HALLIBURTON | Sperry Drilling

PCG Pressure Case Gamma Ray
PCDC Pressure Case Directional

Country : USA
Field : Wattenburg
Location : Lat: 40° 20' 38.04" North
Long: 104° 44' 1.97" West
Well : Loeffler K1-65HN-A2
Company : Noble Energy
Rig : PD 829

Company : **Noble Energy**
Rig : **PD 829**
Well : **Loeffler K1-65HN-A2**
Field : **Wattenburg**
Country : **USA**
API Number : **05-123-37739**

LOCATION
Latitude : **40° 20' 38.04" North**
Longitude : **104° 44' 1.97" West**
UTM Easting = **3,213,546.111 ft**
UTM Northing = **1,369,045.945 ft**

Other Services
Directional Drilling

Permanent Datum : **Ground Level**
Elevation : **4666.00 ft**
Log Measured From : **Drill Floor** **16.00 ft** Above Permanent Datum
Drilling Measured From : **Drill Floor**

TVD LOG

Elev. KB **N/A**
DF **4682.00 ft**
GL **4666.00 ft**
WD **N/A**

Depth Logged : **644.99 ft** To **7,010.40 ft**
Date Logged : **29-Sep-13** To **01-Oct-13**
Total Depth MD : **7,414.00 ft** TVD : **7,010.40 ft**
Spud Date : **27-Sep-13**

Unit No. : **11703725**
Job No. : **CA-XX-0900735959**
Plot Type : **Final**
Plot Date : **02-Oct-13**

Run No.	Borehole Record (TVD) Size	From	To
0200	8.750 in	644.99 ft	7,010.40 ft

Run No.	Borehole Record (TVD) Size	From	To

Casing Record (TVD) Size	Weight	From	To
9.625 in	36.00 lbpf	SURFACE	634.99 ft

WELL INFORMATION

MWD Run Number	100
Date run completed	02-Oct-13
Rig Bit Number	0200
Bit Size (in)	8.750
Tool Nominal OD (in)	6.750
Log Start Depth (MD, ft)	645.00
Log End Depth (MD, ft)	7,414.00
Drill or Wipe	Drill
Drill/Wipe Start Date and Time	29-Sep-13 02:45
Drill/Wipe End Date and Time	01-Oct-13 21:45
Min Inc (deg) @ Depth (MD, ft)	0.40 @ 306.00
Max Inc (deg) @ Depth (MD, ft)	80.68 @ 7,364.00
Bit TFA(in2) / Bit Type	0.84 / PDC
Flow Rate (gpm)	580.00
Max AV (fpm) / CV (fpm) @ MWD	325.7 / 208.8
Fluid Type	Fresh Water Gel
Density (ppg) / Viscosity (spqt)	9.48 / 40.00
Filtrate CL (ppm)	700.00
pH / Fluid Loss (mptm)	9.80 / 0
PV (cP) / YP (lhf2)	10 / 6.00
% Solids / % Sand	9.60 / 0.25
% Oil / Oil:Water Ratio	N/A / N/A
Rm @ Measured Temp (degF)	N/A @ N/A
Rmf @ Measured Temp (degF)	N/A @ N/A
Rmc @ Measured Temp (degF)	N/A @ N/A

Max Tool Temp (degF) / Source	165.58 / PCM				
Rm @ Max Tool Temp (degF)	N/A @ 165.58				
Lead MWD Engineer	Scott Trowbridge				
Customer Representative	JW Irwin				

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM				
Software Version	5.84				
Sub Serial Number	11404283				
Insert Serial Number	11619990				
Date and Time Initialized	27-Sep-13 18:52				
Date and Time Read	02-Oct-13 07:37				
ECMB SW Version	N/A				

Directional Sensor Information

Tool Type	PCDC				
Distance From Bit (ft)	50.00				
Software Version	6.21				
Sub Serial Number	11404283				
Sonde Serial Number	11297574				
Sensor ID Number	N/A				
Toolface Offset (deg)	286.82				

Gamma Ray Sensor Information

Tool Type	PCG				
Distance From Bit (ft)	52.94				
Recorded Sample Period (sec)	10				
Software Version	8.15				
Sub Serial Number	11404283				
Insert/Sonde Serial Number	11579779				

REMARKS

1. All depths are true vertical bit depths, referenced to the Drillers Driller's pipe tally and are measured from the Drill Floor, unlses unlessotherwise specified.

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

3.Critical annular velocities are calculated using the "Power Law" for water based fluids and the "Bingham Plastic" model for oil and synthetic based fluids.

4. All data is stored data unless otherwise specified.

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

PCG Gamma Ray BCorr (Gamma Ray Cor)
Interval Resolution: .5
Interval Distance: .6
Gap Fill: 3

ROPA (Average Rate of Penetration)
Interval Resoulution: .5
Interval Distance: 1.2
Gap Fill: 3

WARRANTY

HALLIBURTON

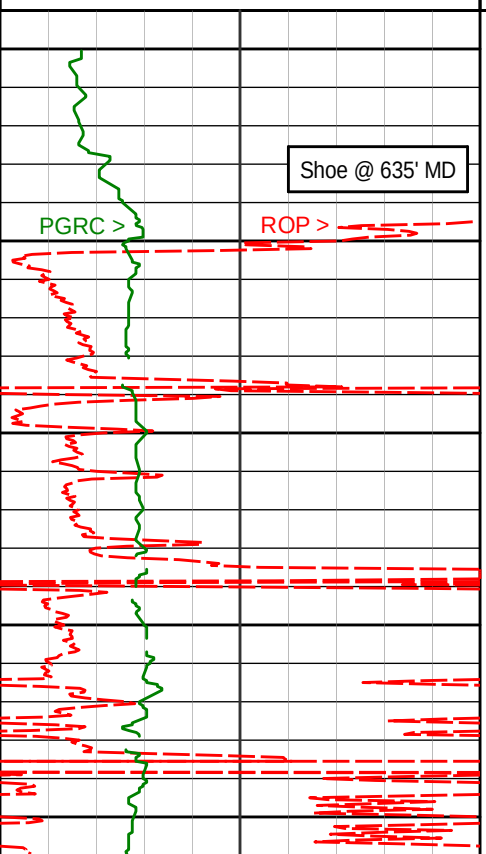
Sperry Drilling Services

TVD Detail Log 1:600

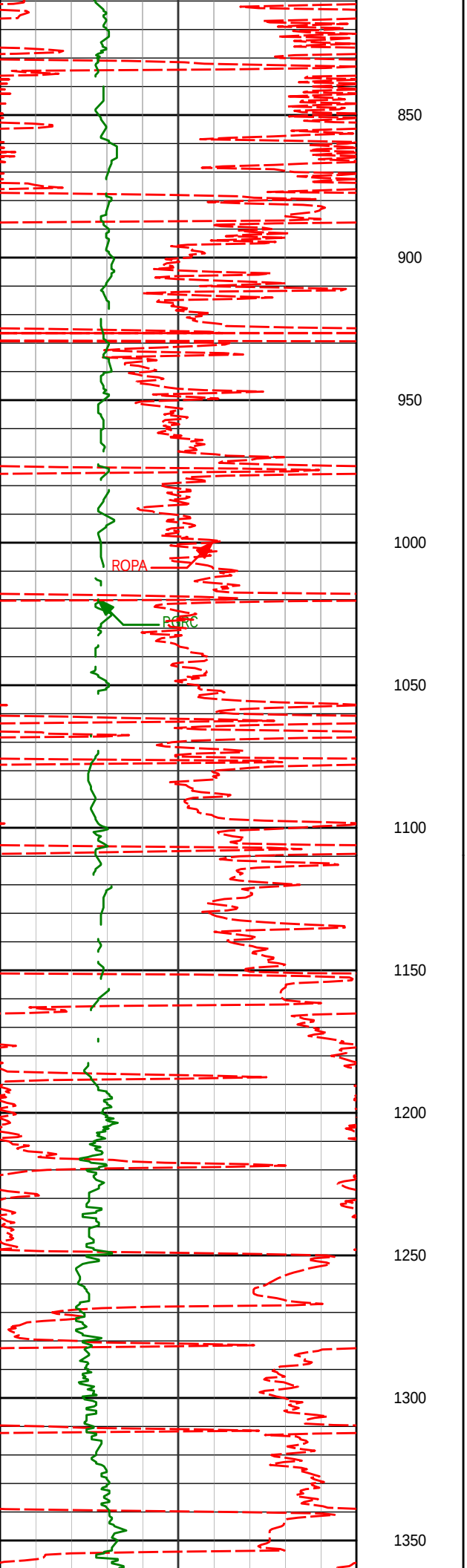
Noble Energy
Loeffler K1-65HN
PD 829
Sec.1-T4N-R66W

Avg Rate of Penetration
ROPA
500 feet per hr 0

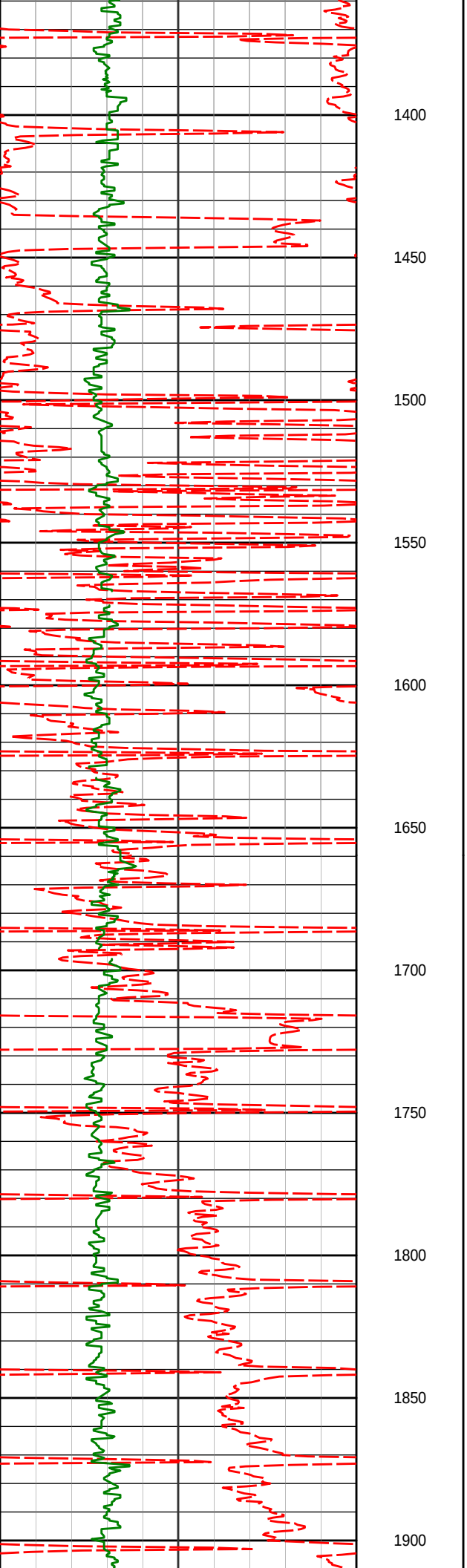
PCG GammaRay BCor
api
0 300



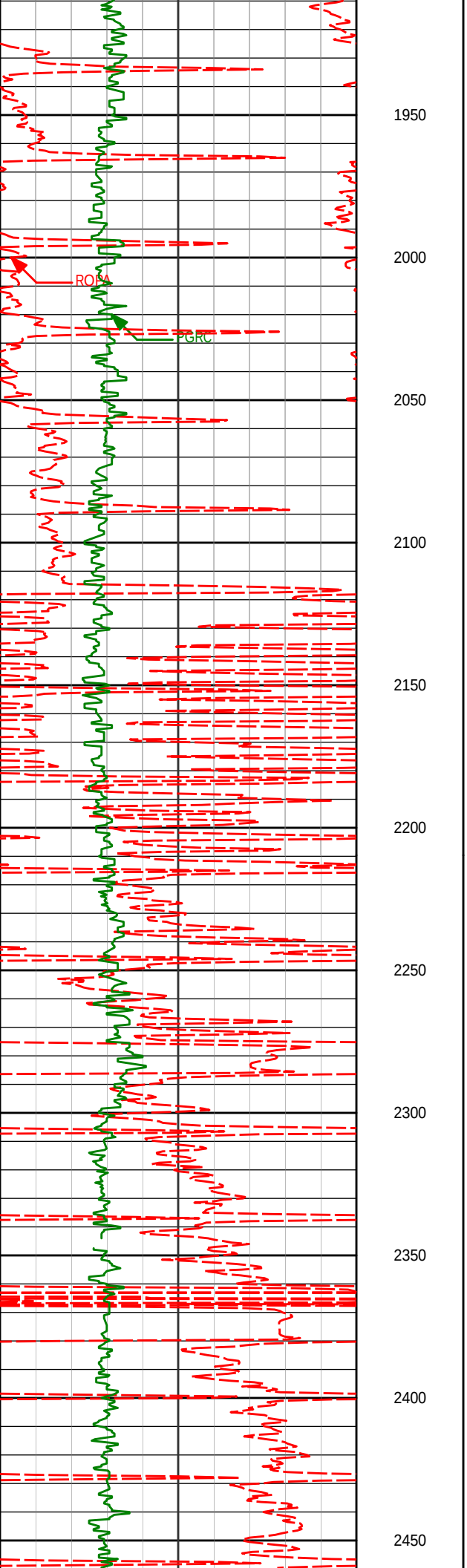
Depth ft	Depth	Inc.	Azi.	TVD	V.S.
600					
	623'	0.40°	315.67°	622.99'	0.59'
Run 100					
650					
700	698'	0.47°	284.63°	697.99'	0.07'
750					
800					



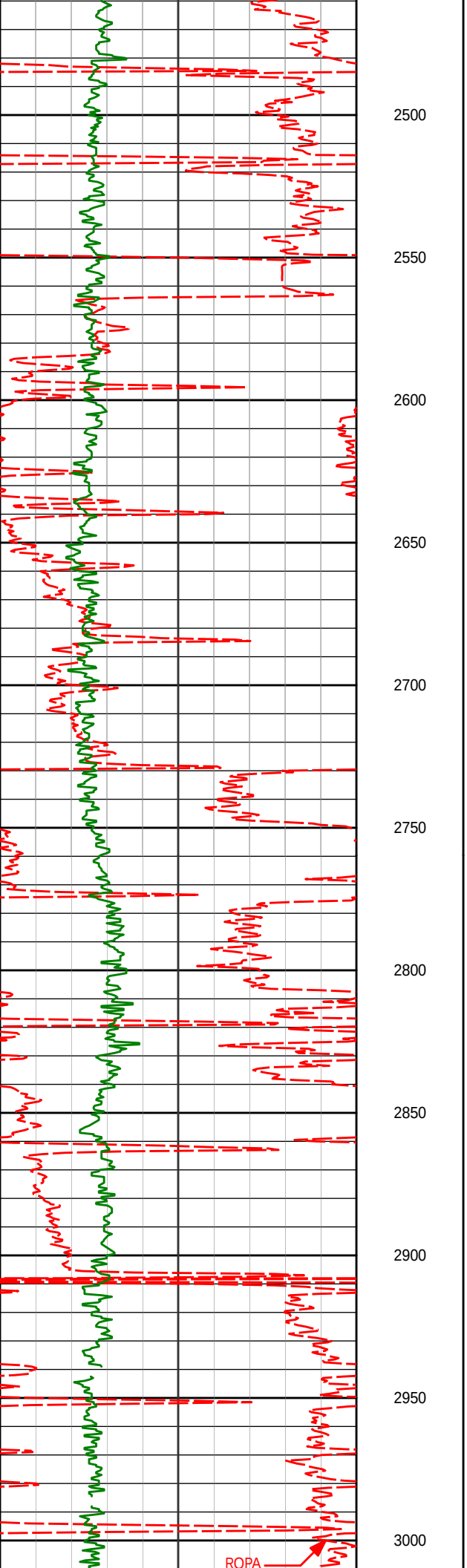
832'	0.68°	280.06°	831.98'	-1.27'
966'	1.28°	190.85°	965.97'	-2.07'
1101'	0.65°	185.90°	1100.95'	-2.02'
1198'	1.63°	185.92°	1197.93'	-1.86'
1292'	3.59°	199.94°	1291.83'	-2.23'



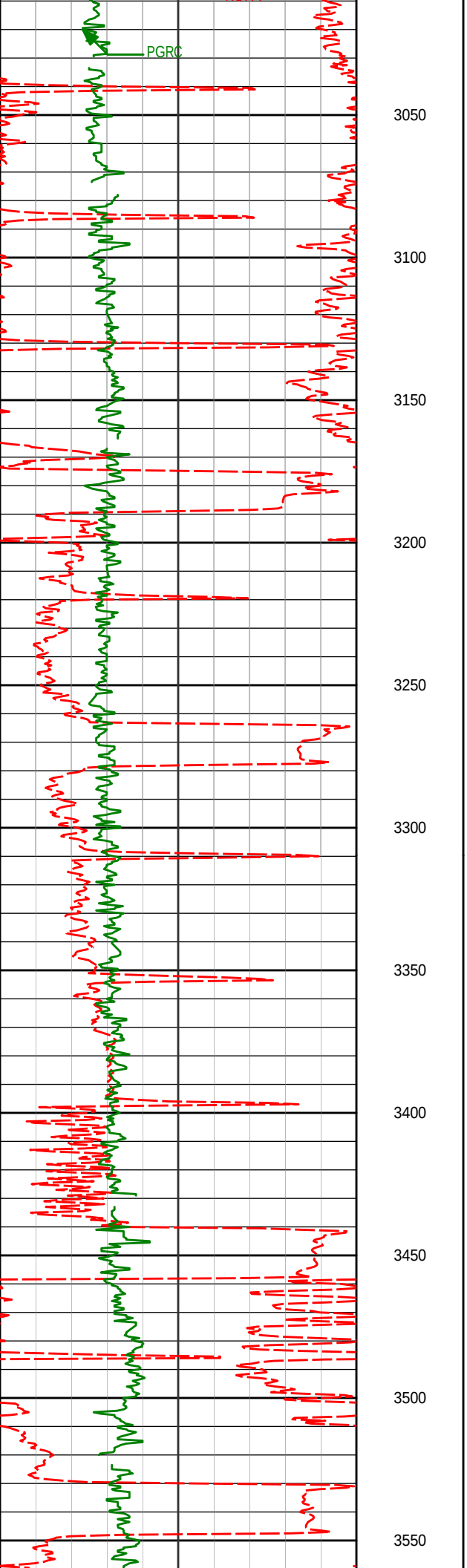
1386'	6.51°	198.06°	1385.45'	-3.41'
1481'	7.08°	198.47°	1479.79'	-4.91'
1575'	7.68°	191.75°	1573.01'	-5.84'
1669'	6.89°	182.55°	1666.25'	-5.18'
1763'	8.03°	190.89°	1759.46'	-4.43'
1857'	7.22°	196.98°	1852.63'	-5.13'



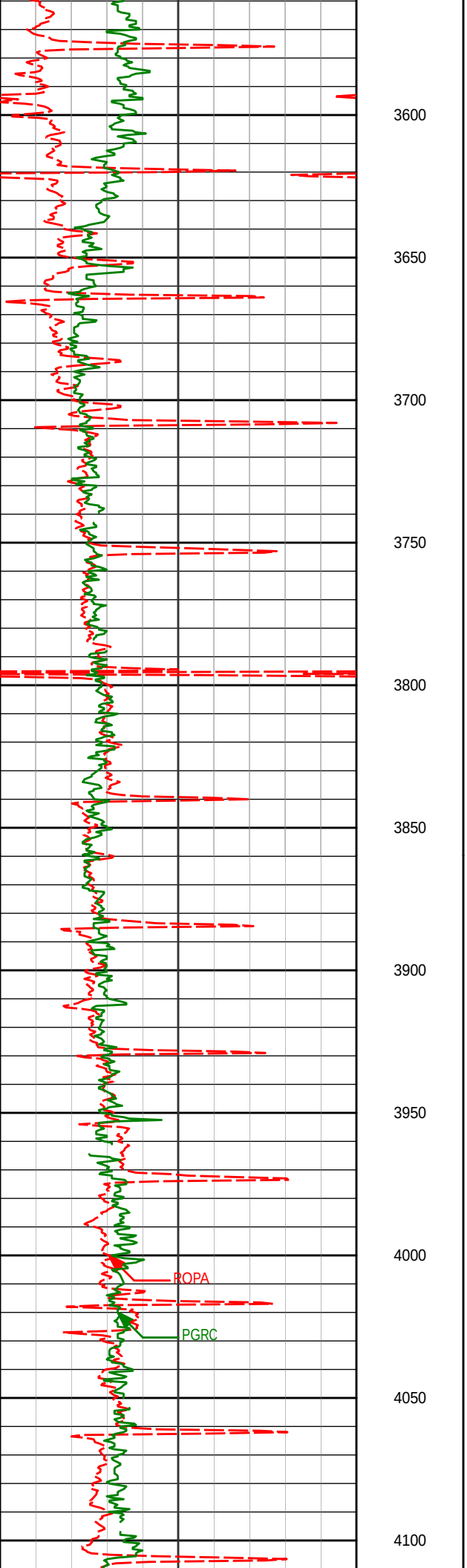
1952'	7.96°	198.56°	1946.79'	-6.71'
2046'	6.46°	197.62°	2040.05'	-8.26'
2140'	7.27°	202.71°	2133.37'	-10.16'
2234'	4.73°	191.91°	2226.85'	-11.50'
2326'	5.01°	192.46°	2318.52'	-11.72'
2418'	6.79°	199.19°	2410.03'	-12.67'



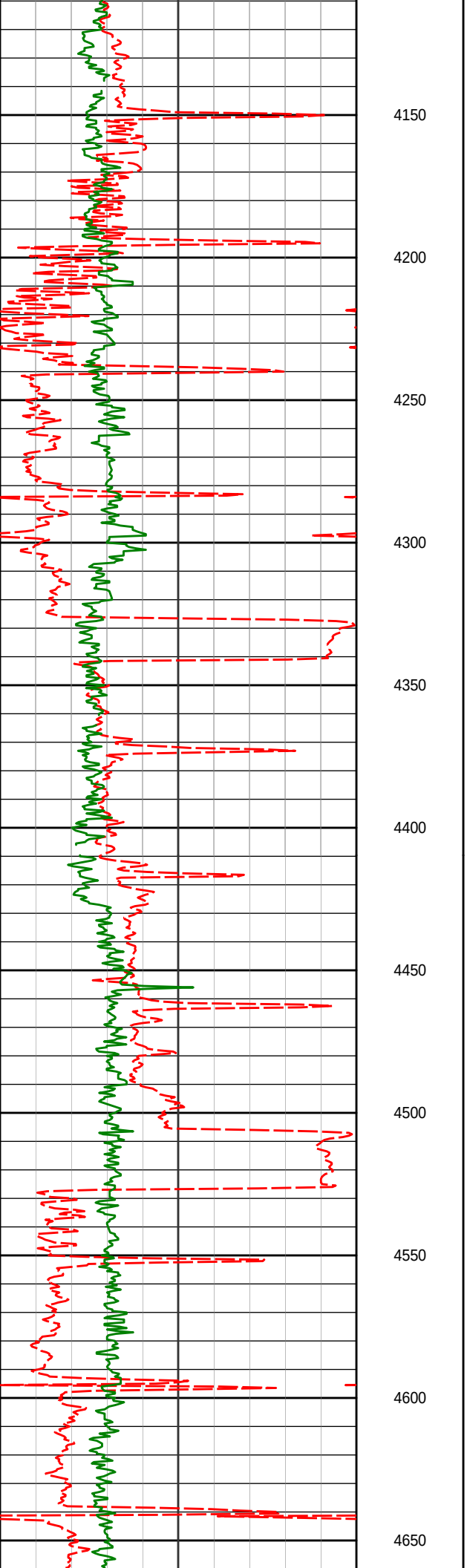
2512'	6.19°	192.29°	2503.43'	-13.66'
2601'	7.80°	190.19°	2591.77'	-13.76'
2691'	9.08°	190.21°	2680.79'	-13.68'
2781'	10.26°	192.47°	2769.51'	-13.90'
2870'	8.72°	194.41°	2857.29'	-14.61'
2960'	8.96°	192.78°	2946.22'	-15.34'



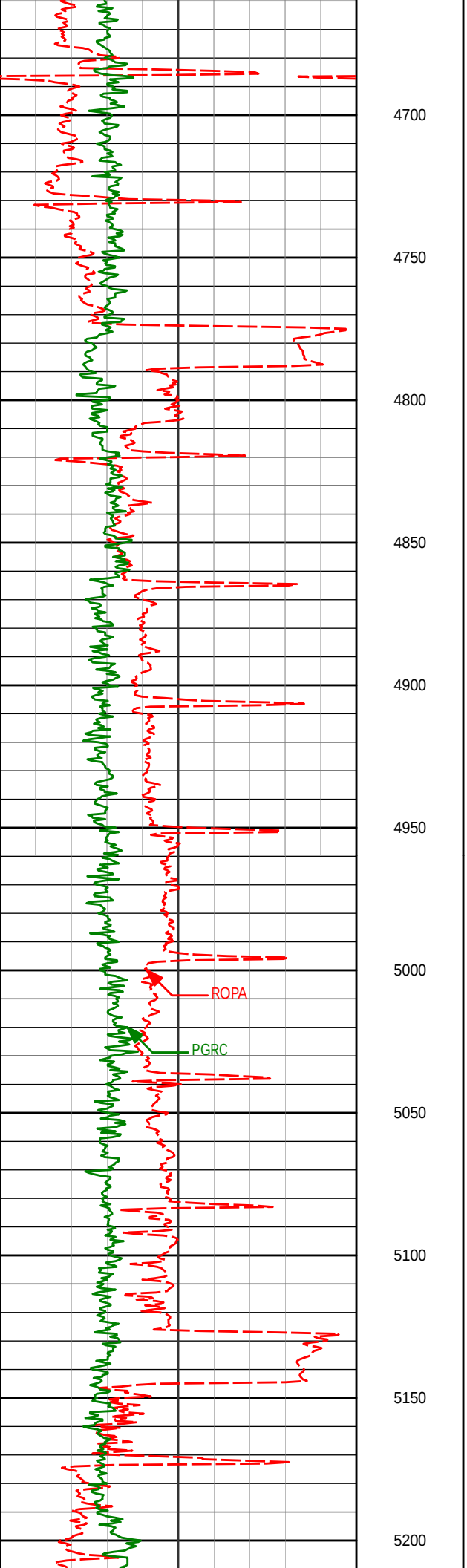
3050'	7.75°	202.45°	3035.27'	-16.86'
3139'	6.38°	184.82°	3123.60'	-17.60'
3229'	6.69°	183.89°	3213.02'	-16.49'
3318'	8.46°	194.53°	3301.24'	-16.34'
3408'	6.57°	188.18°	3390.46'	-16.58'
3498'	7.81°	198.82°	3479.76'	-17.24'



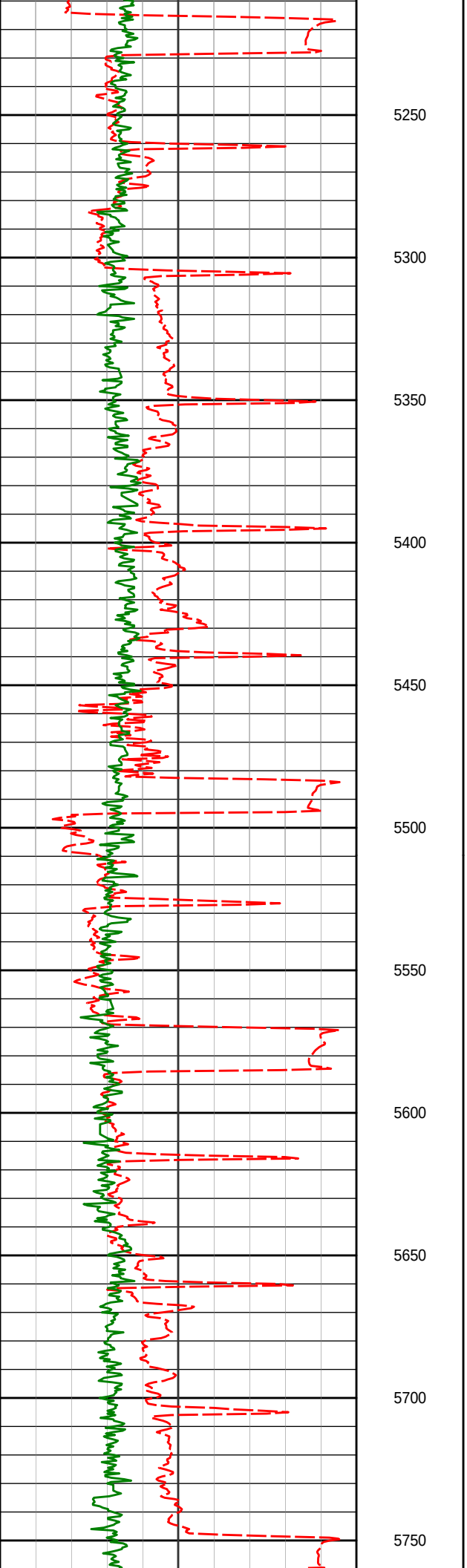
3587'	9.63°	198.22°	3567.73'	-19.10'
3677'	8.36°	192.06°	3656.62'	-20.27'
3767'	9.53°	192.19°	3745.52'	-20.65'
3857'	9.91°	190.94°	3834.23'	-20.91'
3946'	9.11°	189.76°	3922.01'	-20.86'
4036'	9.08°	197.21°	4010.88'	-21.58'
4125'	7.04°	187.63°	4099.00'	-22.12'



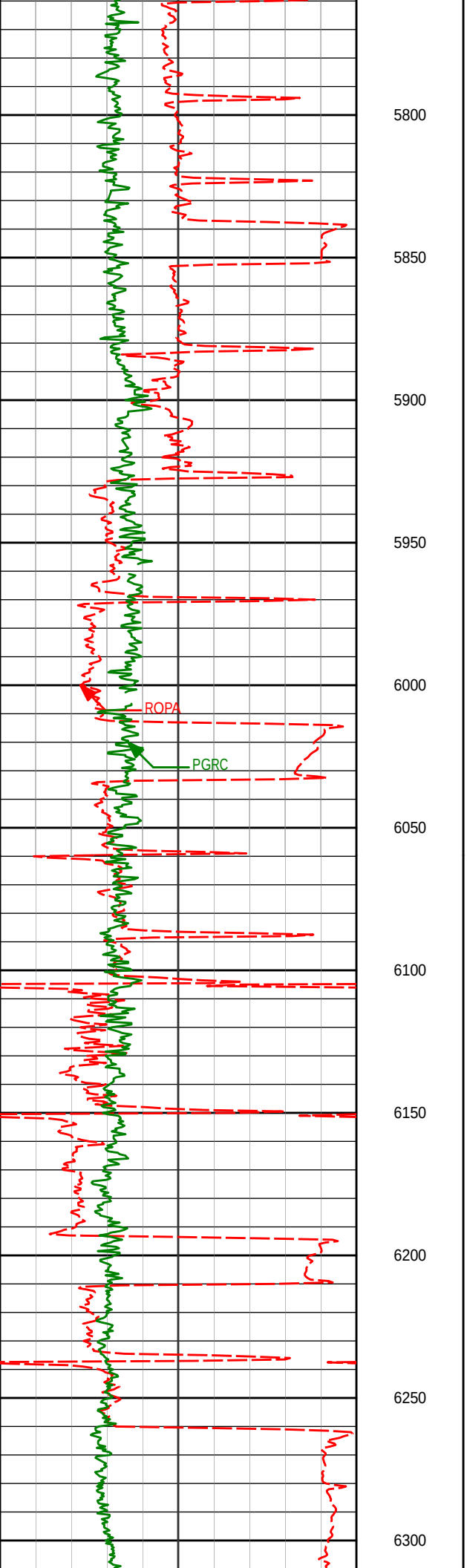
4215'	7.91°	197.35°	4188.24'	-22.57'
4304'	6.04°	185.67°	4276.58'	-22.89'
4394'	7.10°	202.11°	4365.99'	-23.60'
4484'	6.23°	192.48°	4455.39'	-24.87'
4573'	9.09°	197.39°	4543.59'	-25.87'
4663'	8.21°	198.89°	4632.56'	-27.64'



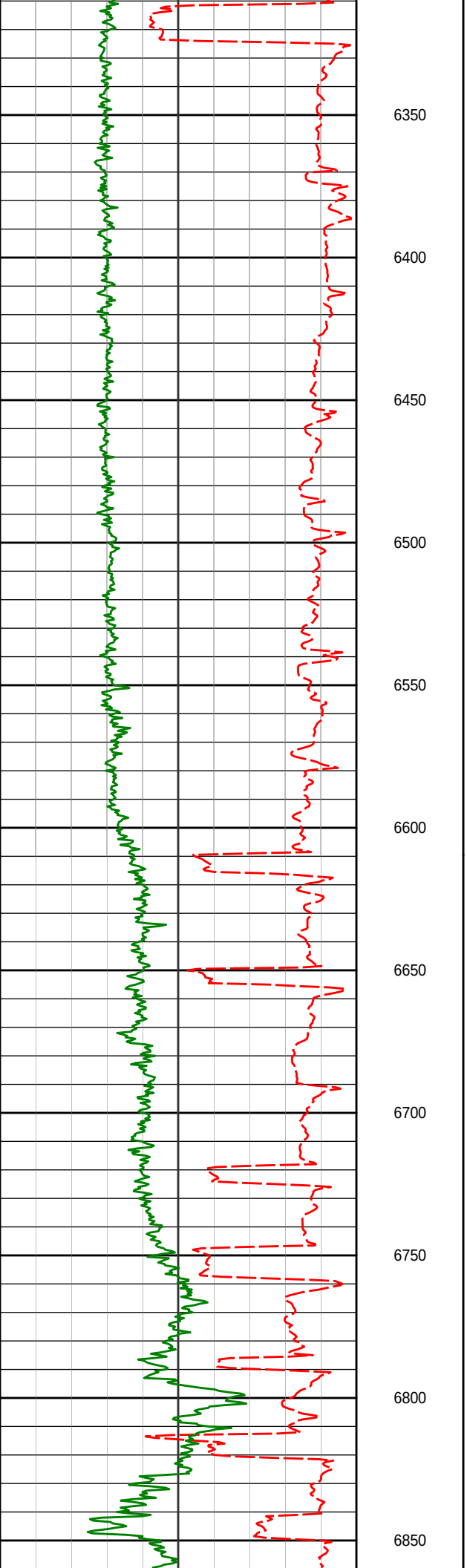
4752'	7.30°	199.01°	4720.75'	-29.39'
4842'	8.50°	198.81°	4809.89'	-31.18'
4932'	8.10°	191.38°	4898.95'	-32.23'
5021'	7.86°	191.88°	4987.09'	-32.45'
5111'	6.47°	196.65°	5076.38'	-33.13'
5201'	7.91°	191.06°	5165.68'	-33.72'



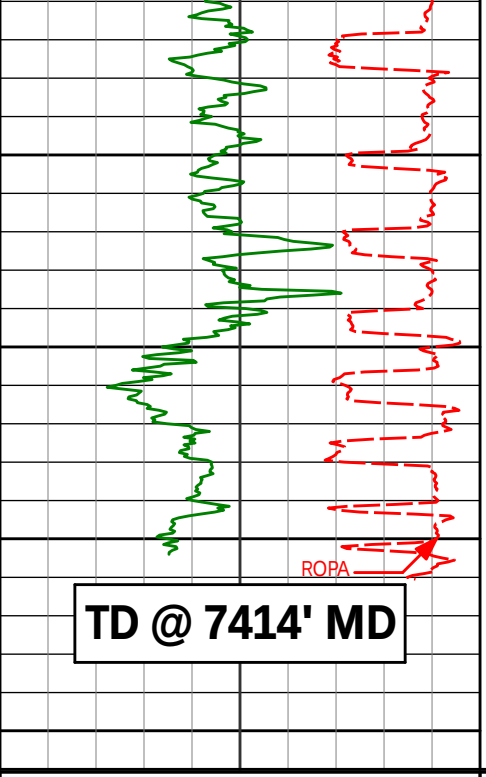
5290'	9.44°	189.24°	5253.65'	-33.61'
5380'	8.20°	191.97°	5342.59'	-33.59'
5469'	6.29°	194.47°	5430.87'	-34.08'
5559'	7.18°	185.53°	5520.25'	-33.92'
5649'	8.70°	188.06°	5609.39'	-33.13'
5738'	7.44°	187.85°	5697.51'	-32.56'



5828'	7.48°	184.53°	5786.75'	-31.67'
5917'	8.79°	186.82°	5874.85'	-30.61'
6007'	7.20°	185.05°	5963.97'	-29.62'
6097'	8.54°	191.10°	6053.12'	-29.14'
6186'	6.82°	187.63°	6141.32'	-28.93'
6276'	7.48°	193.65°	6230.62'	-28.97'
6321'	8.97°	185.25°	6275.16'	-28.80'



6366'	11.95°	183.22°	6319.41'	-27.88'
6411'	14.98°	181.85°	6363.17'	-26.40'
6455'	18.11°	180.68°	6405.34'	-24.36'
6500'	19.83°	168.13°	6447.91'	-20.25'
6545'	21.21°	158.07°	6490.07'	-12.96'
6590'	24.75°	150.83°	6531.50'	-2.56'
6635'	27.32°	142.67°	6571.94'	11.13'
6679'	29.16°	133.86°	6610.72'	27.60'
6724'	32.38°	130.75°	6649.38'	47.18'
6769'	36.71°	124.93°	6686.45'	69.87'
6814'	40.73°	122.56°	6721.55'	95.75'
6859'	43.63°	119.06°	6754.90'	124.09'
6903'	45.31°	113.10°	6786.31'	153.77'
6948'	48.12°	107.99°	6817.17'	186.02'
6993'	49.70°	103.83°	6846.76'	219.77'



Depth ft	Depth	Inc.	Azi.	TVD	V.S.
6900	7038'	52.27°	99.26°	6875.09'	254.71'
	7083'	56.65°	97.99°	6901.24'	291.30'
	7127'	60.77°	96.86°	6924.09'	328.83'
6950	7172'	64.79°	95.40°	6944.67'	368.72'
	7217'	67.49°	94.90°	6962.87'	409.68'
	7262'	70.39°	93.99°	6979.04'	451.43'
	7307'	74.93°	92.41°	6992.45'	494.02'
7000	7364'	80.68°	91.74°	7004.49'	549.10'
7050					

PCG GammaRay BCor
api
0 — 300

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

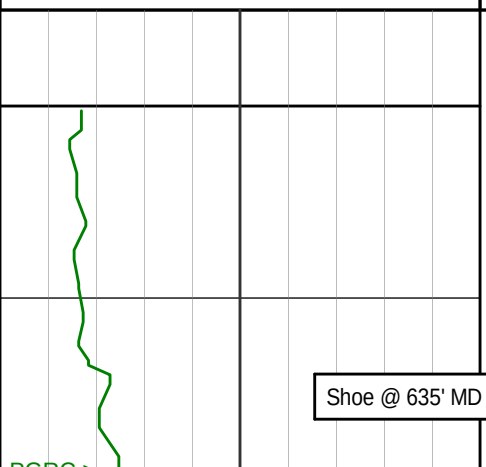
HALLIBURTON
Sperry Drilling Services
TVD Detail Log 1:240

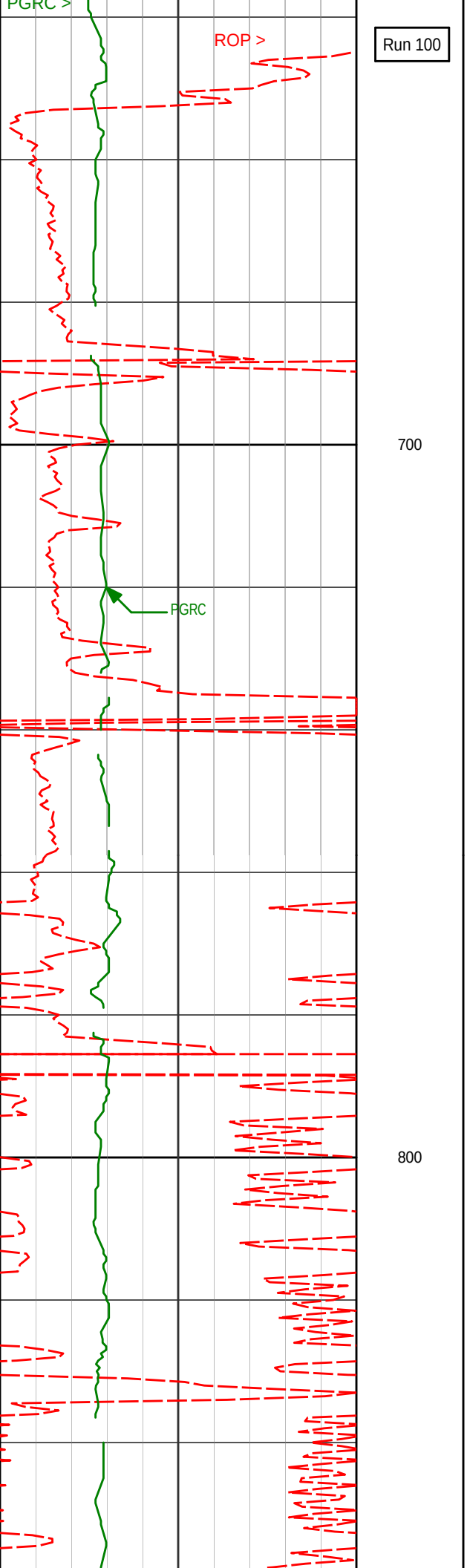
Noble Energy
Loeffler K1-65HN
PD 829
Sec.1-T4N-R66W

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

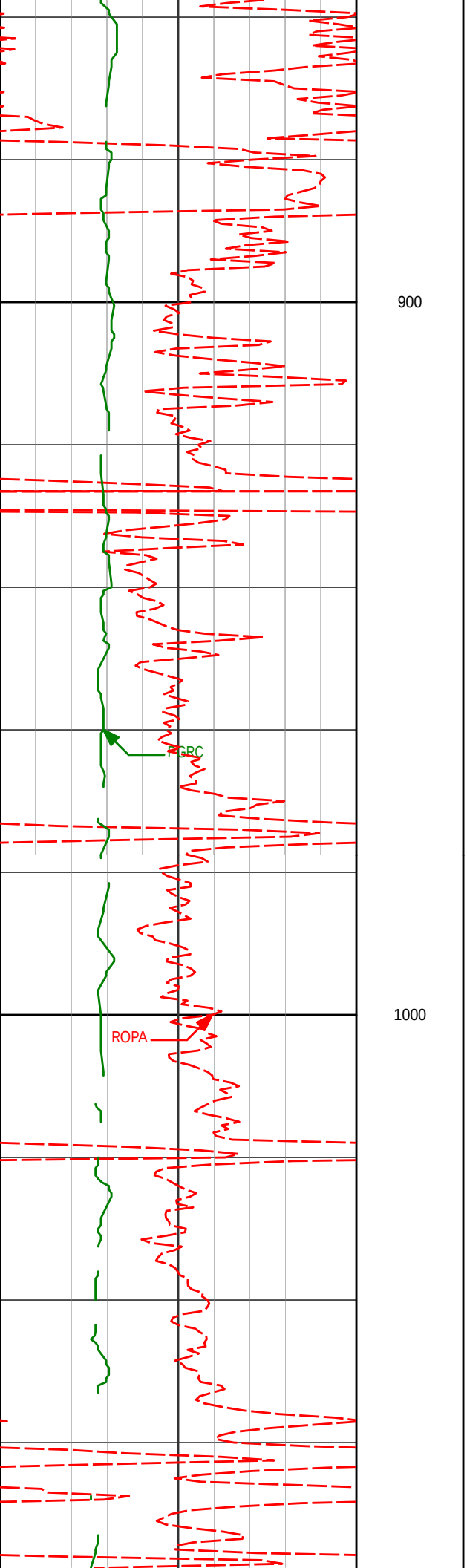
PCG Gamma Ray BCorr
api
0 — 300

Depth ft	Depth	Inc.	Azi.	TVD	V.S.
600					
	623'	0.40°	315.67°	622.99'	0.59'

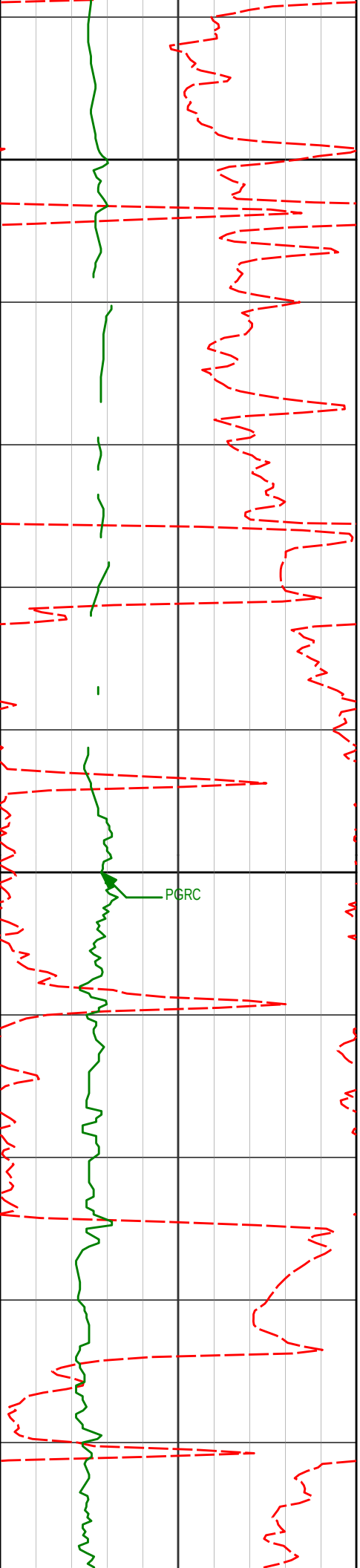




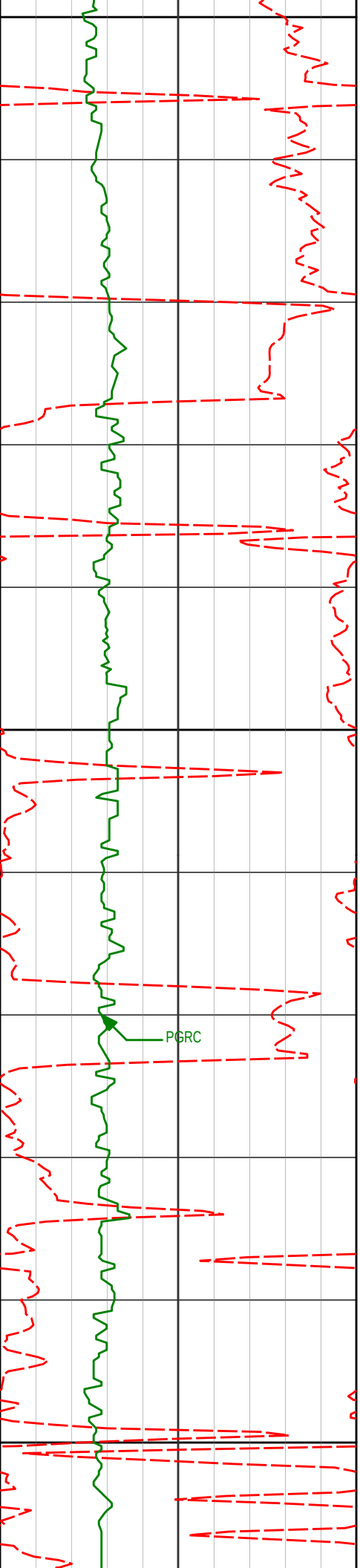
698'	0.47°	284.63°	697.99'	0.07'
832'	0.68°	280.06°	831.98'	-1.27'



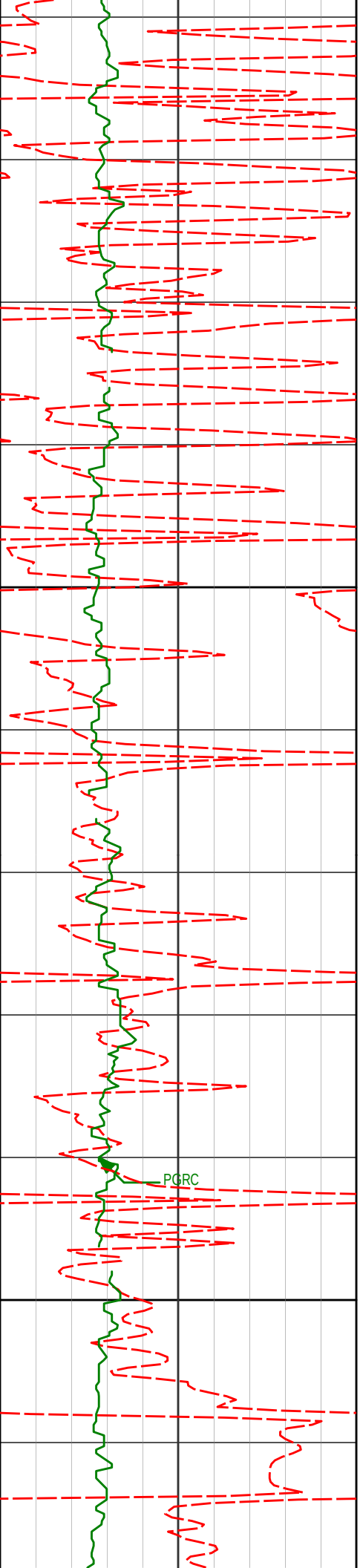
966'	1.28°	190.85°	965.97'	-2.07'



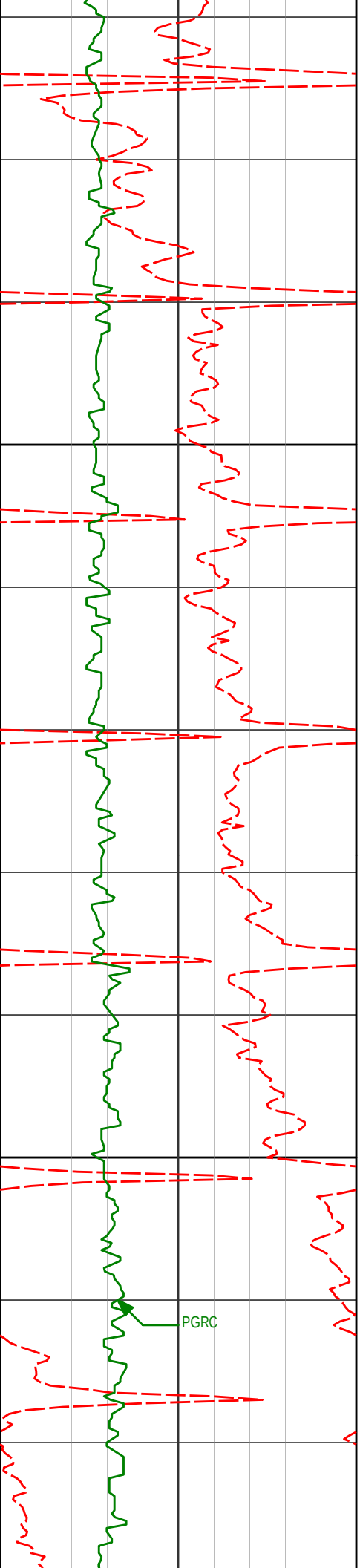
1100	1101'	0.65°	185.90°	1100.95'	-2.02'
1200	1198'	1.63°	185.92°	1197.93'	-1.86'
	1292'	3.59°	199.94°	1291.83'	-2.23'



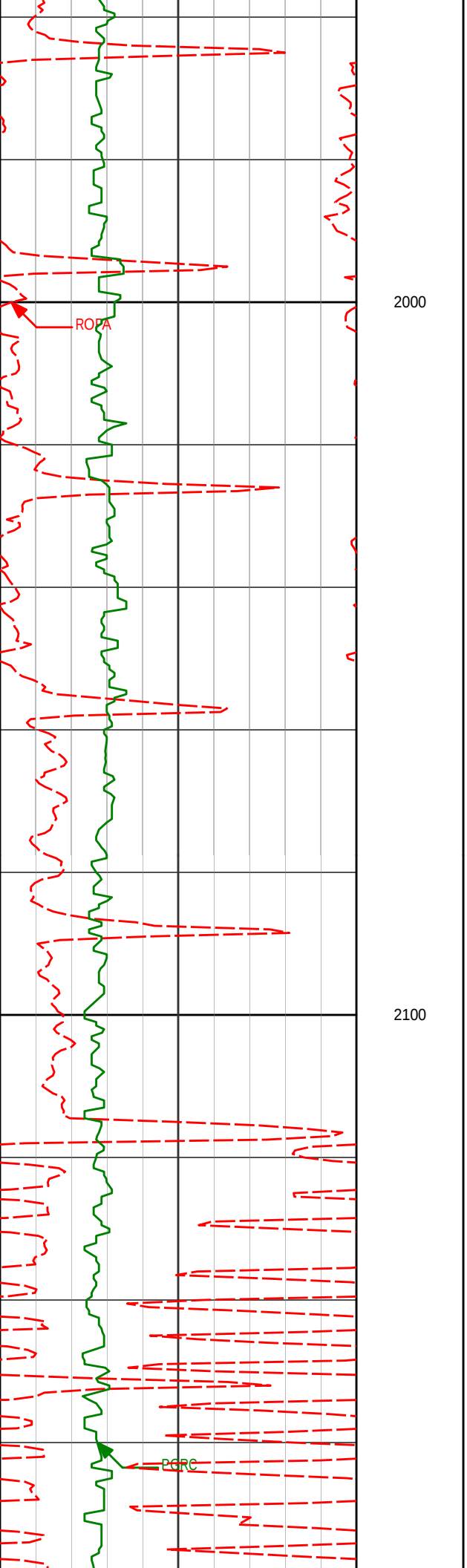
1386'	6.51°	198.06°	1385.45'	-3.41'
1481'	7.08°	198.47°	1479.79'	-4.91'



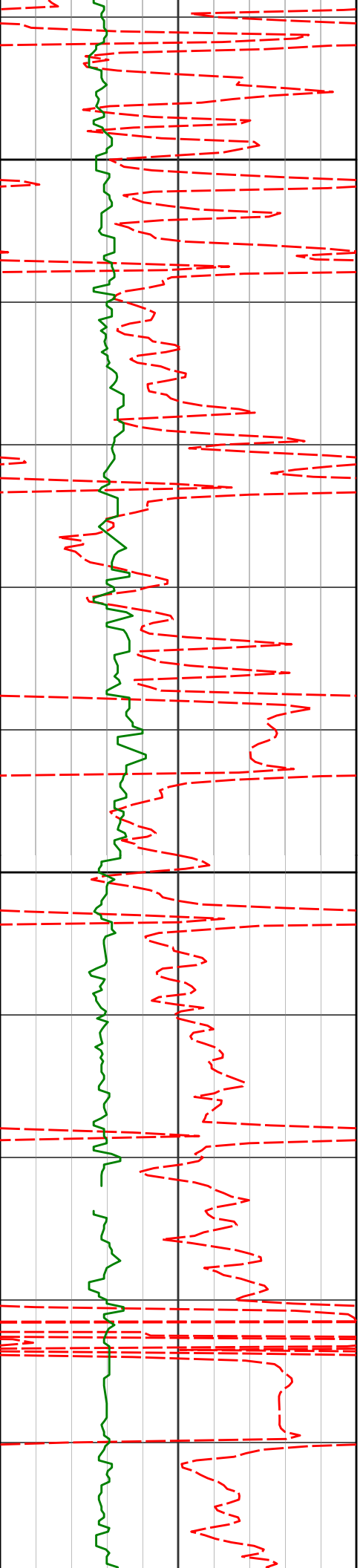
1575'	7.68°	191.75°	1573.01'	-5.84'
1669'	6.89°	182.55°	1666.25'	-5.18'



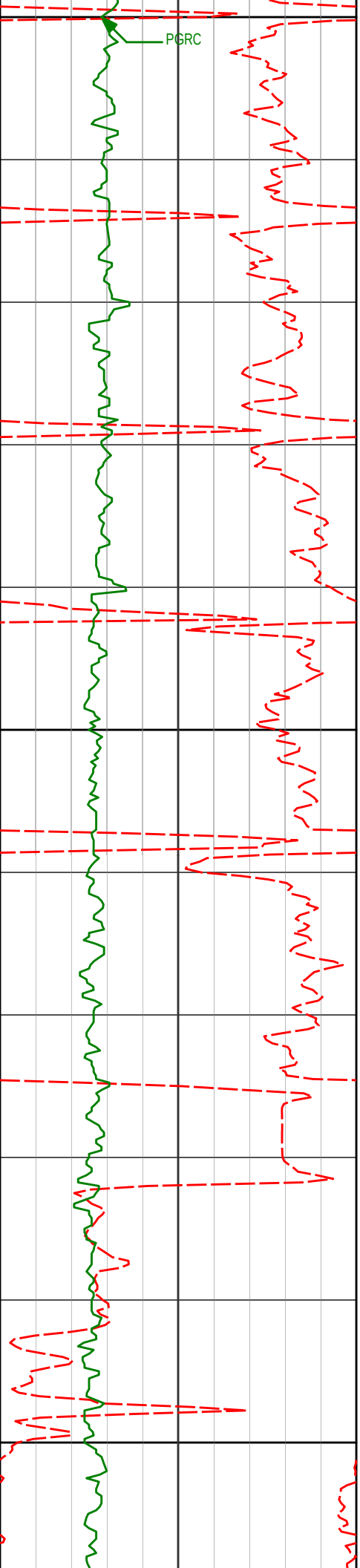
1763'	8.03°	190.89°	1759.46'	-4.43'
1857'	7.22°	196.98°	1852.63'	-5.13'
1952'	7.96°	198.56°	1946.79'	-6.71'



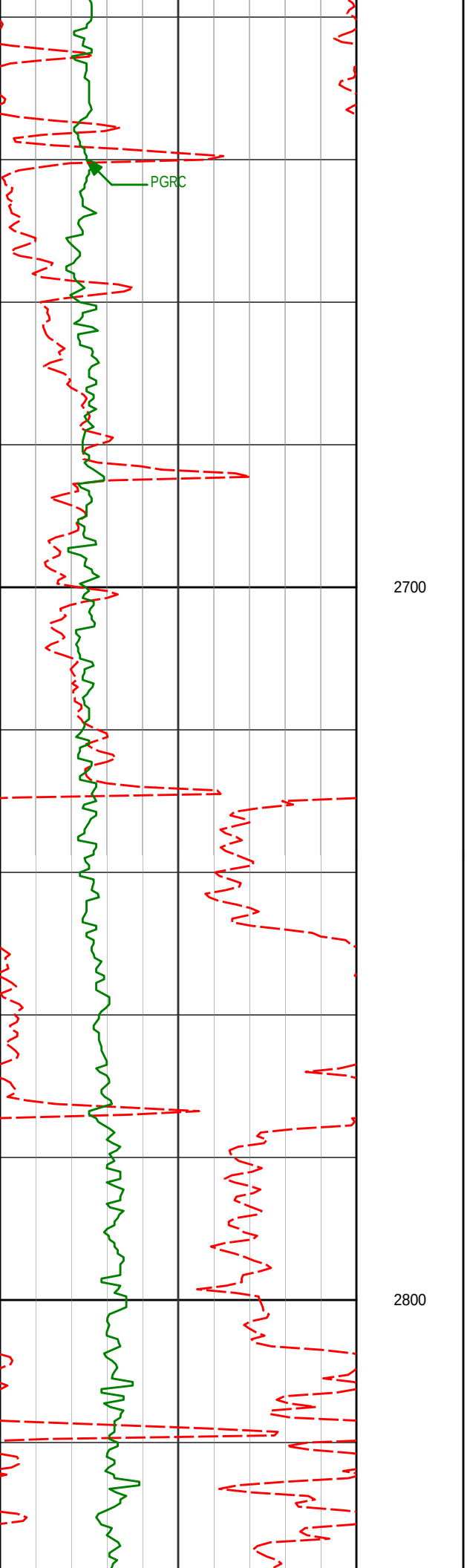
2046'	6.46°	197.62°	2040.05'	-8.26'
2140'	7.27°	202.71°	2133.37'	-10.16'



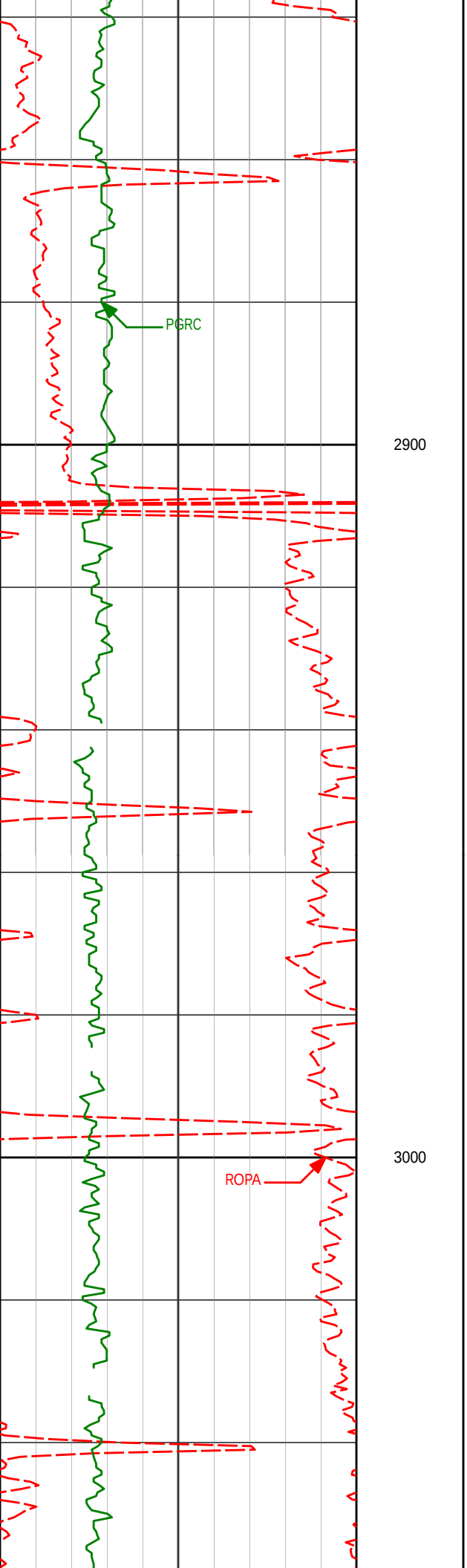
2234'	4.73°	191.91°	2226.85'	-11.50'
2326'	5.01°	192.46°	2318.52'	-11.72'



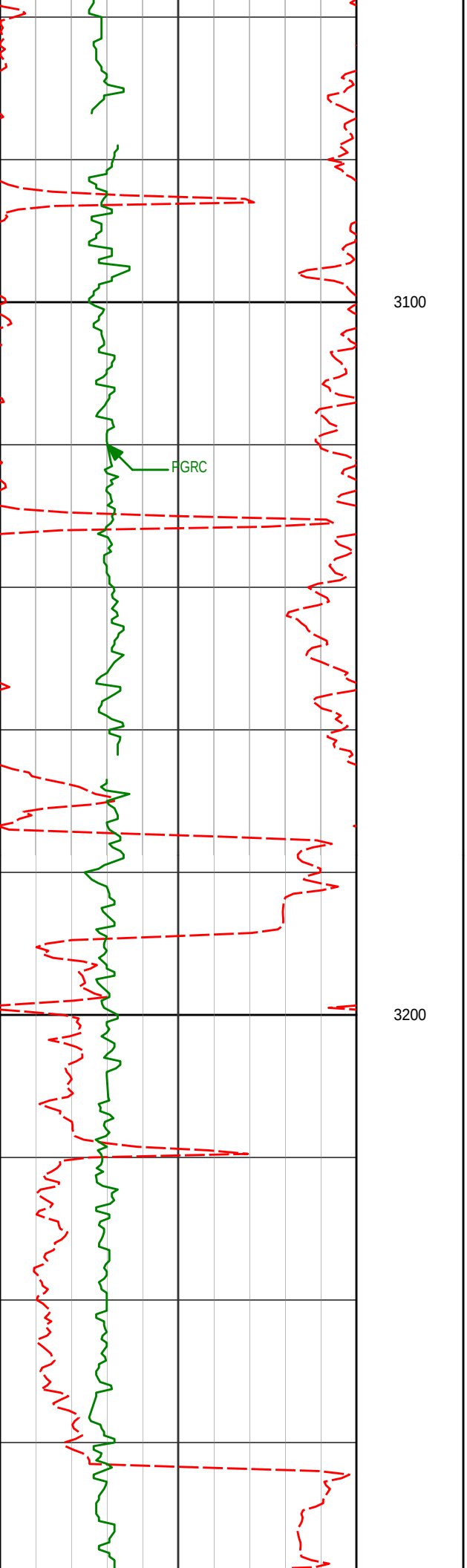
2418'	6.79°	199.19°	2410.03'	-12.67'
2512'	6.19°	192.29°	2503.43'	-13.66'
2601'	7.80°	190.19°	2591.77'	-13.76'



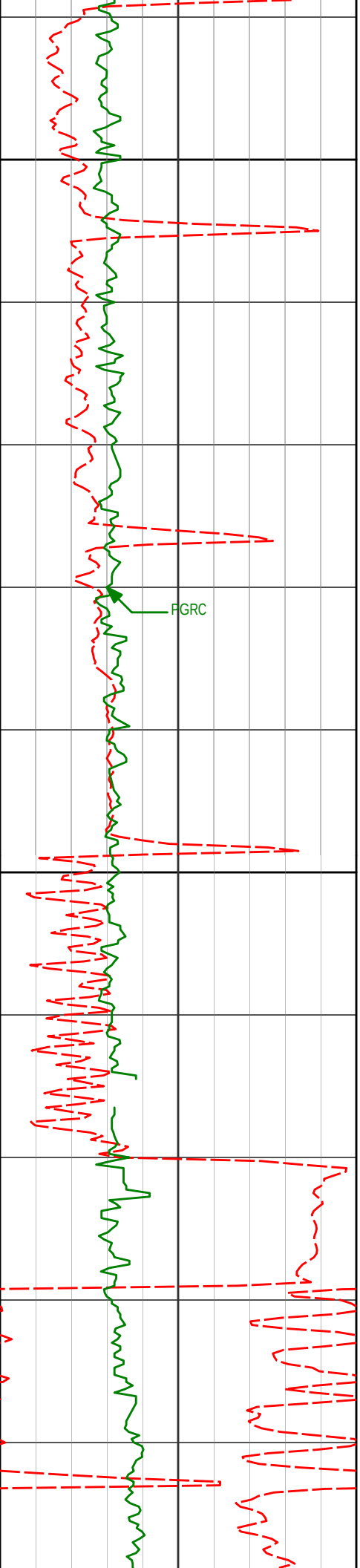
2691'	9.08°	190.21°	2680.79'	-13.68'
2781'	10.26°	192.47°	2769.51'	-13.90'



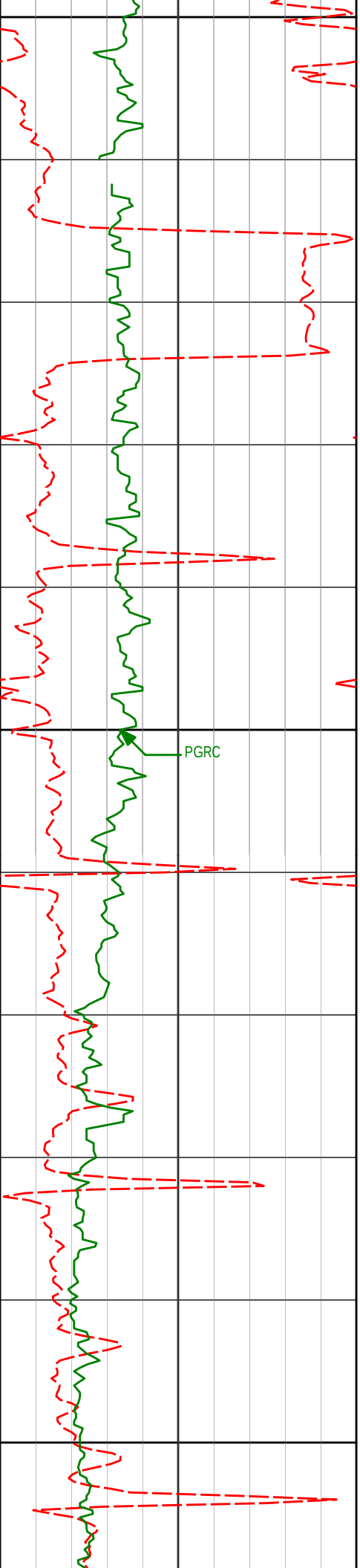
2870'	8.72°	194.41°	2857.29'	-14.61'
2960'	8.96°	192.78°	2946.22'	-15.34'
3050'	7.75°	202.45°	3035.27'	-16.86'



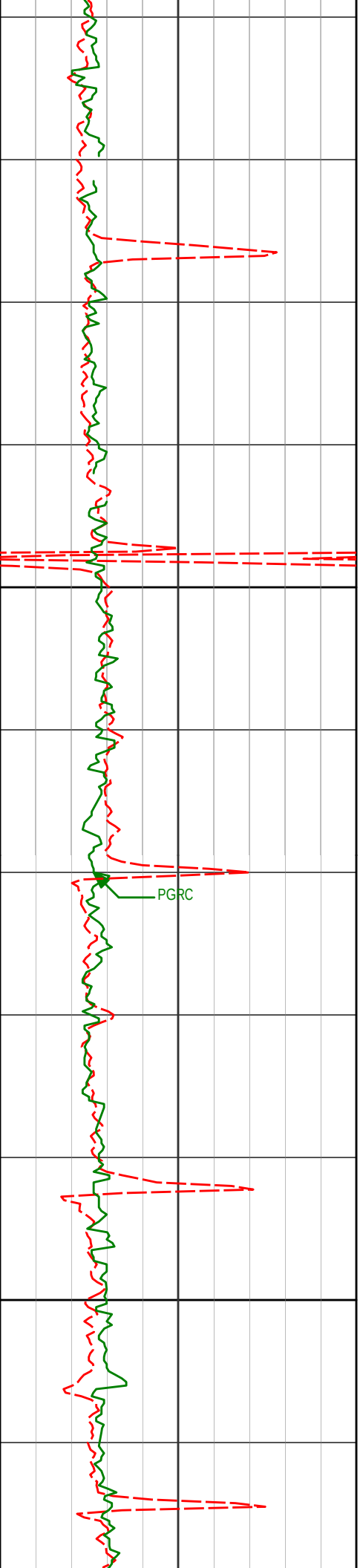
3139'	6.38°	184.82°	3123.60'	-17.60'
3229'	6.69°	183.89°	3213.02'	-16.49'



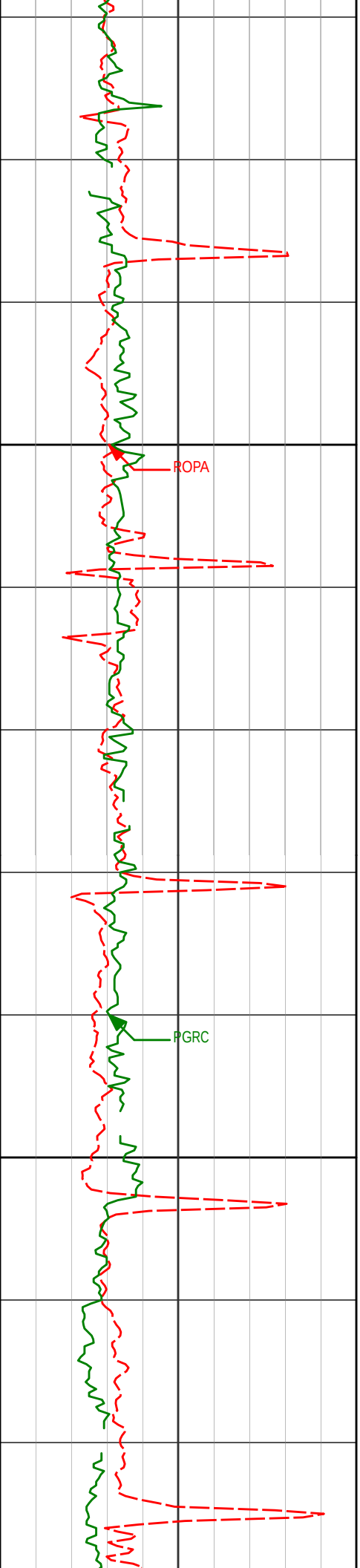
3300	3318'	8.46°	194.53°	3301.24'	-16.34'
	3408'	6.57°	188.18°	3390.46'	-16.58'
3400					
	3498'	7.81°	198.82°	3479.76'	-17.24'



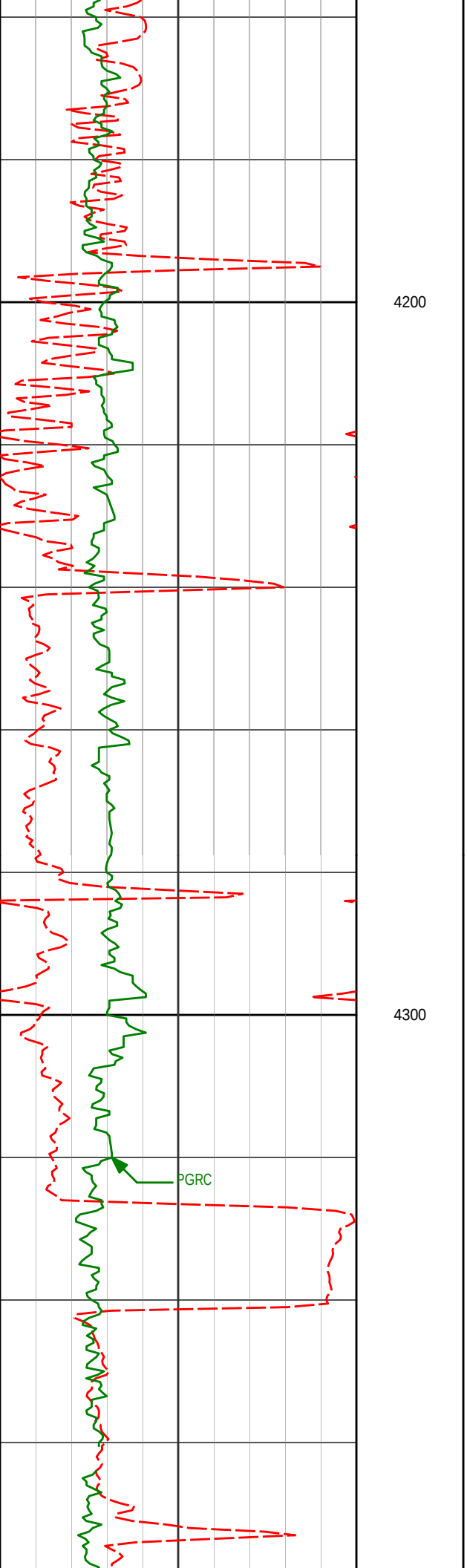
3587'	9.63°	198.22°	3567.73'	-19.10'
3677'	8.36°	192.06°	3656.62'	-20.27'



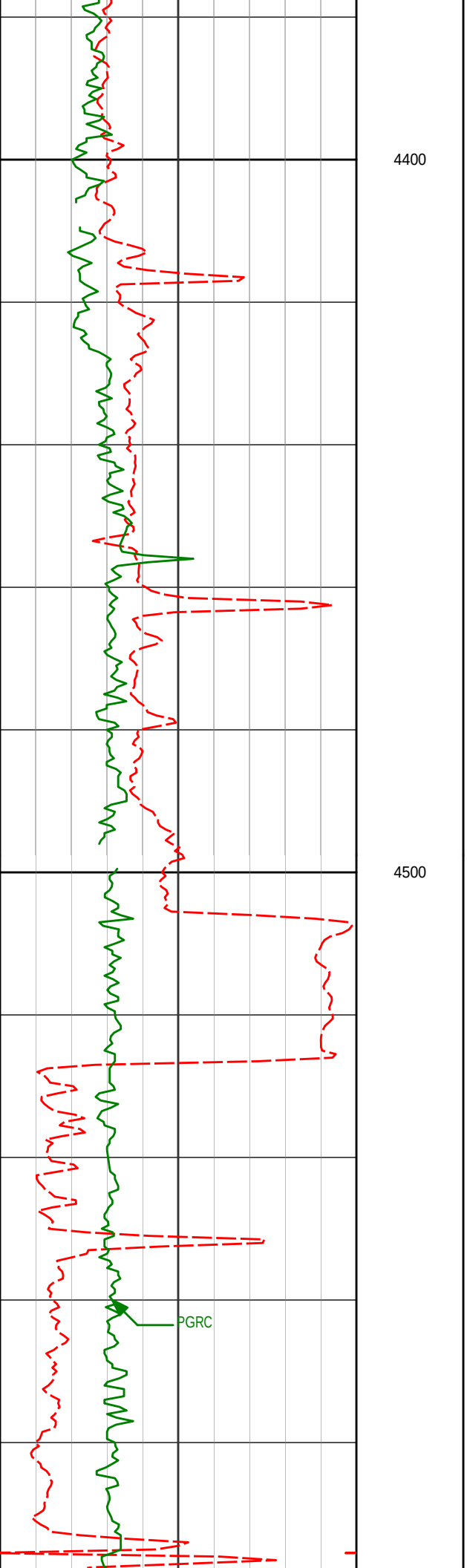
3767'	9.53°	192.19°	3745.52'	-20.65'
3857'	9.91°	190.94°	3834.23'	-20.91'
3946'	9.11°	189.76°	3922.01'	-20.86'



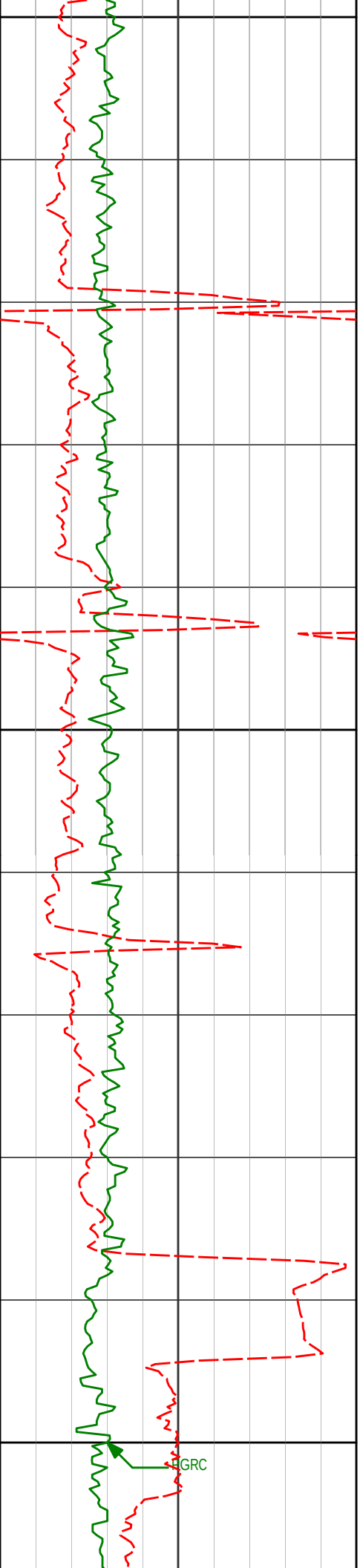
4000					
	4036'	9.08°	197.21°	4010.88'	-21.58'
4100					
	4125'	7.04°	187.63°	4099.00'	-22.12'



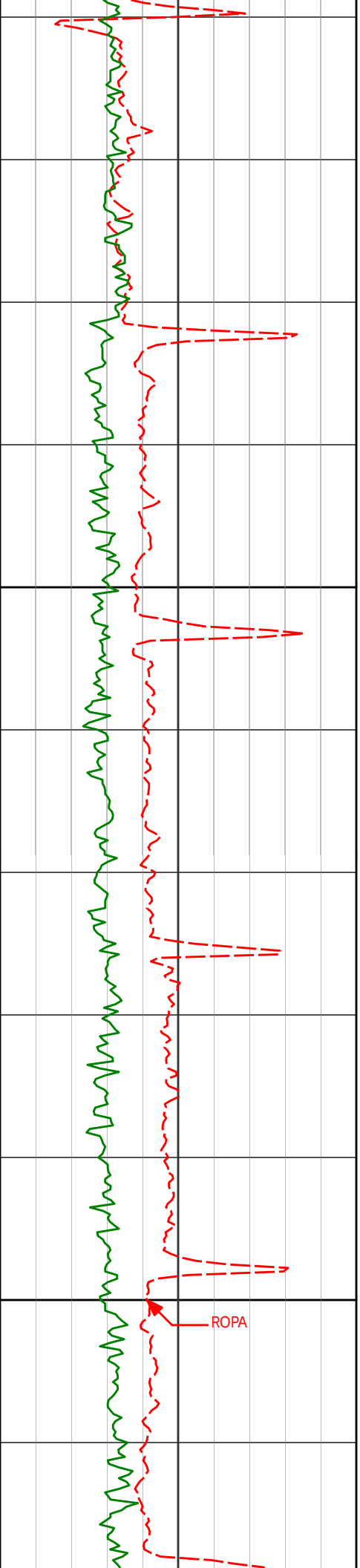
4215'	7.91°	197.35°	4188.24'	-22.57'
4304'	6.04°	185.67°	4276.58'	-22.89'
4394'	7.10°	202.11°	4365.99'	-23.60'



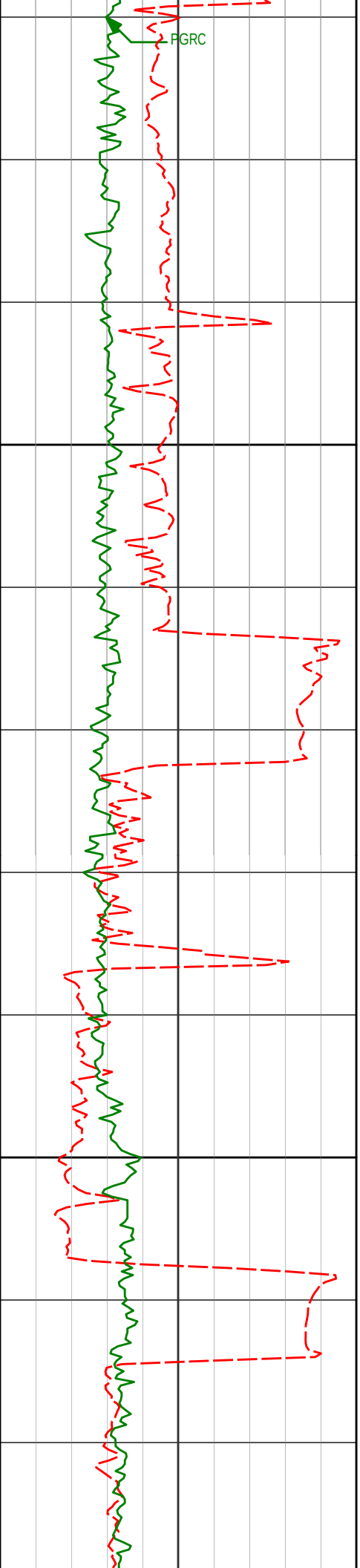
4484'	6.23°	192.48°	4455.39'	-24.87'
4573'	9.09°	197.39°	4543.59'	-25.87'



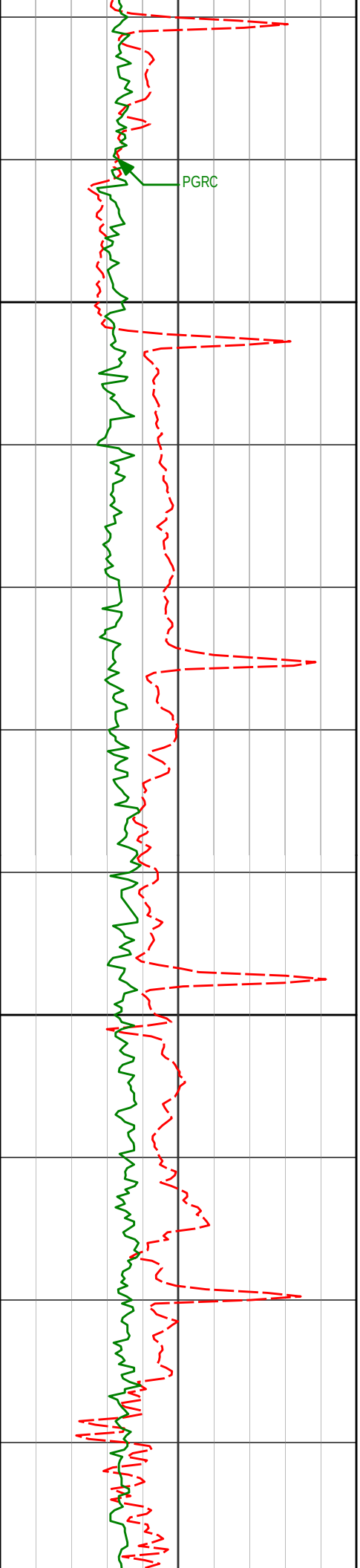
4663'	8.21°	198.89°	4632.56'	-27.64'
4752'	7.30°	199.01°	4720.75'	-29.39'
4842'	8.50°	198.81°	4809.89'	-31.18'



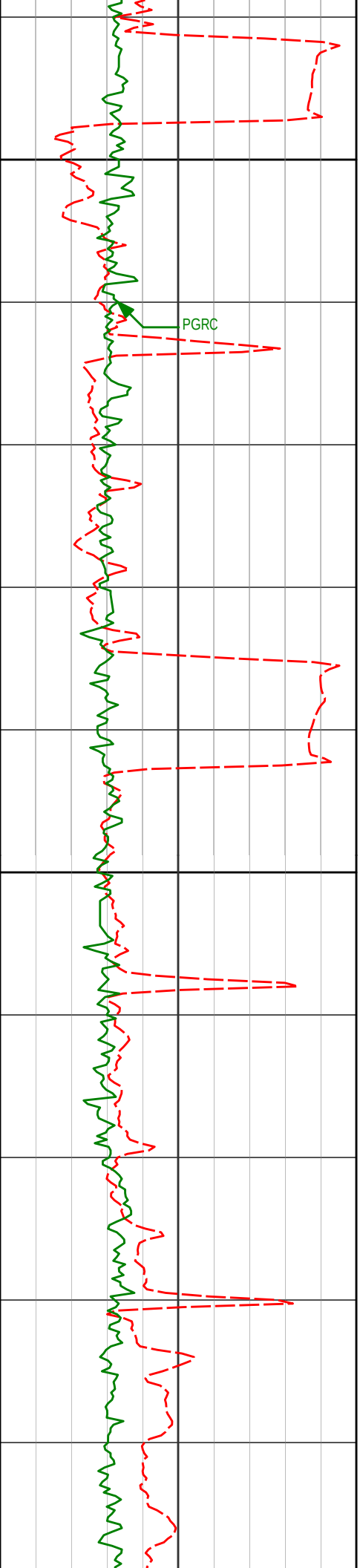
4932'	8.10°	191.38°	4898.95'	-32.23'
5021'	7.86°	191.88°	4987.09'	-32.45'



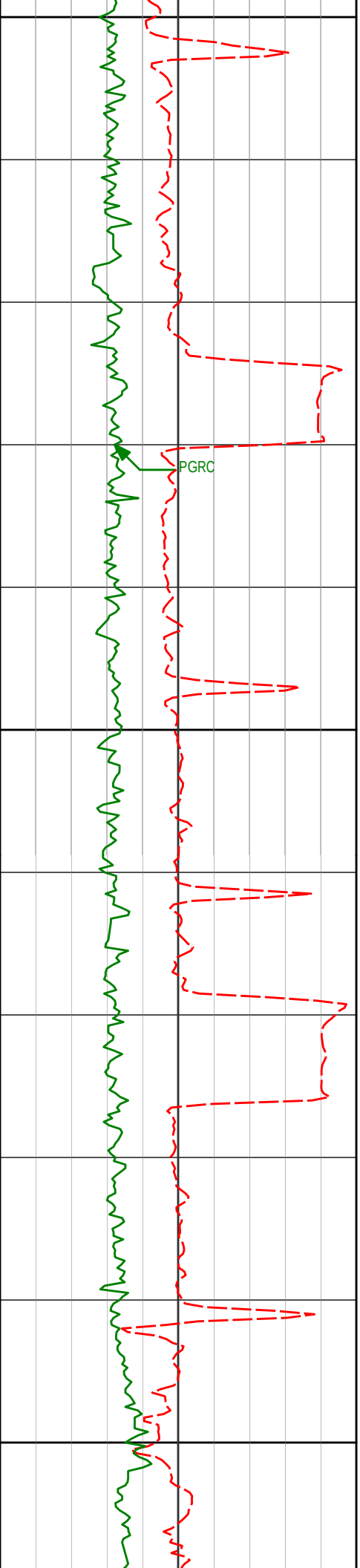
5111'	6.47°	196.65°	5076.38'	-33.13'
5201'	7.91°	191.06°	5165.68'	-33.72'
5290'	9.44°	189.24°	5253.65'	-33.61'



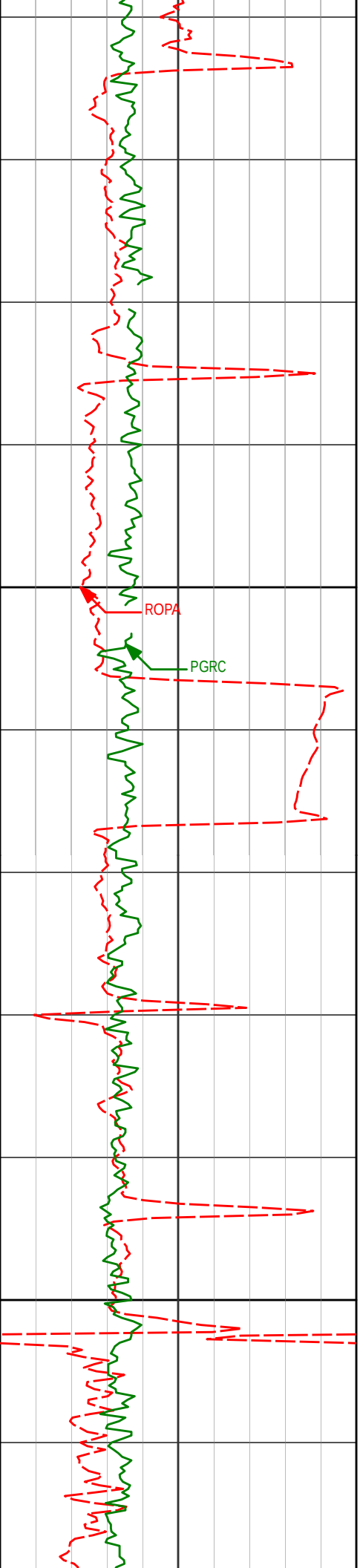
5380'	8.20°	191.97°	5342.59'	-33.59'
5469'	6.29°	194.47°	5430.87'	-34.08'



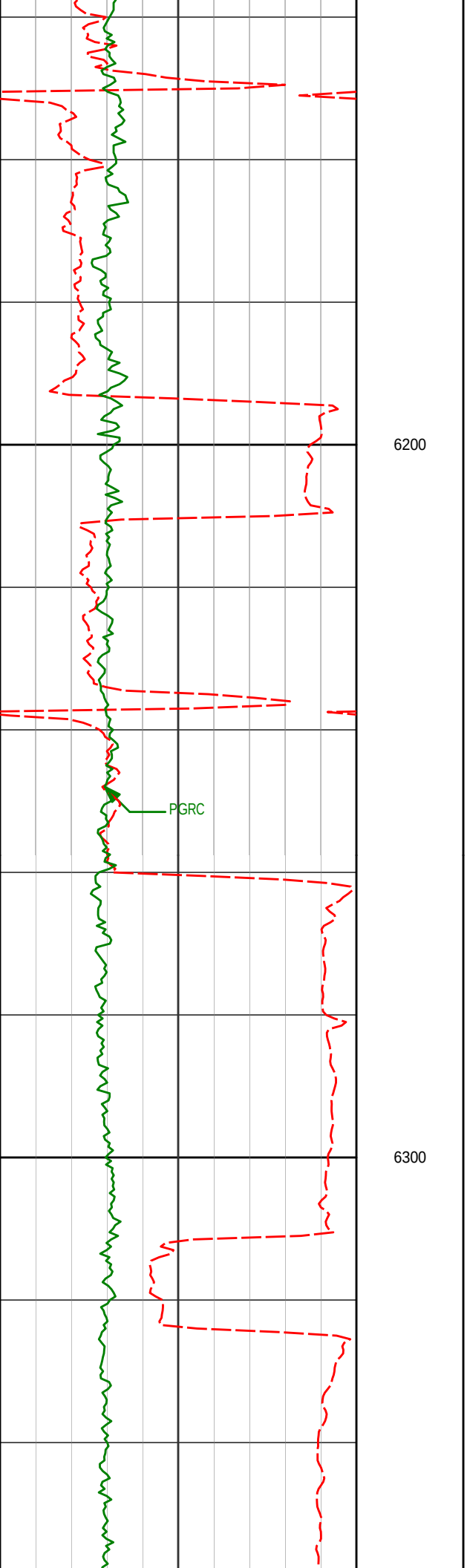
5559'	7.18°	185.53°	5520.25'	-33.92'
5649'	8.70°	188.06°	5609.39'	-33.13'
5738'	7.44°	187.85°	5697.51'	-32.56'



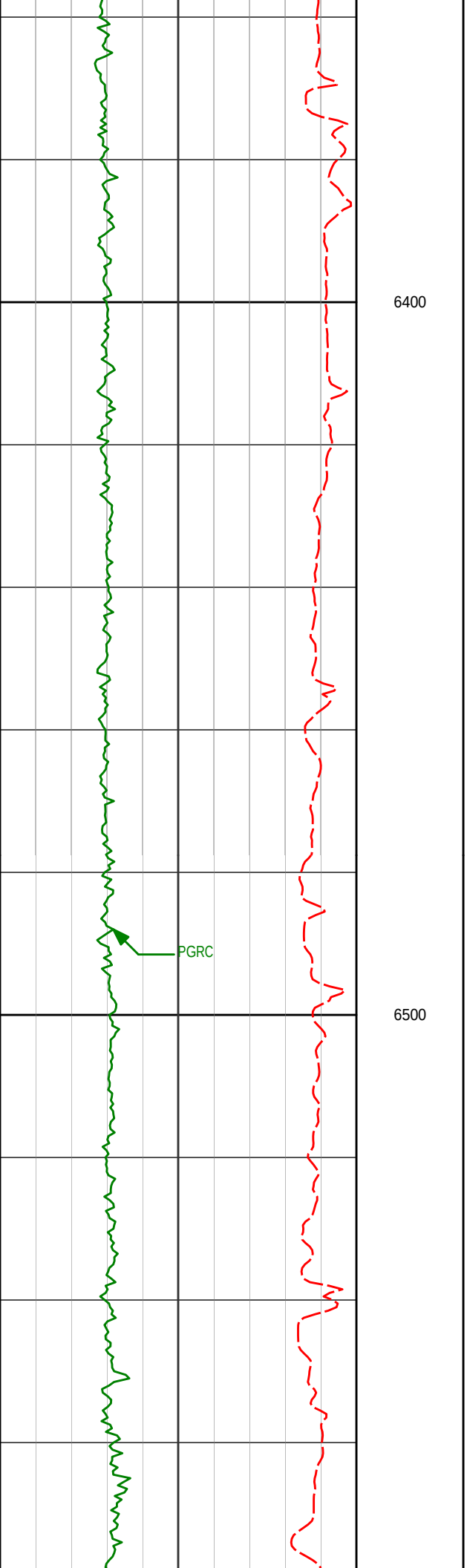
5738'	7.44°	187.85°	5697.51'	-32.56'
5828'	7.48°	184.53°	5786.75'	-31.67'
5917'	8.79°	186.82°	5874.85'	-30.61'



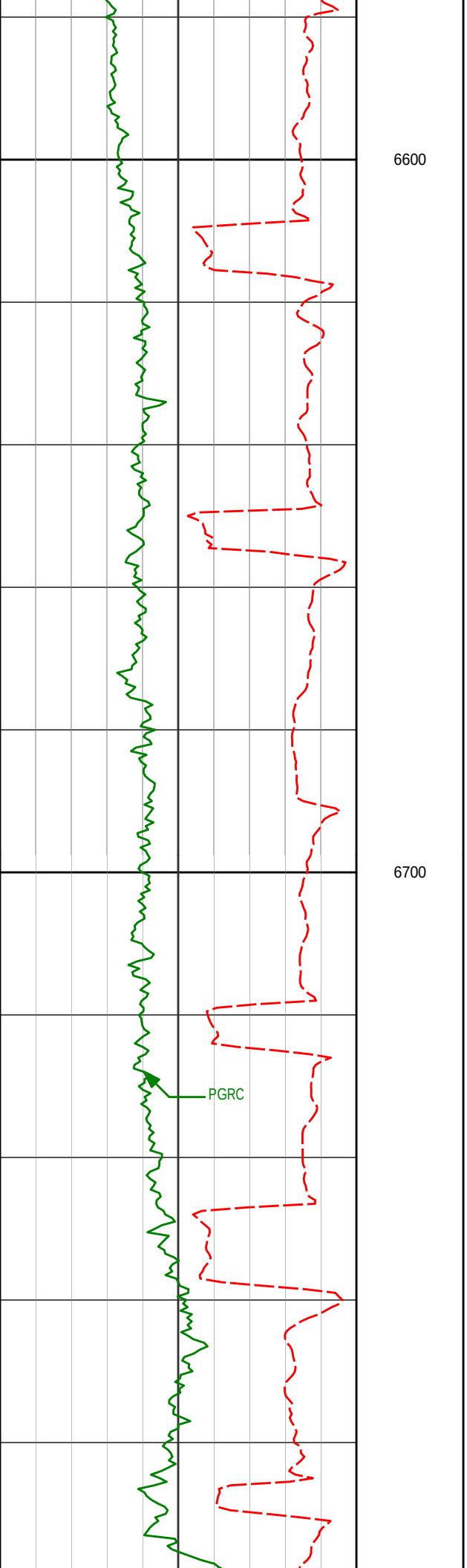
6007'	7.20°	185.05°	5963.97'	-29.62'
6097'	8.54°	191.10°	6053.12'	-29.14'



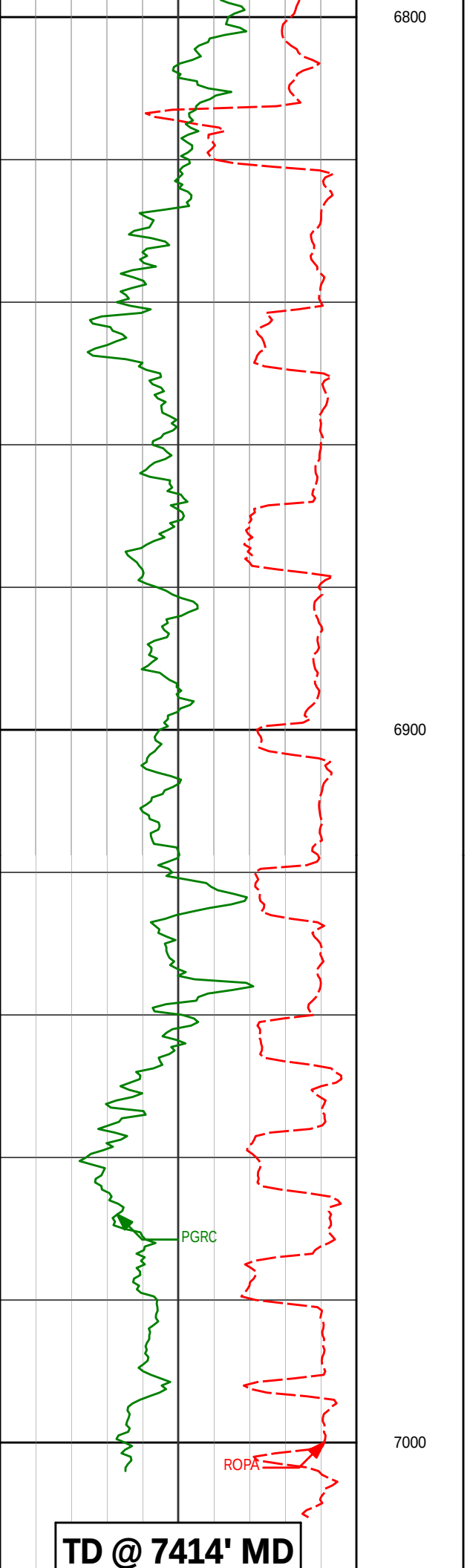
6186'	6.82°	187.63°	6141.32'	-28.93'
6276'	7.48°	193.65°	6230.62'	-28.97'
6321'	8.97°	185.25°	6275.16'	-28.80'
6366'	11.95°	183.22°	6319.41'	-27.88'



6411'	14.98°	181.85°	6363.17'	-26.40'
6455'	18.11°	180.68°	6405.34'	-24.36'
6500'	19.83°	168.13°	6447.91'	-20.25'
6545'	21.21°	158.07°	6490.07'	-12.96'
6590'	24.75°	150.83°	6531.50'	-2.56'
6635'	27.32°	142.67°	6571.94'	11.13'



6679'	29.16°	133.86°	6610.72'	27.60'
6724'	32.38°	130.75°	6649.38'	47.18'
6769'	36.71°	124.93°	6686.45'	69.87'
6814'	40.73°	122.56°	6721.55'	95.75'
6859'	43.63°	119.06°	6754.90'	124.09'
6903'	45.31°	113.10°	6786.31'	153.77'



6948'	48.12°	107.99°	6817.17'	186.02'
6993'	49.70°	103.83°	6846.76'	219.77'
7038'	52.27°	99.26°	6875.09'	254.71'
7083'	56.65°	97.99°	6901.24'	291.30'
7127'	60.77°	96.86°	6924.09'	328.83'
7172'	64.79°	95.40°	6944.67'	368.72'
7217'	67.49°	94.90°	6962.87'	409.68'
7262'	70.39°	93.99°	6979.04'	451.43'
7307'	74.93°	92.41°	6992.45'	494.02'
7364'	80.68°	91.74°	7004.49'	549.10'

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

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Loeffler K1-65HN-A2
Wattenburg
Weld Colorado
USA
CA-XX-0900735959

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
306.00	0.40	54.17	306.00	0.63 N	0.87 E	0.74	0.13
623.00	0.40	315.67	622.99	2.06 N	0.99 E	0.59	0.19
698.00	0.47	284.63	697.99	2.33 N	0.51 E	0.07	0.32
832.00	0.68	280.06	831.98	2.61 N	0.81 W	-1.27	0.16
966.00	1.28	190.85	965.97	1.28 N	1.87 W	-2.07	1.08
1101.00	0.65	185.90	1100.95	0.97 S	2.23 W	-2.02	0.47
1198.00	1.63	185.92	1197.93	2.89 S	2.43 W	-1.86	1.01
1292.00	3.59	199.94	1291.83	6.98 S	3.57 W	-2.23	2.18
1386.00	6.51	198.06	1385.45	14.82 S	6.23 W	-3.41	3.11
1481.00	7.08	198.47	1479.79	25.49 S	9.75 W	-4.91	0.60
1575.00	7.68	191.75	1573.01	37.13 S	12.87 W	-5.84	1.12
1669.00	6.89	182.55	1666.25	48.92 S	14.40 W	-5.18	1.50
1763.00	8.03	190.89	1759.46	61.00 S	15.89 W	-4.43	1.67
1857.00	7.22	196.98	1852.63	73.10 S	18.85 W	-5.13	1.22
1952.00	7.96	198.56	1946.79	85.04 S	22.69 W	-6.71	0.81
2046.00	6.46	197.62	2040.05	96.25 S	26.36 W	-8.26	1.60
2140.00	7.27	202.71	2133.37	106.78 S	30.26 W	-10.16	1.08
2234.00	4.73	191.91	2226.85	116.06 S	33.36 W	-11.50	2.95
2326.00	5.01	192.46	2318.52	123.69 S	35.01 W	-11.72	0.31
2418.00	6.79	199.19	2410.03	132.75 S	37.66 W	-12.67	2.07
2512.00	6.19	192.29	2503.43	142.95 S	40.57 W	-13.66	1.05
2601.00	7.80	190.19	2591.77	153.59 S	42.66 W	-13.76	1.83
2691.00	9.08	190.21	2680.79	166.59 S	45.00 W	-13.68	1.42
2781.00	10.26	192.47	2769.51	181.40 S	47.99 W	-13.90	1.38
2870.00	8.72	194.41	2857.29	195.68 S	51.38 W	-14.61	1.77
2960.00	8.96	192.78	2946.22	209.12 S	54.63 W	-15.34	0.39
3050.00	7.75	202.45	3035.27	221.56 S	58.49 W	-16.86	2.06
3139.00	6.38	184.82	3123.60	232.04 S	61.20 W	-17.60	2.86
3229.00	6.69	183.89	3213.02	242.25 S	61.98 W	-16.49	0.36
3318.00	8.46	194.53	3301.24	253.76 S	63.97 W	-16.34	2.53
3408.00	6.57	188.18	3390.46	265.27 S	66.36 W	-16.58	2.29
3498.00	7.81	198.82	3479.76	276.15 S	69.07 W	-17.24	2.02
3587.00	9.63	198.22	3567.73	288.95 S	73.35 W	-19.10	2.05
3677.00	8.36	192.06	3656.62	302.50 S	77.07 W	-20.27	1.77
3767.00	9.53	192.19	3745.52	316.18 S	80.01 W	-20.65	1.30
3857.00	9.91	190.94	3834.23	331.07 S	83.05 W	-20.91	0.48
3946.00	9.11	189.76	3922.01	345.53 S	85.70 W	-20.86	0.93
4036.00	9.08	197.21	4010.88	359.34 S	89.01 W	-21.58	1.31
4125.00	7.04	187.63	4099.00	371.45 S	91.81 W	-22.12	2.74
4215.00	7.91	197.35	4188.24	382.83 S	94.39 W	-22.57	1.70
4304.00	6.04	185.67	4276.58	393.34 S	96.68 W	-22.89	2.63
4394.00	7.10	202.11	4365.99	403.20 S	99.24 W	-23.60	2.39
4484.00	6.23	192.48	4455.39	413.12 S	102.39 W	-24.87	1.57
4573.00	9.09	197.39	4543.59	424.55 S	105.54 W	-25.87	3.29

4663.00	8.21	198.89	4632.56	437.42 S	109.74 W	-27.64	1.01
4752.00	7.30	199.01	4720.75	448.77 S	113.64 W	-29.39	1.02
4842.00	8.50	198.81	4809.89	460.48 S	117.65 W	-31.18	1.33
4932.00	8.10	191.38	4898.95	472.99 S	121.04 W	-32.23	1.27
5021.00	7.86	191.88	4987.09	485.09 S	123.53 W	-32.45	0.28
5111.00	6.47	196.65	5076.38	495.97 S	126.25 W	-33.13	1.68
5201.00	7.91	191.06	5165.68	506.91 S	128.90 W	-33.72	1.78
5290.00	9.44	189.24	5253.65	520.12 S	131.24 W	-33.61	1.75
5380.00	8.20	191.97	5342.59	533.69 S	133.76 W	-33.59	1.45
5469.00	6.29	194.47	5430.87	544.62 S	136.29 W	-34.08	2.17
5559.00	7.18	185.53	5520.25	554.99 S	138.07 W	-33.92	1.53
5649.00	8.70	188.06	5609.39	567.33 S	139.56 W	-33.13	1.73
5738.00	7.44	187.85	5697.51	579.70 S	141.29 W	-32.56	1.42
5828.00	7.48	184.53	5786.75	591.32 S	142.55 W	-31.67	0.48
5917.00	8.79	186.82	5874.85	603.84 S	143.82 W	-30.61	1.52
6007.00	7.20	185.05	5963.97	616.29 S	145.13 W	-29.62	1.79
6097.00	8.54	191.10	6053.12	628.47 S	146.91 W	-29.14	1.75
6186.00	6.82	187.63	6141.32	640.19 S	148.89 W	-28.93	2.00
6276.00	7.48	193.65	6230.62	651.18 S	150.98 W	-28.97	1.11
6321.00	8.97	185.25	6275.16	657.52 S	151.99 W	-28.80	4.25
6366.00	11.95	183.22	6319.41	665.67 S	152.58 W	-27.88	6.67
6411.00	14.98	181.85	6363.17	676.13 S	153.03 W	-26.40	6.77
6455.00	18.11	180.68	6405.34	688.66 S	153.29 W	-24.36	7.15
6500.00	19.83	168.13	6447.91	703.13 S	151.80 W	-20.25	9.82
6545.00	21.21	158.07	6490.07	718.15 S	147.19 W	-12.96	8.40
6590.00	24.75	150.83	6531.50	733.94 S	139.56 W	-2.56	10.05
6635.00	27.32	142.67	6571.94	750.38 S	128.70 W	11.13	9.78
6679.00	29.16	133.86	6610.72	765.85 S	114.84 W	27.60	10.35
6724.00	32.38	130.75	6649.38	781.31 S	97.80 W	47.18	7.98
6769.00	36.71	124.93	6686.45	796.89 S	77.63 W	69.87	12.09
6814.00	40.73	122.56	6721.55	812.50 S	54.22 W	95.75	9.52
6859.00	43.63	119.06	6754.90	827.95 S	28.26 W	124.09	8.29
6903.00	45.31	113.10	6786.31	841.47 S	0.59 W	153.77	10.23
6948.00	48.12	107.99	6817.17	852.92 S	30.07 E	186.02	10.36
6993.00	49.70	103.83	6846.76	862.20 S	62.68 E	219.77	7.80
7038.00	52.27	99.26	6875.09	869.17 S	96.92 E	254.71	9.74
7083.00	56.65	97.99	6901.24	874.65 S	133.11 E	291.30	10.00
7127.00	60.77	96.86	6924.09	879.50 S	170.39 E	328.83	9.62
7172.00	64.79	95.40	6944.67	883.76 S	210.17 E	368.72	9.39
7217.00	67.49	94.90	6962.87	887.45 S	251.15 E	409.68	6.09
7262.00	70.39	93.99	6979.04	890.70 S	293.02 E	451.43	6.71
7307.00	74.93	92.41	6992.45	893.09 S	335.89 E	494.02	10.63
7364.00	80.68	91.74	7004.49	895.11 S	391.54 E	549.10	10.15

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 100.57 DEGREES (GRID)
A TOTAL CORRECTION OF 8.07 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 7364.00 FEET
IS 977.00 FEET ALONG 156.37 DEGREES (GRID)

Tie on to Vaughn ESS rig survey at 623' MD

Date Printed:02 October 2013