

PCGC - Pressure Case Gamma



1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	100	300			
Date run completed	04-Feb-14	13-Feb-14			
Rig Bit Number	2	300			
Bit Size (in)	8.750	6.125			
Tool Nominal OD (in)	6.750	4.750			
Log Start Depth (MD, ft)	1,206.00	7,757.00			
Log End Depth (MD, ft)	7,641.00	12,164.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	02-Feb-14 19:04	10-Feb-14 08:45			
Drill/Wipe End Date and Time	04-Feb-14 09:26	12-Feb-14 03:45			
Min Inc (deg) @ Depth (MD, ft)	0.07 @ 3,543.00	88.71 @ 9,658.00			
Max Inc (deg) @ Depth (MD, ft)	89.00 @ 7,641.00	93.02 @ 7,768.00			
Bit TFA(in2) / Bit Type	1.18 / PDC	0.98 / PDC			
Flow Rate (gpm)	608.88	270.00			
Max AV (fpm) / CV (fpm) @ MWD	467.2 / 0.0	452.6 / N/A			
Fluid Type	Fresh Water Gel	Polymer			
Density (ppg) / Viscosity (spqt)	9.75 / 40.00	9.70 / 48.00			
Filtrate CL (ppm)	1,700.00	2,900.00			
pH / Fluid Loss (mptm)	8.90 / 0	9.70 / 4			
PV (cP) / YP (lbf2)	10 / 14.00	19 / 21.00			
% Solids / % Sand	8.20 / 0.25	7.7 / 1.0			
% 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 (deg F) @ 100 ft	127.25 / 100 ft	210.10 / 100 ft			

Max Tool Temp (degF) / Source	167.97 / PCM	213.40 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Cameron Denning	James Tilley			
Customer Representative	Irvin McWhorter	Irvin McWhorter			

SENSOR INFORMATION

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	45.32	44.00			
Software Version	6.21	6.21			
Sub Serial Number	11331931	12310750			
Sonde Serial Number	11297493	11297493			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	258.91	253.89			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	50.27	47.21			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11331931	12310750			
Insert/Sonde Serial Number	11293354	11293354			

Pulser Controller Sensor Information

Tool Type	PCM	PCM			
Software Version	5.84	5.84			
PIC Software Version	1.40	1.40			
Sub/HOC Serial Number	11331931	12310750			
Insert/Probe/Module SN	11400958	11400958			
Battery Serial Number	N/A	N/A			
Valve Insert SN	N/A	N/A			
DC Insert Serial Number	N/A	N/A			
Choke Size (32nd)	N/A	N/A			
Driver Current (amps)	N/A	N/A			
Driver SMI Current (amps)	N/A	N/A			
Boot Strap Version	4,130.00	4,130.00			

REMARKS

1. All depths are measured 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. All data presented is recorded data unless otherwise specified.

4. The final survey is projected to the bit.

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. Run 200 was cemented back and Run 300 started sidetrack

Insite version: 8.0.0 b38

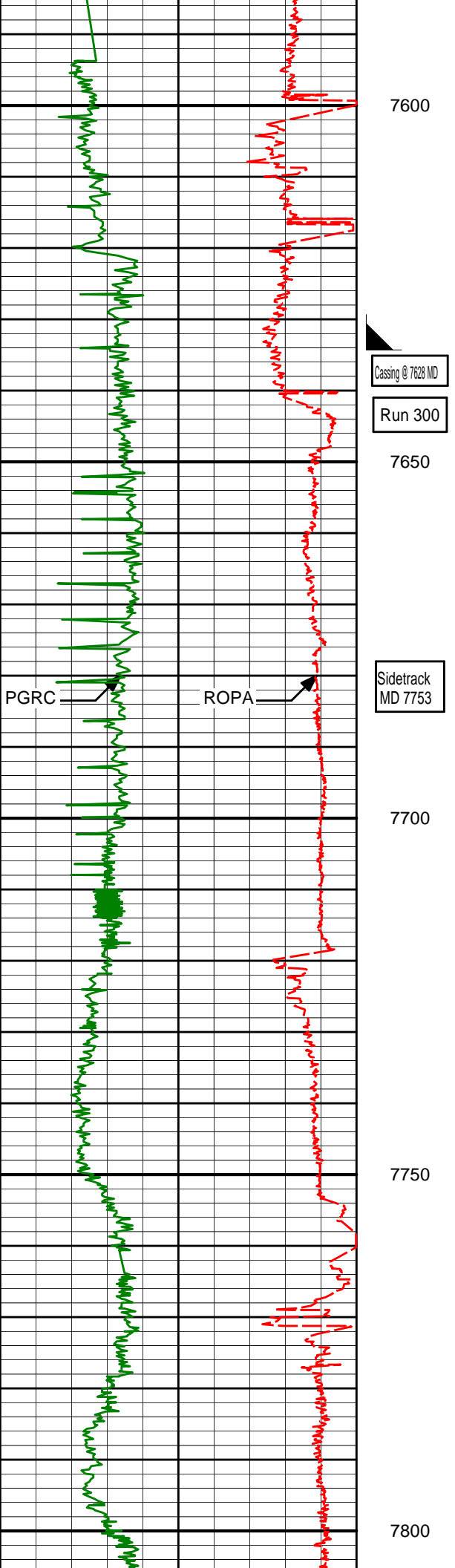
WARRANTY

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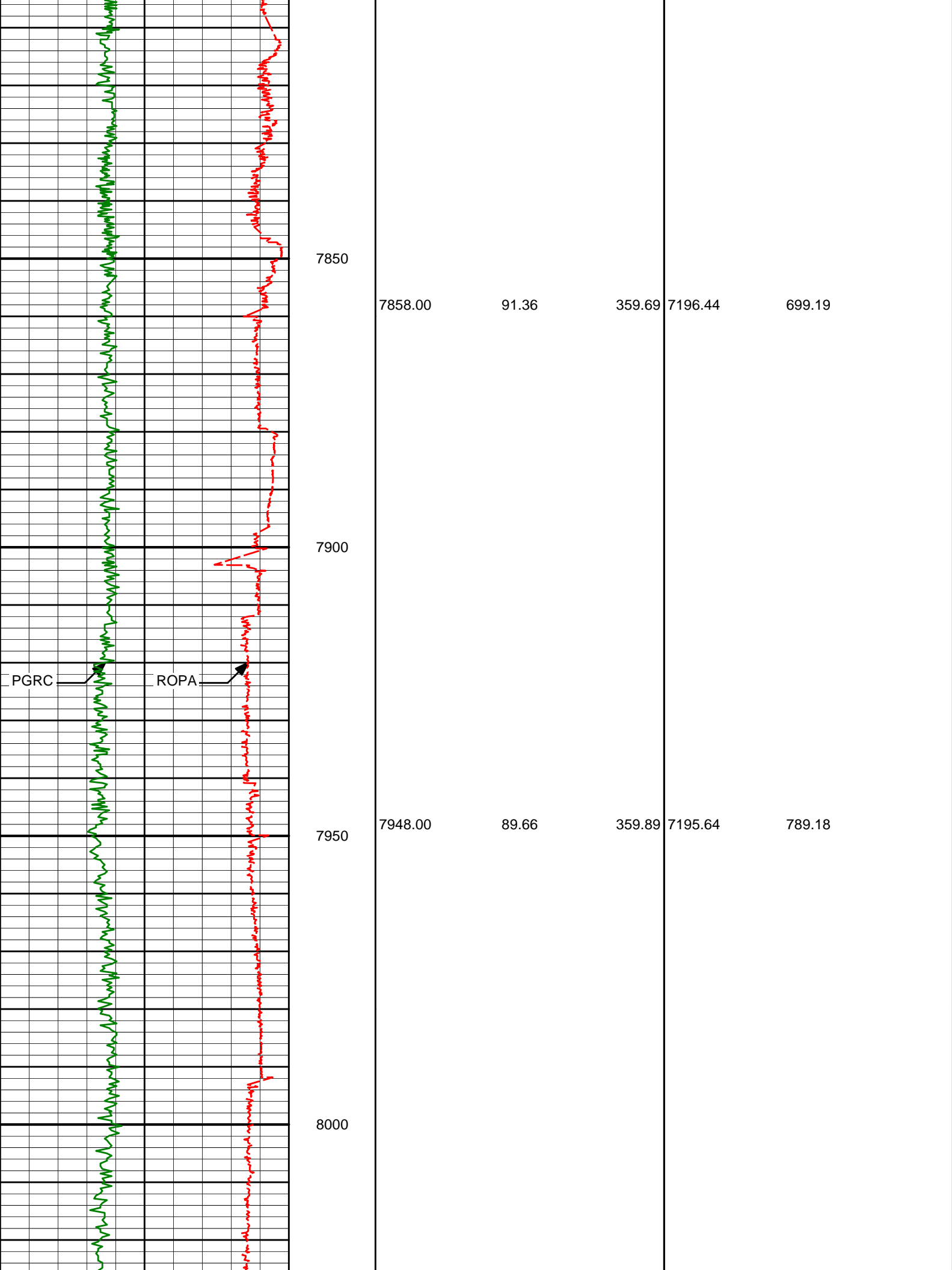
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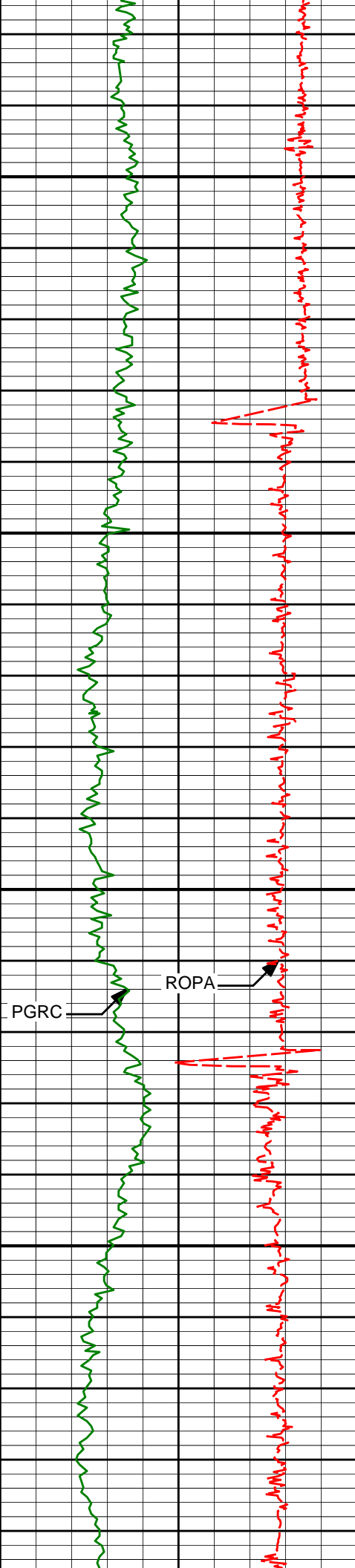
MD Main Log 1:240

Avg Rate of Penetration feet per hr						
1K0						
PCG Gamma Ray BCorr api		Depth				
0300			Survey Depth	Inclination	Azimuth	TVD V/S
		7500	7504.00	82.68	359.95	7191.50 345.57
		7550	7549.00	86.76	0.99	7195.64 390.36



7594.00	88.00	0.35	7197.70	435.31
7600				
7650				
7700				
7709.00	92.16	359.37	7200.54	550.27
7750				
7768.00	93.02	359.26	7199.88	609.26
7800				





8050

8100

8150

8200

8038.00

89.69

0.07

7196.15

879.18

8128.00

89.63

359.97

7196.68

969.17

8218.00

89.54

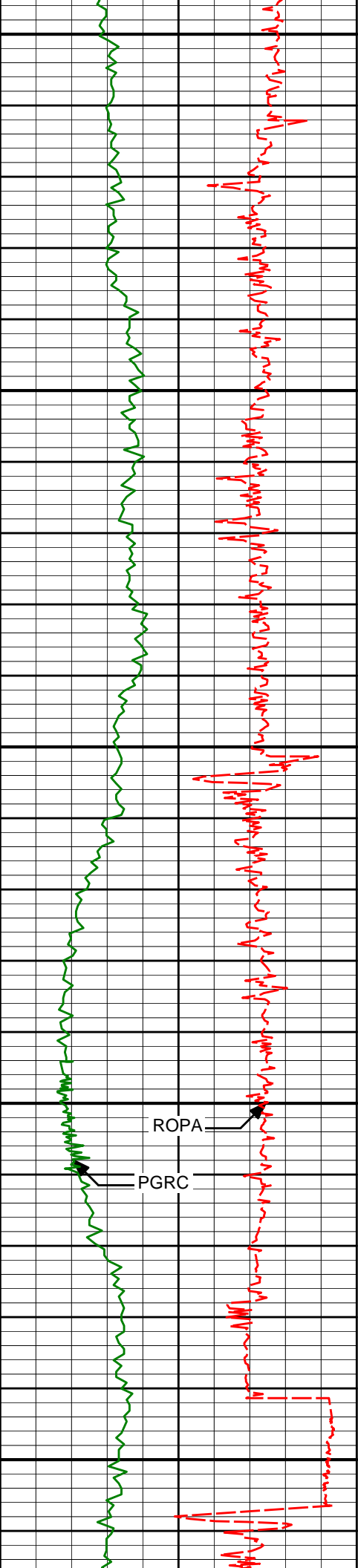
359.85

7197.33

1059.17

PGRC

ROPA



8250

8300

8350

8400

8450

8308.00

89.42

359.93

7198.15

1149.17

8398.00

89.38

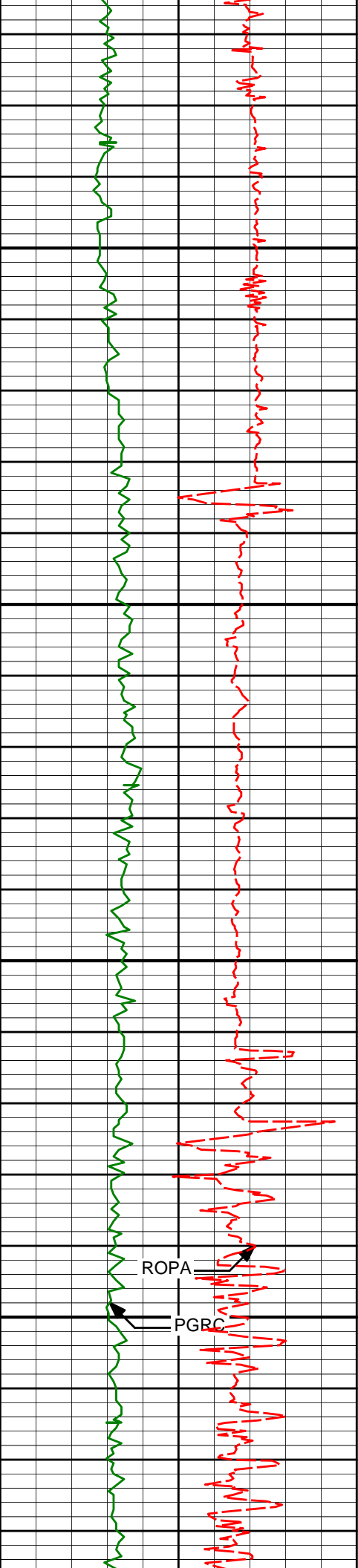
359.93

7199.09

1239.16

ROP

PGR



8500

8550

8600

8650

ROPA

PGRC

8578.00

90.12

0.44

7199.88

1419.16

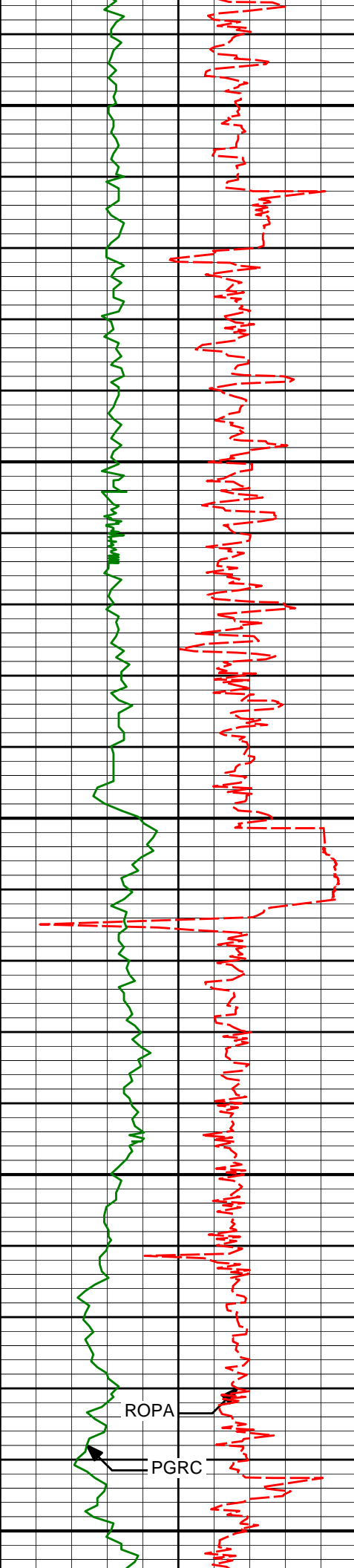
8668.00

90.28

0.80

7199.56

1509.15



8700

8750

8800

8850

8900

8758.00

90.52

2.15

7198.94

1599.12

8848.00

89.78

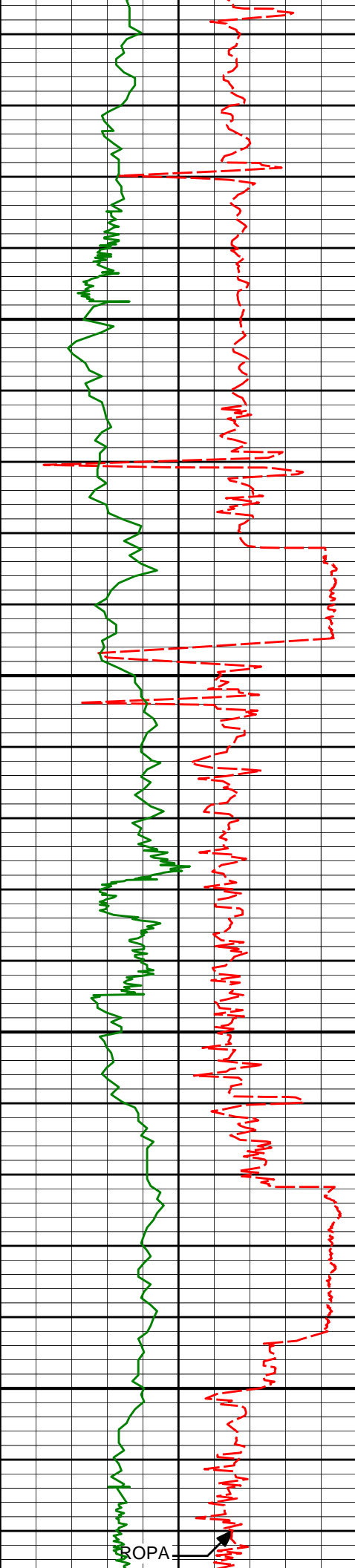
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7198.70

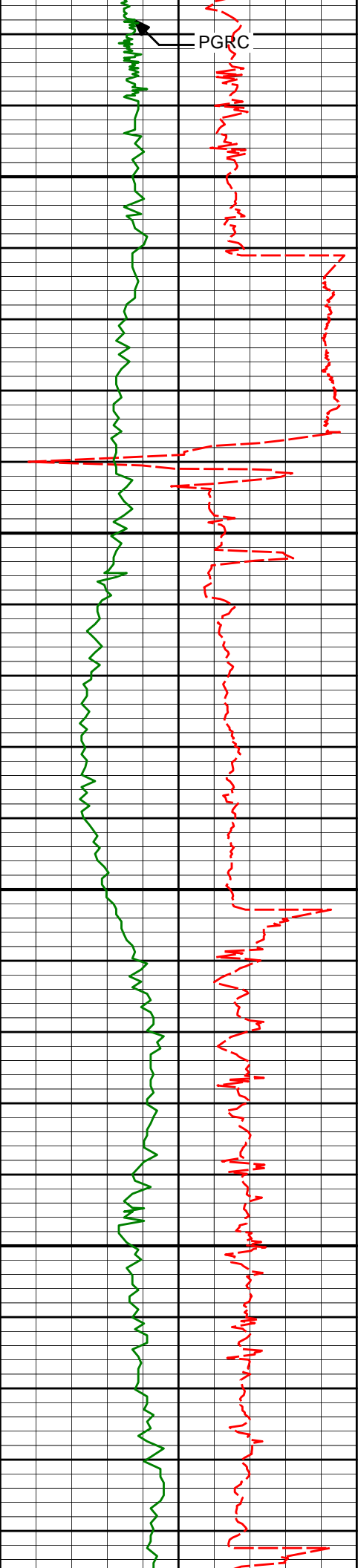
1689.06

ROP

PGRC



8938.00	90.03	1.65	7198.85	1779.01
8950				
9000				
9028.00	90.77	0.45	7198.22	1868.99
9050				
9100				
9118.00	90.80	0.74	7196.99	1958.98



9150

9200

9250

9300

9208.00

89.66

0.18

7196.63

2048.97

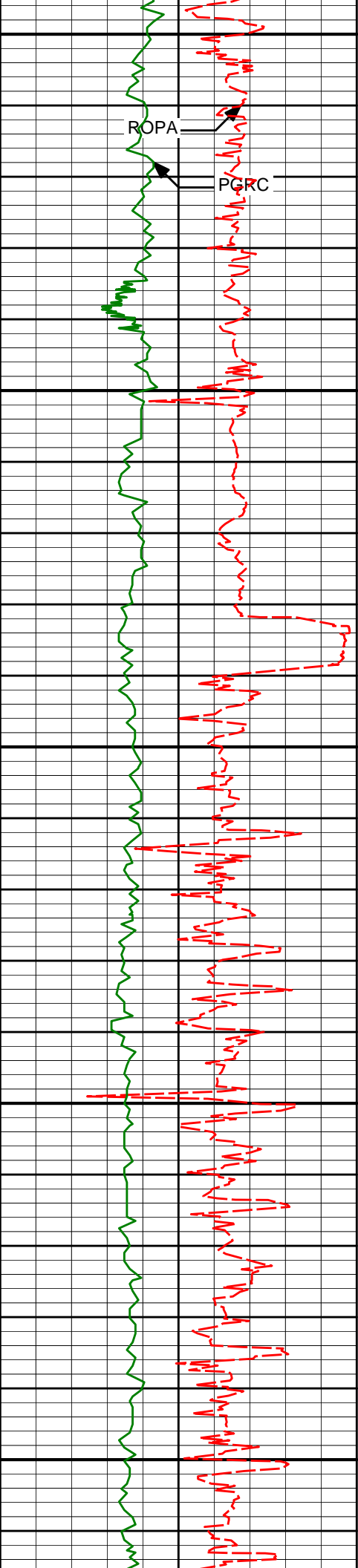
9298.00

89.91

359.89

7196.96

2138.97



9350

ROPA

PGRC

9388.00

89.91

359.62

7197.11

2228.97

9400

9450

9478.00

89.08

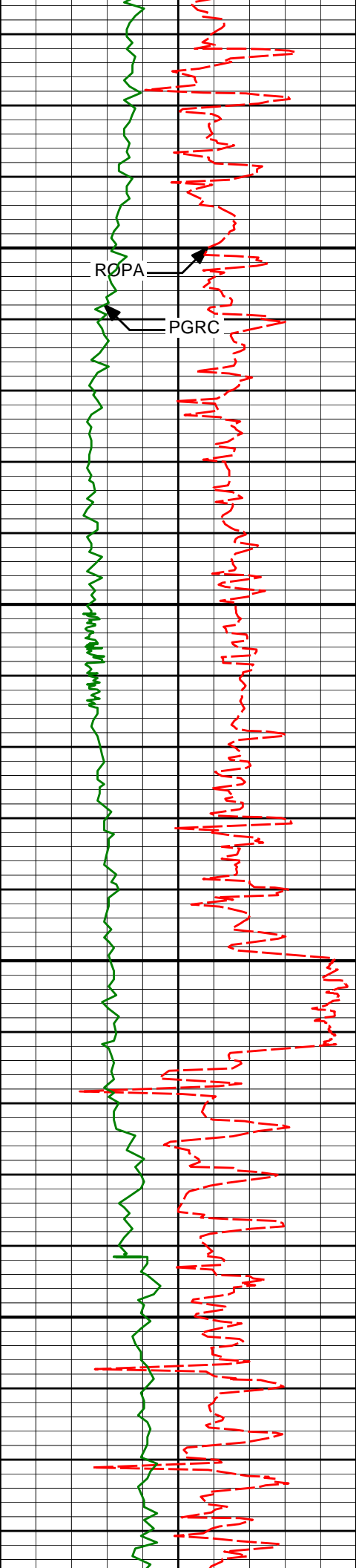
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7197.90

2318.97

9500

9550



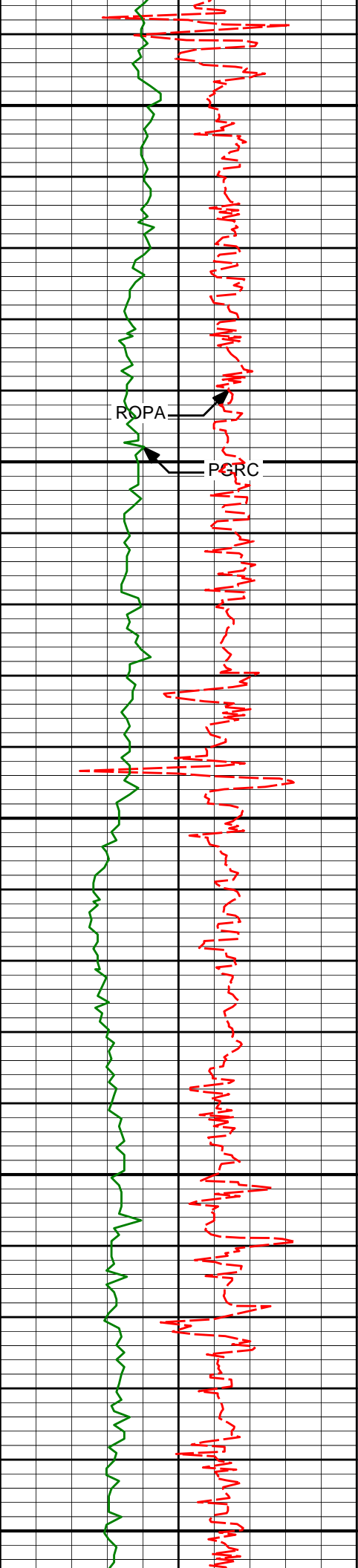
9600

9650

9700

9750

9568.00	88.77	359.13	7199.59	2408.95
9658.00	88.71	358.91	7201.57	2498.91
9749.00	89.57	359.95	7202.93	2589.90



9800

9839.00

89.69

359.85

7203.51

2679.89

ROPA

PGR

9850

9900

9929.00

89.85

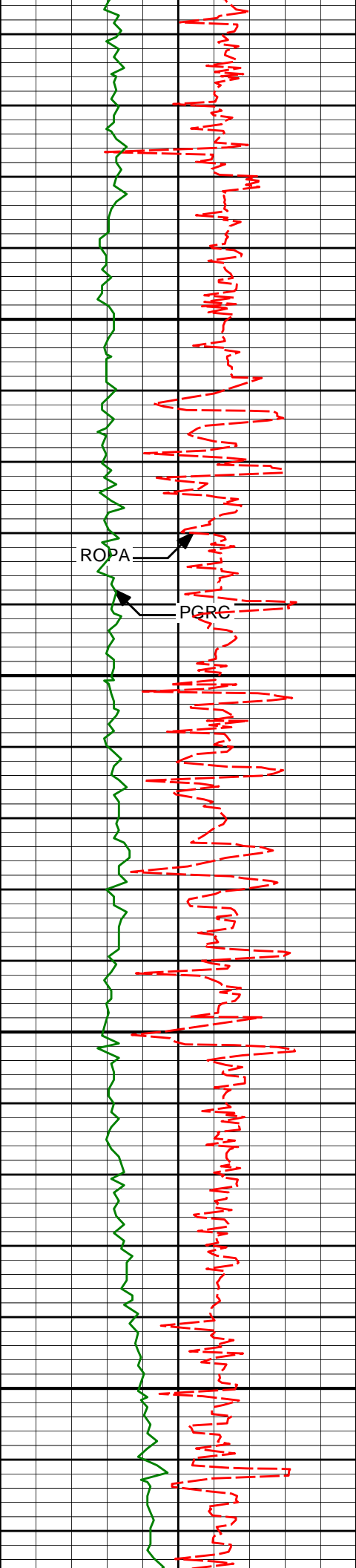
359.72

7203.88

2769.89

9950

10000



10050

10100

10150

10200

10019.00

90.00

359.91

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2859.89

10109.00

90.15

359.60

7203.88

2949.89

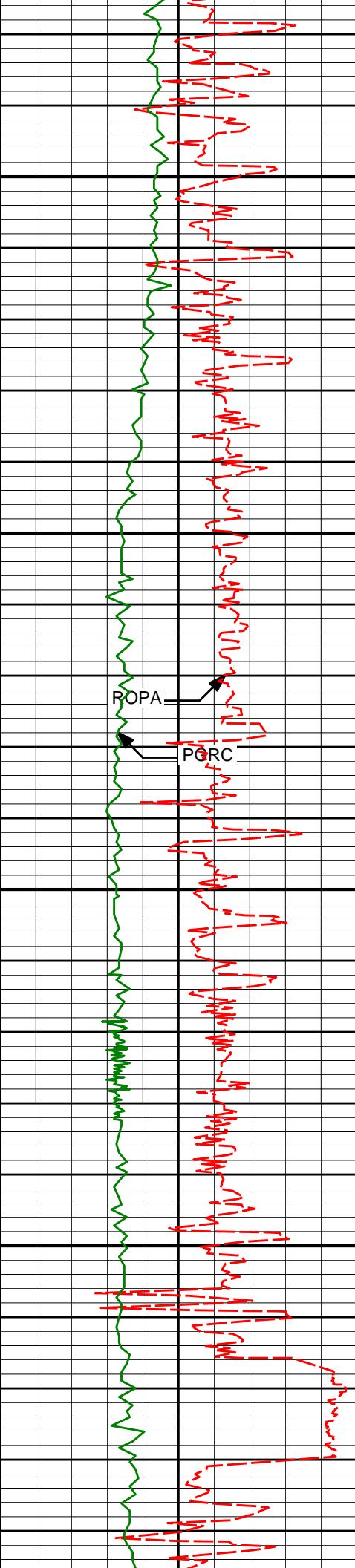
10199.00

90.22

359.44

7203.58

3039.89



10250

10300

10350

10400

10289.00

90.28

359.37

7203.19

3129.88

10379.00

90.49

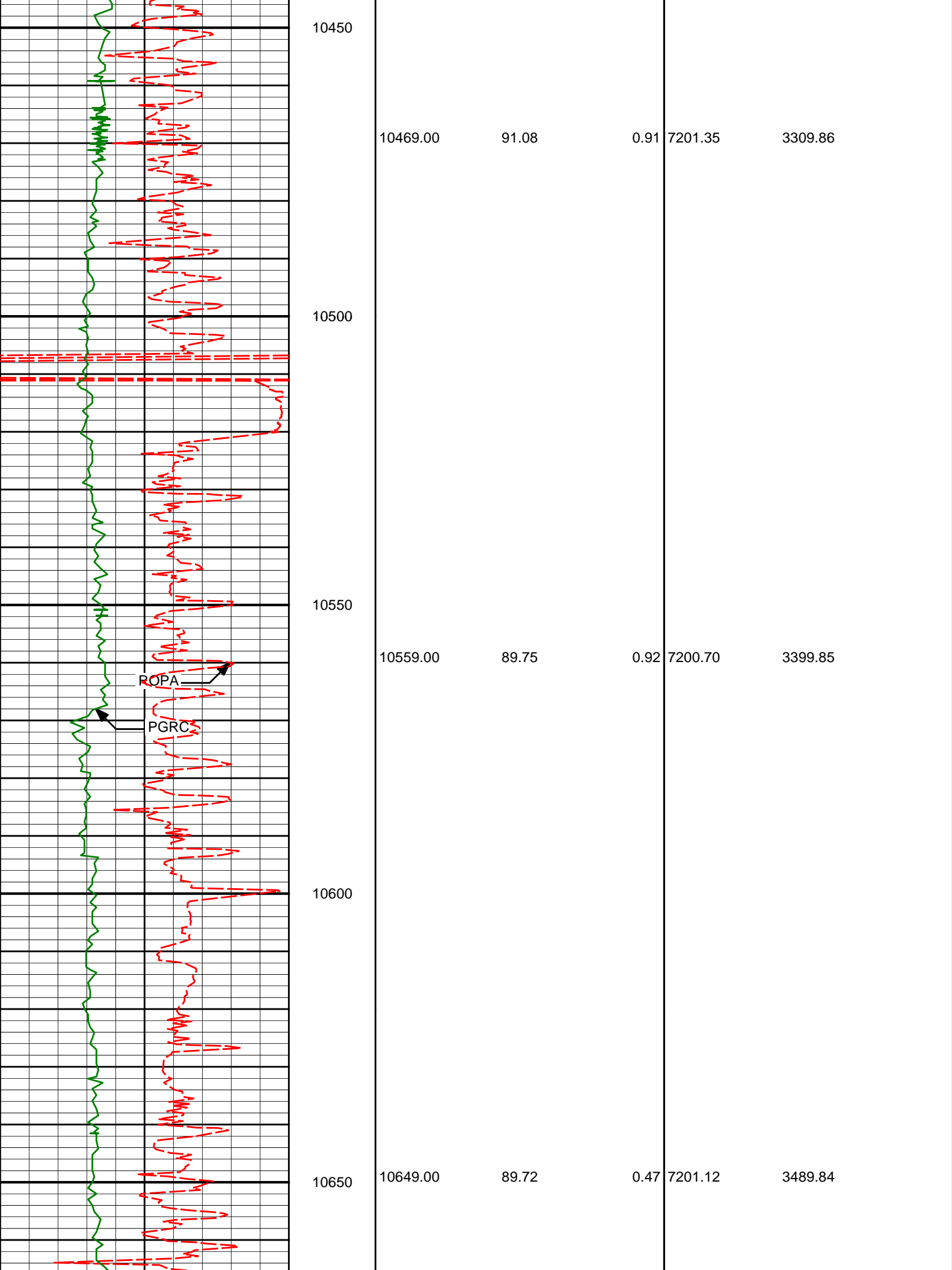
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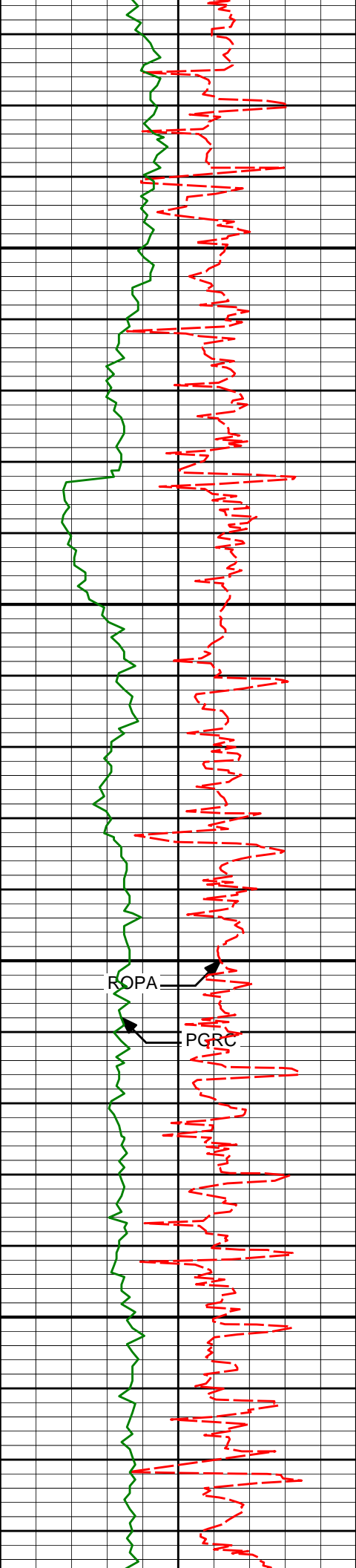
7202.59

3219.87

ROPA

PGRC





10700

10750

10800

10850

10739.00

89.82

0.29

7201.48

3579.83

10829.00

89.94

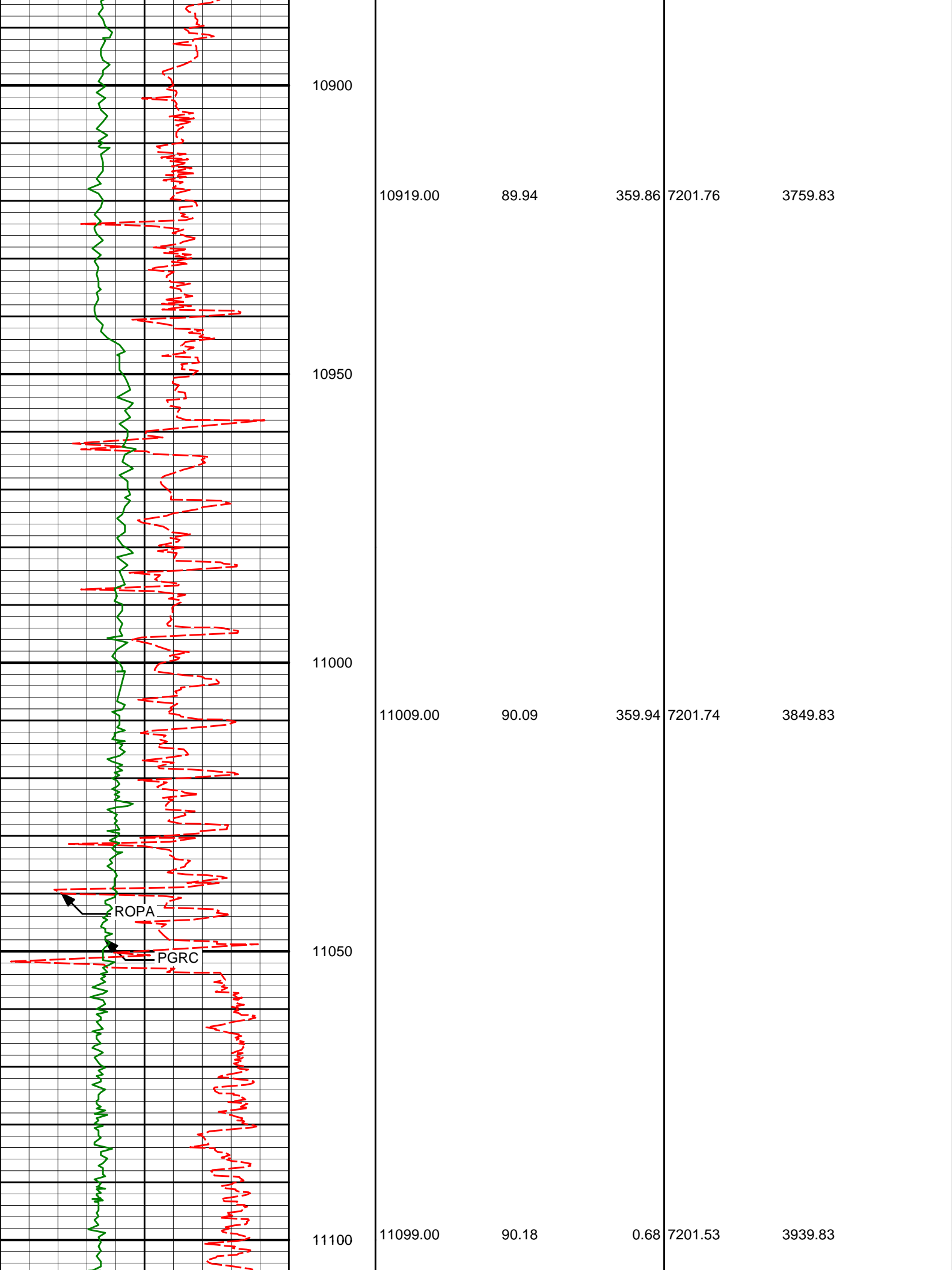
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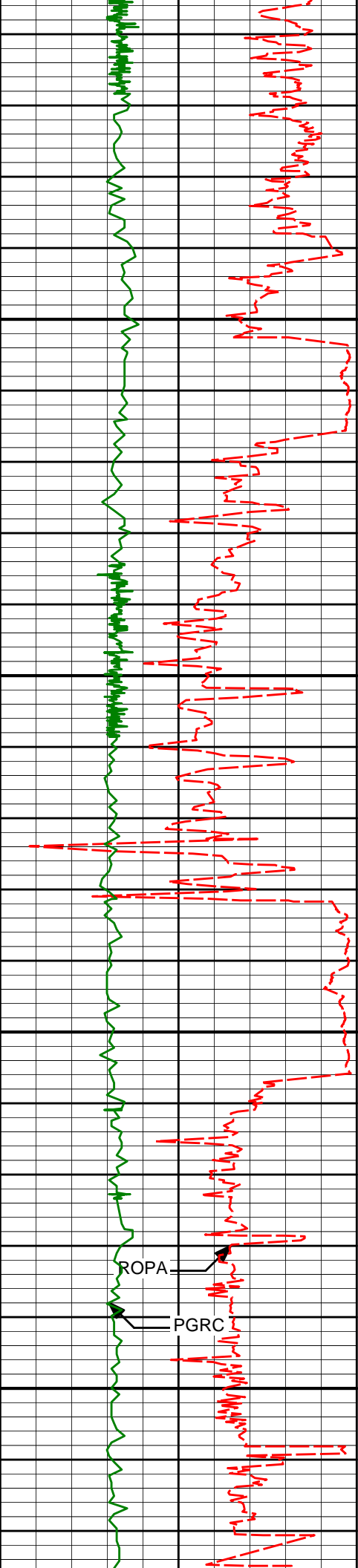
7201.67

3669.83

ROPA

PGR





11150

11200

11250

11300

11189.00

90.00

3.58

7201.39

4029.76

11279.00

89.23

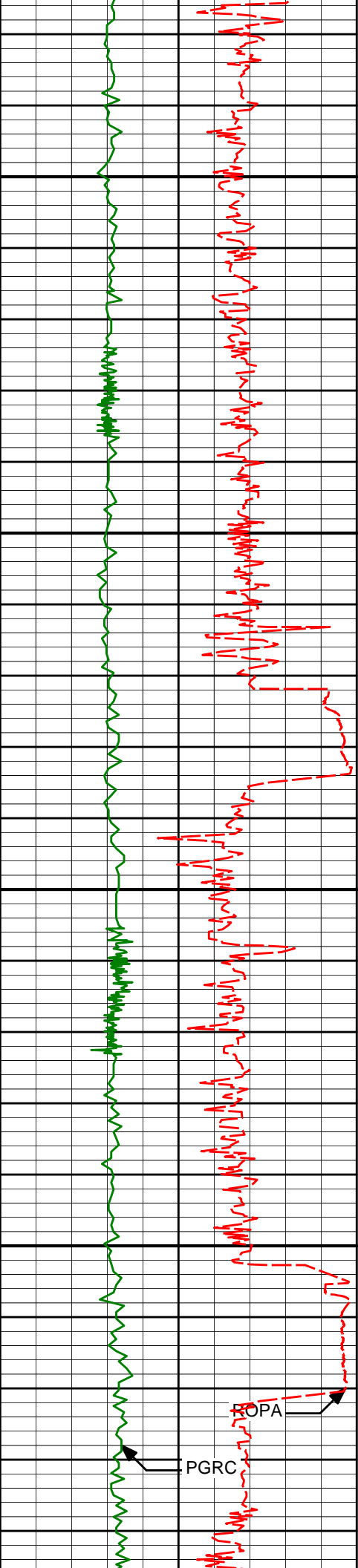
3.52

7201.99

4119.58

ROPA

PGRC



11350

11369.00

89.38

3.43

7203.08

4209.40

11400

11450

11459.00

89.01

3.23

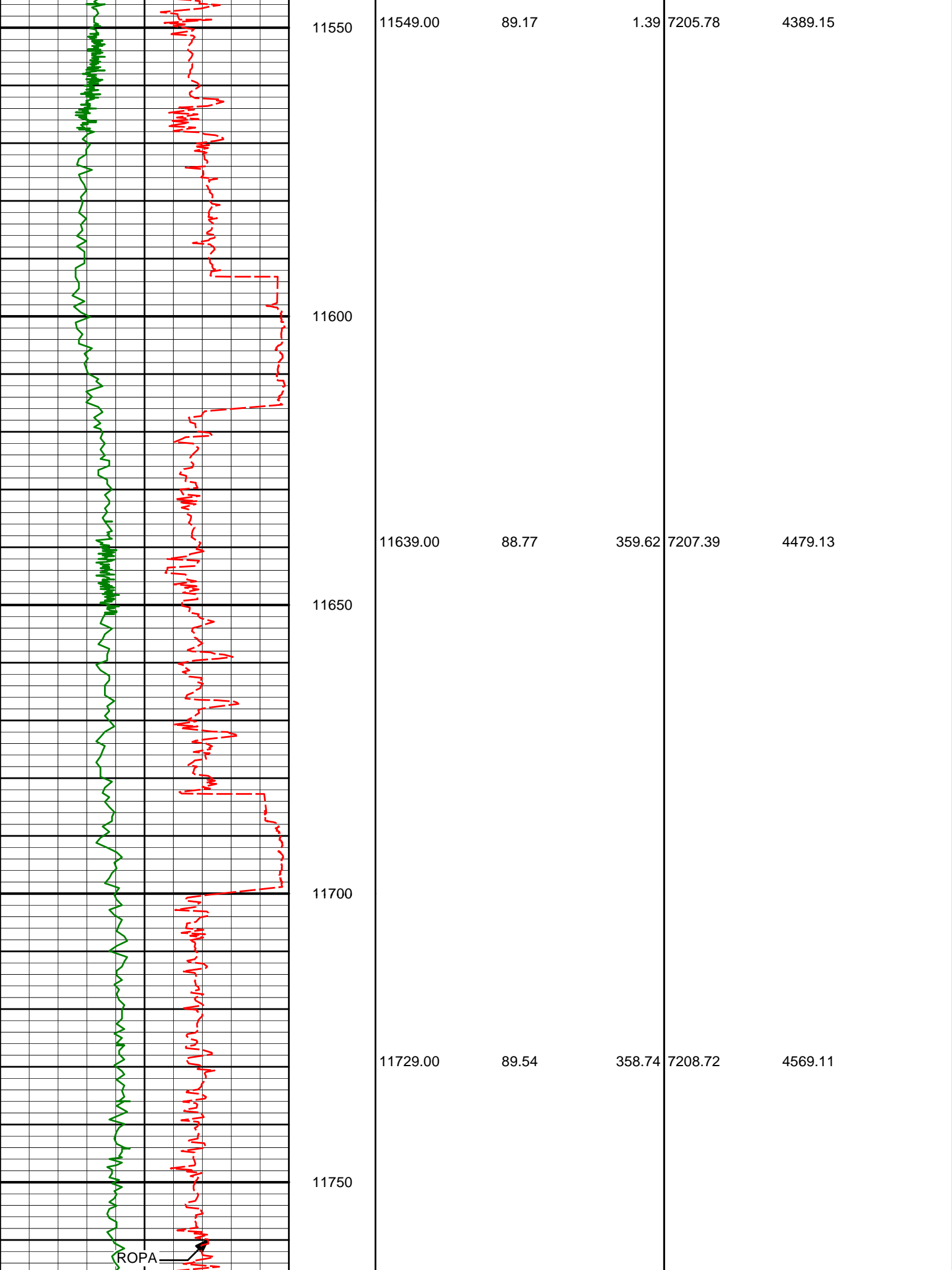
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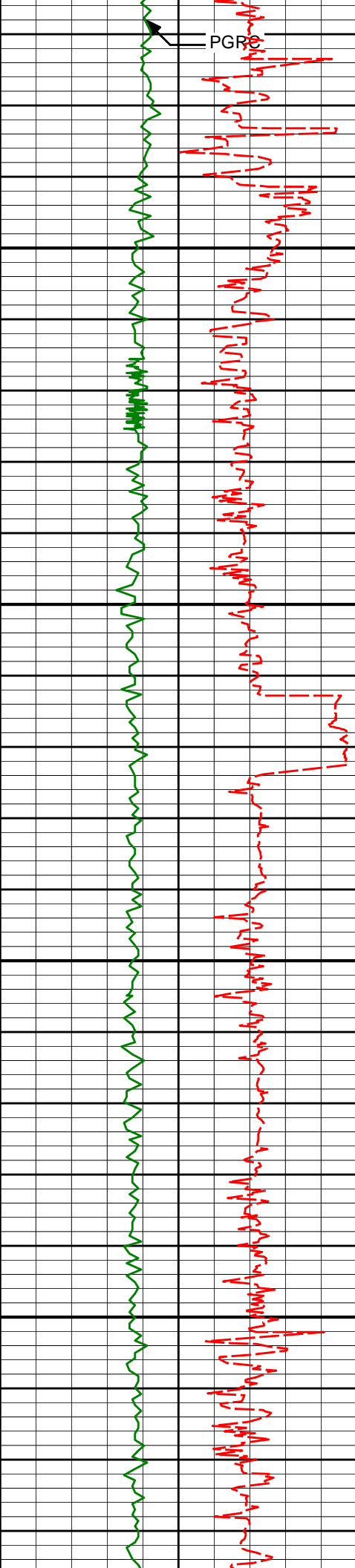
4299.24

11500

ROPA

PGRC





PGR

11800

11819.00

89.54

358.63

7209.44

4659.08

11850

11900

11909.00

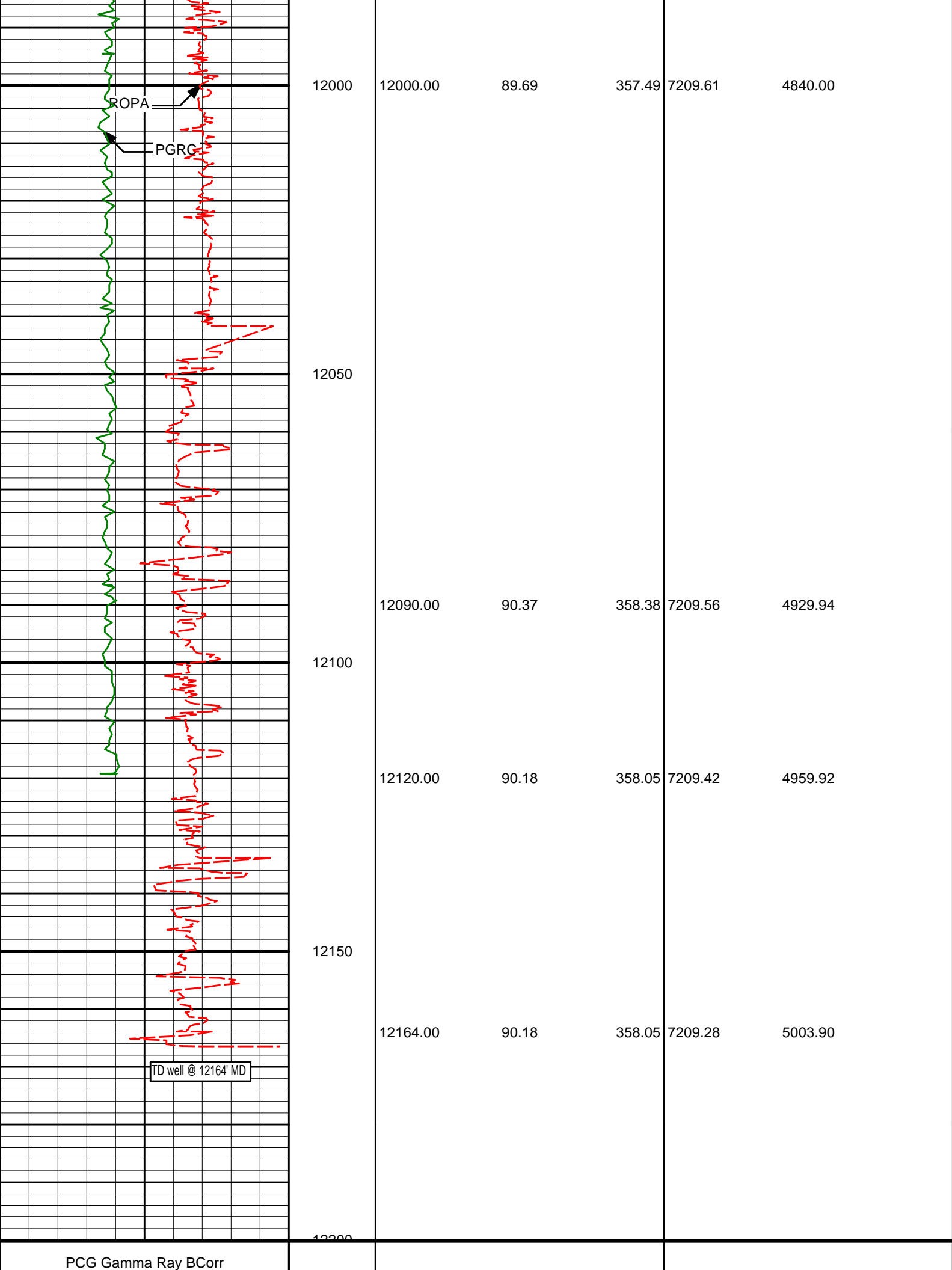
90.28

358.48

7209.59

4749.05

11950



ROPA

PGRC

TD well @ 12164' MD

0	api	300	Depth	Survey Depth	Inclination	Azimuth	TVD	V/S
Avg Rate of Penetration feet per hr								
1K		0						

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DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corp.
 Pettinger 4NE-18HZX
 Wattenberg
 Weld Colorado
 USA
 CA-XX-0900984318
 Surveys are IFR corrected

<i>Measured Depth (feet)</i>	<i>Inclination (degrees)</i>	<i>Direction (degrees)</i>	<i>Vertical Depth (feet)</i>	<i>Latitude (feet)</i>	<i>Departure (feet)</i>	<i>Vertical Section (feet)</i>	<i>Dogleg (deg/100ft)</i>
1124.00	0.41	132.93	1123.99	0.20 N	0.33 E	0.20	TIE-IN
1305.00	0.17	163.31	1304.99	0.50 S	0.88 E	-0.50	0.15
1399.00	2.28	185.38	1398.96	2.49 S	0.75 E	-2.49	2.26
1494.00	3.93	166.74	1493.82	7.54 S	1.32 E	-7.54	2.01
1590.00	6.09	158.07	1589.45	15.47 S	3.97 E	-15.47	2.38
1683.00	7.51	171.05	1681.80	26.05 S	6.76 E	-26.06	2.24
1870.00	10.05	166.41	1866.59	53.99 S	12.50 E	-53.99	1.41
1964.00	9.86	165.61	1959.18	69.76 S	16.42 E	-69.76	0.25
2057.00	9.92	165.42	2050.80	85.22 S	20.42 E	-85.23	0.07
2151.00	8.97	165.89	2143.52	100.17 S	24.24 E	-100.18	1.01
2244.00	8.04	165.86	2235.50	113.50 S	27.60 E	-113.52	1.00
2338.00	9.07	154.56	2328.46	126.57 S	32.39 E	-126.59	2.09
2431.00	7.95	155.29	2420.43	139.03 S	38.23 E	-139.05	1.21
2525.00	9.02	146.15	2513.41	151.06 S	45.05 E	-151.08	1.83
2619.00	7.80	143.03	2606.39	162.27 S	52.99 E	-162.30	1.39
2712.00	9.09	142.92	2698.38	173.18 S	61.22 E	-173.21	1.39
2806.00	7.47	138.94	2791.40	183.71 S	69.71 E	-183.75	1.83
2899.00	6.20	135.80	2883.74	191.87 S	77.18 E	-191.91	1.42
2993.00	7.70	134.16	2977.05	199.90 S	85.24 E	-199.94	1.61
3086.00	6.69	131.94	3069.31	207.86 S	93.74 E	-207.91	1.13
3179.00	6.27	144.43	3161.72	215.61 S	100.72 E	-215.66	1.58
3273.00	3.39	155.17	3255.38	222.31 S	104.87 E	-222.36	3.20
3363.00	1.14	138.94	3345.31	225.40 S	106.58 E	-225.45	2.57
3543.00	0.07	125.79	3525.29	226.81 S	107.84 E	-226.87	0.60
3723.00	0.07	284.88	3705.29	226.85 S	107.83 E	-226.91	0.08
3813.00	0.96	13.39	3795.29	226.10 S	107.95 E	-226.16	1.07
3903.00	0.63	337.38	3885.28	224.91 S	107.93 E	-224.97	0.65
3993.00	0.80	317.84	3975.27	223.99 S	107.32 E	-224.04	0.33
4083.00	0.81	314.30	4065.26	223.08 S	106.44 E	-223.13	0.06
4173.00	0.68	296.52	4155.26	222.40 S	105.51 E	-222.45	0.29
4263.00	0.78	289.37	4245.25	221.95 S	104.46 E	-222.01	0.15
4353.00	0.97	290.86	4335.24	221.48 S	103.17 E	-221.53	0.21
4443.00	1.13	288.85	4425.22	220.92 S	101.61 E	-220.97	0.18
4533.00	1.20	279.98	4515.21	220.47 S	99.85 E	-220.52	0.21
4623.00	1.63	276.36	4605.18	220.17 S	97.65 E	-220.22	0.49
4713.00	0.61	139.49	4695.17	220.39 S	96.68 E	-220.44	2.35
4893.00	0.28	45.74	4875.16	220.81 S	97.62 E	-220.86	0.38
4983.00	0.83	33.48	4965.16	220.11 S	98.14 E	-220.16	0.62
5254.00	1.92	3.24	5236.08	213.94 S	99.48 E	-214.00	0.47
5344.00	0.99	39.28	5326.05	211.84 S	100.06 E	-211.89	1.40
5434.00	0.83	159.83	5416.05	211.85 S	100.77 E	-211.90	1.76
5524.00	0.68	177.93	5506.04	212.99 S	101.02 E	-213.04	0.31
5794.00	1.01	307.79	5776.02	213.13 S	99.19 E	-213.19	0.57
5884.00	1.53	130.93	5866.02	213.44 S	99.47 E	-213.49	2.82
6064.00	0.89	99.31	6045.98	215.24 S	102.67 E	-215.29	0.50

	6154.00	0.68	88.96	6135.97	215.34 S	103.89 E	-215.39	0.28
	6244.00	0.46	74.02	6225.96	215.23 S	104.78 E	-215.29	0.29
	6334.00	0.87	192.01	6315.96	215.80 S	104.98 E	-215.85	1.29
	6424.00	0.33	212.72	6405.95	216.69 S	104.70 E	-216.74	0.64
	6514.00	0.20	348.01	6495.95	216.75 S	104.53 E	-216.81	0.55
	6604.00	0.37	355.47	6585.95	216.31 S	104.47 E	-216.36	0.19
	6649.00	5.35	0.57	6630.88	214.06 S	104.48 E	-214.12	11.07
	6694.00	10.14	358.52	6675.46	208.00 S	104.40 E	-208.06	10.66
	6739.00	14.02	358.10	6719.45	198.59 S	104.11 E	-198.65	8.62
	6784.00	17.85	359.61	6762.72	186.24 S	103.89 E	-186.30	8.56
	6829.00	21.62	358.83	6805.07	171.05 S	103.67 E	-171.11	8.40
	6874.00	27.07	359.99	6846.05	152.51 S	103.50 E	-152.56	12.16
	6919.00	31.15	5.26	6885.36	130.67 S	104.56 E	-130.72	10.70
	6964.00	35.11	2.48	6923.04	106.14 S	106.19 E	-106.19	9.42
	7009.00	38.38	1.98	6959.10	79.24 S	107.24 E	-79.30	7.30
	7054.00	43.00	0.08	6993.21	49.92 S	107.74 E	-49.97	10.63
	7099.00	48.44	357.96	7024.62	17.72 S	107.16 E	-17.78	12.55
	7144.00	52.64	359.27	7053.21	17.00 N	106.33 E	16.95	9.60
	7189.00	57.84	358.74	7078.86	53.95 N	105.69 E	53.90	11.60
	7234.00	60.71	357.94	7101.85	92.62 N	104.56 E	92.56	6.56
	7279.00	63.68	358.51	7122.84	132.40 N	103.33 E	132.34	6.69
	7324.00	67.87	358.57	7141.30	173.41 N	102.29 E	173.36	9.31
	7369.00	70.89	356.67	7157.14	215.49 N	100.53 E	215.43	7.79
	7414.00	73.26	355.98	7170.99	258.21 N	97.79 E	258.16	5.46
	7459.00	75.66	356.60	7183.05	301.47 N	94.98 E	301.42	5.50
	7504.00	82.68	359.95	7191.50	345.62 N	93.67 E	345.57	17.23
	7549.00	86.76	0.99	7195.64	390.41 N	94.04 E	390.36	9.35
	7594.00	88.00	0.35	7197.70	435.36 N	94.56 E	435.31	3.10
	7709.00	89.17	0.45	7200.54	550.32 N	95.36 E	550.27	1.02
	7754.00	91.20	0.21	7200.39	595.32 N	95.62 E	595.27	4.54
	7768.00	93.02	359.26	7199.88	609.31 N	95.56 E	609.26	14.66
	7858.00	91.36	359.69	7196.44	699.24 N	94.74 E	699.19	1.91
	7948.00	89.66	359.89	7195.64	789.23 N	94.41 E	789.18	1.90
	8038.00	89.69	0.07	7196.15	879.23 N	94.37 E	879.18	0.20
	8128.00	89.63	359.97	7196.68	969.22 N	94.41 E	969.17	0.13
	8218.00	89.54	359.85	7197.33	1059.22 N	94.26 E	1059.17	0.17
	8308.00	89.42	359.93	7198.15	1149.22 N	94.09 E	1149.17	0.16
	8398.00	89.38	359.93	7199.09	1239.21 N	93.98 E	1239.16	0.04
	8578.00	90.12	0.44	7199.88	1419.21 N	94.56 E	1419.16	0.50
	8668.00	90.28	0.80	7199.56	1509.20 N	95.54 E	1509.15	0.44
	8758.00	90.52	2.15	7198.94	1599.17 N	97.85 E	1599.12	1.52
	8848.00	89.78	1.90	7198.70	1689.11 N	101.03 E	1689.06	0.87
	8938.00	90.03	1.65	7198.85	1779.07 N	103.82 E	1779.01	0.39
	9028.00	90.77	0.45	7198.22	1869.05 N	105.47 E	1868.99	1.57
	9118.00	90.80	0.74	7196.99	1959.03 N	106.40 E	1958.98	0.32
	9208.00	89.66	0.18	7196.63	2049.03 N	107.13 E	2048.97	1.41
	9298.00	89.91	359.89	7196.96	2139.03 N	107.18 E	2138.97	0.43
	9388.00	89.91	359.62	7197.11	2229.03 N	106.80 E	2228.97	0.30
	9478.00	89.08	359.82	7197.90	2319.02 N	106.36 E	2318.97	0.95
	9568.00	88.77	359.13	7199.59	2409.00 N	105.53 E	2408.95	0.84
	9658.00	88.71	358.91	7201.57	2498.97 N	103.99 E	2498.91	0.25
	9749.00	89.57	359.95	7202.93	2589.95 N	103.09 E	2589.90	1.48
	9839.00	89.69	359.85	7203.51	2679.95 N	102.93 E	2679.89	0.17
	9929.00	89.85	359.72	7203.88	2769.95 N	102.59 E	2769.89	0.23
	10019.00	90.00	359.91	7203.99	2859.95 N	102.30 E	2859.89	0.27
	10109.00	90.15	359.60	7203.88	2949.94 N	101.92 E	2949.89	0.38
	10199.00	90.22	359.44	7203.58	3039.94 N	101.16 E	3039.89	0.19
	10289.00	90.28	359.37	7203.19	3129.94 N	100.23 E	3129.88	0.10
	10379.00	90.49	359.20	7202.59	3219.93 N	99.11 E	3219.87	0.30
	10469.00	91.08	0.91	7201.35	3309.91 N	99.19 E	3309.86	2.01
	10559.00	89.75	0.92	7200.70	3399.90 N	100.63 E	3399.85	1.48
	10649.00	89.72	0.47	7201.12	3489.89 N	101.72 E	3489.84	0.50
	10739.00	89.82	0.29	7201.48	3579.89 N	102.32 E	3579.83	0.23
	10829.00	89.94	0.20	7201.67	3669.89 N	102.70 E	3669.83	0.17
	10919.00	89.94	359.86	7201.76	3759.89 N	102.75 E	3759.83	0.38
	11009.00	90.09	359.94	7201.74	3849.89 N	102.59 E	3849.83	0.19
	11099.00	90.18	0.68	7201.53	3939.88 N	103.08 E	3939.83	0.83
	11189.00	90.00	3.58	7201.39	4029.81 N	106.42 E	4029.76	3.23
	11279.00	89.23	3.52	7201.99	4119.64 N	112.00 E	4119.58	0.86
	11369.00	89.38	3.43	7203.08	4209.46 N	117.45 E	4209.40	0.19
	11459.00	89.24	0.00	7204.07	4299.28 N	122.32 E	4299.24	0.47

11459.00	89.01	3.23	7204.35	4299.30 N	122.68 E	4299.24	0.47
11549.00	89.17	1.39	7205.78	4389.22 N	126.31 E	4389.15	2.05
11639.00	88.77	359.62	7207.39	4479.19 N	127.10 E	4479.13	2.02
11729.00	89.54	358.74	7208.72	4569.17 N	125.81 E	4569.11	1.30
11819.00	89.54	358.63	7209.44	4659.15 N	123.74 E	4659.08	0.12

11909.00	90.28	358.48	7209.59	4749.12 N	121.48 E	4749.05	0.84
12000.00	89.69	357.49	7209.61	4840.06 N	118.28 E	4840.00	1.27
12090.00	90.37	358.38	7209.56	4930.00 N	115.03 E	4929.94	1.24
12120.00	90.18	358.05	7209.42	4959.98 N	114.10 E	4959.92	1.27
12164.00	90.18	358.05	7209.28	5003.96 N	112.60 E	5003.90	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 359.97 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.49 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 12164.00 FEET
IS 5005.23 FEET ALONG 1.29 DEGREES (TRUE)**

**ALL DIRECTIONAL SURVEYS TIED ON TO THE LAST GYRO SURVEY @ 1106' MD
FINAL SURVEY IS A PROJECTION TO THE BIT BEFORE COMMING OUT TO SIDE TRACK**