

1 : 240

WELL INFORMATION					
MWD Run Number	100	200	300	400	500
Date run completed	02-Feb-13	03-Feb-13	06-Feb-13	12-Feb-13	15-Feb-13
Rig Bit Number	0100	0200	0300	0400	0500
Bit Size (in)	8.750	8.750	6.125	6.125	6.125
Tool Nominal OD (in)	6.750	6.750	4.750	4.750	4.750
Log Start Depth (TVD, ft)	1,320.95	6,600.22	7,210.18	7,213.62	7,193.45
Log End Depth (TVD, ft)	6,600.22	7,210.18	7,213.62	7,193.45	7,183.08
Drill or Wipe	Drill	Drill	Drill	Drill	Drill
Drill/Wipe Start Date and Time	31-Jan-13 15:20	02-Feb-13 13:35	05-Feb-13 18:21	06-Feb-13 22:00	11-Feb-13 21:35
Drill/Wipe End Date and Time	02-Feb-13 02:50	03-Feb-13 12:15	06-Feb-13 06:15	11-Feb-13 20:30	13-Feb-13 18:10
Min Inc (deg) @ Depth (TVD, ft)	.18 @ 1,716.94	2.36 @ 6,631.20	88.58 @ 7,211.72	87.71 @ 7,227.44	89.88 @ 7,193.66
Max Inc (deg) @ Depth (TVD, ft)	9.56 @ 3,464.93	84.47 @ 7,206.65	93.15 @ 7,209.05	92.97 @ 7,212.42	91.24 @ 7,187.73
Bit TFA(in2) / Bit Type	1.54 / PDC	1.53 / PDC	1.24 / PDC	.75 / PDC	.86 / PDC
Flow Rate (gpm)	587.79	500.00	290.17	277.45	278.94
Max AV (fpm) / CV (fpm) @ MWD	393.9 / N/A	347.7 / 231.9	383.0 / 453.1	384.2 / 360.8	468.4 / 342.2
Fluid Type	Fresh Water Gel	Fresh Water Gel	Mineral Oil Bas	Mineral Oil Bas	Mineral Oil Bas
Density (ppg) / Viscosity (spqt)	8.40 / 28.00	9.80 / 37.00	9.40 / 63.00	9.43 / 50.00	9.80 / 53.00
Filtrate CL (ppm)	350.00	450.00	50,000.00	45,000.00	46,000.00
pH / Fluid Loss (mptm)	8.00 / 0	8.80 / 0	N/A / 5	N/A / 7	N/A / 6.8
PV (cP) / YP (lbf/ft2)	1 / 2.00	10 / 10.00	15 / 19.00	13 / 11.00	12 / 10.00
% Solids / % Sand	0.8 / 0.5	10 / 0.25	8.8 / 0.1	12.00 / 0.50	12.20 / 0.1
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	70 / 77:23	67.00 / 76:24	67.00 / 76:24
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	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	N/A @ N/A	N/A @ N/A
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A
Mud Temp (in) @ Depth (ft)	100.00 / N/A	171.0 / N/A	104.00 / N/A	270.00 / N/A	274.05 / N/A

Max Tool Temp (degF) / Source	160.83 / PCM	171.2 / PCM	184.30 / HCIM	250.82 / HCIM	254.35 / HCIM
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A
Lead MWD Engineer	Clay Wass	Matt Busche	Matt Busche	Matt Busche	Matt Busche
Customer Representative	Randy Anderson	Randy Anderson	Randy Anderson	Randy Anderson	Will Pettijohn

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	HCIM	HCIM	HCIM
Software Version	5.76	5.76	88.47	88.47	88.47
Sub Serial Number	11342294	11342294	90351628	90351975	90351628
Insert Serial Number	11680788	11619996	11081789	11149260	11081789
Date and Time Initialized	29-Jan-13 04:50	02-Feb-13 00:23	04-Feb-13 00:00	06-Feb-13 14:53	12-Feb-13 12:24
Date and Time Read	02-Feb-13 09:00	04-Feb-13 03:01	06-Feb-13 11:14	12-Feb-13 10:15	15-Feb-13 00:13
ECMB SW Version	N/A	N/A	N/A	N/A	N/A

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC	PCDC	PCDC
Distance From Bit (ft)	60.00	49.00	49.33	49.97	50.01
Software Version	6.21	6.21	6.21	6.21	6.21
Sub Serial Number	11342294	11342294	11122424	246322	11122424
Sonde Serial Number	11478013	11297590	11478013	11297590	11478013
Sensor ID Number	N/A	N/A	N/A	N/A	N/A
Toolface Offset (deg)	282.26	289.81	269.50	139.89	175.33

Gamma Ray Sensor Information

Tool Type		PCG	DGR	DGR	DGR
Distance From Bit (ft)		52.30	71.01	70.33	71.68
Recorded Sample Period (sec)		10		12	12
Software Version		8.15	N/A	N/A	N/A
Sub Serial Number		11342294	10483822	90351975	10483822
Insert/Sonde Serial Number		11681025	075248	10474322	075248

REMARKS

1. All depths are true vertical depths, referenced to the Driller's pipe tally and are measured from the Kelly Bushing, unless otherwise specified.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded data unless otherwise specified.
4. The following smoothing parameters have been applied to the data:

PGRC (Corrected Gamma Ray):

Interval Resolution: 0.5 ft
Interval Distance: 0.6 ft
Gap Fill: 3.0 ft

ROPA (Average Rate Of Penetration):

Interval Resolution: 0.5 ft
Interval Distance: 1.2 ft
Gap Fill: 3.0 ft

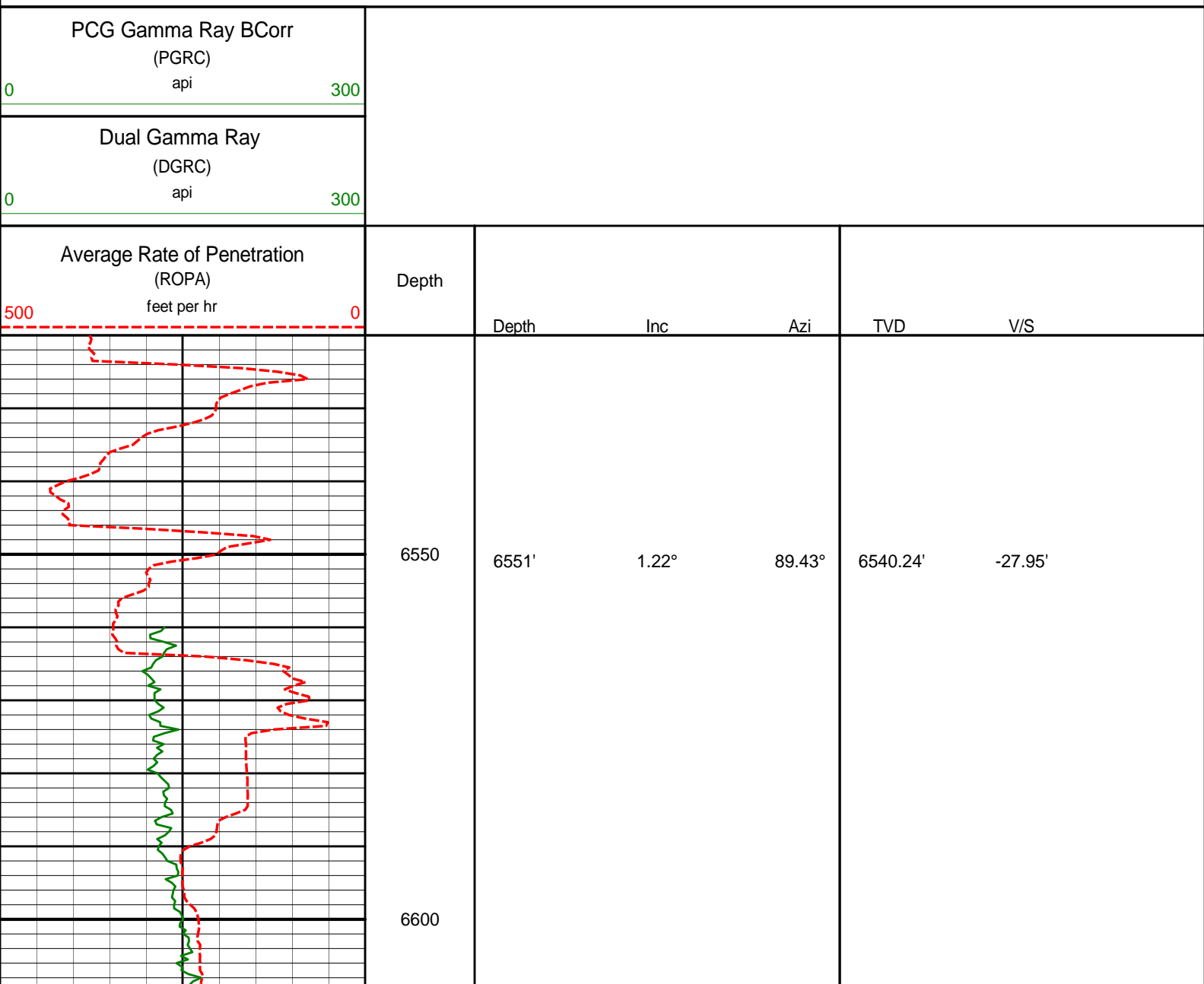
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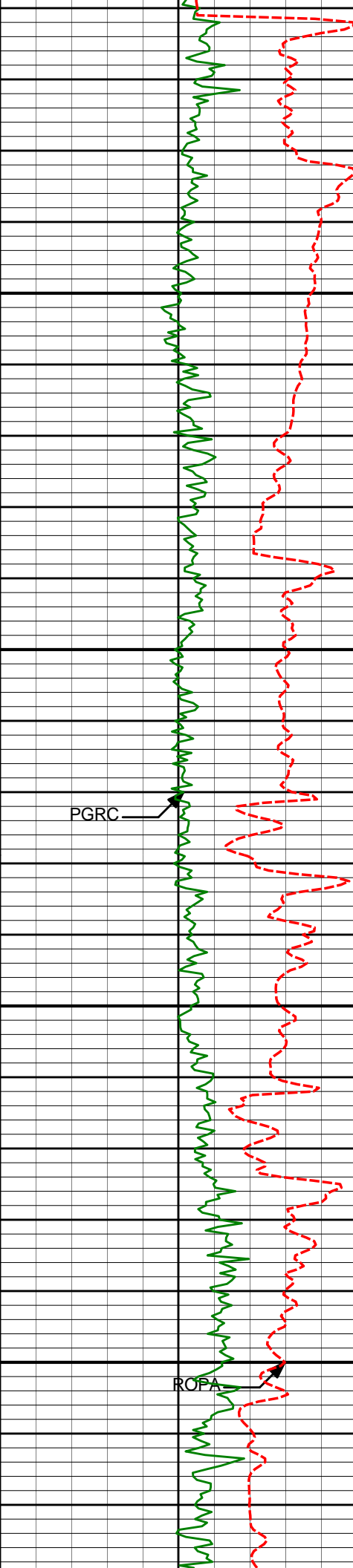
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HALLIBURTON

MD Main Log 1:240





Run 200

6642'	2.36°	160.03°	6631.20'	-26.18'
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6650

6685'	8.44°	173.29°	6673.99'	-22.21'
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6700

PGRC

6728'	12.24°	177.84°	6716.29'	-14.51'
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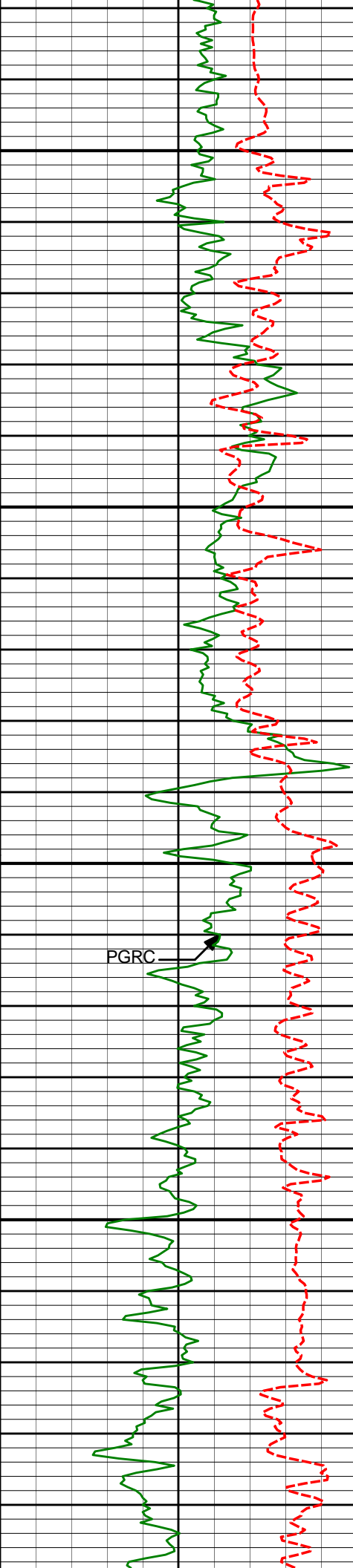
6750

6777'	14.59°	174.37°	6763.95'	-3.17'
-------	--------	---------	----------	--------

6800

ROPA

6813'	19.19°	172.29°	6798.39'	7.22'
-------	--------	---------	----------	-------



6850

6856'

25.29°

178.51°

6838.17'

23.44'

6900

6899'

28.52°

181.36°

6876.52'

42.89'

6950

6942'

31.96°

184.51°

6913.66'

64.49'

6985'

35.36°

184.66°

6949.45'

88.23'

7000

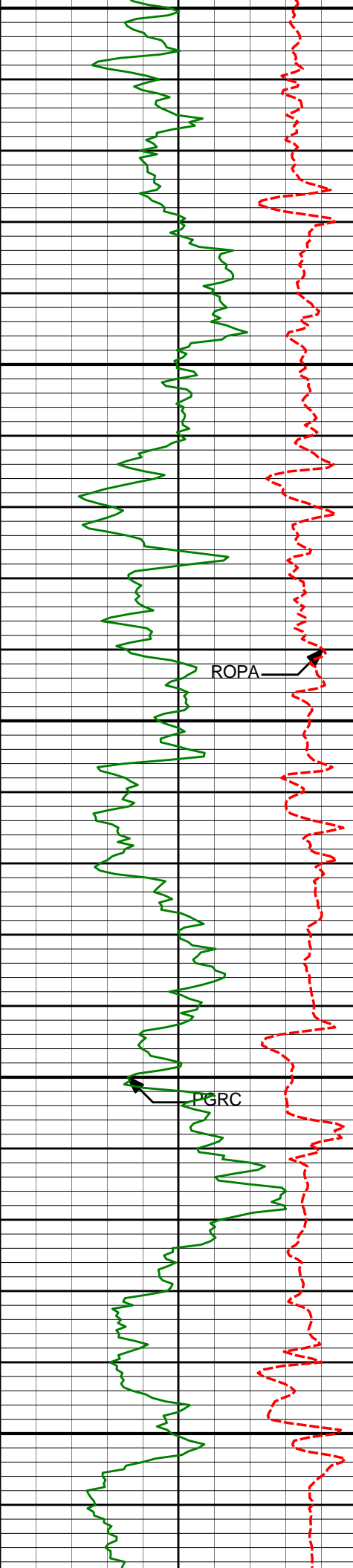
7028'

38.71°

183.75°

6983.77'

114.03'



7050

7071'

42.77°

181.69°

7016.34'

142.04'

7100

7114'

47.61°

179.19°

7046.64'

172.53'

ROPA

7150

7156'

50.73°

178.98°

7074.10'

204.31'

7200

7199'

53.92°

179.87°

7100.38'

238.34'

PGRC

7242'

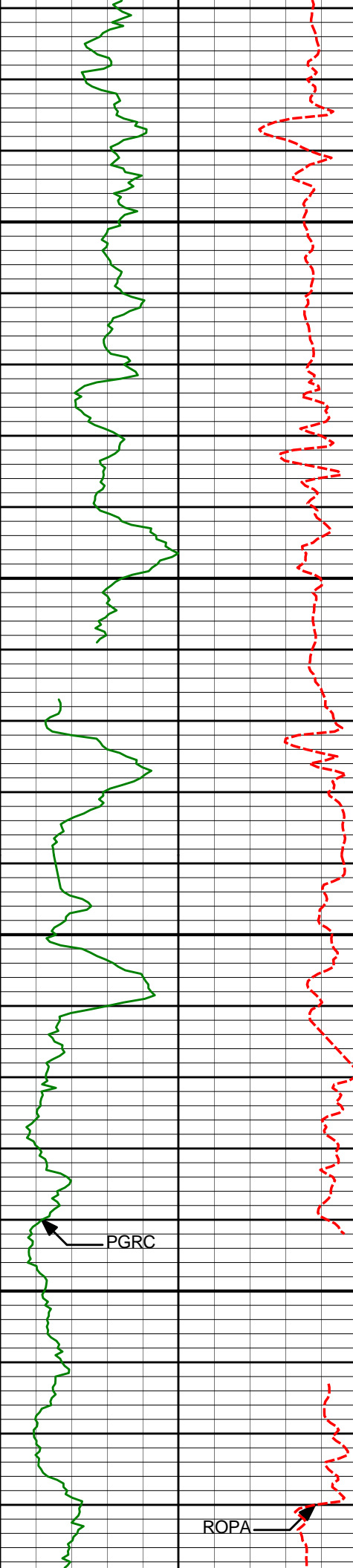
57.67°

181.38°

7124.54'

273.88'

7250



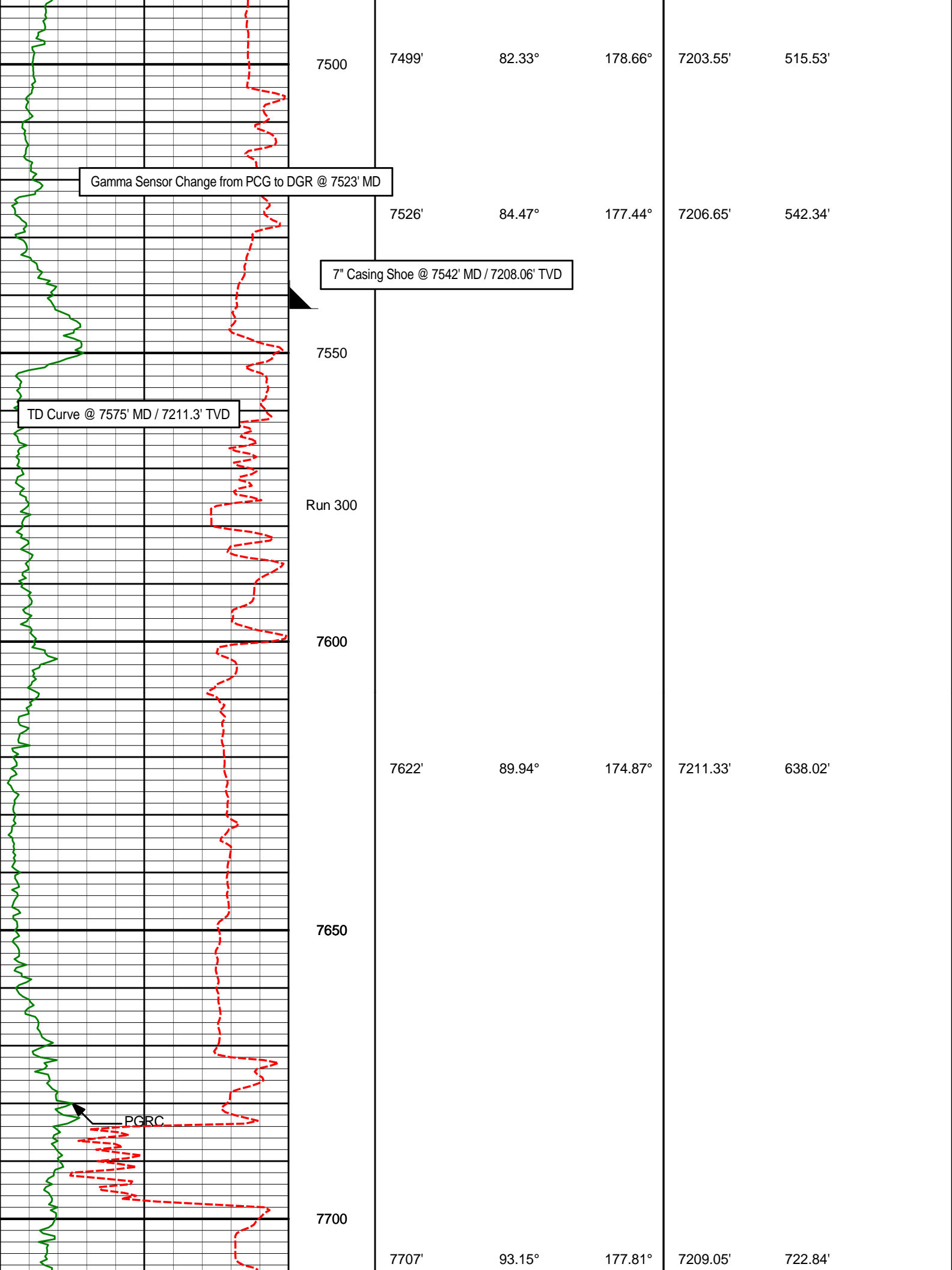
7300

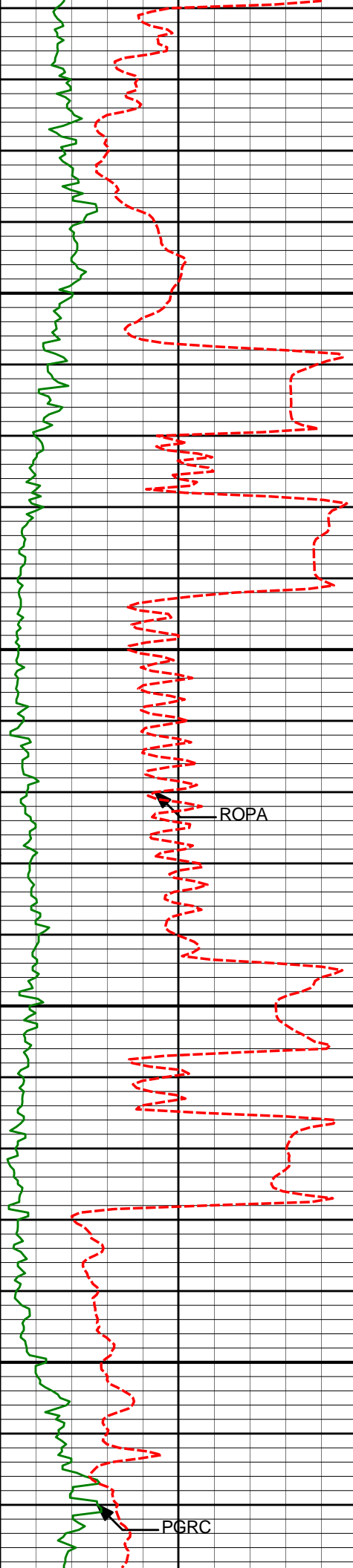
7350

7400

7450

7285'	61.95°	182.90°	7146.16'	311.00'
7328'	67.26°	182.80°	7164.60'	349.76'
7371'	72.93°	182.45°	7179.24'	390.11'
7414'	78.25°	182.36°	7189.94'	431.69'
7457'	81.31°	181.63°	7197.57'	473.96'





7750

7793'

91.24°

179.07°

7205.76'

808.76'

7800

7850

7879'

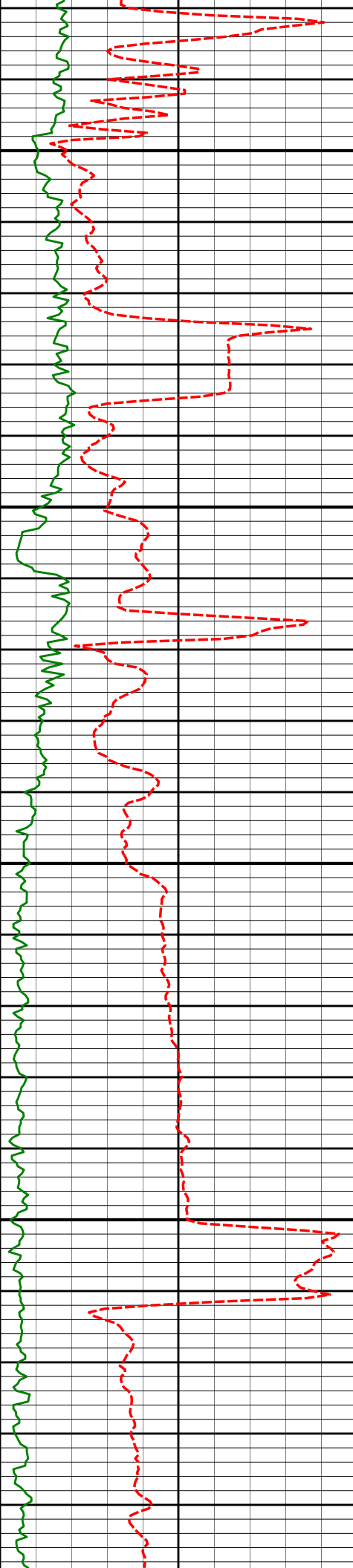
89.07°

180.36°

7205.52'

894.75'

7900



7950

7964'

88.76°

180.50°

7207.13'

979.72'

8000

8050

8050'

89.57°

181.19°

7208.38'

1065.69'

8100

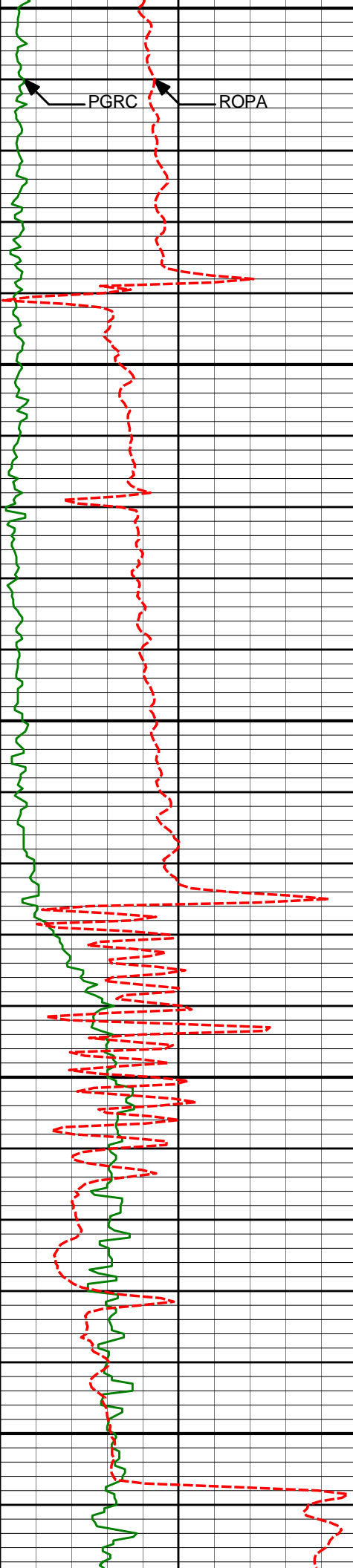
8136'

88.70°

181.36°

7209.68'

1151.63'



8150

PGRC

ROPA

8200

8222'

88.58°

180.72°

7211.72'

1237.58'

8250

8300

8308'

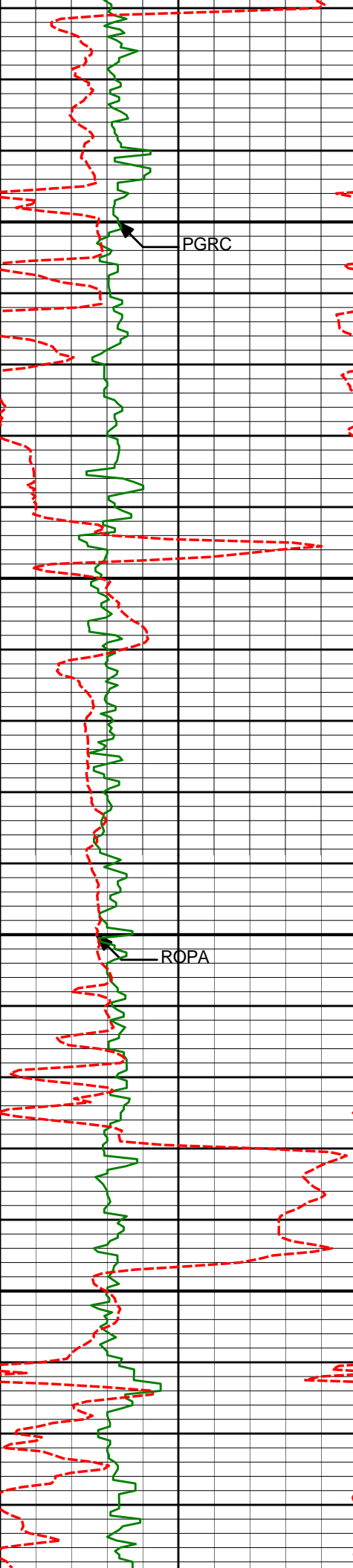
88.89°

180.65°

7213.62'

1323.54'

8350



8400

8450

8500

8550

8393'

90.56°

179.91°

7214.04'

1408.52'

PGRC

8479'

91.36°

180.22°

7212.60'

1494.50'

ROPA

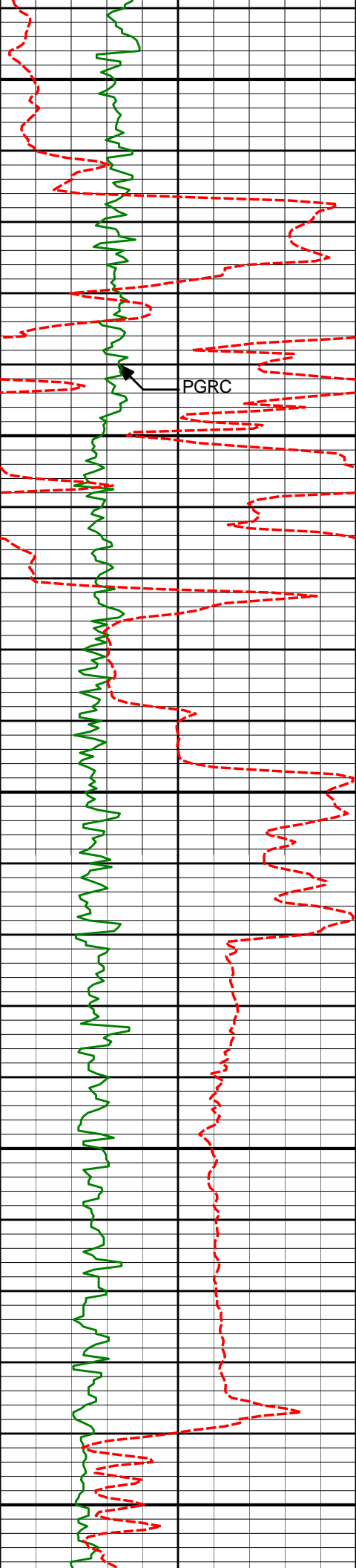
8565'

89.81°

180.41°

7211.72'

1580.49'



8600

8650

8700
Run 400

8750

8800

PGRC

8651'

88.83°

179.51°

7212.74'

1666.48'

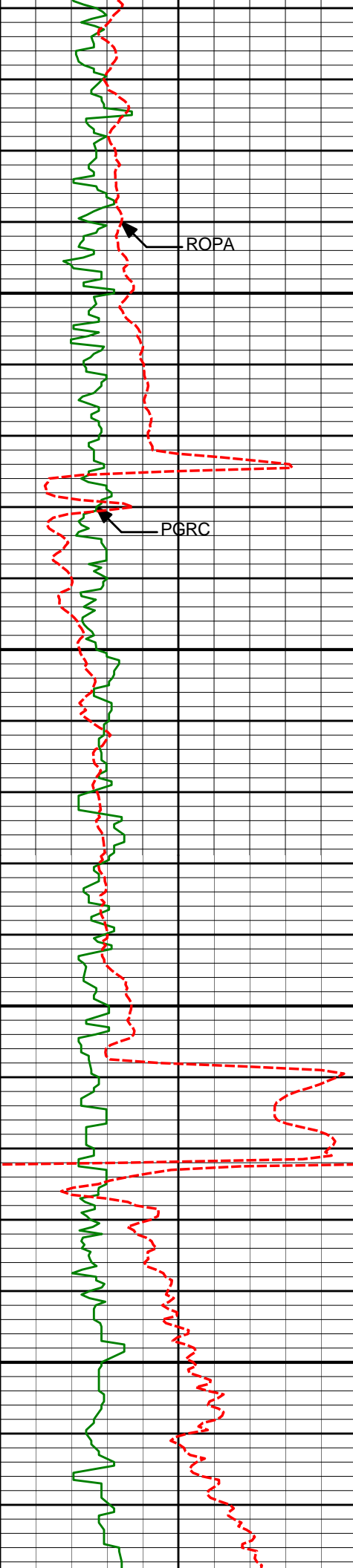
8735'

89.44°

179.18°

7214.01'

1750.47'



8850

8900

8950

9000

8821'

89.44°

178.24°

7214.85'

1836.45'

ROPA

PGRC

8907'

89.44°

177.75°

7215.68'

1922.42'

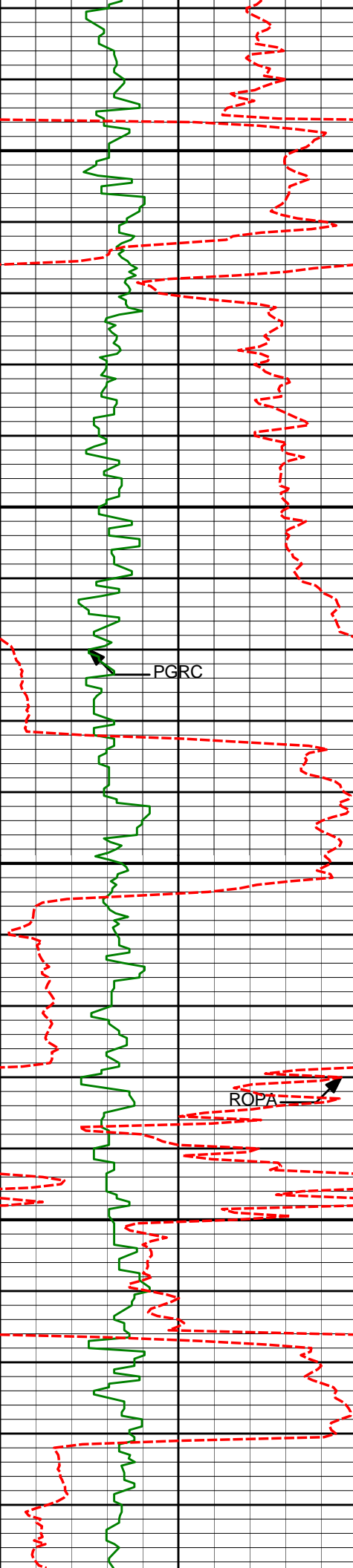
8992'

89.51°

178.04°

7216.46'

2007.39'



9050

9078'

87.90°

180.08°

7218.41'

2093.35'

9100

PGRC

9150

9164'

88.70°

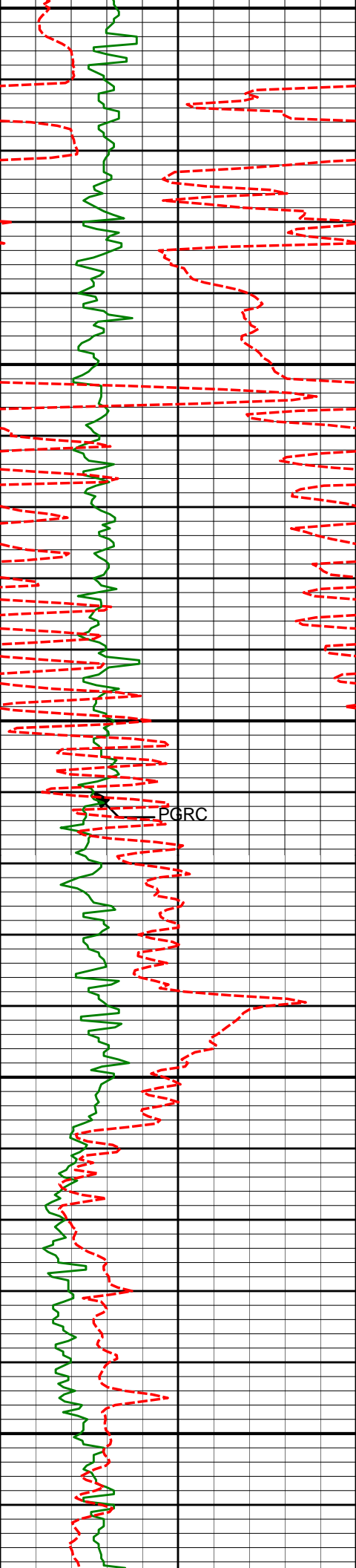
178.74°

7220.96'

2179.31'

ROPA

9200



9250

9300

9350

9400

9450

9250'

9335'

9421'

89.63°

89.81°

88.02°

179.77°

179.47°

178.24°

7222.21'

7222.62'

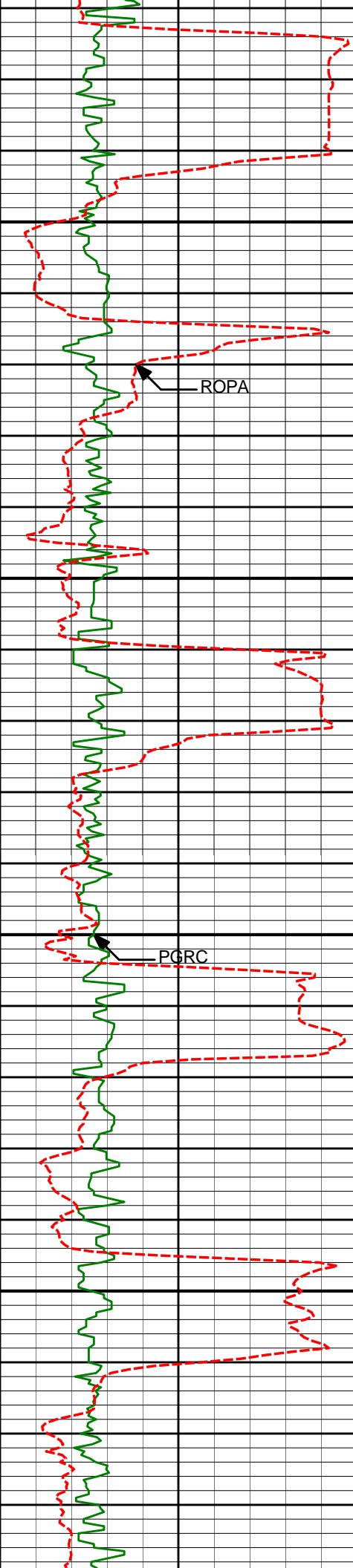
7224.24'

2265.30'

2350.30'

2436.28'

PGRC



9500

9507'

87.71°

176.73°

7227.44'

2522.16'

ROPA

9550

9600

9593'

88.27°

175.74°

7230.46'

2607.97'

PGRC

9650

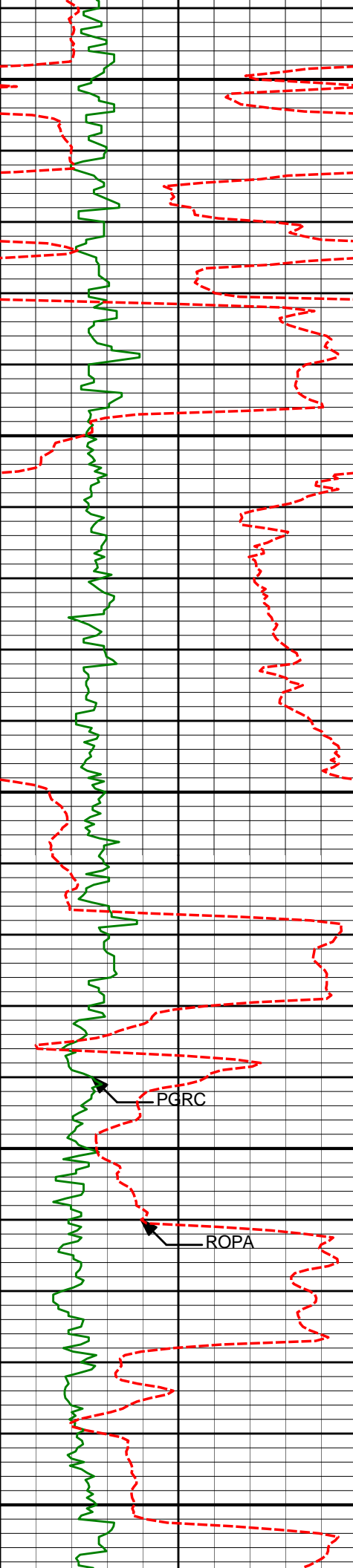
9678'

89.88°

177.05°

7231.83'

2692.83'



9700

9750

9800

9850

9900

9764'

90.31°

177.08°

7231.69'

2778.76'

PGRC

ROPA

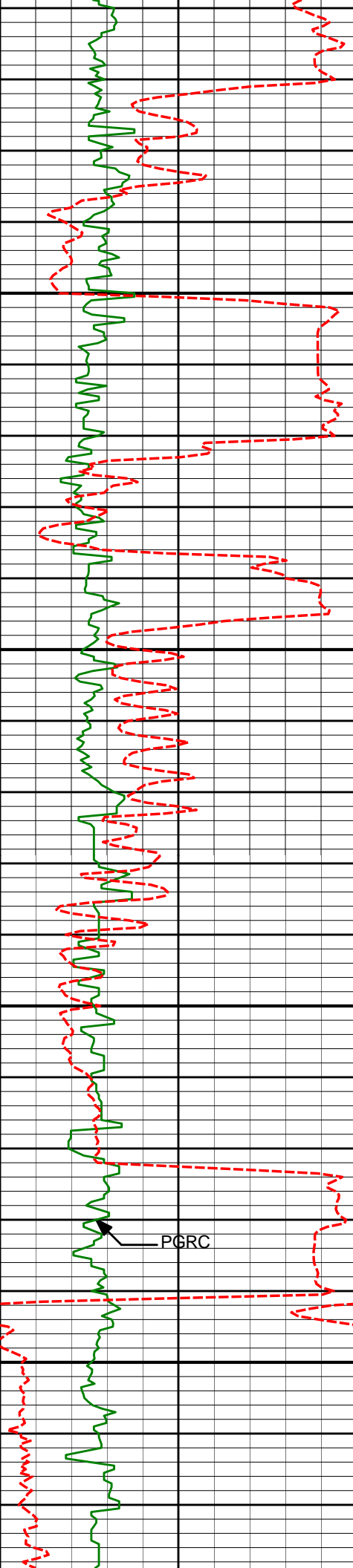
9850'

89.32°

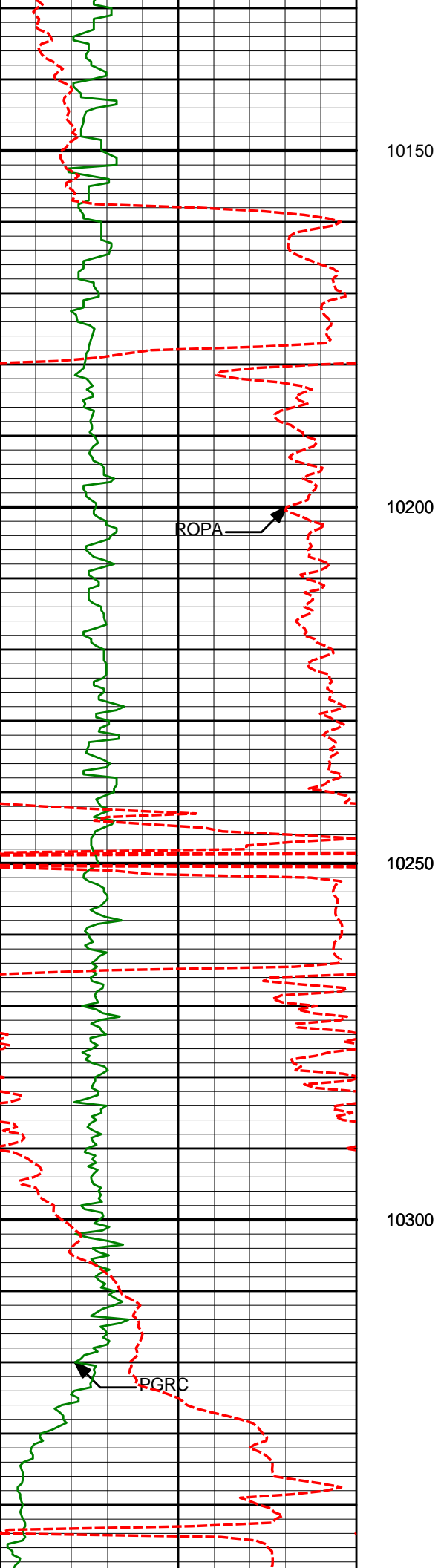
177.25°

7231.97'

2864.69'



	9936'	88.76°	178.98°	7233.41'	2950.65'
9950					
10000					
	10021'	88.83°	180.34°	7235.20'	3035.62'
10050					
10100					
	10107'	89.44°	180.94°	7236.49'	3121.60'



10193'

90.31°

179.62°

7236.68'

3207.58'

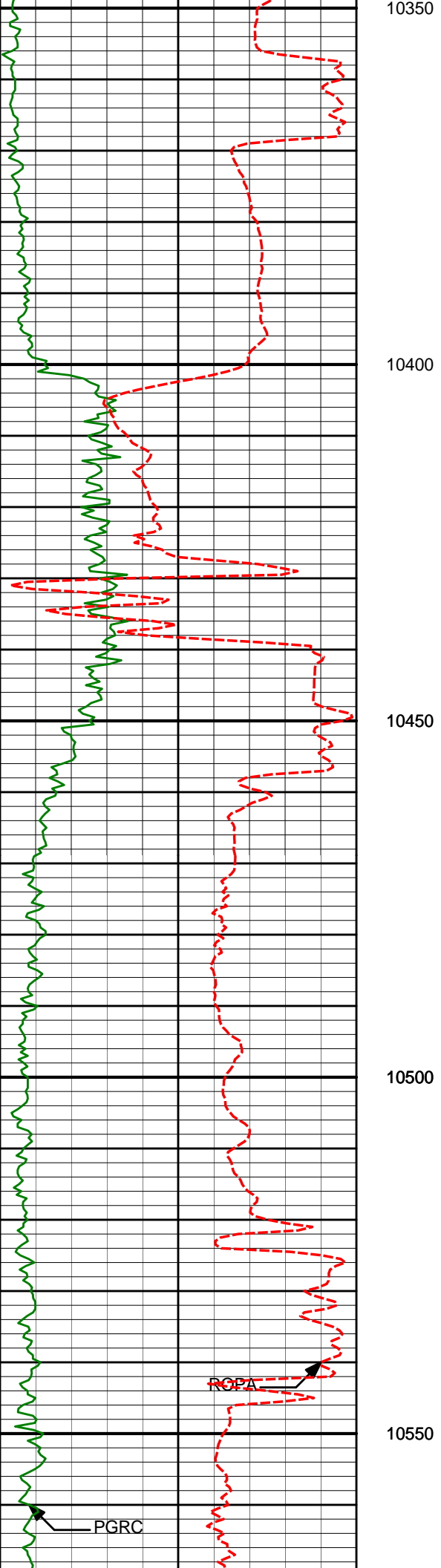
10285'

92.10°

180.03°

7234.74'

3299.56'



10376'

91.61°

179.45°

7231.80'

3390.51'

10468'

91.98°

181.49°

7228.92'

3482.44'

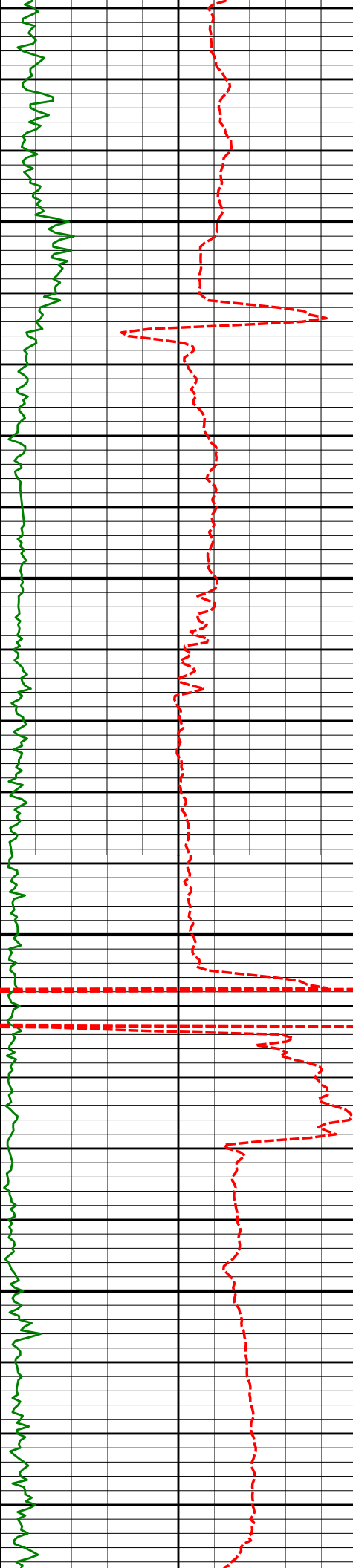
10561'

91.92°

182.57°

7225.76'

3575.30'



10600

10650

10700

10750

10653'

90.74°

181.77°

7223.63'

3667.17'

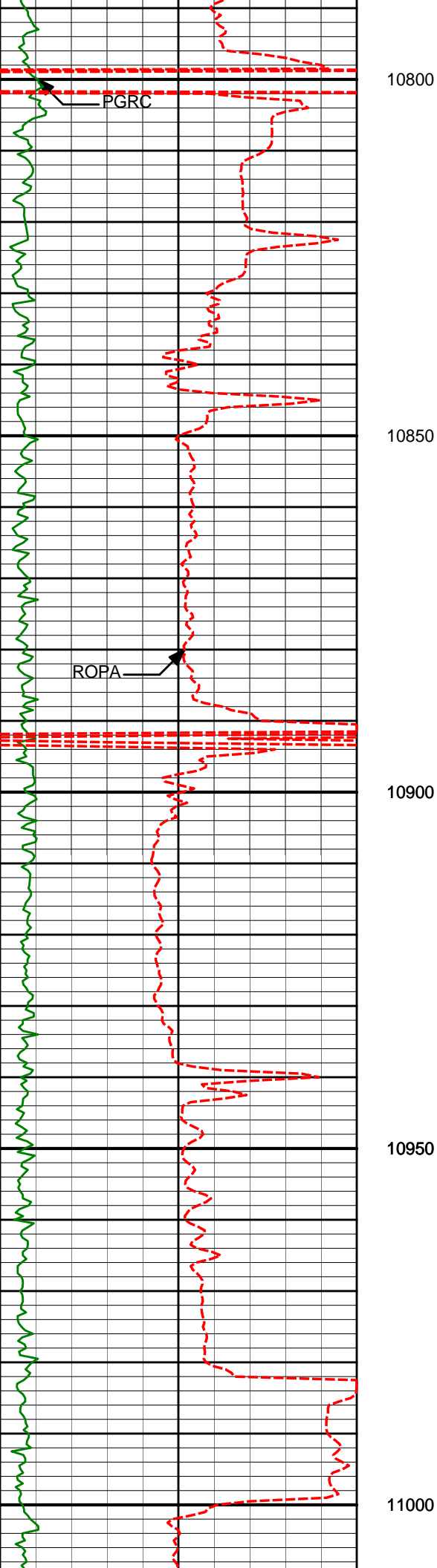
10745'

92.17°

181.68°

7221.29'

3759.06'



10836'

91.61°

181.02°

7218.30'

3849.97'

10850

10900

10929'

91.36°

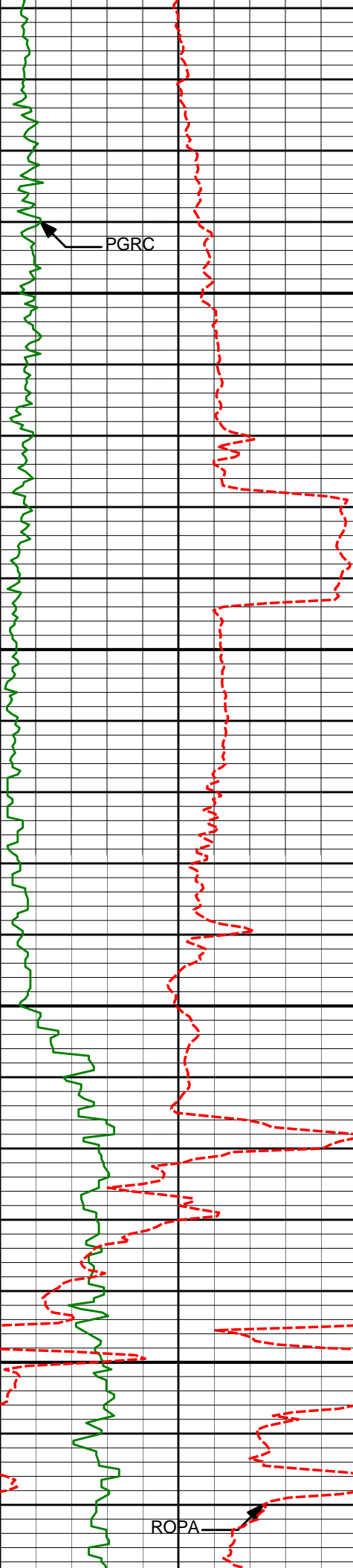
179.95°

7215.89'

3942.92'

10950

11000



11050

11100

11150

11200

11021'

92.97°

181.59°

7212.42'

4034.82'

11204'

88.64°

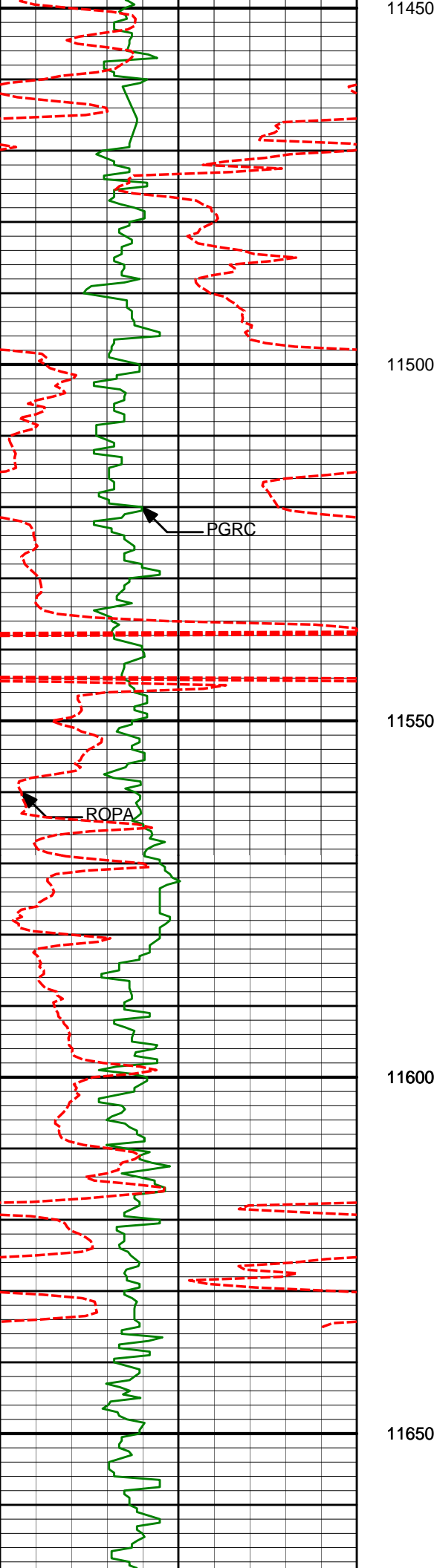
180.59°

7209.85'

4217.69'

PGRC

ROPA



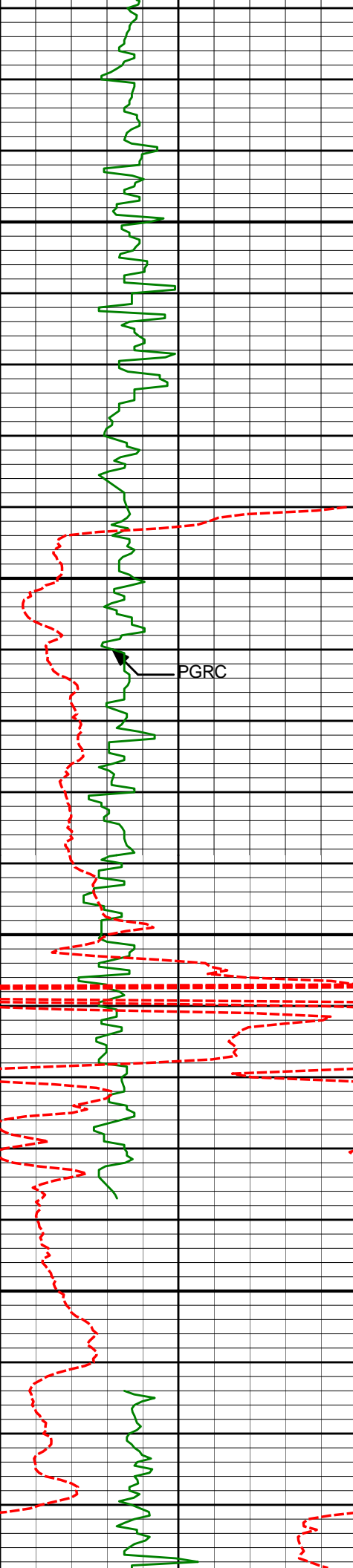
11570'

90.80°

180.52°

7210.56'

4583.64'



11700

11750

11800

11850

11753'

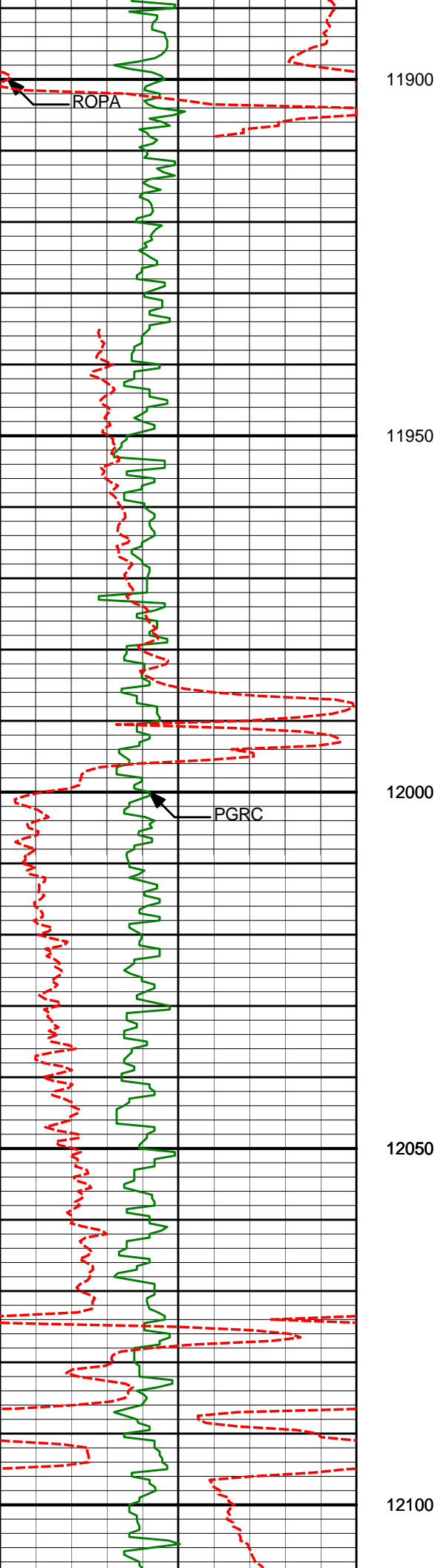
88.70°

179.93°

7211.35'

4766.61'

PGRC



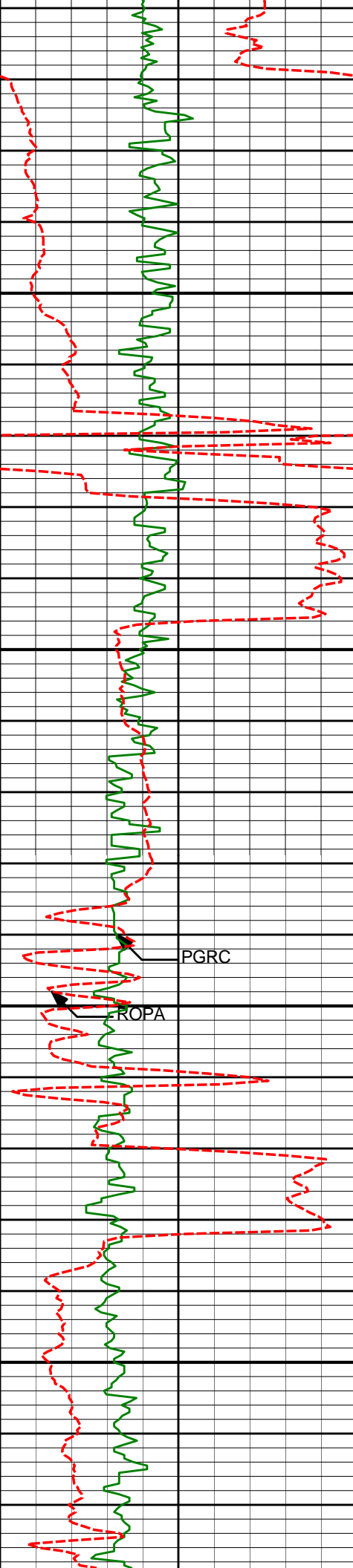
11935'

89.01°

179.30°

7214.97'

4948.57'



12150

12200

12250

12300

PGRC

ROPA

12117'

89.51°

179.41°

7217.33'

5130.55'

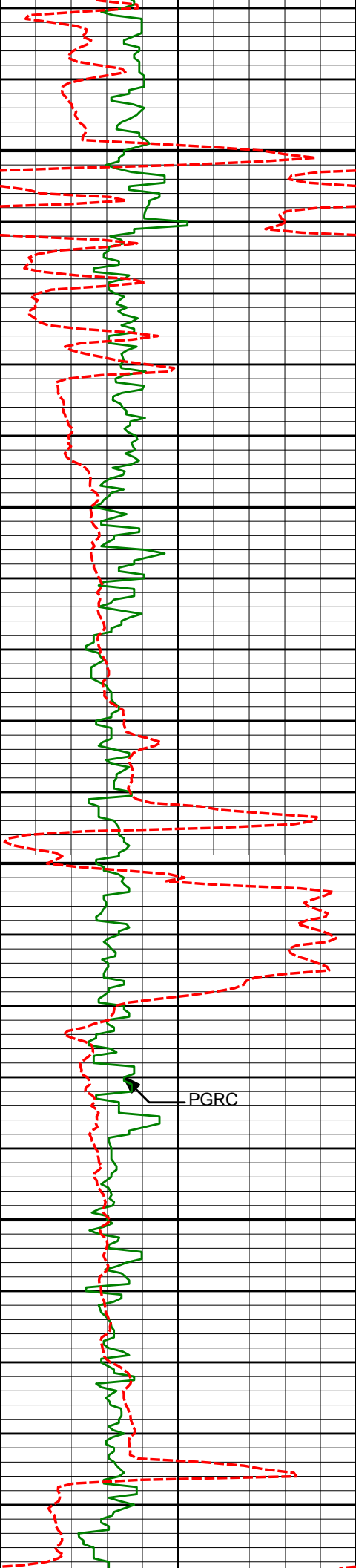
12299'

91.24°

180.18°

7216.15'

5312.54'



12350

12400

12450

12500

PGRC

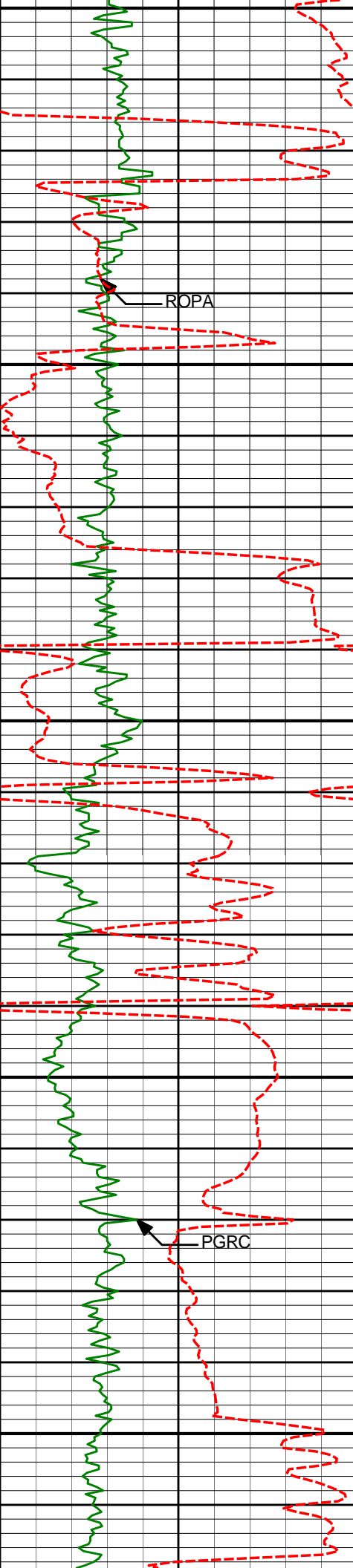
12482'

90.56°

180.73°

7213.29'

5495.49'



12550

12600

12650

12700

12750

ROPA

PGRC

12666'

88.33°

179.65°

7215.07'

5679.45'

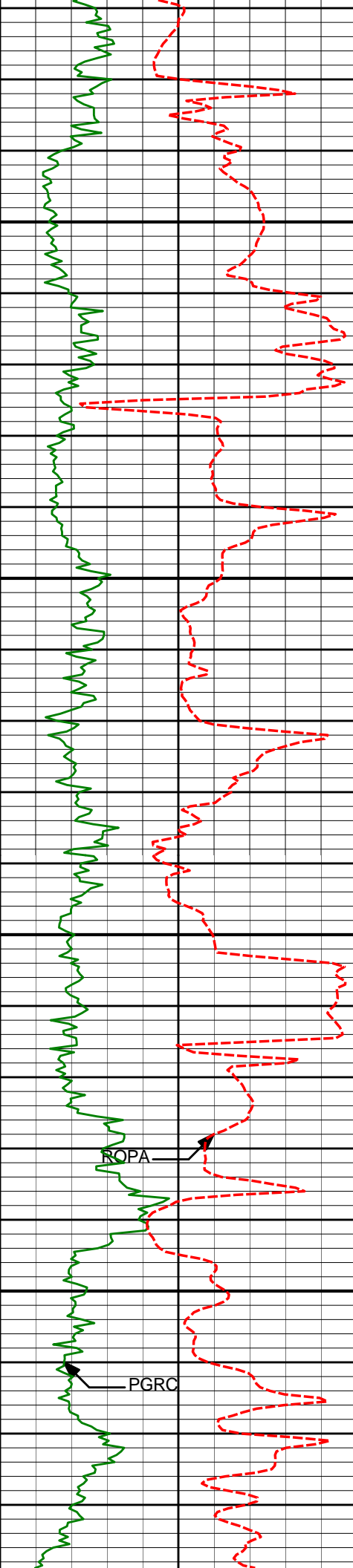
12757'

89.26°

179.16°

7216.99'

5770.43'



12800

12850

12880'

92.04°

178.00°

7215.59'

5893.39'

12900

RQPA

12941'

90.74°

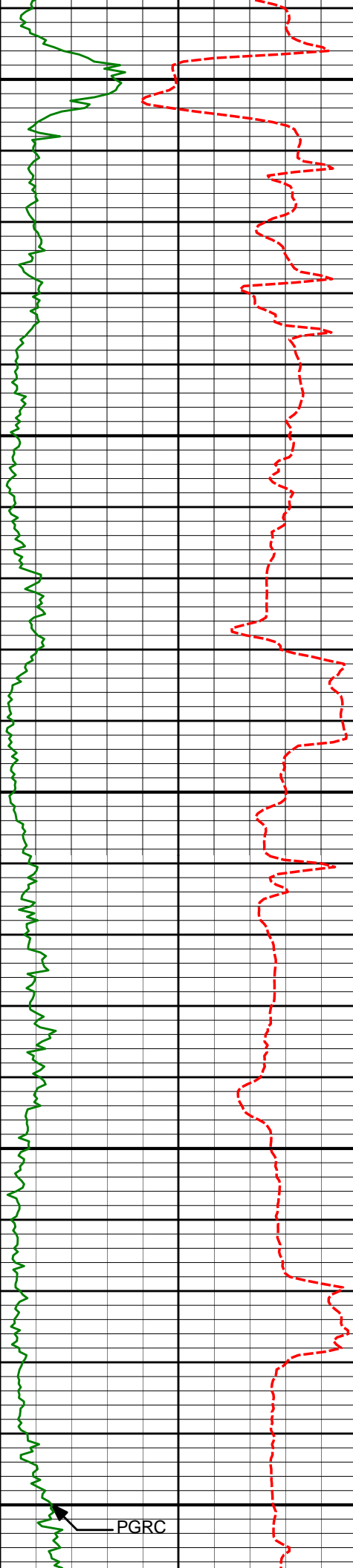
177.87°

7214.11'

5954.35'

12950

PGRC



13000

13050

13100

13150

13200

13027'

90.31°

177.22°

7213.32'

6040.30'

13113'

91.42°

177.89°

7212.03'

6126.24'

13198'

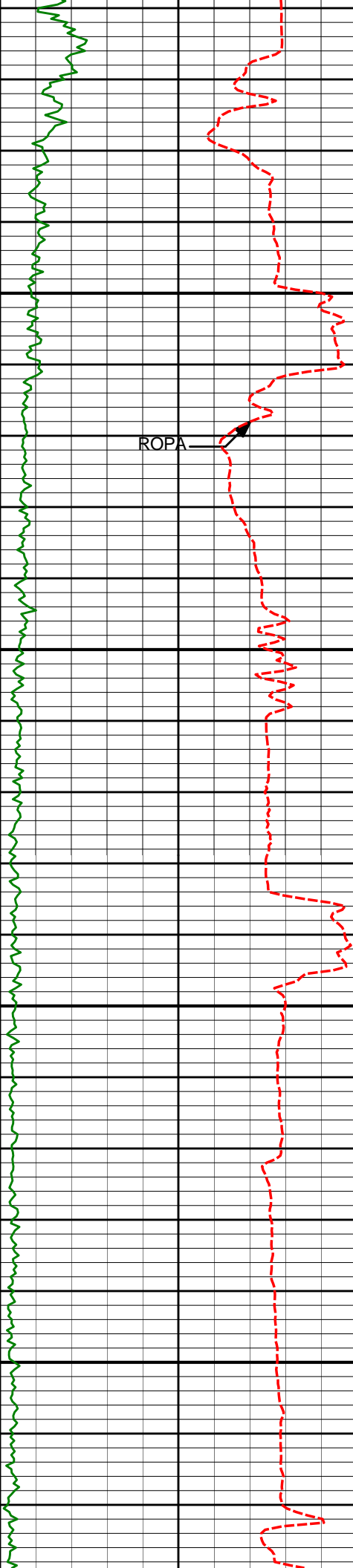
91.11°

179.08°

7210.15'

6211.20'

PGRC



13250

ROPA

13284'

92.29°

179.27°

7207.60'

6297.16'

13300

13350

13370'

91.73°

180.24°

7204.58'

6383.11'

13400



PGRC

ROPA

13450

13500

13550

13600

13455'

90.56°

180.03°

7202.88'

6468.08'

13540'

90.56°

179.65°

7202.06'

6553.08'

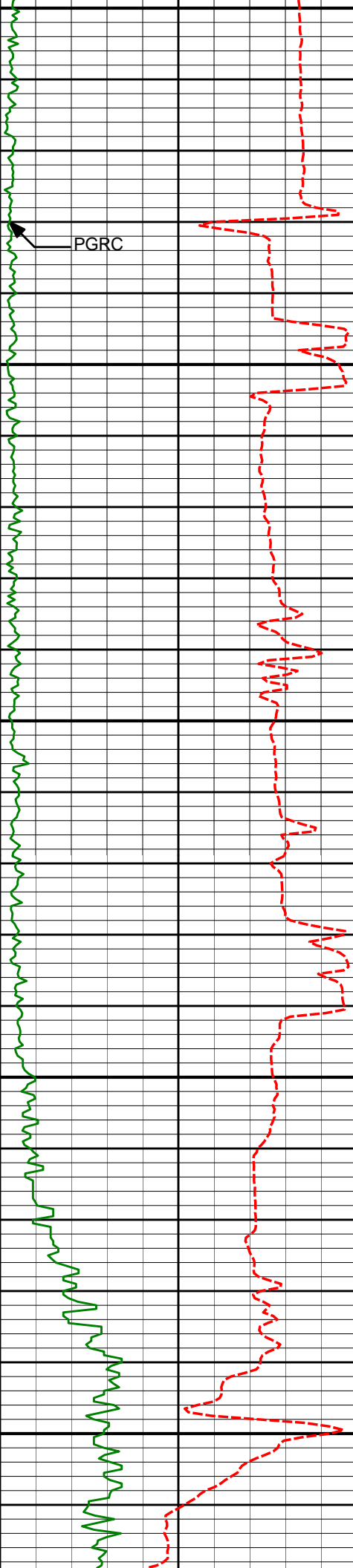
13626'

90.74°

179.35°

7201.09'

6639.07'



PGRC

13650

13700

13750

13800

13850

13711'

90.25°

179.58°

7200.35'

6724.07'

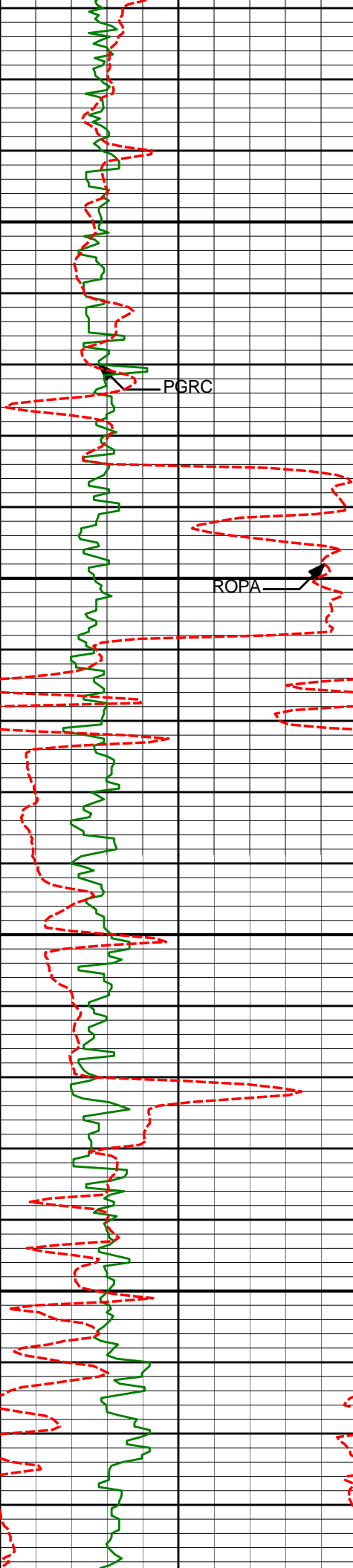
13797'

89.44°

180.67°

7200.58'

6810.06'



13900

PGRC

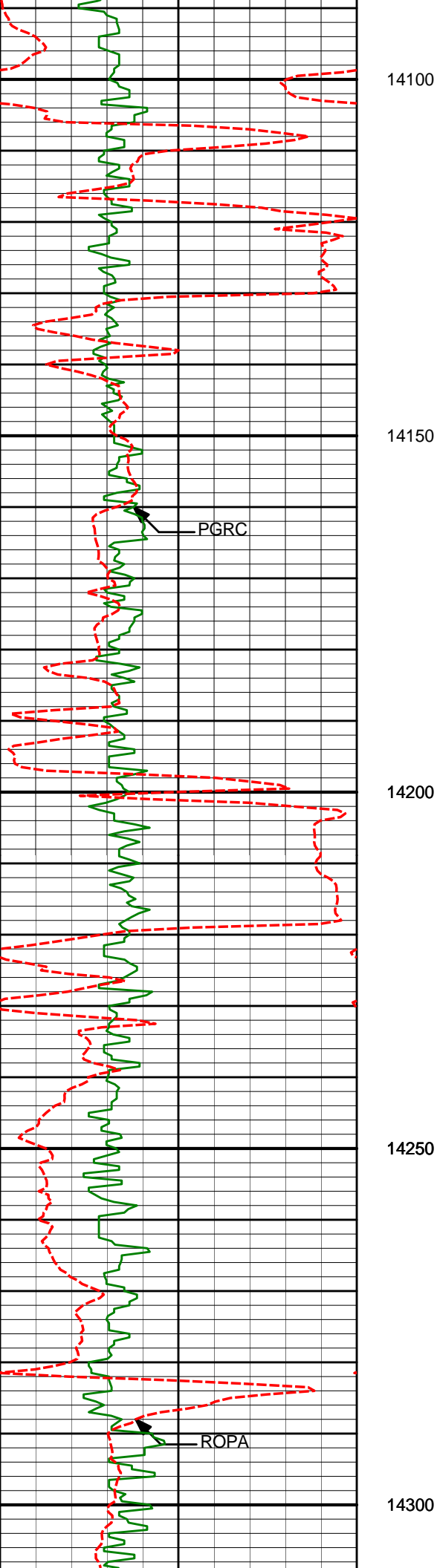
13950

ROPA

14000

14050

13883'	88.39°	179.58°	7202.21'	6896.04'
13969'	89.57°	179.61°	7203.74'	6982.02'
14054'	89.63°	179.94°	7204.34'	7067.02'



14140'

89.75°

179.77°

7204.80'

7153.01'

14150

14200

14226'

90.99°

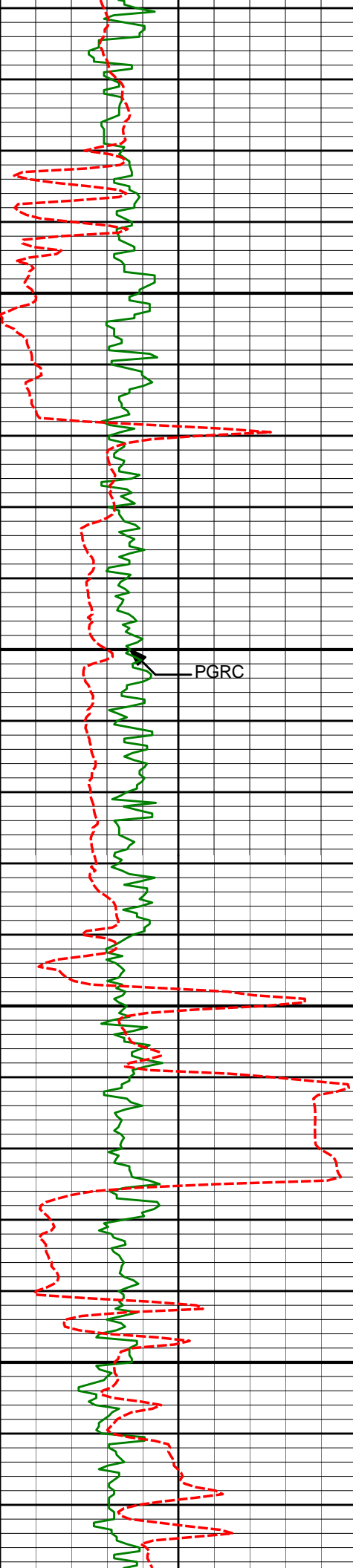
179.60°

7204.24'

7239.01'

14250

14300



14350

14400

14450

14500

PGRC

14312'

90.56°

179.38°

7203.09'

7325.00'

14397'

91.92°

179.38°

7201.25'

7409.98'

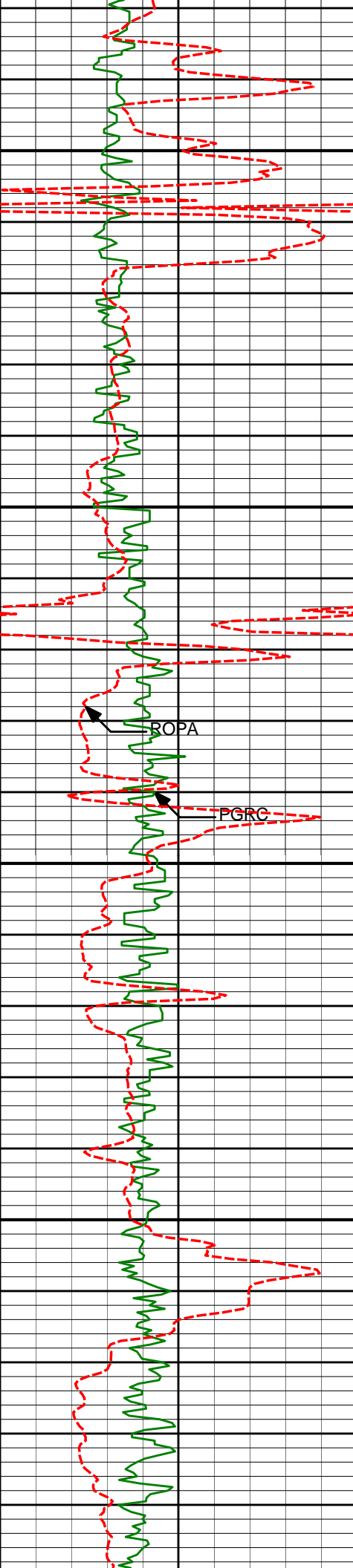
14483'

91.42°

180.30°

7198.75'

7495.94'



14550

14600

14650

14700

BOPA

PGRC

14654'

89.57°

178.74°

7197.27'

7666.92'

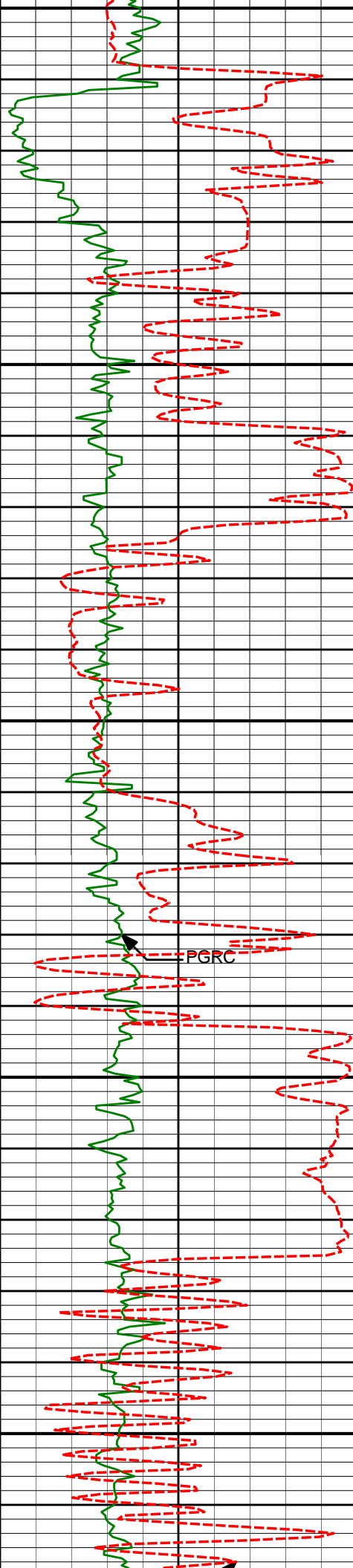
14740'

89.44°

178.42°

7198.01'

7752.91'



14750

14800

14850

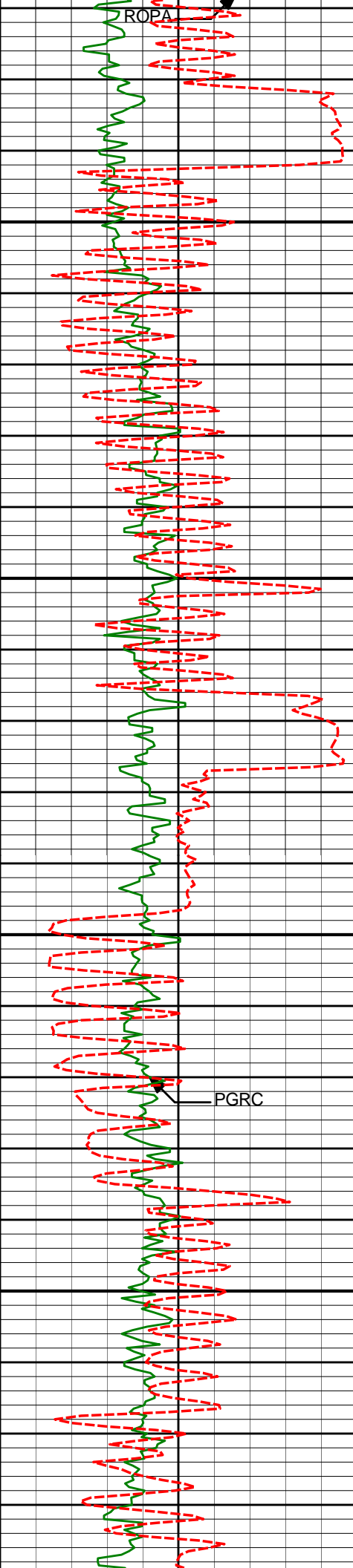
14900

14950

14826'	89.01°	178.43°	7199.17'	7838.88'
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PGRC

14928'	89.81°	178.89°	7200.22'	7940.87'
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15000

15050

15100

15150

14997'

90.06°

177.37°

7200.29'

8009.85'

15083'

91.61°

178.65°

7199.04'

8095.81'

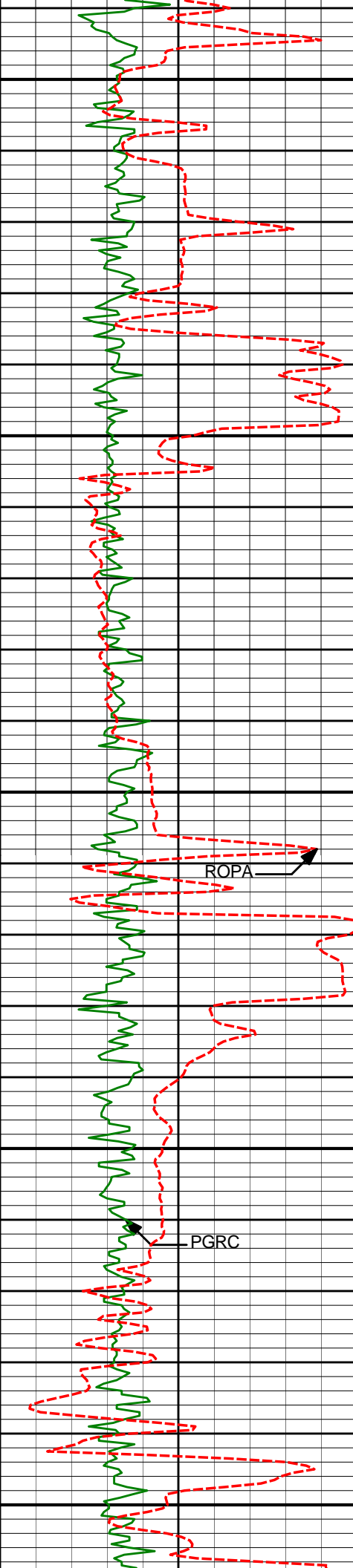
15169'

91.98°

178.28°

7196.35'

8181.75'



15200

15250

15300

15350

15400

15255'

92.16°

179.34°

7193.24'

8267.69'

ROPA

15340'

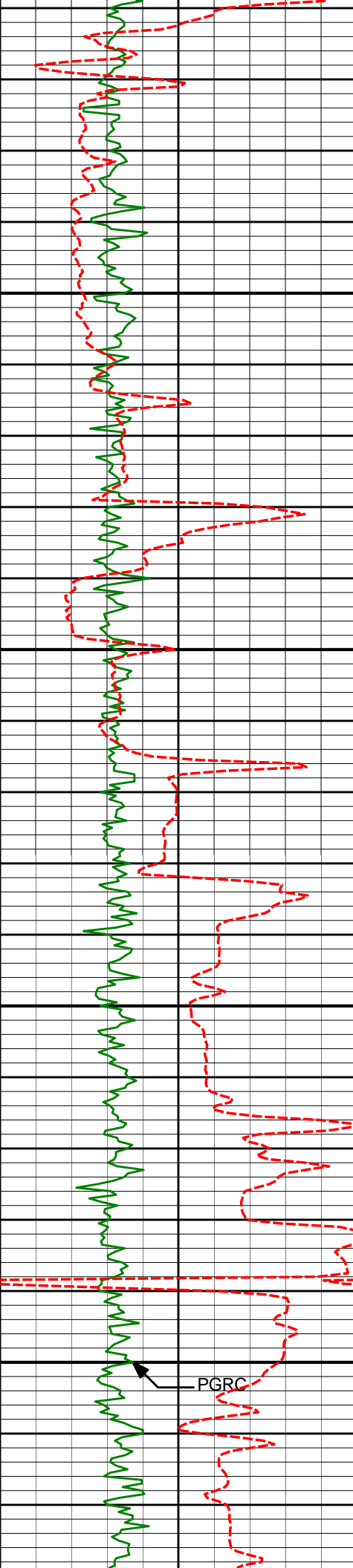
90.25°

179.21°

7191.46'

8352.66'

PGRC



15450

15500

15550

15600

PGRC

15426'

89.88°

178.78°

7191.36'

8438.66'

15512'

89.57°

179.00°

7191.78'

8524.65'

15598'

89.69°

179.10°

7192.34'

8610.65'



15650

15683'

89.38°

178.87°

7193.02'

8695.64'

15700

15750

15769'

90.19°

179.29°

7193.35'

8781.64'

15800

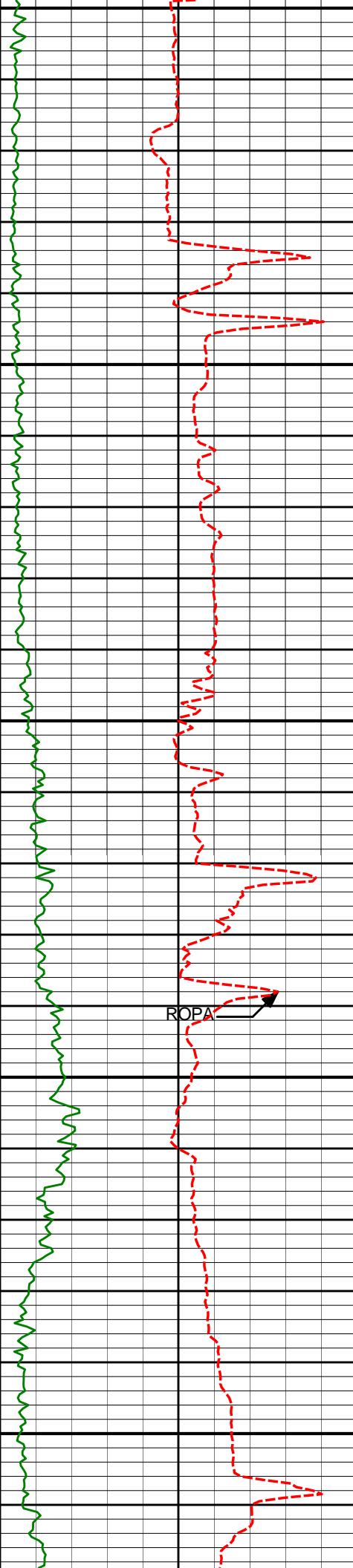
15833'

89.75°

179.70°

7193.38'

8845.64'



15850
Run 500

15900

15950

16000

16050

15919'

89.88°

179.02°

7193.66'

8931.64'

ROPA

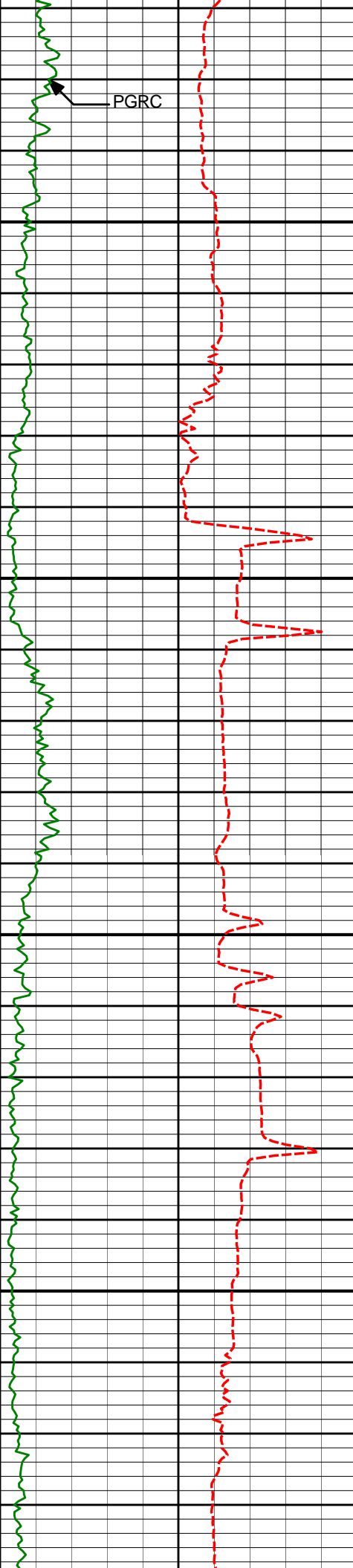
16005'

90.49°

180.08°

7193.38'

9017.64'



PGRC

16090'

90.50°

180.49°

7192.65'

9102.63'

16100

16150

16176'

90.93°

179.84°

7191.58'

9188.61'

16200

16250

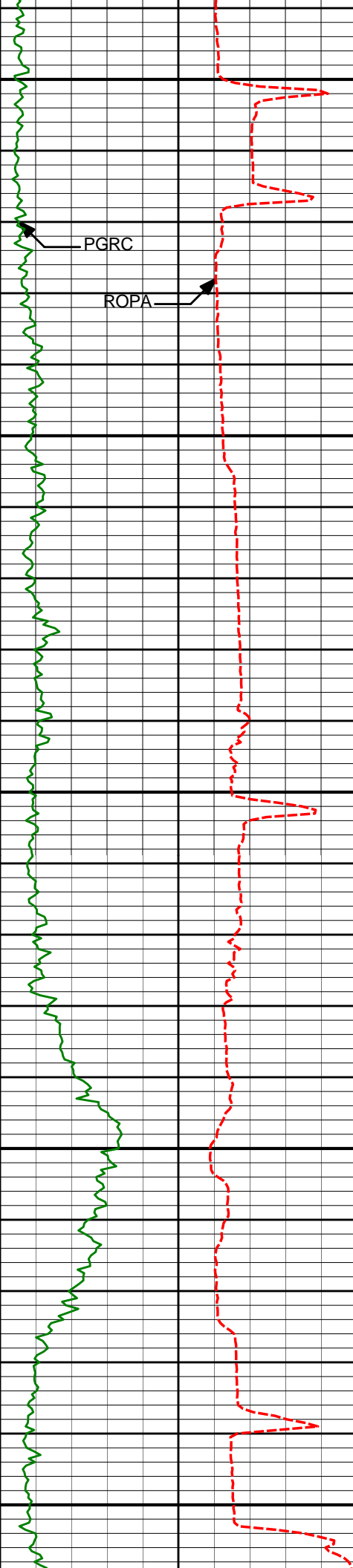
16262'

90.68°

179.57°

7190.38'

9274.60'



16300

PGRC

ROPA

16350

16348'

90.80°

179.58°

7189.26'

9360.59'

16400

16434'

91.24°

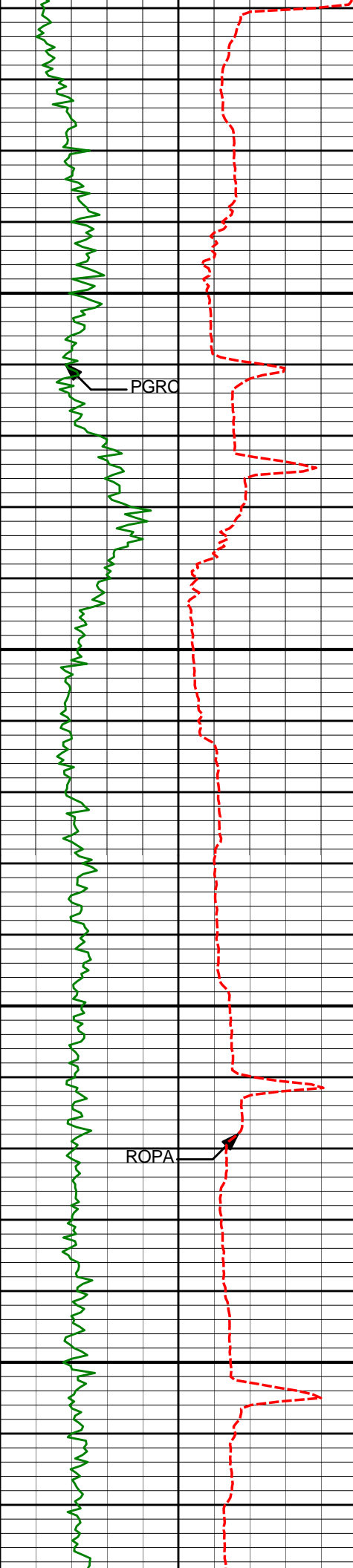
179.82°

7187.73'

9446.58'

16450

16500



16550

16600

16650

16700

PGRC

ROPA

16519'

90.80°

179.89°

7186.22'

9531.56'

16605'

90.62°

179.79°

7185.15'

9617.56'

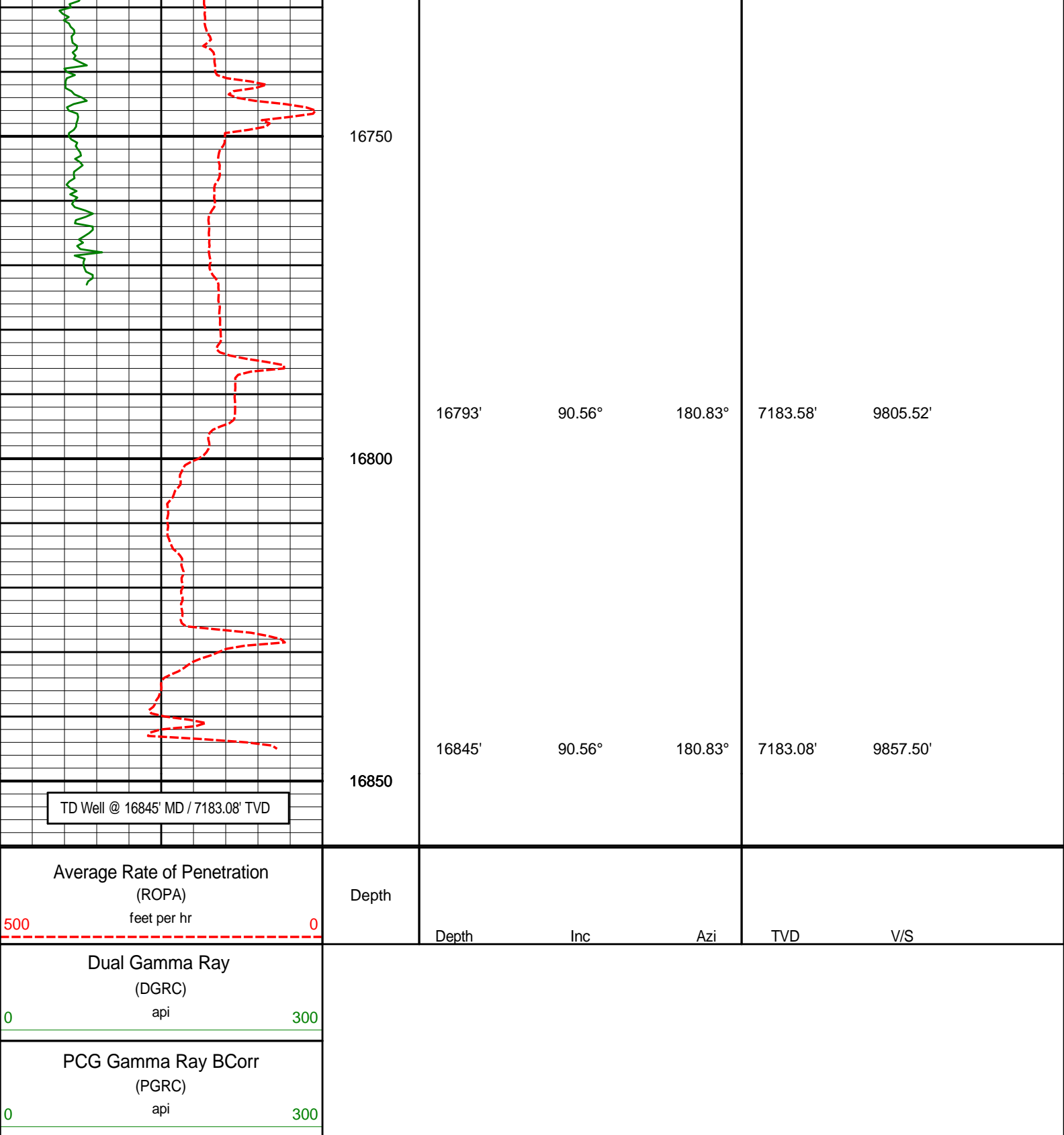
16691'

90.37°

180.63°

7184.41'

9703.54'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Anadarko
Hudson 13C-35HZ
Wattenburg
Weld Colorado
USA
CA-XX-0009939822

	1276.00	0.26	268.18	1275.95	1.29 N	8.72 W	-1.37	TIE-IN
	1350.00	0.37	232.28	1349.95	1.14 N	9.08 W	-1.22	0.30
	1442.00	0.33	252.58	1441.95	0.88 N	9.57 W	-0.97	0.14
	1717.00	0.18	220.40	1716.94	0.31 N	10.61 W	-0.41	0.07
	1989.00	0.18	265.36	1988.94	0.05 S	11.31 W	-0.05	0.05
	2263.00	0.77	197.82	2262.93	1.84 S	12.31 W	1.73	0.26
	2526.00	0.74	205.26	2525.91	5.07 S	13.58 W	4.95	0.04
	2783.00	0.66	187.93	2782.89	8.04 S	14.49 W	7.91	0.09
	2954.00	1.14	258.96	2953.87	9.34 S	16.29 W	9.19	0.65
	3040.00	3.12	265.93	3039.81	9.67 S	19.46 W	9.49	2.32
	3297.00	6.80	270.91	3295.81	9.92 S	41.64 W	9.54	1.44
	3382.00	8.73	272.32	3380.02	9.58 S	53.12 W	9.09	2.28
	3468.00	9.56	272.72	3464.93	8.98 S	66.77 W	8.36	0.97
	3554.00	8.83	271.68	3549.82	8.45 S	80.51 W	7.70	0.88
	3640.00	9.18	274.32	3634.76	7.74 S	93.94 W	6.87	0.63
	3726.00	7.80	275.05	3719.82	6.71 S	106.60 W	5.72	1.61
	3811.00	7.57	273.03	3804.06	5.90 S	117.94 W	4.81	0.42
	3897.00	6.75	274.52	3889.39	5.20 S	128.63 W	4.01	0.98
	3982.00	6.84	275.94	3973.79	4.29 S	138.64 W	3.00	0.22
	4068.00	6.68	277.24	4059.19	3.13 S	148.69 W	1.75	0.25
	4153.00	6.47	274.99	4143.63	2.09 S	158.37 W	0.62	0.39
	4239.00	5.65	282.64	4229.15	0.74 S	167.32 W	-0.81	1.34
	4324.00	3.38	291.87	4313.89	1.11 N	173.73 W	-2.72	2.80
	4410.00	1.96	320.40	4399.79	3.19 N	177.02 W	-4.82	2.21
	4495.00	1.29	339.73	4484.76	5.21 N	178.28 W	-6.86	1.01
	4753.00	0.41	41.32	4742.73	8.64 N	178.67 W	-10.30	0.45
	5009.00	2.52	346.15	4998.64	14.79 N	179.41 W	-16.45	0.90
	5094.00	1.79	348.52	5083.58	17.91 N	180.12 W	-19.57	0.86
	5351.00	1.05	27.78	5340.50	23.93 N	179.82 W	-25.60	0.46
	5608.00	1.28	34.09	5597.45	28.41 N	177.10 W	-30.05	0.10
	5865.00	1.68	109.80	5854.38	29.52 N	171.95 W	-31.11	0.72
	6122.00	0.83	95.00	6111.32	28.08 N	166.55 W	-29.62	0.35
	6294.00	0.95	103.04	6283.30	27.65 N	163.93 W	-29.17	0.10
	6380.00	1.24	107.11	6369.29	27.22 N	162.35 W	-28.72	0.35
	6465.00	1.40	103.10	6454.26	26.71 N	160.45 W	-28.20	0.22
	6551.00	1.22	89.43	6540.24	26.48 N	158.51 W	-27.95	0.42
	6642.00	2.36	160.03	6631.20	24.73 N	156.90 W	-26.18	2.49
	6685.00	8.44	173.29	6673.99	20.76 N	156.23 W	-22.21	14.35
	6728.00	12.24	177.84	6716.29	13.07 N	155.68 W	-14.51	9.03
	6777.00	14.59	174.37	6763.95	1.74 N	154.88 W	-3.17	5.07
	6813.00	19.19	172.29	6798.39	8.65 S	153.64 W	7.22	12.90
	6856.00	25.29	178.51	6838.17	24.85 S	152.46 W	23.44	15.18
	6899.00	28.52	181.36	6876.52	44.30 S	152.46 W	42.89	8.09
	6942.00	31.96	184.51	6913.66	65.92 S	153.60 W	64.49	8.81
	6985.00	35.36	184.66	6949.45	89.67 S	155.50 W	88.23	7.90
	7028.00	38.71	183.75	6983.77	115.49 S	157.39 W	114.03	7.90
	7071.00	42.77	181.69	7016.34	143.52 S	158.70 W	142.04	9.95
	7114.00	47.61	179.19	7046.64	174.01 S	158.91 W	172.53	11.97
	7156.00	50.73	178.98	7074.10	205.78 S	158.40 W	204.31	7.46
	7199.00	53.92	179.87	7100.38	239.81 S	158.06 W	238.34	7.58
	7242.00	57.67	181.38	7124.54	275.36 S	158.46 W	273.88	9.21
	7285.00	61.95	182.90	7146.16	312.49 S	159.86 W	311.00	10.40
	7328.00	67.26	182.80	7164.60	351.27 S	161.79 W	349.76	12.34
	7371.00	72.93	182.45	7179.24	391.64 S	163.64 W	390.11	13.21
	7414.00	78.25	182.36	7189.94	433.24 S	165.39 W	431.69	12.38
	7457.00	81.31	181.63	7197.57	475.53 S	166.86 W	473.96	7.31
	7499.00	82.33	178.66	7203.55	517.09 S	166.96 W	515.53	7.40
	7526.00	84.47	177.44	7206.65	543.90 S	166.05 W	542.34	9.12
	7622.00	89.94	174.87	7211.33	639.52 S	159.61 W	638.02	6.29
	7707.00	93.15	177.81	7209.05	724.30 S	154.19 W	722.84	5.12
	7793.00	91.24	179.07	7205.76	810.20 S	151.85 W	808.76	2.66
	7879.00	89.07	180.36	7205.52	896.19 S	151.43 W	894.75	2.93
	7964.00	88.76	180.50	7207.13	981.17 S	152.07 W	979.72	0.40
	8050.00	89.57	181.19	7208.38	1067.15 S	153.34 W	1065.69	1.23
	8136.00	88.70	181.36	7209.68	1153.12 S	155.25 W	1151.63	1.02
	8222.00	88.58	180.72	7211.72	1239.08 S	156.82 W	1237.58	0.76
	8308.00	88.89	180.65	7213.62	1325.05 S	157.85 W	1323.54	0.37
	8393.00	90.56	179.91	7214.04	1410.05 S	158.27 W	1408.52	2.15
	8479.00	91.36	180.22	7212.60	1496.03 S	158.36 W	1494.50	1.00
	8565.00	89.81	180.41	7211.72	1582.03 S	158.83 W	1580.49	1.81
	8651.00	88.83	179.51	7212.74	1668.03 S	158.76 W	1666.48	1.55

8831.00	88.83	179.31	7212.74	1888.02 S	138.78 W	1888.48	1.33
8735.00	89.44	179.18	7214.01	1752.00 S	157.80 W	1750.47	0.83
8821.00	89.44	178.24	7214.85	1837.97 S	155.87 W	1836.45	1.09
8907.00	89.44	177.75	7215.68	1923.92 S	152.86 W	1922.42	0.57
8992.00	89.51	178.04	7216.46	2008.86 S	149.74 W	2007.39	0.35
9078.00	87.90	180.08	7218.41	2094.82 S	148.32 W	2093.35	3.02
9164.00	88.70	178.74	7220.96	2180.77 S	147.44 W	2179.31	1.81
9250.00	89.63	179.77	7222.21	2266.75 S	146.32 W	2265.30	1.61
9335.00	89.81	179.47	7222.62	2351.75 S	145.76 W	2350.30	0.41
9421.00	88.02	178.24	7224.24	2437.71 S	144.04 W	2436.28	2.53
9507.00	87.71	176.73	7227.44	2523.57 S	140.27 W	2522.16	1.79
9593.00	88.27	175.74	7230.46	2609.33 S	134.63 W	2607.97	1.32
9678.00	89.88	177.05	7231.83	2694.14 S	129.28 W	2692.83	2.44
9764.00	90.31	177.08	7231.69	2780.03 S	124.88 W	2778.76	0.50
9850.00	89.32	177.25	7231.97	2865.92 S	120.62 W	2864.69	1.17
9936.00	88.76	178.98	7233.41	2951.86 S	117.80 W	2950.65	2.11
10021.00	88.83	180.34	7235.20	3036.84 S	117.29 W	3035.62	1.60
10107.00	89.44	180.94	7236.49	3122.82 S	118.25 W	3121.60	1.00
10193.00	90.31	179.62	7236.68	3208.82 S	118.67 W	3207.58	1.83
10285.00	92.10	180.03	7234.74	3300.79 S	118.39 W	3299.56	2.00
10376.00	91.61	179.45	7231.80	3391.75 S	117.98 W	3390.51	0.83
10468.00	91.98	181.49	7228.92	3483.69 S	118.73 W	3482.44	2.25
10561.00	91.92	182.57	7225.76	3576.58 S	122.03 W	3575.30	1.16
10653.00	90.74	181.77	7223.63	3668.49 S	125.51 W	3667.17	1.55
10745.00	92.17	181.68	7221.29	3760.41 S	128.28 W	3759.06	1.55
10836.00	91.61	181.02	7218.30	3851.34 S	130.42 W	3849.97	0.95
10929.00	91.36	179.95	7215.89	3944.30 S	131.21 W	3942.92	1.18
11021.00	92.97	181.59	7212.42	4036.22 S	132.44 W	4034.82	2.49
11204.00	88.64	180.59	7209.85	4219.12 S	135.92 W	4217.69	2.43
11296.00	89.63	180.13	7211.24	4311.11 S	136.50 W	4309.66	1.18
11388.00	89.88	179.94	7211.63	4403.11 S	136.55 W	4401.66	0.34
11570.00	90.80	180.52	7210.56	4585.10 S	137.28 W	4583.64	0.60
11753.00	88.70	179.93	7211.35	4768.09 S	138.00 W	4766.61	1.19
11935.00	89.01	179.30	7214.97	4950.05 S	136.78 W	4948.57	0.39
12117.00	89.51	179.41	7217.33	5132.02 S	134.74 W	5130.55	0.28
12299.00	91.24	180.18	7216.15	5314.01 S	134.09 W	5312.54	1.04
12482.00	90.56	180.73	7213.29	5496.98 S	135.55 W	5495.49	0.48
12666.00	88.33	179.65	7215.07	5680.95 S	136.16 W	5679.45	1.35
12757.00	89.26	179.16	7216.99	5771.93 S	135.21 W	5770.43	1.15
12880.00	92.04	178.00	7215.59	5894.87 S	132.16 W	5893.39	2.45
12941.00	90.74	177.87	7214.11	5955.81 S	129.96 W	5954.35	2.14
13027.00	90.31	177.22	7213.32	6041.72 S	126.28 W	6040.30	0.91
13113.00	91.42	177.89	7212.03	6127.63 S	122.61 W	6126.24	1.51
13198.00	91.11	179.08	7210.15	6212.58 S	120.36 W	6211.20	1.45
13284.00	92.29	179.27	7207.60	6298.53 S	119.13 W	6297.16	1.39
13370.00	91.73	180.24	7204.58	6384.48 S	118.77 W	6383.11	1.30
13455.00	90.56	180.03	7202.88	6469.46 S	118.98 W	6468.08	1.40
13540.00	90.56	179.65	7202.06	6554.45 S	118.74 W	6553.08	0.45
13626.00	90.74	179.35	7201.09	6640.45 S	117.99 W	6639.07	0.42
13711.00	90.25	179.58	7200.35	6725.44 S	117.20 W	6724.07	0.65
13797.00	89.44	180.67	7200.58	6811.44 S	117.39 W	6810.06	1.57
13883.00	88.39	179.58	7202.21	6897.42 S	117.58 W	6896.04	1.76
13969.00	89.57	179.61	7203.74	6983.40 S	116.98 W	6982.02	1.37
14054.00	89.63	179.94	7204.34	7068.40 S	116.64 W	7067.02	0.39
14140.00	89.75	179.77	7204.80	7154.40 S	116.42 W	7153.01	0.24
14226.00	90.99	179.60	7204.24	7240.39 S	115.95 W	7239.01	1.45
14312.00	90.56	179.38	7203.09	7326.38 S	115.19 W	7325.00	0.56
14397.00	91.92	179.38	7201.25	7411.35 S	114.27 W	7409.98	1.60
14483.00	91.42	180.30	7198.75	7497.32 S	114.03 W	7495.94	1.21
14654.00	89.57	178.74	7197.27	7668.29 S	112.60 W	7666.92	1.42
14740.00	89.44	178.42	7198.01	7754.26 S	110.46 W	7752.91	0.40
14826.00	89.01	178.43	7199.17	7840.22 S	108.10 W	7838.88	0.50
14928.00	89.81	178.89	7200.22	7942.19 S	105.71 W	7940.87	0.91
14997.00	90.06	177.37	7200.29	8011.15 S	103.46 W	8009.85	2.23
15083.00	91.61	178.65	7199.04	8097.08 S	100.47 W	8095.81	2.33
15169.00	91.98	178.28	7196.35	8183.01 S	98.16 W	8181.75	0.61
15255.00	92.16	179.34	7193.24	8268.93 S	96.38 W	8267.69	1.26
15340.00	90.25	179.21	7191.46	8353.90 S	95.30 W	8352.66	2.26
15426.00	89.88	178.78	7191.36	8439.89 S	93.79 W	8438.66	0.66
15512.00	89.57	179.00	7191.78	8525.87 S	92.13 W	8524.65	0.44
15598.00	89.69	179.10	7192.34	8611.86 S	90.70 W	8610.65	0.18
15683.00	89.38	178.87	7193.02	8696.84 S	89.20 W	8695.64	0.45
15769.00	90.19	179.29	7193.35	8782.83 S	87.81 W	8781.64	1.05
15833.00	89.75	179.70	7193.38	8846.83 S	87.25 W	8845.64	0.94
15919.00	89.88	179.02	7193.66	8932.82 S	86.30 W	8931.64	0.80

16005.00	90.49	180.08	7193.38	9018.81 S	85.62 W	9017.64	1.42
16090.00	90.50	180.49	7192.65	9103.81 S	86.04 W	9102.63	0.48
16176.00	90.93	179.84	7191.58	9189.80 S	86.28 W	9188.61	0.90
16262.00	90.68	179.57	7190.38	9275.79 S	85.83 W	9274.60	0.43
16348.00	90.80	179.58	7189.26	9361.78 S	85.19 W	9360.59	0.15
16434.00	91.24	179.82	7187.73	9447.77 S	84.74 W	9446.58	0.57
16519.00	90.80	179.89	7186.22	9532.75 S	84.52 W	9531.56	0.51
16605.00	90.62	179.79	7185.15	9618.75 S	84.28 W	9617.56	0.24
16691.00	90.37	180.63	7184.41	9704.74 S	84.60 W	9703.54	1.01
16793.00	90.56	180.83	7183.58	9806.73 S	85.89 W	9805.52	0.27
16845.00	90.56	180.83	7183.08	9858.72 S	86.64 W	9857.50	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 179.47 DEGREES (TRUE)
 A TOTAL CORRECTION OF 8.61 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED
 HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
 HORIZONTAL DISPLACEMENT(CLOSURE) AT 16845.00 FEET
 IS 9859.10 FEET ALONG 180.50 DEGREES (TRUE)
 Final survey is a straight-line projection to the bit.