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° 31' 19.31" North** **Long: 104° 23' 31.49" West**
Well	: **Crow Creek AA01-766**
Company	: **Noble Energy**
Rig	: **H&P 315**

Company : **Noble Energy**
Rig : **H&P 315**
Well : **Crow Creek AA01-766**
Field : **Wattenberg**
Country : **USA**
API Number : **05-123-40158**

LOCATION

Latitude : **40° 31' 19.31" North**
Longitude : **104° 23' 31.49" West**
UTM Easting = **3,308,003.740 ft**
UTM Northing = **1,434,940.310 ft**

Other Services
Directional Drilling

Permanent Datum : **Ground Level** Elevation : **4799.00 ft**
Log Measured From : **Drill Floor** **24.00 ft** Above Permanent Datum
Drilling Measured From : **Drill Floor**

MD LOG

Elev. KB **N/A**
DF **4823.00 ft**
GL **4799.00 ft**
WD **N/A**

Depth Logged : **702.00 ft** To **11,662.00 ft**
Date Logged : **16-Jan-15** To **21-Jan-15**
Total Depth MD : **11,662.00 ft** TVD : **6,689.83 ft**
Spud Date : **16-Jan-15**

Unit No. : **11610113** Job No. :**CA-XX-0901834393**
Plot Type : **Field**
Plot Date : **21-Jan-15**

Run No.	Borehole Record (MD)			Casing Record (MD)			
	Size	From	To	Size	Weight	From	To
2	8.750 in	702.00 ft	7,108.00 ft	9.625 in	36.00 lbpf	SURFACE	692.00 ft
3	6.125 in	7,108.00 ft	11,662.00 ft	7.000 in	26.00 lbpf	SURFACE	7,098.00 ft

WELL INFORMATION

MWD Run Number	100	200			
Date run completed	18-Jan-15	21-Jan-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)	702.00	7,108.00			
Log End Depth (MD, ft)	7,108.00	11,662.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	17-Jan-15 07:45	19-Jan-15 22:05			
Drill/Wipe End Date and Time	18-Jan-15 14:55	20-Jan-15 21:45			
Min Inc (deg) @ Depth (MD, ft)	0.66 @ 726.00	88.46 @ 7,221.00			
Max Inc (deg) @ Depth (MD, ft)	77.39 @ 7,050.00	94.59 @ 9,404.00			
Bit TFA(in2) / Bit Type	1.05 / PDC	0.98 / PDC			
Flow Rate (gpm)	629.82	318.00			
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A			
Fluid Type	Native/Spud Mud	Polymer			
Density (ppg) / Viscosity (spqt)	9.50 / 34.00	9.20 / 32.00			
Filtrate CL (ppm)	1,500.00	2,000.00			
pH / Fluid Loss (mptm)	8.30 / 10	8.60 / 9			
PV (cP) / YP (lhf2)	7 / 5.00	8 / 5.00			
% Solids / % Sand	6.8 / 1.00	4.9 / 0.30			
% 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	172.78 / PCM	228.74 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Henry Schmeidler	Henry Schmeidler			
Customer Representative	Derek Dupee	Derek Dupee			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.93	5.93			
Sub Serial Number	11404272	12301676			
Insert Serial Number	11680742	11680745			
Date and Time Initialized	17-Jan-15 01:02	19-Jan-15 11:06			
Date and Time Read	19-Jan-15 01:04	21-Jan-15 08:23			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	55.90	56.44			
Software Version	6.21	6.21			
Sub Serial Number	11404272	12301676			
Sonde Serial Number	11638470	11297577			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	15.54	281.77			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	50.20	51.34			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11404272	12301676			
Insert/Sonde Serial Number	11121362	11121362			

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 2" (1:600) logs - 1 ft. interval, 3 ft. coercion distance.
- All 5" (1:240) logs - .5 ft. interval, .6 ft. coercion distance.

5. INSITE version 8.1.1

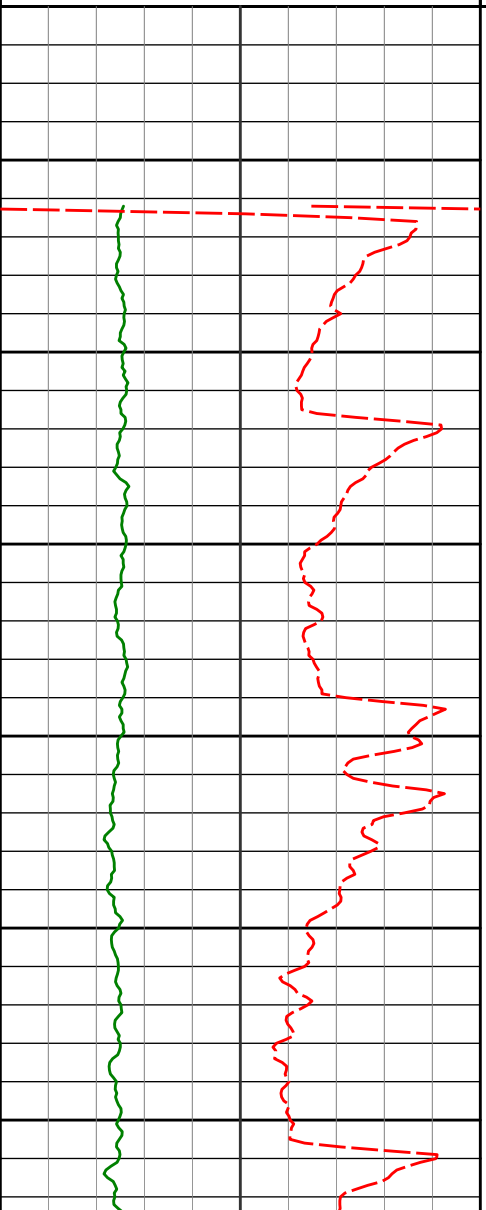
6. Gamma presented inside casing/cement from 7058 ft. MD to 7098 ft. MD.

WARRANTY

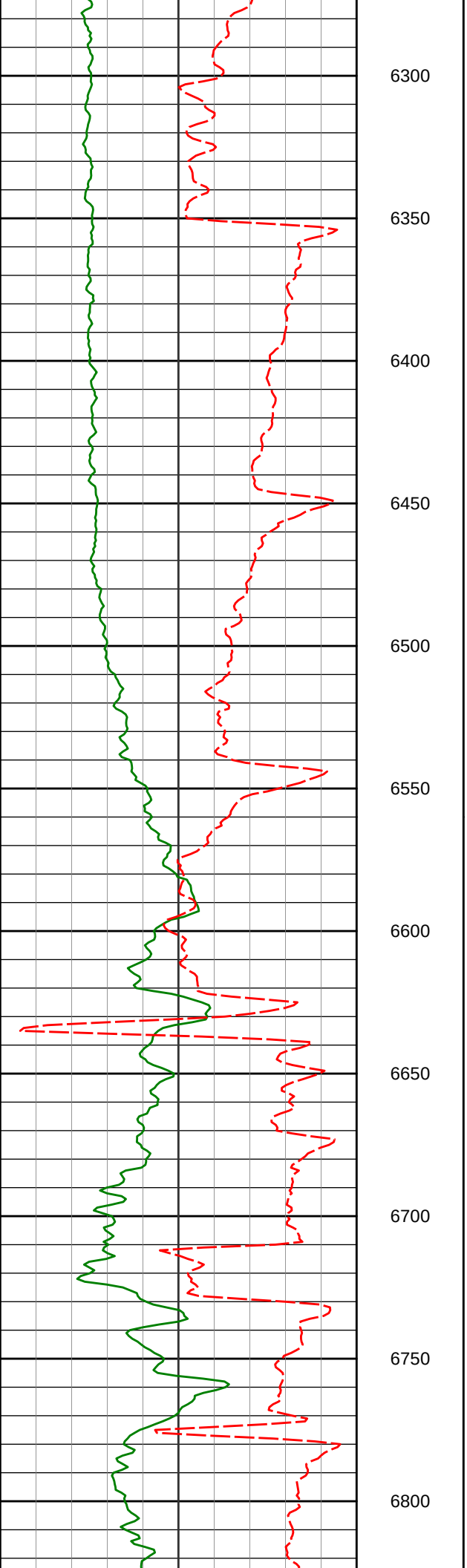
MD Detail 1:600 Scale

PCG Gamma Ray BCorr
PCG Gamma Ray BCorr
0 api 300

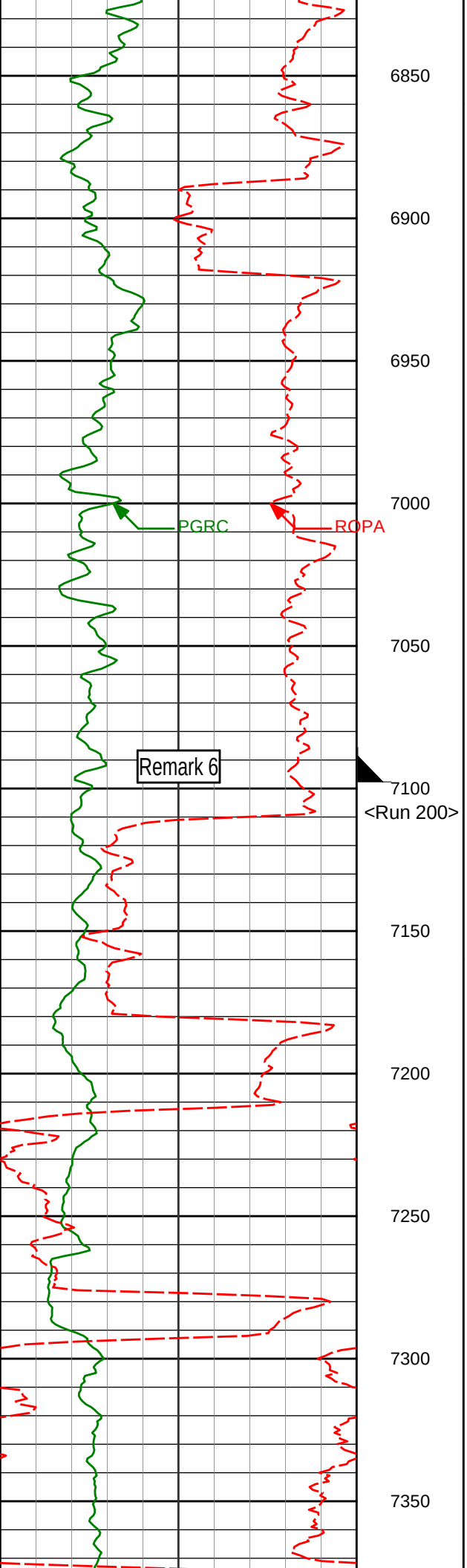
Avg Rate of Penetration
Avg Rate of Penetration
500 feet per hr 0



Depth MD ft	Depth	Inc	Azi	TVD	V.S.	Temp
6000						
<KOP>	6009'	7.88°	73.55°	5937.69'	1.89'	
6050						
6100	6104'	15.44°	96.96°	6030.71'	5.23'	
6150						
6200	6199'	21.59°	103.27°	6120.76'	16.40'	
6250						

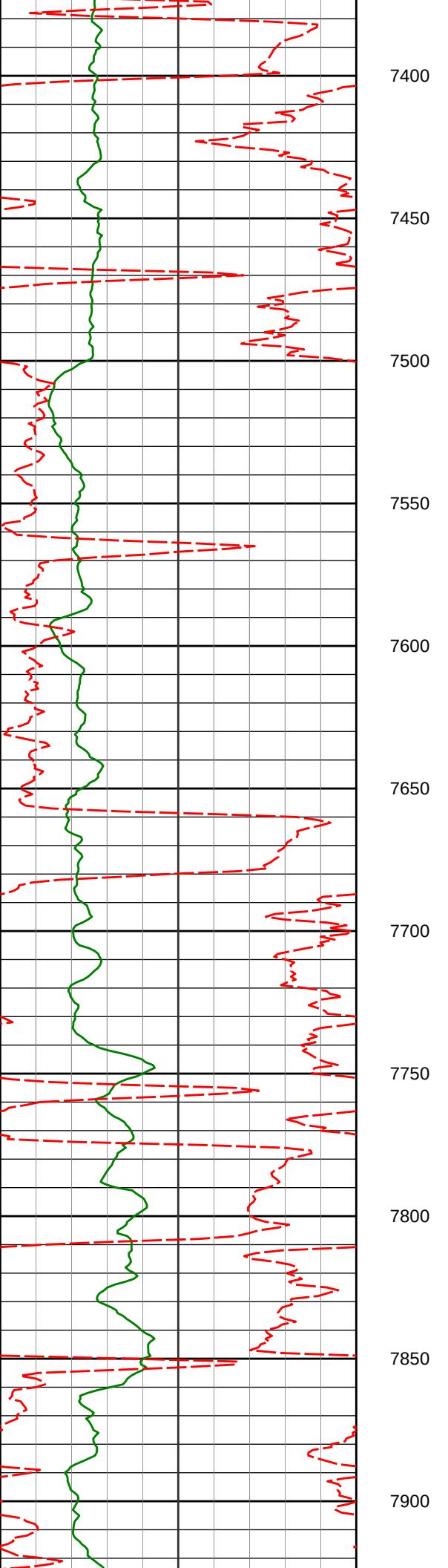


6294'	27.50°	117.06°	6207.21'	37.23'
6389'	33.87°	128.00°	6288.93'	70.88'
6484'	39.67°	142.59°	6365.14'	118.22'
6579'	45.80°	156.30°	6435.04'	178.84'
6674'	51.77°	164.49°	6497.66'	249.42'
6768'	54.28°	173.86°	6554.28'	324.37'
6816'	55.66°	180.76°	6581.85'	363.20'



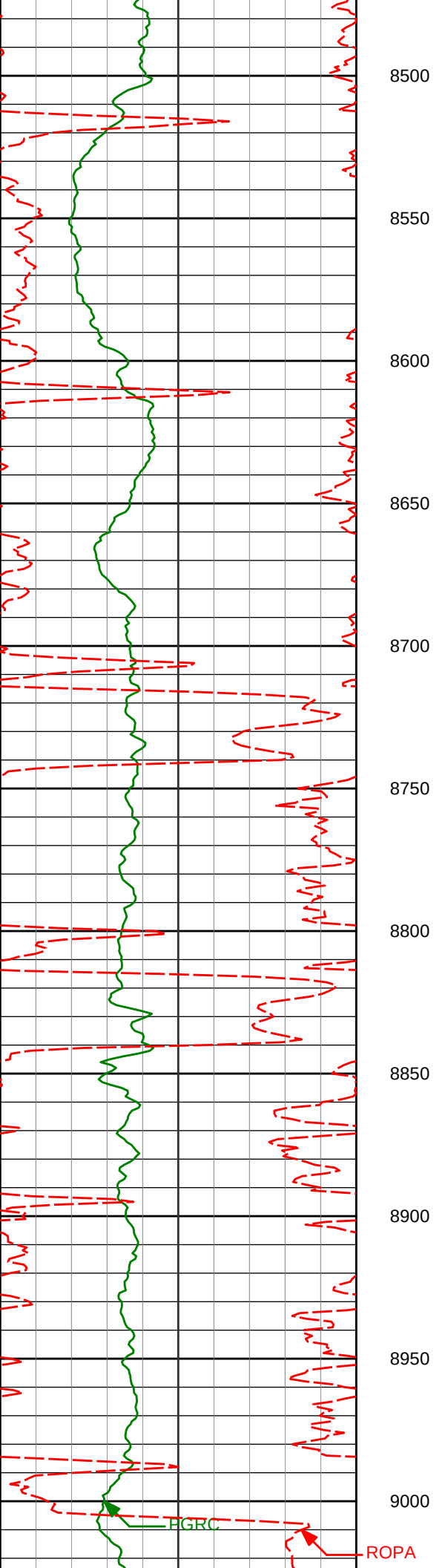
6863'	59.58°	183.22°	6607.01'	401.84'	
6958'	65.71°	184.02°	6650.65'	483.38'	
7050'	77.39°	183.98°	6679.71'	567.48'	
	<7" casing set at 7098' MD>				
					179.66°F
7221'	88.46°	182.55°	6700.74'	731.58'	179.66°F
7316'	91.82°	182.93°	6700.51'	823.79'	

<Run 200>

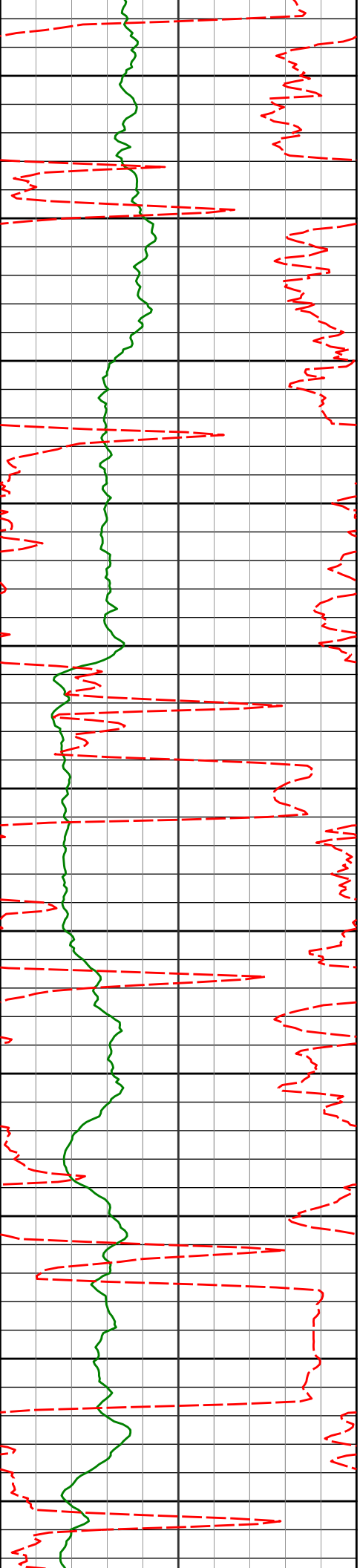


7411'	89.11°	181.74°	6699.74'	916.15'	183.88°F
7506'	90.31°	181.79°	6700.23'	1008.75'	183.88°F
7601'	91.51°	181.82°	6698.72'	1101.32'	
7695'	90.99°	181.59°	6696.68'	1192.94'	183.88°F
7791'	89.97°	181.50°	6695.88'	1286.59'	183.88°F
7885'	89.57°	181.35°	6696.25'	1378.33'	188.09°F

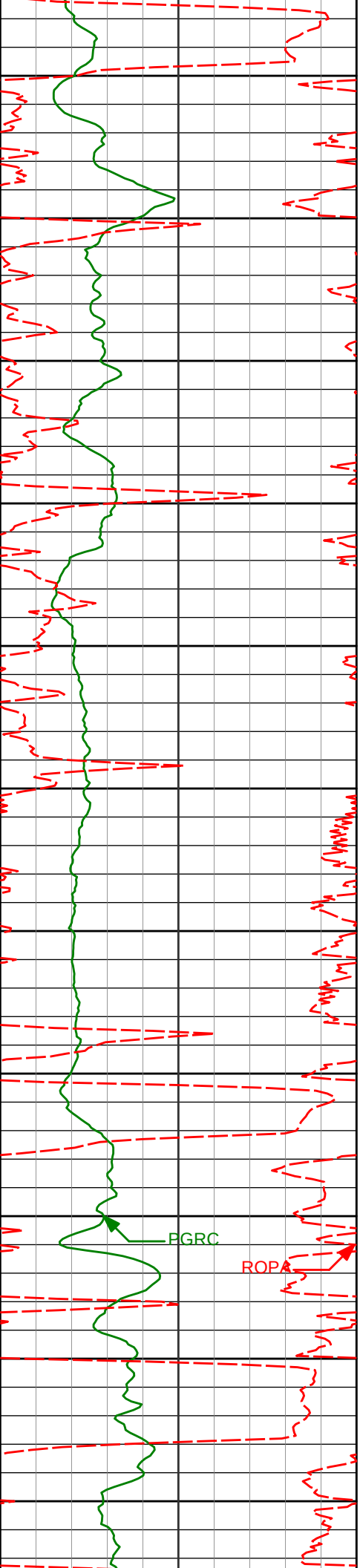
7950					
7980'	91.33°	181.48°	6695.51'	1471.05'	
8000					188.09°F
8050					
8075'	89.97°	182.59°	6694.44'	1563.54'	
8100					188.09°F
8150					
8170'	90.55°	183.48°	6694.00'	1655.64'	
8200					192.31°F
8250					
8265'	88.80°	181.41°	6694.54'	1747.97'	
					196.53°F
8300					
8350					
8360'	89.26°	181.54°	6696.15'	1840.66'	
					196.53°F
8400					
8450					
8455'	90.37°	182.81°	6696.46'	1933.10'	
					200.75°F



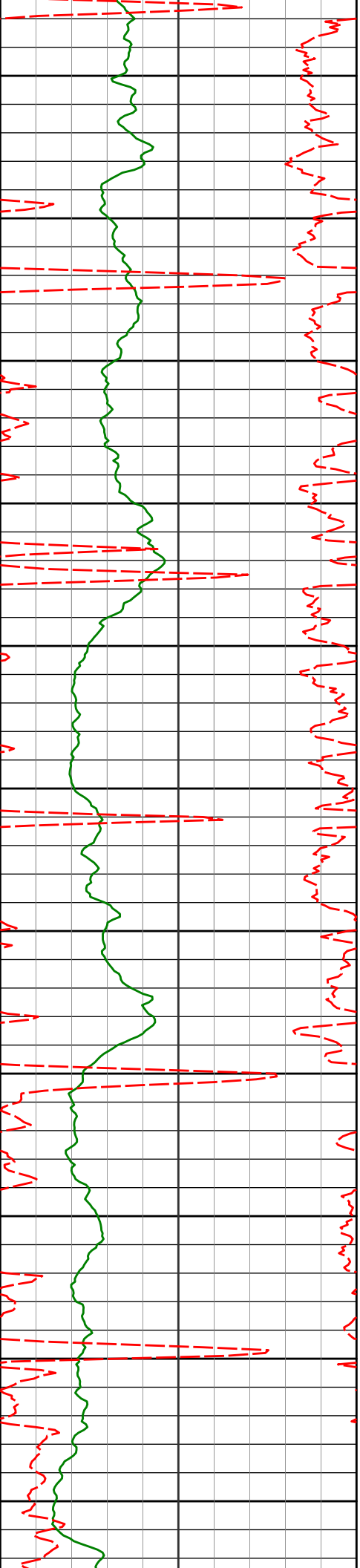
8550'	90.00°	181.99°	6696.15'	2025.45'	200.75°F
8645'	90.40°	181.70°	6695.82'	2118.02'	
8740'	90.65°	181.67°	6694.95'	2210.64'	200.75°F
8835'	89.45°	179.97°	6694.87'	2303.57'	200.75°F
8929'	90.68°	180.55°	6694.77'	2395.71'	204.97°F



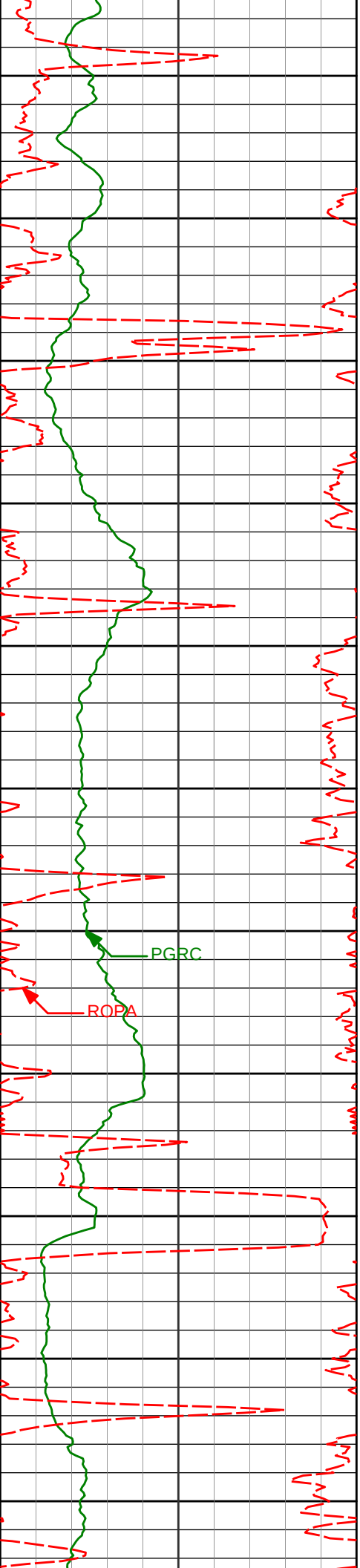
9024	88.61°	179.95°	6695.36	2488.83	200.75°F
9119'	89.08°	179.59°	6697.28'	2582.09'	200.75°F
9214'	90.52°	179.57°	6697.61'	2675.43'	204.97°F
9309'	90.06°	180.79°	6697.13'	2768.57'	204.97°F
9404'	94.59°	182.48°	6693.27'	2861.11'	209.19°F
9499'	91.63°	181.88°	6688.11'	2953.41'	204.97°F



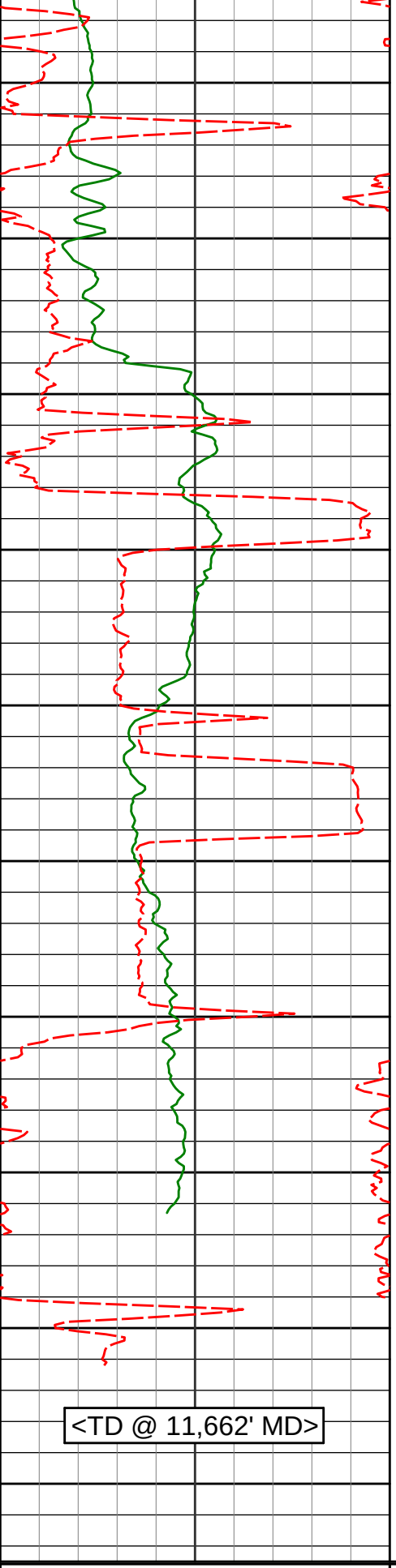
9594'	88.83°	180.63°	6687.72'	3046.18'	204.97°F
9688'	89.04°	179.57°	6689.47'	3138.35'	209.19°F
9783'	89.63°	179.20°	6690.57'	3231.75'	213.41°F
9878'	91.42°	179.37°	6689.70'	3325.17'	213.41°F
9973'	90.40°	178.83°	6688.19'	3418.64'	213.41°F
10068'	89.14°	179.66°	6688.58'	3512.07'	213.41°F



10163'	88.71°	179.58°	6690.36'	3605.38'	213.41°F
10258'	88.80°	178.93°	6692.43'	3698.80'	213.41°F
10353'	89.01°	178.64°	6694.25'	3792.36'	217.63°F
10447'	89.11°	178.22°	6695.79'	3885.03'	217.63°F
10542'	89.17°	178.31°	6697.22'	3978.74'	221.84°F
10637'	89.11°	177.90°	6698.65'	4072.49'	221.84°F



10700					
10732'	89.01°	177.51°	6700.20'	4166.35'	
10750					
10800					
10827'	89.60°	177.49°	6701.35'	4260.26'	
10850					221.84°F
10900					
10922'	89.17°	176.29°	6702.38'	4354.32'	
					226.06°F
10950					
11000					
11017'	89.51°	176.06°	6703.47'	4448.54'	
					226.06°F
11050					
11100					
11111'	89.66°	176.47°	6704.16'	4541.75'	
					221.84°F
11150					
11200					
11206'	90.68°	176.39°	6703.88'	4635.92'	
					226.06°F



Depth MD ft	Depth	Inc	Azi	TVD	V.S.	Temp
11250						
11300	11301'	91.63°	175.74°	6701.96'	4730.15'	230.28°F
11350						
11400	11396'	93.02°	175.51°	6698.10'	4824.40'	221.84°F
11450						
11500	11491'	91.17°	176.22°	6694.62'	4918.62'	221.84°F
11550						
11600	11604'	91.82°	176.80°	6691.68'	5030.58'	226.06°F
11650						
11700						

Avg Rate of Penetration
Avg Rate of Penetration
500 feet per hr 0

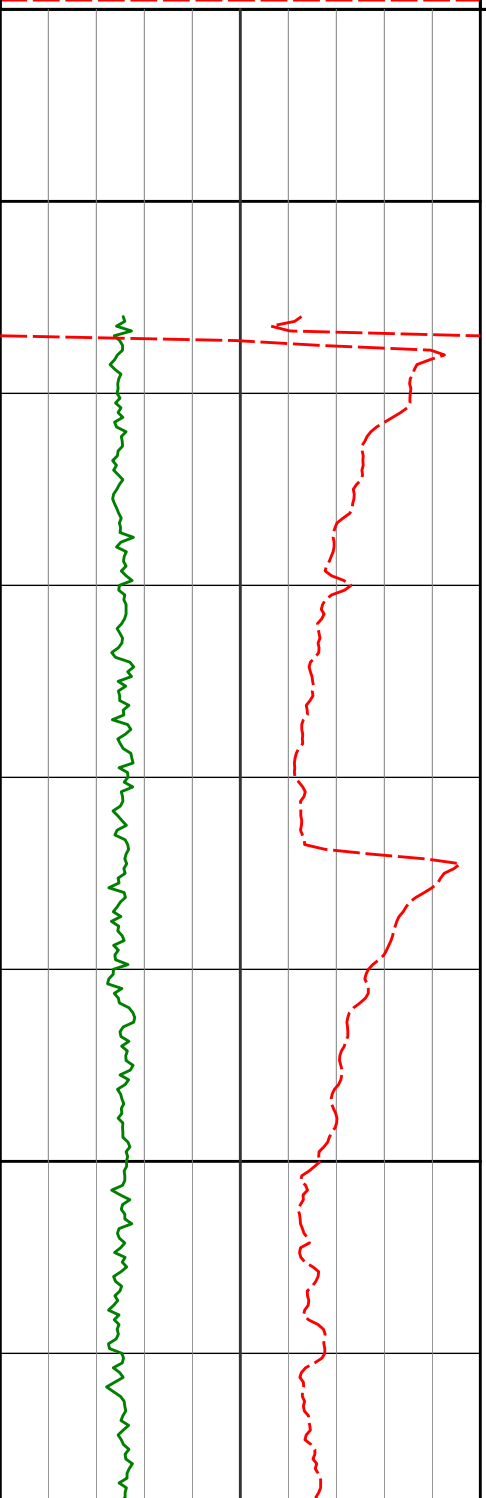
PCG Gamma Ray BCorr
PCG Gamma Ray BCorr
0 api 300

0 api 300

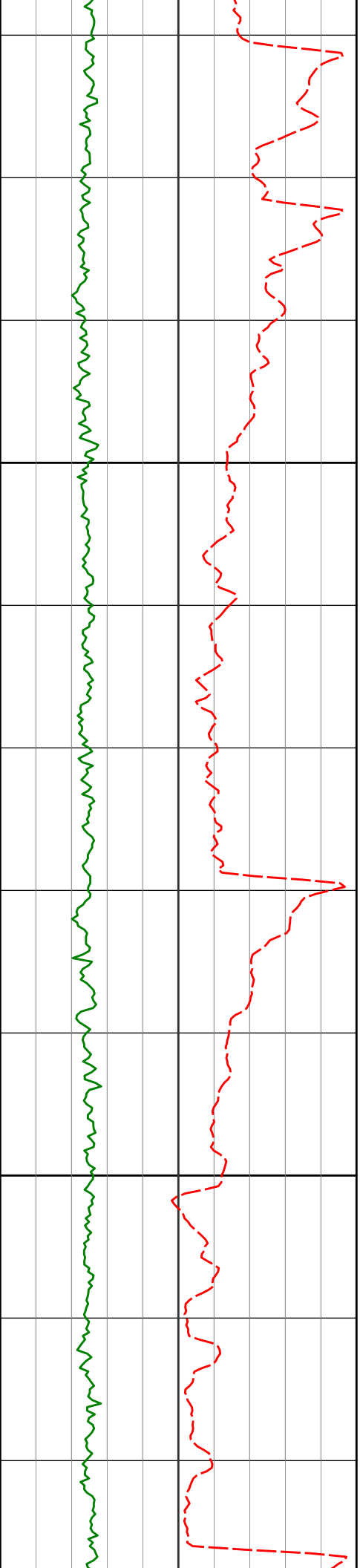
MD Detail 1:240 Scale

PCG Gamma Ray BCorr
PCG Gamma Ray BCorr
0 api 300

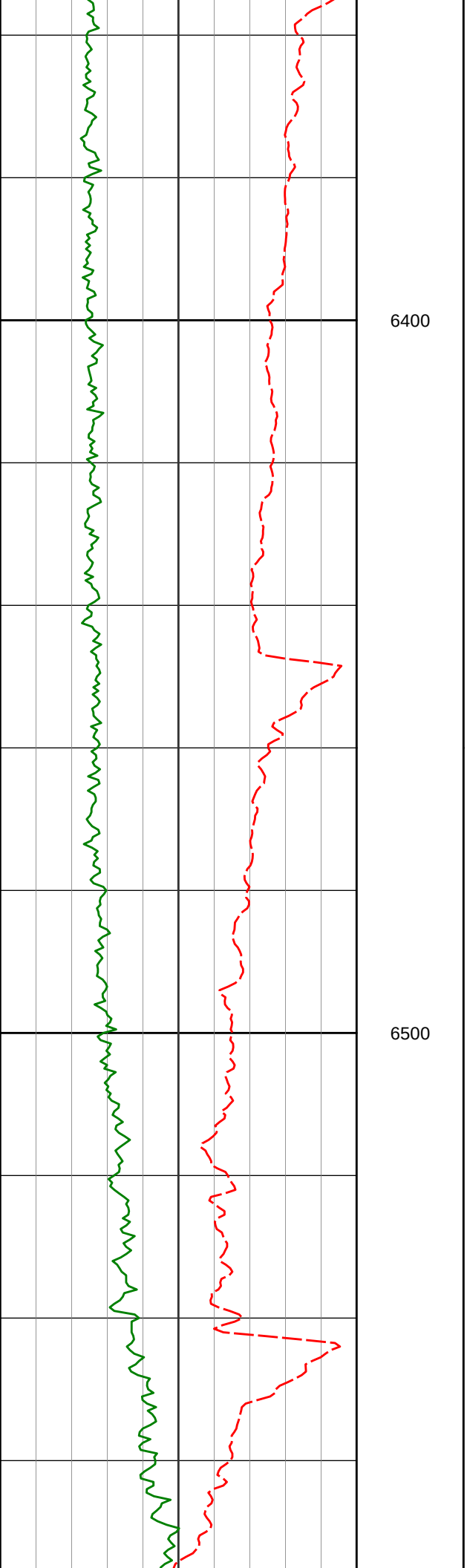
Avg Rate of Penetration
Avg Rate of Penetration
500 feet per hr 0



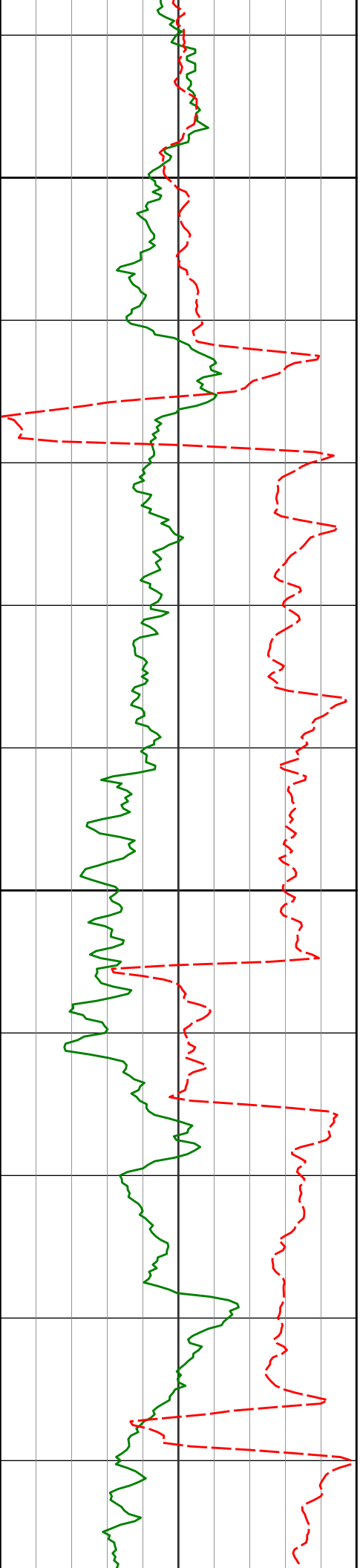
Depth MD ft	Depth	Inc	Azi	TVD	V.S.	Temp
6000						
	6009'	7.88°	73.55°	5937.69'	1.89'	
<KOP>						
6100						
	6104'	15.44°	96.96°	6030.71'	5.23'	



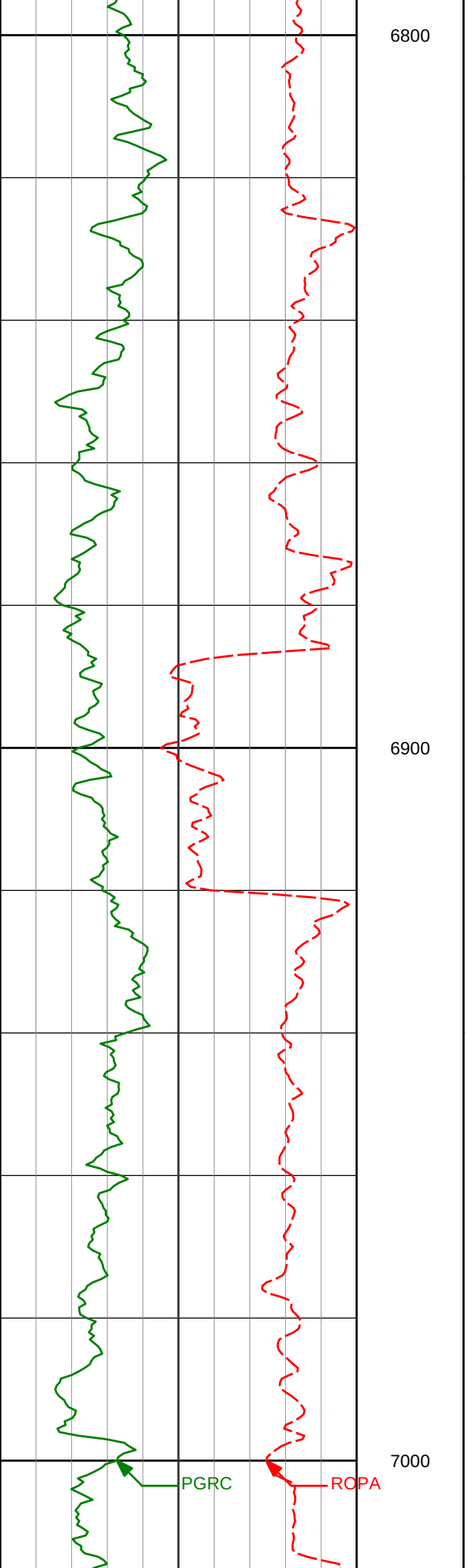
6200	6199'	21.59°	103.27°	6120.76'	16.40'
6300	6294'	27.50°	117.06°	6207.21'	37.23'



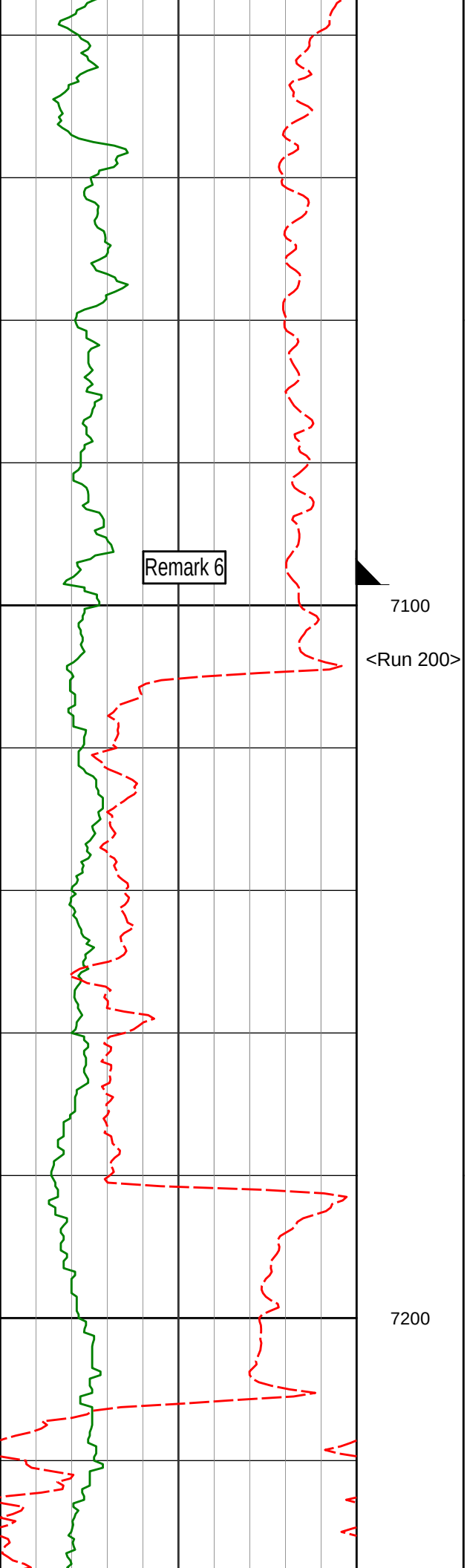
6389'	33.87°	128.00°	6288.93'	70.88'
6484'	39.67°	142.59°	6365.14'	118.22'



6579'	45.80°	156.30°	6435.04'	178.84'
6674'	51.77°	164.49°	6497.66'	249.42'
6768'	54.28°	173.86°	6554.28'	324.37'



6816'	55.66°	180.76°	6581.85'	363.20'
6863'	59.58°	183.22°	6607.01'	401.84'
6958'	65.71°	184.02°	6650.65'	483.38'



7050' 77.39° 183.98° 6679.71' 567.48'

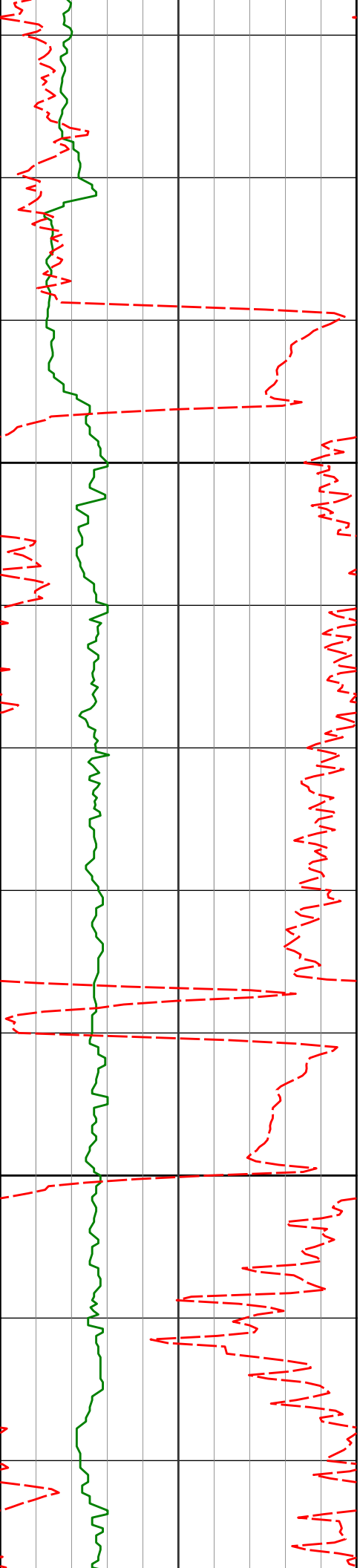
<7" casing set at 7098' MD>

<Run 200>

179.66°F

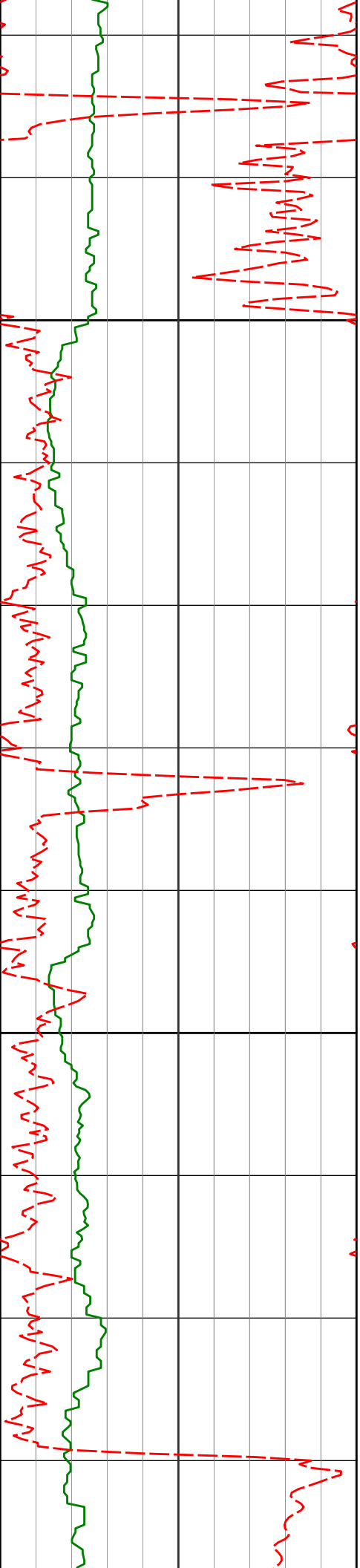
7221' 88.46° 182.55° 6700.74' 731.58'

179.66°F

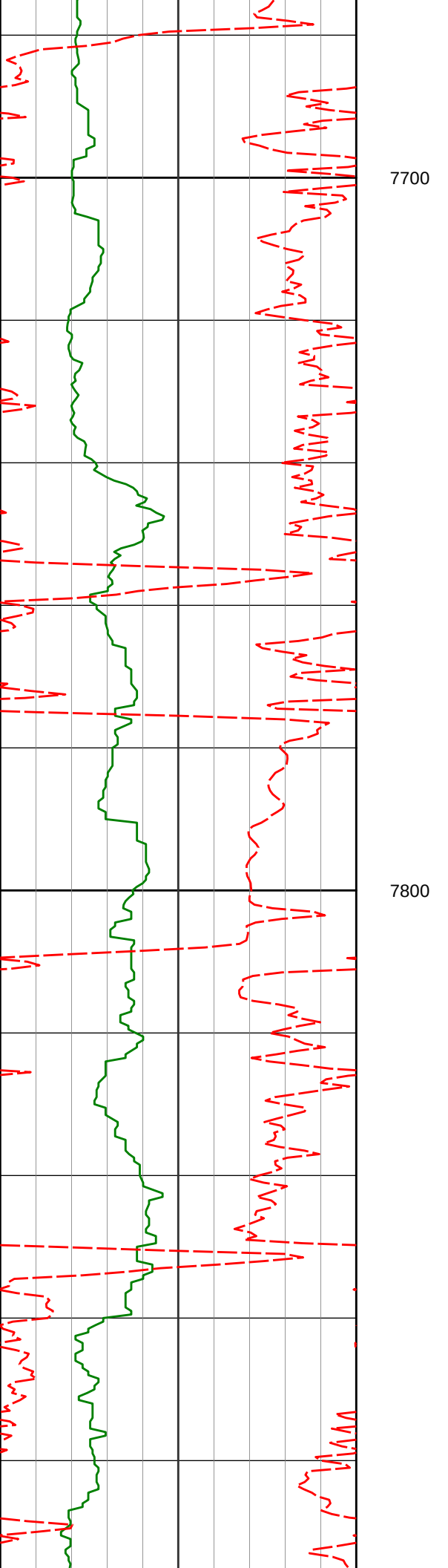


7316'	91.82°	182.93°	6700.51'	823.79'
7411'	89.11°	181.74°	6699.74'	916.15'

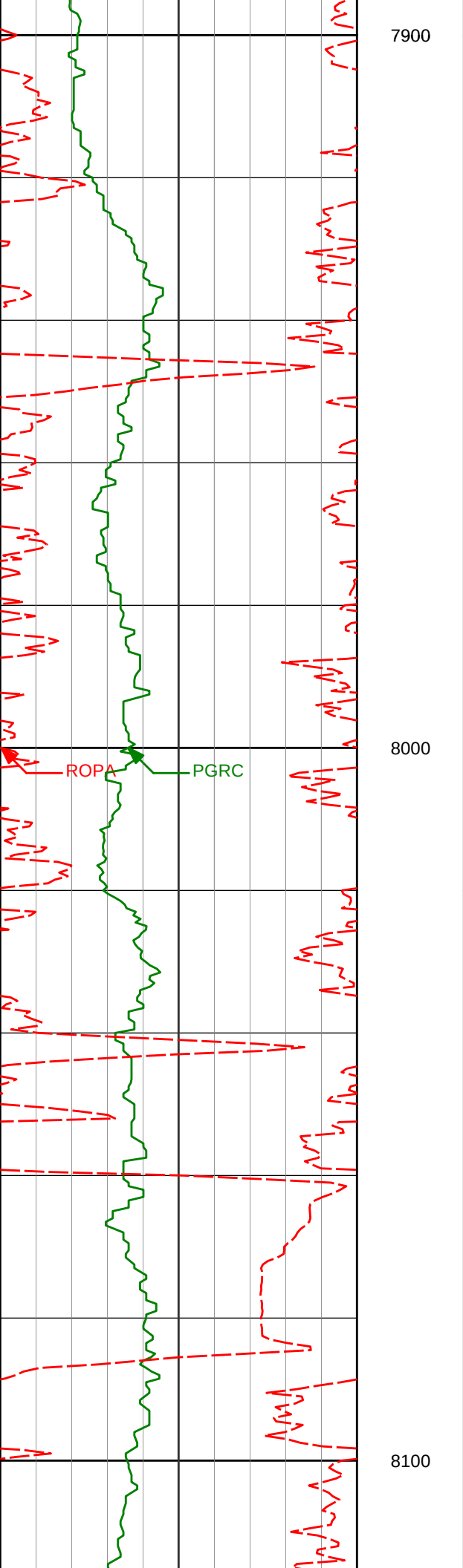
183.88°F



7500						
	7506'	90.31°	181.79°	6700.23'	1008.75'	
						183.88°F
7600						
	7601'	91.51°	181.82°	6698.72'	1101.32'	



7695'	90.99°	181.59°	6696.68'	1192.94'	
					183.88°F
7791'	89.97°	181.50°	6695.88'	1286.59'	
					183.88°F
7885'	89.57°	181.35°	6696.25'	1378.33'	



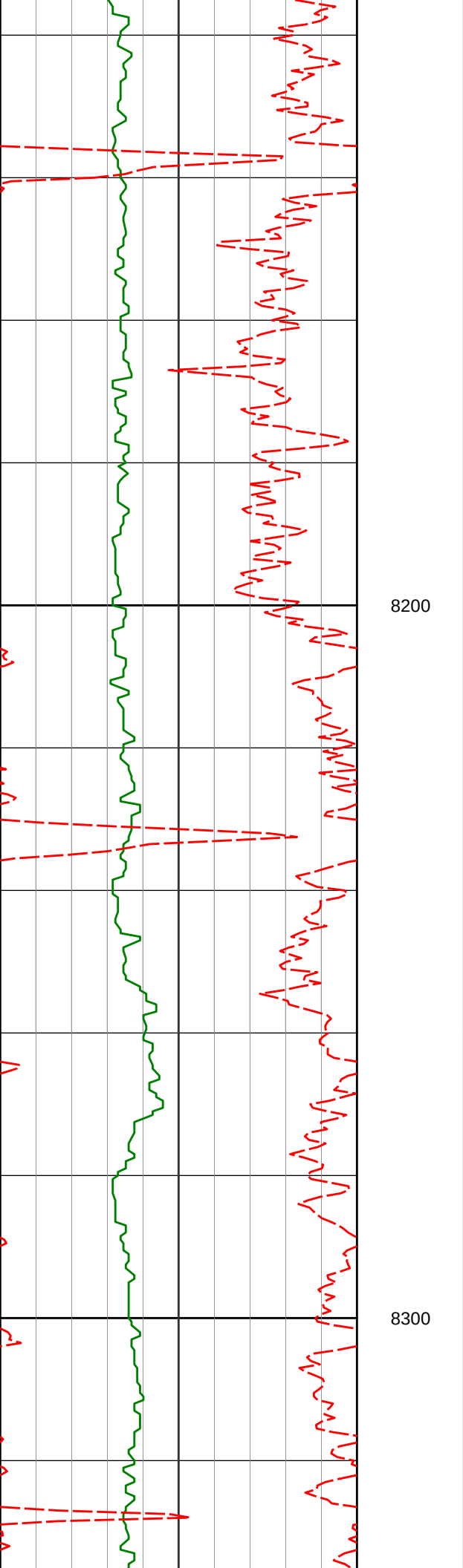
188.09°F

7980'	91.33°	181.48°	6695.51'	1471.05'

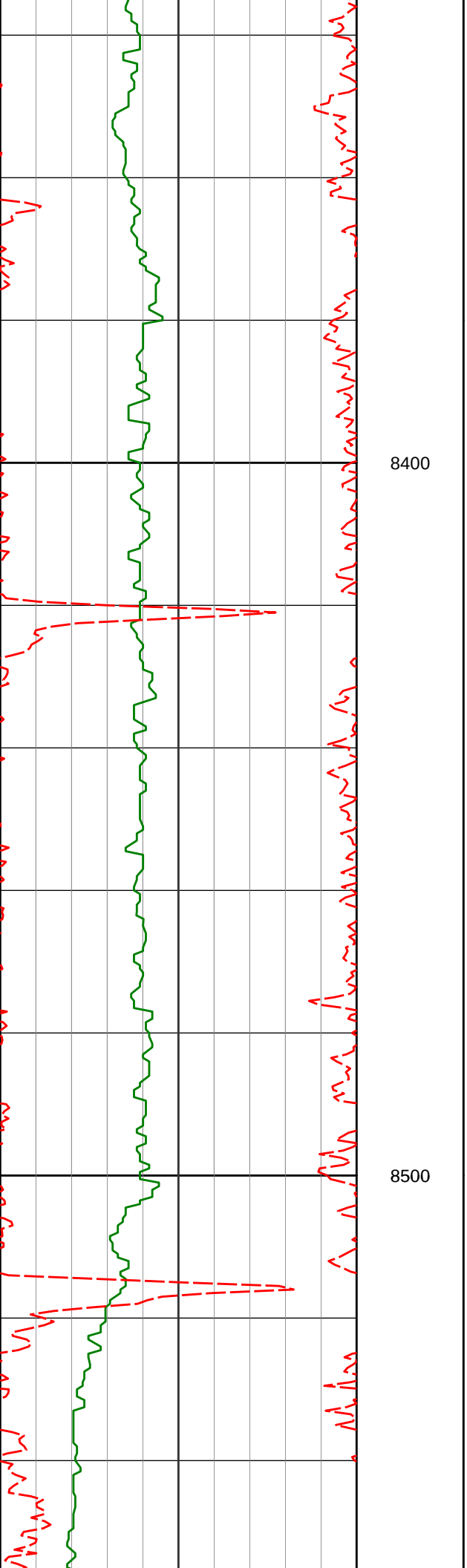
188.09°F

8075'	89.97°	182.59°	6694.44'	1563.54'

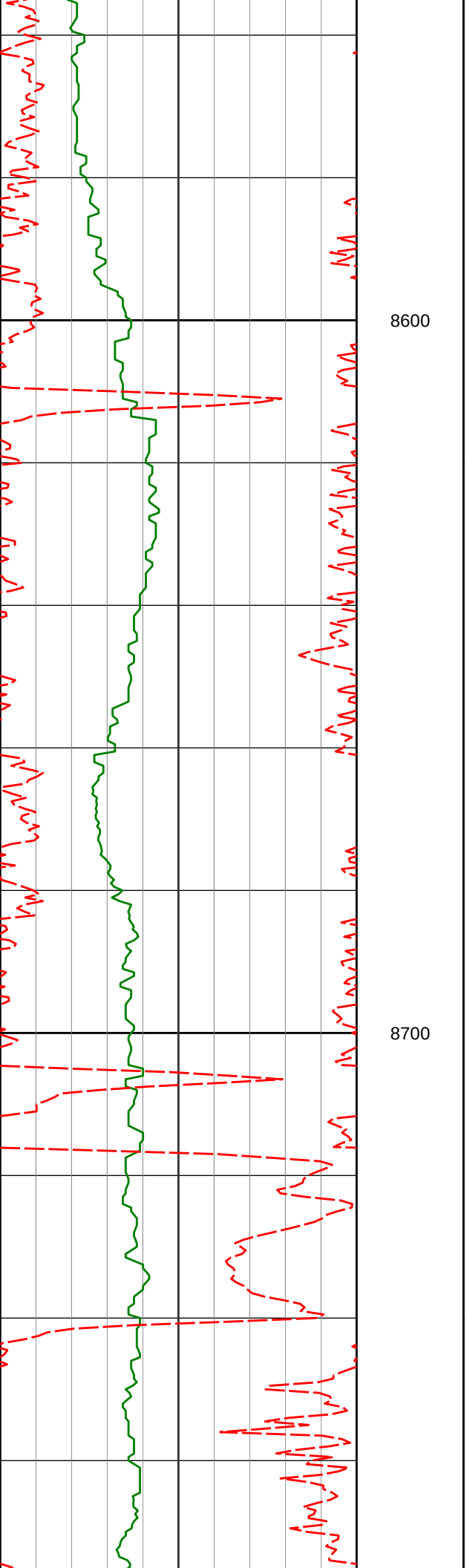
188.09°F



8170'	90.55°	183.48°	6694.00'	1655.64'	
					192.31°F
8200					
8265'	88.80°	181.41°	6694.54'	1747.97'	
					196.53°F
8300					



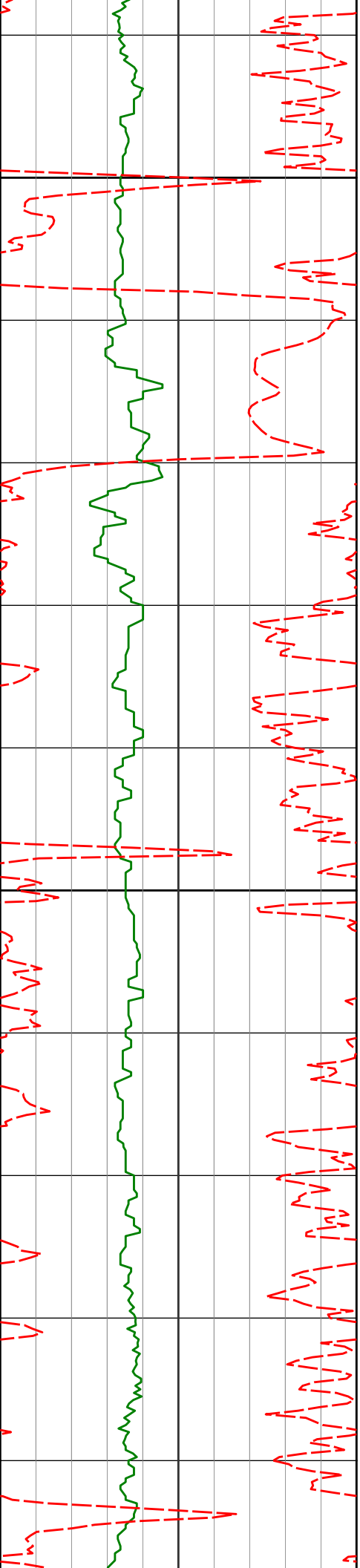
8360'	89.26°	181.54°	6696.15'	1840.66'	
					196.53°F
8455'	90.37°	182.81°	6696.46'	1933.10'	
					200.75°F
8550'	90.00°	181.99°	6696.15'	2025.45'	



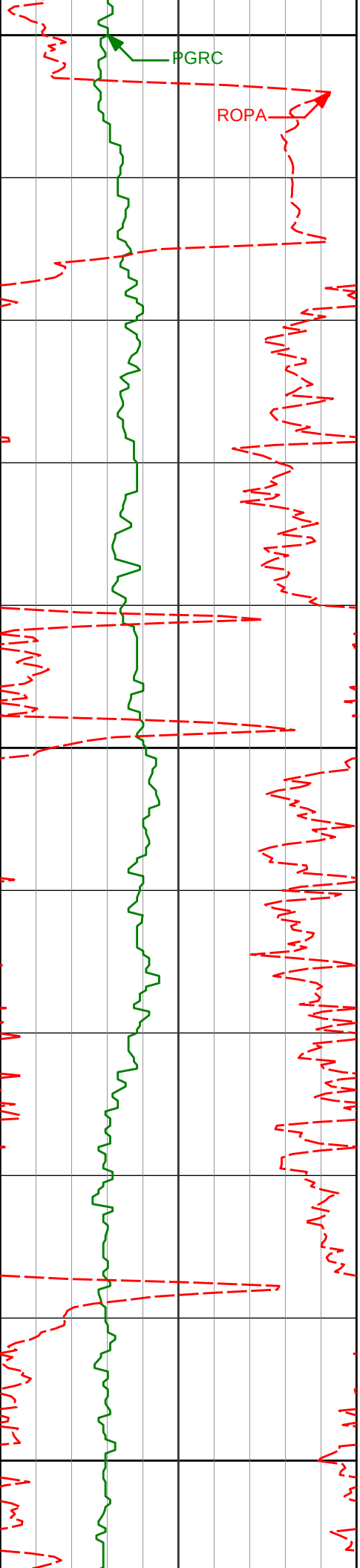
200.75°F

8645'	90.40°	181.70°	6695.82'	2118.02'
8740'	90.65°	181.67°	6694.95'	2210.64'

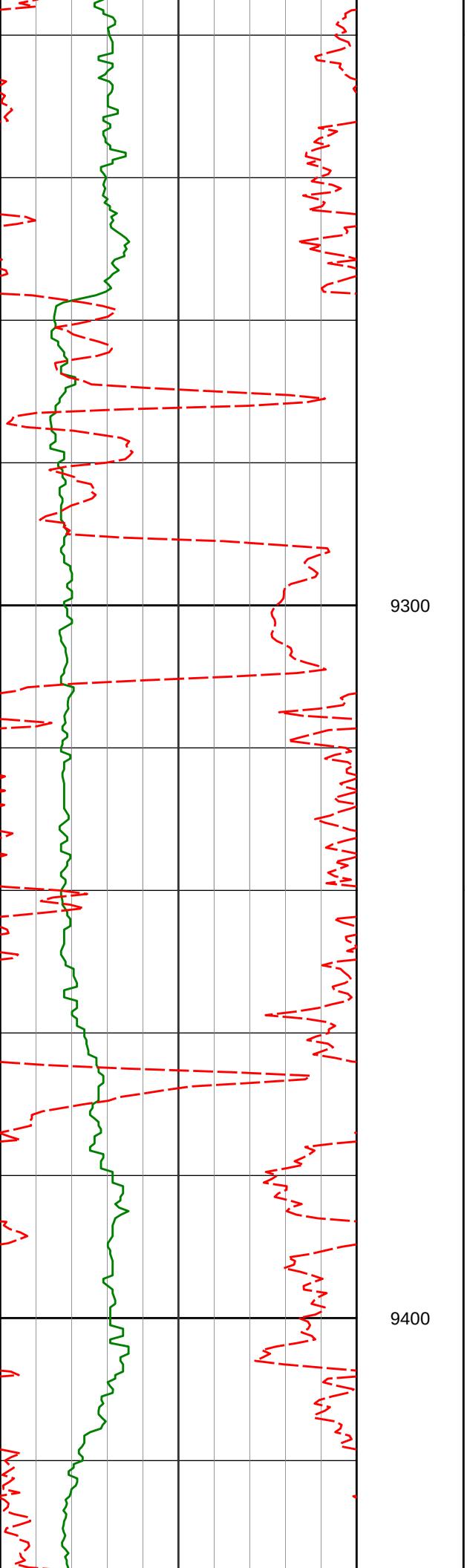
200.75°F



8835'	89.45°	179.97°	6694.87'	2303.57'	200.75°F
8929'	90.68°	180.55°	6694.77'	2395.71'	204.97°F



9000					
9024'	88.61°	179.95°	6695.36'	2488.83'	200.75°F
9100					
9119'	89.08°	179.59°	6697.28'	2582.09'	200.75°F
9200					
9214'	90.52°	179.57°	6697.61'	2675.43'	



204.97°F

9300

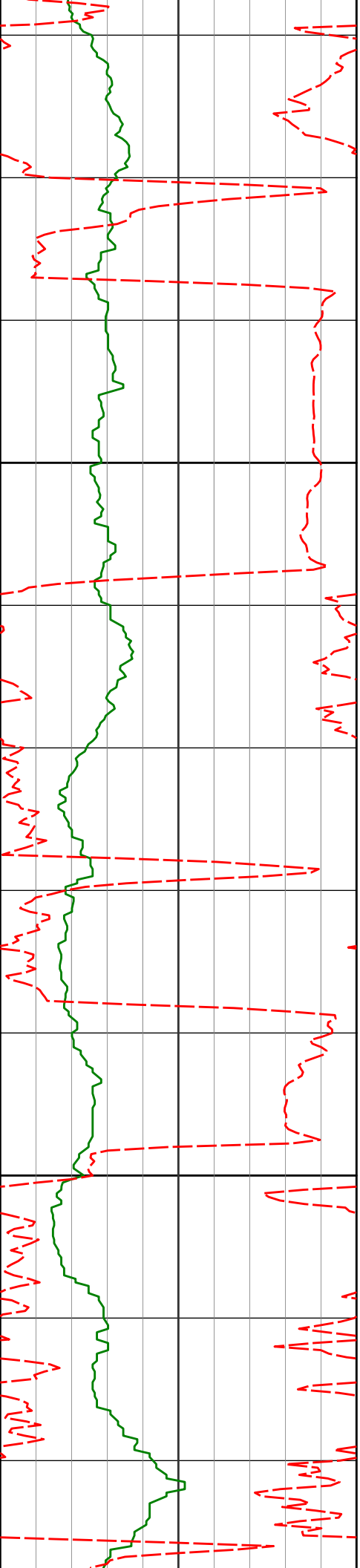
9309' 90.06° 180.79° 6697.13' 2768.57'

204.97°F

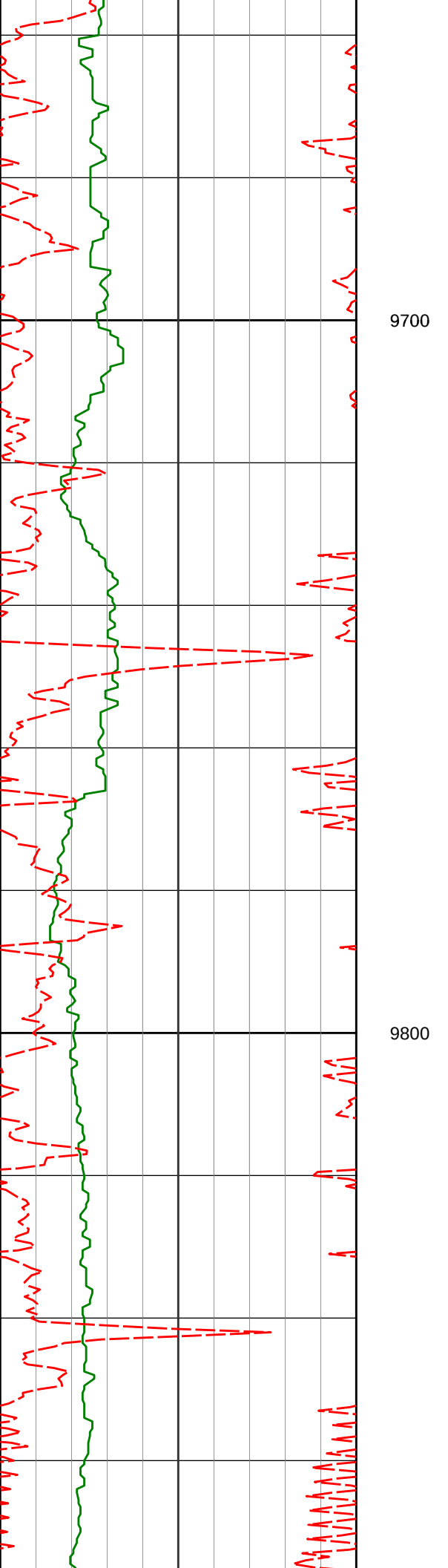
9400

9404' 94.59° 182.48° 6693.27' 2861.11'

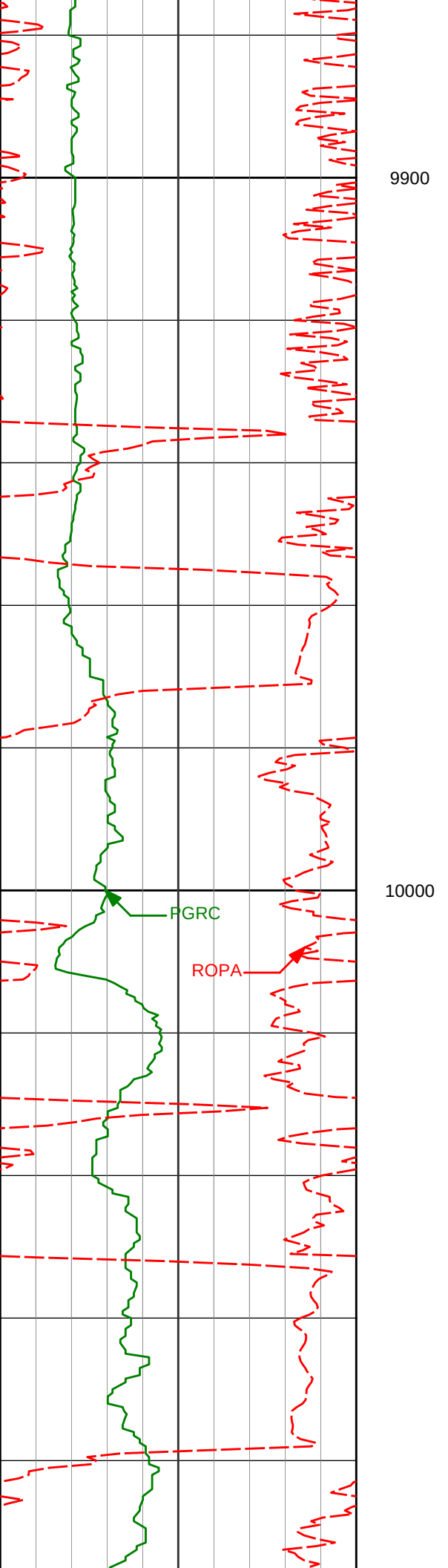
209.19°F



9500	9499'	91.63°	181.88°	6688.11'	2953.41'	204.97°F
9600	9594'	88.83°	180.63°	6687.72'	3046.18'	204.97°F



9688'	89.04°	179.57°	6689.47'	3138.35'	
					209.19°F
9783'	89.63°	179.20°	6690.57'	3231.75'	
					213.41°F



9878'	91.42°	179.37°	6689.70'	3325.17'

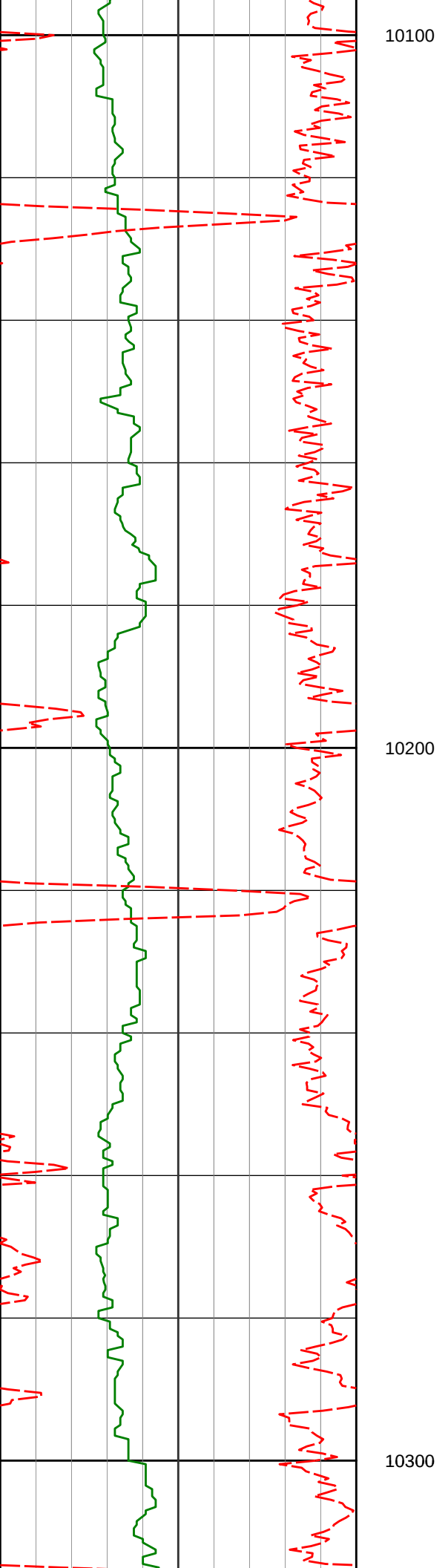
213.41°F

9973'	90.40°	178.83°	6688.19'	3418.64'

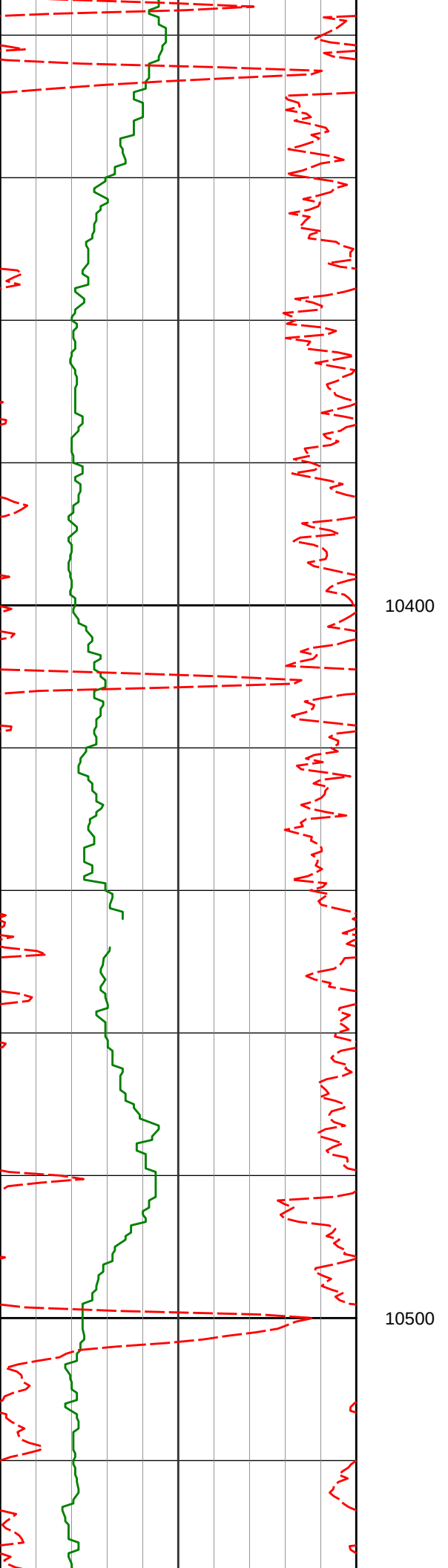
213.41°F

10068'	89.14°	179.66°	6688.58'	3512.07'

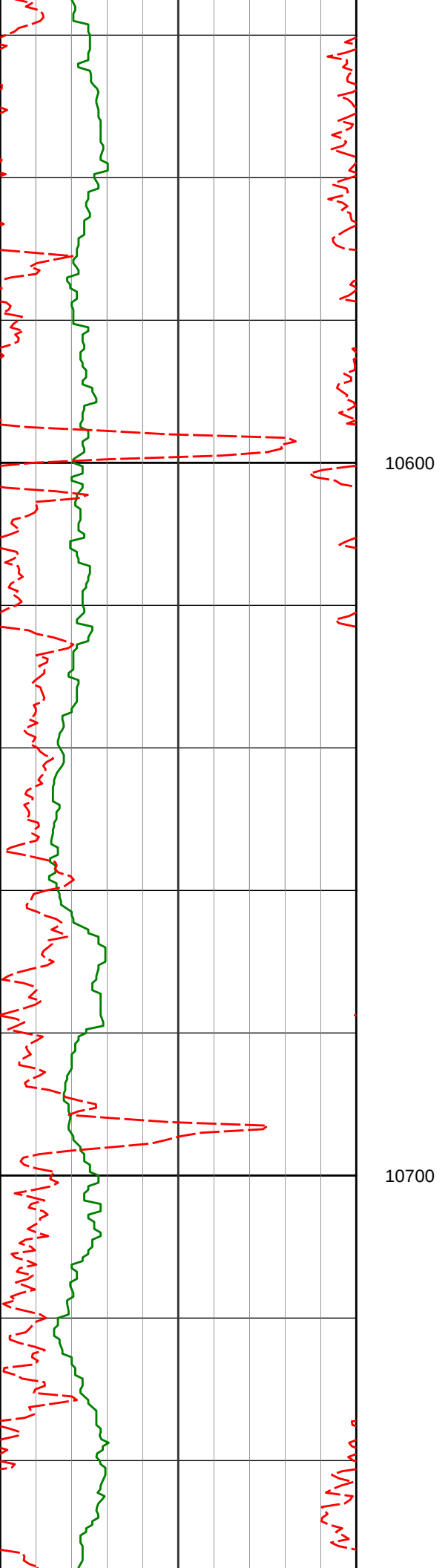
213.41°F



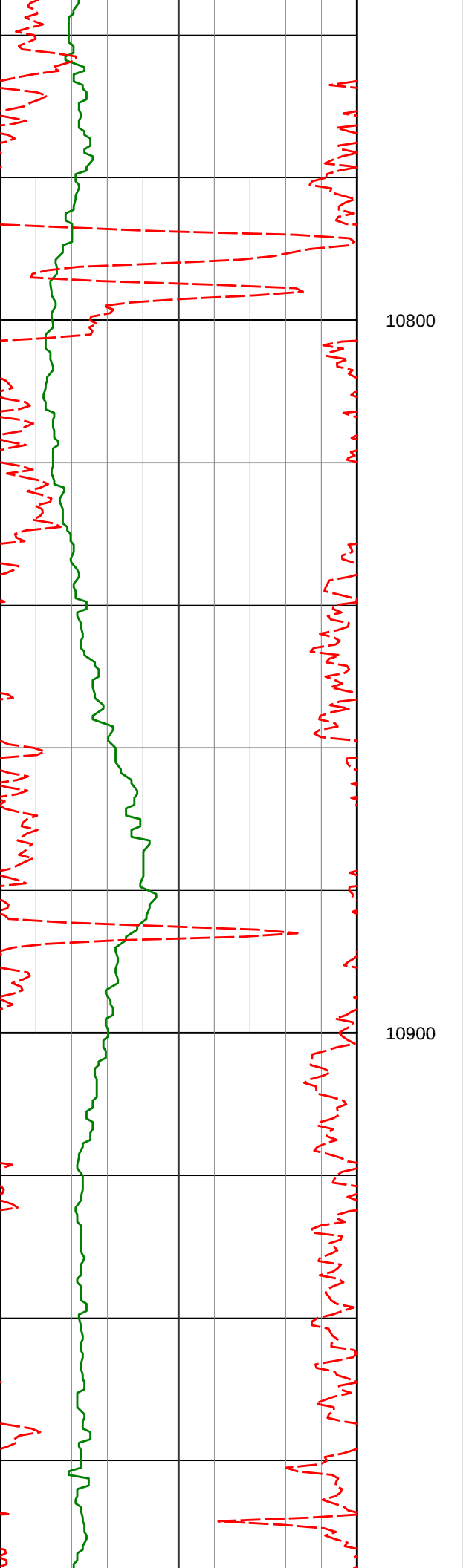
10163'	88.71°	179.58°	6690.36'	3605.38'	213.41°F
10258'	88.80°	178.93°	6692.43'	3698.80'	213.41°F



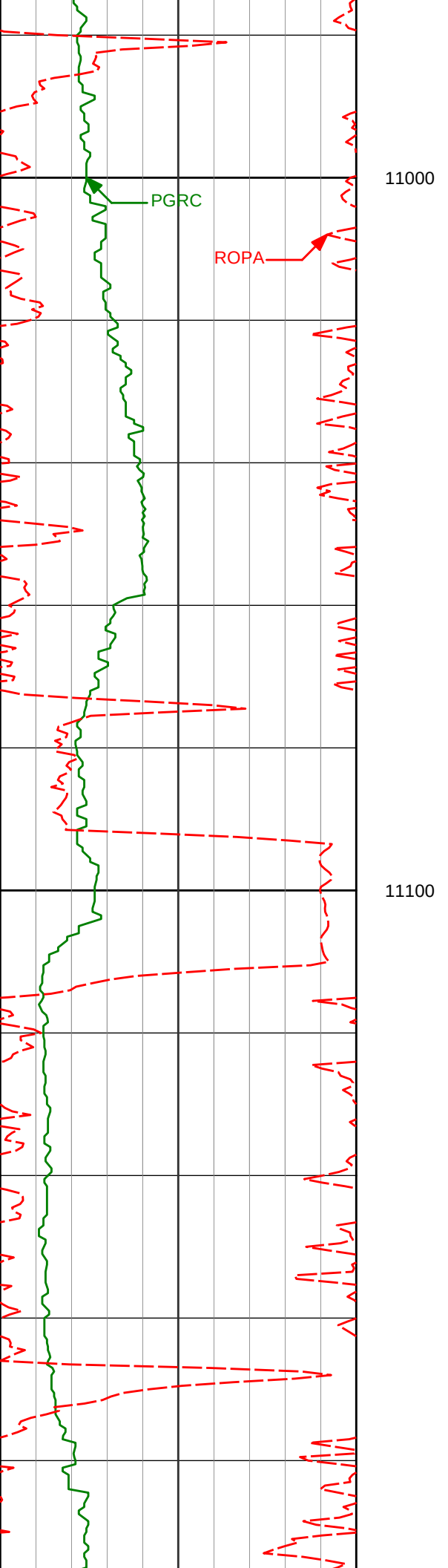
10353'	89.01°	178.64°	6694.25'	3792.36'	
					217.63°F
10447'	89.11°	178.22°	6695.79'	3885.03'	
					217.63°F



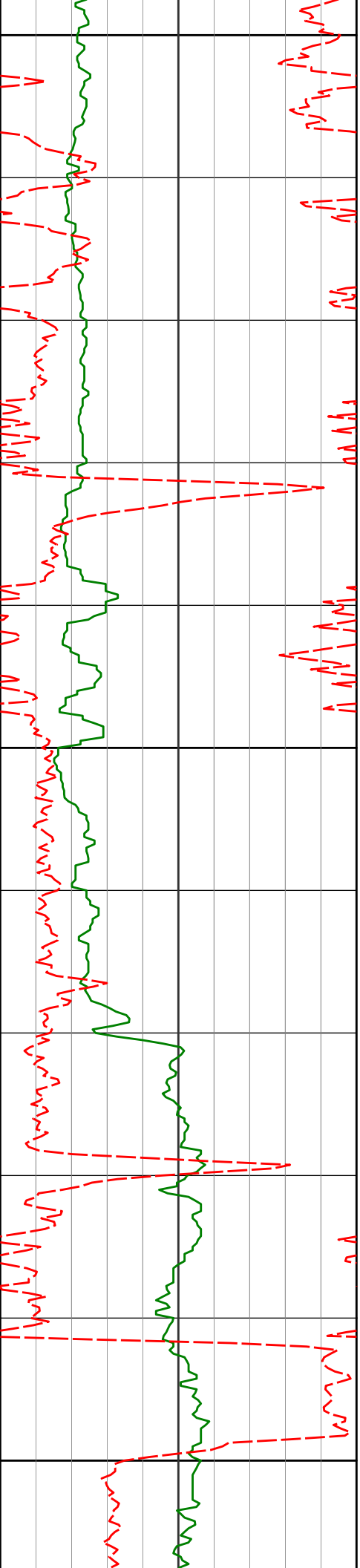
10542'	89.17°	178.31°	6697.22'	3978.74'	
					221.84°F
10637'	89.11°	177.90°	6698.65'	4072.49'	
					221.84°F
10732'	89.01°	177.51°	6700.20'	4166.35'	



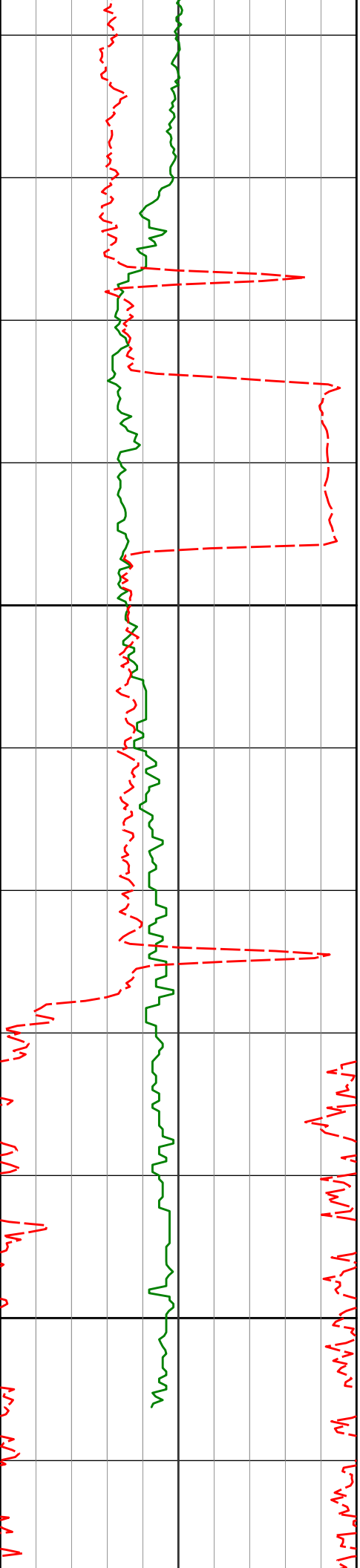
10827'	89.60°	177.49°	6701.35'	4260.26'	221.84°F
10922'	89.17°	176.29°	6702.38'	4354.32'	226.06°F



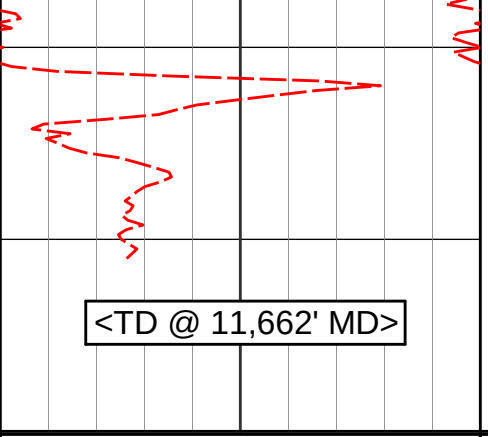
11017'	89.51°	176.06°	6703.47'	4448.54'	226.06°F
11111'	89.66°	176.47°	6704.16'	4541.75'	221.84°F



11206'	90.68°	176.39°	6703.88'	4635.92'	226.06°F
11301'	91.63°	175.74°	6701.96'	4730.15'	230.28°F
11396'	93.02°	175.51°	6698.10'	4824.40'	221.84°F



11491'	91.17°	176.22°	6694.62'	4918.62'	
11500					221.84°F
11600					226.06°F
11604'	91.82°	176.80°	6691.68'	5030.58'	



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

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Crow Creek AA01-766
Wattenberg
Weld Colorado
USA
CA-XX-0901834393

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
318.00	0.03	74.07	318.00	0.02 N	0.08 E	-0.01	0.01
726.00	0.66	23.96	725.99	2.21 N	1.14 E	-1.95	0.16
820.00	0.77	13.30	819.98	3.32 N	1.51 E	-2.97	0.18
914.00	0.77	21.55	913.97	4.53 N	1.89 E	-4.08	0.12
1008.00	0.69	30.39	1007.97	5.61 N	2.41 E	-5.04	0.15
1100.00	0.84	27.83	1099.96	6.68 N	3.00 E	-5.98	0.17
1192.00	0.97	36.45	1191.95	7.91 N	3.78 E	-7.03	0.21
1285.00	2.02	70.75	1284.92	9.09 N	5.80 E	-7.79	1.44
1377.00	3.55	77.84	1376.80	10.22 N	10.12 E	-8.07	1.70
1469.00	6.17	88.42	1468.47	10.96 N	17.84 E	-7.30	2.99
1563.00	8.26	88.41	1561.72	11.29 N	29.64 E	-5.34	2.23
1746.00	9.66	89.13	1742.48	11.88 N	58.14 E	-0.42	0.77
1840.00	8.84	87.38	1835.26	12.33 N	73.24 E	2.06	0.92
1933.00	10.21	87.01	1926.97	13.09 N	88.61 E	4.29	1.47
2028.00	9.85	86.53	2020.52	14.02 N	105.13 E	6.57	0.39
2122.00	9.27	87.36	2113.22	14.86 N	120.71 E	8.77	0.64
2217.00	10.55	86.57	2206.80	15.73 N	137.03 E	11.07	1.35
2312.00	10.02	87.35	2300.27	16.63 N	153.96 E	13.46	0.57
2407.00	8.59	87.66	2394.02	17.30 N	169.31 E	15.76	1.50
2501.00	7.46	87.65	2487.10	17.84 N	182.43 E	17.77	1.20
2596.00	9.37	79.01	2581.07	19.57 N	196.18 E	18.74	2.40
2691.00	10.26	75.83	2674.68	23.11 N	211.98 E	18.31	1.10
2786.00	12.22	78.67	2767.86	27.16 N	230.04 E	17.84	2.15
2881.00	11.66	78.37	2860.80	31.07 N	249.31 E	17.73	0.59
2976.00	10.97	76.96	2953.95	35.05 N	267.52 E	17.35	0.79
3070.00	10.95	76.04	3046.24	39.22 N	284.90 E	16.61	0.19
3165.00	10.13	76.59	3139.64	43.33 N	301.78 E	15.84	0.87
3259.00	9.40	75.59	3232.27	47.16 N	317.25 E	15.08	0.79
3354.00	8.48	75.45	3326.12	50.85 N	331.55 E	14.22	0.97
3449.00	9.23	76.33	3419.98	54.41 N	345.74 E	13.47	0.80
3544.00	11.03	72.52	3513.50	58.95 N	361.82 E	12.13	2.02

3639.00	10.16	71.64	3606.88	64.32 N	378.45 E	10.08	0.93
3733.00	10.98	70.51	3699.28	69.92 N	394.75 E	7.74	0.89
3828.00	11.81	71.59	3792.41	76.00 N	412.51 E	5.20	0.91
3923.00	12.90	71.64	3885.20	82.42 N	431.80 E	2.64	1.14
4018.00	13.71	71.08	3977.65	89.41 N	452.52 E	-0.21	0.87
4113.00	13.08	69.62	4070.07	96.80 N	473.25 E	-3.46	0.76
4207.00	12.35	68.12	4161.76	104.25 N	492.54 E	-7.04	0.85
4302.00	12.38	76.79	4254.57	110.37 N	511.88 E	-9.30	1.95
4397.00	10.04	73.65	4347.75	115.02 N	529.74 E	-10.41	2.54
4492.00	11.56	85.31	4441.08	118.13 N	547.17 E	-10.09	2.79
4587.00	10.27	86.08	4534.36	119.49 N	565.11 E	-7.95	1.36
4682.00	9.43	82.04	4627.96	121.15 N	581.26 E	-6.45	1.15
4871.00	9.13	88.84	4814.49	123.59 N	611.58 E	-2.99	0.60
4966.00	7.88	98.49	4908.45	122.78 N	625.56 E	0.50	1.99
5061.00	9.63	95.27	5002.34	121.09 N	639.91 E	4.94	1.92
5156.00	9.06	97.25	5096.08	119.42 N	655.25 E	9.55	0.69
5251.00	8.37	89.53	5189.98	118.53 N	669.59 E	13.19	1.43
5345.00	8.66	75.13	5282.96	120.40 N	683.28 E	14.00	2.28
5535.00	8.61	71.98	5470.80	128.47 N	710.63 E	11.37	0.25
5630.00	9.76	68.09	5564.59	133.68 N	724.86 E	9.02	1.37
5725.00	11.24	73.44	5658.00	139.32 N	741.21 E	6.64	1.86
5819.00	10.02	74.58	5750.38	144.10 N	757.87 E	5.17	1.32
5914.00	10.30	71.87	5843.89	148.94 N	773.91 E	3.52	0.58
6009.00	7.88	73.55	5937.69	153.43 N	788.23 E	1.89	2.57
6104.00	15.44	96.96	6030.71	153.74 N	807.06 E	5.23	9.24
6199.00	21.59	103.27	6120.76	148.19 N	836.66 E	16.40	6.80
6294.00	27.50	117.06	6207.21	134.18 N	873.26 E	37.23	8.63
6389.00	33.87	128.00	6288.93	107.86 N	913.73 E	70.88	8.89
6484.00	39.67	142.59	6365.14	67.36 N	953.12 E	118.22	11.00
6579.00	45.80	156.30	6435.04	11.92 N	985.33 E	178.84	11.70
6674.00	51.77	164.49	6497.66	55.34 S	1009.04 E	249.42	9.02
6768.00	54.28	173.86	6554.28	128.97 S	1023.02 E	324.37	8.39
6816.00	55.66	180.76	6581.85	168.19 S	1024.84 E	363.20	12.12
6863.00	59.58	183.22	6607.01	207.85 S	1023.45 E	401.84	9.43
6958.00	65.71	184.02	6650.65	292.02 S	1018.10 E	483.38	6.50
7050.00	77.39	183.98	6679.71	378.92 S	1012.03 E	567.48	12.70
7221.00	88.46	182.55	6700.74	548.08 S	1002.40 E	731.58	6.53
7316.00	91.82	182.93	6700.51	642.96 S	997.86 E	823.79	3.56
7411.00	89.11	181.74	6699.74	737.86 S	993.99 E	916.15	3.12
7506.00	90.31	181.79	6700.23	832.82 S	991.07 E	1008.75	1.27
7601.00	91.51	181.82	6698.72	927.76 S	988.08 E	1101.32	1.27
7695.00	90.99	181.59	6696.68	1021.69 S	985.28 E	1192.94	0.61
7791.00	89.97	181.50	6695.88	1117.65 S	982.69 E	1286.59	1.06
7885.00	89.57	181.35	6696.25	1211.62 S	980.35 E	1378.33	0.46
7980.00	91.33	181.48	6695.51	1306.59 S	978.01 E	1471.05	1.85
8075.00	89.97	182.59	6694.44	1401.52 S	974.63 E	1563.54	1.85
8170.00	90.55	183.48	6694.00	1496.38 S	969.61 E	1655.64	1.11
8265.00	88.80	181.41	6694.54	1591.28 S	965.56 E	1747.97	2.86
8360.00	89.26	181.54	6696.15	1686.24 S	963.12 E	1840.66	0.51
8455.00	90.37	182.81	6696.46	1781.17 S	959.52 E	1933.10	1.77
8550.00	90.00	181.99	6696.15	1876.08 S	955.54 E	2025.45	0.94
8645.00	90.40	181.70	6695.82	1971.03 S	952.49 E	2118.02	0.52
8740.00	90.65	181.67	6694.95	2065.99 S	949.70 E	2210.64	0.26
8835.00	89.45	179.97	6694.87	2160.97 S	948.35 E	2303.57	2.19
8929.00	90.68	180.55	6694.77	2254.97 S	947.92 E	2395.71	1.45
9024.00	88.61	179.95	6695.36	2349.96 S	947.51 E	2488.83	2.26
9119.00	89.08	179.59	6697.28	2444.94 S	947.89 E	2582.09	0.62
9214.00	90.52	179.57	6697.61	2539.94 S	948.59 E	2675.43	1.52
9309.00	90.06	180.79	6697.13	2634.93 S	948.28 E	2768.57	1.37
9404.00	94.59	182.48	6693.27	2729.79 S	945.58 E	2861.11	5.09
9499.00	91.63	181.88	6688.11	2824.57 S	941.97 E	2953.41	3.18
9594.00	88.83	180.63	6687.72	2919.53 S	939.89 E	3046.18	3.23
9688.00	89.04	179.57	6689.47	3013.51 S	939.73 E	3138.35	1.15
9783.00	89.63	179.20	6690.57	3108.50 S	940.74 E	3231.75	0.73
9878.00	91.42	179.37	6689.70	3203.49 S	941.93 E	3325.17	1.89
9973.00	90.40	178.83	6688.19	3298.46 S	943.43 E	3418.64	1.21
10068.00	89.14	179.66	6688.58	3393.45 S	944.67 E	3512.07	1.59
10163.00	88.71	179.58	6690.36	3488.43 S	945.30 E	3605.38	0.46
10258.00	88.80	178.93	6692.43	3583.40 S	946.53 E	3698.80	0.69
10353.00	89.01	178.64	6694.25	3678.36 S	948.55 E	3792.36	0.38
10447.00	89.11	178.22	6695.79	3772.31 S	951.12 E	3885.03	0.45

10542.00	89.17	178.31	6697.22	3867.26 S	954.00 E	3978.74	0.12
10637.00	89.11	177.90	6698.65	3962.19 S	957.13 E	4072.49	0.44
10732.00	89.01	177.51	6700.20	4057.11 S	960.94 E	4166.35	0.43
10827.00	89.60	177.49	6701.35	4152.01 S	965.09 E	4260.26	0.62
10922.00	89.17	176.29	6702.38	4246.86 S	970.25 E	4354.32	1.34
11017.00	89.51	176.06	6703.47	4341.64 S	976.59 E	4448.54	0.43
11111.00	89.66	176.47	6704.16	4435.44 S	982.71 E	4541.75	0.46
11206.00	90.68	176.39	6703.88	4530.25 S	988.63 E	4635.92	1.07
11301.00	91.63	175.74	6701.96	4625.01 S	995.15 E	4730.15	1.21
11396.00	93.02	175.51	6698.10	4719.65 S	1002.39 E	4824.40	1.48
11491.00	91.17	176.22	6694.62	4814.34 S	1009.23 E	4918.62	2.09
11604.00	91.82	176.80	6691.68	4927.09 S	1016.10 E	5030.58	0.77
11662.00	91.82	176.80	6689.83	4984.97 S	1019.33 E	5087.99	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 168.85 DEGREES (GRID)
A TOTAL CORRECTION OF 7.57 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11662.00 FEET
IS 5088.12 FEET ALONG 168.44 DEGREES (GRID)

Surface survey at 318' have had the azimuth corrected to grid north, but was not taken by Halliburton.
Tie-in point is 0' MD.

Last survey is a projection to bit from 11,604' to 11,662' MD.

Date Printed:21 January 2015