

WELL INFORMATION					
MWD Run Number	100	200			
Date run completed	20-Oct-14	22-Oct-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)	80.00	1,600.00			
Log End Depth (MD, ft)	1,600.00	6,080.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	19-Oct-14 16:08	20-Oct-14 19:55			
Drill/Wipe End Date and Time	19-Oct-14 22:22	21-Oct-14 23:00			
Min Inc (deg) @ Depth (MD, ft)	0.46 @ 176.00	1.55 @ 5,089.00			
Max Inc (deg) @ Depth (MD, ft)	16.25 @ 1,531.00	85.03 @ 6,033.00			
Bit TFA(in2) / Bit Type	1.53 / PDC	0.88 / PDC			
Flow Rate (gpm)	732.80	505.12			
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A			
Fluid Type	Native/Spud Mud	Polymer			
Density (ppg) / Viscosity (spqt)	8.50 / 32.00	10.00 / 48.00			
Filtrate CL (ppm)	N/A	2,000.00			
pH / Fluid Loss (mptm)	8.00 / 0	9.00 / 0			
PV (cP) / YP (lbf2)	1 / 1.00	15 / 21.00			
% Solids / % Sand	10 / 0.25	12 / .25			
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A			
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Max Tool Temp (in F) / S	168.50 / PDC	175.04 / PDC			

Max Tool Temp (degF) / Source	126.52 / PCM	175.21 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ 126.52	N/A @ 175.21			
Lead MWD Engineer	Cody Wurdeman	Cody Wurdeman			
Customer Representative	Kennith Wilkerson	Kennith Wilkerson			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.93	5.93			
Sub Serial Number	11404299	7464564			
Insert Serial Number	11227504	11400994			
Date and Time Initialized	19-Oct-14 06:50	20-Oct-14 13:32			
Date and Time Read	20-Oct-14 07:24	22-Oct-14 08:53			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	53.53	45.29			
Software Version	6.21	6.21			
Sub Serial Number	11404299	11404299			
Sonde Serial Number	11638567	11297622			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	44.72	56.69			

Gamma Ray Sensor Information

Tool Type		PCG			
Distance From Bit (ft)		50.24			
Recorded Sample Period (sec)		10			
Software Version		8.15			
Sub Serial Number		11404299			
Insert/Sonde Serial Number		11681054			

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

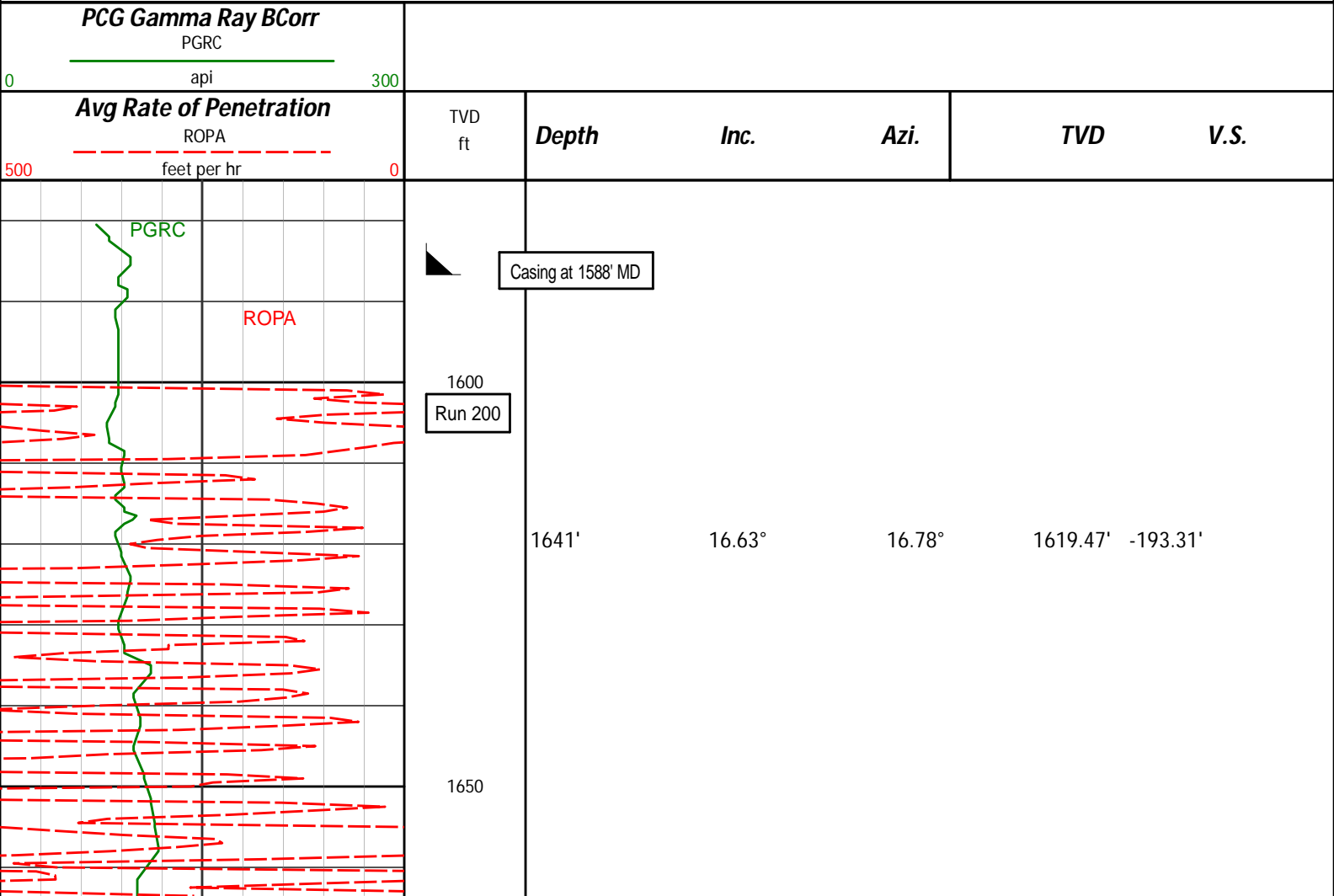
Average Rate of Penetration (ROPA)
Interval Resolution: .5
Interval Distance: 1.2
Gap Fill: 3

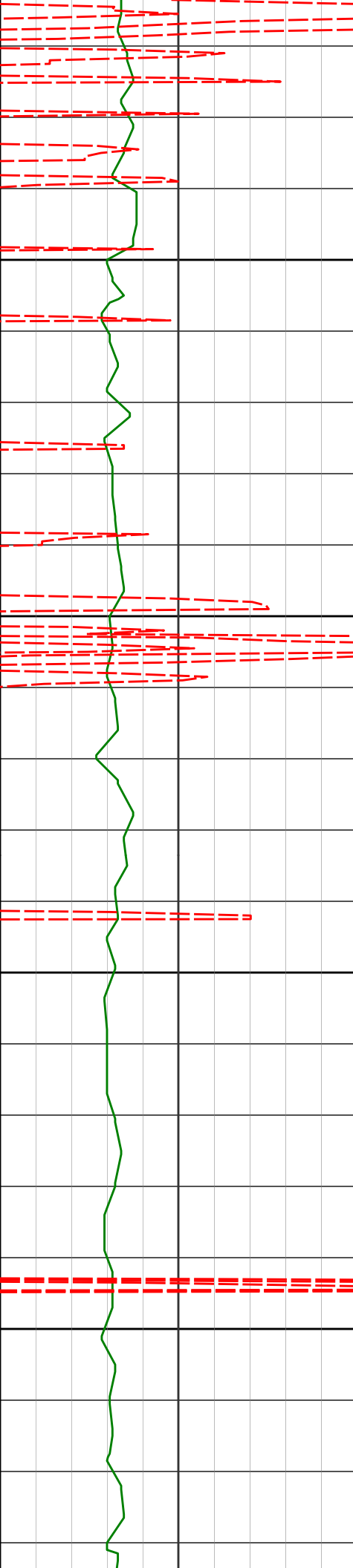
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HALLIBURTON
Sperry Drilling Services
TVD Main Log 1:240

Whiting Oil and Gas
Razor #27J-3411A
Frontier 26
Sec. 27-T10N-R58W





1700

1732'

14.65°

13.06°

1707.10' -216.75'

1750

1800

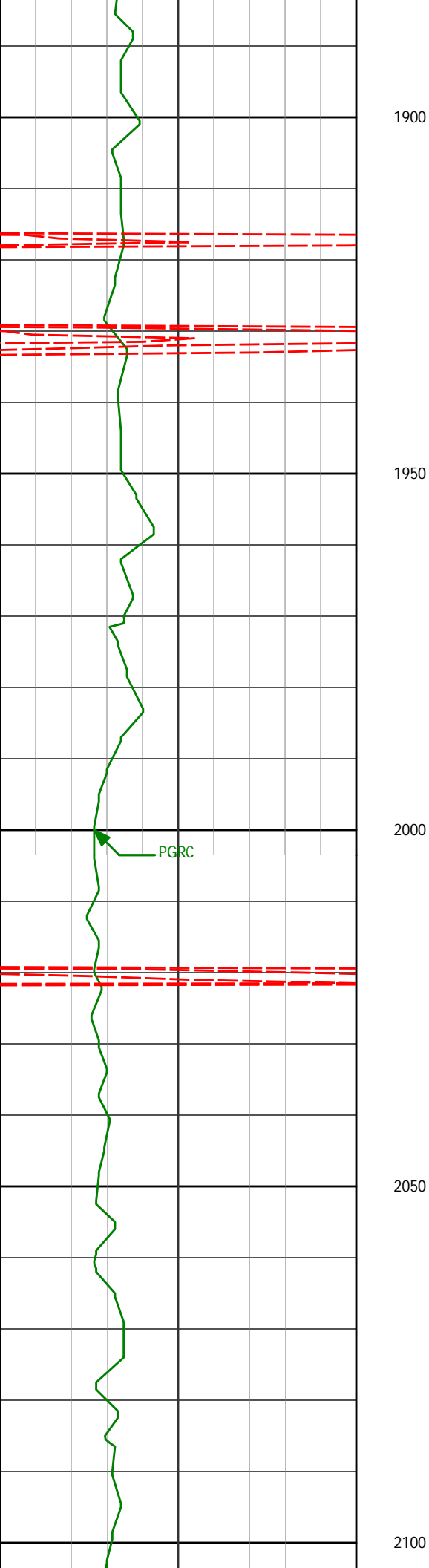
1824'

13.17°

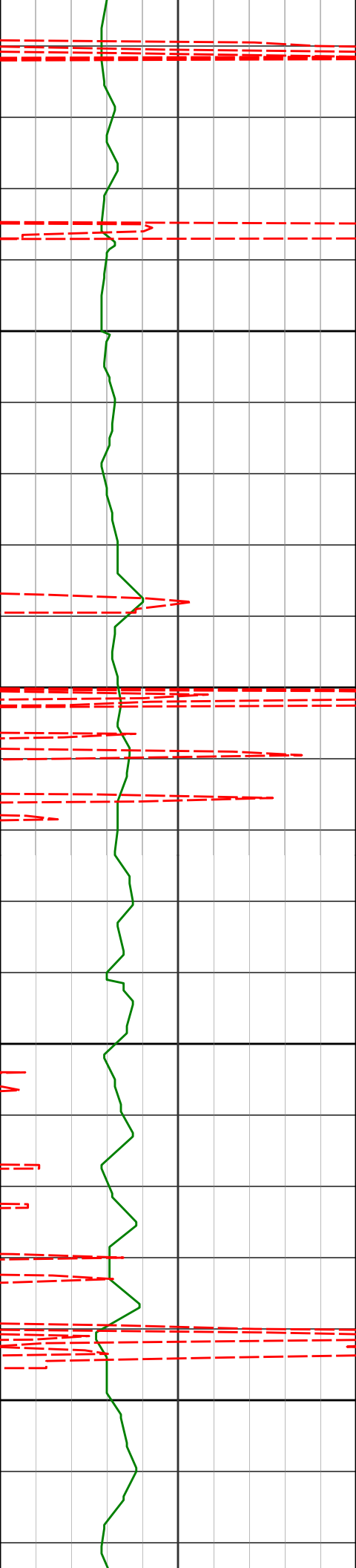
10.66°

1796.40' -238.21'

1850



1915'	12.00°	10.65°	1885.21'	-257.56'
2007'	10.99°	9.94°	1975.37'	-275.47'



2150

2190'

10.21°

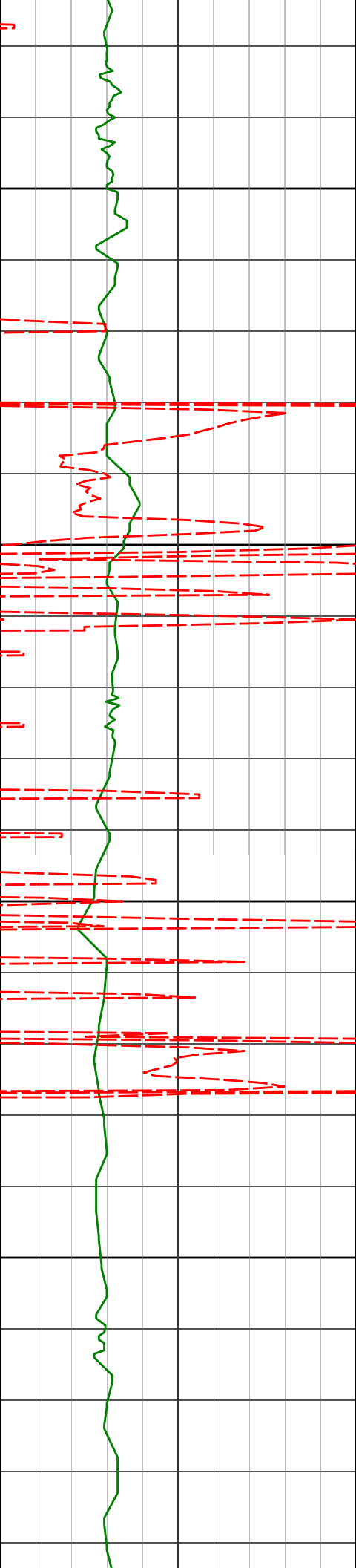
6.28°

2155.24' -308.59'

2200

2250

2300



2373'

8.89°

2.27°

2335.71' -338.74'

2350

2400

2465'

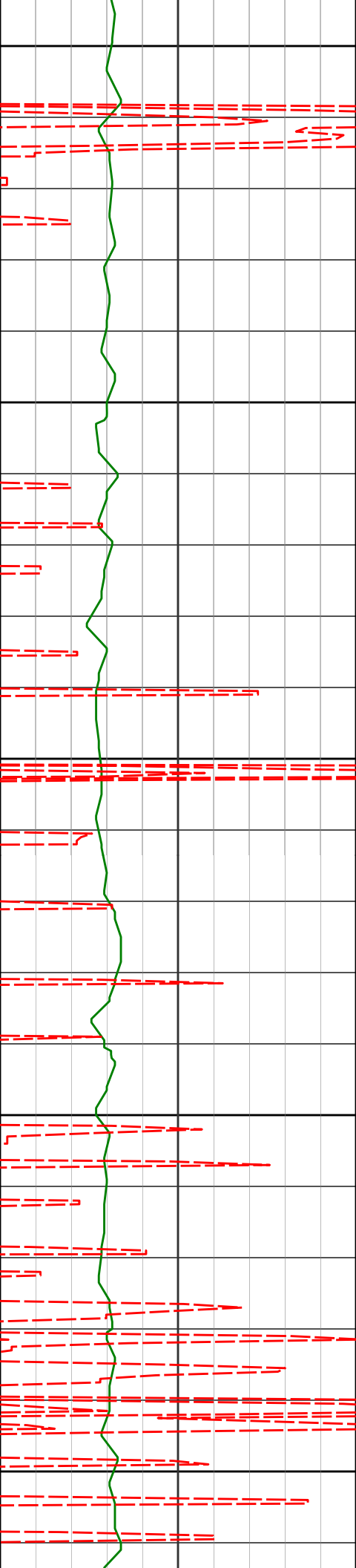
10.49°

19.12°

2426.41' -353.65'

2450

2500



2550

2600

2650

2700

2750

2647'

11.58°

16.85°

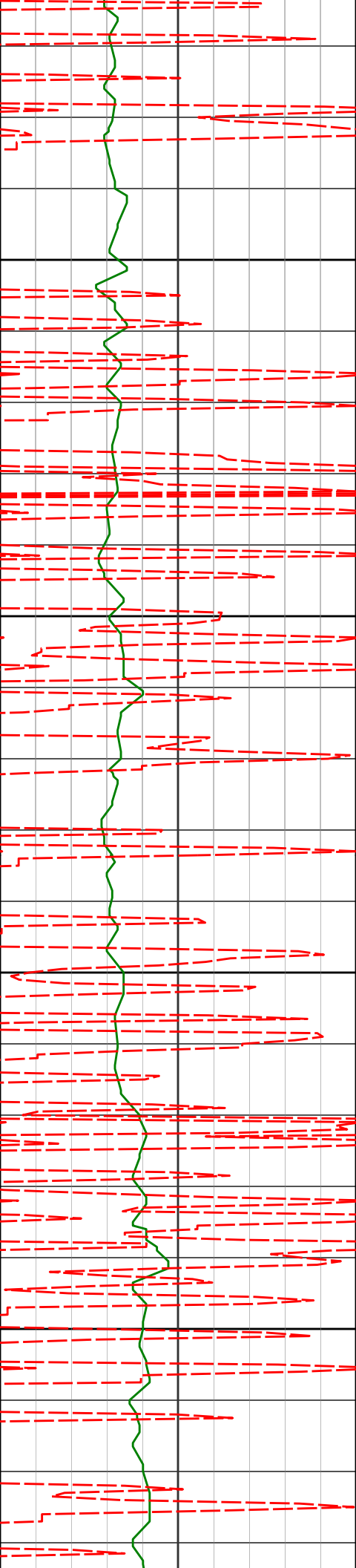
2605.04' -386.39'

2739'

11.42°

17.49°

2695.19' -403.71'



2830'

10.83°

17.64°

2784.48' -420.26'

2800

2850

2921'

9.66°

17.10°

2874.03' -435.53'

2900

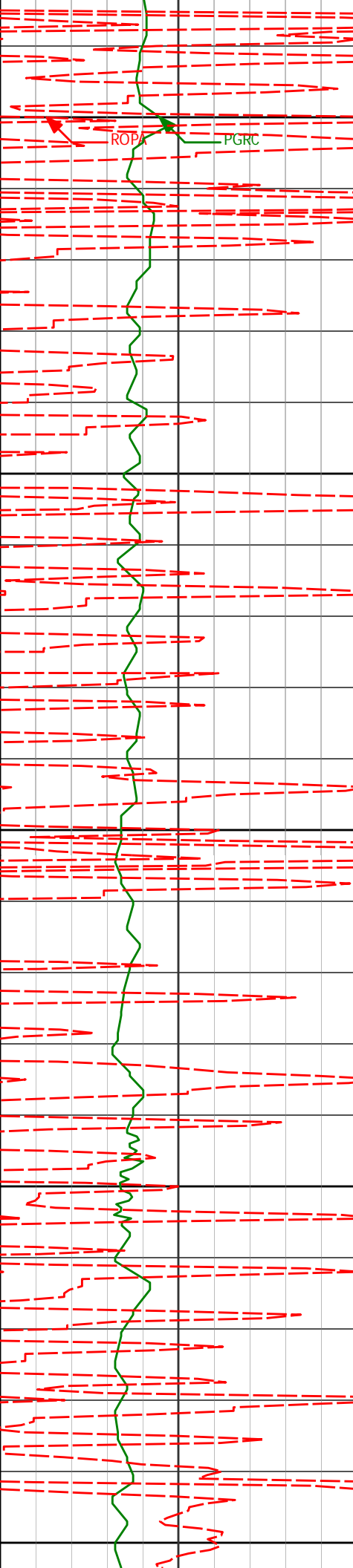
2950

3013'

9.48°

12.09°

2964.75' -450.17'



3000

3050

3100

3150

3200

3105'

8.45°

14.01°

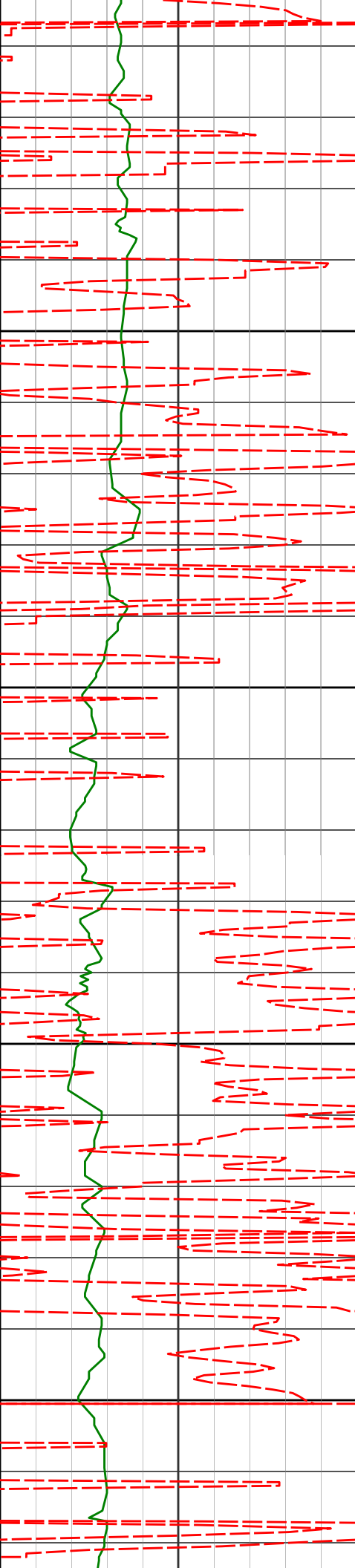
3055.63' -464.01'

3196'

7.76°

13.81°

3145.72' -476.35'



3288'

8.56°

21.75°

3236.79' -488.60'

3250

3300

3350

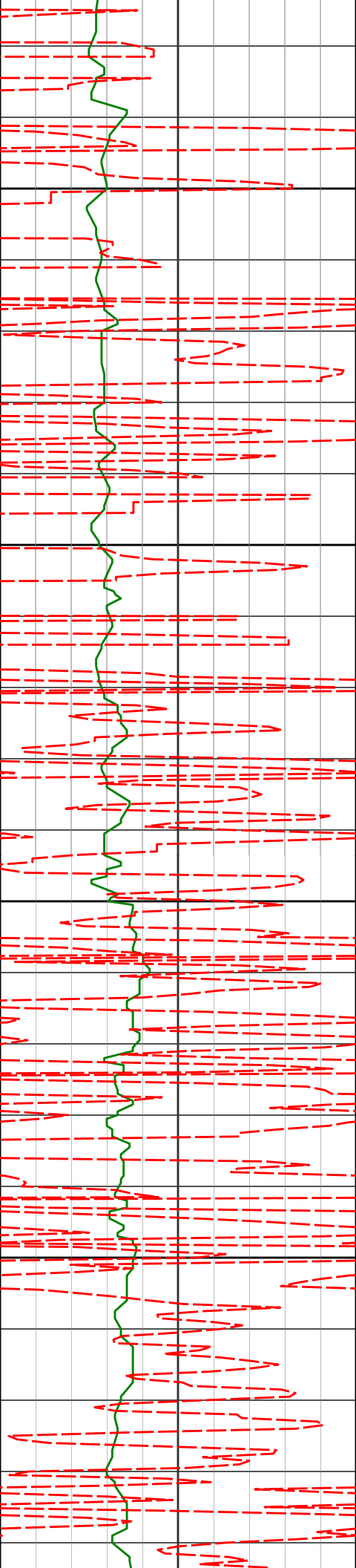
3400

3471'

8.77°

29.46°

3417.71' -512.96'



3450

3500

3550

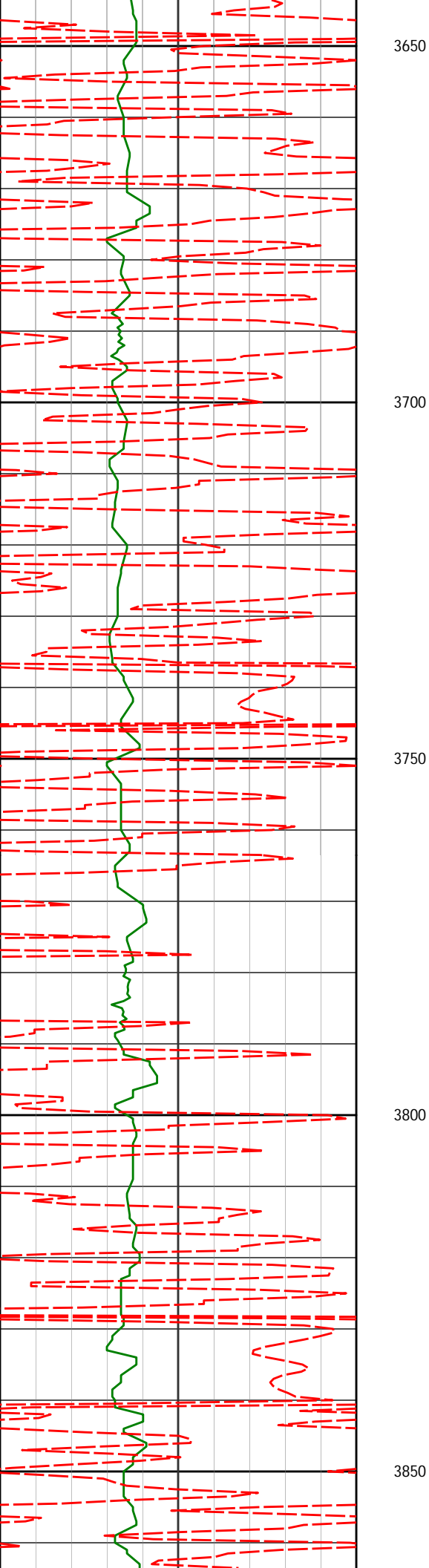
3600

3655'

8.32°

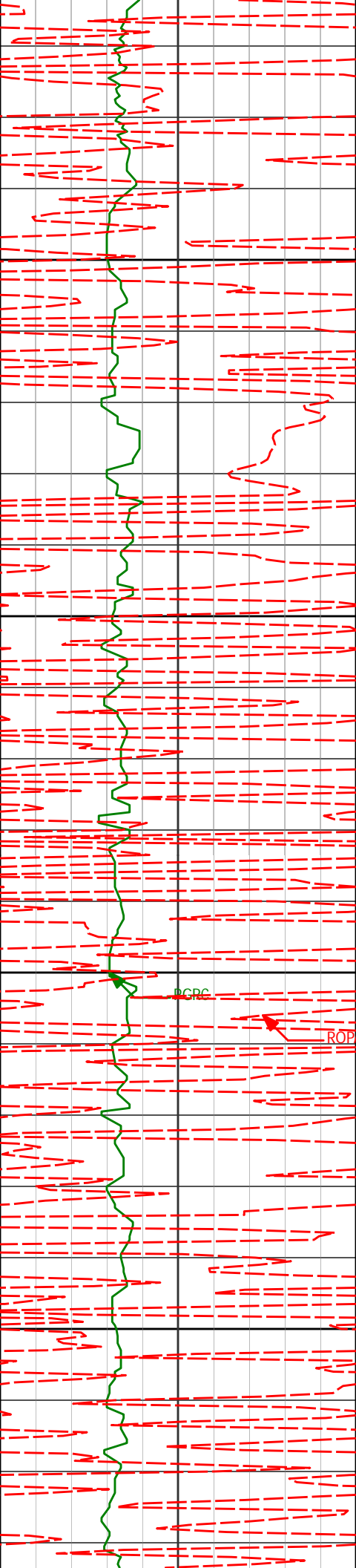
27.95°

3599.66' -536.46'



3746' 7.36° 25.69° 3689.81' -547.33'

3837' 6.93° 28.70° 3780.11' -557.21'



3929'

7.77°

34.42°

3871.35' -566.99'

3900

3950

4020'

10.08°

33.09°

3961.24' -578.46'

4000

RCRC

ROPA

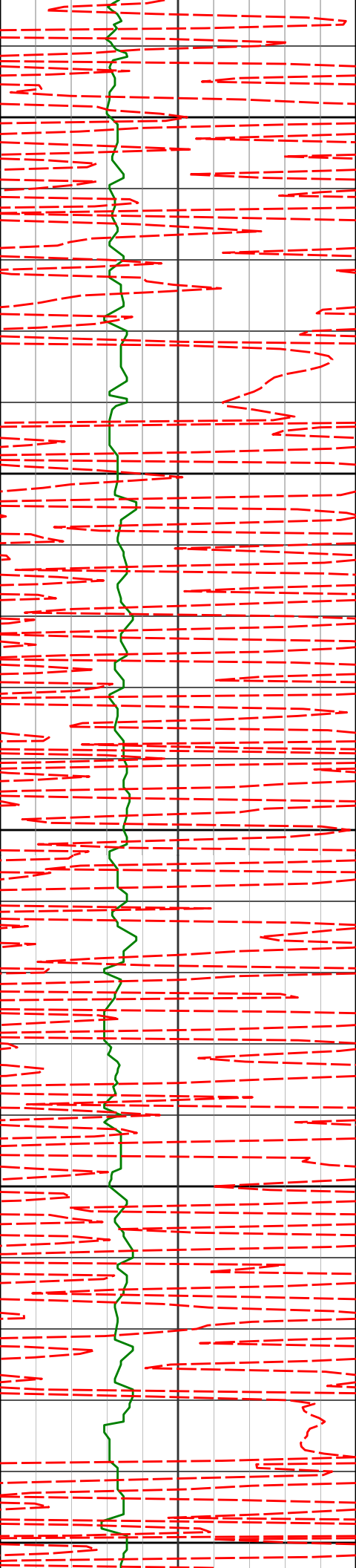
4050

4112'

9.13°

32.26°

4051.95' -591.08'



4100

4150

4200

4250

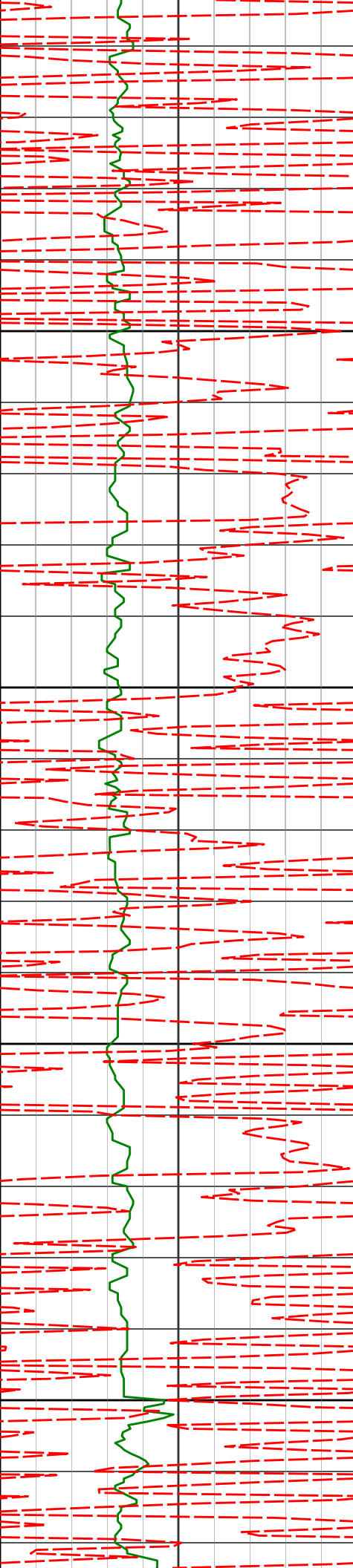
4300

4294'

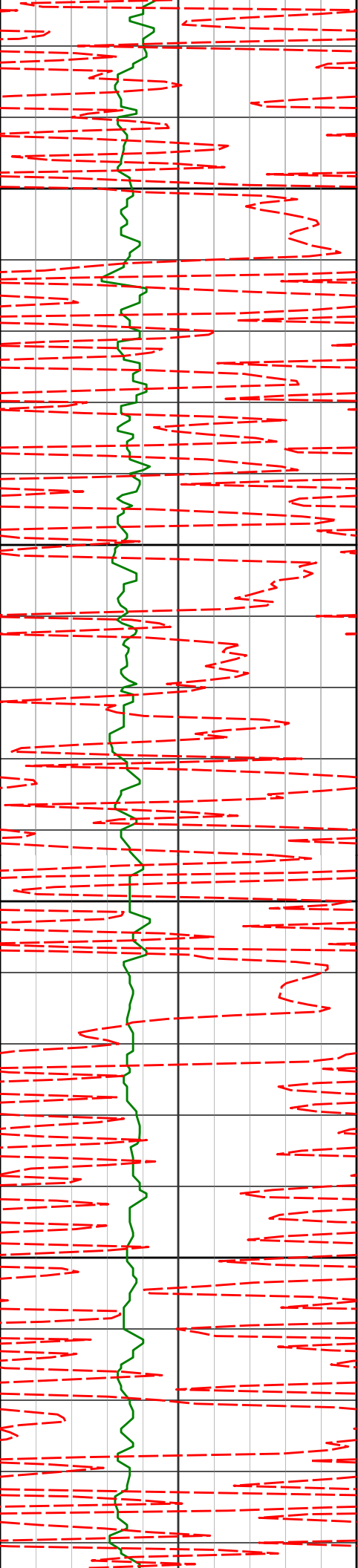
9.75°

33.67°

4231.49' -615.53'



4385'	10.11°	32.07°	4321.12'	-628.41'
4350				
4400				
4478'	10.37°	30.30°	4412.64'	-642.24'
4450				
4500				
4568'	10.01°	27.26°	4501.22'	-655.91'



4550

4660'

8.86°

20.46°

4591.98' -669.44'

4600

4650

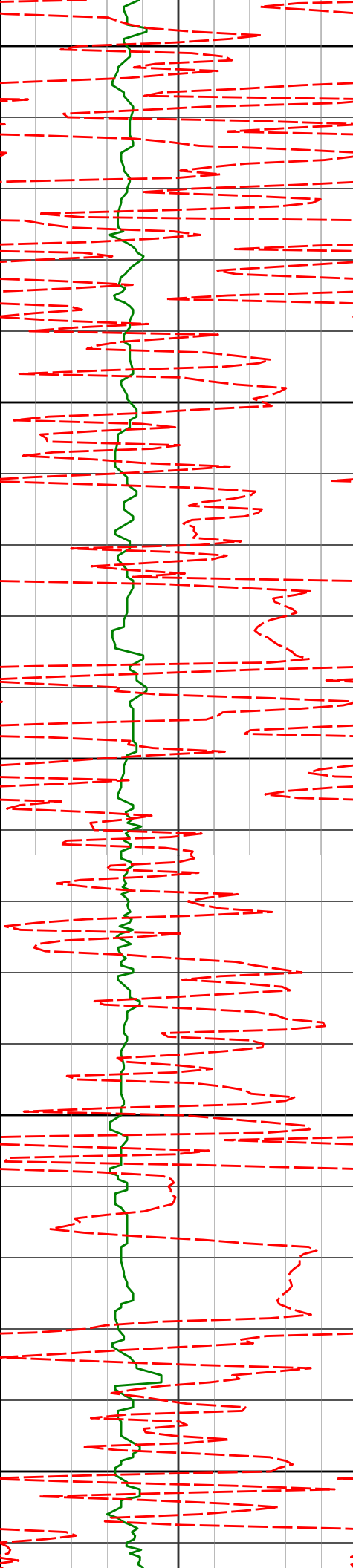
4752'

8.93°

16.94°

4682.87' -682.74'

4700



4750

4844'

7.44°

14.67°

4773.93' -695.20'

4800

4850

4935'

4.88°

18.10°

4864.40' -704.48'

4900

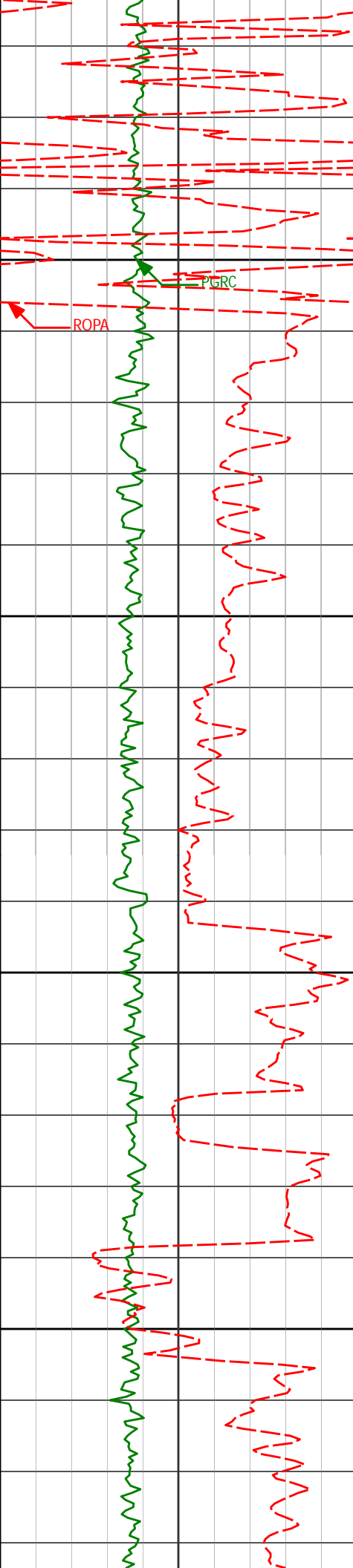
4950

5027'

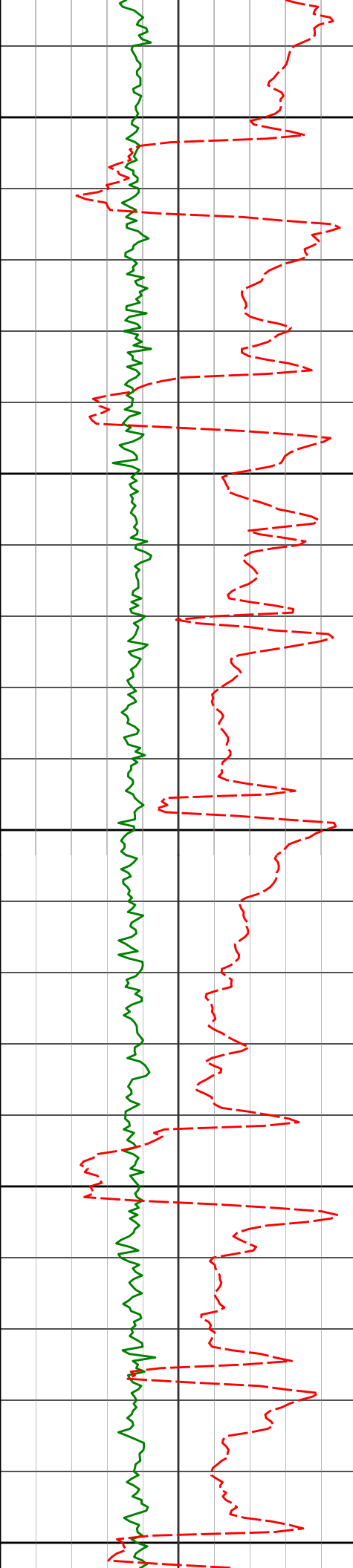
2.08°

21.89°

4956.22' -709.68'



5058'	2.03°	22.49°	4987.20' -710.70'
5089'	1.55°	114.61°	5018.19' -711.01'
5119'	5.96°	154.60°	5048.12' -709.40'
5150'	12.55°	168.52°	5078.71' -704.59'
5181'	14.09°	168.75°	5108.87' -697.55'
5211'	14.35°	170.00°	5137.95' -690.26'
5242'	13.94°	171.51°	5168.01' -682.75'



5200

5273'

15.90°

174.82°

5197.97' -674.79'

5303'

17.21°

174.83°

5226.72' -666.26'

5250

5334'

18.70°

171.60°

5256.21' -656.74'

5364'

21.78°

173.58°

5284.36' -646.41'

5300

5394'

24.32°

177.99°

5311.96' -634.68'

5425'

29.26°

182.82°

5339.63' -620.74'

5350

5456'

31.34°

184.84°

5366.39' -605.18'

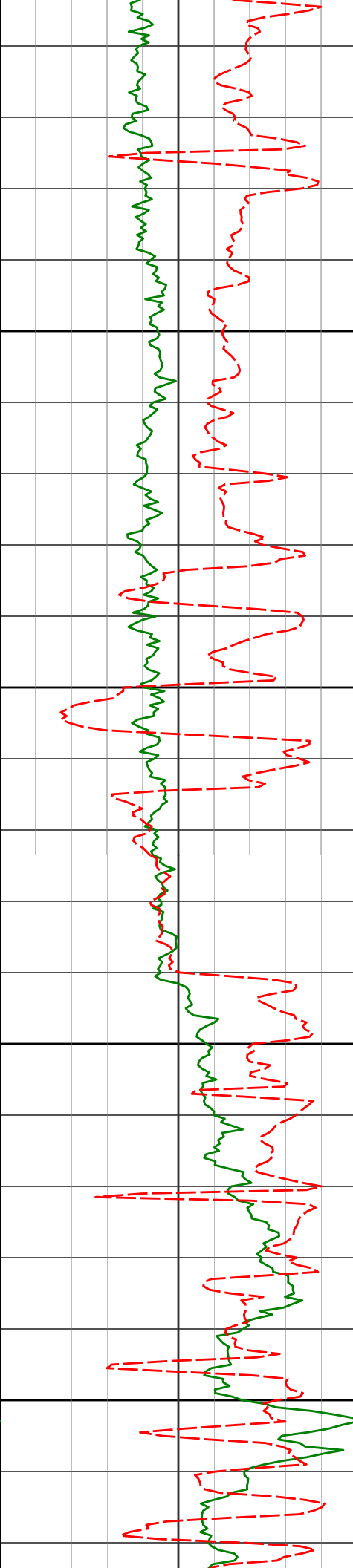
5486'

34.75°

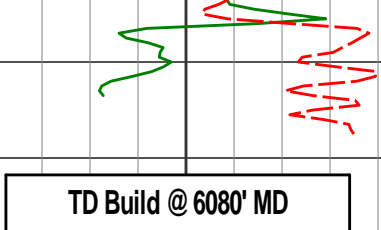
186.34°

5391.54' -588.97'

5400



5450	5517'	38.44°	185.29°	5416.42'	-570.67'
	5548'	42.36°	186.23°	5440.03'	-550.76'
	5578'	48.55°	186.73°	5461.06'	-529.63'
	5610'	53.95°	183.60°	5481.09'	-504.88'
5500	5642'	56.52°	182.61°	5499.33'	-478.70'
	5674'	56.89°	182.94°	5516.90'	-452.04'
5550	5705'	56.78°	182.69°	5533.86'	-426.18'
	5737'	59.59°	182.84°	5550.72'	-399.09'
	5768'	62.48°	181.75°	5565.74'	-372.04'
5600	5800'	65.79°	181.36°	5579.69'	-343.31'
	5832'	69.46°	183.09°	5591.87'	-313.81'
	5863'	73.53°	182.39°	5601.71'	-284.52'
	5895'	76.59°	180.92°	5609.96'	-253.66'
	5926'	77.35°	180.11°	5616.95'	-223.49'

		5650	5938'	78.78°	179.34'	5623.37'	-192.20'
			5989'	82.37°	178.94°	5628.64'	-161.63'
			6033'	85.03°	178.98°	5633.47'	-117.91'

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DIRECTIONAL SURVEY REPORT

Whiting Oil and Gas
 Razor 27J-3411A
 Redtail
 Weld Colorado
 USA
 CA-XX-0901620723
 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
176.00	0.46	275.88	176.00	0.07 N	0.70 W	-0.10	0.26
267.00	1.26	276.89	266.99	0.23 N	2.06 W	-0.30	0.88
358.00	1.65	275.43	357.96	0.47 N	4.36 W	-0.63	0.43
450.00	0.55	299.53	449.94	0.82 N	6.06 W	-1.03	1.27
543.00	1.46	13.24	542.93	2.19 N	6.18 W	-2.40	1.51
634.00	4.01	20.49	633.82	6.30 N	4.80 W	-6.46	2.82
726.00	6.27	21.13	725.44	14.00 N	1.86 W	-14.06	2.46
818.00	7.85	22.08	816.74	24.51 N	2.31 E	-24.41	1.72
910.00	9.25	14.79	907.72	37.48 N	6.56 E	-37.23	1.92
1002.00	9.66	15.14	998.47	52.08 N	10.47 E	-51.68	0.45
1093.00	10.66	13.80	1088.04	67.63 N	14.47 E	-67.08	1.13
1185.00	11.85	12.87	1178.27	85.10 N	18.60 E	-84.40	1.31
1277.00	13.08	14.51	1268.10	104.39 N	23.31 E	-103.51	1.39
1461.00	15.07	17.19	1446.57	147.40 N	35.60 E	-146.07	1.14
1531.00	16.25	17.47	1513.97	165.44 N	41.23 E	-163.90	1.69
1641.00	16.63	16.78	1619.47	195.19 N	50.40 E	-193.31	0.39
1732.00	14.65	13.06	1707.10	218.87 N	56.76 E	-216.75	2.44
1824.00	13.17	10.66	1796.40	240.50 N	61.32 E	-238.21	1.73
1915.00	12.00	10.65	1885.21	259.99 N	64.99 E	-257.56	1.29
2007.00	10.99	9.94	1975.37	278.02 N	68.27 E	-275.47	1.11
2190.00	10.21	6.28	2155.24	311.33 N	73.06 E	-308.59	0.56
2373.00	8.89	2.27	2335.71	341.58 N	75.39 E	-338.74	0.81
2465.00	10.49	19.12	2426.41	356.60 N	78.42 E	-353.65	3.52
2647.00	11.58	16.85	2605.04	389.74 N	89.14 E	-386.39	0.64
2739.00	11.42	17.49	2695.19	407.26 N	94.55 E	-403.71	0.22
2830.00	10.83	17.64	2784.48	424.00 N	99.85 E	-420.26	0.65
2921.00	9.66	17.10	2874.03	439.45 N	104.69 E	-435.53	1.29
3013.00	9.48	12.09	2964.75	454.23 N	108.54 E	-450.17	0.93
3105.00	8.45	14.01	3055.63	468.20 N	111.77 E	-464.01	1.17
3196.00	7.76	13.81	3145.72	480.65 N	114.85 E	-476.35	0.76
3288.00	8.56	21.75	3236.79	493.05 N	118.87 E	-488.60	1.50

3471.00	8.77	29.46	3417.71	517.84 N	130.78 E	-512.96	0.64
3655.00	8.32	27.95	3599.66	541.82 N	143.92 E	-536.46	0.27
3746.00	7.36	25.69	3689.81	552.89 N	149.53 E	-547.33	1.11
3837.00	6.93	28.70	3780.11	562.95 N	154.70 E	-557.21	0.63
3929.00	7.77	34.42	3871.35	572.95 N	160.88 E	-566.99	1.21
4020.00	10.08	33.09	3961.24	584.70 N	168.70 E	-578.46	2.55
4112.00	9.13	32.26	4051.95	597.62 N	176.99 E	-591.08	1.04
4294.00	9.75	33.67	4231.49	622.65 N	193.25 E	-615.53	0.36
4385.00	10.11	32.07	4321.12	635.84 N	201.76 E	-628.41	0.50
4478.00	10.37	30.30	4412.64	649.98 N	210.31 E	-642.24	0.44
4568.00	10.01	27.26	4501.22	663.93 N	217.98 E	-655.91	0.72
4660.00	8.86	20.46	4591.98	677.67 N	224.12 E	-669.44	1.74
4752.00	8.93	16.94	4682.87	691.14 N	228.68 E	-682.74	0.60
4844.00	7.44	14.67	4773.93	703.74 N	232.27 E	-695.20	1.66
4935.00	4.88	18.10	4864.40	713.12 N	234.96 E	-704.48	2.84
5027.00	2.08	21.89	4956.22	718.39 N	236.80 E	-709.68	3.05
5058.00	2.03	22.49	4987.20	719.41 N	237.22 E	-710.70	0.18
5089.00	1.55	114.61	5018.19	719.75 N	237.81 E	-711.01	8.38
5119.00	5.96	154.60	5048.12	718.17 N	238.85 E	-709.40	16.25
5150.00	12.55	168.52	5078.71	713.41 N	240.21 E	-704.59	22.30
5181.00	14.09	168.75	5108.87	706.41 N	241.62 E	-697.55	4.97
5211.00	14.35	170.00	5137.95	699.17 N	242.98 E	-690.26	1.34
5242.00	13.94	171.51	5168.01	691.69 N	244.20 E	-682.75	1.78
5273.00	15.90	174.82	5197.97	683.77 N	245.13 E	-674.79	6.89
5303.00	17.21	174.83	5226.72	675.25 N	245.90 E	-666.26	4.37
5334.00	18.70	171.60	5256.21	665.77 N	247.04 E	-656.74	5.78
5364.00	21.78	173.58	5284.36	655.48 N	248.37 E	-646.41	10.52
5394.00	24.32	177.99	5311.96	643.77 N	249.21 E	-634.68	10.23
5425.00	29.26	182.82	5339.63	629.81 N	249.06 E	-620.74	17.40
5456.00	31.34	184.84	5366.39	614.21 N	248.00 E	-605.18	7.47
5486.00	34.75	186.34	5391.54	597.94 N	246.40 E	-588.97	11.69
5517.00	38.44	185.29	5416.42	579.55 N	244.54 E	-570.67	12.07
5548.00	42.36	186.23	5440.03	559.57 N	242.51 E	-550.76	12.80
5578.00	48.55	186.73	5461.06	538.33 N	240.10 E	-529.63	20.67
5610.00	53.95	183.60	5481.09	513.49 N	237.88 E	-504.88	18.52
5642.00	56.52	182.61	5499.33	487.24 N	236.46 E	-478.70	8.42
5674.00	56.89	182.94	5516.90	460.53 N	235.16 E	-452.04	1.44
5705.00	56.78	182.69	5533.86	434.61 N	233.89 E	-426.18	0.76
5737.00	59.59	182.84	5550.72	407.45 N	232.58 E	-399.09	8.79
5768.00	62.48	181.75	5565.74	380.35 N	231.49 E	-372.04	9.82
5800.00	65.79	181.36	5579.69	351.58 N	230.71 E	-343.31	10.40
5832.00	69.46	183.09	5591.87	322.01 N	229.56 E	-313.81	12.51
5863.00	73.53	182.39	5601.71	292.66 N	228.16 E	-284.52	13.30
5895.00	76.59	180.92	5609.96	261.76 N	227.27 E	-253.66	10.54
5926.00	77.35	180.11	5616.95	231.56 N	227.00 E	-223.49	3.53
5958.00	78.78	179.54	5623.57	200.25 N	227.09 E	-192.20	4.80
5989.00	82.37	178.94	5628.64	169.67 N	227.50 E	-161.63	11.74
6033.00	85.03	178.98	5633.47	125.95 N	228.29 E	-117.91	6.05

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 178.00 DEGREES (TRUE)
A TOTAL CORRECTION OF 7.51 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6033.00 FEET
IS 260.73 FEET ALONG 61.11 DEGREES (TRUE)**

Tie onto surface at 0' MD