HALLIBURTON | Sperry Drilling

PCGK: Pressure Case Gamma
PCDC: Pressure Case Directional

Powered by INSITE™

1 : 600 / 1 : 240

Country : **USA**
Field : **Wattenberg**
Location : **Lat: 40° 30' 11.23" North**
Long: 104° 23' 42.72" West
Well : **Wells Ranch AA11-667**
Company : **Noble Energy**
Rig : **H&P 273**

Company : **Noble Energy**
Rig : **H&P 273**
Well : **Wells Ranch AA11-667**
Field : **Wattenberg**
Country : **USA**
API Number : **05-123-41254**

LOCATION
Latitude : **40° 30' 11.23" North**
Longitude : **104° 23' 42.72" West**
UTM Easting = **3,307,222.250 ft**
UTM Northing = **1,428,040.990 ft**

Other Services
Directional Drilling

Permanent Datum : **Ground Level** Elevation : **4869.00 ft**
Log Measured From : **Drill Floor** **24.00 ft** Above Permanent Datum
Drilling Measured From : **Drill Floor**

MD LOG

Elev. KB **N/A**
DF **4893.00 ft**
GL **4869.00 ft**
WD **N/A**

Depth Logged : **652.00 ft** To **13,782.00 ft**
Date Logged : **29-May-15** To **03-Jun-15**
Total Depth MD : **13,782.00 ft** TVD : **6,745.10 ft**
Spud Date : **29-May-15**

Unit No. : **11703717** Job No. : **CA-XX-0902306869**
Plot Type : **Final**
Plot Date : **03-Jun-15**

Run No.	Borehole Record (MD)			Size	Casing Record (MD)		
	Size	From	To		Weight	From	To
2	8.750 in	652.00 ft	7,066.00 ft	7.000 in	26.00 lbpf	SURFACE	7,063.00 ft
3	6.125 in	7,066.00 ft	13,782.00 ft				

WELL INFORMATION

MWD Run Number	100	200																							
Date run completed	31-May-15	03-Jun-15																							
Rig Bit Number	2	3																							
Bit Size (in)	8.750	6.125																							
Tool Nominal OD (in)	6.750	4.750																							
Log Start Depth (MD, ft)	652.00	7,066.00																							
Log End Depth (MD, ft)	7,066.00	13,782.00																							
Drill or Wipe	Drill	Drill																							
Drill/Wipe Start Date and Time	30-May-15 00:50	01-Jun-15 09:00																							
Drill/Wipe End Date and Time	31-May-15 05:45	03-Jun-15 07:00																							
Min Inc (deg) @ Depth (MD, ft)	0.14 @ 5,819.00	85.87 @ 7,157.00																							
Max Inc (deg) @ Depth (MD, ft)	77.89 @ 7,014.00	91.54 @ 7,726.00																							
Bit TFA(in2) / Bit Type	0.91 / PDC	0.65 / PDC																							
Flow Rate (gpm)	593.37	293.48																							
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A																							
Fluid Type	Fresh Water Gel	Fresh Water Gel																							
Density (ppg) / Viscosity (spqt)	10.00 / 37.00	9.90 / 36.00																							
Filtrate CL (ppm)	1,100.00	1,400.00																							
pH / Fluid Loss (mptm)	8.00 / 0	8.50 / 10																							
PV (cP) / YP (lhf2)	11 / 10.00	11 / 10.00																							
% Solids / % Sand	10.2 / .3	8.50 / 0.10																							
% 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	179.70 / PCM	238.70 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Paul Kock	Paul Kock			
Customer Representative	Justin Fields	Justin Fields			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.93	5.93			
Sub Serial Number	11341324	12365885			
Insert Serial Number	11400838	11400838			
Date and Time Initialized	29-May-15 14:23	31-May-15 20:15			
Date and Time Read	31-May-15 12:12	03-Jun-15 17:11			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	52.00	65.00			
Software Version	6.33	6.33			
Sub Serial Number	11341324	12365885			
Sonde Serial Number	11638623	11638623			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	95.70	106.60			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	40.19	52.60			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11341324	12365885			
Insert/Sonde Serial Number	12071280	12071280			

REMARKS

1. All depths are calibrated to the driller's pipe tally and are measured from the rig 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.
- ROPA: Average Rate of Penetration is real time data.
- PGRC: Smooth Pressure Case Gamma Ray Borehole corrected is recorded data.

4. The following smoothing parameters have been applied to the data:
- All ROP in logs - 0.5 ft interval, 1.2 ft coercion distance.
- Gamma in 2" (1:600) logs - 1 ft interval, 3 ft coercion distance.
- Gamma in 5" (1:240) logs - 0.5 ft interval, 0.6 ft coercion distance.

5. INSITE version 8.1.10

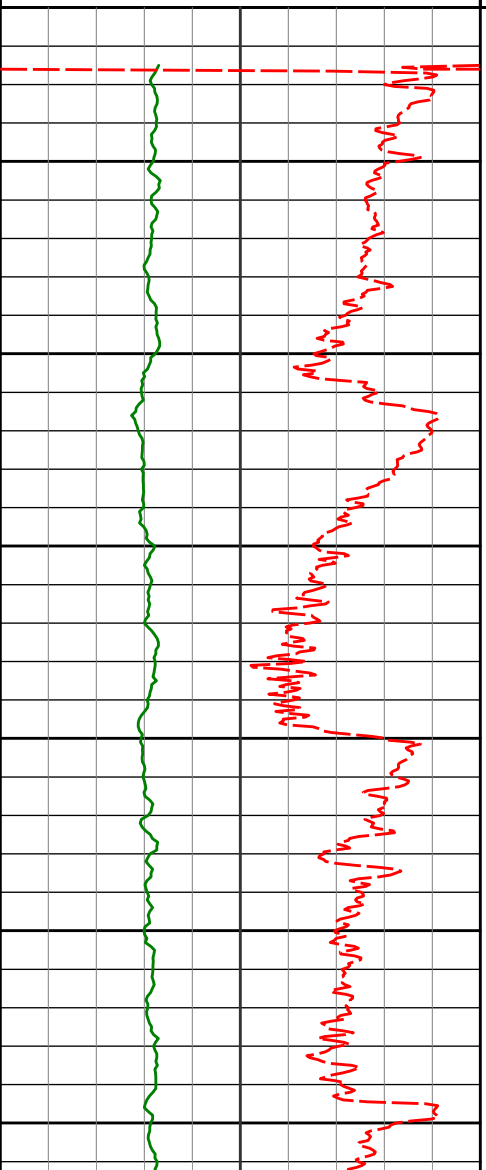
6. Gamma presented inside casing/cement from 7026 ft. MD to 7066 ft. MD.

WARRANTY

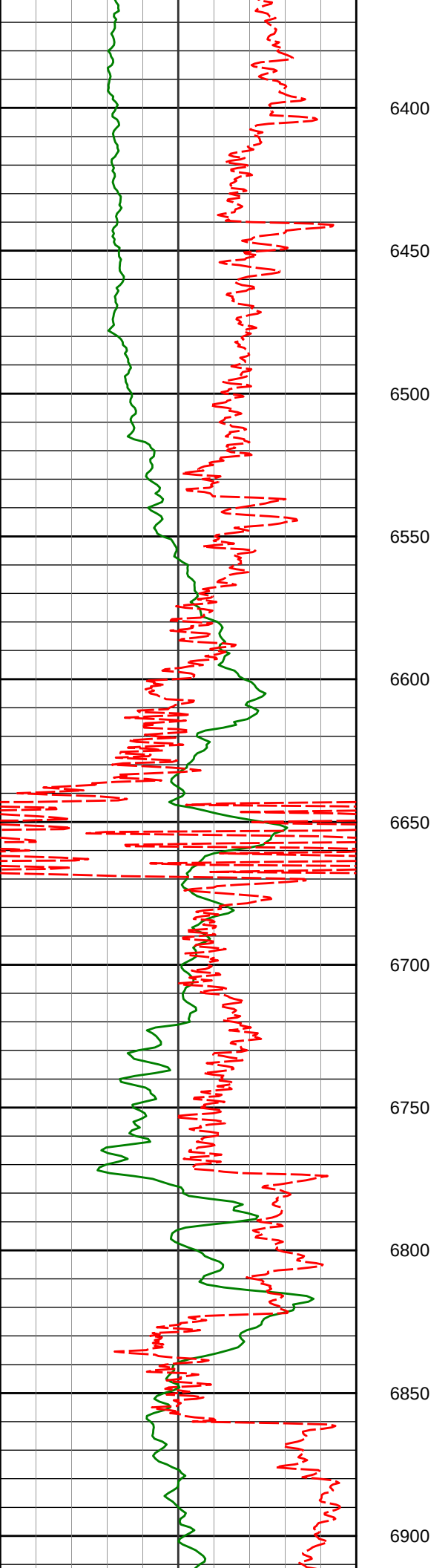
MD Detail 1:600 Scale

Gamma Ray Cor
PGRC
0 api 300

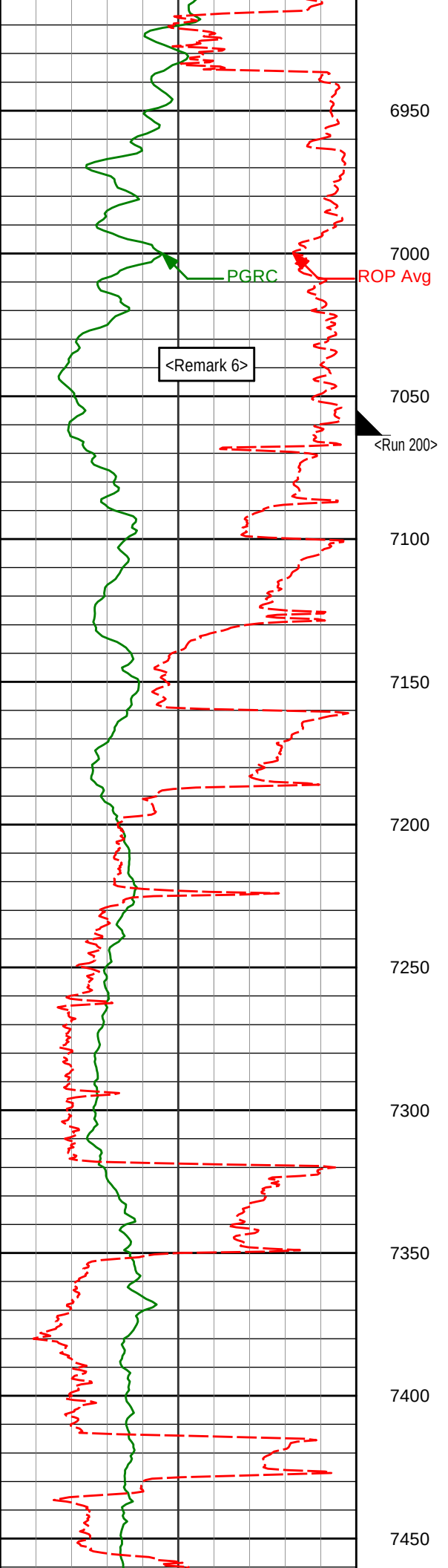
Avg Rate of Penetration
ROP Avg
500 feet per hr 0



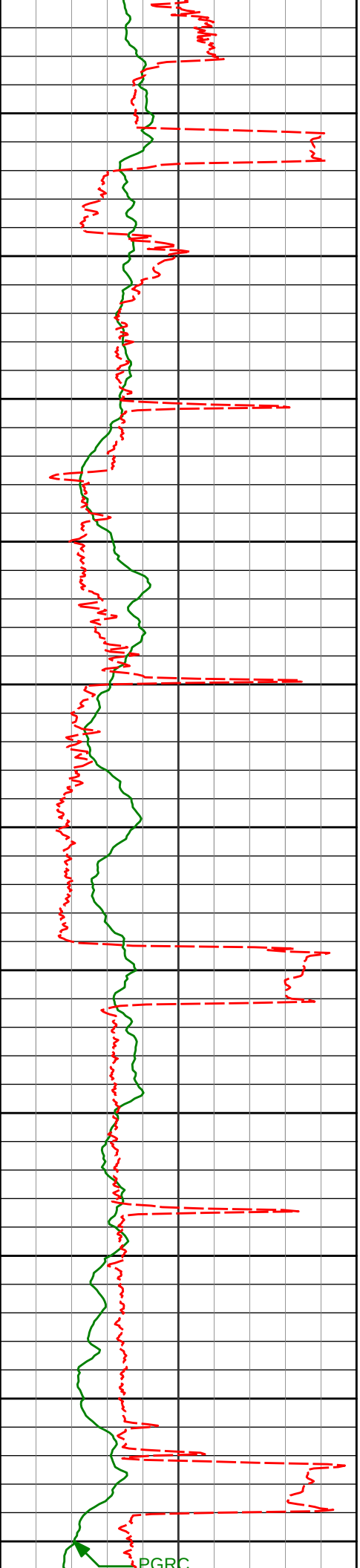
Depth MD ft	Depth	Inc	Azi	TVD	V.S.	Temp
						154.34°F
<KOP>						
						154.34°F
6100	6104'	5.19°	274.76°	6070.24'	-180.65'	
						154.34°F
6150						154.34°F
						154.34°F
6200	6198'	10.48°	274.01°	6163.33'	-167.84'	
						154.34°F
						154.34°F
6250						
						154.34°F
	6293'	18.59°	276.69°	6255.22'	-144.04'	
6300						158.56°F
						158.56°F
6350						
						158.56°F



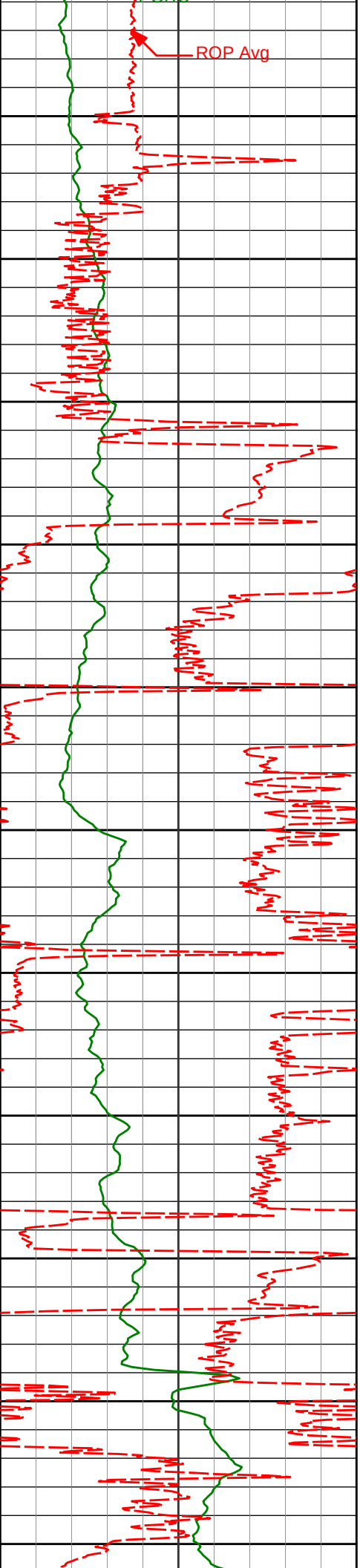
6388'	26.14°	273.46°	6343.01'	-107.94'	162.78°F
					162.78°F
					162.78°F
6483'	35.09°	270.46°	6424.69'	-59.64'	162.78°F
					167.00°F
					167.00°F
6578'	46.93°	271.19°	6496.24'	2.53'	167.00°F
					167.00°F
					167.00°F
6672'	53.92°	271.77°	6556.09'	74.90'	167.00°F
					171.22°F
					171.22°F
6767'	60.43°	269.94°	6607.56'	154.60'	171.22°F
					171.22°F
					171.22°F
6862'	65.79°	267.34°	6650.52'	238.98'	171.22°F
					171.22°F



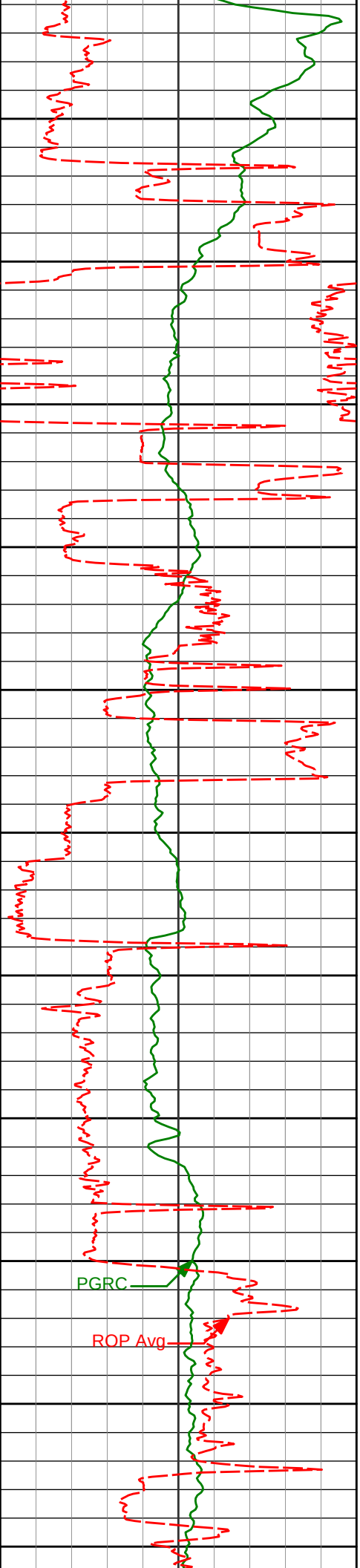
					171.22°F
6957'	72.26°	268.05°	6684.52'	327.20'	175.44°F
					175.44°F
7014'	77.89°	268.34°	6699.20'	382.02'	179.66°F
<7" casing set at 7063' MD>					179.66°F
					179.66°F
					179.66°F
					179.66°F
7157'	85.87°	266.78°	6719.38'	522.73'	167.00°F
					167.00°F
					167.00°F
7252'	89.48°	266.68°	6723.24'	616.99'	171.22°F
					171.22°F
					171.22°F
7347'	89.41°	269.34°	6724.16'	711.55'	171.22°F
					171.22°F
					171.22°F
7442'	91.11°	271.11°	6723.72'	806.39'	179.66°F



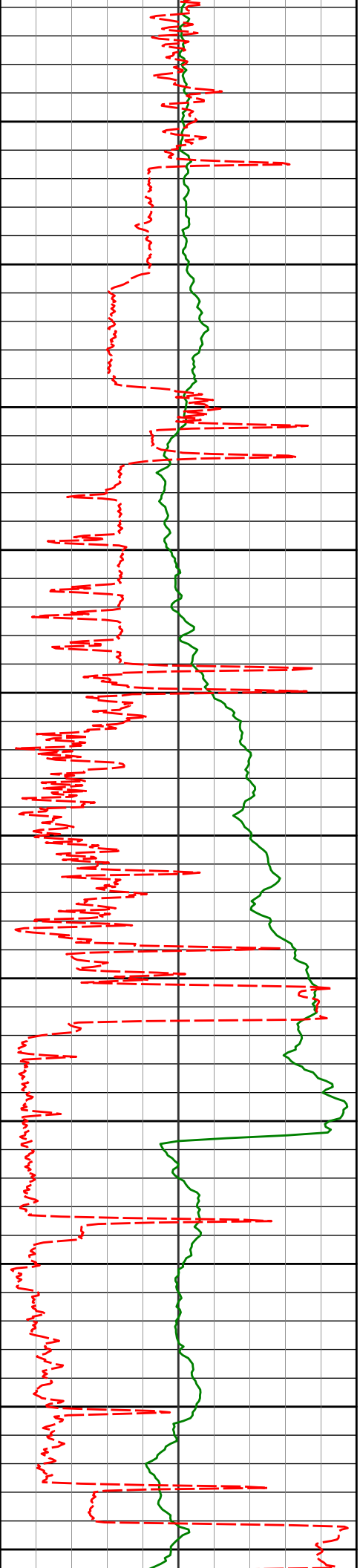
					179.66°F
					179.66°F
7536'	90.19°	270.65°	6722.66'	900.29'	179.66°F
					179.66°F
					179.66°F
					179.66°F
7631'	90.77°	270.50°	6721.87'	995.17'	
					183.88°F
					183.88°F
					183.88°F
7726'	91.54°	270.38°	6719.95'	1090.03'	
					183.88°F
					183.88°F
					183.88°F
7818'	90.92°	271.59°	6717.97'	1181.92'	
					183.88°F
					183.88°F
					183.88°F
7909'	91.51°	271.37°	6716.04'	1272.85'	
					188.09°F
					188.09°F
					188.09°F
8000'	90.15°	272.03°	6714.72'	1363.79'	



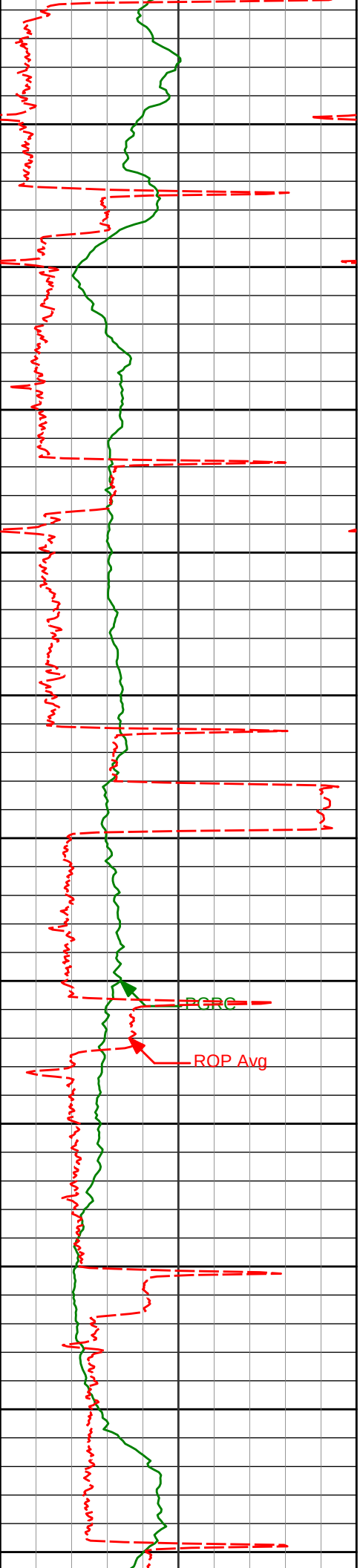
8050					188.09°F
					188.09°F
8092'	91.33°	272.48°	6713.53'	1455.76'	
8100					188.09°F
					188.09°F
8150					188.09°F
8183'	89.26°	272.19°	6713.06'	1546.74'	
8200					188.09°F
					188.09°F
8250					188.09°F
8275'	89.42°	271.88°	6714.13'	1638.71'	
8300					188.09°F
					188.09°F
8350					188.09°F
8366'	89.88°	271.70°	6714.69'	1729.67'	
8400					188.09°F
					192.31°F
8450					192.31°F
8458'	87.94°	271.72°	6716.45'	1821.61'	
8500					192.31°F
					192.31°F
8549'	87.01°	271.68°	6720.46'	1912.48'	192.31°F



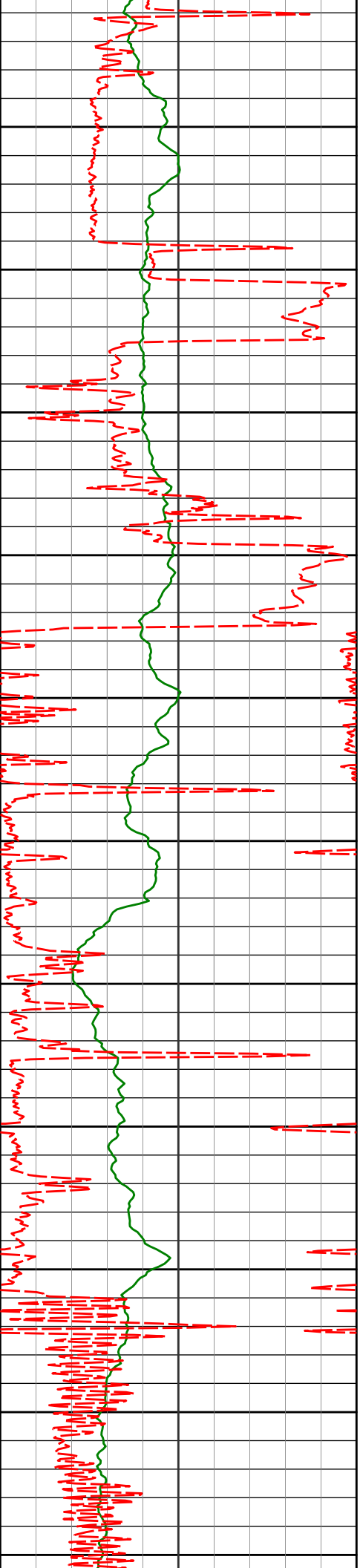
					196.53°F
					196.53°F
8641'	88.00°	270.62°	6724.47'	2004.31'	196.53°F
					196.53°F
					196.53°F
8732'	88.98°	269.76°	6726.87'	2095.14'	196.53°F
					196.53°F
					196.53°F
8824'	90.62°	270.33°	6727.19'	2186.97'	196.53°F
					196.53°F
					196.53°F
8915'	90.62°	270.00°	6726.21'	2277.82'	196.53°F
					196.53°F
					196.53°F
9007'	90.89°	269.84°	6725.00'	2369.64'	196.53°F
					200.75°F
					200.75°F
9099'	90.40°	269.33°	6723.96'	2461.43'	200.75°F



					204.97°F
					204.97°F
					204.97°F
9190'	90.86°	270.85°	6722.96'	2552.27'	
					204.97°F
					204.97°F
					204.97°F
9282'	90.93°	270.84°	6721.52'	2644.16'	
					209.19°F
					209.19°F
					209.19°F
9374'	91.42°	270.21°	6719.64'	2736.03'	
					209.19°F
					209.19°F
					209.19°F
9469'	90.74°	270.09°	6717.85'	2830.85'	
					209.19°F
					209.19°F
					209.19°F
9563'	91.23°	269.51°	6716.23'	2924.65'	
					209.19°F
					200.75°F
					200.75°F

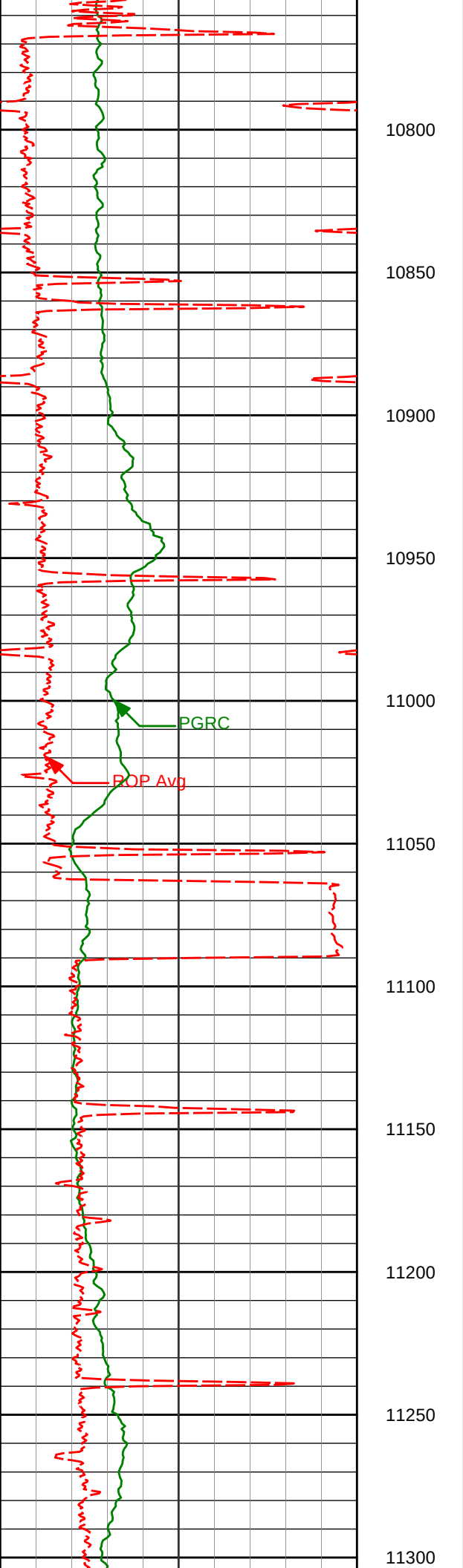


9658'	89.66°	270.23°	6715.49'	3019.46'	200.75°F
					209.19°F
					209.19°F
9752'	89.81°	269.86°	6715.92'	3113.30'	209.19°F
					209.19°F
					209.19°F
9847'	90.22°	269.20°	6715.90'	3208.08'	209.19°F
					213.41°F
					213.41°F
9942'	89.57°	270.09°	6716.08'	3302.87'	213.41°F
					209.19°F
					209.19°F
10037'	89.78°	270.37°	6716.61'	3397.72'	209.19°F
					209.19°F
					209.19°F
10132'	89.91°	270.01°	6716.87'	3492.57'	209.19°F
					209.19°F
					209.19°F
					209.19°F



10226'	90.86°	269.94°	6716.23'	3586.40'	209.19°F
					145.91°F
					145.91°F
					145.91°F
					213.41°F
					213.41°F
10416'	88.46°	272.25°	6717.36'	3776.21'	213.41°F
					209.19°F
					209.19°F
10510'	87.93°	271.85°	6720.31'	3870.14'	209.19°F
					213.41°F
					213.41°F
					213.41°F
10605'	88.27°	271.24°	6723.46'	3965.03'	
					213.41°F
					213.41°F
					213.41°F
10700'	89.11°	271.15°	6725.63'	4059.94'	
					217.63°F
					217.63°F

10250
10300
10350
10400
10450
10500
10550
10600
10650
10700
10750



10795'	89.35°	270.67°	6726.91'	4154.83'	
10889'	89.78°	270.20°	6727.61'	4248.70'	
10984'	90.74°	269.85°	6727.18'	4343.53'	
11079'	88.71°	269.56°	6727.64'	4438.33'	
11174'	88.77°	269.61°	6729.73'	4533.09'	
11268'	89.41°	269.36°	6731.23'	4626.86'	

10800
10850
10900
10950
11000
11050
11100
11150
11200
11250
11300

217.63°F
217.63°F
217.63°F
217.63°F
217.63°F
217.63°F
217.63°F
221.84°F
221.84°F
221.84°F
213.41°F
213.41°F
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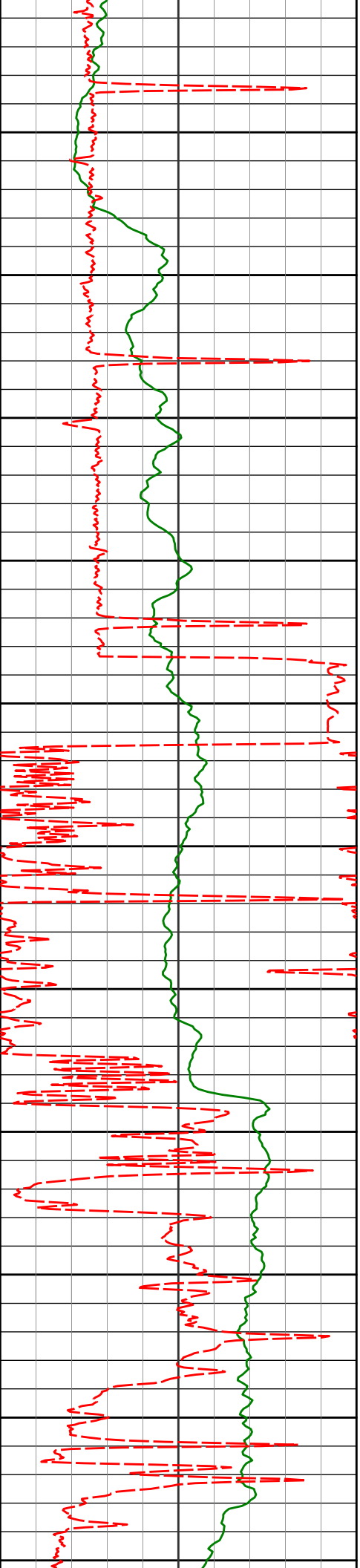
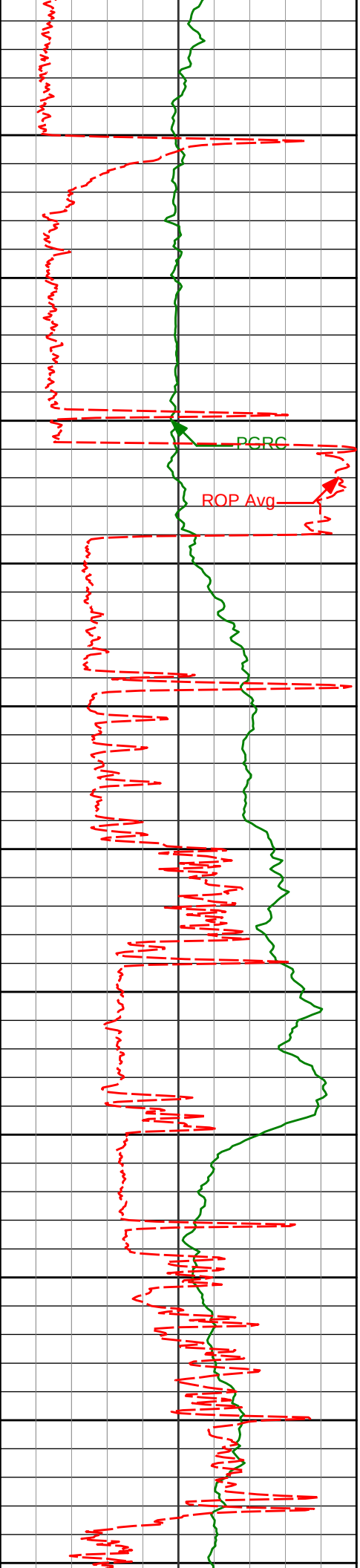
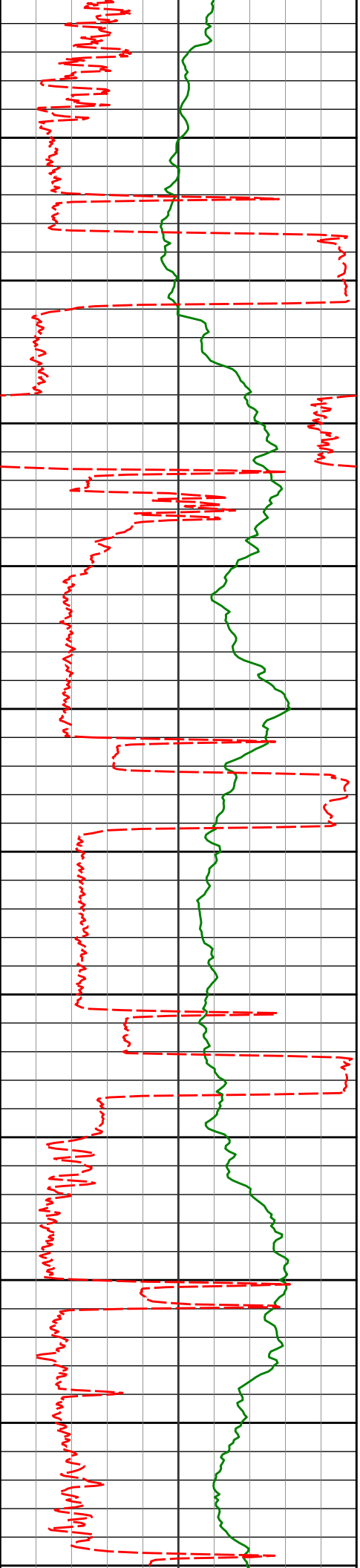
217.63°F
217.63°F
217.63°F
221.84°F



					221.84°F
					221.84°F
11363'	89.91°	268.91°	6731.79'	4721.59'	221.84°F
					221.84°F
					221.84°F
					221.84°F
11458'	91.14°	268.63°	6730.92'	4816.27'	221.84°F
					221.84°F
					221.84°F
11553'	89.85°	269.52°	6730.10'	4910.99'	221.84°F
					221.84°F
					221.84°F
11648'	89.57°	269.30°	6730.59'	5005.76'	221.84°F
					221.84°F
					221.84°F
11742'	89.45°	268.95°	6731.40'	5099.49'	221.84°F
					226.06°F
					226.06°F
					226.06°F
11837'	90.03°	268.55°	6731.83'	5194.18'	
					226.06°F

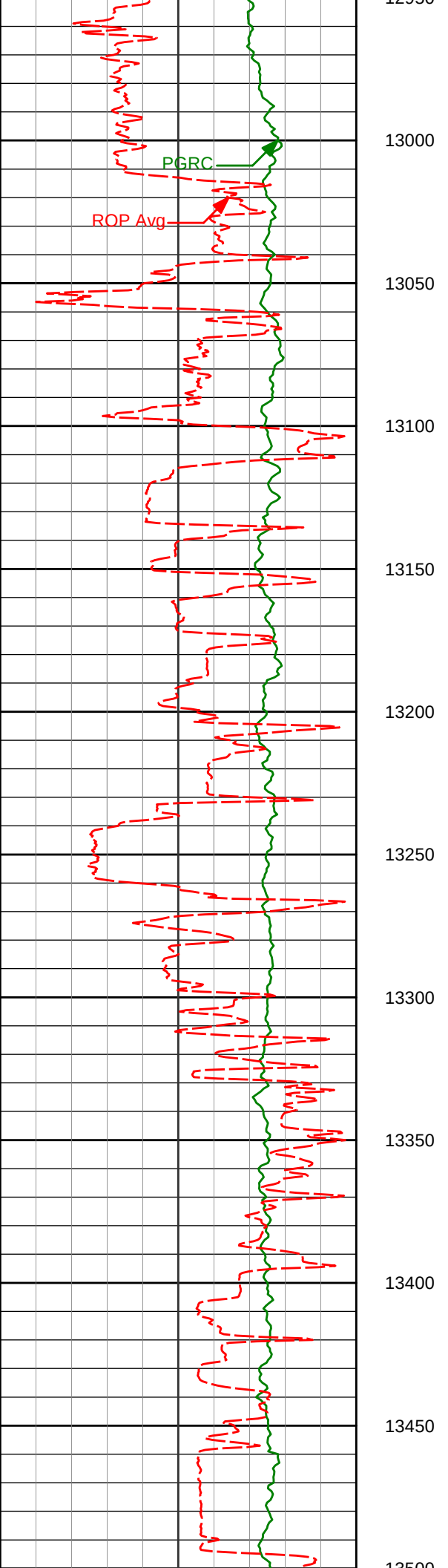


11900					226.06°F
					226.06°F
	11932'	90.00°	268.66°	6731.80'	5288.84'
11950					226.06°F
					226.06°F
12000					226.06°F
	12027'	90.00°	270.63°	6731.80'	5383.63'
					221.84°F
12050					221.84°F
					221.84°F
12100					
	12122'	90.34°	271.10°	6731.52'	5478.53'
					221.84°F
12150					230.28°F
					230.28°F
12200					
	12217'	90.46°	270.73°	6730.86'	5573.44'
					230.28°F
12250					230.28°F
					230.28°F
12300					
	12311'	90.40°	270.48°	6730.15'	5667.32'
					230.28°F
12350					230.28°F
					230.28°F
					230.28°F
12400					

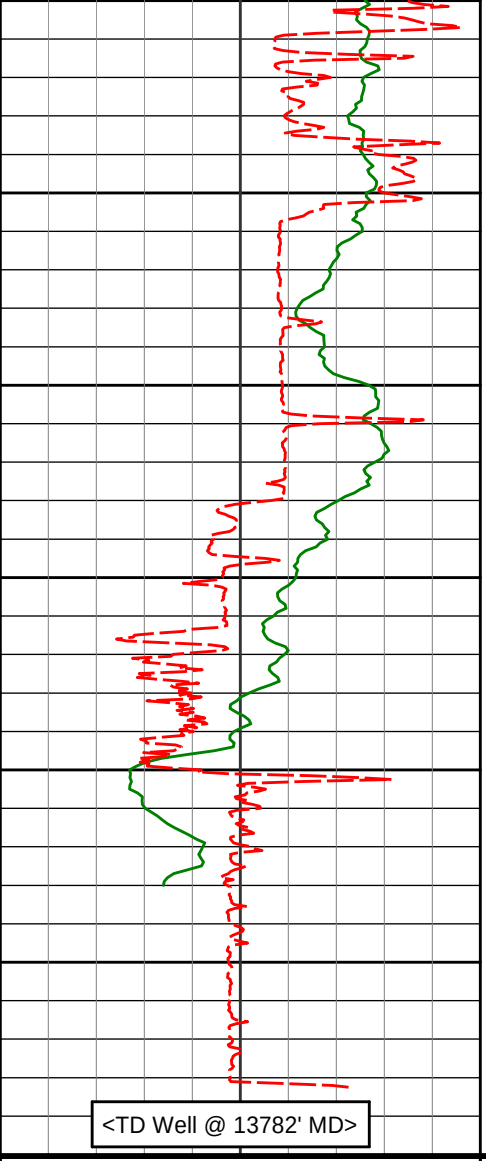


12406'	90.25°	269.39°	6729.61'	5762.15'	230.28°F
					230.28°F
					230.28°F
12501'	89.85°	270.44°	6729.54'	5856.97'	226.06°F
					226.06°F
					226.06°F
12596'	90.22°	270.09°	6729.49'	5951.82'	226.06°F
					230.28°F
					230.28°F
12690'	89.75°	271.08°	6729.51'	6045.71'	230.28°F
					230.28°F
					230.28°F
12785'	87.93°	270.66°	6731.43'	6140.59'	230.28°F
					230.28°F
					230.28°F
12880'	88.15°	270.26°	6734.67'	6235.41'	230.28°F
					230.28°F
					230.28°F

12450
12500
12550
12600
12650
12700
12750
12800
12850
12900
12950



					230.28°F
12975'	88.24°	269.76°	6737.66'	6330.19'	
					230.28°F
					230.28°F
					230.28°F
13070'	89.08°	270.95°	6739.88'	6425.03'	
					230.28°F
					230.28°F
					230.28°F
13164'	88.77°	270.39°	6741.65'	6518.90'	
					230.28°F
					230.28°F
					230.28°F
13259'	89.66°	270.64°	6742.95'	6613.77'	230.28°F
					234.50°F
					234.50°F
					234.50°F
					234.50°F
					234.50°F
					234.50°F
13449'	89.14°	267.89°	6744.95'	6803.24'	
					238.72°F



Depth MD ft	Depth	Inc	Azi	TVD	V.S.	Temp
13500						238.72°F
13550	13543'	89.32°	266.82°	6746.21'	6896.71'	238.72°F
13600						238.72°F
13650	13638'	90.03°	265.95°	6746.75'	6990.99'	238.72°F
13700						238.72°F
13750	13717'	90.89°	265.59°	6746.11'	7069.28'	238.72°F

Avg Rate of Penetration
ROP Avg
500 feet per hr 0

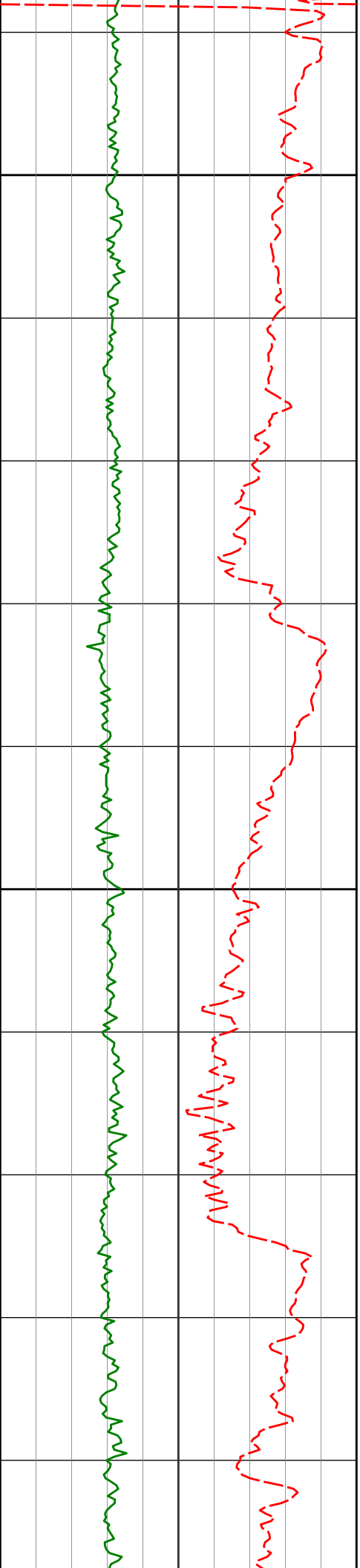
Gamma Ray Cor
PGRC
0 api 300

MD Detail 1:240 Scale

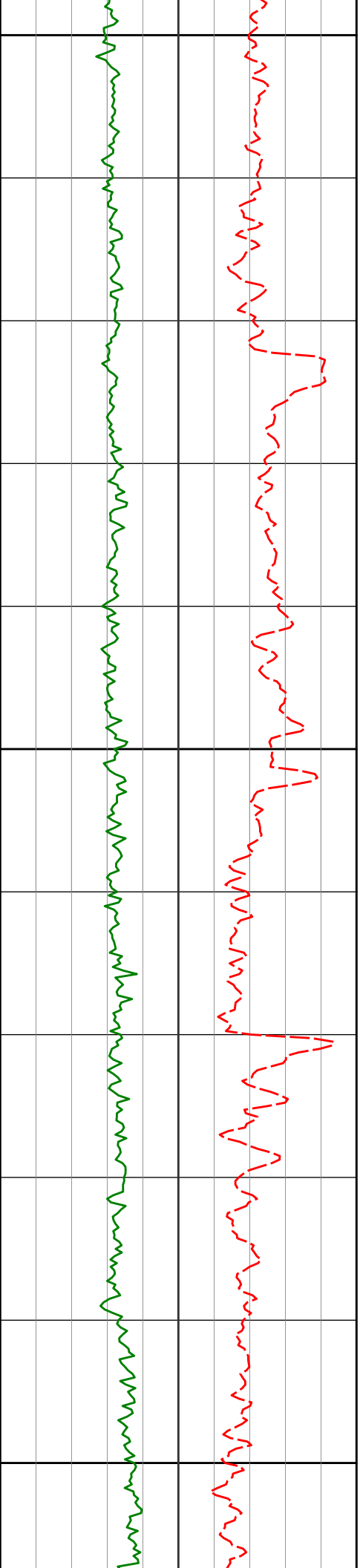
Gamma Ray Cor
PGRC
0 api 300

Avg Rate of Penetration
ROP Avg
500 feet per hr 0

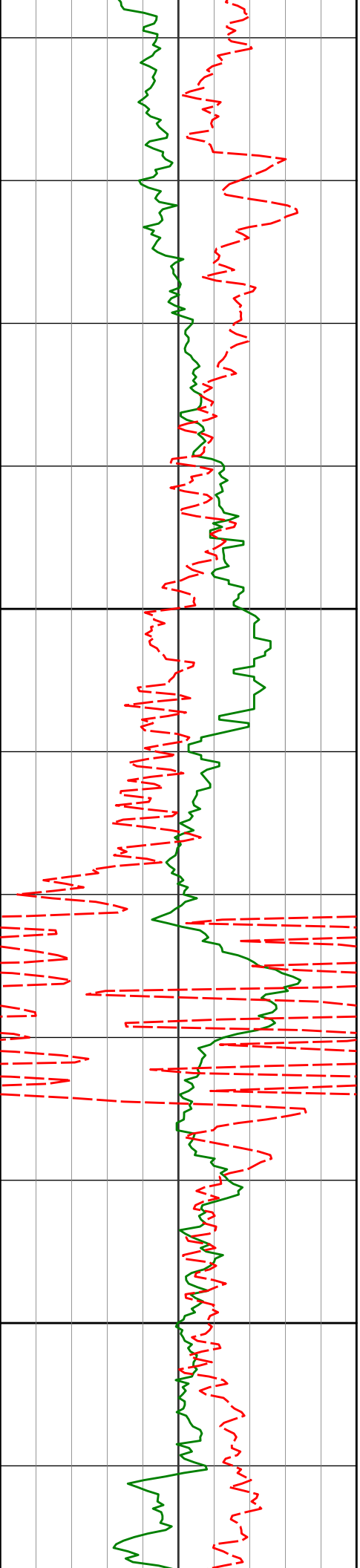
Depth MD ft | Depth | Inc | Azi | TVD | V.S. | Temp



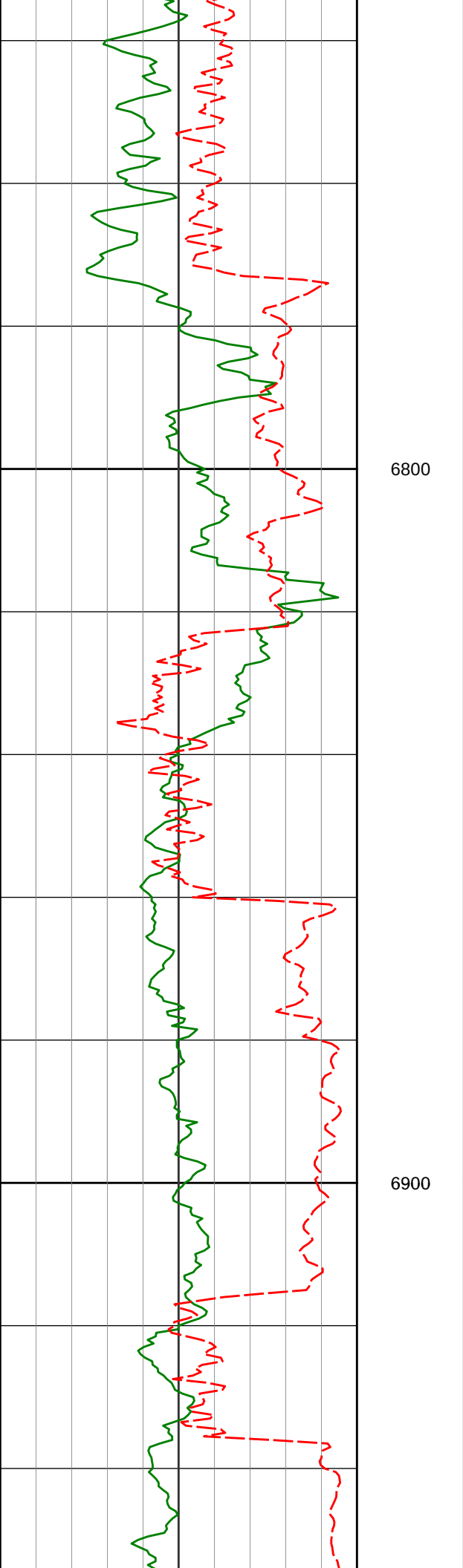
<KOP>						
						154.34°F
6100						
	6104'	5.19°	274.76°	6070.24'	-180.65'	
						154.34°F
						154.34°F
						154.34°F
6200	6198'	10.48°	274.01°	6163.33'	-167.84'	
						154.34°F
						154.34°F
						154.34°F
						154.34°F
	6293'	18.59°	276.69°	6255.22'	-144.04'	



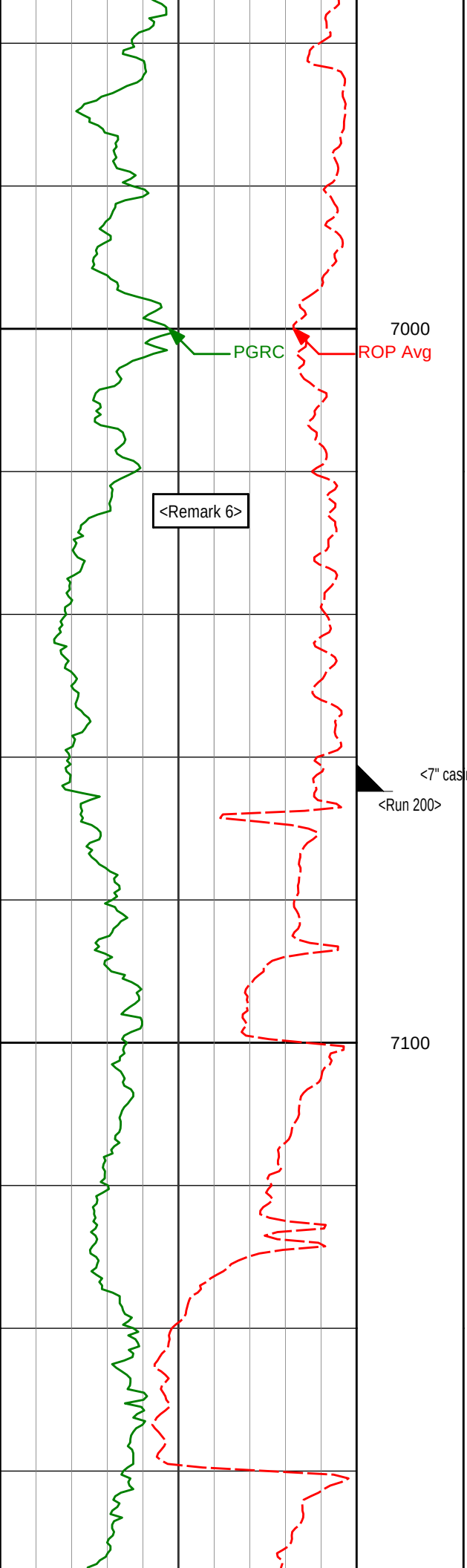
6300						158.56°F
						158.56°F
						158.56°F
	6388'	26.14°	273.46°	6343.01'	-107.94'	162.78°F
6400						
						162.78°F
						162.78°F
						162.78°F
	6483'	35.09°	270.46°	6424.69'	-59.64'	
6500						
						167.00°F



					167.00°F
					167.00°F
6578'	46.93°	271.19°	6496.24'	2.53'	
6600					167.00°F
					167.00°F
					167.00°F
6672'	53.92°	271.77°	6556.09'	74.90'	
					171.22°F
6700					
					171.22°F

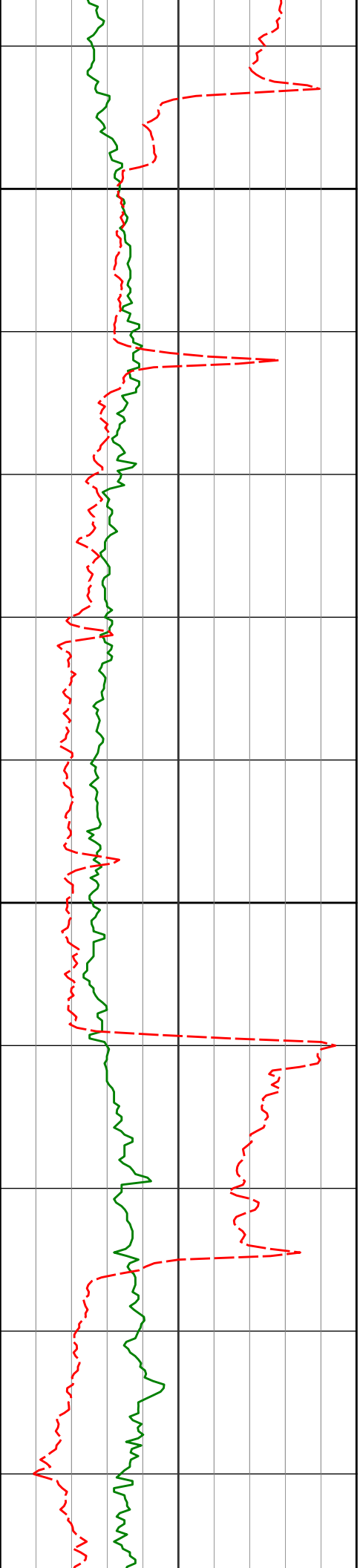


					171.22°F
6767'	60.43°	269.94°	6607.56'	154.60'	
					171.22°F
6800					
					171.22°F
					171.22°F
6862'	65.79°	267.34°	6650.52'	238.98'	
					171.22°F
6900					171.22°F
					171.22°F

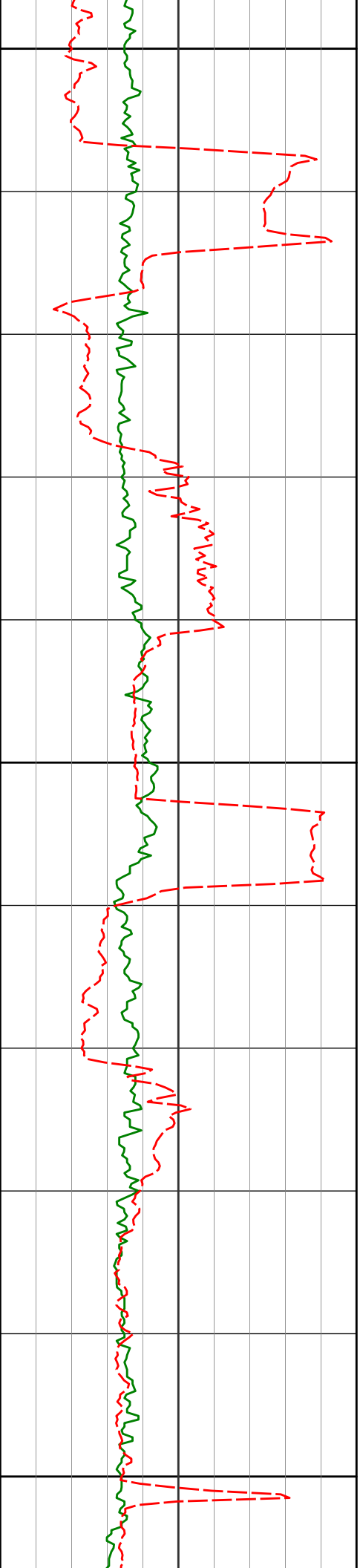


6957'	72.26°	268.05°	6684.52'	327.20'
7014'	77.89°	268.34°	6699.20'	382.02'
7157'	85.87°	266.78°	6719.38'	522.73'

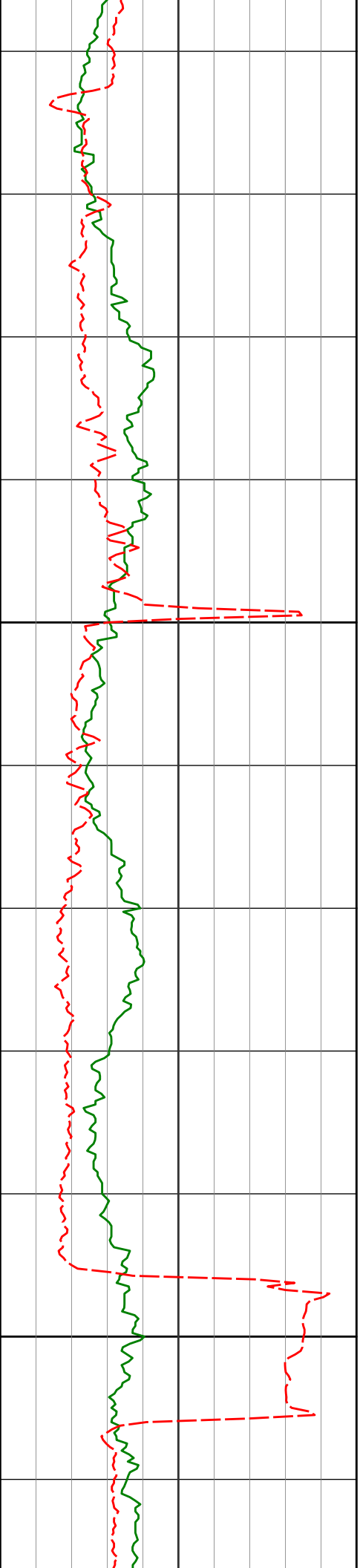
175.44°F
175.44°F
179.66°F
179.66°F
179.66°F
179.66°F
179.66°F
167.00°F



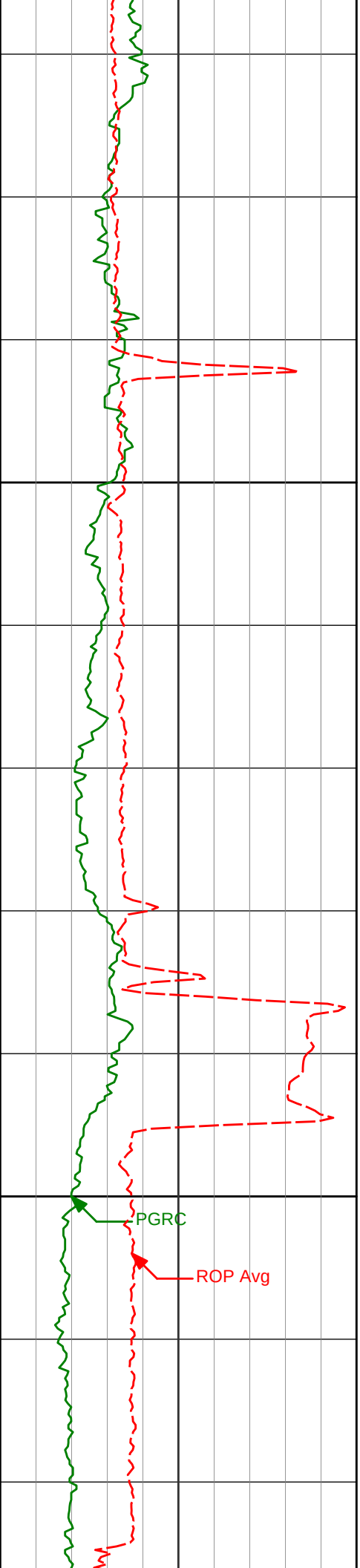
7200					167.00°F
					167.00°F
	7252'	89.48°	266.68°	6723.24'	616.99'
					171.22°F
					171.22°F
7300					
					171.22°F
	7347'	89.41°	269.34°	6724.16'	711.55'
					171.22°F
					171.22°F



					171.22°F
7442'	91.11°	271.11°	6723.72'	806.39'	179.66°F
					179.66°F
					179.66°F
7536'	90.19°	270.65°	6722.66'	900.29'	179.66°F
					179.66°F
					179.66°F

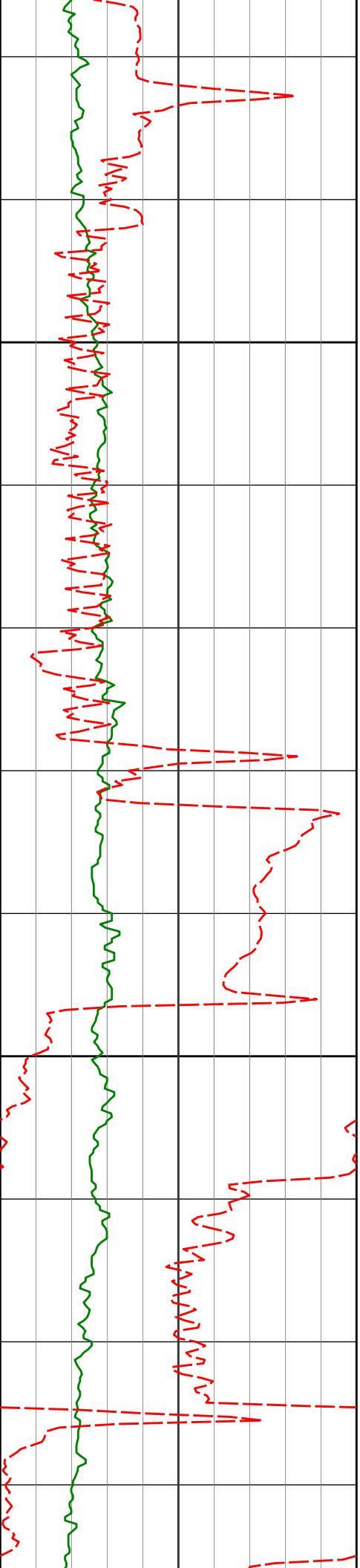


					179.66°F
7631'	90.77°	270.50°	6721.87'	995.17'	
					183.88°F
					183.88°F
7700					
					183.88°F
7726'	91.54°	270.38°	6719.95'	1090.03'	
					183.88°F
					183.88°F
					183.88°F
7800					
					183.88°F
7818'	90.92°	271.59°	6717.97'	1181.92'	
					183.88°F

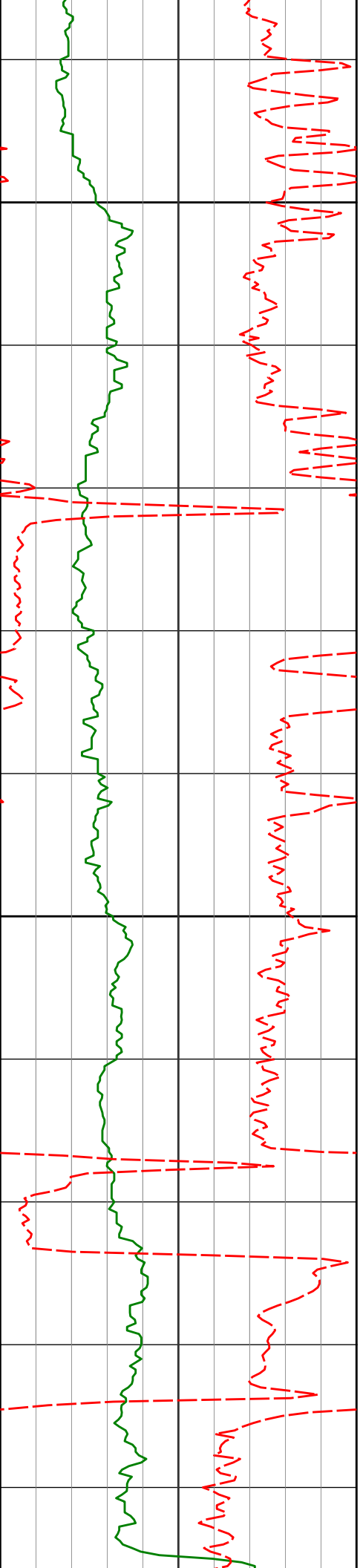


7900					
	7909'	91.51°	271.37°	6716.04'	1272.85'
8000	8000'	90.15°	272.03°	6714.72'	1363.79'

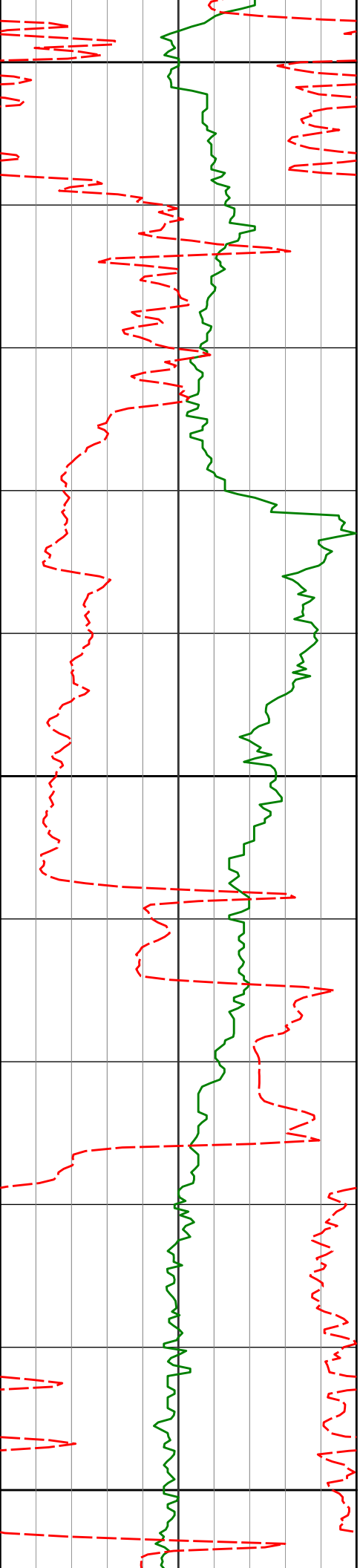
183.88°F
183.88°F
188.09°F
188.09°F
188.09°F
188.09°F
188.09°F



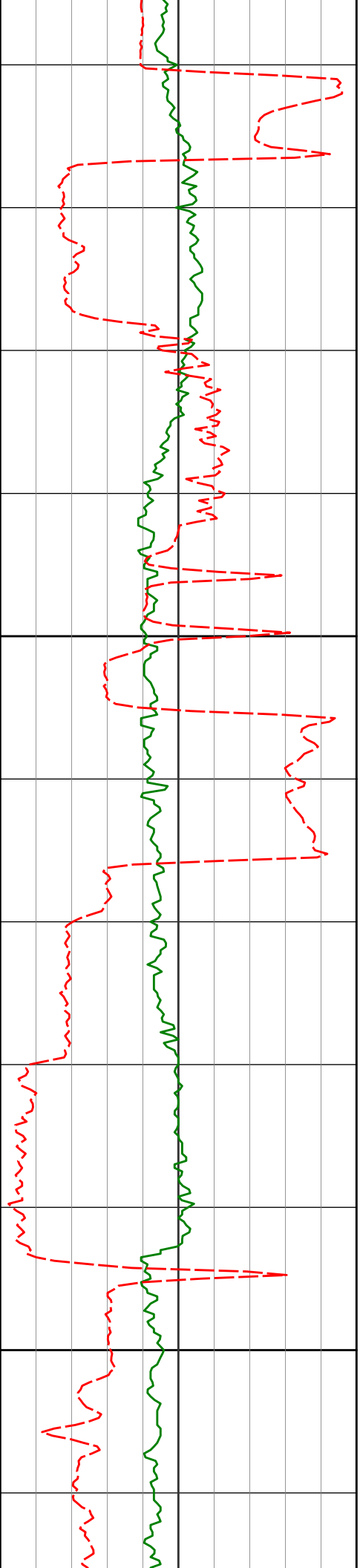
					188.09°F
8092'	91.33°	272.48°	6713.53'	1455.76'	
8100					188.09°F
					188.09°F
					188.09°F
8183'	89.26°	272.19°	6713.06'	1546.74'	
					188.09°F
8200					
					188.09°F
					188.09°F



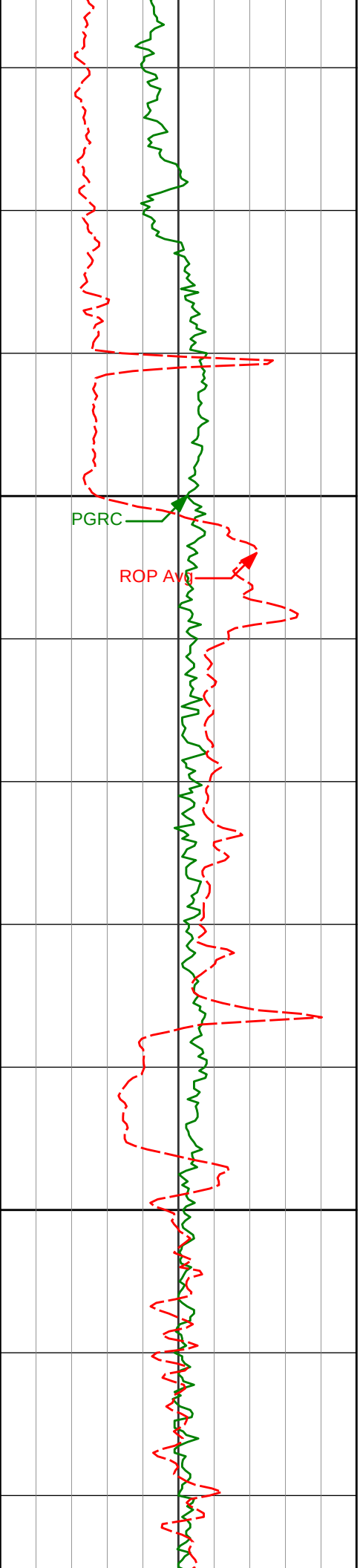
8275'	89.42°	271.88°	6714.13'	1638.71'	188.09°F
					188.09°F
					188.09°F
8366'	89.88°	271.70°	6714.69'	1729.67'	188.09°F
					192.31°F
					192.31°F
8458'	87.94°	271.72°	6716.45'	1821.61'	192.31°F
					192.31°F



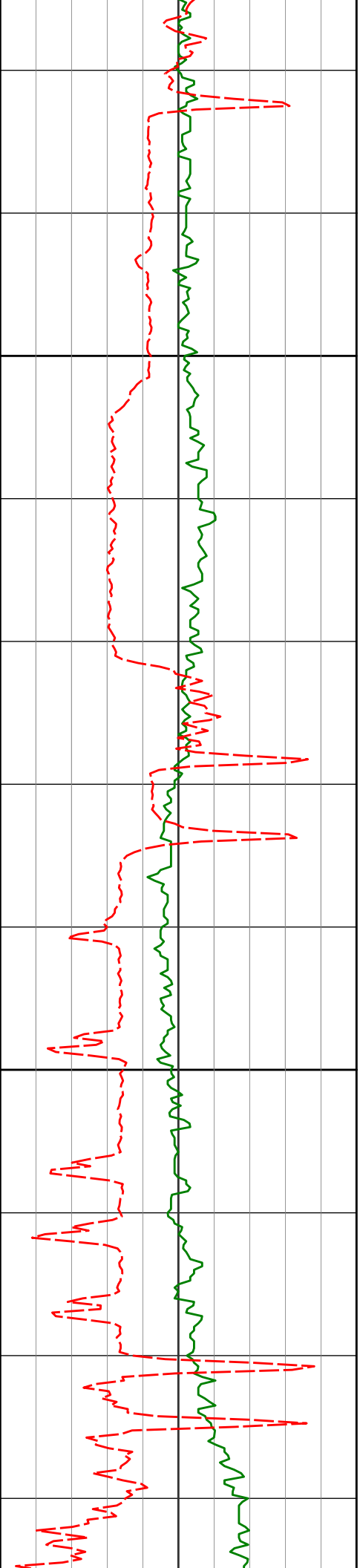
					192.31°F
8549'	87.01°	271.68°	6720.46'	1912.48'	192.31°F
					196.53°F
					196.53°F
8641'	88.00°	270.62°	6724.47'	2004.31'	196.53°F
					196.53°F
					196.53°F



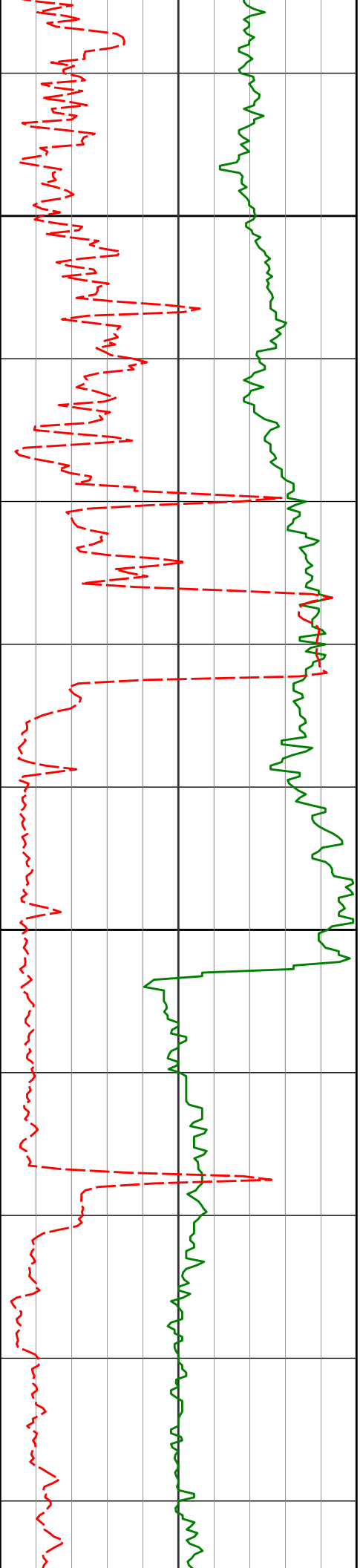
8732'	88.98°	269.76°	6726.87'	2095.14'	196.53°F
					196.53°F
					196.53°F
8824'	90.62°	270.33°	6727.19'	2186.97'	196.53°F
					196.53°F
					196.53°F
8915'	90.62°	270.00°	6726.21'	2277.82'	196.53°F



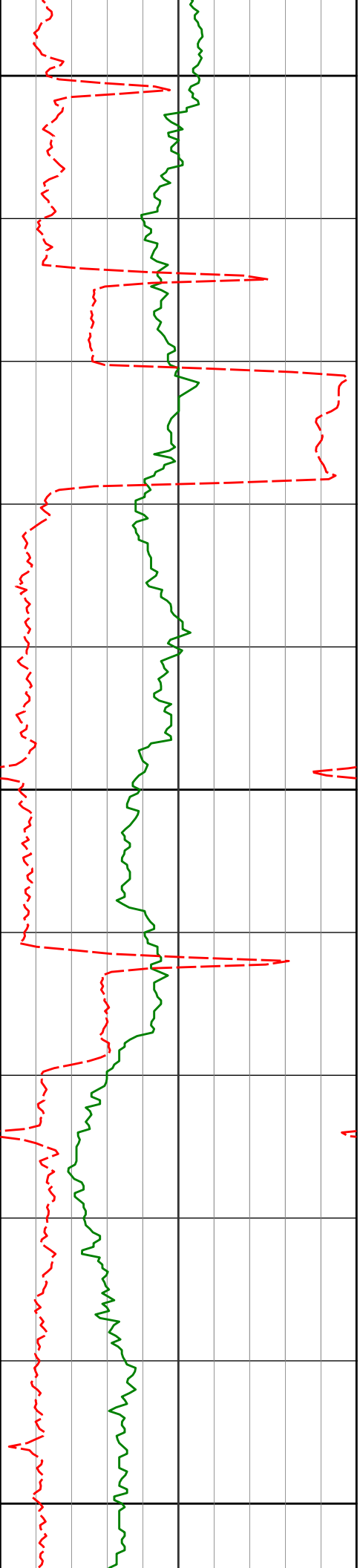
						196.53°F
						196.53°F
9000						196.53°F
	9007'	90.89°	269.84°	6725.00'	2369.64'	
						200.75°F
						200.75°F
						200.75°F
9100	9099'	90.40°	269.33°	6723.96'	2461.43'	
						204.97°F
						204.97°F



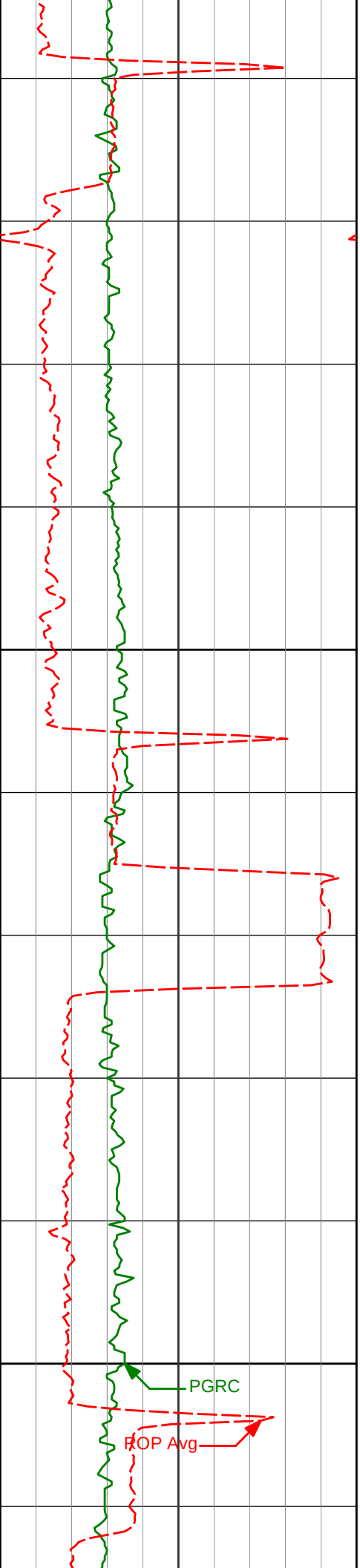
9190'	90.86°	270.85°	6722.96'	2552.27'	204.97°F
9200					
					204.97°F
					204.97°F
					204.97°F
9282'	90.93°	270.84°	6721.52'	2644.16'	
9300					209.19°F
					209.19°F
					209.19°F



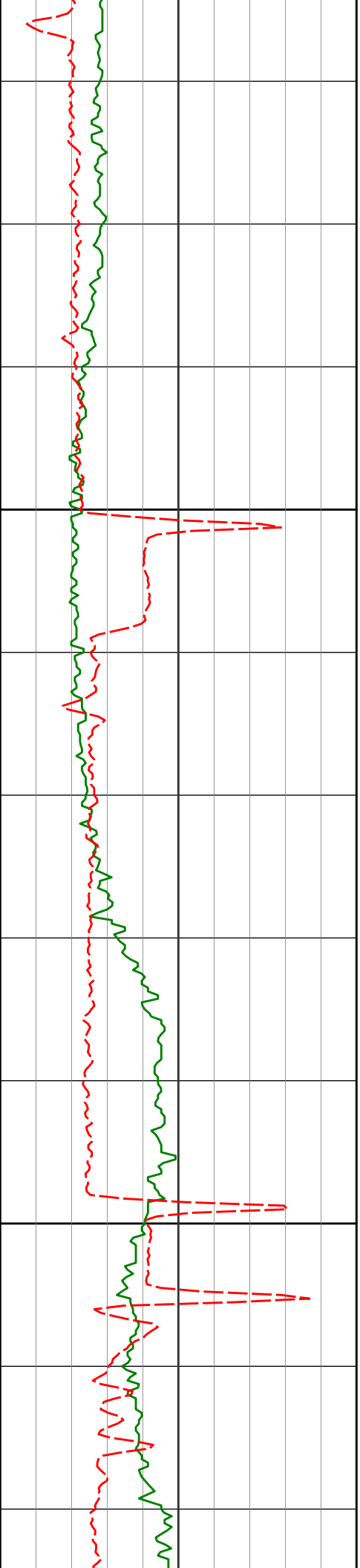
9374'	91.42°	270.21°	6719.64'	2736.03'	
					209.19°F
					209.19°F
					209.19°F
9469'	90.74°	270.09°	6717.85'	2830.85'	
					209.19°F
					209.19°F
					209.19°F
9563'	91.23°	269.51°	6716.23'	2924.65'	
					209.19°F



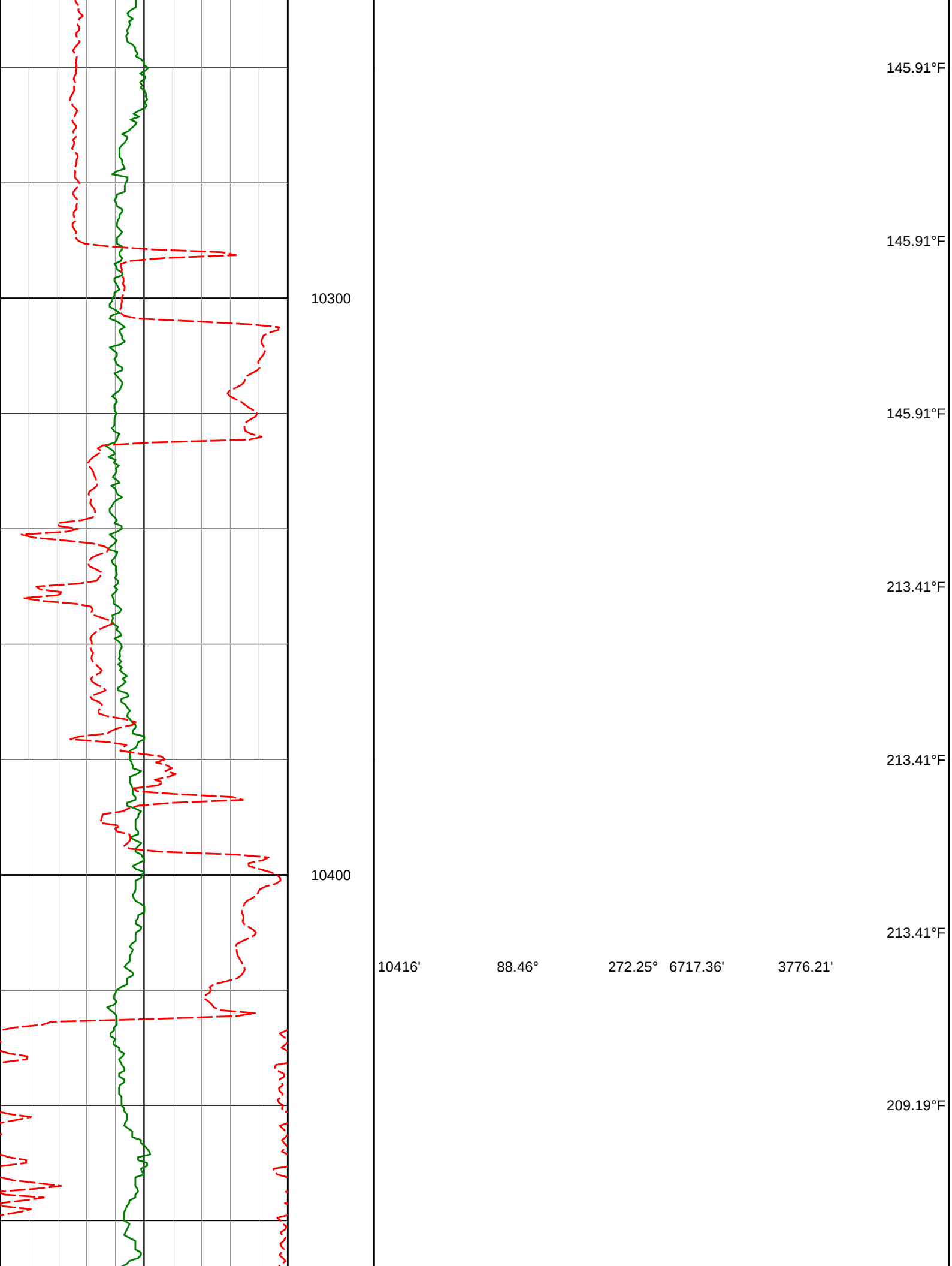
9600					200.75°F
					200.75°F
	9658'	89.66°	270.23°	6715.49'	3019.46'
					200.75°F
					209.19°F
9700					
					209.19°F
	9752'	89.81°	269.86°	6715.92'	3113.30'
					209.19°F
					209.19°F
9800					

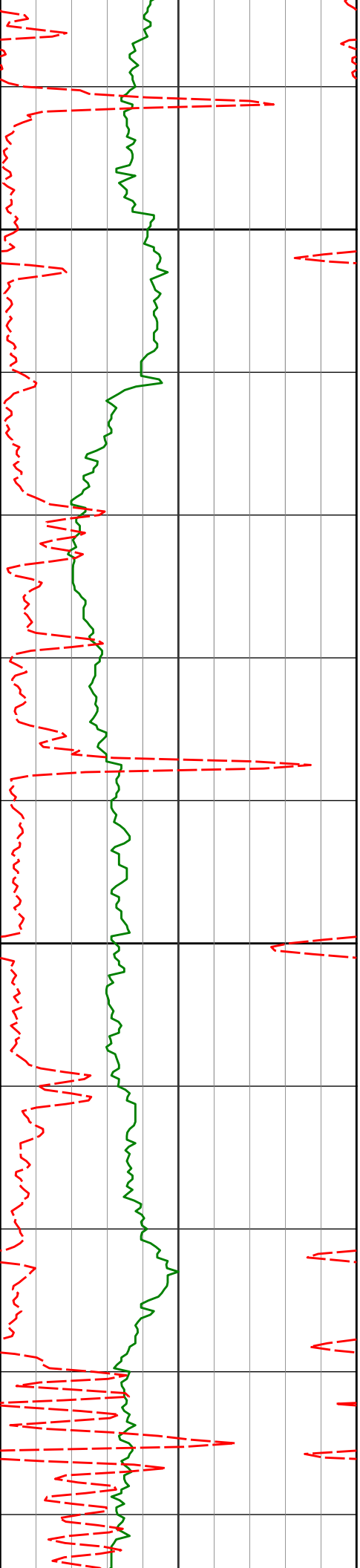


					209.19°F
					209.19°F
9847'	90.22°	269.20°	6715.90'	3208.08'	
					213.41°F
					213.41°F
					213.41°F
9942'	89.57°	270.09°	6716.08'	3302.87'	
					209.19°F
					209.19°F
					209.19°F



10037'	89.78°	270.37°	6716.61'	3397.72'	209.19°F
					209.19°F
10132'	89.91°	270.01°	6716.87'	3492.57'	209.19°F
					209.19°F
					209.19°F
10226'	90.86°	269.94°	6716.23'	3586.40'	209.19°F


145.91°F
145.91°F
10300
145.91°F
213.41°F
213.41°F
10400
213.41°F
10416'
88.46°
272.25°
6717.36'
3776.21'
209.19°F



209.19°F

10500

209.19°F

10510'	87.93°	271.85°	6720.31'	3870.14'

213.41°F

213.41°F

213.41°F

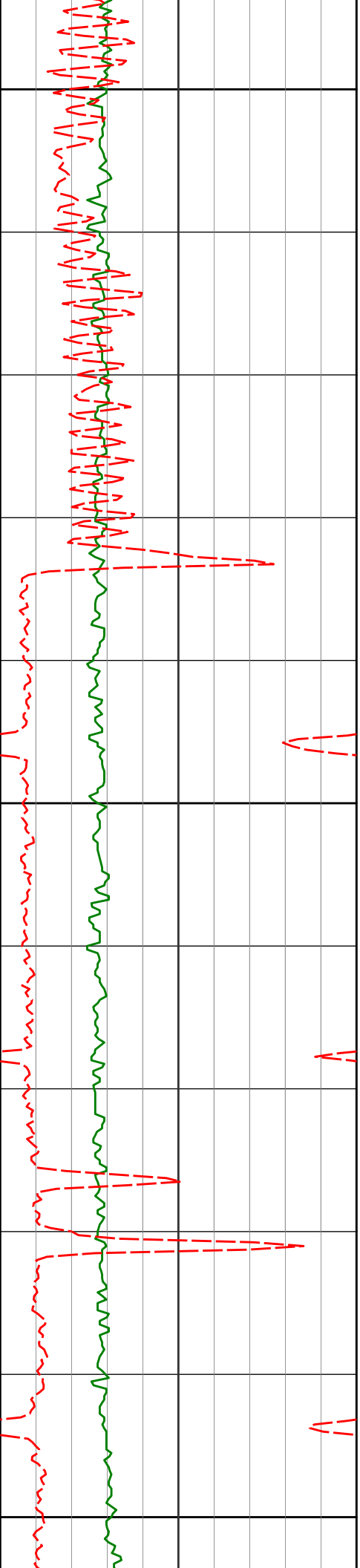
10600

10605'	88.27°	271.24°	6723.46'	3965.03'

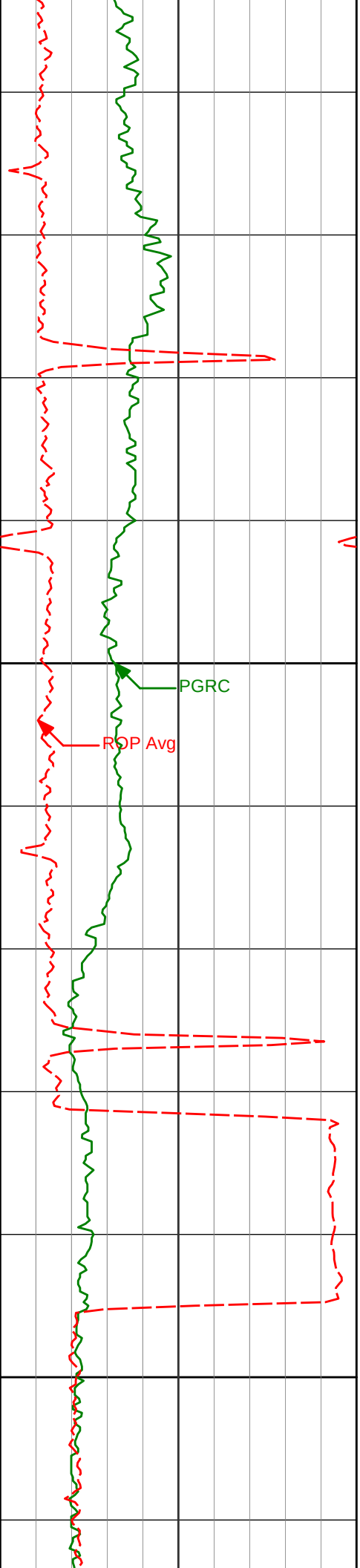
213.41°F

213.41°F

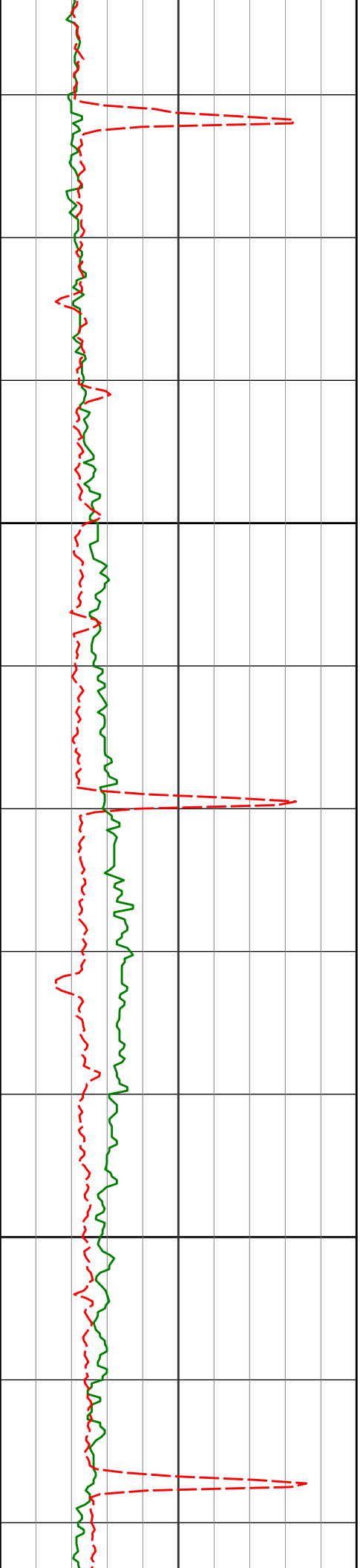
213.41°F



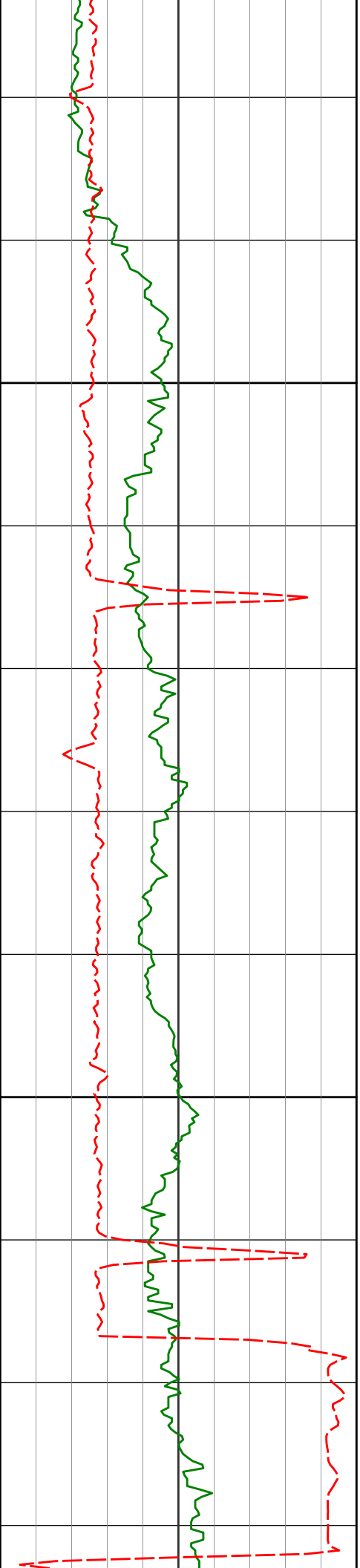
10700	10700'	89.11°	271.15°	6725.63'	4059.94'	217.63°F
						217.63°F
						217.63°F
	10795'	89.35°	270.67°	6726.91'	4154.83'	
10800						217.63°F
						217.63°F
						217.63°F
	10889'	89.78°	270.20°	6727.61'	4248.70'	217.63°F
10900						



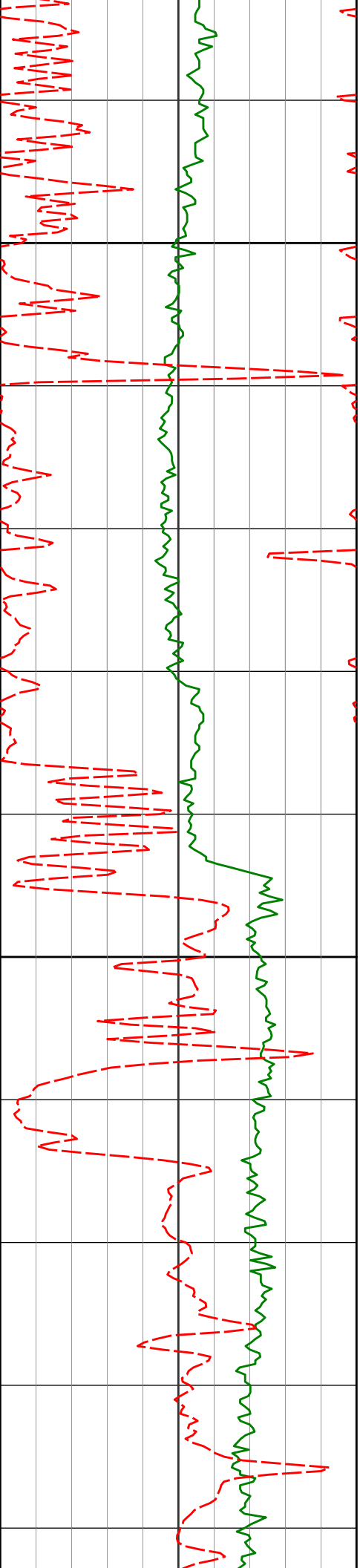
					217.63°F
					217.63°F
					217.63°F
10984'	90.74°	269.85°	6727.18'	4343.53'	
11000					
					221.84°F
					221.84°F
					221.84°F
11079'	88.71°	269.56°	6727.64'	4438.33'	
11100					213.41°F



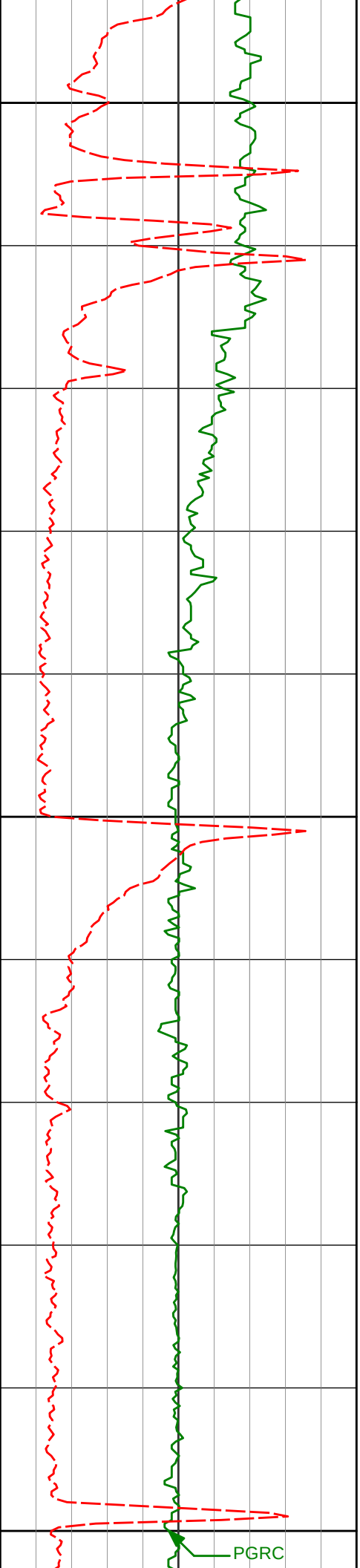
					213.41°F
					221.84°F
11174'	88.77°	269.61°	6729.73'	4533.09'	
					217.63°F
11200					
					217.63°F
					217.63°F
11268'	89.41°	269.36°	6731.23'	4626.86'	
					221.84°F
11300					
					221.84°F
					221.84°F



11363'	89.91°	268.91°	6731.79'	4721.59'	221.84°F
11400					221.84°F
					221.84°F
11458'	91.14°	268.63°	6730.92'	4816.27'	221.84°F
11500					221.84°F
					221.84°F
11553'	89.85°	269.52°	6730.10'	4910.99'	221.84°F



					221.84°F
					221.84°F
					221.84°F
11648'	89.57°	269.30°	6730.59'	5005.76'	
					221.84°F
					221.84°F
					221.84°F
11742'	89.45°	268.95°	6731.40'	5099.49'	
					226.06°F



11800

11900

12000

11837'	90.03°	268.55°	6731.83'	5194.18'
11932'	90.00°	268.66°	6731.80'	5288.84'

226.06°F

226.06°F

226.06°F

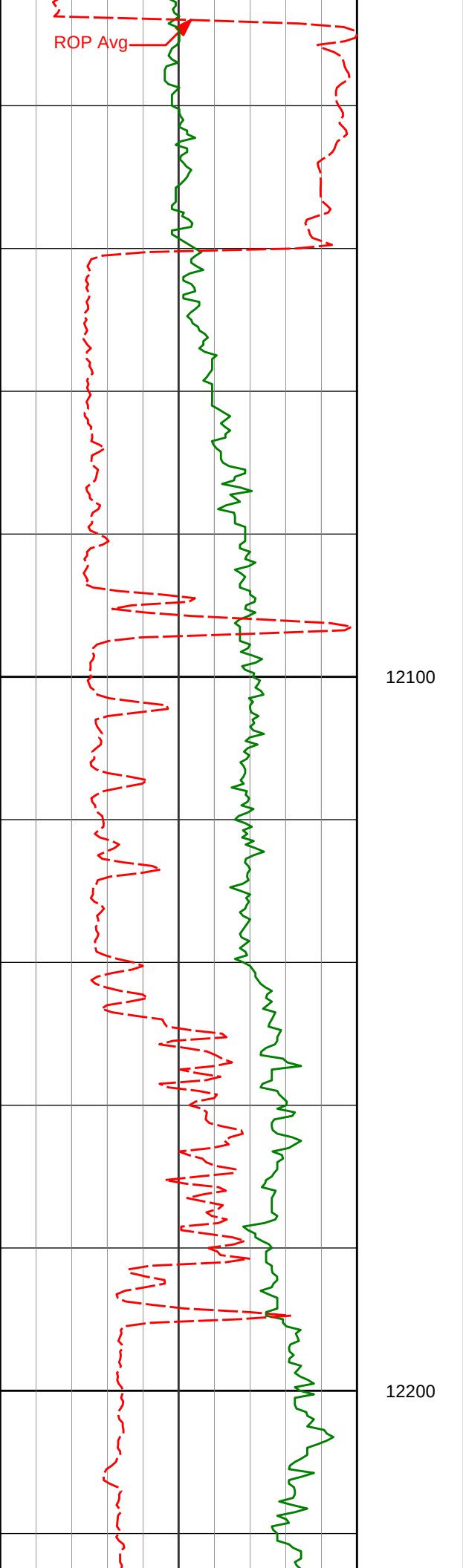
226.06°F

226.06°F

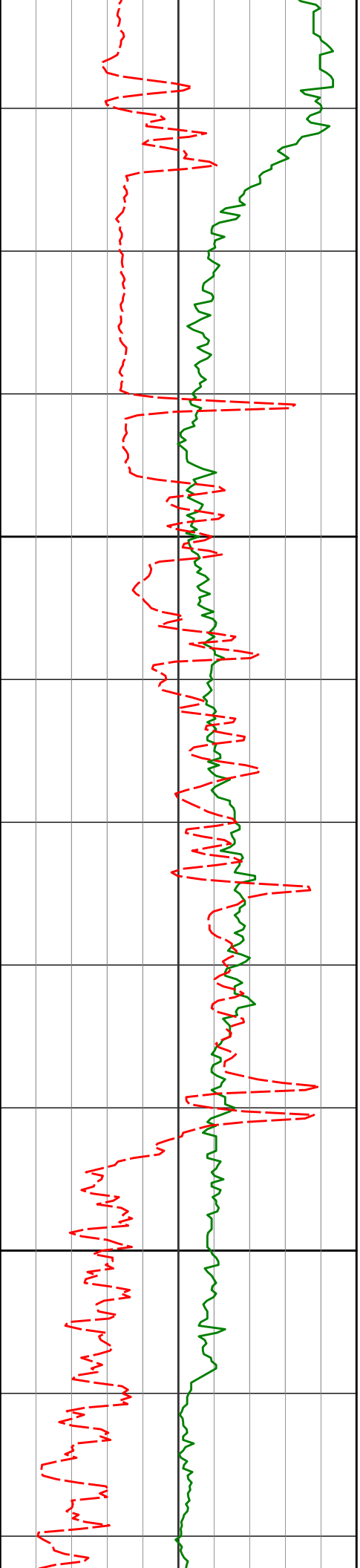
226.06°F

226.06°F

226.06°F



12027'	90.00°	270.63°	6731.80'	5383.63'	221.84°F
					221.84°F
					221.84°F
12122'	90.34°	271.10°	6731.52'	5478.53'	221.84°F
					230.28°F
					230.28°F
12217'	90.46°	270.73°	6730.86'	5573.44'	230.28°F



230.28°F

230.28°F

12300

230.28°F

12311' 90.40° 270.48° 6730.15' 5667.32'

230.28°F

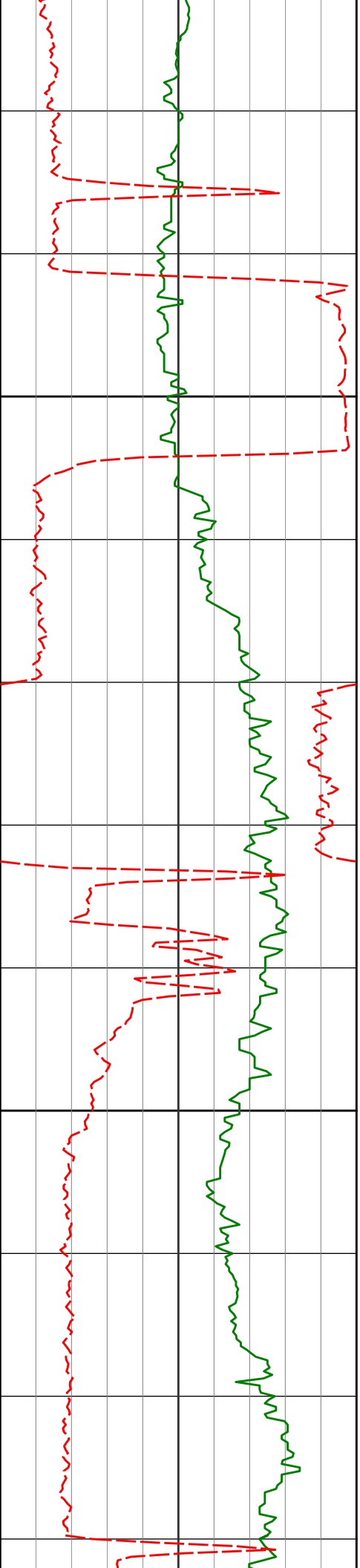
230.28°F

230.28°F

12400

12406' 90.25° 269.39° 6729.61' 5762.15'

230.28°F



230.28°F

230.28°F

12500

12501' 89.85° 270.44° 6729.54' 5856.97'

226.06°F

226.06°F

226.06°F

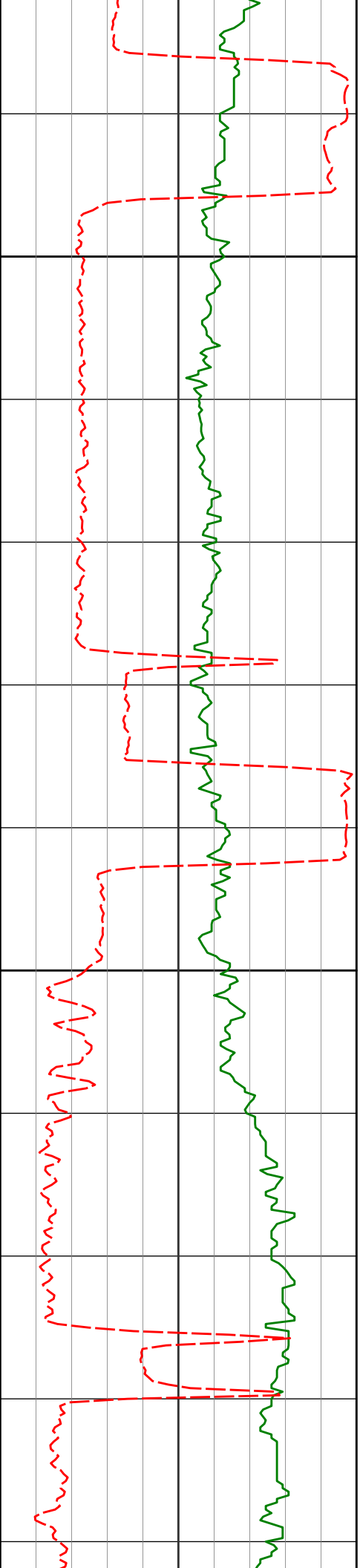
12596' 90.22° 270.09° 6729.49' 5951.82'

12600

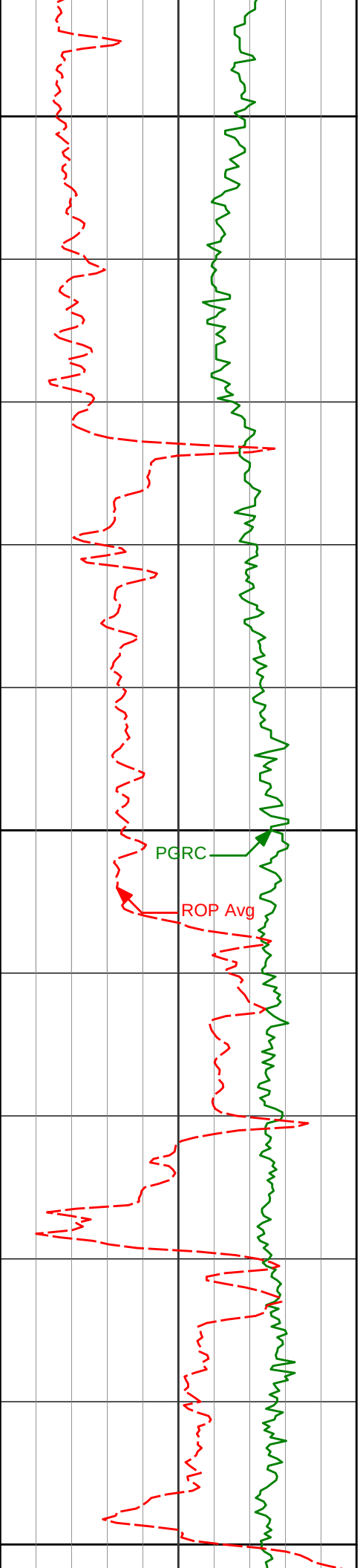
226.06°F

230.28°F

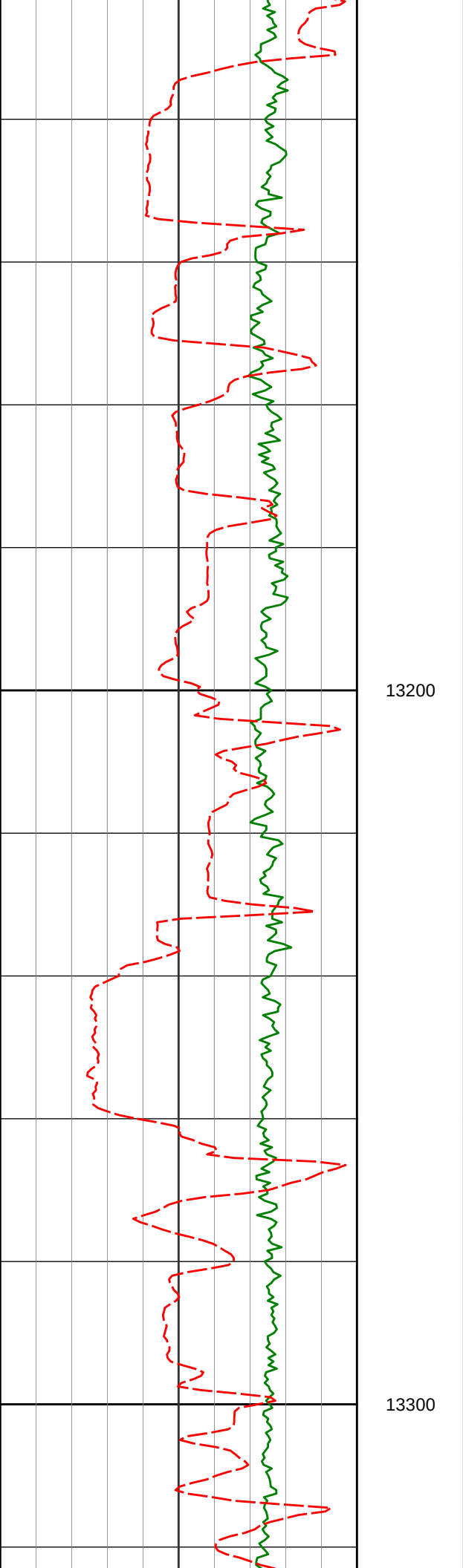
230.28°F



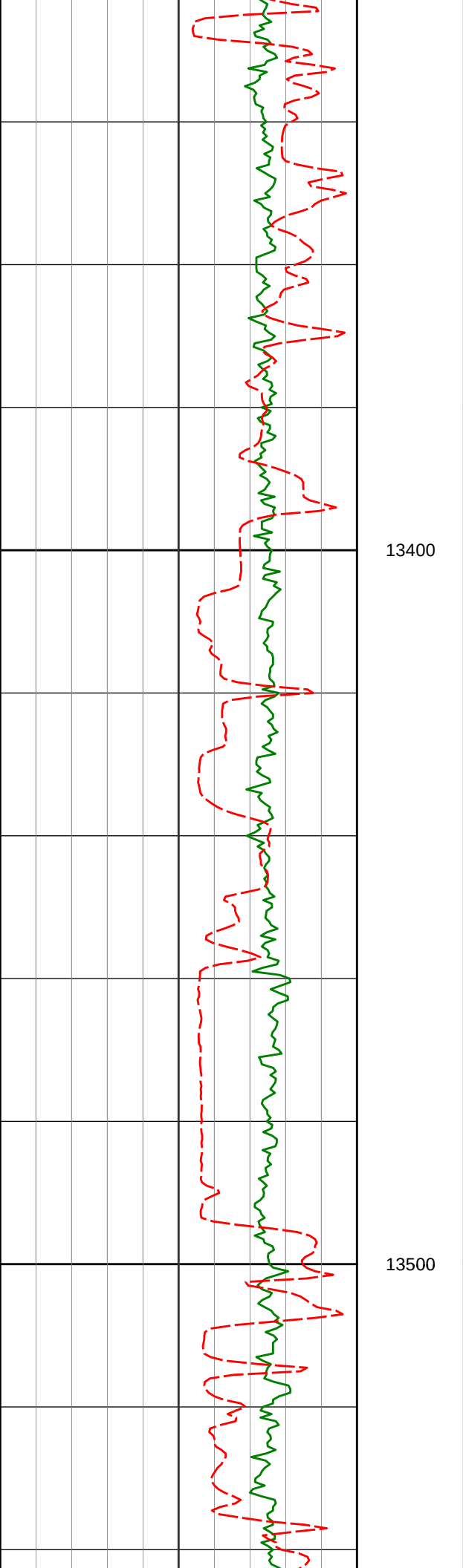
12690'	89.75°	271.08°	6729.51'	6045.71'	230.28°F
12700					
					230.28°F
					230.28°F
12785'	87.93°	270.66°	6731.43'	6140.59'	230.28°F
12800					
					230.28°F
					230.28°F
					230.28°F
12880'	88.15°	270.26°	6734.67'	6235.41'	



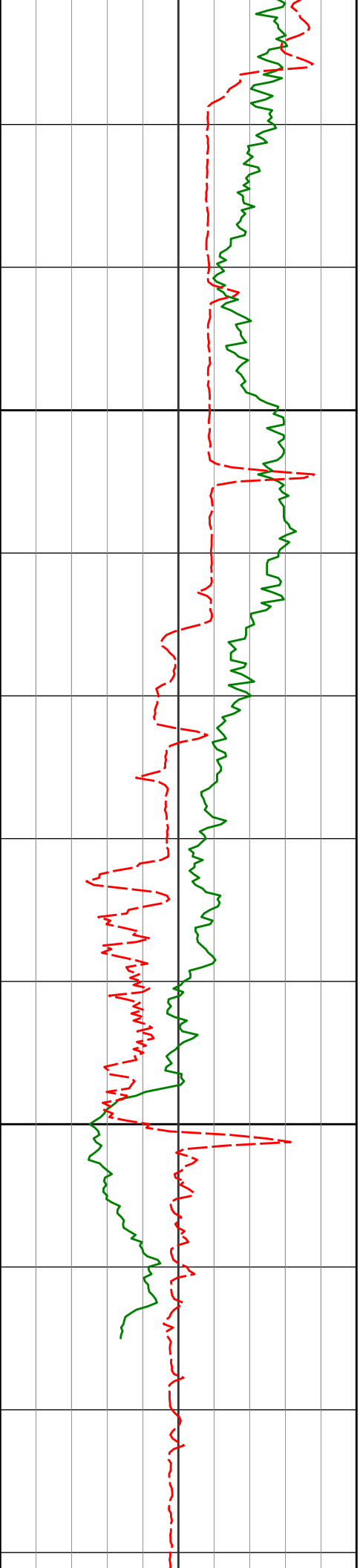
12900					230.28°F
					230.28°F
					230.28°F
	12975'	88.24°	269.76°	6737.66'	6330.19'
					230.28°F
13000					
					230.28°F
					230.28°F
	13070'	89.08°	270.95°	6739.88'	6425.03'
					230.28°F
13100					



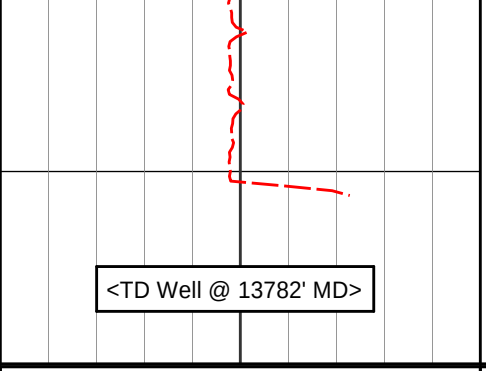
					230.28°F
					230.28°F
13164'	88.77°	270.39°	6741.65'	6518.90'	
					230.28°F
13200					230.28°F
					230.28°F
13259'	89.66°	270.64°	6742.95'	6613.77'	230.28°F
					234.50°F
13300					
					234.50°F



					234.50°F
					234.50°F
					234.50°F
13449'	89.14°	267.89°	6744.95'	6803.24'	
					238.72°F
					238.72°F
					238.72°F



13543'	89.32°	266.82°	6746.21'	6896.71'	
					238.72°F
					238.72°F
					238.72°F
13638'	90.03°	265.95°	6746.75'	6990.99'	
					238.72°F
					238.72°F
					238.72°F
13717'	90.89°	265.59°	6746.11'	7069.28'	



Avg Rate of Penetration ROP Avg 500 feet per hr 0	Depth MD ft	Depth	Inc	Azi	TVD	V.S.	Temp
Gamma Ray Cor PGRC 0 api 300							

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch AA11-667
Wattenberg
Weld Colorado
USA
CA-XX-0902306869

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
250.00	0.41	312.00	250.00	0.60 N	0.66 W	0.70	0.16
500.00	0.82	312.00	499.98	2.39 N	2.66 W	2.80	0.16
664.00	1.06	312.00	663.96	4.20 N	4.66 W	4.90	0.15
759.00	0.97	315.95	758.95	5.36 N	5.88 W	6.19	0.13
854.00	1.30	312.20	853.93	6.66 N	7.23 W	7.61	0.35
1043.00	1.43	313.23	1042.87	9.72 N	10.54 W	11.10	0.07
1138.00	1.59	310.38	1137.84	11.38 N	12.40 W	13.06	0.18
1229.00	1.42	307.99	1228.81	12.89 N	14.25 W	14.99	0.20
1321.00	1.57	304.37	1320.78	14.31 N	16.19 W	17.02	0.20
1412.00	1.67	311.23	1411.74	15.89 N	18.22 W	19.13	0.24
1595.00	1.87	314.03	1594.65	19.72 N	22.37 W	23.51	0.12
1687.00	1.77	304.99	1686.61	21.58 N	24.62 W	25.86	0.33
1778.00	2.08	341.40	1777.56	23.95 N	26.29 W	27.67	1.36
1870.00	2.22	47.72	1869.51	26.73 N	25.51 W	27.06	2.56
1961.00	3.84	43.56	1960.38	30.12 N	22.11 W	23.86	1.79
2053.00	5.97	45.07	2052.04	35.73 N	16.60 W	18.70	2.32
2144.00	7.23	43.56	2142.43	43.22 N	9.30 W	11.86	1.40
2236.00	8.78	40.53	2233.53	52.75 N	0.75 W	3.89	1.74
2327.00	8.64	36.16	2323.48	63.55 N	7.80 E	-3.99	0.74
2419.00	8.04	33.53	2414.51	74.49 N	15.43 E	-10.95	0.77
2510.00	9.12	35.26	2504.49	85.68 N	23.10 E	-17.95	1.22
2602.00	8.39	28.87	2595.42	97.51 N	30.55 E	-24.68	1.32
2694.00	8.35	26.13	2686.44	109.39 N	36.74 E	-30.15	0.44
2786.00	9.37	34.45	2777.35	121.57 N	43.92 E	-36.59	1.78
2881.00	9.19	26.74	2871.11	134.73 N	51.71 E	-43.58	1.32
2976.00	9.16	23.65	2964.89	148.43 N	58.16 E	-49.20	0.52
3070.00	10.27	28.17	3057.54	162.67 N	65.12 E	-55.30	1.43
3165.00	10.21	26.51	3151.03	177.67 N	72.87 E	-62.14	0.32
3260.00	9.59	23.53	3244.61	192.46 N	79.79 E	-68.17	0.85
3355.00	9.16	20.67	3338.35	206.79 N	85.62 E	-73.13	0.67
3449.00	8.56	36.27	3431.24	219.43 N	92.40 E	-79.14	2.63
3544.00	7.22	37.40	3525.34	229.88 N	100.21 E	-86.32	1.42
3639.00	8.95	39.09	3619.39	240.35 N	108.49 E	-93.96	1.84
3733.00	9.95	38.15	3712.11	252.41 N	118.13 E	-102.85	1.08

3828.00	10.46	38.73	3805.61	265.60 N	128.59 E	-112.51	0.55
3923.00	10.98	37.81	3898.95	279.48 N	139.53 E	-122.61	0.58
4018.00	11.81	32.51	3992.08	294.83 N	150.30 E	-132.45	1.41
4112.00	10.04	32.52	4084.37	309.85 N	159.88 E	-141.11	1.89
4302.00	8.31	29.57	4271.93	335.76 N	175.56 E	-155.21	0.94
4397.00	7.10	28.66	4366.07	346.88 N	181.76 E	-160.74	1.28
4492.00	6.27	29.09	4460.43	356.57 N	187.10 E	-165.50	0.88
4587.00	6.24	27.74	4554.86	365.67 N	192.03 E	-169.87	0.16
4681.00	5.77	27.32	4648.35	374.39 N	196.57 E	-173.89	0.50
4776.00	4.91	25.89	4742.93	382.29 N	200.54 E	-177.37	0.91
4871.00	3.72	21.87	4837.66	388.80 N	203.46 E	-179.90	1.29
4966.00	1.13	18.82	4932.57	392.55 N	204.91 E	-181.13	2.72
5061.00	0.60	358.18	5027.56	393.93 N	205.20 E	-181.33	0.64
5156.00	0.79	37.26	5122.55	394.95 N	205.57 E	-181.65	0.52
5250.00	0.81	71.37	5216.54	395.67 N	206.60 E	-182.62	0.50
5345.00	0.96	53.00	5311.53	396.37 N	207.87 E	-183.86	0.34
5440.00	0.83	66.01	5406.52	397.13 N	209.14 E	-185.08	0.25
5535.00	1.25	61.90	5501.51	397.90 N	210.69 E	-186.58	0.44
5629.00	1.07	57.87	5595.49	398.85 N	212.33 E	-188.16	0.21
5819.00	0.14	11.87	5785.47	400.01 N	213.88 E	-189.63	0.51
5914.00	0.95	289.42	5880.47	400.39 N	213.16 E	-188.89	0.99
6009.00	1.95	265.28	5975.44	400.51 N	210.81 E	-186.54	1.21
6104.00	5.19	274.76	6070.24	400.74 N	204.92 E	-180.65	3.45
6198.00	10.48	274.01	6163.33	401.69 N	192.15 E	-167.84	5.63
6293.00	18.59	276.69	6255.22	404.06 N	168.45 E	-144.04	8.56
6388.00	26.14	273.46	6343.01	407.09 N	132.46 E	-107.94	8.05
6483.00	35.09	270.46	6424.69	408.57 N	84.16 E	-59.64	9.55
6578.00	46.93	271.19	6496.24	409.51 N	21.94 E	2.53	12.47
6672.00	53.92	271.77	6556.09	411.40 N	50.44 W	74.90	7.45
6767.00	60.43	269.94	6607.56	412.54 N	130.22 W	154.60	7.04
6862.00	65.79	267.34	6650.52	410.49 N	214.88 W	238.98	6.15
6957.00	72.26	268.05	6684.52	406.93 N	303.46 W	327.20	6.84
7014.00	77.89	268.34	6699.20	405.20 N	358.49 W	382.02	9.90
7157.00	85.87	266.78	6719.38	399.15 N	499.81 W	522.73	5.69
7252.00	89.48	266.68	6723.24	393.74 N	594.56 W	616.99	3.80
7347.00	89.41	269.34	6724.16	390.43 N	689.49 W	711.55	2.80
7442.00	91.11	271.11	6723.72	390.80 N	784.48 W	806.39	2.58
7536.00	90.19	270.65	6722.66	392.25 N	878.46 W	900.29	1.10
7631.00	90.77	270.50	6721.87	393.20 N	973.45 W	995.17	0.64
7726.00	91.54	270.38	6719.95	393.93 N	1068.43 W	1090.03	0.82
7818.00	90.92	271.59	6717.97	395.51 N	1160.39 W	1181.92	1.47
7909.00	91.51	271.37	6716.04	397.86 N	1251.34 W	1272.85	0.69
8000.00	90.15	272.03	6714.72	400.55 N	1342.29 W	1363.79	1.66
8092.00	91.33	272.48	6713.53	404.17 N	1434.21 W	1455.76	1.37
8183.00	89.26	272.19	6713.06	407.87 N	1525.13 W	1546.74	2.29
8275.00	89.42	271.88	6714.13	411.13 N	1617.06 W	1638.71	0.37
8366.00	89.88	271.70	6714.69	413.98 N	1708.02 W	1729.67	0.54
8458.00	87.94	271.72	6716.45	416.72 N	1799.95 W	1821.61	2.11
8549.00	87.01	271.68	6720.46	419.42 N	1890.82 W	1912.48	1.02
8641.00	88.00	270.62	6724.47	421.27 N	1982.72 W	2004.31	1.58
8732.00	88.98	269.76	6726.87	421.57 N	2073.68 W	2095.14	1.44
8824.00	90.62	270.33	6727.19	421.64 N	2165.68 W	2186.97	1.88
8915.00	90.62	270.00	6726.21	421.91 N	2256.67 W	2277.82	0.36
9007.00	90.89	269.84	6725.00	421.78 N	2348.66 W	2369.64	0.35
9099.00	90.40	269.33	6723.96	421.11 N	2440.65 W	2461.43	0.77
9190.00	90.86	270.85	6722.96	421.26 N	2531.65 W	2552.27	1.75
9282.00	90.93	270.84	6721.52	422.62 N	2623.62 W	2644.16	0.07
9374.00	91.42	270.21	6719.64	423.45 N	2715.60 W	2736.03	0.87
9469.00	90.74	270.09	6717.85	423.70 N	2810.58 W	2830.85	0.72
9563.00	91.23	269.51	6716.23	423.37 N	2904.57 W	2924.65	0.81
9658.00	89.66	270.23	6715.49	423.15 N	2999.56 W	3019.46	1.82
9752.00	89.81	269.86	6715.92	423.22 N	3093.56 W	3113.30	0.43
9847.00	90.22	269.20	6715.90	422.44 N	3188.56 W	3208.08	0.81
9942.00	89.57	270.09	6716.08	421.85 N	3283.55 W	3302.87	1.16
10037.00	89.78	270.37	6716.61	422.23 N	3378.55 W	3397.72	0.38
10132.00	89.91	270.01	6716.87	422.55 N	3473.55 W	3492.57	0.40
10226.00	90.86	269.94	6716.23	422.51 N	3567.55 W	3586.40	1.02
10416.00	88.46	272.25	6717.36	426.13 N	3757.48 W	3776.21	1.76
10510.00	87.93	271.85	6720.31	429.50 N	3851.37 W	3870.14	0.70
10605.00	88.27	271.24	6723.46	432.06 N	3946.29 W	3965.03	0.74

10700.00	89.11	271.15	6725.63	434.03 N	4041.24 W	4059.94	0.88
10795.00	89.35	270.67	6726.91	435.54 N	4136.22 W	4154.83	0.57
10889.00	89.78	270.20	6727.61	436.25 N	4230.21 W	4248.70	0.68
10984.00	90.74	269.85	6727.18	436.29 N	4325.21 W	4343.53	1.07
11079.00	88.71	269.56	6727.64	435.80 N	4420.20 W	4438.33	2.16
11174.00	88.77	269.61	6729.73	435.12 N	4515.18 W	4533.09	0.08
11268.00	89.41	269.36	6731.23	434.28 N	4609.16 W	4626.86	0.74
11363.00	89.91	268.91	6731.79	432.85 N	4704.15 W	4721.59	0.71
11458.00	91.14	268.63	6730.92	430.81 N	4799.12 W	4816.27	1.33
11553.00	89.85	269.52	6730.10	429.27 N	4894.10 W	4910.99	1.66
11648.00	89.57	269.30	6730.59	428.29 N	4989.10 W	5005.76	0.38
11742.00	89.45	268.95	6731.40	426.85 N	5083.08 W	5099.49	0.39
11837.00	90.03	268.55	6731.83	424.78 N	5178.06 W	5194.18	0.75
11932.00	90.00	268.66	6731.80	422.47 N	5273.03 W	5288.84	0.12
12027.00	90.00	270.63	6731.80	421.88 N	5368.02 W	5383.63	2.07
12122.00	90.34	271.10	6731.52	423.32 N	5463.01 W	5478.53	0.61
12217.00	90.46	270.73	6730.86	424.84 N	5558.00 W	5573.44	0.41
12311.00	90.40	270.48	6730.15	425.83 N	5651.99 W	5667.32	0.28
12406.00	90.25	269.39	6729.61	425.72 N	5746.99 W	5762.15	1.15
12501.00	89.85	270.44	6729.54	425.58 N	5841.98 W	5856.97	1.18
12596.00	90.22	270.09	6729.49	426.02 N	5936.98 W	5951.82	0.54
12690.00	89.75	271.08	6729.51	426.98 N	6030.98 W	6045.71	1.16
12785.00	87.93	270.66	6731.43	428.43 N	6125.94 W	6140.59	1.96
12880.00	88.15	270.26	6734.67	429.20 N	6220.88 W	6235.41	0.48
12975.00	88.24	269.76	6737.66	429.22 N	6315.84 W	6330.19	0.53
13070.00	89.08	270.95	6739.88	429.81 N	6410.80 W	6425.03	1.53
13164.00	88.77	270.39	6741.65	430.92 N	6504.78 W	6518.90	0.68
13259.00	89.66	270.64	6742.95	431.77 N	6599.77 W	6613.77	0.98
13449.00	89.14	267.89	6744.95	429.35 N	6789.72 W	6803.24	1.47
13543.00	89.32	266.82	6746.21	425.01 N	6883.61 W	6896.71	1.16
13638.00	90.03	265.95	6746.75	419.02 N	6978.42 W	6990.99	1.18
13717.00	90.89	265.59	6746.11	413.19 N	7057.20 W	7069.28	1.18
13782.00	90.89	265.59	6745.10	408.20 N	7122.00 W	7133.67	0.01

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 273.42 DEGREES (GRID)
A TOTAL CORRECTION OF 7.65 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 13782.00 FEET
IS 7133.69 FEET ALONG 273.28 DEGREES (GRID)

Surveys at 250 ft and 500 ft were interpolated from first survey at 664 ft per Noble Energy.

Last survey is a projection from 13717 ft MD to TD at 13782 ft MD.

Date Printed:03 June 2015