

C - Pressure Cased Directional
PCG - Pressure Cased Gamma

1 : 600 / 1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	12-Jan-15	13-Jan-15	15-Jan-15		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	6.125	6.125		
Tool Nominal OD (in)	6.730	4.850	4.850		
Log Start Depth (MD, ft)	692.00	7,031.00	7,043.00		
Log End Depth (MD, ft)	7,031.00	7,043.00	11,647.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	10-Jan-15 16:01	13-Jan-15 13:59	14-Jan-15 02:18		
Drill/Wipe End Date and Time	12-Jan-15 00:12	13-Jan-15 14:53	15-Jan-15 05:01		
Min Inc (deg) @ Depth (MD, ft)	0.40 @ 692.00	0.00 @ 0.00	87.93 @ 10,167.00		
Max Inc (deg) @ Depth (MD, ft)	80.21 @ 6,973.00	0.00 @ 0.00	93.14 @ 10,737.00		
Bit TFA(in2) / Bit Type	0.91 / PDC	0.98 / PDC	0.98 / PDC		
Flow Rate (gpm)	588.67	225.00	309.59		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	N/A / N/A		
Fluid Type	Polymer	Native/Spud Mud	Native/Spud Mud		
Density (ppg) / Viscosity (spqt)	9.15 / 35.00	9.30 / 33.00	9.25 / 33.00		
Filtrate CL (ppm)	1,800.00	1,700.00	1,700.00		
pH / Fluid Loss (mptm)	9.10 / 0	9.40 / 10	8.60 / 9		
PV (cP) / YP (lbf2)	5 / 4.00	5 / 4.00	9 / 7.00		
% Solids / % Sand	4.20 / 1.50	4.20 / 0.10	5.10 / 0.60		
% 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		
Max Tool Temp (in F) / S	107.05 / PDM	100.00 / PDM	234.10 / PDM		

Max Tool Temp (degF) / Source	167.97 / PCM	189.99 / PCM	231.42 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Paul Sheets	Paul Sheets	Paul Sheets		
Customer Representative	Cliff Kester	Cliff Kester	Cliff Kester		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.93	5.93	5.93		
Sub Serial Number	11404272	12301676	12301676		
Insert Serial Number	11680742	11680742	11680745		
Date and Time Initialized	10-Jan-15 04:57	12-Jan-15 17:28	13-Jan-15 19:10		
Date and Time Read	12-Jan-15 09:06	13-Jan-15 20:58	15-Jan-15 14:42		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	55.67	58.80	56.43		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11404272	12301676	12301676		
Sonde Serial Number	11638470	11638470	11297577		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	183.21	111.44	92.88		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	50.57	53.70	51.33		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11404272	12301676	12301676		
Insert/Sonde Serial Number	11293343	11293343	11293301		

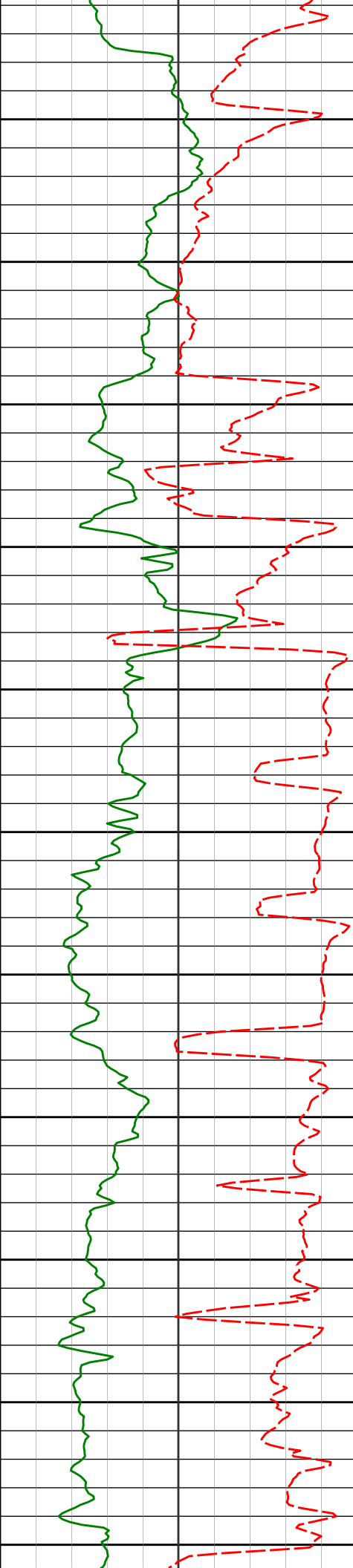
REMARKS

1. All depths are calibrated to driller's pipe tally and are measured from the rig drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
4. The following smoothing parameters have been applied to the data.
-All 2" (1:600) logs - 1ft. interval, 3 ft. coercion distance.
-All 5" (1:240) logs - .5ft interval, .6 ft. coercion distance.
5. INSITE version 8.1.10
6. Gamma presented inside casing/cement from 6981' MD to 7025' MD.

WARRANTY

HALLIBURTON WILL USE ITS BEST EFFORTS TO FURNISH CUSTOMERS WITH ACCURATE INFORMATION AND INTERPRETATIONS THAT ARE PART OF, AND INCIDENT TO, THE SERVICES PROVIDED. HOWEVER, HALLIBURTON CANNOT AND DOES NOT WARRANT THE ACCURACY OR CORRECTNESS OF SUCH INFORMATION AND INTERPRETATIONS. UNDER NO CIRCUMSTANCES SHOULD ANY SUCH INFORMATION OR INTERPRETATION BE RELIED UPON AS THE SOLE BASIS FOR ANY DRILLING, COMPLETION, PRODUCTION, OR FINANCIAL DECISION OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY

PCG Gamma Ray PGRC api							
Avg Rate of Penetration ROPA feet per hr		Depth ft	Depth	Inc.	Azi.	TVD	V.S.
0	300	<KOP>					
		6100'					
		6150'					
		6200'	6199'	13.09°	172.74°	6171.33'	-170.66'
		6250'	6247'	17.35°	175.34°	6217.63'	-158.07'
		6300'	6294'	20.49°	175.84°	6262.09'	-142.83'
		6350'	6342'	22.82°	177.93°	6306.70'	-125.13'
		6400'	6389'	25.57°	178.77°	6349.57'	-105.89'



6450'

6500'

6550'

6600'

6650'

6700'

6750'

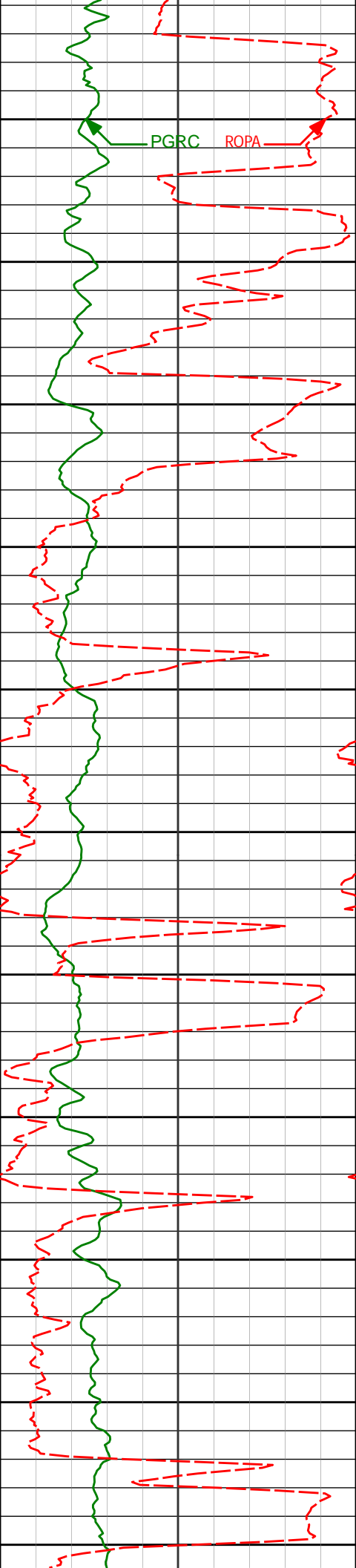
6800'

6850'

6900'

6950'

6484'	35.25°	177.62°	6431.40'	-57.90'
6578'	45.36°	178.44°	6503.00'	2.78'
6626'	49.38°	177.01°	6535.50'	38.07'
6673'	53.39°	176.32°	6564.83'	74.78'
6721'	57.83°	176.43°	6591.93'	114.38'
6768'	62.15°	176.70°	6615.44'	155.07'
6816'	65.57°	177.00°	6636.58'	198.14'
6863'	70.19°	177.97°	6654.27'	241.65'
6911'	76.03°	178.64°	6668.21'	287.52'



7000'

<Run 200>

<Run 300>

7050'

7100'

7150'

7200'

7250'

7300'

7350'

7400'

7450'

7500'

6973'

80.21°

179.70°

6680.97'

348.08'

<7" casing set at 7025' MD>

7130'

88.49°

181.99°

6696.41'

503.58'

7225'

88.24°

182.07°

6699.12'

598.00'

7320'

90.00°

181.72°

6700.58'

692.46'

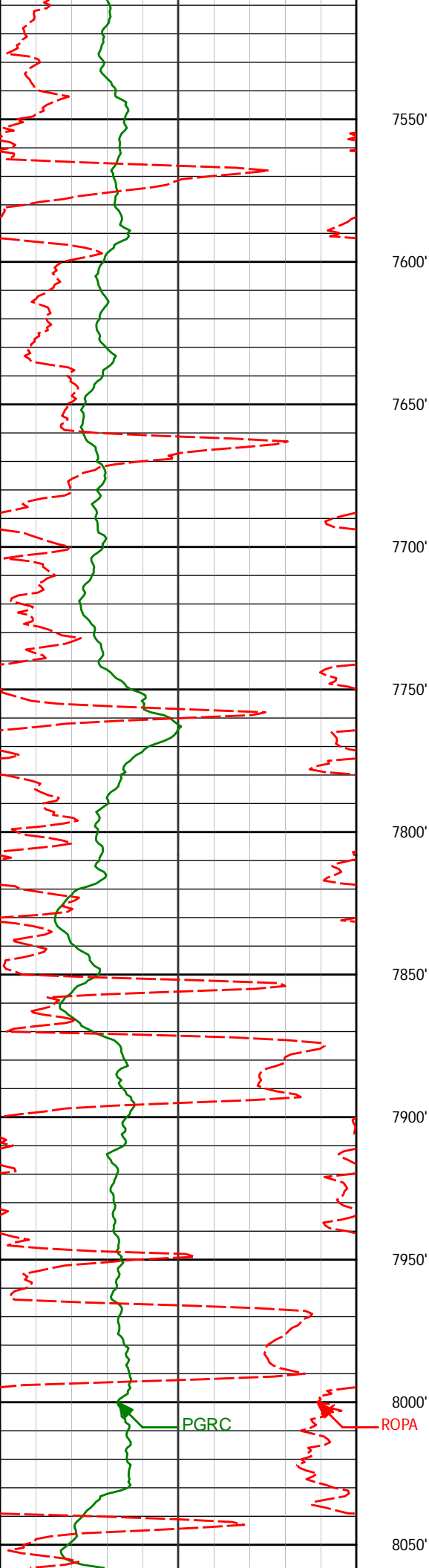
7415'

90.71°

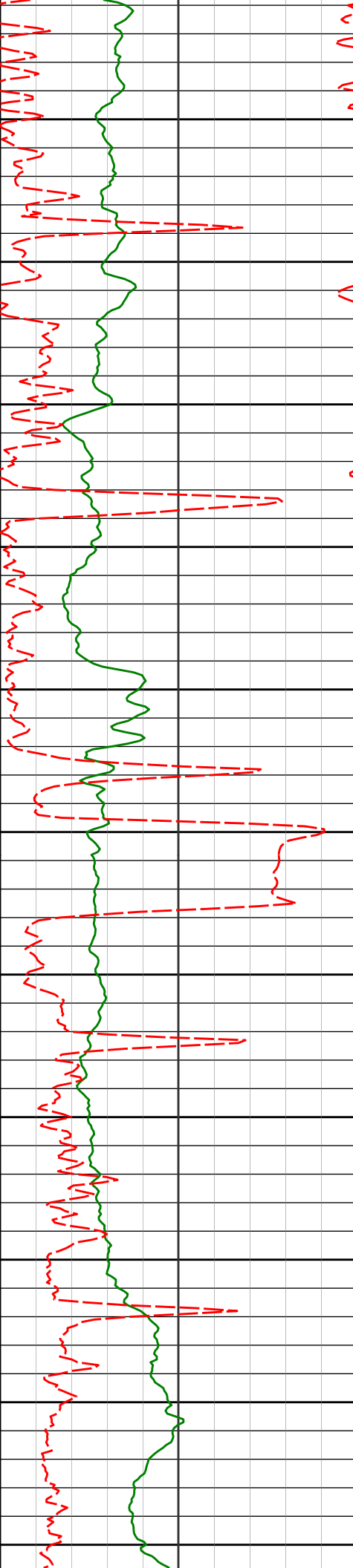
181.22°

6699.99'

787.01'



7510'	90.28°	180.84°	6699.17'	881.62'
7605'	89.63°	180.09°	6699.25'	976.31'
7700'	90.43°	179.75°	6699.20'	1071.08'
7795'	90.99°	179.55°	6698.02'	1165.86'
7890'	91.02°	179.92°	6696.37'	1260.63'
7985'	88.86°	180.35°	6696.47'	1355.37'



8100'

8150'

8200'

8250'

8300'

8350'

8400'

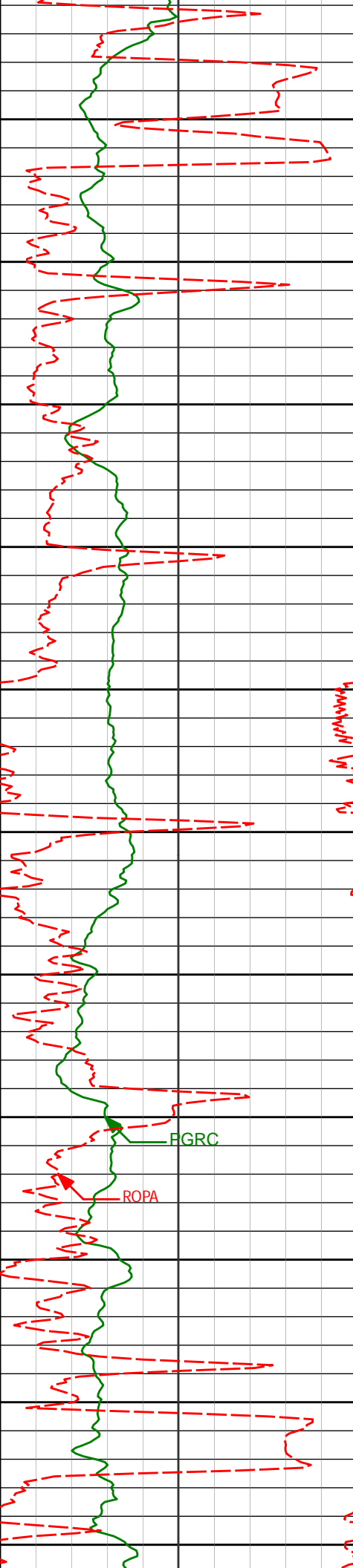
8450'

8500'

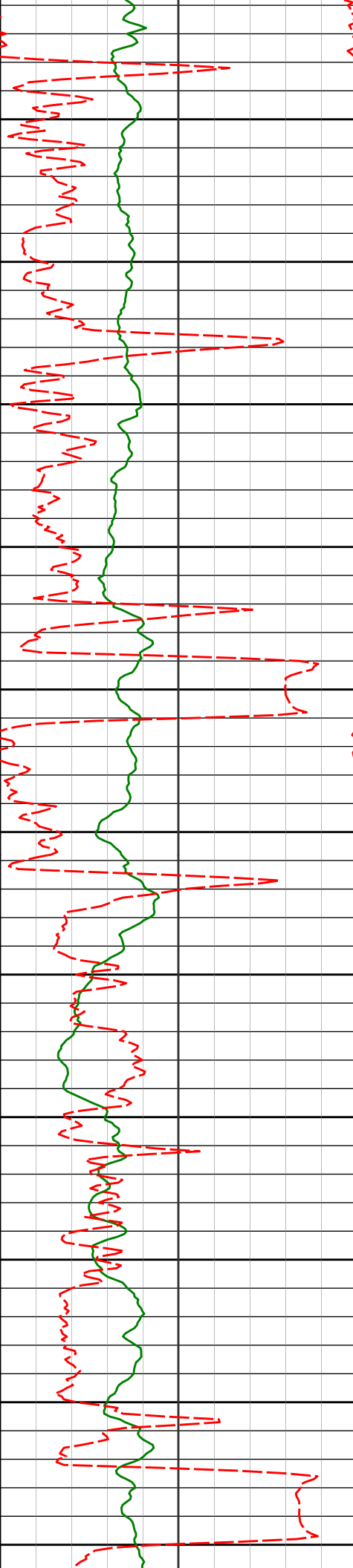
8550'

8600'

8080'	89.11°	180.24°	6698.15'	1450.07'
8175'	89.20°	179.78°	6699.56'	1544.81'
8270'	89.66°	179.52°	6700.50'	1639.60'
8365'	90.65°	182.34°	6700.25'	1734.22'
8459'	90.25°	182.53°	6699.51'	1827.61'
8554'	91.73°	182.58°	6697.88'	1921.94'



8650'	8649'	89.35°	181.99°	6696.98'	2016.34'
8700'					
8750'	8744'	89.57°	181.96°	6697.88'	2110.80'
8800'					
8850'	8839'	89.51°	180.63°	6698.64'	2205.37'
8900'					
8950'	8934'	90.12°	180.99°	6698.95'	2300.02'
9000'					
9050'	9029'	91.20°	180.79°	6697.85'	2394.65'
9100'					
9150'	9124'	89.20°	180.46°	6697.52'	2489.32'



9200'

9219'	89.11°	180.44°	6698.92'	2584.00'
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9250'

9300'

9314'	90.43°	181.09°	6699.31'	2678.66'
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9350'

9400'

9408'	88.92°	180.83°	6699.84'	2772.28'
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9450'

9500'

9503'	89.72°	180.49°	6700.96'	2866.94'
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9550'

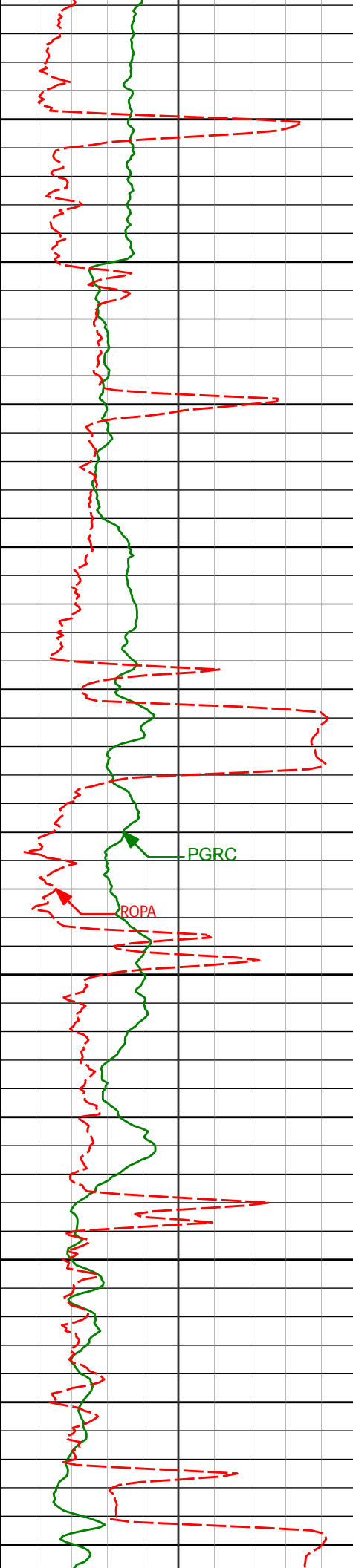
9600'

9598'	90.74°	180.32°	6700.58'	2961.65'
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9650'

9700'

9693'	89.14°	180.93°	6700.68'	3056.32'
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9750'

9788'

89.63°

181.87°

6701.70'

3150.87'

9800'

9850'

9882'

90.92°

181.86°

6701.25'

3244.35'

9900'

9950'

9977'

88.30°

180.33°

6701.89'

3338.94'

10000'

PGRC

ROPA

10050'

10072'

88.28°

180.14°

6704.72'

3433.63'

10100'

10150'

10167'

87.93°

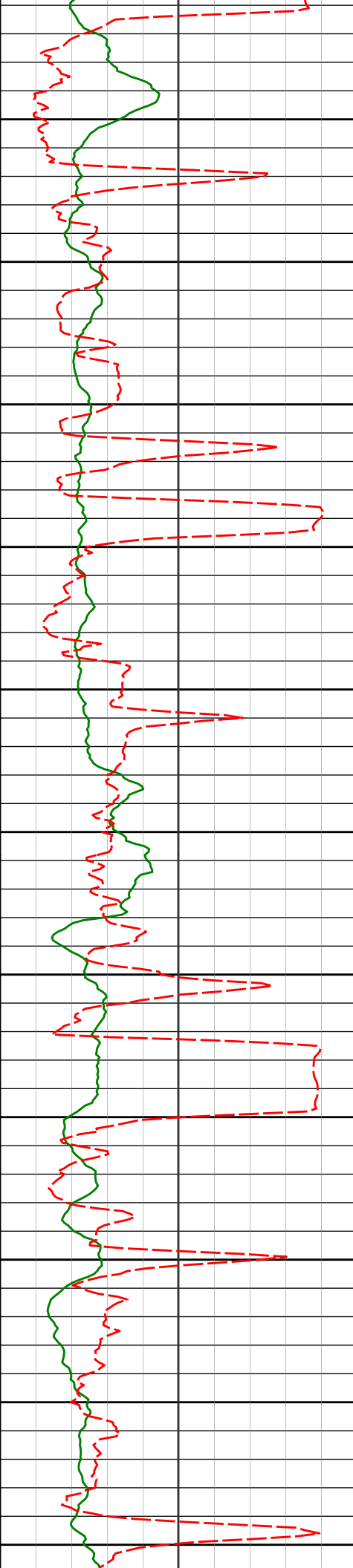
179.42°

6707.87'

3528.36'

10200'

10250'



10300'

10350'

10400'

10450'

10500'

10550'

10600'

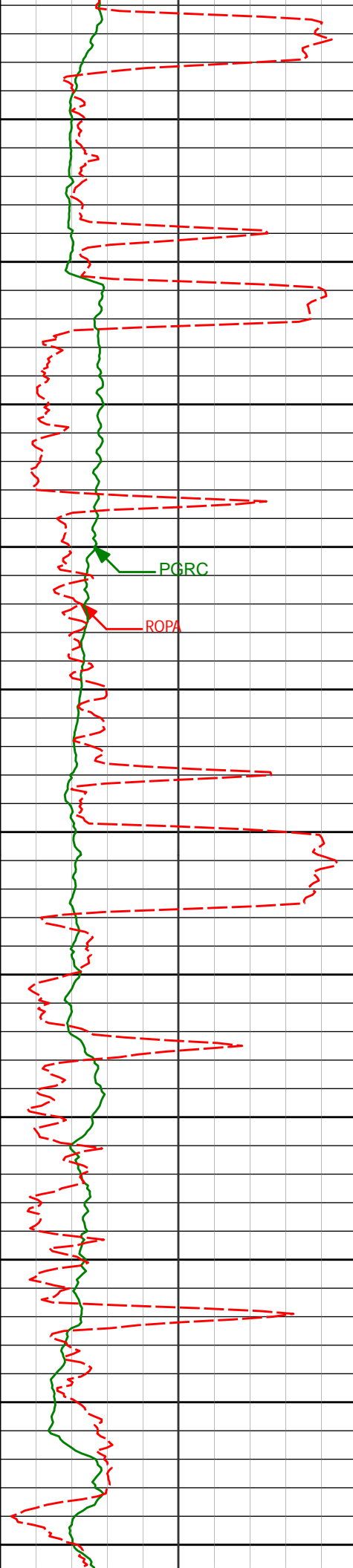
10650'

10700'

10750'

10800'

10262'	89.45°	179.37°	6710.04'	3623.15'
10357'	89.08°	178.97°	6711.26'	3717.98'
10452'	90.03°	178.36°	6712.00'	3812.87'
10547'	89.48°	177.94°	6712.41'	3907.79'
10642'	91.94°	178.90°	6711.24'	4002.68'
10737'	93.14°	178.56°	6707.03'	4097.47'



10850'

10900'

10950'

11000'

11050'

11100'

11150'

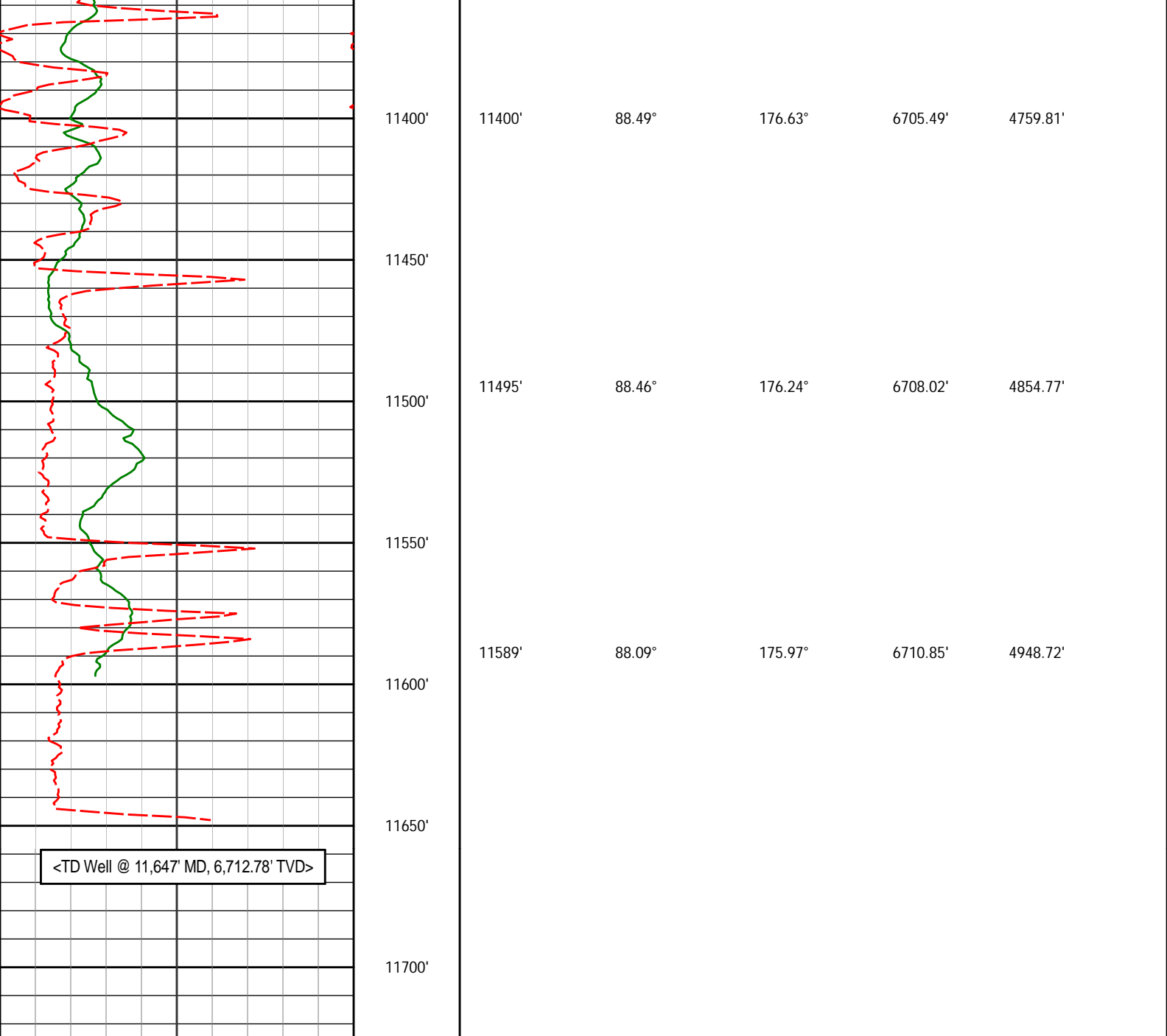
11200'

11250'

11300'

11350'

10831'	92.13°	179.28°	6702.71'	4191.24'
10926'	90.62°	178.39°	6700.43'	4286.08'
11021'	91.39°	177.43°	6698.77'	4381.00'
11116'	89.01°	177.71°	6698.44'	4475.96'
11211'	88.40°	177.11°	6700.59'	4570.90'
11305'	88.58°	176.79°	6703.06'	4664.85'



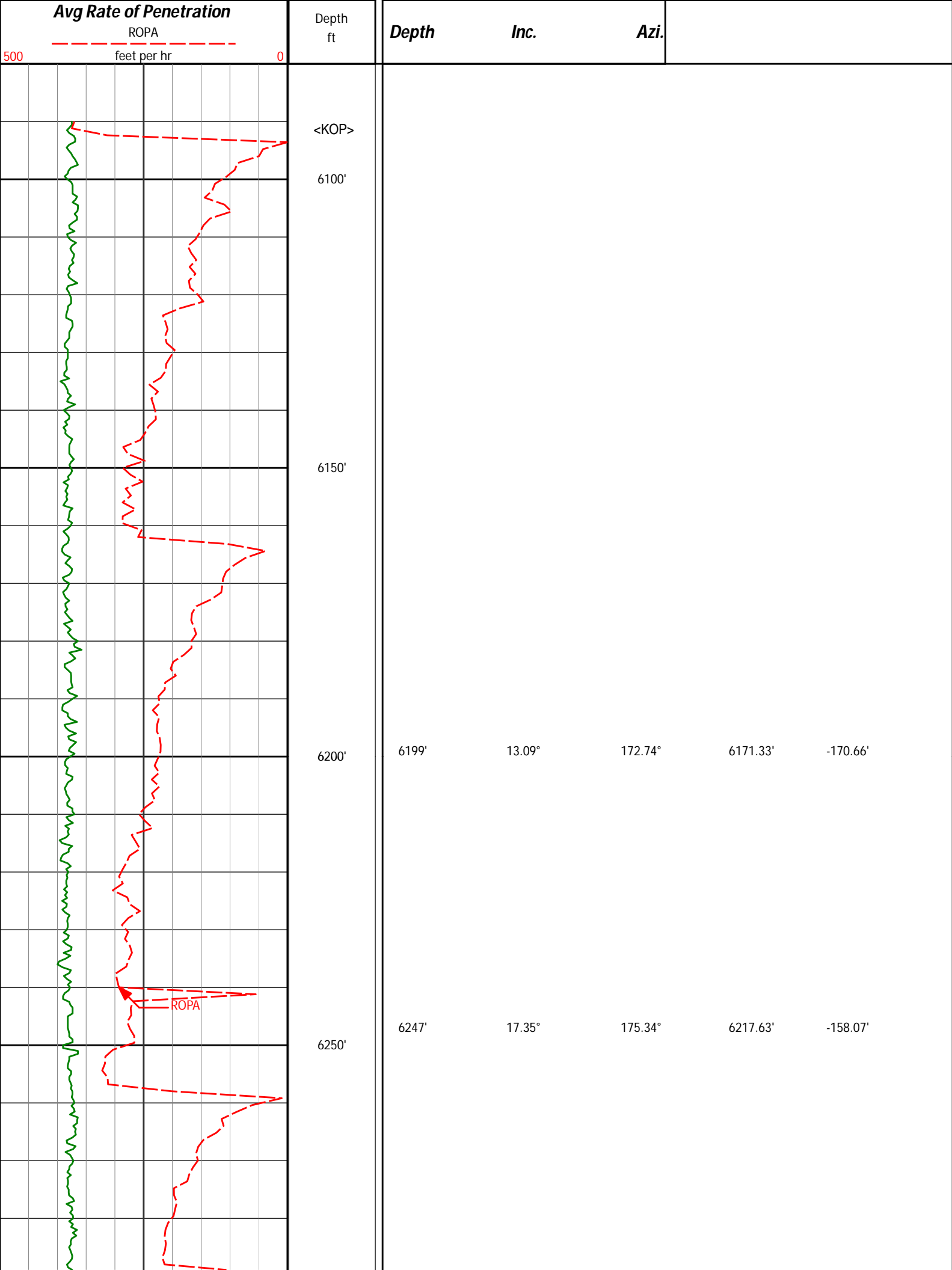
<div><div>Avg Rate of Penetration</div><div>ROPA</div><div>feet per hr</div><div>5000</div></div>	Depth ft	Depth	Inc.	Azi.	TVD	V.S.
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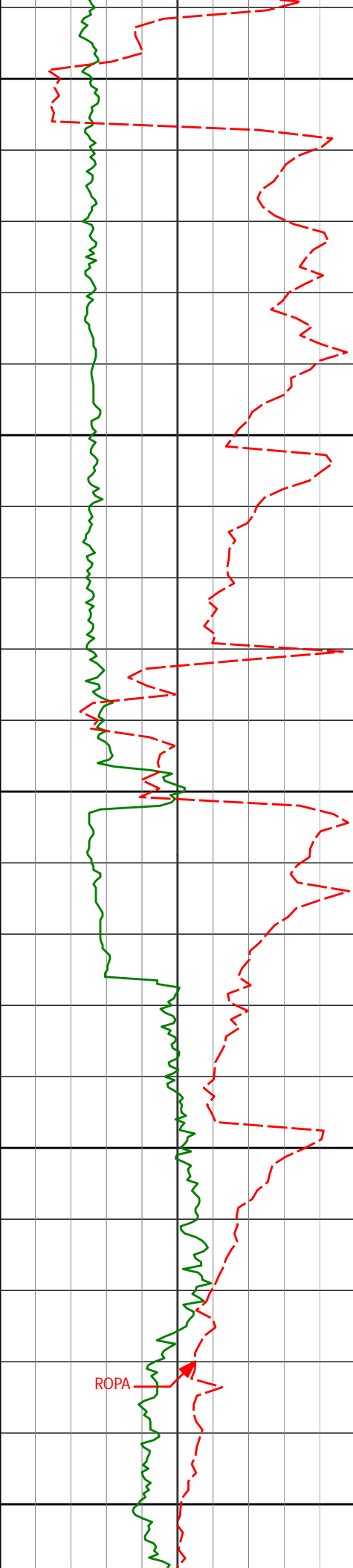
<div><div>PCG Gamma Ray</div><div>PGRC</div><div>api</div><div>0300</div></div>	
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HALLIBURTON
Sperry Drilling Services
MD Detail Log 1:240

Noble Energy, Inc
Crow Creek AA01-776
H&P 315
T6N R63W

<div><div>PCG Gamma Ray</div><div>PGRC</div><div>api</div><div>0300</div></div>		TVD	V.S.
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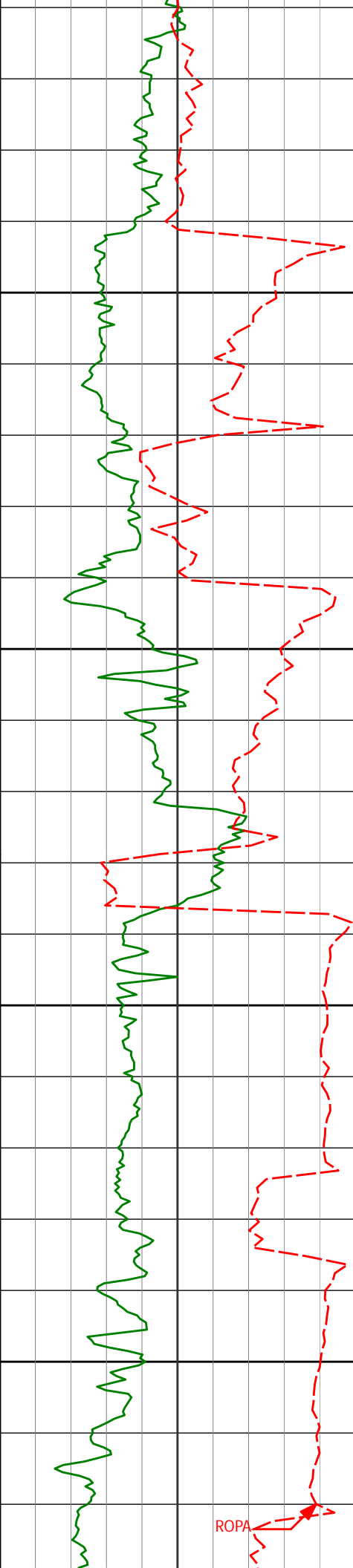
<KOP>

6294'	20.49°	175.84°	6262.09'	-142.83'
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6342'	22.82°	177.93°	6306.70'	-125.13'
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6389'	25.57°	178.77°	6349.57'	-105.89'
-------	--------	---------	----------	----------

6484'	35.25°	177.62°	6431.40'	-57.90'
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6550'

6578'

45.36°

178.44°

6503.00'

2.78'

6600'

6626'

49.38°

177.01°

6535.50'

38.07'

6650'

6673'

53.39°

176.32°

6564.83'

74.78'

6700'

6721'

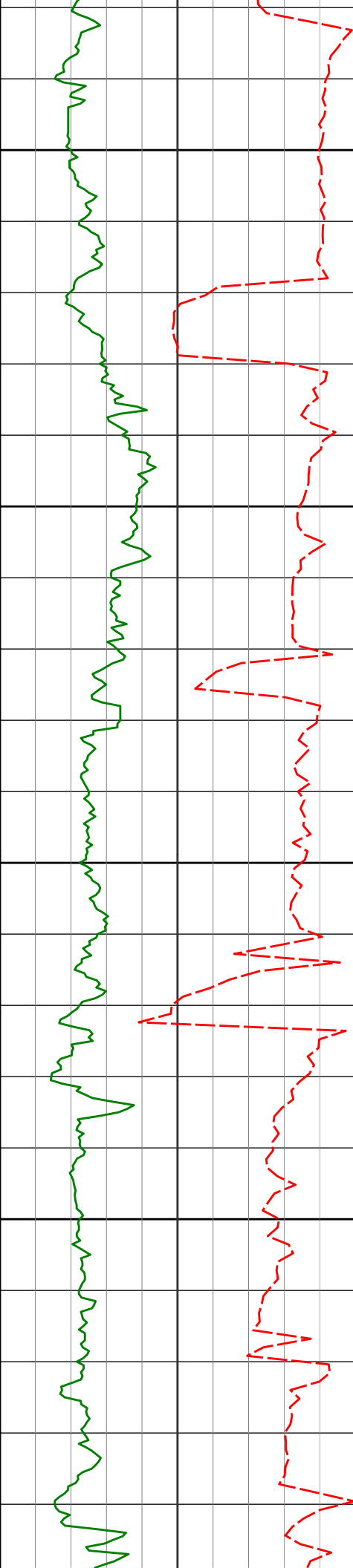
57.83°

176.43°

6591.93'

114.38'

ROPA



6750'

6768'

62.15°

176.70°

6615.44'

155.07'

6800'

6816'

65.57°

177.00°

6636.58'

198.14'

6850'

6863'

70.19°

177.97°

6654.27'

241.65'

6900'

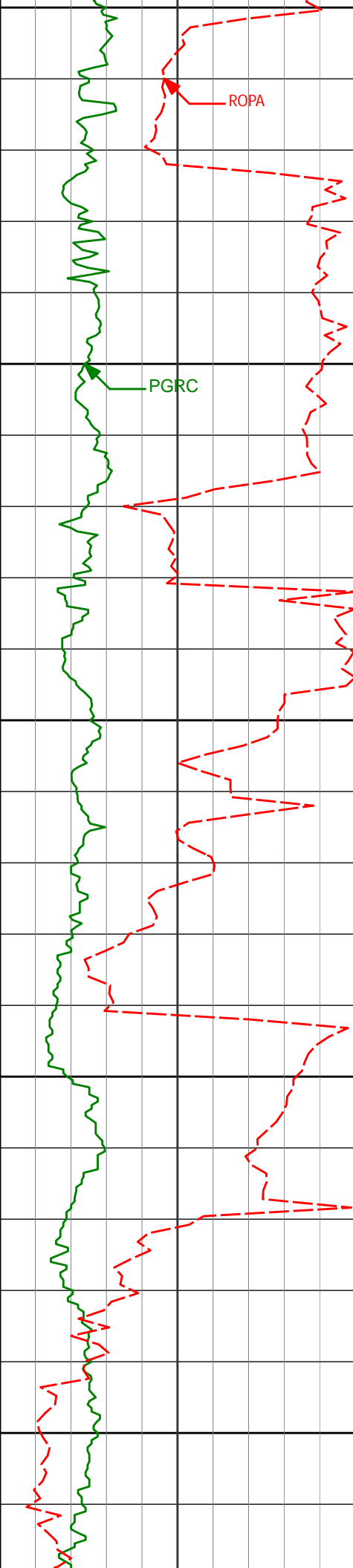
6911'

76.03°

178.64°

6668.21'

287.52'



6950'

ROPA

PGRC



<7" casing set at 7025' MD>

<Run 200>

<Run 300>

7050'

7100'

7150'

6973'

80.21°

179.70°

6680.97'

348.08'

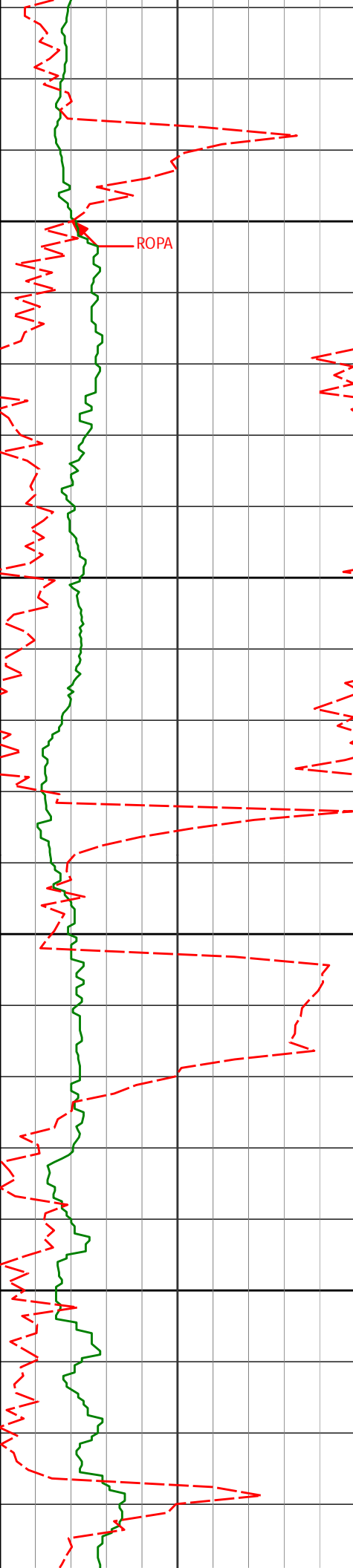
7130'

88.49°

181.99°

6696.41'

503.58'



7200'

ROPA

7225'

88.24°

182.07°

6699.12'

598.00'

7250'

7300'

7320'

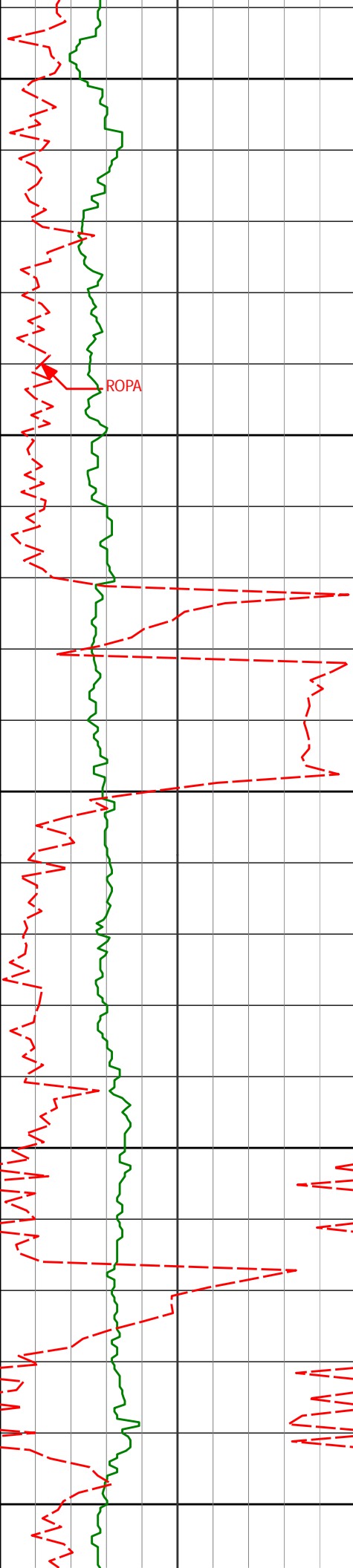
90.00°

181.72°

6700.58'

692.46'

7350'



7400'

7415'

90.71°

181.22°

6699.99'

787.01'

7450'

7500'

7510'

90.28°

180.84°

6699.17'

881.62'

7550'

7600'

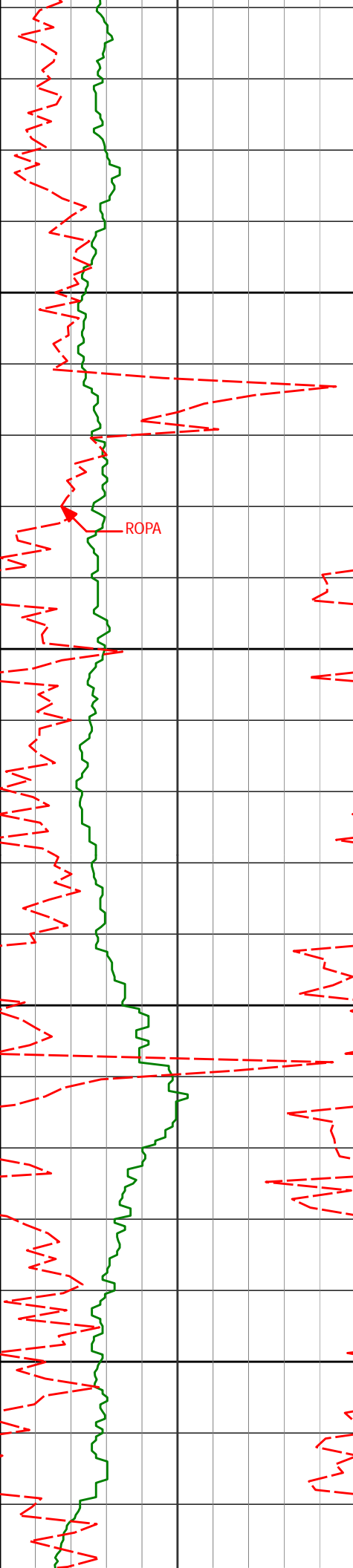
7605'

89.63°

180.09°

6699.25'

976.31'



7650'

ROPA

7700'

7700'

90.43°

179.75°

6699.20'

1071.08'

7750'

7795'

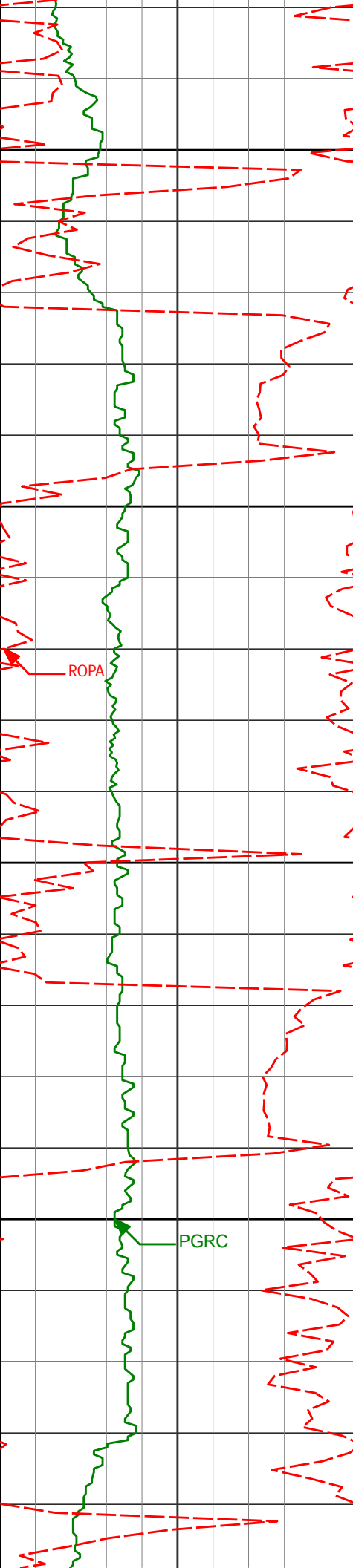
90.99°

179.55°

6698.02'

1165.86'

7800'



7850'

7890'

91.02°

179.92°

6696.37'

1260.63'

7900'

ROPA

7950'

7985'

88.86°

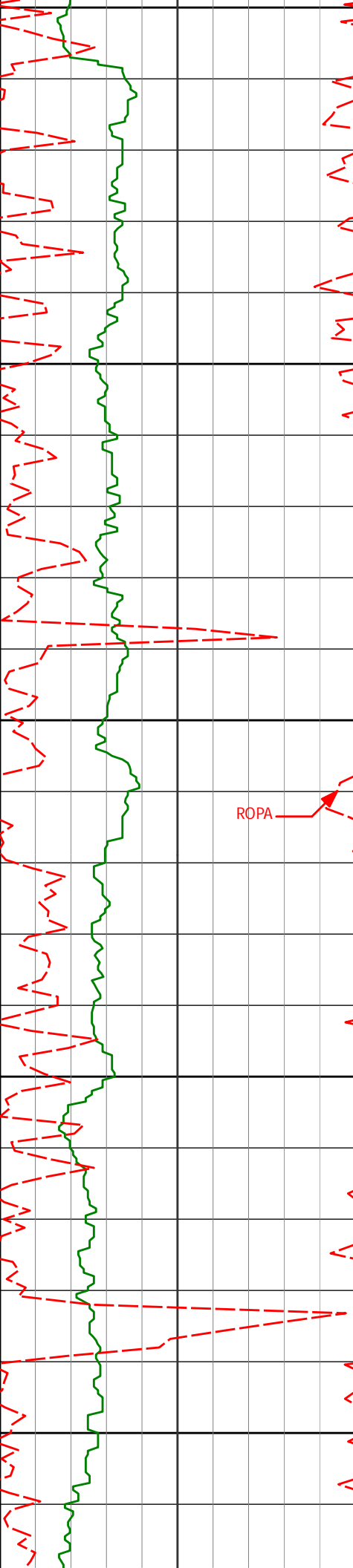
180.35°

6696.47'

1355.37'

8000'

PGRC



8050'

8080'

89.11°

180.24°

6698.15'

1450.07'

8100'

8150'

ROPA

8175'

89.20°

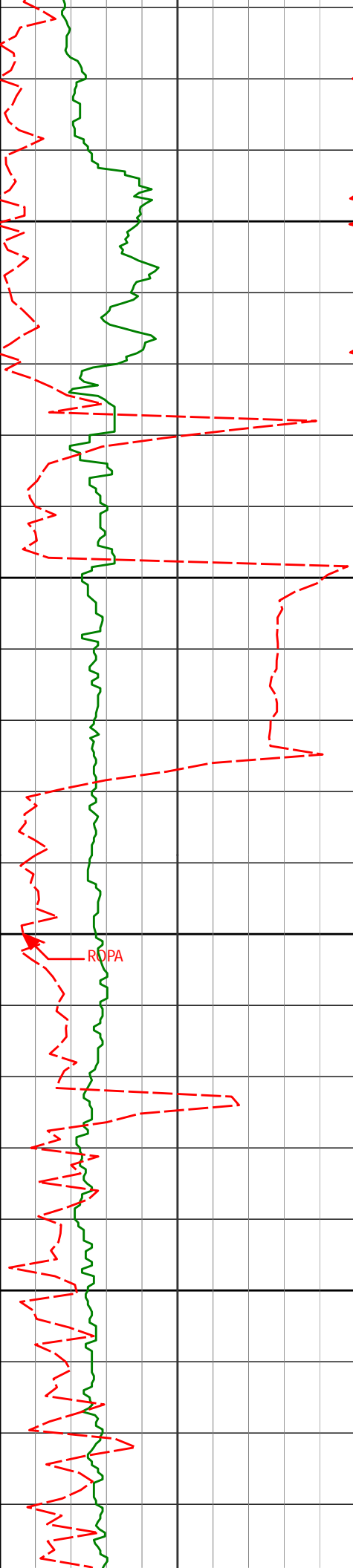
179.78°

6699.56'

1544.81'

8200'

8250'



8300'

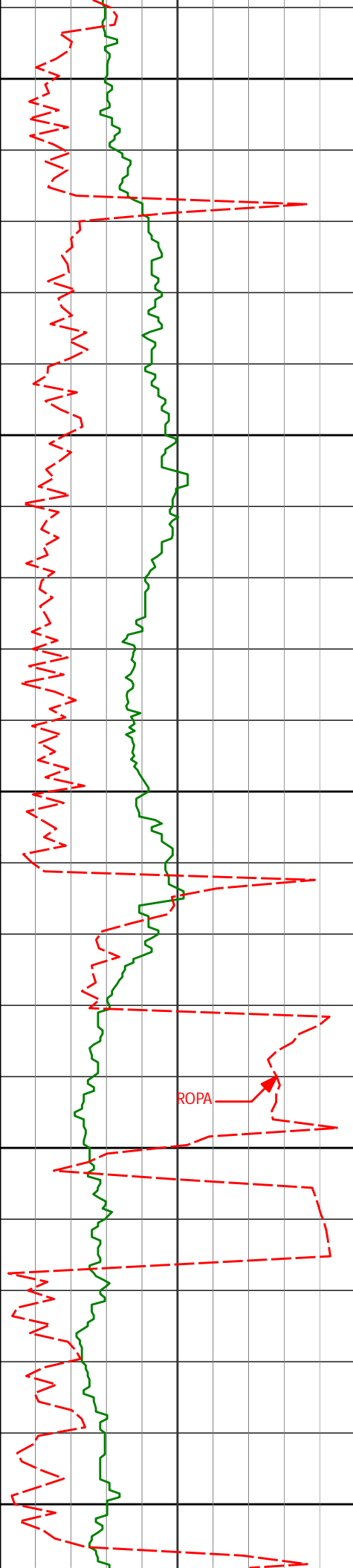
8350'

8400'

8450'

ROPA

8270'	89.66°	179.52°	6700.50'	1639.60'
8365'	90.65°	182.34°	6700.25'	1734.22'
8459'	90.25°	182.53°	6699.51'	1827.61'



8500'

8550'

8600'

8650'

8700'

ROPA

8554'

91.73°

182.58°

6697.88'

1921.94'

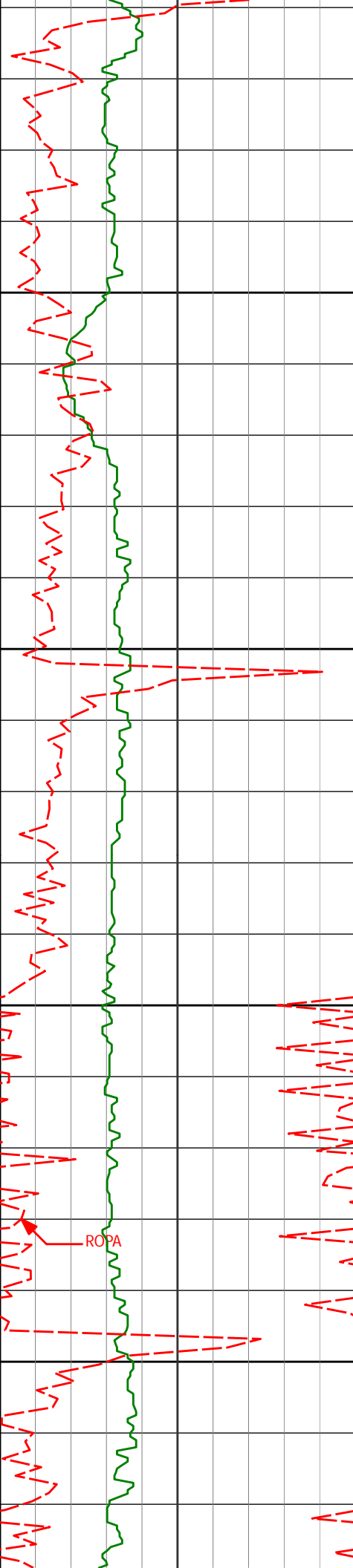
8649'

89.35°

181.99°

6696.98'

2016.34'



8750'

8800'

8850'

8900'

8744'

89.57°

181.96°

6697.88'

2110.80'

8839'

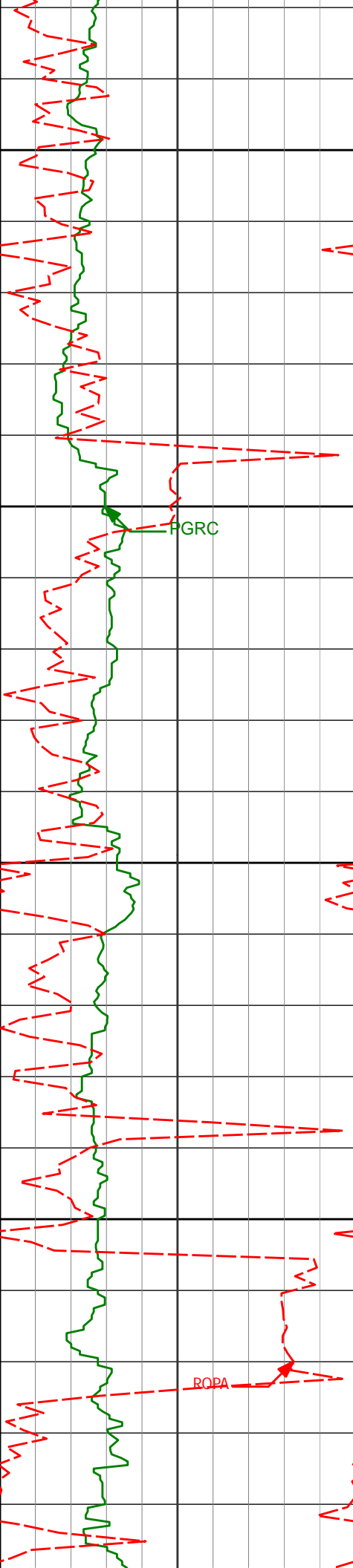
89.51°

180.63°

6698.64'

2205.37'

ROPA



8934'

90.12°

180.99°

6698.95'

2300.02'

8950'

9000'

PGRC

9029'

91.20°

180.79°

6697.85'

2394.65'

9050'

9100'

ROPA

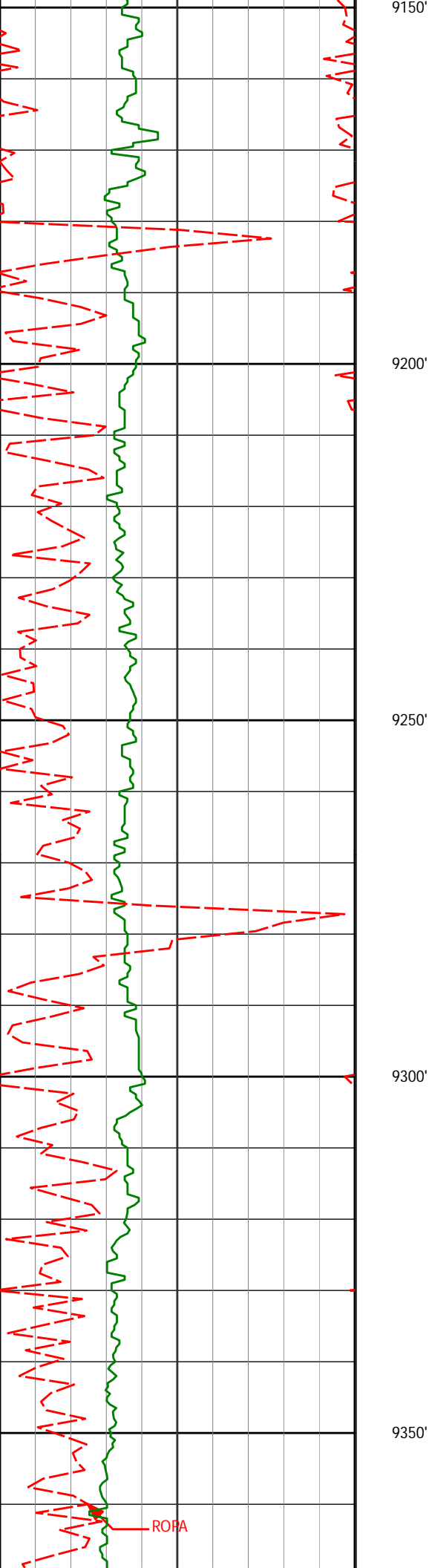
9124'

89.20°

180.46°

6697.52'

2489.32'



9219'

89.11°

180.44°

6698.92'

2584.00'

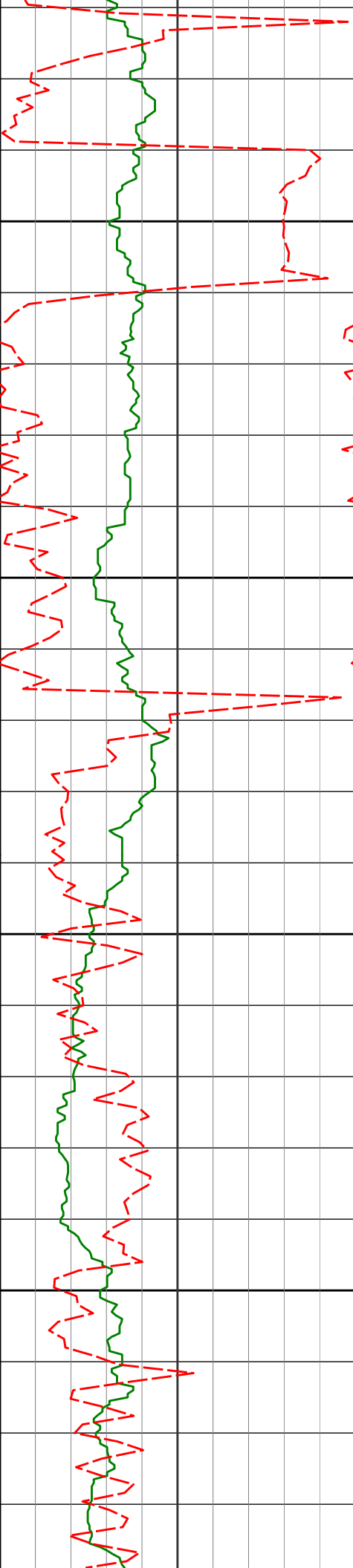
9314'

90.43°

181.09°

6699.31'

2678.66'



9400'

9450'

9500'

9550'

9408'

88.92°

180.83°

6699.84'

2772.28'

9503'

89.72°

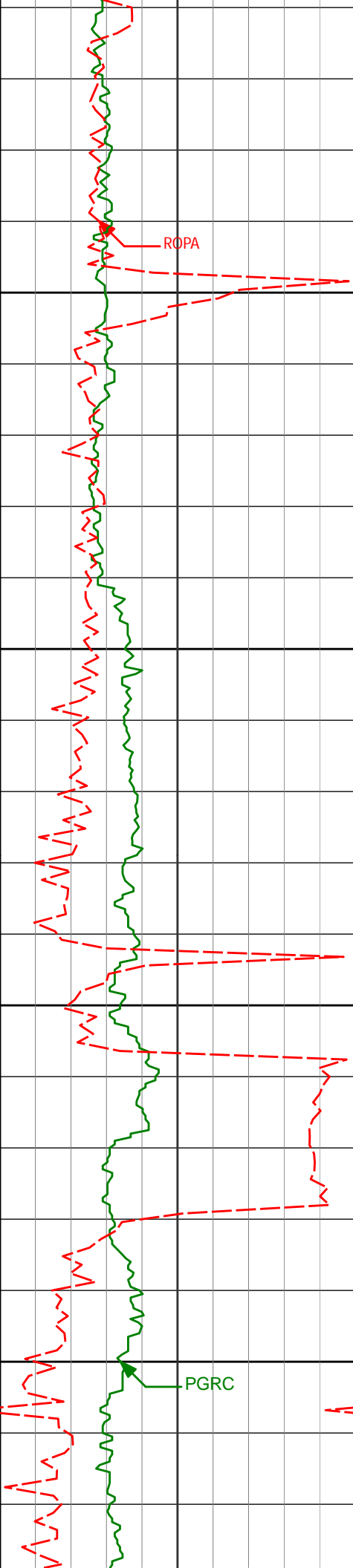
180.49°

6700.96'

2866.94'



Station	Distance	Angle	Distance	Angle	Distance	Angle
9600'	9598'	90.74°	180.32°	6700.58'	2961.65'	
9650'						
9700'	9693'	89.14°	180.93°	6700.68'	3056.32'	
9750'						
9800'	9788'	89.63°	181.87°	6701.70'	3150.87'	



9850'

9882'

90.92°

181.86°

6701.25'

3244.35'

9900'

9950'

9977'

88.30°

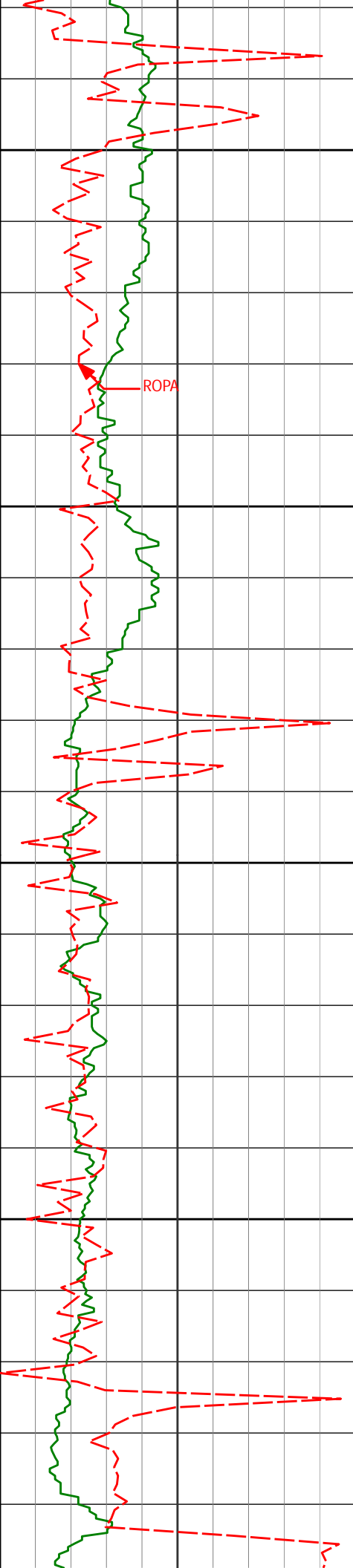
180.33°

6701.89'

3338.94'

10000'

PGRC



10050'

10072'

88.28°

180.14°

6704.72'

3433.63'

10100'

10150'

10167'

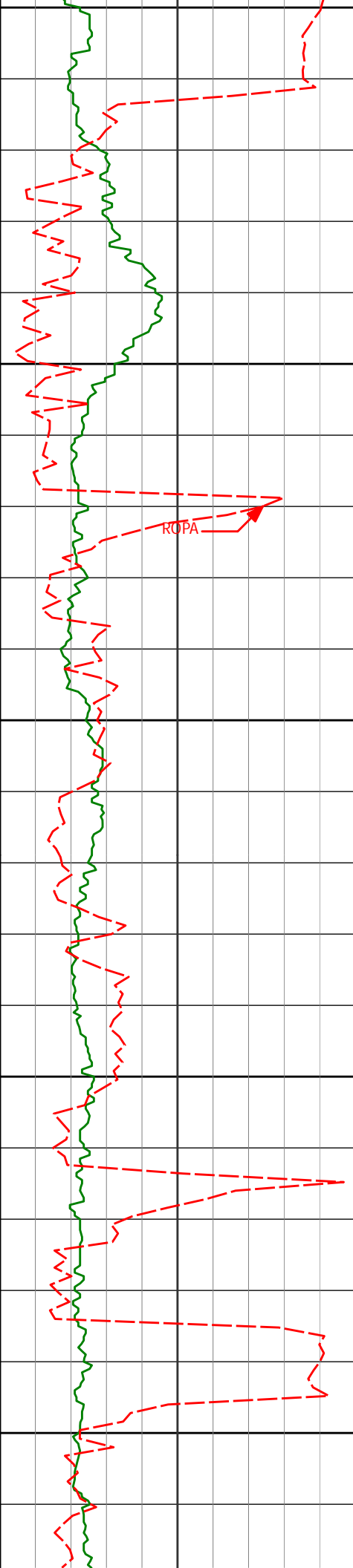
87.93°

179.42°

6707.87'

3528.36'

10200'



10250'

10262'

89.45°

179.37°

6710.04'

3623.15'

10300'

10350'

10357'

89.08°

178.97°

6711.26'

3717.98'

10400'

10450'

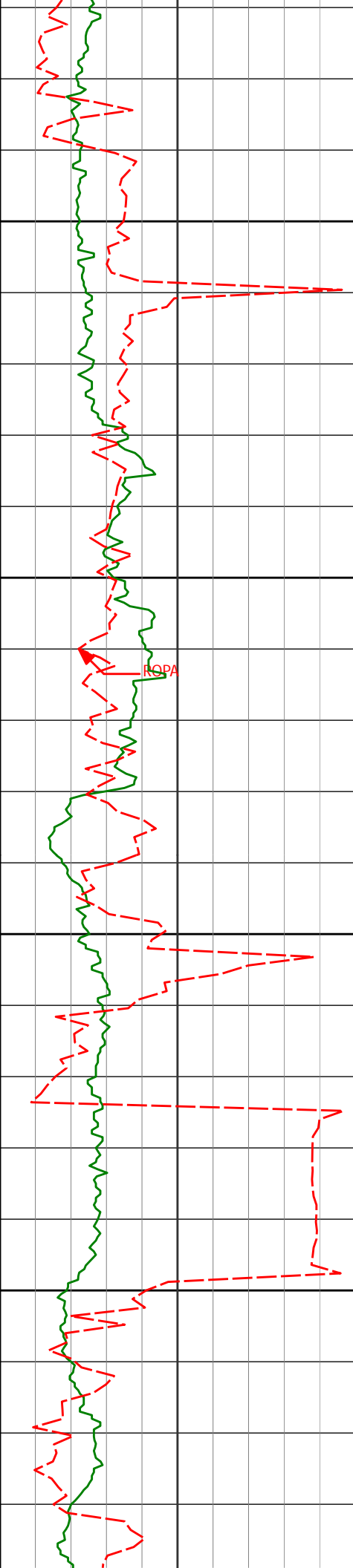
10452'

90.03°

178.36°

6712.00'

3812.87'



10500'

10550'

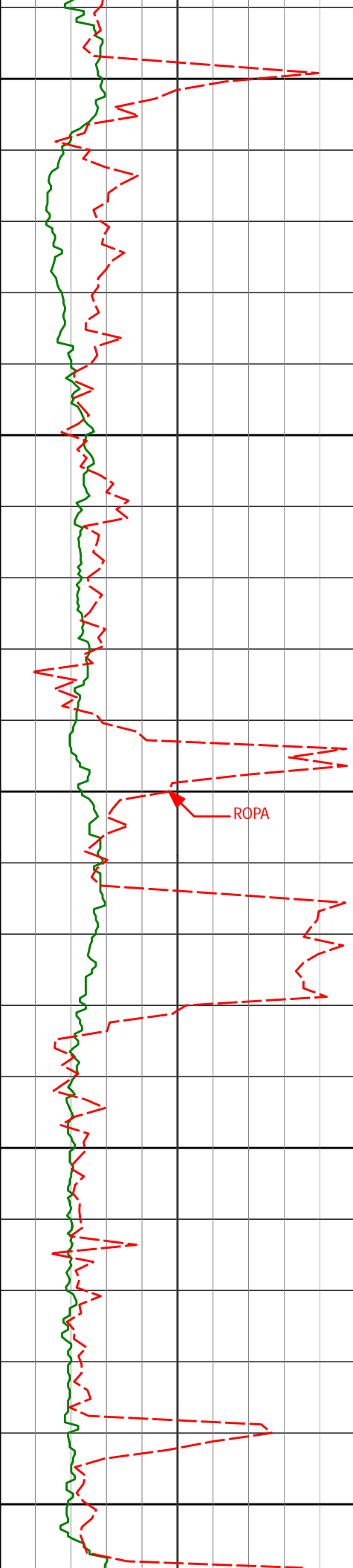
10600'

10650'

10547'	89.48°	177.94°	6712.41'	3907.79'
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10642'	91.94°	178.90°	6711.24'	4002.68'
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ROPA



10700'

10737'

93.14°

178.56°

6707.03'

4097.47'

10750'

10800'

ROPA

10831'

92.13°

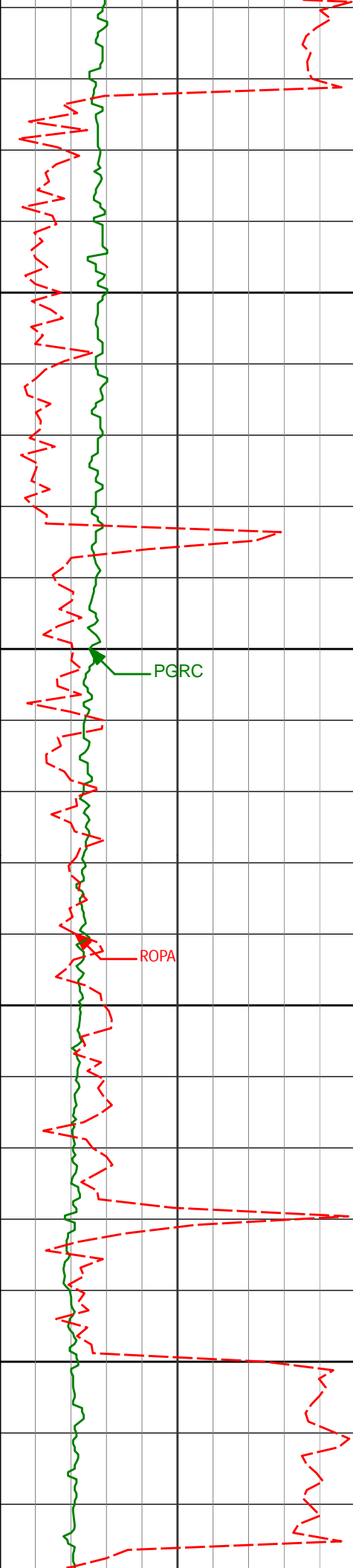
179.28°

6702.71'

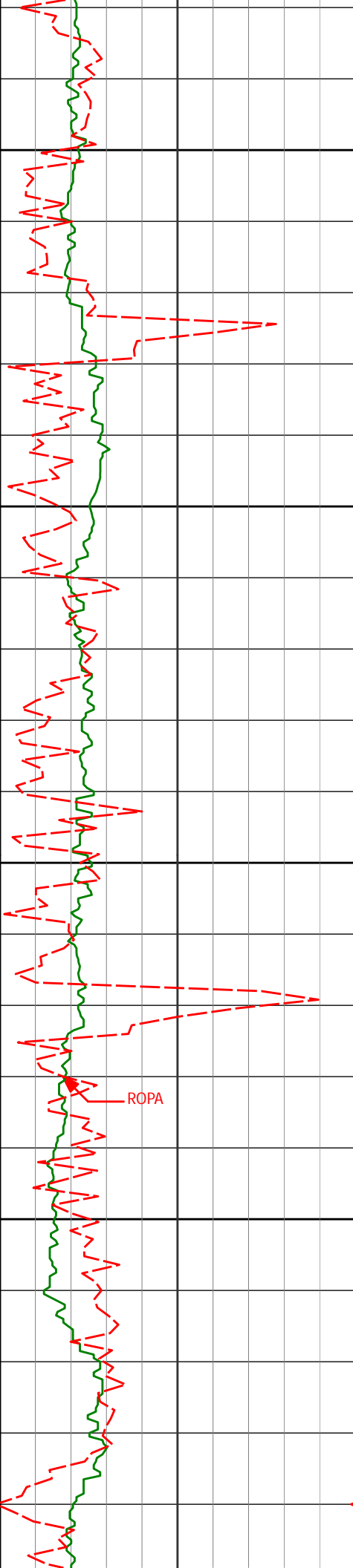
4191.24'

10850'

10900'



10926'	90.62°	178.39°	6700.43'	4286.08'
10950'				
11000'				
11021'	91.39°	177.43°	6698.77'	4381.00'
11050'				
11100'				
11116'	89.01°	177.71°	6698.44'	4475.96'



11150'

11200'

11250'

11300'

ROPA

11211'

88.40°

177.11°

6700.59'

4570.90'

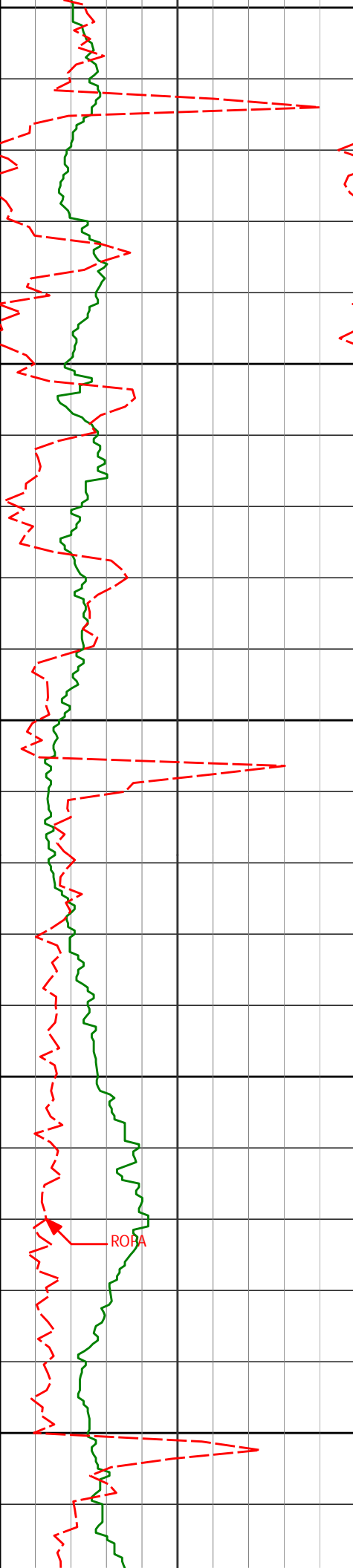
11305'

88.58°

176.79°

6703.06'

4664.85'



11350'

11400'

11450'

11500'

11550'

11400'

11495'

88.49°

88.46°

176.63°

176.24°

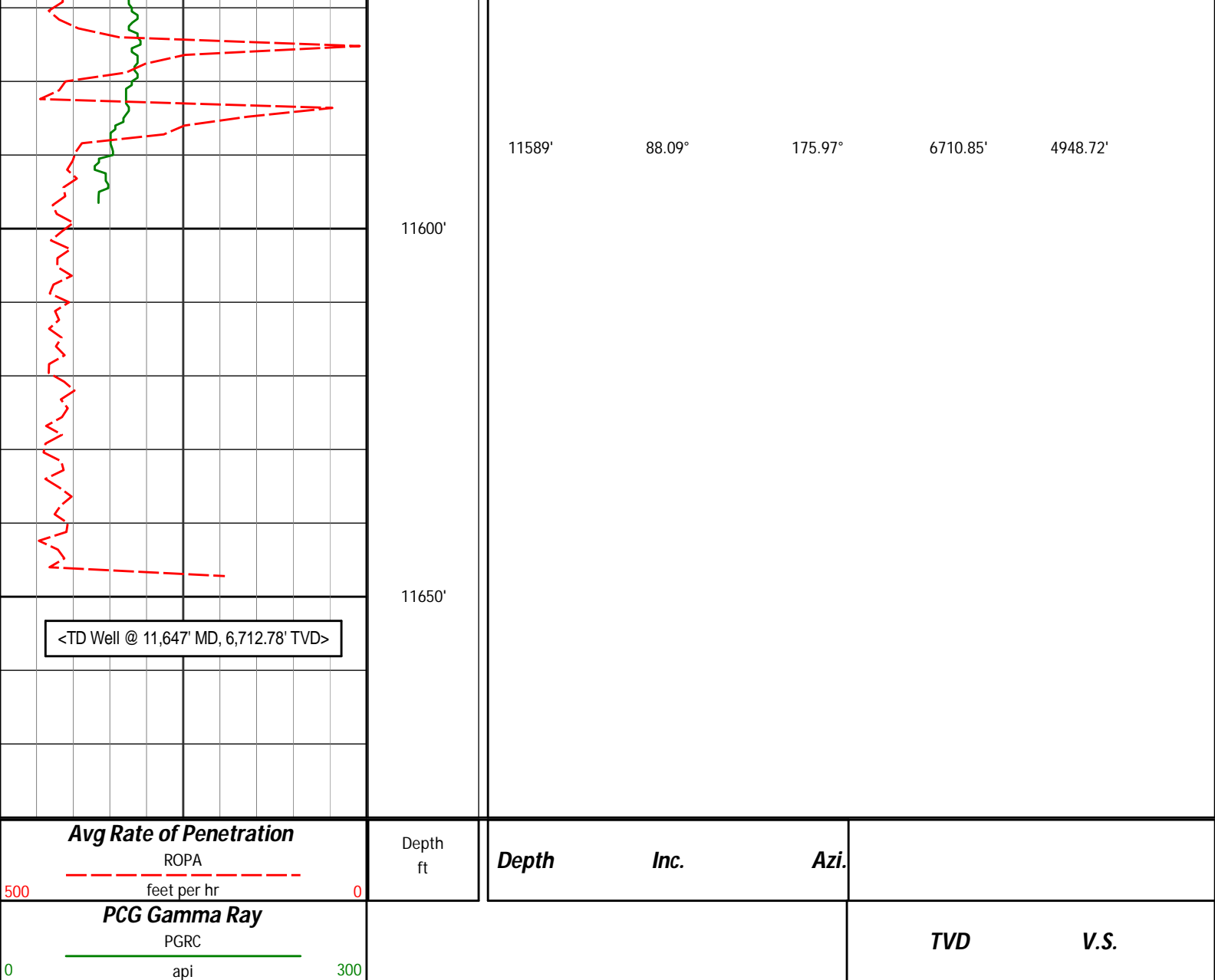
6705.49'

6708.02'

4759.81'

4854.77'

ROPA



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Crow Creek AA01-776
Wattenberg
Weld Colorado
USA
CA-XX-0901834392

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
320.00	0.70	37.18	319.99	1.56 N	1.18 E	-1.47	0.22
692.00	0.40	13.28	691.97	4.63 N	2.85 E	-4.41	0.10
726.00	0.78	11.65	725.97	4.97 N	2.93 E	-4.75	1.12
819.00	0.92	3.02	818.96	6.34 N	3.09 E	-6.10	0.21
914.00	0.97	4.58	913.95	7.91 N	3.20 E	-7.66	0.06
1100.00	1.23	58.63	1099.92	10.52 N	5.03 E	-10.14	0.55
1192.00	1.17	70.06	1191.90	11.36 N	6.76 E	-10.84	0.27
1376.00	1.34	74.32	1375.86	12.58 N	10.60 E	-11.79	0.11
1469.00	1.15	64.61	1468.83	13.28 N	12.49 E	-12.35	0.31
1562.00	1.41	67.66	1561.81	14.11 N	14.39 E	-13.04	0.30

1653.00	1.11	76.95	1652.79	14.74 N	16.29 E	-13.53	0.40
1746.00	1.27	66.91	1745.77	15.34 N	18.11 E	-14.00	0.28
1840.00	1.10	78.71	1839.75	15.93 N	19.95 E	-14.45	0.31
1933.00	1.12	63.50	1932.73	16.51 N	21.64 E	-14.91	0.32
2027.00	1.02	65.77	2026.71	17.26 N	23.23 E	-15.55	0.12
2122.00	0.96	72.73	2121.70	17.85 N	24.76 E	-16.02	0.14
2217.00	0.83	64.39	2216.69	18.38 N	26.14 E	-16.45	0.19
2312.00	0.79	59.42	2311.68	19.01 N	27.33 E	-17.00	0.08
2406.00	2.10	46.45	2405.65	20.53 N	29.14 E	-18.39	1.42
2501.00	2.65	57.50	2500.57	22.91 N	32.25 E	-20.53	0.75
2691.00	6.22	69.10	2689.97	28.94 N	45.56 E	-25.59	1.93
2786.00	8.41	54.66	2784.20	34.79 N	56.04 E	-30.68	3.00
2881.00	8.41	53.60	2878.18	42.93 N	67.29 E	-37.99	0.16
2976.00	8.19	51.23	2972.18	51.29 N	78.16 E	-45.54	0.43
3070.00	8.20	50.39	3065.22	59.76 N	88.55 E	-53.24	0.13
3165.00	7.91	48.05	3159.29	68.45 N	98.63 E	-61.19	0.46
3259.00	7.52	46.98	3252.44	76.97 N	107.94 E	-69.02	0.44
3354.00	7.91	55.35	3346.58	84.94 N	117.87 E	-76.25	1.25
3448.00	6.99	55.75	3439.78	91.83 N	127.92 E	-82.41	0.98
3638.00	8.01	71.43	3628.17	102.56 N	150.03 E	-91.52	1.20
3733.00	8.52	71.05	3722.19	106.95 N	162.97 E	-94.97	0.54
3923.00	9.63	70.63	3909.80	116.80 N	191.27 E	-102.75	0.58
4018.00	8.93	68.29	4003.56	122.16 N	205.61 E	-107.07	0.84
4113.00	8.51	66.71	4097.46	127.66 N	218.92 E	-111.61	0.50
4207.00	8.13	67.14	4190.47	133.00 N	231.44 E	-116.03	0.41
4302.00	7.73	63.42	4284.57	138.47 N	243.34 E	-120.63	0.69
4397.00	6.86	58.92	4378.80	144.26 N	253.92 E	-125.64	1.10
4492.00	7.86	53.66	4473.01	151.03 N	264.01 E	-131.68	1.27
4587.00	8.70	55.22	4567.02	158.98 N	275.15 E	-138.81	0.91
4681.00	7.81	64.17	4660.05	165.82 N	286.74 E	-144.79	1.66
4871.00	6.93	74.27	4848.49	174.55 N	309.38 E	-151.87	0.82
4966.00	5.73	64.39	4942.91	178.15 N	319.17 E	-154.76	1.70
5061.00	8.14	49.66	5037.22	184.56 N	328.57 E	-160.47	3.14
5156.00	6.45	51.62	5131.44	192.22 N	337.88 E	-167.45	1.80
5250.00	5.43	46.47	5224.94	198.56 N	345.24 E	-173.25	1.23
5345.00	4.66	42.77	5319.57	204.49 N	351.12 E	-178.73	0.88
5440.00	4.27	37.77	5414.28	210.11 N	355.90 E	-184.00	0.58
5535.00	3.73	37.62	5509.05	215.36 N	359.95 E	-188.94	0.56
5630.00	2.55	53.69	5603.91	219.06 N	363.54 E	-192.37	1.55
5724.00	1.20	112.39	5697.86	219.92 N	366.13 E	-193.04	2.32
5819.00	1.12	125.53	5792.84	219.00 N	367.81 E	-192.01	0.29
5914.00	0.99	123.88	5887.83	218.00 N	369.24 E	-190.91	0.13
6032.00	0.74	106.79	6005.82	217.21 N	370.82 E	-190.01	0.30
6199.00	13.09	172.74	6171.33	198.06 N	374.26 E	-170.66	7.67
6247.00	17.35	175.34	6217.63	185.53 N	375.53 E	-158.07	8.98
6294.00	20.49	175.84	6262.09	170.34 N	376.69 E	-142.83	6.70
6342.00	22.82	177.93	6306.70	152.65 N	377.64 E	-125.13	5.09
6389.00	25.57	178.77	6349.57	133.40 N	378.18 E	-105.89	5.91
6484.00	35.25	177.62	6431.40	85.40 N	379.77 E	-57.90	10.20
6578.00	45.36	178.44	6503.00	24.72 N	381.81 E	2.78	10.77
6626.00	49.38	177.01	6535.50	10.56 S	383.23 E	38.07	8.66
6673.00	53.39	176.32	6564.83	47.21 S	385.37 E	74.78	8.62
6721.00	57.83	176.43	6591.93	86.74 S	387.88 E	114.38	9.26
6768.00	62.15	176.70	6615.44	127.35 S	390.31 E	155.07	9.19
6816.00	65.57	177.00	6636.58	170.37 S	392.68 E	198.14	7.15
6863.00	70.19	177.97	6654.27	213.86 S	394.59 E	241.65	10.02
6911.00	76.03	178.64	6668.21	259.75 S	395.94 E	287.52	12.23
6973.00	80.21	179.70	6680.97	320.40 S	396.82 E	348.08	6.95
7130.00	88.49	181.99	6696.41	476.47 S	394.50 E	503.58	5.47
7225.00	88.24	182.07	6699.12	571.37 S	391.13 E	598.00	0.28
7320.00	90.00	181.72	6700.58	666.31 S	387.99 E	692.46	1.89
7415.00	90.71	181.22	6699.99	761.27 S	385.55 E	787.01	0.92
7510.00	90.28	180.84	6699.17	856.25 S	383.84 E	881.62	0.60
7605.00	89.63	180.09	6699.25	951.25 S	383.07 E	976.31	1.05
7700.00	90.43	179.75	6699.20	1046.25 S	383.21 E	1071.08	0.92
7795.00	90.99	179.55	6698.02	1141.24 S	383.80 E	1165.86	0.62
7890.00	91.02	179.92	6696.37	1236.22 S	384.25 E	1260.63	0.39
7985.00	88.86	180.35	6696.47	1331.22 S	384.03 E	1355.37	2.32
8080.00	89.11	180.24	6698.15	1426.20 S	383.54 E	1450.07	0.29
8175.00	89.20	179.78	6699.56	1521.19 S	383.53 E	1544.81	0.49
8270.00	89.66	179.52	6700.50	1616.18 S	384.11 E	1639.60	0.56
8365.00	90.65	182.34	6700.25	1711.16 S	382.57 E	1734.22	3.15
8459.00	90.25	182.53	6699.51	1805.07 S	378.58 E	1827.61	0.47
8554.00	91.73	182.58	6697.88	1899.96 S	374.34 E	1921.94	1.56

8649.00	89.35	181.99	6696.98	1994.87 S	370.56 E	2016.34	2.58
8744.00	89.57	181.96	6697.88	2089.81 S	367.28 E	2110.80	0.23
8839.00	89.51	180.63	6698.64	2184.78 S	365.14 E	2205.37	1.41
8934.00	90.12	180.99	6698.95	2279.77 S	363.80 E	2300.02	0.75
9029.00	91.20	180.79	6697.85	2374.75 S	362.32 E	2394.65	1.15
9124.00	89.20	180.46	6697.52	2469.74 S	361.29 E	2489.32	2.14
9219.00	89.11	180.44	6698.92	2564.73 S	360.55 E	2584.00	0.10
9314.00	90.43	181.09	6699.31	2659.72 S	359.27 E	2678.66	1.55
9408.00	88.92	180.83	6699.84	2753.70 S	357.69 E	2772.28	1.63
9503.00	89.72	180.49	6700.96	2848.68 S	356.60 E	2866.94	0.92
9598.00	90.74	180.32	6700.58	2943.68 S	355.92 E	2961.65	1.08
9693.00	89.14	180.93	6700.68	3038.67 S	354.88 E	3056.32	1.80
9788.00	89.63	181.87	6701.70	3133.64 S	352.56 E	3150.87	1.12
9882.00	90.92	181.86	6701.25	3227.58 S	349.49 E	3244.35	1.38
9977.00	88.30	180.33	6701.89	3322.55 S	347.67 E	3338.94	3.19
10072.00	88.28	180.14	6704.72	3417.51 S	347.29 E	3433.63	0.21
10167.00	87.93	179.42	6707.87	3512.46 S	347.65 E	3528.36	0.83
10262.00	89.45	179.37	6710.04	3607.42 S	348.65 E	3623.15	1.59
10357.00	89.08	178.97	6711.26	3702.40 S	350.03 E	3717.98	0.58
10452.00	90.03	178.36	6712.00	3797.37 S	352.25 E	3812.87	1.19
10547.00	89.48	177.94	6712.41	3892.32 S	355.31 E	3907.79	0.73
10642.00	91.94	178.90	6711.24	3987.27 S	357.93 E	4002.68	2.78
10737.00	93.14	178.56	6707.03	4082.15 S	360.02 E	4097.47	1.31
10831.00	92.13	179.28	6702.71	4176.04 S	361.79 E	4191.24	1.32
10926.00	90.62	178.39	6700.43	4270.98 S	363.73 E	4286.08	1.85
11021.00	91.39	177.43	6698.77	4365.90 S	367.20 E	4381.00	1.30
11116.00	89.01	177.71	6698.44	4460.81 S	371.23 E	4475.96	2.51
11211.00	88.40	177.11	6700.59	4555.69 S	375.53 E	4570.90	0.90
11305.00	88.58	176.79	6703.06	4649.52 S	380.52 E	4664.85	0.39
11400.00	88.49	176.63	6705.49	4744.34 S	385.97 E	4759.81	0.20
11495.00	88.46	176.24	6708.02	4839.12 S	391.88 E	4854.77	0.41
11589.00	88.09	175.97	6710.85	4932.86 S	398.25 E	4948.72	0.49
11647.00	88.09	175.97	6712.78	4990.68 S	402.33 E	5006.69	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 175.88 DEGREES (GRID)
A TOTAL CORRECTION OF 7.58 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11647.00 FEET
IS 5006.87 FEET ALONG 175.39 DEGREES (GRID)**

Surface surveys at 320' and 692' have had azimuths corrected to grid north, but were not taken by Halliburton.

Tie-in point is 0' MD.

Last survey is a projection from 11589' MD to bit at 11647' MD.