

PCDC - Pressure Case Directional
PCGK - Pressure Case Gamma

1 : 600 / 1 : 240

Country		: USA			
Field		: Wattenberg			
Location		: Lat: 40° 31' 16.28" North Long: 104° 27' 3.10" West			
Well		: NCLP AA06-69HNC			
Company		: Noble			
Rig		: H&P 321			
LOCATION		Latitude : 40° 31' 16.28" North Longitude : 104° 27' 3.10" West UTM Easting = 3,291,667,200 ft UTM Northing = 1,434,435,560 ft		Other Services Directional Drilling	
Permanent Datum		: Ground Level		Elev. KB N/A	
Log Measured From		: Drill Floor		DF 4741.00 ft GL 4711.00 ft WD N/A	
Drilling Measured From		: Drill Floor			
Depth Logged		: 853.99 ft To 6,755.21 ft		Unit No. : 11210424	
Date Logged		: 03-Jul-14 To 05-Jul-14		Job No. : CA-XX-0901286146	
Total Depth MD		: 7,152.00 ft TVD : 6,755.21 ft		Plot Type : Final	
Spud Date		: 02-Jul-14		Plot Date : 05-Jul-14	
Run No.		Borehole Record (TVD)		Run No.	
		Size From To		Size From To	
100		8,750 in 853.99 ft 6,062.08 ft			
200		8,750 in 6,062.08 ft 6,755.21 ft			

Max Tool Temp (degF) / Source	154.30 / PCM	162.80 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ 154.30	N/A @ 162.80			
Lead MWD Engineer	Robert Barnes	Robert Barnes			
Customer Representative	Jim Turner	Jim Turner			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.84	5.84			
Sub Serial Number	12365886	12365886			
Insert Serial Number	11145581	11145581			
Date and Time Initialized	03-Jul-14 11:43	01-Jan-70 00:00			
Date and Time Read	05-Jul-14 08:59	05-Jul-14 09:03			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	56.00	54.00			
Software Version	6.21	6.21			
Sub Serial Number	12365886	12365886			
Sonde Serial Number	11638573	11638573			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	84.64	282.13			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	49.03	47.12			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	12365886	12365886			
Insert/Sonde Serial Number	11120591	11120591			

REMARKS

1. All depths are calibrated to driller's pipe tally and are true vertical depth from the Drill Floor.
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 "Brigham 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:
 - 1:600 Log
PGRC (Gamma CG) and ROPA (Average Rate of Penetration)
Interval Resolution: 1.0 ft
Interval Distance: 3.0 ft
 - 1:240 Log
PGRC (Gamma CG):
Interval Resolution: 0.5 ft
Interval Distance: 0.6 ft
 - ROPA (Average Rate of Penetration):
Interval Resolution: 0.5 ft

Interval Resolution: 1.2 ft

6. Insite Version v8.0.10

WARRANTY

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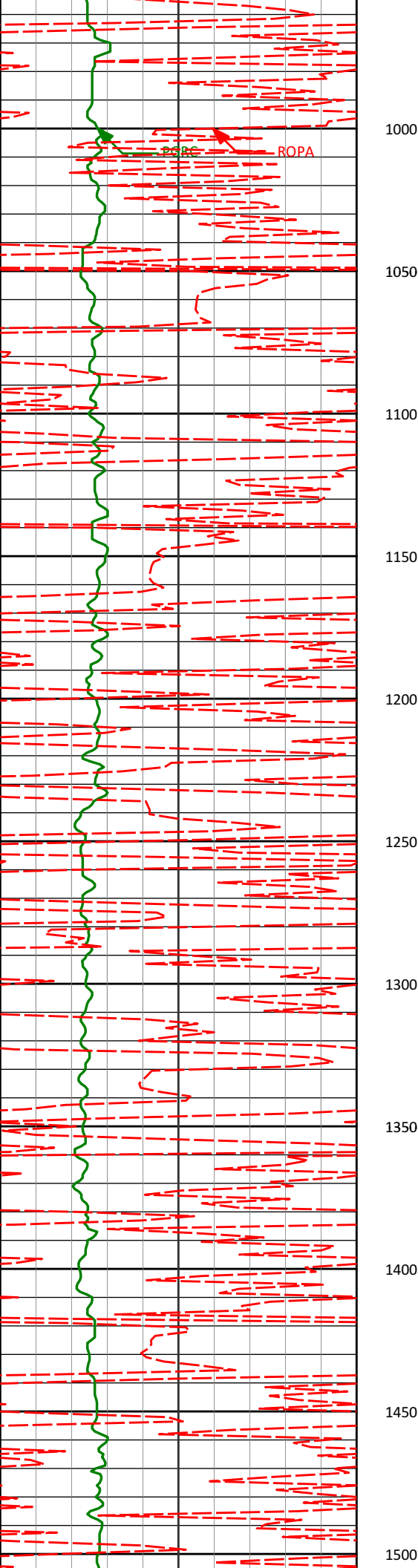
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Sperry Drilling Services

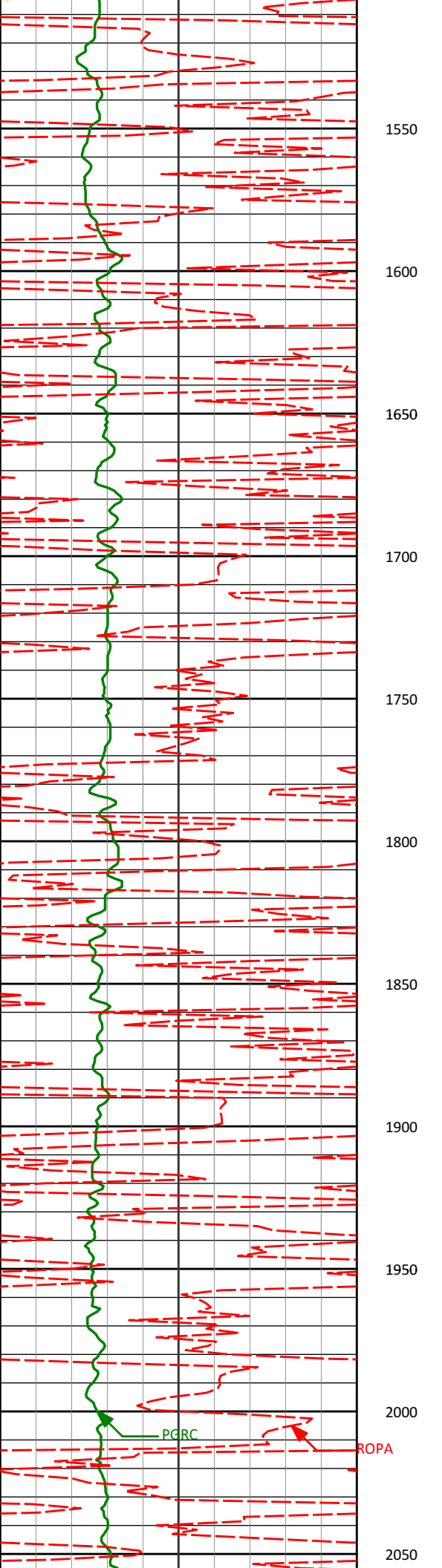
TVD Correlation Log 1:600

Noble Energy
NCLP AA06-69HNC
H&P 321
Sec. 4-T6N-R63W

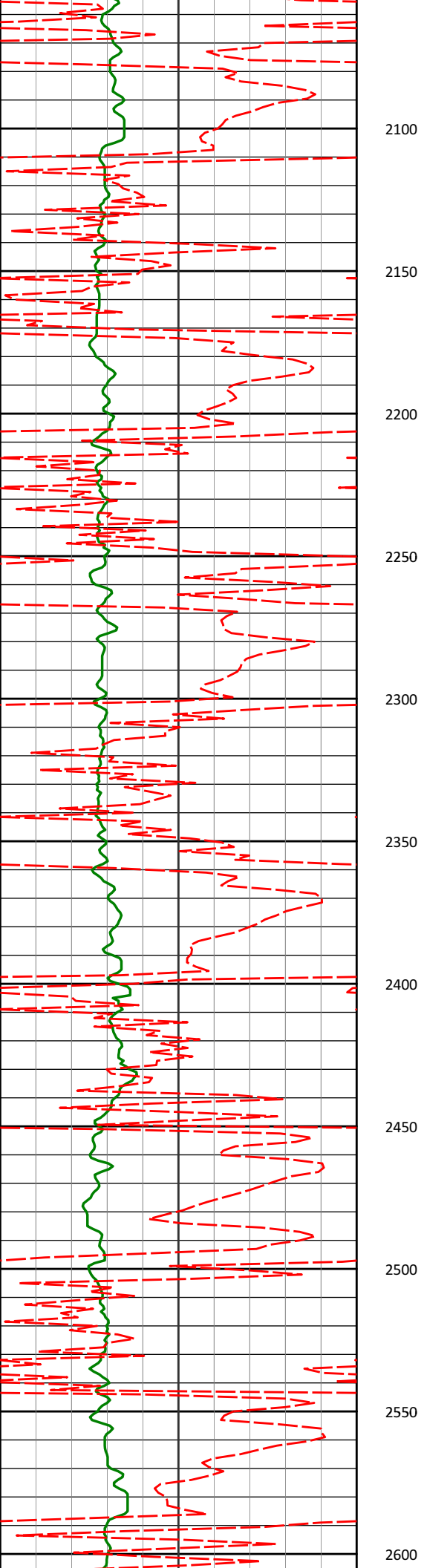




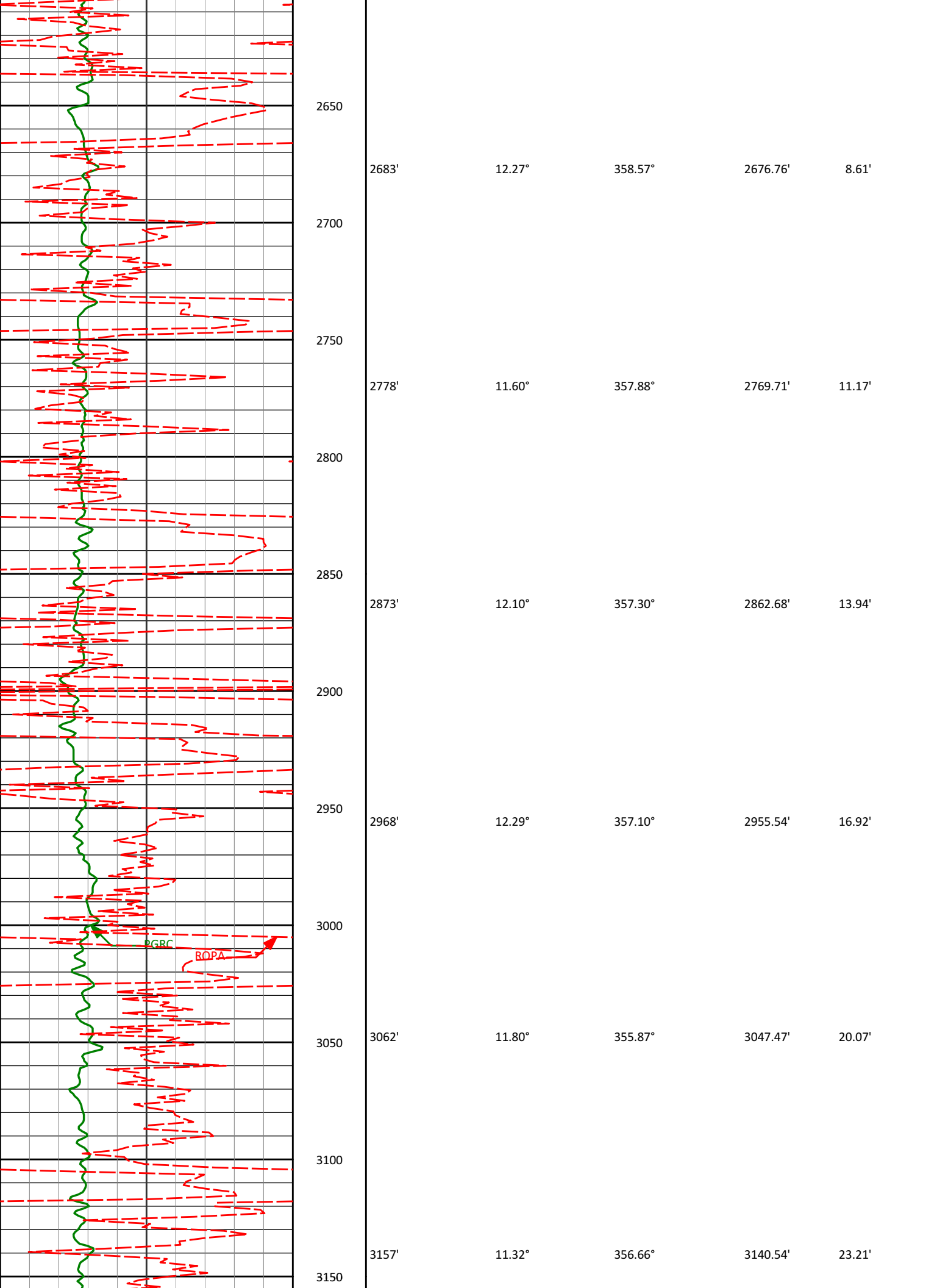
996'	0.23°	187.02°	995.98'	-1.07'
1089'	0.15°	254.81°	1088.98'	-0.95'
1182'	0.11°	247.61°	1181.98'	-0.76'
1274'	0.24°	221.13°	1273.98'	-0.57'
1365'	0.22°	211.39°	1364.98'	-0.38'
1457'	0.00°	190.12°	1456.98'	-0.30'

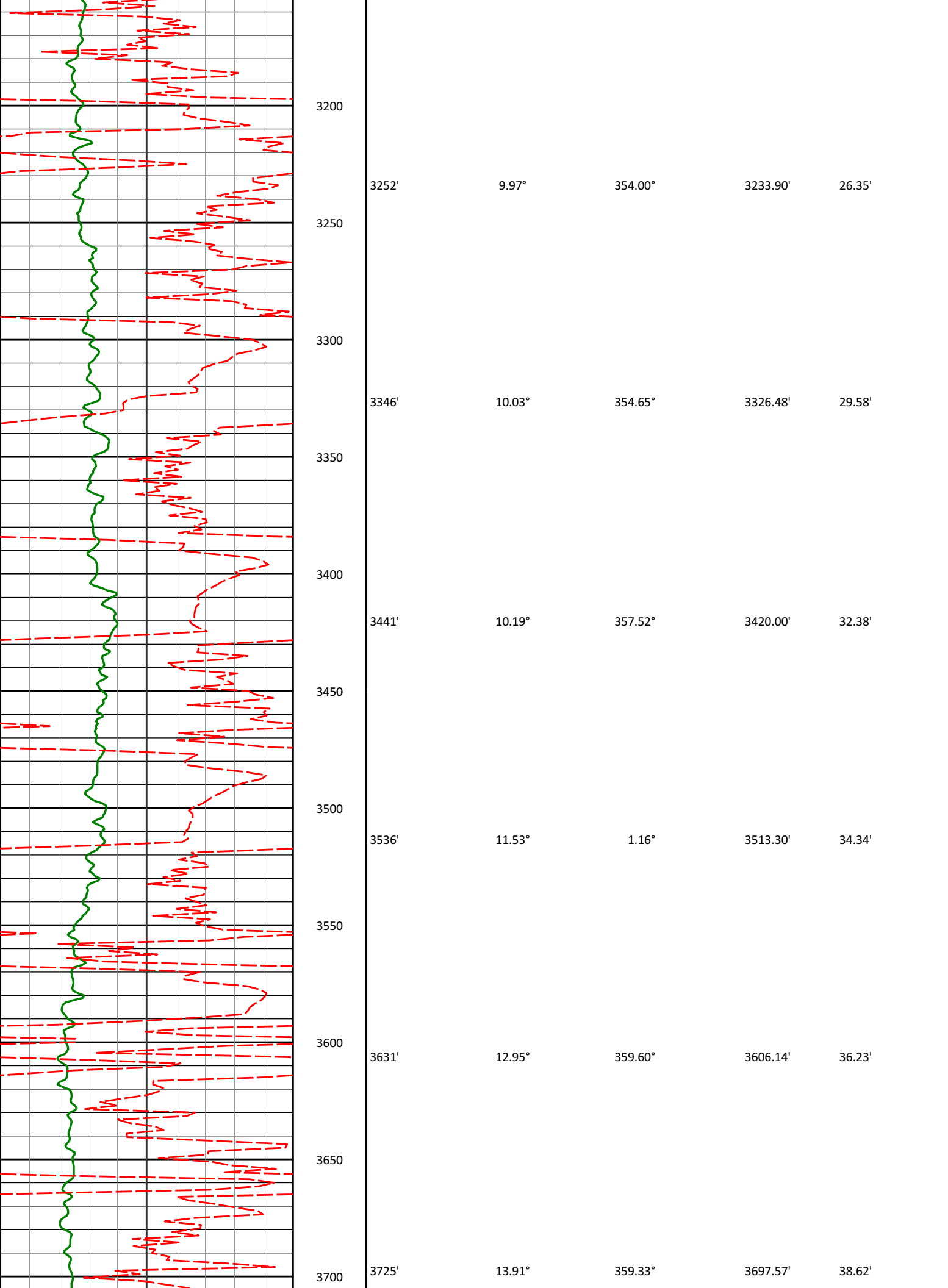


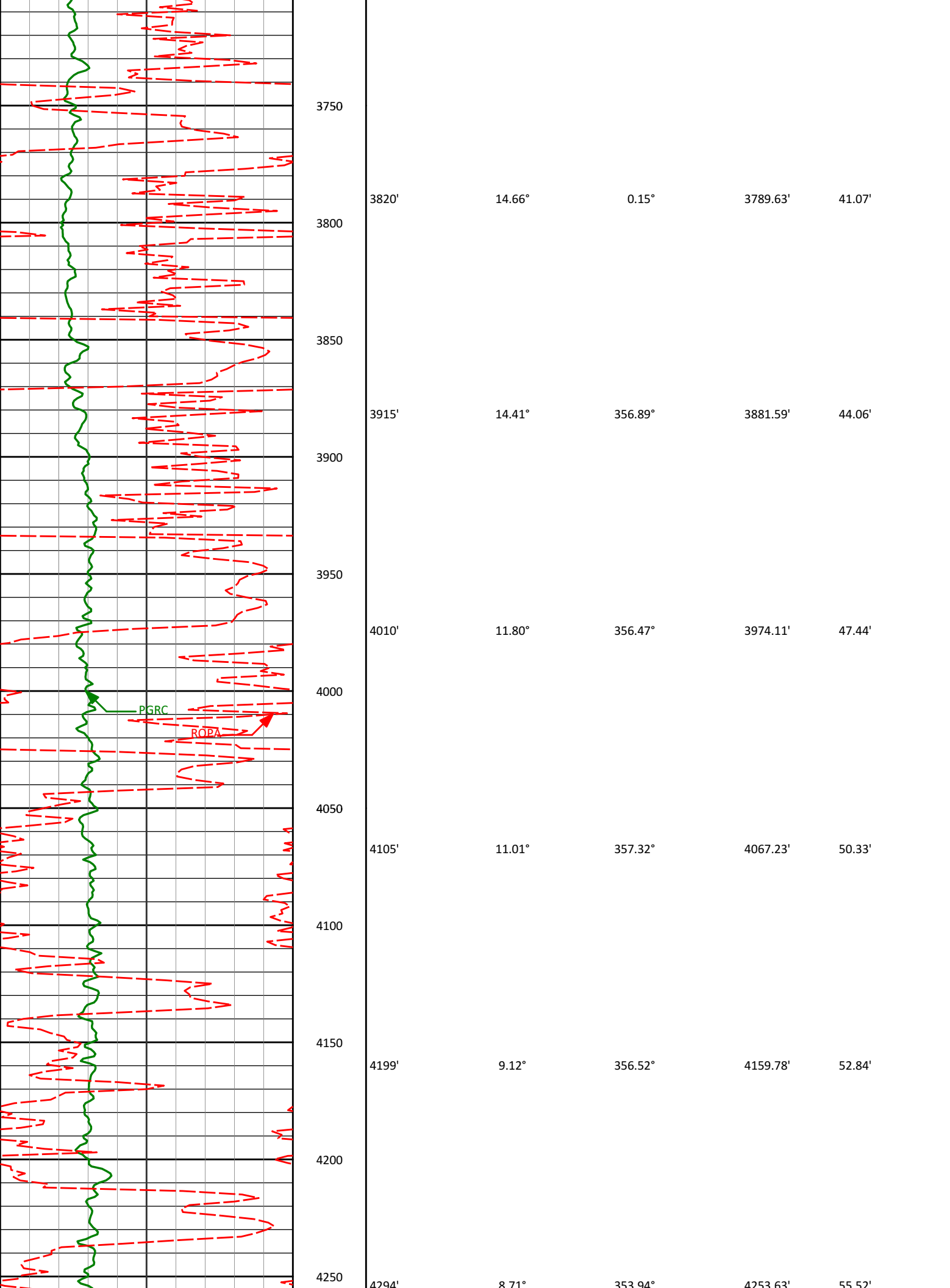
1550	1549'	0.10°	228.99°	1548.98'	-0.25'
1600					
1650	1641'	0.18°	237.25°	1640.98'	-0.08'
1700					
1750	1736'	0.37°	229.97°	1735.98'	0.25'
1800					
1850	1831'	0.36°	214.78°	1830.98'	0.61'
1900					
1950	1926'	0.46°	210.06°	1925.98'	0.91'
2000					
2050	2020'	0.56°	311.59°	2019.97'	1.44'



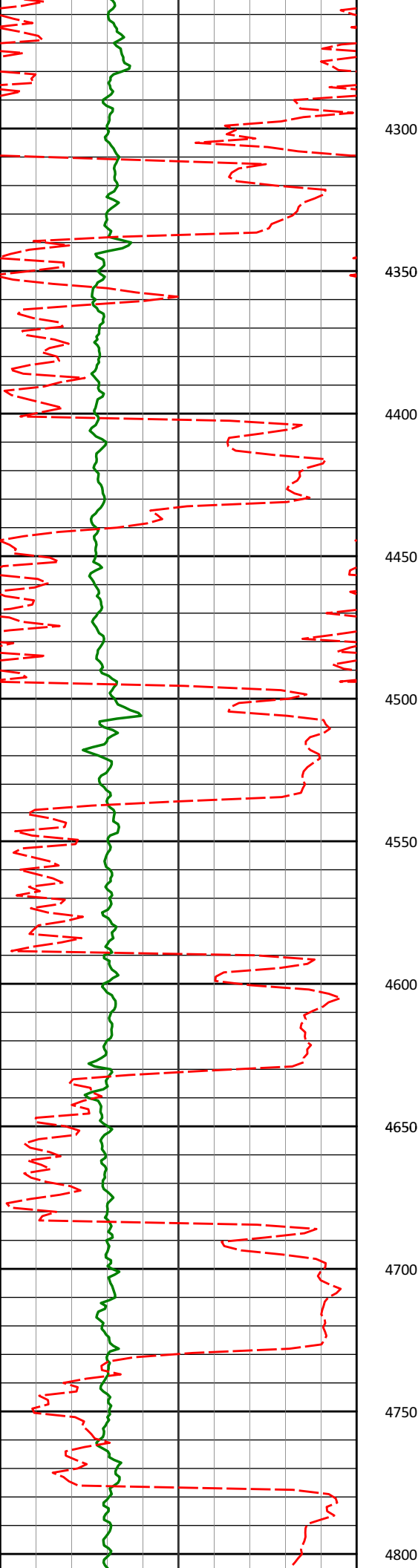
2115'	2.50°	358.18°	2114.94'	2.09'
2209'	4.51°	356.89°	2208.76'	2.93'
2304'	5.84°	1.58°	2303.37'	3.85'
2399'	7.70°	6.12°	2397.70'	4.16'
2494'	9.87°	2.79°	2491.58'	4.54'
2589'	11.98°	358.70°	2584.86'	6.16'



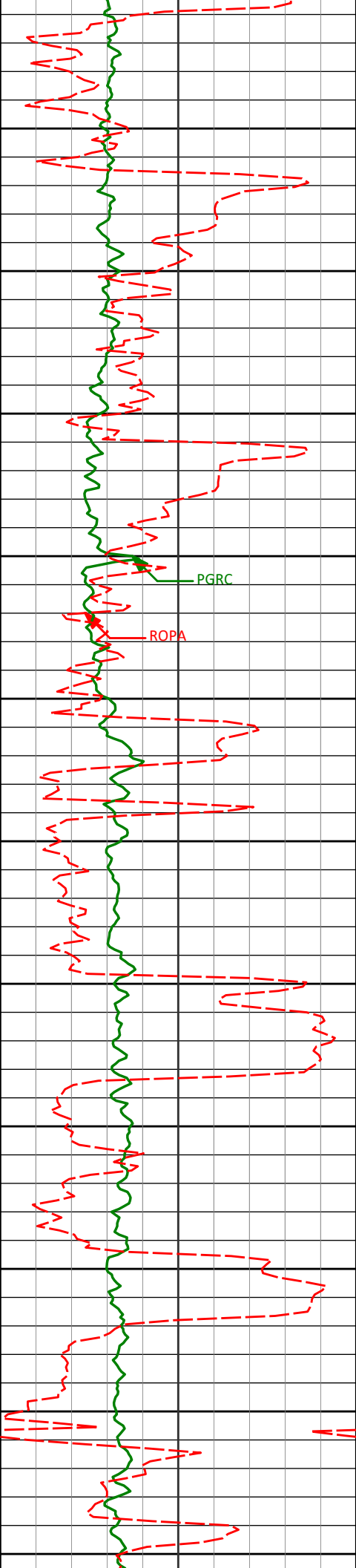




4294'	8.71°	353.94°	4253.63'	55.52'
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4389'	9.05°	355.02°	4347.49'	58.38'
4484'	9.29°	353.63°	4441.28'	61.38'
4579'	10.11°	355.55°	4534.92'	64.46'
4674'	9.88°	357.70°	4628.48'	67.08'
4769'	10.61°	357.43°	4721.96'	69.48'



4850

4900

4950

5000

5050

5100

5150

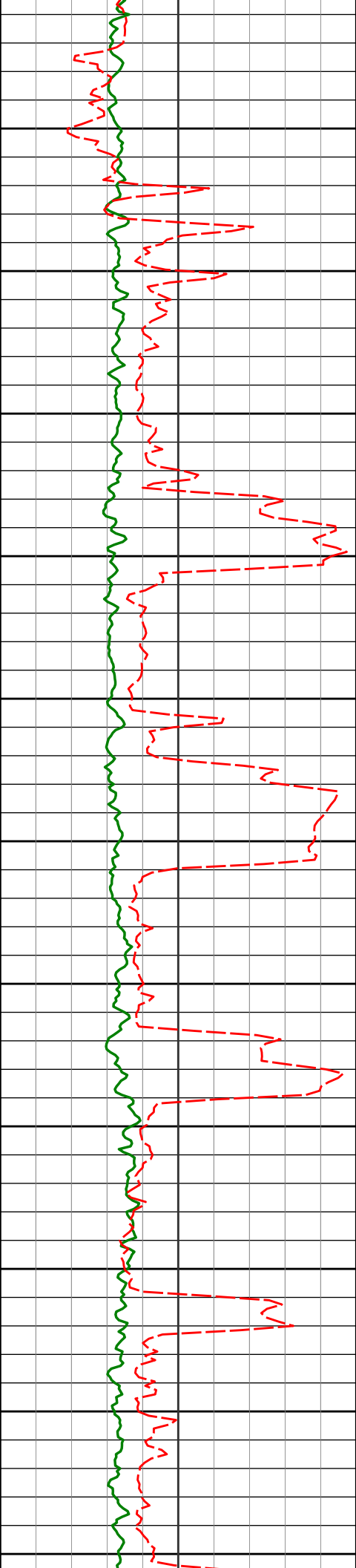
5200

5250

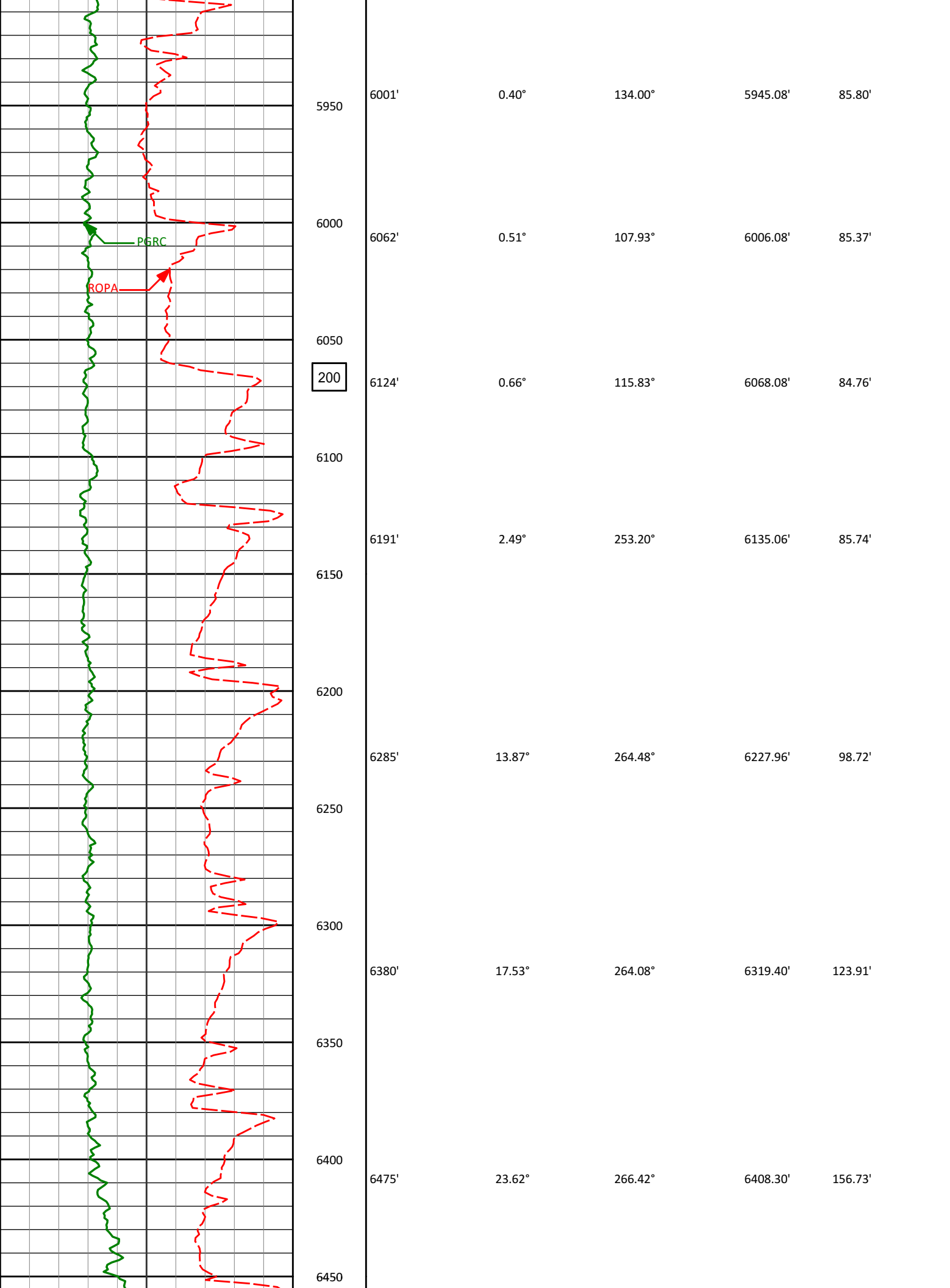
5300

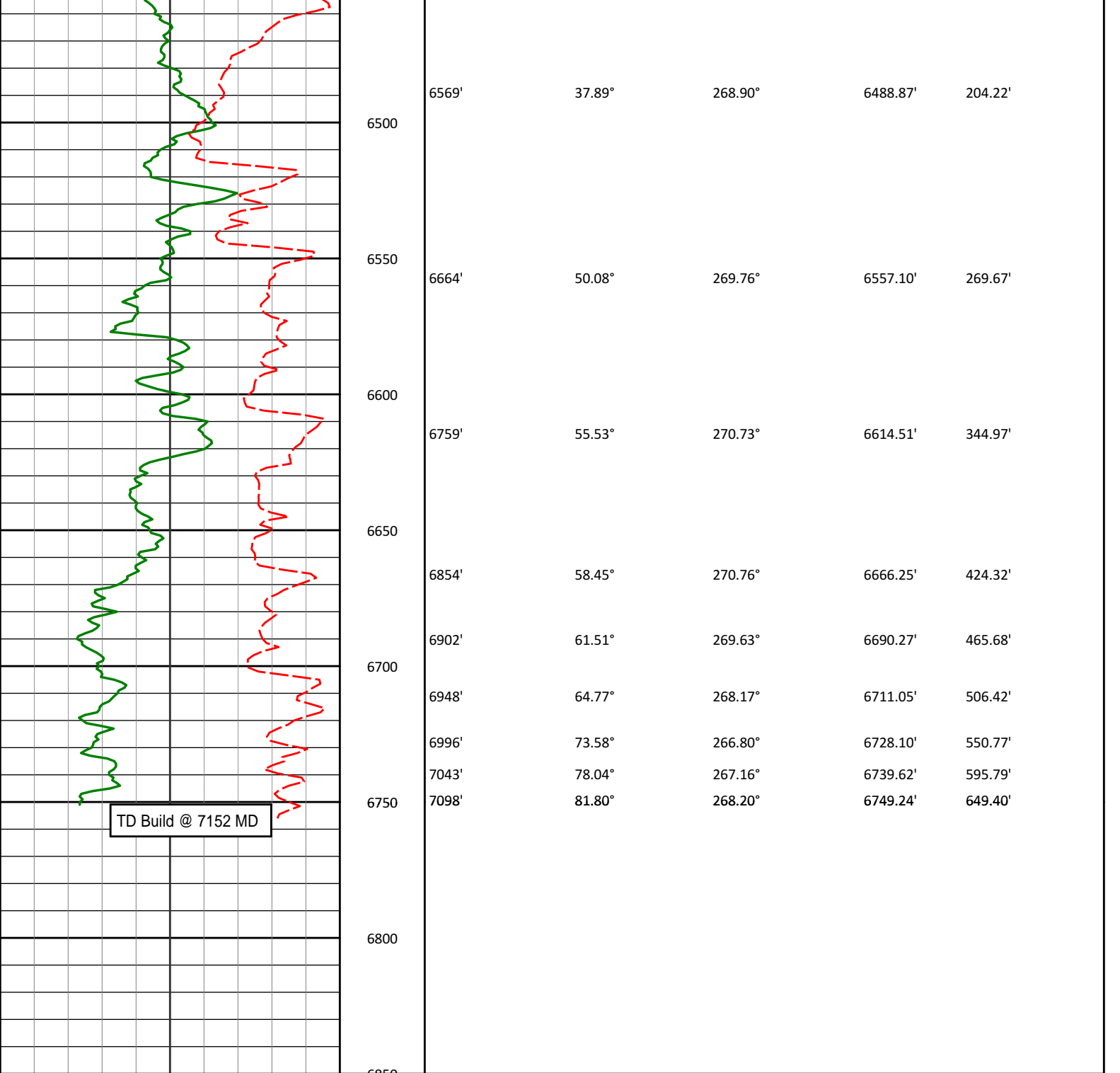
5350

4863'	11.91°	356.90°	4814.15'	72.22'
4958'	10.05°	355.45°	4907.41'	75.21'
5053'	9.38°	357.77°	5001.05'	77.76'
5148'	8.13°	358.36°	5094.94'	79.70'
5243'	7.79°	359.70°	5189.02'	81.24'
5338'	6.97°	358.84°	5283.23'	82.61'



5432'	5.16°	357.63°	5376.70'	83.89'
5400				
5527'	4.30°	356.26°	5471.38'	85.08'
5500				
5622'	3.30°	349.34°	5566.17'	86.44'
5600				
5717'	1.18°	17.32°	5661.10'	87.02'
5700				
5811'	0.28°	121.10°	5755.09'	86.61'
5800				
5906'	0.34°	148.07°	5850.09'	86.23'
5850				
5900				





TD Build @ 7152 MD

<div><div>Avg Rate of Penetration</div><div>ROP</div><div>feet per hr</div></div>	Depth ft	Depth	Inc.	Azi.	TVD	V.S.
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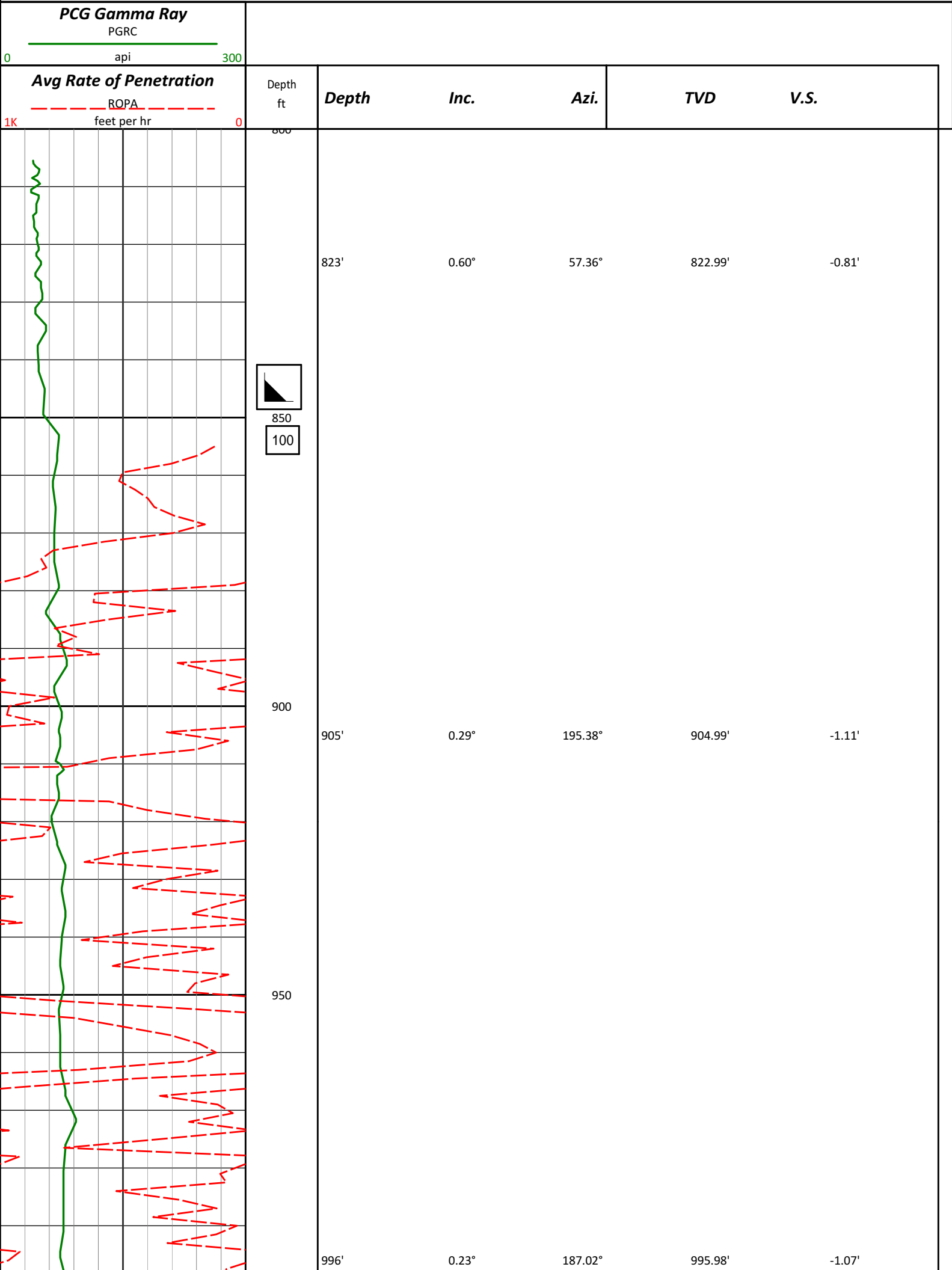
<div><div>PCG Gamma Ray</div><div>PGRC</div><div>api</div></div>
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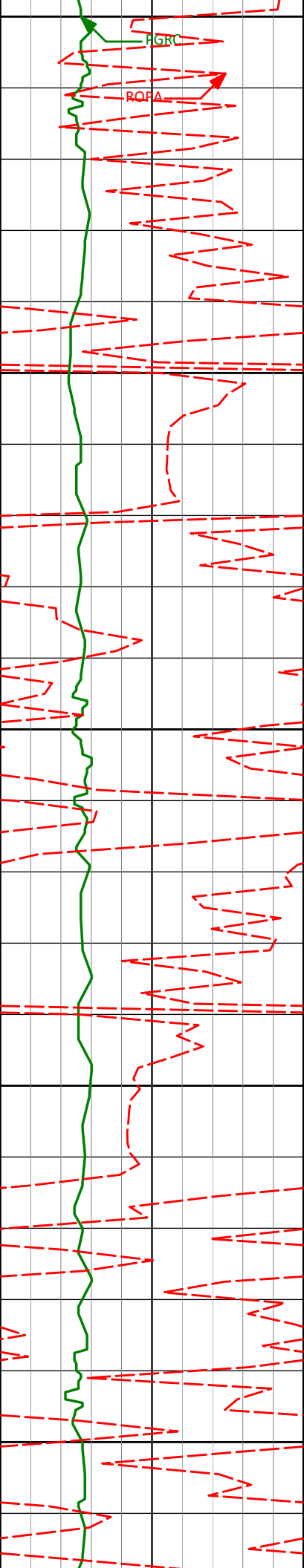
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Sperry Drilling Services

TVD Detail Log 1:240

Noble Energy
NCLP AA06-69HNC
H&P 321
Sec. 4-T6N-R63W





1000

1050

1100

1150

1200

1089'

0.15°

254.81°

1088.98'

-0.95'

1182'

0.11°

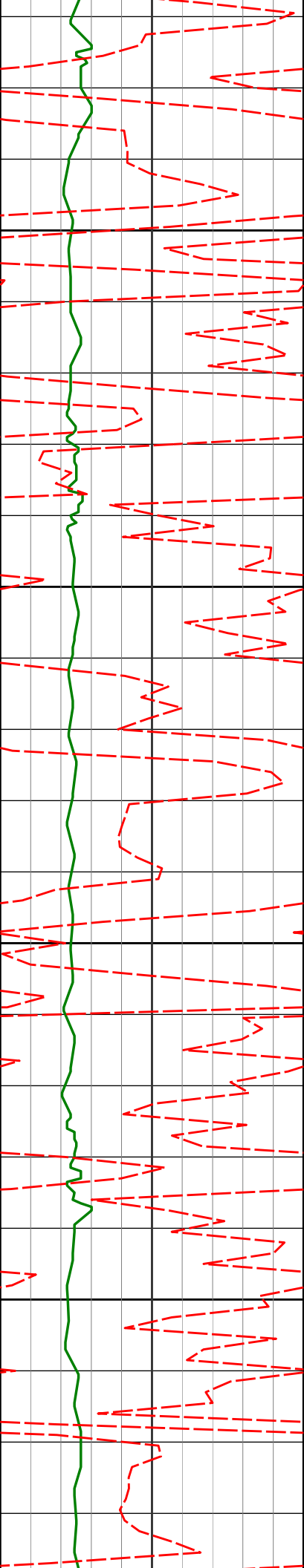
247.61°

1181.98'

-0.76'

PGR

ROPA



1250

1274'

0.24°

221.13°

1273.98'

-0.57'

1300

1350

1365'

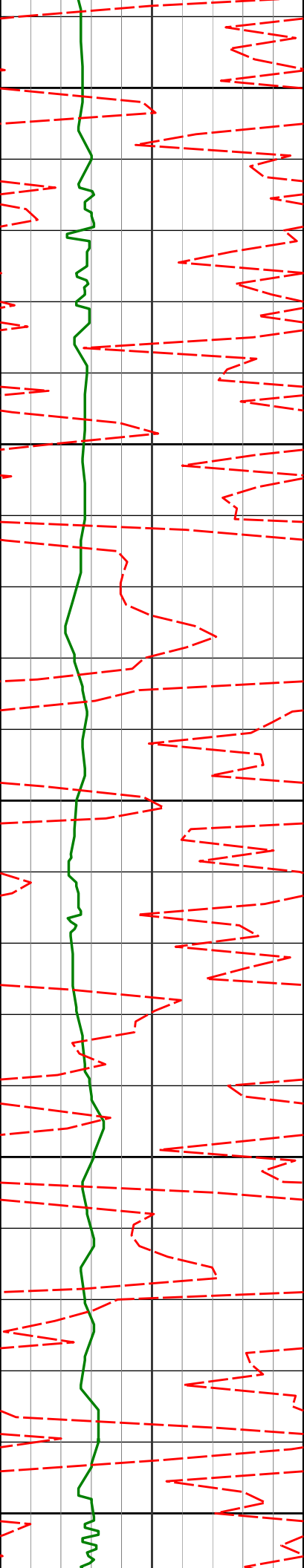
0.22°

211.39°

1364.98'

-0.38'

1400



1450

1457'

0.00°

190.12°

1456.98'

-0.30'

1500

1550

1549'

0.10°

228.99°

1548.98'

-0.25'

1600

1641'

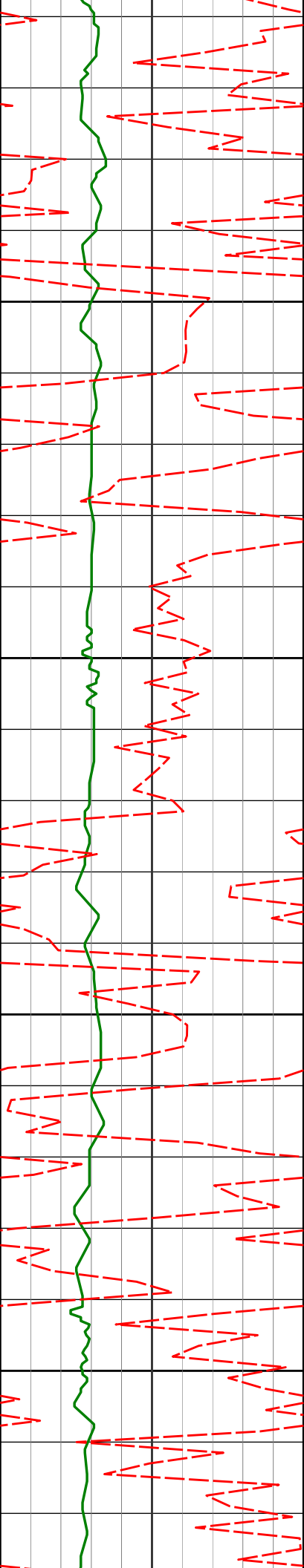
0.18°

237.25°

1640.98'

-0.08'

1650



1700

1750

1800

1850

1736'

0.37°

229.97°

1735.98'

0.25'

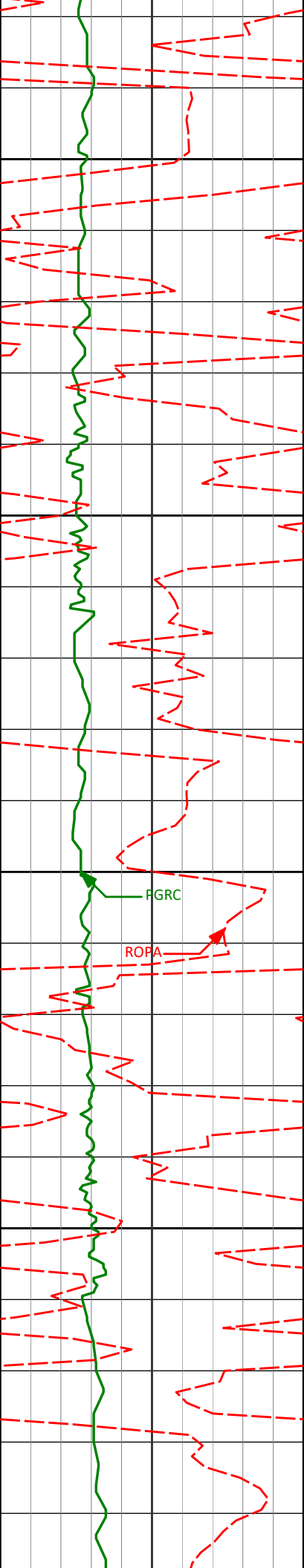
1831'

0.36°

214.78°

1830.98'

0.61'



1900

1926'

0.46°

210.06°

1925.98'

0.91'

1950

2000

PGRC

ROPA

2020'

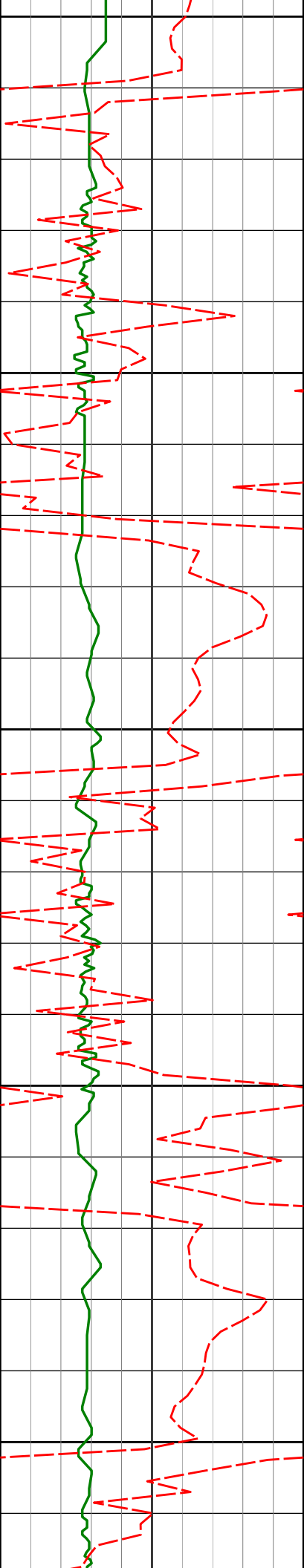
0.56°

311.59°

2019.97'

1.44'

2050



2100

2115'

2.50°

358.18°

2114.94'

2.09'

2150

2200

2209'

4.51°

356.89°

2208.76'

2.93'

2250

2300

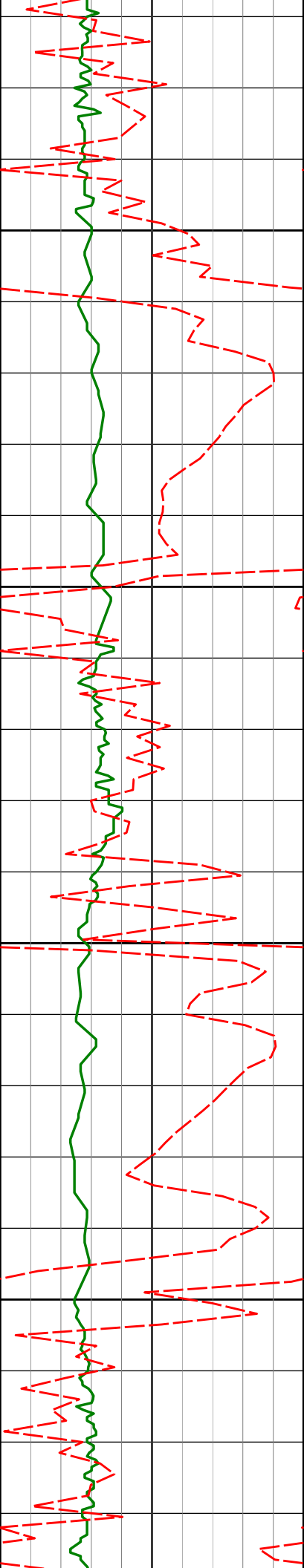
2304'

5.84°

1.58°

2303.37'

3.85'



2350

2400

2450

2500

2399'

7.70°

6.12°

2397.70'

4.16'

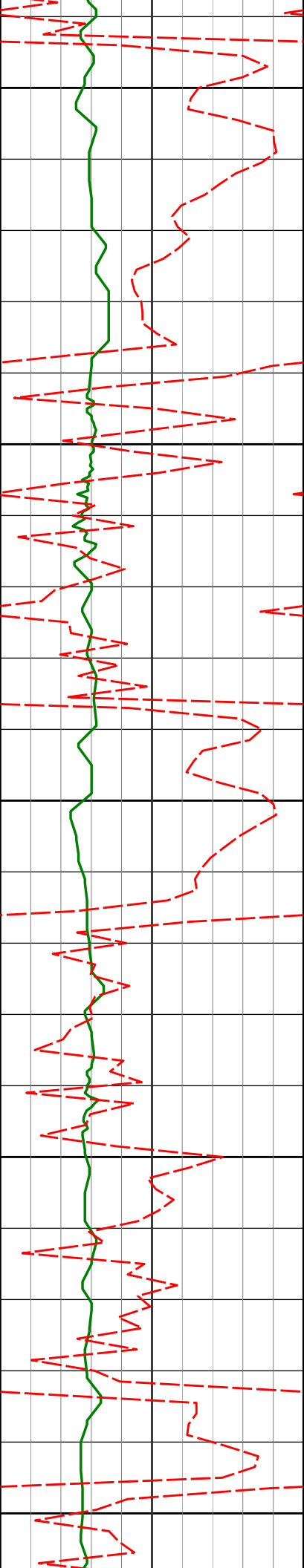
2494'

9.87°

2.79°

2491.58'

4.54'



2550

2589'

11.98°

358.70°

2584.86'

6.16'

2600

2650

2683'

12.27°

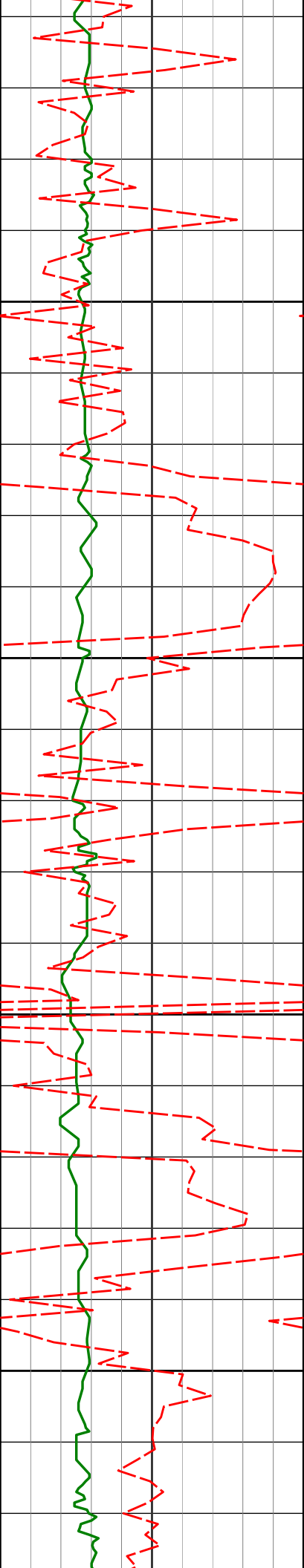
358.57°

2676.76'

8.61'

2700

2750



2800

2850

2900

2950

2778'

11.60°

357.88°

2769.71'

11.17'

2873'

12.10°

357.30°

2862.68'

13.94'

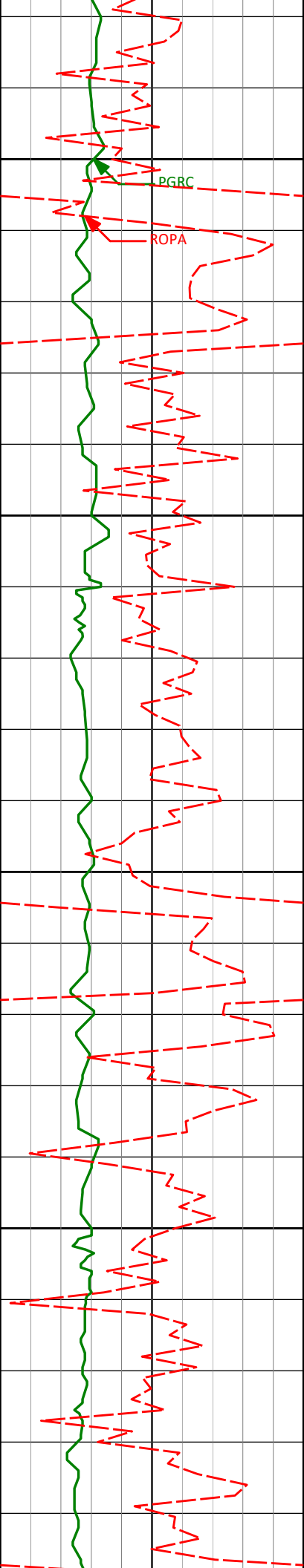
2968'

12.29°

357.10°

2955.54'

16.92'



3000

PGRC

ROPA

3050

3100

3150

3062'

11.80°

355.87°

3047.47'

20.07'

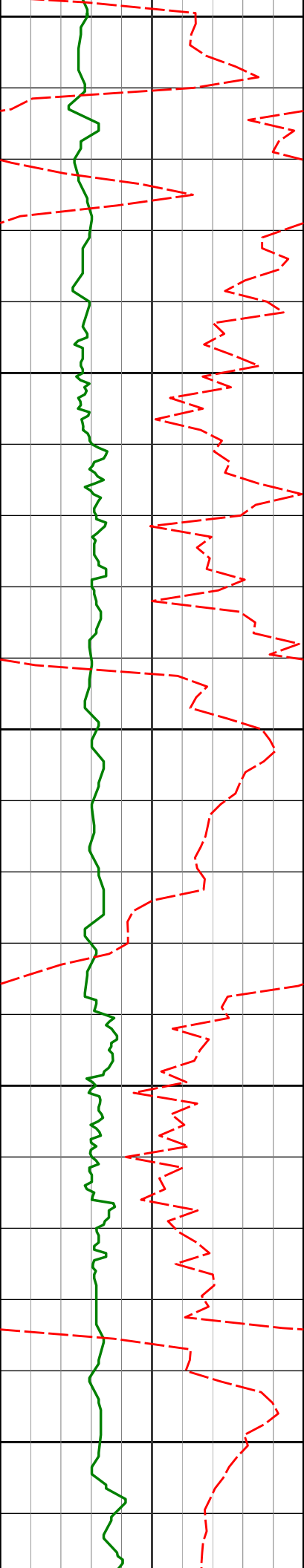
3157'

11.32°

356.66°

3140.54'

23.21'



3200

3252'

9.97°

354.00°

3233.90'

26.35'

3250

3300

3346'

10.03°

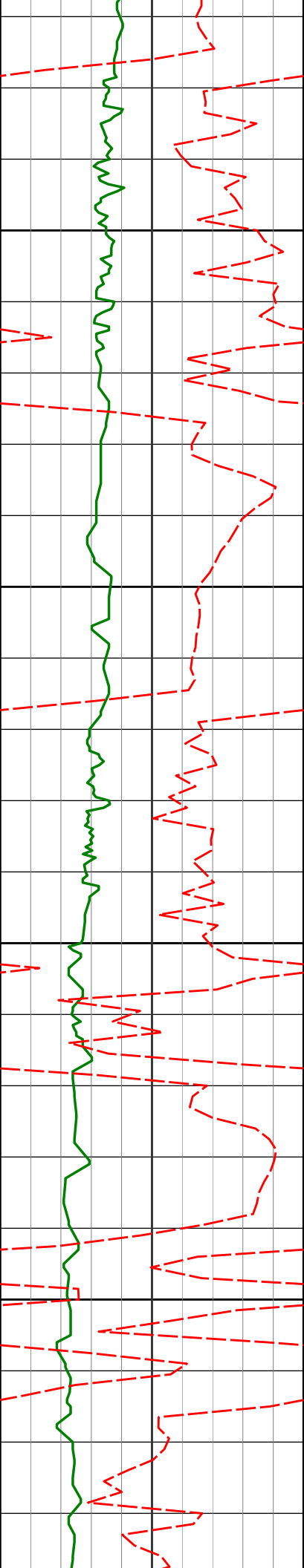
354.65°

3326.48'

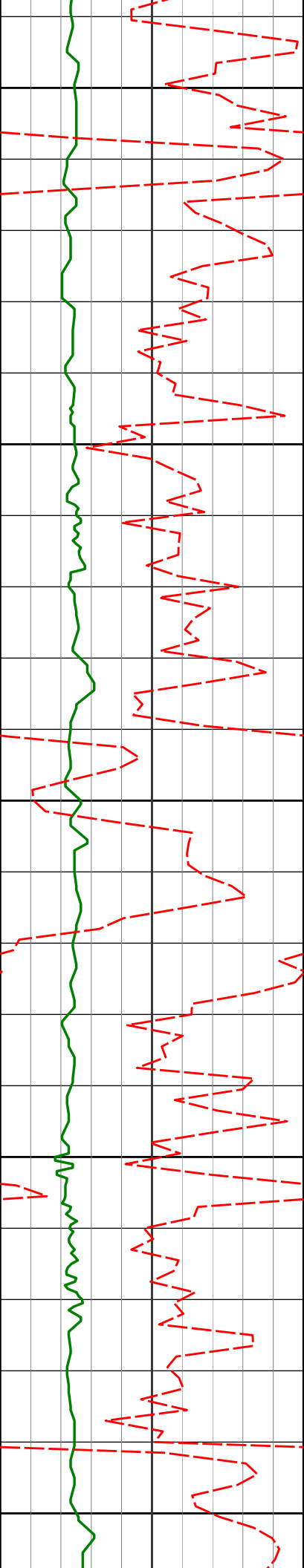
29.58'

3350

3400



3441'	10.19°	357.52°	3420.00'	32.38'
3450				
3500				
3536'	11.53°	1.16°	3513.30'	34.34'
3550				
3600				
3631'	12.95°	359.60°	3606.14'	36.23'



3650

3700

3750

3800

3850

3725'

13.91°

359.33°

3697.57'

38.62'

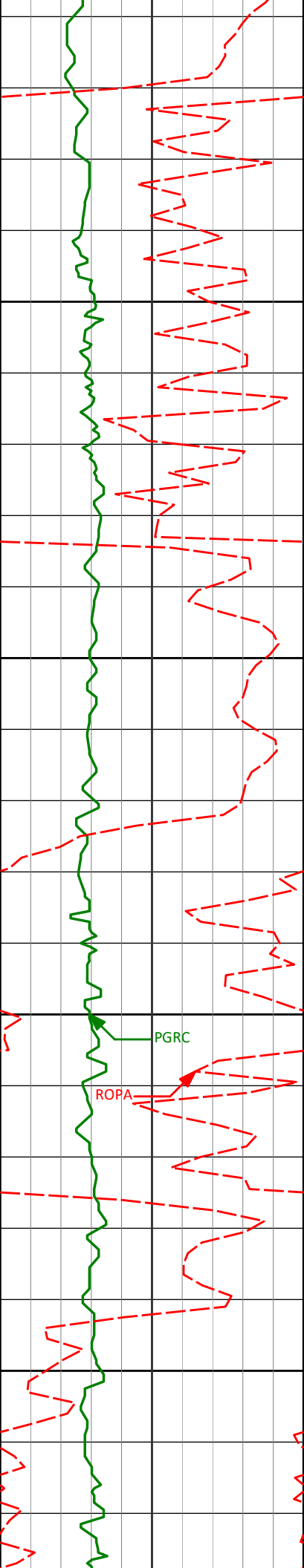
3820'

14.66°

0.15°

3789.63'

41.07'



3915'	14.41°	356.89°	3881.59'	44.06'
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3900

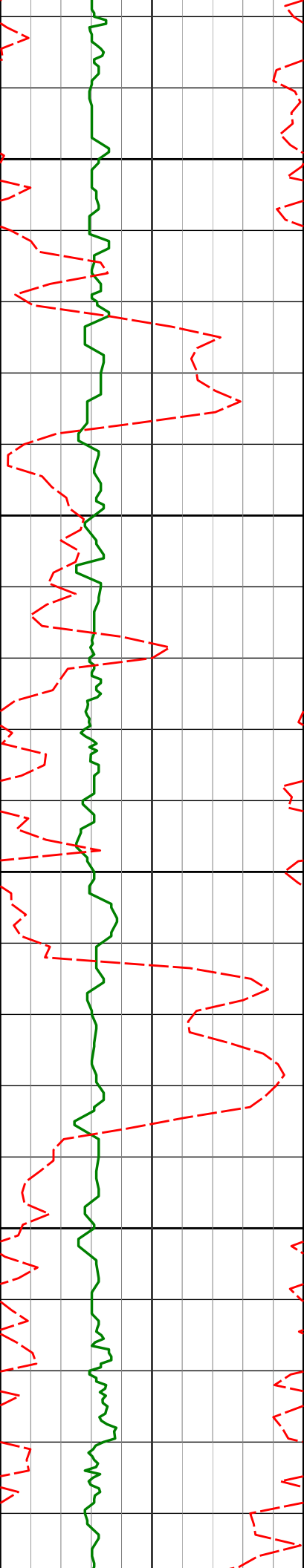
3950

4010'	11.80°	356.47°	3974.11'	47.44'
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4000

4050

4105'	11.01°	357.32°	4067.23'	50.33'
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4100

4150

4200

4250

4199'

9.12°

356.52°

4159.78'

52.84'

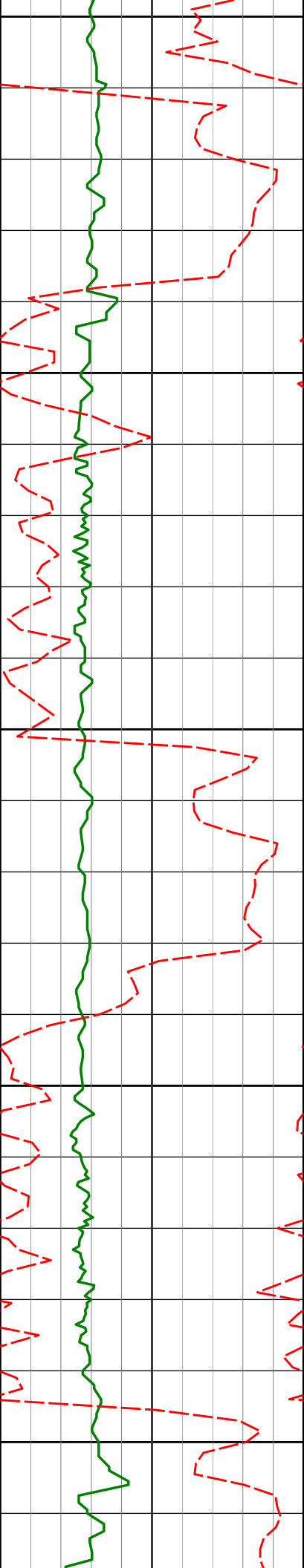
4294'

8.71°

353.94°

4253.63'

55.52'



4300

4350

4400

4450

4500

4389'

9.05°

355.02°

4347.49'

58.38'

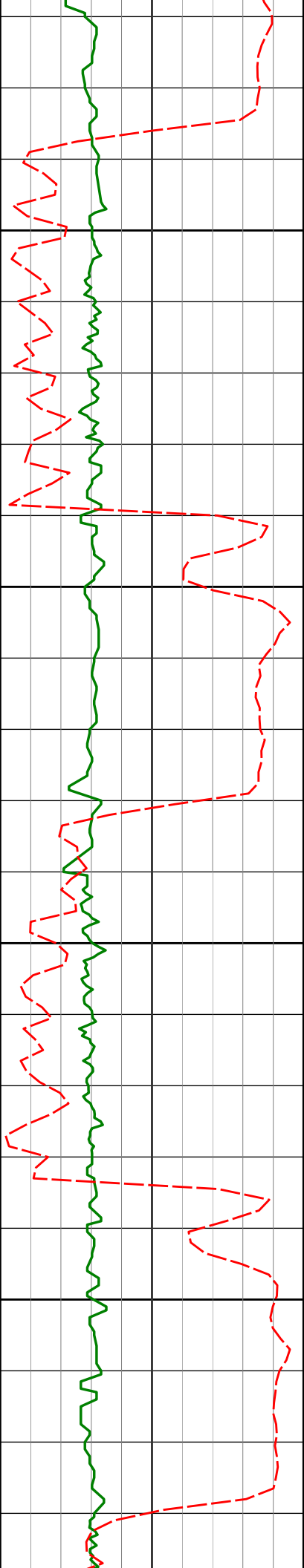
4484'

9.29°

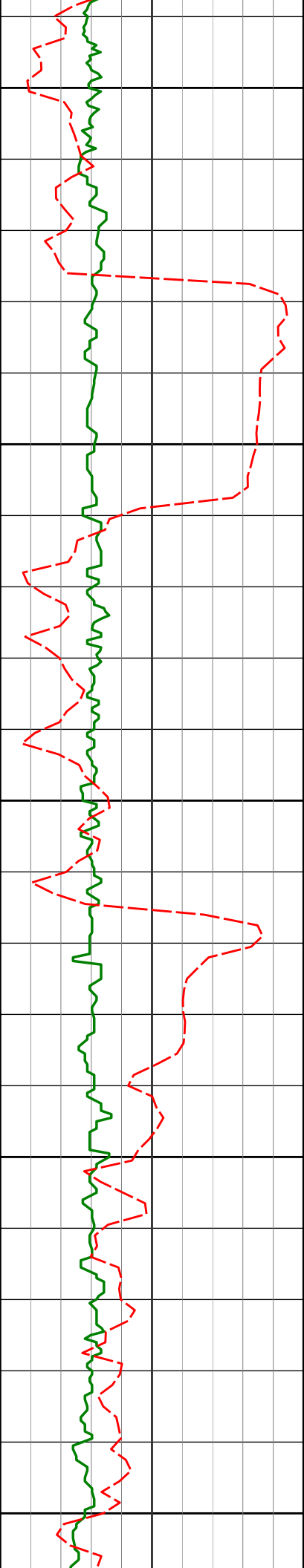
353.63°

4441.28'

61.38'



4579'	10.11°	355.55°	4534.92'	64.46'
4550				
4600				
4674'	9.88°	357.70°	4628.48'	67.08'
4650				
4700				
4769'	10.61°	357.43°	4721.96'	69.48'



4750

4800

4850

4900

4950

4863'

11.91°

356.90°

4814.15'

72.22'

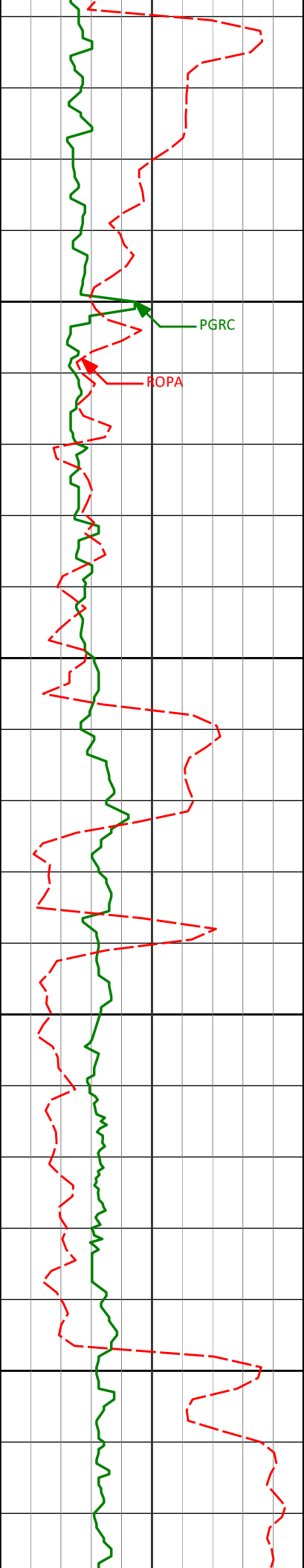
4958'

10.05°

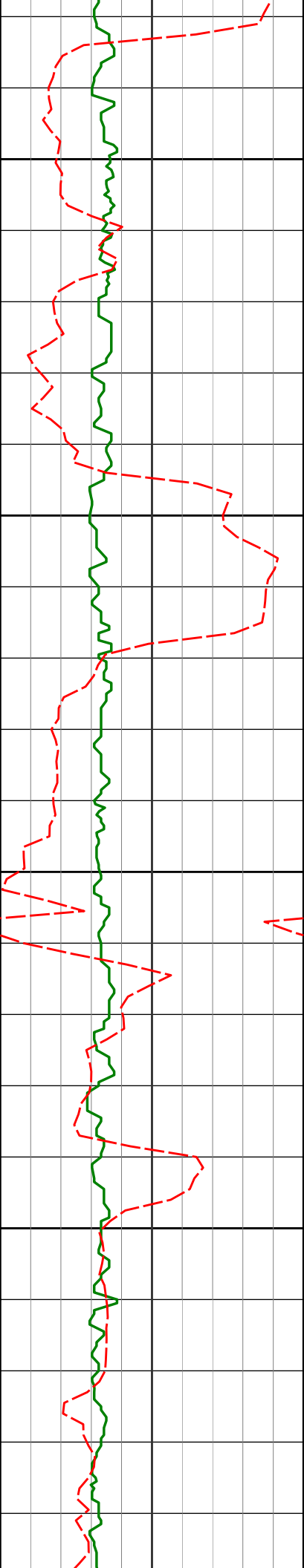
355.45°

4907.41'

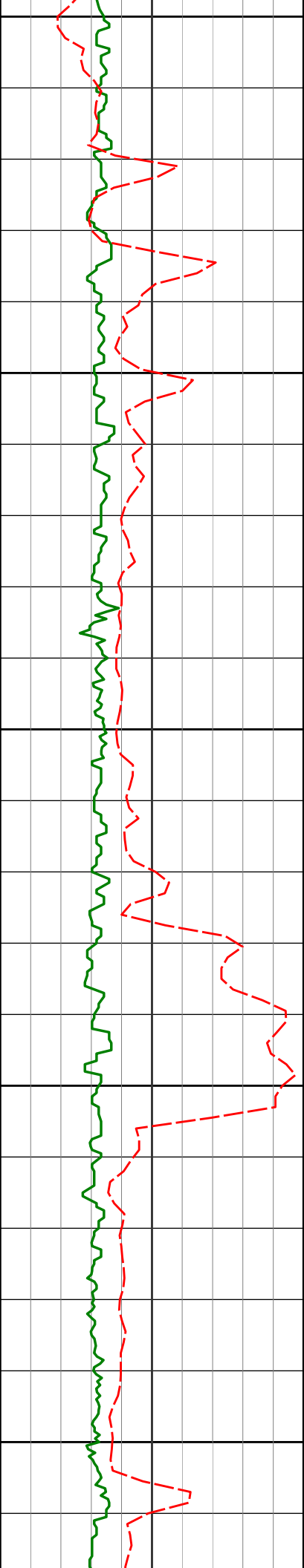
75.21'



5000	5053'	9.38°	357.77°	5001.05'	77.76'
5050					
5100	5148'	8.13°	358.36°	5094.94'	79.70'
5150					



	5243'	7.79°	359.70°	5189.02'	81.24'
5200					
5250					
5300					
5350					
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8100					
8150					
8200					
8250					
8300					
8350					
8400					
8450					
8500					
8550					
8600					
8650					
8700					



5400

5450

5500

5550

5600

5527'

4.30°

356.26°

5471.38'

85.08'

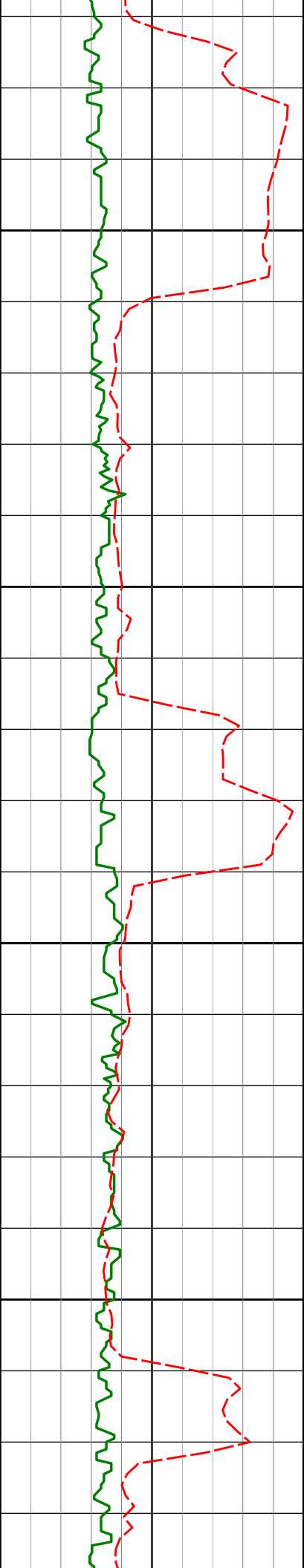
5622'

3.30°

349.34°

5566.17'

86.44'



5650

5717'

1.18°

17.32°

5661.10'

87.02'

5700

5750

5811'

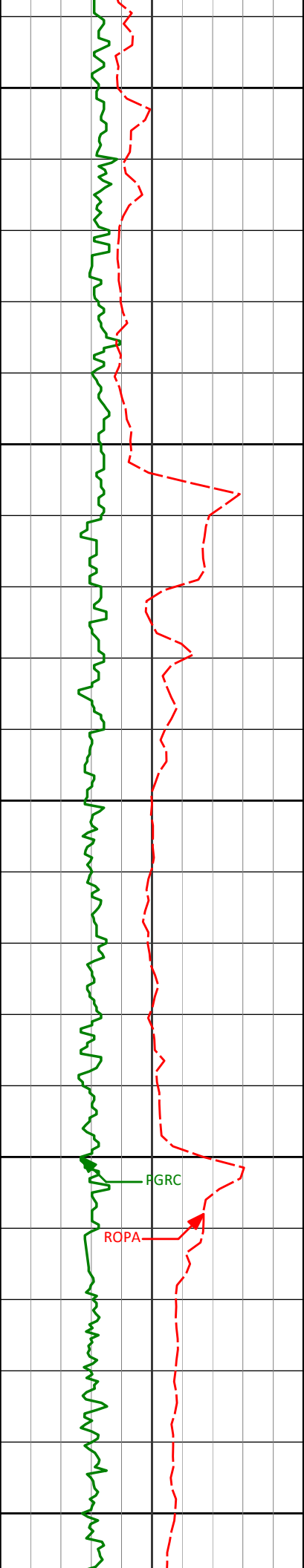
0.28°

121.10°

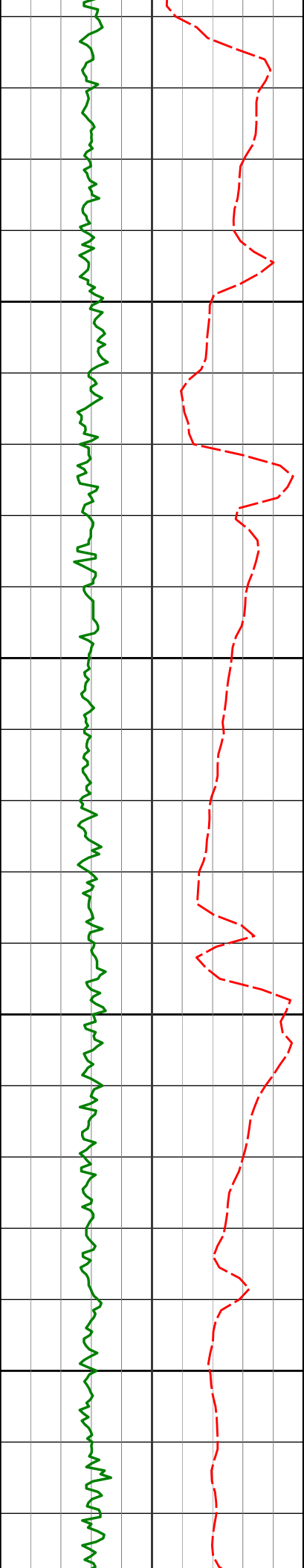
5755.09'

86.61'

5800



5850	5906'	0.34°	148.07°	5850.09'	86.23'
5900					
5950	6001'	0.40°	134.00°	5945.08'	85.80'
6000	6062'	0.51°	107.93°	6006.08'	85.37'
6050					



200

6100

6150

6200

6250

6124'

0.66°

115.83°

6068.08'

84.76'

6191'

2.49°

253.20°

6135.06'

85.74'

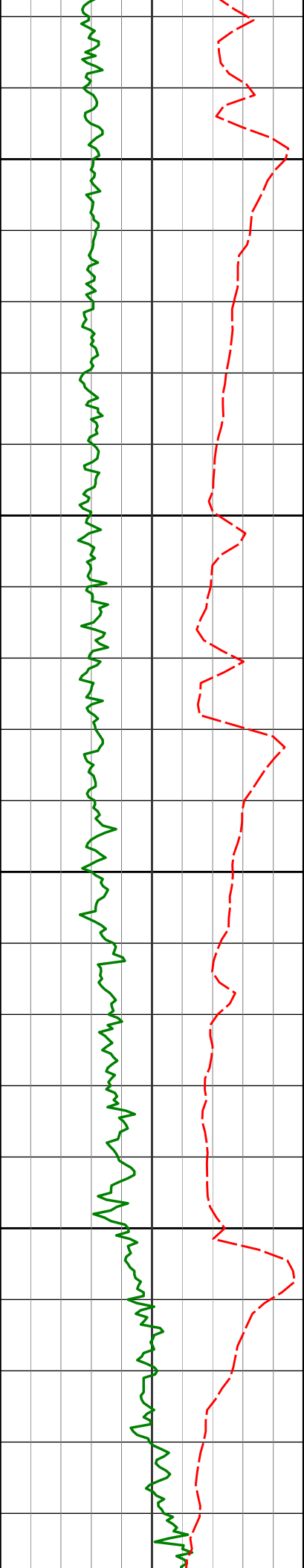
6285'

13.87°

264.48°

6227.96'

98.72'



6300

6350

6400

6450

6380'

17.53°

264.08°

6319.40'

123.91'

6475'

23.62°

266.42°

6408.30'

156.73'

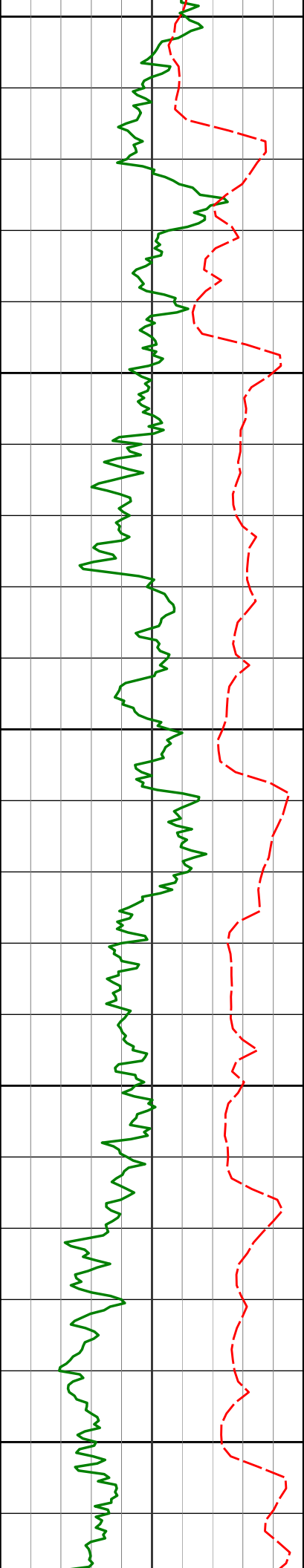
6569'

37.89°

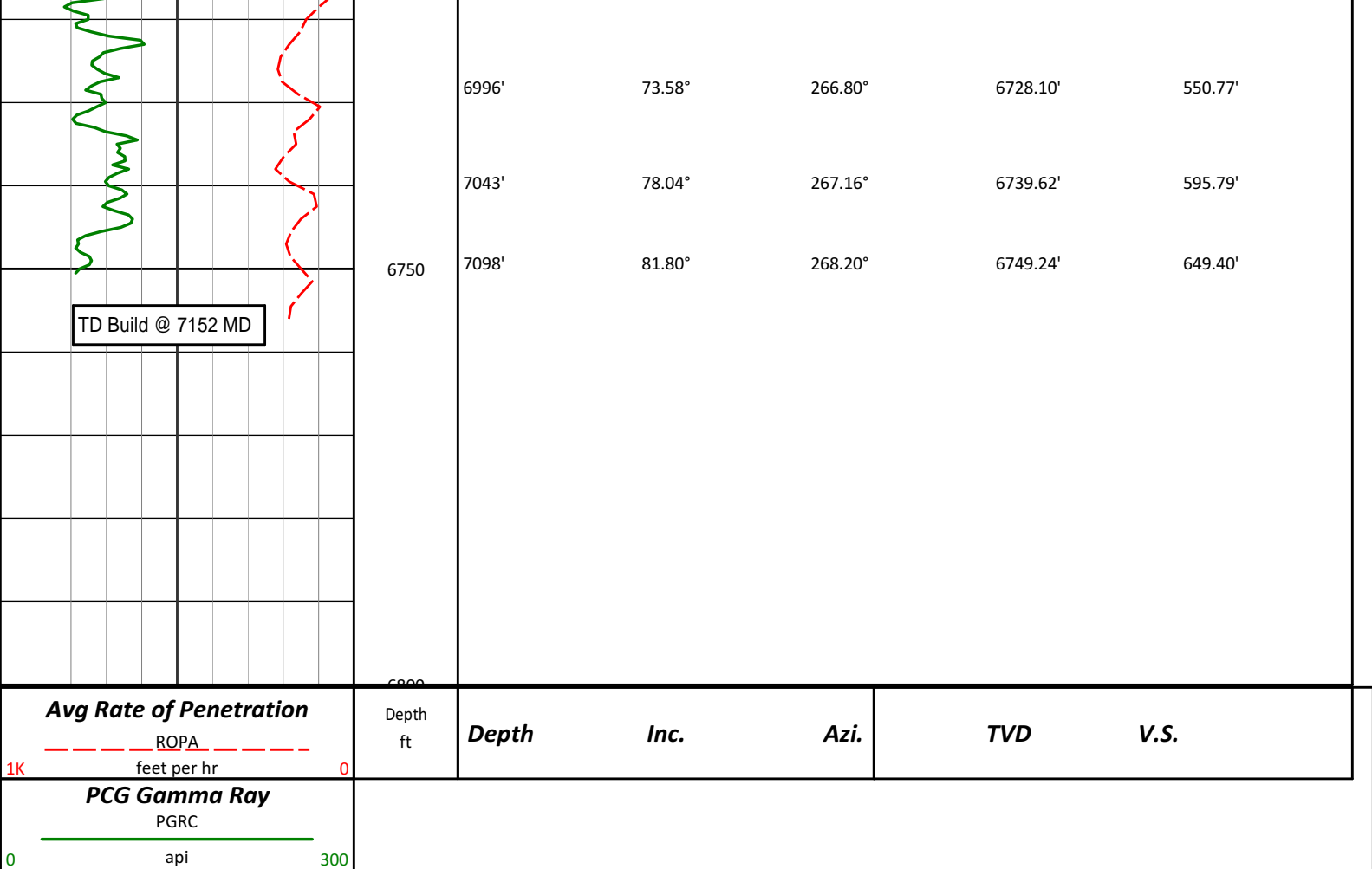
268.90°

6488.87'

204.22'



6500				
6550				
6664'	50.08°	269.76°	6557.10'	269.67'
6600				
6759'	55.53°	270.73°	6614.51'	344.97'
6650				
6854'	58.45°	270.76°	6666.25'	424.32'
6700				
6902'	61.51°	269.63°	6690.27'	465.68'
6948'	64.77°	268.17°	6711.05'	506.42'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble
NCLP AA06-69HNC
Wattenberg
Weld Colorado
USA
CA-XX-0901286146
Other Information:

First Three Survey's from 3rd party source (Multi Shot EMS)
Survey Depth 269 Inc 0.40 Azi 255.46
Survey Depth 545 Inc 0.40 Azi 137.16
Survey Depth 823 Inc 0.60 Azi 57.36

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
269.00	0.40	255.46	269.00	0.24 S	0.91 W	0.88	0.15
545.00	0.40	137.16	544.99	1.18 S	1.19 W	1.06	0.25
823.00	0.60	57.36	822.99	1.11 S	0.70 E	-0.81	0.24
905.00	0.29	195.38	904.99	1.08 S	1.01 E	-1.11	1.02
996.00	0.23	187.02	995.98	1.48 S	0.92 E	-1.07	0.08
1089.00	0.15	254.81	1088.98	1.70 S	0.78 E	-0.95	0.24
1182.00	0.11	247.61	1181.98	1.77 S	0.58 E	-0.76	0.05
1274.00	0.24	221.13	1273.98	1.94 S	0.37 E	-0.57	0.16
1365.00	0.22	211.39	1364.98	2.24 S	0.16 E	-0.38	0.05
1457.00	0.00	180.12	1456.98	2.39 S	0.07 E	-0.30	0.24

1437.00	0.00	190.12	1430.98	2.39 S	0.07 E	-0.30	0.24
1549.00	0.10	228.99	1548.98	2.44 S	0.00 E	-0.25	0.11
1641.00	0.18	237.25	1640.98	2.57 S	0.18 W	-0.08	0.09
1736.00	0.37	229.97	1735.98	2.85 S	0.54 W	0.25	0.20
1831.00	0.36	214.78	1830.98	3.29 S	0.94 W	0.61	0.10
1926.00	0.46	210.06	1925.98	3.87 S	1.30 W	0.91	0.11
2020.00	0.56	311.59	2019.97	3.89 S	1.84 W	1.44	0.84
2115.00	2.50	358.18	2114.94	1.51 S	2.25 W	2.09	2.27
2209.00	4.51	356.89	2208.76	4.23 N	2.52 W	2.93	2.14
2304.00	5.84	1.58	2303.37	12.79 N	2.58 W	3.85	1.47
2399.00	7.70	6.12	2397.70	23.95 N	1.77 W	4.16	2.04
2494.00	9.87	2.79	2491.58	38.41 N	0.70 W	4.54	2.35
2589.00	11.98	358.70	2584.86	56.41 N	0.53 W	6.16	2.36
2683.00	12.27	358.57	2676.76	76.15 N	1.00 W	8.61	0.31
2778.00	11.60	357.88	2769.71	95.78 N	1.60 W	11.17	0.72
2873.00	12.10	357.30	2862.68	115.27 N	2.42 W	13.94	0.54
2968.00	12.29	357.10	2955.54	135.32 N	3.40 W	16.92	0.20
3062.00	11.80	355.87	3047.47	154.89 N	4.60 W	20.07	0.59
3157.00	11.32	356.66	3140.54	173.89 N	5.85 W	23.21	0.53
3252.00	9.97	354.00	3233.90	191.38 N	7.25 W	26.35	1.51
3346.00	10.03	354.65	3326.48	207.62 N	8.86 W	29.58	0.14
3441.00	10.19	357.52	3420.00	224.25 N	10.00 W	32.38	0.56
3536.00	11.53	1.16	3513.30	242.14 N	10.17 W	34.34	1.58
3631.00	12.95	359.60	3606.14	262.28 N	10.05 W	36.23	1.53
3725.00	13.91	359.33	3697.57	284.11 N	10.26 W	38.62	1.02
3820.00	14.66	0.15	3789.63	307.55 N	10.36 W	41.07	0.82
3915.00	14.41	356.89	3881.59	331.38 N	10.97 W	44.06	0.90
4010.00	11.80	356.47	3974.11	352.88 N	12.21 W	47.44	2.75
4105.00	11.01	357.32	4067.23	371.64 N	13.23 W	50.33	0.85
4199.00	9.12	356.52	4159.78	388.04 N	14.10 W	52.84	2.02
4294.00	8.71	353.94	4253.63	402.71 N	15.32 W	55.52	0.60
4389.00	9.05	355.02	4347.49	417.30 N	16.73 W	58.38	0.40
4484.00	9.29	353.63	4441.28	432.37 N	18.23 W	61.38	0.34
4579.00	10.11	355.55	4534.92	448.30 N	19.72 W	64.46	0.93
4674.00	9.88	357.70	4628.48	464.76 N	20.70 W	67.08	0.46
4769.00	10.61	357.43	4721.96	481.64 N	21.42 W	69.48	0.77
4863.00	11.91	356.90	4814.15	499.97 N	22.33 W	72.22	1.39
4958.00	10.05	355.45	4907.41	518.02 N	23.52 W	75.21	1.98
5053.00	9.38	357.77	5001.05	534.02 N	24.48 W	77.76	0.82
5148.00	8.13	358.36	5094.94	548.47 N	24.97 W	79.70	1.32
5243.00	7.79	359.70	5189.02	561.63 N	25.20 W	81.24	0.41
5338.00	6.97	358.84	5283.23	573.83 N	25.35 W	82.61	0.87
5432.00	5.16	357.63	5376.70	583.75 N	25.64 W	83.89	1.93
5527.00	4.30	356.26	5471.38	591.58 N	26.05 W	85.08	0.91
5622.00	3.30	349.34	5566.17	597.82 N	26.78 W	86.44	1.16
5717.00	1.18	17.32	5661.10	601.44 N	27.00 W	87.02	2.45
5811.00	0.28	121.10	5755.09	602.24 N	26.51 W	86.61	1.36
5906.00	0.34	148.07	5850.09	601.89 N	26.17 W	86.23	0.16
6001.00	0.40	134.00	5945.08	601.42 N	25.78 W	85.80	0.11
6062.00	0.51	107.93	6006.08	601.18 N	25.37 W	85.37	0.38
6124.00	0.66	115.83	6068.08	600.94 N	24.78 W	84.76	0.27
6191.00	2.49	253.20	6135.06	600.35 N	25.83 W	85.74	4.49
6285.00	13.87	264.48	6227.96	598.68 N	39.04 W	98.72	12.17
6380.00	17.53	264.08	6319.40	596.10 N	64.62 W	123.91	3.85
6475.00	23.62	266.42	6408.30	593.44 N	97.87 W	156.73	6.47
6569.00	37.89	268.90	6488.87	591.70 N	145.78 W	204.22	15.24
6664.00	50.08	269.76	6557.10	590.98 N	211.62 W	269.67	12.85
6759.00	55.53	270.73	6614.51	591.33 N	287.27 W	344.97	5.79
6854.00	58.45	270.76	6666.25	592.36 N	366.92 W	424.32	3.07
6902.00	61.51	269.63	6690.27	592.50 N	408.47 W	465.68	6.69
6948.00	64.77	268.17	6711.05	591.70 N	449.49 W	506.42	7.63
6996.00	73.58	266.80	6728.10	589.72 N	494.27 W	550.77	18.55
7043.00	78.04	267.16	6739.62	587.32 N	539.76 W	595.79	9.52
7098.00	81.80	268.20	6749.24	585.14 N	593.86 W	649.40	7.09

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 275.74 DEGREES (GRID)

A TOTAL CORRECTION OF 7.46 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 7098.00 FEET
IS 833.69 FEET ALONG 314.58 DEGREES (GRID)

Tied in @ Surface

Date Printed:05 July 2014