

PCG Pressure Case Gamma

[illegible]

WELL INFORMATION

MWD Run Number	100				
Date run completed	25-Dec-13				
Rig Bit Number	2				
Bit Size (in)	8.750				
Tool Nominal OD (in)	6.750				
Log Start Depth (TVD, ft)	686.97				
Log End Depth (TVD, ft)	7,112.99				
Drill or Wipe	Drill				
Drill/Wipe Start Date and Time	24-Dec-13 00:45				
Drill/Wipe End Date and Time	25-Dec-13 00:45				
Min Inc (deg) @ Depth (TVD, ft)	0.13 @ 6,368.00				
Max Inc (deg) @ Depth (TVD, ft)	10.38 @ 2,114.07				
Bit TFA(in2) / Bit Type	0.98 / PDC				
Flow Rate (gpm)	588.64				
Max AV (fpm) / CV (fpm) @ MWD	473.0 / NA				
Fluid Type	Fresh Water Gel				
Density (ppg) / Viscosity (spqt)	9.60 / 35.00				
Filtrate CL (ppm)	1,300.00				
pH / Fluid Loss (mptm)	9.30 / 8				
PV (cP) / YP (lbf2)	9 / 7.00				
% Solids / % Sand	5.0 / 0.25				
% Oil / Oil:Water Ratio	0 / 0:95				
Rm @ Measured Temp (degF)	NA @ NA				
Rmf @ Measured Temp (degF)	NA @ NA				
Rmc @ Measured Temp (degF)	NA @ NA				
Max Tool Temp (degF) / S	477.04 / PDC				

Max Tool Temp (degF) / Source	177.64 / PCM				
Rm @ Max Tool Temp (degF)	NA @ NA				
Lead MWD Engineer	Gary Eifert				
Customer Representative	Johnny Sanchez				

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM				
Software Version	5.84				
Sub Serial Number	11341330				
Insert Serial Number	11400989				
Date and Time Initialized	23-Dec-13 01:21				
Date and Time Read	26-Dec-13 15:23				
ECMB SW Version	N/A				

Directional Sensor Information

Tool Type	PCDC				
Distance From Bit (ft)	55.00				
Software Version	6.21				
Sub Serial Number	11341330				
Sonde Serial Number	11478007				
Sensor ID Number	N/A				
Toolface Offset (deg)	242.03				

Gamma Ray Sensor Information

Tool Type	PCG				
Distance From Bit (ft)	47.97				
Recorded Sample Period (sec)	10				
Software Version	8.15				
Sub Serial Number	1341330				
Insert/Sonde Serial Number	11293391				

REMARKS

1. All depths are true vertical 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

WARRANTY

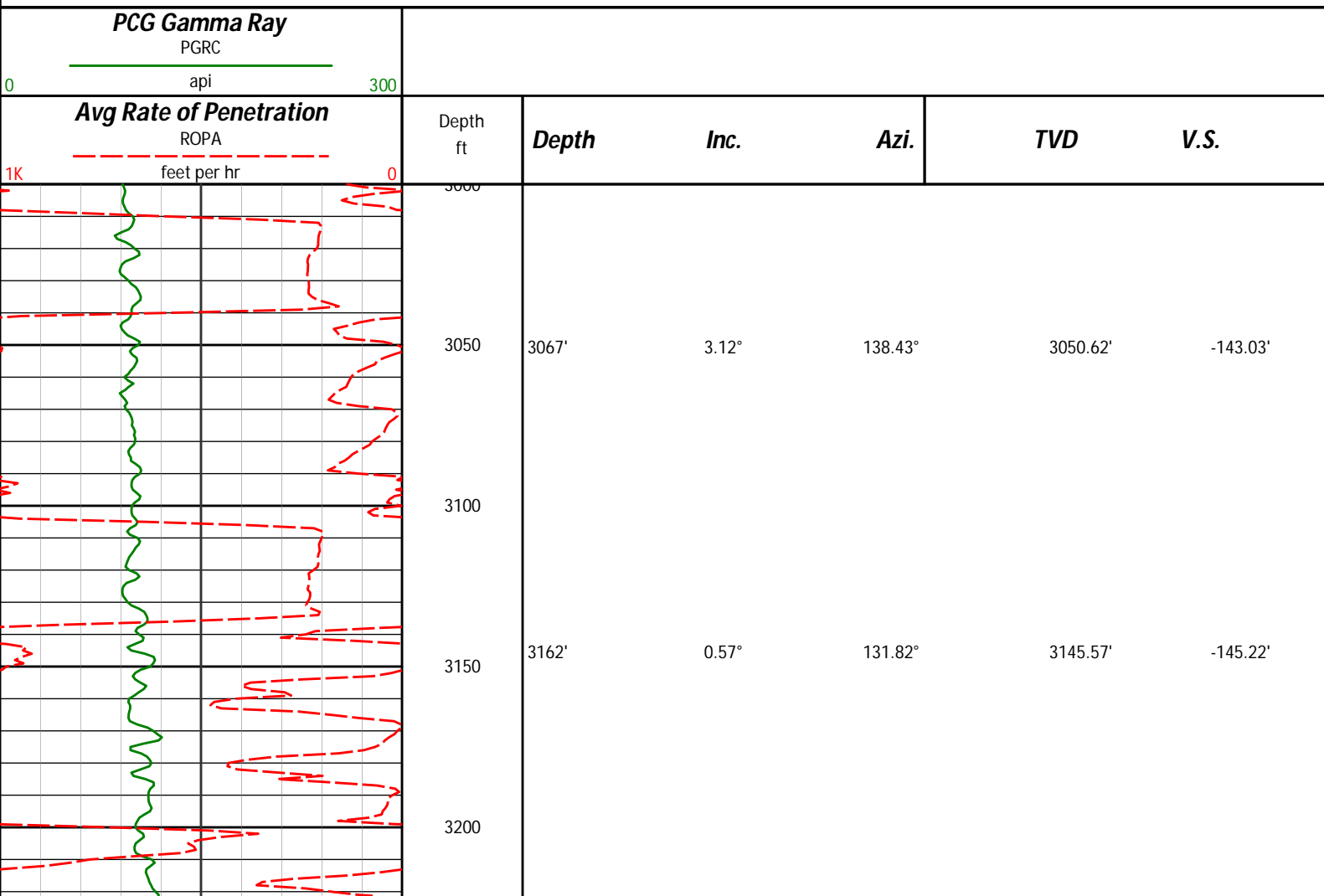
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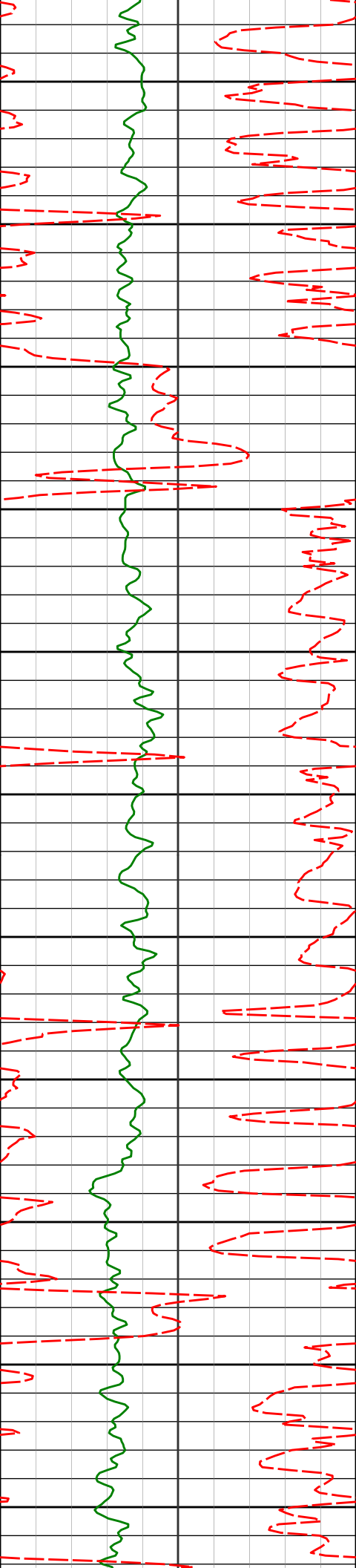
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Sperry Drilling Services

TVD Main Log 1:600

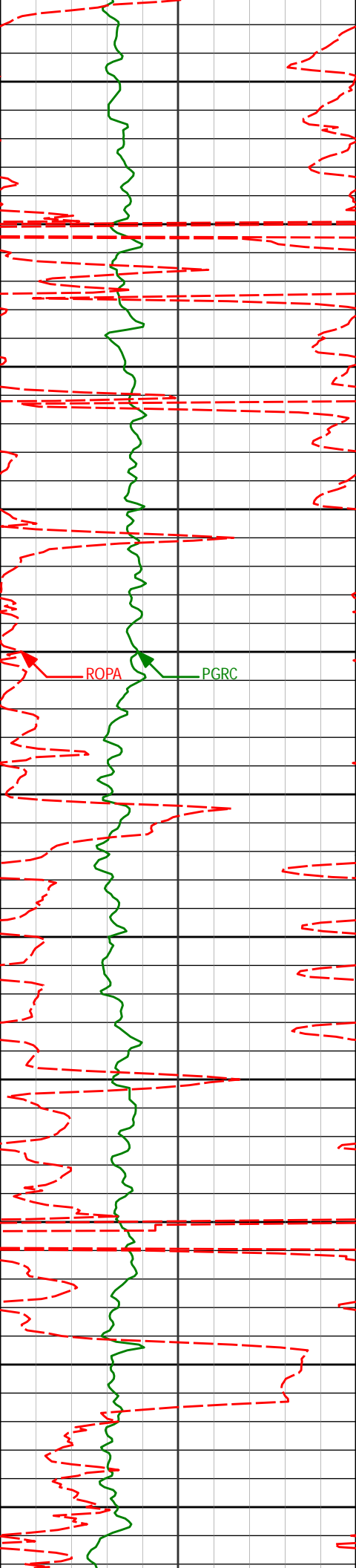
Noble Energy
Marie D04-74-1HN
H&P 343
T3N-R64W





3250
3300
3350
3400
3450
3500
3550
3600
3650
3700
3750

3257'	0.71°	99.12°	3240.56'	-145.60'
3352'	0.24°	189.77°	3335.56'	-145.87'
3446'	0.81°	324.08°	3429.55'	-145.54'
3541'	1.09°	334.68°	3524.54'	-144.20'
3636'	1.07°	301.34°	3619.53'	-142.96'
3731'	0.81°	292.61°	3714.51'	-142.28'



3800

3825'

1.30°

299.40°

3808.50'

-141.55'

3850

3900

3920'

1.13°

302.52°

3903.47'

-140.57'

3950

4000

4015'

0.97°

323.20°

3998.46'

-139.46'

4050

4100

4110'

0.71°

337.67°

4093.45'

-138.30'

4150

4200

4205'

0.84°

357.43°

4188.44'

-137.07'

4250

4300

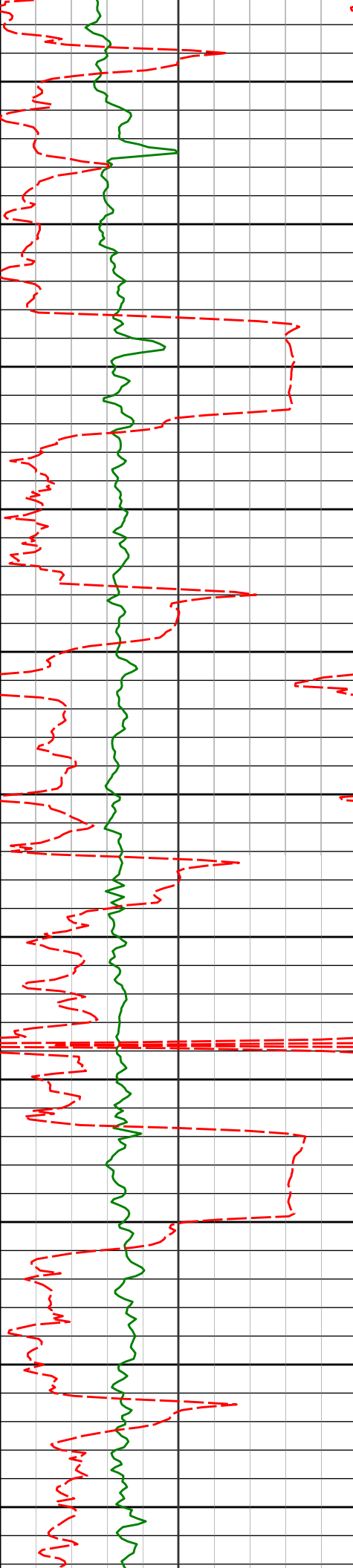
4300'

0.79°

47.40°

4283.43'

-135.92'



4350

4395'	0.65°	28.27°	4378.42'	-134.97'
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4400

4450

4490'	1.03°	109.12°	4473.42'	-134.75'
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4500

4550

4584'	0.86°	94.18°	4567.40'	-135.03'
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4600

4650

4679'	0.84°	84.06°	4662.39'	-134.97'
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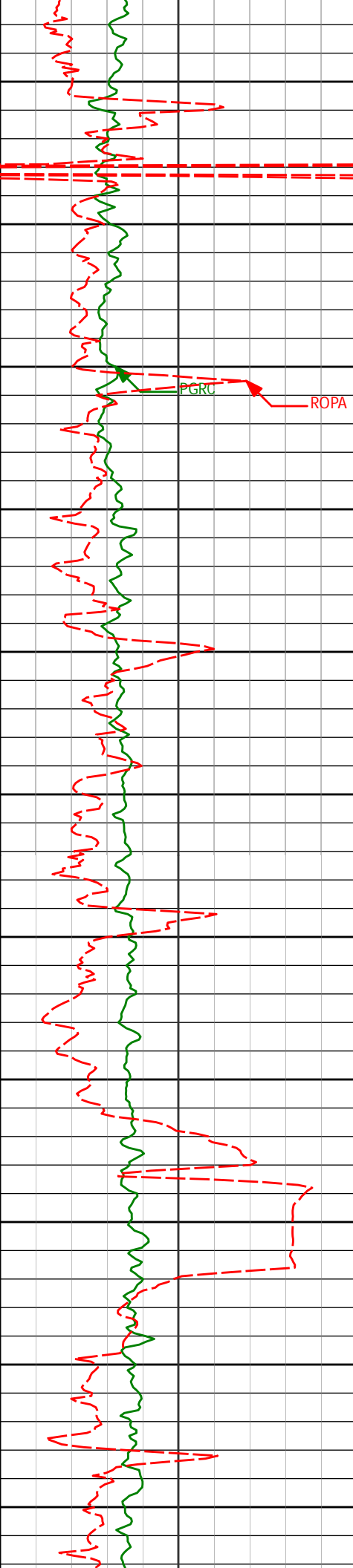
4700

4750

4800

4850

4869'	1.33°	131.43°	4852.36'	-136.19'
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4900

4950

5000

5050

5100

5150

5200

5250

5300

5350

5400

4964'

1.41°

121.07°

4947.34'

-137.47'

5058'

1.34°

122.05°

5041.31'

-138.59'

5248'

1.64°

96.51°

5231.25'

-139.94'

5343'

1.79°

163.60°

5326.21'

-141.46'

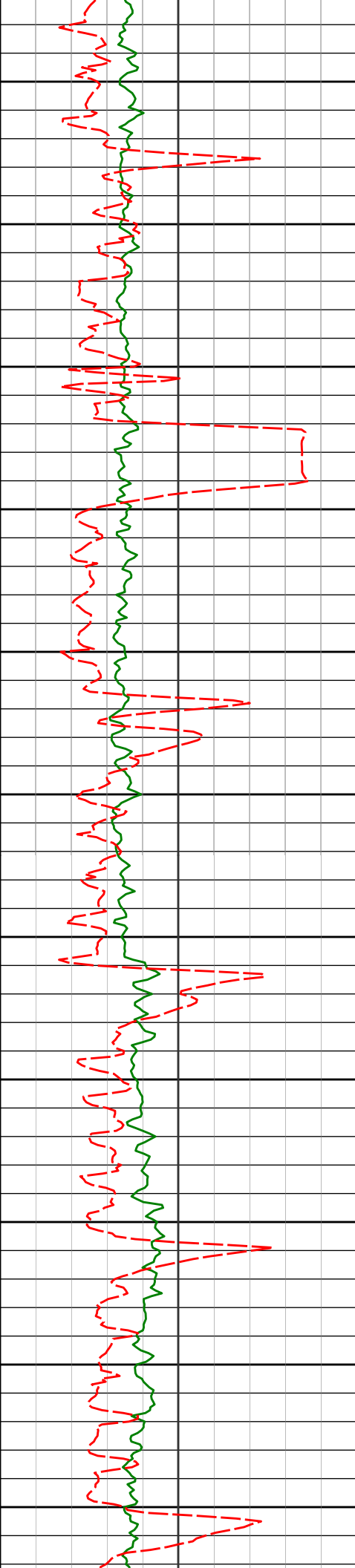
5438'

1.91°

165.67°

5421.16'

-144.42'



5450

5500

5550

5600

5650

5700

5750

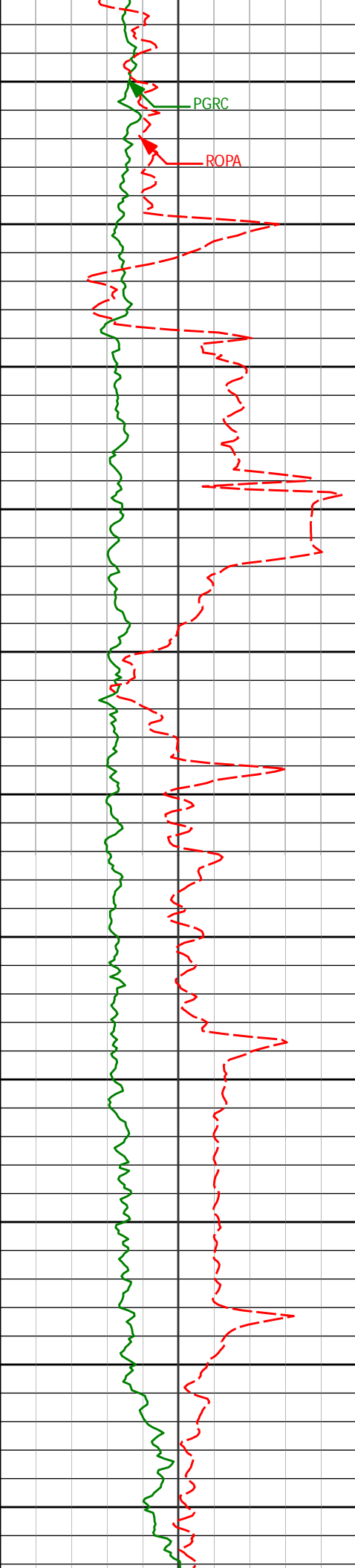
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5850

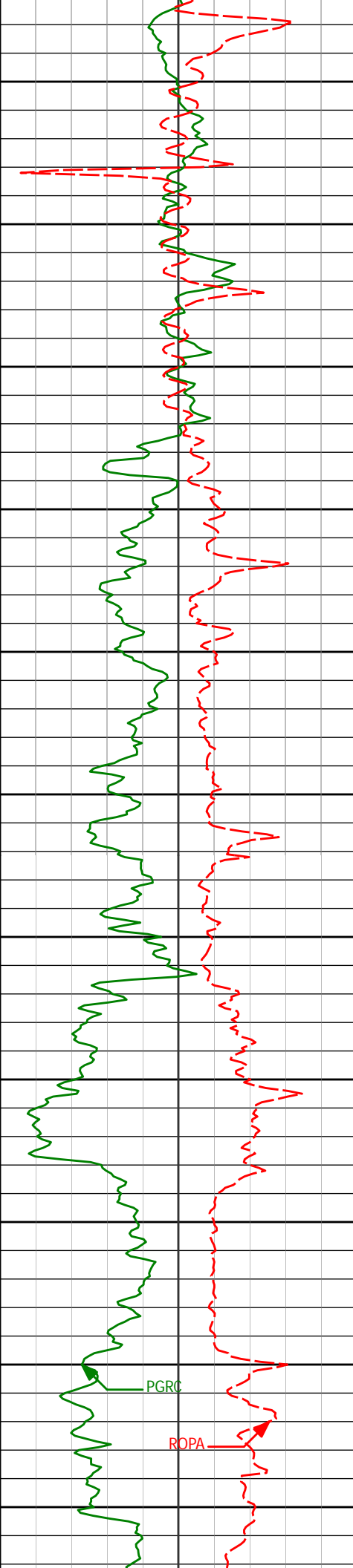
5900

5950

5430	1.74°	103.07°	5421.10'	-144.42'
5532'	1.49°	183.32°	5515.12'	-147.17'
5627'	1.20°	224.84°	5610.10'	-149.13'
5722'	1.21°	219.09°	5705.08'	-150.66'
5817'	1.21°	229.95°	5800.05'	-152.12'
5912'	1.11°	232.80°	5895.03'	-153.37'



6007'	0.91°	211.53°	5990.02'	-154.61'
6101'	0.74°	200.04°	6084.01'	-155.83'
6291'	0.64°	350.11°	6274.00'	-155.96'
6385'	0.13°	290.83°	6368.00'	-155.41'
6480'	0.72°	54.75°	6463.00'	-155.02'



6550

6575'

0.51°

61.60°

6558.00'

-154.45'

6600

6650

6670'

0.35°

2.92°

6652.99'

-153.95'

6700

6750

6765'

0.29°

62.65°

6747.99'

-153.54'

6800

6850

6860'

0.42°

115.13°

6842.99'

-153.56'

6900

6950

6954'

0.22°

126.67°

6936.99'

-153.80'

7000

7050

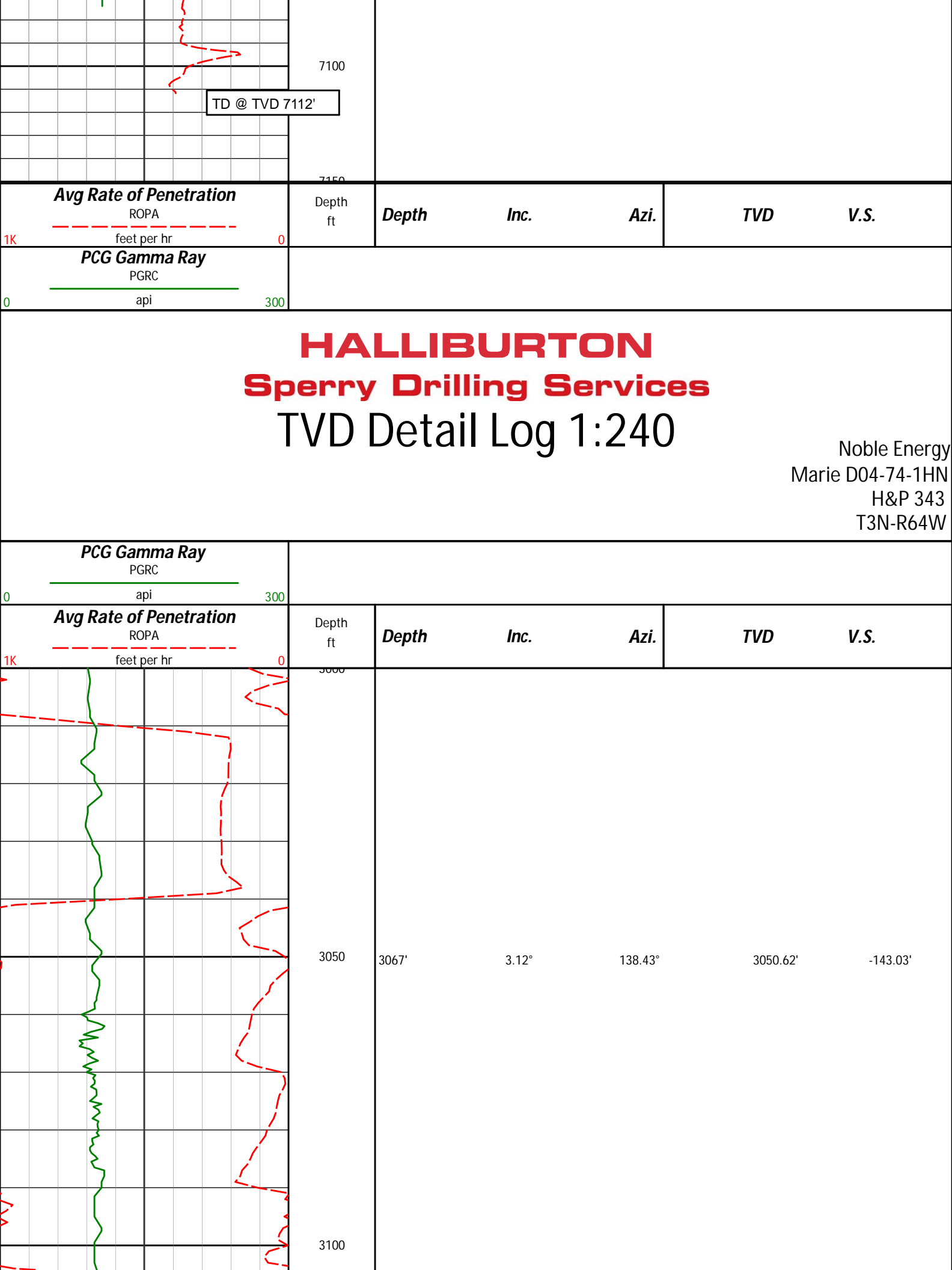
7075'

0.22°

158.76°

7057.99'

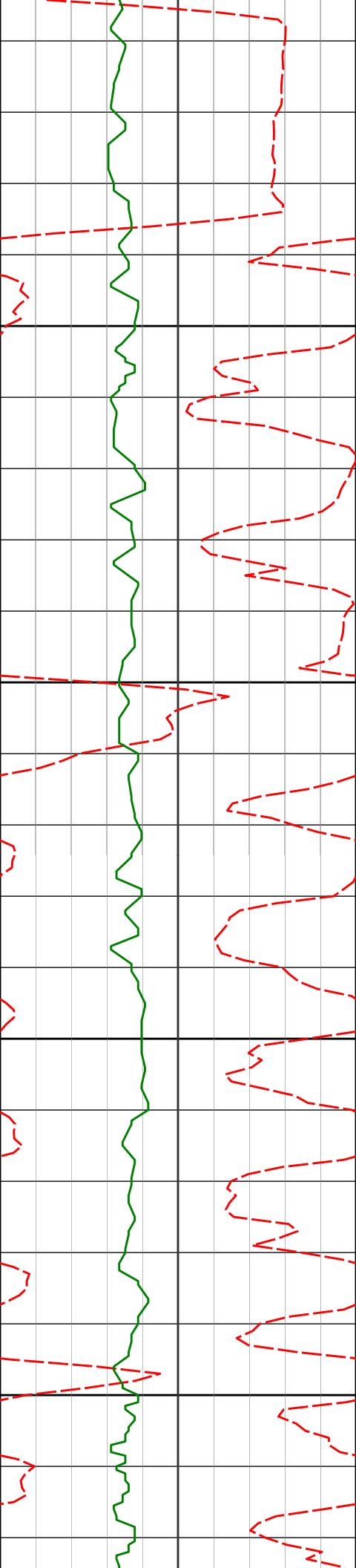
-154.15'



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Sperry Drilling Services
TVD Detail Log 1:240

Noble Energy
Marie D04-74-1HN
H&P 343
T3N-R64W

<div>PCG Gamma Ray PGRC 0300 api</div>						
<div>Avg Rate of Penetration ROPA 1K0 feet per hr</div>		Depth ft	Depth	Inc.	Azi.	TVDV.S.
		3000				
		3050	3067'	3.12°	138.43°	3050.62'-143.03'
		3100				



3162'

0.57°

131.82°

3145.57'

-145.22'

3150

3200

3257'

0.71°

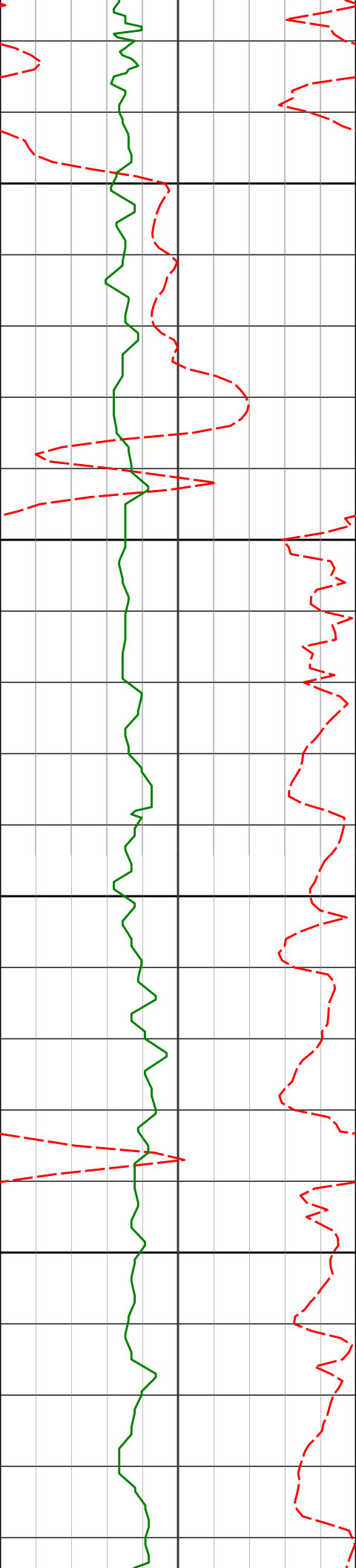
99.12°

3240.56'

-145.60'

3250

3300



3352'

0.24°

189.77°

3335.56'

-145.87'

3350

3400

3446'

0.81°

324.08°

3429.55'

-145.54'

3450

3500

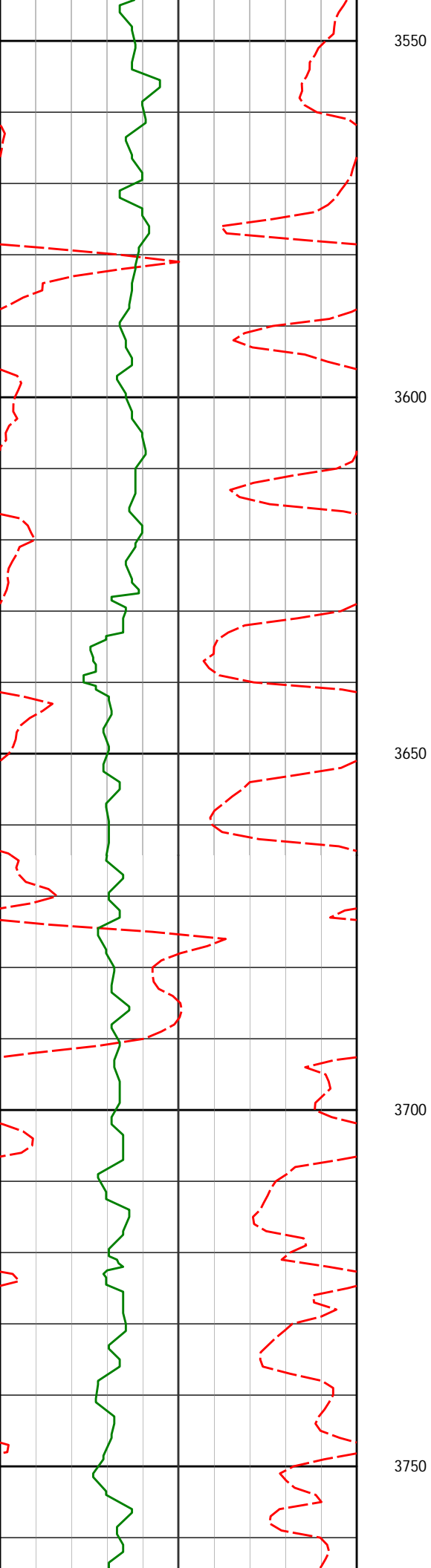
3541'

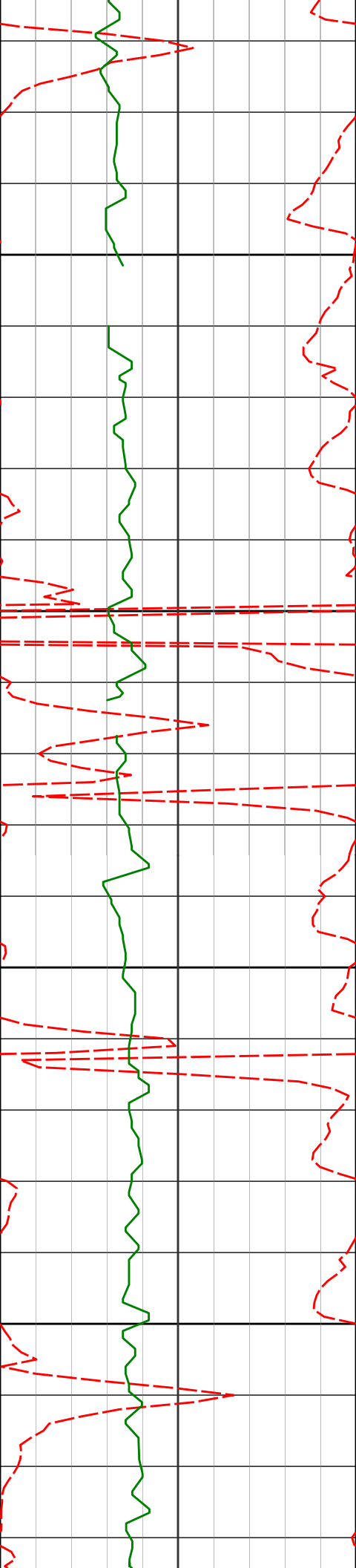
1.09°

334.68°

3524.54'

-144.20'





3800

3850

3900

3950

3825'

1.30°

299.40°

3808.50'

-141.55'

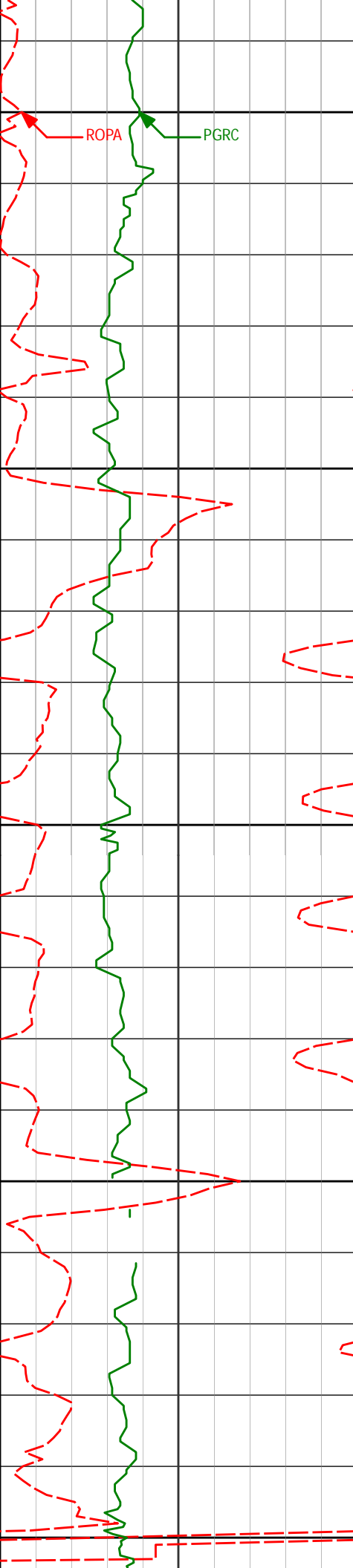
3920'

1.13°

302.52°

3903.47'

-140.57'



4000

4050

4100

4150

4200

4015'

4110'

4205'

0.97°

0.71°

0.84°

323.20°

337.67°

357.43°

3998.46'

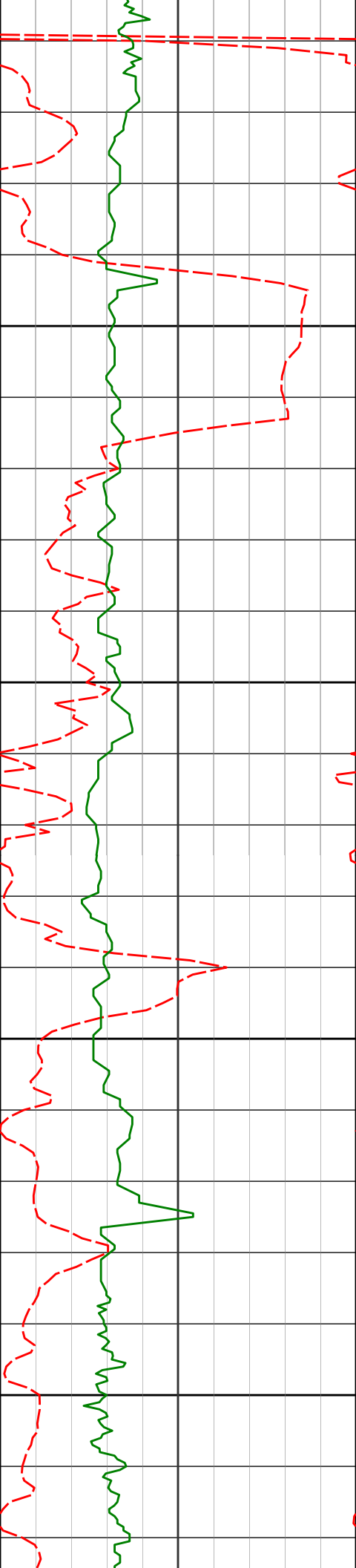
4093.45'

4188.44'

-139.46'

-138.30'

-137.07'



4250

4300

4350

4400

4300'

4395'

4400'

0.79°

0.65°

47.40°

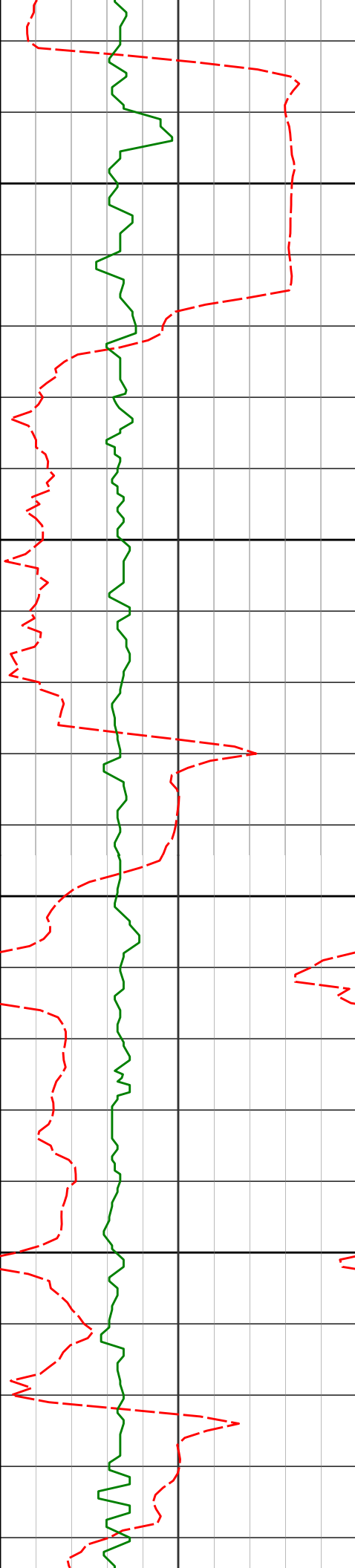
28.27°

4283.43'

4378.42'

-135.92'

-134.97'



4450

4490'

1.03°

109.12°

4473.42'

-134.75'

4500

4550

4584'

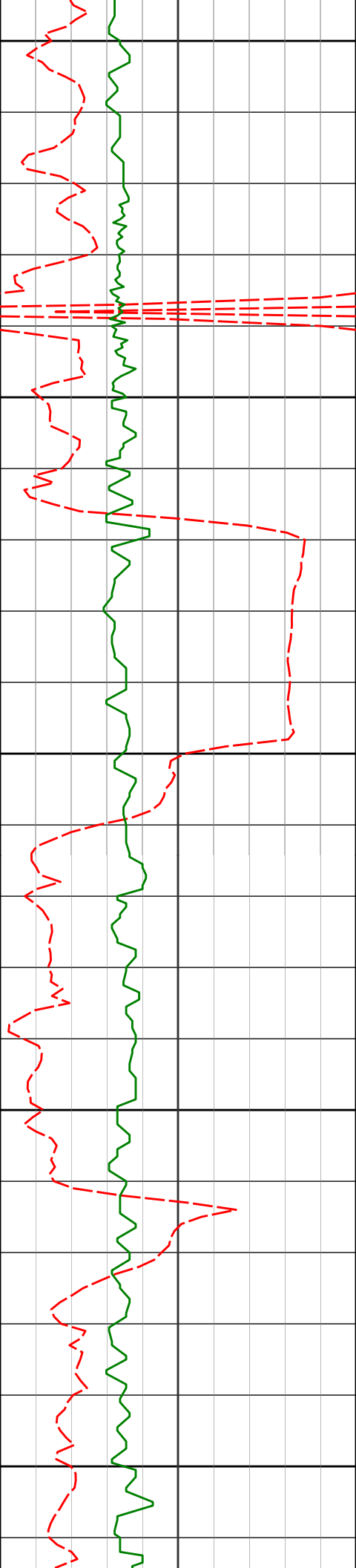
0.86°

94.18°

4567.40'

-135.03'

4600



4650

4679'

0.84°

84.06°

4662.39'

-134.97'

4700

4750

4800

4850

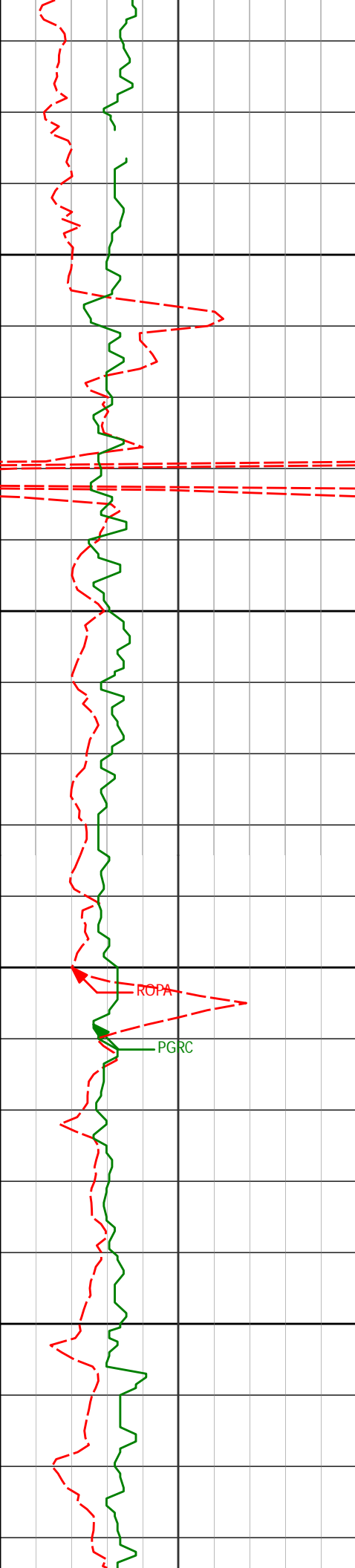
4869'

1.33°

131.43°

4852.36'

-136.19'



4900

4950

5000

5050

4964'

1.41°

121.07°

4947.34'

-137.47'

ROPA

PGRC

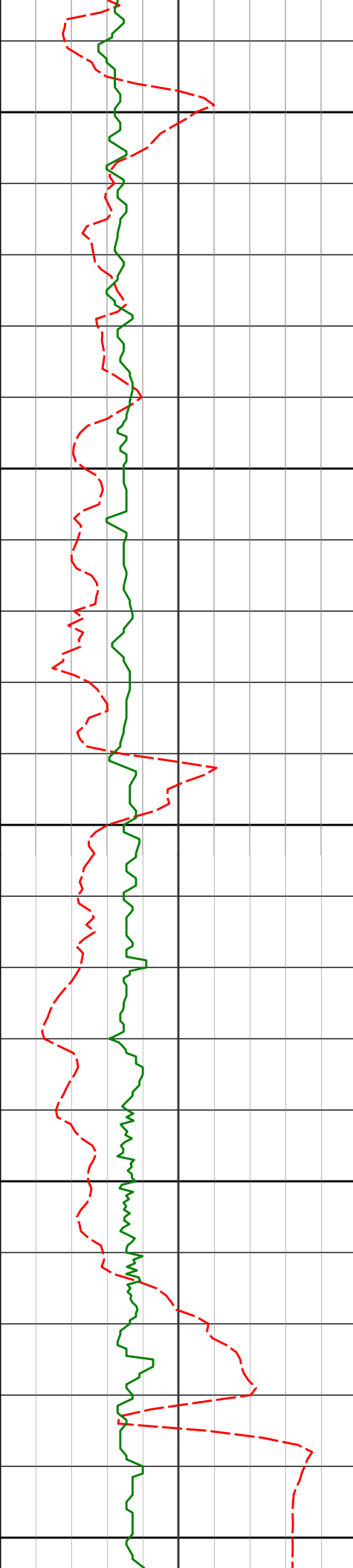
5058'

1.34°

122.05°

5041.31'

-138.59'



5100

5150

5200

5250

5300

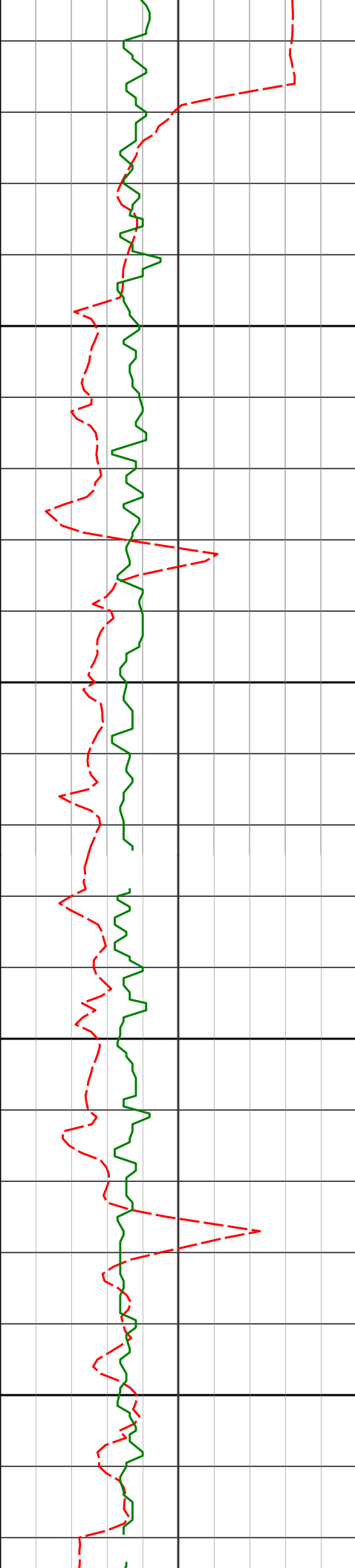
5248'

1.64°

96.51°

5231.25'

-139.94'



5343'

1.79°

163.60°

5326.21'

-141.46'

5350

5400

5438'

1.94°

165.67°

5421.16'

-144.42'

5450

5500

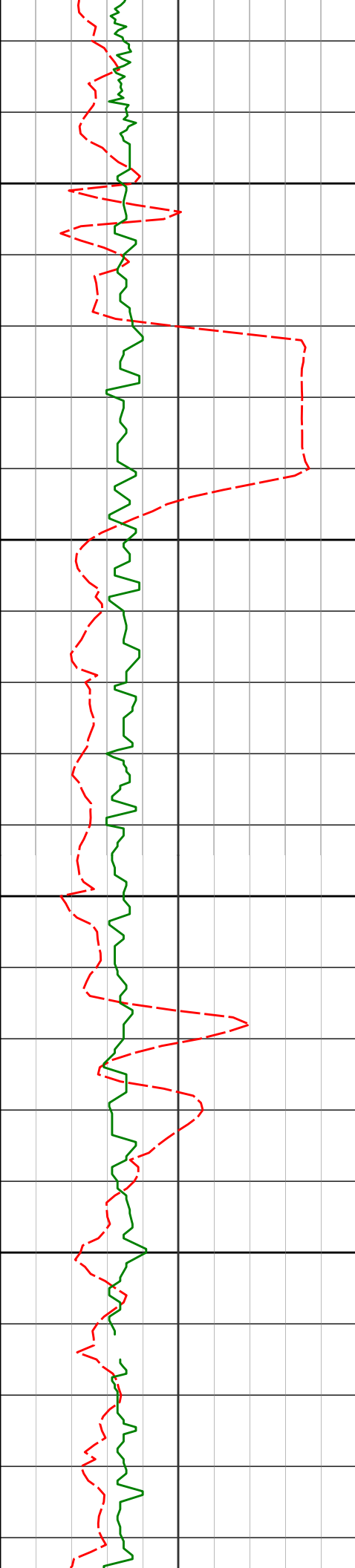
5532'

1.49°

183.32°

5515.12'

-147.17'



5550

5600

5650

5700

5627'

1.20°

224.84°

5610.10'

-149.13'

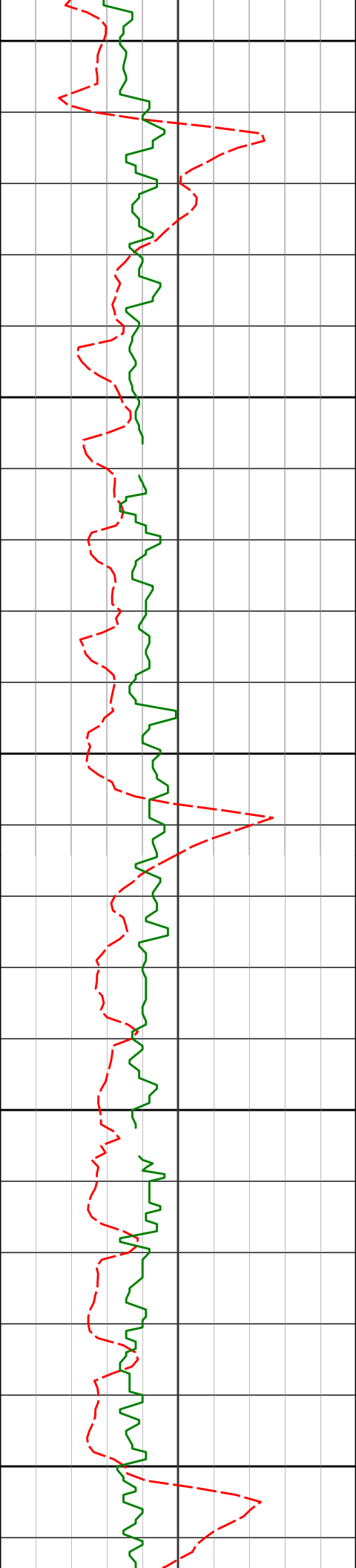
5722'

1.21°

219.09°

5705.08'

-150.66'



5750

5800

5850

5900

5950

5817'

1.21°

229.95°

5800.05'

-152.12'

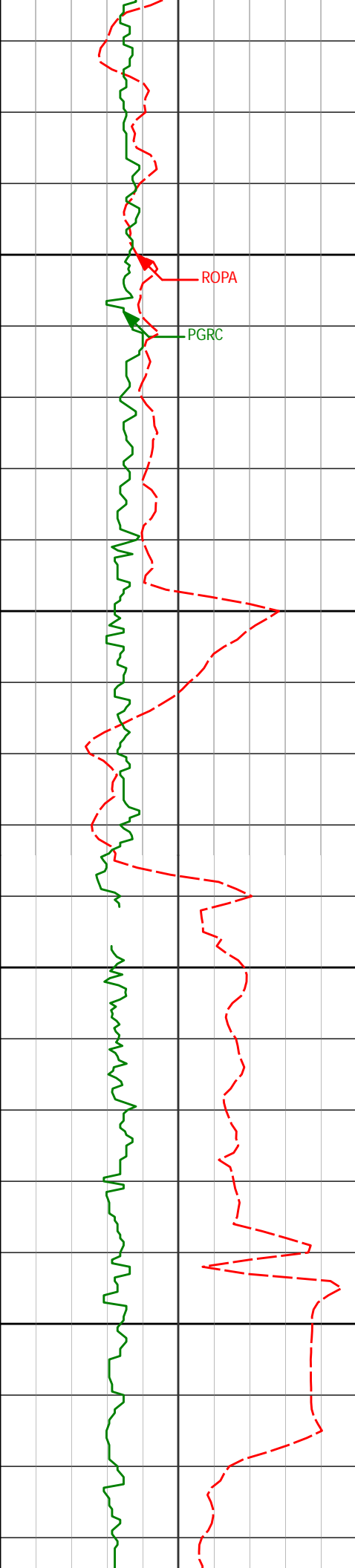
5912'

1.11°

232.80°

5895.03'

-153.37'



6007'

0.91°

211.53°

5990.02'

-154.61'

6000

6050

6101'

0.74°

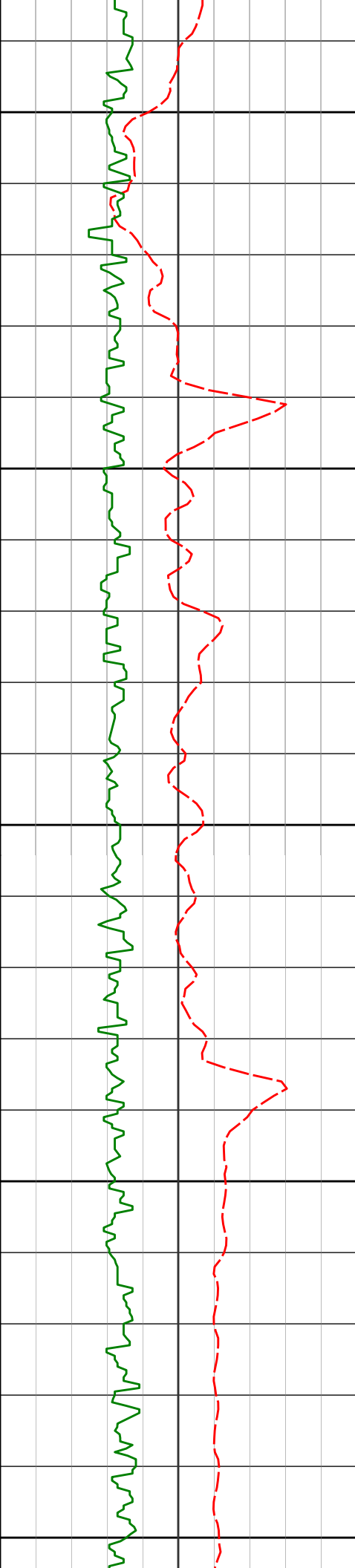
200.04°

6084.01'

-155.83'

6100

6150



6200

6250

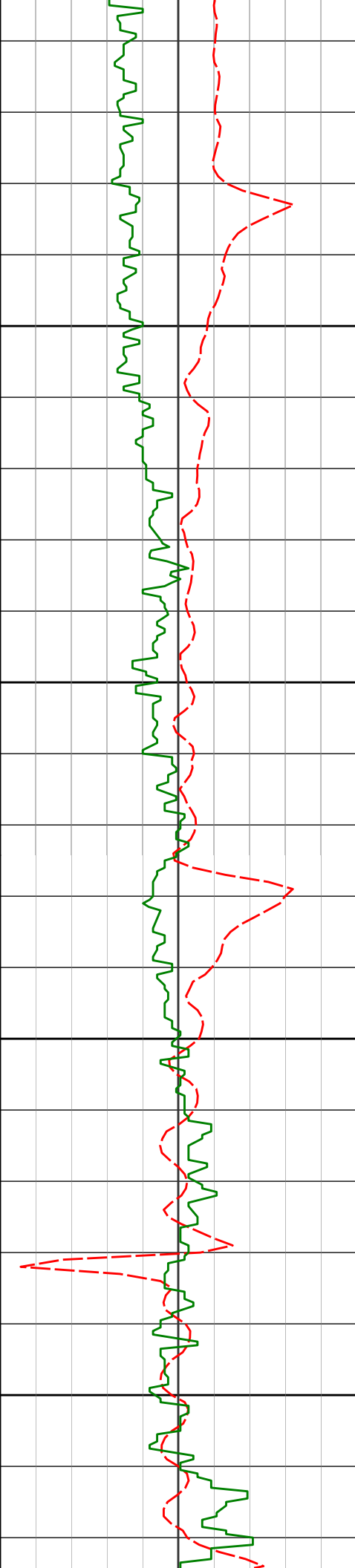
6300

6350

6400

6291' 0.64° 350.11° 6274.00' -155.96'

6385' 0.13° 290.83° 6368.00' -155.41'



6450

6480'

0.72°

54.75°

6463.00'

-155.02'

6500

6550

6575'

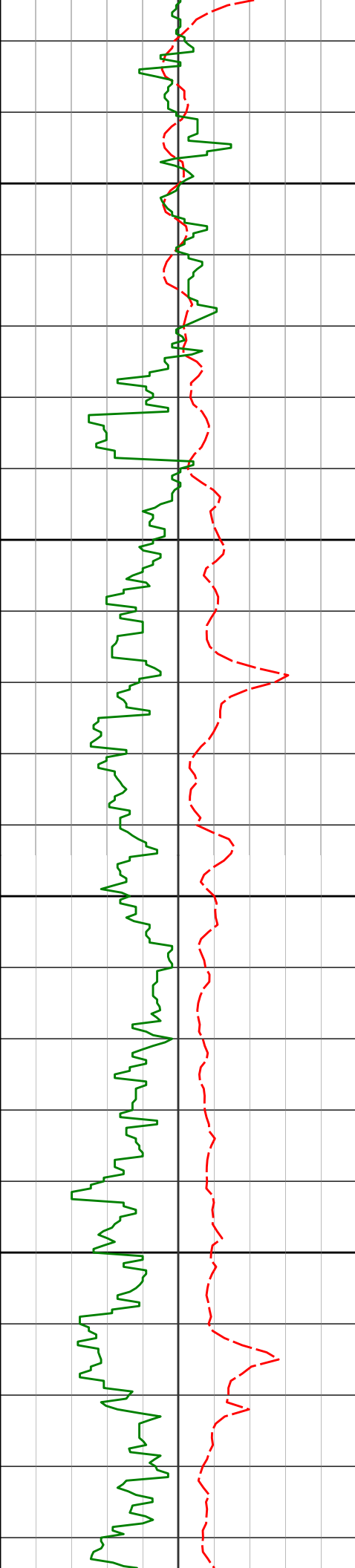
0.51°

61.60°

6558.00'

-154.45'

6600



6650

6670'

0.35°

2.92°

6652.99'

-153.95'

6700

6750

6765'

0.29°

62.65°

6747.99'

-153.54'

6800

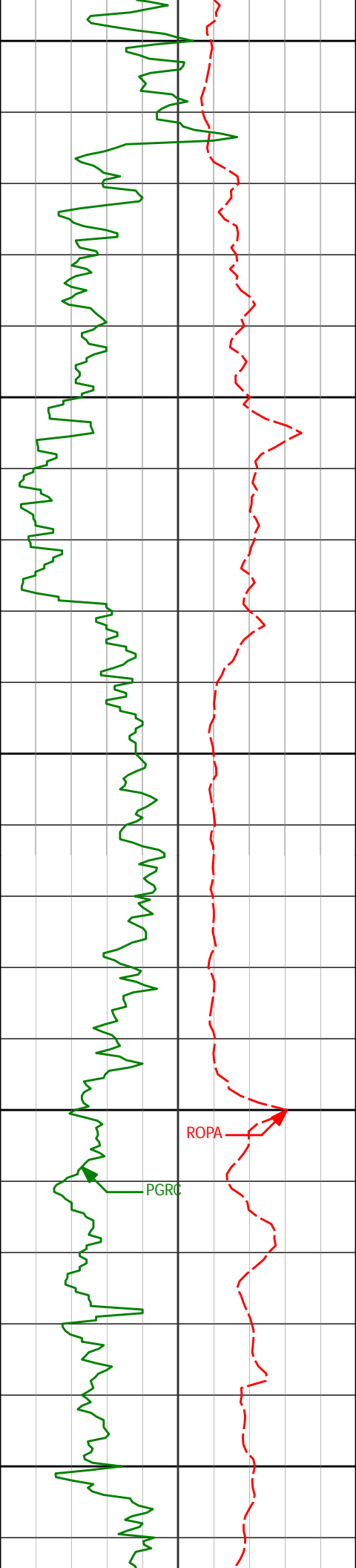
6860'

0.42°

115.13°

6842.99'

-153.56'



6850

6900

6950

7000

7050

6954'

0.22°

126.67°

6936.99'

-153.80'

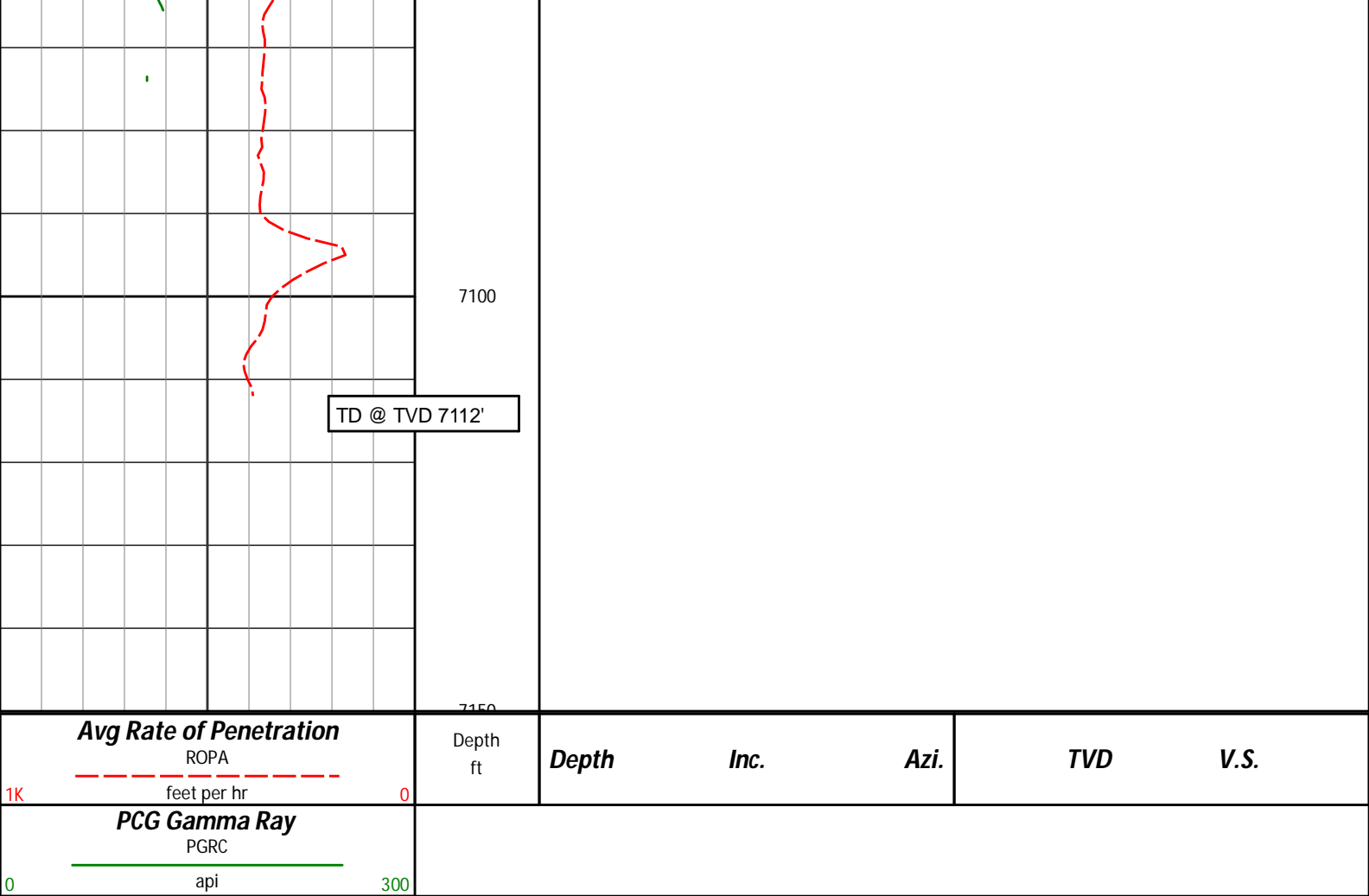
7075'

0.22°

158.76°

7057.99'

-154.15'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Marie D04-74-1HN
Wattenberg
Weld Colorado
USA
CA-XX-0900918600

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
362.00	0.60	44.02	361.99	1.36 N	1.32 E	1.40	0.17
661.00	0.70	45.02	660.97	3.78 N	3.70 E	3.89	0.03
808.00	1.08	45.13	807.96	5.39 N	5.32 E	5.55	0.26
900.00	0.74	64.95	899.94	6.26 N	6.47 E	6.45	0.50
992.00	0.92	63.98	991.93	6.83 N	7.67 E	7.06	0.20
1085.00	1.07	86.26	1084.92	7.22 N	9.22 E	7.49	0.44
1177.00	0.73	201.19	1176.91	6.73 N	9.86 E	7.02	1.66
1270.00	0.76	191.65	1269.91	5.57 N	9.52 E	5.86	0.14
1362.00	1.11	187.35	1361.89	4.09 N	9.29 E	4.37	0.39
1456.00	1.43	180.17	1455.87	2.01 N	9.16 E	2.29	0.38
1551.00	3.06	167.31	1550.80	1.65 S	9.72 E	-1.36	1.79
1645.00	4.31	158.66	1644.60	7.39 S	11.56 E	-7.04	1.45
1740.00	6.24	144.87	1739.20	14.94 S	15.83 E	-14.46	2.42
1834.00	7.31	139.27	1832.54	23.65 S	22.67 E	-22.96	1.33
1929.00	8.30	132.33	1926.66	32.85 S	31.68 E	-31.88	1.44
2024.00	9.58	133.43	2020.50	42.90 S	42.49 E	-41.60	1.36
2119.00	10.38	133.82	2114.07	54.27 S	54.41 E	-52.60	0.84
2213.00	9.70	128.88	2206.63	65.10 S	66.69 E	-63.06	1.16
2308.00	9.98	128.09	2300.23	75.20 S	79.40 E	-72.77	0.32

2403.00	10.06	125.65	2393.78	85.12 S	92.62 E	-82.28	0.46
2498.00	9.70	129.44	2487.37	95.04 S	105.54 E	-91.81	0.78
2593.00	8.73	127.08	2581.15	104.47 S	117.48 E	-100.87	1.09
2688.00	9.84	133.99	2674.90	114.46 S	129.07 E	-110.51	1.65
2782.00	9.70	130.40	2767.54	125.17 S	140.89 E	-120.86	0.67
2877.00	7.58	136.54	2861.46	134.91 S	151.30 E	-130.28	2.43
2972.00	5.08	141.78	2955.87	142.76 S	158.21 E	-137.92	2.69
3067.00	3.12	138.43	3050.62	148.01 S	162.53 E	-143.03	2.08
3162.00	0.57	131.82	3145.57	150.26 S	164.60 E	-145.22	2.70
3257.00	0.71	99.12	3240.56	150.66 S	165.53 E	-145.60	0.41
3352.00	0.24	189.77	3335.56	150.95 S	166.08 E	-145.87	0.79
3446.00	0.81	324.08	3429.55	150.61 S	165.66 E	-145.54	1.06
3541.00	1.09	334.68	3524.54	149.25 S	164.88 E	-144.20	0.35
3636.00	1.07	301.34	3619.53	147.97 S	163.73 E	-142.96	0.65
3731.00	0.81	292.61	3714.51	147.25 S	162.36 E	-142.28	0.31
3825.00	1.30	299.40	3808.50	146.47 S	160.81 E	-141.55	0.53
3920.00	1.13	302.52	3903.47	145.44 S	159.08 E	-140.57	0.19
4015.00	0.97	323.20	3998.46	144.29 S	157.81 E	-139.46	0.43
4110.00	0.71	337.67	4093.45	143.11 S	157.11 E	-138.30	0.35
4205.00	0.84	357.43	4188.44	141.87 S	156.85 E	-137.07	0.31
4300.00	0.79	47.40	4283.43	140.73 S	157.30 E	-135.92	0.72
4395.00	0.65	28.27	4378.42	139.81 S	158.04 E	-134.97	0.29
4490.00	1.03	109.12	4473.42	139.61 S	159.11 E	-134.75	1.19
4584.00	0.86	94.18	4567.40	139.94 S	160.61 E	-135.03	0.32
4679.00	0.84	84.06	4662.39	139.92 S	162.01 E	-134.97	0.16
4869.00	1.33	131.43	4852.36	141.24 S	165.05 E	-136.19	0.52
4964.00	1.41	121.07	4947.34	142.57 S	166.88 E	-137.47	0.27
5058.00	1.34	122.05	5041.31	143.75 S	168.80 E	-138.59	0.08
5248.00	1.64	96.51	5231.25	145.24 S	173.38 E	-139.94	0.38
5343.00	1.79	163.60	5326.21	146.81 S	175.15 E	-141.46	2.00
5438.00	1.94	165.67	5421.16	149.80 S	175.97 E	-144.42	0.18
5532.00	1.49	183.32	5515.12	152.56 S	176.29 E	-147.17	0.73
5627.00	1.20	224.84	5610.10	154.50 S	175.52 E	-149.13	1.05
5722.00	1.21	219.09	5705.08	155.99 S	174.19 E	-150.66	0.13
5817.00	1.21	229.95	5800.05	157.41 S	172.79 E	-152.12	0.24
5912.00	1.11	232.80	5895.03	158.61 S	171.29 E	-153.37	0.12
6007.00	0.91	211.53	5990.02	159.81 S	170.15 E	-154.61	0.45
6101.00	0.74	200.04	6084.01	161.02 S	169.55 E	-155.83	0.25
6291.00	0.64	350.11	6274.00	161.13 S	168.95 E	-155.96	0.70
6385.00	0.13	290.83	6368.00	160.58 S	168.76 E	-155.41	0.62
6480.00	0.72	54.75	6463.00	160.20 S	169.15 E	-155.02	0.84
6575.00	0.51	61.60	6558.00	159.65 S	170.01 E	-154.45	0.24
6670.00	0.35	2.92	6652.99	159.16 S	170.39 E	-153.95	0.47
6765.00	0.29	62.65	6747.99	158.76 S	170.62 E	-153.54	0.34
6860.00	0.42	115.13	6842.99	158.80 S	171.15 E	-153.56	0.35
6954.00	0.22	126.67	6936.99	159.05 S	171.61 E	-153.80	0.22
7075.00	0.22	158.76	7057.99	159.41 S	171.88 E	-154.15	0.10

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 1.73 DEGREES (GRID)
A TOTAL CORRECTION OF 7.82 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.

**HORIZONTAL DISPLACEMENT(CLOSURE) AT 7075.00 FEET
IS 234.43 FEET ALONG 132.84 DEGREES (GRID)**

Surveys are tied into two non-Haliburton surveys at MD 362' and 661' taken while drilling the surface section.