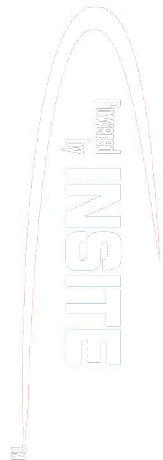


PCDC - Pressure Case Directional
PCGK - Pressure Case Gamma

1 : 240

Country		: USA		Company		: Noble Energy			
Field		: Wattenberg		Rig		: H&P 322			
Location		: Lat: 40° 28' 4.40" North Long: 104° 26' 2.83" West		Well		: Wells Ranch AA21-65-1HN			
Well		: Wells Ranch AA21-65-1HN		Company		: Noble Energy			
Company		: Noble Energy		Rig		: H&P 322			
Rig		: H&P 322		Company : Noble Energy Rig : H&P 322 Well : Wells Ranch AA21-65-1HN Field : Wattenberg Country : USA API Number : 05-123-37599					
LOCATION		Latitude : 40° 28' 4.40" North Longitude : 104° 26' 2.83" West							
		UTM Easting = 3296554.352 ft UTM Northing = 1415074.619 ft							
Permanent Datum		: Ground Level		Elevation :		4730.00 ft		Other Services	
Log Measured From		: Drill Floor		24.00 ft		Above Permanent Datum		Directional Drilling	
Drilling Measured From		: Drill Floor		MD LOG					
Depth Logged		: 969.00 ft To 11,080.00 ft		Unit No.		: 11210425		Job No. : CA-XX-0900918618	
Date Logged		: 09-Feb-14 To 16-Feb-14		Plot Type :		Final			
Total Depth MD		: 11,080.00 ft TVD : 6,654.22 ft		Plot Date :		16-Feb-14			
Spud Date		: 09-Feb-14							
Run No.		Borehole Record (MD)		Run No.		Borehole Record (MD)			
		Size From To				Size From To			
100		8,750 in 969.00 ft 5,990.00 ft							
200		8,750 in 5,990.00 ft 7,129.00 ft							
300		6,125 in 7,129.00 ft 11,080.00 ft							

Max Tool Temp (degF) / Source	412.20 / PCM	412.20 / PCM	412.20 / 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	5.84	5.84	5.84		
Sub Serial Number	246473	246473	12187590		
Insert Serial Number	11680738	11680738	11145509		
Date and Time Initialized	10-Feb-14 09:47	10-Feb-14 09:47	13-Feb-14 22:20		
Date and Time Read	13-Feb-14 16:44	13-Feb-14 15:54	16-Feb-14 15:08		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	61.00	58.00	62.00		
Software Version	6.21	6.21	6.21		
Sub Serial Number	246473	246473	12187590		
Sonde Serial Number	11638621	11638621	11297588		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	310.62	81.36	312.20		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	53.86	51.12	55.23		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	246473	246473	12187590		
Insert/Sonde Serial Number	11681001	11681001	11293266		

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"

PGXR (Gamma Ray CG):

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

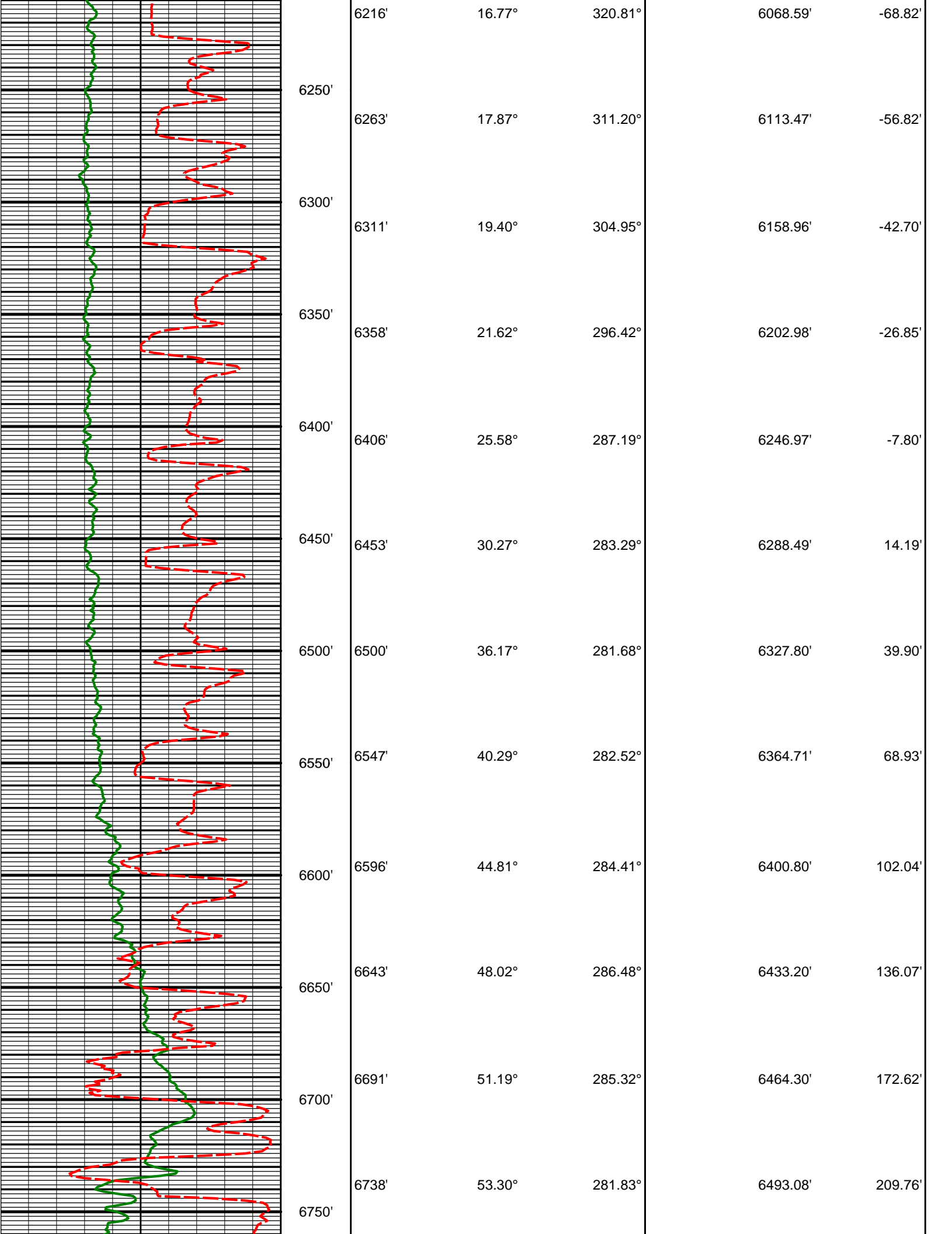
WARRANTY

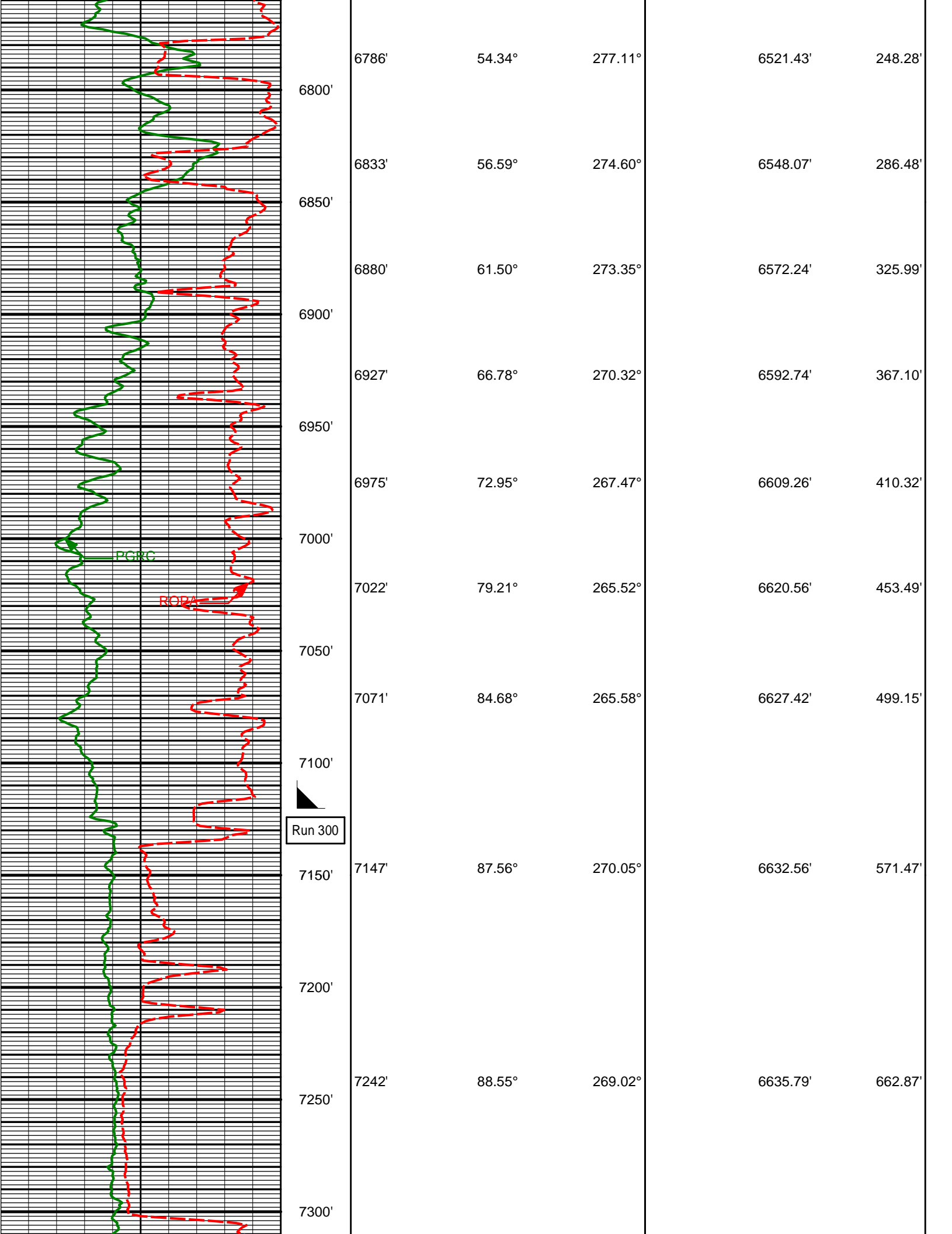
HALLIBURTON WILL USE ITS BEST EFFORTS TO FURNISH CUSTOMERS WITH ACCURATE INFORMATION AND INTERPRETATIONS THAT ARE PART OF, AND INCIDENT TO, THE SERVICES PROVIDED. HOWEVER, HALLIBURTON CANNOT AND DOES NOT WARRANT THE ACCURACY OR CORRECTNESS OF SUCH INFORMATION AND INTERPRETATIONS. UNDER NO CIRCUMSTANCES SHOULD ANY SUCH INFORMATION OR INTERPRETATION BE RELIED UPON AS THE SOLE BASIS FOR ANY DRILLING, COMPLETION, PRODUCTION, OR FINANCIAL DECISION OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING VENTURE, DRILLING RIG OR ITS CREW OR ANY OTHER THIRD PARTY. THE CUSTOMER HAS FULL RESPONSIBILITY FOR ALL DRILLING, COMPLETION AND PRODUCTION OPERATION. HALLIBURTON MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE SERVICES RENDERED. IN NO EVENT WILL HALLIBURTON BE LIABLE FOR FAILURE TO OBTAIN ANY PARTICULAR RESULTS OR FOR ANY DAMAGES, INCLUDING, BUT NOT LIMITED TO, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, RESULTING FROM THE USE OF ANY INFORMATION OR INTERPRETATION PROVIDED BY HALLIBURTON.

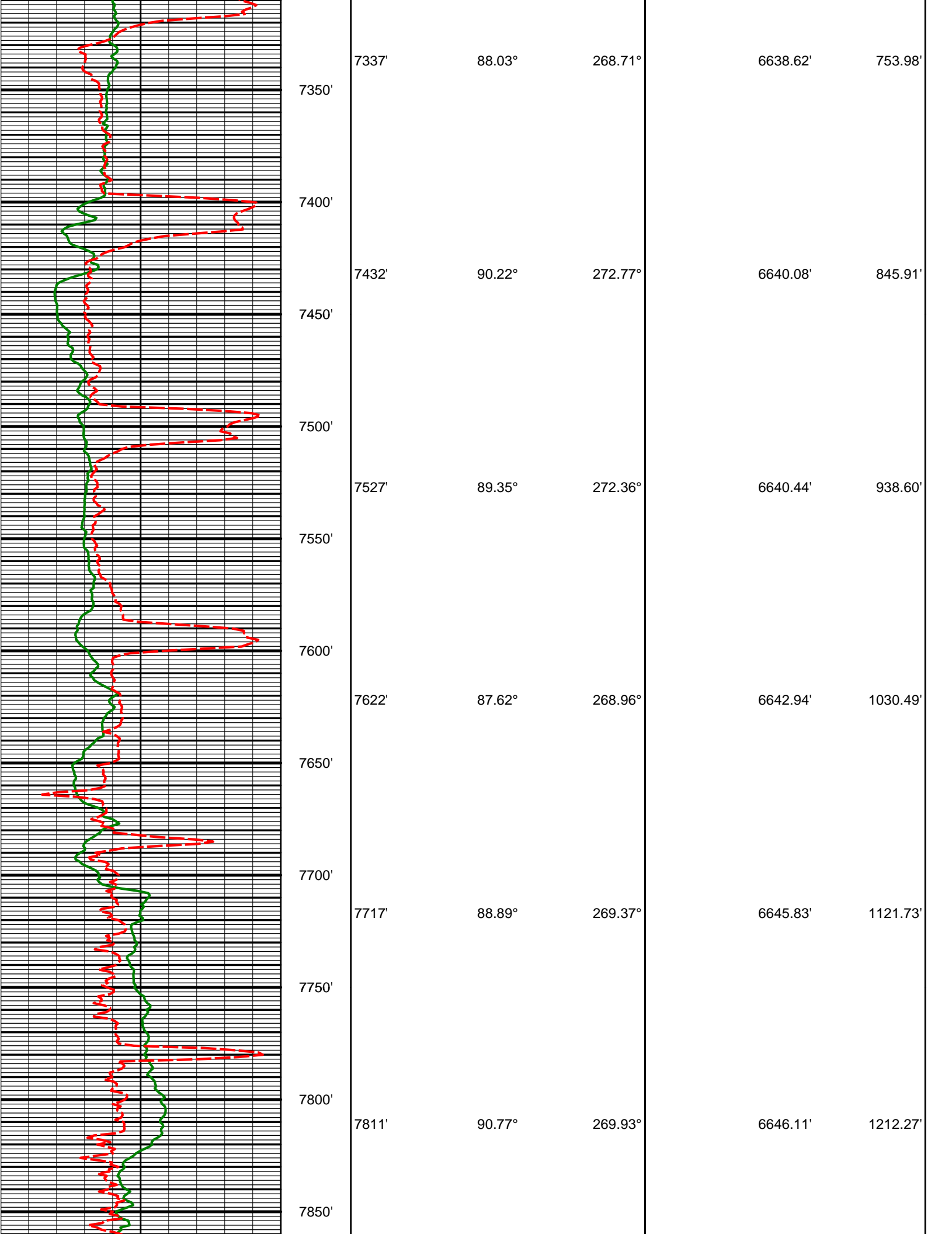
HALLIBURTON

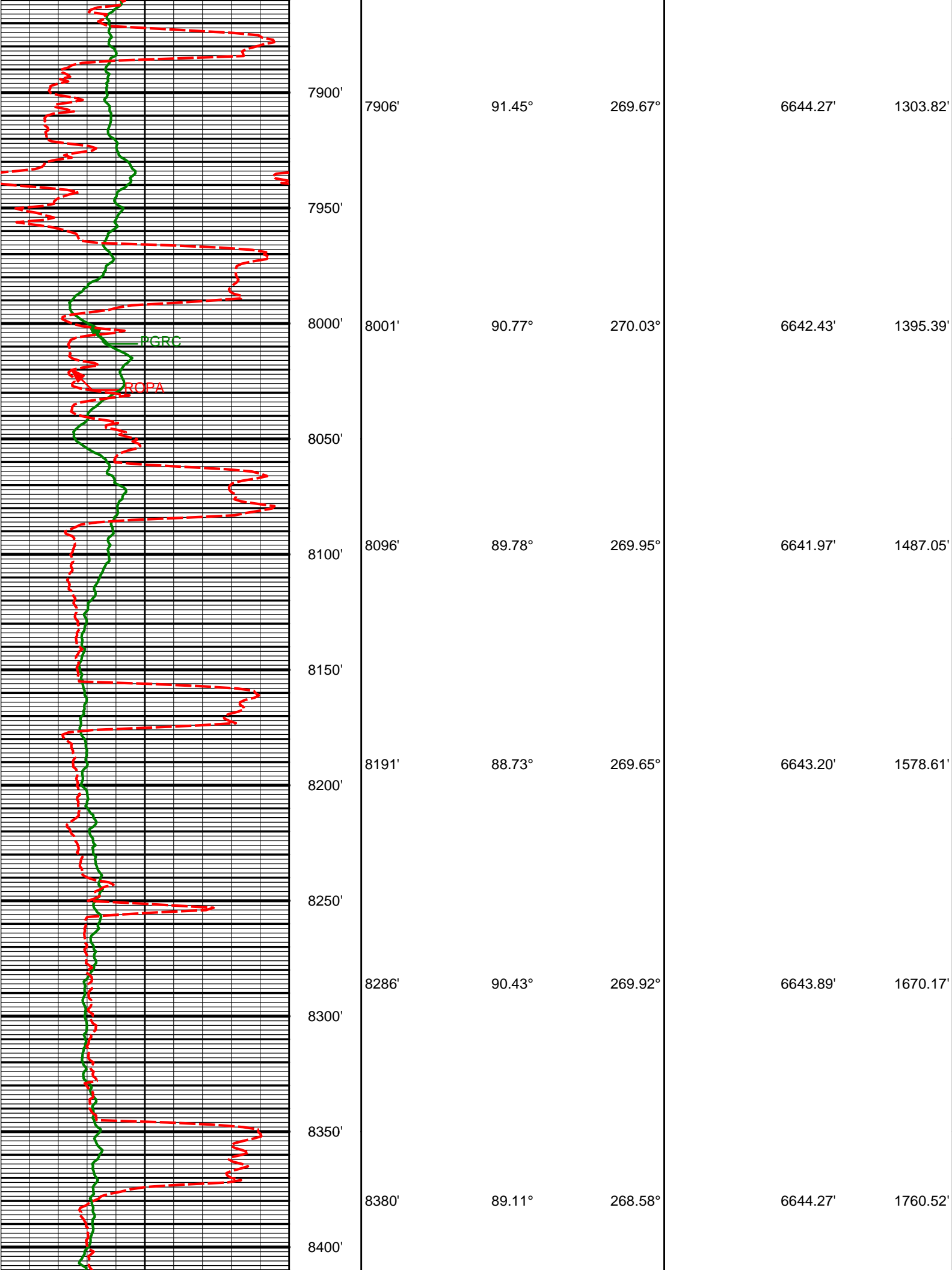
MD Detail Log 1:600

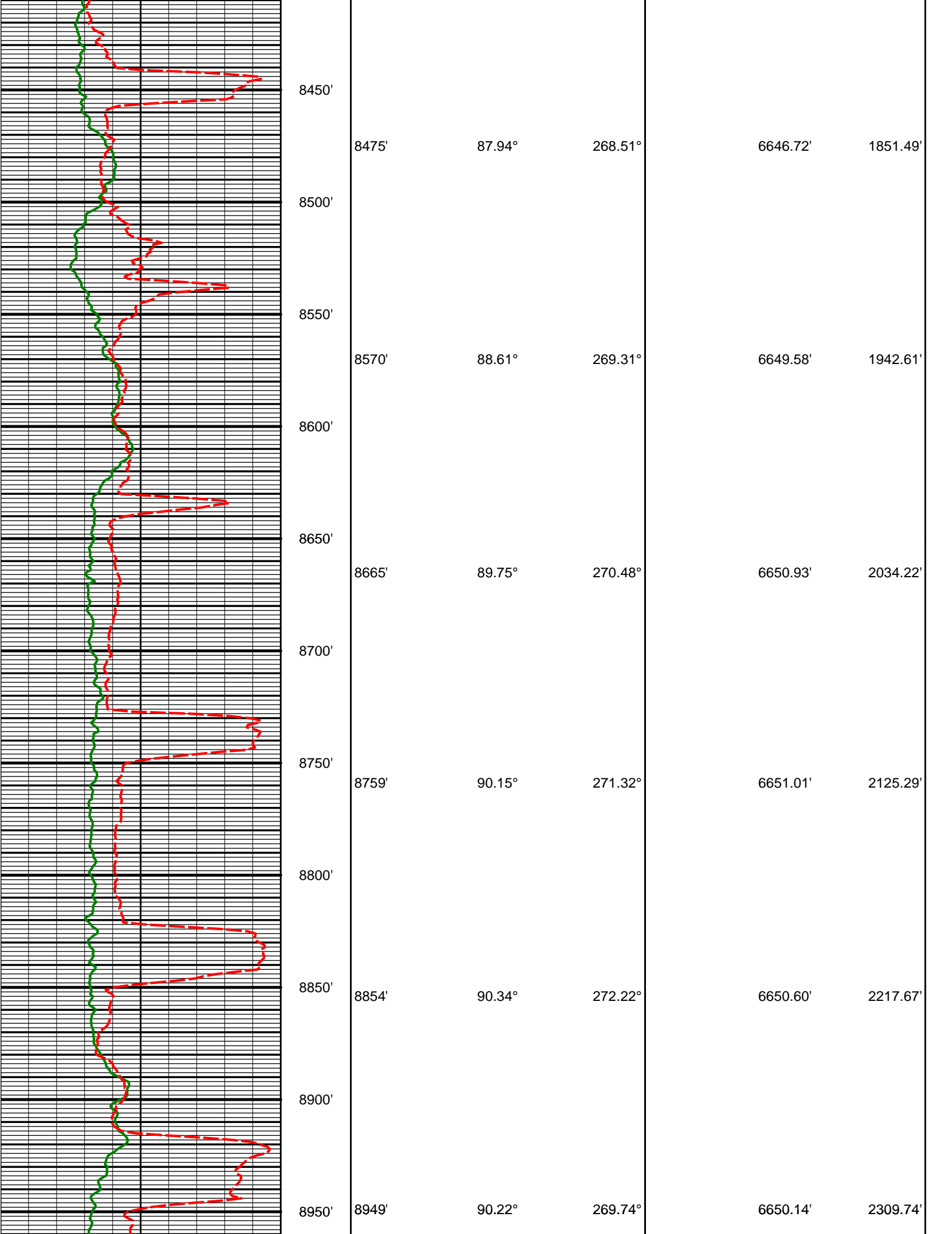
Gamma Ray (PGXC) (Api)						
0300						
Avg Rate of Penetration feet per hr		Feet				
6000						
	Depth	Inc	Azm	TVD	Vsec	
	5950'					
	Run 200 6000'					
	6026'	10.43°	20.78°	5883.90'	-91.57'	
	KOP					
	6073'	10.87°	1.97°	5930.11'	-90.96'	
	6100'					
	6121'	13.99°	339.95°	5977.00'	-86.57'	
	6150'					
	6168'	15.44°	330.97°	6022.46'	-78.92'	
	6200'					

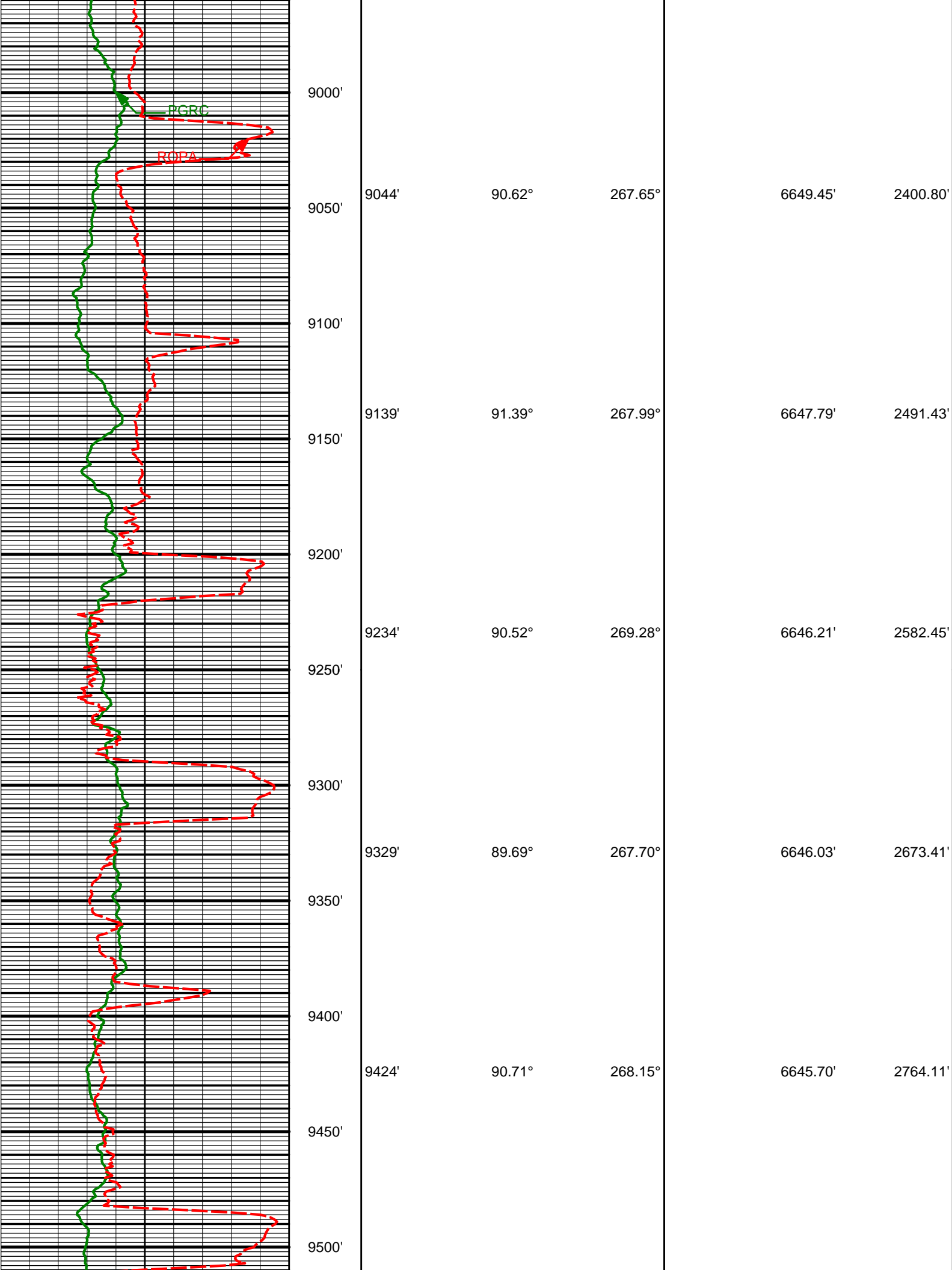


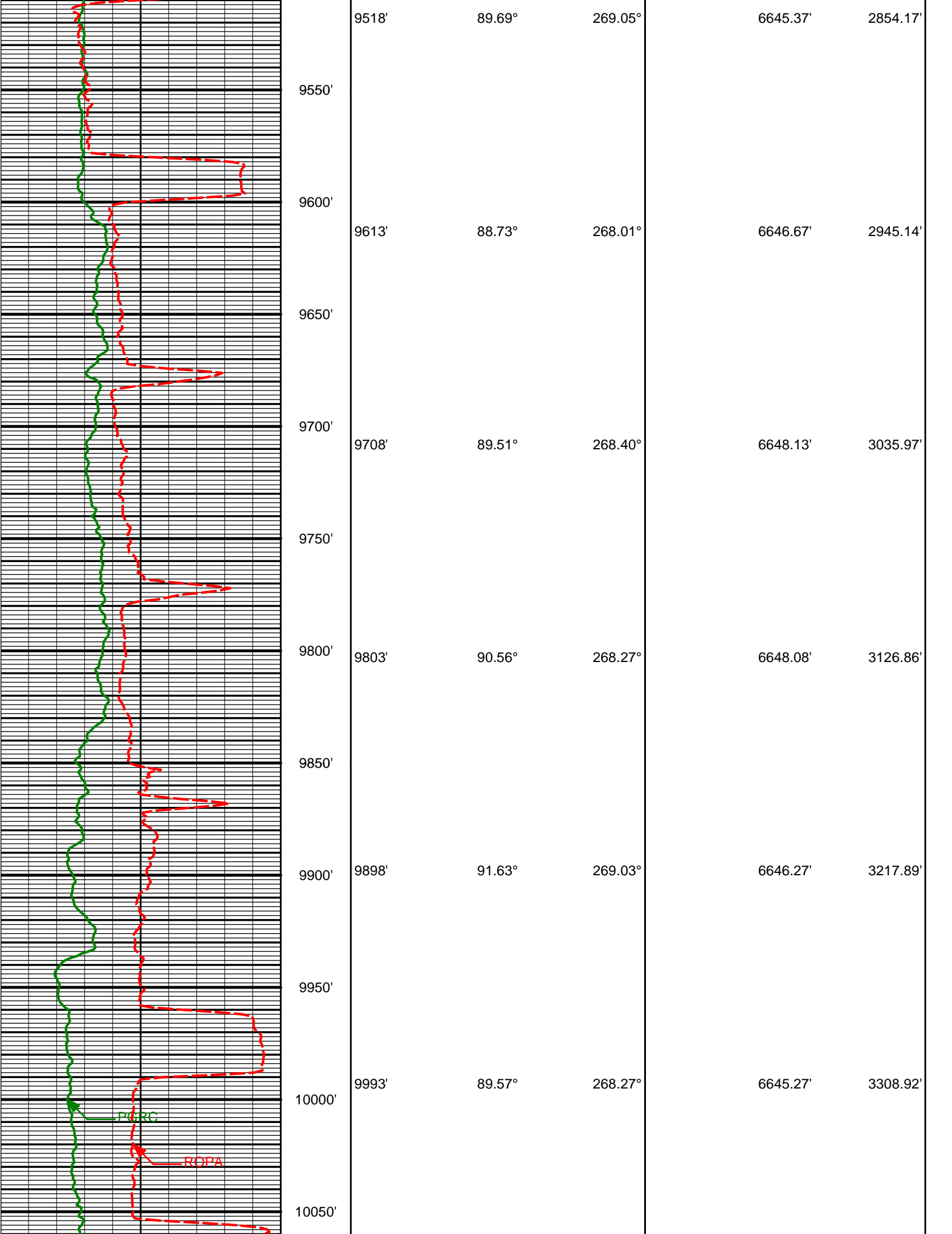


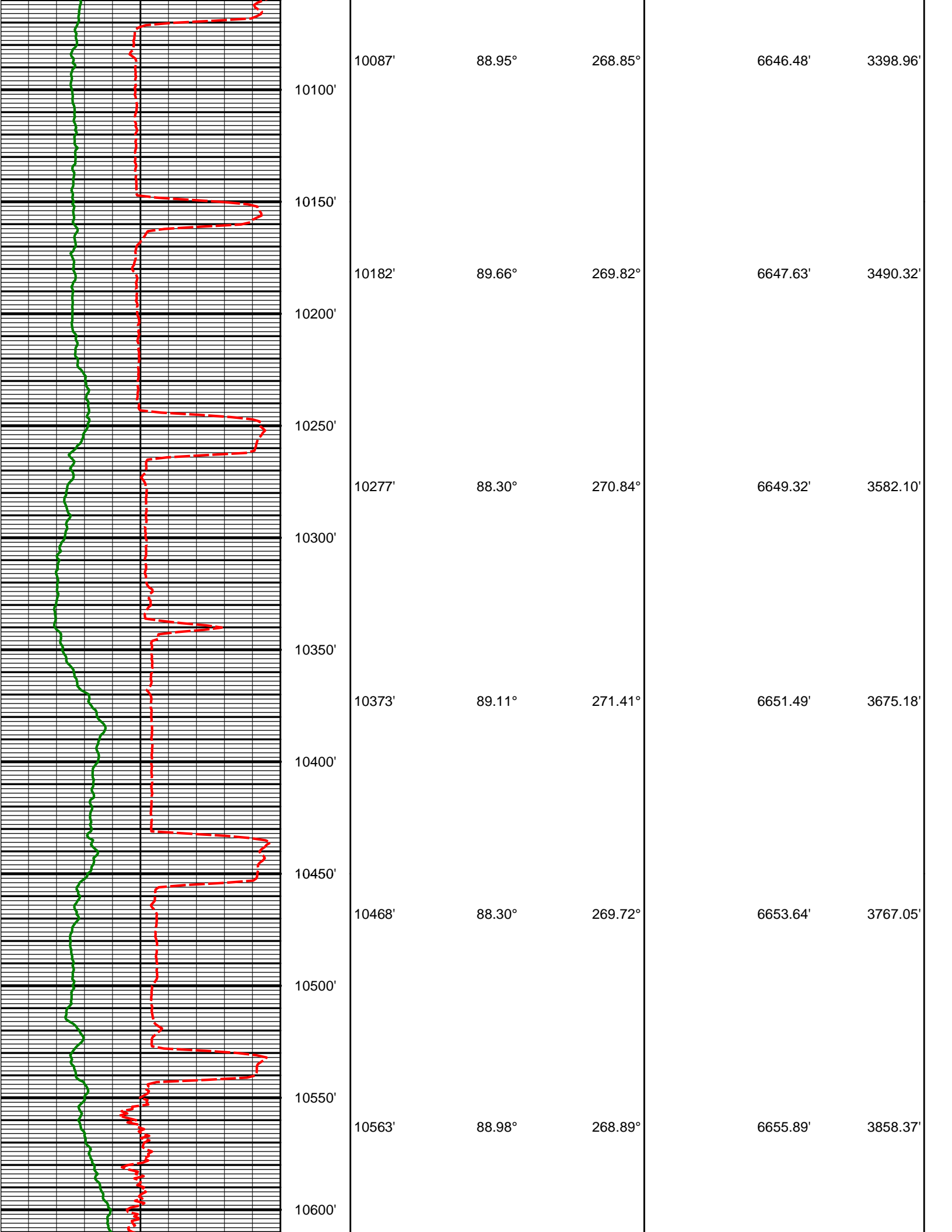


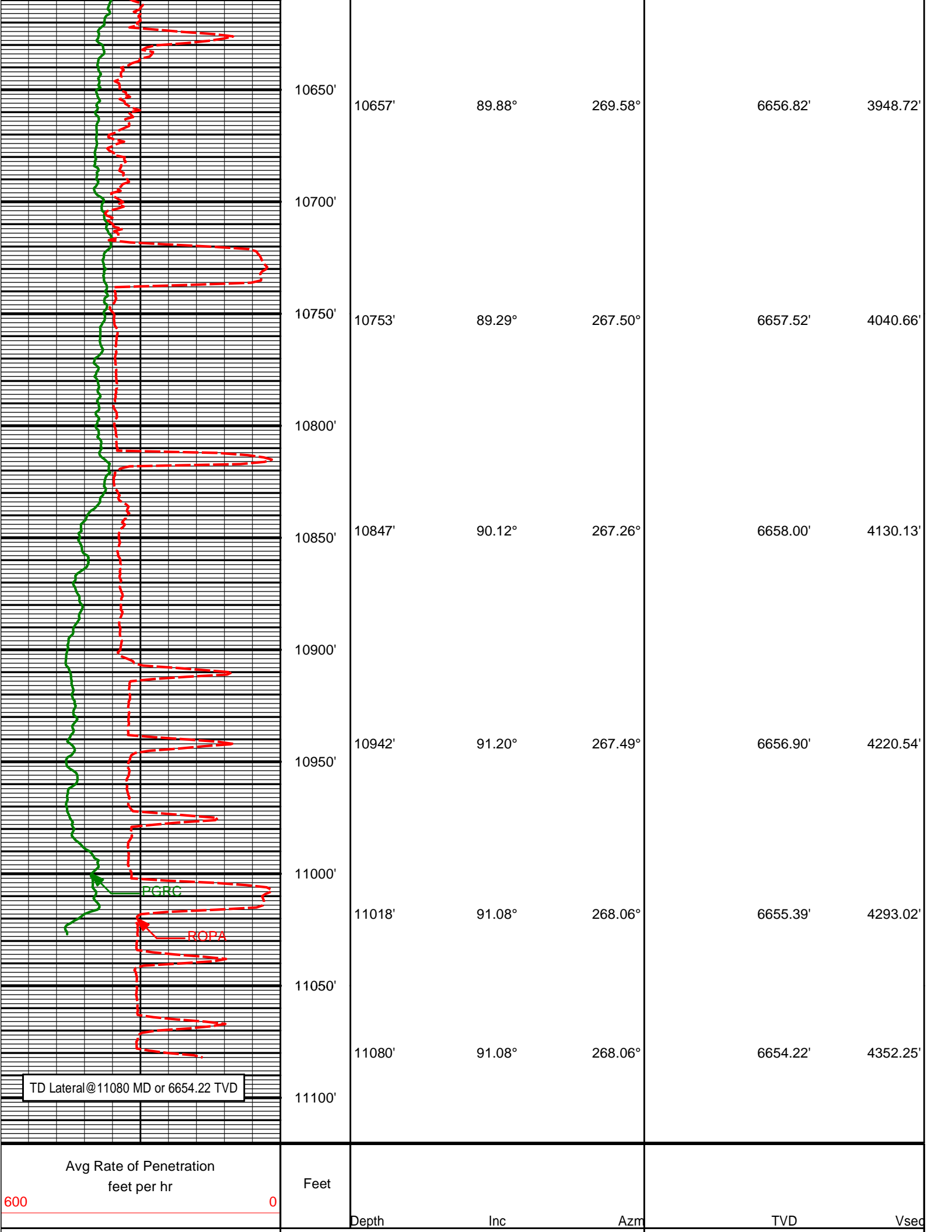








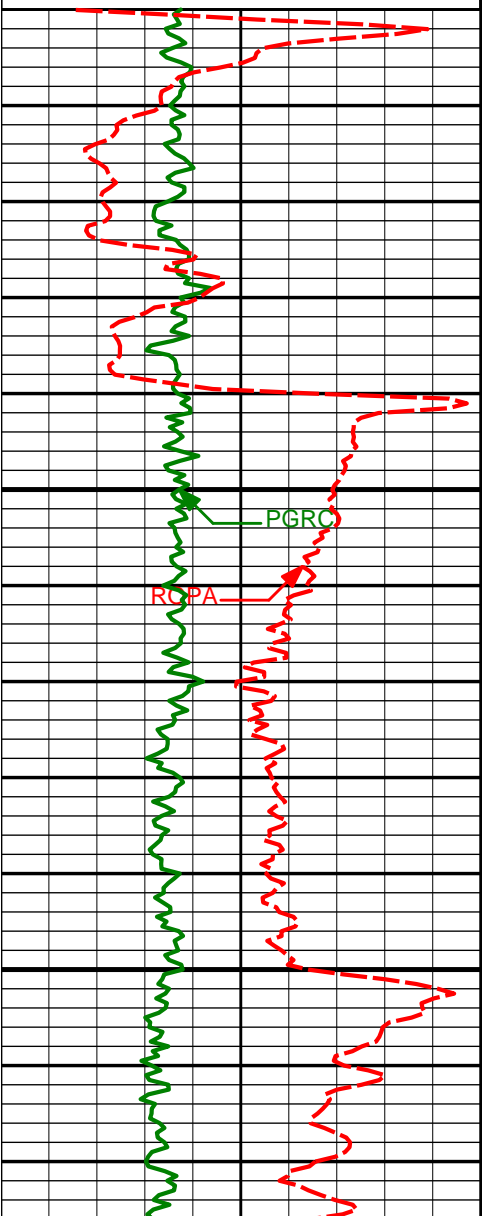


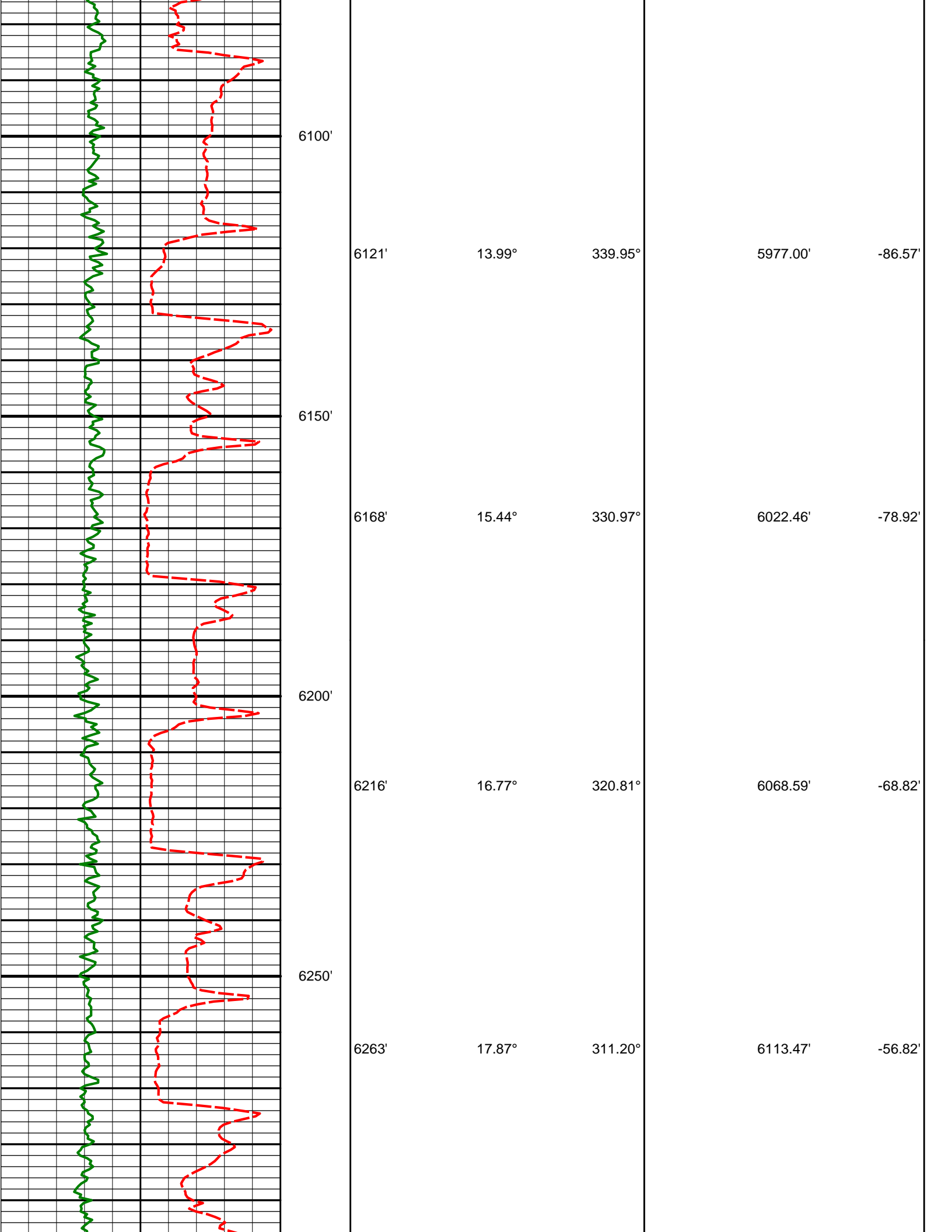


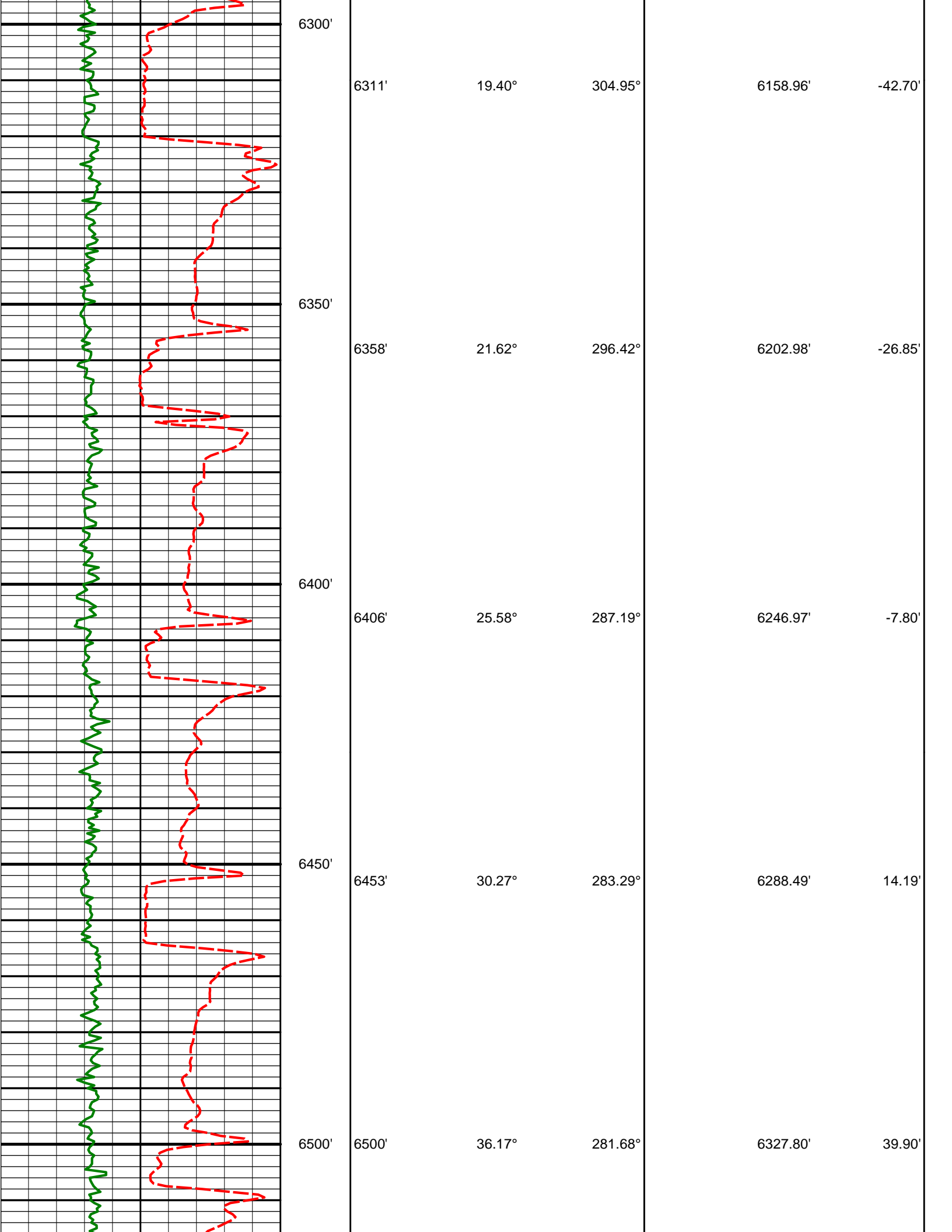
Gamma Ray (PGXC) (Api)		
0300		

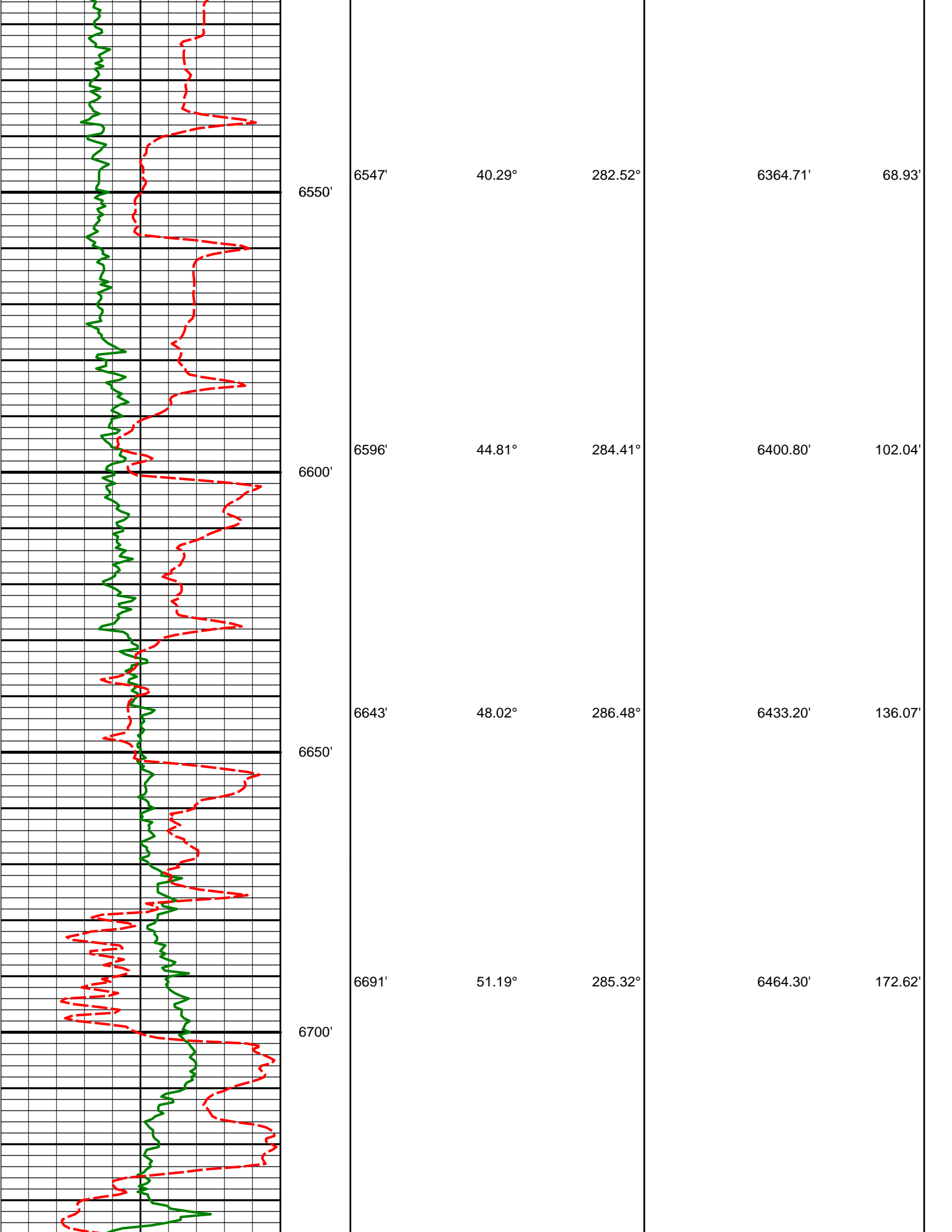
HALLIBURTON

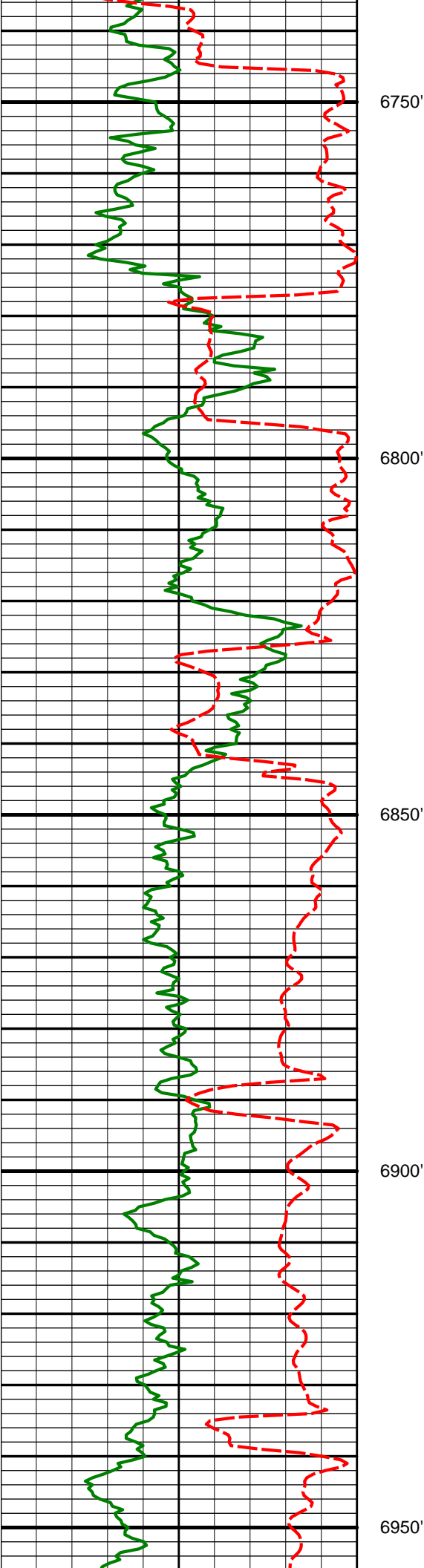
MD Detail Log 1:240

Gamma Ray (PGXC) (Api)					
0300					
Avg Rate of Penetration feet per hr	Feet				
6000					
	Depth	Inc	Azm	TVD	Vsec
					
	6026'	10.43°	20.78°	5883.90'	-91.57'
	6050' KOP				
	6073'	10.87°	1.97°	5930.11'	-90.96'

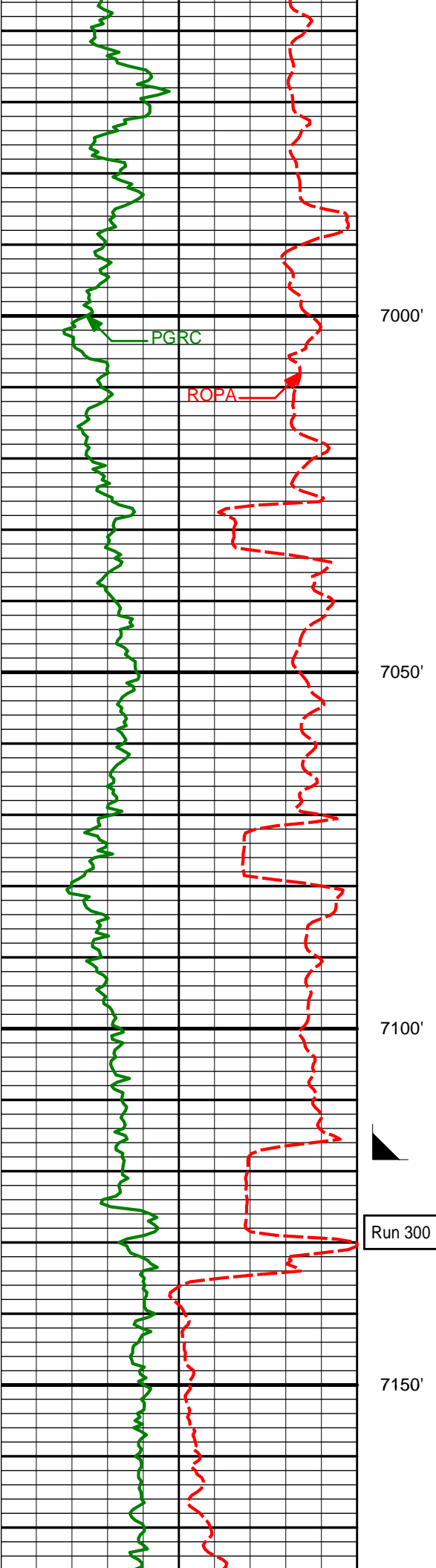








6738'	53.30°	281.83°	6493.08'	209.76'
6786'	54.34°	277.11°	6521.43'	248.28'
6833'	56.59°	274.60°	6548.07'	286.48'
6880'	61.50°	273.35°	6572.24'	325.99'
6927'	66.78°	270.32°	6592.74'	367.10'



6975' 72.95° 267.47° 6609.26' 410.32'

7000'

7022' 79.21° 265.52° 6620.56' 453.49'

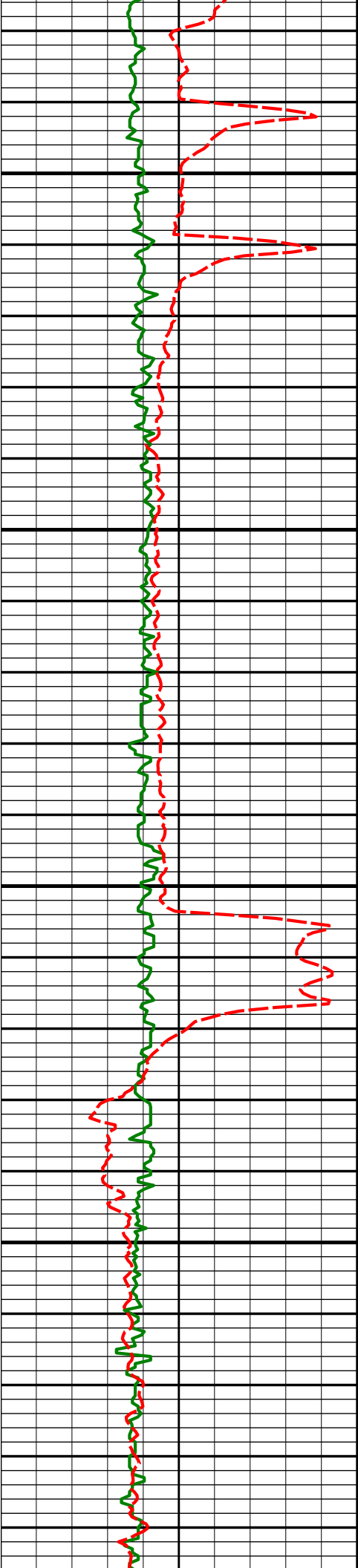
7050'

7071' 84.68° 265.58° 6627.42' 499.15'

7100'

7147' 87.56° 270.05° 6632.56' 571.47'

7150'



7200'

7242'

88.55°

269.02°

6635.79'

662.87'

7250'

7300'

7337'

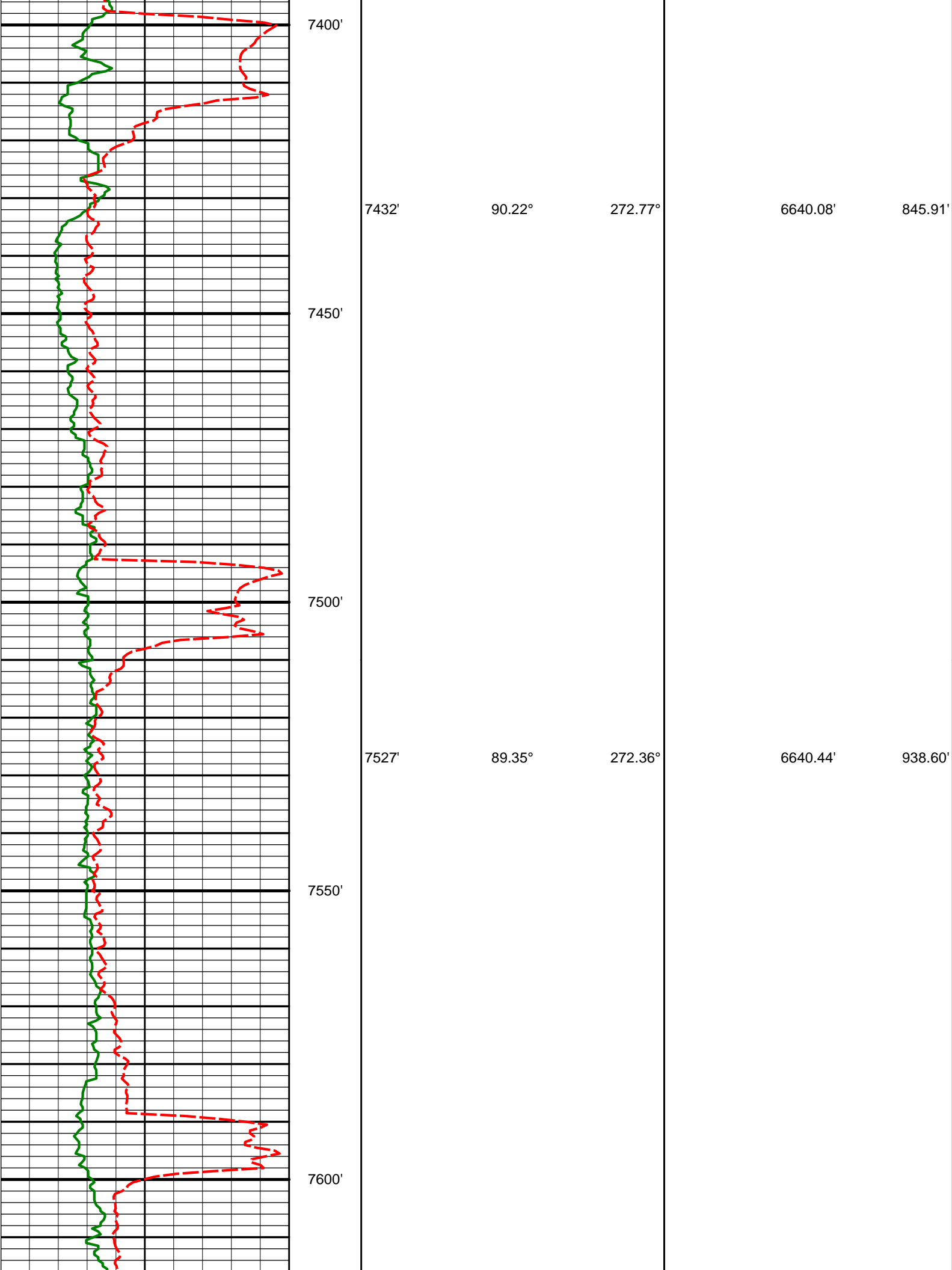
88.03°

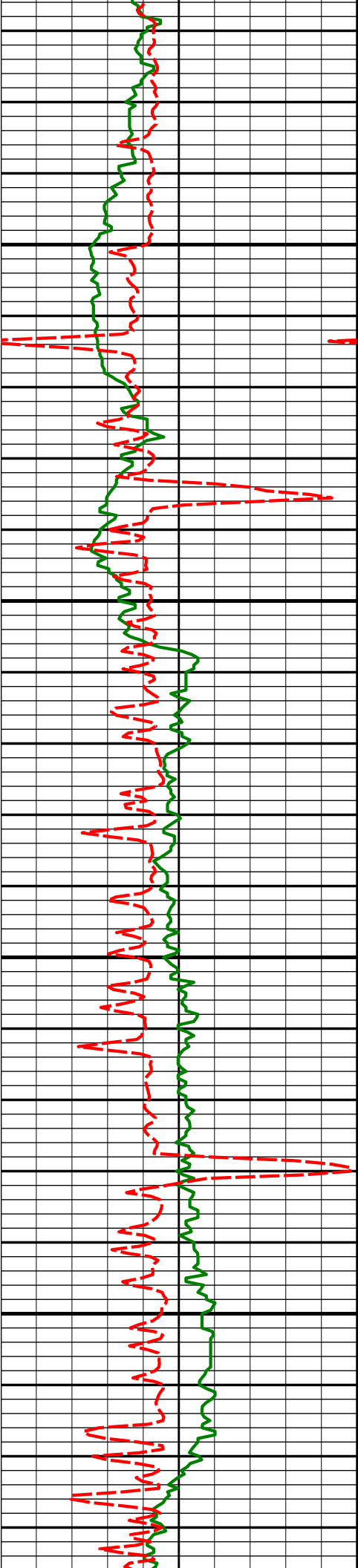
268.71°

6638.62'

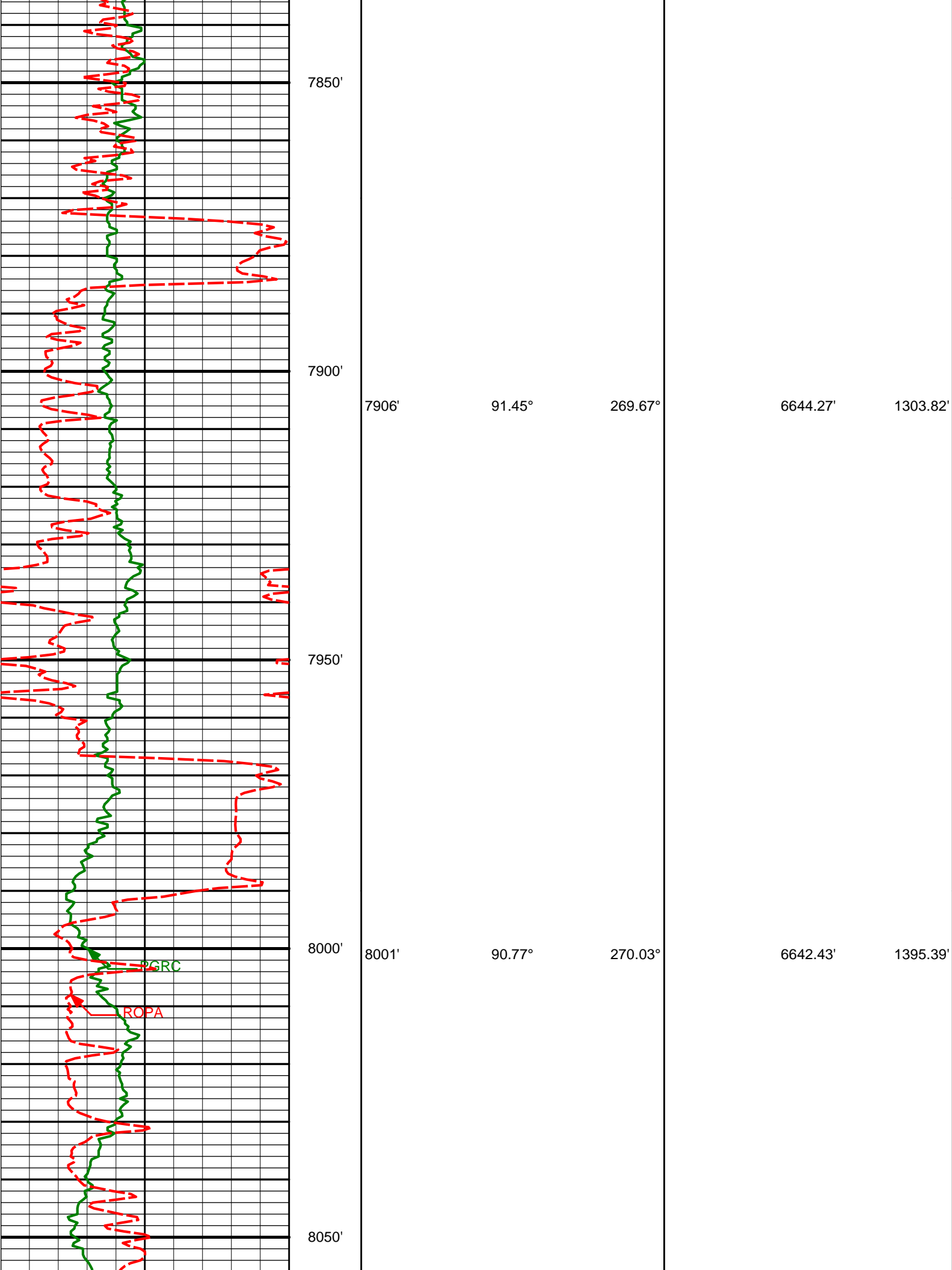
753.98'

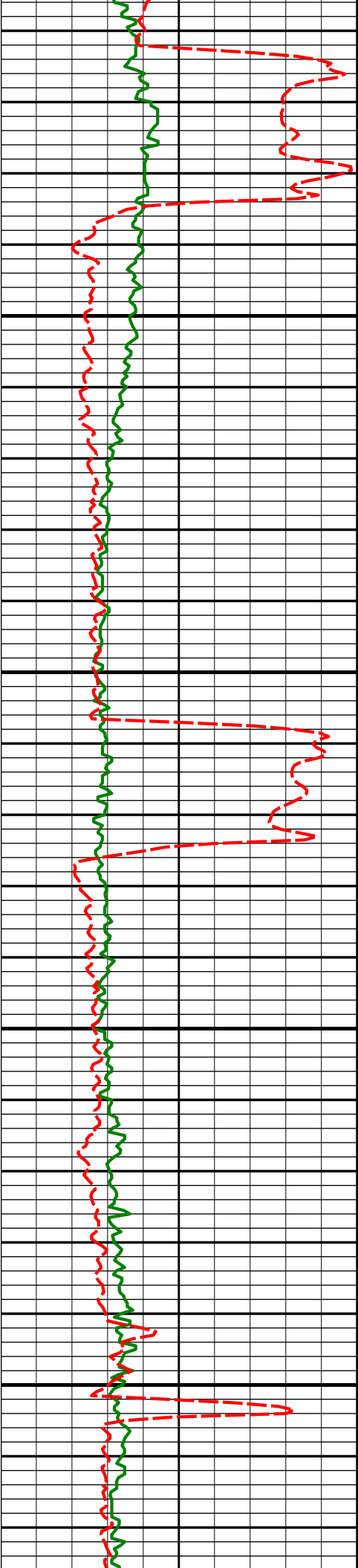
7350'





7622'	87.62°	268.96°	6642.94'	1030.49'
7650'				
7700'				
7717'	88.89°	269.37°	6645.83'	1121.73'
7750'				
7800'				
7811'	90.77°	269.93°	6646.11'	1212.27'





8100'

8150'

8200'

8250'

8096'

89.78°

269.95°

6641.97'

1487.05'

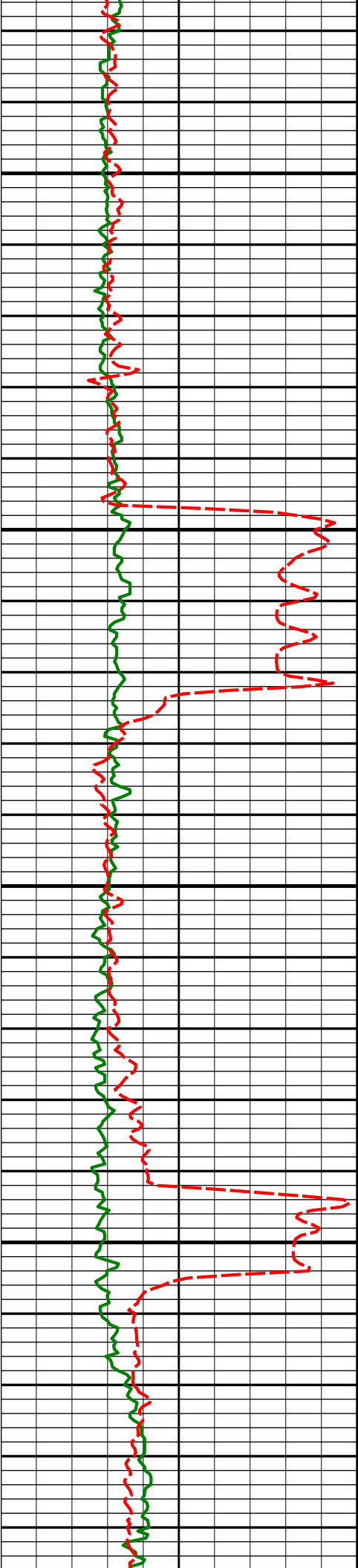
8191'

88.73°

269.65°

6643.20'

1578.61'



8286'

90.43°

269.92°

6643.89'

1670.17'

8300'

8350'

8380'

89.11°

268.58°

6644.27'

1760.52'

8400'

8450'

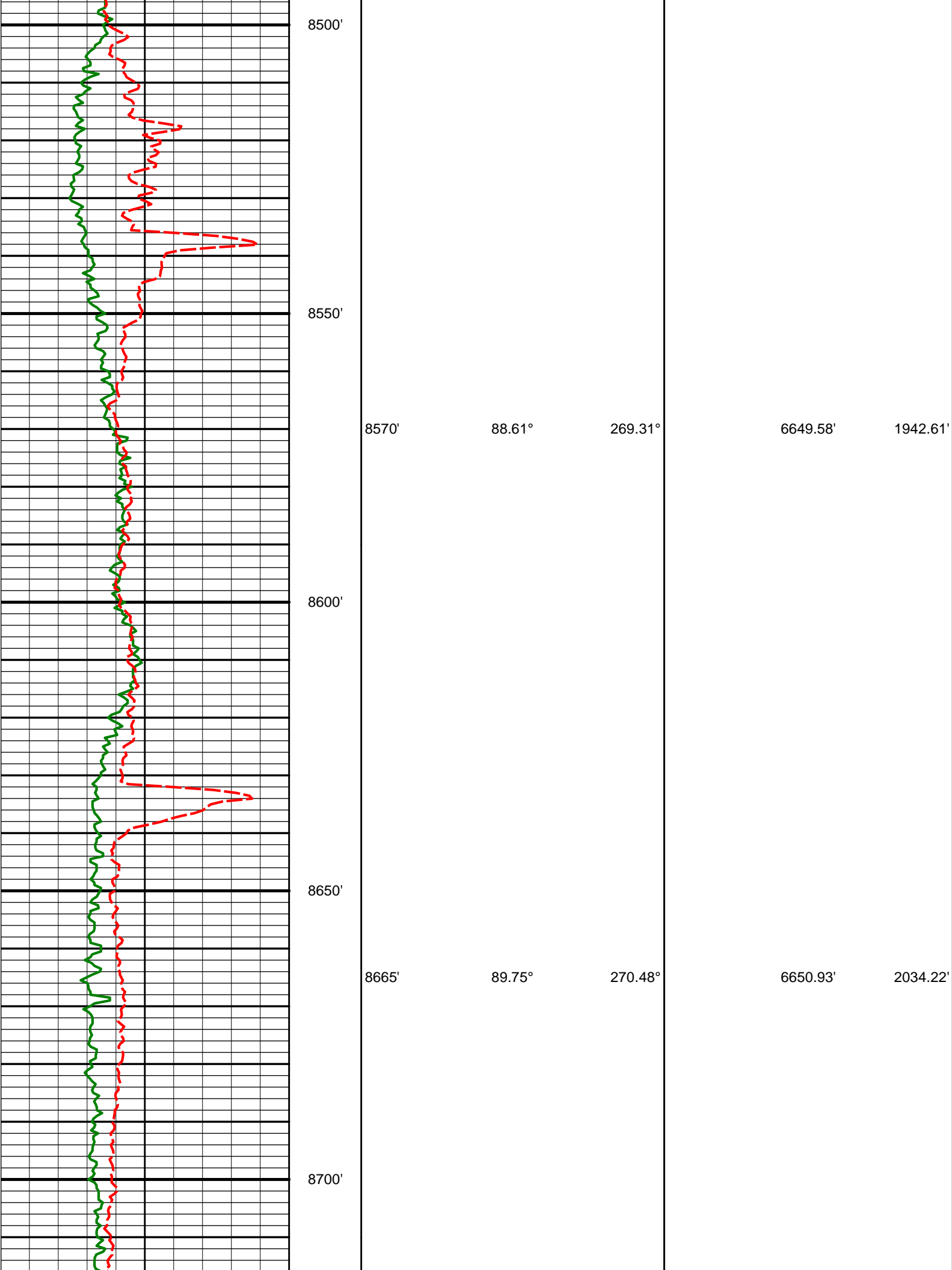
8475'

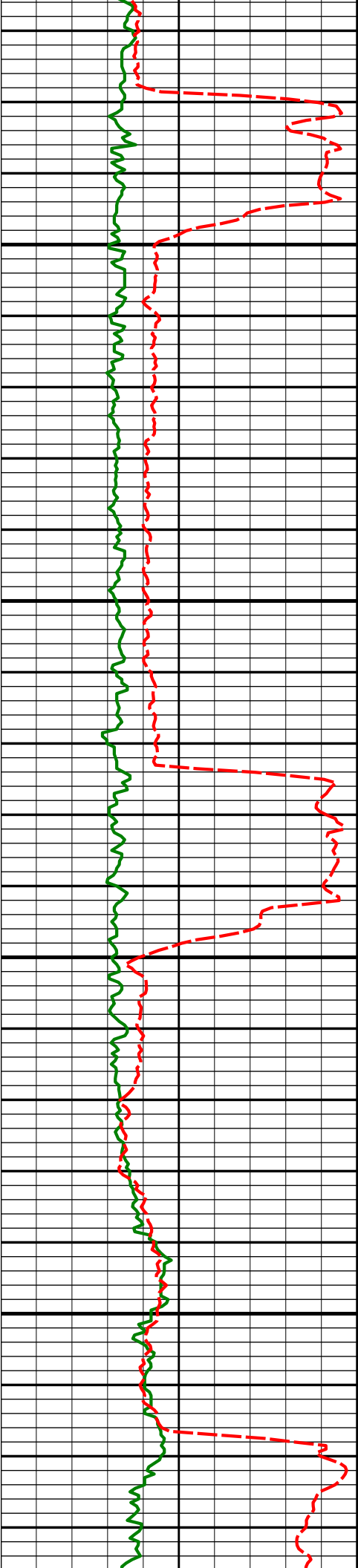
87.94°

268.51°

6646.72'

1851.49'





8750'

8759'

90.15°

271.32°

6651.01'

2125.29'

8800'

8850'

8854'

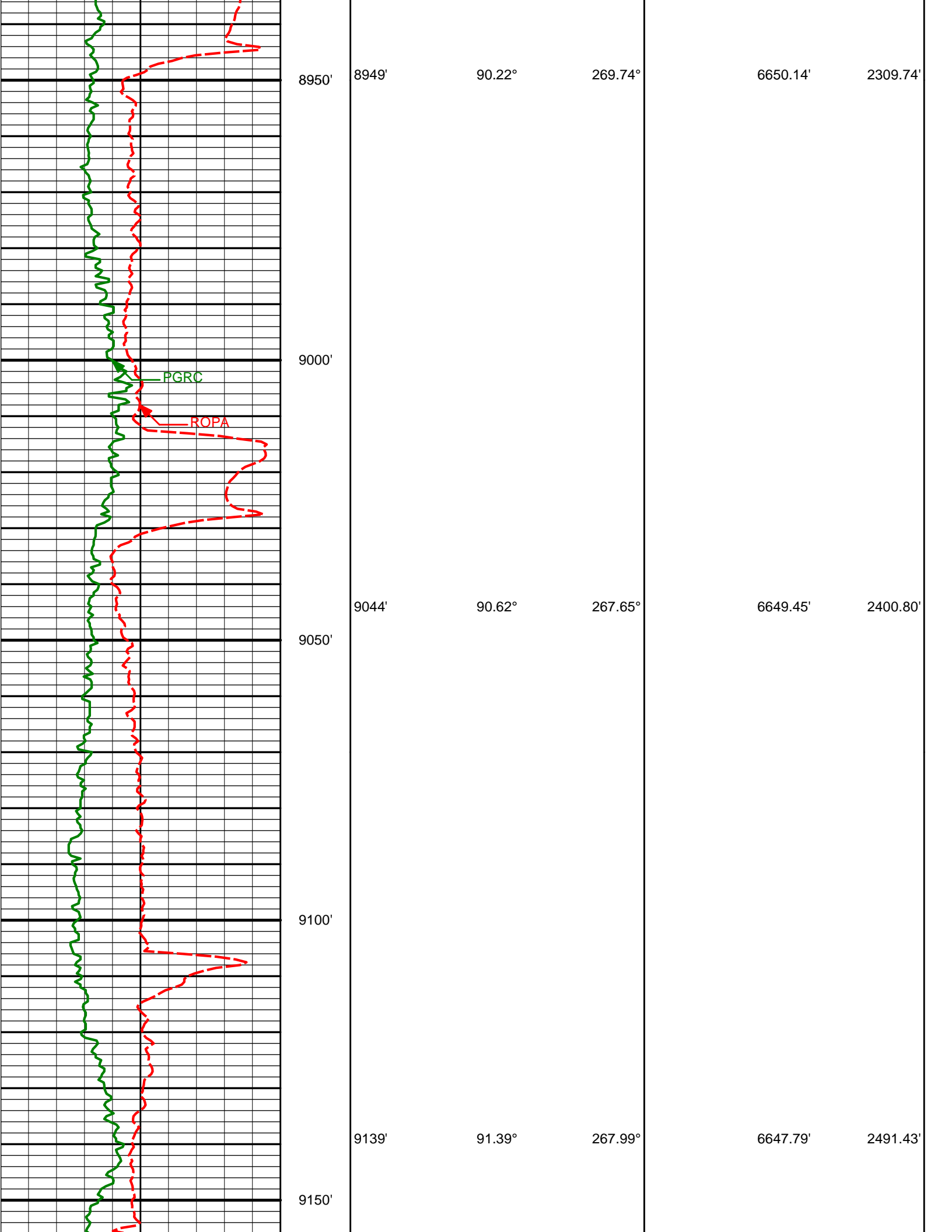
90.34°

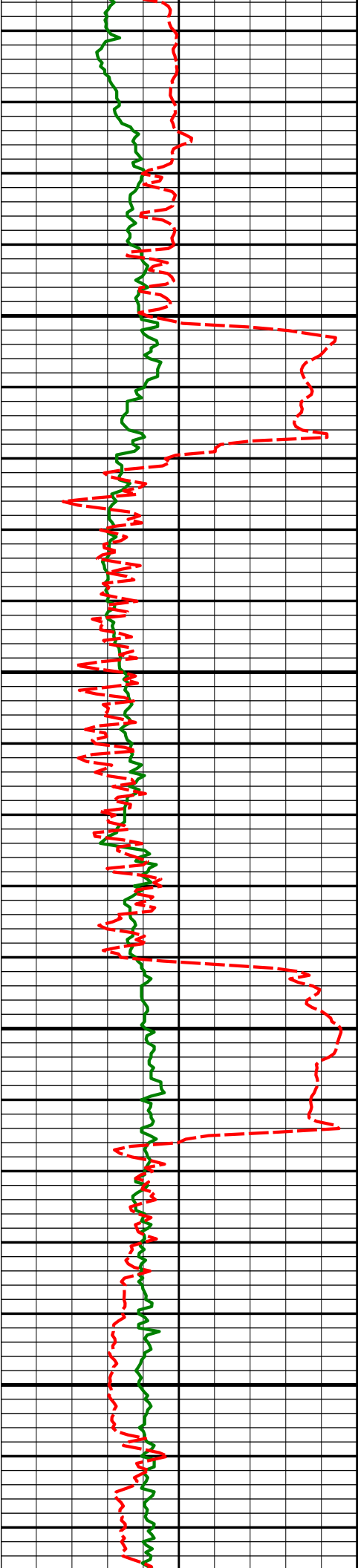
272.22°

6650.60'

2217.67'

8900'





9200'

9234'

90.52°

269.28°

6646.21'

2582.45'

9250'

9300'

9329'

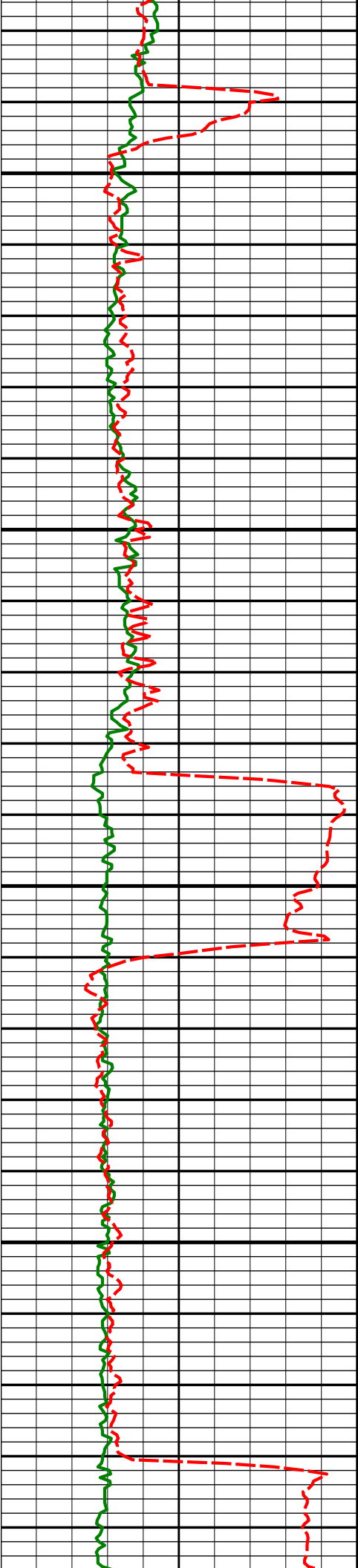
89.69°

267.70°

6646.03'

2673.41'

9350'



9400'

9424'

90.71°

268.15°

6645.70'

2764.11'

9450'

9500'

9518'

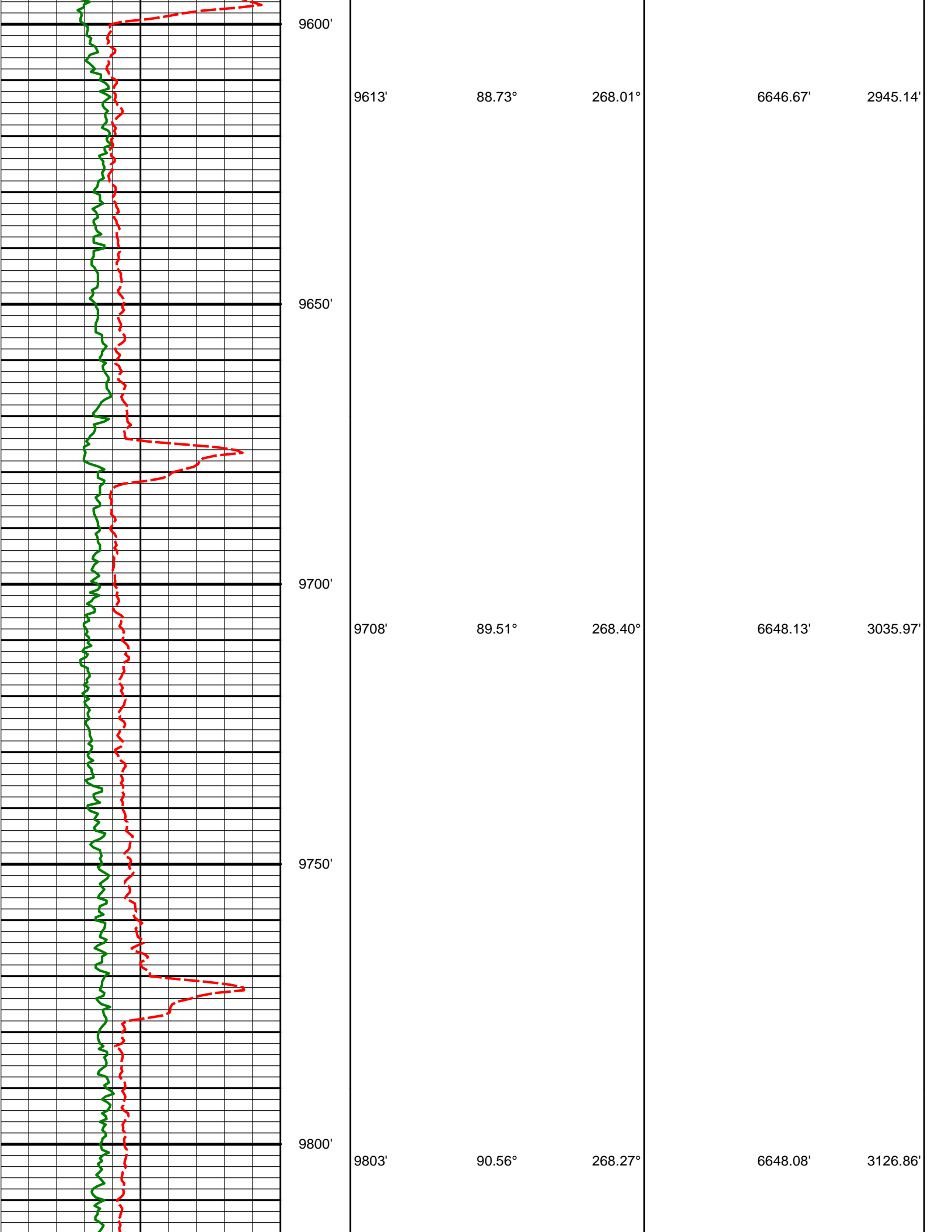
89.69°

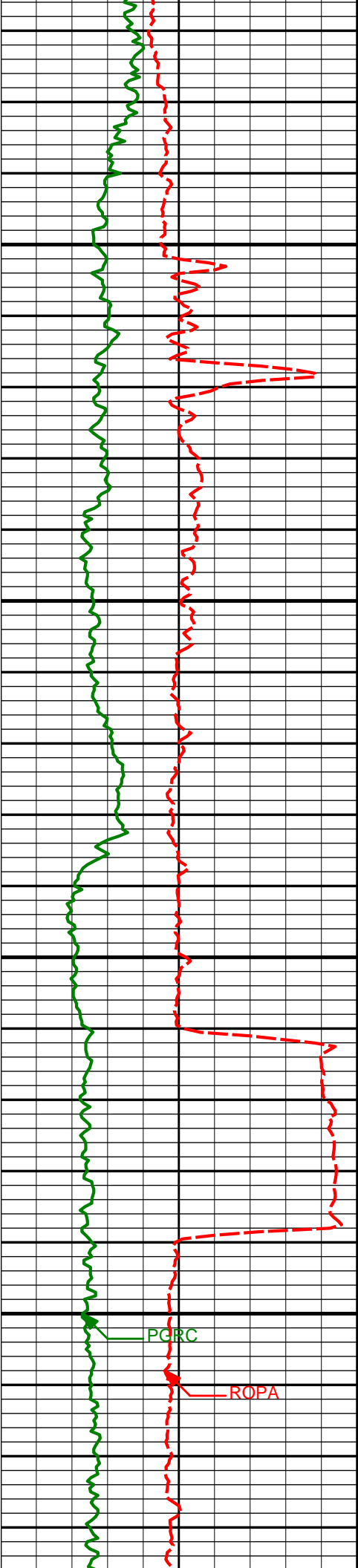
269.05°

6645.37'

2854.17'

9550'





9850'

9900'

9950'

10000'

PGRC

ROPA

9898'

91.63°

269.03°

6646.27'

3217.89'

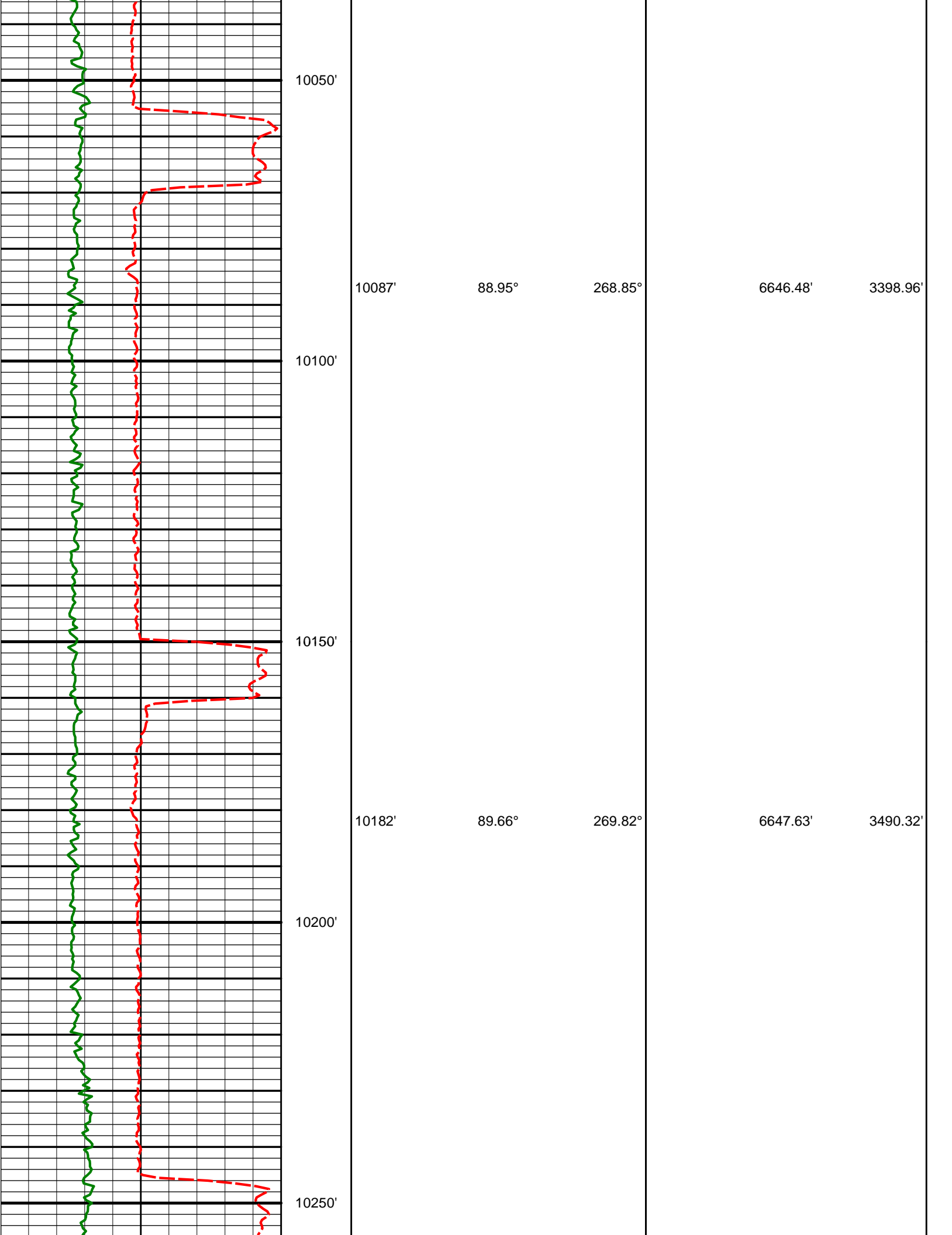
9993'

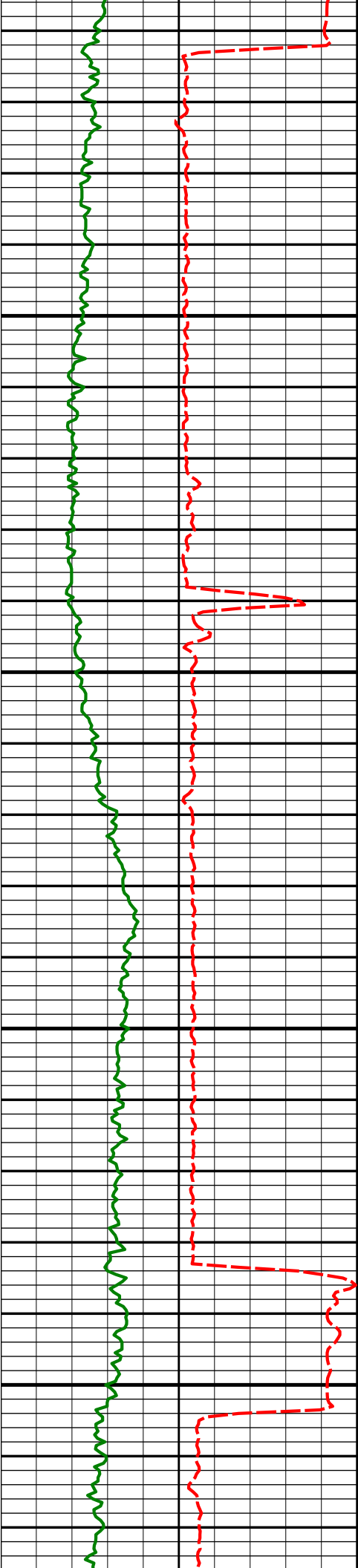
89.57°

268.27°

6645.27'

3308.92'





10277'

88.30°

270.84°

6649.32'

3582.10'

10300'

10350'

10373'

89.11°

271.41°

6651.49'

3675.18'

10400'

10450'

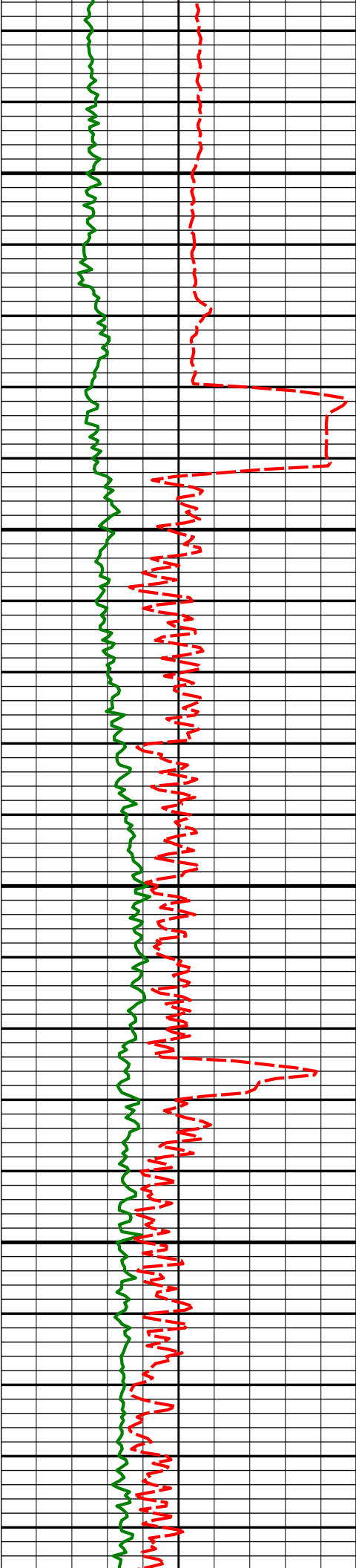
10468'

88.30°

269.72°

6653.64'

3767.05'



10500'

10550'

10600'

10650'

10563'

88.98°

268.89°

6655.89'

3858.37'

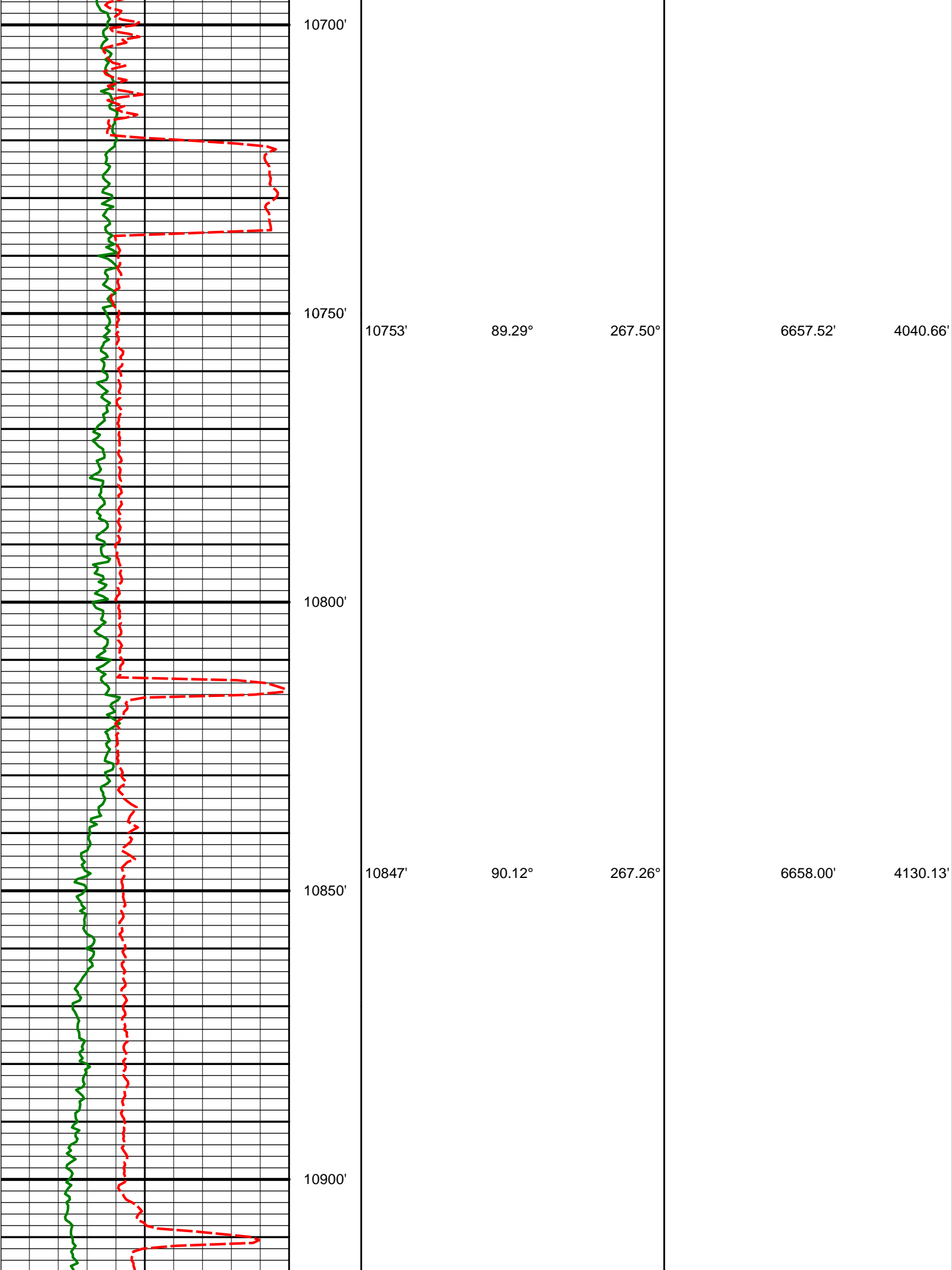
10657'

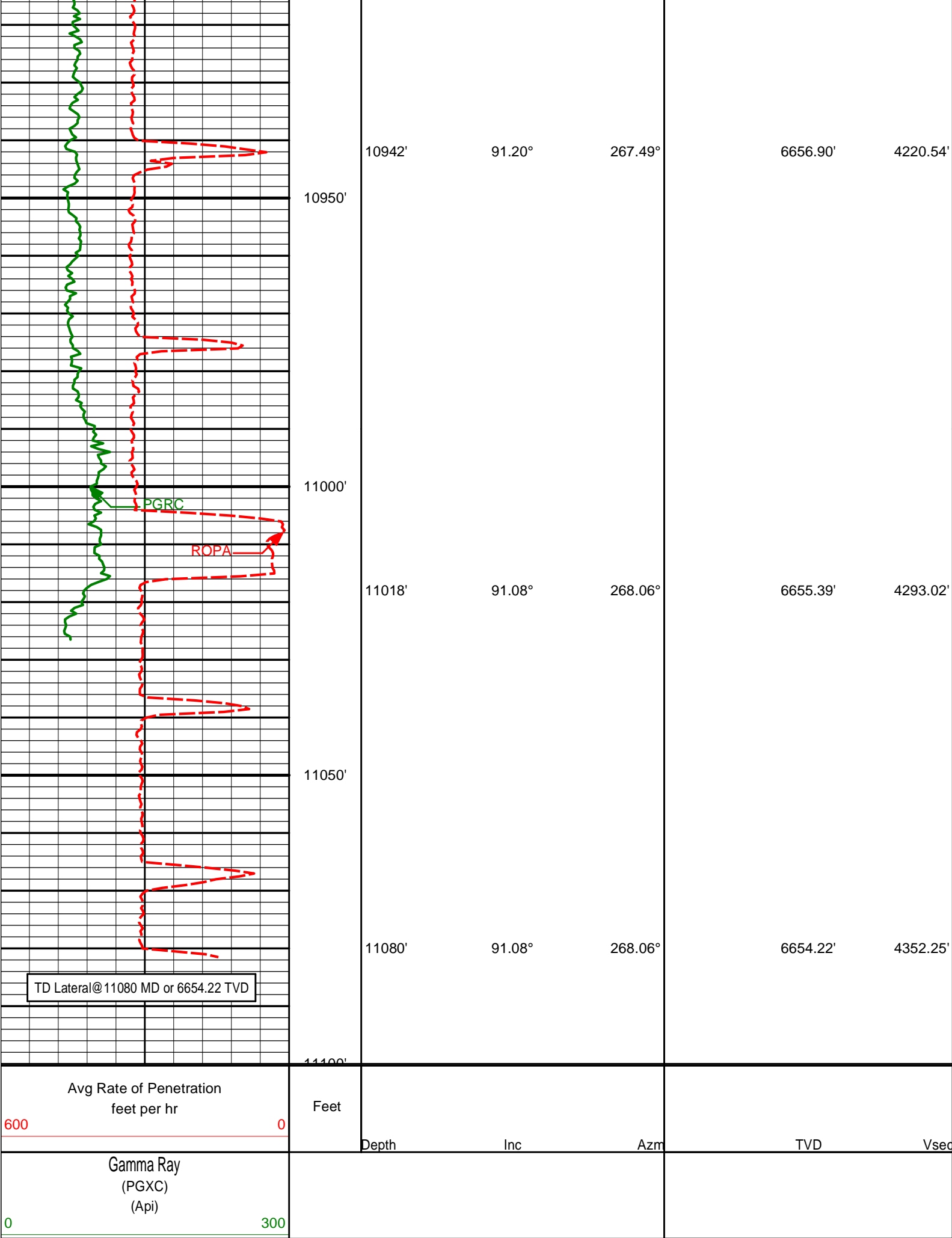
89.88°

269.58°

6656.82'

3948.72'





TD Lateral@ 11080 MD or 6654.22 TVD

Avg Rate of Penetration
feet per hr

Feet

Depth

Inc

Azm

TVD

Vsec

Gamma Ray
(PGXC)
(Api)

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch AA21-65-1HN
Wattenberg
Weld Colorado
USA
CA-XX-0900918618

<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>
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
250.00	0.40	203.38	250.00	0.80 S	0.35 W	0.12	0.16
500.00	0.40	97.08	499.99	1.71 S	0.17 E	-0.62	0.26
750.00	0.40	266.78	749.99	1.87 S	0.17 E	-0.65	0.32
950.00	1.20	192.88	949.97	3.95 S	1.00 W	-0.08	0.58
1014.00	1.41	220.07	1013.96	5.20 S	1.65 W	0.23	1.01
1107.00	1.24	217.44	1106.93	6.88 S	3.00 W	1.09	0.20
1200.00	1.19	21.38	1199.93	6.78 S	3.26 W	1.36	2.58
1293.00	3.32	32.20	1292.85	3.60 S	1.48 W	0.48	2.33
1386.00	5.66	27.30	1385.56	2.75 N	2.06 E	-1.27	2.55
1479.00	8.33	26.20	1477.86	12.87 N	7.14 E	-3.51	2.88
1574.00	9.93	21.22	1571.65	26.68 N	13.14 E	-5.67	1.87
1669.00	11.94	21.13	1664.92	43.48 N	19.65 E	-7.53	2.12
1763.00	12.60	18.73	1756.78	62.25 N	26.44 E	-9.15	0.89
1858.00	14.66	16.51	1849.10	83.59 N	33.19 E	-10.05	2.24
1953.00	15.50	15.12	1940.83	107.37 N	39.91 E	-10.29	0.97
2048.00	14.60	19.20	2032.57	130.93 N	47.16 E	-11.09	1.47
2143.00	14.19	19.88	2124.59	153.19 N	55.06 E	-12.86	0.47
2238.00	14.70	21.64	2216.59	175.34 N	63.46 E	-15.14	0.71
2333.00	14.72	19.30	2308.47	197.94 N	71.90 E	-17.34	0.63
2427.00	15.77	24.80	2399.17	220.80 N	81.20 E	-20.30	1.90
2522.00	16.61	20.30	2490.41	245.26 N	91.33 E	-23.65	1.59
2617.00	15.28	17.50	2581.75	269.93 N	99.81 E	-25.34	1.62
2712.00	15.20	21.88	2673.41	293.42 N	108.21 E	-27.28	1.21
2807.00	15.88	20.92	2764.94	317.12 N	117.49 E	-30.00	0.77
2902.00	17.34	22.74	2855.97	342.32 N	127.61 E	-33.14	1.63
2997.00	18.22	22.35	2946.43	369.12 N	138.73 E	-36.82	0.94
3092.00	16.55	20.74	3037.09	395.51 N	149.17 E	-39.96	1.83
3187.00	16.36	21.28	3128.20	420.63 N	158.82 E	-42.66	0.26
3281.00	14.88	19.51	3218.73	444.35 N	167.65 E	-44.96	1.65
3377.00	13.40	20.21	3311.81	466.41 N	175.62 E	-46.84	1.55
3472.00	13.50	22.76	3404.21	486.97 N	183.71 E	-49.24	0.63
3566.00	13.72	18.37	3495.57	507.67 N	191.47 E	-51.29	1.12
3661.00	14.82	16.17	3587.64	530.03 N	198.40 E	-52.10	1.29
3756.00	16.42	19.07	3679.13	554.40 N	206.17 E	-53.19	1.88
3851.00	17.69	19.39	3769.95	580.70 N	215.35 E	-55.13	1.34
3945.00	17.63	18.91	3859.52	607.64 N	224.70 E	-57.08	0.17
4040.00	16.65	18.70	3950.30	634.14 N	233.73 E	-58.82	1.04
4135.00	16.01	15.98	4041.47	659.63 N	241.70 E	-59.81	1.04
4229.00	15.34	17.74	4131.97	683.93 N	249.06 E	-60.52	0.88
4324.00	13.07	19.59	4224.06	706.02 N	256.49 E	-61.89	2.44
4419.00	12.85	17.00	4316.64	726.24 N	263.18 E	-63.03	0.65
4514.00	13.58	18.45	4409.12	746.93 N	269.80 E	-63.98	0.85
4609.00	12.89	16.91	4501.60	767.65 N	276.42 E	-64.91	0.81
4704.00	12.69	14.48	4594.24	787.89 N	282.11 E	-65.08	0.61
4799.00	12.68	15.61	4686.92	808.04 N	287.53 E	-65.01	0.26
4894.00	12.62	20.90	4779.62	827.78 N	294.03 E	-66.10	1.22
4989.00	13.65	24.00	4872.14	847.71 N	302.29 E	-68.83	1.31
5084.00	15.11	22.41	4964.16	869.40 N	311.57 E	-72.08	1.59
5178.00	13.79	21.57	5055.18	891.15 N	320.36 E	-74.85	1.42
5273.00	13.58	19.20	5147.49	912.21 N	328.19 E	-76.87	0.63
5368.00	12.69	15.65	5240.00	932.79 N	334.68 E	-77.71	1.26
5463.00	12.36	17.37	5332.74	952.54 N	340.53 E	-78.16	0.52
5558.00	11.47	22.91	5425.69	970.95 N	347.24 E	-79.80	1.53
5653.00	11.76	24.40	5518.75	988.47 N	354.92 E	-82.61	0.44
5748.00	12.00	24.83	5611.72	1006.25 N	363.06 E	-85.79	0.27
5843.00	12.16	20.35	5704.61	1024.59 N	370.69 E	-88.33	1.00
5929.00	11.85	20.08	5788.73	1041.37 N	376.87 E	-89.88	0.36
6026.00	10.43	20.78	5882.89	1058.04 N	383.44 E	-91.57	1.47

6026.00	10.43	20.78	5883.90	1058.94 N	383.41 E	-91.37	1.47
6073.00	10.87	1.97	5930.11	1067.35 N	385.07 E	-90.96	7.42
6121.00	13.99	339.95	5977.00	1077.33 N	383.24 E	-86.57	11.71
6168.00	15.44	330.97	6022.46	1088.14 N	378.25 E	-78.92	5.74
6216.00	16.77	320.81	6068.59	1099.10 N	370.77 E	-68.82	6.48
6263.00	17.87	311.20	6113.47	1109.10 N	361.06 E	-56.82	6.51
6311.00	19.40	304.95	6158.96	1118.52 N	348.99 E	-42.70	5.24
6358.00	21.62	296.42	6202.98	1126.85 N	334.83 E	-26.85	7.92
6406.00	25.58	287.19	6246.97	1133.85 N	317.00 E	-7.80	11.26
6453.00	30.27	283.29	6288.49	1139.58 N	295.76 E	14.19	10.70
6500.00	36.17	281.68	6327.80	1145.12 N	270.63 E	39.90	12.69
6547.00	40.29	282.52	6364.71	1151.22 N	242.20 E	68.93	8.84
6596.00	44.81	284.41	6400.80	1158.96 N	209.99 E	102.04	9.57
6643.00	48.02	286.48	6433.20	1168.04 N	177.19 E	136.07	7.55
6691.00	51.19	285.32	6464.30	1178.04 N	142.03 E	172.62	6.87
6738.00	53.30	281.83	6493.08	1186.75 N	105.92 E	209.76	7.38
6786.00	54.34	277.11	6521.43	1193.11 N	67.72 E	248.28	8.23
6833.00	56.59	274.60	6548.07	1197.05 N	29.21 E	286.48	6.50
6880.00	61.50	273.35	6572.24	1199.83 N	10.99 W	325.99	10.69
6927.00	66.78	270.32	6592.74	1201.16 N	53.24 W	367.10	12.64
6975.00	72.95	267.47	6609.26	1200.27 N	98.27 W	410.32	14.01
7022.00	79.21	265.52	6620.56	1197.47 N	143.78 W	453.49	13.91
7071.00	84.68	265.58	6627.42	1193.71 N	192.13 W	499.15	11.16
7147.00	87.56	270.05	6632.56	1190.82 N	267.87 W	571.47	6.99
7242.00	88.55	269.02	6635.79	1190.05 N	362.81 W	662.87	1.51
7337.00	88.03	268.71	6638.62	1188.17 N	457.75 W	753.98	0.64
7432.00	90.22	272.77	6640.08	1189.39 N	552.70 W	845.91	4.85
7527.00	89.35	272.36	6640.44	1193.64 N	647.61 W	938.60	1.01
7622.00	87.62	268.96	6642.94	1194.73 N	742.55 W	1030.49	4.01
7717.00	88.89	269.37	6645.83	1193.35 N	837.50 W	1121.73	1.40
7811.00	90.77	269.93	6646.11	1192.77 N	931.49 W	1212.27	2.09
7906.00	91.45	269.67	6644.27	1192.44 N	1026.47 W	1303.82	0.76
8001.00	90.77	270.03	6642.43	1192.19 N	1121.45 W	1395.39	0.81
8096.00	89.78	269.95	6641.97	1192.17 N	1216.45 W	1487.05	1.04
8191.00	88.73	269.65	6643.20	1191.83 N	1311.44 W	1578.61	1.15
8286.00	90.43	269.92	6643.89	1191.48 N	1406.43 W	1670.17	1.81
8380.00	89.11	268.58	6644.27	1190.25 N	1500.42 W	1760.52	2.01
8475.00	87.94	268.51	6646.72	1187.83 N	1595.35 W	1851.49	1.23
8570.00	88.61	269.31	6649.58	1186.03 N	1690.29 W	1942.61	1.11
8665.00	89.75	270.48	6650.93	1185.86 N	1785.28 W	2034.22	1.72
8759.00	90.15	271.32	6651.01	1187.34 N	1879.27 W	2125.29	0.98
8854.00	90.34	272.22	6650.60	1190.27 N	1974.22 W	2217.67	0.97
8949.00	90.22	269.74	6650.14	1191.90 N	2069.20 W	2309.74	2.61
9044.00	90.62	267.65	6649.45	1189.74 N	2164.17 W	2400.80	2.24
9139.00	91.39	267.99	6647.79	1186.13 N	2259.08 W	2491.43	0.88
9234.00	90.52	269.28	6646.21	1183.87 N	2354.04 W	2582.45	1.63
9329.00	89.69	267.70	6646.03	1181.36 N	2449.00 W	2673.41	1.88
9424.00	90.71	268.15	6645.70	1177.92 N	2543.94 W	2764.11	1.17
9518.00	89.69	269.05	6645.37	1175.62 N	2637.91 W	2854.17	1.44
9613.00	88.73	268.01	6646.67	1173.19 N	2732.86 W	2945.14	1.48
9708.00	89.51	268.40	6648.13	1170.22 N	2827.80 W	3035.97	0.91
9803.00	90.56	268.27	6648.08	1167.46 N	2922.76 W	3126.86	1.11
9898.00	91.63	269.03	6646.27	1165.23 N	3017.72 W	3217.89	1.39
9993.00	89.57	268.27	6645.27	1162.99 N	3112.68 W	3308.92	2.32
10087.00	88.95	268.85	6646.48	1160.63 N	3206.64 W	3398.96	0.90
10182.00	89.66	269.82	6647.63	1159.53 N	3301.63 W	3490.32	1.26
10277.00	88.30	270.84	6649.32	1160.08 N	3396.61 W	3582.10	1.79
10373.00	89.11	271.41	6651.49	1161.96 N	3492.56 W	3675.18	1.02
10468.00	88.30	269.72	6653.64	1162.89 N	3587.53 W	3767.05	1.97
10563.00	88.98	268.89	6655.89	1161.73 N	3682.49 W	3858.37	1.12
10657.00	89.88	269.58	6656.82	1160.48 N	3776.48 W	3948.72	1.20
10753.00	89.29	267.50	6657.52	1158.04 N	3872.44 W	4040.66	2.25
10847.00	90.12	267.26	6658.00	1153.74 N	3966.34 W	4130.13	0.92
10942.00	91.20	267.49	6656.90	1149.39 N	4061.23 W	4220.54	1.16
11018.00	91.08	268.06	6655.39	1146.43 N	4137.16 W	4293.02	0.77
11080.00	91.08	268.06	6654.22	1144.33 N	4199.11 W	4352.25	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 285.24 DEGREES (GRID)
A TOTAL CORRECTION OF 7.68 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11080.00 FEET
IS 4352.25 FEET ALONG 285.24 DEGREES (GRID)

Tie-In @ Surface

Surveys at 250 ft, 500 ft, 750 ft, and 950 were taken and provided by HP 322 while they were drilling the surface hole and have been covered from magnetic north to grid north.

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