

DGR Dual Gamma Ray



1 : 240

Company : Anadarko Petroleum Corp. Rig : H&P 308 Well : Turkey Springs 3N-14hz Field : Wattenburg Country : USA API Number : 05-123-36691	Other Services Directional Drilling
LOCATION Latitude : 40° 7' 44.05" North Longitude : 104° 44' 33.64" West UTM Easting = 3,211,762.87 ft UTM Northing = 1,290,707.80 ft	

WELL INFORMATION

MWD Run Number	100	200			
Date run completed	26-Jun-13	30-Jun-13			
Rig Bit Number	0100	0200			
Bit Size (in)	8.750	6.125			
Tool Nominal OD (in)	6.750	4.750			
Log Start Depth (MD, ft)	1,106.00	8,109.00			
Log End Depth (MD, ft)	8,109.00	12,283.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	23-Jun-13 14:20	27-Jun-13 20:55			
Drill/Wipe End Date and Time	25-Jun-13 21:37	30-Jun-13 07:20			
Min Inc (deg) @ Depth (MD, ft)	.21 @ 1,468.00	83.68 @ 10,077.00			
Max Inc (deg) @ Depth (MD, ft)	86.12 @ 8,058.00	92.78 @ 11,779.00			
Bit TFA(in2) / Bit Type	.86 / PDC	.61 / PDC			
Flow Rate (gpm)	576.39	275.00			
Max AV (fpm) / CV (fpm) @ MWD	443.0 / 399.0	364.0 / 438.0			
Fluid Type	Fresh Water Gel	Fresh Water Gel			
Density (ppg) / Viscosity (spqt)	9.20 / 56.00	9.50 / 39.00			
Filtrate CL (ppm)	1,200.00	1,300.00			
pH / Fluid Loss (mptm)	9.00 / 9.00	9.00 / 9.00			
PV (cP) / YP (lhf2)	18 / 15.00	13 / 13.00			
% Solids / % Sand	8 / .5	6 / .5			
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A			
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Max Tool Temp (degF) / Source	185.02 / PCM	240.23 / HCIM			
Rm @ Max Tool Temp (degF)	N/A @ 185.02	N/A @ 240.23			
Lead MWD Engineer	Ryan White	Ryan White			
Customer Representative	Travis Kruckenburg	Travis Kruckenburg			

SENSOR INFORMATION

Downhole Processor Information					
Tool Type	PCM	HCIM			
Software Version	5.84	88.56			
Sub Serial Number	11341324	11644870			
Insert Serial Number	11145605	11603780			
Date and Time Initialized	22-Jun-13 16:23	27-Jun-13 12:01			
Date and Time Read	26-Jun-13 05:21	01-Jan-70 00:00			
ECMB SW Version	N/A	N/A			

Directional Sensor Information					
Tool Type	PCDC	PCDC			
Distance From Bit (ft)	49.20	48.43			
Software Version	6.21	6.21			
Sub Serial Number	11341324	11069033			
Sonde Serial Number	11638470	11297493			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	31.56	158.40			

Gamma Ray Sensor Information					
Tool Type	PCG	DGR			
Distance From Bit (ft)	54.15	68.52			
Recorded Sample Period (sec)	10	8			
Software Version	8.15	N/A			
Sub Serial Number	11341324	11644870			
Insert/Sonde Serial Number	11579782	11714244			

Pulser Controller Sensor Information					
Tool Type	PCM	PCM			
Software Version	5.84	8.17			
PIC Software Version	1.40				
Sub/HOC Serial Number	11341324	11644599			
Insert/Probe/Module SN	11145605	11145604			
Battery Serial Number	N/A	N/A			
Valve Insert SN	N/A	N/A			
DC Insert Serial Number	N/A	N/A			
Choke Size (32nd)	N/A	N/A			
Driver Current (amps)	N/A	N/A			
Driver SMI Current (amps)	N/A	N/A			
Boot Strap Version	4,130.00				

REMARKS
1. All depths are measured bit depths, referenced to the driller's pipe tally and are measured from the drill floor, unless otherwise specified.
2. No depth corrections have been made for pipe stretch or compression.
3. Critical annular velocities are calculated using the "Power Law" model for water based fluids and the "Bingham Plastic" model for oil and synthetic based fluids.
4. All data presented is recorded data unless otherwise specified
5. The following smoothing parameters have been applied to the data: PGRC (Corrected Gamma Ray): Interval Resolution: 0.5 ft Interval Distance: 0.6 ft

Gap Fill: 3.0 ft

Gap Fill: 3.0 ft

ROPA (Average Rate of Penetration):

Interval Resolution: 0.5 ft

Interval Distance: 1.2 ft

Gap Fill : 3.0 ft

6. INSITE version 7.4.10

WARRANTY

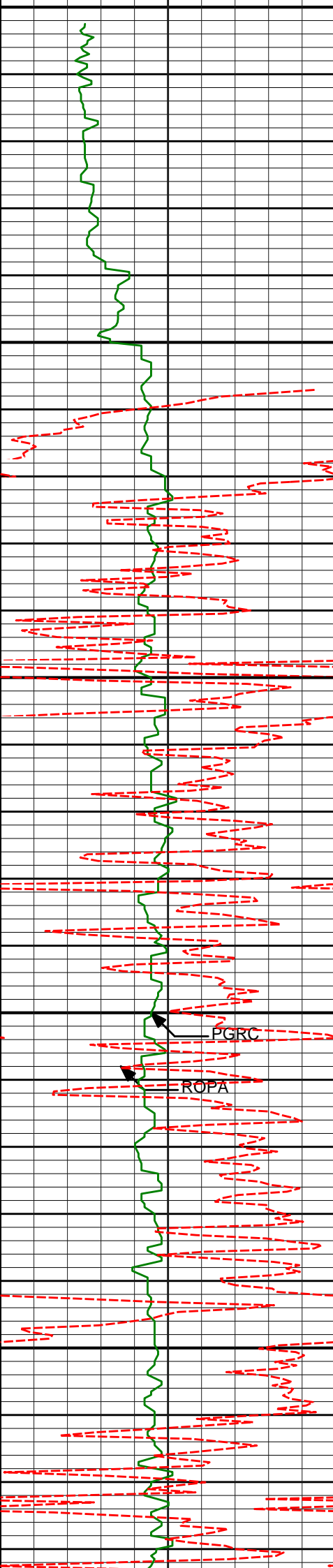
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HALLIBURTON

Sperry Drilling

MD 1:240 Detail Log

[illegible]



1050

1100

1150

1200

1250

1100'

0.17°

272.98°

1099.99'

2.33'

1192'

0.35°

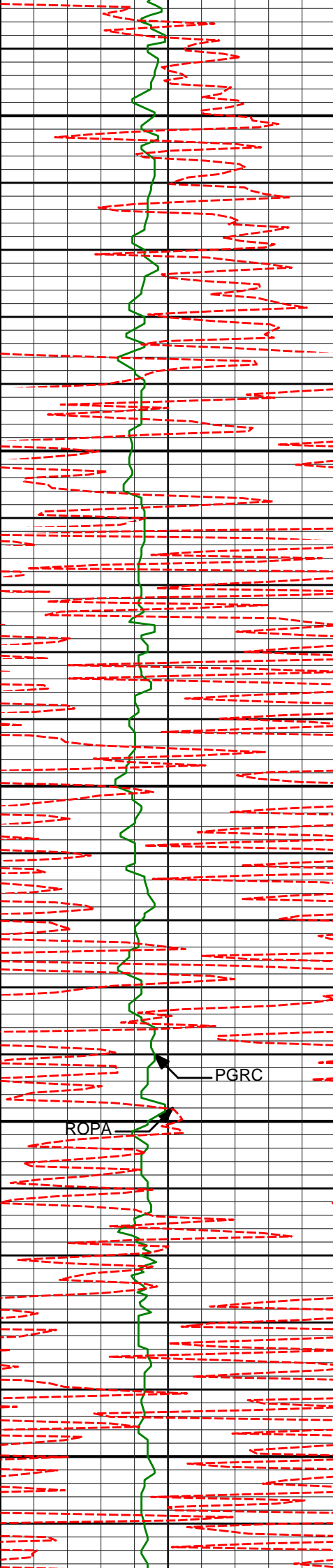
296.38°

1191.99'

2.45'

PGRC

ROPA



1300

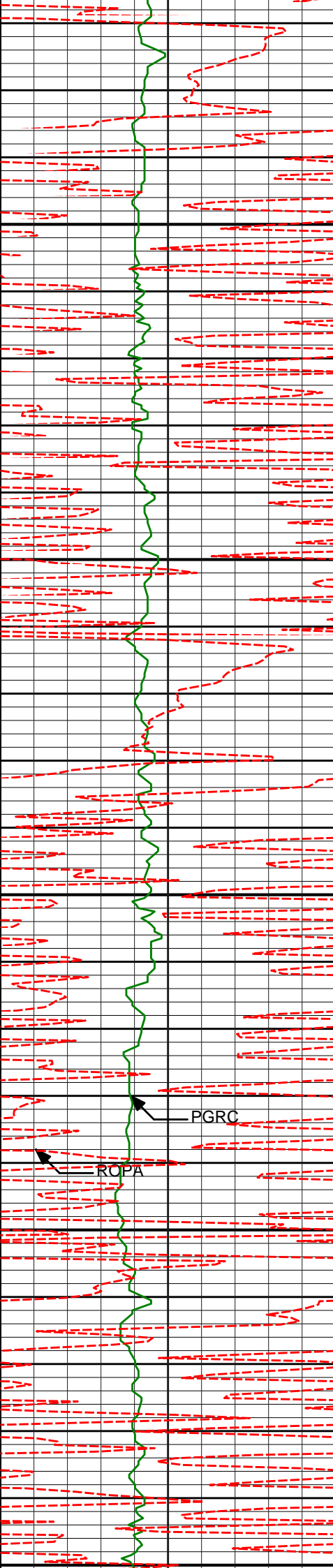
1350

1400

1450

1500

1284'	0.43°	302.99°	1283.99'	2.75'
1376'	0.22°	338.41°	1375.99'	3.09'
1468'	0.21°	289.07°	1467.98'	3.30'



1550

1560'

2.07°

301.69°

1559.96'

4.19'

1600

1650

1652'

4.71°

329.92°

1651.80'

8.24'

PGRC

ROPA

1700

1744'

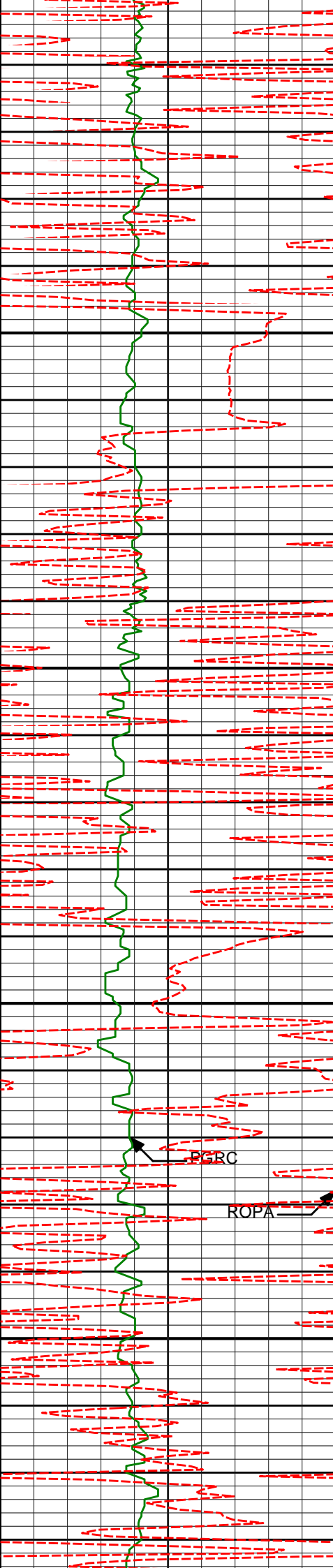
4.68°

326.36°

1743.49'

14.52'

1750



1800

1850

1900

1950

1836'

7.24°

316.82°

1834.99'

21.71'

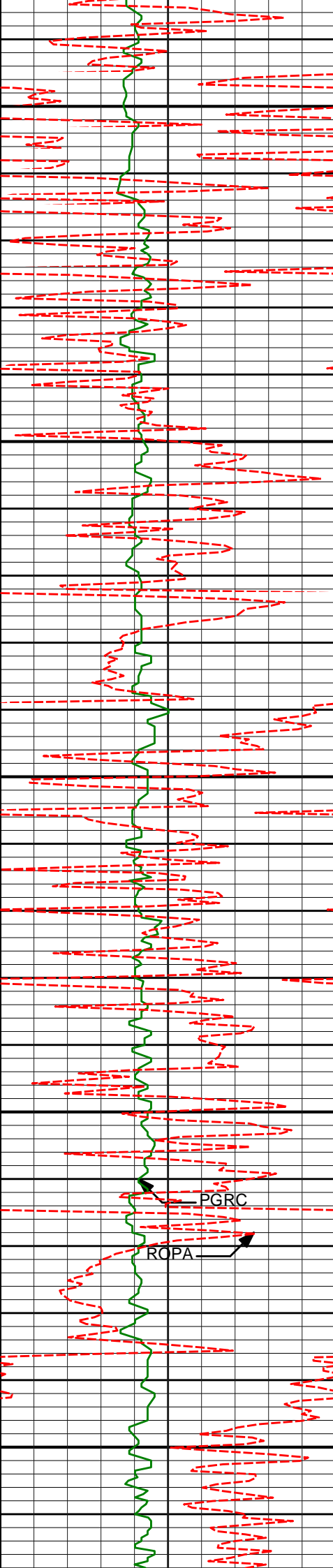
1928'

9.31°

318.60°

1926.02'

31.28'



2000

2020'

9.30°

318.42°

2016.81'

42.15'

2050

2100

2112'

10.92°

315.83°

2107.38'

53.66'

2150

PGRC

ROPA

2200

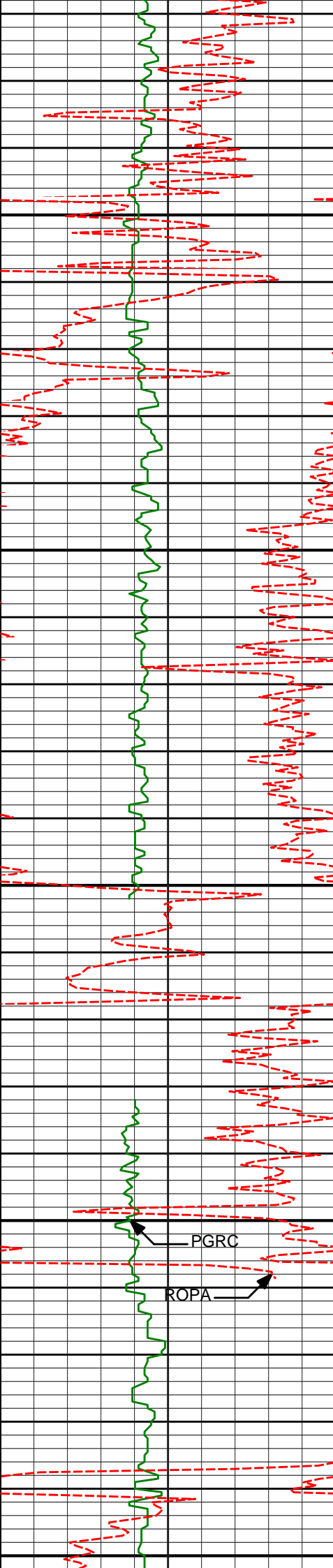
2204'

13.65°

307.05°

2197.28'

66.05'



2250

2300

2350

2400

2450

2296'

15.25°

305.71°

2286.36'

79.15'

2388'

16.06°

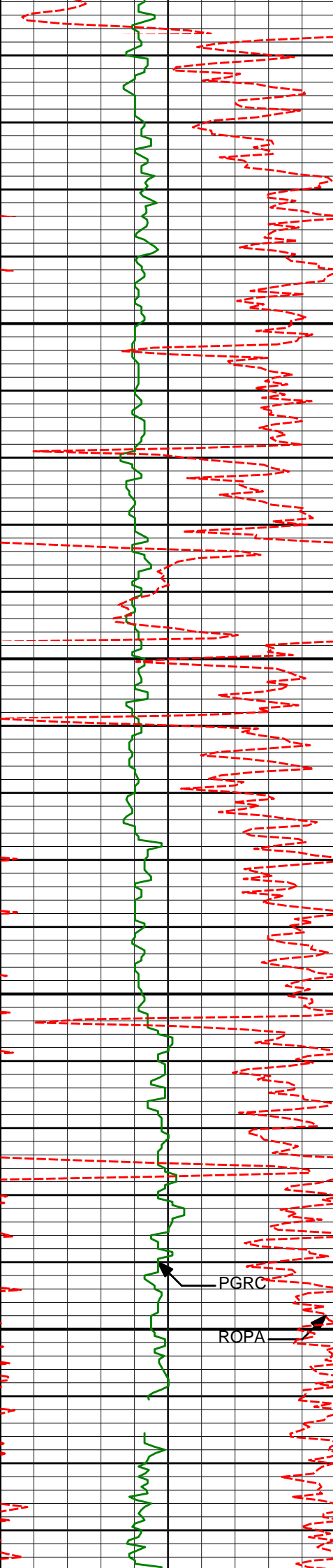
298.79°

2374.96'

91.77'

PGRC

ROPA



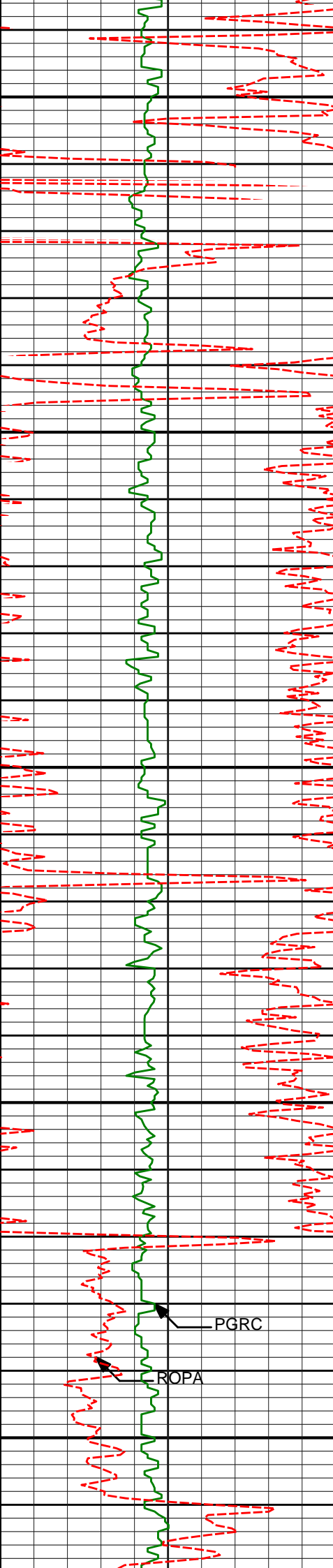
2500

2550

2600

2650

2480'	17.31°	294.84°	2463.08'	103.01'
2572'	17.60°	291.15°	2550.85'	113.08'
2667'	16.16°	291.31°	2641.76'	122.37'



2700

2750

2800

2850

2900

2761'

17.56°

290.91°

2731.71'

131.49'

2856'

17.04°

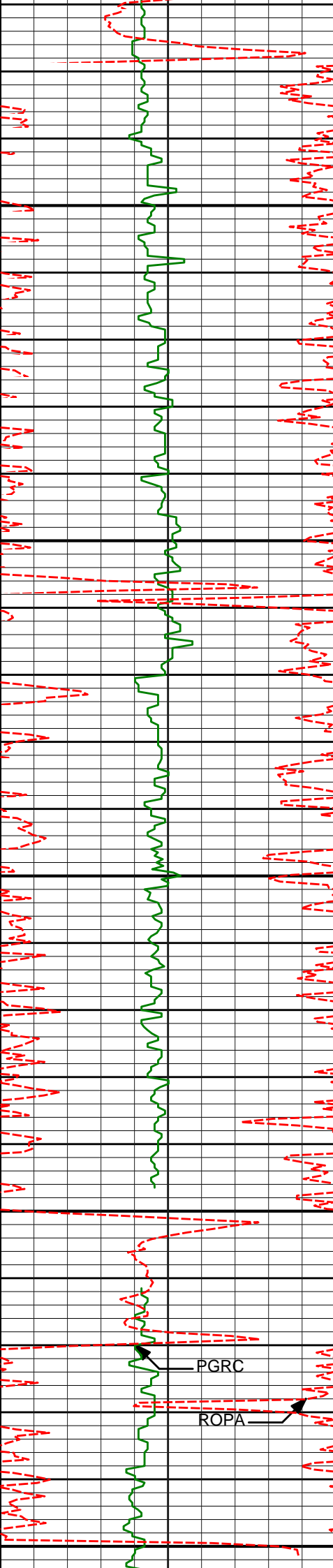
289.48°

2822.42'

140.53'

PGRC

ROPA



2950

3000

3050

3100

3150

2950'

3045'

3139'

17.44°

17.06°

19.10°

287.48°

286.48°

288.44°

2912.19'

3002.92'

3092.27'

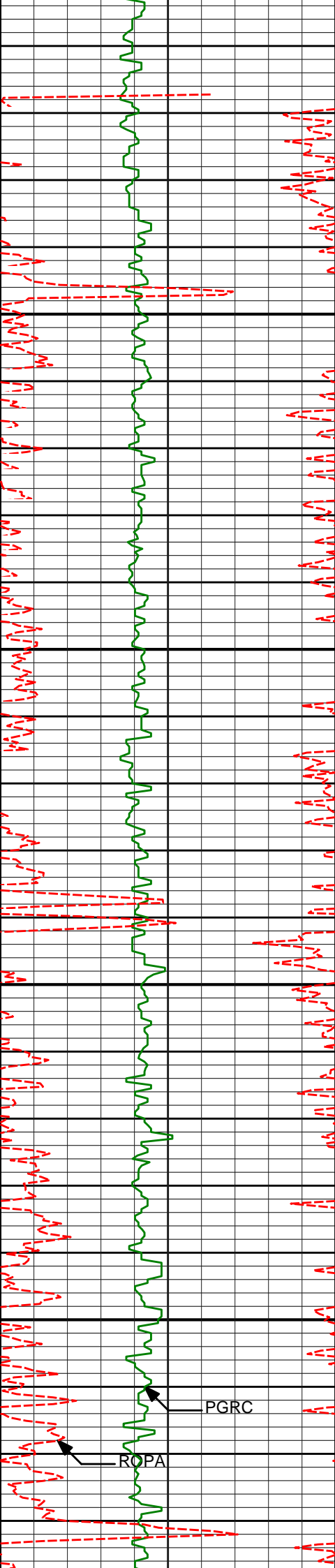
148.64'

156.13'

164.16'

PGRC

ROPA



3200

3234'

19.44°

288.81°

3181.95'

173.36'

3250

3300

3328'

19.53°

288.67°

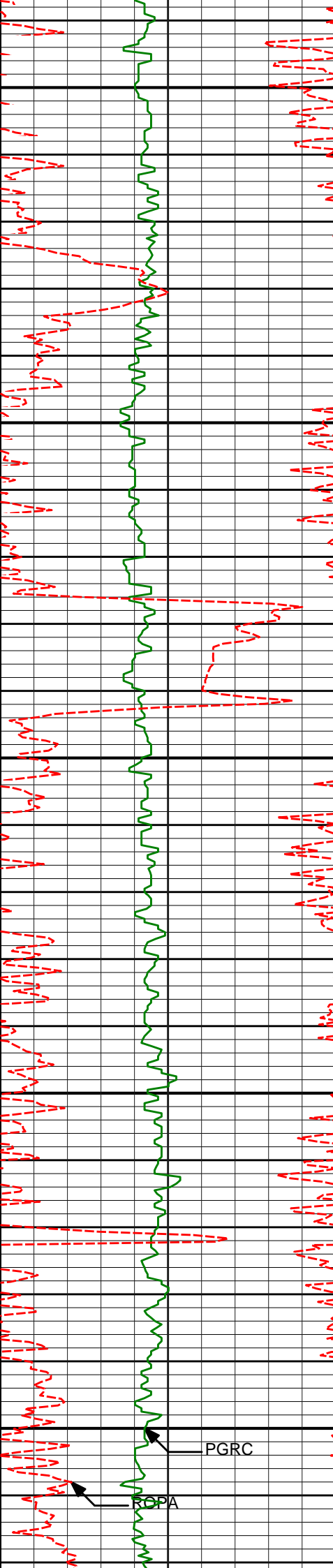
3270.57'

182.63'

3350

PGRC

ROPA



3400

3423'

19.28°

288.24°

3360.17'

191.81'

3450

3500

3518'

17.62°

292.30°

3450.29'

201.41'

3550

3600

PGRC

PGPA

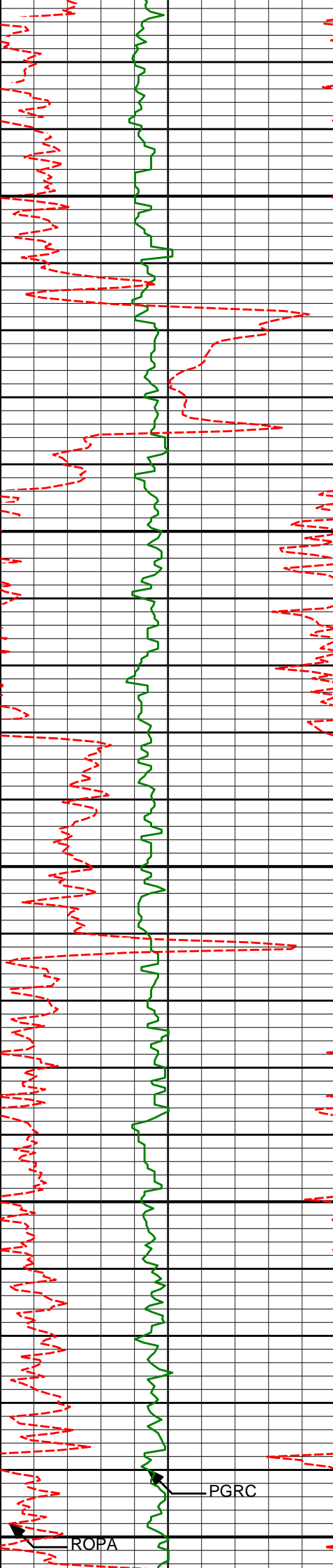
3612'

16.66°

289.82°

3540.11'

210.67'



3650

3700

3750

3800

3850

3707'

17.89°

295.10°

3630.83'

220.77'

3802'

16.99°

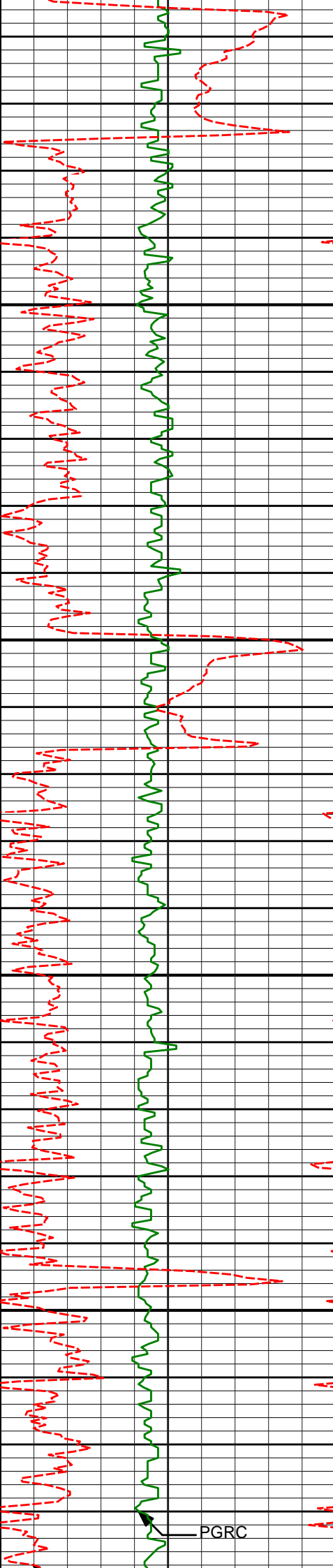
294.05°

3721.47'

231.91'

PGRC

ROPA



3900

3950

4000

4050

PGRC

3896'

17.52°

299.81°

3811.24'

243.87'

3991'

18.30°

300.14°

3901.64'

257.78'

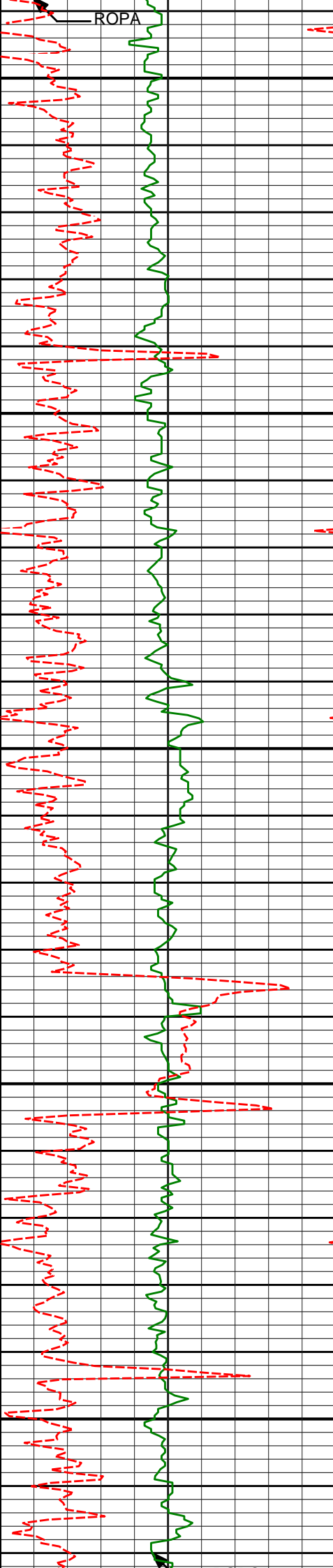
4085'

17.19°

299.27°

3991.16'

271.30'



ROPA

4100

4150

4200

4250

4300

4180'

15.54°

295.77°

4082.31'

283.05'

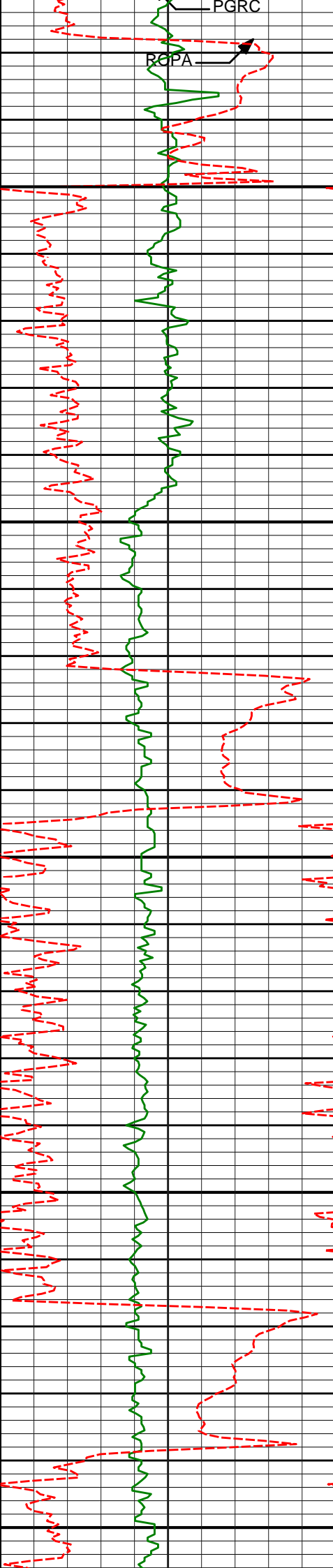
4274'

14.16°

304.37°

4173.18'

294.45'



4350

4369'

16.97°

303.43°

4264.69'

308.07'

4400

4450

4464'

18.48°

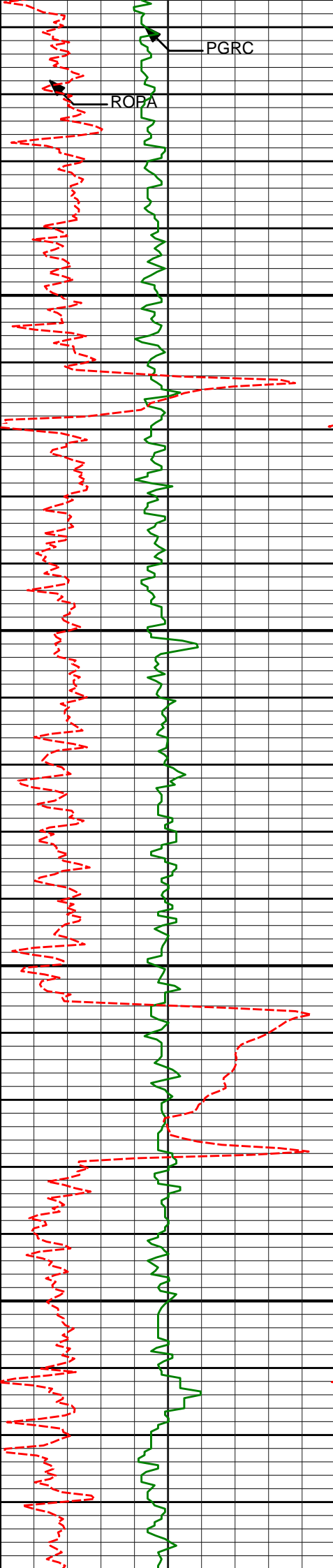
301.30°

4355.18'

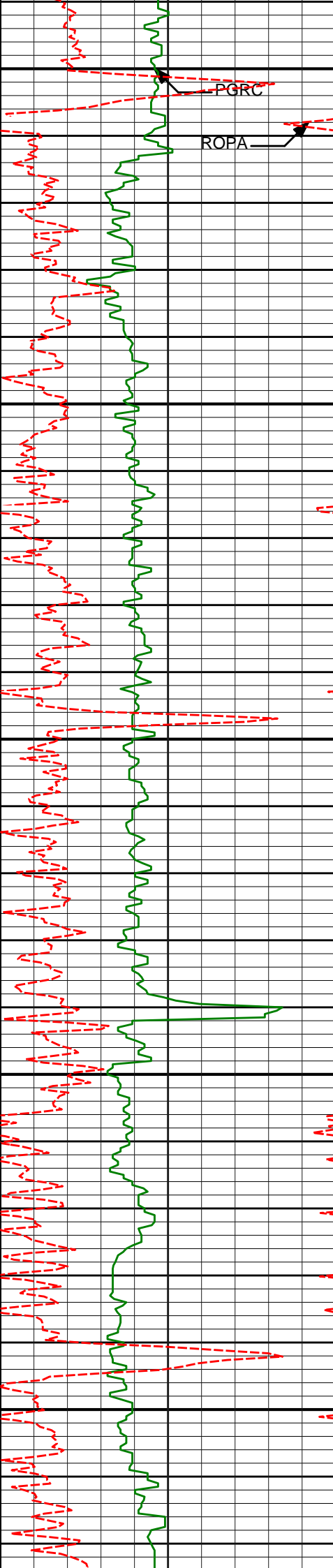
322.87'

4500

4550



	4558'	21.33°	299.95°	4443.55'	338.40'
4600					
4650	4653'	19.98°	299.92°	4532.45'	354.33'
4700					
4750	4747'	21.55°	296.08°	4620.34'	369.13'



4800

PGRC

ROPA

4842'

20.67°

294.74°

4708.97'

382.97'

4850

4900

4936'

19.41°

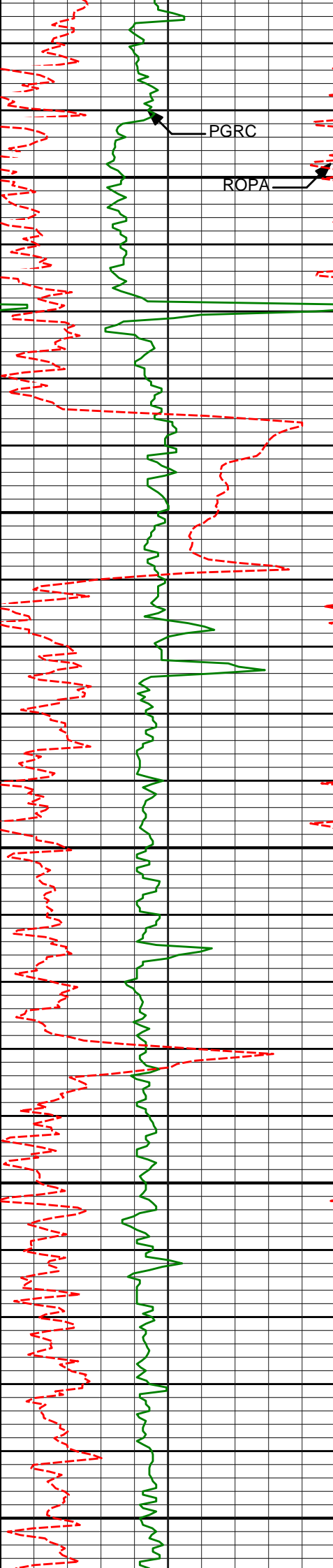
294.99°

4797.27'

395.72'

4950

5000



5050

5100

5150

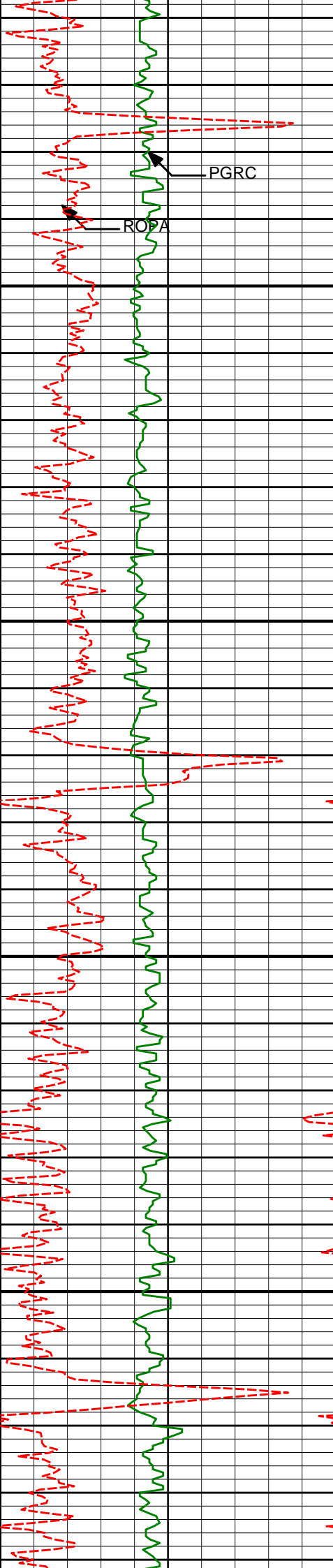
5200

5250

5031'	18.15°	294.54°	4887.21'	407.78'
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5126'	20.33°	291.34°	4976.90'	419.15'
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5220'	20.19°	291.94°	5065.09'	430.33'
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5300

5315'

18.90°

291.97°

5154.61'

441.41'

5350

5400

5409'

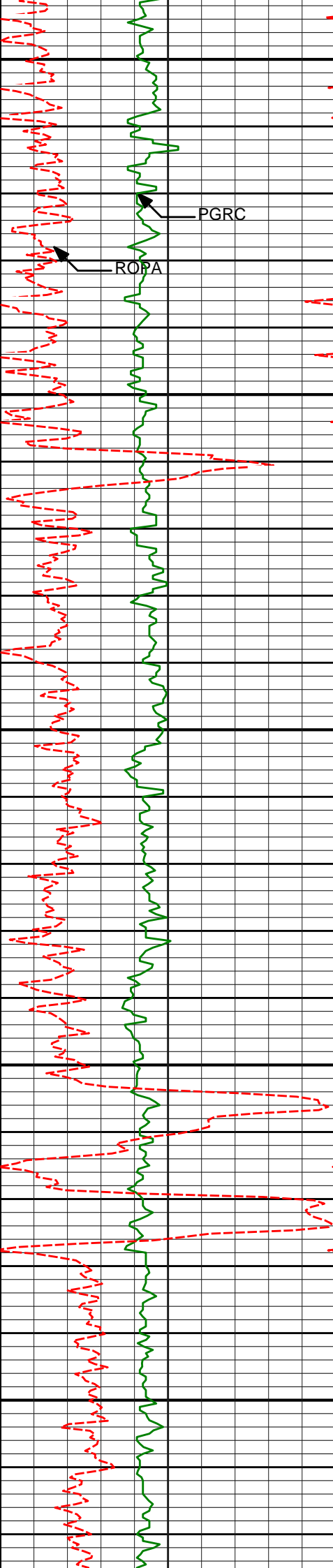
17.74°

292.06°

5243.85'

451.74'

5450



5500

5504'

16.47°

291.25°

5334.64'

461.35'

PGRC

ROPA

5550

5600

5598'

15.66°

290.27°

5424.97'

469.91'

5650

5700

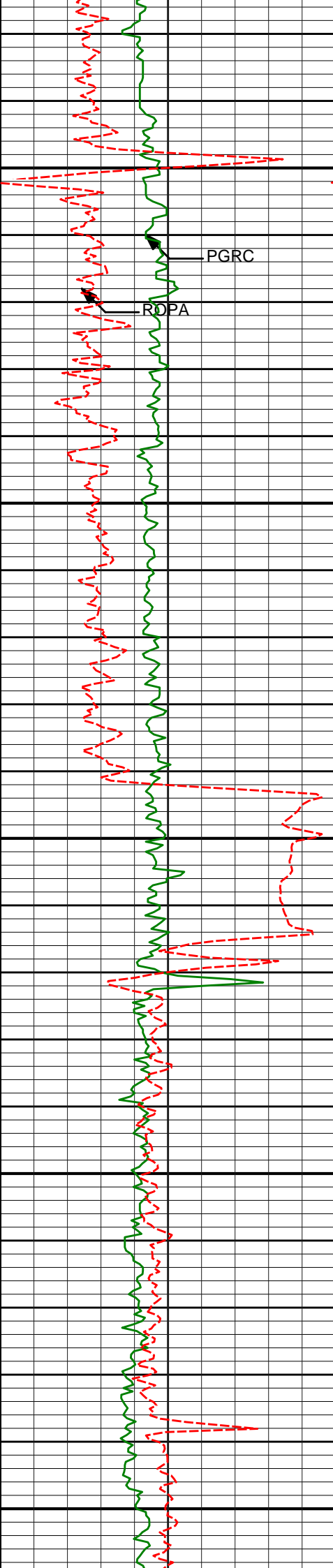
5693'

14.99°

290.31°

5516.59'

477.98'



5750

PGRC

RDPA

5787'

13.12°

289.52°

5607.77'

485.18'

5800

5850

5882'

13.94°

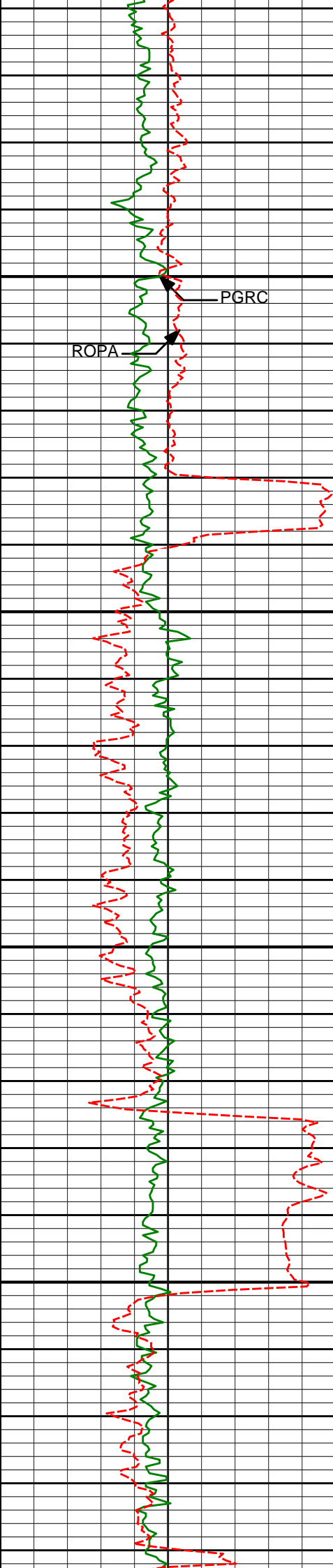
293.55°

5700.14'

492.79'

5900

5950



5976'	13.17°	291.48°	5791.52'	500.68'
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6000

ROPAR

PGRC

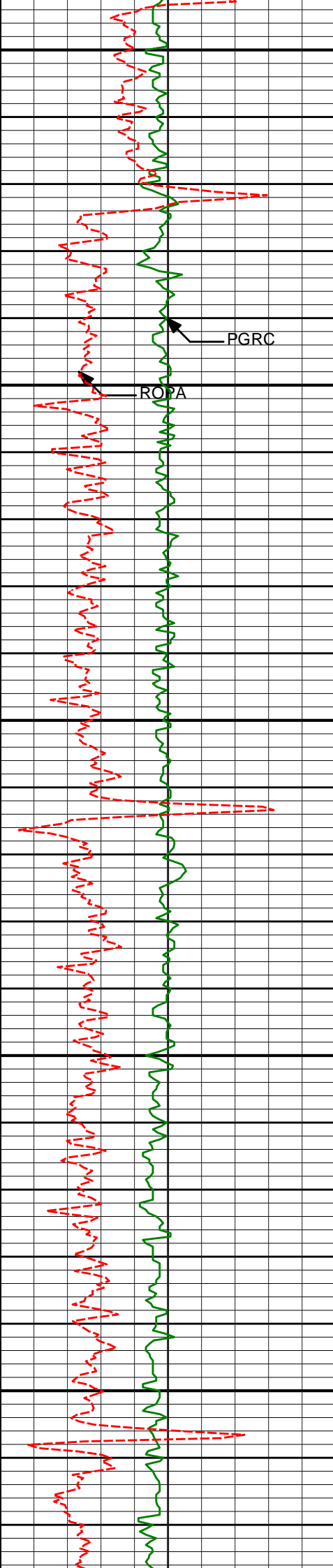
6050

6071'	11.61°	290.46°	5884.31'	507.47'
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6100

6150

6166'	13.20°	294.03°	5977.09'	514.72'
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6200

PGRC

ROSA

6250

6260'

11.55°

291.48°

6068.90'

522.03'

6300

6350

6355'

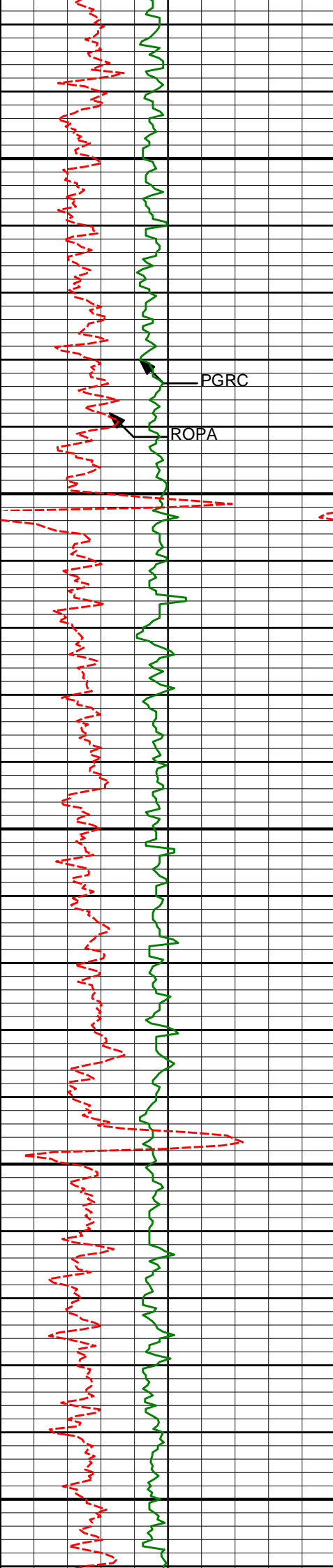
9.36°

286.63°

6162.32'

527.28'

6400



6450

6449'

7.61°

286.08°

6255.29'

530.83'

PGRC

ROPA

6500

6544'

6.36°

286.46°

6349.58'

533.77'

6550

6600

6638'

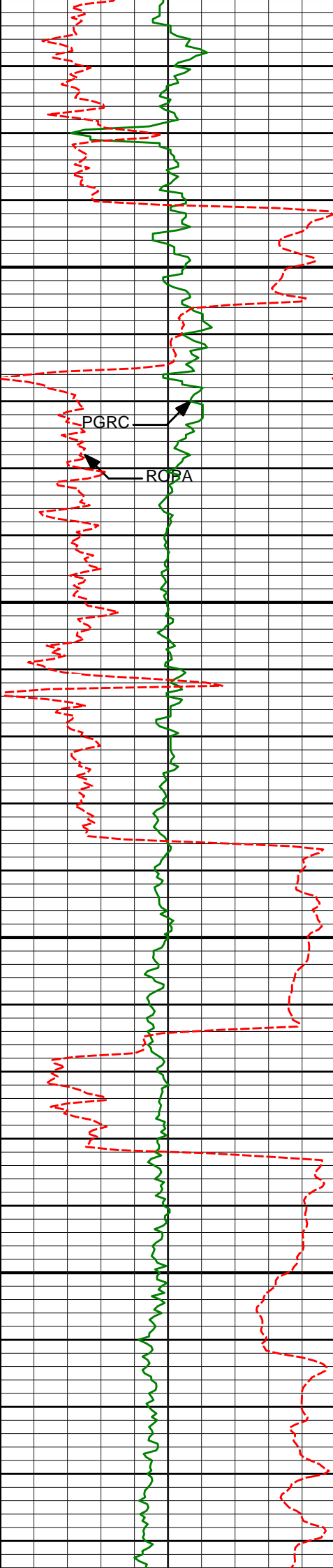
5.09°

279.28°

6443.11'

535.67'

6650



6700

6750

6800

6850

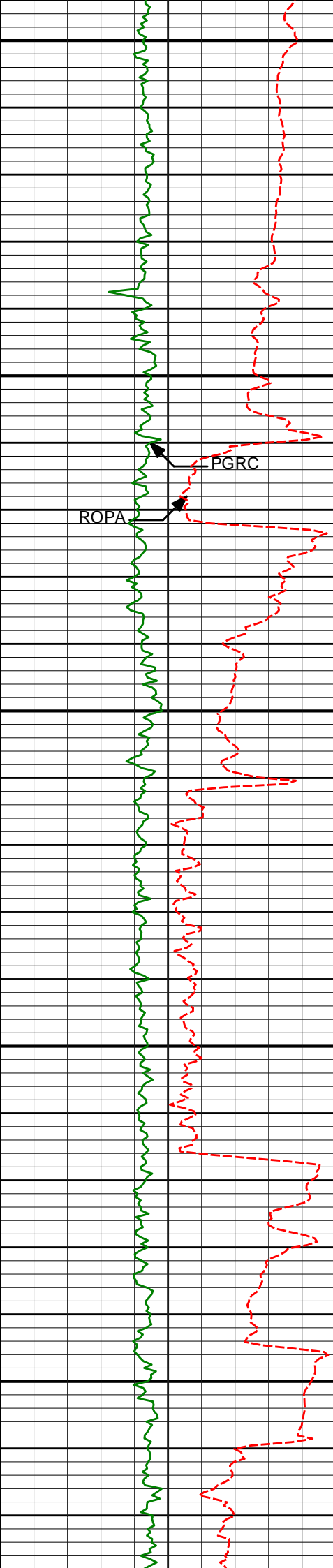
PGRC

ROPA

6733'	3.79°	292.25°	6537.83'	537.34'
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6828'	3.23°	336.64°	6632.66'	540.88'
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6875'	7.10°	4.70°	6679.47'	544.98'
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6900

6922'	12.53°	2.16°	6725.77'	552.99'
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6950

6969'	16.99°	1.48°	6771.20'	564.96'
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7000

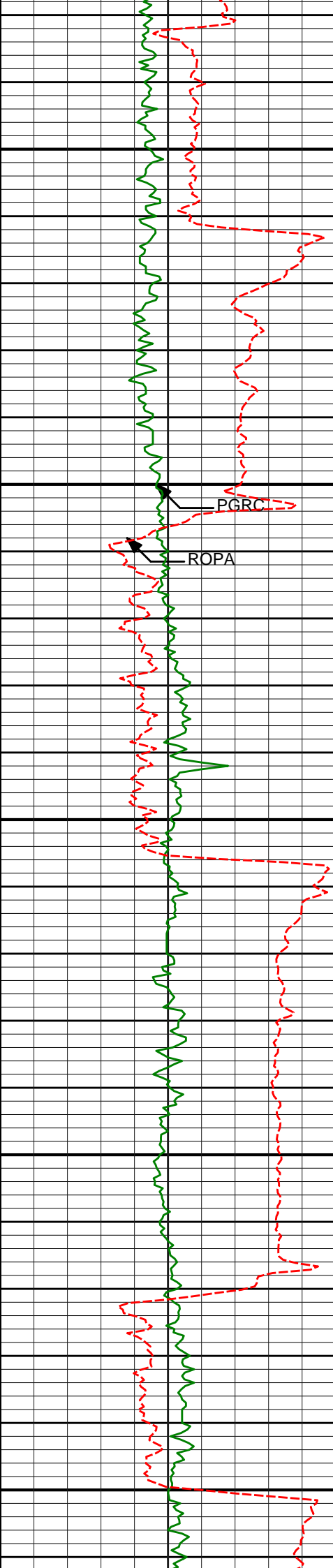
7017'	21.00°	1.81°	6816.58'	580.58'
-------	--------	-------	----------	---------

7050

7064'	21.64°	0.23°	6860.36'	597.66'
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7100

7112'	24.76°	1.45°	6904.48'	616.57'
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7150

7159'

24.56°

0.52°

6947.19'

636.18'

7200

7206'

29.17°

1.75°

6989.11'

657.41'

7250

7253'

28.83°

0.52°

7030.21'

680.19'

7300

7301'

35.30°

359.90°

7070.87'

705.65'

7350

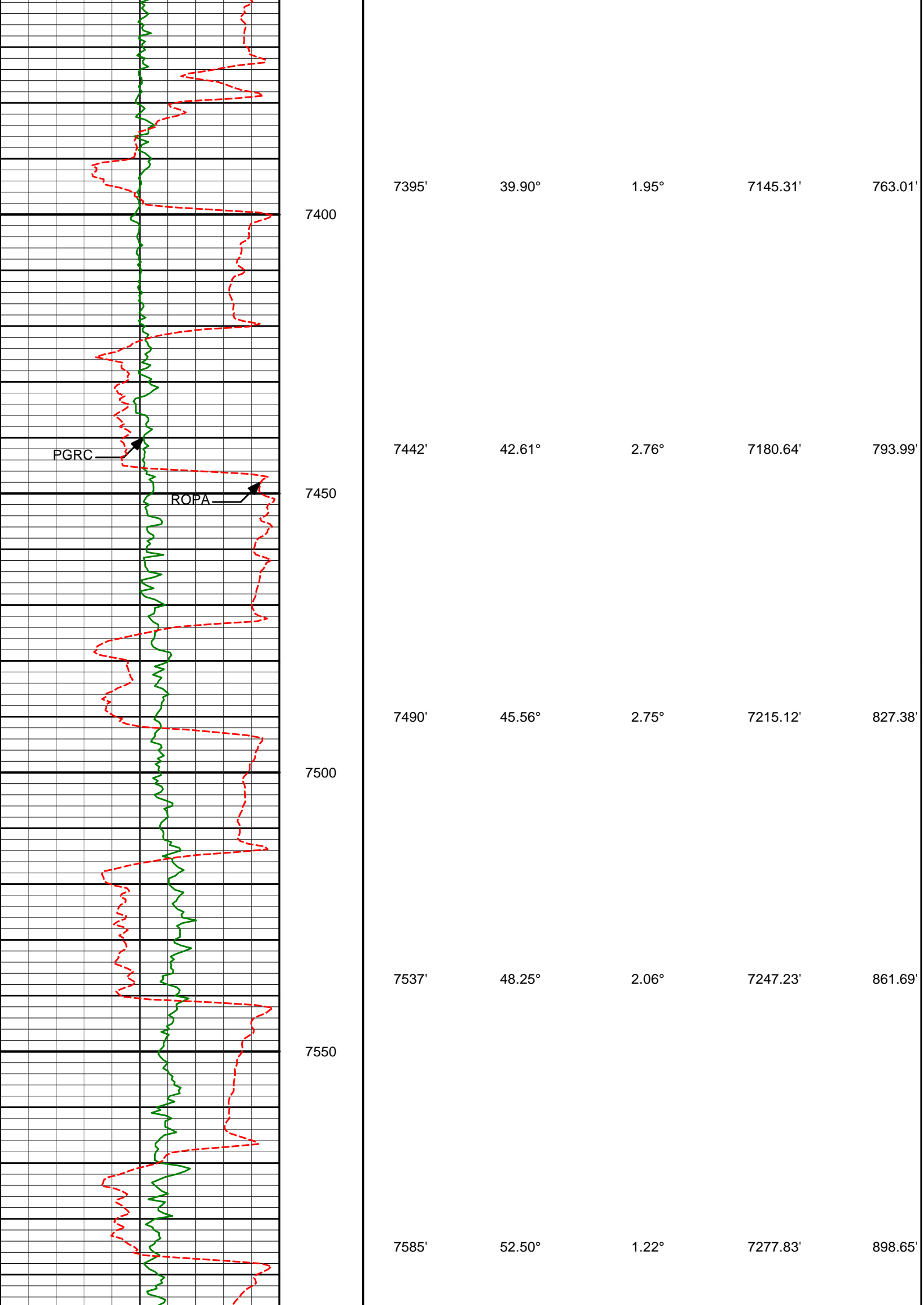
7348'

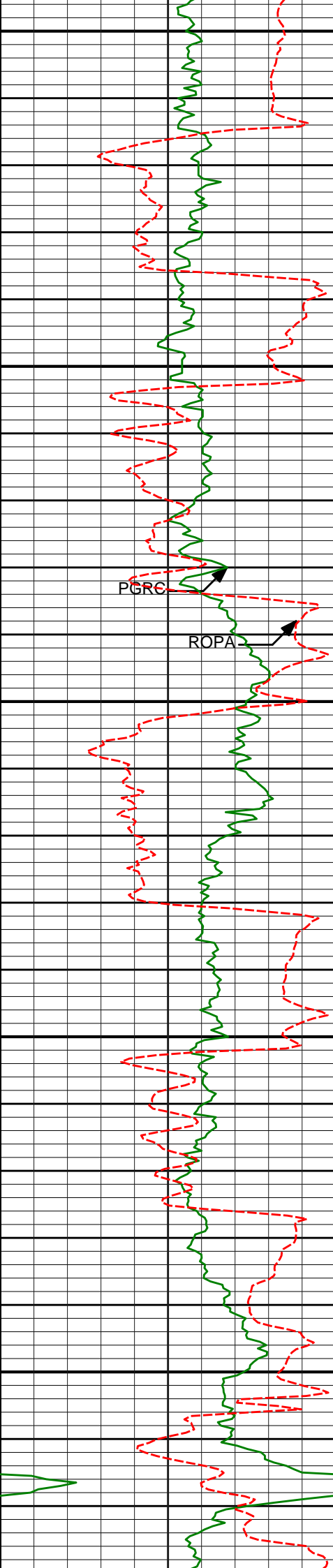
37.63°

1.01°

7108.67'

733.58'





7600

7632'

56.37°

1.65°

7305.16'

936.88'

7650

7679'

58.16°

2.20°

7330.58'

976.41'

PGRC

ROPA

7700

7726'

60.26°

2.92°

7354.63'

1016.77'

7750

7774'

63.06°

4.36°

7377.42'

1058.99'

7800

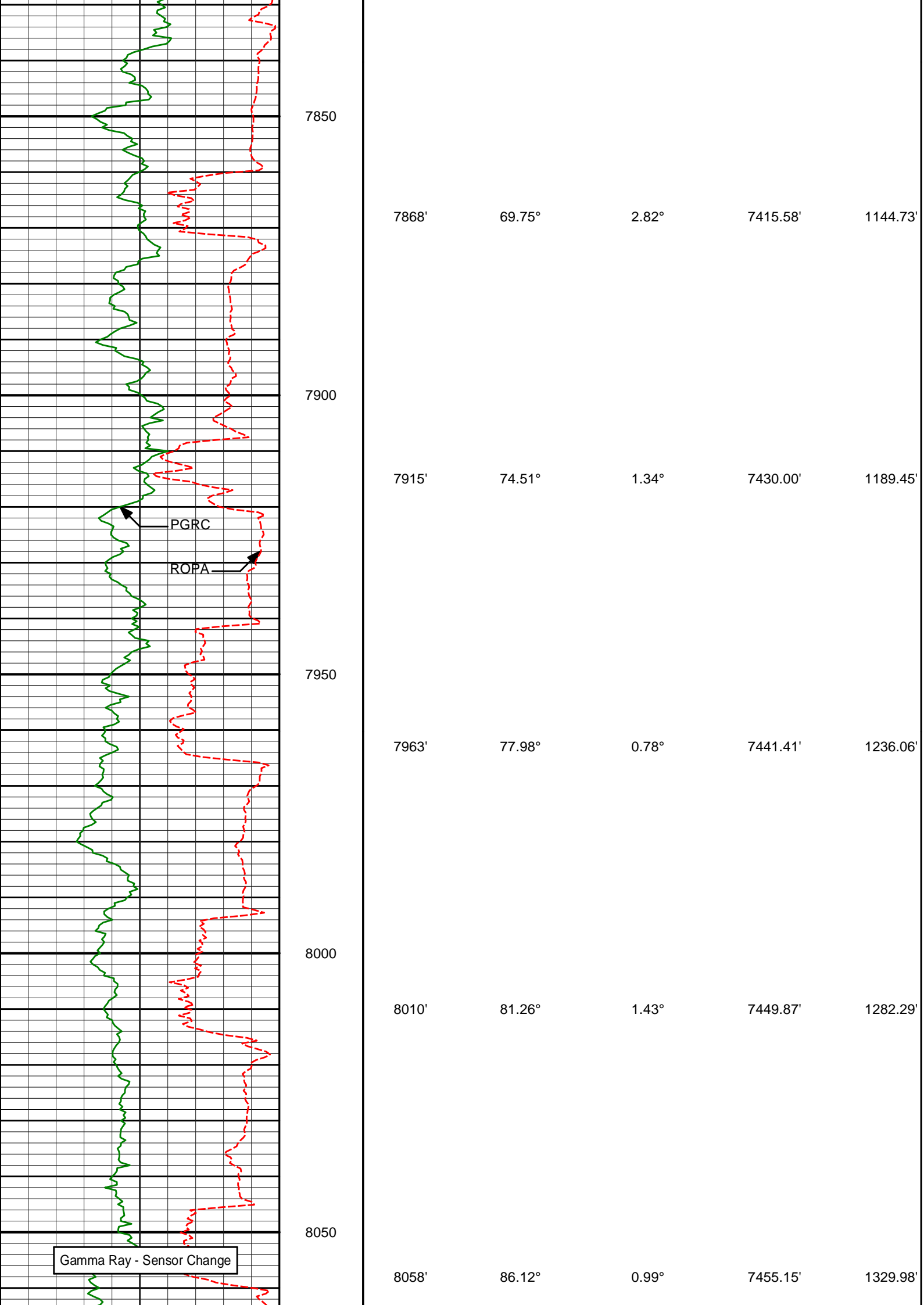
7821'

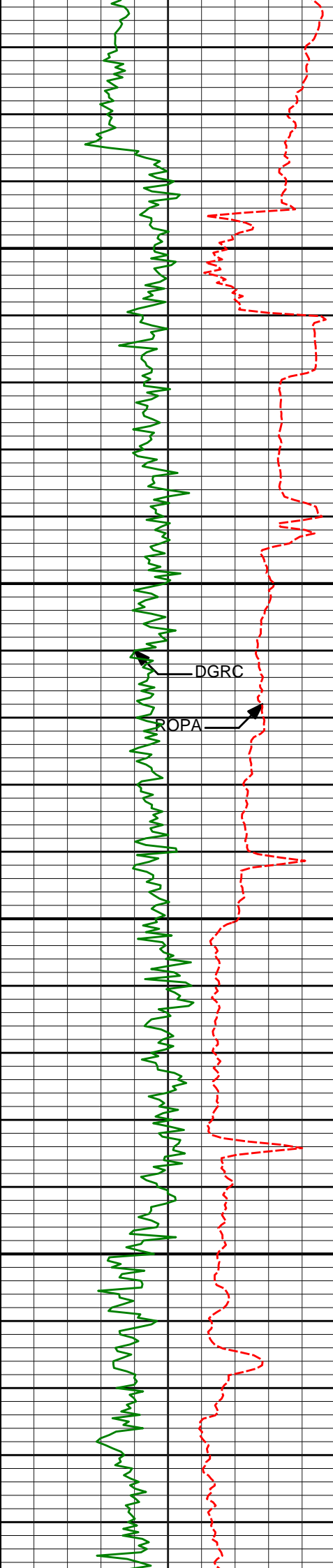
65.67°

5.02°

7397.75'

1101.29'





Casing set @
8,098 MD'

8100

8150

DGRC

SOPA

8185'

89.57°

359.55°

7459.92'

1456.84'

8200

8250

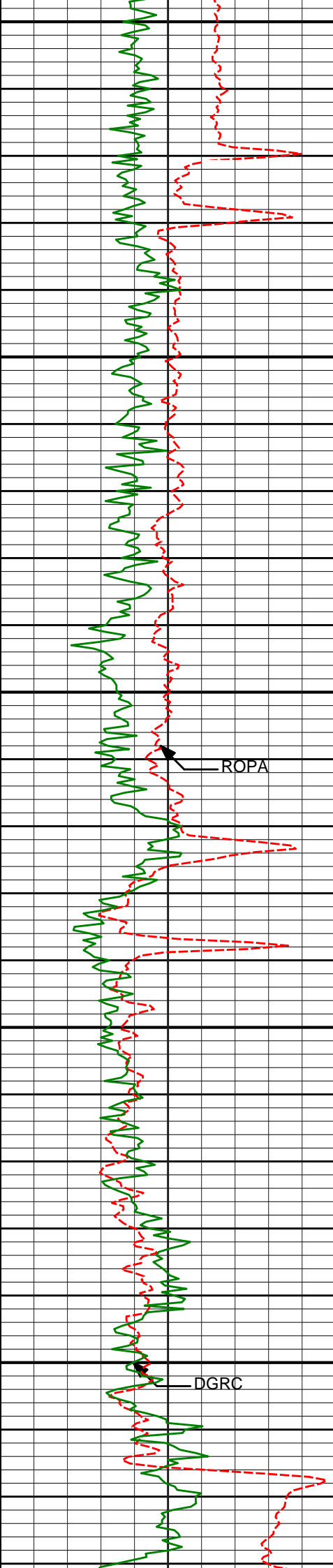
8280'

89.32°

0.24°

7460.84'

1551.79'



8300

8350

8400

8450

8500

8374'

90.56°

358.97°

7460.94'

1645.73'

ROPA

8469'

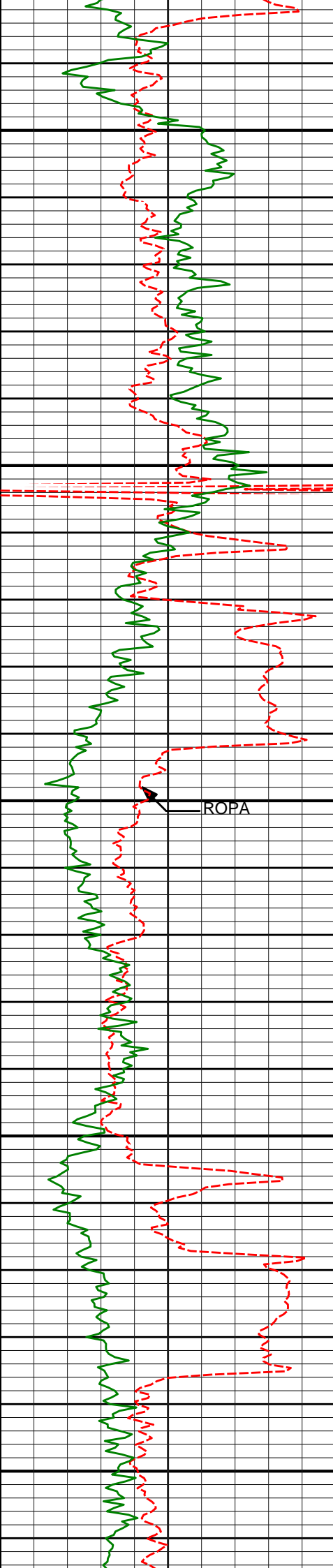
92.04°

358.60°

7458.79'

1740.59'

DGRC



8550

8564'

92.16°

359.56°

7455.31'

1835.44'

8600

8650

ROPA

8658'

91.11°

0.17°

7452.62'

1929.36'

8700

8750

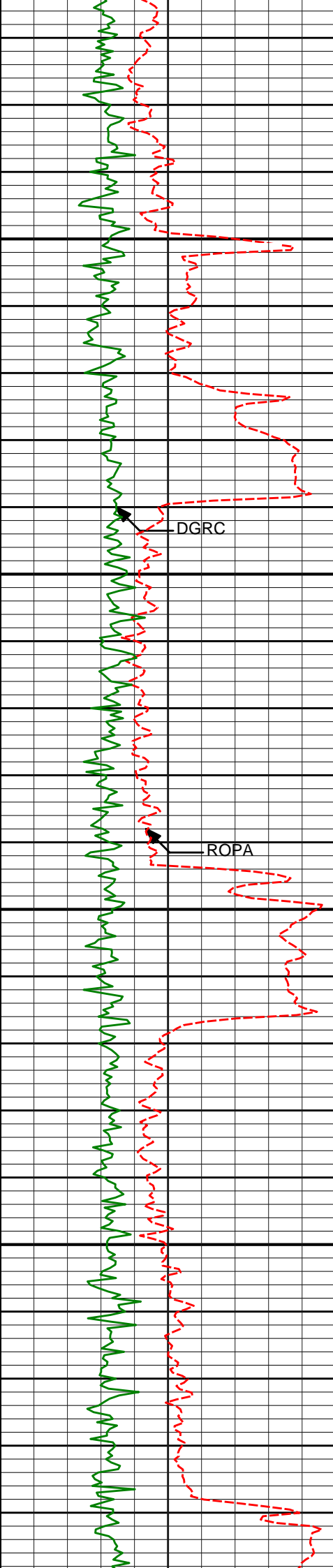
8753'

89.38°

0.58°

7452.22'

2024.34'



8800

8850

8900

8950

8847'

89.51°

359.00°

7453.13'

2118.28'

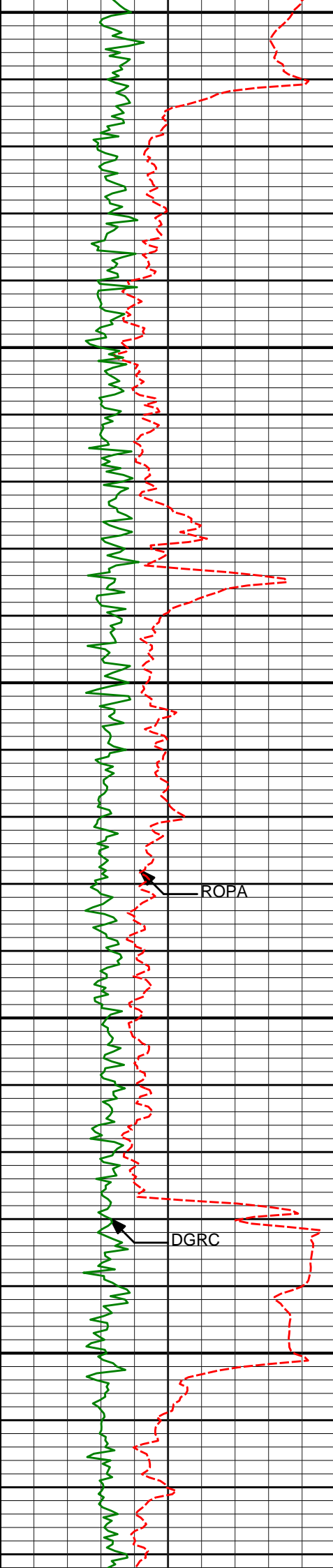
8942'

89.13°

0.43°

7454.25'

2213.23'



9000

9050

9100

9150

9200

9036'

89.07°

0.82°

7455.73'

2307.20'

9131'

89.81°

358.42°

7456.66'

2402.14'

9226'

90.00°

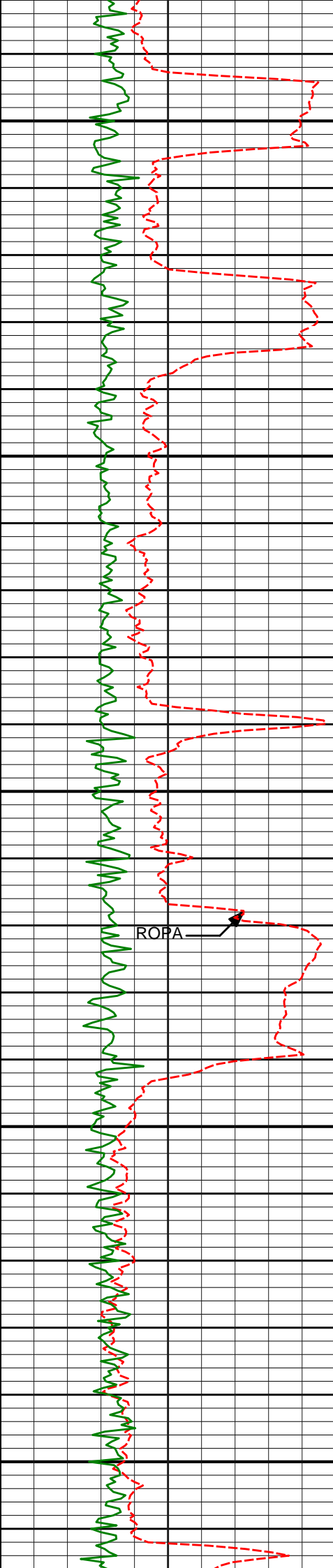
0.06°

7456.82'

2497.06'

ROPA

DGRC



9250

9300

9350

9400

9450

ROPA

9320'

90.25°

1.60°

7456.61'

2591.05'

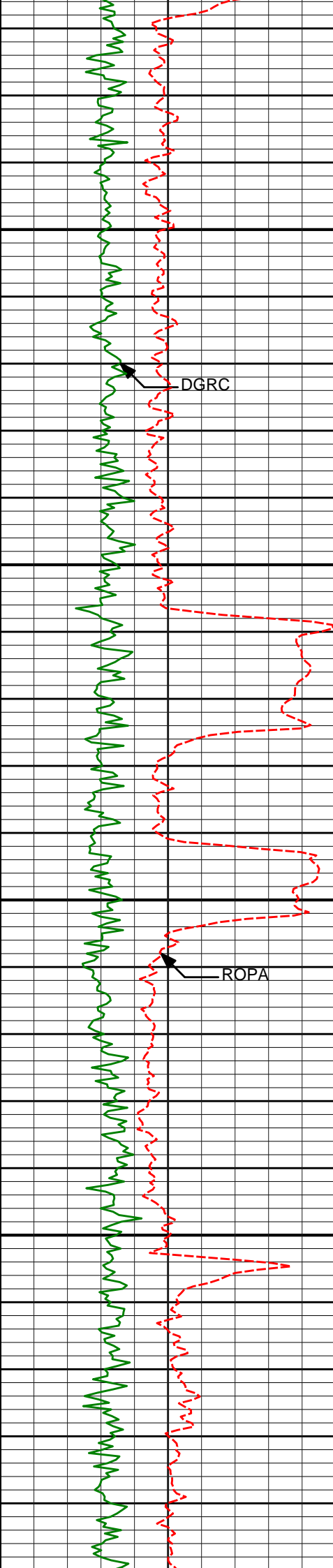
9415'

90.56°

3.83°

7455.94'

2686.02'



9500

9509'

90.49°

0.45°

7455.08'

2779.99'

DGRC

9550

9600

9604'

90.56°

3.87°

7454.21'

2874.97'

ROPA

9650

9700

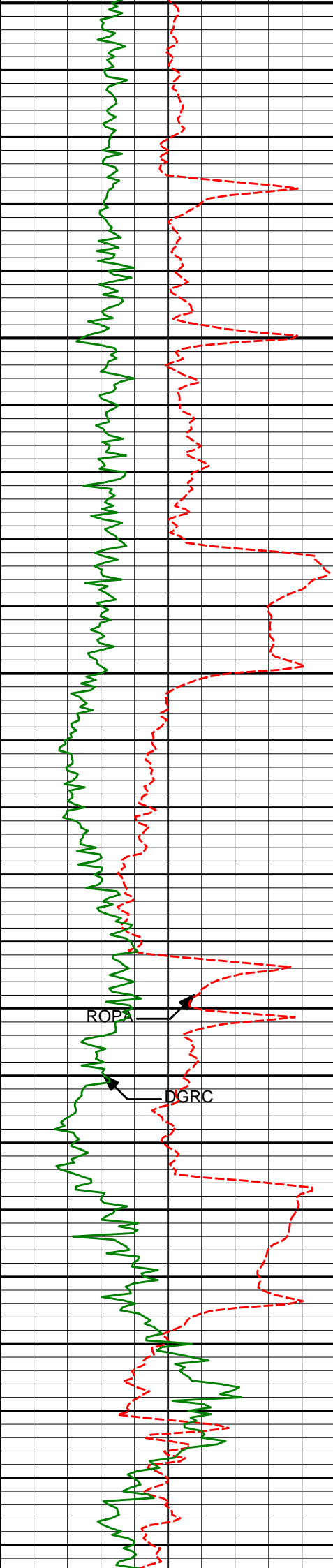
9698'

90.74°

2.20°

7453.14'

2968.93'



9700

9750

9800

9850

9900

9793'

88.76°

1.51°

7453.56'

3063.92'

9888'

88.08°

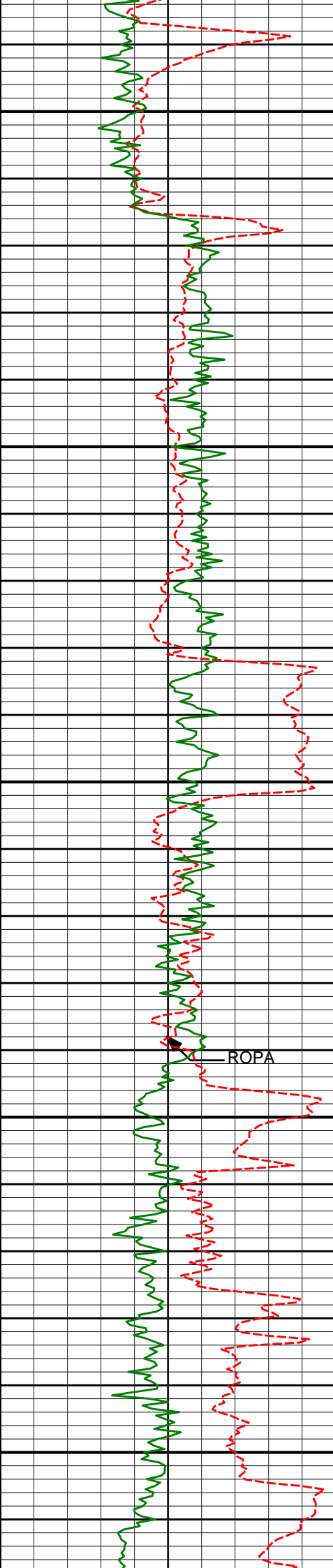
2.83°

7456.18'

3158.88'

ROP

DGRC



9950

10000

10050

10100

10150

9982'

85.74°

1.37°

7461.24'

3252.73'

10077'

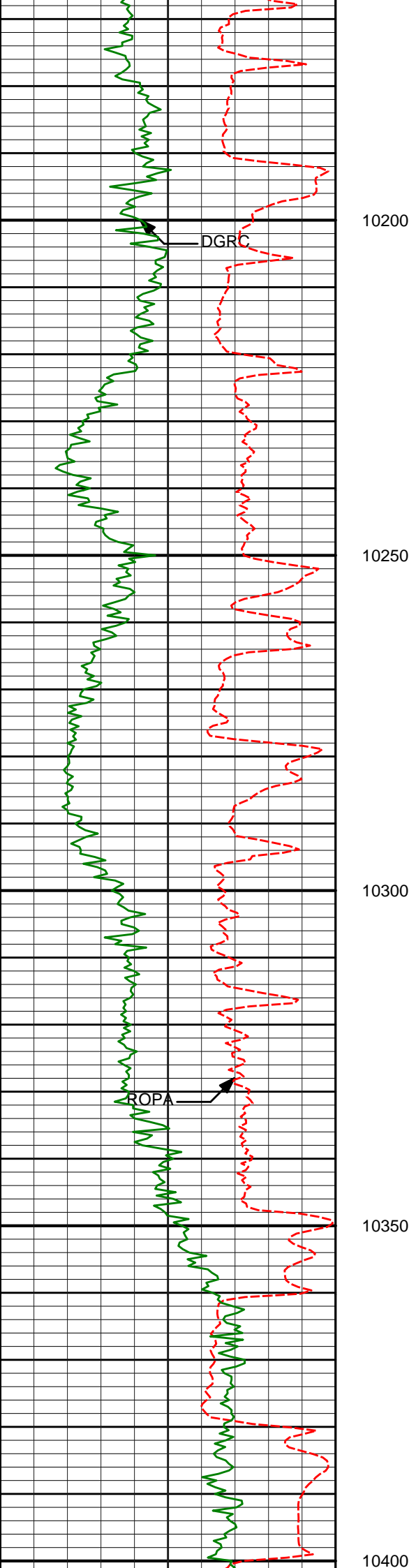
83.68°

0.25°

7470.00'

3347.31'

ROPA



10171'

84.93°

0.51°

7479.33'

3440.82'

10200

DGRC

10250

10266'

86.66°

1.84°

7486.30'

3535.56'

10300

ROPA

10350

10360'

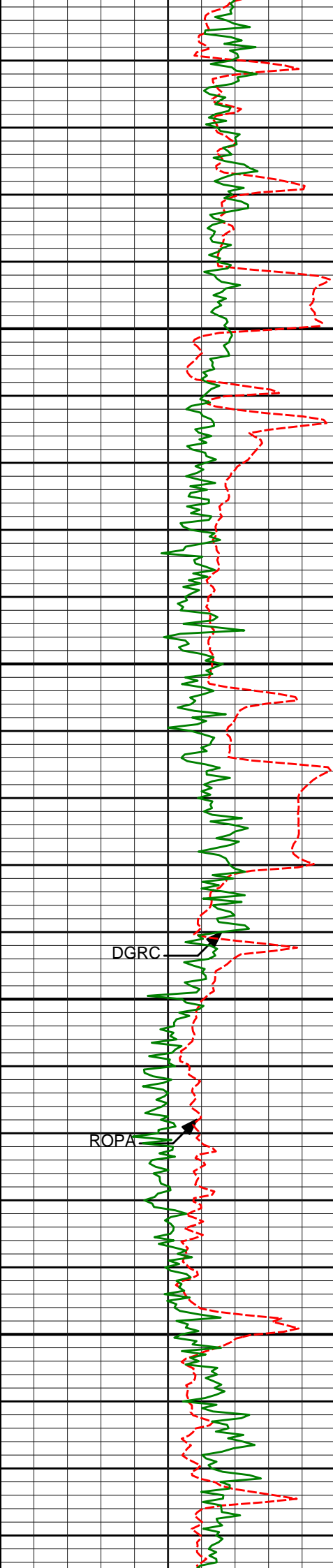
88.95°

2.43°

7489.90'

3629.48'

10400



10450

10455'

89.01°

2.54°

7491.59'

3724.45'

10500

DGRC

10550

10549'

91.11°

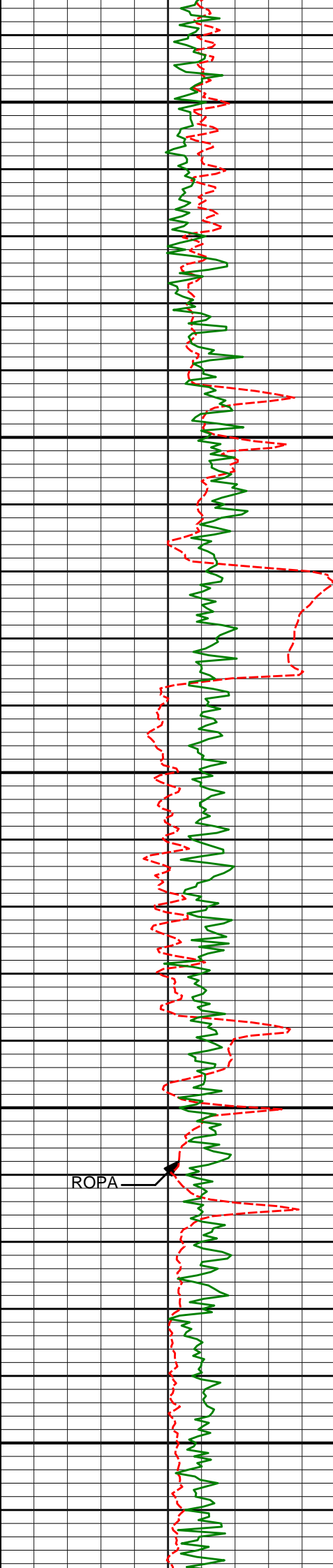
3.92°

7491.49'

3818.40'

ROPA

10600



10650

10700

10750

10800

10850

ROPA

10644'

88.70°

3.05°

7491.65'

3913.34'

10738'

90.19°

6.77°

7492.56'

4007.16'

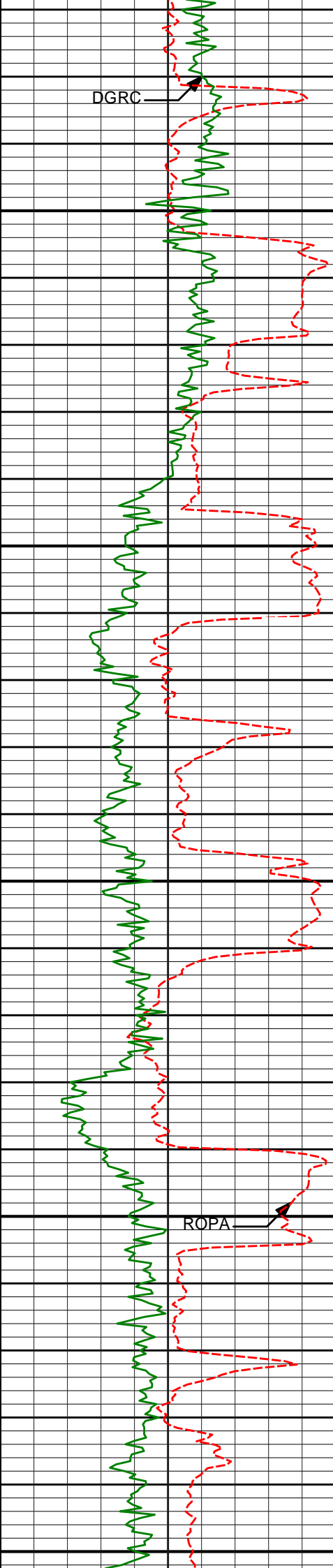
10833'

91.24°

9.63°

7491.37'

4101.50'



10900

10950

11000

11050

11100

10928'

91.91°

9.70°

7488.76'

4195.51'

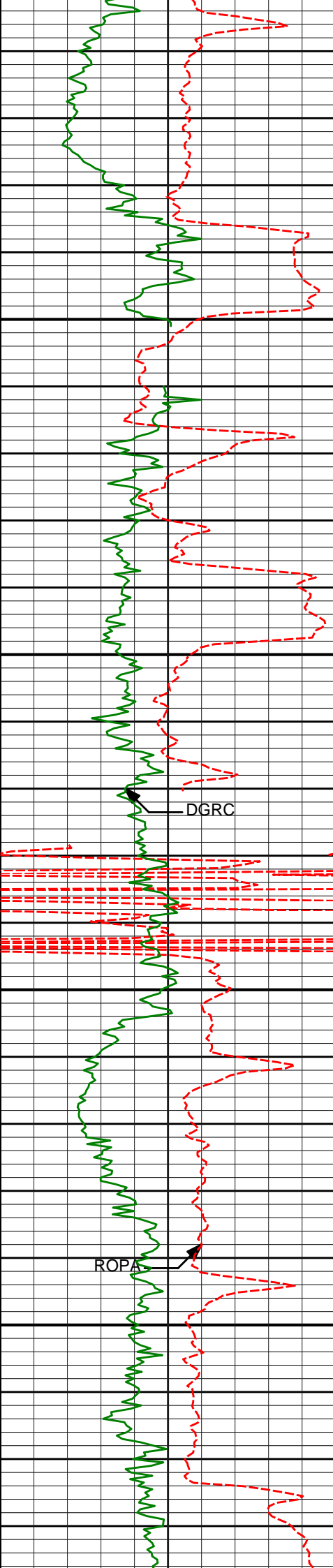
11022'

88.64°

6.28°

7488.31'

4288.89'



11150

11200

11250

11300

11117'

90.87°

4.84°

7488.72'

4383.65'

11211'

88.33°

1.80°

7489.37'

4477.58'

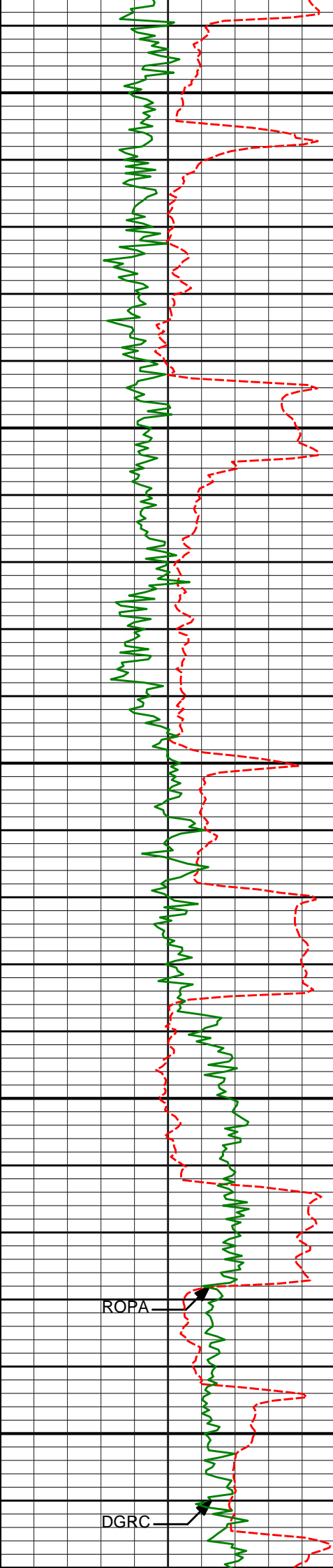
11306'

86.85°

0.18°

7493.37'

4572.49'



11350

11400

11450

11500

11550

11401'

86.60°

1.98°

7498.79'

4667.33'

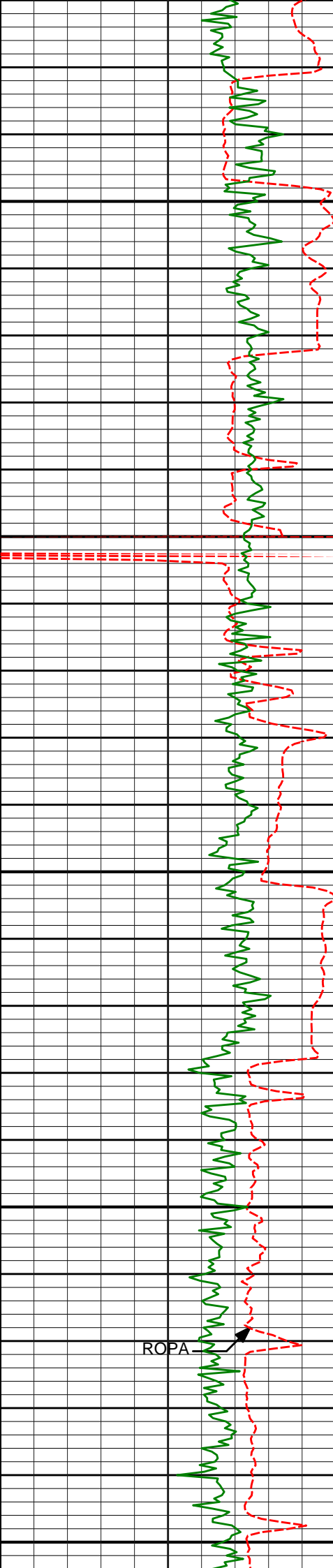
11495'

86.66°

2.18°

7504.32'

4761.16'



11600

11650

11700

11750

11800

11590'

88.27°

2.44°

7508.52'

4856.06'

11684'

90.00°

1.31°

7509.94'

4950.04'

ROPA

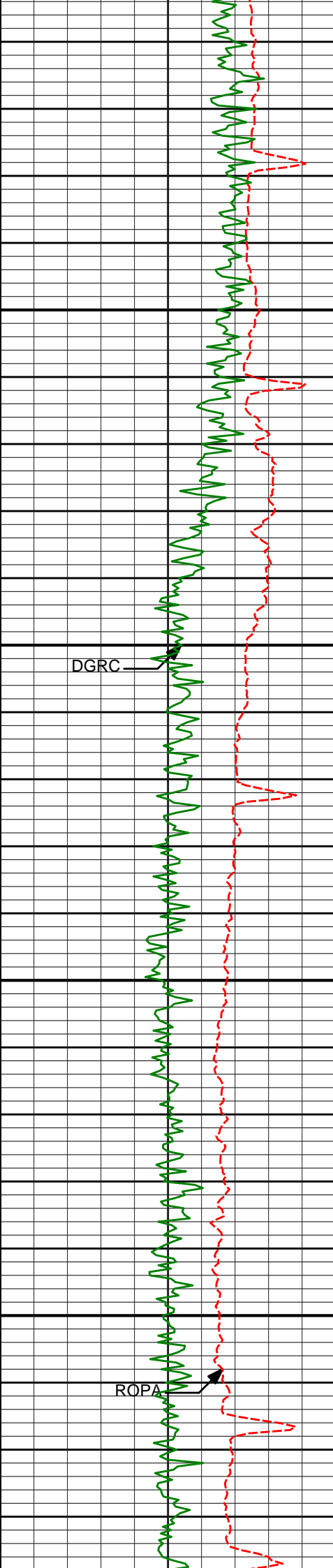
11779'

92.78°

1.16°

7507.64'

5045.00'



11850

11900

11950

12000

DGRC

ROPA

11874'

92.41°

0.04°

7503.33'

5139.89'

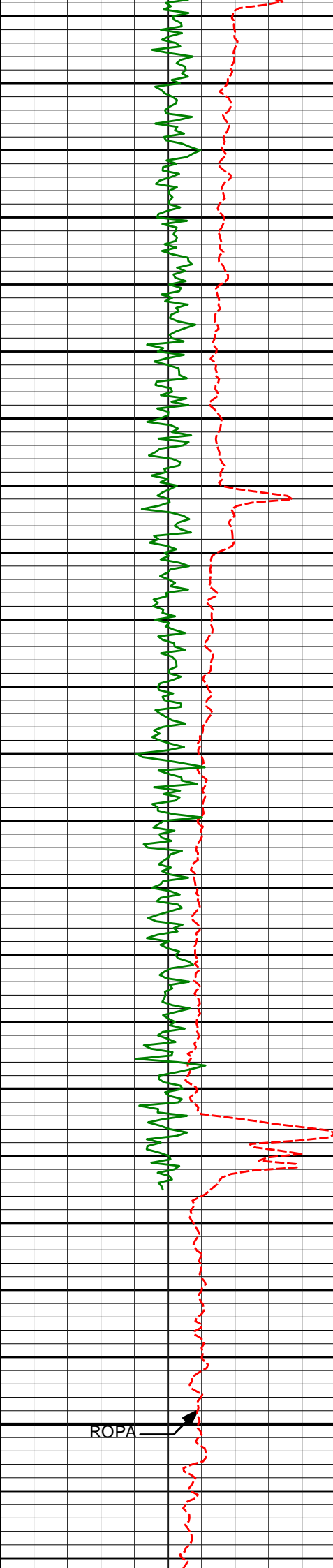
11968'

92.29°

0.88°

7499.48'

5233.79'



12050

12063'

91.67°

359.47°

7496.20'

5328.70'

12100

12150

12158'

90.80°

359.58°

7494.15'

5423.62'

12200

12233'

89.94°

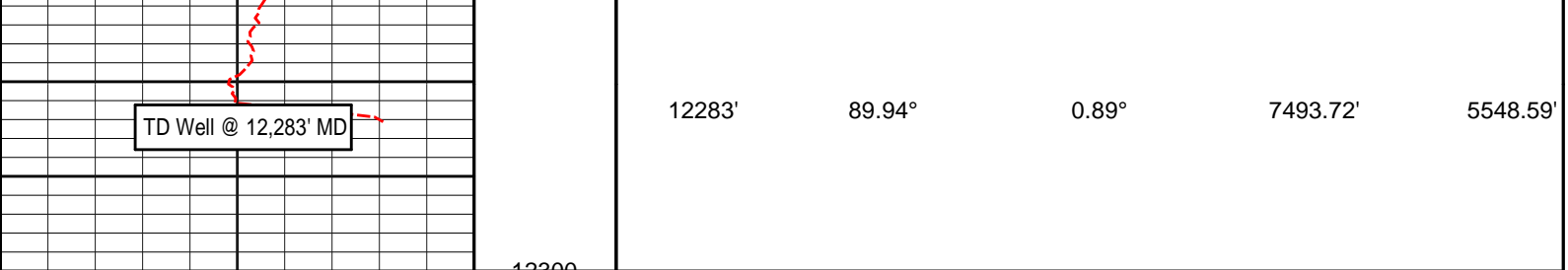
0.89°

7493.67'

5498.60'

12250

ROPA



Gamma Ray KclBh (DGRC) api	Depth ft 1 : 240	DEPTH	INC	AZI	TVD	VS
0250						
Avg Rate of Penetration (ROPA) feet per hr						
5000						
PCG Gamma Ray BCorr (PGRC) api						
0250						

HALLIBURTON

Sperry Drilling

MD 1:240 Detail Log



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corp.
Turkey Springs 3N-14hZ
Wattenburg
Weld Colorado
USA
CA-XX-0900382956
Survey's tied on to surface gyro's.

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
1010.00	0.13	173.81	1009.99	2.52 N	3.46 W	2.43	TIE-IN
1100.00	0.17	272.98	1099.99	2.43 N	3.58 W	2.33	0.26
1192.00	0.35	296.38	1191.99	2.56 N	3.97 W	2.45	0.22
1284.00	0.43	302.99	1283.99	2.87 N	4.51 W	2.75	0.10
1376.00	0.22	338.41	1375.99	3.22 N	4.87 W	3.09	0.31
1468.00	0.21	289.07	1467.98	3.44 N	5.09 W	3.30	0.20
1560.00	2.07	301.69	1559.96	4.37 N	6.66 W	4.19	2.03
1652.00	4.71	329.92	1651.80	8.51 N	9.97 W	8.24	3.31
1744.00	4.68	326.36	1743.49	14.91 N	13.94 W	14.52	0.32
1836.00	7.24	316.82	1834.99	22.26 N	19.99 W	21.71	2.97
1928.00	9.31	318.60	1926.02	32.07 N	28.88 W	31.28	2.27
2020.00	9.30	318.42	2016.81	43.21 N	38.74 W	42.15	0.03
2112.00	10.92	315.83	2107.38	55.02 N	49.74 W	53.66	1.83
2204.00	13.65	307.05	2197.28	67.82 N	64.48 W	66.05	3.59
2296.00	15.25	305.71	2286.36	81.42 N	82.97 W	79.15	1.78
2388.00	16.06	298.79	2374.96	94.61 N	103.95 W	91.77	2.21
2480.00	17.31	294.84	2463.08	106.49 N	127.53 W	103.01	1.83

2572.00	17.60	291.15	2550.85	117.26 N	152.92 W	113.08	1.24
2667.00	16.16	291.31	2641.76	127.25 N	178.63 W	122.37	1.52
2761.00	17.56	290.91	2731.71	137.06 N	204.07 W	131.49	1.49
2856.00	17.04	289.48	2822.42	146.82 N	230.58 W	140.53	0.71
2950.00	17.44	287.48	2912.19	155.65 N	257.00 W	148.64	0.76
3045.00	17.06	286.48	3002.92	163.87 N	283.94 W	156.13	0.51
3139.00	19.10	288.44	3092.27	172.65 N	311.75 W	164.16	2.26
3234.00	19.44	288.81	3181.95	182.67 N	341.46 W	173.36	0.38
3328.00	19.53	288.67	3270.57	192.74 N	371.16 W	182.63	0.11
3423.00	19.28	288.24	3360.17	202.73 N	401.09 W	191.81	0.30
3518.00	17.62	292.30	3450.29	213.10 N	429.30 W	201.41	2.21
3612.00	16.66	289.82	3540.11	223.06 N	455.14 W	210.67	1.28
3707.00	17.89	295.10	3630.83	233.87 N	481.16 W	220.77	2.10
3802.00	16.99	294.05	3721.47	245.72 N	507.05 W	231.91	1.00
3896.00	17.52	299.81	3811.24	258.35 N	531.87 W	243.87	1.90
3991.00	18.30	300.14	3901.64	272.95 N	557.18 W	257.78	0.83
4085.00	17.19	299.27	3991.16	287.15 N	582.06 W	271.30	1.21
4180.00	15.54	295.77	4082.31	299.55 N	605.77 W	283.05	2.02
4274.00	14.16	304.37	4173.18	311.52 N	626.60 W	294.45	2.76
4369.00	16.97	303.43	4264.69	325.72 N	647.77 W	308.07	2.97
4464.00	18.48	301.30	4355.18	341.18 N	672.20 W	322.87	1.73
4558.00	21.33	299.95	4443.55	357.45 N	699.75 W	338.40	3.07
4653.00	19.98	299.92	4532.45	374.18 N	728.79 W	354.33	1.42
4747.00	21.55	296.08	4620.34	389.78 N	758.22 W	369.13	2.21
4842.00	20.67	294.74	4708.97	404.47 N	789.12 W	382.97	1.06
4936.00	19.41	294.99	4797.27	418.01 N	818.34 W	395.72	1.34
5031.00	18.15	294.54	4887.21	430.82 N	846.11 W	407.78	1.34
5126.00	20.33	291.34	4976.90	442.98 N	874.95 W	419.15	2.55
5220.00	20.19	291.94	5065.09	454.98 N	905.20 W	430.33	0.27
5315.00	18.90	291.97	5154.61	466.86 N	934.68 W	441.41	1.36
5409.00	17.74	292.06	5243.85	477.93 N	962.07 W	451.74	1.23
5504.00	16.47	291.25	5334.64	488.25 N	988.04 W	461.35	1.36
5598.00	15.66	290.27	5424.97	497.48 N	1012.36 W	469.91	0.91
5693.00	14.99	290.31	5516.59	506.18 N	1035.91 W	477.98	0.71
5787.00	13.12	289.52	5607.77	513.97 N	1057.37 W	485.18	2.00
5882.00	13.94	293.55	5700.14	522.14 N	1078.02 W	492.79	1.31
5976.00	13.17	291.48	5791.52	530.59 N	1098.37 W	500.68	0.97
6071.00	11.61	290.46	5884.31	537.89 N	1117.39 W	507.47	1.66
6166.00	13.20	294.03	5977.09	545.65 N	1136.26 W	514.72	1.86
6260.00	11.55	291.48	6068.90	553.47 N	1154.82 W	522.03	1.85
6355.00	9.36	286.63	6162.32	559.16 N	1171.07 W	527.28	2.48
6449.00	7.61	286.08	6255.29	563.08 N	1184.38 W	530.83	1.86
6544.00	6.36	286.46	6349.58	566.31 N	1195.47 W	533.77	1.32
6638.00	5.09	279.28	6443.11	568.46 N	1204.58 W	535.67	1.55
6733.00	3.79	292.25	6537.83	570.33 N	1211.64 W	537.34	1.72
6828.00	3.23	336.64	6632.66	573.97 N	1215.61 W	540.88	2.84
6875.00	7.10	4.70	6679.47	578.08 N	1215.90 W	544.98	9.60
6922.00	12.53	2.16	6725.77	586.08 N	1215.47 W	552.99	11.59
6969.00	16.99	1.48	6771.20	598.05 N	1215.10 W	564.96	9.50
7017.00	21.00	1.81	6816.58	613.66 N	1214.65 W	580.58	8.36
7064.00	21.64	0.23	6860.36	630.74 N	1214.35 W	597.66	1.83
7112.00	24.76	1.45	6904.48	649.65 N	1214.06 W	616.57	6.58
7159.00	24.56	0.52	6947.19	669.25 N	1213.72 W	636.18	0.93
7206.00	29.17	1.75	6989.11	690.48 N	1213.28 W	657.41	9.88
7253.00	28.83	0.52	7030.21	713.26 N	1212.83 W	680.19	1.46
7301.00	35.30	359.90	7070.87	738.73 N	1212.75 W	705.65	13.50
7348.00	37.63	1.01	7108.67	766.66 N	1212.52 W	733.58	5.15
7395.00	39.90	1.95	7145.31	796.07 N	1211.75 W	763.01	4.99
7442.00	42.61	2.76	7180.64	827.04 N	1210.47 W	793.99	5.88
7490.00	45.56	2.75	7215.12	860.39 N	1208.87 W	827.38	6.15
7537.00	48.25	2.06	7247.23	894.68 N	1207.43 W	861.69	5.82
7585.00	52.50	1.22	7277.83	931.62 N	1206.38 W	898.65	8.96
7632.00	56.37	1.65	7305.16	969.84 N	1205.42 W	936.88	8.27
7679.00	58.16	2.20	7330.58	1009.35 N	1204.09 W	976.41	3.93
7726.00	60.26	2.92	7354.63	1049.68 N	1202.28 W	1016.77	4.66
7774.00	63.06	4.36	7377.42	1091.84 N	1199.60 W	1058.99	6.40
7821.00	65.67	5.02	7397.75	1134.06 N	1196.13 W	1101.29	5.70
7868.00	69.75	2.82	7415.58	1177.44 N	1193.17 W	1144.73	9.70
7915.00	74.51	1.34	7430.00	1222.13 N	1191.55 W	1189.45	10.56
7963.00	77.98	0.78	7441.41	1268.73 N	1190.69 W	1236.06	7.32
8010.00	81.26	1.43	7449.87	1314.95 N	1189.80 W	1282.29	7.11
8058.00	86.12	0.99	7455.15	1362.63 N	1188.79 W	1329.98	10.17
8185.00	89.57	359.55	7459.92	1489.52 N	1188.20 W	1456.84	2.94
8280.00	89.32	0.24	7460.84	1584.52 N	1188.37 W	1551.79	0.77
8374.00	90.56	358.97	7460.94	1678.51 N	1189.02 W	1645.73	1.89
8469.00	92.04	358.60	7458.79	1773.46 N	1191.03 W	1740.59	1.61

8564.00	92.16	359.56	7455.31	1868.38 N	1192.56 W	1835.44	1.02
8658.00	91.11	0.17	7452.62	1962.34 N	1192.78 W	1929.36	1.29
8753.00	89.38	0.58	7452.22	2057.34 N	1192.16 W	2024.34	1.87
8847.00	89.51	359.00	7453.13	2151.33 N	1192.50 W	2118.28	1.69
8942.00	89.13	0.43	7454.25	2246.32 N	1192.98 W	2213.23	1.56
9036.00	89.07	0.82	7455.73	2340.30 N	1191.95 W	2307.20	0.42
9131.00	89.81	358.42	7456.66	2435.29 N	1192.58 W	2402.14	2.64
9226.00	90.00	0.06	7456.82	2530.27 N	1193.84 W	2497.06	1.74
9320.00	90.25	1.60	7456.61	2624.26 N	1192.48 W	2591.05	1.66
9415.00	90.56	3.83	7455.94	2719.15 N	1187.98 W	2686.02	2.37
9509.00	90.49	0.45	7455.08	2813.06 N	1184.47 W	2779.99	3.60
9604.00	90.56	3.87	7454.21	2907.98 N	1180.89 W	2874.97	3.60
9698.00	90.74	2.20	7453.14	3001.84 N	1175.91 W	2968.93	1.79
9793.00	88.76	1.51	7453.56	3096.78 N	1172.84 W	3063.92	2.21
9888.00	88.08	2.83	7456.18	3191.67 N	1169.24 W	3158.88	1.56
9982.00	85.74	1.37	7461.24	3285.46 N	1165.80 W	3252.73	2.93
10077.00	83.68	0.25	7470.00	3380.04 N	1164.46 W	3347.31	2.47
10171.00	84.93	0.51	7479.33	3473.58 N	1163.84 W	3440.82	1.36
10266.00	86.66	1.84	7486.30	3568.29 N	1161.90 W	3535.56	2.29
10360.00	88.95	2.43	7489.90	3662.15 N	1158.40 W	3629.48	2.52
10455.00	89.01	2.54	7491.59	3757.05 N	1154.28 W	3724.45	0.13
10549.00	91.11	3.92	7491.49	3850.89 N	1148.99 W	3818.40	2.67
10644.00	88.70	3.05	7491.65	3945.71 N	1143.21 W	3913.34	2.70
10738.00	90.19	6.77	7492.56	4039.34 N	1135.17 W	4007.16	4.26
10833.00	91.24	9.63	7491.37	4133.35 N	1121.62 W	4101.50	3.21
10928.00	91.91	9.70	7488.76	4226.97 N	1105.68 W	4195.51	0.71
11022.00	88.64	6.28	7488.31	4320.03 N	1092.62 W	4288.89	5.03
11117.00	90.87	4.84	7488.72	4414.57 N	1083.41 W	4383.65	2.79
11211.00	88.33	1.80	7489.37	4508.39 N	1077.97 W	4477.58	4.21
11306.00	86.85	0.18	7493.37	4603.29 N	1076.33 W	4572.49	2.31
11401.00	86.60	1.98	7498.79	4698.11 N	1074.54 W	4667.33	1.91
11495.00	86.66	2.18	7504.32	4791.89 N	1071.14 W	4761.16	0.22
11590.00	88.27	2.44	7508.52	4886.71 N	1067.31 W	4856.06	1.72
11684.00	90.00	1.31	7509.94	4980.65 N	1064.23 W	4950.04	2.20
11779.00	92.78	1.16	7507.64	5075.59 N	1062.19 W	5045.00	2.93
11874.00	92.41	0.04	7503.33	5170.48 N	1061.19 W	5139.89	1.24
11968.00	92.29	0.88	7499.48	5264.40 N	1060.44 W	5233.79	0.90
12063.00	91.67	359.47	7496.20	5359.34 N	1060.15 W	5328.70	1.62
12158.00	90.80	359.58	7494.15	5454.31 N	1060.94 W	5423.62	0.92
12233.00	89.94	0.89	7493.67	5529.31 N	1060.63 W	5498.60	2.09
12283.00	89.94	0.89	7493.72	5579.30 N	1059.85 W	5548.59	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 1.55 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.59 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 12283.00 FEET
IS 5679.08 FEET ALONG 349.24 DEGREES (TRUE)

Final survey is a projection to bit.