



WELL INFORMATION					
MWD Run Number	100	200			
Date run completed	08-Mar-13	10-Mar-13			
Rig Bit Number	2	3			
Bit Size (in)	8.750	8.750			
Tool Nominal OD (in)	6.750	6.750			
Log Start Depth (TVD, ft)	683.00	5,826.26			
Log End Depth (TVD, ft)	5,826.26	6,596.70			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	08-Mar-13 02:45	09-Mar-13 05:00			
Drill/Wipe End Date and Time	08-Mar-13 19:30	09-Mar-13 20:30			
Min Inc (deg) @ Depth (TVD, ft)	.35 @ 4,740.40	.40 @ 5,877.26			
Max Inc (deg) @ Depth (TVD, ft)	15.08 @ 2,498.40	86.51 @ 6,593.92			
Bit TFA(in2) / Bit Type	.86 / PDC	.86 / PDC			
Flow Rate (gpm)	588.46	575.00			
Max AV (fpm) / CV (fpm) @ MWD	427.6 / NA	414.6 / NA			
Fluid Type	Fresh Water Gel	Fresh Water Gel			
Density (ppg) / Viscosity (spqt)	8.80 / 30.00	10.30 / 30.00			
Filtrate CL (ppm)	1,900.00	2,300.00			
pH / Fluid Loss (mptm)	9.90 / NA	9.90 / NA			
PV (cP) / YP (lbf2)	5 / 4.00	4 / 2.00			
% Solids / % Sand	2.2 / .5	5.4 / 0.40			
% Oil / Oil:Water Ratio	0.5 / 0.5:97	0 / 0:90			
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 (deg F) / S	145.00 / PDM	150.40 / PDM			

Max Tool Temp (degF) / Source	145.90 / PCM	156.13 / PCM			
Rm @ Max Tool Temp (degF)	NA @ 145.90	NA @ 156.13			
Lead MWD Engineer	Ryan Brunkhorst	Ryan Brunkhorst			
Customer Representative	Matt Settles	Matt Settles			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.76	5.76			
Sub Serial Number	11404284	11404284			
Insert Serial Number	10809550	10809550			
Date and Time Initialized	07-Mar-13 15:59	07-Mar-13 15:59			
Date and Time Read	10-Mar-13 05:12	10-Mar-13 05:18			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	56.00	54.00			
Software Version	6.21	6.21			
Sub Serial Number	11404284	11404284			
Sonde Serial Number	11833237	11833237			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	92.27	260.89			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	48.87	47.49			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11404284	11404284			
Insert/Sonde Serial Number	11293431	11293431			

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
6. The depth used for the tie in survey is the shoe depth of the surface casing and assumes an inclination and azimuth of zero.
7. INSITE version 7.4.01

WARRANTY

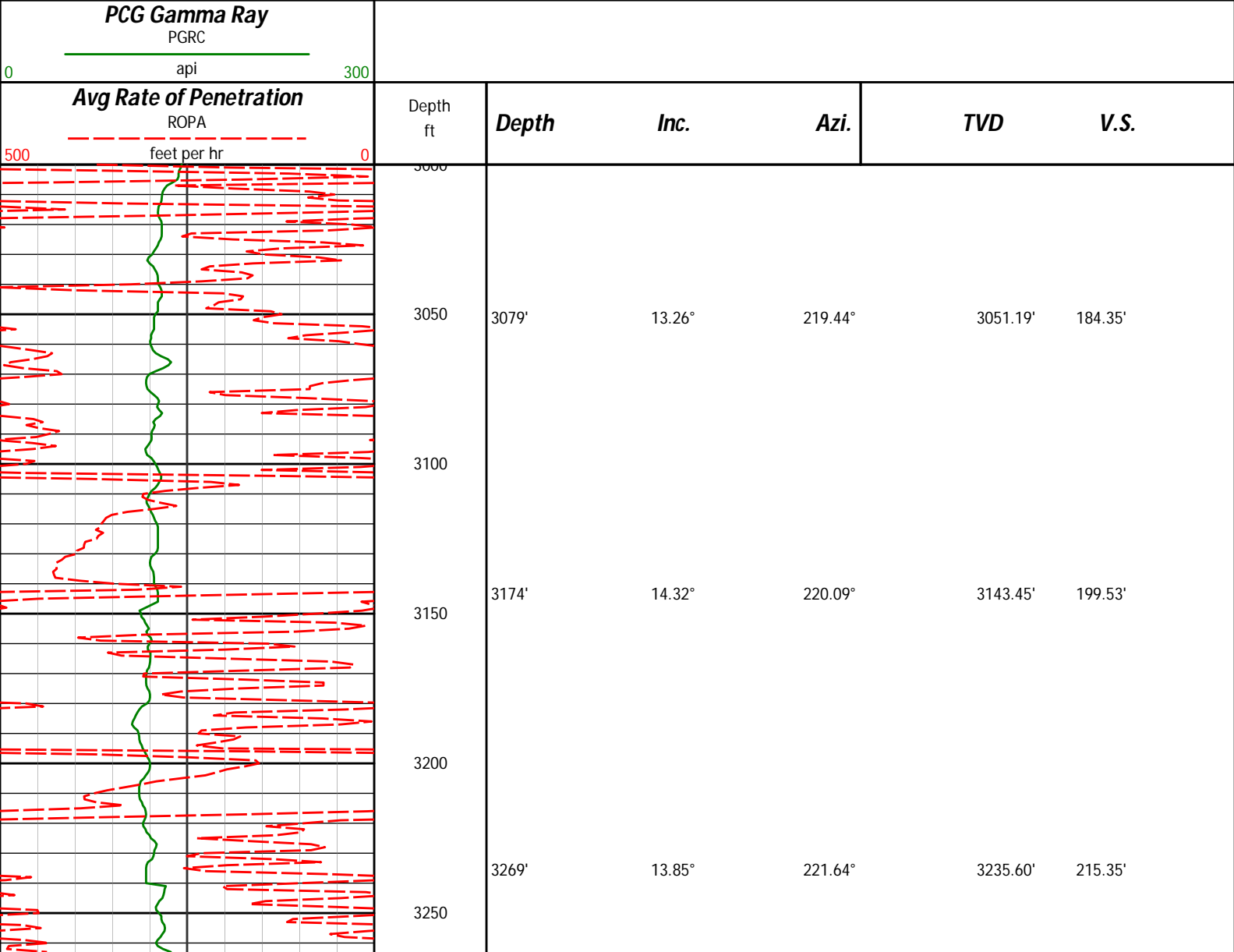
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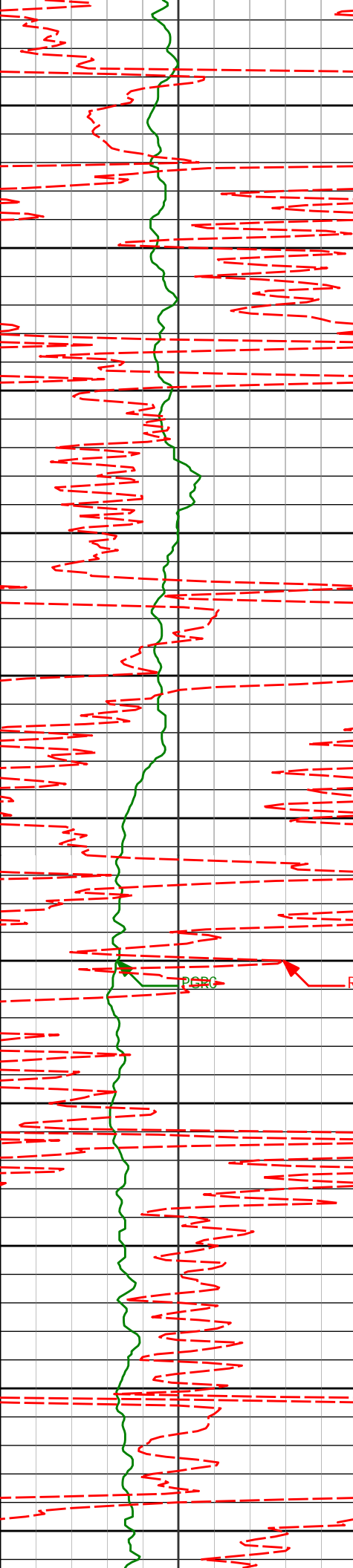
HALLIBURTON

Sperry Drilling Services

TVD Main Log 1:600

Noble Energy
Wells Ranch State PC AA16-62-1HNL
H&P 343
T6N-R63W





3300

3364'

13.69°

222.27°

3327.87'

231.14'

3350

3400

3459'

11.65°

223.38°

3420.55'

245.90'

3450

3500

3554'

10.62°

224.86°

3513.76'

259.19'

3550

3600

3649'

10.64°

226.32°

3607.13'

272.19'

3650

3700

3744'

11.74°

223.19°

3700.32'

285.67'

3750

3800

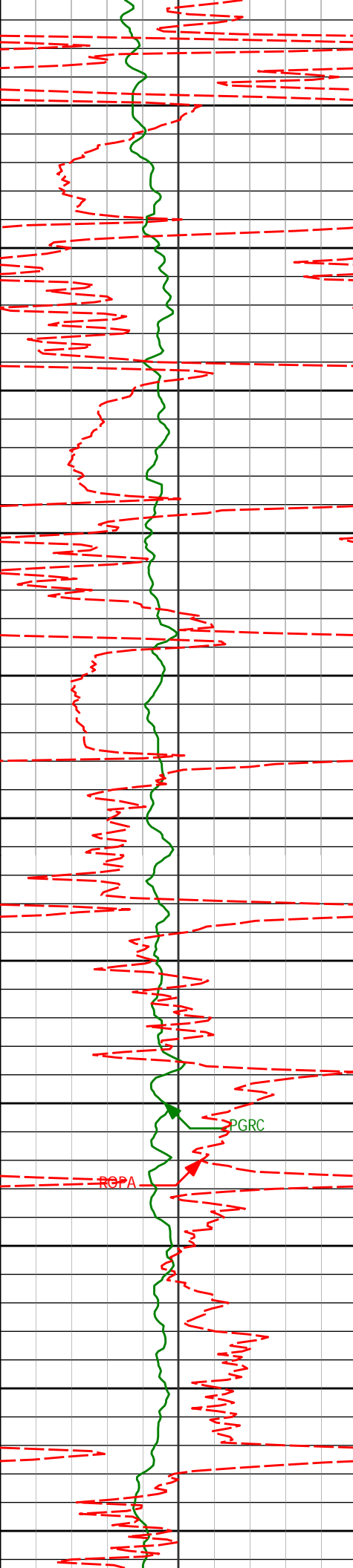
3839'

11.54°

224.65°

3793.37'

299.51'



3850

3934'

9.81°

216.62°

3886.73'

311.55'

3900

3950

4029'

5.71°

215.94°

3980.84'

319.57'

4000

4050

4124'

2.66°

240.49°

4075.58'

324.46'

4100

4150

4219'

2.00°

239.77°

4170.50'

327.89'

4200

PGRC

RCPA

4250

4314'

1.36°

234.26°

4265.46'

330.29'

4300

4350

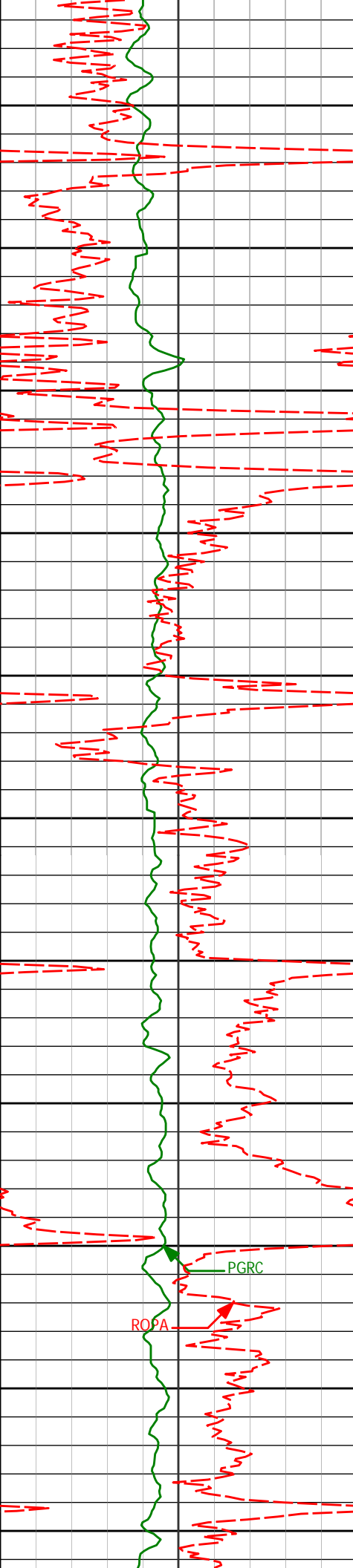
4409'

1.07°

234.51°

4360.44'

331.98'



4400

4450

4500

4550

4600

4650

4700

4750

4800

4850

4900

4504'

0.84°

241.86°

4455.42'

333.34'

4599'

0.74°

254.50°

4550.42'

334.57'

4694'

0.70°

273.27°

4645.41'

335.74'

4789'

0.35°

314.82°

4740.40'

336.52'

4884'

0.77°

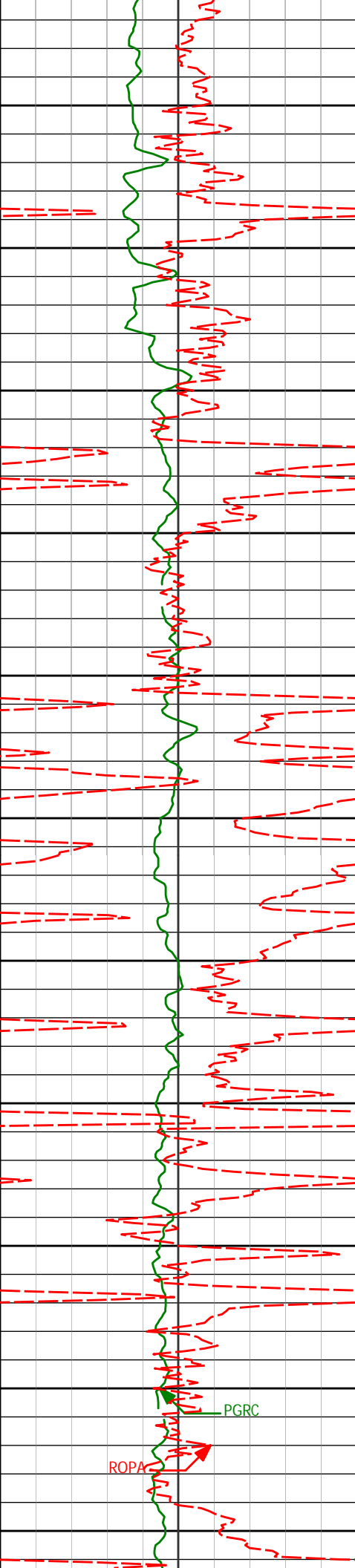
64.43°

4835.40'

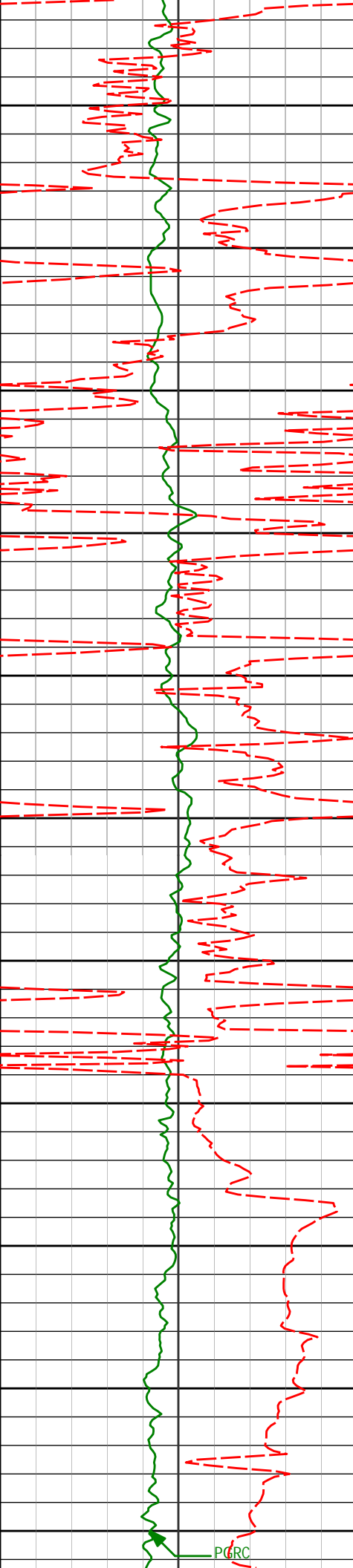
336.13'

ROPA

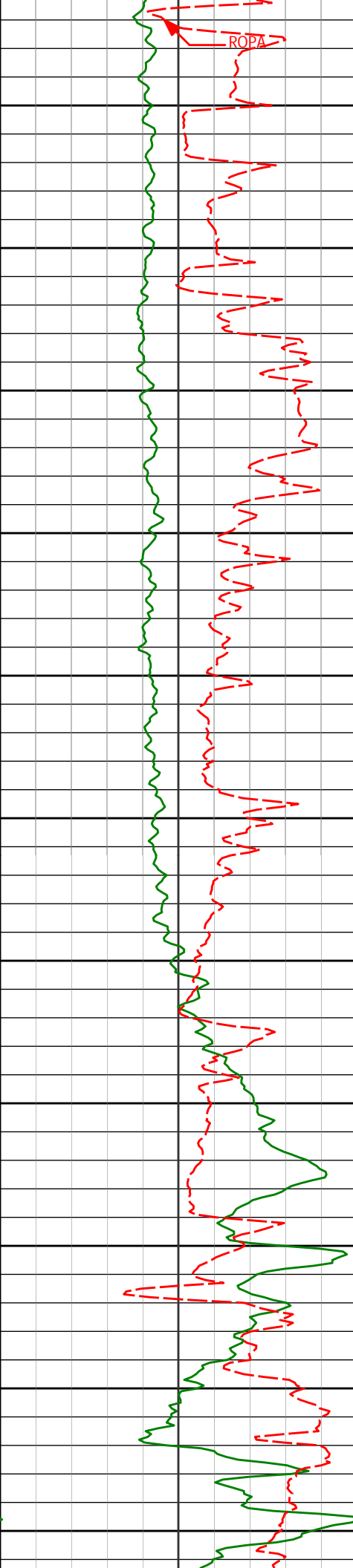
PGR



4979'	1.14°	53.59°	4930.39'	334.76'
4950				
5000				
5074'	1.24°	64.81°	5025.37'	333.03'
5050				
5100				
5169'	0.89°	83.60°	5120.35'	331.35'
5150				
5200				
5264'	1.23°	65.23°	5215.33'	329.67'
5250				
5300				
5359'	1.28°	63.95°	5310.31'	327.75'
5350				
5400				
5454'	0.92°	53.81°	5405.29'	326.15'
5450				

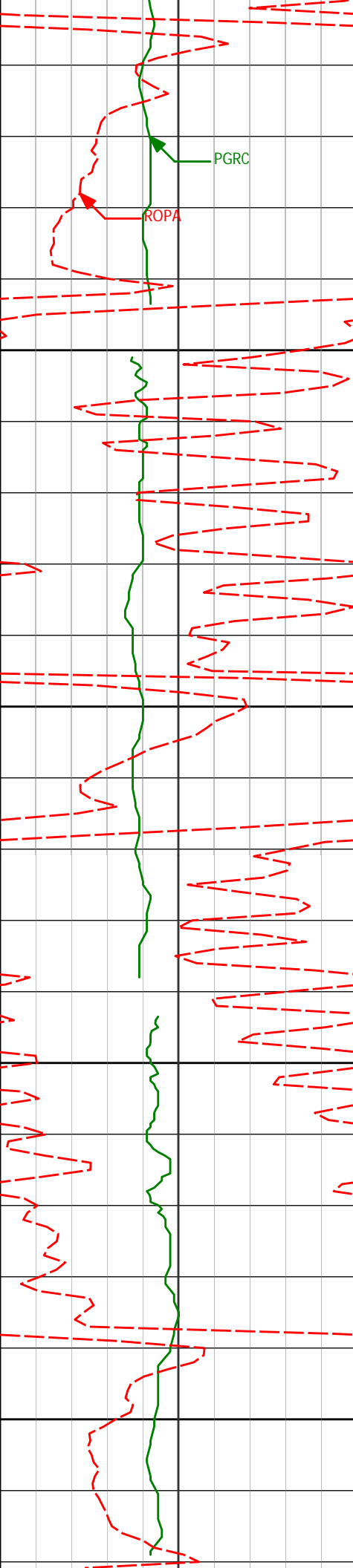


5500	5549'	0.57°	78.25°	5500.29'	325.05'
5550					
5600	5644'	0.86°	76.69°	5595.28'	323.88'
5650					
5700	5739'	0.71°	74.40°	5690.27'	322.61'
5750					
5800	5820'	0.54°	49.50°	5771.27'	321.82'
5850					
5900	5926'	0.40°	30.57°	5877.26'	321.23'
5950	5974'	4.16°	272.03°	5925.22'	322.88'
<Run 200> 5950					
6000	6021'	9.14°	256.56°	5971.89'	328.24'

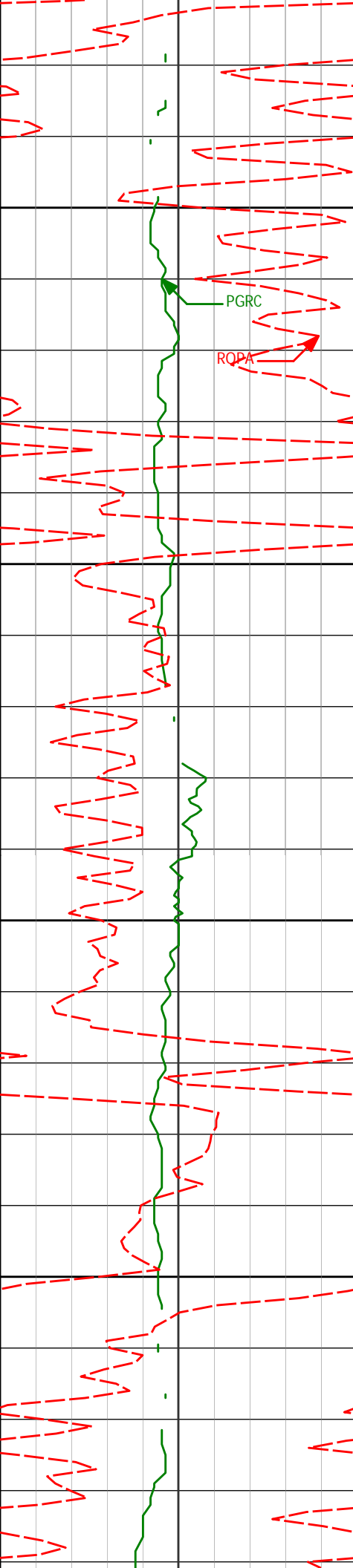


	6069'	12.55°	257.14°	6019.03'	337.11'
6050					
	6116'	13.77°	267.01°	6064.80'	347.73'
6100					
	6164'	15.97°	275.12°	6111.19'	359.99'
6150					
	6211'	16.81°	282.54°	6156.29'	372.97'
6200					
6250	6306'	23.28°	279.80°	6245.49'	404.64'
6300					
6350	6401'	32.21°	272.75°	6329.50'	448.31'
6400	6496'	43.20°	277.09°	6404.56'	505.79'
6450	6544'	50.13°	281.28°	6437.49'	539.95'
	6591'	54.14°	281.25°	6466.33'	576.01'
6500	6639'	57.55°	279.94°	6493.28'	614.72'
	6686'	61.14°	278.84°	6517.24'	654.30'
	6734'	65.08°	275.39°	6538.95'	696.52'
6550					
	6781'	70.89°	276.40°	6556.56'	739.62'

[illegible]



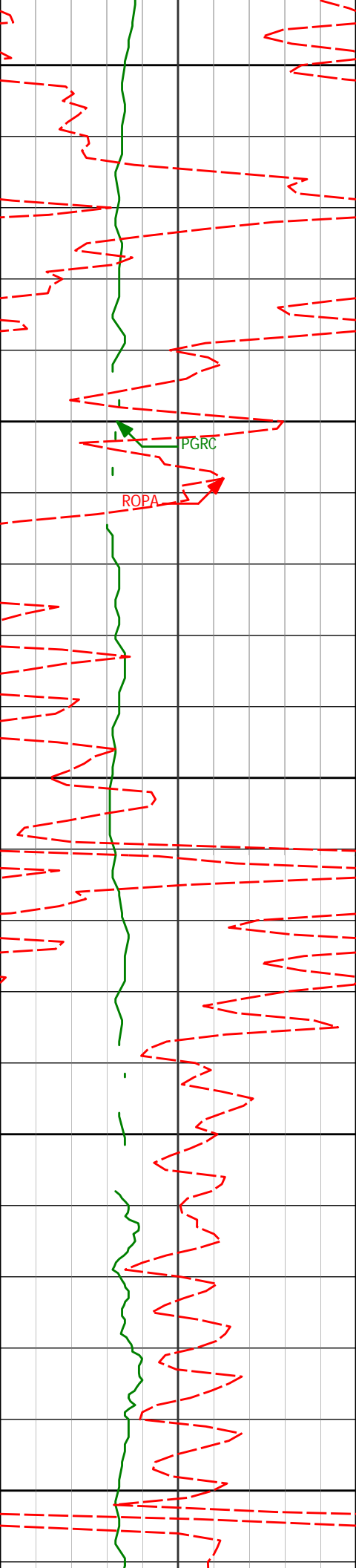
3174'	14.32°	220.09°	3143.45'	199.53'
3150				
3200				
3269'	13.85°	221.64°	3235.60'	215.35'
3250				
3300				



3364'	13.69°	222.27°	3327.87'	231.14'
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3459'	11.65°	223.38°	3420.55'	245.90'
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3554'	10.62°	224.86°	3513.76'	259.19'
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3550

3600

3650

3700

3750

3649'

10.64°

226.32°

3607.13'

272.19'

3744'

11.74°

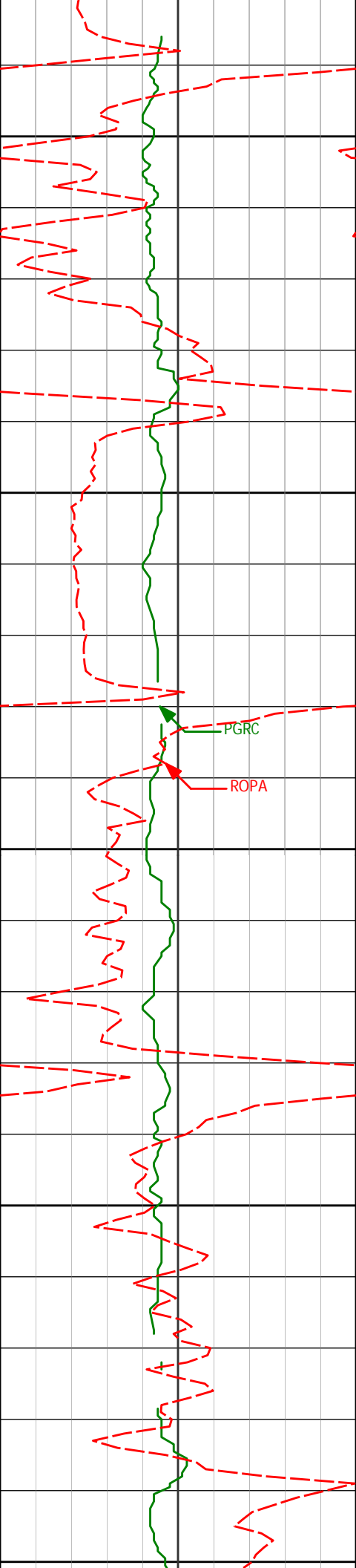
223.19°

3700.32'

285.67'



3839'	11.54°	224.65°	3793.37'	299.51'
3800				
3850				
3934'	9.81°	216.62°	3886.73'	311.55'
3900				
3950				
4020'	5.71°	215.94°	3080.84'	310.57'



4000

4050

4100

4150

4200

4124'

2.66°

240.49°

4075.58'

324.46'

PGRC

ROPA

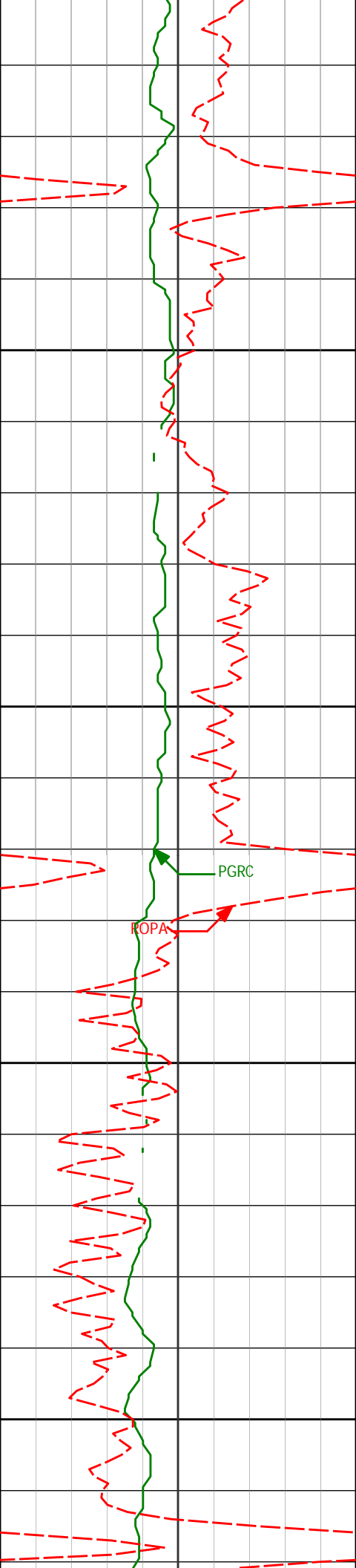
4219'

2.00°

239.77°

4170.50'

327.89'



4250

4300

4350

4400

4314'

4409'

1.36°

1.07°

234.26°

234.51°

4265.46'

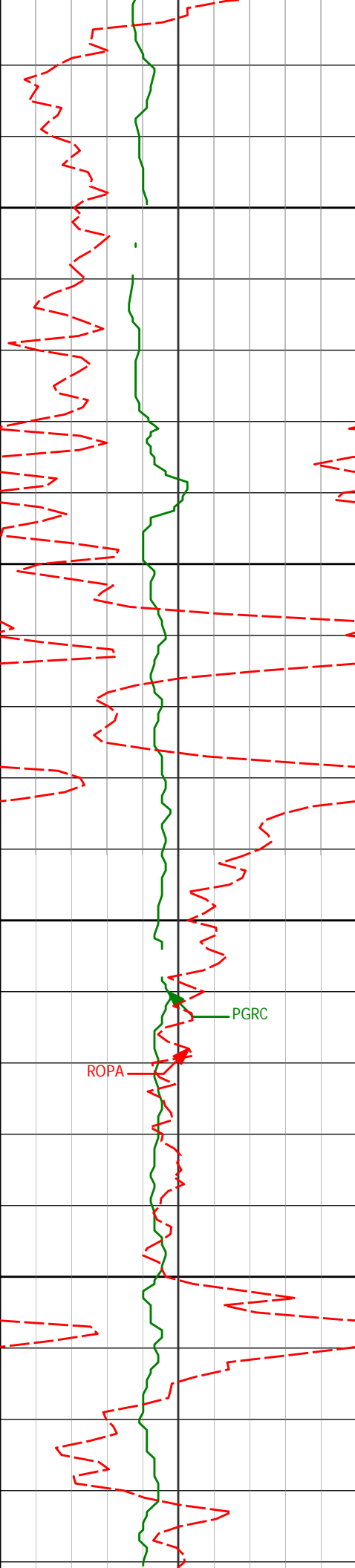
4360.44'

330.29'

331.98'

PGRC

ROPAC



4450

4504'

0.84°

241.86°

4455.42'

333.34'

4500

4550

4599'

0.74°

254.50°

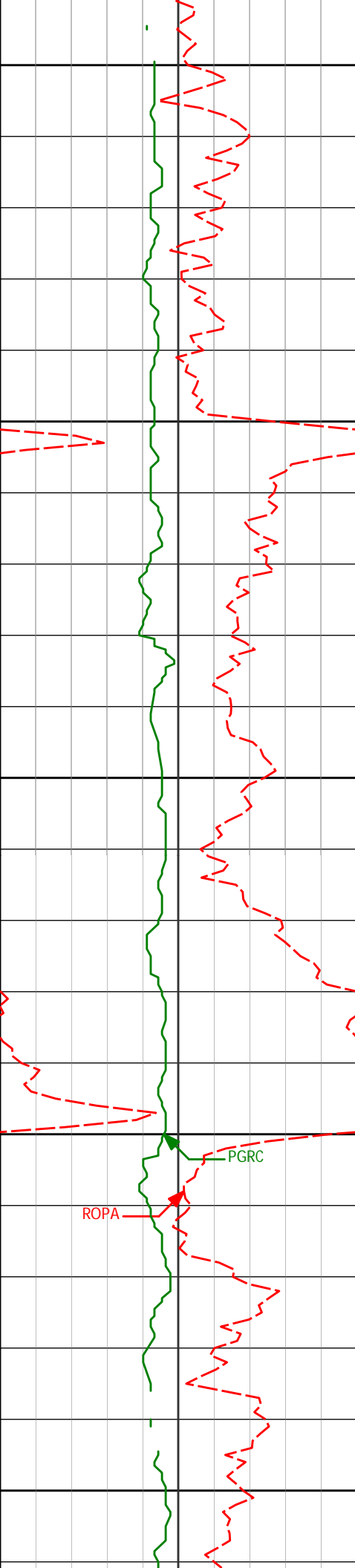
4550.42'

334.57'

4600

PGRC

ROPA



4694'

0.70°

273.27°

4645.41'

335.74'

4650

4700

4789'

0.35°

314.82°

4740.40'

336.52'

4750

4800

4884'

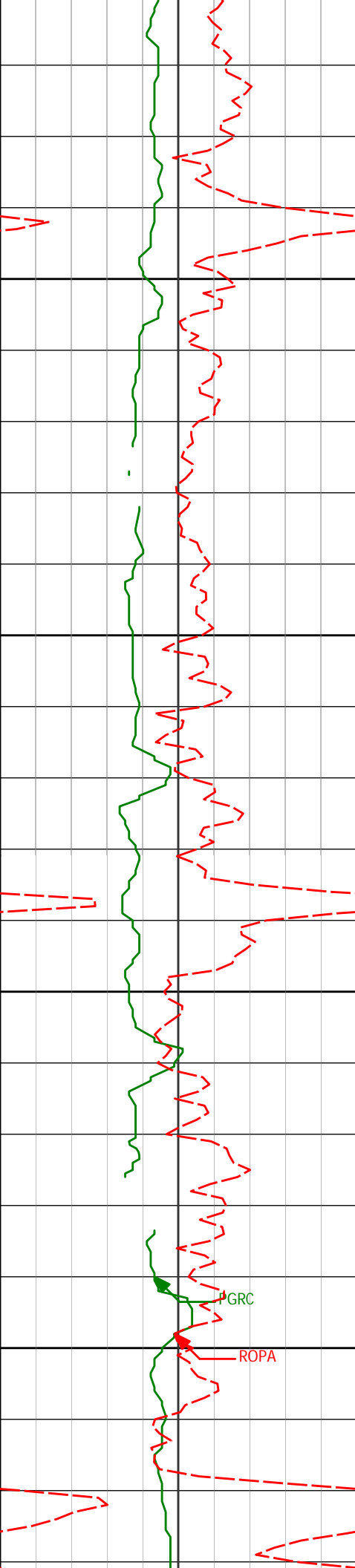
0.77°

64.43°

4835.40'

336.13'

4850



4900

4950

5000

5050

4979'

1.14°

53.59°

4930.39'

334.76'

5074'

1.24°

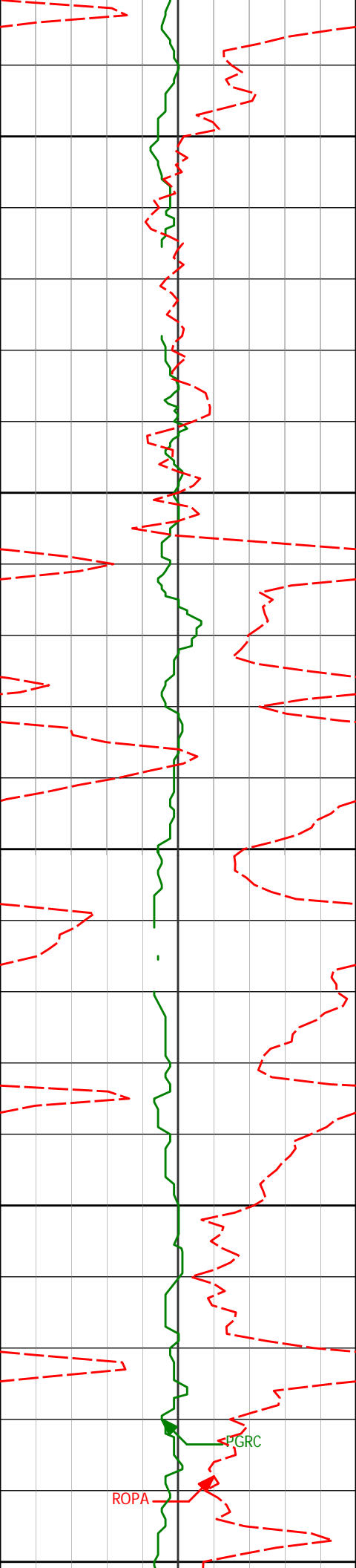
64.81°

5025.37'

333.03'

GRC

ROPA



5100

5169'

0.89°

83.60°

5120.35'

331.35'

5150

5200

5264'

1.23°

65.23°

5215.33'

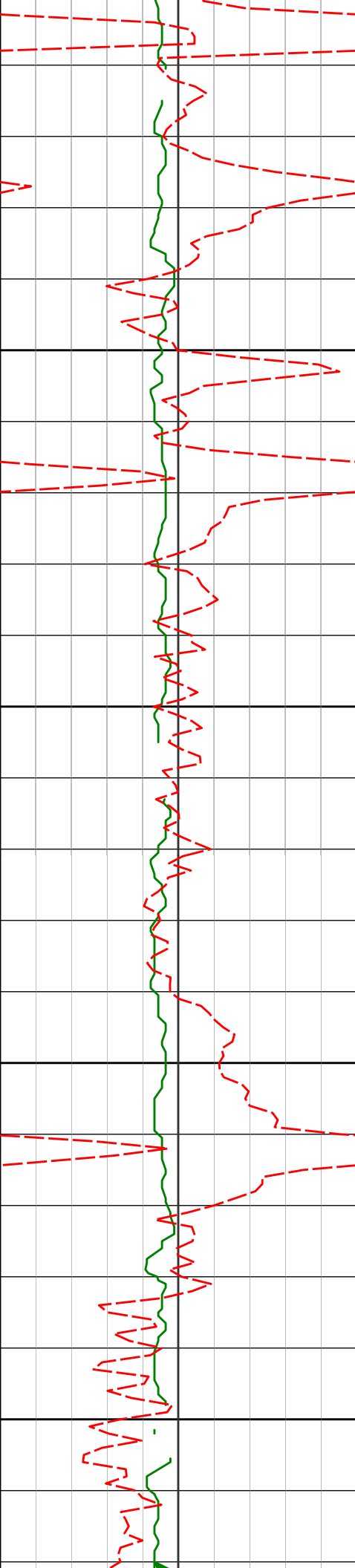
329.67'

5250

5300

PGRC

ROPA



5359'

1.28°

63.95°

5310.31'

327.75'

5350

5400

5454'

0.92°

53.81°

5405.29'

326.15'

5450

5500

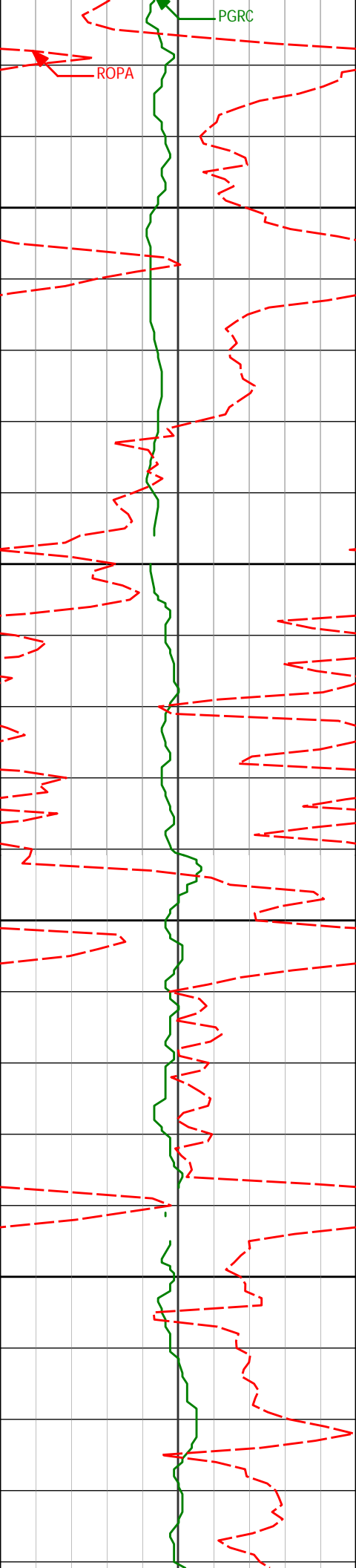
5549'

0.57°

78.25°

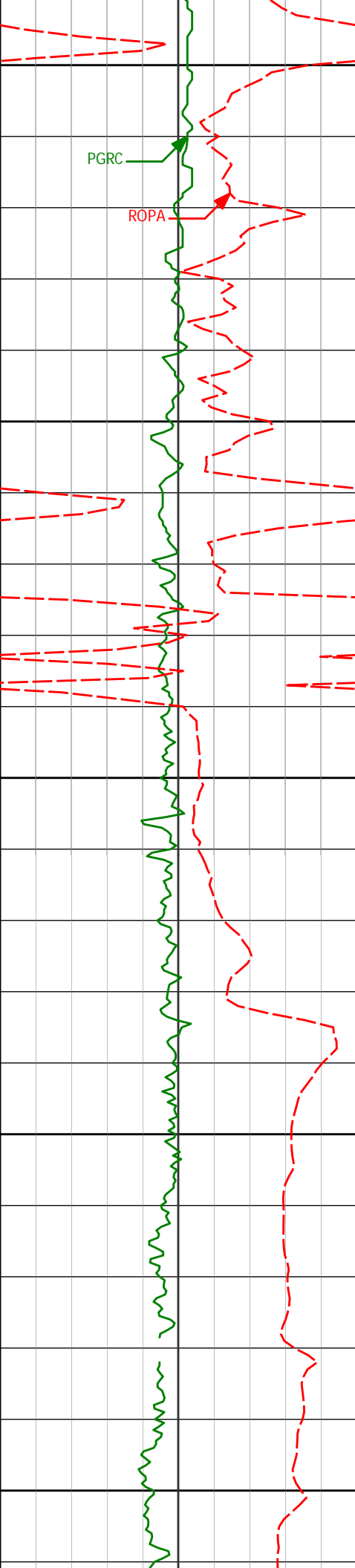
5500.29'

325.05'

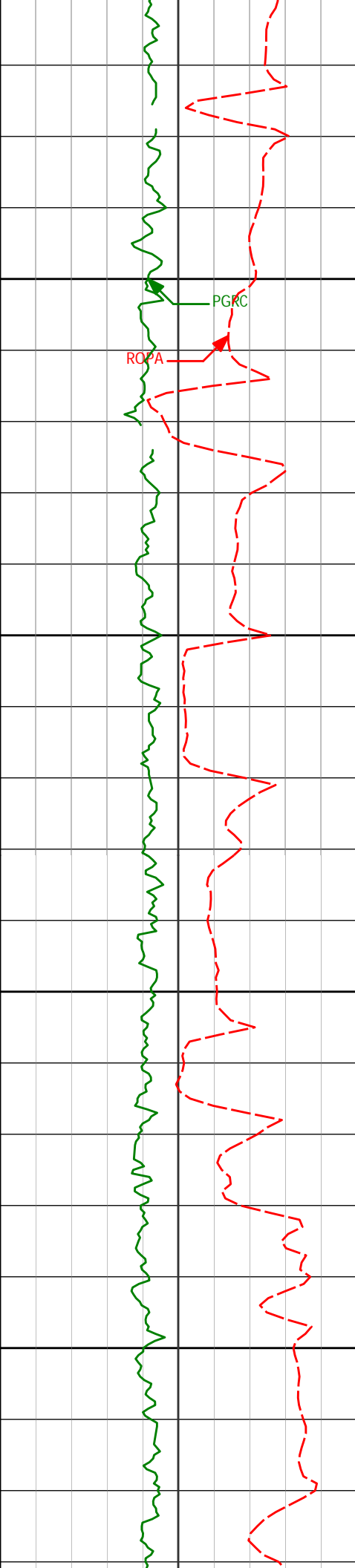


5644'	0.86°	76.69°	5595.28'	323.88'
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5739'	0.71°	74.40°	5690.27'	322.61'
-------	-------	--------	----------	---------



5750				
5820'	0.54°	49.50°	5771.27'	321.82'
5800				
5850				
5926'	0.40°	30.57°	5877.26'	321.23'
5900				
5974'	4.16°	272.03°	5925.22'	322.88'
<Run 200>				
5950				



6000

6050

6100

6150

6021'

9.14°

256.56°

5971.89'

328.24'

6069'

12.55°

257.14°

6019.03'

337.11'

6116'

13.77°

267.01°

6064.80'

347.73'

6164'

15.97°

275.12°

6111.19'

359.99'

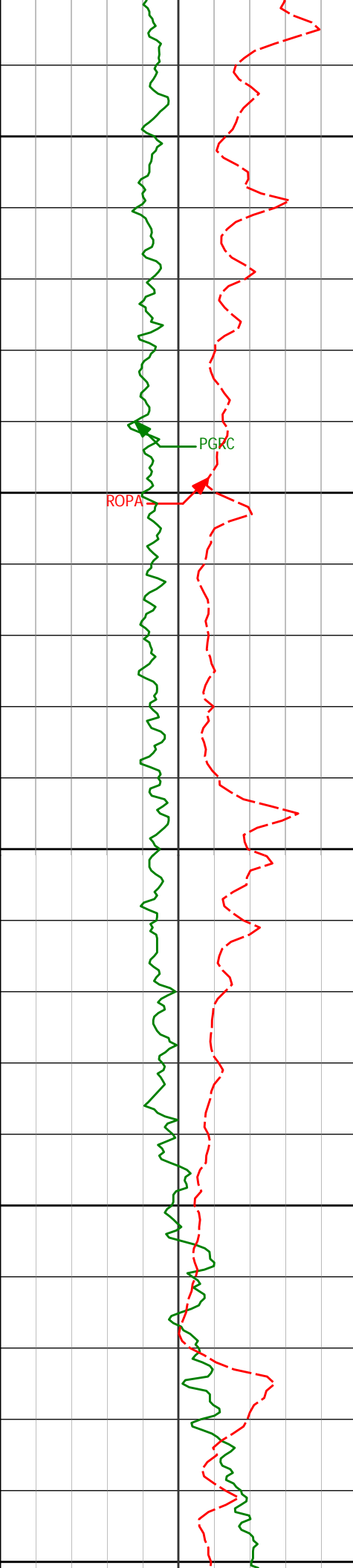
6211'

16.81°

282.54°

6156.29'

372.97'



6200

6250

6300

6350

6400

6306'

23.28°

279.80°

6245.49'

404.64'

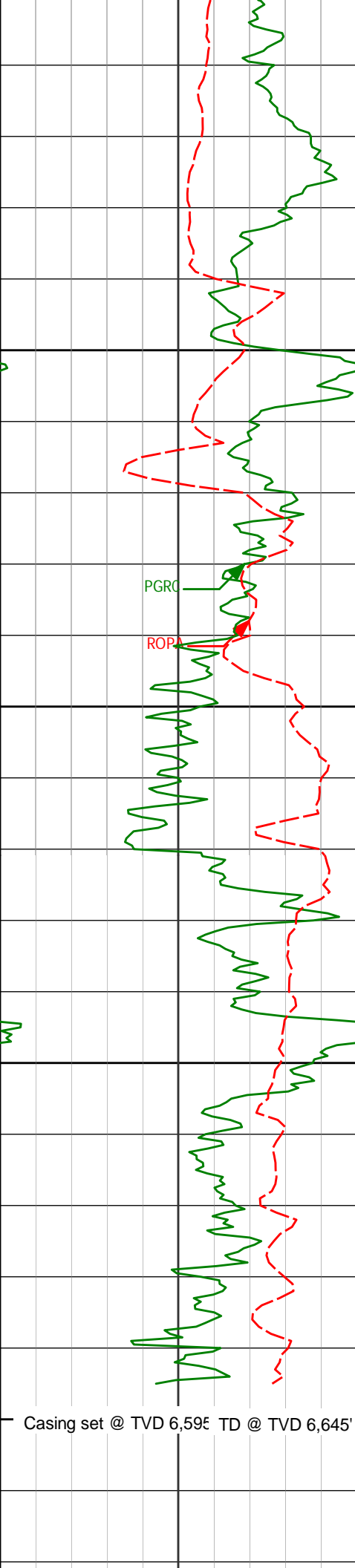
6401'

32.21°

272.75°

6329.50'

448.31'



6496'	43.20°	277.09°	6404.56'	505.79'
6544'	50.13°	281.28°	6437.49'	539.95'
6450				
6591'	54.14°	281.25°	6466.33'	576.01'
6639'	57.55°	279.94°	6493.28'	614.72'
6500				
6686'	61.14°	278.84°	6517.24'	654.30'
6734'	65.08°	275.39°	6538.95'	696.52'
6550				
6781'	70.89°	276.40°	6556.56'	739.62'
6829'	76.48°	276.12°	6570.04'	785.16'
6876'	79.30°	270.67°	6579.91'	830.86'
6924'	81.44°	268.36°	6587.94'	878.15'
6981'	86.51°	264.29°	6593.92'	934.79'
6600				

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



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch State PC USX AA16-6
Wattenberg
Weld Colorado
USA
CA-XX-0900206156
Surveys are tied into surface casing shoe.

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
673.00	0.00	0.00	673.00	0.00 N	0.00 E	0.00	0.00
811.00	0.55	315.69	811.00	0.47 N	0.46 W	0.44	0.40
904.00	0.68	300.27	903.99	1.07 N	1.25 W	1.21	0.23
997.00	0.73	307.42	996.99	1.71 N	2.20 W	2.13	0.11
1091.00	0.91	302.28	1090.98	2.47 N	3.30 W	3.20	0.21
1184.00	0.90	316.34	1183.96	3.40 N	4.43 W	4.29	0.24
1277.00	1.26	315.83	1276.95	4.66 N	5.65 W	5.46	0.39
1371.00	0.80	295.91	1370.93	5.68 N	6.96 W	6.72	0.61
1465.00	0.64	312.20	1464.93	6.32 N	7.94 W	7.68	0.27
1560.00	0.65	309.71	1559.92	7.02 N	8.75 W	8.45	0.03
1655.00	0.82	235.84	1654.91	6.99 N	9.72 W	9.43	0.94
1750.00	3.27	219.00	1749.85	4.50 N	11.99 W	11.80	2.63
1845.00	4.88	209.28	1844.60	1.13 S	15.67 W	15.71	1.84
1939.00	5.54	218.45	1938.22	8.17 S	20.45 W	20.77	1.13
2034.00	5.99	227.39	2032.74	15.12 S	26.95 W	27.54	1.06
2129.00	7.73	226.81	2127.05	22.85 S	35.26 W	36.16	1.83
2225.00	10.39	225.63	2221.85	33.32 S	46.16 W	47.47	2.78
2319.00	12.84	218.39	2313.92	47.44 S	58.70 W	60.58	3.03
2414.00	13.72	222.69	2406.38	63.99 S	72.90 W	75.44	1.39
2509.00	15.08	220.60	2498.40	81.66 S	88.58 W	91.83	1.53
2604.00	13.82	219.19	2590.39	99.84 S	103.79 W	107.77	1.38
2699.00	14.05	217.83	2682.59	117.74 S	118.03 W	122.72	0.42
2794.00	14.16	219.00	2774.73	135.88 S	132.42 W	137.83	0.32
2889.00	13.92	219.21	2866.89	153.76 S	146.96 W	153.09	0.26
2984.00	14.54	221.19	2958.98	171.59 S	162.03 W	168.88	0.83
3079.00	13.26	219.44	3051.19	188.98 S	176.81 W	184.35	1.42
3174.00	14.32	220.09	3143.45	206.38 S	191.30 W	199.53	1.13
3269.00	13.85	221.64	3235.60	223.87 S	206.42 W	215.35	0.63
3364.00	13.69	222.27	3327.87	240.68 S	221.53 W	231.14	0.23
3459.00	11.65	223.38	3420.55	255.98 S	235.69 W	245.90	2.16
3554.00	10.62	224.86	3513.76	269.15 S	248.45 W	259.19	1.13
3649.00	10.64	226.32	3607.13	281.42 S	260.97 W	272.19	0.28
3744.00	11.74	223.19	3700.32	294.52 S	273.92 W	285.67	1.32
3839.00	11.54	224.65	3793.37	308.33 S	287.22 W	299.51	0.37
3934.00	9.81	216.62	3886.73	321.58 S	298.72 W	311.55	2.40
4029.00	5.71	215.94	3980.84	331.91 S	306.33 W	319.57	4.32
4124.00	2.66	240.49	4075.58	336.82 S	311.02 W	324.46	3.65
4219.00	2.00	239.77	4170.50	338.74 S	314.37 W	327.89	0.70
4314.00	1.36	234.26	4265.46	340.24 S	316.72 W	330.29	0.69
4409.00	1.07	234.51	4360.44	341.41 S	318.36 W	331.98	0.31
4504.00	0.84	241.86	4455.42	342.25 S	319.69 W	333.34	0.27
4599.00	0.74	254.50	4550.42	342.75 S	320.90 W	334.57	0.21
4694.00	0.70	273.27	4645.41	342.88 S	322.07 W	335.74	0.25
4789.00	0.35	314.82	4740.40	342.64 S	322.86 W	336.52	0.52
4884.00	0.77	64.43	4835.40	342.16 S	322.49 W	336.13	1.00

4979.00	1.14	53.59	4930.39	341.32 S	321.15 W	334.76	0.43
5074.00	1.24	64.81	5025.37	340.33 S	319.46 W	333.03	0.27
5169.00	0.89	83.60	5120.35	339.81 S	317.79 W	331.35	0.52
5264.00	1.23	65.23	5215.33	339.30 S	316.14 W	329.67	0.50
5359.00	1.28	63.95	5310.31	338.40 S	314.26 W	327.75	0.06
5454.00	0.92	53.81	5405.29	337.49 S	312.69 W	326.15	0.43
5549.00	0.57	78.25	5500.29	336.94 S	311.61 W	325.05	0.49
5644.00	0.86	76.69	5595.28	336.68 S	310.45 W	323.88	0.31
5739.00	0.71	74.40	5690.27	336.36 S	309.19 W	322.61	0.16
5820.00	0.54	49.50	5771.27	335.97 S	308.42 W	321.82	0.39
5926.00	0.40	30.57	5877.26	335.33 S	307.85 W	321.23	0.20
5974.00	4.16	272.03	5925.22	335.13 S	309.51 W	322.88	9.09
6021.00	9.14	256.56	5971.89	335.93 S	314.84 W	328.24	11.17
6069.00	12.55	257.14	6019.03	337.98 S	323.64 W	337.11	7.11
6116.00	13.77	267.01	6064.80	339.41 S	334.21 W	347.73	5.43
6164.00	15.97	275.12	6111.19	339.12 S	346.49 W	359.99	6.30
6211.00	16.81	282.54	6156.29	337.06 S	359.57 W	372.97	4.80
6306.00	23.28	279.80	6245.49	330.88 S	391.51 W	404.64	6.88
6401.00	32.21	272.75	6329.50	326.46 S	435.40 W	448.31	10.00
6496.00	43.20	277.09	6404.56	321.21 S	493.14 W	505.79	11.89
6544.00	50.13	281.28	6437.49	315.58 S	527.56 W	539.95	15.77
6591.00	54.14	281.25	6466.33	308.33 S	563.94 W	576.01	8.53
6639.00	57.55	279.94	6493.28	301.04 S	602.98 W	614.72	7.45
6686.00	61.14	278.84	6517.24	294.45 S	642.86 W	654.30	7.90
6734.00	65.08	275.39	6538.95	289.17 S	685.33 W	696.52	10.41
6781.00	70.89	276.40	6556.56	284.69 S	728.65 W	739.62	12.52
6829.00	76.48	276.12	6570.04	279.67 S	774.43 W	785.16	11.66
6876.00	79.30	270.67	6579.91	276.96 S	820.28 W	830.86	12.83
6924.00	81.44	268.36	6587.94	277.36 S	867.59 W	878.15	6.51
6981.00	86.51	264.29	6593.92	281.01 S	924.13 W	934.79	11.38

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 CLOSURE OF 253.09 DEGREES (GRID)
A TOTAL CORRECTION OF 7.80 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6981.00 FEET
IS 965.91 FEET ALONG 253.09 DEGREES (GRID)**