



WELL INFORMATION					
MWD Run Number	100	200			
Date run completed	11-May-12	12-May-12			
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)	585.00	5,818.33			
Log End Depth (TVD, ft)	5,818.33	6,491.11			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	09-May-12 17:00	11-May-12 02:06			
Drill/Wipe End Date and Time	11-May-12 00:30	12-May-12 03:45			
Min Inc (deg) @ Depth (TVD, ft)	.62 @ 5,450.51	3.10 @ 5,784.43			
Max Inc (deg) @ Depth (TVD, ft)	17.57 @ 2,382.73	81.94 @ 6,484.35			
Bit TFA(in2) / Bit Type	.75 / PDC	.75 / PDC			
Flow Rate (gpm)	570.00	576.00			
Max AV (fpm) / CV (fpm) @ MWD	411.0 / NA	417.0 / NA			
Fluid Type	Fresh Water Gel	Fresh Water Gel			
Density (ppg) / Viscosity (spqt)	8.60 / 27.00	9.80 / 33.00			
Filtrate CL (ppm)	2,300.00	1,900.00			
pH / Fluid Loss (mptm)	8.80 / 50	9.50 / 10			
PV (cP) / YP (lbf2)	1 / 4.00	7 / 8.00			
% Solids / % Sand	3.70 / 0.25	6.20 / 0.50			
% Oil / Oil:Water Ratio	0 / 0:89.5	0 / 0:88			
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	158.48 / PDM	170.70 / PDM			

Max Tool Temp (degF) / Source	156.13 / PCM	172.78 / PCM			
Rm @ Max Tool Temp (degF)	NA @ NA	NA @ NA			
Lead MWD Engineer	Gary Eifert	Gary Eifert			
Customer Representative	Johnny Sanchez	Johnny Sanchez			

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.76	5.76			
Sub Serial Number	11341347	11341347			
Insert Serial Number	11400855	11226936			
Date and Time Initialized	18-Apr-12 20:04	11-May-12 03:58			
Date and Time Read	11-May-12 09:32	12-May-12 12:15			
ECMB SW Version	N/A	N/A			

### Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	56.00	55.00			
Software Version	6.21	6.21			
Sub Serial Number	11341347	11341347			
Sonde Serial Number	11833220	11297574			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	165.00	189.33			

### Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	49.03	47.71			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11341347	11341347			
Insert/Sonde Serial Number	11292594	11121362			

## REMARKS

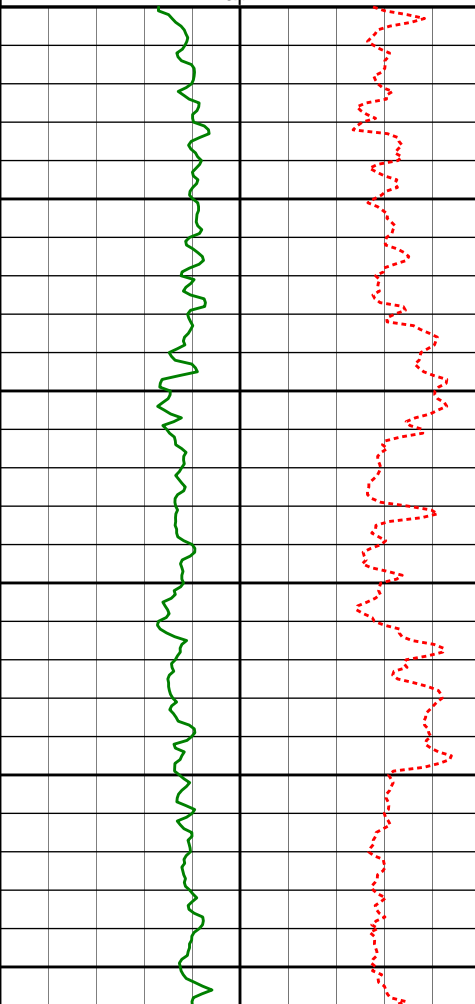
1. All depths are true vertical bit depths, referenced to the Driller's pipe tally and are measured from the Drill Floor, unless otherwise specified.
2. No depth corrections have been made for pipe stretch or compression.
3. Critical annual velocities are calculated using the "Power Law" model for water 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. INSITE version 7.3.40

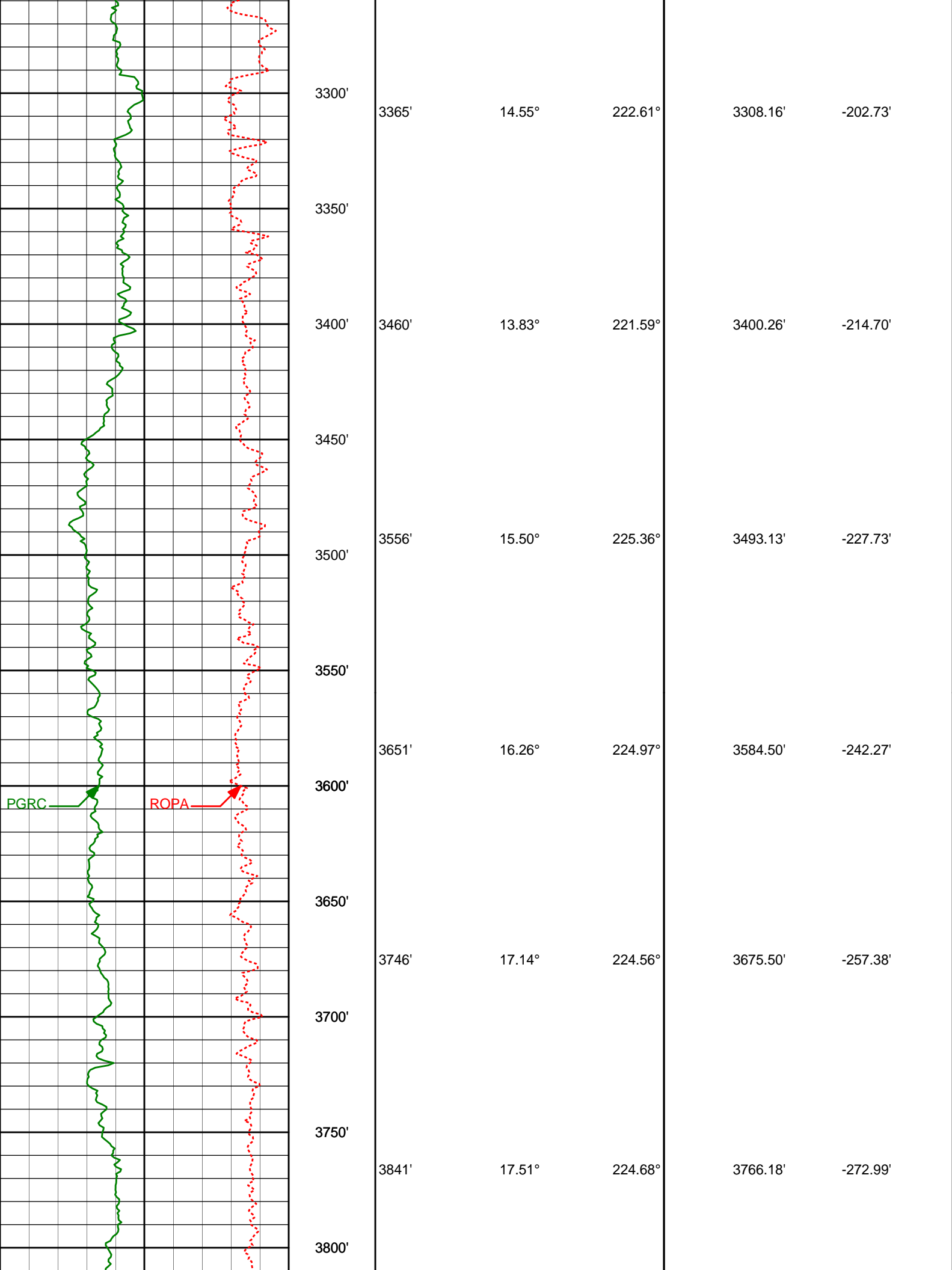
WARRANTY

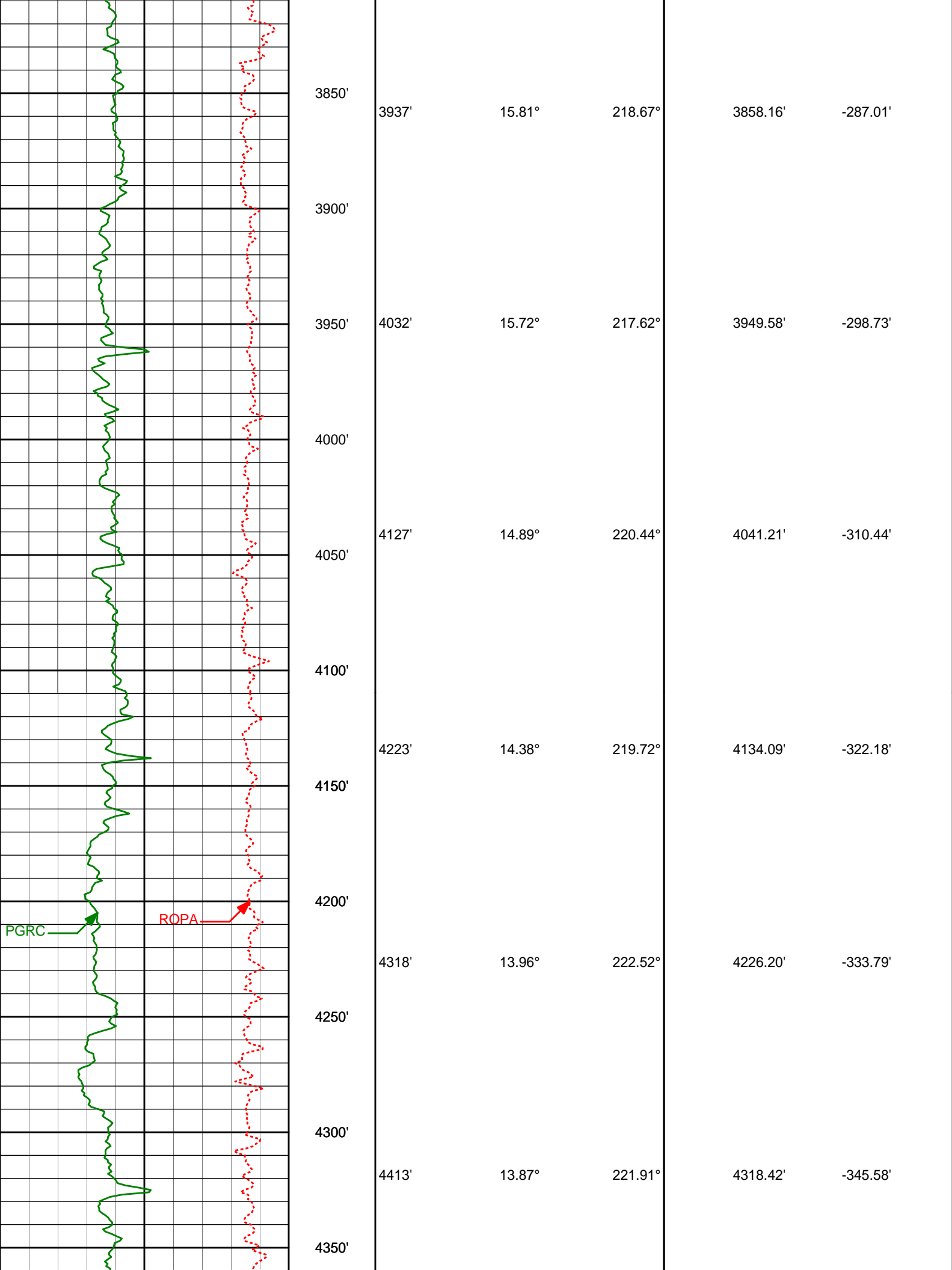
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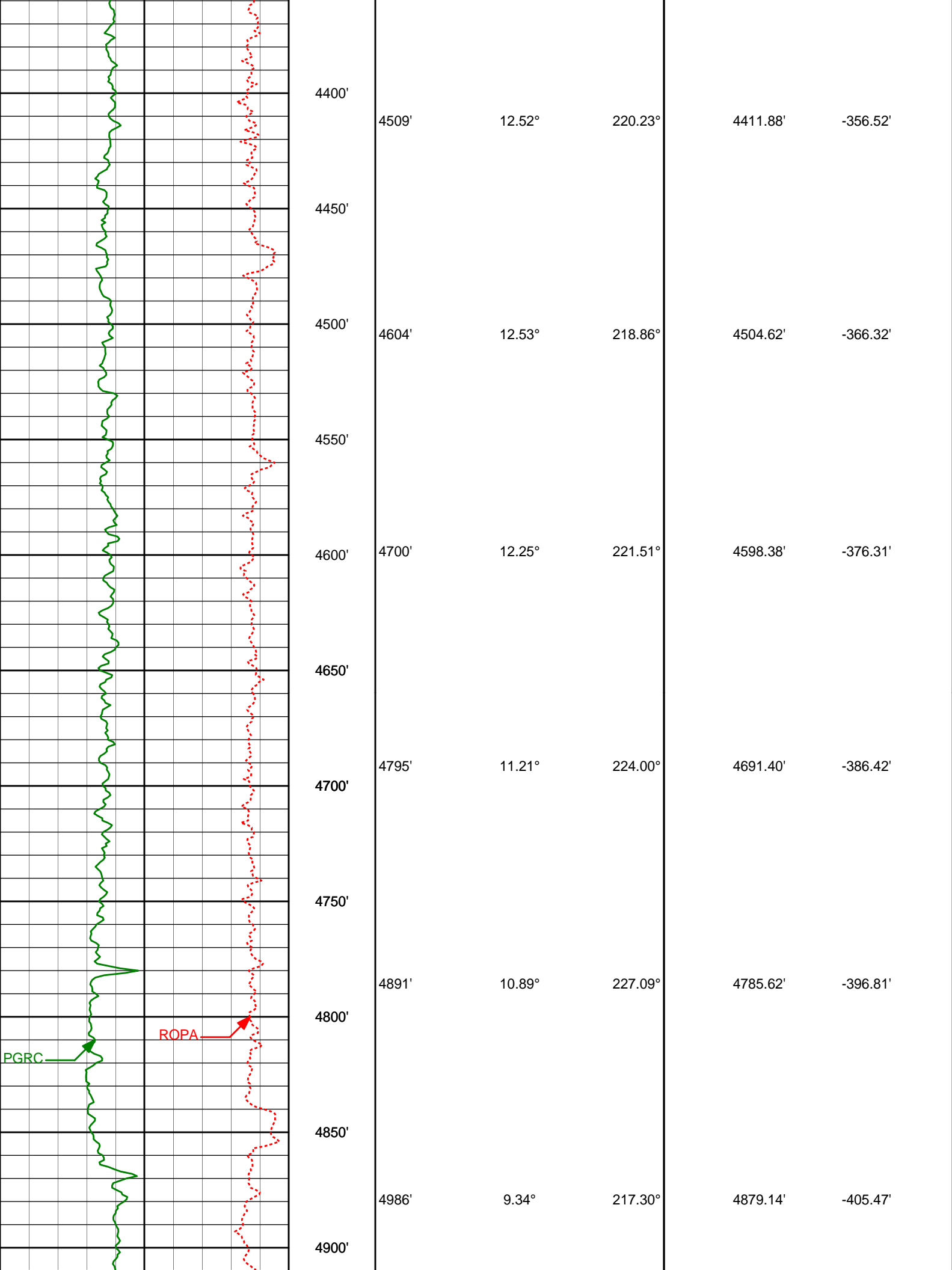
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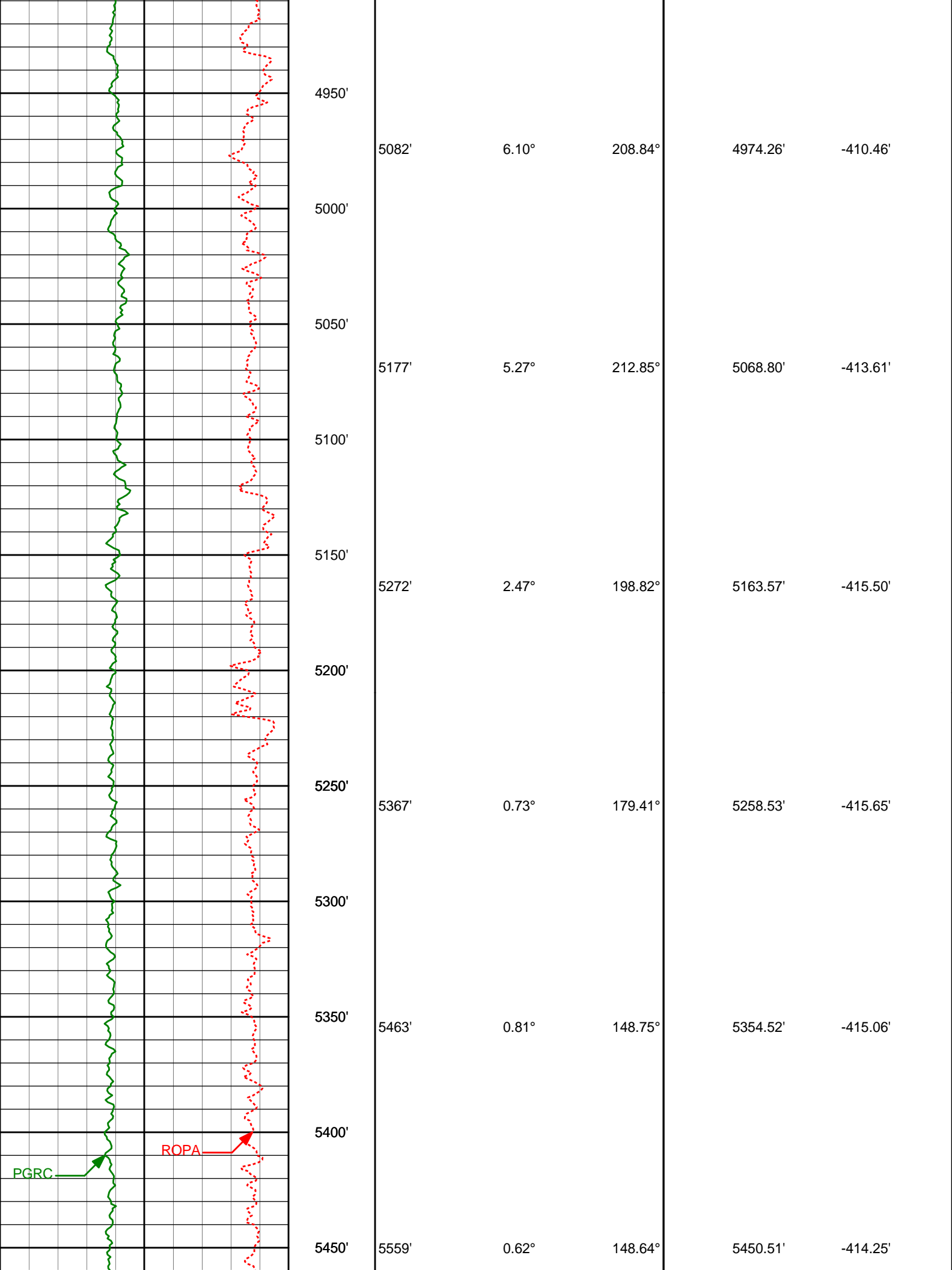
TVD Main Log 1:600

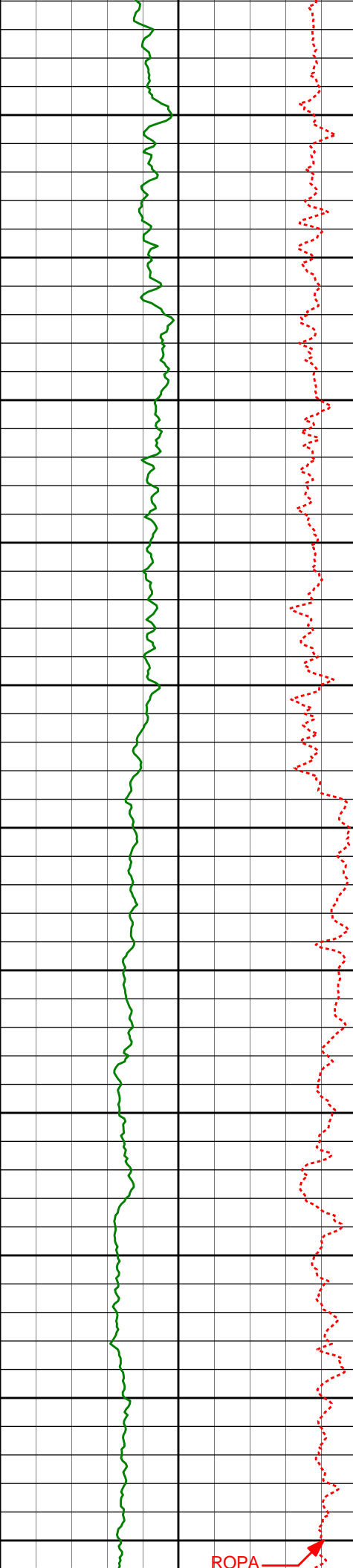
Average Rate of Penetration ROPA						
1K0						
feet per hr						
Gamma Ray PGRC		True Vertical Depth (ft) 1:600	Depth	Inc	Azi.	TVDV.S.
0200api						
		3079'	11.95°	213.85°	3029.58'	-173.43'
		3050'				
		3100'				
		3174'	13.05°	216.03°	3122.33'	-181.74'
		3150'				
		3200'				
		3269'	12.92°	219.62°	3214.90'	-191.32'
		3250'				





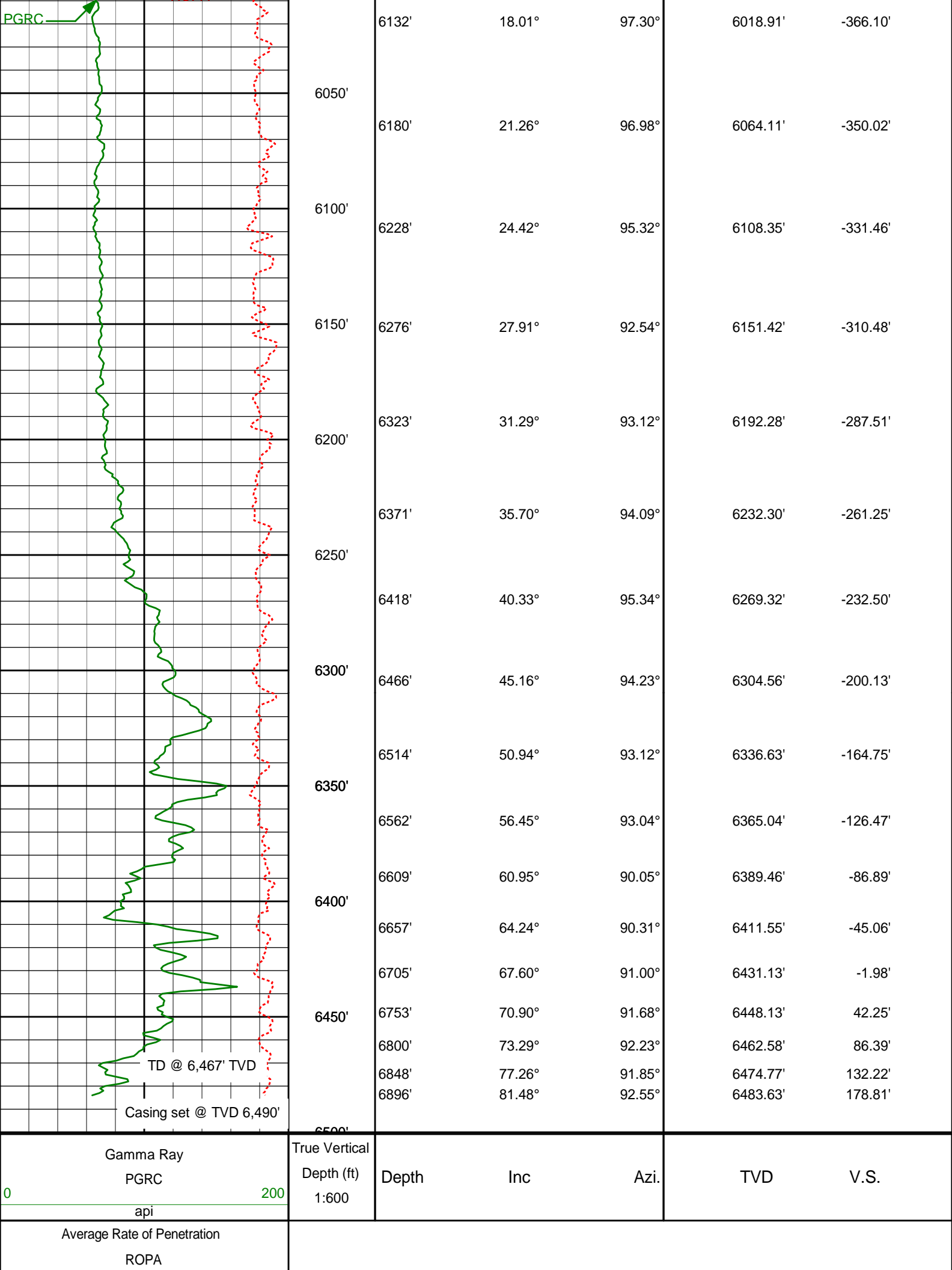


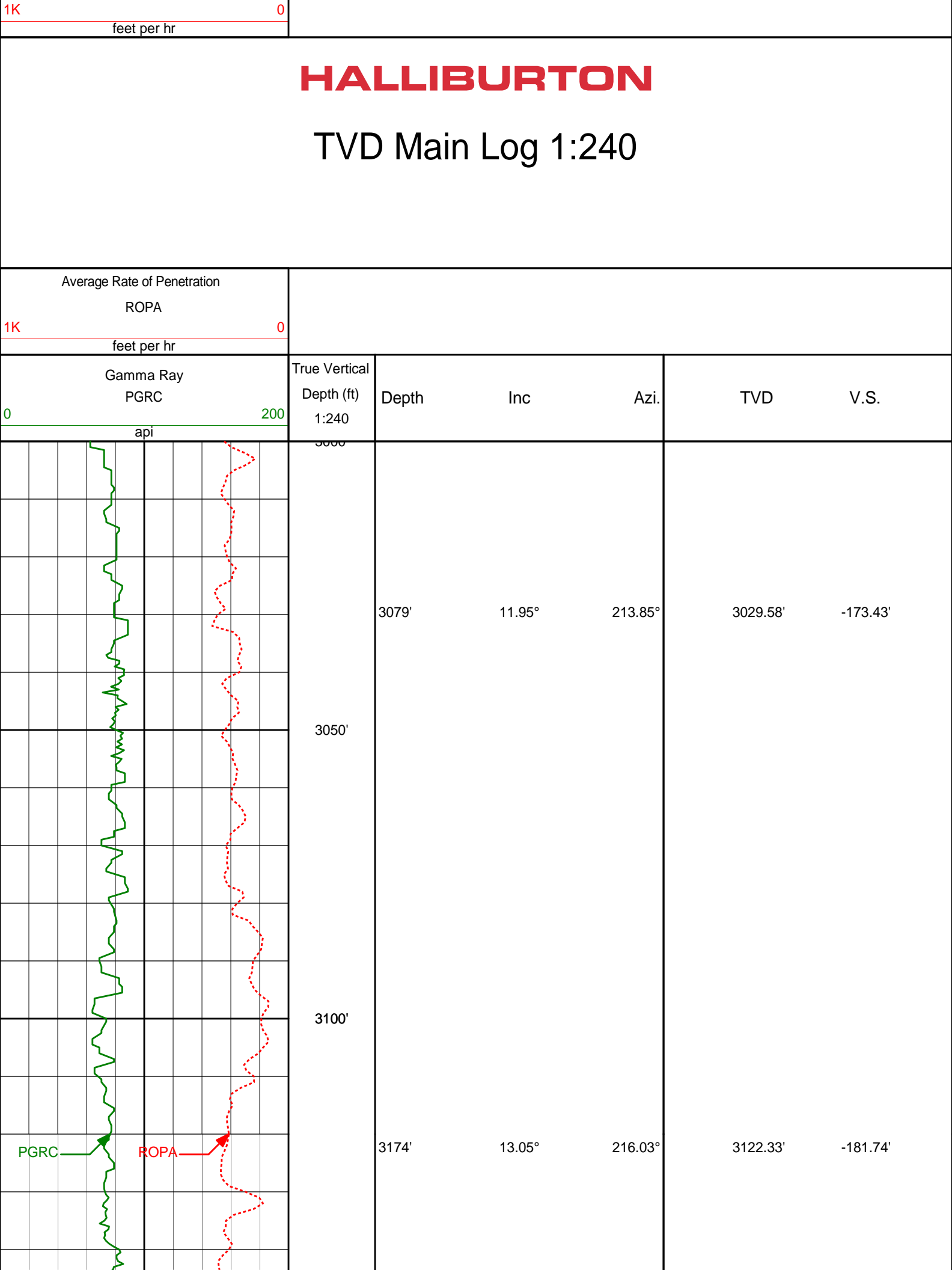


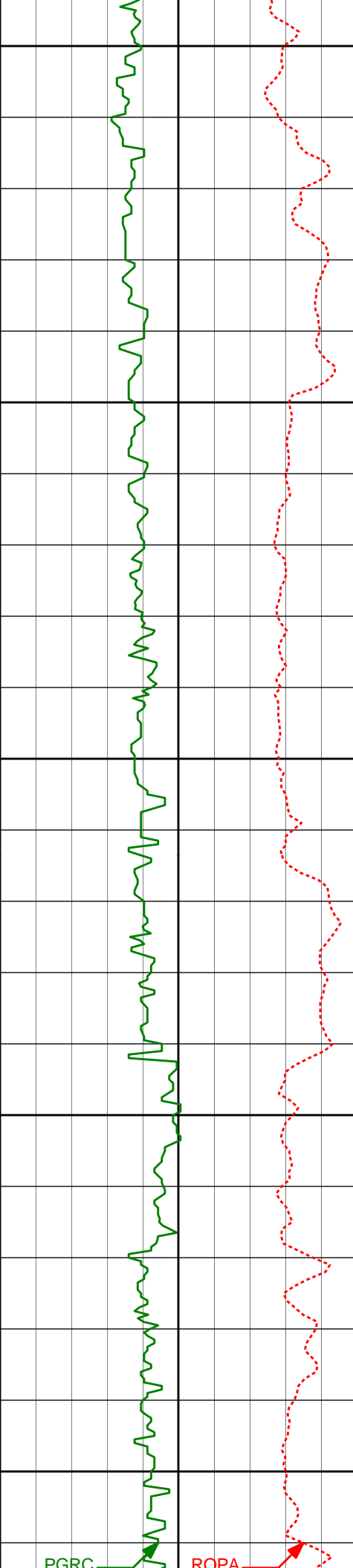


5500'				
5550'	5654'	1.00°	148.52°	5545.50' -413.34'
5600'				
5650'	5749'	1.10°	146.89°	5640.49' -412.14'
5700'	5794'	1.15°	142.13°	5685.48' -411.50'
5750'	5846'	1.54°	118.79°	5737.47' -410.44'
5800'	5893'	3.10°	101.93°	5784.43' -408.57'
<Run 200>	5941'	6.72°	85.69°	5832.24' -404.56'
5850'				
5900'	5989'	9.25°	82.55°	5879.78' -398.20'
5950'	6036'	11.35°	92.47°	5926.02' -390.04'
6000'	6084'	14.33°	98.15°	5972.82' -379.44'









3150'

3200'

3250'

3300'

3350'

3269'

12.92°

219.62°

3214.90'

-191.32'

3365'

14.55°

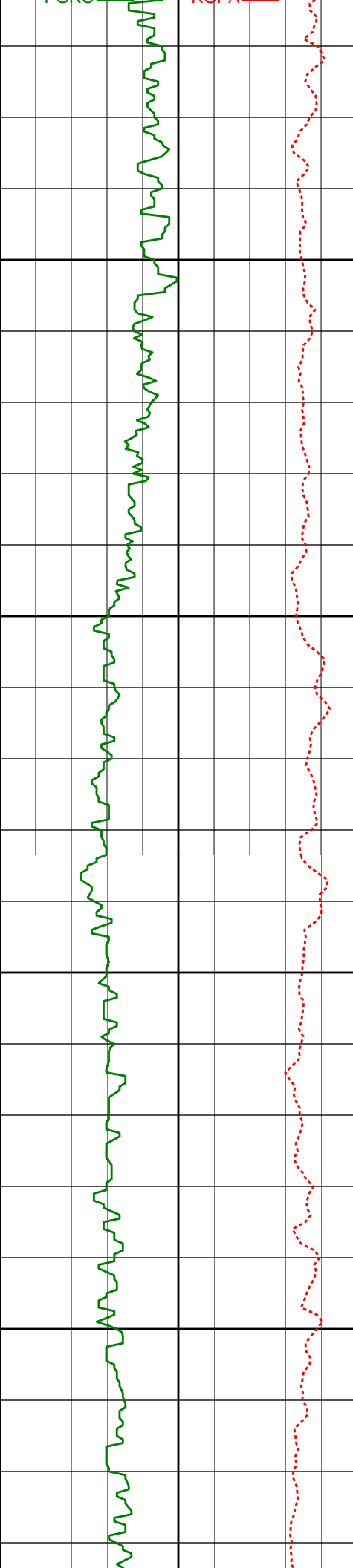
222.61°

3308.16'

-202.73'

PGRC

ROPA



3400'

3460'

13.83°

221.59°

3400.26'

-214.70'

3450'

3500'

3550'

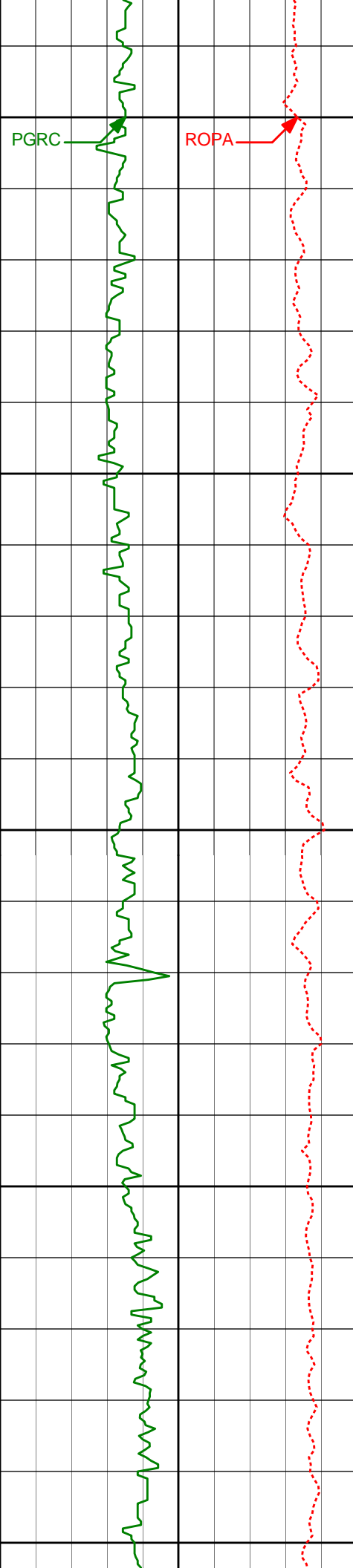
3556'

15.50°

225.36°

3493.13'

-227.73'



3600'

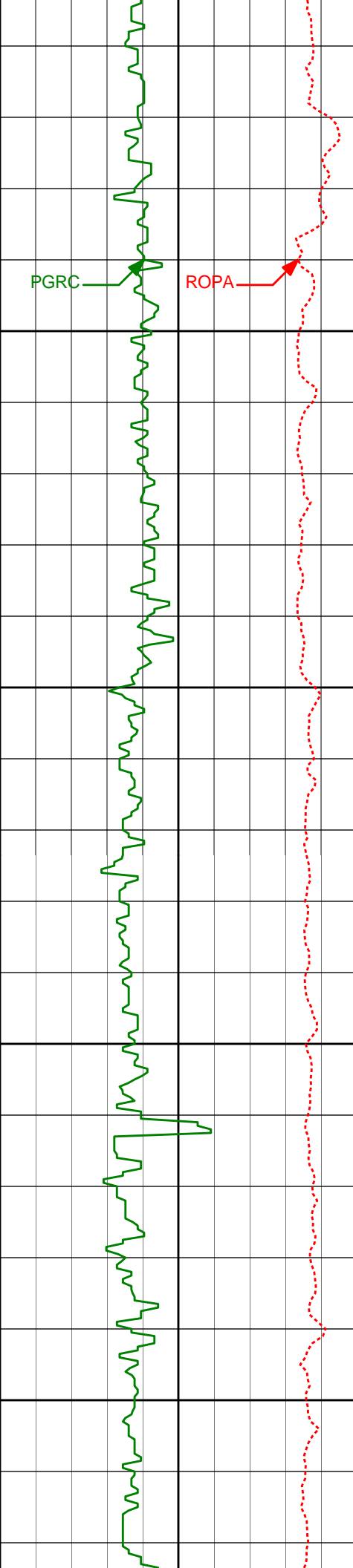
3650'

3700'

3750'

3800'

3651'	16.26°	224.97°	3584.50'	-242.27'
3746'	17.14°	224.56°	3675.50'	-257.38'
3841'	17.51°	224.68°	3766.18'	-272.99'



3850'

3937'

15.81°

218.67°

3858.16'

-287.01'

3900'

3950'

4032'

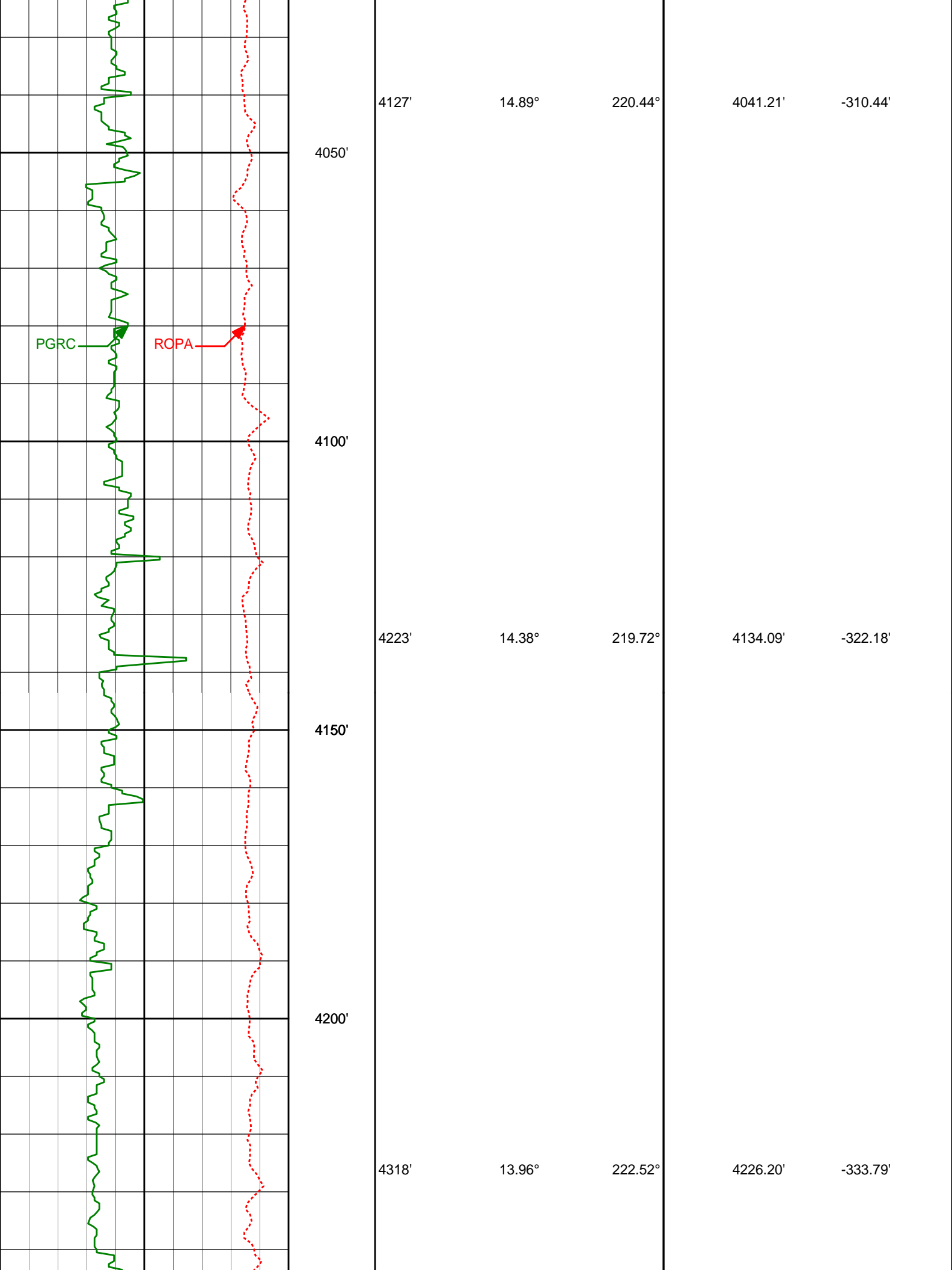
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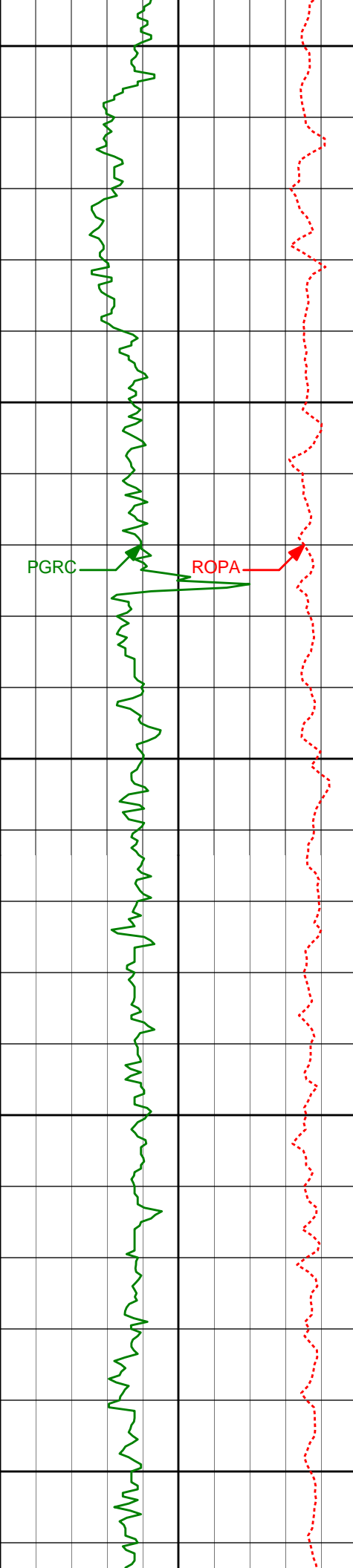
217.62°

3949.58'

-298.73'

4000'





4250'

4300'

4350'

4400'

4450'

4413'

13.87°

221.91°

4318.42'

-345.58'

4509'

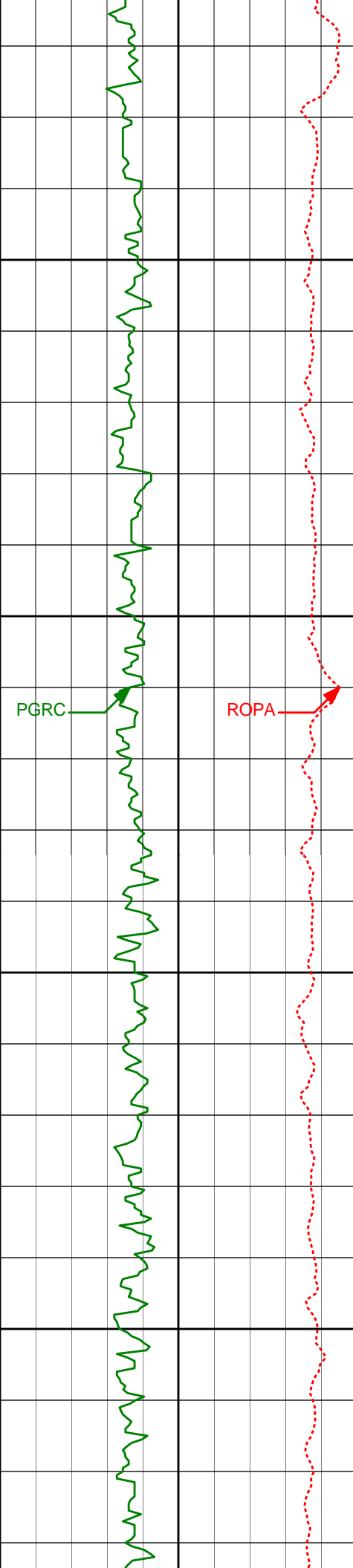
12.52°

220.23°

4411.88'

-356.52'





4500'

4604'

12.53°

218.86°

4504.62'

-366.32'

4550'

PGRC

ROPA

4600'

4700'

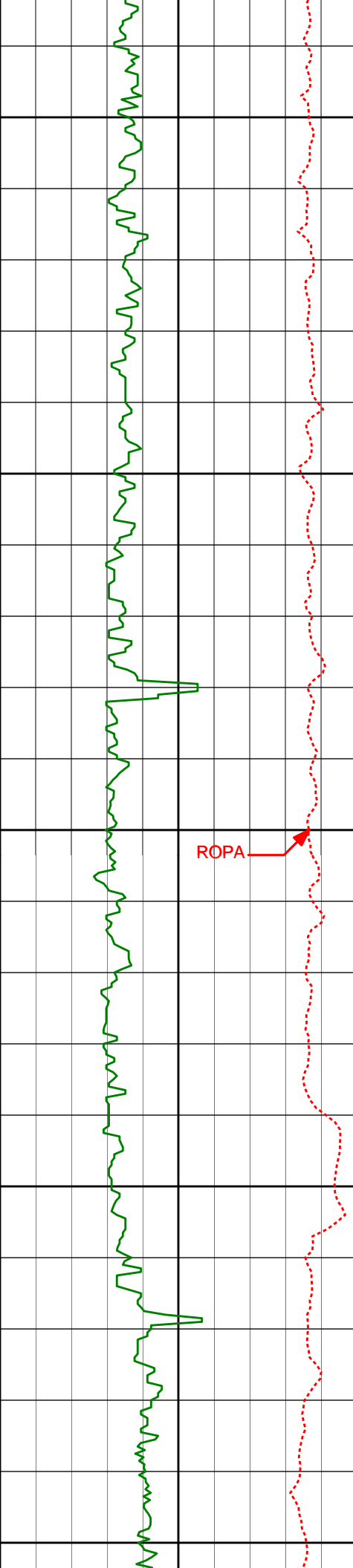
12.25°

221.51°

4598.38'

-376.31'

4650'



4700'

4750'

4800'

4850'

4900'

ROPA

4795'

11.21°

224.00°

4691.40'

-386.42'

4891'

10.89°

227.09°

4785.62'

-396.81'

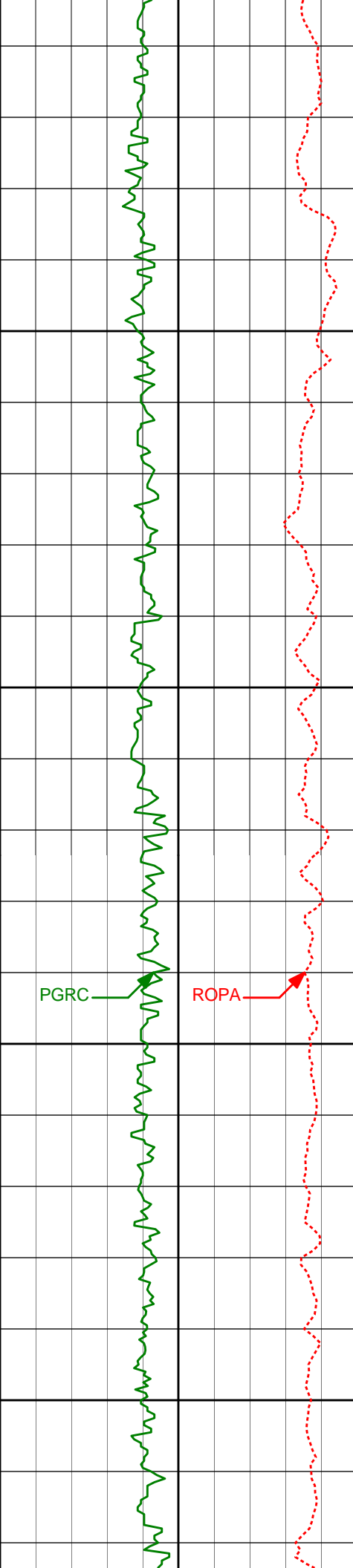
4986'

9.34°

217.30°

4879.14'

-405.47'



4950'

5000'

5050'

5100'

5082'

6.10°

208.84°

4974.26'

-410.46'

5177'

5.27°

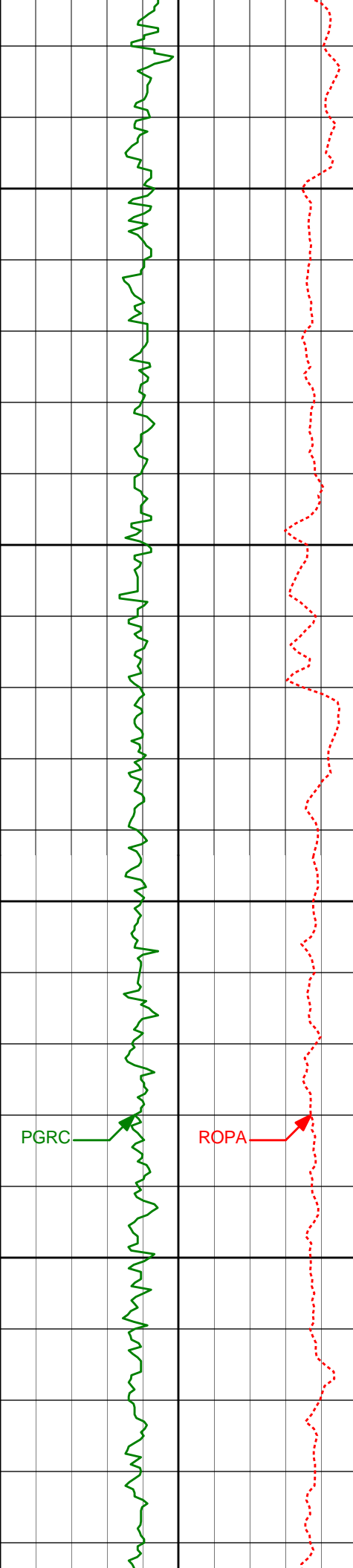
212.85°

5068.80'

-413.61'

PGRC

ROPA



5150'

5272'

2.47°

198.82°

5163.57'

-415.50'

5200'

5250'

5367'

0.73°

179.41°

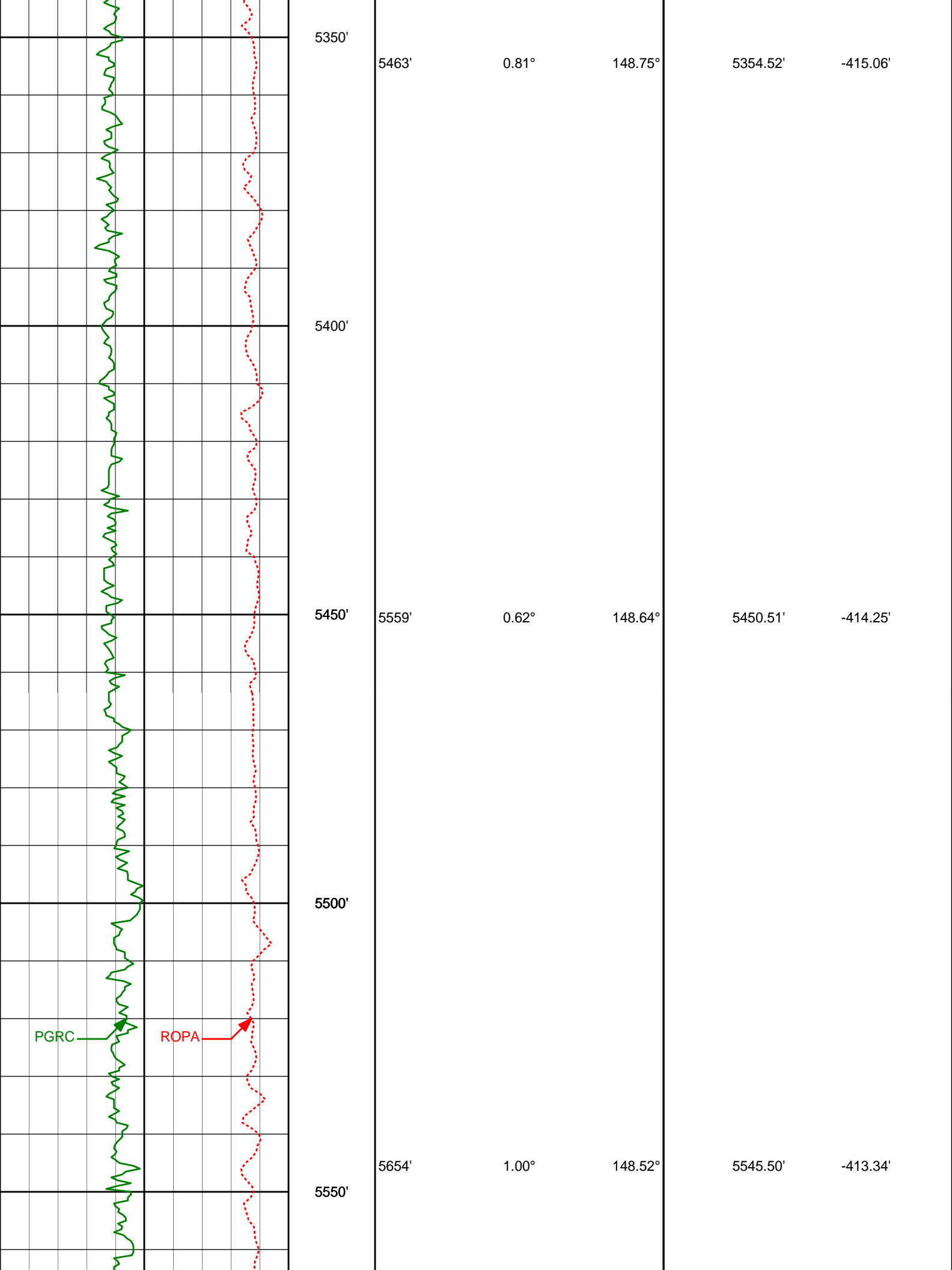
5258.53'

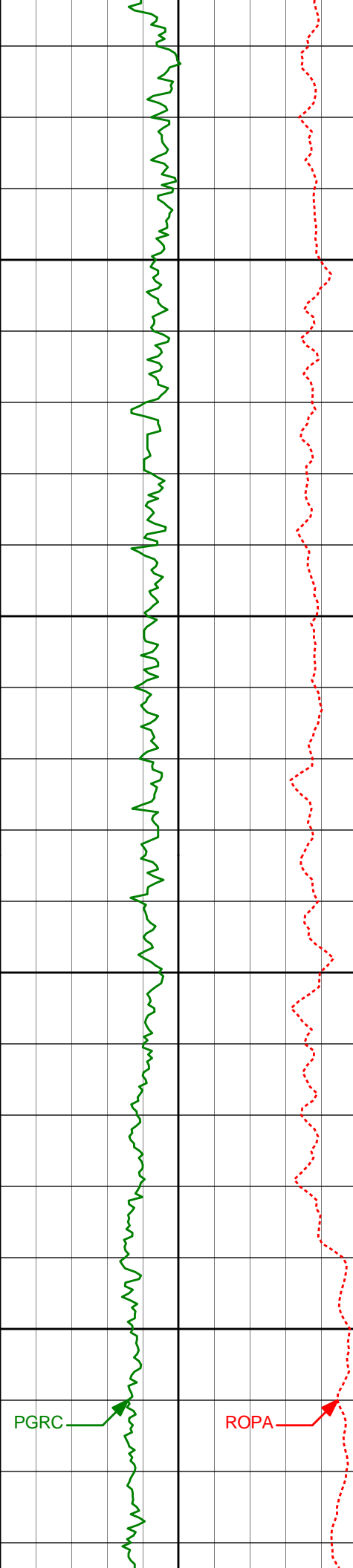
-415.65'

PGRC

ROPA

5300'





5600'

5749'

1.10°

146.89°

5640.49'

-412.14'

5650'

5794'

1.15°

142.13°

5685.48'

-411.50'

5700'

5846'

1.54°

118.79°

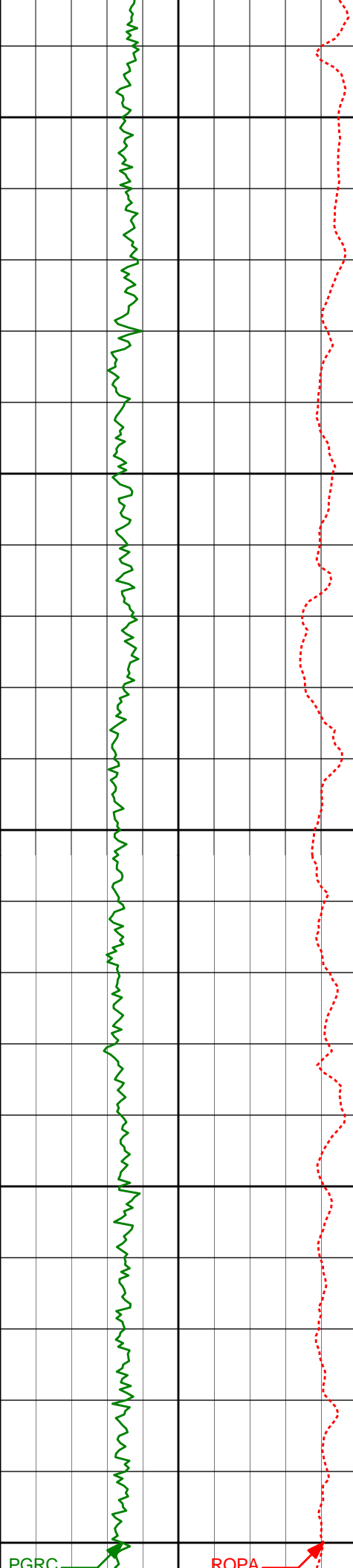
5737.47'

-410.44'

5750'

PGRC

ROPA



5800'

<Run 200>

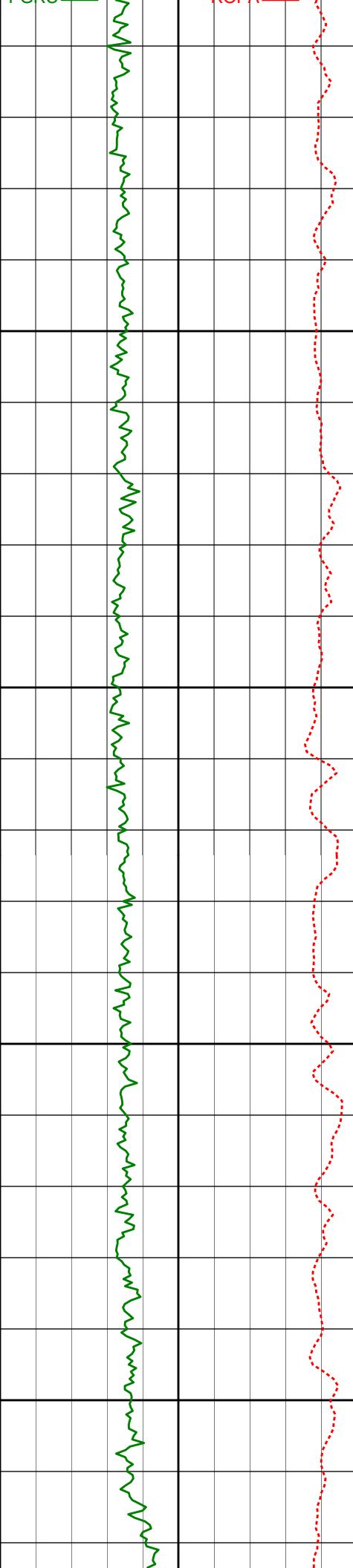
5850'

5900'

5950'

6000'

5893'	3.10°	101.93°	5784.43'	-408.57'
5941'	6.72°	85.69°	5832.24'	-404.56'
5989'	9.25°	82.55°	5879.78'	-398.20'
6036'	11.35°	92.47°	5926.02'	-390.04'
6084'	14.33°	98.15°	5972.82'	-379.44'



6050'

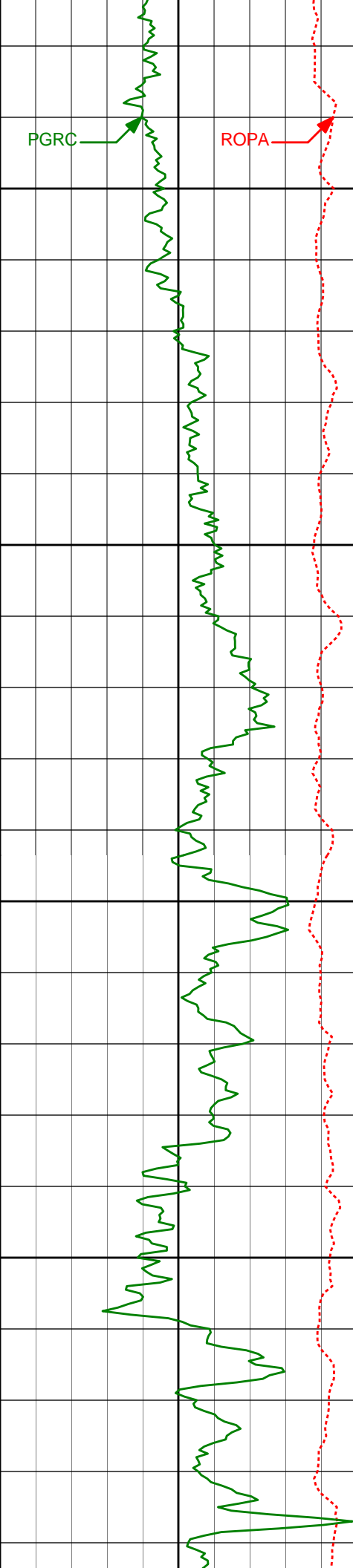
6100'

6150'

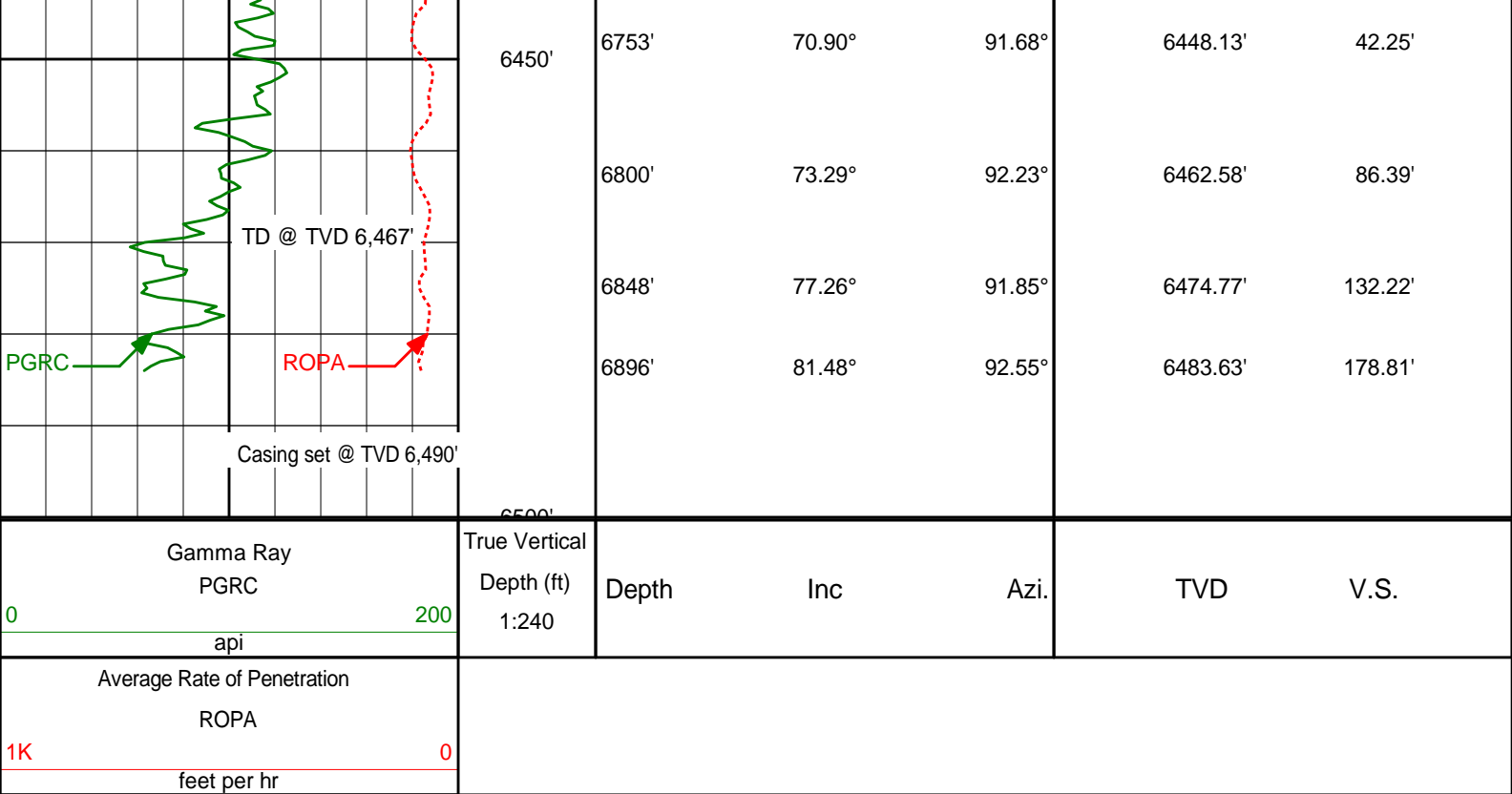
6200'

6132'	18.01°	97.30°	6018.91'	-366.10'
6180'	21.26°	96.98°	6064.11'	-350.02'
6228'	24.42°	95.32°	6108.35'	-331.46'
6276'	27.91°	92.54°	6151.42'	-310.48'
6323'	31.29°	93.12°	6192.28'	-287.51'





6371'	35.70°	94.09°	6232.30'	-261.25'
6250'				
6418'	40.33°	95.34°	6269.32'	-232.50'
6300'				
6466'	45.16°	94.23°	6304.56'	-200.13'
6350'				
6514'	50.94°	93.12°	6336.63'	-164.75'
6300'				
6562'	56.45°	93.04°	6365.04'	-126.47'
6250'				
6609'	60.95°	90.05°	6389.46'	-86.89'
6200'				
6657'	64.24°	90.31°	6411.55'	-45.06'
6150'				
6705'	67.60°	91.00°	6431.13'	-1.98'



**HALLIBURTON**

## DIRECTIONAL SURVEY REPORT

Noble Energy  
SLW State PC BB18-65HN  
Wattenberg  
Weld Colorado  
USA  
CA-XX-0009441275

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
585.00	0.00	0.00	585.00	0.00 N	0.00 E	0.00	0.00
630.00	4.48	125.92	629.95	1.03 S	1.43 E	1.60	9.96
724.00	2.38	105.03	723.78	3.69 S	6.28 E	6.88	2.57
819.00	0.79	24.00	818.75	3.61 S	8.45 E	8.99	2.51
914.00	0.64	42.58	913.74	2.62 S	9.08 E	9.41	0.29
1008.00	0.65	42.09	1007.74	1.84 S	9.79 E	9.96	0.02
1103.00	0.63	25.59	1102.73	0.97 S	10.38 E	10.37	0.20
1195.00	1.34	227.46	1194.73	1.24 S	9.80 E	9.86	2.10
1287.00	3.70	222.21	1286.63	4.17 S	7.02 E	7.69	2.58
1379.00	6.09	225.72	1378.29	9.78 S	1.52 E	3.39	2.61
1471.00	7.85	235.51	1469.61	16.74 S	7.15 W	-3.78	2.30
1564.00	10.04	227.83	1561.47	25.79 S	18.40 W	-13.06	2.68
1656.00	12.44	214.56	1651.72	39.34 S	29.97 W	-21.79	3.82
1748.00	13.75	214.34	1741.32	56.53 S	41.76 W	-30.04	1.42
1840.00	13.96	220.48	1830.65	74.00 S	55.13 W	-39.78	1.61
1932.00	14.51	219.12	1919.83	91.38 S	69.60 W	-50.62	0.70
2025.00	13.60	217.82	2010.04	109.05 S	83.66 W	-60.99	1.03
2124.00	14.70	217.33	2106.04	128.23 S	98.41 W	-71.76	1.11
2219.00	13.34	212.81	2198.21	147.03 S	111.66 W	-81.12	1.84
2315.00	14.41	213.77	2291.41	166.27 S	124.30 W	-89.80	1.14
2410.00	17.57	220.46	2382.73	187.02 S	140.18 W	-101.37	3.85
2506.00	16.73	217.38	2474.46	209.03 S	157.98 W	-114.58	1.29
2601.00	16.34	215.26	2565.53	230.81 S	174.00 W	-126.08	0.76
2697.00	15.30	214.96	2657.89	252.22 S	189.05 W	-136.71	1.09
2792.00	13.45	217.71	2749.91	271.23 S	202.99 W	-146.71	2.08
2888.00	13.19	217.00	2843.33	288.80 S	216.41 W	-156.48	0.32

2888.00	13.19	217.08	2043.33	288.68 S	210.41 W	-158.48	0.32
2983.00	13.04	214.10	2935.86	306.33 S	228.94 W	-165.38	0.71
3079.00	11.95	213.85	3029.58	323.55 S	240.54 W	-173.43	1.13
3174.00	13.05	216.03	3122.33	340.39 S	252.33 W	-181.74	1.26
3269.00	12.92	219.62	3214.90	357.24 S	265.41 W	-191.32	0.86
3365.00	14.55	222.61	3308.16	374.39 S	280.42 W	-202.73	1.85
3460.00	13.83	221.59	3400.26	391.66 S	296.03 W	-214.70	0.80
3556.00	15.50	225.36	3493.13	409.25 S	312.77 W	-227.73	2.01
3651.00	16.26	224.97	3584.50	427.58 S	331.20 W	-242.27	0.80
3746.00	17.14	224.56	3675.50	446.96 S	350.43 W	-257.38	0.94
3841.00	17.51	224.68	3766.18	467.10 S	370.30 W	-272.99	0.39
3937.00	15.81	218.67	3858.16	487.59 S	388.64 W	-287.01	2.52
4032.00	15.72	217.62	3949.58	507.89 S	404.58 W	-298.73	0.32
4127.00	14.89	220.44	4041.21	527.38 S	420.36 W	-310.44	1.17
4223.00	14.38	219.72	4134.09	545.94 S	435.98 W	-322.18	0.57
4318.00	13.96	222.52	4226.20	563.46 S	451.27 W	-333.79	0.85
4413.00	13.87	221.91	4318.42	580.38 S	466.62 W	-345.58	0.18
4509.00	12.52	220.23	4411.88	596.89 S	481.03 W	-356.52	1.46
4604.00	12.53	218.86	4504.62	612.78 S	494.15 W	-366.32	0.31
4700.00	12.25	221.51	4598.38	628.51 S	507.43 W	-376.31	0.66
4795.00	11.21	224.00	4691.40	642.71 S	520.53 W	-386.42	1.22
4891.00	10.89	227.09	4785.62	655.60 S	533.66 W	-396.81	0.70
4986.00	9.34	217.30	4879.14	667.85 S	544.91 W	-405.47	2.43
5082.00	6.10	208.84	4974.26	678.52 S	552.09 W	-410.46	3.57
5177.00	5.27	212.85	5068.80	686.61 S	556.90 W	-413.61	0.97
5272.00	2.47	198.82	5163.57	692.21 S	559.93 W	-415.50	3.10
5367.00	0.73	179.41	5258.53	694.76 S	560.58 W	-415.65	1.88
5463.00	0.81	148.75	5354.52	695.96 S	560.22 W	-415.06	0.43
5559.00	0.62	148.64	5450.51	696.98 S	559.60 W	-414.25	0.20
5654.00	1.00	148.52	5545.50	698.13 S	558.90 W	-413.34	0.40
5749.00	1.10	146.89	5640.49	699.60 S	557.96 W	-412.14	0.11
5794.00	1.15	142.13	5685.48	700.32 S	557.45 W	-411.50	0.23
5846.00	1.54	118.79	5737.47	701.07 S	556.52 W	-410.44	1.28
5893.00	3.10	101.93	5784.43	701.63 S	554.72 W	-408.57	3.60
5941.00	6.72	85.69	5832.24	701.69 S	550.65 W	-404.56	7.99
5989.00	9.25	82.55	5879.78	700.98 S	544.02 W	-398.20	5.35
6036.00	11.35	92.47	5926.02	700.69 S	535.65 W	-390.04	5.84
6084.00	14.33	98.15	5972.82	701.74 S	525.05 W	-379.44	6.73
6132.00	18.01	97.30	6018.91	703.52 S	511.81 W	-366.10	7.69
6180.00	21.26	96.98	6064.11	705.52 S	495.81 W	-350.02	6.76
6228.00	24.42	95.32	6108.35	707.50 S	477.29 W	-331.46	6.73
6276.00	27.91	92.54	6151.42	708.92 S	456.18 W	-310.48	7.70
6323.00	31.29	93.12	6192.28	710.07 S	432.99 W	-287.51	7.23
6371.00	35.70	94.09	6232.30	711.75 S	406.56 W	-261.25	9.24
6418.00	40.33	95.34	6269.32	714.15 S	377.73 W	-232.50	10.00
6466.00	45.16	94.23	6304.56	716.85 S	345.27 W	-200.13	10.17
6514.00	50.94	93.12	6336.63	719.12 S	309.66 W	-164.75	12.18
6562.00	56.45	93.04	6365.04	721.19 S	271.05 W	-126.47	11.46
6609.00	60.95	90.05	6389.46	722.25 S	230.92 W	-86.89	11.02
6657.00	64.24	90.31	6411.55	722.38 S	188.31 W	-45.06	6.87
6705.00	67.60	91.00	6431.13	722.89 S	144.50 W	-1.98	7.12
6753.00	70.90	91.68	6448.13	723.94 S	99.63 W	42.25	7.00
6800.00	73.29	92.23	6462.58	725.47 S	54.94 W	86.39	5.21
6848.00	77.26	91.85	6474.77	727.12 S	8.55 W	132.22	8.31
6896.00	81.48	92.55	6483.63	728.93 S	38.58 E	178.81	8.90
6901.00	81.94	92.91	6484.35	729.17 S	43.52 E	183.71	11.67
6984.00	84.97	95.22	6493.81	735.02 S	125.76 E	265.52	4.58
7079.00	85.51	94.64	6501.70	743.15 S	220.08 E	359.63	0.83
7174.00	87.04	92.08	6507.87	748.70 S	314.71 E	453.55	3.14
7270.00	88.40	91.58	6511.69	751.76 S	410.58 E	548.20	1.50
7365.00	92.06	91.77	6511.31	754.53 S	505.52 E	641.89	3.86
7461.00	92.50	89.76	6507.49	755.82 S	601.43 E	736.24	2.14
7556.00	91.97	91.40	6503.78	756.78 S	696.35 E	829.55	1.81
7652.00	93.24	85.75	6499.42	754.39 S	792.18 E	923.11	6.03
7747.00	92.47	88.86	6494.69	749.93 S	886.95 E	1015.22	3.37
7843.00	91.70	89.00	6491.20	748.14 S	982.87 E	1108.99	0.81
7938.00	92.34	88.56	6487.86	746.11 S	1077.78 E	1201.72	0.82
8033.00	91.36	88.18	6484.80	743.41 S	1172.69 E	1294.32	1.10
8129.00	91.29	87.72	6482.58	739.98 S	1268.61 E	1387.76	0.49
8224.00	90.86	88.53	6480.79	736.87 S	1363.54 E	1480.30	0.97
8320.00	89.38	88.76	6480.59	734.60 S	1459.51 E	1574.02	1.56
8415.00	88.12	89.85	6482.66	733.45 S	1554.48 E	1666.97	1.75
8510.00	89.54	89.25	6484.60	732.70 S	1649.45 E	1760.00	1.62
8606.00	90.71	90.54	6484.39	732.52 S	1745.45 E	1854.15	1.82
8701.00	89.85	91.67	6483.93	734.36 S	1840.43 E	1947.70	1.50

8797.00	90.99	89.97	6483.23	735.74 S	1936.41 E	2042.13	2.14
8892.00	91.57	91.46	6481.11	736.92 S	2031.37 E	2135.53	1.68
8988.00	91.17	91.50	6478.81	739.39 S	2127.31 E	2230.14	0.42
9083.00	91.05	91.53	6476.97	741.90 S	2222.26 E	2323.78	0.13
9179.00	91.91	93.96	6474.49	746.49 S	2318.11 E	2418.71	2.68
9274.00	91.70	93.48	6471.50	752.65 S	2412.87 E	2512.87	0.55
9370.00	89.91	93.28	6470.16	758.31 S	2508.69 E	2607.97	1.87
9465.00	91.79	91.86	6468.75	762.56 S	2603.57 E	2701.89	2.48
9561.00	90.15	92.92	6467.13	766.56 S	2699.47 E	2796.75	2.03
9656.00	89.66	93.01	6467.28	771.48 S	2794.34 E	2890.78	0.53
9752.00	90.99	93.31	6466.74	776.77 S	2890.19 E	2985.85	1.42
9847.00	91.48	92.23	6464.70	781.36 S	2985.06 E	3079.81	1.26
9942.00	90.86	90.66	6462.76	783.75 S	3080.01 E	3173.43	1.77
10038.00	90.25	90.41	6461.83	784.64 S	3176.00 E	3267.78	0.69
10133.00	88.80	90.58	6462.62	785.46 S	3270.99 E	3361.14	1.54
10227.00	88.30	89.57	6465.00	785.59 S	3364.96 E	3453.35	1.20
10275.00	90.00	90.56	6465.71	785.64 S	3412.95 E	3500.45	4.09
10323.00	90.86	91.40	6465.35	786.47 S	3460.94 E	3547.70	2.51
10390.00	92.43	92.36	6463.42	788.67 S	3527.87 E	3613.79	2.74
10418.00	93.12	93.31	6462.06	790.05 S	3555.80 E	3641.46	4.16
10514.00	91.14	92.74	6458.50	795.11 S	3651.60 E	3736.43	2.14
10609.00	90.12	92.63	6457.45	799.55 S	3746.49 E	3830.39	1.08
10705.00	88.98	92.44	6458.20	803.80 S	3842.39 E	3925.30	1.20
10800.00	88.12	91.20	6460.60	806.81 S	3937.31 E	4019.01	1.60
10896.00	87.81	90.37	6464.01	808.12 S	4033.24 E	4113.38	0.92
10926.00	87.44	90.15	6465.25	808.26 S	4063.21 E	4142.82	1.44
10986.00	87.44	90.15	6467.93	808.41 S	4123.15 E	4201.65	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 101.15 DEGREES (GRID)  
A TOTAL CORRECTION OF 7.93 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 10986.00 FEET  
IS 4201.66 FEET ALONG 101.09 DEGREES (GRID)**