



1 : 240

WELL INFORMATION					
MWD Run Number	100	200			
Date run completed	04-Dec-17	08-Dec-17			
Rig Bit Number	2	3			
Bit Size (in)	8.500	6.125			
Tool Nominal OD (in)	6.750	4.750			
Log Start Depth (MD, ft)	1,908.00	6,028.00			
Log End Depth (MD, ft)	6,028.00	15,361.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	03-Dec-17 14:30	04-Dec-17 04:43			
Drill/Wipe End Date and Time	04-Dec-17 04:00	04-Dec-17 04:43			
Min Inc (deg) @ Depth (MD, ft)	0.69 @ 4,971.00	0.82 @ 6,271.00			
Max Inc (deg) @ Depth (MD, ft)	17.48 @ 1,919.00	92.37 @ 8,514.00			
Bit TFA(in2) / Bit Type	0.75 / PDC	0.75 / PDC			
Flow Rate (gpm)	565.62	286.79			
Max AV (fpm) / CV (fpm) @ MWD	433.3 / 703.6	394.6 / 483.2			
Fluid Type	Diesel Mud Base	Diesel Mud Base			
Density (ppg) / Viscosity (spqt)	9.05 / 76.00	9.62 / 71.00			
Filtrate CL (ppm)	32,000.00	31,000.00			
pH / API Filtrate (mptm)	N/A	N/A / 4			
PV (cP) / YP (lbf2)	21 / 10.00	25 / 10.00			
% Solids / % Sand	8.00 / 0	11.00 / 0			
% Oil / Oil:Water Ratio	69.00 / 75:25	69.00 / 78:22			
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) / C	N/A	N/A			

Max Tool Temp (degF) / Source	N/A	N/A			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Max Trainoff	Max Trainoff			
Customer Representative	Jackie McKinley	Jackie McKinley			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	Sperry Next Gen	Sperry Next Gen			
Software Version	N/A	N/A			
Sub Serial Number	N/A	N/A			
Insert Serial Number	N/A	N/A			
Date and Time Initialized	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			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

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

Gamma Ray Sensor Information

Tool Type	Sperry Next Gen GM	Sperry Next Gen GM			
Distance From Bit (ft)	37.52	41.38			
Recorded Sample Period (sec)	N/A	N/A			
Software Version	N/A	N/A			
Sub Serial Number	N/A	N/A			
Insert/Sonde Serial Number	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. All runs were drilled with Sperry Next Gen MWD tools. Directional Module SN: D067, Gamma Module SN: G071
4. All data presented is recorded data unless otherwise stated.
5. All gamma data was corrected for collar thickness only.
6. 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

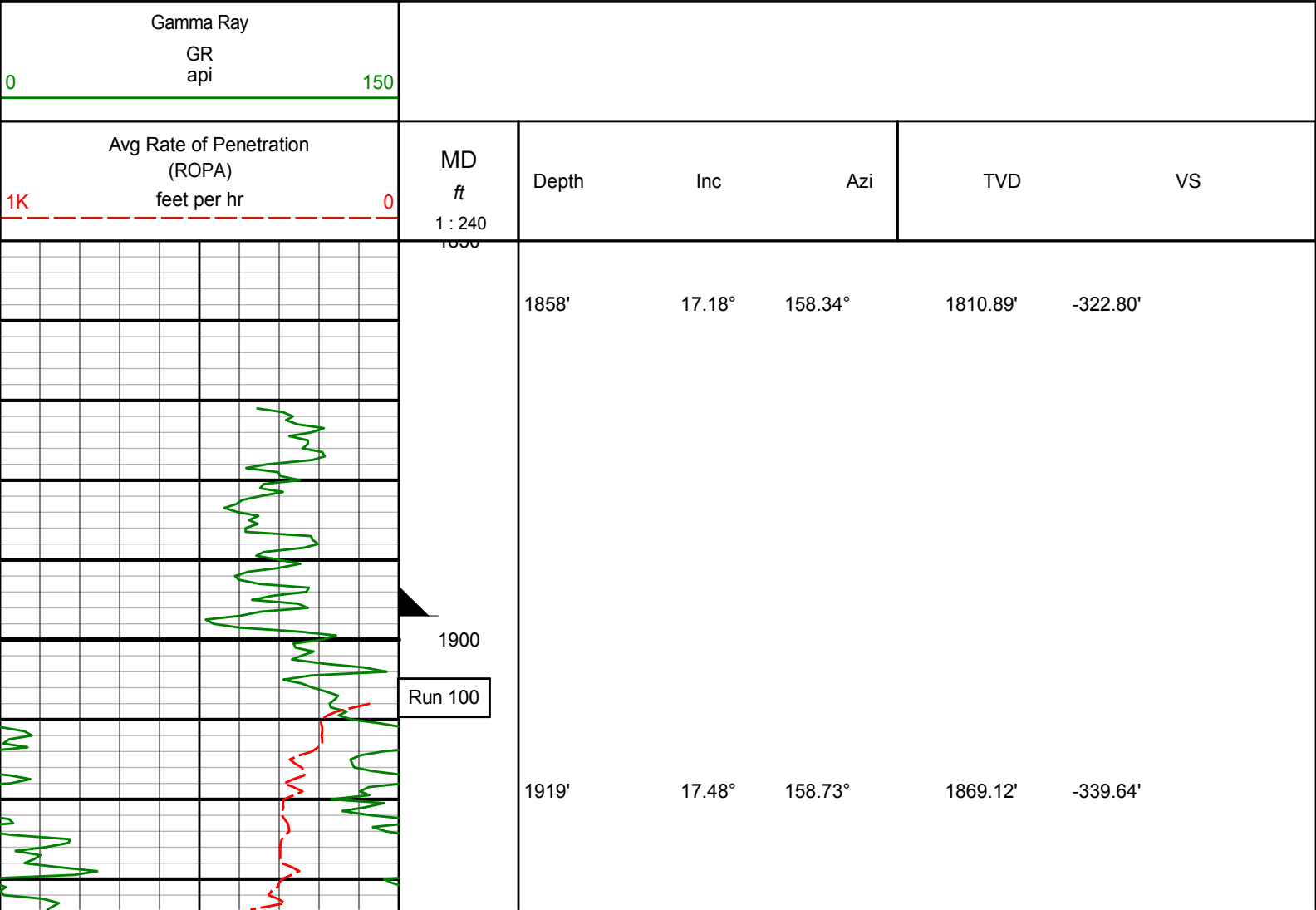
ROPA (Average Rate of Penetration):
Interval Resolution: 0.5ft
Interval Distance: 1.2ft
Gap Fill: 3.0ft
7. Surveys from 1919-15315 corrected by Sperry Survey Management

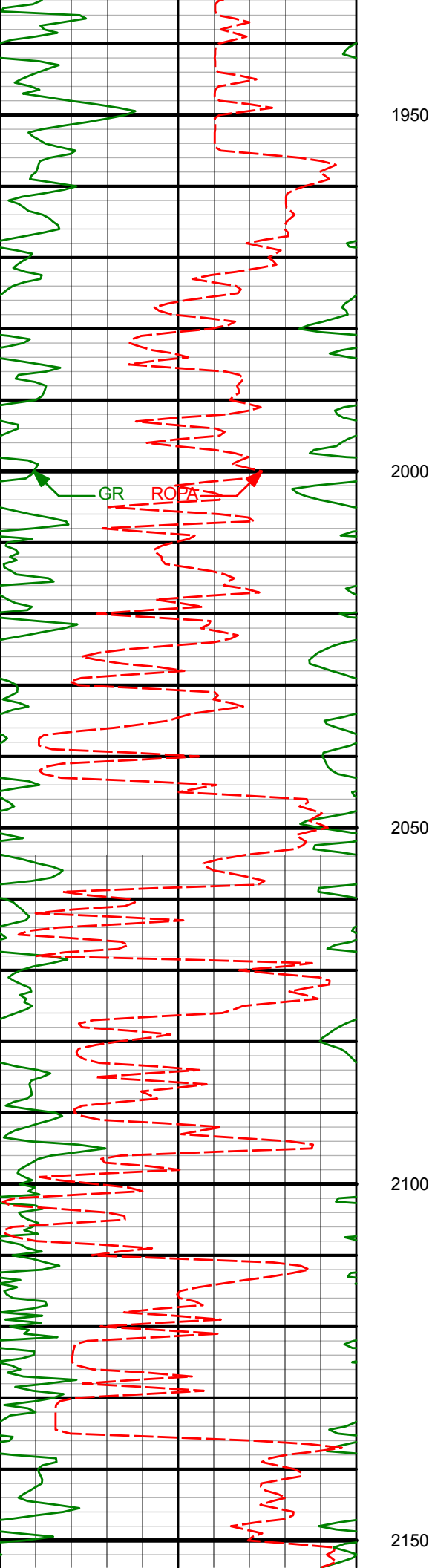
WARRANTY

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Detail Log 1:240





2008'

17.13°

157.02°

1954.09'

-364.05'

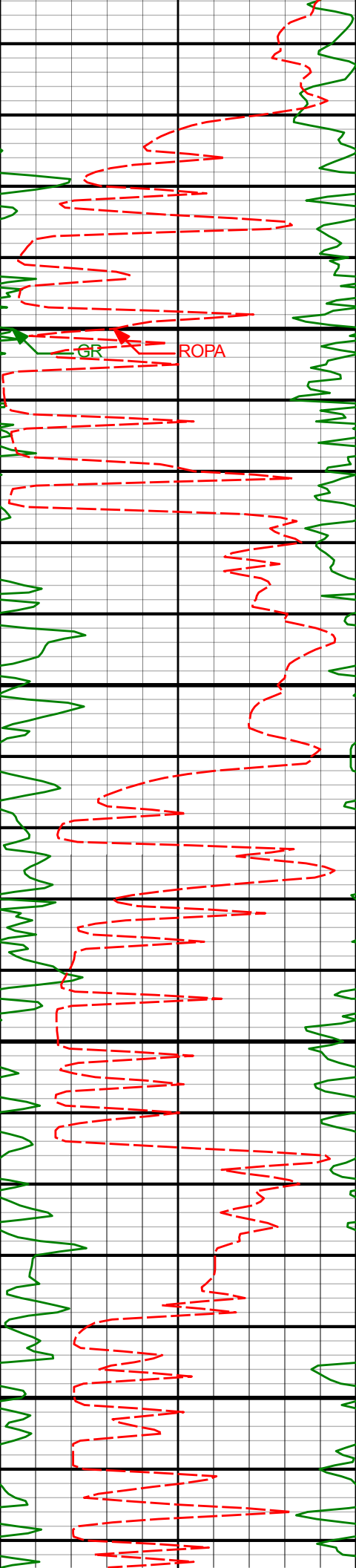
2098'

16.63°

155.24°

2040.21'

-387.83'



2188'	14.73°	156.40°	2126.86'	-409.90'
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2200

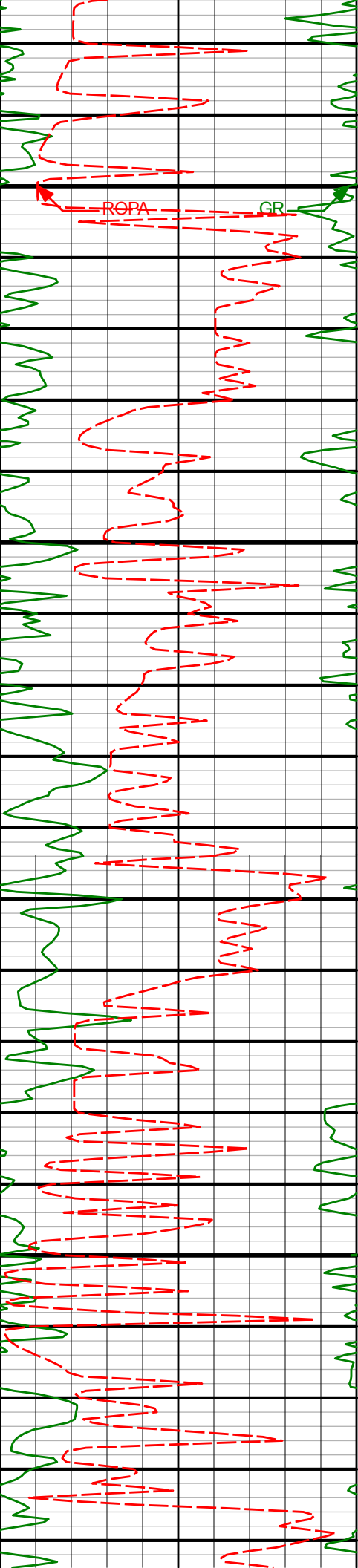
2250

2278'	12.56°	162.16°	2214.32'	-429.61'
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2300

2350

2368'	12.06°	163.40°	2302.25'	-447.87'
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2400

2450

2500

2550

2457'

11.52°

162.99°

2389.37'

-465.22'

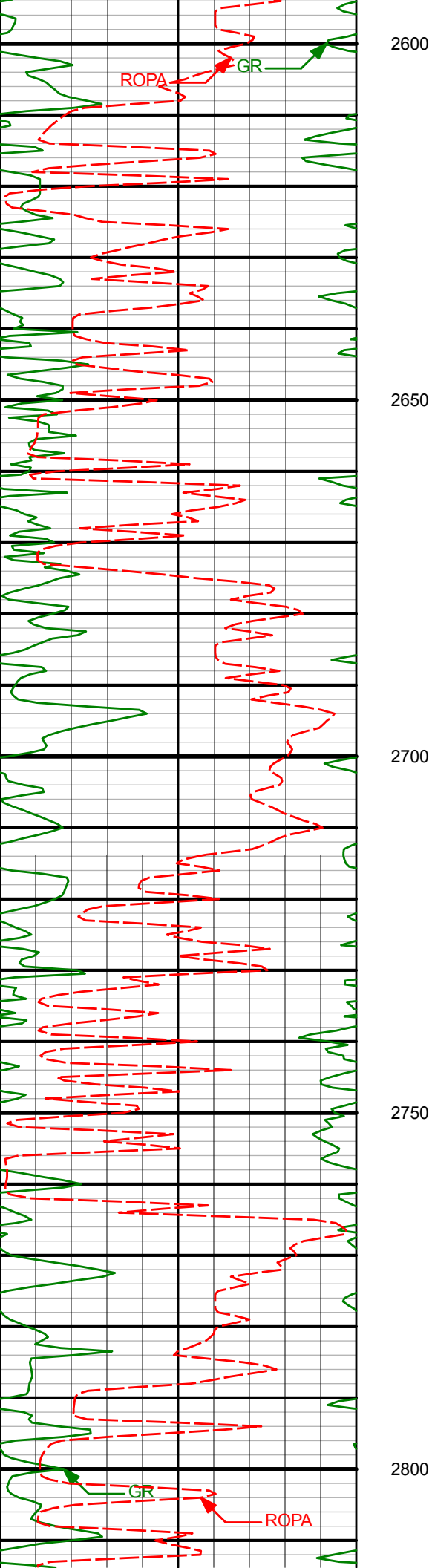
2547'

11.08°

163.16°

2477.63'

-482.04'



2637'

10.87°

164.09°

2565.98'

-498.42'

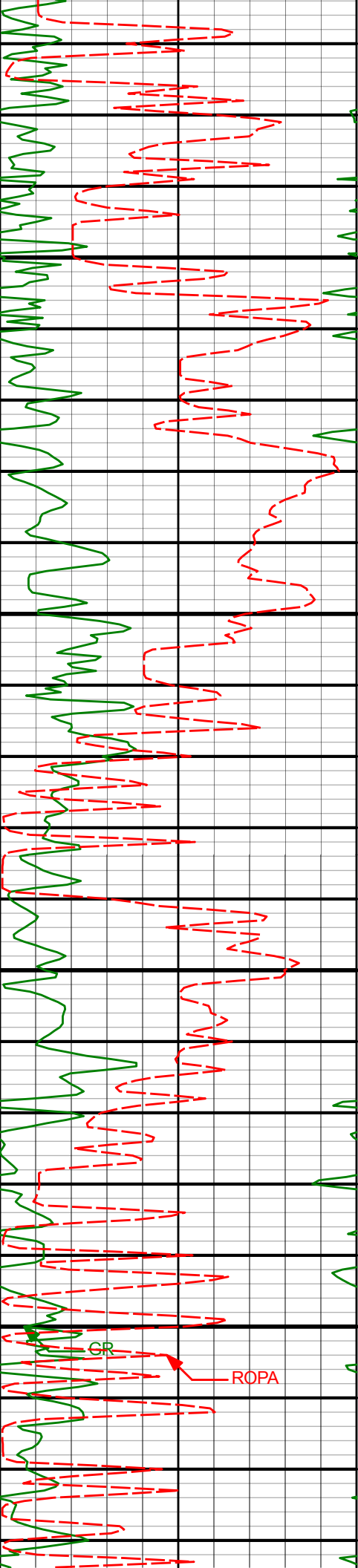
2727'

11.84°

160.52°

2654.22'

-515.23'



2850

2900

2950

3000

2817'

11.00°

158.14°

2742.44'

-531.83'

2906'

10.53°

168.65°

2829.88'

-547.63'

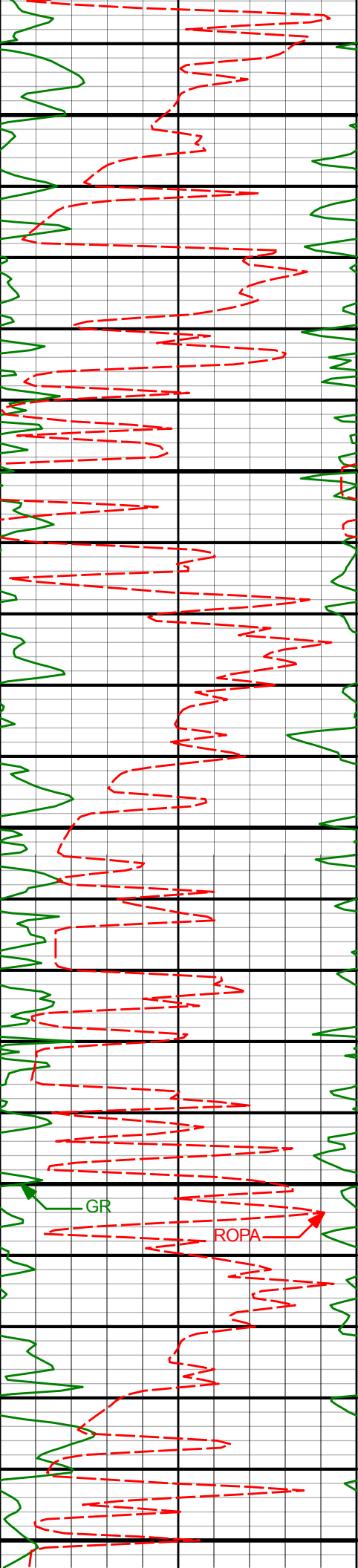
2996'

9.45°

173.65°

2918.52'

-563.02'



3050

3086'

8.62°

174.87°

3007.40'

-577.07'

3100

3150

3176'

7.71°

175.88°

3096.48'

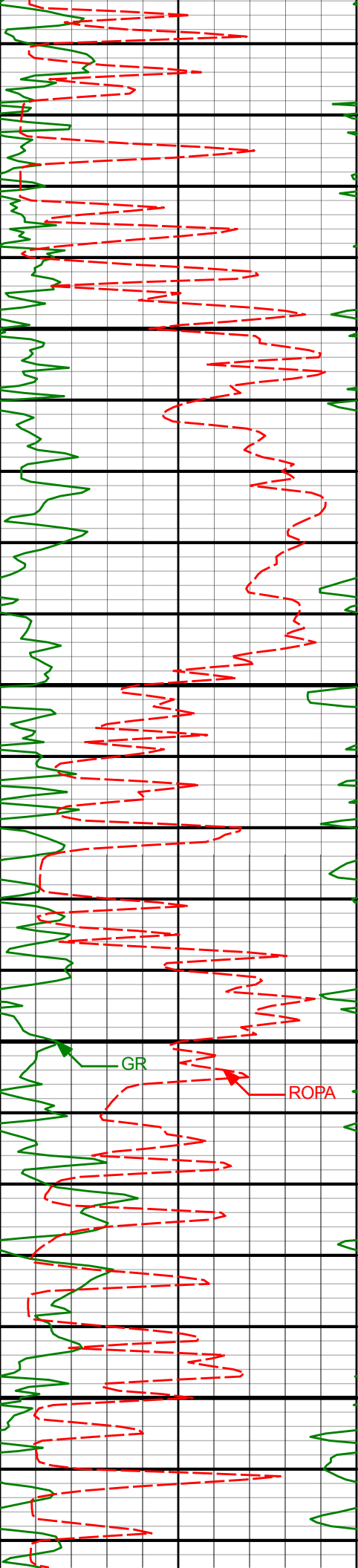
-589.80'

3200

GR

ROPA

3250



3300

3350

3400

3450

3265'

6.68°

177.95°

3184.78'

-600.92'

3355'

6.97°

166.50°

3274.15'

-611.44'

3445'

6.57°

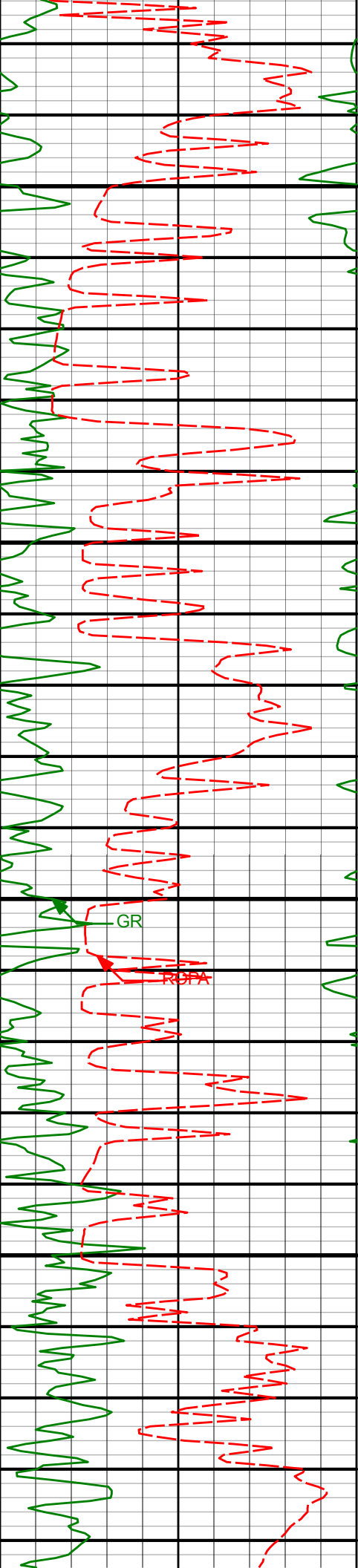
168.78°

3363.52'

-621.78'

GR

ROPA



3500

3550

3600

3650

3535'

5.97°

172.26°

3452.98'

-631.45'

3624'

4.96°

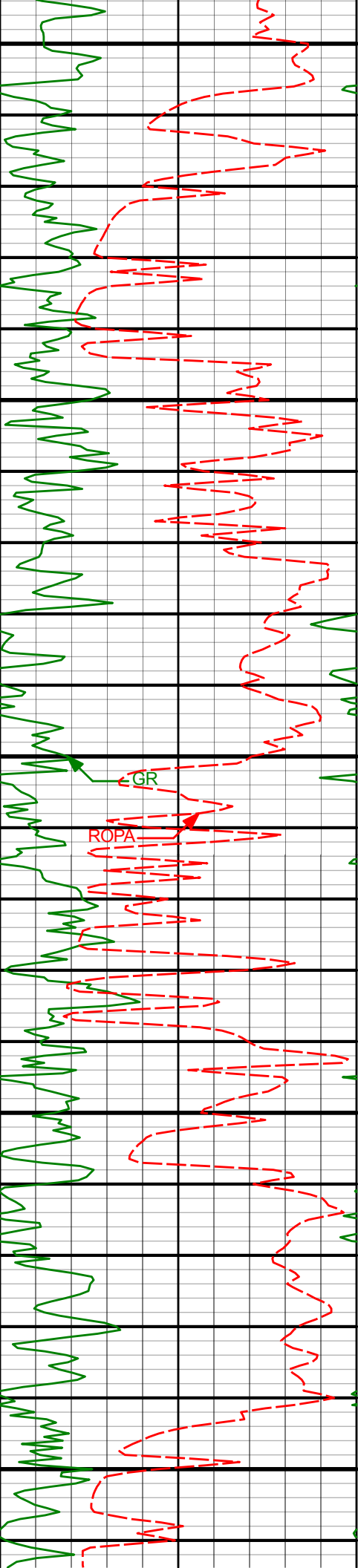
179.51°

3541.58'

-639.88'

GR

RUPA



3700

3714'

3.08°

214.96°

3631.37'

-645.76'

3750

3800

3804'

3.01°

196.65°

3721.24'

-650.02'

3850

3894'

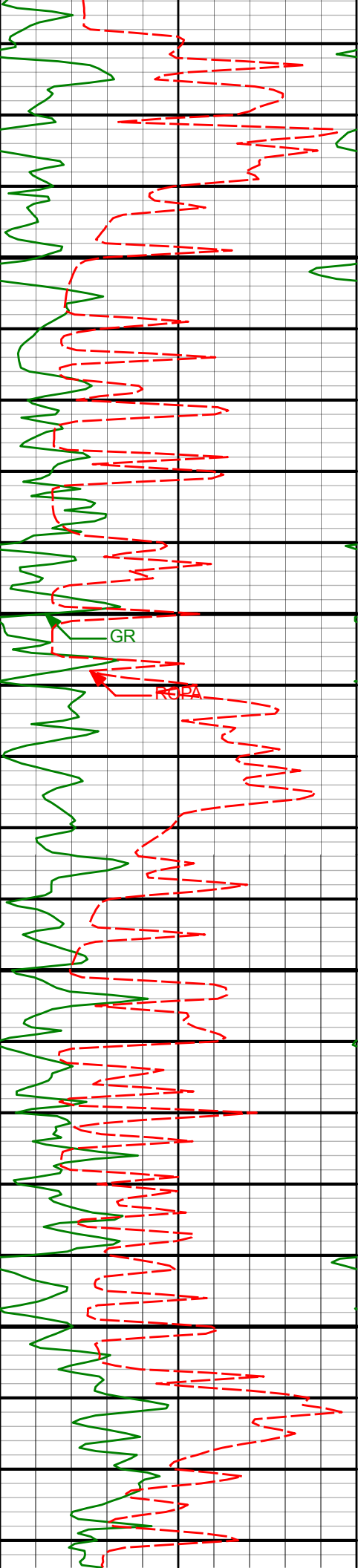
3.60°

154.81°

3811.10'

-654.84'

3900



3950

3984'

3.02°

144.80°

3900.95'

-659.30'

4000

GR

RCIPA

4050

4073'

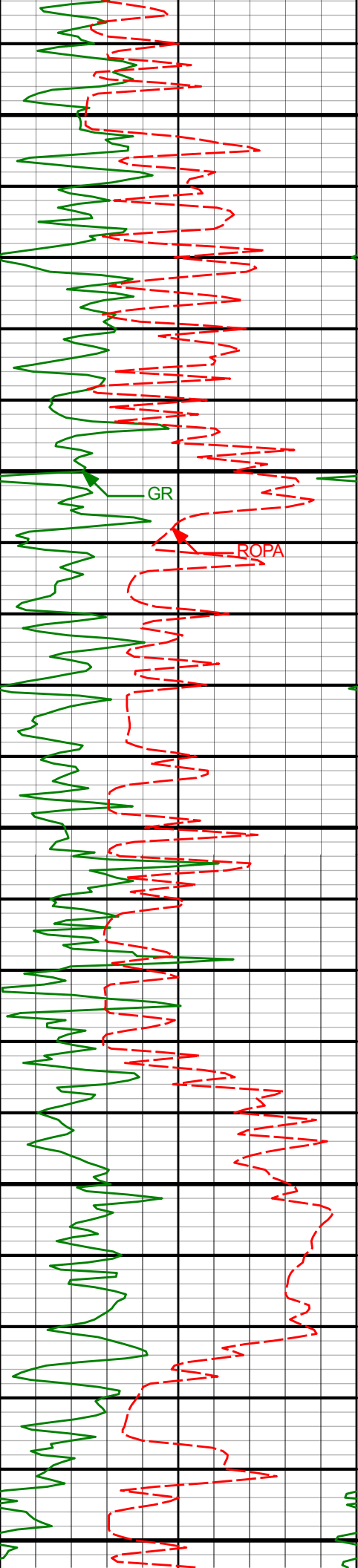
1.96°

145.80°

3989.87'

-662.45'

4100



4150

4163'

1.85°

158.76°

4079.82'

-665.07'

4200

GR

ROPA

4250

4252'

1.37°

171.71°

4168.78'

-667.45'

4300

4342'

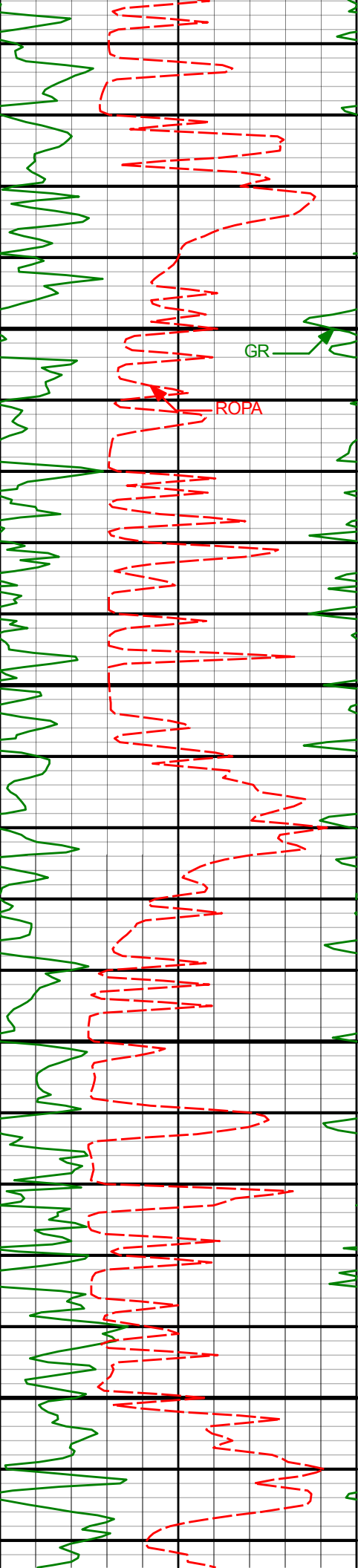
2.14°

149.17°

4258.74'

-669.94'

4350



4400

GR

ROPA

4432'

2.09°

149.55°

4348.68'

-672.78'

4450

4500

4522'

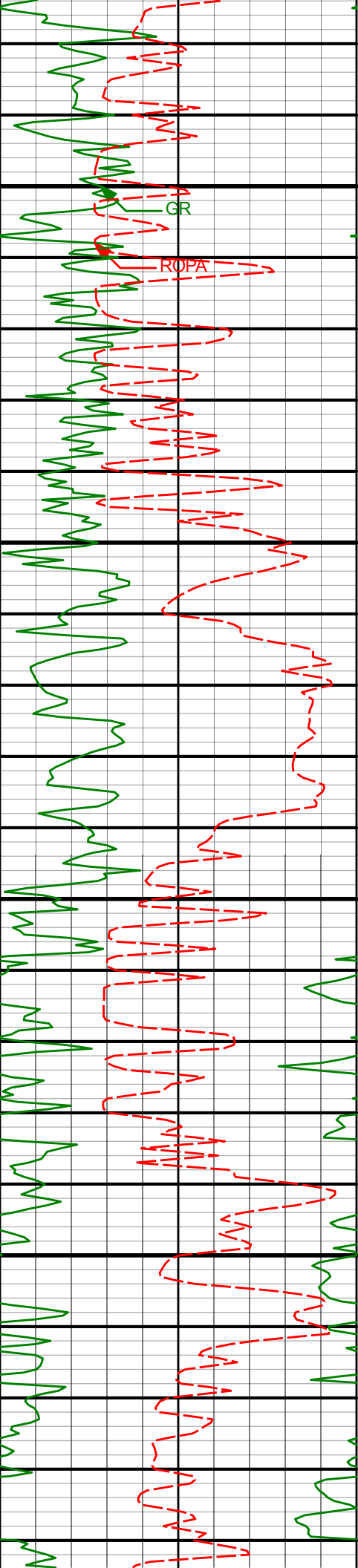
1.73°

157.73°

4438.63'

-675.43'

4550



4600

4650

4700

4750

4611'

1.05°

175.08°

4527.60'

-677.48'

4701'

1.62°

129.67°

4617.58'

-679.11'

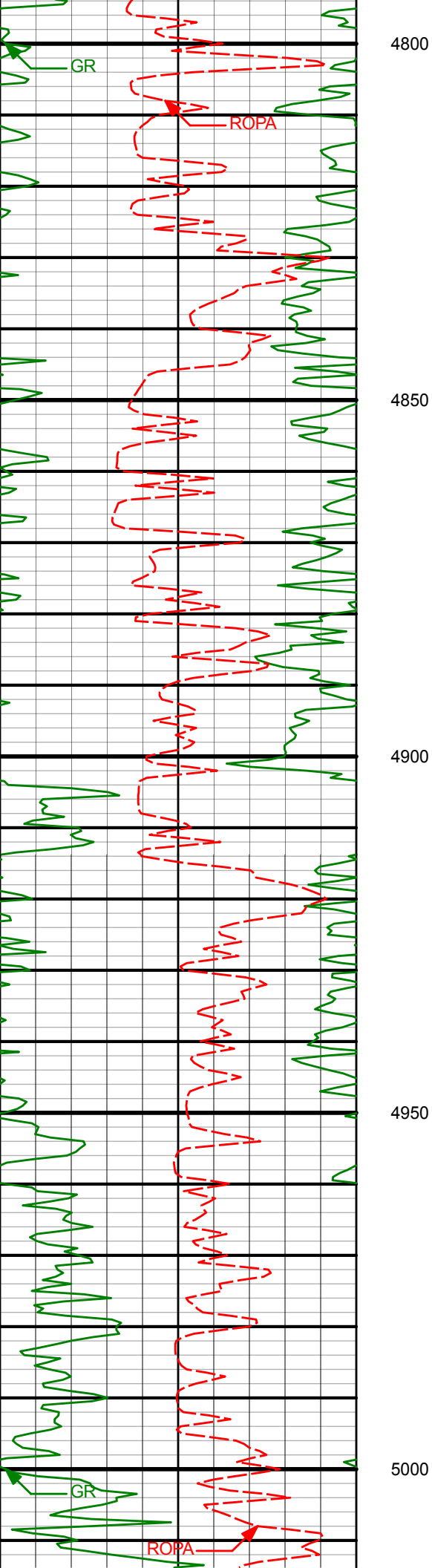
4791'

1.31°

134.84°

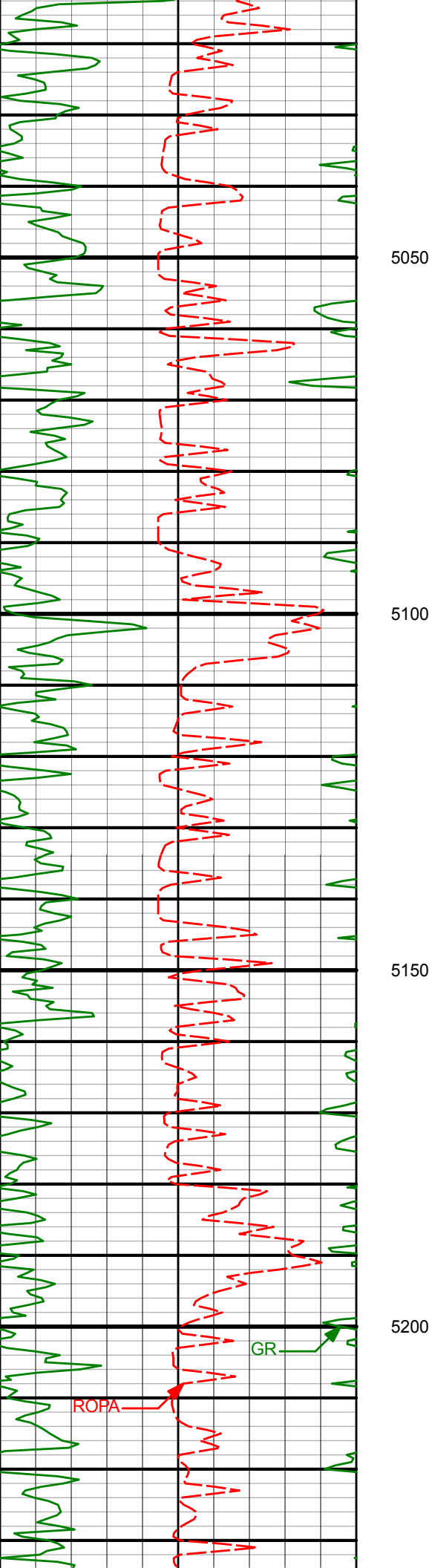
4707.55'

-680.62'



4881' 0.82° 142.74° 4797.54' -681.85'

4971' 0.69° 174.54° 4887.53' -682.90'



5060'

0.97°

197.27°

4976.52'

-684.16'

5100

5150

5150'

1.17°

216.29°

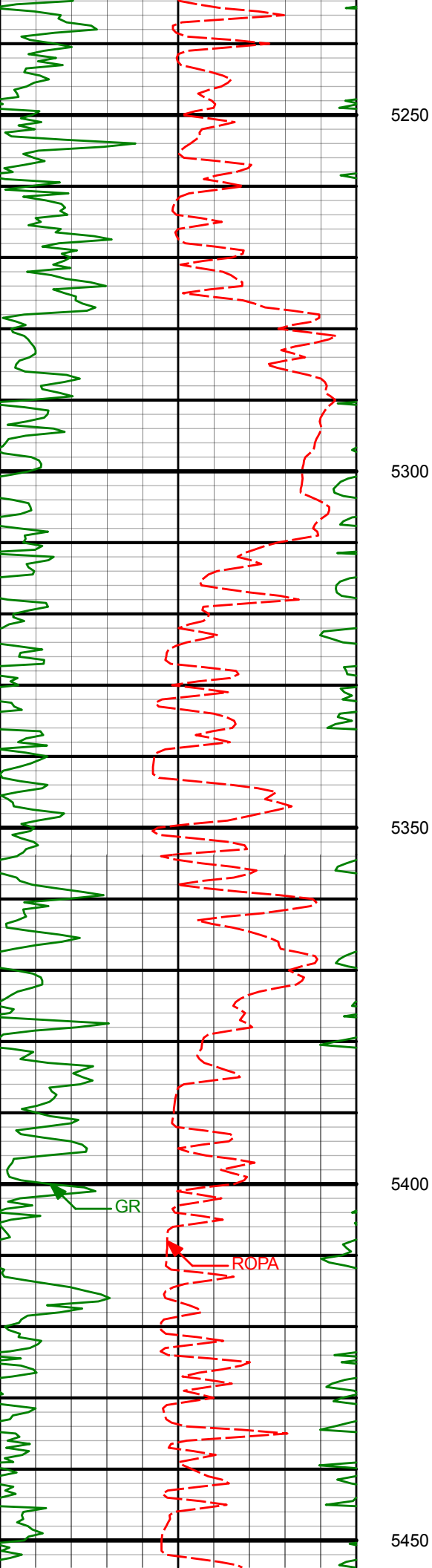
5066.51'

-685.63'

5200

GR

ROPA



5240'

1.48°

218.80°

5156.48'

-687.29'

5250

5300

5330'

1.84°

166.06°

5246.45'

-689.61'

5350

5400

GR

ROPA

5419'

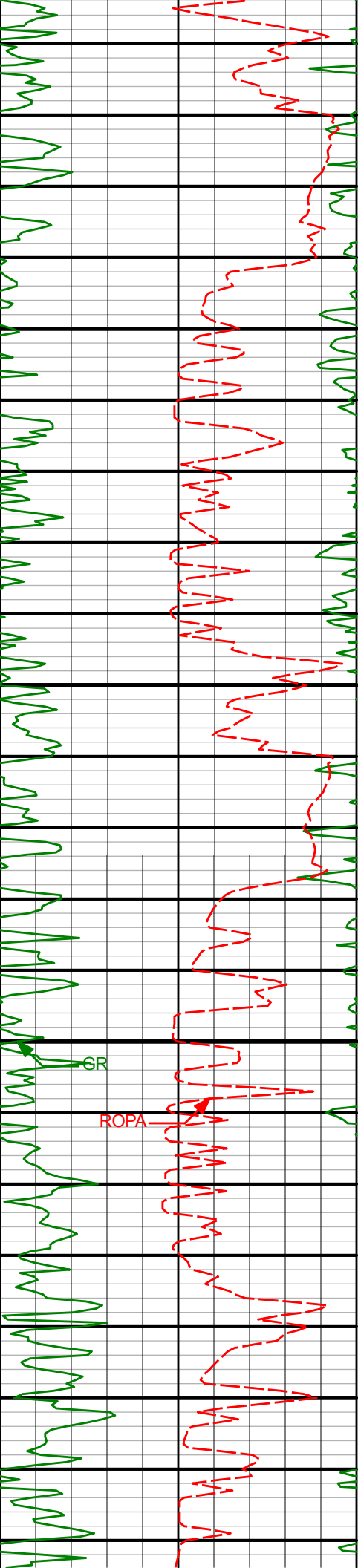
2.13°

169.44°

5335.39'

-692.61'

5450



5500

5550

5600

5650

5509'

2.34°

154.54°

5425.33'

-695.90'

5599'

2.59°

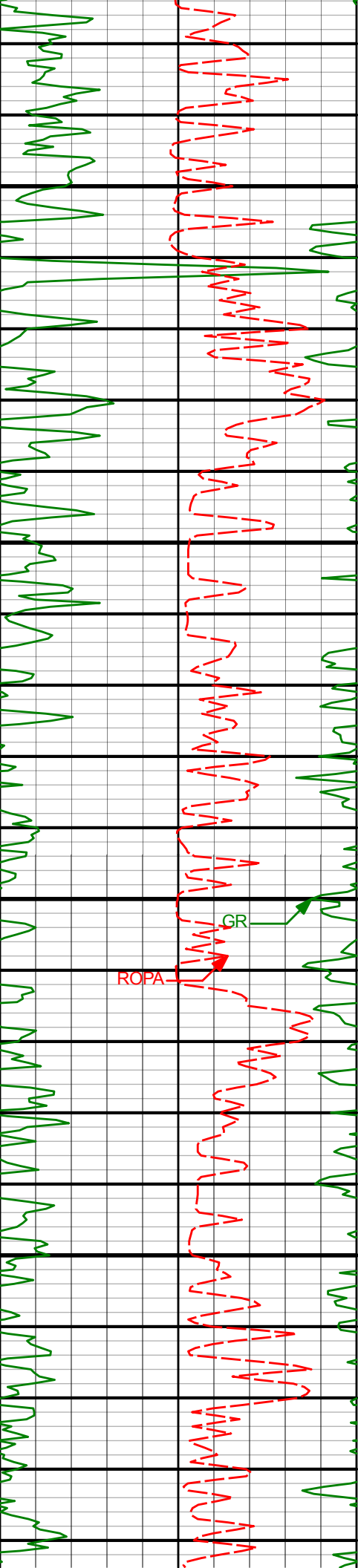
121.10°

5515.25'

-698.59'

GR

ROPA



5700

5750

5800

5850

5689'

1.72°

103.77°

5605.18'

-699.93'

5778'

0.88°

78.33°

5694.16'

-700.09'

ROPA

GR

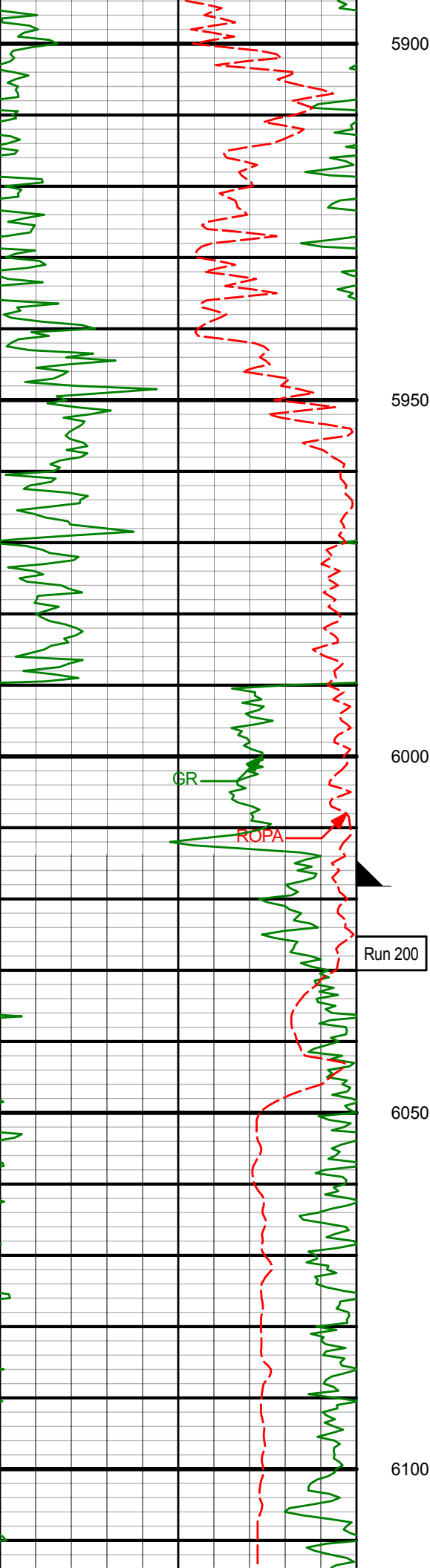
5868'

0.82°

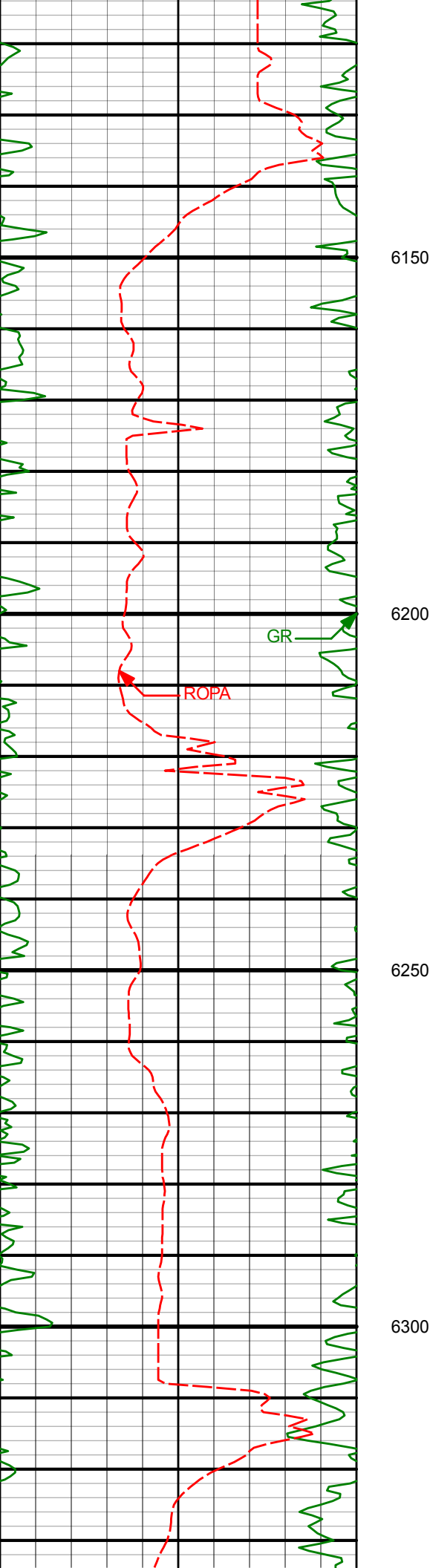
63.82°

5784.15'

-699.65'



5958'	0.85°	71.83°	5874.14'	-699.14'
5986'	0.92°	70.86°	5902.14'	-699.00'
6091'	1.00°	64.34°	6007.12'	-698.31'



6181' 0.84° 43.57° 6097.11' -697.48'

6200

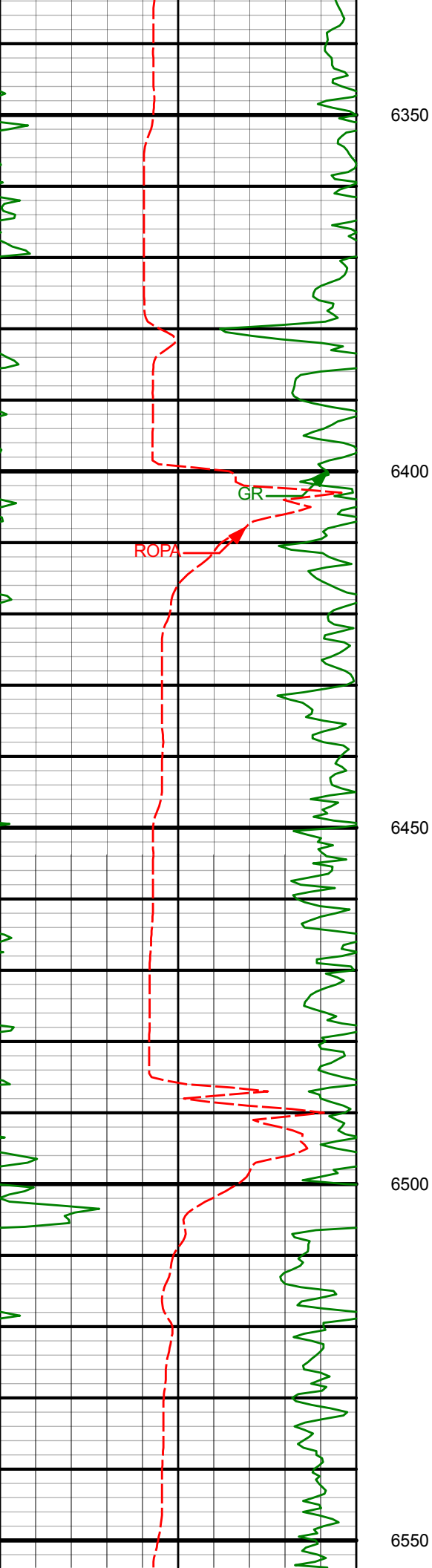
GR

ROPA

6250

6271' 0.82° 36.26° 6187.10' -696.48'

6300



6360'

1.17°

19.73°

6276.09'

-695.10'

6450'

1.58°

15.36°

6366.06'

-693.03'

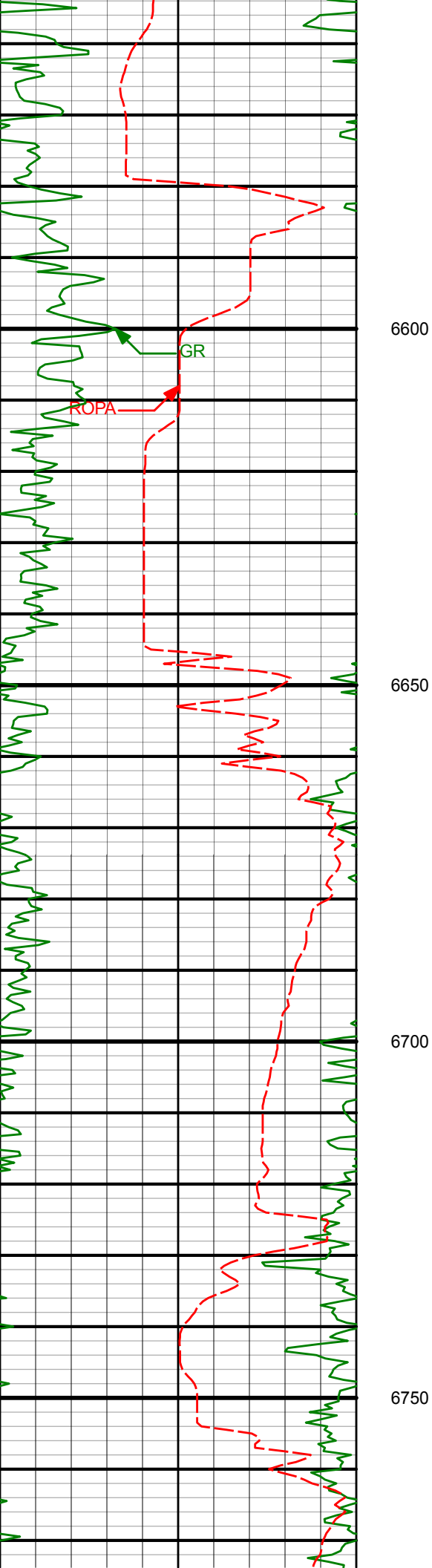
6540'

1.34°

33.93°

6456.03'

-690.95'



6629'

1.12°

43.41°

6545.01'

-689.44'

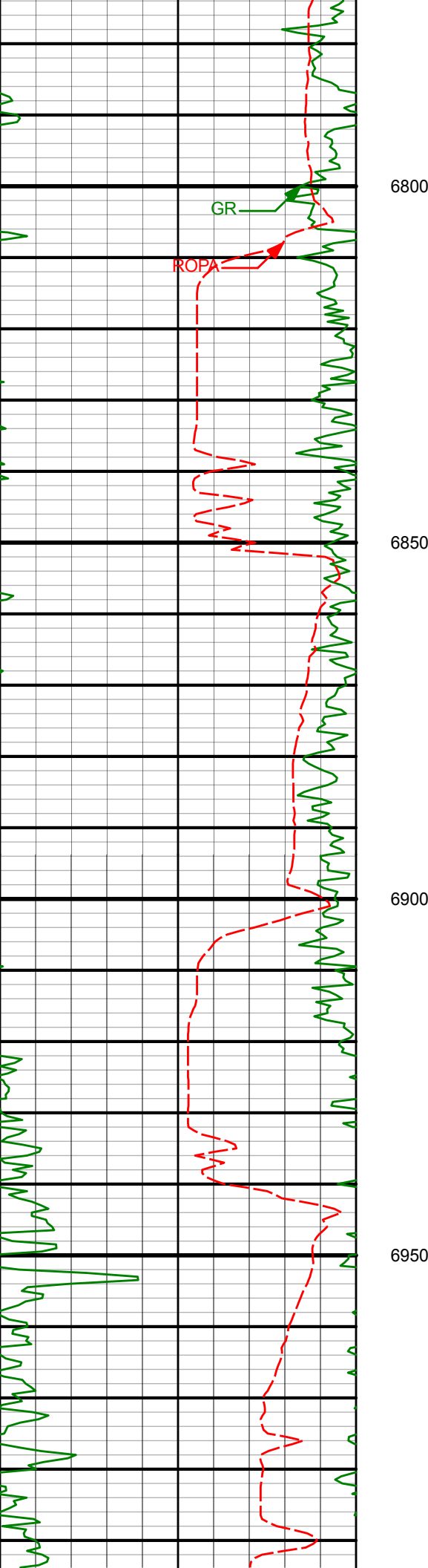
6719'

8.83°

7.57°

6634.62'

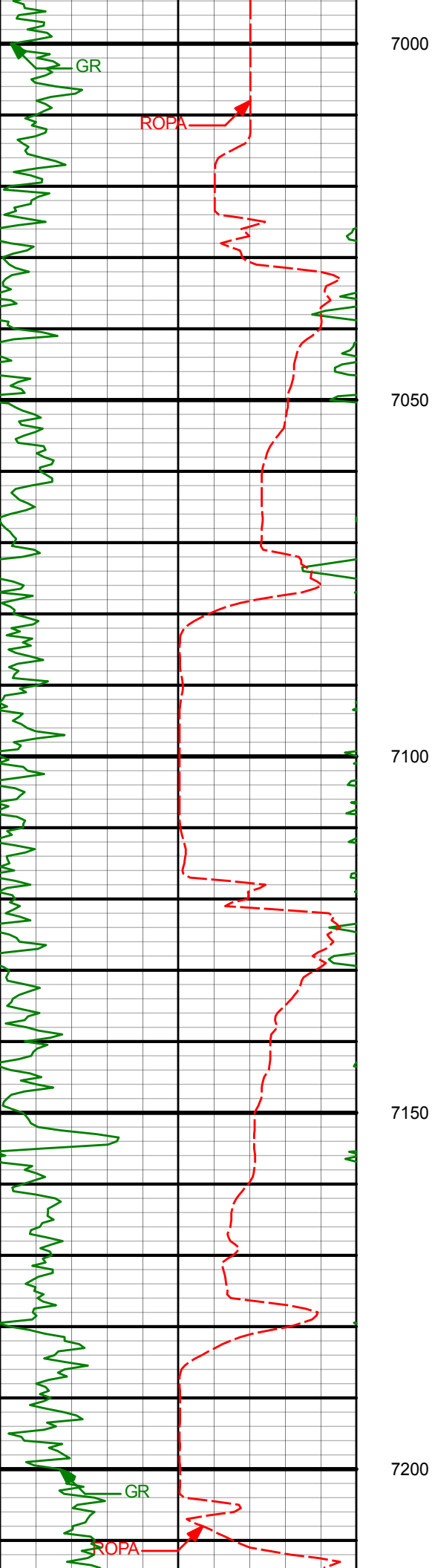
-681.92'



6809'	14.56°	358.81°	6722.72'	-663.74'
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6899'	19.61°	1.18°	6808.72'	-637.32'
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6988'	24.82°	358.36°	6891.09'	-603.69'
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7078'

28.98°

359.33°

6971.33'

-563.00'

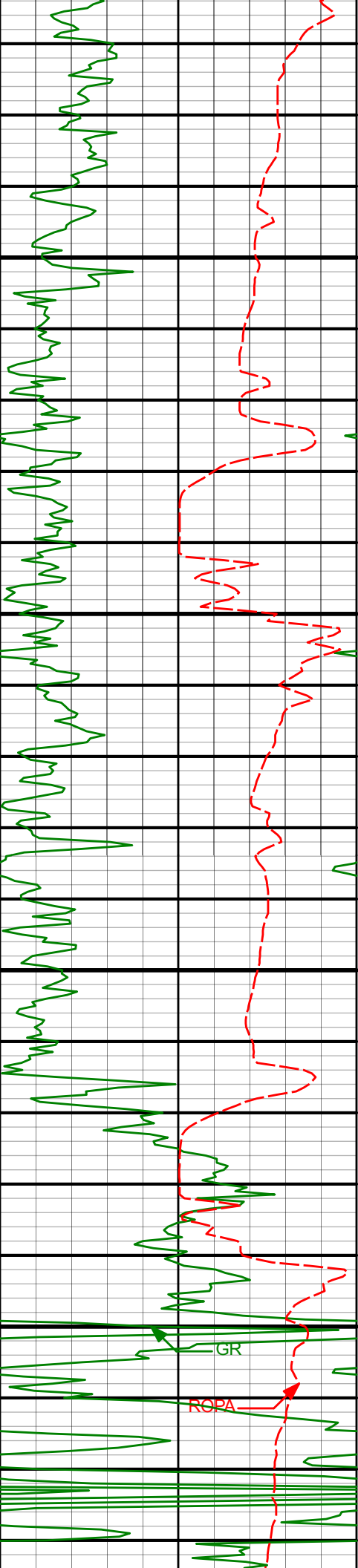
7168'

32.82°

2.08°

7048.54'

-516.80'



7250

7257'

37.58°

356.83°

7121.27'

-465.57'

7300

7350

7347'

44.15°

359.71°

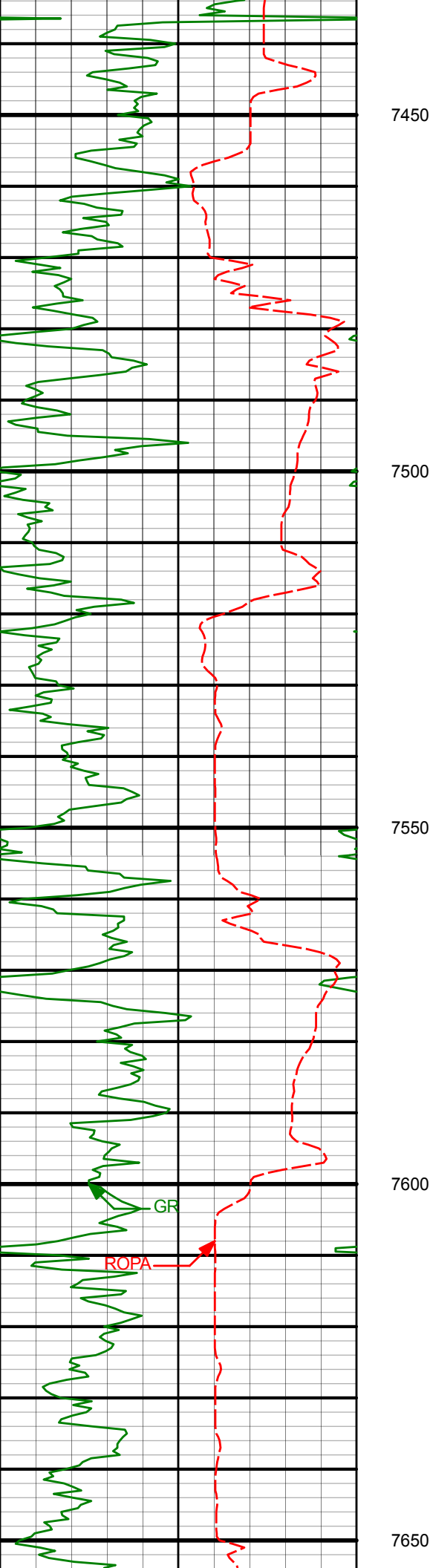
7189.30'

-406.77'

7400

GR

ROPA



7437'

52.96°

0.42°

7248.81'

-339.38'

7527'

59.11°

0.02°

7299.06'

-264.77'

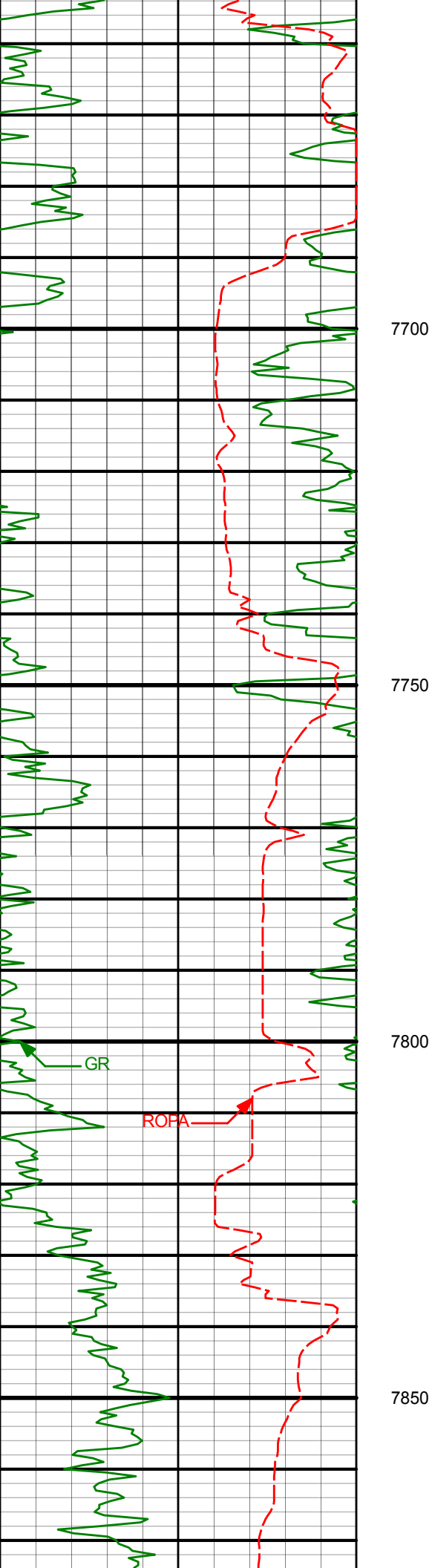
7616'

63.84°

0.15°

7341.56'

-186.60'



7706'

66.66°

0.62°

7379.23'

-104.88'

7750

7796'

72.76°

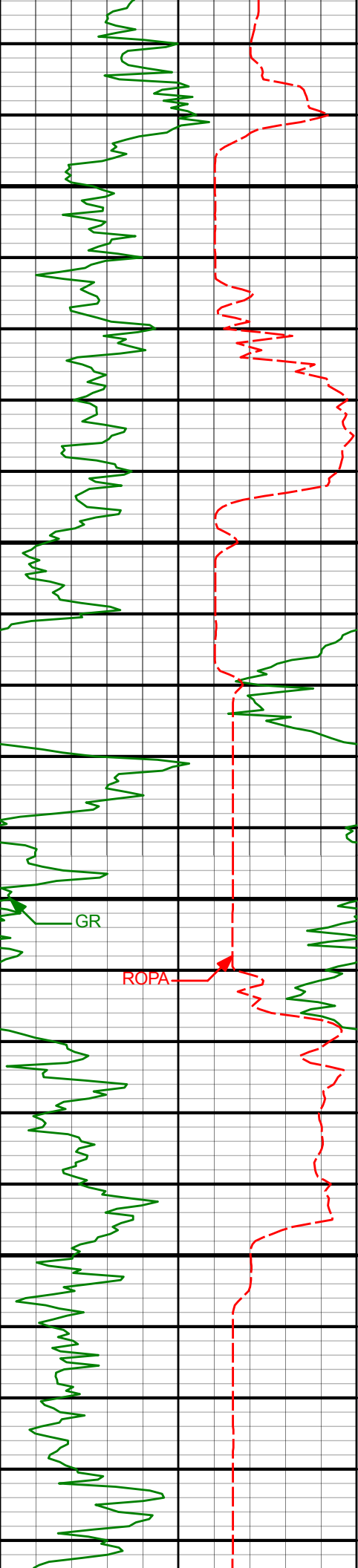
0.41°

7410.42'

-20.50'

7800

7850



7886'

83.93°

1.03°

7428.57'

67.50'

7900

7950

7975'

85.32°

359.28°

7436.91'

156.10'

8000

8050

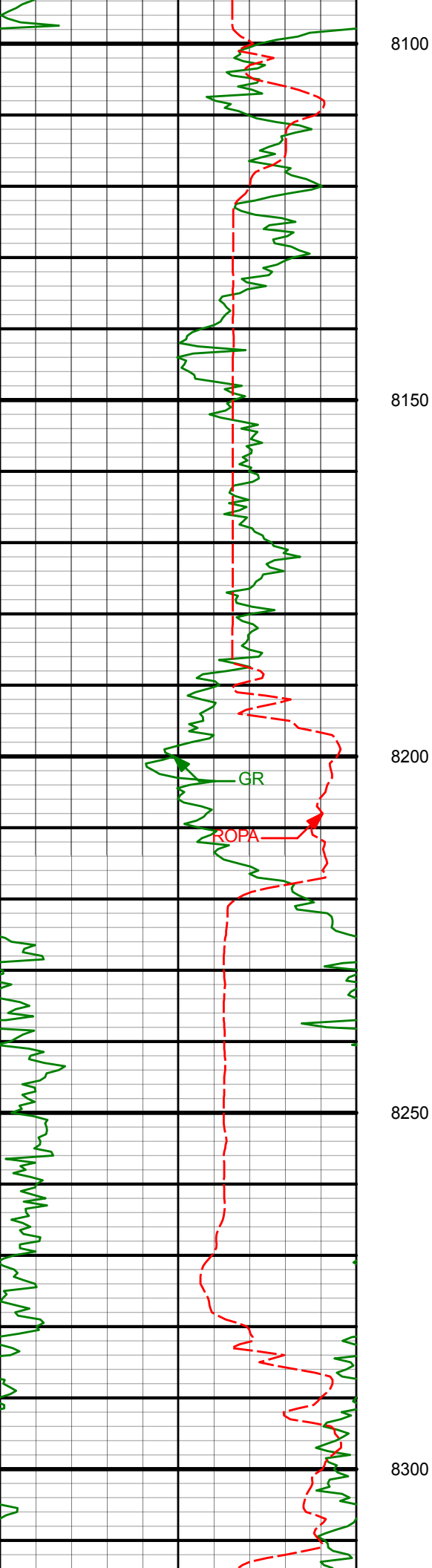
8065'

88.97°

0.82°

7441.39'

245.97'



8155'

87.92°

0.47°

7443.84'

335.93'

8200

GR

ROPA

8245'

89.35°

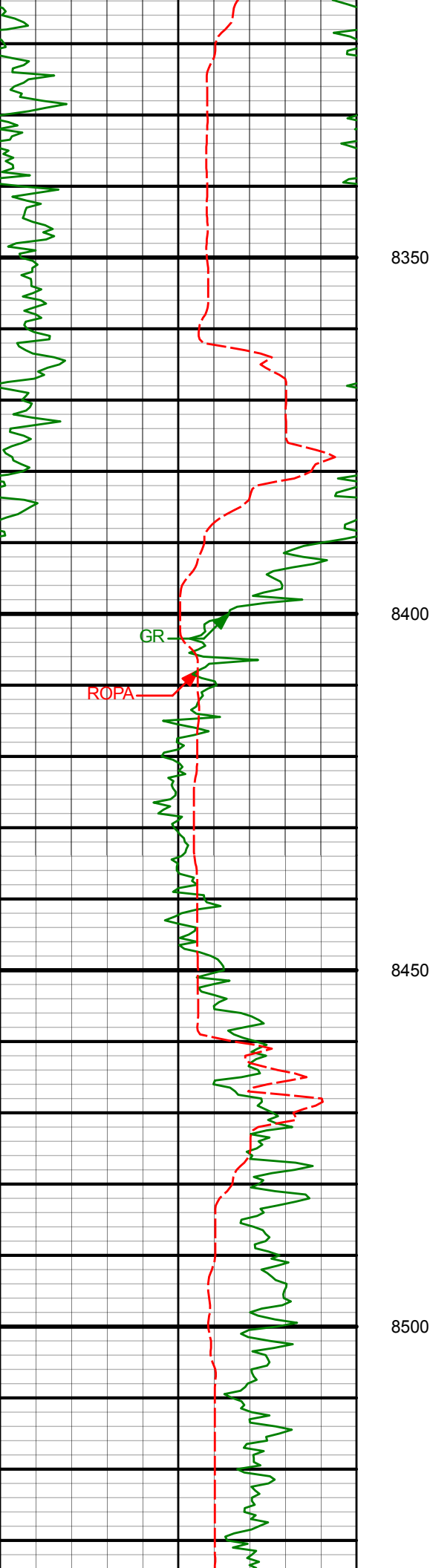
1.53°

7445.98'

425.90'

8250

8300



8335'

91.95°

1.86°

7444.96'

515.87'

8425'

92.12°

1.31°

7441.76'

605.80'

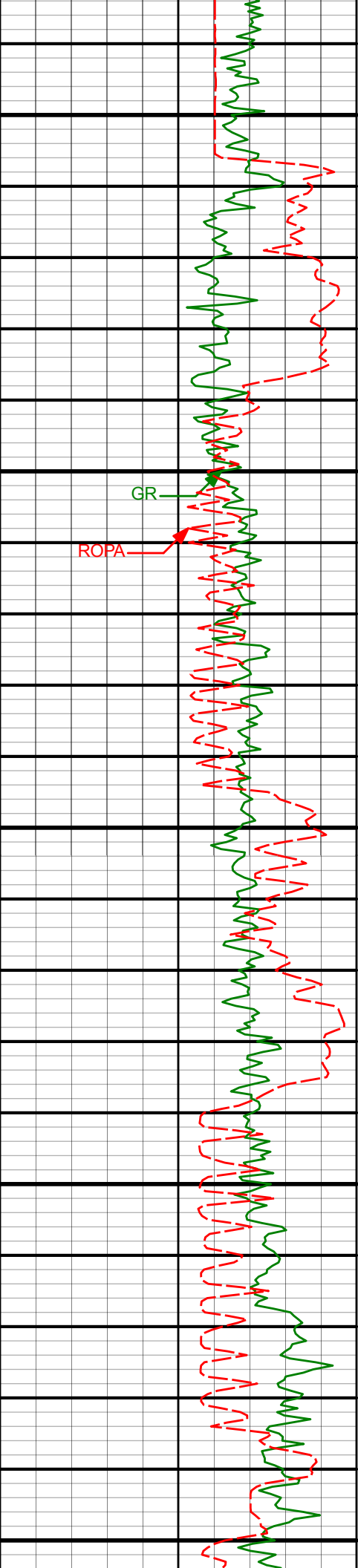
8514'

92.37°

0.76°

7438.27'

694.73'



8550

8600

8650

8700

8750

GR

ROPA

8604'

89.90°

359.96°

7436.49'

784.71'

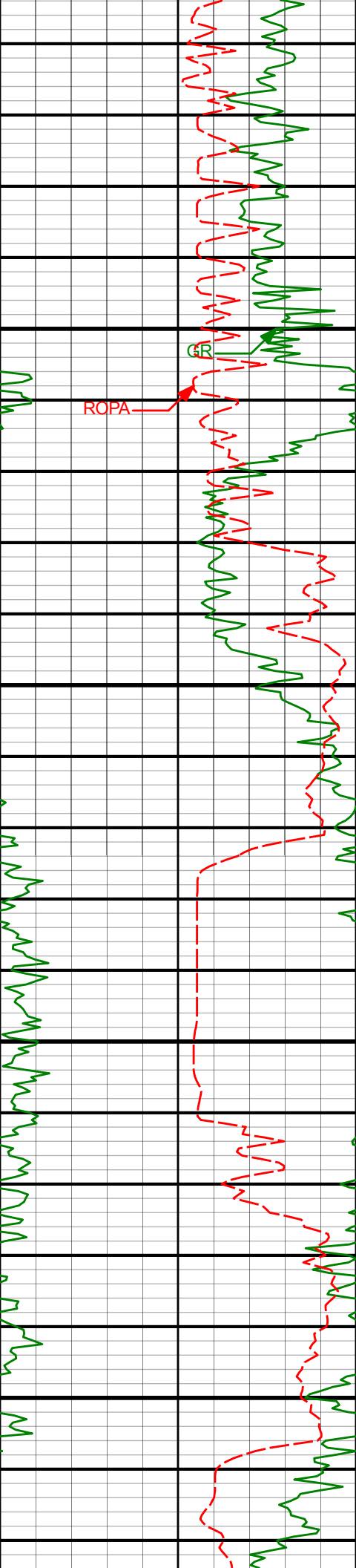
8694'

90.69°

359.03°

7436.03'

874.69'



8788'

89.98°

357.63°

7435.48'

968.61'

8800

8850

8883'

90.65°

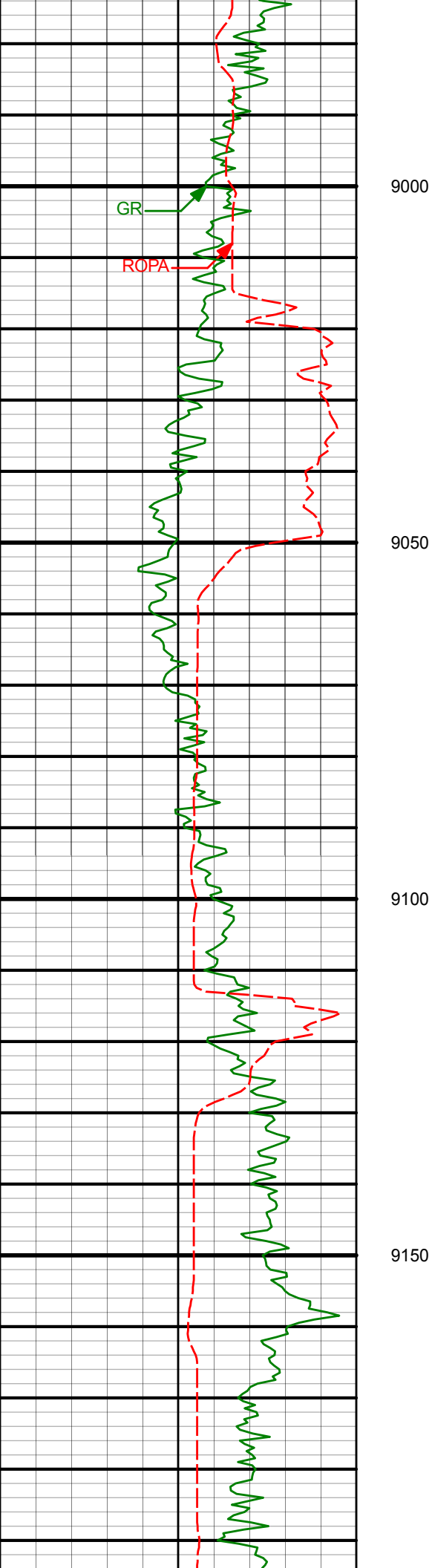
358.82°

7434.96'

1063.52'

8900

8950



8977'

91.24°

0.65°

7433.40'

1157.49'

9000

GR

ROPA

9050

9071'

91.49°

2.41°

7431.16'

1251.45'

9100

9150

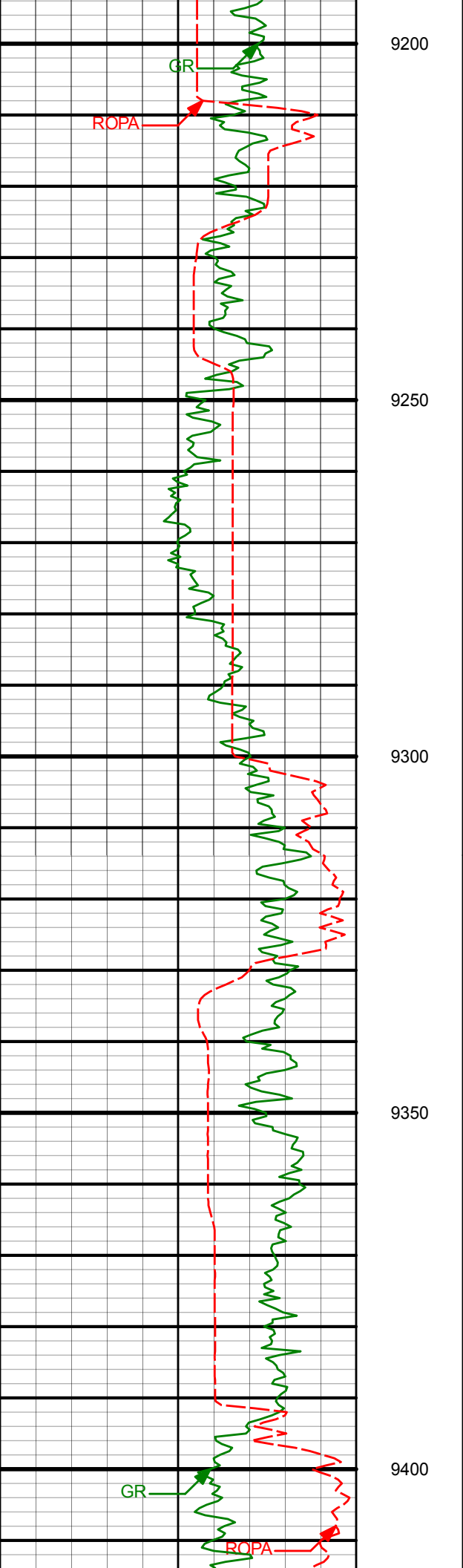
9166'

91.91°

2.11°

7428.34'

1346.37'



9260'

92.04°

1.50°

7425.10'

1440.29'

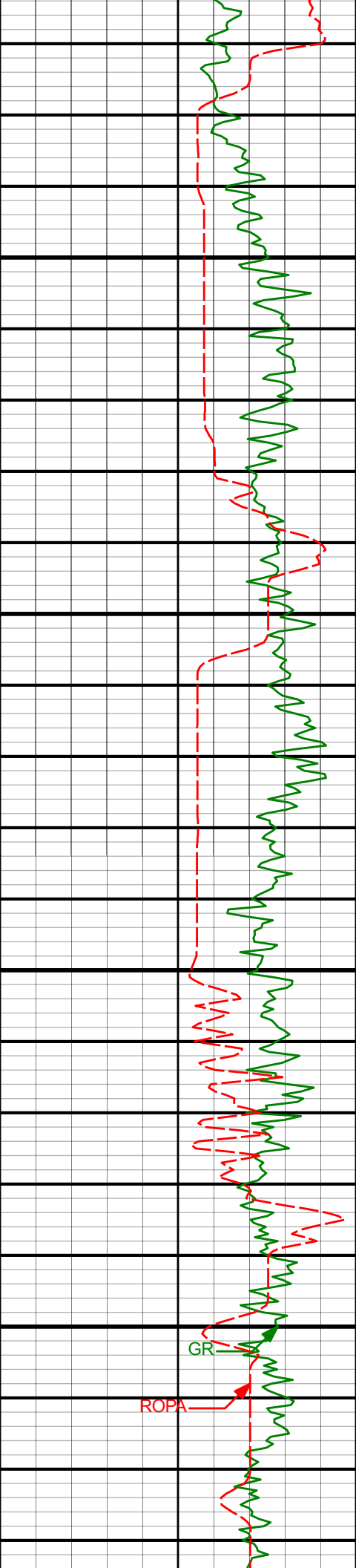
9354'

91.32°

2.91°

7422.34'

1534.21'



9450

9500

9550

9600

9448'

9543'

89.52°

89.18°

1.29°

0.42°

7421.65'

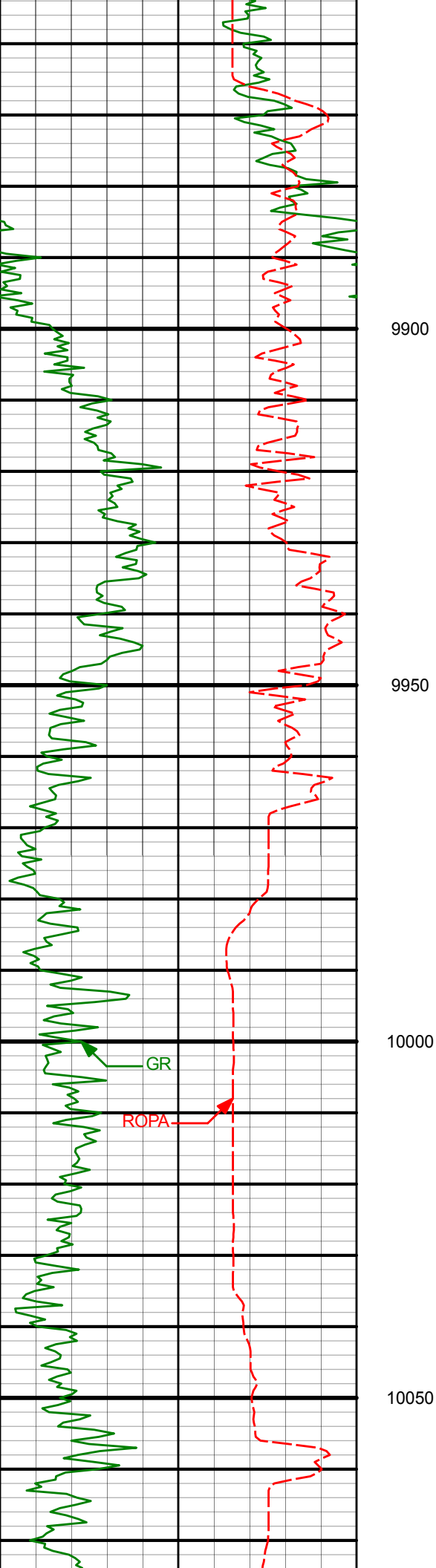
7422.73'

1628.17'

1723.16'

GR

ROPA



9920'

91.20°

1.46°

7419.82'

2100.04'

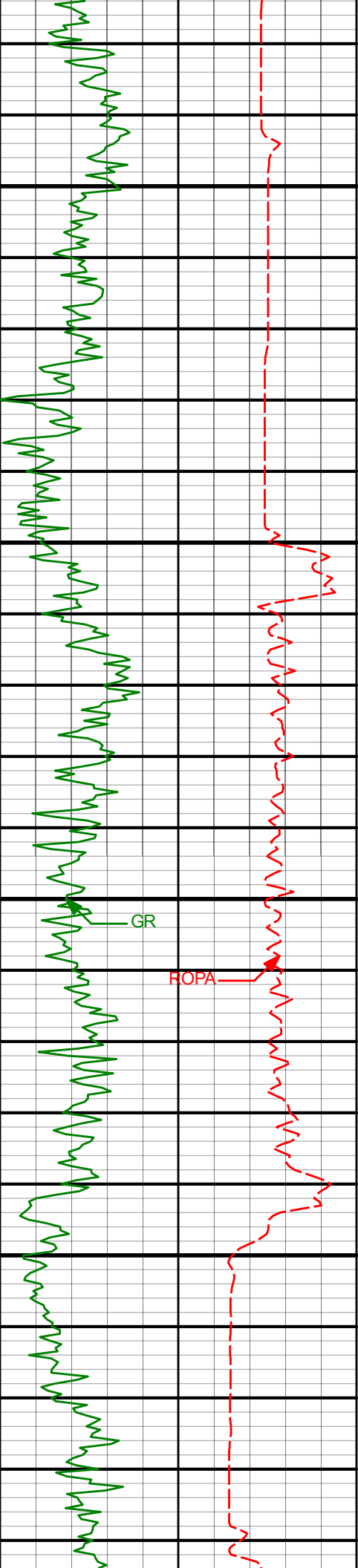
10014'

91.11°

0.88°

7417.93'

2194.02'



10100

10108'

91.32°

0.35°

7415.94'

2287.99'

10150

10200

10198'

91.07°

359.69°

7414.06'

2377.97'

10250

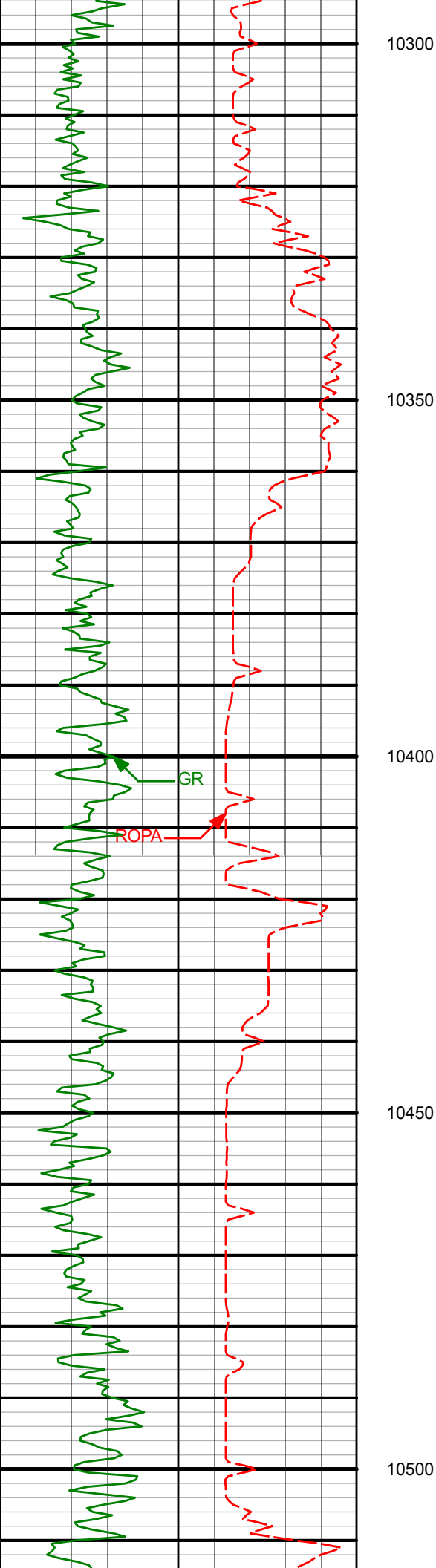
10288'

89.27°

358.32°

7413.80'

2467.93'



10378'

90.57°

1.69°

7413.93'

2557.91'

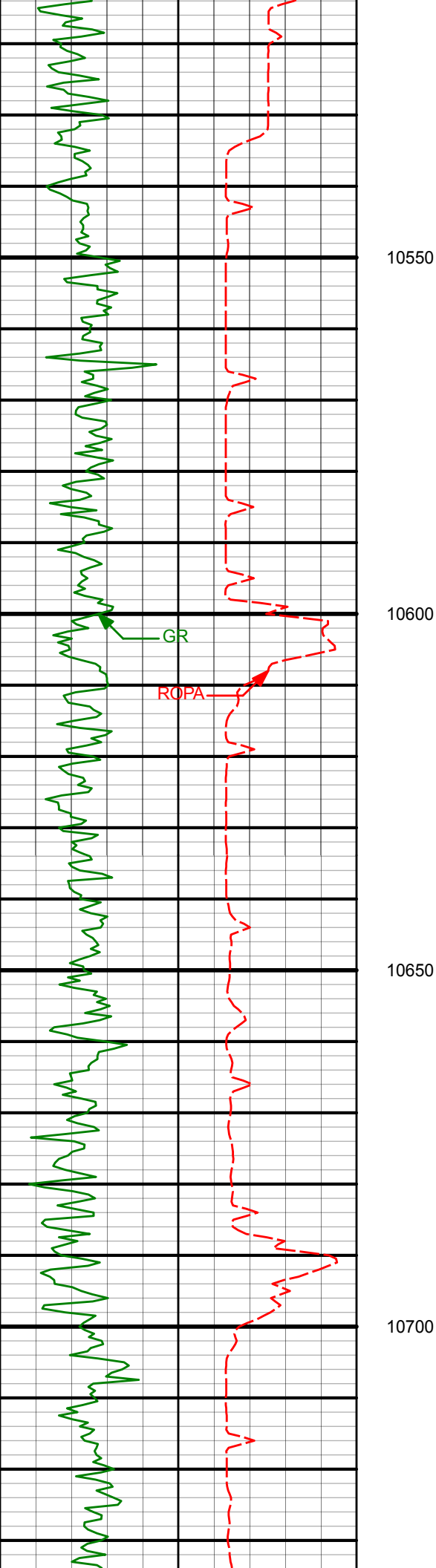
10468'

89.73°

1.15°

7413.70'

2647.90'



10557'

90.82°

1.01°

7413.27'

2736.89'

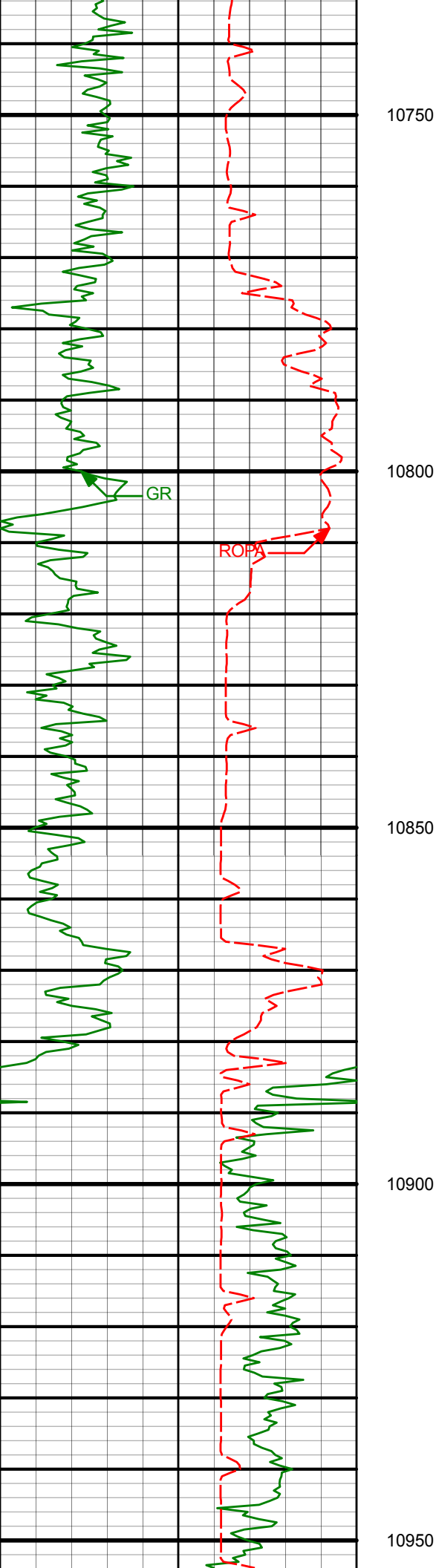
10647'

90.73°

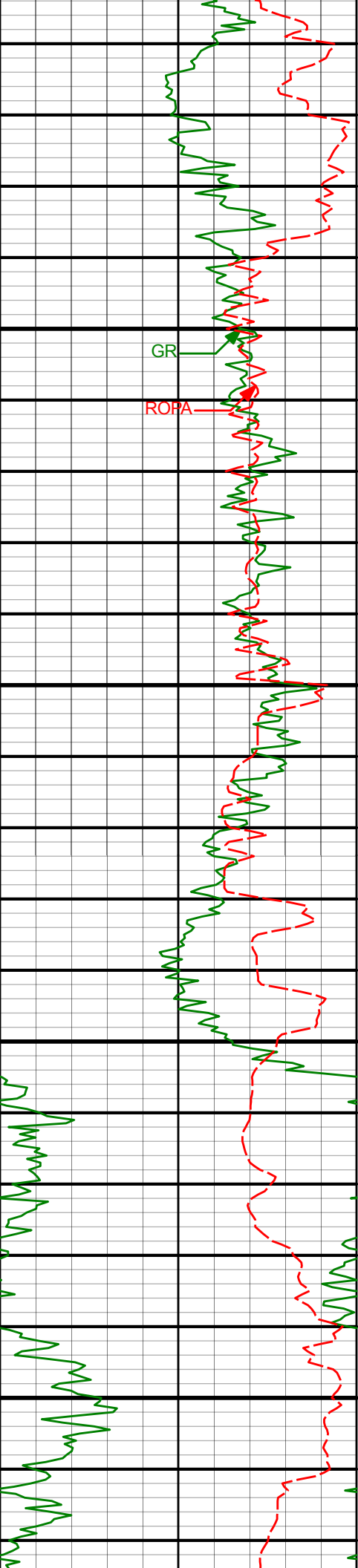
0.61°

7412.05'

2826.88'



10737'	91.45°	1.08°	7410.34'	2916.86'
10827'	87.50°	0.58°	7411.16'	3006.84'
10916'	86.79°	359.93°	7415.59'	3095.73'



11000

11050

11100

11150

11006'

88.22°

358.89°

7419.51'

3185.62'

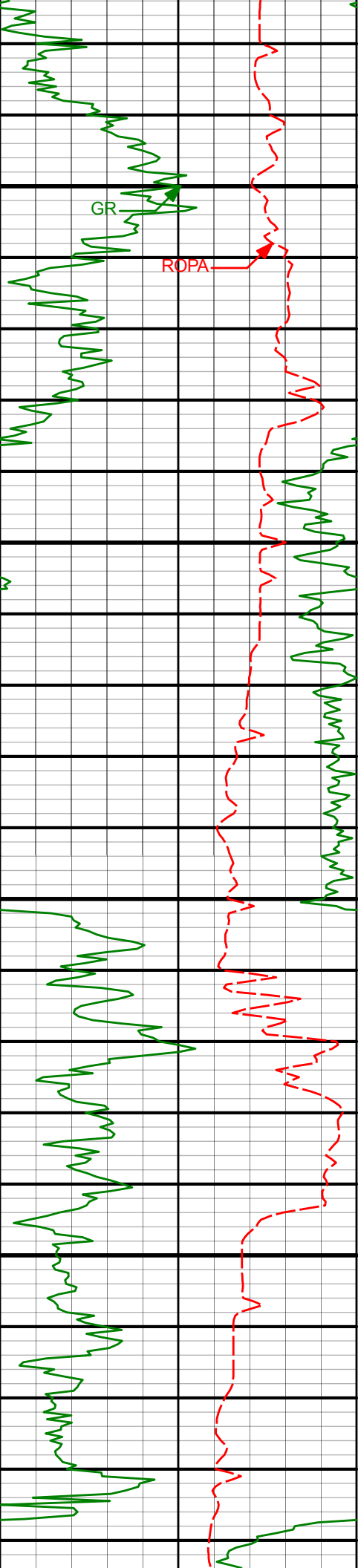
11096'

88.01°

358.66°

7422.48'

3275.52'



11186'

89.56°

358.03°

7424.39'

3365.43'

11200

11250

11300

11350

11275'

88.76°

357.67°

7425.69'

3454.31'

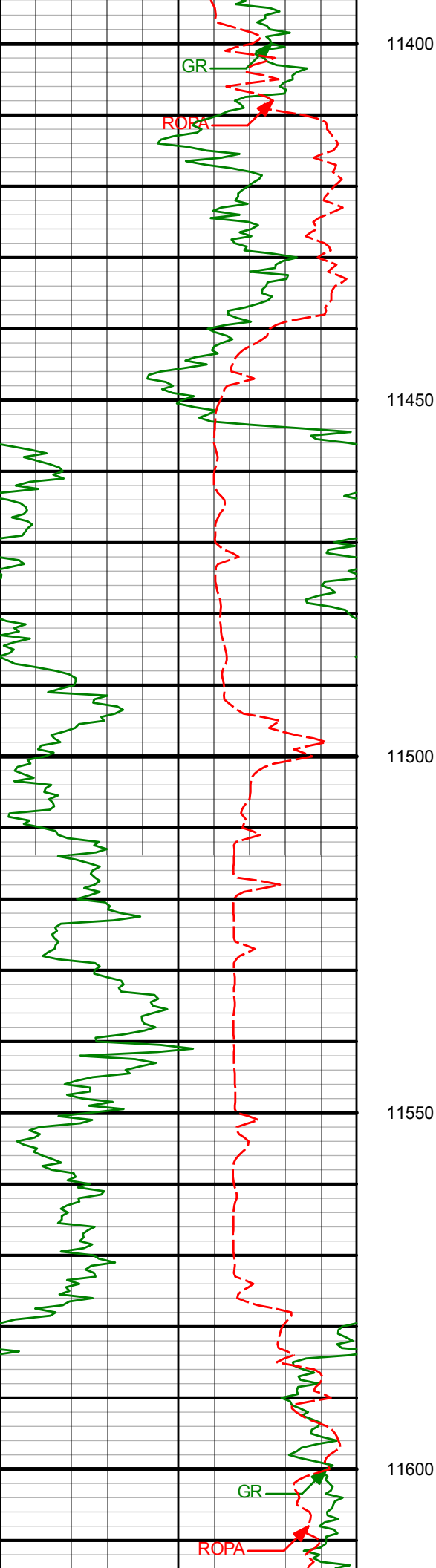
11365'

88.76°

358.59°

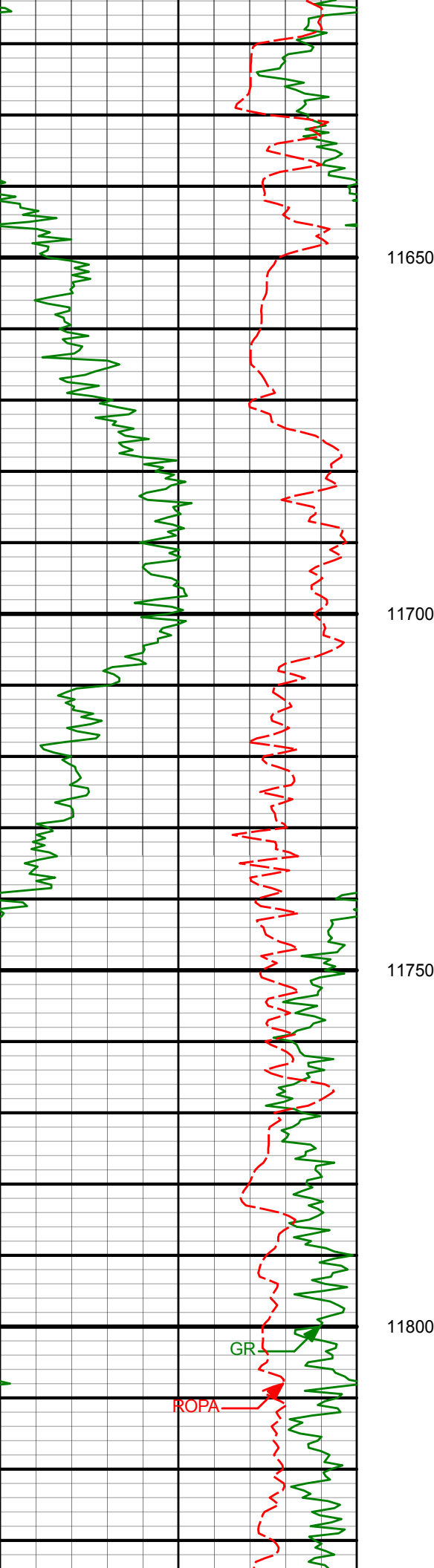
7427.63'

3544.21'



11455' 88.63° 0.04° 7429.68' 3634.16'

11545' 87.24° 359.55° 7432.92' 3724.09'



11634'

89.26°

1.33°

7435.63'

3813.04'

11650

11700

11724'

91.11°

0.83°

7435.33'

3903.03'

11750

11800

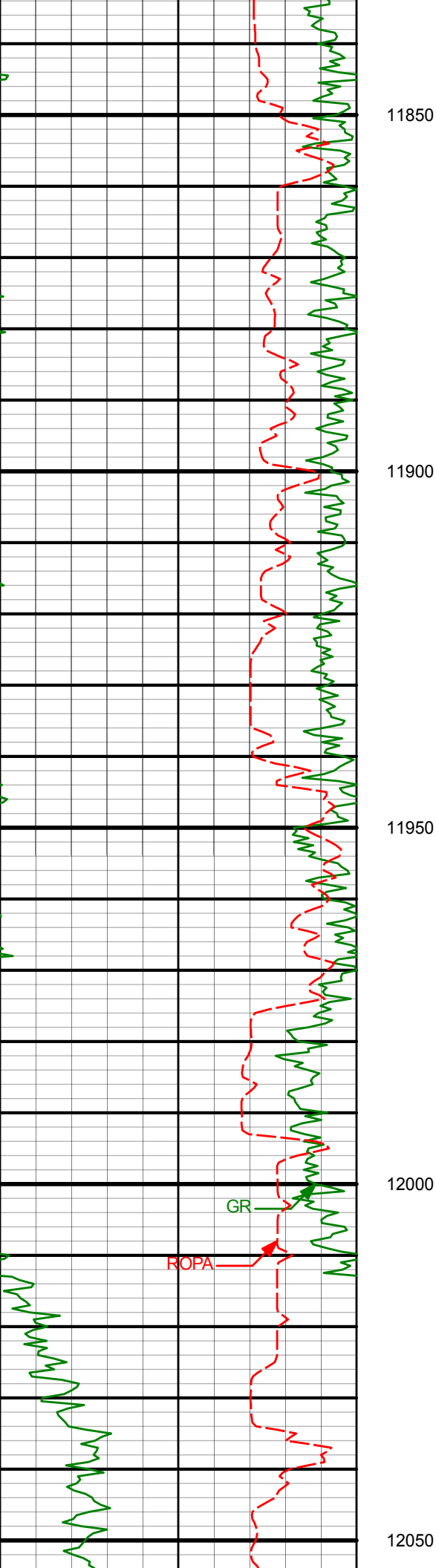
11814'

90.44°

0.05°

7434.11'

3993.02'



11904'

89.39°

359.43°

7434.24'

4083.01'

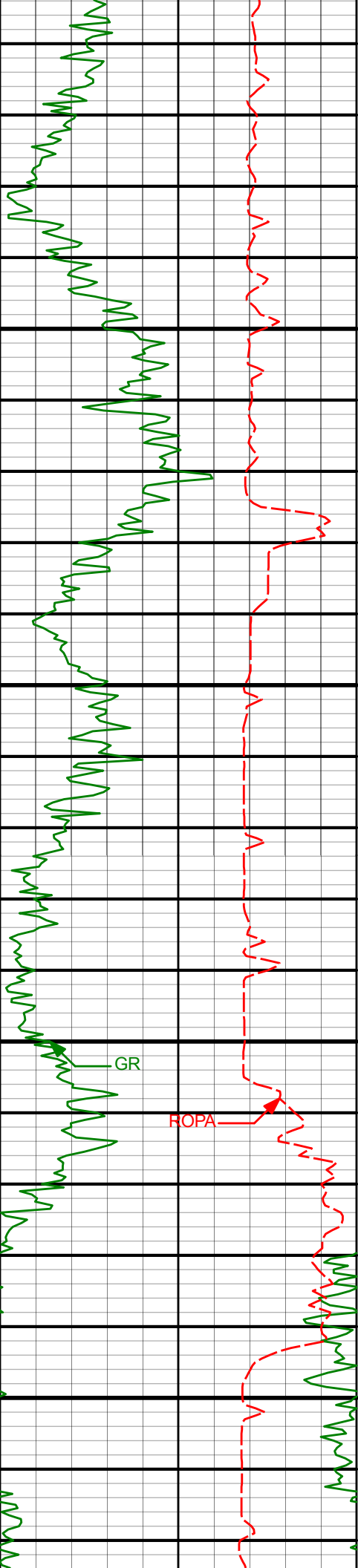
11994'

91.41°

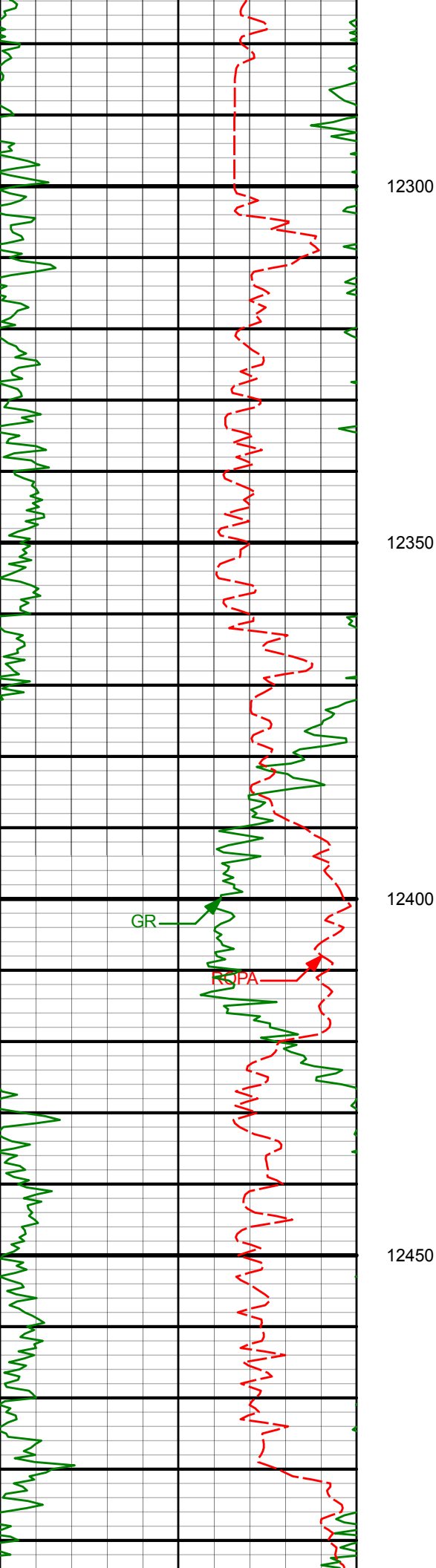
1.36°

7433.62'

4172.99'

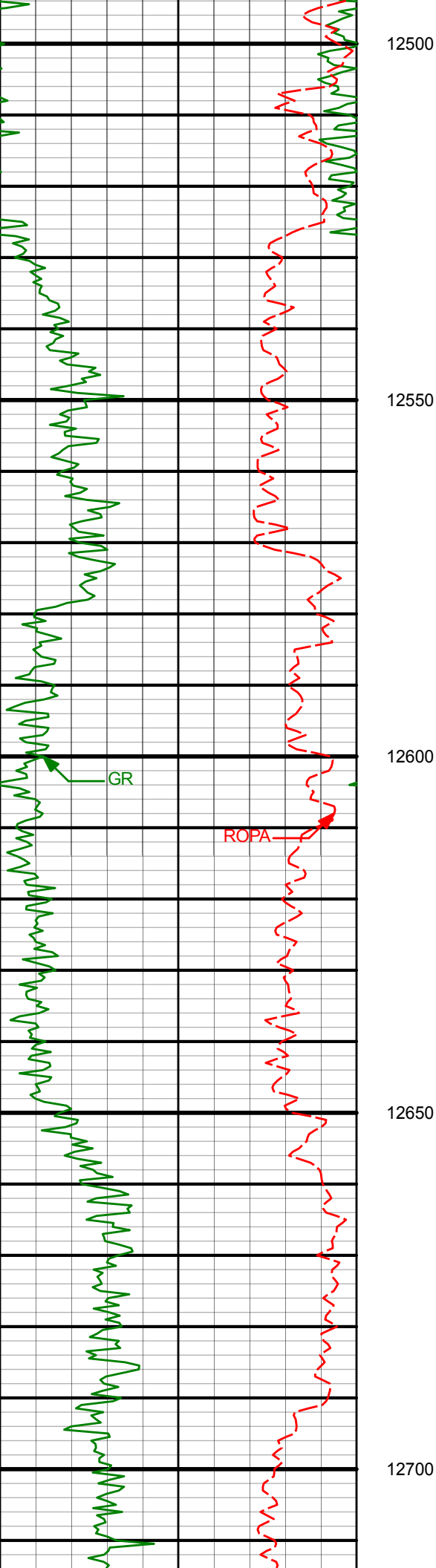


12083'	91.62°	0.56°	7431.27'	4261.96'
12100				
12150				
12173'	92.25°	359.98°	7428.24'	4351.91'
12200				
12250				
12263'	91.16°	1.98°	7425.57'	4441.86'



12353'	90.90°	1.49°	7423.95'	4531.83'
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12442'	87.97°	1.88°	7424.83'	4620.80'
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12622'

88.72°

1.11°

7430.03'

4800.70'

12700

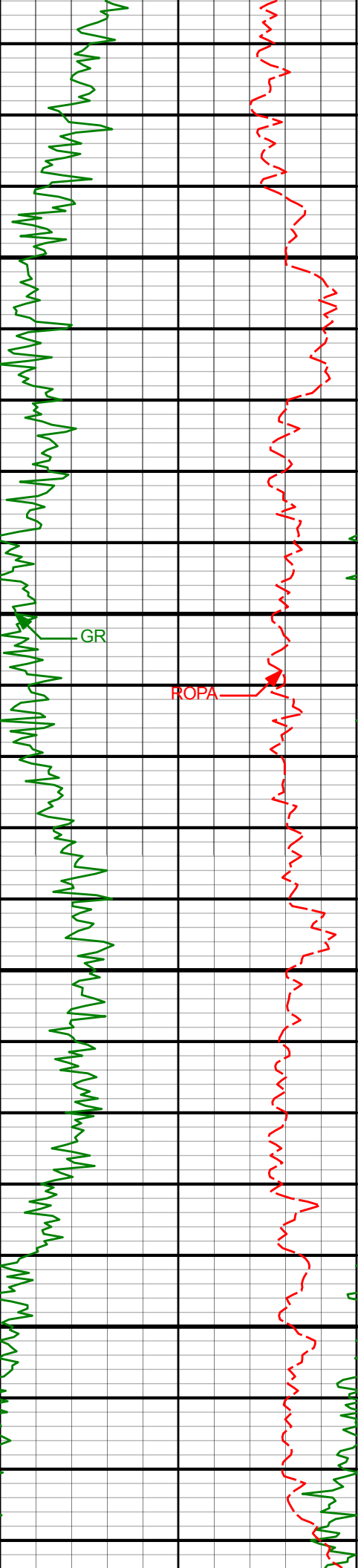
12712'

90.23°

0.79°

7430.86'

4890.69'



12750

12800

12850

12900

GR

ROPA

12802'

90.40°

0.09°

7430.36'

4980.69'

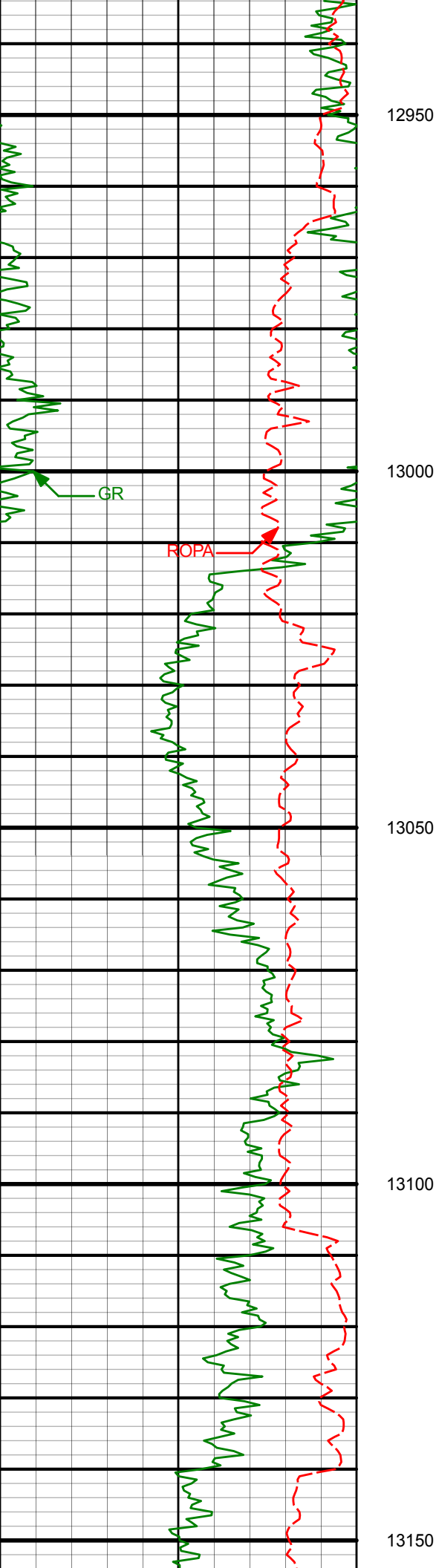
12891'

90.48°

359.62°

7429.68'

5069.68'



12981'

91.53°

1.71°

7428.09'

5159.66'

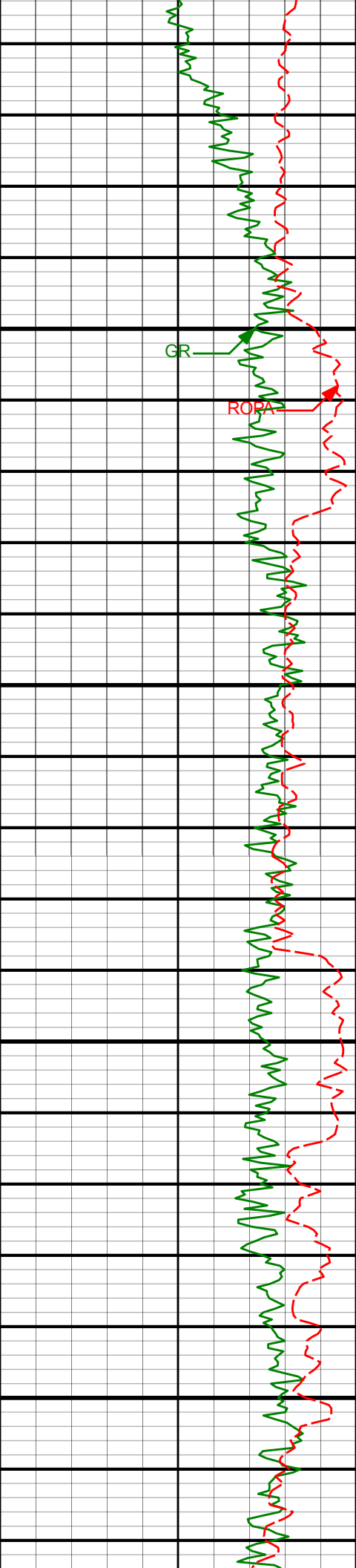
13071'

92.08°

1.22°

7425.25'

5249.60'



13200

13250

13300

13350

13161'

91.20°

2.13°

7422.68'

5339.55'

13251'

90.02°

2.33°

7421.72'

5429.51'

13340'

88.89°

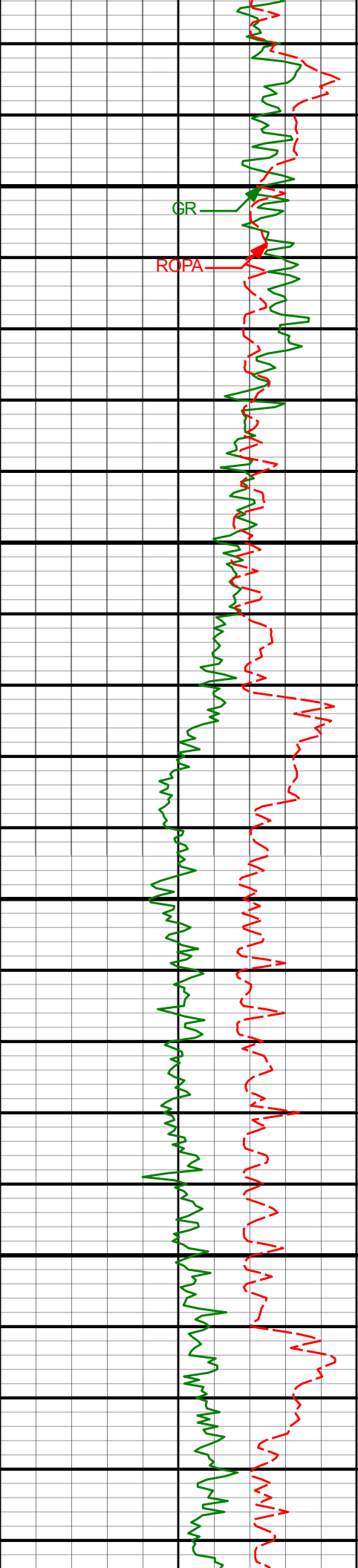
2.41°

7422.57'

5518.46'

GR

ROPA



13400

GR

ROPA

13430'

88.80°

1.50°

7424.38'

5608.42'

13450

13500

13520'

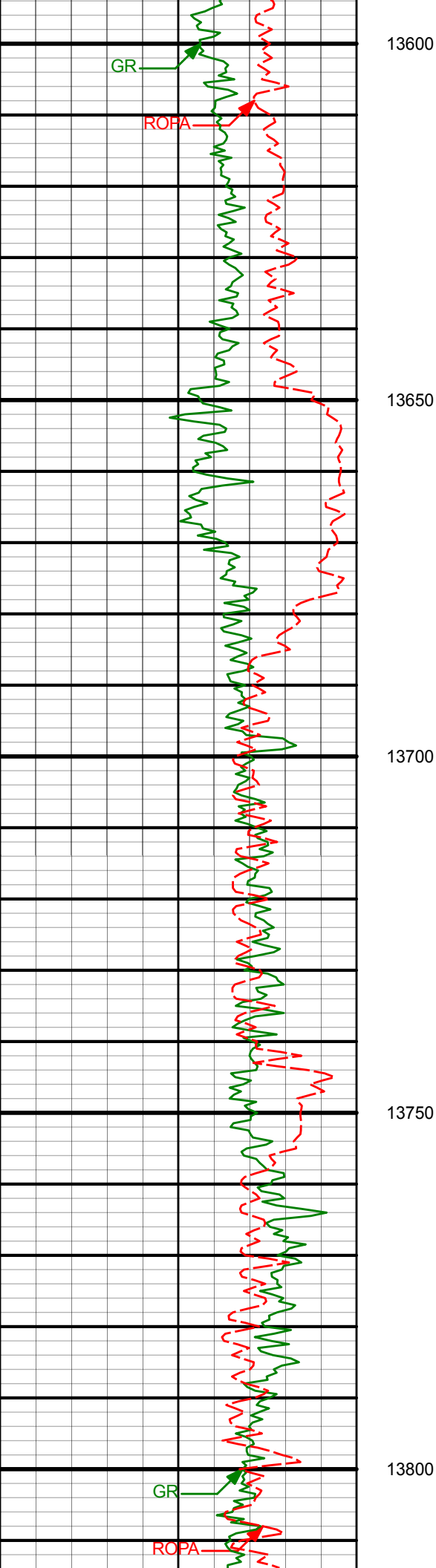
89.56°

2.14°

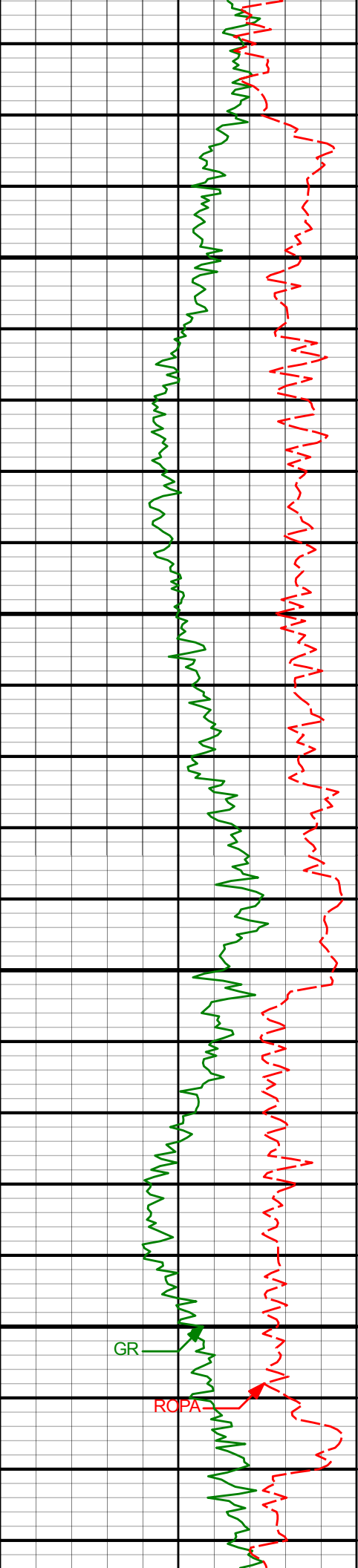
7425.67'

5698.39'

13550



13610'	89.94°	1.30°	7426.07'	5788.37'
13699'	88.09°	1.41°	7427.60'	5877.35'
13789'	88.26°	1.12°	7430.47'	5967.29'



13850

13900

13950

14000

13879'

88.63°

0.95°

7432.91'

6057.26'

13969'

90.90°

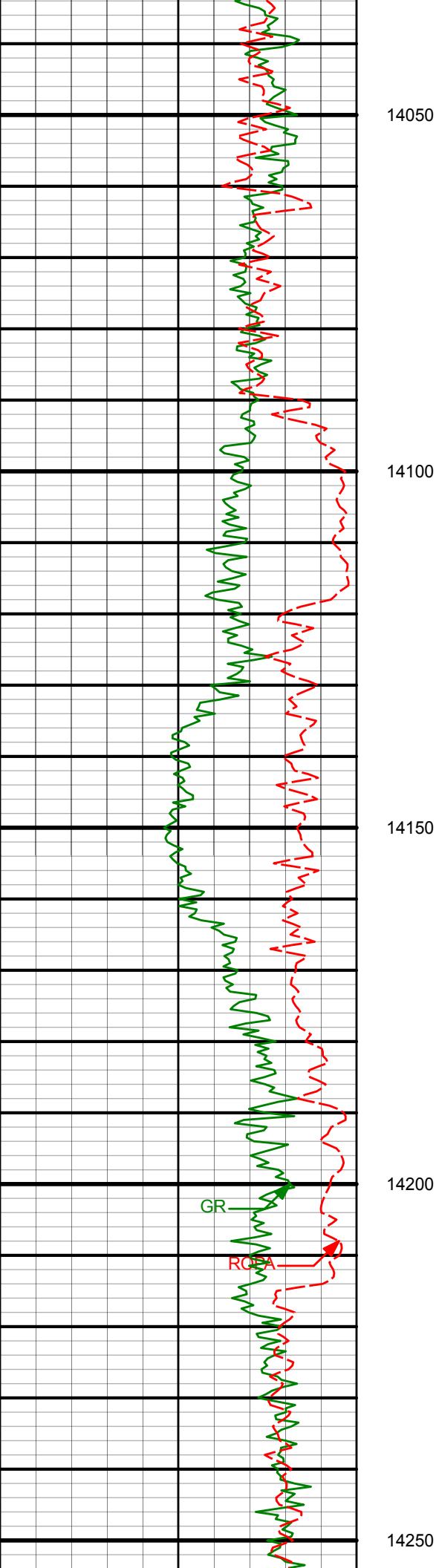
359.56°

7433.27'

6147.25'

GR

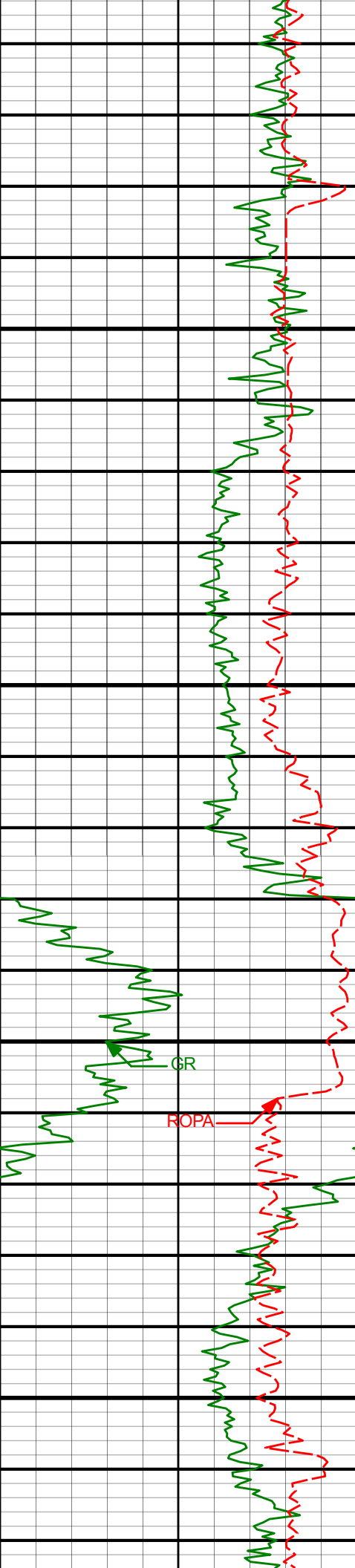
ROPA



14059'	91.62°	359.22°	7431.29'	6237.21'
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14148'	91.36°	357.37°	7428.98'	6326.10'
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14238'	89.52°	358.33°	7428.28'	6415.98'
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14300

14350

14400

14450

14328'

89.85°

357.21°

7428.78'

6505.87'

14418'

90.69°

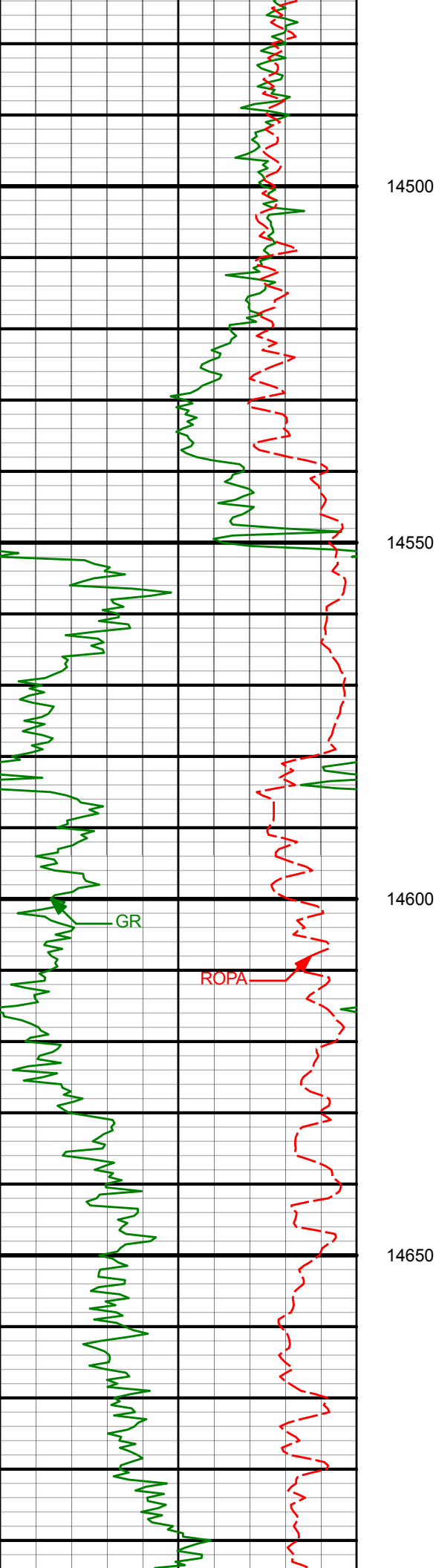
0.02°

7428.35'

6595.80'

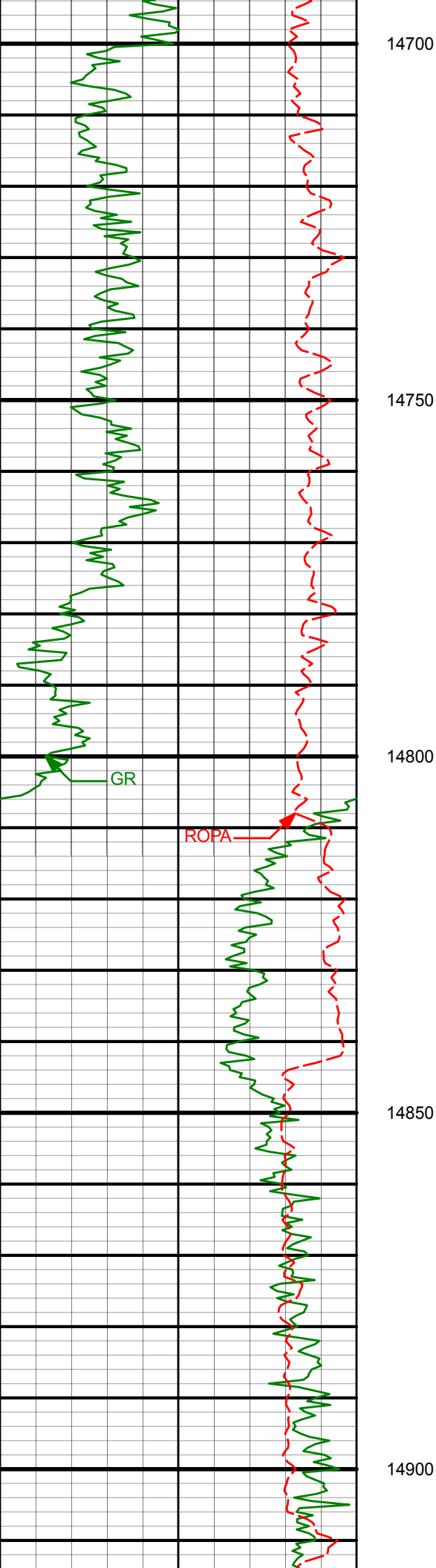
GR

ROPA



14508'	89.98°	359.78°	7427.82'	6685.79'
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14687'	88.09°	2.14°	7430.84'	6864.74'
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14777'

87.25°

1.30°

7434.50'

6954.65'

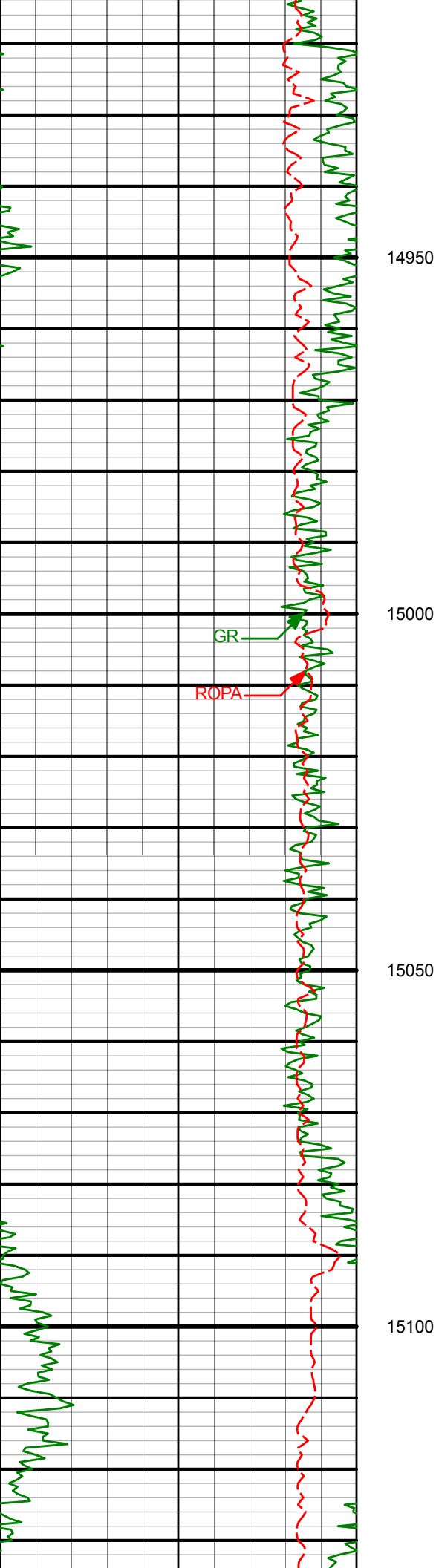
14867'

89.81°

1.79°

7436.81'

7044.60'



14956'

90.06°

0.76°

7436.90'

7133.60'

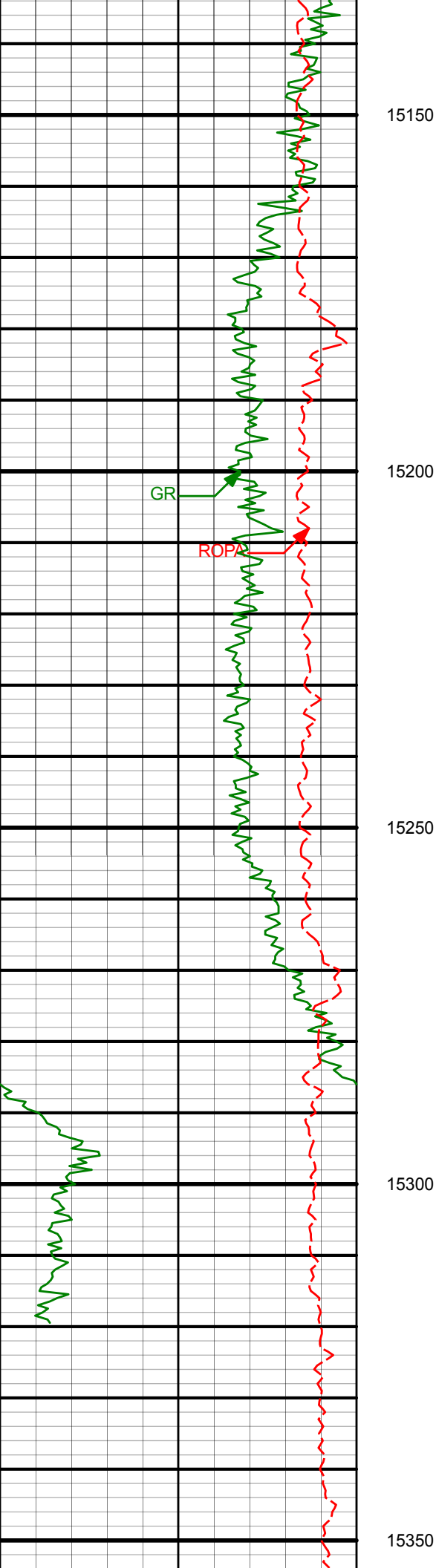
15046'

89.81°

359.42°

7437.00'

7223.59'



15136'	90.40°	359.68°	7436.84'	7313.57'
15226'	90.90°	0.06°	7435.82'	7403.56'
15315'	91.62°	0.05°	7433.86'	7492.53'

<div>TD Well @ 15361'MD</div>		15361'	91.62°	0.05°	7432.56'	7538.51'	
Avg Rate of Penetration (ROPA) feet per hr		MD ft 1 : 240	Depth	Inc	Azi	TVD	VS
Gamma Ray GR api							

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corp

Wagner 27N-10HZ

Wattenberg

Weld Colorado

USA

CA-XX-0904430238

Surveys from 13'-1858' provided by 3rd party

First Sperry survey @ 1919'

Survey corrections provided by Sperry Survey Management

Final survey @ 15361' 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	0.26	161.06	133.00	0.26 S	0.09 E	-0.26	0.22
165.00	0.48	208.14	165.00	0.44 S	0.05 E	-0.44	1.12
197.00	0.57	186.02	197.00	0.72 S	0.03 W	-0.72	0.69
228.00	1.14	169.94	227.99	1.18 S	0.01 E	-1.18	1.98
260.00	1.49	152.36	259.99	1.86 S	0.26 E	-1.86	1.66
292.00	1.85	151.31	291.97	2.68 S	0.70 E	-2.67	1.13
323.00	2.07	150.87	322.95	3.61 S	1.21 E	-3.60	0.71
355.00	2.50	155.79	354.93	4.75 S	1.78 E	-4.73	1.48
387.00	2.77	159.13	386.89	6.11 S	2.34 E	-6.08	0.97
419.00	3.25	155.35	418.85	7.66 S	2.99 E	-7.62	1.62
450.00	3.47	153.59	449.80	9.30 S	3.78 E	-9.25	0.78
482.00	4.00	154.29	481.73	11.17 S	4.69 E	-11.12	1.66
546.00	4.88	159.04	545.54	15.72 S	6.63 E	-15.65	1.49
577.00	5.71	156.40	576.40	18.37 S	7.72 E	-18.28	2.79
608.00	6.24	156.67	607.24	21.33 S	9.01 E	-21.23	1.71
640.00	6.94	156.58	639.02	24.70 S	10.46 E	-24.58	2.19
672.00	7.91	157.19	670.76	28.50 S	12.09 E	-28.37	3.04
703.00	9.01	159.74	701.42	32.75 S	13.75 E	-32.59	3.75
735.00	9.27	158.16	733.01	37.49 S	15.58 E	-37.31	1.13
767.00	9.80	158.95	764.57	42.42 S	17.52 E	-42.23	1.71
798.00	10.99	158.43	795.06	47.63 S	19.55 E	-47.41	3.85
830.00	11.03	160.01	826.47	53.35 S	21.72 E	-53.10	0.95
862.00	11.73	159.13	857.84	59.26 S	23.92 E	-59.00	2.25

Wagner 27N-10HZ

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
893.00	12.70	156.40	888.14	65.33 S	26.41 E	-65.04	3.64
925.00	12.83	156.05	919.35	71.80 S	29.26 E	-71.47	0.47
957.00	13.45	154.29	950.51	78.40 S	32.32 E	-78.04	2.31
988.00	14.24	154.29	980.61	85.08 S	35.54 E	-84.69	2.55
1020.00	14.99	154.47	1011.57	92.36 S	39.03 E	-91.93	2.35
1052.00	14.99	154.47	1042.49	99.83 S	42.59 E	-99.36	0.00
1083.00	15.12	155.17	1072.42	107.12 S	46.02 E	-106.61	0.72
1114.00	14.90	156.76	1102.36	114.45 S	49.29 E	-113.90	1.51
1146.00	15.95	159.22	1133.21	122.34 S	52.47 E	-121.76	3.87
1178.00	16.48	159.57	1163.94	130.71 S	55.62 E	-130.09	1.68
1210.00	17.36	160.71	1194.55	139.47 S	58.78 E	-138.81	2.94
1241.00	17.18	159.39	1224.16	148.12 S	61.92 E	-147.43	1.39
1273.00	16.96	158.25	1254.75	156.88 S	65.31 E	-156.15	1.25
1305.00	17.67	158.95	1285.30	165.74 S	68.79 E	-164.98	2.31
1336.00	17.71	158.69	1314.83	174.53 S	72.19 E	-173.72	0.29
1368.00	18.24	159.83	1345.27	183.76 S	75.69 E	-182.92	1.99
1400.00	18.54	159.83	1375.63	193.24 S	79.17 E	-192.36	0.94
1431.00	18.28	158.43	1405.05	202.39 S	82.65 E	-201.47	1.65
1463.00	18.28	157.11	1435.43	211.68 S	86.45 E	-210.71	1.29
1494.00	18.33	156.58	1464.86	220.63 S	90.28 E	-219.62	0.56
1526.00	18.24	156.84	1495.25	229.85 S	94.25 E	-228.80	0.38
1558.00	18.50	156.58	1525.62	239.11 S	98.24 E	-238.02	0.85
1590.00	18.72	156.32	1555.94	248.47 S	102.32 E	-247.33	0.73
1621.00	18.76	155.35	1585.30	257.56 S	106.39 E	-256.38	1.01
1652.00	18.85	155.52	1614.65	266.65 S	110.55 E	-265.42	0.34
1684.00	18.02	157.11	1645.00	275.91 S	114.61 E	-274.64	3.03
1716.00	17.80	156.93	1675.45	284.97 S	118.46 E	-283.65	0.71
1747.00	17.49	156.84	1704.99	293.62 S	122.15 E	-292.26	1.00
1779.00	17.45	156.67	1735.52	302.44 S	125.94 E	-301.04	0.20
1811.00	17.58	157.28	1766.03	311.31 S	129.70 E	-309.86	0.70
1858.00	17.18	158.34	1810.89	324.30 S	135.01 E	-322.80	1.09
1919.00	17.48	158.73	1869.12	341.22 S	141.66 E	-339.64	0.53
2008.00	17.13	157.02	1954.09	365.74 S	151.62 E	-364.05	0.70
2098.00	16.63	155.24	2040.21	389.64 S	162.19 E	-387.83	0.80
2188.00	14.73	156.40	2126.86	411.82 S	172.16 E	-409.90	2.14
2278.00	12.56	162.16	2214.32	431.61 S	179.74 E	-429.61	2.84
2368.00	12.06	163.40	2302.25	449.94 S	185.42 E	-447.87	0.62
2457.00	11.52	162.99	2389.37	467.35 S	190.68 E	-465.22	0.62
2547.00	11.08	163.16	2477.63	484.22 S	195.82 E	-482.04	0.49
2637.00	10.87	164.09	2565.98	500.66 S	200.65 E	-498.42	0.31
2727.00	11.84	160.52	2654.22	517.52 S	206.05 E	-515.23	1.33
2817.00	11.00	158.14	2742.44	534.20 S	212.33 E	-531.83	1.08
2906.00	10.53	168.65	2829.88	550.05 S	217.09 E	-547.63	2.26
2996.00	9.45	173.65	2918.52	565.47 S	219.53 E	-563.02	1.54
3086.00	8.62	174.87	3007.40	579.53 S	220.95 E	-577.07	0.95
3176.00	7.71	175.88	3096.48	592.27 S	221.99 E	-589.80	1.02
3265.00	6.68	177.95	3184.78	603.40 S	222.60 E	-600.92	1.20
3355.00	6.97	166.50	3274.15	613.94 S	224.06 E	-611.44	1.54
3445.00	6.57	168.78	3363.52	624.30 S	226.34 E	-621.78	0.53
3535.00	5.97	172.26	3452.98	634.00 S	227.98 E	-631.45	0.79
3624.00	4.96	179.51	3541.58	642.43 S	228.63 E	-639.88	1.38
3714.00	3.08	214.96	3631.37	648.30 S	227.28 E	-645.76	3.37
3804.00	3.01	196.65	3721.24	652.54 S	225.22 E	-650.02	1.08
3894.00	3.60	154.81	3811.10	657.36 S	225.75 E	-654.84	2.69
3984.00	3.02	144.80	3900.95	661.85 S	228.32 E	-659.30	0.91
4073.00	1.96	145.80	3989.87	665.03 S	230.53 E	-662.45	1.19
4163.00	1.85	158.76	4079.82	667.66 S	231.92 E	-665.07	0.49
4252.00	1.37	171.71	4168.78	670.05 S	232.59 E	-667.45	0.68
4342.00	2.14	149.17	4258.74	672.55 S	233.61 E	-669.94	1.13
4432.00	2.09	149.55	4348.68	675.40 S	235.30 E	-672.78	0.06

Wagner 27N-10HZ

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
4522.00	1.73	157.73	4438.63	678.07 S	236.64 E	-675.43	0.50
4611.00	1.05	175.08	4527.60	680.13 S	237.22 E	-677.48	0.89
4701.00	1.62	129.67	4617.58	681.77 S	238.27 E	-679.11	1.28
4791.00	1.31	134.84	4707.55	683.30 S	239.98 E	-680.62	0.37
4881.00	0.82	142.74	4797.54	684.55 S	241.10 E	-681.85	0.57
4971.00	0.69	174.54	4887.53	685.60 S	241.54 E	-682.90	0.48
5060.00	0.97	197.27	4976.52	686.85 S	241.37 E	-684.16	0.48
5150.00	1.17	216.29	5066.51	688.32 S	240.60 E	-685.63	0.45
5240.00	1.48	218.80	5156.48	689.97 S	239.33 E	-687.29	0.35
5330.00	1.84	166.06	5246.45	692.28 S	238.95 E	-689.61	1.68
5419.00	2.13	169.44	5335.39	695.29 S	239.59 E	-692.61	0.34
5509.00	2.34	154.54	5425.33	698.59 S	240.69 E	-695.90	0.69
5599.00	2.59	121.10	5515.25	701.30 S	243.23 E	-698.59	1.60
5689.00	1.72	103.77	5605.18	702.68 S	246.29 E	-699.93	1.20
5778.00	0.88	78.33	5694.16	702.86 S	248.26 E	-700.09	1.13
5868.00	0.82	63.82	5784.15	702.44 S	249.51 E	-699.65	0.25
5958.00	0.85	71.83	5874.14	701.94 S	250.72 E	-699.14	0.13
5986.00	0.92	70.86	5902.14	701.81 S	251.13 E	-699.00	0.24
6091.00	1.00	64.34	6007.12	701.13 S	252.75 E	-698.31	0.13
6181.00	0.84	43.57	6097.11	700.32 S	253.91 E	-697.48	0.41
6271.00	0.82	36.26	6187.10	699.32 S	254.74 E	-696.48	0.12
6360.00	1.17	19.73	6276.09	697.95 S	255.43 E	-695.10	0.50
6450.00	1.58	15.36	6366.06	695.89 S	256.07 E	-693.03	0.47
6540.00	1.34	33.93	6456.03	693.82 S	256.98 E	-690.95	0.59
6629.00	1.12	43.41	6545.01	692.32 S	258.16 E	-689.44	0.34
6719.00	8.83	7.57	6634.62	684.82 S	259.68 E	-681.92	8.83
6809.00	14.56	358.81	6722.72	666.65 S	260.35 E	-663.74	6.65
6899.00	19.61	1.18	6808.72	640.22 S	260.43 E	-637.32	5.66
6988.00	24.82	358.36	6891.09	606.59 S	260.20 E	-603.69	5.98
7078.00	28.98	359.33	6971.33	565.89 S	259.41 E	-563.00	4.64
7168.00	32.82	2.08	7048.54	519.69 S	260.04 E	-516.80	4.55
7257.00	37.58	356.83	7121.27	468.45 S	259.41 E	-465.57	6.33
7347.00	44.15	359.71	7189.30	409.63 S	257.74 E	-406.77	7.60
7437.00	52.96	0.42	7248.81	342.23 S	257.84 E	-339.38	9.81
7527.00	59.11	0.02	7299.06	267.62 S	258.12 E	-264.77	6.84
7616.00	63.84	0.15	7341.56	189.45 S	258.24 E	-186.60	5.31
7706.00	66.66	0.62	7379.23	107.73 S	258.79 E	-104.88	3.18
7796.00	72.76	0.41	7410.42	23.36 S	259.55 E	-20.50	6.78
7886.00	83.93	1.03	7428.57	64.64 N	260.67 E	67.50	12.42
7975.00	85.32	359.28	7436.91	153.24 N	260.91 E	156.10	2.50
8065.00	88.97	0.82	7441.39	243.11 N	260.99 E	245.97	4.40
8155.00	87.92	0.47	7443.84	333.07 N	262.00 E	335.93	1.24
8245.00	89.35	1.53	7445.98	423.03 N	263.57 E	425.90	1.98
8335.00	91.95	1.86	7444.96	512.98 N	266.24 E	515.87	2.91
8425.00	92.12	1.31	7441.76	602.89 N	268.73 E	605.80	0.64
8514.00	92.37	0.76	7438.27	691.80 N	270.34 E	694.73	0.69
8604.00	89.90	359.96	7436.49	781.78 N	270.90 E	784.71	2.89
8694.00	90.69	359.03	7436.03	871.77 N	270.11 E	874.69	1.36
8788.00	89.98	357.63	7435.48	965.72 N	267.38 E	968.61	1.67
8883.00	90.65	358.82	7434.96	1060.68 N	264.44 E	1063.52	1.43
8977.00	91.24	0.65	7433.40	1154.66 N	264.00 E	1157.49	2.04
9071.00	91.49	2.41	7431.16	1248.59 N	266.50 E	1251.45	1.89
9166.00	91.91	2.11	7428.34	1343.48 N	270.25 E	1346.37	0.54
9260.00	92.04	1.50	7425.10	1437.37 N	273.21 E	1440.29	0.66
9354.00	91.32	2.91	7422.34	1531.26 N	276.82 E	1534.21	1.68
9448.00	89.52	1.29	7421.65	1625.19 N	280.27 E	1628.17	2.58
9543.00	89.18	0.42	7422.73	1720.17 N	281.69 E	1723.16	0.98
9637.00	89.18	359.51	7424.08	1814.16 N	281.63 E	1817.15	0.96
9731.00	91.28	2.63	7423.70	1908.13 N	283.39 E	1911.13	4.00
9825.00	91.11	1.68	7421.74	2002.04 N	286.92 E	2005.07	1.03

Wagner 27N-10HZ

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
9920.00	91.20	1.46	7419.82	2096.98 N	289.51 E	2100.04	0.25
10014.00	91.11	0.88	7417.93	2190.94 N	291.43 E	2194.02	0.62
10108.00	91.32	0.35	7415.94	2284.92 N	292.44 E	2287.99	0.61
10198.00	91.07	359.69	7414.06	2374.90 N	292.47 E	2377.97	0.78
10288.00	89.27	358.32	7413.80	2464.88 N	290.91 E	2467.93	2.52
10378.00	90.57	1.69	7413.93	2554.86 N	290.92 E	2557.91	4.01
10468.00	89.73	1.15	7413.70	2644.83 N	293.15 E	2647.90	1.11
10557.00	90.82	1.01	7413.27	2733.82 N	294.83 E	2736.89	1.24
10647.00	90.73	0.61	7412.05	2823.80 N	296.10 E	2826.88	0.45
10737.00	91.45	1.08	7410.34	2913.77 N	297.43 E	2916.86	0.95
10827.00	87.50	0.58	7411.16	3003.74 N	298.73 E	3006.84	4.42
10916.00	86.79	359.93	7415.59	3092.63 N	299.12 E	3095.73	1.08
11006.00	88.22	358.89	7419.51	3182.53 N	298.20 E	3185.62	1.96
11096.00	88.01	358.66	7422.48	3272.46 N	296.27 E	3275.52	0.35
11186.00	89.56	358.03	7424.39	3362.40 N	293.67 E	3365.43	1.86
11275.00	88.76	357.67	7425.69	3451.33 N	290.33 E	3454.31	0.98
11365.00	88.76	358.59	7427.63	3541.26 N	287.39 E	3544.21	1.01
11455.00	88.63	0.04	7429.68	3631.23 N	286.31 E	3634.16	1.62
11545.00	87.24	359.55	7432.92	3721.17 N	285.99 E	3724.09	1.64
11634.00	89.26	1.33	7435.63	3810.11 N	286.67 E	3813.04	3.03
11724.00	91.11	0.83	7435.33	3900.09 N	288.37 E	3903.03	2.12
11814.00	90.44	0.05	7434.11	3990.08 N	289.06 E	3993.02	1.14
11904.00	89.39	359.43	7434.24	4080.08 N	288.65 E	4083.01	1.36
11994.00	91.41	1.36	7433.62	4170.07 N	289.27 E	4172.99	3.11
12083.00	91.62	0.56	7431.27	4259.02 N	290.77 E	4261.96	0.94
12173.00	92.25	359.98	7428.24	4348.97 N	291.19 E	4351.91	0.95
12263.00	91.16	1.98	7425.57	4438.91 N	292.73 E	4441.86	2.53
12353.00	90.90	1.49	7423.95	4528.85 N	295.46 E	4531.83	0.61
12442.00	87.97	1.88	7424.83	4617.80 N	298.08 E	4620.80	3.33
12622.00	88.72	1.11	7430.03	4797.66 N	302.78 E	4800.70	0.60
12712.00	90.23	0.79	7430.86	4887.64 N	304.27 E	4890.69	1.71
12802.00	90.40	0.09	7430.36	4977.64 N	304.96 E	4980.69	0.80
12891.00	90.48	359.62	7429.68	5066.63 N	304.74 E	5069.68	0.53
12981.00	91.53	1.71	7428.09	5156.61 N	305.79 E	5159.66	2.60
13071.00	92.08	1.22	7425.25	5246.53 N	308.10 E	5249.60	0.82
13161.00	91.20	2.13	7422.68	5336.46 N	310.73 E	5339.55	1.41
13251.00	90.02	2.33	7421.72	5426.38 N	314.23 E	5429.51	1.32
13340.00	88.89	2.41	7422.57	5515.30 N	317.90 E	5518.46	1.28
13430.00	88.80	1.50	7424.38	5605.23 N	320.97 E	5608.42	1.01
13520.00	89.56	2.14	7425.67	5695.17 N	323.83 E	5698.39	1.10
13610.00	89.94	1.30	7426.07	5785.13 N	326.54 E	5788.37	1.02
13699.00	88.09	1.41	7427.60	5874.09 N	328.65 E	5877.35	2.08
13789.00	88.26	1.12	7430.47	5964.02 N	330.63 E	5967.29	0.38
13879.00	88.63	0.95	7432.91	6053.97 N	332.25 E	6057.26	0.46
13969.00	90.90	359.56	7433.27	6143.96 N	332.65 E	6147.25	2.95
14059.00	91.62	359.22	7431.29	6233.94 N	331.69 E	6237.21	0.88
14148.00	91.36	357.37	7428.98	6322.86 N	329.04 E	6326.10	2.11
14238.00	89.52	358.33	7428.28	6412.79 N	325.66 E	6415.98	2.31
14328.00	89.85	357.21	7428.78	6502.72 N	322.16 E	6505.87	1.30
14418.00	90.69	0.02	7428.35	6592.68 N	319.98 E	6595.80	3.26
14508.00	89.98	359.78	7427.82	6682.68 N	319.82 E	6685.79	0.84
14687.00	88.09	2.14	7430.84	6861.61 N	322.82 E	6864.74	1.69
14777.00	87.25	1.30	7434.50	6951.49 N	325.52 E	6954.65	1.32
14867.00	89.81	1.79	7436.81	7041.42 N	327.94 E	7044.60	2.90
14956.00	90.06	0.76	7436.90	7130.40 N	329.92 E	7133.60	1.19
15046.00	89.81	359.42	7437.00	7220.40 N	330.07 E	7223.59	1.51
15136.00	90.40	359.68	7436.84	7310.39 N	329.36 E	7313.57	0.71
15226.00	90.90	0.06	7435.82	7400.39 N	329.16 E	7403.56	0.70
15315.00	91.62	0.05	7433.86	7489.36 N	329.25 E	7492.53	0.80
15361.00	91.62	0.05	7432.56	7535.35 N	329.29 E	7538.51	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 0.63 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 15361.00 FEET
IS 7542.54 FEET ALONG 2.50 DEGREES (TRUE)