HALLIBURTON | Sperry Drilling

PCDC - Pressure Case Directional
PCGK - Pressure Case Gamma

Powered by INSITE

1 : 600 / 1 : 240

Company : **Noble Energy**
Rig : **H&P 322**
Well : **NCLP AA07-69-1AHNC**
Field : **Wattenberg**
Country : **USA**
API Number : **05-123-39110**

Country	USA
Field	Wattenberg
Location	Lat: 40° 30' 31.43" North Long: 104° 27' 3.42" West
Well	NCLP AA07-69-1AHNC
Company	Noble Energy
Rig	H&P 322

LOCATION

Latitude : **40° 30' 31.43" North**
Longitude : **104° 27' 3.42" West**

UTM Easting = **3,291,695.881 ft**
UTM Northing = **1,429,896.331 ft**

Other Services
Directional Drilling

Permanent Datum : **Ground Level** Elevation : **4703.00 ft**
Log Measured From : **Drill Floor** **24.00 ft** Above Permanent Datum
Drilling Measured From : **Drill Floor**

TVD LOG

Elev. KB **N/A**
DF **4727.00 ft**
GL **4703.00 ft**
WD **N/A**

Depth Logged : **880.99 ft** To **6,771.34 ft**
Date Logged : **03-Aug-14** To **12-Aug-14**
Total Depth MD : **13,335.00 ft** TVD : **6,771.34 ft**
Spud Date : **03-Aug-14**

Unit No. : **11210425** Job No. : **CA-XX-0901435867**

Plot Type : **Final**
Plot Date : **13-Sep-16**

Run No.	Borehole Record (TVD) Size	From	To
2	8.750 in	880.99 ft	6,048.90 ft
3	8.750 in	6,048.90 ft	6,591.92 ft
4	8.750 in	6,591.92 ft	6,672.58 ft
5	8.750 in	6,672.58 ft	6,771.34 ft

Run No.	Borehole Record (TVD) Size	From	To

Casing Record (TVD)

Size	Weight	From	To
9.625 in	36.00 lbpf	SURFACE	870.99 ft
7.000 in	26.00 lbpf	SURFACE	6,770.34 ft

WELL INFORMATION

MWD Run Number	100	200	300	400
Date run completed	05-Aug-14	06-Aug-14	06-Aug-14	07-Aug-14
Rig Bit Number	2	3	4	5
Bit Size (in)	8.750	8.750	8.750	8.750
Tool Nominal OD (in)	6.750	6.750	6.750	6.750
Log Start Depth (TVD, ft)	880.99	6,048.90	6,591.92	6,672.58
Log End Depth (TVD, ft)	6,048.90	6,591.92	6,672.58	6,771.34
Drill or Wipe	Drill	Drill	Drill	Drill
Drill/Wipe Start Date and Time	04-Aug-14 15:15	05-Aug-14 17:21	06-Aug-14 06:26	06-Aug-14 15:13
Drill/Wipe End Date and Time	05-Aug-14 08:45	05-Aug-14 21:56	06-Aug-14 07:30	07-Aug-14 13:15
Min Inc (deg) @ Depth (TVD, ft)	0.04 @ 1,663.98	0.68 @ 6,093.90	30.18 @ 6,546.58	12.74 @ 6,336.47
Max Inc (deg) @ Depth (TVD, ft)	9.19 @ 2,788.62	23.66 @ 6,462.81	35.51 @ 6,626.79	81.90 @ 6,764.71
Bit TFA(in2) / Bit Type	0.91 / PDC	0.98 / PDC	0.98 / PDC	1.11 / PDC
Flow Rate (gpm)	577.00	570.00	540.00	539.00
Max AV (fpm) / CV (fpm) @ MWD	462.9 / 462.9	427.3 / 427.3	427.3 / 427.3	427.3 / 427.3
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel
Density (ppg) / Viscosity (spqt)	8.70 / 28.00	10.25 / 36.00	10.75 / 38.00	10.75 / 39.00
Filtrate CL (ppm)	2,400.00	2,100.00	1,800.00	1,700.00
pH / Fluid Loss (mptm)	9.60 / N/A	9.00 / N/A	9.20 / N/A	9.20 / N/A
PV (cP) / YP (lhf2)	2 / 3.00	12 / 10.00	11 / 10.00	14 / 11.00
% Solids / % Sand	2.1 / 0.01	10.3 / .2	11.0 / .2	11.2 / .25
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	N/A / N/A	N/A / N/A
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A

Max Tool Temp (degF) / Source	158.60 / PCM	150.10 / PCM	150.10 / PCM	167.00 / PCM	
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	
Lead MWD Engineer	Robert Ley	Robert Ley	Robert Ley	Robert Ley	
Customer Representative	Charles Collver	Charles Collver	Charles Collver	Charles Collver	

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM	PCM	
Software Version	5.93	5.93	5.93	5.93	
Sub Serial Number	11342274	11342274	11342274	11342274	
Insert Serial Number	11145513	11145513	11145513	11145513	
Date and Time Initialized	04-Aug-14 00:10	01-Jan-70 00:00	01-Jan-70 00:00	01-Jan-70 00:00	
Date and Time Read	07-Aug-14 21:31	07-Aug-14 21:22	07-Aug-14 21:15	07-Aug-14 20:36	
ECMB SW Version	N/A	N/A	N/A	N/A	

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC	PCDC	
Distance From Bit (ft)	59.00	57.00	58.00	56.00	
Software Version	6.21	6.21	6.21	6.21	
Sub Serial Number	11342274	11342274	11342274	11342274	
Sonde Serial Number	11638605	11638605	11638605	11638605	
Sensor ID Number	N/A	N/A	N/A	N/A	
Toolface Offset (deg)	352.60	251.73	153.99	266.43	

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG	PCG	
Distance From Bit (ft)	51.60	50.19	50.58	49.39	
Recorded Sample Period (sec)	10	10	10	10	
Software Version	8.15	8.15	8.15	8.15	
Sub Serial Number	11342274	11342274	11342274	11342274	
Insert/Sonde Serial Number	11680902	11680902	11680902	11680902	

REMARKS

1. All depths are true vertical depths and are calibrated to the driller' pipe tally and are measured from the drill floor.

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

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

4. The Following smoothing parameters have been applied to the data"

PGXR (Gamma Ray):
Interval Resolution: 0.5 feet
Coercion Distance: 0.6 feet
Gap Fill: 3.0 feet

ROPA (Rate of Penetration):
Interval Resolution: 0.5 feet
Coercion Distance: 1.2 feet

WARRANTY

HALLIBURTON WILL USE ITS BEST EFFORTS TO FURNISH CUSTOMERS WITH ACCURATE INFORMATION AND INTERPRETATIONS

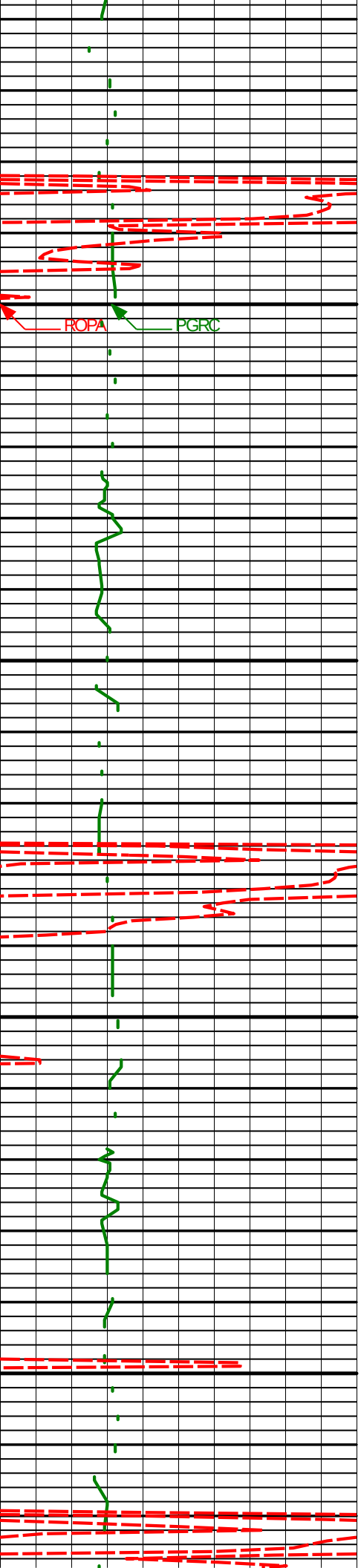
HALLIBURTON

TVD Detail Log 1:240

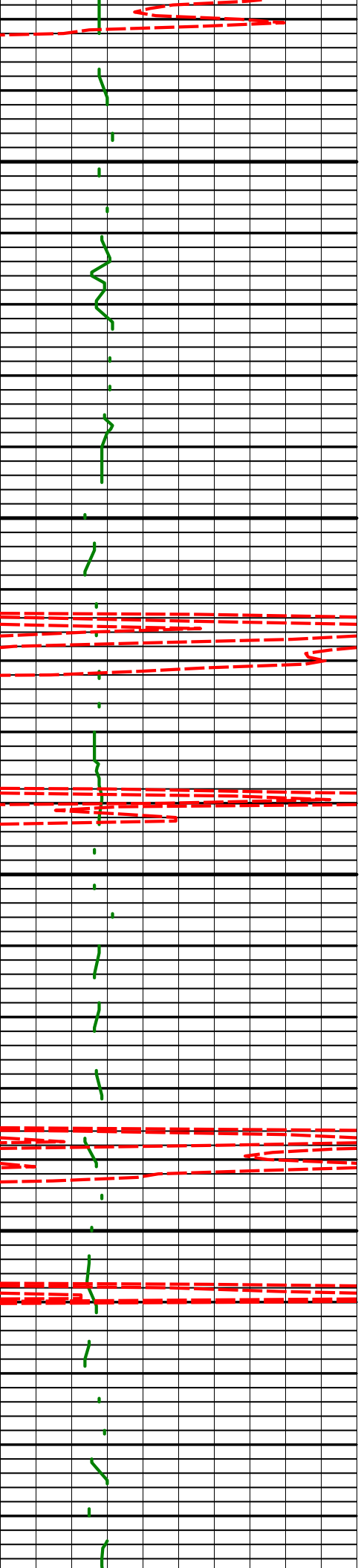
Gamma Ray
(PGXC)
(Api)
0 300

Avg Rate of Penetration
feet per hr
600 0

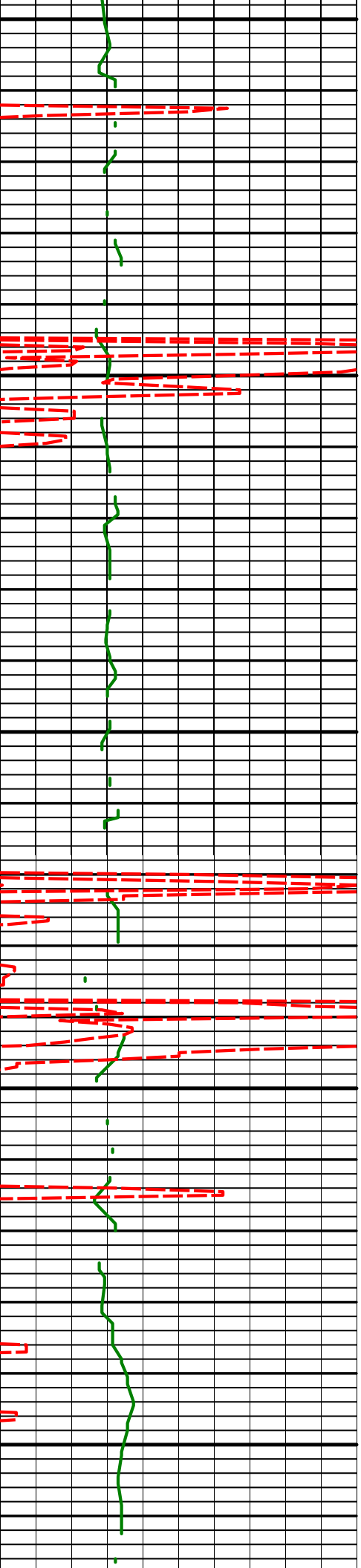
Feet	Depth	Inc	Azm	TVD	Vsec
	870'	0.40°	326.46°	869.99'	1.46'
900'					
	921'	0.27°	328.98°	920.99'	1.60'
950'					



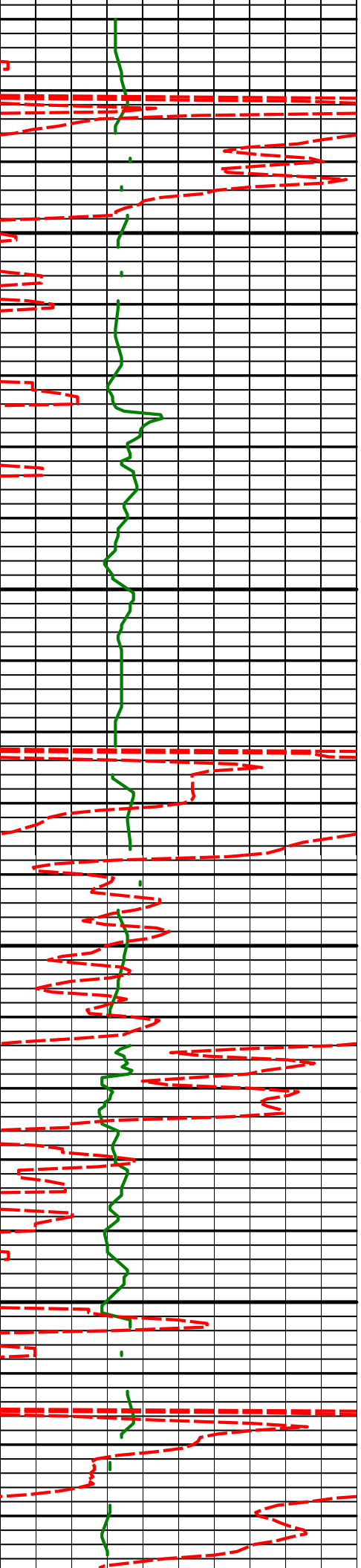
1014'	0.11°	305.46°	1013.99'	1.77'



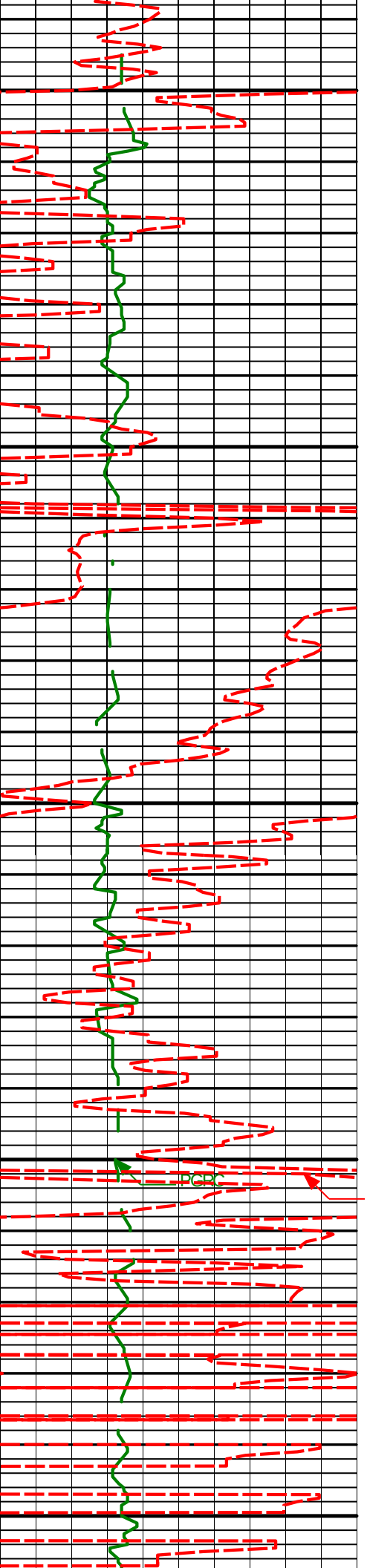
1293'	0.17°	313.60°	1292.98'	2.25'



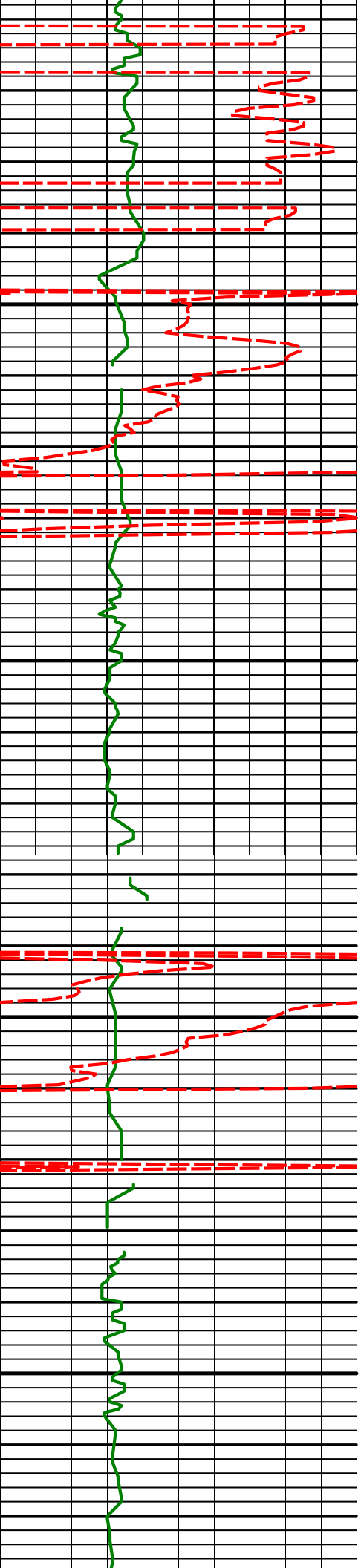
1479'	0.22°	332.83°	1478.98'	2.58'
1571'	0.12°	307.38°	1570.98'	2.73'



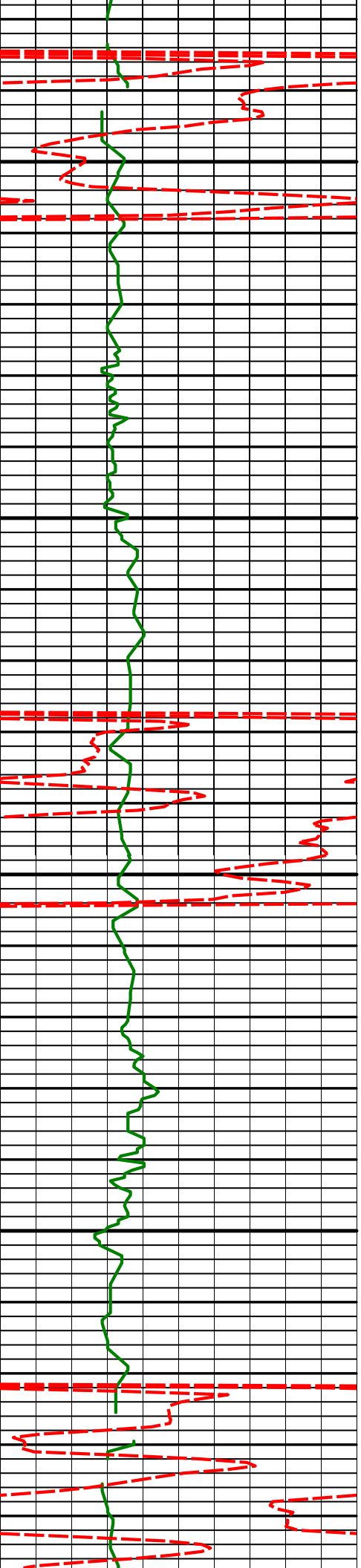
1664'	0.04°	297.61°	1663.98'	2.84'
1757'	2.67°	183.47°	1756.95'	3.13'



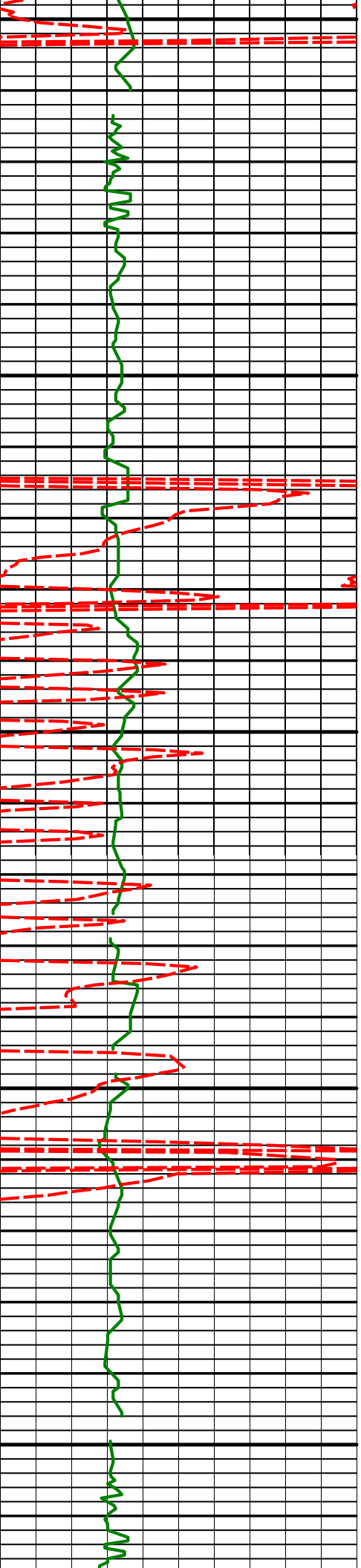
1849'	4.56°	201.65°	1848.77'	4.95'
1942'	6.34°	208.66°	1941.34'	9.27'
2037'	4.01°	184.24°	2035.96'	12.52'



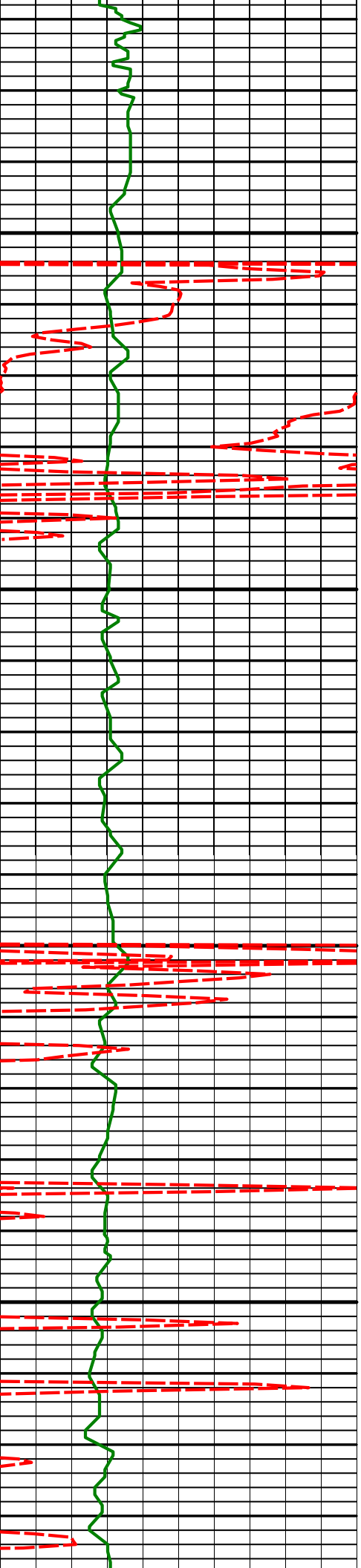
2132'	5.51°	191.84°	2130.63'	14.19'
2227'	7.07°	196.87°	2225.06'	17.45'



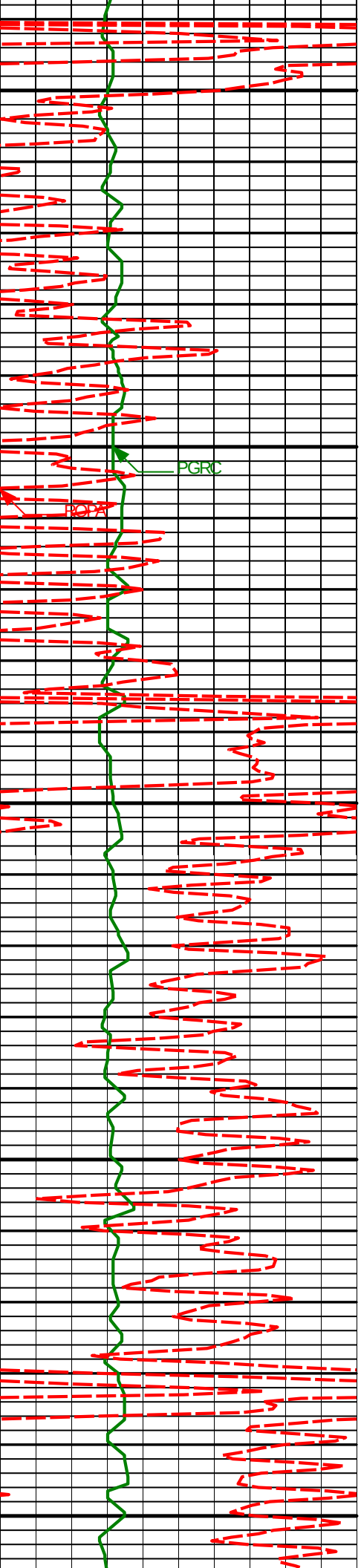
2322'	7.48°	198.24°	2319.29'	21.79'	
2416'	6.89°	211.50°	2412.56'	27.31'	



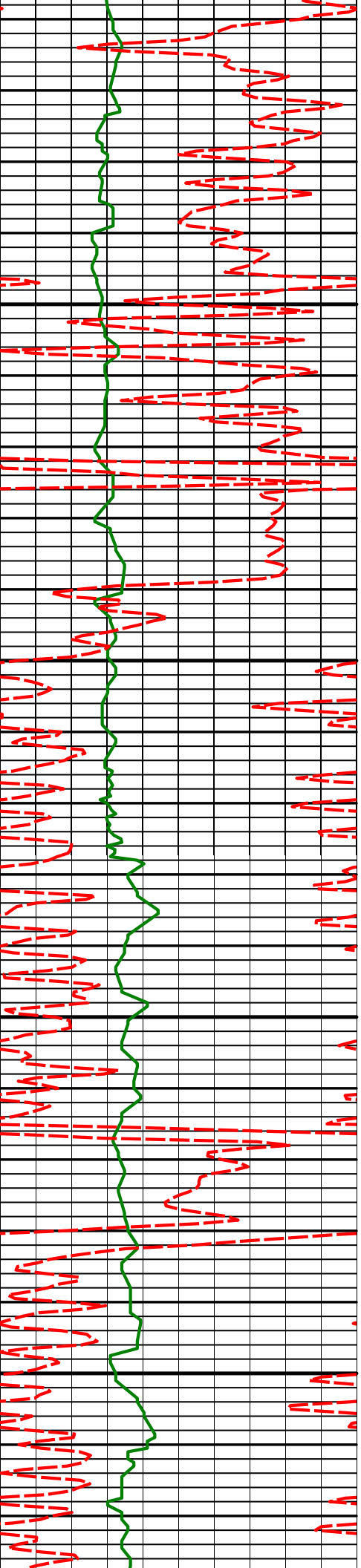
2511'	8.35°	208.57°	2506.72'	34.26'
2606'	8.80°	199.37°	2600.66'	40.77'
2701'	7.80°	201.24°	2694.67'	46.31'



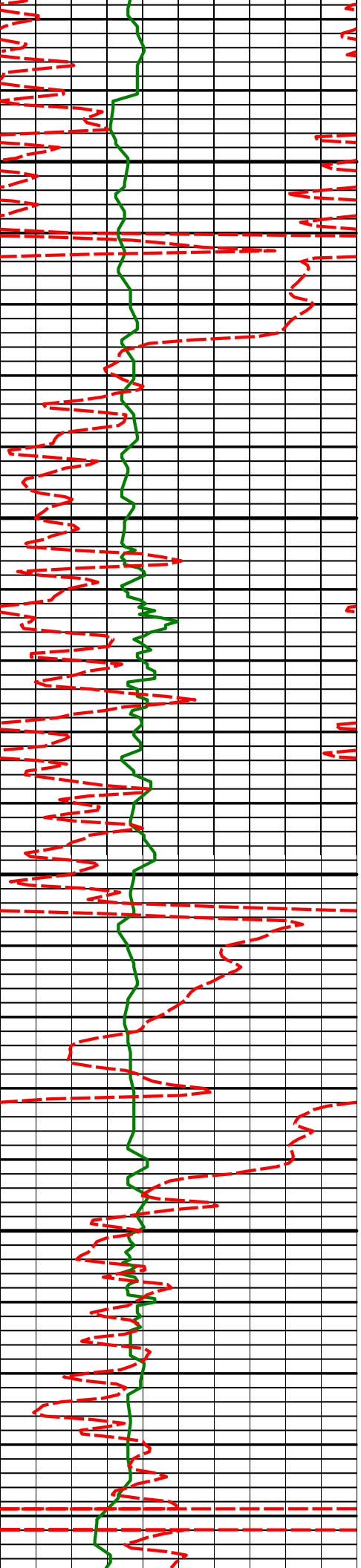
2796'	9.19°	201.71°	2788.62'	52.27'
2891'	8.77°	199.55°	2882.46'	58.36'



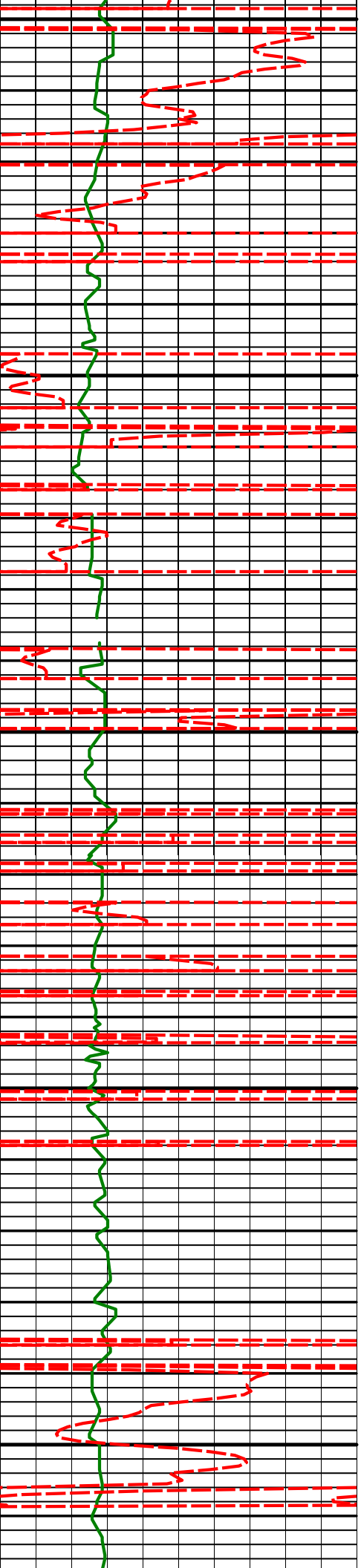
2986'	8.79°	201.69°	2976.34'	64.31'
3081'	8.08°	202.08°	3070.32'	70.31'



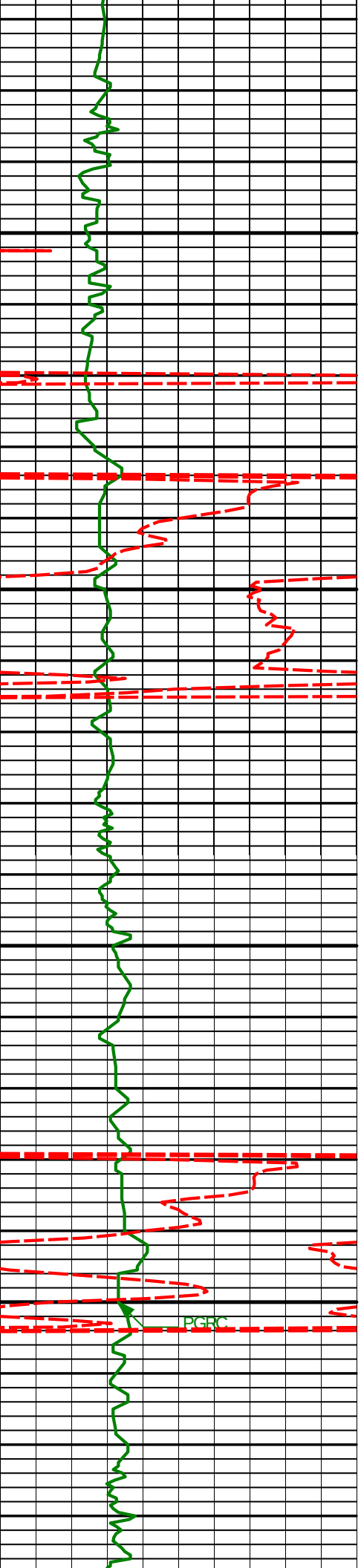
3176'	7.79°	203.38°	3164.41'	76.12'
3271'	6.92°	203.83°	3258.62'	81.68'
3365'	5.77°	215.20°	3352.05'	87.25'



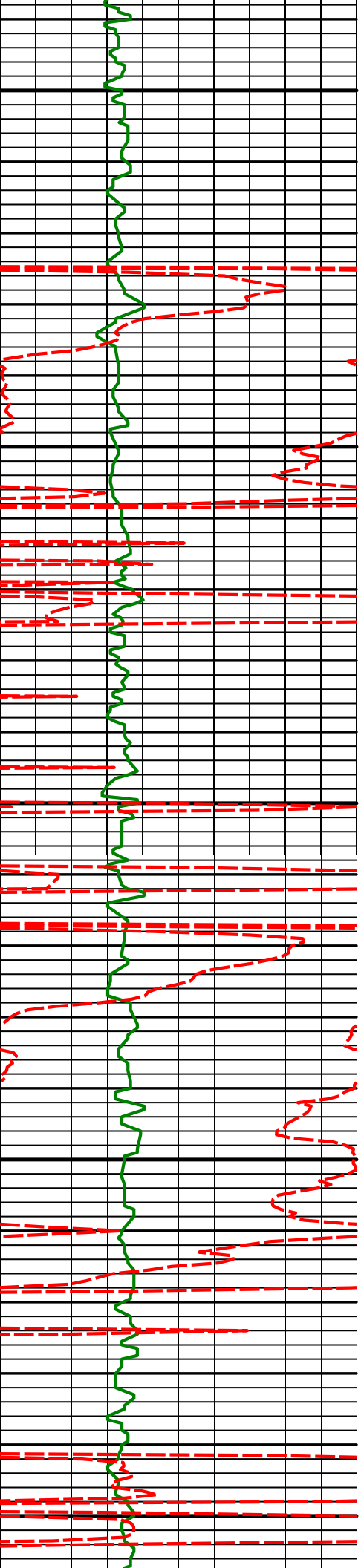
3460'	4.17°	223.01°	3446.69'	92.75'
3556'	4.93°	204.31°	3542.39'	97.22'



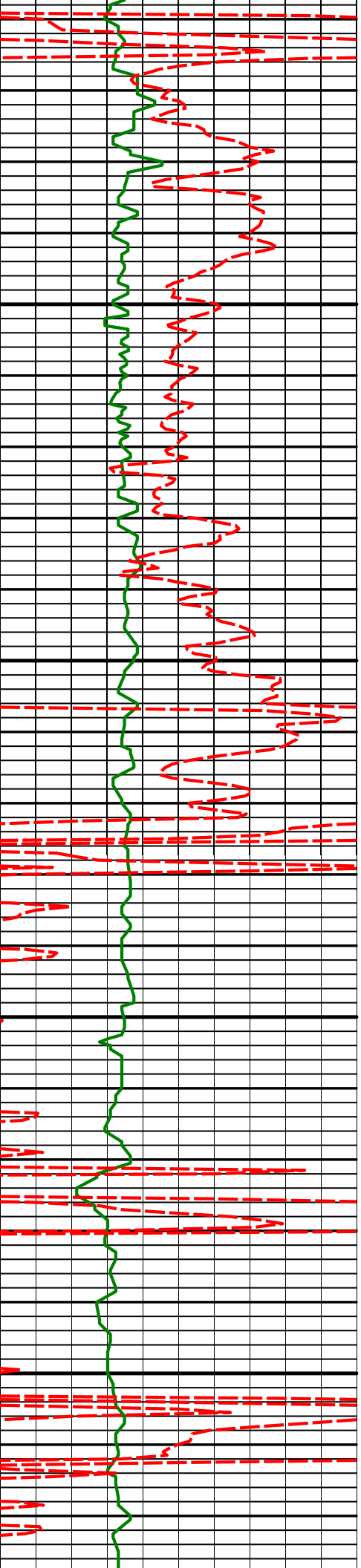
3650'	6.01°	210.60°	3635.97'	101.87'
3745'	6.73°	209.88°	3730.38'	107.74'



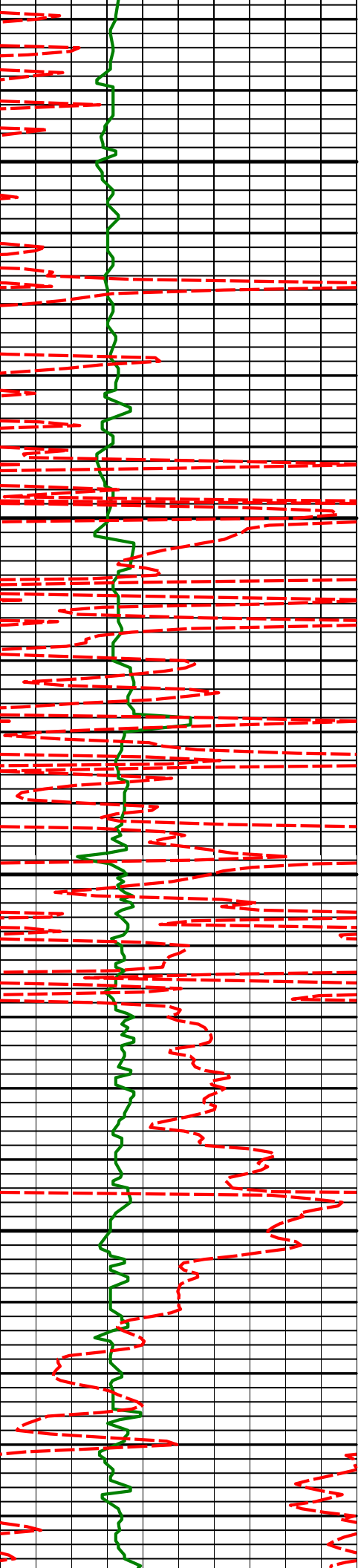
3840'	6.22°	212.66°	3824.77'	113.86'
3935'	4.28°	211.55°	3919.37'	118.95'
4030'	3.29°	224.10°	4014.16'	123.01'



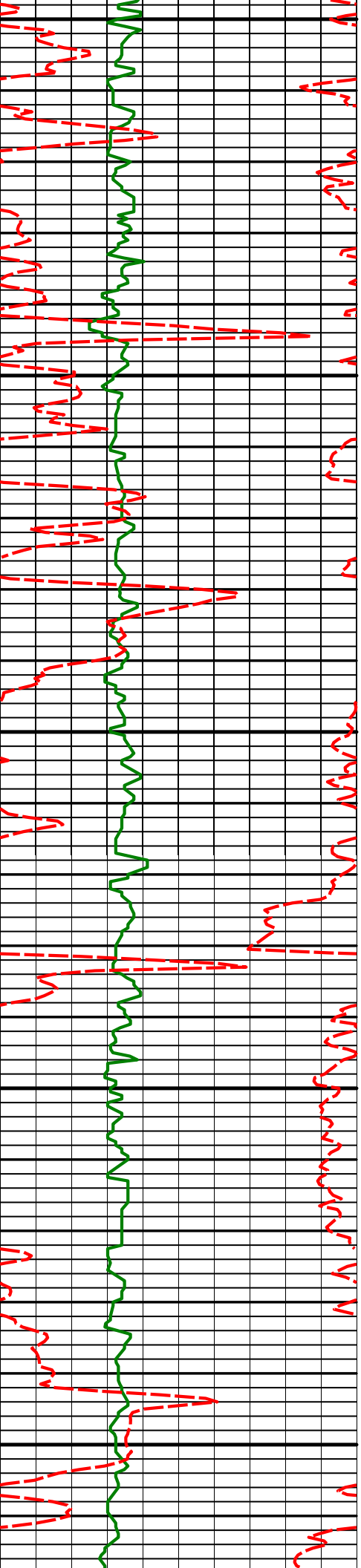
4125'	2.38°	192.62°	4109.05'	125.58'
4220'	0.65°	43.28°	4204.03'	125.74'



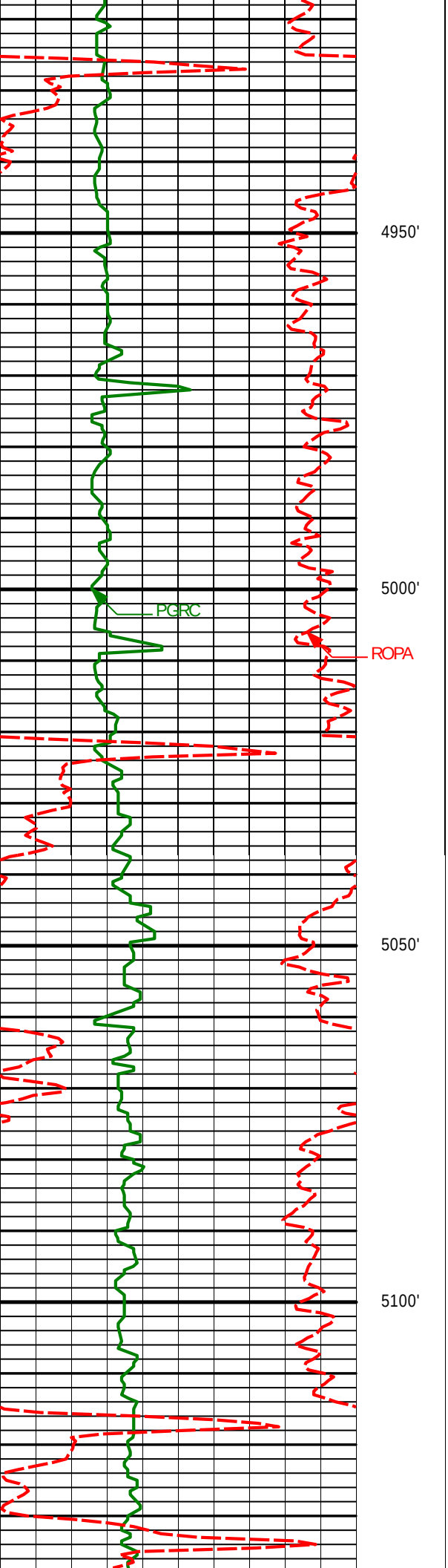
4315'	0.79°	46.59°	4299.02'	124.84'	
4410'	0.48°	107.66°	4394.01'	123.97'	



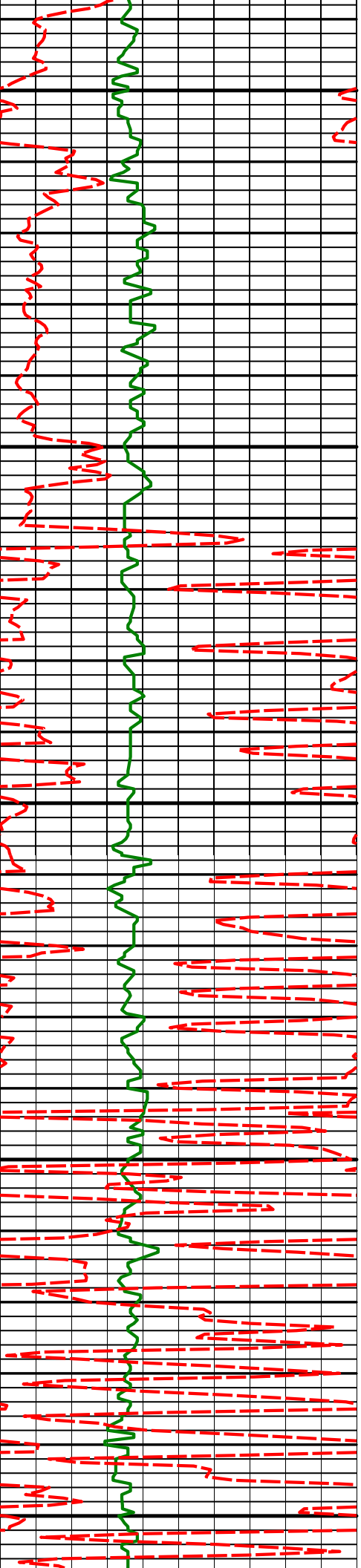
4505'	0.76°	31.25°	4489.01'	123.24'
4599'	1.78°	0.58°	4582.99'	122.78'
4694'	0.25°	345.42°	4677.97'	122.71'



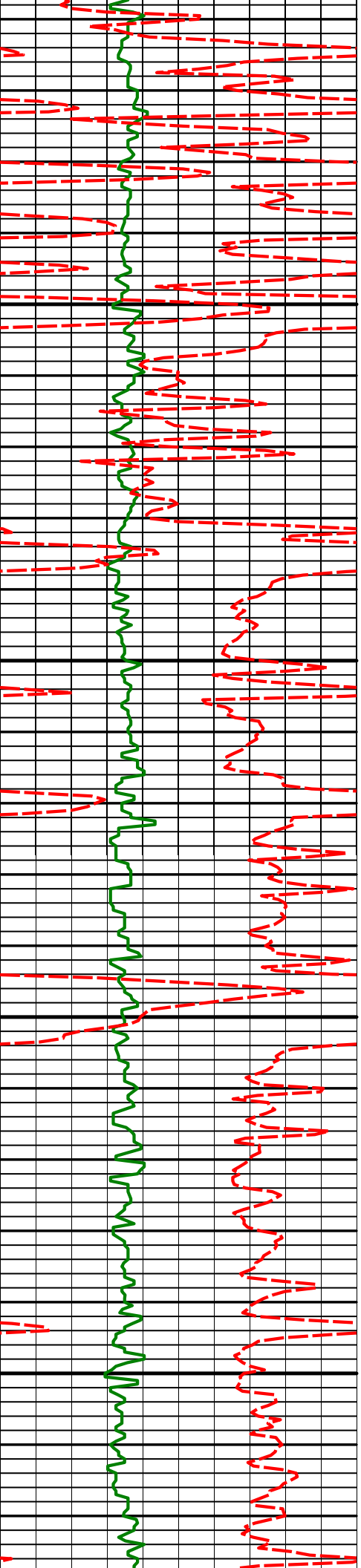
4788'	0.21°	333.70°	4771.97'	122.81'
4883'	0.66°	133.20°	4866.97'	122.50'



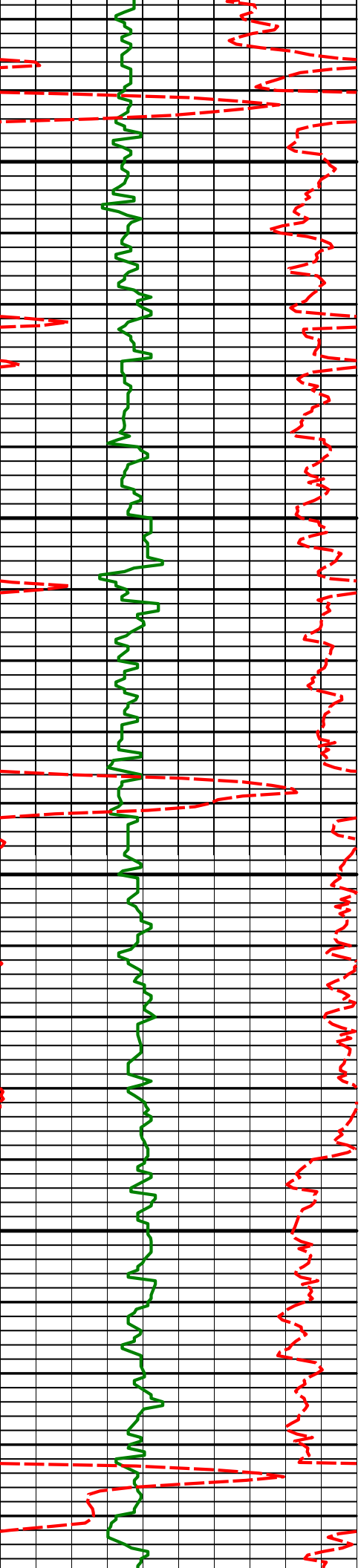
4978'	0.53°	142.17°	4961.96'	121.88'
5073'	0.90°	143.52°	5056.95'	121.23'



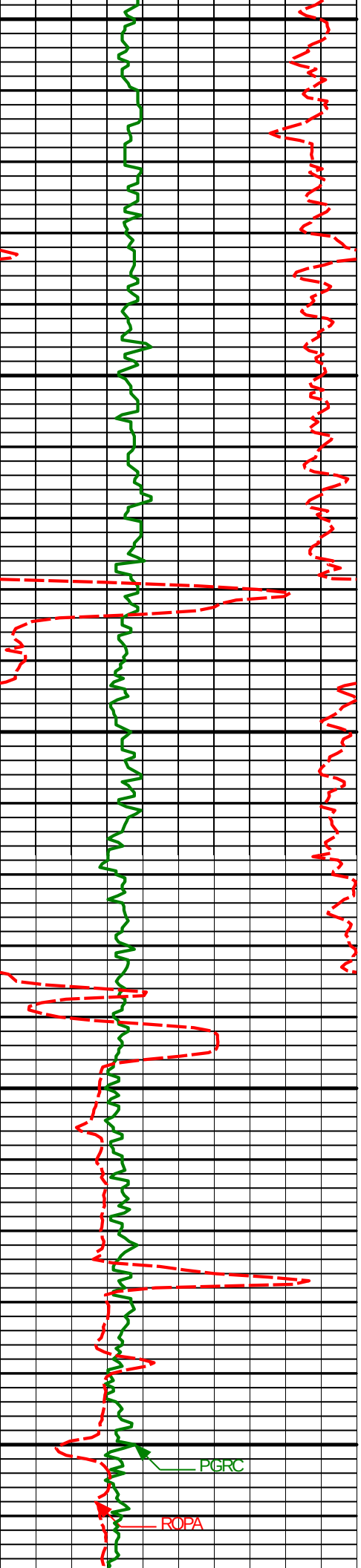
5168'	0.58°	165.33°	5151.95'	120.74'	
5262'	0.70°	237.37°	5245.94'	121.15'	
5357'	0.39°	290.40°	5340.94'	121.95'	



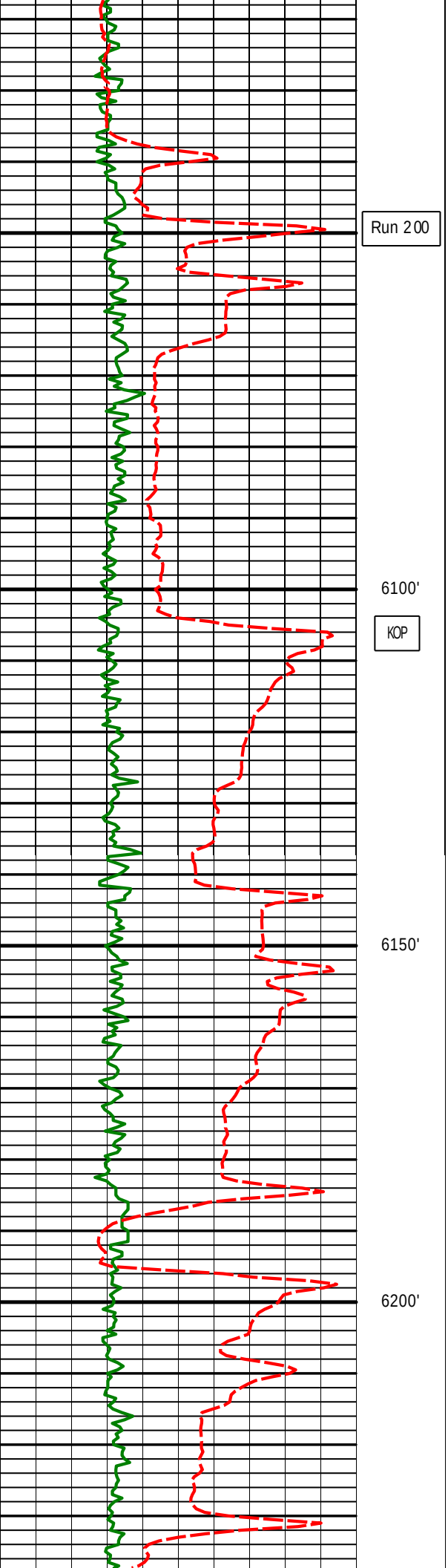
5452'	0.52°	259.76°	5435.93'	122.68'
5547'	0.52°	276.84°	5530.93'	123.54'



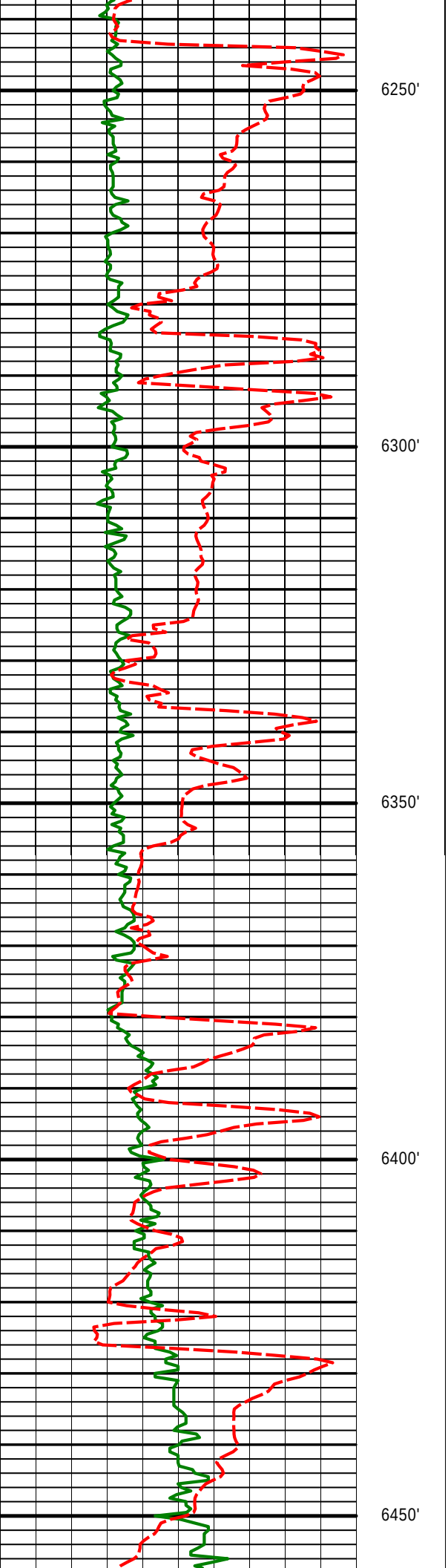
5642'	0.99°	240.90°	5625.92'	124.71'
5737'	0.90°	227.10°	5720.91'	126.02'



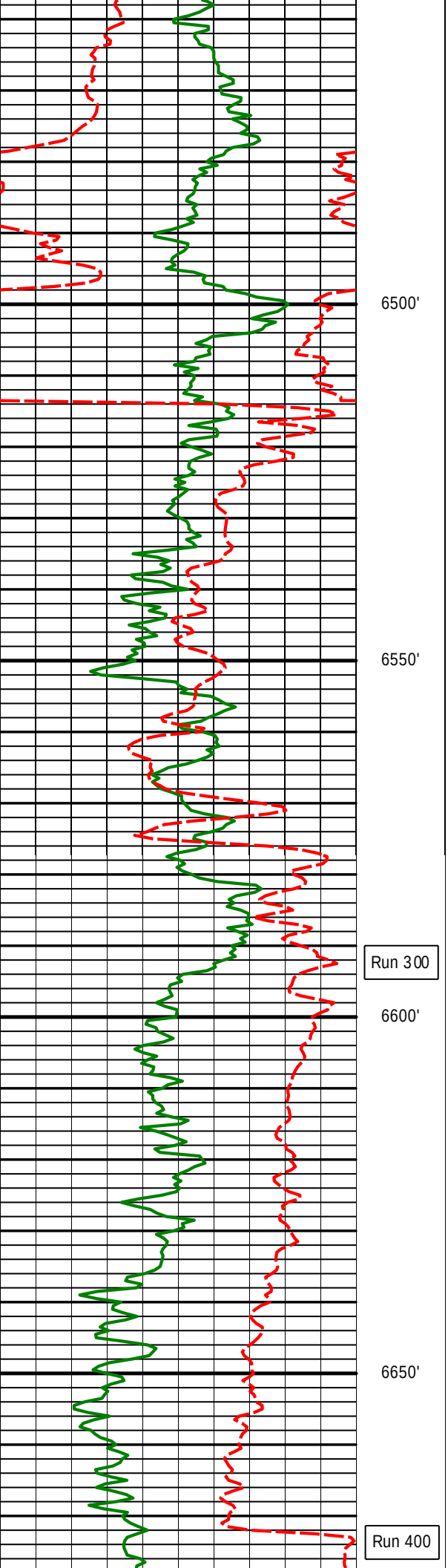
5831'	0.47°	286.89°	5814.90'	126.95'
5926'	0.21°	191.56°	5909.90'	127.36'
6006'	0.33°	181.73°	5989.90'	127.42'



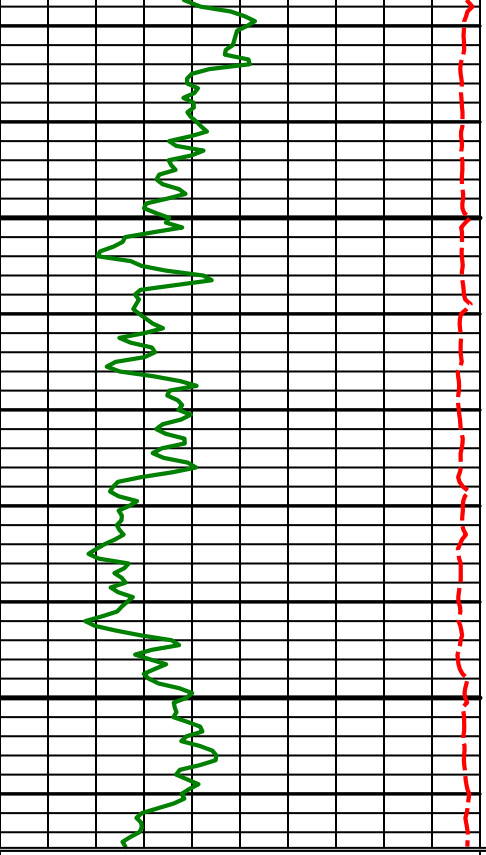
6110'	0.68°	243.93°	6093.90'	128.02'
6157'	4.54°	257.90°	6140.84'	130.12'
6205'	7.33°	256.51°	6188.58'	135.01'
6252'	9.39°	251.48°	6235.08'	141.67'



6300'	12.64°	254.05°	6282.19'	150.59'
6347'	15.29°	258.52°	6327.80'	161.75'
6395'	17.73°	267.39°	6373.82'	175.33'
6442'	20.12°	268.83°	6418.28'	190.57'



6490'	23.66°	266.52°	6462.81'	208.46'
6584'	30.18°	262.08°	6546.58'	250.95'
6637'	32.22°	261.14°	6591.92'	278.35'
6679'	35.51°	264.55°	6626.79'	301.73'
6737'	42.47°	267.24°	6671.84'	338.20'



6785'	53.08°	267.25°	6704.05'	373.69'
6832'	63.04°	266.99°	6728.89'	413.51'
6879'	71.23°	268.09°	6747.13'	456.77'
6926'	78.17°	269.73°	6759.52'	502.02'
6956'	81.90°	269.74°	6764.71'	531.50'

Avg Rate of Penetration
feet per hr
600 0

Feet

Depth Inc Azm TVD Vsec

Gamma Ray
(PGXC)
(Api)
0 300

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
NCLP AA07-69-1AHNC
Wattenberg
Weld Colorado
USA
CA-XX-0901435867

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
311.00	0.60	304.86	310.99	0.93 N	1.34 W	1.28	0.19
594.00	0.30	82.56	593.99	1.87 N	1.82 W	1.70	0.30
870.00	0.40	326.46	869.99	2.77 N	1.63 W	1.46	0.22
921.00	0.27	328.98	920.99	3.02 N	1.79 W	1.60	0.26
1014.00	0.11	305.46	1013.99	3.26 N	1.98 W	1.77	0.19
1293.00	0.17	313.60	1292.98	3.70 N	2.50 W	2.26	0.02
1479.00	0.22	332.83	1478.98	4.21 N	2.86 W	2.59	0.04
1571.00	0.12	307.38	1570.98	4.43 N	3.02 W	2.74	0.13
1664.00	0.04	297.61	1663.98	4.50 N	3.12 W	2.84	0.09
1757.00	2.67	183.47	1756.95	2.35 N	3.28 W	3.13	2.89
1849.00	4.56	201.65	1848.77	3.19 S	4.76 W	4.95	2.38
1942.00	6.34	208.66	1941.34	11.13 S	8.59 W	9.27	2.04
2037.00	4.01	184.24	2035.96	19.05 S	11.35 W	12.52	3.32
2132.00	5.51	191.84	2130.63	26.82 S	12.53 W	14.18	1.71
2227.00	7.07	196.87	2225.06	36.88 S	15.17 W	17.43	1.74

2227.00	7.07	196.87	2223.06	36.88 S	15.17 W	17.43	1.74
2322.00	7.48	198.24	2319.29	48.35 S	18.80 W	21.77	0.47
2416.00	6.89	211.50	2412.56	58.97 S	23.66 W	27.28	1.87
2511.00	8.35	208.57	2506.72	69.89 S	29.94 W	34.23	1.59
2606.00	8.80	199.37	2600.66	82.80 S	35.64 W	40.73	1.52
2701.00	7.80	201.24	2694.66	95.67 S	40.39 W	46.27	1.09
2796.00	9.19	201.71	2788.62	108.72 S	45.53 W	52.21	1.46
2891.00	8.77	199.55	2882.46	122.60 S	50.76 W	58.30	0.57
2986.00	8.79	201.69	2976.34	136.17 S	55.87 W	64.24	0.34
3081.00	8.08	202.08	3070.31	149.10 S	61.06 W	70.23	0.75
3176.00	7.79	203.38	3164.40	161.19 S	66.13 W	76.03	0.36
3271.00	6.92	203.83	3258.62	172.34 S	70.99 W	81.59	0.92
3365.00	5.77	215.20	3352.05	181.38 S	76.00 W	87.15	1.81
3460.00	4.17	223.01	3446.69	187.81 S	81.11 W	92.65	1.82
3556.00	4.93	204.31	3542.39	194.12 S	85.19 W	97.12	1.73
3650.00	6.01	210.60	3635.96	202.04 S	89.36 W	101.77	1.31
3745.00	6.73	209.88	3730.38	211.14 S	94.67 W	107.63	0.76
3840.00	6.22	212.66	3824.77	220.30 S	100.22 W	113.74	0.63
3935.00	4.28	211.55	3919.37	227.66 S	104.85 W	118.82	2.04
4030.00	3.29	224.10	4014.16	232.64 S	108.60 W	122.88	1.35
4125.00	2.38	192.62	4109.05	236.52 S	110.93 W	125.44	1.86
4220.00	0.65	43.28	4204.02	238.05 S	110.99 W	125.60	3.11
4315.00	0.79	46.59	4299.02	237.21 S	110.15 W	124.70	0.15
4410.00	0.48	107.66	4394.01	236.88 S	109.29 W	123.83	0.74
4505.00	0.76	31.25	4489.01	236.46 S	108.58 W	123.10	0.84
4599.00	1.78	0.58	4582.98	234.47 S	108.25 W	122.64	1.27
4694.00	0.25	345.42	4677.97	232.79 S	108.28 W	122.57	1.62
4788.00	0.21	333.70	4771.97	232.44 S	108.41 W	122.67	0.07
4883.00	0.66	133.20	4866.96	232.66 S	108.09 W	122.37	0.91
4978.00	0.53	142.17	4961.96	233.38 S	107.42 W	121.75	0.17
5073.00	0.90	143.52	5056.95	234.33 S	106.71 W	121.09	0.39
5168.00	0.58	165.33	5151.94	235.39 S	106.14 W	120.59	0.44
5262.00	0.70	237.37	5245.94	236.16 S	106.51 W	121.00	0.81
5357.00	0.39	290.40	5340.94	236.36 S	107.30 W	121.81	0.59
5452.00	0.52	259.76	5435.93	236.33 S	108.02 W	122.53	0.29
5547.00	0.52	276.84	5530.93	236.35 S	108.88 W	123.38	0.16
5642.00	0.99	240.90	5625.92	236.70 S	110.02 W	124.55	0.68
5737.00	0.90	227.10	5720.91	237.61 S	111.29 W	125.87	0.26
5831.00	0.47	286.89	5814.90	238.00 S	112.20 W	126.80	0.83
5926.00	0.21	191.56	5909.90	238.06 S	112.60 W	127.21	0.56
6006.00	0.33	181.73	5989.90	238.43 S	112.64 W	127.27	0.16
6110.00	0.68	243.93	6093.90	239.00 S	113.20 W	127.87	0.58
6157.00	4.54	257.90	6140.84	239.51 S	115.27 W	129.96	8.26
6205.00	7.33	256.51	6188.58	240.63 S	120.11 W	134.86	5.82
6252.00	9.39	251.48	6235.08	242.54 S	126.66 W	141.52	4.65
6300.00	12.64	254.05	6282.19	245.23 S	135.43 W	150.43	6.85
6347.00	15.29	258.52	6327.79	247.88 S	146.45 W	161.60	6.08
6395.00	17.73	267.39	6373.82	249.47 S	159.95 W	175.18	7.30
6442.00	20.12	268.83	6418.27	249.96 S	175.19 W	190.41	5.18
6490.00	23.66	266.52	6462.81	250.72 S	193.06 W	208.30	7.59
6584.00	30.18	262.08	6546.58	255.12 S	235.34 W	250.77	7.25
6637.00	32.22	261.14	6591.92	259.13 S	262.50 W	278.12	3.96
6679.00	35.51	264.55	6626.79	262.02 S	285.71 W	301.47	9.04
6737.00	42.47	267.24	6671.85	264.56 S	322.09 W	337.94	12.35
6785.00	53.08	267.25	6704.06	266.27 S	357.54 W	373.43	22.10
6832.00	63.04	266.99	6728.89	268.28 S	397.32 W	413.26	21.20
6879.00	71.23	268.09	6747.14	270.12 S	440.55 W	456.52	17.56
6926.00	78.17	269.73	6759.53	270.97 S	485.85 W	501.78	15.14
6956.00	81.90	269.74	6764.72	271.11 S	515.39 W	531.27	12.43

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 266.43 DEGREES (GRID)
A TOTAL CORRECTION OF 7.46 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6956.00 FEET
IS 582.35 FEET ALONG 242.25 DEGREES (GRID)

Tie In @ Surface

Tie-in @ Surface

Surveys at 311 ft, 594 ft and 870 ft were taken and provided by HP 322 while they were drilling the surface hole and have been converted from magnetic north to grid north.

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