



WELL INFORMATION					
MWD Run Number	100	200			
Date run completed	18-Feb-15	21-Feb-15			
Rig Bit Number	0100	0200			
Bit Size (in)	13.500	8.750			
Tool Nominal OD (in)	6.750	4.750			
Log Start Depth (MD, ft)	95.00	1,882.00			
Log End Depth (MD, ft)	1,882.00	6,585.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	18-Feb-15 08:20	19-Feb-15 20:15			
Drill/Wipe End Date and Time	18-Feb-15 16:05	21-Feb-15 11:10			
Min Inc (deg) @ Depth (MD, ft)	2.17 @ 268.00	1.09 @ 5,489.00			
Max Inc (deg) @ Depth (MD, ft)	11.90 @ 1,734.00	87.33 @ 6,543.00			
Bit TFA(in2) / Bit Type	0.90 / PDC	1.04 / PDC			
Flow Rate (gpm)	593.75	489.68			
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	313.0 / 728.0			
Fluid Type	Native/Spud Mud	Polymer			
Density (ppg) / Viscosity (spqt)	8.80 / 29.00	10.00 / 44.00			
Filtrate CL (ppm)	1,700.00	22,000.00			
pH / Fluid Loss (mptm)	8.80 / 0	9.30 / 0			
PV (cP) / YP (lbf2)	1 / 1.00	17 / 12.00			
% Solids / % Sand	3 / .25	10 / .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 (degF) @ Depth (MD, ft)	168.05 @ 268.00	175.04 @ 5489.00			

Max Tool Temp (degF) / Source	106.97 / PCM	175.21 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ 106.97	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	12463931	12463931			
Insert Serial Number	11145604	11145582			
Date and Time Initialized	17-Feb-15 20:24	19-Feb-15 06:31			
Date and Time Read	18-Feb-15 19:04	21-Feb-15 20:32			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	55.00	40.09			
Software Version	6.33	6.21			
Sub Serial Number	12463931	12463931			
Sonde Serial Number	11638628	10993516			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	133.00	70.30			

Gamma Ray Sensor Information

Tool Type		PCG			
Distance From Bit (ft)		48.94			
Recorded Sample Period (sec)		10			
Software Version		8.15			
Sub Serial Number		12463931			
Insert/Sonde Serial Number		12037413			

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:

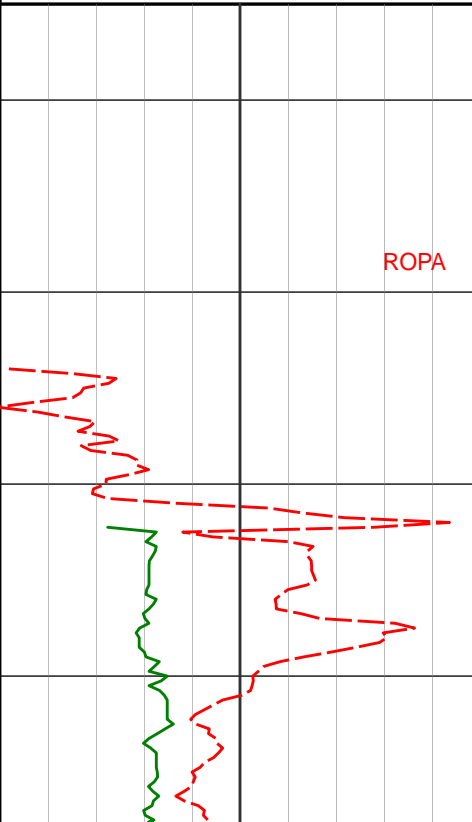
PCG Gamma Ray BCorr (PGRC)
Interval Resolution: .5
Interval Distance: .6
Gap Fill: 3

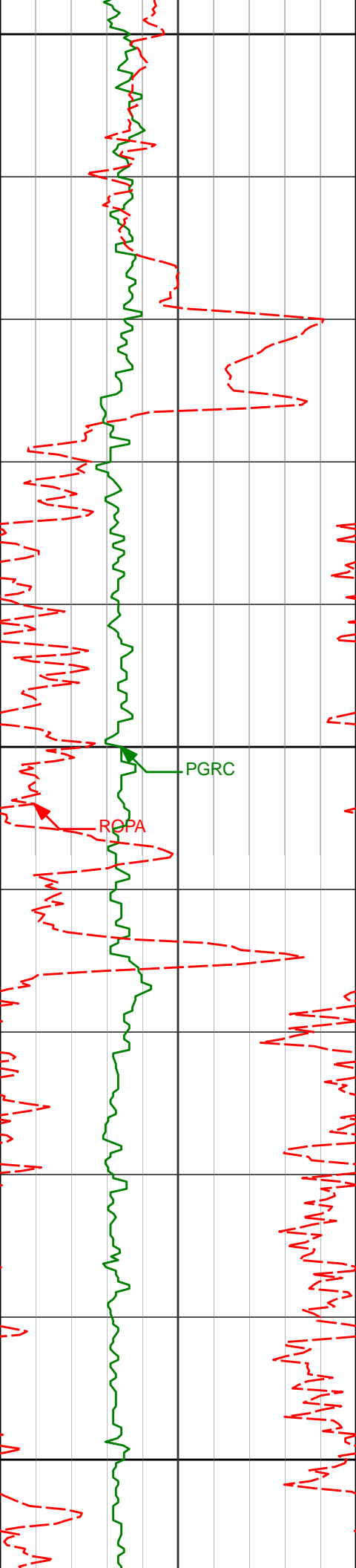
Average Rate of Penetration (ROPA)
Interval Resolution: .5
Interval Distance: 1.2
Gap Fill: 3

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HALLIBURTON
Sperry Drilling Services
TVD Main Log 1:240

Whiting Oil and Gas
Razor 11F-0205A
Frontier 26
Sec. 11-T10N-R58W

PCG Gamma Ray BCorr PCG Gamma Ray BCorr api								
0	300	Depth TVD ft	Depth	Inc	Azi	TVD	V.S.	DLS
Avg Rate of Penetration Avg Rate of Penetration feet per hr								
500	0							
PGRC								
ROPA								
								
				</				



1900

2000

2100

1917'

2009'

2100'

11.42°

11.59°

10.79°

220.05°

205.81°

201.41°

1898.36'

1988.53'

2077.80'

-178.60'

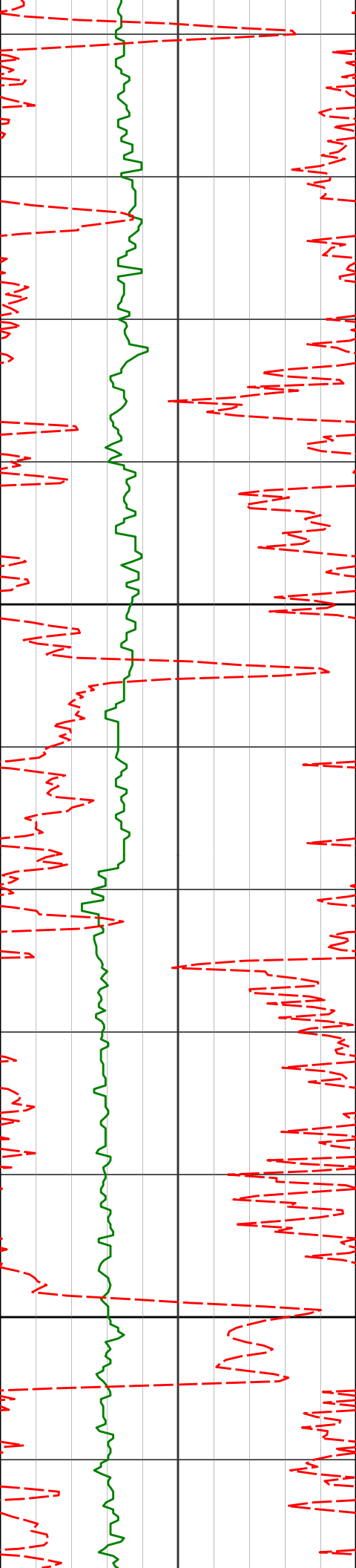
-193.19'

-208.84'

0.48°

3.09°

1.29°



2200

2300

2192'

10.58°

200.52°

2168.21'

-224.32'

0.29°

2283'

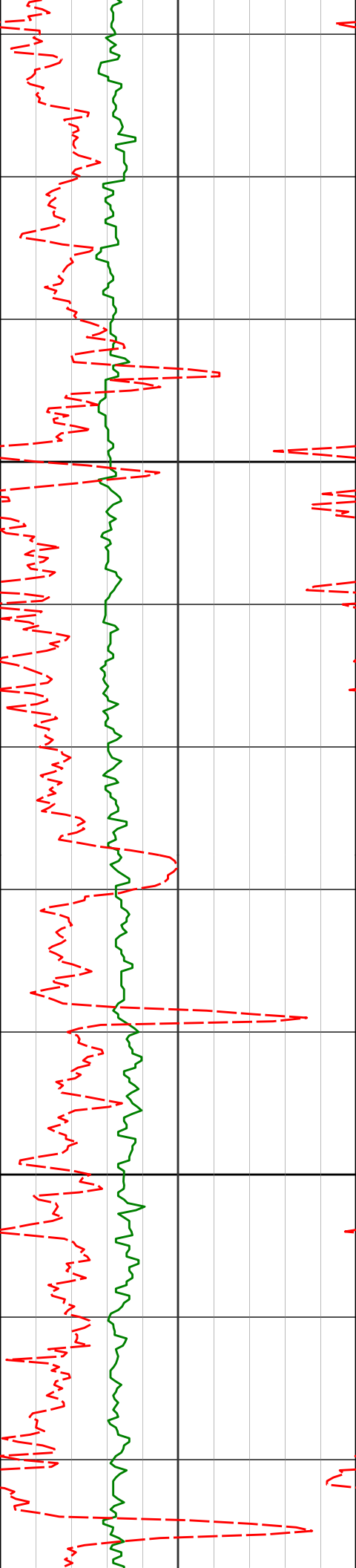
10.29°

198.84°

2257.70'

-239.43'

0.46°



2400

2500

2375'

11.97°

208.89°

2347.98'

-255.04'

2.78°

2466'

11.38°

207.89°

2437.09'

-270.61'

0.69°

2558'

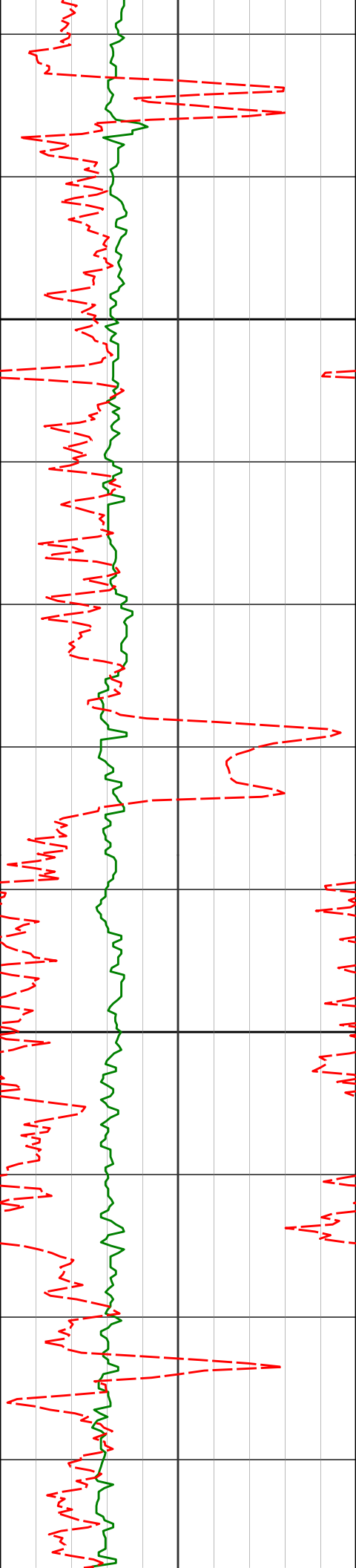
10.39°

207.30°

2527.44'

-285.43'

1.08°



2600

2700

2649'

9.96°

205.31°

2617.01'

-299.33'

0.61°

2741'

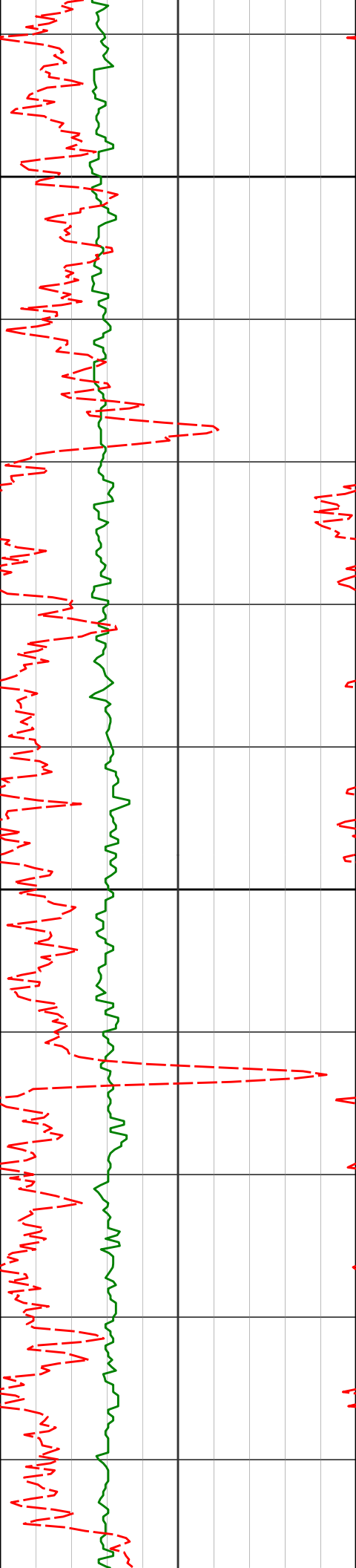
12.62°

208.86°

2707.22'

-314.73'

2.99°



2800

2900

2833'

12.42°

209.15°

2797.03'

-331.49'

0.23°

2924'

12.25°

207.23°

2885.93'

-347.96'

0.49°

3016'

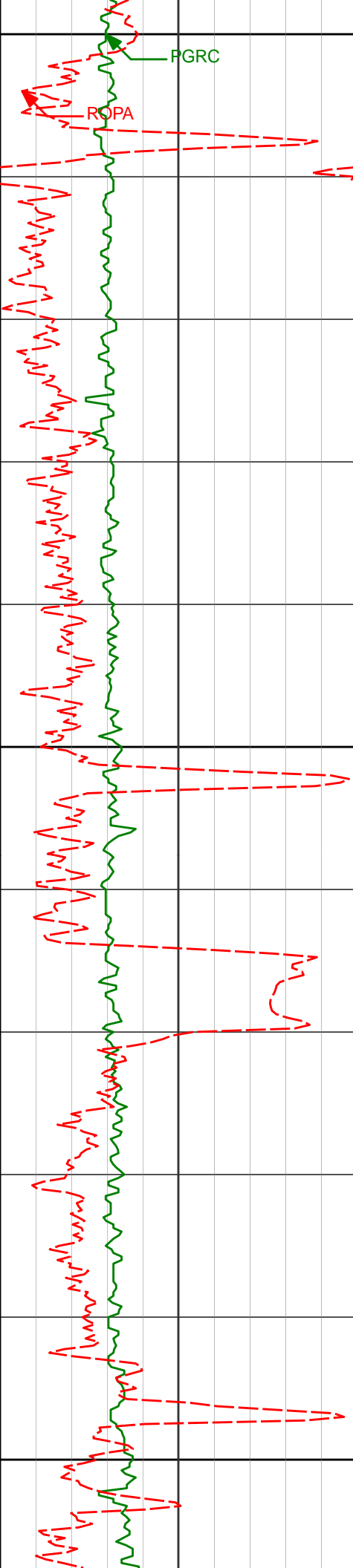
12.23°

204.74°

2975.84'

-364.88'

0.57°



3000

PGRC

ROPA

3107'

12.34°

203.28°

3064.76'

-382.00'

0.36°

3100

3199'

12.66°

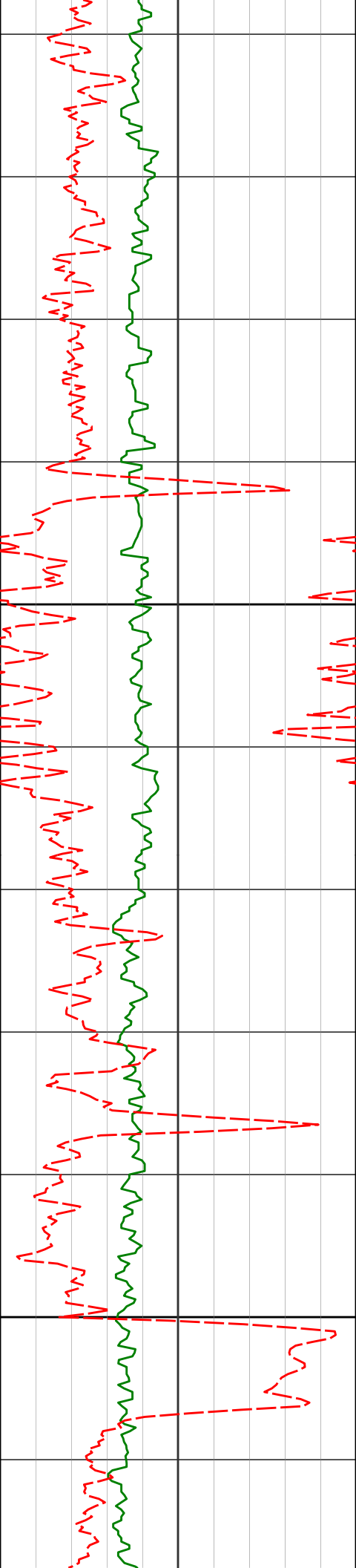
212.79°

3154.59'

-398.84'

2.26°

3200



3290'

11.63°

208.35°

3243.55'

-414.60'

1.53°

3300

3382'

9.67°

200.31°

3333.97'

-429.50'

2.67°

3400

3474'

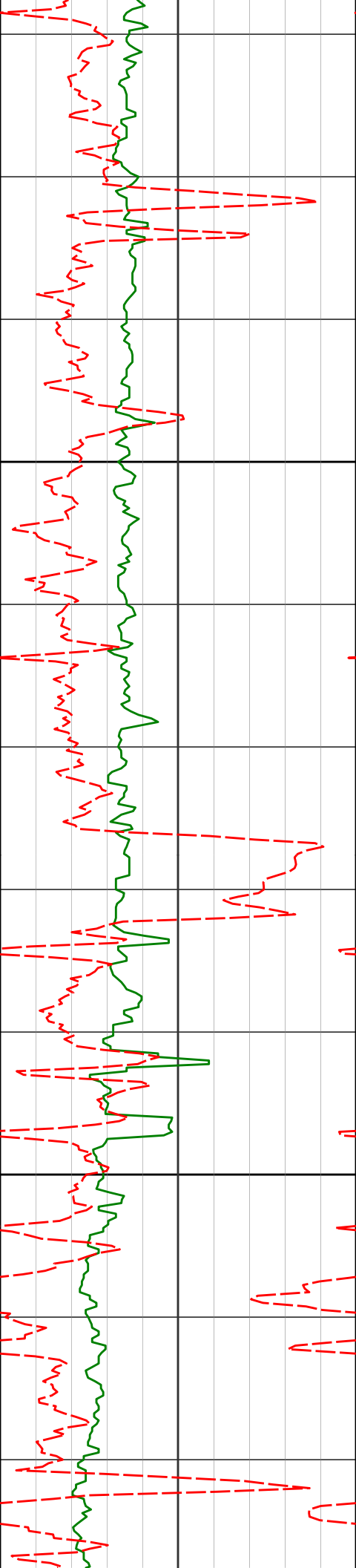
10.20°

207.40°

3424.59'

-443.51'

1.45°



3500

3565'

10.02°

205.94°

3514.18'

-457.27'

0.34°

3600

3656'

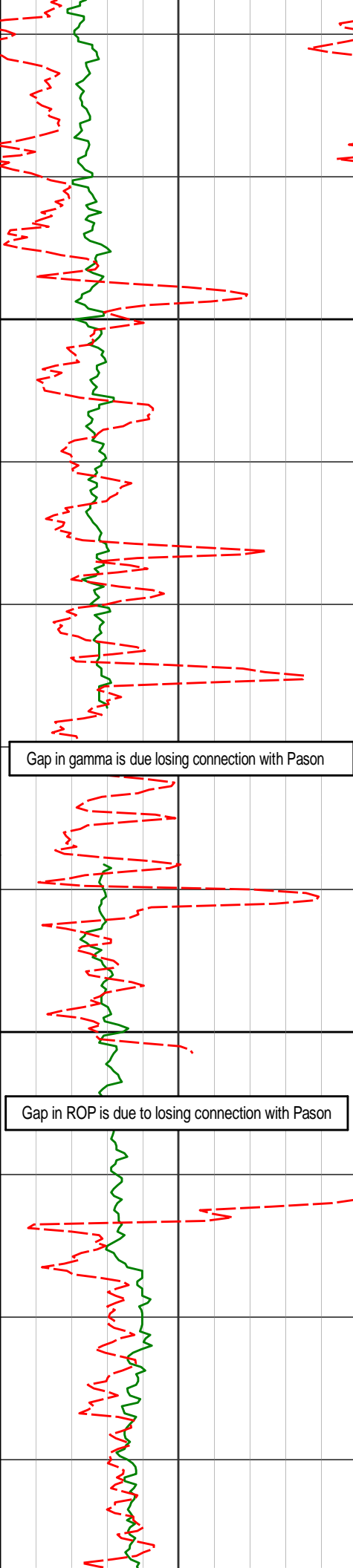
11.42°

211.40°

3603.59'

-471.50'

1.90°



3700

3748'

11.86°

211.07°

3693.70'

-486.69'

0.48°

3800

3839'

12.21°

211.31°

3782.70'

-502.23'

0.39°

3930'

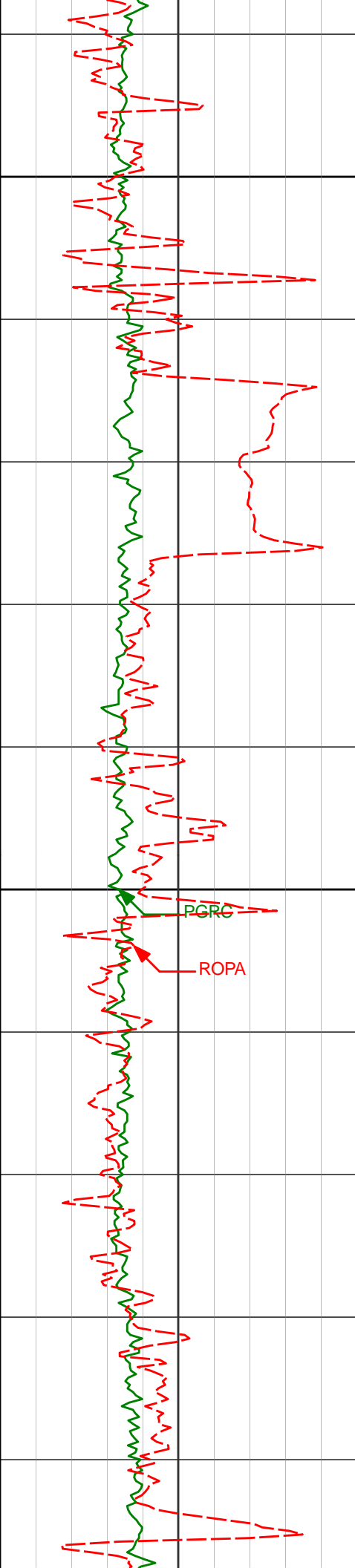
11.30°

210.87°

3871.79'

-517.42'

1.00°



3900

4000

4021'

14.09°

211.93°

3960.55'

-533.74'

3.08°

PGRC

ROPA

4113'

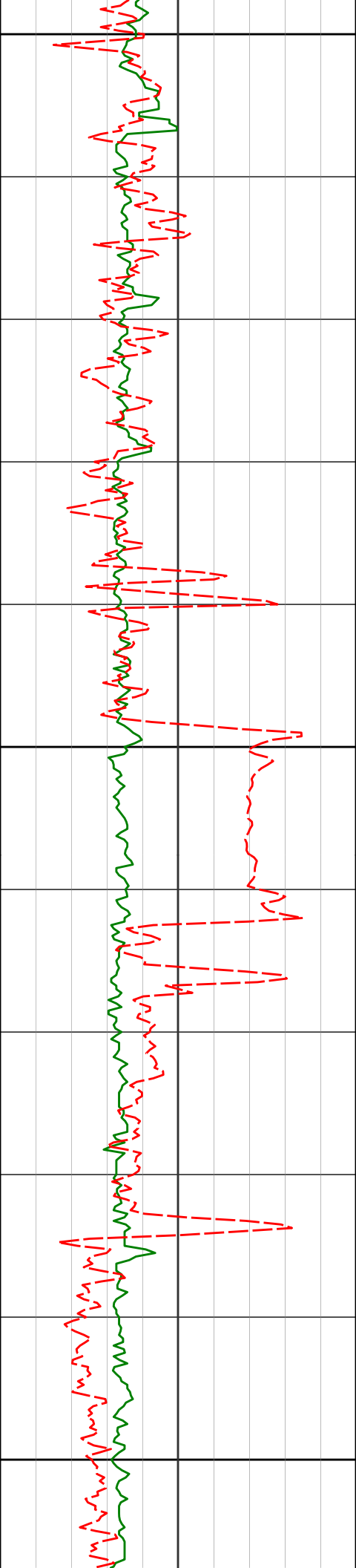
13.42°

206.55°

4049.92'

-552.03'

1.57°



4100

4205'

12.39°

204.93°

4139.59'

-569.89'

1.19°

4200

4296'

14.09°

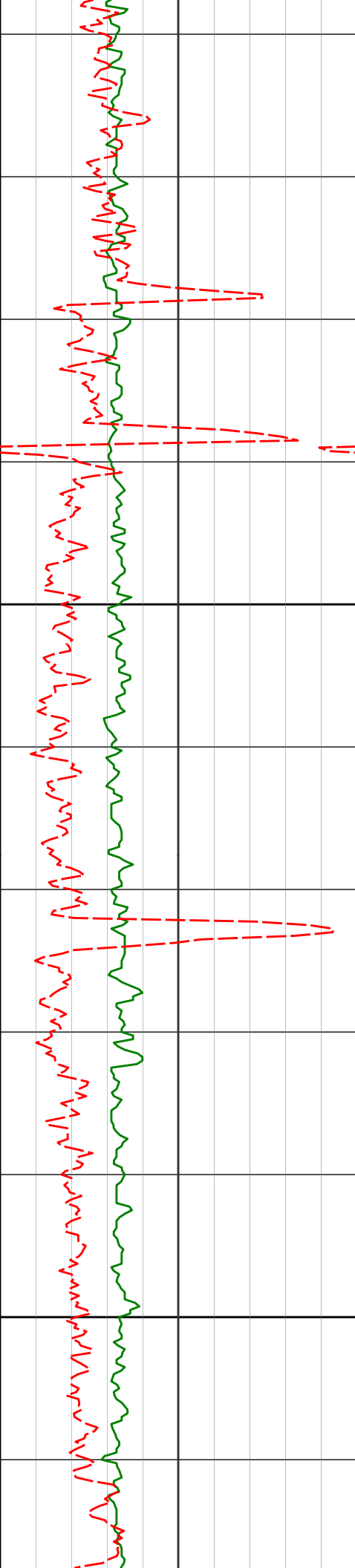
216.37°

4228.19'

-586.91'

3.42°

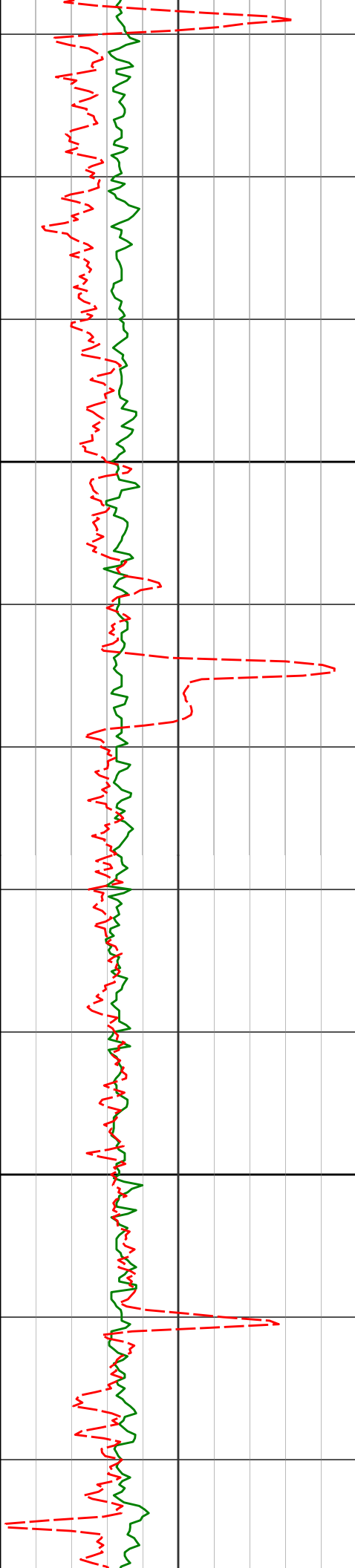
4300



4400

4500

4387'	14.03°	215.49°	4316.46'	-603.90'	0.24°
4479'	13.53°	214.39°	4405.81'	-620.98'	0.61°
4571'	12.34°	213.23°	4495.48'	-637.27'	1.32°



4600

4700

4664'

11.61°

210.76°

4586.45'

-652.90'

0.96°

4754'

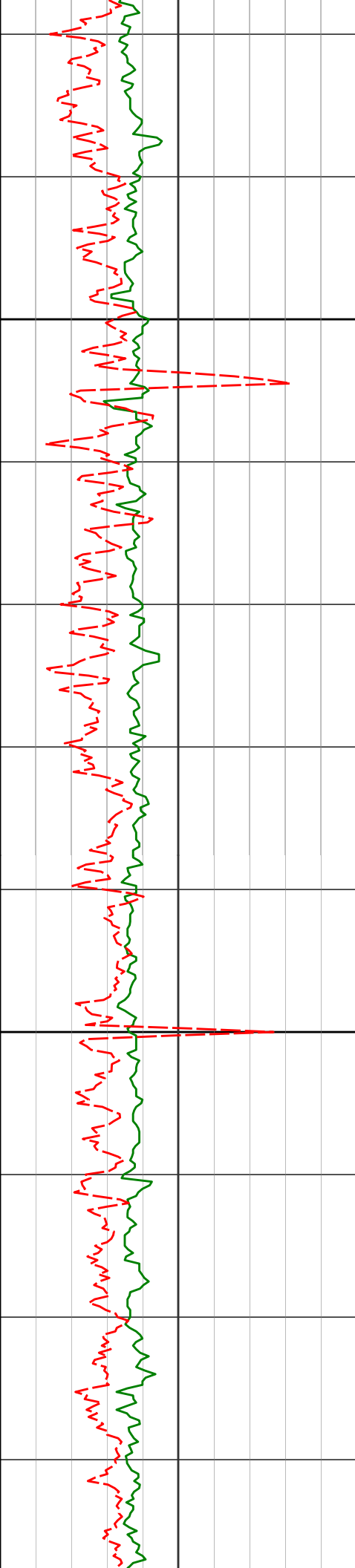
10.77°

206.47°

4674.74'

-667.62'

1.31°



4800

4900

4847'

9.08°

200.87°

4766.35'

-681.79'

2.09°

4939'

8.45°

196.11°

4857.28'

-694.73'

1.04°

5031'

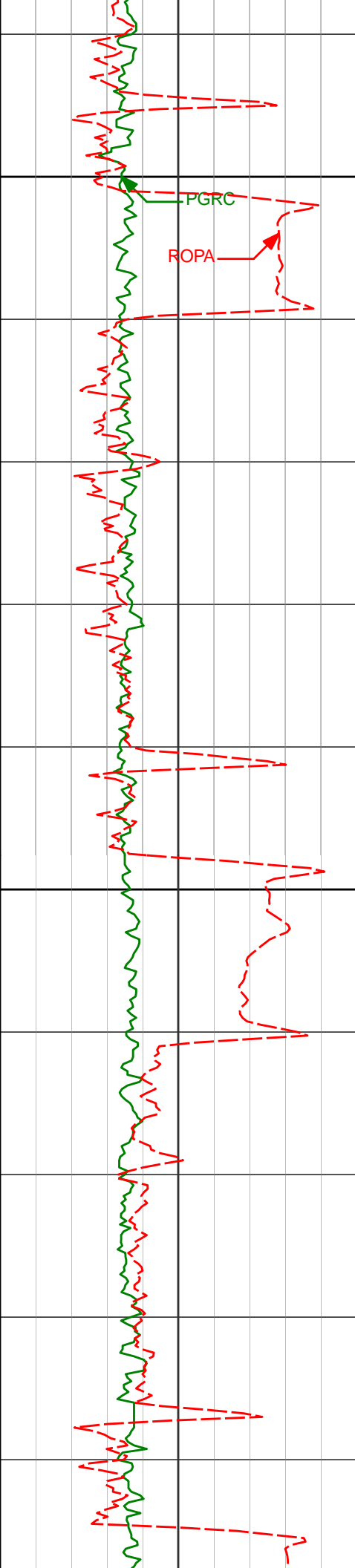
6.71°

192.43°

4948.47'

-706.25'

1.96°



5000

PGRC

ROPA

5100

5123'

3.36°

194.18°

5040.10'

-713.97'

3.64°

5215'

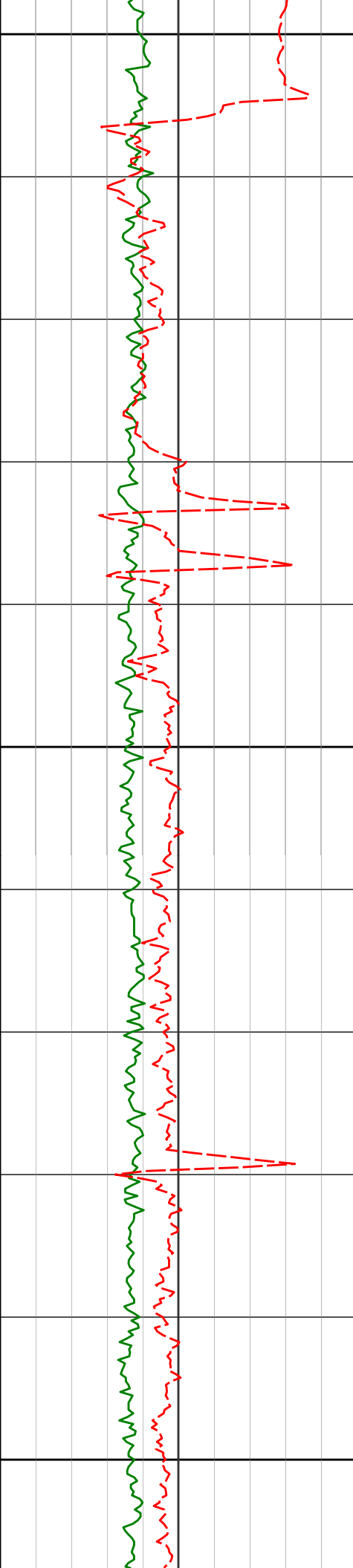
1.63°

217.73°

5132.01'

-717.52'

2.15°



5200

5307'

1.50°

1.88°

5224.00'

-717.30'

3.24°

5300

5398'

1.20°

17.10°

5314.97'

-715.22'

0.51°

5400

5489'

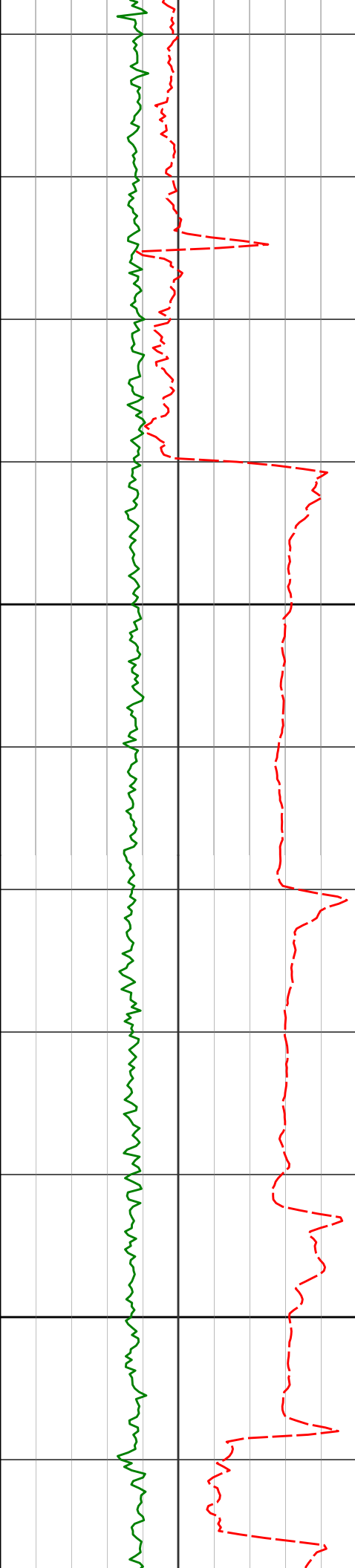
1.09°

23.52°

5405.96'

-713.56'

0.19°



KOP 5563' MD

5500

5600

5581'

5628'

5676'

2.99°

9.67°

15.88°

351.42°

335.05°

338.76°

5497.90'

5544.59'

5591.38'

-710.39'

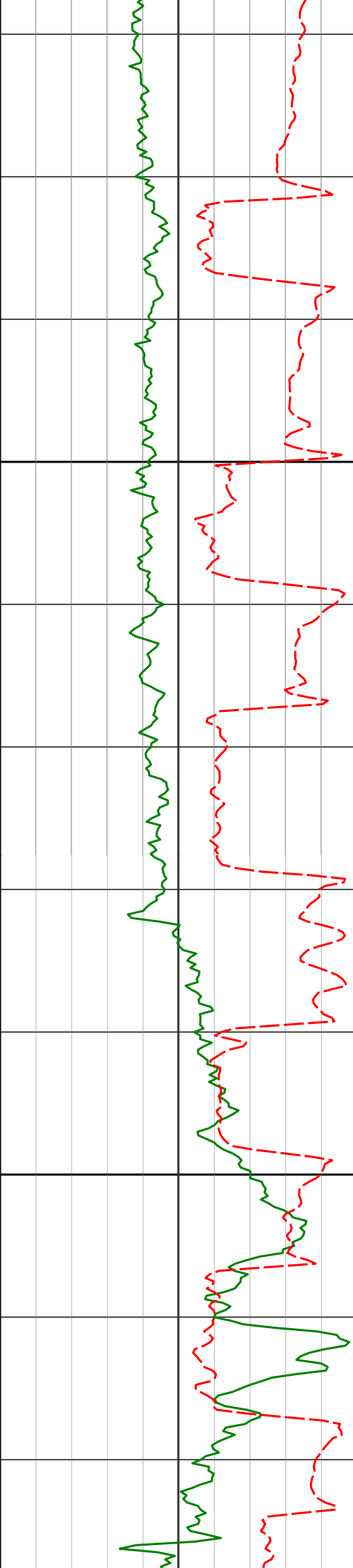
-705.48'

-695.45'

2.33°

14.58°

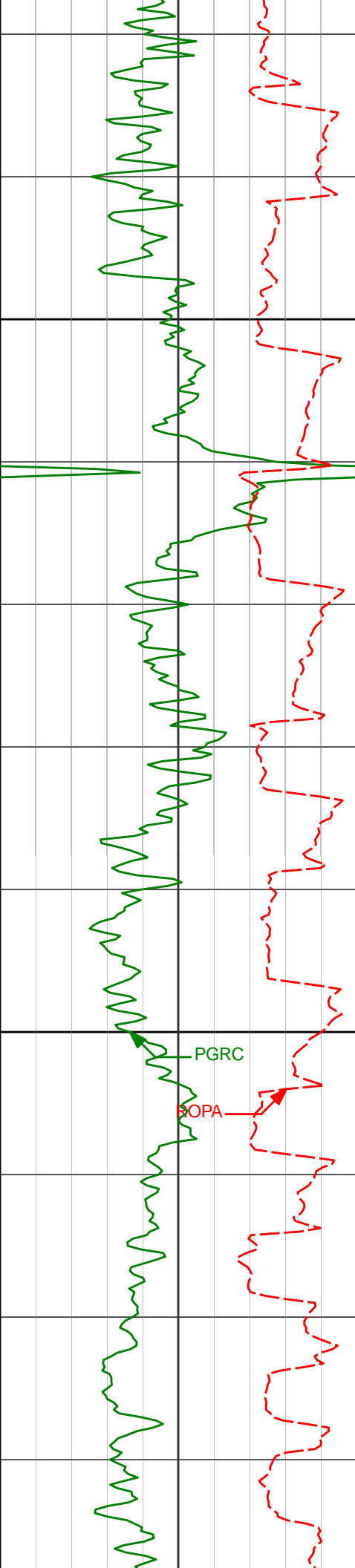
13.04°



5700

5800

5723'	20.63°	344.22°	5636.00'	-681.20'	10.73°
5771'	25.79°	349.20°	5680.10'	-662.55'	11.49°
5818'	30.21°	351.46°	5721.59'	-640.60'	9.67°
5866'	33.13°	352.86°	5762.44'	-615.46'	6.27°
5913'	36.82°	355.08°	5800.95'	-588.55'	8.30°
5961'	39.76°	357.09°	5838.62'	-558.81'	6.65°



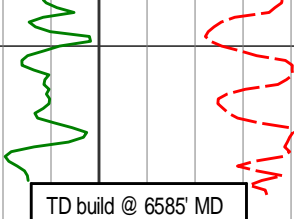
5900

6000

PGRC

SOPA

6008'	41.75°	357.68°	5874.22'	-528.14'	4.31°
6056'	45.31°	357.43°	5909.02'	-495.10'	7.43°
6103'	49.59°	358.55°	5940.79'	-460.50'	9.27°
6151'	54.40°	359.40°	5970.34'	-422.74'	10.12°
6198'	58.06°	359.59°	5996.46'	-383.74'	7.79°
6246'	62.93°	359.62°	6020.09'	-342.05'	10.15°
6293'	67.85°	0.94°	6039.66'	-299.45'	10.77°
6341'	70.60°	1.23°	6056.69'	-254.74'	5.76°
6388'	74.94°	0.37°	6070.60'	-210.01'	9.40°

		6100	6436'	78.62°	0.42°	6081.58'	-163.42'	7.67°	
			6483'	83.02°	359.31°	6089.08'	-117.13'	9.65°	
			6531'	86.52°	358.16°	6093.45'	-69.38'	7.67°	
Avg Rate of Penetration Avg Rate of Penetration feet per hr		Depth TVD ft	Depth	Inc	Azi	TVD	V.S.	DLS	
PCG Gamma Ray BCorr PCG Gamma Ray BCorr api									

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Whiting Oil and Gas
Razor 11F-0205A
Redtail
Weld Colorado
USA
CA-XX-0901932192
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	2.26	225.45	175.95	2.43 S	2.47 W	-2.26	1.28
268.00	2.17	219.69	267.89	5.05 S	4.88 W	-4.71	0.26
360.00	2.52	227.06	359.81	7.77 S	7.47 W	-7.25	0.50
451.00	4.22	208.28	450.65	12.08 S	10.52 W	-11.34	2.20
543.00	6.68	209.07	542.23	19.74 S	14.73 W	-18.70	2.68
636.00	6.55	211.00	634.61	29.01 S	20.09 W	-27.60	0.28
728.00	6.02	212.14	726.06	37.59 S	25.36 W	-35.81	0.59
820.00	7.82	217.62	817.38	46.64 S	31.74 W	-44.40	2.08
912.00	7.90	216.89	908.52	56.65 S	39.36 W	-53.88	0.14
1004.00	7.63	216.32	999.67	66.63 S	46.77 W	-63.34	0.31
1094.00	7.58	216.35	1088.88	76.22 S	53.83 W	-72.44	0.06
1185.00	8.11	215.65	1179.03	86.27 S	61.13 W	-81.97	0.59
1278.00	7.69	217.85	1271.15	96.52 S	68.77 W	-91.68	0.56
1460.00	11.10	219.01	1450.68	119.75 S	87.27 W	-113.62	1.88
1552.00	11.51	220.94	1540.90	133.57 S	98.86 W	-126.63	0.61
1643.00	11.63	220.91	1630.05	147.36 S	110.82 W	-139.58	0.13
1734.00	11.90	222.10	1719.14	161.25 S	123.12 W	-152.62	0.40
1825.00	11.65	221.92	1808.22	175.05 S	135.54 W	-165.55	0.28
1917.00	11.42	220.05	1898.36	188.93 S	147.61 W	-178.60	0.48
2009.00	11.59	205.81	1988.53	204.23 S	157.50 W	-193.19	3.09
2100.00	10.79	201.41	2077.80	220.39 S	164.59 W	-208.84	1.29
2192.00	10.58	200.52	2168.21	236.32 S	170.69 W	-224.32	0.29
2283.00	10.29	198.84	2257.70	251.83 S	176.24 W	-239.43	0.46
2375.00	11.97	208.89	2347.98	267.97 S	183.51 W	-255.04	2.78
2466.00	11.38	207.89	2437.09	284.16 S	192.27 W	-270.61	0.69
2558.00	10.39	207.30	2527.44	299.56 S	200.32 W	-285.43	1.08
2649.00	9.96	205.31	2617.01	313.96 S	207.45 W	-299.33	0.61
2741.00	12.62	208.86	2707.22	329.96 S	215.70 W	-314.73	2.99
2833.00	12.42	209.15	2797.03	347.40 S	225.37 W	-331.49	0.23
2924.00	12.25	207.88	2885.88	364.58 S	234.55 W	-347.88	0.48

2924.00	12.25	207.23	2885.93	364.53 S	234.55 W	-347.96	0.49
3016.00	12.23	204.74	2975.84	382.06 S	243.10 W	-364.88	0.57
3107.00	12.34	203.28	3064.76	399.75 S	250.98 W	-382.00	0.36
3199.00	12.66	212.79	3154.59	417.26 S	260.32 W	-398.84	2.26
3290.00	11.63	208.35	3243.55	433.71 S	270.08 W	-414.60	1.53
3382.00	9.67	200.31	3333.97	449.12 S	277.16 W	-429.50	2.67
3474.00	10.20	207.40	3424.59	463.60 S	283.60 W	-443.51	1.45
3565.00	10.02	205.94	3514.18	477.87 S	290.77 W	-457.27	0.34
3656.00	11.42	211.40	3603.59	492.68 S	298.92 W	-471.50	1.90
3748.00	11.86	211.07	3693.70	508.56 S	308.55 W	-486.69	0.48
3839.00	12.21	211.31	3782.70	524.79 S	318.37 W	-502.23	0.39
3930.00	11.30	210.87	3871.79	540.66 S	327.95 W	-517.42	1.00
4021.00	14.09	211.93	3960.55	557.72 S	338.39 W	-533.74	3.08
4113.00	13.42	206.55	4049.92	576.77 S	349.08 W	-552.03	1.57
4205.00	12.39	204.93	4139.59	595.27 S	358.01 W	-569.89	1.19
4296.00	14.09	216.37	4228.19	613.05 S	368.70 W	-586.91	3.42
4387.00	14.03	215.49	4316.46	630.95 S	381.67 W	-603.90	0.24
4479.00	13.53	214.39	4405.81	648.91 S	394.22 W	-620.98	0.61
4571.00	12.34	213.23	4495.48	666.02 S	405.69 W	-637.27	1.32
4664.00	11.61	210.76	4586.45	682.37 S	415.92 W	-652.90	0.96
4754.00	10.77	206.47	4674.74	697.68 S	424.30 W	-667.62	1.31
4847.00	9.08	200.87	4766.35	712.32 S	430.79 W	-681.79	2.09
4939.00	8.45	196.11	4857.28	725.60 S	435.25 W	-694.73	1.04
5031.00	6.71	192.43	4948.47	737.34 S	438.29 W	-706.25	1.96
5123.00	3.36	194.18	5040.10	745.21 S	440.10 W	-713.97	3.64
5215.00	1.63	217.73	5132.01	748.85 S	441.56 W	-717.52	2.15
5307.00	1.50	1.88	5224.00	748.69 S	442.33 W	-717.30	3.24
5398.00	1.20	17.10	5314.97	746.58 S	442.01 W	-715.22	0.51
5489.00	1.09	23.52	5405.96	744.88 S	441.38 W	-713.56	0.19
5581.00	2.99	351.42	5497.90	741.70 S	441.39 W	-710.39	2.33
5628.00	9.67	335.05	5544.59	736.91 S	443.24 W	-705.48	14.58
5676.00	15.88	338.76	5591.38	727.12 S	447.32 W	-695.45	13.04
5723.00	20.63	344.22	5636.00	713.15 S	451.91 W	-681.20	10.73
5771.00	25.79	349.20	5680.10	694.74 S	456.17 W	-662.55	11.49
5818.00	30.21	351.46	5721.59	673.00 S	459.84 W	-640.60	9.67
5866.00	33.13	352.86	5762.44	648.03 S	463.27 W	-615.46	6.27
5913.00	36.82	355.08	5800.95	621.25 S	466.07 W	-588.55	8.30
5961.00	39.76	357.09	5838.62	591.58 S	468.08 W	-558.81	6.65
6008.00	41.75	357.68	5874.22	560.93 S	469.48 W	-528.14	4.31
6056.00	45.31	357.43	5909.02	527.91 S	470.89 W	-495.10	7.43
6103.00	49.59	358.55	5940.79	493.31 S	472.10 W	-460.50	9.27
6151.00	54.40	359.40	5970.34	455.51 S	472.76 W	-422.74	10.12
6198.00	58.06	359.59	5996.46	416.45 S	473.11 W	-383.74	7.79
6246.00	62.93	359.62	6020.09	374.68 S	473.39 W	-342.05	10.15
6293.00	67.85	0.94	6039.66	331.97 S	473.18 W	-299.45	10.77
6341.00	70.60	1.23	6056.69	287.10 S	472.32 W	-254.74	5.76
6388.00	74.94	0.37	6070.60	242.23 S	471.70 W	-210.01	9.40
6436.00	78.62	0.42	6081.58	195.51 S	471.38 W	-163.42	7.67
6483.00	83.02	359.31	6089.08	149.12 S	471.49 W	-117.13	9.65
6531.00	86.52	358.16	6093.45	101.34 S	472.55 W	-69.38	7.67
6543.00	87.33	357.96	6094.09	89.37 S	472.95 W	-57.41	6.95

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 356.15 DEGREES (TRUE)
A TOTAL CORRECTION OF 7.46 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6543.00 FEET
IS 481.32 FEET ALONG 259.30 DEGREES (TRUE)**

Tie onto surface at 0' MD