



1 : 240

[illegible]

MWD Run Number	100	200	300		
Date run completed	25-Jan-13	26-Jan-13	30-Jan-13		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.750	6.750	8.000		
Log Start Depth (MD, ft)	1,445.00	5,263.00	6,415.00		
Log End Depth (MD, ft)	5,263.00	6,415.00	10,328.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	25-Jan-13 10:52	26-Jan-13 02:53	27-Jan-13 20:30		
Drill/Wipe End Date and Time	25-Jan-13 18:59	26-Jan-13 14:30	30-Jan-13 04:00		
Min Inc (deg) @ Depth (MD, ft)	.59 @ 1,663.00	.68 @ 5,263.00	85.71 @ 6,434.00		
Max Inc (deg) @ Depth (MD, ft)	17.30 @ 3,466.00	80.99 @ 6,359.00	91.88 @ 9,219.00		
Bit TFA(in2) / Bit Type	.75 / PDC	.86 / PDC	.46 / PDC		
Flow Rate (gpm)	578.00	569.00	270.00		
Max AV (fpm) / CV (fpm) @ MWD	462.9 / 462.9	462.9 / 462.9	369.0 / 369.0		
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	8.38 / 27.00	8.38 / 27.00	9.33 / 36.00		
Filtrate CL (ppm)	700.00	700.00	700.00		
pH / Fluid Loss (mptm)	8.30 / N/A	8.30 / N/A	8.20 / N/A		
PV (cP) / YP (lbf/2)	1 / 3.00	1 / 3.00	8 / 9.00		
% Solids / % Sand	0.40 / 0.10	0.40 / 0.10	8.00 / 0.30		
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	N/A / N/A		
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Max Tool Temp (deg F) / S	125.50 / PDM	125.50 / PDM	227.50 / PDM		

Max Tool Temp (degF) / Source	137.50 / PCM	165.58 / PCM	207.73 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Robert Ley	Robert Ley	Robert Ley		
Customer Representative	Charles Collver	Charles Collver	Charles Collver		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.76	5.76	5.76		
Sub Serial Number	11341341	11341341	11706791		
Insert Serial Number	11227556	11227556	11227556		
Date and Time Initialized	24-Jan-13 17:31	01-Jan-70 00:00	27-Jan-13 06:42		
Date and Time Read	26-Jan-13 19:42	26-Jan-13 19:37	30-Jan-13 13:34		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	57.00	56.00	66.00		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11341341	11341341	11706791		
Sonde Serial Number	10835184	10835184	10835184		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	300.27	270.54	352.80		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	49.72	48.59	59.29		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11341341	11341341	11706791		
Insert/Sonde Serial Number	11293270	11293270	11293270		

REMARKS

1. All depths are measured depths and are calibrated to the driller' pipe tally and are measured 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. The Following smoothing parameters have been applied to the data"

PGRC (Gamma Ray Corrected):

Interval Resolution: 0.5 feet
Coercion Distance: 0.6 feet
Gap Fill: 3.0 feet

ROPA (Rate of Penetration):

Interval Resolution: 0.5 feet
Coercion Distance: 1.2 feet
Gap Fill: 3.0 feet

Insite Version 7.3.40 build 25

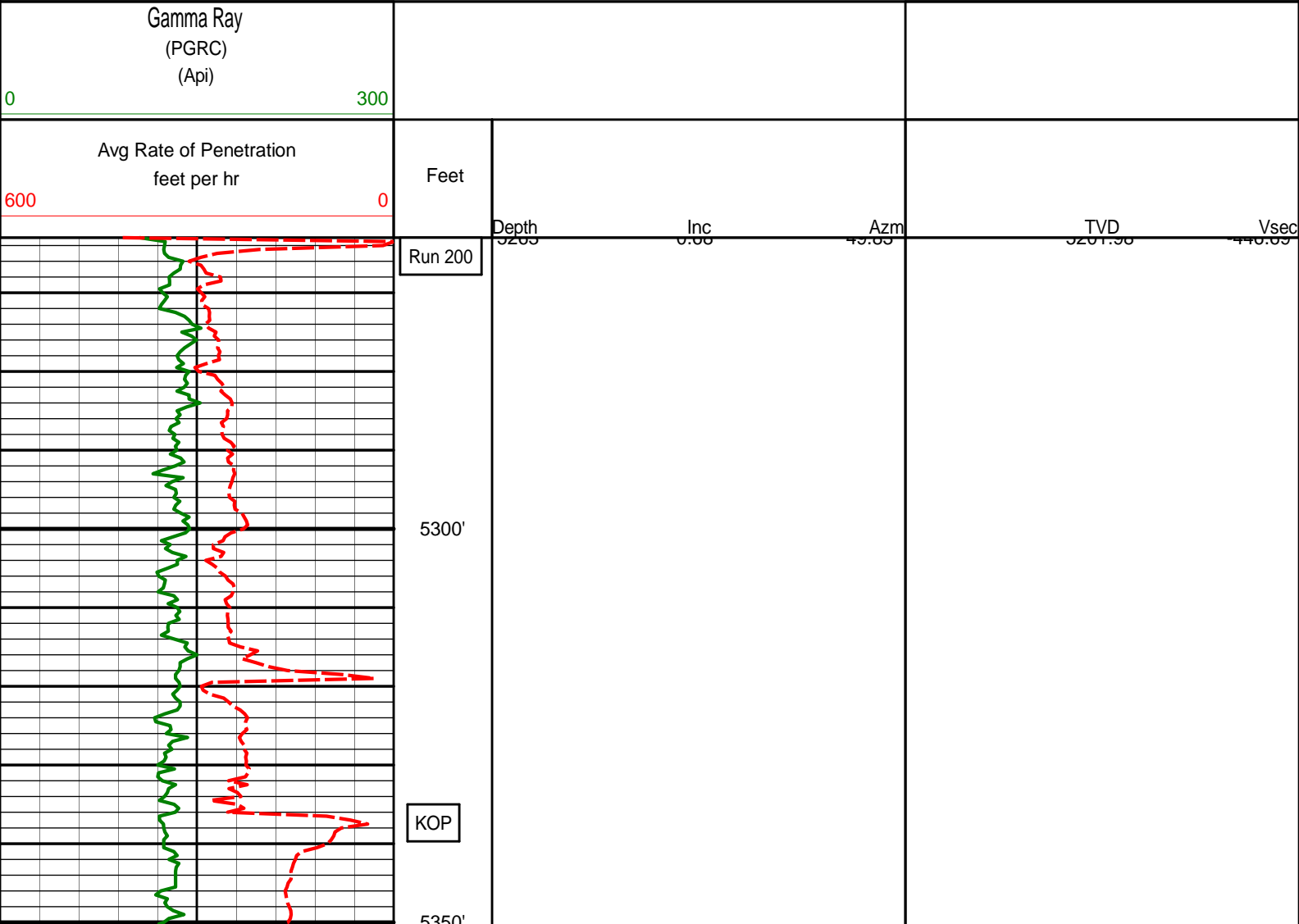
5. Survey at TD is projected to the bit

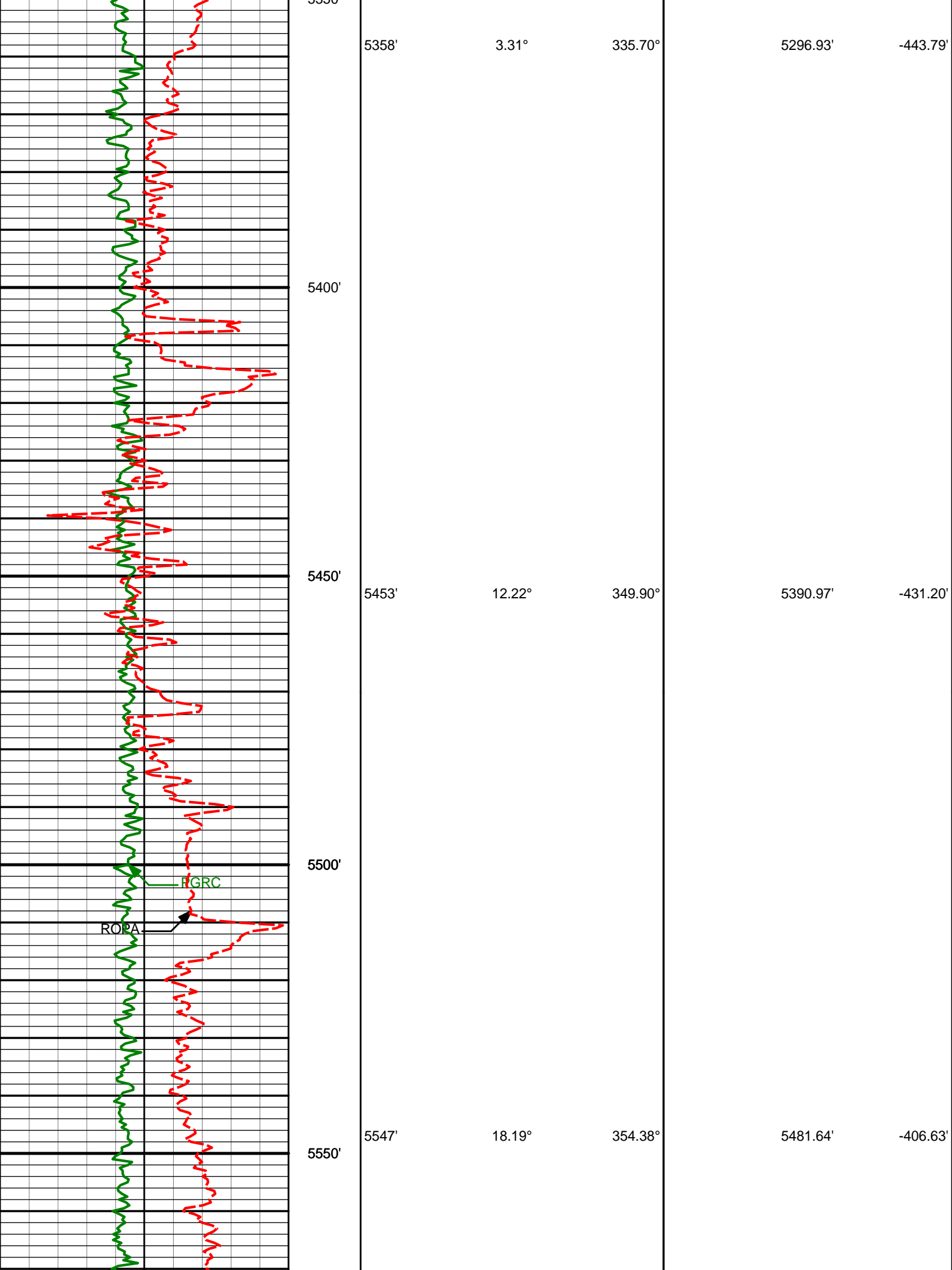
WARRANTY

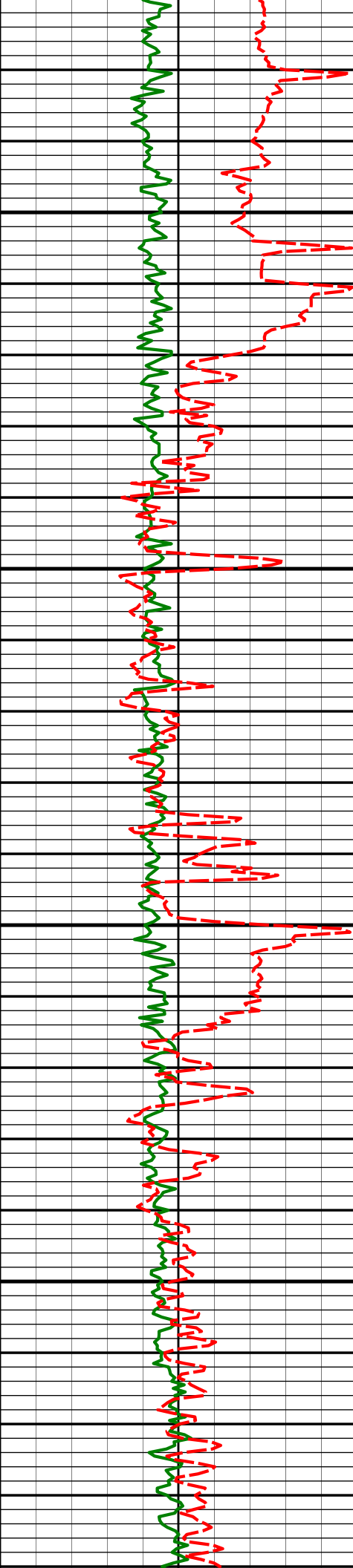
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MD Detail Log 1:240







5600'

5642'

22.95°

354.15°

5570.55'

-373.27'

5650'

5700'

5737'

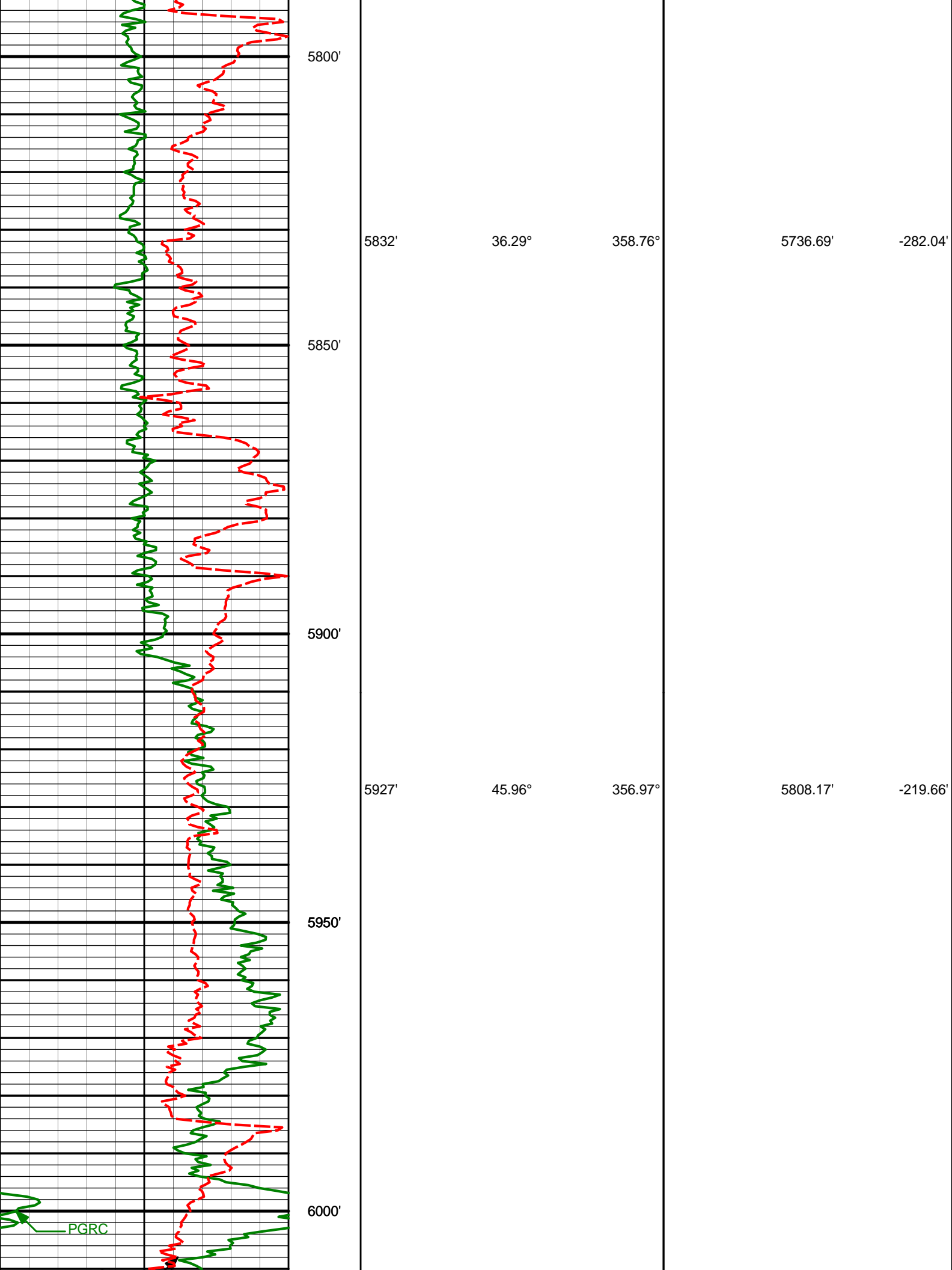
27.97°

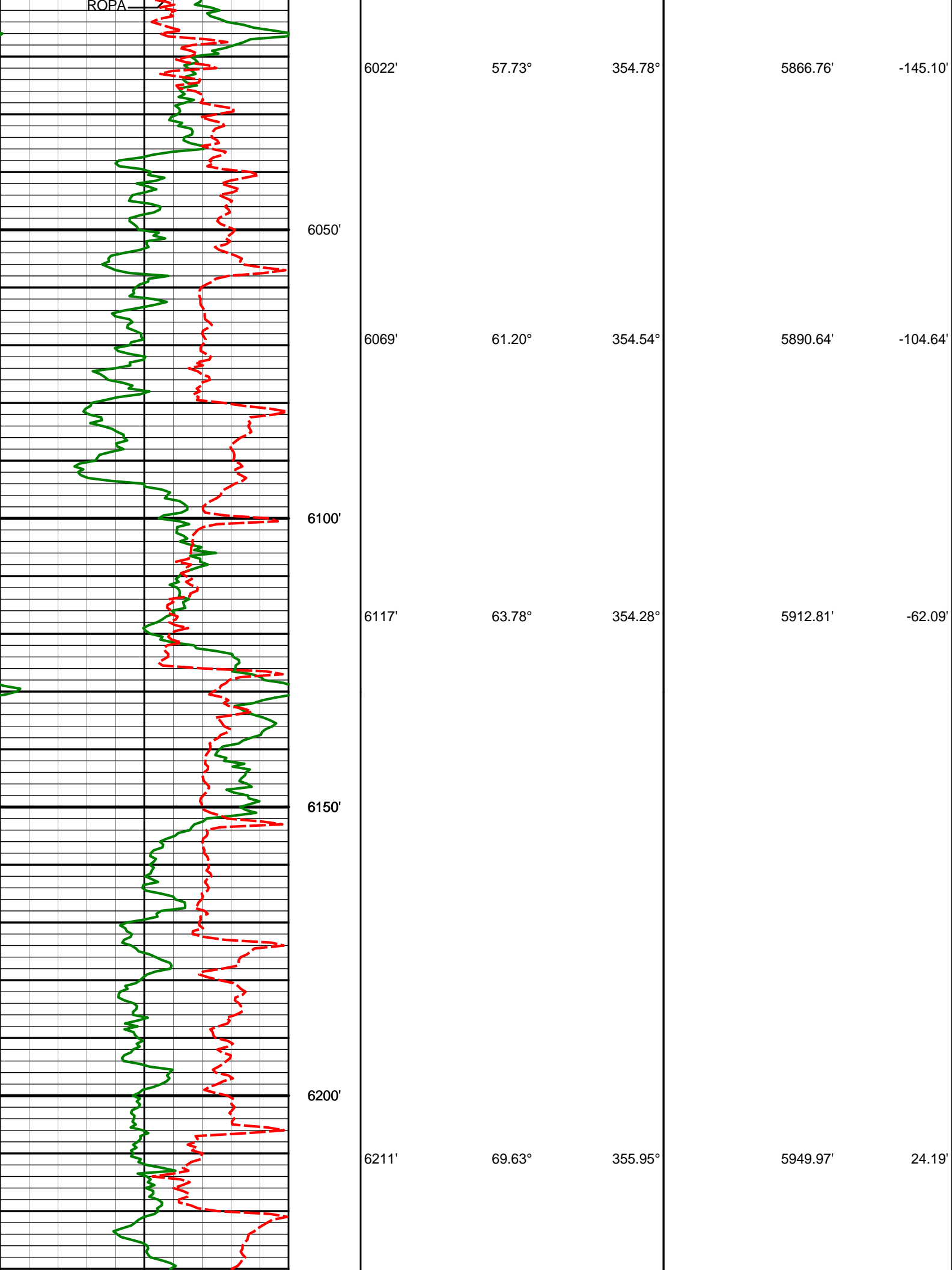
358.26°

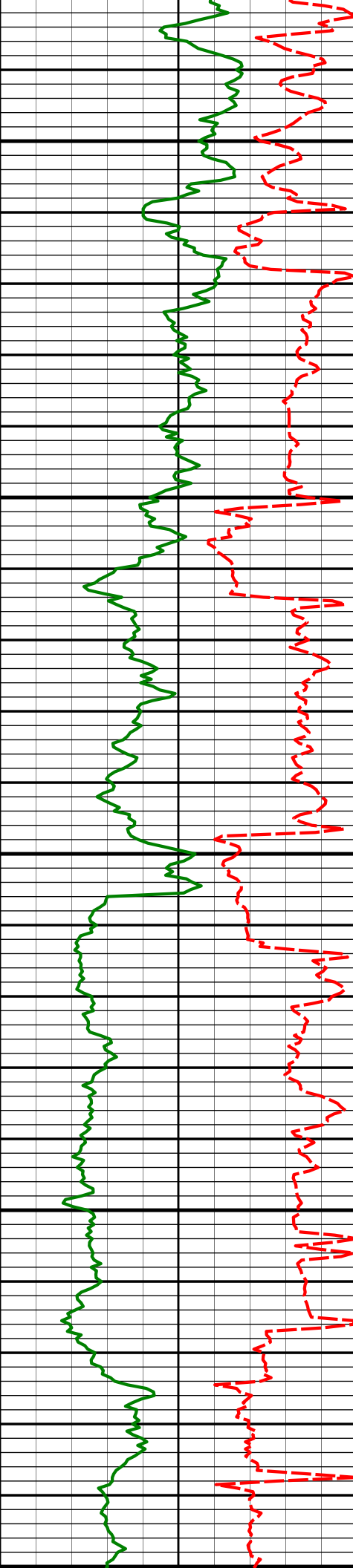
5656.31'

-332.47'

5750'







6250'

6300'

6350'



Run 300

6450'

6306'

77.67°

356.51°

5976.69'

115.27'

6359'

80.99°

357.47°

5986.50'

167.34'

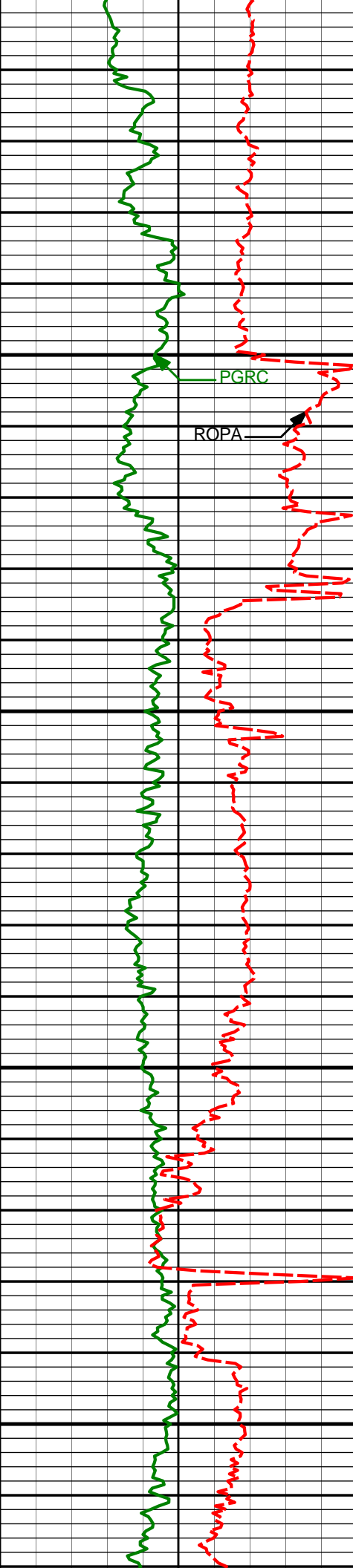
6434'

85.71°

358.58°

5995.18'

241.78'



PGRC

ROPA

6500'

6550'

6600'

6609'

90.68°

1.46°

6000.69'

416.24'

6650'

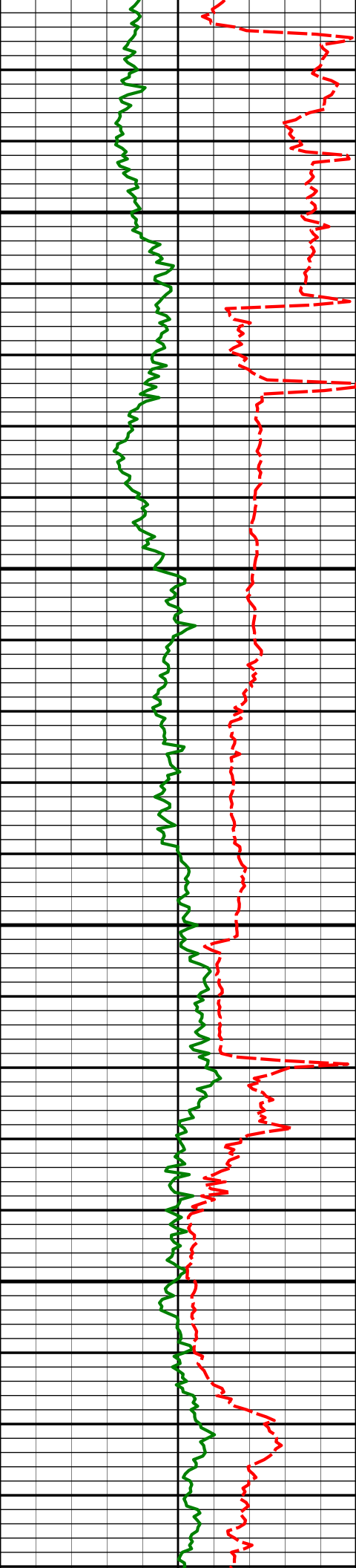
6657'

90.71°

1.49°

6000.11'

464.04'



6700'

6750'

6800'

6850'

6752'

6846'

87.13°

86.49°

359.62°

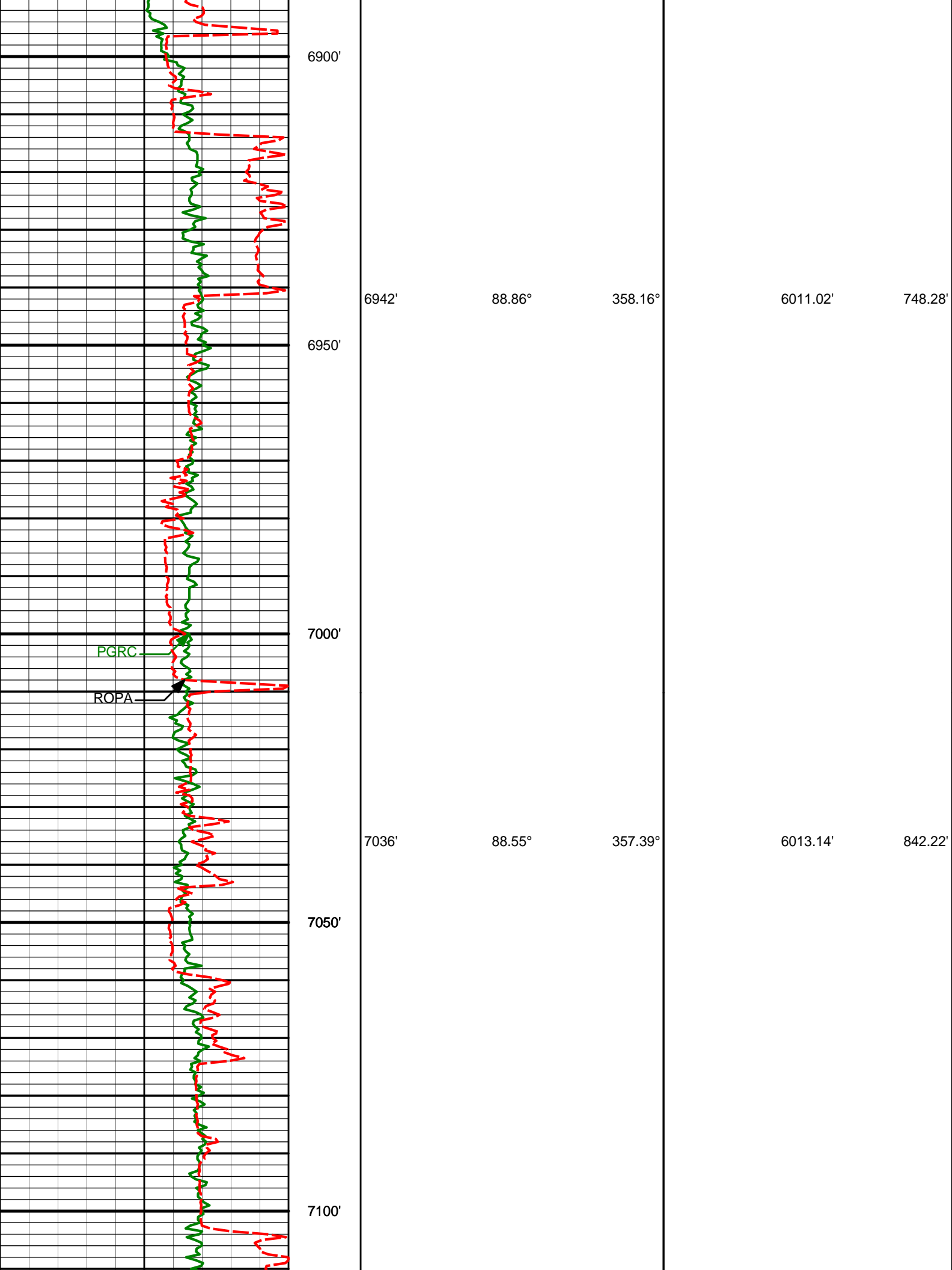
359.16°

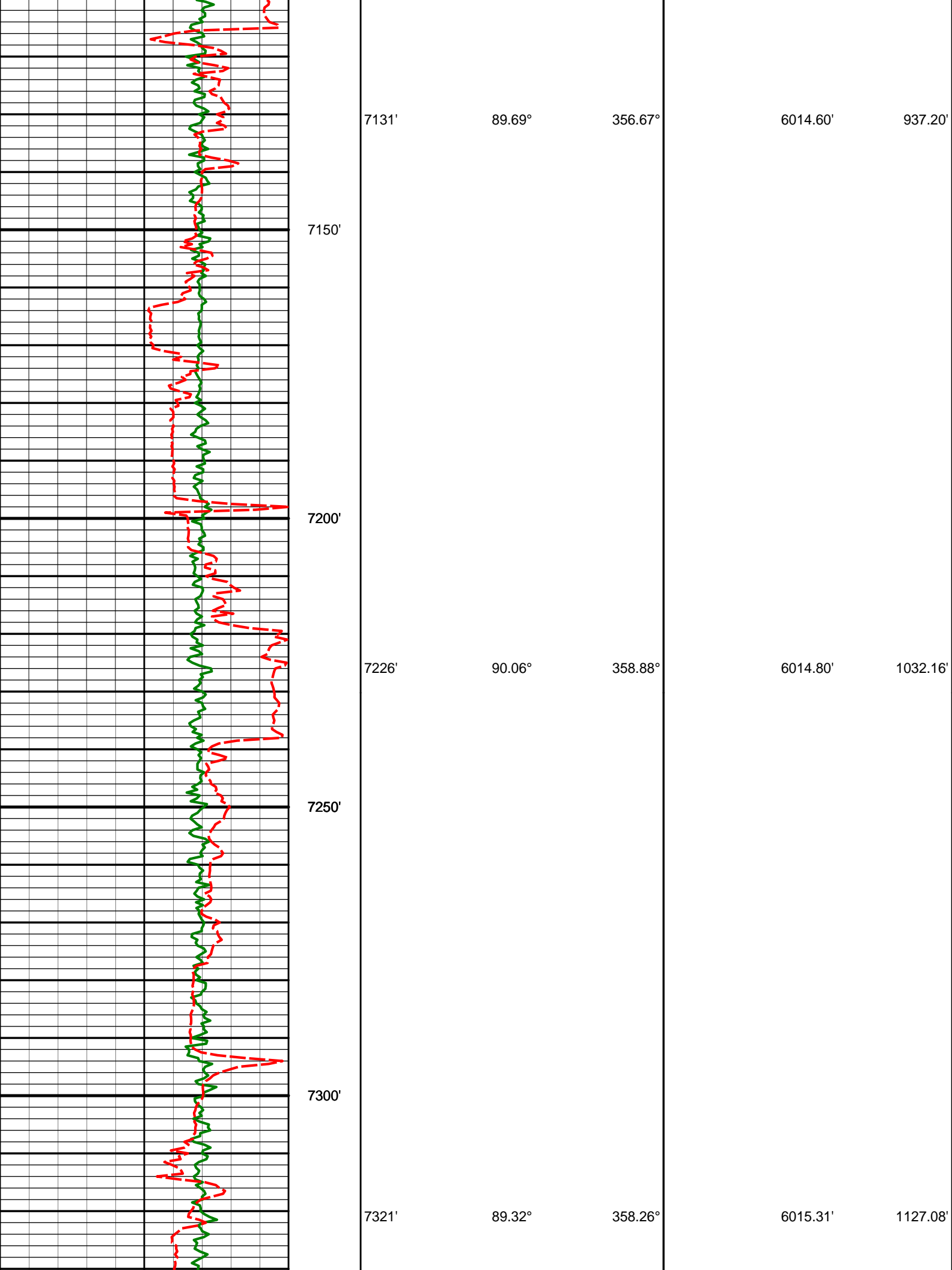
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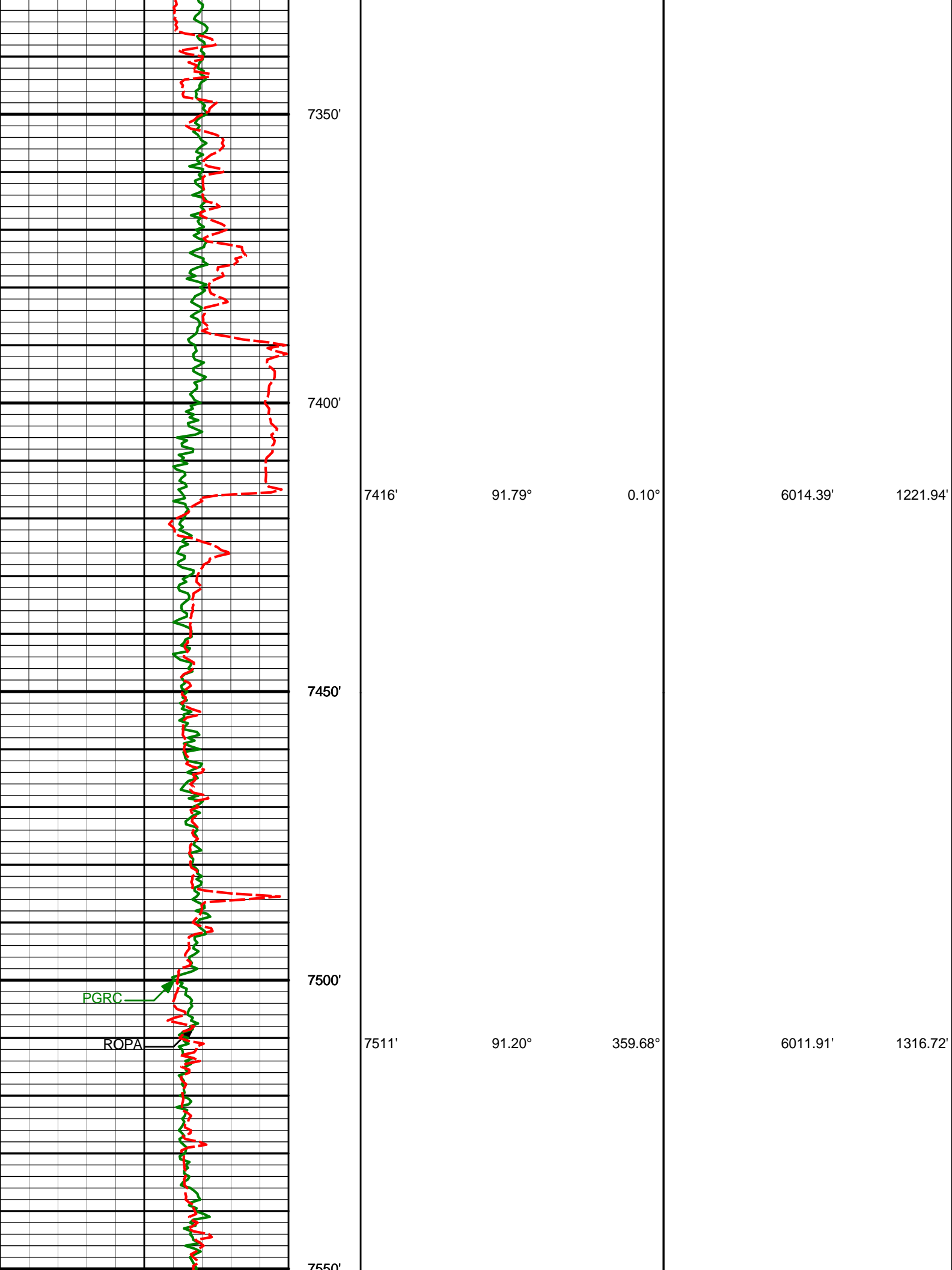
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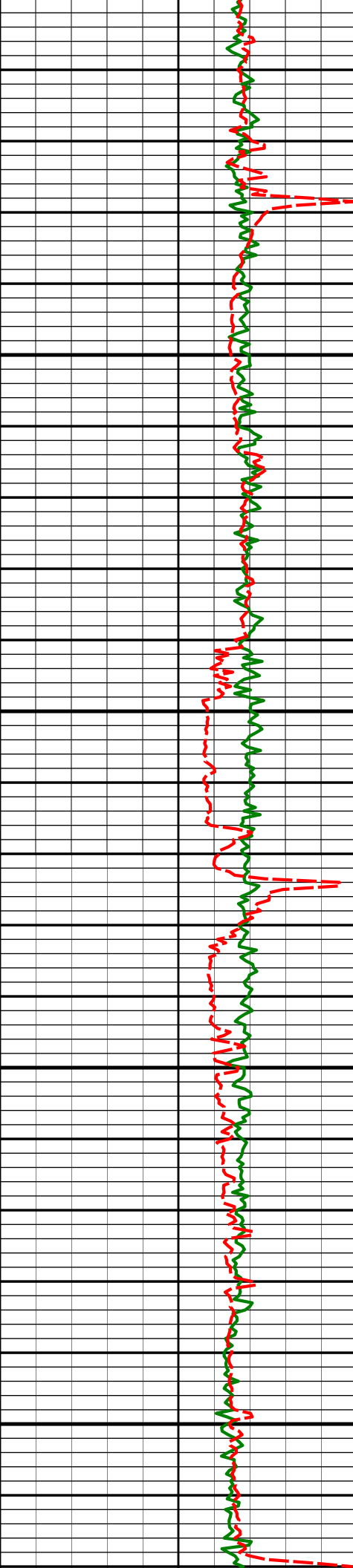
558.74'

652.45'









7550'

7600'

7650'

7700'

7750'

7606'

7701'

90.96°

90.31°

359.26°

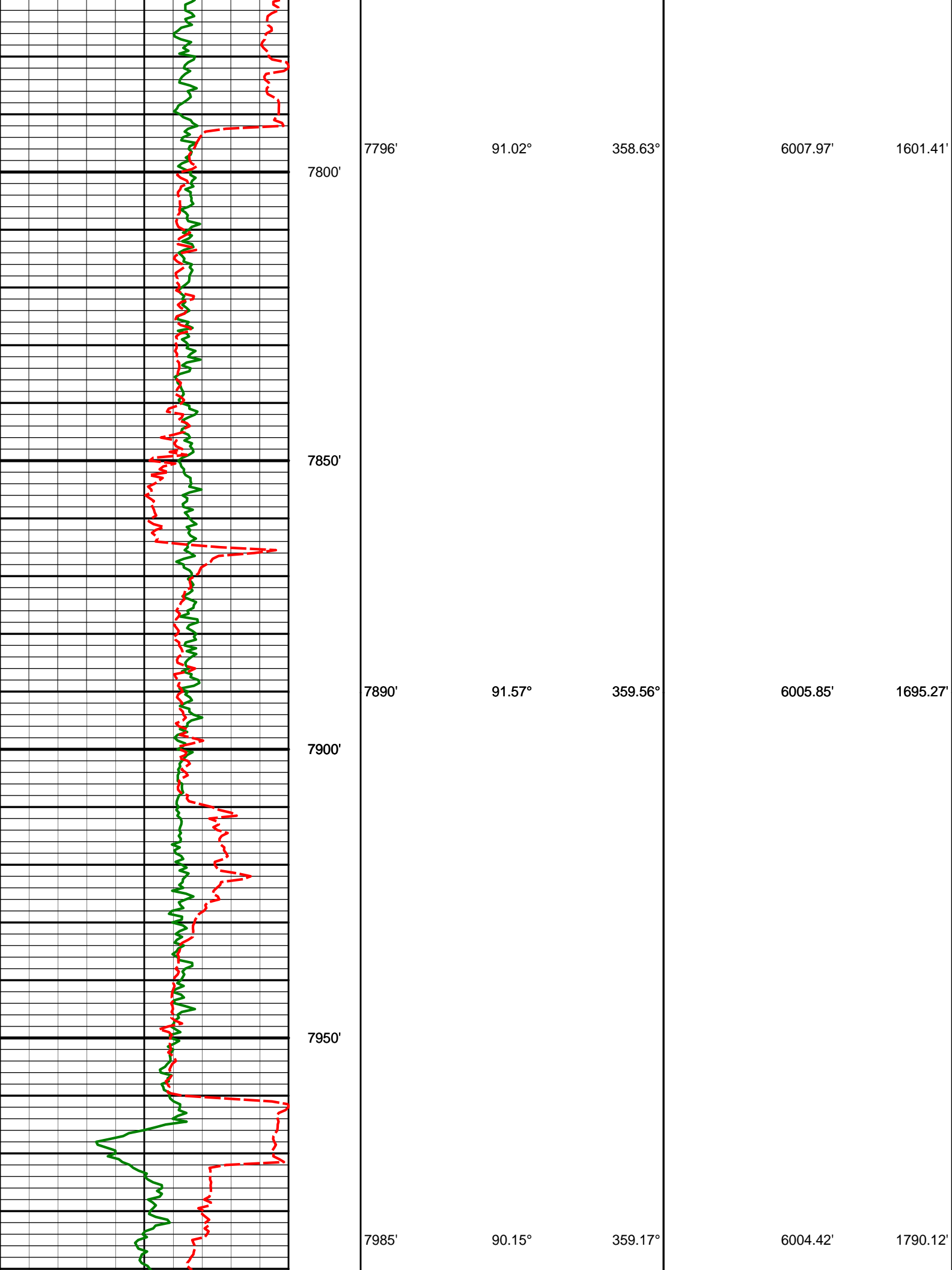
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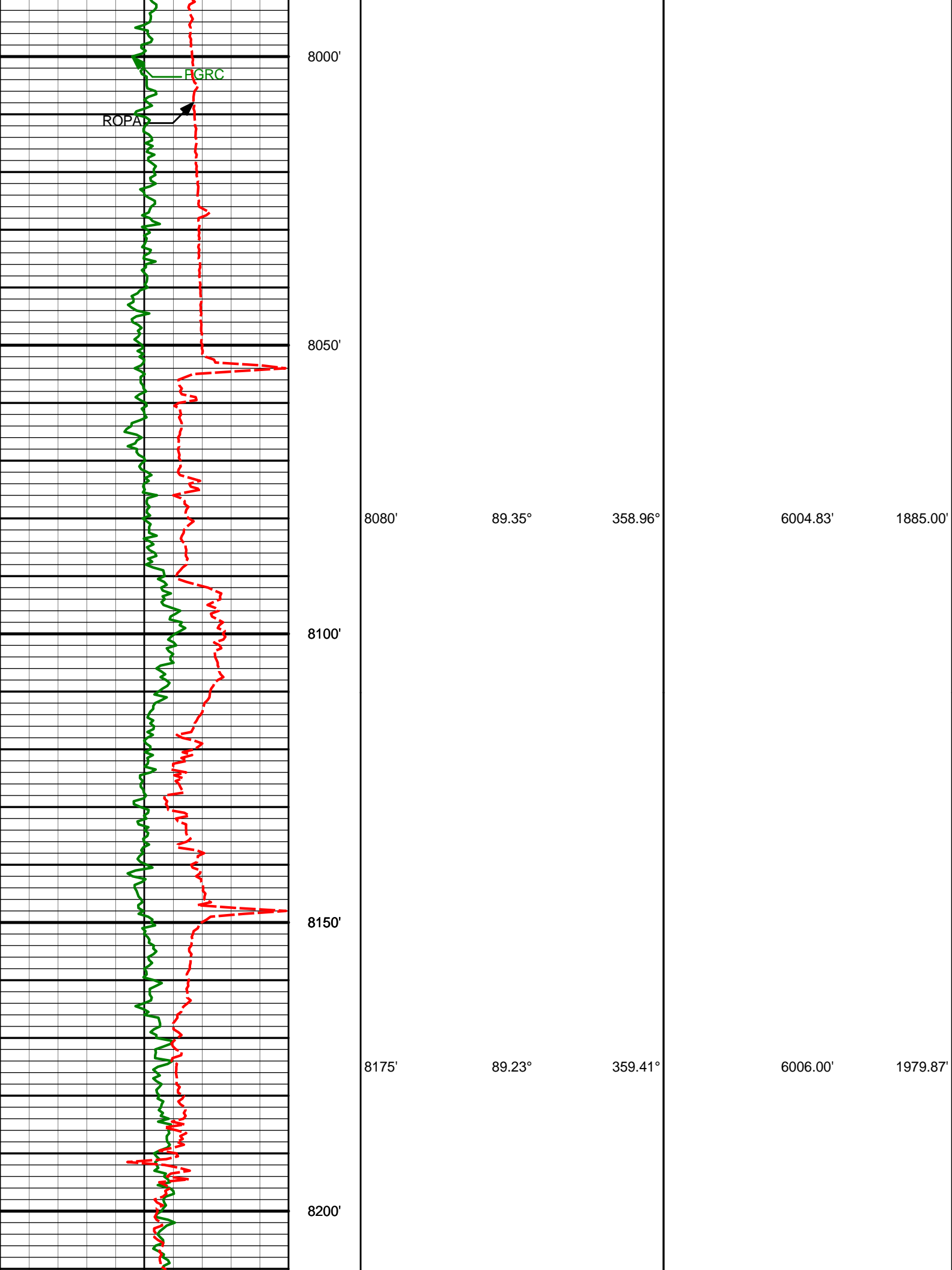
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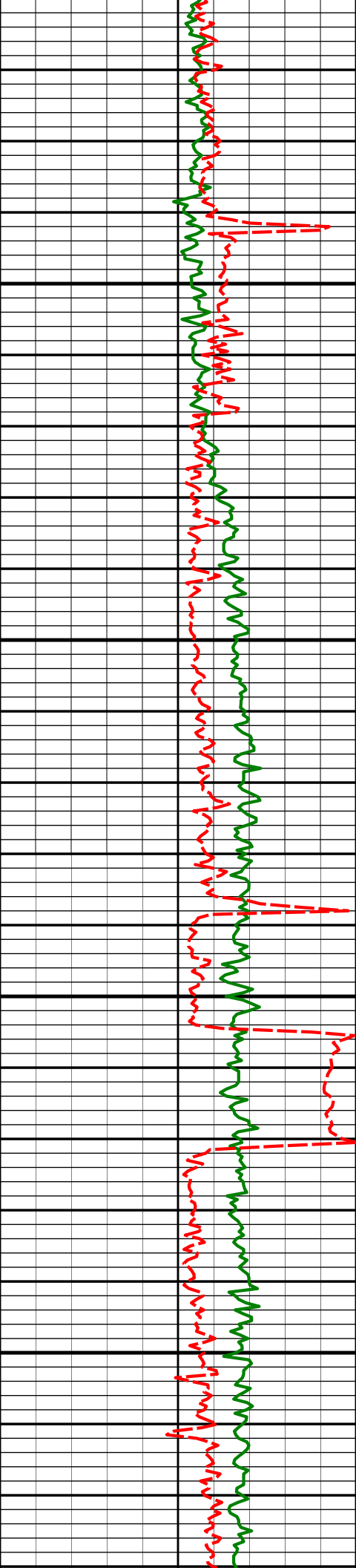
6009.07'

1411.55'

1506.47'







8250'

8270'

89.01°

359.04°

6007.46'

2074.73'

8300'

8350'

8365'

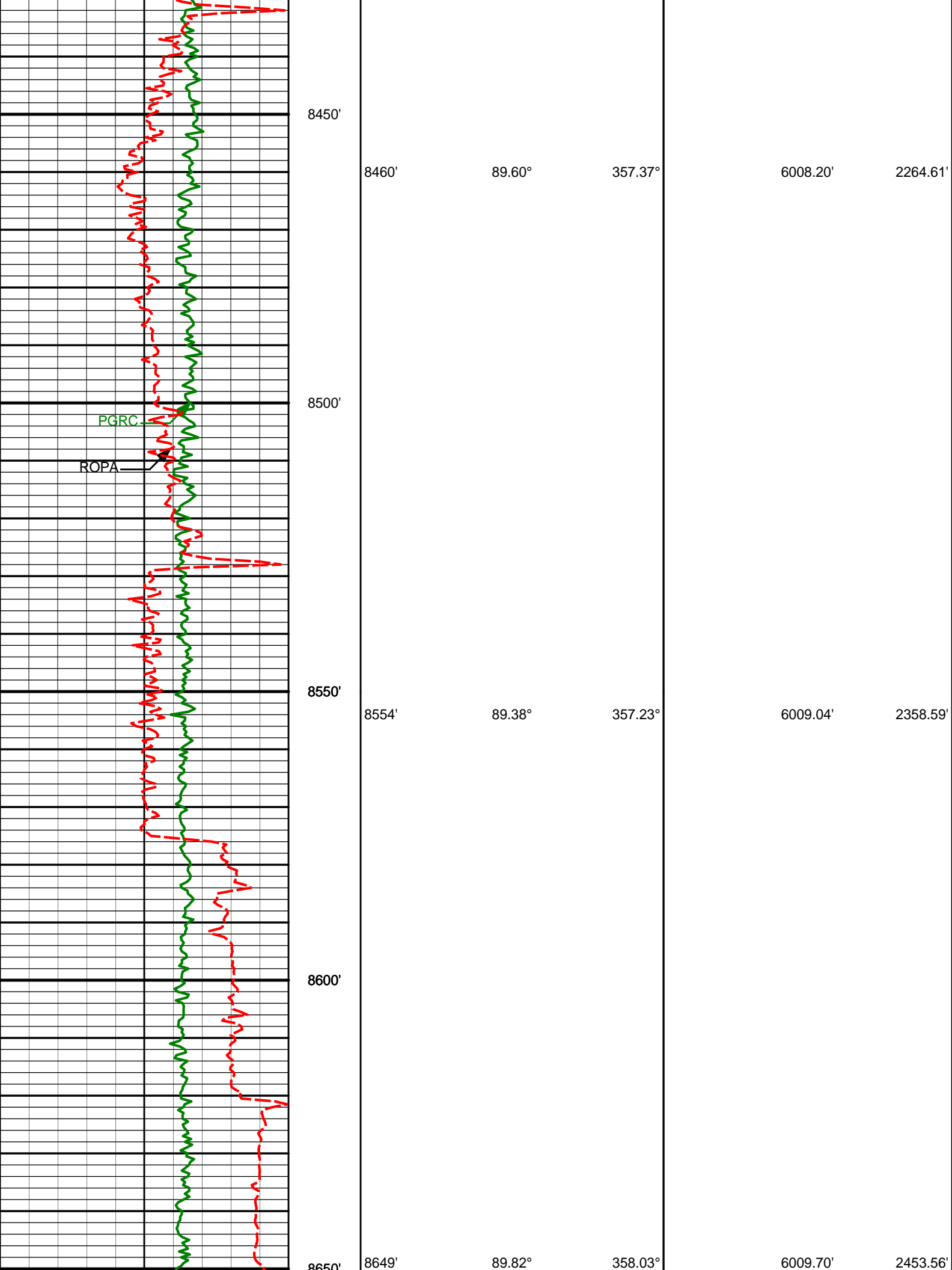
90.25°

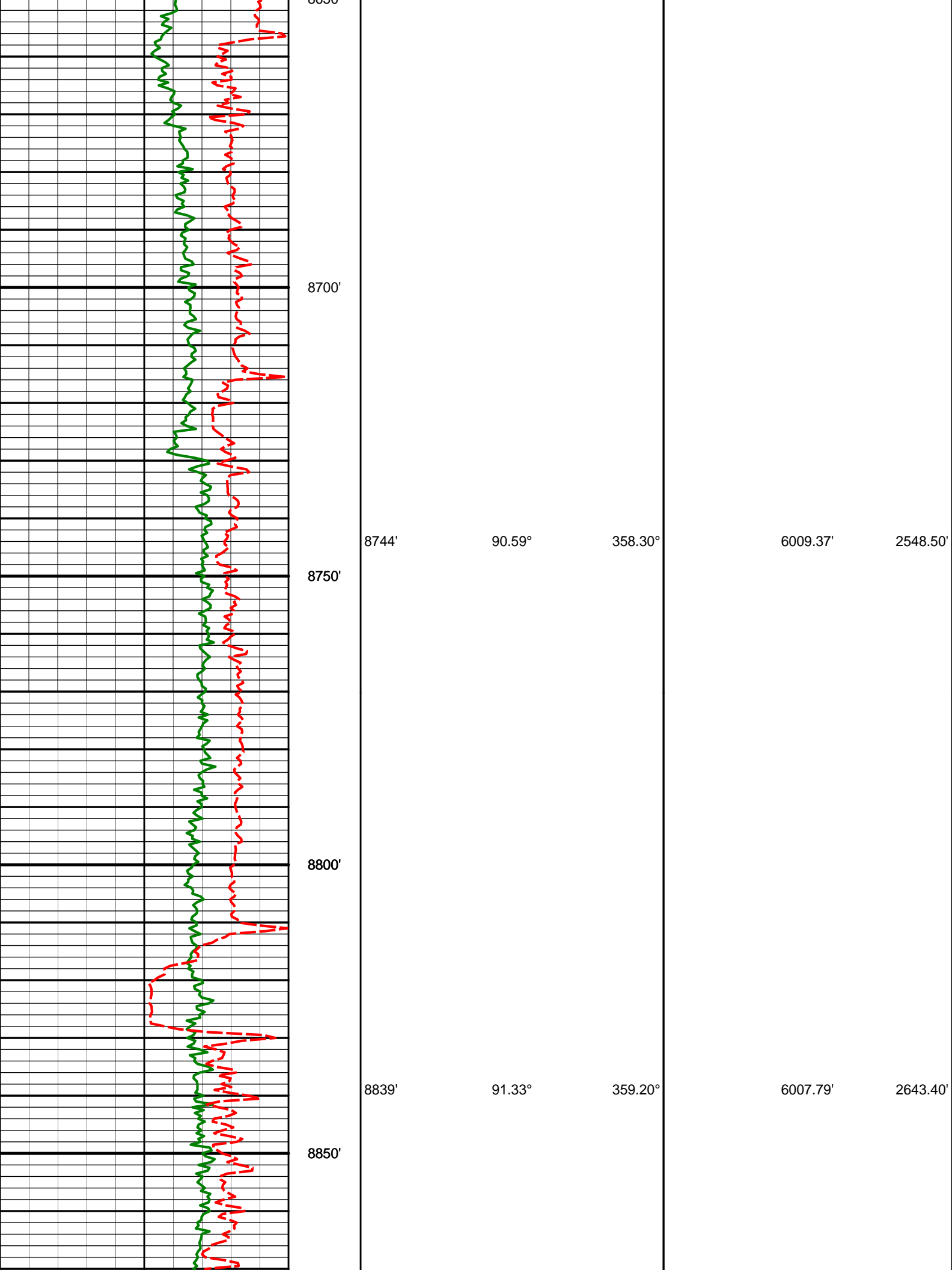
358.36°

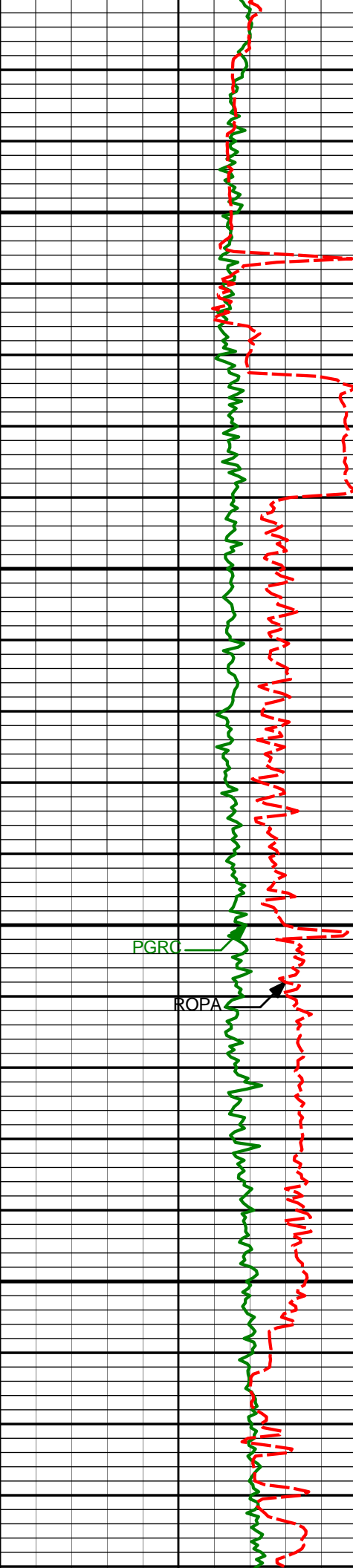
6008.07'

2169.64'

8400'







8900'

8934'

89.63°

357.83°

6006.99'

2738.31'

8950'

9000'

PGRC

ROPA

9029'

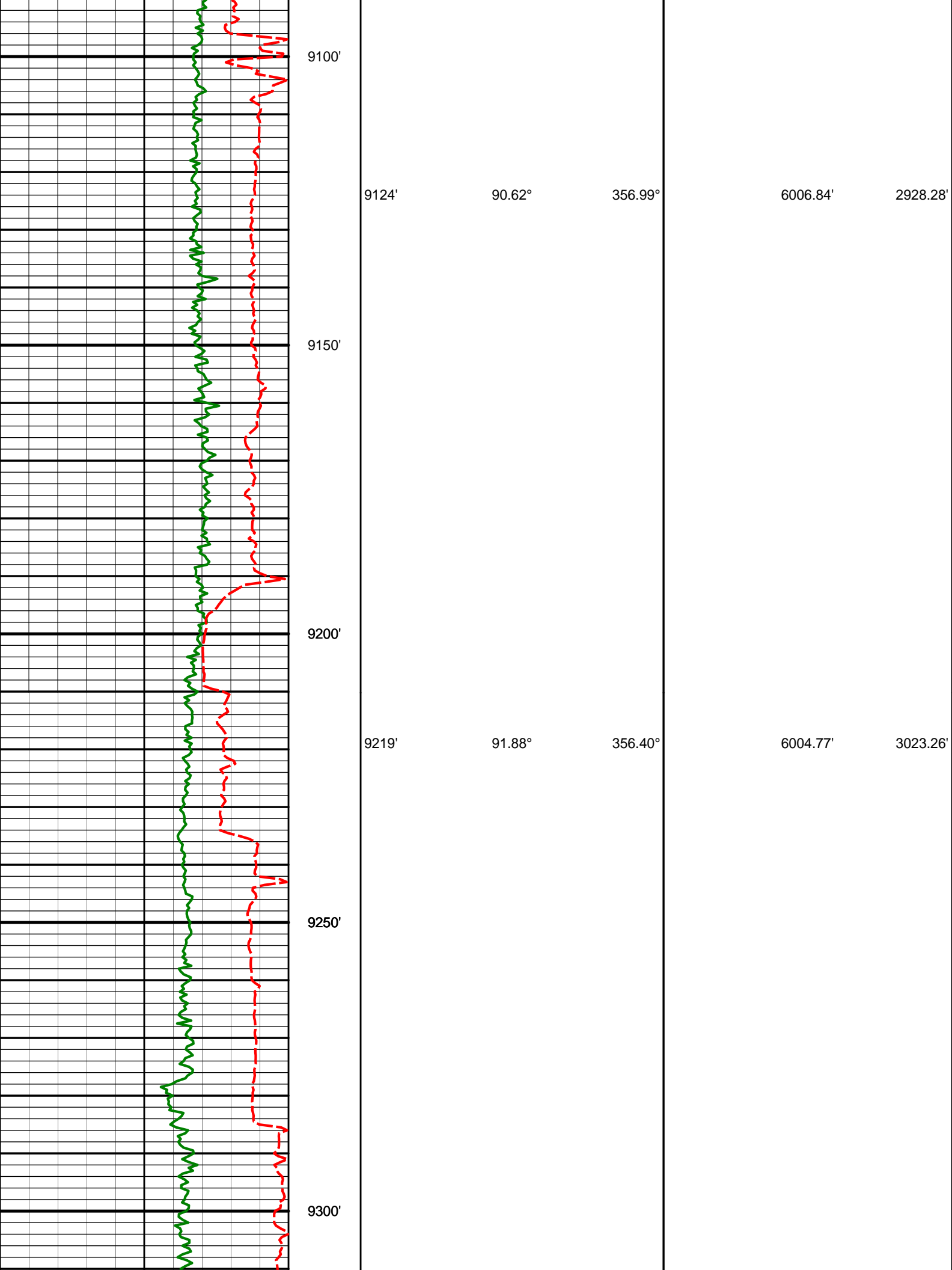
89.97°

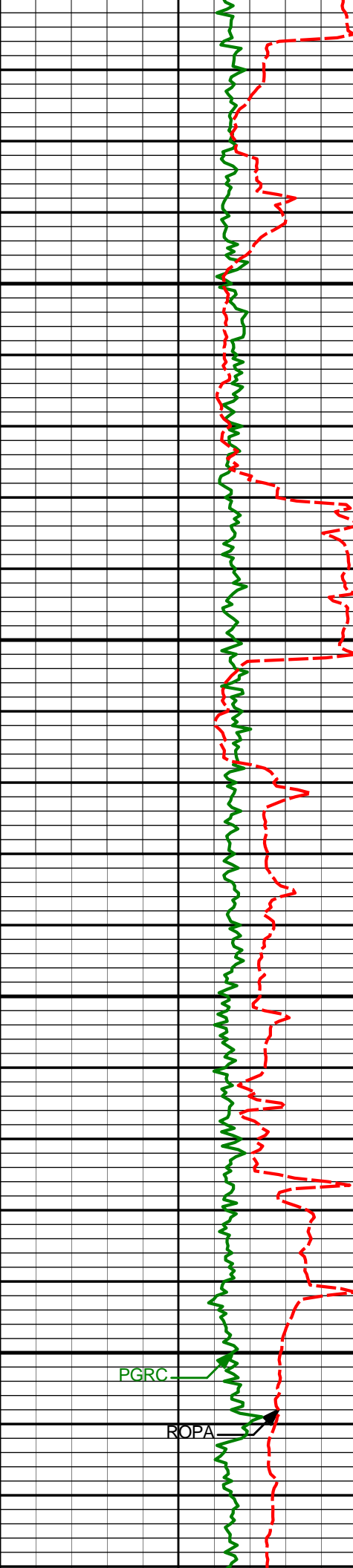
357.02°

6007.32'

2833.29'

9050'





9350'

9400'

9450'

9500'

PGRC

ROPA

9314'

91.33°

358.72°

6002.11'

3118.19'

9408'

89.48°

359.18°

6001.45'

3212.08'

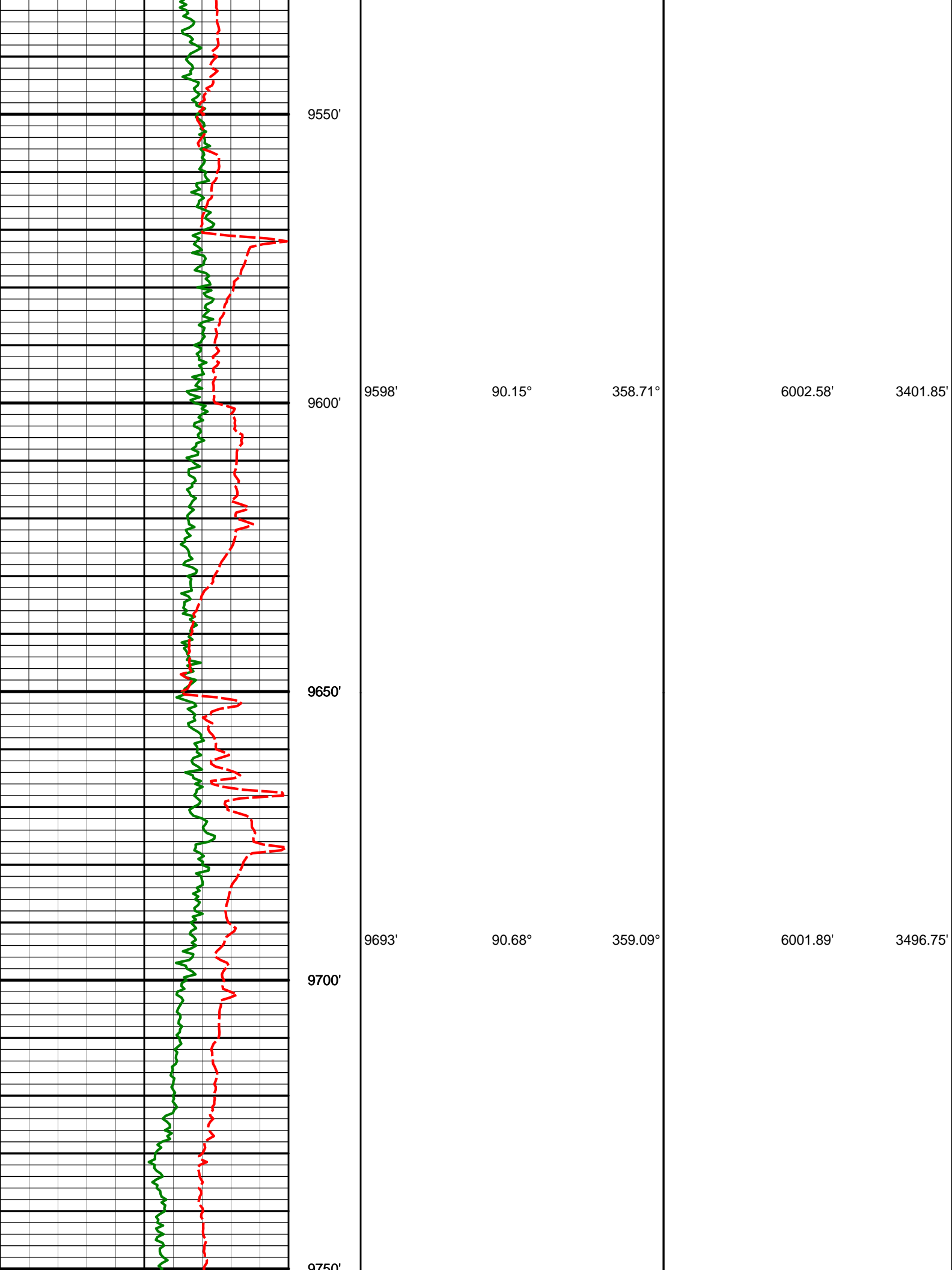
9503'

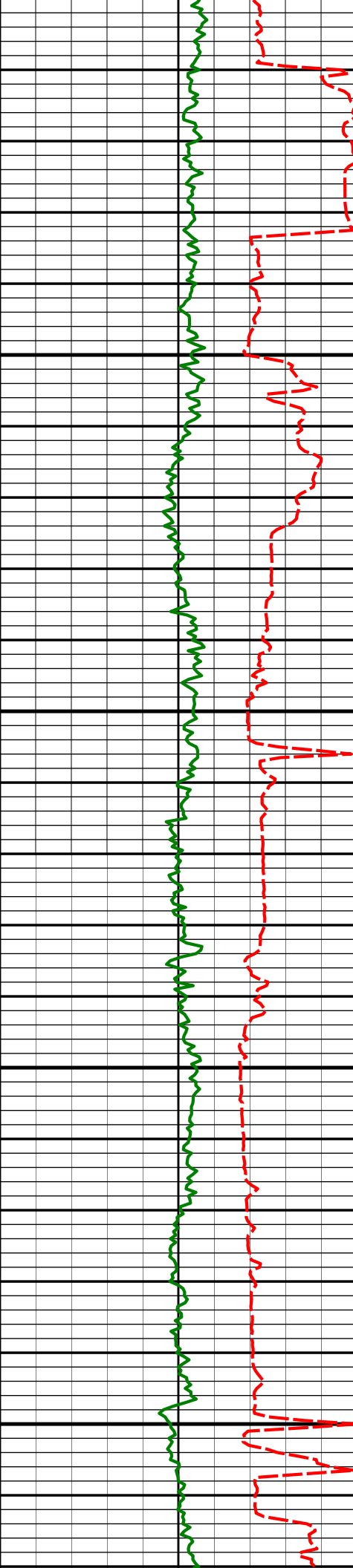
89.51°

359.10°

6002.29'

3306.95'





9750'

9800'

9850'

9900'

9950'

9788'

88.28°

0.04°

6002.76'

3591.58'

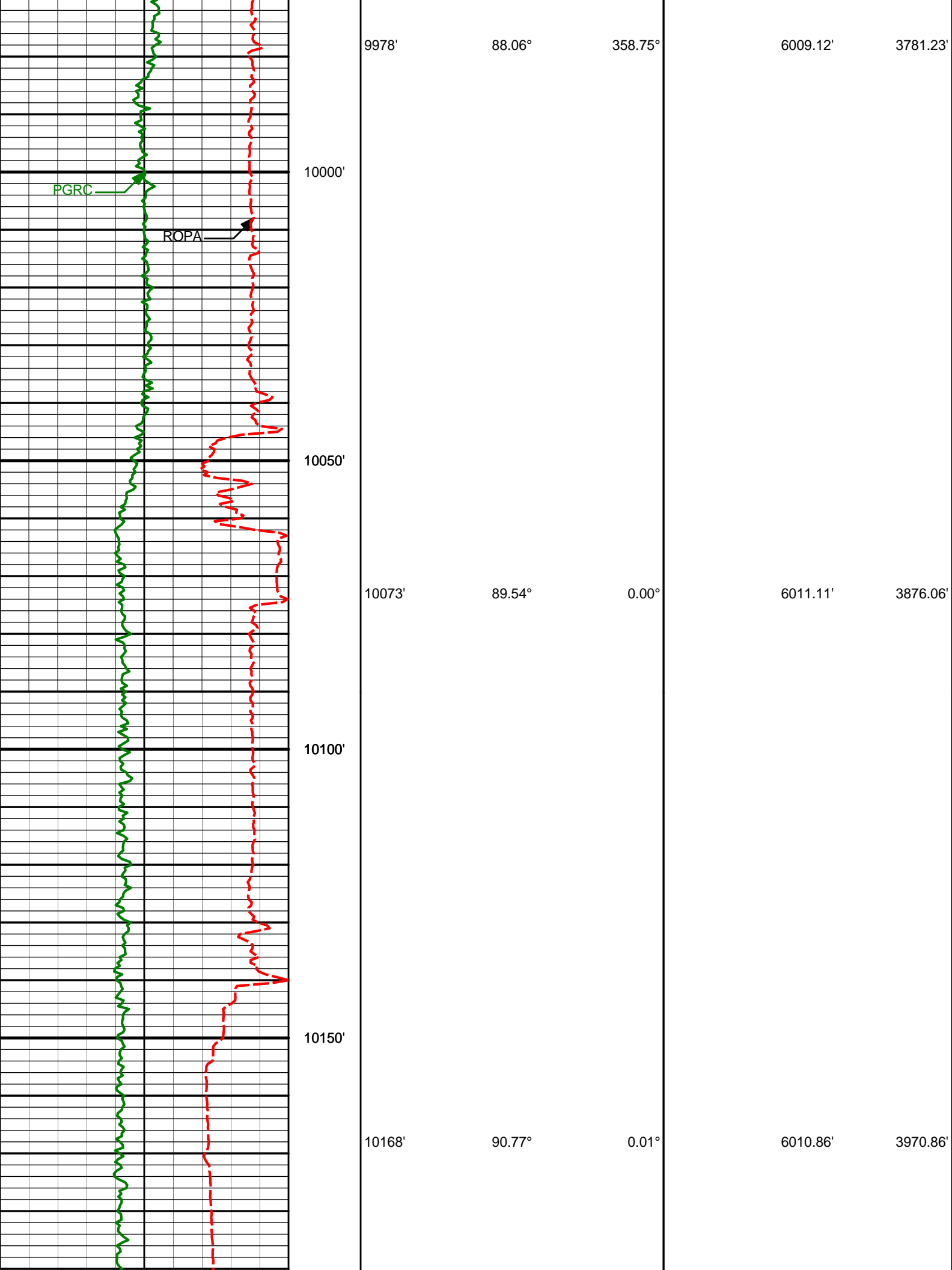
9883'

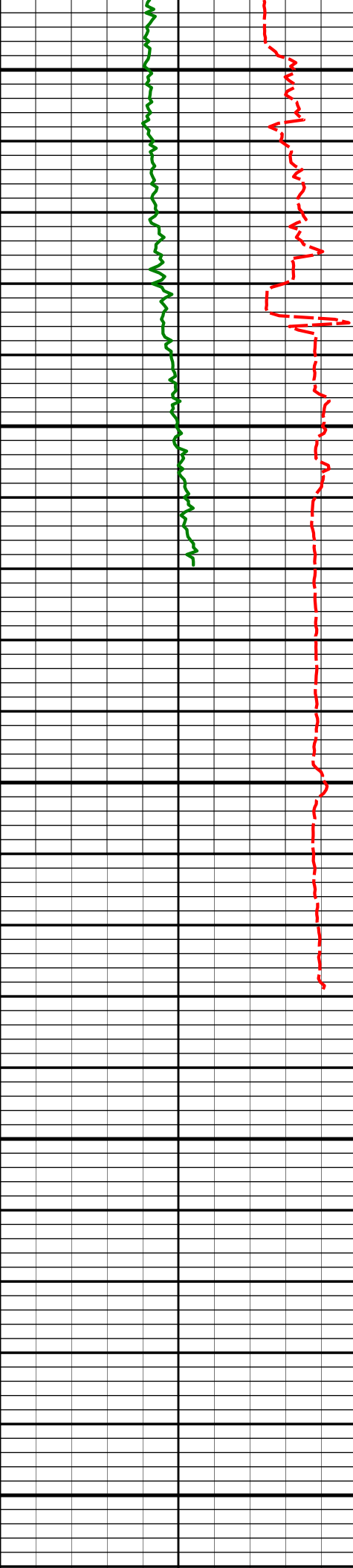
87.99°

358.86°

6005.85'

3686.38'





10200'

10250'

10300'

10350'

10400'

10262'

91.45°

0.01°

6009.04'

4064.64'

10328'

91.45°

0.01°

6007.37'

4130.48'

[illegible]

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**Noble Energy
Castor LC25-72HN
Wattenberg
Weld Colorado
USA
CA-XX-0900130261**

2992.00	14.83	199.42	2958.93	263.69 S	60.87 W	-259.16	2.55
3087.00	14.39	198.79	3050.86	286.33 S	68.72 W	-281.24	0.49
3182.00	14.81	198.98	3142.79	308.99 S	76.47 W	-303.34	0.44
3276.00	15.05	207.20	3233.62	331.21 S	85.96 W	-324.90	2.27
3371.00	16.37	208.02	3325.07	354.00 S	97.89 W	-346.86	1.41
3466.00	17.30	211.95	3416.00	377.81 S	111.65 W	-369.72	1.55
3561.00	15.98	209.43	3507.02	401.18 S	125.55 W	-392.14	1.59
3656.00	13.58	211.69	3598.88	422.07 S	137.84 W	-412.18	2.59
3751.00	10.22	210.73	3691.82	438.81 S	148.01 W	-428.22	3.55
3846.00	7.50	208.17	3785.68	451.52 S	155.24 W	-440.43	2.89
3941.00	3.34	197.09	3880.23	459.64 S	158.98 W	-448.29	4.50
4036.00	2.05	110.19	3975.16	462.87 S	158.20 W	-451.56	4.02
4131.00	0.62	20.84	4070.14	462.97 S	156.43 W	-451.78	2.25
4510.00	1.26	14.43	4449.08	457.02 S	154.66 W	-445.96	0.17
4795.00	1.30	125.20	4734.04	455.84 S	151.23 W	-445.00	0.74
5080.00	0.77	93.59	5019.00	457.82 S	146.68 W	-447.28	0.27
5206.00	0.74	61.85	5144.99	457.49 S	145.11 W	-447.05	0.33
5263.00	0.68	49.83	5201.98	457.09 S	144.53 W	-446.69	0.28
5358.00	3.31	335.70	5296.93	454.23 S	145.23 W	-443.79	3.36
5453.00	12.22	349.90	5390.97	441.80 S	148.13 W	-431.20	9.52
5547.00	18.19	354.38	5481.64	417.39 S	151.31 W	-406.63	6.48
5642.00	22.95	354.15	5570.55	384.18 S	154.65 W	-373.27	5.01
5737.00	27.97	358.26	5656.31	343.46 S	157.22 W	-332.47	5.59
5832.00	36.29	358.76	5736.69	293.00 S	158.51 W	-282.04	8.76
5927.00	45.96	356.97	5808.17	230.65 S	160.93 W	-219.66	10.26
6022.00	57.73	354.78	5866.76	156.29 S	166.41 W	-145.10	12.52
6069.00	61.20	354.54	5890.64	115.99 S	170.18 W	-104.64	7.39
6117.00	63.78	354.28	5912.81	73.62 S	174.33 W	-62.09	5.40
6211.00	69.63	355.95	5949.97	12.36 N	181.65 W	24.19	6.44
6306.00	77.67	356.51	5976.69	103.25 N	187.63 W	115.27	8.48
6359.00	80.99	357.47	5986.50	155.26 N	190.36 W	167.34	6.51
6434.00	85.71	358.58	5995.18	229.68 N	192.92 W	241.78	6.46
6609.00	90.68	1.46	6000.69	404.52 N	192.86 W	416.24	3.28
6657.00	90.71	1.49	6000.11	452.50 N	191.63 W	464.04	0.09
6752.00	87.13	359.62	6001.90	547.46 N	190.71 W	558.74	4.25
6846.00	86.49	359.16	6007.13	641.31 N	191.71 W	652.45	0.84
6942.00	88.86	358.16	6011.02	737.20 N	193.95 W	748.28	2.68
7036.00	88.55	357.39	6013.14	831.10 N	197.59 W	842.22	0.88
7131.00	89.69	356.67	6014.60	925.96 N	202.51 W	937.20	1.42
7226.00	90.06	358.88	6014.80	1020.88 N	206.21 W	1032.16	2.36
7321.00	89.32	358.26	6015.31	1115.85 N	208.58 W	1127.08	1.01
7416.00	91.79	0.10	6014.39	1210.83 N	209.94 W	1221.94	3.24
7511.00	91.20	359.68	6011.91	1305.79 N	210.13 W	1316.72	0.76
7606.00	90.96	359.26	6010.12	1400.77 N	211.01 W	1411.55	0.51
7701.00	90.31	357.70	6009.07	1495.73 N	213.53 W	1506.47	1.77
7796.00	91.02	358.63	6007.97	1590.67 N	216.57 W	1601.41	1.23
7890.00	91.57	359.56	6005.85	1684.64 N	218.06 W	1695.27	1.15
7985.00	90.15	359.17	6004.42	1779.62 N	219.12 W	1790.12	1.55
8080.00	89.35	358.96	6004.83	1874.60 N	220.68 W	1885.00	0.87
8175.00	89.23	359.41	6006.00	1969.58 N	222.04 W	1979.87	0.49
8270.00	89.01	359.04	6007.46	2064.56 N	223.33 W	2074.73	0.45
8365.00	90.25	358.36	6008.07	2159.54 N	225.49 W	2169.64	1.48
8460.00	89.60	357.37	6008.20	2254.47 N	229.03 W	2264.61	1.24
8554.00	89.38	357.23	6009.04	2348.36 N	233.46 W	2358.59	0.27
8649.00	89.82	358.03	6009.70	2443.27 N	237.39 W	2453.56	0.96
8744.00	90.59	358.30	6009.37	2538.22 N	240.44 W	2548.50	0.86
8839.00	91.33	359.20	6007.79	2633.19 N	242.51 W	2643.40	1.23
8934.00	89.63	357.83	6006.99	2728.15 N	244.97 W	2738.31	2.30
9029.00	89.97	357.02	6007.32	2823.05 N	249.24 W	2833.29	0.92
9124.00	90.62	356.99	6006.84	2917.92 N	254.20 W	2928.28	0.68
9219.00	91.88	356.40	6004.77	3012.73 N	259.68 W	3023.26	1.47
9314.00	91.33	358.72	6002.11	3107.60 N	263.72 W	3118.19	2.50
9408.00	89.48	359.18	6001.45	3201.58 N	265.45 W	3212.08	2.03
9503.00	89.51	359.10	6002.29	3296.57 N	266.87 W	3306.95	0.08
9598.00	90.15	358.71	6002.58	3391.55 N	268.68 W	3401.85	0.80
9693.00	90.68	359.09	6001.89	3486.53 N	270.50 W	3496.75	0.68
9788.00	88.28	0.04	6002.76	3581.51 N	271.22 W	3591.58	2.72
9883.00	87.99	358.86	6005.85	3676.46 N	272.13 W	3686.38	1.28
9978.00	88.06	358.75	6009.12	3771.38 N	274.11 W	3781.23	0.13
10073.00	89.54	0.00	6011.11	3866.35 N	275.14 W	3876.06	2.04
10168.00	90.77	0.01	6010.86	3961.35 N	275.13 W	3970.86	1.30
10262.00	91.45	0.01	6009.04	4055.33 N	275.11 W	4064.64	0.72
10328.00	91.45	0.01	6007.37	4121.31 N	275.10 W	4130.48	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 IS COMPUTED ALONG A DIRECTION OF 356.26 DEGREES (GRID)
A TOTAL CORRECTION OF 7.25 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 10328.00 FEET
IS 4130.48 FEET ALONG 356.18 DEGREES (GRID)

Date Printed:30 January 2013