HALLIBURTON | Sperry Drilling

PCGK - Pressure Case Gamma
PCDC - Pressure Case Directional

Powered by INSITE

1 : 240

Country	: USA
Field	: Wattenberg
Location	: Lat: 40° 13' 6.92" North Long: 104° 44' 58.90" West
Well	: Ferge 28N-14HZ
Company	: Anadarko Petroleum Corporation
Rig	: Ensign 132

Company : **Anadarko Petroleum Corporation**
Rig : **Ensign 132**
Well : **Ferge 28N-14HZ**
Field : **Wattenberg**
Country : **USA**
API Number : **05-123-36341**

LOCATION
Latitude : **40° 13' 6.92" North**
Longitude : **104° 44' 58.90" West**
UTM Easting = **3,209,524.544 ft**
UTM Northing = **1,323,360.520 ft**

Other Services
Directional Drilling

Permanent Datum : **Ground Level** Elevation : **4913.00 ft**
Log Measured From : **Kelly Bushing** **13.00 ft** Above Permanent Datum
Drilling Measured From : **Kelly Bushing**

MD LOG

Elev. KB **4926.00 ft**
DF **4926.00 ft**
GL **4913.00 ft**
WD **N/A**

Depth Logged : **1,249.00 ft** To **12,518.00 ft**
Date Logged : **28-Apr-14** To **05-May-14**
Total Depth MD : **12,518.00 ft** TVD : **7,128.21 ft**
Spud Date : **28-Apr-14**

Unit No. : **11210429**
Job No. : **CA-XX-0901264985**
Plot Type : **Final**
Plot Date : **10-May-14**

Run No.	Borehole Record (MD) Size	From	To
0100	8.750 in	1,249.00 ft	7,671.00 ft
0200	6.125 in	7,671.00 ft	12,518.00 ft

Run No.	Borehole Record (MD) Size	From	To

Casing Record (MD) Size	Weight	From	To
9.625 in	36.00 lbpf	13.00 ft	1,232.00 ft
7.000 in	27.00 lbpf	13.00 ft	7,661.00 ft

WELL INFORMATION

MWD Run Number	100	200			
Date run completed	01-May-14	05-May-14			
Rig Bit Number	0100	0200			
Bit Size (in)	8.750	6.125			
Tool Nominal OD (in)	6.750	4.750			
Log Start Depth (MD, ft)	1,249.00	7,671.00			
Log End Depth (MD, ft)	7,671.00	12,518.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	28-Apr-14 23:50	03-May-14 01:40			
Drill/Wipe End Date and Time	01-May-14 07:45	05-May-14 01:30			
Min Inc (deg) @ Depth (MD, ft)	0.14 @ 6,401.00	88.15 @ 7,682.00			
Max Inc (deg) @ Depth (MD, ft)	84.44 @ 7,625.00	92.62 @ 8,823.00			
Bit TFA(in2) / Bit Type	1.18 / PDC	1.24 / PDC			
Flow Rate (gpm)	557.63	291.52			
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)	10.30 / 45.00	9.80 / 38.00			
Filtrate CL (ppm)	1,200.00	1,250.00			
pH / Fluid Loss (mptm)	9.30 / 5	9.70 / 5			
PV (cP) / YP (lhf2)	18 / 18.00	10 / 13.00			
% Solids / % Sand	10.8 / 0.50	5.9 / 0.25			
% 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	412.20 / PCM	231.42 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Matt Busche	Matt Busche			
Customer Representative	Terry Bradshaw	Terry Bradshaw			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.76	5.84			
Sub Serial Number	11342294	12334786			
Insert Serial Number	11680779	12230081			
Date and Time Initialized	28-Apr-14 11:43	02-May-14 12:33			
Date and Time Read	01-May-14 17:14	05-May-14 21:16			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	46.00	45.00			
Software Version	6.21	6.21			
Sub Serial Number	11342294	12334786			
Sonde Serial Number	11833026	11638587			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	278.46	205.93			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	48.78	47.53			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11342294	12334786			
Insert/Sonde Serial Number	11293433	11579846			

REMARKS

1. All depths are measured depths, referenced to the Driller's pipe tally and are measured from the Kelly Bushing, unless otherwise specified.

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

3. All data presented is recorded data unless otherwise specified.

4. The final survey is a projection at the bit.

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

PGRC (Corrected Gamma Ray):
Interval Resolution: 0.5 ft
Interval Distance: 0.6 ft
Gap Fill: 3.0 ft

ROPA (Average Rate Of Penetration):
Interval Resolution: 0.5 ft
Interval Distance: 1.2 ft
Gap Fill: 3.0 ft

Insite version: 8.0.2

WARRANTY

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HALLIBURTON

TVD Main Log 1:240

PCG Gamma Ray BCorr
(PGRC)
0 api 300

Avg Rate of Penetration
feet per hr
500 0

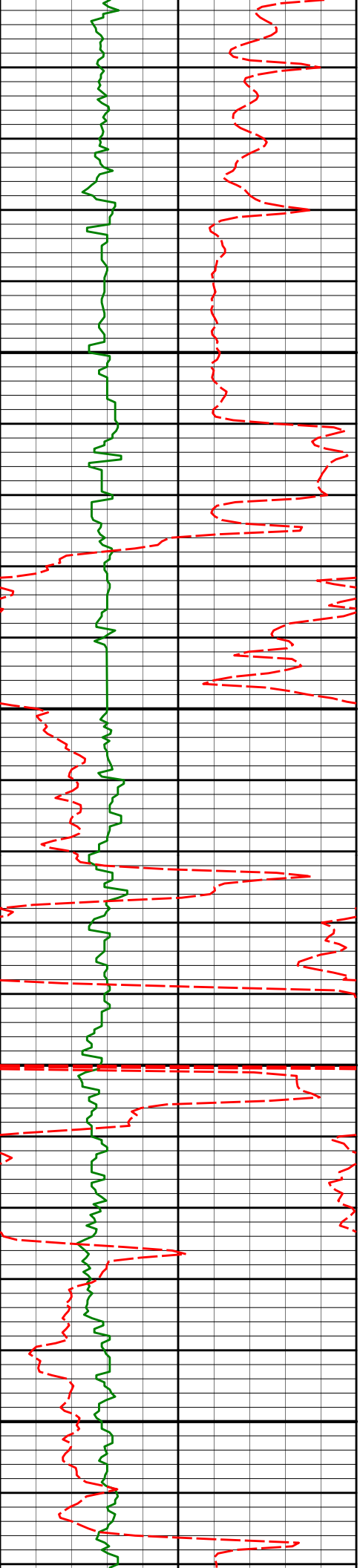
Depth

Depth	Inc	Azi	TVD	V/S
1283'	0.29°	155.81°	1282.98'	0.21'

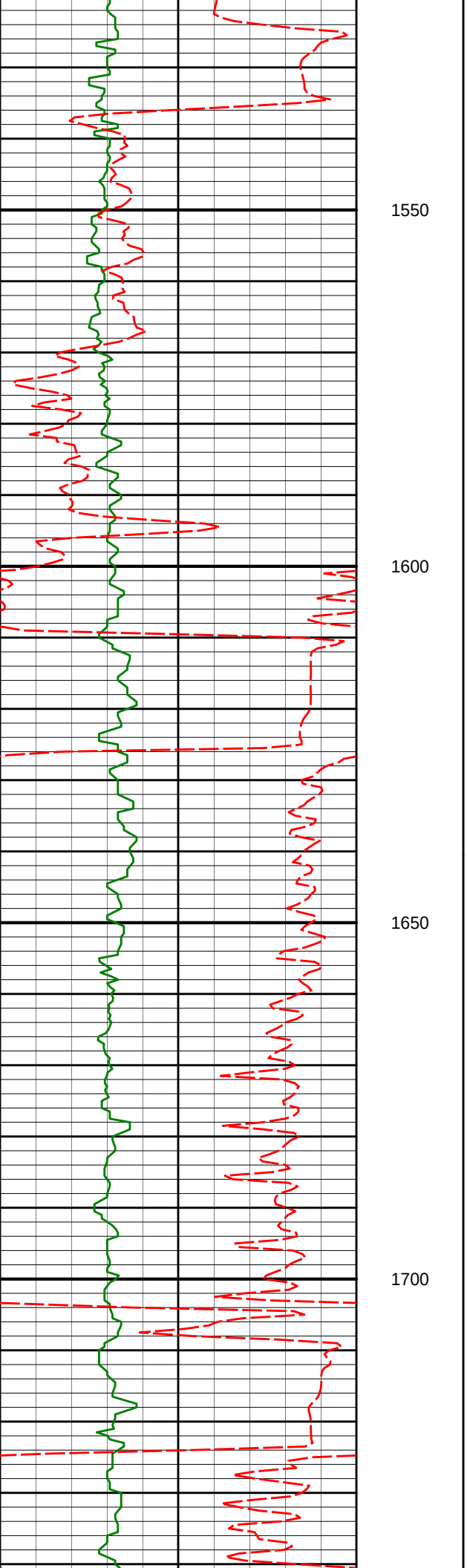
9.625" Casing Shoe @ 1232' MD / 1232.98' TVD

1250

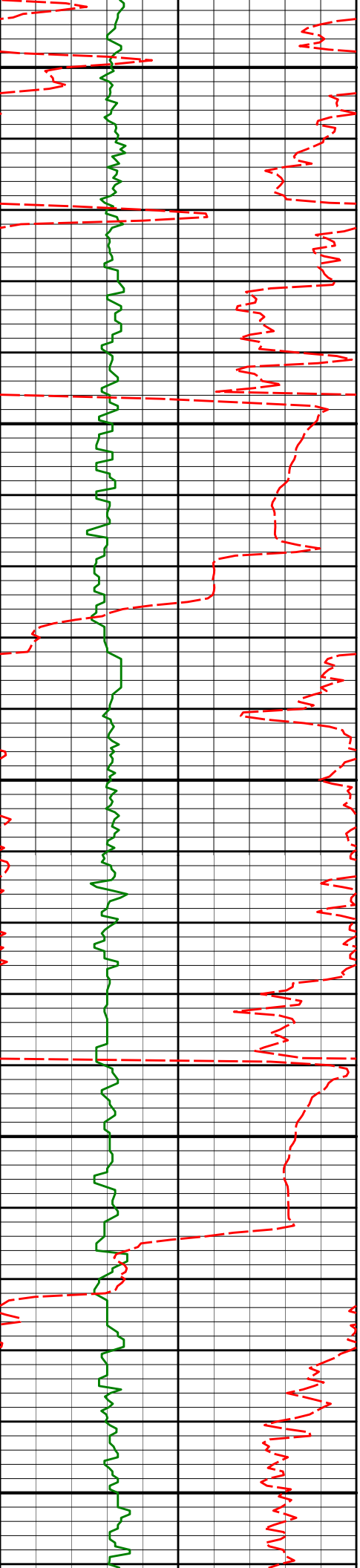
1300



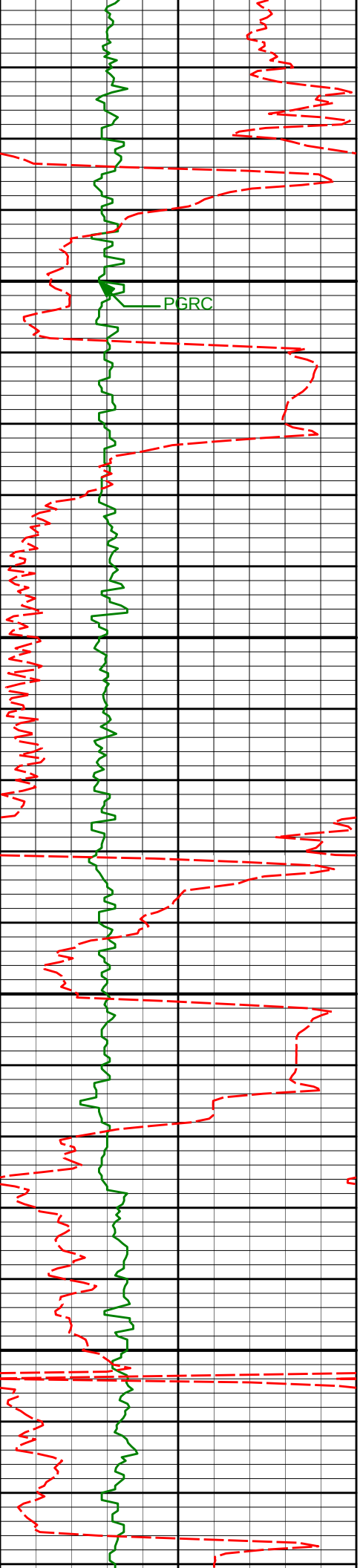
1378'	0.84°	139.73°	1377.97'	-0.52'
1479'	2.58°	120.58°	1478.92'	-2.16'



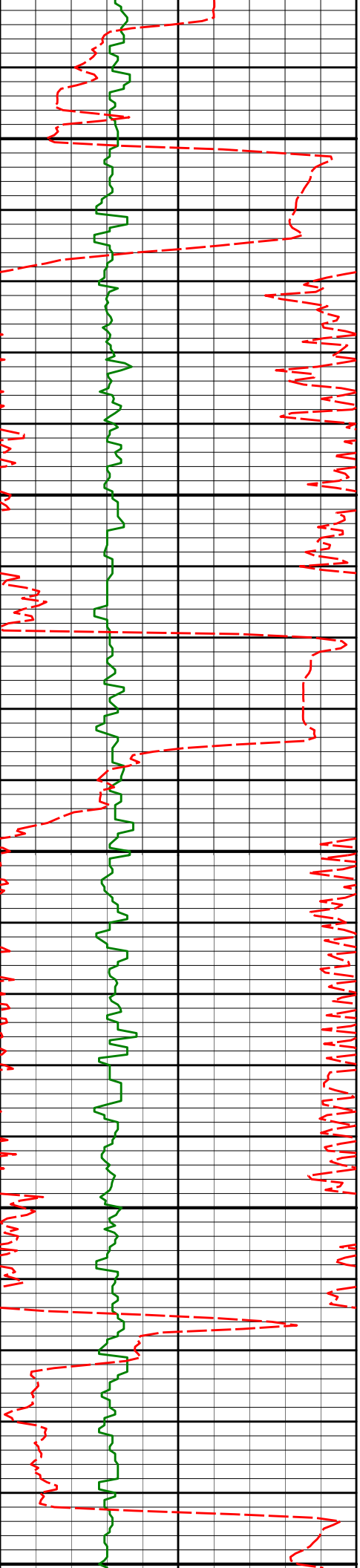
1566'	3.43°	114.51°	1565.80'	-4.10'
1660'	5.74°	110.76°	1659.50'	-6.70'



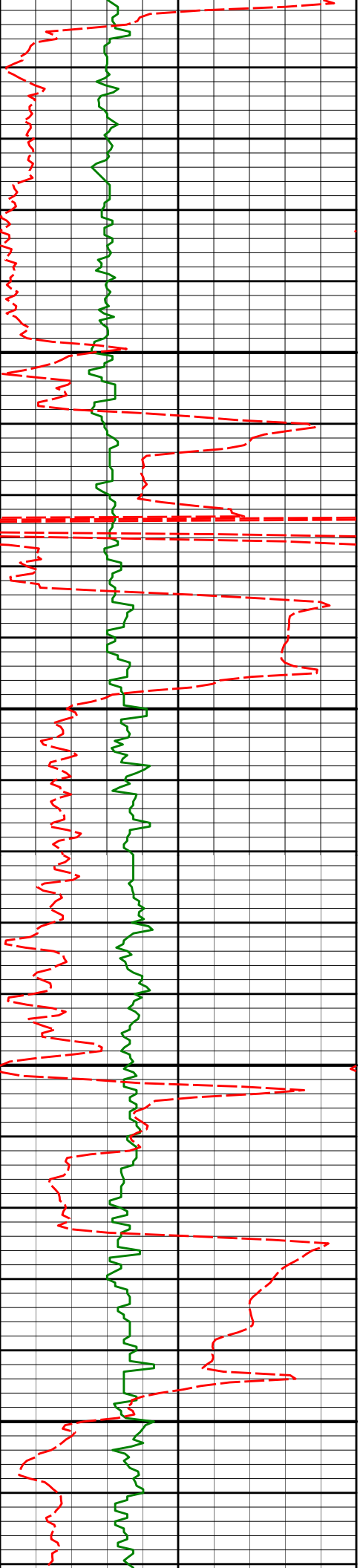
1754'	7.14°	113.30°	1752.90'	-10.35'
1848'	9.54°	115.62°	1845.90'	-15.61'
1942'	12.62°	108.93°	1938.14'	-21.74'



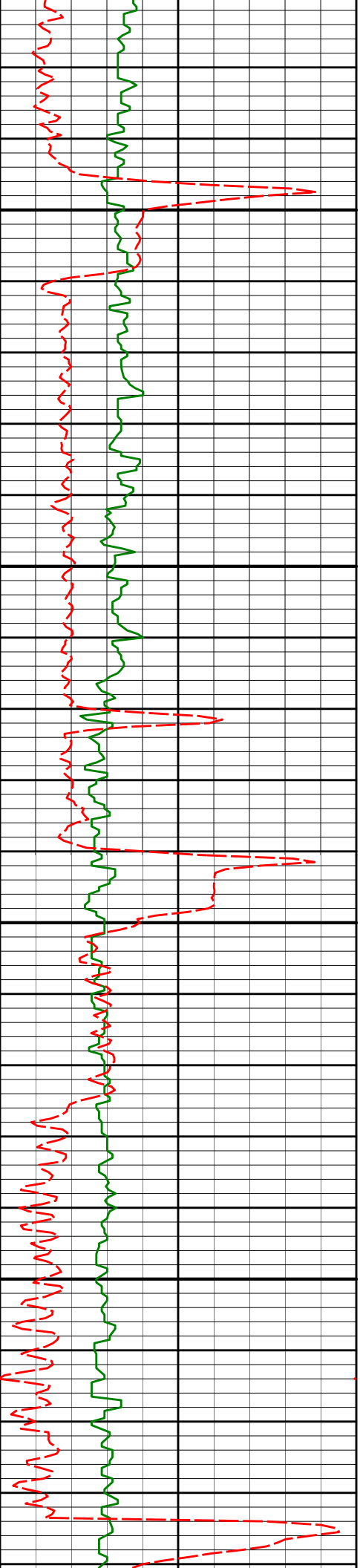
2037'	13.94°	109.11°	2030.60'	-28.16'
2131'	15.28°	106.62°	2121.56'	-34.65'



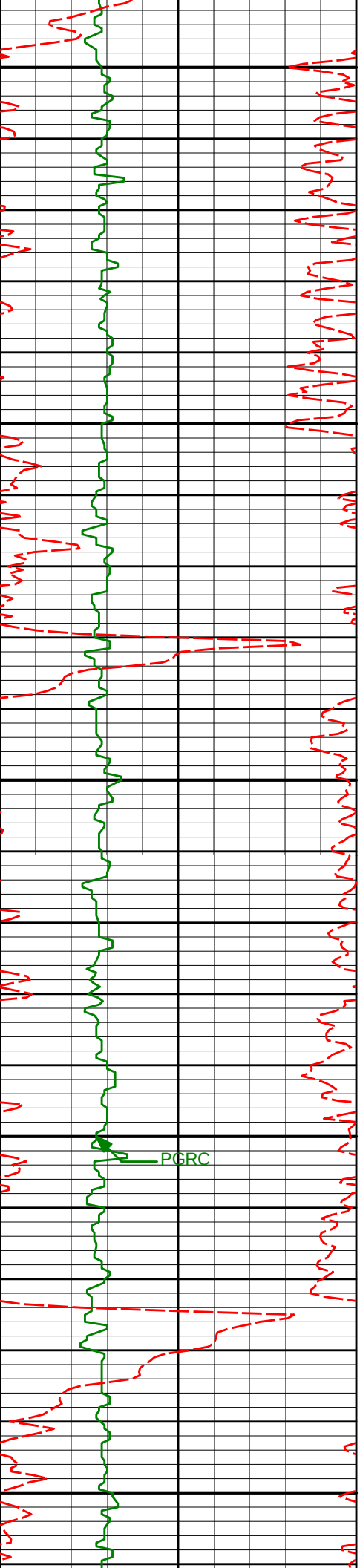
2225'	16.85°	109.37°	2211.89'	-41.88'
2319'	18.36°	110.83°	2301.48'	-50.76'



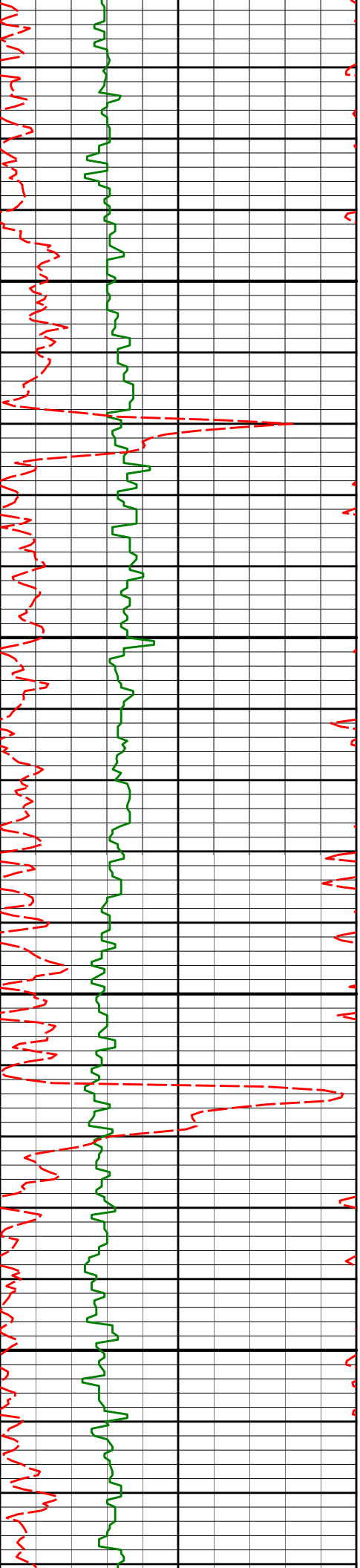
2413'	18.07°	110.76°	2390.77'	-60.27'
2508'	18.18°	110.14°	2481.06'	-69.66'
2602'	20.94°	111.53°	2569.62'	-79.89'



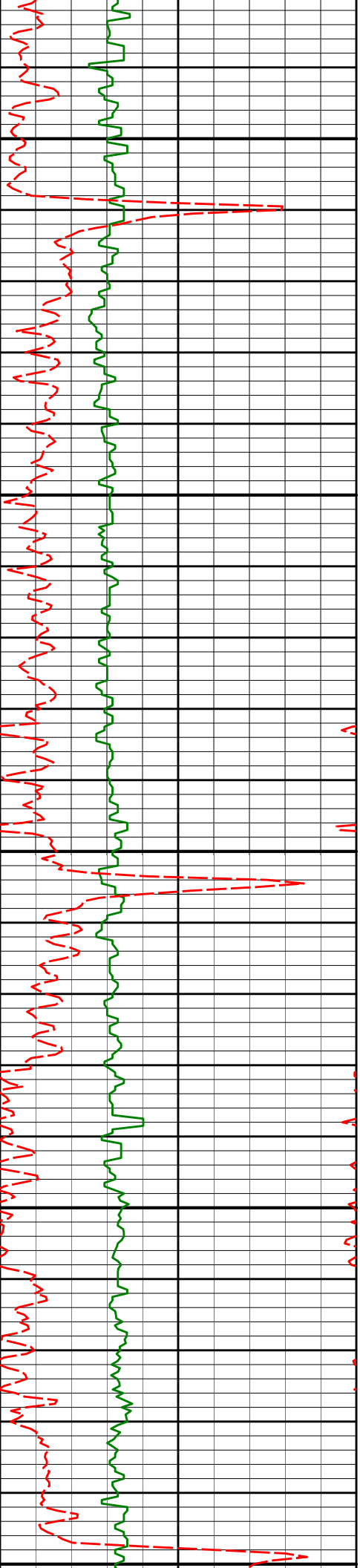
2696'	20.70°	110.92°	2657.49'	-90.93'
2790'	21.34°	111.04°	2745.23'	-101.94'



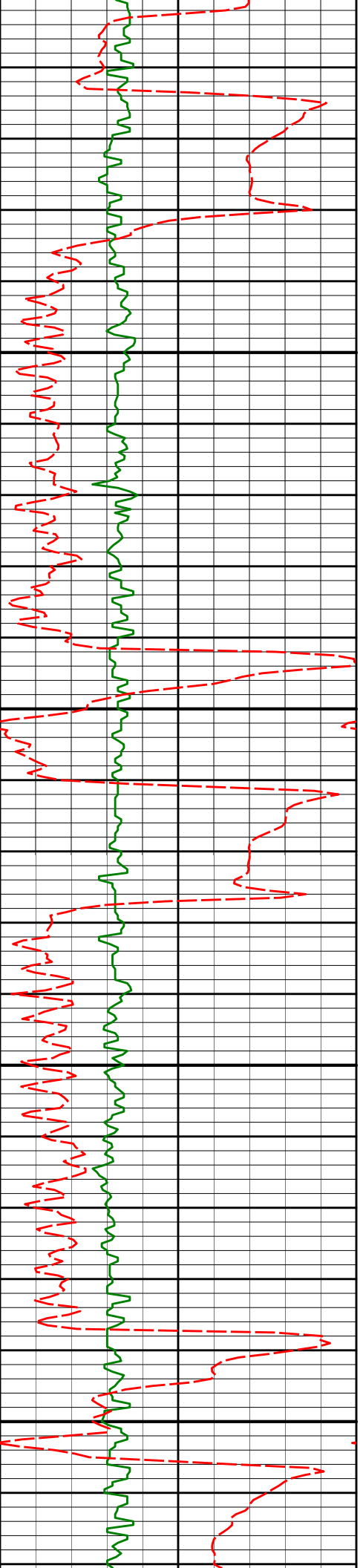
2884'	21.56°	111.00°	2832.72'	-113.19'
2979'	21.77°	111.54°	2921.01'	-124.81'



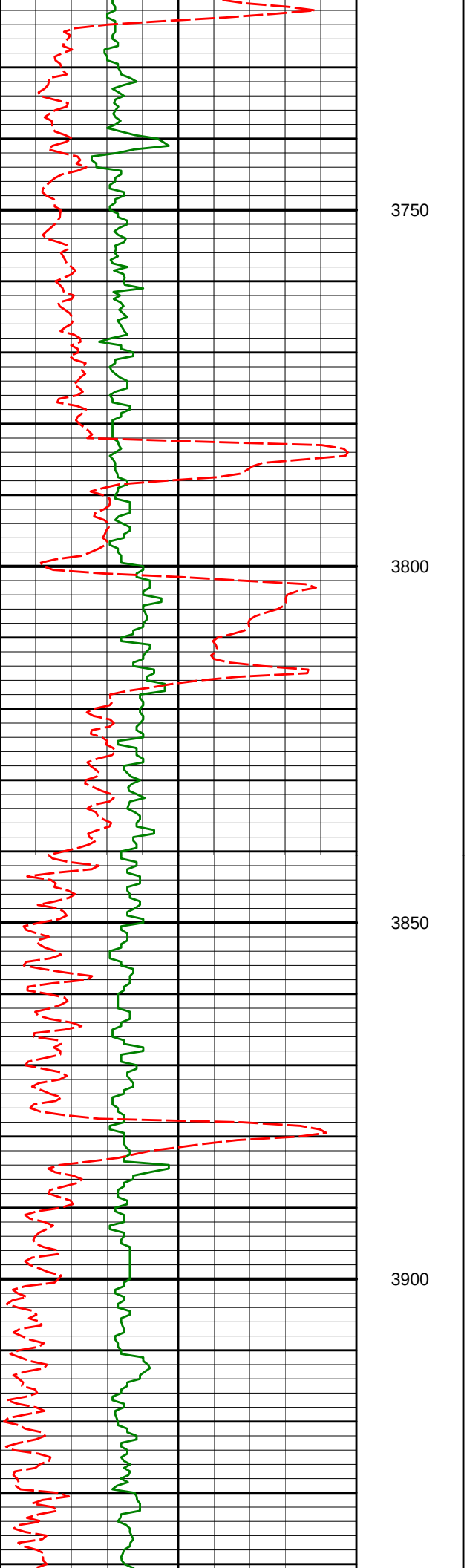
3074'	21.92°	112.54°	3009.19'	-136.97'
3169'	19.98°	110.72°	3097.90'	-148.45'
3264'	19.93°	110.11°	3187.20'	-158.73'



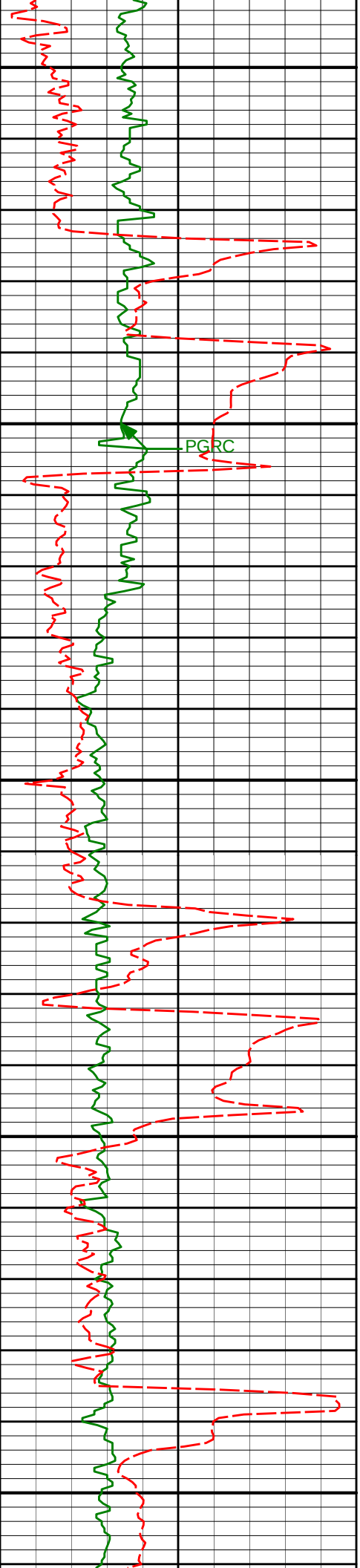
3359'	18.64°	109.05°	3276.87'	-168.26'
3454'	16.31°	107.50°	3367.48'	-176.32'



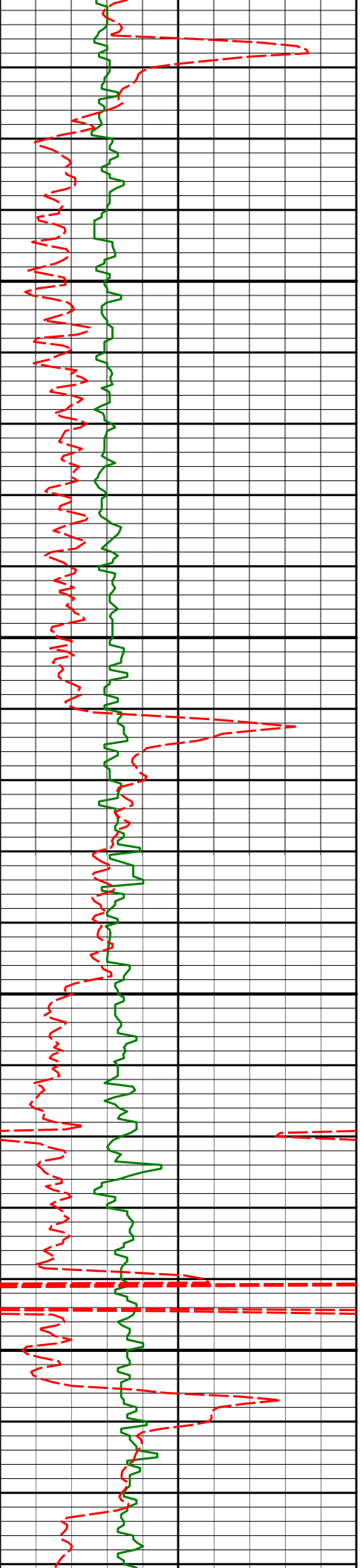
	3549'	17.09°	106.37°	3458.47'	-183.38'
	3644'	17.35°	107.42°	3549.21'	-190.65'



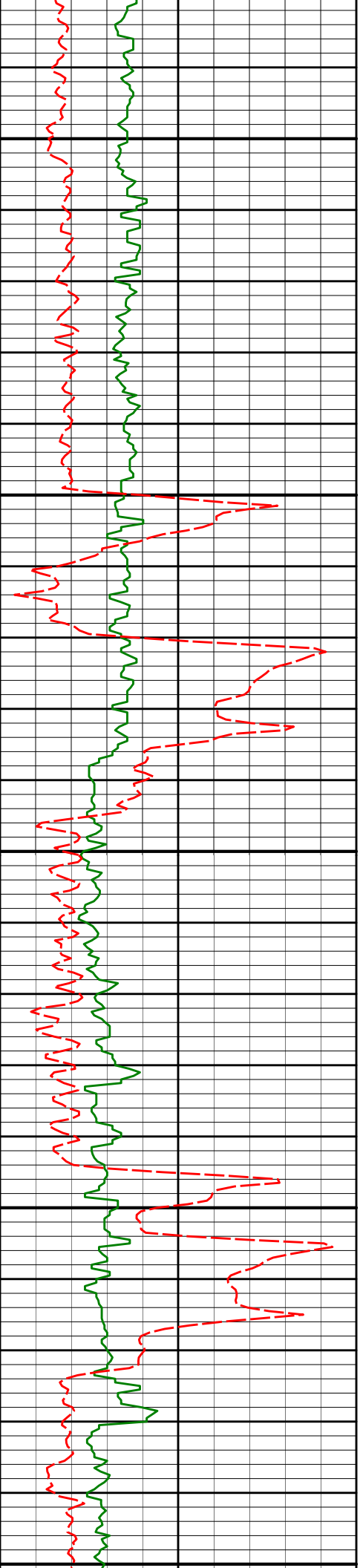
3740'	18.20°	110.77°	3640.63'	-199.32'
3835'	18.81°	112.29°	3730.72'	-209.45'
3930'	16.74°	109.17°	3821.18'	-218.83'



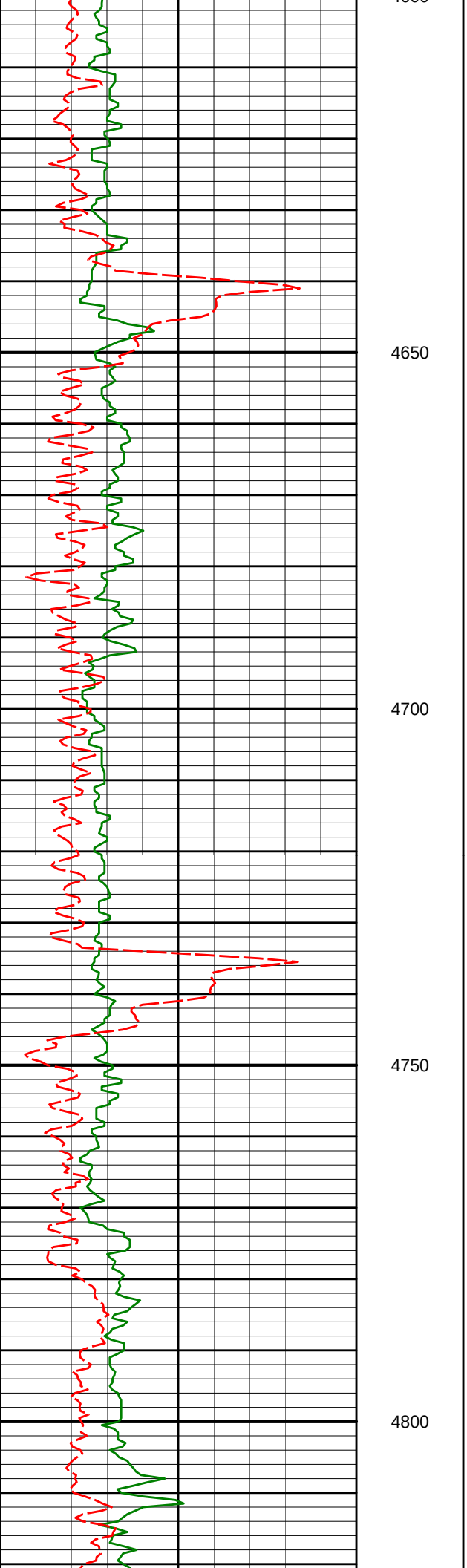
4025'	18.11°	113.25°	3911.82'	-228.26'
4120'	20.58°	114.69°	4001.45'	-240.10'



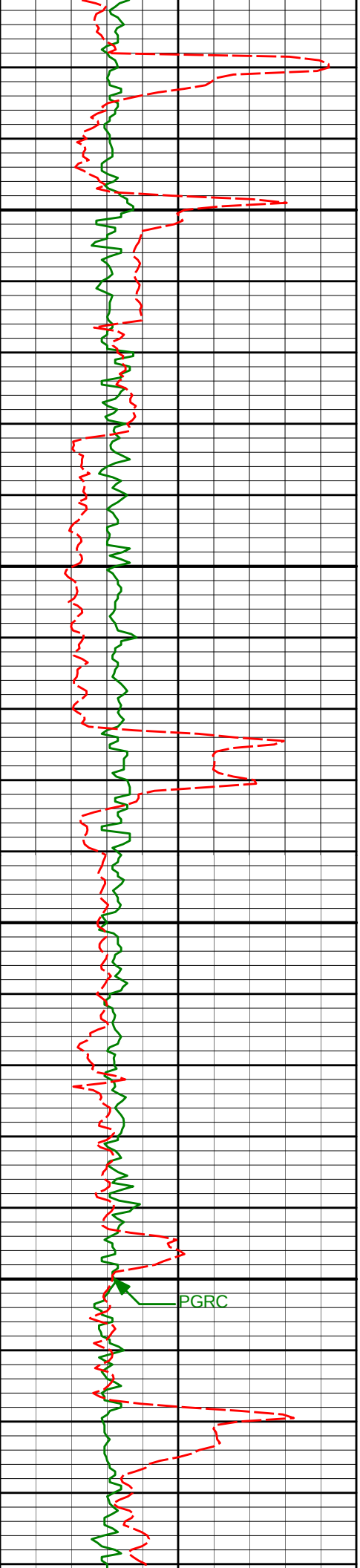
4215'	21.08°	114.47°	4090.24'	-253.11'
4310'	20.40°	114.62°	4179.09'	-266.05'



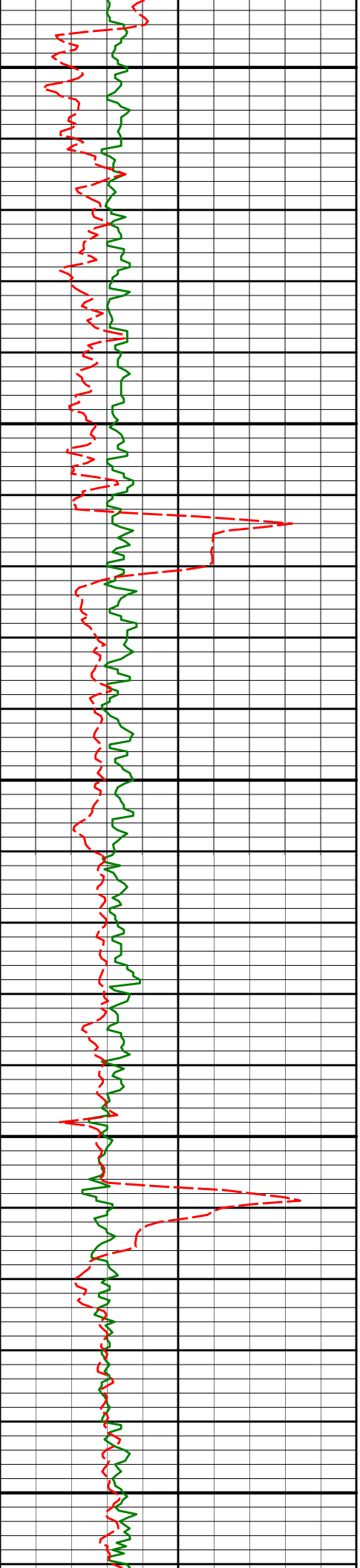
4405'	18.47°	114.72°	4268.67'	-278.28'
4500'	18.71°	115.05°	4358.71'	-290.09'
4596'	19.35°	112.77°	4449.47'	-301.80'



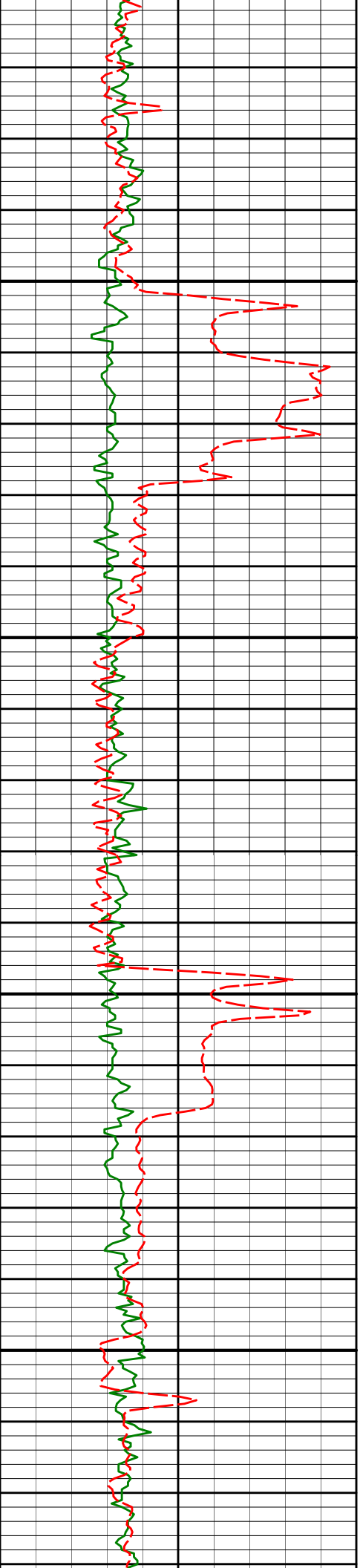
4691'	18.60°	112.30°	4539.30'	-312.68'
4786'	18.67°	113.60°	4629.32'	-323.57'



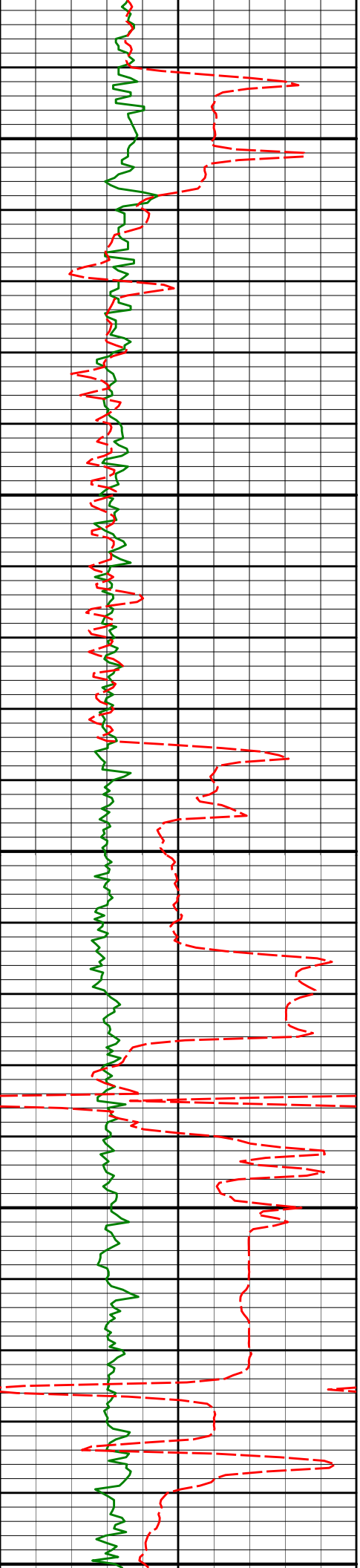
4880'	18.70°	114.42°	4718.37'	-334.90'
4975'	18.12°	115.21°	4808.51'	-346.57'



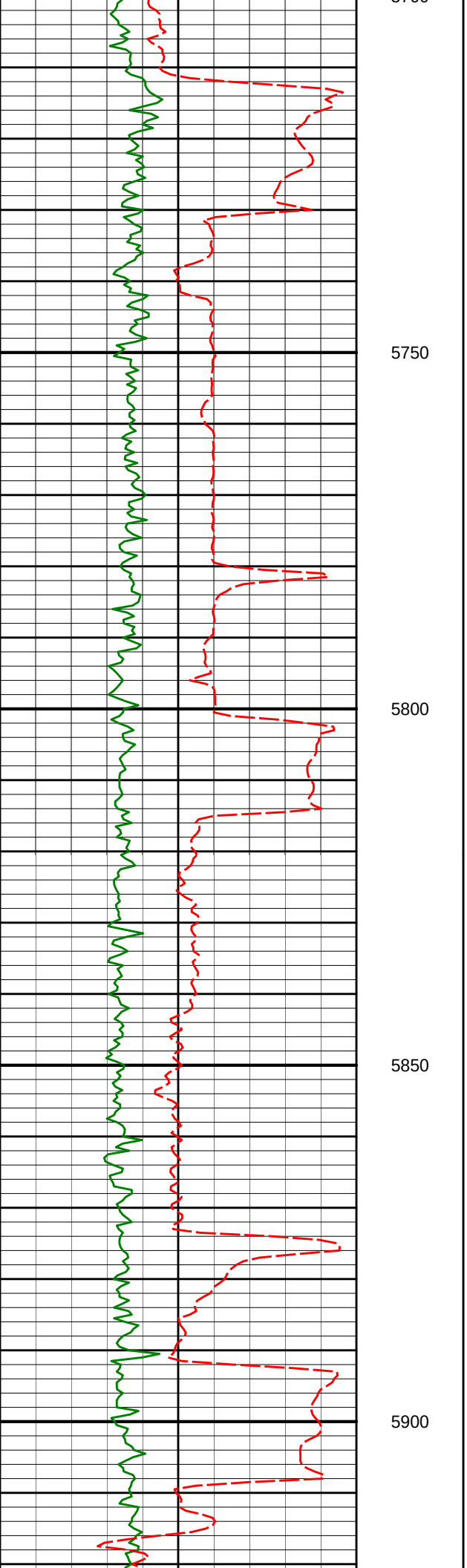
5070'	17.15°	115.74°	4899.04'	-358.06'
5165'	15.78°	116.53°	4990.14'	-369.10'
5260'	15.20°	117.44°	5081.69'	-379.85'



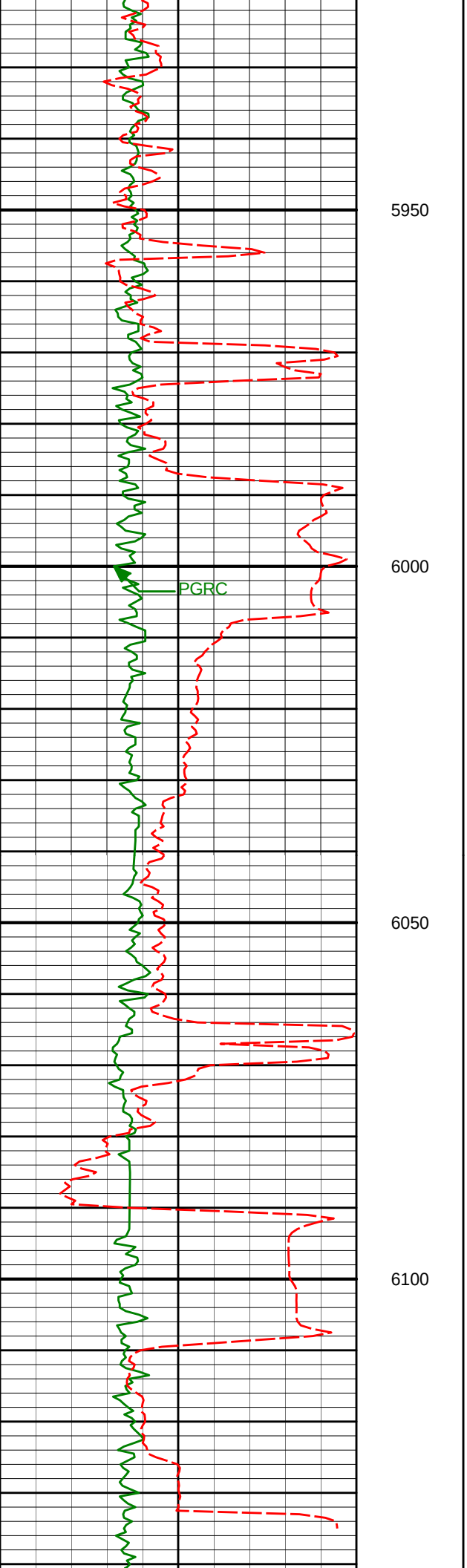
5355'	14.95°	113.02°	5173.43'	-389.62'
5450'	14.08°	112.75°	5265.39'	-398.14'



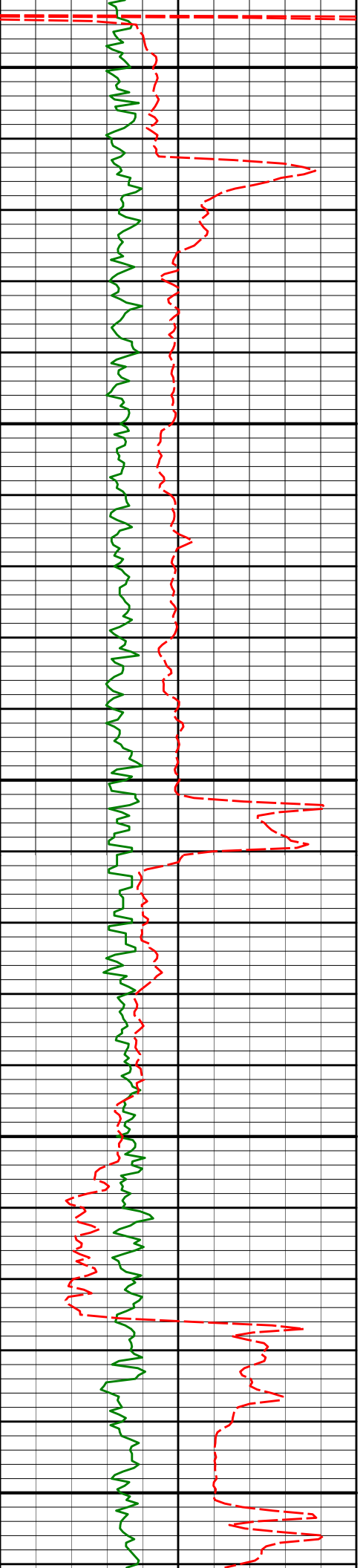
5545'	12.89°	113.40°	5357.77'	-406.13'
5640'	11.50°	110.24°	5450.63'	-412.99'



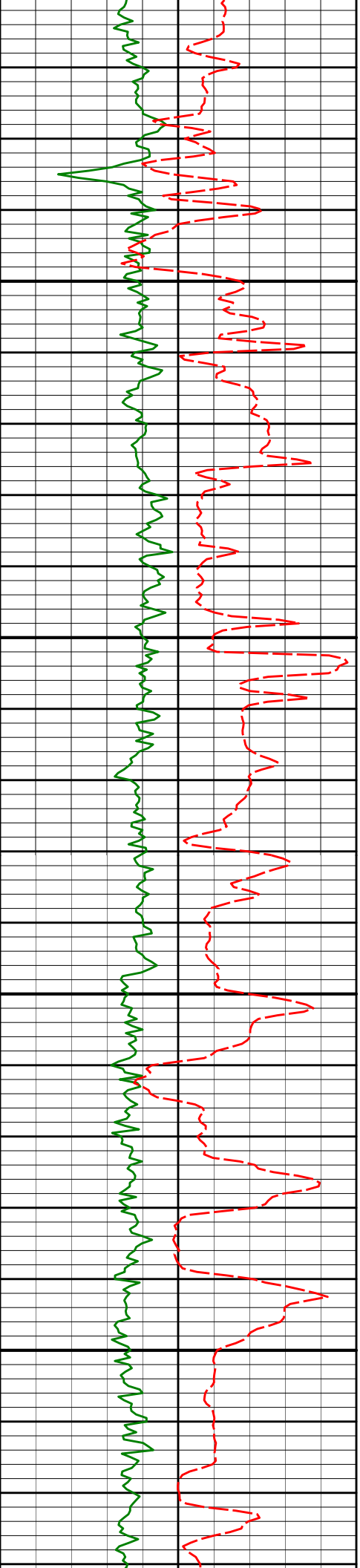
5735'	8.83°	108.22°	5544.13'	-418.01'
5831'	7.44°	104.13°	5639.16'	-421.40'



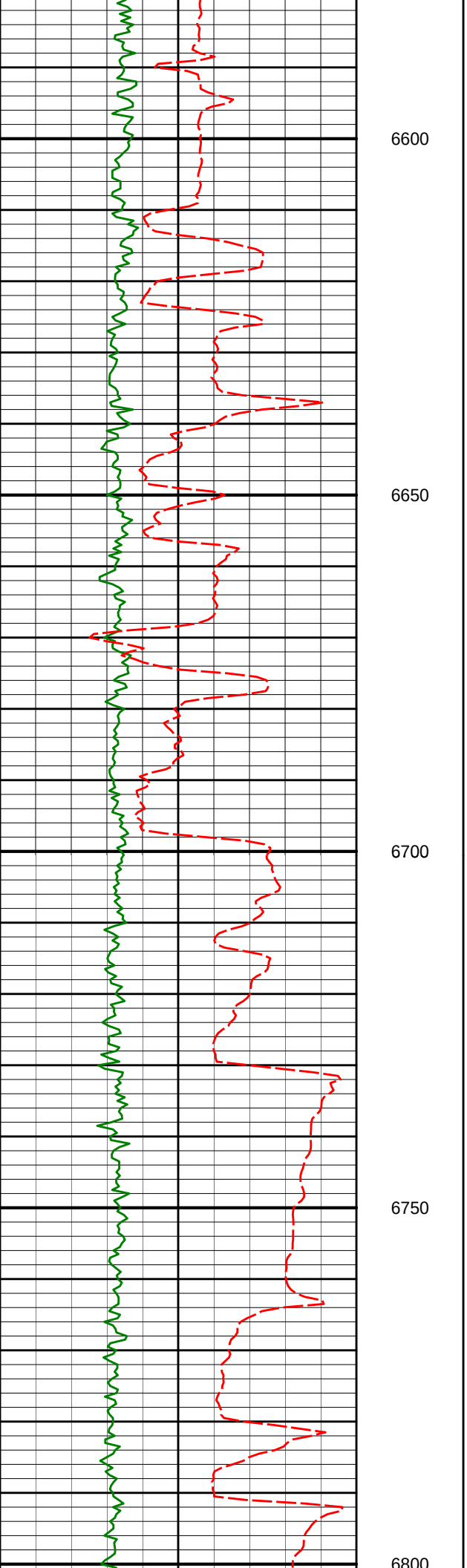
5926'	4.68°	101.18°	5733.62'	-423.32'
6021'	3.34°	72.65°	5828.40'	-423.03'
6116'	0.94°	58.79°	5923.32'	-421.69'



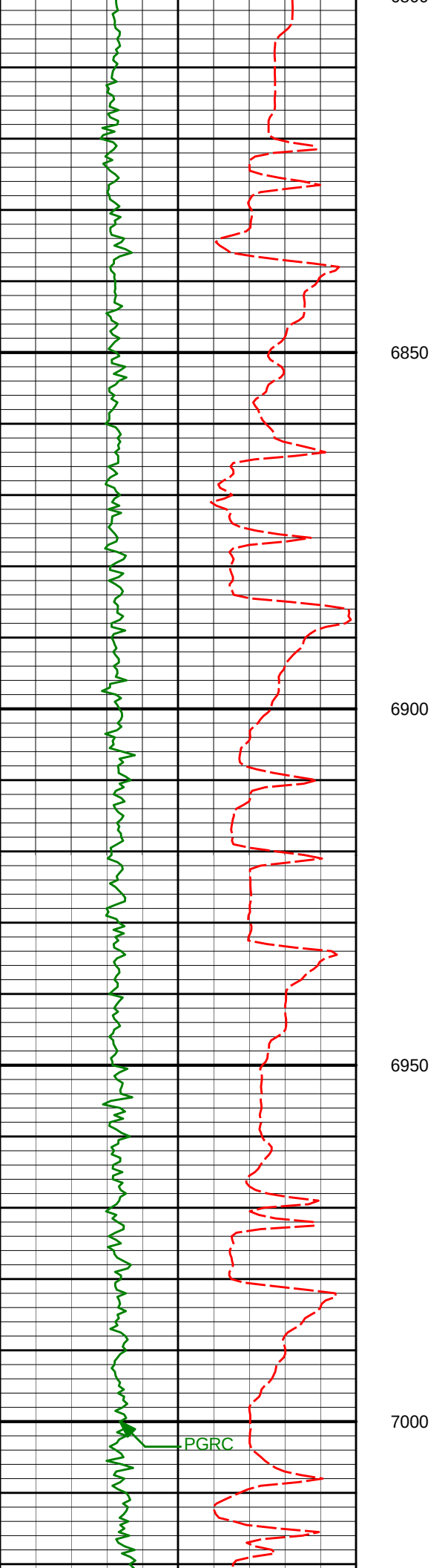
6211'	0.50°	34.37°	6018.32'	-420.92'
6306'	0.30°	22.40°	6113.31'	-420.33'



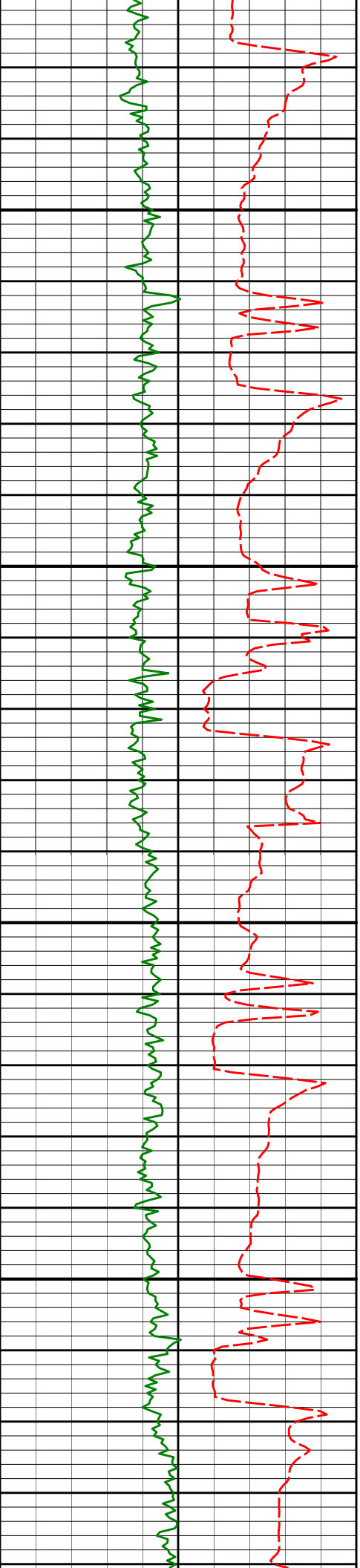
6401'	0.14°	327.34°	6208.31'	-420.01'	
6497'	0.28°	337.66°	6304.31'	-419.70'	



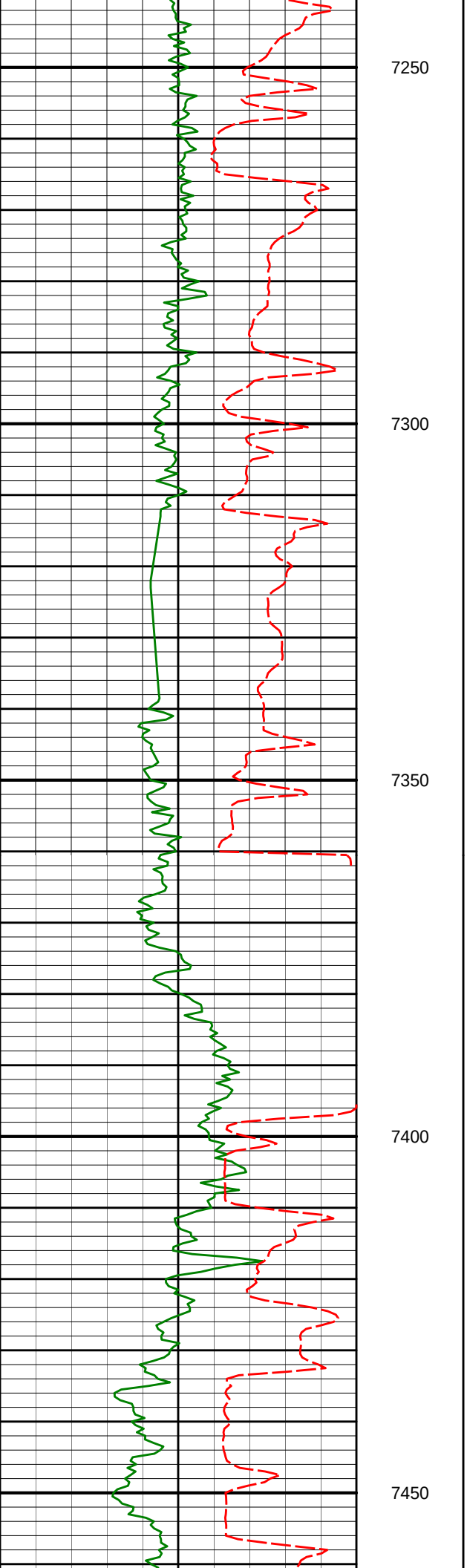
6592'	0.20°	76.49°	6399.31'	-419.44'
6687'	0.25°	41.14°	6494.31'	-419.24'
6735'	2.13°	2.75°	6542.30'	-418.26'
6781'	5.19°	358.37°	6588.20'	-415.33'



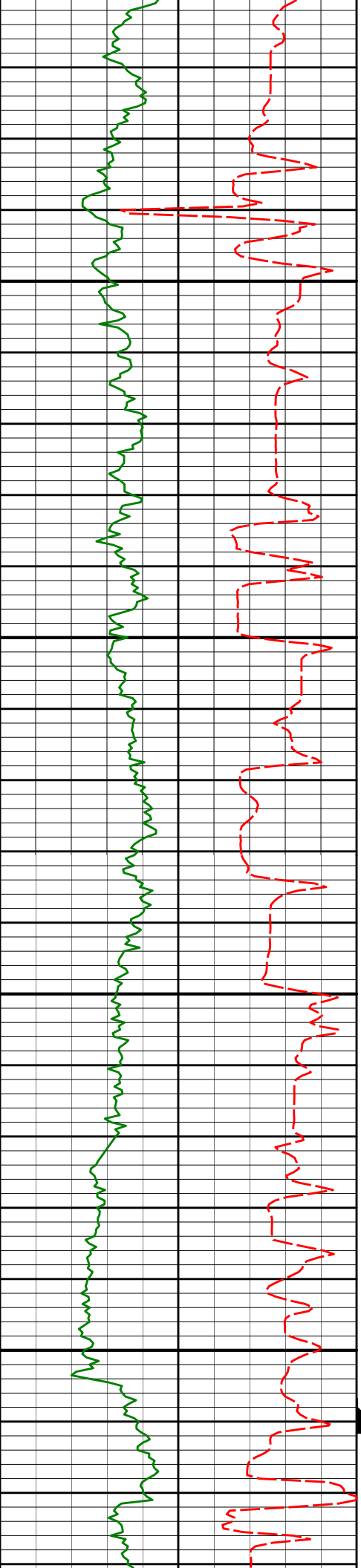
6829'	10.11°	358.87°	6635.76'	-408.95'
6877'	13.45°	358.03°	6682.74'	-399.17'
6925'	16.88°	358.93°	6729.06'	-386.64'
6972'	21.51°	358.92°	6773.44'	-371.21'
7020'	25.68°	0.59°	6817.42'	-352.02'



7067'	30.34°	1.99°	6858.90'	-329.96'
7115'	34.48°	1.59°	6899.41'	-304.23'
7162'	39.33°	0.30°	6936.99'	-276.03'
7210'	44.69°	359.40°	6972.64'	-243.93'

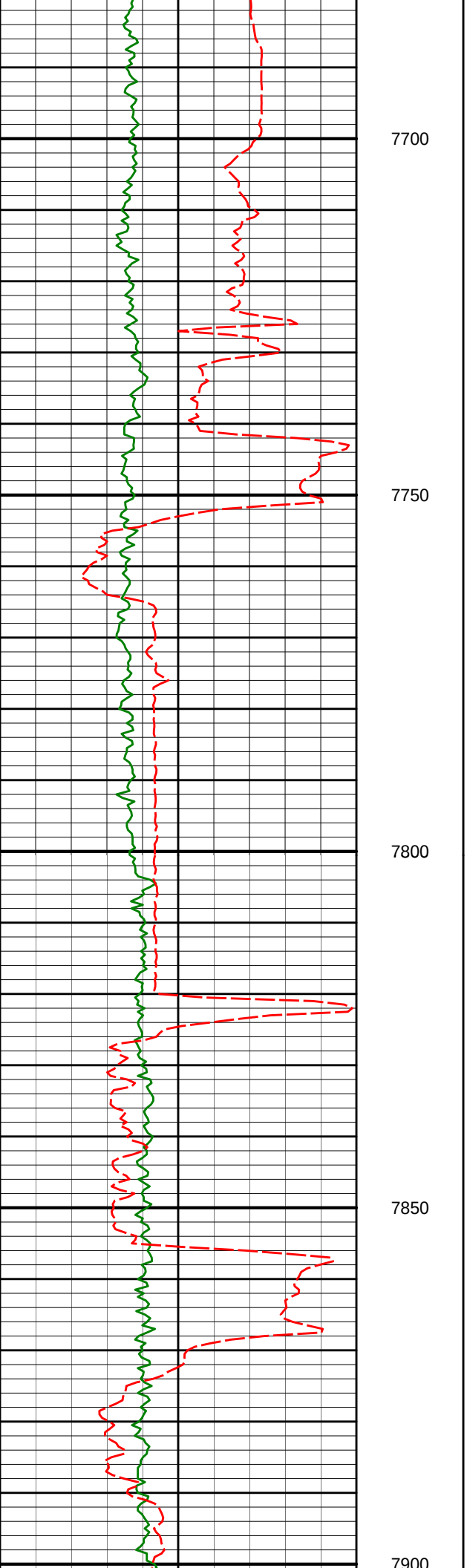


7257'	49.47°	1.29°	7004.64'	-209.54'
7305'	53.84°	2.12°	7034.41'	-171.91'
7352'	59.10°	1.45°	7060.36'	-132.74'
7400'	63.36°	1.56°	7083.46'	-90.68'
7447'	66.18°	0.55°	7103.49'	-48.17'

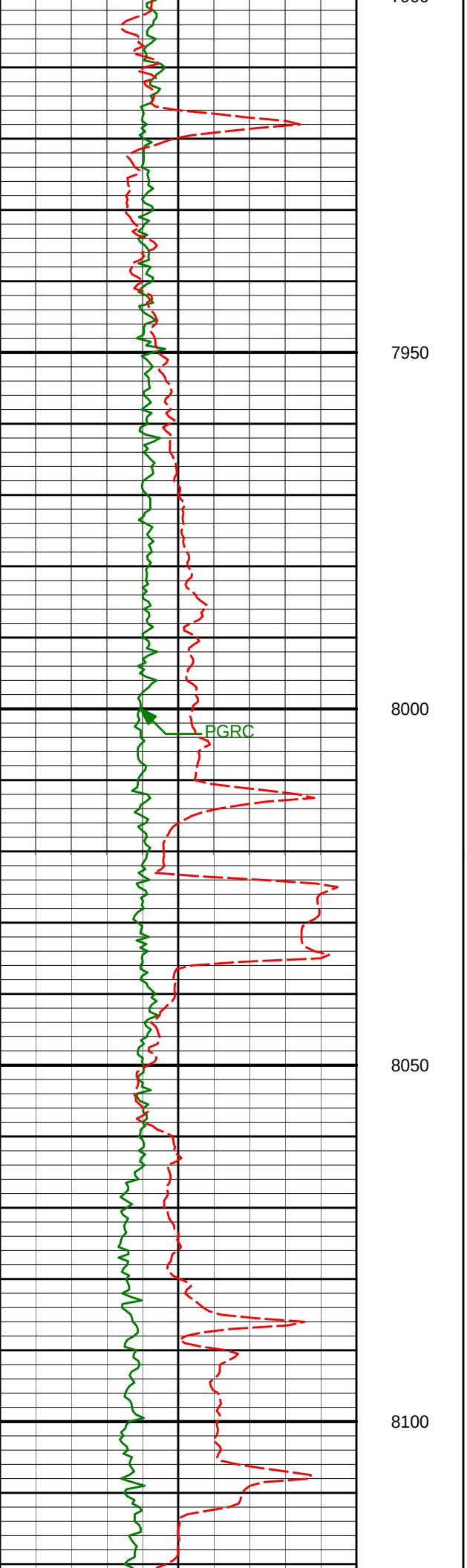


7495'	71.54°	0.59°	7120.79'	-3.43'
7542'	77.01°	0.93°	7133.53'	41.78'
7590'	80.30°	1.51°	7142.97'	88.84'
7625'	84.44°	1.49°	7147.62'	123.52'

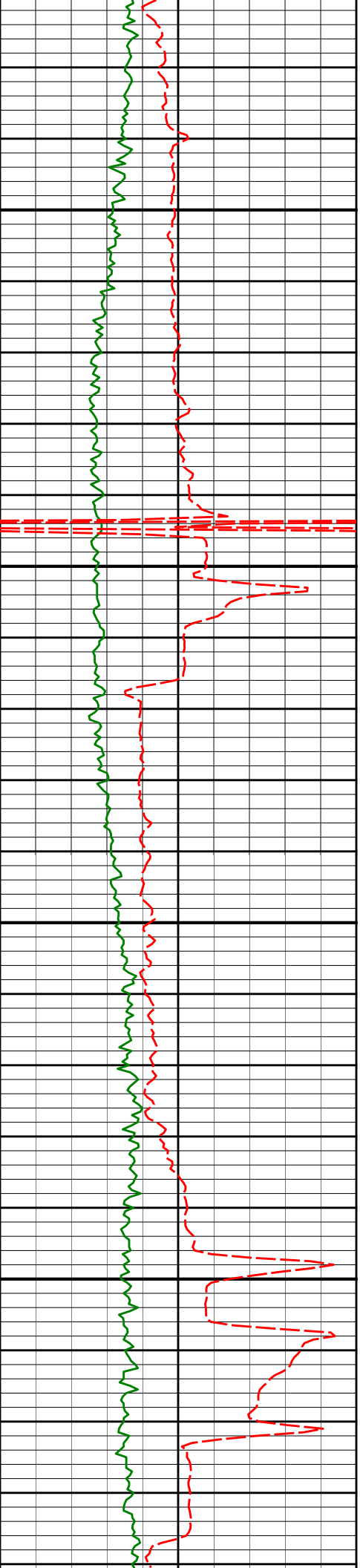
7" Casing Shoe @ 7661' MD / 7150.37' TVD



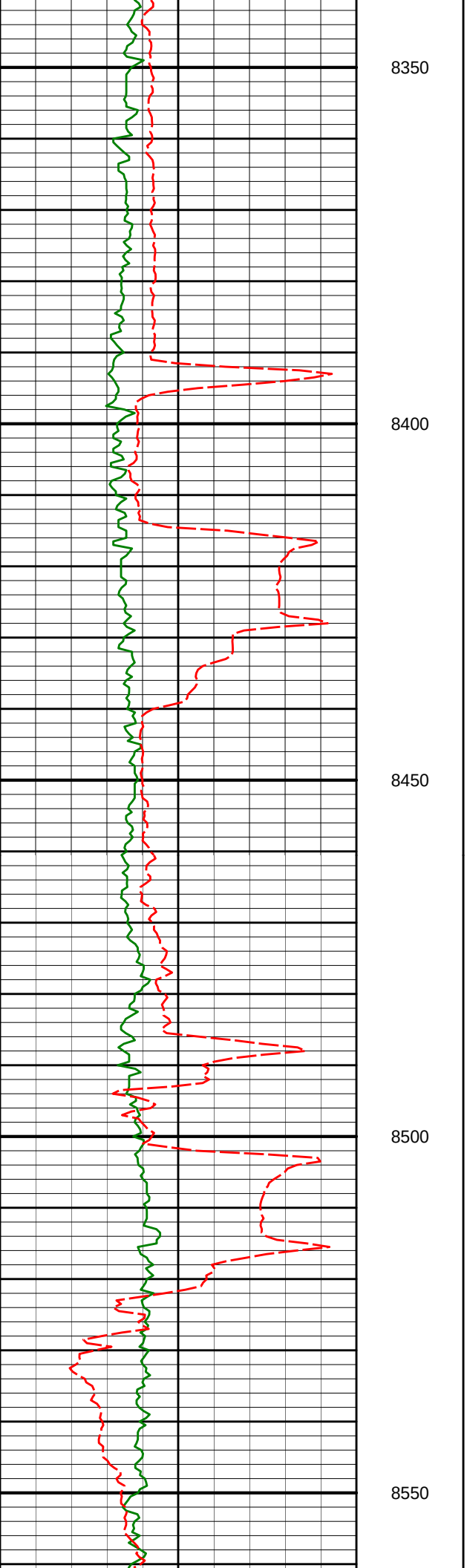
7682'	88.15°	1.68°	7151.30'	180.39'
7777'	89.45°	0.75°	7153.29'	275.36'
7872'	90.56°	1.21°	7153.28'	370.34'



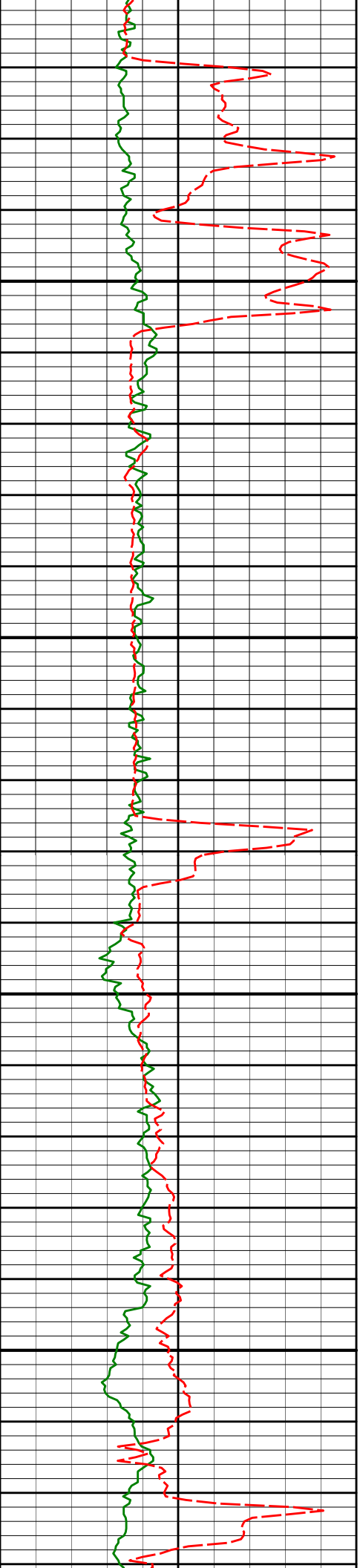
7967'	89.85°	1.09°	7152.94'	465.33'
8062'	91.20°	1.11°	7152.07'	560.32'



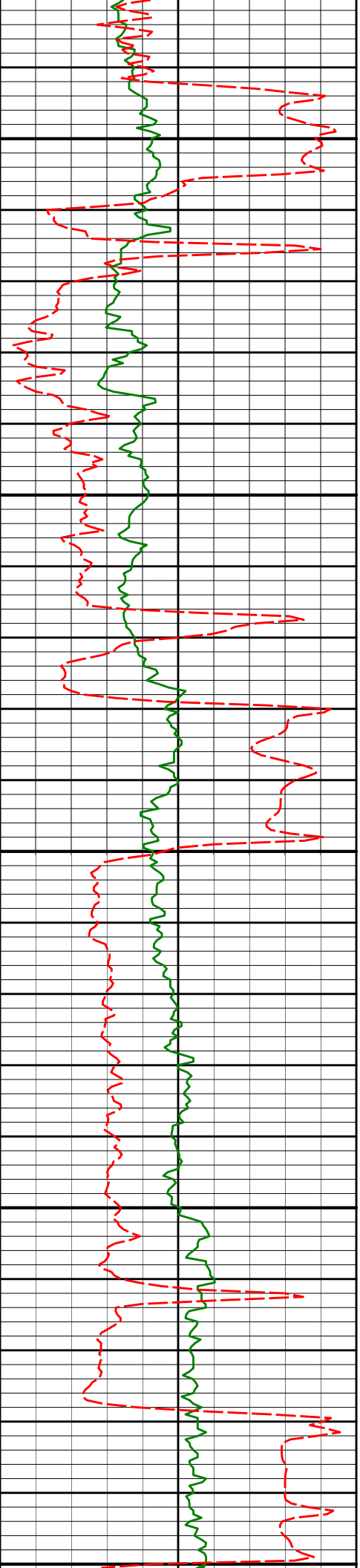
8157'	90.59°	0.62°	7150.58'	655.29'
8252'	88.80°	359.48°	7151.09'	750.23'



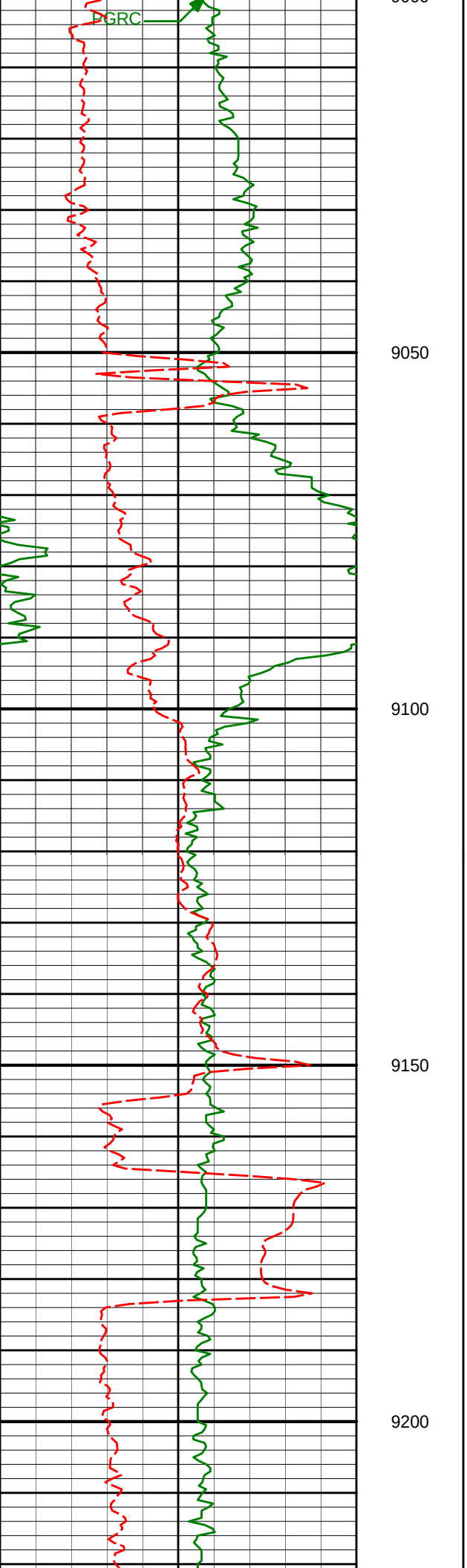
8347'	91.08°	1.12°	7151.19'	845.18'
8442'	89.45°	0.77°	7150.75'	940.17'
8538'	90.59°	1.66°	7150.72'	1036.16'



8633'	92.13°	2.12°	7148.46'	1131.13'
8728'	92.28°	0.44°	7144.81'	1226.05'

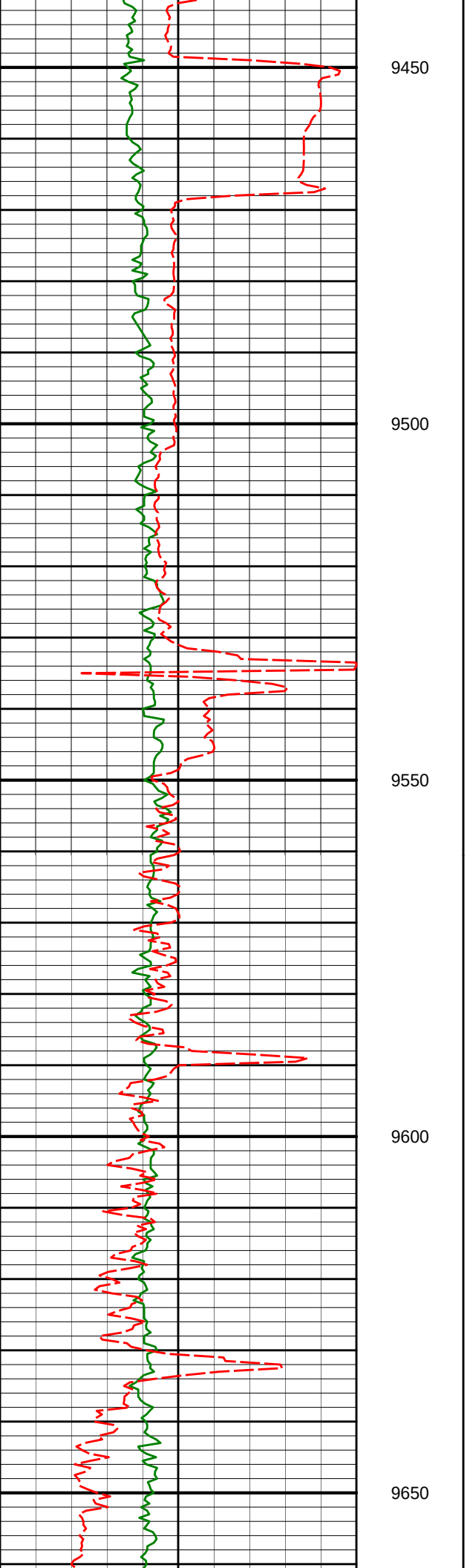


8823'	92.62°	1.73°	7140.75'	1320.95'
8918'	91.75°	1.69°	7137.12'	1415.88'

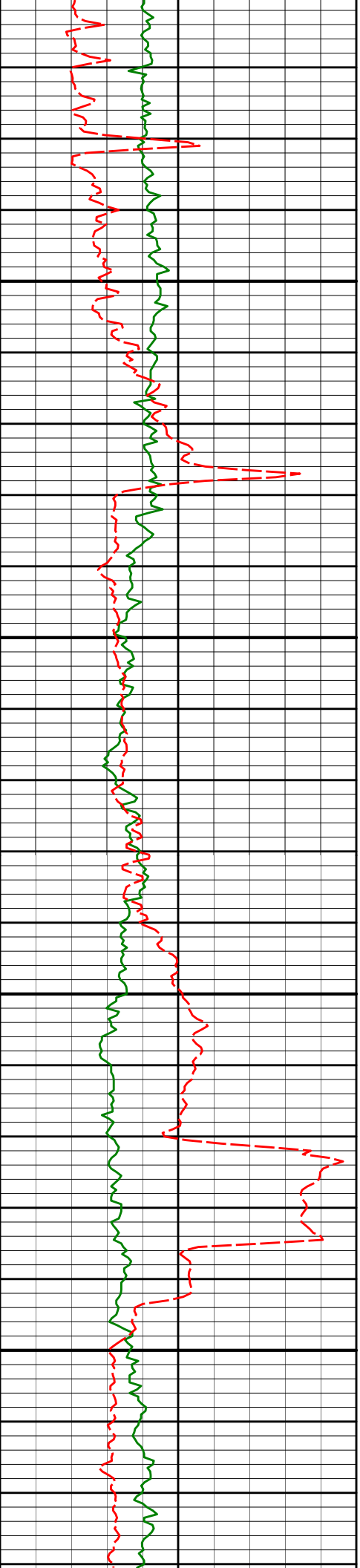


9013'	89.97°	2.17°	7135.70'	1510.86'
9108'	90.31°	1.21°	7135.47'	1605.86'
9204'	88.18°	1.19°	7136.73'	1701.84'

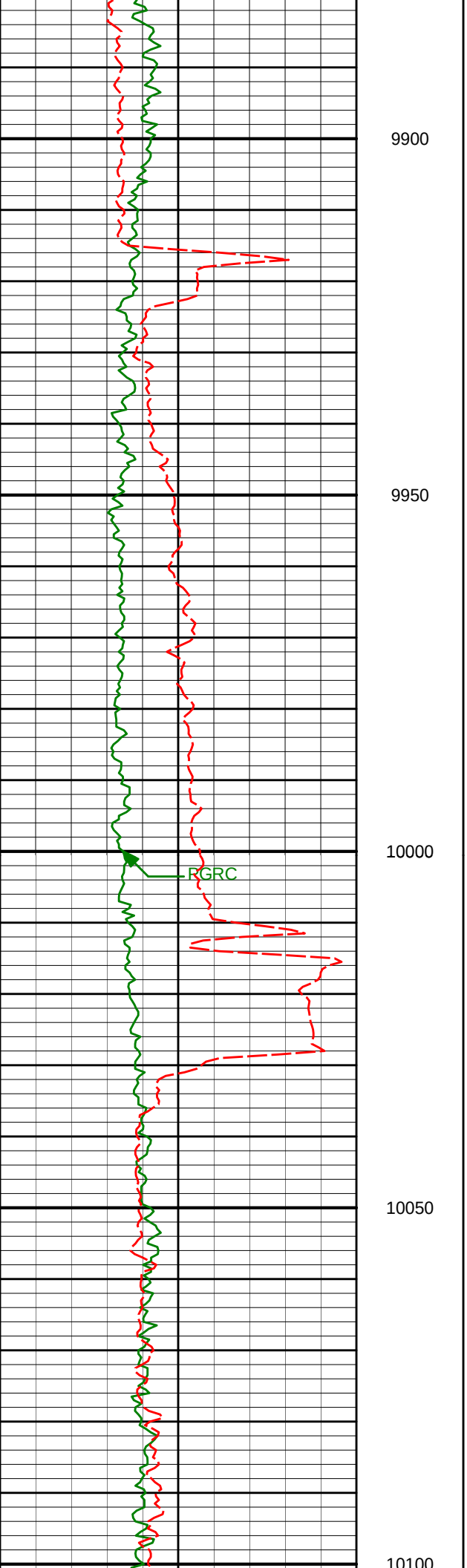
9299'	88.27°	0.15°	7139.67'	1796.77'	
9394'	89.60°	0.54°	7141.44'	1891.71'	



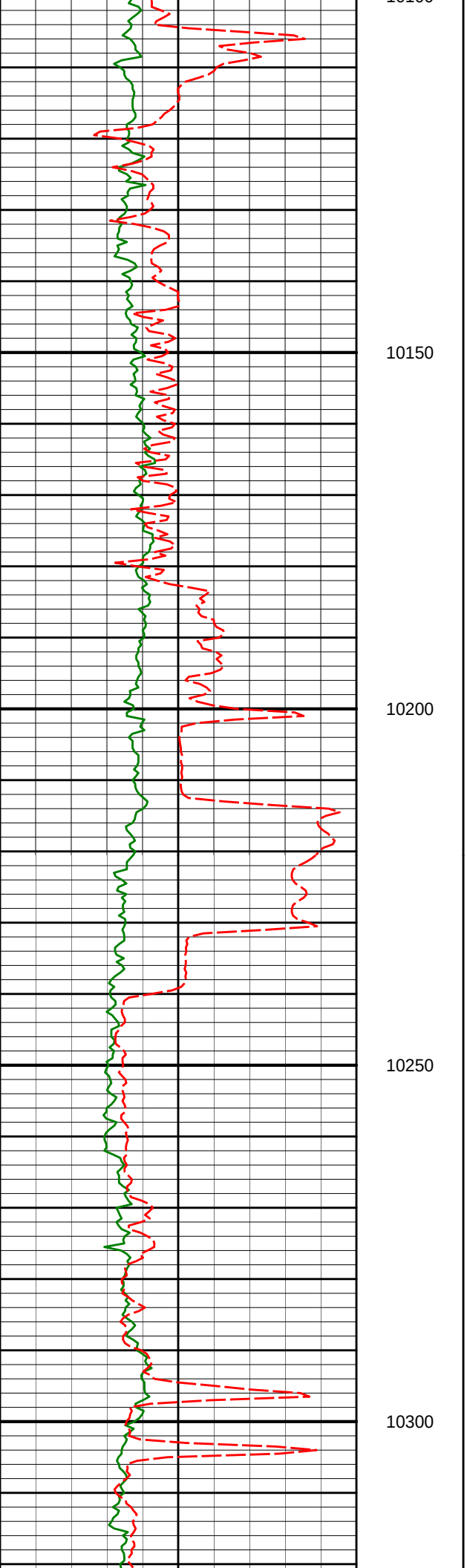
9489'	90.68°	3.01°	7141.21'	1986.70'
9584'	90.74°	1.87°	7140.03'	2081.69'



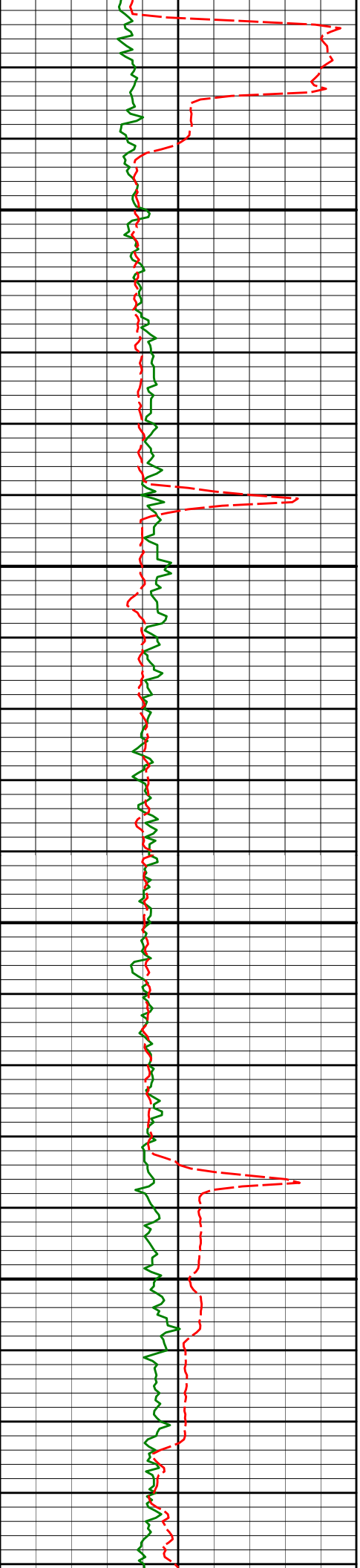
9679'	89.32°	2.36°	7139.98'	2176.69'
9774'	88.80°	1.47°	7141.54'	2271.67'
9870'	90.37°	1.32°	7142.23'	2367.66'



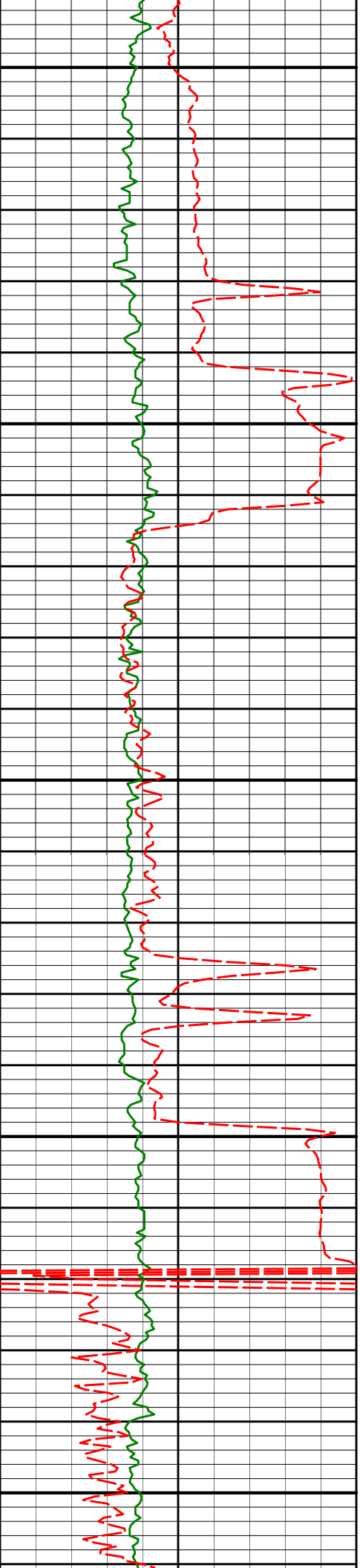
9965'	91.08°	0.71°	7141.03'	2462.64'
10060'	91.48°	1.98°	7138.91'	2557.61'



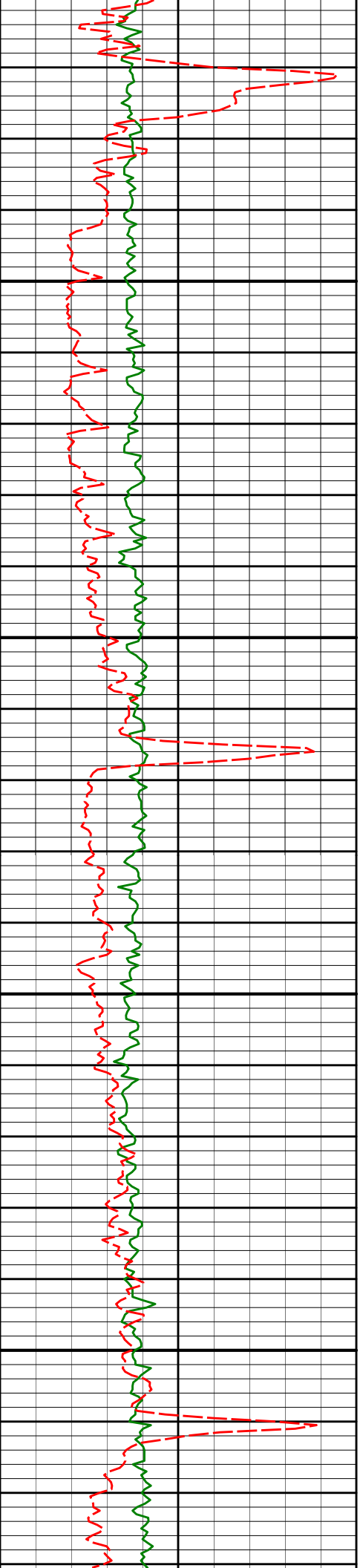
	10165'	90.68°	359.59°	7136.93'	2662.57'
	10250'	91.88°	2.46°	7135.03'	2747.52'



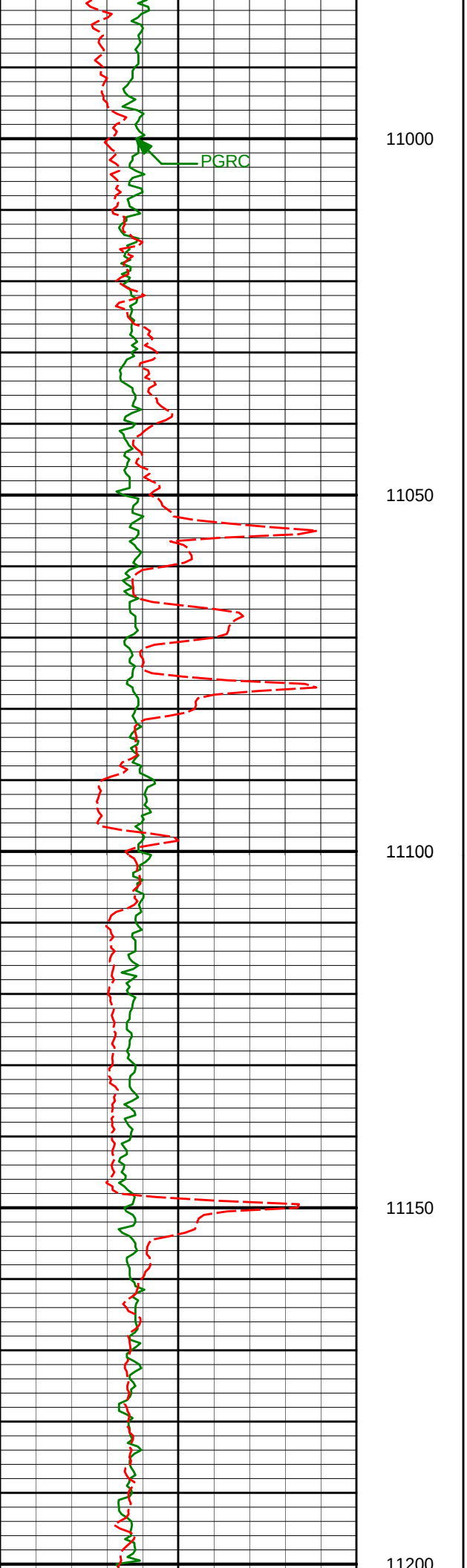
10345'	91.39°	3.11°	7132.32'	2842.47'
10440'	90.99°	2.10°	7130.35'	2937.44'
10536'	89.26°	0.69°	7130.14'	3033.43'



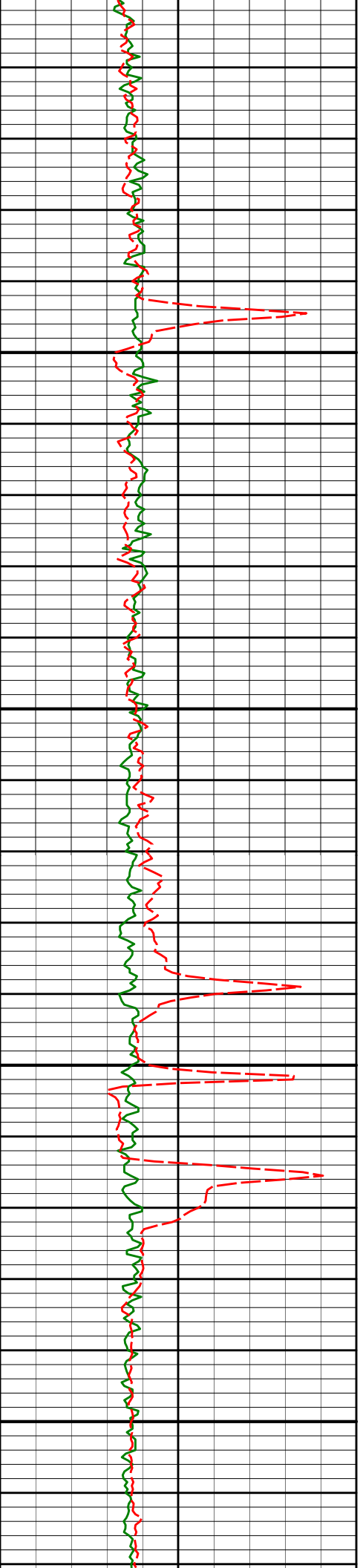
10631'	89.97°	1.78°	7130.78'	3128.42'
10726'	90.49°	4.42°	7130.40'	3223.39'



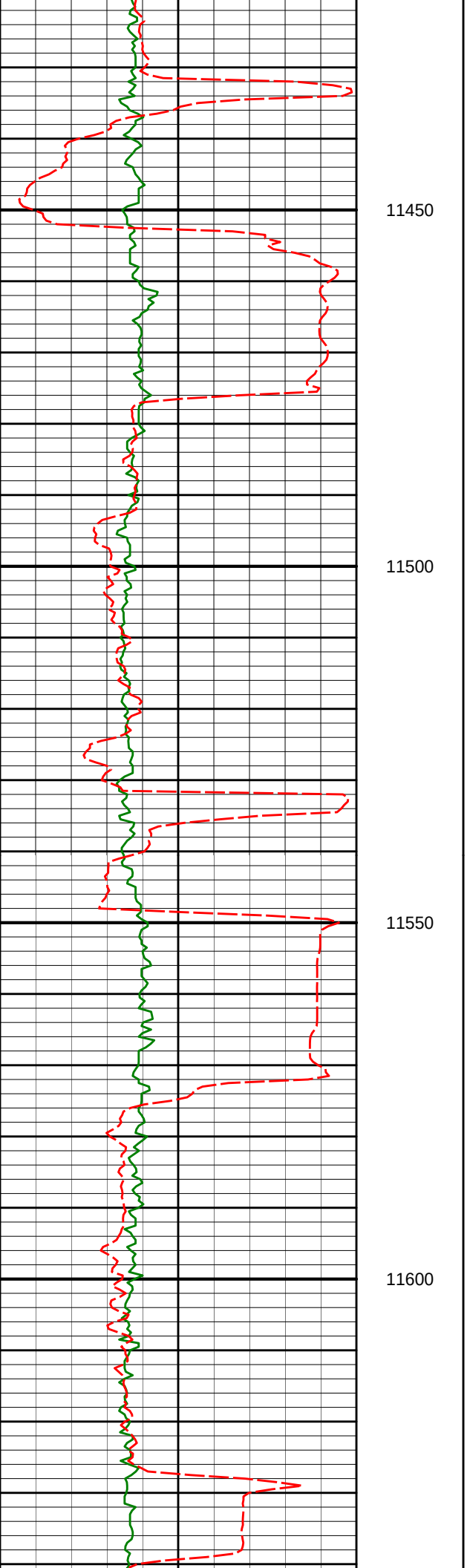
10821'	90.46°	4.67°	7129.61'	3318.29'
10916'	90.28°	3.12°	7128.99'	3413.23'



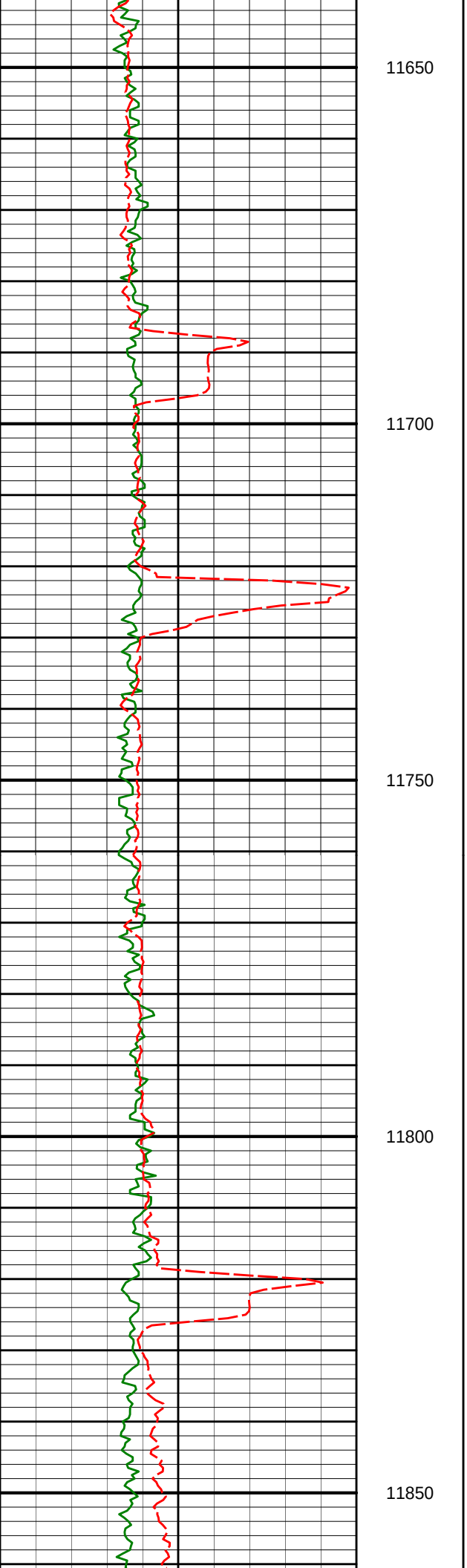
11011'	90.09°	1.92°	7128.69'	3508.22'
11106'	90.22°	1.33°	7128.43'	3603.22'



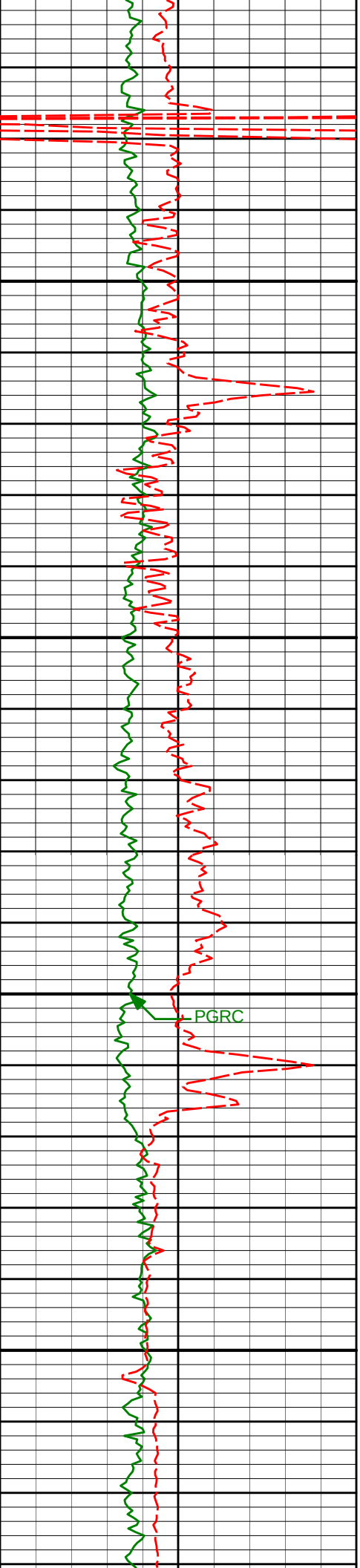
11202'	90.37°	1.70°	7127.94'	3699.22'
11297'	89.97°	359.50°	7127.65'	3794.18'
11392'	90.28°	359.80°	7127.45'	3889.11'



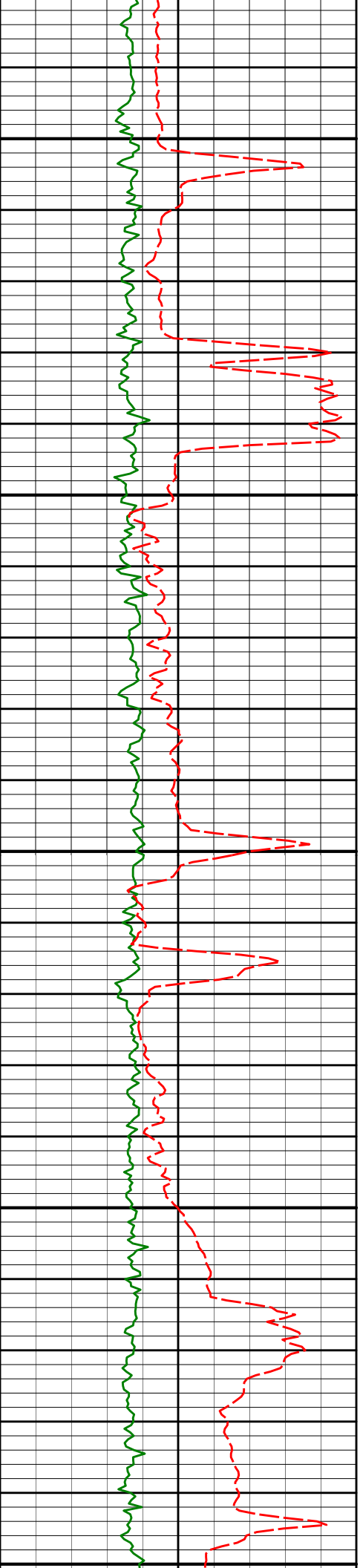
11487'	89.60°	359.27°	7127.55'	3984.03'
11582'	89.97°	3.17°	7127.90'	4079.00'



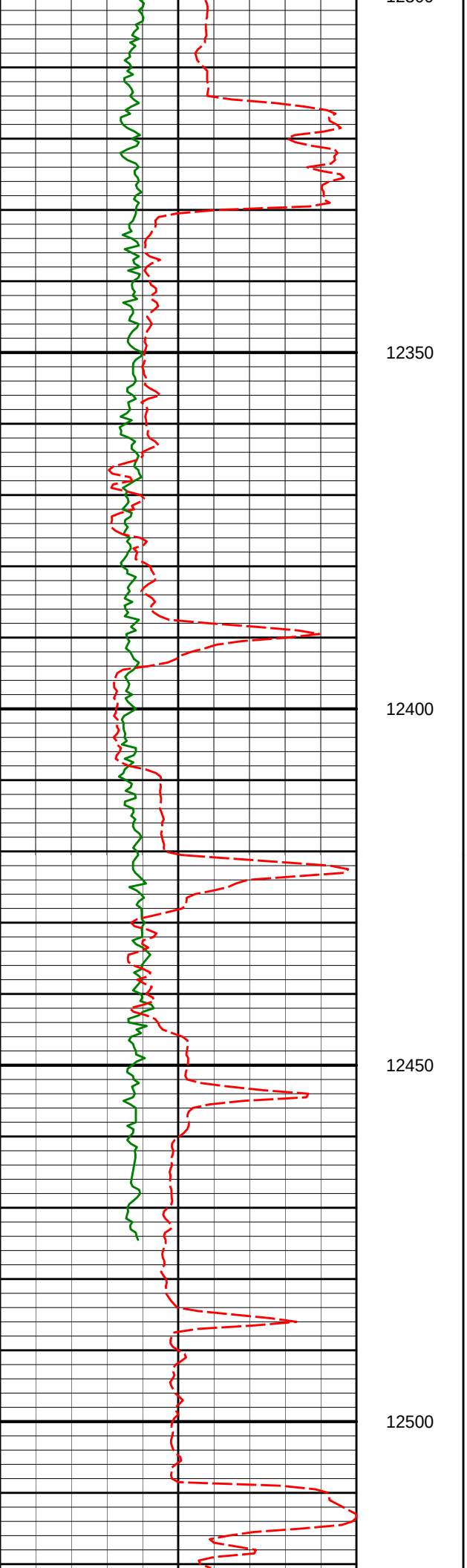
11677'	90.43°	3.66°	7127.57'	4173.97'
11772'	90.19°	2.31°	7127.06'	4268.95'



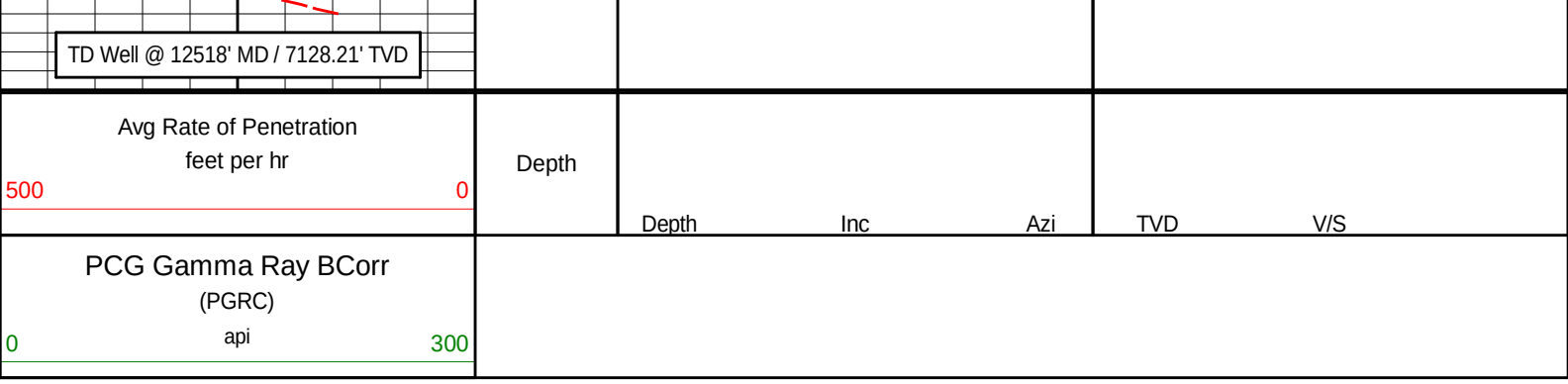
11867'	90.43°	2.21°	7126.54'	4363.94'
11962'	89.82°	1.20°	7126.34'	4458.94'
12057'	89.75°	0.95°	7126.69'	4553.93'



12152'	90.22°	0.92°	7126.72'	4648.92'
12247'	89.91°	359.21°	7126.61'	4743.86'



12342'	89.60°	357.54°	7127.02'	4838.68'
12437'	89.66°	356.75°	7127.63'	4933.34'
12469'	89.57°	355.48°	7127.85'	4965.18'
12518'	89.57°	355.48°	7128.21'	5013.87'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corporation
Ferge 28N-14HZ
Wattenberg
Weld Colorado
USA
CA-XX-0901264985

Measured Depth (feet)	*Inclination (degrees)*	*Direction (degrees)*	*Vertical Depth (feet)*	*Latitude (feet)*	*Departure (feet)*	*Vertical Section (feet)*	*Dogleg (deg/100ft)*
1176.00	0.77	286.60	1175.98	0.37 N	2.93 W	0.27	TIE-IN
1283.00	0.29	155.81	1282.98	0.33 N	3.51 W	0.21	0.92
1378.00	0.84	139.73	1377.97	0.42 S	2.96 W	-0.52	0.60
1479.00	2.58	120.58	1478.92	2.14 S	0.52 W	-2.16	1.79
1566.00	3.43	114.51	1565.80	4.22 S	3.53 E	-4.10	1.04
1660.00	5.74	110.76	1659.50	7.05 S	10.49 E	-6.70	2.48
1754.00	7.14	113.30	1752.90	11.03 S	20.25 E	-10.35	1.52
1848.00	9.54	115.62	1845.90	16.71 S	32.64 E	-15.61	2.58
1942.00	12.62	108.93	1938.14	23.41 S	49.38 E	-21.74	3.55
2037.00	13.94	109.11	2030.60	30.52 S	70.01 E	-28.16	1.39
2131.00	15.28	106.62	2121.56	37.77 S	92.58 E	-34.65	1.57
2225.00	16.85	109.37	2211.89	45.84 S	117.30 E	-41.88	1.86
2319.00	18.36	110.83	2301.48	55.62 S	143.99 E	-50.76	1.67
2413.00	18.07	110.76	2390.77	66.05 S	171.46 E	-60.27	0.31
2508.00	18.18	110.14	2481.06	76.38 S	199.15 E	-69.66	0.23
2602.00	20.94	111.53	2569.62	87.59 S	228.55 E	-79.89	2.98
2696.00	20.70	110.92	2657.49	99.69 S	259.69 E	-90.93	0.34
2790.00	21.34	111.04	2745.23	111.76 S	291.18 E	-101.94	0.68
2884.00	21.56	111.00	2832.72	124.09 S	323.26 E	-113.19	0.23
2979.00	21.77	111.54	2921.01	136.81 S	355.95 E	-124.81	0.30
3074.00	21.92	112.54	3009.19	150.08 S	388.71 E	-136.97	0.42
3169.00	19.98	110.72	3097.90	162.62 S	420.27 E	-148.45	2.15
3264.00	19.93	110.11	3187.20	173.93 S	450.66 E	-158.73	0.23
3359.00	18.64	109.05	3276.87	184.45 S	480.21 E	-168.26	1.41
3454.00	16.31	107.50	3367.48	193.42 S	507.29 E	-176.32	2.50
3549.00	17.09	106.37	3458.47	201.37 S	533.41 E	-183.38	0.89
3644.00	17.35	107.42	3549.21	209.54 S	560.31 E	-190.65	0.43
3740.00	18.20	110.77	3640.63	219.14 S	587.99 E	-199.32	1.38
3835.00	18.81	112.29	3730.72	230.21 S	616.03 E	-209.45	0.82
3930.00	16.74	109.17	3821.18	240.52 S	643.13 E	-218.83	2.40
4025.00	18.11	113.25	3911.82	250.84 S	669.62 E	-228.26	1.93
4120.00	20.58	114.69	4001.45	263.64 S	698.36 E	-240.10	2.65
4215.00	21.08	114.47	4090.24	277.69 S	729.08 E	-253.11	0.53
4310.00	20.40	114.62	4179.09	291.67 S	759.69 E	-266.05	0.72
4405.00	18.47	114.72	4268.67	304.86 S	788.41 E	-278.28	2.03
4500.00	18.71	115.05	4358.71	317.61 S	815.88 E	-290.09	0.28
4596.00	19.35	112.77	4449.47	330.28 S	844.50 E	-301.80	1.02
4691.00	18.60	112.30	4539.30	342.12 S	873.03 E	-312.68	0.81
4786.00	18.67	113.60	4629.32	353.96 S	900.98 E	-323.57	0.44
4880.00	18.70	114.42	4718.37	366.21 S	928.49 E	-334.90	0.28
4975.00	18.12	115.21	4808.51	378.80 S	955.72 E	-346.57	0.66
5070.00	17.15	115.74	4899.04	391.18 S	981.70 E	-358.06	1.03
5165.00	15.78	116.53	4990.14	403.03 S	1005.88 E	-369.10	1.46

5260.00	15.20	117.44	5081.69	414.54 S	1028.49 E	-379.85	0.66
5355.00	14.95	113.02	5173.43	425.07 S	1050.82 E	-389.62	1.24
5450.00	14.08	112.75	5265.39	434.33 S	1072.75 E	-398.14	0.92
5545.00	12.89	113.40	5357.77	443.01 S	1093.14 E	-406.13	1.26
5640.00	11.50	110.24	5450.63	450.49 S	1111.75 E	-412.99	1.62
5735.00	8.83	108.22	5544.13	456.05 S	1127.56 E	-418.01	2.84
5831.00	7.44	104.13	5639.16	459.87 S	1140.59 E	-421.40	1.57
5926.00	4.68	101.18	5733.62	462.12 S	1150.36 E	-423.32	2.92
6021.00	3.34	72.65	5828.40	462.05 S	1156.80 E	-423.03	2.49
6116.00	0.94	58.79	5923.32	460.82 S	1160.11 E	-421.69	2.57
6211.00	0.50	34.37	6018.32	460.07 S	1161.01 E	-420.92	0.55
6306.00	0.30	22.40	6113.31	459.50 S	1161.34 E	-420.33	0.23
6401.00	0.14	327.34	6208.31	459.17 S	1161.37 E	-420.01	0.26
6497.00	0.28	337.66	6304.31	458.86 S	1161.22 E	-419.70	0.15
6592.00	0.20	76.49	6399.31	458.61 S	1161.29 E	-419.44	0.39
6687.00	0.25	41.14	6494.31	458.41 S	1161.59 E	-419.24	0.15
6735.00	2.13	2.75	6542.30	457.44 S	1161.70 E	-418.26	4.04
6781.00	5.19	358.37	6588.20	454.51 S	1161.68 E	-415.33	6.68
6829.00	10.11	358.87	6635.76	448.12 S	1161.54 E	-408.95	10.25
6877.00	13.45	358.03	6682.74	438.33 S	1161.26 E	-399.17	6.97
6925.00	16.88	358.93	6729.06	425.78 S	1160.94 E	-386.64	7.16
6972.00	21.51	358.92	6773.44	410.33 S	1160.65 E	-371.21	9.85
7020.00	25.68	0.59	6817.42	391.12 S	1160.59 E	-352.02	8.80
7067.00	30.34	1.99	6858.90	369.06 S	1161.11 E	-329.96	10.01
7115.00	34.48	1.59	6899.41	343.36 S	1161.91 E	-304.23	8.64
7162.00	39.33	0.30	6936.99	315.15 S	1162.36 E	-276.03	10.45
7210.00	44.69	359.40	6972.64	283.03 S	1162.26 E	-243.93	11.24
7257.00	49.47	1.29	7004.64	248.63 S	1162.49 E	-209.54	10.59
7305.00	53.84	2.12	7034.41	211.01 S	1163.62 E	-171.91	9.20
7352.00	59.10	1.45	7060.36	171.86 S	1164.83 E	-132.74	11.25
7400.00	63.36	1.56	7083.46	129.81 S	1165.93 E	-90.68	8.88
7447.00	66.18	0.55	7103.49	87.31 S	1166.71 E	-48.17	6.31
7495.00	71.54	0.59	7120.79	42.56 S	1167.16 E	-3.43	11.17
7542.00	77.01	0.93	7133.53	2.66 N	1167.76 E	41.78	11.66
7590.00	80.30	1.51	7142.97	49.71 N	1168.76 E	88.84	6.96
7625.00	84.44	1.49	7147.62	84.38 N	1169.67 E	123.52	11.83
7682.00	88.15	1.68	7151.30	141.23 N	1171.24 E	180.39	6.52
7777.00	89.45	0.75	7153.29	236.18 N	1173.26 E	275.36	1.68
7872.00	90.56	1.21	7153.28	331.17 N	1174.88 E	370.34	1.26
7967.00	89.85	1.09	7152.94	426.14 N	1176.79 E	465.33	0.76
8062.00	91.20	1.11	7152.07	521.12 N	1178.61 E	560.32	1.42
8157.00	90.59	0.62	7150.58	616.10 N	1180.05 E	655.29	0.82
8252.00	88.80	359.48	7151.09	711.09 N	1180.13 E	750.23	2.23
8347.00	91.08	1.12	7151.19	806.08 N	1180.63 E	845.18	2.96
8442.00	89.45	0.77	7150.75	901.06 N	1182.19 E	940.17	1.75
8538.00	90.59	1.66	7150.72	997.04 N	1184.23 E	1036.16	1.51
8633.00	92.13	2.12	7148.46	1091.96 N	1187.36 E	1131.13	1.69
8728.00	92.28	0.44	7144.81	1186.86 N	1189.48 E	1226.05	1.77
8823.00	92.62	1.73	7140.75	1281.75 N	1191.28 E	1320.95	1.40
8918.00	91.75	1.69	7137.12	1376.64 N	1194.11 E	1415.88	0.92
9013.00	89.97	2.17	7135.70	1471.57 N	1197.31 E	1510.86	1.94
9108.00	90.31	1.21	7135.47	1566.53 N	1200.11 E	1605.86	1.07
9204.00	88.18	1.19	7136.73	1662.50 N	1202.12 E	1701.84	2.22
9299.00	88.27	0.15	7139.67	1757.44 N	1203.23 E	1796.77	1.10
9394.00	89.60	0.54	7141.44	1852.42 N	1203.80 E	1891.71	1.46
9489.00	90.68	3.01	7141.21	1947.37 N	1206.75 E	1986.70	2.84
9584.00	90.74	1.87	7140.03	2042.27 N	1210.79 E	2081.69	1.20
9679.00	89.32	2.36	7139.98	2137.20 N	1214.30 E	2176.69	1.58
9774.00	88.80	1.47	7141.54	2232.14 N	1217.47 E	2271.67	1.08
9870.00	90.37	1.32	7142.23	2328.10 N	1219.81 E	2367.66	1.64
9965.00	91.08	0.71	7141.03	2423.08 N	1221.49 E	2462.64	0.99
10060.00	91.48	1.98	7138.91	2518.03 N	1223.72 E	2557.61	1.40
10165.00	90.68	359.59	7136.93	2622.99 N	1225.16 E	2662.57	2.40
10250.00	91.88	2.46	7135.03	2707.95 N	1226.68 E	2747.52	3.66
10345.00	91.39	3.11	7132.32	2802.79 N	1231.29 E	2842.47	0.86
10440.00	90.99	2.10	7130.35	2897.67 N	1235.61 E	2937.44	1.14
10536.00	89.26	0.69	7130.14	2993.64 N	1237.94 E	3033.43	2.32
10631.00	89.97	1.78	7130.78	3088.61 N	1239.99 E	3128.42	1.37
10726.00	90.49	4.42	7130.40	3183.46 N	1245.13 E	3223.39	2.83
10821.00	90.46	4.67	7129.61	3278.16 N	1252.66 E	3318.29	0.27
10916.00	90.28	3.12	7128.99	3372.94 N	1259.11 E	3413.23	1.64
11011.00	90.09	1.92	7128.69	3467.84 N	1263.29 E	3508.22	1.28
11106.00	90.22	1.33	7128.43	3562.80 N	1265.98 E	3603.22	0.64
11202.00	90.37	1.70	7127.94	3658.77 N	1268.52 E	3699.22	0.42

11297.00	89.97	359.50	7127.65	3753.76 N	1269.51 E	3794.18	2.35
11392.00	90.28	359.80	7127.45	3848.76 N	1268.93 E	3889.11	0.45
11487.00	89.60	359.27	7127.55	3943.75 N	1268.16 E	3984.03	0.91
11582.00	89.97	3.17	7127.90	4038.71 N	1270.18 E	4079.00	4.12
11677.00	90.43	3.66	7127.57	4133.54 N	1275.84 E	4173.97	0.71
11772.00	90.19	2.31	7127.06	4228.41 N	1280.79 E	4268.95	1.44
11867.00	90.43	2.21	7126.54	4323.33 N	1284.54 E	4363.94	0.27
11962.00	89.82	1.20	7126.34	4418.29 N	1287.36 E	4458.94	1.24
12057.00	89.75	0.95	7126.69	4513.27 N	1289.14 E	4553.93	0.27
12152.00	90.22	0.92	7126.72	4608.26 N	1290.70 E	4648.92	0.50
12247.00	89.91	359.21	7126.61	4703.26 N	1290.80 E	4743.86	1.83
12342.00	89.60	357.54	7127.02	4798.21 N	1288.11 E	4838.68	1.79
12437.00	89.66	356.75	7127.63	4893.09 N	1283.38 E	4933.34	0.83
12469.00	89.57	355.48	7127.85	4925.02 N	1281.21 E	4965.18	3.98
12518.00	89.57	355.48	7128.21	4973.86 N	1277.35 E	5013.87	0.00

CALCULATION BASED ON MINIMUM CURVATURE METHOD

SURVEY COORDINATES RELATIVE TO WELL SYSTEM REFERENCE POINT
TVD VALUES GIVEN RELATIVE TO DRILLING MEASUREMENT POINT

VERTICAL SECTION RELATIVE TO WELL HEAD
VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 1.92 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.55 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 12518.00 FEET
IS 5135.26 FEET ALONG 14.40 DEGREES (TRUE)

All directional surveys tied on to the last gyro survey at 1176.00' MD. Final survey is a straight-line projection to the bit.

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