

WELL INFORMATION					
MWD Run Number	100	200			
Date run completed	07-Aug-14	09-Aug-14			
Rig Bit Number	0100	0200			
Bit Size (in)	13.500	8.750			
Tool Nominal OD (in)	6.750	6.750			
Log Start Depth (MD, ft)	81.00	1,641.00			
Log End Depth (MD, ft)	1,641.00	6,215.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	07-Aug-14 03:08	08-Aug-14 07:35			
Drill/Wipe End Date and Time	07-Aug-14 11:10	09-Aug-14 15:03			
Min Inc (deg) @ Depth (MD, ft)	0.58 @ 177.00	0.72 @ 5,020.00			
Max Inc (deg) @ Depth (MD, ft)	6.18 @ 1,186.00	83.64 @ 6,162.00			
Bit TFA(in2) / Bit Type	1.84 / PDC	0.74 / PDC			
Flow Rate (gpm)	740.00	461.66			
Max AV (fpm) / CV (fpm) @ MWD	NA / NA	217.0 / NA			
Fluid Type	Native	Fresh Water Gel			
Density (ppg) / Viscosity (spqt)	8.60 / 0.00	9.50 / 52.00			
Filtrate CL (ppm)	NA	2,000.00			
pH / Fluid Loss (mptm)	8.30 / 0	8.90 / 0			
PV (cP) / YP (lbf2)	NA / NA	19 / 12.00			
% Solids / % Sand	0 / 0	12.5 / 0.25			
% Oil / Oil:Water Ratio	NA / NA	NA / NA			
Rm @ Measured Temp (degF)	NA @ NA	NA @ NA			
Rmf @ Measured Temp (degF)	NA @ NA	NA @ NA			
Rmc @ Measured Temp (degF)	NA @ NA	NA @ NA			
Max Tool Temp (degF) @ Depth (MD, ft)	168.00 / 177.00	177.00 / 177.00			

Max Tool Temp (degF) / Source	130.96 / PCM	177.64 / PCM			
Rm @ Max Tool Temp (degF)	NA @ 130.96	NA @ 177.64			
Lead MWD Engineer	Scott Trowbridge	Scott Trowbridge			
Customer Representative	Kennith Wilkerson	Kennith Wilkerson			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.93	5.93			
Sub Serial Number	11341319	11341319			
Insert Serial Number	10996900	11400991			
Date and Time Initialized	06-Aug-14 16:28	07-Aug-14 21:54			
Date and Time Read	07-Aug-14 15:13	09-Aug-14 23:53			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	56.04	51.16			
Software Version	6.21	6.21			
Sub Serial Number	11341319	11341319			
Sonde Serial Number	11638472	11478070			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	331.34	354.11			

Gamma Ray Sensor Information

Tool Type		PCG			
Distance From Bit (ft)		46.06			
Recorded Sample Period (sec)		10			
Software Version		8.15			
Sub Serial Number		1134319			
Insert/Sonde Serial Number		12071301			

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

4. All data is stored data unless otherwise specified.

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

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

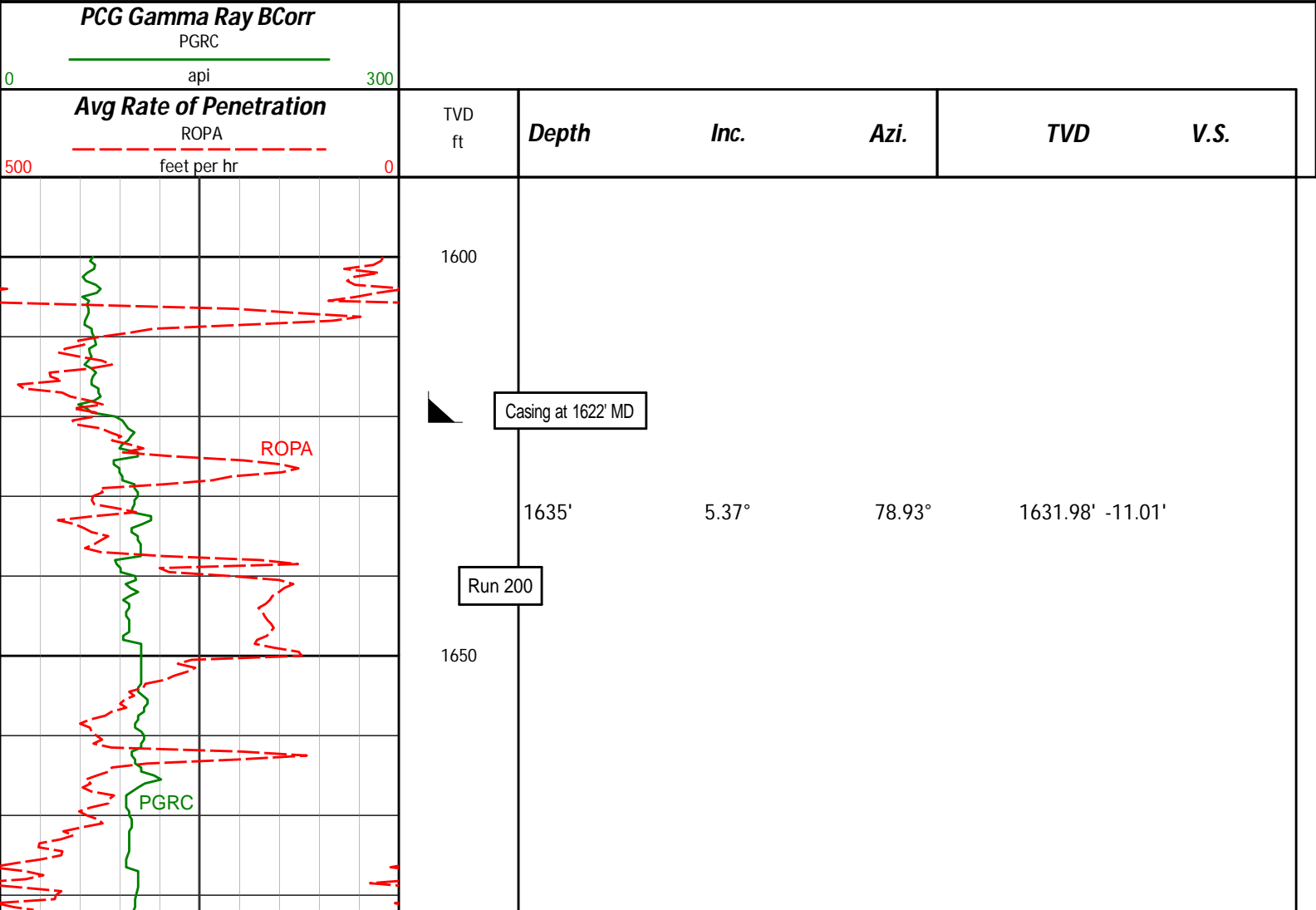
Average Rate of Penetration (ROPA)
Interval Resolution: .5
Interval Distance: 1.2
Gap Fill: 3

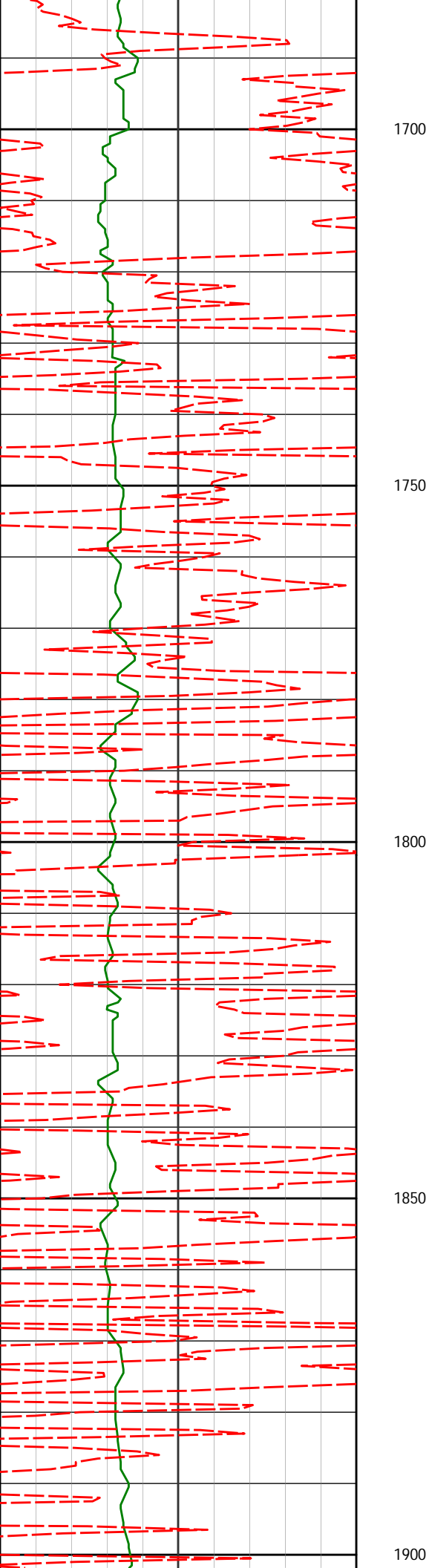
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HALLIBURTON
Sperry Drilling Services
TVD Main Log 1:240

Whiting Oil and Gas
Razor #27J-2212B
Frontier 26
Sec. 27-T10N-R58W





1726'

4.88°

72.09°

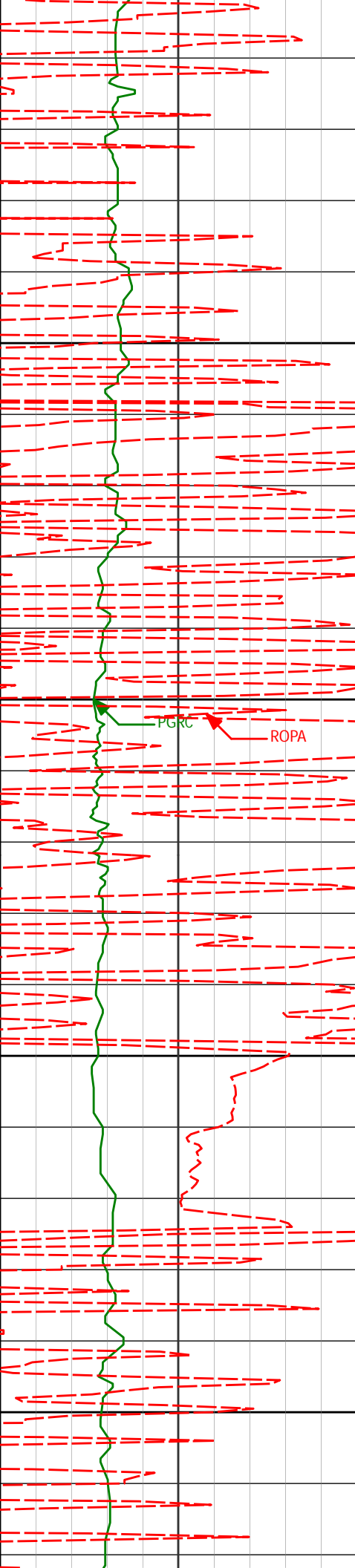
1722.62' -8.71'

1817'

4.71°

63.10°

1813.30' -5.57'



1950

2000

2050

2100

1909'

4.81°

61.02°

1904.98' -1.74'

2000'

4.63°

54.52°

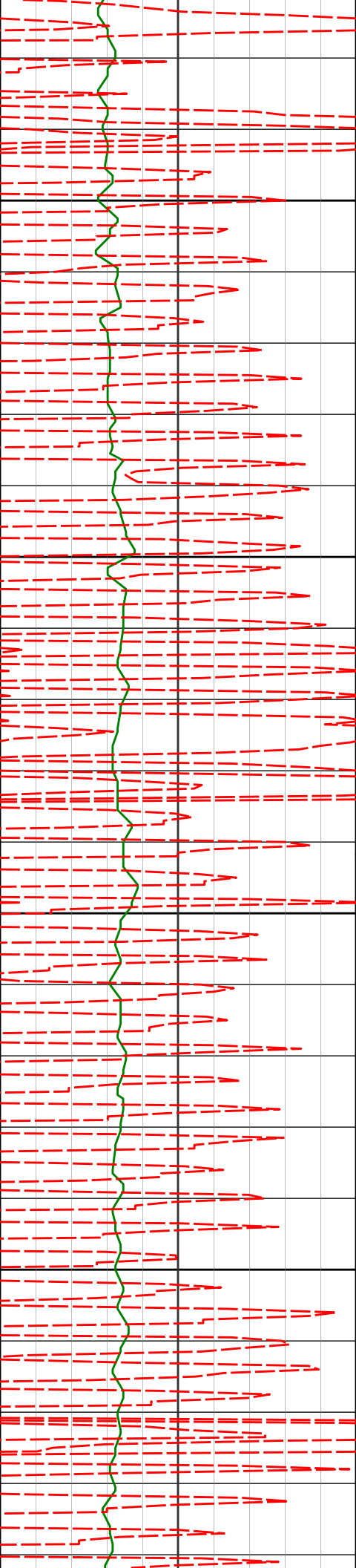
1995.67' 2.47'

2092'

6.12°

97.85°

2087.30' 4.25'



2150

2183'

5.37°

97.95°

2177.85'

3.34'

2200

2250

2275'

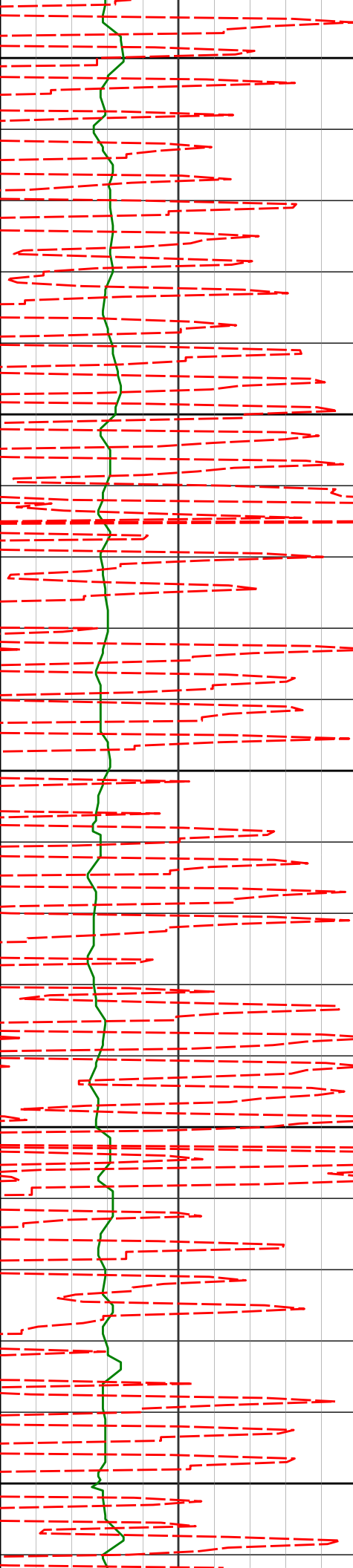
5.29°

98.88°

2269.45'

2.40'

2300



2350

2366'

4.75°

100.91°

2360.10'

1.34'

2400

2450

2458'

4.75°

104.90°

2451.78'

-0.09'

2500

2549'

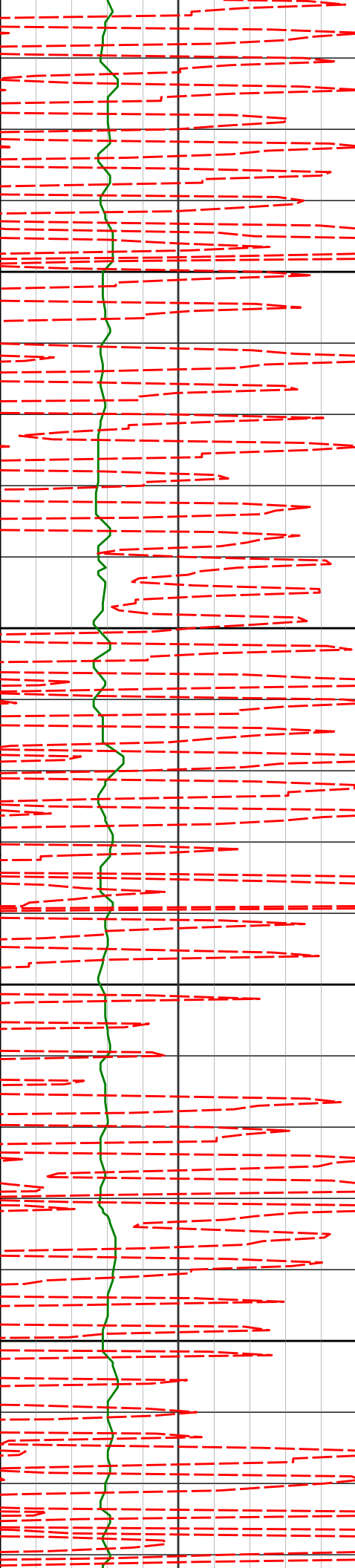
5.33°

100.81°

2542.43'

-1.56'

2550



2600

2641'

5.56°

83.04°

2634.02' -1.49'

2650

2700

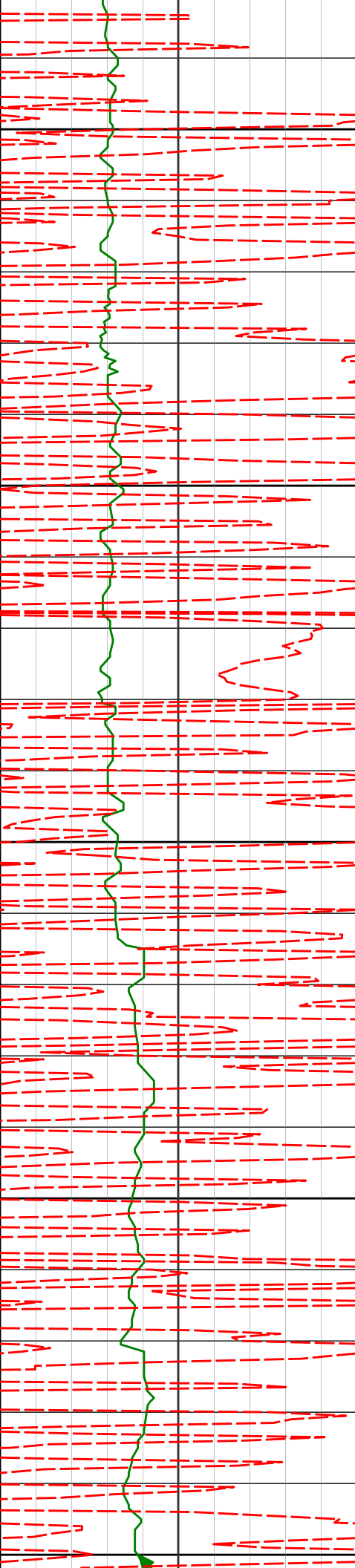
2732'

5.22°

78.55°

2724.62' 0.18'

2750



2800

2823'

4.61°

79.72°

2815.28'

1.93'

2850

2900

2915'

5.35°

79.04°

2906.94'

3.70'

2950

3000

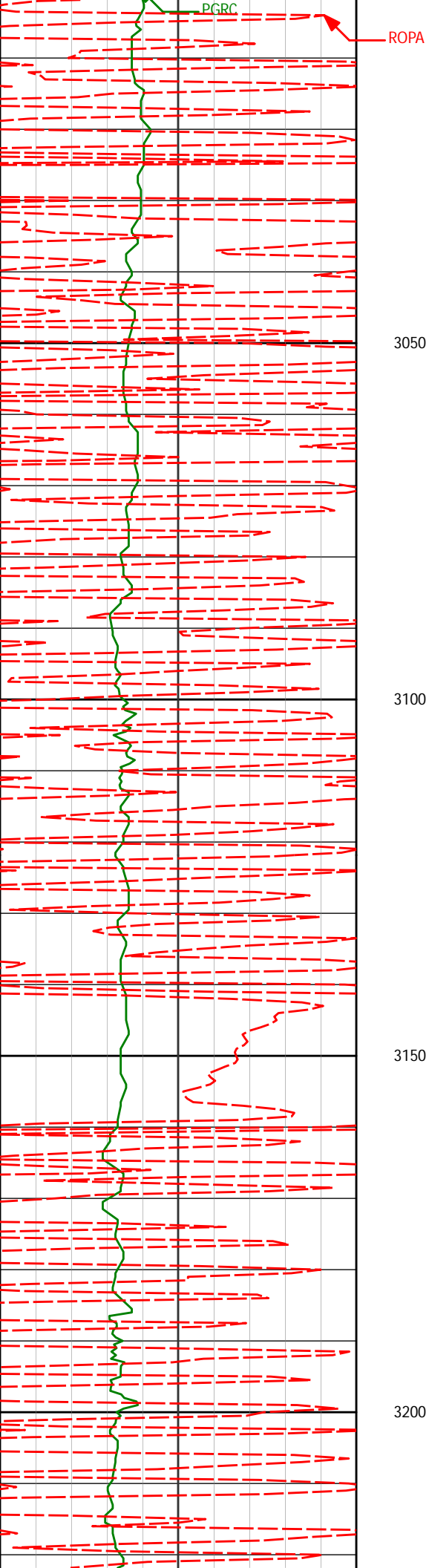
3007'

4.79°

70.91°

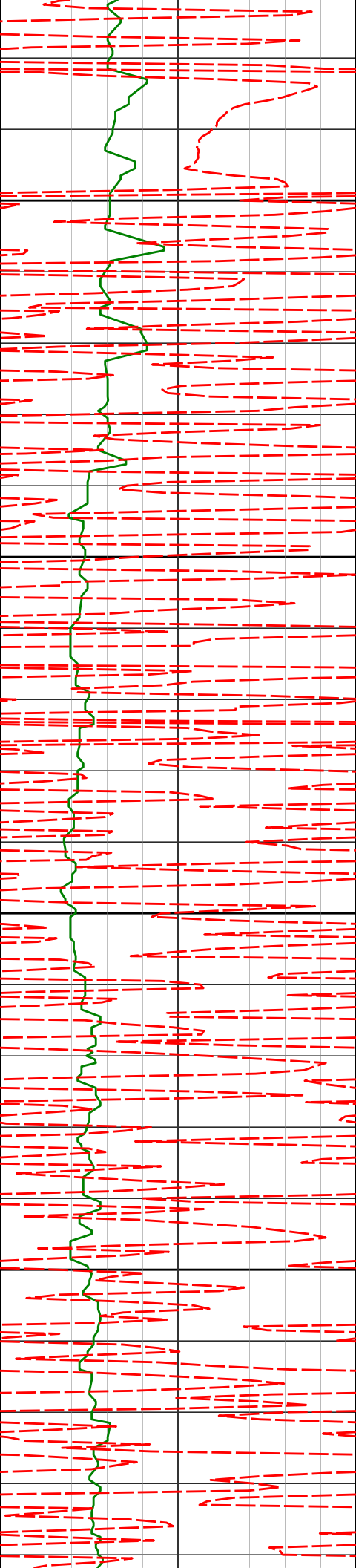
2998.58'

6.06'



3098'	4.21°	64.30°	3089.30'	9.00'
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3189'	4.41°	94.50°	3180.05'	10.42'
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3250

3281'

6.30°

96.71°

3271.65'

9.87'

3300

3350

3373'

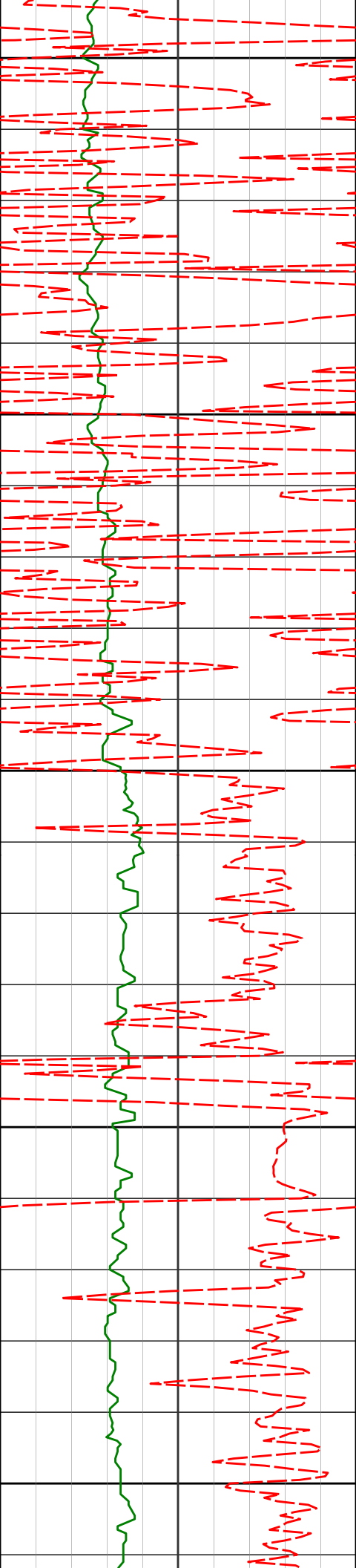
6.53°

97.20°

3363.07'

9.01'

3400



3450

3465'

6.66°

96.87°

3454.46'

8.10'

3500

3550

3556'

7.26°

97.49°

3544.79'

7.13'

3600

3650

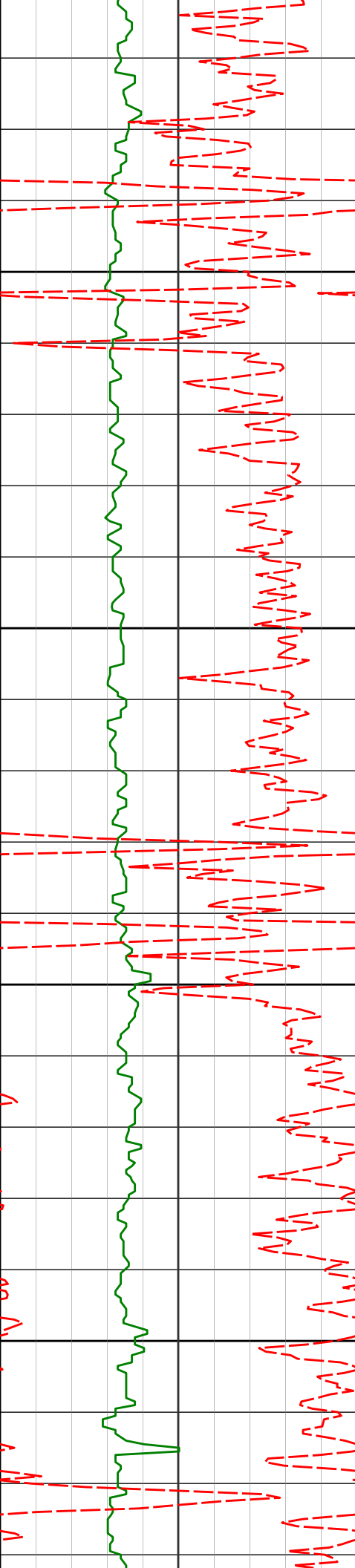
3648'

5.75°

88.57°

3636.20'

6.88'



3700

3750

3800

3850

3739'

5.59°

90.68°

3726.75'

7.27'

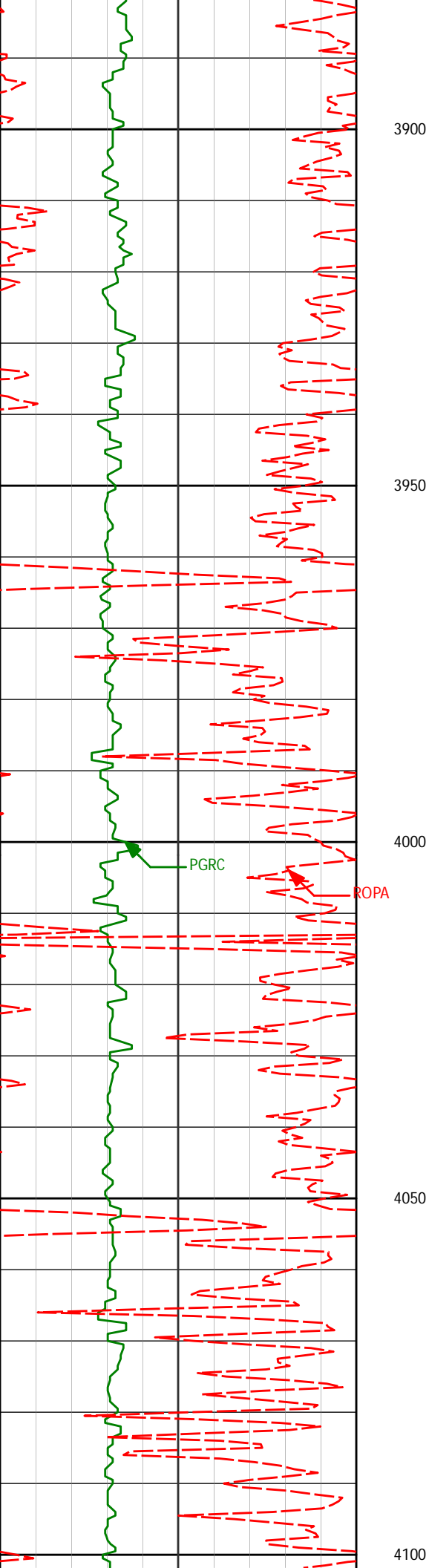
3830'

5.03°

94.18°

3817.36'

7.25'



3922'

4.92°

95.03°

3909.02' 6.90'

4013'

5.40°

95.86°

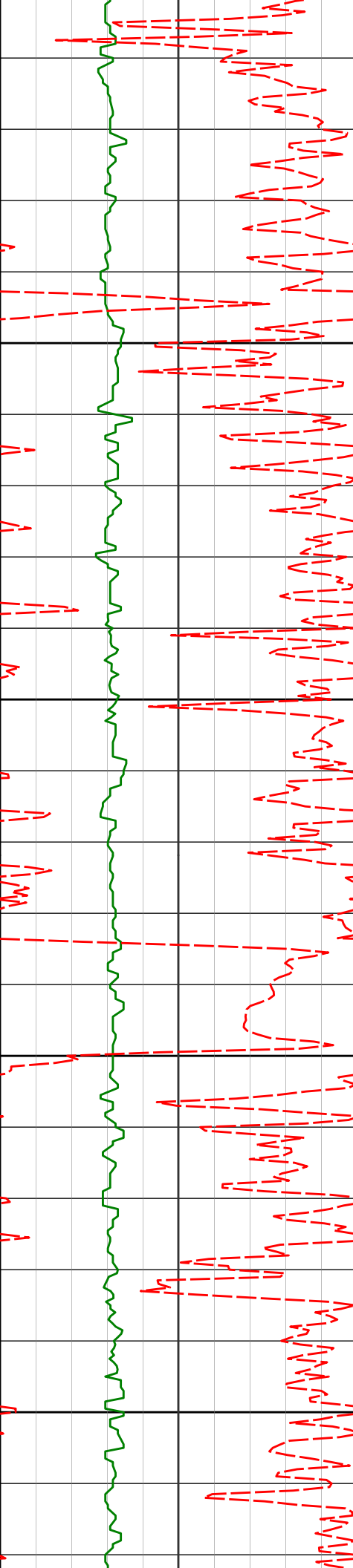
3999.65' 6.43'

4105'

5.37°

95.42°

4091.24' 5.90'



4150

4196'

4.91°

93.48°

4181.87'

5.57'

4200

4250

4287'

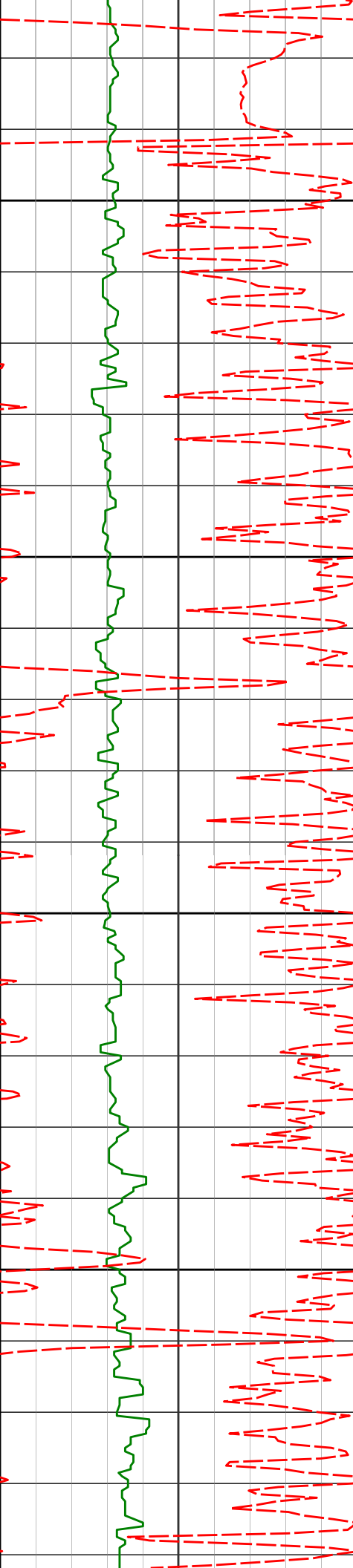
3.29°

78.80°

4272.64'

6.08'

4300



4350

4378'

0.95°

80.79°

4363.57'

6.83'

4400

4450

4470'

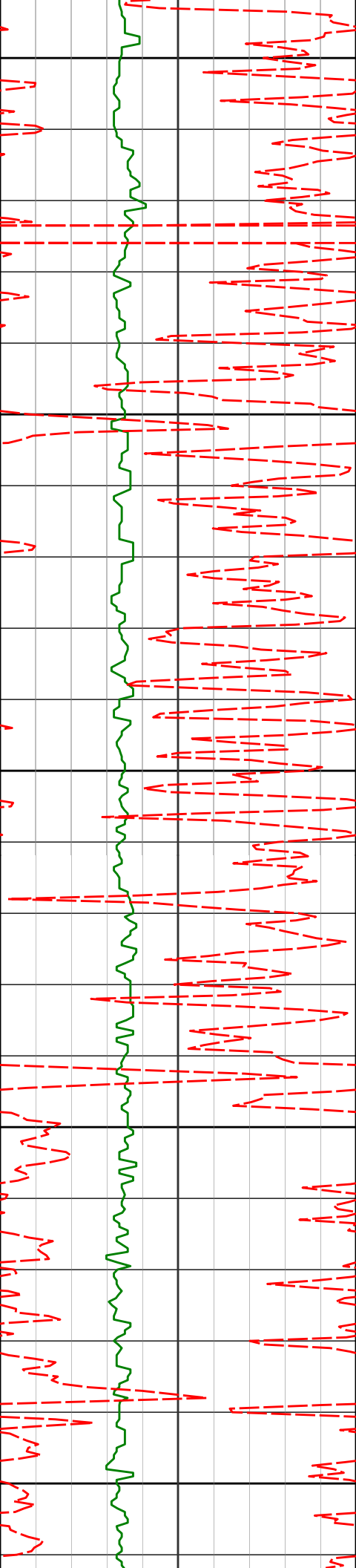
0.88°

93.67°

4455.56'

6.96'

4500



4550

4600

4650

4700

4750

4563'

4653'

4745'

0.80°

1.27°

1.03°

73.30°

87.82°

82.74°

4548.55'

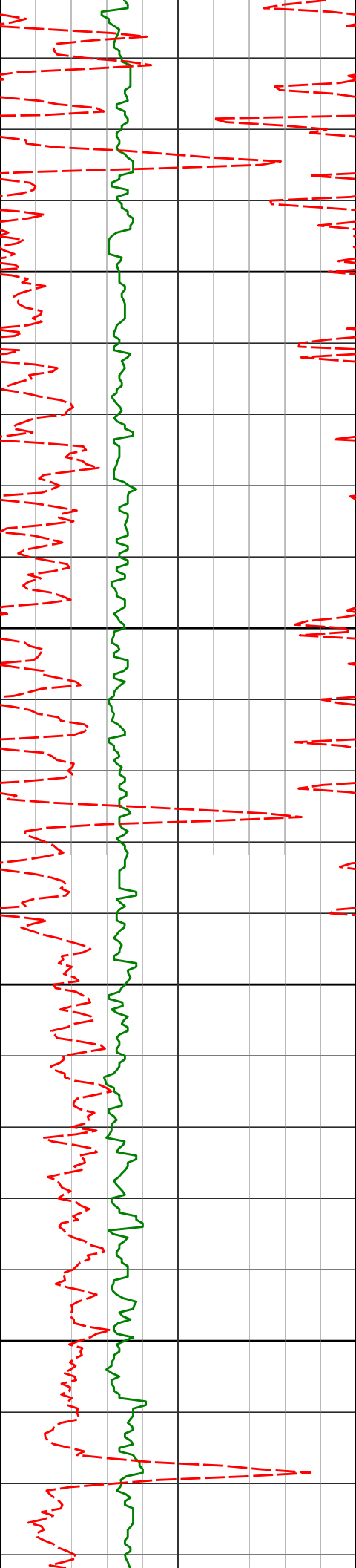
4638.54'

4730.52'

7.15'

7.43'

7.64'



4800

4837'

1.33°

75.28°

4822.50'

8.09'

4850

4900

4929'

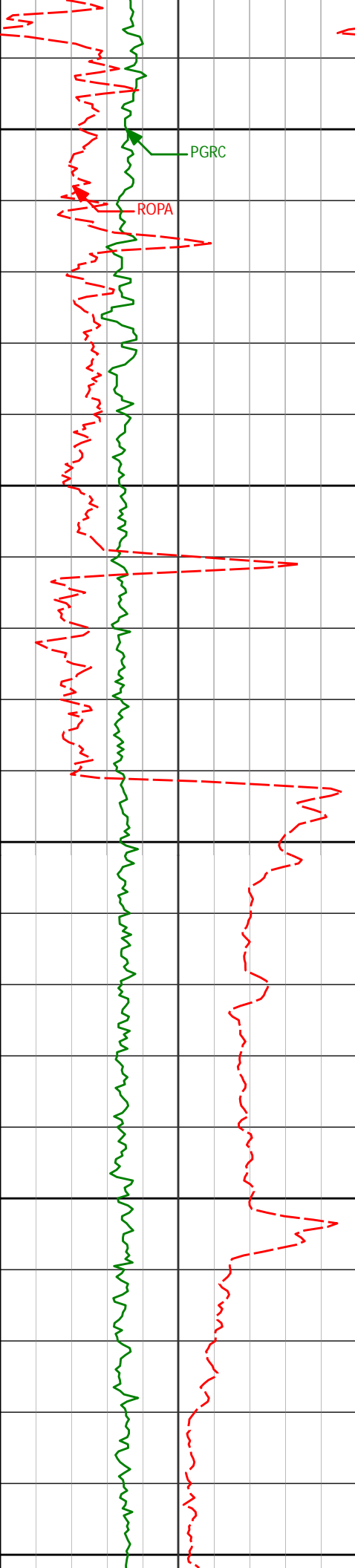
0.95°

66.28°

4914.48'

8.73'

4950



5000

5020'

0.72°

95.37°

5005.47' 9.02'

5050

5100

5112'

1.85°

55.83°

5097.45' 9.87'

5100

5143'

6.84°

22.40°

5128.35' 11.90'

5150

5174'

10.80°

21.52°

5158.98' 16.37'

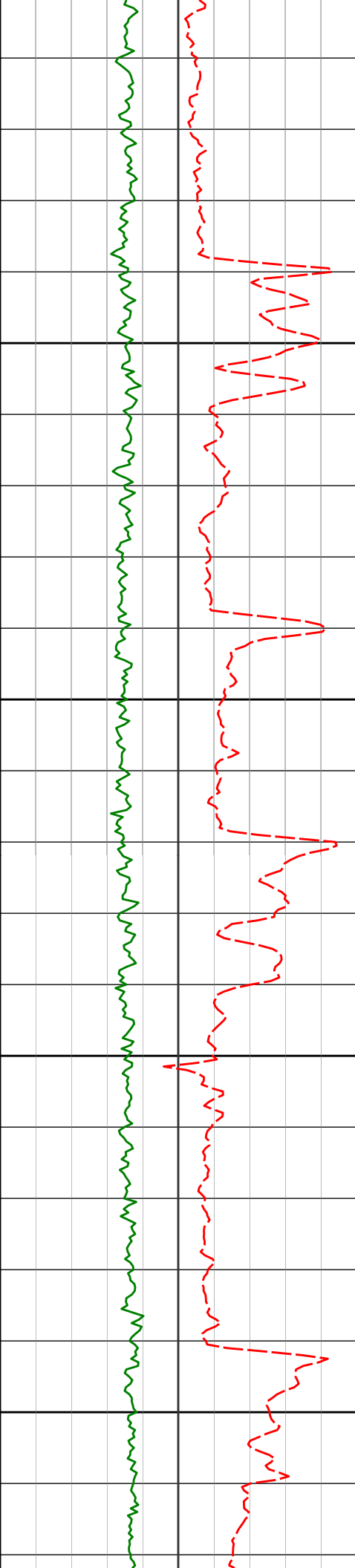
5200

5204'

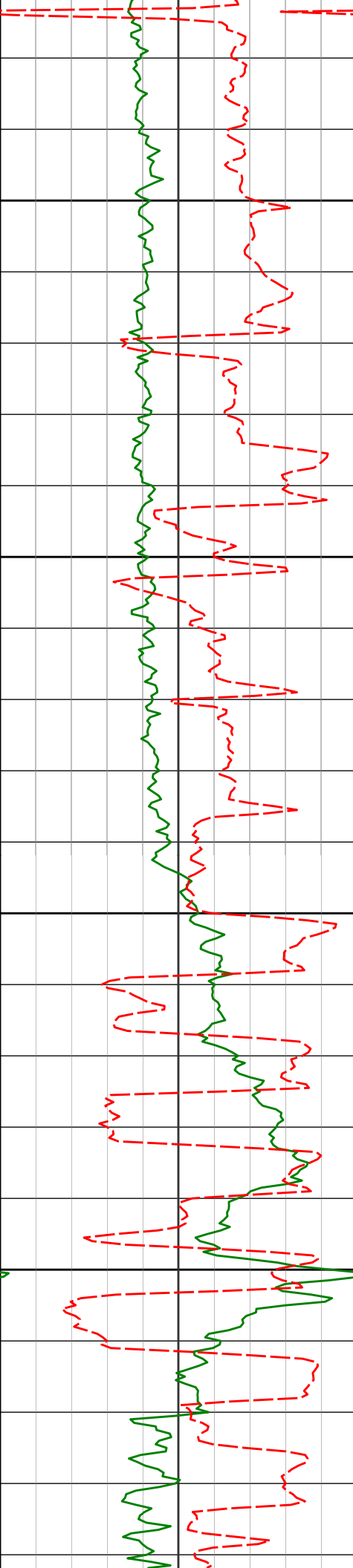
14.56°

29.15°

5188.24' 22.39'



5250	5235'	21.58°	29.98°	5217.70'	30.91'
	5266'	23.54°	30.16°	5246.32'	41.42'
5300	5296'	25.99°	27.21°	5273.56'	52.66'
	5327'	31.44°	26.10°	5300.74'	66.21'
5350	5358'	34.36°	24.96°	5326.77'	81.67'
	5388'	37.12°	21.47°	5351.12'	98.02'
5400	5419'	41.73°	13.53°	5375.07'	116.98'
	5449'	45.80°	8.13°	5396.74'	137.48'
	5479'	49.26°	3.87°	5417.00'	159.55'



5450

5500

5550

5600

5510'

53.35°

357.92°

5436.39' 183.71'

5541'

55.12°

354.95°

5454.51' 208.73'

5571'

55.26°

354.60°

5471.63' 233.16'

5602'

56.48°

352.61°

5489.03' 258.54'

5633'

56.91°

351.79°

5506.05' 284.06'

5663'

57.16°

351.20°

5522.37' 308.79'

5695'

57.19°

350.92°

5539.72' 335.18'

5726'

58.87°

350.80°

5556.13' 360.97'

5758'

60.70°

351.76°

5572.23' 388.13'

5789'

61.46°

352.93°

5587.23' 414.86'

5821'

62.96°

353.20°

5602.15' 442.82'

5853'

65.08°

353.32°

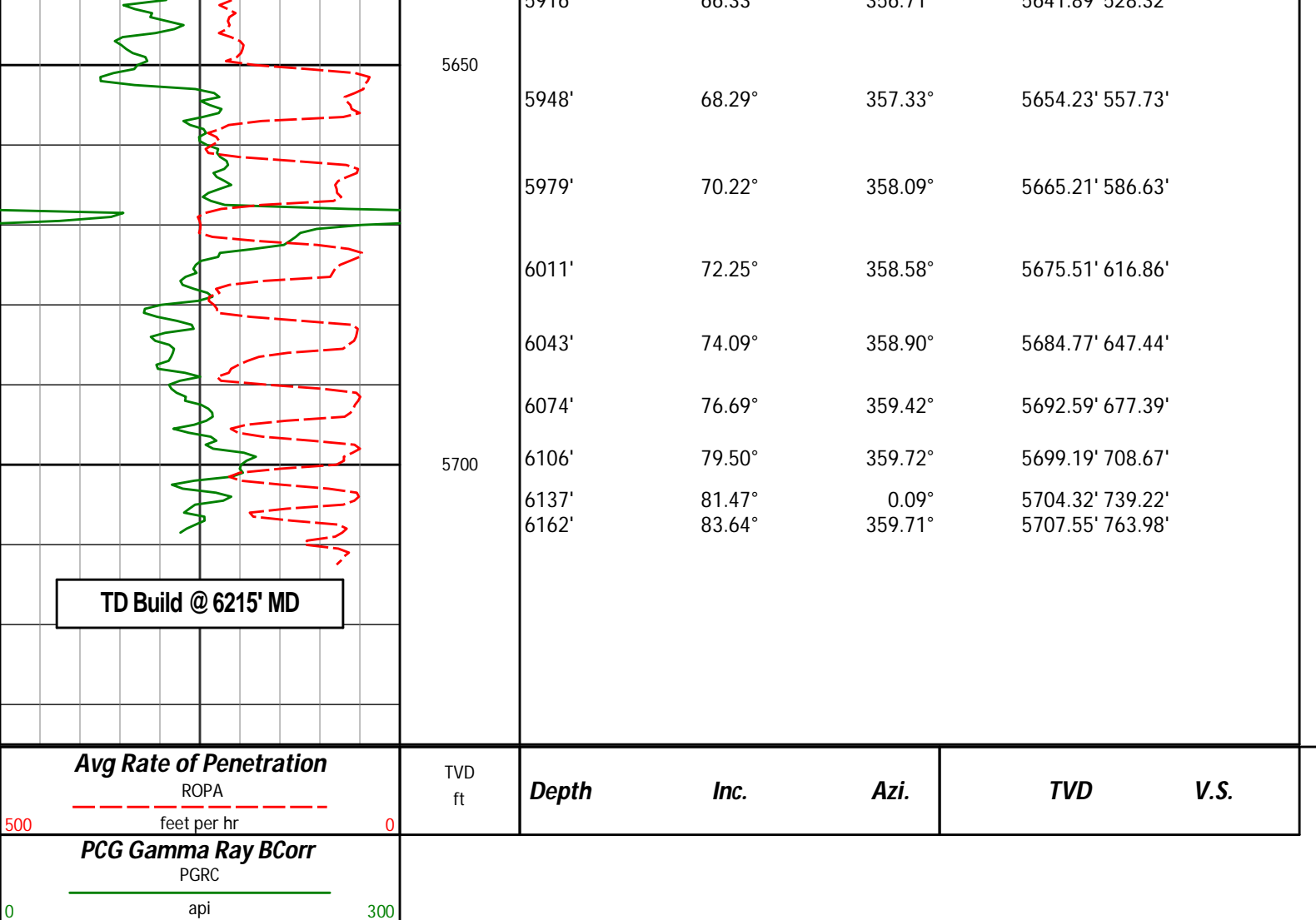
5616.16' 471.24'

5884'

66.08°

355.52°

5628.98' 499.21'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Whiting Oil and Gas
Razor 27J-2212B
Redtail
Weld Colorado
USA
CA-XX-0901566507
Surveys are Sag, IFR and MS corrected.

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
177.00	0.58	233.78	177.00	0.53 S	0.72 W	-0.56	0.33
268.00	0.62	228.85	267.99	1.13 S	1.47 W	-1.18	0.07
359.00	0.80	234.60	358.98	1.82 S	2.35 W	-1.90	0.21
451.00	0.82	246.47	450.98	2.45 S	3.48 W	-2.58	0.18
544.00	0.78	240.92	543.97	3.03 S	4.64 W	-3.20	0.09
635.00	0.87	239.70	634.96	3.68 S	5.78 W	-3.89	0.10
727.00	0.97	179.93	726.95	4.81 S	6.38 W	-5.04	1.00
819.00	2.21	164.18	818.91	7.29 S	5.90 W	-7.51	1.42
911.00	2.37	135.72	910.84	10.36 S	4.09 W	-10.51	1.23
1003.00	3.83	116.52	1002.71	13.09 S	0.01 W	-13.09	1.93
1094.00	5.73	106.19	1093.39	15.72 S	7.07 E	-15.44	2.28
1186.00	6.18	93.77	1184.89	17.32 S	16.43 E	-16.70	1.48
1278.00	4.95	86.79	1276.46	17.43 S	25.33 E	-16.47	1.52
1369.00	5.36	89.25	1367.09	17.15 S	33.50 E	-15.89	0.51
1461.00	5.43	81.68	1458.68	16.47 S	42.10 E	-14.88	0.78

1552.00	5.02	78.44	1549.31	15.05 S	50.26 E	-13.16	0.55
1583.00	4.94	71.33	1580.19	14.35 S	52.86 E	-12.36	2.01
1635.00	5.37	78.93	1631.98	13.16 S	57.37 E	-11.01	1.55
1726.00	4.88	72.09	1722.62	11.15 S	65.23 E	-8.71	0.86
1817.00	4.71	63.10	1813.30	8.27 S	72.24 E	-5.57	0.85
1909.00	4.81	61.02	1904.98	4.70 S	78.99 E	-1.74	0.22
2000.00	4.63	54.52	1995.67	0.72 S	85.32 E	2.47	0.62
2092.00	6.12	97.85	2087.30	0.77 N	93.20 E	4.25	4.56
2183.00	5.37	97.95	2177.85	0.48 S	102.22 E	3.34	0.82
2275.00	5.29	98.88	2269.45	1.73 S	110.68 E	2.40	0.13
2366.00	4.75	100.91	2360.10	3.09 S	118.52 E	1.34	0.62
2458.00	4.75	104.90	2451.78	4.79 S	125.94 E	-0.09	0.36
2549.00	5.33	100.81	2542.43	6.55 S	133.74 E	-1.56	0.75
2641.00	5.56	83.04	2634.02	6.82 S	142.36 E	-1.49	1.84
2732.00	5.22	78.55	2724.62	5.46 S	150.79 E	0.18	0.60
2823.00	4.61	79.72	2815.28	3.99 S	158.45 E	1.93	0.68
2915.00	5.35	79.04	2906.94	2.51 S	166.30 E	3.70	0.81
3007.00	4.79	70.91	2998.58	0.44 S	174.14 E	6.06	0.99
3098.00	4.21	64.30	3089.30	2.25 N	180.74 E	9.00	0.85
3189.00	4.41	94.50	3180.05	3.43 N	187.24 E	10.42	2.47
3281.00	6.30	96.71	3271.65	2.56 N	195.78 E	9.87	2.07
3373.00	6.53	97.20	3363.07	1.31 N	205.98 E	9.01	0.26
3465.00	6.66	96.87	3454.46	0.02 N	216.47 E	8.10	0.15
3556.00	7.26	97.49	3544.79	1.36 S	227.41 E	7.13	0.66
3648.00	5.75	88.57	3636.20	2.00 S	237.78 E	6.88	1.97
3739.00	5.59	90.68	3726.75	1.94 S	246.77 E	7.27	0.29
3830.00	5.03	94.18	3817.36	2.29 S	255.18 E	7.25	0.71
3922.00	4.92	95.03	3909.02	2.92 S	263.13 E	6.90	0.14
4013.00	5.40	95.86	3999.65	3.70 S	271.28 E	6.43	0.53
4105.00	5.37	95.42	4091.24	4.55 S	279.87 E	5.90	0.06
4196.00	4.91	93.48	4181.87	5.19 S	287.99 E	5.57	0.54
4287.00	3.29	78.80	4272.64	4.92 S	294.44 E	6.08	2.11
4378.00	0.95	80.79	4363.57	4.29 S	297.75 E	6.83	2.57
4470.00	0.88	93.67	4455.56	4.22 S	299.21 E	6.96	0.24
4563.00	0.80	73.30	4548.55	4.07 S	300.54 E	7.15	0.33
4653.00	1.27	87.82	4638.54	3.86 S	302.14 E	7.43	0.59
4745.00	1.03	82.74	4730.52	3.71 S	303.98 E	7.64	0.28
4837.00	1.33	75.28	4822.50	3.34 S	305.83 E	8.09	0.37
4929.00	0.95	66.28	4914.48	2.76 S	307.56 E	8.73	0.46
5020.00	0.72	95.37	5005.47	2.51 S	308.82 E	9.02	0.52
5112.00	1.85	55.83	5097.45	1.73 S	310.63 E	9.87	1.49
5143.00	6.84	22.40	5128.35	0.26 N	311.75 E	11.90	17.40
5174.00	10.80	21.52	5158.98	4.67 N	313.52 E	16.37	12.78
5204.00	14.56	29.15	5188.24	10.58 N	316.38 E	22.39	13.69
5235.00	21.58	29.98	5217.70	18.93 N	321.14 E	30.91	22.66
5266.00	23.54	30.16	5246.32	29.22 N	327.10 E	41.42	6.33
5296.00	25.99	27.21	5273.56	40.25 N	333.11 E	52.66	9.14
5327.00	31.44	26.10	5300.74	53.56 N	339.78 E	66.21	17.66
5358.00	34.36	24.96	5326.77	68.76 N	347.03 E	81.67	9.63
5388.00	37.12	21.47	5351.12	84.86 N	353.92 E	98.02	11.43
5419.00	41.73	13.53	5375.07	103.62 N	359.76 E	116.98	22.02
5449.00	45.80	8.13	5396.74	123.99 N	363.62 E	137.48	18.40
5479.00	49.26	3.87	5417.00	145.99 N	365.91 E	159.55	15.58
5510.00	53.35	357.92	5436.39	170.15 N	366.25 E	183.71	19.95
5541.00	55.12	354.95	5454.51	195.25 N	364.68 E	208.73	9.64
5571.00	55.26	354.60	5471.63	219.78 N	362.44 E	233.16	1.07
5602.00	56.48	352.61	5489.03	245.28 N	359.58 E	258.54	6.61
5633.00	56.91	351.79	5506.05	270.95 N	356.06 E	284.06	2.61
5663.00	57.16	351.20	5522.37	295.84 N	352.34 E	308.79	1.85
5695.00	57.19	350.92	5539.72	322.41 N	348.16 E	335.18	0.74
5726.00	58.87	350.80	5556.13	348.37 N	343.98 E	360.97	5.43
5758.00	60.70	351.76	5572.23	375.70 N	339.79 E	388.13	6.28
5789.00	61.46	352.93	5587.23	402.59 N	336.18 E	414.86	4.11
5821.00	62.96	353.20	5602.15	430.69 N	332.76 E	442.82	4.75
5853.00	65.08	353.32	5616.16	459.26 N	329.39 E	471.24	6.63
5884.00	66.08	355.52	5628.98	487.35 N	326.64 E	499.21	7.22
5916.00	66.33	356.71	5641.89	516.56 N	324.66 E	528.32	3.49
5948.00	68.29	357.33	5654.23	546.04 N	323.13 E	557.73	6.38
5979.00	70.22	358.09	5665.21	575.01 N	321.97 E	586.63	6.63
6011.00	72.25	358.58	5675.51	605.29 N	321.09 E	616.86	6.51
6043.00	74.09	358.90	5684.77	635.91 N	320.42 E	647.44	5.83
6074.00	76.69	359.42	5692.59	665.91 N	319.98 E	677.39	8.54
6106.00	79.50	359.72	5699.19	697.21 N	319.74 E	708.67	8.83
6137.00	81.47	0.09	5704.32	727.79 N	319.69 E	739.22	6.46

6162.00

83.64

359.71

5707.55

752.57 N

319.65 E

763.98

8.81

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 2.14 DEGREES (TRUE)
A TOTAL CORRECTION OF 7.54 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6162.00 FEET
IS 817.64 FEET ALONG 23.01 DEGREES (TRUE)**

Tie onto surface at 0' MD

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