



1 : 600 / 1 : 240

WELL INFORMATION					
MWD Run Number	100	200			
Date run completed	10-Sep-15	14-Sep-15			
Rig Bit Number	0100	0200			
Bit Size (in)	8.750	6.125			
Tool Nominal OD (in)	6.750	4.750			
Log Start Depth (MD, ft)	638.00	6,929.00			
Log End Depth (MD, ft)	6,929.00	16,038.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	08-Sep-15 17:25	11-Sep-15 06:40			
Drill/Wipe End Date and Time	10-Sep-15 02:00	14-Sep-15 03:00			
Min Inc (deg) @ Depth (MD, ft)	0.28 @ 5,435.00	88.15 @ 8,488.00			
Max Inc (deg) @ Depth (MD, ft)	84.11 @ 6,861.00	93.61 @ 15,546.00			
Bit TFA(in2) / Bit Type	0.98 / PDC	0.98 / PDC			
Flow Rate (gpm)	582.86	316.86			
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A			
Fluid Type	Native/Spud Mud	Native/Spud Mud			
Density (ppg) / Viscosity (spqt)	10.20 / 39.00	9.80 / 34.00			
Filtrate CL (ppm)	2,300.00	2,700.00			
pH / Fluid Loss (mptm)	9.60 / 8	9.30 / 6			
PV (cP) / YP (lhf2)	13 / 15.00	10 / 13.00			
% Solids / % Sand	10.20 / 0.15	7.70 / 0.25			
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A			
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Max Tool Temp (in F) @ S	477.04 / PDC	322.70 / PDC			

Max Tool Temp (degF) / Source	177.64 / PCM	238.70 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Henry Schmeidler	Henry Schmeidler			
Customer Representative	Johnny Sanchez	Johnny Sanchez			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.93	5.93			
Sub Serial Number	11404299	12334773			
Insert Serial Number	11619985	11400870			
Date and Time Initialized	08-Sep-15 12:28	10-Sep-15 15:58			
Date and Time Read	10-Sep-15 06:43	14-Sep-15 16:54			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	66.00	67.00			
Software Version	6.33	6.21			
Sub Serial Number	11404299	12334773			
Sonde Serial Number	10859920	11478016			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	160.70	100.00			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	58.77	60.60			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11404299	12334773			
Insert/Sonde Serial Number	11680918	12037418			

REMARKS

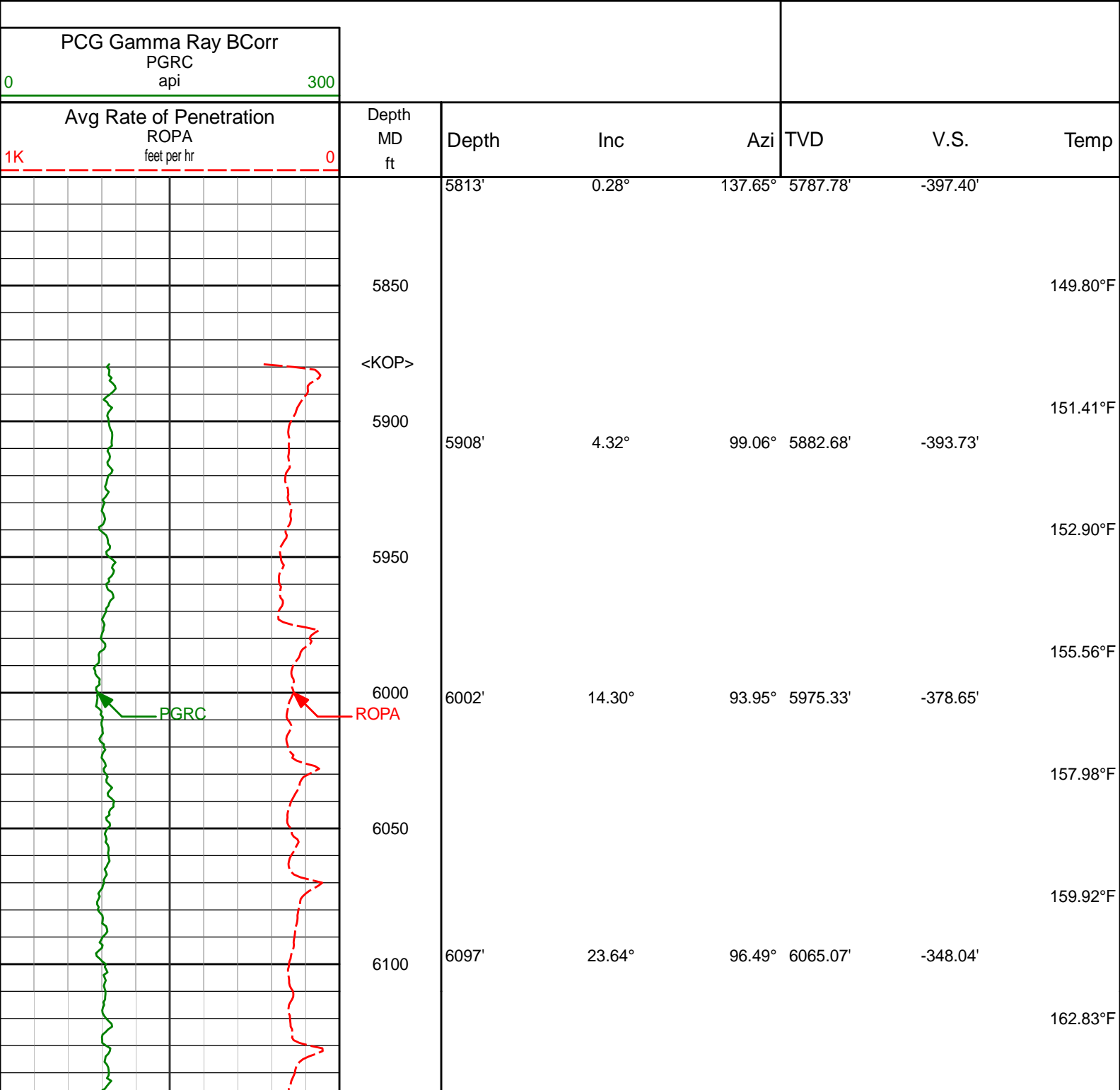
1. All depths are calibrated to driller's pipe tally and are total vertical depth from the drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
4. Environmental parameters used in gamma and resistance processing:
Hole Size: 6.125"
Mud Density: 9.9-10.3
5. The following smoothing parameters have been applied to the data:
Interval: 0.5 ft
Coercion Distance: 1.2 ft (ROPA)
Interval: 0.5 ft
Coercion Distance: 0.6 ft (Gamma Ray)

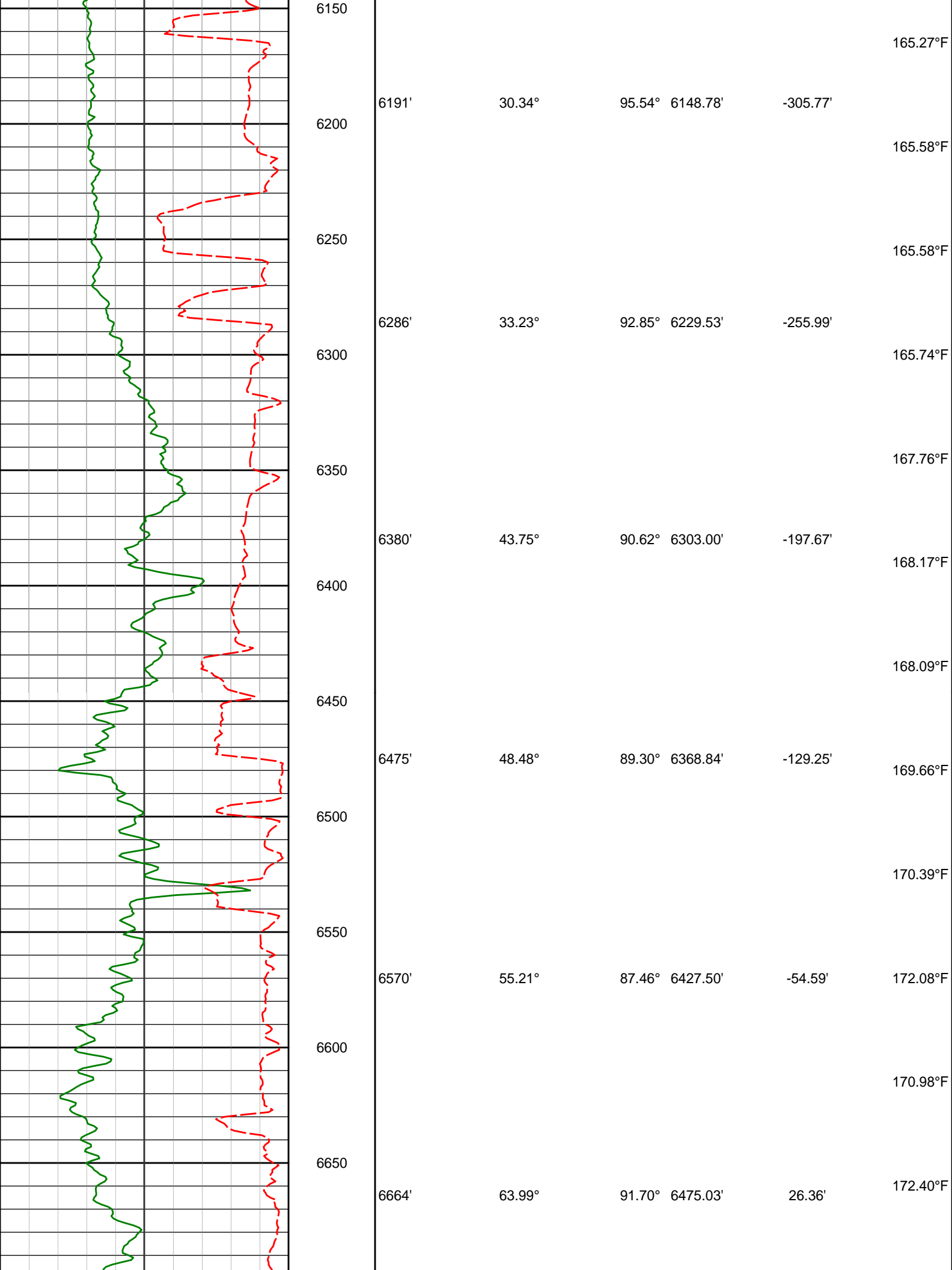
WARRANTY

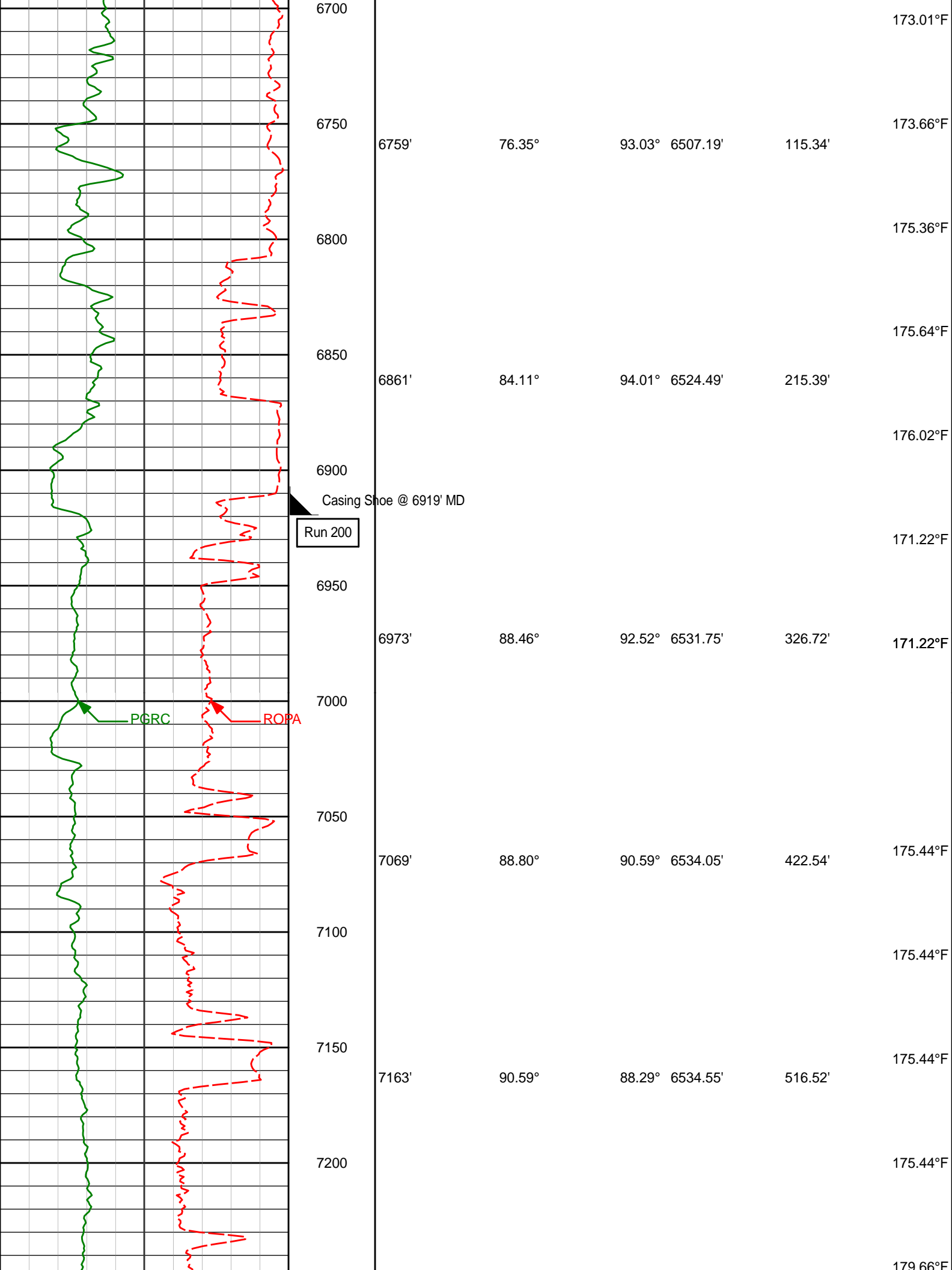
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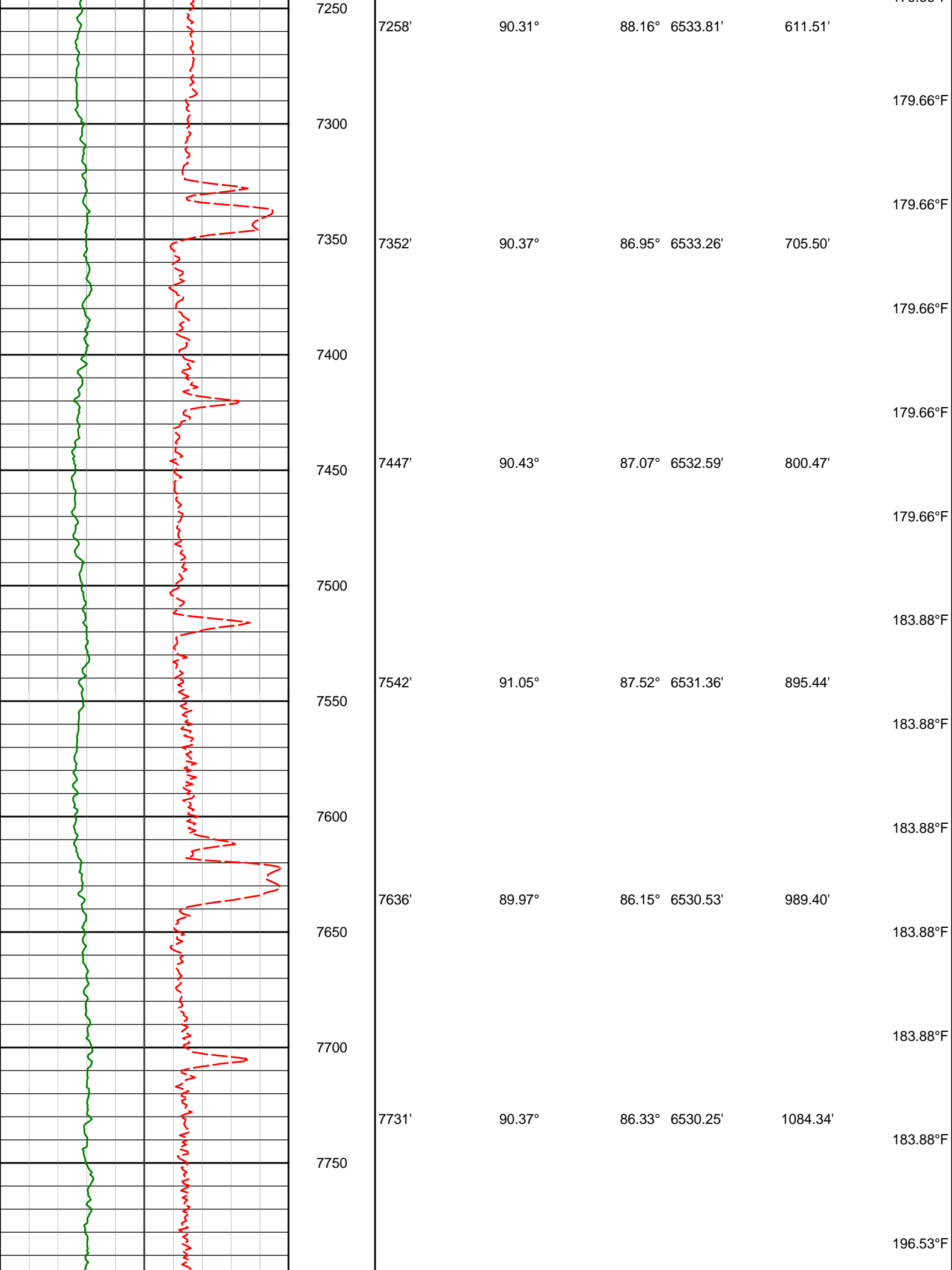
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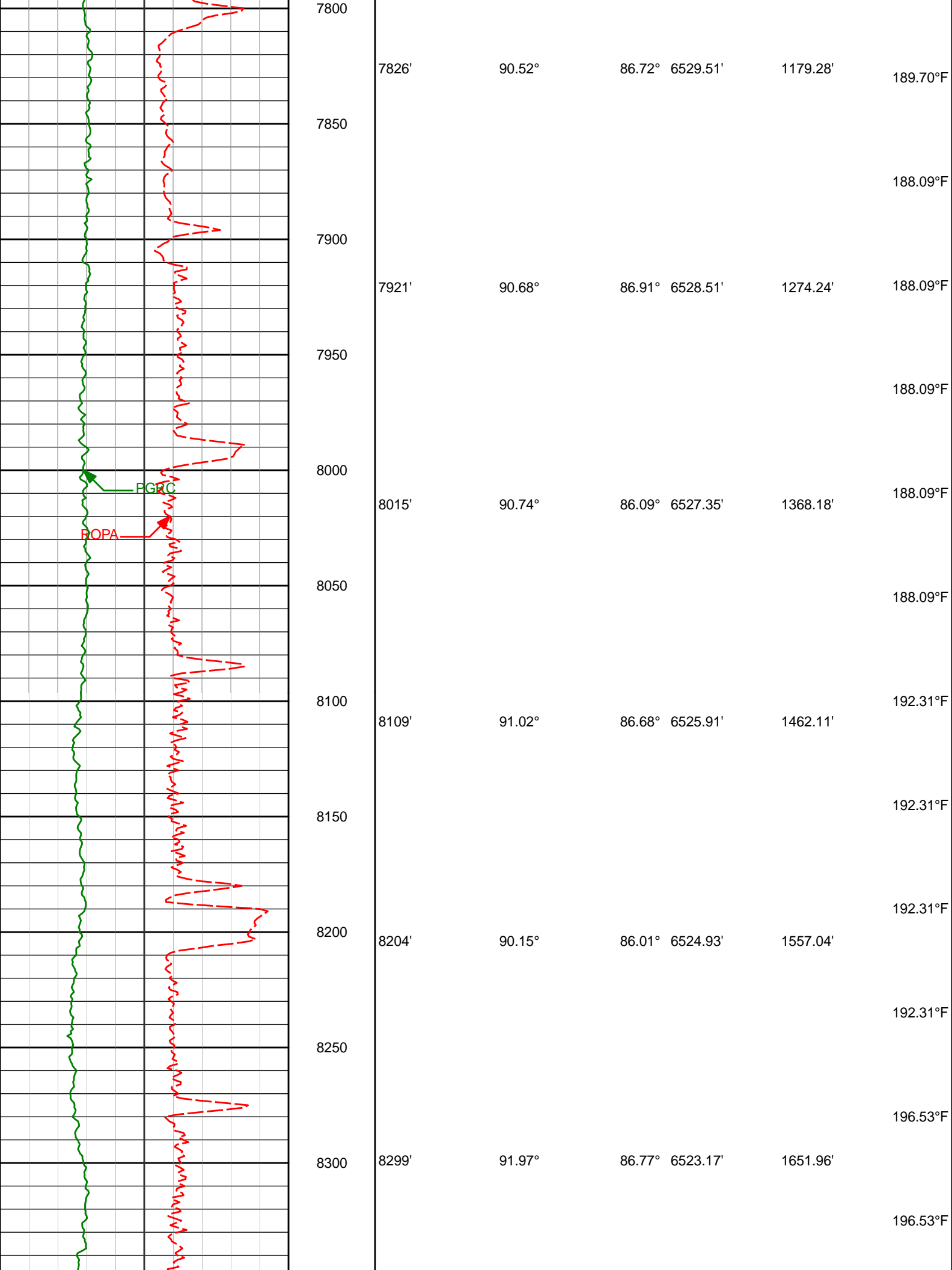
MD Detail 1:600 Scale

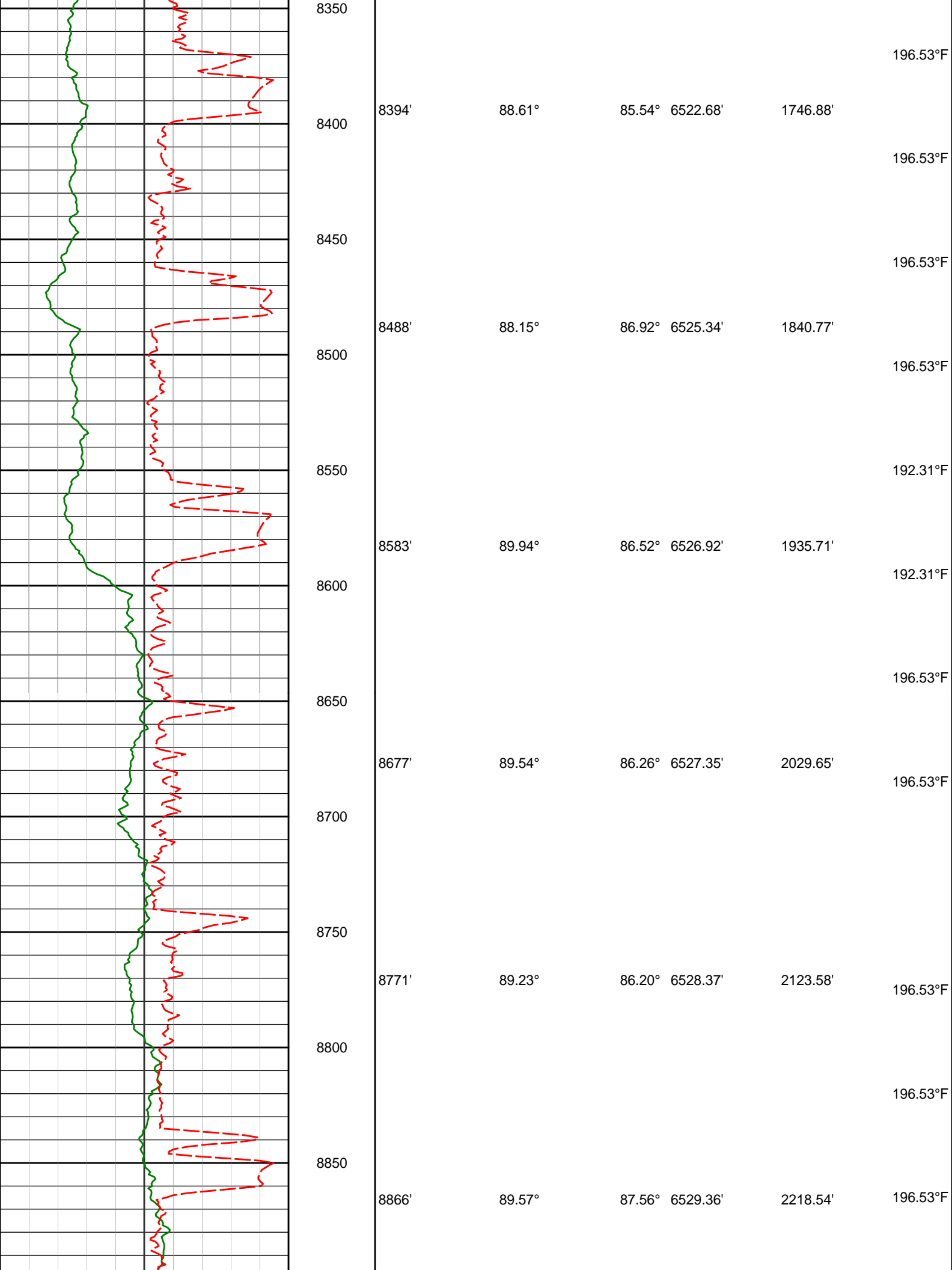


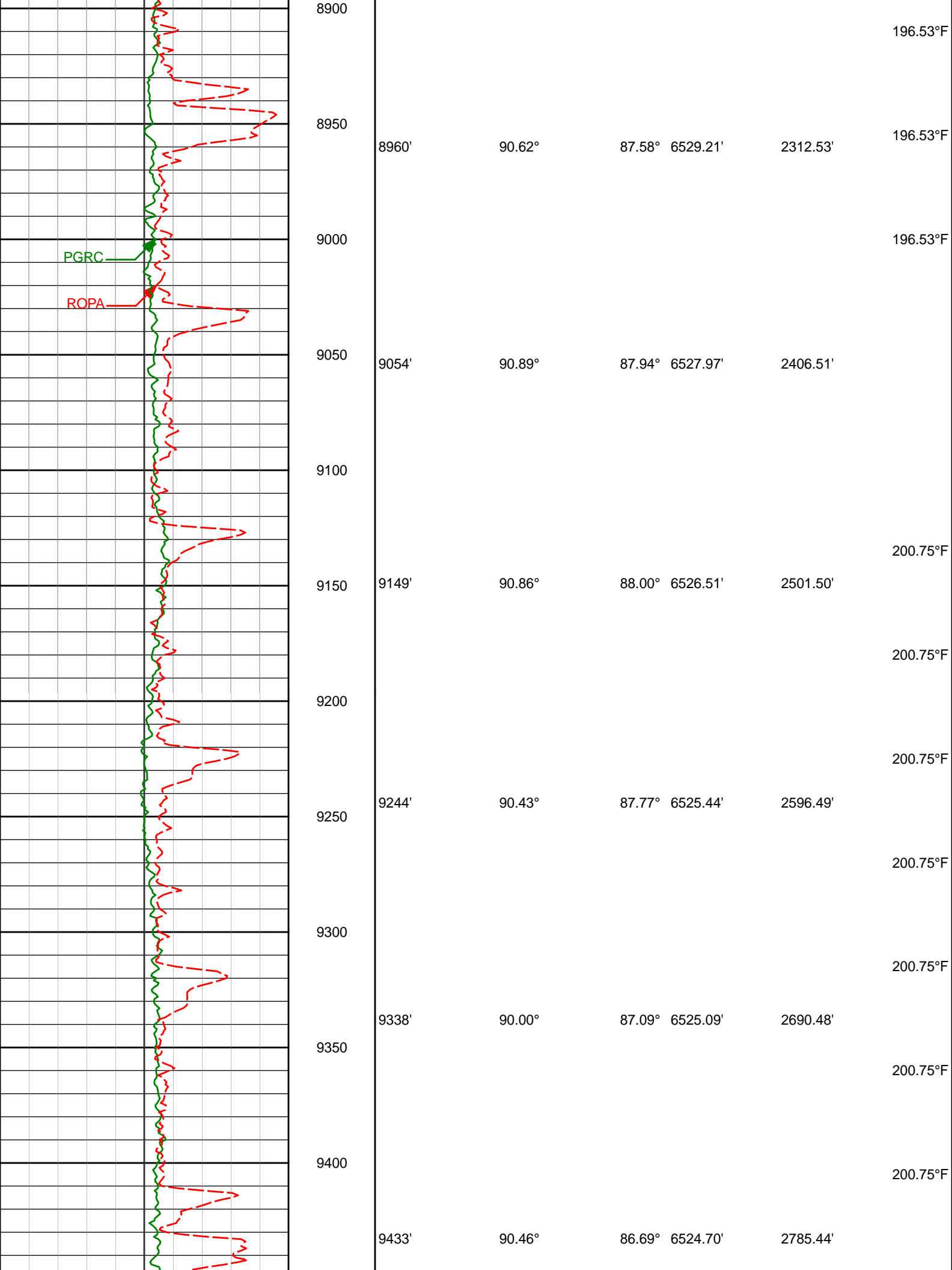


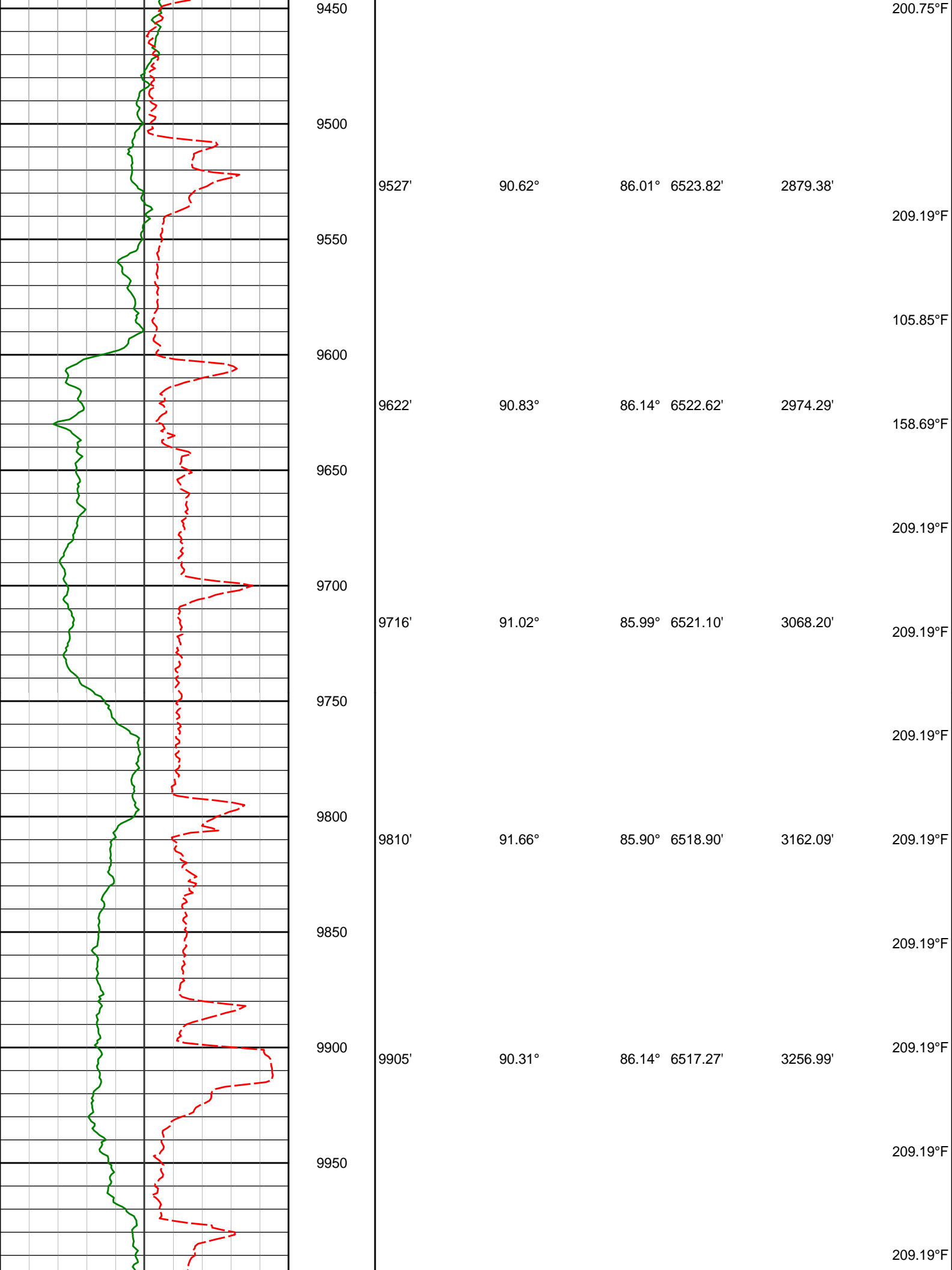


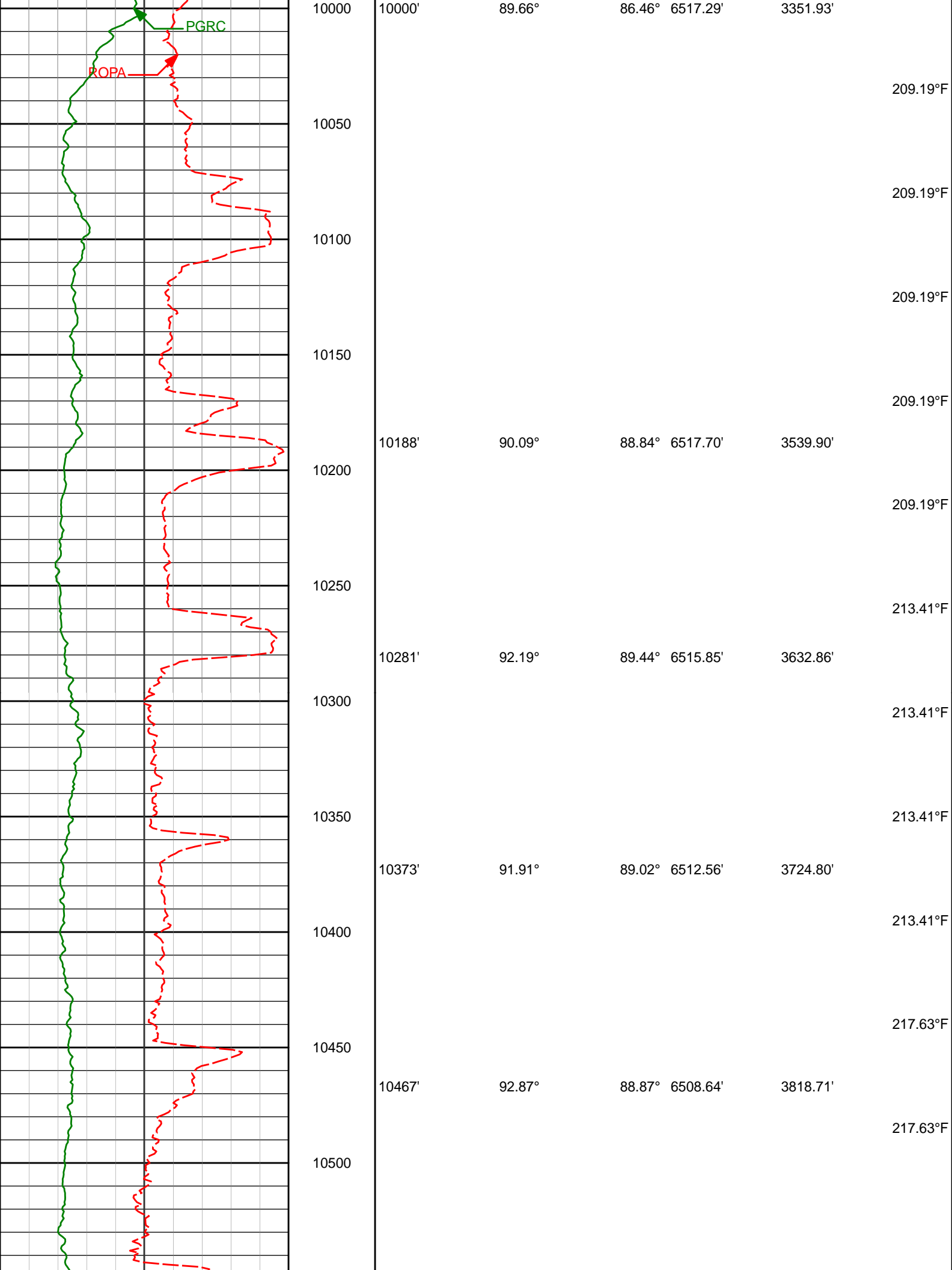


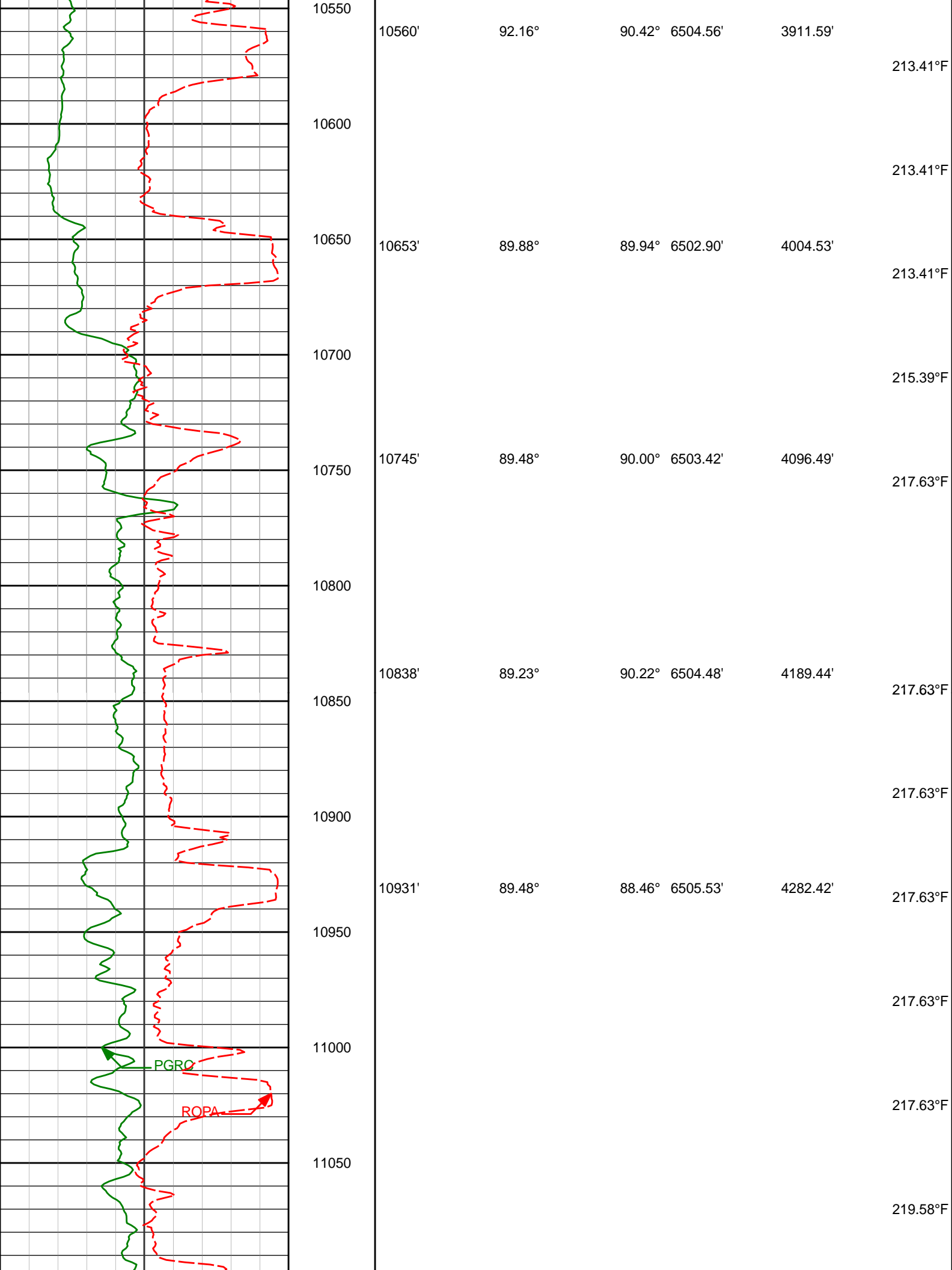


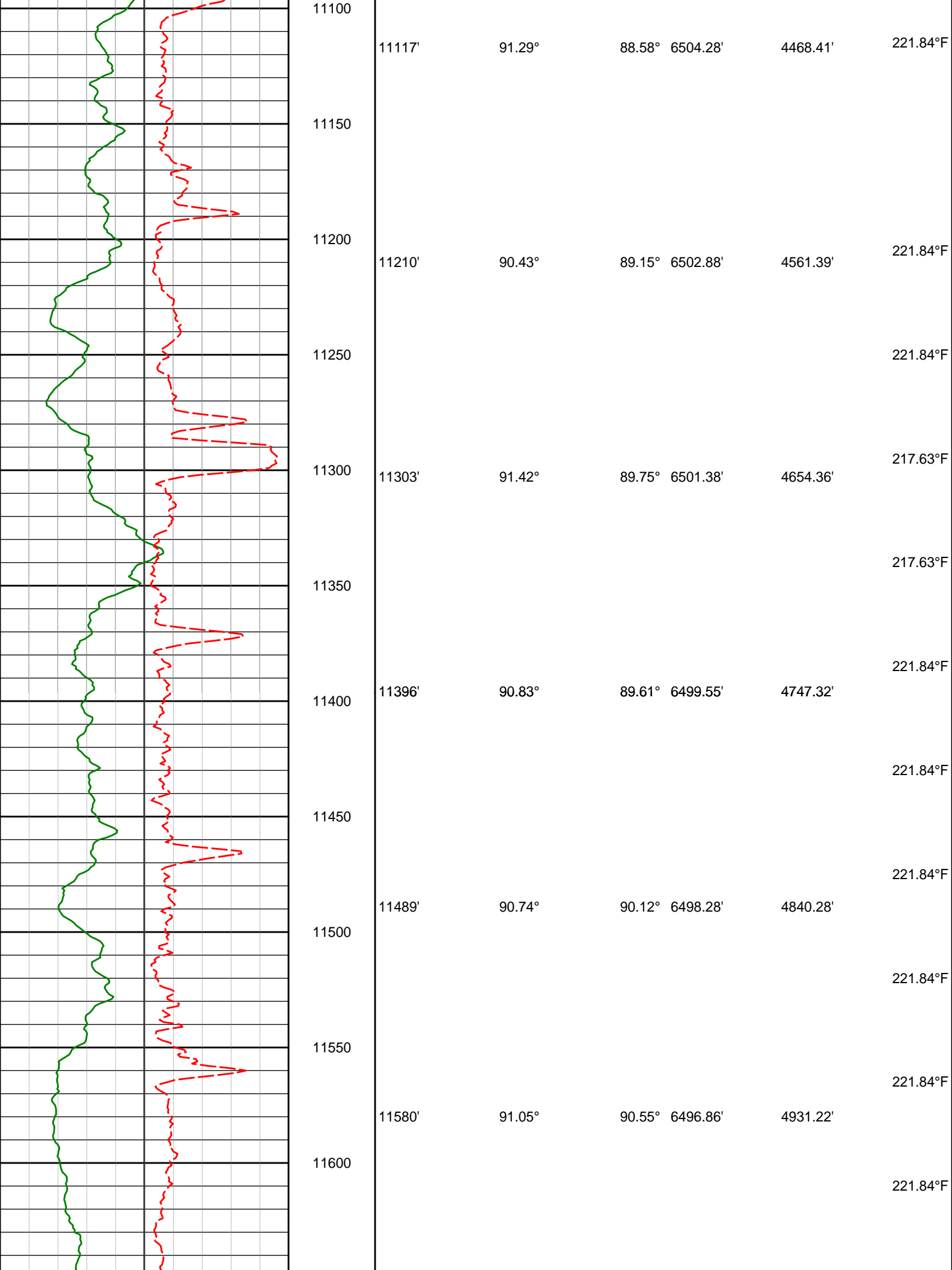


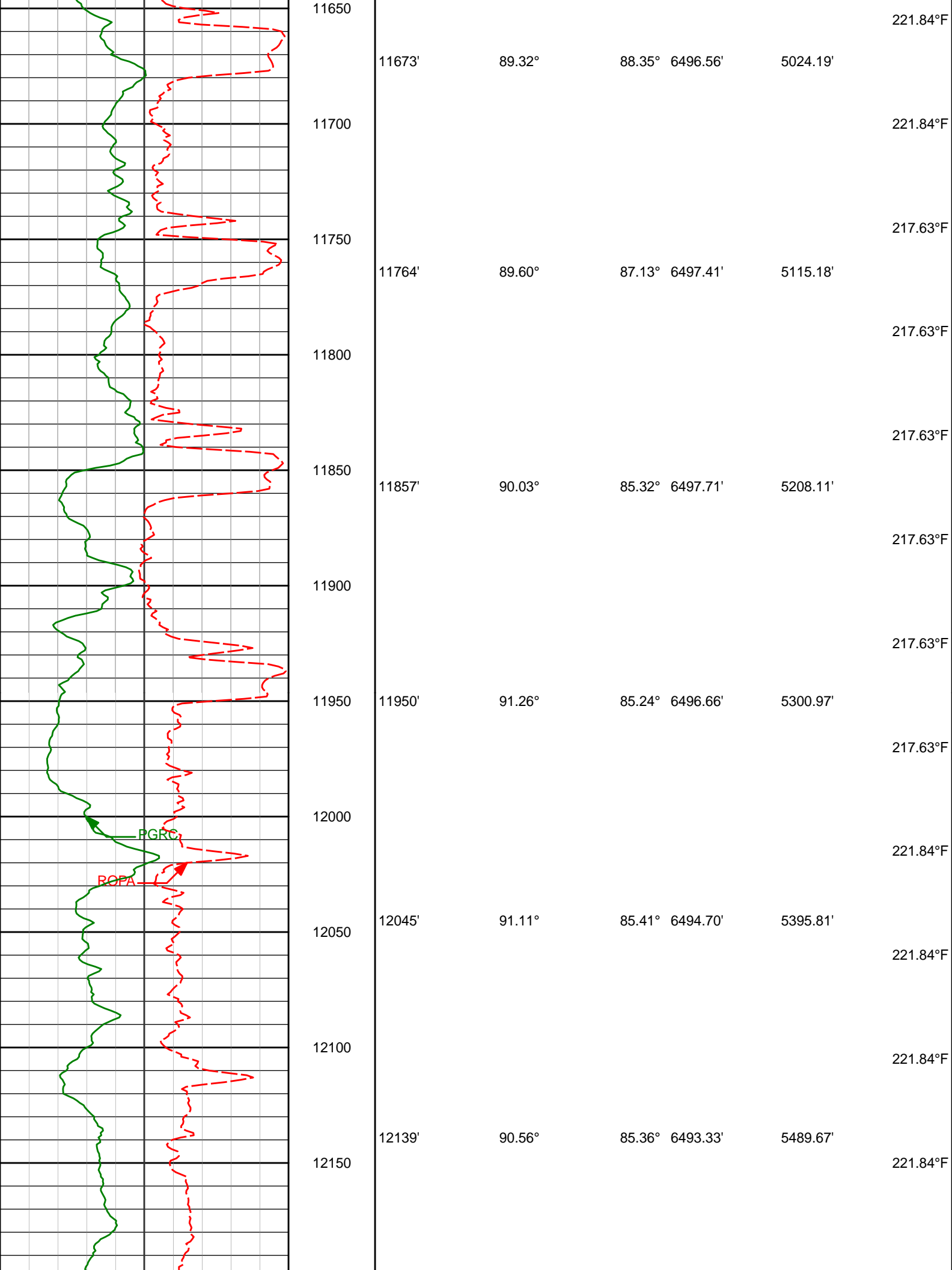


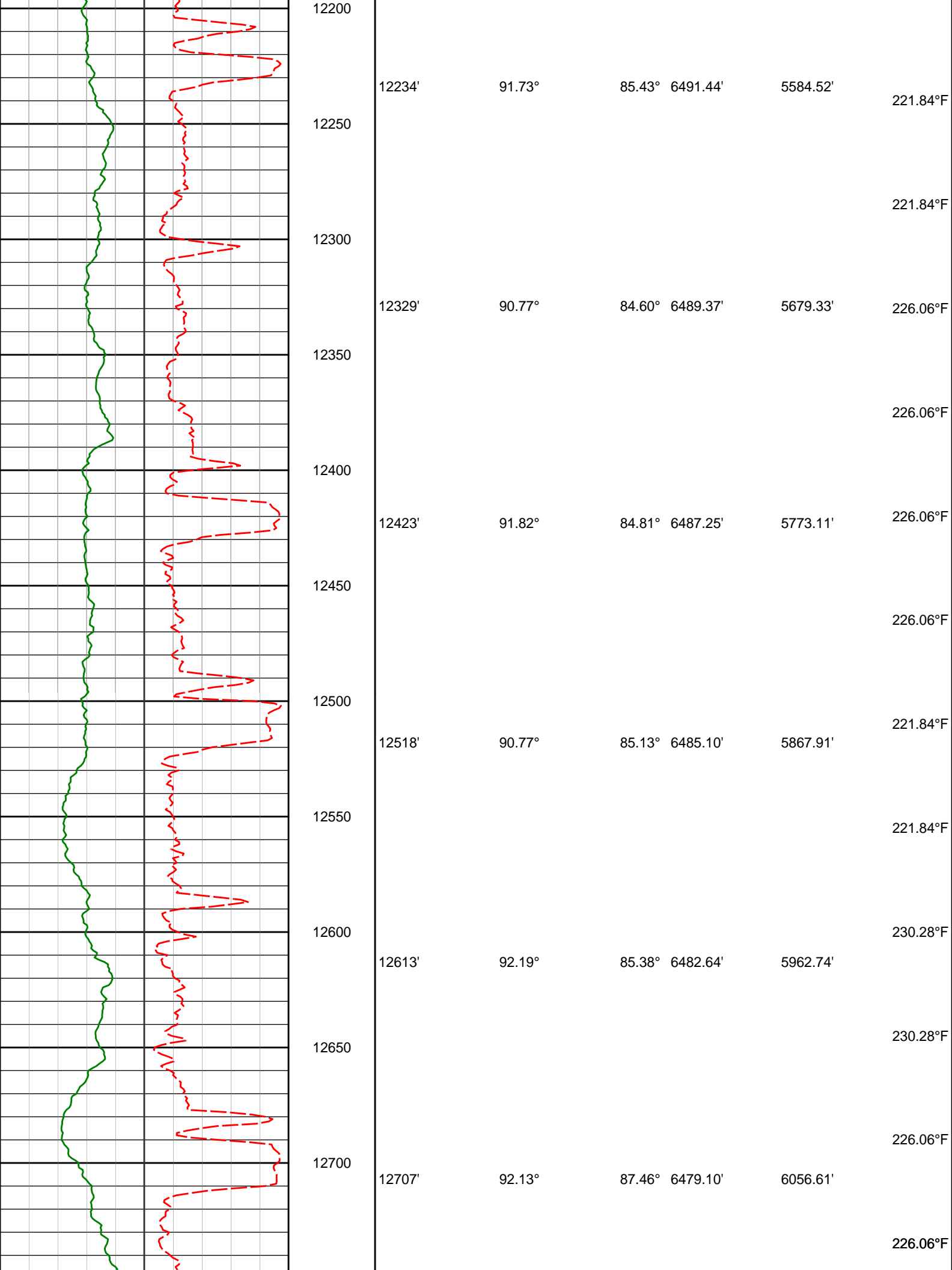


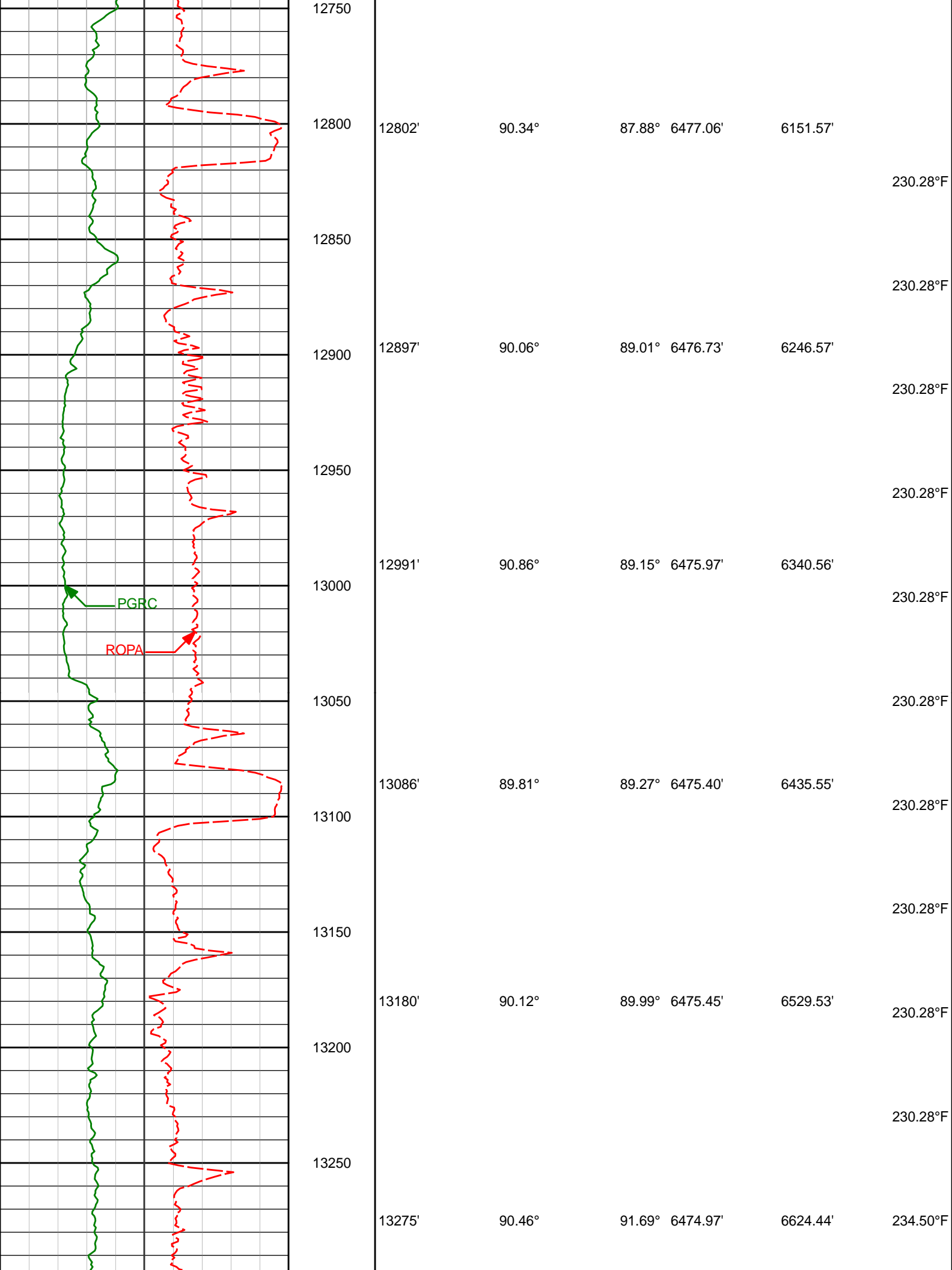


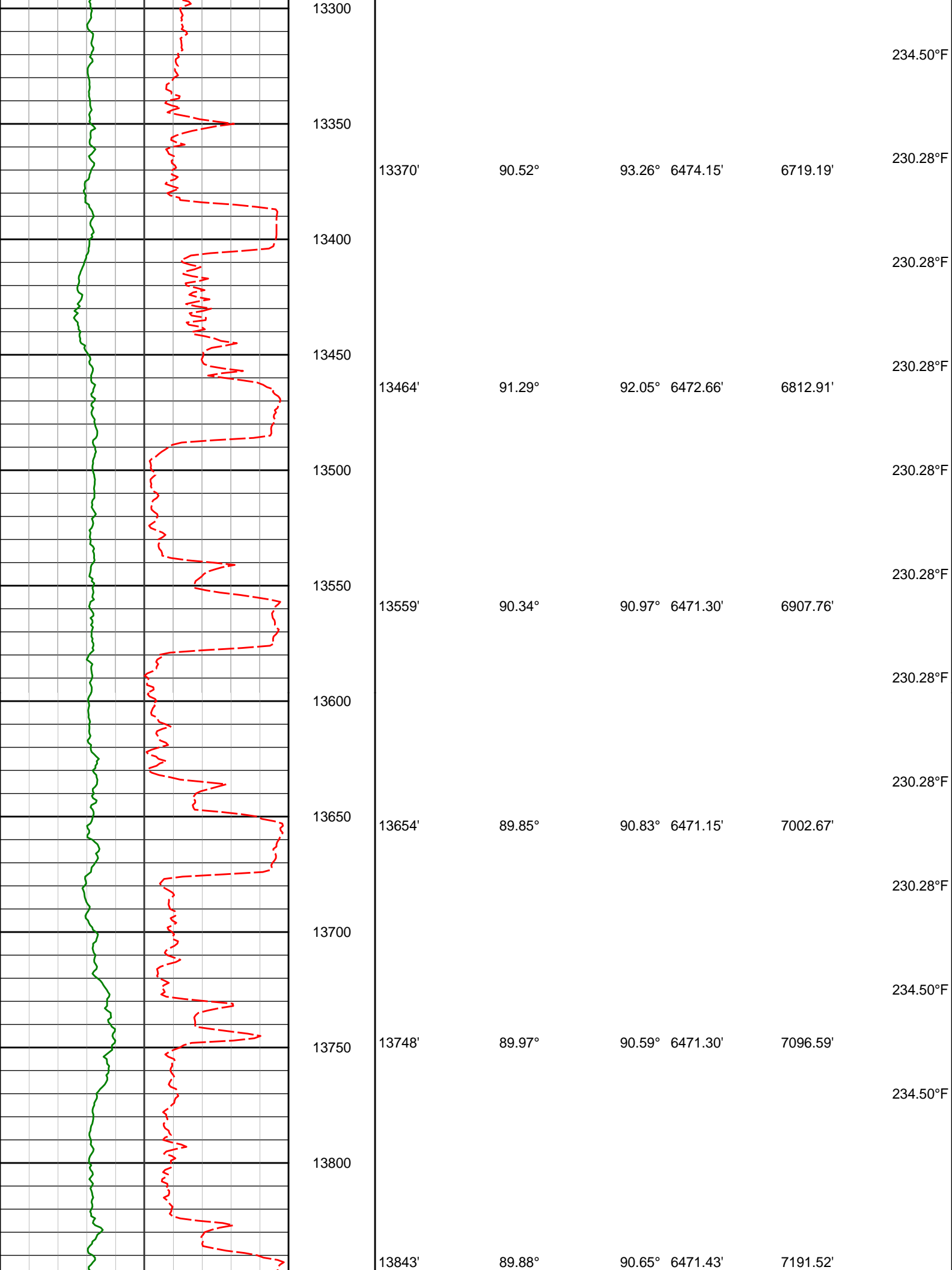


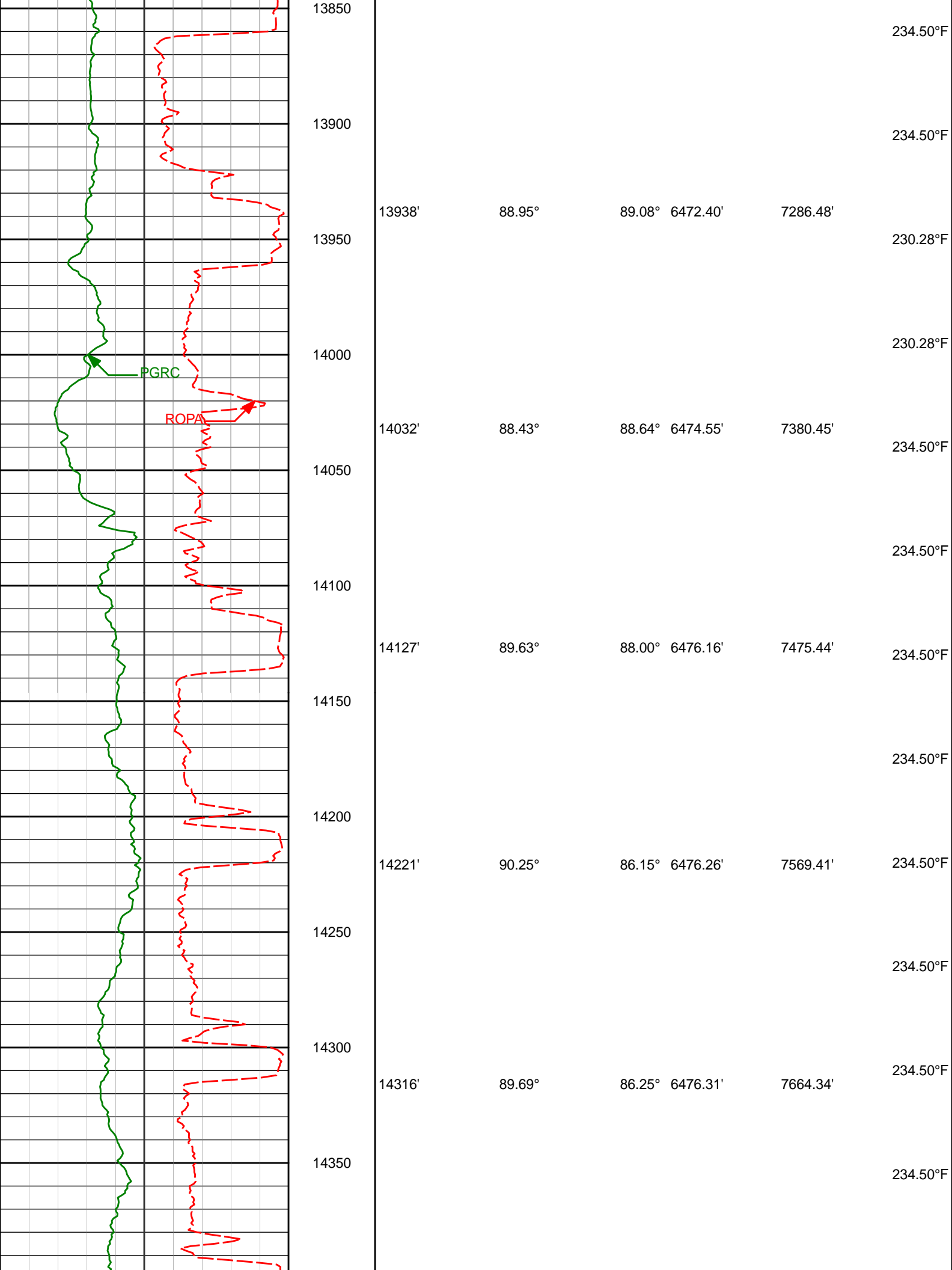


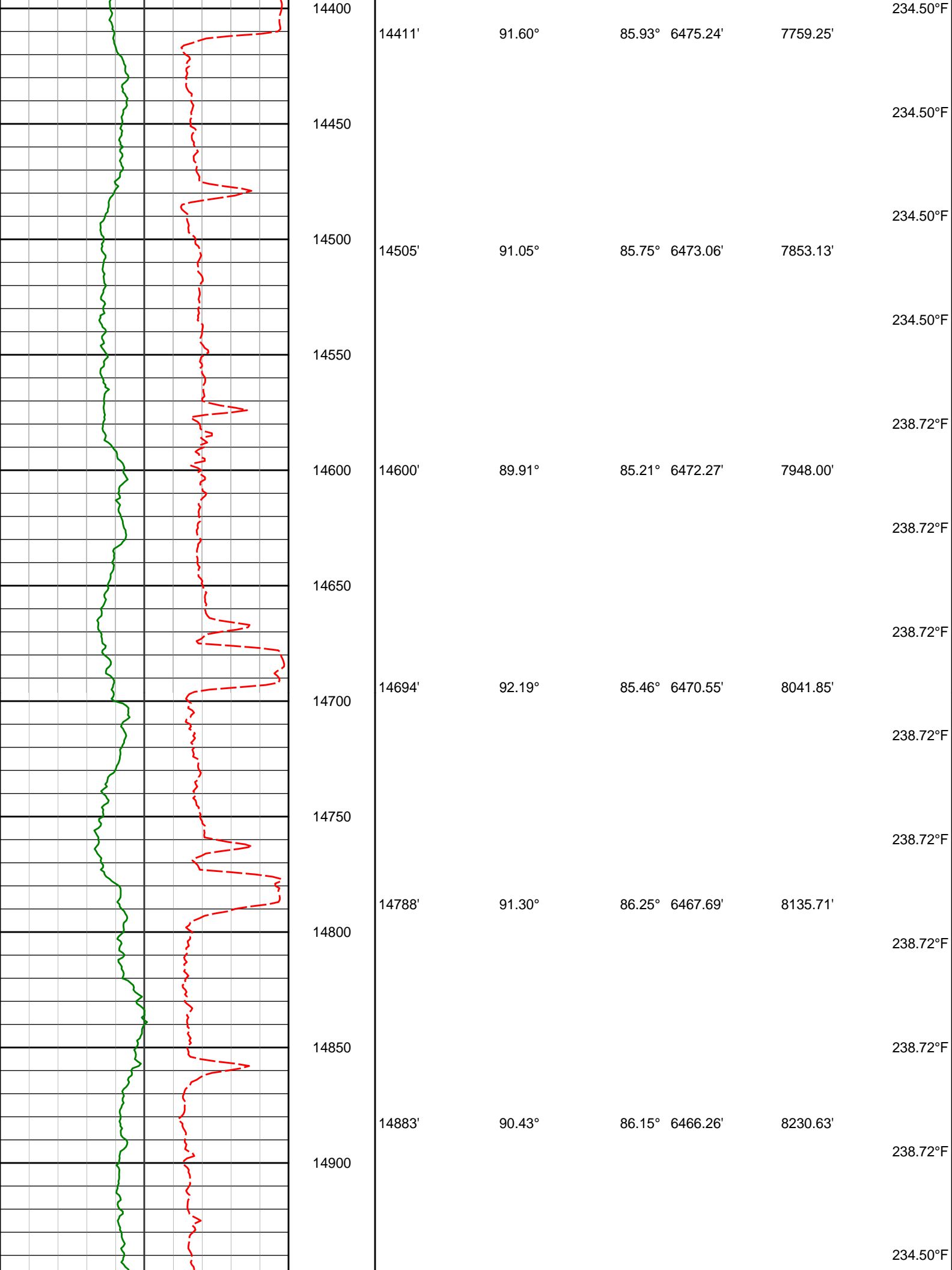


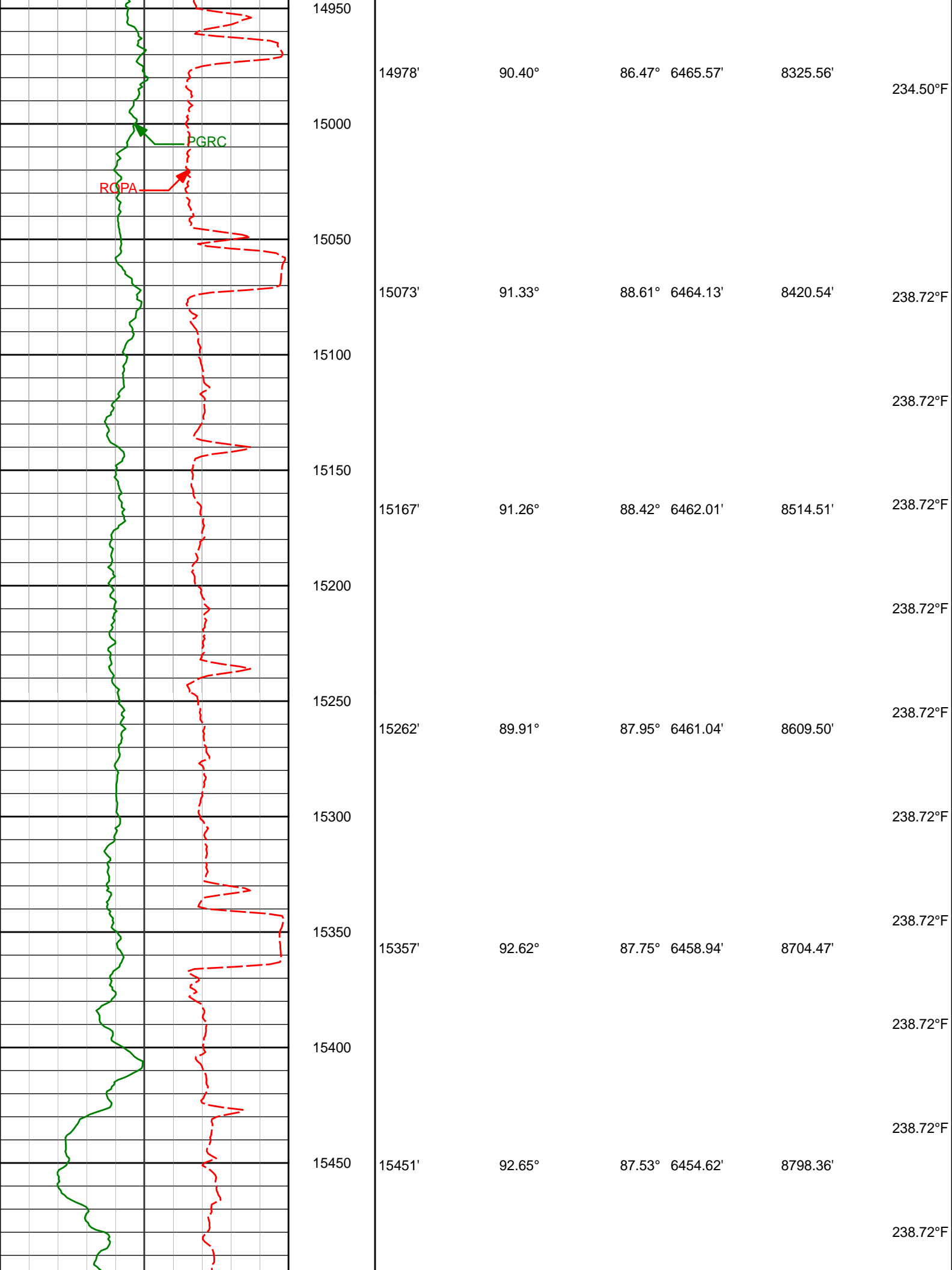


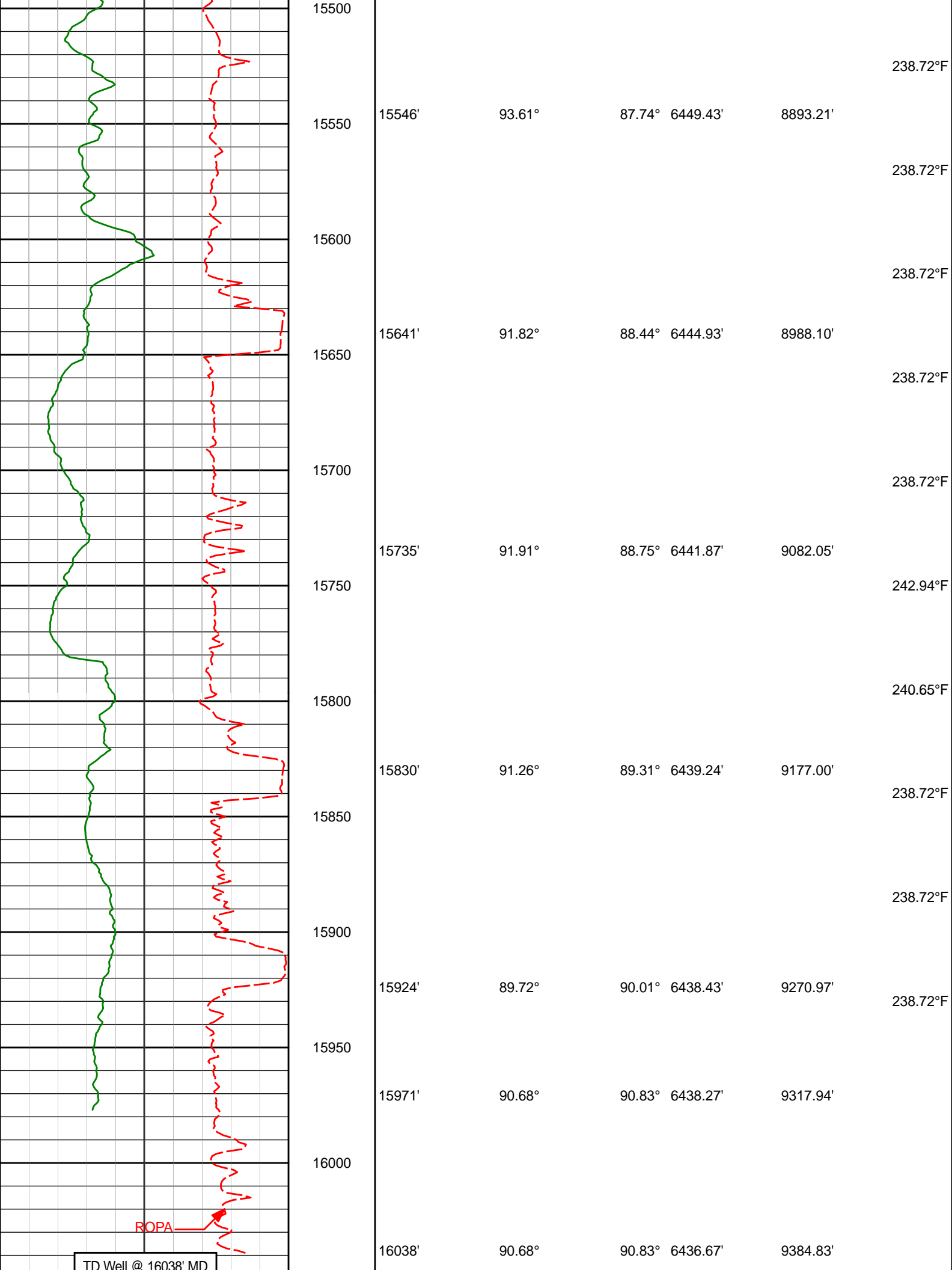




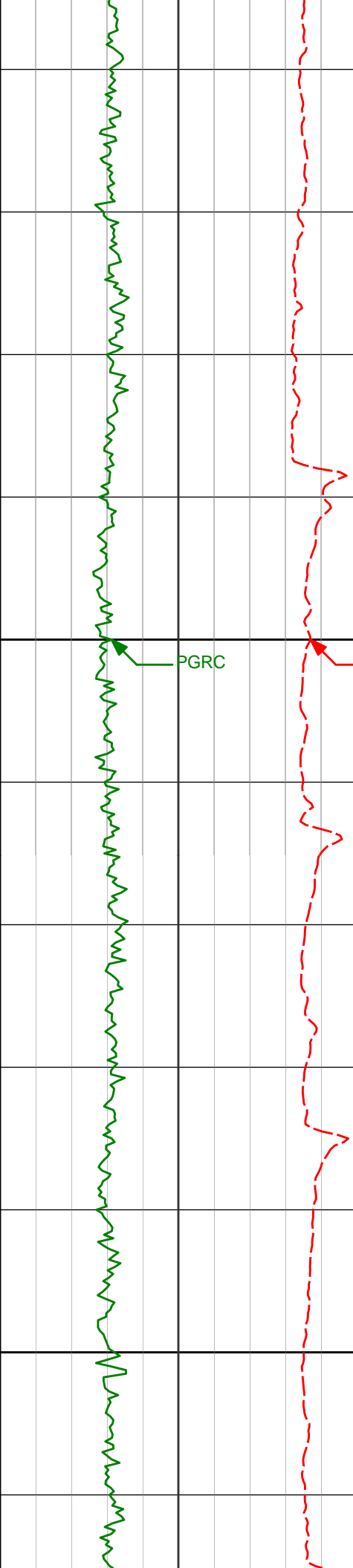








[illegible]



6000

6002'

14.30°

93.95° 5975.33'

-378.65'

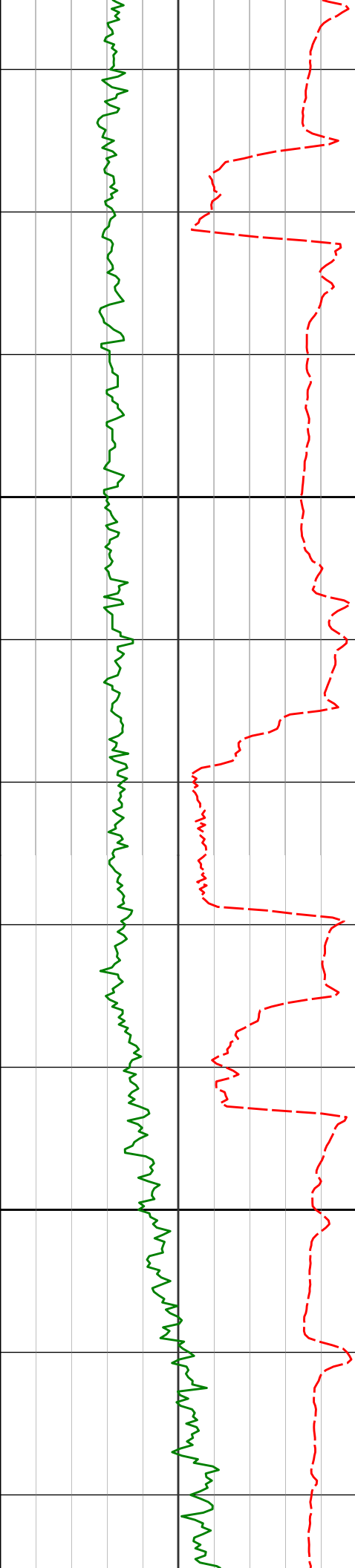
6100

6097'

23.64°

96.49° 6065.07'

-348.04'



6200

6300

6191'

30.34°

95.54° 6148.78'

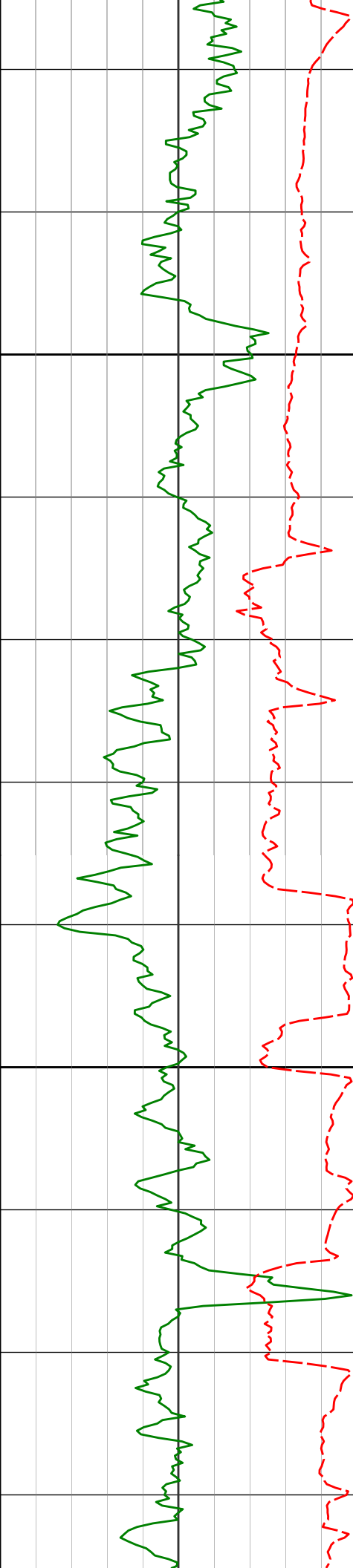
-305.77'

6286'

33.23°

92.85° 6229.53'

-255.99'



6400

6500

6380'

6475'

6570'

43.75°

48.48°

55.21°

90.62°

89.30°

87.46°

6303.00'

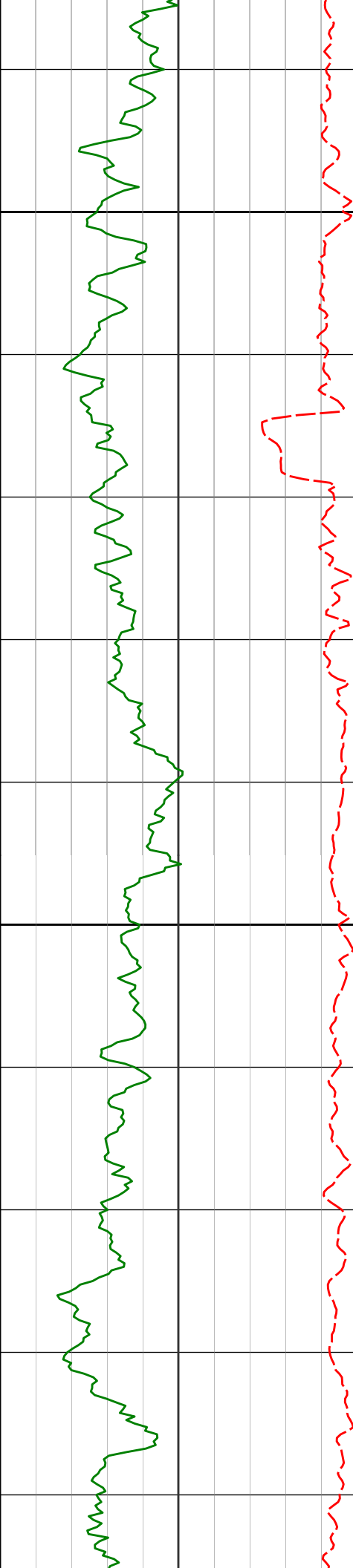
6368.84'

6427.50'

-197.67'

-129.25'

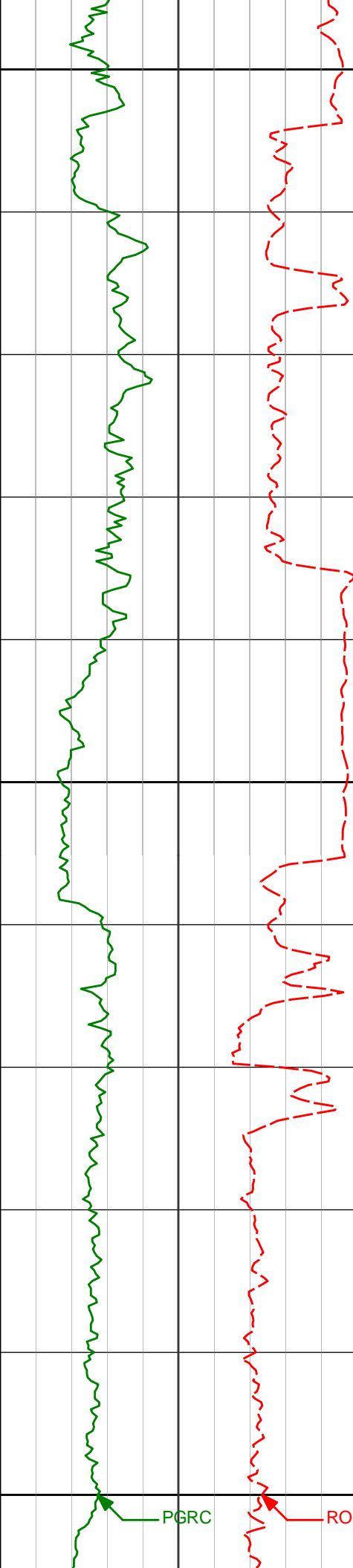
-54.59'



6600

6700

6570	55.21	57.48	6427.58	54.55
6664'	63.99°	91.70°	6475.03'	26.36'
6759'	76.35°	93.03°	6507.19'	115.34'



6800

6861'

84.11°

94.01° 6524.49'

215.39'

6900

Casing Shoe @ 6919' MD

Run 200

6973'

88.46°

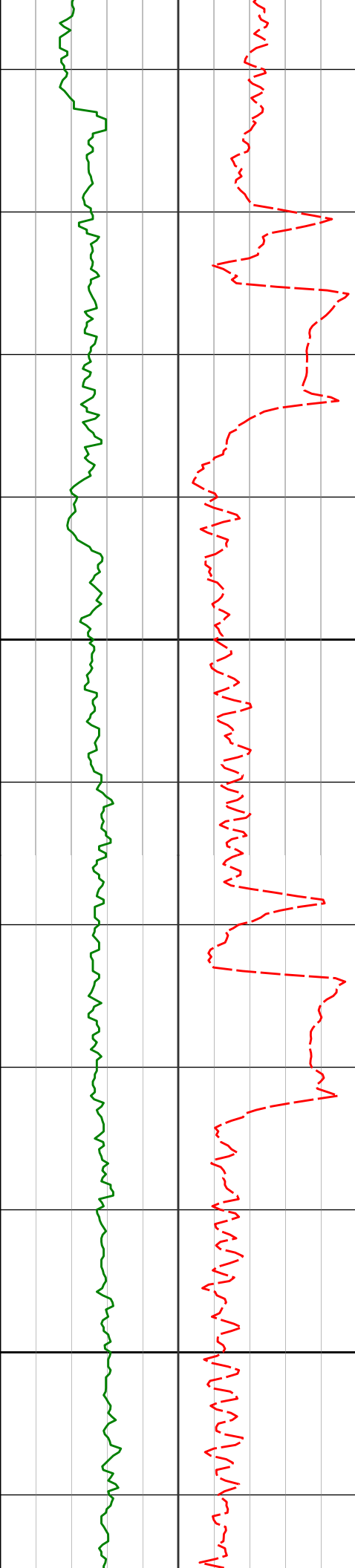
92.52° 6531.75'

326.72'

7000

PGRC

ROPA



7100

7200

7069'

88.80°

90.59° 6534.05'

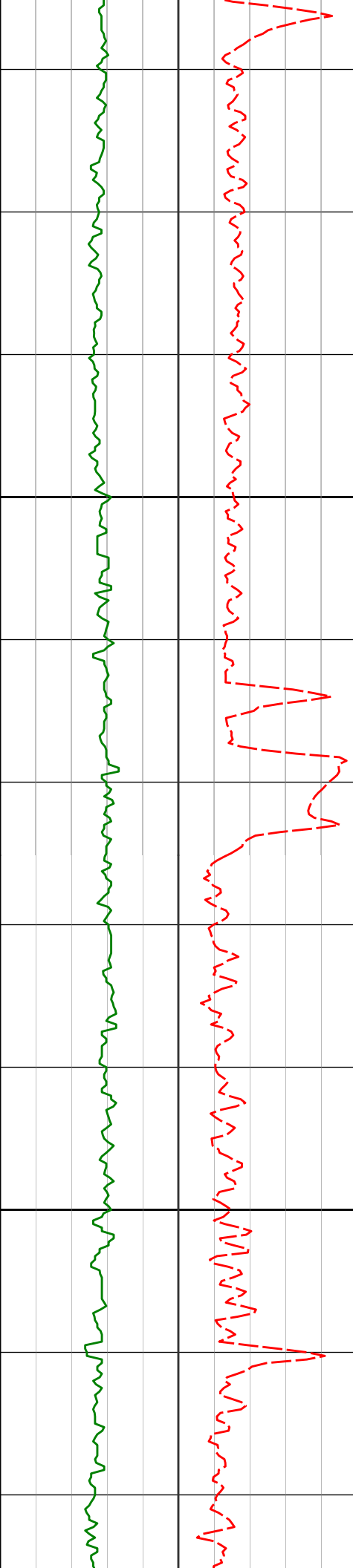
422.54'

7163'

90.59°

88.29° 6534.55'

516.52'



7300

7400

7258'

90.31°

88.16° 6533.81'

611.51'

7352'

90.37°

86.95° 6533.26'

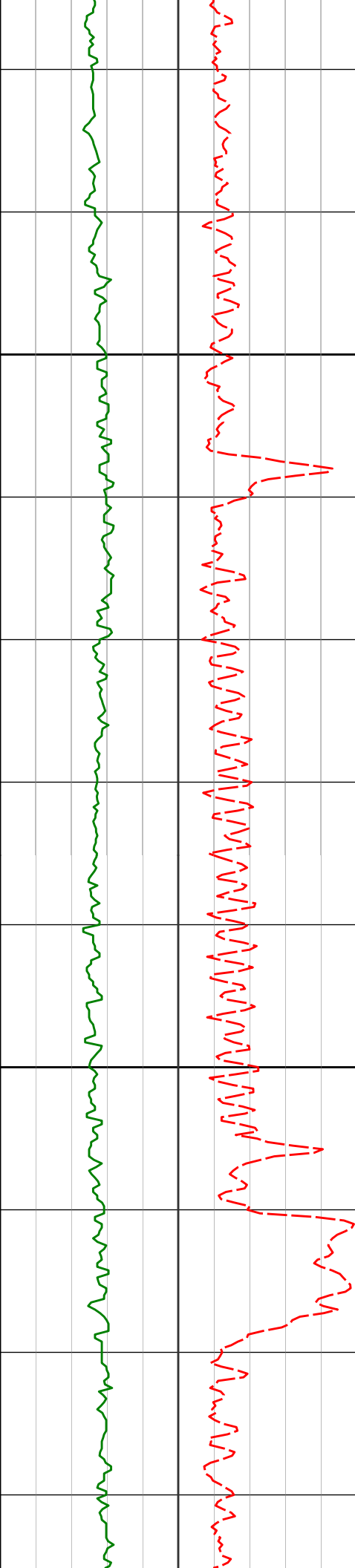
705.50'

7447'

90.43°

87.07° 6532.59'

800.47'



7500

7542'

91.05°

87.52° 6531.36'

895.44'

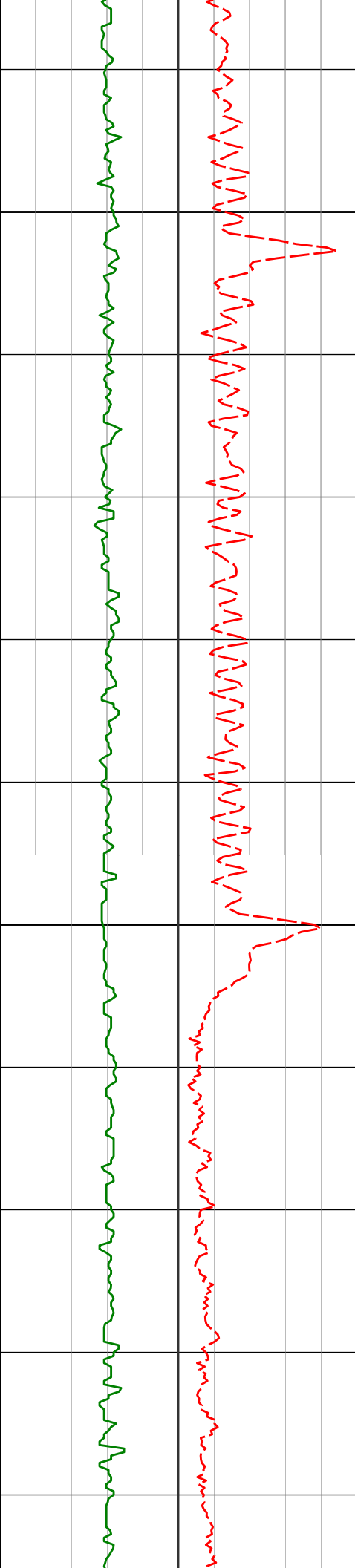
7600

7636'

89.97°

86.15° 6530.53'

989.40'



7700

7731'

90.37°

86.33° 6530.25'

1084.34'

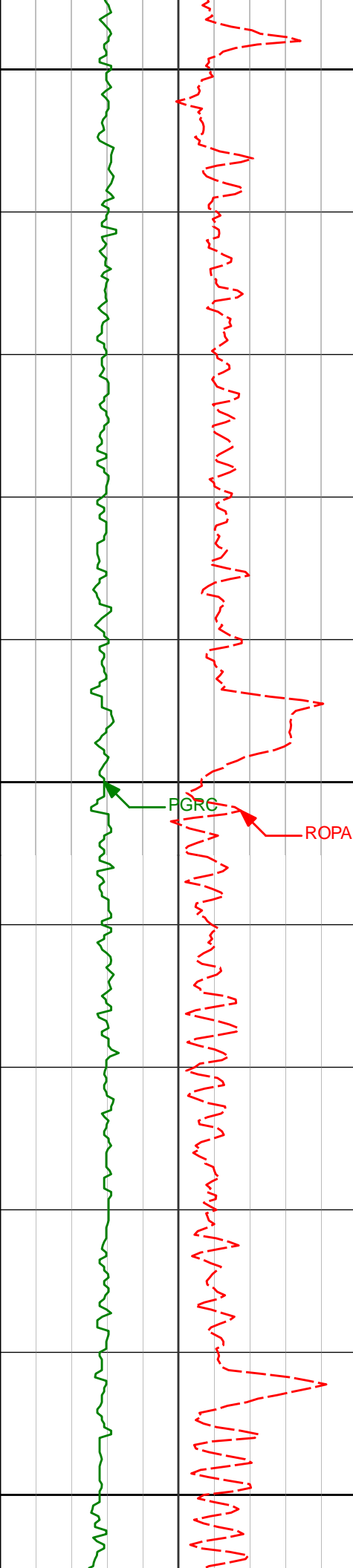
7800

7826'

90.52°

86.72° 6529.51'

1179.28'



7900

7921'

90.68°

86.91° 6528.51'

1274.24'

8000

8015'

90.74°

86.09° 6527.35'

1368.18'

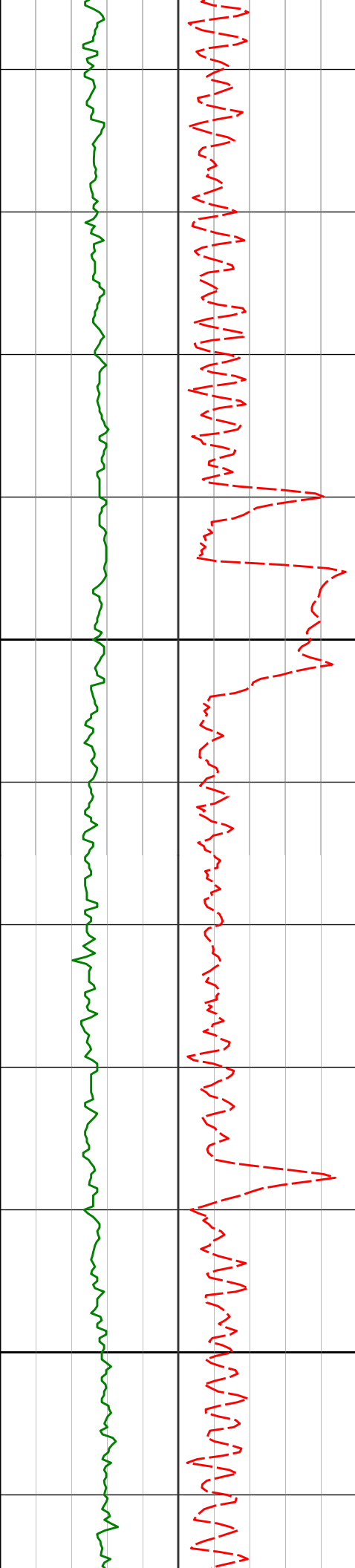
8100

8109'

91.02°

86.68° 6525.91'

1462.11'



8200

8204'

90.15°

86.01° 6524.93'

1557.04'

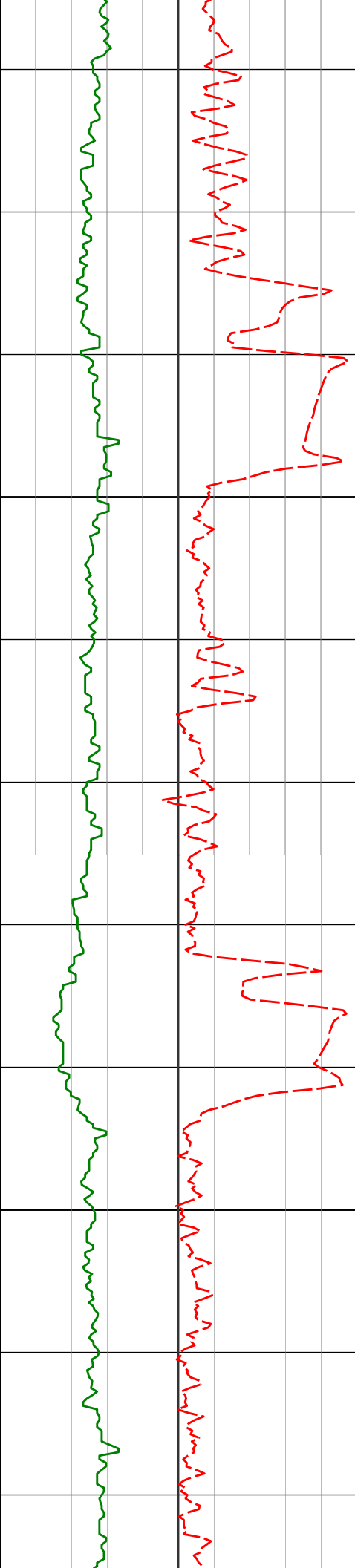
8300

8299'

91.97°

86.77° 6523.17'

1651.96'



8400

8500

8394'

88.61°

85.54° 6522.68'

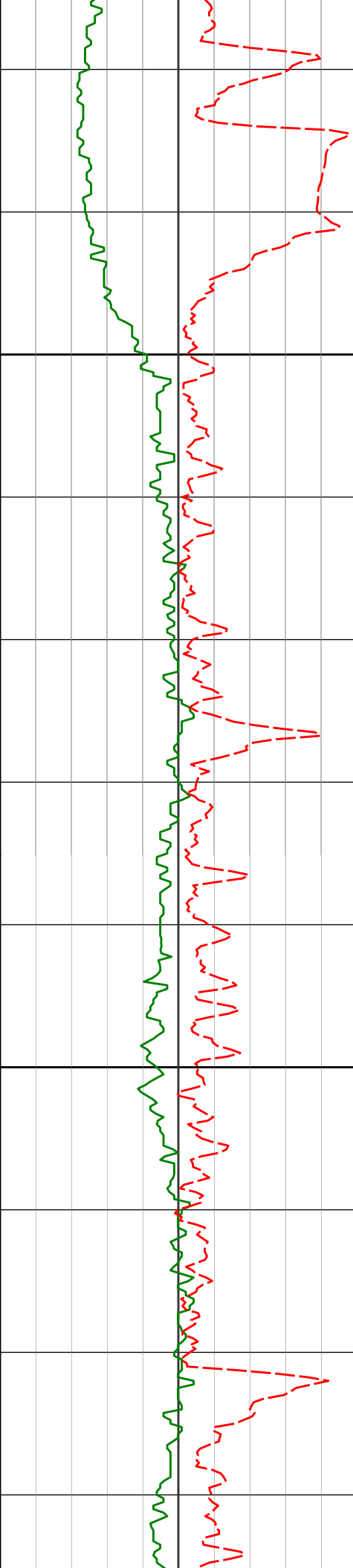
1746.88'

8488'

88.15°

86.92° 6525.34'

1840.77'



8600

8700

8583'

89.94°

86.52° 6526.92'

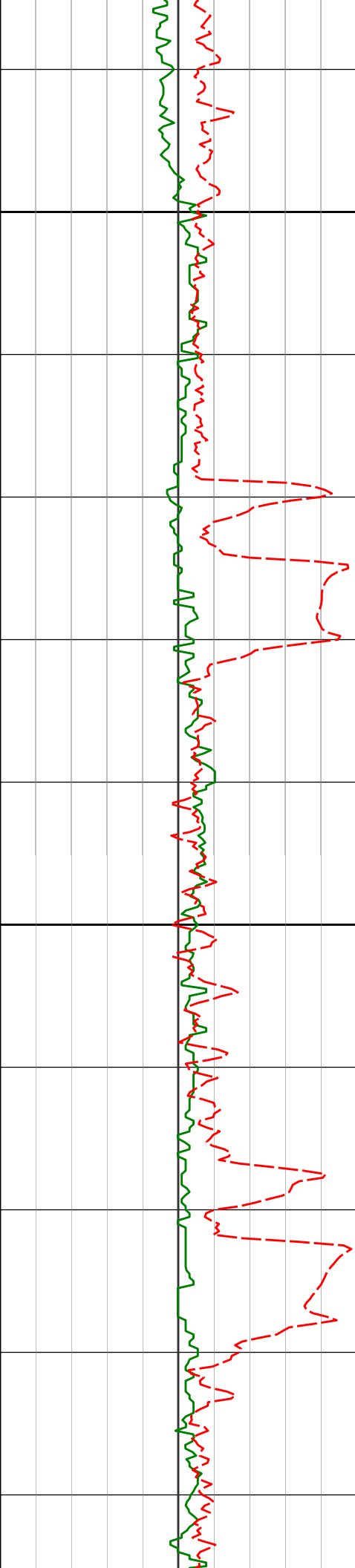
1935.71'

8677'

89.54°

86.26° 6527.35'

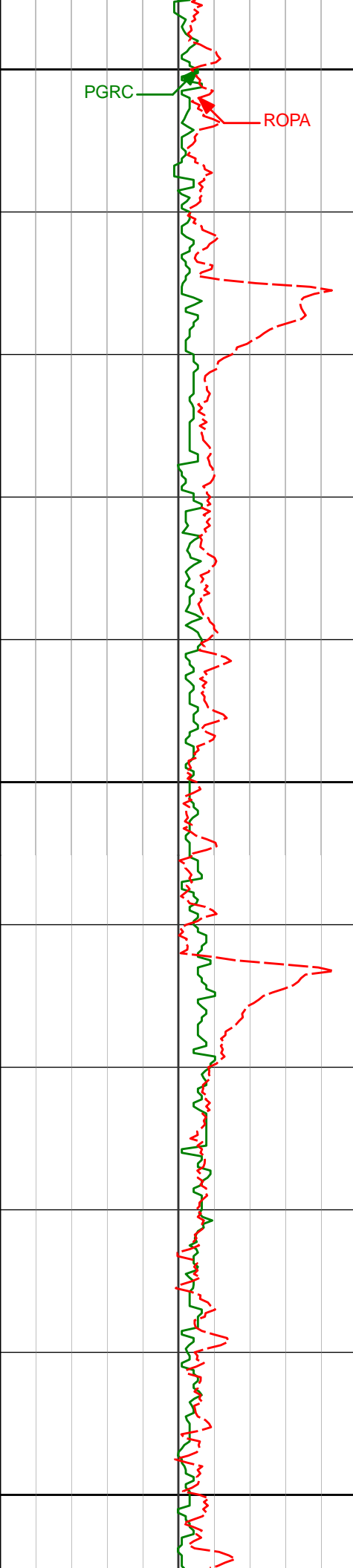
2029.65'



8800

8900

8771'	89.23°	86.20°	6528.37'	2123.58'
8866'	89.57°	87.56°	6529.36'	2218.54'
8960'	90.62°	87.58°	6529.21'	2312.53'



9000

PGRC

ROPA

9100

9200

9054'

90.89°

87.94° 6527.97'

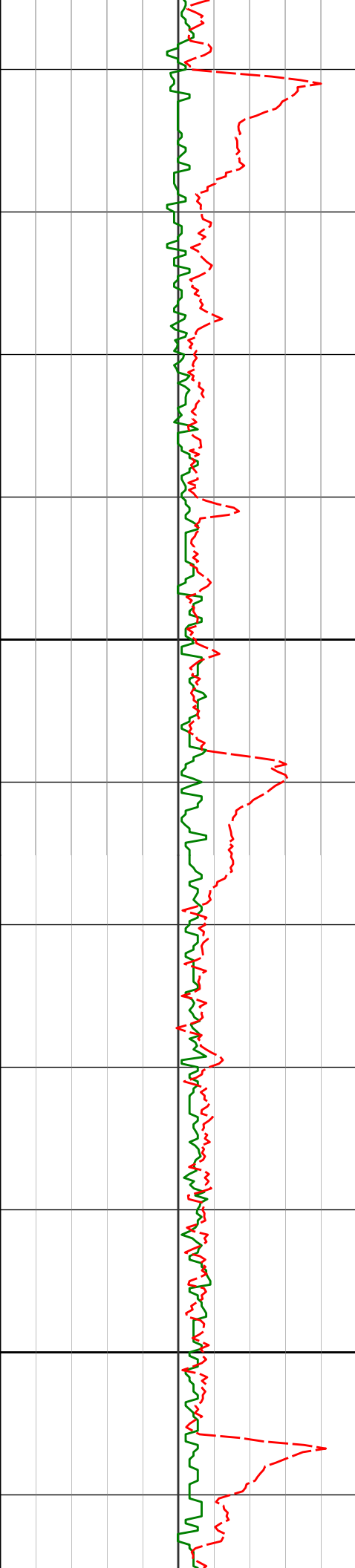
2406.51'

9149'

90.86°

88.00° 6526.51'

2501.50'



9300

9400

9244'

9338'

90.43°

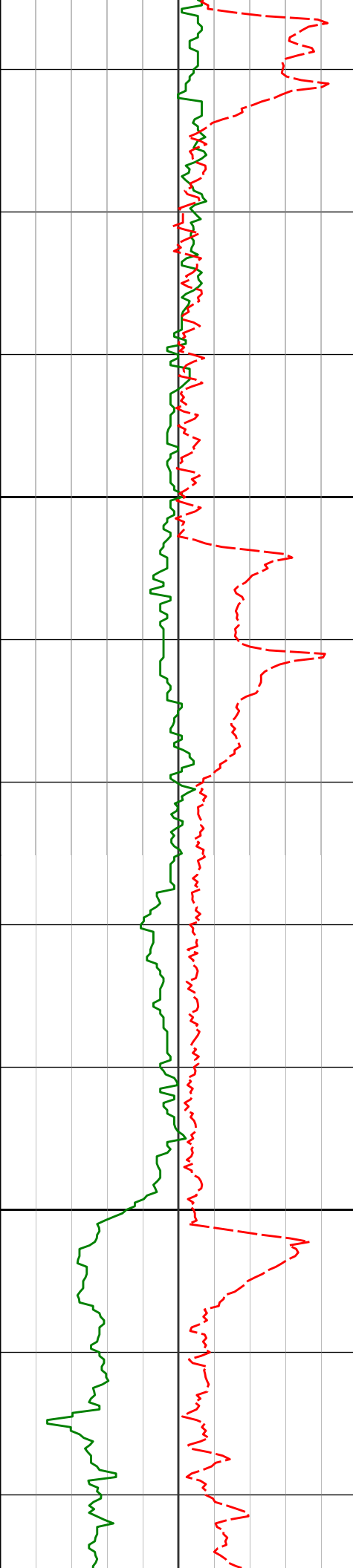
90.00°

87.77° 6525.44'

87.09° 6525.09'

2596.49'

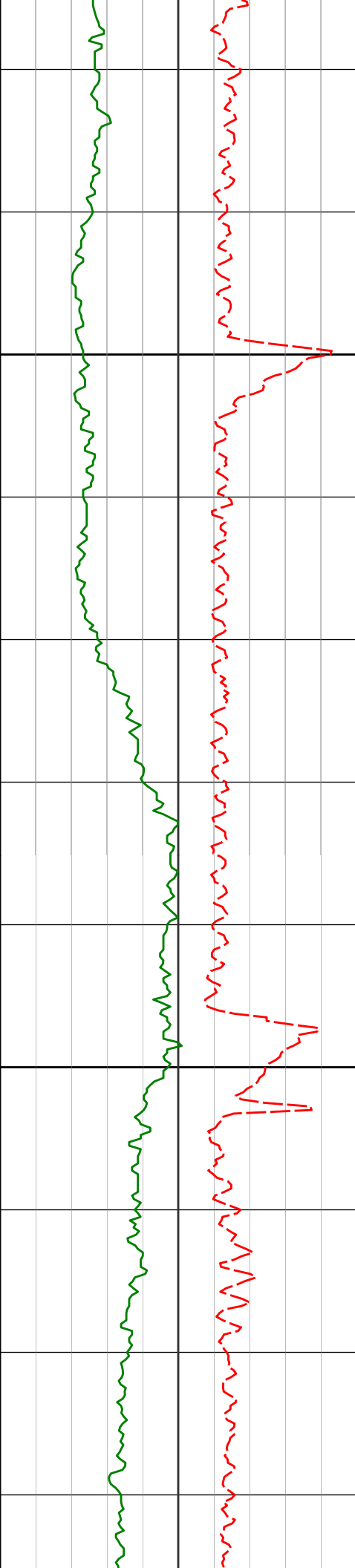
2690.48'



9500

9600

9433'	90.46°	86.69°	6524.70'	2785.44'
9527'	90.62°	86.01°	6523.82'	2879.38'
9622'	90.83°	86.14°	6522.62'	2974.29'



9700

9716'

91.02°

85.99° 6521.10'

3068.20'

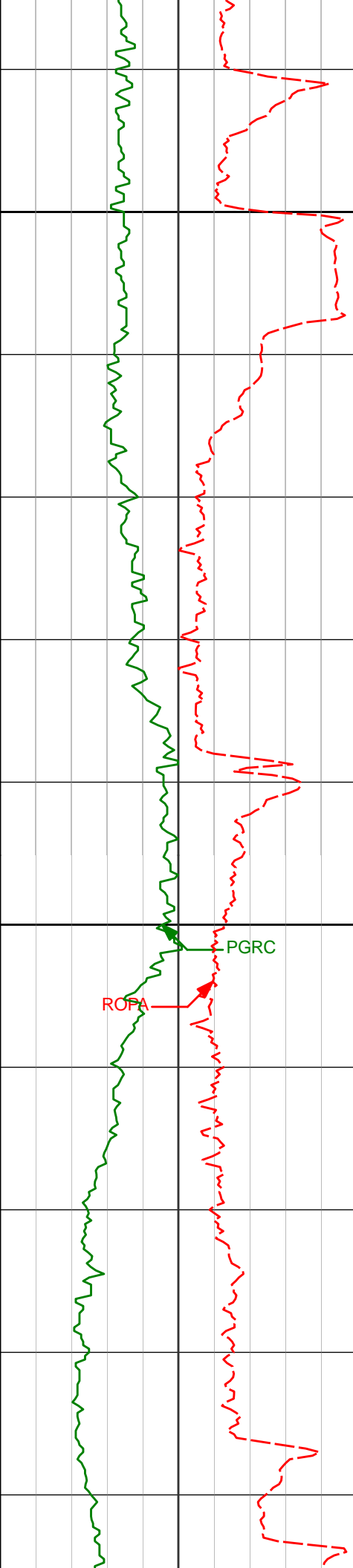
9800

9810'

91.66°

85.90° 6518.90'

3162.09'



9900

9905'

90.31°

86.14° 6517.27'

3256.99'

10000

10000'

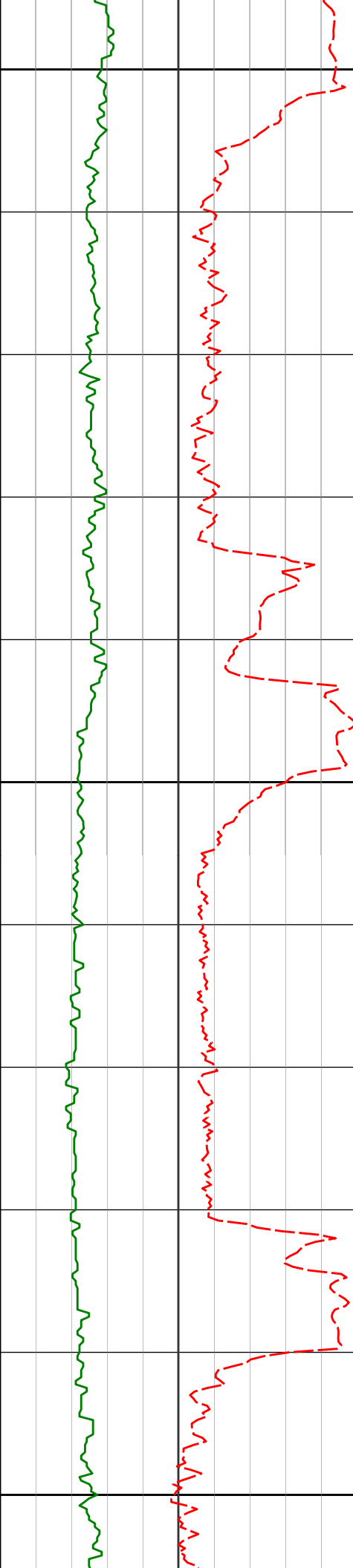
89.66°

86.46° 6517.29'

3351.93'

PGRC

ROPA



10100

10188'

90.09°

88.84° 6517.70'

3539.90'

10200

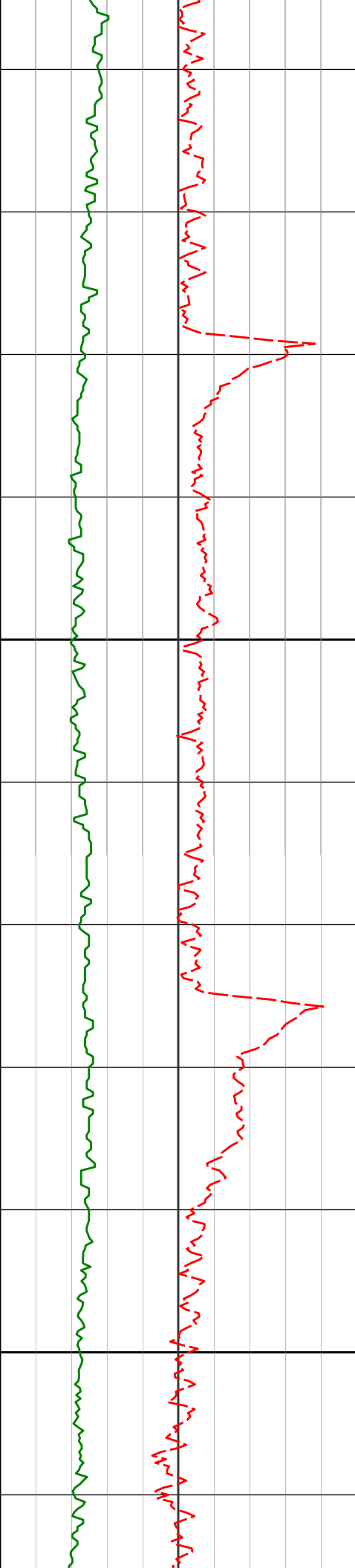
10281'

92.19°

89.44° 6515.85'

3632.86'

10300



10400

10500

10373'

91.91°

89.02° 6512.56'

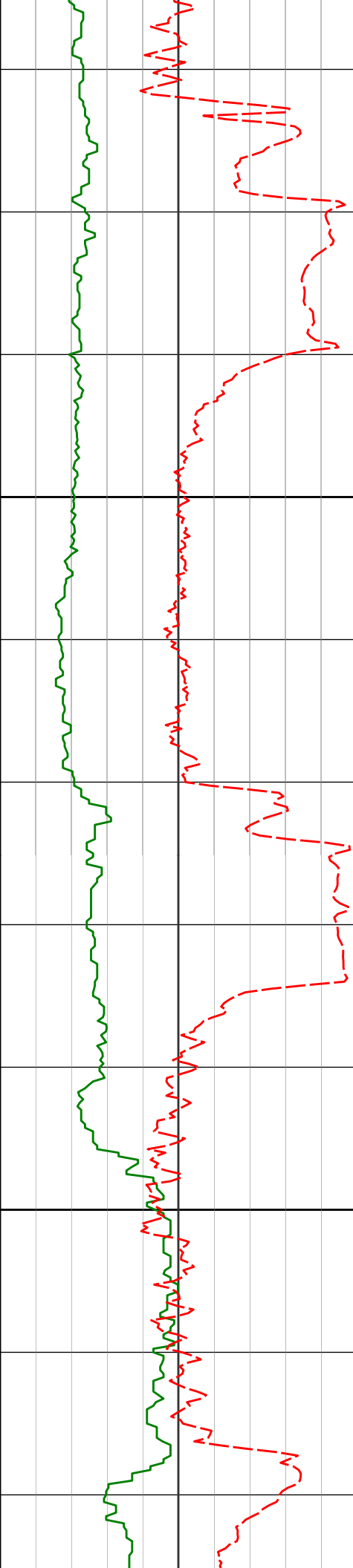
3724.80'

10467'

92.87°

88.87° 6508.64'

3818.71'



10600

10700

10560'

10653'

10745'

92.16°

89.88°

89.48°

90.42°

89.94°

90.00°

6504.56'

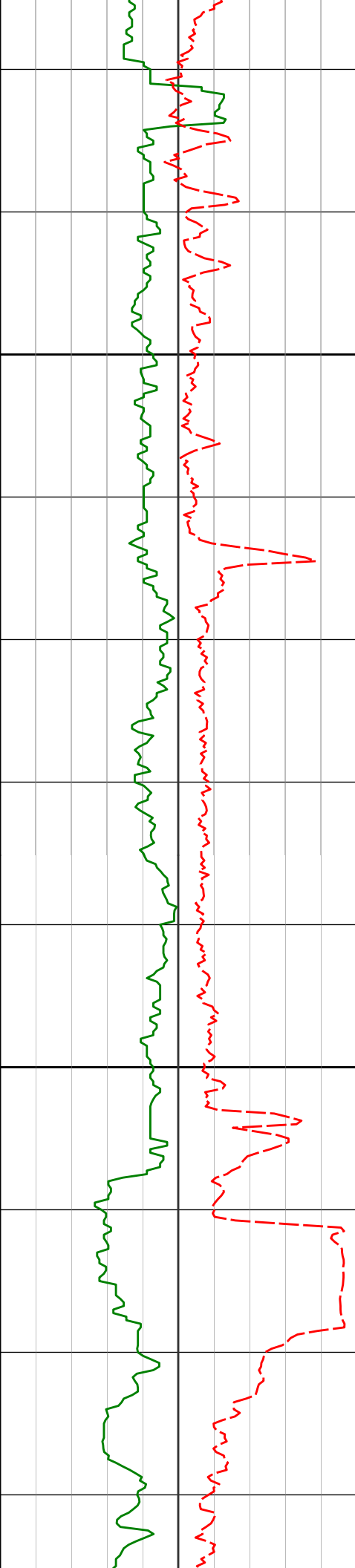
6502.90'

6503.42'

3911.59'

4004.53'

4096.49'



10800

10838'

89.23°

90.22° 6504.48'

4189.44'

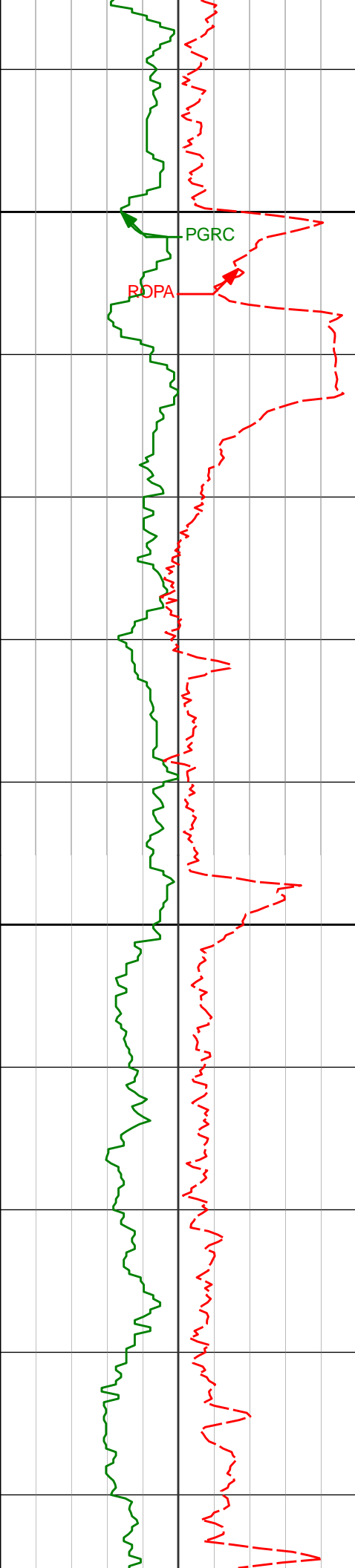
10900

10931'

89.48°

88.46° 6505.53'

4282.42'



11000

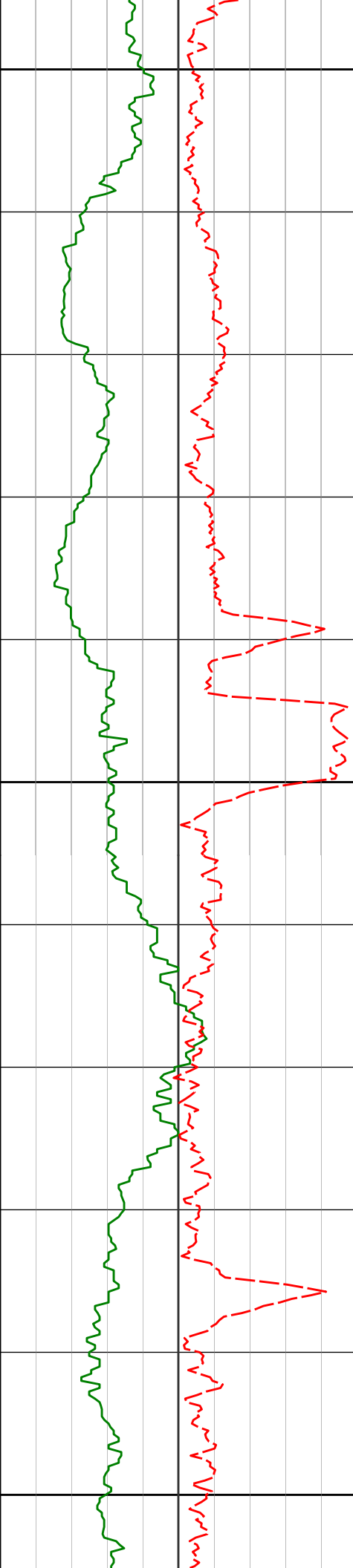
11100

11117'

91.29°

88.58° 6504.28'

4468.41'



11200

11210'

90.43°

89.15° 6502.88'

4561.39'

11300

11303'

91.42°

89.75° 6501.38'

4654.36'

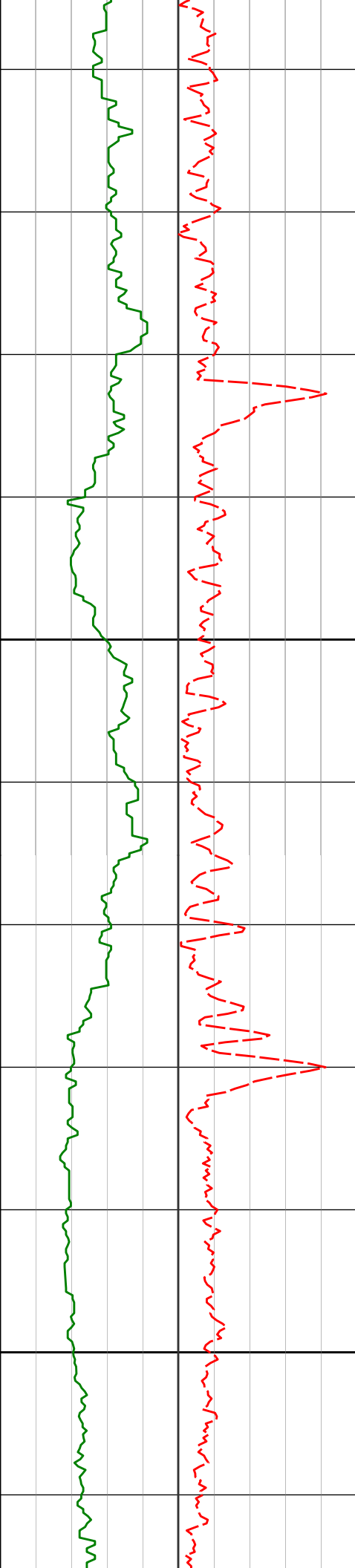
11400

11396'

90.83°

89.61° 6499.55'

4747.32'



11500

11600

11489'

90.74°

90.12° 6498.28'

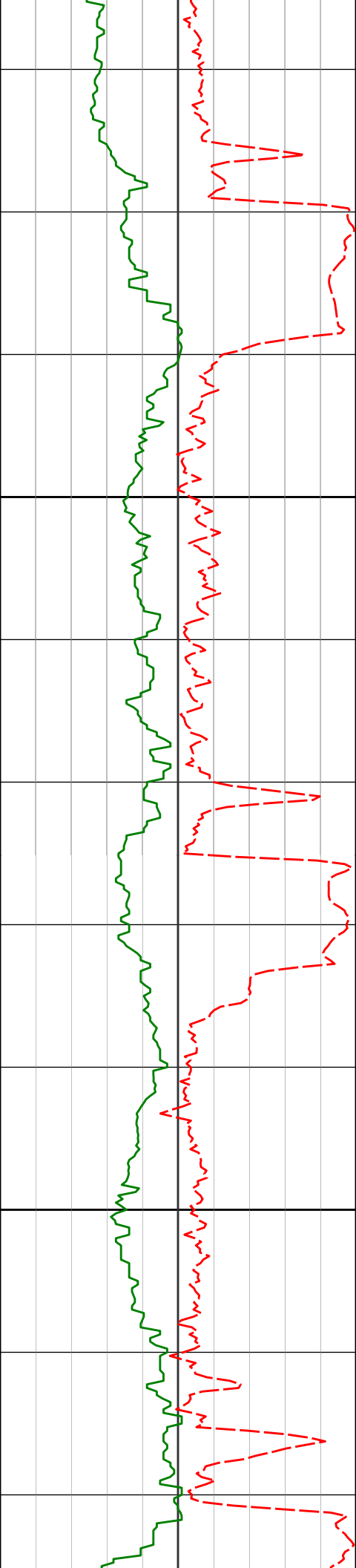
4840.28'

11580'

91.05°

90.55° 6496.86'

4931.22'



11700

11800

11673'

89.32°

88.35° 6496.56'

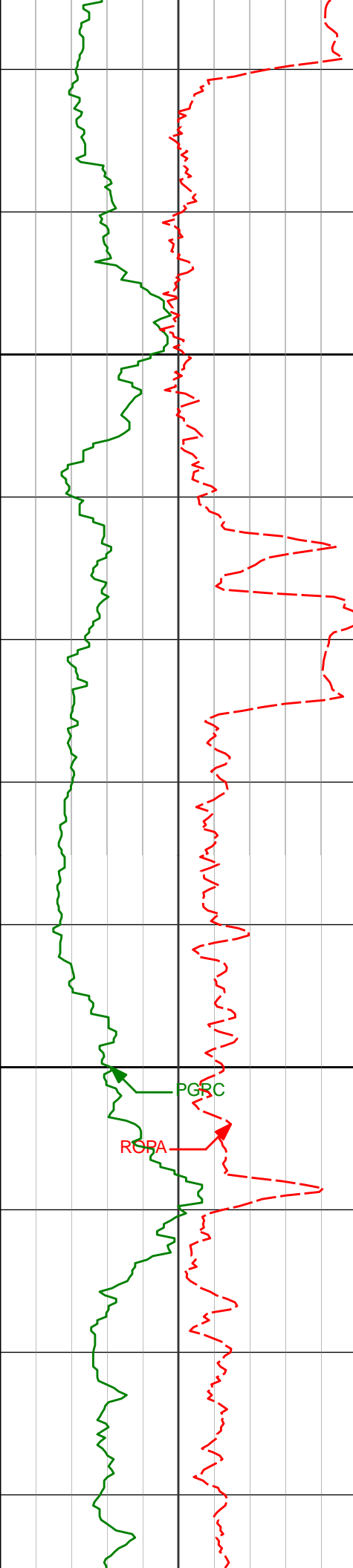
5024.19'

11764'

89.60°

87.13° 6497.41'

5115.18'



11900

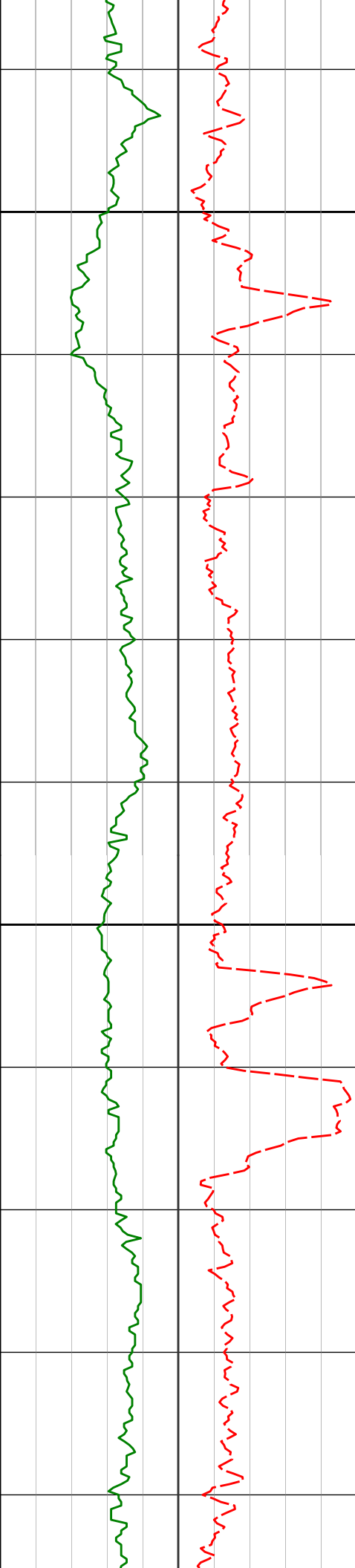
12000

PGRC
ROPA

11857' 90.03° 85.32° 6497.71' 5208.11'

11950' 91.26° 85.24° 6496.66' 5300.97'

12045' 91.11° 85.41° 6494.70' 5395.81'



12100

12139'

90.56°

85.36° 6493.33'

5489.67'

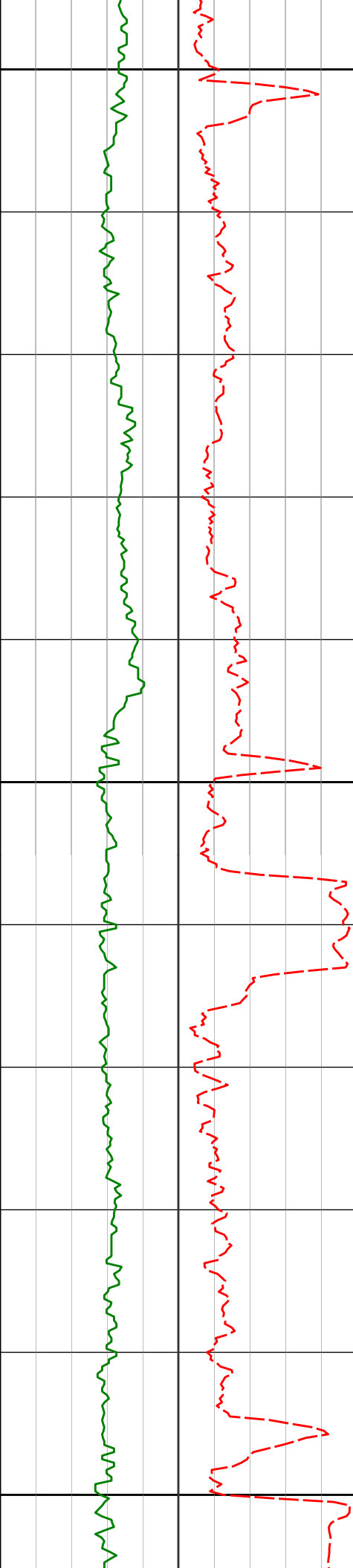
12200

12234'

91.73°

85.43° 6491.44'

5584.52'



12300

12329'

90.77°

84.60° 6489.37'

5679.33'

12400

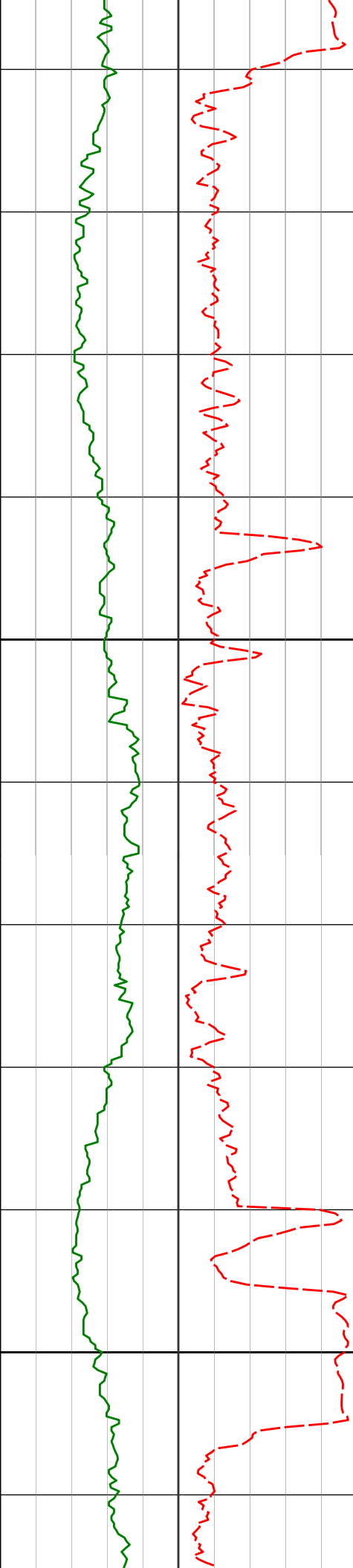
12423'

91.82°

84.81° 6487.25'

5773.11'

12500



12600

12700

12518'

90.77°

85.13° 6485.10'

5867.91'

12613'

92.19°

85.38° 6482.64'

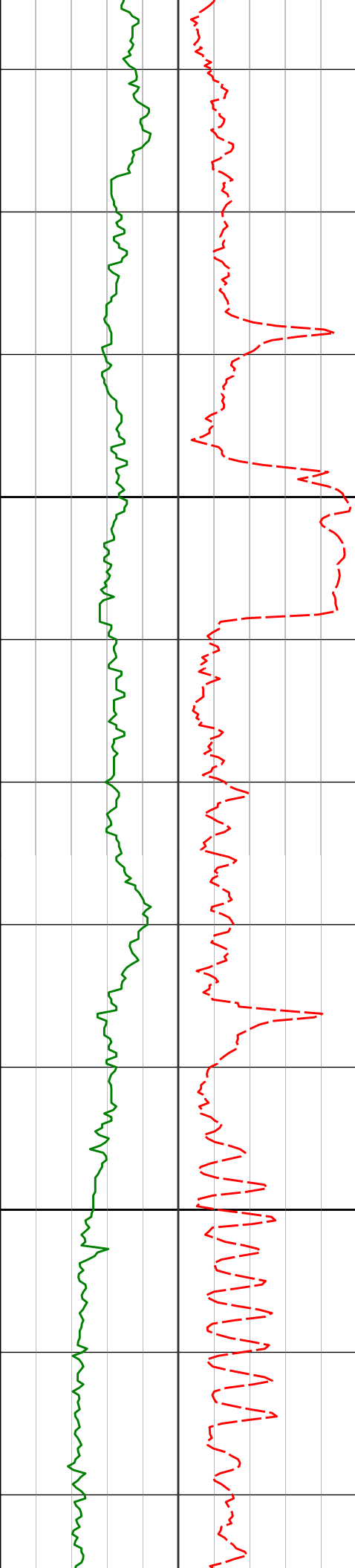
5962.74'

12707'

92.13°

87.46° 6479.10'

6056.61'



12800

12802'

90.34°

87.88° 6477.06'

6151.57'

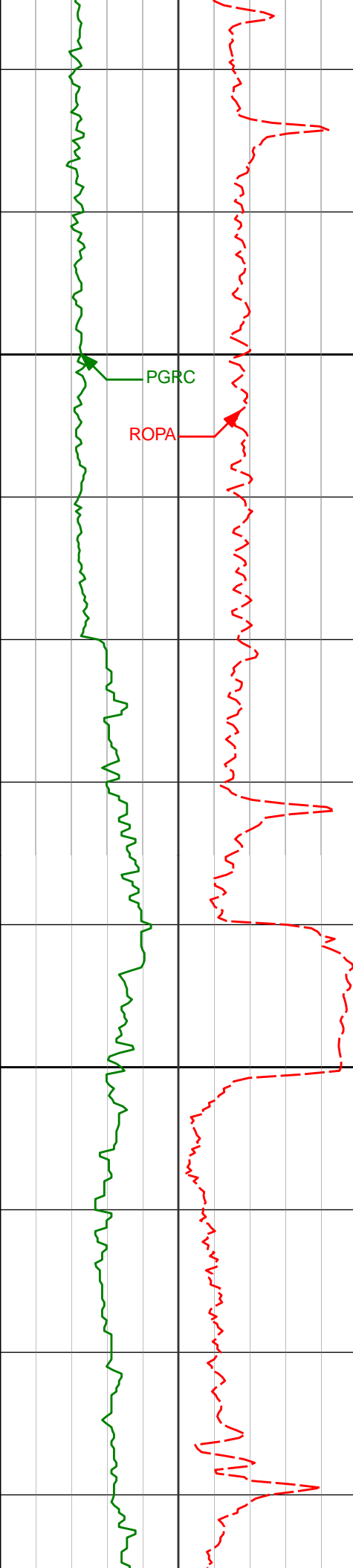
12900

12897'

90.06°

89.01° 6476.73'

6246.57'



13000

13100

12991'

90.86°

89.15° 6475.97'

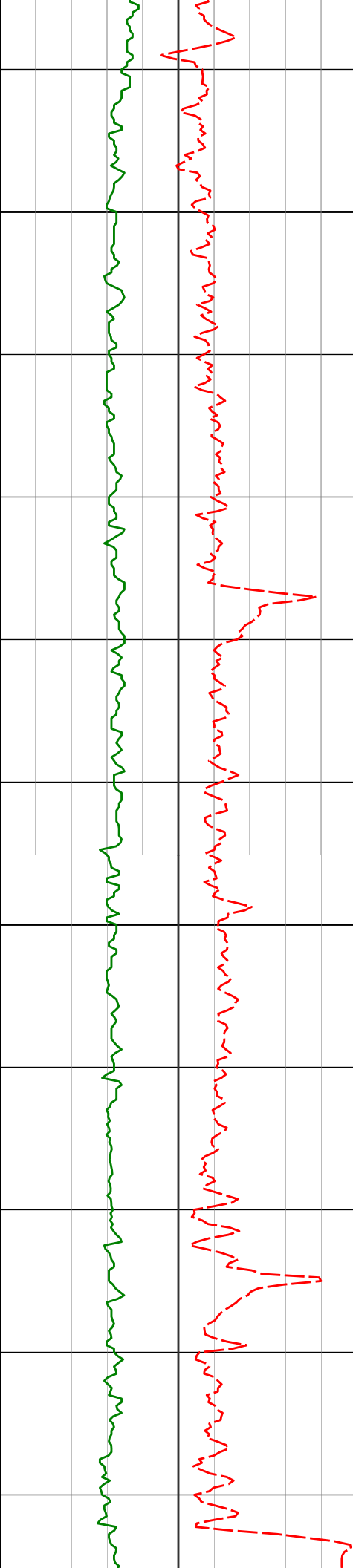
6340.56'

13086'

89.81°

89.27° 6475.40'

6435.55'



13200

13300

13180'

90.12°

89.99° 6475.45'

6529.53'

13275'

90.46°

91.69° 6474.97'

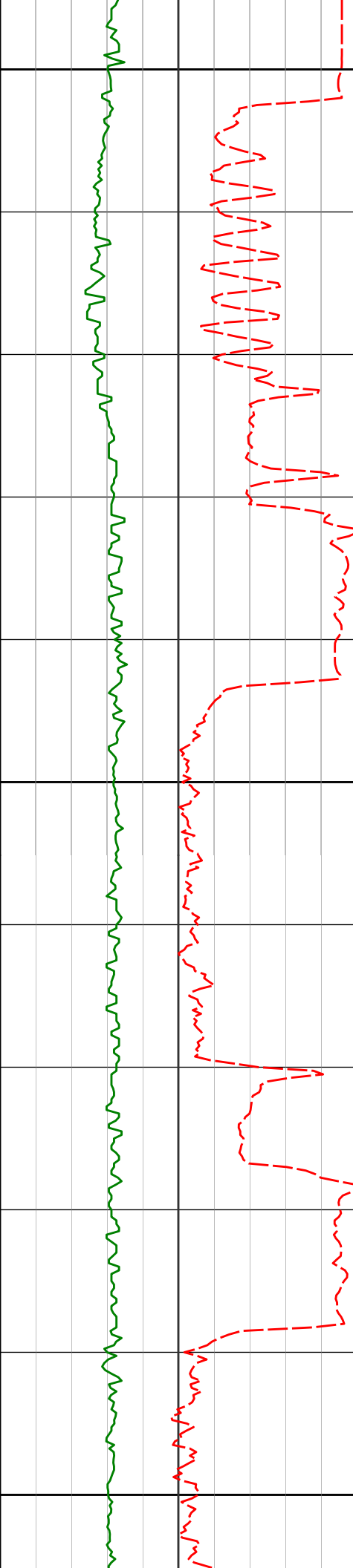
6624.44'

13370'

90.52°

93.26° 6474.15'

6719.19'



13400

13464'

91.29°

92.05° 6472.66'

6812.91'

13500

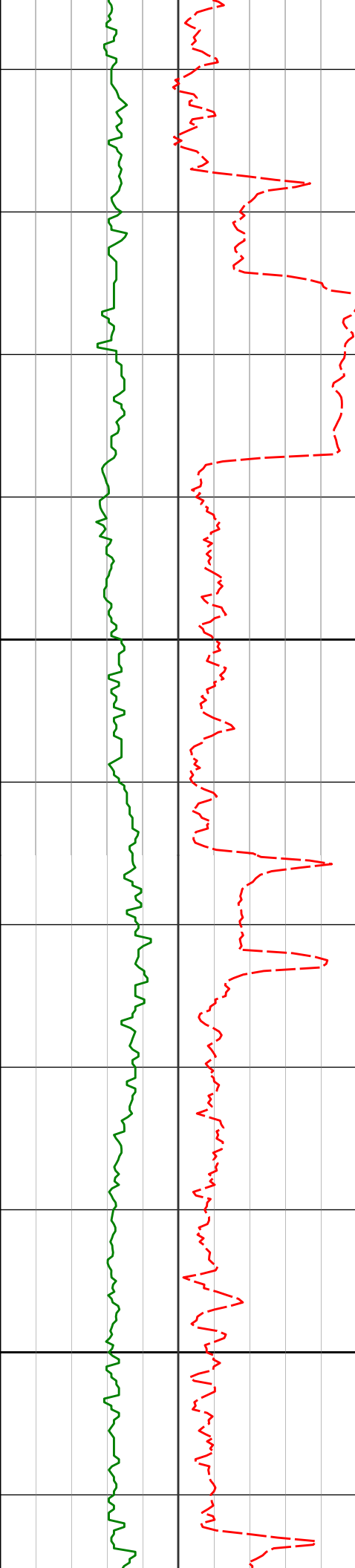
13559'

90.34°

90.97° 6471.30'

6907.76'

13600



13700

13800

13654'

89.85°

90.83° 6471.15'

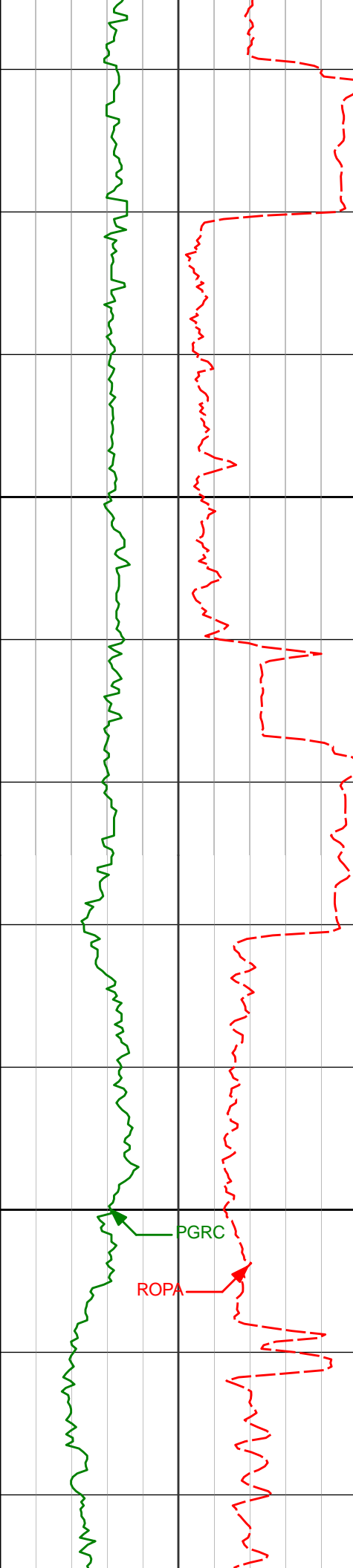
7002.67'

13748'

89.97°

90.59° 6471.30'

7096.59'



13900

14000

13843'

89.88°

90.65° 6471.43'

7191.52'

13938'

88.95°

89.08° 6472.40'

7286.48'

14032'

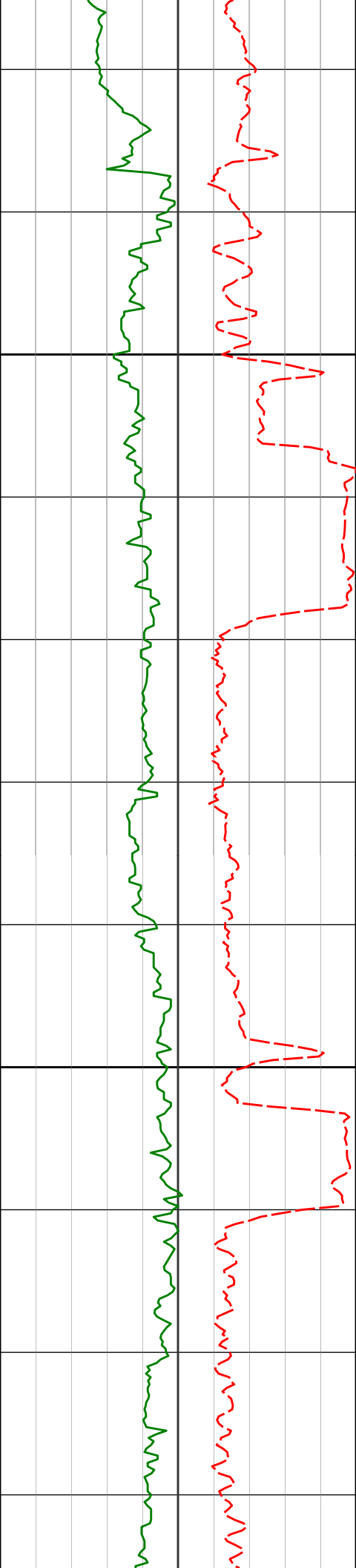
88.43°

88.64° 6474.55'

7380.45'

PGRC

ROPA



14100

14127'

89.63°

88.00° 6476.16'

7475.44'

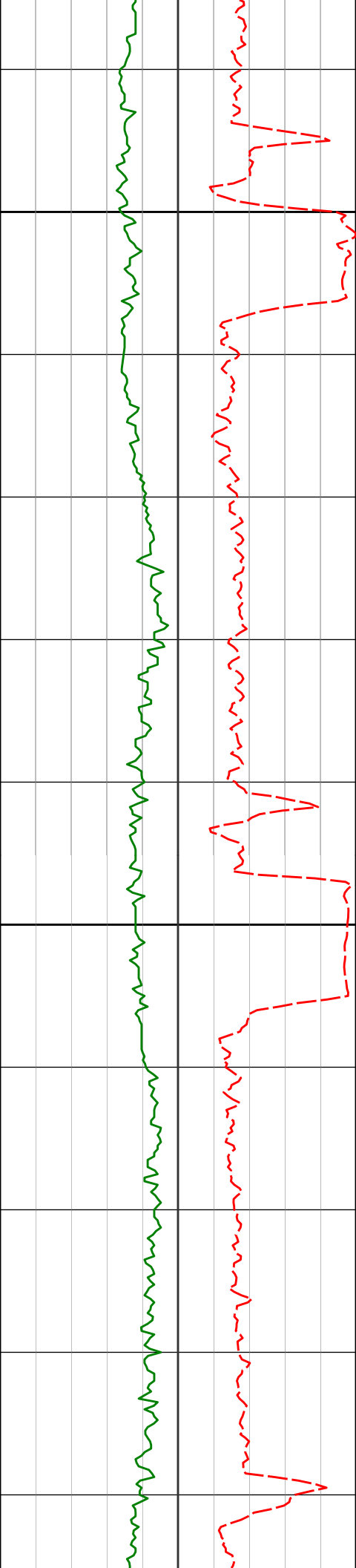
14200

14221'

90.25°

86.15° 6476.26'

7569.41'



14300

14316'

89.69°

86.25° 6476.31'

7664.34'

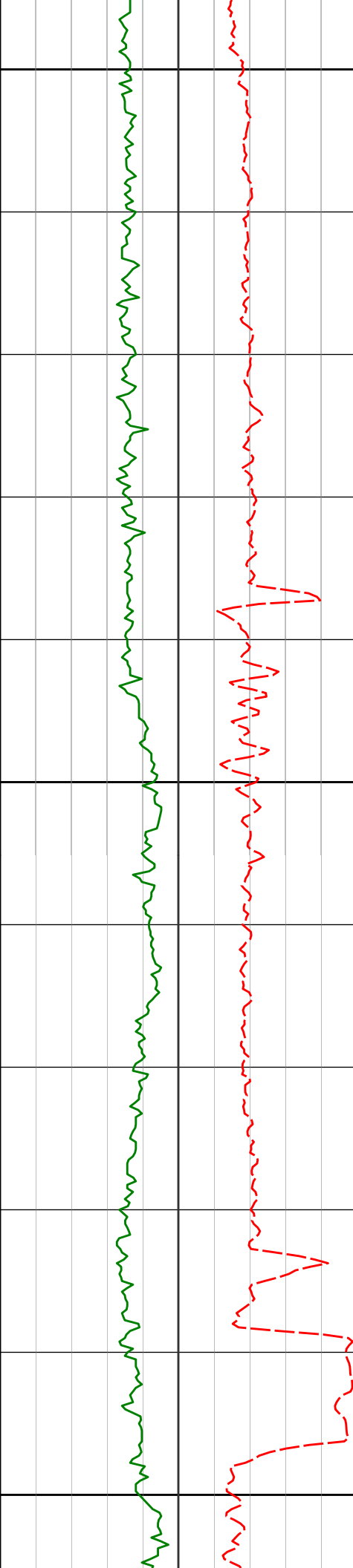
14400

14411'

91.60°

85.93° 6475.24'

7759.25'



14500

14505'

91.05°

85.75° 6473.06'

7853.13'

14600

14600'

89.91°

85.21° 6472.27'

7948.00'

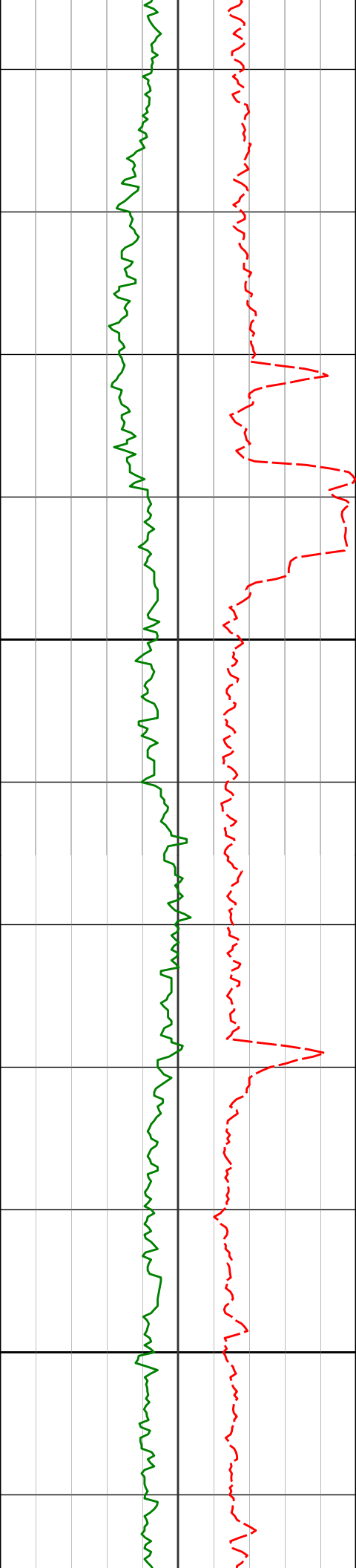
14700

14694'

92.19°

85.46° 6470.55'

8041.85'



14800

14900

14788'

91.30°

86.25° 6467.69'

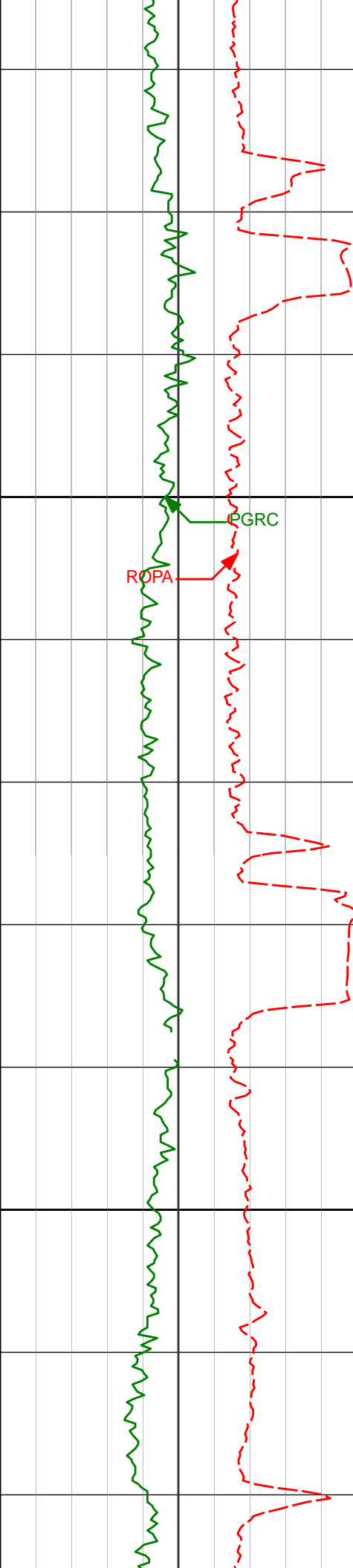
8135.71'

14883'

90.43°

86.15° 6466.26'

8230.63'



15000

15100

14978'

90.40°

86.47° 6465.57'

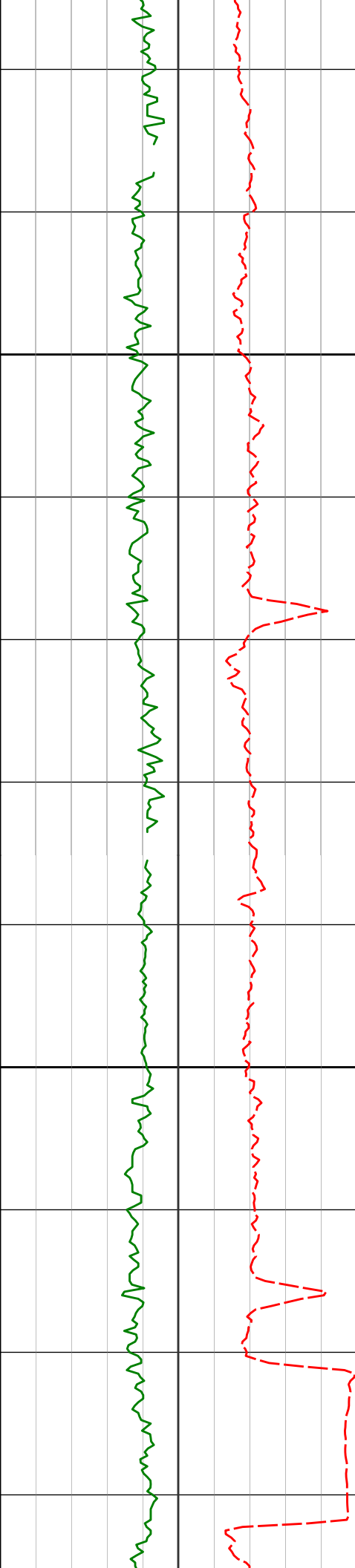
8325.56'

15073'

91.33°

88.61° 6464.13'

8420.54'



15200

15300

15167'

91.26°

88.42° 6462.01'

8514.51'

15262'

89.91°

87.95° 6461.04'

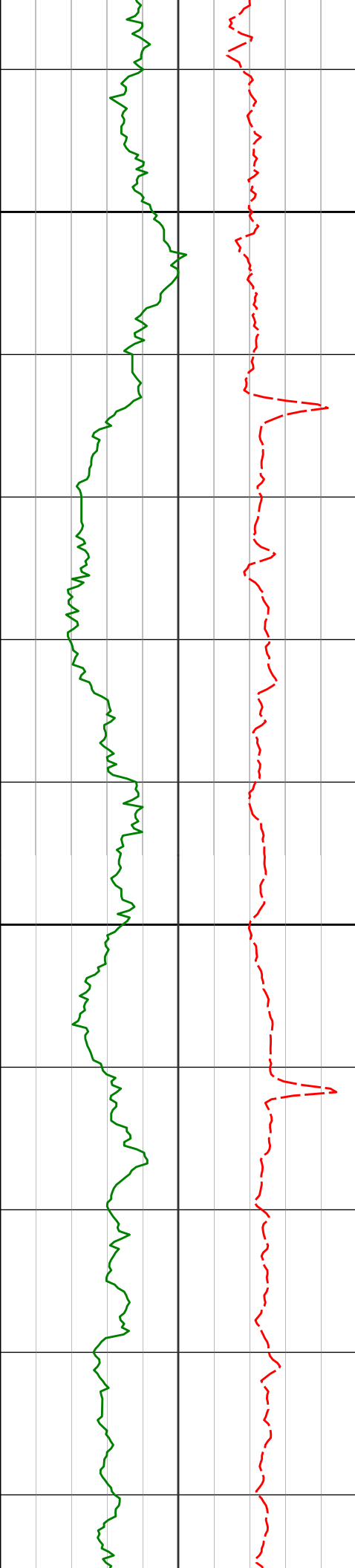
8609.50'

15357'

92.62°

87.75° 6458.94'

8704.47'



15400

15451'

92.65°

87.53° 6454.62'

8798.36'

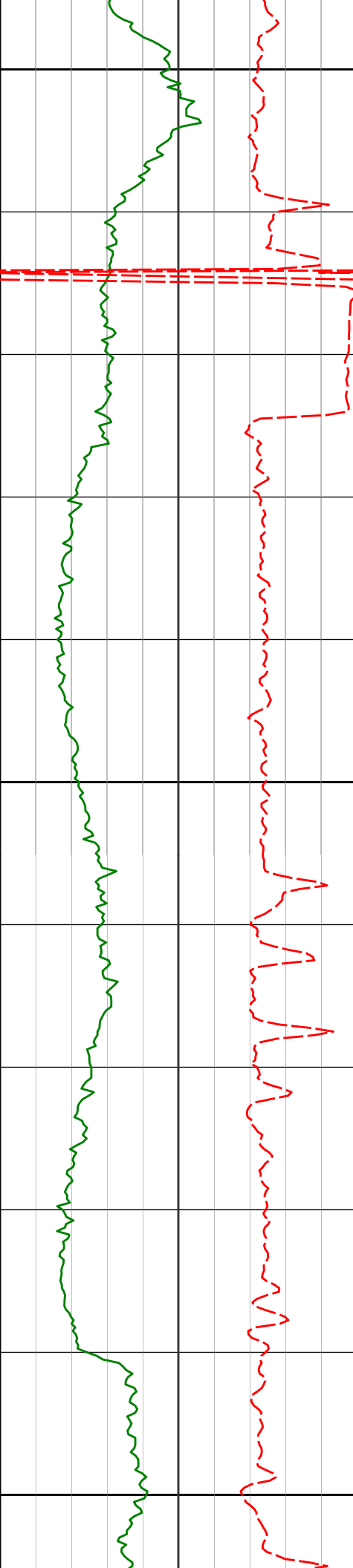
15500

15546'

93.61°

87.74° 6449.43'

8893.21'



15600

15641'

91.82°

88.44° 6444.93'

8988.10'

15700

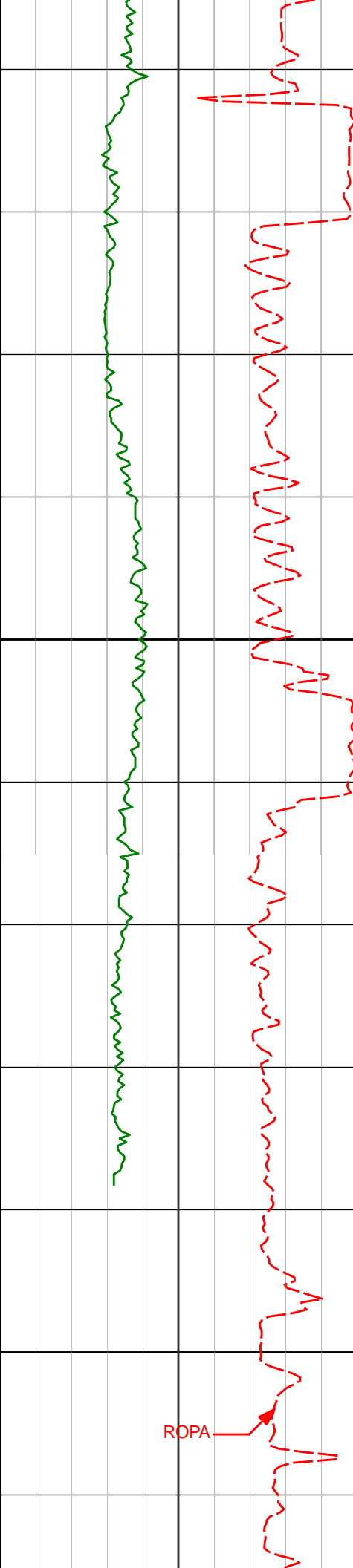
15735'

91.91°

88.75° 6441.87'

9082.05'

15800



15900

16000

15830'

91.26°

89.31° 6439.24'

9177.00'

15924'

89.72°

90.01° 6438.43'

9270.97'

15971'

90.68°

90.83° 6438.27'

9317.94'

ROPA

<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div> <div>TD Well @ 16038' MD</div>										16038'										90.68°										90.83° 6436.67'										9384.83'																																																											
Avg Rate of Penetration ROPA feet per hr										Depth MD ft										Depth										Inc										Azi										TVD										V.S.										Temp																													
PCG GR XHi-Range RT PGRC api																																																																																																			

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch AE32-640
Wattenburg
Weld Colorado
USA
CA-XX-0902674374

Surveys in the Lateral Section (Starting at 6973) have had IFR/MSA Corrections applied.

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
646.00	0.50	220.31	645.99	2.14 S	1.81 W	-1.87	0.08
741.00	0.56	222.43	740.99	2.79 S	2.39 W	-2.47	0.07
836.00	0.81	220.60	835.98	3.65 S	3.15 W	-3.24	0.27
1025.00	0.65	206.57	1024.97	5.63 S	4.50 W	-4.65	0.13
1212.00	0.40	223.15	1211.96	7.07 S	5.43 W	-5.62	0.16
1491.00	0.70	224.15	1490.94	9.01 S	7.29 W	-7.53	0.11
1583.00	0.81	224.92	1582.94	9.87 S	8.14 W	-8.41	0.12
1768.00	0.48	267.06	1767.93	10.84 S	9.83 W	-10.12	0.30
1861.00	3.55	272.02	1860.86	10.75 S	13.10 W	-13.39	3.31
1953.00	4.40	262.61	1952.64	11.11 S	19.45 W	-19.75	1.16
2047.00	5.35	263.72	2046.29	12.05 S	27.39 W	-27.71	1.01
2140.00	6.66	267.99	2138.78	12.72 S	37.08 W	-37.42	1.48
2234.00	8.67	263.83	2231.94	13.67 S	49.57 W	-49.93	2.22
2327.00	9.85	258.81	2323.73	15.97 S	64.35 W	-64.76	1.54
2419.00	8.70	252.98	2414.52	19.53 S	78.72 W	-79.23	1.62
2511.00	7.84	249.44	2505.57	23.77 S	91.25 W	-91.86	1.08
2603.00	8.44	260.52	2596.65	27.08 S	103.78 W	-104.48	1.82
2694.00	7.93	262.08	2686.72	29.05 S	116.59 W	-117.34	0.61
2788.00	7.43	261.26	2779.87	30.87 S	129.02 W	-129.82	0.54
2881.00	7.27	261.16	2872.11	32.69 S	140.78 W	-141.63	0.18
2975.00	8.69	264.17	2965.20	34.32 S	153.73 W	-154.61	1.58
3070.00	7.01	260.05	3059.30	36.05 S	166.58 W	-167.51	1.86
3164.00	6.02	253.63	3152.70	38.43 S	176.97 W	-177.95	1.31

3260.00	6.70	262.63	3248.11	40.57 S	187.35 W	-188.39	1.25
3353.00	7.40	270.07	3340.41	41.26 S	198.72 W	-199.78	1.24
3448.00	7.04	265.79	3434.65	41.68 S	210.65 W	-211.71	0.68
3543.00	7.47	271.81	3528.89	41.91 S	222.62 W	-223.69	0.92
3637.00	9.10	279.14	3621.91	40.54 S	236.06 W	-237.09	2.06
3732.00	9.33	277.98	3715.69	38.28 S	251.10 W	-252.06	0.32
3827.00	9.74	277.85	3809.37	36.11 S	266.69 W	-267.58	0.44
3921.00	9.51	277.30	3902.05	34.04 S	282.27 W	-283.10	0.27
4016.00	8.58	261.41	3995.88	34.10 S	297.07 W	-297.89	2.79
4110.00	7.96	258.78	4088.91	36.41 S	310.39 W	-311.27	0.78
4299.00	6.55	259.80	4276.39	40.87 S	333.83 W	-334.82	0.75
4394.00	6.17	263.38	4370.80	42.41 S	344.23 W	-345.26	0.57
4489.00	5.19	257.06	4465.34	43.96 S	353.49 W	-354.56	1.23
4583.00	4.75	258.60	4558.98	45.68 S	361.44 W	-362.56	0.49
4678.00	4.16	244.16	4653.70	47.96 S	368.40 W	-369.58	1.33
4772.00	3.93	234.63	4747.47	51.32 S	374.10 W	-375.36	0.76
4867.00	3.48	230.03	4842.27	55.05 S	378.96 W	-380.33	0.56
4961.00	3.56	235.98	4936.09	58.52 S	383.57 W	-385.03	0.40
5056.00	2.95	244.00	5030.94	61.24 S	388.21 W	-389.74	0.80
5151.00	2.16	236.19	5125.84	63.31 S	391.89 W	-393.48	0.90
5245.00	1.15	205.94	5219.80	65.15 S	393.78 W	-395.41	1.38
5340.00	0.49	211.87	5314.79	66.35 S	394.41 W	-396.08	0.71
5435.00	0.28	291.89	5409.79	66.61 S	394.83 W	-396.51	0.54
5529.00	0.81	274.59	5503.79	66.47 S	395.70 W	-397.37	0.58
5624.00	0.56	167.44	5598.78	66.86 S	396.27 W	-397.95	1.16
5718.00	0.53	157.87	5692.78	67.71 S	396.00 W	-397.71	0.10
5813.00	0.28	137.65	5787.78	68.29 S	395.68 W	-397.40	0.30
5908.00	4.32	99.06	5882.68	69.03 S	391.98 W	-393.73	4.32
6002.00	14.30	93.95	5975.33	70.39 S	376.86 W	-378.65	10.64
6097.00	23.64	96.49	6065.07	73.36 S	346.16 W	-348.04	9.87
6191.00	30.34	95.54	6148.78	77.79 S	303.75 W	-305.77	7.15
6286.00	33.23	92.85	6229.53	81.40 S	253.86 W	-255.99	3.38
6380.00	43.75	90.62	6303.00	83.04 S	195.47 W	-197.67	11.28
6475.00	48.48	89.30	6368.84	82.96 S	127.02 W	-129.25	5.09
6570.00	55.21	87.46	6427.50	80.79 S	52.40 W	-54.59	7.24
6664.00	63.99	91.70	6475.03	80.33 S	28.57 E	26.36	10.12
6759.00	76.35	93.03	6507.19	84.05 S	117.69 E	115.34	13.07
6861.00	84.11	94.01	6524.49	90.22 S	217.94 E	215.39	7.66
6973.00	88.46	92.56	6531.75	96.62 S	329.49 E	326.72	4.09
7069.00	88.80	90.63	6534.05	99.29 S	425.42 E	422.54	2.04
7163.00	90.59	88.32	6534.55	98.43 S	519.41 E	516.52	3.10
7258.00	90.31	88.19	6533.81	95.54 S	614.36 E	611.51	0.32
7352.00	90.37	86.99	6533.26	91.59 S	708.28 E	705.50	1.28
7447.00	90.43	87.11	6532.59	86.69 S	803.15 E	800.47	0.14
7542.00	91.05	87.56	6531.36	82.27 S	898.04 E	895.44	0.80
7636.00	89.97	86.19	6530.53	77.14 S	991.89 E	989.40	1.85
7731.00	90.37	86.37	6530.25	70.97 S	1086.69 E	1084.34	0.46
7826.00	90.52	86.76	6529.51	65.28 S	1181.51 E	1179.28	0.44
7921.00	90.68	86.95	6528.51	60.06 S	1276.36 E	1274.24	0.26
8015.00	90.74	86.12	6527.35	54.38 S	1370.18 E	1368.18	0.88
8109.00	91.02	86.72	6525.91	48.51 S	1463.99 E	1462.11	0.70
8204.00	90.15	86.04	6524.93	42.51 S	1558.79 E	1557.04	1.15
8299.00	91.97	86.81	6523.17	36.59 S	1653.59 E	1651.96	2.08
8394.00	88.61	85.58	6522.68	30.29 S	1748.36 E	1746.88	3.77
8488.00	88.15	86.95	6525.34	24.17 S	1842.12 E	1840.77	1.54
8583.00	89.94	86.56	6526.92	18.79 S	1936.95 E	1935.71	1.93
8677.00	89.54	86.30	6527.35	12.94 S	2030.77 E	2029.65	0.51
8771.00	89.23	86.24	6528.37	6.82 S	2124.56 E	2123.58	0.33
8866.00	89.57	87.60	6529.36	1.71 S	2219.42 E	2218.54	1.47
8960.00	90.62	87.62	6529.21	2.22 N	2313.34 E	2312.53	1.11
9054.00	90.89	87.98	6527.97	5.83 N	2407.26 E	2406.51	0.48
9149.00	90.86	88.03	6526.51	9.13 N	2502.19 E	2501.50	0.07
9244.00	90.43	87.80	6525.44	12.58 N	2597.12 E	2596.49	0.52
9338.00	90.00	87.12	6525.09	16.75 N	2691.03 E	2690.48	0.85
9433.00	90.46	86.73	6524.70	21.84 N	2785.89 E	2785.44	0.64
9527.00	90.62	86.04	6523.82	27.77 N	2879.70 E	2879.38	0.74
9622.00	90.83	86.17	6522.62	34.21 N	2974.47 E	2974.29	0.26
9716.00	91.02	86.03	6521.10	40.60 N	3068.24 E	3068.20	0.25
9810.00	91.66	85.94	6518.90	47.19 N	3161.98 E	3162.09	0.70
9905.00	90.31	86.17	6517.27	53.72 N	3256.74 E	3256.99	1.45
10000.00	89.66	86.49	6517.29	59.80 N	3351.55 E	3351.93	0.76
10188.00	90.09	88.88	6517.70	67.38 N	3539.38 E	3539.90	1.29
10281.00	92.19	89.48	6515.85	68.71 N	3632.35 E	3632.86	2.34
10373.00	91.91	89.06	6512.56	69.89 N	3724.28 E	3724.80	0.55
10467.00	92.87	88.91	6508.64	71.55 N	3818.18 E	3818.71	1.03

10560.00	92.16	90.46	6504.56	72.07 N	3911.09 E	3911.09	1.83
10653.00	89.88	89.98	6502.90	71.72 N	4004.07 E	4004.53	2.51
10745.00	89.48	90.04	6503.42	71.70 N	4096.06 E	4096.49	0.44
10838.00	89.23	90.25	6504.48	71.46 N	4189.06 E	4189.44	0.35
10931.00	89.48	88.50	6505.53	72.47 N	4282.04 E	4282.42	1.90
11117.00	91.29	88.62	6504.28	77.15 N	4467.97 E	4468.41	0.98
11210.00	90.43	89.19	6502.88	78.93 N	4560.94 E	4561.39	1.11
11303.00	91.42	89.79	6501.38	79.76 N	4653.93 E	4654.36	1.24
11396.00	90.83	89.64	6499.55	80.22 N	4746.91 E	4747.32	0.65
11489.00	90.74	90.16	6498.28	80.39 N	4839.90 E	4840.28	0.56
11580.00	91.05	90.59	6496.86	79.80 N	4930.88 E	4931.22	0.58
11673.00	89.32	88.38	6496.56	80.63 N	5023.87 E	5024.19	3.01
11764.00	89.60	87.17	6497.41	84.17 N	5114.80 E	5115.18	1.37
11857.00	90.03	85.36	6497.71	90.23 N	5207.59 E	5208.11	2.00
11950.00	91.26	85.28	6496.66	97.81 N	5300.28 E	5300.97	1.33
12045.00	91.11	85.44	6494.70	105.49 N	5394.94 E	5395.81	0.24
12139.00	90.56	85.40	6493.33	112.99 N	5488.63 E	5489.67	0.59
12234.00	91.73	85.47	6491.44	120.55 N	5583.31 E	5584.52	1.23
12329.00	90.77	84.63	6489.37	128.75 N	5677.93 E	5679.33	1.34
12423.00	91.82	84.84	6487.25	137.36 N	5771.51 E	5773.11	1.14
12518.00	90.77	85.16	6485.10	145.64 N	5866.13 E	5867.91	1.15
12613.00	92.19	85.41	6482.64	153.44 N	5960.77 E	5962.74	1.52
12707.00	92.13	87.50	6479.10	159.25 N	6054.52 E	6056.61	2.22
12802.00	90.34	87.92	6477.06	163.04 N	6149.42 E	6151.57	1.93
12897.00	90.06	89.04	6476.73	165.56 N	6244.38 E	6246.57	1.22
12991.00	90.86	89.19	6475.97	167.01 N	6338.37 E	6340.56	0.87
13086.00	89.81	89.30	6475.40	168.26 N	6433.35 E	6435.55	1.11
13180.00	90.12	90.02	6475.45	168.82 N	6527.35 E	6529.53	0.83
13275.00	90.46	91.72	6474.97	167.37 N	6622.34 E	6624.44	1.83
13370.00	90.52	93.29	6474.15	163.21 N	6717.24 E	6719.19	1.65
13464.00	91.29	92.09	6472.66	158.79 N	6811.12 E	6812.91	1.52
13559.00	90.34	91.00	6471.30	156.23 N	6906.07 E	6907.76	1.52
13654.00	89.85	90.87	6471.15	154.68 N	7001.06 E	7002.67	0.54
13748.00	89.97	90.63	6471.30	153.46 N	7095.05 E	7096.59	0.29
13843.00	89.88	90.69	6471.43	152.37 N	7190.05 E	7191.52	0.12
13938.00	88.95	89.12	6472.40	152.53 N	7285.04 E	7286.48	1.91
14032.00	88.43	88.68	6474.55	154.34 N	7378.99 E	7380.45	0.73
14127.00	89.63	88.03	6476.16	157.06 N	7473.94 E	7475.44	1.44
14221.00	90.25	86.19	6476.26	161.80 N	7567.82 E	7569.41	2.07
14316.00	89.69	86.29	6476.31	168.03 N	7662.61 E	7664.34	0.59
14411.00	91.60	85.97	6475.24	174.45 N	7757.38 E	7759.25	2.04
14505.00	91.05	85.79	6473.06	181.20 N	7851.11 E	7853.13	0.62
14600.00	89.91	85.25	6472.27	188.62 N	7945.82 E	7948.00	1.33
14694.00	92.19	85.50	6470.55	196.21 N	8039.49 E	8041.85	2.44
14788.00	91.30	86.29	6467.69	202.94 N	8133.20 E	8135.71	1.27
14883.00	90.43	86.19	6466.26	209.17 N	8227.99 E	8230.63	0.91
14978.00	90.40	86.51	6465.57	215.22 N	8322.79 E	8325.56	0.34
15073.00	91.33	88.65	6464.13	219.24 N	8417.69 E	8420.54	2.46
15167.00	91.26	88.45	6462.01	221.62 N	8511.64 E	8514.51	0.22
15262.00	89.91	87.99	6461.04	224.57 N	8606.58 E	8609.50	1.51
15357.00	92.62	87.78	6458.94	228.08 N	8701.49 E	8704.47	2.86
15451.00	92.65	87.57	6454.62	231.89 N	8795.31 E	8798.36	0.23
15546.00	93.61	87.78	6449.43	235.74 N	8890.09 E	8893.21	1.03
15641.00	91.82	88.47	6444.93	238.84 N	8984.93 E	8988.10	2.02
15735.00	91.91	88.79	6441.87	241.09 N	9078.85 E	9082.05	0.35
15830.00	91.26	89.35	6439.24	242.63 N	9173.80 E	9177.00	0.90
15924.00	89.72	90.04	6438.43	243.13 N	9267.79 E	9270.97	1.80
15971.00	90.68	90.86	6438.27	242.76 N	9314.79 E	9317.94	2.68

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 88.43 DEGREES (GRID)
A TOTAL CORRECTION OF 7.32 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 15971.00 FEET
IS 9317.95 FEET ALONG 88.51 DEGREES (GRID)

Final survey is a straight line projection to TD.

