

PCGC - Pressure Case Gamma
PCDC - Pressure Case Directional

1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	15-Nov-13	16-Nov-13	20-Nov-13		
Rig Bit Number	0100	0200	0300		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.750	6.750	4.750		
Log Start Depth (TVD, ft)	1,254.96	6,711.26	7,330.29		
Log End Depth (TVD, ft)	6,711.26	7,330.29	7,331.05		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	13-Nov-13 06:15	14-Nov-13 22:00	18-Nov-13 03:30		
Drill/Wipe End Date and Time	14-Nov-13 20:20	14-Nov-13 22:00	19-Nov-13 14:30		
Min Inc (deg) @ Depth (TVD, ft)	0.31 @ 6,705.26	1.57 @ 6,752.26	87.72 @ 7,325.29		
Max Inc (deg) @ Depth (TVD, ft)	21.18 @ 4,410.55	90.20 @ 7,330.29	91.45 @ 7,327.67		
Bit TFA(in2) / Bit Type	.9687 / PDC	.9687 / PDC	.9817 / PDC		
Flow Rate (gpm)	562.30	517.65	290.00		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	455.5 / N/A		
Fluid Type	Native/Spud Mud	Other	Native/Spud Mud		
Density (ppg) / Viscosity (spqt)	8.50 / 28.00	10.10 / 39.00	9.53 / 41.00		
Filtrate CL (ppm)	1,200.00	1,200.00	1,100.00		
pH / Fluid Loss (mptm)	9.00 / 18	9.00 / 4	9.10 / 7		
PV (cP) / YP (lbf2)	1 / 4.00	12 / 11.00	10 / 15.00		
% Solids / % Sand	5.50 / 1.00	6.70 / 1.25	6.7 / 1.00		
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	N/A / N/A		
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Min Tool Temp (deg F) / S	100.00 / 20M	170.07 / 20M	204.40 / 20M		

Max Tool Temp (degF) / Source	163.20 / PCM	170.37 / PCM	231.42 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Matt Busche	Matt Busche	Patrick Megee		
Customer Representative					

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.76	5.84	5.76		
Sub Serial Number	11404283	11404283	12134689		
Insert Serial Number	11227549	11400908	11227549		
Date and Time Initialized	12-Nov-13 14:46	14-Nov-13 23:28	17-Nov-13 10:27		
Date and Time Read	15-Nov-13 09:33	17-Nov-13 11:02	20-Nov-13 07:54		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	44.73	47.00	45.00		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11404283	11404283	12134689		
Sonde Serial Number	11833053	11477984	11833053		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	200.89	350.30	325.36		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	49.68	49.94	48.39		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11404283	11404283	12134689		
Insert/Sonde Serial Number	11681022	11579809	11681022		

REMARKS

1. All depths are measured bit depths, referenced to the Driller's pipe tally and are measured from the Kelly Bushing, unless otherwise specified.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded data unless otherwise specified.
4. Final Survey is the Projection to Bit
5. Data gap from 7800' to 7825' caused by depth tracking issue
6. The following smoothing parameters have been applied to the data:

PGRC (Corrected Gamma Ray):

Interval Resolution: 0.5 ft

Interval Distance: 0.6 ft

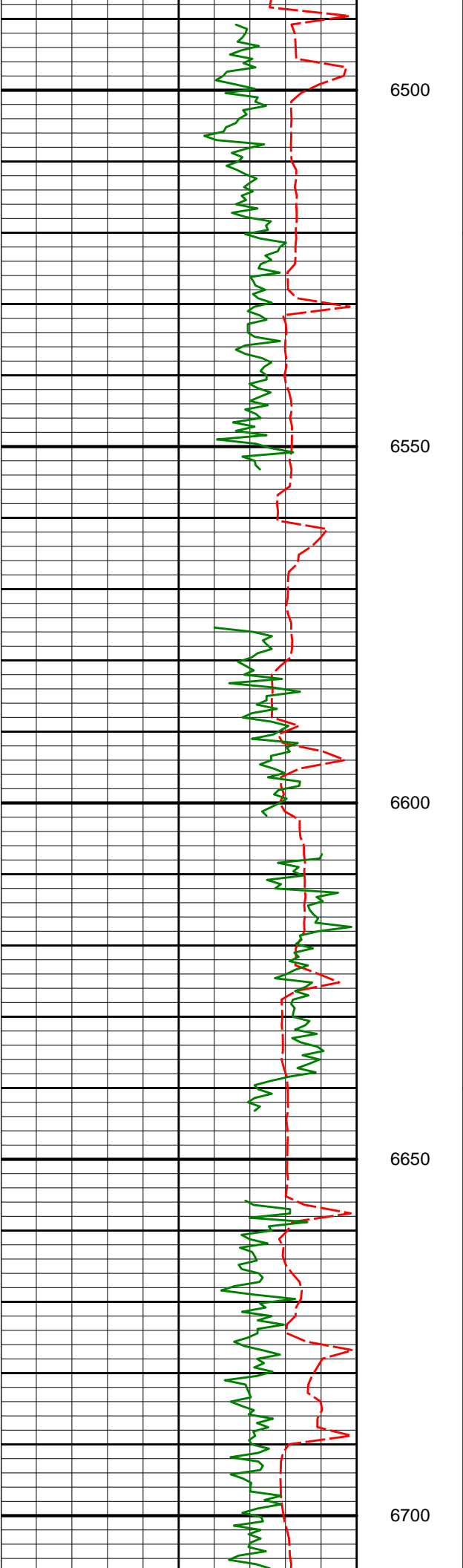
Gap Fill: 3.0 ft

ROPA (Average Rate Of Penetration):

Interval Resolution: 0.5 ft

Interval Distance: 1.2 ft

Gap Fill: 3.0 ft



6546'

5.05°

54.33°

6325.76'

-681.15'

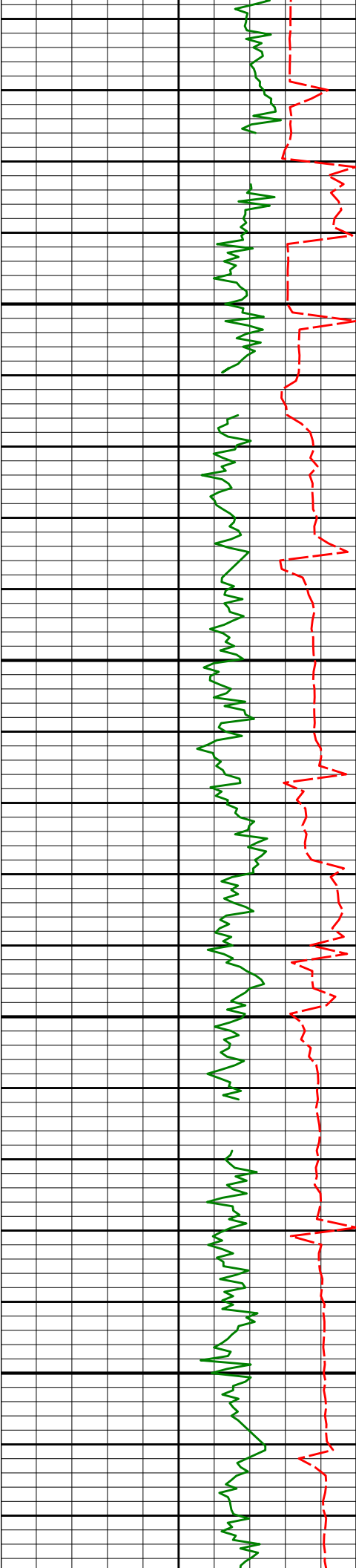
6641'

4.01°

48.91°

6420.46'

-685.62'



6750

6800

6850

6900

6736'

2.35°

47.64°

6515.31'

-689.02'

6831'

0.93°

52.41°

6610.27'

-690.75'

6885'

0.41°

51.04°

6664.26'

-691.13'

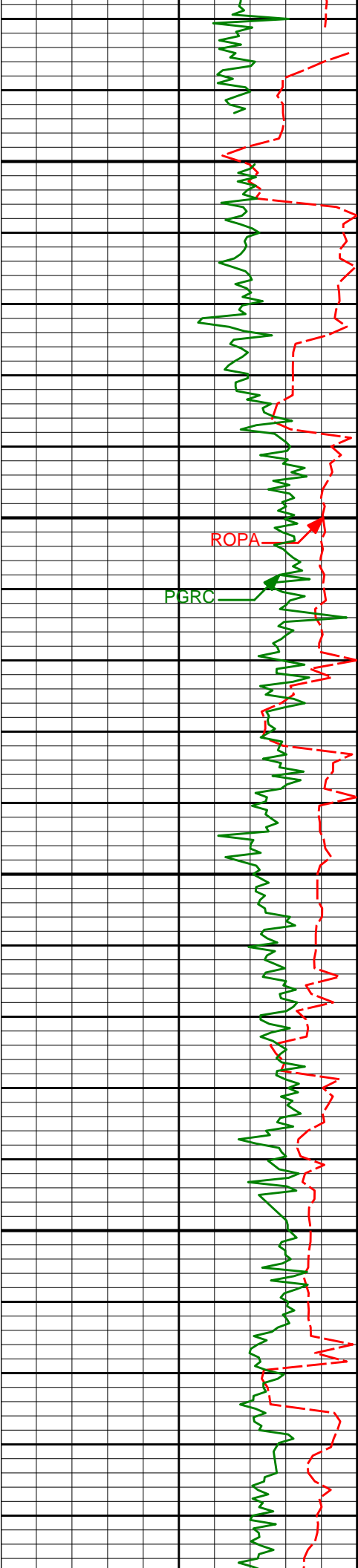
6926'

0.31°

21.18°

6705.26'

-691.32'



6950

6973'

1.57°

167.10°

6752.26'

-690.81'

7000

ROPA

PGRC

7021'

5.37°

174.51°

6800.16'

-687.92'

7050

7068'

8.72°

177.55°

6846.80'

-682.16'

7100

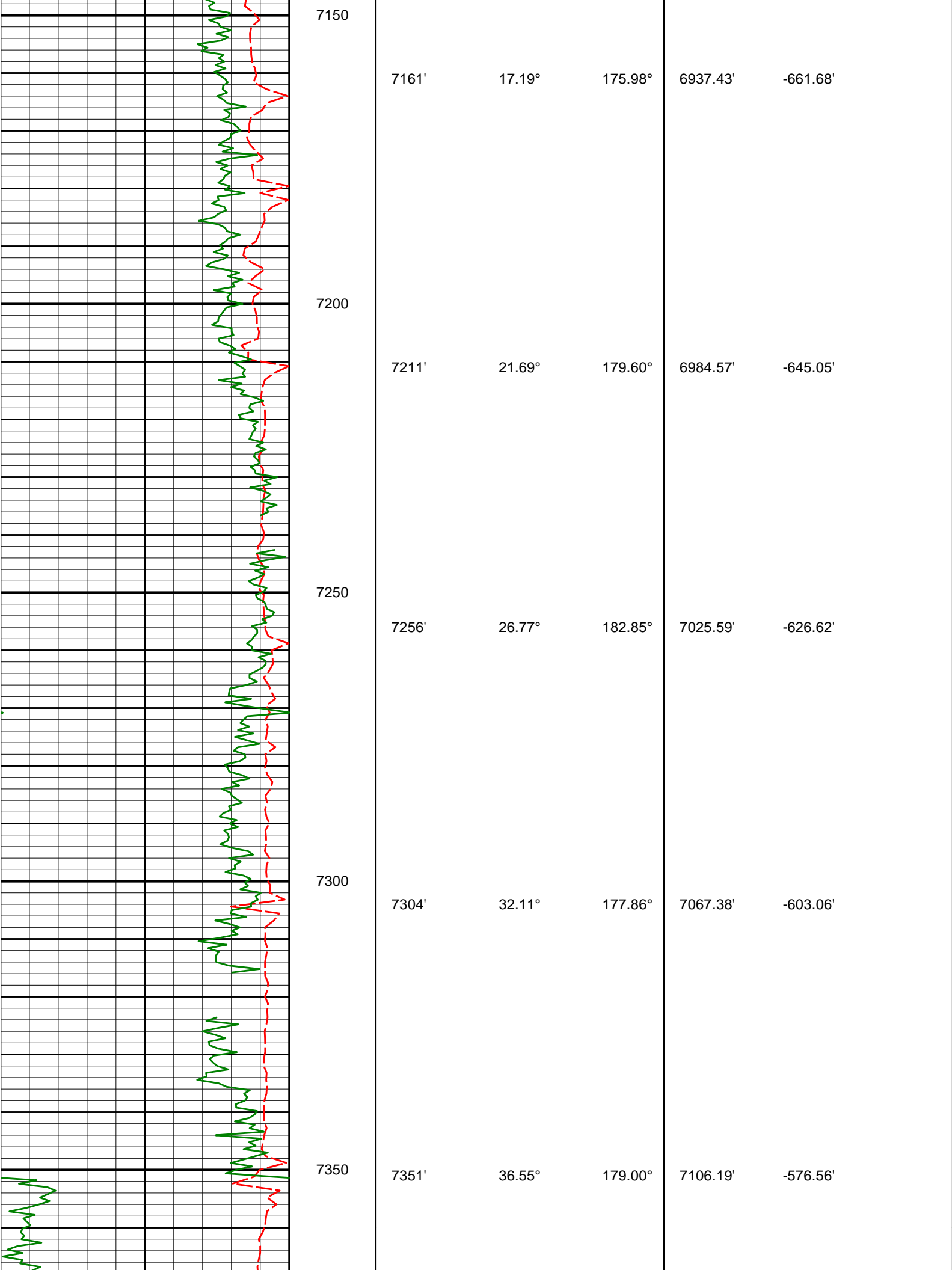
7116'

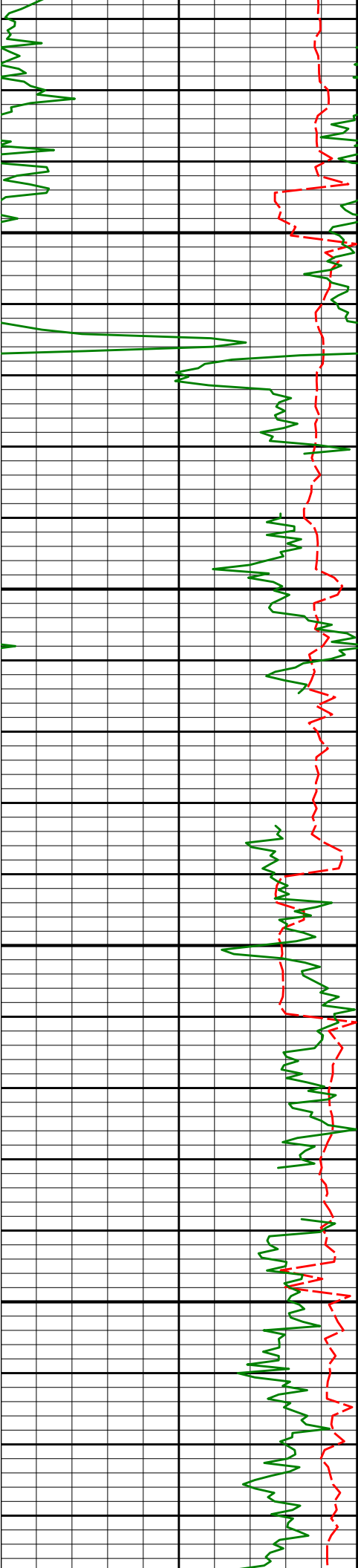
12.68°

176.26°

6893.96'

-673.26'





7400

7399'

41.31°

178.81°

7143.52'

-546.41'

7450

7446'

47.65°

180.01°

7177.04'

-513.51'

7500

7494'

52.25°

179.34°

7207.92'

-476.78'

7550

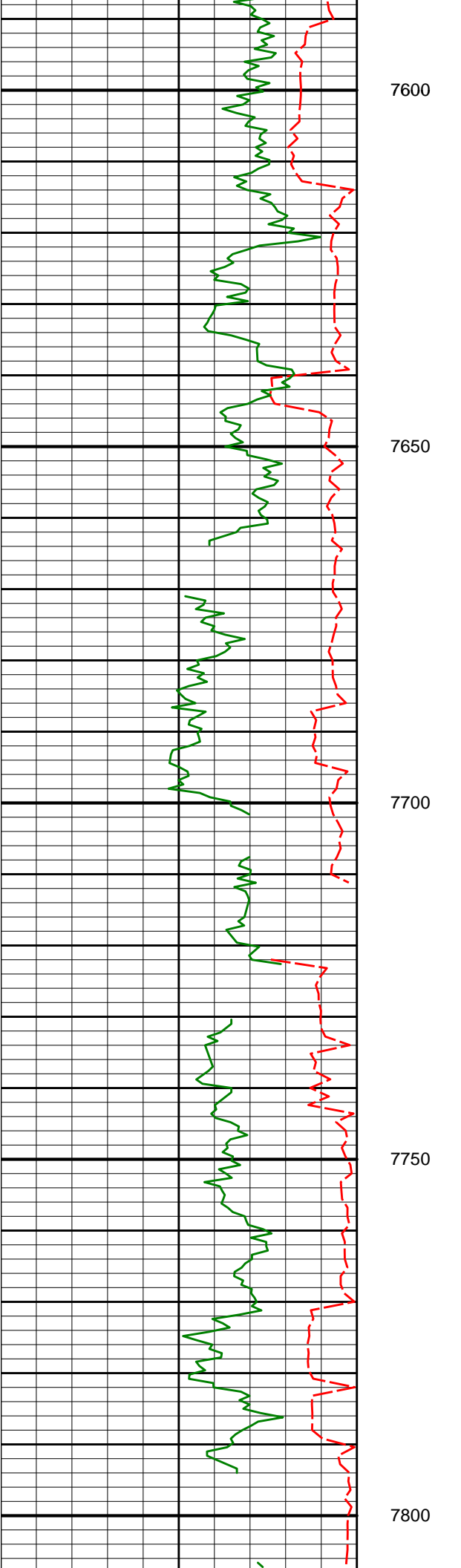
7541'

57.46°

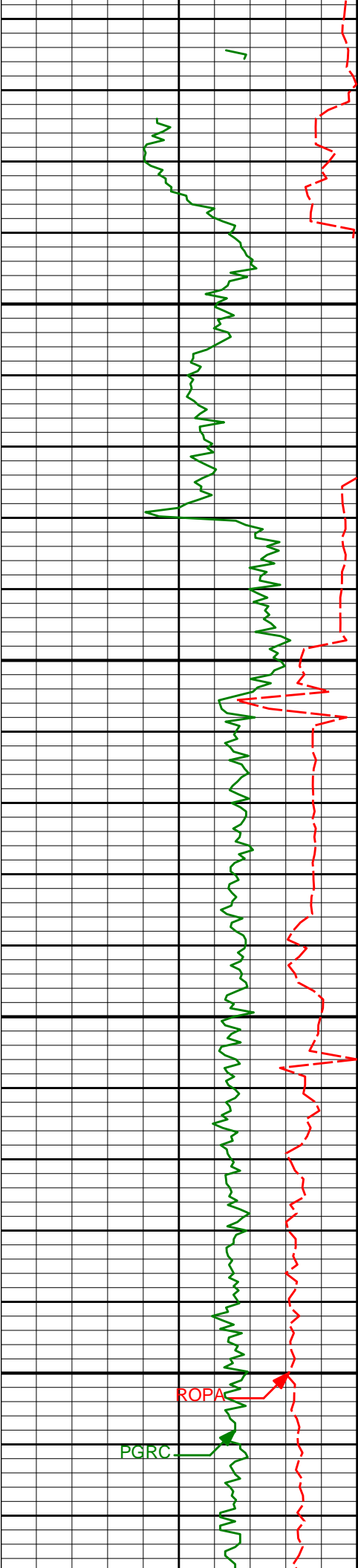
178.50°

7234.97'

-438.36'



7589'	62.71°	177.04°	7258.90'	-396.78'
7636'	66.70°	175.85°	7278.98'	-354.33'
7684'	72.51°	174.96°	7295.70'	-309.42'
7732'	76.18°	175.59°	7308.65'	-263.29'
7779'	79.56°	175.81°	7318.52'	-217.40'



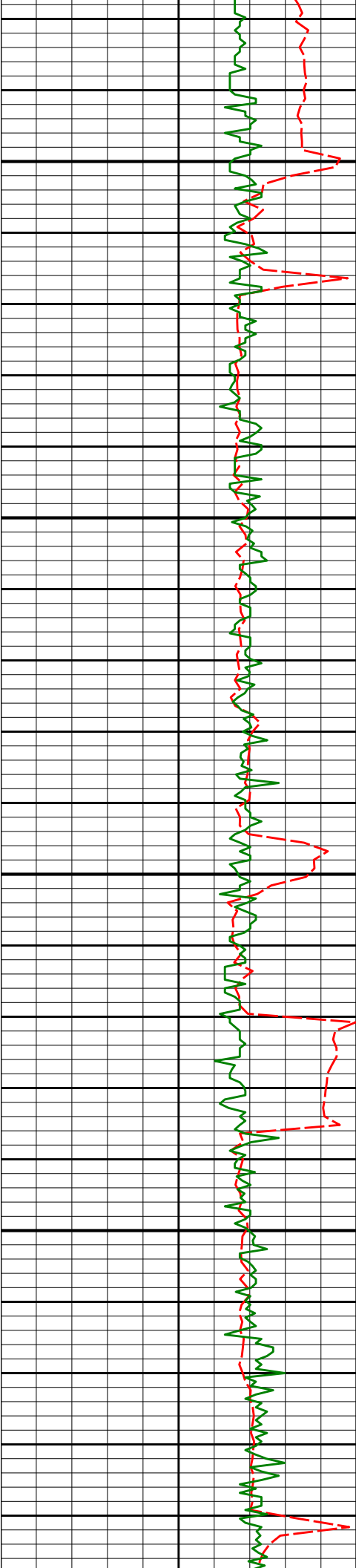
7" Casing Shoe @ 7895' MD

7900

7950

8000

7827'	82.84°	176.91°	7325.86'	-170.01'
7858'	86.21°	177.91°	7328.82'	-139.16'
7905'	90.20°	178.20°	7330.29'	-92.20'
7913'	90.37°	179.09°	7330.25'	-84.20'
8008'	90.03°	177.03°	7329.92'	10.79'



8050

8100

8150

8200

8104'

90.34°

177.05°

7329.61'

106.76'

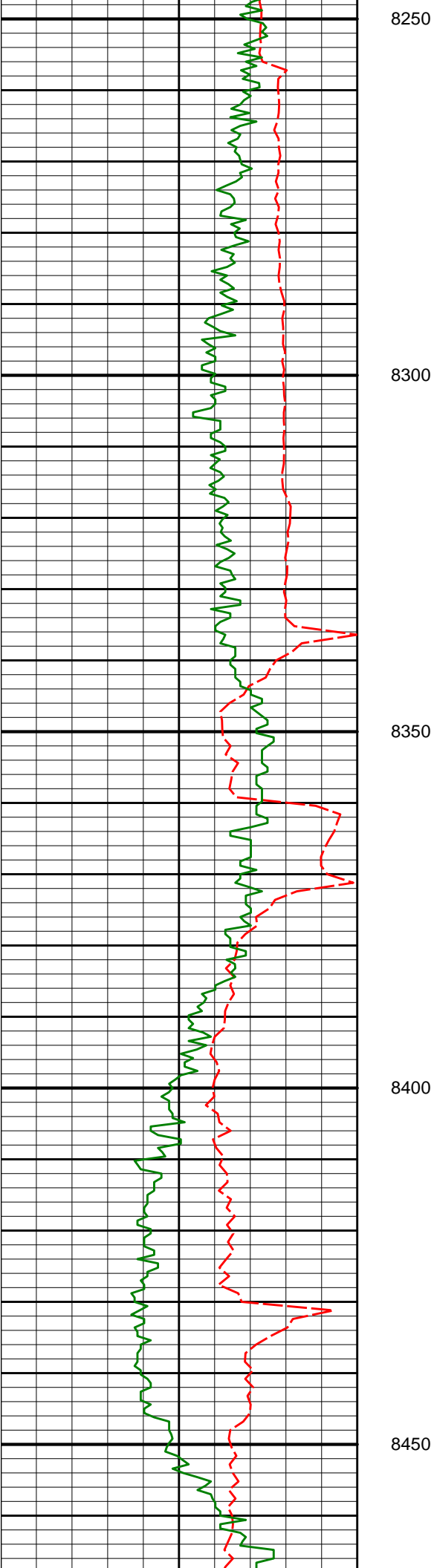
8199'

90.46°

179.74°

7328.95'

201.74'



8294'

90.18°

178.45°

7328.41'

296.74'

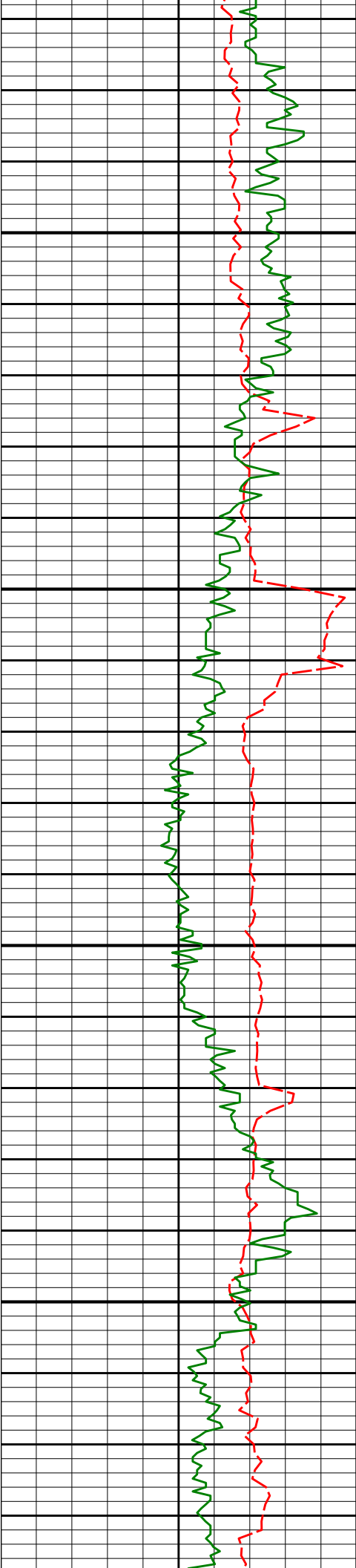
8389'

90.46°

179.73°

7327.87'

391.73'



8484'

90.93°

178.44°

7326.72'

486.72'

8500

8550

8579'

90.52°

179.68°

7325.52'

581.70'

8600

8650

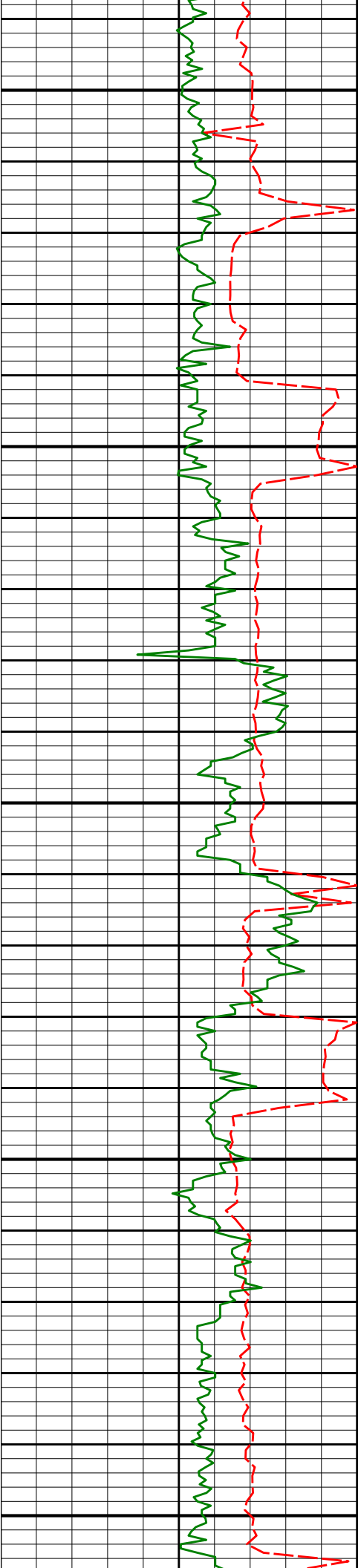
8674'

91.02°

178.85°

7324.24'

676.69'



8700

8750

8800

8850

8900

8769'

87.72°

177.53°

7325.29'

771.66'

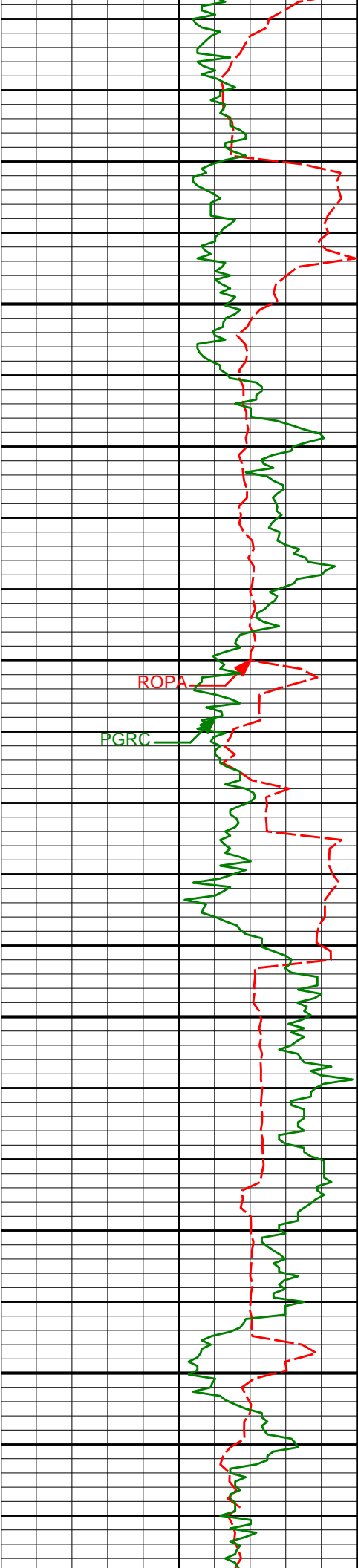
8865'

87.90°

177.82°

7328.96'

867.58'



8950

8960'

88.80°

177.95°

7331.69'

962.53'

9000

9050

9055'

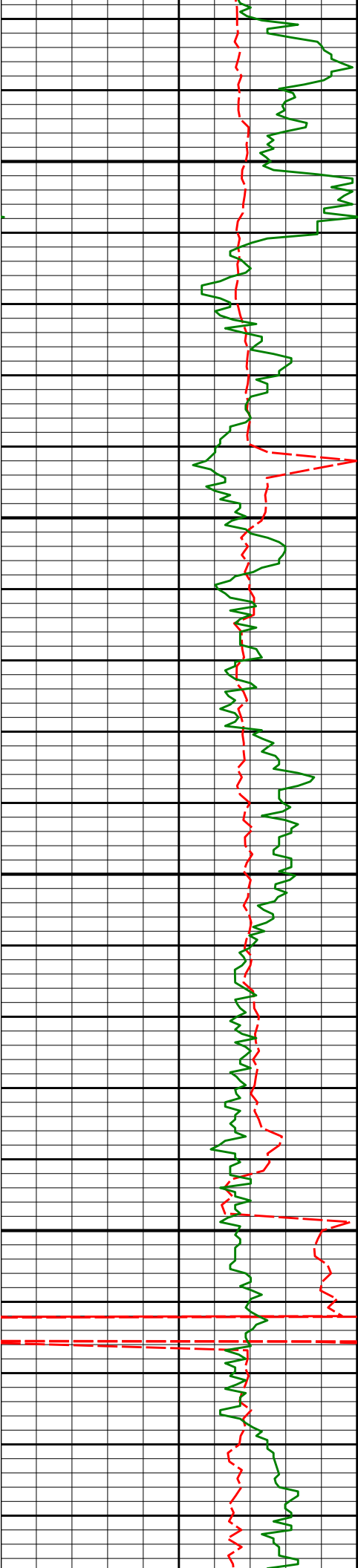
89.97°

179.72°

7332.72'

1057.52'

9100



9150

9150'

91.02°

178.11°

7331.90'

1152.51'

9200

9250

9245'

90.96°

177.32°

7330.26'

1247.49'

9300

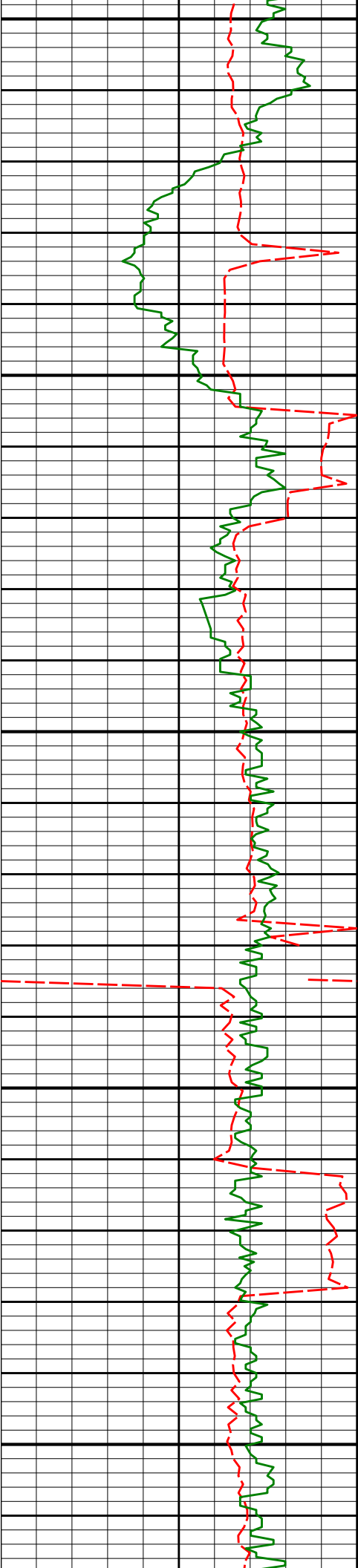
9341'

91.20°

179.49°

7328.45'

1343.46'



9350

9400

9450

9500

9550

9436'

88.61°

179.11°

7328.61'

1438.45'

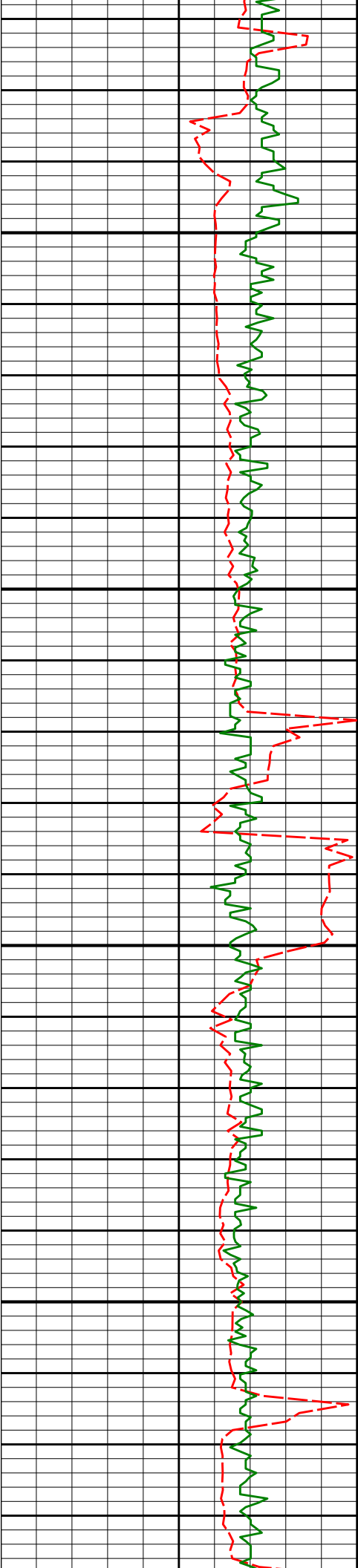
9531'

89.66°

178.88°

7330.04'

1533.43'



9600

9650

9700

9750

9626'

89.38°

177.60°

7330.83'

1628.43'

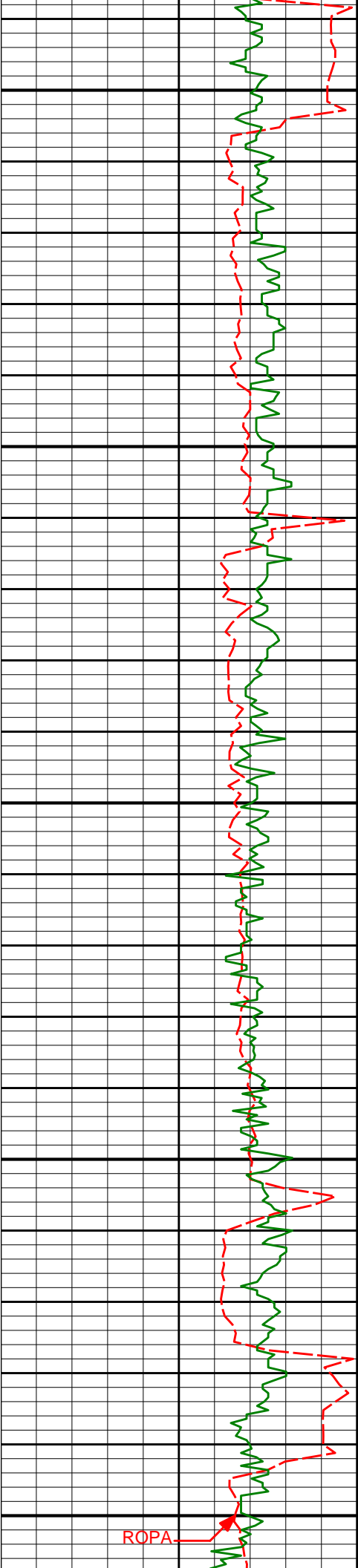
9721'

90.52°

179.36°

7330.91'

1723.42'



9800

9850

9900

9950

10000

9817'

89.60°

180.58°

7330.81'

1819.39'

9912'

88.92°

178.61°

7332.03'

1914.36'

ROPA

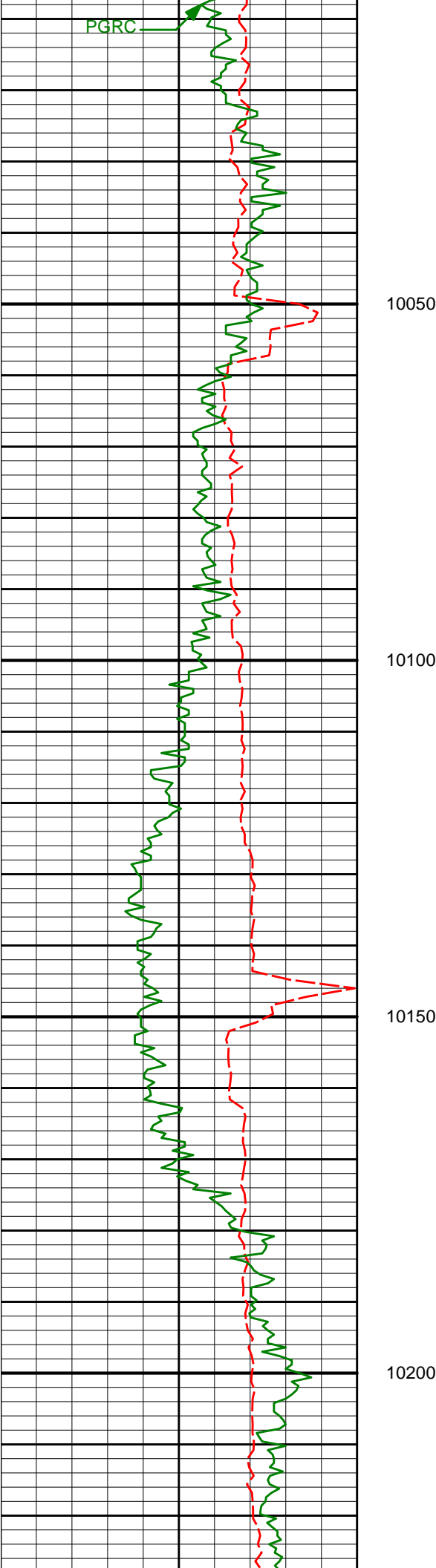
10007'

90.40°

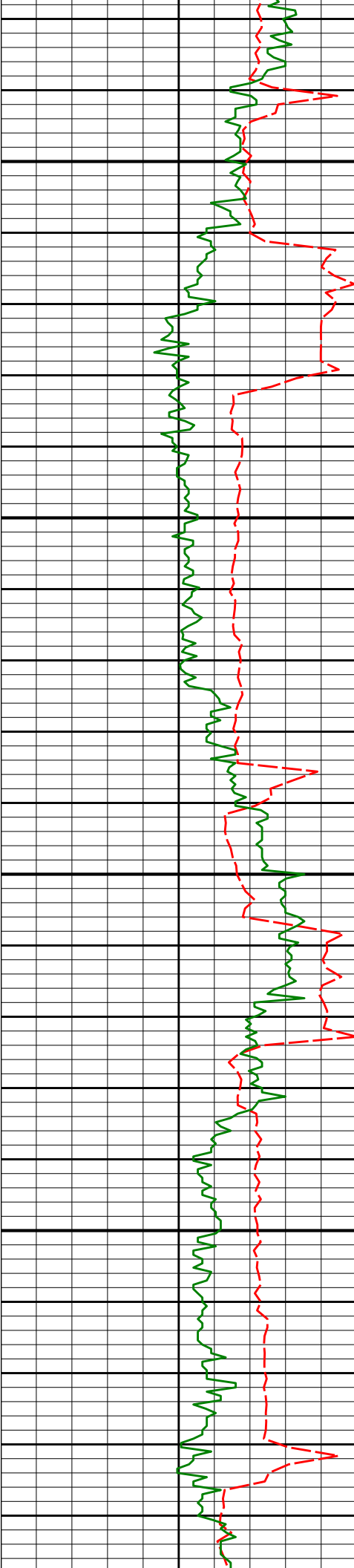
178.73°

7332.59'

2009.36'



10007'	90.74°	176.76°	7332.65'	2100.35'
10102'	90.86°	178.02°	7331.55'	2104.35'
10197'	90.99°	176.68°	7330.01'	2199.31'



10250

10292'

90.34°

178.41°

7328.91'

2294.29'

10300

10350

10387'

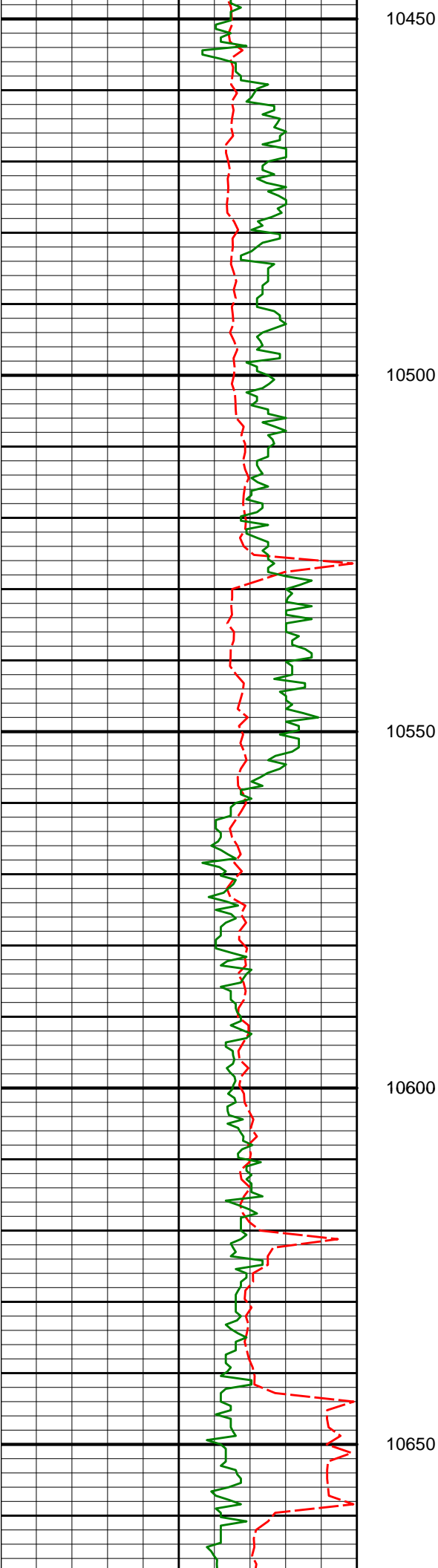
90.59°

179.95°

7328.15'

2389.28'

10400



10482'

90.65°

178.83°

7327.12'

2484.26'

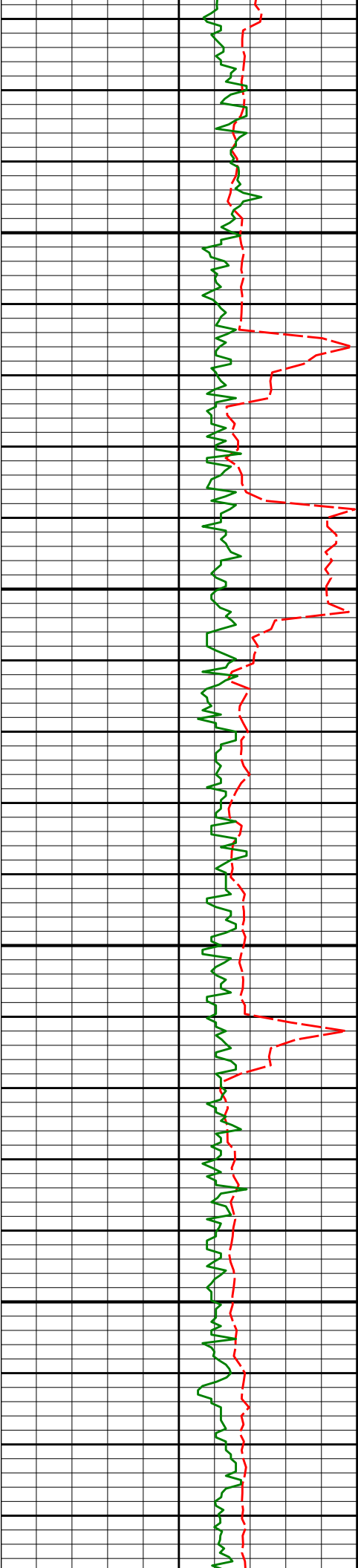
10578'

91.33°

177.55°

7325.47'

2580.24'



10700

10750

10800

10850

10673'

89.88°

178.05°

7324.48'

2675.22'

10768'

89.66°

179.38°

7324.86'

2770.22'

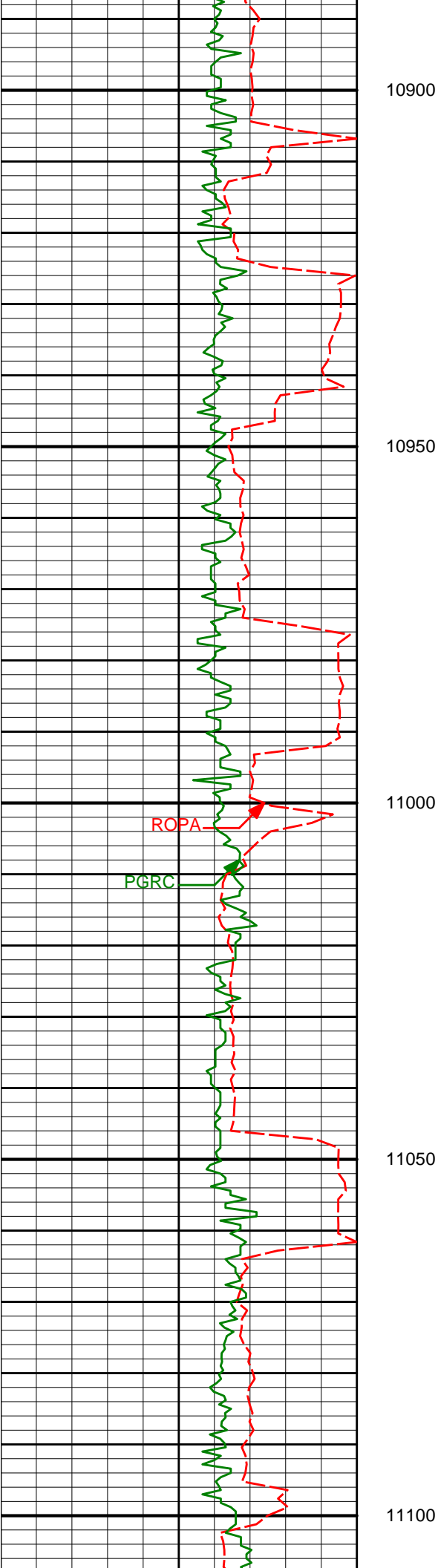
10863'

89.63°

176.84°

7325.45'

2865.21'



10958'

89.41°

177.54°

7326.24'

2960.18'

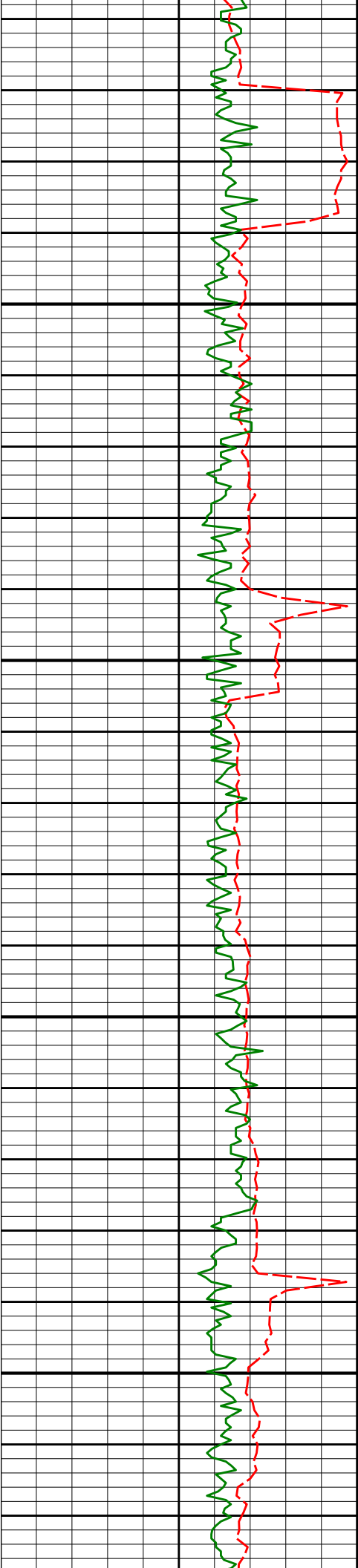
11053'

89.11°

179.01°

7327.47'

3055.16'



11150

11148'

89.57°

182.04°

7328.56'

3150.09'

11200

11250

11244'

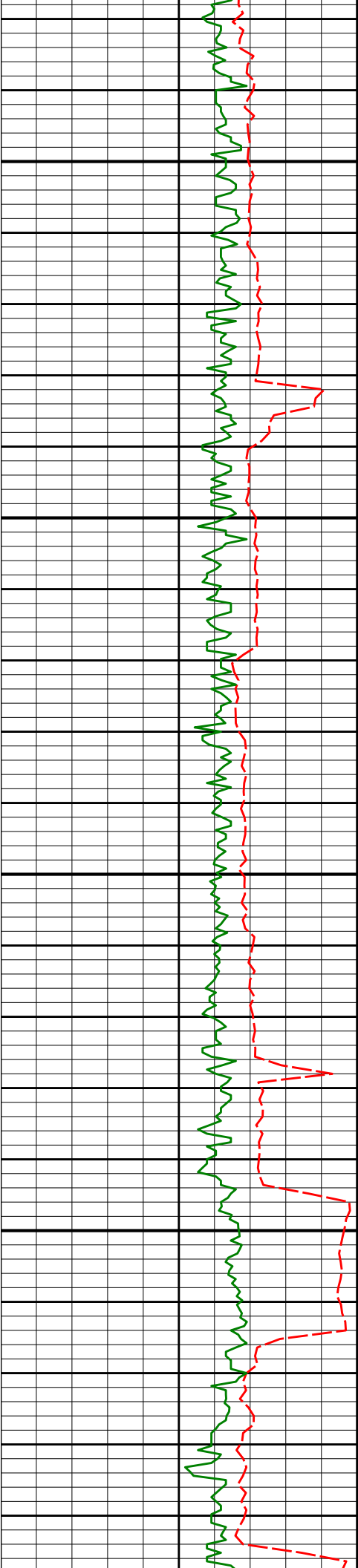
90.65°

181.36°

7328.38'

3245.95'

11300



11350

11400

11450

11500

11339'

90.25°

179.98°

7327.64'

3340.88'

11434'

89.81°

177.00°

7327.59'

3435.87'

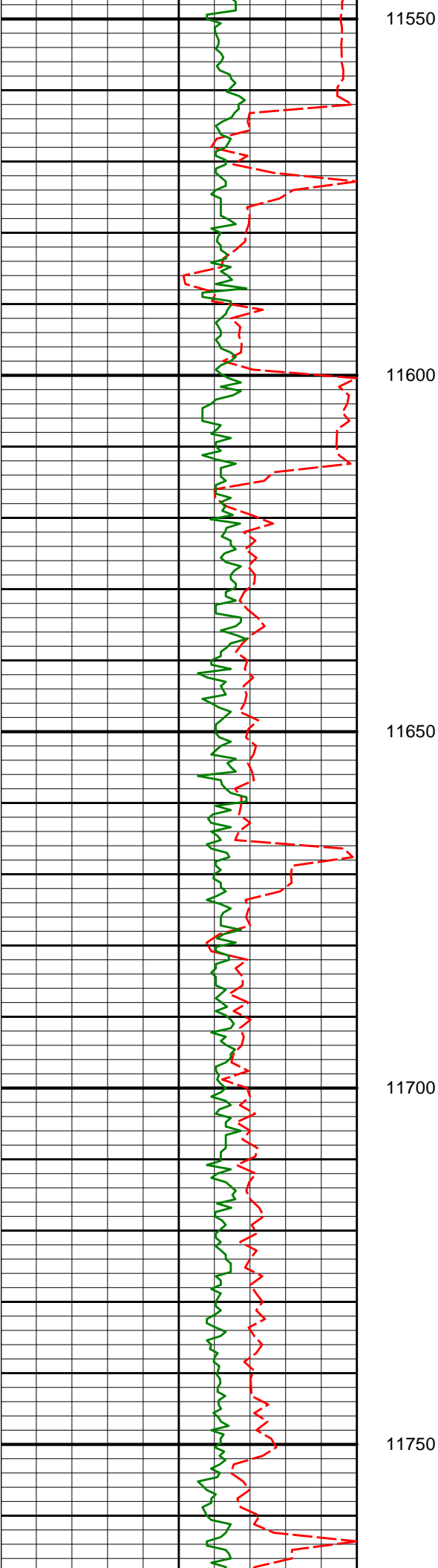
11529'

90.00°

177.61°

7327.75'

3530.84'



11624'

89.75°

180.56°

7327.95'

3625.83'

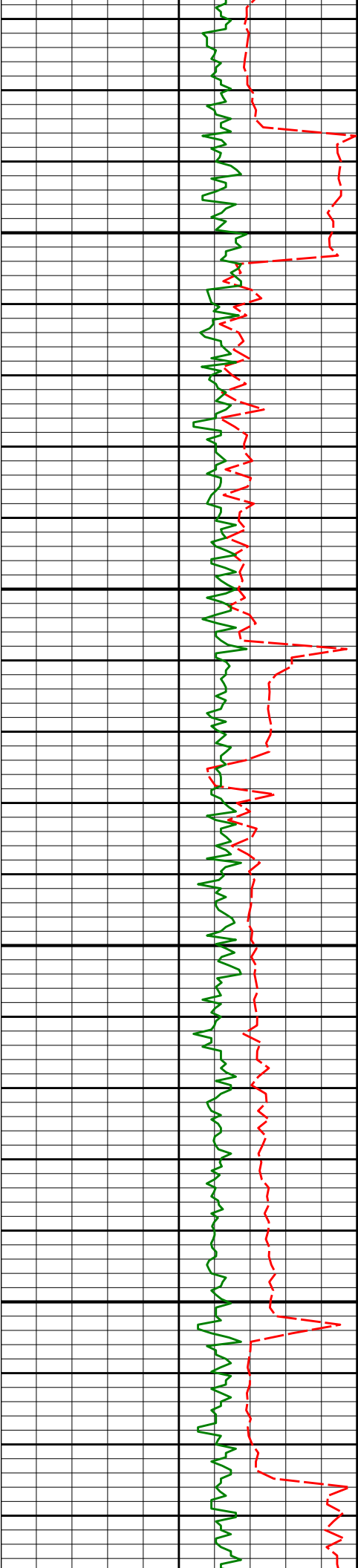
11719'

89.66°

178.15°

7328.44'

3720.81'



11800

11814'

89.32°

178.70°

7329.28'

3815.81'

11850

11900

11909'

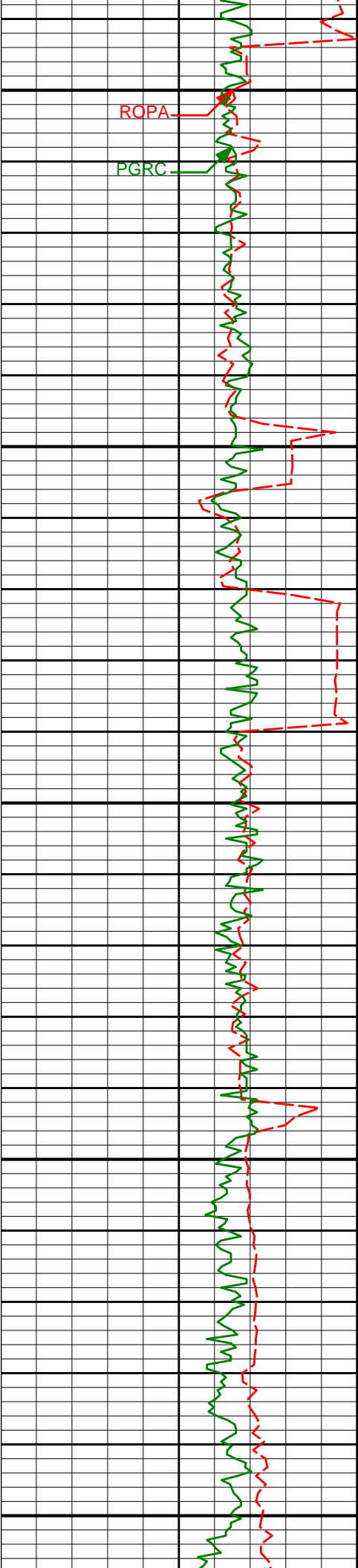
89.85°

176.88°

7329.97'

3910.79'

11950



12000

ROPA

PGRC

12050

12100

12150

12200

12004'

89.85°

177.34°

7330.23'

4005.76'

12099'

90.06°

179.97°

7330.30'

4100.75'

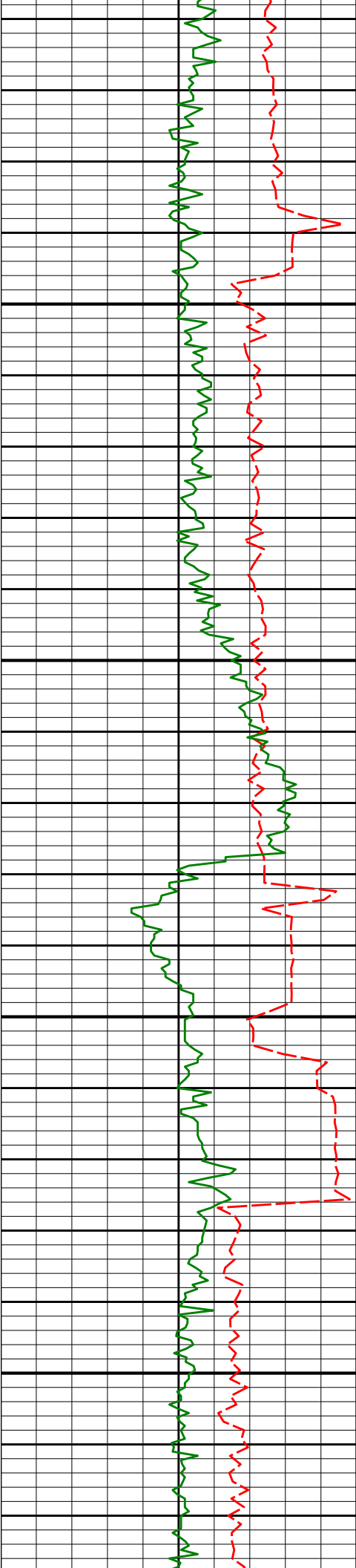
12194'

90.83°

179.50°

7329.56'

4195.73'



12250

12300

12350

12400

12289'

91.45°

178.74°

7327.67'

4290.70'

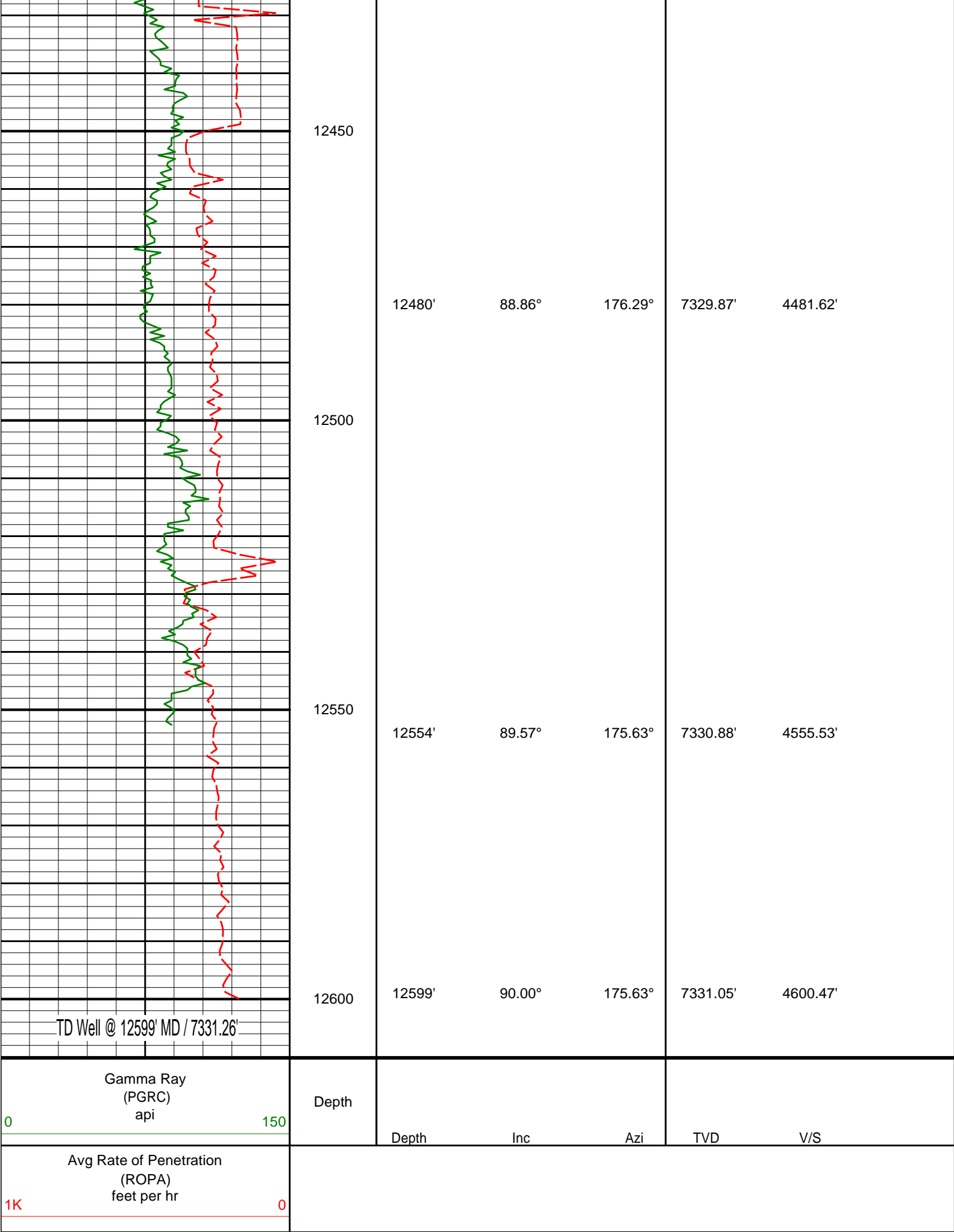
12385'

88.52°

177.36°

7327.69'

4386.69'



DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corporation
 Highway 160 38N-2HZ
 Wattenberg
 Weld Colorado
 USA
 CA-XX-0900754414

<i>Measured Depth (feet)</i>	<i>Inclination (degrees)</i>	<i>Direction (degrees)</i>	<i>Vertical Depth (feet)</i>	<i>Latitude (feet)</i>	<i>Departure (feet)</i>	<i>Vertical Section (feet)</i>	<i>Dogleg (deg/100ft)</i>
1138.00	0.57	68.51	1137.97	2.25 N	6.79 E	-2.08	TIE-IN
1317.00	0.81	70.31	1316.96	3.00 N	8.81 E	-2.78	0.14
1412.00	0.64	86.98	1411.95	3.26 N	9.98 E	-3.01	0.28
1508.00	2.74	70.18	1507.90	4.07 N	12.67 E	-3.75	2.23
1569.00	3.99	66.31	1568.80	5.41 N	15.99 E	-5.02	2.07
1661.00	5.79	62.20	1660.46	8.86 N	23.03 E	-8.29	1.99
1752.00	7.90	60.97	1750.80	14.04 N	32.56 E	-13.23	2.32
1844.00	9.83	62.99	1841.70	20.68 N	45.08 E	-19.55	2.13
1935.00	12.28	63.11	1931.00	28.58 N	60.64 E	-27.07	2.69
2027.00	14.55	59.67	2020.49	38.85 N	79.34 E	-36.87	2.61
2119.00	15.84	55.37	2109.28	51.82 N	99.65 E	-49.33	1.86
2211.00	17.36	57.46	2197.44	66.33 N	121.55 E	-63.30	1.77
2303.00	17.89	63.74	2285.13	79.96 N	145.79 E	-76.33	2.15
2394.00	17.84	61.30	2371.74	92.84 N	170.56 E	-88.59	0.82
2485.00	17.87	61.84	2458.36	106.12 N	195.09 E	-101.26	0.19
2577.00	17.25	61.71	2546.07	119.25 N	219.55 E	-113.77	0.67
2669.00	18.61	64.72	2633.61	131.99 N	244.84 E	-125.88	1.78
2760.00	19.87	63.70	2719.52	145.04 N	271.83 E	-138.26	1.44
2852.00	19.39	63.06	2806.17	158.89 N	299.46 E	-151.42	0.57
2944.00	18.88	63.73	2893.09	172.40 N	326.42 E	-164.26	0.60
3036.00	19.02	60.73	2980.11	186.31 N	352.85 E	-177.51	1.07
3127.00	18.61	60.80	3066.24	200.65 N	378.46 E	-191.21	0.44
3188.00	18.41	60.86	3124.09	210.09 N	395.37 E	-200.23	0.33
3249.00	18.04	59.50	3182.03	219.58 N	411.92 E	-209.30	0.93
3311.00	18.64	58.80	3240.88	229.58 N	428.67 E	-218.89	1.04
3406.00	17.66	57.09	3331.15	245.27 N	453.75 E	-233.95	1.18
3501.00	19.35	58.26	3421.24	261.38 N	479.24 E	-249.43	1.82
3596.00	19.65	59.68	3510.79	277.73 N	506.41 E	-265.09	0.59
3691.00	18.84	57.22	3600.48	294.09 N	533.09 E	-280.79	1.20
3786.00	18.12	60.12	3690.59	309.76 N	558.79 E	-295.81	1.23
3882.00	18.27	58.50	3781.79	325.05 N	584.56 E	-310.47	0.55
3977.00	18.57	60.05	3871.92	340.39 N	610.36 E	-325.16	0.61
4072.00	18.69	59.68	3961.94	355.62 N	636.61 E	-339.73	0.18
4167.00	20.44	59.17	4051.46	371.81 N	664.00 E	-355.24	1.86
4262.00	19.00	56.75	4140.88	388.79 N	691.18 E	-371.54	1.74
4389.00	19.01	55.40	4260.96	411.87 N	725.50 E	-393.77	0.35
4453.00	19.30	54.44	4321.42	423.94 N	742.68 E	-405.41	0.67
4548.00	21.18	57.86	4410.55	442.20 N	769.98 E	-422.98	2.34
4643.00	19.74	55.98	4499.56	460.30 N	797.81 E	-440.39	1.66
4738.00	18.25	53.49	4589.38	478.13 N	823.07 E	-457.59	1.78
4834.00	17.88	54.11	4680.65	495.72 N	847.09 E	-474.57	0.44
4929.00	17.25	53.67	4771.22	512.61 N	870.26 E	-490.89	0.67
5024.00	17.27	57.98	4861.94	528.44 N	893.56 E	-506.13	1.35
5119.00	18.30	61.57	4952.40	543.02 N	918.64 E	-520.08	1.59
5214.00	18.56	65.23	5042.53	556.45 N	945.49 E	-532.85	1.25
5341.00	18.13	62.69	5163.08	573.99 N	981.40 E	-549.49	0.71
5404.00	17.81	63.77	5223.01	582.74 N	998.75 E	-557.81	0.74
5500.00	18.30	65.80	5314.28	595.41 N	1025.67 E	-569.81	0.83
5595.00	19.02	66.46	5404.29	607.71 N	1053.47 E	-581.41	0.79
5690.00	18.44	66.27	5494.25	619.94 N	1081.42 E	-592.95	0.62
5785.00	16.68	65.40	5584.82	631.66 N	1107.57 E	-604.02	1.87
5848.00	17.69	64.14	5645.01	639.60 N	1124.41 E	-611.54	1.71
5912.00	17.00	62.66	5706.10	648.13 N	1141.47 E	-619.65	1.28
5975.00	16.82	61.02	5766.38	656.78 N	1157.62 E	-627.89	0.81
6070.00	15.55	60.58	5857.61	669.69 N	1180.74 E	-640.23	1.35
6166.00	13.34	55.33	5950.57	682.32 N	1201.06 E	-652.34	2.67

6188.00	15.34	55.33	5938.37	682.32 N	1281.88 E	-652.34	2.87
6261.00	10.76	61.34	6043.48	692.81 N	1217.86 E	-662.41	3.01
6356.00	8.99	56.88	6137.07	701.12 N	1231.86 E	-670.37	2.04
6451.00	6.25	62.66	6231.22	707.55 N	1242.67 E	-676.54	2.99
6546.00	5.05	54.33	6325.76	712.36 N	1250.66 E	-681.15	1.53
6641.00	4.01	48.91	6420.46	716.98 N	1256.56 E	-685.62	1.18
6736.00	2.35	47.64	6515.31	720.48 N	1260.51 E	-689.02	1.76
6831.00	0.93	52.41	6610.27	722.26 N	1262.55 E	-690.75	1.50
6885.00	0.41	51.04	6664.26	722.65 N	1263.05 E	-691.13	0.95
6926.00	0.31	21.18	6705.26	722.85 N	1263.21 E	-691.32	0.51
6973.00	1.57	167.10	6752.26	722.34 N	1263.40 E	-690.81	3.92
7021.00	5.37	174.51	6800.16	719.46 N	1263.76 E	-687.92	7.95
7068.00	8.72	177.55	6846.80	713.71 N	1264.12 E	-682.16	7.17
7116.00	12.68	176.26	6893.96	704.82 N	1264.62 E	-673.26	8.25
7161.00	17.19	175.98	6937.43	693.25 N	1265.41 E	-661.68	10.03
7211.00	21.69	179.60	6984.57	676.63 N	1265.99 E	-645.05	9.32
7256.00	26.77	182.85	7025.59	658.18 N	1265.55 E	-626.62	11.66
7304.00	32.11	177.86	7067.38	634.62 N	1265.49 E	-603.06	12.24
7351.00	36.55	179.00	7106.19	608.13 N	1266.20 E	-576.56	9.53
7399.00	41.31	178.81	7143.52	577.98 N	1266.78 E	-546.41	9.92
7446.00	47.65	180.01	7177.04	545.07 N	1267.10 E	-513.51	13.60
7494.00	52.25	179.34	7207.92	508.34 N	1267.31 E	-476.78	9.64
7541.00	57.46	178.50	7234.97	469.93 N	1268.05 E	-438.36	11.19
7589.00	62.71	177.04	7258.90	428.38 N	1269.68 E	-396.78	11.25
7636.00	66.70	175.85	7278.98	385.97 N	1272.32 E	-354.33	8.80
7684.00	72.51	174.96	7295.70	341.15 N	1275.93 E	-309.42	12.23
7732.00	76.18	175.59	7308.65	295.09 N	1279.73 E	-263.29	7.74
7779.00	79.56	175.81	7318.52	249.28 N	1283.18 E	-217.40	7.22
7827.00	82.84	176.91	7325.86	201.95 N	1286.18 E	-170.01	7.18
7858.00	86.21	177.91	7328.82	171.12 N	1287.58 E	-139.16	11.35
7905.00	90.20	178.20	7330.29	124.18 N	1289.17 E	-92.20	8.51
7913.00	90.37	179.09	7330.25	116.19 N	1289.36 E	-84.20	11.30
8008.00	90.03	177.03	7329.92	21.25 N	1292.58 E	10.79	2.20
8104.00	90.34	177.05	7329.61	74.62 S	1297.54 E	106.76	0.32
8199.00	90.46	179.74	7328.95	169.58 S	1300.21 E	201.74	2.83
8294.00	90.18	178.45	7328.41	264.56 S	1301.71 E	296.74	1.38
8389.00	90.46	179.73	7327.87	359.54 S	1303.21 E	391.73	1.37
8484.00	90.93	178.44	7326.72	454.52 S	1304.73 E	486.72	1.44
8579.00	90.52	179.68	7325.52	549.50 S	1306.29 E	581.70	1.37
8674.00	91.02	178.85	7324.24	644.48 S	1307.51 E	676.69	1.01
8769.00	87.72	177.53	7325.29	739.41 S	1310.51 E	771.66	3.74
8865.00	87.90	177.82	7328.96	835.27 S	1314.40 E	867.58	0.36
8960.00	88.80	177.95	7331.69	930.16 S	1317.90 E	962.53	0.95
9055.00	89.97	179.72	7332.72	1025.13 S	1319.83 E	1057.52	2.23
9150.00	91.02	178.11	7331.90	1120.10 S	1321.63 E	1152.51	2.02
9245.00	90.96	177.32	7330.26	1215.01 S	1325.42 E	1247.49	0.84
9341.00	91.20	179.49	7328.45	1310.95 S	1328.09 E	1343.46	2.27
9436.00	88.61	179.11	7328.61	1405.94 S	1329.25 E	1438.45	2.76
9531.00	89.66	178.88	7330.04	1500.91 S	1330.91 E	1533.43	1.13
9626.00	89.38	177.60	7330.83	1595.86 S	1333.83 E	1628.43	1.37
9721.00	90.52	179.36	7330.91	1690.82 S	1336.34 E	1723.42	2.20
9817.00	89.60	180.58	7330.81	1786.82 S	1336.39 E	1819.39	1.60
9912.00	88.92	178.61	7332.03	1881.81 S	1337.06 E	1914.36	2.20
10007.00	90.40	178.73	7332.59	1976.78 S	1339.26 E	2009.36	1.56
10102.00	90.86	178.02	7331.55	2071.73 S	1341.94 E	2104.35	0.89
10197.00	90.99	176.68	7330.01	2166.61 S	1346.34 E	2199.31	1.43
10292.00	90.34	178.41	7328.91	2261.52 S	1350.41 E	2294.29	1.95
10387.00	90.59	179.95	7328.15	2356.50 S	1351.77 E	2389.28	1.64
10482.00	90.65	178.83	7327.12	2451.49 S	1352.79 E	2484.26	1.18
10578.00	91.33	177.55	7325.47	2547.42 S	1355.82 E	2580.24	1.50
10673.00	89.88	178.05	7324.48	2642.35 S	1359.46 E	2675.22	1.61
10768.00	89.66	179.38	7324.86	2737.32 S	1361.59 E	2770.22	1.41
10863.00	89.63	176.84	7325.45	2832.26 S	1364.73 E	2865.21	2.67
10958.00	89.41	177.54	7326.24	2927.14 S	1369.39 E	2960.18	0.77
11053.00	89.11	179.01	7327.47	3022.09 S	1372.25 E	3055.16	1.58
11148.00	89.57	182.04	7328.56	3117.06 S	1371.38 E	3150.09	3.23
11244.00	90.65	181.36	7328.38	3213.02 S	1368.53 E	3245.95	1.33
11339.00	90.25	179.98	7327.64	3308.01 S	1367.41 E	3340.88	1.51
11434.00	89.81	177.00	7327.59	3402.96 S	1369.92 E	3435.87	3.18
11529.00	90.00	177.61	7327.75	3497.86 S	1374.38 E	3530.84	0.68
11624.00	89.75	180.56	7327.95	3592.84 S	1375.89 E	3625.83	3.12
11719.00	89.66	178.15	7328.44	3687.82 S	1376.96 E	3720.81	2.54

11814.00	89.32	178.70	7329.28	3782.78 S	1379.57 E	3815.81	0.68
11909.00	89.85	176.88	7329.97	3877.70 S	1383.23 E	3910.79	1.99
12004.00	89.85	177.34	7330.23	3972.58 S	1388.02 E	4005.76	0.48
12099.00	90.06	179.97	7330.30	4067.55 S	1390.24 E	4100.75	2.78
12194.00	90.83	179.50	7329.56	4162.54 S	1390.68 E	4195.73	0.95
12289.00	91.45	178.74	7327.67	4257.51 S	1392.13 E	4290.70	1.03
12385.00	88.52	177.36	7327.69	4353.44 S	1395.40 E	4386.69	3.38
12480.00	88.86	176.29	7329.87	4448.27 S	1400.66 E	4481.62	1.17
12554.00	89.57	175.63	7330.88	4522.08 S	1405.87 E	4555.53	1.31
12599.00	90.00	175.63	7331.05	4566.95 S	1409.30 E	4600.47	0.96

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 178.58 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.54 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 12599.00 FEET
IS 4779.45 FEET ALONG 162.85 DEGREES (TRUE)**

All directional surveys tied on to the last gyro survey at 1138.00' MD. Final survey is a straight-line projection to the bit.