HALLIBURTON | Sperry Drilling

PCG Pressure Case Gamma
PCG Pressure Case Directional

Powered by INSITE™

1 : 600 / 1 : 240

Country	: **USA**
Field	: **Wattenberg**
Location	: **Lat: 40° 26' 55.86" North** **Long: 104° 21' 15.23" West**
Well	: **Wells Ranch AE32-685**
Company	: **Noble Energy**
Rig	: **H&P 343**

Company : **Noble Energy**
Rig : **H&P 343**
Well : **Wells Ranch AE32-685**
Field : **Wattenberg**
Country : **USA**
API Number : **05-123-41731**

LOCATION

Latitude : **40° 26' 55.86" North**
Longitude : **104° 21' 15.23" West**
UTM Easting = **3,318,870.000 usft**
UTM Northing = **1,408,416.470 usft**

Other Services
Directional Drilling

Permanent Datum : **Ground Level** Elevation : **4748.00 ft**
Log Measured From : **Drill Floor** **24.00 ft** Above Permanent Datum
Drilling Measured From : **Drill Floor**

TVD LOG

Elev. KB **N/A**
DF **4748.00 ft**
GL **4772.00 ft**
WD **N/A**

Depth Logged : **619.00 ft** To **6,532.60 ft**
Date Logged : **11-Oct-15** To **13-Oct-15**
Total Depth MD : **8,000.00 ft** TVD : **6,532.60 ft**
Spud Date : **11-Oct-15**

Unit No. : **11610115** Job No. : **CA-XX-0902771585**
Plot Type : **Final**
Plot Date : **16-Oct-15**

Run No.	Borehole Record (TVD)			Casing Record (TVD)			
	Size	From	To	Size	Weight	From	To
0200	8.750 in	619.00 ft	6,450.89 ft	9.625 in	36.60 lbpf	SURFACE	620.00 ft
				7.000 in	34.70 lbpf	SURFACE	6,547.49 ft

WELL INFORMATION

MWD Run Number	100	200			
Date run completed	12-Oct-15	13-Oct-15			
Rig Bit Number	0200	0300			
Bit Size (in)	8.750	8.750			
Tool Nominal OD (in)	6.750	6.750			
Log Start Depth (TVD, ft)	619.00	6,450.89			
Log End Depth (TVD, ft)	6,450.89	6,547.91			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	11-Oct-15 13:49	12-Oct-15 20:30			
Drill/Wipe End Date and Time	12-Oct-15 11:10	13-Oct-15 01:42			
Min Inc (deg) @ Depth (TVD, ft)	0.17 @ 5,865.03	57.22 @ 6,491.93			
Max Inc (deg) @ Depth (TVD, ft)	47.09 @ 6,434.30	85.43 @ 6,543.99			
Bit TFA(in2) / Bit Type	1.21 / PDC	1.04 / PDC			
Flow Rate (gpm)	588.60	466.80			
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A			
Fluid Type	Native/Spud Mud	Native/Spud Mud			
Density (ppg) / Viscosity (spqt)	9.50 / 27.00	10.60 / 38.00			
Filtrate CL (ppm)	1,200.00	1,500.00			
pH / Fluid Loss (mptm)	8.10 / 68	9.20 / 7			
PV (cP) / YP (lhf2)	2 / 3.00	12 / 12.00			
% Solids / % Sand	1.9 / 0.25	11.30 / 0.15			
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A			
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			

Max Tool Temp (degF) / Source	165.58 / PCM	165.58 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Matt Busche	Matt Busche			
Customer Representative	Johnny Sanchez	Johnny Sanchez			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.93	5.93			
Sub Serial Number	11342302	11342302			
Insert Serial Number	11055866	11055866			
Date and Time Initialized	10-Oct-15 21:29	10-Oct-15 21:29			
Date and Time Read	13-Oct-15 06:58	13-Oct-15 08:04			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	68.00	66.00			
Software Version	6.33	6.33			
Sub Serial Number	11342302	11342302			
Sonde Serial Number	11062113	11062113			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	204.10	25.50			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	61.07	58.92			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11342302	11342302			
Insert/Sonde Serial Number	11293345	11293345			

REMARKS

1. All depths are calibrated to driller's pipe tally and are total vertical depth from the drill floor.

2. No depth corrections have been made for pipe stretch or compression.

3. All data presented is recorded (memory data) unless otherwise stated.

4. Environmental parameters used in gamma and resistance processing:

Hole Size: 8.75"
Mud Density: 8.75-10.75ppg

5. The following smoothing parameters have been applied to the data:

1:600 (2"):
Interval: 1.0 ft
Coercion Distance: 3.0 ft (ROPA)
Interval: 1.0 ft
Coercion Distance: 3.0 ft (Gamma Ray)

1:240 (5")
Interval: 0.5 ft
Coercion Distance: 1.2 ft (ROPA)
Interval: 0.5 ft
Coercion Distance: 0.6 ft (Gamma Ray)

WARRANTY

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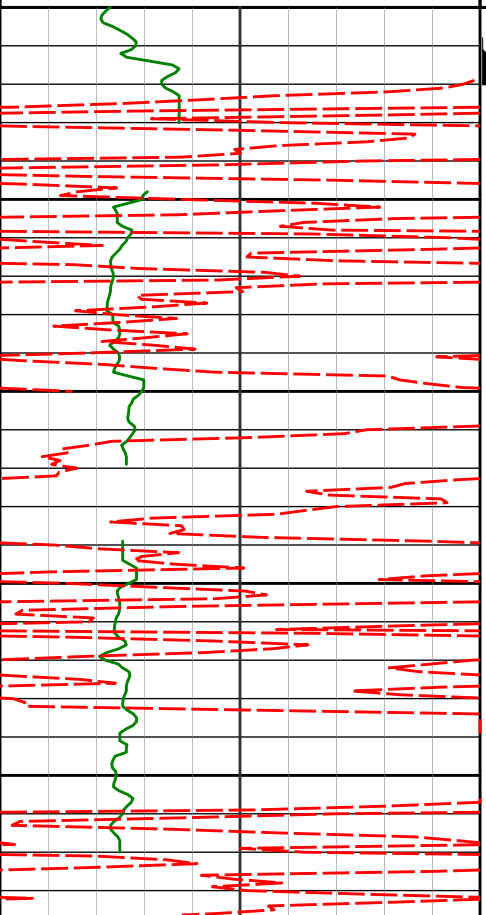
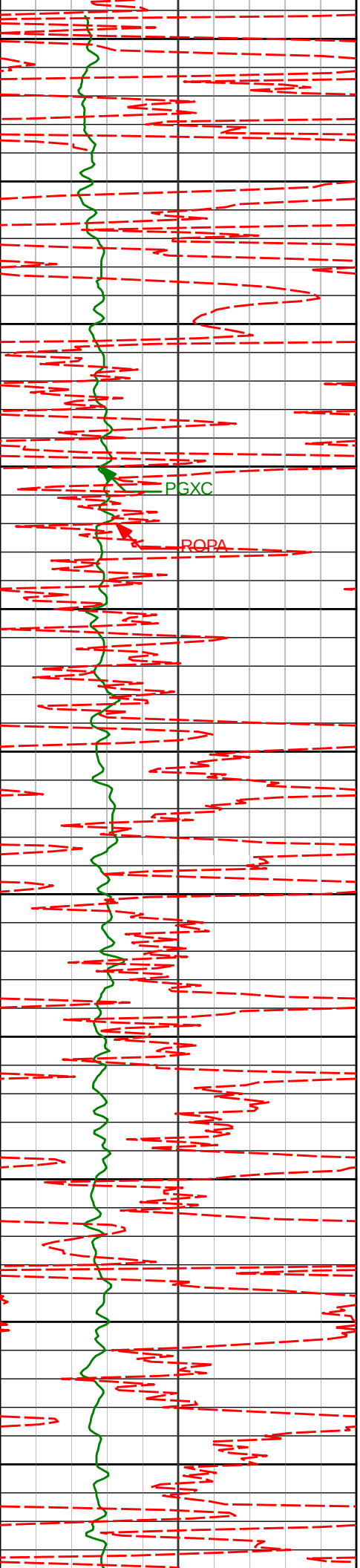
TVD Detail 1:600 Scale

PCG GR XHi-Range RT BCor
PGXRC-T
0 api 300

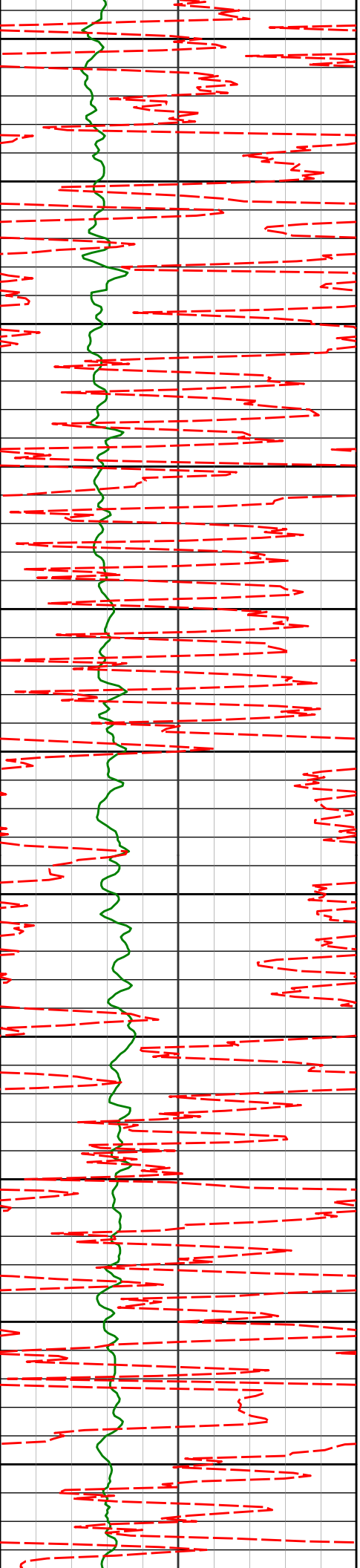
Avg Rate of Penetration
ROPA
1K feet per hr 0



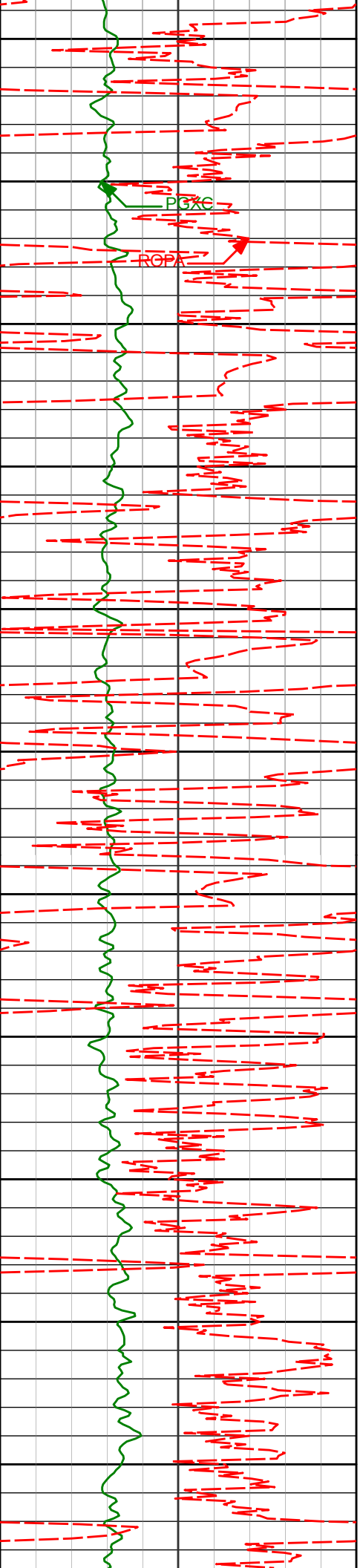
Depth TVD ft	Depth	Inc	Azi	TVD	V.S.	Temp
						81.11°F
	675'	0.40°	18.71°	674.99'	0.89'	82.02°F
						82.02°F
	739'	0.49°	30.71°	738.99'	1.12'	
						84.06°F
	833'	0.25°	7.29°	832.99'	1.39'	



850					84.06°F
900					84.06°F
	928'	0.39°	345.32°	927.99'	1.36'
950					
					86.09°F
1000					
					86.09°F
1050					
					86.09°F
1100					
					86.09°F
1150					
					88.14°F
1200					
	1207'	1.62°	302.47°	1206.94'	-2.02'
					88.14°F
1250					
					88.14°F
	1299'	1.71°	296.82°	1298.90'	-4.26'
1300					88.14°F
1350					
					88.14°F



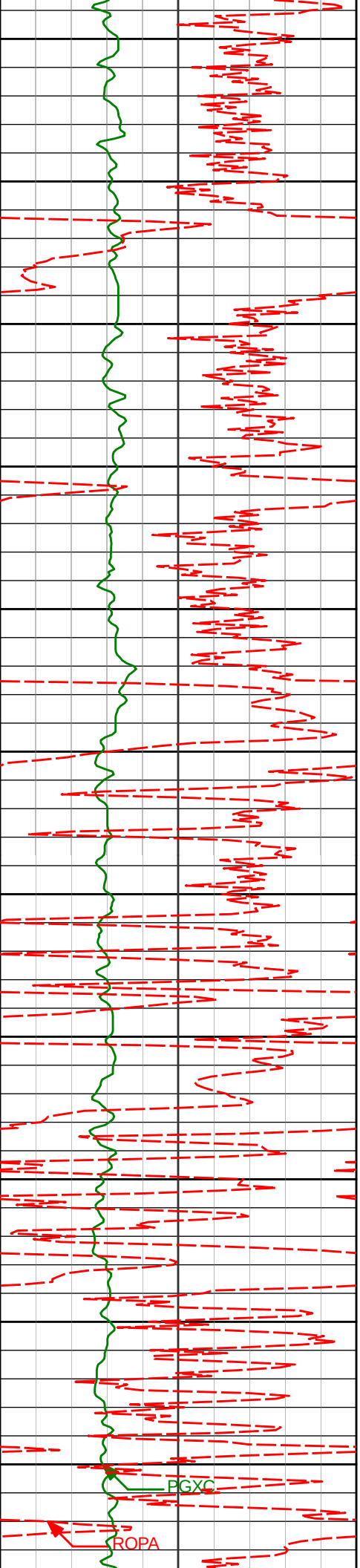
					88.14°F
					90.19°F
1484'	1.64°	305.19°	1483.83'	-8.71'	90.19°F
					90.19°F
1576'	1.73°	302.19°	1575.79'	-10.87'	90.19°F
					92.26°F
					92.26°F
					94.33°F
1763'	1.68°	300.21°	1762.70'	-15.45'	94.33°F
					94.33°F
1854'	1.83°	298.01°	1853.66'	-17.80'	96.10°F
					96.42°F
					97.94°F



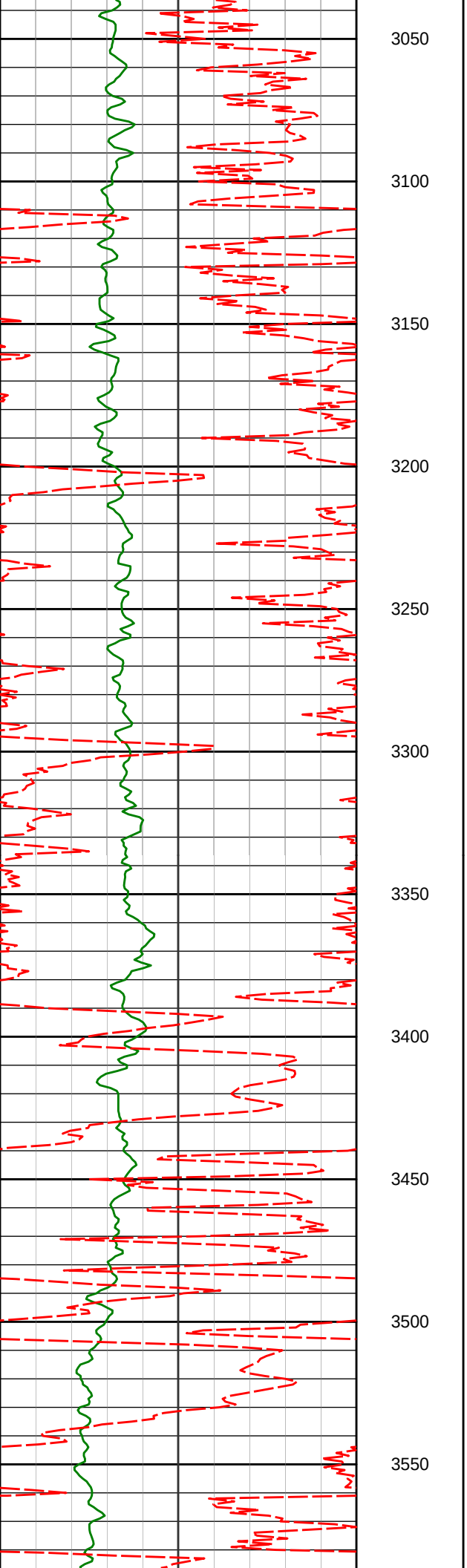
1950
2000
2050
2100
2150
2200
2250
2300
2350
2400
2450

1947'	3.69°	316.43°	1946.55'	-21.01'
2040'	5.82°	308.39°	2039.23'	-26.46'
2133'	8.40°	308.98°	2131.50'	-35.00'
2224'	11.25°	305.06°	2221.16'	-46.87'
2317'	12.19°	292.00°	2312.24'	-62.85'
2409'	11.62°	290.67°	2402.26'	-80.09'

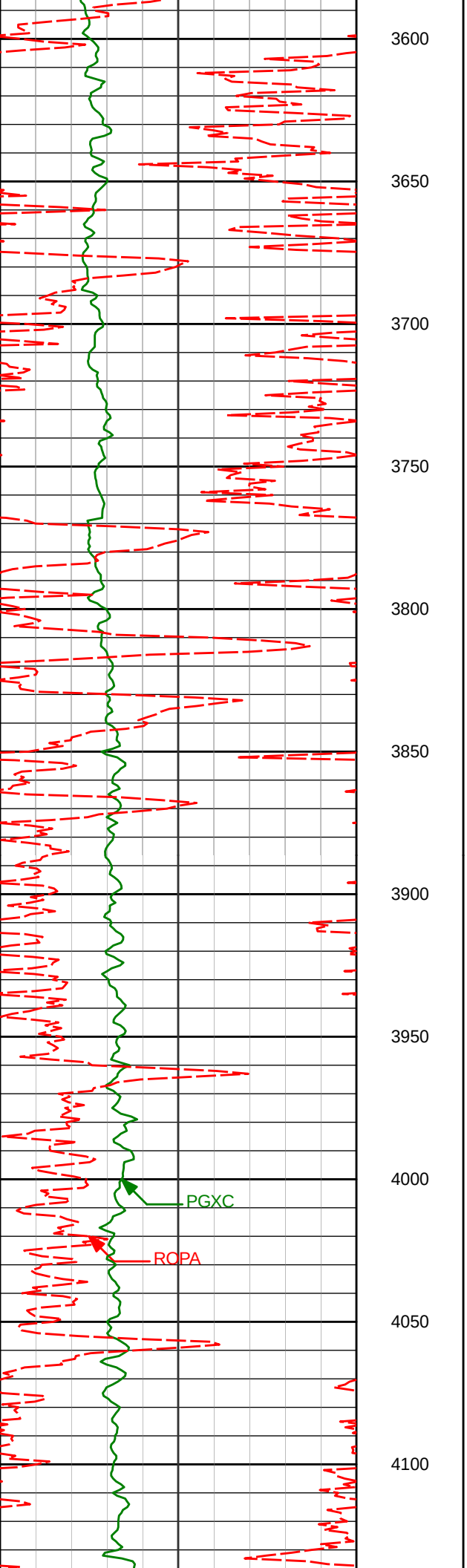
98.51°F
98.51°F
98.51°F
100.13°F
100.62°F
100.62°F
100.62°F
102.72°F
102.72°F
104.83°F
104.83°F



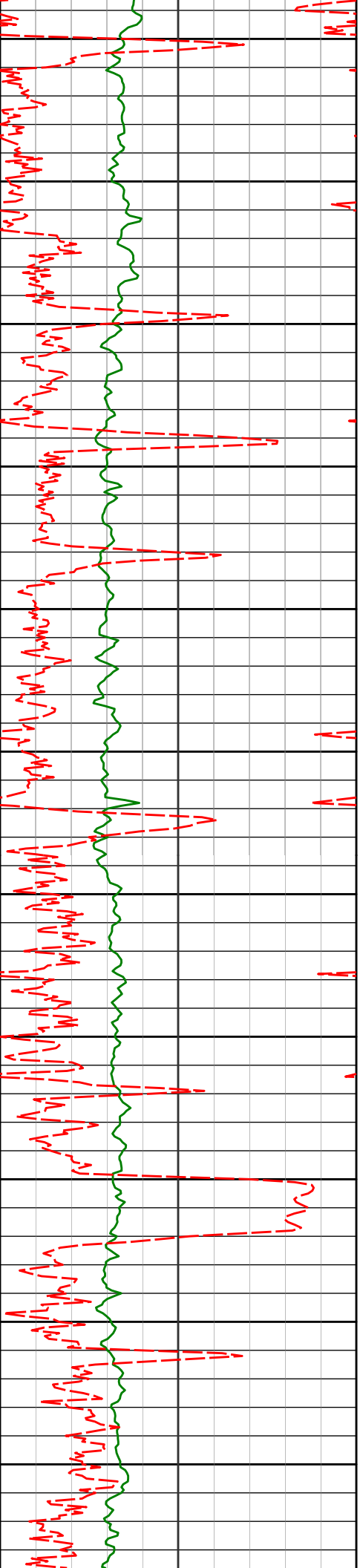
2502'	11.51°	290.34°	2493.37'	-97.14'
				104.83°F
				104.83°F
2595'	11.42°	290.69°	2584.51'	-114.04'
				106.97°F
				106.97°F
2688'	11.38°	290.57°	2675.68'	-130.83'
				107.65°F
				109.09°F
2780'	11.30°	300.98°	2765.89'	-146.58'
				109.09°F
				109.09°F
2872'	10.59°	302.16°	2856.22'	-160.90'
				111.24°F
				111.24°F
2966'	9.21°	302.11°	2948.82'	-174.05'
				113.40°F
				113.40°F



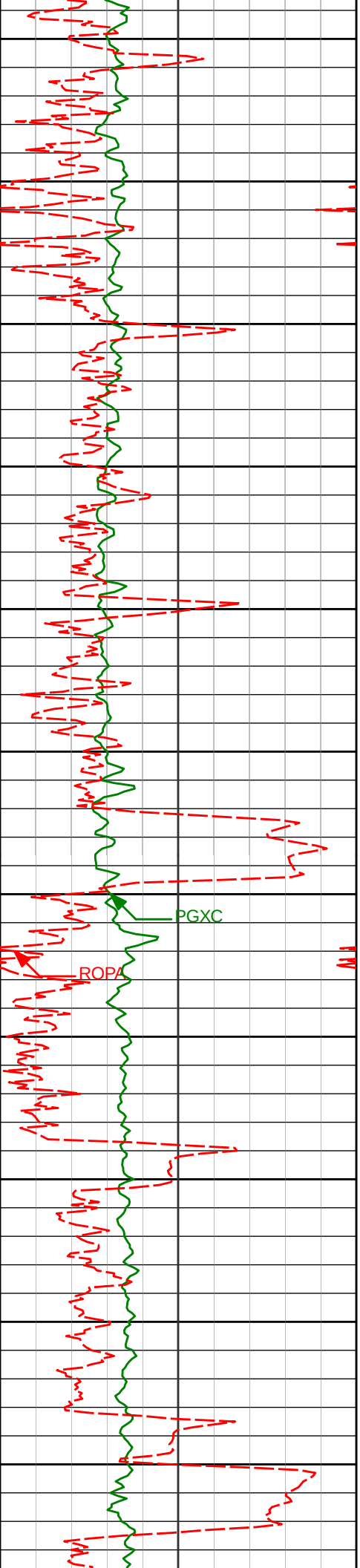
3061'	9.37°	302.93°	3042.57'	-186.48'	113.40°F
					113.40°F
3155'	9.13°	305.47°	3135.35'	-198.46'	
					115.56°F
3250'	7.61°	282.88°	3229.36'	-210.37'	115.56°F
					117.73°F
3344'	6.58°	301.49°	3322.65'	-220.77'	117.73°F
					117.73°F
3439'	6.34°	299.18°	3417.05'	-229.66'	118.78°F
					119.91°F
3534'	7.69°	300.23°	3511.33'	-239.38'	119.91°F
					119.91°F



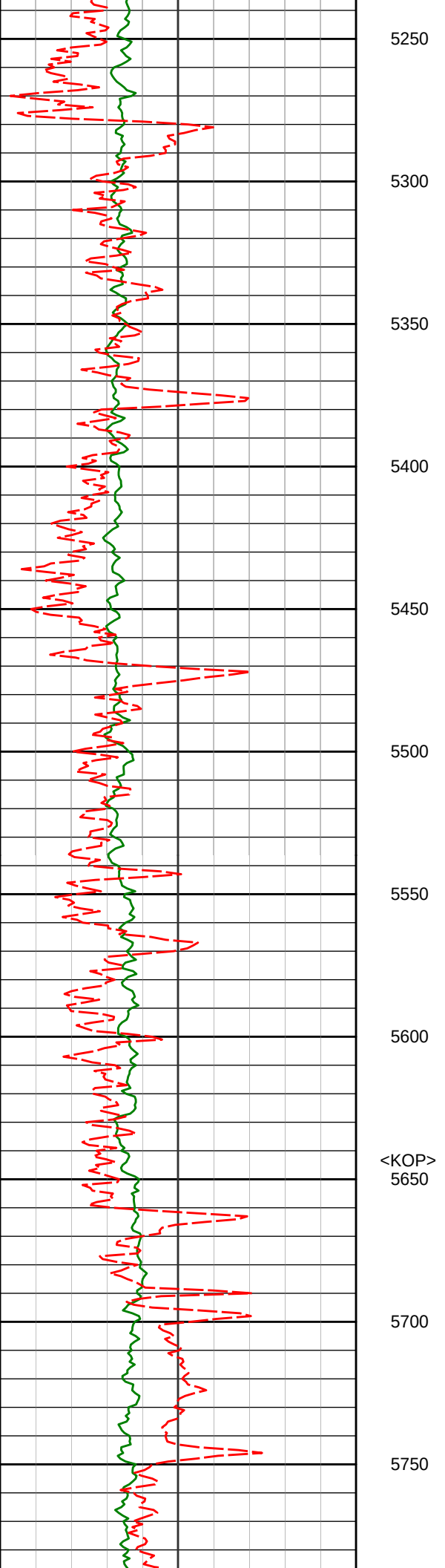
3628'	8.39°	307.48°	3604.41'	-249.81'	119.91°F
					122.11°F
3723'	8.59°	305.76°	3698.37'	-260.55'	122.11°F
					124.30°F
3817'	8.96°	305.58°	3791.27'	-271.69'	124.30°F
					124.30°F
3912'	8.86°	304.49°	3885.12'	-283.22'	124.30°F
					128.73°F
4007'	8.35°	302.79°	3979.06'	-294.57'	128.73°F
					128.73°F
4101'	7.88°	302.35°	4072.11'	-305.31'	128.73°F
					128.73°F



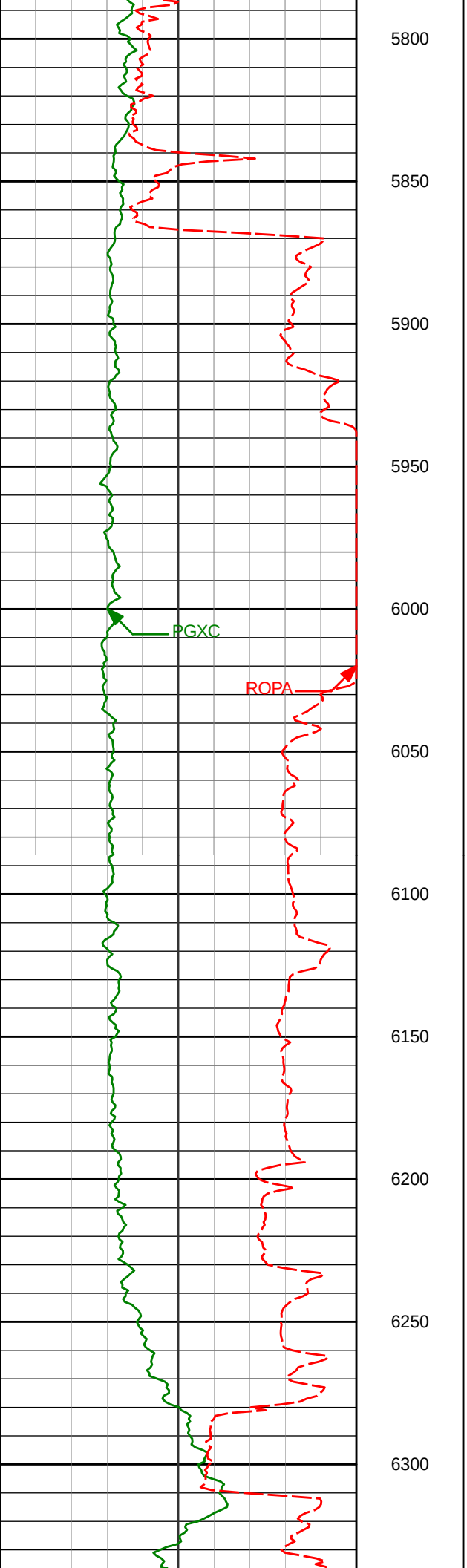
					128.73°F
4196'	6.95°	299.39°	4166.32'	-315.43'	130.96°F
					130.96°F
4290'	6.43°	297.65°	4259.68'	-324.72'	131.40°F
					133.20°F
4385'	6.19°	296.99°	4354.10'	-333.70'	133.20°F
					133.20°F
4479'	5.29°	292.76°	4447.63'	-341.96'	135.45°F
					135.14°F
4574'	4.55°	289.92°	4542.28'	-349.36'	133.58°F
					135.60°F
					137.70°F
					137.70°F



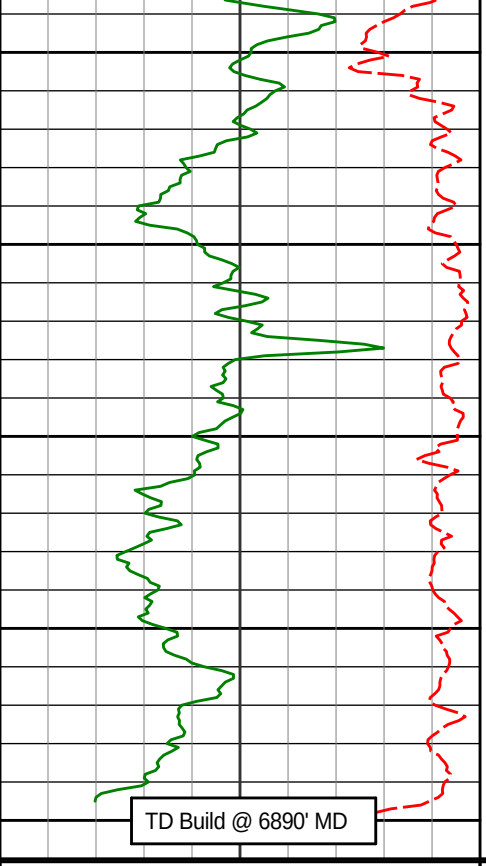
					137.70°F
4763'	4.30°	305.00°	4730.73'	-361.80'	
					139.70°F
					139.96°F
4858'	3.75°	302.62°	4825.49'	-367.10'	
					141.72°F
					142.25°F
4952'	4.17°	293.89°	4919.27'	-372.63'	
					140.80°F
					139.96°F
5047'	1.65°	285.50°	5014.14'	-376.99'	
					142.25°F
					143.47°F
5141'	1.86°	259.81°	5108.09'	-379.79'	
					144.54°F
					142.74°F
5236'	0.49°	16.72°	5203.08'	-381.18'	
					143.72°F



					144.54°F
5330'	0.80°	47.19°	5297.07'	-380.54'	
					144.54°F
					144.54°F
5425'	0.64°	22.12°	5392.07'	-379.80'	
					144.66°F
					146.71°F
5520'	0.87°	0.02°	5487.06'	-379.53'	144.54°F
					146.65°F
5614'	0.99°	346.61°	5581.04'	-379.63'	146.84°F
					147.36°F
5709'	0.81°	319.60°	5676.03'	-380.17'	149.14°F
					149.14°F
					149.14°F
5803'	0.33°	297.33°	5770.03'	-380.80'	



					149.14°F
					149.19°F
5898'	0.17°	114.91°	5865.03'	-380.91'	
					150.97°F
					152.08°F
5993'	8.58°	98.73°	5959.67'	-373.84'	
					153.79°F
					155.21°F
6087'	13.67°	98.13°	6051.87'	-356.09'	
					156.35°F
					158.32°F
6182'	26.22°	89.37°	6141.01'	-323.99'	
					160.23°F
					160.83°F
6276'	34.85°	85.86°	6221.90'	-276.30'	
					160.83°F
					161.58°F
6371'	39.94°	91.46°	6297.38'	-218.72'	



Depth	Inc	Azi	TVD	V.S.	Temp
					162.25°F
6465'	43.54°	92.64°	6367.50'	-156.43'	
					159.61°F
6560'	47.09°	91.57°	6434.30'	-89.20'	146.45°F
					145.91°F
6654'	57.22°	85.78°	6491.93'	-15.17'	
6749'	73.51°	82.13°	6531.41'	70.78'	
6818'	85.43°	85.17°	6543.99'	138.39'	

Avg Rate of Penetration
ROPA
1K feet per hr 0

Depth
TVD
ft

PCG GR XHi-Range RT BCor
PGXRC-T
0 api 300

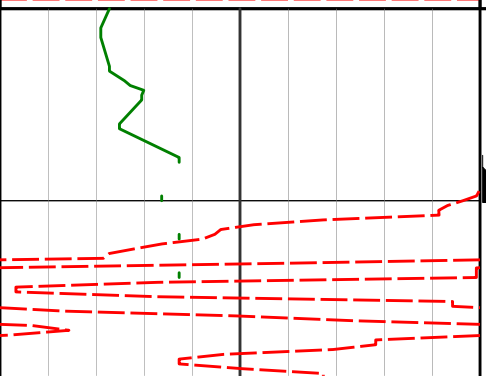
TVD Detail 1:240 Scale

PCG GR XHi-Range RT
PGXRC-T
0 api 300

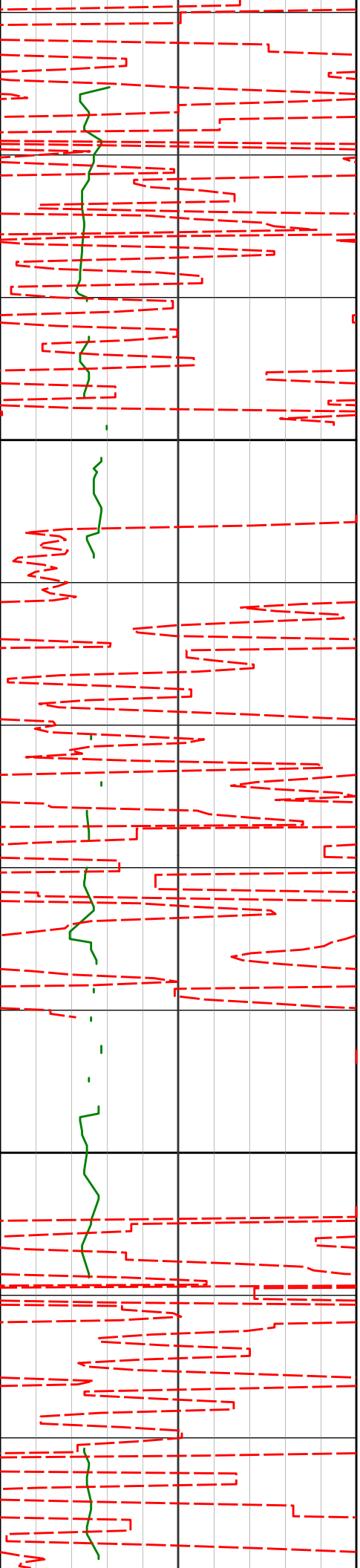
Avg Rate of Penetration
ROPA
1K feet per hr 0

Depth
TVD
ft

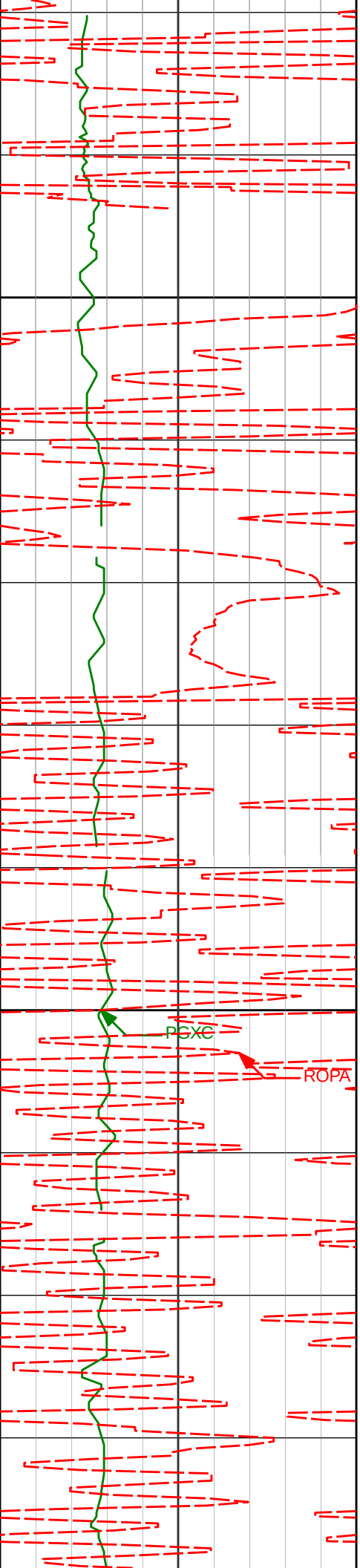
Depth	Inc	Azi	TVD	V.S.	Temp



81.11°F



675'	0.40°	18.71°	674.99'	0.89'	82.02°F
700					
					82.02°F
739'	0.49°	30.71°	738.99'	1.12'	
800					
					84.06°F
833'	0.25°	7.29°	832.99'	1.39'	
					84.06°F



900

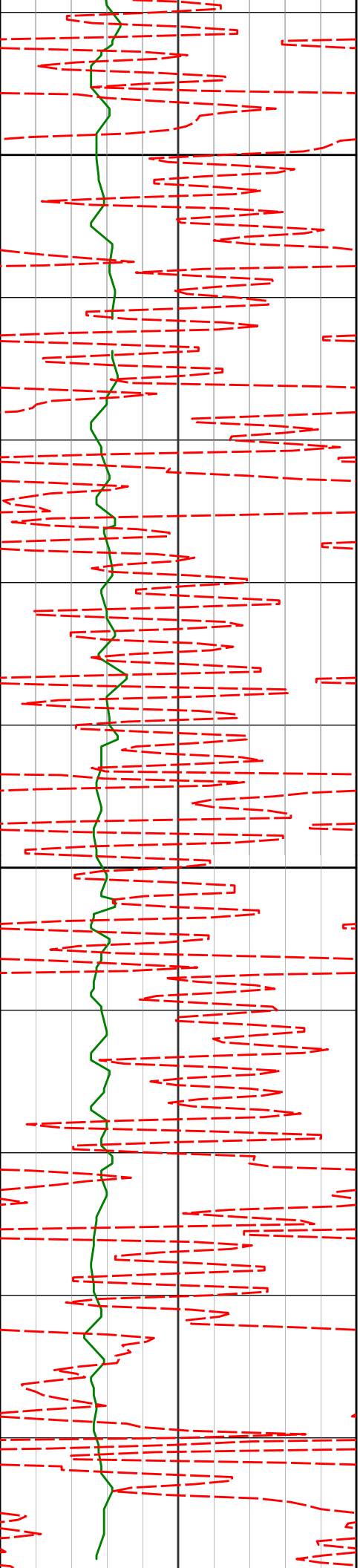
84.06°F

928' 0.39° 345.32° 927.99' 1.36'

86.09°F

1000

86.09°F



86.09°F

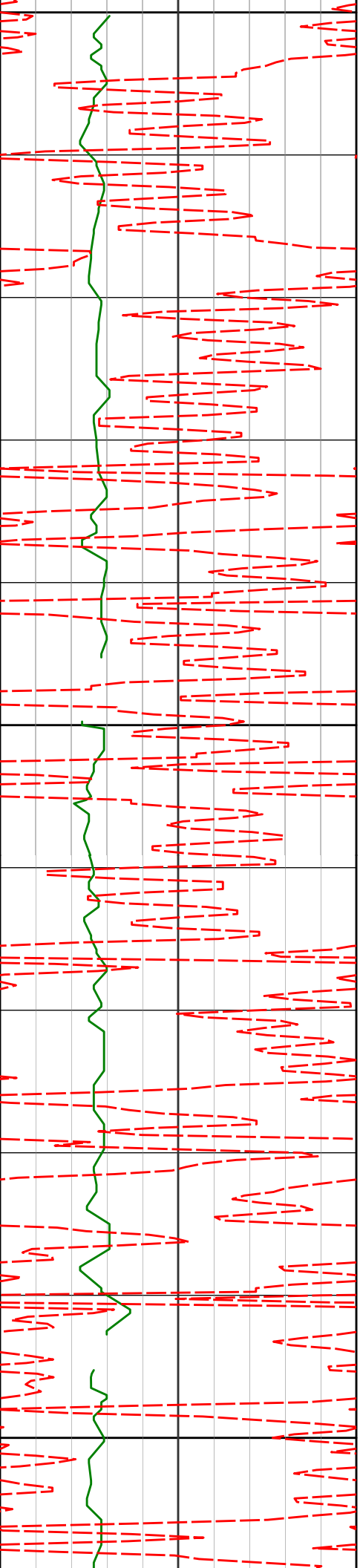
86.09°F

88.14°F

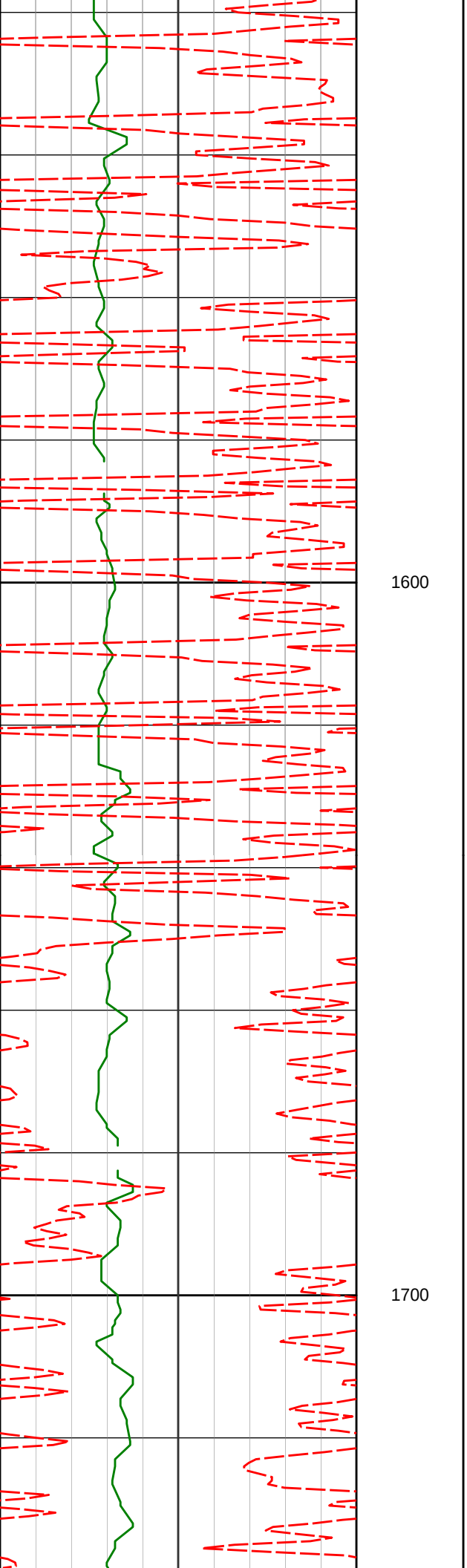
1207' 1.62° 302.47° 1206.94' -2.02'

88.14°F

88.14°F



1299'	1.71°	296.82°	1298.90'	-4.26'	88.14°F
					88.14°F
					88.14°F
					90.19°F
1484'	1.64°	305.19°	1483.83'	-8.71'	90.19°F



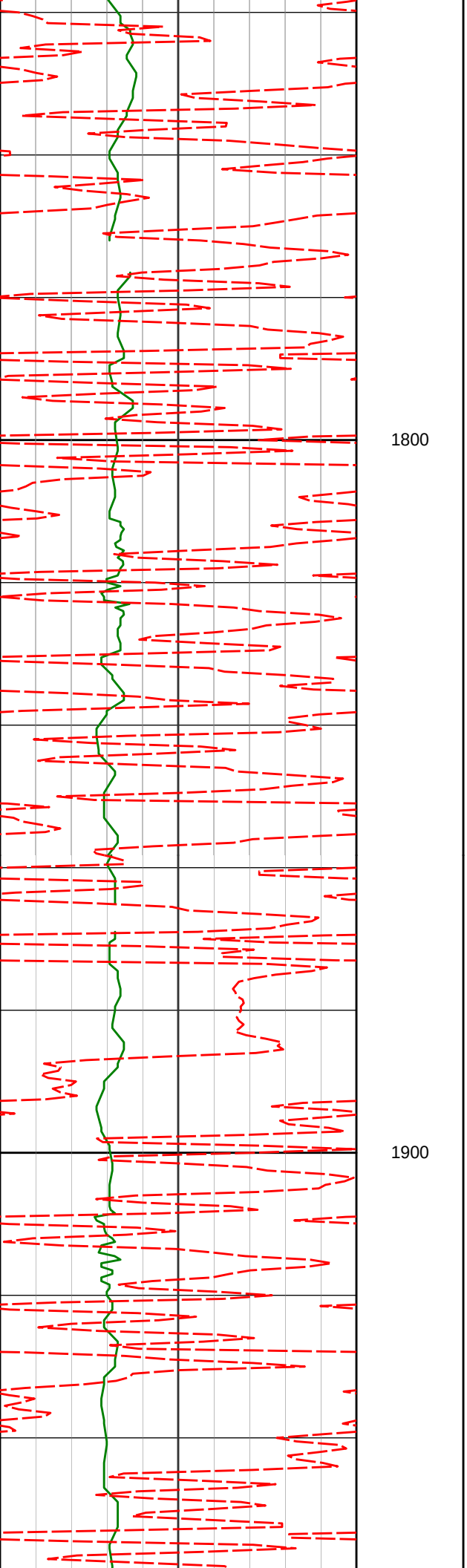
1576'	1.73°	302.19°	1575.79'	-10.87'	90.19°F

90.19°F

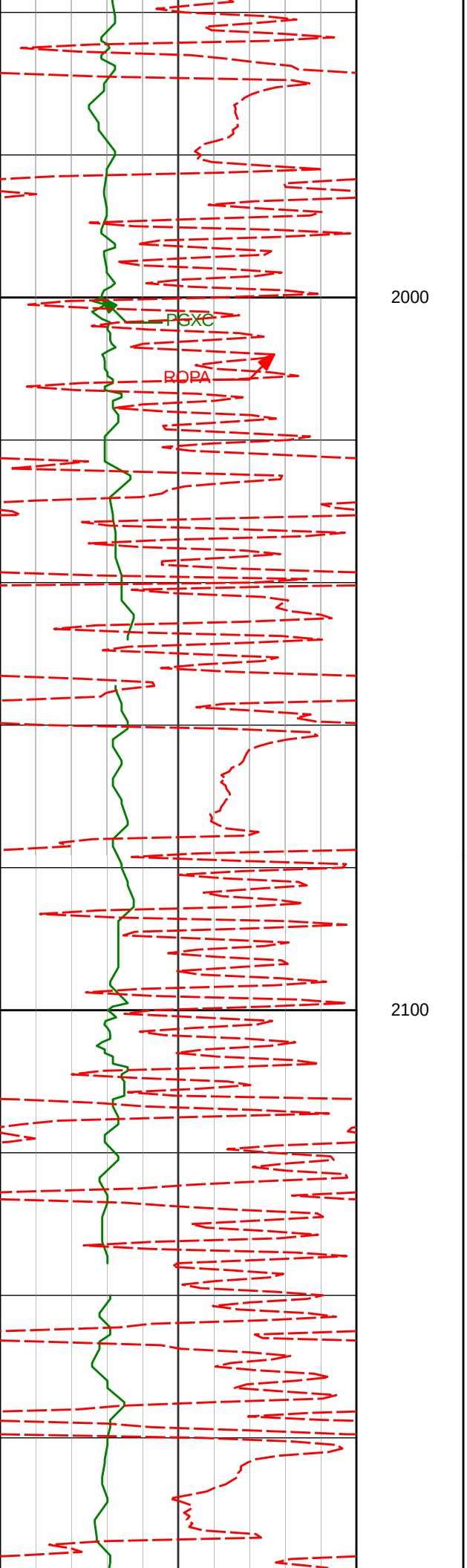
92.26°F

92.26°F

94.33°F



					94.33°F
1763'	1.68°	300.21°	1762.70'	-15.45'	
					94.33°F
					96.10°F
1854'	1.83°	298.01°	1853.66'	-17.80'	
					96.42°F
					97.94°F
1947'	3.69°	316.43°	1946.55'	-21.01'	



2000

2100

98.51°F

98.51°F

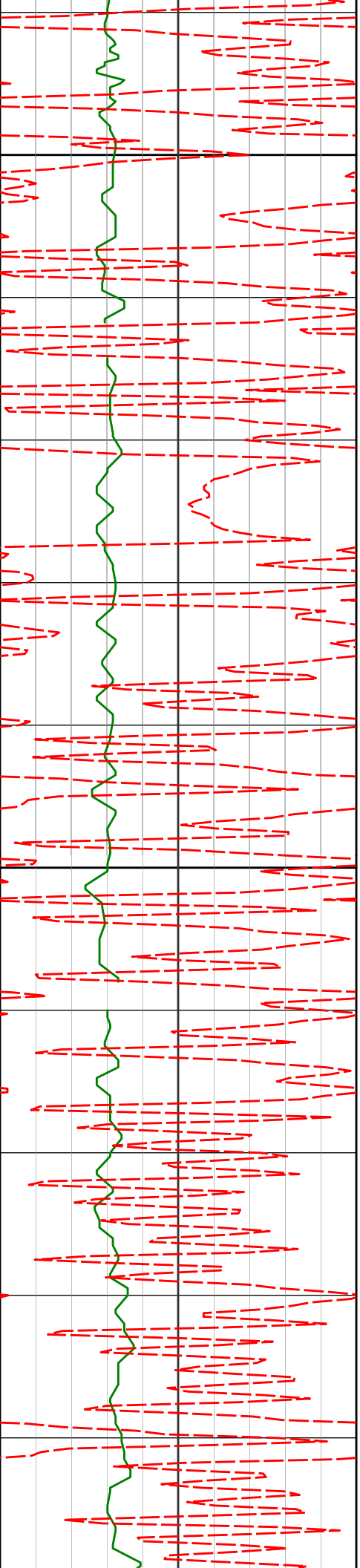
2040' 5.82° 308.39° 2039.23' -26.46'

98.51°F

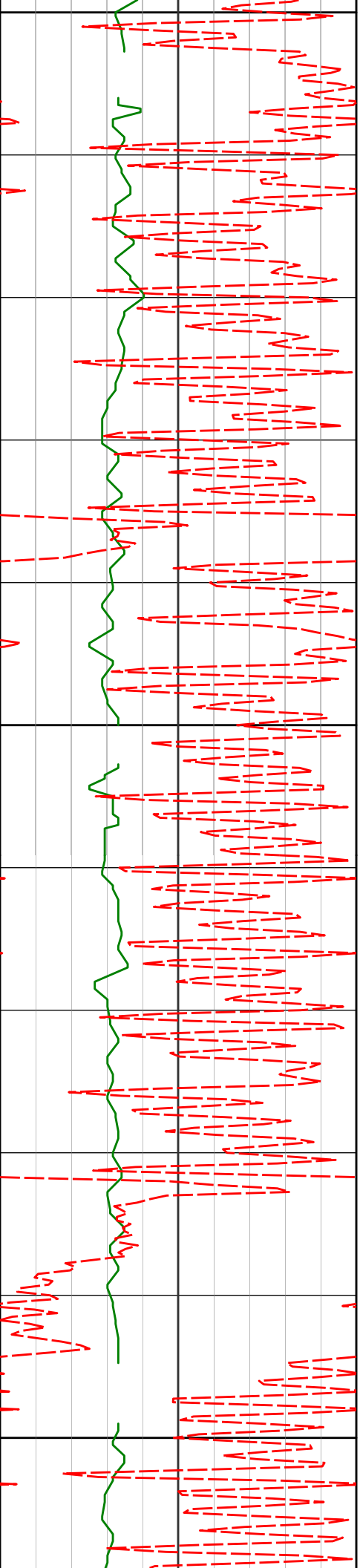
98.51°F

2133' 8.40° 308.98° 2131.50' -35.00'

100.13°F



2200					100.62°F
	2224'	11.25°	305.06°	2221.16'	-46.87'	
					100.62°F
					100.62°F
2300					
	2317'	12.19°	292.00°	2312.24'	-62.85'	
					102.72°F
					102.72°F



2409'	11.62°	290.67°	2402.26'	-80.09'
2502'	11.51°	290.34°	2493.37'	-97.14'
2595'	11.42°	290.69°	2584.51'	-114.04'

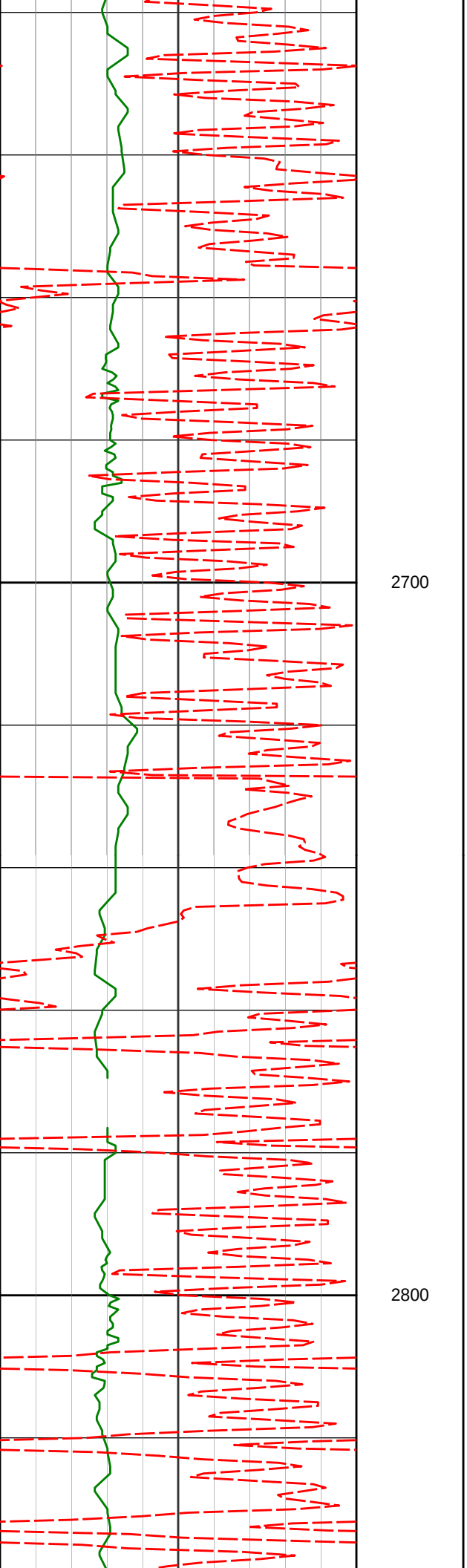
104.83°F

104.83°F

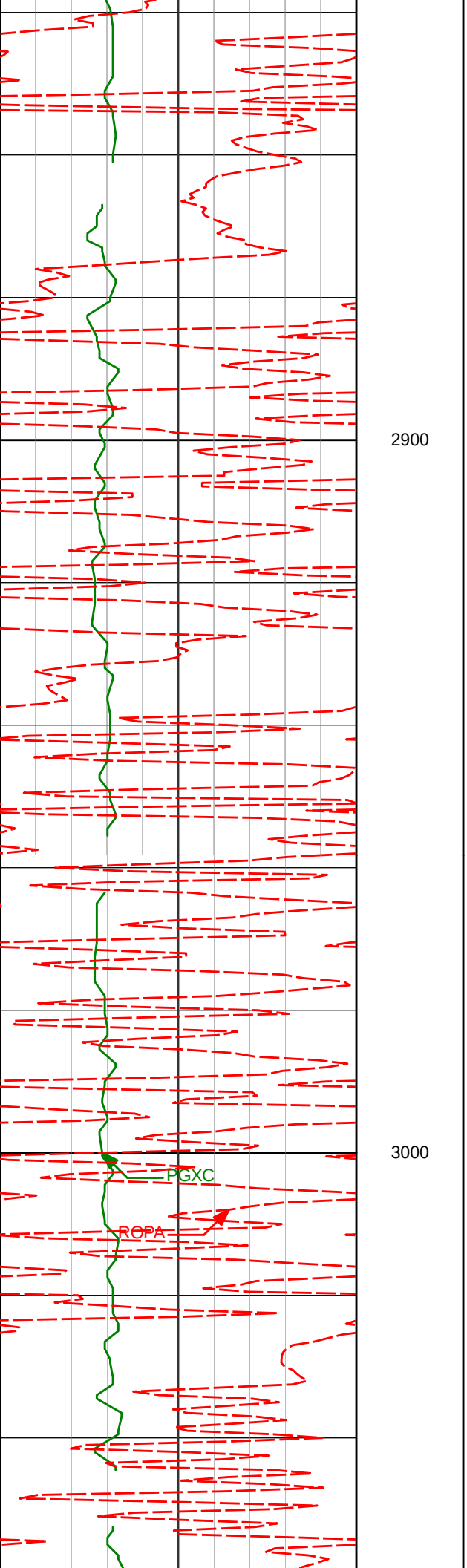
104.83°F

104.83°F

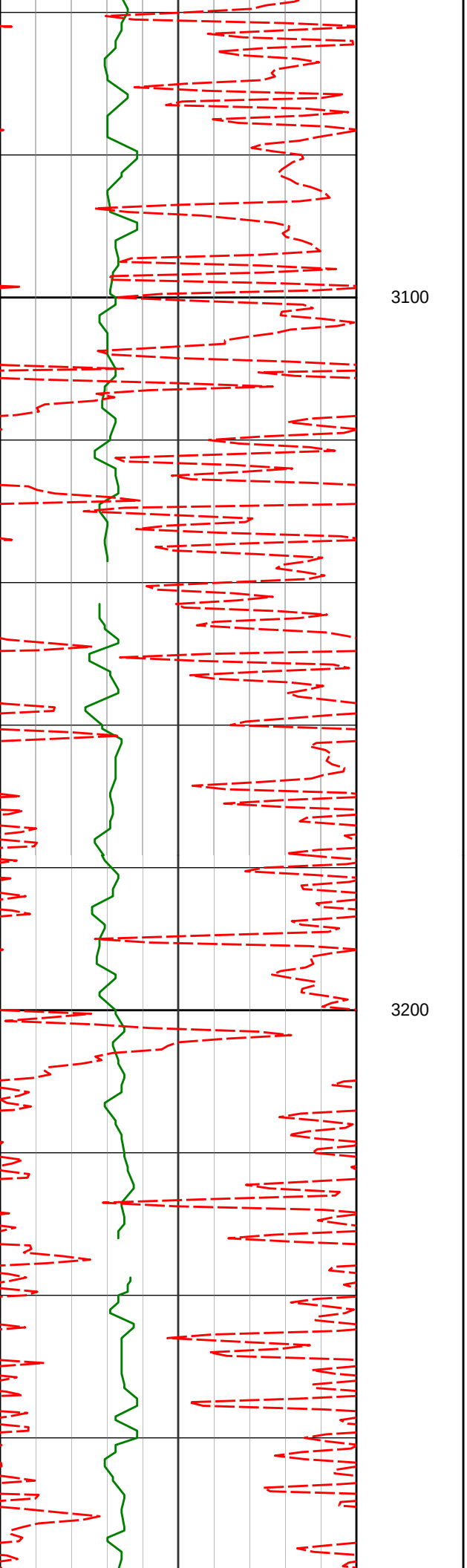
106.97°F



					106.97°F
2688'	11.38°	290.57°	2675.68'	-130.83'	
2700					107.65°F
					109.09°F
2780'	11.30°	300.98°	2765.89'	-146.58'	
2800					109.09°F
					109.09°F



2872'	10.59°	302.16°	2856.22'	-160.90'
				111.24°F
				111.24°F
2966'	9.21°	302.11°	2948.82'	-174.05'
				113.40°F
				113.40°F
3061'	9.37°	302.93°	3042.57'	-186.48'



113.40°F

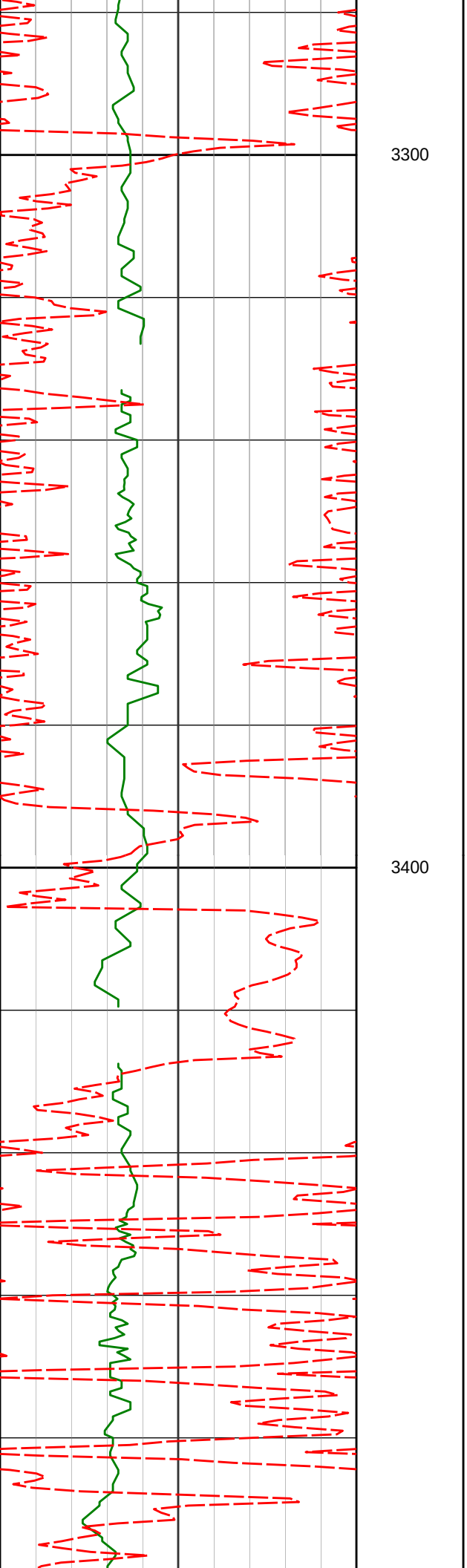
113.40°F

3155'	9.13°	305.47°	3135.35'	-198.46'

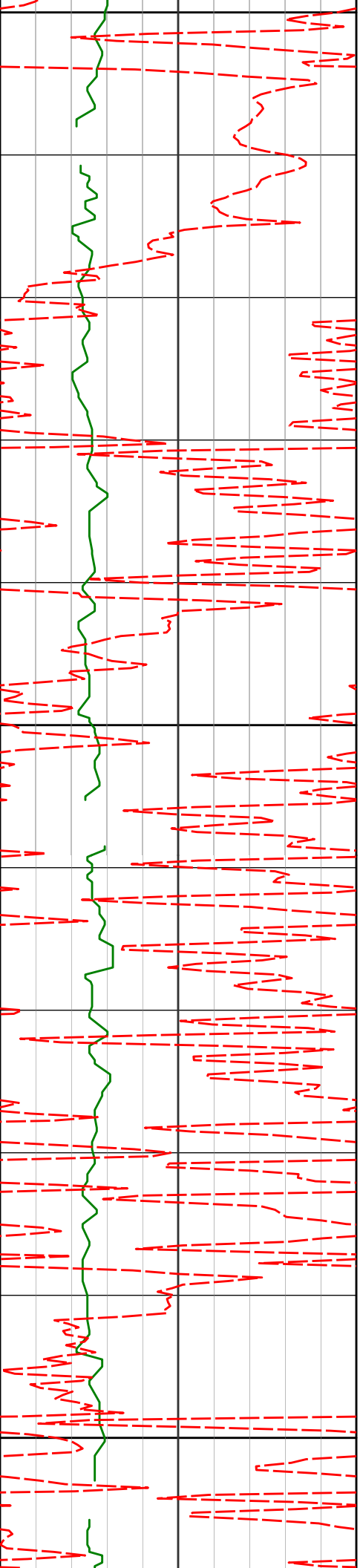
115.56°F

3250'	7.61°	282.88°	3229.36'	-210.37'

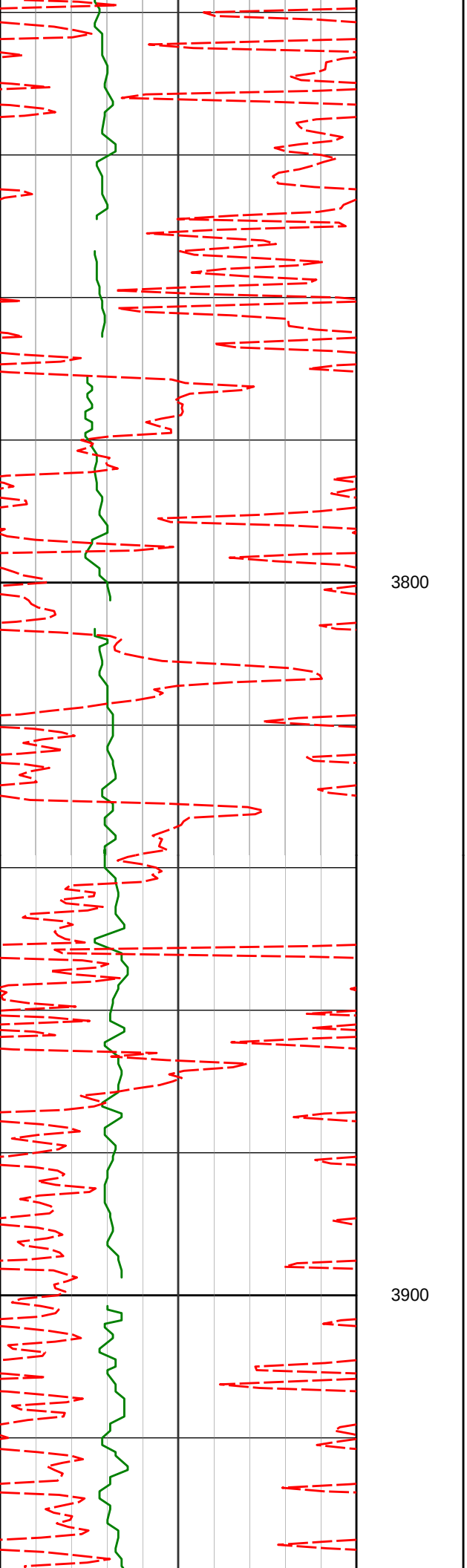
115.56°F



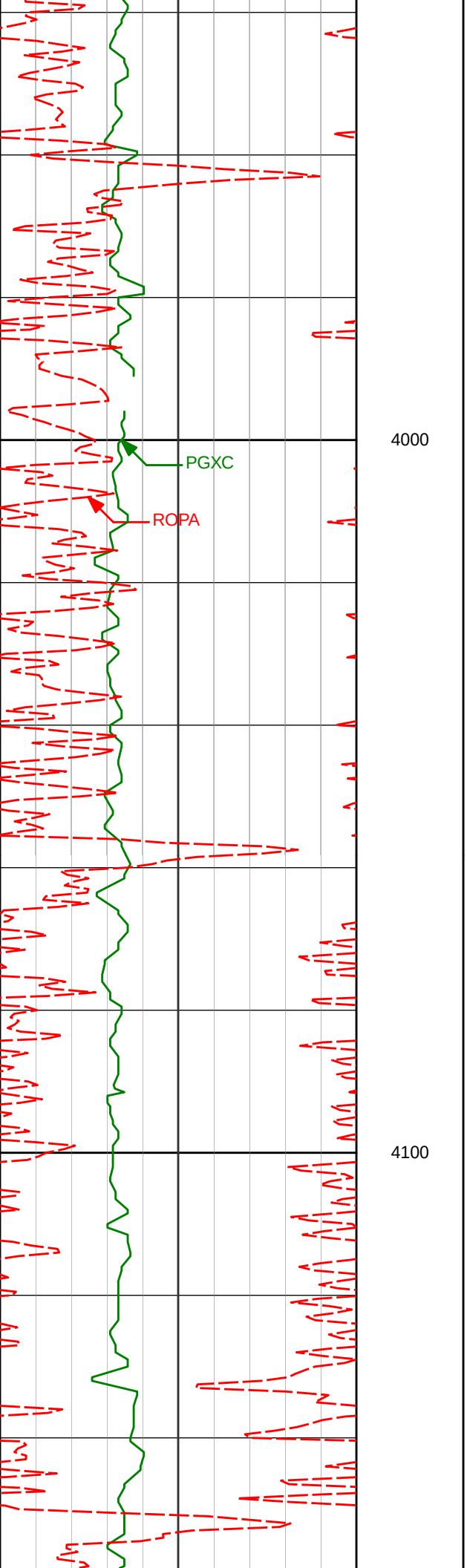
					117.73°F
3344'	6.58°	301.49°	3322.65'	-220.77'	
					117.73°F
					117.73°F
3439'	6.34°	299.18°	3417.05'	-229.66'	
					118.78°F
					119.91°F



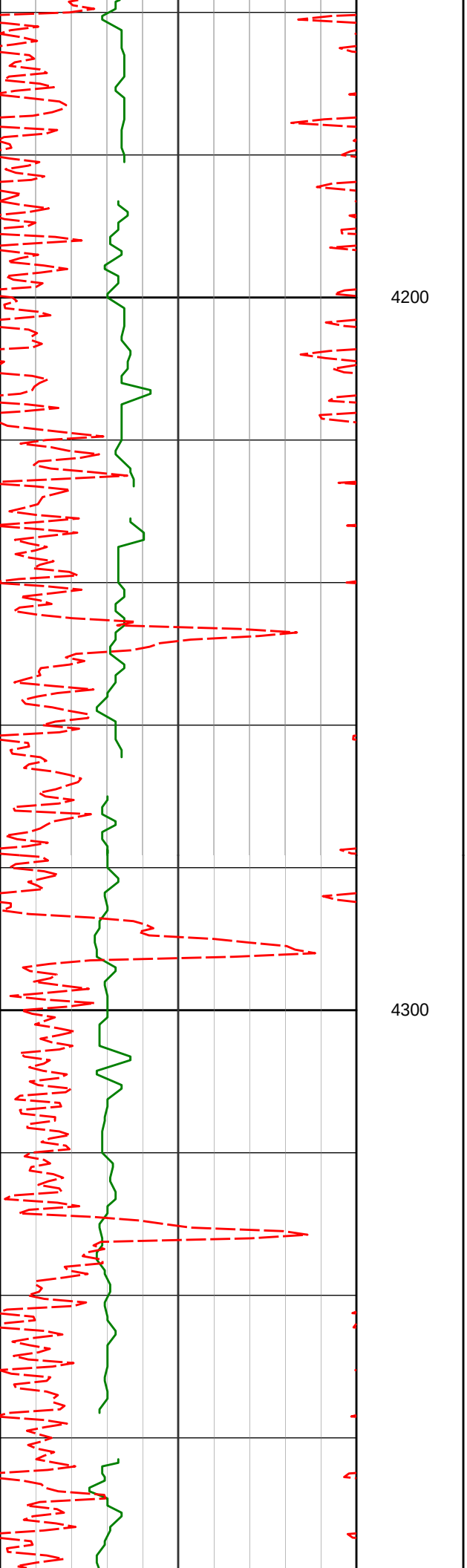
3534'	7.69°	300.23°	3511.33'	-239.38'	119.91°F
					119.91°F
3628'	8.39°	307.48°	3604.41'	-249.81'	119.91°F
					122.11°F
3723'	8.59°	305.76°	3698.37'	-260.55'	122.11°F



					124.30°F
					124.30°F
3817'	8.96°	305.58°	3791.27'	-271.69'	
3800					
					124.30°F
					124.30°F
3912'	8.86°	304.49°	3885.12'	-283.22'	
3900					
					128.73°F



					128.73°F
4007'	8.35°	302.79°	3979.06'	-294.57'	
					128.73°F
					128.73°F
4101'	7.88°	302.35°	4072.11'	-305.31'	
					128.73°F
					128.73°F



4196'	6.95°	299.39°	4166.32'	-315.43'
4290'	6.43°	297.65°	4259.68'	-324.72'
4385'	6.19°	296.99°	4354.10'	-333.70'

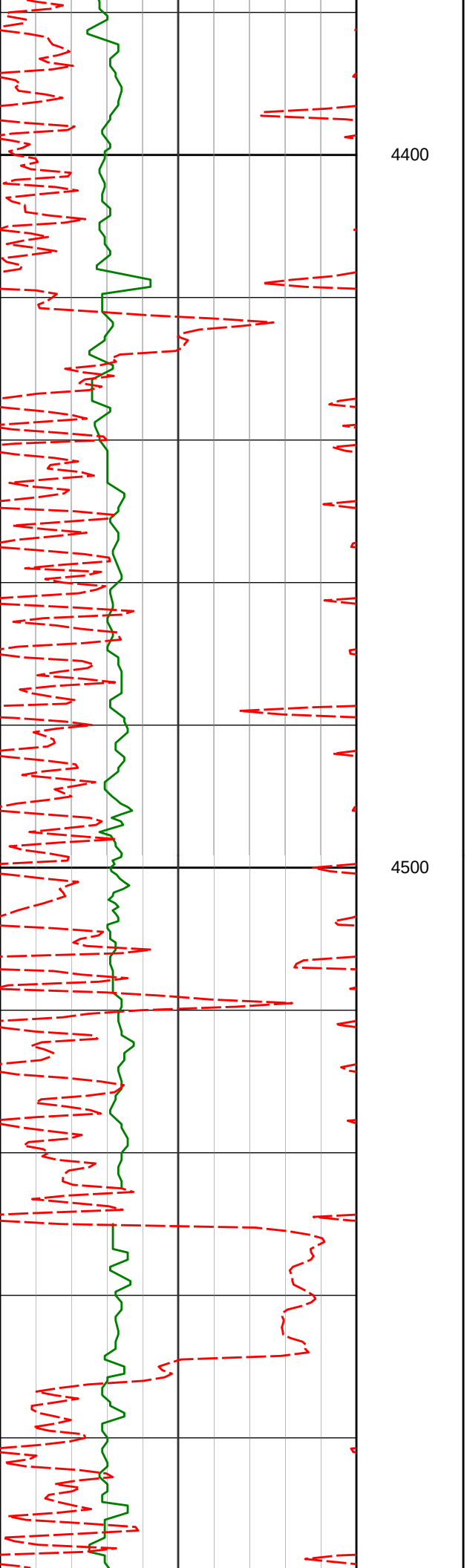
130.96°F

130.96°F

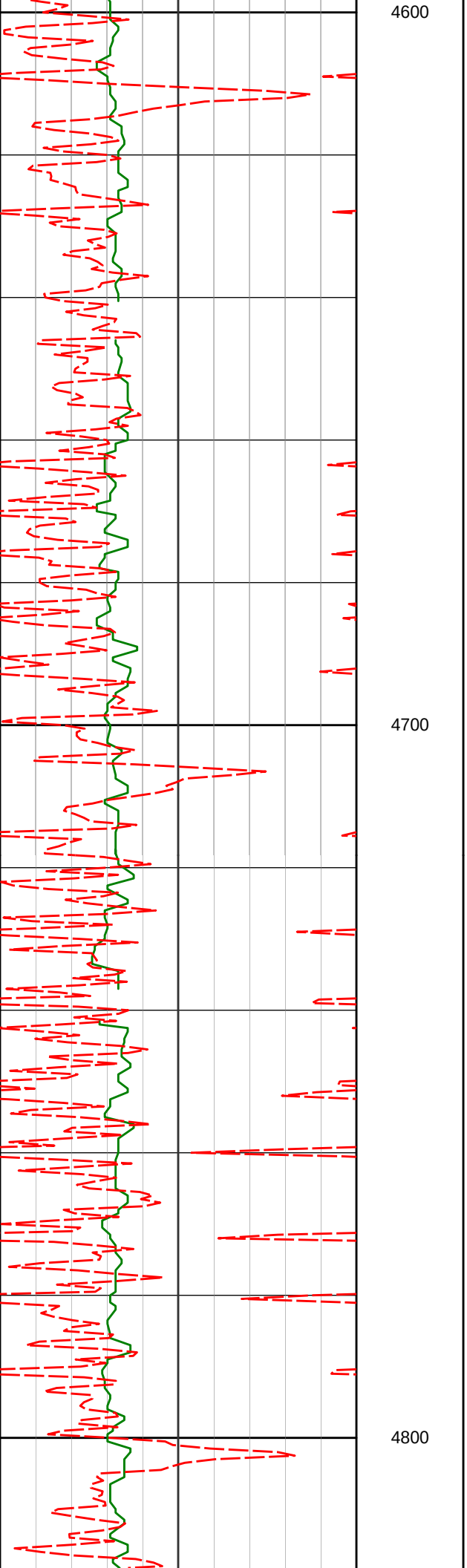
131.40°F

133.20°F

133.20°F



					133.20°F
4479'	5.29°	292.76°	4447.63'	-341.96'	135.45°F
					135.14°F
4574'	4.55°	289.92°	4542.28'	-349.36'	133.58°F
					135.60°F



137.70°F

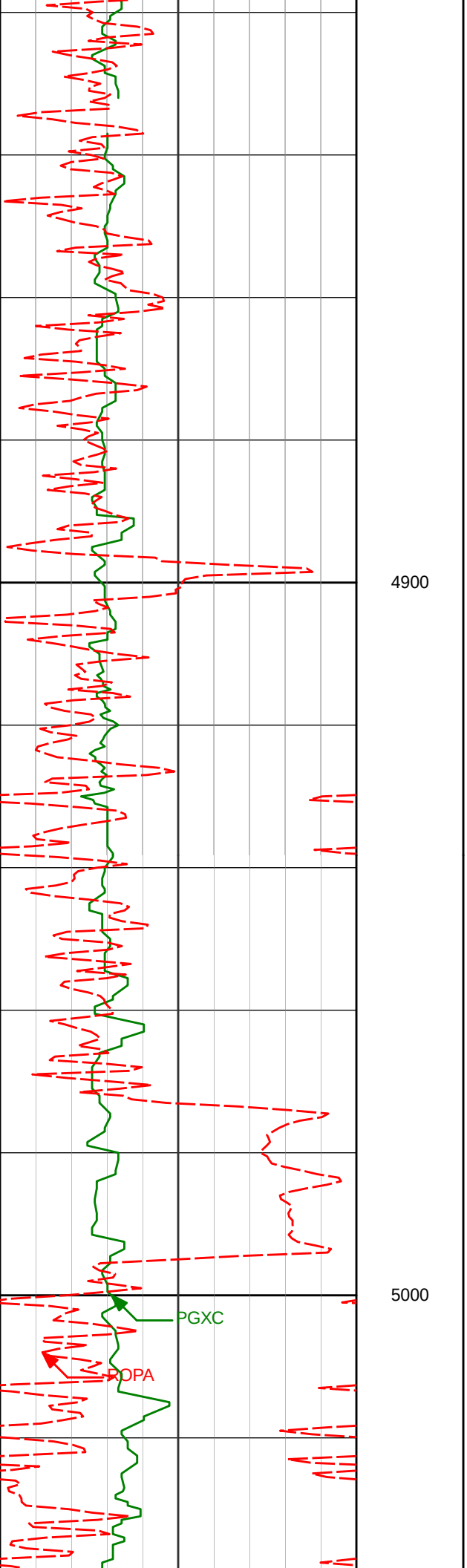
137.70°F

137.70°F

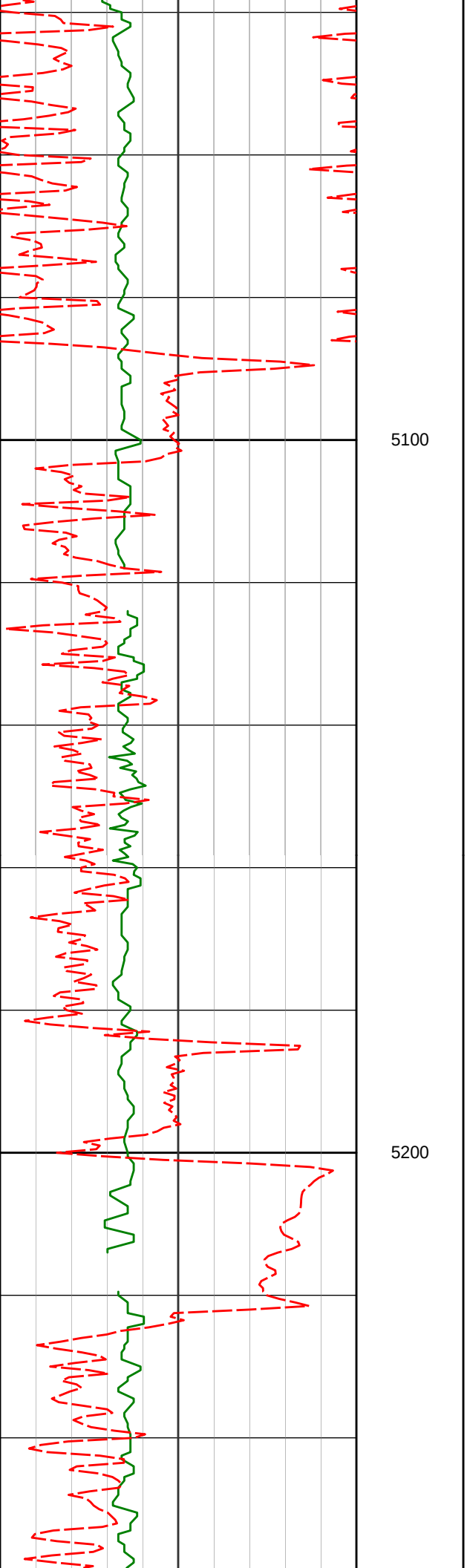
4763' 4.30° 305.00° 4730.73' -361.80'

139.70°F

139.96°F



4858'	3.75°	302.62°	4825.49'	-367.10'	141.72°F
4952'	4.17°	293.89°	4919.27'	-372.63'	142.25°F
					140.80°F
					139.96°F
5047'	1.65°	285.50°	5014.14'	-376.99'	



142.25°F

143.47°F

5100

5141' 1.86° 259.81° 5108.09' -379.79'

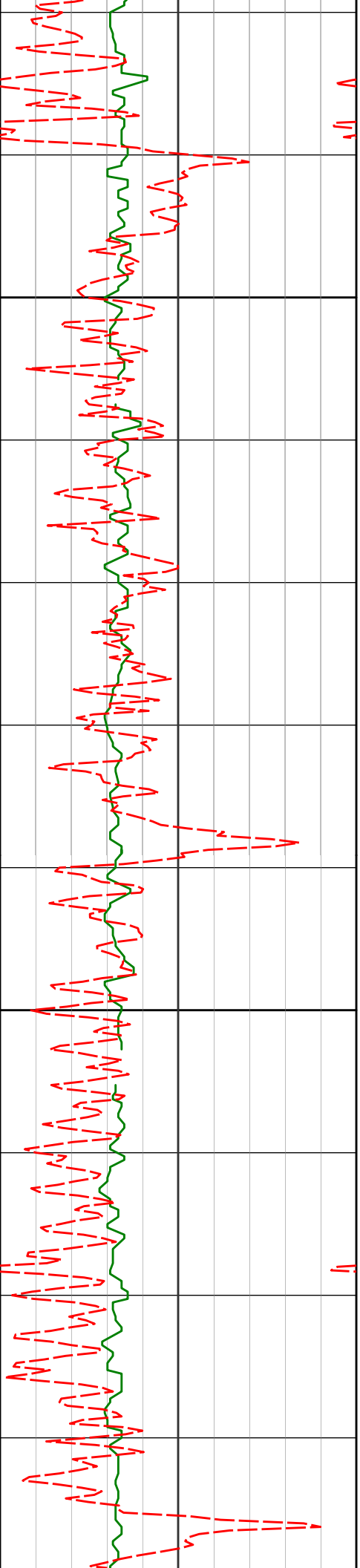
144.54°F

142.74°F

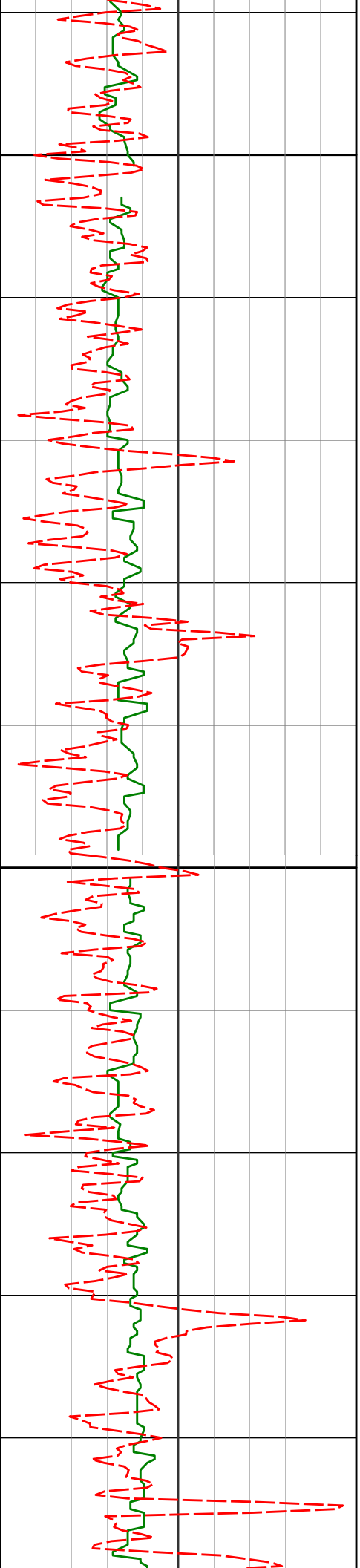
5200

5236' 0.49° 16.72° 5203.08' -381.18'

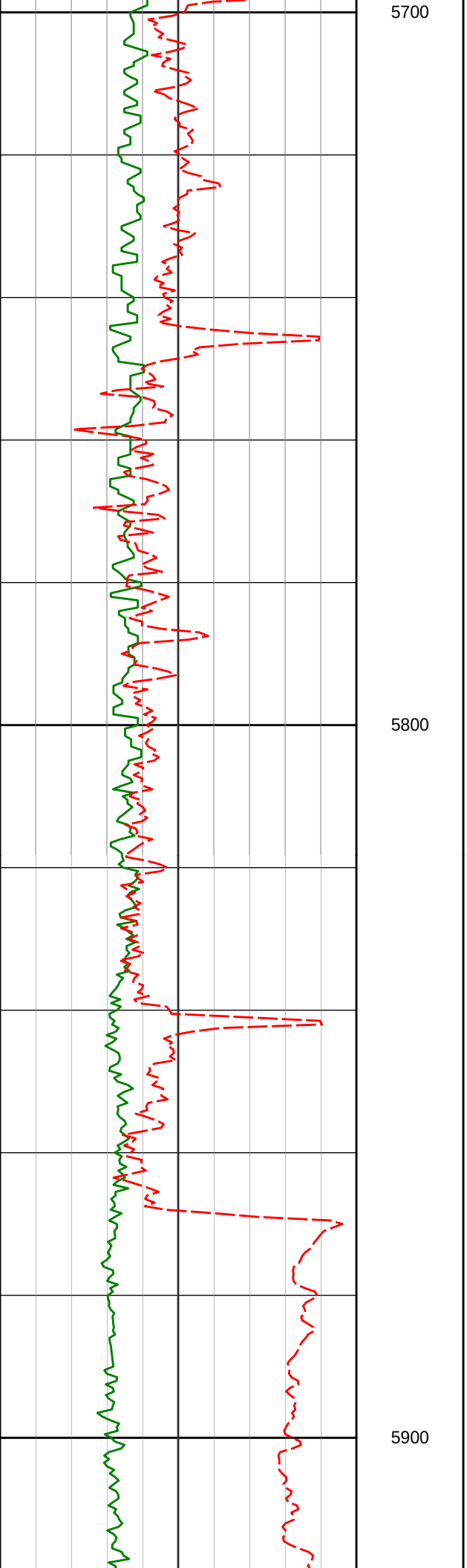
143.72°F



					144.54°F
5300	5330'	0.80°	47.19°	5297.07'	-380.54'
					144.54°F
					144.54°F
5400	5425'	0.64°	22.12°	5392.07'	-379.80'
					144.66°F
					146.71°F



5520'	0.87°	0.02°	5487.06'	-379.53'	144.54°F
5500					
					146.65°F
5614'	0.99°	346.61°	5581.04'	-379.63'	146.84°F
5600					
					147.36°F
<KOP>					
					149.14°F
5709'	0.81°	319.60°	5676.03'	-380.17'	



149.14°F

149.14°F

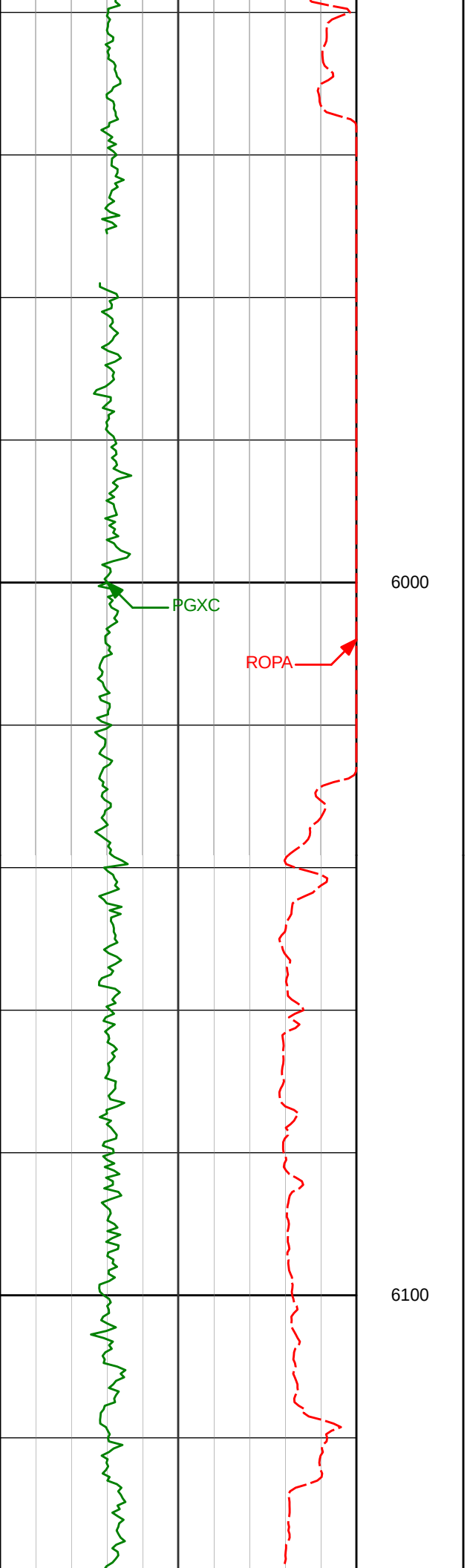
5803'	0.33°	297.33°	5770.03'	-380.80'

149.14°F

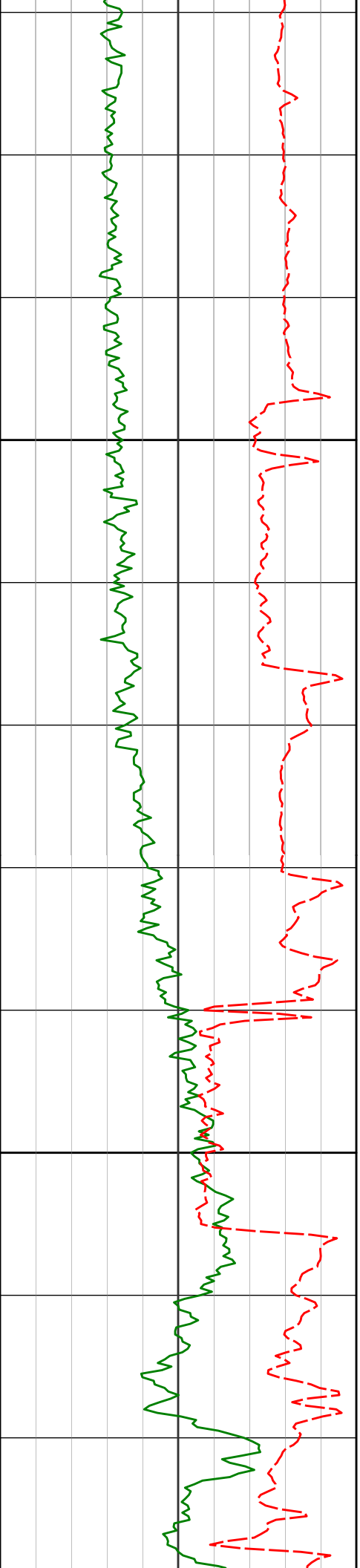
149.19°F

5898'	0.17°	114.91°	5865.03'	-380.91'

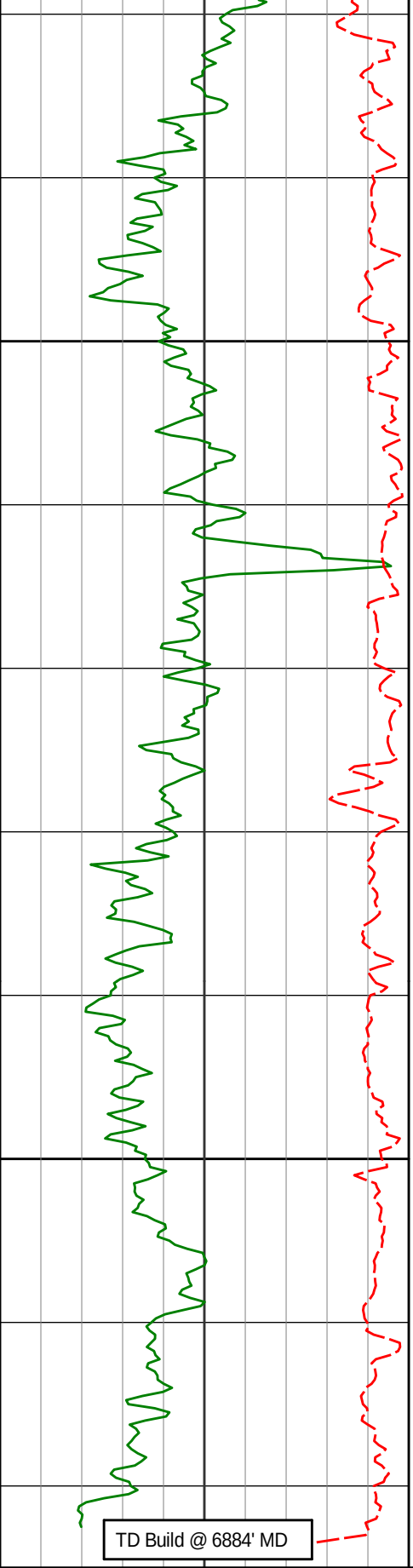
150.97°F



					152.08°F
5993'	8.58°	98.73°	5959.67'	-373.84'	
					153.79°F
					155.21°F
6087'	13.67°	98.13°	6051.87'	-356.09'	
					156.35°F
					158.32°F



6182'	26.22°	89.37°	6141.01'	-323.99'	
					160.23°F
					160.83°F
6276'	34.85°	85.86°	6221.90'	-276.30'	
					160.83°F
6371'	39.94°	91.46°	6297.38'	-218.72'	161.58°F
					162.25°F



Depth	Inc	Azi	TVD	V.S.	Temp
6465'	43.54°	92.64°	6367.50'	-156.43'	
					159.61°F
6560'	47.09°	91.57°	6434.30'	-89.20'	146.45°F
					145.91°F
6654'	57.22°	85.78°	6491.93'	-15.17'	
6749'	73.51°	82.13°	6531.41'	70.78'	
6818'	85.43°	85.17°	6543.99'	138.39'	

Avg Rate of Penetration
ROPA
1K feet per hr 0

PCG GR XHi-Range RT
PGXRC-T
0 api 300

Depth
TVD
ft

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch AE32-685
Wattenberg
Weld Colorado
USA
CA-XX-0902771585

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
675.00	0.40	18.71	674.99	2.23 N	0.76 E	0.89	0.06
739.00	0.49	30.71	738.99	2.68 N	0.97 E	1.12	0.20
833.00	0.25	7.29	832.99	3.23 N	1.20 E	1.39	0.30
928.00	0.39	345.32	927.99	3.74 N	1.14 E	1.36	0.19
1207.00	1.62	302.47	1206.94	6.76 N	2.42 W	-2.02	0.49
1299.00	1.71	296.82	1298.90	8.08 N	4.74 W	-4.26	0.21
1484.00	1.64	305.19	1483.83	10.85 N	9.36 W	-8.71	0.14
1576.00	1.73	302.19	1575.79	12.35 N	11.61 W	-10.87	0.14
1763.00	1.68	300.21	1762.70	15.23 N	16.37 W	-15.45	0.04
1854.00	1.83	298.01	1853.66	16.58 N	18.81 W	-17.80	0.19
1947.00	3.69	316.43	1946.55	19.45 N	22.18 W	-21.01	2.18
2040.00	5.82	308.39	2039.23	24.55 N	27.94 W	-26.46	2.40
2133.00	8.40	308.98	2131.50	31.75 N	36.92 W	-35.00	2.77
2224.00	11.25	305.06	2221.16	41.03 N	49.36 W	-46.87	3.22
2317.00	12.19	292.00	2312.24	49.93 N	65.89 W	-62.85	3.02
2409.00	11.62	290.67	2402.26	56.83 N	83.57 W	-80.09	0.69
2502.00	11.51	290.34	2493.37	63.37 N	101.03 W	-97.14	0.14
2595.00	11.42	290.69	2584.51	69.84 N	118.34 W	-114.04	0.12
2688.00	11.38	290.57	2675.68	76.32 N	135.54 W	-130.83	0.04
2780.00	11.30	300.98	2765.89	84.15 N	151.77 W	-146.58	2.22
2872.00	10.59	302.16	2856.22	93.29 N	166.65 W	-160.90	0.81
2966.00	9.21	302.11	2948.82	101.88 N	180.33 W	-174.05	1.46
3061.00	9.37	302.93	3042.57	110.13 N	193.27 W	-186.48	0.22
3155.00	9.13	305.47	3135.35	118.62 N	205.77 W	-198.46	0.51
3250.00	7.61	282.88	3229.36	124.39 N	218.04 W	-210.37	3.78
3344.00	6.58	301.49	3322.65	128.59 N	228.70 W	-220.77	2.66
3439.00	6.34	299.18	3417.05	134.00 N	237.92 W	-229.66	0.37
3534.00	7.69	300.23	3511.33	139.75 N	248.00 W	-239.38	1.42
3628.00	8.39	307.48	3604.41	147.09 N	258.87 W	-249.81	1.31
3723.00	8.59	305.76	3698.37	155.46 N	270.13 W	-260.55	0.34
3817.00	8.96	305.58	3791.27	163.82 N	281.78 W	-271.69	0.40
3912.00	8.86	304.49	3885.12	172.27 N	293.83 W	-283.22	0.21
4007.00	8.35	302.79	3979.06	180.14 N	305.65 W	-294.57	0.60
4101.00	7.88	302.35	4072.11	187.29 N	316.83 W	-305.31	0.51
4196.00	6.95	299.39	4166.32	193.59 N	327.34 W	-315.43	1.06
4290.00	6.43	297.65	4259.68	198.82 N	336.96 W	-324.72	0.60
4385.00	6.19	296.99	4354.10	203.61 N	346.23 W	-333.70	0.26
4479.00	5.29	292.76	4447.63	207.59 N	354.74 W	-341.96	1.05
4574.00	4.55	289.92	4542.28	210.57 N	362.32 W	-349.36	0.82
4763.00	4.30	305.00	4730.73	217.18 N	375.17 W	-361.80	0.63
4858.00	3.75	302.62	4825.49	220.90 N	380.70 W	-367.10	0.61
4952.00	4.17	293.89	4919.27	223.94 N	386.42 W	-372.63	0.78
5047.00	1.65	285.50	5014.14	225.70 N	390.90 W	-376.99	2.68
5141.00	1.86	259.81	5108.09	225.80 N	393.70 W	-379.79	0.86
5236.00	0.49	16.72	5203.08	225.92 N	395.10 W	-381.18	2.24
5330.00	0.80	47.19	5297.07	226.75 N	394.51 W	-380.54	0.48
5425.00	0.64	22.12	5392.07	227.69 N	393.82 W	-379.80	0.37
5520.00	0.87	0.02	5487.06	228.91 N	393.62 W	-379.53	0.38
5614.00	0.99	346.61	5581.04	230.41 N	393.81 W	-379.63	0.27
5709.00	0.81	319.60	5676.03	231.72 N	394.43 W	-380.17	0.48
5803.00	0.33	297.33	5770.03	232.35 N	395.10 W	-380.80	0.56
5898.00	0.17	114.91	5865.03	232.42 N	395.21 W	-380.91	0.53
5993.00	8.58	98.73	5959.67	231.28 N	388.06 W	-373.84	8.86

6087.00	13.67	98.13	6051.87	228.64 N	370.13 W	-356.09	5.41
6182.00	26.22	89.37	6141.01	227.28 N	337.89 W	-323.99	13.55
6276.00	34.85	85.86	6221.90	229.45 N	290.25 W	-276.30	9.37
6371.00	39.94	91.46	6297.38	230.64 N	232.63 W	-218.72	6.43
6465.00	43.54	92.64	6367.50	228.38 N	170.11 W	-156.43	3.92
6560.00	47.09	91.57	6434.30	225.91 N	102.62 W	-89.20	3.82
6654.00	57.22	85.78	6491.93	227.88 N	28.57 W	-15.17	11.82
6749.00	73.51	82.13	6531.41	237.12 N	56.98 E	70.78	17.50
6818.00	85.43	85.17	6543.99	244.57 N	124.27 E	138.39	17.81

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 86.64 DEGREES (GRID)
A TOTAL CORRECTION OF 7.31 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6818.00 FEET
IS 274.33 FEET ALONG 26.94 DEGREES (GRID)

Final survey is a projection to the bit at TD.

Date Printed:16 October 2015