HALLIBURTON | Sperry Drilling

PCG Pressure Case Gamma
PCD Pressure Case Directional

Company : **Noble Energy**
Rig : **H&P 343**
Well : **Wells Ranch AA35-64-1AHNA**
Field : **Wattenberg**
Country : **USA**
API Number : **0512338661**

Country	: **USA**
Field	: **Wattenberg**
Location	: **Lat: 40° 26' 28.03" North** **Long: 104° 23' 38.76" West**
Well	: **Wells Ranch AA35-64-1AHNA**
Company	: **Noble Energy**
Rig	: **H&P 343**

LOCATION

Latitude : **40° 26' 28.03" North**
Longitude : **104° 23' 38.76" West**
UTM Easting = **3,307,809.805 ft**
UTM Northing = **1,405,459.580 ft**

Other Services
Directional Drilling

Elev. KB **NA**
DF **4797.00 ft**
GL **4773.00 ft**
WD **NA**

Permanent Datum : **Ground Level** Elevation : **4773.00 ft**
Log Measured From : **Drill Floor** **24.00 ft** Above Permanent Datum
Drilling Measured From : **Drill Floor**

MD LOG

Depth Logged : **634.00 ft** To **11,056.00 ft**
Date Logged : **21-Feb-14** To **27-Feb-14**
Total Depth MD : **11,056.00 ft** TVD: **6,547.95 ft**
Spud Date : **21-Feb-14**

Unit No. : **11610115**
Plot Type : **Final**
Plot Date : **28-Feb-14**

Job No. :**CA-XX-0901018825**

Run No.	Borehole Record (MD) Size	From	To
2	8.750 in	634.00 ft	5,846.00 ft
3	8.750 in	5,846.00 ft	6,865.00 ft
4	6.125 in	6,865.00 ft	11,056.00 ft

Run No.	Casing Record (MD) Size	Weight	From	To
	9.625 in	36.60 lbpf	SURFACE	624.00 ft
	7.000 in	34.70 lbpf	SURFACE	6,855.00 ft

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	24-Feb-14	25-Feb-14	27-Feb-14		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.750	6.750	4.750		
Log Start Depth (MD, ft)	634.00	5,846.00	6,865.00		
Log End Depth (MD, ft)	5,846.00	6,865.00	11,056.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	22-Feb-14 14:30	24-Feb-14 12:00	26-Feb-14 07:30		
Drill/Wipe End Date and Time	23-Feb-14 07:15	25-Feb-14 01:30	27-Feb-14 11:00		
Min Inc (deg) @ Depth (MD, ft)	0.10 @ 5,619.00	0.52 @ 5,903.00	85.62 @ 6,960.00		
Max Inc (deg) @ Depth (MD, ft)	9.16 @ 3,914.00	81.71 @ 6,812.00	92.50 @ 7,333.00		
Bit TFA(in2) / Bit Type	0.98 / PDC	0.98 / PDC	0.98 / PDC		
Flow Rate (gpm)	589.20	571.37	300.00		
Max AV (fpm) / CV (fpm) @ MWD	417.0 / NA	417.4 / NA	448.2 / NA		
Fluid Type	Native/Spud Mud	Native/Spud Mud	Native/Spud Mud		
Density (ppg) / Viscosity (spqt)	9.25 / 45.00	10.50 / 51.00	9.10 / 33.00		
Filtrate CL (ppm)	2,800.00	3,000.00	3,300.00		
pH / Fluid Loss (mptm)	9.20 / 7	9.70 / 10	10.20 / 6		
PV (cP) / YP (lhf2)	12 / 16.00	13 / 18.00	6 / 7.00		
% Solids / % Sand	5.7 / 0.20	9.9 / 0.25	3.4 / .25		
% Oil / Oil:Water Ratio	0 / 0:95	0 / 0:95	0 / 0:95		
Rm @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA		
Rmf @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA		
Rmc @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA		

Max Tool Temp (degF) / Source	158.47 / PCM	158.47 / PCM	217.60 / PCM		
Rm @ Max Tool Temp (degF)	NA @ NA	NA @ NA	NA @ NA		
Lead MWD Engineer	Adam Sampson	Adam Sampson	Brett Vandergon		
Customer Representative	Johnny Sanchez	Johnny Sanchez	Matt Settles		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.84	5.84	5.84		
Sub Serial Number	11342275	11342275	12134685		
Insert Serial Number	10997273	10997273	11619995		
Date and Time Initialized	22-Feb-14 09:14	01-Jan-70 00:00	25-Feb-14 11:00		
Date and Time Read	25-Feb-14 08:02	25-Feb-14 07:56	27-Feb-14 21:59		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	55.00	53.00	64.00		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11342275	11342275	12134685		
Sonde Serial Number	11477956	11477956	11833228		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	94.93	139.94	70.34		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	47.94	46.66	56.89		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11342275	11342275	12134685		
Insert/Sonde Serial Number	12037425	12037425	11681019		

REMARKS

1. All depths are measured bit depths, referenced to the Driller's pipe tally and are measured from the Drill Floor, unless otherwise specified.
2. No depth corrections have been made for pipe stretch or compression.
3. Critical annual velocities are calculated using the "Power Law" model for water based fluids and the "Bingham Plastic" model for oil and synthetic based fluids.
4. All data presented is recorded data unless otherwise specified.
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
6. INSITE version 8.0.0

WARRANTY

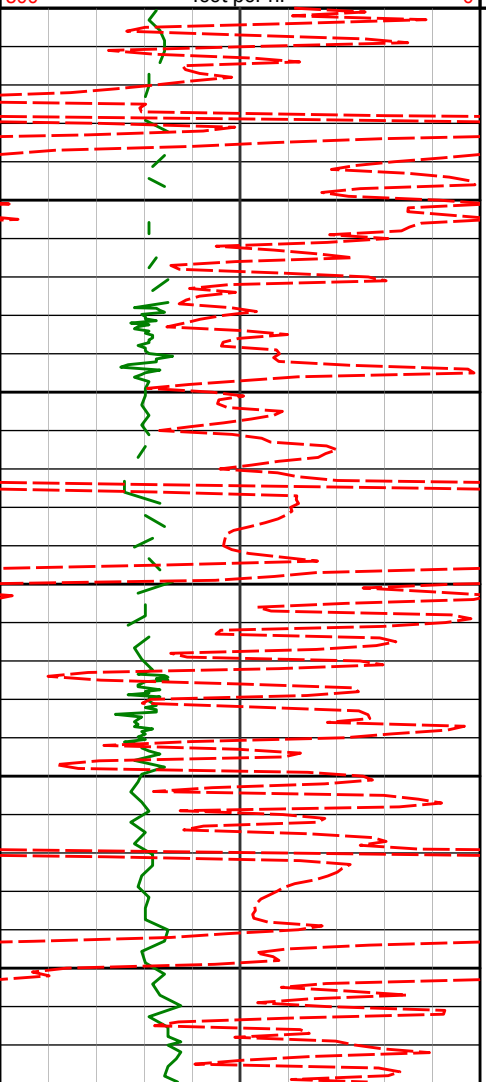
HALLIBURTON
Sperry Drilling Services

MD Main Log 1:600

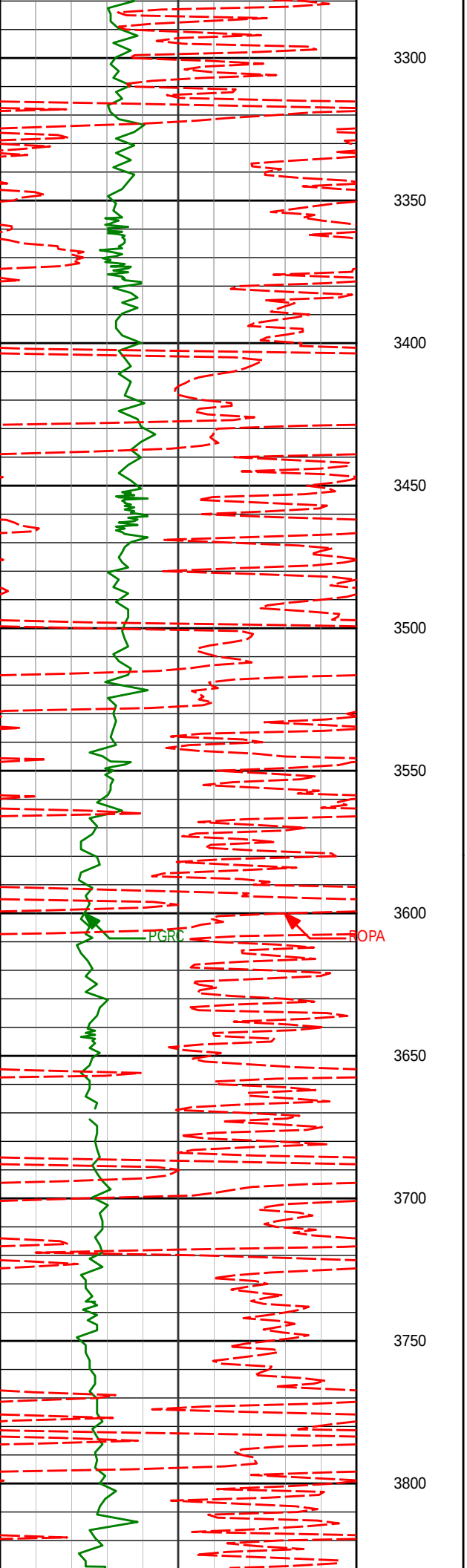
Noble Energy
Wells Ranch AA35-64-1AHNA
H&P 343
T6N-R63W

PCG Gamma Ray
PGRC
0 api 300

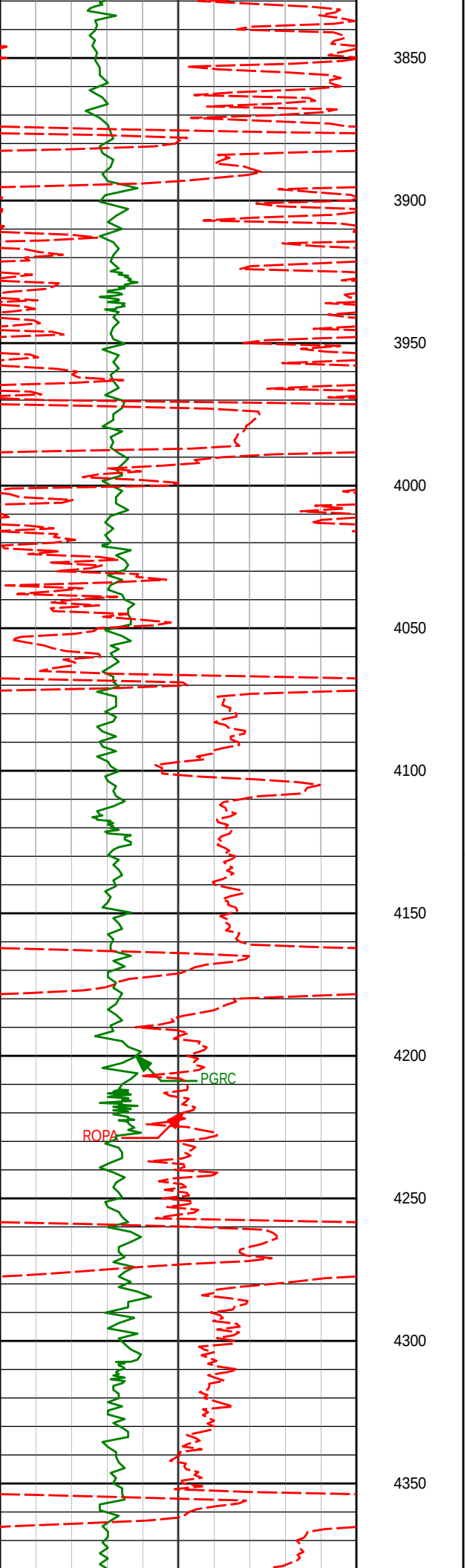
Avg Rate of Penetration
ROPA
500 feet per hr 0



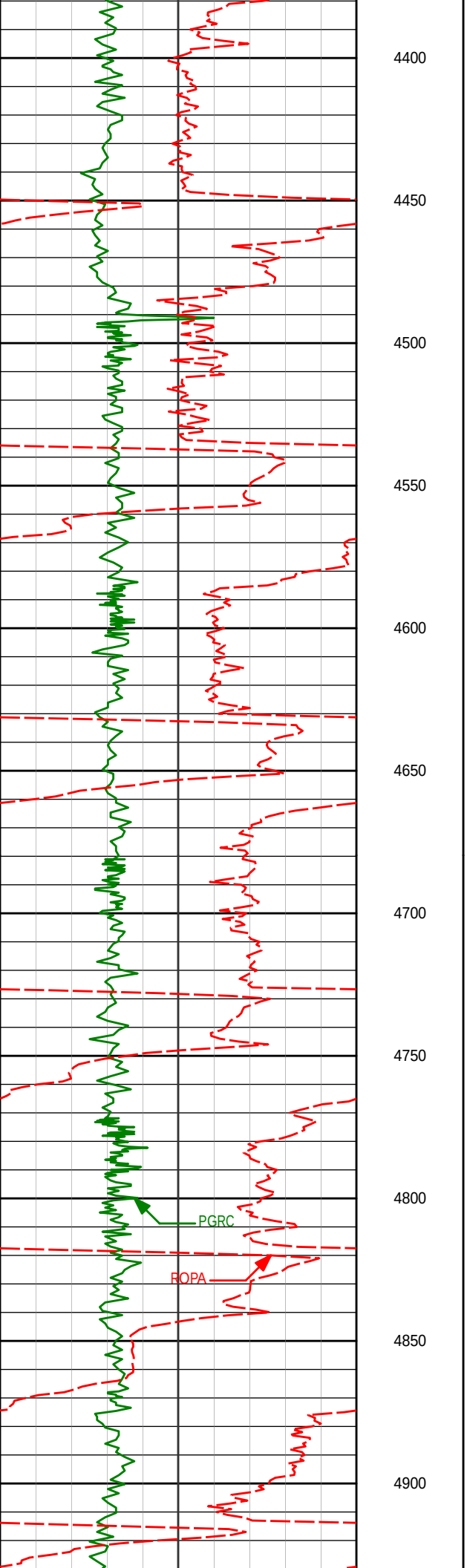
Depth ft	Depth	Inc.	Azi.	TVD	V.S.
	3066'	7.17°	204.64°	3060.07'	50.07'
	3160'	7.91°	202.56°	3153.26'	55.74'
	3254'	8.52°	204.26°	3246.30'	61.89'



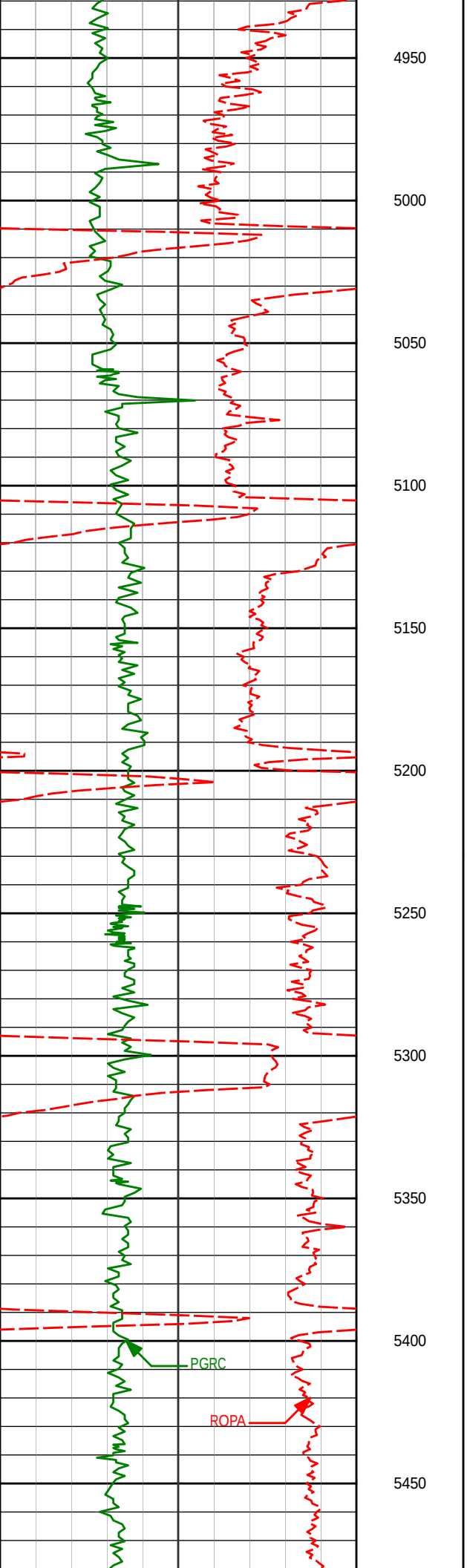
3349'	6.83°	205.18°	3340.44'	67.94'
3443'	8.32°	202.59°	3433.62'	73.67'
3536'	8.41°	200.69°	3525.63'	79.48'
3631'	8.50°	200.44°	3619.60'	85.25'
3725'	8.69°	201.03°	3712.54'	91.08'
3819'	9.08°	199.99°	3805.41'	97.06'



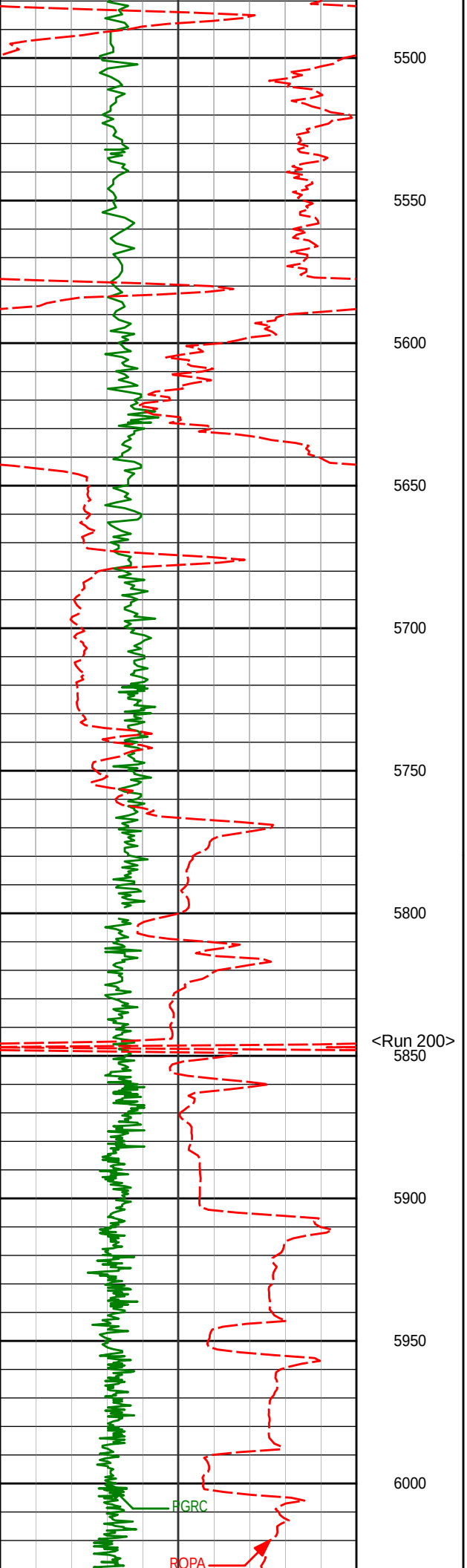
3914'	9.16°	199.35°	3899.21'	103.06'
4008'	7.77°	200.45°	3992.19'	108.61'
4103'	7.36°	201.99°	4086.36'	113.90'
4197'	6.56°	199.45°	4179.67'	118.64'
4292'	6.29°	202.65°	4274.07'	123.10'



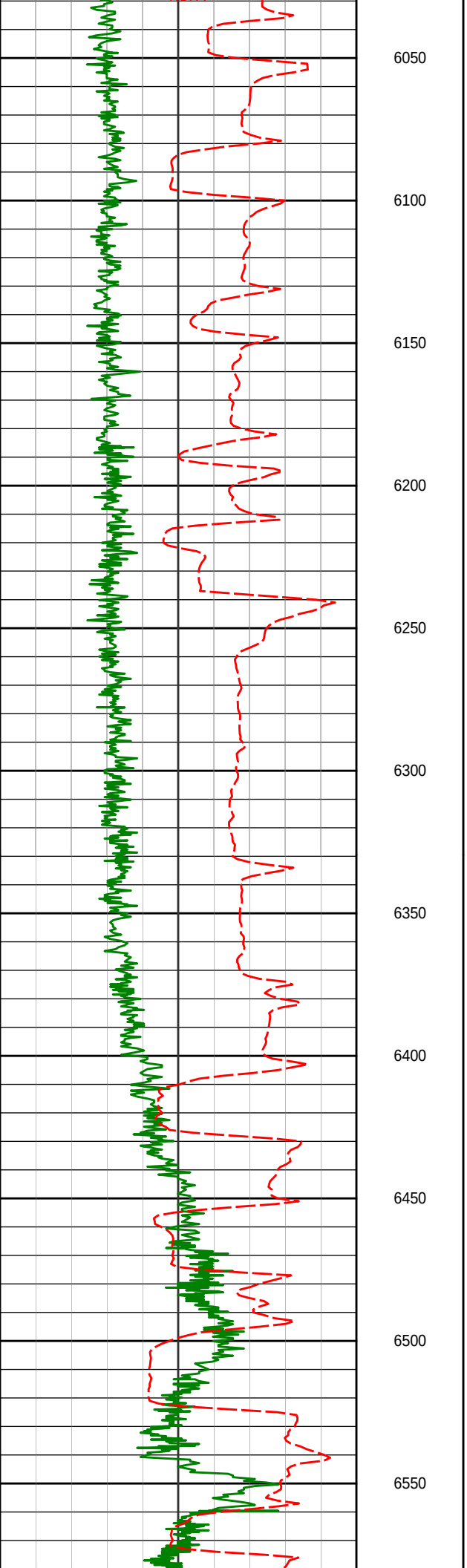
4387'	5.59°	202.92°	4368.56'	127.50'
4482'	5.35°	205.38°	4463.13'	131.74'
4577'	4.03°	200.98°	4557.81'	135.30'
4671'	2.68°	198.28°	4651.64'	137.52'
4766'	1.55°	182.82°	4746.58'	138.50'
4861'	0.50°	179.98°	4841.56'	138.67'



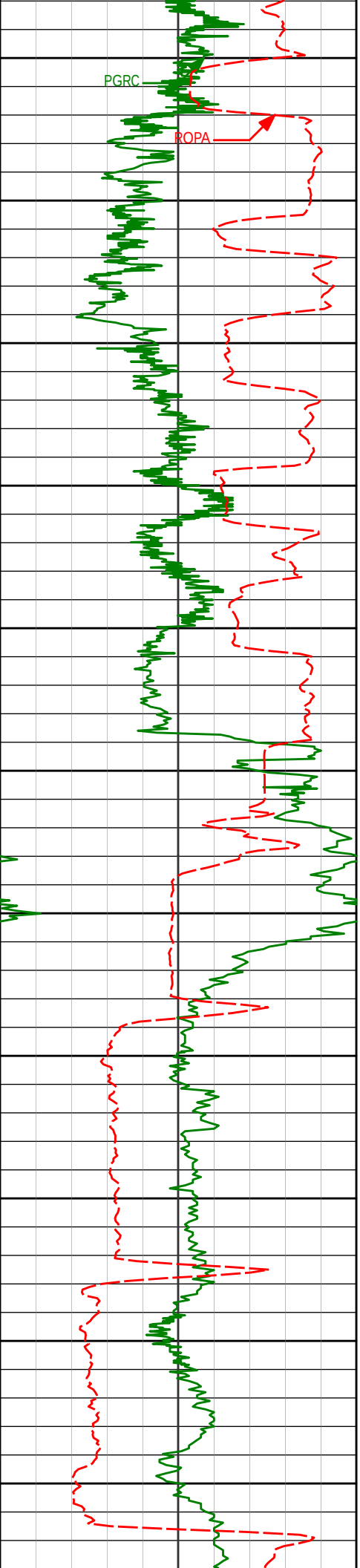
4955'	0.25°	208.24°	4935.56'	138.81'
5050'	0.43°	150.53°	5030.56'	138.77'
5145'	0.43°	214.75°	5125.55'	138.83'
5240'	0.41°	234.08°	5220.55'	139.34'
5335'	0.38°	269.39°	5315.55'	139.95'



5525'	0.39°	227.17°	5505.55'	141.08'
5619'	0.10°	284.91°	5599.55'	141.40'
5714'	0.11°	323.92°	5694.54'	141.53'
5791'	0.32°	133.51°	5771.54'	141.43'
5903'	0.52°	168.65°	5883.54'	141.15'
5951'	4.87°	256.94°	5931.48'	143.13'
5997'	9.27°	259.37°	5977.12'	148.74'



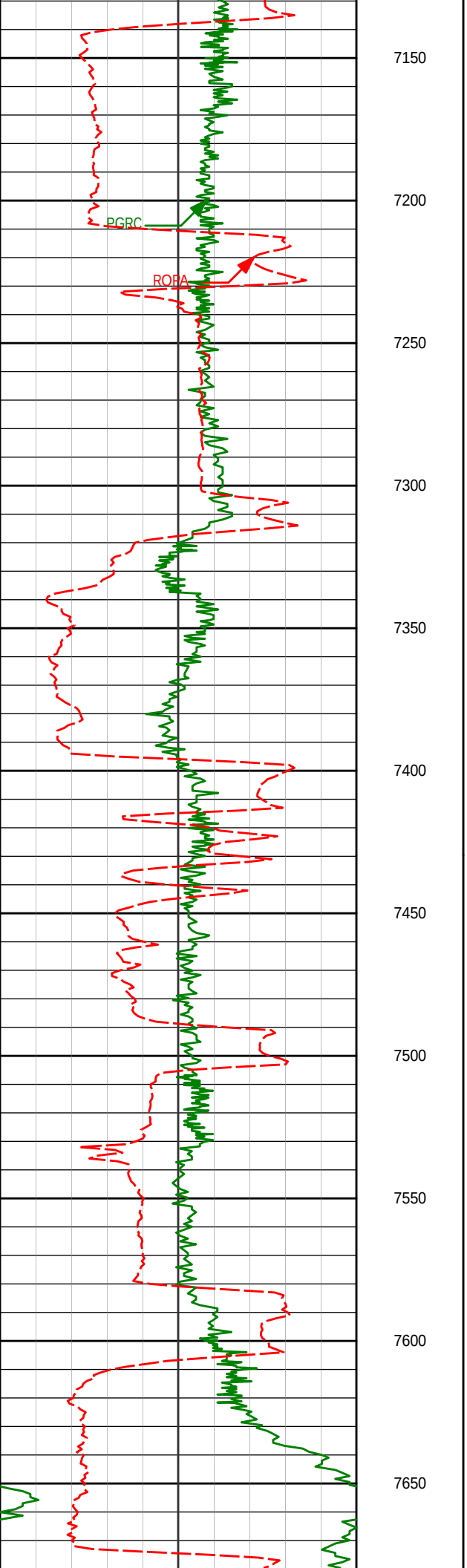
6045'	13.26°	261.11°	6024.19'	158.06'
6091'	16.71°	263.92°	6068.62'	169.93'
6139'	20.52°	268.99°	6114.10'	185.24'
6186'	24.88°	274.29°	6157.45'	203.26'
6281'	29.64°	270.02°	6241.89'	246.52'
6329'	38.08°	268.95°	6281.71'	273.19'
6376'	45.77°	268.54°	6316.65'	304.54'
6424'	49.42°	268.81°	6349.02'	339.94'
6471'	52.81°	269.73°	6378.52'	376.47'
6519'	54.62°	269.83°	6406.92'	415.08'
6566'	59.25°	270.16°	6432.56'	454.37'



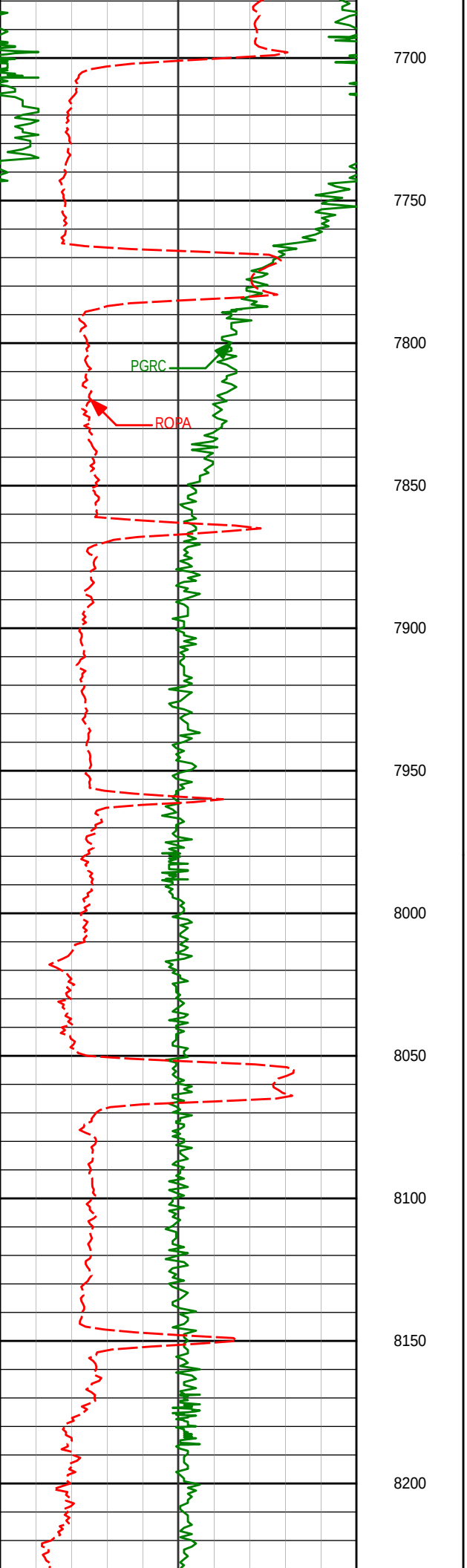
6600	6614'	63.63°	270.52°	6455.50'	496.41'
6650	6661'	68.79°	269.56°	6474.46'	539.31'
6700	6709'	72.49°	268.88°	6490.37'	584.52'
6750	6755'	76.75°	268.66°	6502.56'	628.82'
6800	6812'	81.71°	269.67°	6513.21'	684.72'
6850					
6900					
6950	6960'	85.62°	271.39°	6529.54'	831.36'
7000					
7050	7053'	85.87°	271.28°	6536.44'	923.73'
7100					

Casing Set @ 6,855' MD

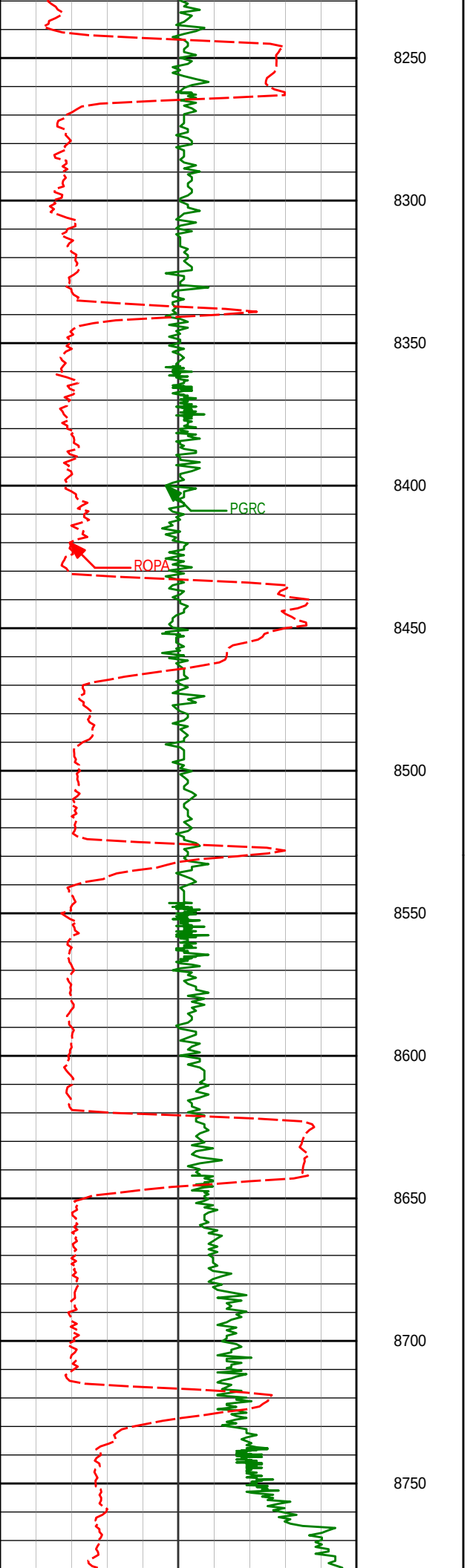
<Run 300>



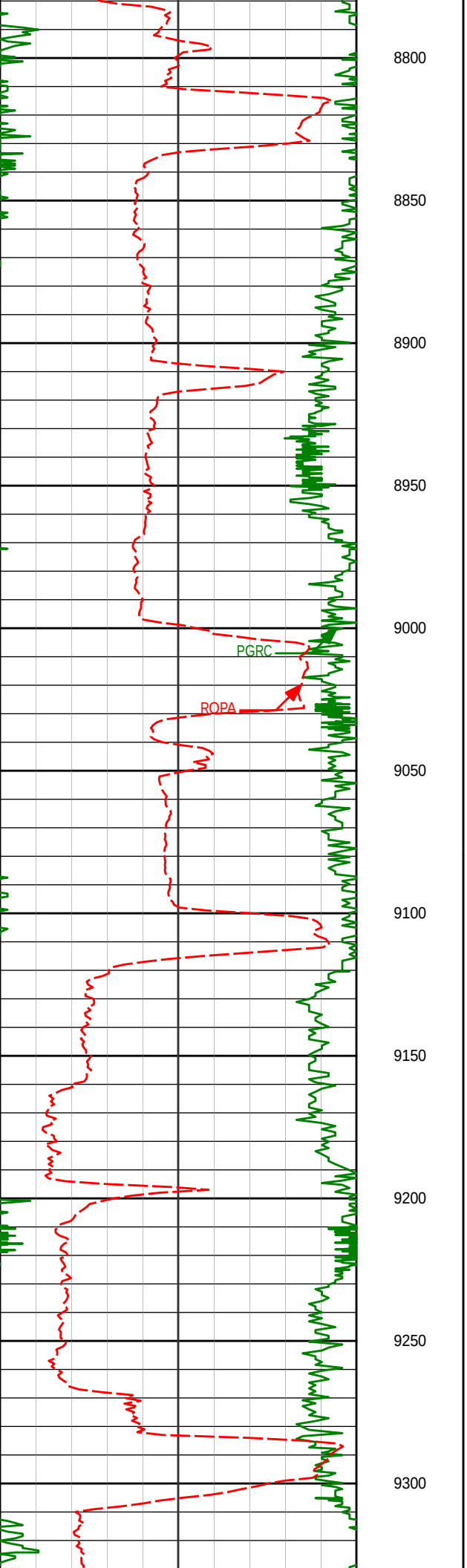
7147'	88.21°	269.97°	6541.29'	1017.32'
7239'	89.63°	270.50°	6543.03'	1109.07'
7333'	92.50°	268.16°	6541.28'	1202.89'
7424'	91.39°	267.94°	6538.19'	1293.79'
7518'	91.29°	268.26°	6535.99'	1387.71'
7612'	91.26°	269.19°	6533.90'	1481.60'



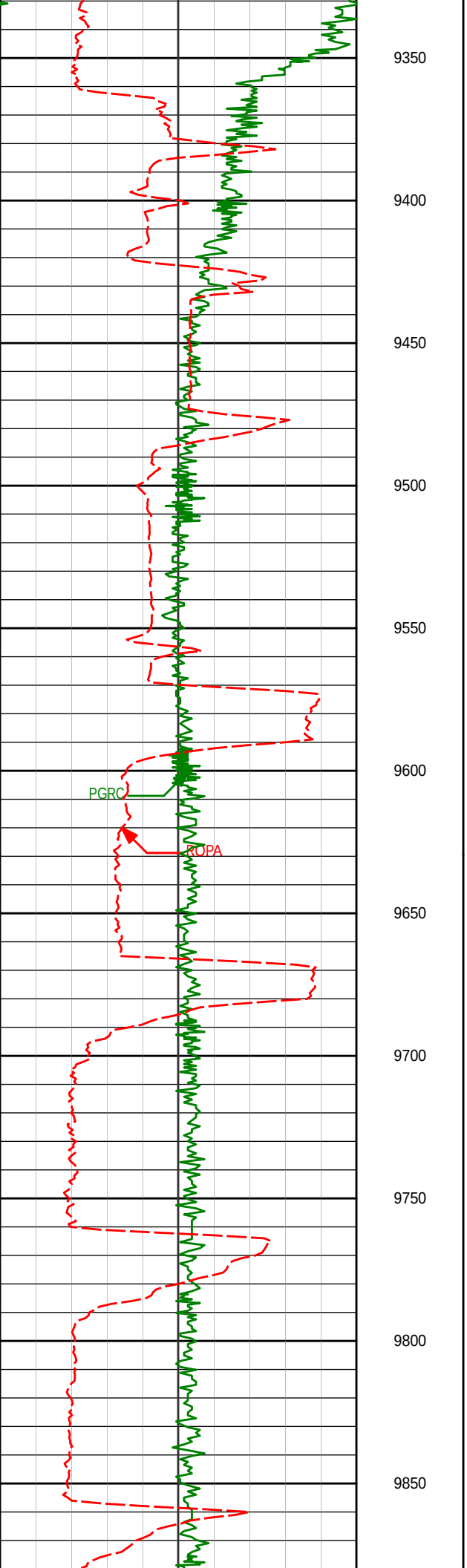
7700	7705'	89.88°	268.93°	6532.98'	1574.47'
7750					
7800	7800'	88.64°	269.24°	6534.20'	1669.34'
7850					
7900	7894'	89.08°	269.41°	6536.07'	1763.18'
7950					
8000	7989'	89.42°	268.82°	6537.32'	1858.05'
8050					
8100	8084'	89.63°	269.49°	6538.10'	1952.92'
8150					
8200	8179'	90.58°	269.52°	6537.93'	2047.76'



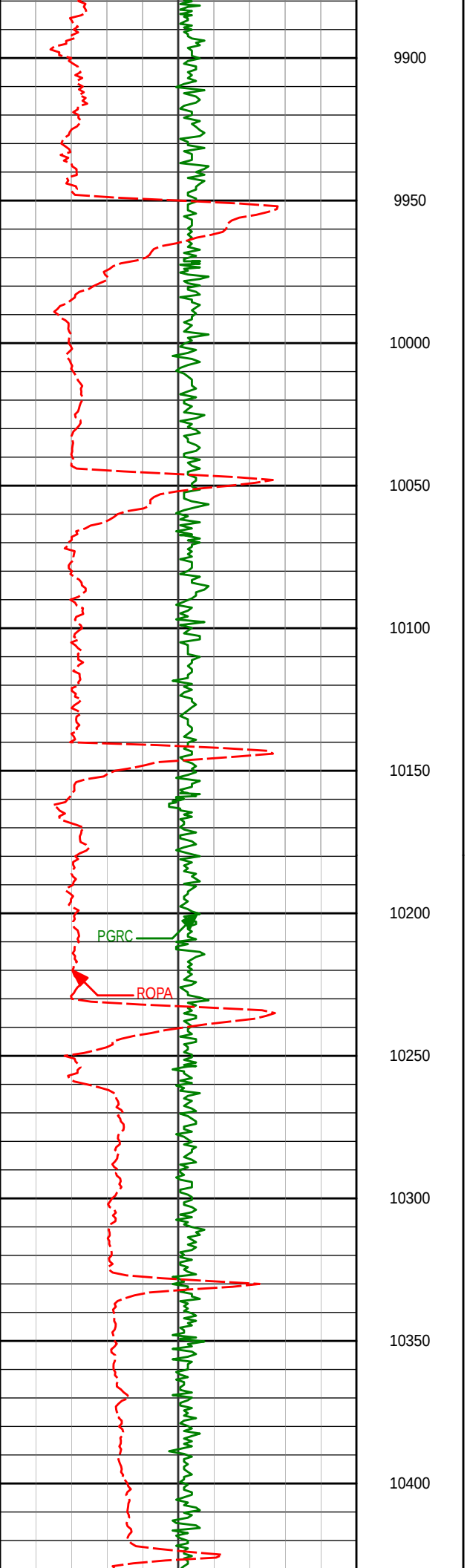
8274'	88.71°	268.17°	6538.52'	2142.65'
8369'	89.23°	268.15°	6540.23'	2237.58'
8463'	90.09°	269.24°	6540.79'	2331.48'
8558'	90.43°	268.20°	6540.35'	2426.39'
8653'	90.03°	270.08°	6539.97'	2521.26'
8748'	90.74°	269.71°	6539.33'	2616.06'



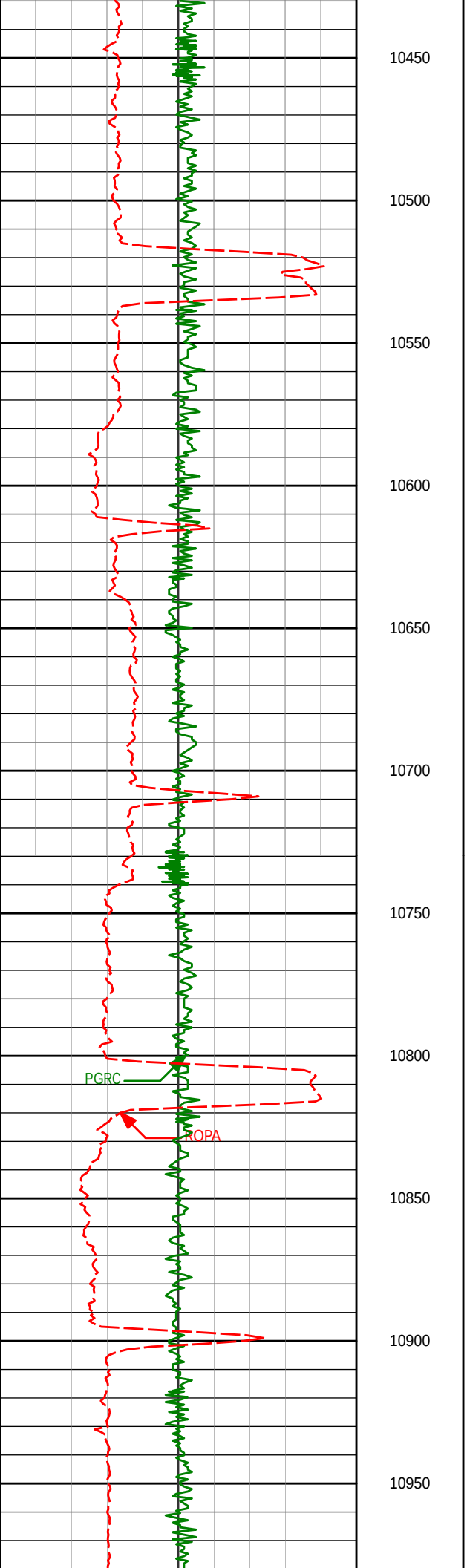
8842'	89.78°	269.78°	6538.91'	2709.87'
8937'	90.12°	268.24°	6538.99'	2804.76'
9032'	90.19°	269.66°	6538.73'	2899.64'
9127'	89.20°	269.89°	6539.24'	2994.45'
9222'	90.03°	270.11°	6539.88'	3089.24'
9316'	88.34°	269.46°	6541.21'	3183.04'



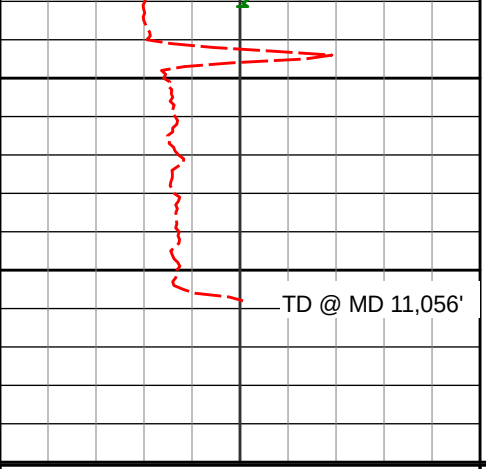
9411'	88.80°	269.38°	6543.59'	3277.86'
9506'	89.01°	268.54°	6545.40'	3372.73'
9600'	90.93°	270.45°	6545.45'	3466.57'
9695'	90.12°	270.87°	6544.58'	3561.27'
9790'	89.82°	270.37°	6544.63'	3655.99'



9885'	90.19°	270.31°	6544.62'	3750.74'
9980'	90.00°	270.37°	6544.46'	3845.49'
10075'	90.00°	270.20°	6544.46'	3940.25'
10170'	89.85°	269.50°	6544.59'	4035.05'
10265'	89.63°	268.94°	6545.02'	4129.92'
10360'	89.88°	268.83°	6545.43'	4224.81'



10454'	90.56°	269.57°	6545.06'	4318.68'
10549'	89.04°	269.33°	6545.40'	4413.53'
10644'	89.32°	269.92°	6546.76'	4508.34'
10739'	90.12°	270.02°	6547.22'	4603.14'
10834'	89.45°	269.82°	6547.58'	4697.93'
10928'	89.91°	269.62°	6548.10'	4791.75'



Depth ft	Depth	Inc.	Azi.	TVD	V.S.
11000	10992'	90.12°	269.52°	6548.09'	4855.64'
11050	11056'	90.12°	269.52°	6547.95'	4919.53'

Avg Rate of Penetration
ROPA
500 feet per hr 0

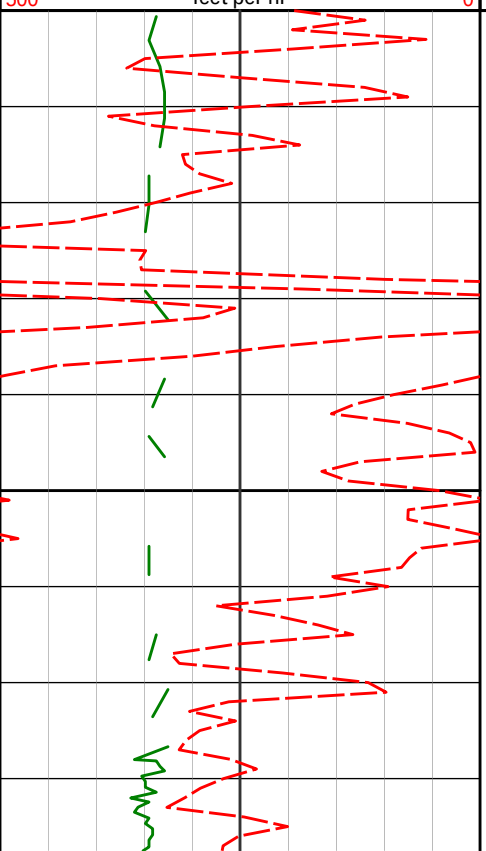
PCG Gamma Ray
PGRC
0 api 300

HALLIBURTON
Sperry Drilling Services
MD Detail Log 1:240

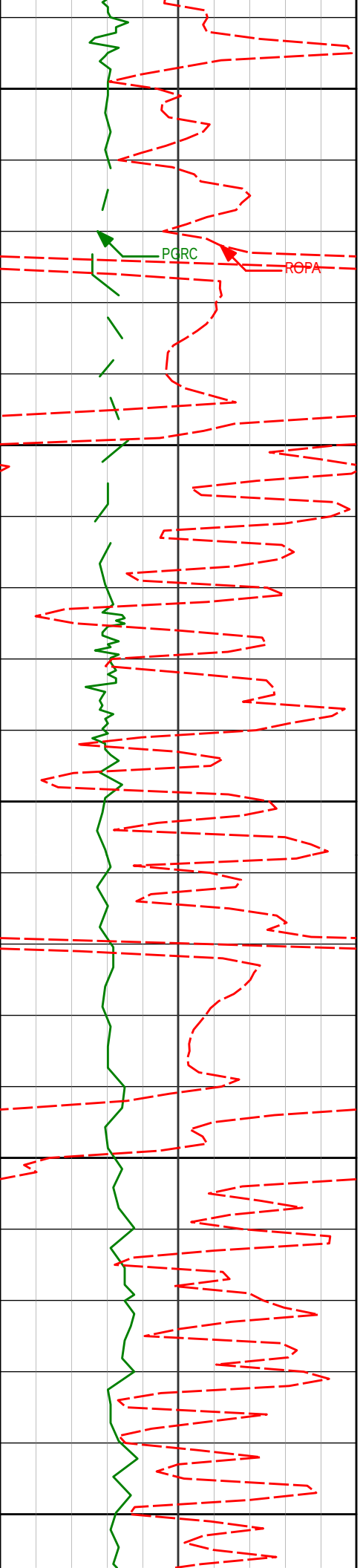
Noble Energy
Wells Ranch AA35-64-1AHNA
H&P 343
T6N-R63W

PCG Gamma Ray
PGRC
0 api 300

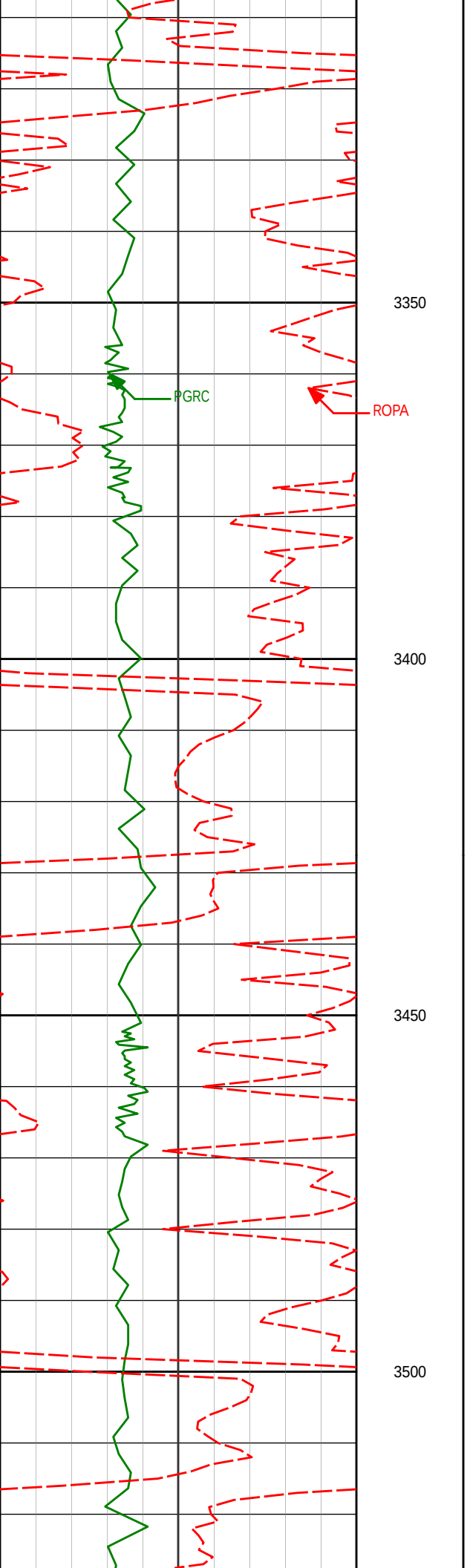
Avg Rate of Penetration
ROPA
500 feet per hr 0



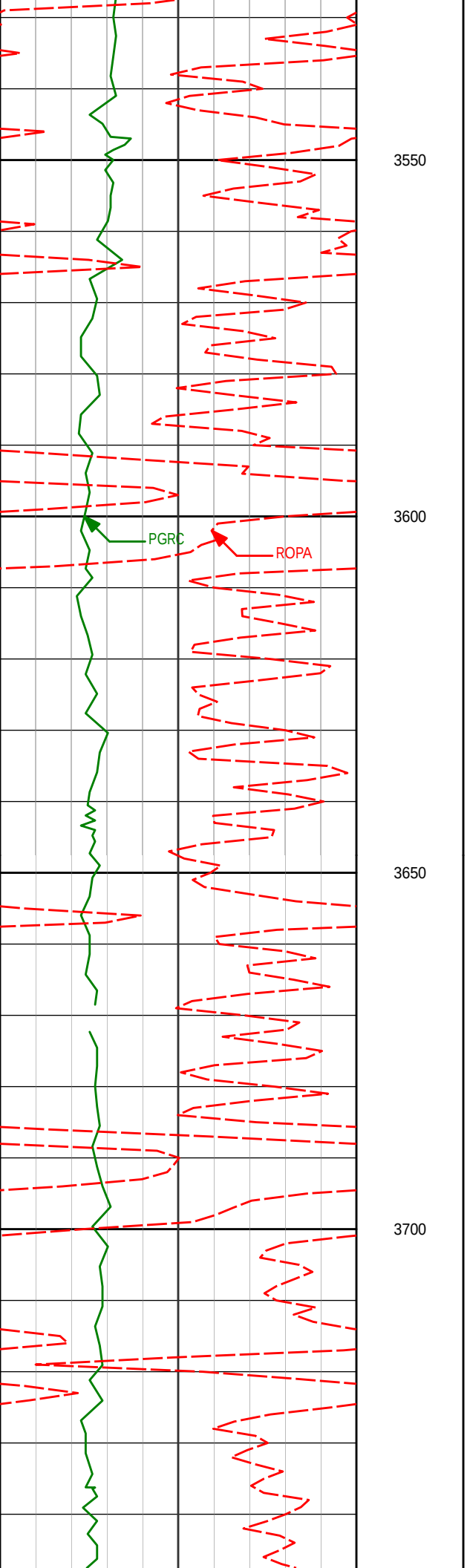
Depth ft	Depth	Inc.	Azi.	TVD	V.S.
3050	3066'	7.17°	204.64°	3060.07'	50.07'



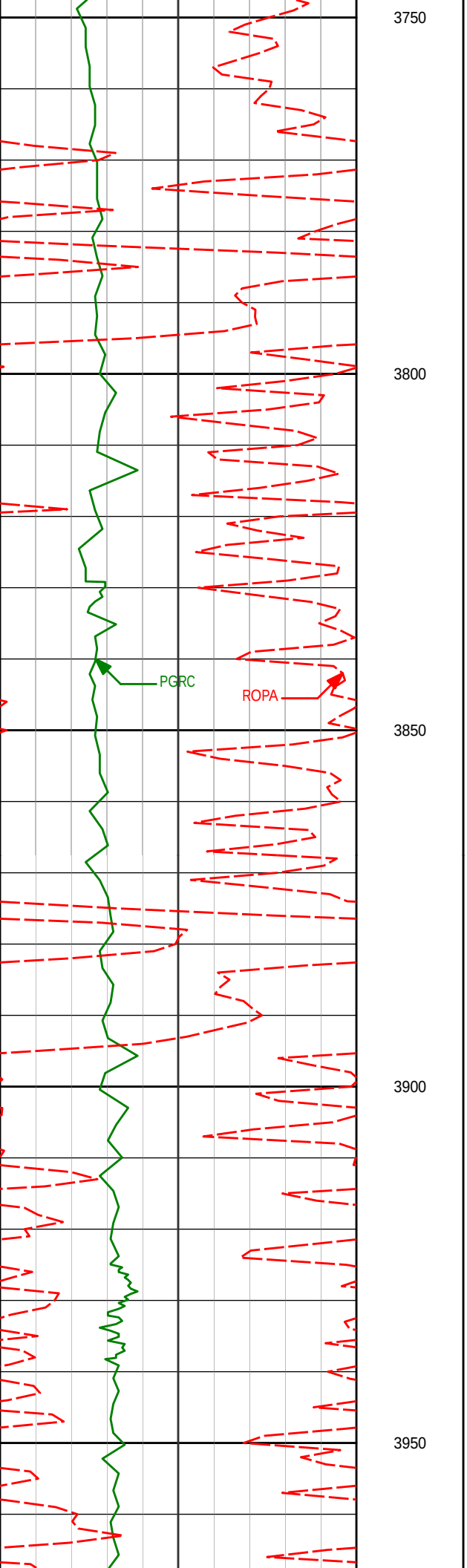
3160'	7.91°	202.56°	3153.26'	55.74'
3254'	8.52°	204.26°	3246.30'	61.89'



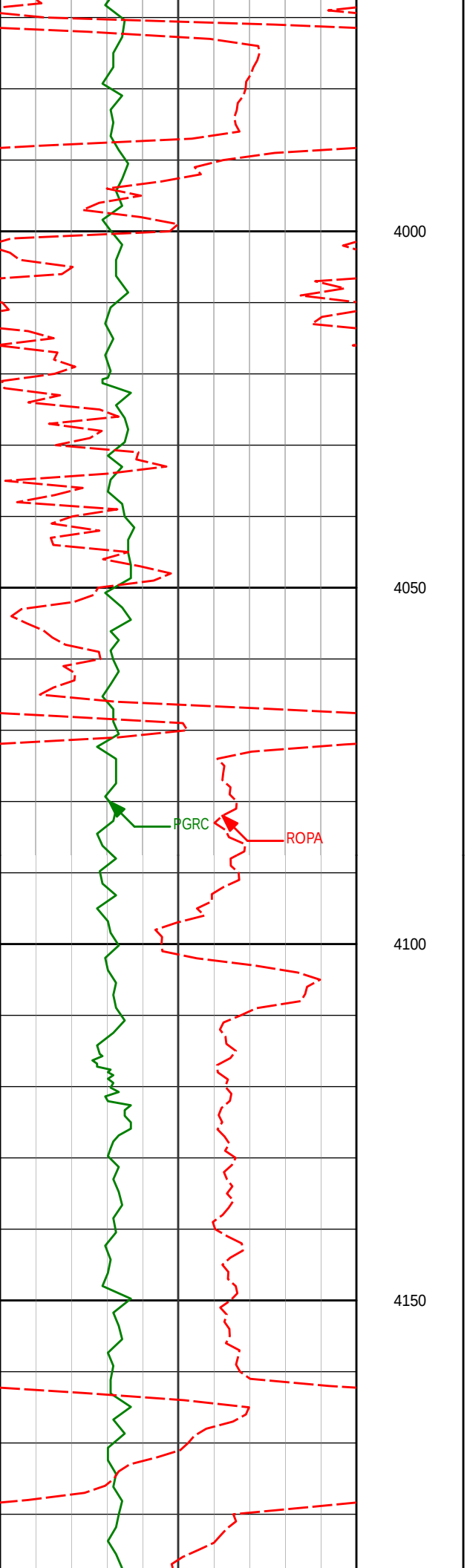
3349'	6.83°	205.18°	3340.44'	67.94'
3443'	8.32°	202.59°	3433.62'	73.67'



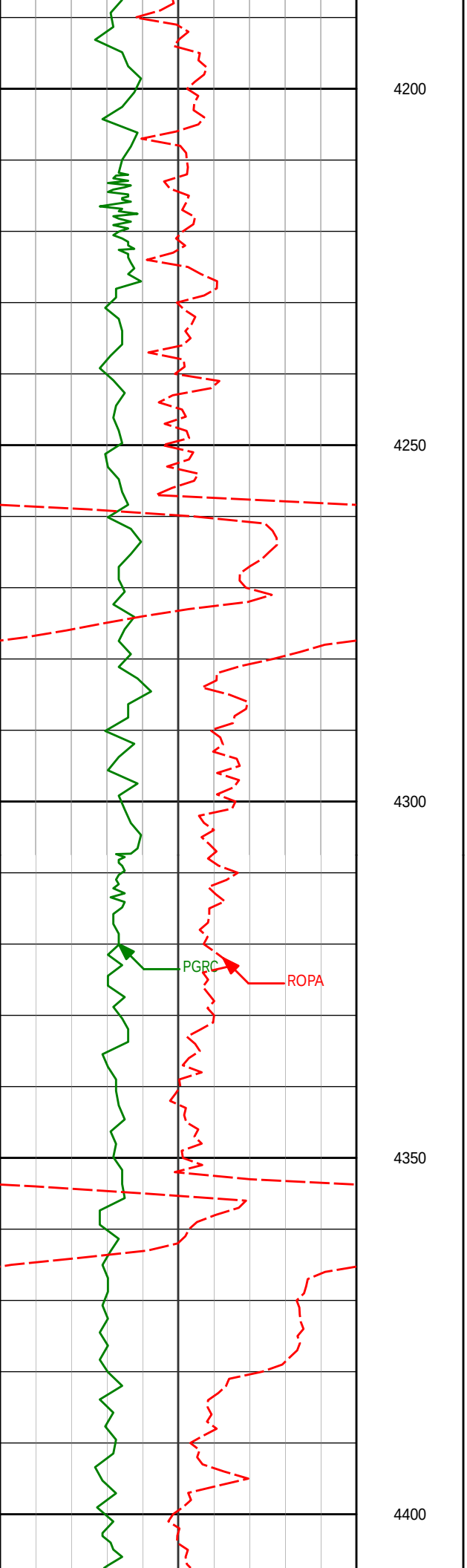
3536'	8.41°	200.69°	3525.63'	79.48'
3631'	8.50°	200.44°	3619.60'	85.25'
3725'	8.69°	201.03°	3712.54'	91.08'



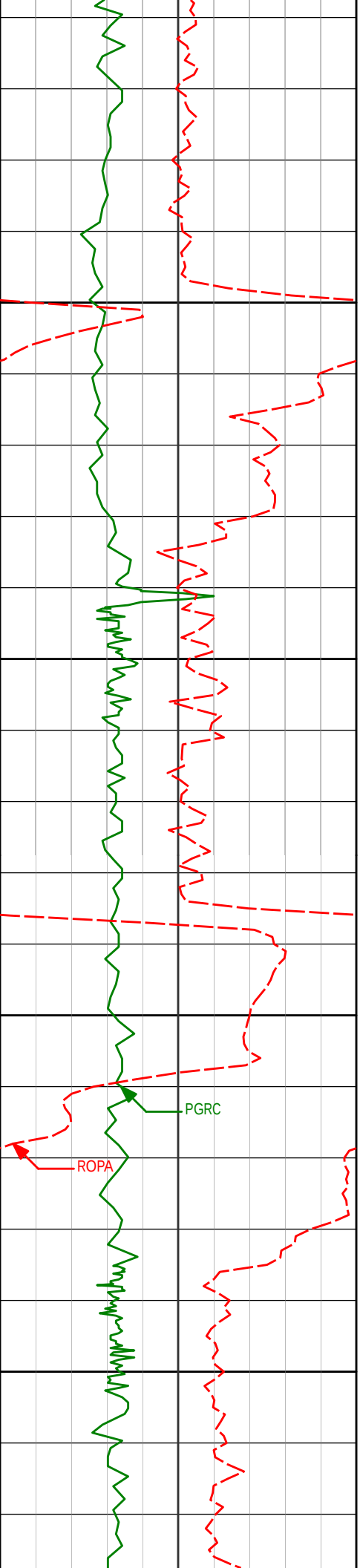
3819'	9.08°	199.99°	3805.41'	97.06'
3914'	9.16°	199.35°	3899.21'	103.06'



4008'	7.77°	200.45°	3992.19'	108.61'
4103'	7.36°	201.99°	4086.36'	113.90'

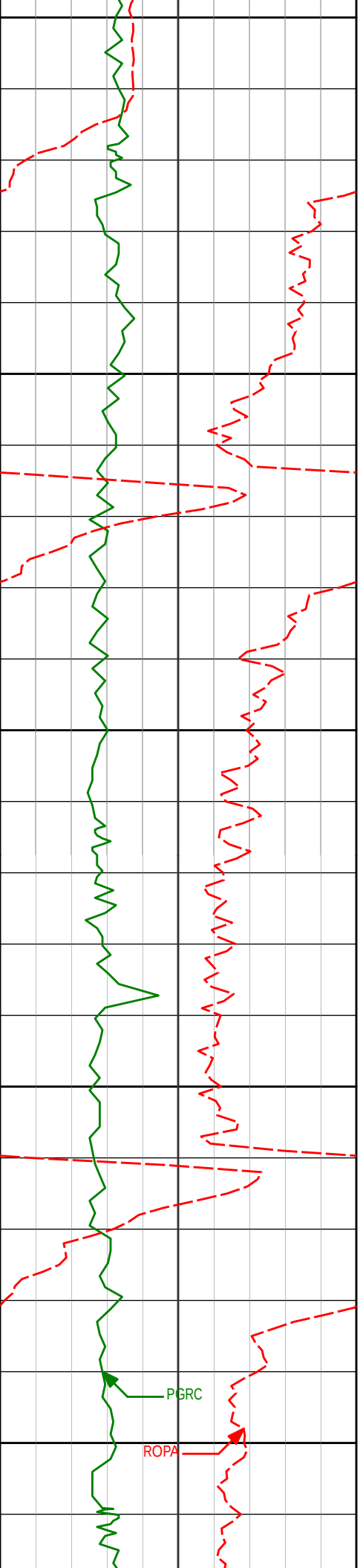


4197'	6.56°	199.45°	4179.67'	118.64'
4292'	6.29°	202.65°	4274.07'	123.10'
4387'	5.59°	202.92°	4368.56'	127.50'

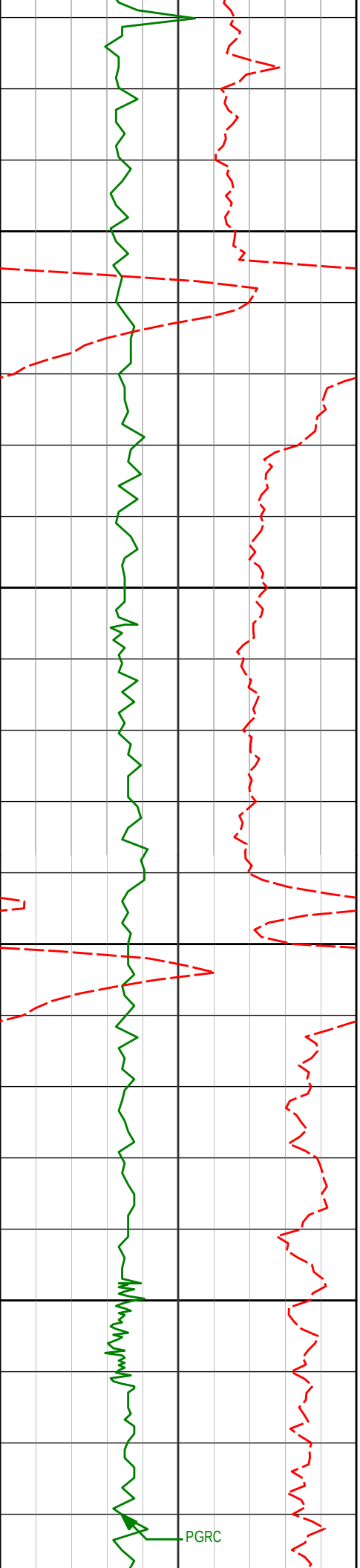


4482'	5.35°	205.38°	4463.13'	131.74'
4577'	4.03°	200.98°	4557.81'	135.30'

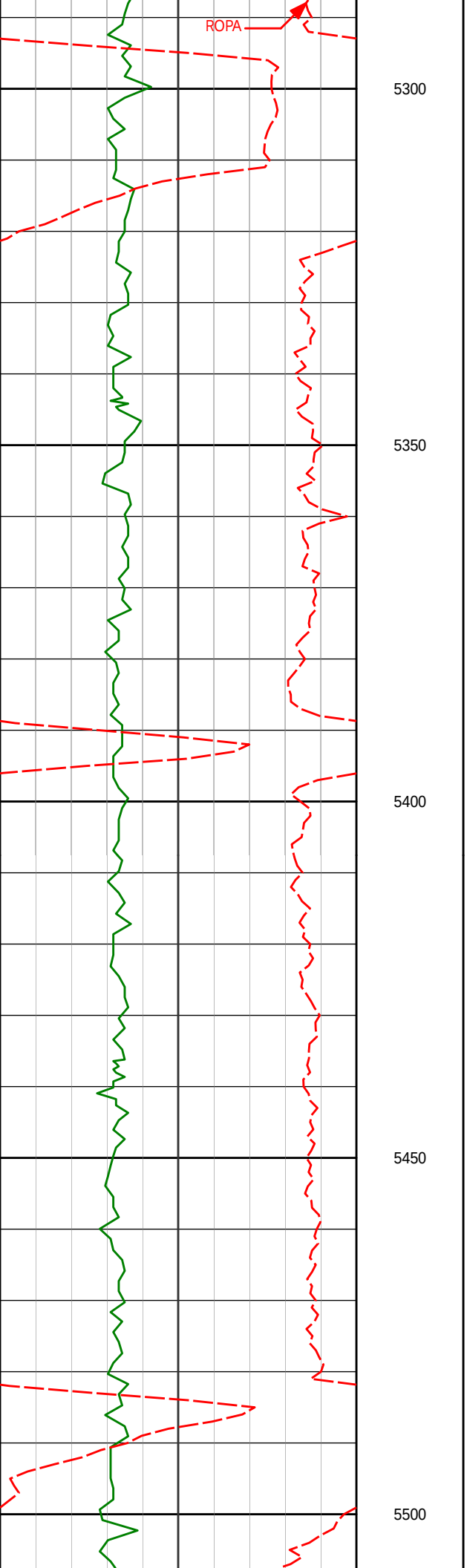
4671'	2.68°	198.28°	4651.64'	137.52'
4766'	1.55°	182.82°	4746.58'	138.50'



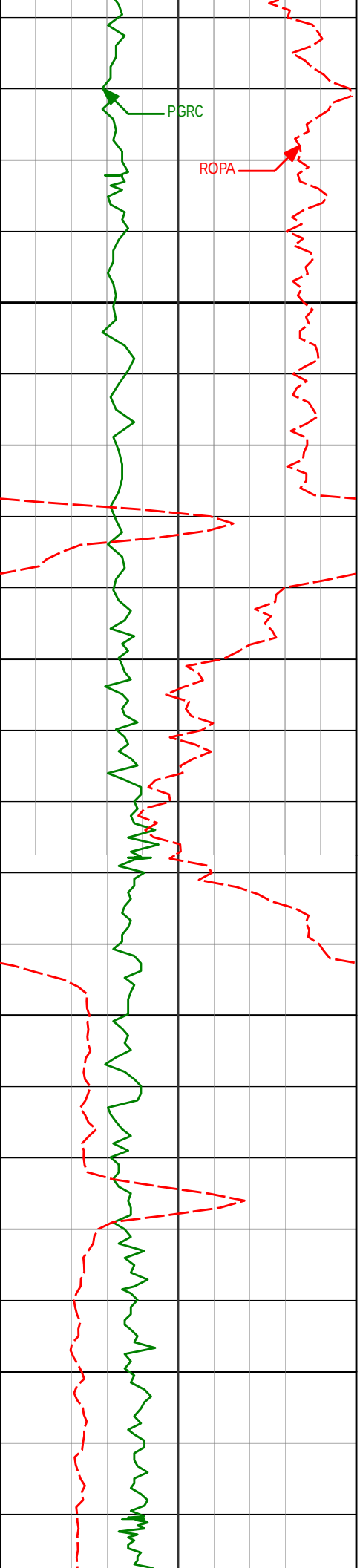
4861'	0.50°	179.98°	4841.56'	138.67'
4955'	0.25°	208.24°	4935.56'	138.81'
5050'	0.43°	150.53°	5030.56'	138.77'



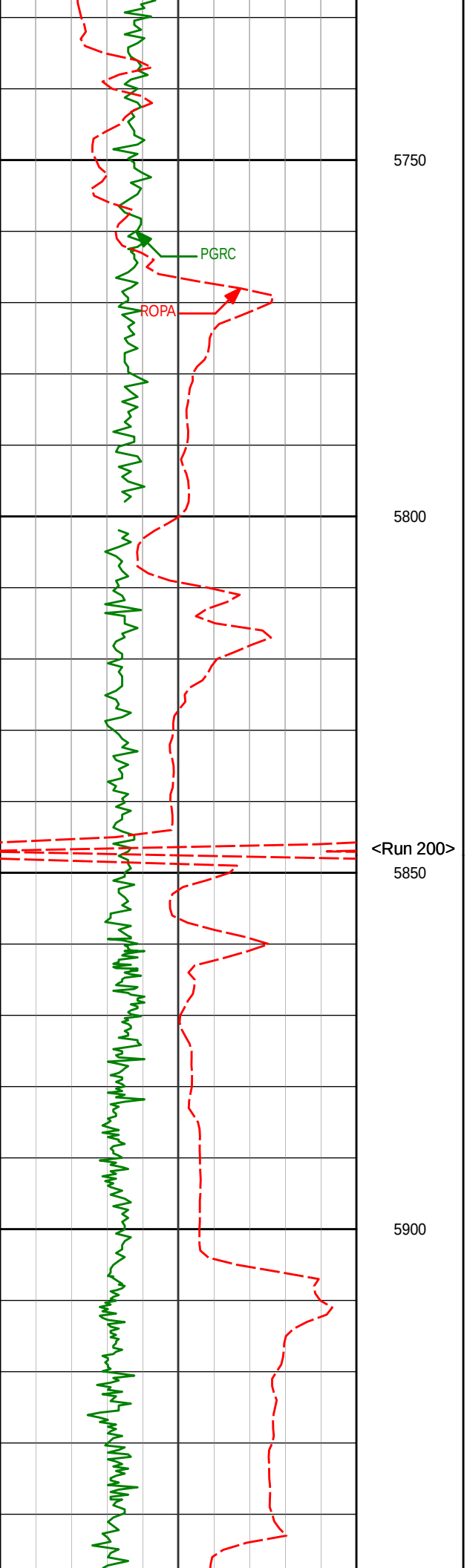
5145'	0.43°	214.75°	5125.55'	138.83'
5240'	0.41°	234.08°	5220.55'	139.34'



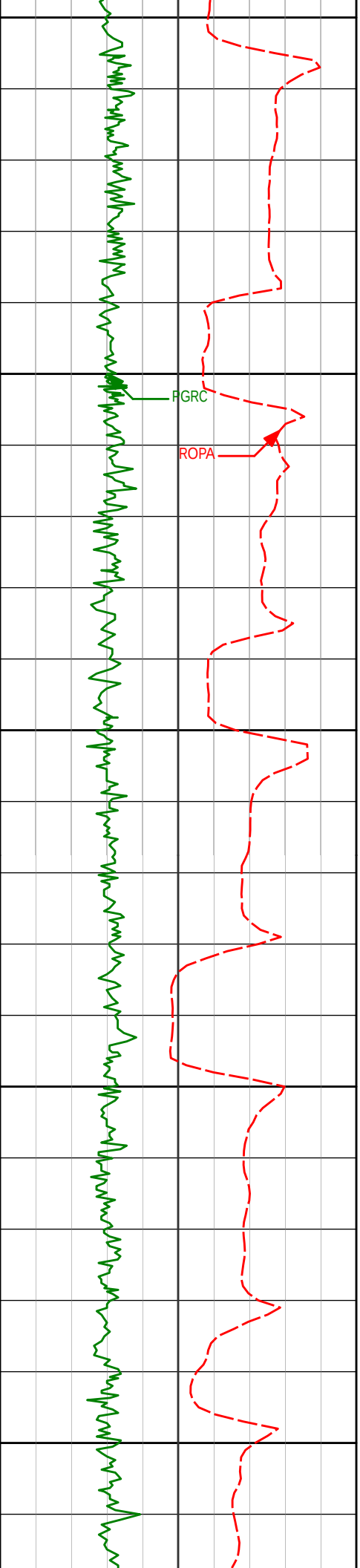
5335'	0.38°	269.39°	5315.55'	139.95'



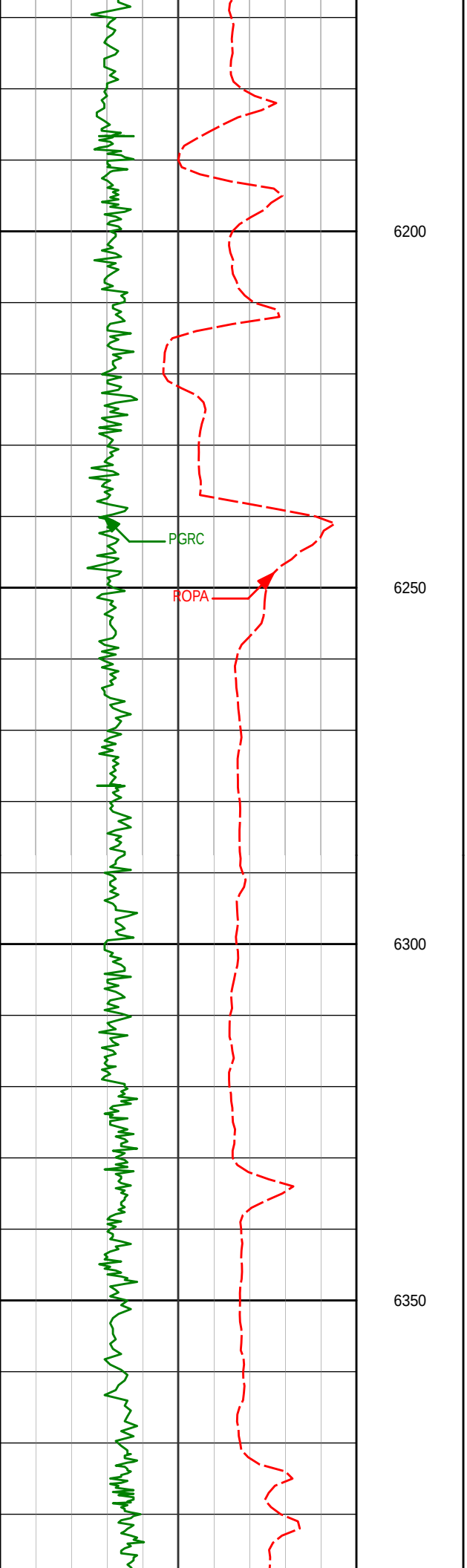
5525'	0.39°	227.17°	5505.55'	141.08'
5619'	0.10°	284.91°	5599.55'	141.40'
5714'	0.11°	323.92°	5694.54'	141.53'



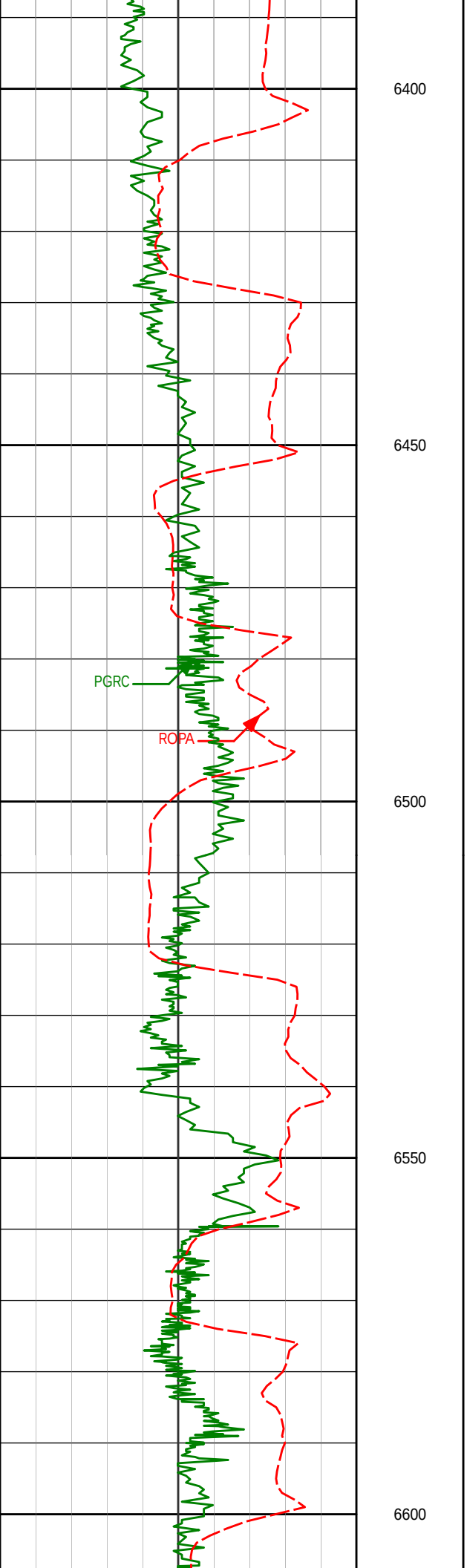
5791'	0.32°	133.51°	5771.54'	141.43'
5903'	0.52°	168.65°	5883.54'	141.15'



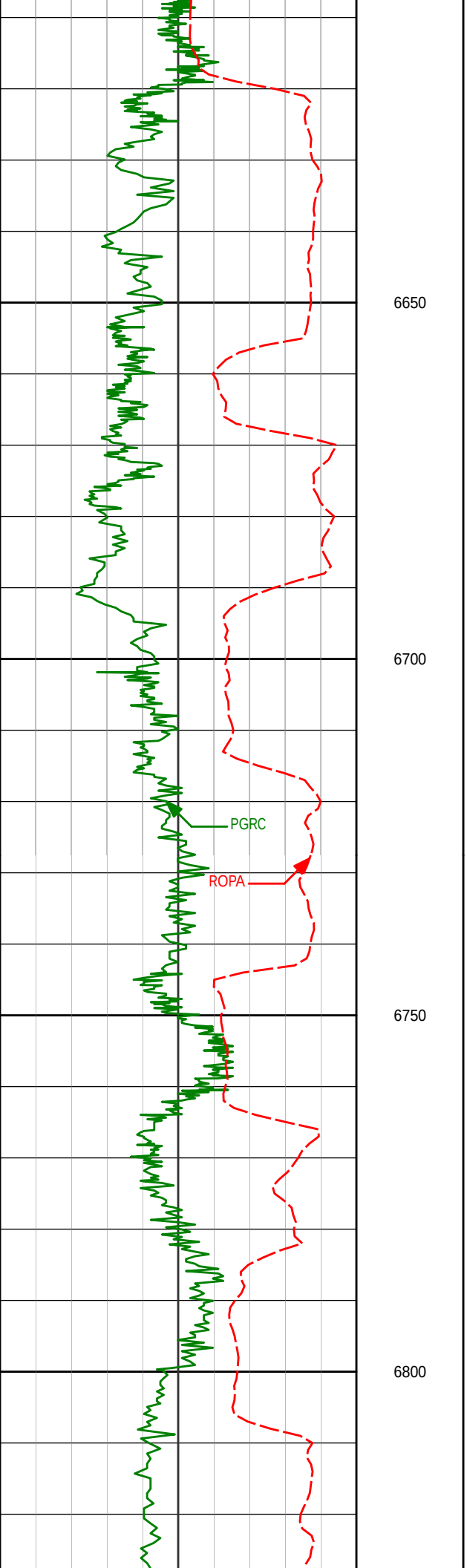
5951'	4.87°	256.94°	5931.48'	143.13'
5997'	9.27°	259.37°	5977.12'	148.74'
6045'	13.26°	261.11°	6024.19'	158.06'
6091'	16.71°	263.92°	6068.62'	169.93'
6139'	20.52°	268.99°	6114.10'	185.24'



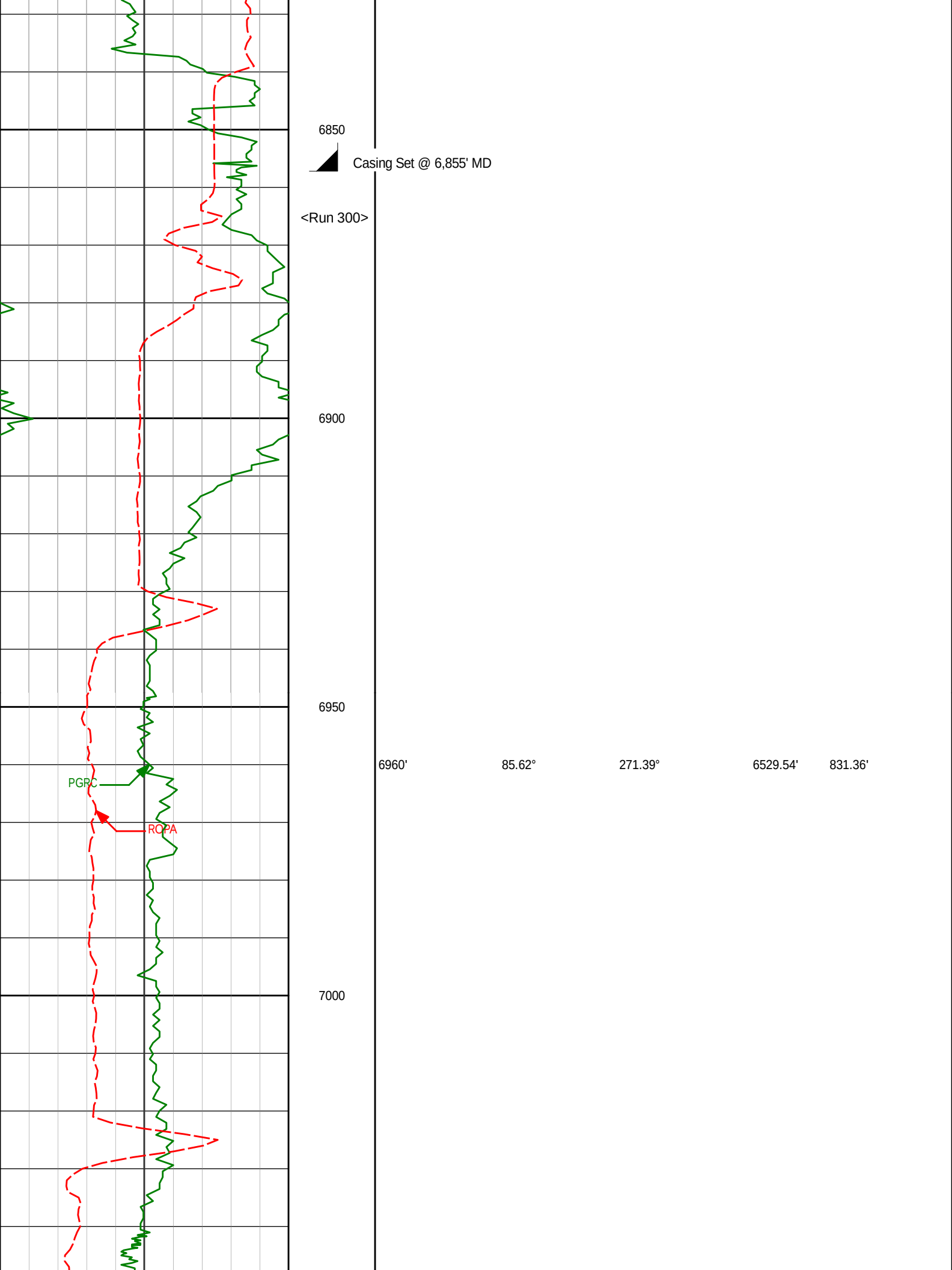
6186'	24.88°	274.29°	6157.45'	203.26'
6281'	29.64°	270.02°	6241.89'	246.52'
6329'	38.08°	268.95°	6281.71'	273.19'
6376'	45.77°	268.54°	6316.65'	304.54'

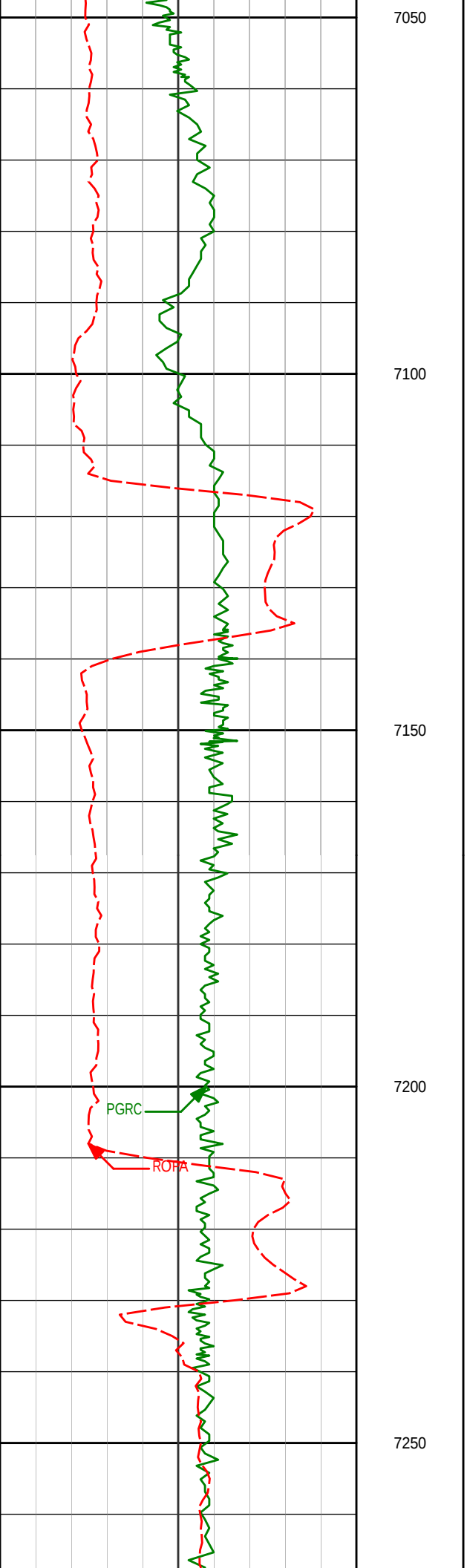


6424'	49.42°	268.81°	6349.02'	339.94'
6471'	52.81°	269.73°	6378.52'	376.47'
6519'	54.62°	269.83°	6406.92'	415.08'
6566'	59.25°	270.16°	6432.56'	454.37'

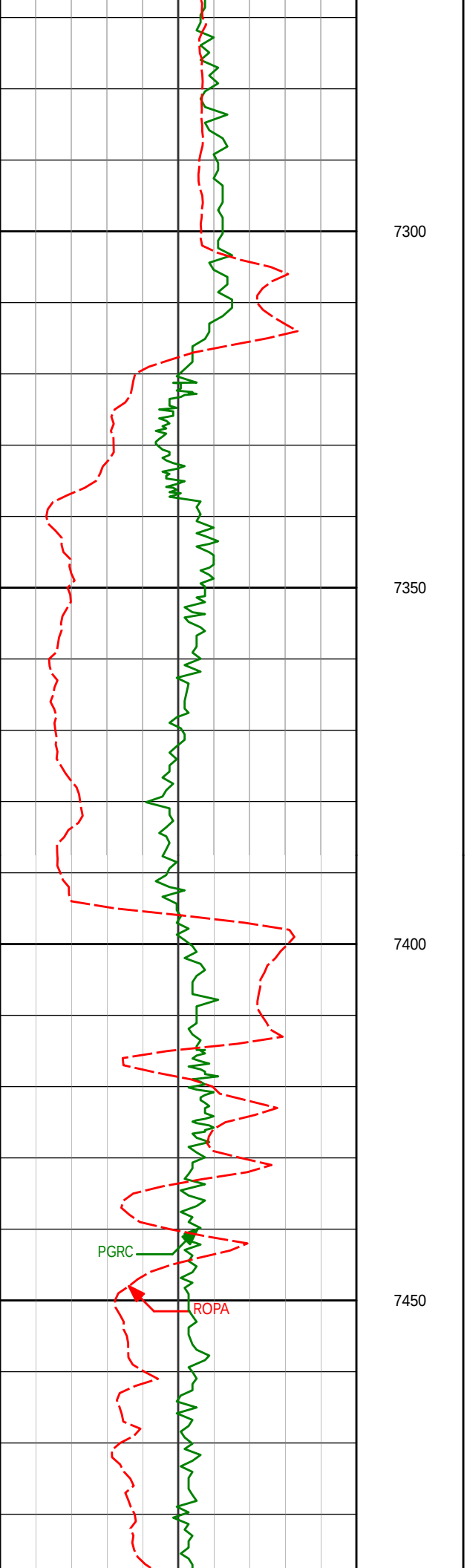


6614'	63.63°	270.52°	6455.50'	496.41'
6661'	68.79°	269.56°	6474.46'	539.31'
6709'	72.49°	268.88°	6490.37'	584.52'
6755'	76.75°	268.66°	6502.56'	628.82'
6812'	81.71°	269.67°	6513.21'	684.72'

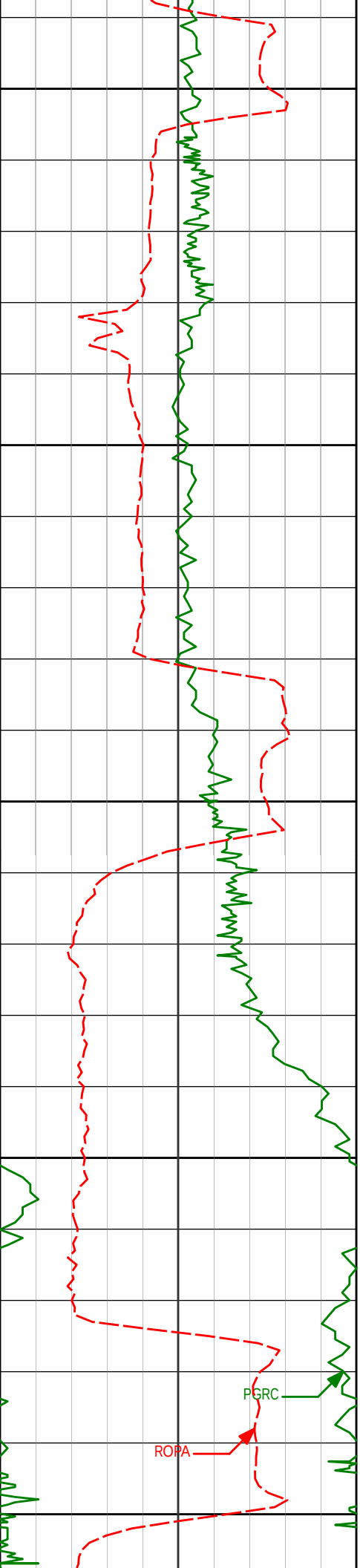

6850
Casing Set @ 6,855' MD
<Run 300>
6900
6950
6960'
85.62°
271.39°
6529.54'
831.36'
PGRC
ROPA
7000



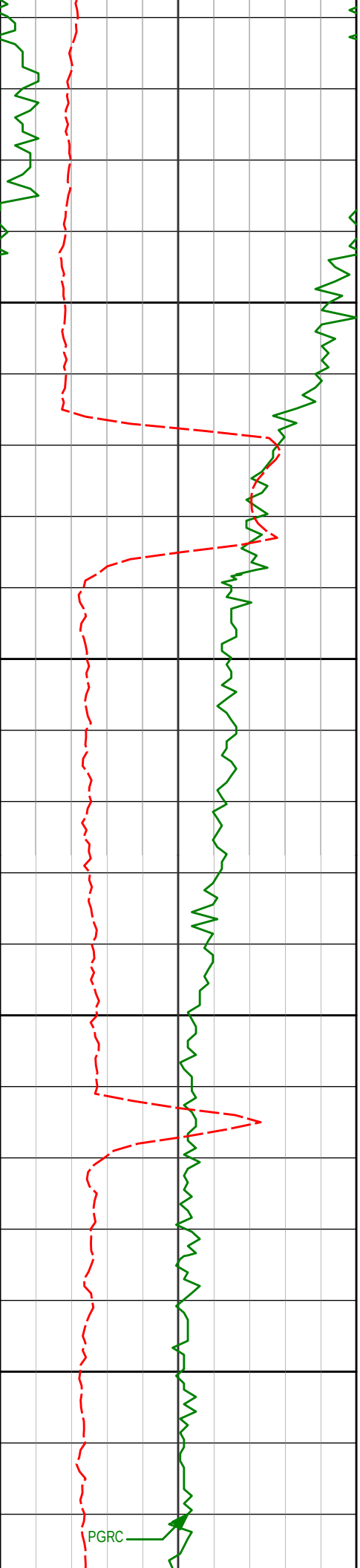
7053'	85.87°	271.28°	6536.44'	923.73'
7147'	88.21°	269.97°	6541.29'	1017.32'
7239'	89.63°	270.50°	6543.03'	1109.07'



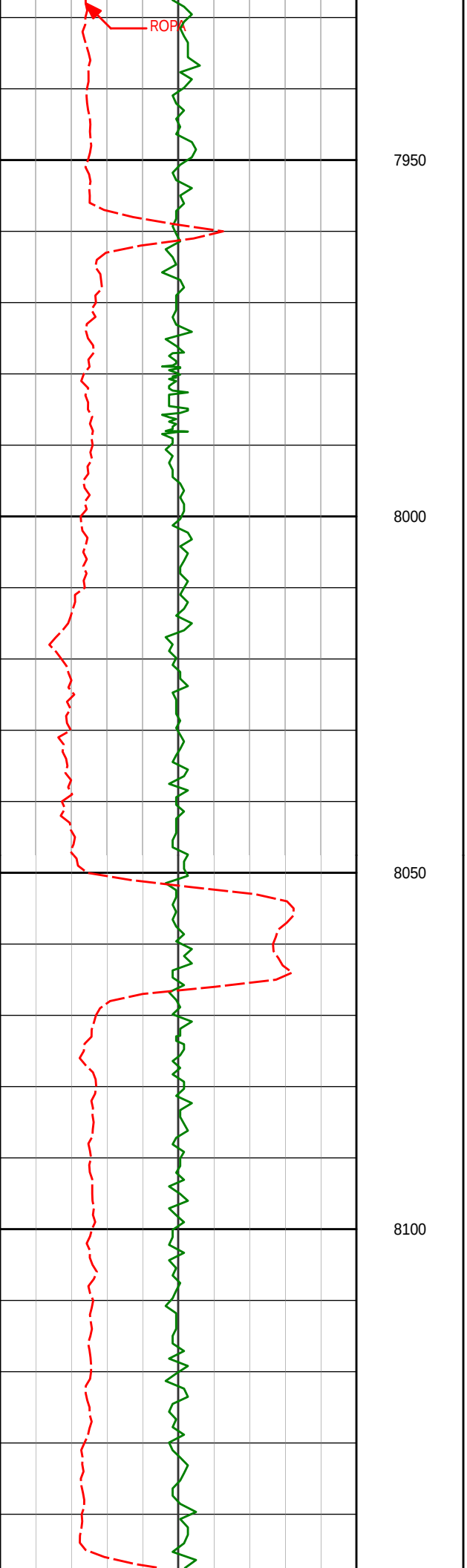
7333'	92.50°	268.16°	6541.28'	1202.89'
7424'	91.39°	267.94°	6538.19'	1293.79'



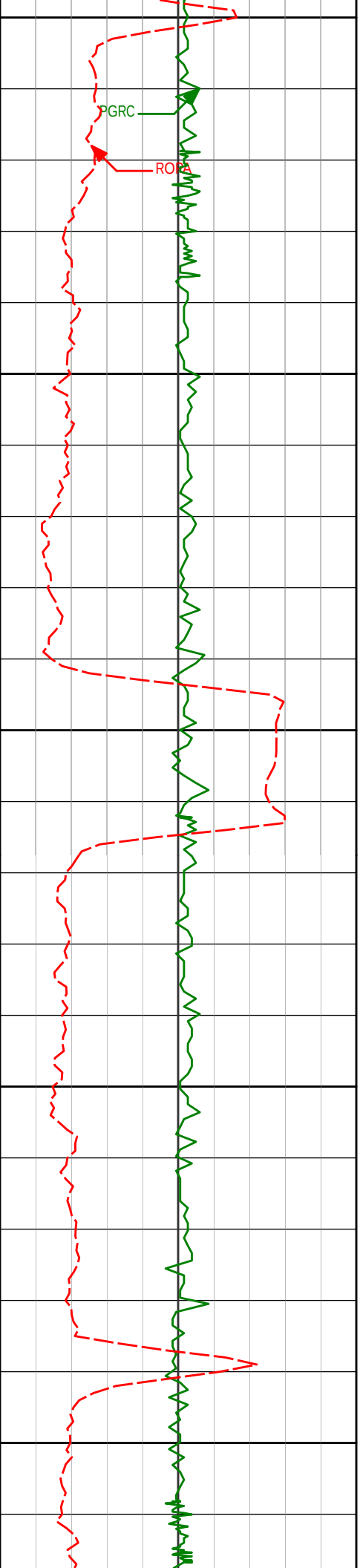
7518'	91.29°	268.26°	6535.99'	1387.71'
7612'	91.26°	269.19°	6533.90'	1481.60'
7705'	89.88°	268.93°	6532.98'	1574.47'



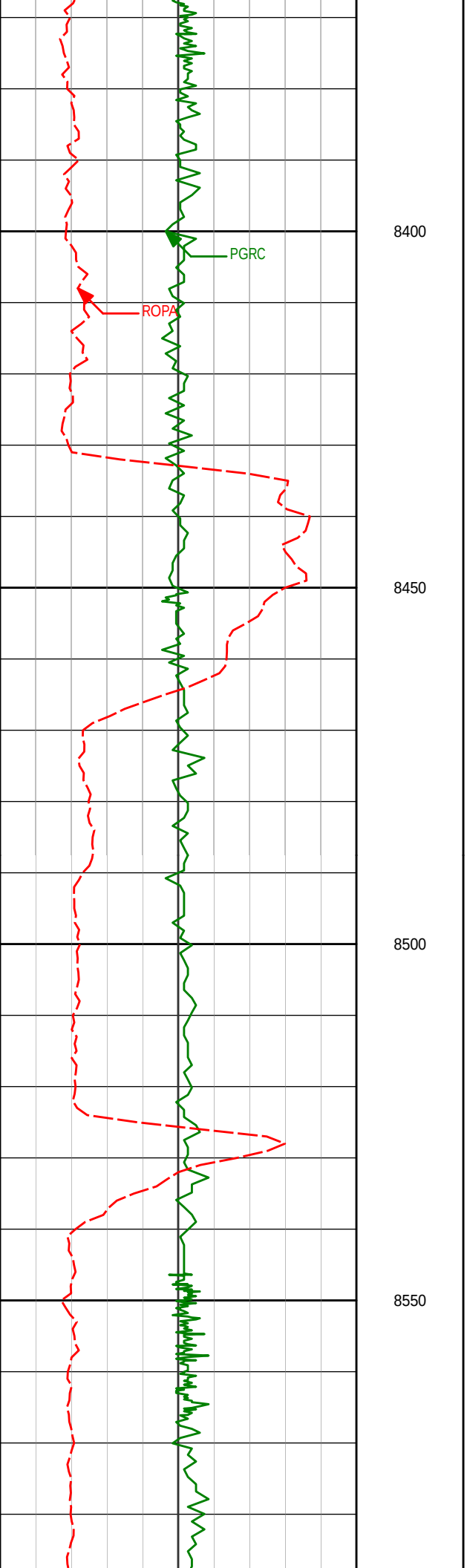
7800	7800'	88.64°	269.24°	6534.20'	1669.34'
	7894'	89.08°	269.41°	6536.07'	1763.18'



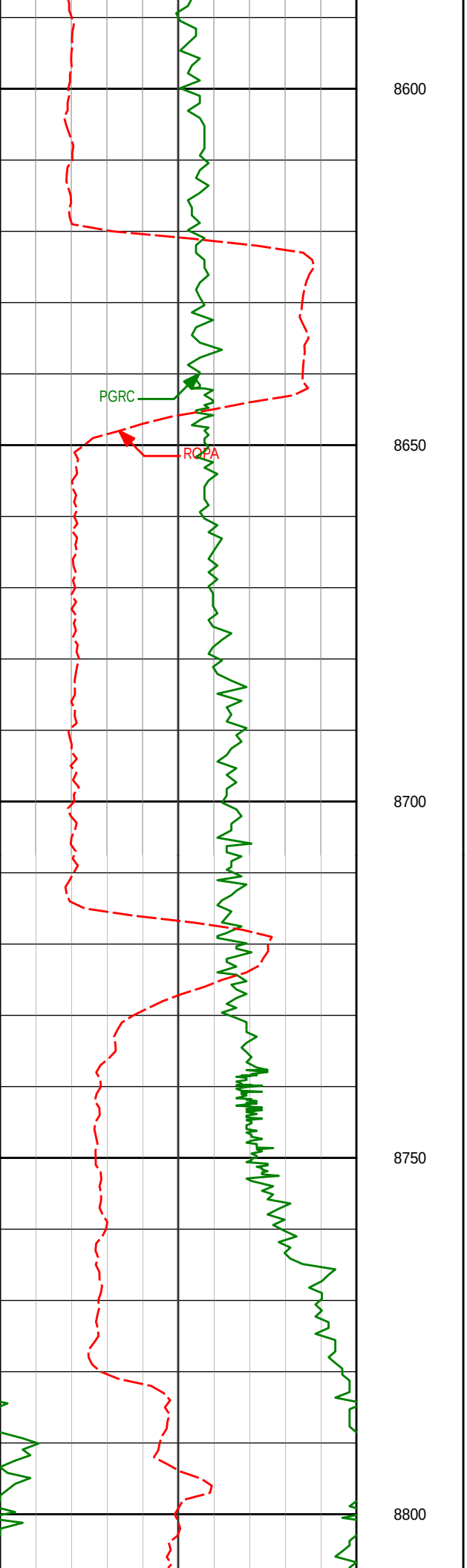
7989'	89.42°	268.82°	6537.32'	1858.05'
8084'	89.63°	269.49°	6538.10'	1952.92'



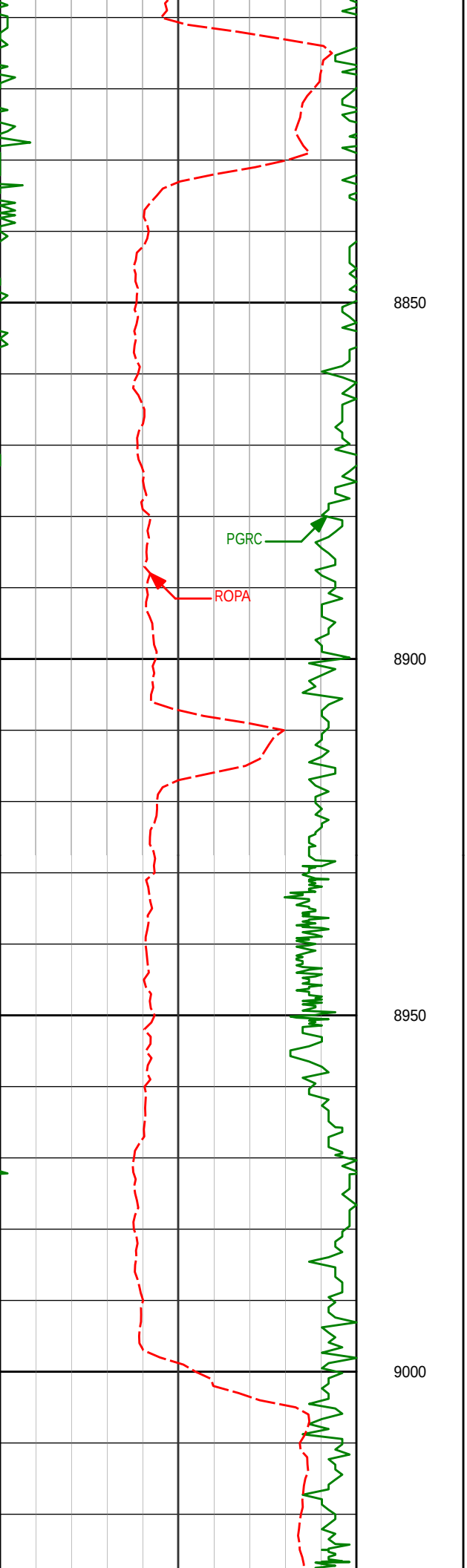
8179'	90.58°	269.52°	6537.93'	2047.76'
8274'	88.71°	268.17°	6538.52'	2142.65'



8369'	89.23°	268.15°	6540.23'	2237.58'
8463'	90.09°	269.24°	6540.79'	2331.48'
8558'	90.43°	268.20°	6540.35'	2426.39'

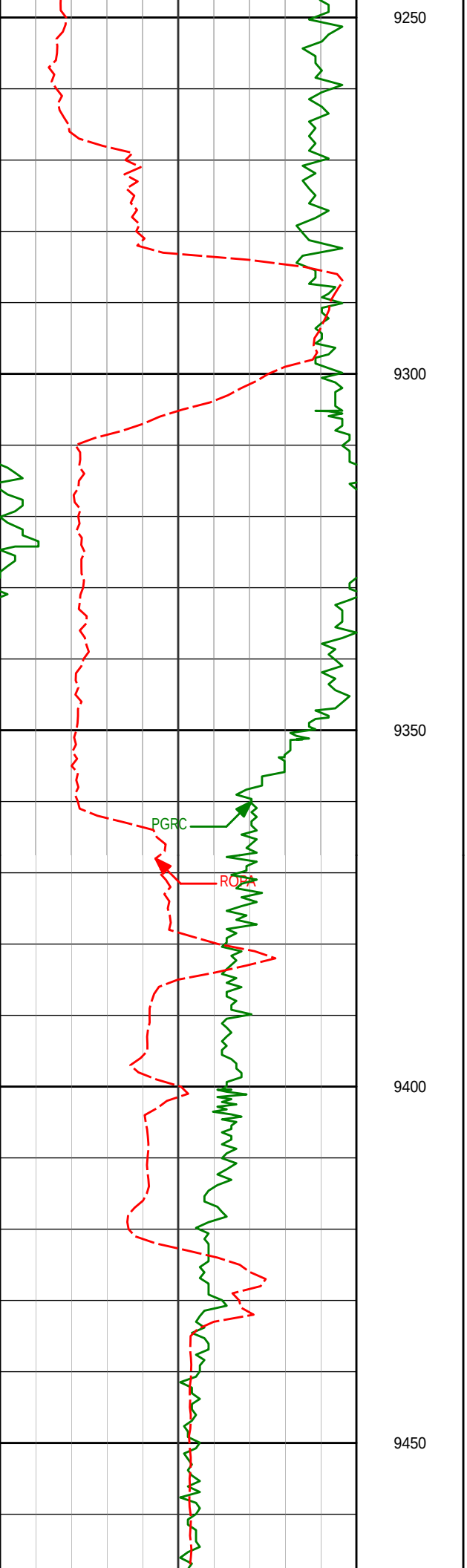


8653'	90.03°	270.08°	6539.97'	2521.26'
8748'	90.74°	269.71°	6539.33'	2616.06'

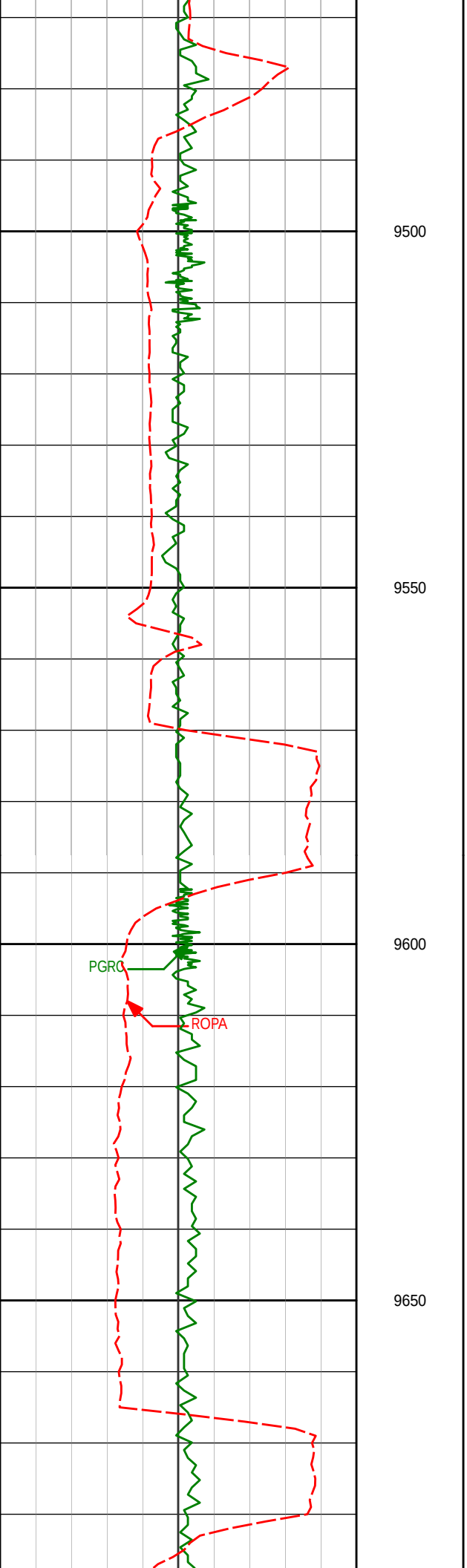


8842'	89.78°	269.78°	6538.91'	2709.87'
8937'	90.12°	268.24°	6538.99'	2804.76'

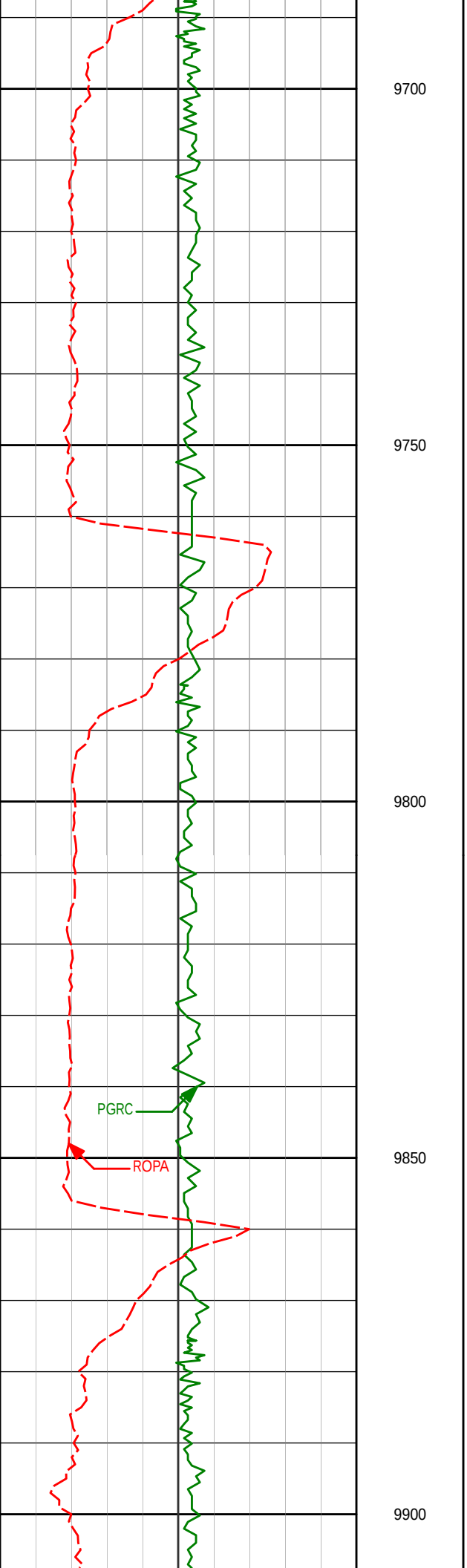
9032'	90.19°	269.66°	6538.73'	2899.64'
9127'	89.20°	269.89°	6539.24'	2994.45'
9222'	90.03°	270.11°	6539.88'	3089.24'



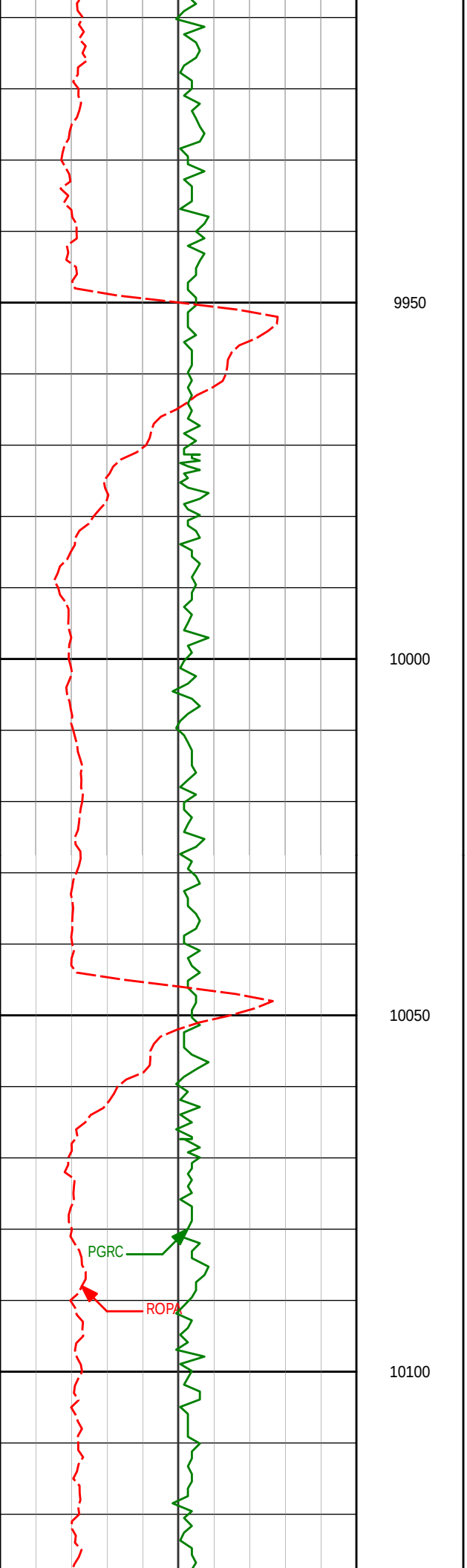
9316'	88.34°	269.46°	6541.21'	3183.04'
9411'	88.80°	269.38°	6543.59'	3277.86'



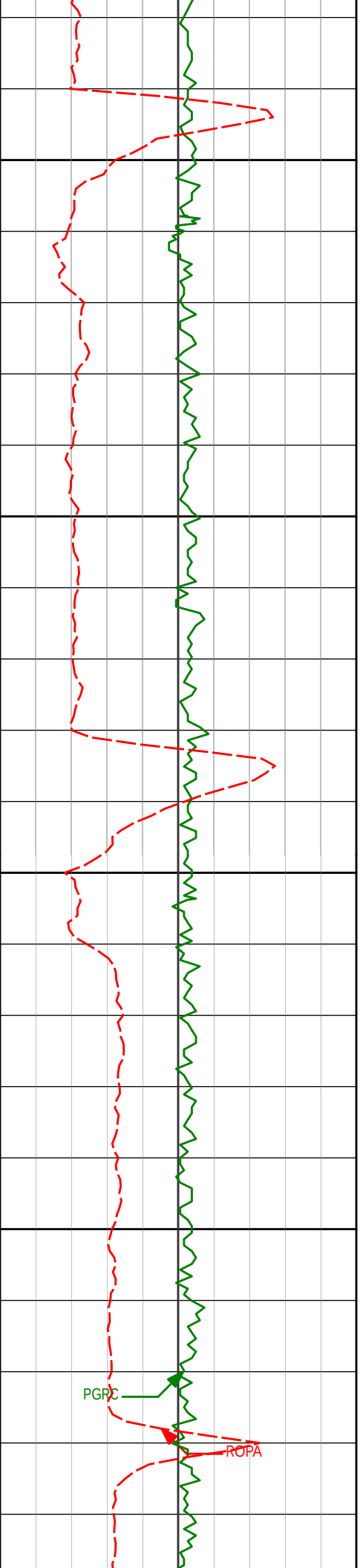
9506'	89.01°	268.54°	6545.40'	3372.73'
9600'	90.93°	270.45°	6545.45'	3466.57'



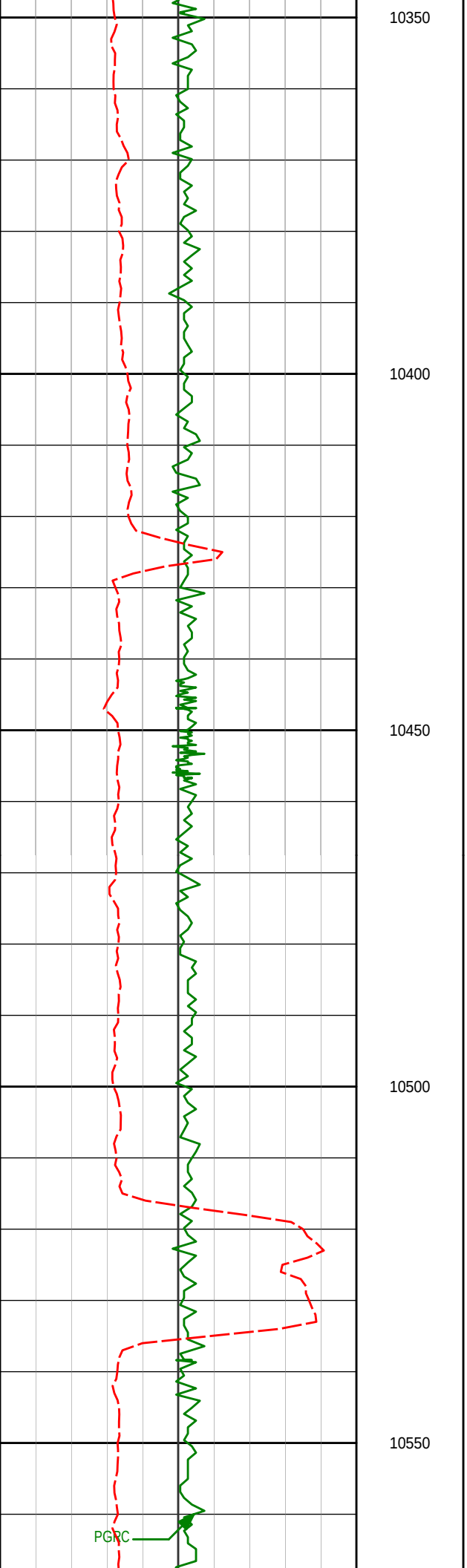
9695'	90.12°	270.87°	6544.58'	3561.27'
9790'	89.82°	270.37°	6544.63'	3655.99'
9885'	90.19°	270.31°	6544.62'	3750.74'



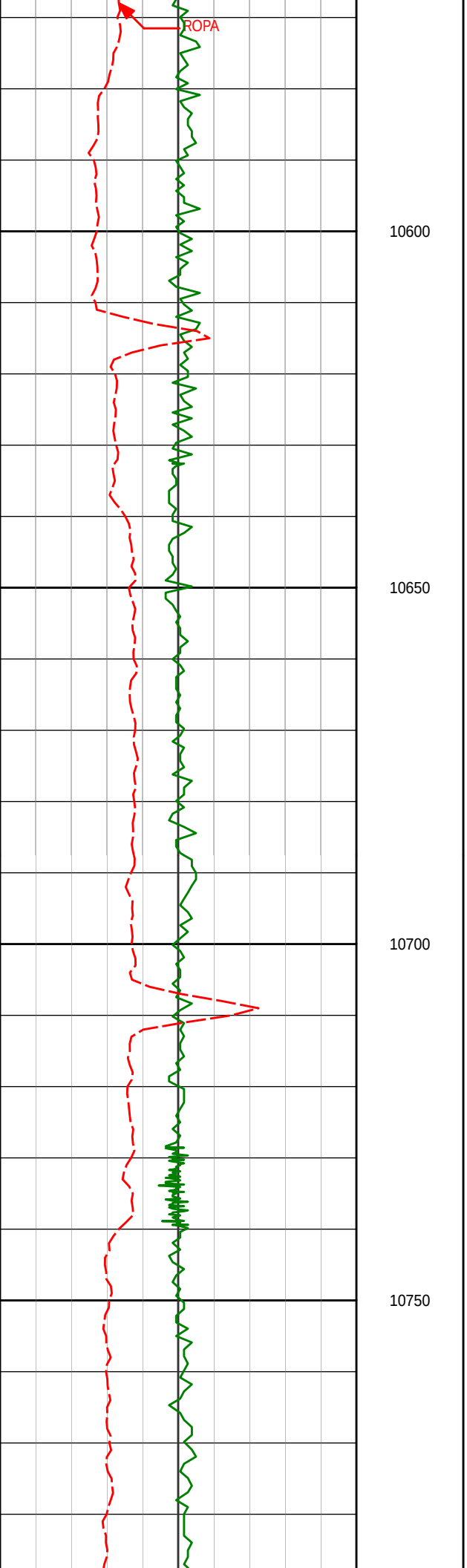
9980'	90.00°	270.37°	6544.46'	3845.49'
10075'	90.00°	270.20°	6544.46'	3940.25'



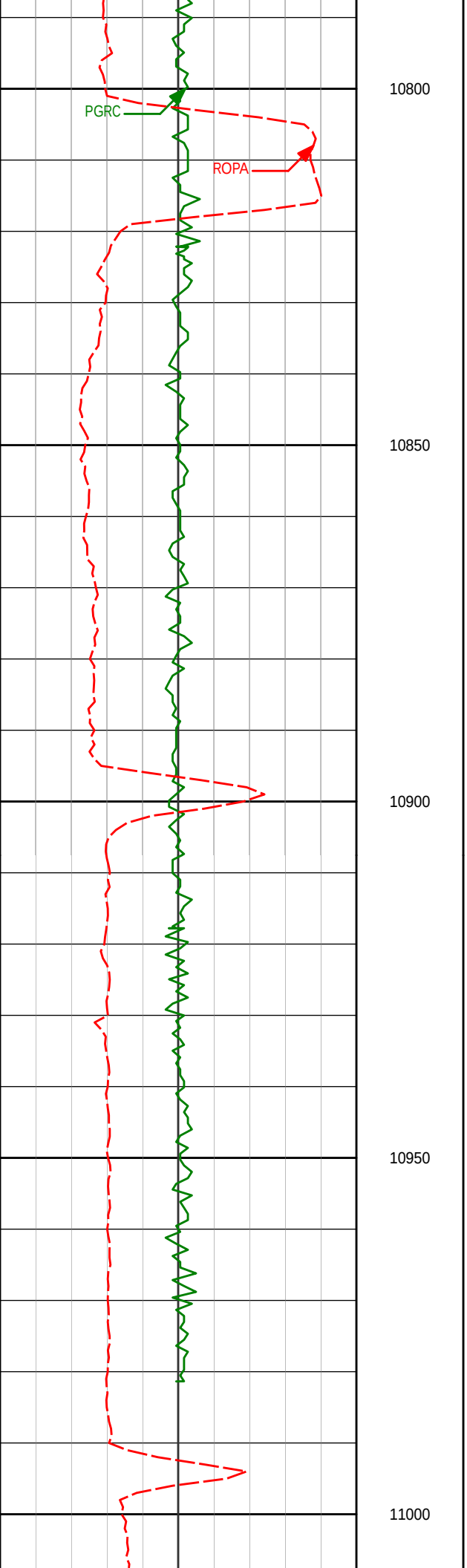
10170'	89.85°	269.50°	6544.59'	4035.05'
10265'	89.63°	268.94°	6545.02'	4129.92'



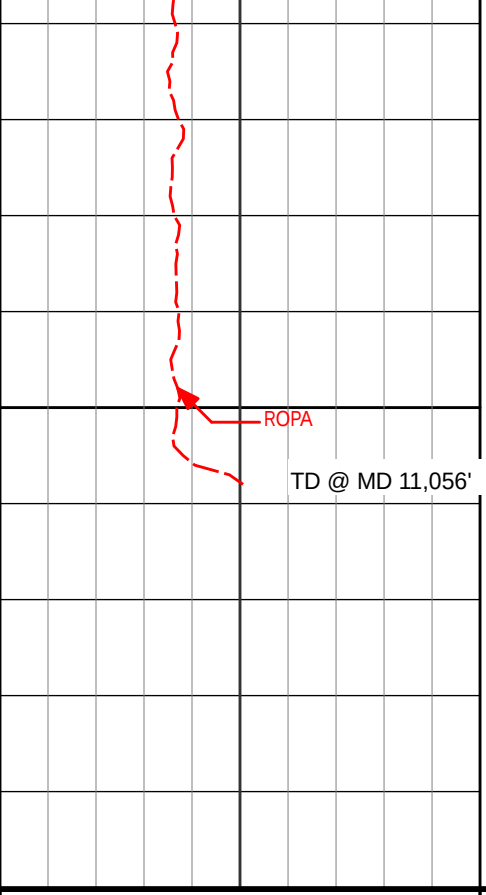
10360'	89.88°	268.83°	6545.43'	4224.81'
10454'	90.56°	269.57°	6545.06'	4318.68'
10549'	89.04°	269.33°	6545.40'	4413.53'



10644'	89.32°	269.92°	6546.76'	4508.34'
10739'	90.12°	270.02°	6547.22'	4603.14'



10834'	89.45°	269.82°	6547.58'	4697.93'
10928'	89.91°	269.62°	6548.10'	4791.75'
10992'	90.12°	269.52°	6548.09'	4855.64'



11050

11100

Depth	Inc.	Azi.	TVD	V.S.
11056'	90.12°	269.52°	6547.95'	4919.53'

Avg Rate of Penetration
ROPA
500 feet per hr 0

Depth
ft

PCG Gamma Ray
PGRC
0 api 300

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch AA35-64-1AHNA
Wattenberg
Weld Colorado
USA
CA-XX-0901018825

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
301.00	0.80	4.23	300.99	2.10 N	0.15 E	-0.29	0.27
605.00	1.00	8.43	604.95	6.84 N	0.70 E	-1.15	0.07
708.00	0.34	36.63	707.95	7.97 N	1.01 E	-1.54	0.70
802.00	0.31	27.49	801.94	8.42 N	1.30 E	-1.85	0.06
895.00	0.26	357.68	894.94	8.85 N	1.41 E	-1.99	0.17
988.00	0.28	9.65	987.94	9.29 N	1.44 E	-2.05	0.06
1082.00	0.17	42.96	1081.94	9.62 N	1.57 E	-2.20	0.18
1173.00	0.34	15.12	1172.94	9.98 N	1.73 E	-2.39	0.23
1267.00	0.31	12.93	1266.94	10.49 N	1.86 E	-2.55	0.03
1360.00	0.28	7.82	1359.94	10.96 N	1.95 E	-2.67	0.04
1453.00	0.96	219.00	1452.93	10.58 N	1.49 E	-2.19	1.30
1548.00	1.09	210.05	1547.92	9.18 N	0.54 E	-1.14	0.22
1643.00	1.13	210.83	1642.90	7.60 N	0.40 W	-0.11	0.05
1738.00	0.64	218.63	1737.89	6.38 N	1.21 W	0.78	0.53
1833.00	0.53	228.77	1832.88	5.67 N	1.87 W	1.49	0.16
1928.00	0.37	242.63	1927.88	5.24 N	2.47 W	2.12	0.20

2023.00	0.26	319.45	2022.88	5.27 N	2.89 W	2.53	0.42
2118.00	0.58	320.18	2117.88	5.80 N	3.33 W	2.94	0.34
2213.00	1.44	216.30	2212.87	5.21 N	4.35 W	3.99	1.76
2307.00	3.13	209.12	2306.79	2.01 N	6.30 W	6.15	1.82
2402.00	4.65	206.36	2401.57	3.70 S	9.27 W	9.49	1.61
2497.00	6.07	202.31	2496.15	11.80 S	12.89 W	13.64	1.55
2592.00	6.93	202.22	2590.54	21.75 S	16.96 W	18.37	0.91
2687.00	8.28	205.83	2684.70	33.22 S	22.11 W	24.27	1.51
2782.00	7.49	204.77	2778.80	45.00 S	27.68 W	30.61	0.85
2877.00	8.40	206.62	2872.89	56.82 S	33.39 W	37.09	0.99
2971.00	8.10	206.31	2965.92	68.90 S	39.40 W	43.89	0.32
3066.00	7.17	204.64	3060.07	80.29 S	44.84 W	50.07	1.01
3160.00	7.91	202.56	3153.26	91.59 S	49.76 W	55.74	0.84
3254.00	8.52	204.26	3246.30	103.91 S	55.11 W	61.89	0.70
3349.00	6.83	205.18	3340.44	115.44 S	60.40 W	67.94	1.78
3443.00	8.32	202.59	3433.62	126.78 S	65.39 W	73.67	1.63
3536.00	8.41	200.69	3525.63	139.35 S	70.38 W	79.48	0.31
3631.00	8.50	200.44	3619.60	152.43 S	75.29 W	85.25	0.10
3725.00	8.69	201.03	3712.54	165.57 S	80.26 W	91.08	0.22
3819.00	9.08	199.99	3805.41	179.17 S	85.34 W	97.06	0.45
3914.00	9.16	199.35	3899.21	193.35 S	90.41 W	103.06	0.14
4008.00	7.77	200.45	3992.19	206.36 S	95.11 W	108.61	1.49
4103.00	7.36	201.99	4086.36	218.02 S	99.63 W	113.90	0.48
4197.00	6.56	199.45	4179.67	228.67 S	103.68 W	118.64	0.91
4292.00	6.29	202.65	4274.07	238.59 S	107.49 W	123.10	0.47
4387.00	5.59	202.92	4368.56	247.65 S	111.29 W	127.50	0.74
4482.00	5.35	205.38	4463.13	255.91 S	114.99 W	131.74	0.35
4577.00	4.03	200.98	4557.81	263.03 S	118.09 W	135.30	1.44
4671.00	2.68	198.28	4651.64	268.20 S	119.96 W	137.52	1.45
4766.00	1.55	182.82	4746.58	271.60 S	120.72 W	138.50	1.32
4861.00	0.50	179.98	4841.56	273.29 S	120.78 W	138.67	1.11
4955.00	0.25	208.24	4935.56	273.89 S	120.88 W	138.81	0.32
5050.00	0.43	150.53	5030.56	274.38 S	120.80 W	138.77	0.38
5145.00	0.43	214.75	5125.55	274.98 S	120.83 W	138.83	0.48
5240.00	0.41	234.08	5220.55	275.47 S	121.31 W	139.34	0.15
5335.00	0.38	269.39	5315.55	275.68 S	121.90 W	139.95	0.25
5525.00	0.39	227.17	5505.55	276.12 S	123.00 W	141.08	0.15
5619.00	0.10	284.91	5599.55	276.32 S	123.32 W	141.40	0.37
5714.00	0.11	323.92	5694.54	276.22 S	123.45 W	141.53	0.07
5791.00	0.32	133.51	5771.54	276.31 S	123.34 W	141.43	0.56
5903.00	0.52	168.65	5883.54	277.03 S	123.01 W	141.15	0.28
5951.00	4.87	256.94	5931.48	277.70 S	124.95 W	143.13	10.17
5997.00	9.27	259.37	5977.12	278.83 S	130.50 W	148.74	9.59
6045.00	13.26	261.11	6024.19	280.39 S	139.74 W	158.06	8.34
6091.00	16.71	263.92	6068.62	281.91 S	151.53 W	169.93	7.66
6139.00	20.52	268.99	6114.10	282.79 S	166.81 W	185.24	8.62
6186.00	24.88	274.29	6157.45	282.19 S	184.92 W	203.26	10.24
6281.00	29.64	270.02	6241.89	280.69 S	228.37 W	246.52	5.41
6329.00	38.08	268.95	6281.71	280.95 S	255.09 W	273.19	17.63
6376.00	45.77	268.54	6316.65	281.65 S	286.46 W	304.54	16.37
6424.00	49.42	268.81	6349.02	282.47 S	321.89 W	339.94	7.62
6471.00	52.81	269.73	6378.52	282.93 S	358.46 W	376.47	7.37
6519.00	54.62	269.83	6406.92	283.07 S	397.15 W	415.08	3.77
6566.00	59.25	270.16	6432.56	283.08 S	436.53 W	454.37	9.87
6614.00	63.63	270.52	6455.50	282.82 S	478.68 W	496.41	9.15
6661.00	68.79	269.56	6474.46	282.80 S	521.67 W	539.31	11.14
6709.00	72.49	268.88	6490.37	283.42 S	566.94 W	584.52	7.82
6755.00	76.75	268.66	6502.56	284.37 S	611.27 W	628.82	9.27
6812.00	81.71	269.67	6513.21	285.18 S	667.25 W	684.72	8.87
6960.00	85.62	271.39	6529.54	283.81 S	814.30 W	831.36	2.88
7053.00	85.87	271.28	6536.44	281.65 S	907.02 W	923.73	0.29
7147.00	88.21	269.97	6541.29	280.63 S	1000.88 W	1017.32	2.85
7239.00	89.63	270.50	6543.03	280.25 S	1092.86 W	1109.07	1.65
7333.00	92.50	268.16	6541.28	281.35 S	1186.82 W	1202.89	3.94
7424.00	91.39	267.94	6538.19	284.45 S	1277.72 W	1293.79	1.24
7518.00	91.29	268.26	6535.99	287.56 S	1371.64 W	1387.71	0.36
7612.00	91.26	269.19	6533.90	289.65 S	1465.59 W	1481.60	0.99
7705.00	89.88	268.93	6532.98	291.18 S	1558.57 W	1574.47	1.51
7800.00	88.64	269.24	6534.20	292.70 S	1653.55 W	1669.34	1.35
7894.00	89.08	269.41	6536.07	293.80 S	1747.52 W	1763.18	0.50
7989.00	89.42	268.82	6537.32	295.27 S	1842.50 W	1858.05	0.72
8084.00	89.63	269.49	6538.10	296.67 S	1937.49 W	1952.92	0.74
8179.00	90.58	269.52	6537.93	297.49 S	2032.48 W	2047.76	1.00
8274.00	88.71	268.17	6538.52	299.41 S	2127.46 W	2142.65	2.43
8369.00	89.23	268.15	6540.23	302.46 S	2222.39 W	2237.58	0.55

8463.00	90.09	269.24	6540.79	304.60 S	2316.36 W	2331.48	1.48
8558.00	90.43	268.20	6540.35	306.72 S	2411.34 W	2426.39	1.15
8653.00	90.03	270.08	6539.97	308.15 S	2506.32 W	2521.26	2.02
8748.00	90.74	269.71	6539.33	308.32 S	2601.32 W	2616.06	0.84
8842.00	89.78	269.78	6538.91	308.74 S	2695.32 W	2709.87	1.02
8937.00	90.12	268.24	6538.99	310.38 S	2790.30 W	2804.76	1.66
9032.00	90.19	269.66	6538.73	312.12 S	2885.28 W	2899.64	1.50
9127.00	89.20	269.89	6539.24	312.49 S	2980.28 W	2994.45	1.07
9222.00	90.03	270.11	6539.88	312.49 S	3075.27 W	3089.24	0.90
9316.00	88.34	269.46	6541.21	312.85 S	3169.26 W	3183.04	1.93
9411.00	88.80	269.38	6543.59	313.81 S	3264.22 W	3277.86	0.49
9506.00	89.01	268.54	6545.40	315.53 S	3359.19 W	3372.73	0.91
9600.00	90.93	270.45	6545.45	316.36 S	3453.18 W	3466.57	2.88
9695.00	90.12	270.87	6544.58	315.27 S	3548.17 W	3561.27	0.96
9790.00	89.82	270.37	6544.63	314.24 S	3643.16 W	3655.99	0.61
9885.00	90.19	270.31	6544.62	313.68 S	3738.16 W	3750.74	0.39
9980.00	90.00	270.37	6544.46	313.11 S	3833.16 W	3845.49	0.21
10075.00	90.00	270.20	6544.46	312.64 S	3928.16 W	3940.25	0.18
10170.00	89.85	269.50	6544.59	312.89 S	4023.16 W	4035.05	0.75
10265.00	89.63	268.94	6545.02	314.18 S	4118.14 W	4129.92	0.63
10360.00	89.88	268.83	6545.43	316.03 S	4213.13 W	4224.81	0.29
10454.00	90.56	269.57	6545.06	317.34 S	4307.11 W	4318.68	1.07
10549.00	89.04	269.33	6545.40	318.25 S	4402.11 W	4413.53	1.62
10644.00	89.32	269.92	6546.76	318.88 S	4497.09 W	4508.34	0.69
10739.00	90.12	270.02	6547.22	318.93 S	4592.09 W	4603.14	0.85
10834.00	89.45	269.82	6547.58	319.06 S	4687.09 W	4697.93	0.74
10928.00	89.91	269.62	6548.10	319.52 S	4781.09 W	4791.75	0.53
10992.00	90.12	269.52	6548.09	320.00 S	4845.09 W	4855.64	0.36
11056.00	90.12	269.52	6547.95	320.53 S	4909.08 W	4919.53	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 266.19 DEGREES (GRID)
A TOTAL CORRECTION OF 7.63 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11056.00 FEET
IS 4919.54 FEET ALONG 266.26 DEGREES (GRID)

Surveys are tied into two non-Haliburton surveys at MD 301' and 605' taken while drilling the surface section. The final survey is a straight-line projection to bit.

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