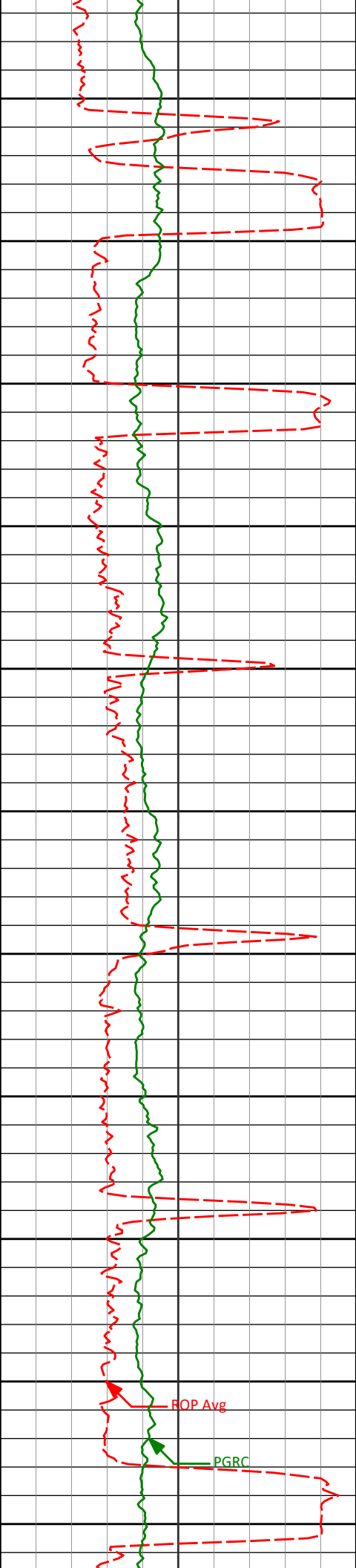
9499'

89.66°

359.79°

6553.53'

3072.28'



9550

9594'

88.80°

0.51°

6554.81'

3163.97'

9600

9650

9689'

90.06°

0.91°

6555.75'

3255.41'

9700

9750

9784'

89.57°

359.84°

6556.06'

3347.00'

9800

9850

9878'

89.54°

359.60°

6556.79'

3437.91'

9900

9950

9973'

89.57°

358.25°

6557.53'

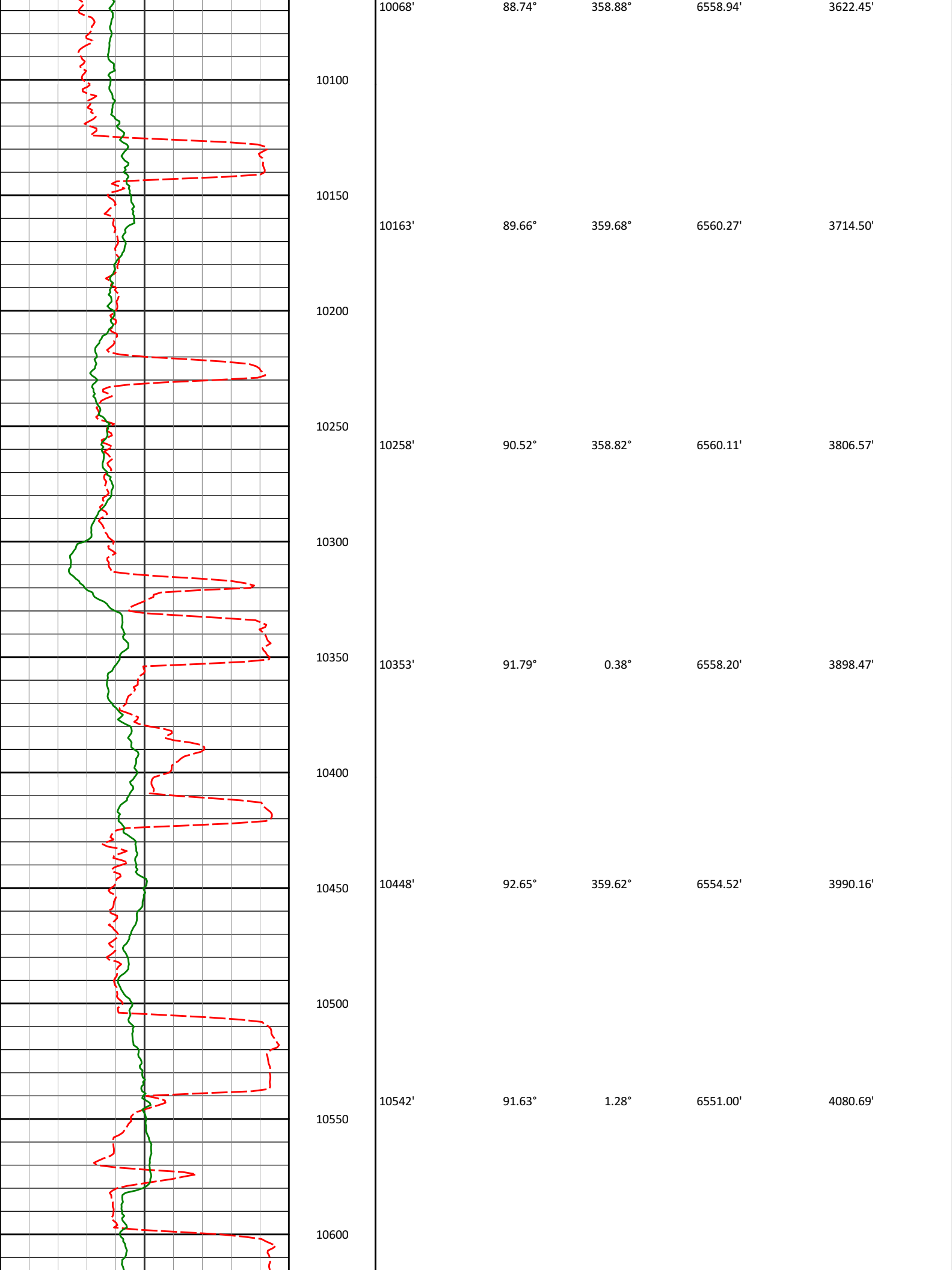
3530.11'

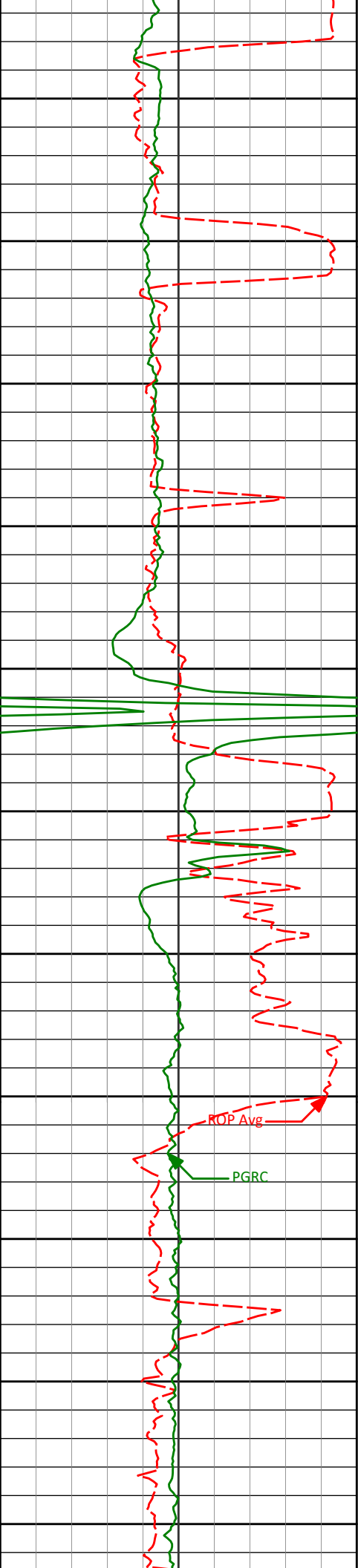
10000

ROP Avg

PGRC

10050





10650

10700

10750

10800

10850

10900

10950

11000

11050

11100

11150

10637'

10732'

10827'

10922'

11017'

11112'

89.85°

89.38°

89.91°

90.52°

89.20°

89.97°

1.60°

1.40°

1.25°

2.65°

2.47°

2.37°

6549.78'

6550.42'

6551.00'

6550.65'

6550.88'

6551.57'

4171.79'

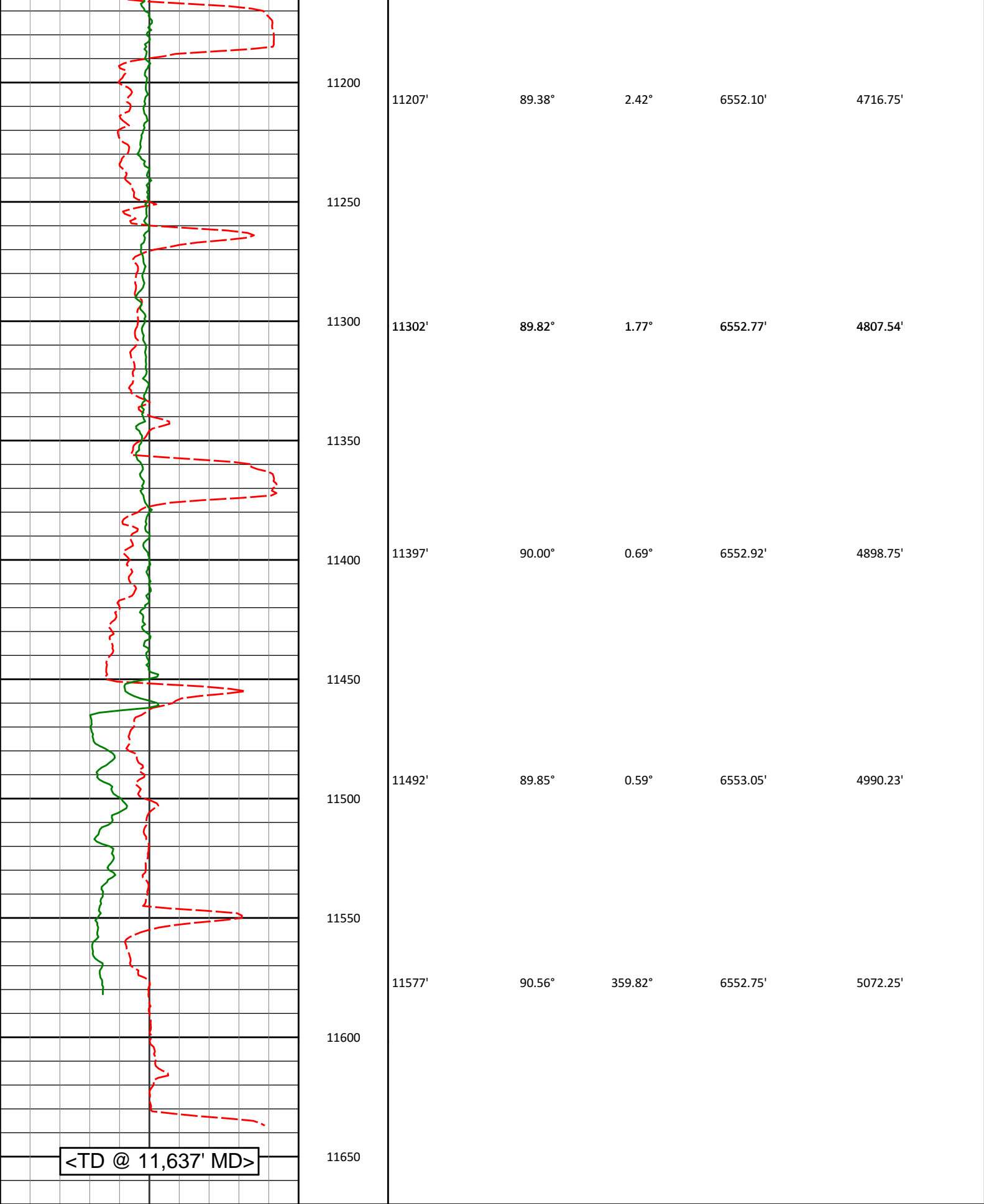
4262.87'

4354.04'

4444.90'

4535.47'

4626.10'



<TD @ 11,637' MD>

Avg Rate of Penetration

ROP Avg

feet per hr

Depth
ft

Depth

Inc.

Azi.

TVD

V.S.

PCG Gamma Ray

PGRC

HALLIBURTON

Sperry Drilling Services

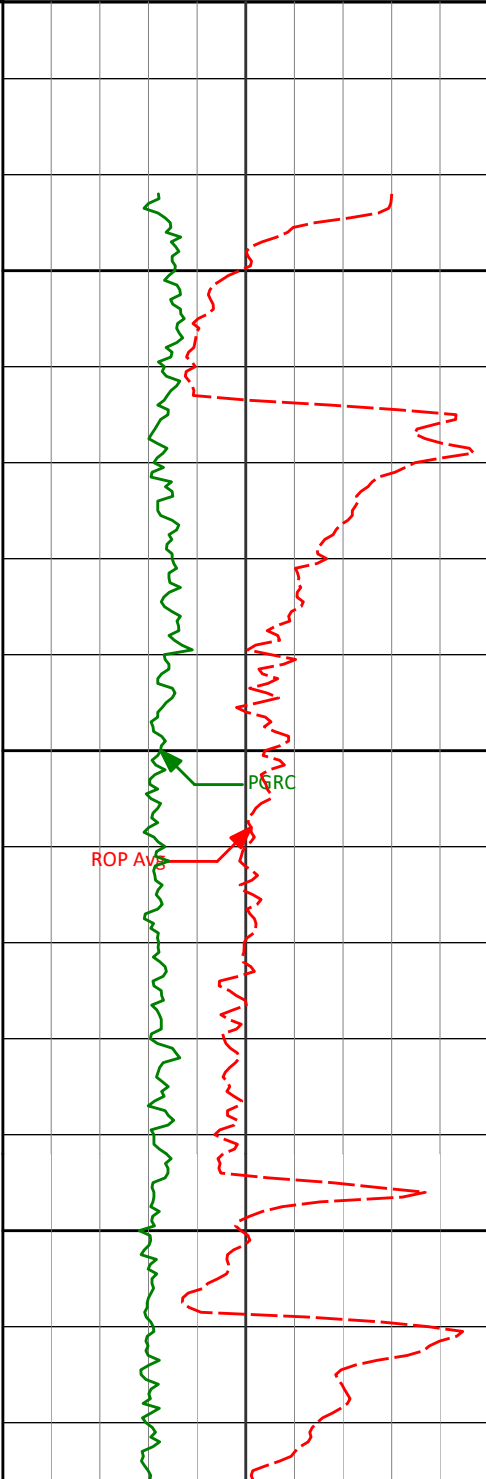
MD Detail Log 1:240

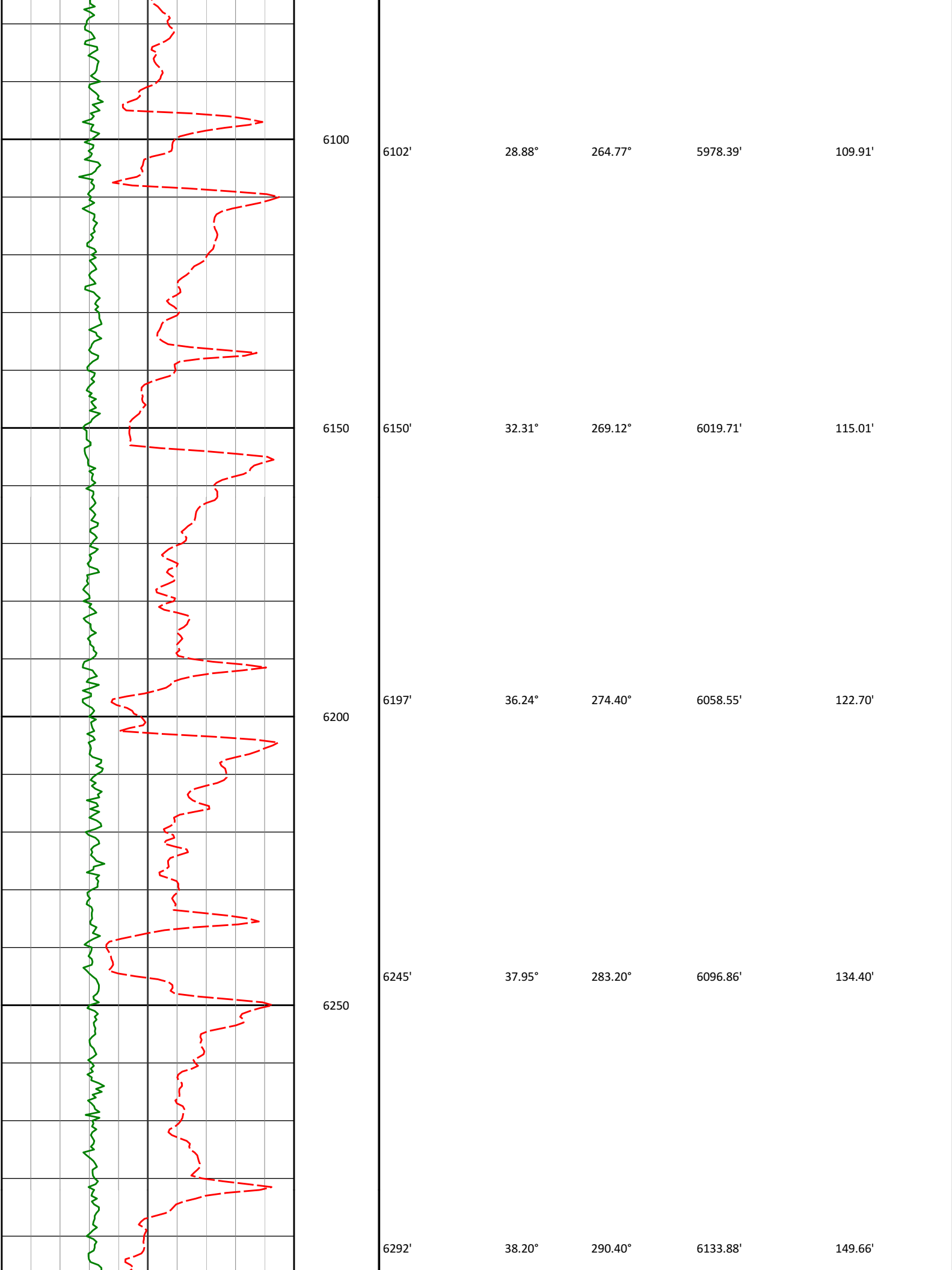
Noble Energy, Inc

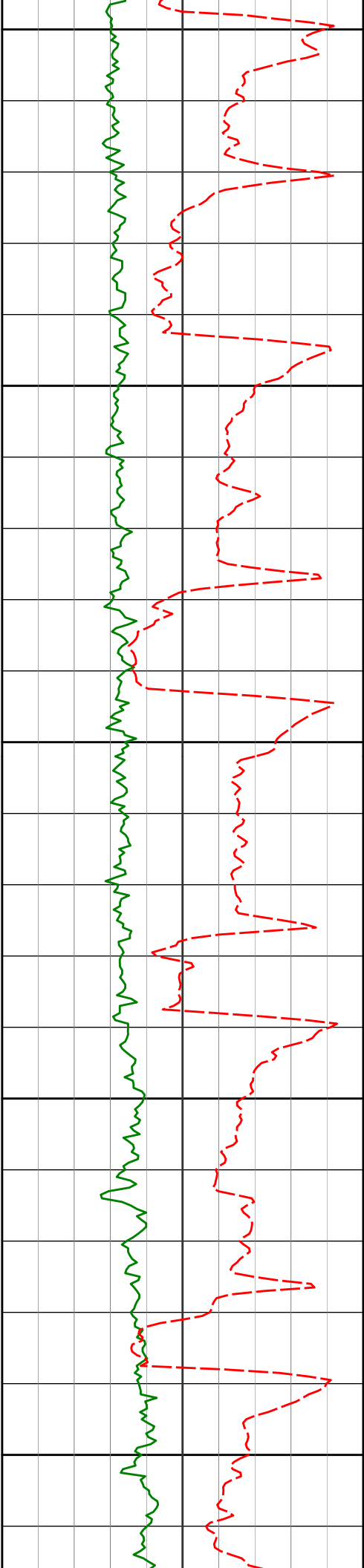
Sater CC18-74-1HN

H&P 315

T4N R63W

PCG Gamma Ray PGRC									
0 300 api									
Avg Rate of Penetration ROP Avg 500 0 feet per hr				Depth ft	Depth	Inc.	Azi.	TVD	V.S.
				<Run 200>					
				5950					
				<KOP>					
				6000					
PGRC				6007'	20.68°	261.57°	5892.44'	103.61'	
ROP Avg									
				6050					
				6055'	25.47°	264.58°	5936.59'	106.30'	





6300

6340'

37.89°

294.99°

6171.69'

167.74'

6350

6387'

38.01°

301.75°

6208.77'

187.57'

6400

6435'

41.45°

307.79°

6245.69'

211.01'

6450

6482'

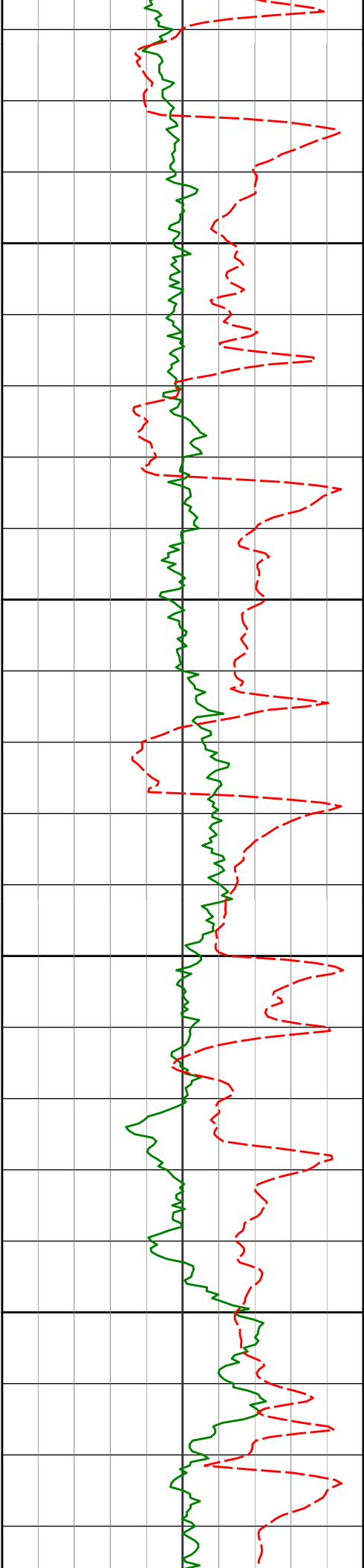
44.55°

313.87°

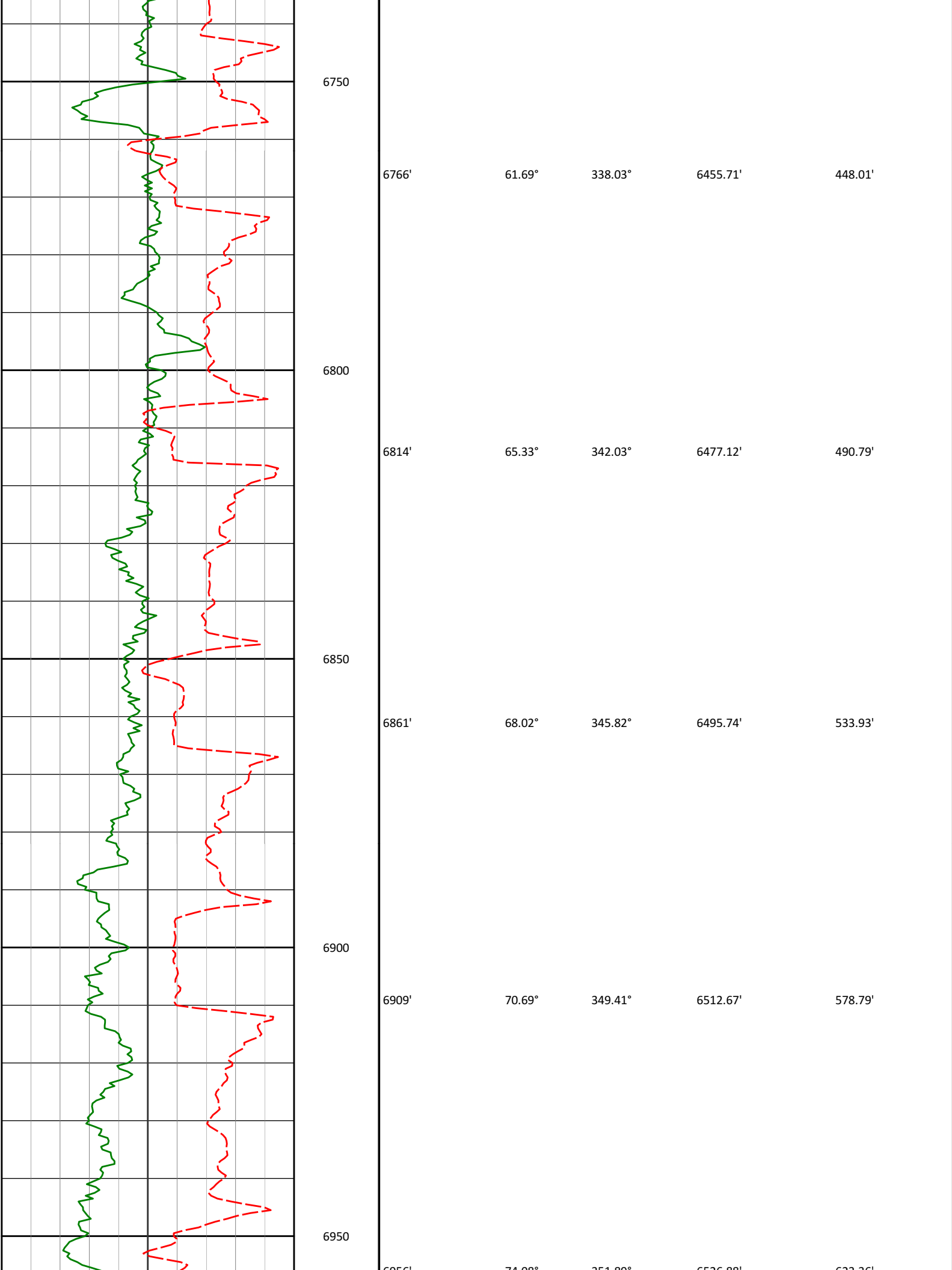
6280.07'

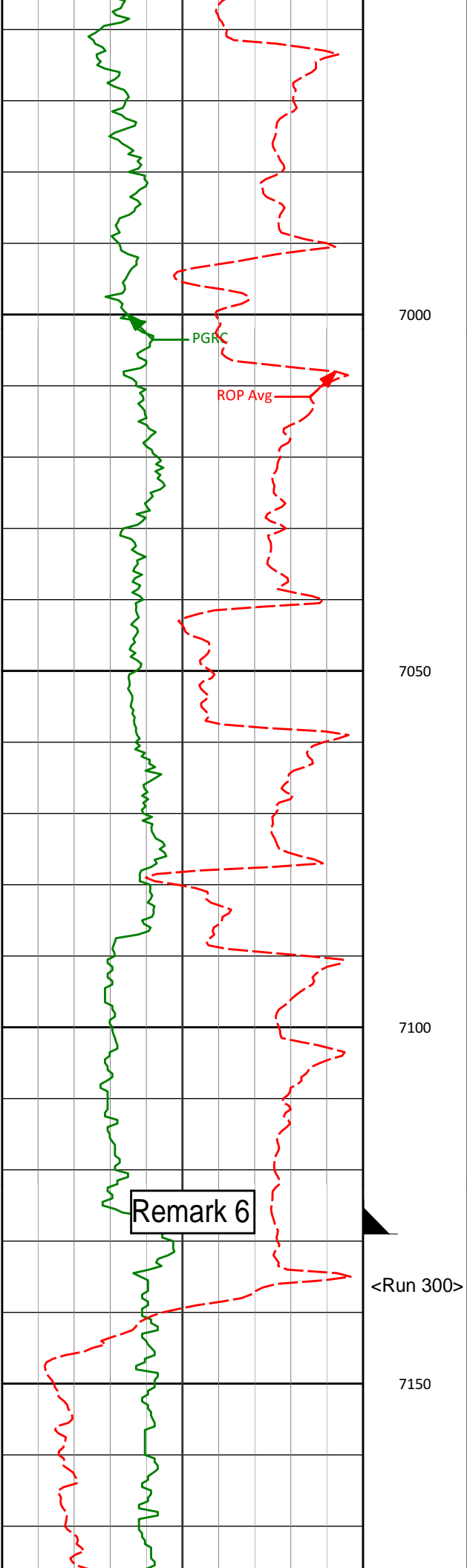
237.53'

6500

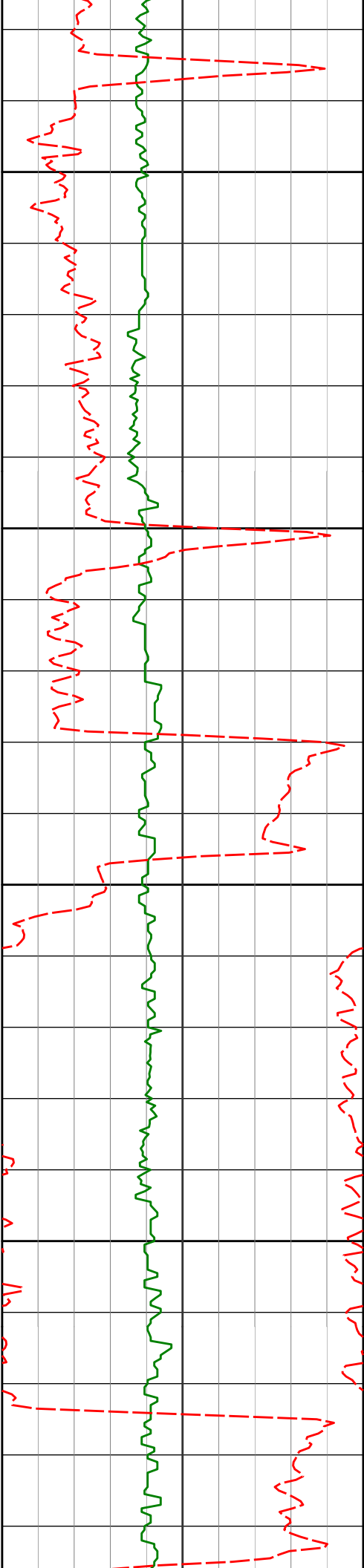


6530'	45.78°	319.78°	6313.93'	267.52'
6576'	47.59°	325.15°	6345.50'	298.42'
6624'	50.74°	328.16°	6376.88'	332.89'
6671'	54.39°	330.85°	6405.45'	368.85'
6719'	58.08°	334.62°	6432.13'	407.83'





6950	74.08	351.89	6526.88	623.36
7000				
7004'	77.96°	353.52°	6538.48'	669.50'
7050				
7050'	82.28°	354.70°	6546.37'	714.23'
7080'	84.63°	355.58°	6549.79'	743.57'
7100				
<7" casing set at 7129' MD>				
<Run 300>				
7150				



7200

7222'

90.74°

359.17°

6555.52'

882.06'

7250

7300

7317'

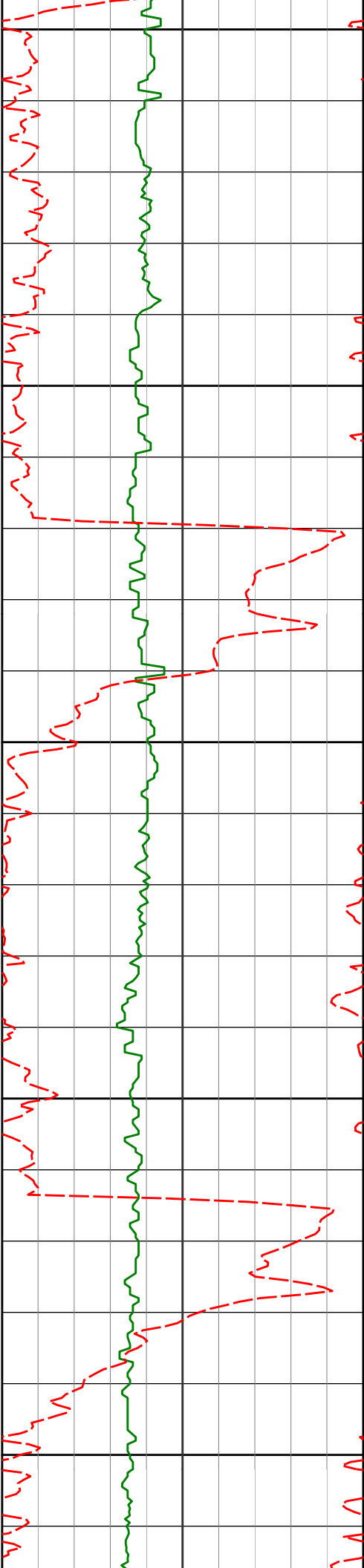
90.80°

359.10°

6554.25'

974.17'

7350



7400

7412'

89.14°

357.79°

6554.30'

1066.56'

7450

7500

7507'

89.91°

358.95°

6555.09'

1158.98'

7550

7600

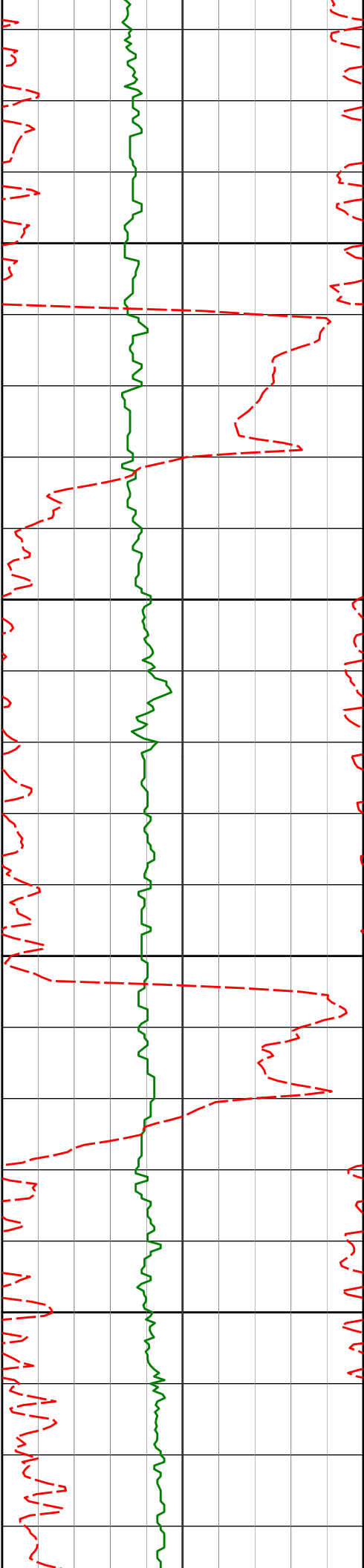
7601'

90.03°

359.75°

6555.14'

1250.04'



7650

7696'

88.21°

359.57°

6556.60'

1341.93'

7700

7750

7791'

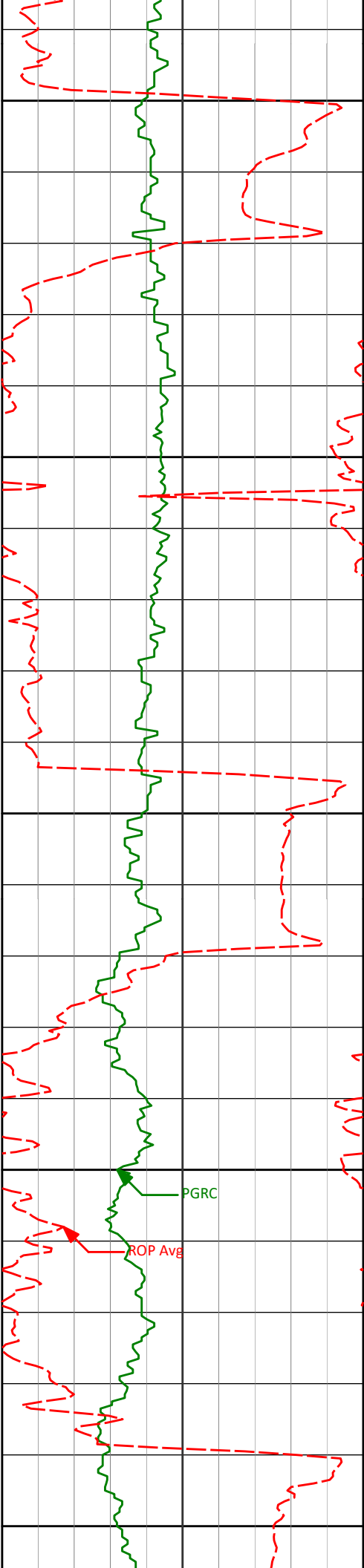
89.26°

359.34°

6558.69'

1433.89'

7800



7850

7886'

89.60°

359.85°

6559.64'

1525.82'

7900

7950

7981'

89.01°

0.37°

6560.79'

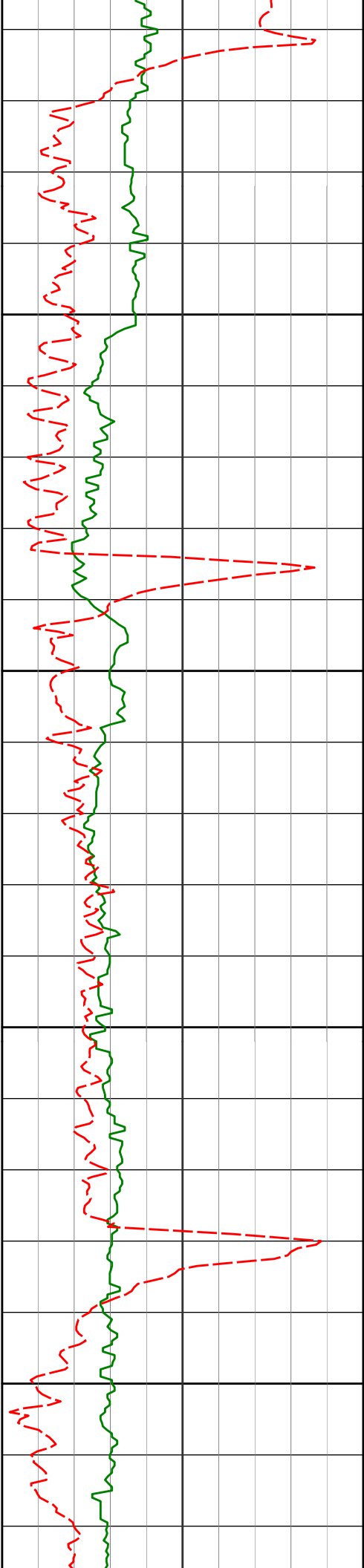
1617.52'

8000

PGRC

ROP Avg

8050



8100

8150

8200

8250

8076'

89.23°

1.88°

6562.24'

1708.77'

8171'

90.49°

1.45°

6562.47'

1799.77'

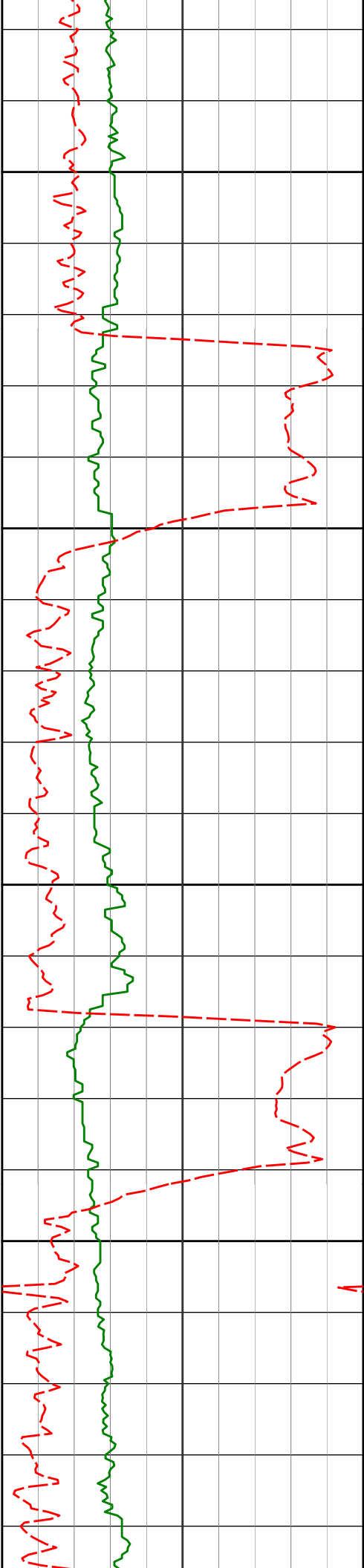
8266'

90.52°

0.11°

6561.63'

1891.18'



8300

8350

8400

8450

8360'

90.59°

0.72°

6560.72'

1981.79'

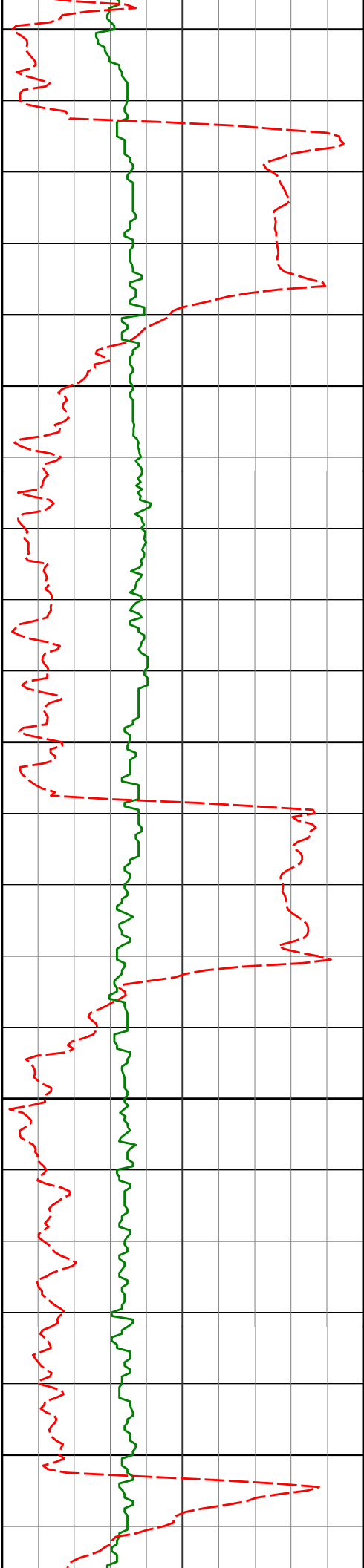
8455'

91.63°

2.51°

6558.88'

2072.79'



8500

8550

8600

8650

8700

8550'

91.33°

1.19°

6556.43'

2163.68'

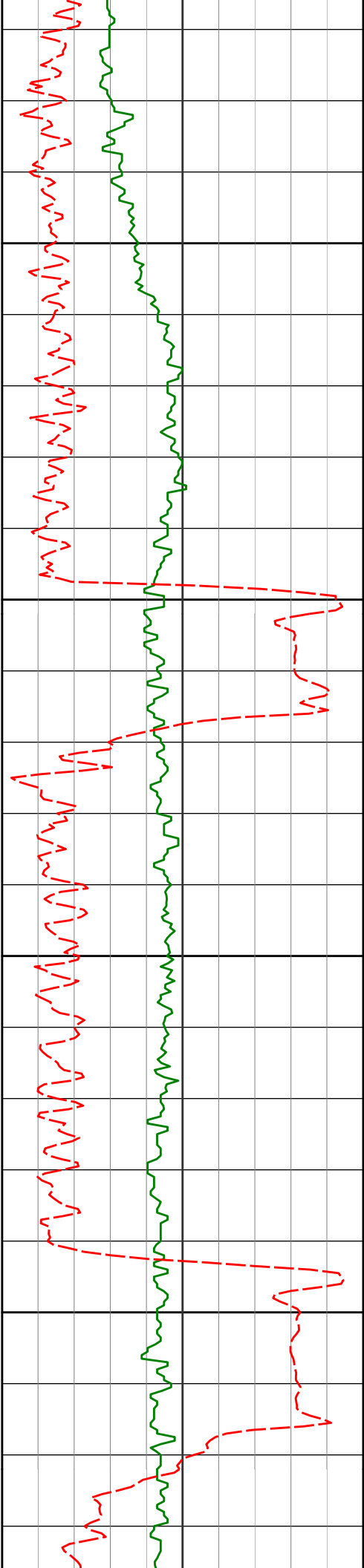
8645'

90.03°

2.20°

6555.30'

2254.66'



8740'

90.52°

3.22°

6554.84'

2345.14'

8750

8800

8835'

91.02°

1.81°

6553.56'

2435.72'

8850

8900

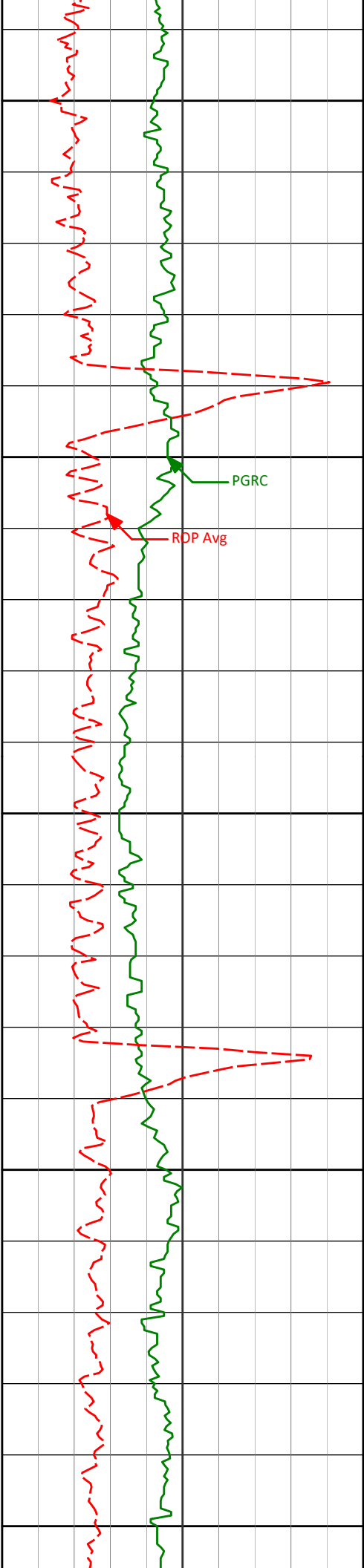
8930'

88.95°

2.63°

6553.59'

2526.45'



8950

9000

9050

9100

9150

RDP Avg

PGRC

9025'

89.29°

2.26°

6555.05'

2617.07'

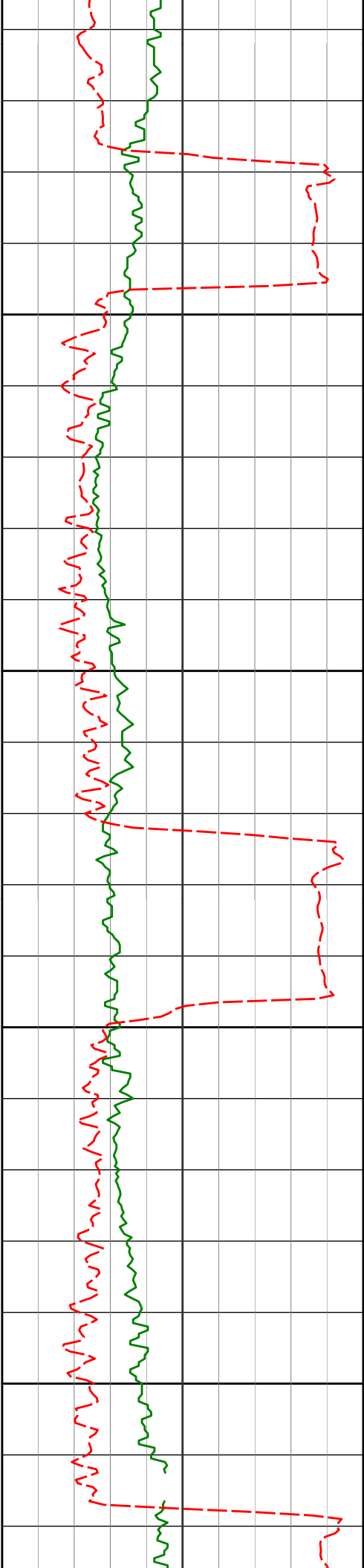
9120'

91.57°

1.77°

6554.33'

2707.90'



9200

9214'

90.68°

2.27°

6552.49'

2797.75'

9250

9300

9309'

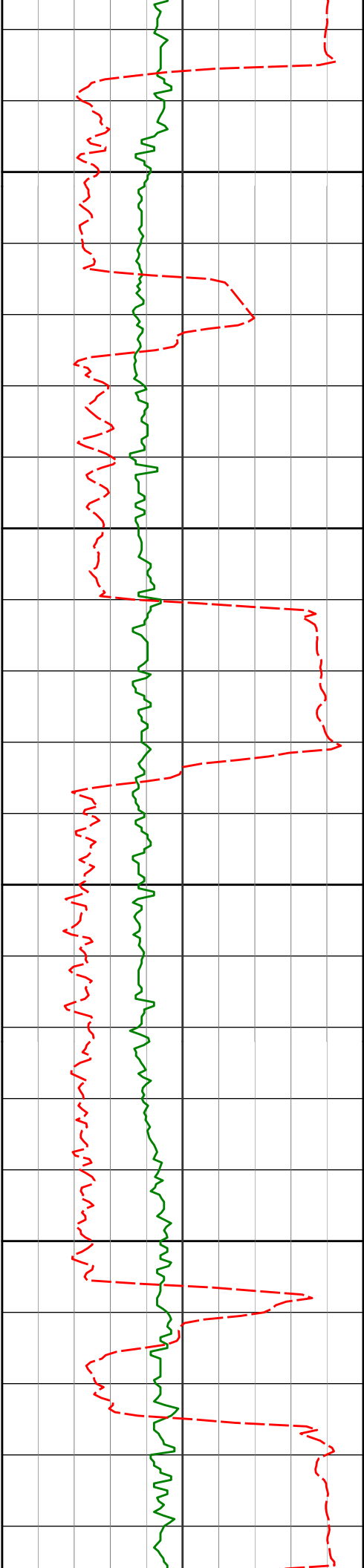
90.22°

0.12°

6551.74'

2888.97'

9350



9400

9404'

88.98°

0.49°

6552.41'

2980.59'

9450

9500

9499'

89.66°

359.79°

6553.53'

3072.28'

9550

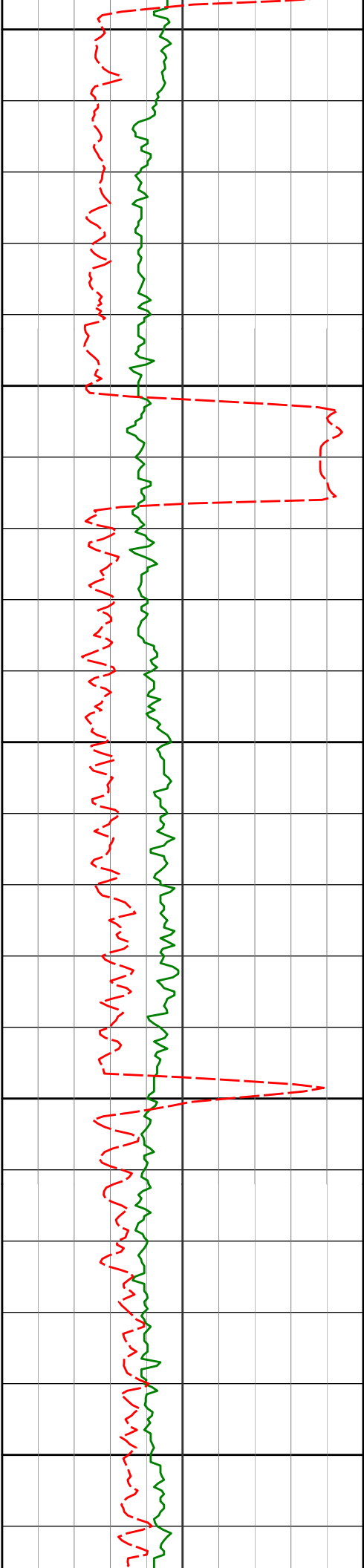
9594'

88.80°

0.51°

6554.81'

3163.97'



9600

9650

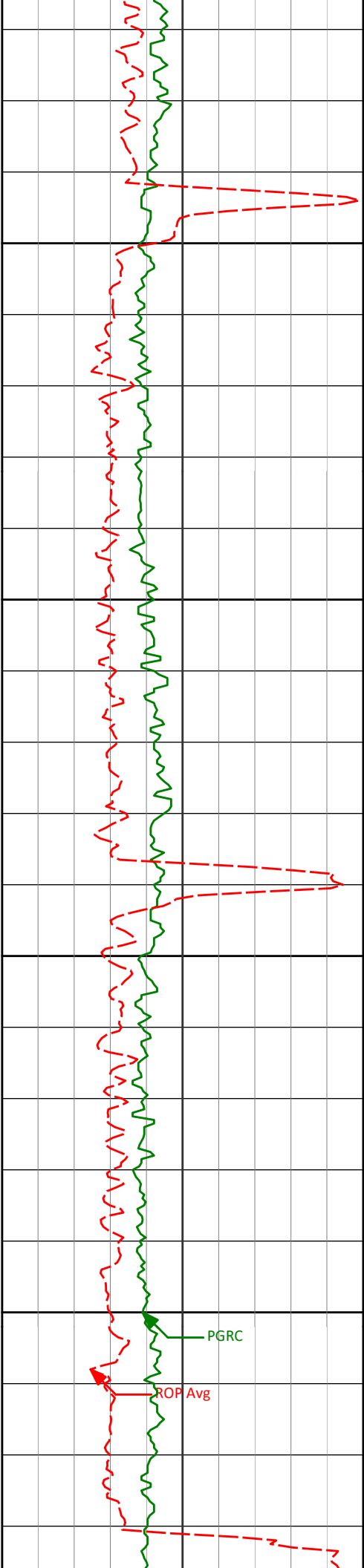
9700

9750

9800

9689'	90.06°	0.91°	6555.75'	3255.41'
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9784'	89.57°	359.84°	6556.06'	3347.00'
-------	--------	---------	----------	----------



9850

9878'

89.54°

359.60°

6556.79'

3437.91'

9900

9950

9973'

89.57°

358.25°

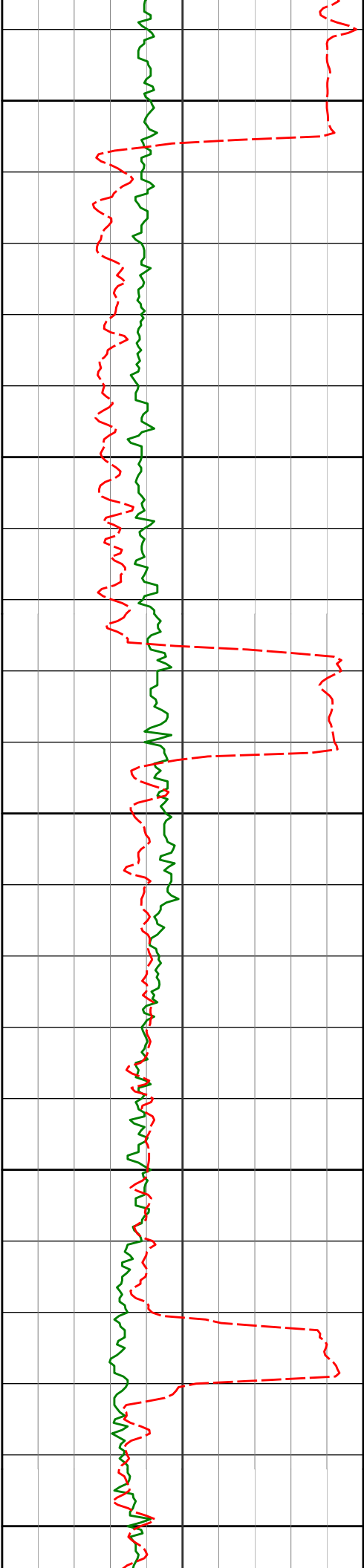
6557.53'

3530.11'

10000

PGRC

ROP Avg



10050

10068'

88.74°

358.88°

6558.94'

3622.45'

10100

10150

10163'

89.66°

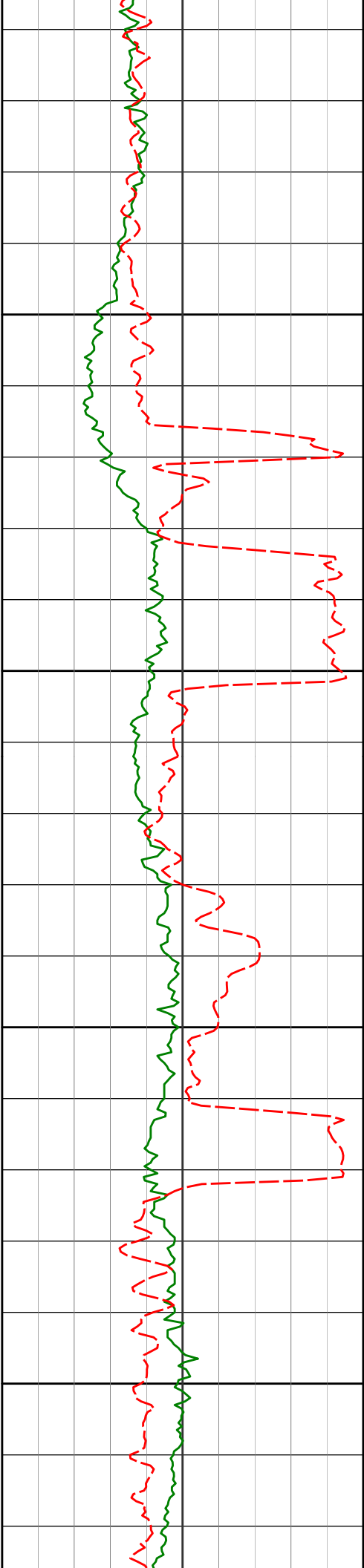
359.68°

6560.27'

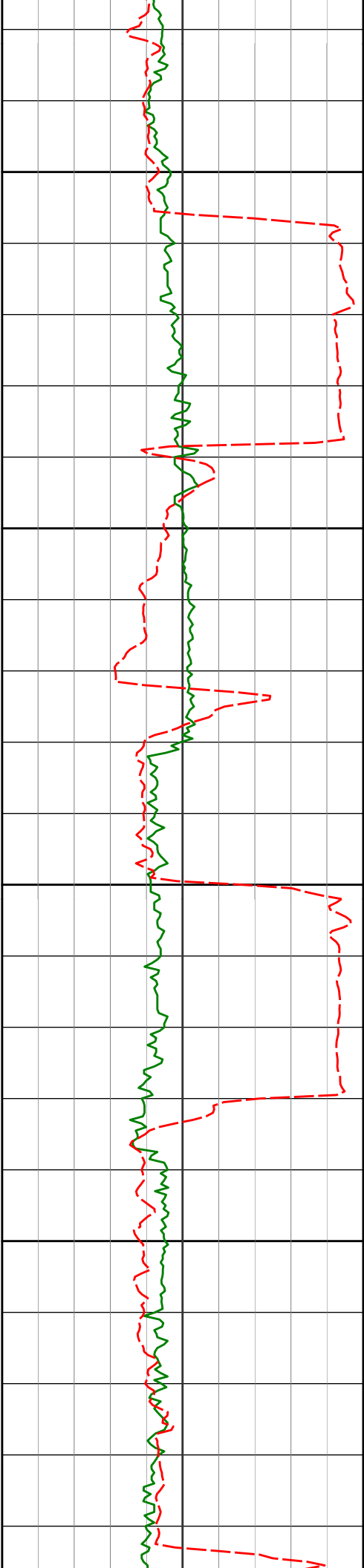
3714.50'

10200

10250



10258'	90.52°	358.82°	6560.11'	3806.57'
10353'	91.79°	0.38°	6558.20'	3898.47'
10448'	92.65°	359.62°	6554.52'	3990.16'



10500

10542'

91.63°

1.28°

6551.00'

4080.69'

10550

10600

10637'

89.85°

1.60°

6549.78'

4171.79'

10650



10732'

89.38°

1.40°

6550.42'

4262.87'

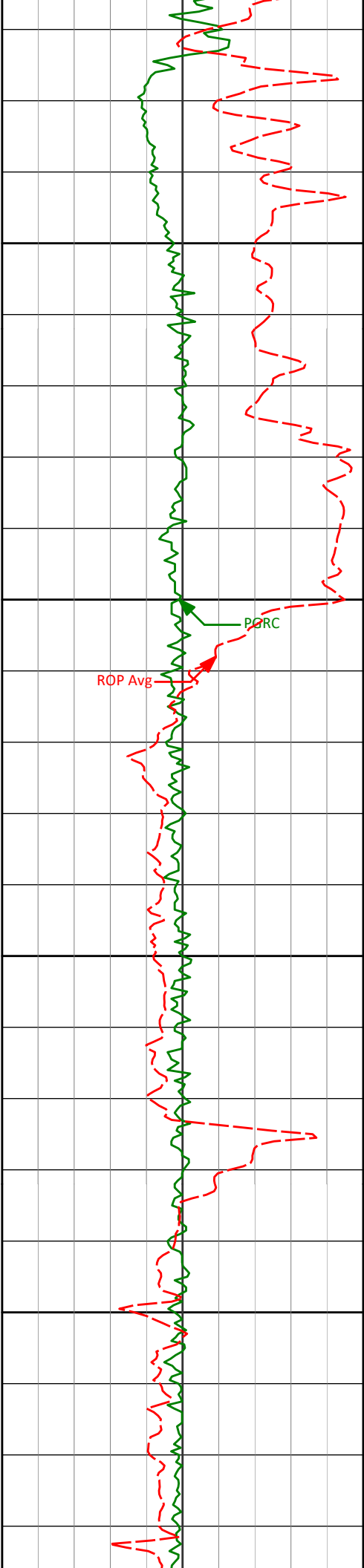
10827'

89.91°

1.25°

6551.00'

4354.04'



10922'

90.52°

2.65°

6550.65'

4444.90'

10950

11000

11017'

89.20°

2.47°

6550.88'

4535.47'

11050

11100

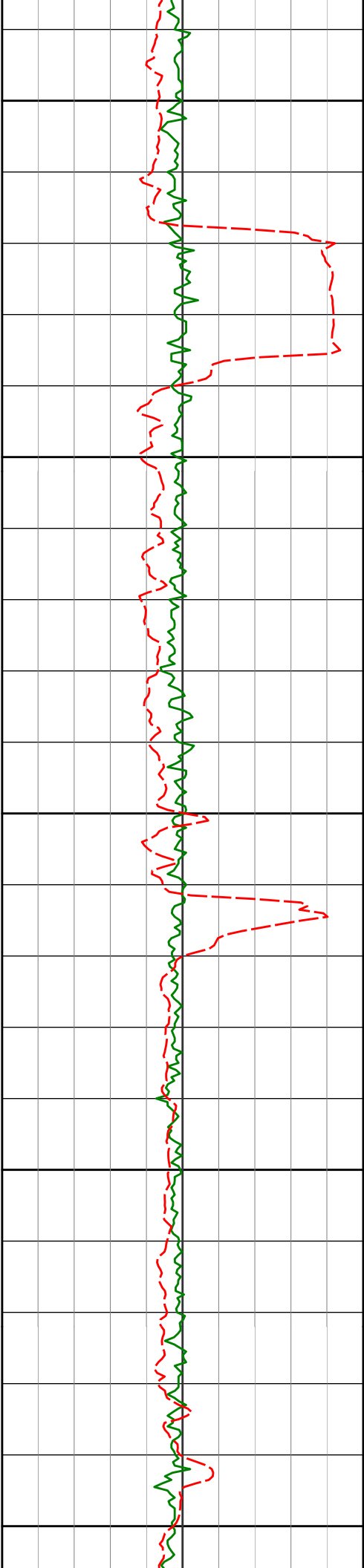
11112'

89.97°

2.37°

6551.57'

4626.10'



11150

11200

11250

11300

11350

11207'

89.38°

2.42°

6552.10'

4716.75'

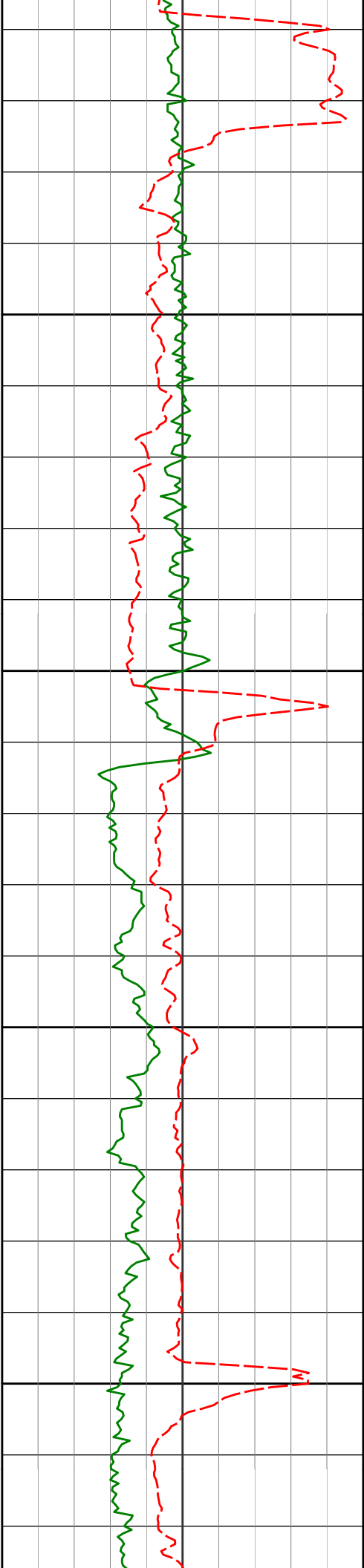
11302'

89.82°

1.77°

6552.77'

4807.54'



11400

11450

11500

11550

11397'

90.00°

0.69°

6552.92'

4898.75'

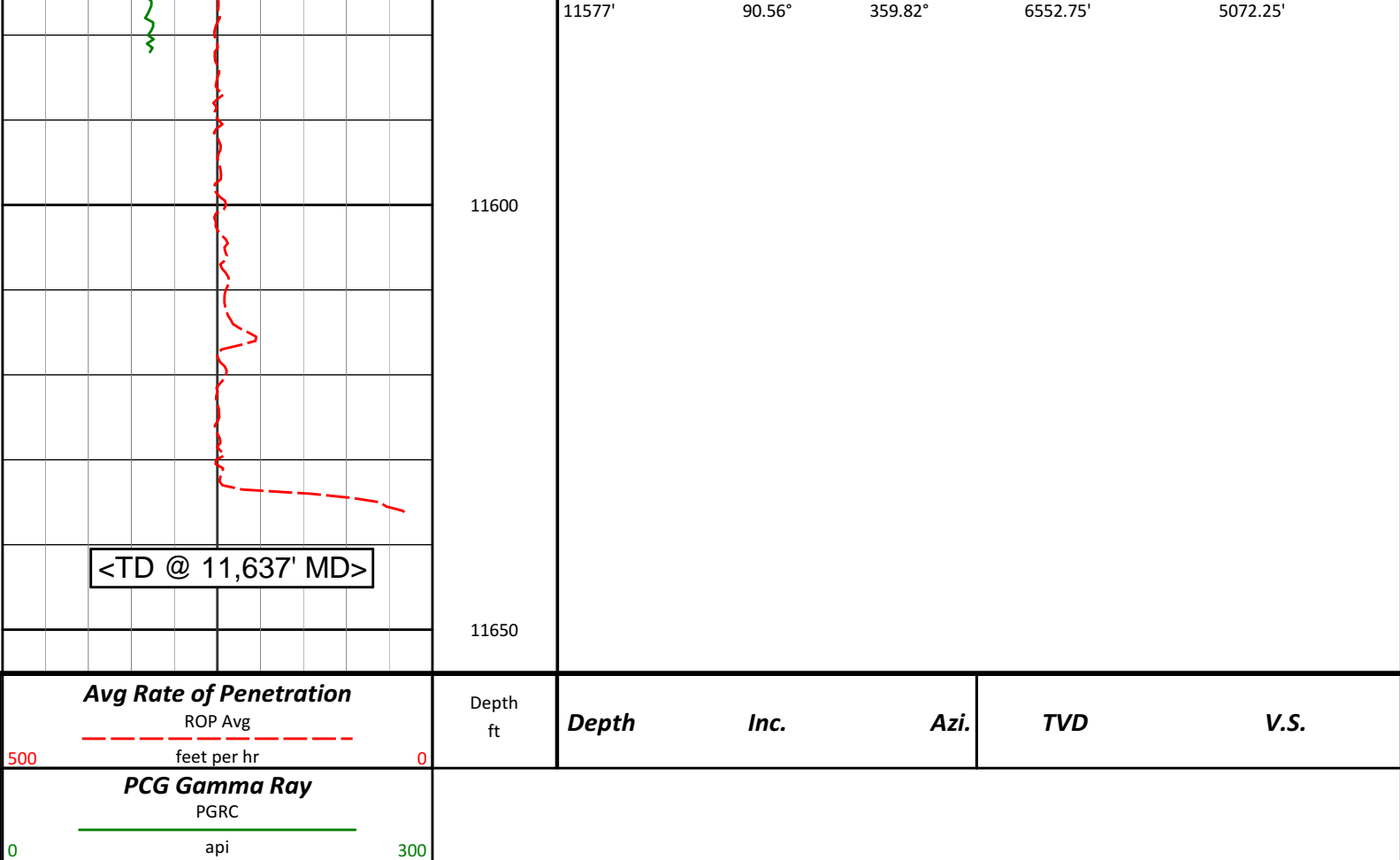
11492'

89.85°

0.59°

6553.05'

4990.23'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Sater CC18-74-1HN
Wattenberg
Weld Colorado
USA
CA-XX-0901120860

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
271.00	0.60	284.70	271.00	0.36 N	1.37 W	0.70	0.22
611.00	0.50	319.50	610.98	1.94 N	4.06 W	2.92	0.10
715.00	0.26	307.30	714.98	2.43 N	4.54 W	3.52	0.24
809.00	0.06	127.05	808.98	2.53 N	4.68 W	3.66	0.35
902.00	0.07	271.12	901.98	2.50 N	4.69 W	3.63	0.13
1088.00	0.11	244.32	1087.98	2.43 N	4.97 W	3.63	0.03
1181.00	0.07	130.91	1180.98	2.35 N	5.01 W	3.57	0.16
1366.00	0.11	336.15	1365.98	2.44 N	4.99 W	3.65	0.10
1553.00	0.13	355.04	1552.98	2.82 N	5.09 W	4.04	0.02
1647.00	0.37	311.27	1646.98	3.13 N	5.33 W	4.40	0.31
1742.00	2.40	276.80	1741.94	3.57 N	7.53 W	5.40	2.21
1837.00	3.75	266.17	1836.81	3.60 N	12.61 W	6.74	1.54
1932.00	5.13	264.42	1931.52	2.98 N	19.93 W	8.04	1.46
2027.00	5.59	257.39	2026.10	1.56 N	28.67 W	8.93	0.84
2121.00	7.74	254.76	2119.46	1.11 S	39.25 W	9.09	2.32
2216.00	8.94	251.26	2213.46	5.16 S	52.42 W	8.59	1.37
2311.00	9.12	259.85	2307.28	8.86 S	66.82 W	8.75	1.43
2406.00	9.88	260.74	2400.98	11.50 S	82.28 W	10.20	0.81
2501.00	10.38	262.15	2494.50	13.98 S	98.80 W	12.08	0.59
2596.00	11.80	261.10	2587.72	16.65 S	116.87 W	14.18	1.51

2398.00	11.60	281.10	2387.72	18.85 S	116.87 W	14.18	1.31
2691.00	14.19	262.86	2680.28	19.60 S	138.03 W	16.81	2.55
2786.00	15.24	262.65	2772.17	22.65 S	161.97 W	20.07	1.10
2881.00	14.26	261.75	2864.03	25.92 S	185.93 W	23.12	1.06
2976.00	13.27	259.07	2956.31	29.67 S	208.21 W	25.27	1.24
3070.00	13.60	258.28	3047.73	33.96 S	229.62 W	26.67	0.41
3166.00	13.82	256.87	3141.00	38.86 S	251.85 W	27.69	0.42
3261.00	12.90	263.65	3233.43	42.61 S	273.44 W	29.66	1.91
3355.00	13.64	268.57	3324.92	44.05 S	294.96 W	33.85	1.44
3450.00	14.83	265.43	3417.00	45.29 S	318.28 W	38.68	1.49
3545.00	13.40	265.98	3509.14	47.03 S	341.37 W	42.99	1.51
3640.00	15.46	263.00	3601.14	49.35 S	364.92 W	46.85	2.30
3735.00	15.96	262.77	3692.59	52.53 S	390.44 W	50.38	0.53
3829.00	15.34	262.49	3783.10	55.78 S	415.59 W	53.75	0.66
3924.00	13.03	261.80	3875.20	58.95 S	438.66 W	56.66	2.44
4019.00	14.32	262.46	3967.50	62.02 S	460.90 W	59.46	1.36
4114.00	13.54	254.88	4059.72	66.46 S	483.28 W	60.97	2.09
4208.00	13.04	255.75	4151.20	71.94 S	504.19 W	61.09	0.57
4303.00	12.75	259.21	4243.81	76.54 S	524.87 W	62.01	0.87
4398.00	13.82	262.81	4336.26	79.93 S	546.43 W	64.32	1.42
4493.00	13.75	263.57	4428.53	82.61 S	568.91 W	67.55	0.20
4588.00	13.02	263.11	4520.95	85.16 S	590.75 W	70.74	0.77
4683.00	14.37	260.05	4613.24	88.48 S	612.99 W	73.30	1.61
4778.00	13.96	260.48	4705.36	92.41 S	635.90 W	75.43	0.44
4873.00	14.43	259.97	4797.45	96.37 S	658.86 W	77.56	0.51
4968.00	15.46	258.52	4889.24	100.95 S	682.93 W	79.37	1.16
5063.00	14.99	258.14	4980.90	105.99 S	707.36 W	80.82	0.51
5158.00	13.76	258.27	5072.93	110.82 S	730.45 W	82.14	1.29
5252.00	13.17	263.53	5164.35	114.30 S	752.04 W	84.37	1.44
5347.00	14.07	259.69	5256.68	117.58 S	774.15 W	86.92	1.34
5442.00	14.74	261.24	5348.69	121.49 S	797.45 W	89.19	0.82
5537.00	15.48	261.59	5440.41	125.18 S	821.93 W	91.96	0.78
5632.00	14.65	259.57	5532.14	129.21 S	846.28 W	94.38	1.03
5727.00	15.19	257.99	5623.94	133.97 S	870.27 W	95.99	0.71
5821.00	14.98	259.19	5714.70	138.82 S	894.25 W	97.52	0.40
5885.00	15.37	262.00	5776.47	141.55 S	910.78 W	99.16	1.30
6007.00	20.68	261.57	5892.44	146.96 S	948.13 W	103.61	4.35
6055.00	25.47	264.58	5936.59	149.18 S	966.80 W	106.30	10.27
6102.00	28.88	264.77	5978.39	151.17 S	988.17 W	109.91	7.25
6150.00	32.31	269.12	6019.71	152.43 S	1012.55 W	115.01	8.51
6197.00	36.24	274.40	6058.55	151.55 S	1038.98 W	122.70	10.49
6245.00	37.95	283.20	6096.86	147.09 S	1067.52 W	134.40	11.61
6292.00	38.20	290.40	6133.88	138.72 S	1095.22 W	149.66	9.46
6340.00	37.89	294.99	6171.69	127.32 S	1122.50 W	167.74	5.92
6387.00	38.01	301.75	6208.77	113.60 S	1147.90 W	187.57	8.84
6435.00	41.45	307.79	6245.69	96.07 S	1173.04 W	211.01	10.77
6482.00	44.55	313.87	6280.07	75.10 S	1197.23 W	237.53	11.00
6530.00	45.78	319.78	6313.93	50.29 S	1220.49 W	267.52	9.10
6576.00	47.59	325.15	6345.50	23.75 S	1240.85 W	298.42	9.37
6624.00	50.74	328.16	6376.88	6.59 N	1260.78 W	332.89	8.09
6671.00	54.39	330.85	6405.45	38.74 N	1279.70 W	368.85	8.99
6719.00	58.08	334.62	6432.13	74.21 N	1297.94 W	407.83	10.09
6766.00	61.69	338.03	6455.71	111.44 N	1314.25 W	448.01	9.91
6814.00	65.33	342.03	6477.12	151.81 N	1328.89 W	490.79	10.64
6861.00	68.02	345.82	6495.74	193.27 N	1340.82 W	533.93	9.35
6909.00	70.69	349.41	6512.67	237.13 N	1350.44 W	578.79	8.95
6956.00	74.08	351.89	6526.88	281.32 N	1357.71 W	623.36	8.80
7004.00	77.96	353.52	6538.48	327.51 N	1363.62 W	669.50	8.71
7050.00	82.28	354.70	6546.37	372.58 N	1368.26 W	714.23	9.73
7080.00	84.63	355.58	6549.79	402.28 N	1370.79 W	743.57	8.37
7222.00	90.74	359.17	6555.52	543.92 N	1377.28 W	882.06	4.99
7317.00	90.80	359.10	6554.25	638.90 N	1378.71 W	974.17	0.10
7412.00	89.14	357.79	6554.30	733.86 N	1381.29 W	1066.56	2.23
7507.00	89.91	358.95	6555.09	828.82 N	1384.00 W	1158.98	1.47
7601.00	90.03	359.75	6555.14	922.81 N	1385.06 W	1250.04	0.86
7696.00	88.21	359.57	6556.60	1017.79 N	1385.63 W	1341.93	1.92
7791.00	89.26	359.34	6558.69	1112.76 N	1386.53 W	1433.89	1.13
7886.00	89.60	359.85	6559.64	1207.76 N	1387.20 W	1525.82	0.64
7981.00	89.01	0.37	6560.79	1302.75 N	1387.02 W	1617.52	0.83
8076.00	89.23	1.88	6562.24	1397.72 N	1385.15 W	1708.77	1.60
8171.00	90.49	1.45	6562.47	1492.67 N	1382.40 W	1799.77	1.40
8266.00	90.52	0.11	6561.63	1587.66 N	1381.10 W	1891.18	1.41

8360.00	90.59	0.72	6560.72	1681.65 N	1380.42 W	1981.79	0.65
8455.00	91.63	2.51	6558.88	1776.59 N	1377.74 W	2072.79	2.18
8550.00	91.33	1.19	6556.43	1871.51 N	1374.67 W	2163.68	1.43
8645.00	90.03	2.20	6555.30	1966.46 N	1371.85 W	2254.66	1.73
8740.00	90.52	3.22	6554.84	2061.35 N	1367.35 W	2345.14	1.19
8835.00	91.02	1.81	6553.56	2156.24 N	1363.18 W	2435.72	1.57
8930.00	88.95	2.63	6553.59	2251.17 N	1359.50 W	2526.45	2.34
9025.00	89.29	2.26	6555.05	2346.07 N	1355.45 W	2617.07	0.53
9120.00	91.57	1.77	6554.33	2441.00 N	1352.11 W	2707.90	2.46
9214.00	90.68	2.27	6552.49	2534.92 N	1348.79 W	2797.75	1.09
9309.00	90.22	0.12	6551.74	2629.89 N	1346.81 W	2888.97	2.32
9404.00	88.98	0.49	6552.41	2724.89 N	1346.30 W	2980.59	1.35
9499.00	89.66	359.79	6553.53	2819.88 N	1346.07 W	3072.28	1.03
9594.00	88.80	0.51	6554.81	2914.87 N	1345.82 W	3163.97	1.18
9689.00	90.06	0.91	6555.75	3009.86 N	1344.65 W	3255.41	1.40
9784.00	89.57	359.84	6556.06	3104.85 N	1344.03 W	3347.00	1.25
9878.00	89.54	359.60	6556.79	3198.85 N	1344.49 W	3437.91	0.25
9973.00	89.57	358.25	6557.53	3293.83 N	1346.28 W	3530.11	1.42
10068.00	88.74	358.88	6558.94	3388.78 N	1348.66 W	3622.45	1.10
10163.00	89.66	359.68	6560.27	3483.77 N	1349.86 W	3714.50	1.29
10258.00	90.52	358.82	6560.11	3578.76 N	1351.10 W	3806.57	1.28
10353.00	91.79	0.38	6558.20	3673.73 N	1351.76 W	3898.47	2.11
10448.00	92.65	359.62	6554.52	3768.66 N	1351.76 W	3990.16	1.21
10542.00	91.63	1.28	6551.00	3862.58 N	1351.02 W	4080.69	2.08
10637.00	89.85	1.60	6549.78	3957.54 N	1348.63 W	4171.79	1.91
10732.00	89.38	1.40	6550.42	4052.51 N	1346.15 W	4262.87	0.53
10827.00	89.91	1.25	6551.00	4147.48 N	1343.95 W	4354.04	0.57
10922.00	90.52	2.65	6550.65	4242.42 N	1340.72 W	4444.90	1.61
11017.00	89.20	2.47	6550.88	4337.32 N	1336.49 W	4535.47	1.41
11112.00	89.97	2.37	6551.57	4432.23 N	1332.47 W	4626.10	0.82
11207.00	89.38	2.42	6552.10	4527.15 N	1328.50 W	4716.75	0.62
11302.00	89.82	1.77	6552.77	4622.08 N	1325.02 W	4807.54	0.82
11397.00	90.00	0.69	6552.92	4717.06 N	1322.98 W	4898.75	1.16
11492.00	89.85	0.59	6553.05	4812.05 N	1321.91 W	4990.23	0.19
11577.00	90.56	359.82	6552.75	4897.05 N	1321.61 W	5072.25	1.24
11637.00	90.56	359.82	6552.17	4957.05 N	1321.80 W	5130.25	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 344.99 DEGREES (GRID)
A TOTAL CORRECTION OF 7.70 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11637.00 FEET
IS 5130.25 FEET ALONG 345.07 DEGREES (GRID)**

Surface surveys at 271 ft and 611 ft have had azimuths corrected to grid north, but were not taken by Halliburton.

Last survey is a projection from 11577 ft MD to bit at 11637 ft MD.