



1 : 240

WELL INFORMATION					
MWD Run Number	100	200	300		
Date run completed	27-Nov-17	29-Nov-18	02-Dec-17		
Rig Bit Number	2	3	4		
Bit Size (in)	8.500	6.125	6.125		
Tool Nominal OD (in)	6.75	4.75	4.75		
Log Start Depth (MD, ft)	1,884.00	6,024.00	8,265.00		
Log End Depth (MD, ft)	6,024.00	8,265.00	15,590.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	26-Nov-17 18:00	28-Nov-17 13:10	29-Nov-17 17:50		
Drill/Wipe End Date and Time	27-Nov-17 11:50	29-Nov-17 03:15	01-Dec-17 12:30		
Min Inc (deg) @ Depth (MD, ft)	0.28 @ 4,075.00	0.18 @ 6,271.00	86.62 @ 14,687.00		
Max Inc (deg) @ Depth (MD, ft)	17.95 @ 2,639.00	88.76 @ 7,976.00	92.46 @ 9,246.00		
Bit TFA(in2) / Bit Type	0.75 / PDC	0.75 / PDC	0.75 / PDC		
Flow Rate (gpm)	530.85	288.25	294.40		
Max AV (fpm) / CV (fpm) @ MWD	431.4 / 456.1	426.5 / 460.4	426.5 / 413.2		
Fluid Type	Diesel Mud Base	Diesel Mud Base	Diesel Mud Base		
Density (ppg) / Viscosity (spqt)	9.10 / 69.00	9.40 / 70.00	9.40 / 71.00		
Filtrate CL (ppm)	32,000.00	37,000.00	30,000.00		
pH / API Filtrate (mptm)	N/A	N/A / 5	N/A		
PV (cP) / YP (lbf2)	16 / 7.00	18 / 7.00	17 / 10.00		
% Solids / % Sand	9.00 / N/A	10.00 / N/A	10.00 / N/A		
% Oil / Oil:Water Ratio	72.00 / 79:21	65.00 / 72:26	68.00 / 76:24		
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 (deg F) @ C	N/A	N/A	N/A		

Max Tool Temp (degF) / Source	N/A	N/A	N/A		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Jason Davis	Max Trainoff	Max Trainoff		
Customer Representative	Luke Rains	Luke Rains	Luke Rains		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	Sperry Next Gen	Sperry Next Gen	Sperry Next Gen		
Software Version	N/A	N/A	N/A		
Sub Serial Number	N/A	N/A	N/A		
Insert Serial Number	N/A	N/A	N/A		
Date and Time Initialized	01-Jan-70 00:00:00	01-Jan-70 00:00:00	01-Jan-70 00:00:00		
Date and Time Read	01-Jan-70 00:00:00	01-Jan-70 00:00:00	01-Jan-70 00:00:00		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	Sperry Next Gen DM	Sperry Next Gen DM	Sperry Next Gen DM		
Distance From Bit (ft)	42	46	46		
Software Version	N/A	N/A	N/A		
Sub Serial Number	N/A	N/A	N/A		
Sonde Serial Number	N/A	N/A	N/A		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	N/A	N/A	N/A		

Gamma Ray Sensor Information

Tool Type	Sperry Next Gen GM	Sperry Next Gen GM	Sperry Next Gen GM		
Distance From Bit (ft)	37.45	41.42	41.42		
Recorded Sample Period (sec)	N/A	N/A	N/A		
Software Version	N/A	N/A	N/A		
Sub Serial Number	N/A	N/A	N/A		
Insert/Sonde Serial Number	N/A	N/A	N/A		

REMARKS

1. All depths are calibrated 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. Run 100 was drilled with Sperry Next Gen MWD tools. Directional Module SN: D046, Gamma Module SN: G071
4. Runs 200 and 300 were drilled with Sperry Next Gen MWD tools. Directional Module SN: D067, Gamma Module SN: G071
5. All data presented is recorded data unless otherwise stated.
6. All gamma data was corrected for collar thickness only.
7. The following smoothing parameters have been applied to the data:
GR (Gamma Ray):
Interval Resolution: 0.5ft
Interval Distance: 0.6ft
Gap Fill: 3.0ft

ROPA (Average Rate of Penetration):
Interval Resolution: 0.5ft
Interval Distance: 1.2ft
Gap Fill: 3.0ft

8. Surveys from 2010-15544 corrected by Sperry Survey Management

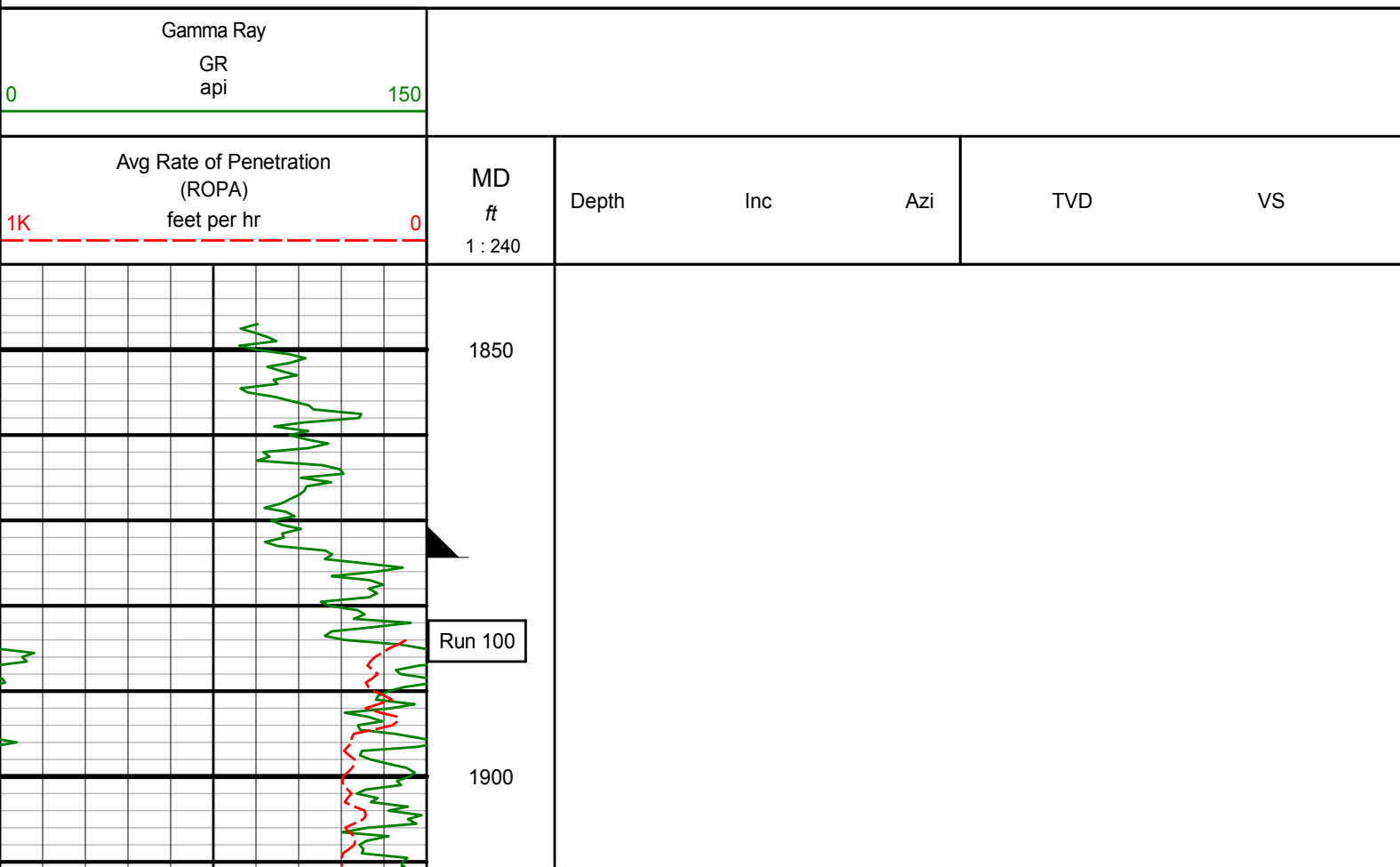
INSITE version 8.5

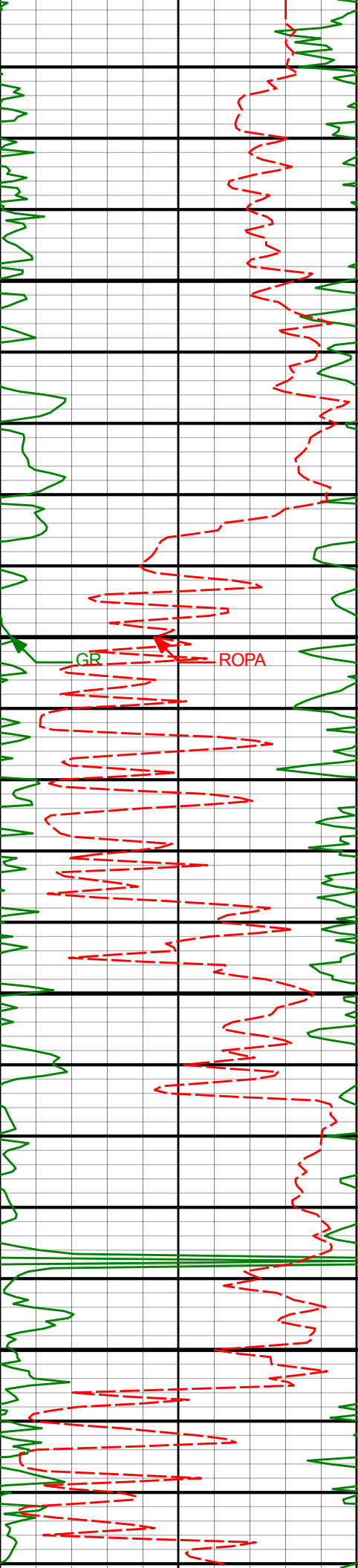
WARRANTY

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Detail Log 1:240





1950

2000

2050

2100

2100'

15.67°

174.39°

1955.08'

-399.30'

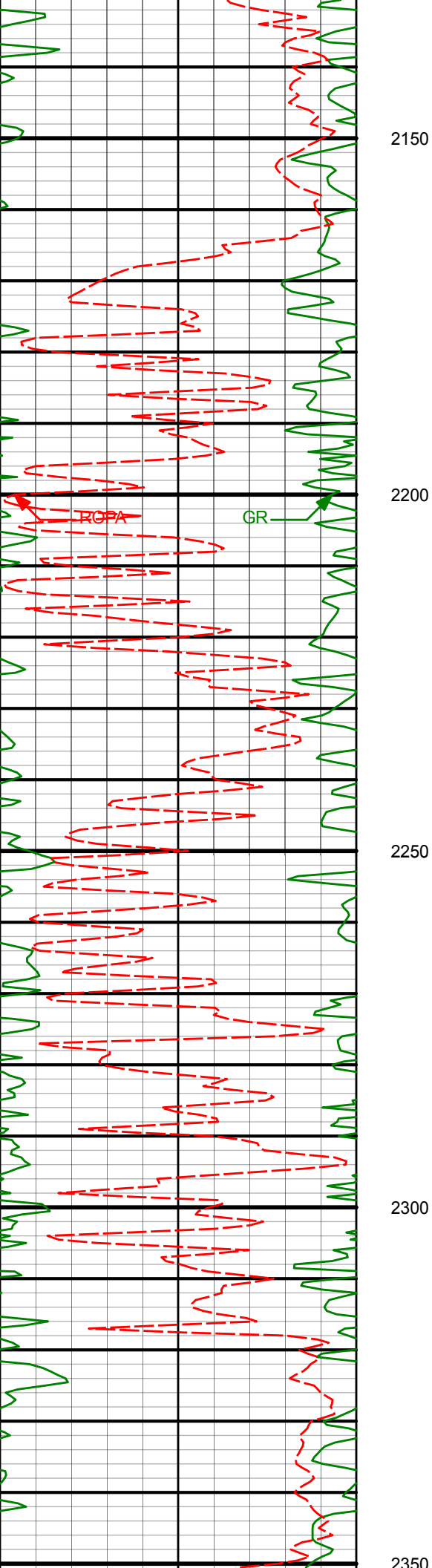
2100'

14.04°

183.39°

2042.08'

-422.29'



2190'

15.21°

181.44°

2129.16'

-445.00'

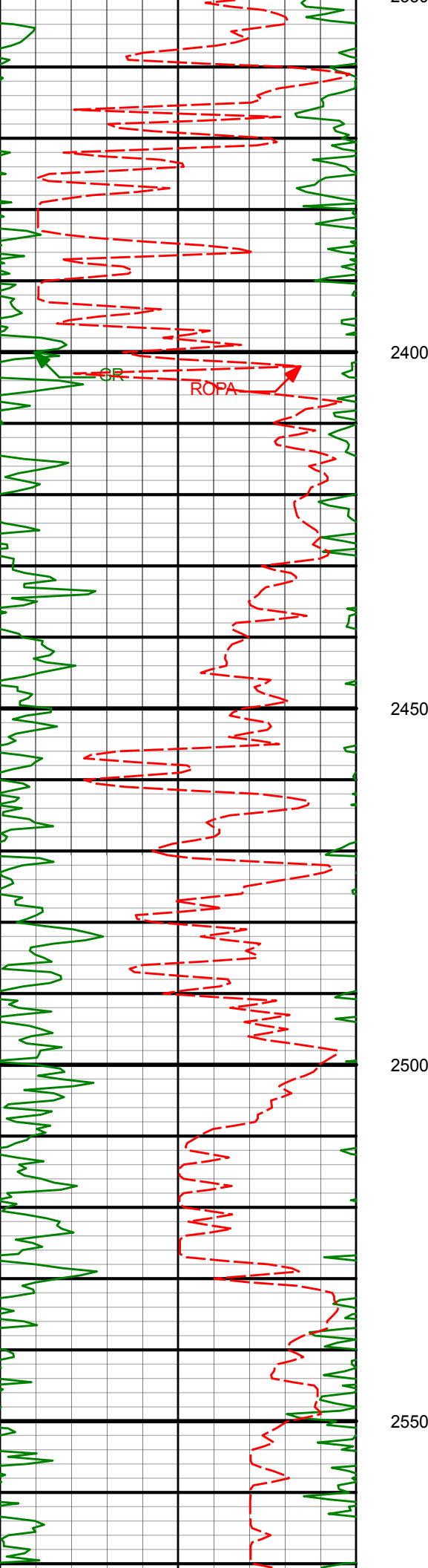
2280'

14.19°

179.25°

2216.22'

-467.83'



2369' 15.41° 186.18° 2302.27' -490.52'

2400

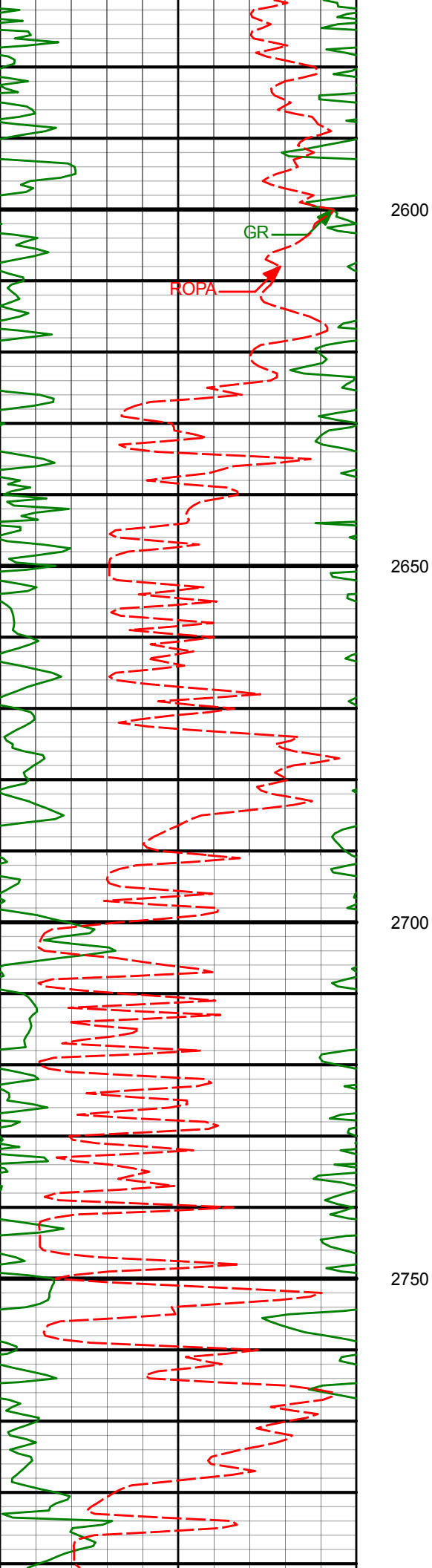
2450

2459' 15.25° 180.13° 2389.07' -514.26'

2500

2550

2549' 14.83° 181.54° 2475.99' -537.62'



2639'

17.95°

182.98°

2562.32'

-562.99'

2700

2729'

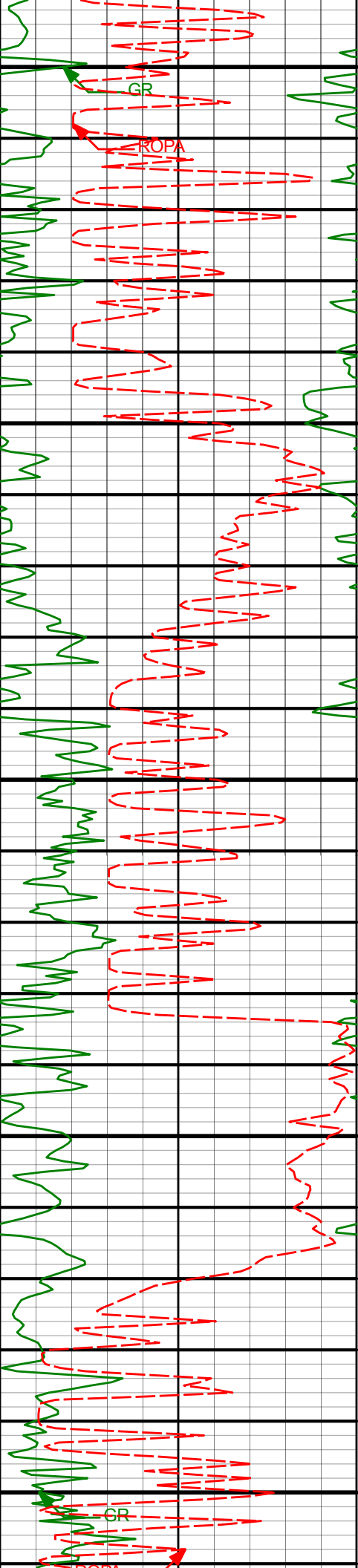
16.69°

181.76°

2648.24'

-589.77'

2750



2800

2850

2900

2950

3000

2818'

15.07°

180.20°

2733.84'

-614.12'

2908'

13.87°

179.89°

2820.99'

-636.60'

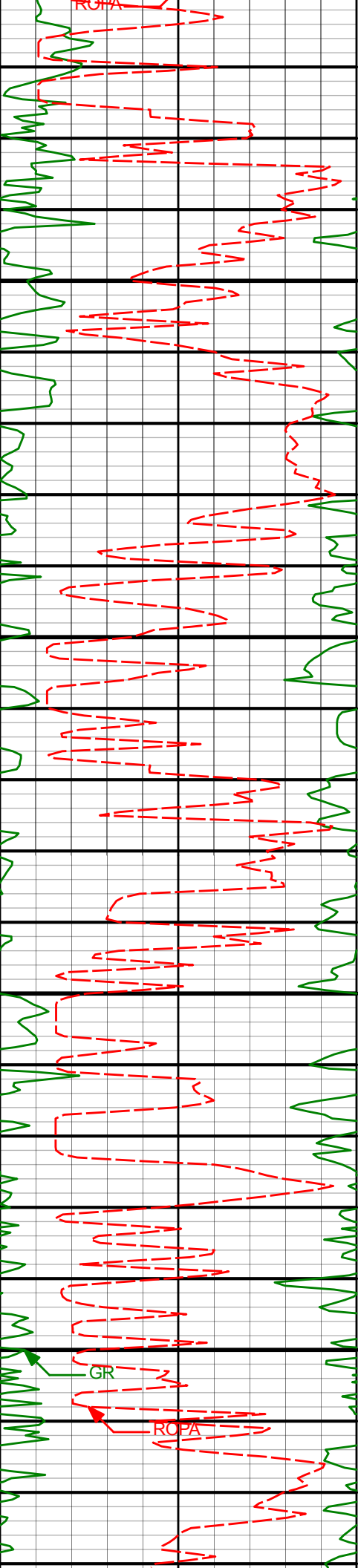
2998'

14.38°

180.67°

2908.26'

-658.56'



3050

3100

3150

3200

3088'

15.54°

181.98°

2995.21'

-681.79'

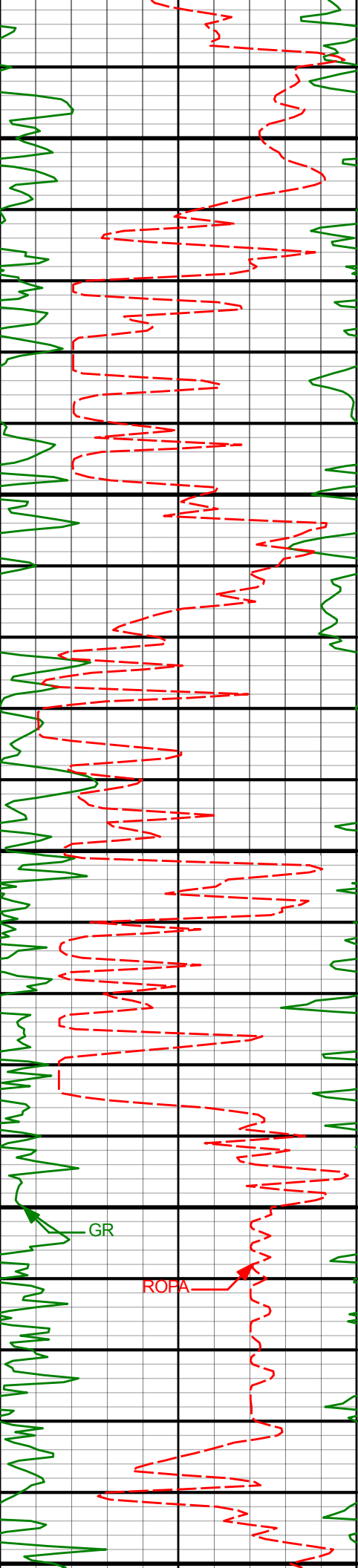
3177'

14.40°

181.33°

3081.19'

-704.78'



3250

3267'

14.78°

179.23°

3168.29'

-727.45'

3300

3350

3357'

13.13°

178.37°

3255.63'

-749.14'

3400

GR

ROPA

3450

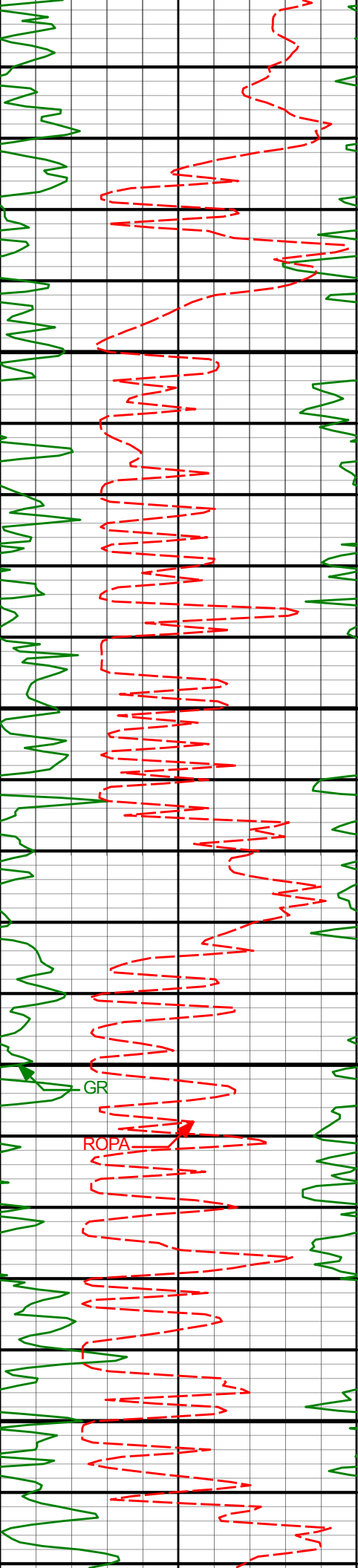
3447'

11.78°

175.63°

3343.51'

-768.51'



3450

3500

3550

3600

3650

3536'

13.28°

171.27°

3430.39'

-787.64'

GR

ROPA

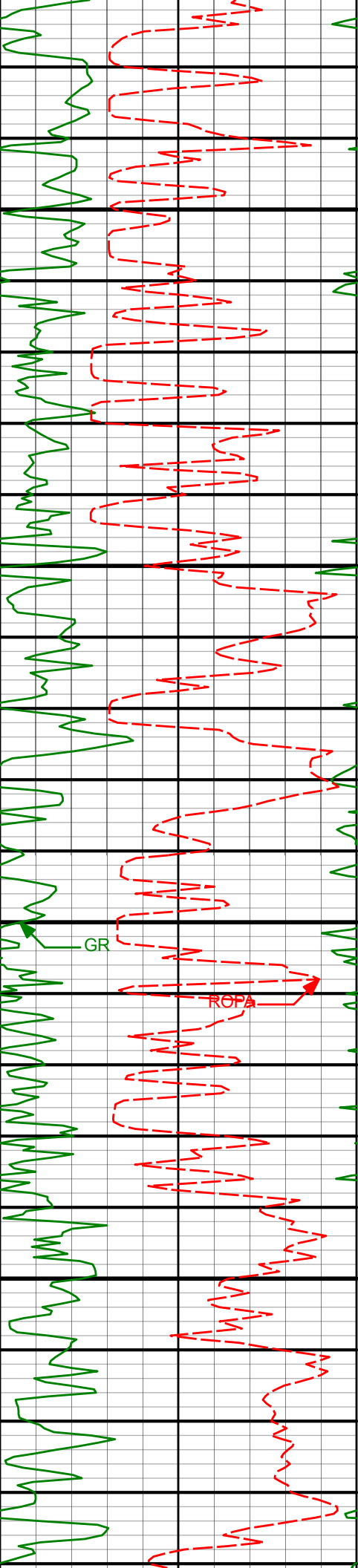
3626'

11.25°

171.19°

3518.33'

-806.50'



3700

3716'

9.06°

172.90°

3606.91'

-822.18'

3750

3800

3806'

7.49°

176.50°

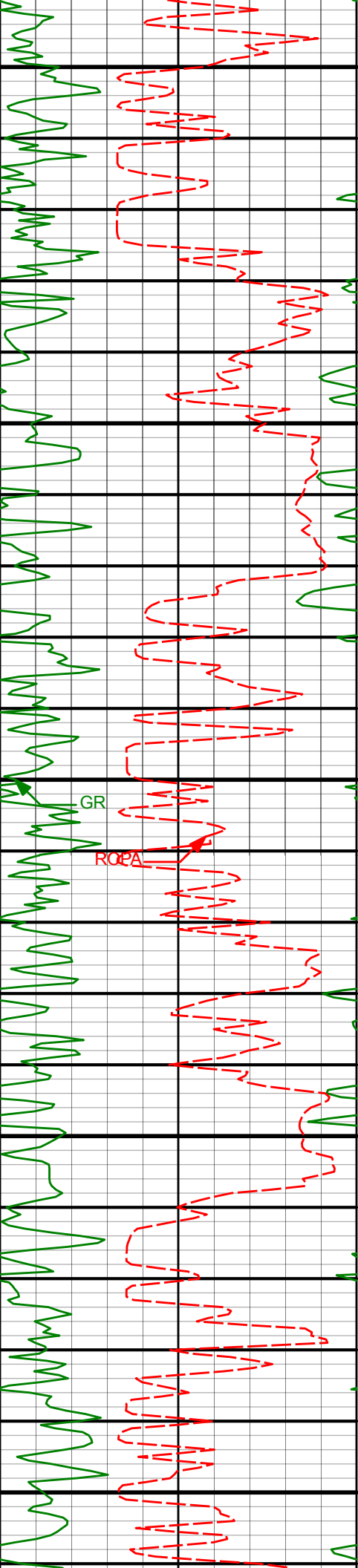
3695.97'

-835.06'

3850

GR

ROPA



3900

3950

4000

4050

4100

3896'

5.60°

153.29°

3785.40'

-844.81'

3985'

2.17°

177.56°

3874.18'

-850.34'

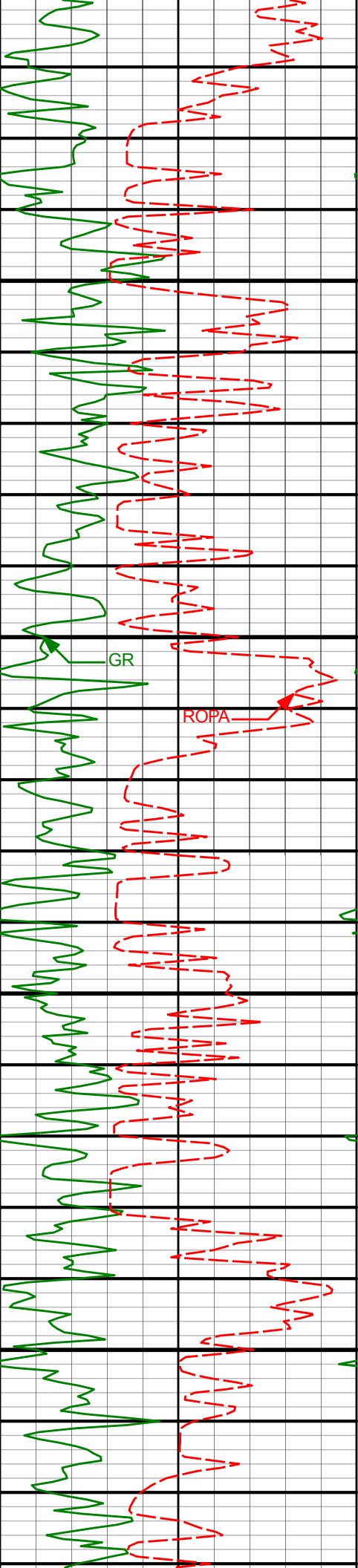
4075'

0.28°

20.34°

3964.17'

-851.84'



4150

4200

4250

4300

4164'

0.70°

352.27°

4053.16'

-851.09'

GR

ROPA

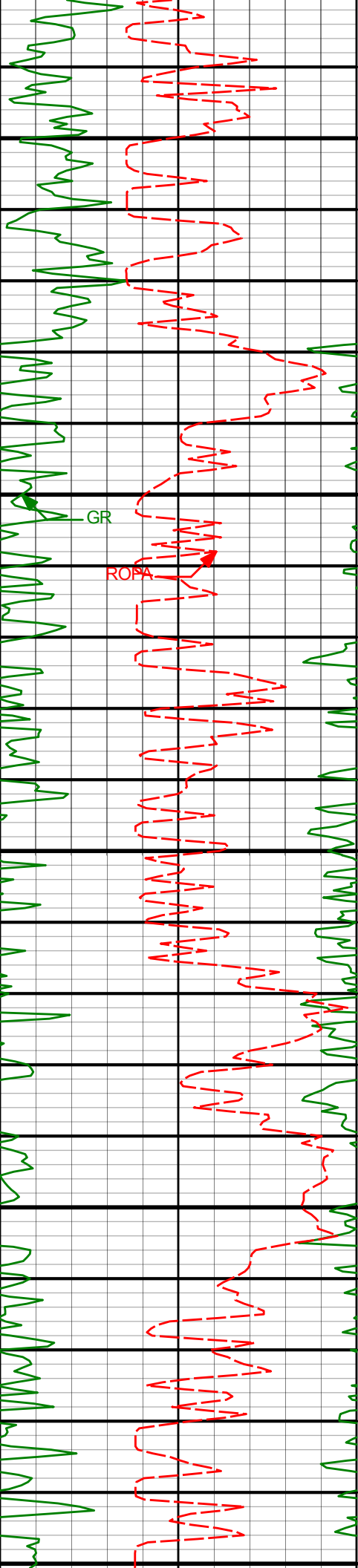
4254'

1.18°

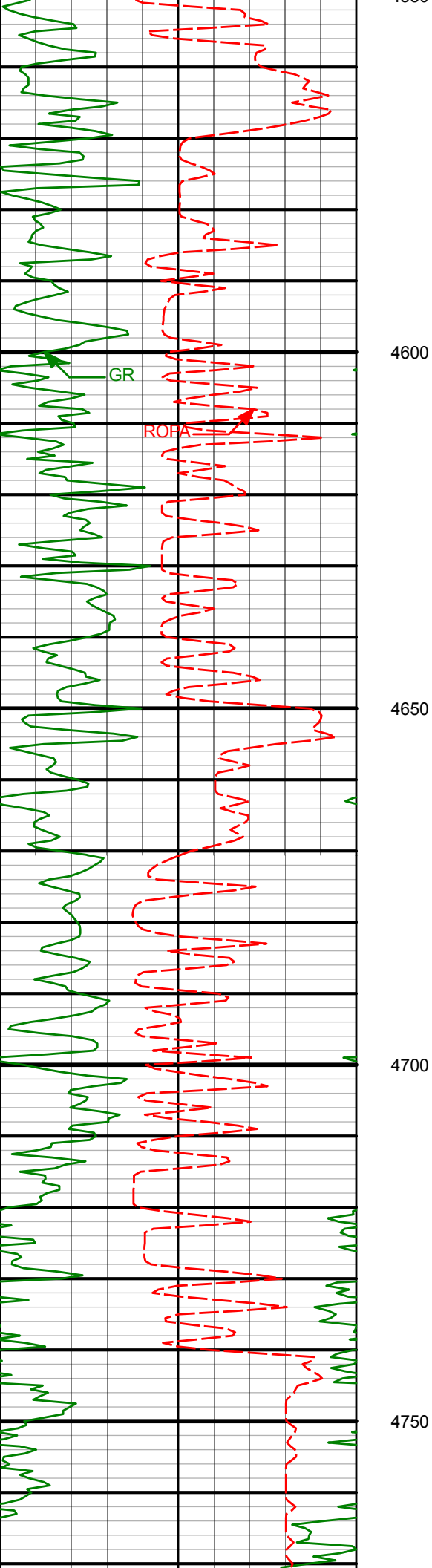
359.27°

4143.15'

-849.62'



4344'	1.45°	343.60°	4233.13'	-847.60'
4350				
4400				
4434'	1.47°	324.15°	4323.10'	-845.59'
4450				
4500				
4523'	1.16°	214.85°	4412.08'	-845.42'
4550				



4613'

1.12°

192.92°

4502.07'

-847.03'

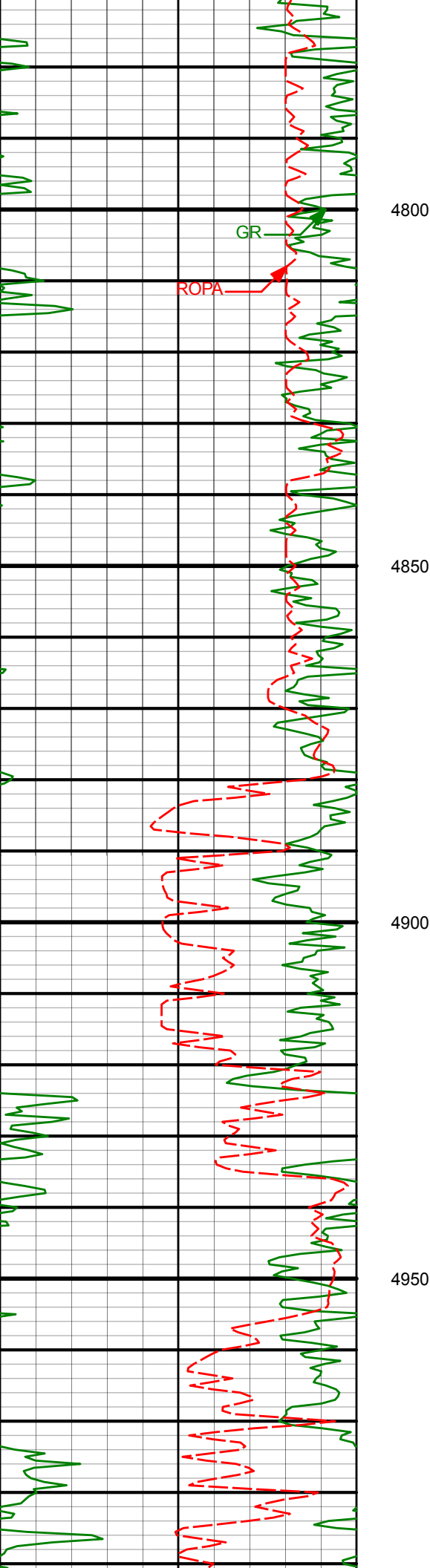
4703'

0.51°

228.11°

4592.06'

-848.16'



4793'

0.66°

265.44°

4682.05'

-848.48'

4800

GR

ROPA

4850

4883'

0.94°

250.76°

4772.04'

-848.78'

4900

4950

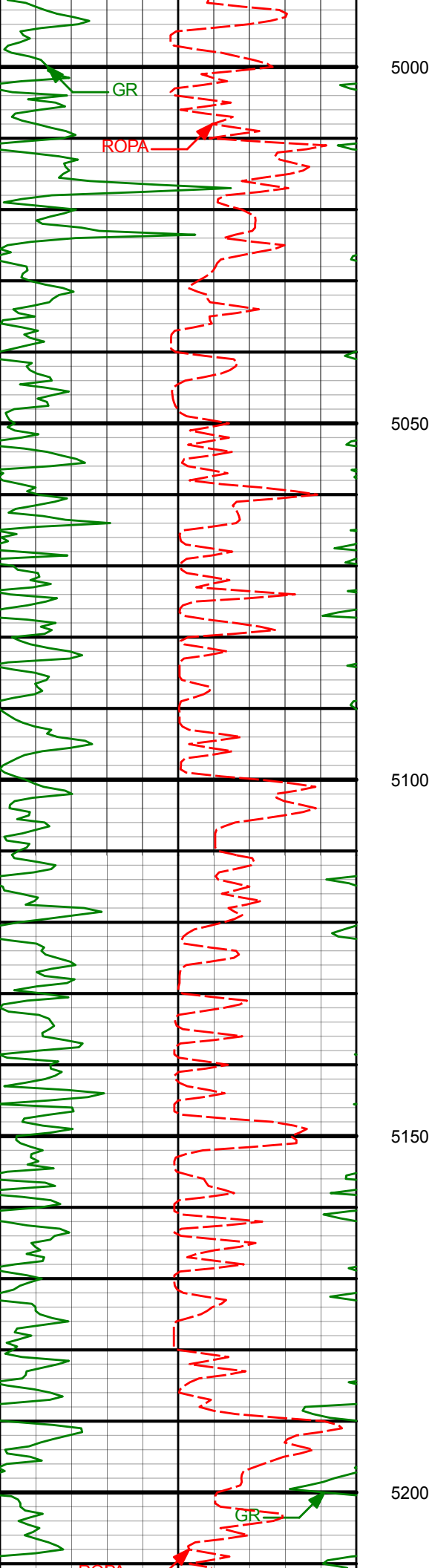
4972'

0.69°

133.76°

4861.04'

-849.39'



5062'

0.44°

200.75°

4951.04'

-850.09'

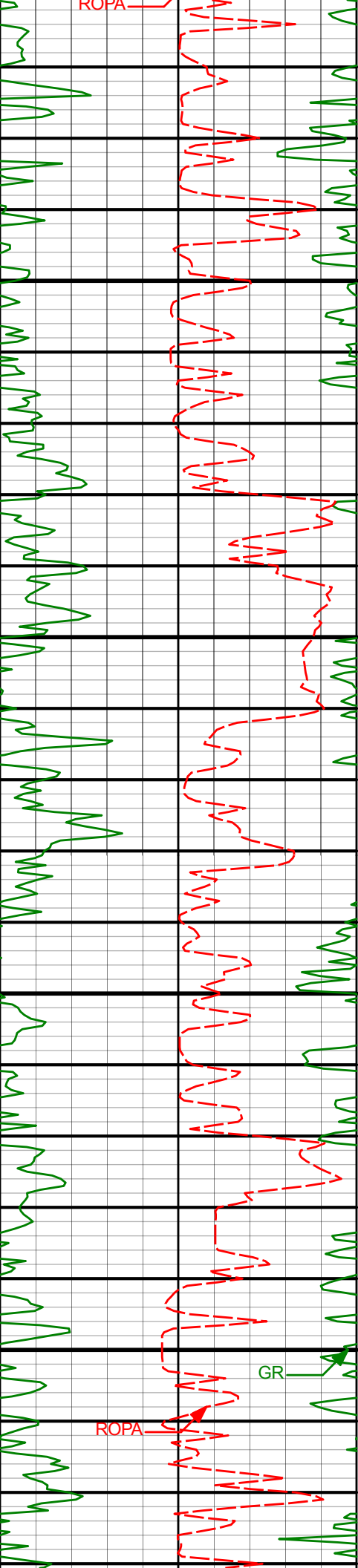
5152'

0.78°

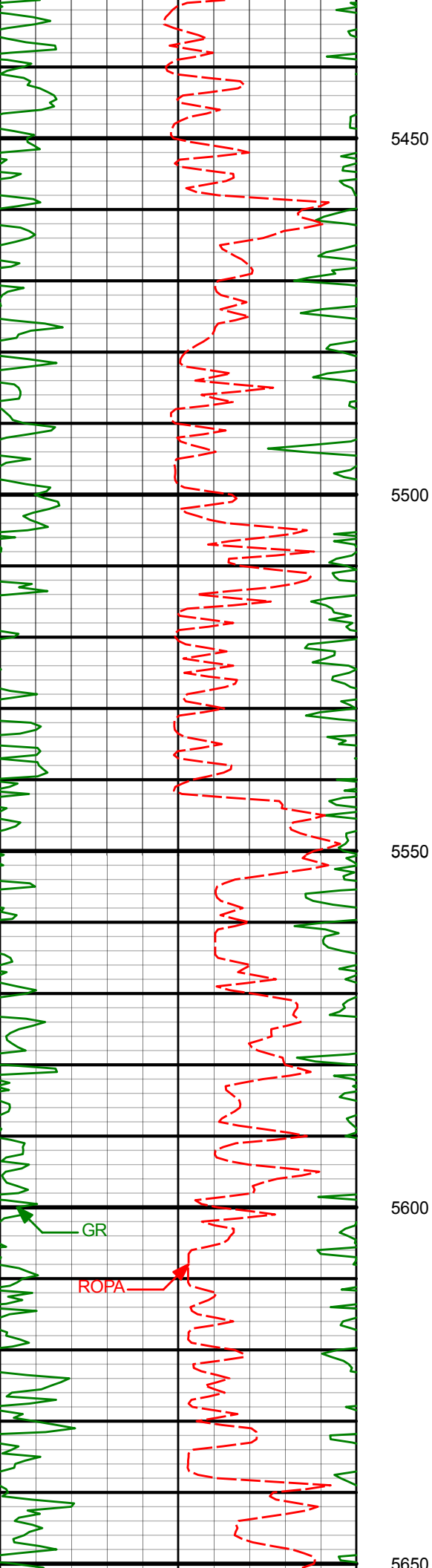
209.12°

5041.03'

-850.96'



5242'	0.96°	204.39°	5131.02'	-852.18'
5250				
5300				
5331'	1.29°	90.41°	5220.01'	-852.86'
5350				
5400				
5421'	0.78°	71.38°	5310.00'	-852.65'



5511'

0.63°

43.65°

5399.99'

-852.09'

5600

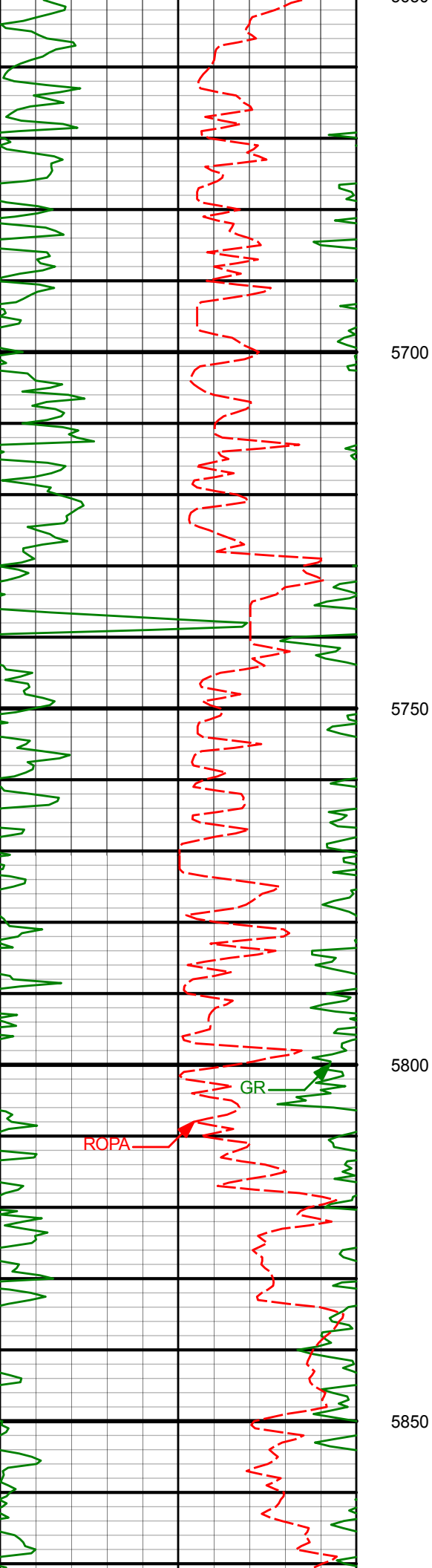
5601'

0.71°

21.40°

5489.98'

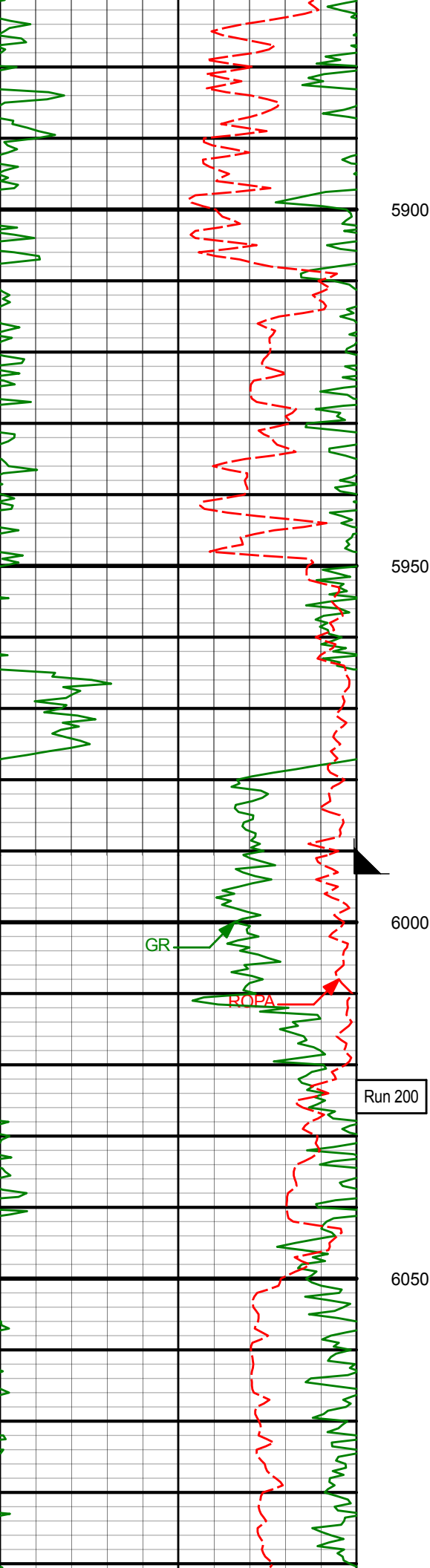
-851.21'

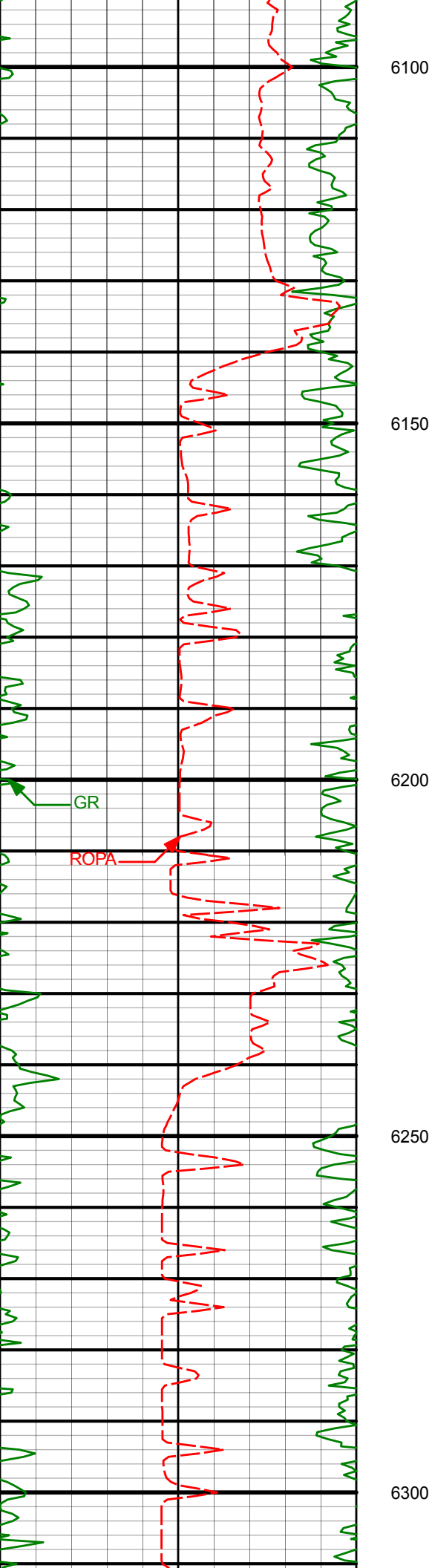


0.80° 339.60° 5578.98' -850.11'

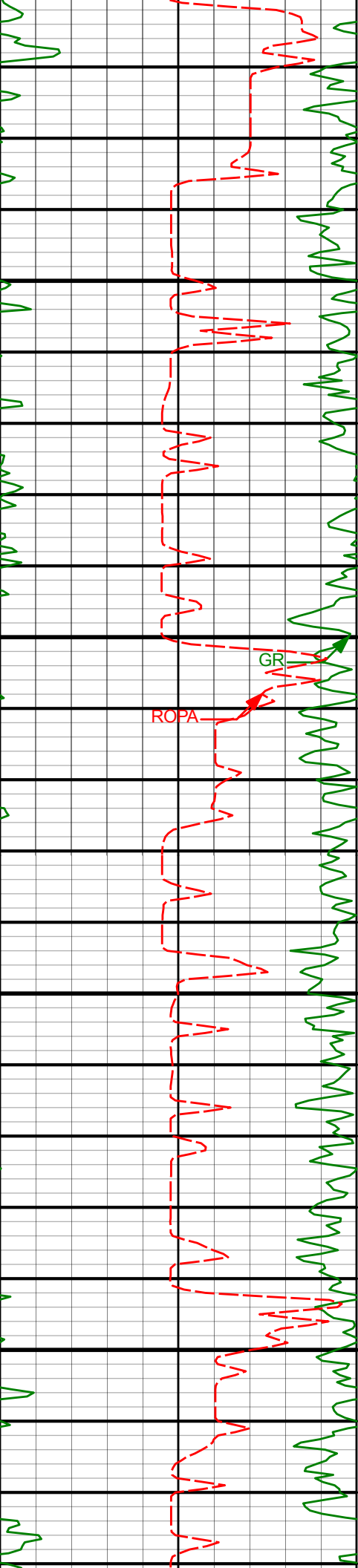
0.96° 333.72° 5668.97' -848.86'

1.17° 117.32° 5758.96' -848.60'





6091'	0.65°	114.60°	5979.93'	-850.40'
6181'	0.61°	98.89°	6069.93'	-850.67'
6271'	0.18°	15.47°	6159.92'	-850.60'



6350

6360'

0.53°

322.56°

6248.92'

-850.15'

6400

ROPA

GR

6450

6450'

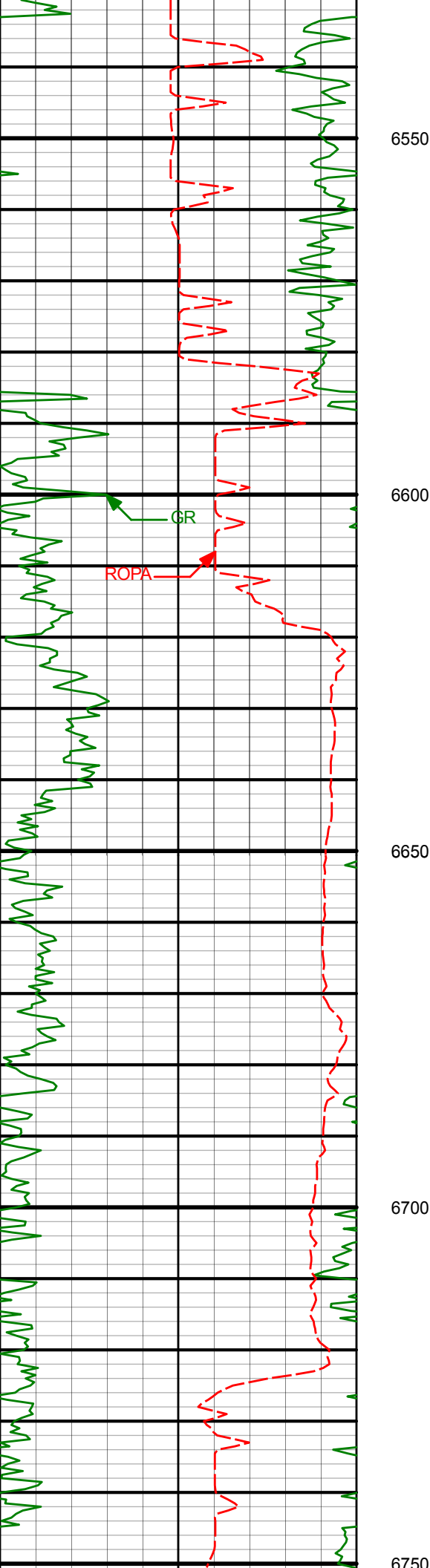
0.88°

324.58°

6338.92'

-849.26'

6500



6540'

0.74°

342.15°

6428.91'

-848.15'

6630'

2.02°

7.92°

6518.88'

-846.03'

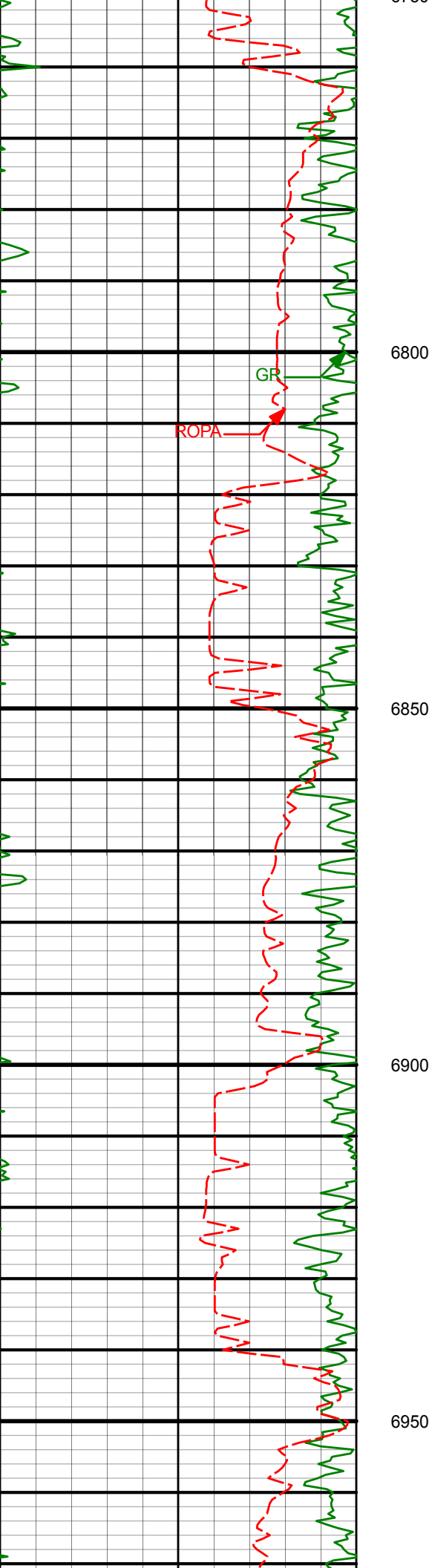
6719'

13.72°

3.89°

6606.89'

-833.90'



6809'

18.72°

358.15°

6693.28'

-808.79'

6850

6900

6899'

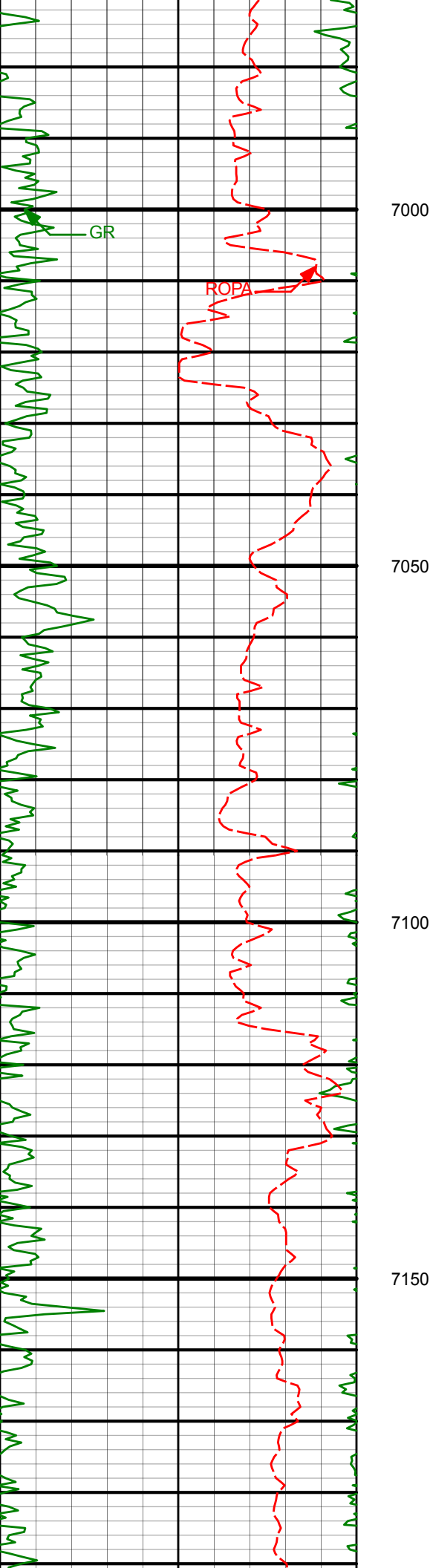
23.41°

352.84°

6777.25'

-776.63'

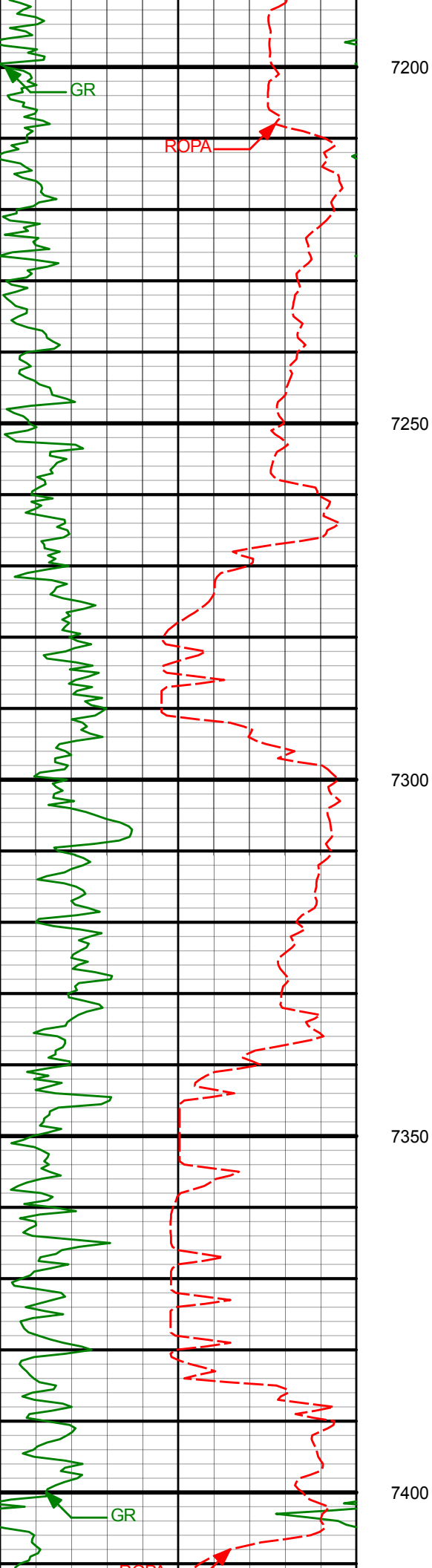
6950



6988'	26.34°	354.25°	6857.99'	-739.49'
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7078'	29.35°	357.56°	6937.56'	-697.61'
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7168'	37.25°	357.69°	7012.72'	-648.30'
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7258'

49.78°

357.81°

7077.85'

-586.54'

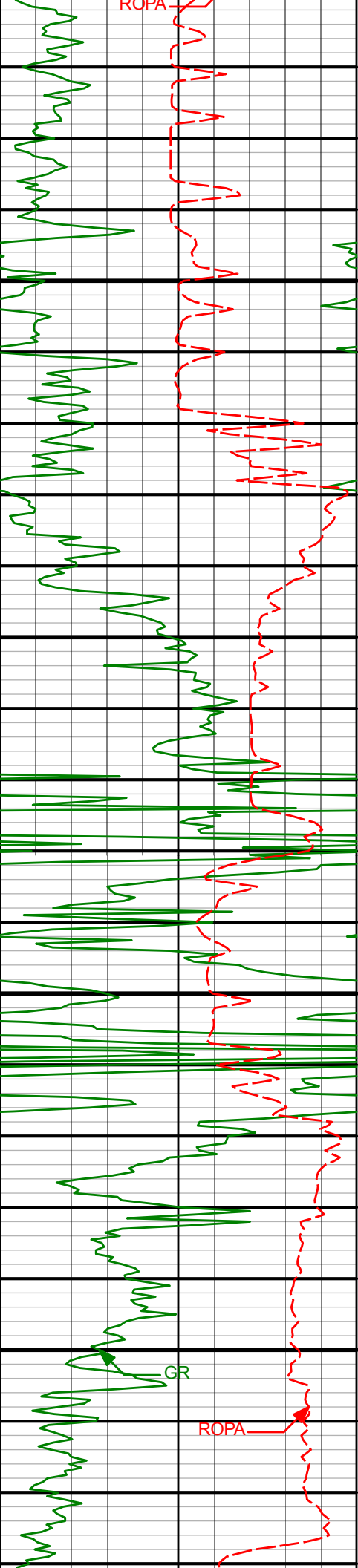
7347'

50.70°

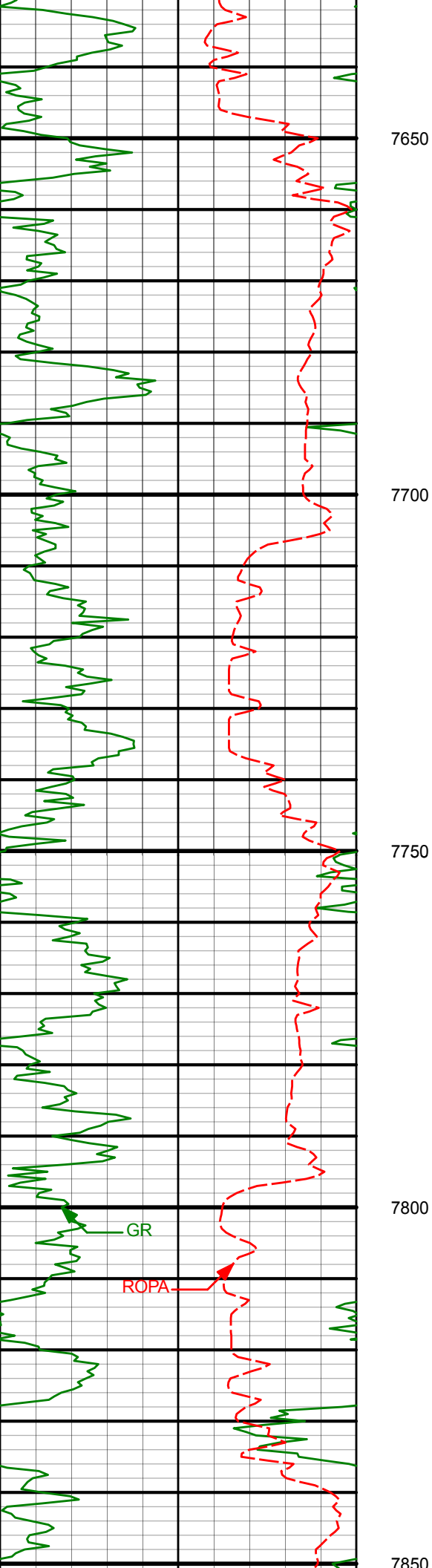
4.03°

7134.80'

-518.18'



7437'	51.29°	2.88°	7191.45'	-448.32'
7450				
7500				
7527'	57.04°	2.36°	7244.11'	-375.43'
7550				
7600				
7617'	63.78°	0.43°	7288.54'	-297.22'



7706'

71.06°

1.91°

7322.69'

-215.11'

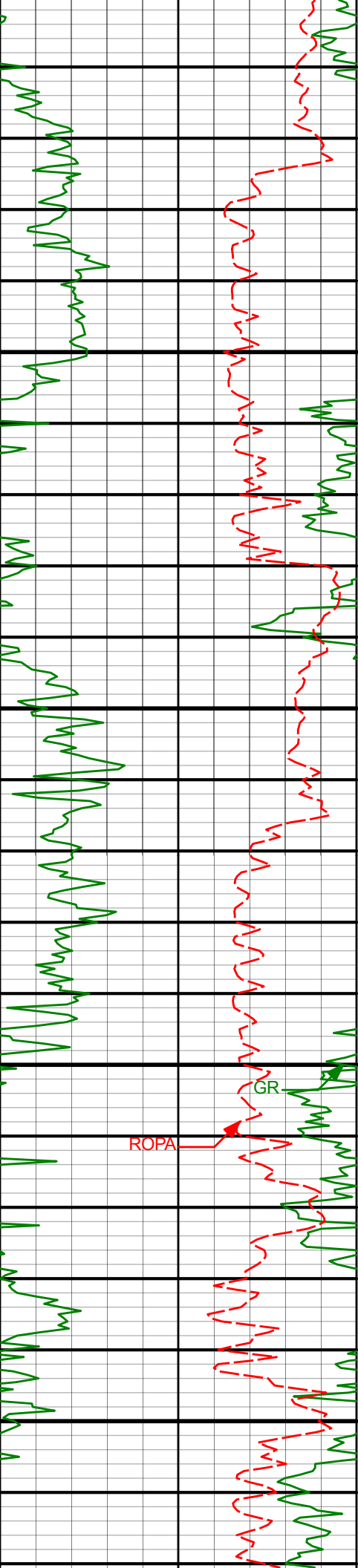
7796'

77.98°

3.21°

7346.70'

-128.47'



7886'

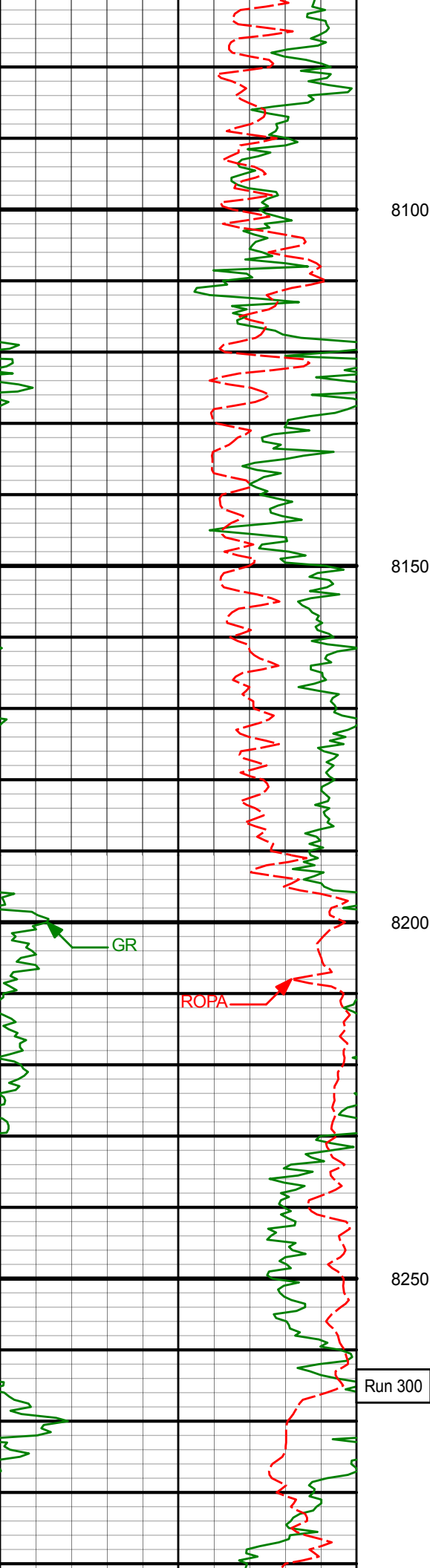
7900

7950

8000

8050

7886'	83.34°	2.61°	7361.30'	-39.76'
7976'	88.76°	2.08°	7367.50'	49.95'
8065'	88.51°	1.15°	7369.61'	138.92'



8100

8150

8200

8250

8155'

88.04°

0.43°

7372.32'

228.88'

8245'

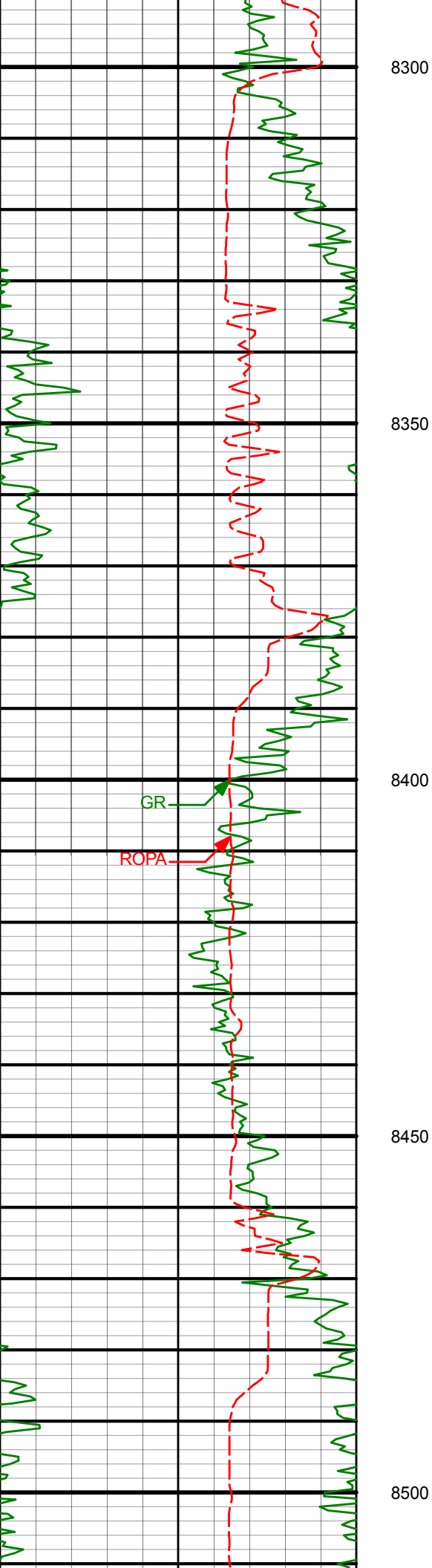
89.73°

2.50°

7374.07'

318.84'

Run 300



8300

8335'

89.39°

1.97°

7374.76'

408.81'

8350

8400

8425'

89.85°

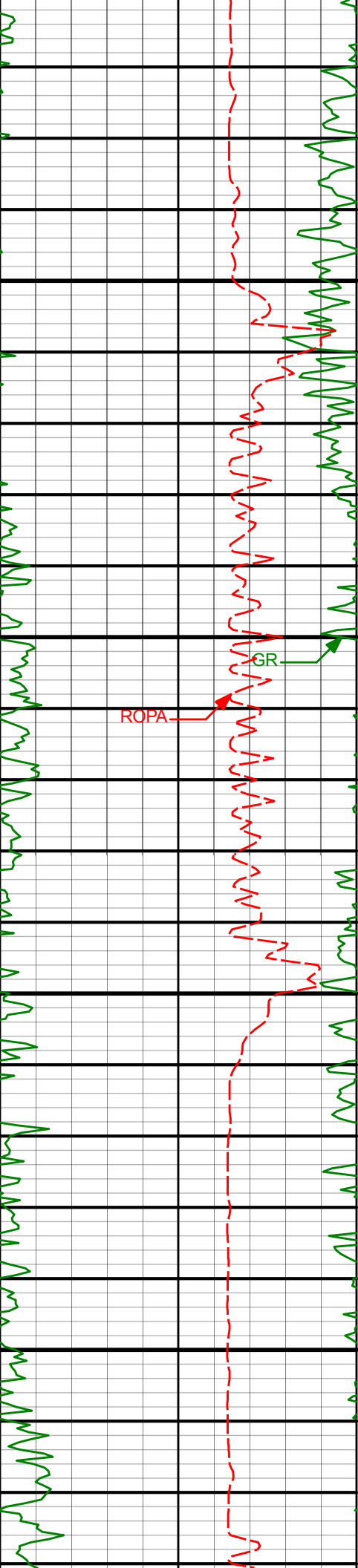
1.44°

7375.35'

498.79'

8450

8500



8515'

89.81°

0.45°

7375.62'

588.79'

8550

8600

8604'

89.81°

359.44°

7375.91'

677.78'

8650

8700

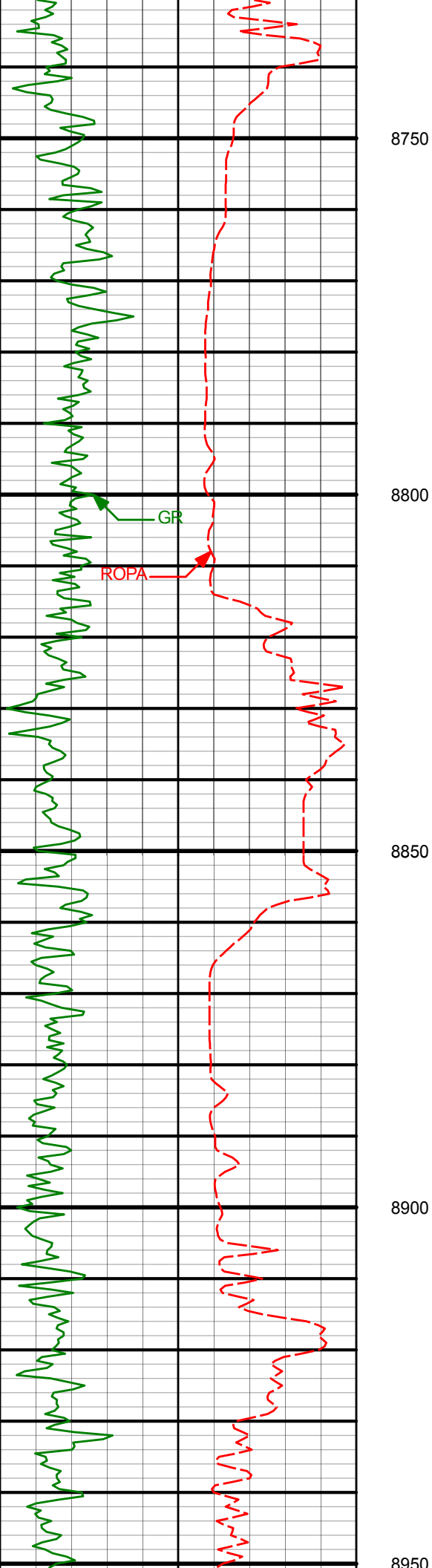
8694'

90.02°

359.15°

7376.04'

767.75'



8784'

89.94°

357.77°

7376.08'

857.68'

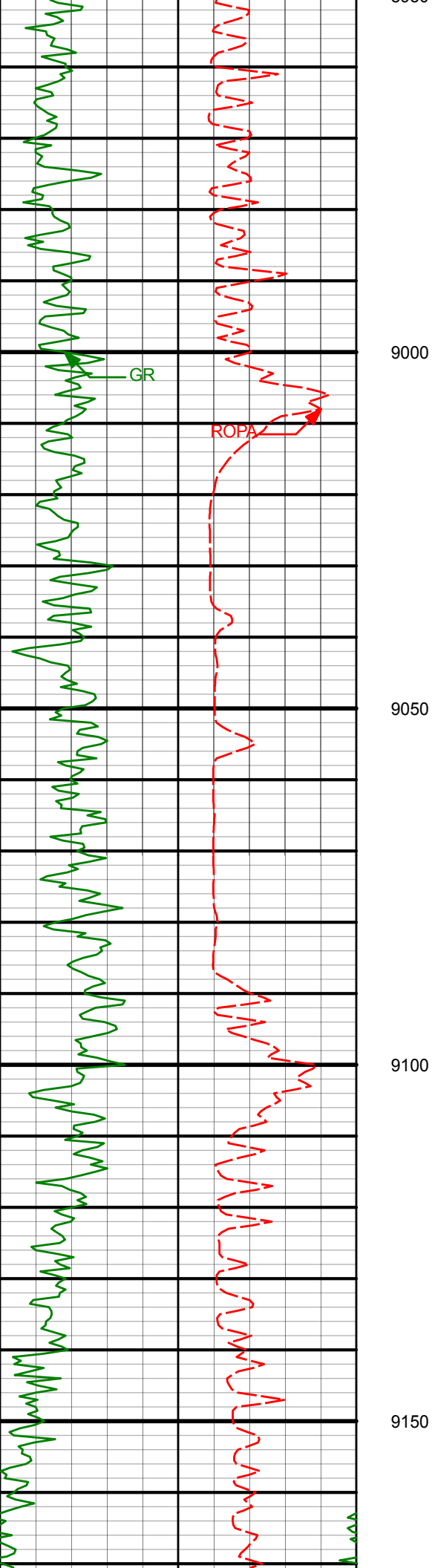
8874'

90.65°

1.78°

7375.62'

947.65'



8963'

91.11°

2.34°

7374.25'

1036.61'

9058'

91.28°

2.06°

7372.26'

1131.56'

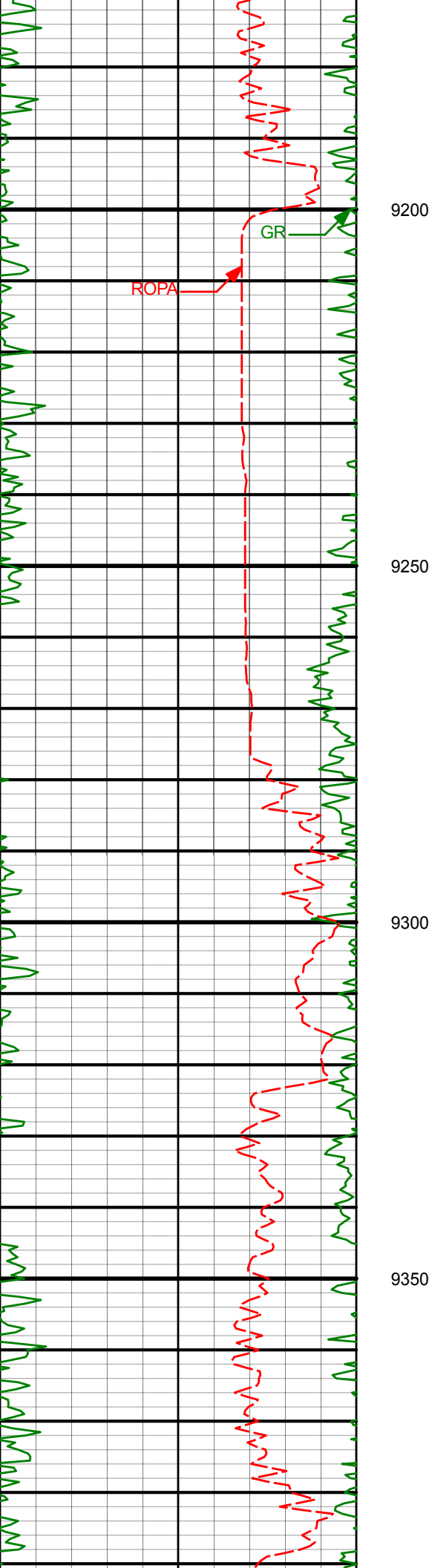
9152'

91.83°

0.46°

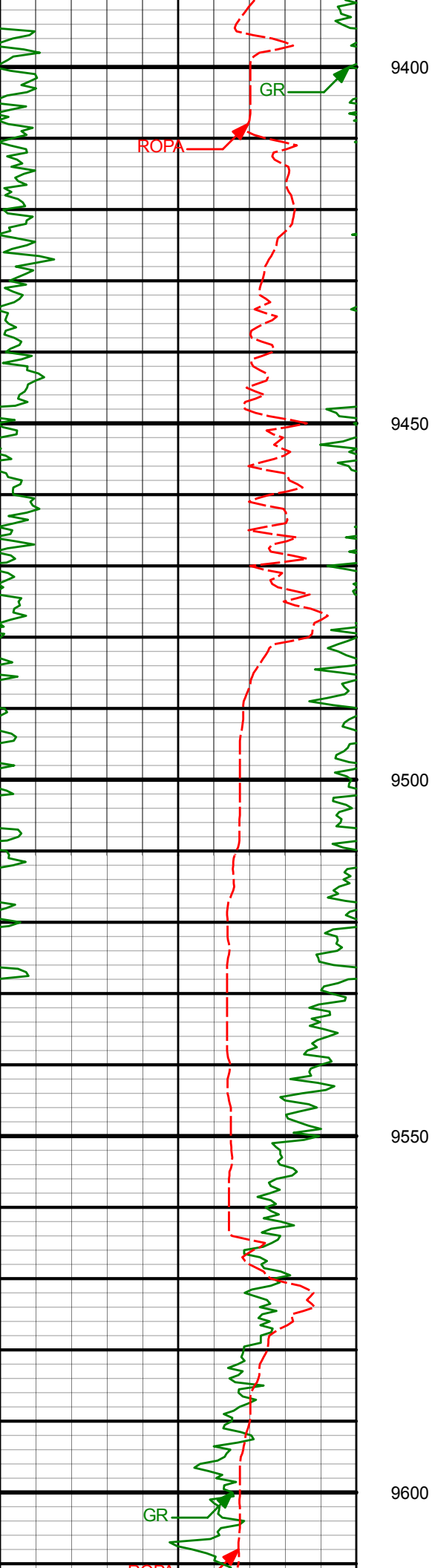
7369.71'

1225.52'



9246' 92.46° 359.78° 7366.20' 1319.45'

9341' 89.98° 0.98° 7364.18' 1414.41'



9435'

90.19°

1.63°

7364.05'

1508.41'

9529'

90.57°

1.76°

7363.43'

1602.39'

9400

9450

9500

9550

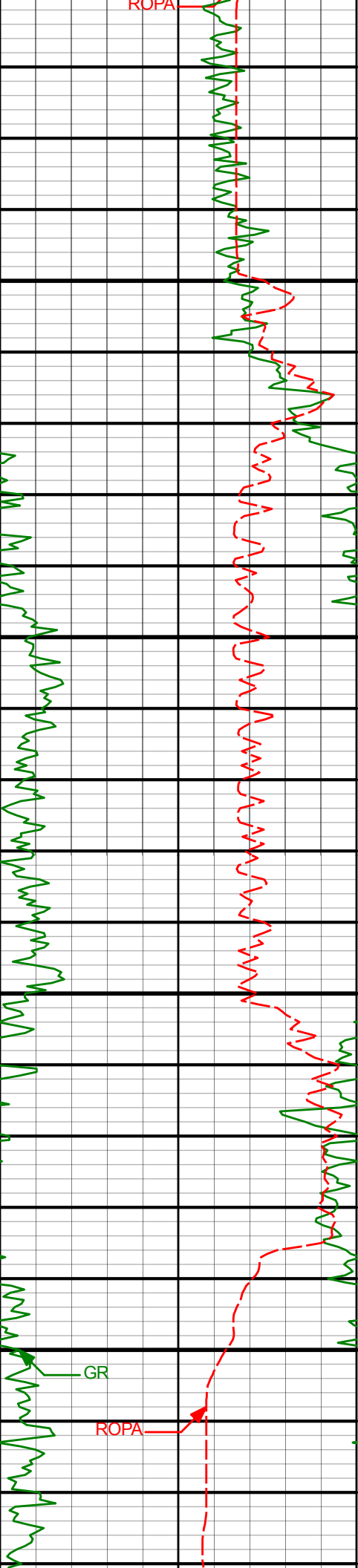
9600

GR

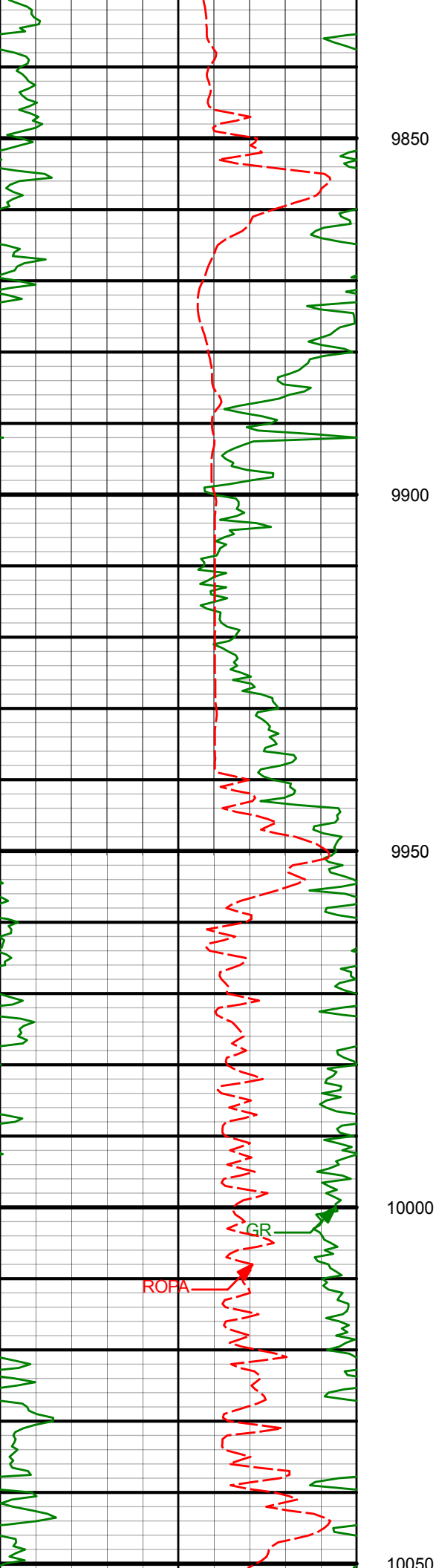
ROPA

GR

ROPA



9624'	90.90°	1.23°	7362.21'	1697.37'
9650				
9700				
9718'	91.40°	1.06°	7360.32'	1791.35'
9750				
9800				
9812'	88.55°	359.87°	7360.35'	1885.34'



9906'

88.76°

359.95°

7362.56'

1979.31'

10000

10001'

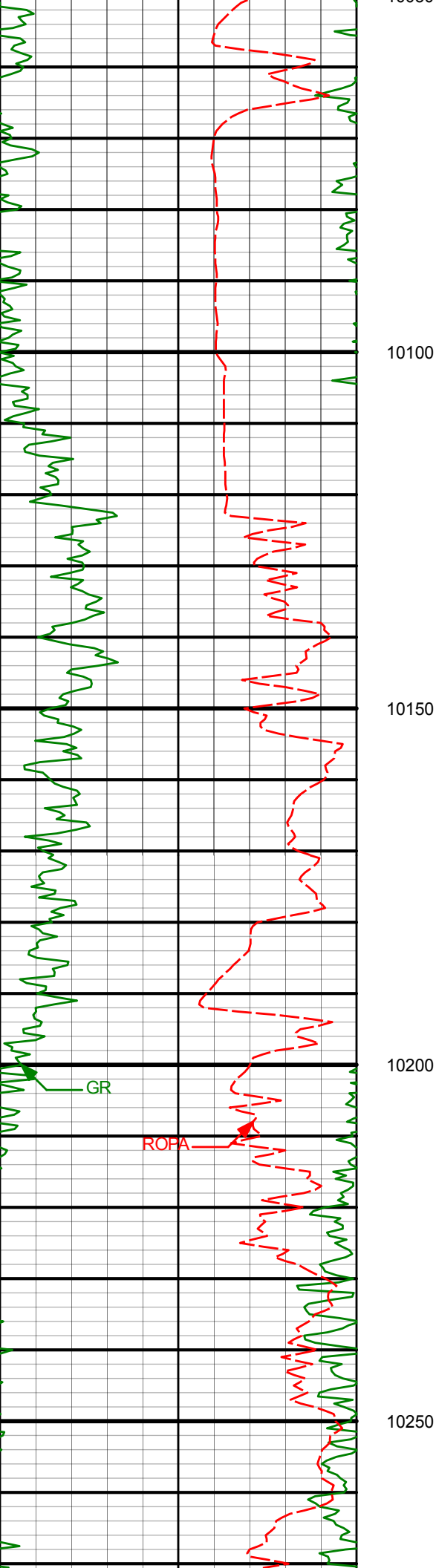
88.47°

358.93°

7364.85'

2074.25'

10050



10095'

88.47°

358.33°

7367.36'

2168.16'

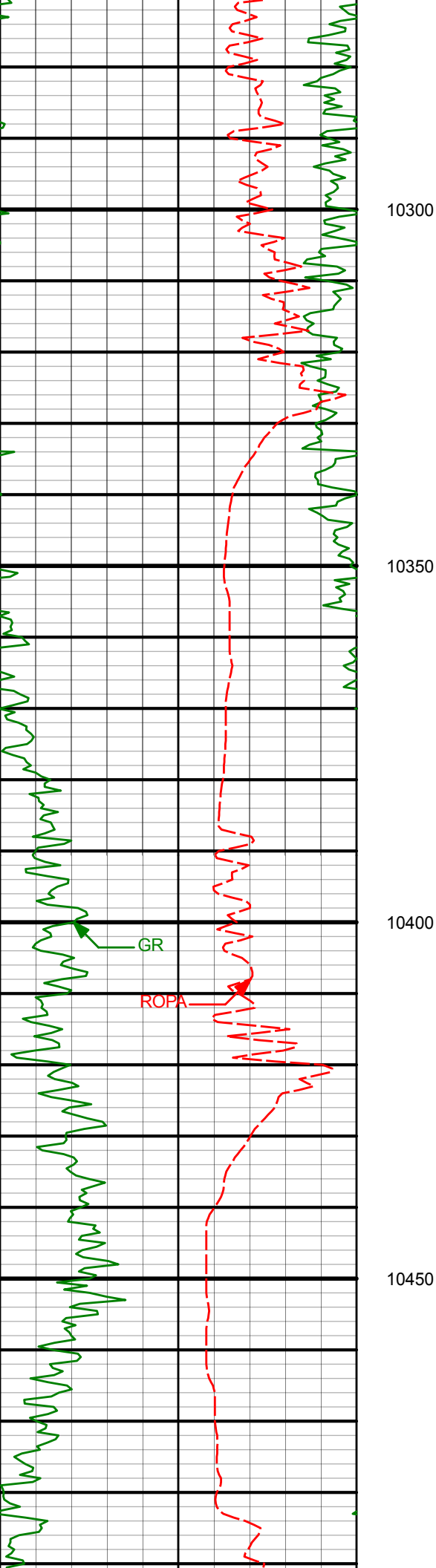
10189'

88.85°

1.84°

7369.57'

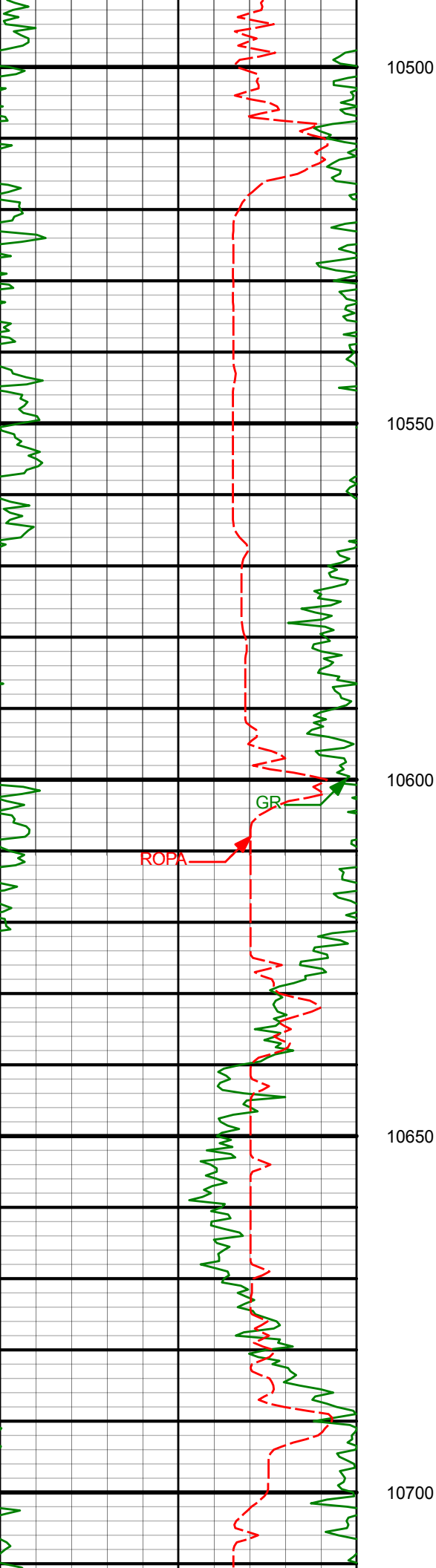
2262.11'



10284'	90.48°	2.41°	7370.12'	2357.08'
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10378'	91.28°	1.87°	7368.67'	2451.03'
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10468'	91.49°	1.39°	7366.49'	2541.00'
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10558'

91.95°

0.98°

7363.79'

2630.95'

10600

ROPA

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10650

10647'

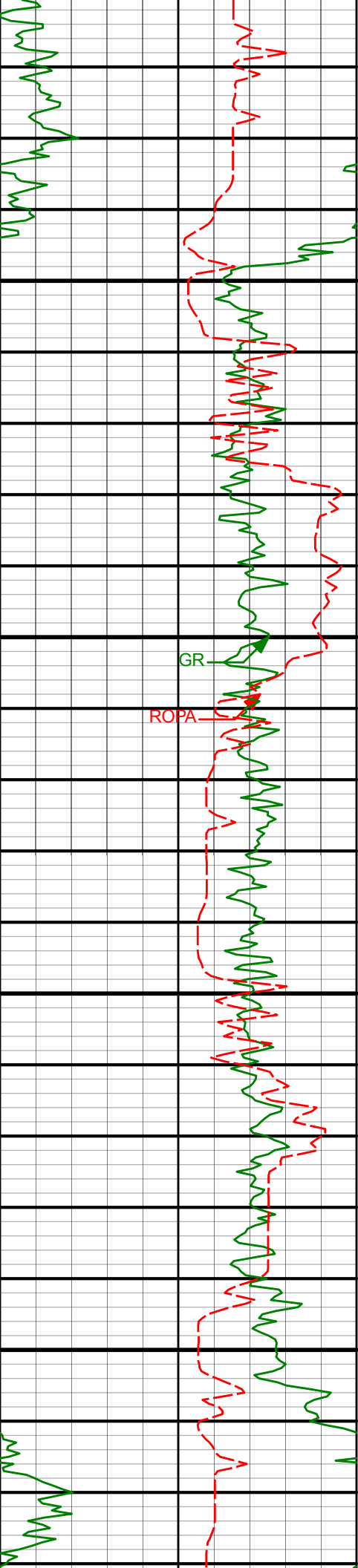
91.91°

0.74°

7360.79'

2719.90'

10700



10737'	91.36°	0.34°	7358.22'	2809.86'
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10750

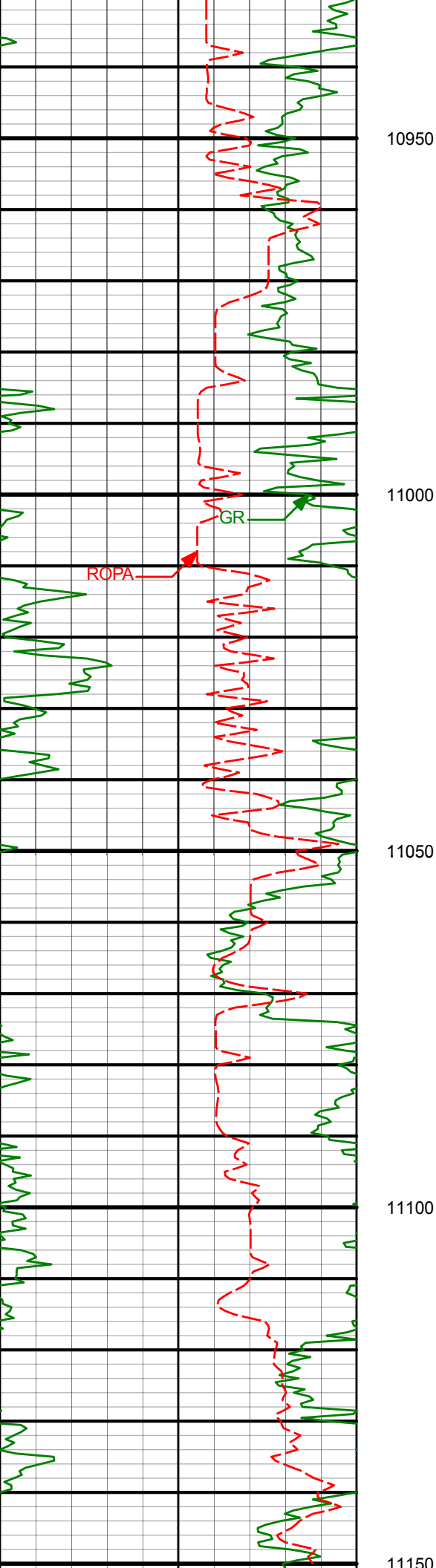
10800

10827'	89.89°	0.45°	7357.23'	2899.85'
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10850

10900

10916'	90.19°	359.81°	7357.17'	2988.85'
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11006'

88.97°

359.26°

7357.83'

3078.83'

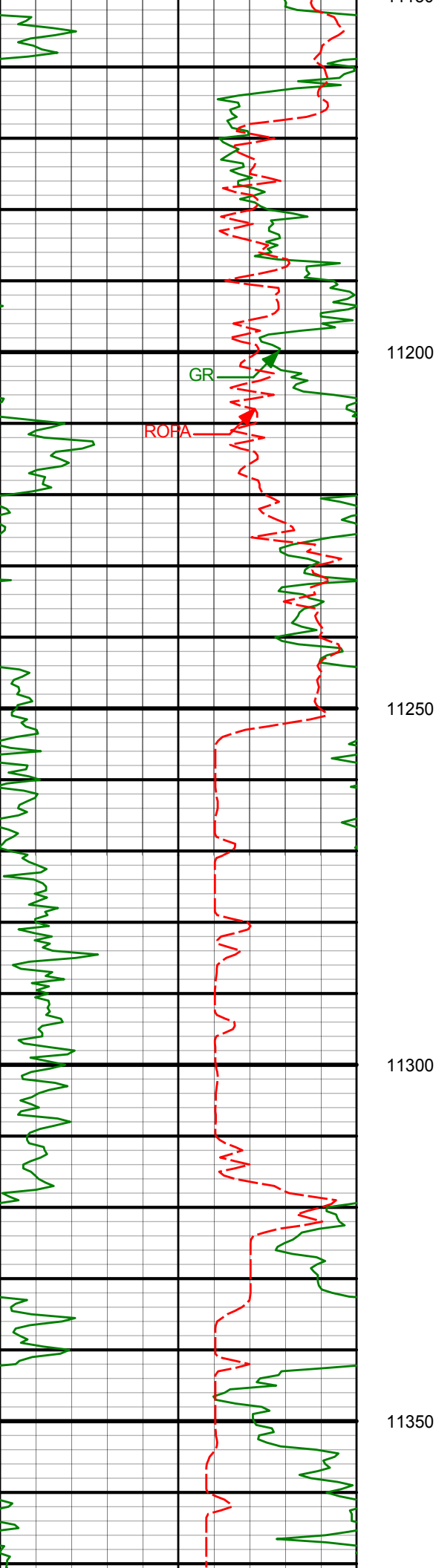
11096'

88.72°

358.77°

7359.64'

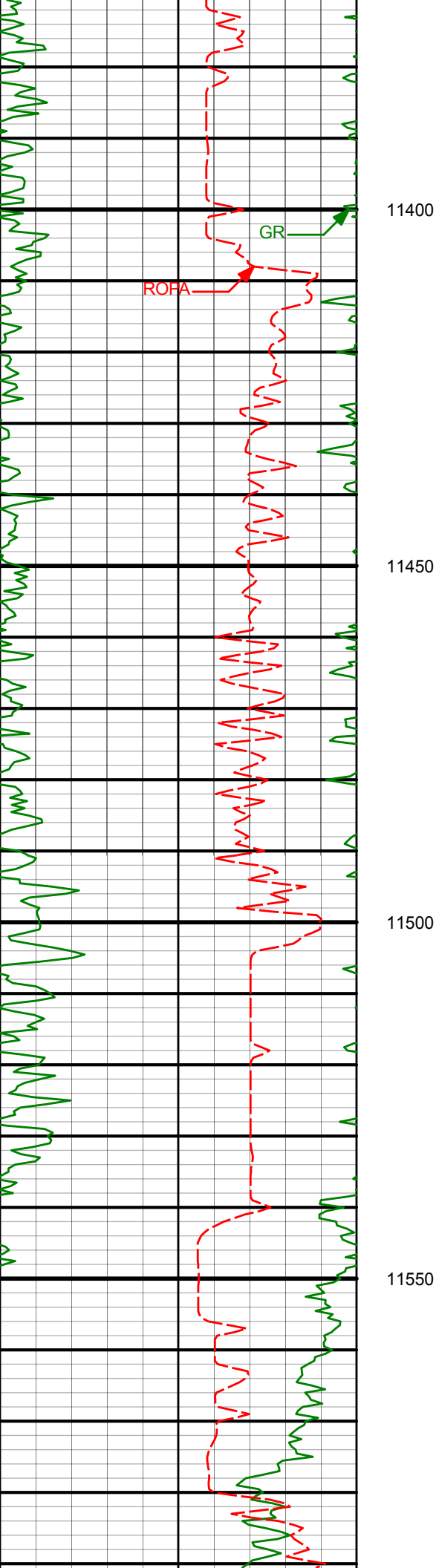
3168.77'



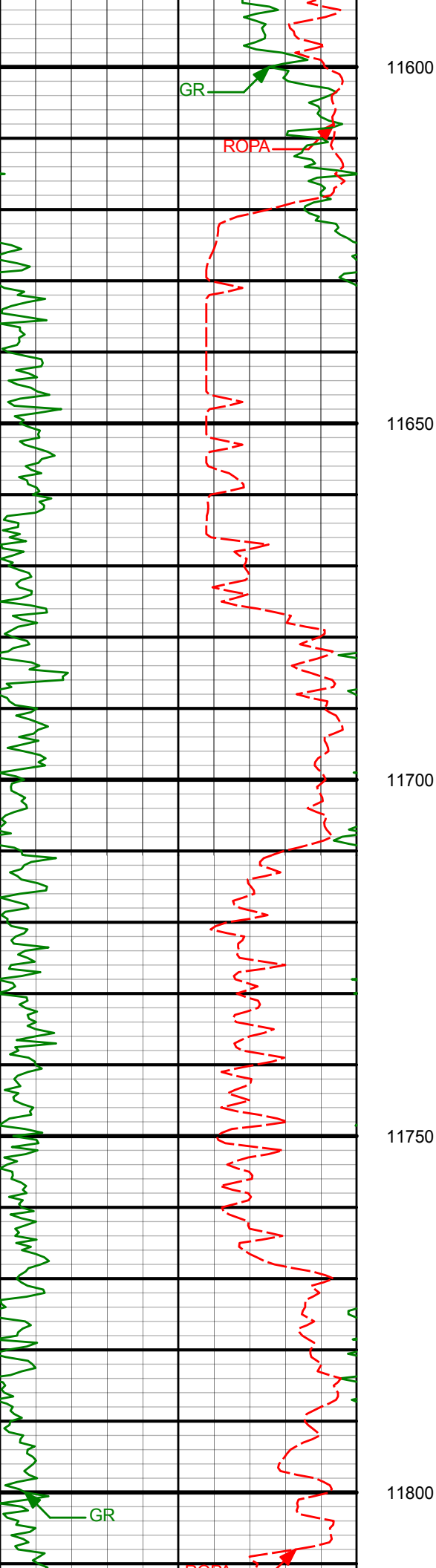
11186' 89.77° 359.82° 7360.83' 3258.73'

11276' 91.62° 0.45° 7359.74' 3348.71'

11365' 91.74° 0.49° 7357.13' 3437.67'



11455'	91.83°	358.65°	7354.32'	3527.61'
11545'	91.45°	357.92°	7351.75'	3617.49'



11600

11650

11700

11750

11800

11634'

90.19°

358.44°

7350.48'

3706.39'

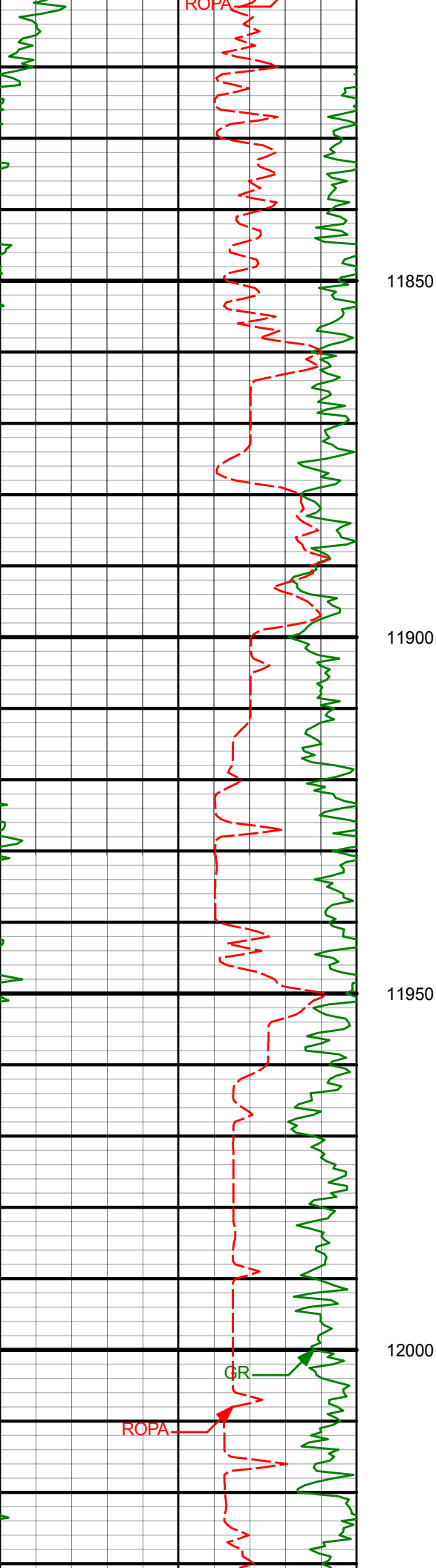
11724'

88.93°

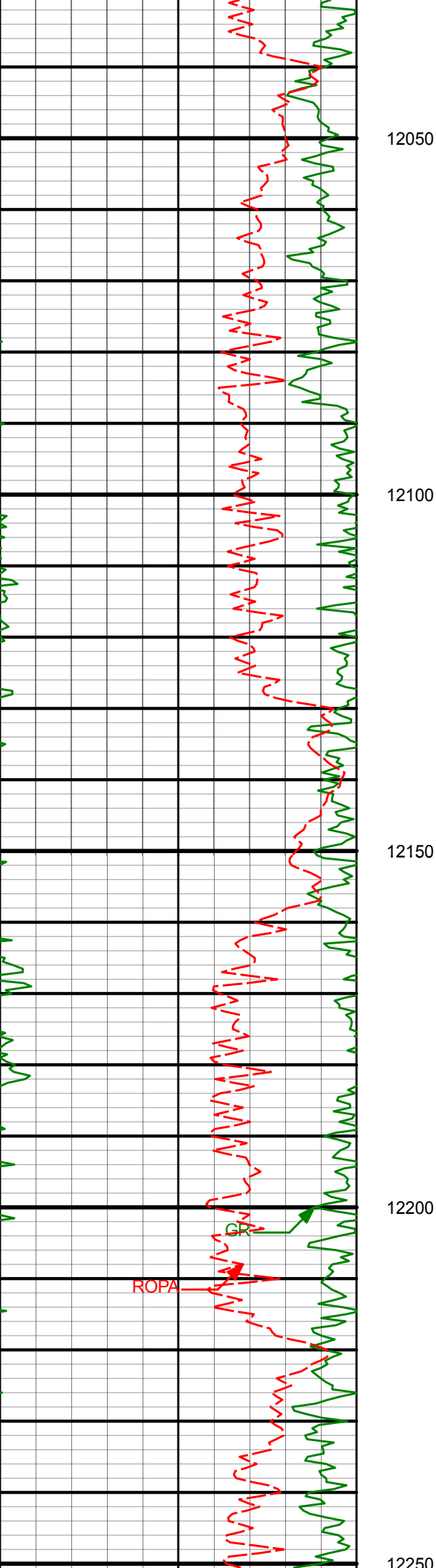
359.89°

7351.17'

3796.35'



11814'	90.23°	3.38°	7351.83'	3886.32'
11850				
11900				
11904'	89.90°	2.00°	7351.74'	3976.27'
11950				
11994'	89.52°	1.30°	7352.20'	4066.25'
12000				



12050

12083'

88.81°

358.67°

7353.50'

4155.23'

12100

12150

12173'

90.31°

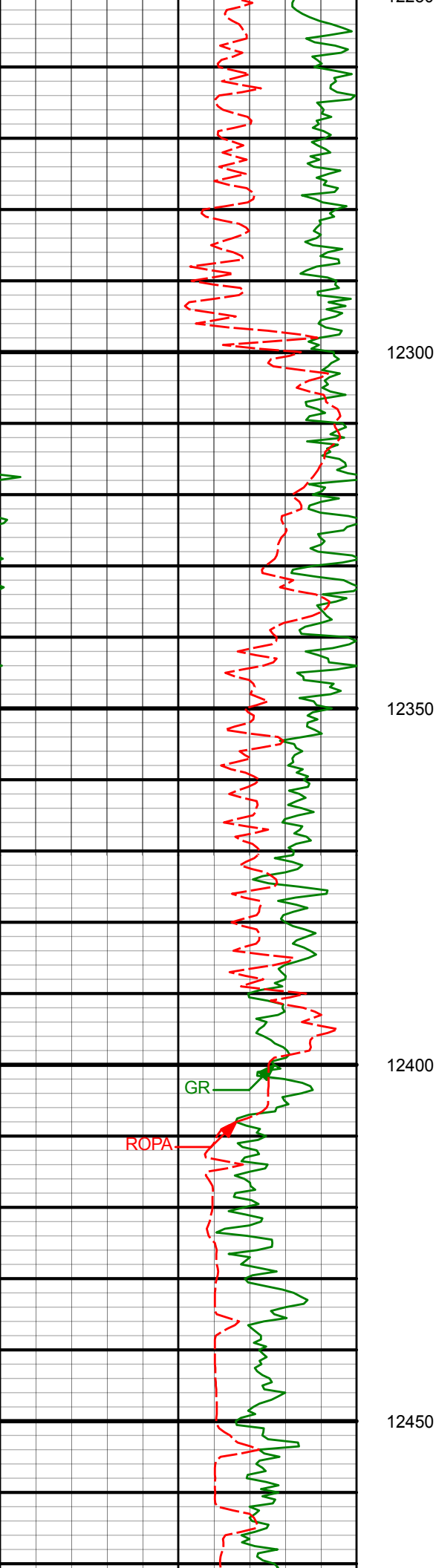
1.23°

7354.19'

4245.21'

12200

12250



12263' 89.60° 359.83° 7354.26' 4335.20'

12300

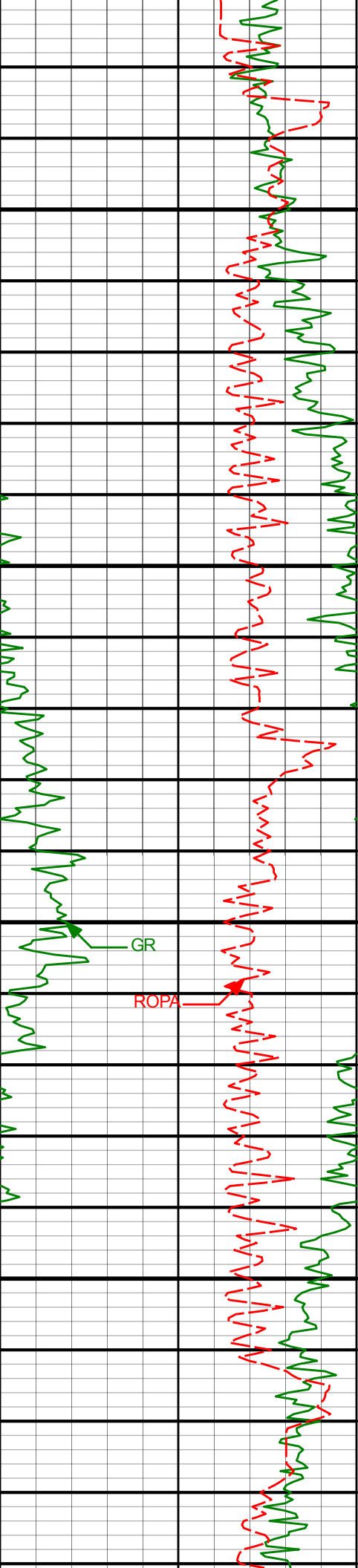
12350

12353' 90.78° 3.44° 7353.96' 4425.17'

12400

12450

12442' 90.15° 2.92° 7353.24' 4514.09'



12500

12532'

90.27°

2.43°

7352.91'

4604.04'

12550

12600

12622'

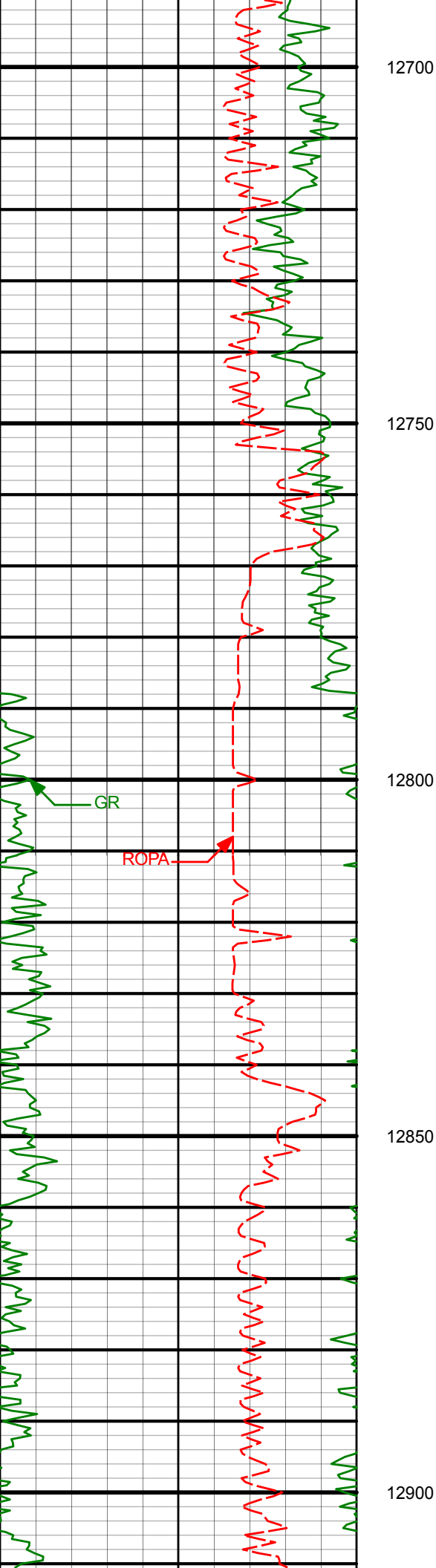
90.65°

2.84°

7352.19'

4693.98'

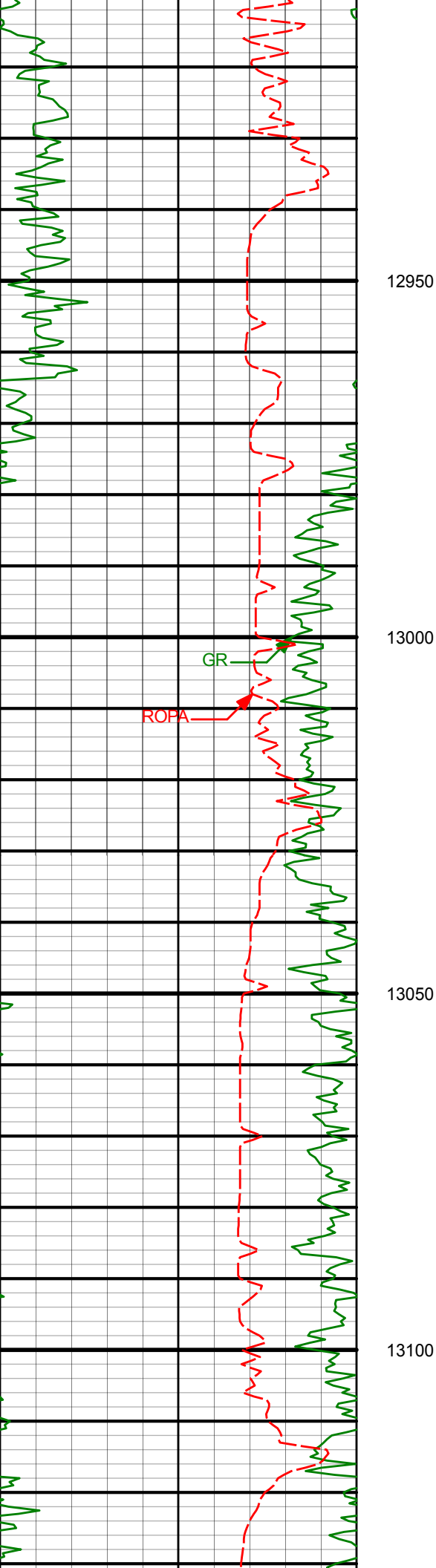
12650



12712'	90.65°	2.38°	7351.16'	4783.93'
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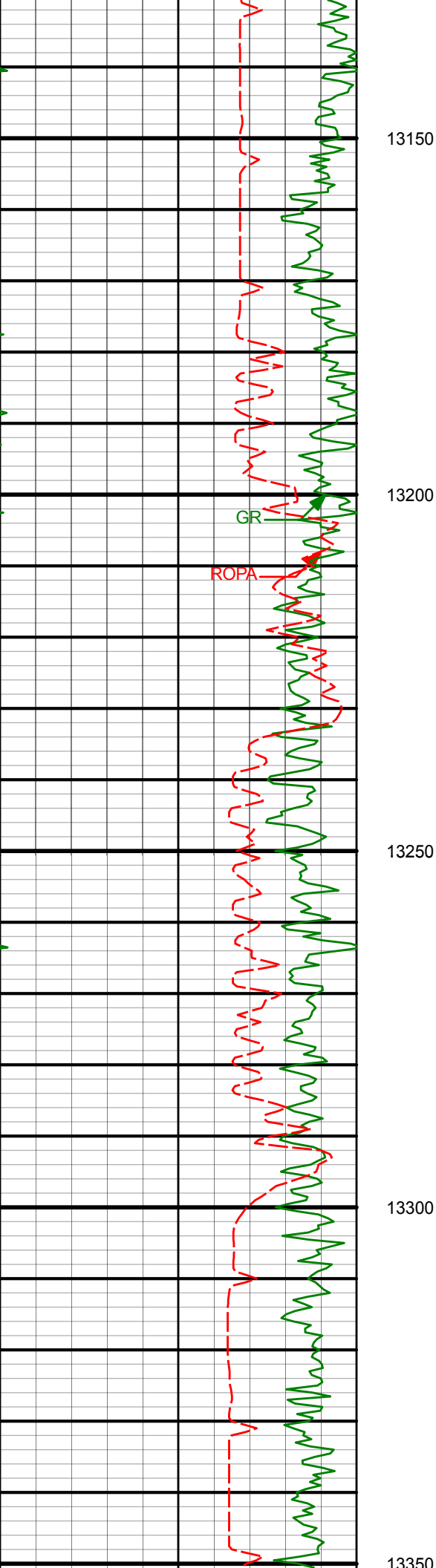
12802'	90.52°	2.05°	7350.24'	4873.89'
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12892'	90.36°	2.04°	7349.55'	4963.86'
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12981' 90.19° 1.90° 7349.12' 5052.84'

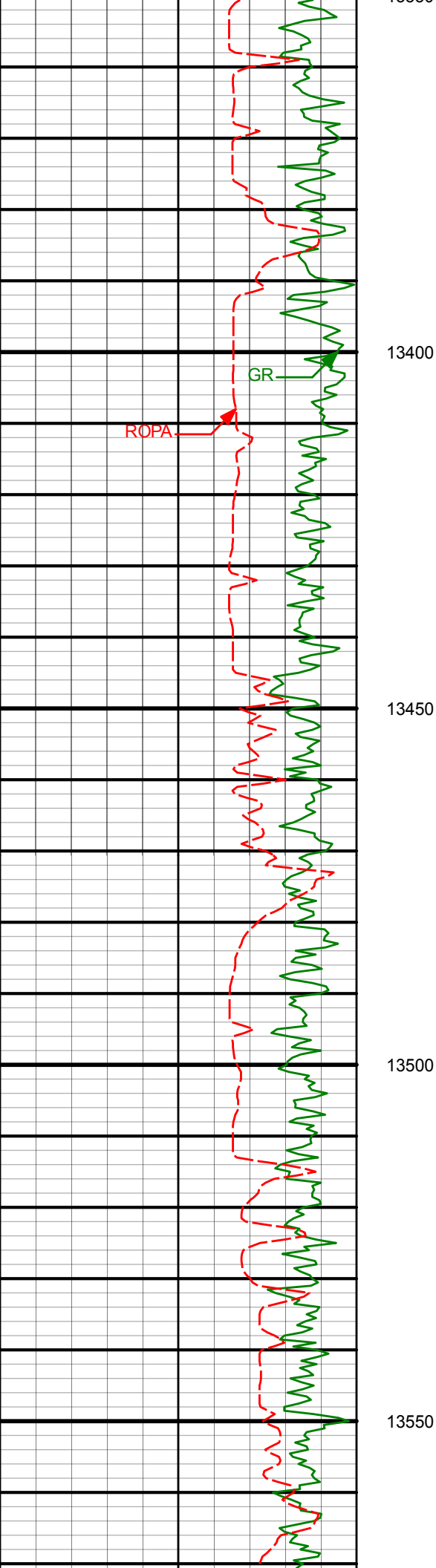
13071' 90.44° 1.58° 7348.63' 5142.83'



13161'	90.57°	1.50°	7347.84'	5232.81'
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13251'	89.56°	1.12°	7347.74'	5322.81'
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13341'	89.60°	1.26°	7348.40'	5412.80'
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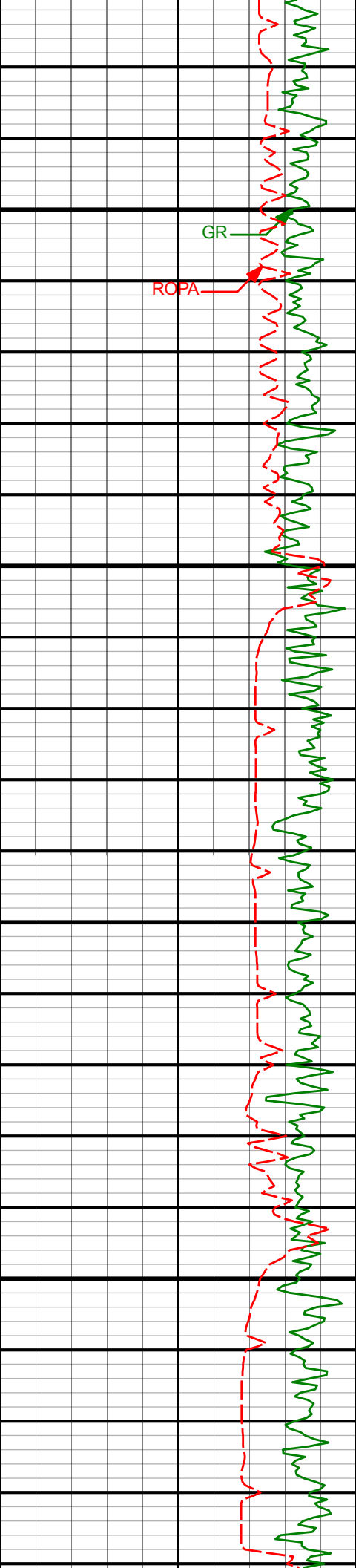
13430' 89.18° 0.48° 7349.34' 5501.80'

13450

13500

13520' 89.64° 0.18° 7350.27' 5591.79'

13550



13600

13650

13700

13750

13610'

13700'

13789'

89.77°

89.85°

89.85°

359.04°

358.68°

358.41°

7350.73'

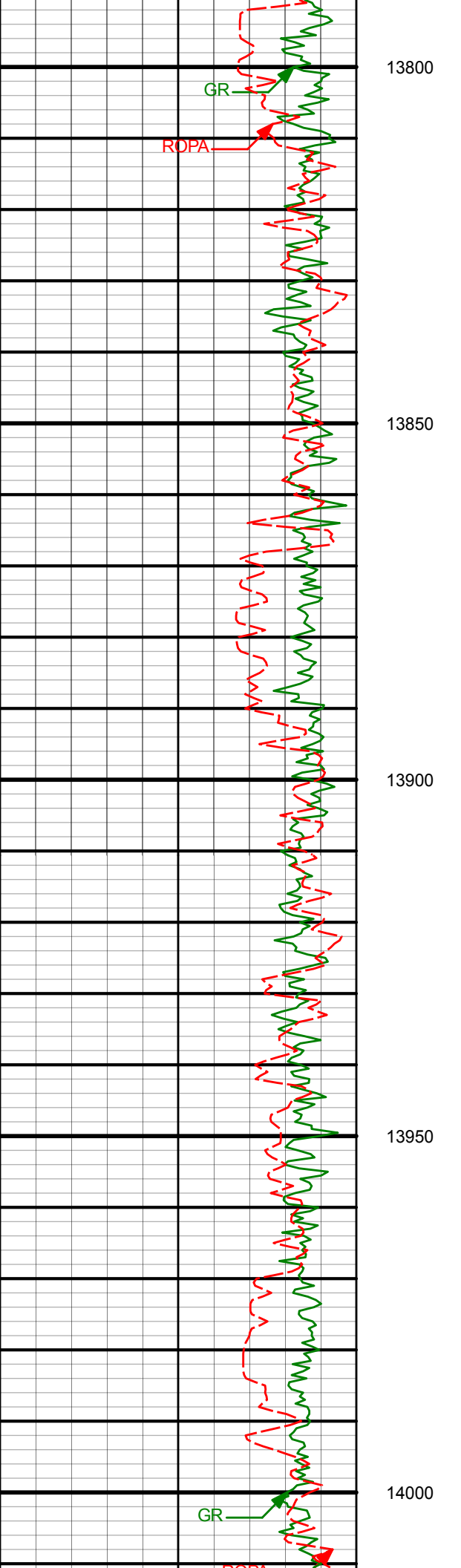
7351.02'

7351.25'

5681.77'

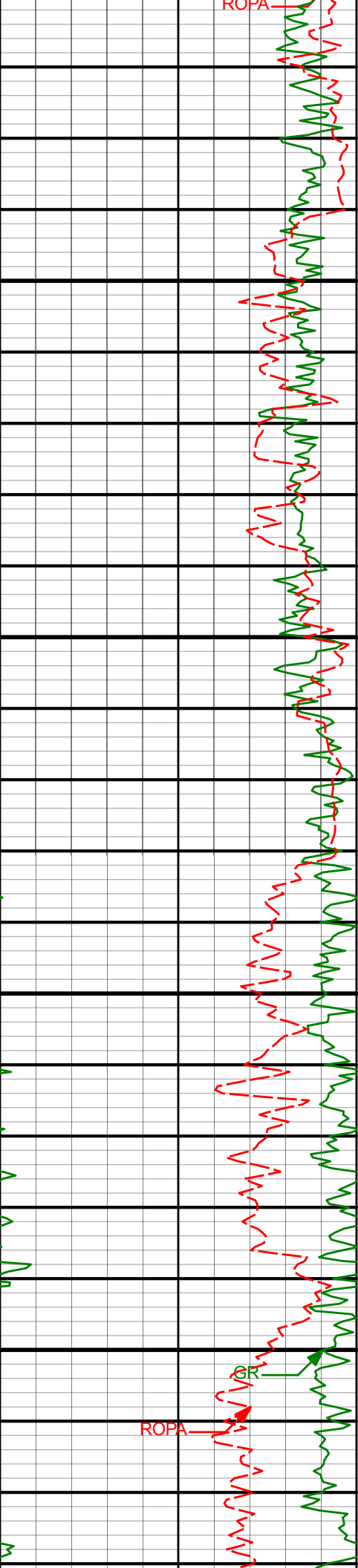
5771.72'

5860.66'



13879' 90.19° 358.18° 7351.22' 5950.58'

13969' 90.23° 357.36° 7350.89' 6040.46'



14050

14100

14150

14200

14059'

90.19°

358.96°

7350.56'

6130.36'

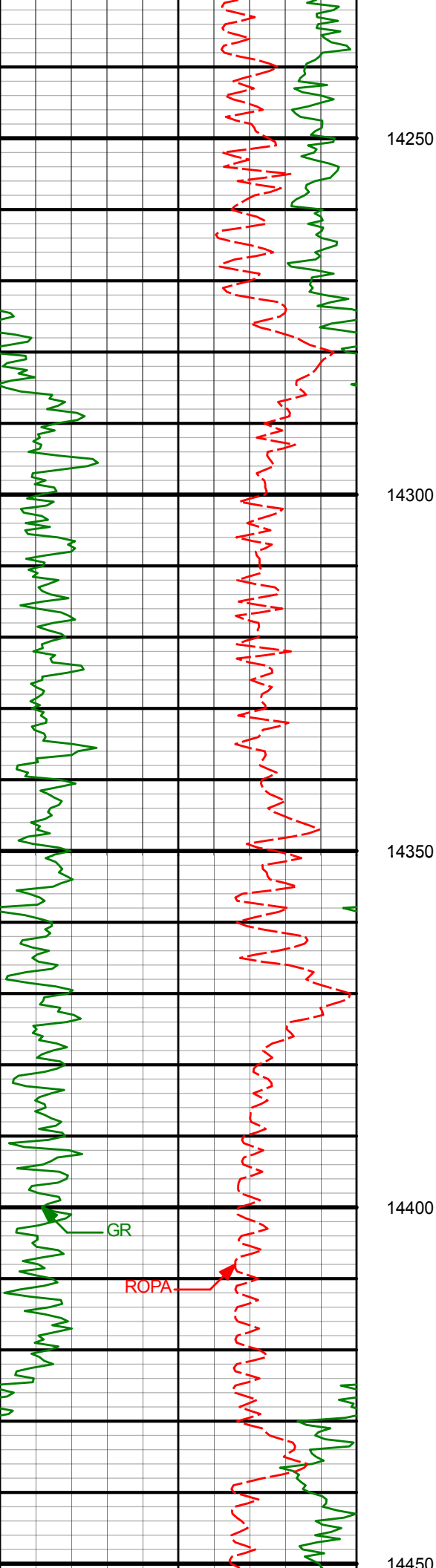
14148'

88.68°

1.87°

7351.44'

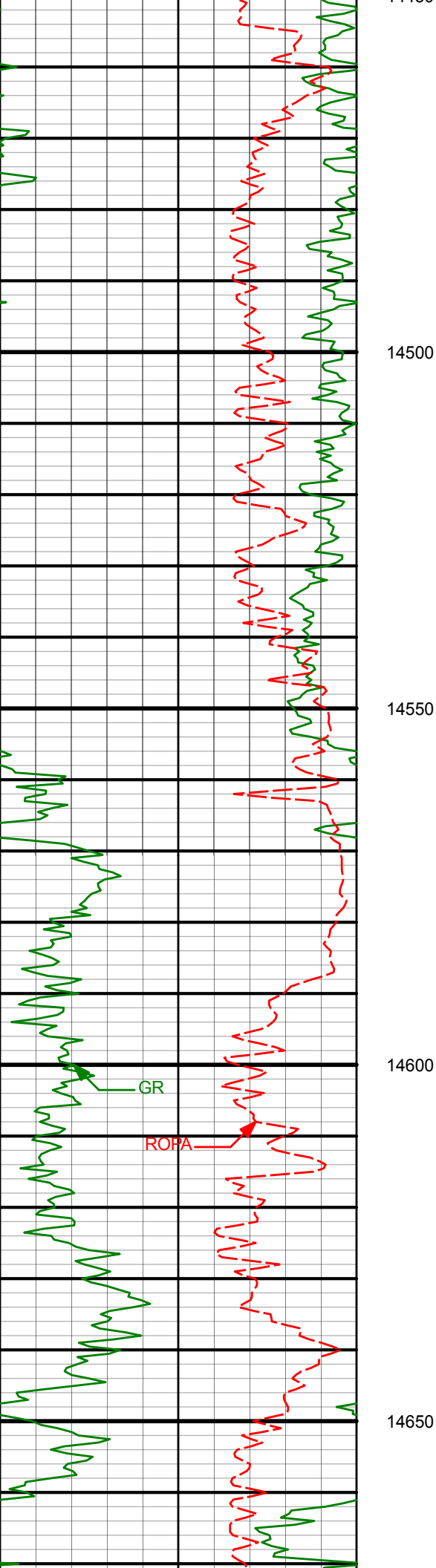
6219.34'



14238' 88.22° 0.87° 7353.88' 6309.30'

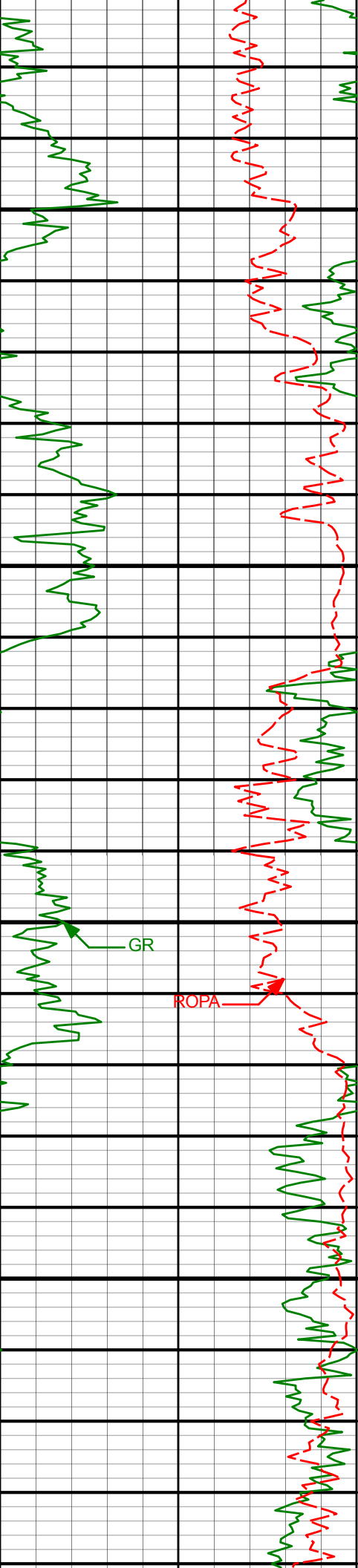
14328' 88.38° 0.54° 7356.55' 6399.26'

14418' 87.75° 359.67° 7359.58' 6489.21'



14508' 88.25° 358.93° 7362.72' 6579.12'

14598' 87.33° 1.70° 7366.19' 6669.04'



14700

14750

14800

14850

14687'

86.62°

0.88°

7370.88'

6757.92'

14777'

87.79°

2.34°

7375.26'

6847.79'

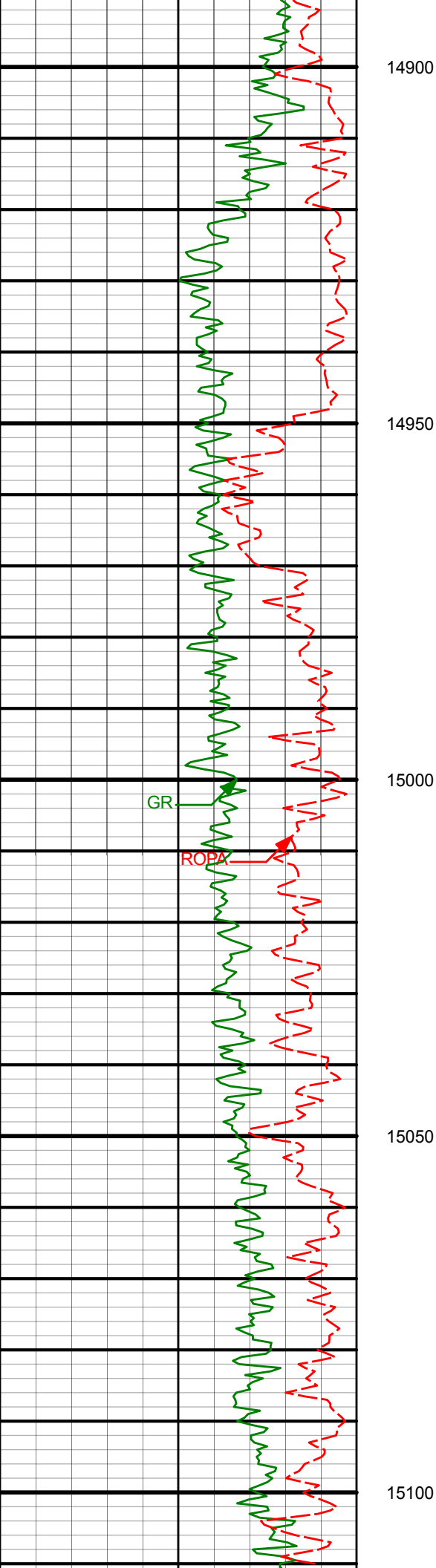
14867'

87.50°

2.62°

7378.96'

6937.68'



14900

14950

15000

15050

15100

14957'

90.27°

3.85°

7380.71'

7027.56'

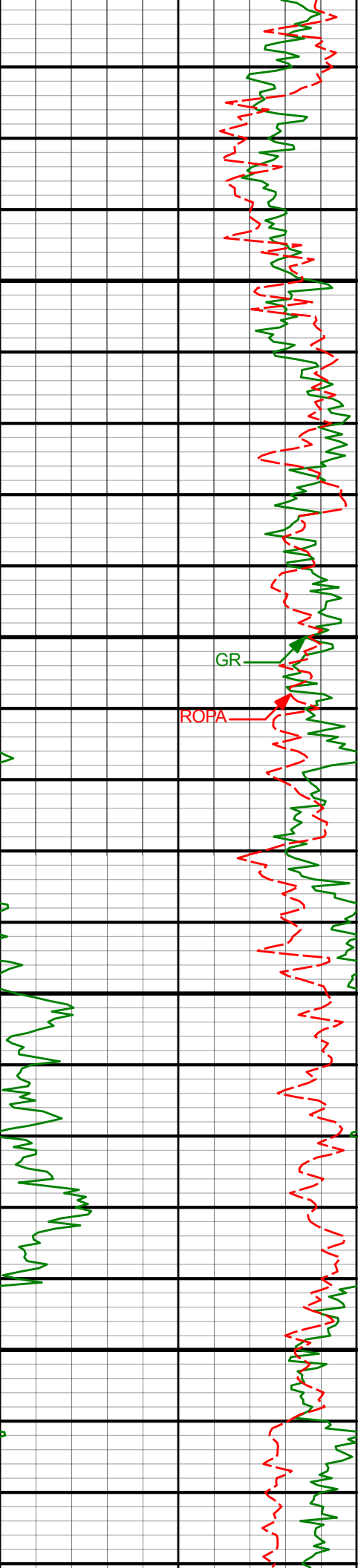
15046'

90.27°

3.08°

7380.29'

7116.46'



15136'	90.82°	2.54°	7379.43'	7206.39'
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15150

15200

GR

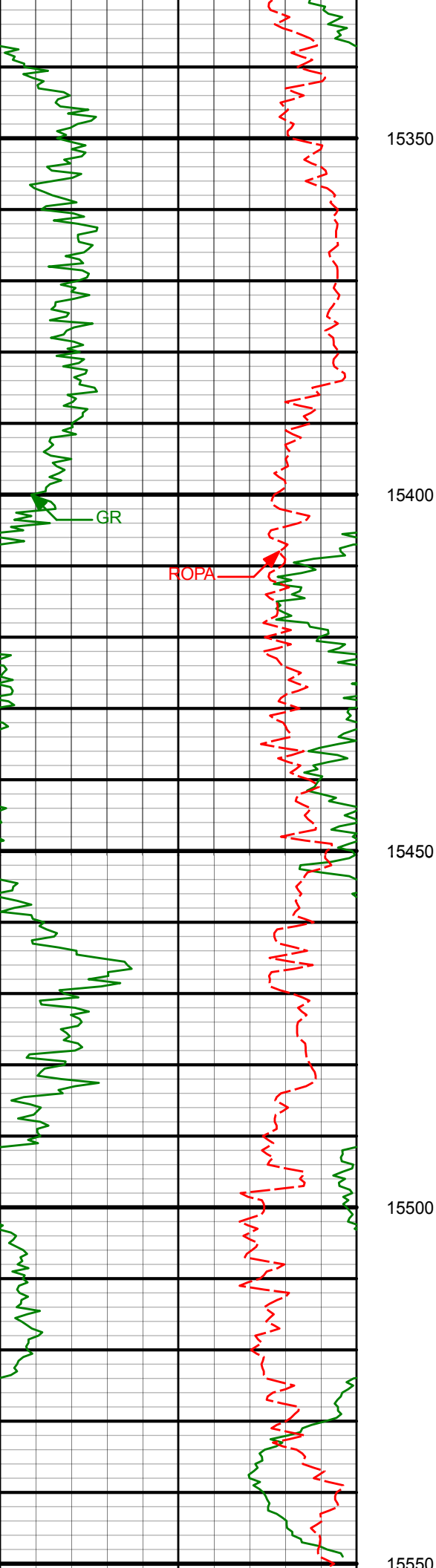
ROPA

15226'	91.11°	1.83°	7377.91'	7296.35'
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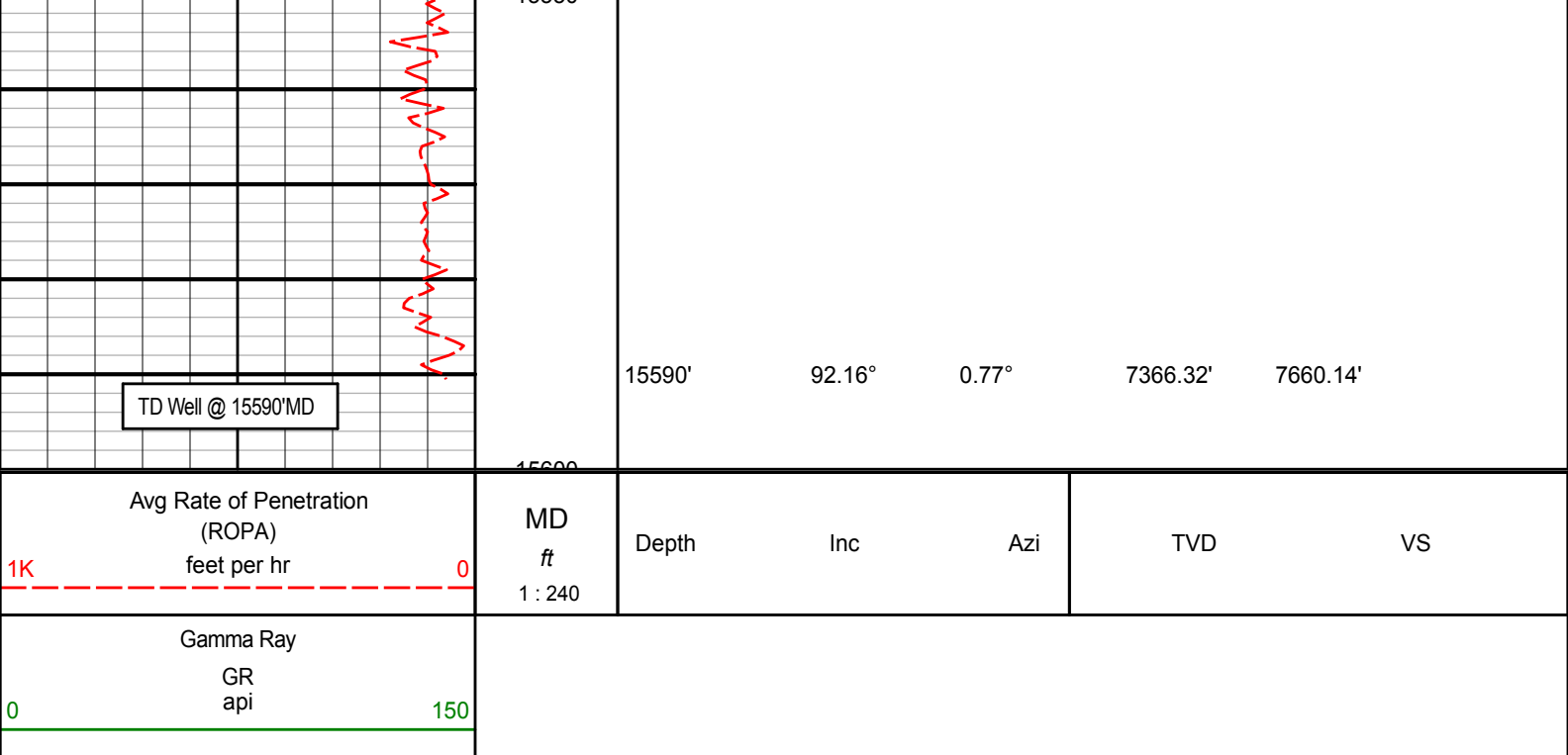
15250

15300

15316'	91.45°	1.71°	7375.90'	7386.31'
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15405'	92.00°	0.96°	7373.22'	7475.27'
15495'	92.21°	0.77°	7369.92'	7565.20'
15544'	92.16°	0.77°	7368.05'	7614.17'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corp
Wagner 2N-10HZ
Wattenberg
Weld Colorado
USA

CA-XX-0904430236

Surveys from 13'-1834' provided by 3rd party

First Sperry survey @ 2010'

Survey corrections provided by Sperry Survey Management

Final survey @ 15590' is projected to TD

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
13.00	0.00	0.00	13.00	0.00 N	0.00 E	0.00	0.00
133.00	0.57	209.23	133.00	0.52 S	0.29 W	-0.52	0.47
165.00	0.66	192.09	165.00	0.84 S	0.41 W	-0.85	0.64
197.00	1.45	168.09	196.99	1.42 S	0.36 W	-1.42	2.78
228.00	1.98	172.05	227.98	2.33 S	0.21 W	-2.33	1.75
260.00	2.15	170.64	259.96	3.47 S	0.03 W	-3.47	0.55
292.00	2.24	170.91	291.93	4.68 S	0.16 E	-4.68	0.28
323.00	2.42	170.38	322.91	5.92 S	0.37 E	-5.92	0.58
355.00	2.02	169.24	354.88	7.14 S	0.59 E	-7.14	1.26
387.00	2.64	169.41	386.86	8.42 S	0.83 E	-8.41	1.94
419.00	2.94	174.68	418.82	9.96 S	1.04 E	-9.95	1.23
450.00	3.74	178.20	449.77	11.77 S	1.14 E	-11.75	2.66
482.00	4.13	179.52	481.69	13.96 S	1.19 E	-13.95	1.25
514.00	5.01	175.48	513.59	16.51 S	1.31 E	-16.49	2.93
546.00	4.92	177.50	545.47	19.27 S	1.48 E	-19.25	0.61
577.00	5.93	174.42	576.33	22.19 S	1.69 E	-22.17	3.39
608.00	6.64	177.67	607.14	25.58 S	1.92 E	-25.55	2.56
640.00	7.38	177.85	638.90	29.48 S	2.07 E	-29.45	2.31
672.00	8.53	177.85	670.59	33.90 S	2.24 E	-33.87	3.59

Wagner 2N-10HZ

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
703.00	9.54	179.52	701.21	38.77 S	2.34 E	-38.74	3.37
767.00	10.68	179.87	764.21	50.01 S	2.40 E	-49.97	1.78
798.00	10.59	179.61	794.68	55.73 S	2.43 E	-55.69	0.33
830.00	11.03	180.75	826.11	61.73 S	2.41 E	-61.69	1.53
862.00	11.34	178.64	857.51	67.93 S	2.44 E	-67.90	1.60
893.00	11.56	179.87	887.89	74.09 S	2.52 E	-74.05	1.06
925.00	12.08	178.82	919.21	80.64 S	2.60 E	-80.60	1.76
957.00	12.30	177.23	950.49	87.39 S	2.83 E	-87.35	1.25
988.00	13.49	176.97	980.71	94.30 S	3.18 E	-94.25	3.84
1020.00	14.24	178.02	1011.77	101.96 S	3.52 E	-101.91	2.47
1051.00	14.24	176.88	1041.82	109.58 S	3.86 E	-109.52	0.90
1083.00	14.02	174.77	1072.85	117.37 S	4.42 E	-117.31	1.75
1114.00	13.84	174.95	1102.94	124.80 S	5.09 E	-124.73	0.60
1146.00	14.59	175.48	1133.96	132.63 S	5.75 E	-132.55	2.38
1178.00	15.03	174.60	1164.90	140.78 S	6.45 E	-140.69	1.54
1210.00	16.39	175.74	1195.70	149.42 S	7.18 E	-149.31	4.36
1241.00	16.79	175.74	1225.41	158.24 S	7.84 E	-158.13	1.29
1273.00	17.40	175.65	1256.00	167.62 S	8.54 E	-167.50	1.91
1305.00	16.70	175.74	1286.59	176.98 S	9.25 E	-176.85	2.19
1336.00	16.17	175.65	1316.33	185.72 S	9.91 E	-185.59	1.71
1368.00	16.13	174.07	1347.06	194.59 S	10.70 E	-194.44	1.38
1400.00	17.23	174.07	1377.72	203.72 S	11.65 E	-203.56	3.44
1431.00	17.40	175.21	1407.31	212.91 S	12.51 E	-212.74	1.22
1463.00	18.24	177.23	1437.78	222.68 S	13.16 E	-222.50	3.26
1494.00	18.72	178.29	1467.18	232.50 S	13.54 E	-232.31	1.89
1558.00	19.07	177.76	1527.73	253.21 S	14.25 E	-253.01	0.61
1590.00	19.64	178.02	1557.92	263.81 S	14.64 E	-263.61	1.80
1621.00	19.73	177.59	1587.11	274.24 S	15.04 E	-274.03	0.55
1652.00	20.04	177.15	1616.26	284.78 S	15.53 E	-284.56	1.11
1684.00	20.17	176.18	1646.31	295.76 S	16.17 E	-295.53	1.12
1715.00	20.83	176.00	1675.35	306.59 S	16.91 E	-306.35	2.14
1747.00	20.52	176.53	1705.29	317.86 S	17.65 E	-317.62	1.13
1779.00	19.64	176.27	1735.34	328.83 S	18.33 E	-328.57	2.76
1811.00	19.03	175.04	1765.54	339.39 S	19.14 E	-339.12	2.29
1834.00	19.34	175.21	1787.26	346.92 S	19.78 E	-346.65	1.37
2010.00	15.67	174.39	1955.08	399.64 S	24.54 E	-399.30	2.09
2100.00	14.04	183.39	2042.08	422.64 S	25.08 E	-422.29	3.14
2190.00	15.21	181.44	2129.16	445.34 S	24.14 E	-445.00	1.42
2280.00	14.19	179.25	2216.22	468.17 S	23.99 E	-467.83	1.29
2369.00	15.41	186.18	2302.27	490.84 S	22.86 E	-490.52	2.41
2459.00	15.25	180.13	2389.07	514.58 S	21.54 E	-514.26	1.78
2549.00	14.83	181.54	2475.99	537.93 S	21.21 E	-537.62	0.63
2639.00	17.95	182.98	2562.32	563.29 S	20.18 E	-562.99	3.50
2729.00	16.69	181.76	2648.24	590.06 S	19.06 E	-589.77	1.45
2818.00	15.07	180.20	2733.84	614.40 S	18.63 E	-614.12	1.89
2908.00	13.87	179.89	2820.99	636.88 S	18.61 E	-636.60	1.34
2998.00	14.38	180.67	2908.26	658.84 S	18.50 E	-658.56	0.61
3088.00	15.54	181.98	2995.21	682.07 S	17.95 E	-681.79	1.34
3177.00	14.40	181.33	3081.19	705.06 S	17.28 E	-704.78	1.29
3267.00	14.78	179.23	3168.29	727.72 S	17.18 E	-727.45	0.72
3357.00	13.13	178.37	3255.63	749.42 S	17.62 E	-749.14	1.84
3447.00	11.78	175.63	3343.51	768.80 S	18.61 E	-768.51	1.64
3536.00	13.28	171.27	3430.39	787.96 S	20.86 E	-787.64	1.99
3626.00	11.25	171.19	3518.33	806.86 S	23.77 E	-806.50	2.25
3716.00	9.06	172.90	3606.91	822.57 S	25.99 E	-822.18	2.46
3806.00	7.49	176.50	3695.97	835.47 S	27.23 E	-835.06	1.83
3896.00	5.60	153.29	3785.40	845.25 S	29.56 E	-844.81	3.58
3985.00	2.17	177.56	3874.18	850.81 S	31.58 E	-850.34	4.19
4075.00	0.28	20.34	3964.17	852.30 S	31.73 E	-851.84	2.70
4164.00	0.70	352.27	4053.16	851.56 S	31.73 E	-851.09	0.53

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
4254.00	1.18	359.27	4143.15	850.08 S	31.65 E	-849.62	0.55
4344.00	1.45	343.60	4233.13	848.06 S	31.32 E	-847.60	0.50
4434.00	1.47	324.15	4323.10	846.04 S	30.32 E	-845.59	0.55
4523.00	1.16	214.85	4412.08	845.85 S	29.14 E	-845.42	2.41
4613.00	1.12	192.92	4502.07	847.45 S	28.42 E	-847.03	0.48
4703.00	0.51	228.11	4592.06	848.58 S	27.93 E	-848.16	0.85
4793.00	0.66	265.44	4682.05	848.88 S	27.11 E	-848.48	0.44
4883.00	0.94	250.76	4772.04	849.17 S	25.90 E	-848.78	0.39
4972.00	0.69	133.76	4861.04	849.78 S	25.60 E	-849.39	1.57
5062.00	0.44	200.75	4951.04	850.48 S	25.87 E	-850.09	0.73
5152.00	0.78	209.12	5041.03	851.34 S	25.45 E	-850.96	0.39
5242.00	0.96	204.39	5131.02	852.56 S	24.84 E	-852.18	0.21
5331.00	1.29	90.41	5220.01	853.24 S	25.53 E	-852.86	2.12
5421.00	0.78	71.38	5310.00	853.06 S	27.12 E	-852.65	0.68
5511.00	0.63	43.65	5399.99	852.51 S	28.04 E	-852.09	0.41
5601.00	0.71	21.40	5489.98	851.63 S	28.58 E	-851.21	0.30
5690.00	0.80	339.60	5578.98	850.54 S	28.57 E	-850.11	0.61
5780.00	0.96	333.72	5668.97	849.28 S	28.02 E	-848.86	0.20
5870.00	1.17	117.32	5758.96	849.03 S	28.50 E	-848.60	2.24
5960.00	0.98	125.77	5848.94	849.90 S	29.94 E	-849.45	0.27
6091.00	0.65	114.60	5979.93	850.86 S	31.52 E	-850.40	0.28
6181.00	0.61	98.89	6069.93	851.15 S	32.46 E	-850.67	0.20
6271.00	0.18	15.47	6159.92	851.09 S	32.97 E	-850.60	0.69
6360.00	0.53	322.56	6248.92	850.63 S	32.76 E	-850.15	0.50
6450.00	0.88	324.58	6338.92	849.73 S	32.11 E	-849.26	0.39
6540.00	0.74	342.15	6428.91	848.62 S	31.53 E	-848.15	0.31
6630.00	2.02	7.92	6518.88	846.49 S	31.57 E	-846.03	1.54
6719.00	13.72	3.89	6606.89	834.37 S	32.51 E	-833.90	13.15
6809.00	18.72	358.15	6693.28	809.27 S	32.76 E	-808.79	5.84
6899.00	23.41	352.84	6777.25	777.07 S	30.07 E	-776.63	5.62
6988.00	26.34	354.25	6857.99	739.87 S	25.88 E	-739.49	3.36
7078.00	29.35	357.56	6937.56	697.95 S	22.94 E	-697.61	3.76
7168.00	37.25	357.69	7012.72	648.62 S	20.90 E	-648.30	8.78
7258.00	49.78	357.81	7077.85	586.82 S	18.48 E	-586.54	13.92
7347.00	50.70	4.03	7134.80	518.47 S	19.60 E	-518.18	5.47
7437.00	51.29	2.88	7191.45	448.65 S	23.82 E	-448.32	1.19
7527.00	57.04	2.36	7244.11	375.80 S	27.14 E	-375.43	6.40
7617.00	63.78	0.43	7288.54	297.61 S	29.00 E	-297.22	7.71
7706.00	71.06	1.91	7322.69	215.51 S	30.70 E	-215.11	8.32
7796.00	77.98	3.21	7346.70	128.92 S	34.59 E	-128.47	7.82
7886.00	83.34	2.61	7361.30	40.26 S	39.09 E	-39.76	5.99
7976.00	88.76	2.08	7367.50	49.42 N	42.77 E	49.95	6.06
8065.00	88.51	1.15	7369.61	138.36 N	45.28 E	138.92	1.09
8155.00	88.04	0.43	7372.32	228.31 N	46.51 E	228.88	0.95
8245.00	89.73	2.50	7374.07	318.25 N	48.82 E	318.84	2.97
8335.00	89.39	1.97	7374.76	408.18 N	52.33 E	408.81	0.70
8425.00	89.85	1.44	7375.35	498.14 N	55.01 E	498.79	0.78
8515.00	89.81	0.45	7375.62	588.13 N	56.49 E	588.79	1.10
8604.00	89.81	359.44	7375.91	677.12 N	56.41 E	677.78	1.14
8694.00	90.02	359.15	7376.04	767.12 N	55.30 E	767.75	0.40
8784.00	89.94	357.77	7376.08	857.08 N	52.88 E	857.68	1.54
8874.00	90.65	1.78	7375.62	947.06 N	52.52 E	947.65	4.53
8963.00	91.11	2.34	7374.25	1035.99 N	55.72 E	1036.61	0.82
9058.00	91.28	2.06	7372.26	1130.90 N	59.37 E	1131.56	0.35
9152.00	91.83	0.46	7369.71	1224.84 N	61.43 E	1225.52	1.80
9246.00	92.46	359.78	7366.20	1318.78 N	61.62 E	1319.45	0.99
9341.00	89.98	0.98	7364.18	1413.74 N	62.25 E	1414.41	2.90
9435.00	90.19	1.63	7364.05	1507.72 N	64.39 E	1508.41	0.72
9529.00	90.57	1.76	7363.43	1601.67 N	67.17 E	1602.39	0.43
9624.00	90.90	1.23	7362.21	1696.63 N	69.65 E	1697.37	0.67

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
9718.00	91.40	1.06	7360.32	1790.60 N	71.52 E	1791.35	0.56
9812.00	88.55	359.87	7360.35	1884.58 N	72.29 E	1885.34	3.29
9906.00	88.76	359.95	7362.56	1978.56 N	72.14 E	1979.31	0.24
10001.00	88.47	358.93	7364.85	2073.52 N	71.22 E	2074.25	1.11
10095.00	88.47	358.33	7367.36	2167.46 N	68.98 E	2168.16	0.64
10189.00	88.85	1.84	7369.57	2261.42 N	69.12 E	2262.11	3.76
10284.00	90.48	2.41	7370.12	2356.35 N	72.65 E	2357.08	1.82
10378.00	91.28	1.87	7368.67	2450.27 N	76.16 E	2451.03	1.03
10468.00	91.49	1.39	7366.49	2540.21 N	78.71 E	2541.00	0.58
10558.00	91.95	0.98	7363.79	2630.15 N	80.57 E	2630.95	0.68
10647.00	91.91	0.74	7360.79	2719.09 N	81.91 E	2719.90	0.27
10737.00	91.36	0.34	7358.22	2809.05 N	82.76 E	2809.86	0.76
10827.00	89.89	0.45	7357.23	2899.04 N	83.37 E	2899.85	1.64
10916.00	90.19	359.81	7357.17	2988.04 N	83.57 E	2988.85	0.79
11006.00	88.97	359.26	7357.83	3078.03 N	82.84 E	3078.83	1.48
11096.00	88.72	358.77	7359.64	3168.00 N	81.29 E	3168.77	0.61
11186.00	89.77	359.82	7360.83	3257.98 N	80.18 E	3258.73	1.65
11276.00	91.62	0.45	7359.74	3347.97 N	80.40 E	3348.71	2.17
11365.00	91.74	0.49	7357.13	3436.93 N	81.12 E	3437.67	0.15
11455.00	91.83	358.65	7354.32	3526.88 N	80.44 E	3527.61	2.05
11545.00	91.45	357.92	7351.75	3616.80 N	77.74 E	3617.49	0.91
11634.00	90.19	358.44	7350.48	3705.74 N	74.91 E	3706.39	1.53
11724.00	88.93	359.89	7351.17	3795.73 N	73.60 E	3796.35	2.14
11814.00	90.23	3.38	7351.83	3885.67 N	76.16 E	3886.32	4.14
11904.00	89.90	2.00	7351.74	3975.57 N	80.39 E	3976.27	1.58
11994.00	89.52	1.30	7352.20	4065.53 N	82.98 E	4066.25	0.88
12083.00	88.81	358.67	7353.50	4154.51 N	82.95 E	4155.23	3.05
12173.00	90.31	1.23	7354.19	4244.50 N	82.88 E	4245.21	3.29
12263.00	89.60	359.83	7354.26	4334.49 N	83.71 E	4335.20	1.74
12353.00	90.78	3.44	7353.96	4424.44 N	86.28 E	4425.17	4.21
12442.00	90.15	2.92	7353.24	4513.30 N	91.21 E	4514.09	0.92
12532.00	90.27	2.43	7352.91	4603.20 N	95.41 E	4604.04	0.56
12622.00	90.65	2.84	7352.19	4693.10 N	99.55 E	4693.98	0.62
12712.00	90.65	2.38	7351.16	4783.00 N	103.65 E	4783.93	0.50
12802.00	90.52	2.05	7350.24	4872.93 N	107.13 E	4873.89	0.40
12892.00	90.36	2.04	7349.55	4962.87 N	110.34 E	4963.86	0.19
12981.00	90.19	1.90	7349.12	5051.82 N	113.40 E	5052.84	0.25
13071.00	90.44	1.58	7348.63	5141.77 N	116.13 E	5142.83	0.45
13161.00	90.57	1.50	7347.84	5231.74 N	118.55 E	5232.81	0.17
13251.00	89.56	1.12	7347.74	5321.71 N	120.61 E	5322.81	1.20
13341.00	89.60	1.26	7348.40	5411.69 N	122.47 E	5412.80	0.16
13430.00	89.18	0.48	7349.34	5500.67 N	123.82 E	5501.80	0.99
13520.00	89.64	0.18	7350.27	5590.67 N	124.34 E	5591.79	0.61
13610.00	89.77	359.04	7350.73	5680.66 N	123.73 E	5681.77	1.28
13700.00	89.85	358.68	7351.02	5770.64 N	121.95 E	5771.72	0.41
13789.00	89.85	358.41	7351.25	5859.62 N	119.69 E	5860.66	0.30
13879.00	90.19	358.18	7351.22	5949.58 N	117.01 E	5950.58	0.46
13969.00	90.23	357.36	7350.89	6039.51 N	113.51 E	6040.46	0.90
14059.00	90.19	358.96	7350.56	6129.46 N	110.63 E	6130.36	1.77
14148.00	88.68	1.87	7351.44	6218.44 N	111.28 E	6219.34	3.69
14238.00	88.22	0.87	7353.88	6308.38 N	113.43 E	6309.30	1.22
14328.00	88.38	0.54	7356.55	6398.33 N	114.54 E	6399.26	0.41
14418.00	87.75	359.67	7359.58	6488.28 N	114.71 E	6489.21	1.20
14508.00	88.25	358.93	7362.72	6578.22 N	113.61 E	6579.12	0.99
14598.00	87.33	1.70	7366.19	6668.14 N	114.10 E	6669.04	3.24
14687.00	86.62	0.88	7370.88	6756.99 N	116.10 E	6757.92	1.22
14777.00	87.79	2.34	7375.26	6846.84 N	118.62 E	6847.79	2.08
14867.00	87.50	2.62	7378.96	6936.68 N	122.51 E	6937.68	0.45
14957.00	90.27	3.85	7380.71	7026.51 N	127.59 E	7027.56	3.37
15046.00	90.27	3.08	7380.29	7115.35 N	132.97 E	7116.46	0.87

Wagner 2N-10HZ

<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>
15136.00	90.82	2.54	7379.43	7205.23 N	137.38 E	7206.39	0.85
15226.00	91.11	1.83	7377.91	7295.16 N	140.81 E	7296.35	0.86
15316.00	91.45	1.71	7375.90	7385.09 N	143.59 E	7386.31	0.40
15405.00	92.00	0.96	7373.22	7474.03 N	145.66 E	7475.27	1.04
15495.00	92.21	0.77	7369.92	7563.95 N	147.02 E	7565.20	0.32
15544.00	92.16	0.77	7368.05	7612.91 N	147.68 E	7614.17	0.09
15590.00	92.16	0.77	7366.32	7658.88 N	148.30 E	7660.14	0.01

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 0.72 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.14 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 15590.00 FEET
IS 7660.31 FEET ALONG 1.11 DEGREES (TRUE)**