

**PCGC - Pressure Case Gamma**  
**PCDC - Pressure Case Directional**

1 : 240

[illegible]

## WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	20-Apr-14	22-Apr-14	26-Apr-14		
Rig Bit Number	0100	0200	0300		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.750	6.750	4.750		
Log Start Depth (MD, ft)	1,255.00	7,112.00	7,620.00		
Log End Depth (MD, ft)	7,112.00	7,620.00	12,273.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	18-Apr-14 03:45	20-Apr-14 08:30	23-Apr-14 04:06		
Drill/Wipe End Date and Time	19-Apr-14 19:45	21-Apr-14 12:10	24-Apr-14 23:11		
Min Inc (deg) @ Depth (MD, ft)	0.20 @ 6,495.00	33.75 @ 7,115.00	87.96 @ 11,108.00		
Max Inc (deg) @ Depth (MD, ft)	28.80 @ 7,066.00	83.98 @ 7,579.00	92.04 @ 12,058.00		
Bit TFA(in2) / Bit Type	1.33 / PDC	1.33 / PDC	1.24 / PDC		
Flow Rate (gpm)	573.70	541.67	281.85		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	N/A / N/A		
Fluid Type	Native/Spud Mud	Native/Spud Mud	Native/Spud Mud		
Density (ppg) / Viscosity (spqt)	9.35 / 45.00	10.40 / 46.00	9.88 / 42.00		
Filtrate CL (ppm)	1,200.00	1,200.00	1,000.00		
pH / Fluid Loss (mptm)	9.30 / 4	9.40 / 4	9.70 / 4		
PV (cP) / YP (lbf2)	15 / 15.00	17 / 15.00	13 / 13.00		
% Solids / % Sand	9.5 / 1.25	8.7 / 1.50	8.8 / 0.50		
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	N/A / N/A		
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Max Tool Temp (in F) / S	127.07 / PCM	127.51 / PCM	212.00 / PCM		

Max Tool Temp (degF) / Source	167.97 / PCM	197.51 / PCM	242.28 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Matt Busche	Matt Busche	Matt Busche		
Customer Representative	Sam Taylor	Sam Taylor	Sam Taylor		

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.76	5.76	5.84		
Sub Serial Number	11342294	11342294	11768602		
Insert Serial Number	12230081	11680779	12230081		
Date and Time Initialized	17-Apr-14 16:54	19-Apr-14 21:33	20-Apr-14 17:51		
Date and Time Read	20-Apr-14 04:35	21-Apr-14 21:53	26-Apr-14 10:45		
ECMB SW Version	N/A	N/A	N/A		

### Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	43.67	41.00	43.03		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11342294	11342294	11768602		
Sonde Serial Number	11638587	11833026	11638587		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	60.80	348.35	52.08		

### Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	48.62	44.22	47.98		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11342294	11342294	11768602		
Insert/Sonde Serial Number	11579846	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 straight line projection to 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

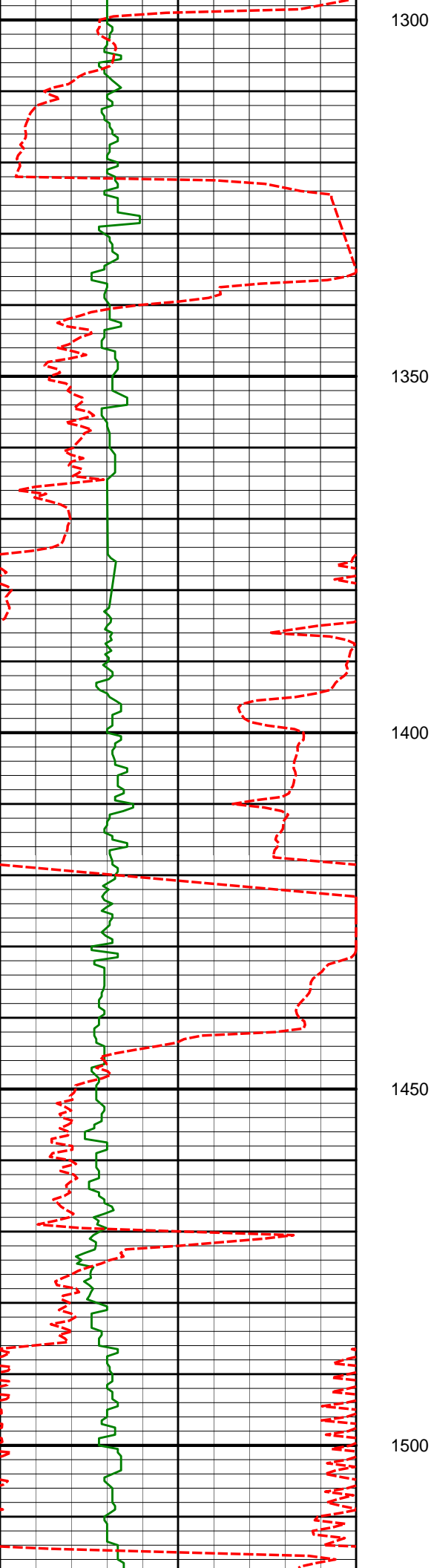
WARRANTY

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HALLIBURTON

MD Main Log 1:240

PCG Gamma Ray BCorr (PGRC) api							
0300							
Average Rate of Penetration (ROPA) feet per hr		Depth					
5000		Depth	Inc	Azi	TVD	V/S	
		1200					
		1250					
		1283'					
			0.28°	292.25°	1282.95'	-1.03'	



1378'

0.46°

294.01°

1377.95'

-0.80'

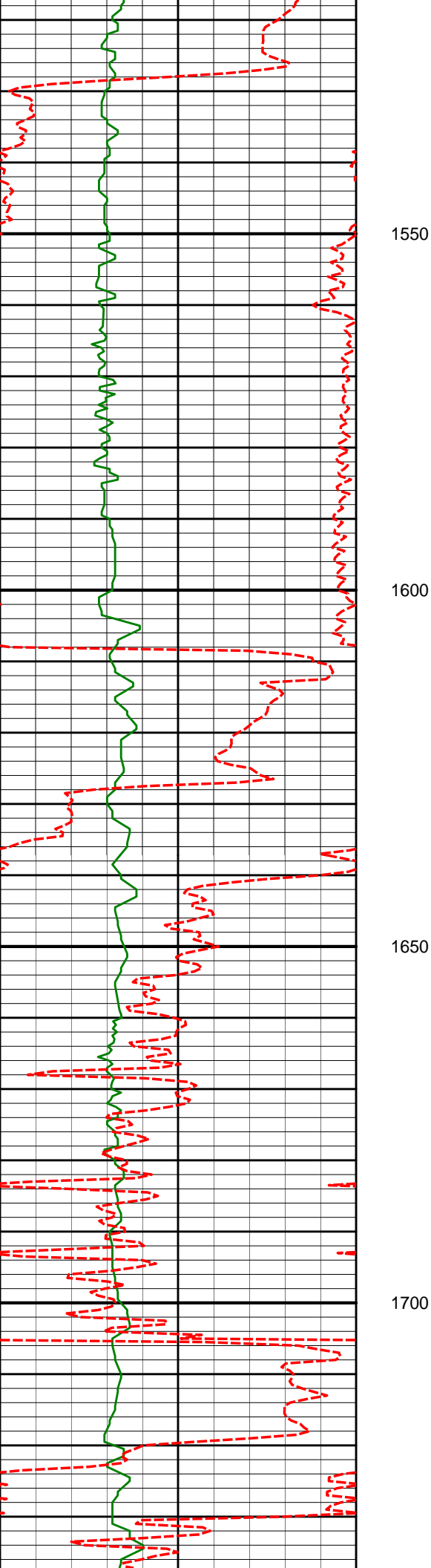
1475'

1.39°

117.45°

1474.94'

-1.17'



1569'

3.11°

110.84°

1568.87'

-2.53'

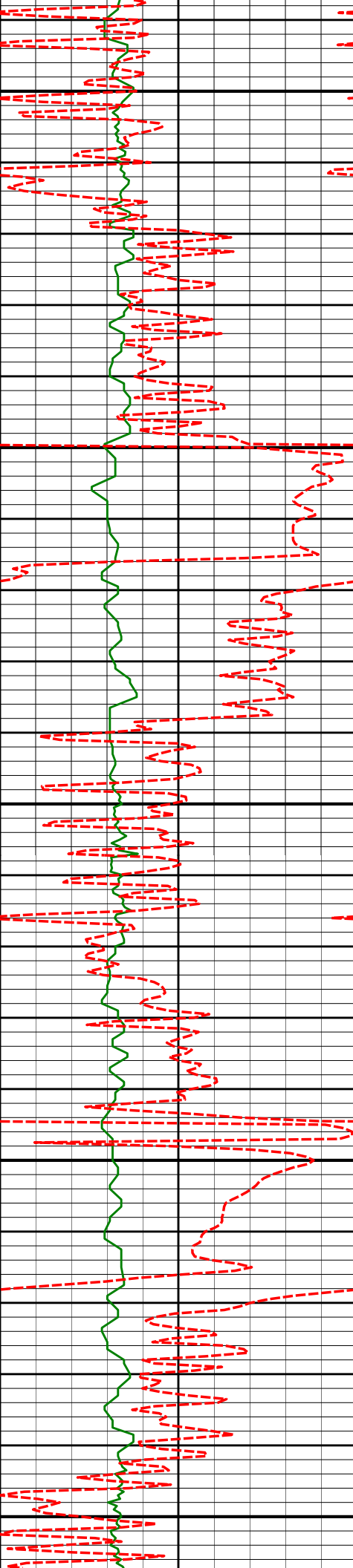
1664'

5.13°

109.73°

1663.62'

-4.74'



1750

1758'

6.43°

104.28°

1757.14'

-7.26'

1800

1850

1852'

7.89°

101.30°

1850.40'

-9.57'

1900

1950

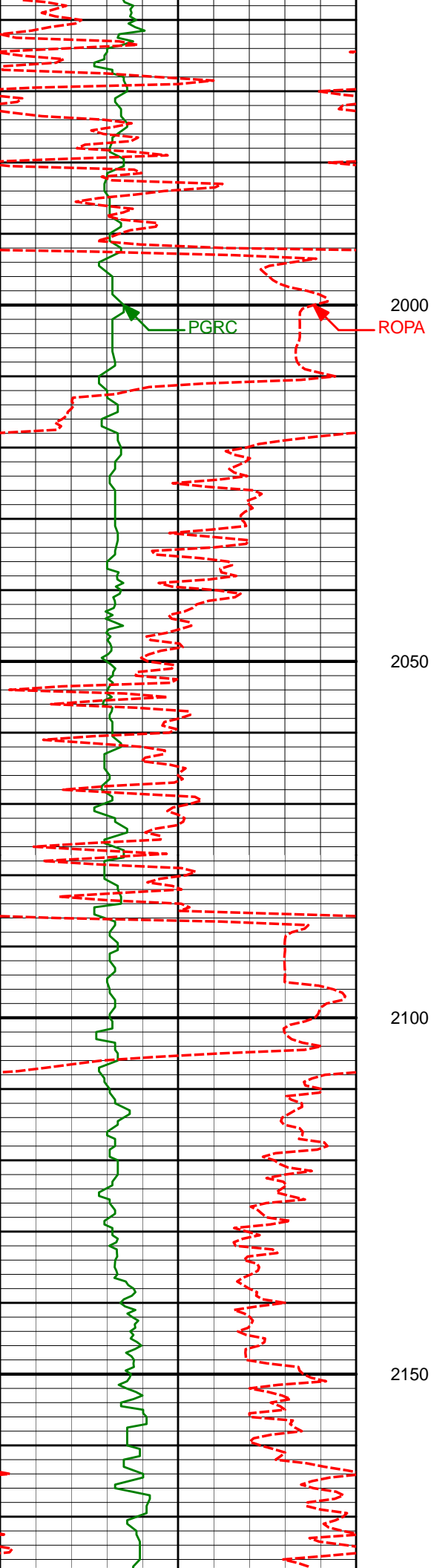
1946'

9.47°

109.15°

1943.32'

-13.08'



2040'

11.00°

105.58°

2035.83'

-17.68'

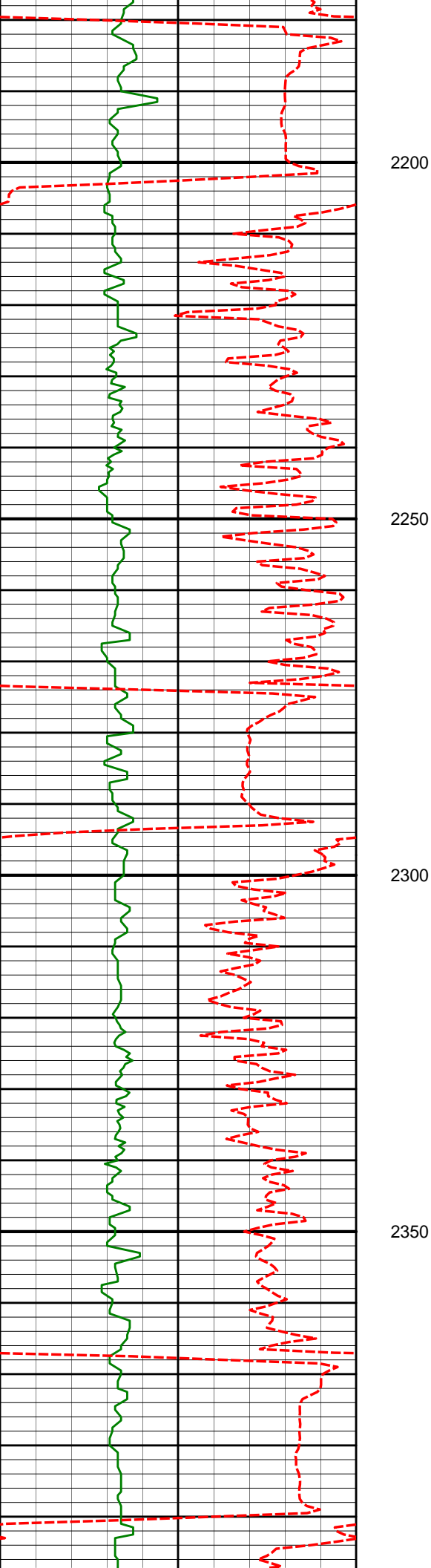
2134'

11.65°

100.51°

2128.00'

-21.43'



2228'

13.13°

103.46°

2219.81'

-25.22'

2322'

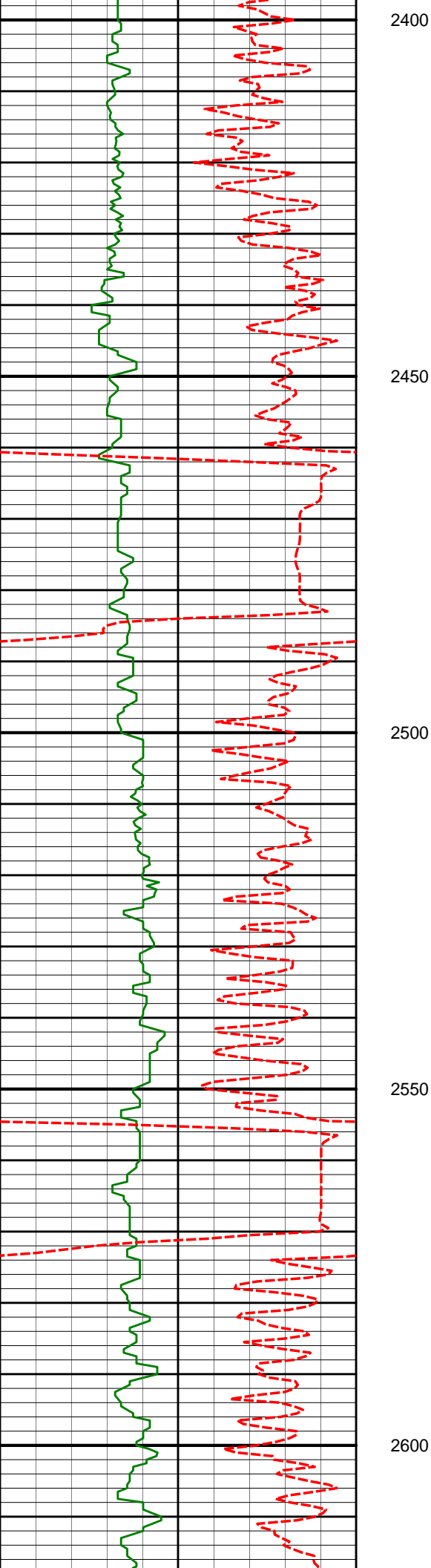
13.12°

110.64°

2311.36'

-31.02'





2400

2417'

14.39°

107.35°

2403.63'

-37.88'

2450

2500

2550

2600

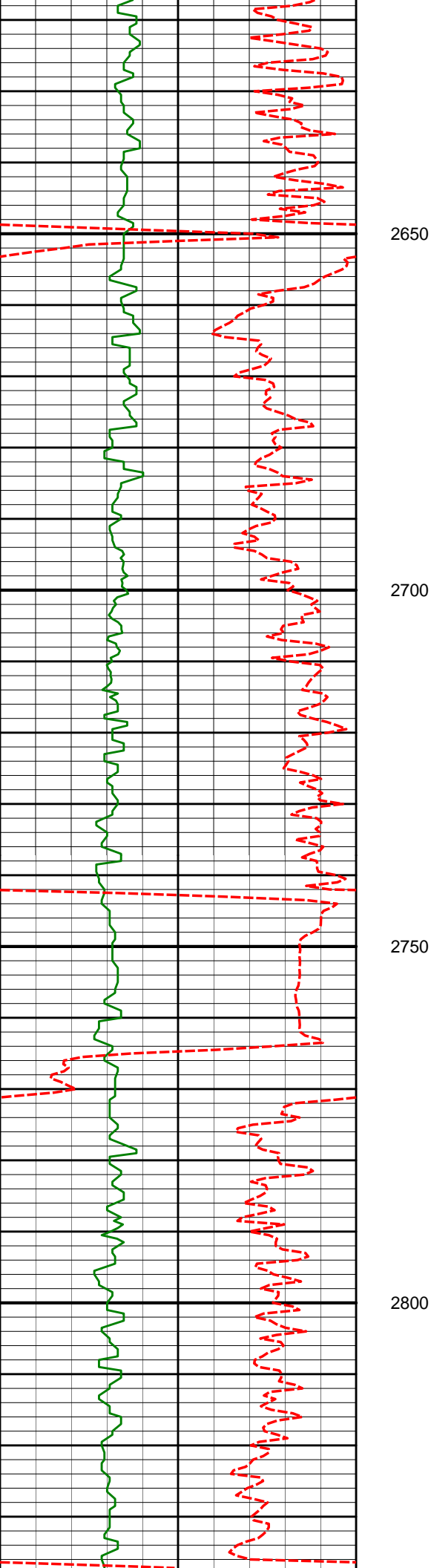
2605'

15.87°

106.86°

2585.11'

-51.28'



2650

2700

2750

2800

2699'

14.83°

107.24°

2675.76'

-58.06'

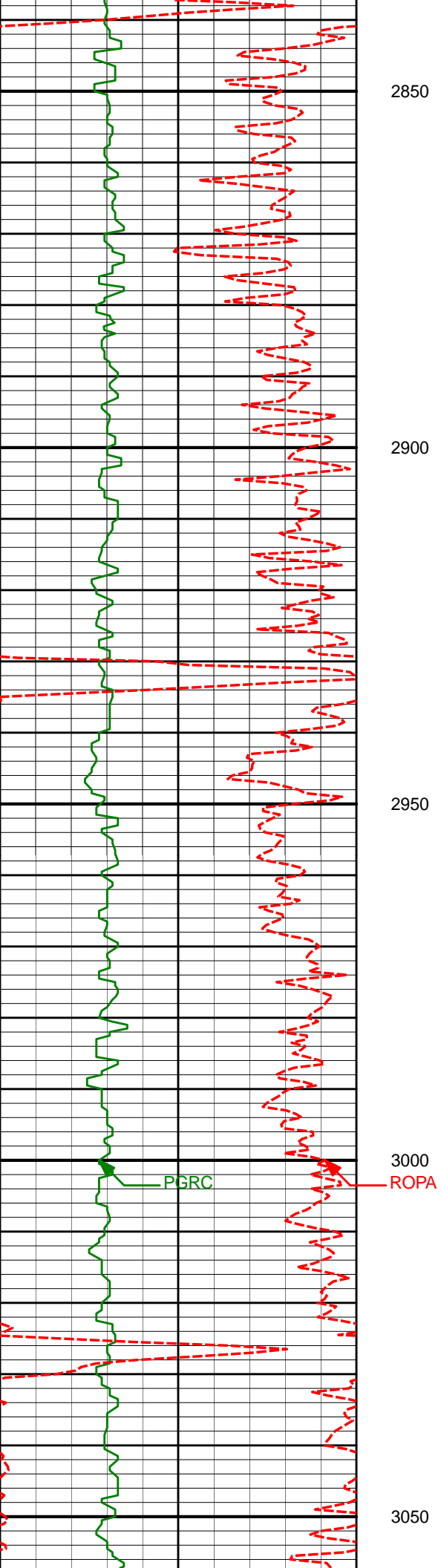
2794'

17.58°

105.84°

2766.97'

-65.03'



2850

2888'

17.55°

105.75°

2856.59'

-72.16'

2900

2950

2982'

17.66°

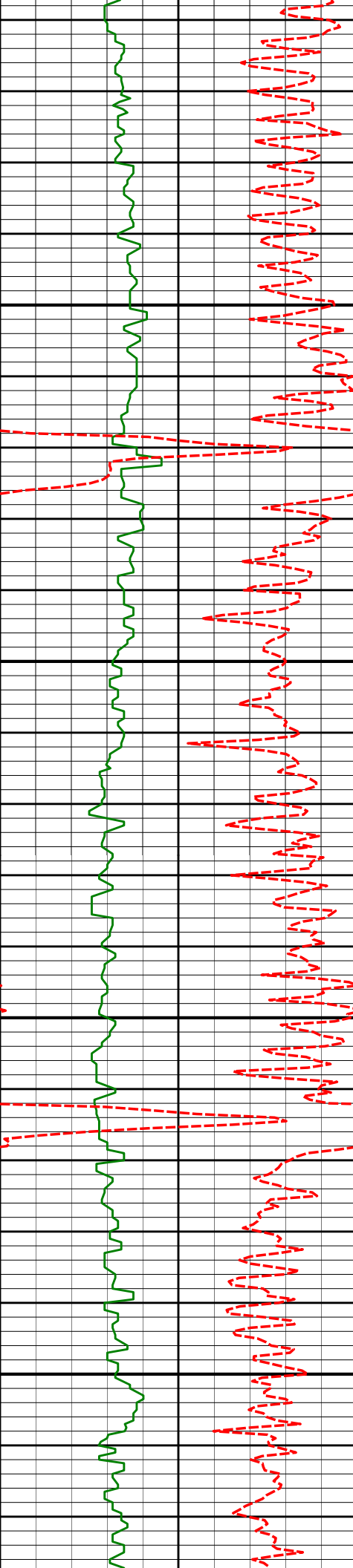
105.89°

2946.19'

-79.31'

3000

3050



3100

3150

3200

3250

3076'

17.49°

105.54°

3035.80'

-86.41'

3170'

16.13°

104.20°

3125.78'

-92.83'

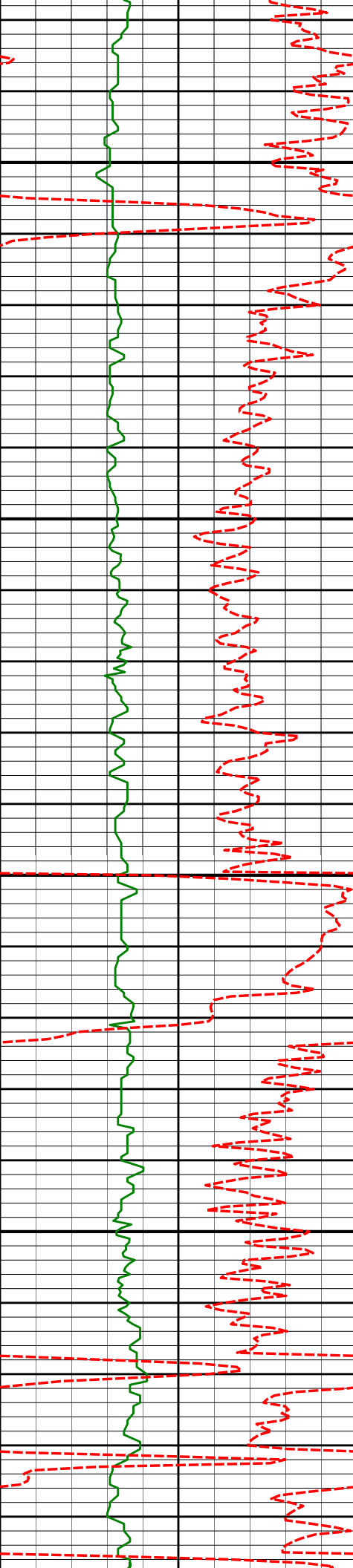
3265'

15.66°

104.52°

3217.15'

-98.73'



3300

3350

3400

3450

3359'

13.80°

102.10°

3308.06'

-103.76'

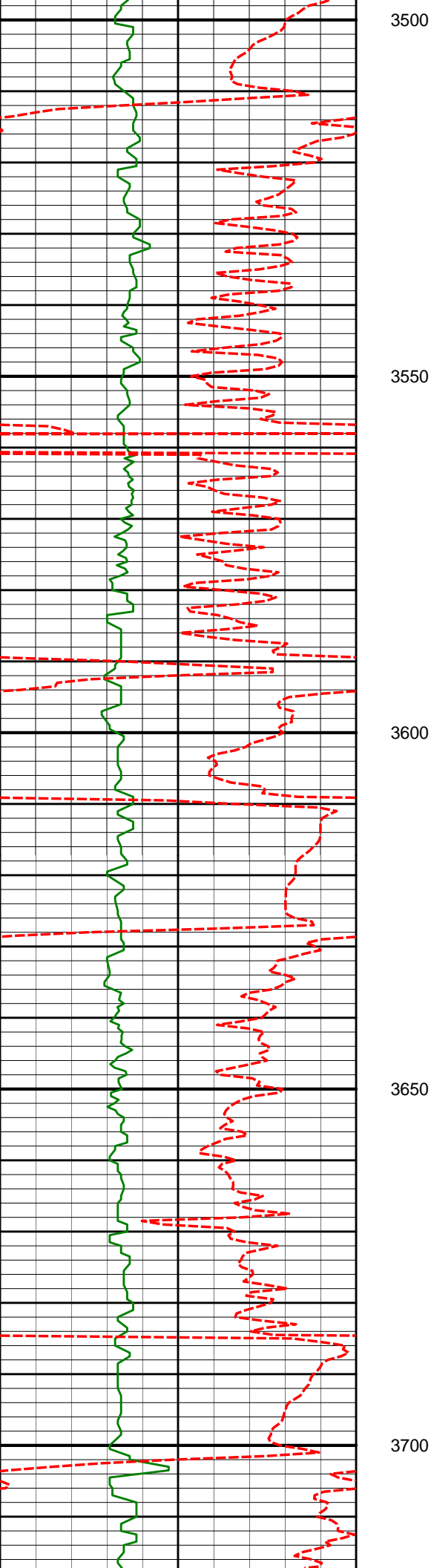
3454'

13.72°

100.39°

3400.33'

-107.69'



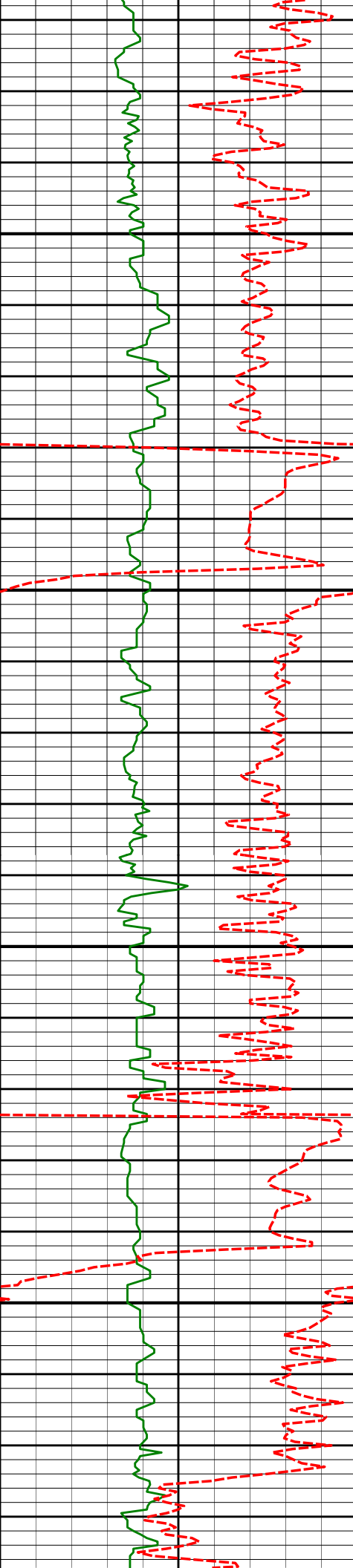
3644'

13.57°

105.59°

3584.98'

-116.79'



3750

3800

3850

3900

3739'

13.58°

106.89°

3677.32'

-122.56'

3834'

14.06°

108.11°

3769.57'

-128.92'

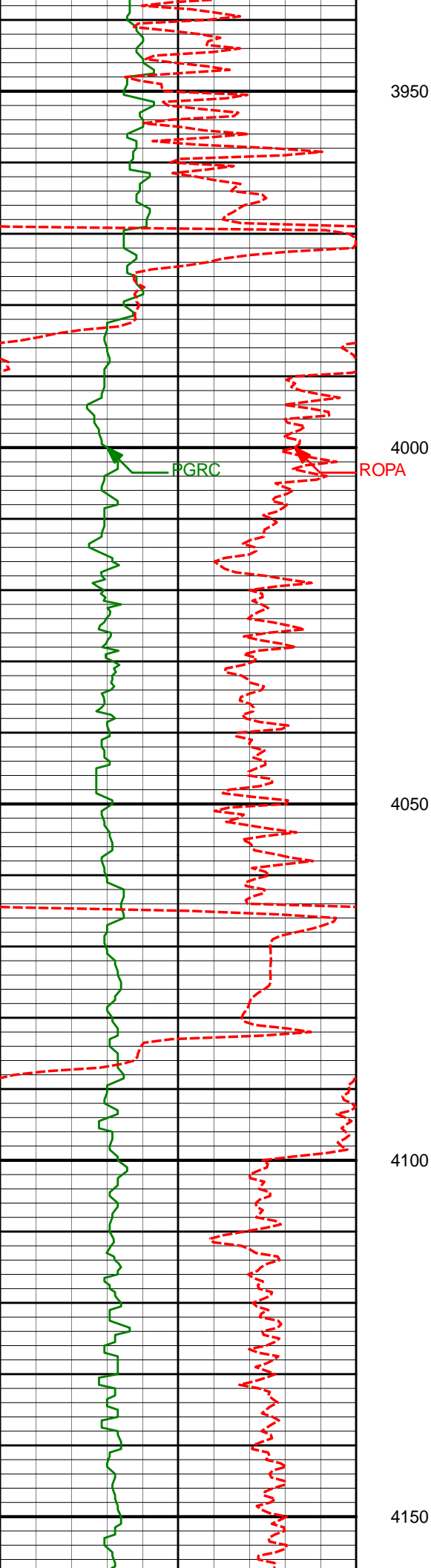
3929'

15.05°

105.87°

3861.52'

-135.39'



4024'

14.00°

104.96°

3953.49'

-141.23'

4119'

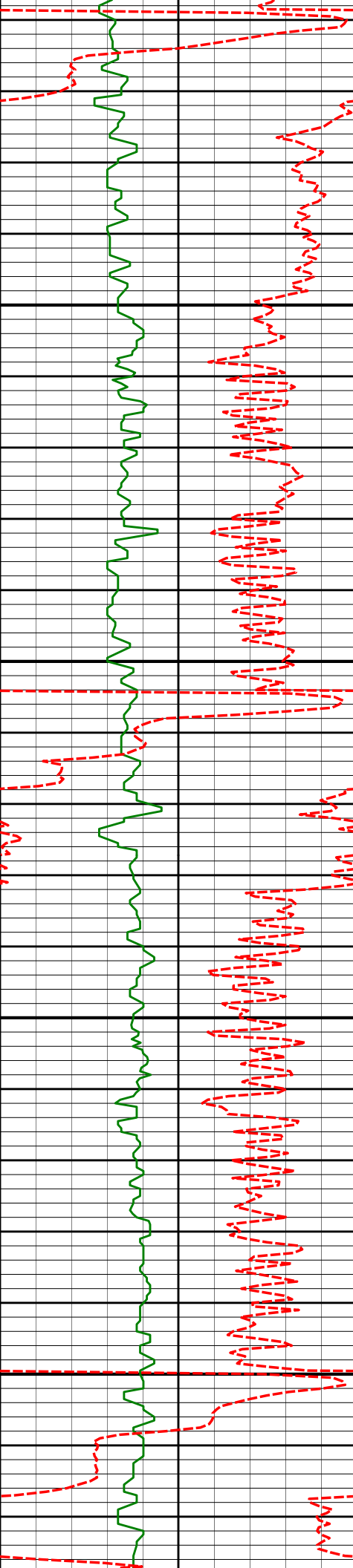
16.07°

105.87°

4045.23'

-147.27'





4200

4214'

15.85°

106.45°

4136.57'

-154.00'

4250

4300

4309'

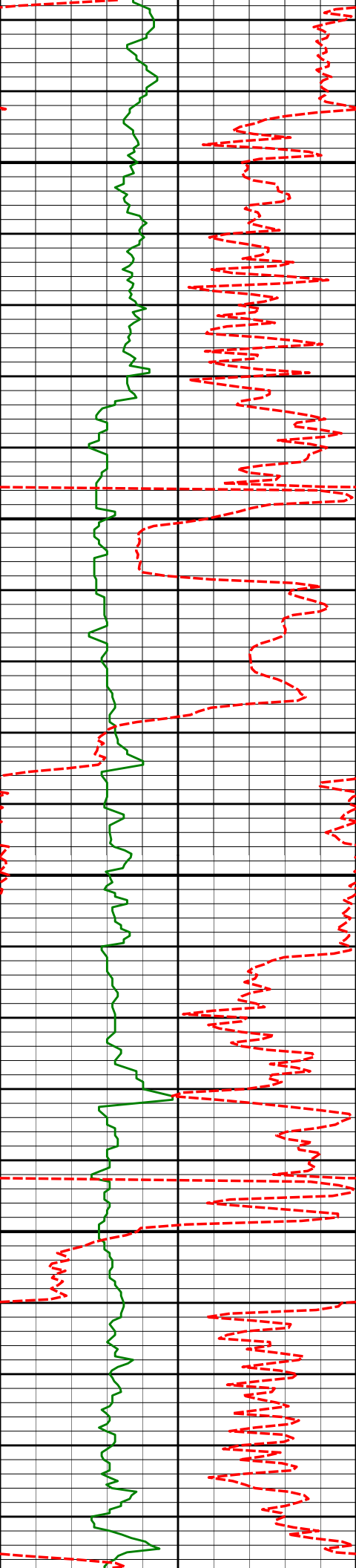
14.46°

107.10°

4228.26'

-160.64'

4350



4400

4404'

12.70°

106.56°

4320.60'

-166.65'

4450

4500

4499'

13.62°

104.89°

4413.11'

-172.04'

4550

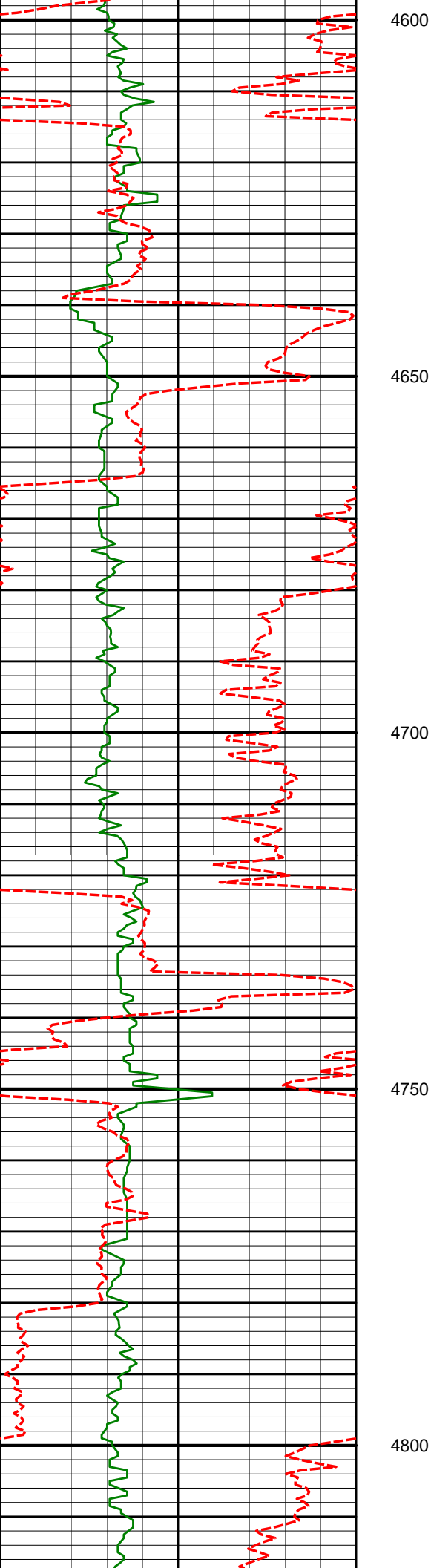
4594'

12.47°

103.12°

4505.65'

-176.80'



4689'

12.23°

105.10°

4598.45'

-181.32'

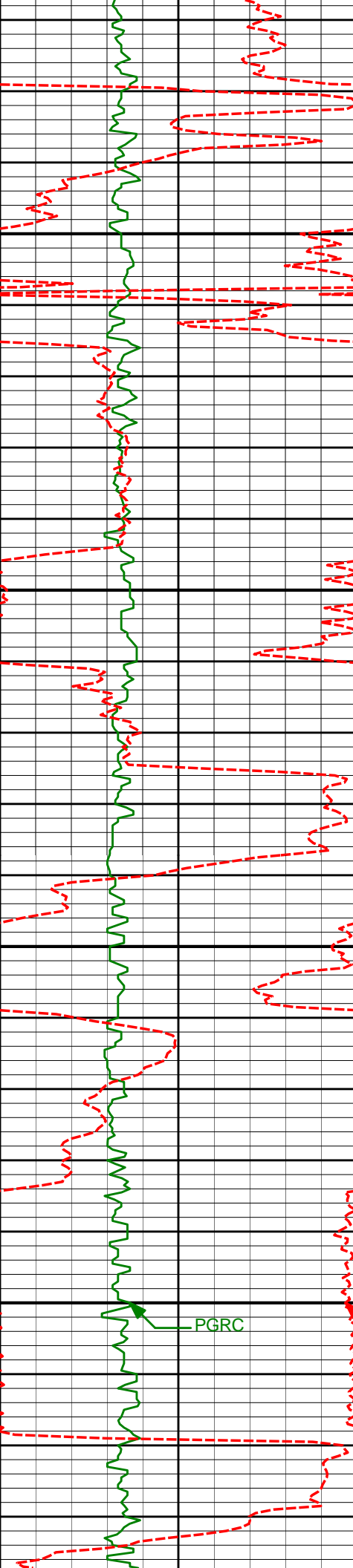
4785'

11.51°

106.83°

4692.40'

-186.33'



4850

4880'

10.54°

105.71°

4785.65'

-191.05'

4900

4950

4975'

8.24°

102.66°

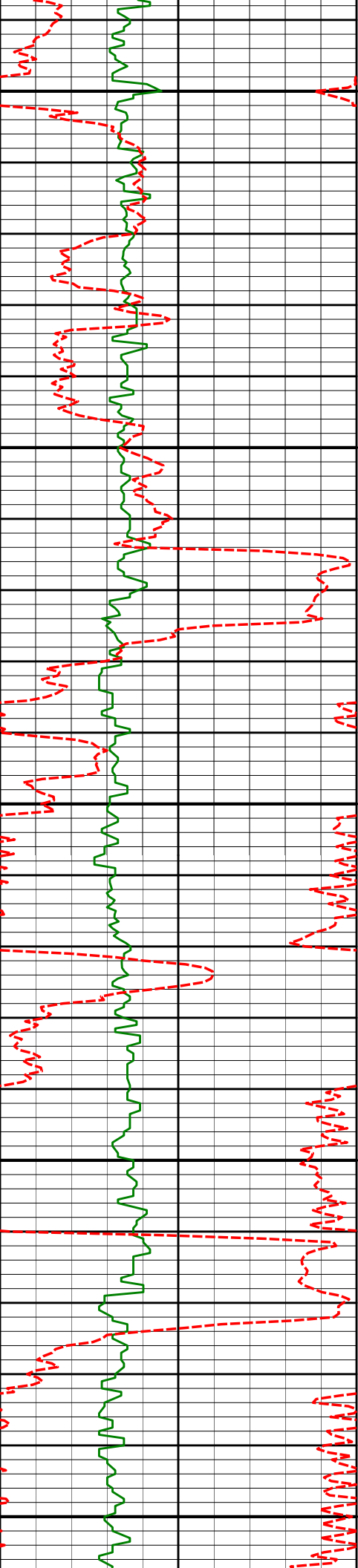
4879.37'

-194.57'

5000

PGRC

ROPA



5050

5070'

6.79°

106.39°

4973.55'

-197.38'

5100

5150

5165'

5.45°

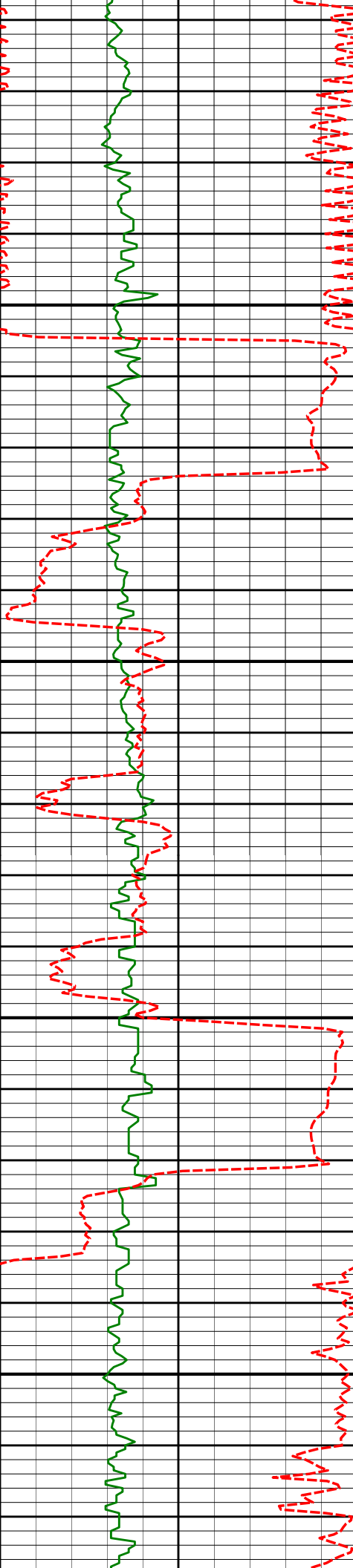
102.71°

5068.01'

-199.75'

5200

5250



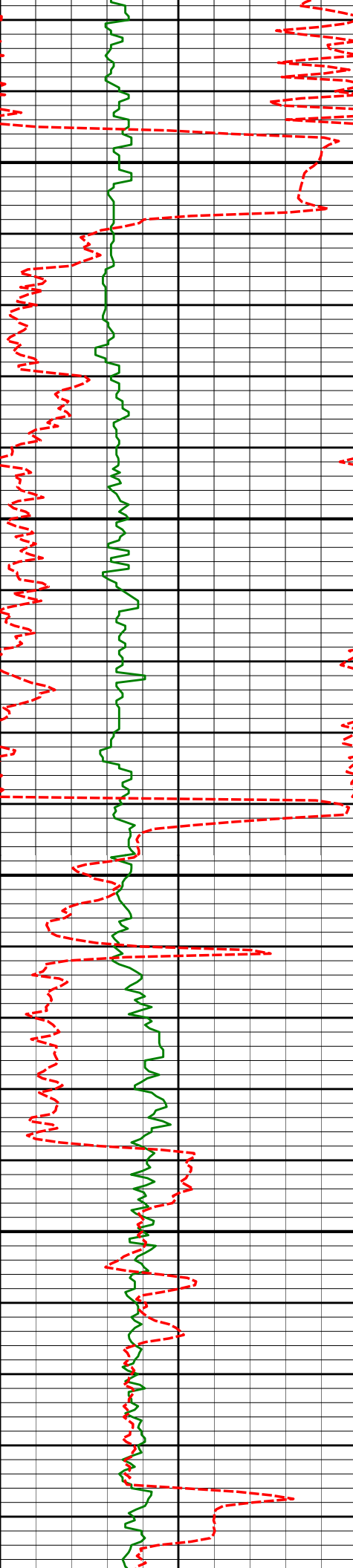
5300

5350

5400

5450

5260'	4.24°	100.27°	5162.67'	-201.19'
5355'	2.38°	104.65°	5257.50'	-202.20'
5450'	0.83°	172.16°	5352.47'	-203.34'



5500

5550

5600

5650

5545'

1.15°

278.10°

5447.46'

-203.91'

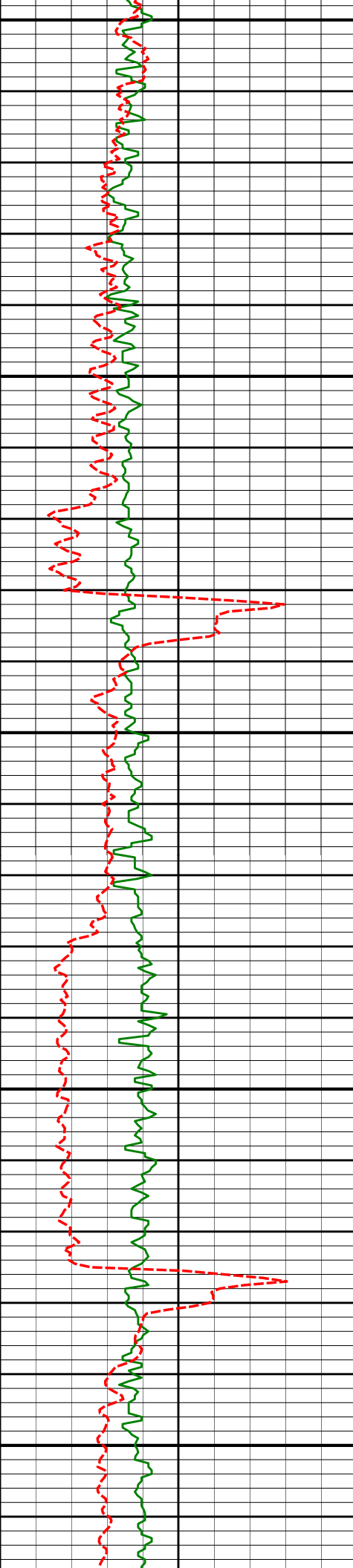
5639'

1.01°

266.48°

5541.44'

-203.86'



5700

5734'

0.84°

259.45°

5636.43'

-204.07'

5750

5800

5829'

0.74°

255.44°

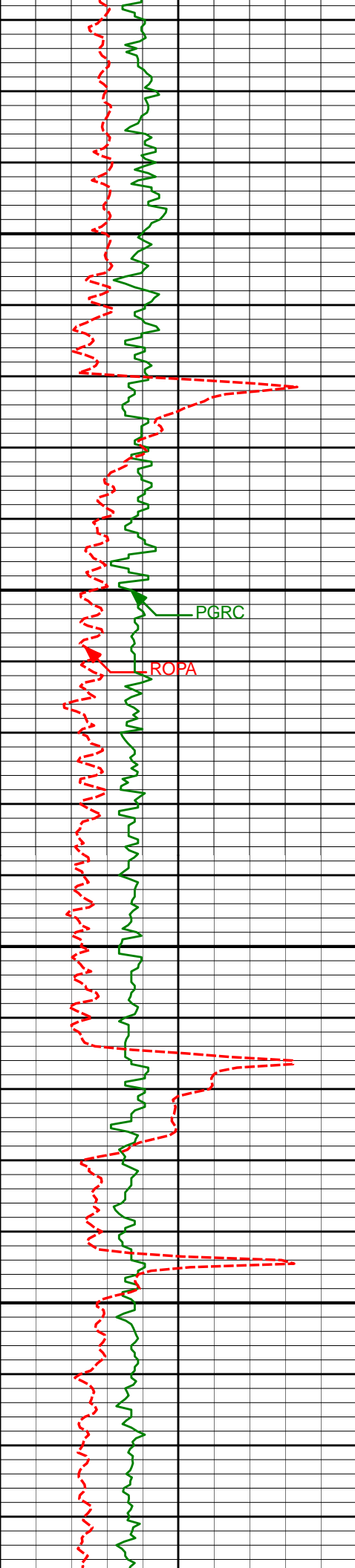
5731.42'

-204.38'

5850

5900





5950

6000

6050

6100

5924'

0.88°

247.64°

5826.41'

-204.84'

6020'

0.86°

246.76°

5922.40'

-205.44'

6115'

1.04°

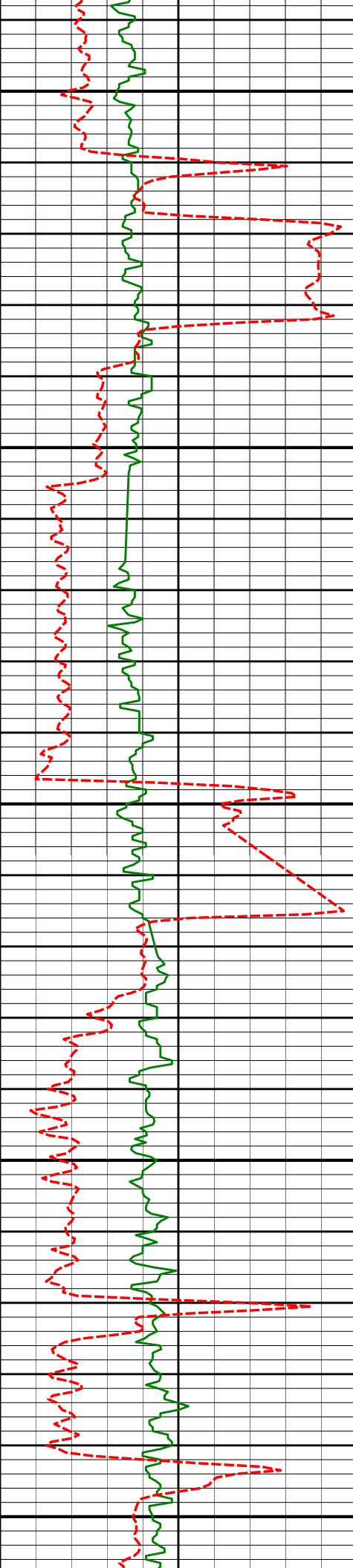
242.53°

6017.39'

-206.15'

PGRC

ROPA



6150

6200

6250

6300

6350

6210'

0.67°

7.62°

6112.38'

-206.01'

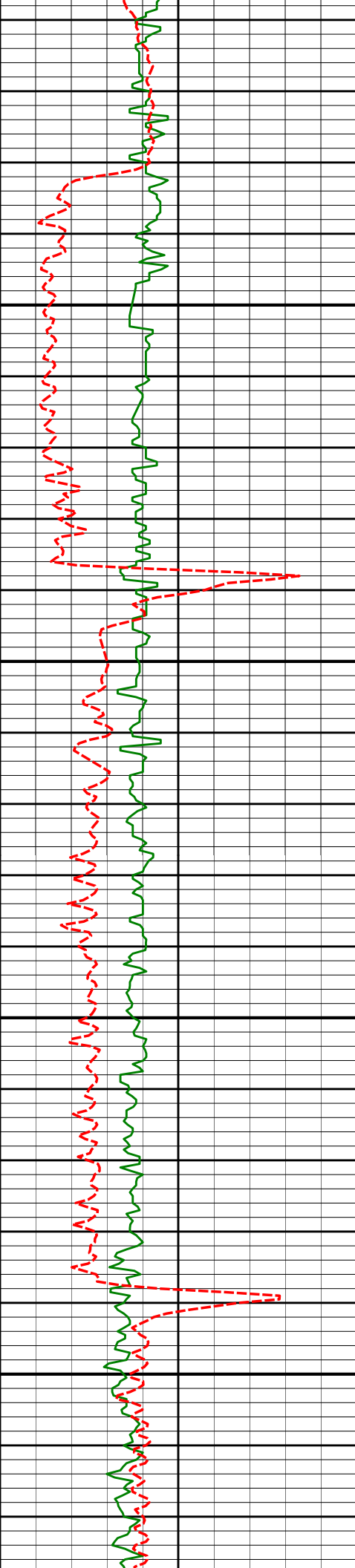
6305'

0.49°

5.27°

6207.38'

-205.05'



6400

6400'

0.28°

334.95°

6302.38'

-204.44'

6450

6500

6550

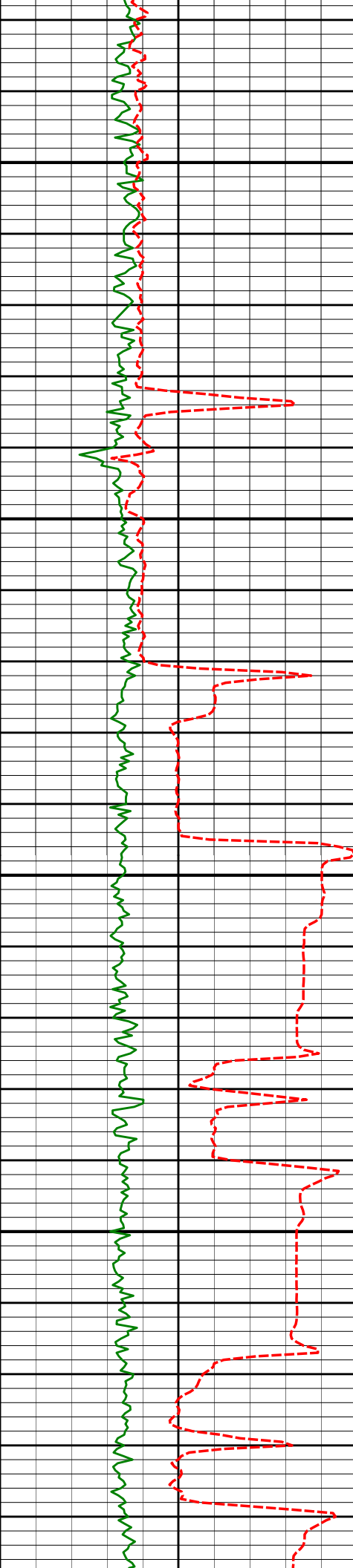
6495'

0.20°

254.09°

6397.38'

-204.28'



6600

6650

6700

6750

6590'

0.41°

217.21°

6492.38'

-204.60'

6686'

0.58°

233.12°

6588.37'

-205.18'

6734'

2.59°

341.09°

6636.36'

-204.31'

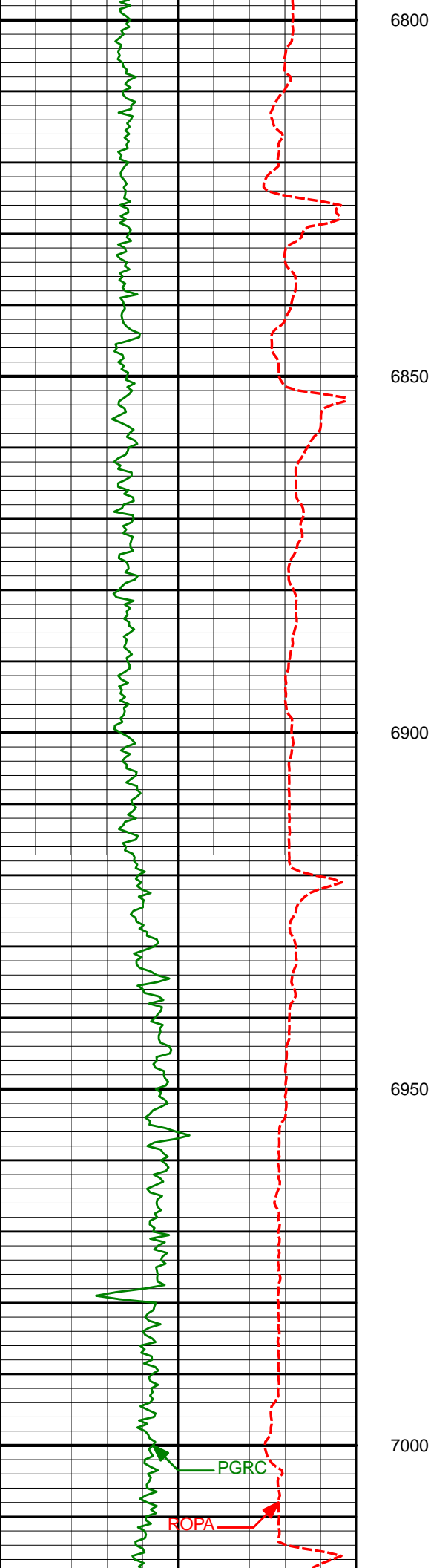
6781'

5.01°

348.28°

6683.25'

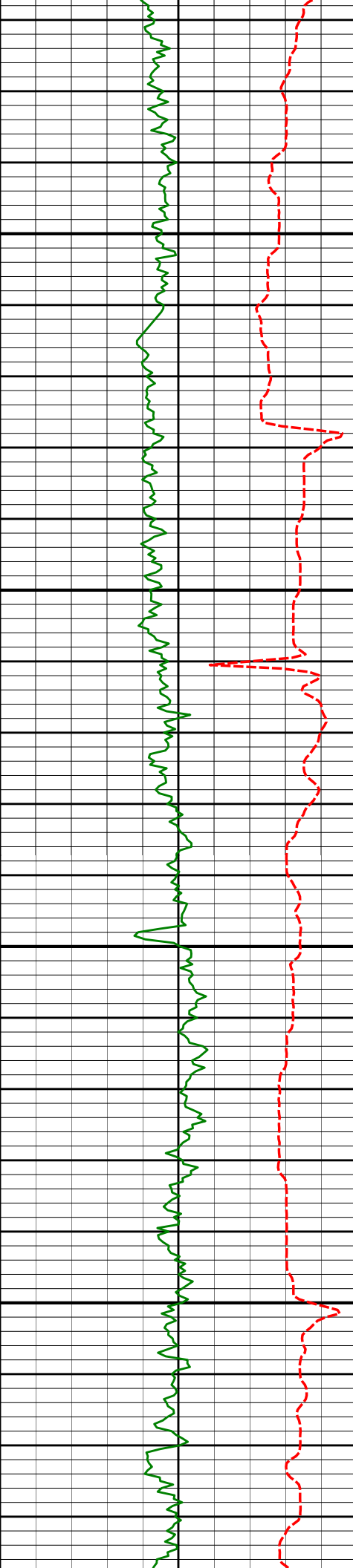
-201.31'



6876' 12.30° 349.15° 6777.10' -187.36'

6924' 16.27° 354.52° 6823.61' -175.68'

6971' 20.51° 356.37° 6868.20' -160.93'



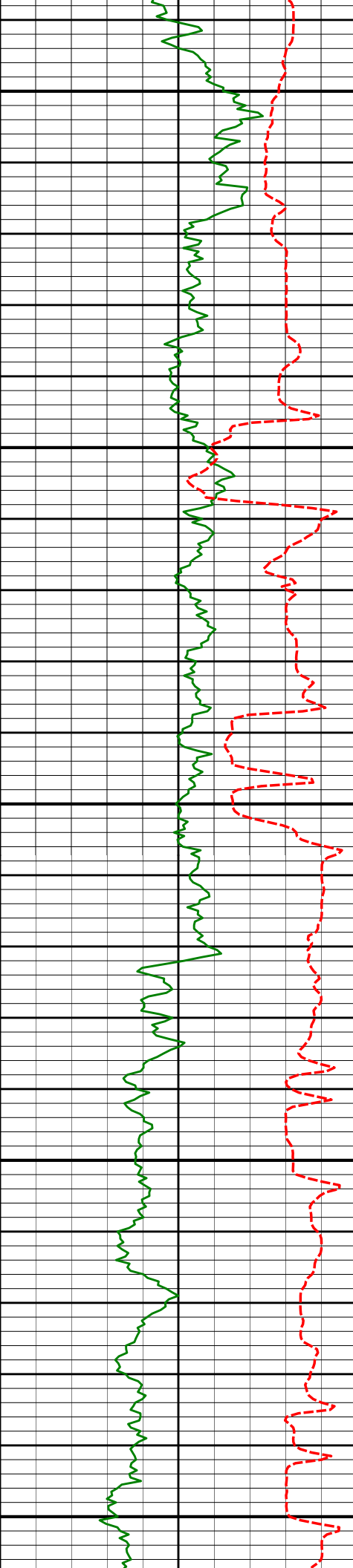
7050

7100

7150

7200

7019'	24.68°	357.62°	6912.51'	-142.54'
7066'	28.80°	358.84°	6954.47'	-121.42'
7115'	33.75°	359.05°	6996.34'	-96.01'
7162'	39.35°	359.07°	7034.08'	-68.06'



7250

7257'

52.16°

2.75°

7100.24'

-0.17'

7300

7305'

58.23°

4.27°

7127.63'

39.19'

7350

7352'

62.31°

4.40°

7150.93'

79.94'

7400

7400'

67.12°

3.25°

7171.42'

123.28'

7450

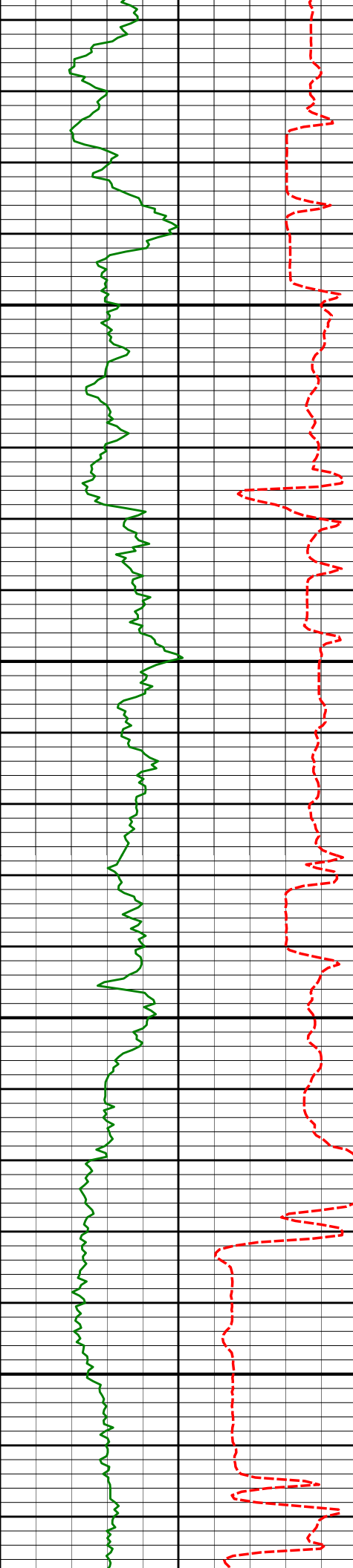
7447'

71.76°

2.11°

7187.93'

167.26'



7500

7550

7600

7650

7495'

74.97°

1.00°

7201.67'

213.25'

7542'

80.22°

2.02°

7211.76'

259.13'

7579'

83.98°

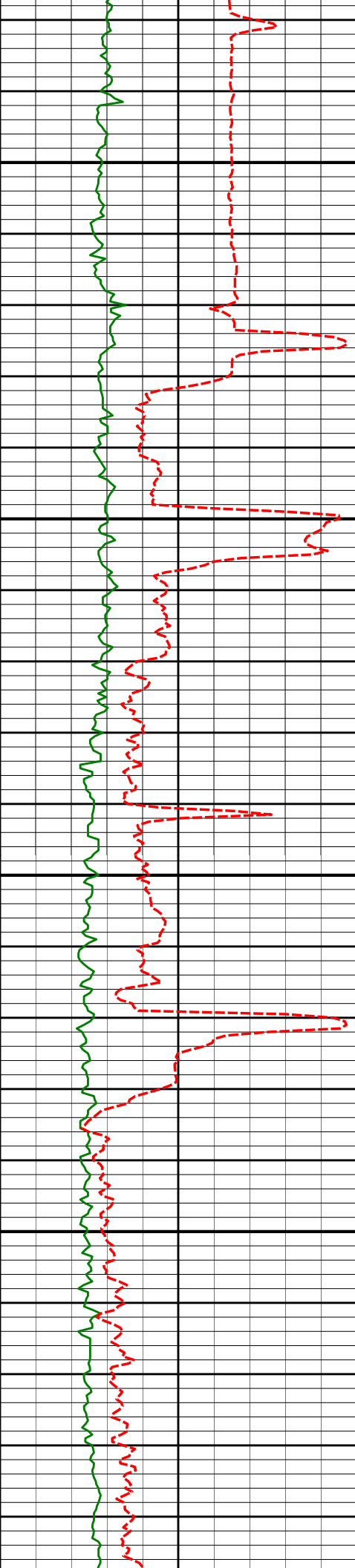
2.52°

7216.84'

295.77'

7" Casing Shoe @ 7610 MD / 7219.76' TVD





7700

7750

7800

7850

7683'

88.15°

0.93°

7223.98'

399.49'

7778'

89.38°

1.12°

7226.03'

494.47'

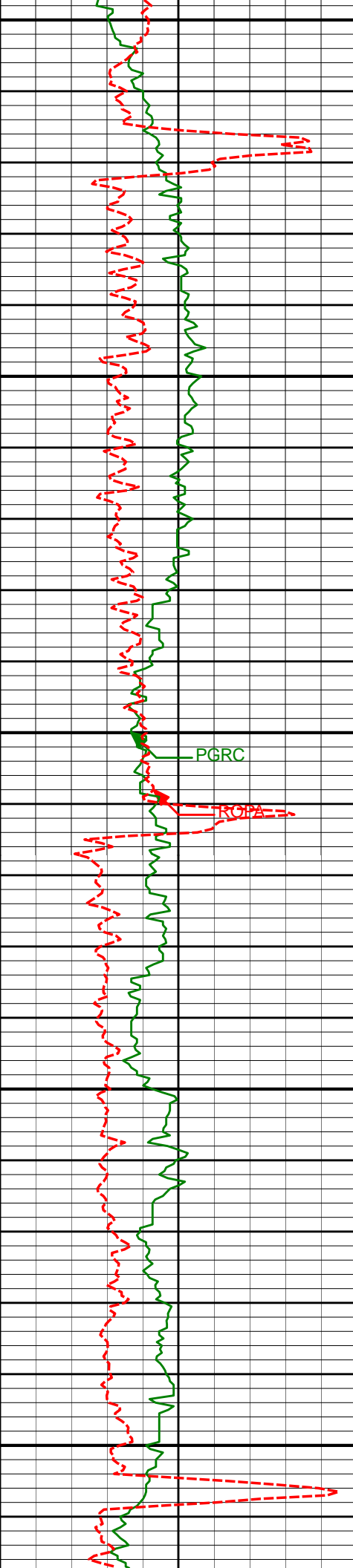
7873'

90.00°

1.38°

7226.54'

589.47'



7900

7950

8000

8050

8100

7968'

90.34°

1.00°

7226.26'

684.47'

PGRC

ROPA

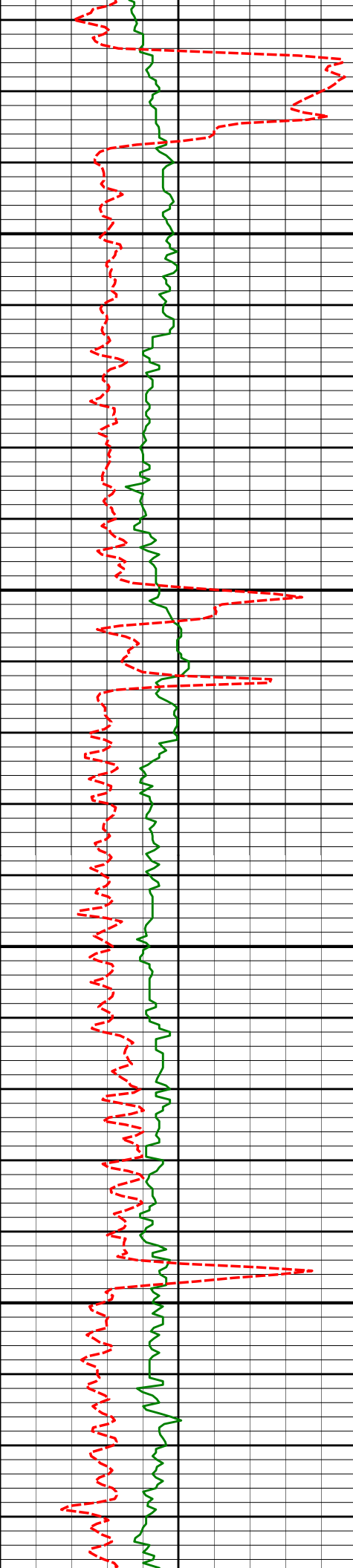
8063'

91.02°

0.18°

7225.13'

779.45'



8150

8158'

89.91°

0.24°

7224.36'

874.43'

8200

8250

8253'

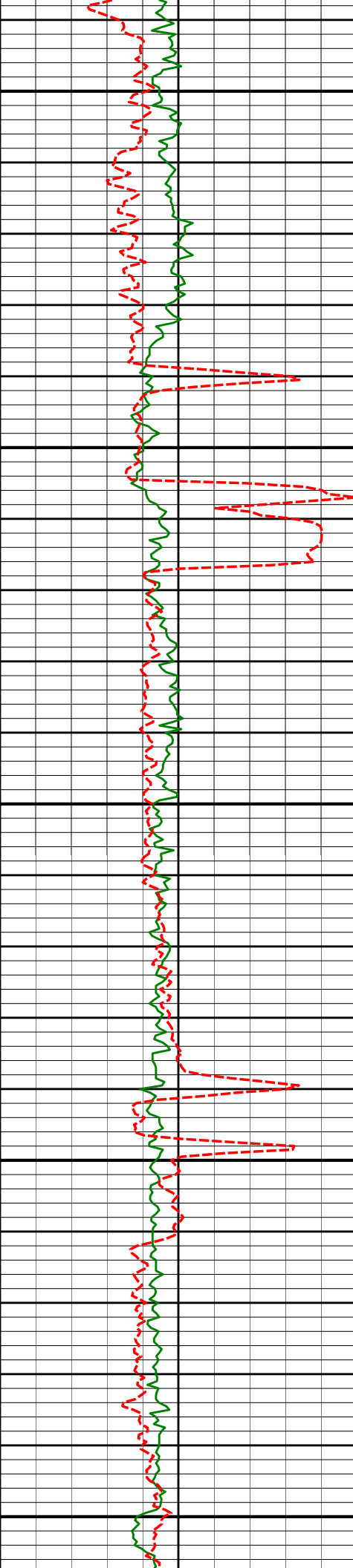
89.81°

0.27°

7224.59'

969.42'

8300



8350

8348'

88.95°

0.69°

7225.62'

1064.40'

8400

8444'

90.34°

359.78°

7226.22'

1160.38'

8450

8500

8539'

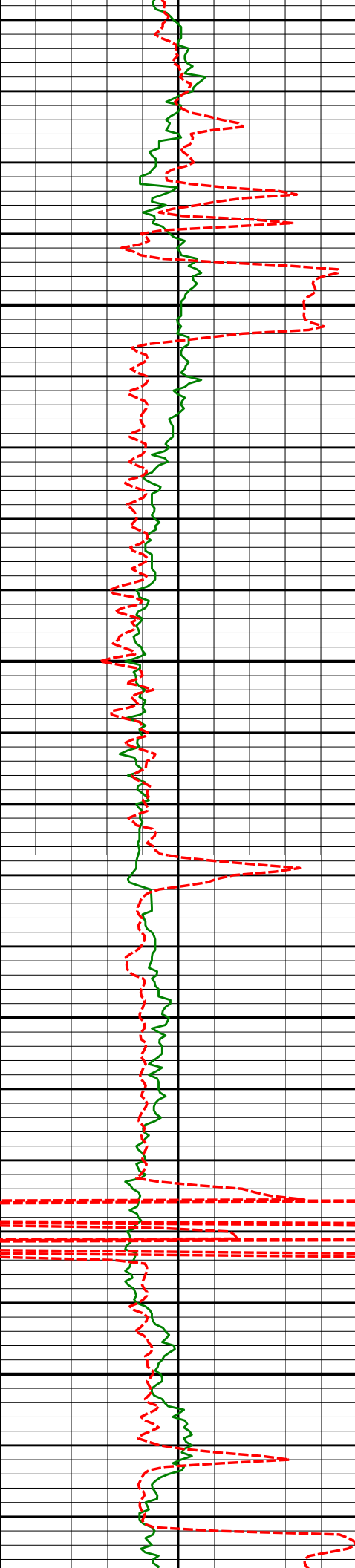
88.89°

359.19°

7226.85'

1255.33'

8550



8600

8650

8700

8750

8634'

91.01°

359.37°

7226.94'

1350.27'

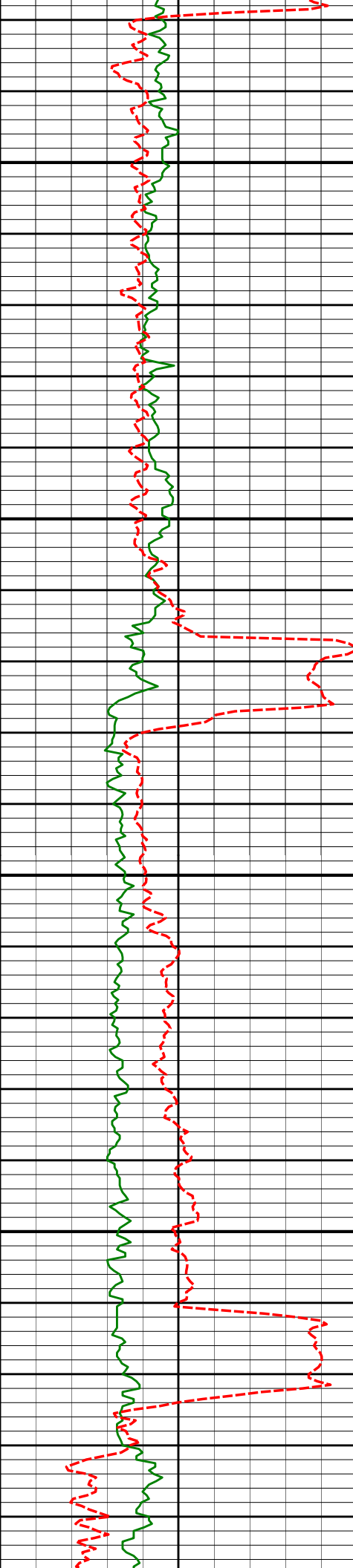
8729'

91.57°

359.19°

7224.80'

1445.19'



8800

8824'

90.77°

358.65°

7222.86'

1540.09'

8850

8900

8919'

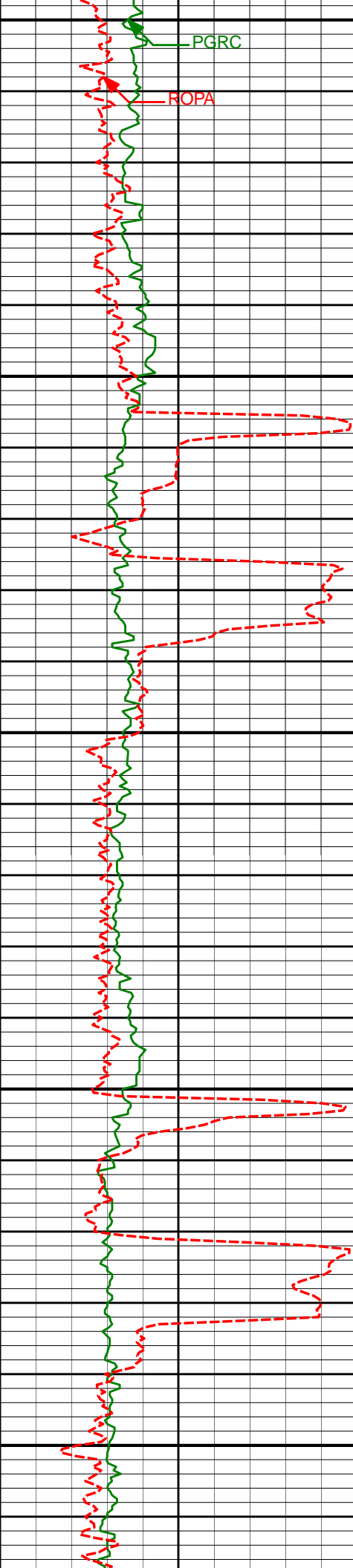
91.39°

359.92°

7221.07'

1635.02'

8950



9000

PGRC

ROPA

9014'

91.60°

0.73°

7218.58'

1729.97'

9050

9100

9110'

90.92°

0.89°

7216.47'

1825.95'

9150

9200

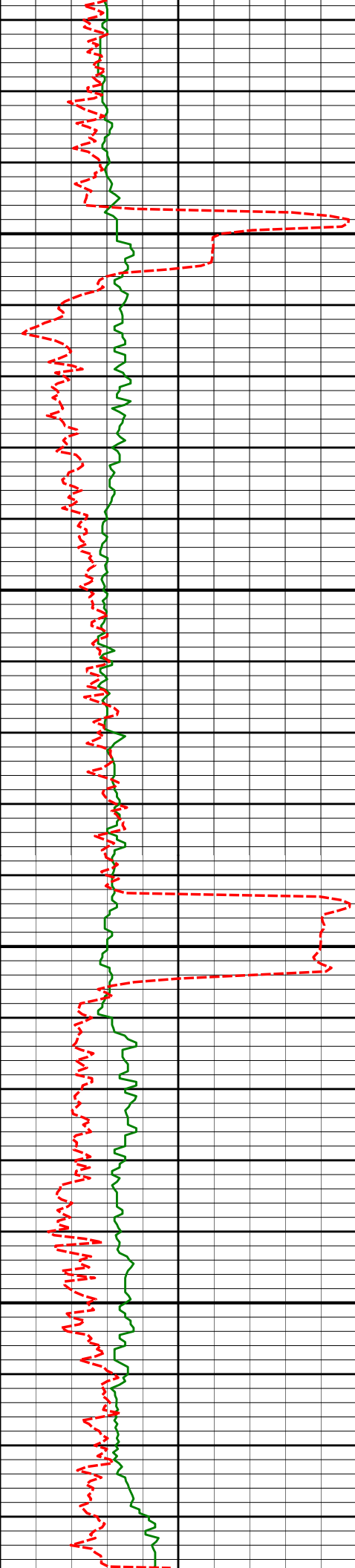
9205'

90.12°

1.08°

7215.60'

1920.94'



9250

9300

9350

9400

9300'

9395'

90.93°

88.95°

0.72°

0.09°

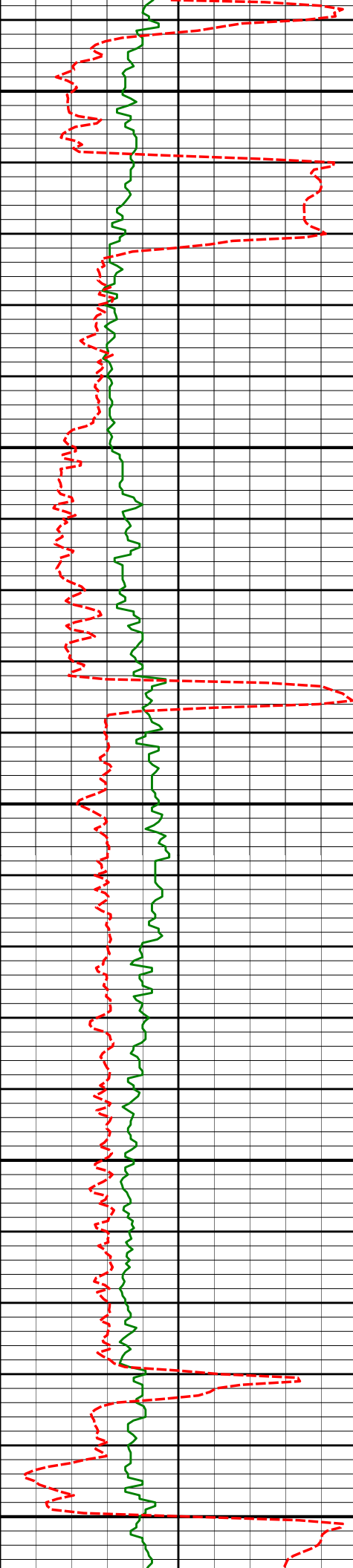
7214.73'

7214.84'

2015.93'

2110.92'





9450

9490'

90.15°

1.35°

7215.58'

2205.91'

9500

9550

9585'

89.69°

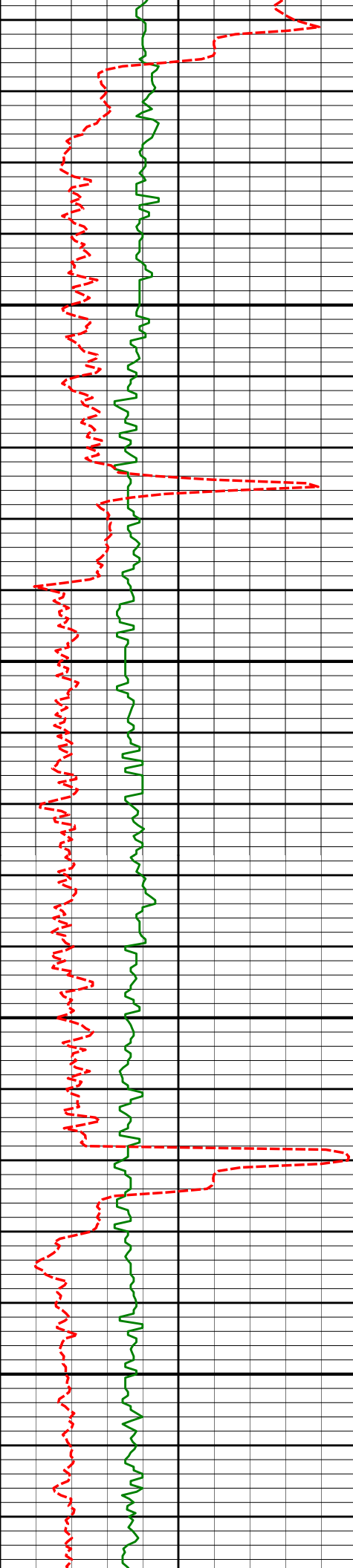
0.29°

7215.71'

2300.90'

9600

9650



9700

9750

9800

9850

9681'

90.87°

1.70°

7215.24'

2396.90'

9776'

91.05°

0.85°

7213.65'

2491.88'

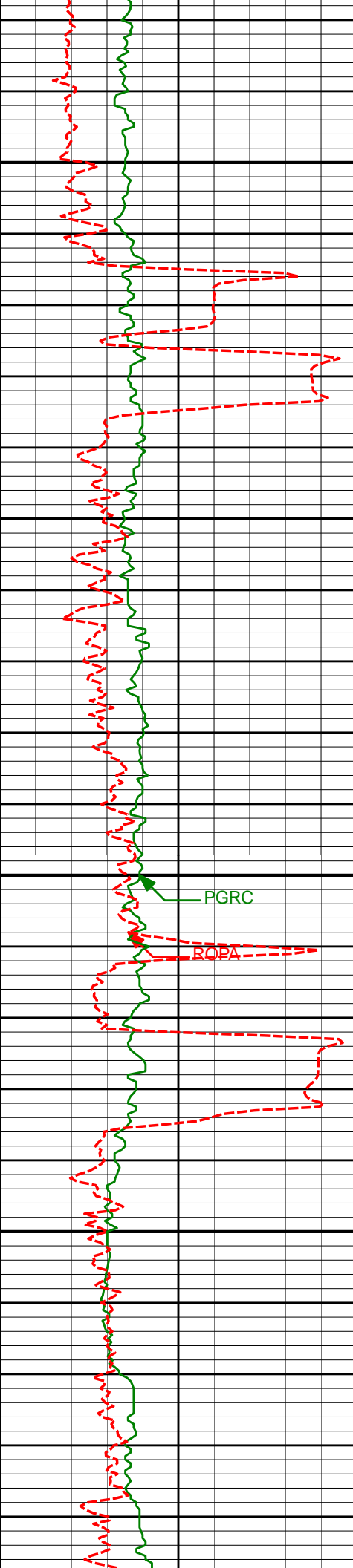
9871'

91.17°

2.16°

7211.81'

2586.86'



9900

9950

10000

10050

PGRC

ROPA

9966'

91.79°

3.70°

7209.36'

2681.79'

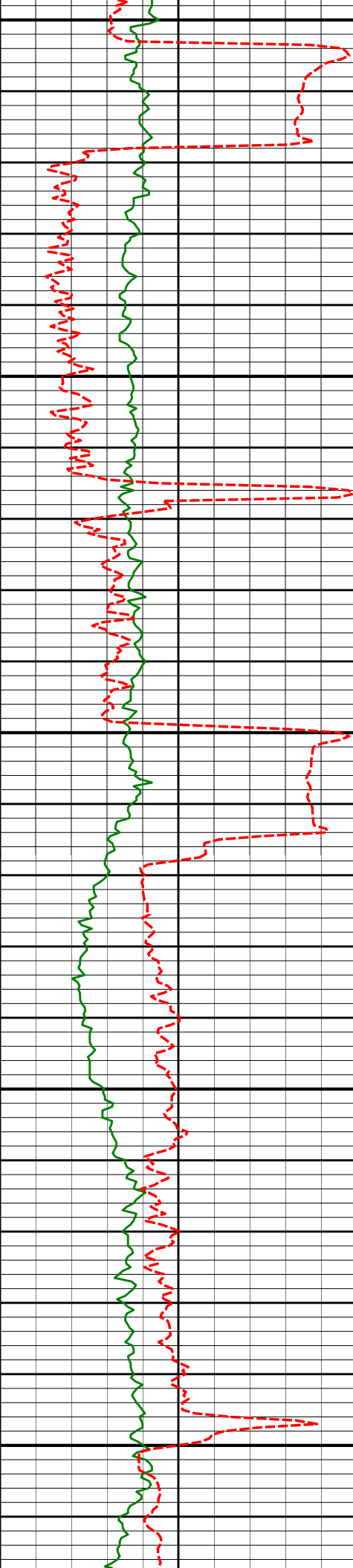
10061'

90.71°

2.32°

7207.29'

2776.71'



10100

10150

10200

10250

10300

10156'

90.22°

2.60°

7206.52'

2871.69'

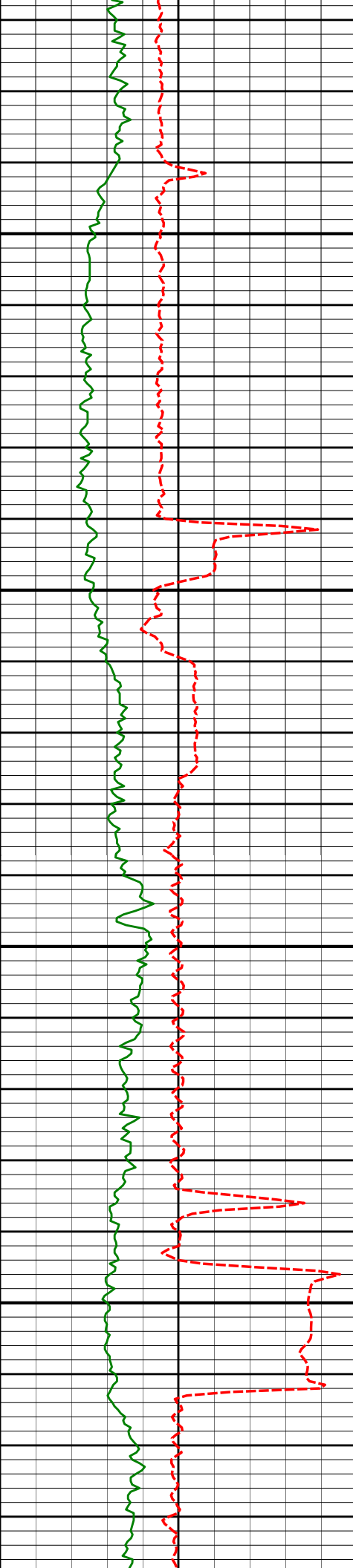
10251'

89.04°

2.07°

7207.14'

2966.67'



10350

10400

10450

10500

10347'

89.48°

1.07°

7208.37'

3062.66'

10442'

91.32°

1.76°

7207.71'

3157.65'

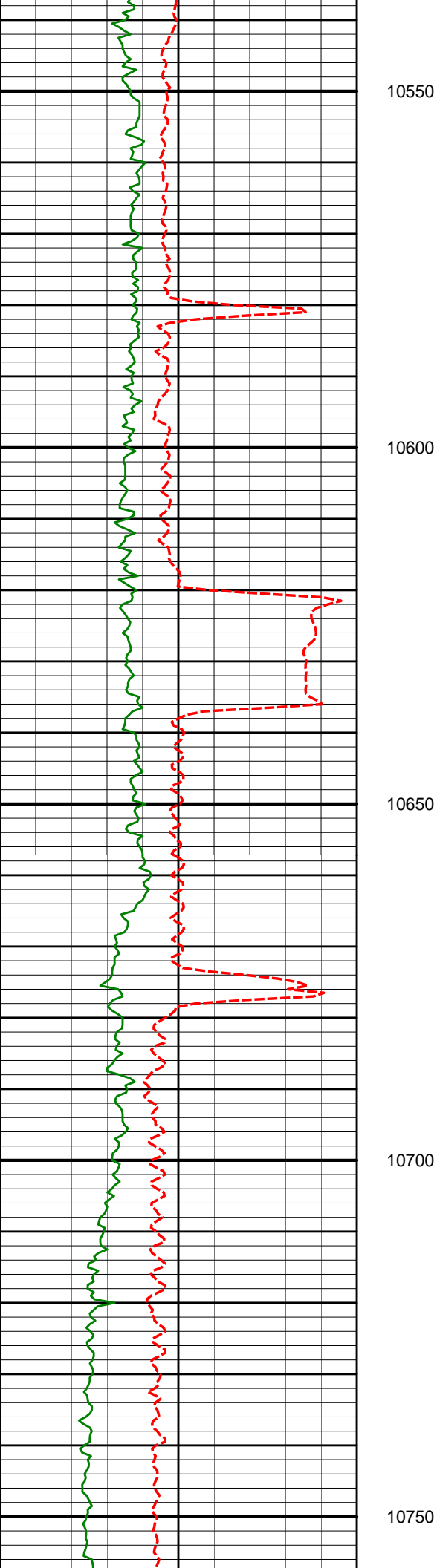
10537'

89.17°

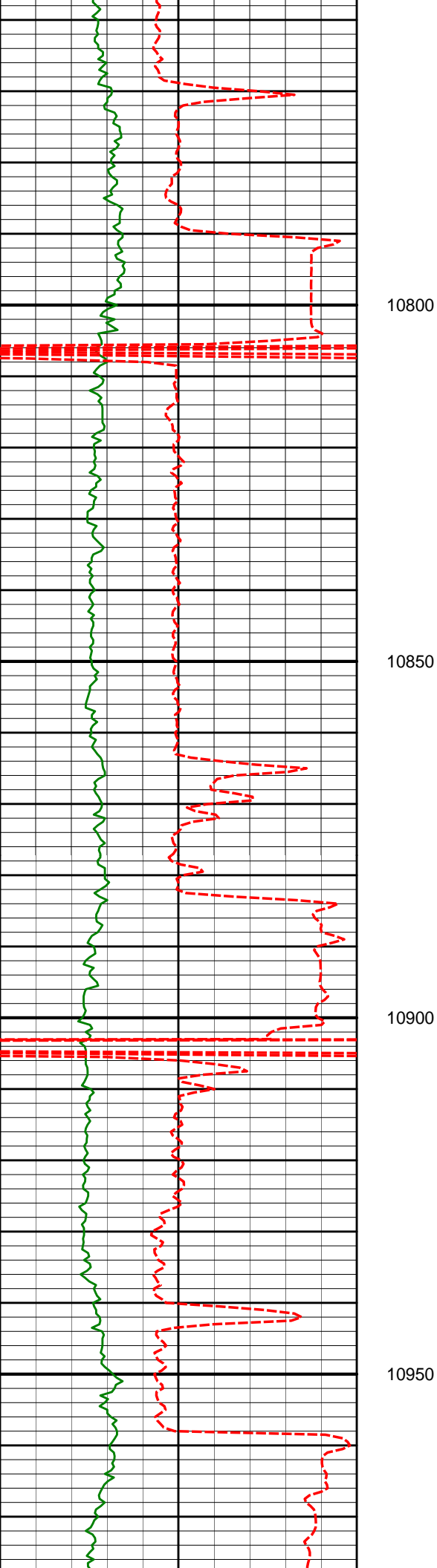
359.93°

7207.30'

3252.64'



10537'	89.17°	359.93°	7207.30'	3332.04'
10632'	89.29°	359.68°	7208.58'	3347.60'
10727'	90.09°	359.40°	7209.09'	3442.55'



10800

10822'

89.85°

0.80°

7209.14'

3537.53'

10850

10900

10917'

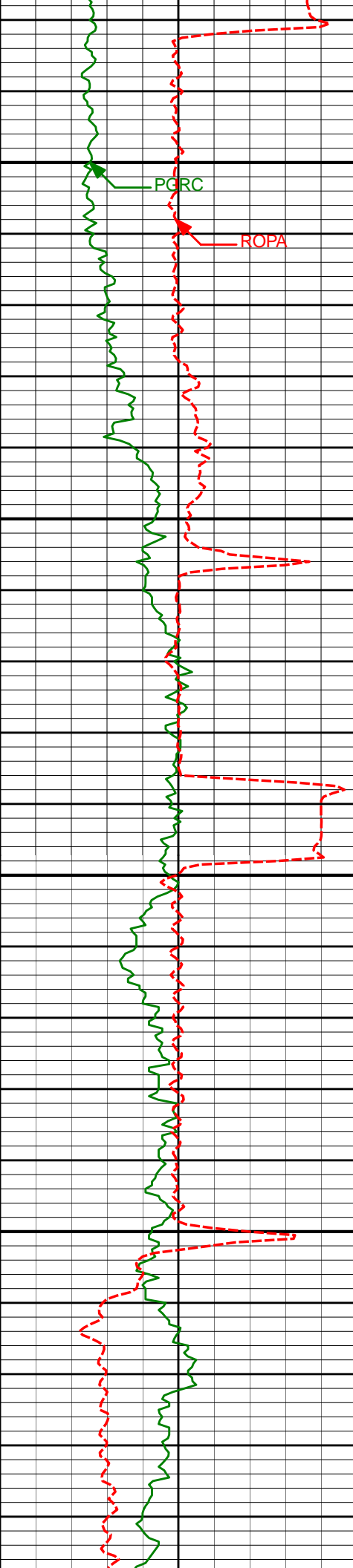
90.06°

2.68°

7209.22'

3632.52'

10950



11000

11050

11100

11150

PGRC

ROPA

11013'

88.98°

1.97°

7210.02'

3728.50'

11108'

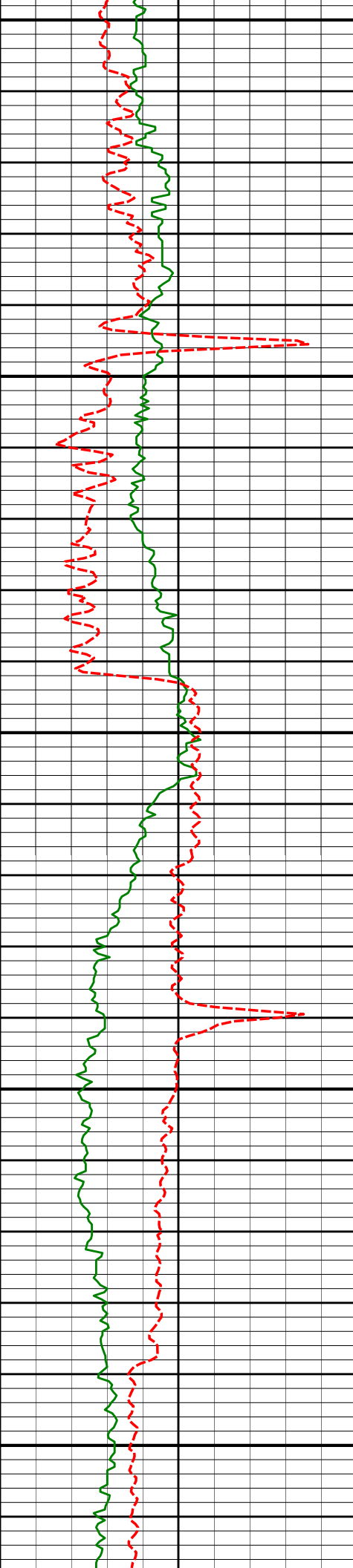
87.96°

3.16°

7212.56'

3823.44'





11200

11250

11300

11350

11400

11203'

88.03°

2.89°

7215.88'

3918.34'

11298'

88.30°

2.18°

7218.92'

4013.26'

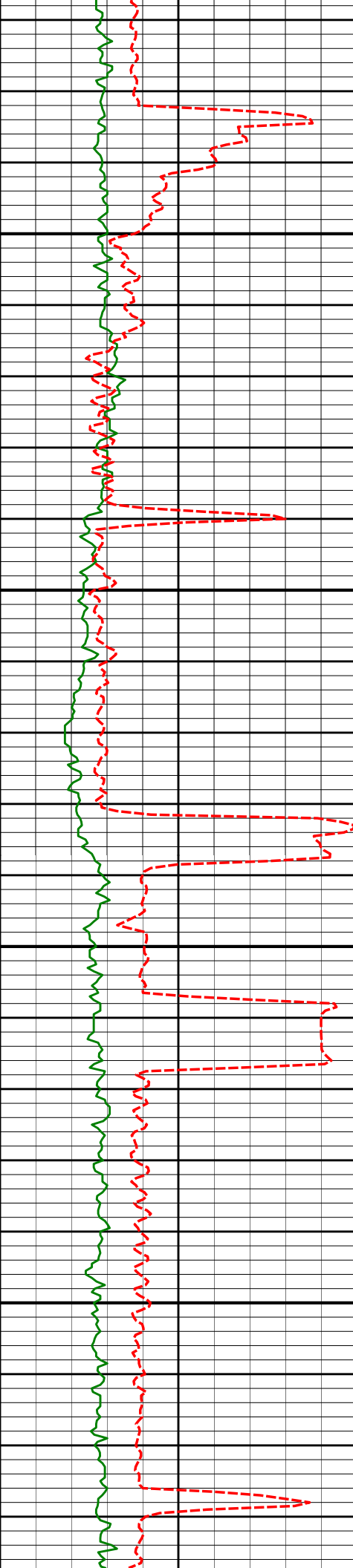
11393'

88.33°

1.89°

7221.71'

4108.21'



11450

11500

11550

11600

11488'

88.64°

1.21°

7224.22'

4203.18'

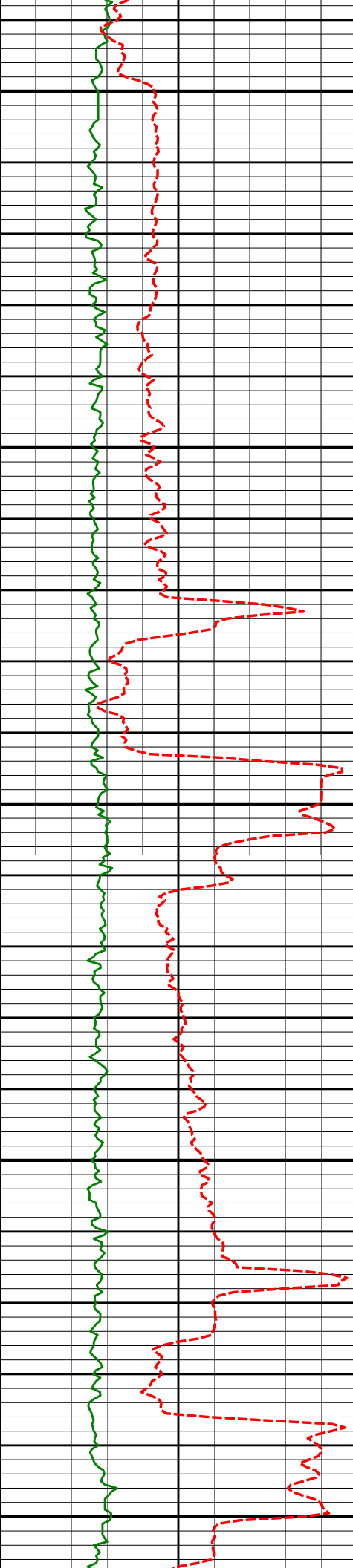
11583'

90.12°

2.46°

7225.25'

4298.16'



11650

11700

11750

11800

11850

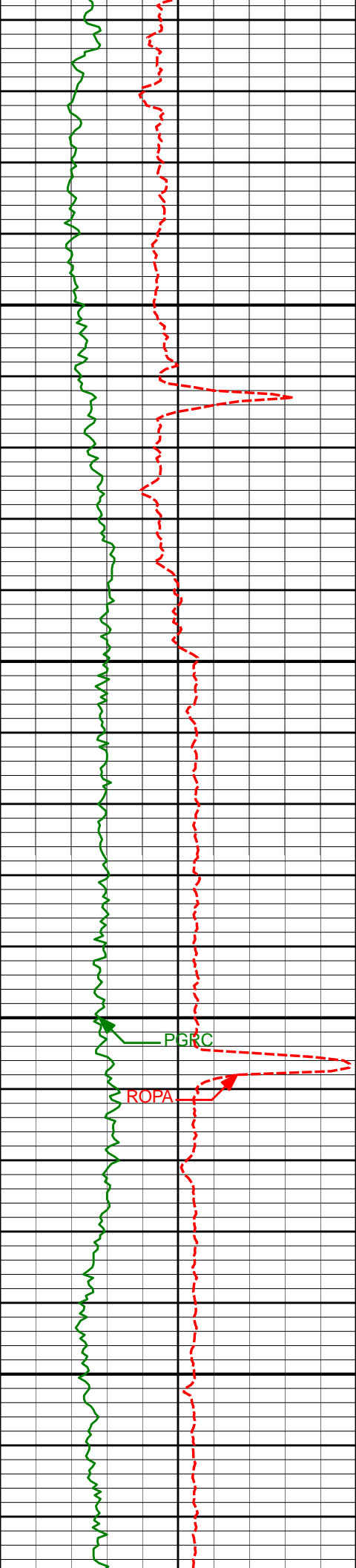
11773'

89.78°

1.72°

7225.40'

4488.14'



11900

11950

12000

12050

11868'

91.05°

1.87°

7224.71'

4583.13'

PGRC

ROPA

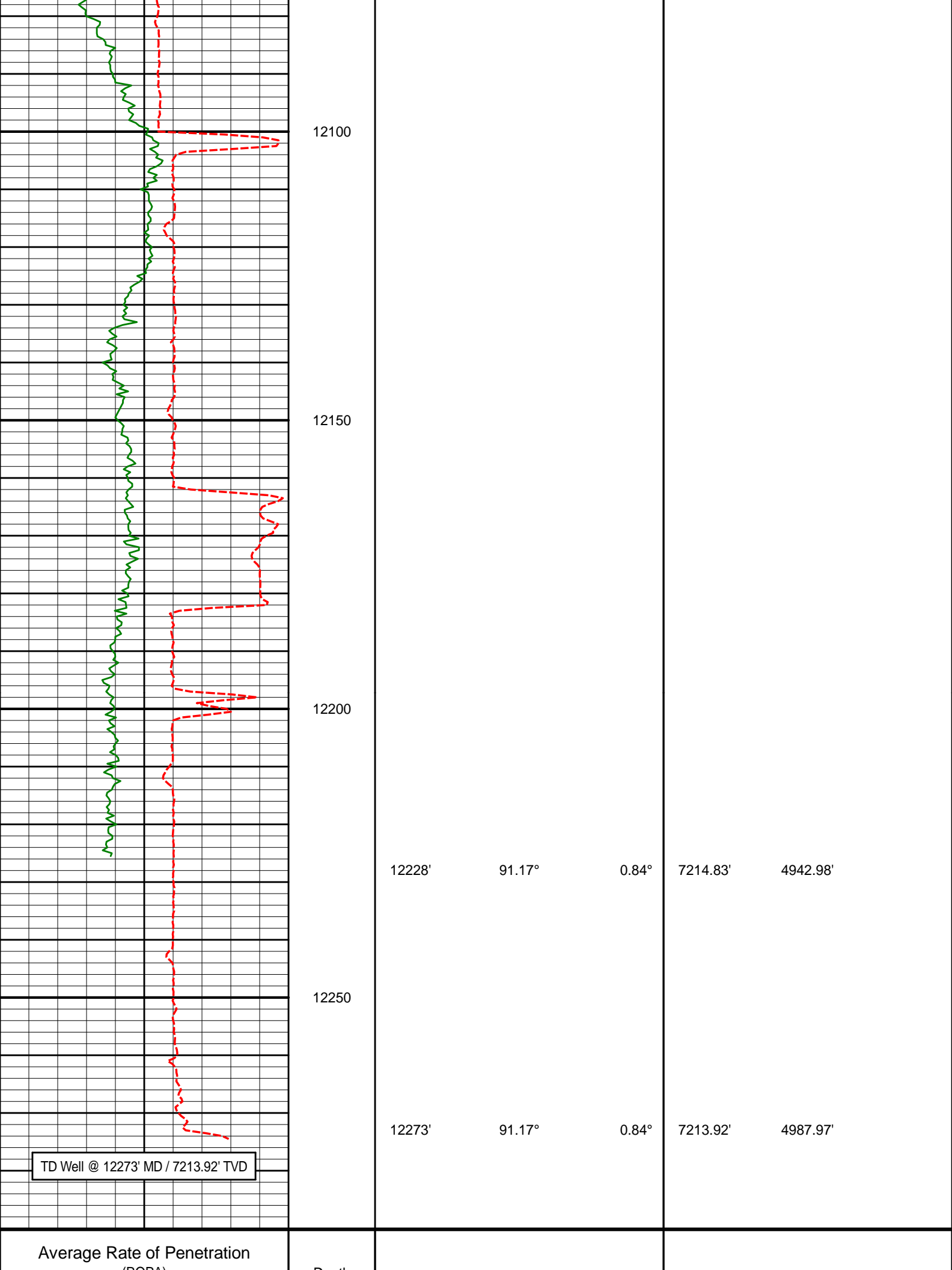
12058'

92.04°

1.60°

7219.59'

4773.05'



Average Rate of Penetration  
(ROP)

Depth

(ROPA)	Depth	Depth	Inc	Azi	TVD	V/S
500 feet per hr	0					
PCG Gamma Ray BCorr (PGRC) api	0	300				

# HALLIBURTON

## DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corporation  
Ferge 3N-14HZ  
Wattenberg  
Weld Colorado  
USA  
CA-XX-0901263476

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
1174.00	1.11	266.22	1173.96	0.88 S	7.07 W	-1.03	TIE-IN
1283.00	0.28	292.25	1282.95	0.85 S	8.37 W	-1.03	0.80
1378.00	0.46	294.01	1377.95	0.61 S	8.93 W	-0.80	0.19
1475.00	1.39	117.45	1474.94	0.99 S	8.24 W	-1.17	1.91
1569.00	3.11	110.84	1568.87	2.42 S	4.85 W	-2.53	1.85
1664.00	5.13	109.73	1663.62	4.77 S	1.56 E	-4.74	2.13
1758.00	6.43	104.28	1757.14	7.49 S	10.61 E	-7.26	1.50
1852.00	7.89	101.30	1850.40	10.05 S	22.04 E	-9.57	1.60
1946.00	9.47	109.15	1943.32	13.85 S	35.68 E	-13.08	2.10
2040.00	11.00	105.58	2035.83	18.80 S	51.62 E	-17.68	1.76
2134.00	11.65	100.51	2128.00	22.94 S	69.59 E	-21.43	1.26
2228.00	13.13	103.46	2219.81	27.16 S	89.31 E	-25.22	1.71
2322.00	13.12	110.64	2311.36	33.40 S	109.68 E	-31.02	1.73
2417.00	14.39	107.35	2403.63	40.72 S	131.03 E	-37.88	1.57
2605.00	15.87	106.86	2585.11	55.15 S	177.94 E	-51.28	0.79
2699.00	14.83	107.24	2675.76	62.44 S	201.73 E	-58.06	1.11
2794.00	17.58	105.84	2766.97	69.96 S	227.14 E	-65.03	2.92
2888.00	17.55	105.75	2856.59	77.68 S	254.44 E	-72.16	0.04
2982.00	17.66	105.89	2946.19	85.43 S	281.79 E	-79.31	0.13
3076.00	17.49	105.54	3035.80	93.12 S	309.12 E	-86.41	0.21
3170.00	16.13	104.20	3125.78	100.11 S	335.39 E	-92.83	1.50
3265.00	15.66	104.52	3217.15	106.56 S	360.59 E	-98.73	0.50
3359.00	13.80	102.10	3308.06	112.09 S	383.84 E	-103.76	2.08
3454.00	13.72	100.39	3400.33	116.50 S	406.00 E	-107.69	0.44
3644.00	13.57	105.59	3584.98	126.55 S	449.63 E	-116.79	0.65
3739.00	13.58	106.89	3677.32	132.79 S	471.04 E	-122.56	0.32
3834.00	14.06	108.11	3769.57	139.62 S	492.68 E	-128.92	0.59
3929.00	15.05	105.87	3861.52	146.58 S	515.51 E	-135.39	1.20
4024.00	14.00	104.96	3953.49	152.92 S	538.48 E	-141.23	1.13
4119.00	16.07	105.87	4045.23	159.48 S	562.23 E	-147.27	2.19
4214.00	15.85	106.45	4136.57	166.75 S	587.32 E	-154.00	0.29
4309.00	14.46	107.10	4228.26	173.91 S	611.10 E	-160.64	1.47
4404.00	12.70	106.56	4320.60	180.37 S	632.45 E	-166.65	1.86
4499.00	13.62	104.89	4413.11	186.22 S	653.27 E	-172.04	1.05
4594.00	12.47	103.12	4505.65	191.43 S	674.07 E	-176.80	1.28
4689.00	12.23	105.10	4598.45	196.38 S	693.77 E	-181.32	0.51
4785.00	11.51	106.83	4692.40	201.80 S	712.75 E	-186.33	0.84
4880.00	10.54	105.71	4785.65	206.90 S	730.19 E	-191.05	1.05
4975.00	8.24	102.66	4879.37	210.74 S	745.20 E	-194.57	2.48
5070.00	6.79	106.39	4973.55	213.82 S	757.23 E	-197.38	1.61
5165.00	5.45	102.71	5068.01	216.40 S	767.02 E	-199.75	1.47
5260.00	4.24	100.27	5162.67	218.01 S	774.88 E	-201.19	1.29
5355.00	2.38	104.65	5257.50	219.14 S	780.24 E	-202.20	1.97
5450.00	0.83	172.16	5352.47	220.32 S	782.24 E	-203.34	2.32
5545.00	1.15	278.10	5447.46	220.87 S	781.39 E	-203.91	1.68
5639.00	1.01	266.48	5541.44	220.78 S	779.63 E	-203.86	0.28
5734.00	0.84	259.45	5636.43	220.96 S	778.11 E	-204.07	0.21
5829.00	0.74	255.44	5731.42	221.25 S	776.83 E	-204.38	0.12
5924.00	0.88	247.64	5826.41	221.68 S	775.55 E	-204.84	0.18

5924.00	0.88	247.64	5826.41	221.68 S	775.56 E	-204.84	0.19
6020.00	0.86	246.76	5922.40	222.24 S	774.22 E	-205.44	0.03
6115.00	1.04	242.53	6017.39	222.92 S	772.80 E	-206.15	0.20
6210.00	0.67	7.62	6112.38	222.77 S	772.11 E	-206.01	1.61
6305.00	0.49	5.27	6207.38	221.81 S	772.22 E	-205.05	0.19
6400.00	0.28	334.95	6302.38	221.20 S	772.16 E	-204.44	0.30
6495.00	0.20	254.09	6397.38	221.03 S	771.90 E	-204.28	0.33
6590.00	0.41	217.21	6492.38	221.35 S	771.54 E	-204.60	0.29
6686.00	0.58	233.12	6588.37	221.91 S	770.94 E	-205.18	0.23
6734.00	2.59	341.09	6636.36	221.03 S	770.39 E	-204.31	5.88
6781.00	5.01	348.28	6683.25	218.02 S	769.63 E	-201.31	5.24
6876.00	12.30	349.15	6777.10	204.00 S	766.88 E	-187.36	7.67
6924.00	16.27	354.52	6823.61	192.28 S	765.28 E	-175.68	8.71
6971.00	20.51	356.37	6868.20	177.50 S	764.13 E	-160.93	9.11
7019.00	24.68	357.62	6912.51	159.09 S	763.18 E	-142.54	8.74
7066.00	28.80	358.84	6954.47	137.96 S	762.54 E	-121.42	8.84
7115.00	33.75	359.05	6996.34	112.53 S	762.08 E	-96.01	10.10
7162.00	39.35	359.07	7034.08	84.56 S	761.62 E	-68.06	11.91
7257.00	52.16	2.75	7100.24	16.68 S	762.93 E	-0.17	13.76
7305.00	58.23	4.27	7127.63	22.64 N	765.36 E	39.19	12.91
7352.00	62.31	4.40	7150.93	63.32 N	768.45 E	79.94	8.68
7400.00	67.12	3.25	7171.42	106.62 N	771.34 E	123.28	10.25
7447.00	71.76	2.11	7187.93	150.56 N	773.39 E	167.26	10.13
7495.00	74.97	1.00	7201.67	196.53 N	774.63 E	213.25	7.04
7542.00	80.22	2.02	7211.76	242.40 N	775.84 E	259.13	11.37
7579.00	83.98	2.52	7216.84	279.01 N	777.30 E	295.77	10.25
7683.00	88.15	0.93	7223.98	382.69 N	780.41 E	399.49	4.29
7778.00	89.38	1.12	7226.03	477.65 N	782.11 E	494.47	1.31
7873.00	90.00	1.38	7226.54	572.63 N	784.19 E	589.47	0.71
7968.00	90.34	1.00	7226.26	667.61 N	786.16 E	684.47	0.54
8063.00	91.02	0.18	7225.13	762.60 N	787.14 E	779.45	1.12
8158.00	89.91	0.24	7224.36	857.59 N	787.49 E	874.43	1.17
8253.00	89.81	0.27	7224.59	952.59 N	787.91 E	969.42	0.11
8348.00	88.95	0.69	7225.62	1047.58 N	788.70 E	1064.40	1.01
8444.00	90.34	359.78	7226.22	1143.57 N	789.10 E	1160.38	1.73
8539.00	88.89	359.19	7226.85	1238.56 N	788.25 E	1255.33	1.65
8634.00	91.01	359.37	7226.94	1333.55 N	787.05 E	1350.27	2.24
8729.00	91.57	359.19	7224.80	1428.52 N	785.86 E	1445.19	0.62
8824.00	90.77	358.65	7222.86	1523.48 N	784.07 E	1540.09	1.01
8919.00	91.39	359.92	7221.07	1618.46 N	782.89 E	1635.02	1.48
9014.00	91.60	0.73	7218.58	1713.42 N	783.43 E	1729.97	0.89
9110.00	90.92	0.89	7216.47	1809.39 N	784.79 E	1825.95	0.73
9205.00	90.12	1.08	7215.60	1904.37 N	786.43 E	1920.94	0.86
9300.00	90.93	0.72	7214.73	1999.35 N	787.92 E	2015.93	0.92
9395.00	88.95	0.09	7214.84	2094.34 N	788.60 E	2110.92	2.18
9490.00	90.15	1.35	7215.58	2189.33 N	789.79 E	2205.91	1.83
9585.00	89.69	0.29	7215.71	2284.32 N	791.15 E	2300.90	1.22
9681.00	90.87	1.70	7215.24	2380.30 N	792.81 E	2396.90	1.91
9776.00	91.05	0.85	7213.65	2475.26 N	794.93 E	2491.88	0.92
9871.00	91.17	2.16	7211.81	2570.21 N	797.42 E	2586.86	1.38
9966.00	91.79	3.70	7209.36	2665.05 N	802.28 E	2681.79	1.75
10061.00	90.71	2.32	7207.29	2759.89 N	807.27 E	2776.71	1.85
10156.00	90.22	2.60	7206.52	2854.80 N	811.35 E	2871.69	0.60
10251.00	89.04	2.07	7207.14	2949.72 N	815.22 E	2966.67	1.36
10347.00	89.48	1.07	7208.37	3045.67 N	817.85 E	3062.66	1.13
10442.00	91.32	1.76	7207.71	3140.64 N	820.19 E	3157.65	2.07
10537.00	89.17	359.93	7207.30	3235.62 N	821.59 E	3252.64	2.98
10632.00	89.29	359.68	7208.58	3330.61 N	821.26 E	3347.60	0.29
10727.00	90.09	359.40	7209.09	3425.60 N	820.49 E	3442.55	0.90
10822.00	89.85	0.80	7209.14	3520.60 N	820.65 E	3537.53	1.50
10917.00	90.06	2.68	7209.22	3615.55 N	823.53 E	3632.52	2.00
11013.00	88.98	1.97	7210.02	3711.47 N	827.43 E	3728.50	1.35
11108.00	87.96	3.16	7212.56	3806.33 N	831.68 E	3823.44	1.65
11203.00	88.03	2.89	7215.88	3901.14 N	836.70 E	3918.34	0.29
11298.00	88.30	2.18	7218.92	3996.00 N	840.91 E	4013.26	0.80
11393.00	88.33	1.89	7221.71	4090.90 N	844.28 E	4108.21	0.31
11488.00	88.64	1.21	7224.22	4185.83 N	846.85 E	4203.18	0.78
11583.00	90.12	2.46	7225.25	4280.77 N	849.90 E	4298.16	2.04
11773.00	89.78	1.72	7225.40	4470.64 N	856.82 E	4488.14	0.43
11868.00	91.05	1.87	7224.71	4565.59 N	859.79 E	4583.13	1.34
12058.00	92.04	1.60	7219.59	4755.43 N	865.54 E	4773.05	0.54
12228.00	91.17	0.84	7214.83	4925.33 N	869.15 E	4942.98	0.68
12273.00	91.17	0.84	7213.92	4970.31 N	869.81 E	4987.97	0.01

**CALCULATION BASED ON MINIMUM CURVATURE METHOD**

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

**VERTICAL SECTION RELATIVE TO WELL HEAD  
VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 1.24 DEGREES (TRUE)  
A TOTAL CORRECTION OF 8.50 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 12273.00 FEET  
IS 5045.85 FEET ALONG 9.93 DEGREES (TRUE)**

**All directional surveys tied on to the last gyro survey at 1174' MD. Final survey is a straight-line projection to the bit.**

**Date Printed:30 April 2014**