



1 : 600 / 1 : 240

Country : USA							
Field : Wattenberg							
Location : Lat: 40° 29' 10.39" North Long: 104° 28' 7.72" West							
Well : Colt A13-652							
Company : Noble Energy							
Rig : H&P 321							
LOCATION		Company : Noble Energy Rig : H&P 321 Well : Colt A13-652 Field : Wattenberg Country : USA API Number : 05-123-40928					
Latitude : 40° 29' 10.39" North Longitude : 104° 28' 7.72" West UTM Easting = 3,286,825.059 ft UTM Northing = 1,421,637.919 ft		Other Services Directional Drilling					
Permanent Datum : Ground Level		Elev. KB N/A					
Log Measured From : Drill Floor		30.00 ft Above Permanent Datum DF 4694.00 ft GL 4664.00 ft WD N/A					
Drilling Measured From : Drill Floor		MD LOG					
Depth Logged : 940.00 ft To 16,440.00 ft		Unit No. : 11210424					
Date Logged : 26-Mar-15 To 04-Apr-15		Job No. : CA-XX-0902175510					
Total Depth MD : 16,440.00 ft TVD: 6,747.15 ft		Plot Type : Final					
Spud Date : 26-Mar-15		Plot Date : 04-Apr-15					
Run No.	Borehole Record (MD)		Casing Record (MD)				
	Size	From	To	Size	Weight	From	To
	100	8.750 in	940.00 ft	6.410.00 ft	9.625 in	34.90 lbpf	SURFACE 930.00 ft
	200	8.750 in	6.410.00 ft	6.610.00 ft	7.000 in	25.70 lbpf	SURFACE 7,050.00 ft
	300	8.750 in	6.610.00 ft	6.900.00 ft			
	400	8.750 in	6.900.00 ft	7.060.00 ft			
	500	6.125 in	7.060.00 ft	11,540.00 ft			
	600	6.125 in	11,540.00 ft	16,440.00 ft			

WELL INFORMATION

MWD Run Number	100	200	300	400	500
Date run completed	19-Mar-15	20-Mar-15	24-Mar-15	29-Mar-15	31-Mar-15
Rig Bit Number	2	3	4	5	6
Bit Size (in)	8.750	8.750	6.125	8.750	6.125
Tool Nominal OD (in)	6.790	6.790	4.780	6.790	4.750
Log Start Depth (MD, ft)	934.00	6,137.00	7,019.00	6,900.00	7,060.00
Log End Depth (MD, ft)	6,137.00	7,019.00	16,228.00	7,060.00	11,540.00
Drill or Wipe	Drill	Drill	Drill	Drill	Drill
Drill/Wipe Start Date and Time	18-Mar-15 17:58	20-Mar-15 01:06	21-Mar-15 17:24	29-Mar-15 13:06	30-Mar-15 16:13
Drill/Wipe End Date and Time	19-Mar-15 17:14	20-Mar-15 13:11	24-Mar-15 09:46	29-Mar-15 15:23	31-Mar-15 17:27
Min Inc (deg) @ Depth (MD, ft)	0.17 @ 957.00	15.64 @ 6,177.00	87.84 @ 11,998.00	86.95 @ 6,936.00	88.74 @ 10,613.00
Max Inc (deg) @ Depth (MD, ft)	10.35 @ 3,810.00	83.05 @ 6,965.00	91.85 @ 13,232.00	91.00 @ 7,060.00	92.00 @ 8,066.00
Bit TFA(in2) / Bit Type	1.37 / PDC	1.37 / PDC	0.98 / PDC	1.49 / PDC	0.98 / PDC
Flow Rate (gpm)	586.74	550.10	315.00	570.00	313.29
Max AV (fpm) / CV (fpm) @ MWD	349.4 / N/A	358.8 / N/A	515.8 / N/A	N/A / N/A	467.5 / 400.0
Fluid Type	Native/Spud Mud	Native/Spud Mud	Native/Spud Mud	Fresh Water Gel	Fresh Water Gel
Density (ppg) / Viscosity (spqt)	9.10 / 37.00	10.50 / 42.00	9.20 / 35.00	10.65 / 38.00	9.18 / 36.00
Filtrate CL (ppm)	1,600.00	1,800.00	1,600.00	1,700.00	1,600.00
pH / Fluid Loss (mptm)	9.30 / 8	9.80 / 7	8.20 / 8	9.30 / 6	9.70 / 9
PV (cP) / YP (lhf2)	10 / 8.00	14 / 14.00	6 / 12.00	11 / 12.00	8 / 8.00
% Solids / % Sand	4.20 / 0.25	11.20 / 0.20	5.60 / 0.15	10.80 / 0.15	6.20 / 0.10
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	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	N/A @ N/A	N/A @ N/A
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A
MWD Tool Joint Length	11.25 / PDC	10.75 / PDC	11.25 / PDC	11.25 / PDC	11.25 / PDC

Max Tool Temp (degF) / Source	145.90 / PCM	167.00 / PCM	242.90 / PCM	160.83 / PCM	234.12 / PCM
Rm @ Max Tool Temp (degF)	N/A @ 145.90	N/A @ 167.00	N/A @ 242.90	N/A @ 160.83	N/A @ 234.12
Lead MWD Engineer	Robert Barnes	Robert Barnes	Robert Barnes	Robert Barnes	Brad West
Customer Representative	Jeremy Stolz	Jim Turner	Jim Turner	Jim Turner	Stetson Nielsen
SENSOR INFORMATION					
Downhole Processor Information					
Tool Type	PCM	PCM	PCM	PCM	PCM
Software Version	5.93	5.93	5.93	5.93	5.93
Sub Serial Number	11342274	11342274	11342274	11342274	11768602
Insert Serial Number	11680766	11680766	11680771	11680771	11680766
Date and Time Initialized	18-Mar-15 01:37	01-Jan-70 00:00	20-Mar-15 22:22	01-Jan-70 00:00	30-Mar-15 01:40
Date and Time Read	20-Mar-15 20:14	01-Jan-70 00:00	24-Mar-15 23:42	01-Jan-70 00:00	01-Apr-15 00:31
ECMB SW Version	N/A	N/A	N/A	N/A	N/A
Directional Sensor Information					
Tool Type	PCDC	PCDC	PCDC	PCDC	PCDC
Distance From Bit (ft)	55.00	54.00	67.00	54.00	68.00
Software Version	6.21	6.21	6.21	6.33	6.21
Sub Serial Number	11342274	11342274	12334786	11342274	11768602
Sonde Serial Number	11478053	11478053	11062073	11145627	11297516
Sensor ID Number	N/A	N/A	N/A	N/A	N/A
Toolface Offset (deg)	211.57	140.38	218.88	265.43	3.36
Gamma Ray Sensor Information					
Tool Type	PCG	PCG	PCG	PCG	PCG
Distance From Bit (ft)	47.64	46.81	69.75	46.57	71.00
Recorded Sample Period (sec)	10	10	10	10	10
Software Version	8.15	8.15	8.15	8.15	8.15
Sub Serial Number	11342274	11342274	12334786	11342274	11768602
Insert/Sonde Serial Number	11293345	11293345	11681081	11681081	11293345
WELL INFORMATION					
MWD Run Number	600				
Date run completed	04-Apr-15				
Rig Bit Number	7				
Bit Size (in)	6.125				
Tool Nominal OD (in)	4.750				
Log Start Depth (MD, ft)	11,540.00				
Log End Depth (MD, ft)	16,440.00				
Drill or Wipe	Drill				
Drill/Wipe Start Date and Time	01-Apr-15 07:40				
Drill/Wipe End Date and Time	03-Apr-15 15:04				
Min Inc (deg) @ Depth (MD, ft)	84.98 @ 14,934.00				
Max Inc (deg) @ Depth (MD, ft)	92.44 @ 13,322.00				
Bit TFA(in2) / Bit Type	0.98 / PDC				
Flow Rate (gpm)	313.04				
Max AV (fpm) / CV (fpm) @ MWD	485.2 / 400.0				
Fluid Type	Native/Spud Mud				
Density (ppg) / Viscosity (spqt)	9.30 / 35.00				
Filtrate CL (ppm)	2,000.00				
pH / Fluid Loss (mptm)	9.10 / 8				
PV (cP) / YP (lhf2)	6 / 7.00				
% Solids / % Sand	4.60 / 0.20				
% Oil / Oil:Water Ratio	N/A / N/A				

Rm @ Measured Temp (degF)	N/A @ N/A				
Rmf @ Measured Temp (degF)	N/A @ N/A				
Rmc @ Measured Temp (degF)	N/A @ N/A				
Max Tool Temp (degF) / Source	251.40 / PCM				
Rm @ Max Tool Temp (degF)	N/A @ 251.40				
Lead MWD Engineer	Brad West				
Customer Representative	Stetson Nielsen				

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM				
Software Version	5.93				
Sub Serial Number	11768602				
Insert Serial Number	10997267				
Date and Time Initialized	31-Mar-15 20:40				
Date and Time Read	04-Apr-15 09:42				
ECMB SW Version	N/A				

Directional Sensor Information

Tool Type	PCDC				
Distance From Bit (ft)	70.00				
Software Version	6.21				
Sub Serial Number	11768602				
Sonde Serial Number	11638501				
Sensor ID Number	N/A				
Toolface Offset (deg)	51.00				

Gamma Ray Sensor Information

Tool Type	PCG				
Distance From Bit (ft)	72.56				
Recorded Sample Period (sec)	10				
Software Version	8.15				
Sub Serial Number	11768602				
Insert/Sonde Serial Number	11681051				

REMARKS

1. All depths are calibrated to driller's pipe tally and are measured depth from the Drill Floor.
2. No depth corrections have been made for pipe stretch or compression.
3. Critical annular velocities are calculated using the "Power Law" model for water based fluids and the "Brigham Plastic" model for oil and synthetic based fluids.
4. All data presented is recorded data unless otherwise specified.
5. The following smoothing parameters have been applied to the data:

1: 600 Log
PGRC (Gamma CG) and ROPA (Average Rate of Penetration)
Interval Resolution: 1.0 ft
Interval Distance: 3.0 ft

1: 240 Log
PGRC (Gamma CG):

Interval Resolution: 0.5 ft
Interval Distance: 0.6 ft

ROPA (Average Rate Of Penetration):

Interval Resolution: 0.5 ft

Interval Distance: 1.2 ft

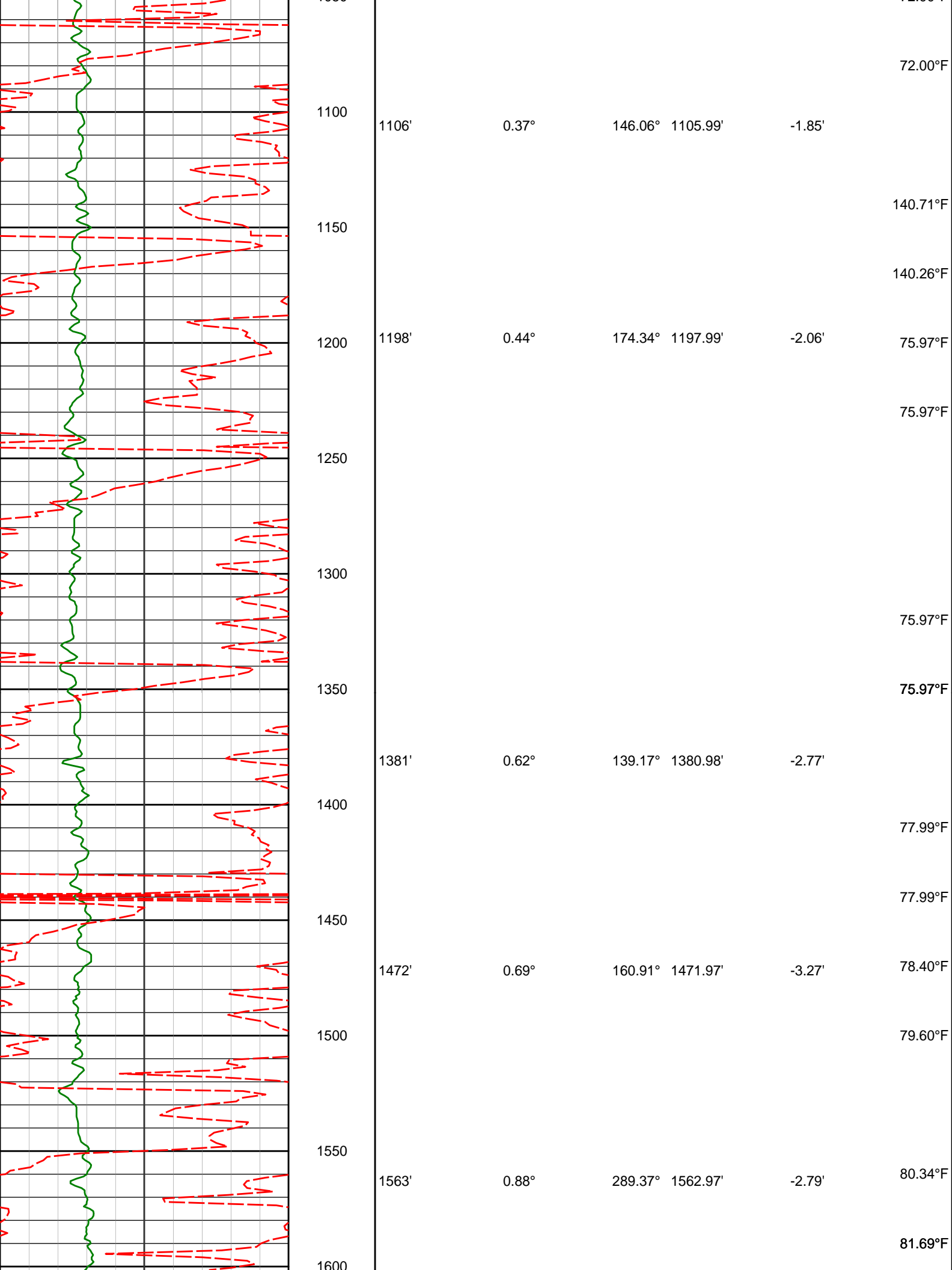
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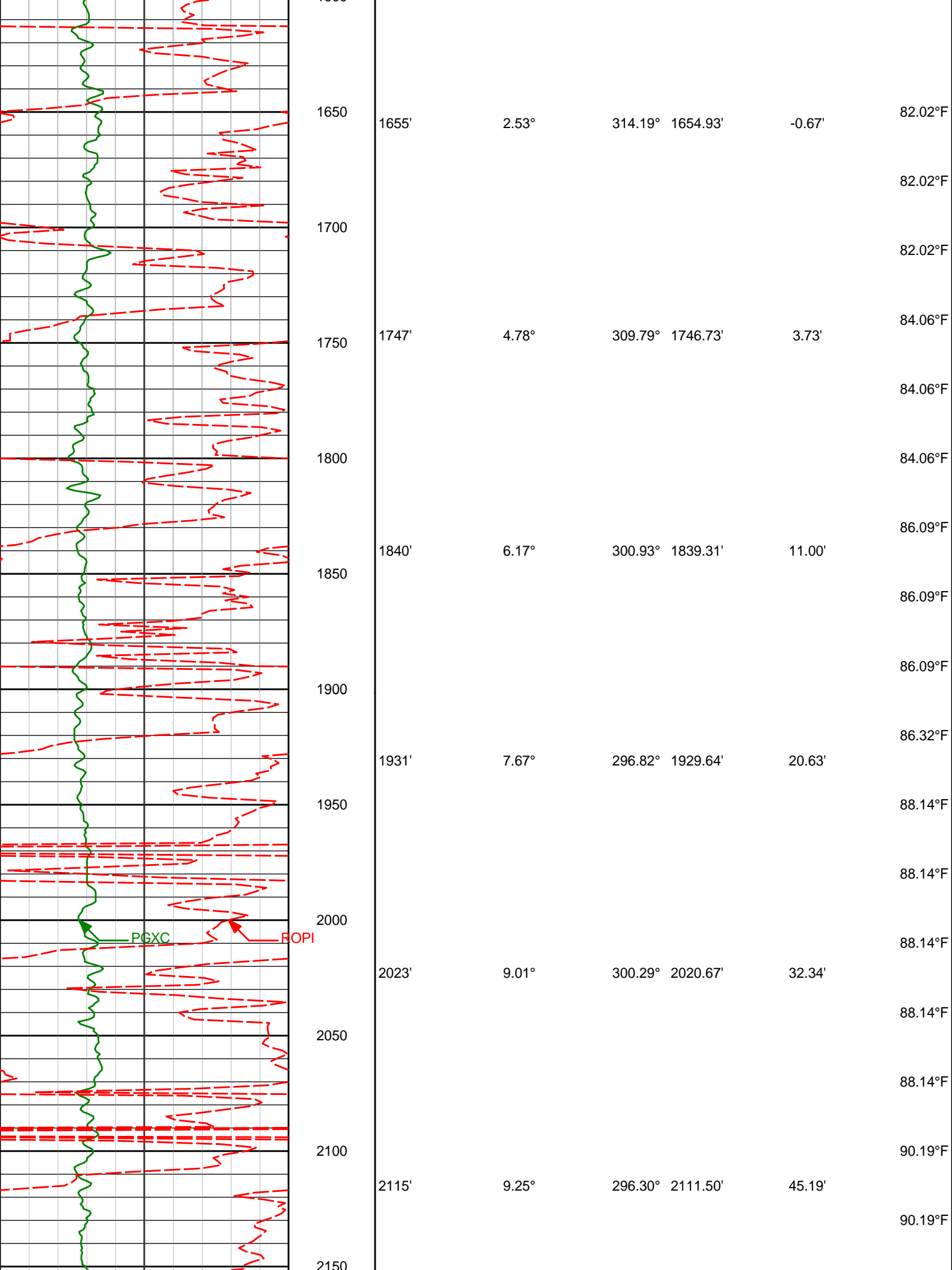
WARRANTY

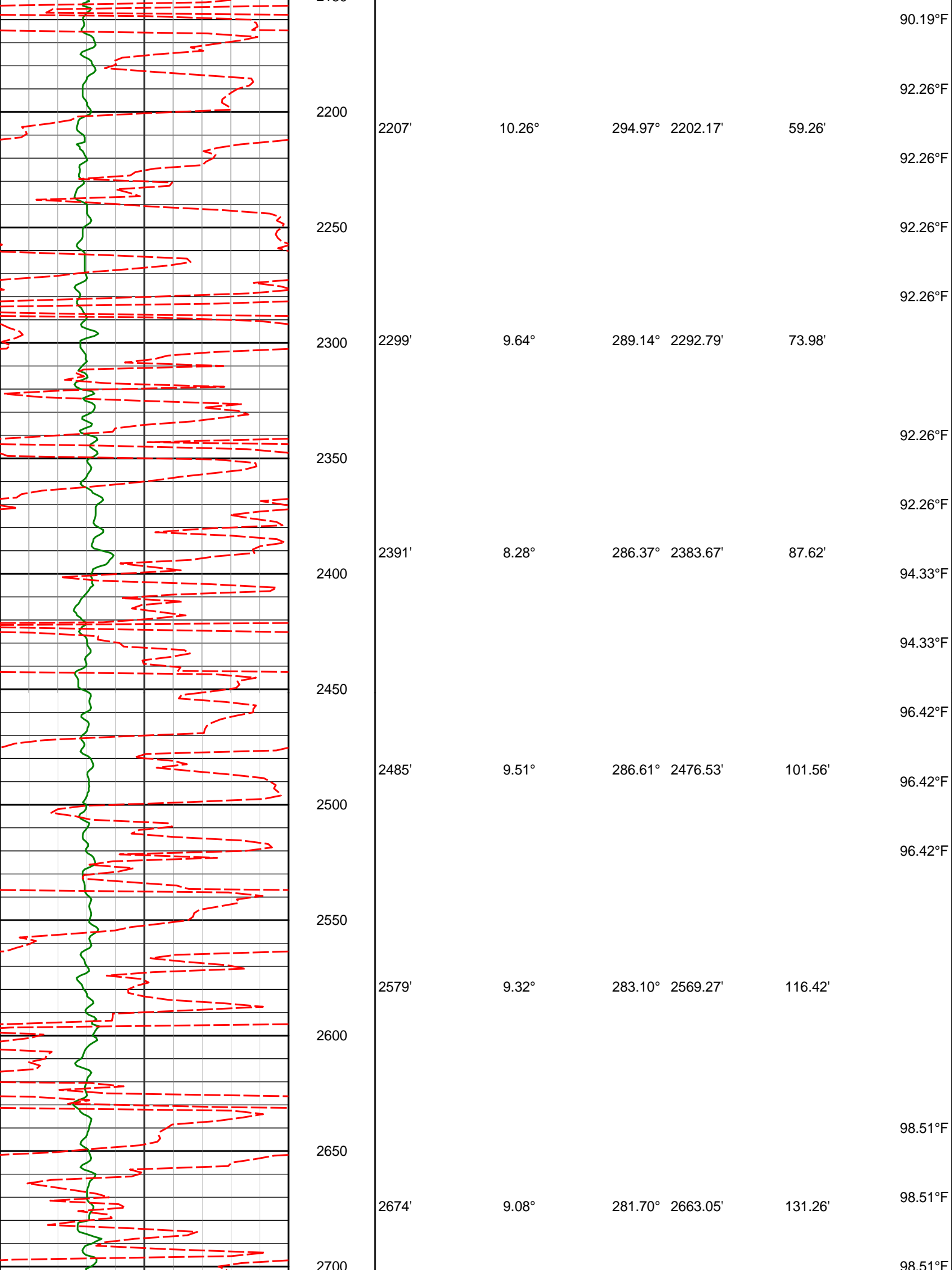
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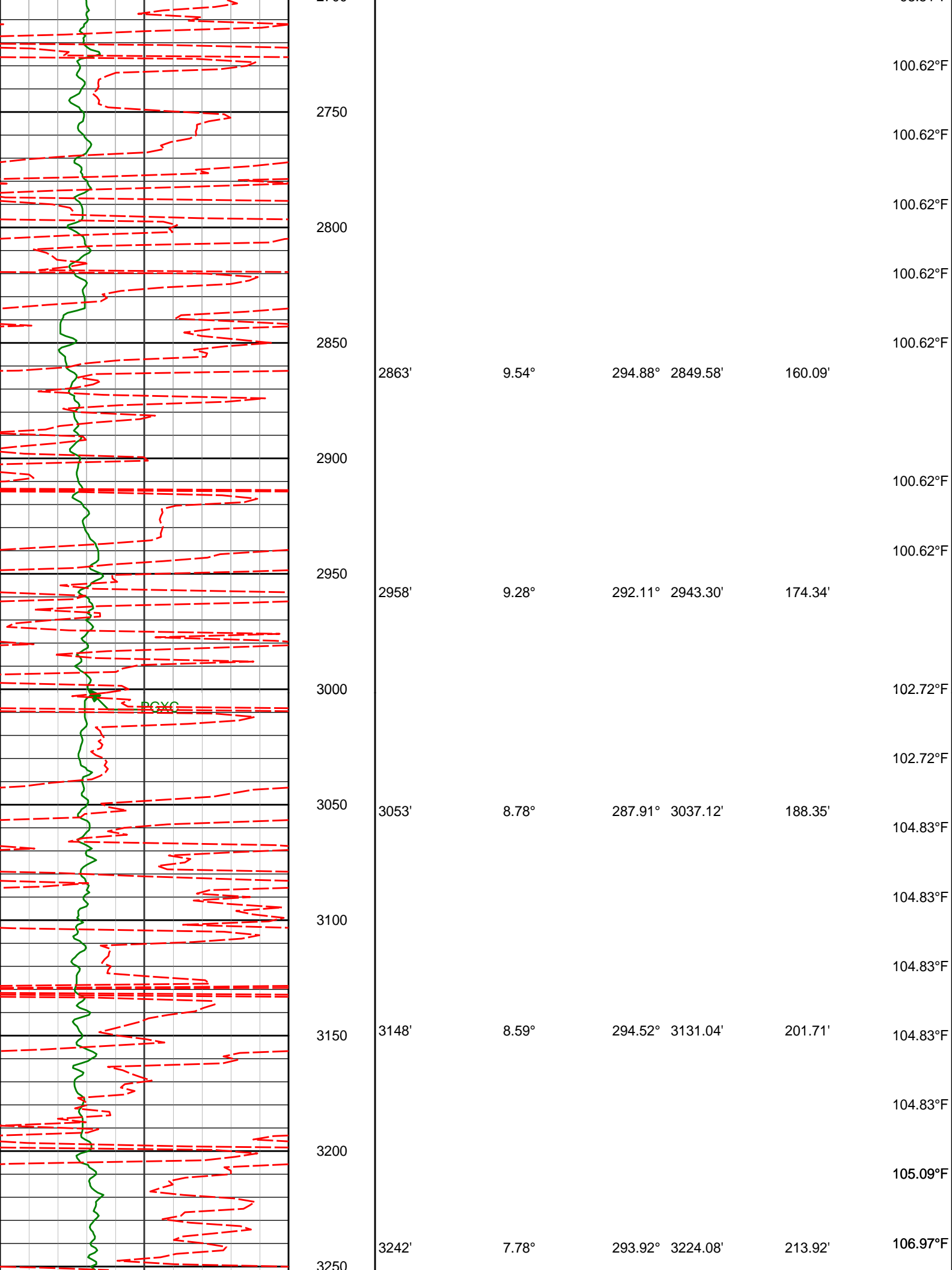
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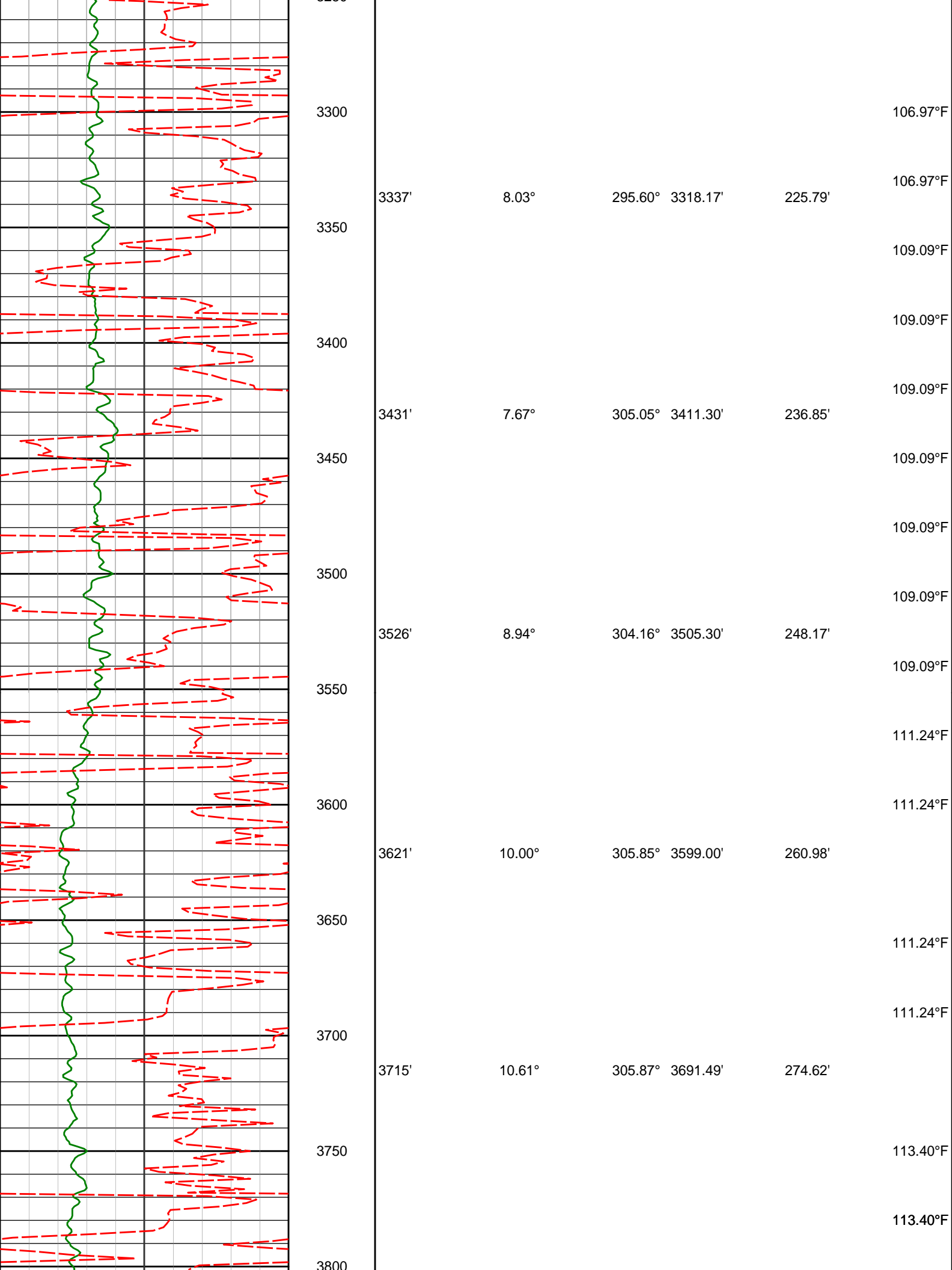
PCG GR XHi-Range RT BCor PGXRC-T api							
Inst Rate of Penetration ROPI feet per hr		Depth TVD ft	Inc	Azi	TVD	V.S.	Temp
		900 Run 100 950 1000 1050					70.02°F 70.02°F 70.02°F
		1014'	0.43°	156.23°	1013.99'	-1.55'	72.00°F

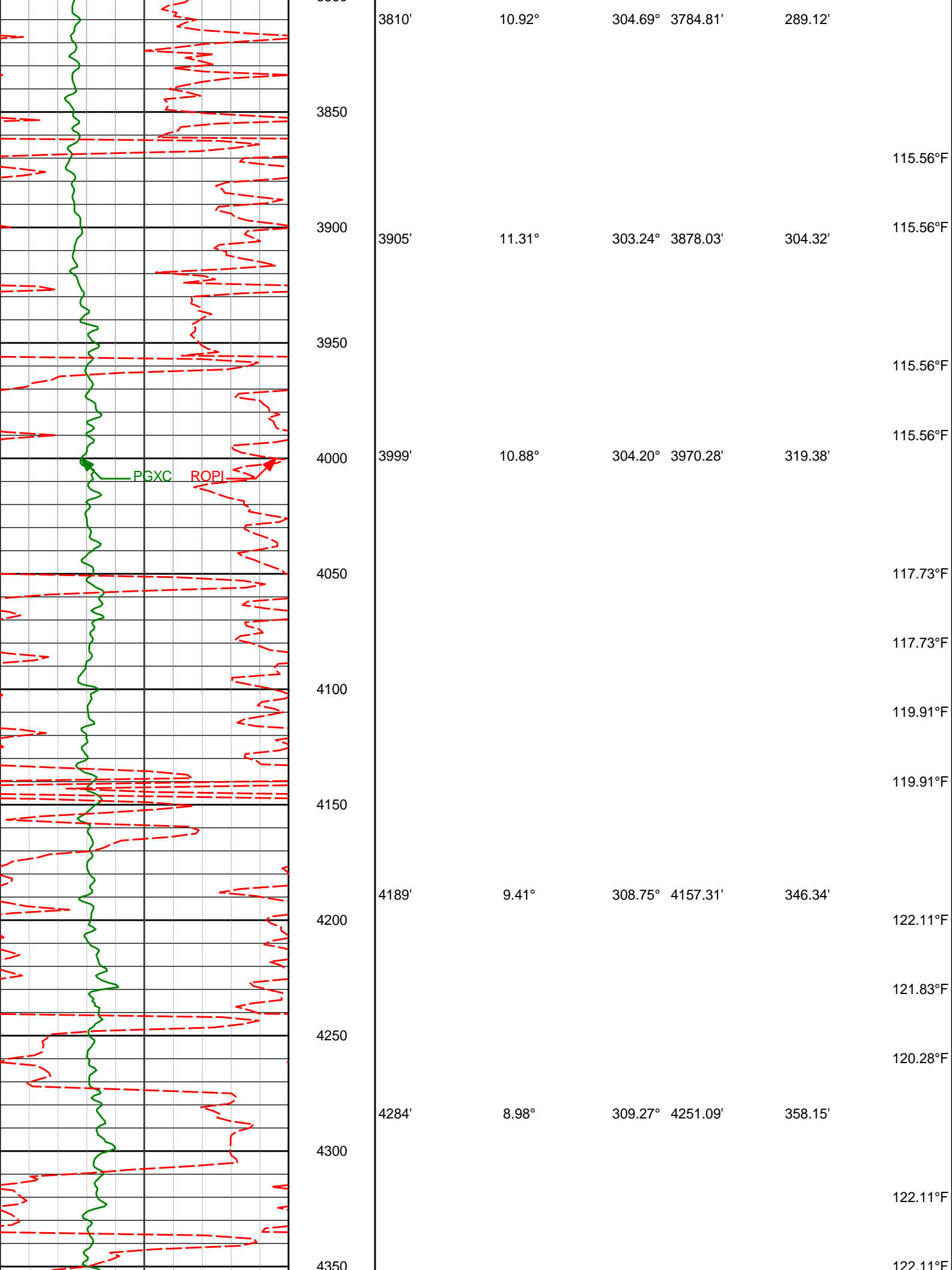


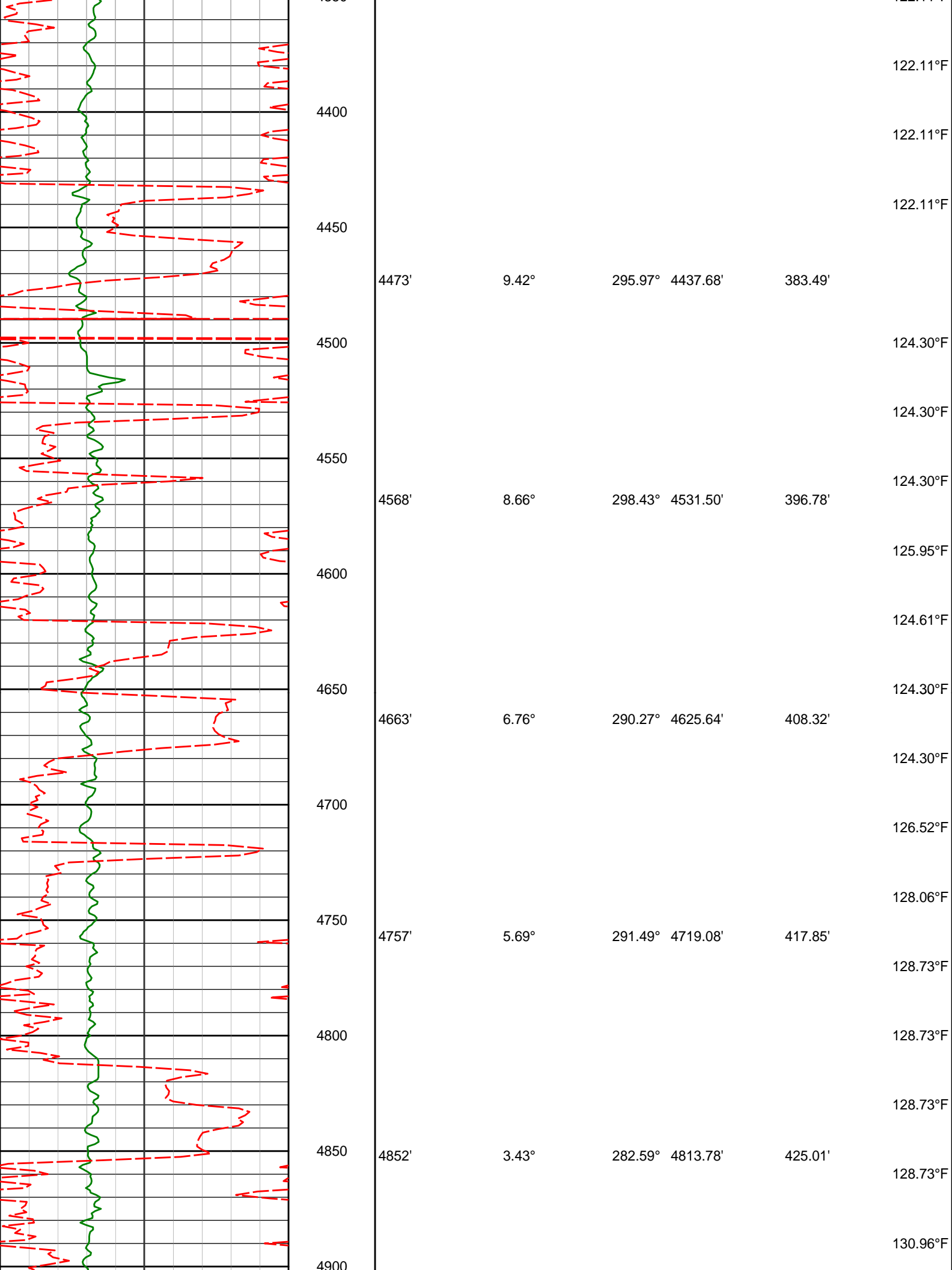


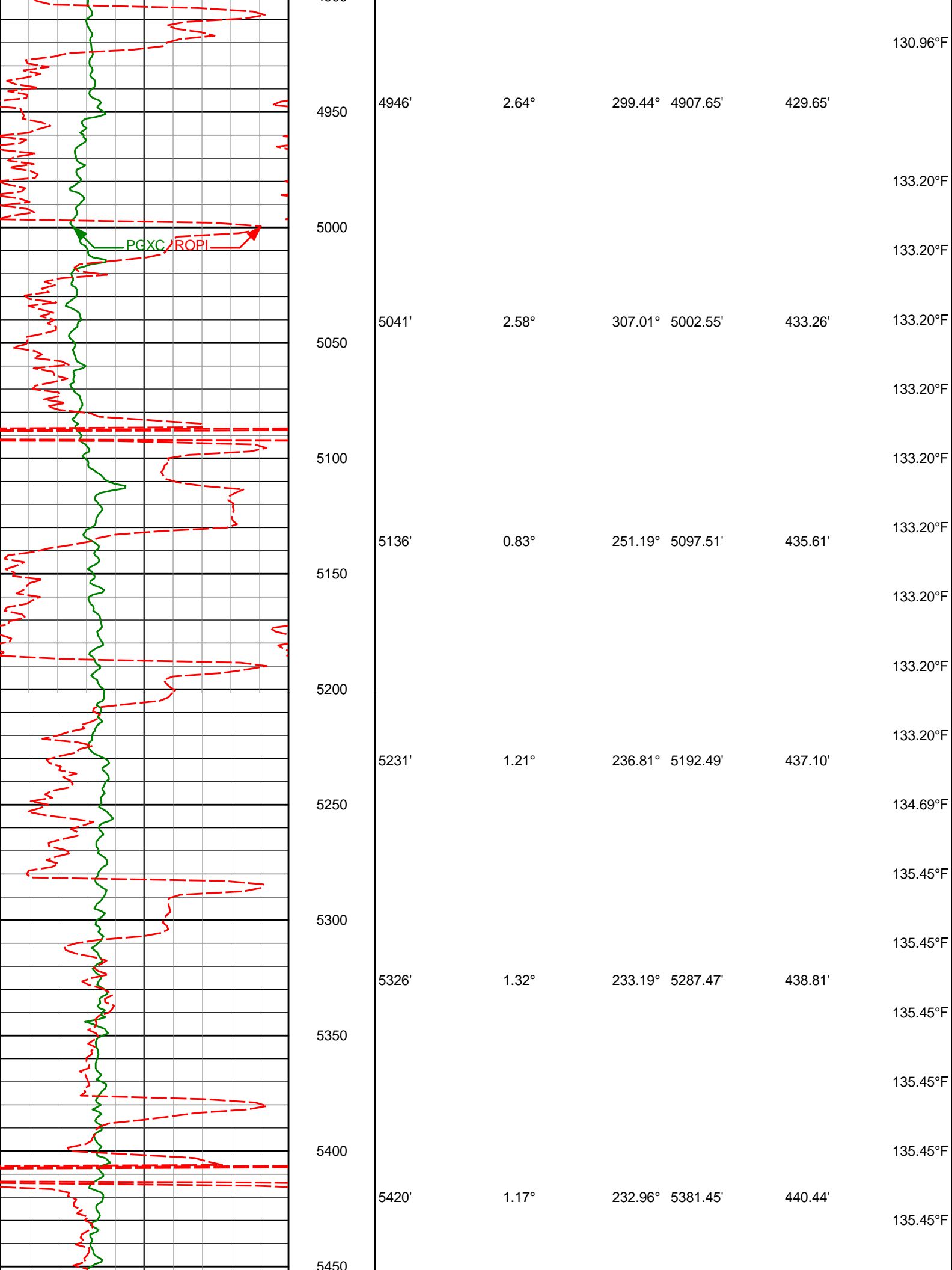


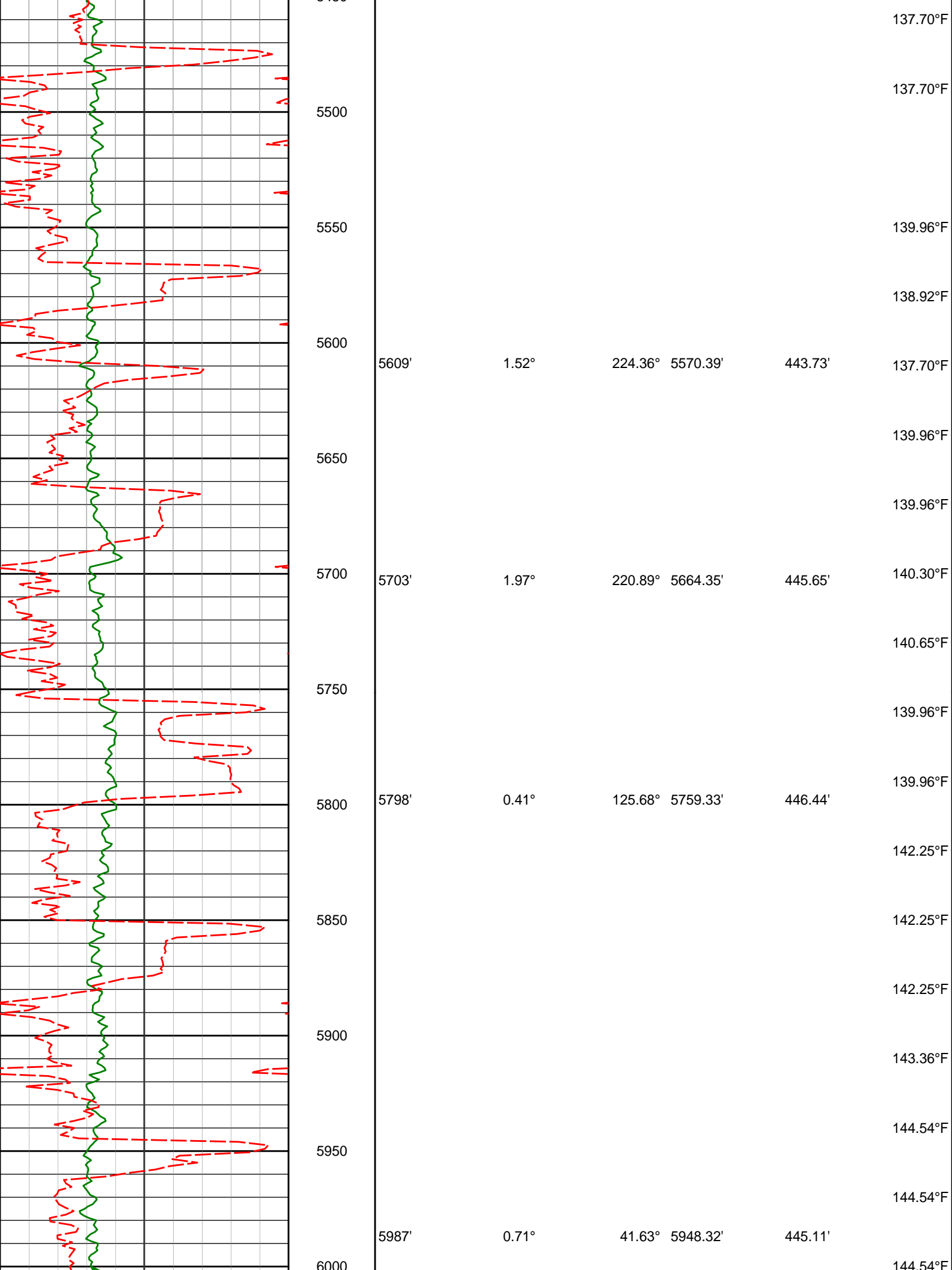


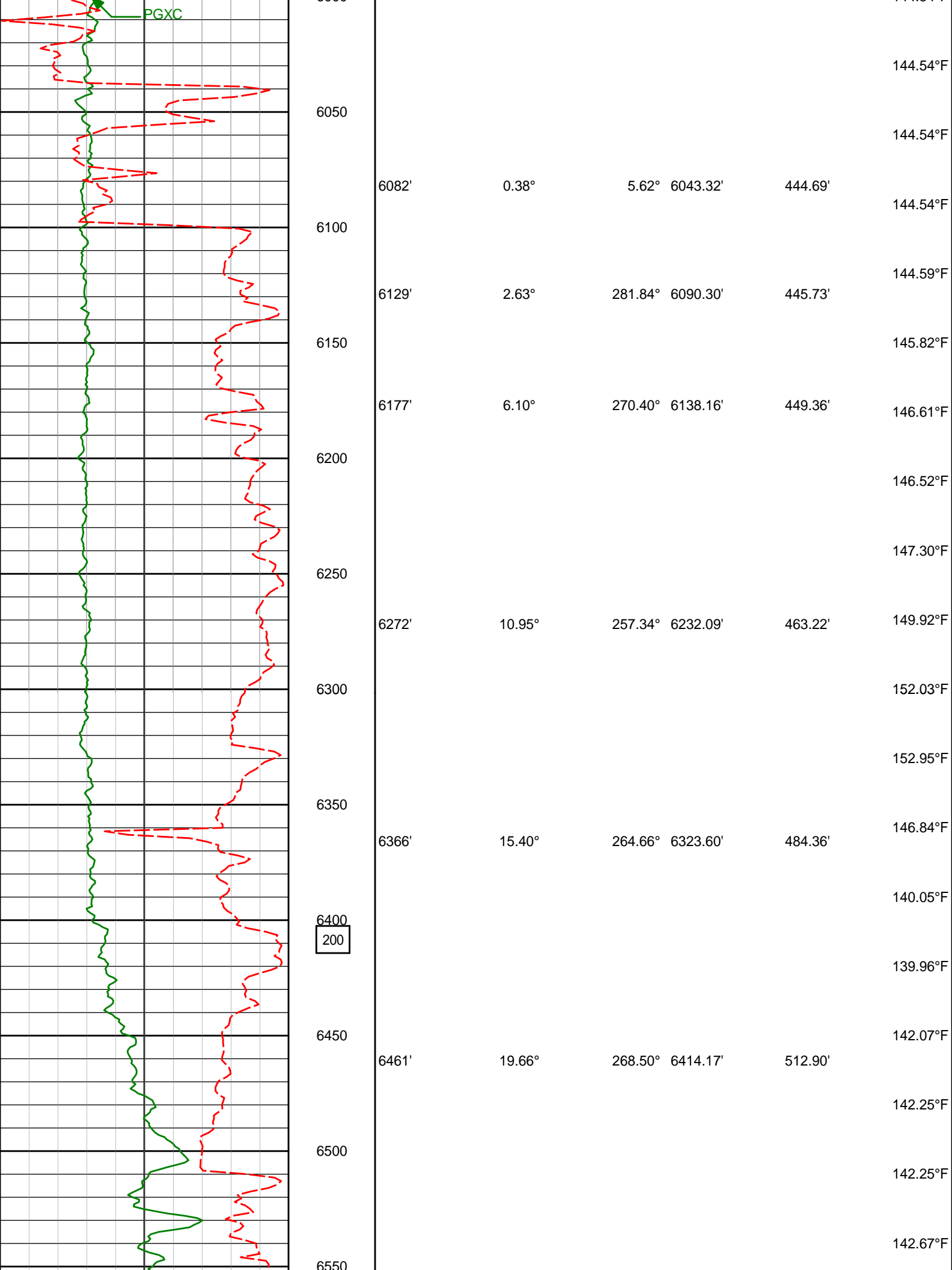


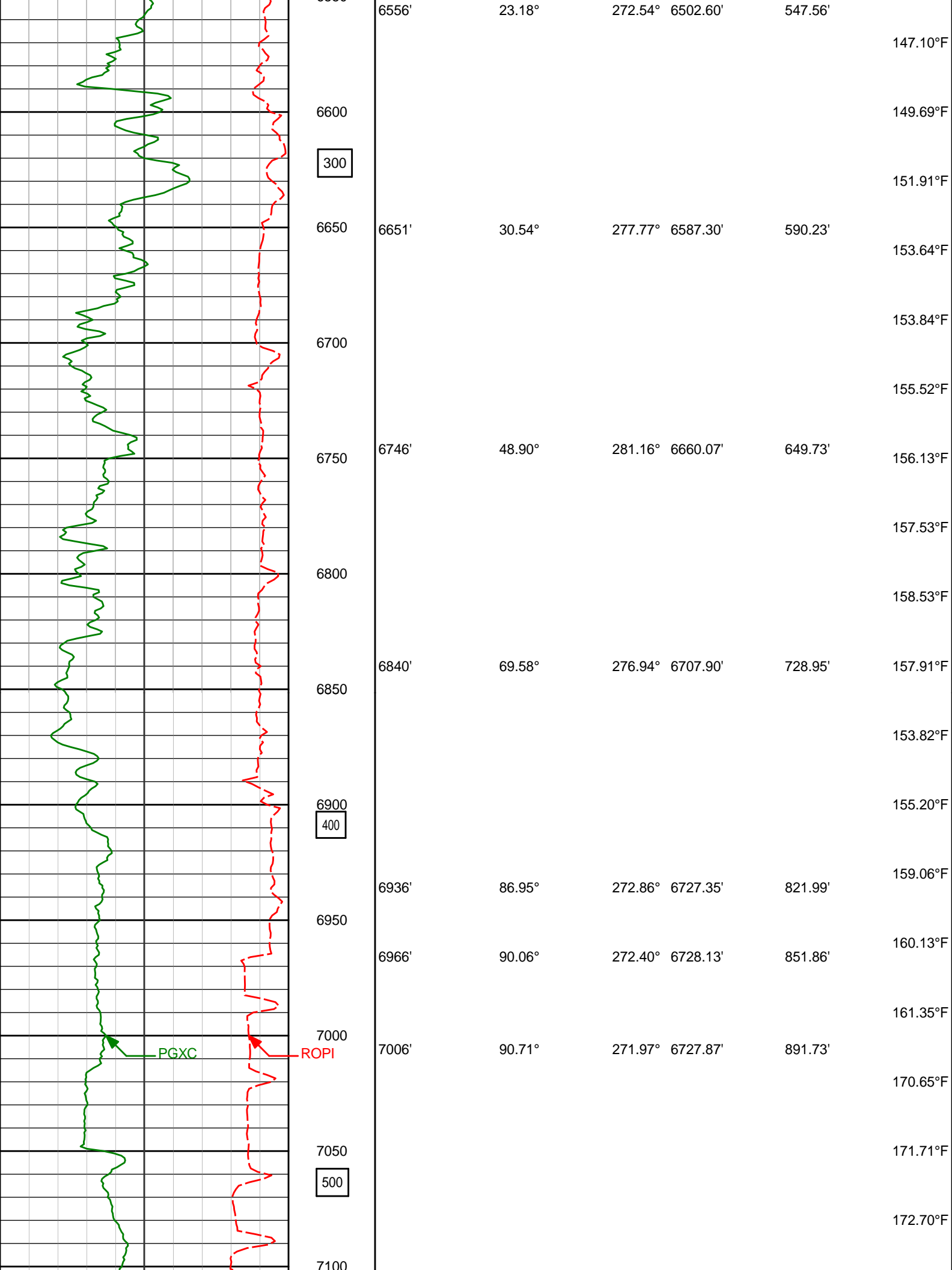


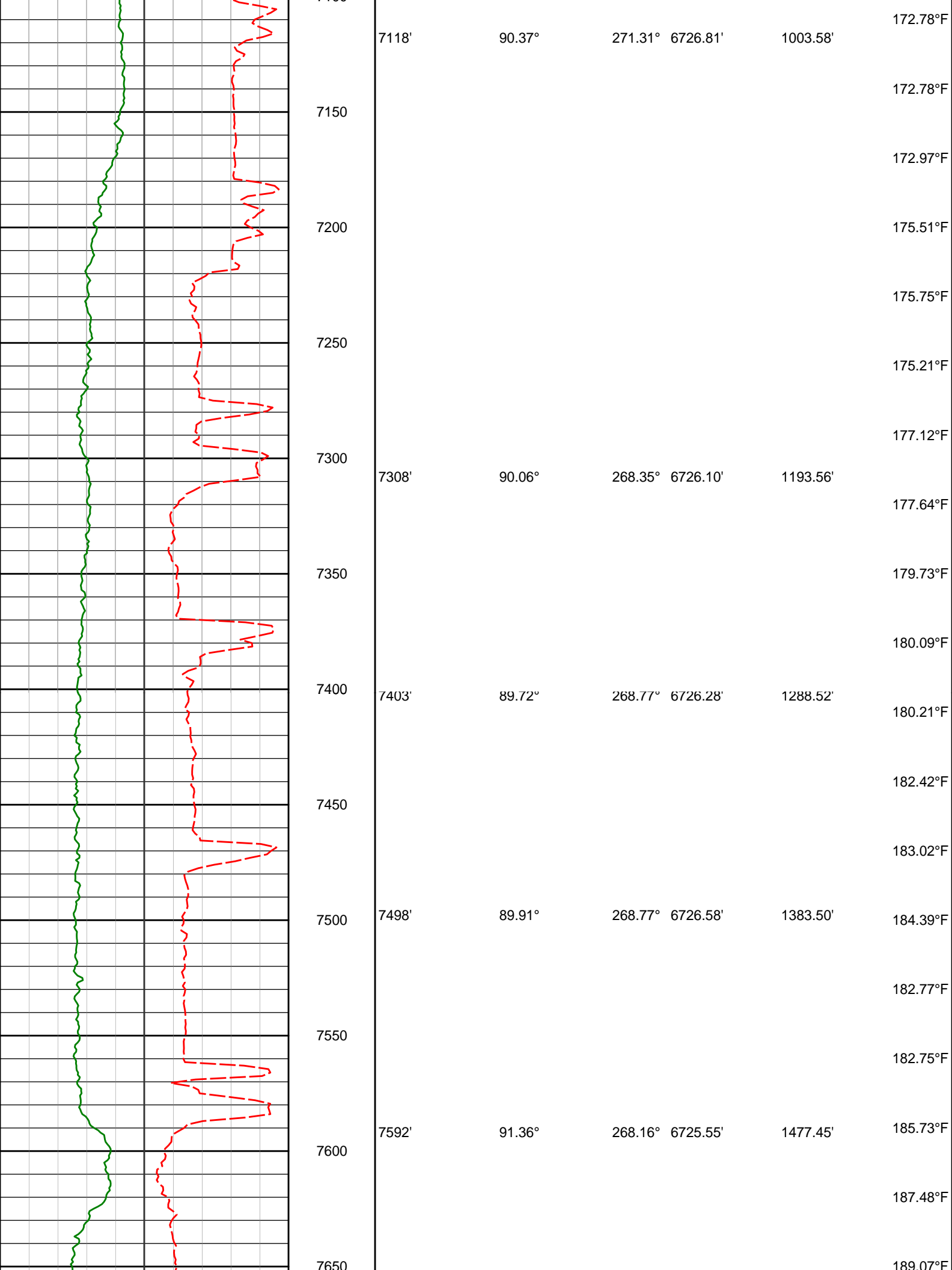


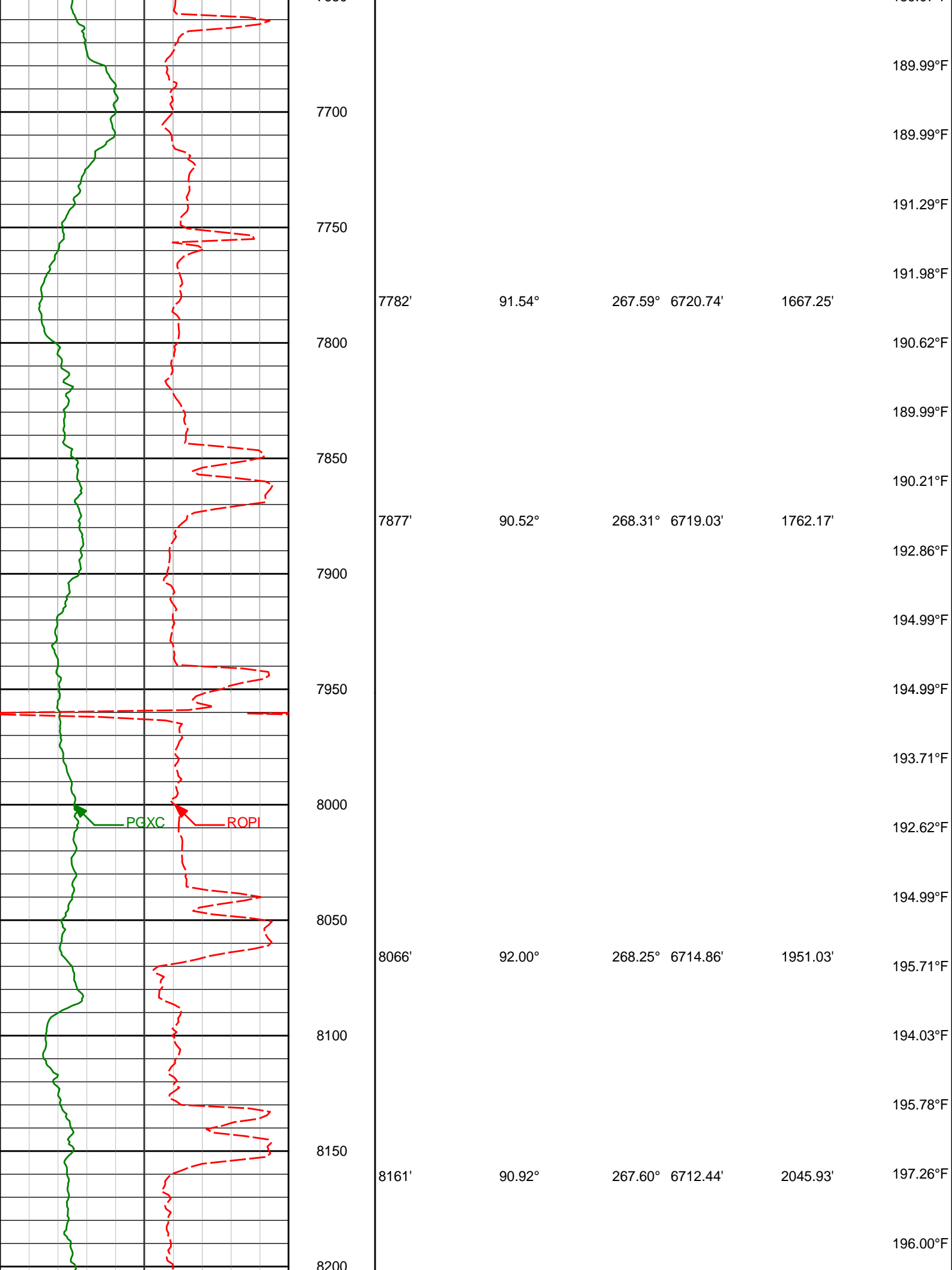


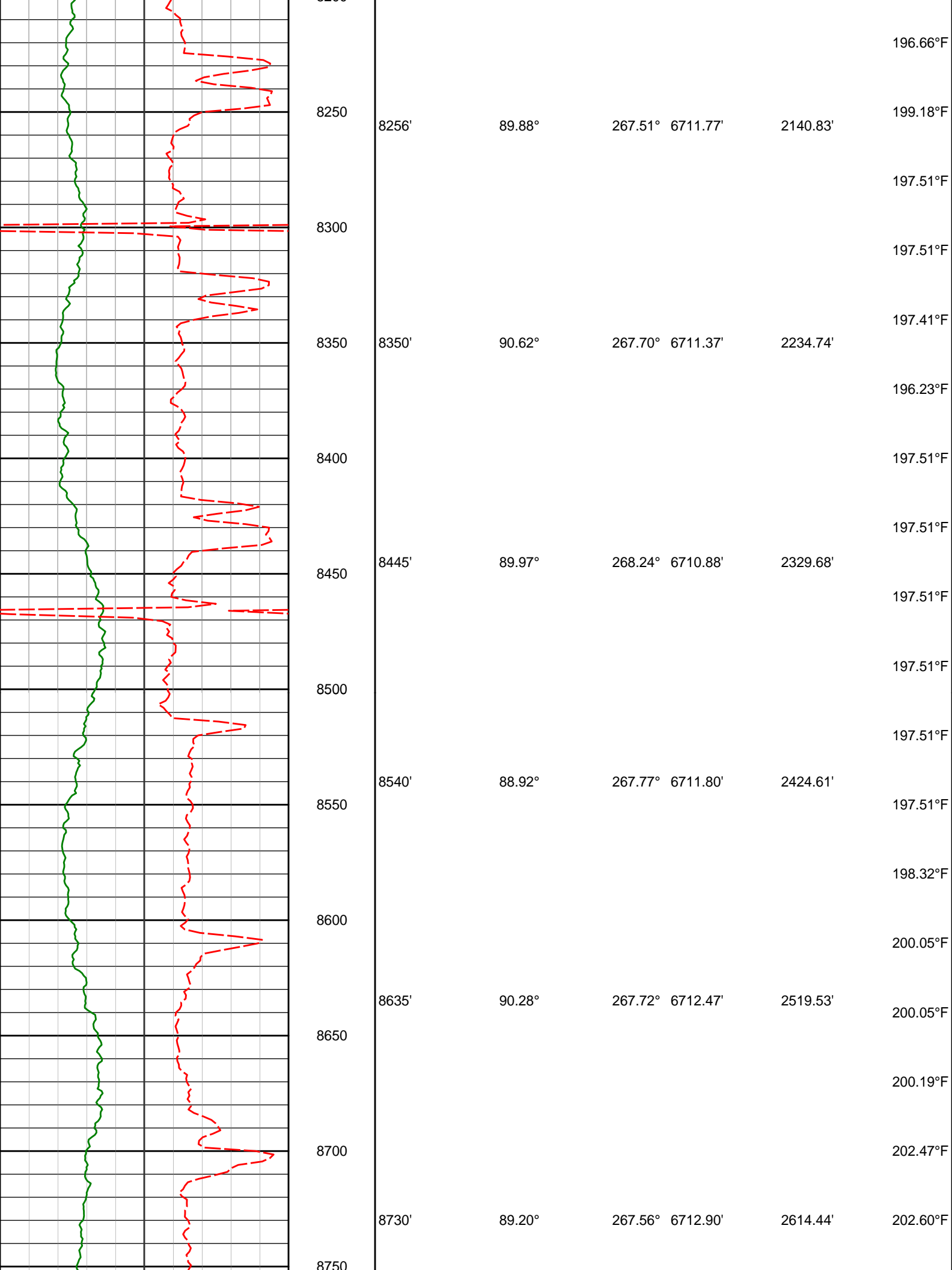


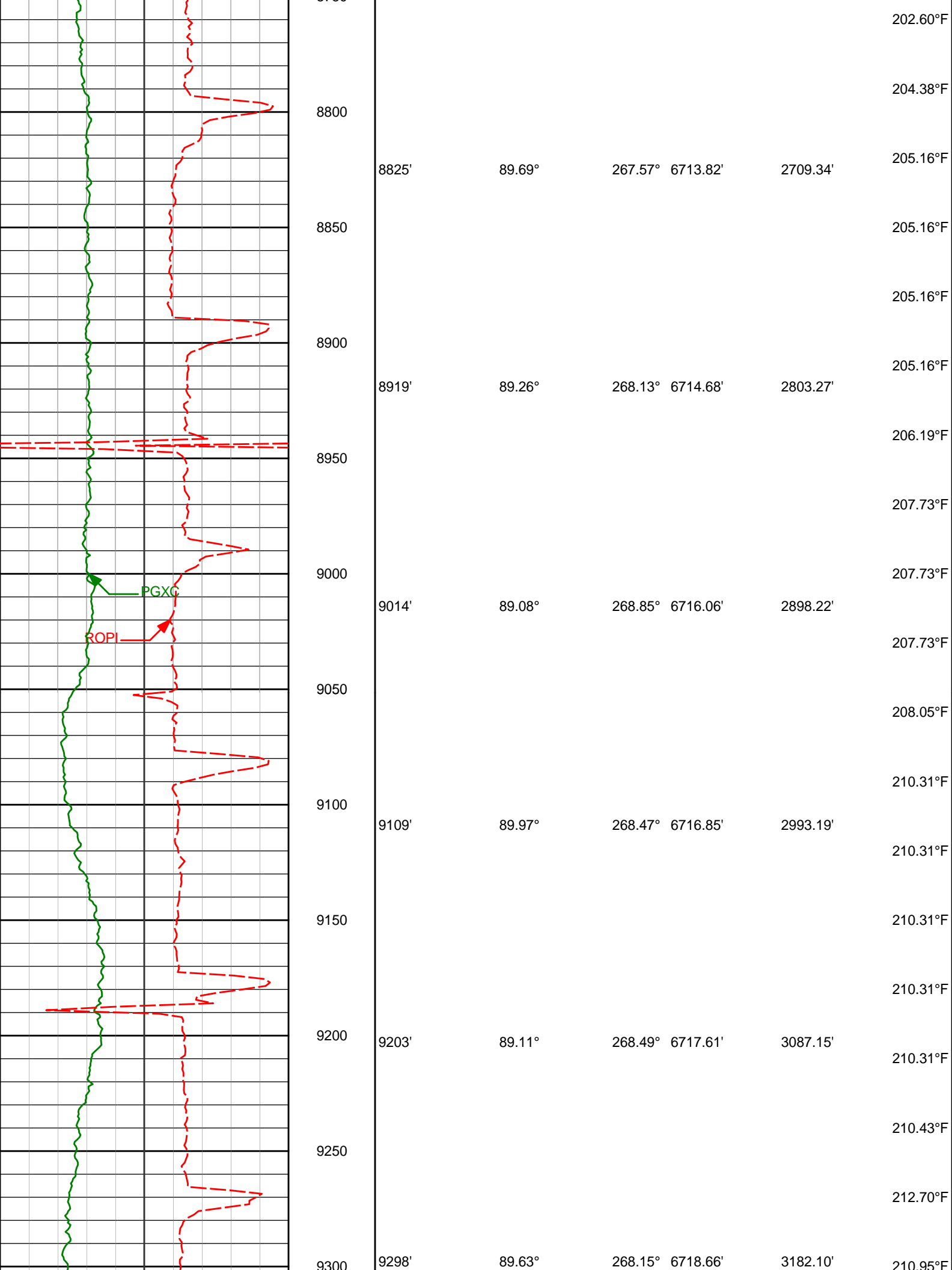


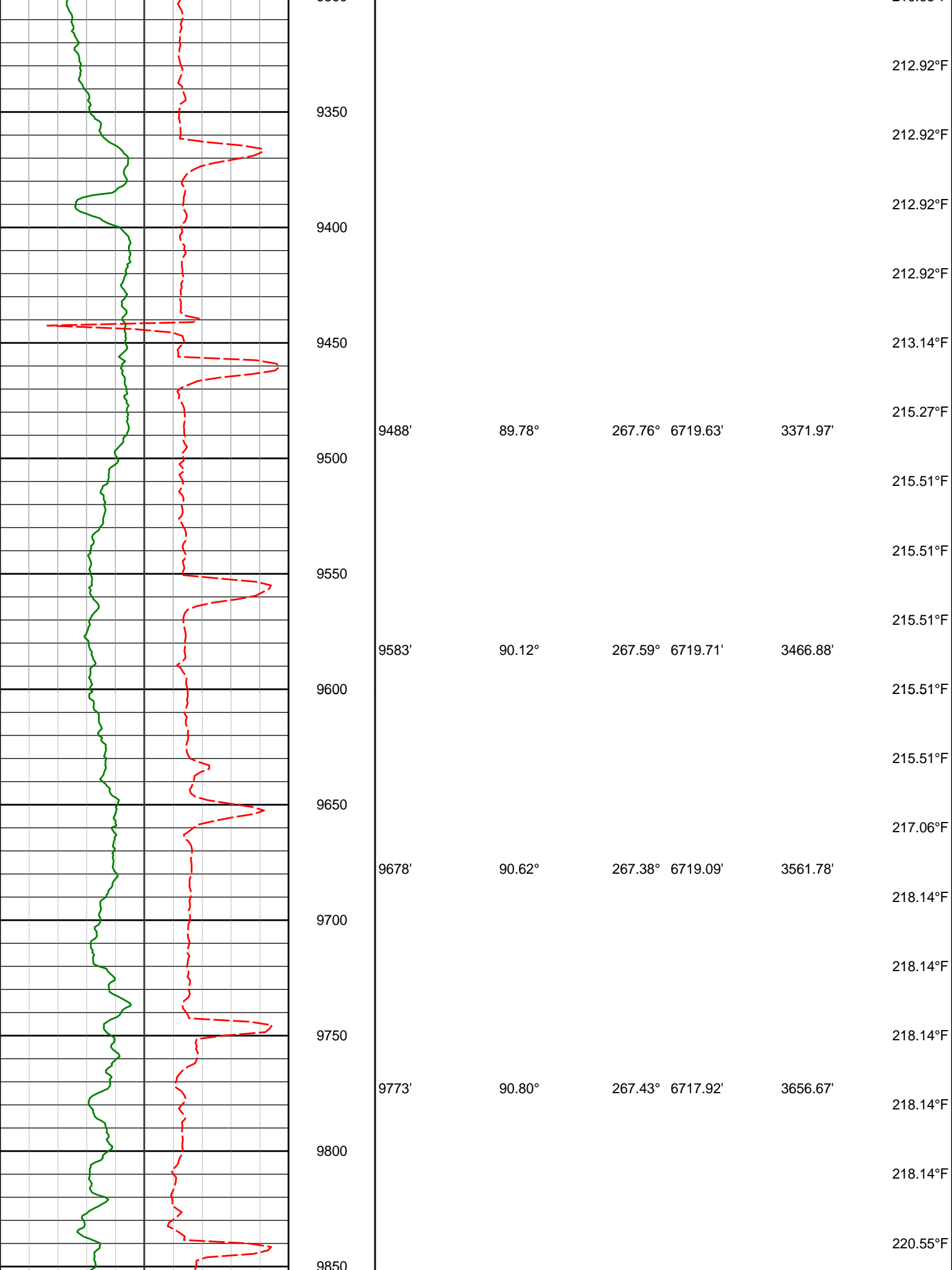


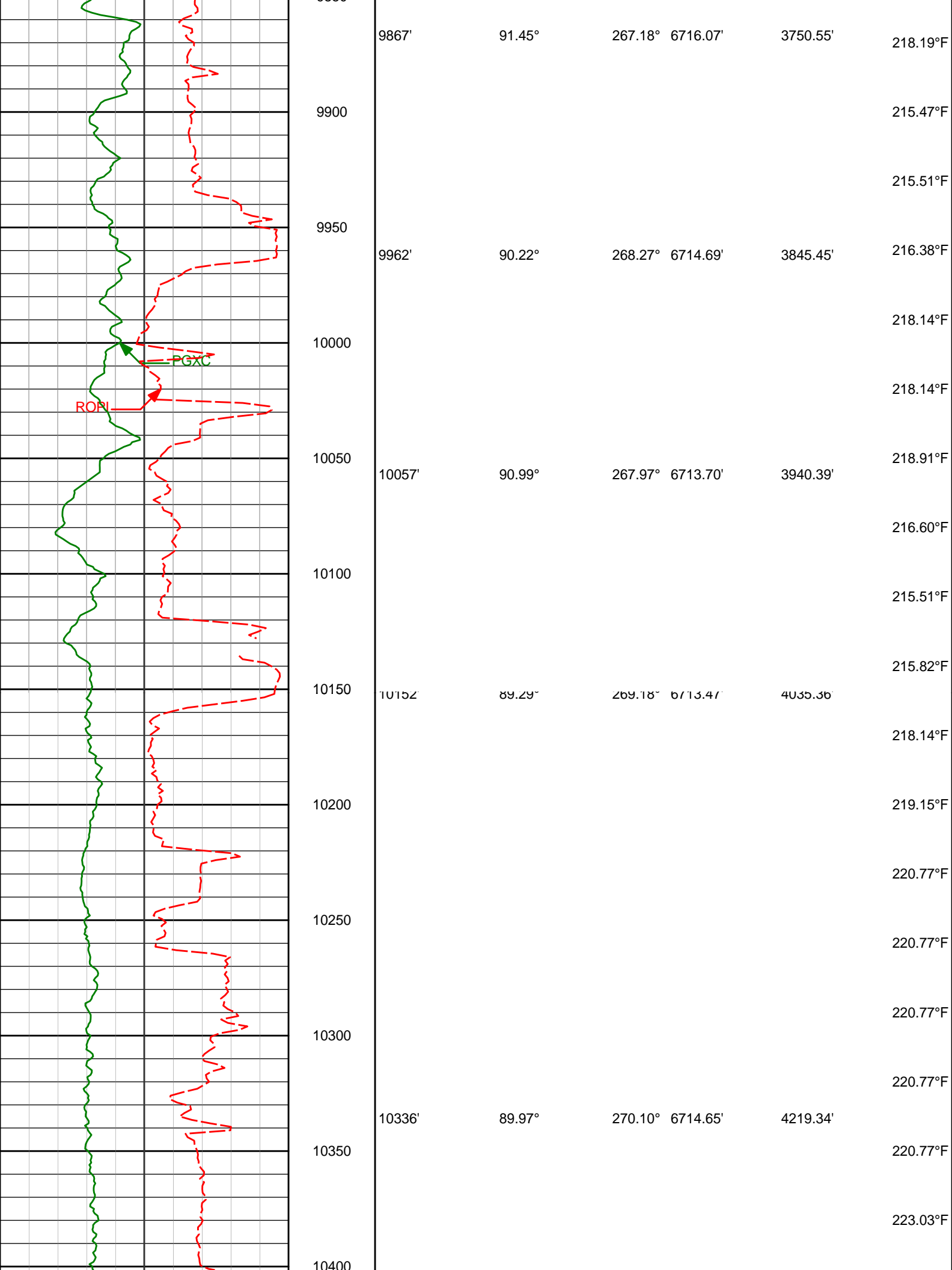


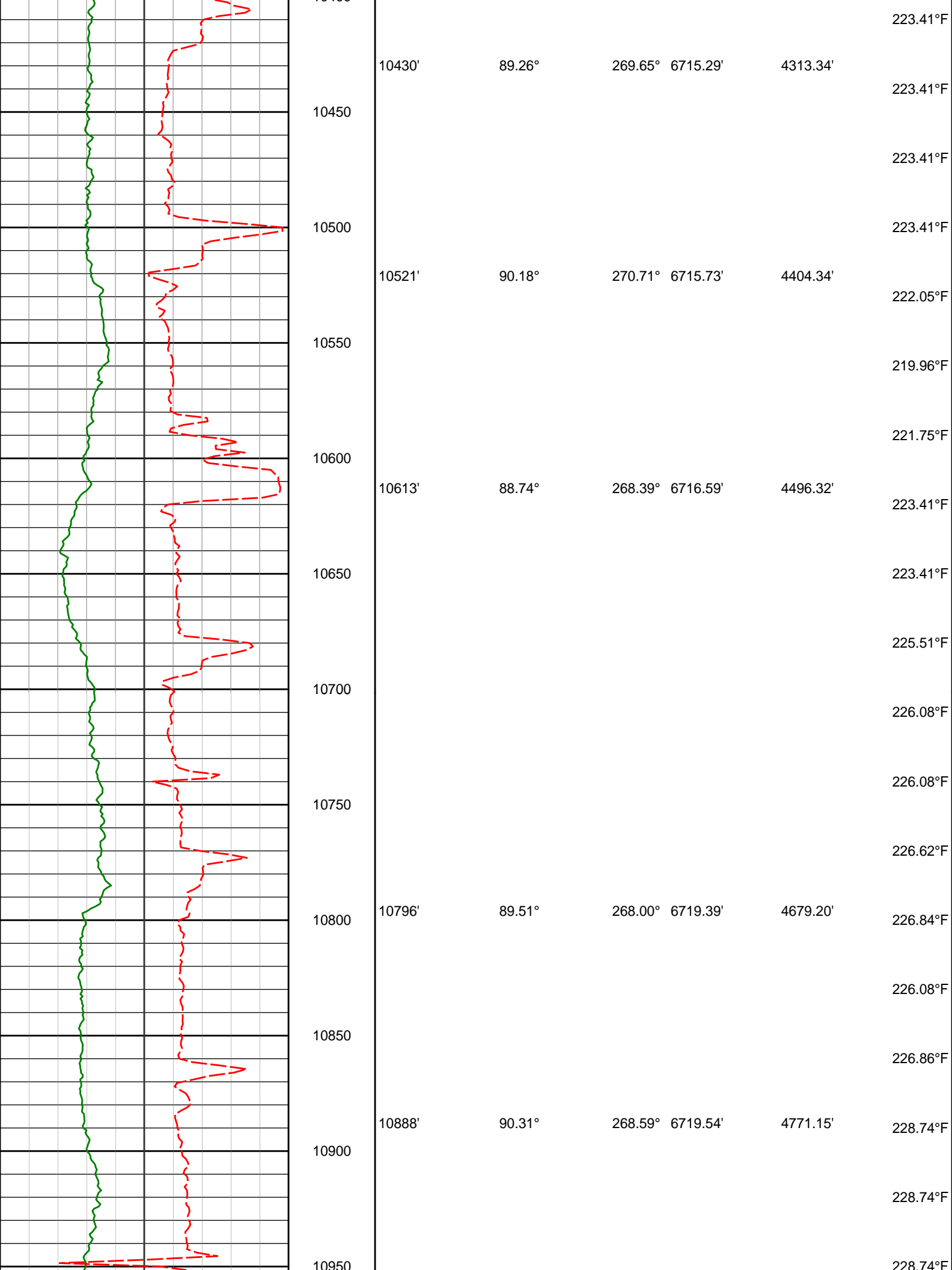


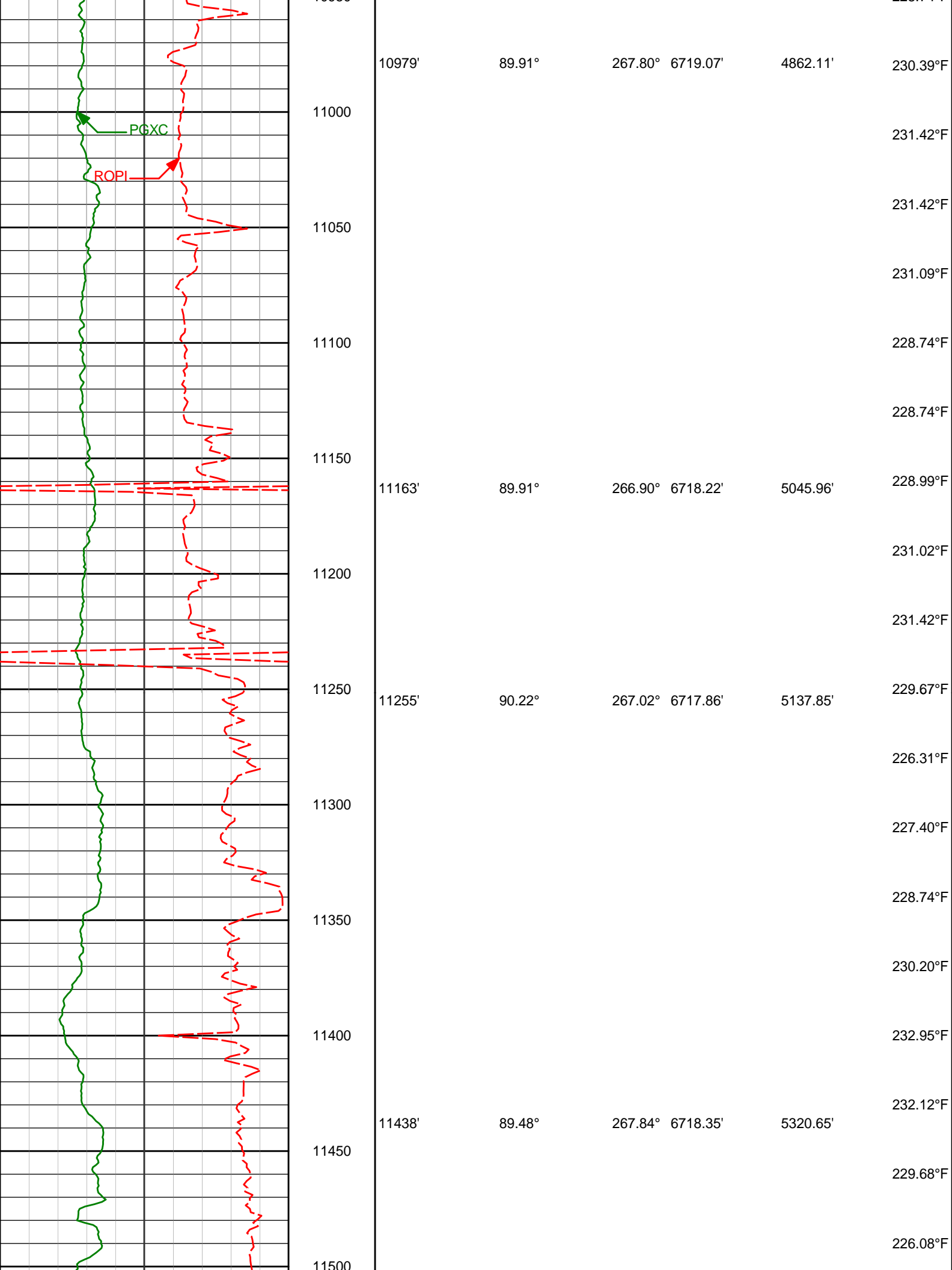


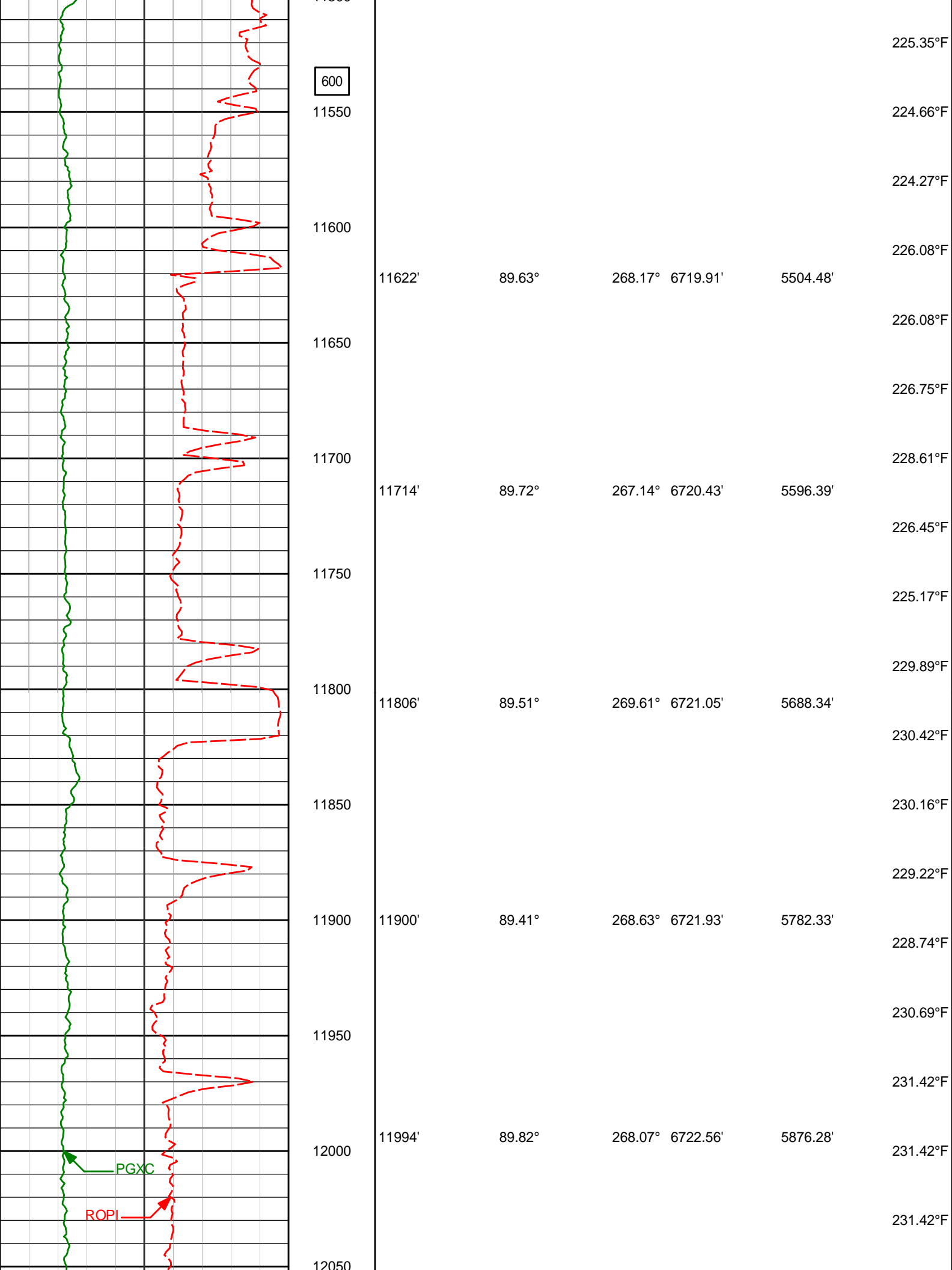


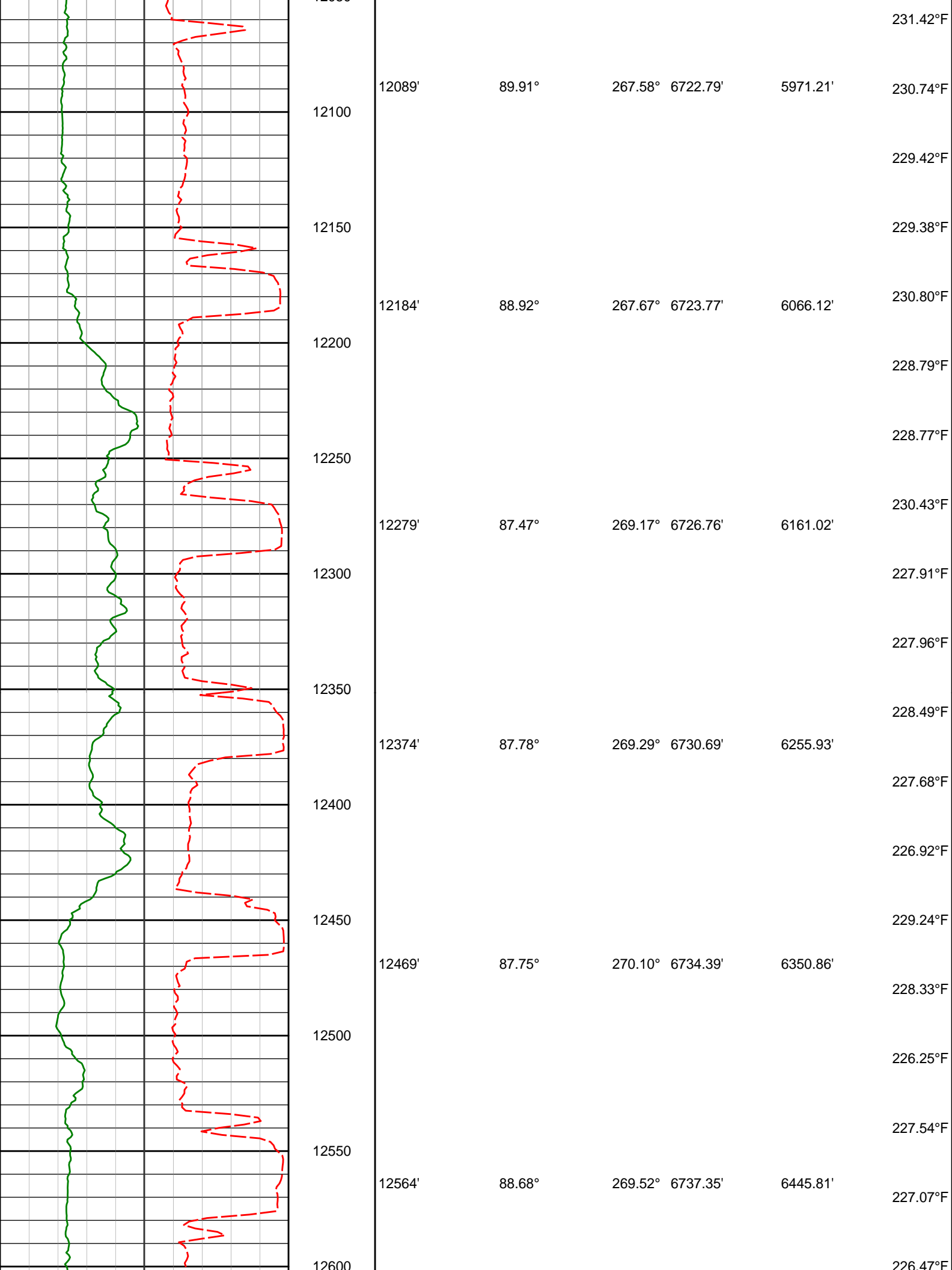


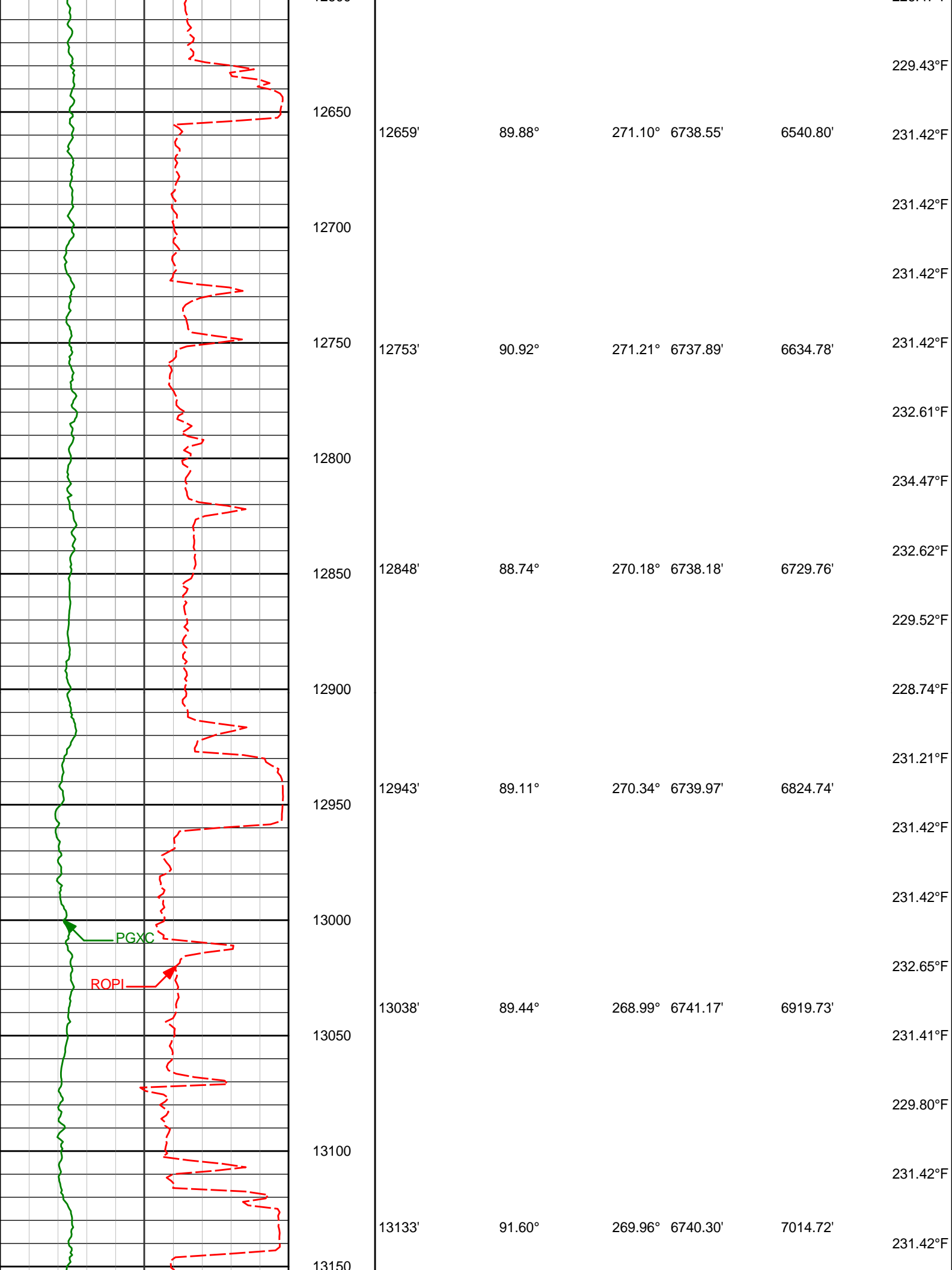


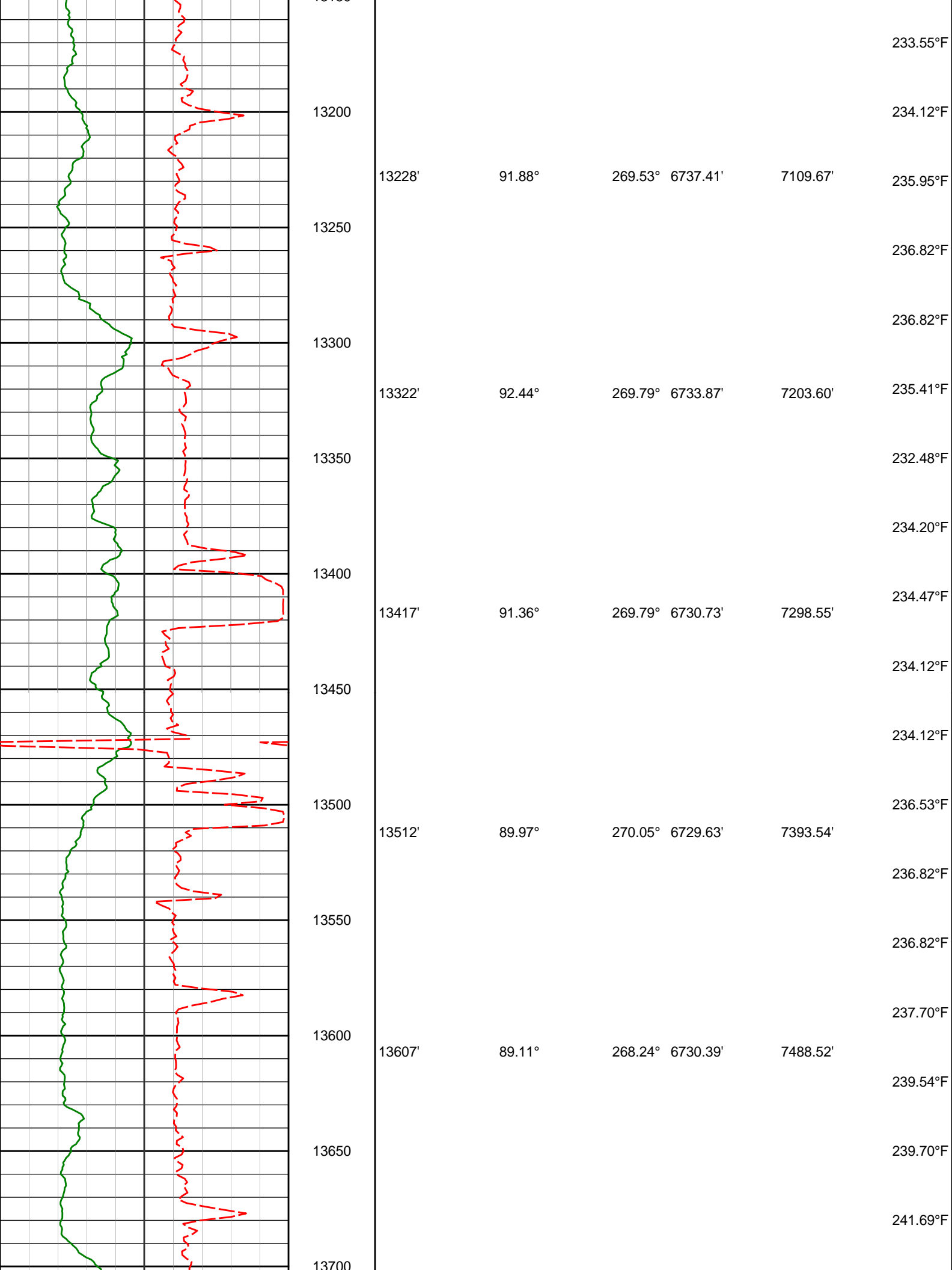


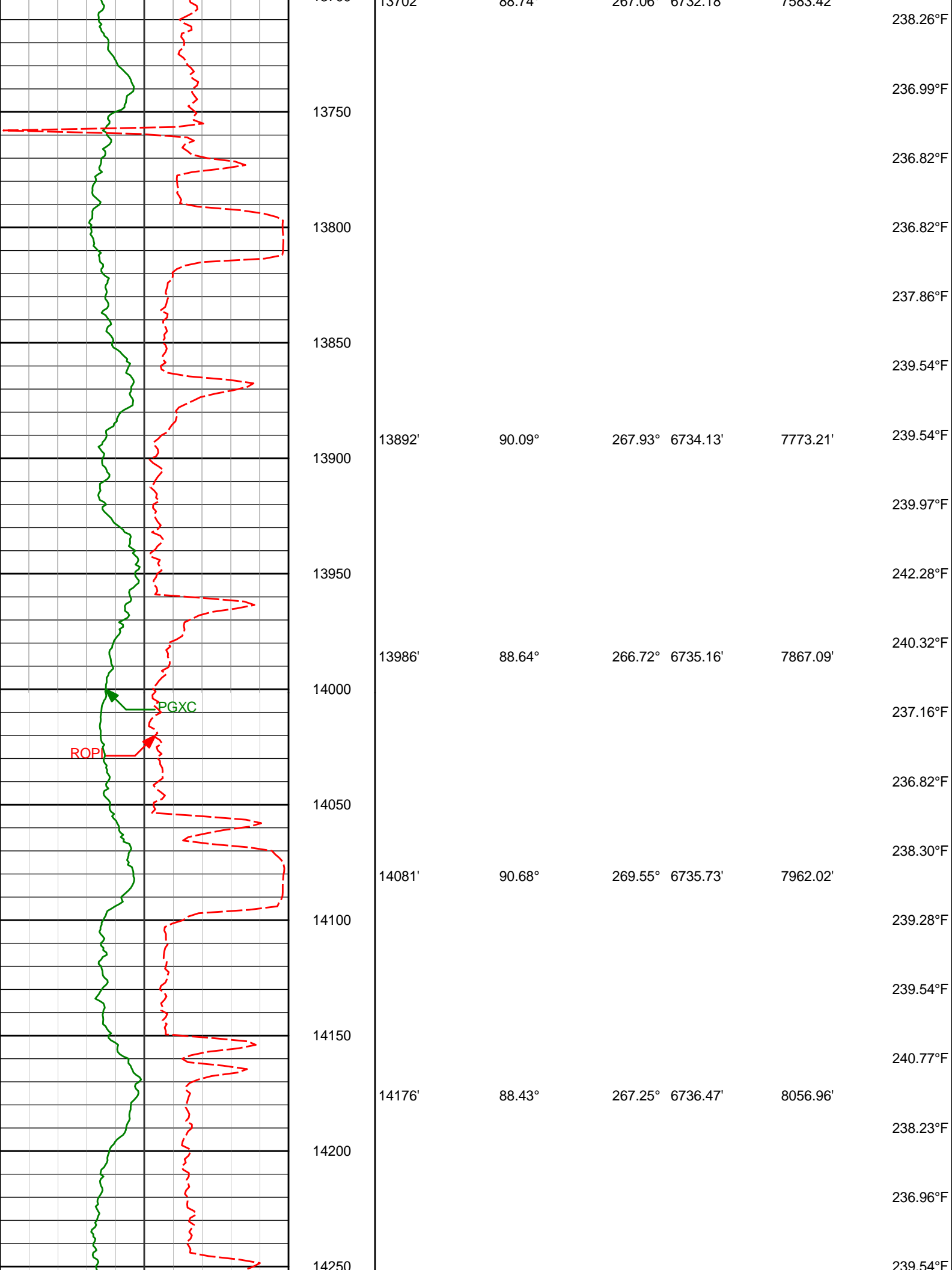


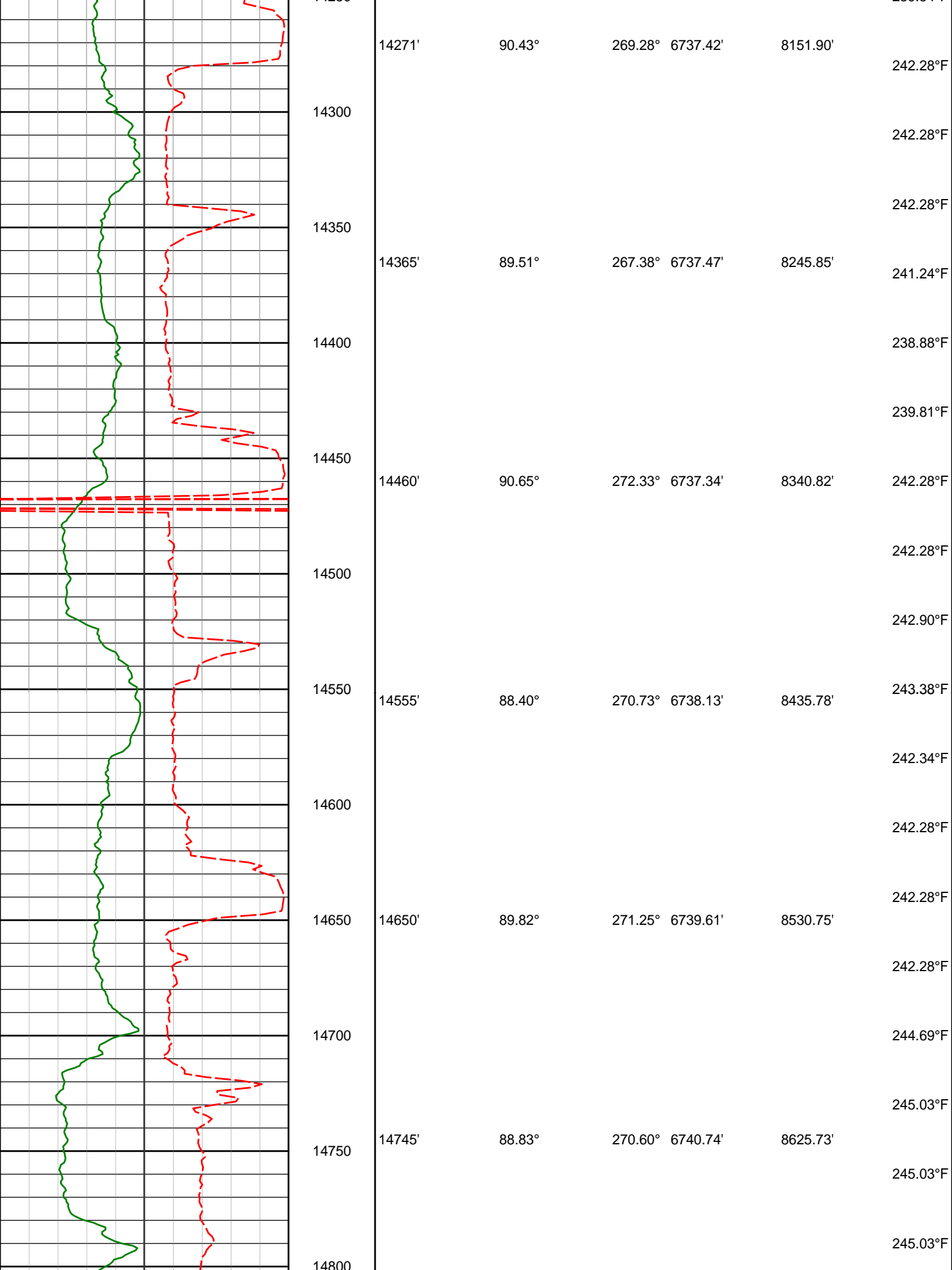


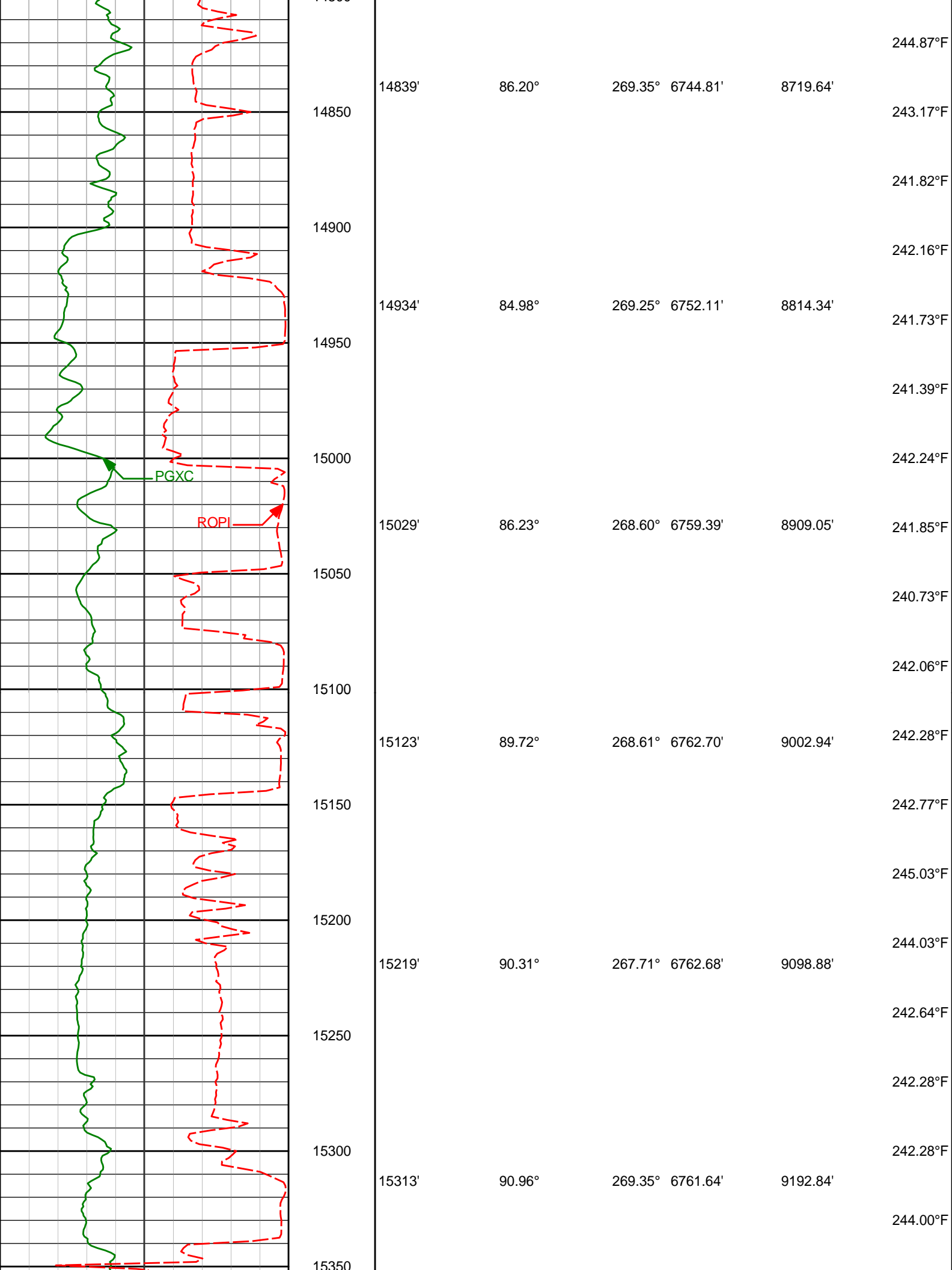


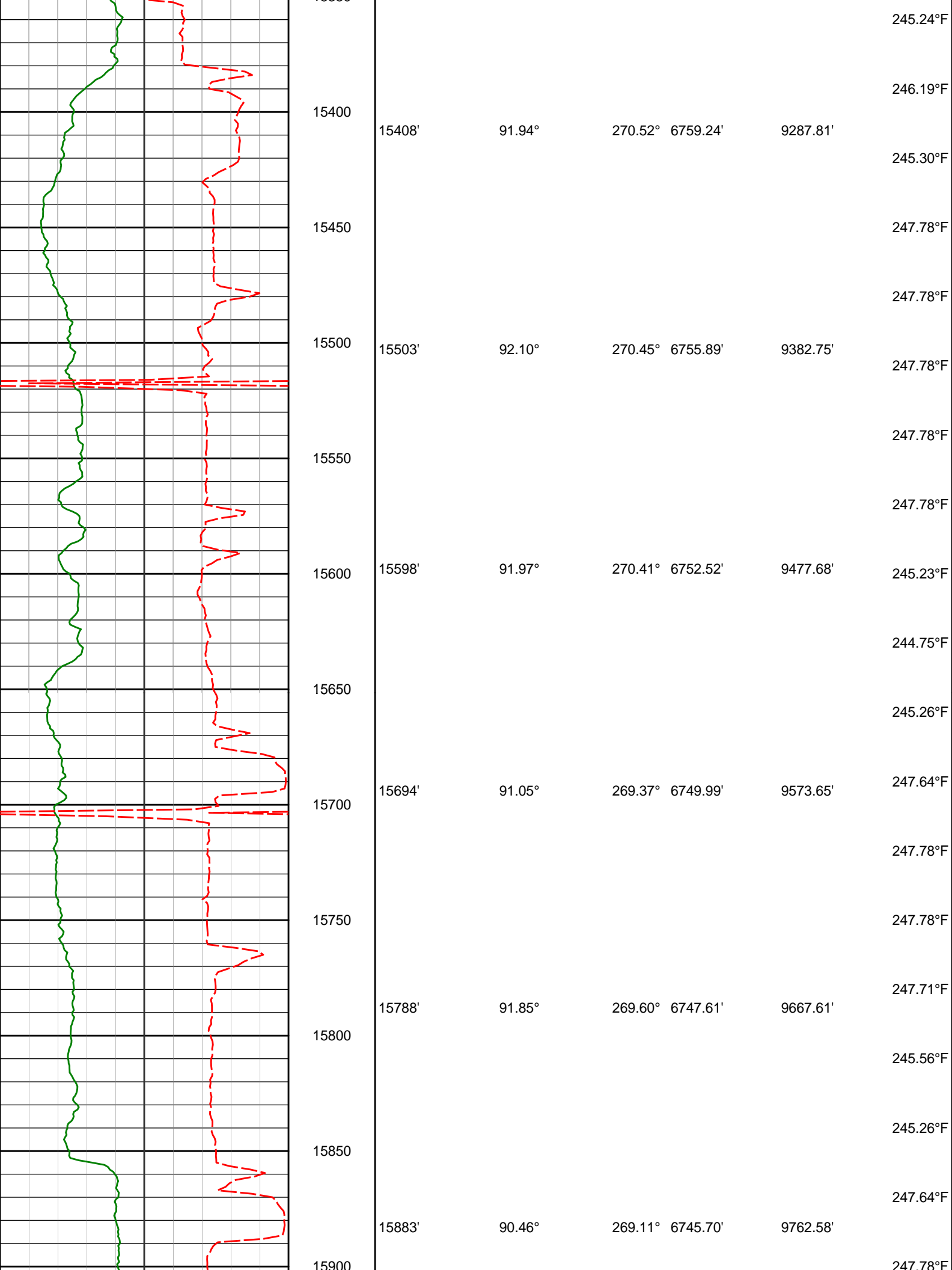


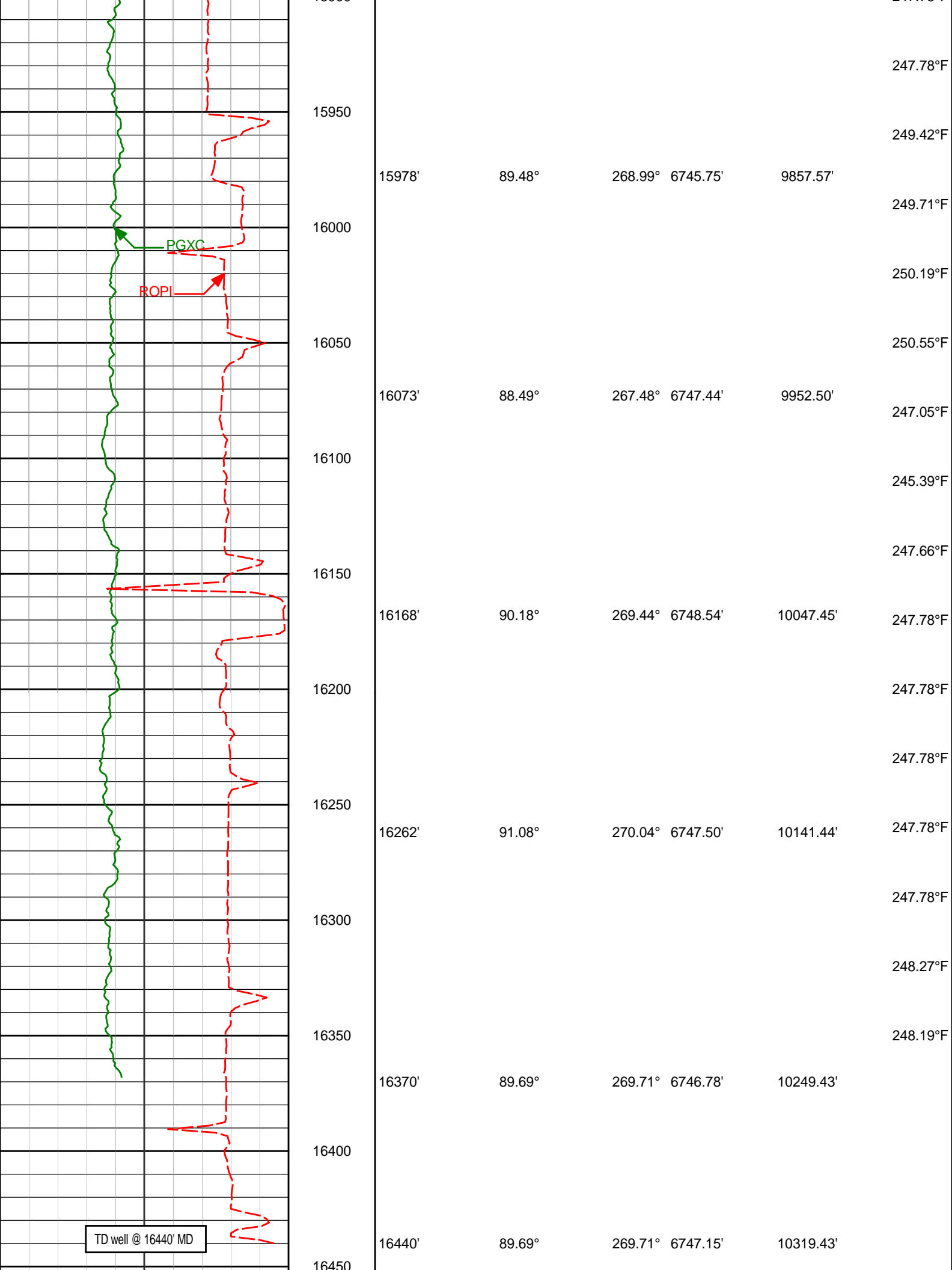






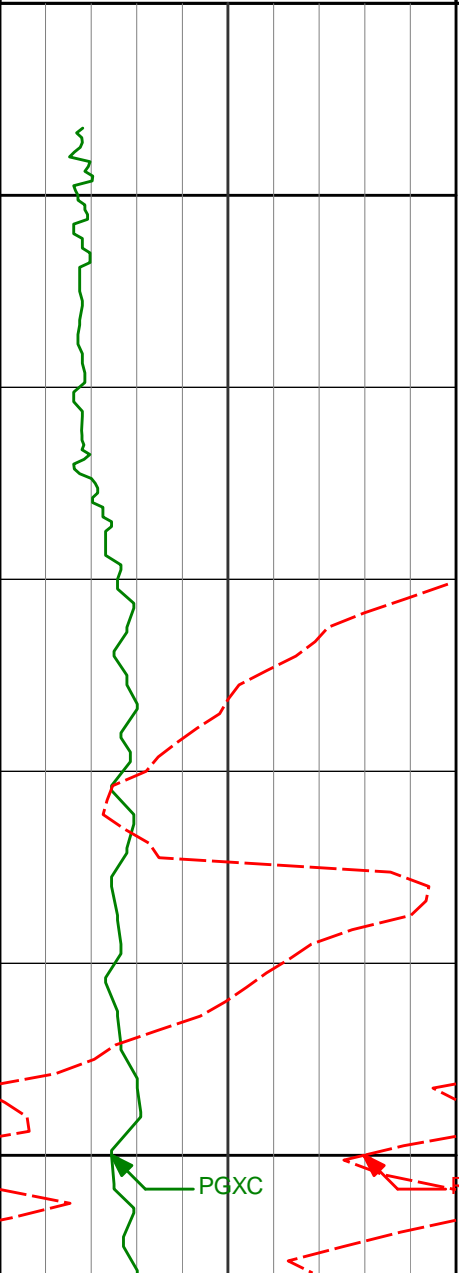
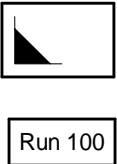


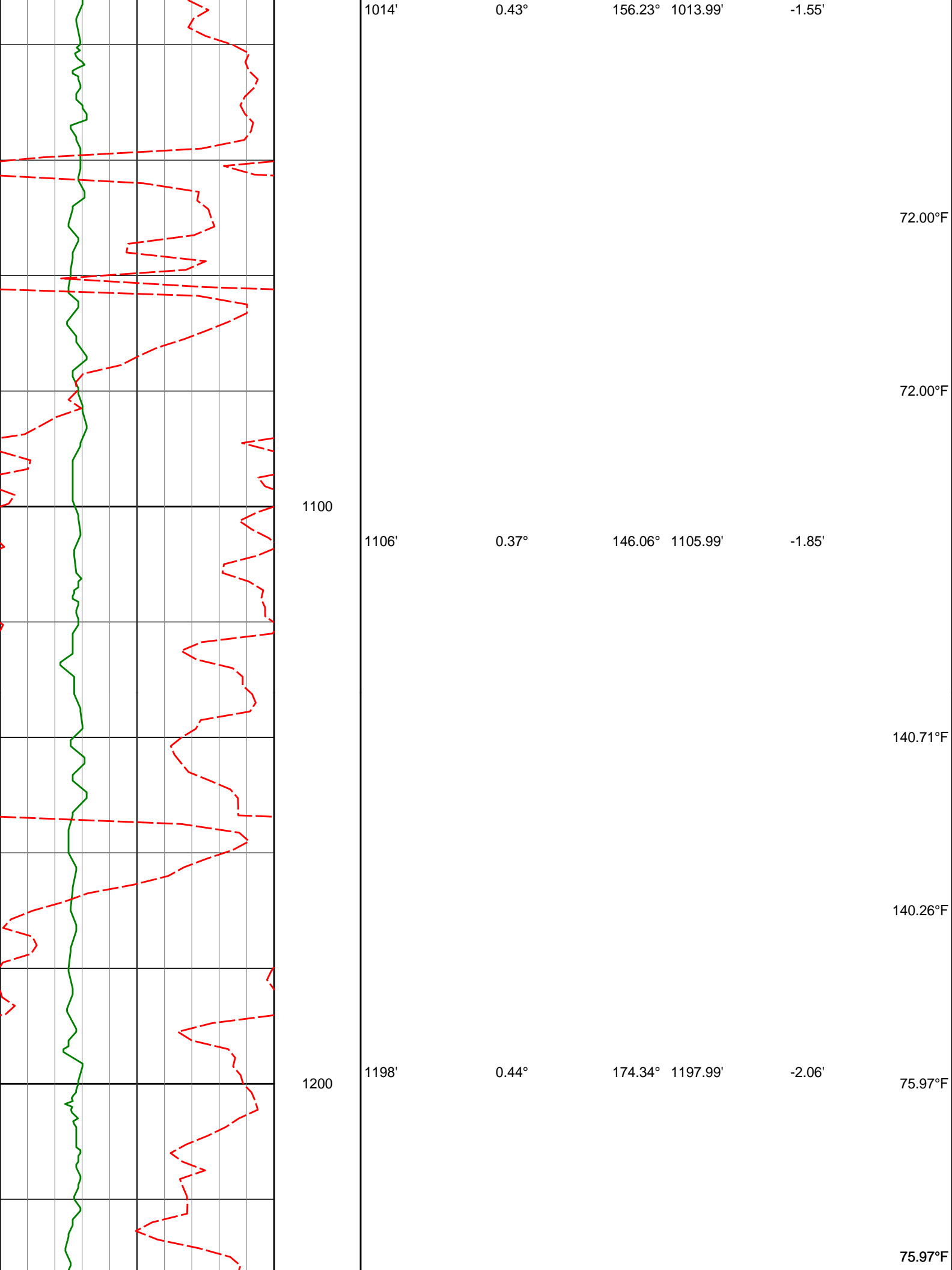


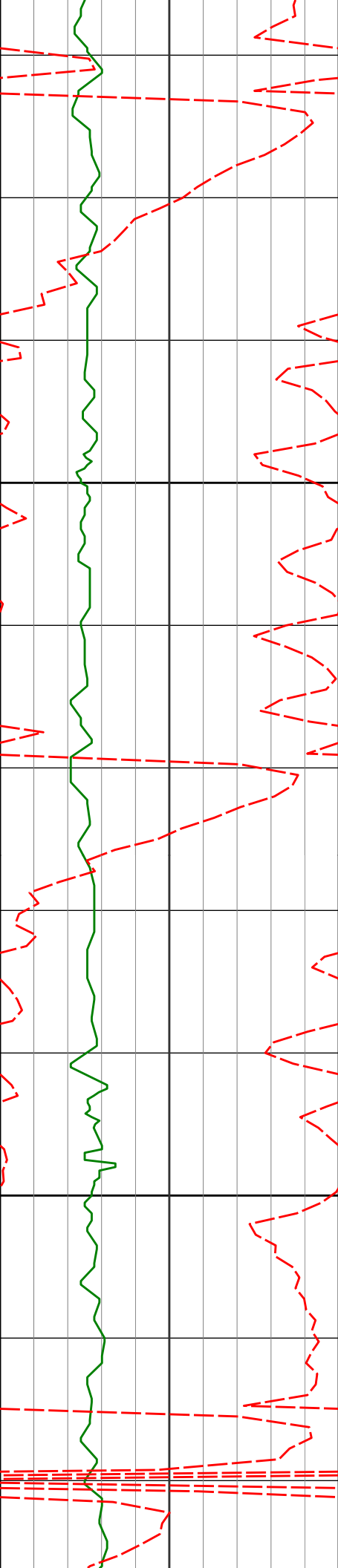


										10.155															
Inst Rate of Penetration ROPI feet per hr										Depth TVD ft		Depth				Inc		Azi		TVD		V.S.		Temp	
1K-----0																									
PCG GR XHi-Range RT BCor PGXRC-T api																									
0-----300																									

MD Detail 1:240 Scale

PCG GR XHi-Range RT BCor PGXRC-T api								
Inst Rate of Penetration ROPI feet per hr		Depth TVD ft	Depth	Inc	Azi	TVD	V.S.	Temp
0 300								
1K 0								
		 Run 100						
		900						70.02°F
								70.02°F
								70.02°F
		1000						
PGXC								
ROPI								





1300

75.97°F

75.97°F

1381'

0.62°

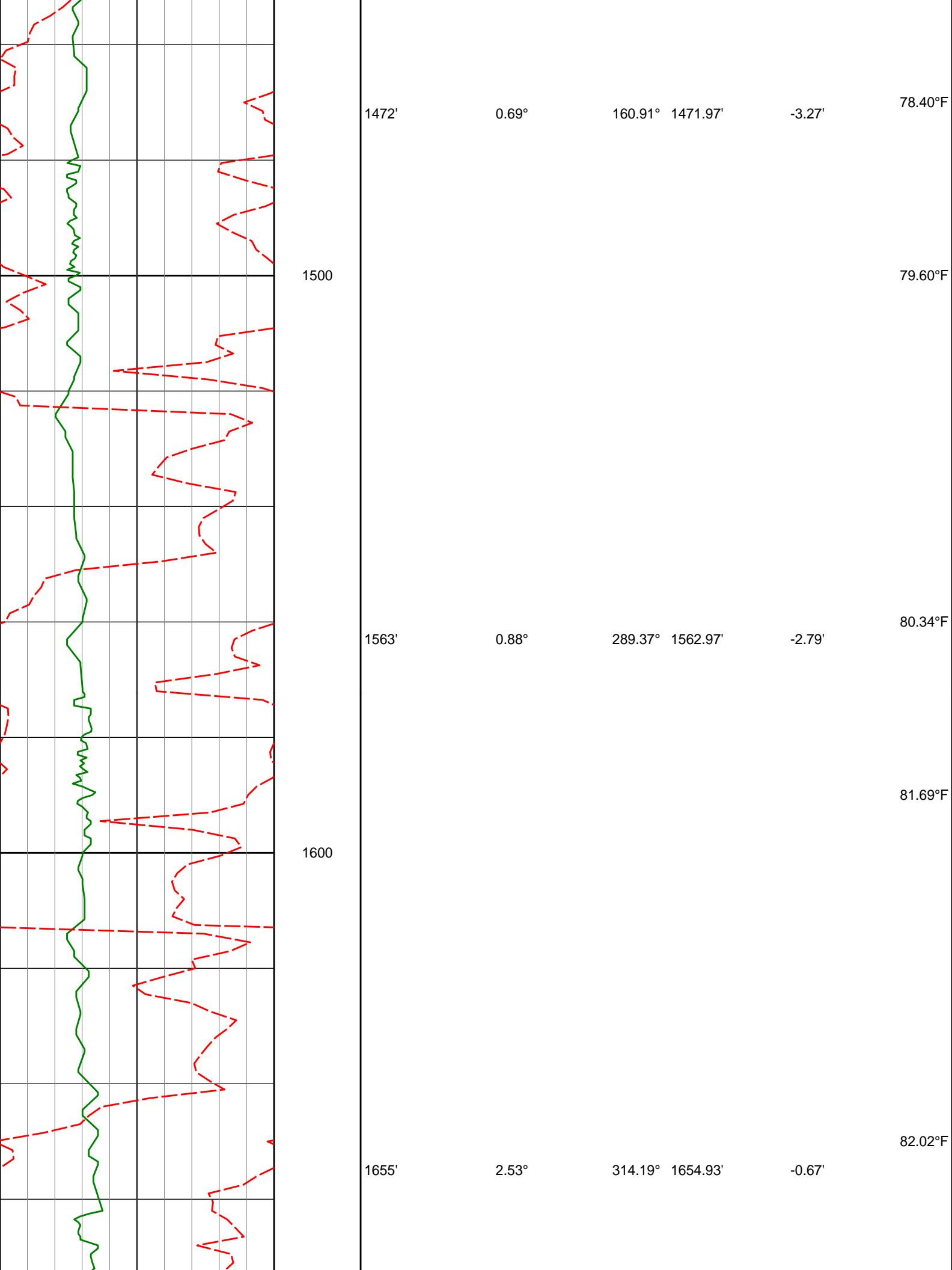
139.17° 1380.98'

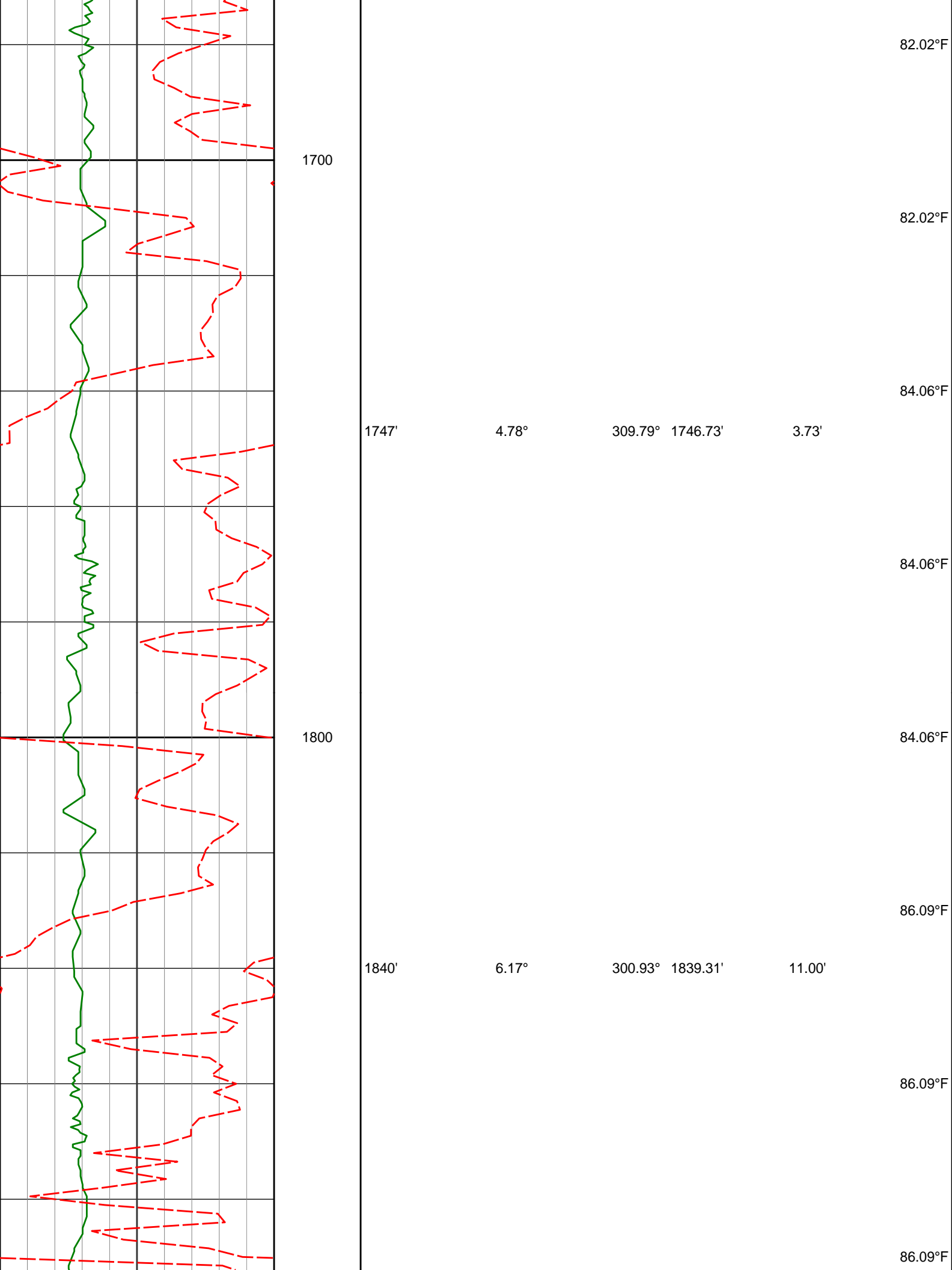
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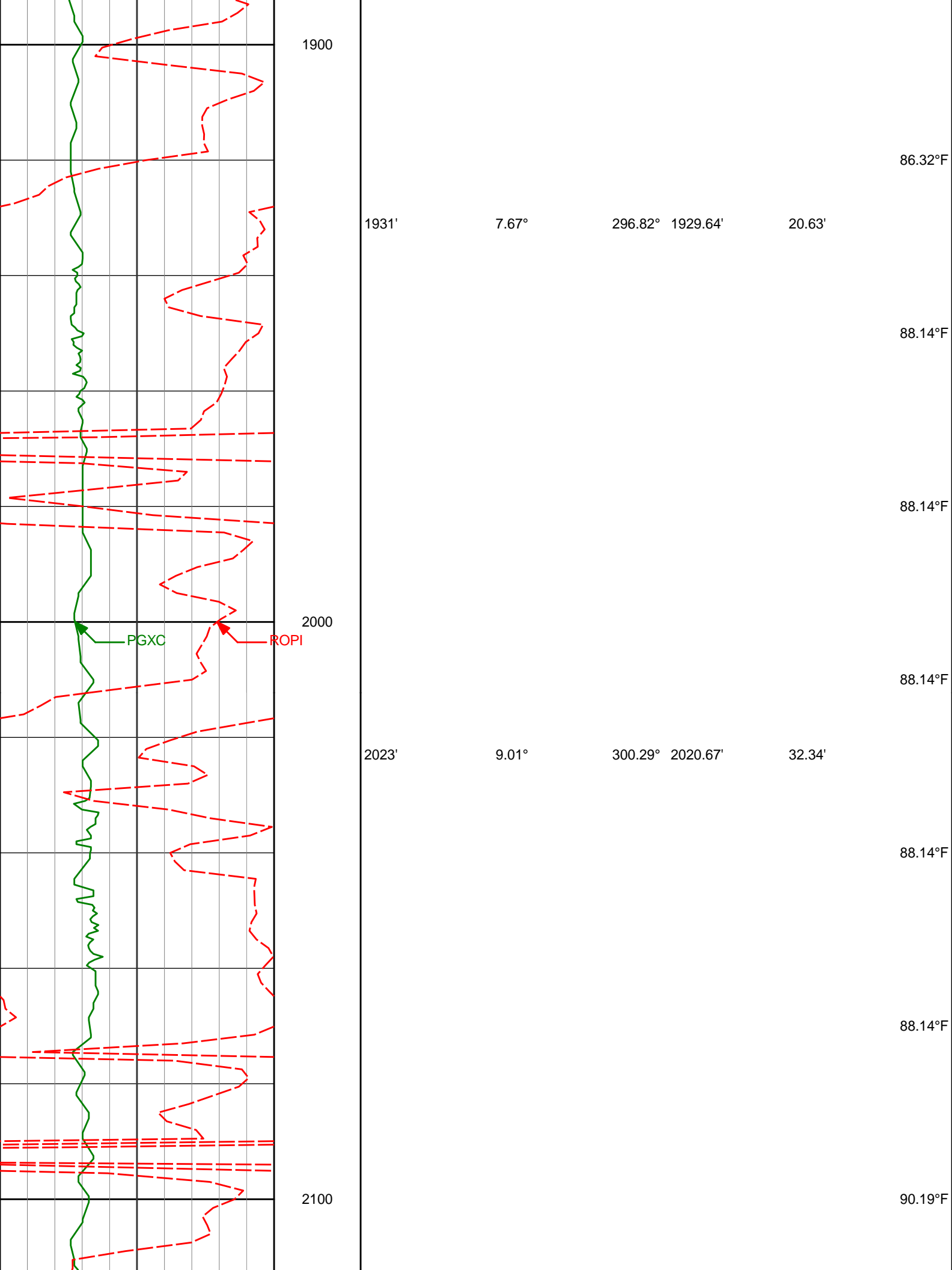
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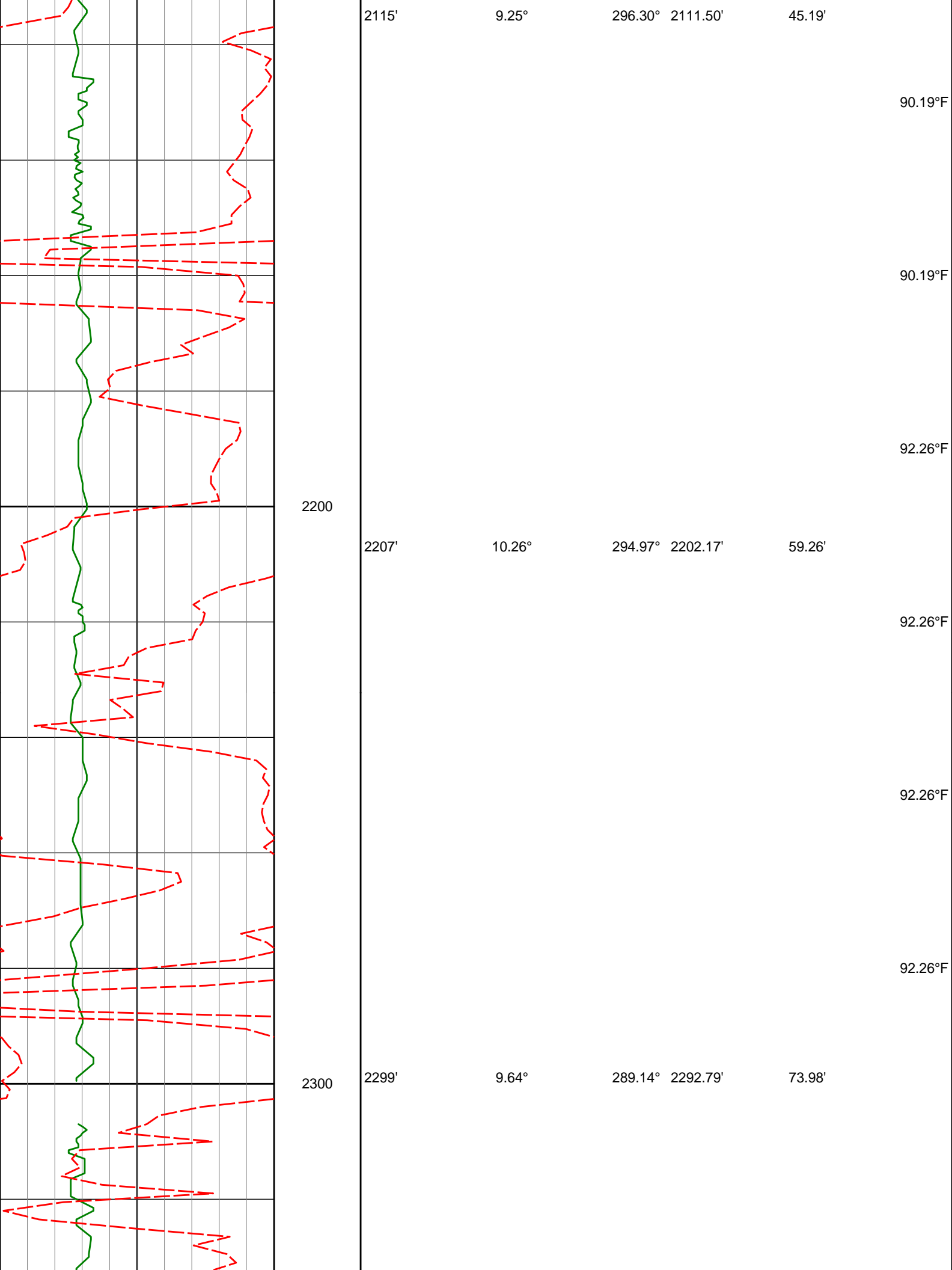
77.99°F

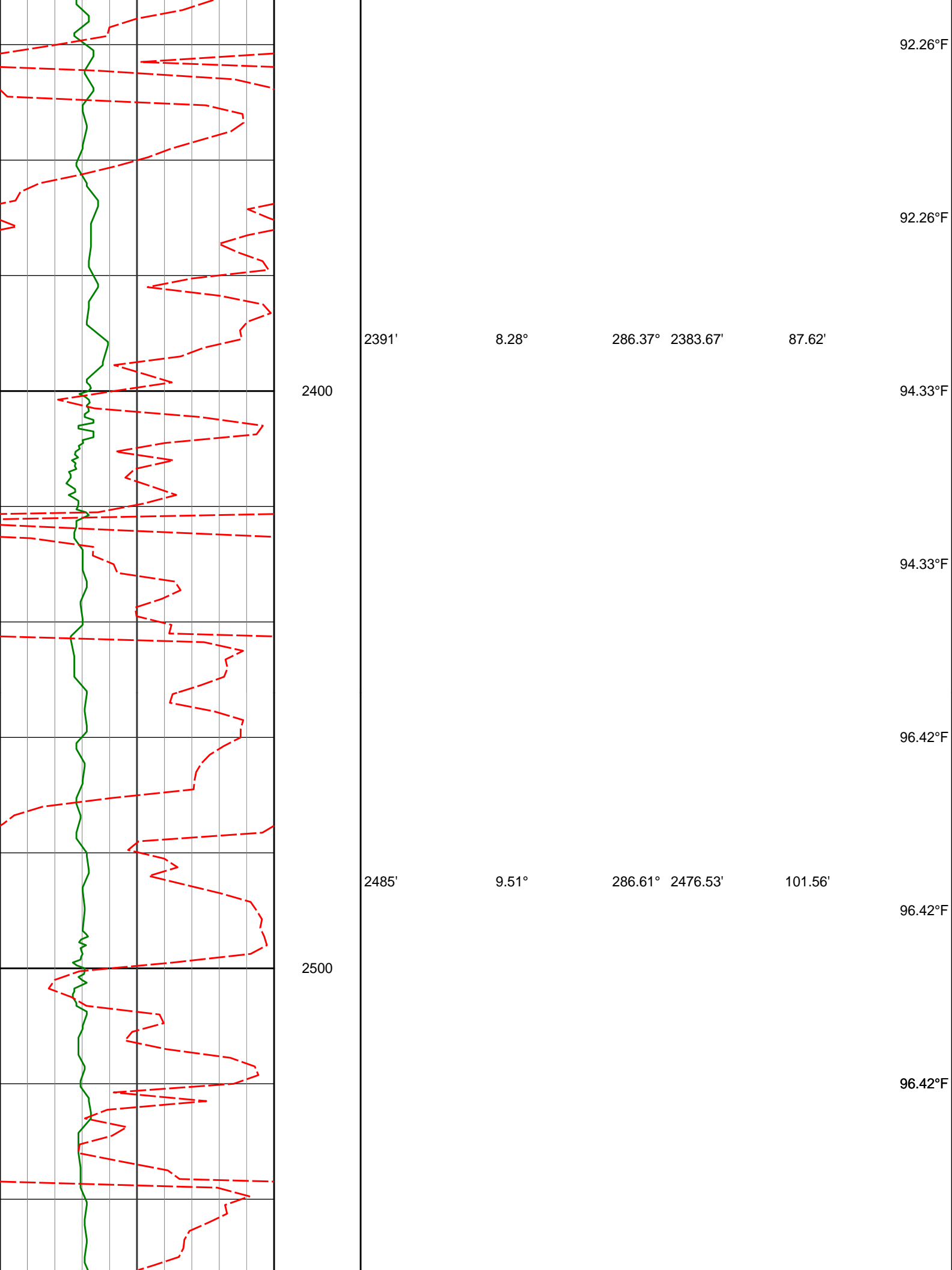
77.99°F

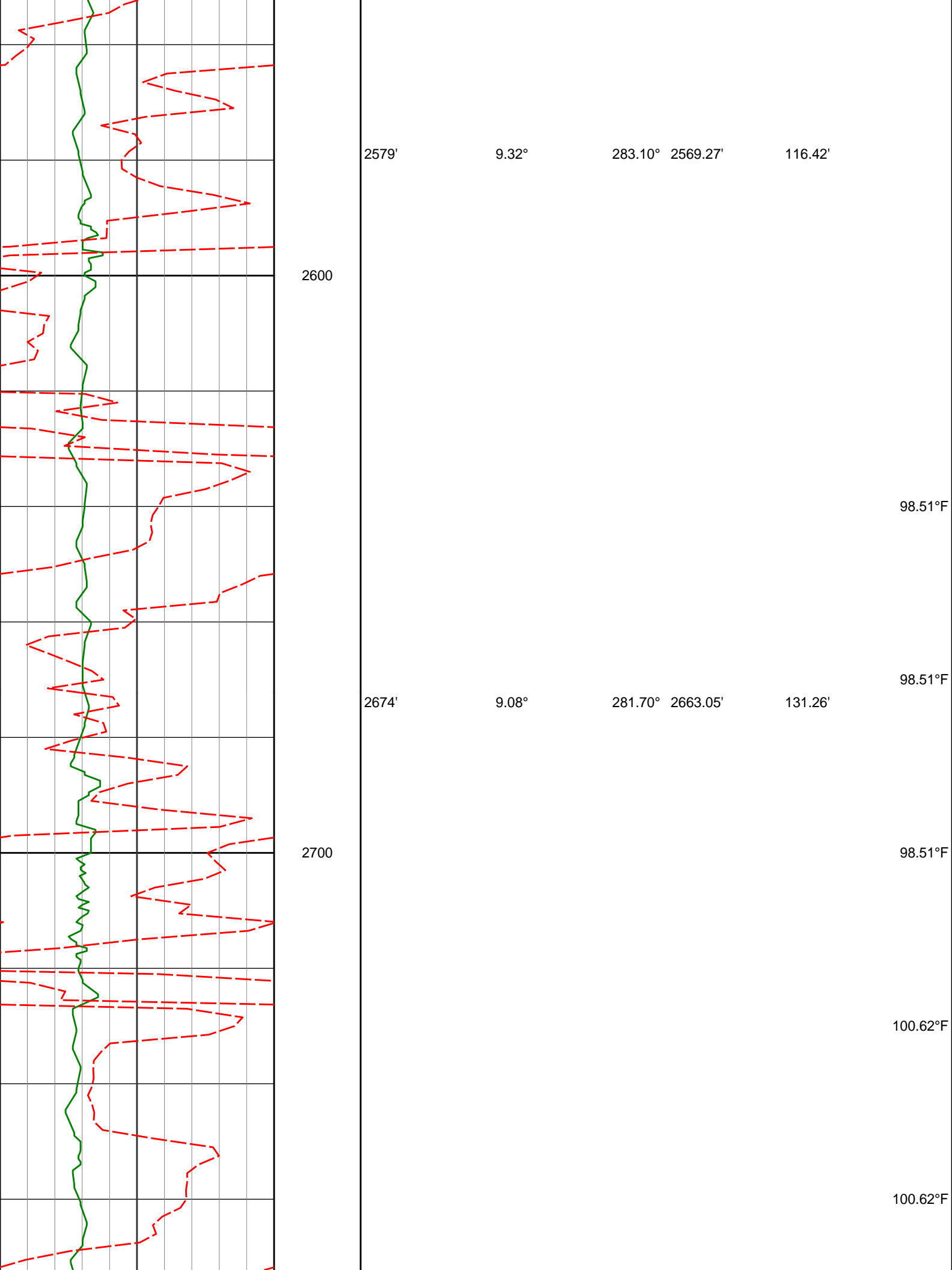


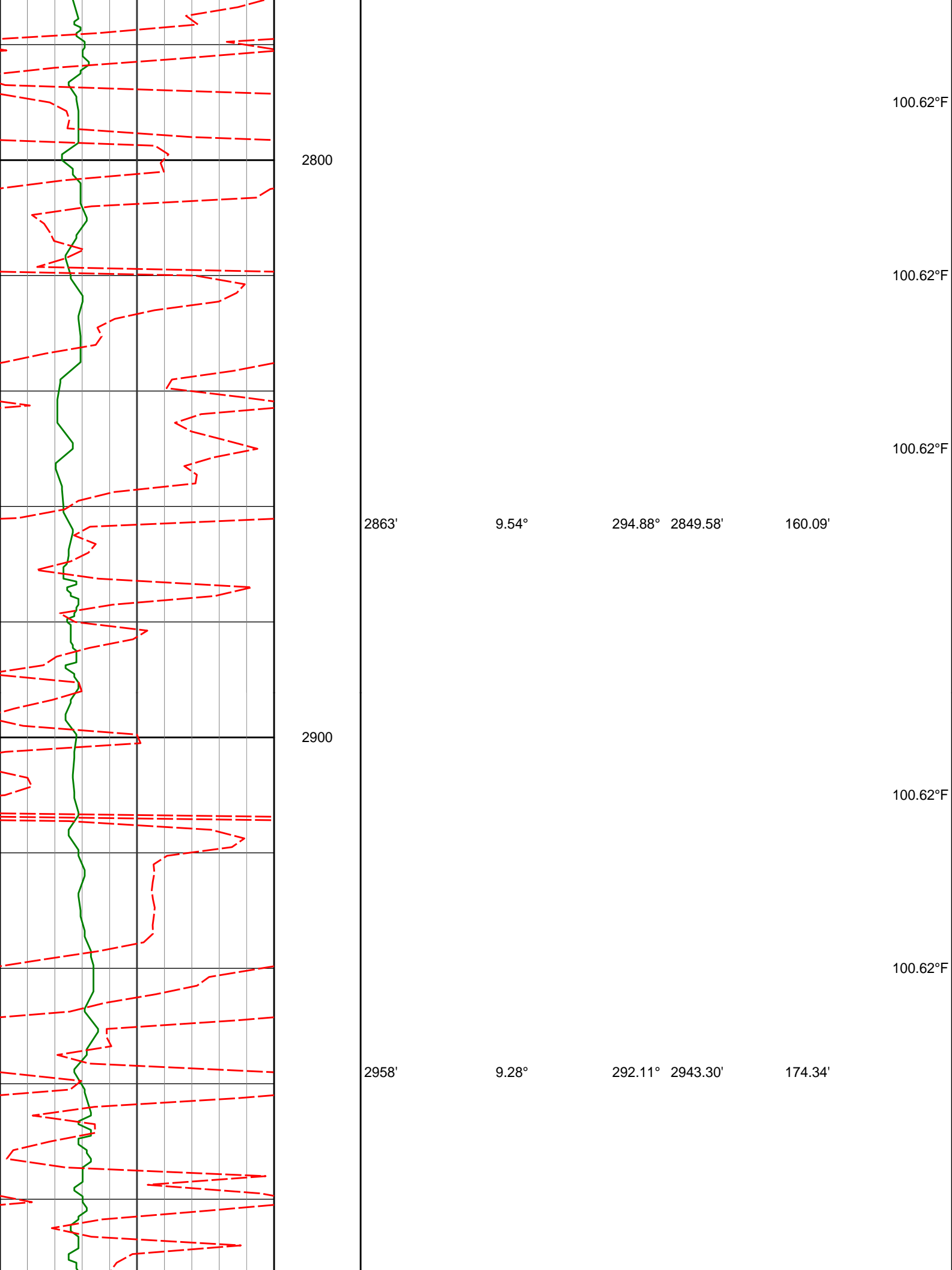


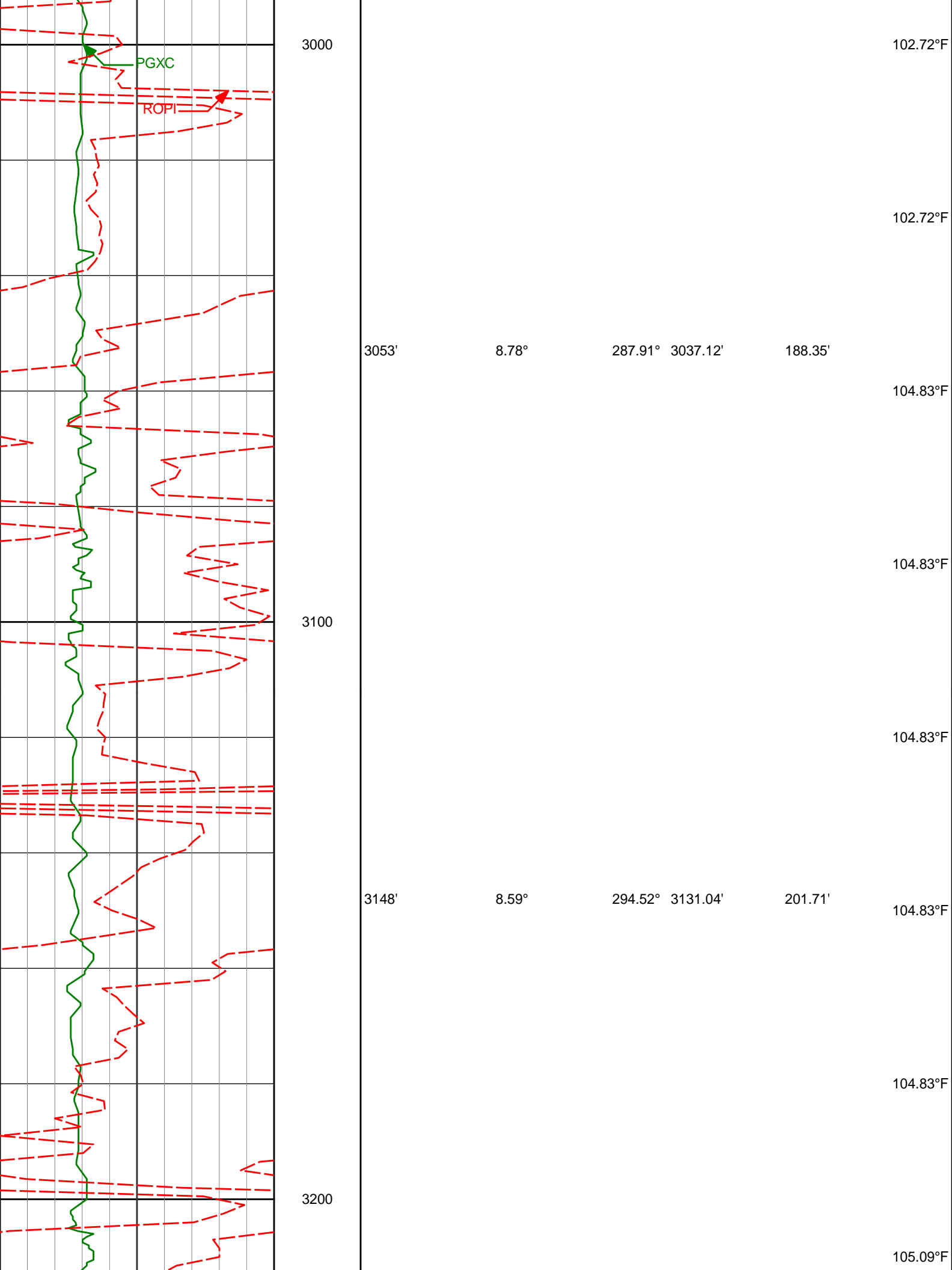


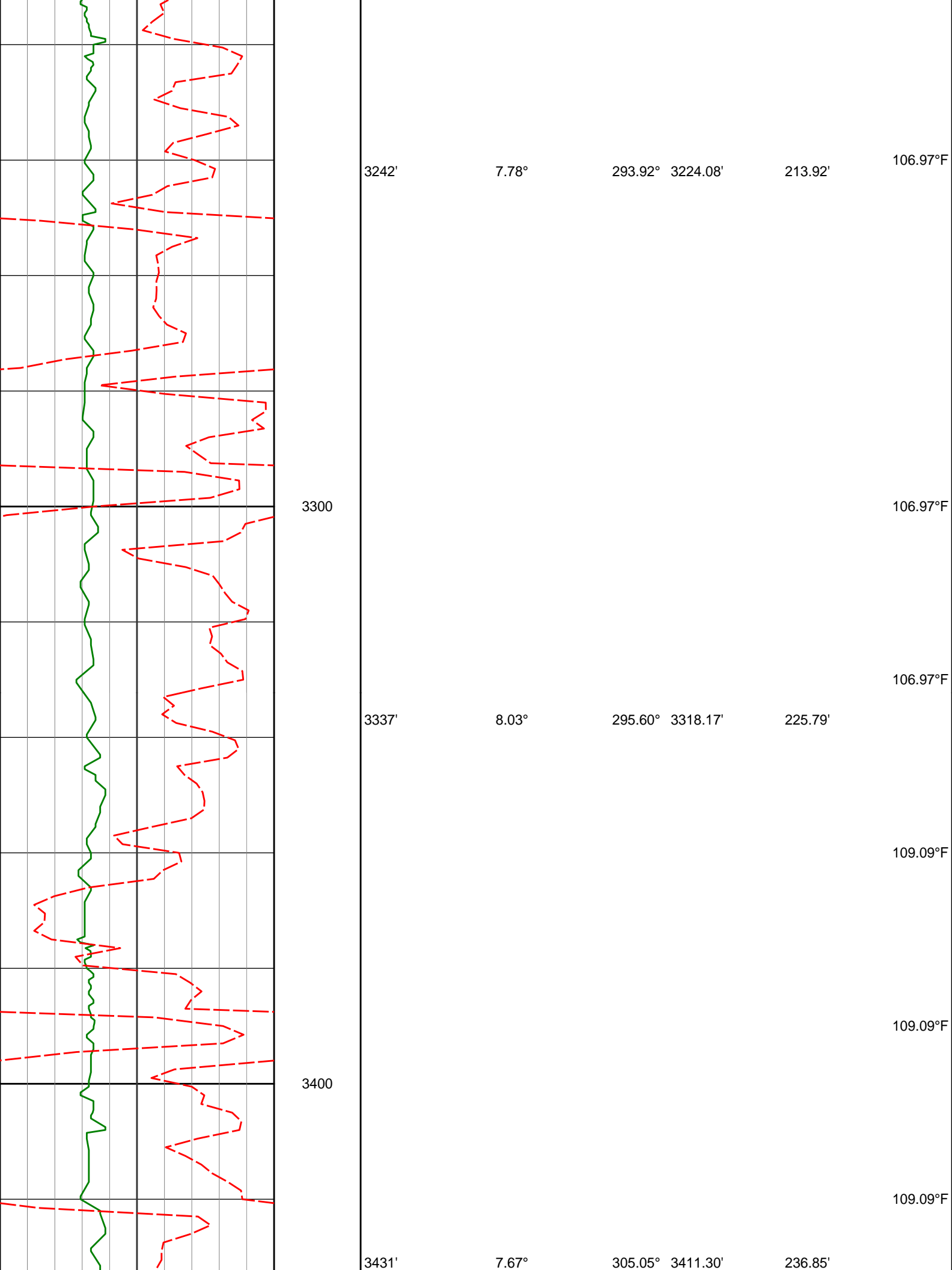


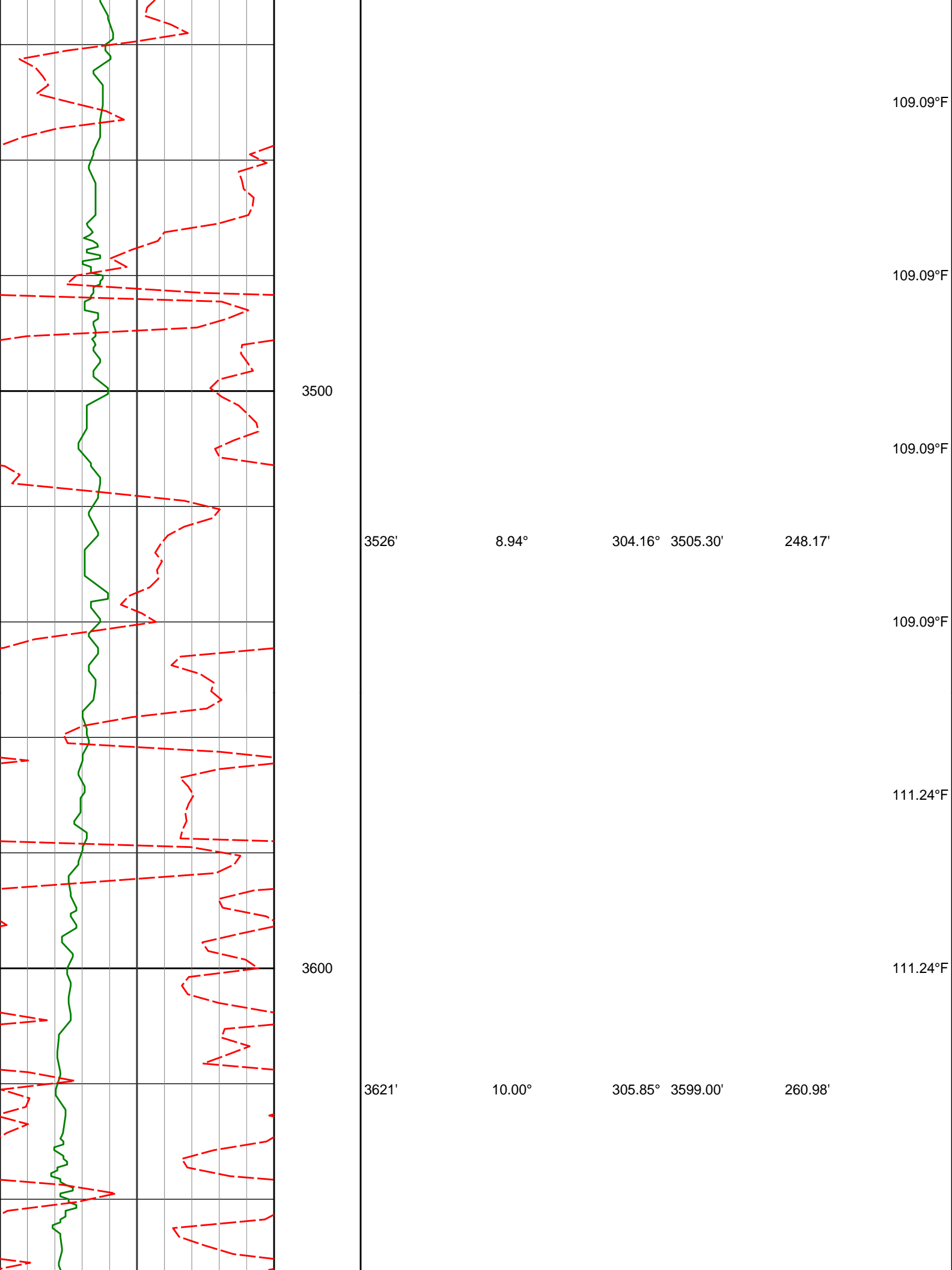


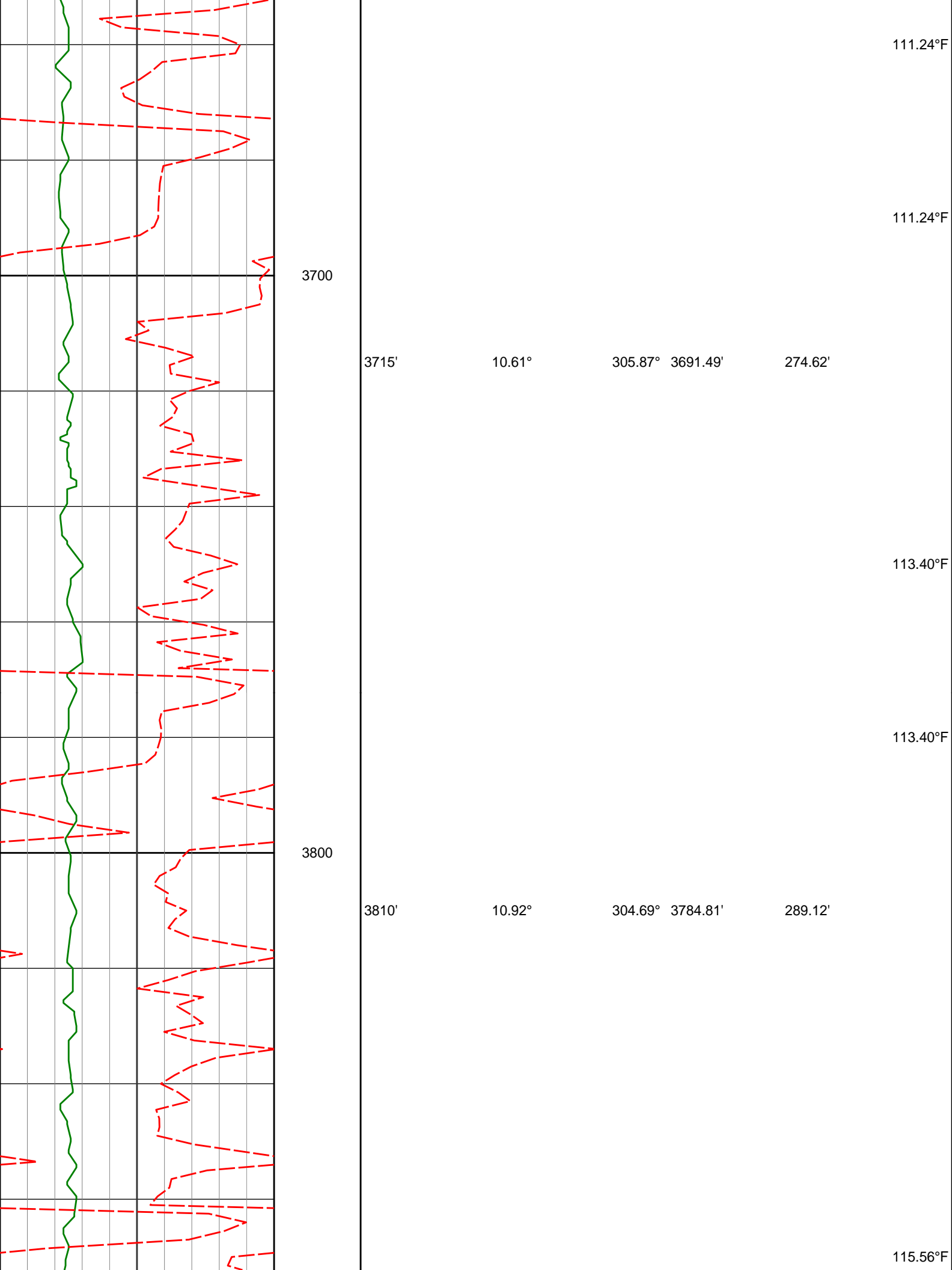


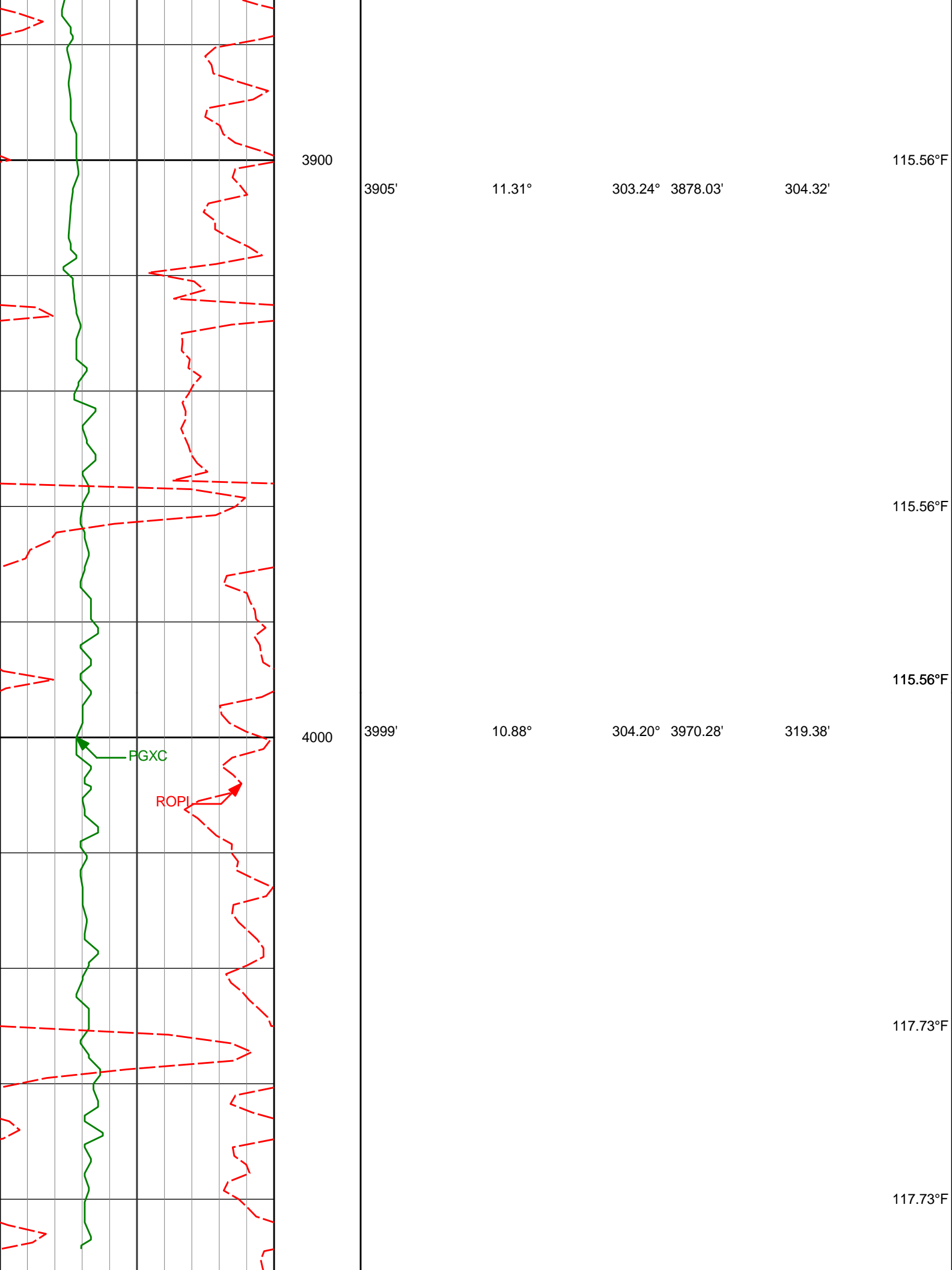


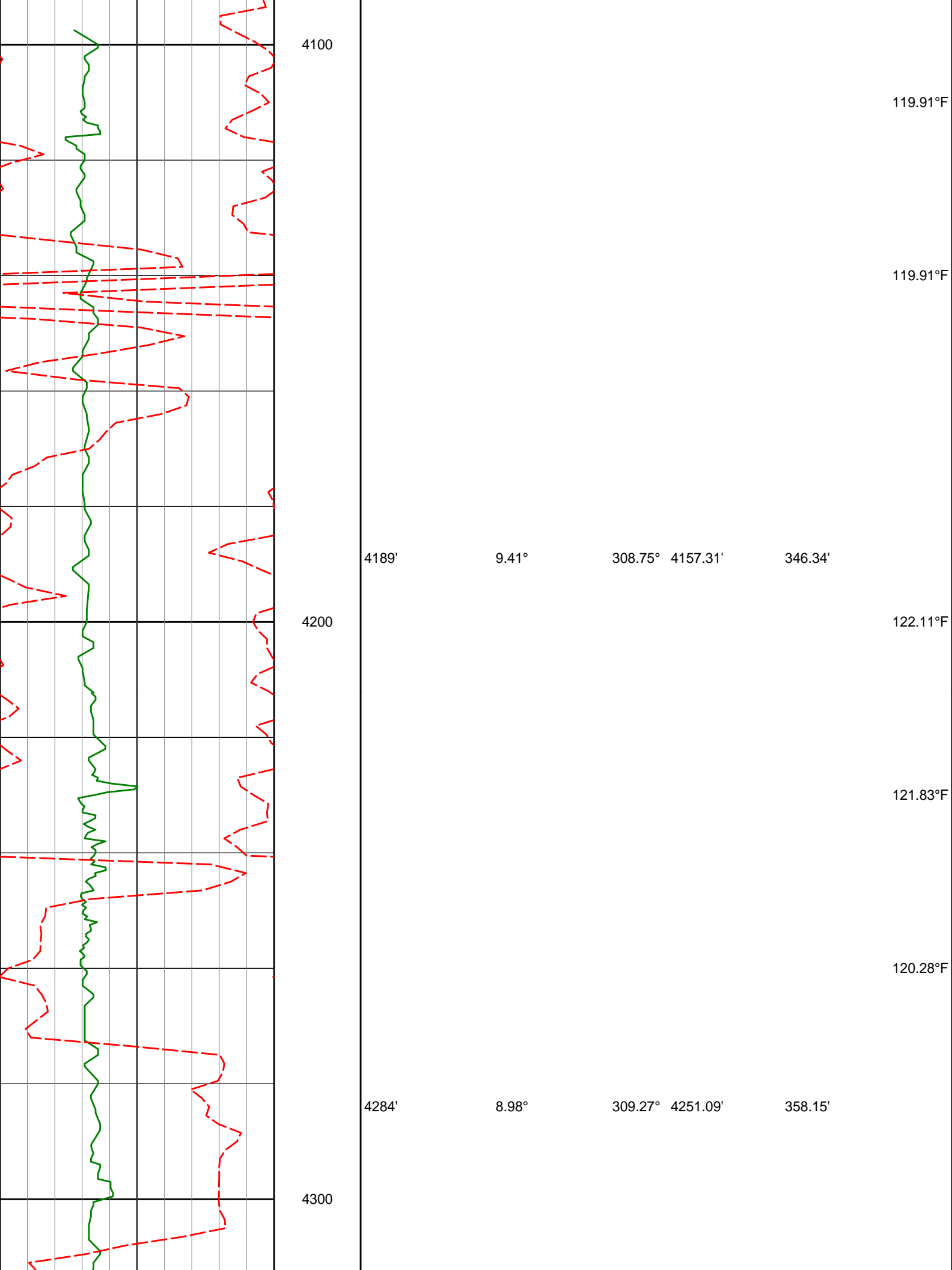


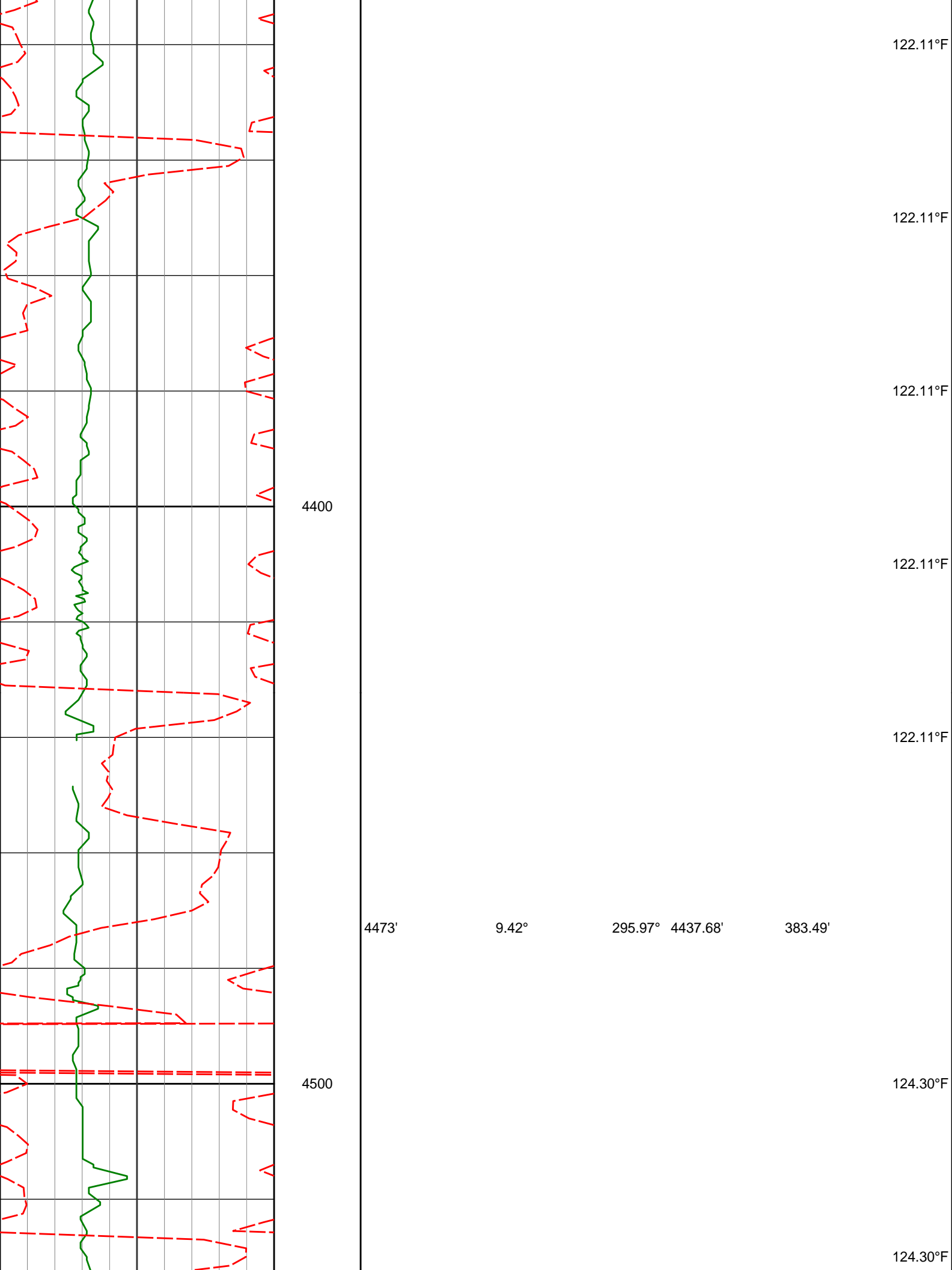


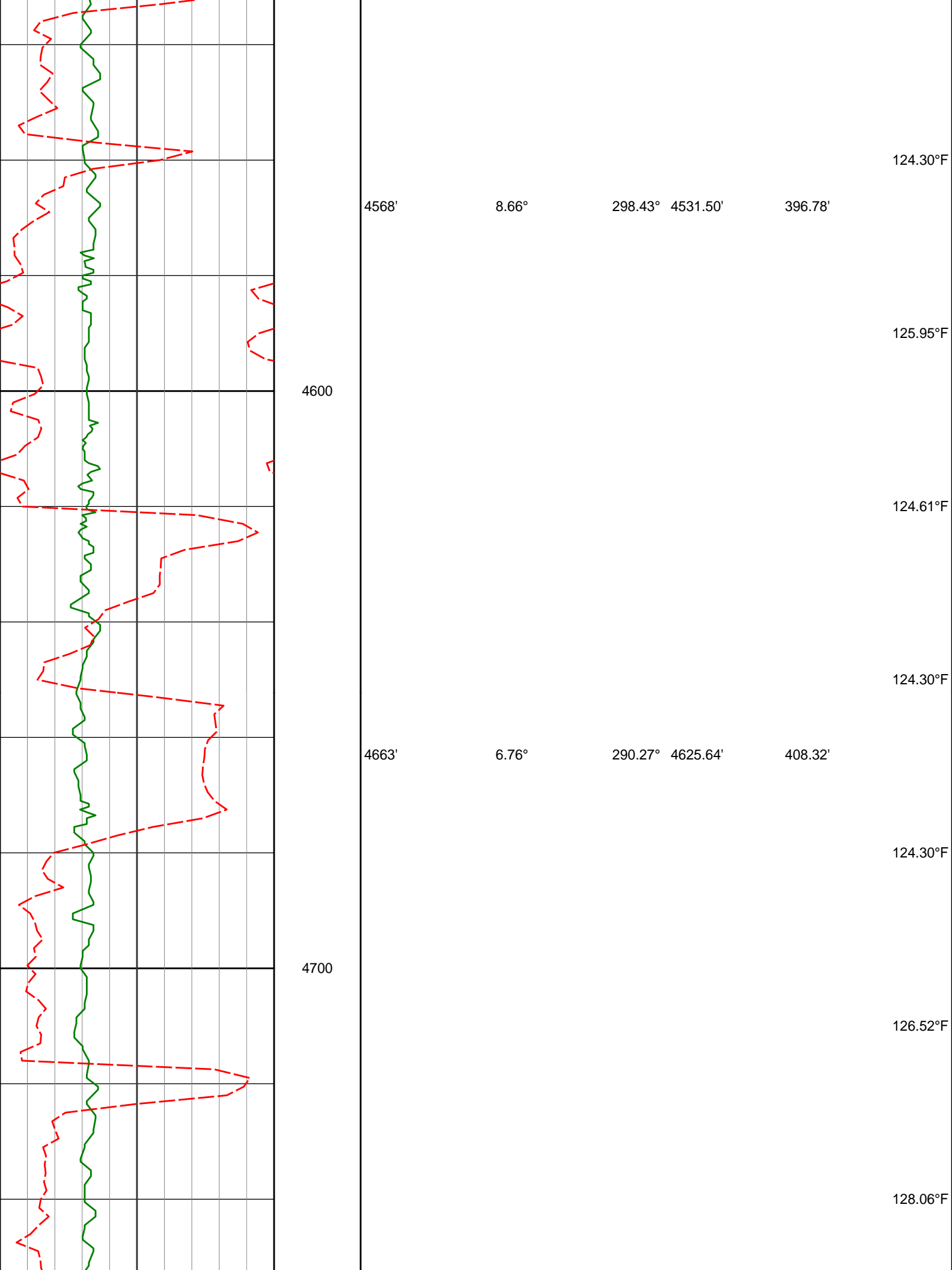


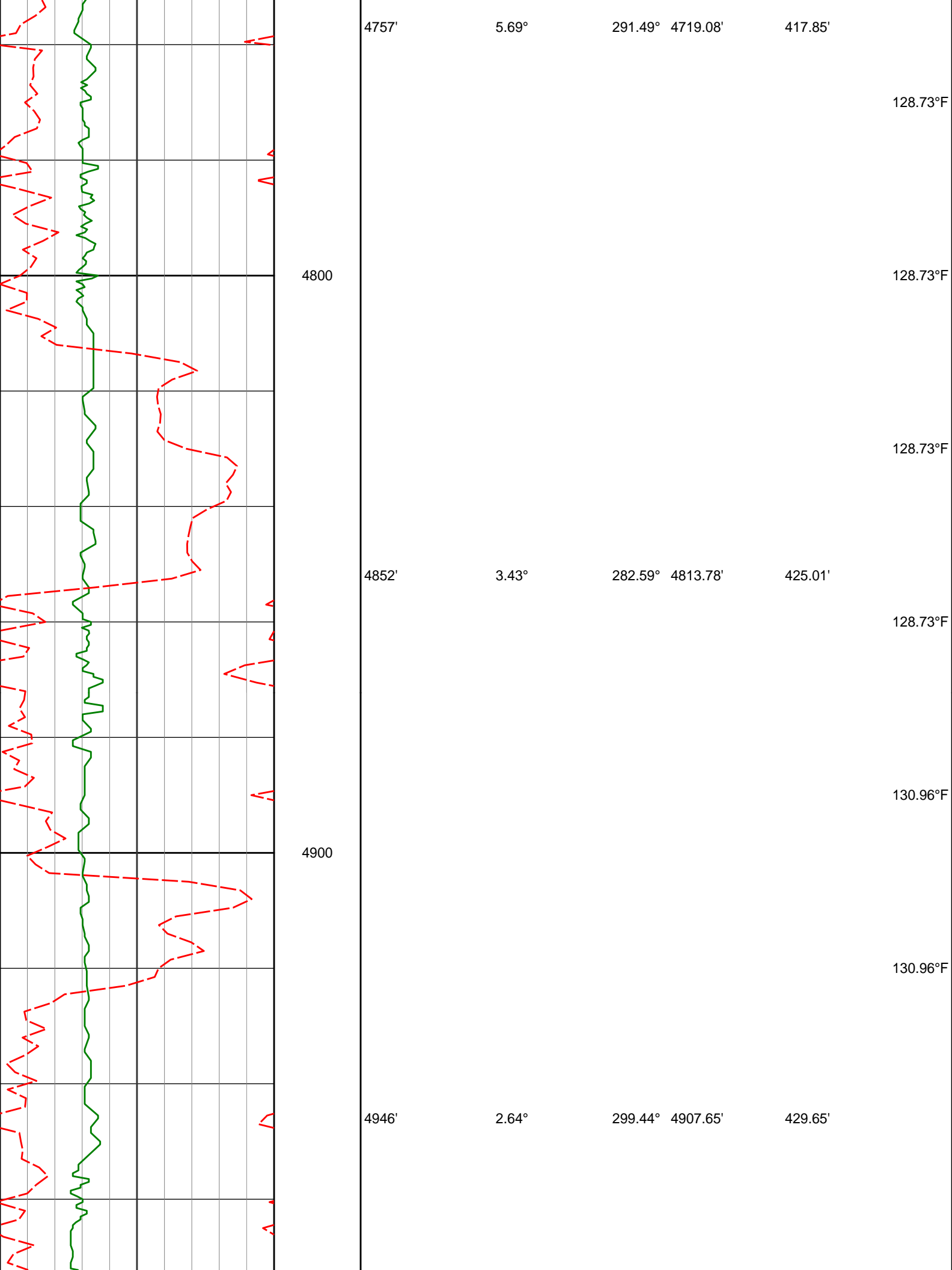


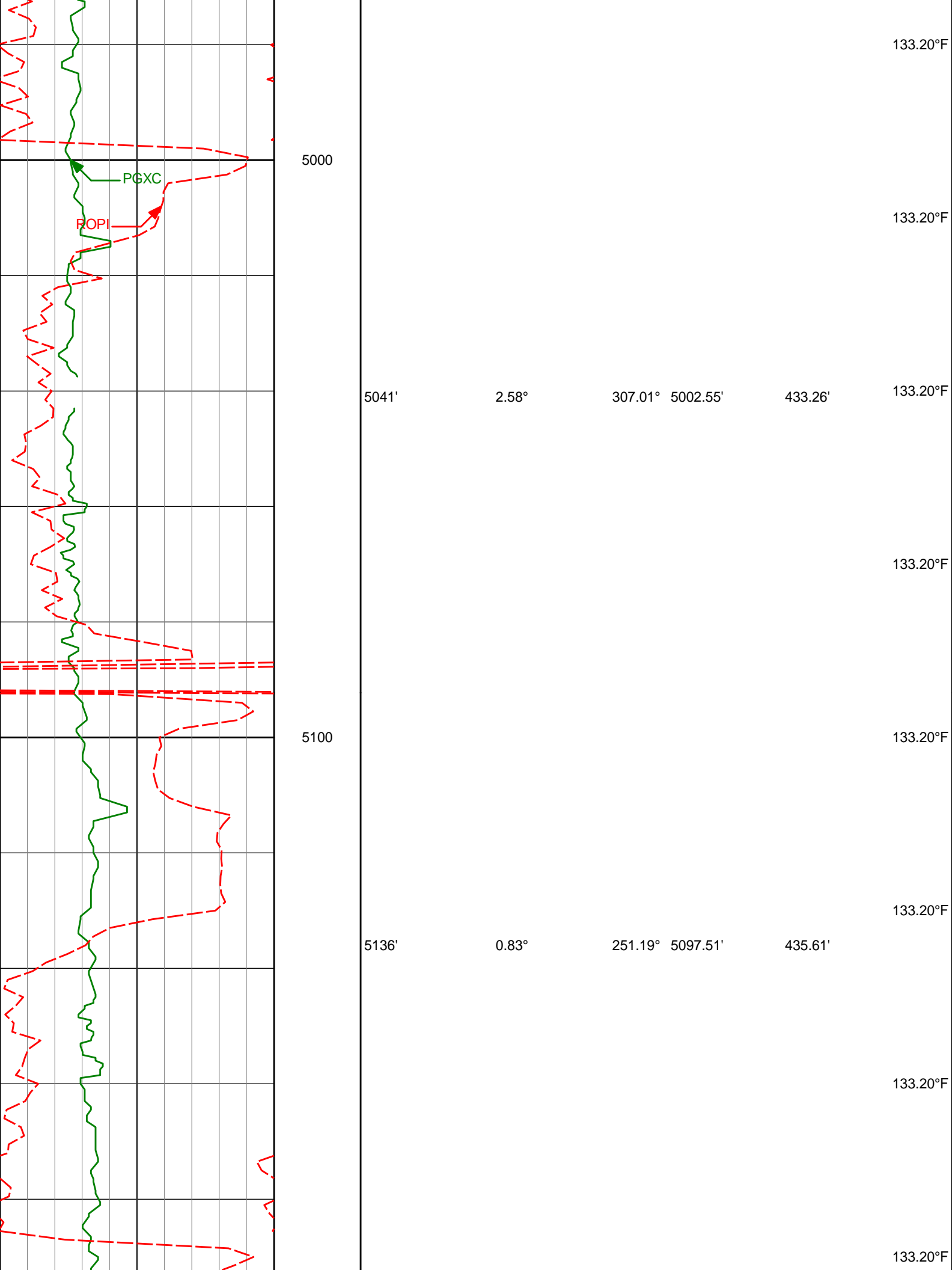


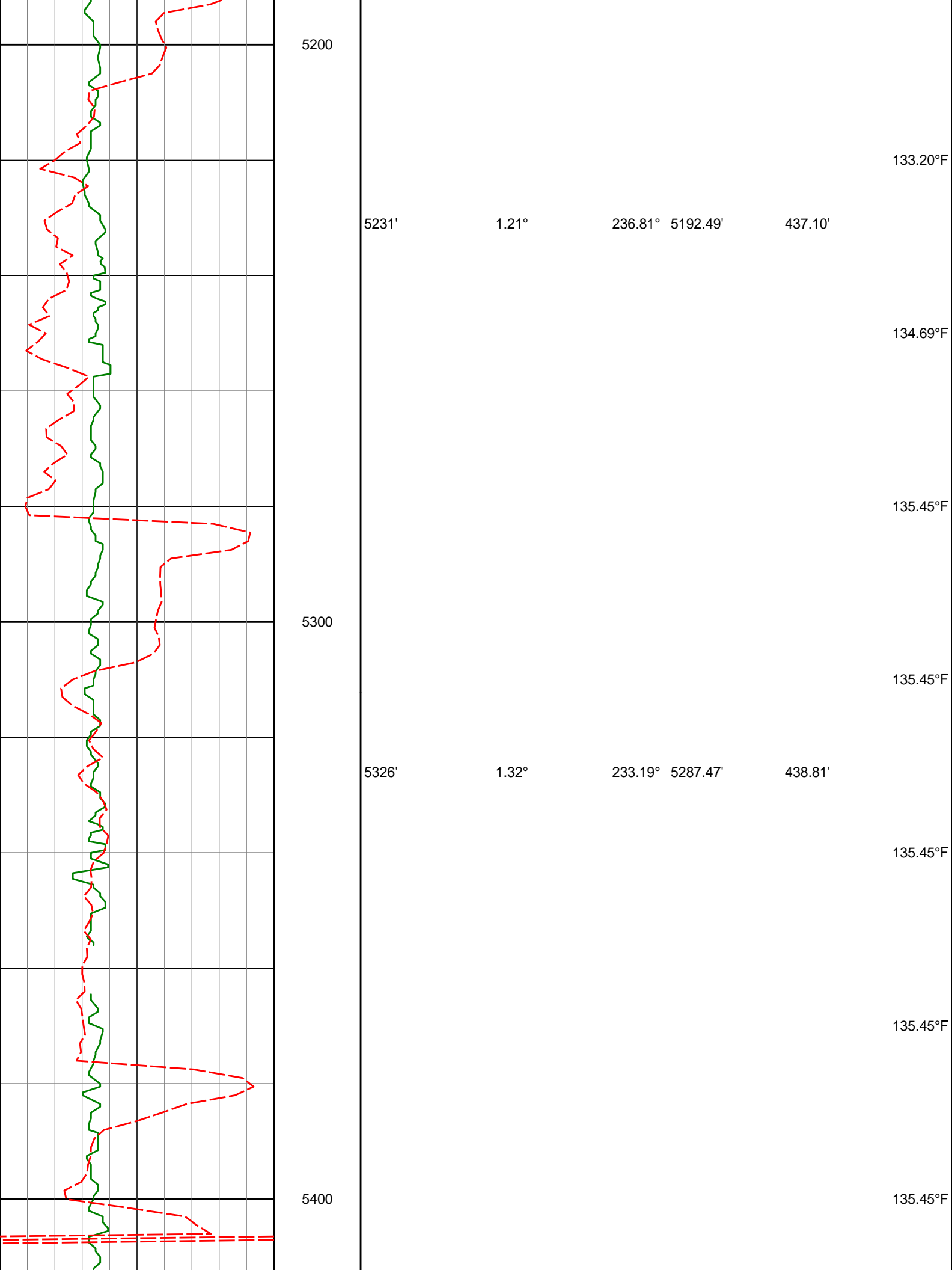


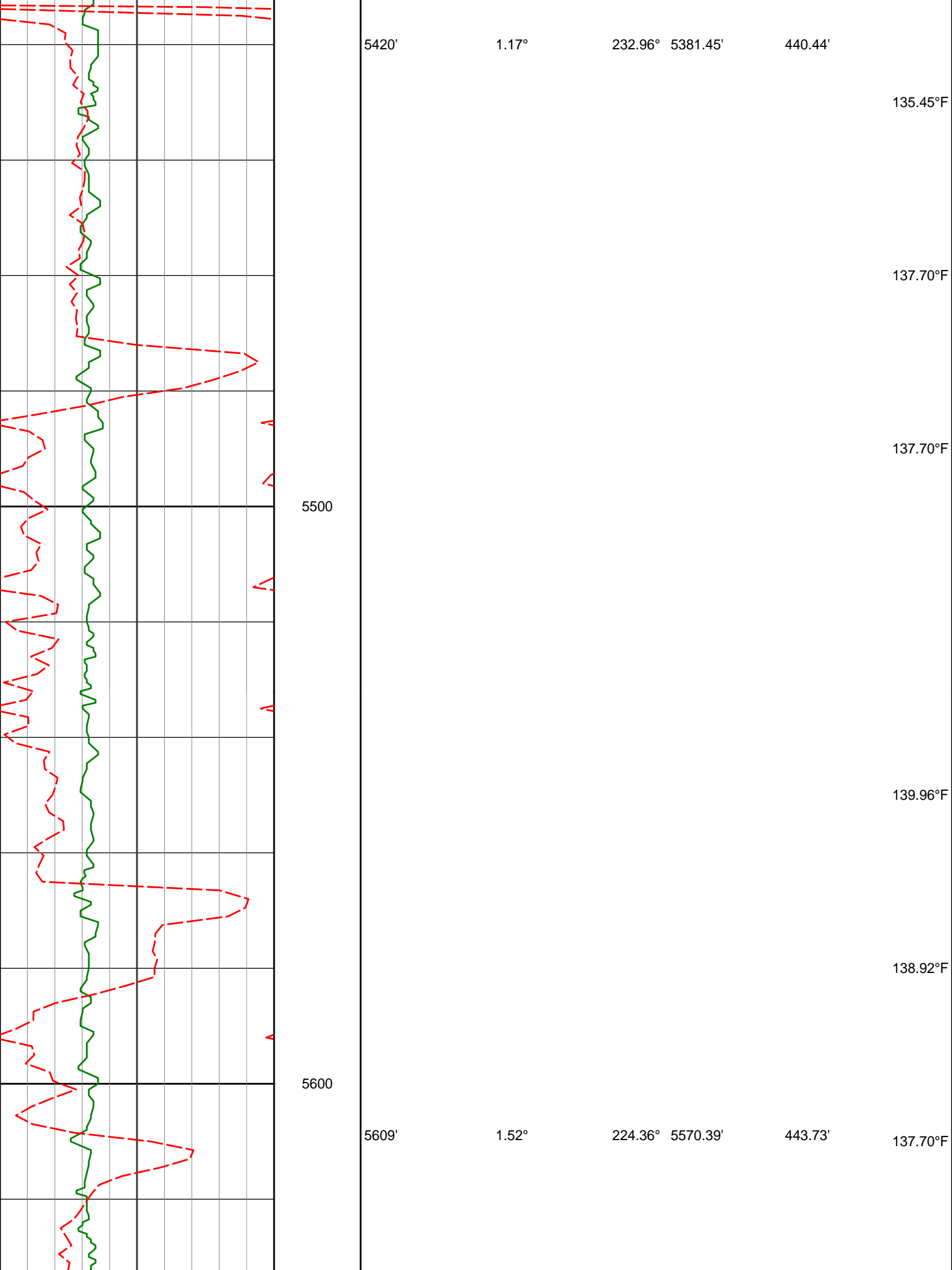


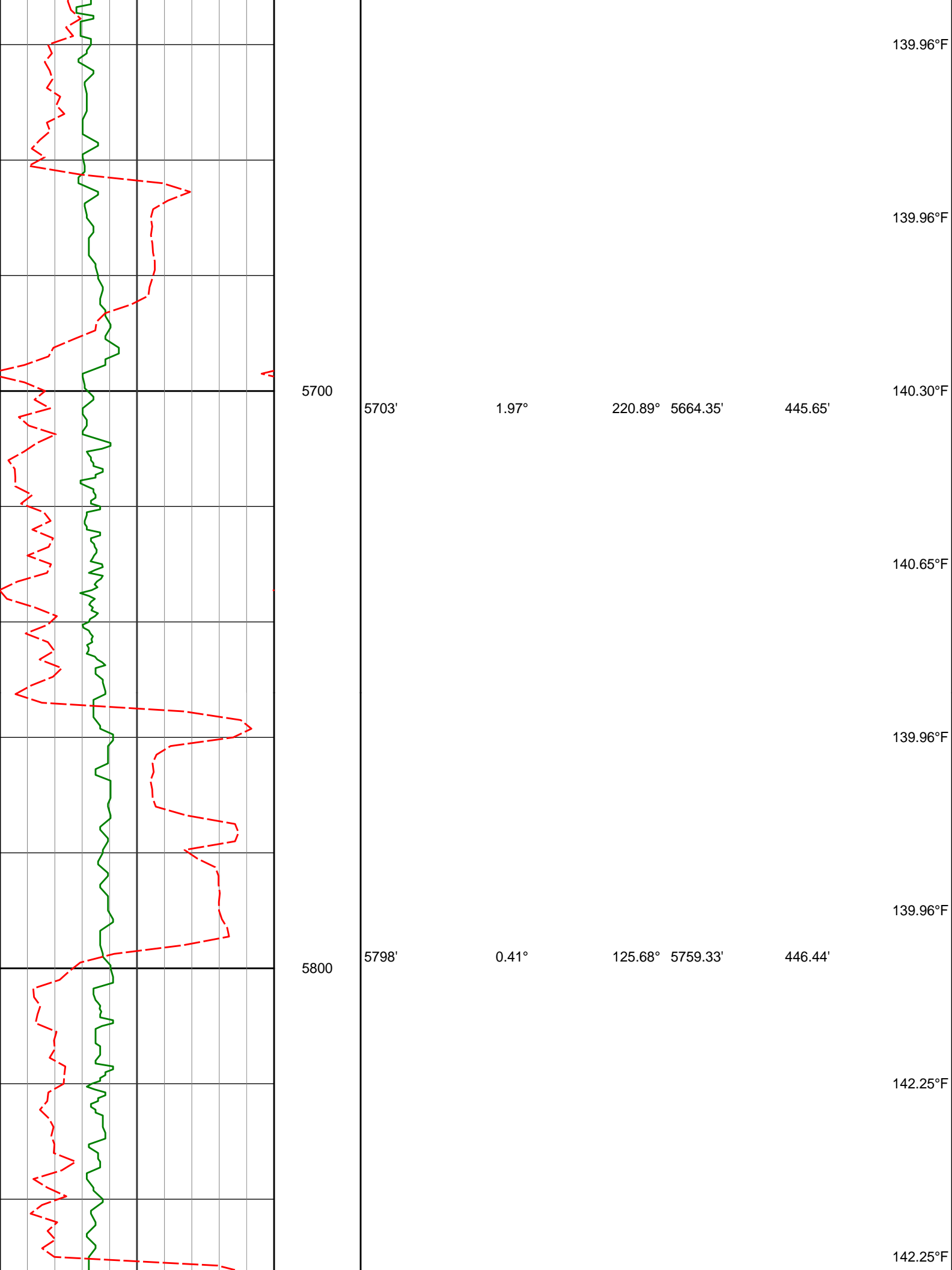


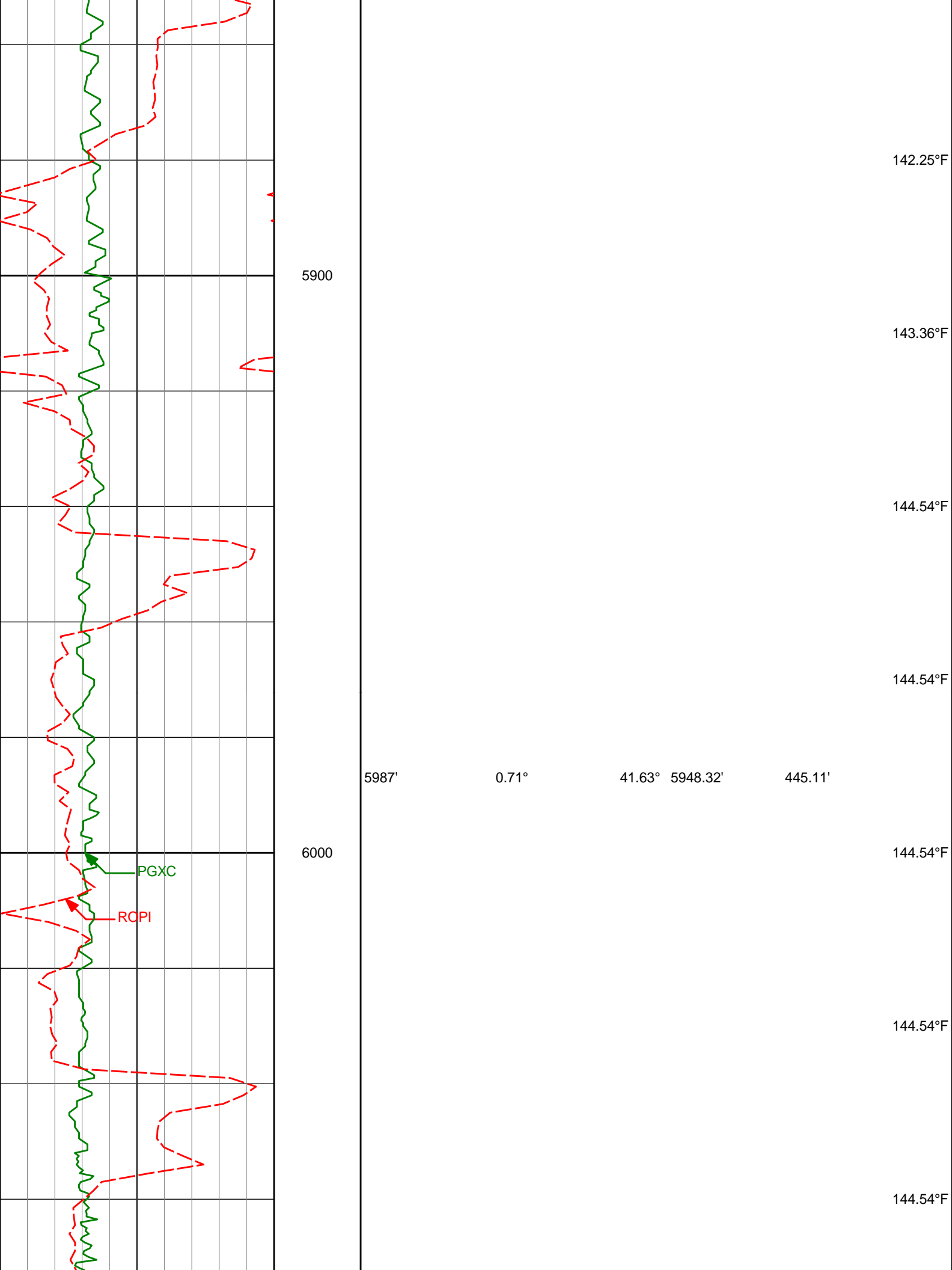


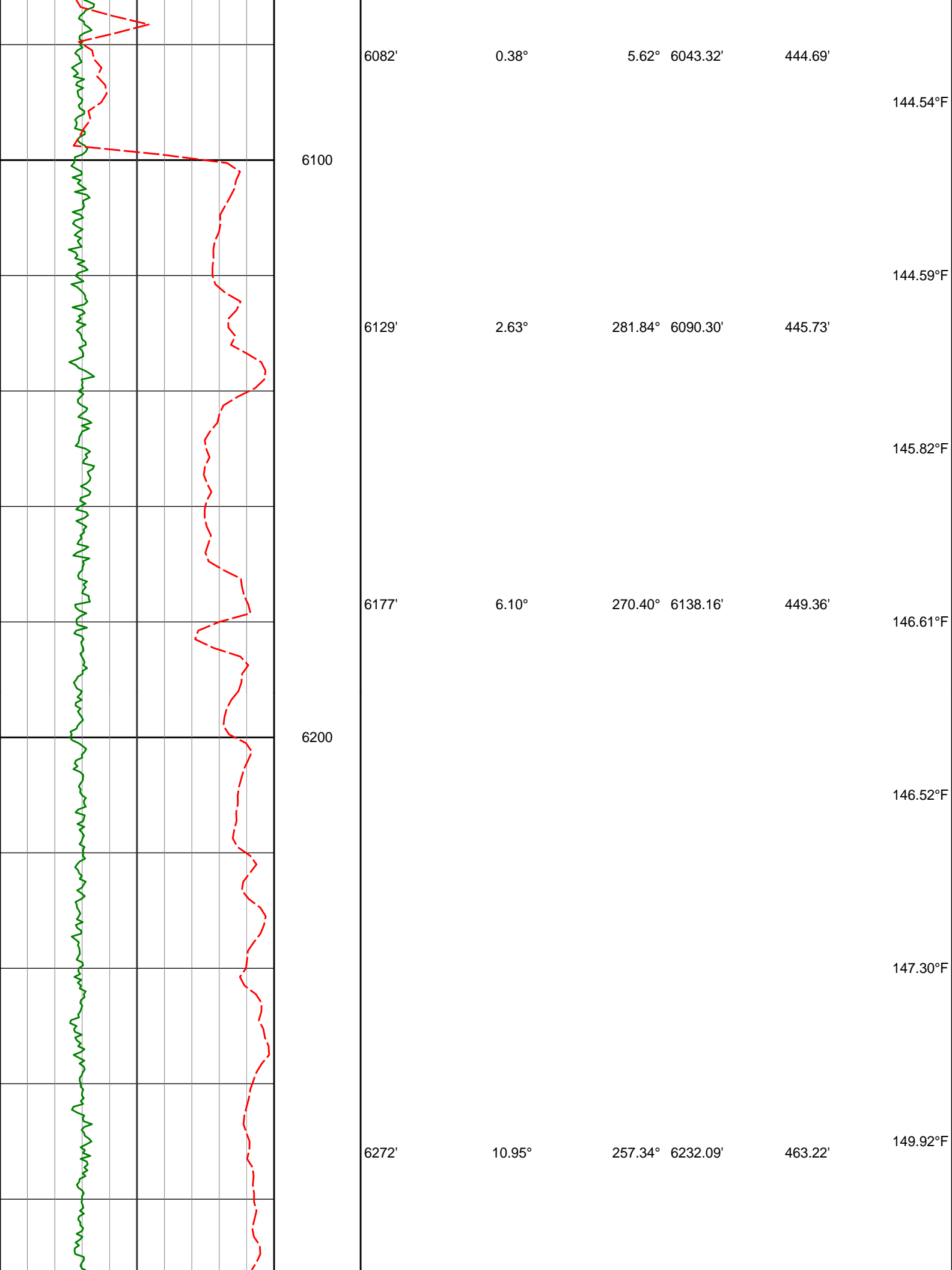


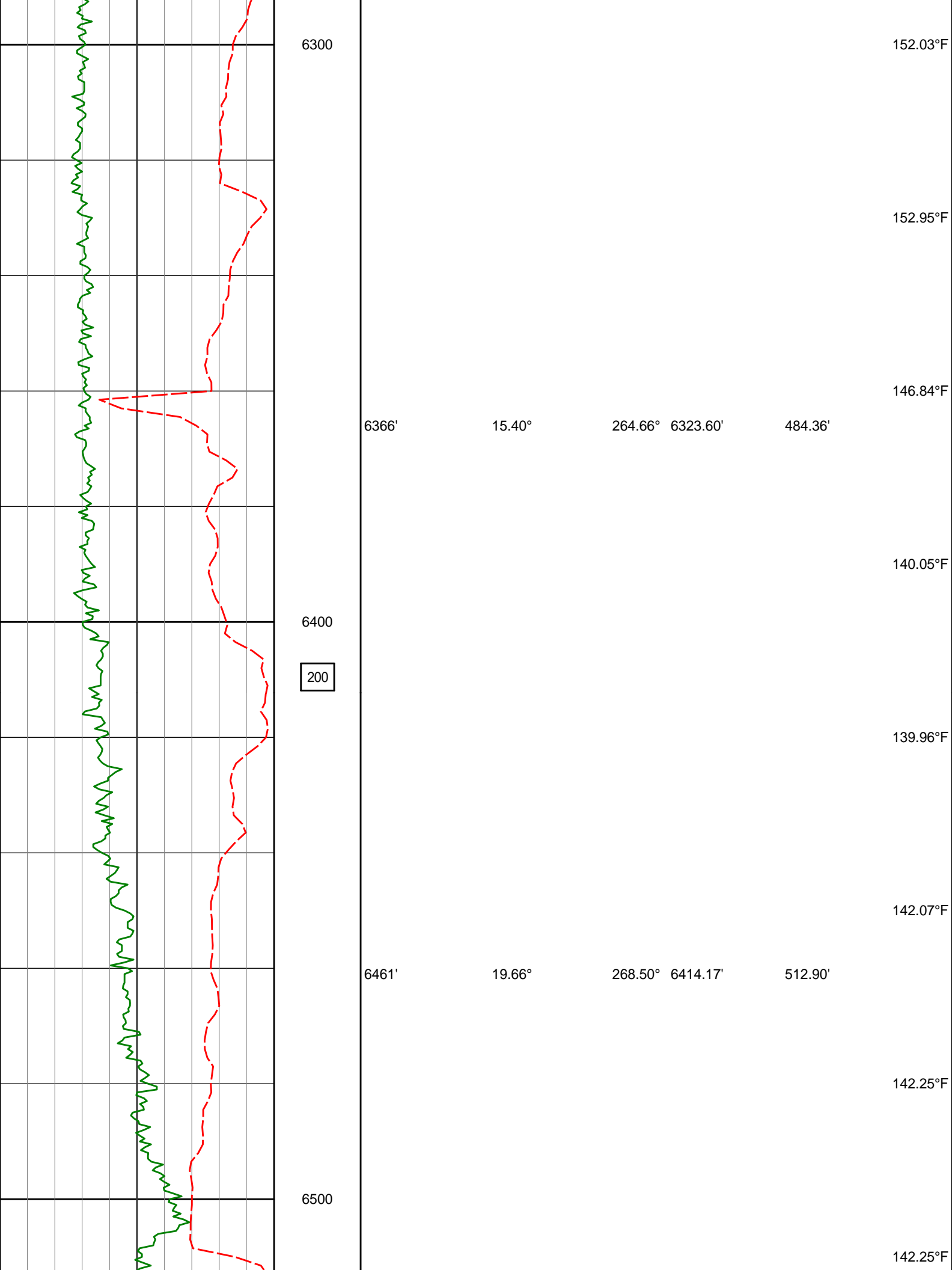


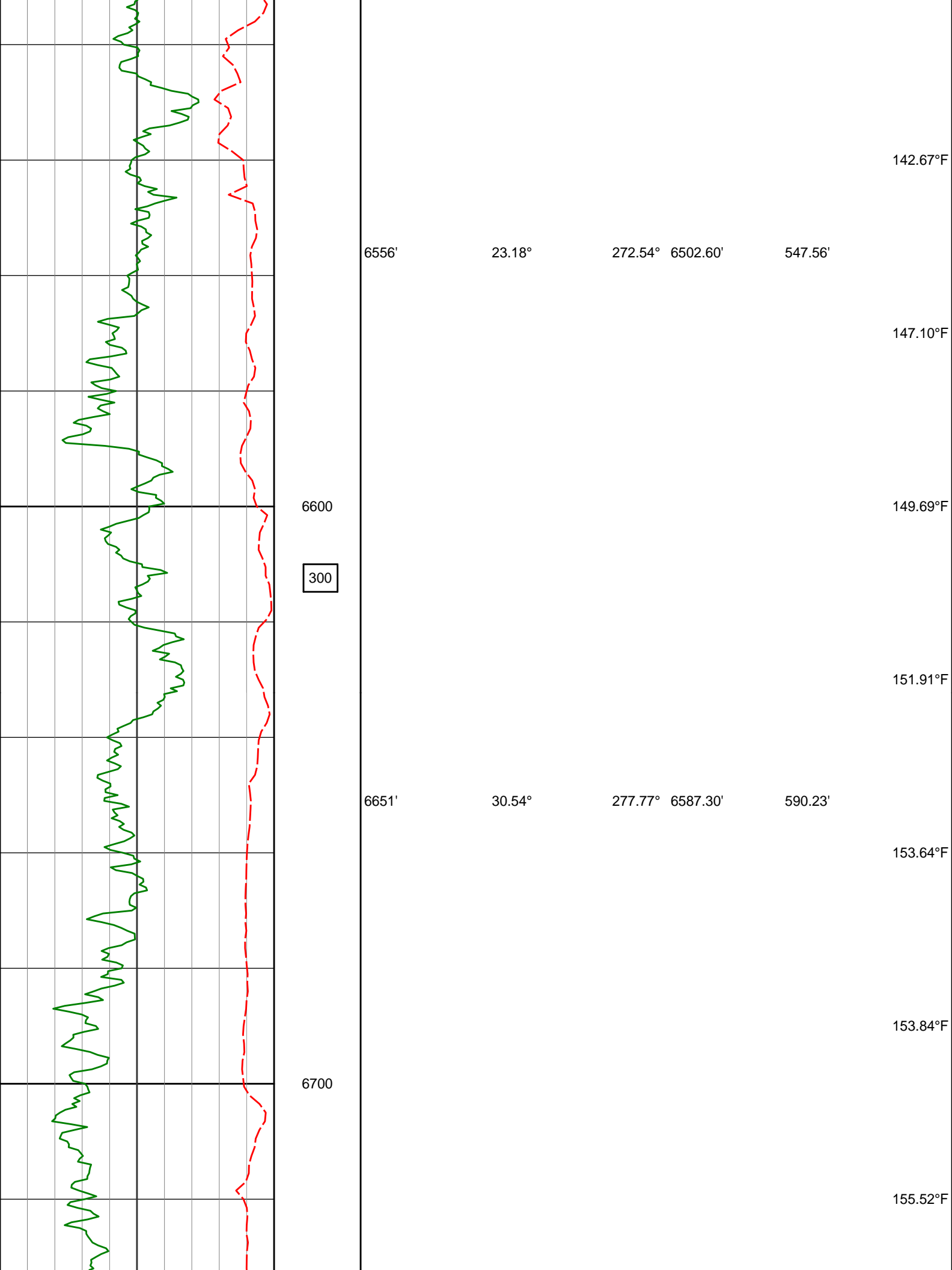


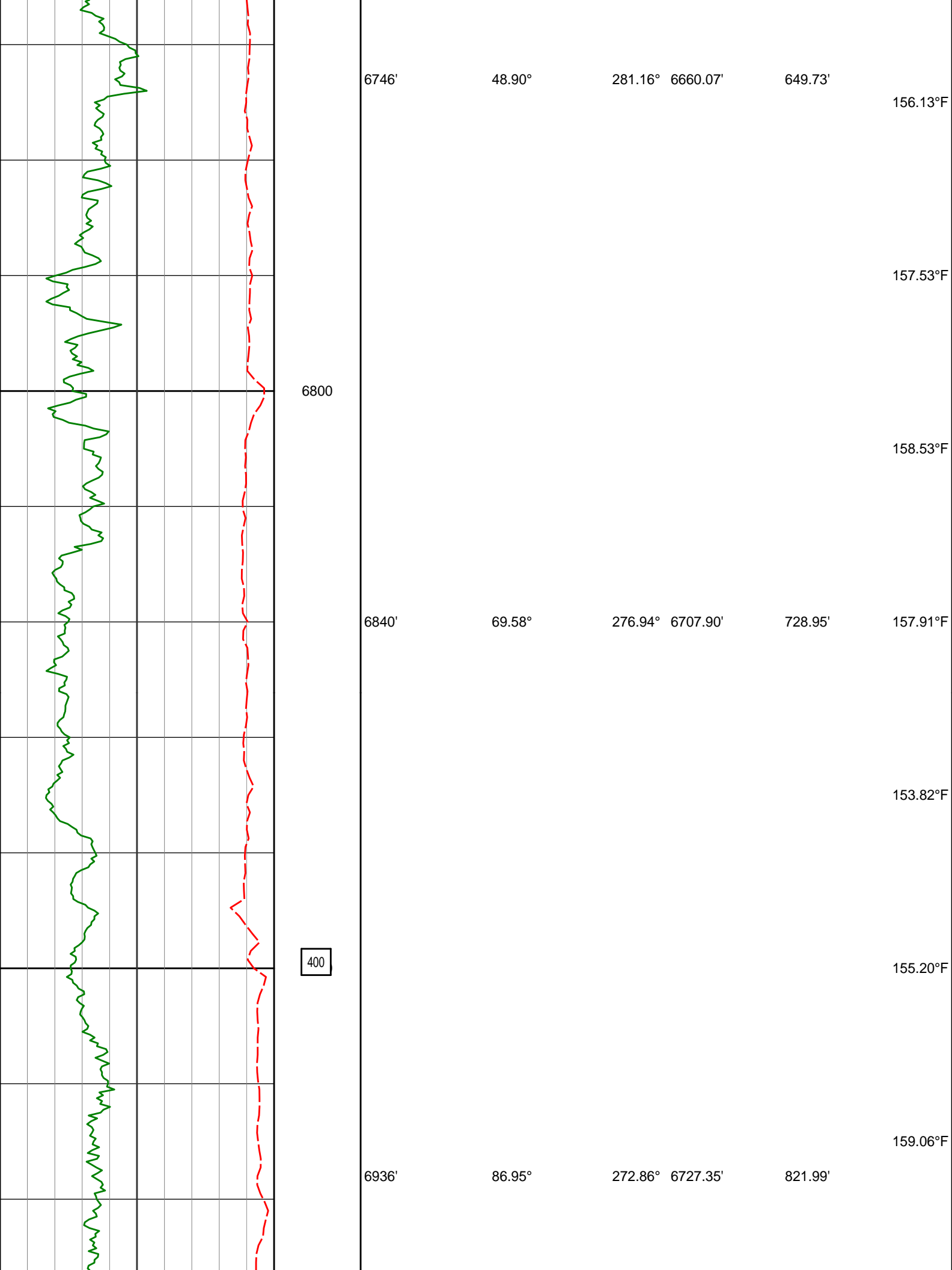












6746'

48.90°

281.16° 6660.07'

649.73'

156.13°F

157.53°F

6800

158.53°F

6840'

69.58°

276.94° 6707.90'

728.95'

157.91°F

153.82°F

400

155.20°F

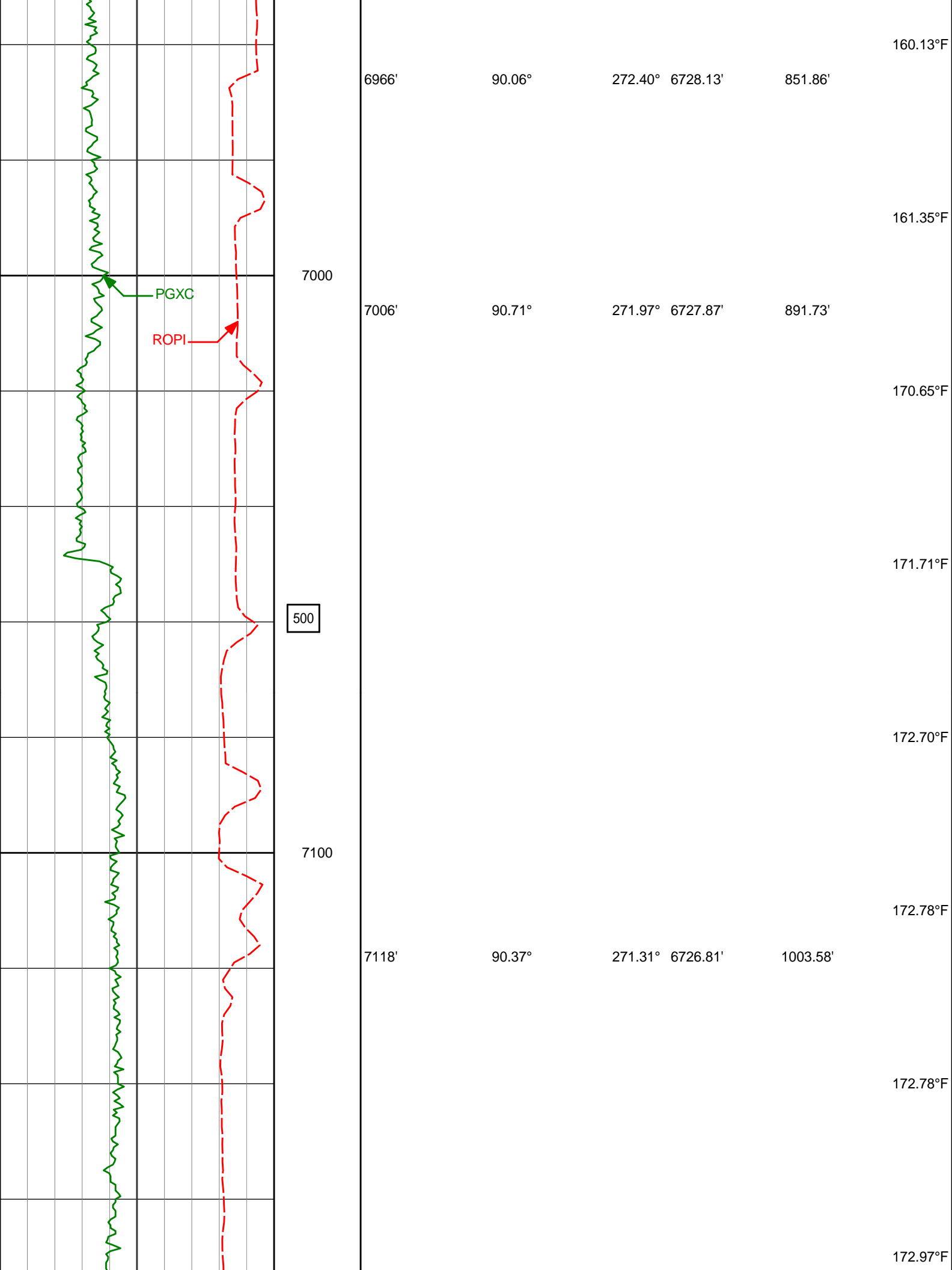
159.06°F

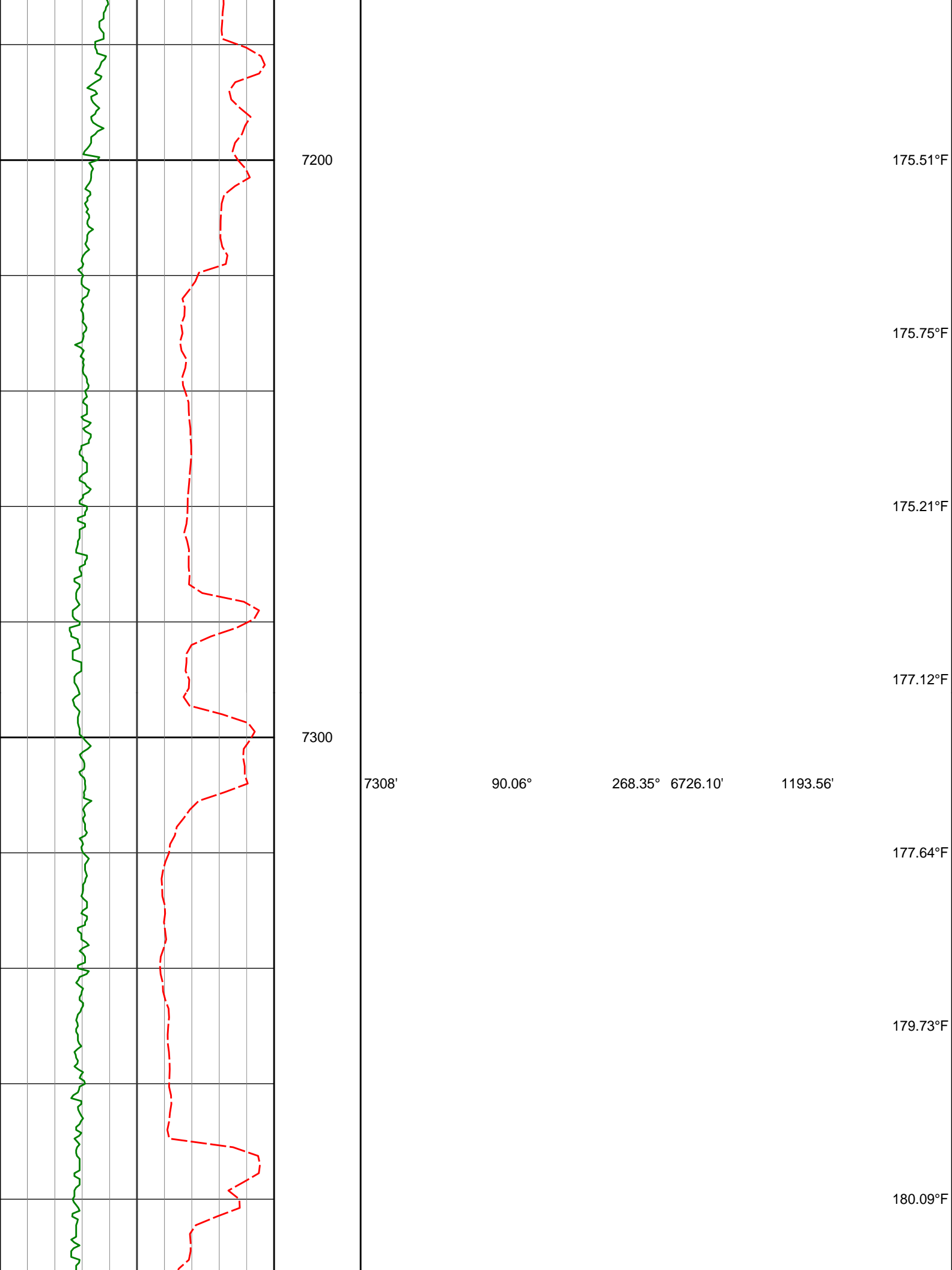
6936'

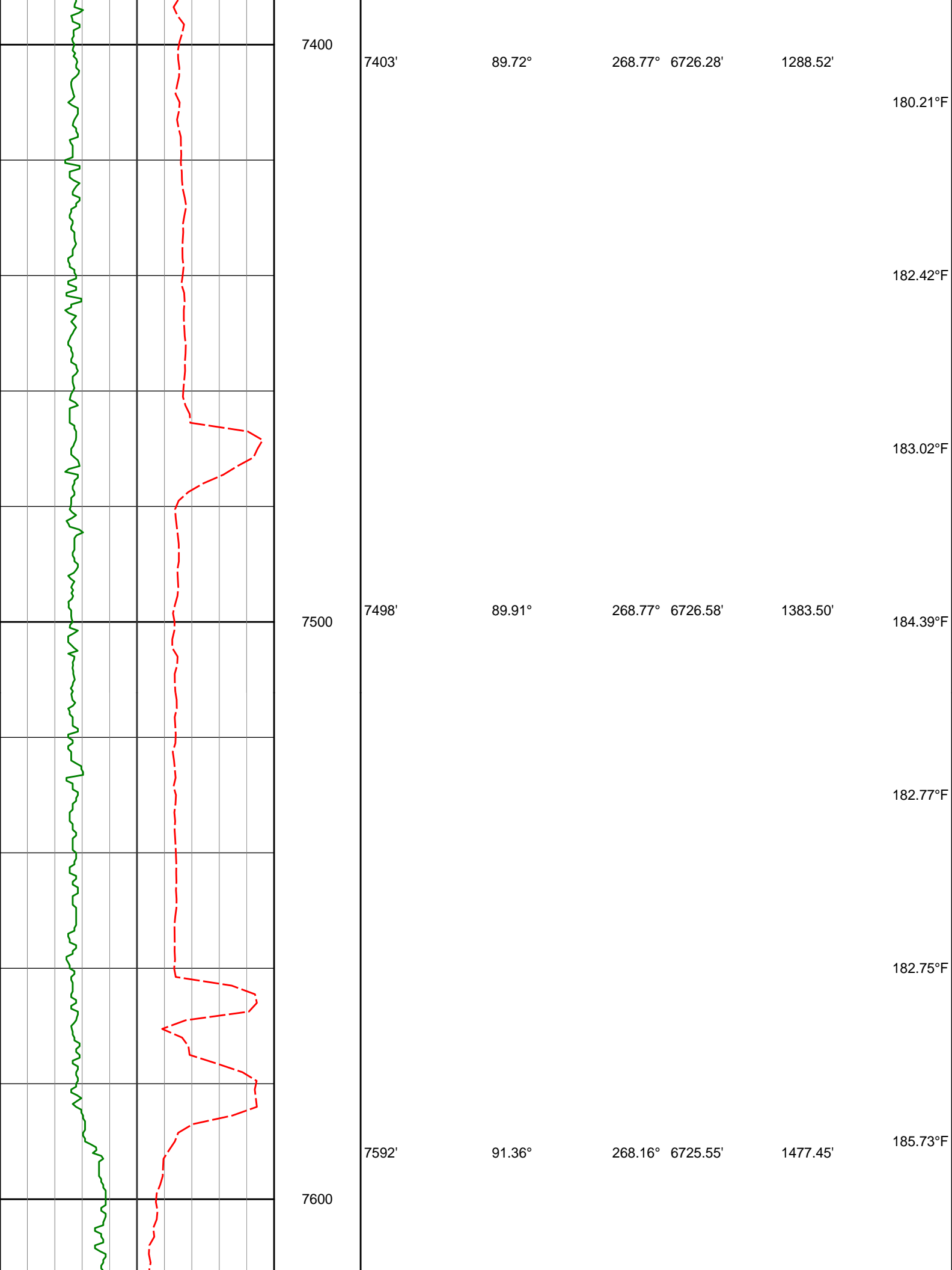
86.95°

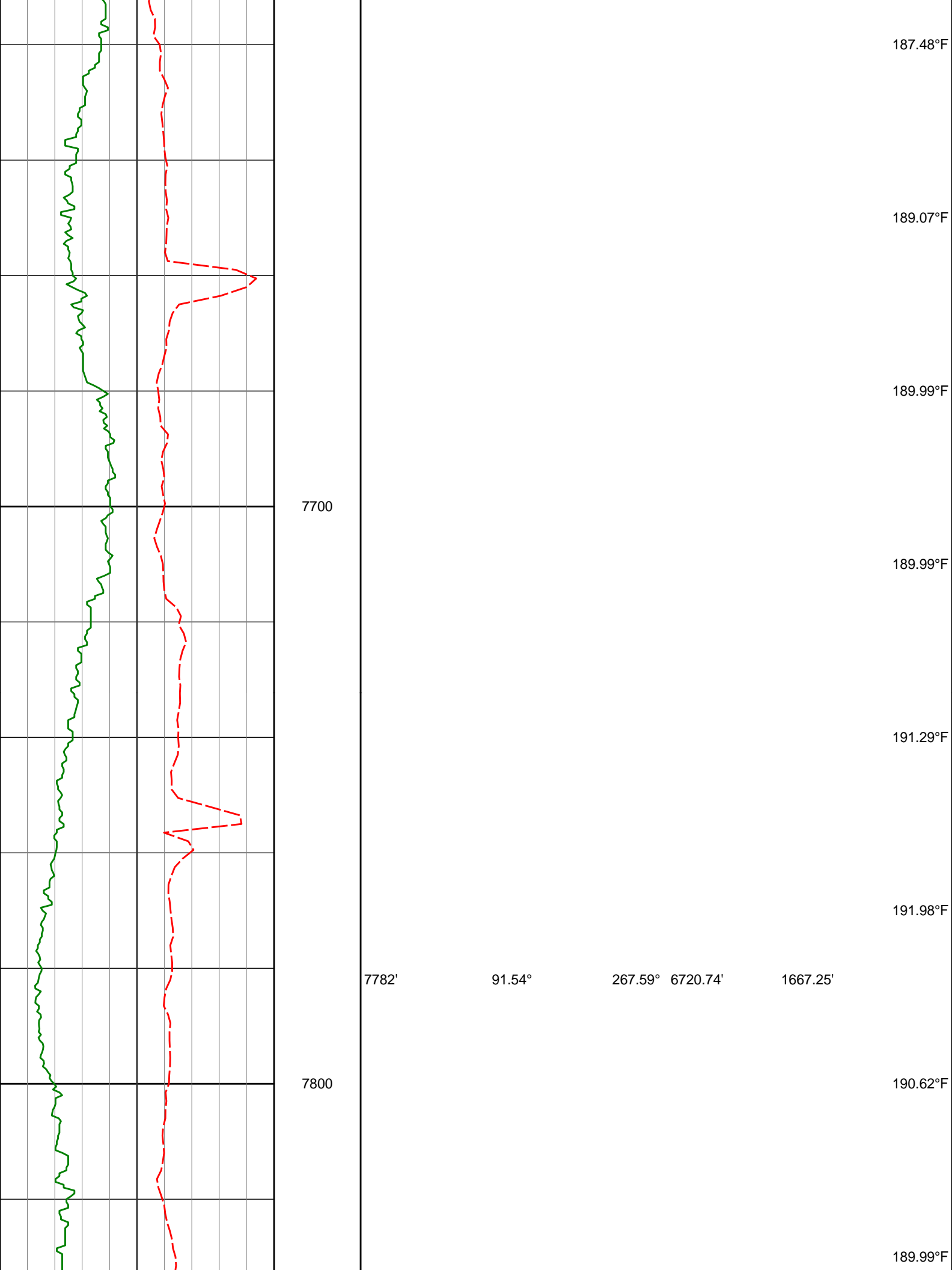
272.86° 6727.35'

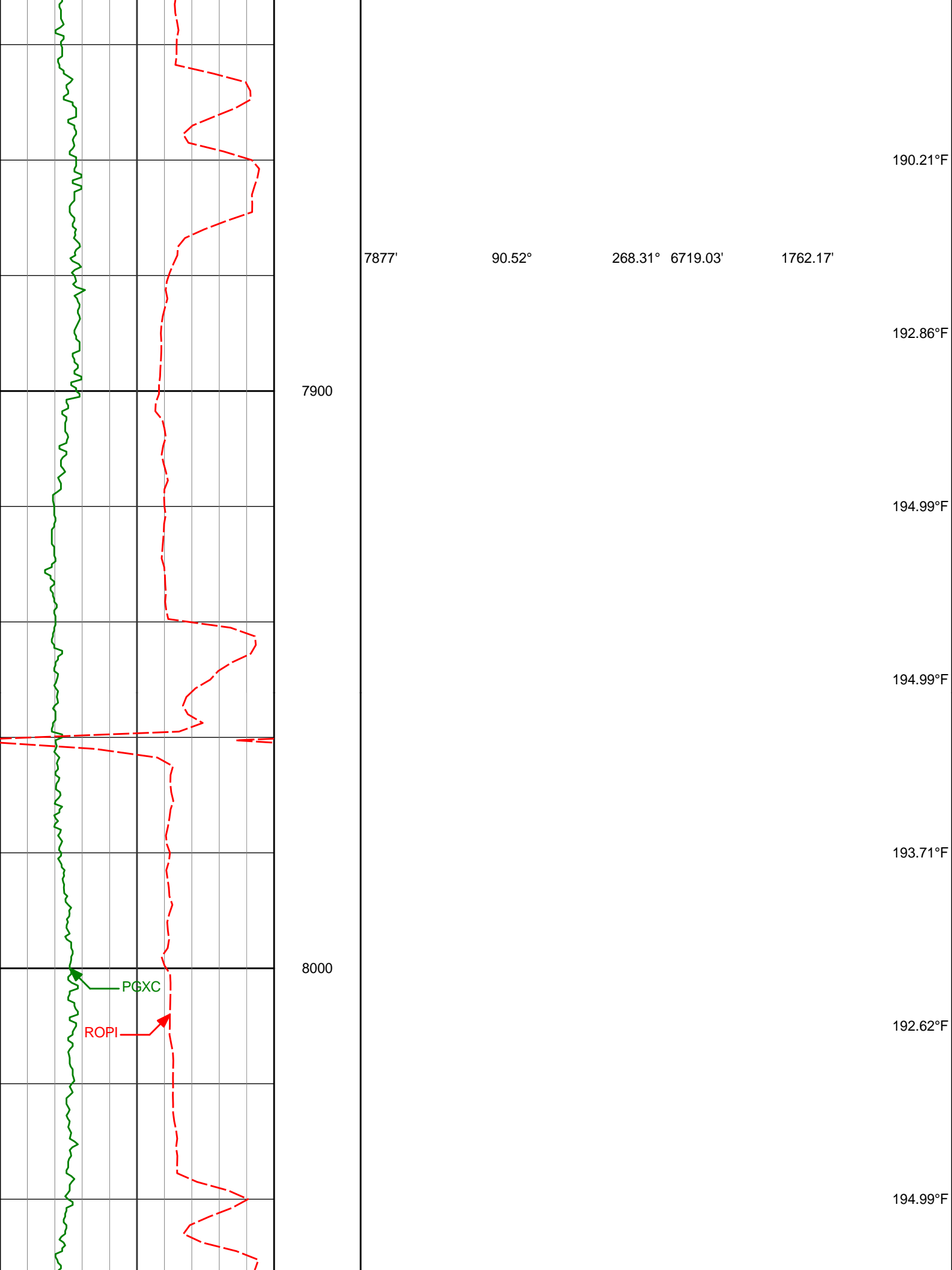
821.99'

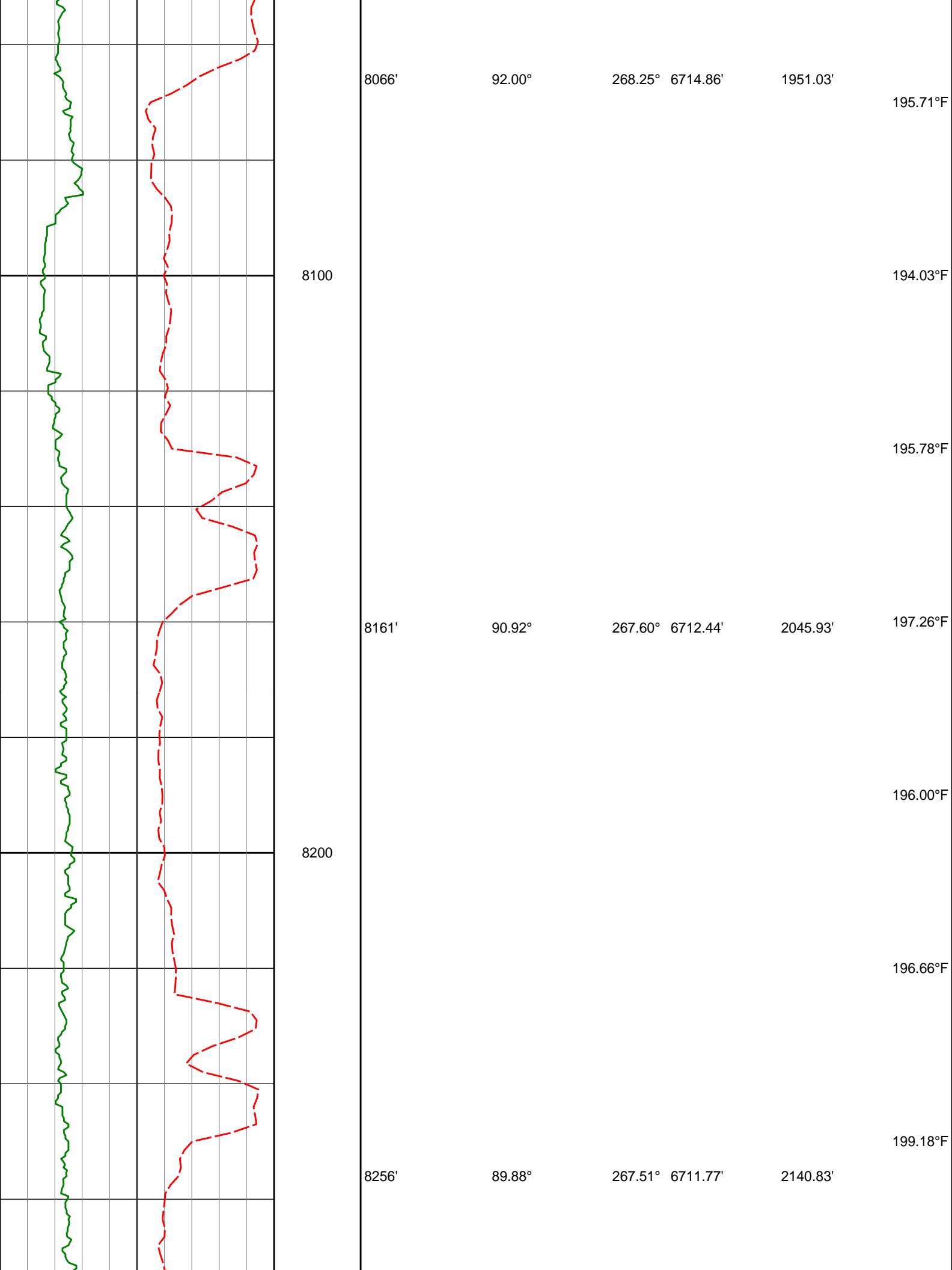


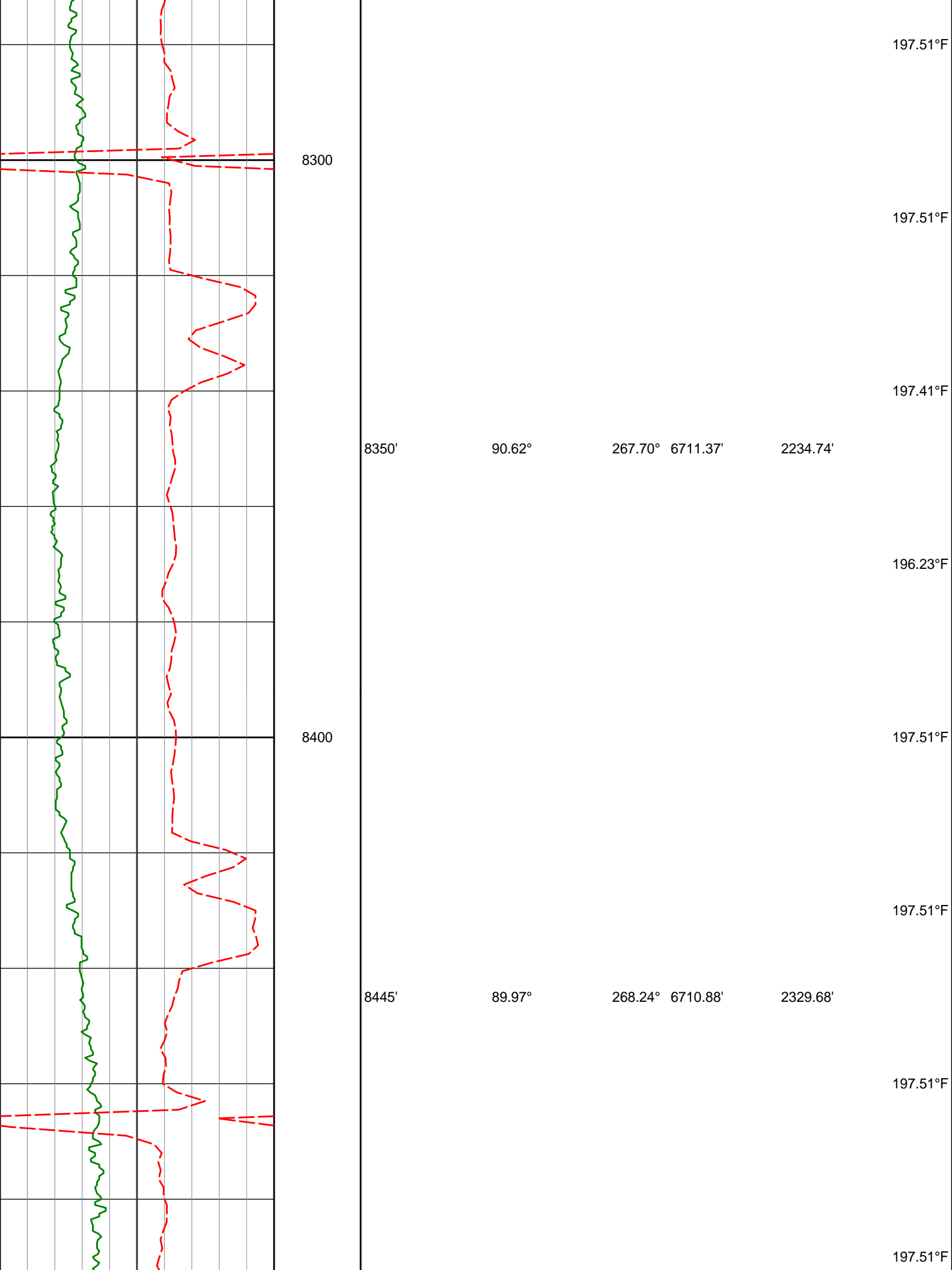


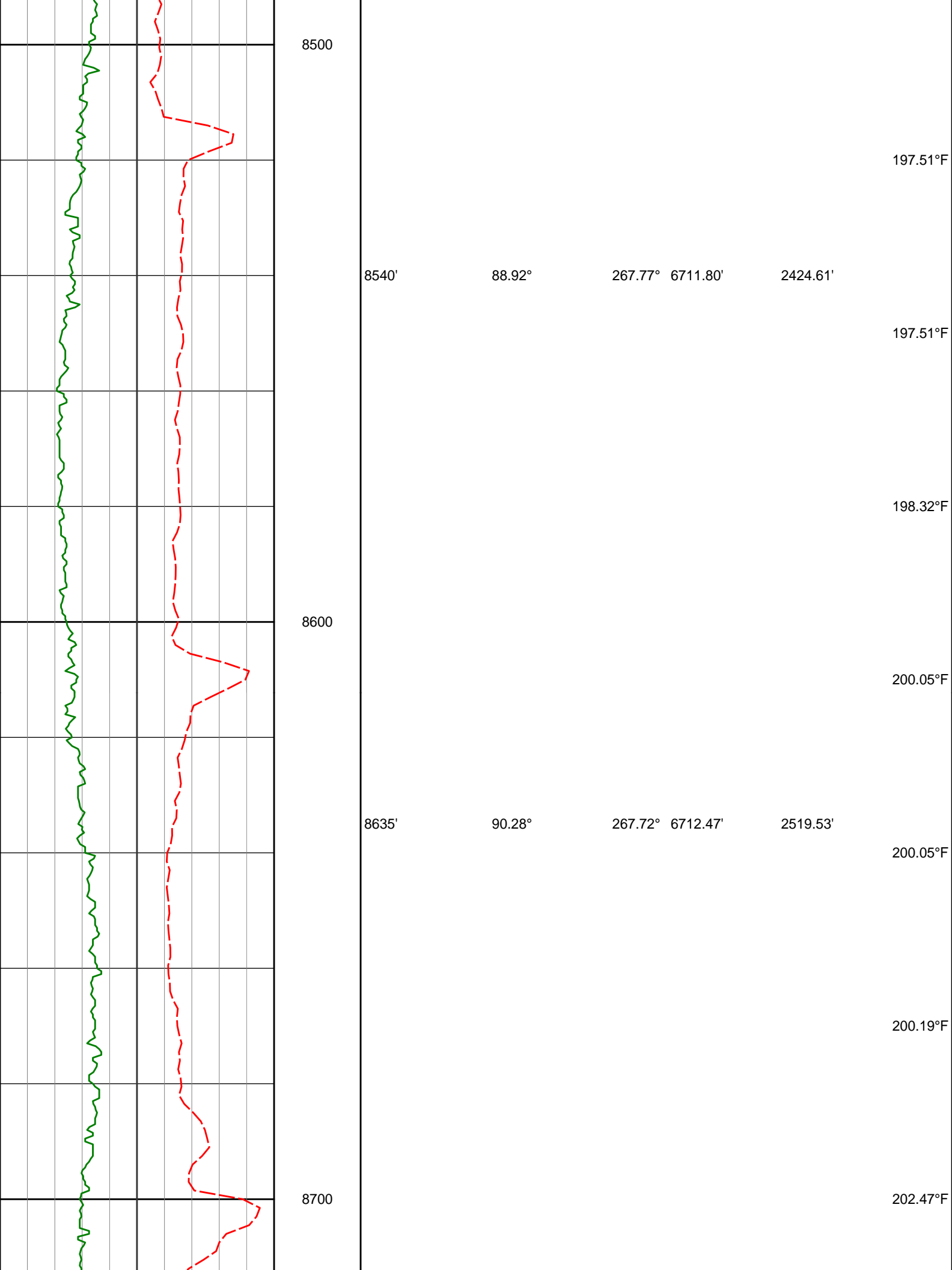


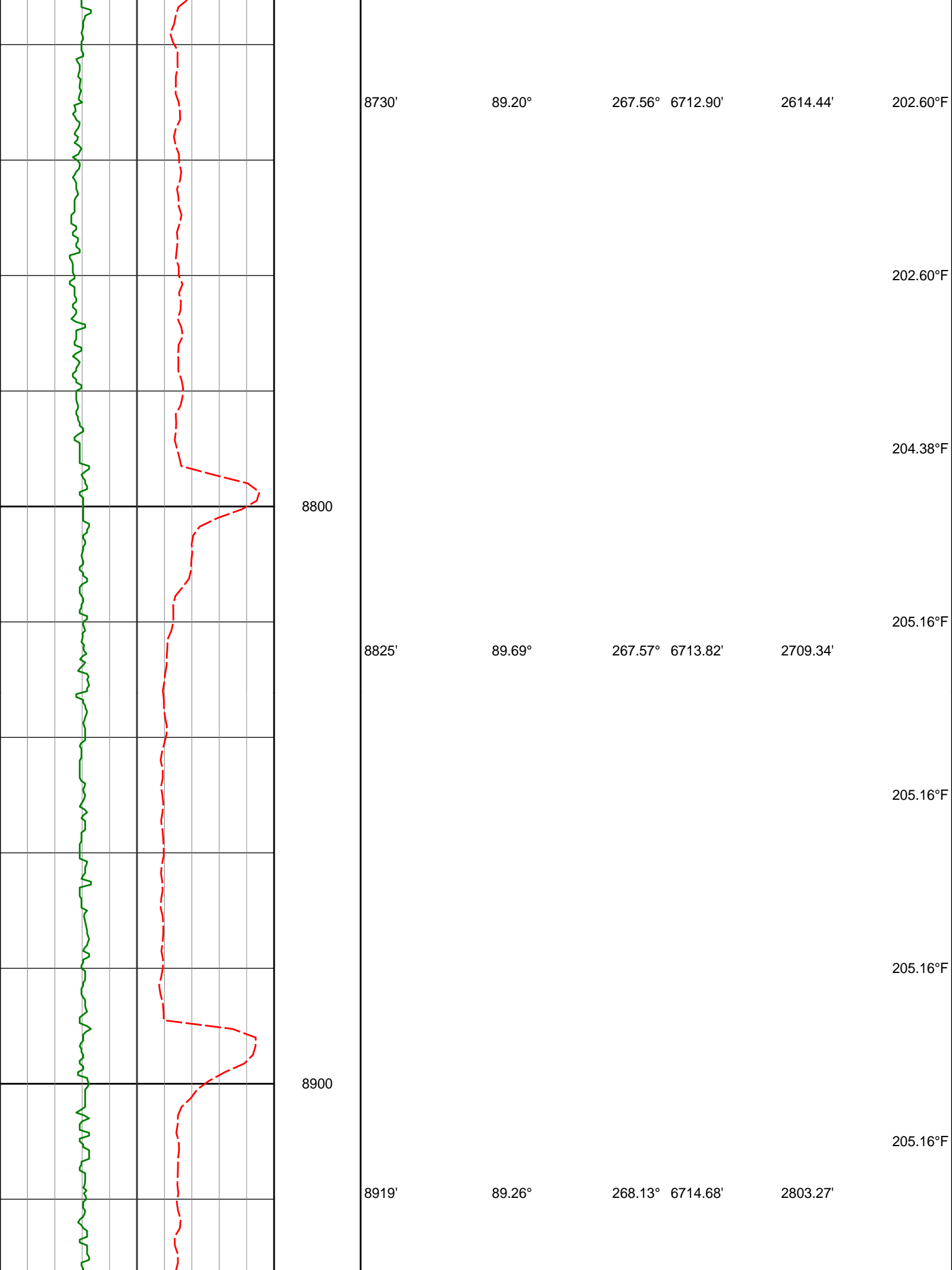


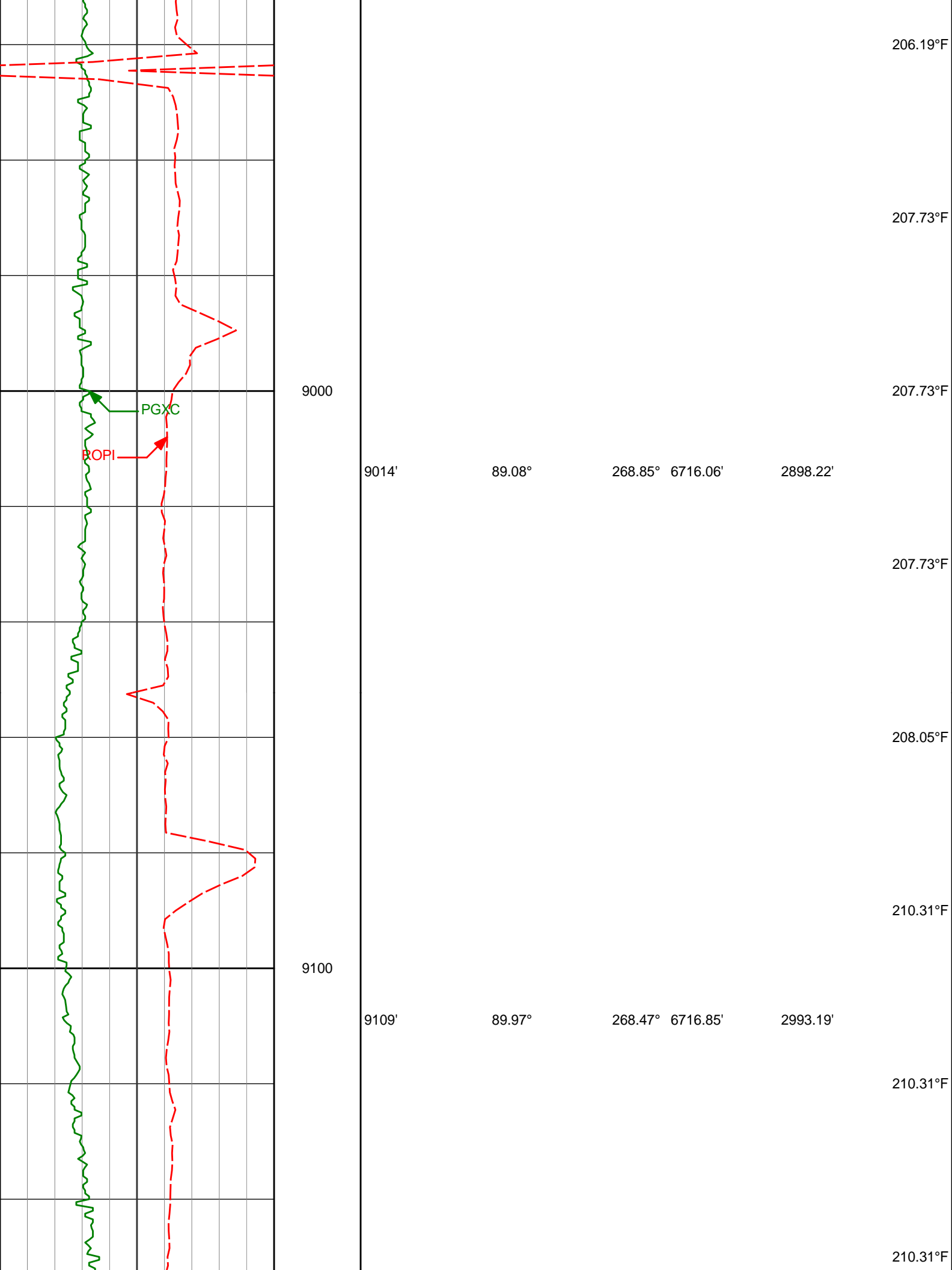


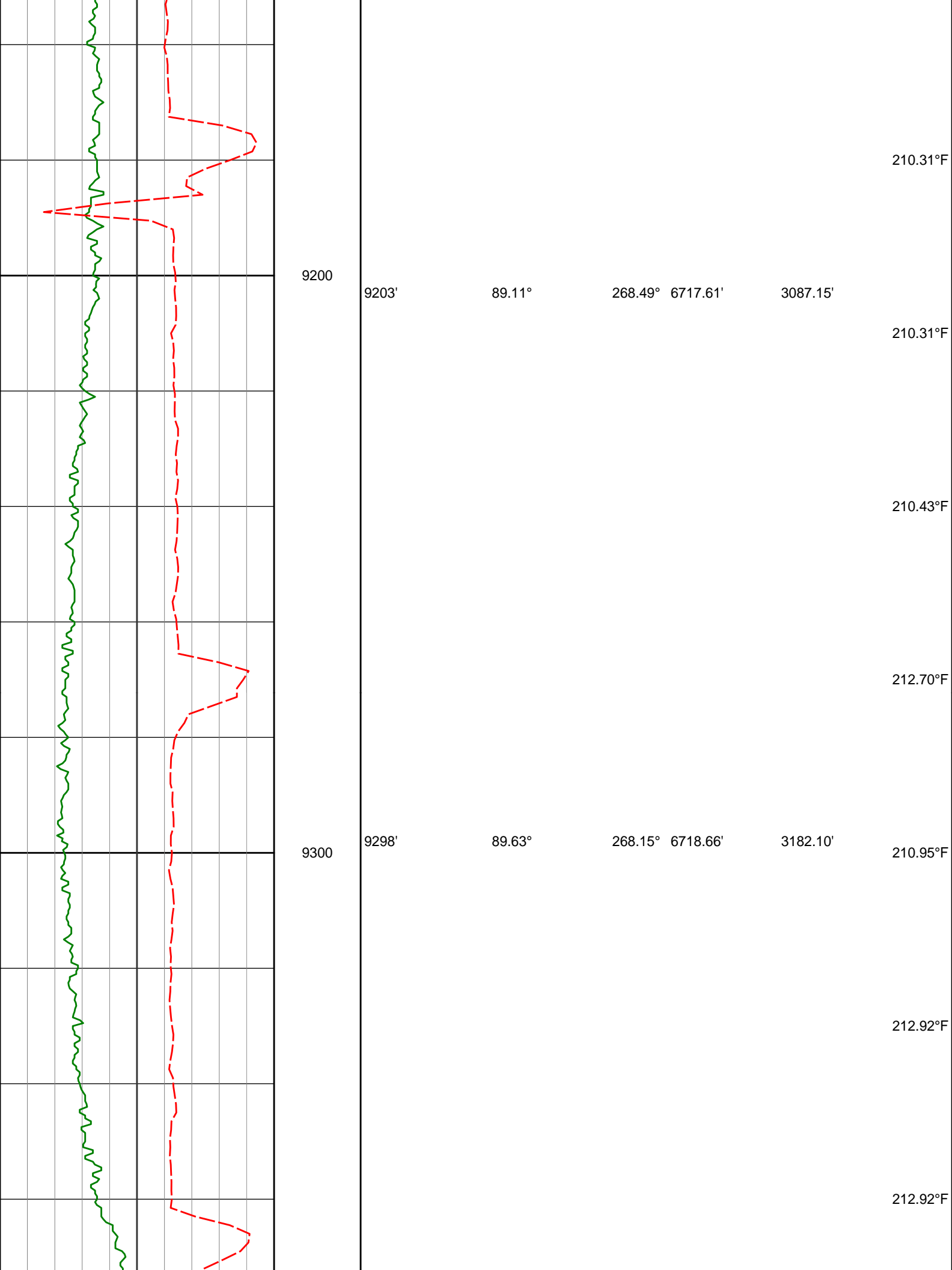


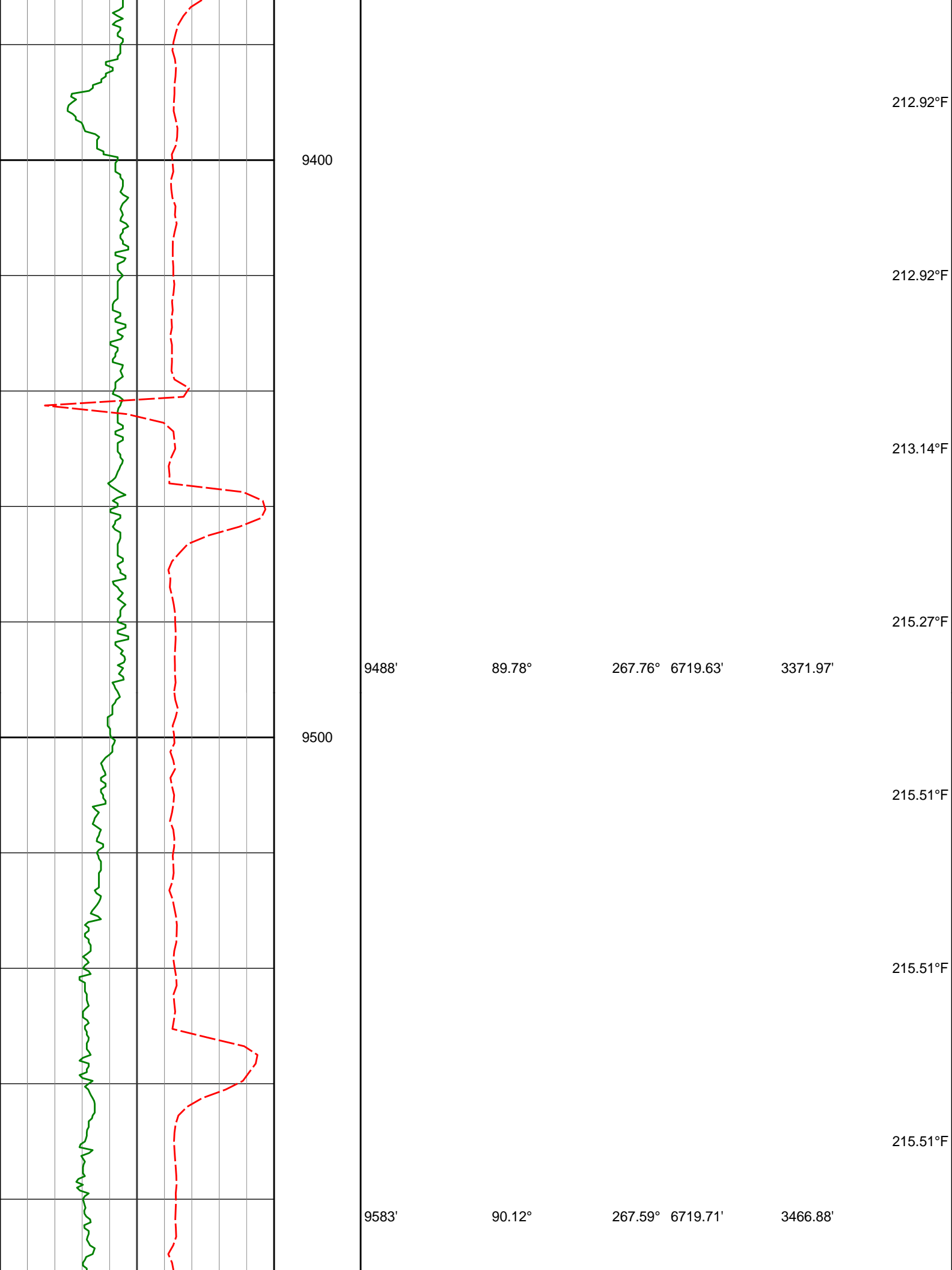


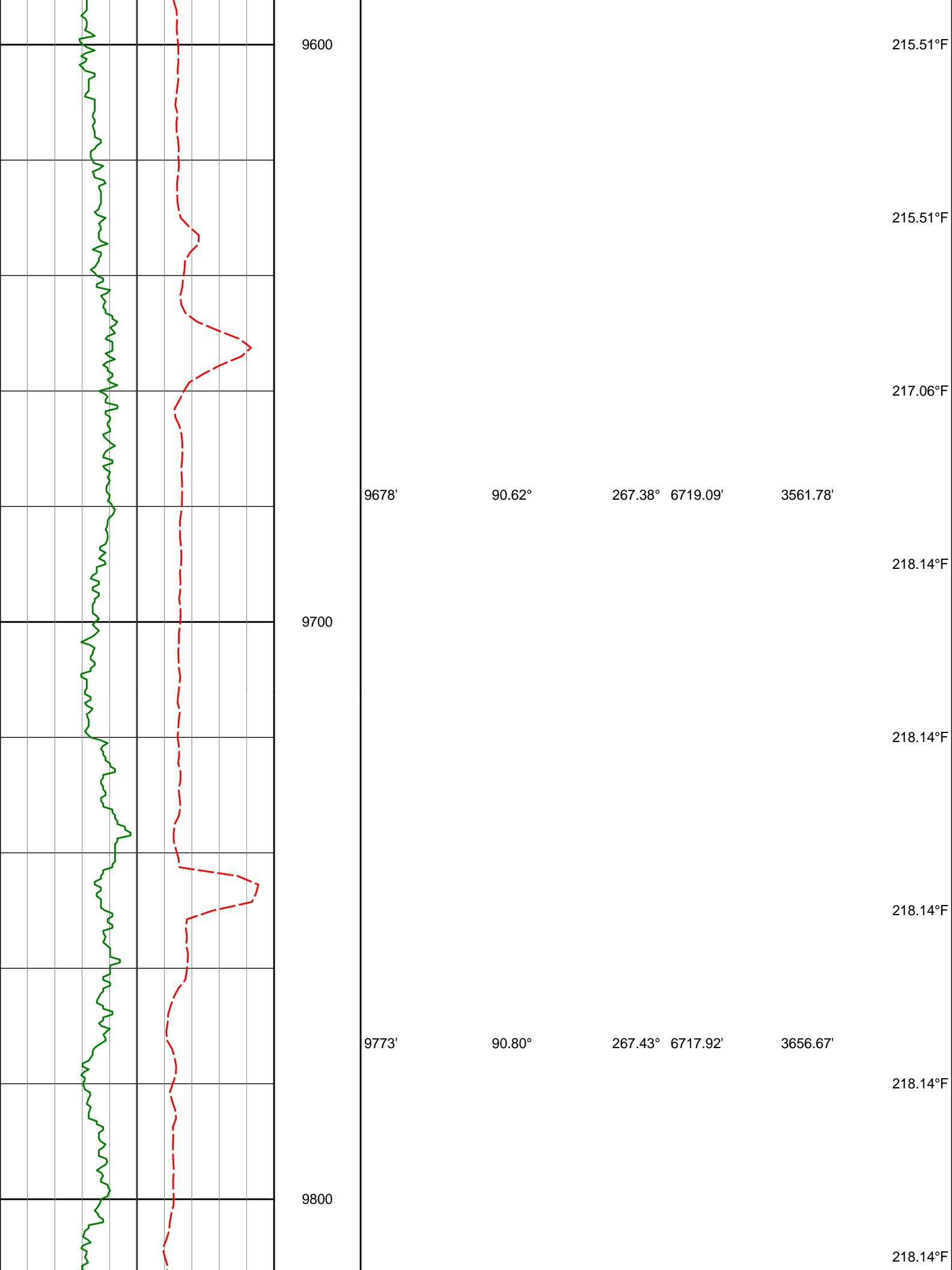


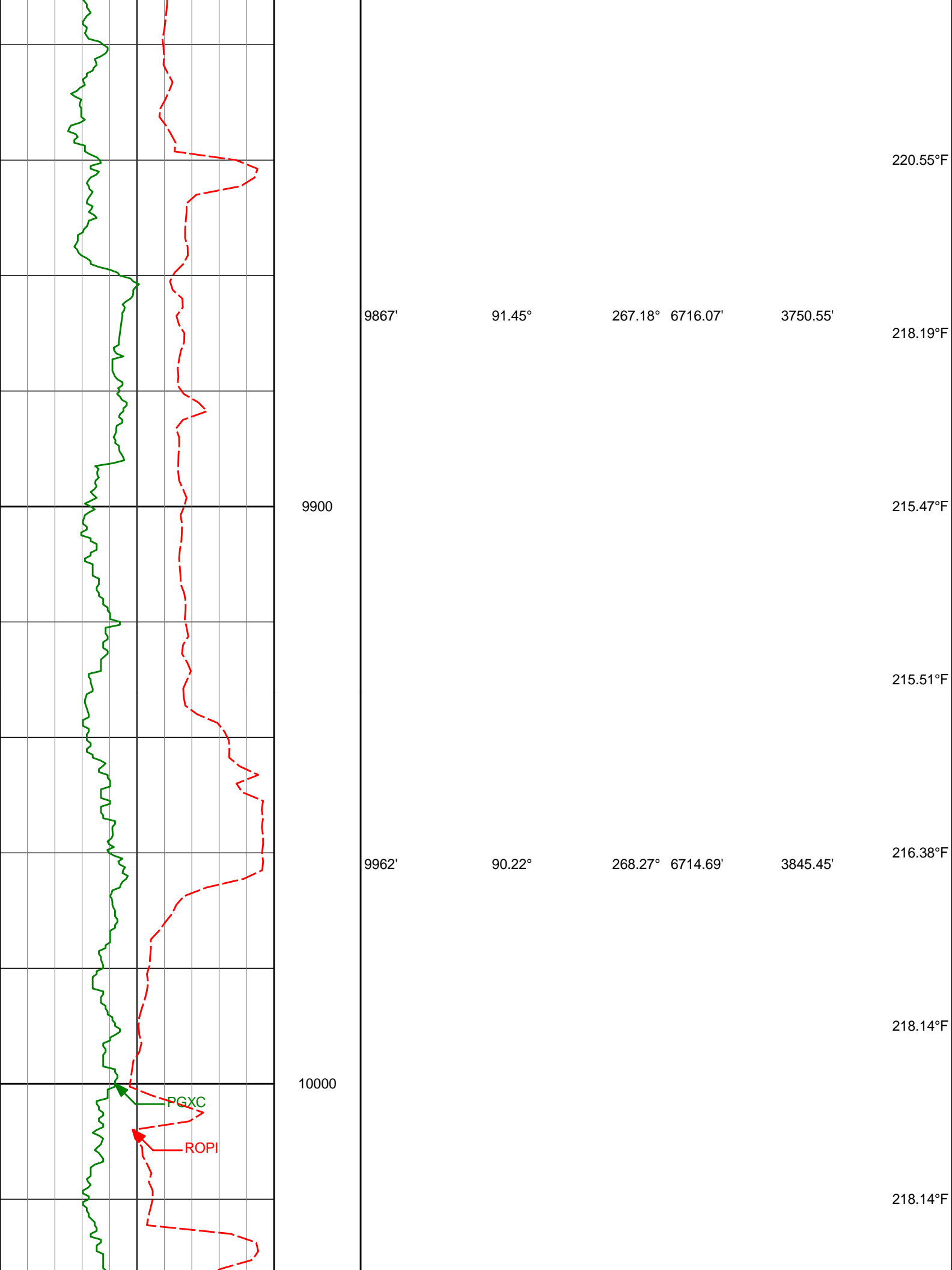


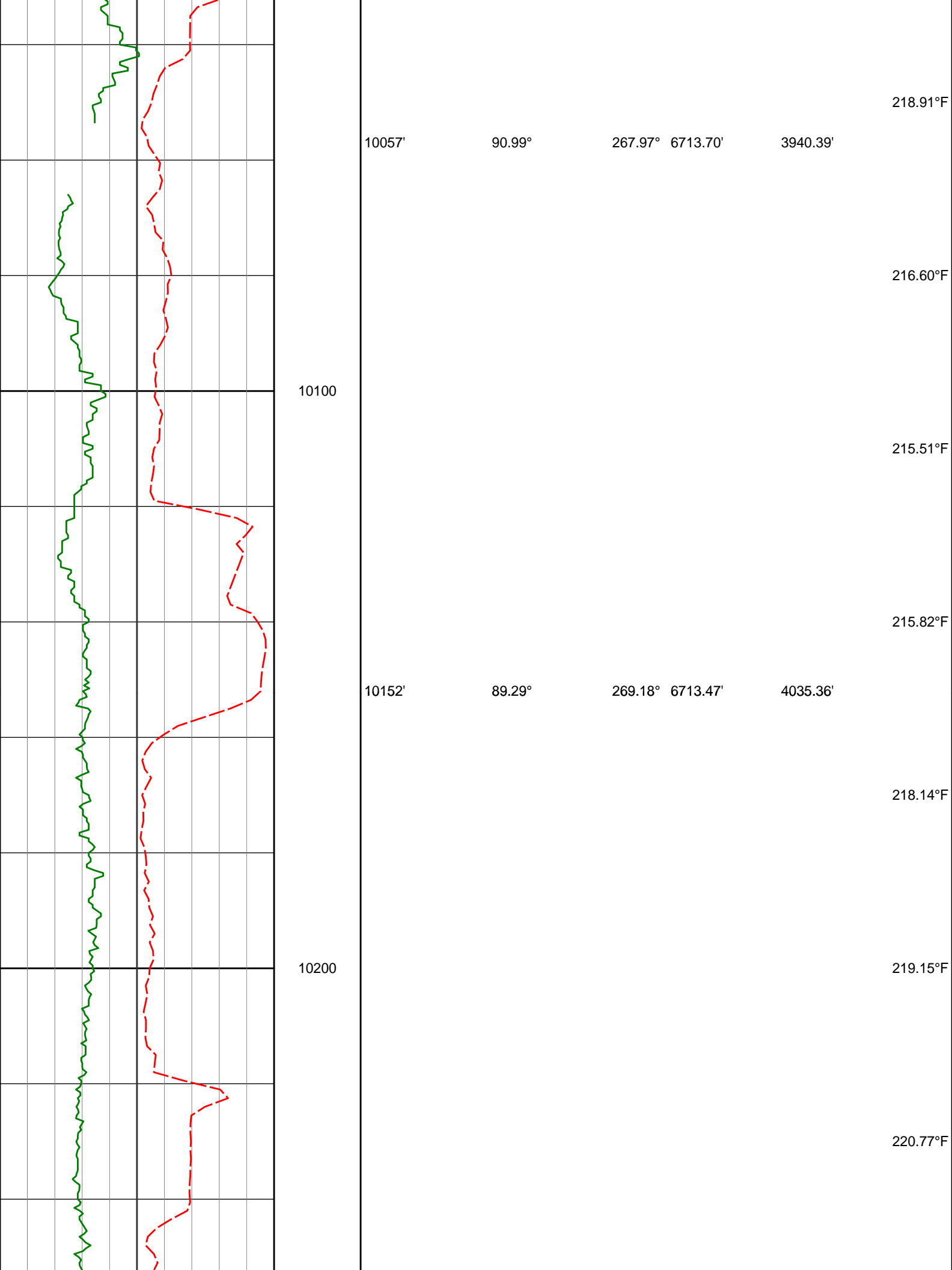


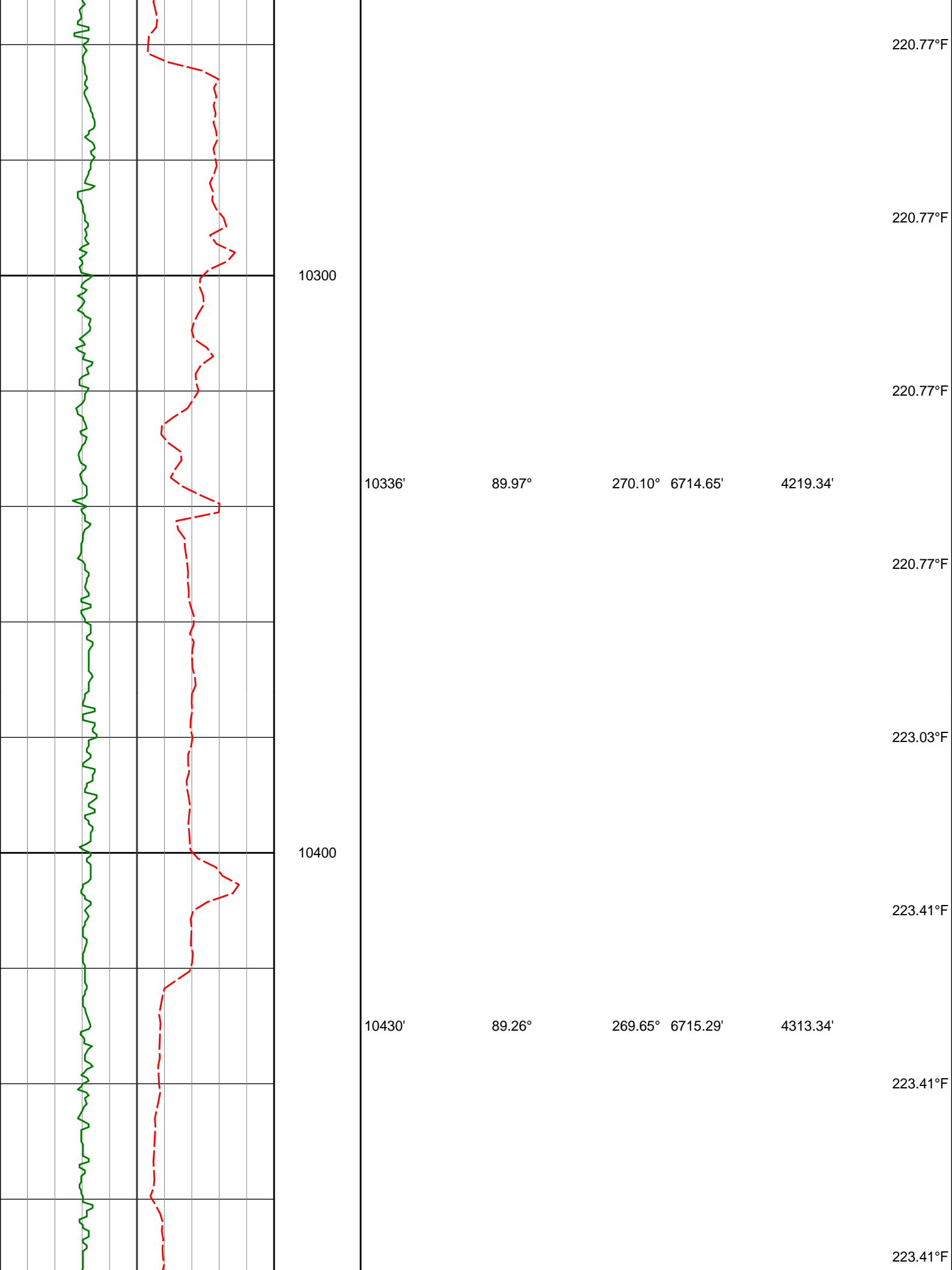


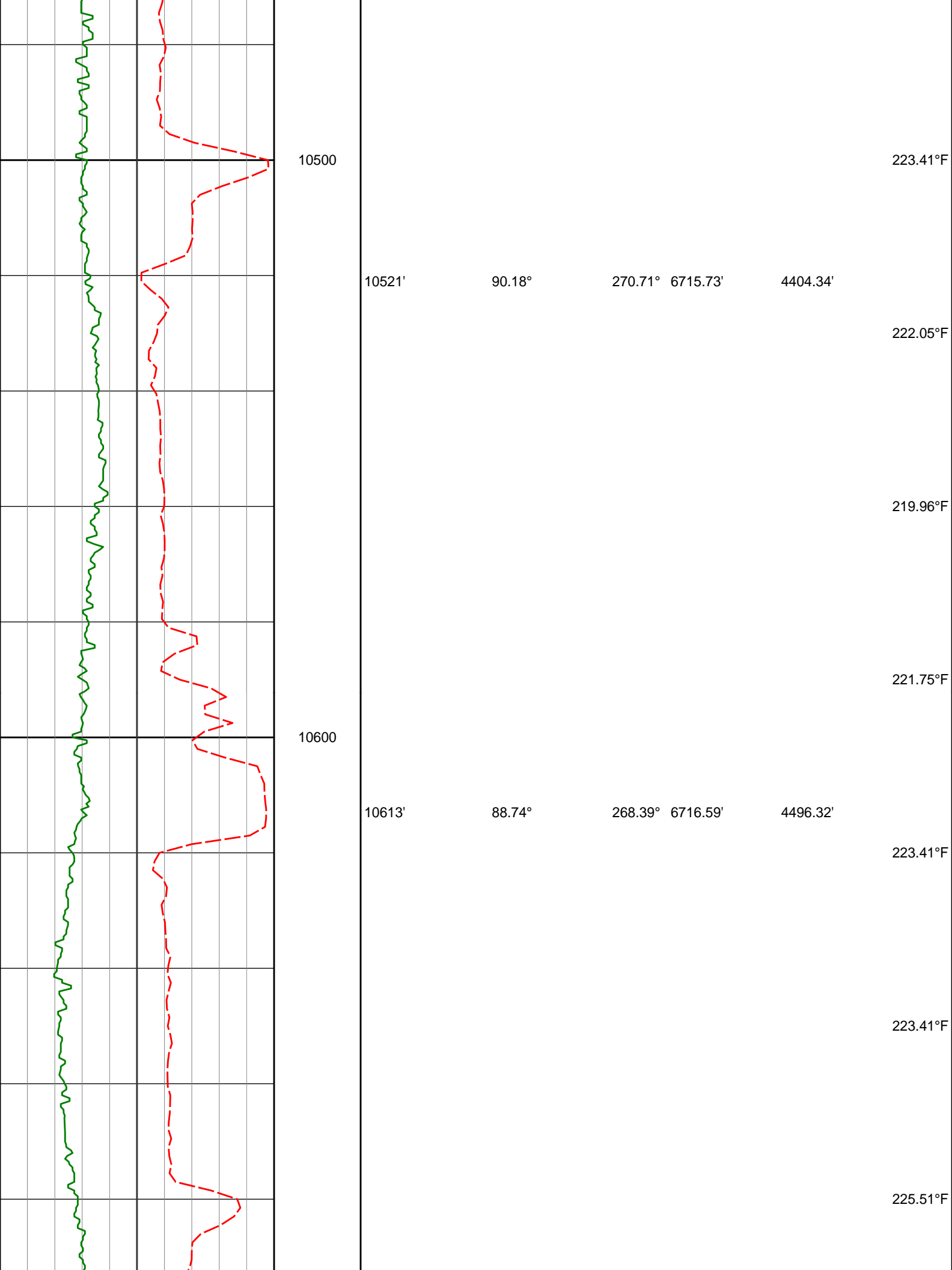


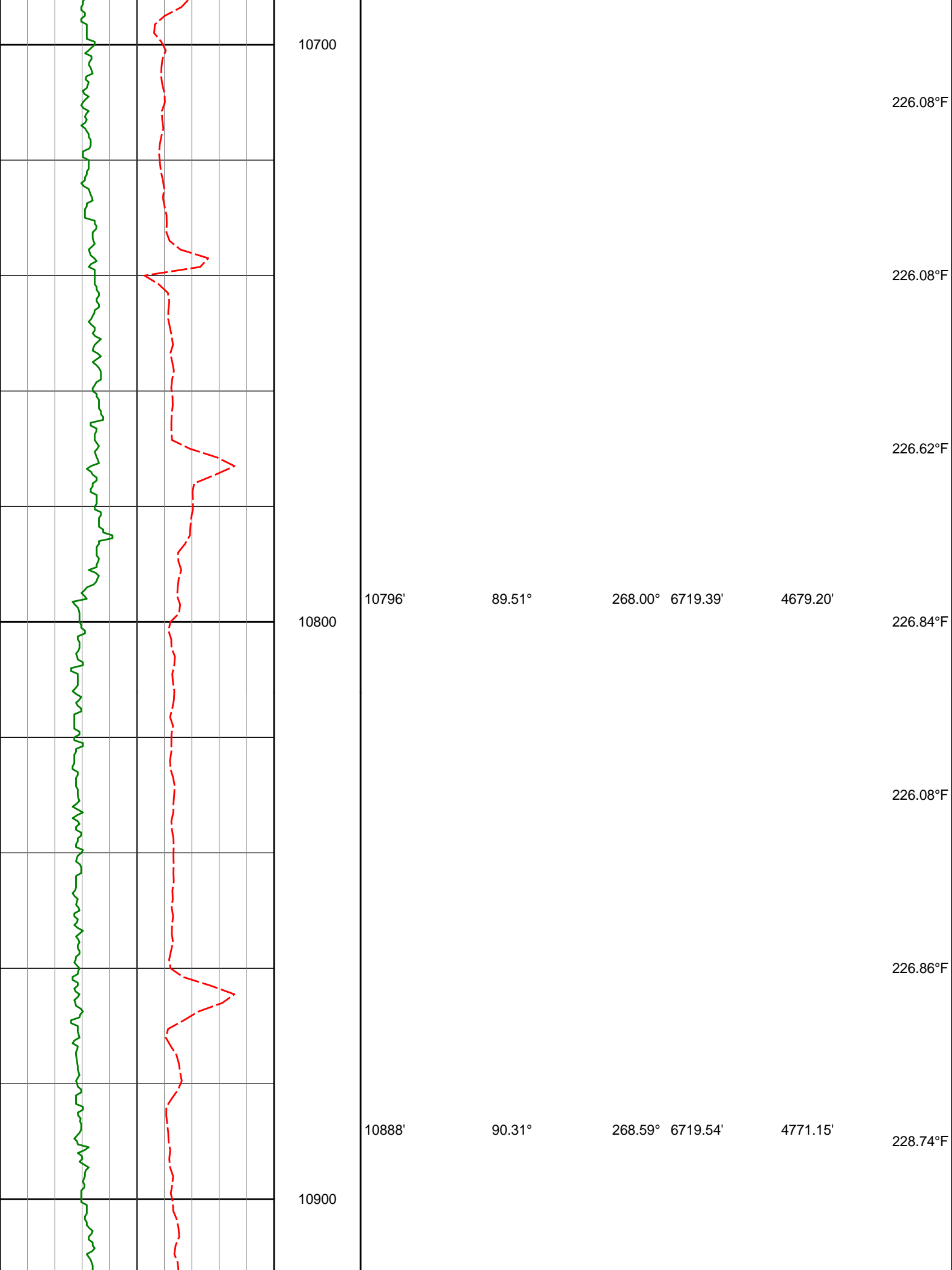


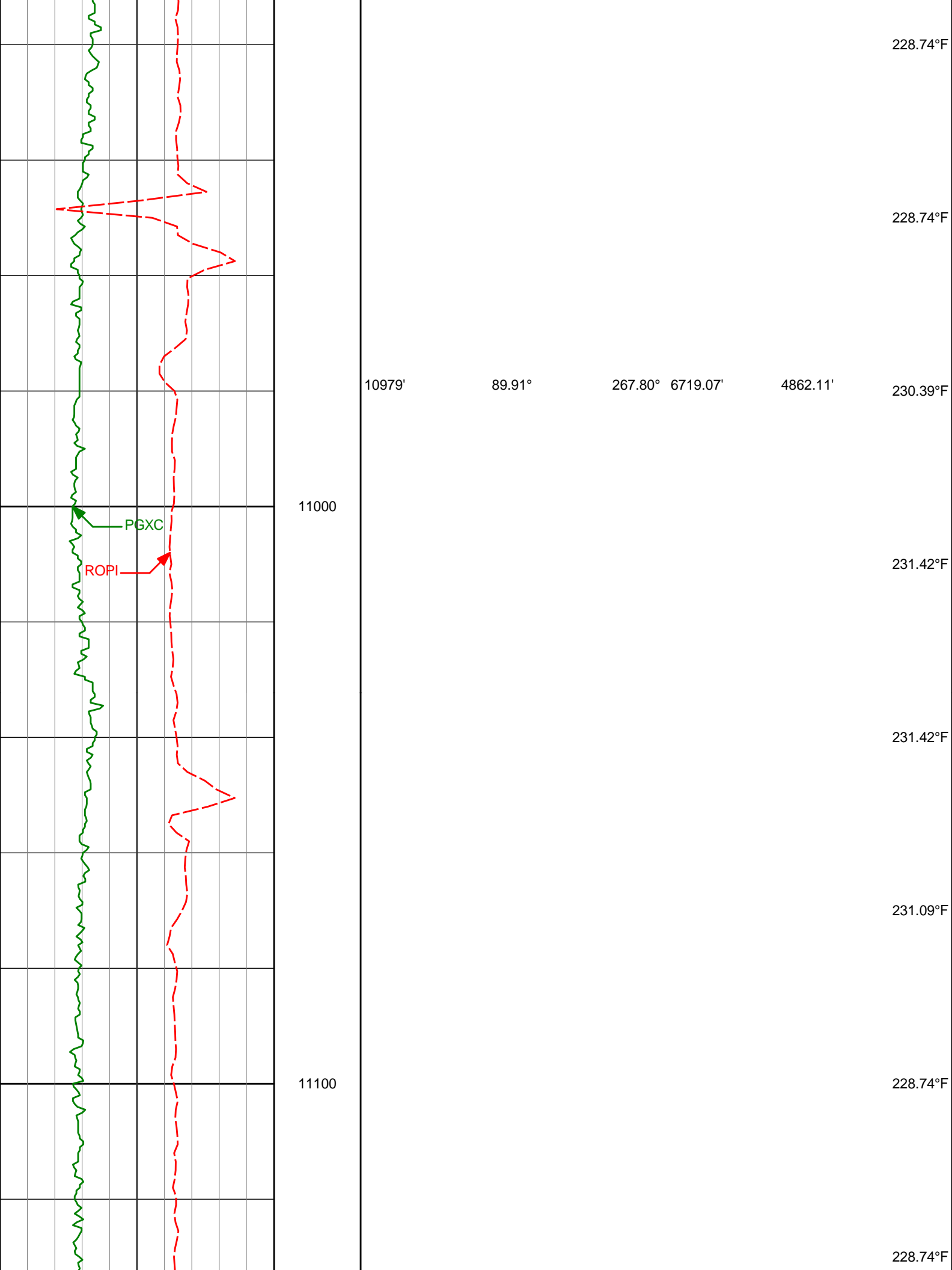


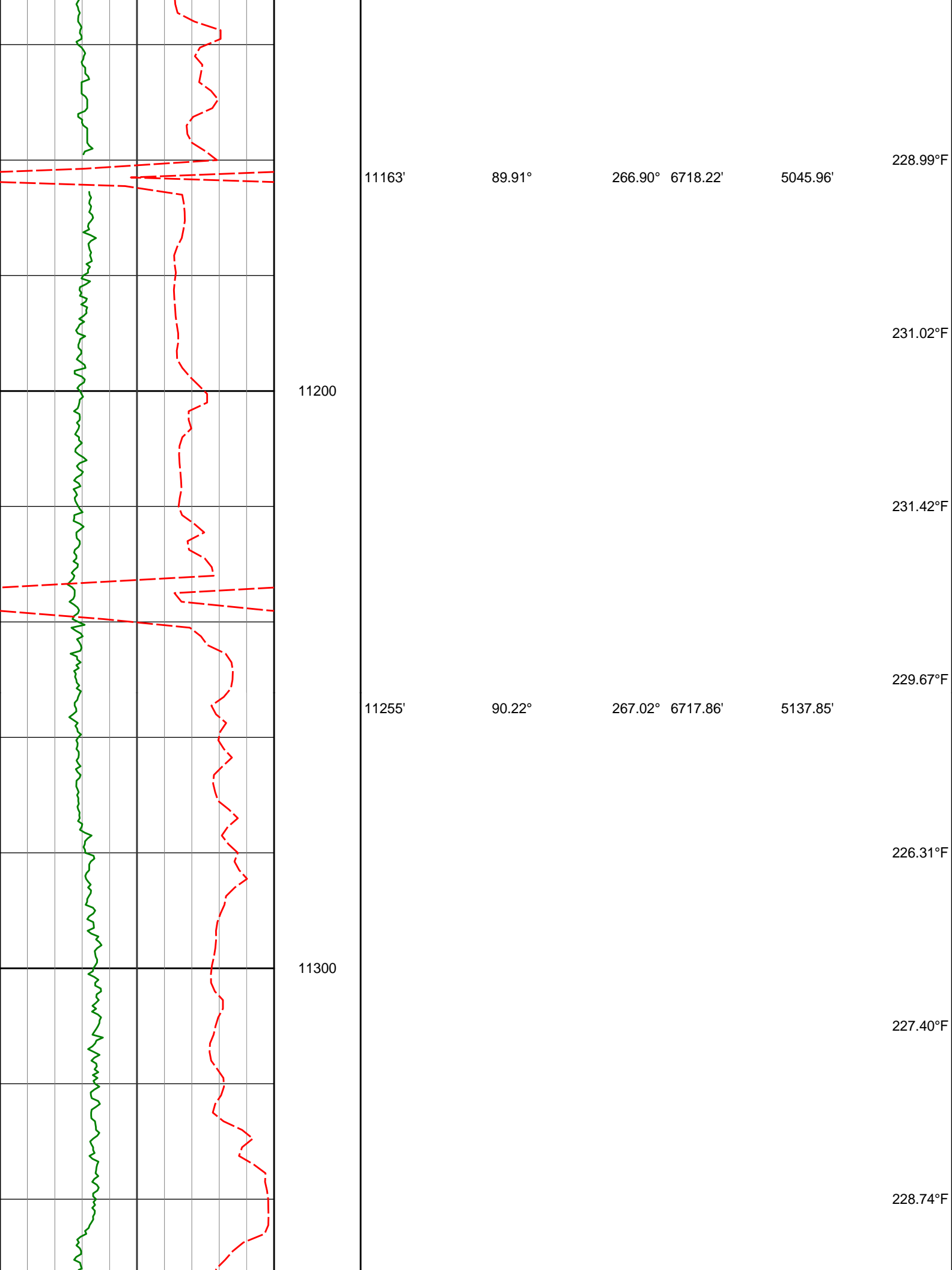


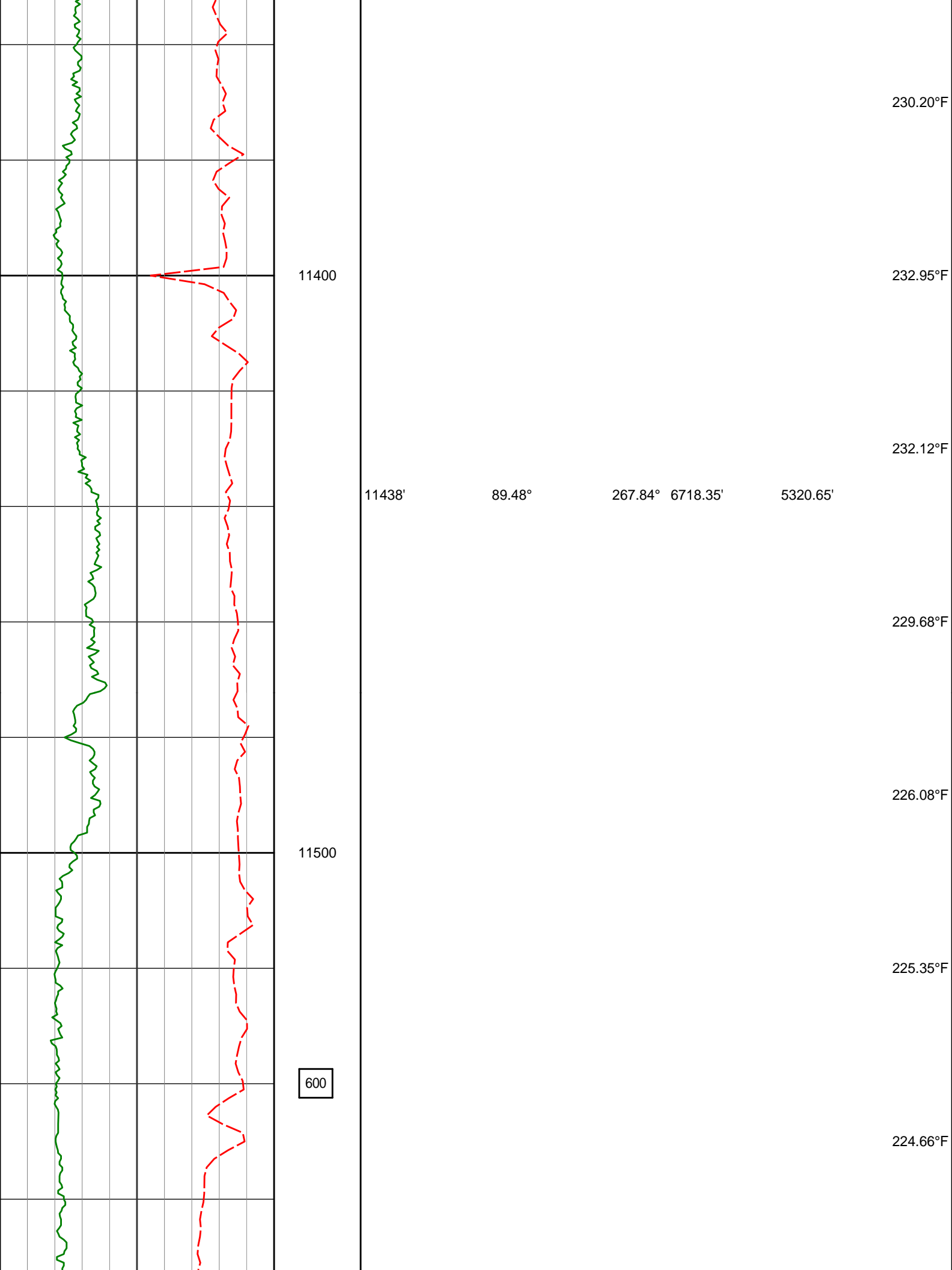


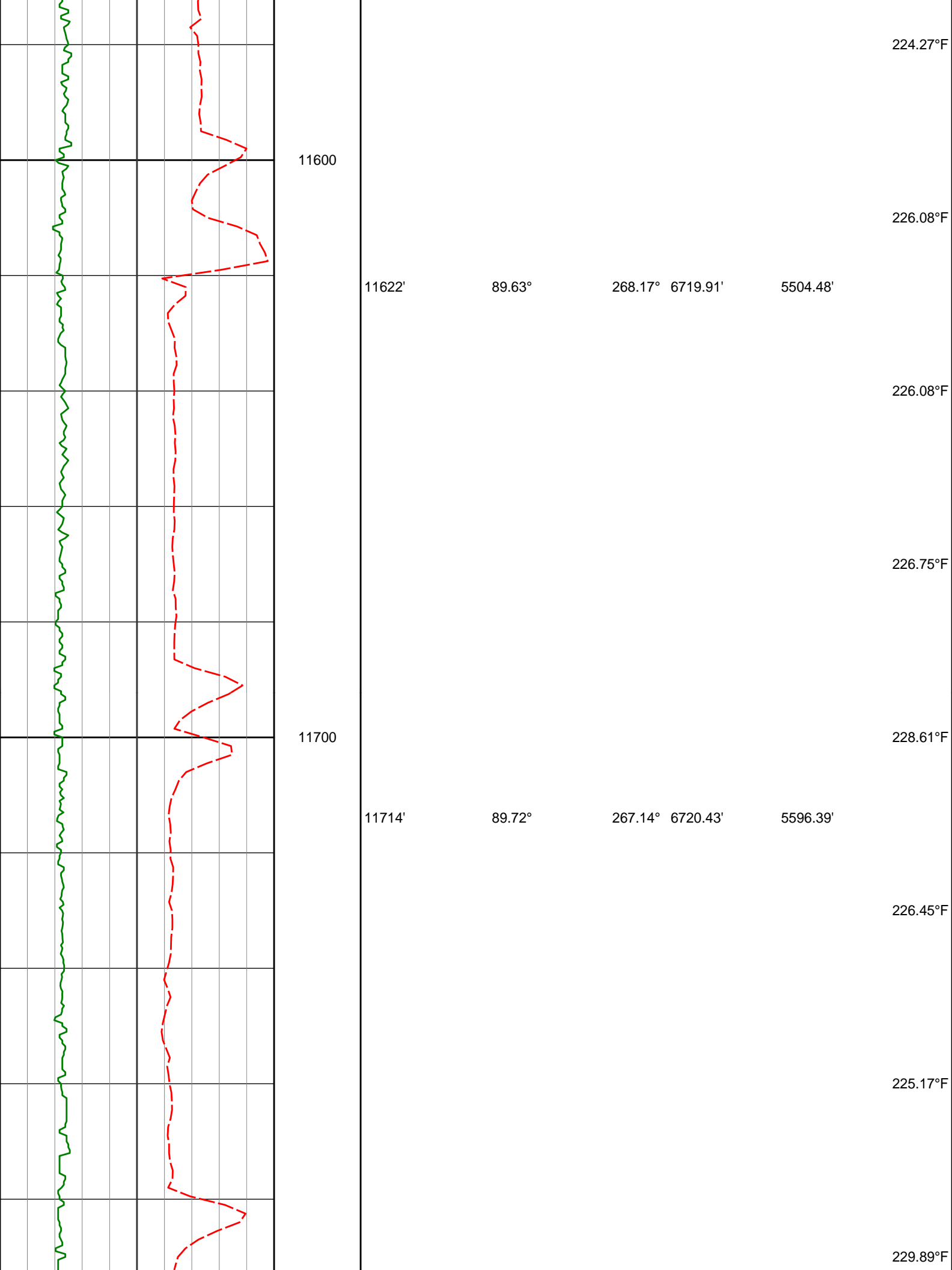


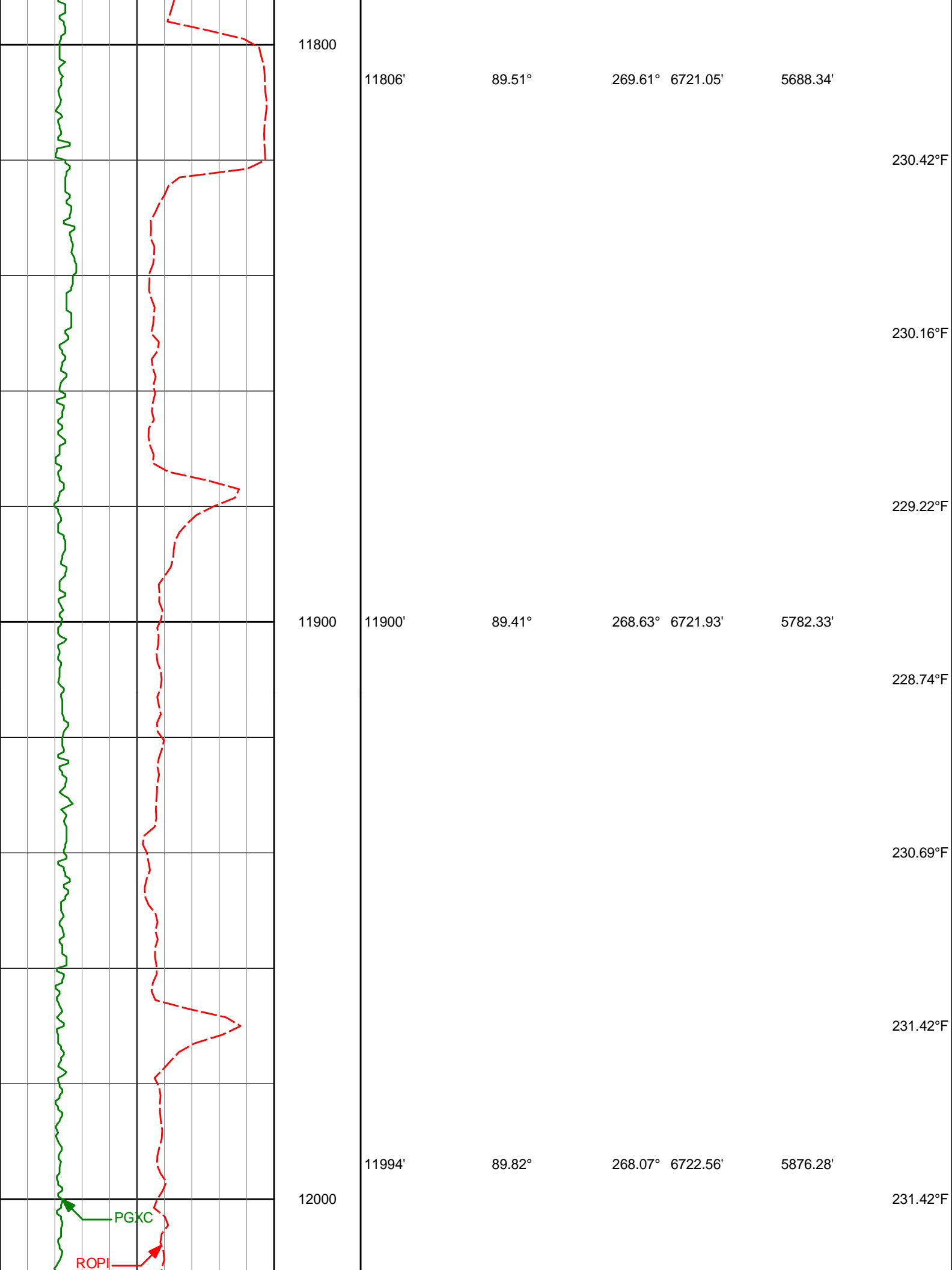


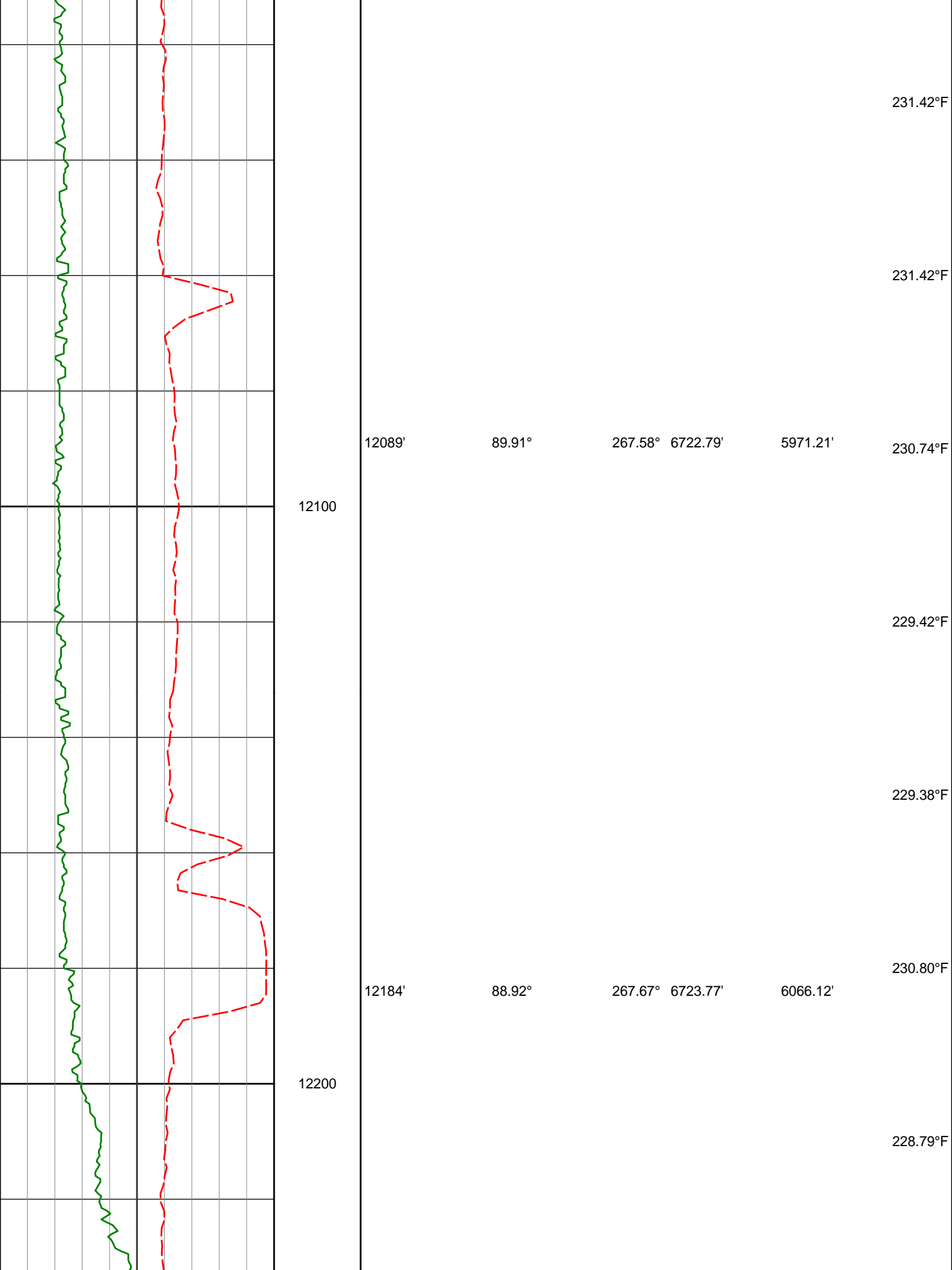


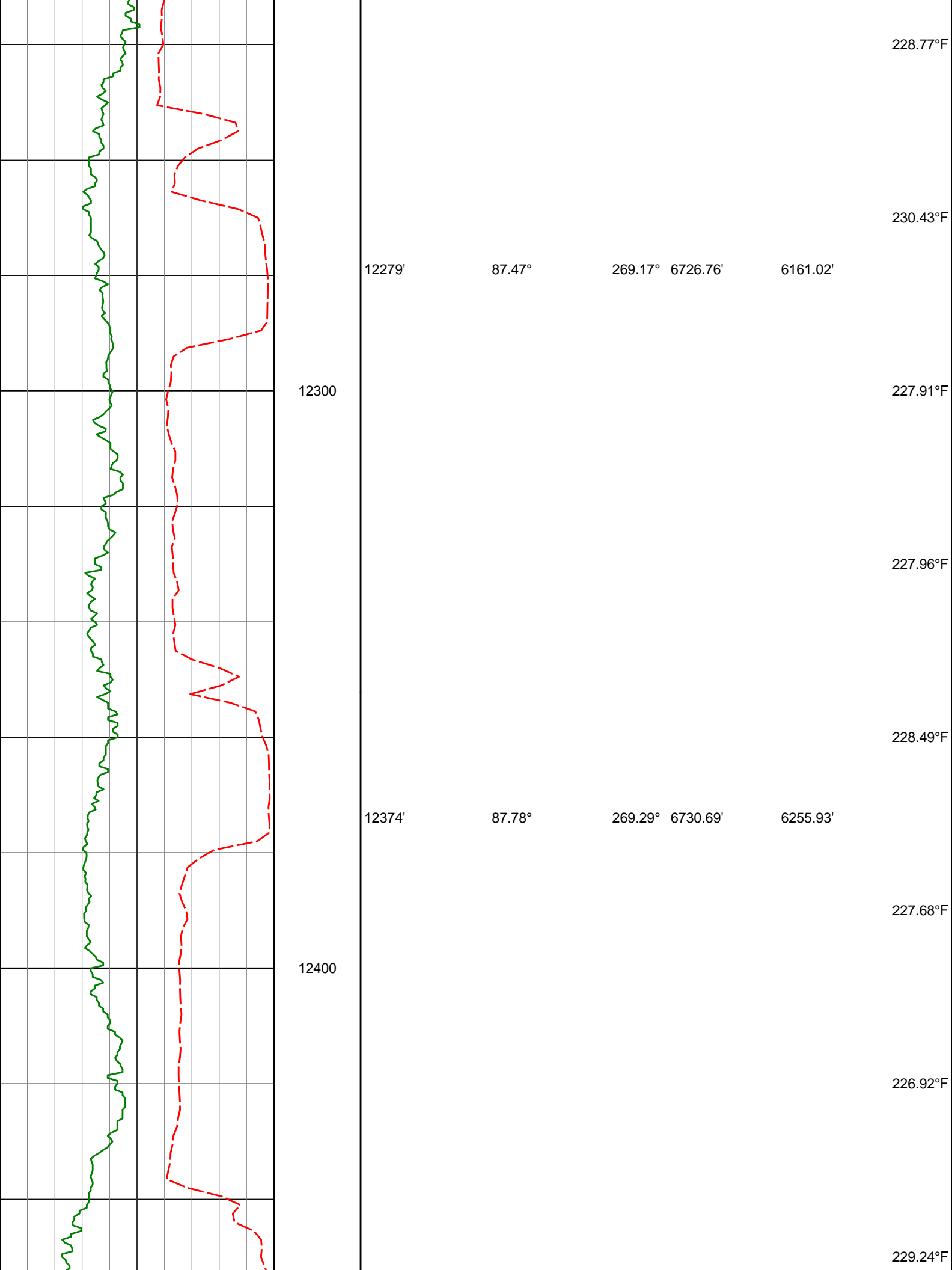


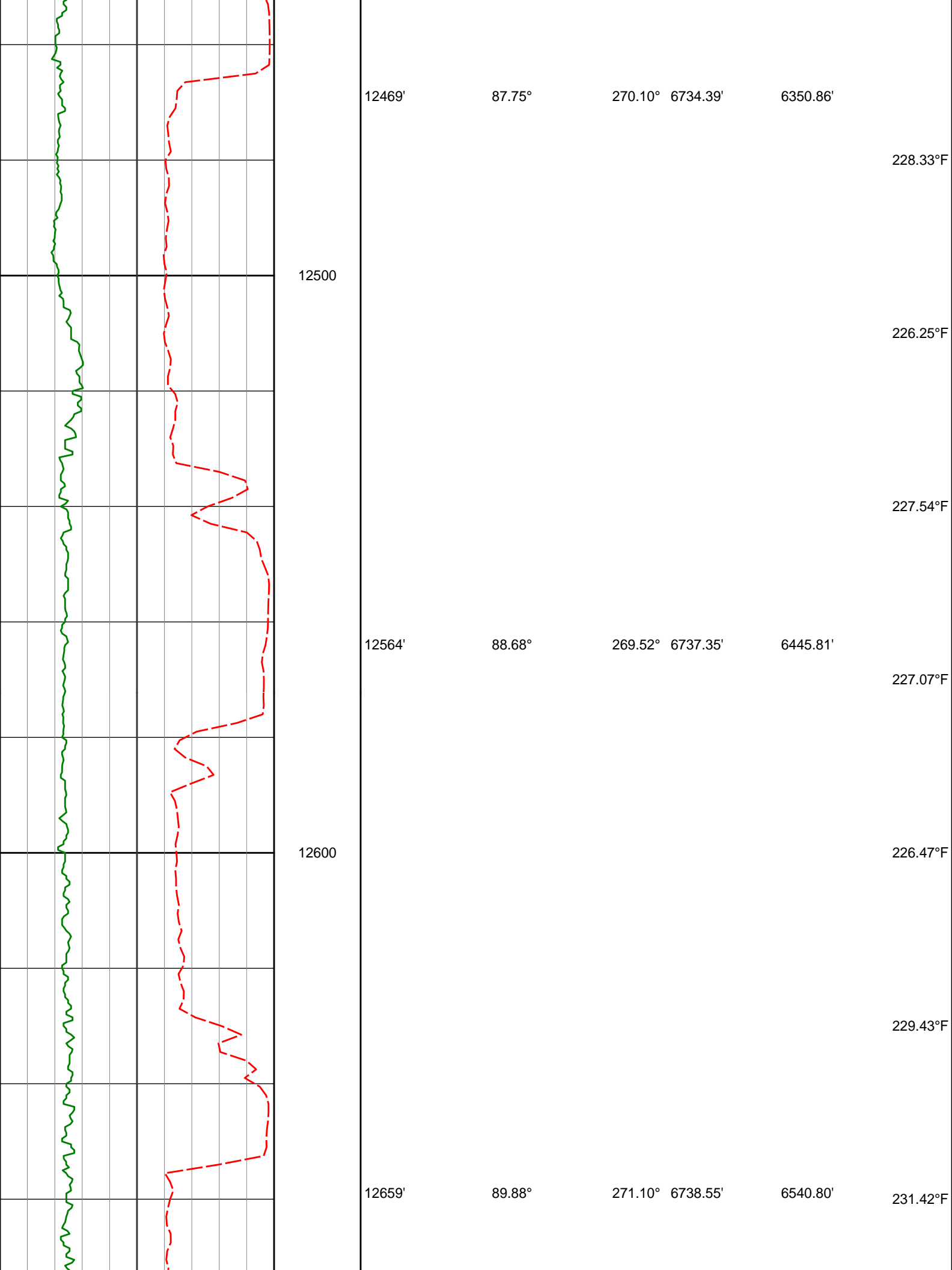


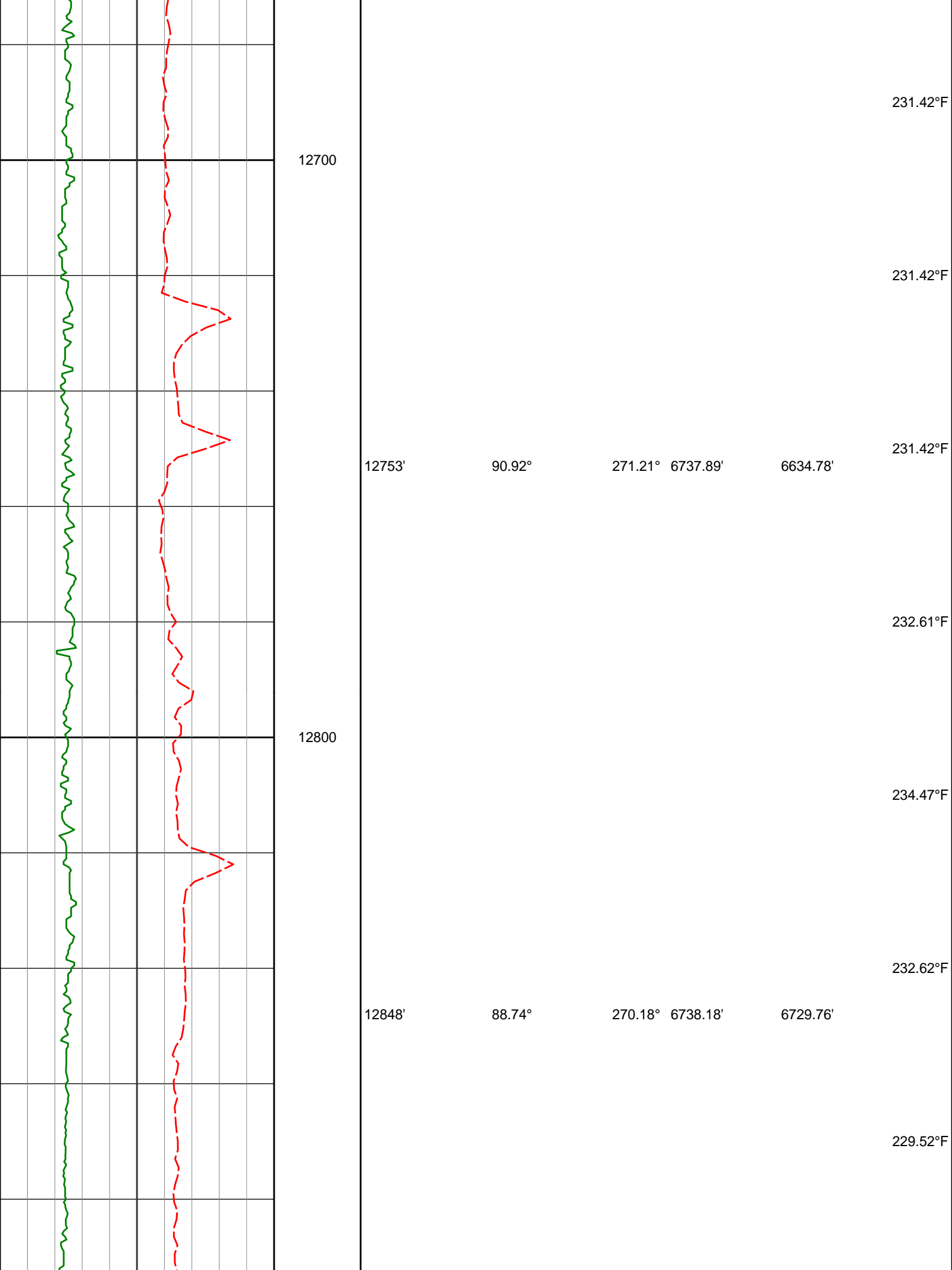


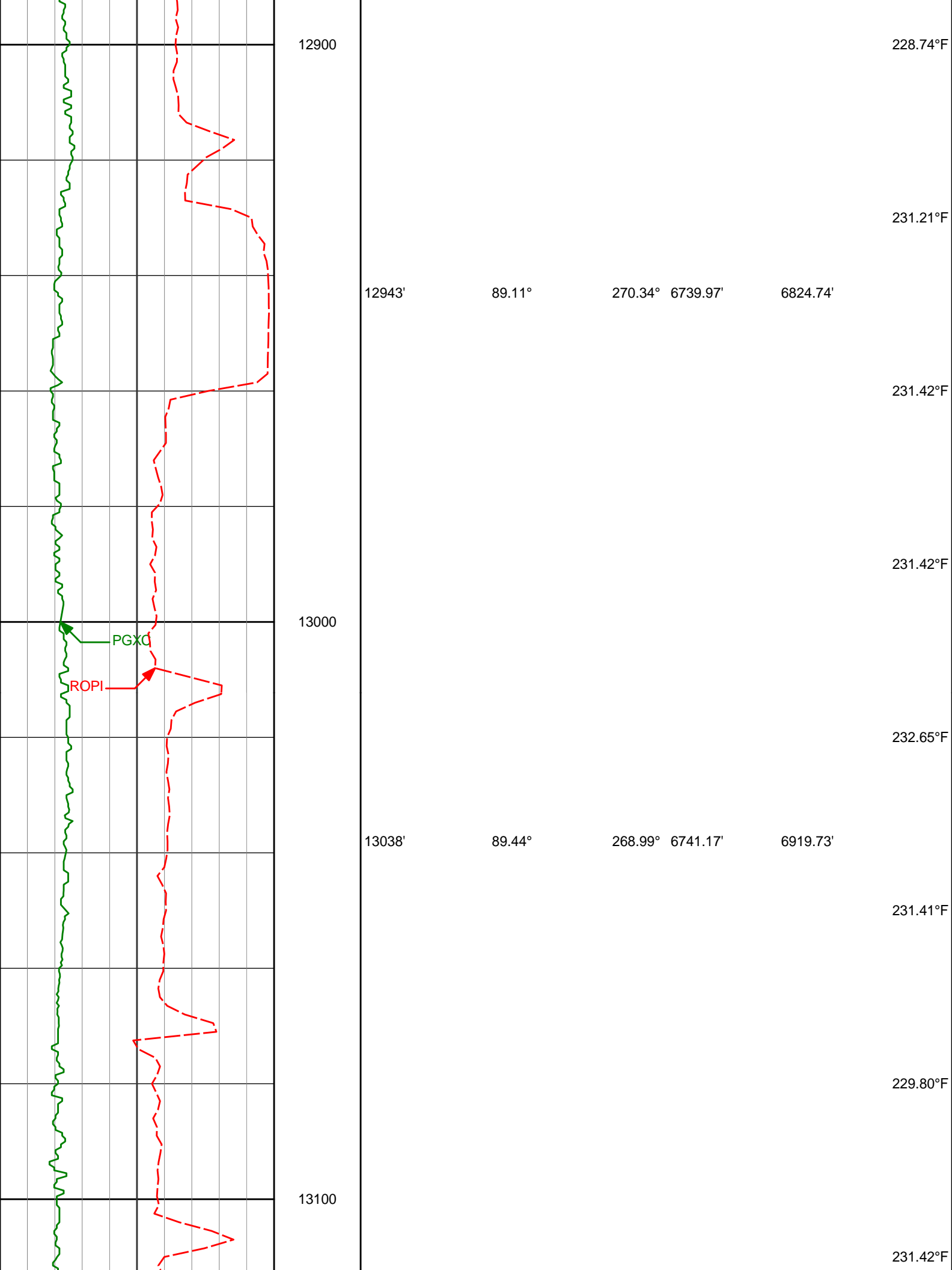


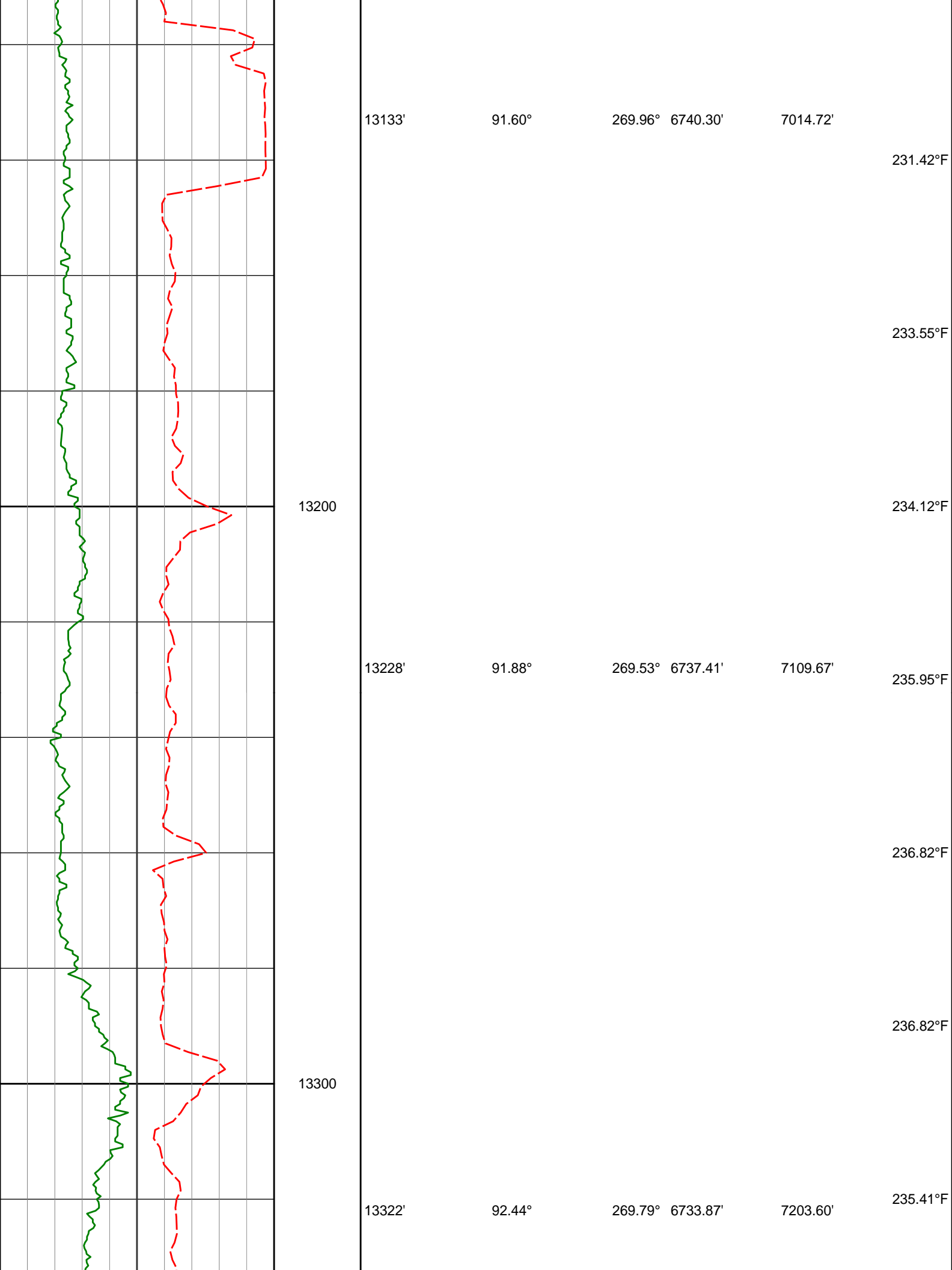


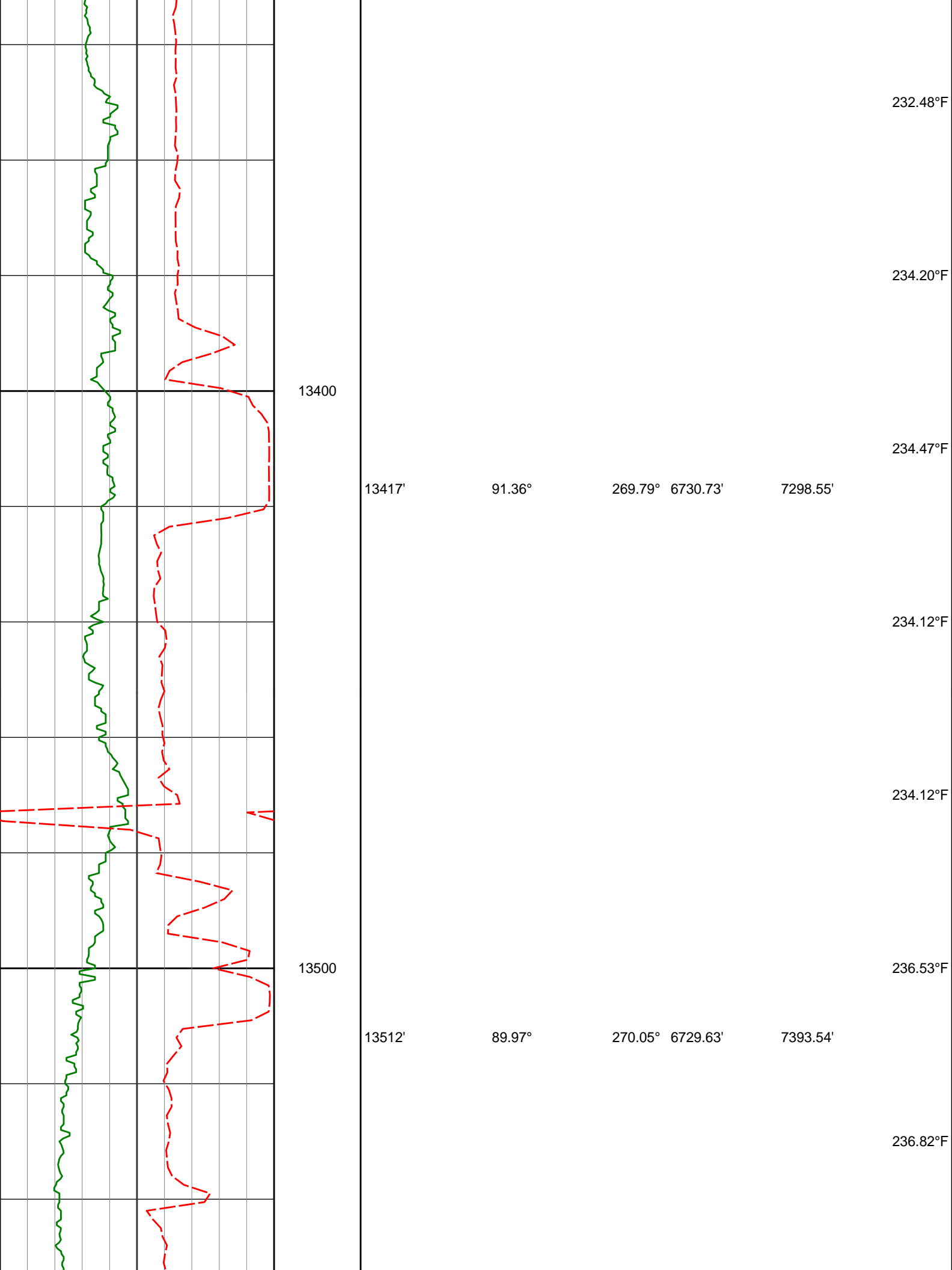


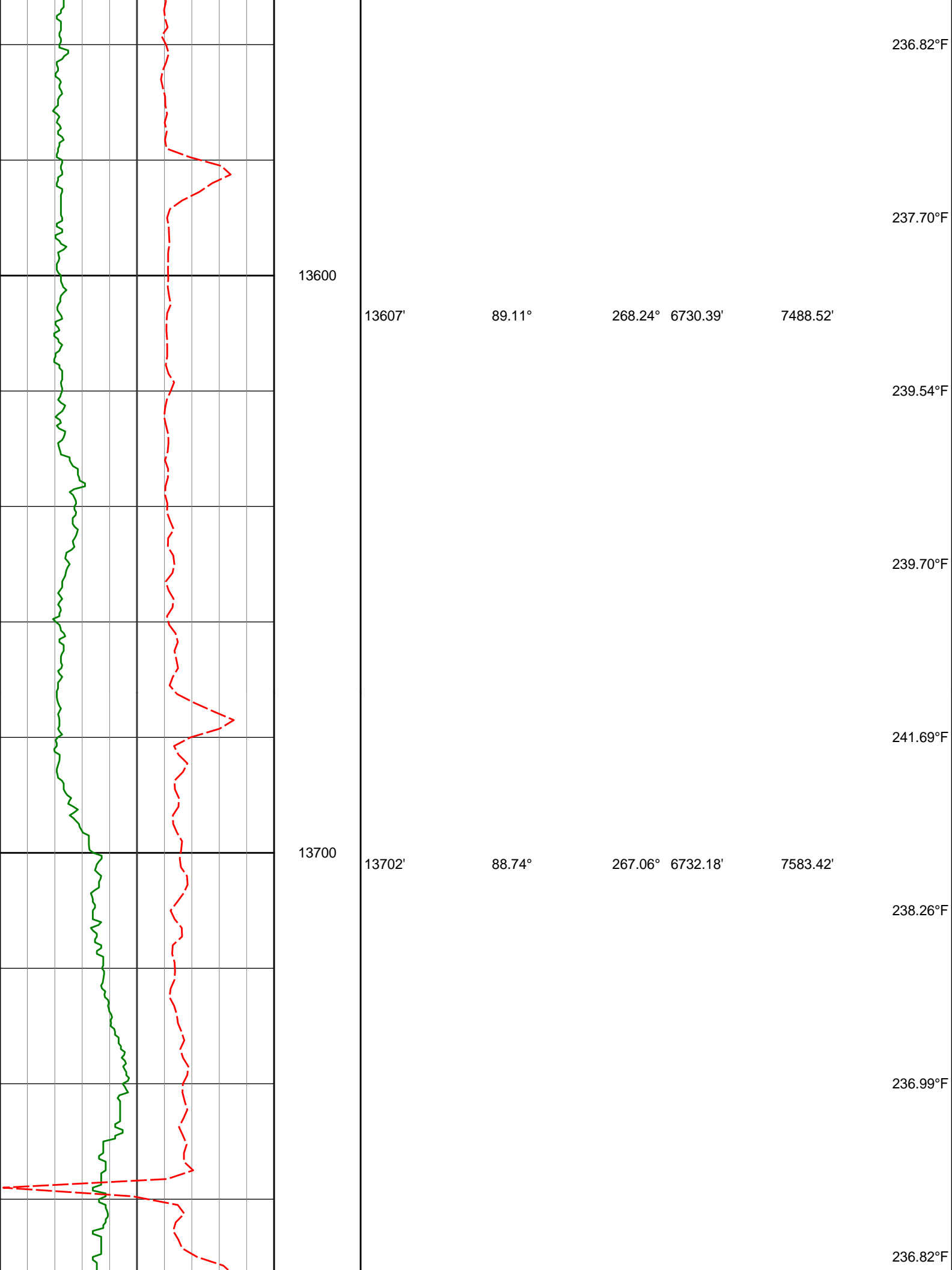


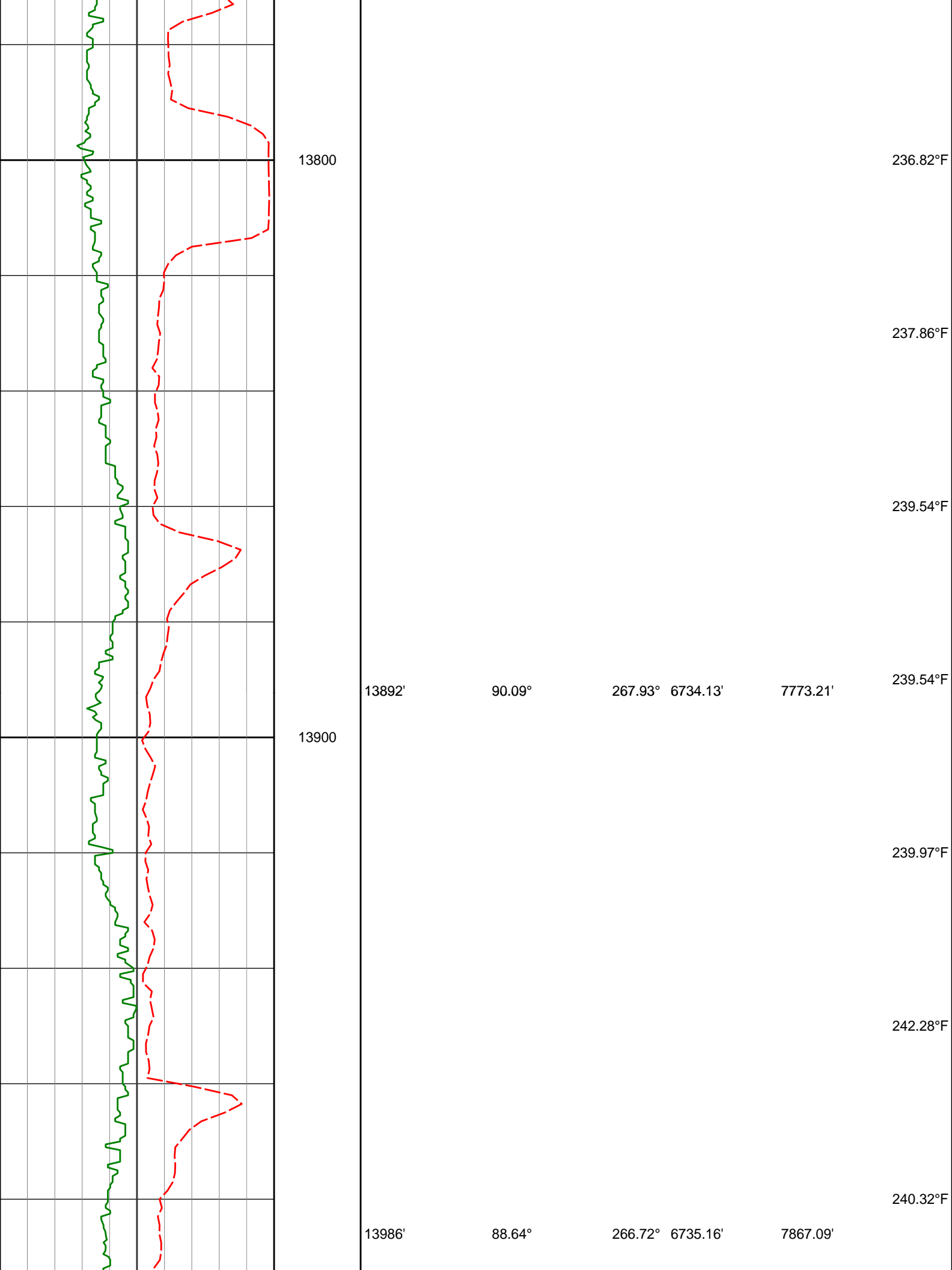


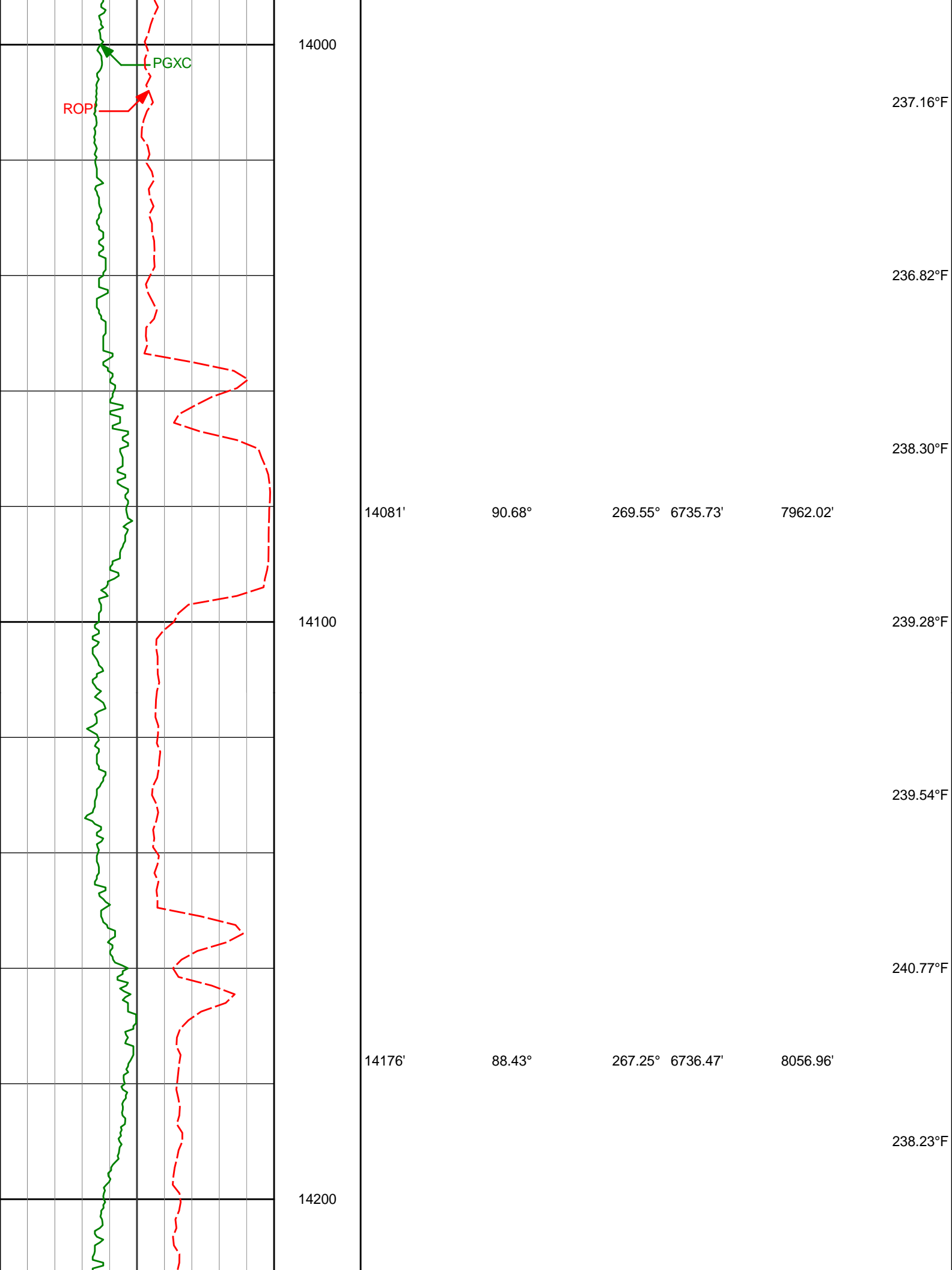


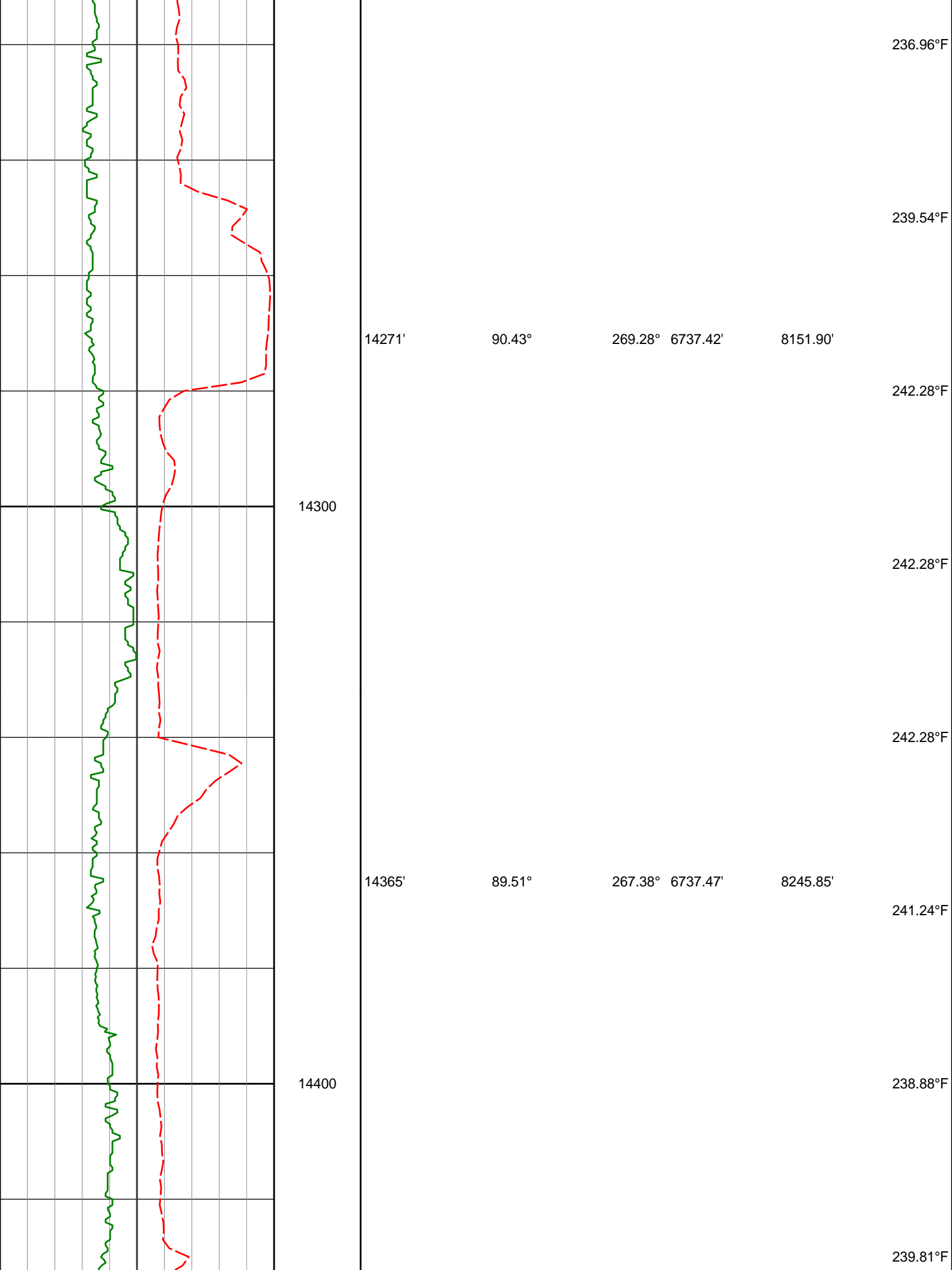


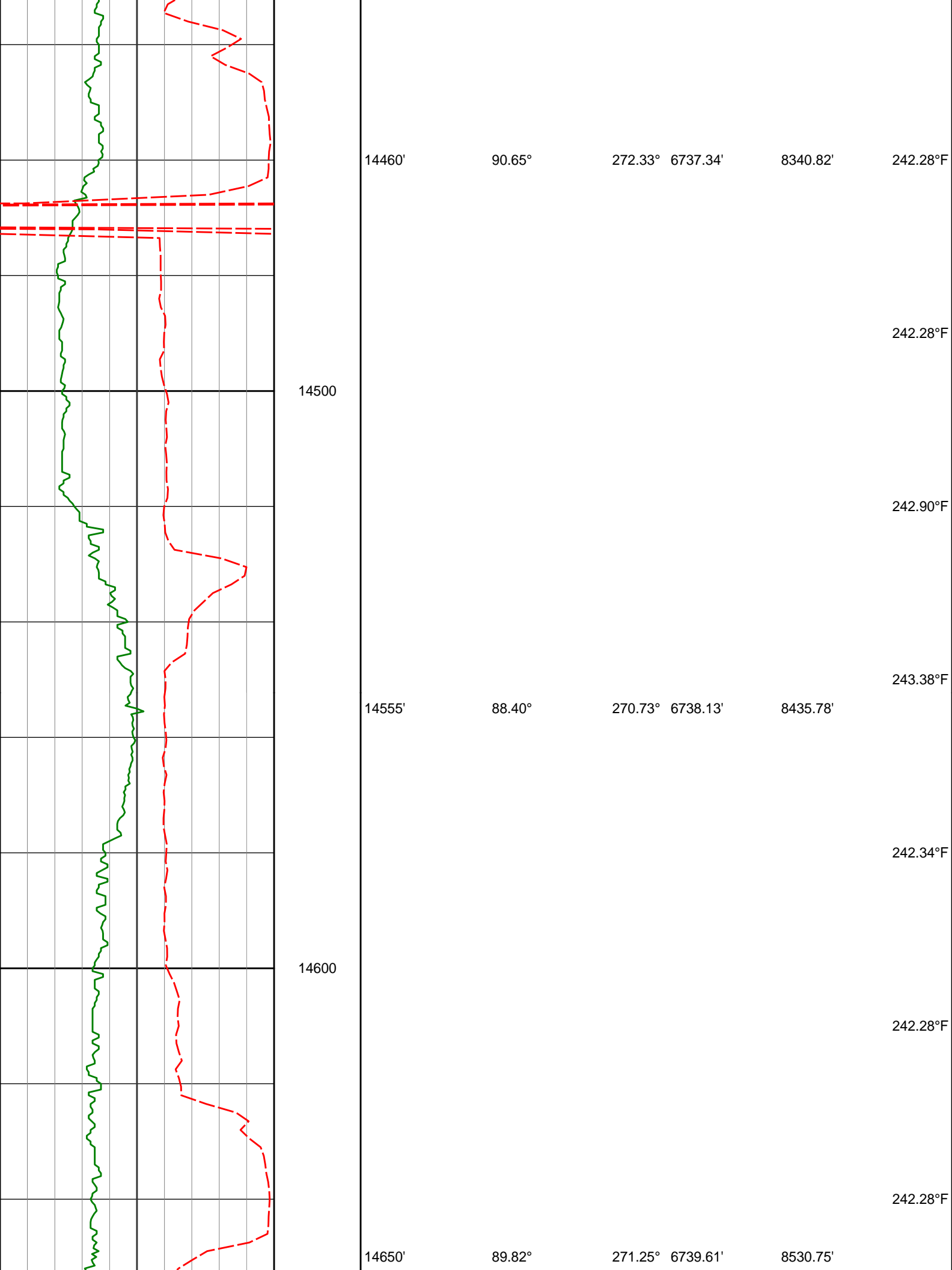


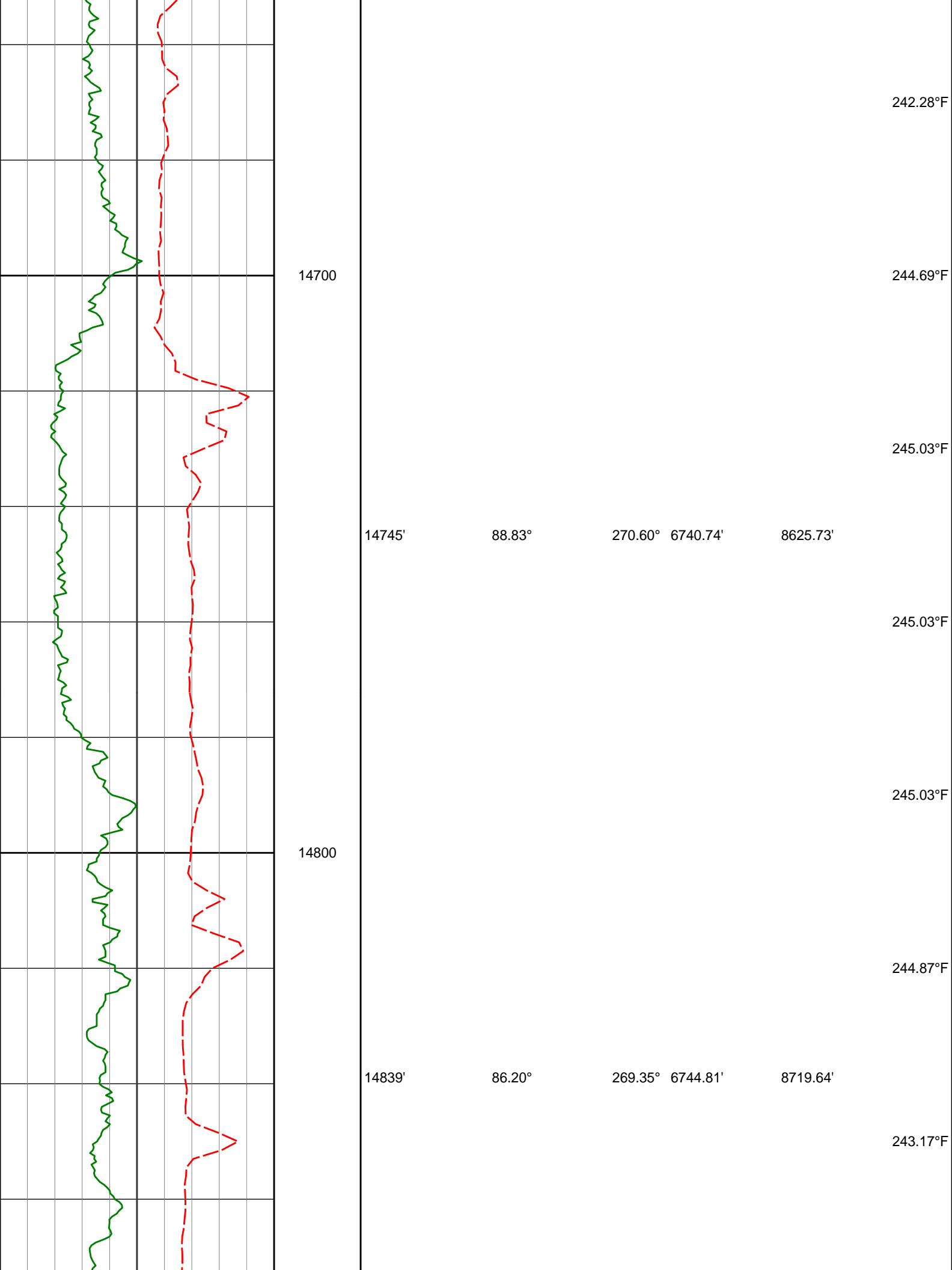


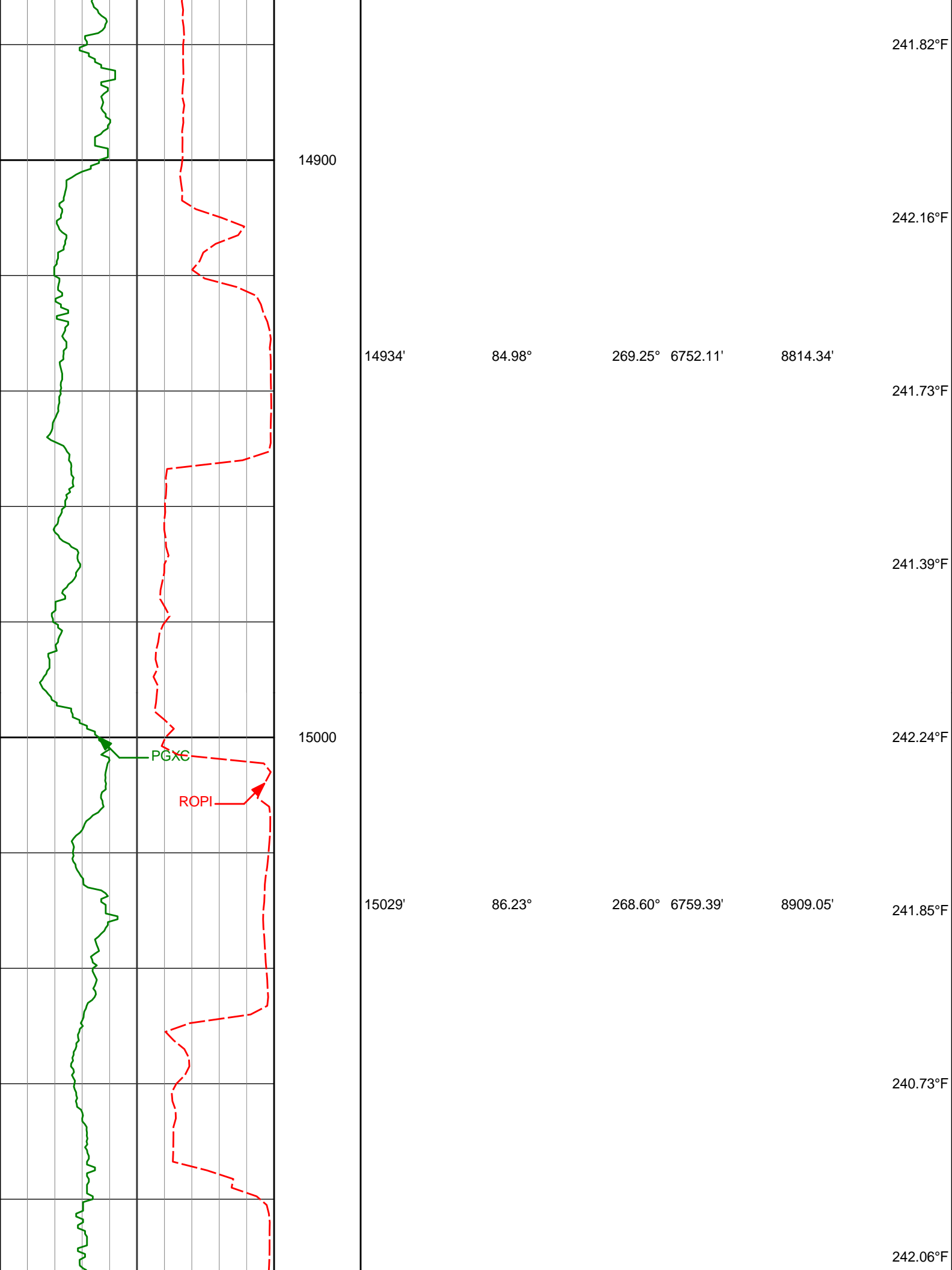


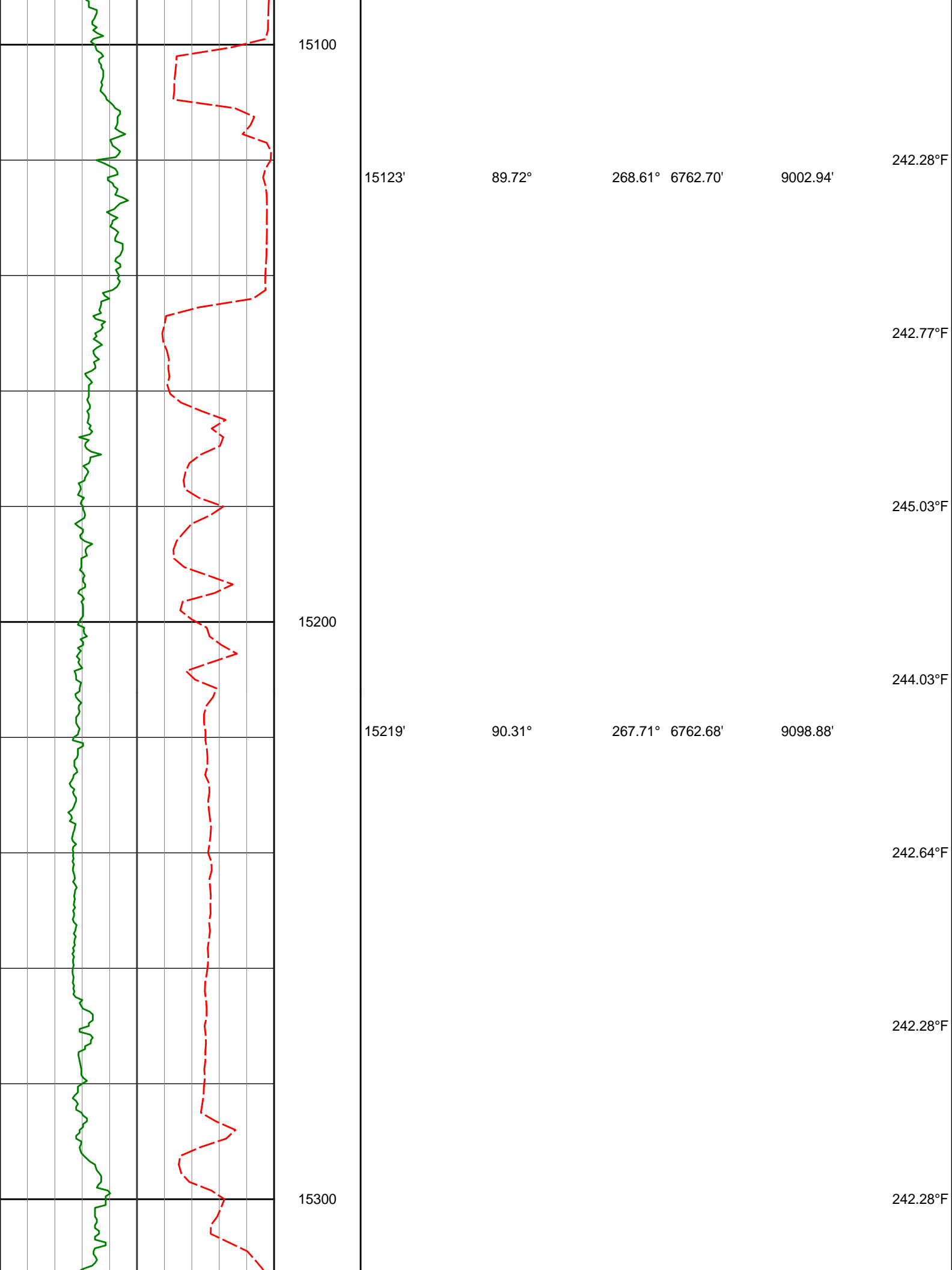


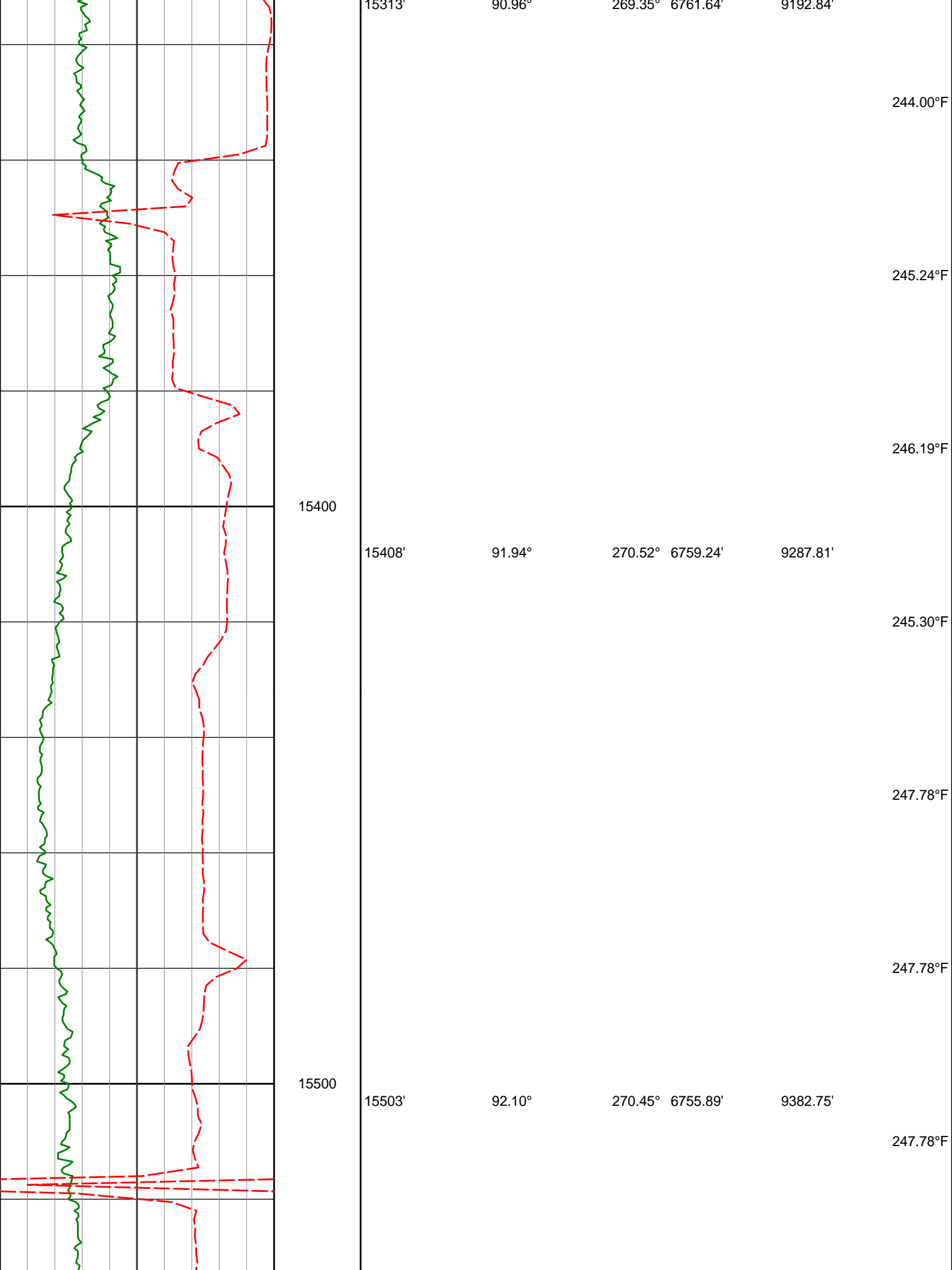


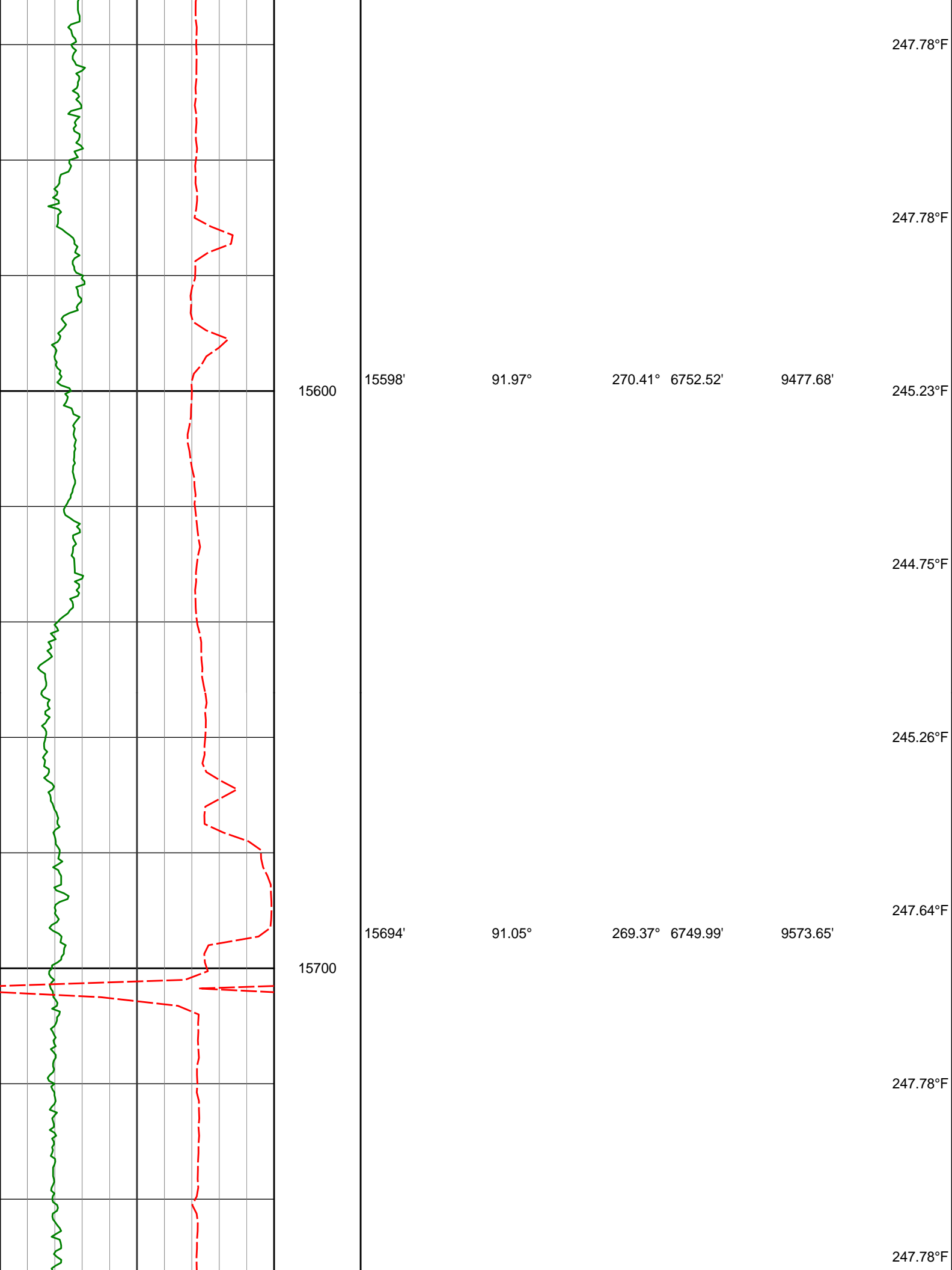


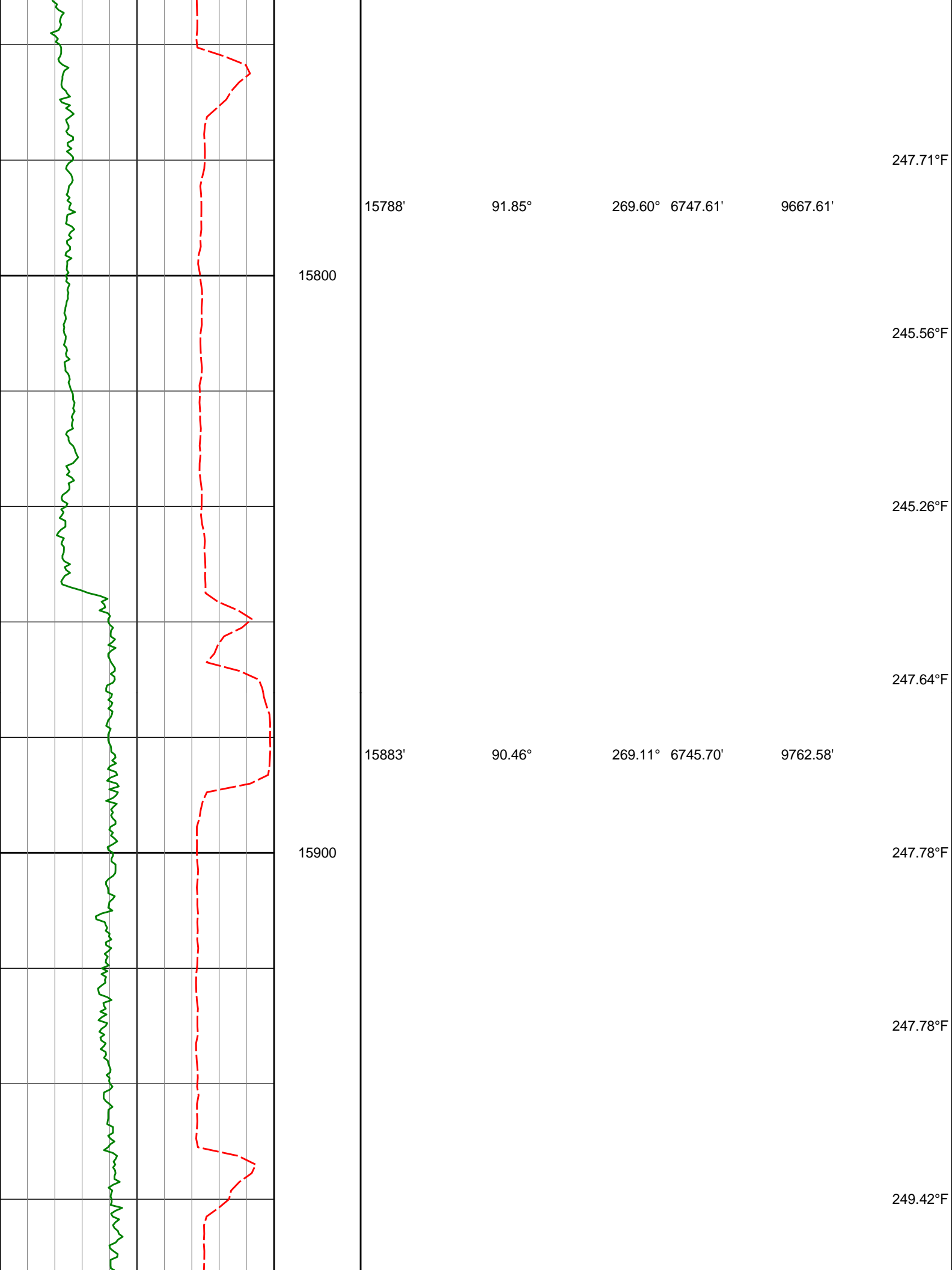












247.71°F

15788'

91.85°

269.60° 6747.61'

9667.61'

15800

245.56°F

245.26°F

247.64°F

15883'

90.46°

269.11° 6745.70'

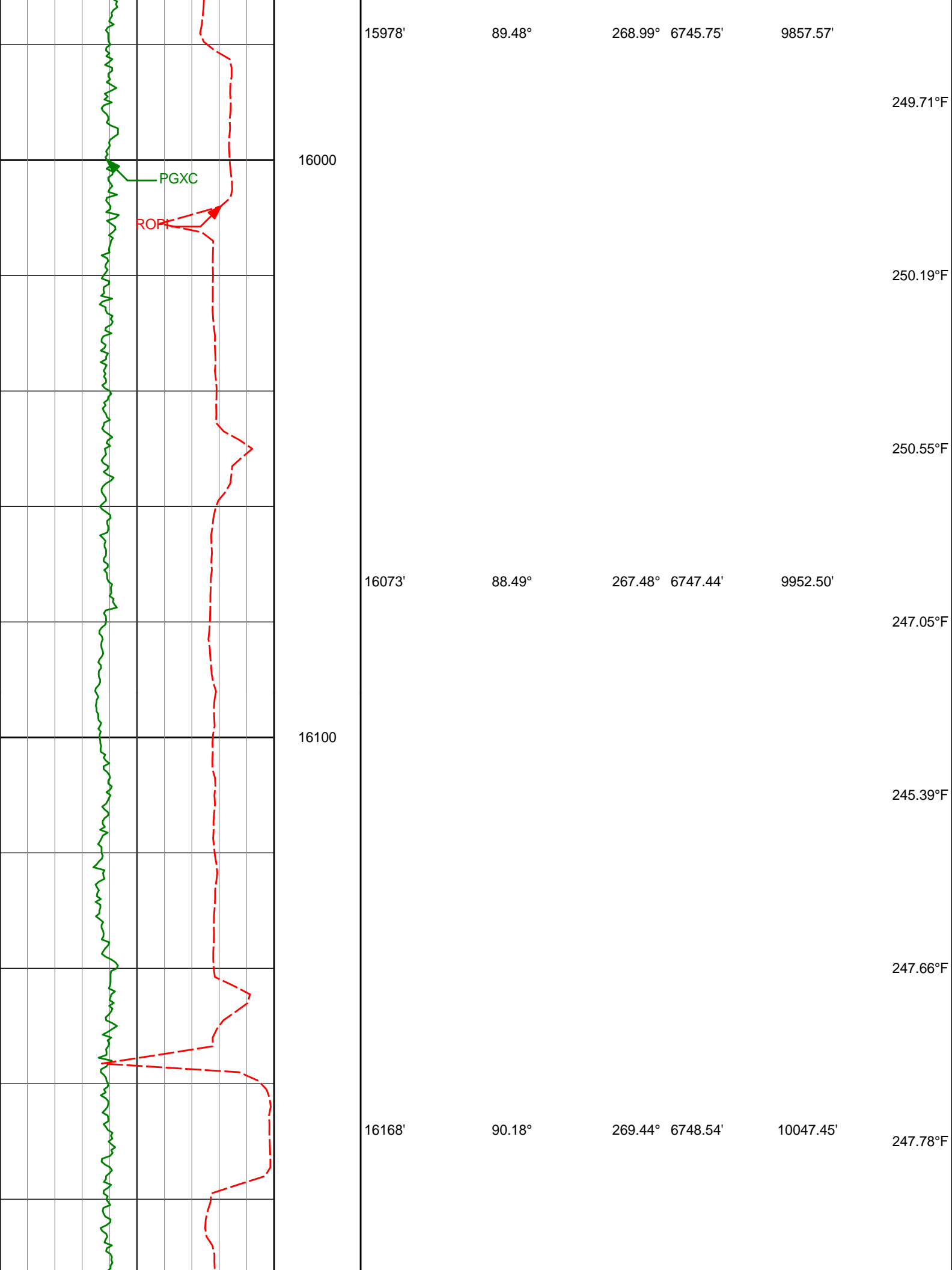
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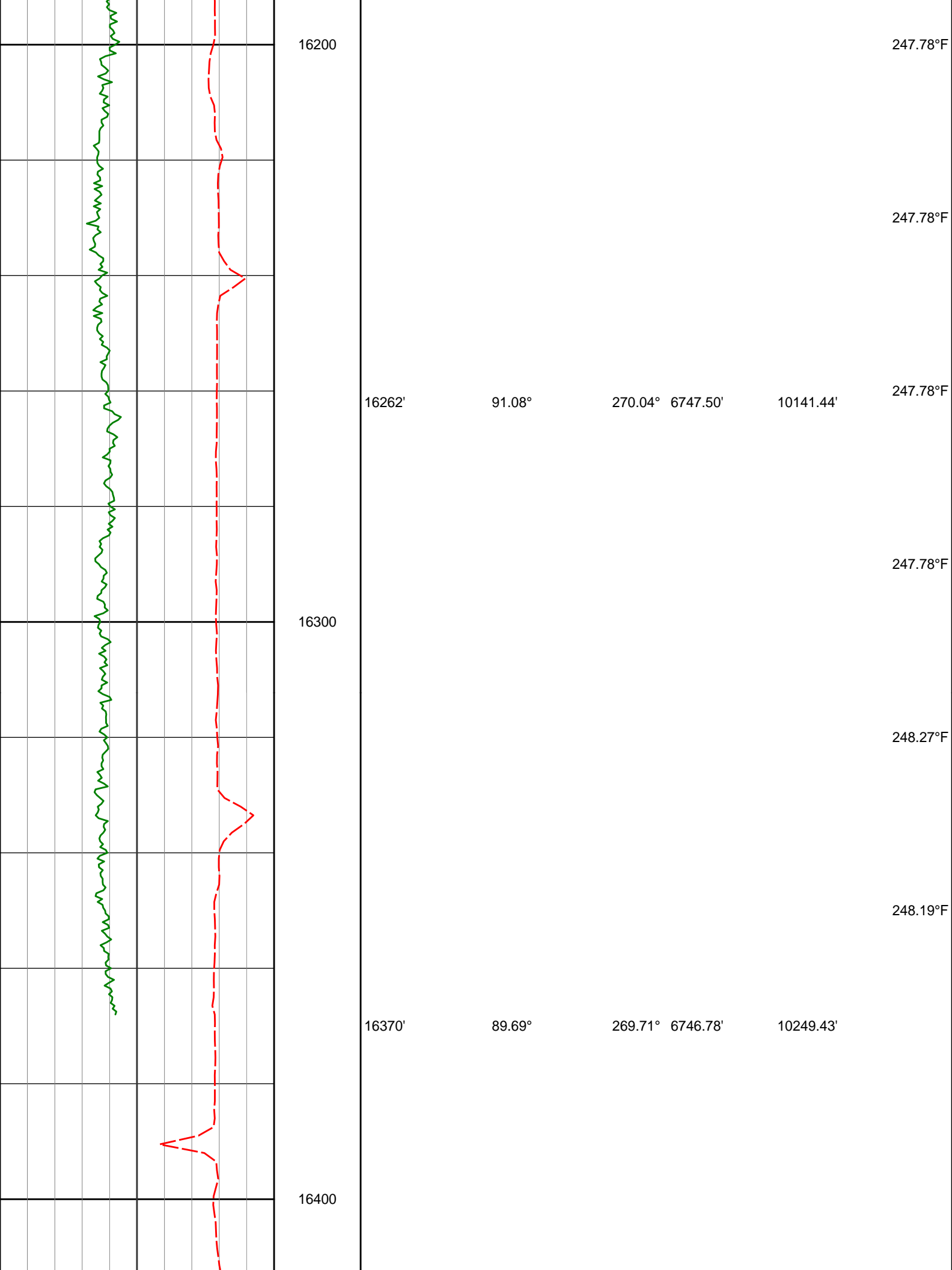
15900

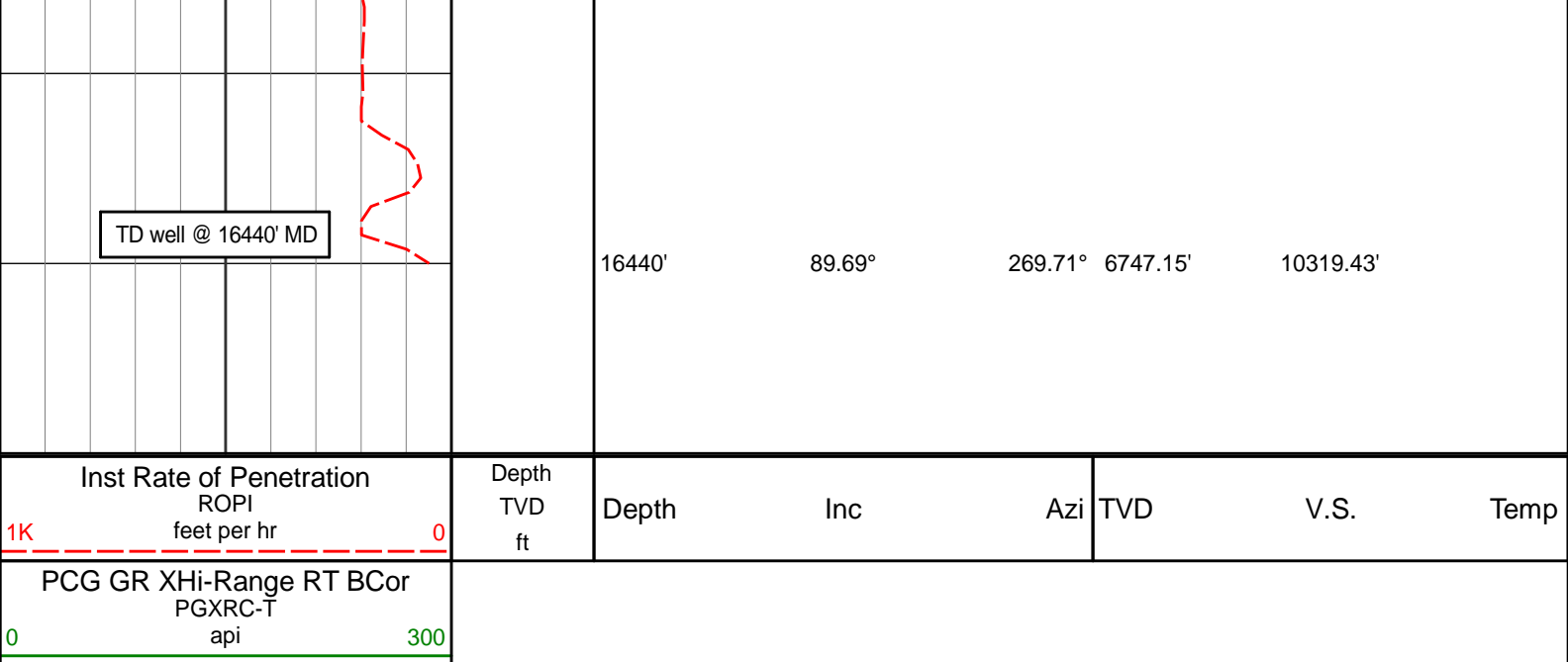
247.78°F

247.78°F

249.42°F







HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Colt A13-652
Wattenberg
Weld Colorado
USA
CA-XX-0902175510
Tied in @ Surface

Final survey projected to bit.

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
1014.00	0.43	156.25	1013.99	3.50 S	1.54 E	-1.55	0.04
1106.00	0.37	146.09	1105.99	4.07 S	1.85 E	-1.85	0.10
1198.00	0.44	174.36	1197.99	4.67 S	2.05 E	-2.06	0.23
1381.00	0.62	139.19	1380.98	6.11 S	2.76 E	-2.77	0.20
1472.00	0.69	160.93	1471.97	7.00 S	3.26 E	-3.27	0.28
1563.00	0.88	289.39	1562.97	7.29 S	2.78 E	-2.79	1.55
1655.00	2.53	314.21	1654.93	5.64 S	0.66 E	-0.67	1.93
1747.00	4.78	309.81	1746.73	1.77 S	3.73 W	3.73	2.46
1840.00	6.17	300.94	1839.31	3.28 N	11.00 W	11.00	1.75
1931.00	7.67	296.83	1929.64	8.54 N	20.61 W	20.63	1.74
2023.00	9.01	300.30	2020.67	14.94 N	32.31 W	32.34	1.55
2115.00	9.25	296.31	2111.50	21.85 N	45.16 W	45.19	0.73
2207.00	10.26	294.96	2202.17	28.59 N	59.21 W	59.26	1.13
2299.00	9.64	289.14	2292.79	34.57 N	73.92 W	73.98	1.28
2391.00	8.28	286.36	2383.67	38.96 N	87.56 W	87.62	1.55
2485.00	9.51	286.61	2476.53	43.09 N	101.49 W	101.56	1.31
2579.00	9.32	283.10	2569.27	47.03 N	116.34 W	116.42	0.64
2674.00	9.08	281.71	2663.05	50.30 N	131.18 W	131.26	0.34
2863.00	9.54	294.88	2849.58	59.92 N	160.00 W	160.09	1.15
2958.00	9.28	292.12	2943.30	66.11 N	174.24 W	174.34	0.55
3053.00	8.78	287.92	3037.12	71.23 N	188.23 W	188.35	0.87
3148.00	8.59	294.53	3131.04	76.41 N	201.59 W	201.71	1.07
3242.00	7.78	293.93	3224.08	81.90 N	213.79 W	213.92	0.87
3337.00	8.03	295.61	3318.17	87.38 N	225.65 W	225.79	0.35
3431.00	7.67	305.06	3411.30	93.82 N	236.71 W	236.85	1.42
3526.00	8.94	304.18	3505.30	101.61 N	248.01 W	248.17	1.34
3621.00	10.00	305.86	3599.00	110.59 N	260.80 W	260.98	1.15

3715.00	10.61	305.88	3691.49	120.45 N	274.43 W	274.62	0.65
3810.00	10.92	304.69	3784.81	130.69 N	288.91 W	289.12	0.40
3905.00	11.31	303.23	3878.03	140.92 N	304.10 W	304.32	0.50
3999.00	10.88	304.21	3970.28	150.95 N	319.14 W	319.38	0.50
4189.00	9.41	308.75	4157.31	170.75 N	346.08 W	346.34	0.88
4284.00	8.98	309.28	4251.09	180.30 N	357.87 W	358.15	0.46
4473.00	9.42	295.98	4437.68	196.41 N	383.18 W	383.49	1.15
4568.00	8.66	298.44	4531.50	203.22 N	396.46 W	396.78	0.90
4663.00	6.76	290.28	4625.64	208.57 N	407.99 W	408.32	2.30
4757.00	5.69	291.50	4719.08	212.19 N	417.51 W	417.85	1.14
4852.00	3.43	282.60	4813.78	214.54 N	424.67 W	425.01	2.49
4946.00	2.64	299.45	4907.65	216.22 N	429.31 W	429.65	1.26
5041.00	2.58	307.03	5002.55	218.58 N	432.92 W	433.26	0.37
5136.00	0.83	251.21	5097.51	219.64 N	435.27 W	435.61	2.34
5231.00	1.21	236.83	5192.49	218.87 N	436.76 W	437.10	0.48
5326.00	1.32	233.21	5287.47	217.67 N	438.47 W	438.81	0.14
5420.00	1.17	232.98	5381.45	216.45 N	440.10 W	440.44	0.15
5609.00	1.52	224.38	5570.39	213.49 N	443.40 W	443.73	0.21
5703.00	1.97	220.91	5664.35	211.38 N	445.32 W	445.65	0.49
5798.00	0.41	125.71	5759.33	209.95 N	446.11 W	446.44	2.15
5987.00	0.71	41.66	5948.32	210.43 N	444.78 W	445.11	0.41
6082.00	0.38	5.64	6043.32	211.18 N	444.36 W	444.69	0.48
6129.00	2.63	281.85	6090.30	211.56 N	445.40 W	445.73	5.56
6177.00	6.10	270.42	6138.16	211.80 N	449.03 W	449.36	7.42
6272.00	10.95	257.34	6232.09	209.86 N	462.89 W	463.22	5.47
6366.00	15.40	264.65	6323.60	206.74 N	484.03 W	484.36	5.04
6461.00	19.66	268.49	6414.17	205.14 N	512.58 W	512.90	4.64
6556.00	23.18	272.52	6502.60	205.54 N	547.24 W	547.56	4.02
6651.00	30.54	277.74	6587.30	209.62 N	589.90 W	590.23	8.12
6746.00	48.90	281.76	6660.07	220.26 N	649.38 W	649.73	19.51
6840.00	69.58	277.77	6707.90	233.58 N	728.59 W	728.95	22.29
6936.00	86.95	275.34	6727.35	244.21 N	821.61 W	821.99	18.26
6966.00	90.06	274.88	6728.13	246.88 N	851.48 W	851.86	10.48
7006.00	90.71	274.45	6727.87	250.13 N	891.34 W	891.73	1.94
7118.00	90.37	271.33	6726.81	255.78 N	1003.18 W	1003.58	2.81
7308.00	90.06	268.37	6726.10	255.29 N	1193.16 W	1193.56	1.56
7403.00	89.72	268.79	6726.28	252.94 N	1288.13 W	1288.52	0.57
7498.00	89.91	268.79	6726.58	250.94 N	1383.11 W	1383.50	0.19
7592.00	91.36	268.18	6725.55	248.46 N	1477.06 W	1477.45	1.68
7782.00	91.54	267.61	6720.74	241.47 N	1666.87 W	1667.25	0.31
7877.00	90.52	268.33	6719.03	238.11 N	1761.80 W	1762.17	1.31
8066.00	92.00	268.27	6714.86	232.52 N	1950.66 W	1951.03	0.78
8161.00	90.92	267.62	6712.44	229.11 N	2045.57 W	2045.93	1.33
8256.00	89.88	267.53	6711.77	225.09 N	2140.48 W	2140.83	1.11
8350.00	90.62	267.72	6711.37	221.20 N	2234.40 W	2234.74	0.81
8445.00	89.97	268.26	6710.88	217.87 N	2329.34 W	2329.68	0.89
8540.00	88.92	267.79	6711.80	214.59 N	2424.28 W	2424.61	1.21
8635.00	90.28	267.74	6712.47	210.89 N	2519.20 W	2519.53	1.43
8730.00	89.20	267.59	6712.90	207.02 N	2614.12 W	2614.44	1.15
8825.00	89.69	267.59	6713.82	203.03 N	2709.03 W	2709.34	0.52
8919.00	89.26	268.15	6714.68	199.54 N	2802.96 W	2803.27	0.75
9014.00	89.08	268.87	6716.06	197.07 N	2897.92 W	2898.22	0.78
9109.00	89.97	268.50	6716.85	194.89 N	2992.89 W	2993.19	1.02
9203.00	89.11	268.51	6717.61	192.43 N	3086.85 W	3087.15	0.92
9298.00	89.63	268.17	6718.66	189.68 N	3181.80 W	3182.10	0.65
9488.00	89.78	267.78	6719.63	182.97 N	3371.68 W	3371.97	0.22
9583.00	90.12	267.61	6719.71	179.15 N	3466.61 W	3466.88	0.40
9678.00	90.62	267.40	6719.09	175.01 N	3561.51 W	3561.78	0.57
9773.00	90.80	267.45	6717.92	170.74 N	3656.41 W	3656.67	0.20
9867.00	91.45	267.20	6716.07	166.36 N	3750.29 W	3750.55	0.74
9962.00	90.22	268.29	6714.69	162.63 N	3845.20 W	3845.45	1.73
10057.00	90.99	268.00	6713.70	159.55 N	3940.15 W	3940.39	0.87
10152.00	89.29	269.21	6713.47	157.24 N	4035.11 W	4035.36	2.19
10336.00	89.97	270.13	6714.65	156.18 N	4219.10 W	4219.34	0.62
10430.00	89.26	269.66	6715.29	156.01 N	4313.10 W	4313.34	0.90
10521.00	90.18	270.72	6715.73	156.31 N	4404.10 W	4404.34	1.55
10613.00	88.74	268.41	6716.59	155.61 N	4496.08 W	4496.32	2.96
10796.00	89.51	268.01	6719.39	149.90 N	4678.97 W	4679.20	0.47
10888.00	90.31	268.59	6719.54	147.17 N	4770.93 W	4771.15	1.08
11255.00	90.22	267.02	6717.86	133.13 N	5137.64 W	5137.85	0.43
11438.00	89.48	267.86	6718.35	124.96 N	5320.46 W	5320.65	0.61
11530.00	89.48	267.38	6719.19	121.13 N	5412.37 W	5412.56	0.52
11622.00	89.63	268.19	6719.91	117.58 N	5504.30 W	5504.48	0.90
11714.00	89.72	267.16	6720.43	113.85 N	5596.22 W	5596.39	1.13

11806.00	89.51	269.63	6721.05	111.27 N	5688.18 W	5688.34	2.70
11900.00	89.41	268.65	6721.93	109.86 N	5782.16 W	5782.33	1.05
11994.00	89.82	268.09	6722.56	107.19 N	5876.12 W	5876.28	0.73
12089.00	89.91	267.60	6722.79	103.61 N	5971.05 W	5971.21	0.53
12184.00	88.92	267.69	6723.77	99.71 N	6065.97 W	6066.12	1.04
12279.00	87.47	269.19	6726.76	97.13 N	6160.88 W	6161.02	2.20
12374.00	87.78	269.31	6730.69	95.90 N	6255.79 W	6255.93	0.35
12469.00	87.75	270.12	6734.39	95.43 N	6350.72 W	6350.86	0.86
12564.00	88.68	269.53	6737.35	95.14 N	6445.67 W	6445.81	1.15
12659.00	89.88	271.11	6738.55	95.67 N	6540.65 W	6540.80	2.09
12753.00	90.92	271.24	6737.89	97.59 N	6634.63 W	6634.78	1.12
12848.00	88.74	270.18	6738.18	98.76 N	6729.62 W	6729.76	2.56
12943.00	89.11	270.34	6739.97	99.19 N	6824.60 W	6824.74	0.42
13038.00	89.44	268.99	6741.17	98.63 N	6919.59 W	6919.73	1.46
13133.00	91.60	269.99	6740.30	97.79 N	7014.57 W	7014.72	2.50
13228.00	91.88	269.54	6737.41	97.40 N	7109.53 W	7109.67	0.56
13322.00	92.44	269.83	6733.87	96.89 N	7203.46 W	7203.60	0.67
13417.00	91.36	269.79	6730.73	96.57 N	7298.40 W	7298.55	1.14
13512.00	89.97	270.06	6729.63	96.45 N	7393.39 W	7393.54	1.49
13607.00	89.11	268.29	6730.39	95.08 N	7488.38 W	7488.52	2.08
13702.00	88.74	267.11	6732.18	91.27 N	7583.28 W	7583.42	1.29
13892.00	90.09	267.93	6734.13	83.05 N	7773.09 W	7773.21	0.83
13986.00	88.64	266.72	6735.16	78.67 N	7866.98 W	7867.09	2.01
14081.00	90.68	269.60	6735.73	75.62 N	7961.91 W	7962.02	3.71
14176.00	88.43	267.30	6736.47	73.04 N	8056.86 W	8056.96	3.39
14271.00	90.43	269.29	6737.42	70.21 N	8151.80 W	8151.90	2.98
14365.00	89.51	267.37	6737.47	67.47 N	8245.76 W	8245.85	2.27
14460.00	90.65	272.35	6737.34	67.24 N	8340.73 W	8340.82	5.38
14555.00	88.40	270.72	6738.13	69.78 N	8435.68 W	8435.78	2.92
14650.00	89.82	271.25	6739.61	71.42 N	8530.65 W	8530.75	1.59
14745.00	88.83	270.59	6740.74	72.94 N	8625.63 W	8625.73	1.25
14839.00	86.20	269.36	6744.81	72.91 N	8719.53 W	8719.64	3.09
14934.00	84.98	269.30	6752.11	71.80 N	8814.24 W	8814.34	1.29
15029.00	86.23	268.65	6759.39	70.11 N	8908.95 W	8909.05	1.49
15123.00	89.72	268.59	6762.70	67.85 N	9002.85 W	9002.94	3.71
15219.00	90.31	267.70	6762.68	64.75 N	9098.79 W	9098.88	1.11
15313.00	90.96	269.40	6761.64	62.37 N	9192.75 W	9192.84	1.94
15408.00	91.94	270.57	6759.24	62.35 N	9287.72 W	9287.81	1.61
15503.00	92.10	270.50	6755.89	63.23 N	9382.66 W	9382.75	0.18
15598.00	91.97	270.45	6752.52	64.01 N	9477.60 W	9477.68	0.14
15694.00	91.05	269.41	6749.99	63.90 N	9573.56 W	9573.65	1.45
15788.00	91.85	269.64	6747.61	63.12 N	9667.53 W	9667.61	0.89
15883.00	90.46	269.13	6745.70	62.10 N	9762.50 W	9762.58	1.55
15978.00	89.48	269.00	6745.75	60.55 N	9857.48 W	9857.57	1.05
16073.00	88.49	267.53	6747.44	57.67 N	9952.42 W	9952.50	1.87
16168.00	90.18	269.44	6748.54	55.16 N	10047.37 W	10047.45	2.69
16262.00	91.08	270.07	6747.50	54.76 N	10141.37 W	10141.44	1.16
16370.00	89.69	269.70	6746.78	54.55 N	10249.36 W	10249.43	1.33
16440.00	89.69	269.70	6747.15	54.18 N	10319.36 W	10319.43	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 270.09 DEGREES (GRID)
A TOTAL CORRECTION OF 7.42 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 16440.00 FEET
IS 10319.50 FEET ALONG 270.30 DEGREES (GRID)**