



**1:600 / 1:240**

WELL INFORMATION					
MWD Run Number	100	200	300		
Date run completed	11-Aug-12	13-Aug-12	15-Aug-12		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.750	6.750	4.830		
Log Start Depth (MD, ft)	657.00	5,767.00	6,961.00		
Log End Depth (MD, ft)	5,767.00	6,961.00	10,632.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	10-Aug-12 06:00	11-Aug-12 18:45	14-Aug-12 06:00		
Drill/Wipe End Date and Time	11-Aug-12 06:00	12-Aug-12 20:10	14-Aug-12 12:00		
Min Inc (deg) @ Depth (MD, ft)	.15 @ 817.00	1.12 @ 5,812.00	86.77 @ 8,353.00		
Max Inc (deg) @ Depth (MD, ft)	16.37 @ 2,581.00	83.20 @ 6,911.00	93.24 @ 9,302.00		
Bit TFA(in2) / Bit Type	.75 / PDC	.86 / PDC	.46 / PDC		
Flow Rate (gpm)	600.00	520.00	265.00		
Max AV (fpm) / CV (fpm) @ MWD	300.0 / 300.0	458.4 / 346.1	300.0 / 300.0		
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	10.10 / 58.00	10.90 / 58.00	9.30 / 33.00		
Filtrate CL (ppm)	2,200.00	2,200.00	1,400.00		
pH / Fluid Loss (mptm)	9.60 / 99	9.60 / 28	8.90 / 99		
PV (cP) / YP (Ihf2)	18 / 16.00	18 / 16.00	7 / 7.00		
% Solids / % Sand	10.00 / 0.75	10.00 / 0.75	2.00 / 0.25		
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	N/A / N/A		
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Min Tool Temp (deg F) @ S	458.45 / PDC	458.45 / PDC	318.11 / PDC		

Max Tool Temp (degF) / Source	158.47 / PCM	163.20 / PCM	218.14 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	adam sampson	adam sampson	adam sampson		
Customer Representative	mike pino	mike pino	mike pino		

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.76	5.76	5.76		
Sub Serial Number	11303519	11303519	11854090		
Insert Serial Number	11145604	11619972	11145604		
Date and Time Initialized	05-Aug-12 09:53	11-Aug-12 08:07	13-Aug-12 15:04		
Date and Time Read	11-Aug-12 13:39	13-Aug-12 01:10	15-Aug-12 21:17		
ECMB SW Version	N/A	N/A	N/A		

### Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	57.00	50.00	64.00		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11303519	11303519	11854090		
Sonde Serial Number	10993496	11478124	11478124		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	264.80	3.20	220.10		

### Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	49.60	53.04	66.21		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11303519	11303519	11854090		
Insert/Sonde Serial Number	11293259	11121369	11293259		

## REMARKS

1. All depths are calibrated to driller's pipe tally and are measured depth from the Drill Floor.
2. No depth corrections have been made for pipe stretch or compression.
3. Critical annular velocities are calculated using the "Power Law" model for water based fluids and the "Brigham 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 (Gamma CG):  
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 7.3.5

WARRANTY

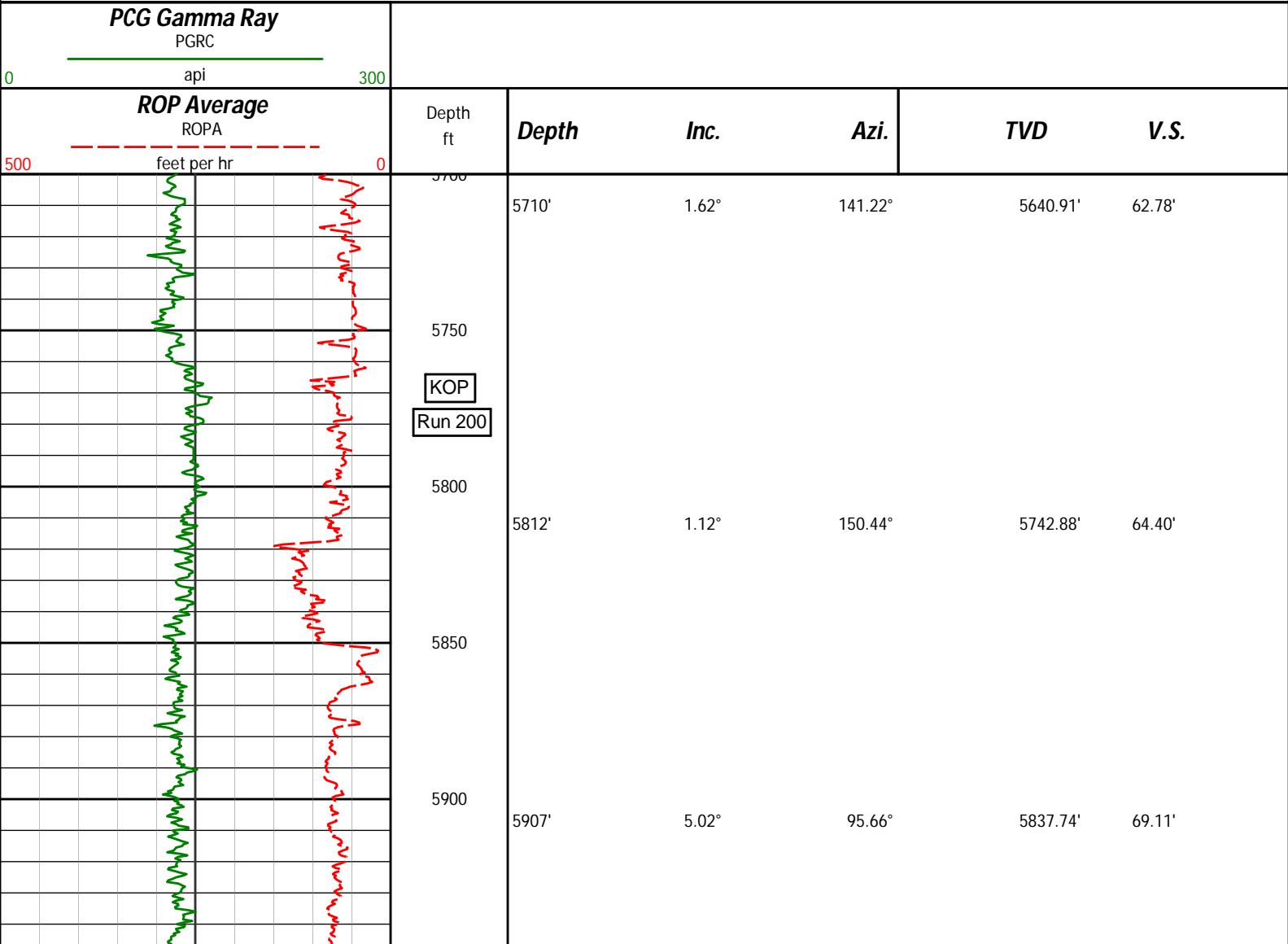
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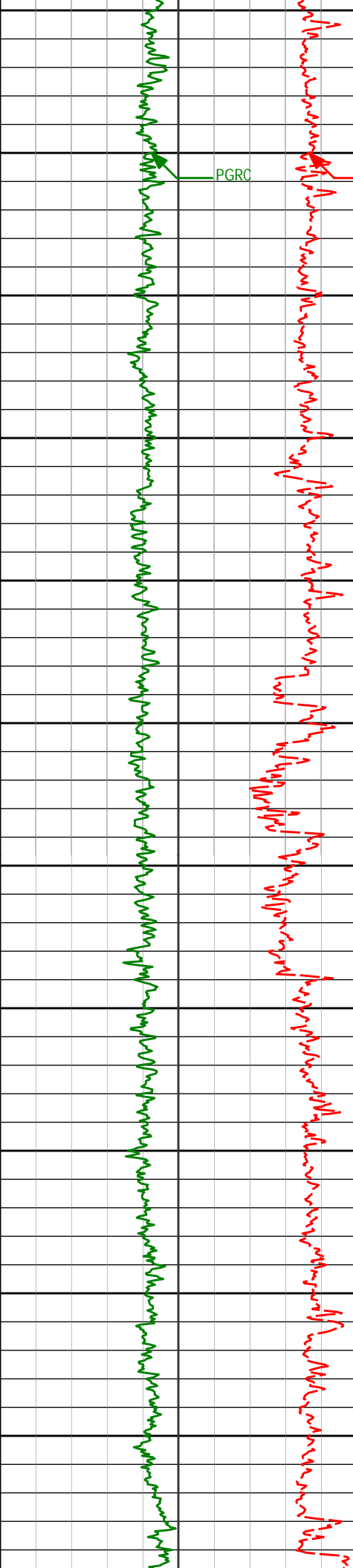
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Sperry Drilling Services

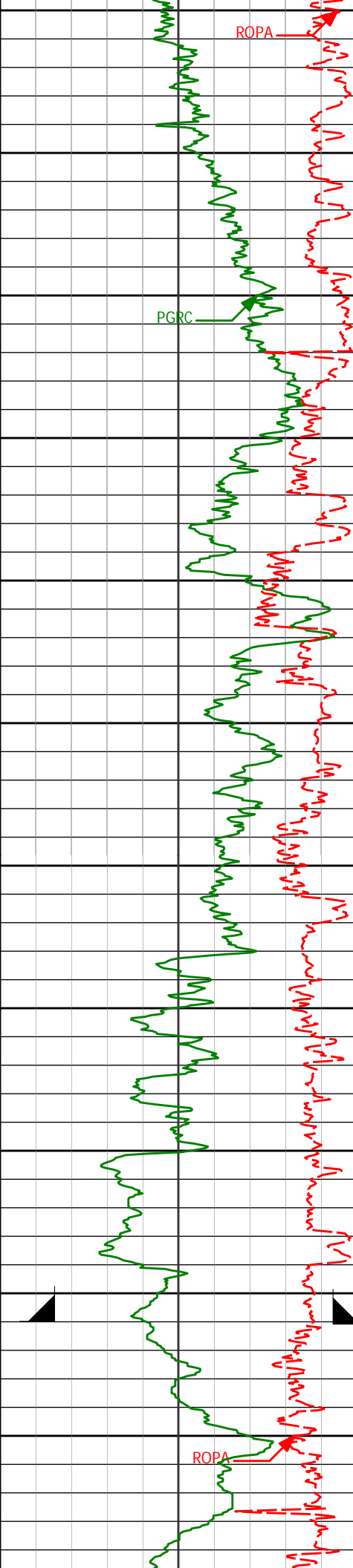
MD Main Log 1:600

Noble Energy  
Wells Ranch AA24-67-1HN  
H&P 321  
T6N-R63W

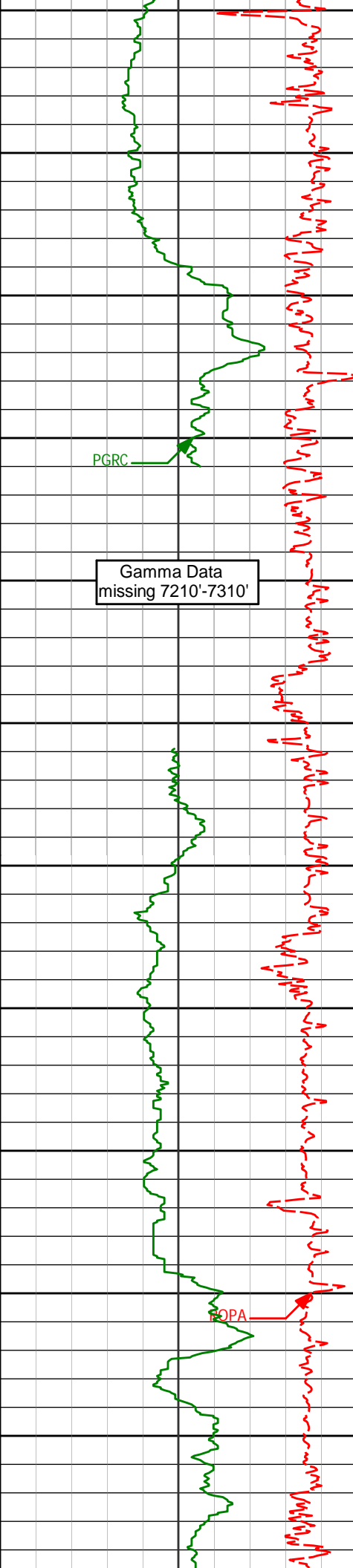




5950	5955'	9.59°	89.35°	5885.34'	75.17'
6000	6002'	12.81°	86.86°	5931.44'	84.19'
6050	6050'	16.50°	84.38°	5977.87'	96.09'
6100	6097'	19.30°	85.49°	6022.59'	110.22'
6150	6145'	21.45°	89.39°	6067.58'	126.70'
6200	6192'	25.06°	91.40°	6110.76'	145.13'
6250	6240'	28.06°	92.13°	6153.69'	166.50'
6300	6287'	31.20°	91.78°	6194.54'	189.65'
6350	6335'	36.57°	90.58°	6234.38'	216.26'
6400	6382'	41.15°	89.50°	6270.96'	245.53'
6450	6430'	45.94°	89.69°	6305.75'	278.31'
	6476'	51.30°	88.74°	6336.15'	312.50'



6500				
6524'	54.38°	89.23°	6365.14'	350.39'
6550				
6571'	59.74°	89.51°	6390.68'	389.48'
6600				
6619'	65.69°	89.44°	6412.68'	431.76'
6650				
6666'	68.28°	89.19°	6431.05'	474.63'
6700				
6714'	70.24°	88.44°	6448.05'	519.07'
6750				
6761'	72.26°	88.34°	6463.16'	563.08'
6800				
6809'	75.21°	88.44°	6476.60'	608.65'
6850				
6856'	78.91°	88.33°	6487.13'	653.94'
6900				
6911'	83.20°	87.82°	6495.68'	707.61'
7" Casing Shoe @ 6951'				
6950				
Run 300				
6977'	88.09°	87.93°	6500.69'	772.59'
7000				
7024'	89.20°	87.76°	6501.80'	818.99'



7050

7100

7150

7200

7250

7300

7350

7400

7450

7500

7550

7119'

90.83°

89.15°

6501.77'

912.95'

7214'

89.94°

90.11°

6501.13'

1007.18'

7309'

90.77°

89.72°

6500.54'

1101.47'

7404'

89.60°

86.75°

6500.24'

1195.37'

7499'

92.13°

87.03°

6498.81'

1288.90'

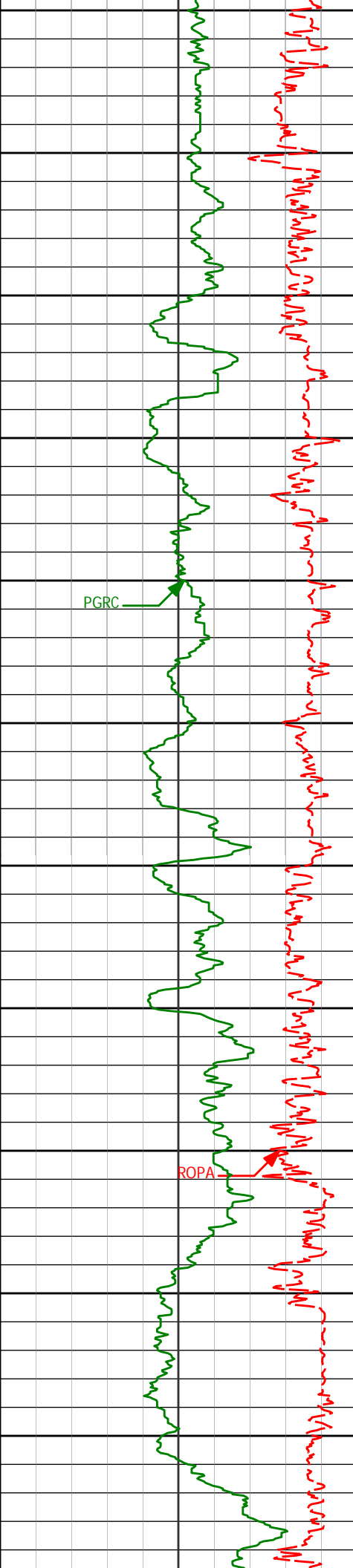
7594'

90.96°

89.17°

6496.26'

1382.74'



7600

7650

7689'

86.82°

86.21°

6498.10'

1476.46'

7700

7750

7784'

88.92°

87.39°

6501.63'

1569.92'

7800

PGRC

7850

7878'

92.68°

91.42°

6500.32'

1663.07'

7900

7950

7973'

92.90°

89.85°

6495.69'

1757.38'

8000

ROPA

8050

8068'

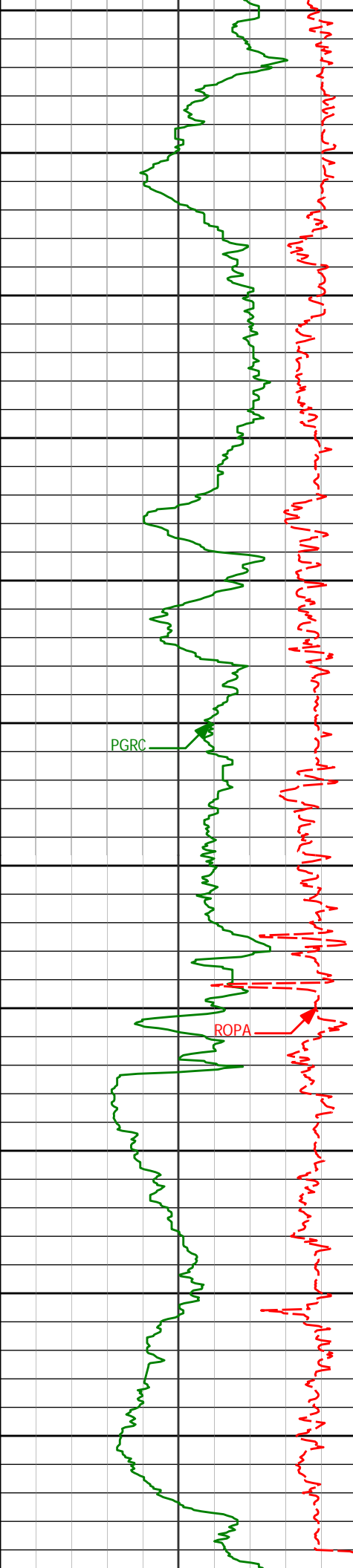
89.48°

89.83°

6493.73'

1851.62'

8100



8150

8163'

89.45°

90.33°

6494.62'

1945.95'

8200

8250

8258'

89.14°

88.85°

6495.80'

2040.16'

8300

8350

8353'

86.77°

86.48°

6499.19'

2133.85'

8400

PGRC

8450

8448'

88.37°

86.89°

6503.23'

2227.26'

8500

ROPA

8550

8543'

90.83°

88.15°

6503.89'

2320.97'

8600

8650

8637'

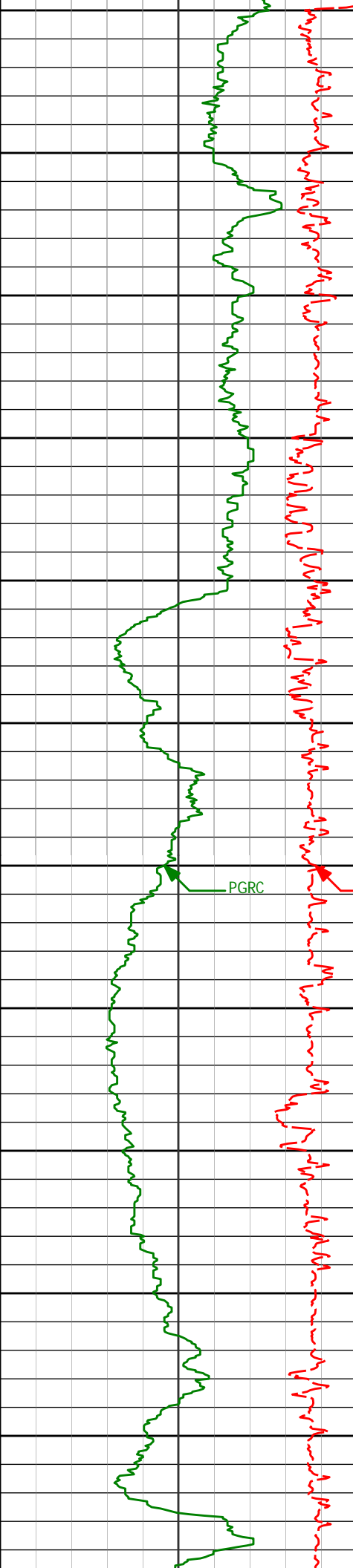
92.49°

90.30°

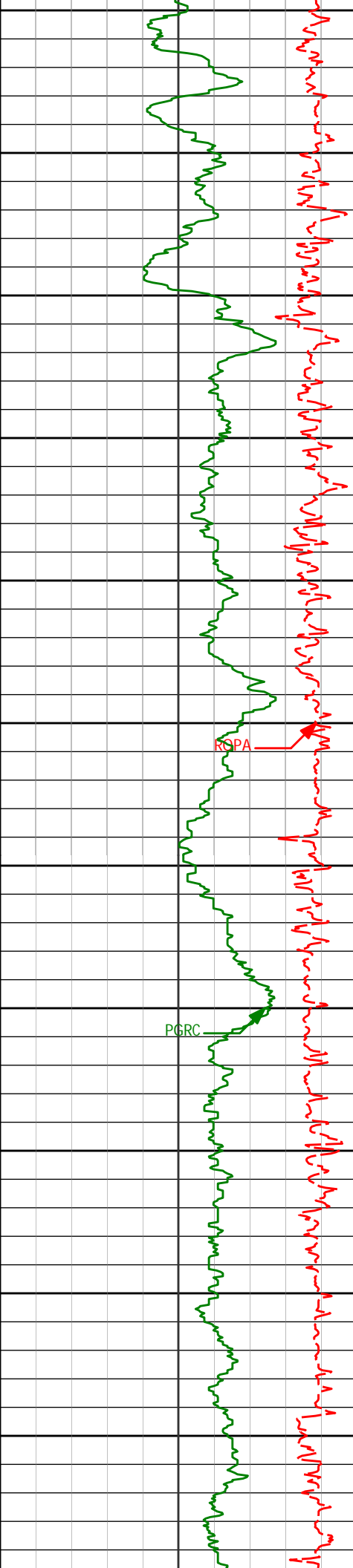
6501.16'

2414.08'





8732'	90.43°	89.77°	6498.74'	2508.36'
8827'	90.99°	92.14°	6497.56'	2602.83'
8922'	87.87°	88.14°	6498.51'	2697.13'
9017'	87.97°	90.49°	6501.96'	2791.23'
9112'	90.80°	90.62°	6502.98'	2885.63'
9207'	92.65°	90.16°	6500.12'	2979.97'



9250

9300

9350

9400

9450

9500

9550

9600

9650

9700

9750

9302'

93.24°

90.40°

6495.23'

3074.21'

9397'

90.99°

92.37°

6491.72'

3168.69'

9492'

88.61°

90.53°

6492.06'

3263.25'

9586'

91.26°

90.69°

6492.16'

3356.67'

9681'

89.75°

88.91°

6491.31'

3450.93'

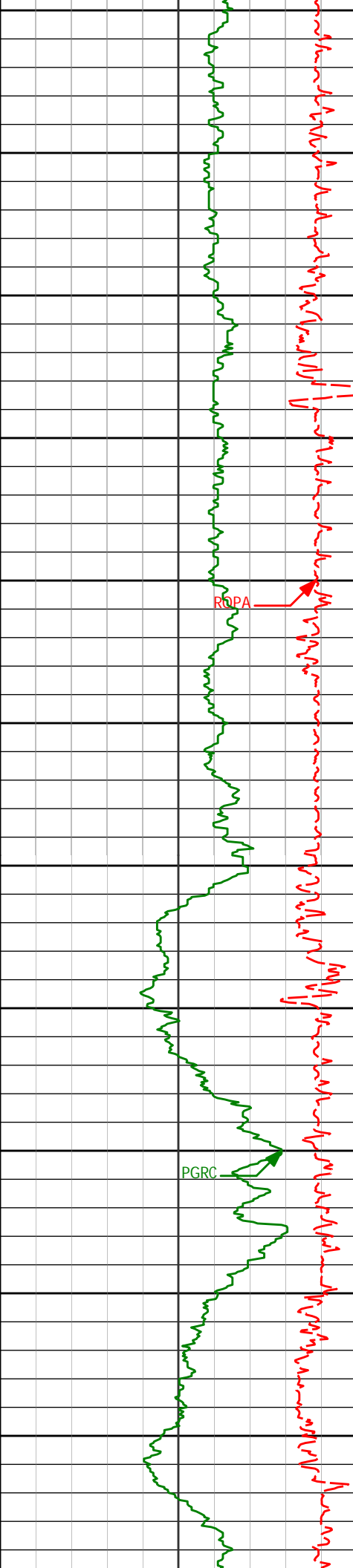
9776'

90.77°

89.20°

6490.88'

3545.04'



9800

9850

9900

9950

10000

10050

10100

10150

10200

10250

10300

9871'

89.14°

87.91°

6490.95'

3639.03'

9966'

90.00°

87.36°

6491.67'

3732.78'

10061'

90.65°

86.71°

6491.13'

3826.37'

10156'

91.60°

87.60°

6489.27'

3919.98'

10251'

90.59°

89.43°

6487.45'

4013.94'

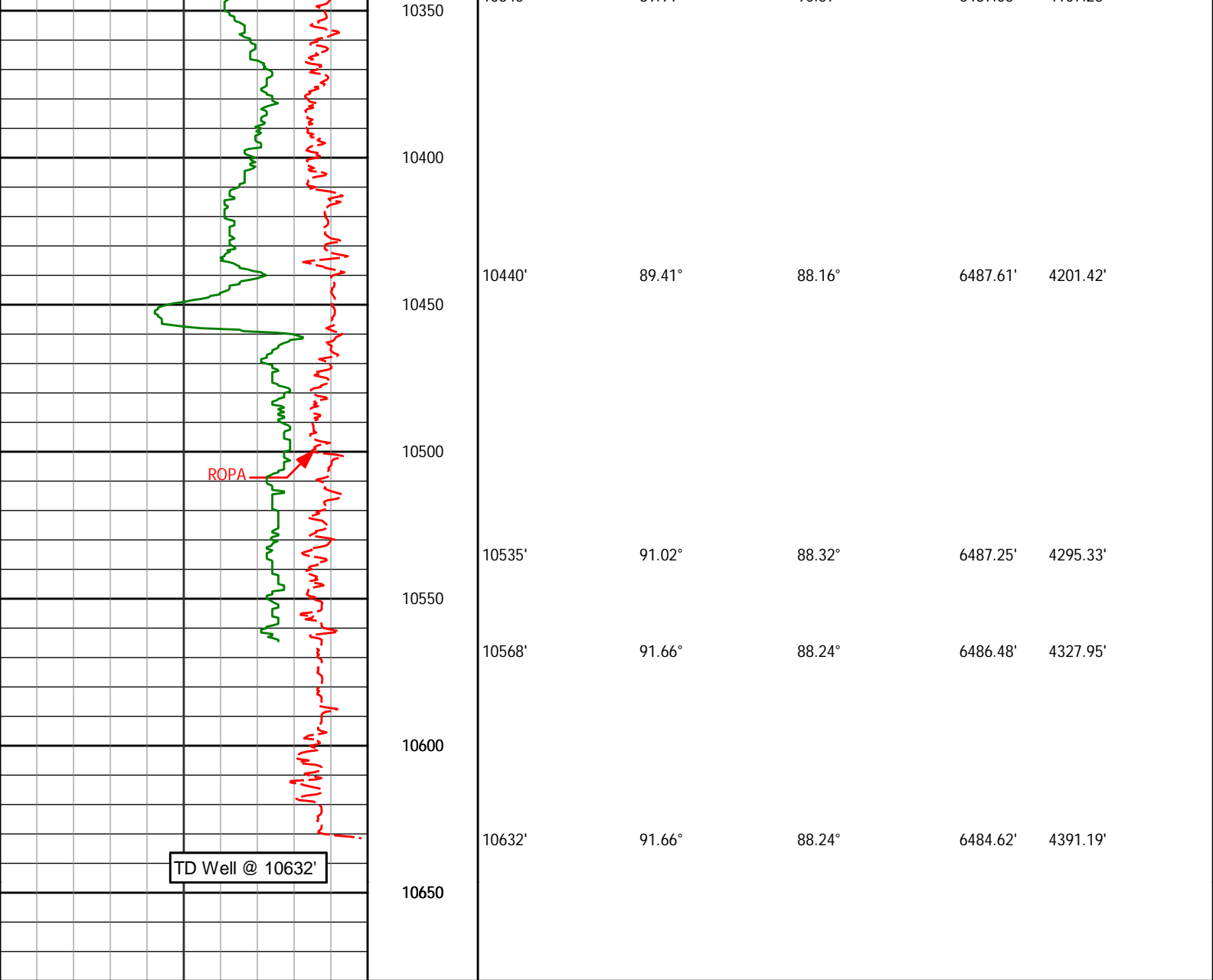
10345'

89.91°

90.57°

6487.05'

4107.25'



<div>ROP Average</div> <div>ROPA</div> <div>500 feet per hr 0</div>	Depth ft	Depth	Inc.	Azi.	TVD	V.S.
<div>PCG Gamma Ray</div> <div>PGRC</div> <div>0 300</div>						

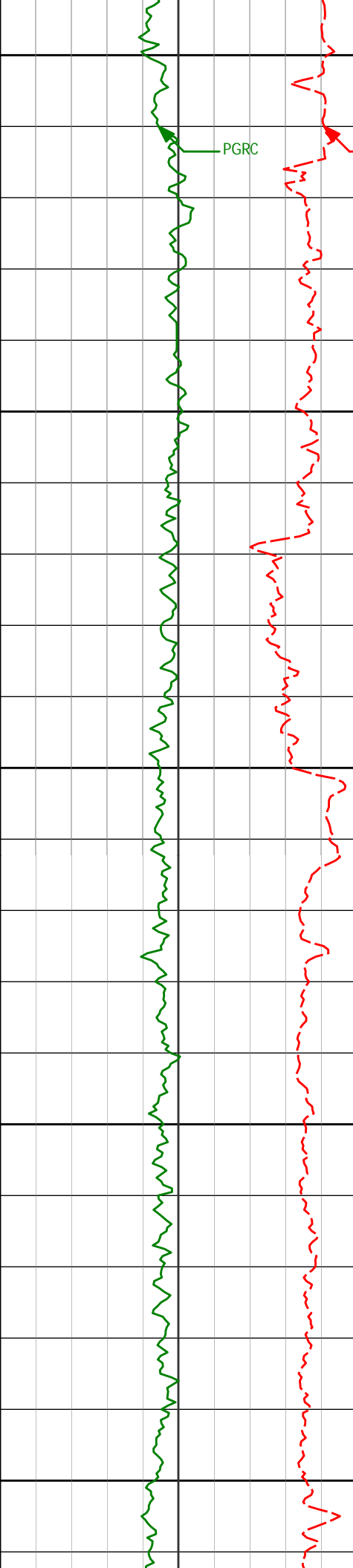
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Sperry Drilling Services

# MD Detail Log 1:240

Noble Energy  
Wells Ranch AA24-67-1HN  
H&P 321  
T6N-R63W

<div>PCG Gamma Ray</div> <div>PGRC</div> <div>0 300</div>						
<div>ROP Average</div> <div>ROPA</div> <div>500 feet per hr 0</div>	Depth ft	Depth	Inc.	Azi.	TVD	V.S.



5750

PGRC

ROPA

KOP

Run 200

5800

5812'

1.12°

150.44°

5742.88'

64.40'

5850

5900

5907'

5.02°

95.66°

5837.74'

69.11'

5950

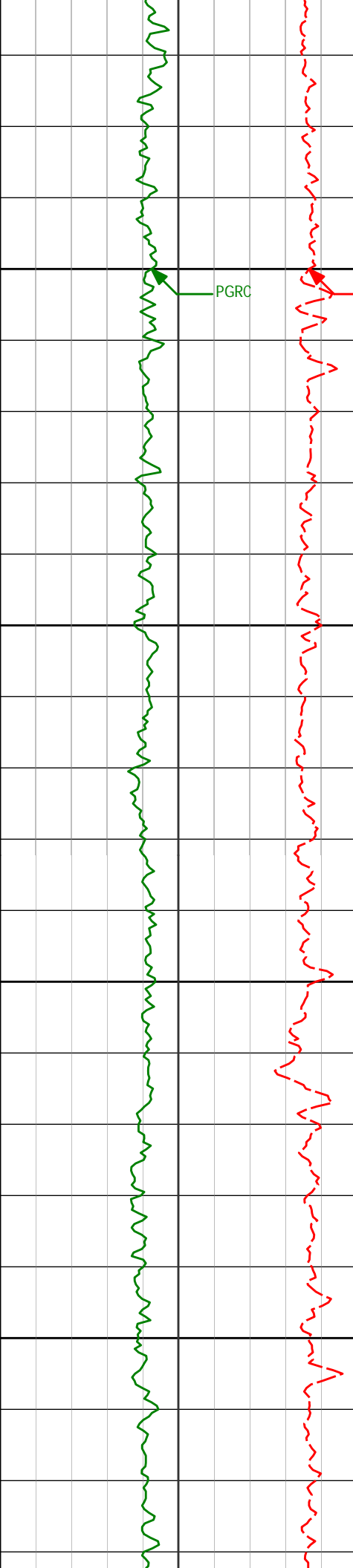
5955'

9.59°

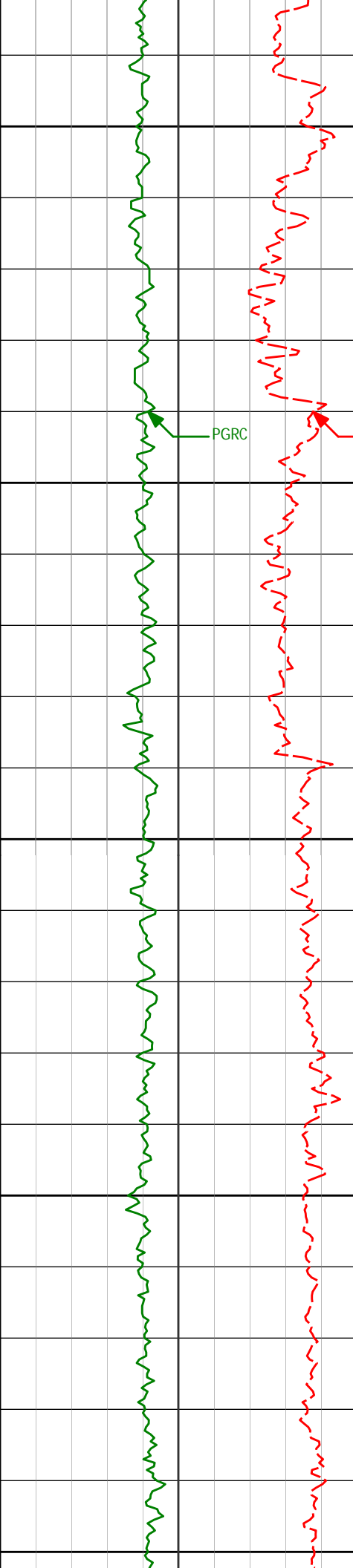
89.35°

5885.34'

75.17'



6000	6002'	12.81°	86.86°	5931.44'	84.19'
6050	6050'	16.50°	84.38°	5977.87'	96.09'
6100	6097'	19.30°	85.49°	6022.59'	110.22'
6150	6145'	21.45°	89.39°	6067.58'	126.70'



6200

6250

6300

6350

6400

6192'

25.06°

91.40°

6110.76'

145.13'

6240'

28.06°

92.13°

6153.69'

166.50'

6287'

31.20°

91.78°

6194.54'

189.65'

6335'

36.57°

90.58°

6234.38'

216.26'

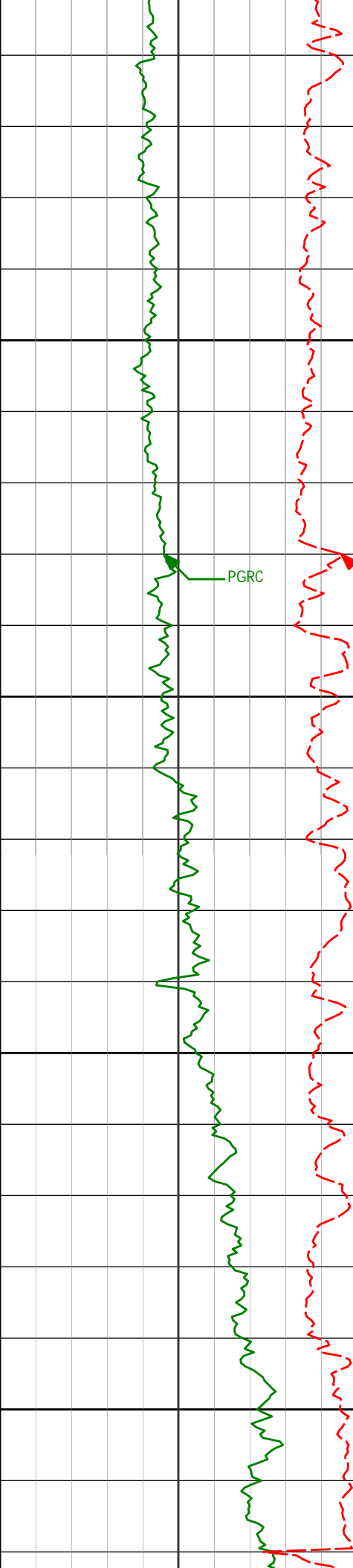
6382'

41.15°

89.50°

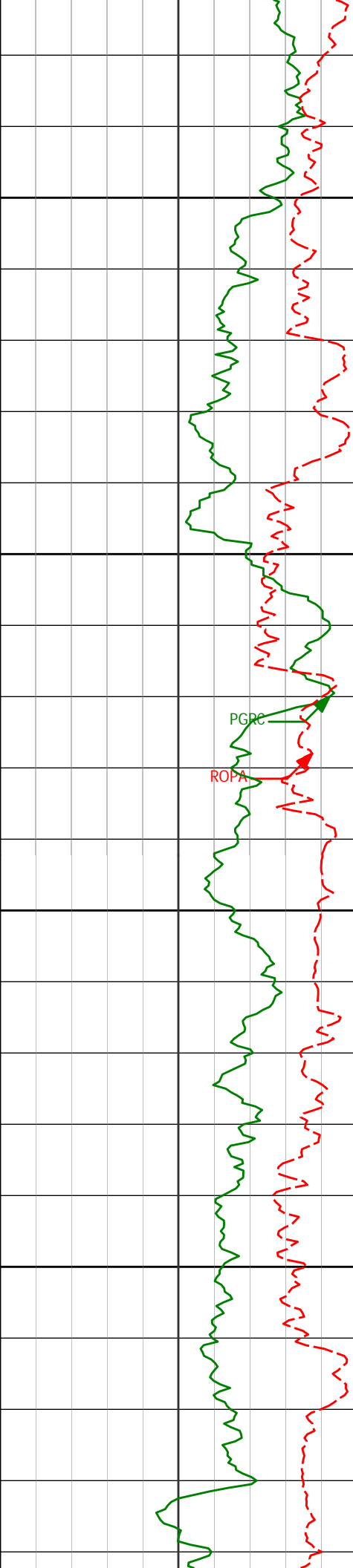
6270.96'

245.53'



6430'	45.94°	89.69°	6305.75'	278.31'
6450				
6476'	51.30°	88.74°	6336.15'	312.50'
6500				
6524'	54.38°	89.23°	6365.14'	350.39'
6550				
6571'	59.74°	89.51°	6390.68'	389.48'
6600				
6619'	65.69°	89.44°	6412.68'	431.76'





6650

6666'

68.28°

89.19°

6431.05'

474.63'

6700

6714'

70.24°

88.44°

6448.05'

519.07'

PGRC

ROPA

6750

6761'

72.26°

88.34°

6463.16'

563.08'

6800

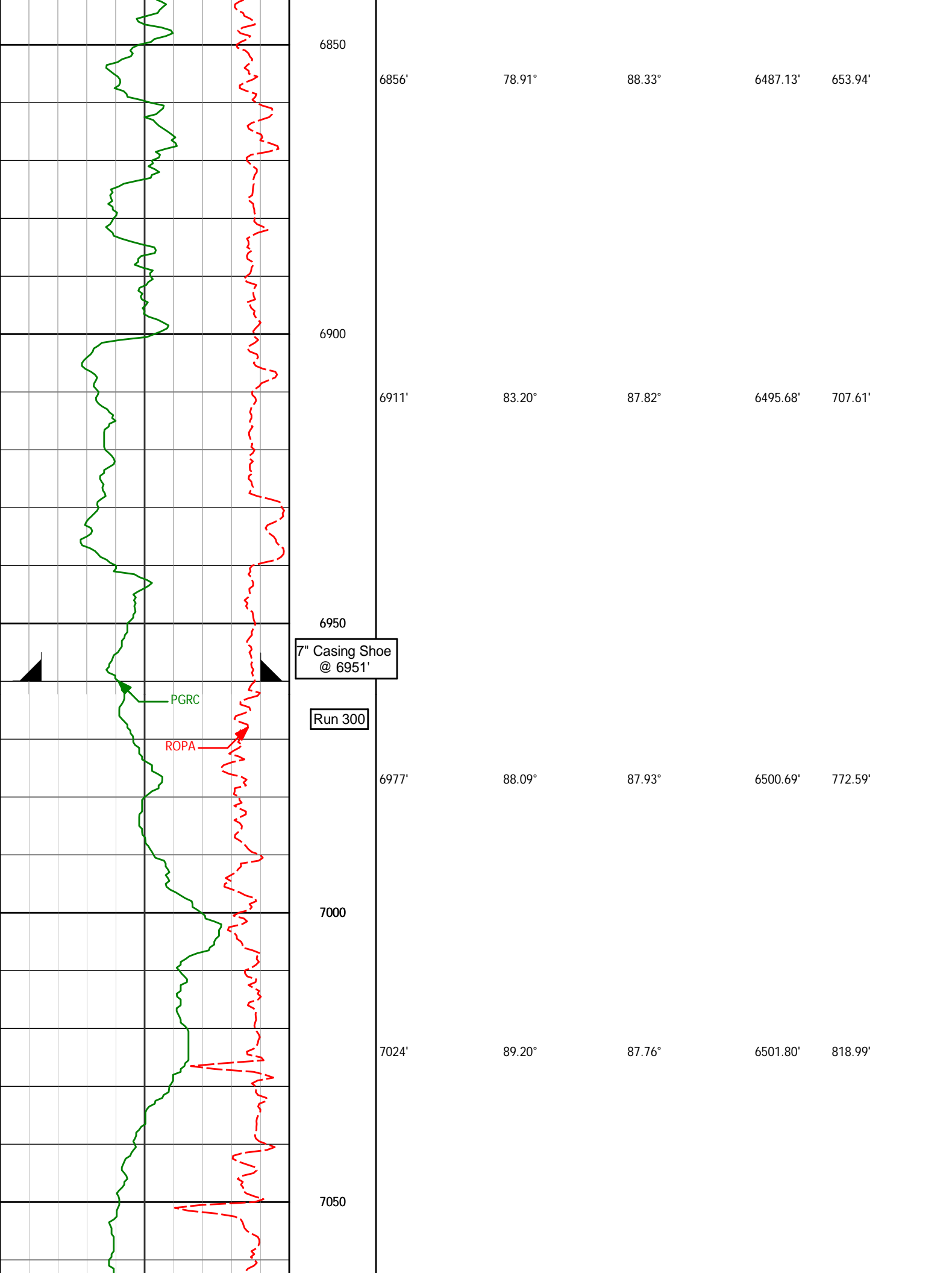
6809'

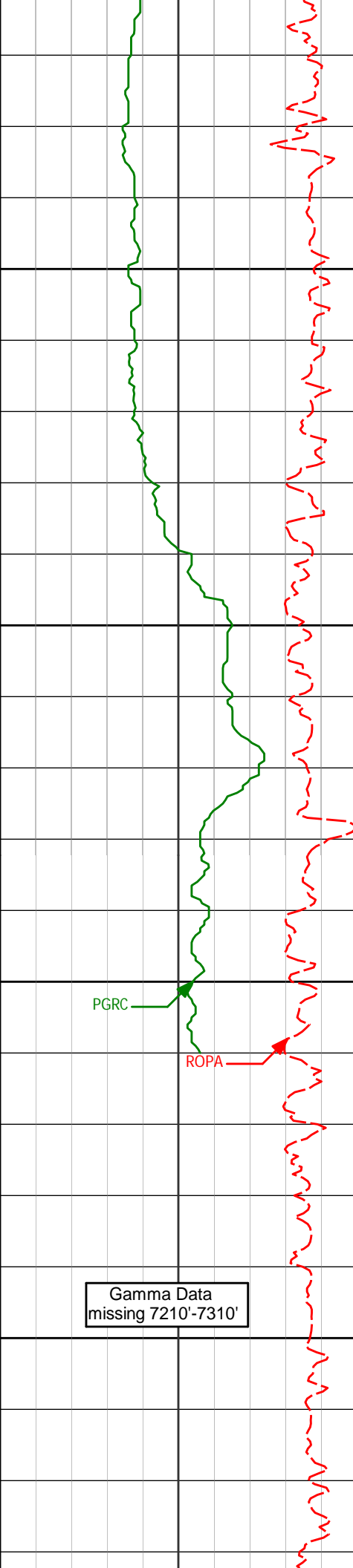
75.21°

88.44°

6476.60'

608.65'





7100

7150

7200

7250

7119'

90.83°

89.15°

6501.77'

912.95'

7214'

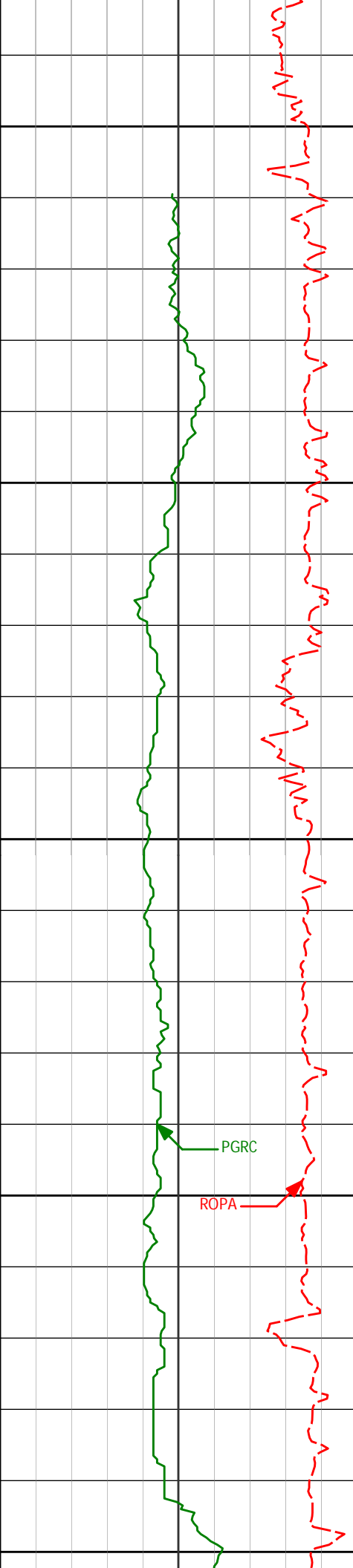
89.94°

90.11°

6501.13'

1007.18'

Gamma Data  
missing 7210'-7310'



7300

7309'

90.77°

89.72°

6500.54'

1101.47'

7350

7400

7404'

89.60°

86.75°

6500.24'

1195.37'

7450

PGRC

ROPA

7500

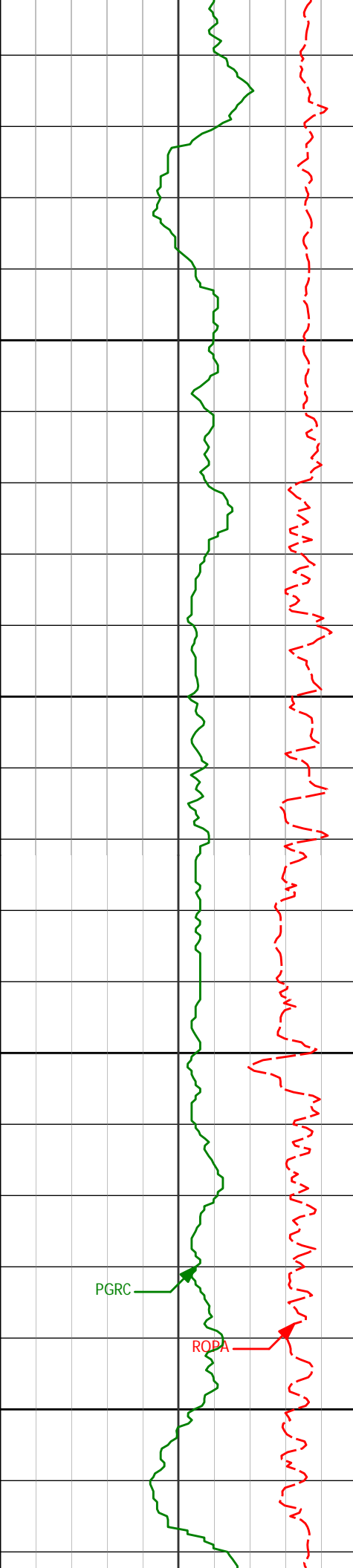
7499'

92.13°

87.03°

6498.81'

1288.90'



7550

7600

7650

7700

7594'

90.96°

89.17°

6496.26'

1382.74'

7689'

86.82°

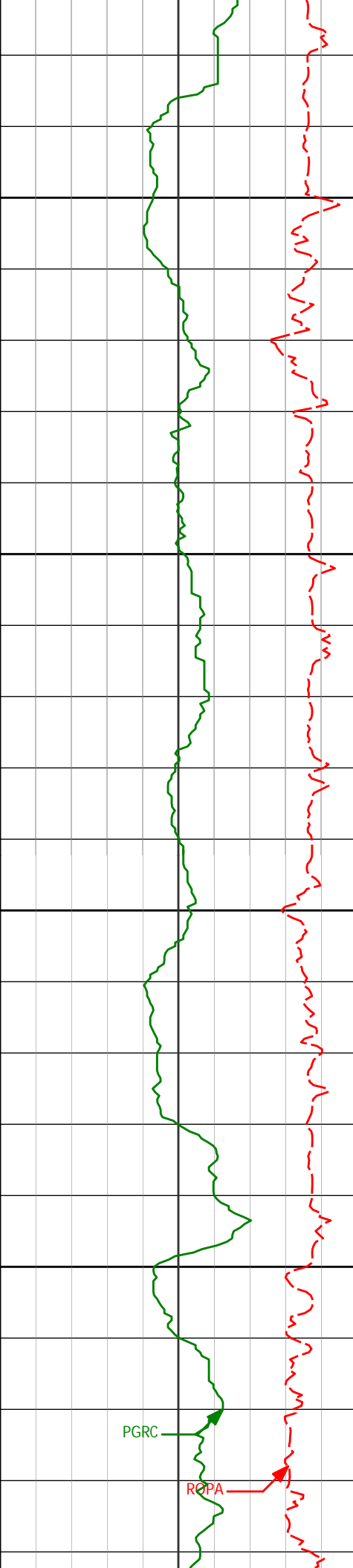
86.21°

6498.10'

1476.46'

PGRC

ROPA



7750

7784'

88.92°

87.39°

6501.63'

1569.92'

7800

7850

7878'

92.68°

91.42°

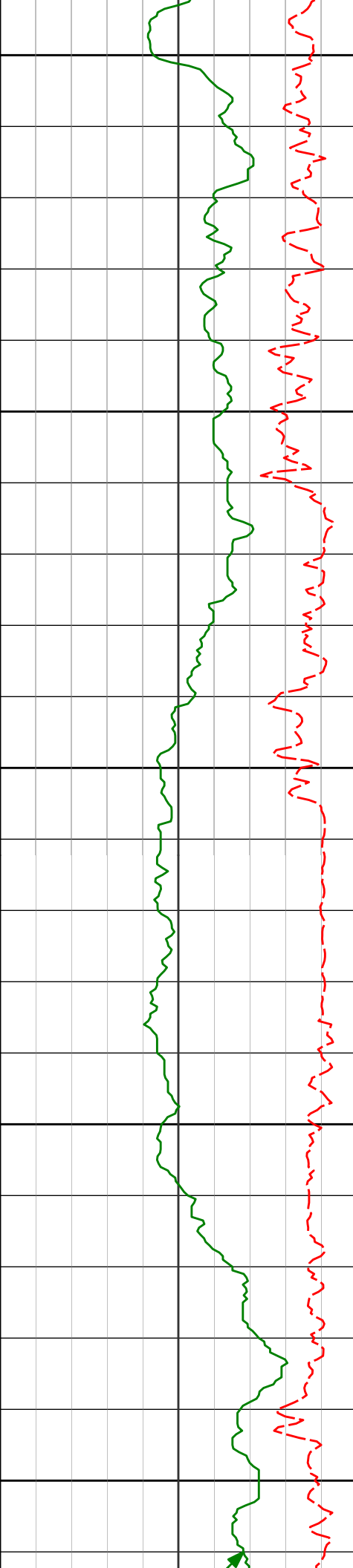
6500.32'

1663.07'

7900

PGRC

RCPA



7950

7973'

92.90°

89.85°

6495.69'

1757.38'

8000

8050

8068'

89.48°

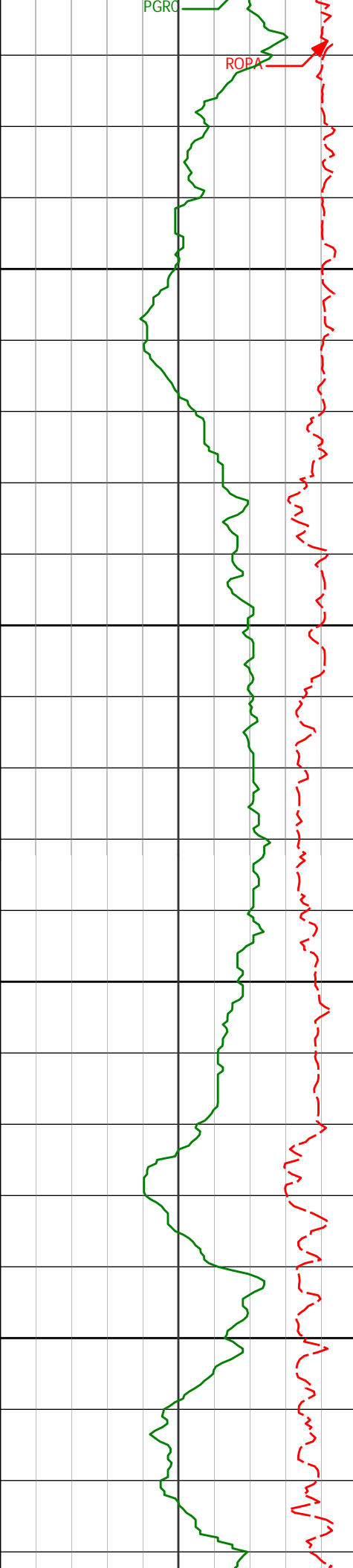
89.83°

6493.73'

1851.62'

8100

8150



8200

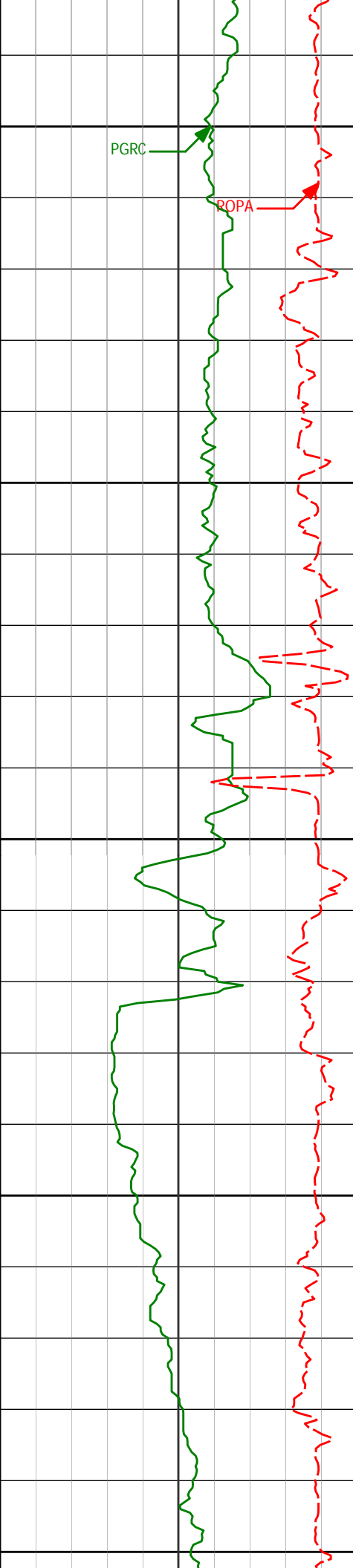
8250

8300

8350

8163'	89.45°	90.33°	6494.62'	1945.95'
8258'	89.14°	88.85°	6495.80'	2040.16'
8353'	86.77°	86.48°	6499.19'	2133.85'





8400

8450

8500

8550

8600

8448'

88.37°

86.89°

6503.23'

2227.26'

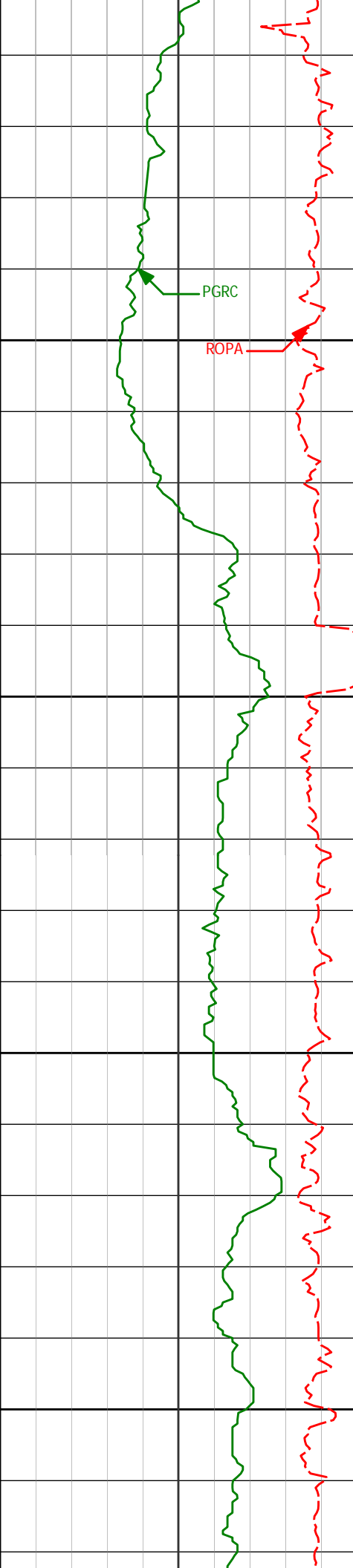
8543'

90.83°

88.15°

6503.89'

2320.97'



8637'

92.49°

90.30°

6501.16'

2414.08'

8650

8700

8732'

90.43°

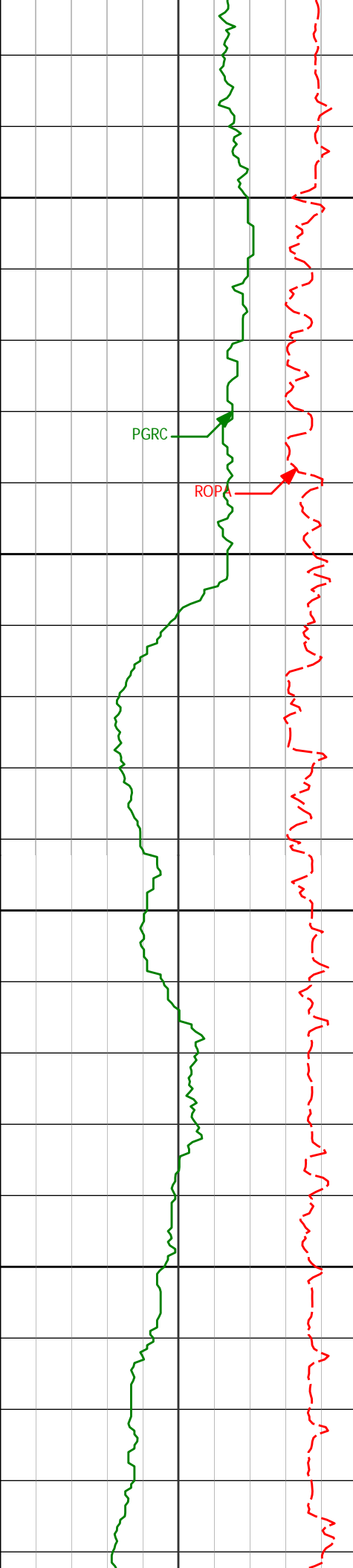
89.77°

6498.74'

2508.36'

8750

8800



8850

PGRC

ROPA

8900

8950

9000

8827'

90.99°

92.14°

6497.56'

2602.83'

8922'

87.87°

88.14°

6498.51'

2697.13'

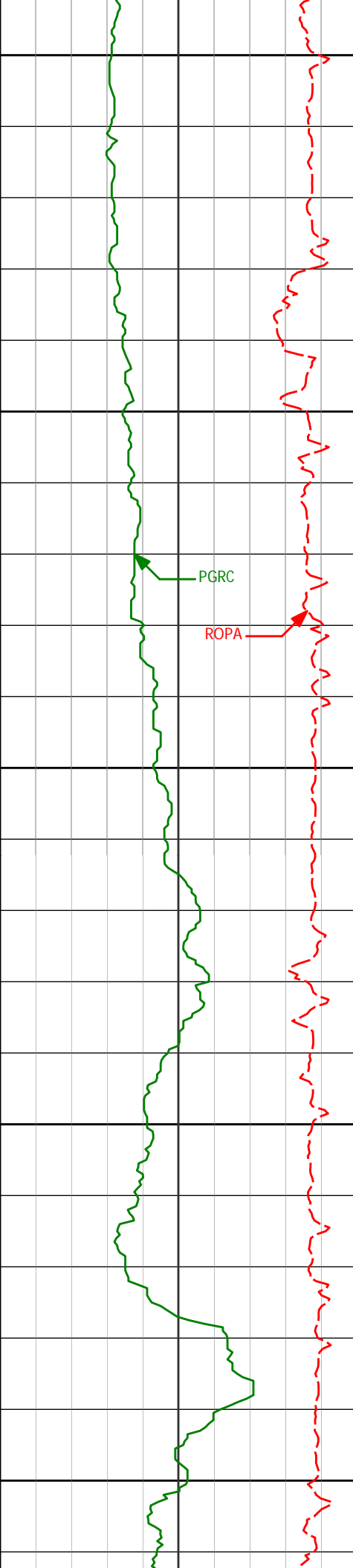
9017'

87.97°

90.49°

6501.96'

2791.23'



9050

9100

9150

9200

9250

9112'

90.80°

90.62°

6502.98'

2885.63'

PGRC

ROPA

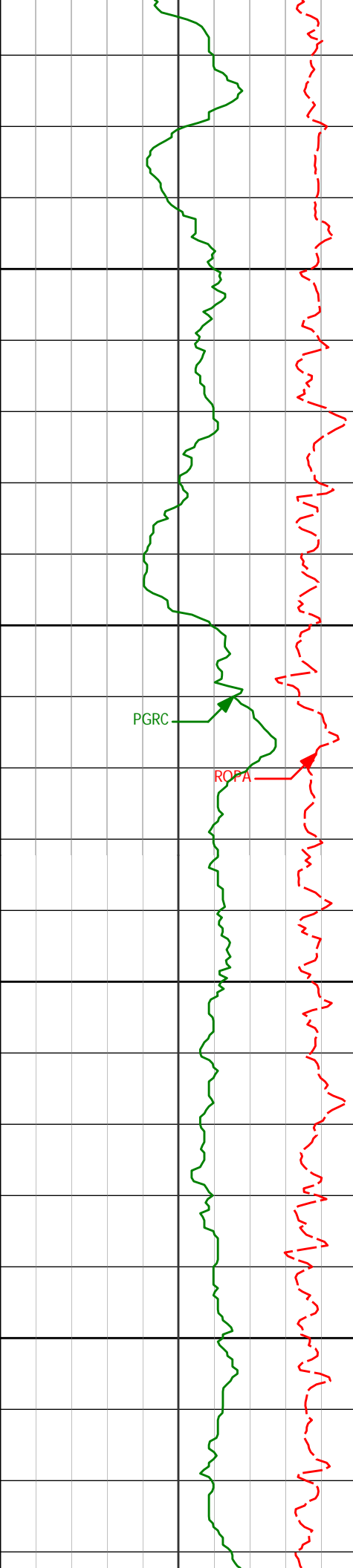
9207'

92.65°

90.16°

6500.12'

2979.97'



9300

9302'

93.24°

90.40°

6495.23'

3074.21'

9350

PGRC

ROPA

9400

9397'

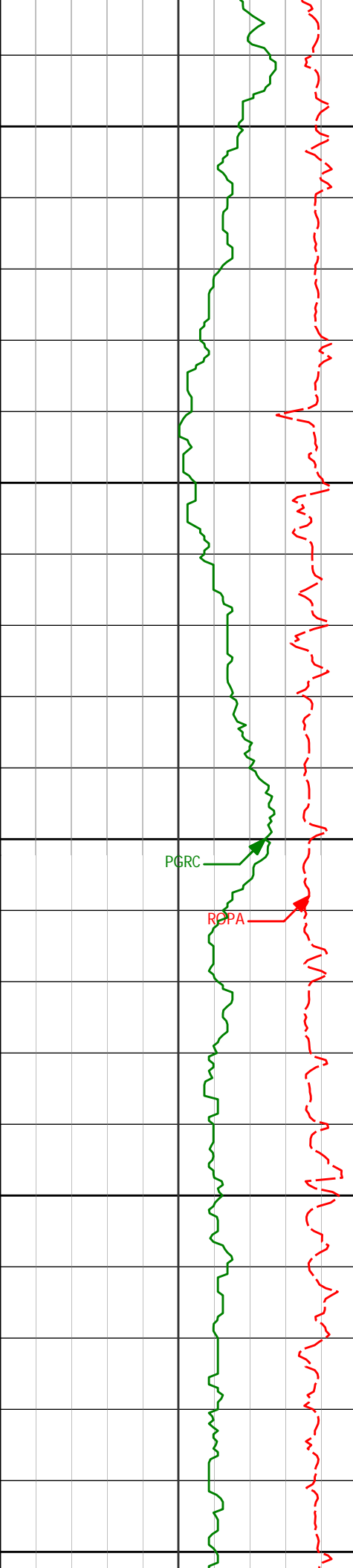
90.99°

92.37°

6491.72'

3168.69'

9450



9492'	88.61°	90.53°	6492.06'	3263.25'
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9500

9550

9586'	91.26°	90.69°	6492.16'	3356.67'
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9600

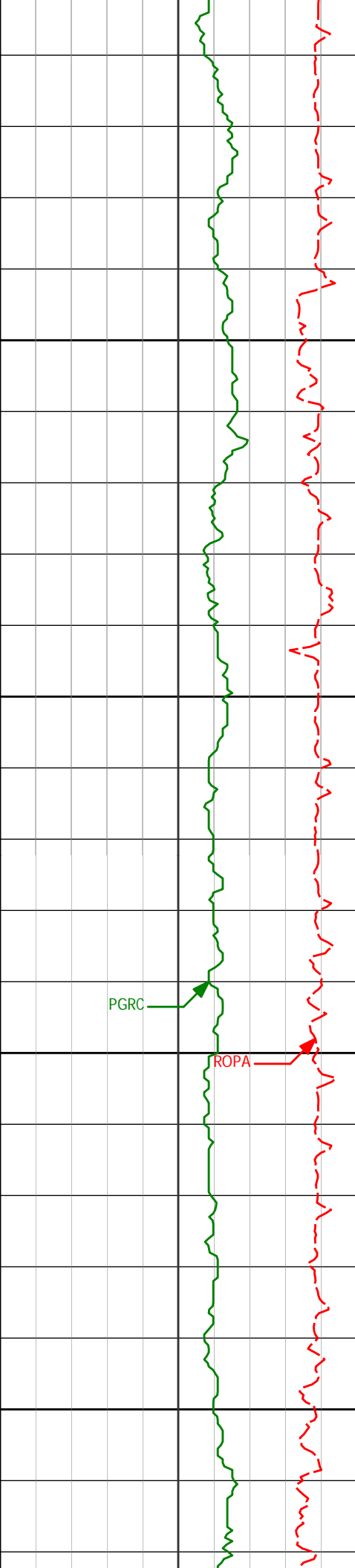
PGRC

RCPA

9650

9681'	89.75°	88.91°	6491.31'	3450.93'
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9700



9750

9776'

90.77°

89.20°

6490.88'

3545.04'

9800

PGRC

ROPA

9850

9871'

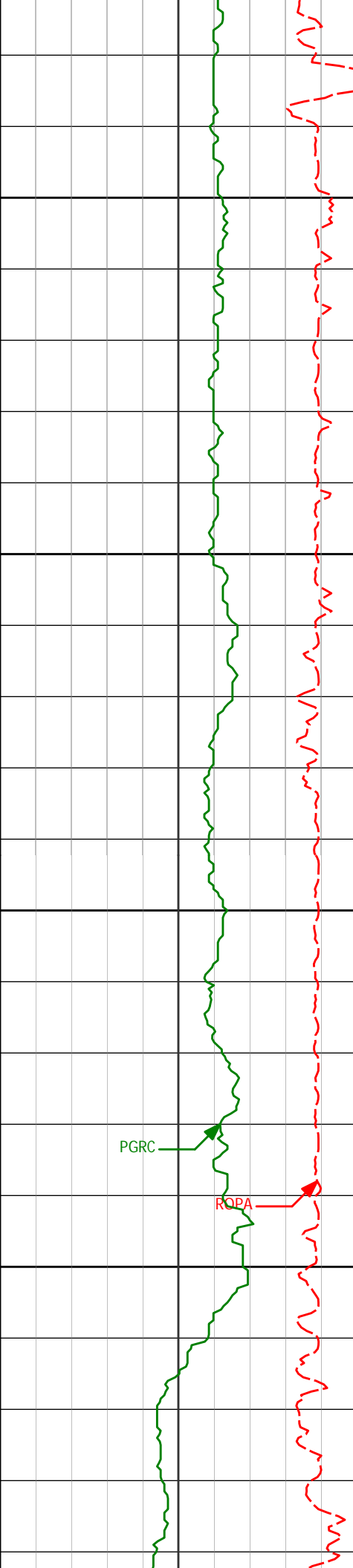
89.14°

87.91°

6490.95'

3639.03'

9900



9950

9966'

90.00°

87.36°

6491.67'

3732.78'

10000

10050

10061'

90.65°

86.71°

6491.13'

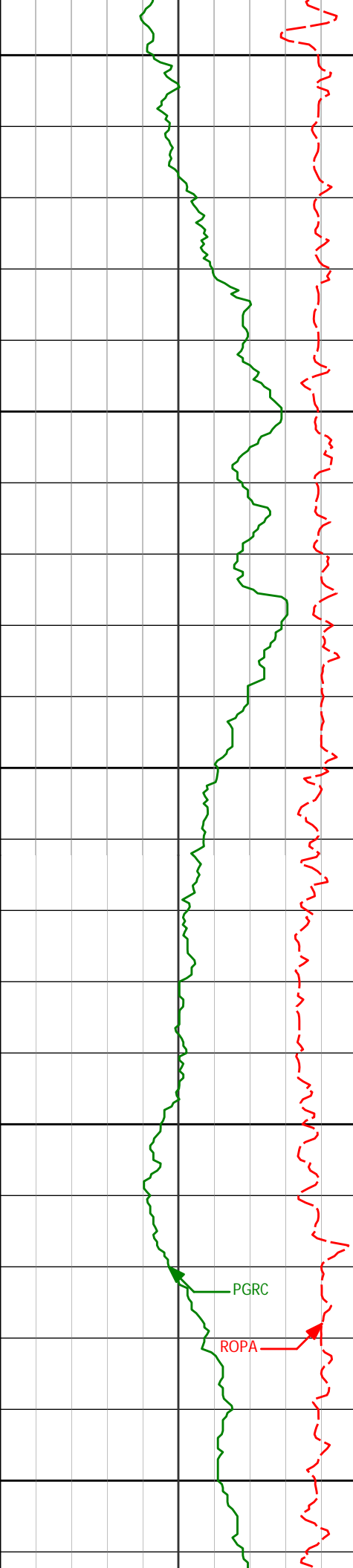
3826.37'

PGRC

ROPA

10100





10150

10156'

91.60°

87.60°

6489.27'

3919.98'

10200

10250

10251'

90.59°

89.43°

6487.45'

4013.94'

10300

PGRC

ROPA

10350

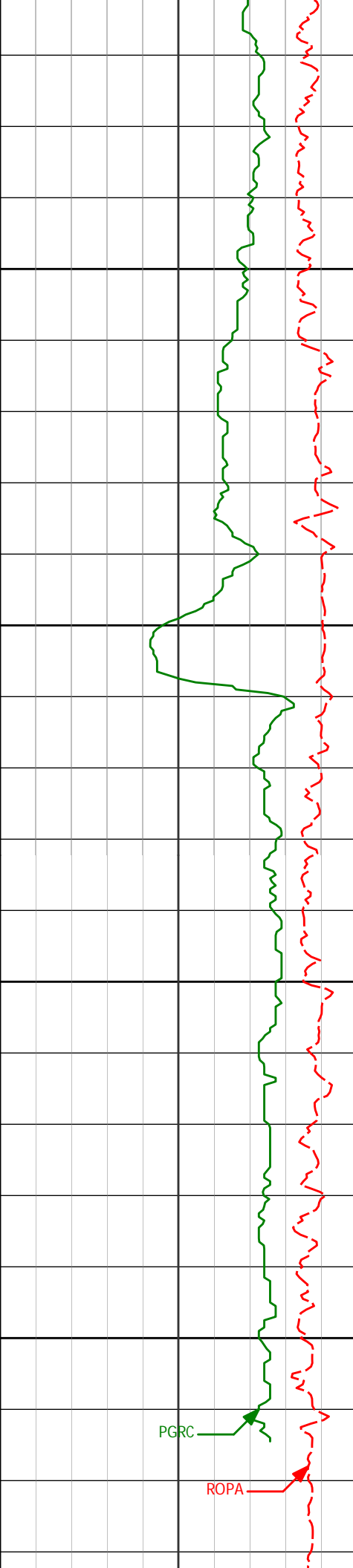
10345'

89.91°

90.57°

6487.05'

4107.25'



10400

10440'

89.41°

88.16°

6487.61'

4201.42'

10450

10500

10535'

91.02°

88.32°

6487.25'

4295.33'

10550

PGRC

ROPA

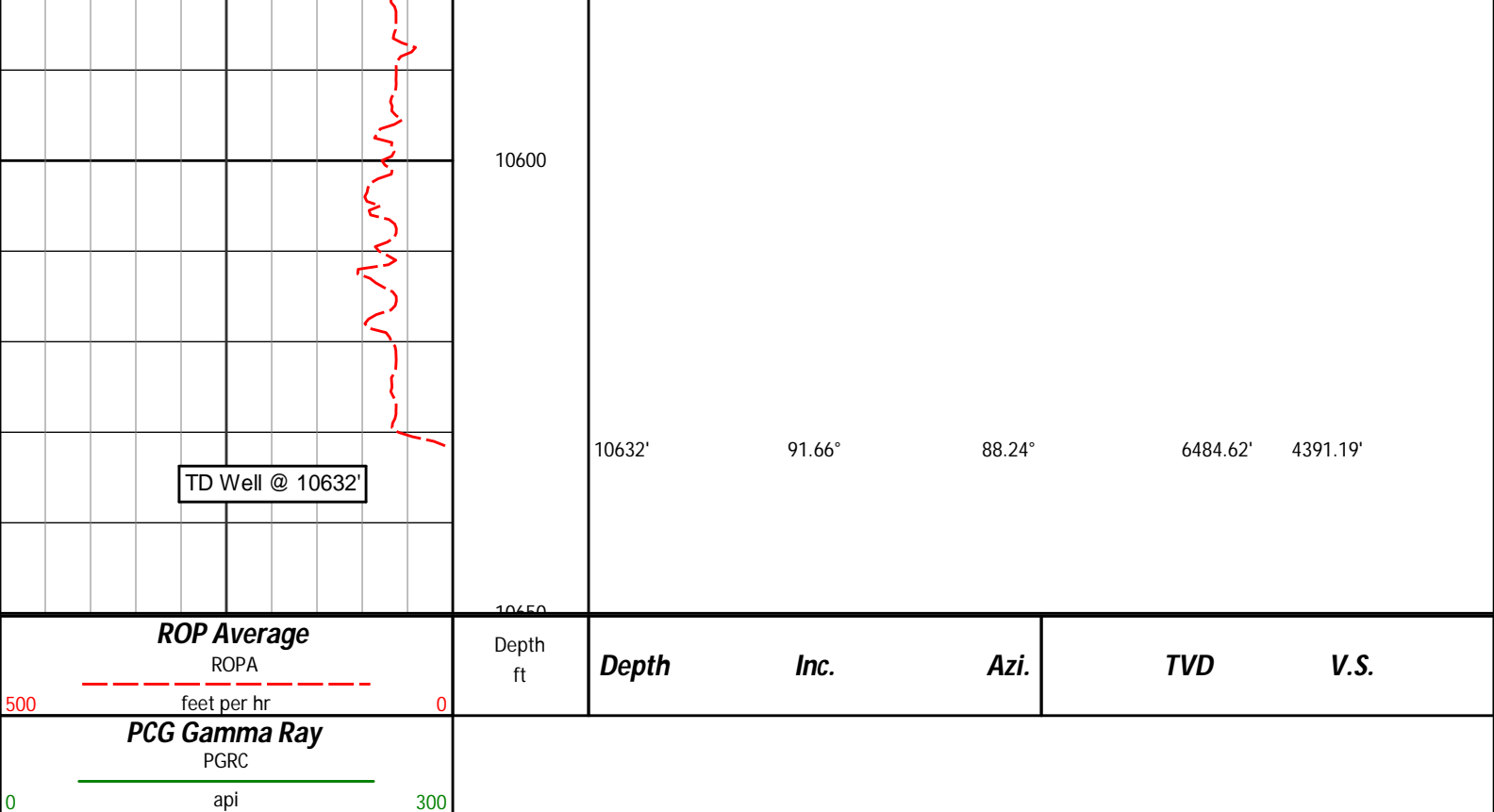
10568'

91.66°

88.24°

6486.48'

4327.95'



## HALLIBURTON

### DIRECTIONAL SURVEY REPORT

Noble Energy  
Wells Ranch AA24-67-1HN-A2  
Wattenburg  
Weld Colorado  
USA  
CA-XX-0009691517

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
657.00	0.00	0.00	657.00	0.00 N	0.00 E	0.00	TIE-IN
817.00	0.15	344.08	817.00	0.21 N	0.06 W	-0.08	0.10
1101.00	0.43	39.08	1101.00	1.40 N	0.51 E	0.34	0.13
1382.00	0.66	355.93	1381.98	3.85 N	1.06 E	0.59	0.16
1474.00	0.40	358.61	1473.98	4.70 N	1.02 E	0.45	0.29
1566.00	2.51	190.35	1565.95	3.03 N	0.65 E	0.28	3.16
1658.00	5.20	187.74	1657.74	3.08 S	0.28 W	0.10	2.92
1750.00	6.92	181.38	1749.22	12.75 S	0.97 W	0.57	2.01
1842.00	8.73	178.91	1840.36	25.28 S	0.97 W	2.08	1.99
1934.00	10.67	182.11	1931.04	40.77 S	1.15 W	3.76	2.19
2026.00	12.68	182.94	2021.14	59.36 S	1.98 W	5.17	2.20
2118.00	14.27	178.00	2110.60	80.78 S	2.11 W	7.63	2.13
2210.00	15.21	180.55	2199.58	104.18 S	1.83 W	10.72	1.24
2302.00	14.06	181.09	2288.59	127.41 S	2.16 W	13.19	1.26
2394.00	15.22	178.06	2377.60	150.66 S	1.96 W	16.18	1.52
2486.00	15.42	180.71	2466.33	174.96 S	1.70 W	19.36	0.79
2581.00	16.37	179.52	2557.70	200.98 S	1.74 W	22.45	1.06
2676.00	15.03	178.75	2649.15	226.69 S	1.36 W	25.92	1.43
2771.00	16.11	175.65	2740.67	252.14 S	0.09 W	30.24	1.43
2866.00	14.99	174.36	2832.19	277.51 S	2.11 E	35.49	1.23
2961.00	15.46	178.00	2923.86	302.40 S	3.76 E	40.12	1.12
3056.00	15.62	177.46	3015.38	327.82 S	4.77 E	44.18	0.23
3151.00	13.99	177.55	3107.23	352.07 S	5.83 E	48.14	1.71
3245.00	15.96	176.28	3198.03	376.32 S	7.15 E	52.37	2.13
3340.00	14.05	176.23	3289.79	400.86 S	8.76 E	56.92	2.01

3435.00	14.28	182.22	3381.91	424.08 S	9.06 E	60.02	1.56
3530.00	13.45	186.42	3474.14	446.76 S	7.37 E	61.07	1.37
3625.00	12.66	192.65	3566.69	467.90 S	3.86 E	60.12	1.70
3720.00	12.89	191.34	3659.34	488.45 S	0.51 W	58.26	0.39
3815.00	13.91	189.80	3751.75	510.09 S	4.54 W	56.87	1.13
3909.00	12.06	187.55	3843.34	530.97 S	7.75 W	56.19	2.03
4004.00	9.91	176.38	3936.61	548.97 S	8.54 W	57.57	3.18
4099.00	6.62	171.83	4030.61	562.55 S	7.24 W	60.49	3.53
4194.00	3.59	199.81	4125.23	570.77 S	7.47 W	61.25	4.04
4289.00	2.94	197.42	4220.08	575.90 S	9.21 W	60.14	0.70
4384.00	0.90	286.16	4315.03	578.01 S	10.65 W	58.96	3.21
4668.00	0.37	278.74	4599.01	577.25 S	13.69 W	55.85	0.19
4953.00	0.36	176.31	4884.01	578.00 S	14.54 W	55.10	0.20
5238.00	0.52	166.27	5169.00	580.16 S	14.18 W	55.73	0.06
5522.00	1.24	119.70	5452.97	582.94 S	11.20 W	59.01	0.34
5710.00	1.62	141.22	5640.91	586.02 S	7.78 W	62.78	0.35
5812.00	1.12	150.44	5742.88	588.01 S	6.39 W	64.40	0.53
5907.00	5.02	95.66	5837.74	589.22 S	1.79 W	69.11	4.70
5955.00	9.59	89.35	5885.34	589.39 S	4.29 E	75.17	9.65
6002.00	12.81	86.86	5931.44	589.06 S	13.42 E	84.19	6.94
6050.00	16.50	84.38	5977.87	588.10 S	25.52 E	96.09	7.78
6097.00	19.30	85.49	6022.59	586.83 S	39.91 E	110.22	6.01
6145.00	21.45	89.39	6067.58	586.11 S	56.59 E	126.70	5.29
6192.00	25.06	91.40	6110.76	586.26 S	75.14 E	145.13	7.86
6240.00	28.06	92.13	6153.69	586.93 S	96.59 E	166.50	6.29
6287.00	31.20	91.78	6194.54	587.72 S	119.81 E	189.65	6.70
6335.00	36.57	90.58	6234.38	588.25 S	146.55 E	216.26	11.27
6382.00	41.15	89.50	6270.96	588.26 S	176.03 E	245.53	9.86
6430.00	45.94	89.69	6305.75	588.03 S	209.09 E	278.31	9.98
6476.00	51.30	88.74	6336.15	587.54 S	243.59 E	312.50	11.75
6524.00	54.38	89.23	6365.14	586.87 S	281.83 E	350.39	6.49
6571.00	59.74	89.51	6390.68	586.44 S	321.26 E	389.48	11.41
6619.00	65.69	89.44	6412.68	586.04 S	363.89 E	431.76	12.39
6666.00	68.28	89.19	6431.05	585.52 S	407.15 E	474.63	5.54
6714.00	70.24	88.44	6448.05	584.59 S	452.02 E	519.07	4.33
6761.00	72.26	88.34	6463.16	583.34 S	496.51 E	563.08	4.31
6809.00	75.21	88.44	6476.60	582.05 S	542.56 E	608.65	6.14
6856.00	78.91	88.33	6487.13	580.75 S	588.34 E	653.94	7.87
6911.00	83.20	87.82	6495.68	578.93 S	642.63 E	707.61	7.86
6977.00	88.09	87.93	6500.69	576.49 S	708.38 E	772.59	7.41
7024.00	89.20	87.76	6501.80	574.72 S	755.33 E	818.99	2.39
7119.00	90.83	89.15	6501.77	572.16 S	850.29 E	912.95	2.26
7214.00	89.94	90.11	6501.13	571.54 S	945.28 E	1007.18	1.39
7309.00	90.77	89.72	6500.54	571.41 S	1040.28 E	1101.47	0.97
7404.00	89.60	86.75	6500.24	568.49 S	1135.22 E	1195.37	3.36
7499.00	92.13	87.03	6498.81	563.34 S	1230.06 E	1288.90	2.67
7594.00	90.96	89.17	6496.26	560.18 S	1324.97 E	1382.74	2.57
7689.00	86.82	86.21	6498.10	556.35 S	1419.84 E	1476.46	5.35
7784.00	88.92	87.39	6501.63	551.05 S	1514.62 E	1569.92	2.54
7878.00	92.68	91.42	6500.32	550.07 S	1608.57 E	1663.07	5.86
7973.00	92.90	89.85	6495.69	551.11 S	1703.45 E	1757.38	1.66
8068.00	89.48	89.83	6493.73	550.85 S	1798.41 E	1851.62	3.60
8163.00	89.45	90.33	6494.62	550.99 S	1893.41 E	1945.95	0.53
8258.00	89.14	88.85	6495.80	550.31 S	1988.40 E	2040.16	1.60
8353.00	86.77	86.48	6499.19	546.44 S	2083.24 E	2133.85	3.53
8448.00	88.37	86.89	6503.23	540.94 S	2178.00 E	2227.26	1.74
8543.00	90.83	88.15	6503.89	536.83 S	2272.90 E	2320.97	2.92
8637.00	92.49	90.30	6501.16	535.56 S	2366.84 E	2414.08	2.89
8732.00	90.43	89.77	6498.74	535.61 S	2461.80 E	2508.36	2.24
8827.00	90.99	92.14	6497.56	537.19 S	2556.77 E	2602.83	2.56
8922.00	87.87	88.14	6498.51	537.41 S	2651.74 E	2697.13	5.33
9017.00	87.97	90.49	6501.96	536.27 S	2746.66 E	2791.23	2.47
9112.00	90.80	90.62	6502.98	537.19 S	2841.64 E	2885.63	2.99
9207.00	92.65	90.16	6500.12	537.84 S	2936.59 E	2979.97	2.01
9302.00	93.24	90.40	6495.23	538.30 S	3031.47 E	3074.21	0.68
9397.00	90.99	92.37	6491.72	540.60 S	3126.36 E	3168.69	3.15
9492.00	88.61	90.53	6492.06	543.00 S	3221.32 E	3263.25	3.16
9586.00	91.26	90.69	6492.16	544.00 S	3315.31 E	3356.67	2.82
9681.00	89.75	88.91	6491.31	543.68 S	3410.30 E	3450.93	2.46
9776.00	90.77	89.20	6490.88	542.11 S	3505.28 E	3545.04	1.11
9871.00	89.14	87.91	6490.95	539.71 S	3600.25 E	3639.03	2.19
9966.00	90.00	87.36	6491.67	535.80 S	3695.16 E	3732.78	1.07
10061.00	90.65	86.71	6491.13	530.89 S	3790.03 E	3826.37	0.97
10156.00	91.60	87.60	6489.27	526.18 S	3884.89 E	3919.98	1.37
10251.00	90.59	89.43	6487.45	523.72 S	3979.84 E	4013.94	2.20

10345.00	89.91	90.57	6487.05	523.72 S	4073.84 E	4107.25	1.41
10440.00	89.41	88.16	6487.61	522.67 S	4168.82 E	4201.42	2.59
10535.00	91.02	88.32	6487.25	519.75 S	4263.77 E	4295.33	1.70
10568.00	91.66	88.24	6486.48	518.76 S	4296.75 E	4327.95	1.96

**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 96.91 DEGREES (GRID)  
A TOTAL CORRECTION OF 7.85 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 10568.00 FEET  
IS 4327.95 FEET ALONG 96.88 DEGREES (GRID)**

**Final survey projected to TD**

**Date Printed:15 August 2012**