



1 : 600 / 1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	100	200	300	400	
Date run completed	25-Jul-15	26-Jul-15	31-Jul-15	02-Aug-15	
Rig Bit Number	2	3	4	5	
Bit Size (in)	8.750	8.750	6.125	6.125	
Tool Nominal OD (in)	6.750	6.750	4.750	4.830	
Log Start Depth (MD, ft)	770.00	6,613.00	7,057.00	15,035.00	
Log End Depth (MD, ft)	6,613.00	7,057.00	15,035.00	16,023.00	
Drill or Wipe	Drill	Drill	Drill	Drill	
Drill/Wipe Start Date and Time	24-Jul-15 01:00	26-Jul-15 01:45	27-Jul-15 14:30	28-Jul-15 17:10	
Drill/Wipe End Date and Time	25-Jul-15 11:30	26-Jul-15 08:30	30-Jul-15 15:30	28-Jul-15 17:50	
Min Inc (deg) @ Depth (MD, ft)	0.23 @ 5,591.00	42.15 @ 6,633.00	86.15 @ 12,870.00	88.40 @ 15,806.00	
Max Inc (deg) @ Depth (MD, ft)	34.05 @ 6,538.00	87.35 @ 7,002.00	92.65 @ 10,903.00	90.77 @ 15,521.00	
Bit TFA(in2) / Bit Type	0.91 / PDC	0.91 / PDC	0.65 / PDC	0.65 / PDC	
Flow Rate (gpm)	561.35	575.00	295.63	596.00	
Max AV (fpm) / CV (fpm) @ MWD	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	
Density (ppg) / Viscosity (spqt)	10.00 / 33.00	10.00 / 37.00	9.53 / 37.00	9.55 / 35.00	
Filtrate CL (ppm)	1,000.00	1,600.00	1,800.00	1,800.00	
pH / Fluid Loss (mptm)	7.90 / 23	8.00 / 7	8.50 / 9	8.50 / 6	
PV (cP) / YP (lbf2)	7 / 5.00	14 / 10.00	14 / 9.00	12 / 6.00	
% Solids / % Sand	1.60 / 1.00	3.60 / 0.10	1.30 / 0.00	1.40 / 0.10	
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	N/A / N/A	2.00 / N/A	
Rm @ Measured Temp (degF)	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	
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	
Max Tool Temp (in F) / S	174.00 / PDM	174.00 / PDM	220.70 / PDM	217.70 / PDM	

Max Tool Temp (degF) / Source	171.20 / PCM	171.20 / PCM	238.70 / PCM	247.78 / PCM	
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	
Lead MWD Engineer	Paul Kock	Paul Kock	Paul Kock	Paul Kock	
Customer Representative	Dave Nielson	Justin Fields	Justin Fields	Justin Field	

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM	PCM	
Software Version	5.93	5.93	5.93	5.93	
Sub Serial Number	11404289	11404289	12187588	12187588	
Insert Serial Number	10997272	10997272	11400868	10997272	
Date and Time Initialized	23-Jul-15 21:17	23-Jul-15 21:17	27-Jul-15 06:25	30-Jul-15 20:45	
Date and Time Read	26-Jul-15 16:50	26-Jul-15 16:40	31-Jul-15 04:01	02-Aug-15 08:35	
ECMB SW Version	N/A	N/A	N/A	N/A	

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC	PCDC	
Distance From Bit (ft)	54.00	55.00	63.00	67.00	
Software Version	6.21	6.21	6.21	6.21	
Sub Serial Number	11404289	11404289	12187588	12187588	
Sonde Serial Number	12177556	12177556	12177556	11833222	
Sensor ID Number	N/A	N/A	N/A	N/A	
Toolface Offset (deg)	27.30	170.90	183.40	330.90	

Gamma Ray Sensor Information

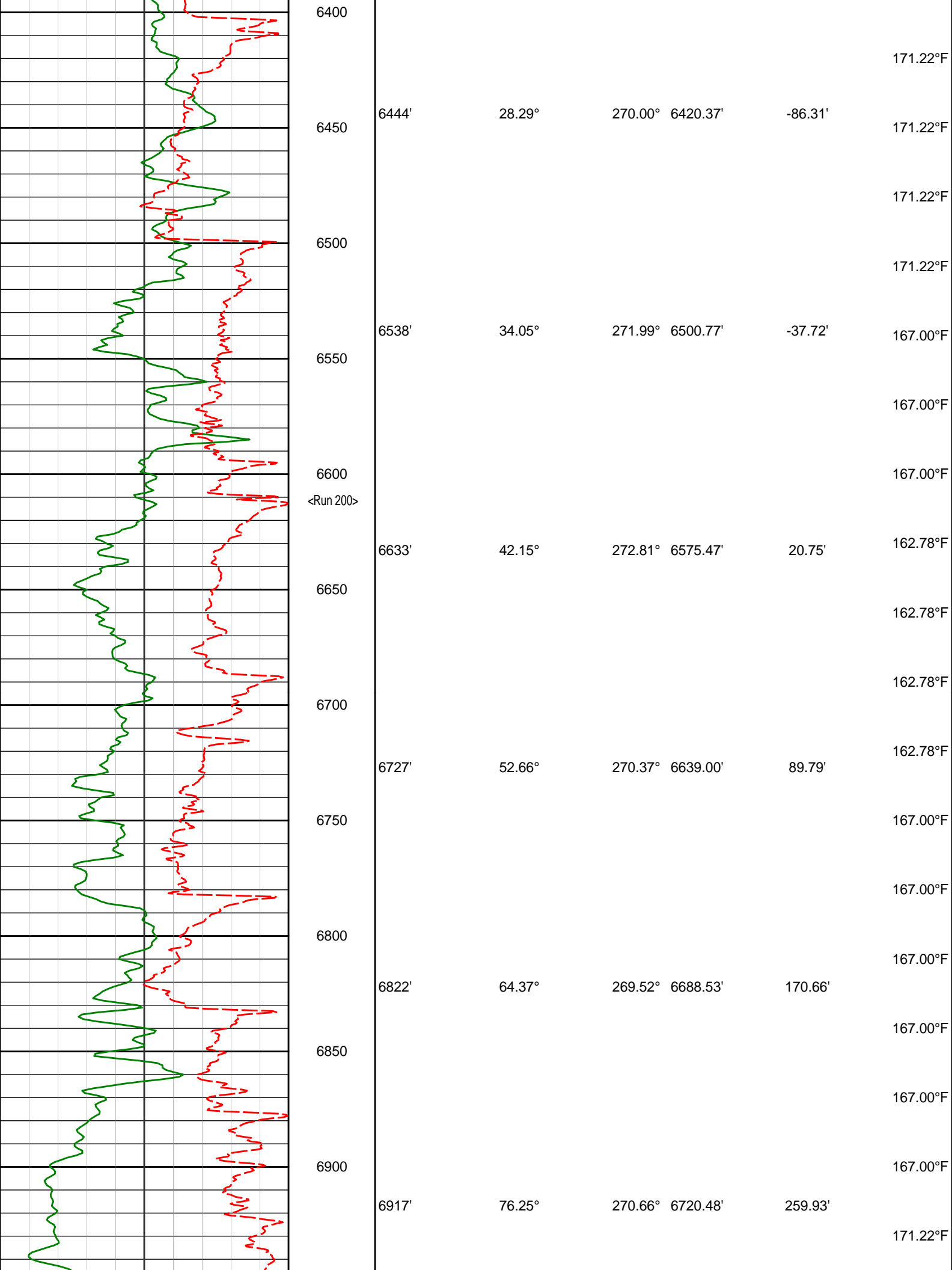
Tool Type	PCG	PCG	PCG	PCG	
Distance From Bit (ft)	42.36	43.22	50.99	54.53	
Recorded Sample Period (sec)	10	10	15	10	
Software Version	8.15	8.15	8.15	8.15	
Sub Serial Number	11404289	11404289	12187588	12187588	
Insert/Sonde Serial Number	11681025	11681025	11681025	11681007	

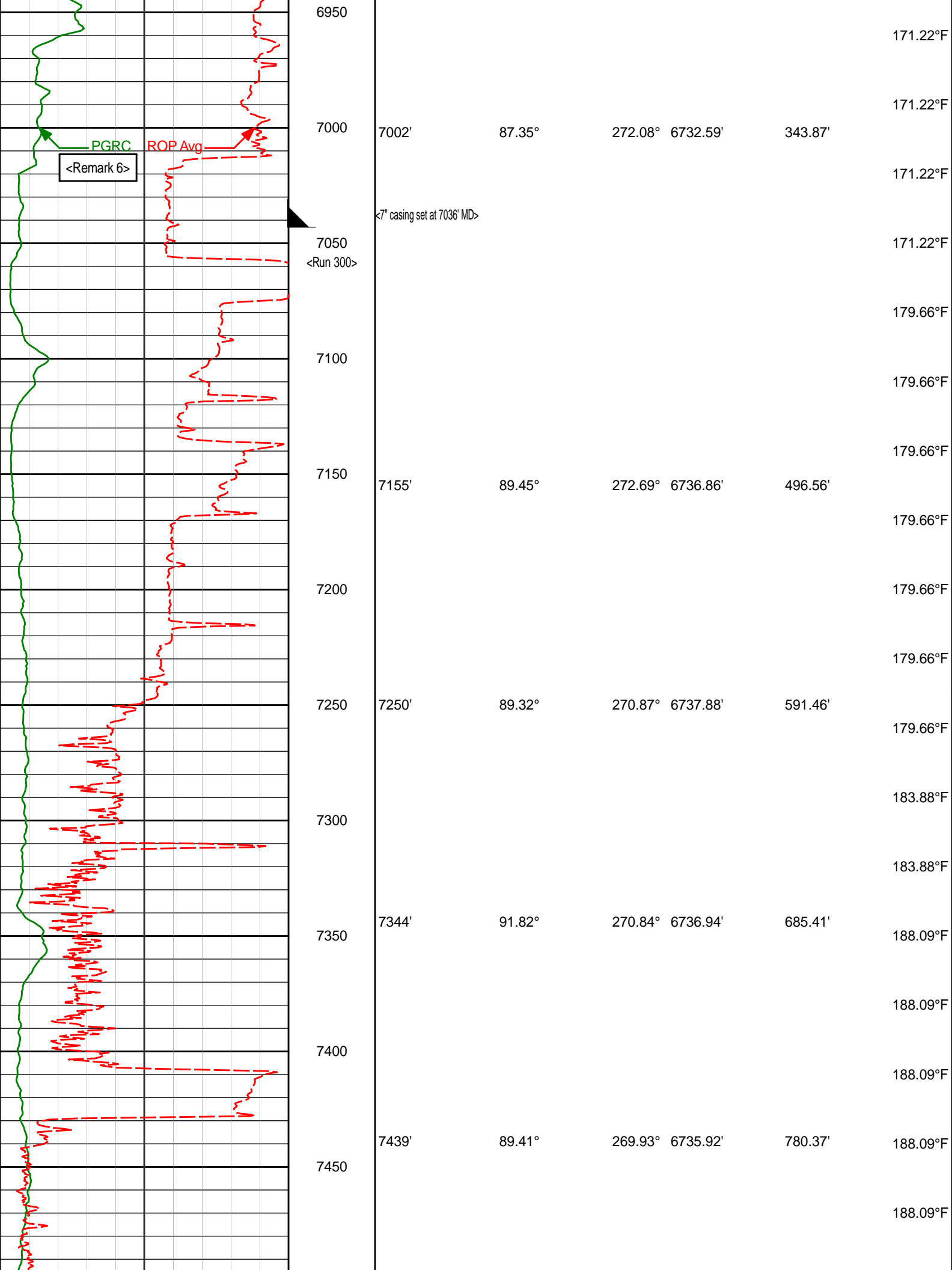
REMARKS

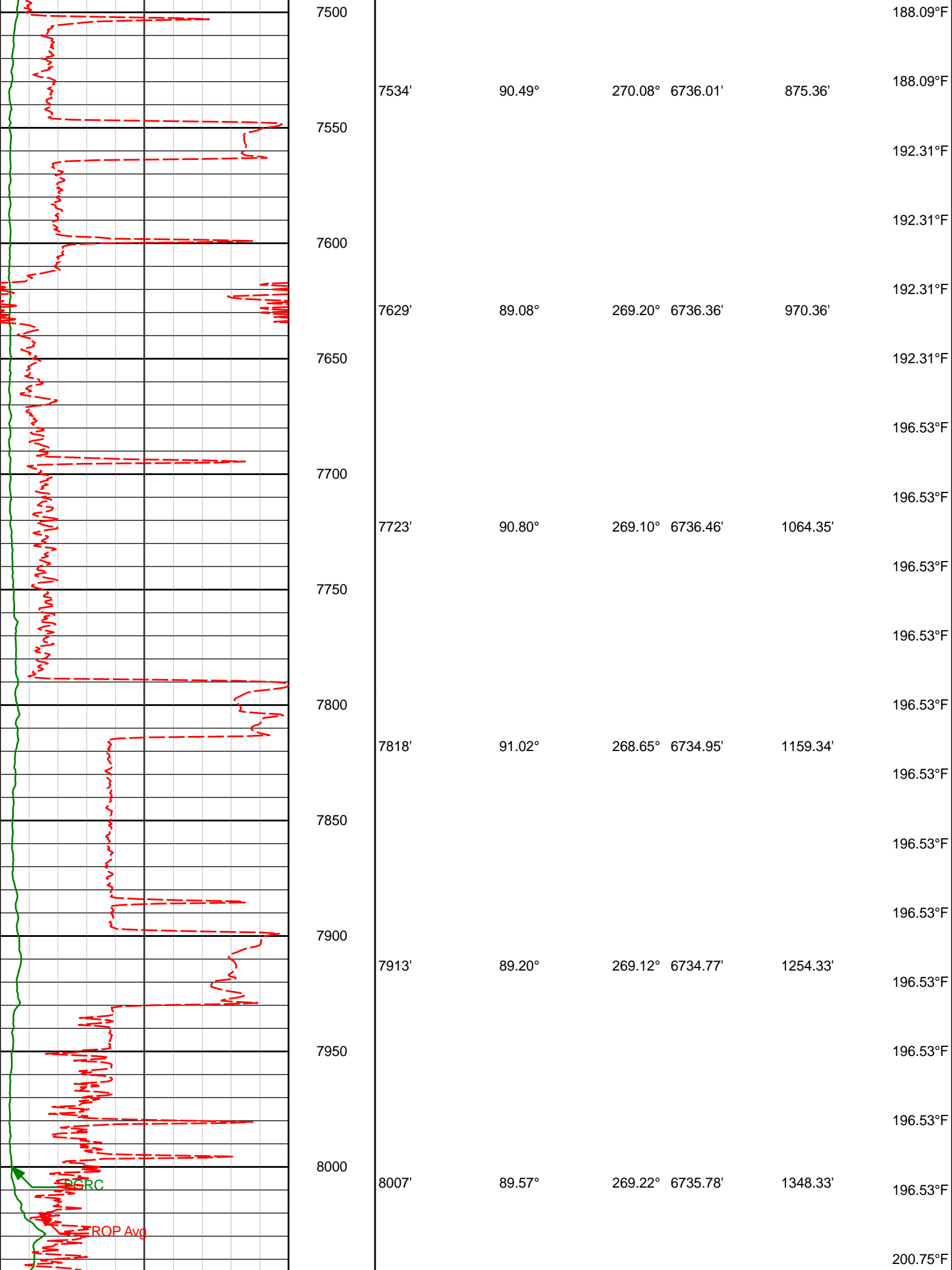
1. All depths are calibrated to the driller's pipe tally and are measured from the rig drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
 - ROPA: Average Rate of Penetration is real time data.
 - PGRC: Smooth Pressure Case Gamma Ray Borehole corrected is recorded data.
4. The following smoothing parameters have been applied to the data:
 - All ROP in logs - 0.5 ft interval, 1.2 ft coercion distance.
 - Gamma in 2" (1:600) logs - 1 ft interval, 3 ft coercion distance.
 - Gamma in 5" (1:240) logs - 0.5 ft interval, 0.6 ft coercion distance.
5. INSITE version 8.3.0
6. Gamma presented inside casing/cement from 7014 ft. MD to 7057 ft. MD.

WARRANTY

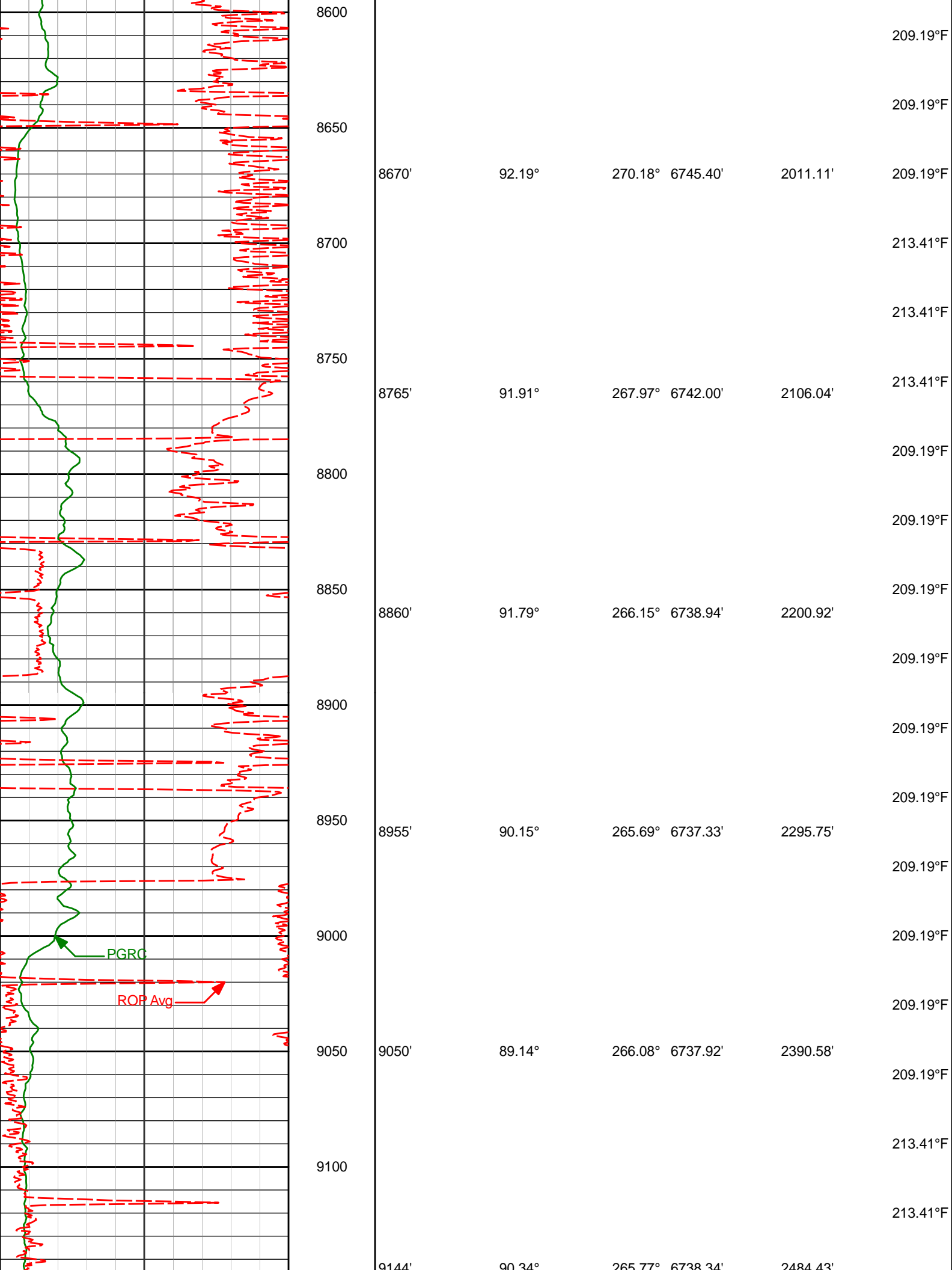
MD Detail 1:600 Scale

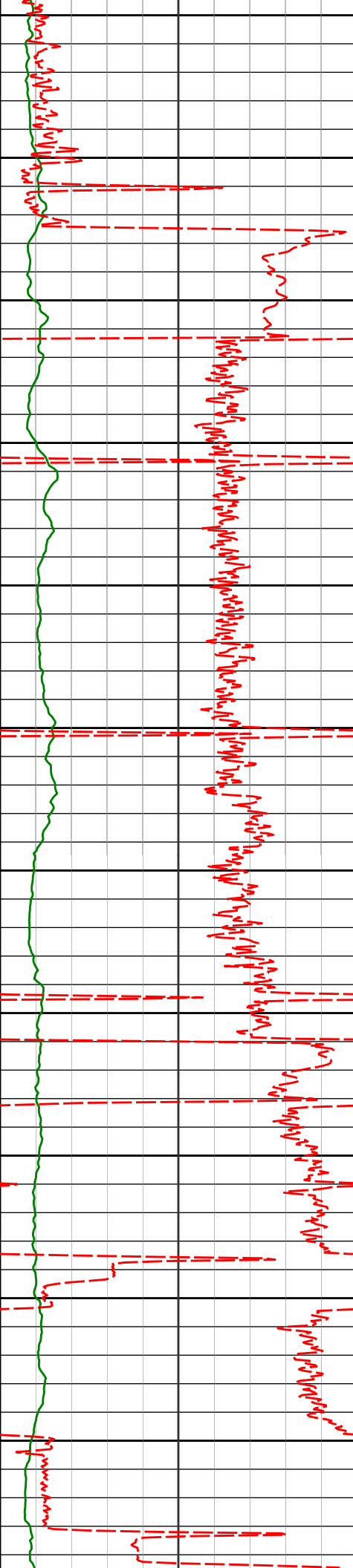




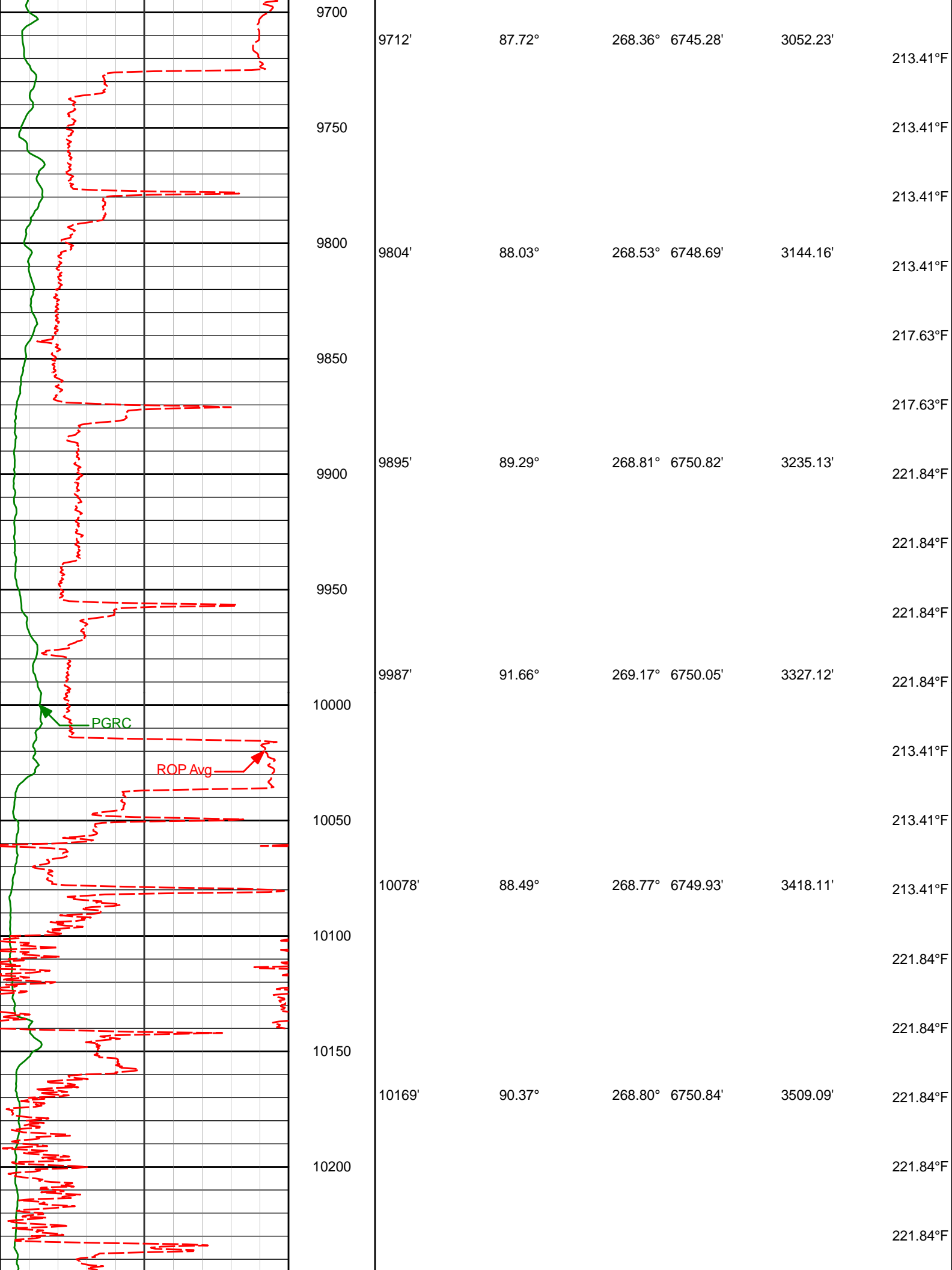


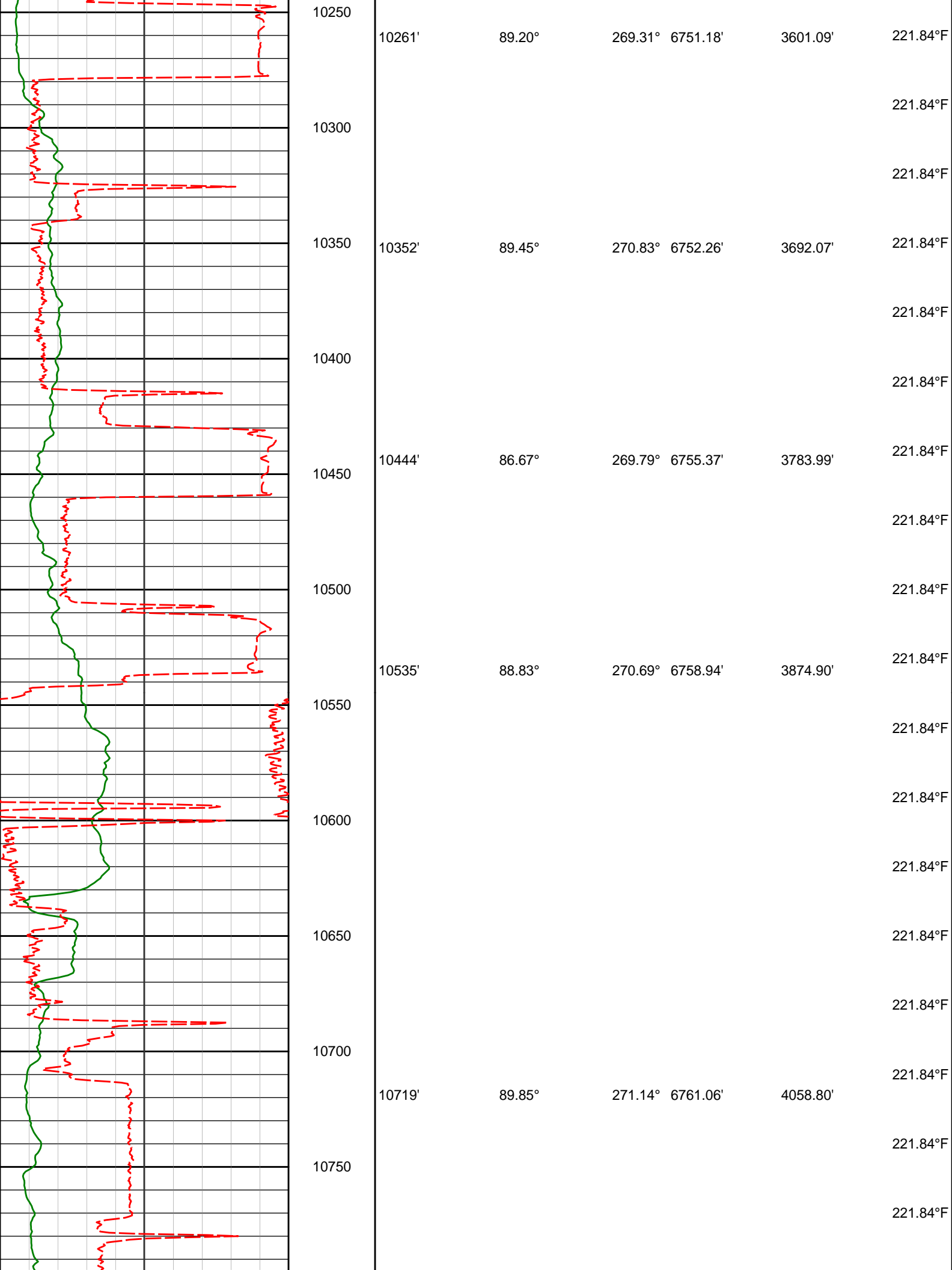


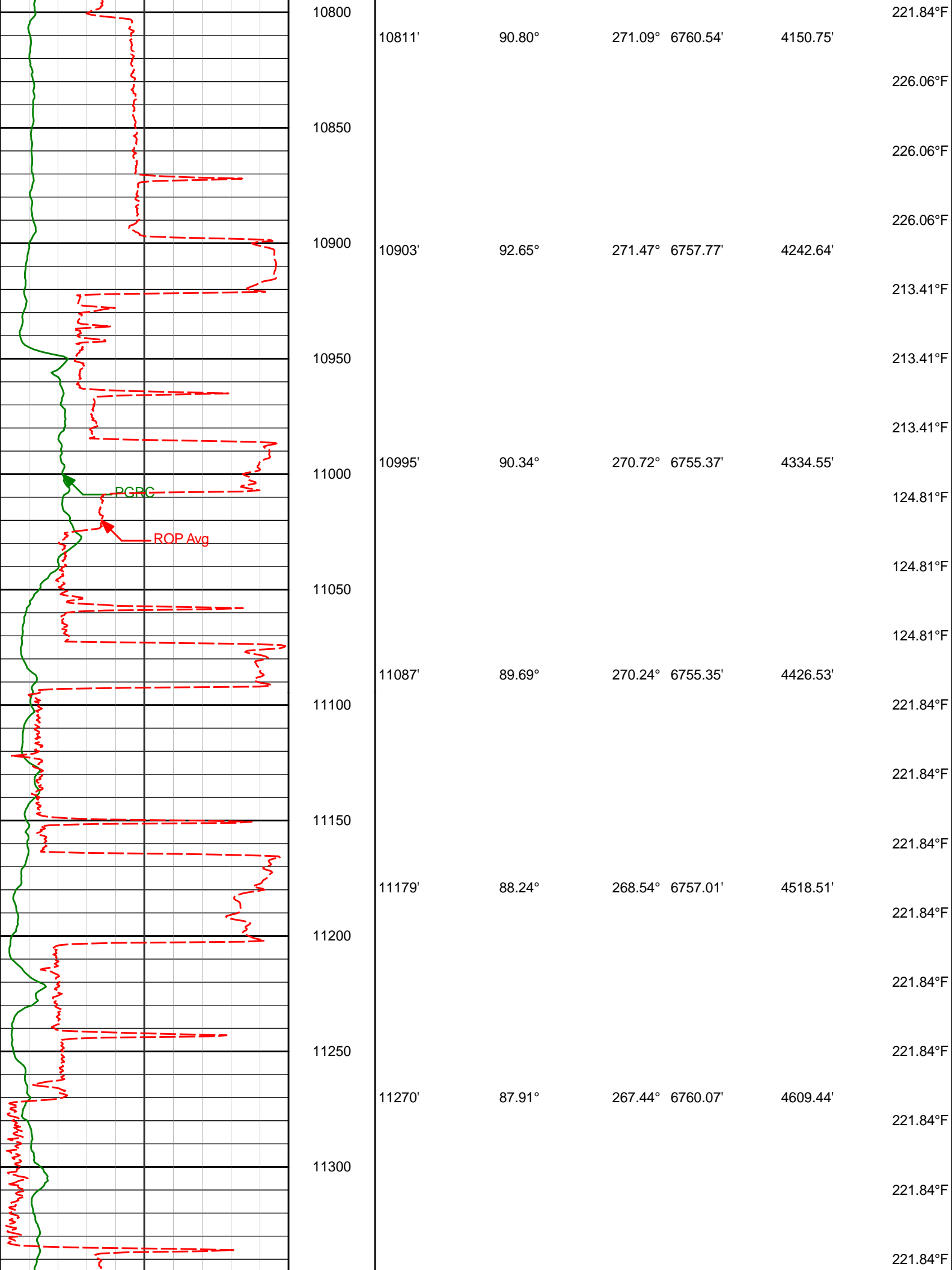


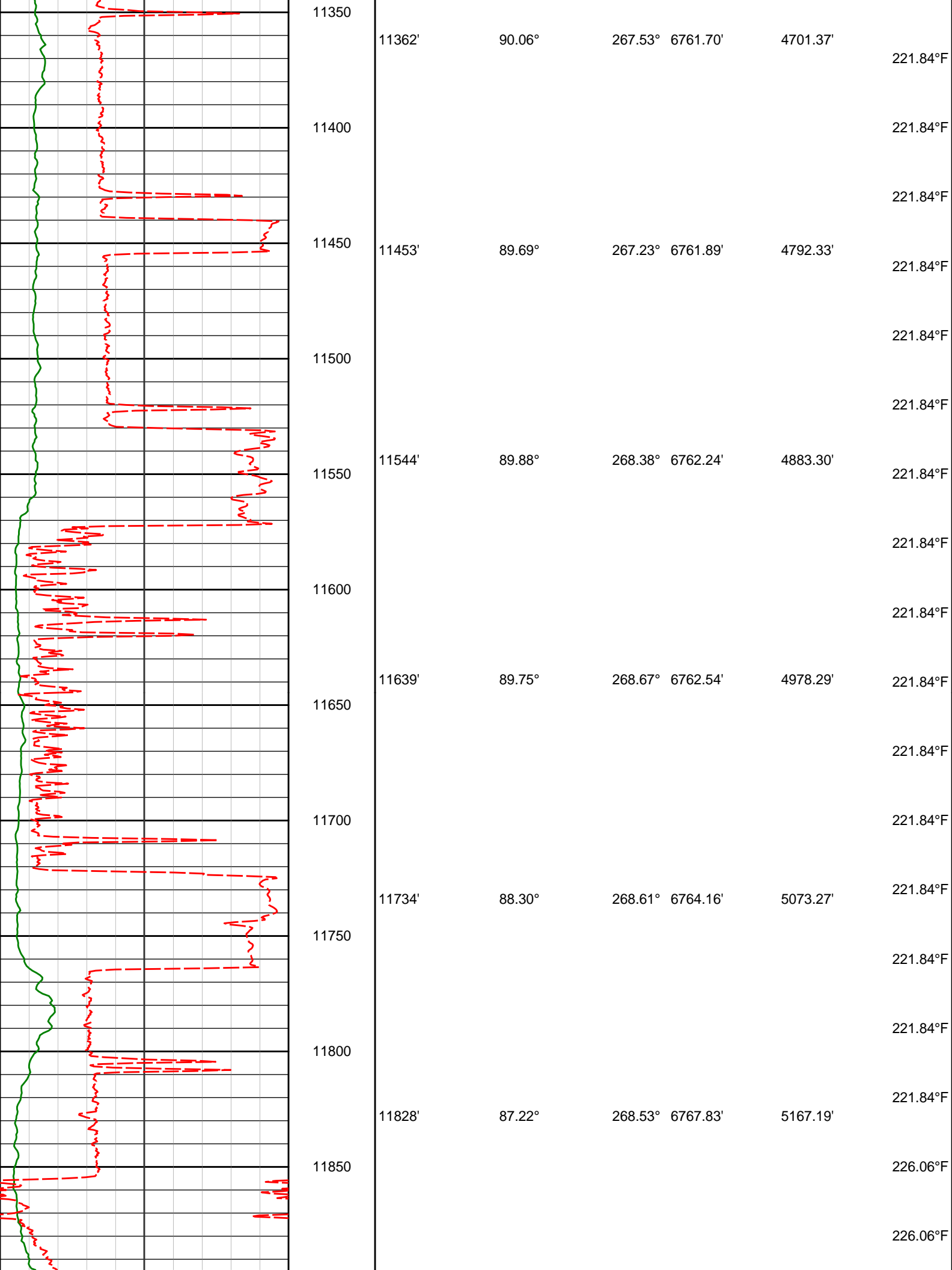


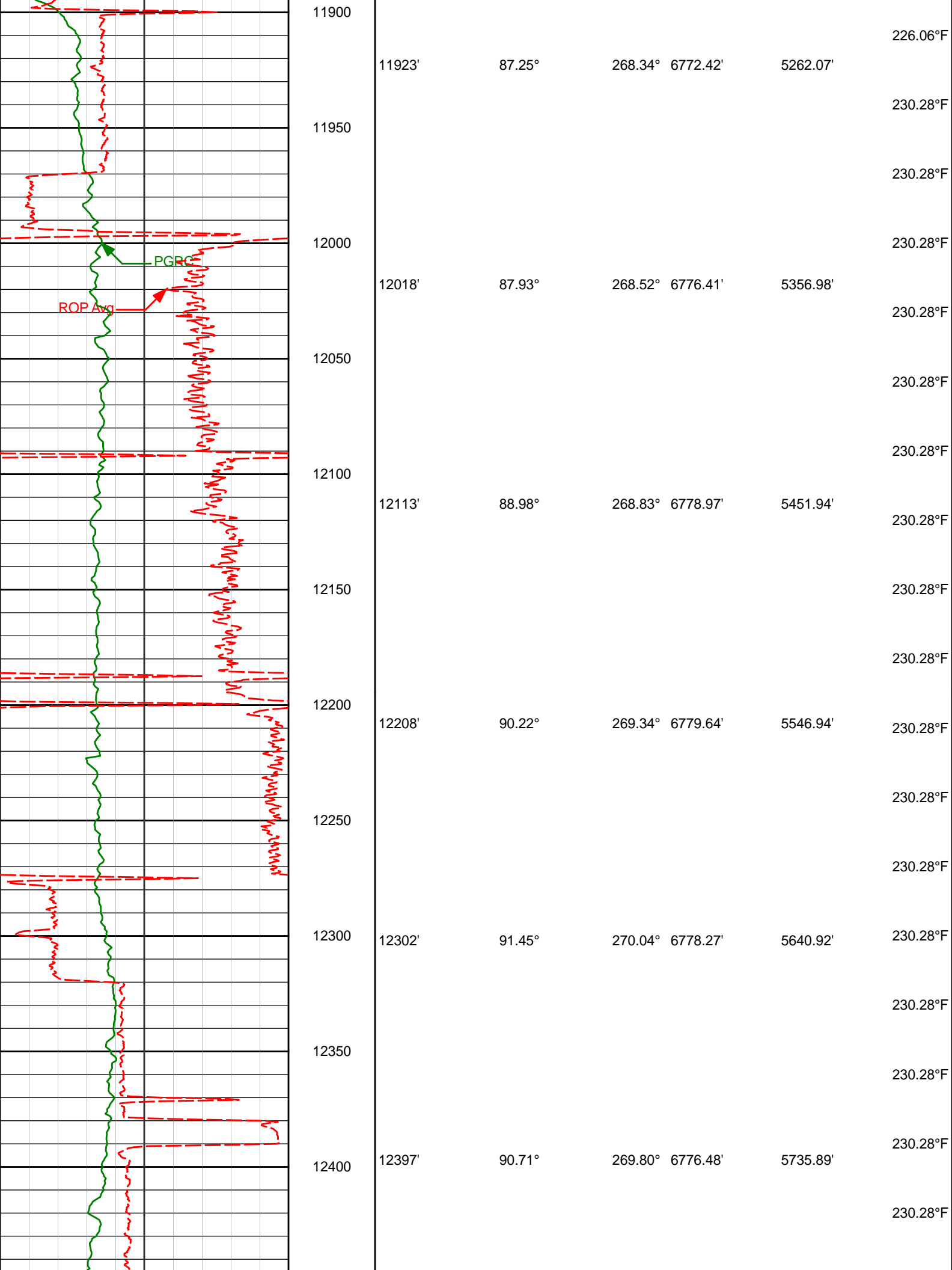
9150						213.41°F
						209.19°F
9200						209.19°F
	9239'	89.45°	267.45°	6738.52'	2579.33'	209.19°F
9250						209.19°F
						209.19°F
9300						209.19°F
	9334'	88.27°	269.24°	6740.41'	2674.29'	209.19°F
9350						213.41°F
						213.41°F
9400						213.41°F
	9428'	89.88°	269.69°	6741.93'	2768.27'	213.41°F
9450						217.63°F
						217.63°F
9500						217.63°F
	9523'	88.58°	269.37°	6743.20'	2863.26'	213.41°F
9550						213.41°F
						213.41°F
9600						213.41°F
	9618'	90.59°	269.06°	6743.89'	2958.25'	213.41°F
9650						213.41°F
						213.41°F

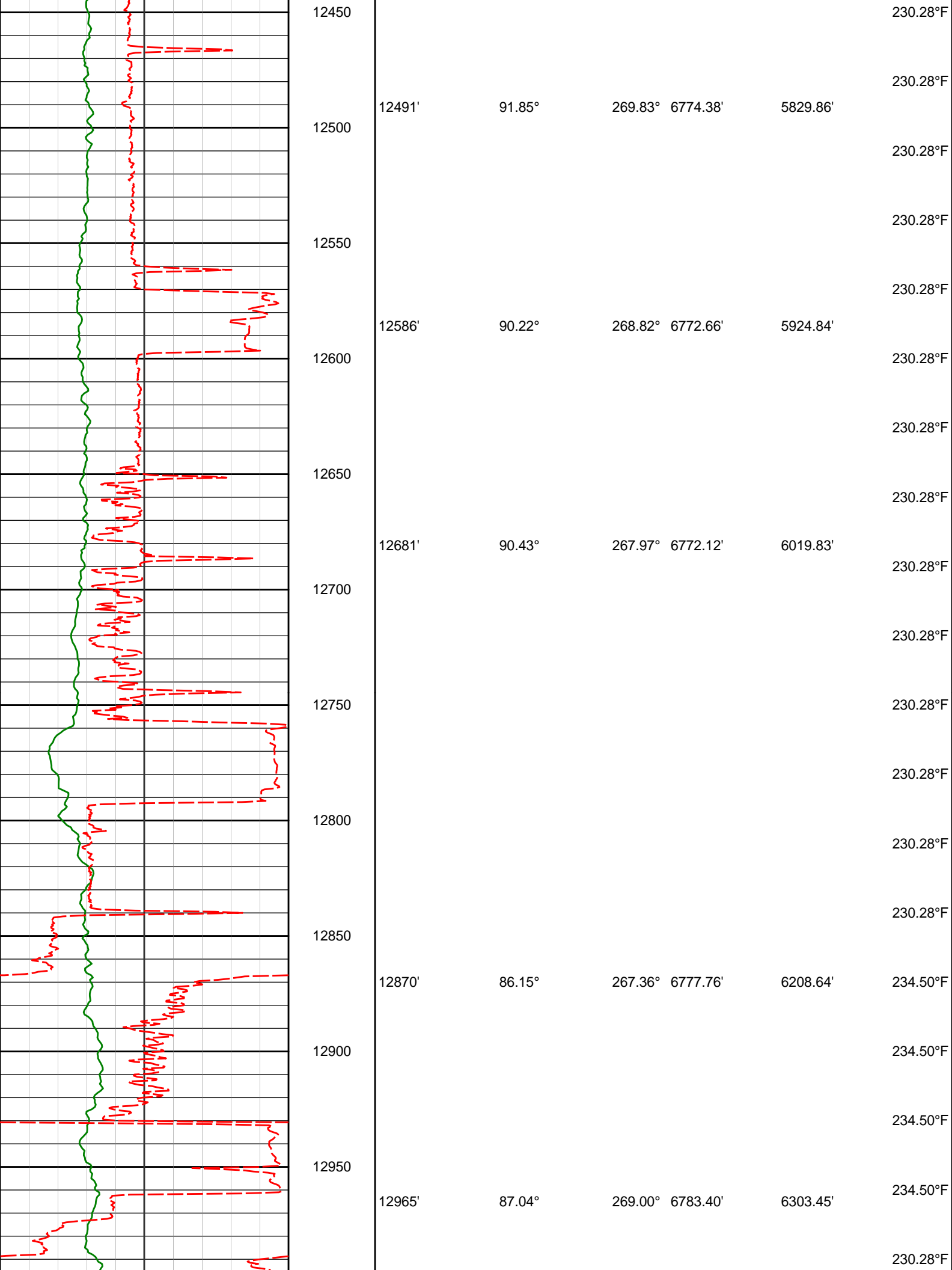


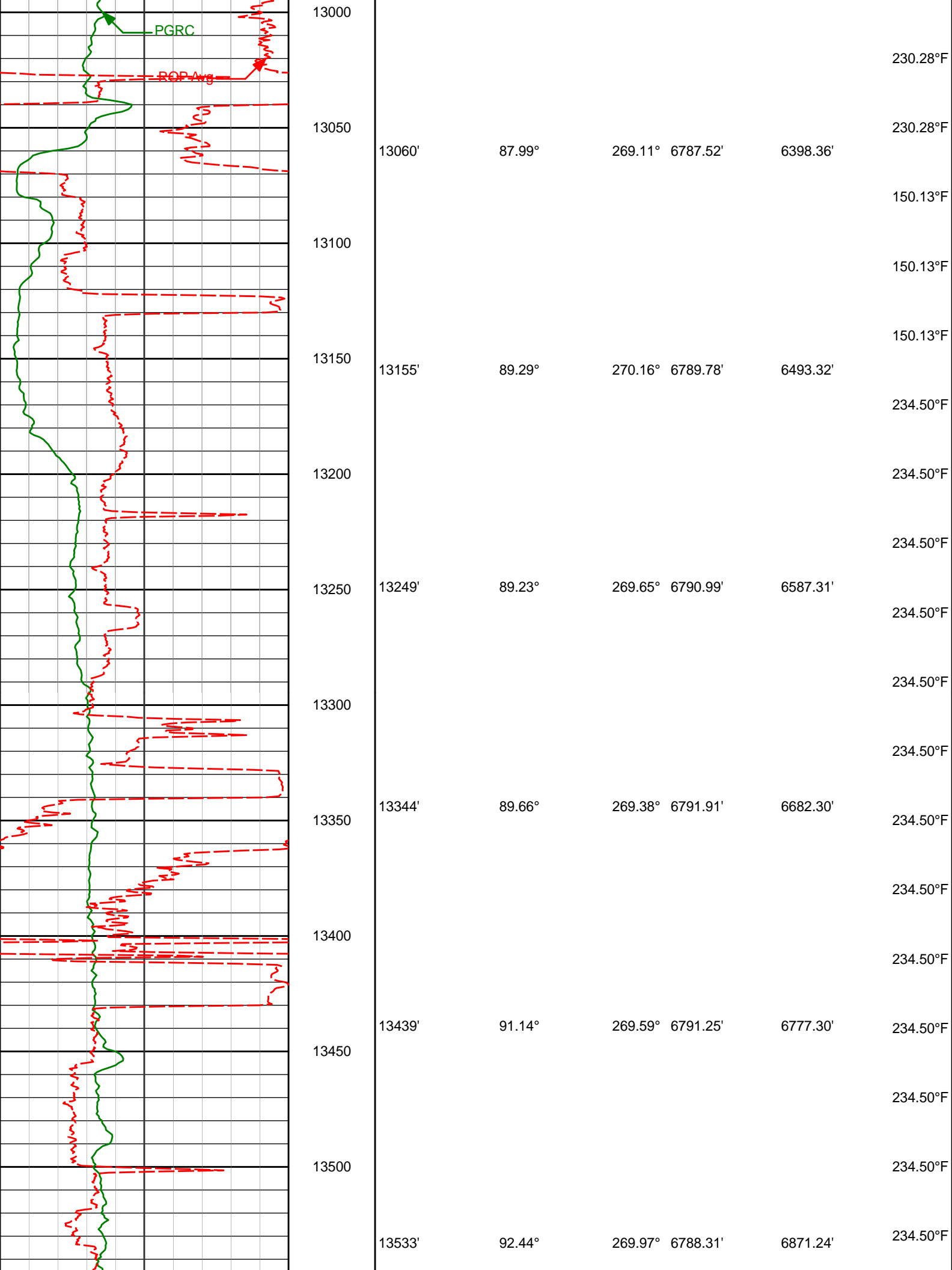


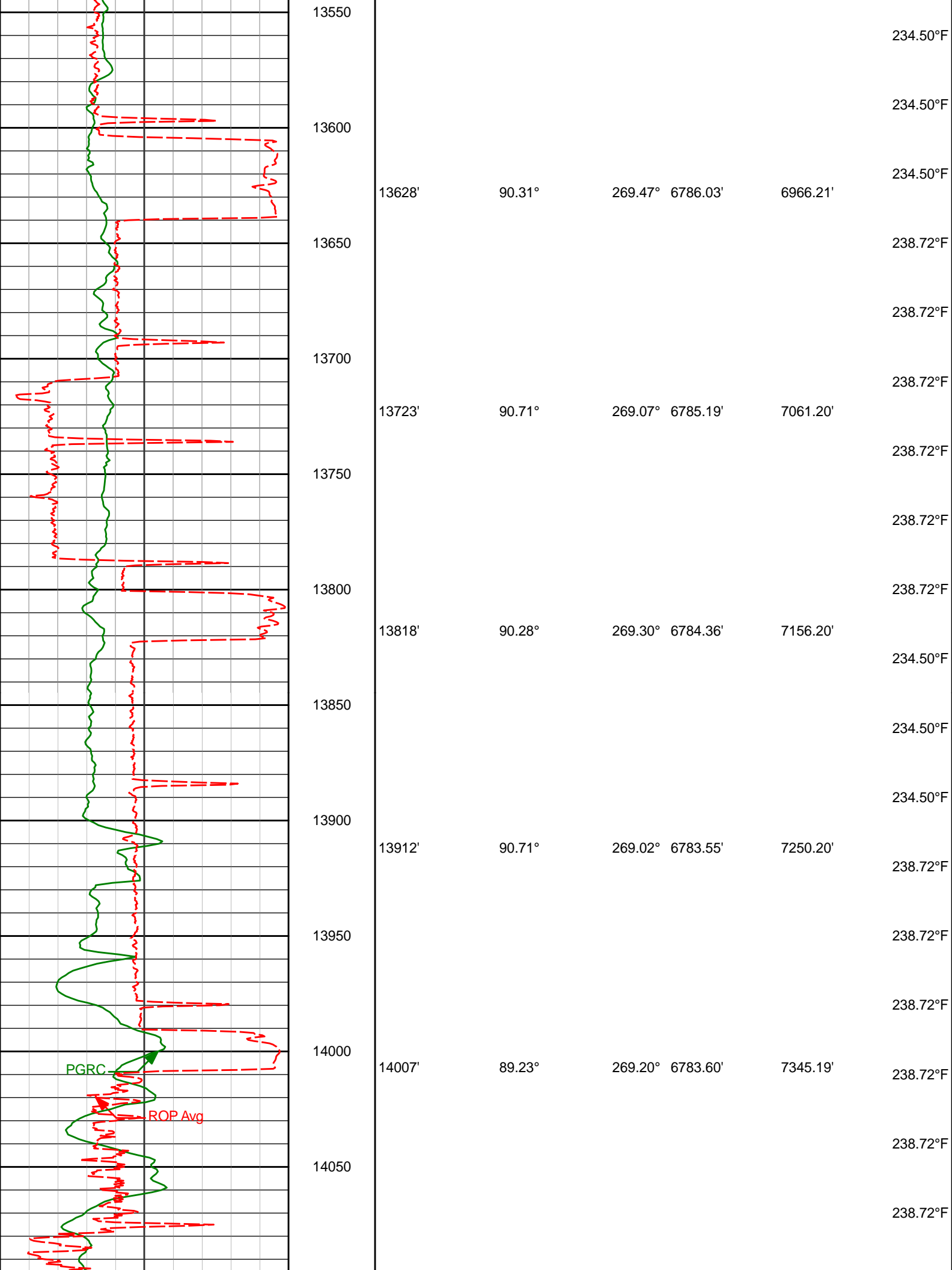


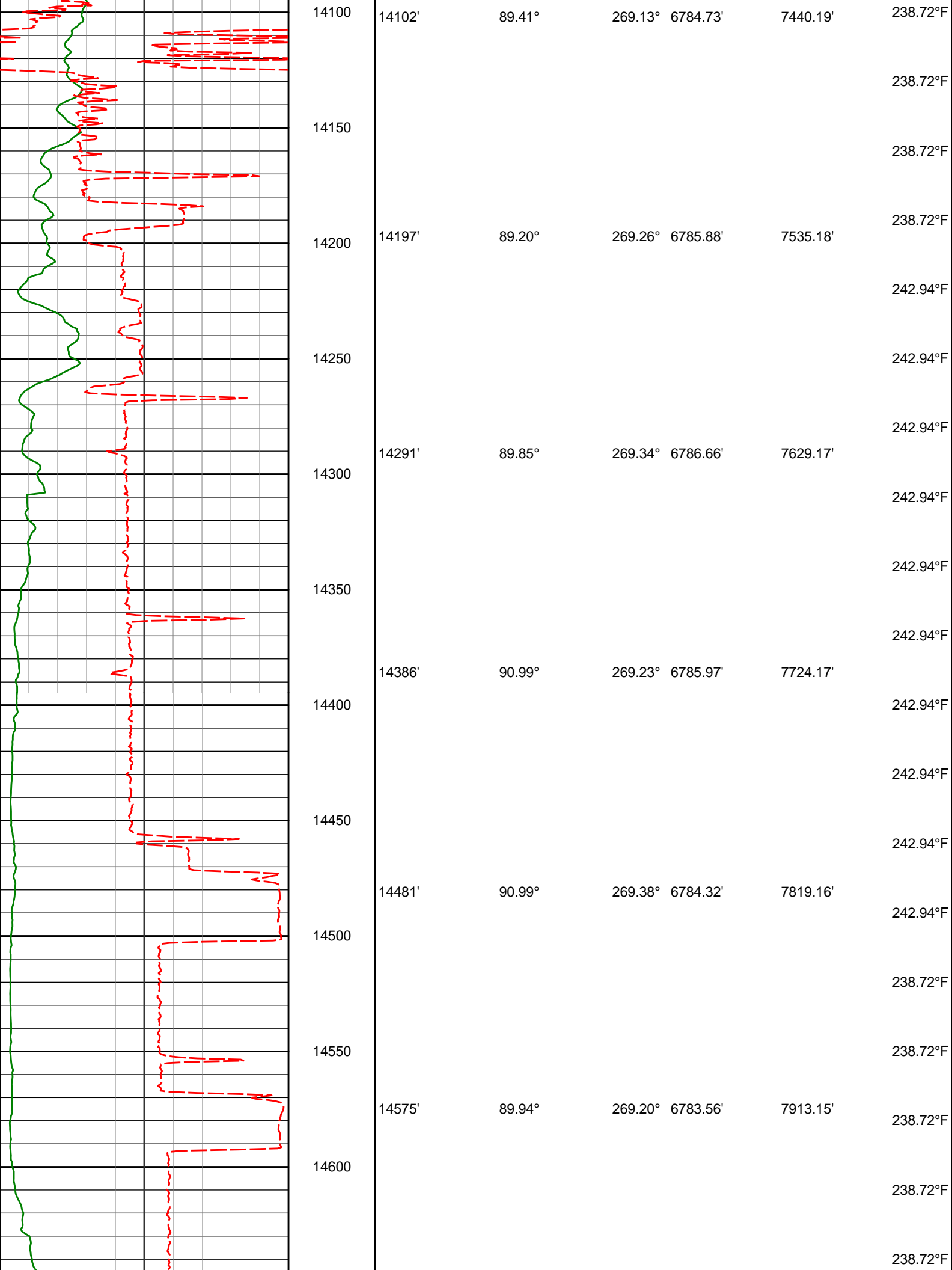


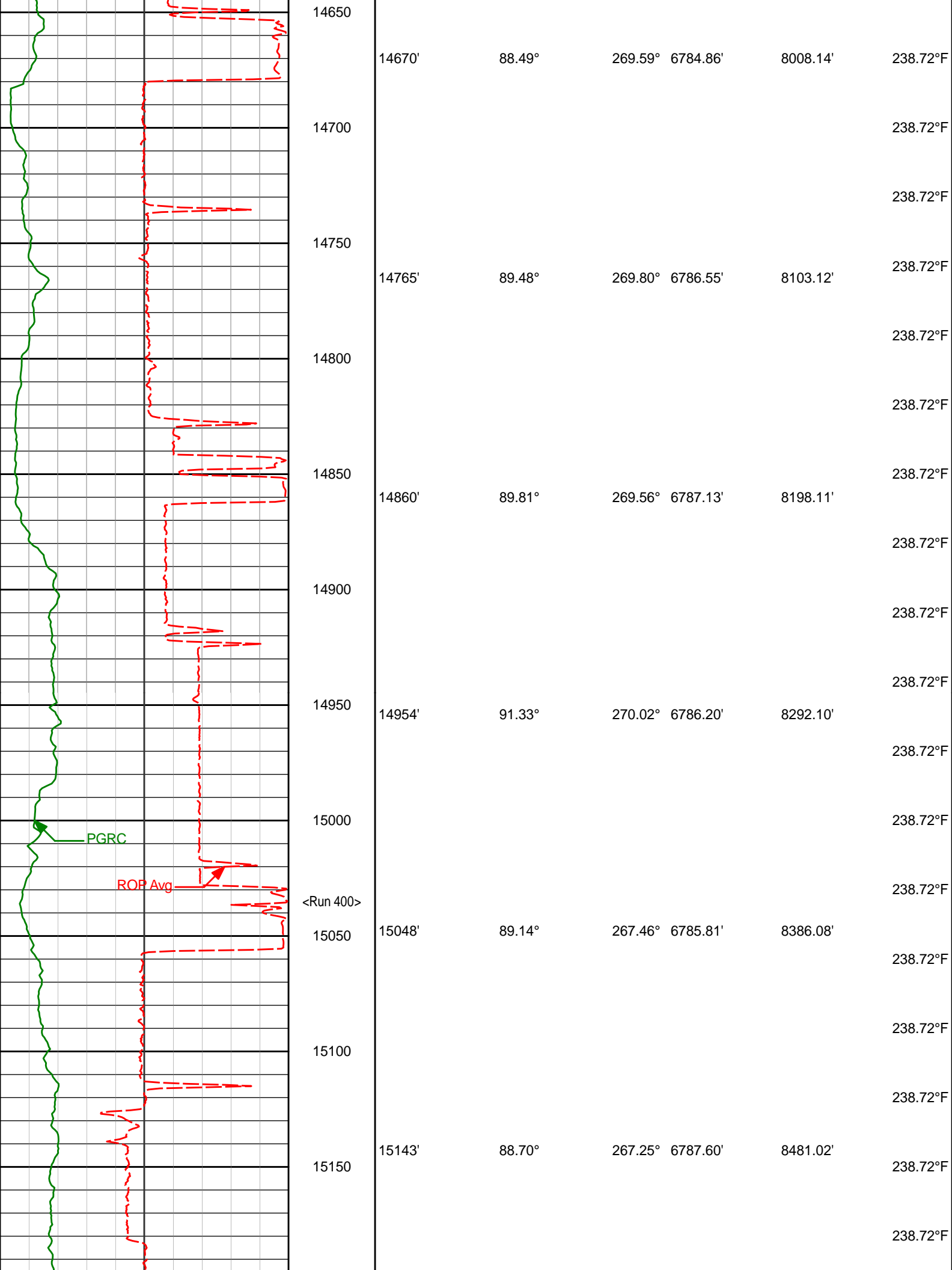


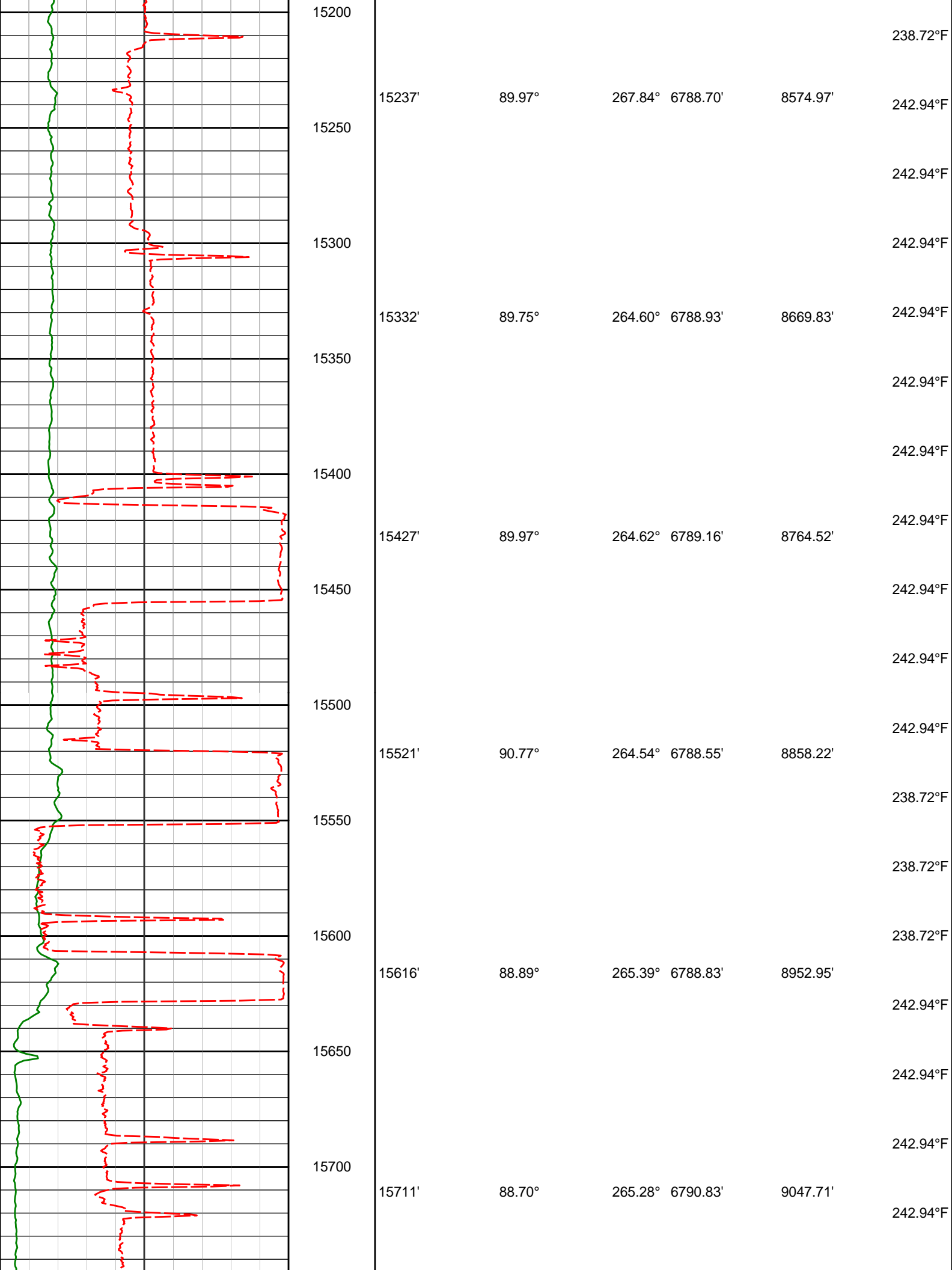


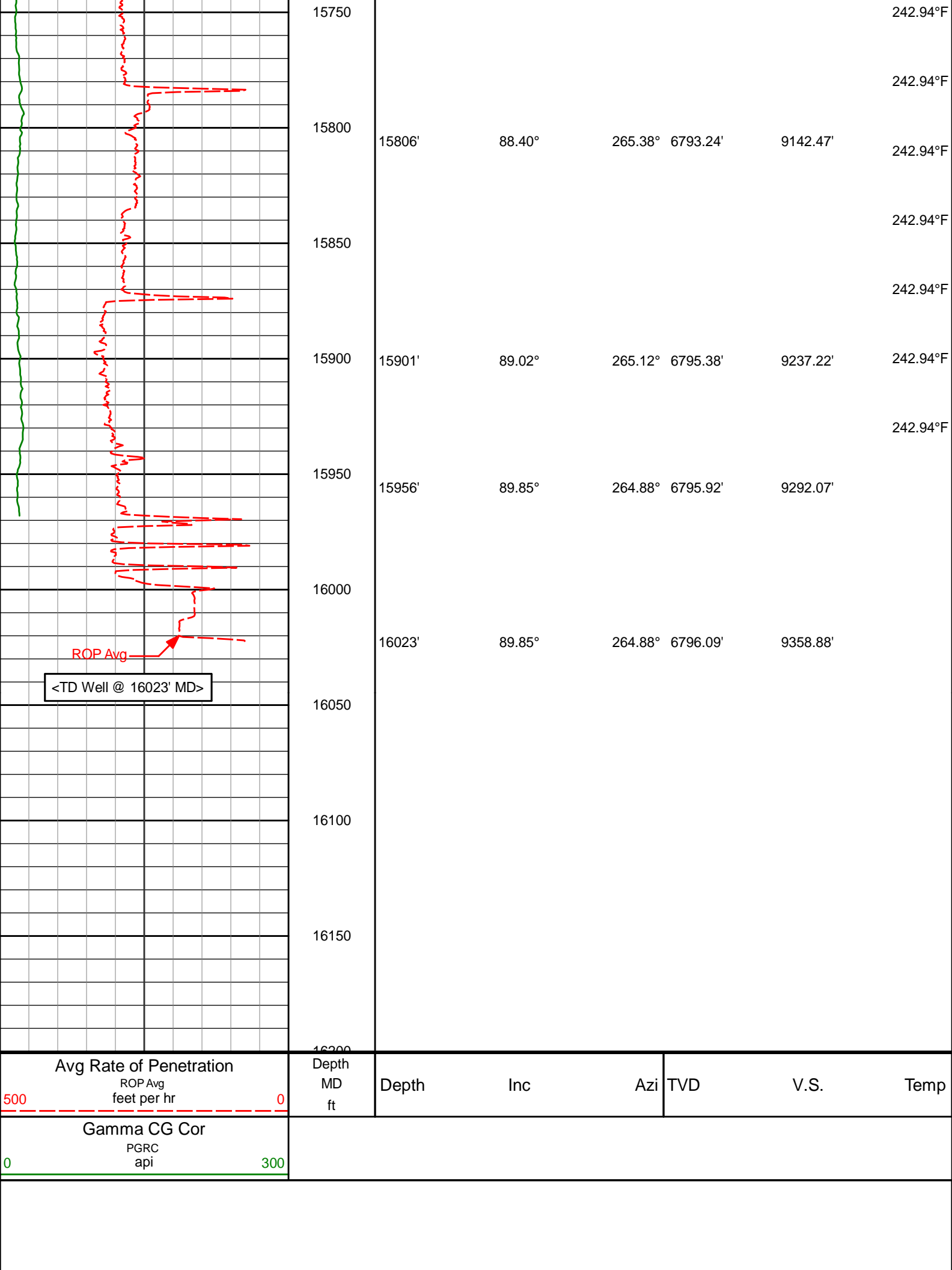








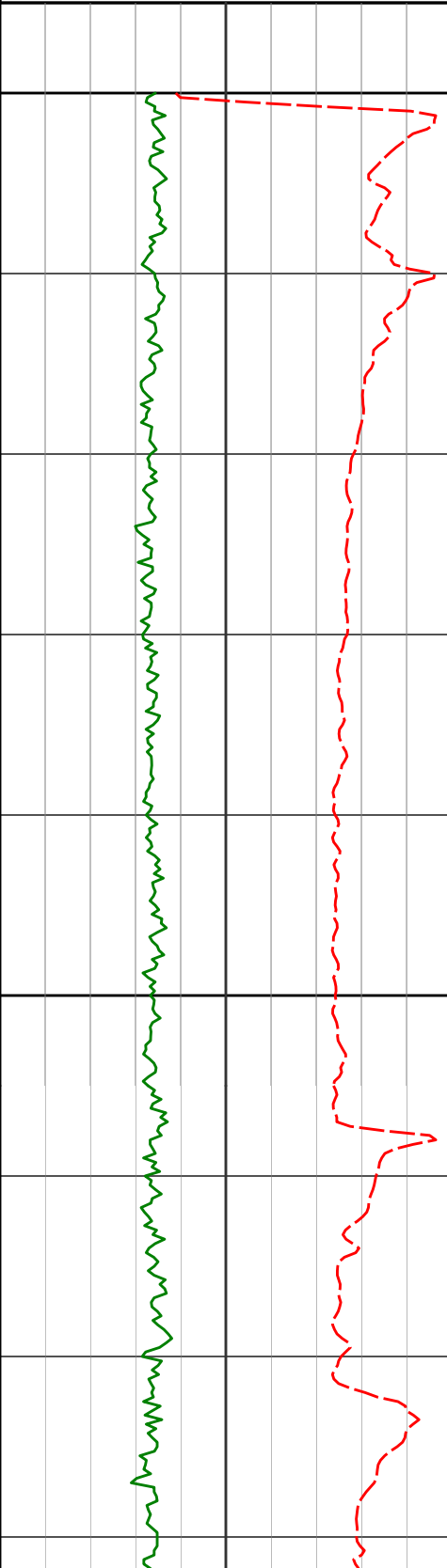




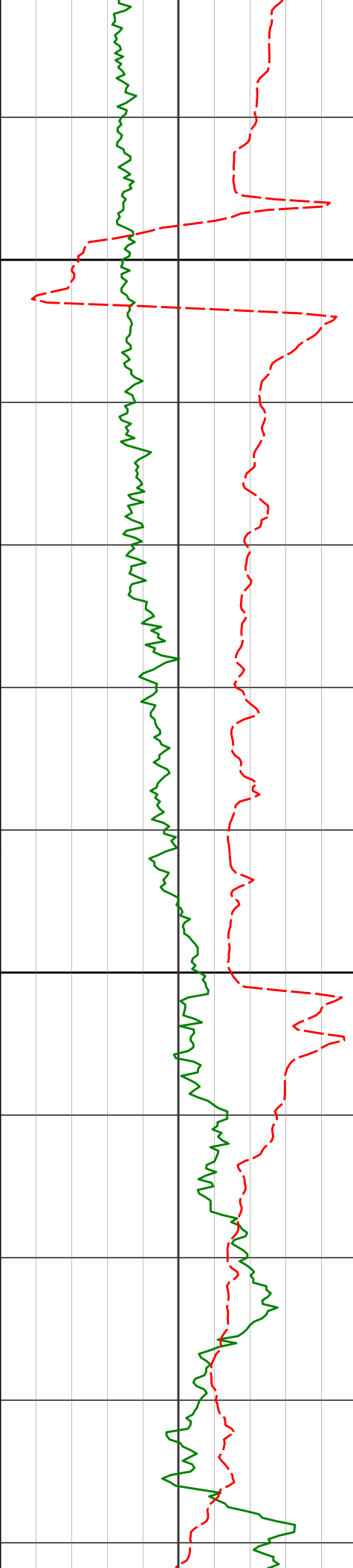
<TD Well @ 16023' MD>

Avg Rate of Penetration ROP Avg feet per hr		Depth MD ft	Depth	Inc	Azi	TVD	V.S.	Temp
500		0						
Gamma CG Cor PGRC api		0						
		300						

MD Detail 1:240 Scale

Gamma Ray Cor PGRC api																													
Avg Rate of Penetration ROP Avg feet per hr										Depth MD ft		Depth		Inc		Azi		TVD		V.S.		Temp							
										6100 <KOP>																			
										6159'		6.16°		268.64°		6150.06'		-171.14'											
										6200																			
										6254'		14.37°		272.73°		6243.46'		-154.24'											

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



6300

6349'

20.73°

272.83° 6333.99'

-125.66'

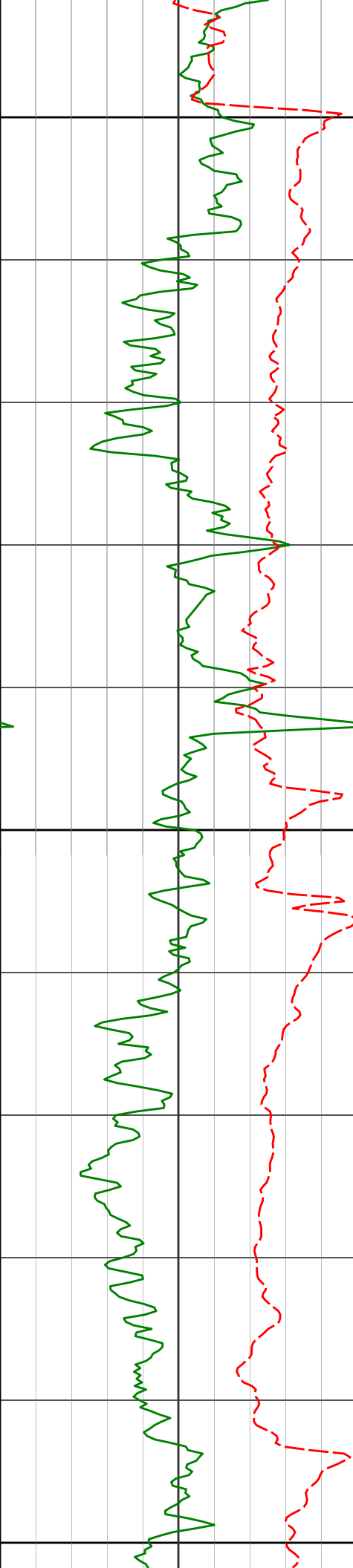
6400

6444'

28.29°

270.00° 6420.37'

-86.31'



6500

6538'

34.05°

271.99° 6500.77'

-37.72'

6600

<Run 200>

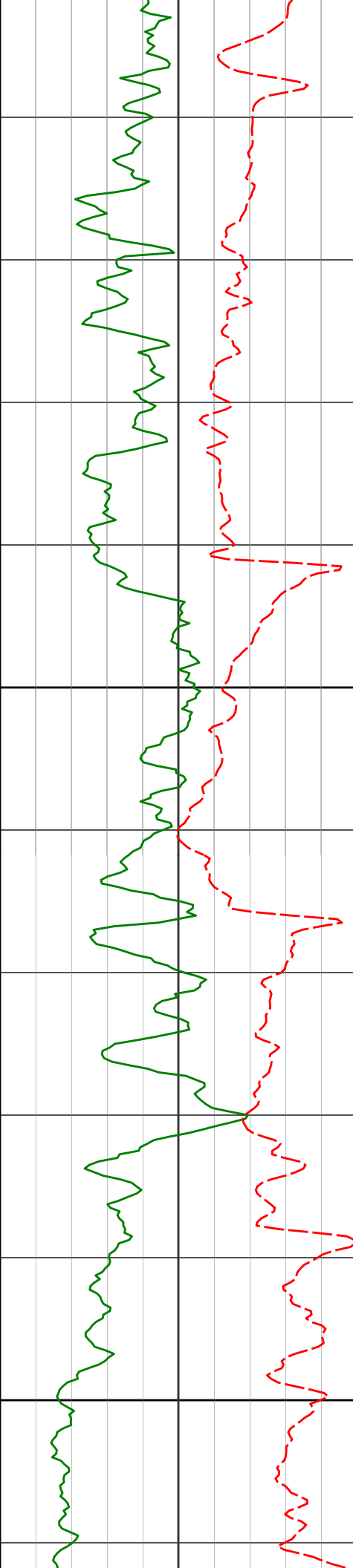
6633'

42.15°

272.81° 6575.47'

20.75'

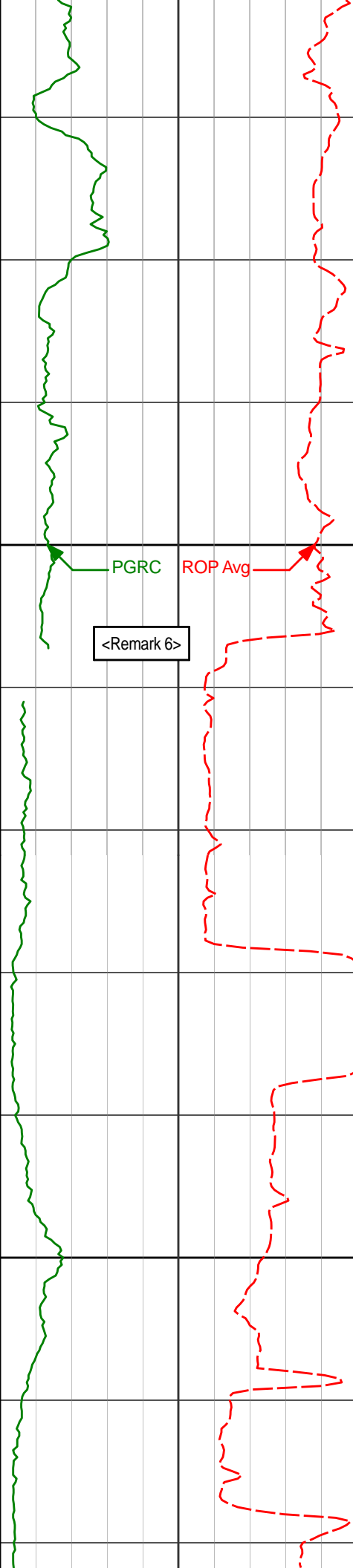
6700



6800

6900

6727'	52.66°	270.37°	6639.00'	89.79'
6822'	64.37°	269.52°	6688.53'	170.66'
6917'	76.25°	270.66°	6720.48'	259.93'



7000

7002'

87.35°

272.08° 6732.59'

343.87'

PGRC

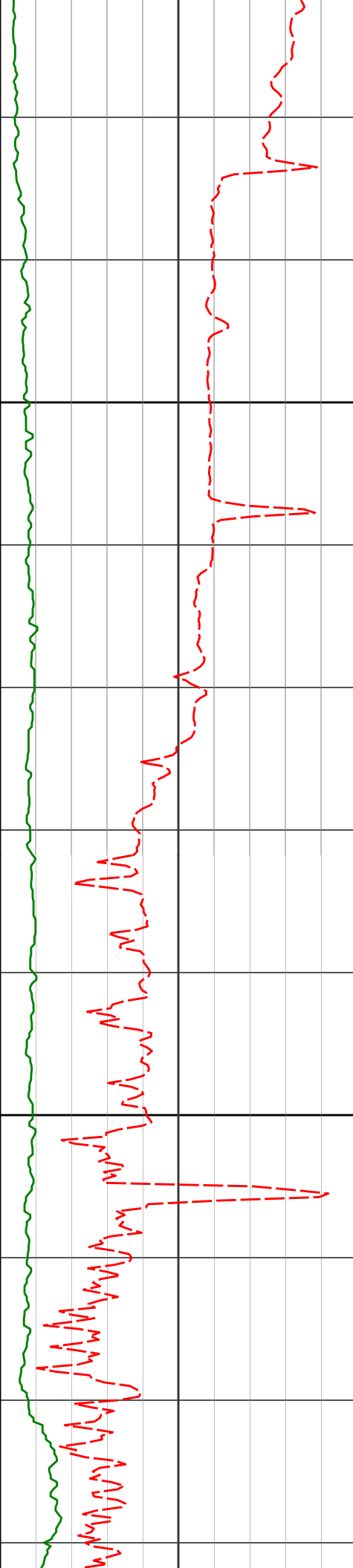
ROP Avg

<Remark 6>

<7" casing set at 7036' MD>

<Run 300>

7100



7200

7300

7155'

89.45°

272.69° 6736.86'

496.56'

7250'

89.32°

270.87° 6737.88'

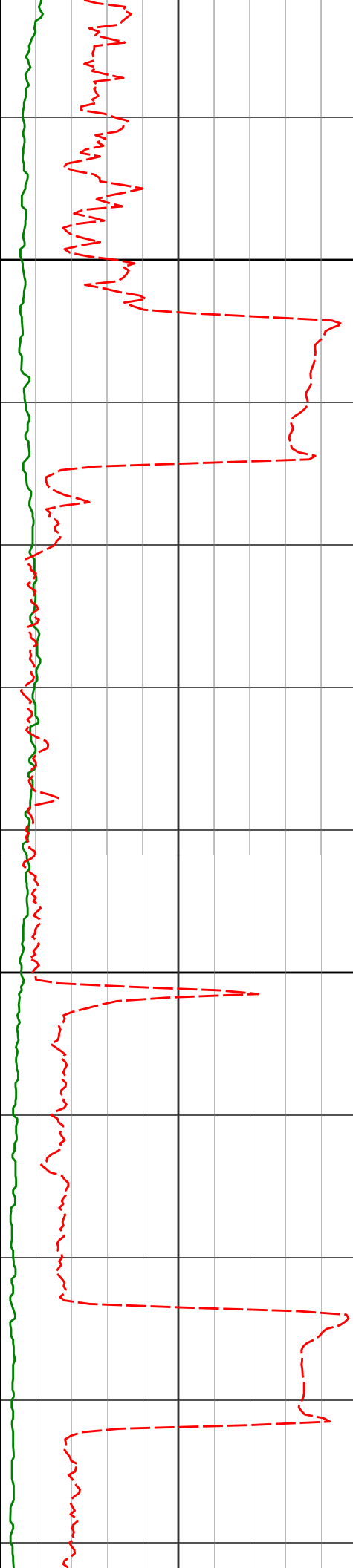
591.46'

7344'

91.82°

270.84° 6736.94'

685.41'



7400

7439'

89.41°

269.93° 6735.92'

780.37'

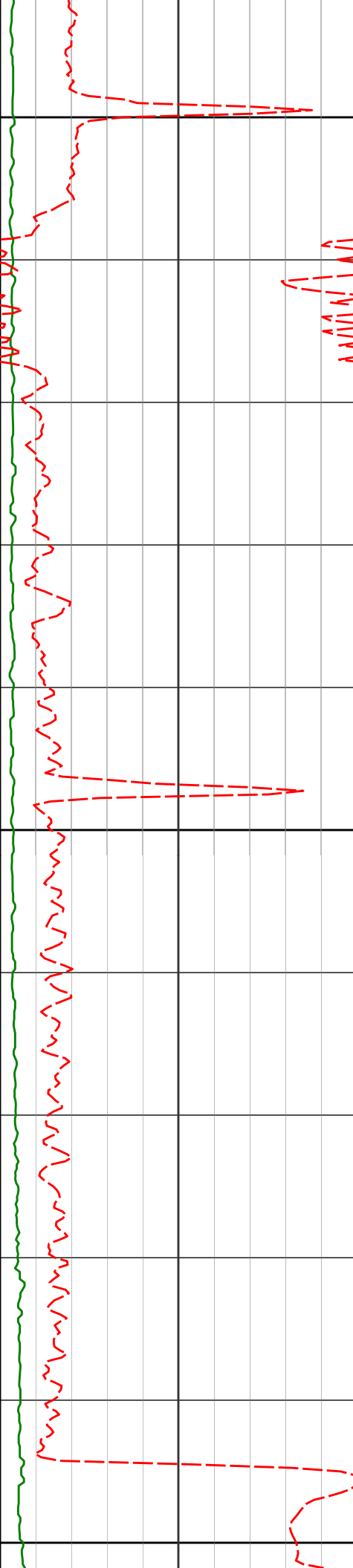
7500

7534'

90.49°

270.08° 6736.01'

875.36'



7600

7629'

89.08°

269.20° 6736.36'

970.36'

7700

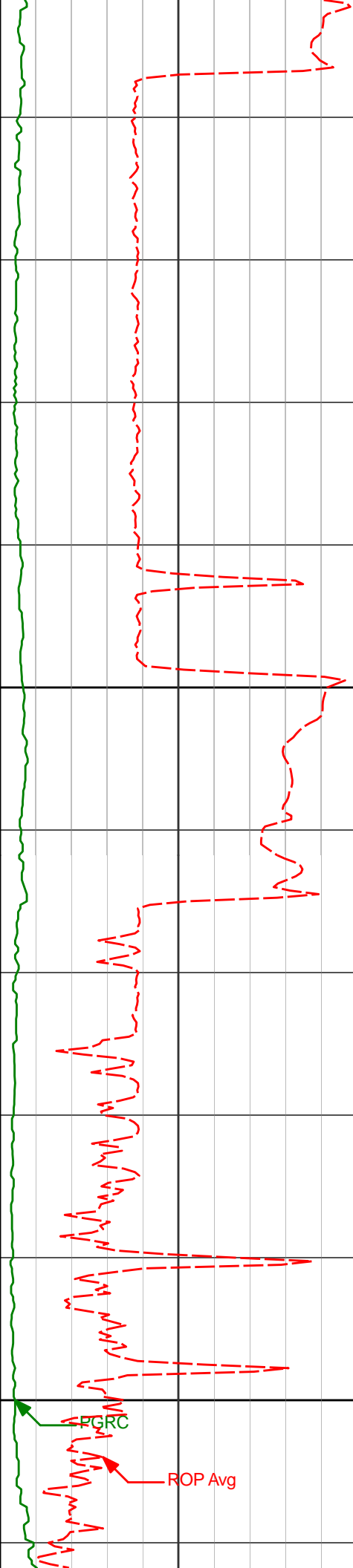
7723'

90.80°

269.10° 6736.46'

1064.35'

7800



7900

8000

7818'

7913'

8007'

91.02°

89.20°

89.57°

268.65° 6734.95'

269.12° 6734.77'

269.22° 6735.78'

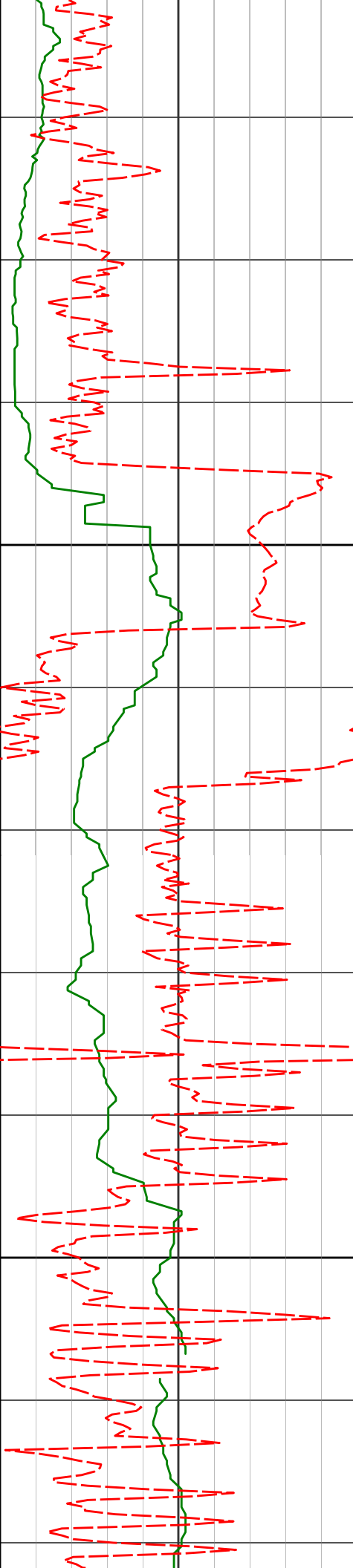
1159.34'

1254.33'

1348.33'

PGRC

ROP Avg



8100

8102'

88.12°

268.52° 6737.69'

1443.30'

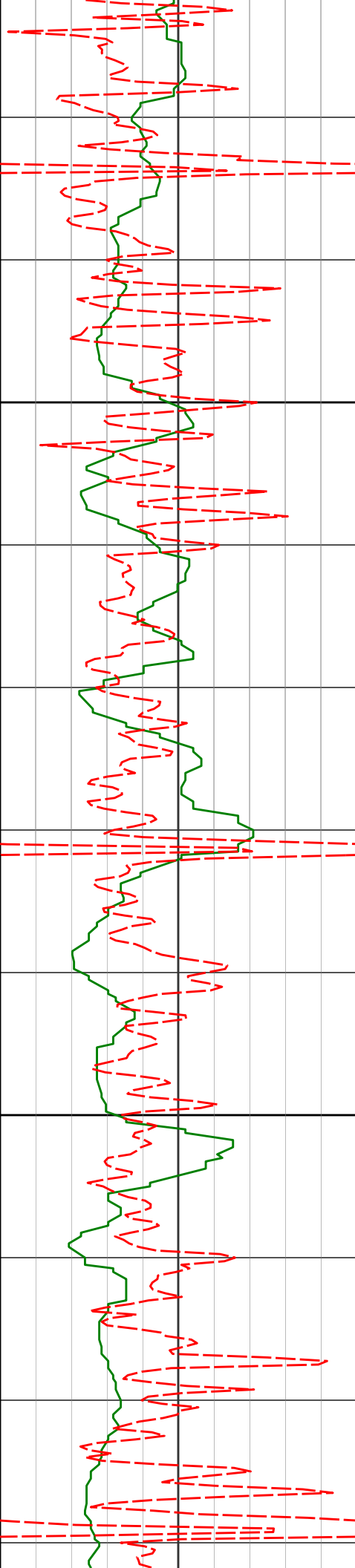
8200

8197'

87.94°

268.70° 6740.96'

1538.24'



8300

8292'

88.46°

269.23° 6743.94'

1633.19'

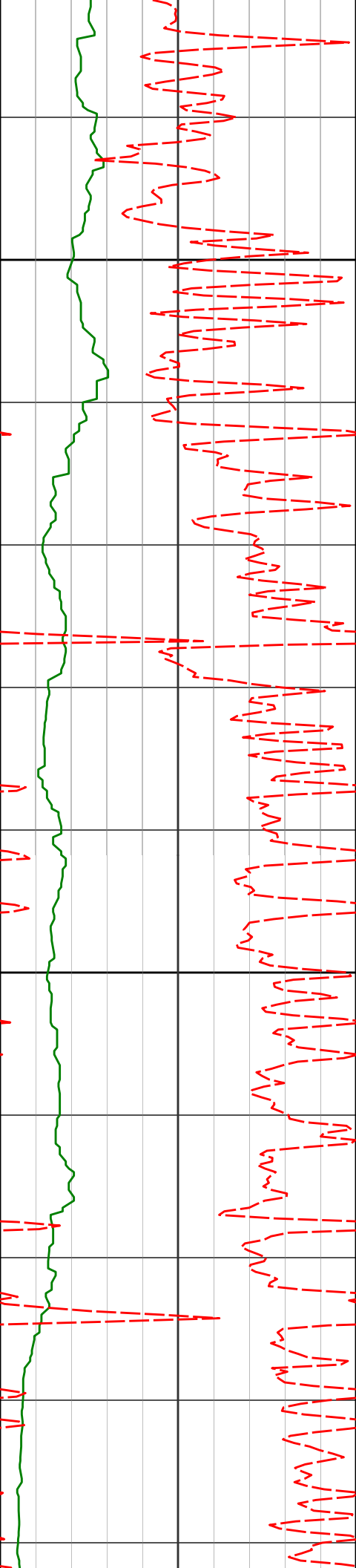
8400

8387'

88.80°

269.51° 6746.21'

1728.17'



8481'

89.60°

269.82° 6747.53'

1822.15'

8500

8576'

90.40°

269.96° 6747.53'

1917.14'

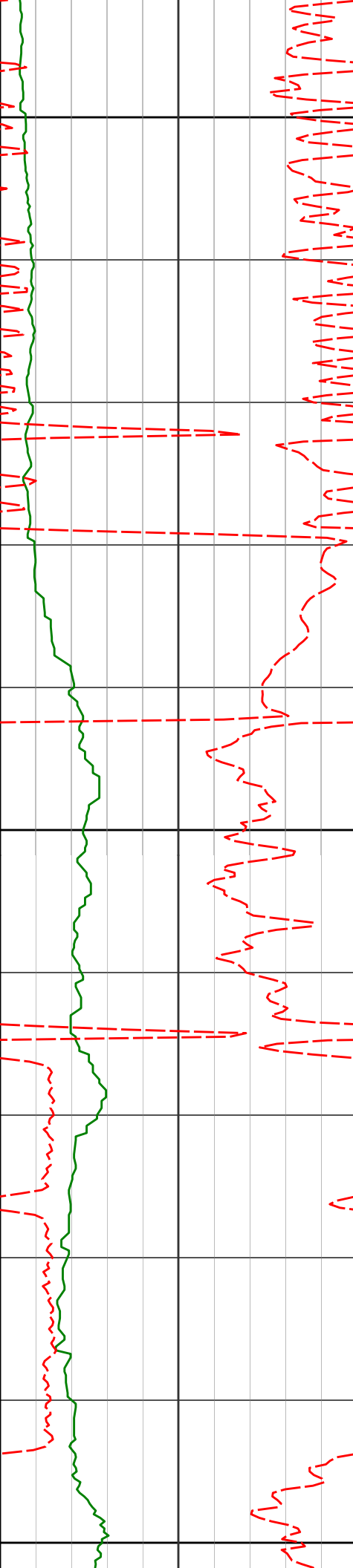
8600

8670'

92.19°

270.18° 6745.40'

2011.11'



8700

8765'

91.91°

267.97° 6742.00'

2106.04'

8800

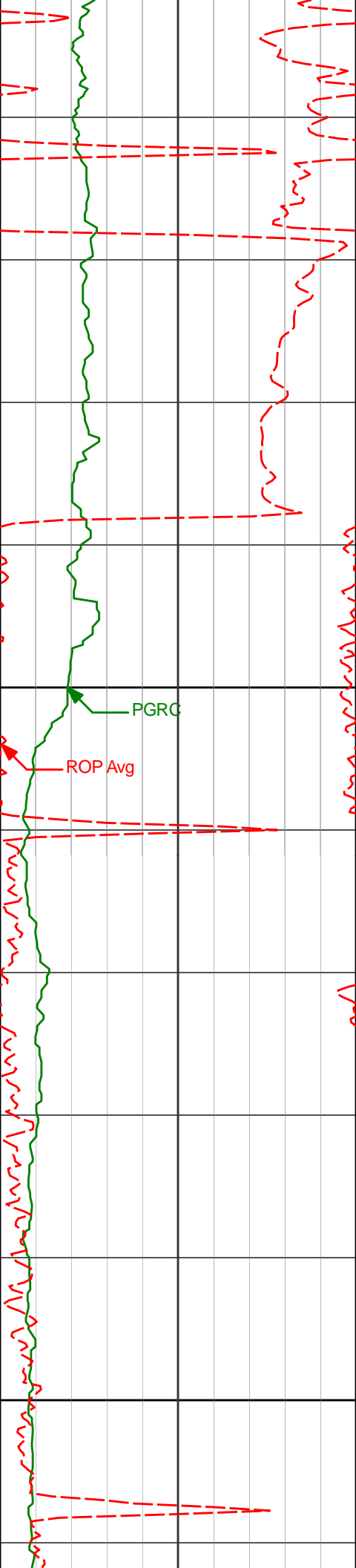
8860'

91.79°

266.15° 6738.94'

2200.92'

8900

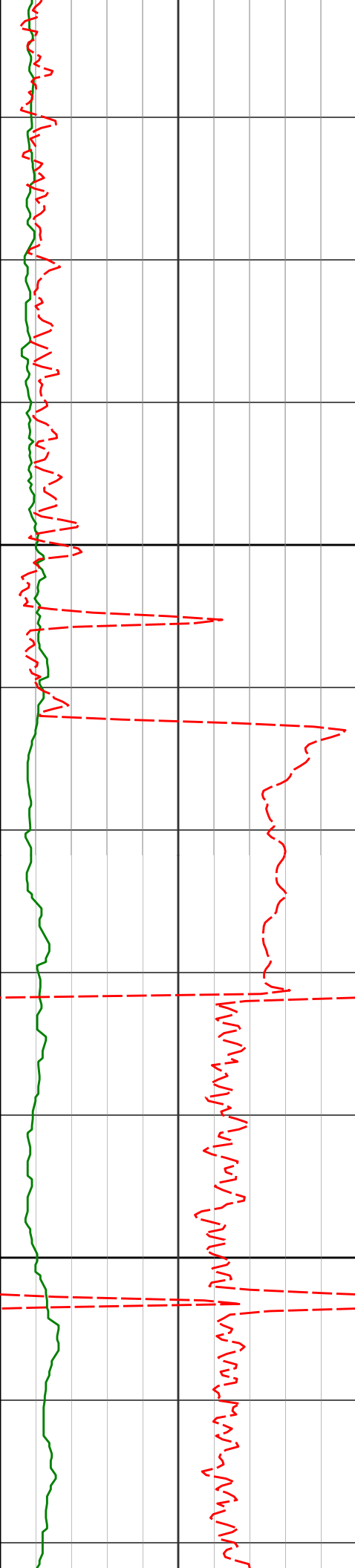


8955' 90.15° 265.69° 6737.33' 2295.75'

9000

9050' 89.14° 266.08° 6737.92' 2390.58'

9100



9200

9300

9144'

90.34°

265.77° 6738.34'

2484.43'

9239'

89.45°

267.45° 6738.52'

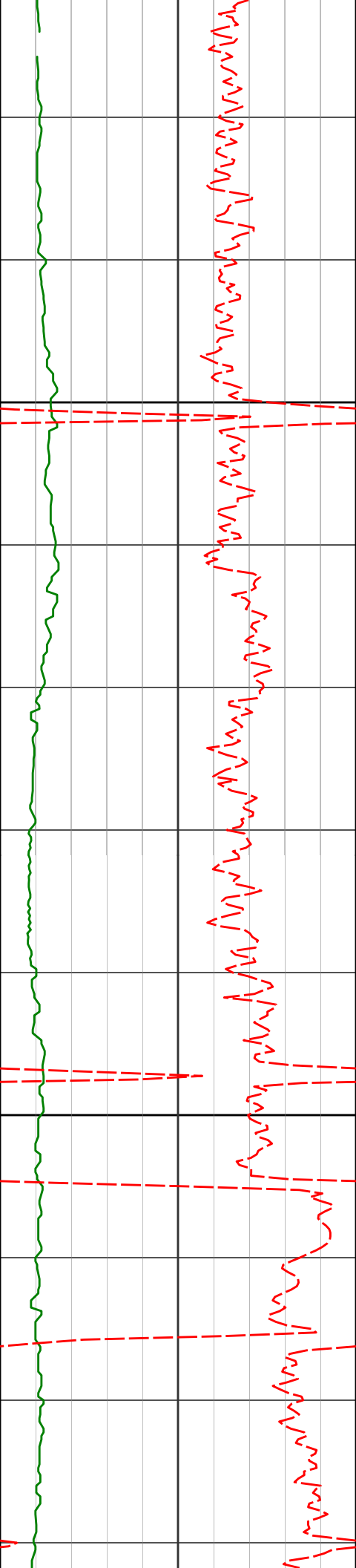
2579.33'

9334'

88.27°

269.24° 6740.41'

2674.29'



9400

9428'

89.88°

269.69° 6741.93'

2768.27'

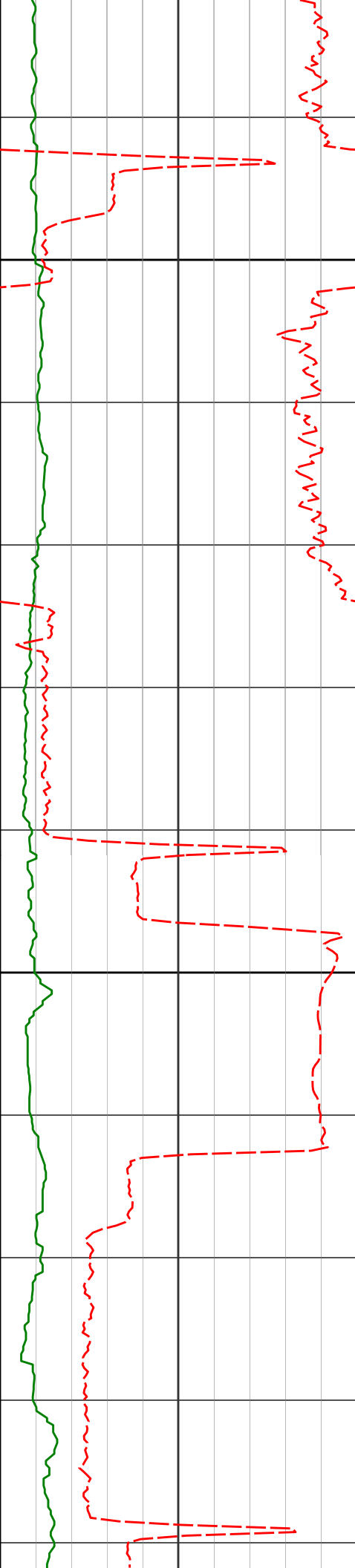
9500

9523'

88.58°

269.37° 6743.20'

2863.26'



9600

9618'

90.59°

269.06° 6743.89'

2958.25'

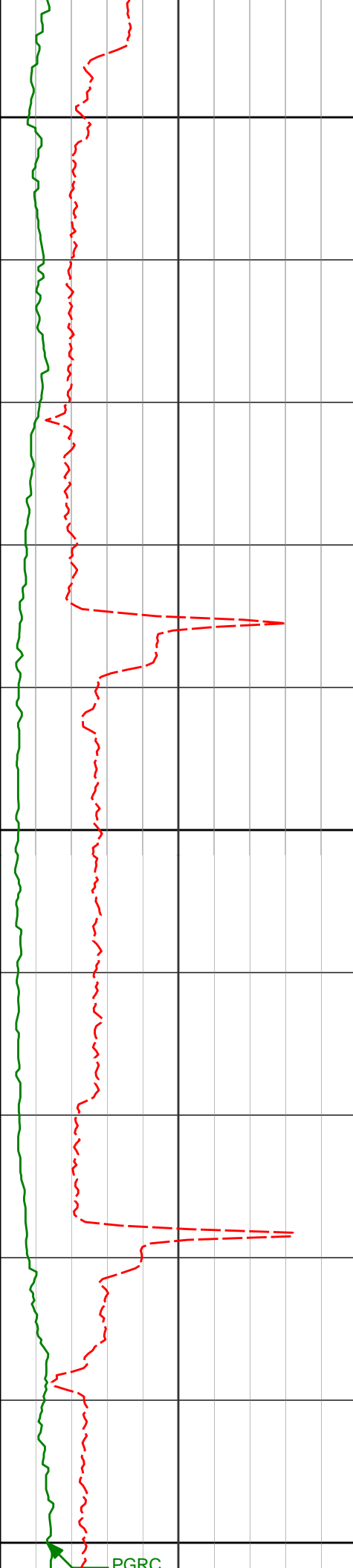
9700

9712'

87.72°

268.36° 6745.28'

3052.23'



9800

9804'

88.03°

268.53° 6748.69'

3144.16'

9900

9895'

89.29°

268.81° 6750.82'

3235.13'

10000

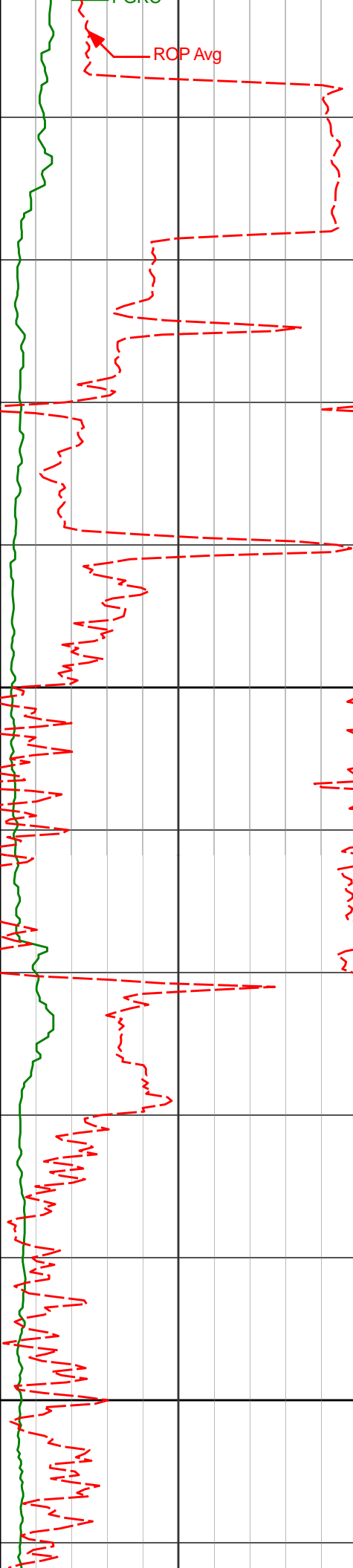
9987'

91.66°

269.17° 6750.05'

3327.12'

PGRC

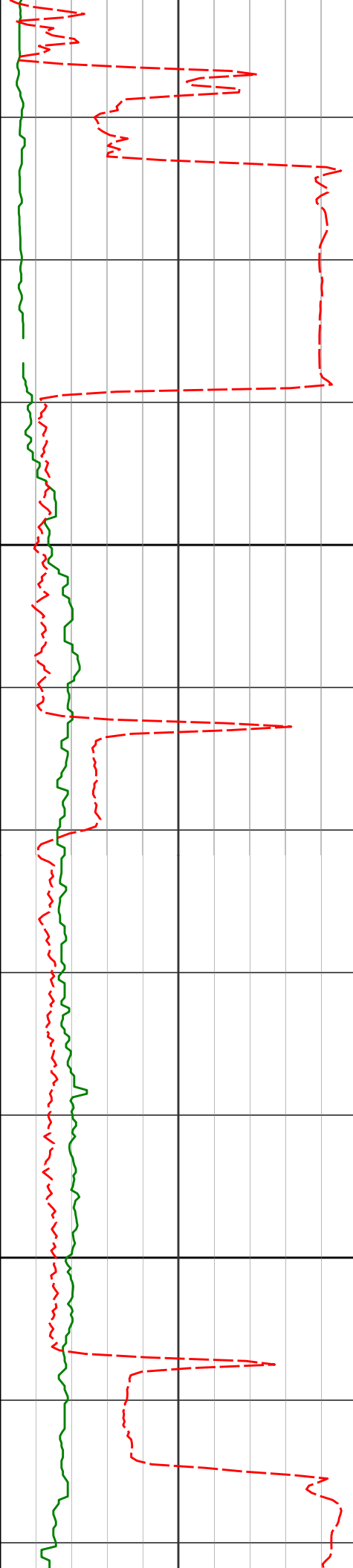


10078' 88.49° 268.77° 6749.93' 3418.11'

10100

10169' 90.37° 268.80° 6750.84' 3509.09'

10200



10261'

89.20°

269.31° 6751.18'

3601.09'

10300

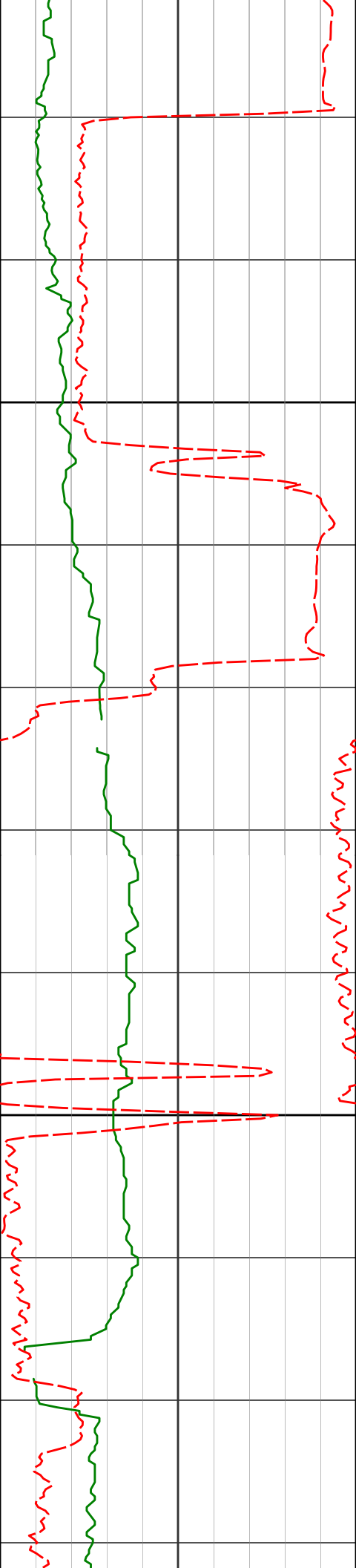
10352'

89.45°

270.83° 6752.26'

3692.07'

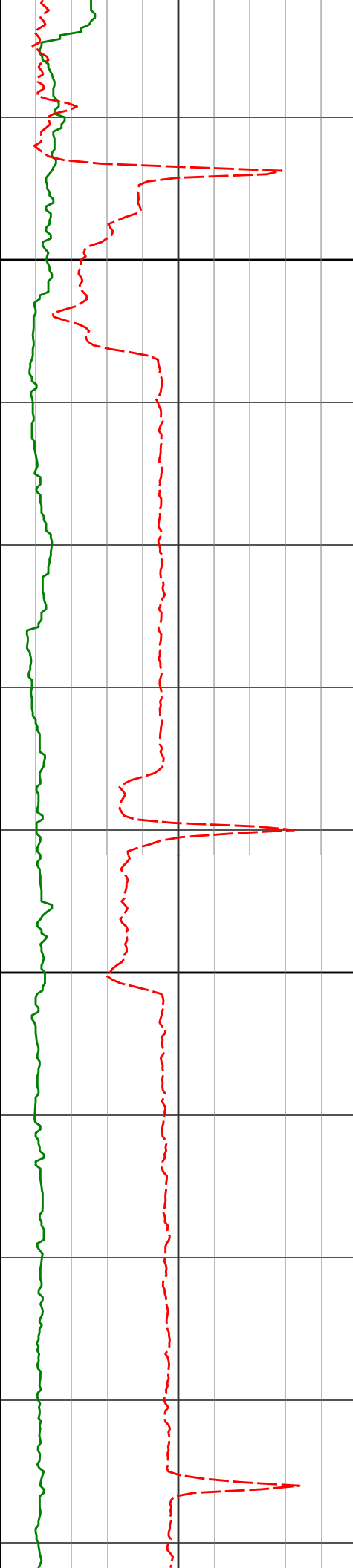
10400



10500

10600

10444	86.67°	269.79°	6755.37'	3783.99'
10535'	88.83°	270.69°	6758.94'	3874.90'



10700

10719'

89.85°

271.14° 6761.06'

4058.80'

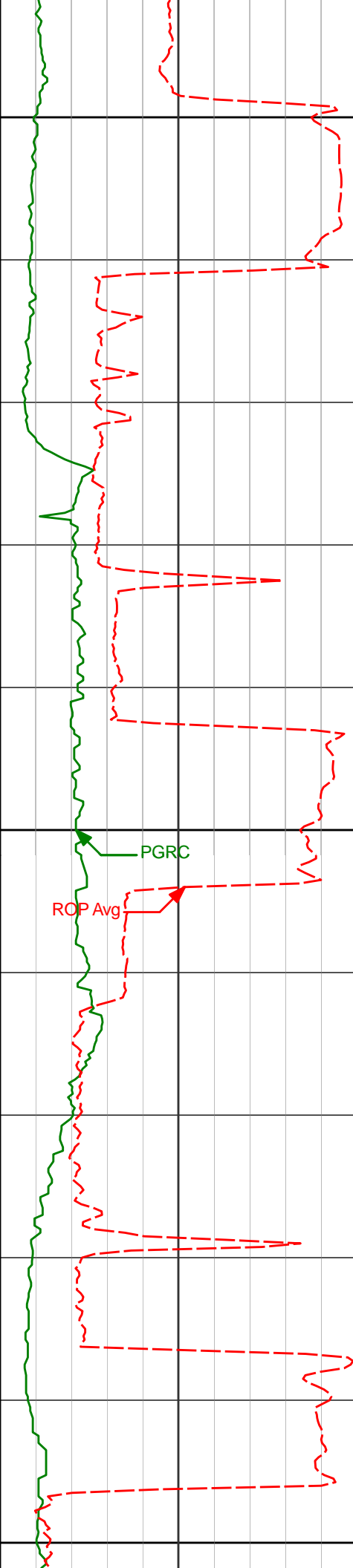
10800

10811'

90.80°

271.09° 6760.54'

4150.75'



10900

10903'

92.65°

271.47° 6757.77'

4242.64'

11000

10995'

90.34°

270.72° 6755.37'

4334.55'

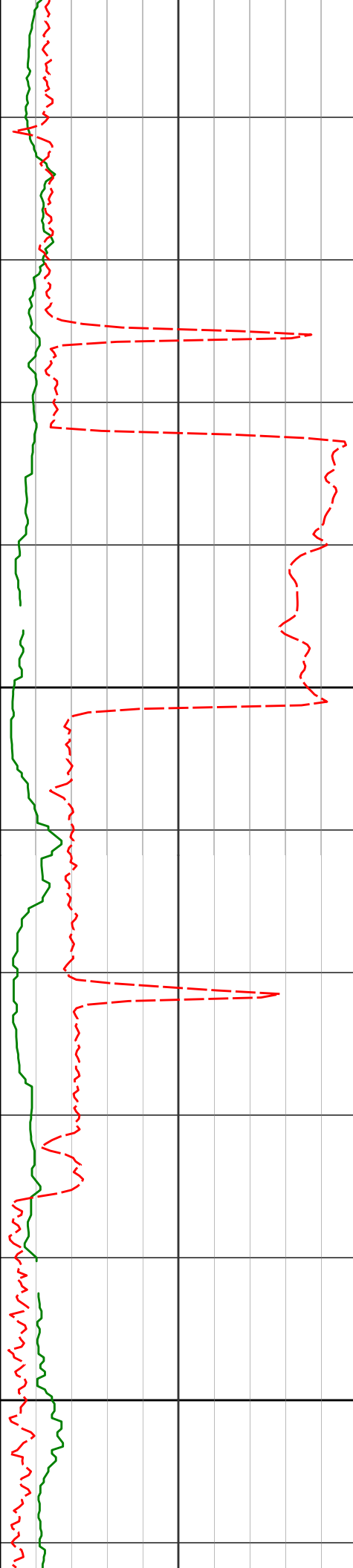
11100

11087'

89.69°

270.24° 6755.35'

4426.53'



11200

11300

11179'

88.24°

268.54° 6757.01'

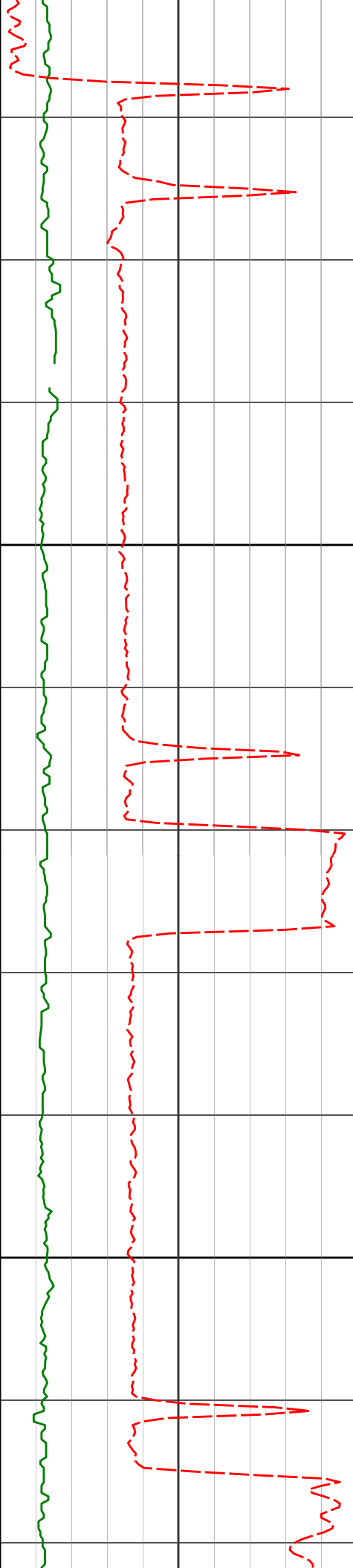
4518.51'

11270'

87.91°

267.44° 6760.07'

4609.44'



11400

11500

11362'

90.06°

267.53° 6761.70'

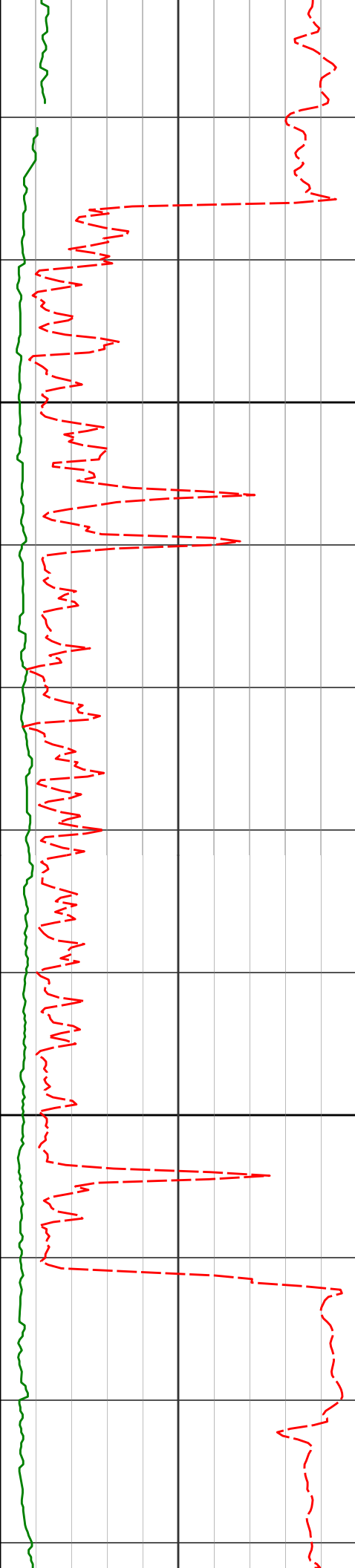
4701.37'

11453'

89.69°

267.23° 6761.89'

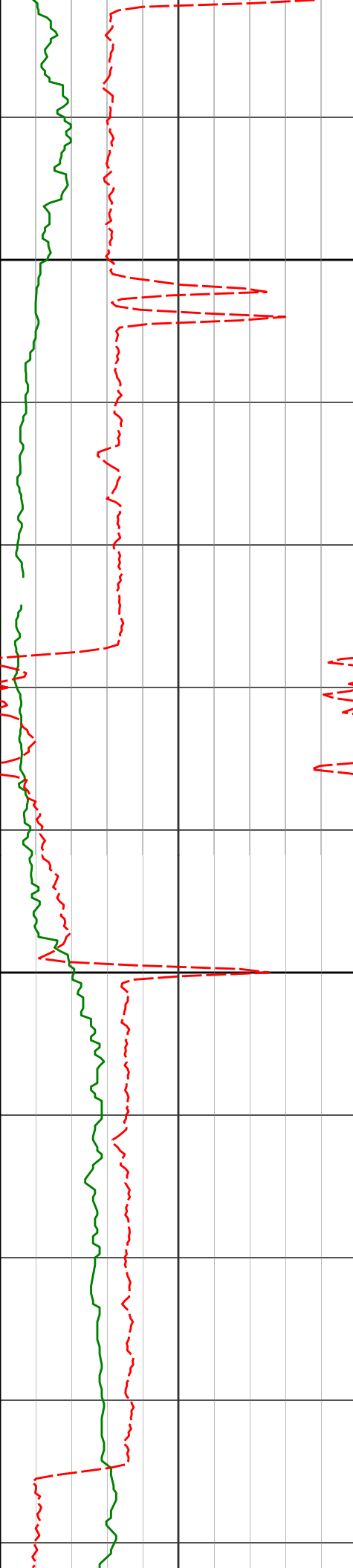
4792.33'



11600

11700

11544	89.88°	268.38°	6762.24'	4883.30'
11639'	89.75°	268.67°	6762.54'	4978.29'
11734'	88.30°	268.61°	6764.16'	5073.27'



11800

11828'

87.22°

268.53° 6767.83'

5167.19'

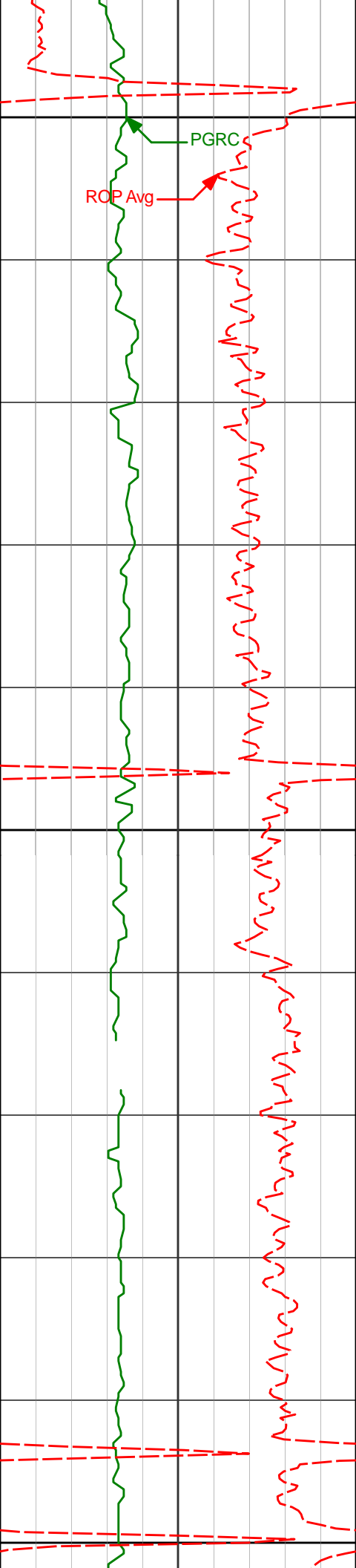
11900

11923'

87.25°

268.34° 6772.42'

5262.07'



12000

12018'

87.93°

268.52° 6776.41'

5356.98'

12100

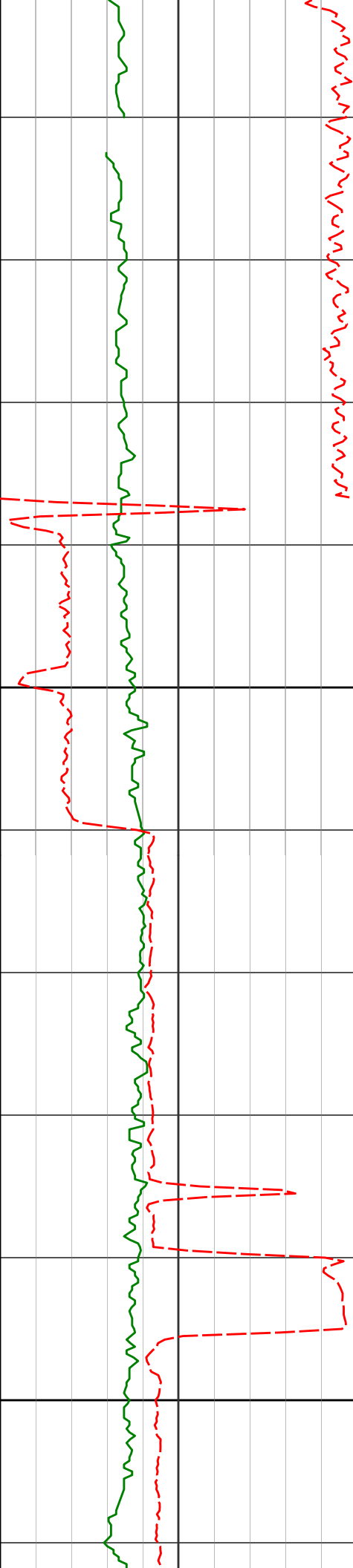
12113'

88.98°

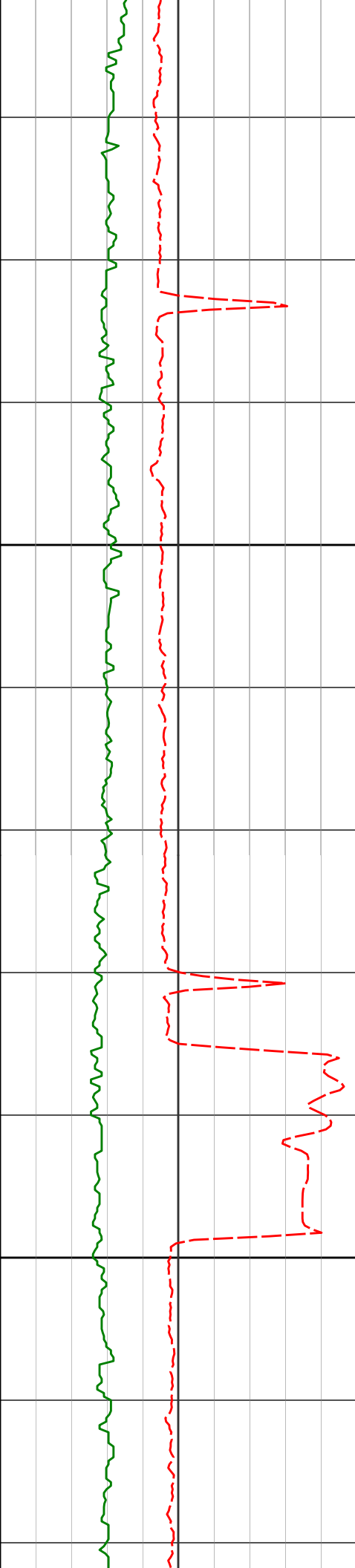
268.83° 6778.97'

5451.94'

12200



Station	Distance (ft)	Bearing	Distance (ft)	Bearing	Distance (ft)	Bearing	Distance (ft)	Bearing
12200	12208'	90.22°	269.34°	6779.64'	5546.94'			
12300	12302'	91.45°	270.04°	6778.27'	5640.92'			
12400	12397'	90.71°	269.80°	6776.48'	5735.89'			



12500

12600

12491'

91.85°

269.83° 6774.38'

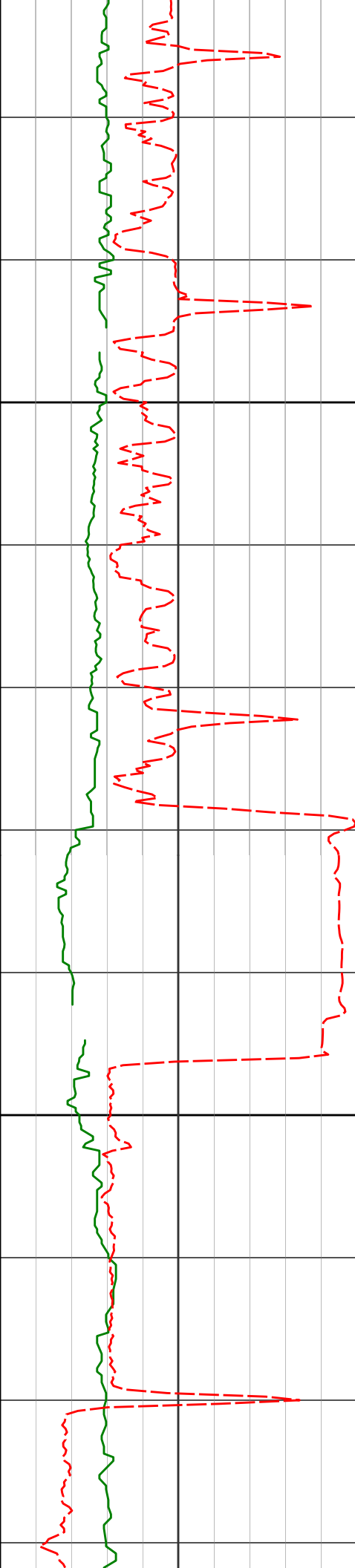
5829.86'

12586'

90.22°

268.82° 6772.66'

5924.84'



12700

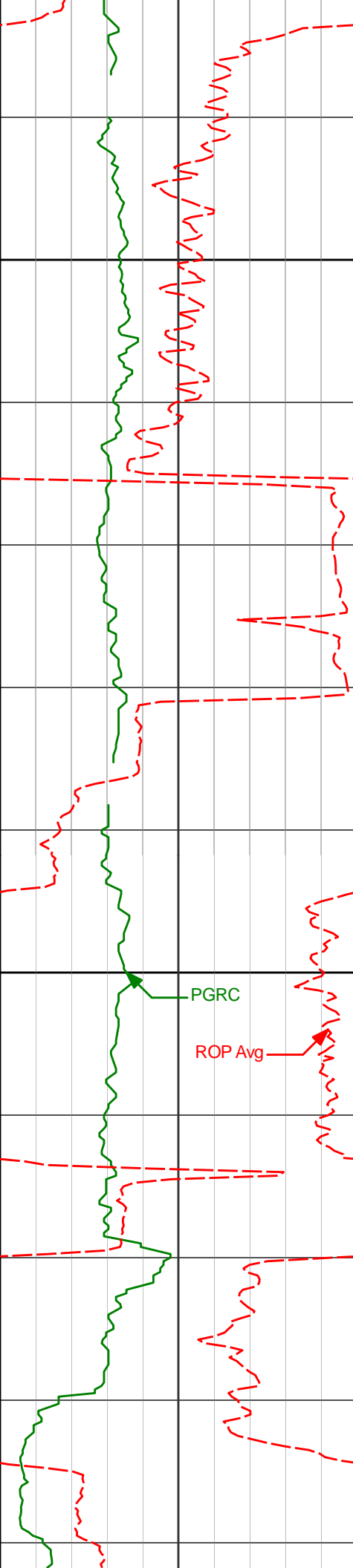
12800

12681'

90.43°

267.97° 6772.12'

6019.83'



12870'

86.15°

267.36° 6777.76'

6208.64'

12900

12965'

87.04°

269.00° 6783.40'

6303.45'

13000

PGRC

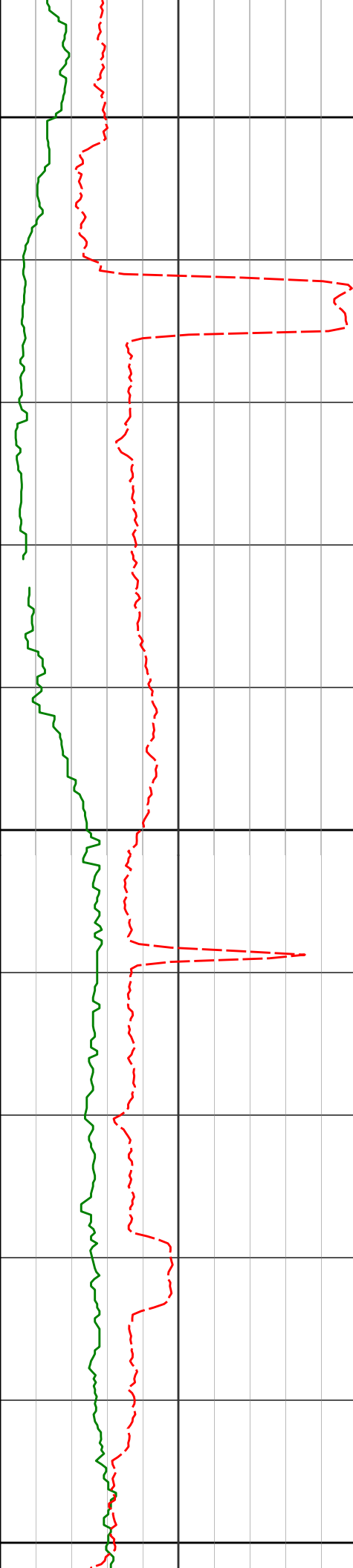
ROP Avg

13060'

87.99°

269.11° 6787.52'

6398.36'



13100

13155'

89.29°

270.16° 6789.78'

6493.32'

13200

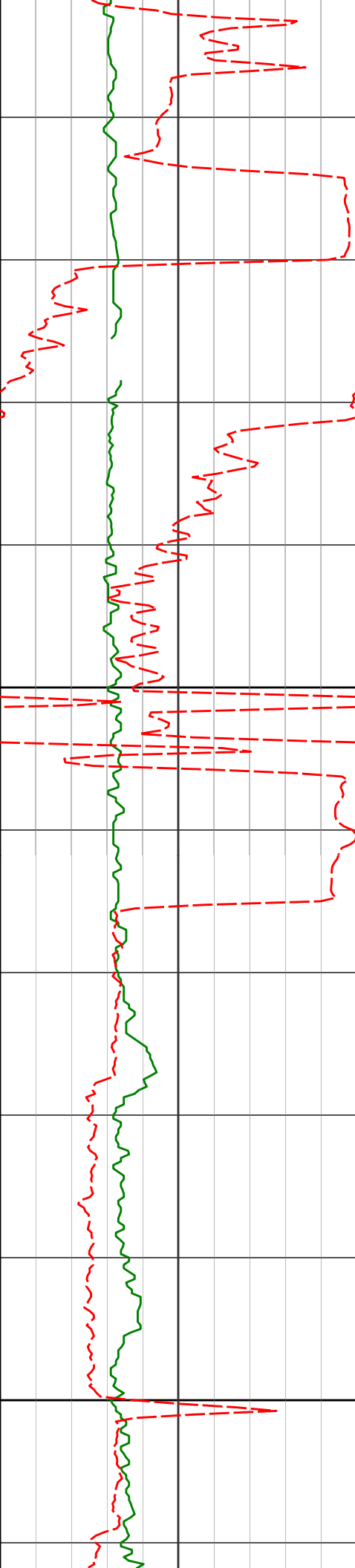
13249'

89.23°

269.65° 6790.99'

6587.31'

13300



13400

13500

13344'

89.66°

269.38° 6791.91'

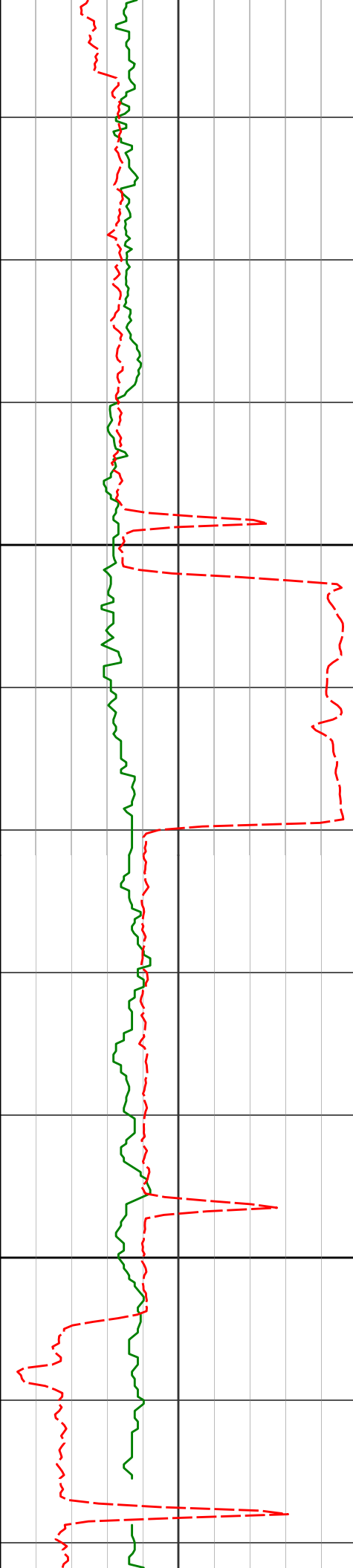
6682.30'

13439'

91.14°

269.59° 6791.25'

6777.30'



13600

13700

13533'

92.44°

269.97° 6788.31'

6871.24'

13628'

90.31°

269.47° 6786.03'

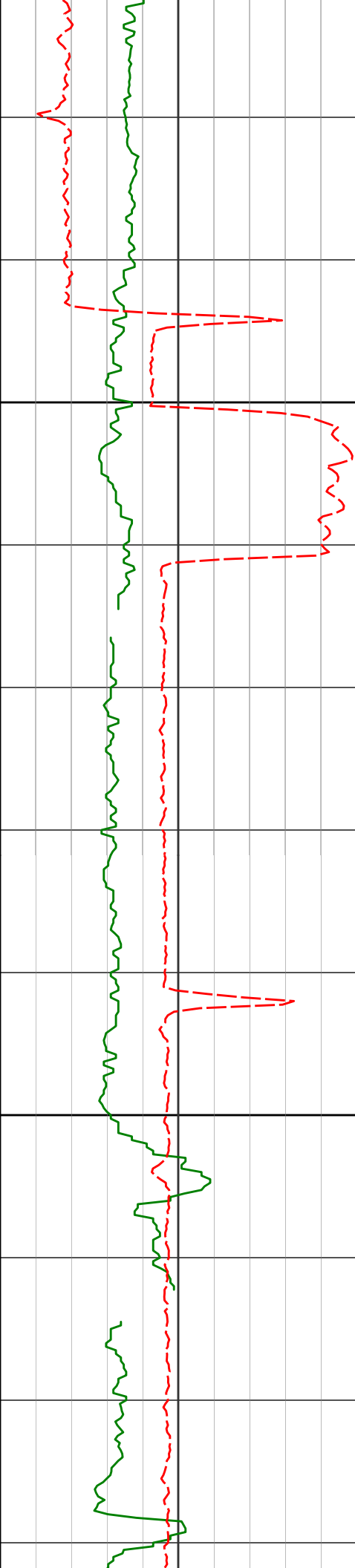
6966.21'

13723'

90.71°

269.07° 6785.19'

7061.20'



13800

13818'

90.28°

269.30° 6784.36'

7156.20'

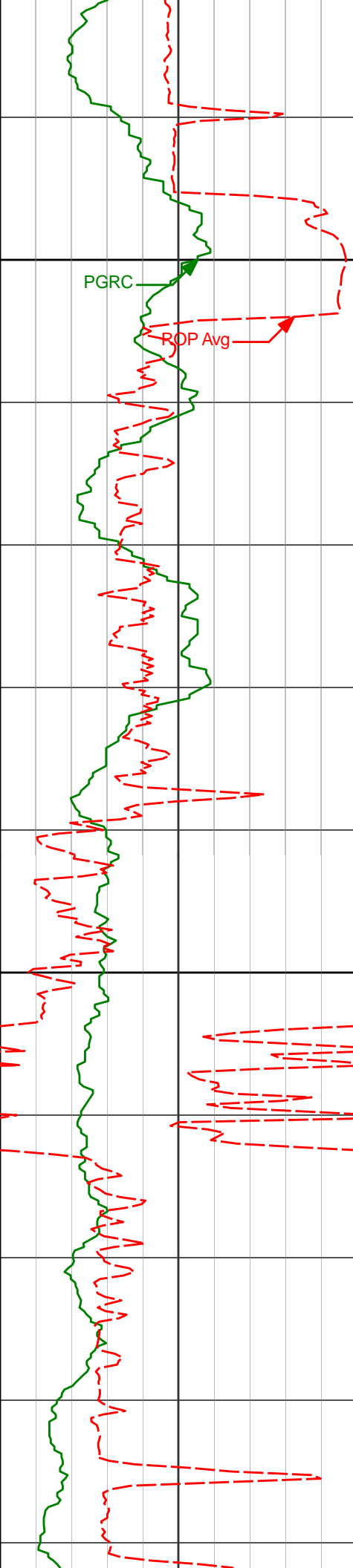
13900

13912'

90.71°

269.02° 6783.55'

7250.20'



14000

14007'

89.23°

269.20° 6783.60'

7345.19'

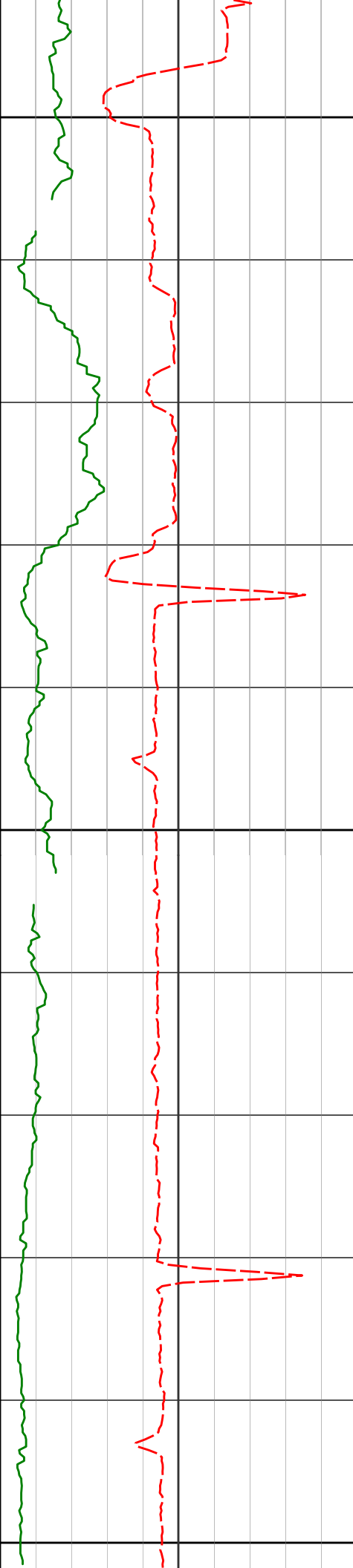
14100

14102'

89.41°

269.13° 6784.73'

7440.19'



14200

14197'

89.20°

269.26° 6785.88'

7535.18'

14300

14291'

89.85°

269.34° 6786.66'

7629.17'

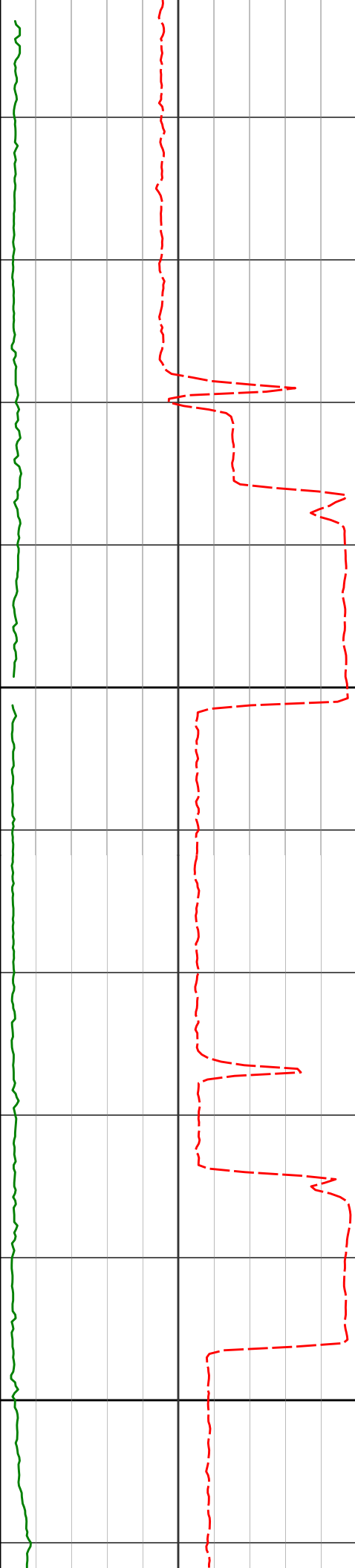
14400

14386'

90.99°

269.23° 6785.97'

7724.17'



14500

14600

14481'

90.99°

269.38° 6784.32'

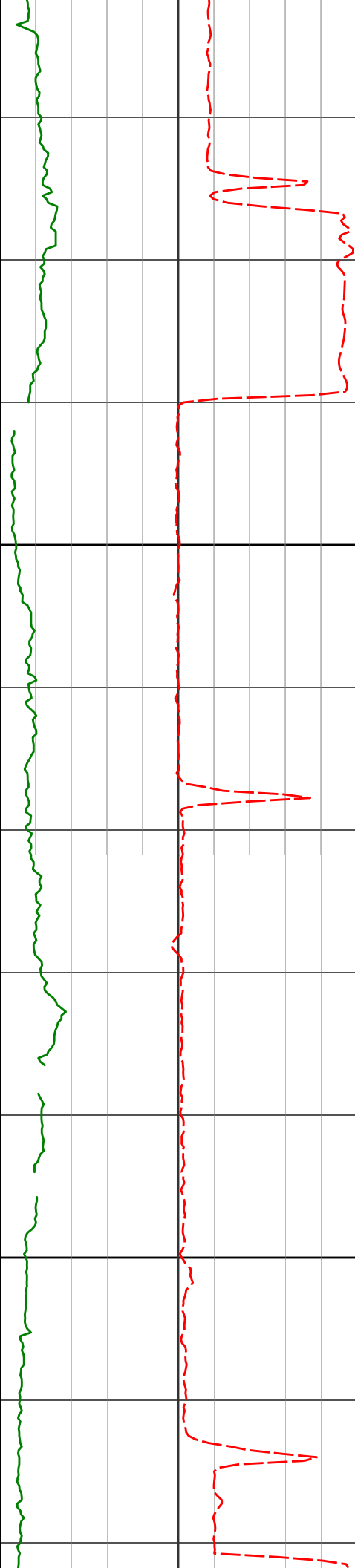
7819.16'

14575'

89.94°

269.20° 6783.56'

7913.15'



14700

14670'

88.49°

269.59° 6784.86'

8008.14'

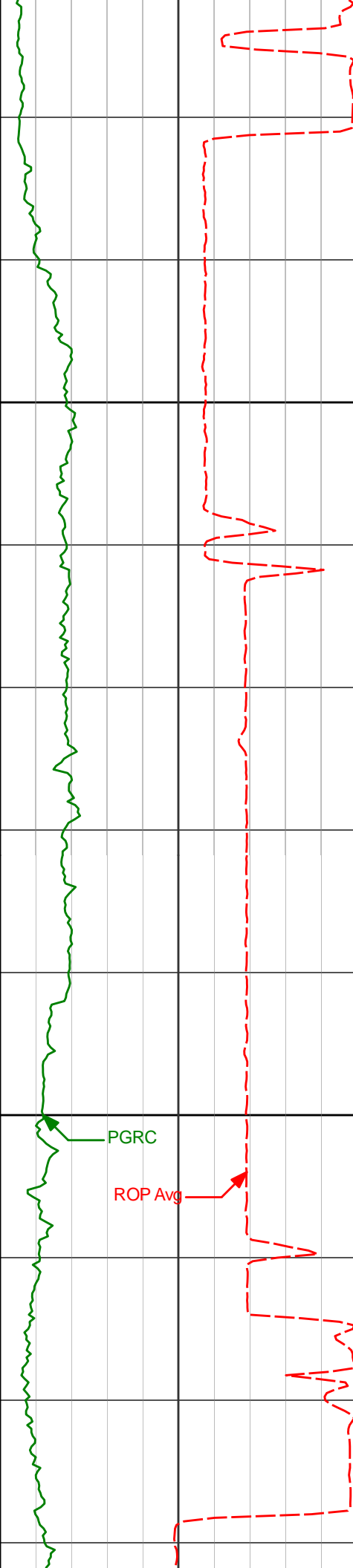
14765'

89.48°

269.80° 6786.55'

8103.12'

14800



14900

<Run 400>

14860'

89.81°

269.56° 6787.13'

8198.11'

14954'

91.33°

270.02° 6786.20'

8292.10'

15000

PGRC

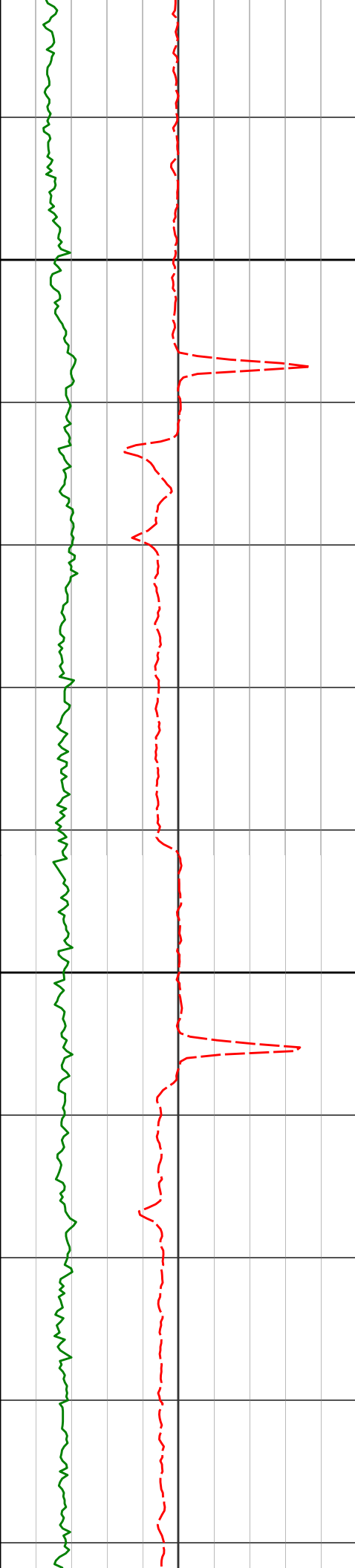
ROP Avg

15048'

89.14°

267.46° 6785.81'

8386.08'



15100

15143'

88.70°

267.25° 6787.60'

8481.02'

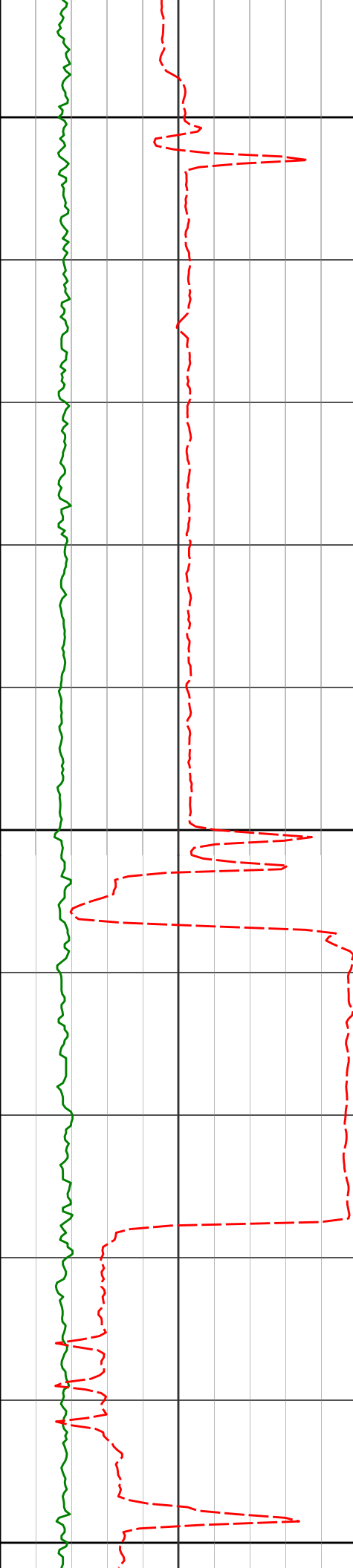
15200

15237'

89.97°

267.84° 6788.70'

8574.97'



15300

15332'

89.75°

264.60° 6788.93'

8669.83'

15400

15427'

89.97°

264.62° 6789.16'

8764.52'

15500



15600

15700

15521'

15616'

15711'

90.77°

88.89°

88.70°

264.54° 6788.55'

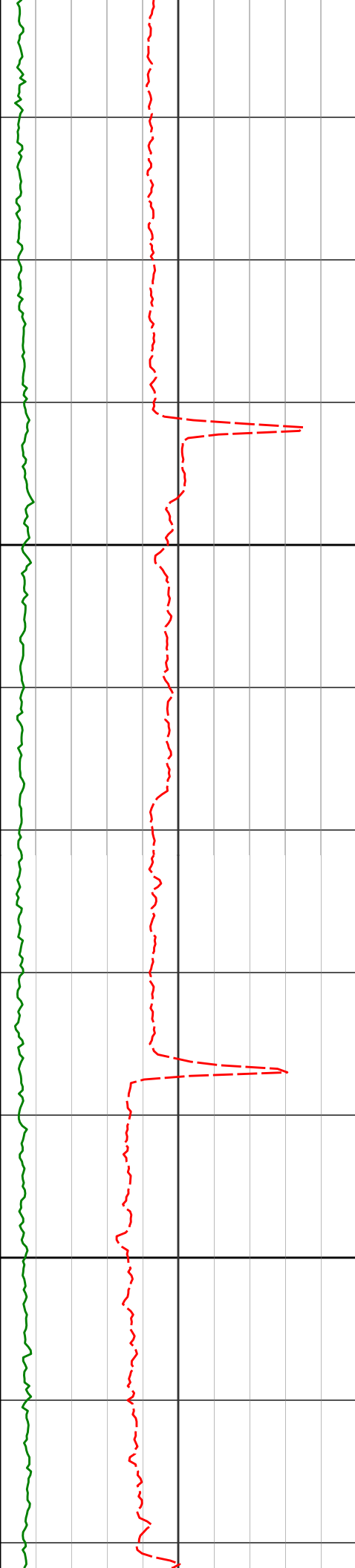
265.39° 6788.83'

265.28° 6790.83'

8858.22'

8952.95'

9047.71'



15800

15806'

88.40°

265.38° 6793.24'

9142.47'

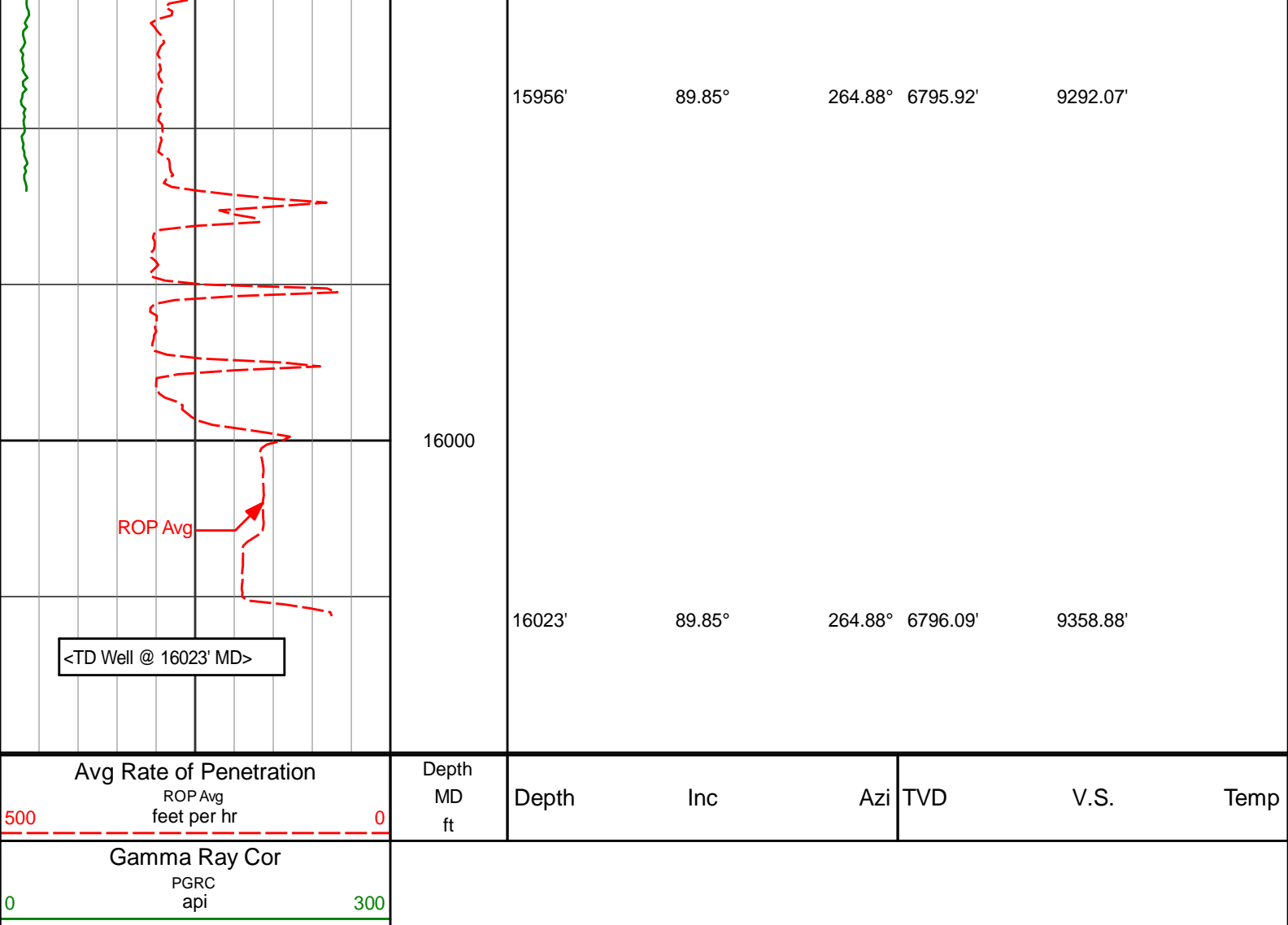
15900

15901'

89.02°

265.12° 6795.38'

9237.22'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
70 Ranch State BB18-681
Wattenberg
Weld Colorado
USA
CA-XX-0902563265

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
300.00	0.71	70.11	299.99	0.63 N	1.75 E	-1.76	0.24
600.00	1.42	70.11	599.94	2.53 N	6.99 E	-7.03	0.24
770.00	1.83	70.11	769.87	4.17 N	11.52 E	-11.58	0.24
826.00	1.96	70.11	825.84	4.80 N	13.27 E	-13.33	0.24
1015.00	1.81	71.28	1014.74	6.86 N	19.14 E	-19.23	0.09
1201.00	1.36	18.02	1200.67	9.89 N	22.59 E	-22.73	0.79
1293.00	1.65	105.84	1292.65	10.57 N	24.20 E	-24.35	2.27
1384.00	1.36	98.15	1383.62	10.06 N	26.53 E	-26.67	0.39
1475.00	1.55	96.59	1474.59	9.76 N	28.82 E	-28.95	0.21
1567.00	1.67	98.18	1566.56	9.43 N	31.38 E	-31.50	0.14
1750.00	1.25	199.65	1749.52	7.18 N	33.34 E	-33.44	1.24
1841.00	0.95	218.76	1840.50	5.65 N	32.54 E	-32.61	0.51
1933.00	0.92	185.70	1932.49	4.32 N	31.99 E	-32.04	0.58
2025.00	0.97	186.98	2024.48	2.81 N	31.82 E	-31.85	0.05
2116.00	0.84	184.88	2115.47	1.38 N	31.67 E	-31.68	0.14

2110.00	0.84	104.08	2113.47	1.38 N	31.07 E	-31.08	0.14
2208.00	0.69	182.85	2207.46	0.16 N	31.58 E	-31.58	0.16
2301.00	2.40	97.90	2300.43	0.67 S	33.48 E	-33.47	2.62
2392.00	4.15	83.85	2391.28	0.58 S	38.64 E	-38.63	2.10
2484.00	5.76	80.69	2482.93	0.52 N	46.50 E	-46.51	1.78
2576.00	5.12	83.11	2574.52	1.76 N	55.14 E	-55.16	0.74
2760.00	6.44	79.55	2757.58	4.62 N	73.44 E	-73.50	0.74
2851.00	6.57	78.55	2847.99	6.58 N	83.57 E	-83.65	0.19
2942.00	7.17	89.67	2938.34	7.64 N	94.35 E	-94.45	1.60
3036.00	6.81	82.16	3031.64	8.44 N	105.75 E	-105.85	1.04
3131.00	6.05	79.77	3126.05	10.10 N	116.25 E	-116.38	0.85
3226.00	5.47	75.73	3220.57	12.10 N	125.56 E	-125.72	0.74
3320.00	5.61	94.47	3314.14	12.85 N	134.49 E	-134.65	1.92
3415.00	4.99	87.20	3408.73	12.69 N	143.24 E	-143.41	0.96
3510.00	6.33	94.50	3503.26	12.48 N	152.60 E	-152.75	1.60
3604.00	5.86	92.25	3596.73	11.88 N	162.56 E	-162.71	0.57
3699.00	6.11	93.51	3691.22	11.38 N	172.45 E	-172.59	0.30
3794.00	4.19	87.92	3785.83	11.20 N	180.97 E	-181.10	2.08
3888.00	2.59	97.87	3879.66	11.03 N	186.50 E	-186.64	1.81
4078.00	0.44	218.00	4069.60	9.86 N	190.30 E	-190.42	1.49
4267.00	1.30	212.42	4258.58	7.48 N	188.70 E	-188.79	0.45
4362.00	1.45	207.72	4353.55	5.51 N	187.57 E	-187.63	0.20
4457.00	1.46	210.32	4448.52	3.40 N	186.40 E	-186.43	0.07
4551.00	1.68	196.10	4542.48	1.04 N	185.41 E	-185.41	0.47
4645.00	1.91	194.30	4636.44	1.80 S	184.64 E	-184.60	0.26
4739.00	1.84	187.46	4730.39	4.82 S	184.06 E	-183.97	0.25
4834.00	1.80	269.73	4825.35	6.33 S	182.37 E	-182.26	2.52
4928.00	1.50	266.32	4919.31	6.42 S	179.66 E	-179.55	0.33
5023.00	1.15	322.33	5014.29	5.74 S	177.83 E	-177.73	1.35
5118.00	0.83	293.57	5109.28	4.71 S	176.62 E	-176.54	0.62
5307.00	0.77	281.29	5298.26	3.92 S	174.12 E	-174.05	0.09
5402.00	1.04	352.54	5393.25	2.93 S	173.38 E	-173.32	1.14
5496.00	0.56	303.75	5487.24	1.83 S	172.89 E	-172.85	0.85
5591.00	0.23	139.89	5582.24	1.72 S	172.63 E	-172.59	0.83
5686.00	0.31	82.41	5677.24	1.84 S	173.01 E	-172.97	0.29
5780.00	0.56	72.59	5771.24	1.66 S	173.71 E	-173.67	0.27
5875.00	0.40	102.35	5866.23	1.60 S	174.48 E	-174.44	0.31
5970.00	0.49	87.83	5961.23	1.65 S	175.21 E	-175.17	0.15
6065.00	0.37	95.76	6056.23	1.67 S	175.93 E	-175.89	0.14
6159.00	6.16	268.64	6150.06	1.82 S	171.18 E	-171.14	6.95
6254.00	14.37	272.73	6243.46	1.38 S	154.27 E	-154.24	8.67
6349.00	20.73	272.83	6333.99	0.02 N	125.67 E	-125.66	6.70
6444.00	28.29	270.00	6420.37	0.85 N	86.31 E	-86.31	8.04
6538.00	34.05	271.99	6500.77	1.76 N	37.70 E	-37.72	6.23
6633.00	42.15	272.81	6575.47	4.26 N	20.82 W	20.75	8.54
6727.00	52.66	270.37	6639.00	6.05 N	89.89 W	89.79	11.35
6822.00	64.37	269.52	6688.53	5.94 N	170.76 W	170.66	12.35
6917.00	76.25	270.66	6720.48	6.11 N	260.04 W	259.93	12.56
7002.00	87.35	272.08	6732.59	8.14 N	344.02 W	343.87	13.16
7155.00	89.45	272.69	6736.86	14.50 N	496.81 W	496.56	1.43
7250.00	89.32	270.87	6737.88	17.45 N	591.76 W	591.46	1.92
7344.00	91.82	270.84	6736.94	18.85 N	685.74 W	685.41	2.66
7439.00	89.41	269.93	6735.92	19.49 N	780.72 W	780.37	2.71
7534.00	90.49	270.08	6736.01	19.50 N	875.72 W	875.36	1.15
7629.00	89.08	269.20	6736.36	18.90 N	970.71 W	970.36	1.75
7723.00	90.80	269.10	6736.46	17.51 N	1064.70 W	1064.35	1.83
7818.00	91.02	268.65	6734.95	15.64 N	1159.67 W	1159.34	0.53
7913.00	89.20	269.12	6734.77	13.79 N	1254.65 W	1254.33	1.98
8007.00	89.57	269.22	6735.78	12.43 N	1348.63 W	1348.33	0.41
8102.00	88.12	268.52	6737.69	10.56 N	1443.59 W	1443.30	1.69
8197.00	87.94	268.70	6740.96	8.26 N	1538.51 W	1538.24	0.27
8292.00	88.46	269.23	6743.94	6.54 N	1633.44 W	1633.19	0.78
8387.00	88.80	269.51	6746.21	5.50 N	1728.41 W	1728.17	0.46
8481.00	89.60	269.82	6747.53	4.95 N	1822.40 W	1822.15	0.91
8576.00	90.40	269.96	6747.53	4.76 N	1917.40 W	1917.14	0.85
8670.00	92.19	270.18	6745.40	4.88 N	2011.37 W	2011.11	1.92
8765.00	91.91	267.97	6742.00	3.35 N	2106.29 W	2106.04	2.34
8860.00	91.79	266.15	6738.94	1.52 S	2201.11 W	2200.92	1.92
8955.00	90.15	265.69	6737.33	8.28 S	2295.85 W	2295.75	1.79
9050.00	89.14	266.08	6737.92	15.10 S	2390.61 W	2390.58	1.14
9144.00	90.34	265.77	6738.34	21.78 S	2484.37 W	2484.43	1.32
9239.00	89.45	267.45	6738.52	27.40 S	2579.19 W	2579.33	2.00
9334.00	88.27	269.24	6740.41	30.14 S	2674.13 W	2674.29	2.26
9428.00	89.88	269.69	6741.93	31.02 S	2768.11 W	2768.27	1.78
9523.00	88.58	269.37	6743.20	31.80 S	2863.10 W	2863.26	1.41

9618.00	90.59	269.06	6743.89	33.10 S	2958.08 W	2958.25	2.14
9712.00	87.72	268.36	6745.28	35.21 S	3052.04 W	3052.23	3.14
9804.00	88.03	268.53	6748.69	37.71 S	3143.94 W	3144.16	0.38
9895.00	89.29	268.81	6750.82	39.82 S	3234.89 W	3235.13	1.42
9987.00	91.66	269.17	6750.05	41.44 S	3326.86 W	3327.12	2.61
10078.00	88.49	268.77	6749.93	43.08 S	3417.84 W	3418.11	3.51
10169.00	90.37	268.80	6750.84	45.01 S	3508.81 W	3509.09	2.07
10261.00	89.20	269.31	6751.18	46.52 S	3600.79 W	3601.09	1.39
10352.00	89.45	270.83	6752.26	46.41 S	3691.78 W	3692.07	1.69
10444.00	86.67	269.79	6755.37	45.91 S	3783.72 W	3783.99	3.23
10535.00	88.83	270.69	6758.94	45.53 S	3874.64 W	3874.90	2.57
10719.00	89.85	271.14	6761.06	42.59 S	4058.60 W	4058.80	0.61
10811.00	90.80	271.09	6760.54	40.80 S	4150.58 W	4150.75	1.03
10903.00	92.65	271.47	6757.77	38.75 S	4242.52 W	4242.64	2.05
10995.00	90.34	270.72	6755.37	36.99 S	4334.46 W	4334.55	2.64
11087.00	89.69	270.24	6755.35	36.22 S	4426.46 W	4426.53	0.88
11179.00	88.24	268.54	6757.01	37.20 S	4518.43 W	4518.51	2.43
11270.00	87.91	267.44	6760.07	40.39 S	4609.32 W	4609.44	1.26
11362.00	90.06	267.53	6761.70	44.43 S	4701.21 W	4701.37	2.34
11453.00	89.69	267.23	6761.89	48.59 S	4792.12 W	4792.33	0.52
11544.00	89.88	268.38	6762.24	52.07 S	4883.05 W	4883.30	1.28
11639.00	89.75	268.67	6762.54	54.52 S	4978.02 W	4978.29	0.33
11734.00	88.30	268.61	6764.16	56.77 S	5072.97 W	5073.27	1.53
11828.00	87.22	268.53	6767.83	59.12 S	5166.87 W	5167.19	1.15
11923.00	87.25	268.34	6772.42	61.71 S	5261.72 W	5262.07	0.20
12018.00	87.93	268.52	6776.41	64.31 S	5356.60 W	5356.98	0.74
12113.00	88.98	268.83	6778.97	66.51 S	5451.54 W	5451.94	1.15
12208.00	90.22	269.34	6779.64	68.02 S	5546.53 W	5546.94	1.41
12302.00	91.45	270.04	6778.27	68.53 S	5640.51 W	5640.92	1.51
12397.00	90.71	269.80	6776.48	68.66 S	5735.49 W	5735.89	0.82
12491.00	91.85	269.83	6774.38	68.97 S	5829.47 W	5829.86	1.21
12586.00	90.22	268.82	6772.66	70.09 S	5924.44 W	5924.84	2.02
12681.00	90.43	267.97	6772.12	72.75 S	6019.40 W	6019.83	0.92
12870.00	86.15	267.36	6777.76	80.44 S	6208.12 W	6208.64	2.29
12965.00	87.04	269.00	6783.40	83.45 S	6302.90 W	6303.45	1.96
13060.00	87.99	269.11	6787.52	85.02 S	6397.79 W	6398.36	1.01
13155.00	89.29	270.16	6789.78	85.62 S	6492.76 W	6493.32	1.76
13249.00	89.23	269.65	6790.99	85.78 S	6586.75 W	6587.31	0.55
13344.00	89.66	269.38	6791.91	86.58 S	6681.75 W	6682.30	0.53
13439.00	91.14	269.59	6791.25	87.44 S	6776.74 W	6777.30	1.57
13533.00	92.44	269.97	6788.31	87.80 S	6870.69 W	6871.24	1.44
13628.00	90.31	269.47	6786.03	88.26 S	6965.65 W	6966.21	2.30
13723.00	90.71	269.07	6785.19	89.47 S	7060.64 W	7061.20	0.60
13818.00	90.28	269.30	6784.36	90.82 S	7155.63 W	7156.20	0.51
13912.00	90.71	269.02	6783.55	92.20 S	7249.61 W	7250.20	0.55
14007.00	89.23	269.20	6783.60	93.68 S	7344.60 W	7345.19	1.57
14102.00	89.41	269.13	6784.73	95.06 S	7439.58 W	7440.19	0.20
14197.00	89.20	269.26	6785.88	96.40 S	7534.57 W	7535.18	0.26
14291.00	89.85	269.34	6786.66	97.54 S	7628.56 W	7629.17	0.70
14386.00	90.99	269.23	6785.97	98.73 S	7723.54 W	7724.17	1.21
14481.00	90.99	269.38	6784.32	99.88 S	7818.52 W	7819.16	0.16
14575.00	89.94	269.20	6783.56	101.05 S	7912.51 W	7913.15	1.13
14670.00	88.49	269.59	6784.86	102.05 S	8007.50 W	8008.14	1.58
14765.00	89.48	269.80	6786.55	102.56 S	8102.48 W	8103.12	1.07
14860.00	89.81	269.56	6787.13	103.09 S	8197.47 W	8198.11	0.43
14954.00	91.33	270.02	6786.20	103.43 S	8291.47 W	8292.10	1.69
15048.00	89.14	267.46	6785.81	105.50 S	8385.43 W	8386.08	3.58
15143.00	88.70	267.25	6787.60	109.88 S	8480.31 W	8481.02	0.51
15237.00	89.97	267.84	6788.70	113.91 S	8574.22 W	8574.97	1.49
15332.00	89.75	264.60	6788.93	120.17 S	8669.00 W	8669.83	3.42
15427.00	89.97	264.62	6789.16	129.09 S	8763.58 W	8764.52	0.23
15521.00	90.77	264.54	6788.55	137.97 S	8857.15 W	8858.22	0.86
15616.00	88.89	265.39	6788.83	146.31 S	8951.78 W	8952.95	2.17
15711.00	88.70	265.28	6790.83	154.03 S	9046.44 W	9047.71	0.23
15806.00	88.40	265.38	6793.24	161.77 S	9141.10 W	9142.47	0.33
15901.00	89.02	265.12	6795.38	169.63 S	9235.75 W	9237.22	0.71
15956.00	89.85	264.88	6795.92	174.42 S	9290.54 W	9292.07	1.57
16023.00	89.85	264.88	6796.09	180.40 S	9357.27 W	9358.88	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 RELATIVE TO WELL HEAD
VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 269.20 DEGREES (GRID)
A TOTAL CORRECTION OF 7.54 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 16023.00 FEET
IS 9359.01 FEET ALONG 268.90 DEGREES (GRID)

Surveys at 300 ft, 600 ft and 770 ft were interpolated between surface and first survey at 826 ft per Noble Energy.

Last survey is a projection from 15956 ft MD to TD at 16023 ft MD.

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