

1 : 240

Country : USA								
Field : Wattenburg								
Location : Lat: 40° 10' 35.23" North Long: 104° 43' 41.46" West								
Well : USA Fed 03N-36HZ								
Company : Anadarko Petroleum Corp								
Rig : Ensign 132								
LOCATION		Other Services						
		Directional Drilling Battery Powered Surveys						
Latitude : 40° 10' 35.23" North Longitude : 104° 43' 41.46" West								
UTM Easting = 3,215,665.02 ft UTM Northing = 1,308,063.18 ft								
Permanent Datum : Ground Level		Elevation : 5003.00 ft	Elev. KB 5016.00 ft					
Log Measured From : Drill Floor		13.00 ft Above Permanent Datum	DF 5016.00 ft					
Drilling Measured From : Drill Floor		MD LOG	GL 5003.00 ft					
			WD N/A					
Depth Logged : 0 ft To 11,792.00 ft		Unit No. : 11210429 Job No. :CA-XX-0900512977						
Date Logged : 23-Jul-13 To 31-Jul-13								
Total Depth MD : 11,792.00 ft TVD: 7,249.98 ft		Plot Type : Final						
Spud Date : 03-Aug-13		Plot Date : 05-Aug-13						
Run No.	Borehole Record (MD)		Borehole Record (MD)					
	Size	From	To	Run No.	Size	From	To	
	1	13,500 in	SURFACE	962.00 ft				
	2	8,750 in	962.00 ft	7,218.00 ft				
	3	8,750 in	7,218.00 ft	7,655.00 ft				
4	6,125 in	7,655.00 ft	11,792.00 ft					
		Casing Record (MD)						
	Size	Weight	From	To				
	9.625 in	36.00 lbpf	SURFACE	962.00 ft				
	7.000 in	26.00 lbpf	SURFACE	7,645.00 ft				

MWD Run Number	100	200	300	400	
Date run completed	27-Jul-13	29-Jul-13	31-Jul-13	03-Aug-13	
Rig Bit Number	1	2	3	4	
Bit Size (in)	13.500	8.750	8.750	6.125	
Tool Nominal OD (in)	8.000	6.750	6.420	8.000	
Log Start Depth (TVD, ft)	1.00	961.98	7,120.67	7,269.72	
Log End Depth (TVD, ft)	961.98	7,120.67	7,269.72	7,249.98	
Drill or Wipe	Drill	Drill	Drill	Drill	
Drill/Wipe Start Date and Time	25-Jul-13 14:33	28-Jul-13 06:00	29-Jul-13 02:30	30-Jul-13 09:15	
Drill/Wipe End Date and Time	25-Jul-13 14:33	29-Jul-13 20:15	30-Jul-13 16:00	03-Aug-13 05:00	
Min Inc (deg) @ Depth (TVD, ft)	.17 @ 329.00	.28 @ 5,931.66	43.72 @ 7,120.67	88.02 @ 7,258.68	
Max Inc (deg) @ Depth (TVD, ft)	.62 @ 451.00	39.90 @ 7,084.89	85.43 @ 7,267.27	93.09 @ 7,260.94	
Bit TFA(in2) / Bit Type	1.49 / PDC	1.04 / PDC	1.04 / PDC	.98 / PDC	
Flow Rate (gpm)	463.80	583.66	499.52	299.24	
Max AV (fpm) / CV (fpm) @ MWD	723.0 / 181.0	723.0 / 181.0	723.0 / 181.0	0 / 0	
Fluid Type	Native/Spud Mud	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel	
Density (ppg) / Viscosity (spqt)	8.55 / 36.00	9.23 / 38.00	9.23 / 38.00	9.60 / 34.00	
Filtrate CL (ppm)	900.00	900.00	900.00	750.00	
pH / Fluid Loss (mptm)	9.00 / 0	8.50 / 0	8.50 / 0	9.50 / 0	
PV (cP) / YP (lbf2)	6 / 5.00	11 / 13.00	11 / 13.00	11 / 11.00	
% Solids / % Sand	1.2 / 0	1.2 / 0	1.2 / 0	1.2 / 0	
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	N/A / N/A	N/A / N/A	
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	
Rmf @ Measured Temp (degF)	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	
Max Tool Temp (deg F) / S	25.00 / 25	127.00 / 25M	122.55 / 25M	232.05 / 120M	

Max Tool Temp (degF) / Source	95.00 / 95	167.00 / PCM	182.55 / PCM	229.65 / HCIM	
Rm @ Max Tool Temp (degF)	N/A @ 95.00	N/A @ 167.00	N/A @ 182.55	N/A @ 229.65	
Lead MWD Engineer	Evan LeBlanc	Evan LeBlanc	Evan LeBlanc	Evan LeBlanc	
Customer Representative	Mike Bradshaw	Mike Bradshaw	Mike Bradshaw	Terry Bradshaw	

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM	HCIM	
Software Version	5.84	5.84	5.84	88.56	
Sub Serial Number	11847568	11341324	11341324	11252401	
Insert Serial Number	11680751	11227549	11680751	11252401	
Date and Time Initialized	26-Jul-13 05:10	28-Jul-13 01:44	29-Jul-13 17:11	31-Jul-13 20:05	
Date and Time Read	27-Jul-13 02:19	29-Jul-13 21:14	31-Jul-13 03:04	03-Aug-13 22:01	
ECMB SW Version	N/A	N/A	N/A	N/A	

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC	PCDC	
Distance From Bit (ft)	48.67	45.43	41.10	48.04	
Software Version	6.21	6.21	6.21	6.21	
Sub Serial Number	11847568	11341324	11341324	1	
Sonde Serial Number	11145708	11297584	11145708	11297584	
Sensor ID Number	N/A	N/A	N/A	N/A	
Toolface Offset (deg)	348.35	169.99	348.35	195.96	

Gamma Ray Sensor Information

Tool Type	N/A	PCG	PCG	DGR	
Distance From Bit (ft)	N/A	50.38	46.03	70.92	
Recorded Sample Period (sec)	N/A	10	10	8	
Software Version	N/A	8.15	8.15	N/A	
Sub Serial Number	N/A	11341324	11341324	10911224	
Insert/Sonde Serial Number	N/A	11293285	11579782	10873620	

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:

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

5. The following parameters have been used for borehole corrections:

Hole size: 6.125-8.75"
Mud Weight: 8.5-10.2ppg

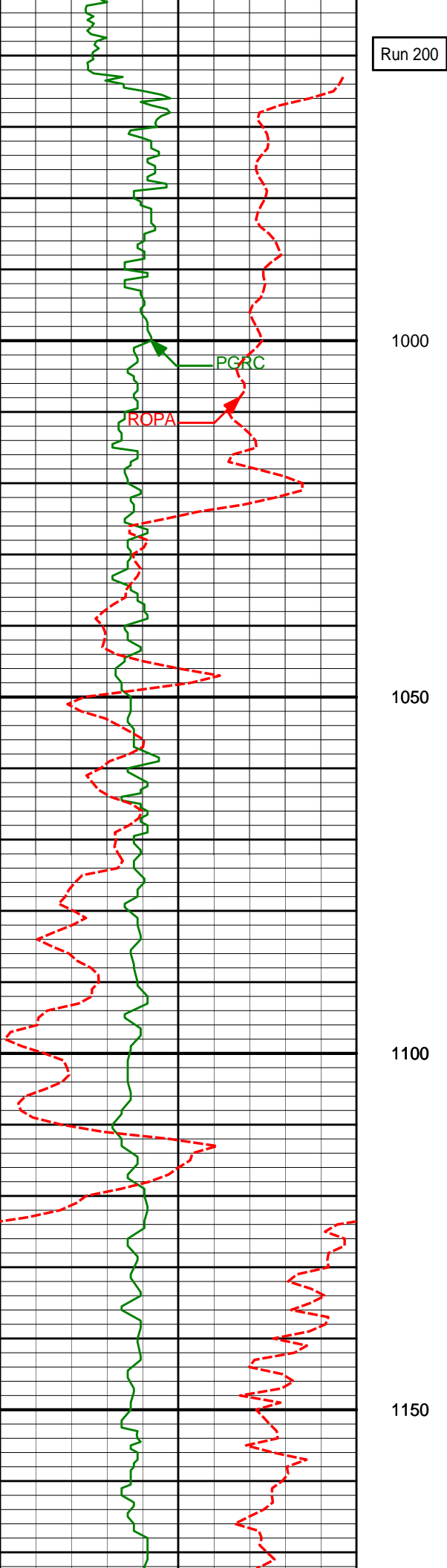
6. Gamma Ray logging tool change from PCGK to DGR

Insite version: 7.4.10

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TVD Main Log 1:240

PCG Gamma Ray BCorr (PGRC) api						
0	300					
Average Rate of Penetration (ROPA) feet per hr						
750	0					
Dual Gamma Ray DGRC api		Depth				
0	300	Depth	Inc	Azi	TVD	V/S
		912'	0.29°	260.14°	911.98'	-1.73'
		950				

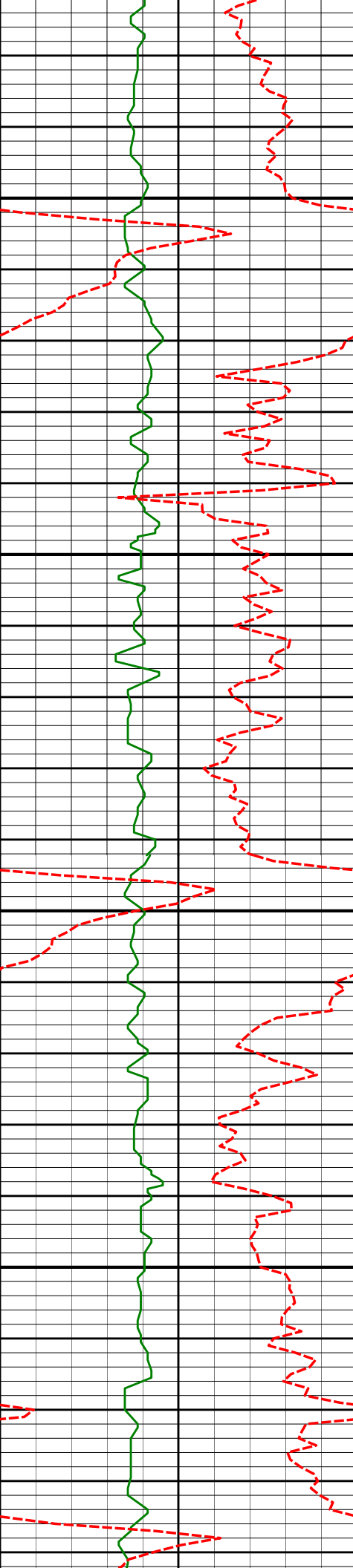


Run 200

975'	0.55°	263.16°	974.98'	-1.79'
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1066'	0.55°	270.51°	1065.97'	-1.83'
-------	-------	---------	----------	--------

1158'	0.67°	274.56°	1157.97'	-1.78'
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1200

1250

1300

1350

1250'

0.68°

267.28°

1249.96'

-1.75'

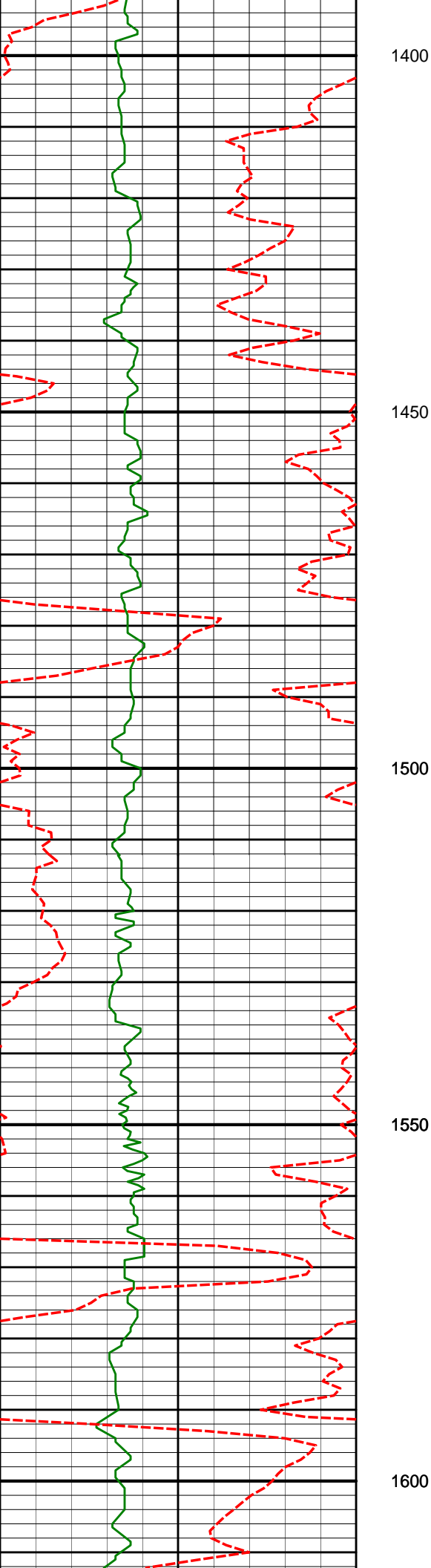
1341'

0.77°

273.68°

1340.95'

-1.73'



1433'

0.88°

271.47°

1432.94'

-1.66'

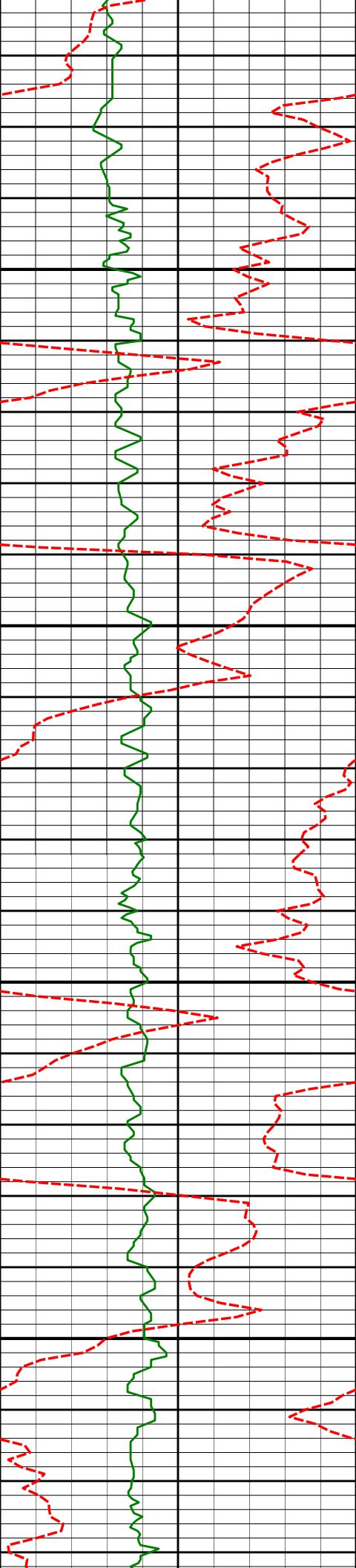
1525'

0.81°

259.53°

1524.93'

-1.75'



1617'

2.22°

202.22°

1616.90'

-3.51'

1650

1700

1708'

4.57°

189.89°

1707.74'

-8.70'

1750

1800

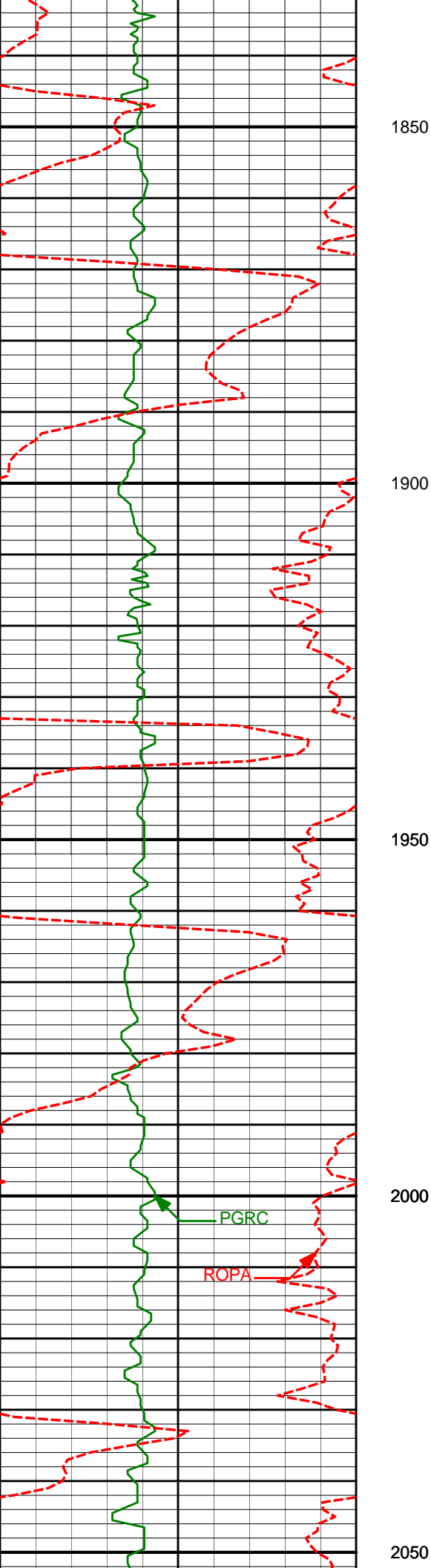
1800'

6.68°

178.03°

1799.29'

-17.66'



1891'

8.53°

178.36°

1889.49'

-29.69'

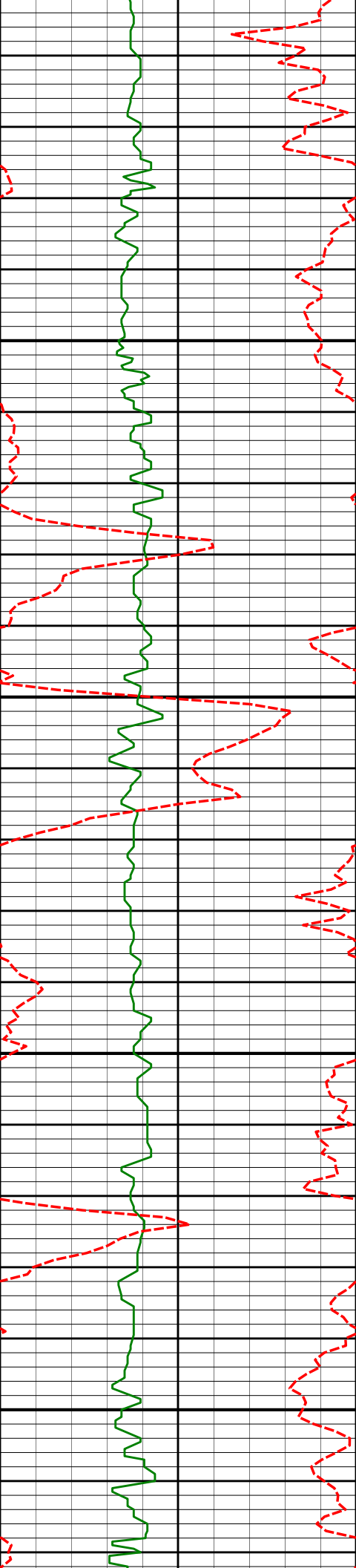
1986'

10.67°

182.83°

1983.15'

-45.52'



2081'

10.12°

181.88°

2076.59'

-62.64'

2100

2150

2176'

11.18°

179.98°

2169.96'

-80.19'

2200

2250

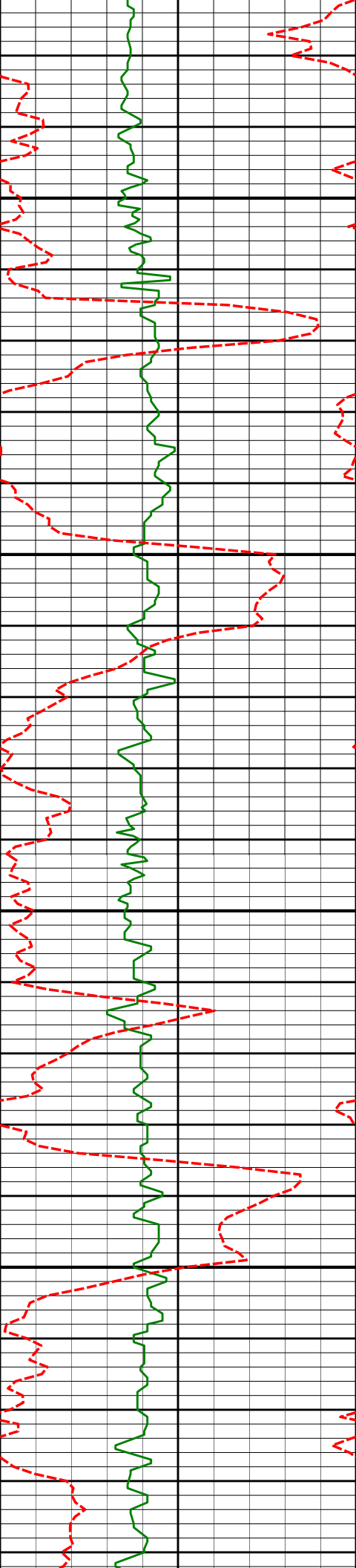
2271'

10.06°

178.00°

2263.33'

-97.69'



2300

2350

2400

2450

2366'

9.77°

182.22°

2356.91'

-114.04'

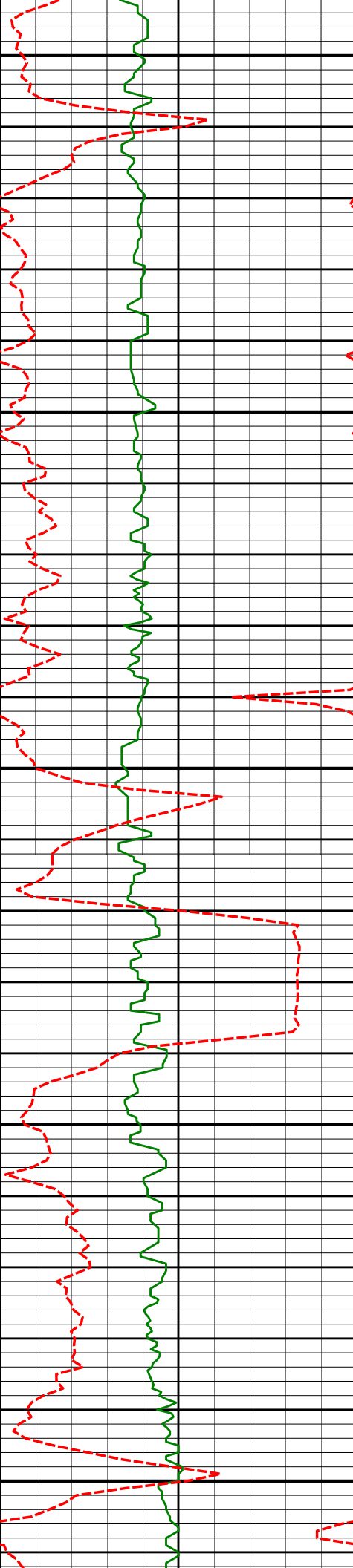
2462'

10.46°

187.57°

2451.42'

-130.81'



2500

2550

2600

2650

2700

2557'

8.65°

187.51°

2545.10'

-146.42'

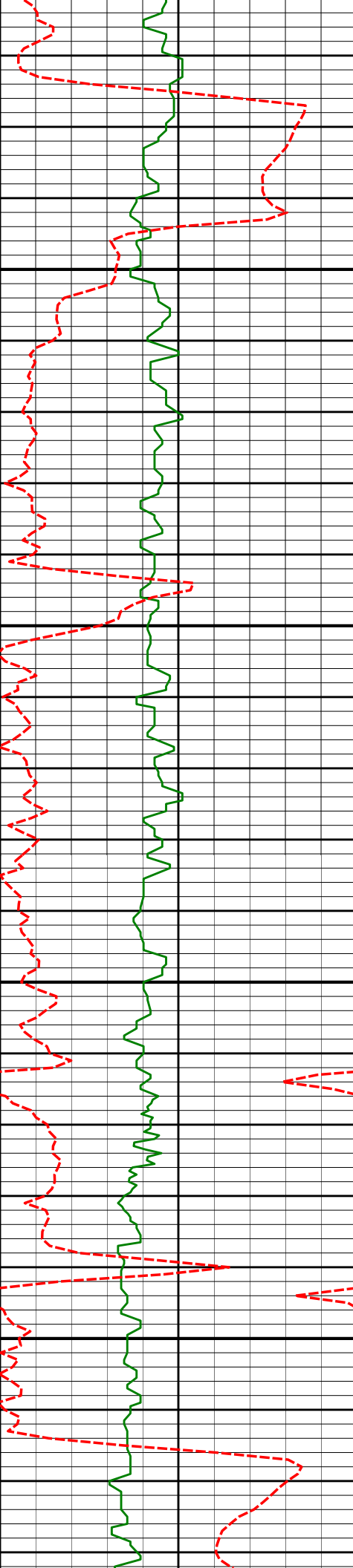
2652'

9.18°

182.25°

2638.95'

-161.06'



2750

2800

2850

2900

2747'

10.17°

181.18°

2732.60'

-177.02'

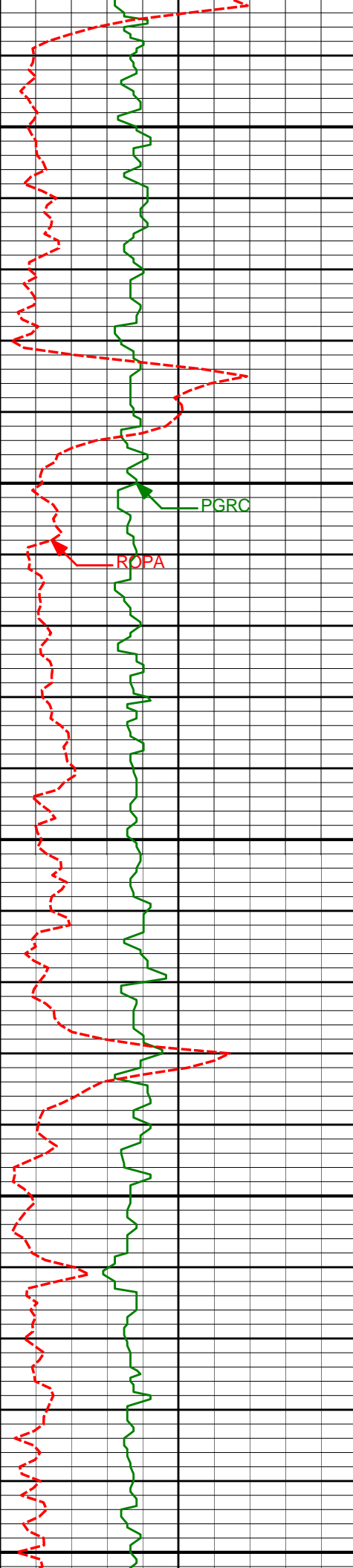
2842'

8.66°

181.10°

2826.32'

-192.55'



2950

3000

3050

3100

3150

2937'

10.64°

180.68°

2919.97'

-208.47'

3032'

10.74°

181.58°

3013.32'

-226.09'

3127'

10.24°

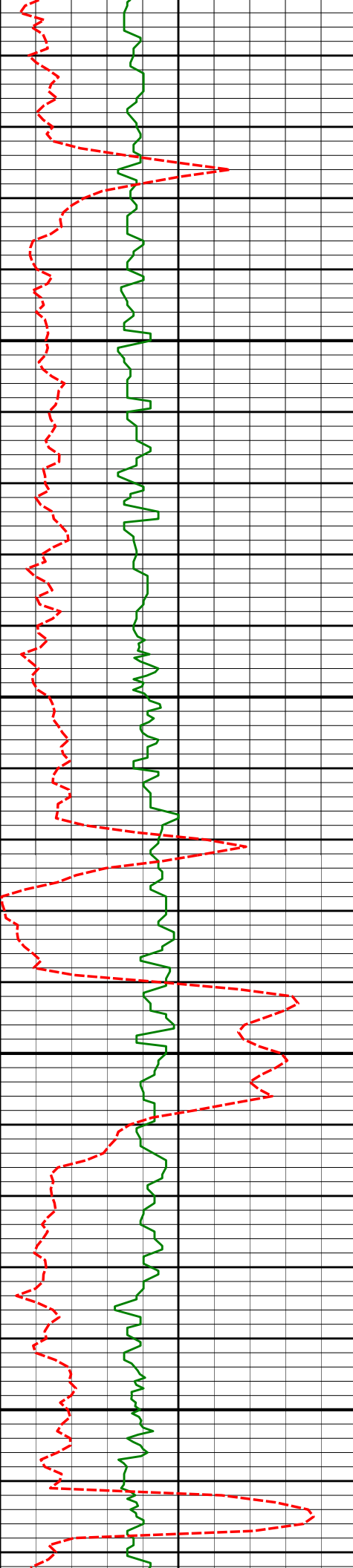
181.43°

3106.73'

-243.37'

PGRC

ROPA



3200

3250

3300

3350

3222'

9.14°

177.98°

3200.38'

-259.35'

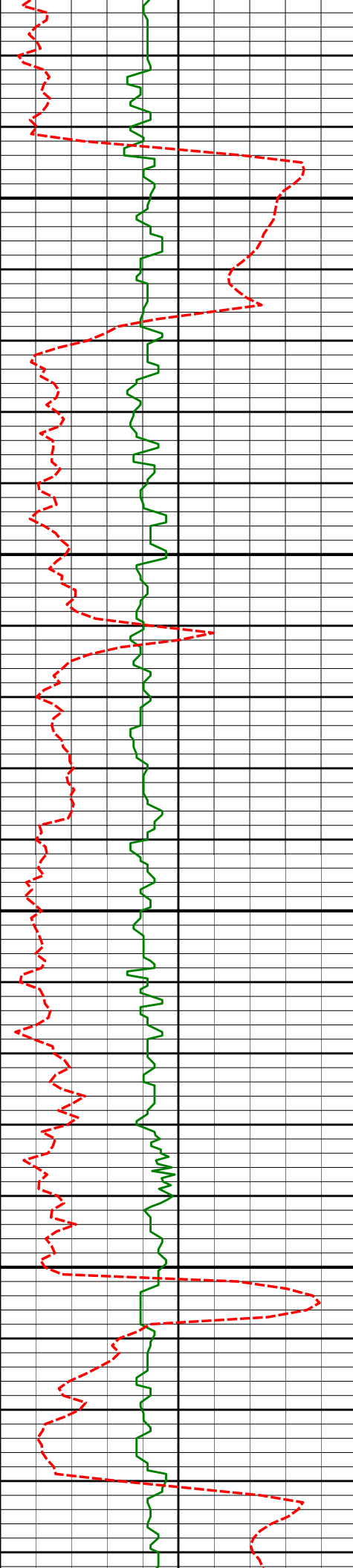
3318'

9.02°

176.52°

3295.17'

-274.49'



3400

3413'

10.91°

185.61°

3388.74'

-290.87'

3450

3500

3508'

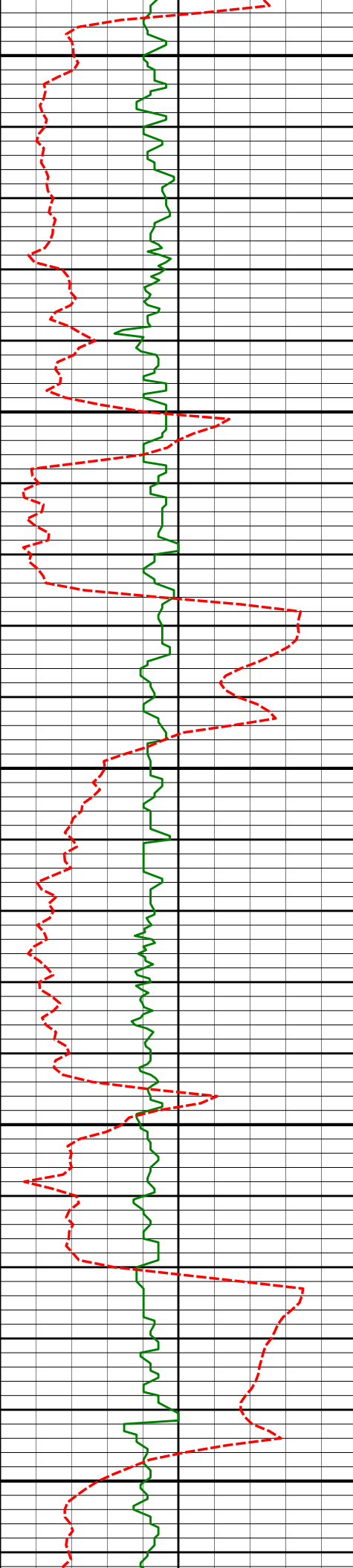
9.56°

188.86°

3482.23'

-307.59'

3550



3600

3603'

9.26°

184.08°

3575.95'

-323.00'

3650

3700

3698'

9.02°

189.83°

3669.75'

-337.94'

3750

3800

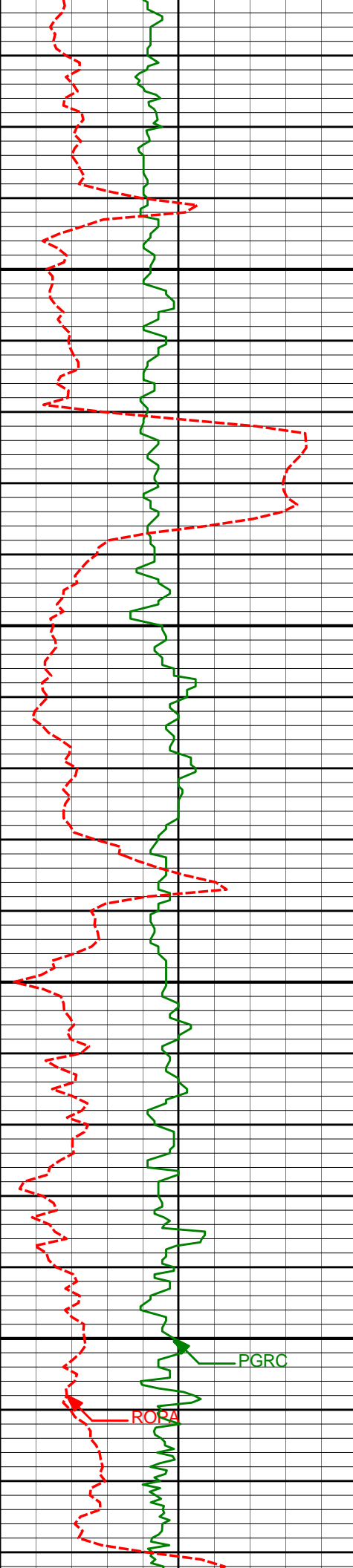
3793'

10.89°

185.34°

3763.31'

-354.20'



3850

3900

3950

4000

PGRC

ROPA

3888'

10.37°

180.60°

3856.68'

-371.68'

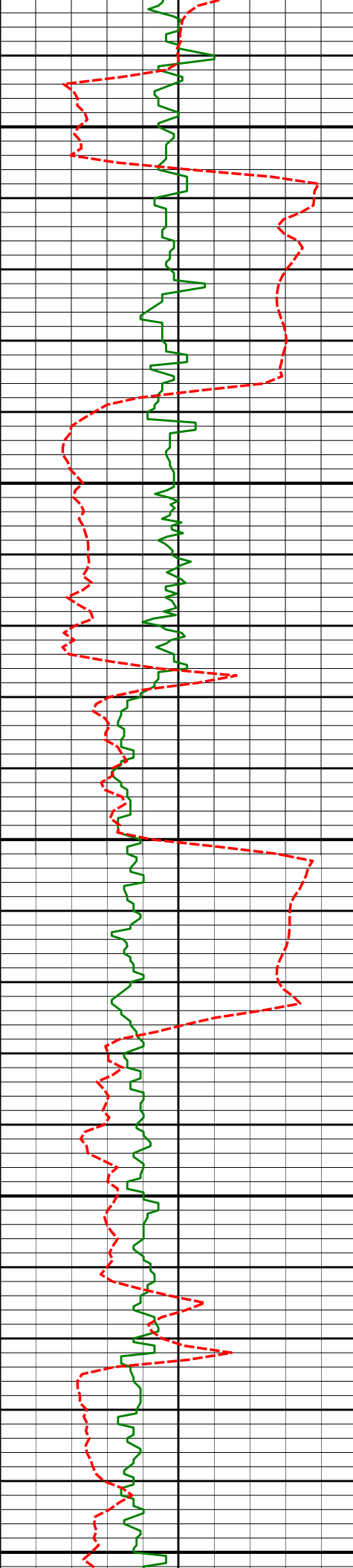
3983'

8.53°

178.91°

3950.39'

-387.27'



4050

4079'

9.20°

181.40°

4045.24'

-402.06'

4100

4150

4174'

11.42°

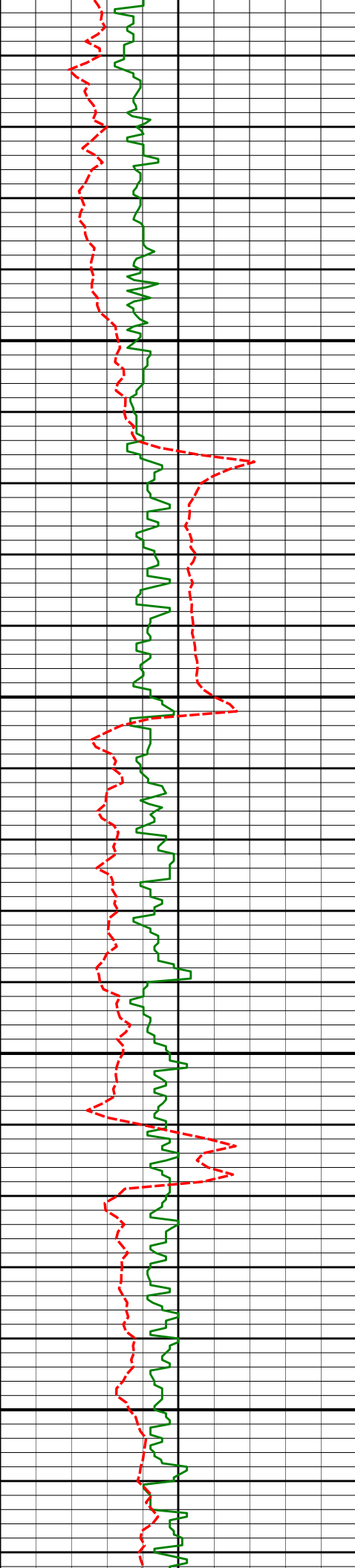
185.60°

4138.71'

-419.01'

4200

4250



4269'

11.83°

186.35°

4231.76'

-438.03'

4300

4350

4364'

11.22°

187.13°

4324.84'

-456.86'

4400

4450

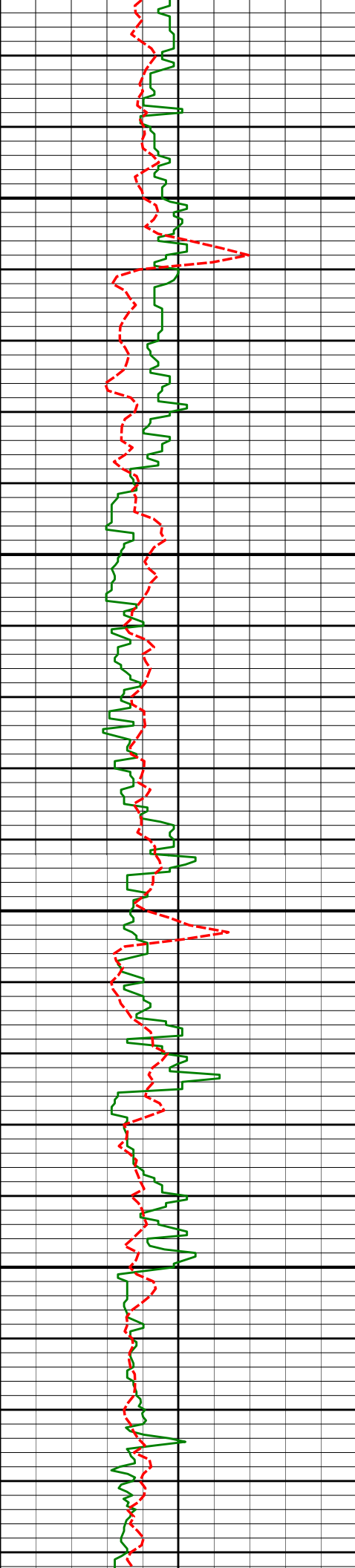
4459'

9.92°

185.99°

4418.23'

-474.15'



4500

4550

4600

4650

4554'

8.68°

185.24°

4511.98'

-489.41'

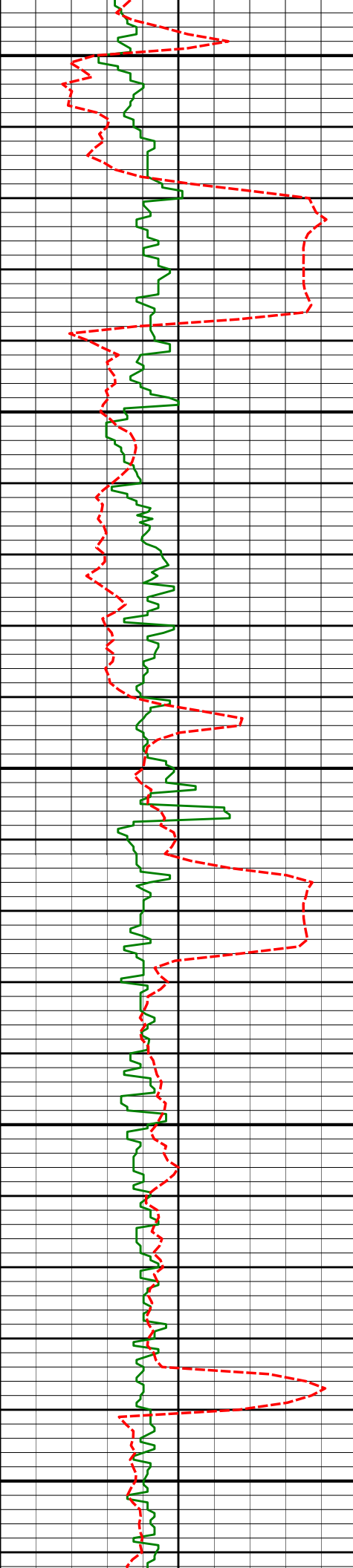
4650'

7.76°

187.20°

4606.99'

-503.05'



4700

4745'

7.44°

181.49°

4701.16'

-515.55'

4750

4800

4840'

8.34°

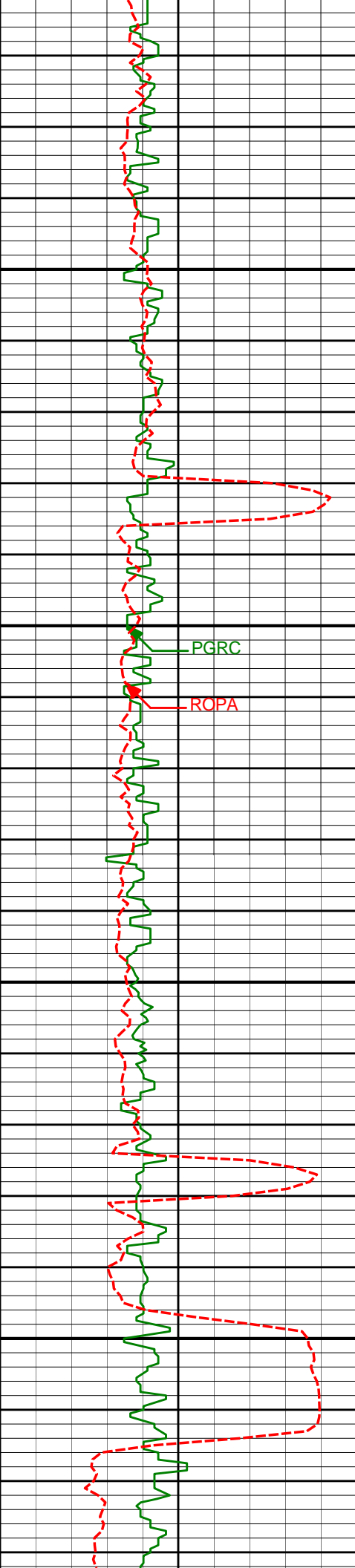
173.51°

4795.26'

-528.55'

4850

4900



4950

5000

5050

5100

4935'

8.11°

177.32°

4889.28'

-542.10'

5030'

7.38°

180.51°

4983.42'

-554.89'

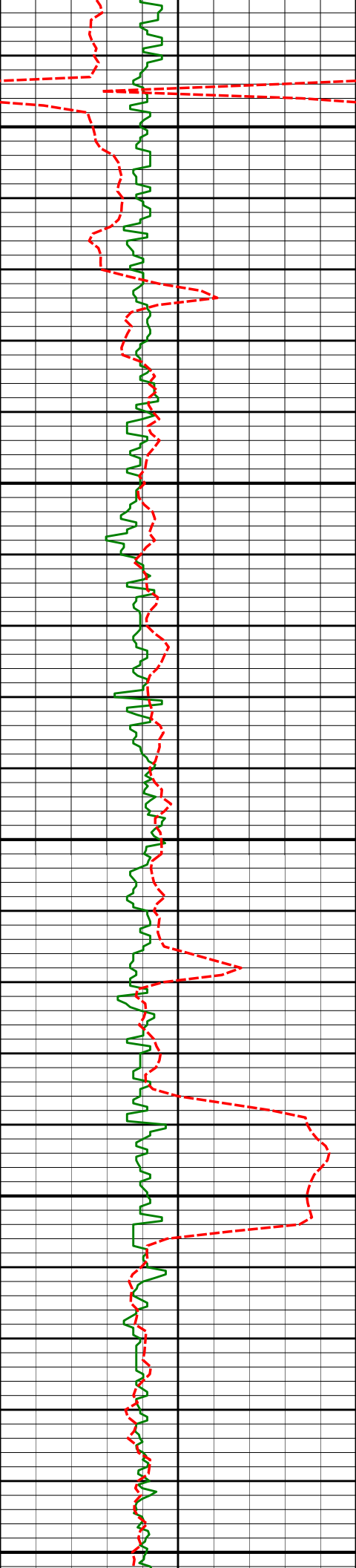
5125'

8.47°

178.22°

5077.51'

-567.99'



5150

5200

5250

5300

5350

5220'

7.40°

184.53°

5171.60'

-581.08'

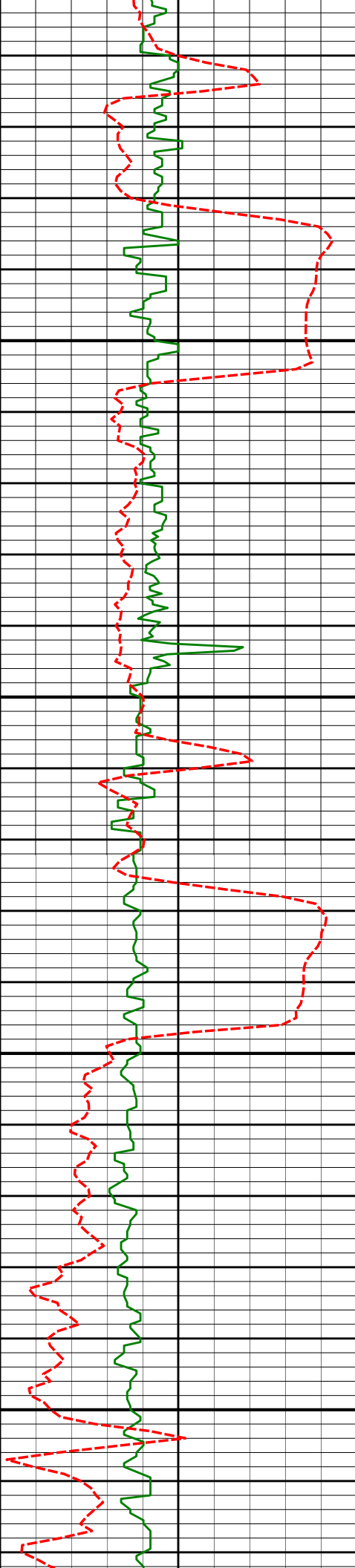
5315'

5.86°

177.03°

5265.96'

-592.02'



5400

5410'

2.34°

177.90°

5360.70'

-598.80'

5450

5500

5506'

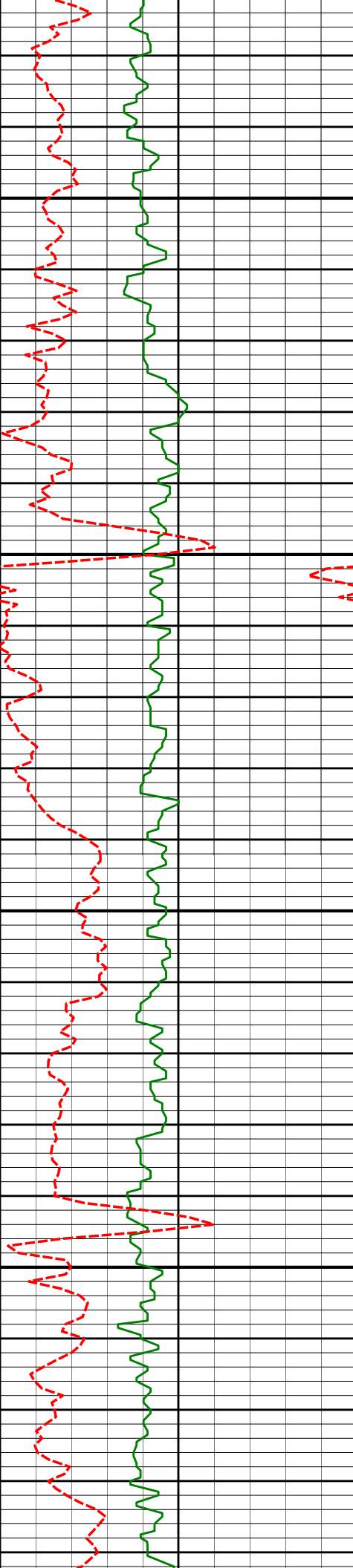
0.32°

222.14°

5456.67'

-600.96'

5550



5600

5650

5700

5750

5696'

0.54°

263.05°

5646.67'

-601.45'

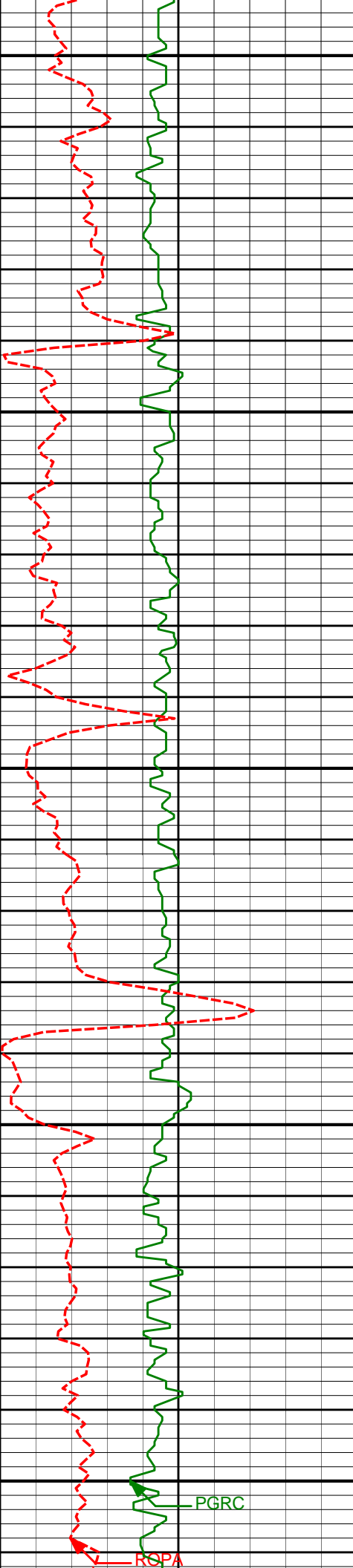
5791'

0.62°

266.54°

5741.66'

-601.53'



5800

5850

5900

5950

6000

PGRC

RQPA

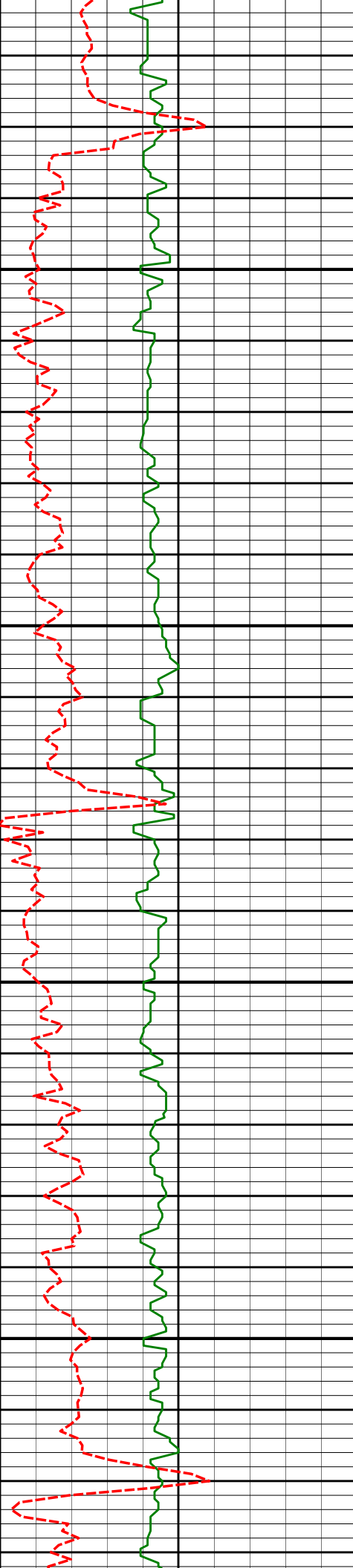
5981'

0.28°

266.08°

5931.66'

-601.61'



6050

6076'

0.40°

171.98°

6026.66'

-601.95'

6100

6150

6171'

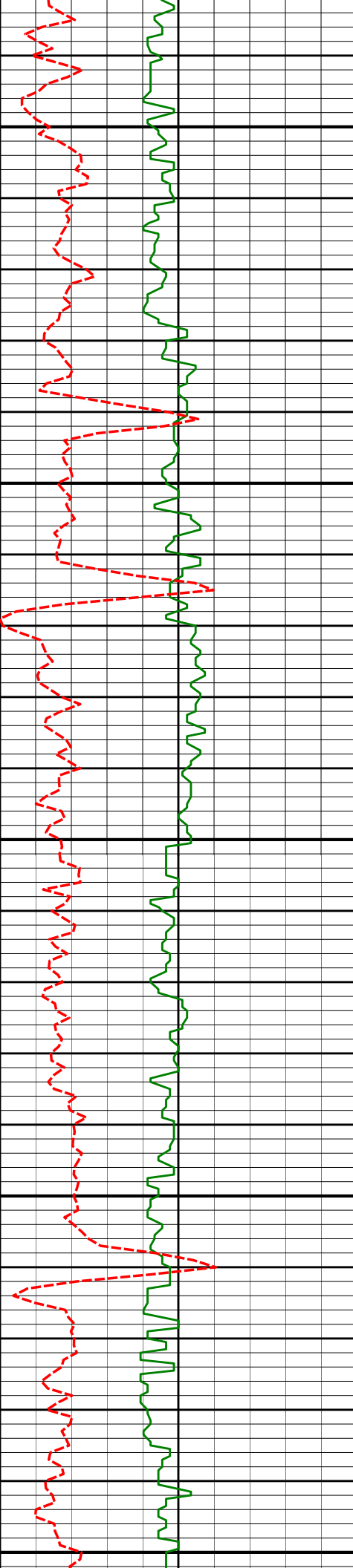
0.37°

178.11°

6121.65'

-602.59'

6200



6250

6266'

0.48°

153.04°

6216.65'

-603.25'

6300

6350

6361'

0.72°

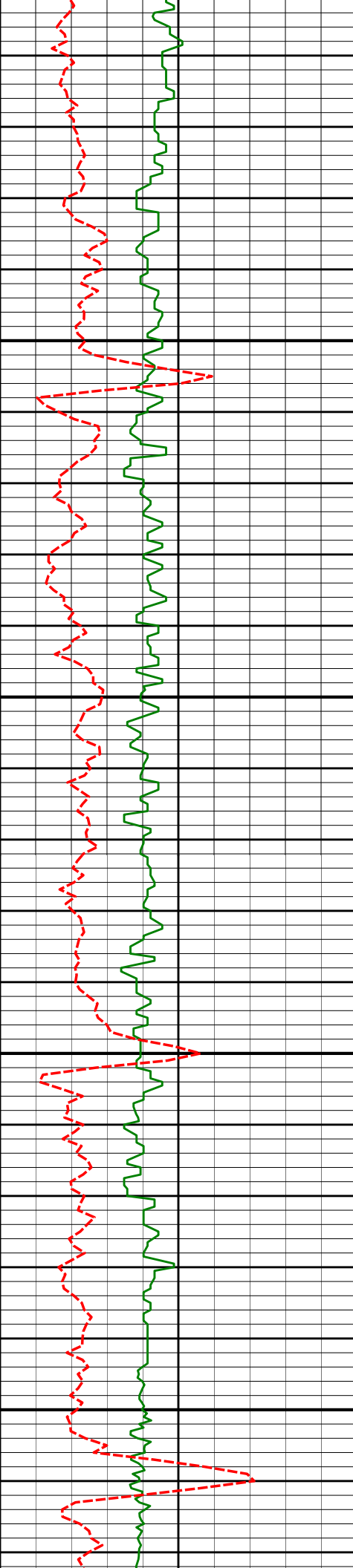
149.41°

6311.65'

-604.12'

6400

6450



6500

6550

6600

6650

6456'

0.72°

151.68°

6406.64'

-605.17'

6552'

1.00°

158.65°

6502.63'

-606.48'

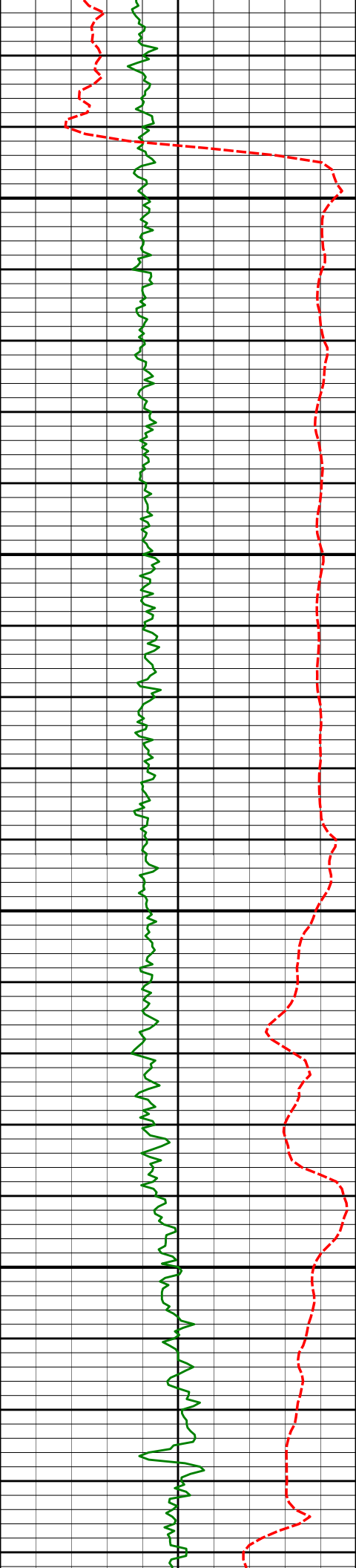
6647'

0.94°

154.97°

6597.62'

-607.97'

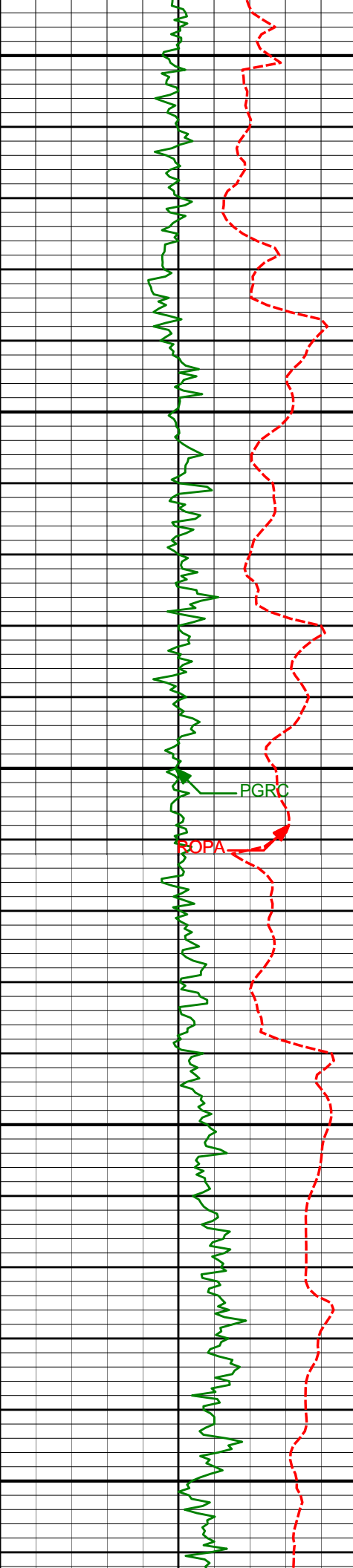


KOP

6750

6800

6850



6900

6932'

17.86°

2.37°

6877.33'

-564.40'

6950

6980'

21.63°

359.73°

6922.50'

-548.20'

7000

FGRC

ROPA

7027'

26.01°

356.23°

6965.49'

-529.23'

7050

7075'

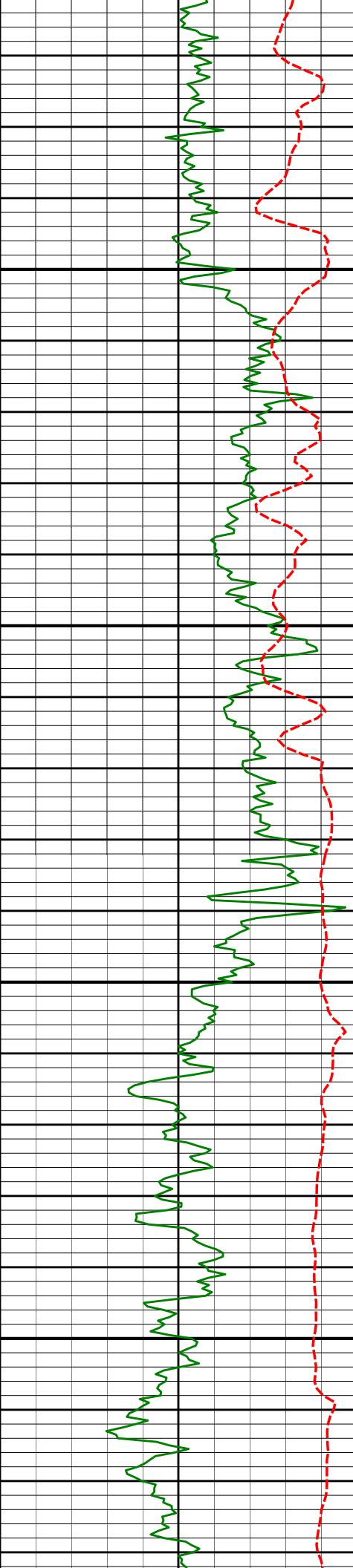
30.71°

355.28°

7007.71'

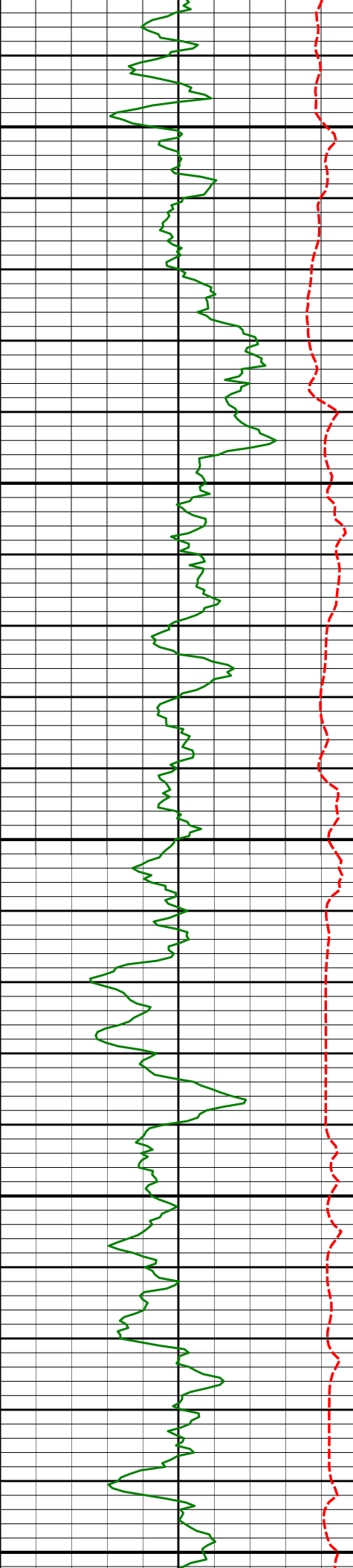
-506.49'

7100



	7122'	35.81°	354.24°	7047.00'	-480.81'
7150					
	7170'	39.90°	353.83°	7084.89'	-451.50'
7200					
	7218'	43.72°	356.72°	7120.67'	-419.60'
7250					
	7266'	50.16°	357.59°	7153.42'	-384.58'
7300					
	7313'	56.02°	358.28°	7181.64'	-347.03'

Run 300



7350

7361'

62.98°

358.31°

7205.99'

-305.70'

7400

7408'

68.63°

359.58°

7225.24'

-262.85'

7450

7456'

74.06°

1.58°

7240.59'

-217.40'

7500

7503'

78.23°

3.25°

7251.84'

-171.84'

7550

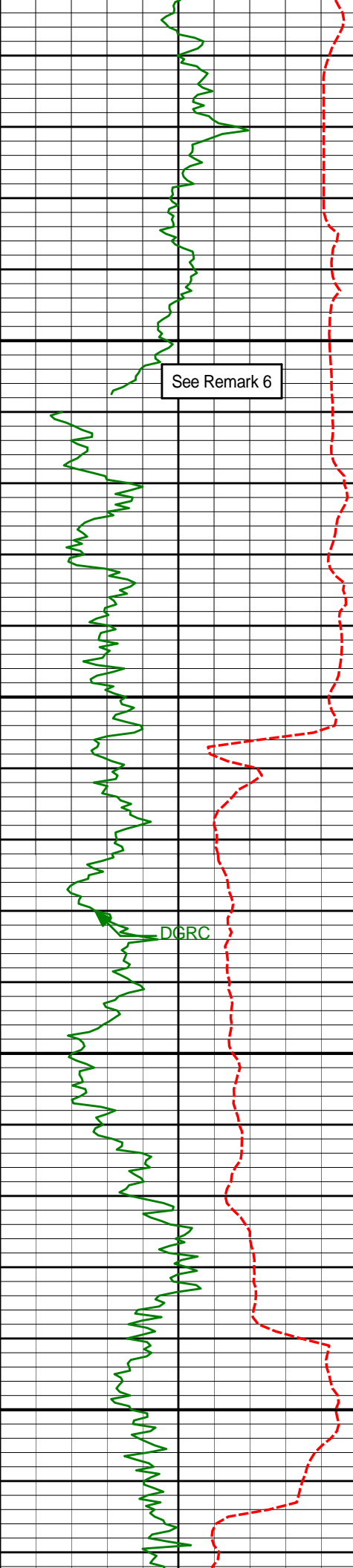
7551'

81.18°

3.23°

7260.42'

-124.72'



See Remark 6

DGRC

7600

7650

7700

7750

7598'

84.94°

4.66°

7266.10'

-78.21'

7612'

85.43°

4.75°

7267.27'

-64.32'

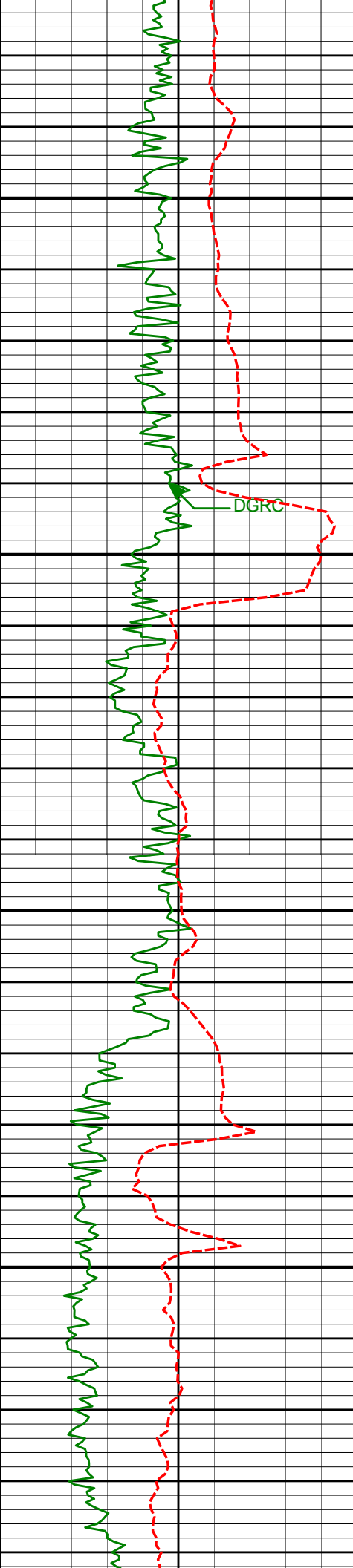
7691'

90.25°

4.76°

7270.25'

14.27'



7800

7850

7900

7950

7786'

90.99°

1.78°

7269.22'

109.05'

7881'

91.73°

359.14°

7266.97'

204.00'

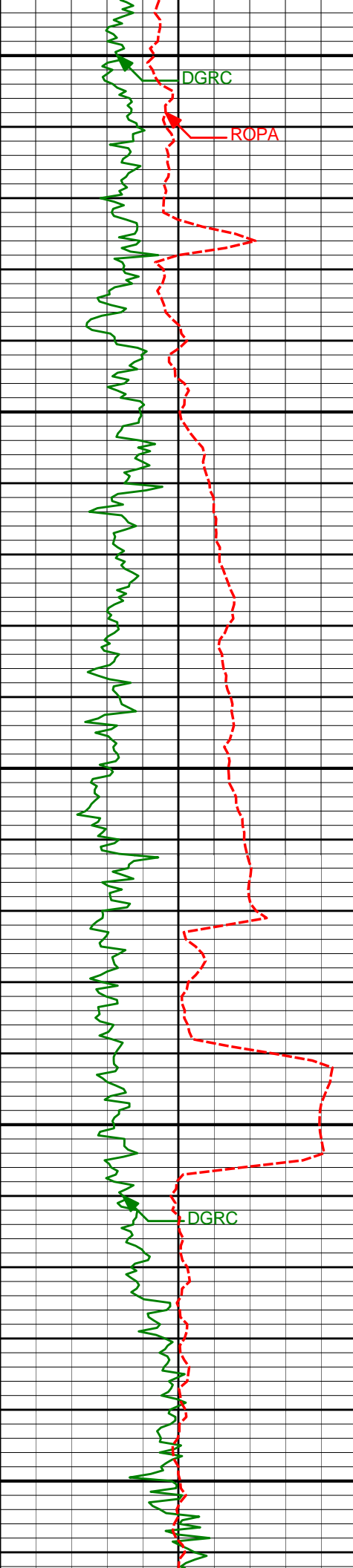
7976'

92.04°

358.87°

7263.84'

298.95'



8000

DGRC

ROPA

8050

8071'

92.47°

358.70°

7260.10'

393.87'

8100

8150

DGRC

8166'

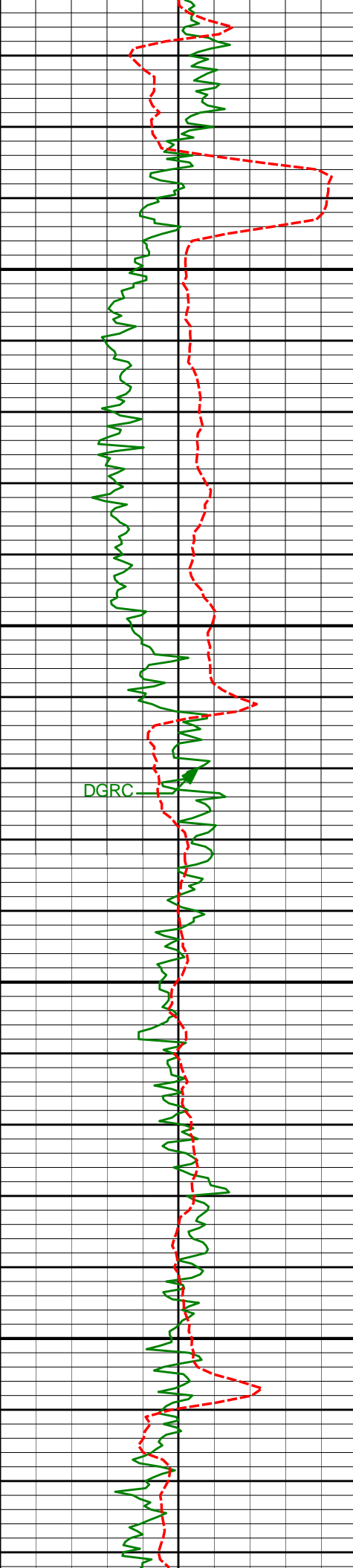
90.93°

358.52°

7257.29'

488.81'

8200



8250

8300

8350

8400

DGRC

8261'

89.75°

358.47°

7256.72'

583.79'

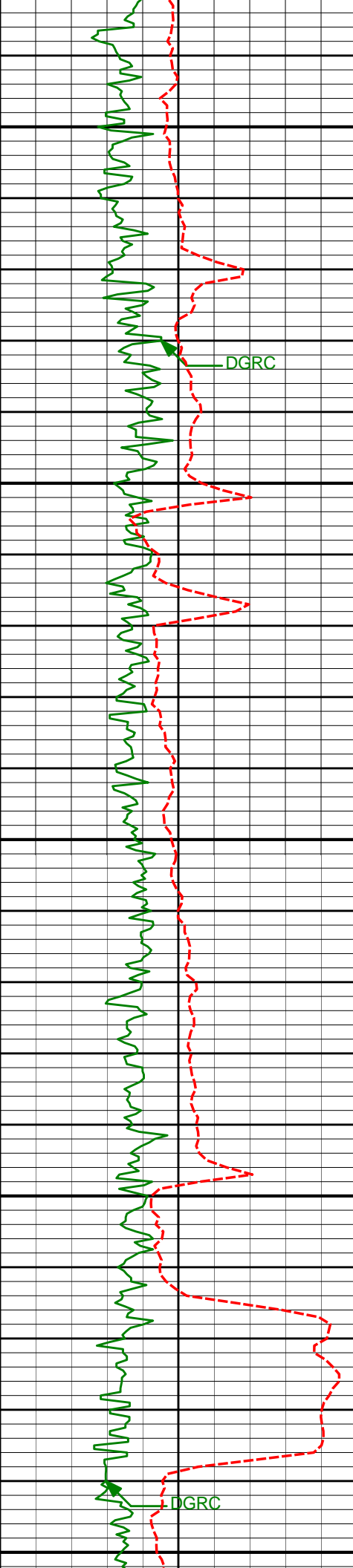
8356'

89.94°

357.91°

7256.98'

678.77'



8450

8452'

90.19°

357.18°

7256.87'

774.71'

8500

8550

8547'

90.19°

355.96°

7256.56'

869.58'

8600

8650

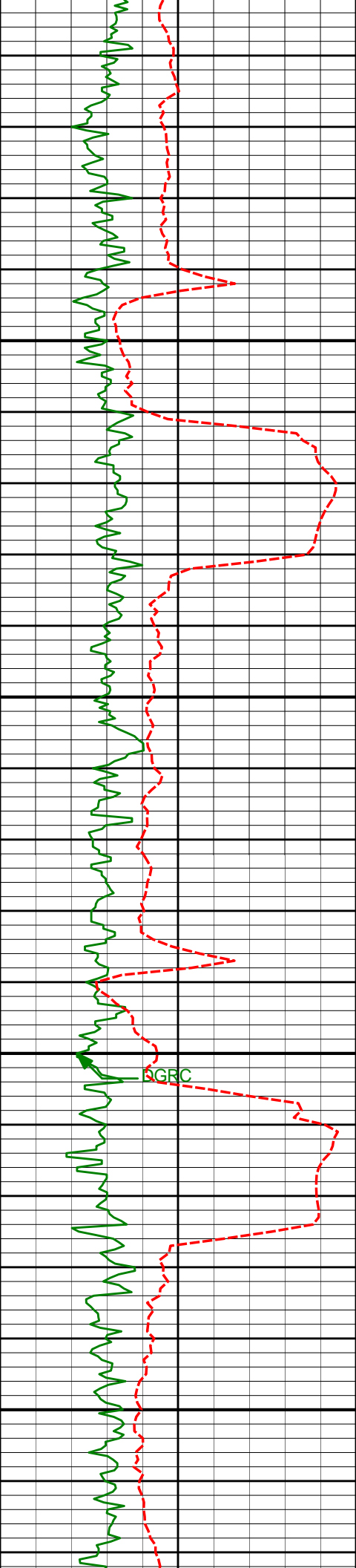
8642'

90.25°

357.11°

7256.19'

964.45'



8700

8737'

90.31°

358.86°

7255.73'

1059.41'

8750

8800

SGRC

8832'

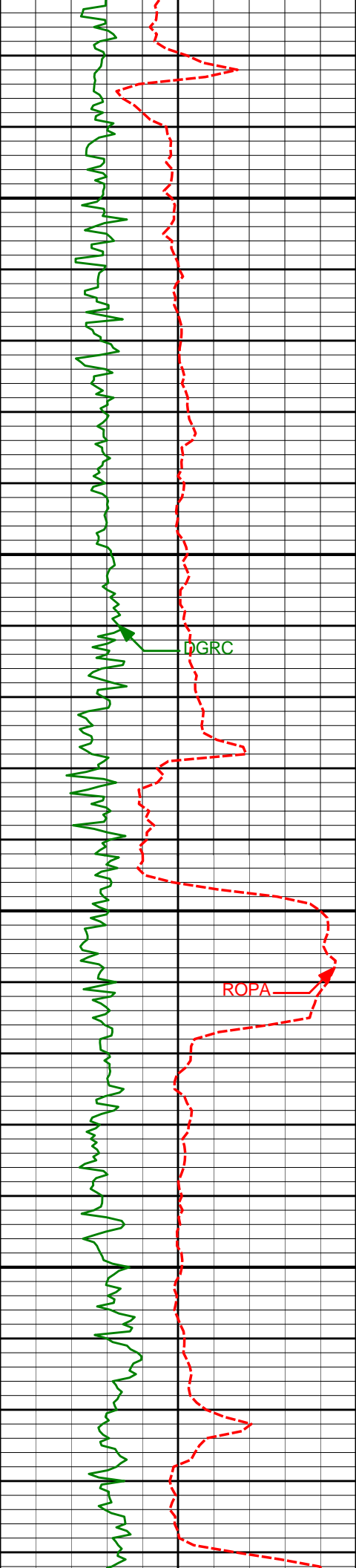
89.07°

359.87°

7256.24'

1154.41'

8850



8900

8927'

89.26°

357.65°

7257.63'

1249.38'

8950

DGRC

9000

ROPA

9022'

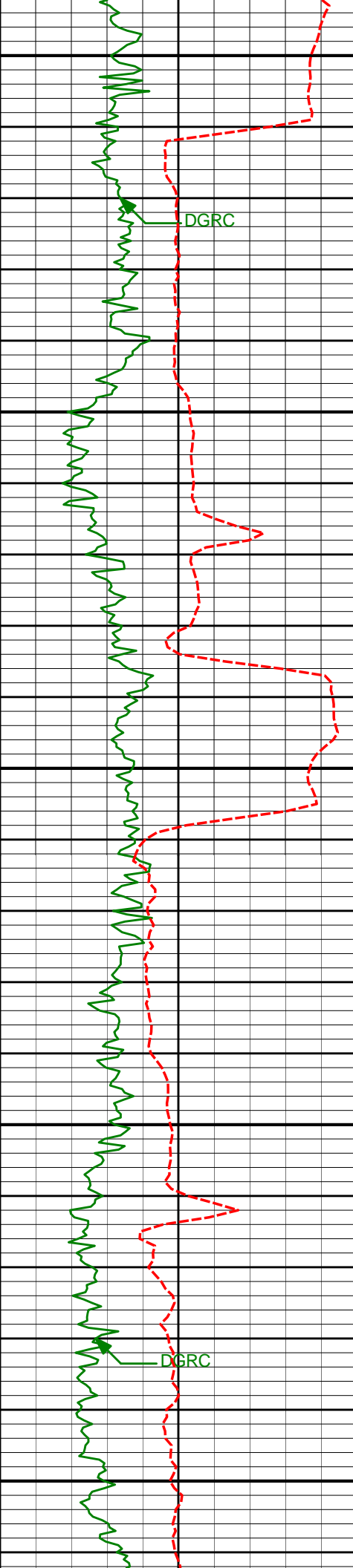
89.01°

357.95°

7259.06'

1344.33'

9050



9100

9117'

88.33°

359.75°

7261.27'

1439.29'

DGRC

9150

9200

9212'

89.07°

1.16°

7263.42'

1534.25'

9250

DGRC

9300

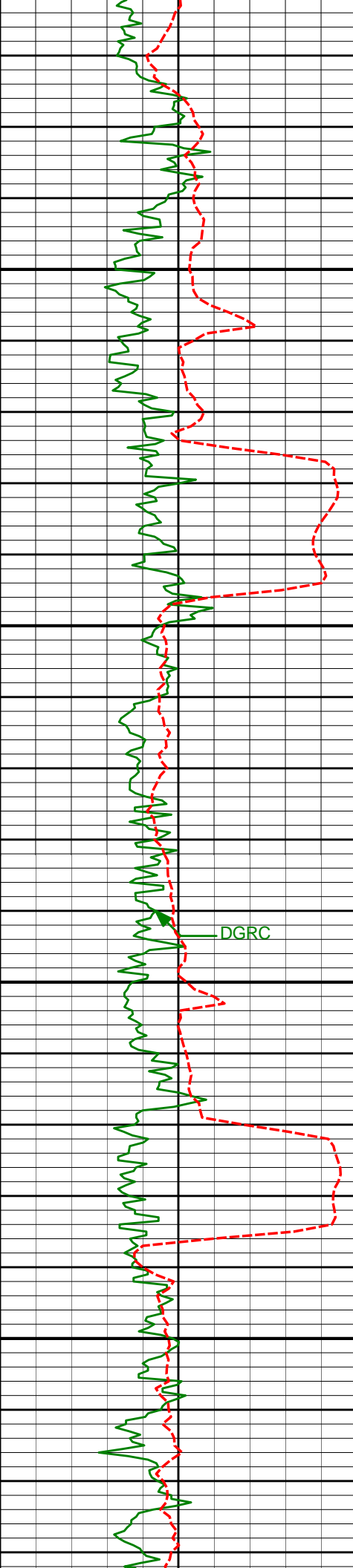
9307'

89.26°

0.35°

7264.81'

1629.22'



9350

9400

9450

9500

9402'

89.38°

1.51°

7265.93'

1724.18'

DGRC

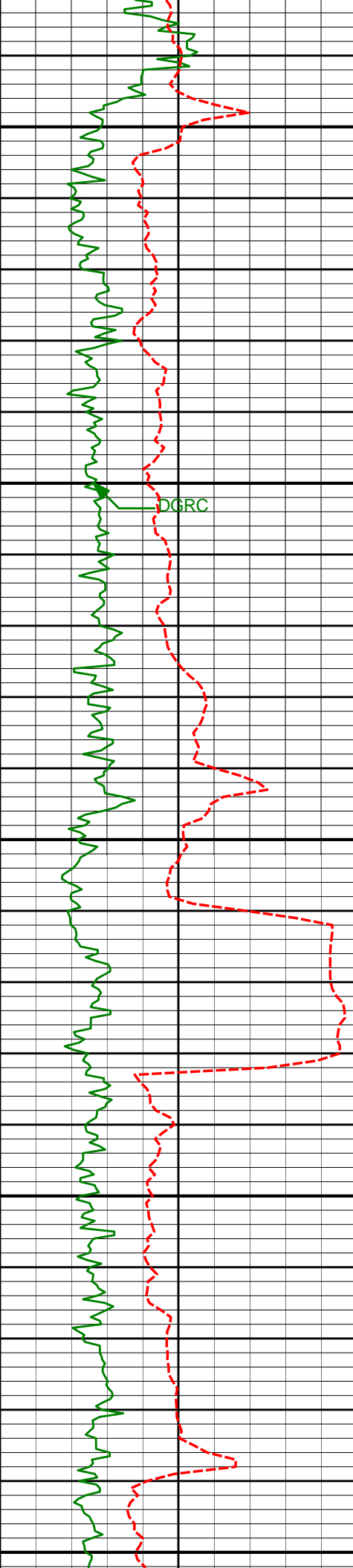
9497'

89.75°

1.80°

7266.65'

1819.11'



9550

9592'

88.70°

0.67°

7267.94'

1914.06'

9600

9650

9688'

90.86°

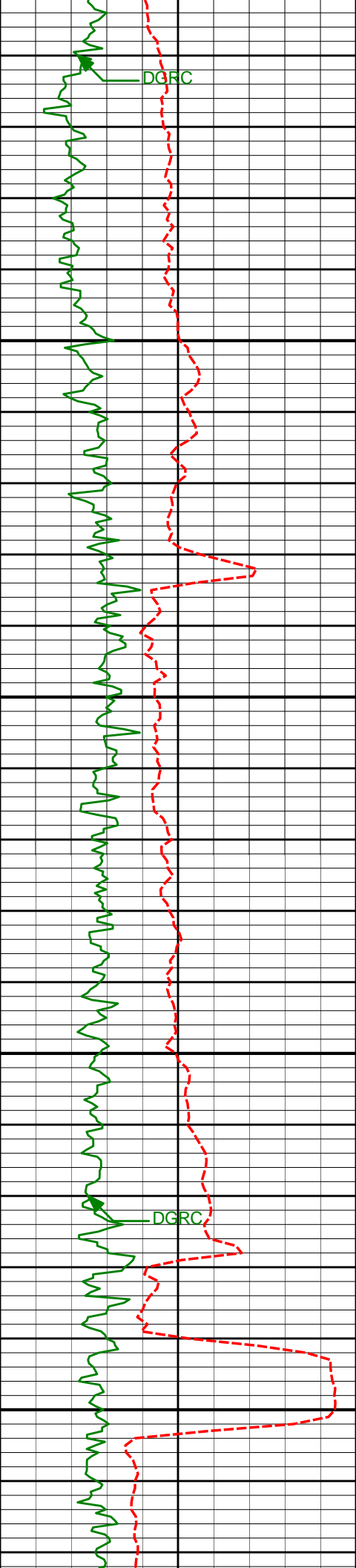
0.53°

7268.31'

2010.03'

9700

9750



9800

9850

9900

9950

9783'

92.47°

0.56°

7265.55'

2104.98'

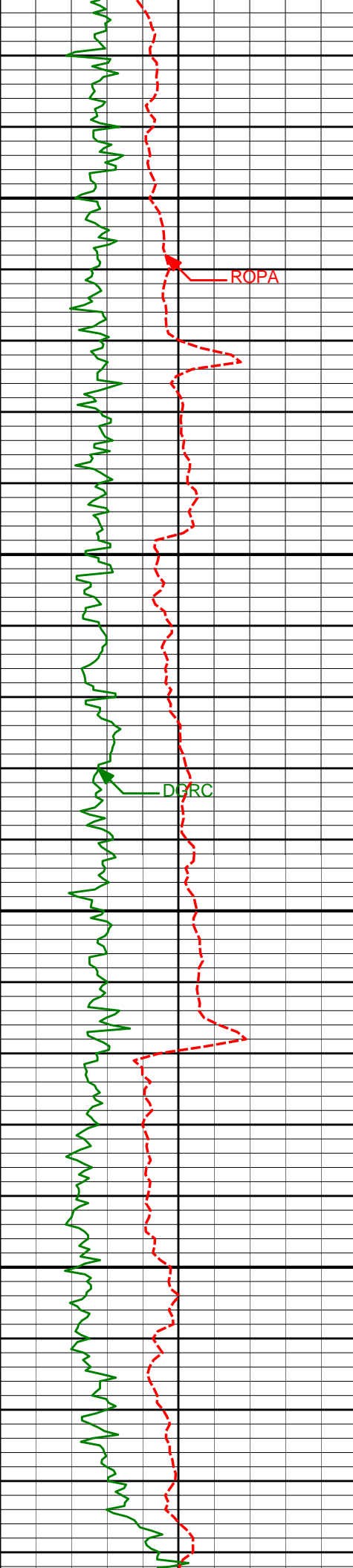
9878'

93.09°

359.34°

7260.94'

2199.86'



10000

10050

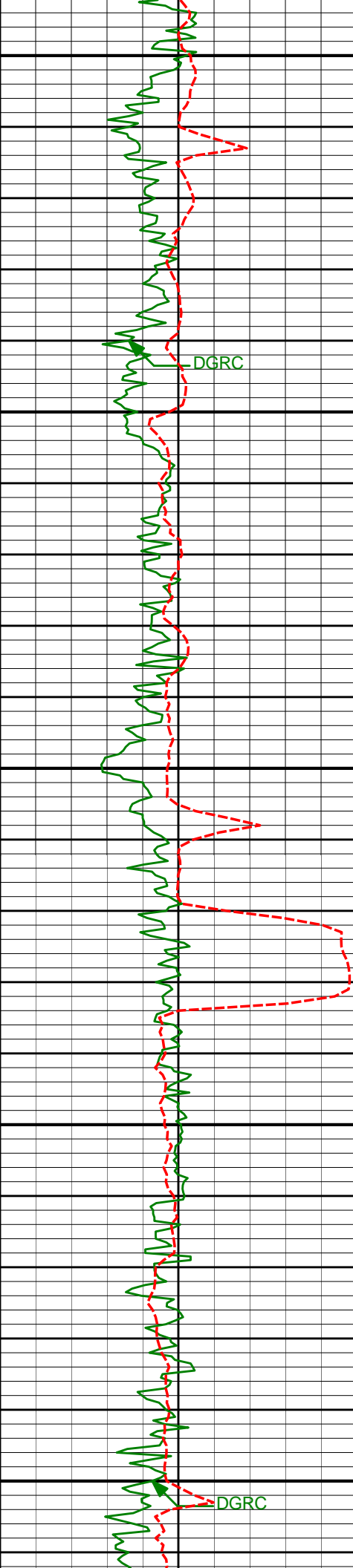
10100

10150

ROPA

DGRC

9973'	91.05°	359.35°	7257.51'	2294.79'
10068'	89.32°	358.58°	7257.20'	2389.78'
10163'	89.69°	358.31°	7258.02'	2484.76'



10200

10250

10300

10350

10400

DGRC

DGRC

10258'

90.93°

357.41°

7257.51'

2579.72'

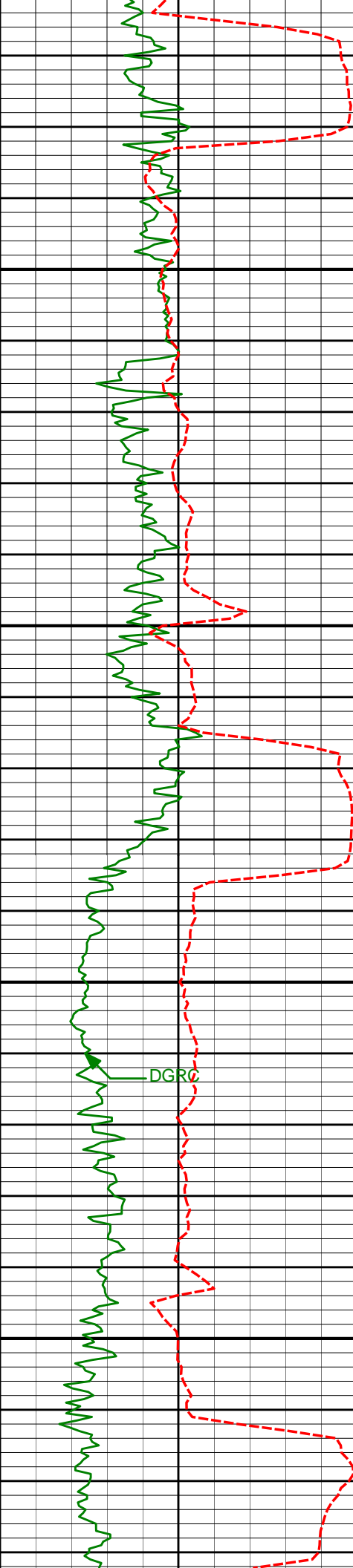
10353'

90.56°

358.14°

7256.27'

2674.66'



10450

10500

10550

10600

10448'

89.26°

358.31°

7256.42'

2769.64'

10543'

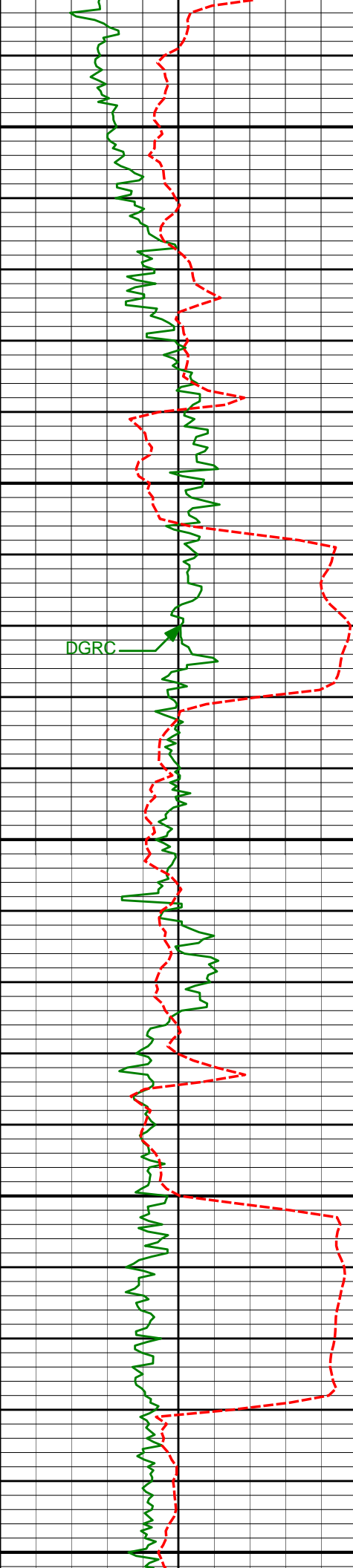
88.02°

359.26°

7258.68'

2864.60'

DGRC



10650

10700

10750

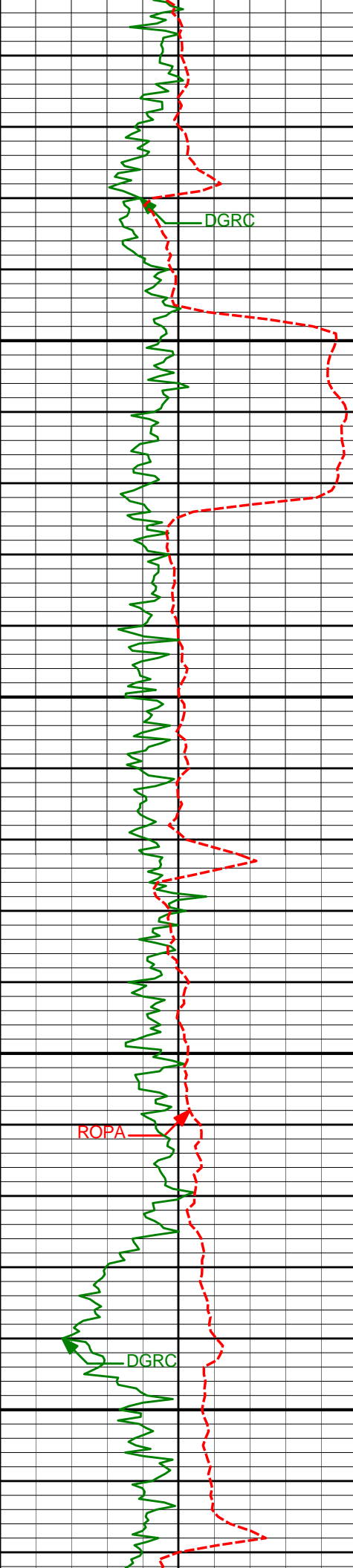
10800

10850

10639'	89.38°	359.27°	7260.85'	2960.57'
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10734'	89.81°	359.74°	7261.53'	3055.57'
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10829'	90.68°	0.80°	7261.12'	3150.56'
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10900

10950

11000

11050

10924'

89.81°

2.18°

7260.71'

3245.50'

11019'

90.06°

1.12°

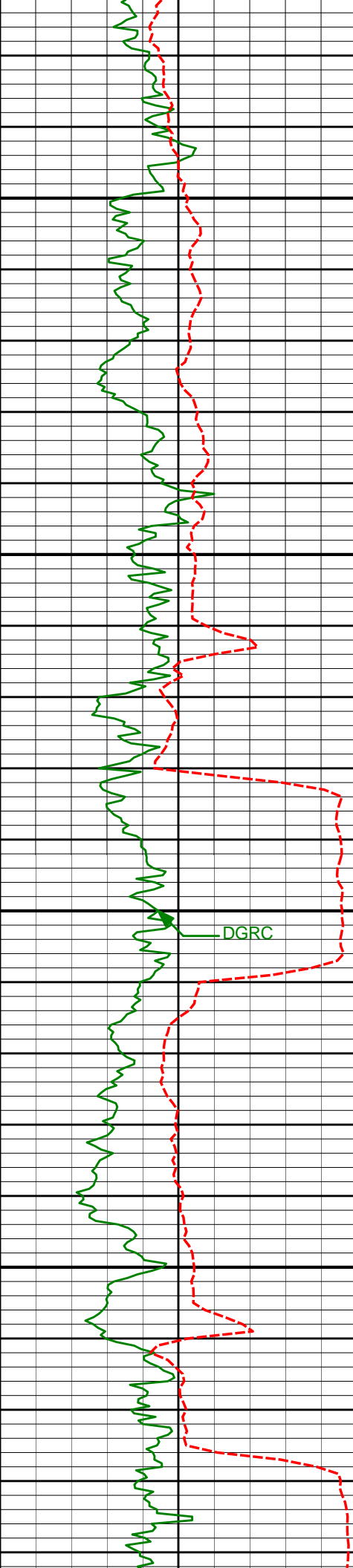
7260.82'

3340.43'

DGRC

ROPA

DGRC



11100

11114'

89.32°

359.63°

7261.34'

3435.42'

11150

11200

11209'

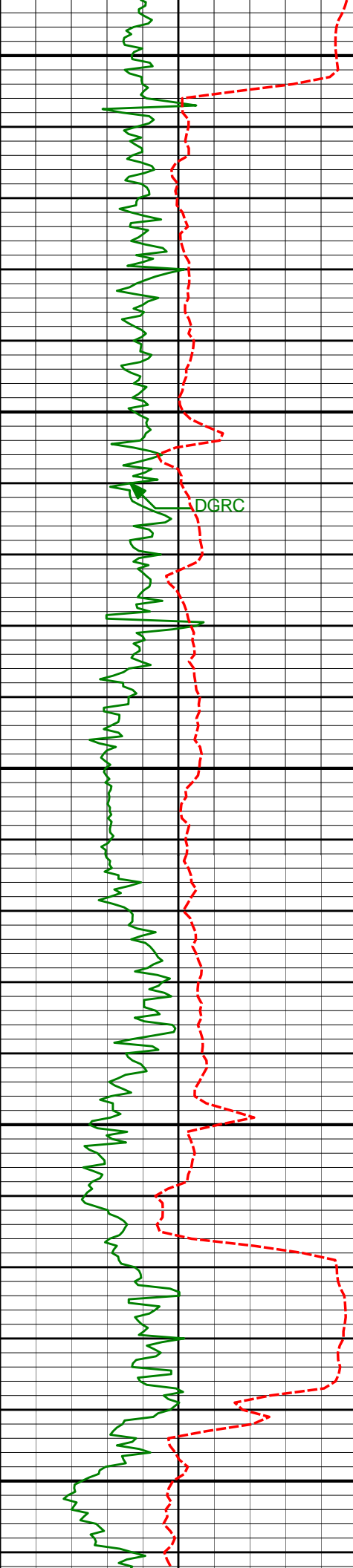
90.25°

359.80°

7261.69'

3530.41'

11250



11300

11304'

91.05°

1.56°

7260.61'

3625.38'

11350

DGRC

11400

11399'

90.99°

0.30°

7258.92'

3720.34'

11450

11500

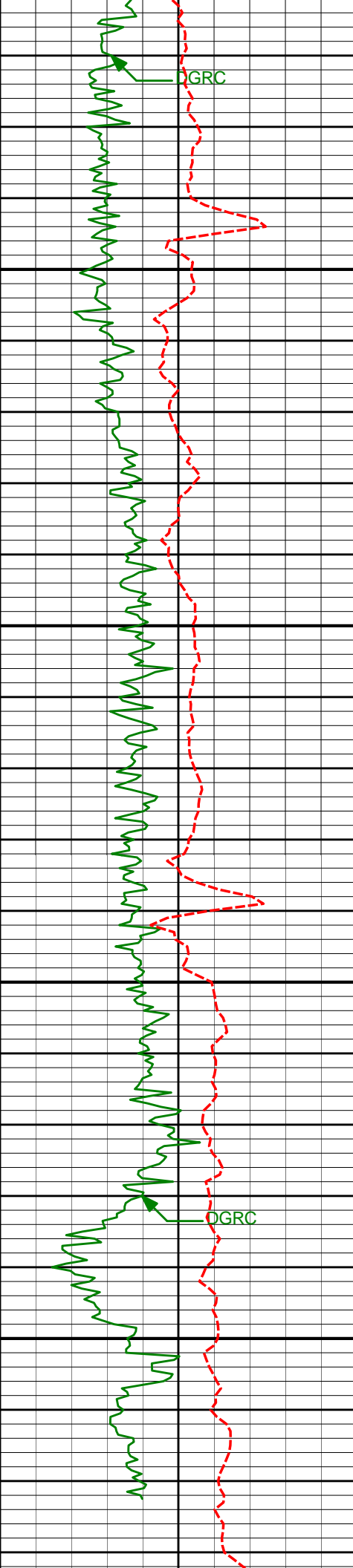
11494'

90.93°

1.40°

7257.33'

3815.30'



11550

11600

11650

11700

11589'

91.24°

0.29°

7255.53'

3910.25'

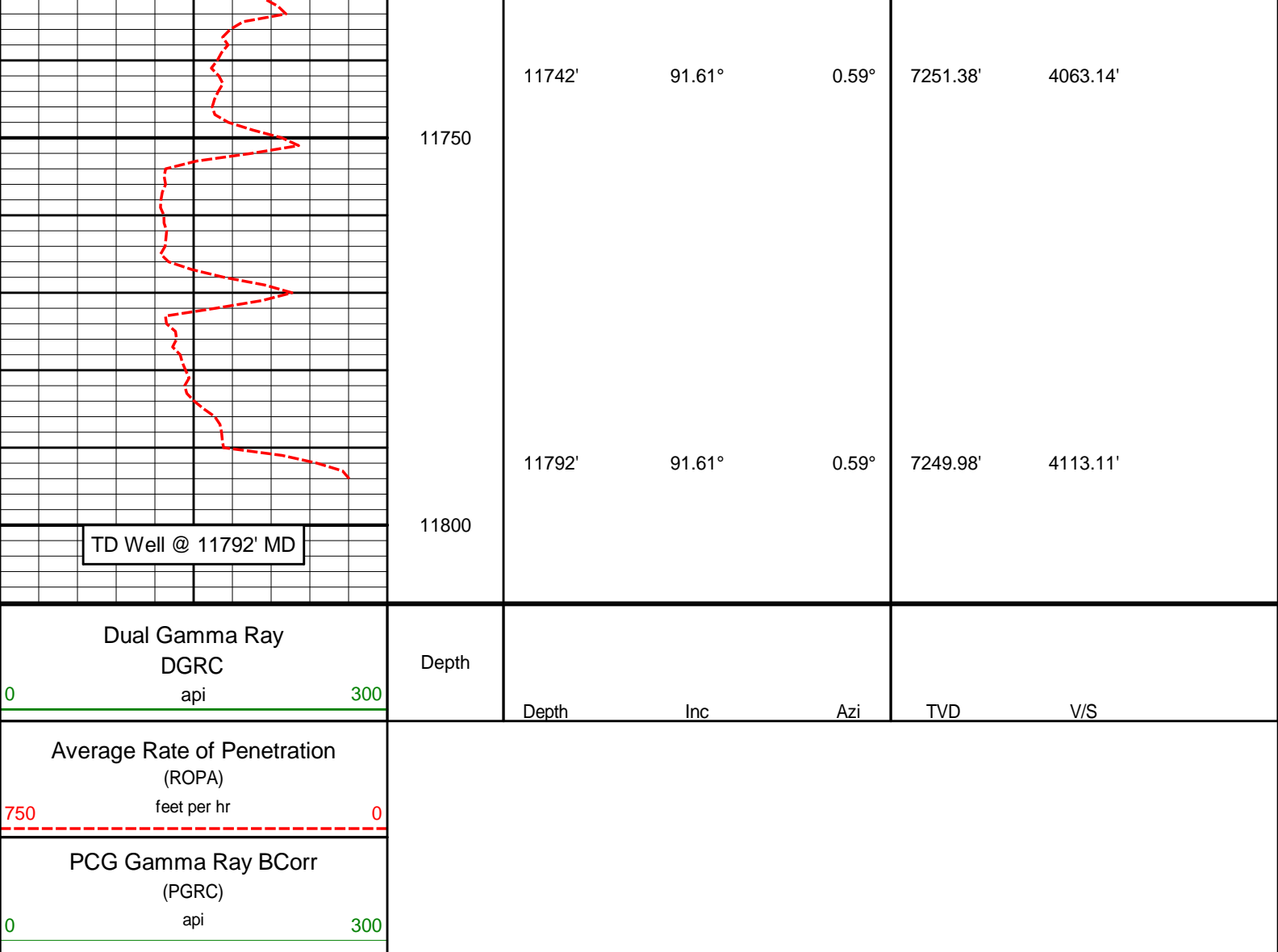
11684'

91.73°

1.75°

7253.07'

4005.19'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corp
USA Fed 03N-36HZ
Wattenburg
Weld Colorado
USA
CA-XX-0900512977

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
142.00	0.24	312.39	142.00	0.20 N	0.22 W	0.20	0.17
236.00	0.32	196.55	236.00	0.08 N	0.44 W	0.09	0.51
329.00	0.17	304.20	329.00	0.09 S	0.63 W	-0.08	0.44
360.00	0.24	282.23	360.00	0.05 S	0.73 W	-0.04	0.34
451.00	0.62	250.29	451.00	0.18 S	1.38 W	-0.16	0.48
545.00	0.58	236.16	544.99	0.61 S	2.25 W	-0.59	0.16
638.00	0.36	256.24	637.99	0.94 S	2.93 W	-0.92	0.29
731.00	0.54	247.46	730.98	1.18 S	3.62 W	-1.15	0.21
825.00	0.56	244.05	824.98	1.55 S	4.44 W	-1.52	0.04
912.00	0.29	260.14	911.98	1.78 S	5.04 W	-1.73	0.34
975.00	0.55	263.16	974.98	1.84 S	5.50 W	-1.79	0.41
1066.00	0.55	270.51	1065.97	1.89 S	6.37 W	-1.83	0.08
1158.00	0.67	274.56	1157.97	1.84 S	7.34 W	-1.78	0.14
1250.00	0.68	267.28	1249.96	1.82 S	8.42 W	-1.75	0.09

	1341.00	0.77	273.68	1340.95	1.81 S	9.57 W	-1.73	0.13
	1433.00	0.88	271.47	1432.94	1.75 S	10.90 W	-1.66	0.12
	1525.00	0.81	259.53	1524.93	1.85 S	12.24 W	-1.75	0.21
	1617.00	2.22	202.22	1616.90	3.62 S	13.56 W	-3.51	2.07
	1708.00	4.57	189.89	1707.74	8.82 S	14.85 W	-8.70	2.69
	1800.00	6.68	178.03	1799.29	17.78 S	15.29 W	-17.66	2.61
	1891.00	8.53	178.36	1889.49	29.82 S	14.92 W	-29.69	2.03
	1986.00	10.67	182.83	1983.15	45.65 S	15.15 W	-45.52	2.38
	2081.00	10.12	181.88	2076.59	62.78 S	15.86 W	-62.64	0.61
	2176.00	11.18	179.98	2169.96	80.33 S	16.13 W	-80.19	1.18
	2271.00	10.06	178.00	2263.33	97.83 S	15.83 W	-97.69	1.24
	2366.00	9.77	182.22	2356.91	114.18 S	15.86 W	-114.04	0.82
	2462.00	10.46	187.57	2451.42	130.96 S	17.32 W	-130.81	1.21
	2557.00	8.65	187.51	2545.10	146.59 S	19.39 W	-146.42	1.91
	2652.00	9.18	182.25	2638.95	161.24 S	20.62 W	-161.06	1.02
	2747.00	10.17	181.18	2732.60	177.20 S	21.09 W	-177.02	1.06
	2842.00	8.66	181.10	2826.32	192.74 S	21.40 W	-192.55	1.59
	2937.00	10.64	180.68	2919.97	208.66 S	21.64 W	-208.47	2.09
	3032.00	10.74	181.58	3013.32	226.28 S	21.99 W	-226.09	0.20
	3127.00	10.24	181.43	3106.73	243.57 S	22.45 W	-243.37	0.53
	3222.00	9.14	177.98	3200.38	259.55 S	22.39 W	-259.35	1.31
	3318.00	9.02	176.52	3295.17	274.68 S	21.67 W	-274.49	0.27
	3413.00	10.91	185.61	3388.74	291.06 S	22.09 W	-290.87	2.58
	3508.00	9.56	188.86	3482.23	307.81 S	24.19 W	-307.59	1.55
	3603.00	9.26	184.08	3575.95	323.23 S	25.95 W	-323.00	0.88
	3698.00	9.02	189.83	3669.75	338.19 S	27.76 W	-337.94	0.99
	3793.00	10.89	185.34	3763.31	354.46 S	29.87 W	-354.20	2.13
	3888.00	10.37	180.60	3856.68	371.95 S	30.79 W	-371.68	1.07
	3983.00	8.53	178.91	3950.39	387.54 S	30.75 W	-387.27	1.96
	4079.00	9.20	181.40	4045.24	402.33 S	30.80 W	-402.06	0.80
	4174.00	11.42	185.60	4138.71	419.29 S	31.90 W	-419.01	2.47
	4269.00	11.83	186.35	4231.76	438.33 S	33.90 W	-438.03	0.46
	4364.00	11.22	187.13	4324.84	457.18 S	36.12 W	-456.86	0.66
	4459.00	9.92	185.99	4418.23	474.49 S	38.12 W	-474.15	1.39
	4554.00	8.68	185.24	4511.98	489.76 S	39.63 W	-489.41	1.31
	4650.00	7.76	187.20	4606.99	503.41 S	41.11 W	-503.05	1.00
	4745.00	7.44	181.49	4701.16	515.92 S	42.07 W	-515.55	0.86
	4840.00	8.34	173.51	4795.26	528.91 S	41.45 W	-528.55	1.49
	4935.00	8.11	177.32	4889.28	542.45 S	40.36 W	-542.10	0.62
	5030.00	7.38	180.51	4983.42	555.25 S	40.10 W	-554.89	0.89
	5125.00	8.47	178.22	5077.51	568.34 S	39.94 W	-567.99	1.19
	5220.00	7.40	184.53	5171.60	581.44 S	40.20 W	-581.08	1.45
	5315.00	5.86	177.03	5265.96	592.38 S	40.44 W	-592.02	1.86
	5410.00	2.34	177.90	5360.70	599.16 S	40.11 W	-598.80	3.71
	5506.00	0.32	222.14	5456.67	601.32 S	40.22 W	-600.96	2.21
	5696.00	0.54	263.05	5646.67	601.82 S	41.47 W	-601.45	0.19
	5791.00	0.62	266.54	5741.66	601.91 S	42.42 W	-601.53	0.09
	5981.00	0.28	266.08	5931.66	602.00 S	43.91 W	-601.61	0.18
	6076.00	0.40	171.98	6026.66	602.34 S	44.10 W	-601.95	0.53
	6171.00	0.37	178.11	6121.65	602.98 S	44.04 W	-602.59	0.05
	6266.00	0.48	153.04	6216.65	603.64 S	43.85 W	-603.25	0.22
	6361.00	0.72	149.41	6311.65	604.51 S	43.37 W	-604.12	0.26
	6456.00	0.72	151.68	6406.64	605.55 S	42.78 W	-605.17	0.03
	6552.00	1.00	158.65	6502.63	606.86 S	42.19 W	-606.48	0.31
	6647.00	0.94	154.97	6597.62	608.34 S	41.56 W	-607.97	0.09
	6695.00	0.58	109.01	6645.61	608.77 S	41.16 W	-608.41	1.42
	6742.00	4.76	2.84	6692.56	606.90 S	40.84 W	-606.54	10.54
	6790.00	9.71	357.48	6740.16	600.87 S	40.92 W	-600.50	10.40
	6837.00	13.30	354.72	6786.21	591.52 S	41.59 W	-591.15	7.73
	6885.00	17.21	357.35	6832.51	578.92 S	42.43 W	-578.55	8.27
	6932.00	17.86	2.37	6877.33	564.78 S	42.45 W	-564.40	3.50
	6980.00	21.63	359.73	6922.50	548.57 S	42.19 W	-548.20	8.07
	7027.00	26.01	356.23	6965.49	529.61 S	42.91 W	-529.23	9.79
	7075.00	30.71	355.28	7007.71	506.88 S	44.61 W	-506.49	9.84
	7122.00	35.81	354.24	7047.00	481.22 S	46.98 W	-480.81	10.92
	7170.00	39.90	353.83	7084.89	451.93 S	50.04 W	-451.50	8.54
	7218.00	43.72	356.72	7120.67	420.05 S	52.65 W	-419.60	8.91
	7266.00	50.16	357.59	7153.42	385.05 S	54.37 W	-384.58	13.48
	7313.00	56.02	358.28	7181.64	347.51 S	55.72 W	-347.03	12.52
	7361.00	62.98	358.31	7205.99	306.19 S	56.95 W	-305.70	14.50
	7408.00	68.63	359.58	7225.24	263.35 S	57.73 W	-262.85	12.27
	7456.00	74.06	1.58	7240.59	217.89 S	57.25 W	-217.40	11.98
	7503.00	78.23	3.25	7251.84	172.31 S	55.32 W	-171.84	9.52
	7551.00	81.18	3.23	7260.42	125.16 S	52.66 W	-124.72	6.15

7598.00	84.94	4.66	7266.10	78.63 S	49.44 W	-78.21	8.55
7612.00	85.43	4.75	7267.27	64.72 S	48.30 W	-64.32	3.56
7691.00	90.25	4.76	7270.25	13.92 N	41.76 W	14.27	6.10
7786.00	90.99	1.78	7269.22	108.75 N	36.34 W	109.05	3.23
7881.00	91.73	359.14	7266.97	203.71 N	35.58 W	204.00	2.89
7976.00	92.04	358.87	7263.84	298.65 N	37.23 W	298.95	0.43
8071.00	92.47	358.70	7260.10	393.55 N	39.24 W	393.87	0.49
8166.00	90.93	358.52	7257.29	488.48 N	41.54 W	488.81	1.63
8261.00	89.75	358.47	7256.72	583.44 N	44.04 W	583.79	1.24
8356.00	89.94	357.91	7256.98	678.40 N	47.04 W	678.77	0.62
8452.00	90.19	357.18	7256.87	774.31 N	51.15 W	774.71	0.80
8547.00	90.19	355.96	7256.56	869.13 N	56.83 W	869.58	1.28
8642.00	90.25	357.11	7256.19	963.96 N	62.58 W	964.45	1.21
8737.00	90.31	358.86	7255.73	1058.89 N	65.92 W	1059.41	1.84
8832.00	89.07	359.87	7256.24	1153.88 N	66.97 W	1154.41	1.68
8927.00	89.26	357.65	7257.63	1248.85 N	69.02 W	1249.38	2.35
9022.00	89.01	357.95	7259.06	1343.77 N	72.67 W	1344.33	0.41
9117.00	88.33	359.75	7261.27	1438.72 N	74.58 W	1439.29	2.02
9212.00	89.07	1.16	7263.42	1533.69 N	73.82 W	1534.25	1.68
9307.00	89.26	0.35	7264.81	1628.67 N	72.57 W	1629.22	0.88
9402.00	89.38	1.51	7265.93	1723.65 N	71.03 W	1724.18	1.23
9497.00	89.75	1.80	7266.65	1818.60 N	68.29 W	1819.11	0.49
9592.00	88.70	0.67	7267.94	1913.57 N	66.24 W	1914.06	1.62
9688.00	90.86	0.53	7268.31	2009.56 N	65.23 W	2010.03	2.25
9783.00	92.47	0.56	7265.55	2104.51 N	64.33 W	2104.98	1.70
9878.00	93.09	359.34	7260.94	2199.40 N	64.41 W	2199.86	1.44
9973.00	91.05	359.35	7257.51	2294.32 N	65.50 W	2294.79	2.15
10068.00	89.32	358.58	7257.20	2389.30 N	67.21 W	2389.78	1.99
10163.00	89.69	358.31	7258.02	2484.26 N	69.79 W	2484.76	0.48
10258.00	90.93	357.41	7257.51	2579.19 N	73.34 W	2579.72	1.61
10353.00	90.56	358.14	7256.27	2674.11 N	77.03 W	2674.66	0.86
10448.00	89.26	358.31	7256.42	2769.06 N	79.97 W	2769.64	1.38
10543.00	88.02	359.26	7258.68	2864.01 N	81.98 W	2864.60	1.64
10639.00	89.38	359.27	7260.85	2959.98 N	83.22 W	2960.57	1.42
10734.00	89.81	359.74	7261.53	3054.97 N	84.04 W	3055.57	0.67
10829.00	90.68	0.80	7261.12	3149.97 N	83.59 W	3150.56	1.44
10924.00	89.81	2.18	7260.71	3244.93 N	81.12 W	3245.50	1.72
11019.00	90.06	1.12	7260.82	3339.89 N	78.38 W	3340.43	1.15
11114.00	89.32	359.63	7261.34	3434.88 N	77.76 W	3435.42	1.75
11209.00	90.25	359.80	7261.69	3529.88 N	78.23 W	3530.41	1.00
11304.00	91.05	1.56	7260.61	3624.86 N	77.11 W	3625.38	2.03
11399.00	90.99	0.30	7258.92	3719.83 N	75.56 W	3720.34	1.33
11494.00	90.93	1.40	7257.33	3814.81 N	74.16 W	3815.30	1.16
11589.00	91.24	0.29	7255.53	3909.78 N	72.75 W	3910.25	1.21
11684.00	91.73	1.75	7253.07	4004.73 N	71.06 W	4005.19	1.62
11742.00	91.61	0.59	7251.38	4062.69 N	69.88 W	4063.14	2.01
11792.00	91.61	0.59	7249.98	4112.67 N	69.37 W	4113.11	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 359.52 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.57 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11792.00 FEET
IS 4113.26 FEET ALONG 359.03 DEGREES (TRUE)

All directional surveys tied onto surface at 0' MD. Final survey is a straight-line projection to the bit.