

## PCG Pressure Case Gamma PCD Pressure Case Directional

[illegible]

## WELL INFORMATION

<b>MWD Run Number</b>	100	200			
<b>Date run completed</b>	14-Jun-14	15-Jun-14			
<b>Rig Bit Number</b>	2	3			
<b>Bit Size (in)</b>	8.750	8.750			
<b>Tool Nominal OD (in)</b>	6.750	6.750			
<b>Log Start Depth (MD, ft)</b>	840.00	5,926.00			
<b>Log End Depth (MD, ft)</b>	5,926.00	6,957.00			
<b>Drill or Wipe</b>	Drill	Drill			
<b>Drill/Wipe Start Date and Time</b>	13-Jun-14 14:30	14-Jun-14 16:00			
<b>Drill/Wipe End Date and Time</b>	14-Jun-14 08:45	15-Jun-14 04:30			
<b>Min Inc (deg) @ Depth (MD, ft)</b>	0.11 @ 1,548.00	0.28 @ 5,949.00			
<b>Max Inc (deg) @ Depth (MD, ft)</b>	8.72 @ 3,156.00	83.23 @ 6,906.00			
<b>Bit TFA(in2) / Bit Type</b>	0.91 / PDC	1.24 / PDC			
<b>Flow Rate (gpm)</b>	600.00	595.31			
<b>Max AV (fpm) / CV (fpm) @ MWD</b>	417.0 / 0.0	417.0 / 0.0			
<b>Fluid Type</b>	Fresh Water Gel	Fresh Water Gel			
<b>Density (ppg) / Viscosity (spqt)</b>	8.60 / 29.00	10.30 / 38.00			
<b>Filtrate CL (ppm)</b>	2,700.00	2,500.00			
<b>pH / Fluid Loss (mptm)</b>	9.00 / 12	9.80 / 0			
<b>PV (cP) / YP (lbf2)</b>	3 / 4.00	12 / 11.00			
<b>% Solids / % Sand</b>	2.20 / 0.25	10.4 / .15			
<b>% Oil / Oil:Water Ratio</b>	NA / NA	NA / NA			
<b>Rm @ Measured Temp (degF)</b>	NA @ NA	NA @ NA			
<b>Rmf @ Measured Temp (degF)</b>	NA @ NA	NA @ NA			
<b>Rmc @ Measured Temp (degF)</b>	NA @ NA	NA @ NA			
<b>Max Tool Temp (degF) / S</b>	170.16 / PGM	170.07 / PGM			

Max Tool Temp (degF) / Source	150.10 / PCM	170.37 / PCM			
Rm @ Max Tool Temp (degF)	NA @ 150.10	NA @ 170.37			
Lead MWD Engineer	William Lawrence	William Lawrence			
Customer Representative					

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.84	5.84			
Sub Serial Number	11341339	11341339			
Insert Serial Number	11227556	11227556			
Date and Time Initialized	12-Jun-14 14:59	01-Jan-70 00:00			
Date and Time Read	15-Jun-14 09:18	15-Jun-14 09:32			
ECMB SW Version	N/A	N/A			

### Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	53.00	51.00			
Software Version	6.21	6.21			
Sub Serial Number	11341339	11341339			
Sonde Serial Number	11297584	11297584			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	188.49	253.33			

### Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	46.25	46.25			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11341339	11341339			
Insert/Sonde Serial Number	11579843	11579843			

## REMARKS

1. All depths are true vertical 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

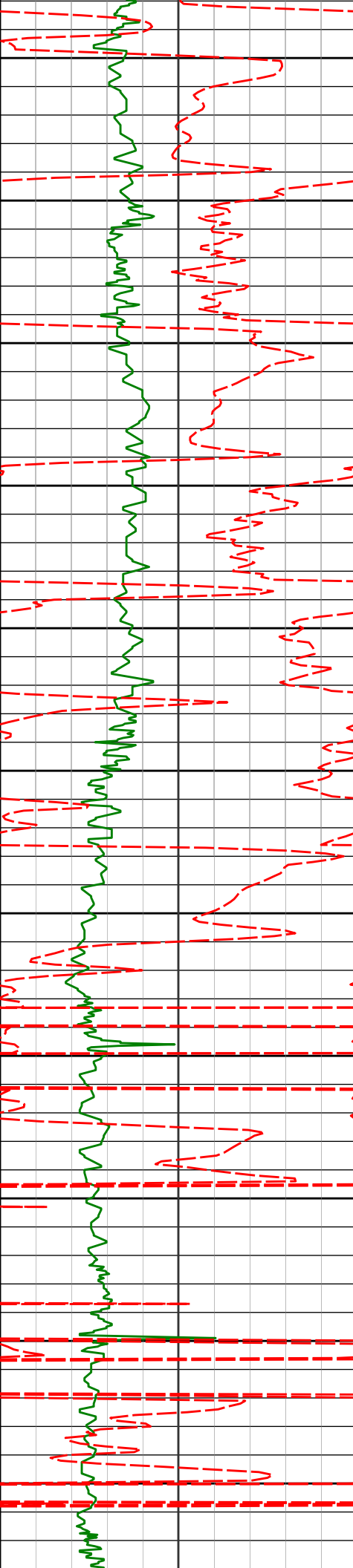
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## HALLIBURTON Sperry Drilling Services TVD Main Log 1:600

Noble Energy  
NCLP PC AA 04-65-1HN  
H&P 343  
T6N-R63W





3300

3345'

6.22°

193.87°

3336.94'

27.52'

3350

3400

3440'

7.06°

182.83°

3431.31'

29.46'

3450

3500

3535'

5.76°

177.66°

3525.71'

29.96'

3550

3600

3629'

6.23°

189.66°

3619.20'

31.00'

3650

3700

3724'

5.72°

193.54°

3713.69'

33.34'

3750

3800

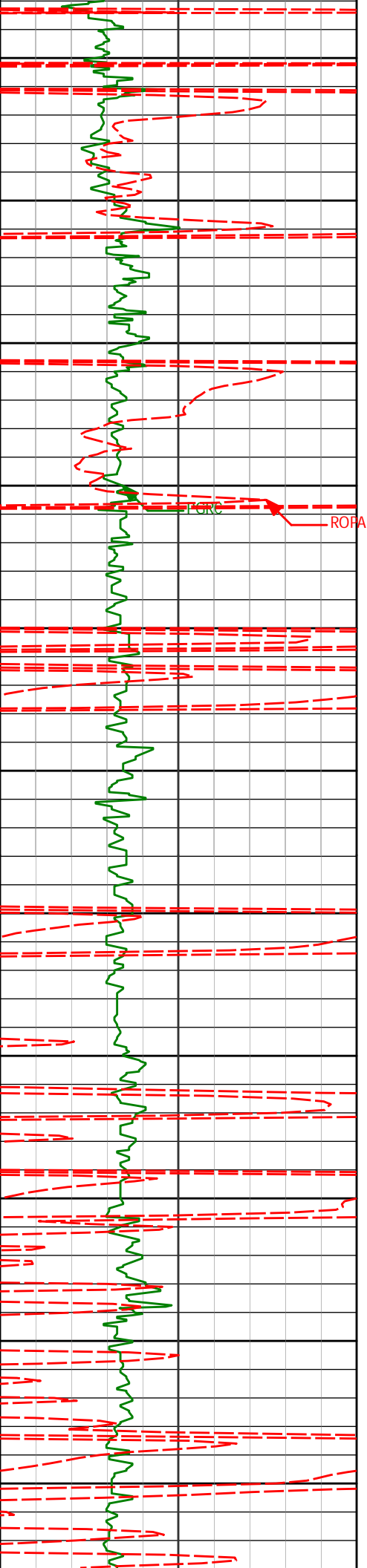
3819'

5.46°

202.07°

3808.24'

36.49'



3850

3900

3950

4000

4050

4100

4150

4200

4250

4300

4350

3913'

4.23°

210.50°

3901.90'

40.20'

4007'

1.07°

232.17°

3995.79'

42.79'

4101'

0.92°

232.67°

4089.77'

44.12'

4195'

0.62°

249.41°

4183.77'

45.22'

4290'

0.52°

134.08°

4278.76'

45.41'

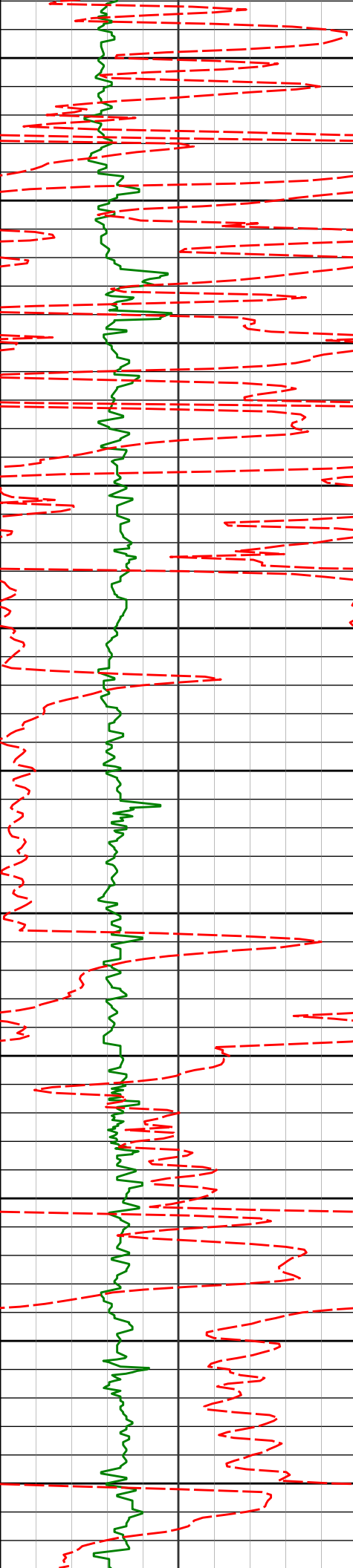
4385'

0.92°

120.47°

4373.76'

44.47'



4400

4450

4500

4550

4600

4650

4700

4750

4800

4850

4900

4480'

1.02°

124.83°

4468.74'

43.15'

4574'

0.84°

180.67°

4562.73'

42.52'

4669'

0.63°

183.90°

4657.72'

42.61'

4763'

0.86°

184.35°

4751.72'

42.74'

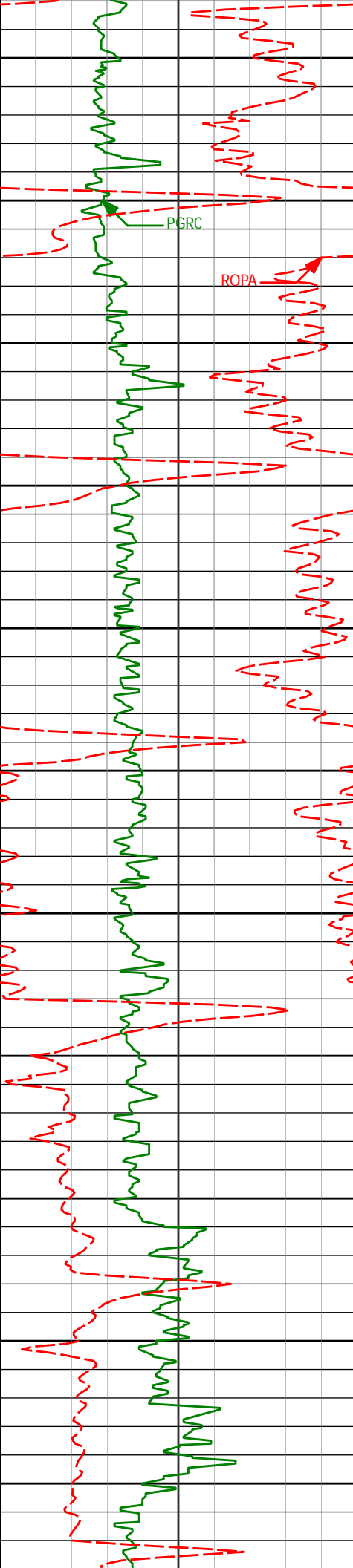
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0.26°

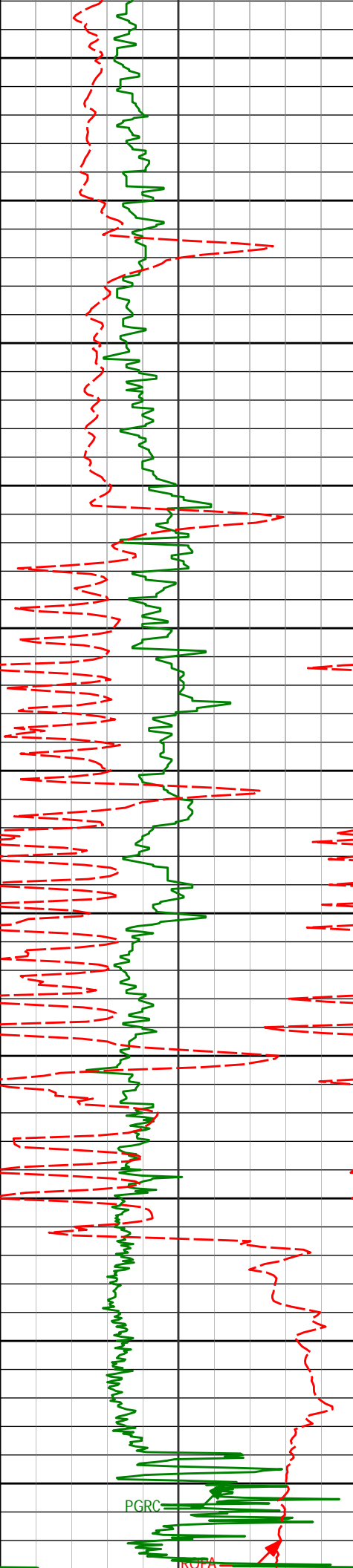
158.25°

4846.71'

42.75'



4953'	0.87°	157.15°	4941.71'	42.43'
4950				
5000				
5048'	0.86°	156.46°	5036.69'	41.91'
5050				
5100				
5143'	0.61°	133.20°	5131.69'	41.30'
5150				
5200				
5238'	0.33°	193.01°	5226.68'	41.02'
5250				
5300				
5332'	0.85°	177.78°	5320.68'	41.09'
5350				
5400				
5427'	1.10°	175.91°	5415.67'	41.06'
5450				



Run 200

5500

5522'

0.93°

189.17°

5510.65'

41.18'

5550

5600

5616'

0.96°

186.95°

5604.64'

41.45'

5650

5700

5711'

0.90°

237.68°

5699.63'

42.23'

5750

5800

5806'

0.74°

192.84°

5794.62'

43.03'

5850

5873'

0.11°

243.25°

5861.62'

43.20'

5900

5900'

0.22°

246.31°

5888.62'

43.27'

5950

5949'

0.28°

237.31°

5937.62'

43.47'

6000

5995'

2.06°

259.96°

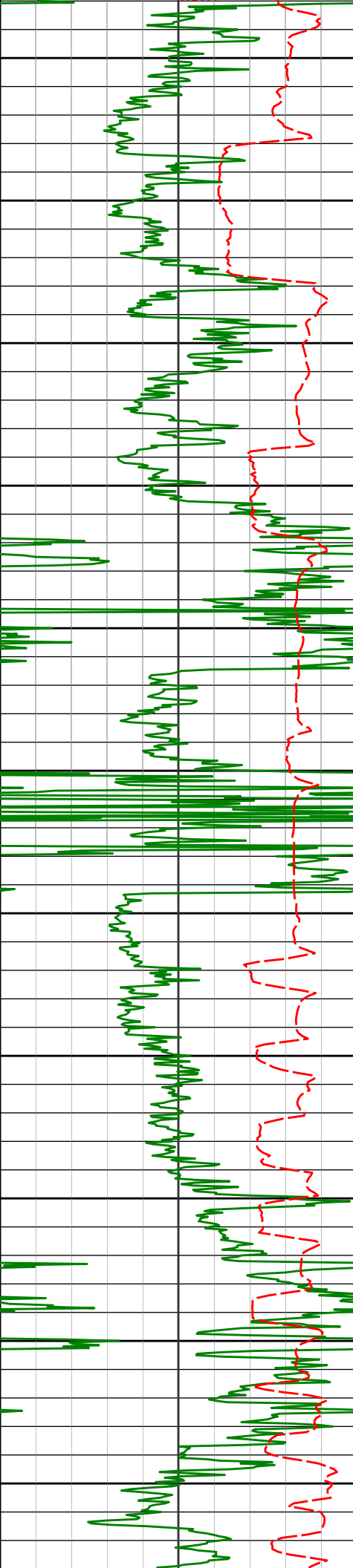
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44.38'

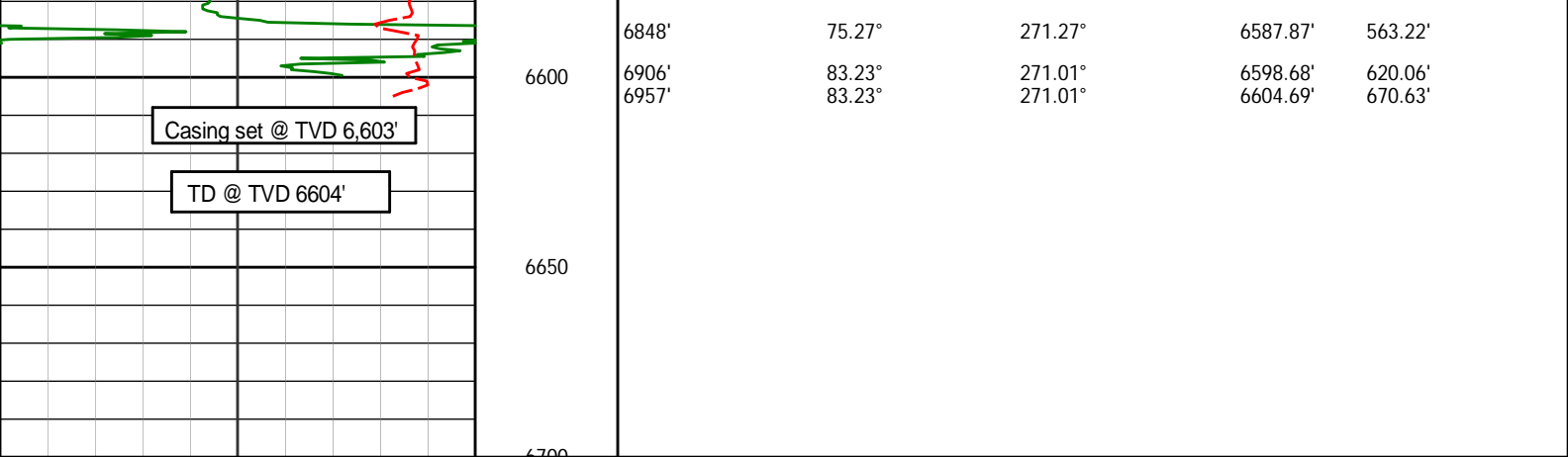
PGRC

KOPFA





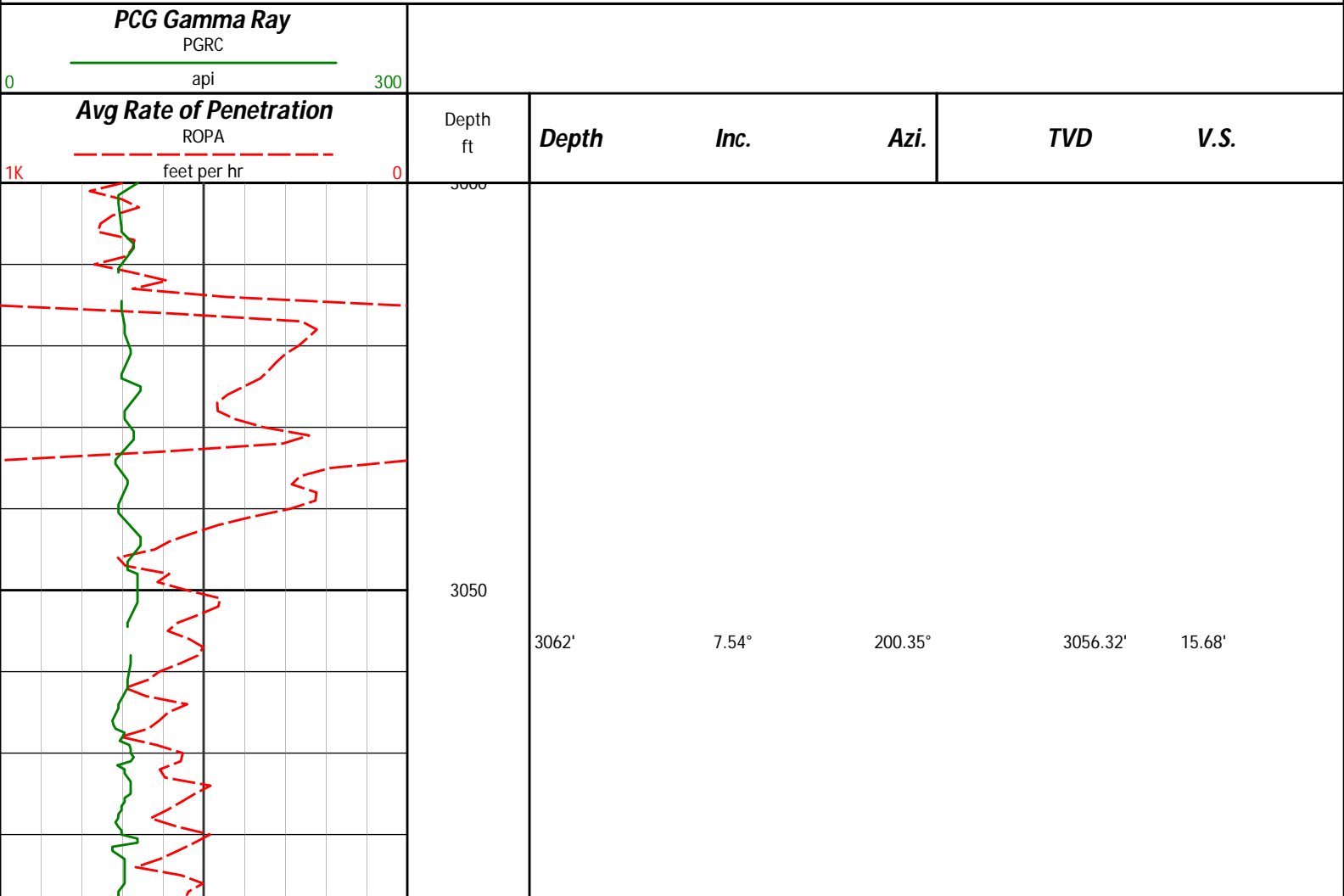
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6090'	14.66°	264.43°	6077.31'	58.74'
6100				
6150				
6185'	19.68°	260.22°	6168.05'	86.62'
6200				
6250				
6280'	25.86°	269.37°	6255.64'	123.23'
6300				
6374'	37.25°	270.07°	6335.61'	172.31'
6350				
6400				
6469'	47.48°	270.11°	6405.70'	236.19'
6450				
6563'	52.91°	270.55°	6465.86'	308.30'
6500				
6658'	60.71°	271.93°	6517.83'	387.60'
6550				
6753'	68.62°	272.08°	6558.44'	473.16'

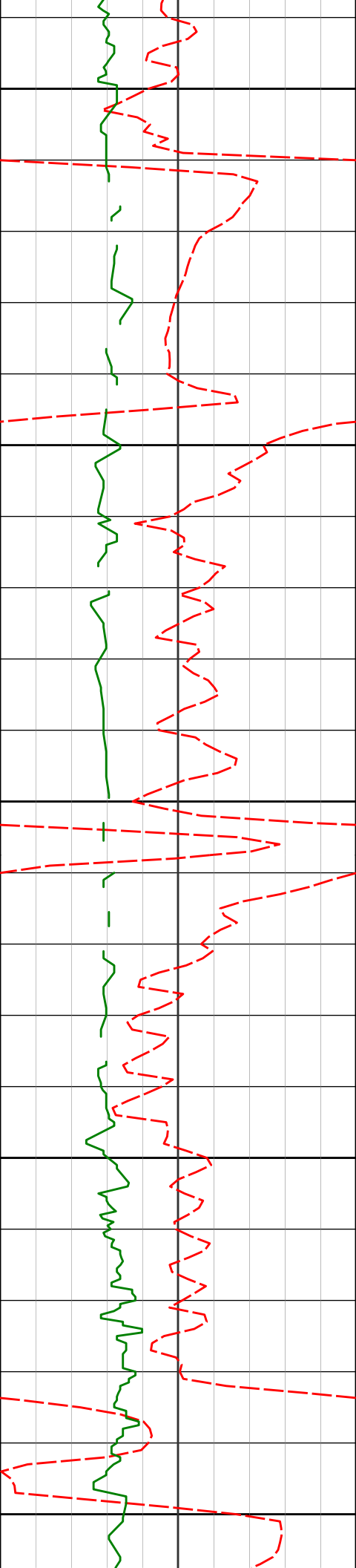


Avg Rate of Penetration ROPA feet per hr		Depth ft	Depth	Inc.	Azi.	TVD	V.S.
1K	0						
PCG Gamma Ray PGRC api							
0	300						

**HALLIBURTON**  
**Sperry Drilling Services**  
**TVD Detail Log 1:240**

Noble Energy  
NCLP PC AA04-65-1HN  
H&P 343  
T6N-R63W





3100

3150

3200

3250

3300

3156'

8.72°

195.47°

3149.38'

20.21'

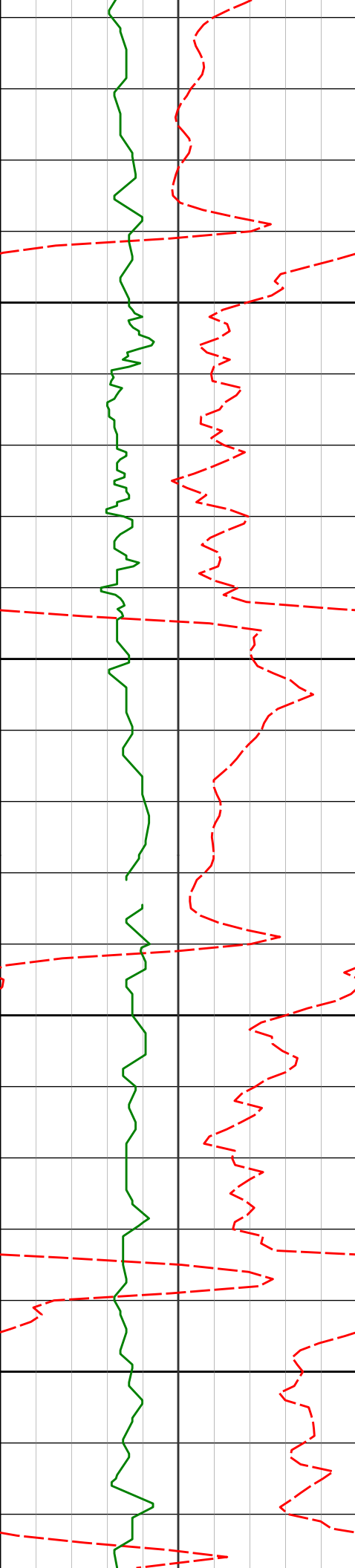
3251'

6.58°

197.81°

3243.53'

24.26'



3345'

6.22°

193.87°

3336.94'

27.52'

3350

3400

3440'

7.06°

182.83°

3431.31'

29.46'

3450

3500

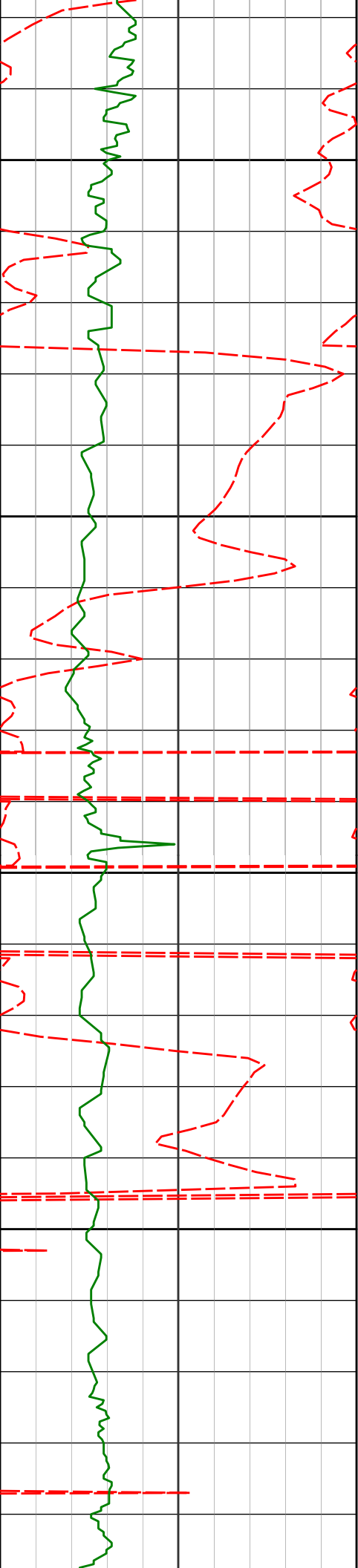
3535'

5.76°

177.66°

3525.71'

29.96'



3550

3600

3650

3700

3629'

6.23°

189.66°

3619.20'

31.00'

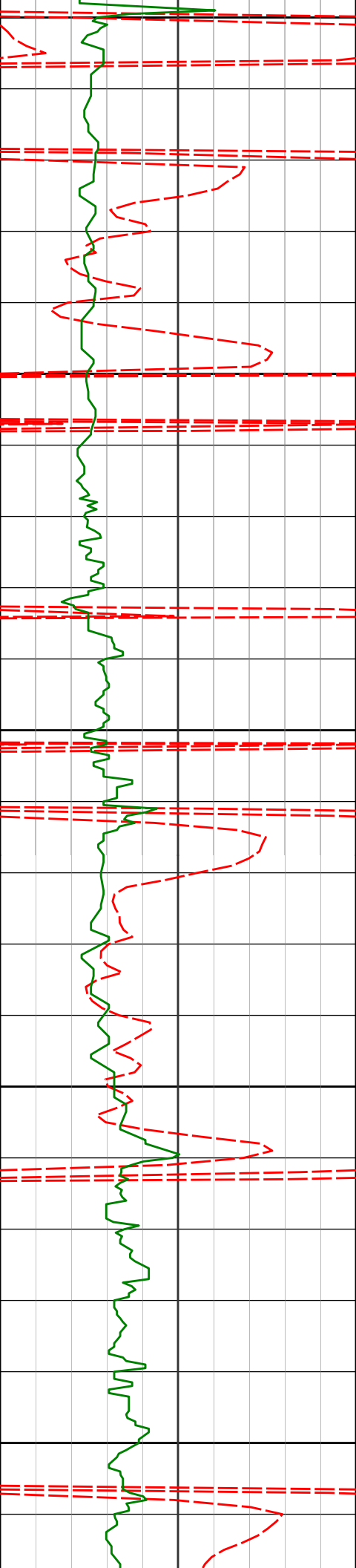
3724'

5.72°

193.54°

3713.69'

33.34'



3750

3800

3850

3900

3950

3819'

5.46°

202.07°

3808.24'

36.49'

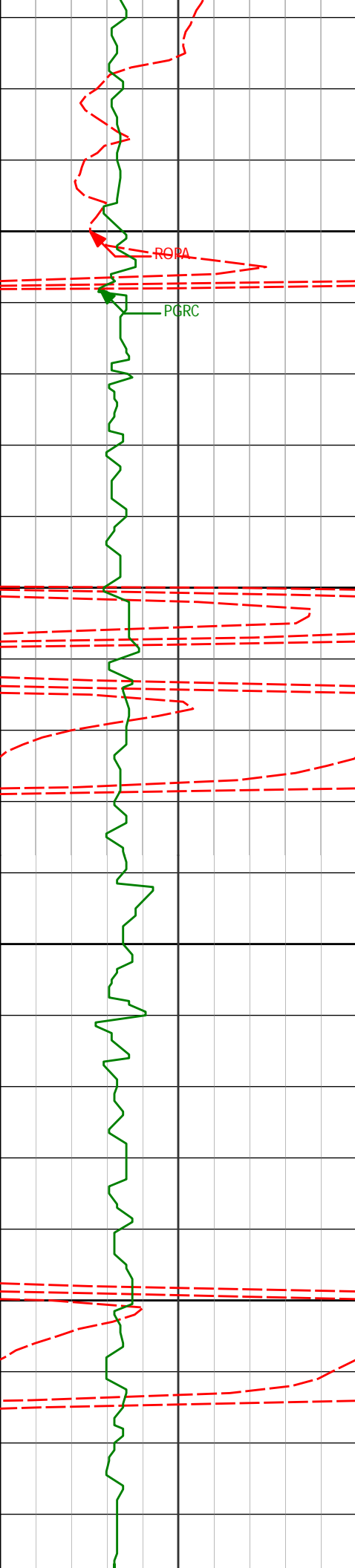
3913'

4.23°

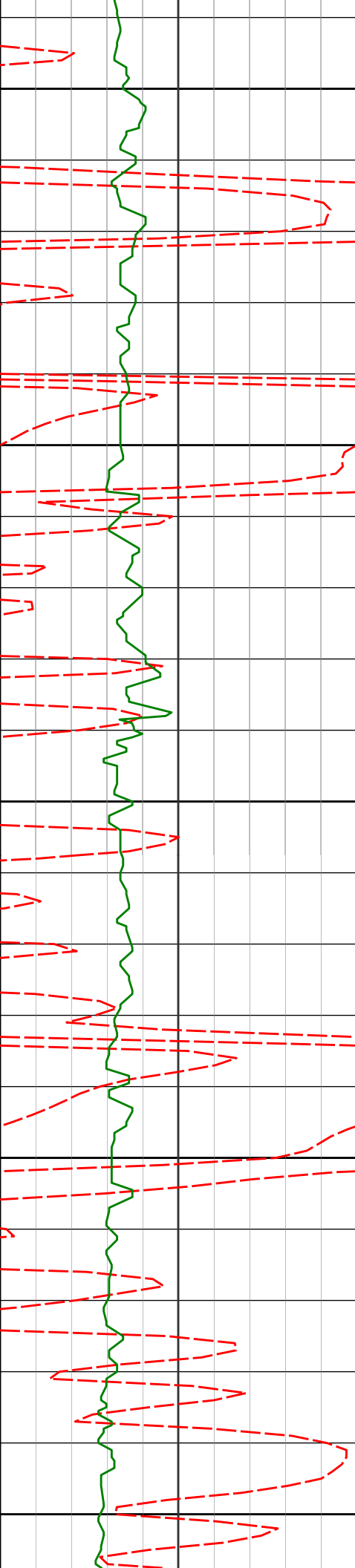
210.50°

3901.90'

40.20'



4007'	1.07°	232.17°	3995.79'	42.79'
4000				
4050				
4101'	0.92°	232.67°	4089.77'	44.12'
4100				
4150				
4195'	0.62°	249.41°	4183.77'	45.22'



4200

4250

4300

4350

4400

4290'

0.52°

134.08°

4278.76'

45.41'

4385'

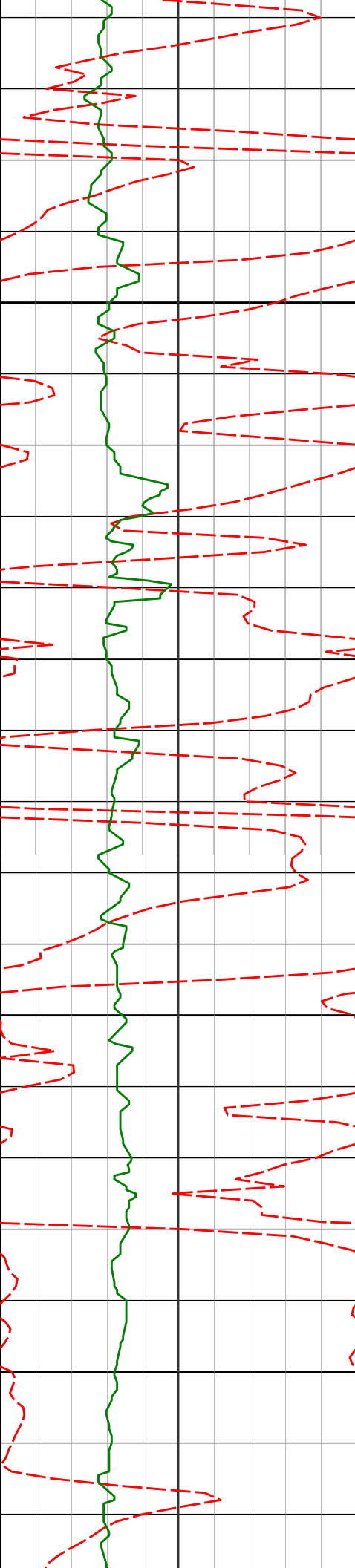
0.92°

120.47°

4373.76'

44.47'





4450

4480'

1.02°

124.83°

4468.74'

43.15'

4500

4550

4574'

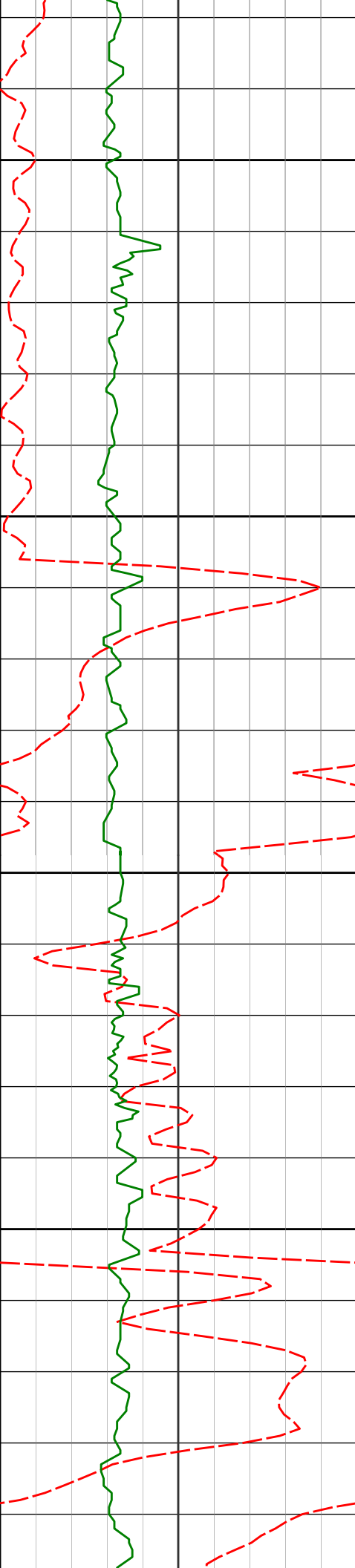
0.84°

180.67°

4562.73'

42.52'

4600



4650

4700

4750

4800

4669'

0.63°

183.90°

4657.72'

42.61'

4763'

0.86°

184.35°

4751.72'

42.74'

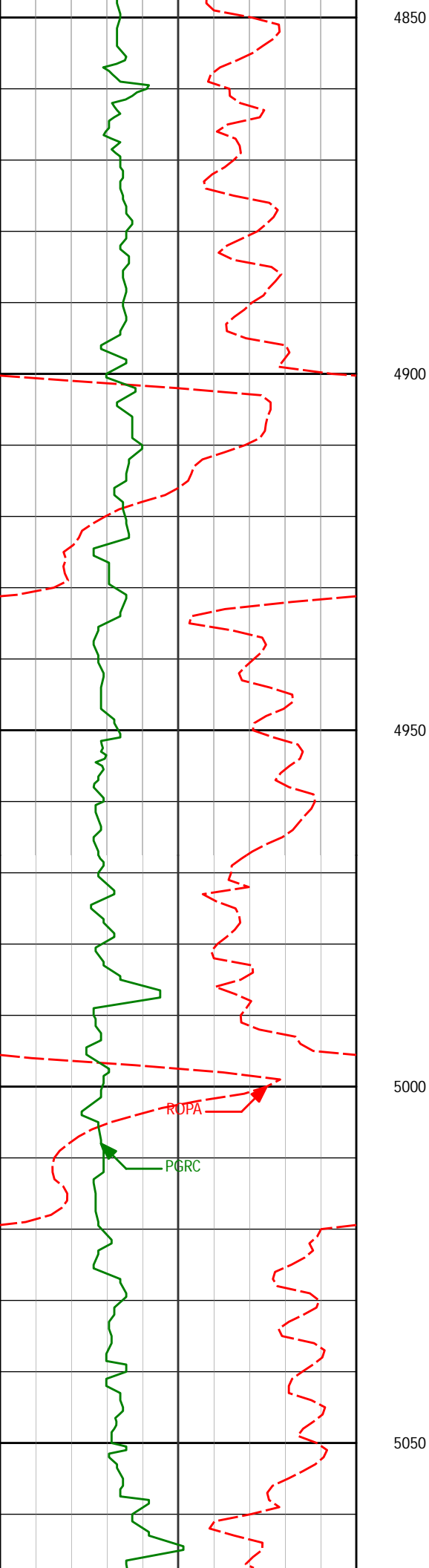
4858'

0.26°

158.25°

4846.71'

42.75'



4953'

0.87°

157.15°

4941.71'

42.43'

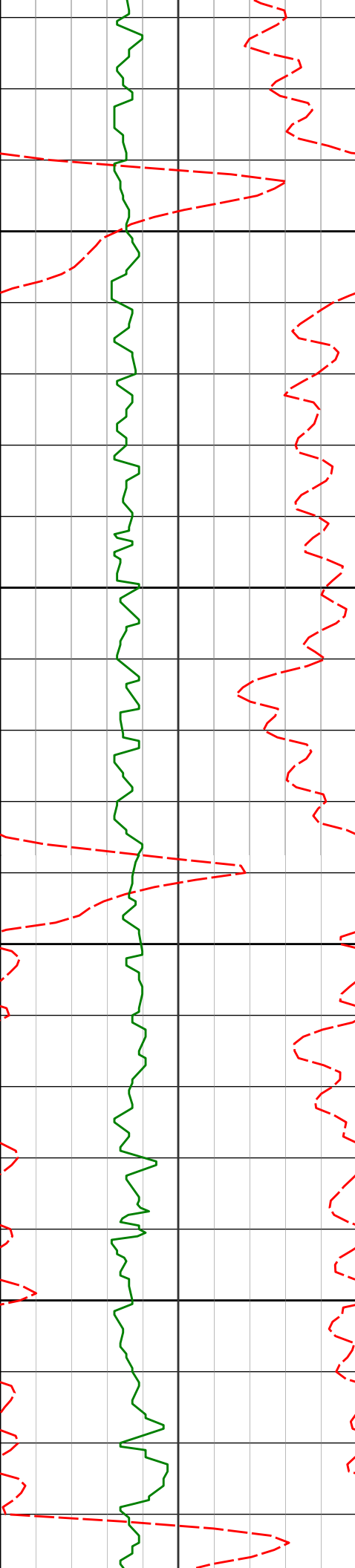
5048'

0.86°

156.46°

5036.69'

41.91'



5100

5150

5200

5250

5143'

0.61°

133.20°

5131.69'

41.30'

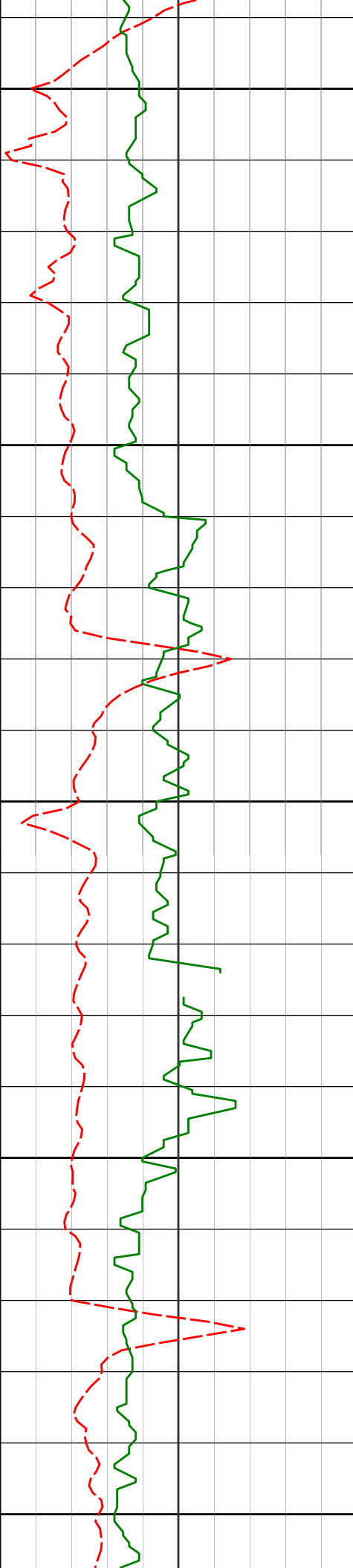
5238'

0.33°

193.01°

5226.68'

41.02'



5300

5332'

0.85°

177.78°

5320.68'

41.09'

5350

5400

5427'

1.10°

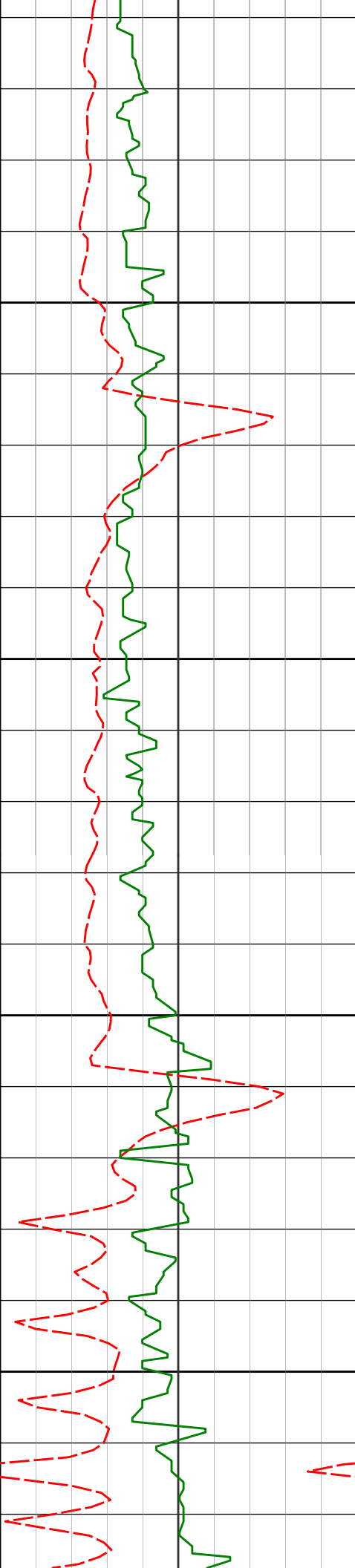
175.91°

5415.67'

41.06'

5450

5500



5522'

0.93°

189.17°

5510.65'

41.18'

5550

5600

5616'

0.96°

186.95°

5604.64'

41.45'

5650

5700

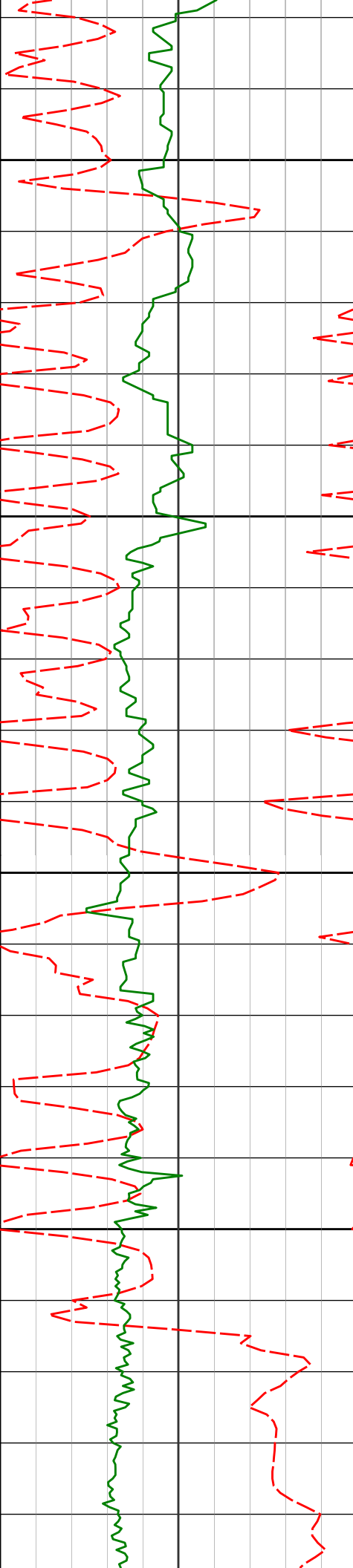
5711'

0.90°

237.68°

5699.63'

42.23'



5750

5800

5850

5900

Run 200

5806'

0.74°

192.84°

5794.62'

43.03'

5873'

0.11°

243.25°

5861.62'

43.20'

5900'

0.22°

246.31°

5888.62'

43.27'

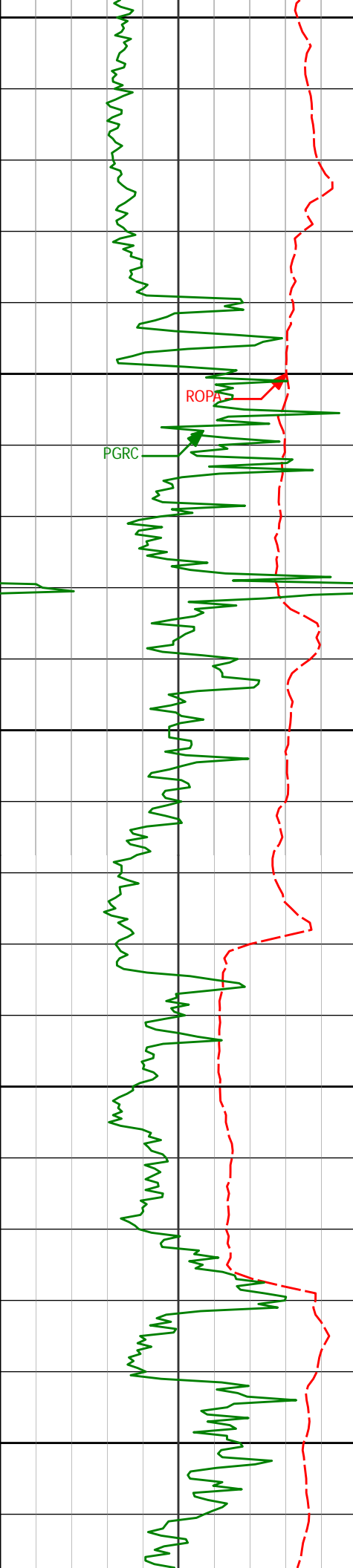
5949'

0.28°

237.31°

5937.62'

43.47'



5950

5995'

2.06°

259.96°

5983.60'

44.38'

6000

ROPA

PGRC

6043'

9.16°

265.01°

6031.34'

49.06'

6050

6090'

14.66°

264.43°

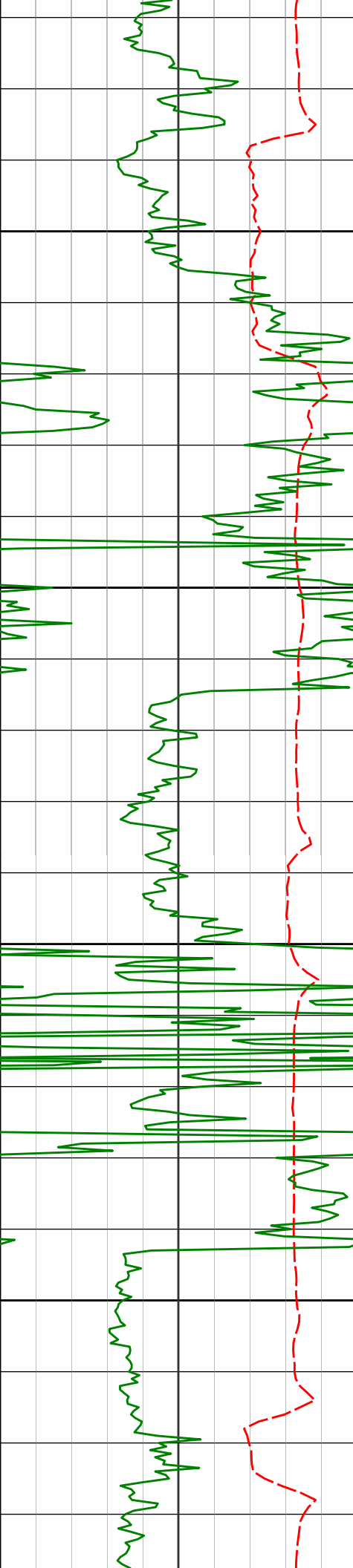
6077.31'

58.74'

6100

6150





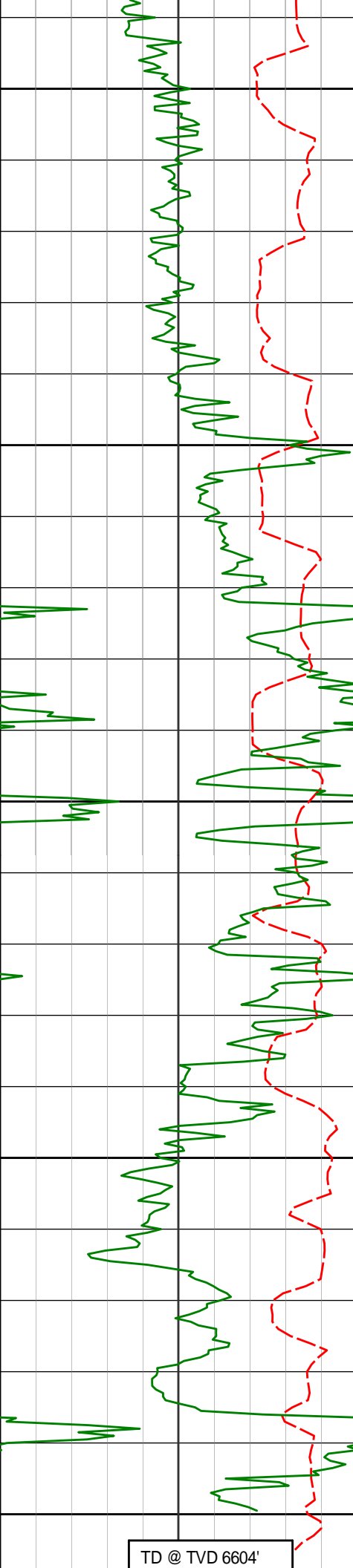
6200

6250

6300

6350

6185	19.68°	260.22°	6168.05	86.62'
6280'	25.86°	269.37°	6255.64'	123.23'
6374'	37.25°	270.07°	6335.61'	172.31'



6400

6469'

47.48°

270.11°

6405.70'

236.19'

6450

6563'

52.91°

270.55°

6465.86'

308.30'

6500

6658'

60.71°

271.93°

6517.83'

387.60'

6550

6753'

68.62°

272.08°

6558.44'

473.16'

6848'

75.27°

271.27°

6587.87'

563.22'

6600

6906'

83.23°

271.01°

6598.68'

620.06'

6957'

83.23°

271.01°

6604.69'

670.63'

TD @ TVD 6604'



3819.00	5.46	202.07	3808.24	155.94 S	30.50 W	36.49	0.92
3913.00	4.23	210.50	3901.90	163.07 S	33.94 W	40.20	1.51
4007.00	1.07	232.17	3995.79	166.60 S	36.39 W	42.79	3.47
4101.00	0.92	232.67	4089.77	167.60 S	37.68 W	44.12	0.16
4195.00	0.62	249.41	4183.77	168.23 S	38.76 W	45.22	0.40
4290.00	0.52	134.08	4278.76	168.71 S	38.93 W	45.41	1.02
4385.00	0.92	120.47	4373.76	169.40 S	37.96 W	44.47	0.46
4480.00	1.02	124.83	4468.74	170.27 S	36.61 W	43.15	0.13
4574.00	0.84	180.67	4562.73	171.44 S	35.93 W	42.52	0.94
4669.00	0.63	183.90	4657.72	172.65 S	35.98 W	42.61	0.23
4763.00	0.86	184.35	4751.72	173.87 S	36.07 W	42.74	0.24
4858.00	0.26	158.25	4846.71	174.78 S	36.04 W	42.75	0.67
4953.00	0.87	157.15	4941.71	175.65 S	35.68 W	42.43	0.64
5048.00	0.86	156.46	5036.69	176.97 S	35.12 W	41.91	0.02
5143.00	0.61	133.20	5131.69	177.97 S	34.46 W	41.30	0.40
5238.00	0.33	193.01	5226.68	178.58 S	34.15 W	41.02	0.56
5332.00	0.85	177.78	5320.68	179.54 S	34.19 W	41.09	0.57
5427.00	1.10	175.91	5415.67	181.15 S	34.10 W	41.06	0.27
5522.00	0.93	189.17	5510.65	182.82 S	34.15 W	41.18	0.30
5616.00	0.96	186.95	5604.64	184.36 S	34.37 W	41.45	0.05
5711.00	0.90	237.68	5699.63	185.55 S	35.10 W	42.23	0.84
5806.00	0.74	192.84	5794.62	186.54 S	35.86 W	43.03	0.68
5873.00	0.11	243.25	5861.62	187.00 S	36.02 W	43.20	1.01
5900.00	0.22	246.31	5888.62	187.03 S	36.09 W	43.27	0.41
5949.00	0.28	237.31	5937.62	187.13 S	36.28 W	43.47	0.15
5995.00	2.06	259.96	5983.60	187.33 S	37.18 W	44.38	3.92
6043.00	9.16	265.01	6031.34	187.82 S	41.85 W	49.06	14.81
6090.00	14.66	264.43	6077.31	188.72 S	51.50 W	58.74	11.70
6185.00	19.68	260.22	6168.05	192.61 S	79.25 W	86.62	5.44
6280.00	25.86	269.37	6255.64	195.56 S	115.77 W	123.23	7.48
6374.00	37.25	270.07	6335.61	195.75 S	164.88 W	172.31	12.12
6469.00	47.48	270.11	6405.70	195.65 S	228.82 W	236.19	10.77
6563.00	52.91	270.55	6465.86	195.22 S	301.00 W	308.30	5.79
6658.00	60.71	271.93	6517.83	193.46 S	380.42 W	387.60	8.30
6753.00	68.62	272.08	6558.44	190.45 S	466.16 W	473.16	8.33
6848.00	75.27	271.27	6587.87	187.83 S	556.39 W	563.22	7.05
6906.00	83.23	271.01	6598.68	186.69 S	613.32 W	620.06	13.73
6957.00	83.23	271.01	6604.69	185.80 S	663.95 W	670.63	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 267.79 DEGREES (GRID)  
A TOTAL CORRECTION OF 7.47 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6957.00 FEET  
IS 689.46 FEET ALONG 254.37 DEGREES (GRID)**

**Final survey is a straigh line projection to TD.**