

**PCDC - Pressure Case Directional**  
**PCGK - Pressure Case Gamma**

**1 : 240**

Country		: USA			
Field		: Wattenberg			
Location		: Lat: 40° 44' 34.43" North Long: 103° 55' 25.20" West			
Well		: Timbro LC13-75-1HN			
Company		: Noble Energy			
Rig		: H&P 322			
LOCATION		Company : Noble Energy Rig : H&P 322 Well : Timbro LC13-75-1HN Field : Wattenberg Country : USA API Number : 05-123-36683			
Latitude : 40° 44' 34.43" North Longitude : 103° 55' 25.20" West					
UTM Easting = 3,436,781.473 ft UTM Northing = 1,517,364.553 ft					
Permanent Datum : Ground Level		Elevation : 4857.00 ft		Elev. KB N/A	
Log Measured From : Drill Floor		24.00 ft Above Permanent Datum		DF 4881.00 ft GL 4857.00 ft WD N/A	
Drilling Measured From : Drill Floor		MD LOG			
Depth Logged : 640.00 ft To 10,390.00 ft		Unit No. : 11210425		Job No. :CA-XX-0900343455	
Date Logged : 27-Apr-13 To 05-May-13		Plot Type : Final			
Total Depth MD : 10,390.00 ft TVD : 5,965.66 ft		Plot Date : 04-May-13			
Spud Date : 27-Apr-13					
Borehole Record (MD)		Borehole Record (MD)			
Run No.	Size From To	Run No.	Size From To		
2	8.750 in 640.00 ft 5224.00 ft				
3	8.750 in 5224.00 ft 6360.00 ft				
4	6.125 in 6,360.00 ft 10,390.00 ft				
Casing Record (MD)		Casing Record (MD)			
	Size Weight From To				
	9.265 in 36.00 lbpf SURFACE 640.00 ft				
	7.000 in 26.00 lbpf SURFACE 6350.00 ft				

**WELL INFORMATION**

MWD Run Number	100	200	300		
Date run completed	29-Apr-13	30-Apr-13	04-May-13		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.750	6.750	4.75		
Log Start Depth (MD, ft)	640.00	5,224.00	6,360.00		
Log End Depth (MD, ft)	5,224.00	6,360.00	10,390.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	28-Apr-13 20:19	29-Apr-13 16:37	02-Apr-13 02:12		
Drill/Wipe End Date and Time	29-Apr-13 08:26	30-Apr-13 12:06	03-Apr-13 10:48		
Min Inc (deg) @ Depth (MD, ft)	.02 @ 300.00	.86 @ 5,258.00	84.97 @ 6,380.00		
Max Inc (deg) @ Depth (MD, ft)	16.41 @ 3,461.00	79.54 @ 6,304.00	91.63 @ 9,223.00		
Bit TFA(in2) / Bit Type	.75 / PDC	.86 / PDC	.46 / PDC		
Flow Rate (gpm)	582.00	565.00	268.00		
Max AV (fpm) / CV (fpm) @ MWD	441.5 / 441.5	441.5 / 441.5	442.9 / 442.9		
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	8.93 / 28.00	10.87 / 38.00	10.33 / 37.00		
Filtrate CL (ppm)	2,100.00	2,100.00	2,000.00		
pH / Fluid Loss (mptm)	8.50 / N/A	9.10 / N/A	8.50 / N/A		
PV (cP) / YP (lbf2)	2 / 5.00	12 / 11.00	10 / 10.00		
% Solids / % Sand	3.70 / 0.25	12.2 / 0.50	9.70 / 0.65		
% Oil / Oil:Water Ratio	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		
Rmf @ Measured Temp (degF)	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		

Max Tool Temp (degF) / Source	141.70 / PCM	171.20 / PCM	213.14 / PCM		
Rm @ Max Tool Temp (degF)	.7191 @ 141.70	.5999 @ 171.20	.4855 @ 213.14		
Lead MWD Engineer	Osahon Igunbor	Osahon Igunbor	Osahon Igunbor		
Customer Representative	Jeremy Stolz	Jeremy Stolz	Jeremy Stolz		

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.76	5.76	5.76		
Sub Serial Number	11341333	11341333	12134690		
Insert Serial Number	10868872	10868872	11400904		
Date and Time Initialized	27-Apr-13 16:24	27-Apr-13 16:24:00	30-Apr-13 17:19		
Date and Time Read	01-May-13 08:32	01-May-13 08:26	03-May-13 23:34		
ECMB SW Version	N/A	N/A	N/A		

### Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	55.00	56.00	61.00		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11341333	11341333	12134690		
Sonde Serial Number	11638497	11638497	11833222		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	238.24	81.46	129.36		

### Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	47.65	48.93	53.80		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11341333	11341333	12134690		
Insert/Sonde Serial Number	11579834	11579834	11579852		

## REMARKS

1. All depths are measured depths and are calibrated to the driller' pipe tally and are measured from the drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
4. The Following smoothing parameters have been applied to the data"

PGRC (Gamma Ray):  
Interval Resolution: 0.5 feet  
Coercion Distance: 0.6 feet  
Gap Fill: 3.0 feet

ROPA (Rate of Penetration):  
Interval Resolution: 0.5 feet  
Coercion Distance: 1.2 feet

## WARRANTY

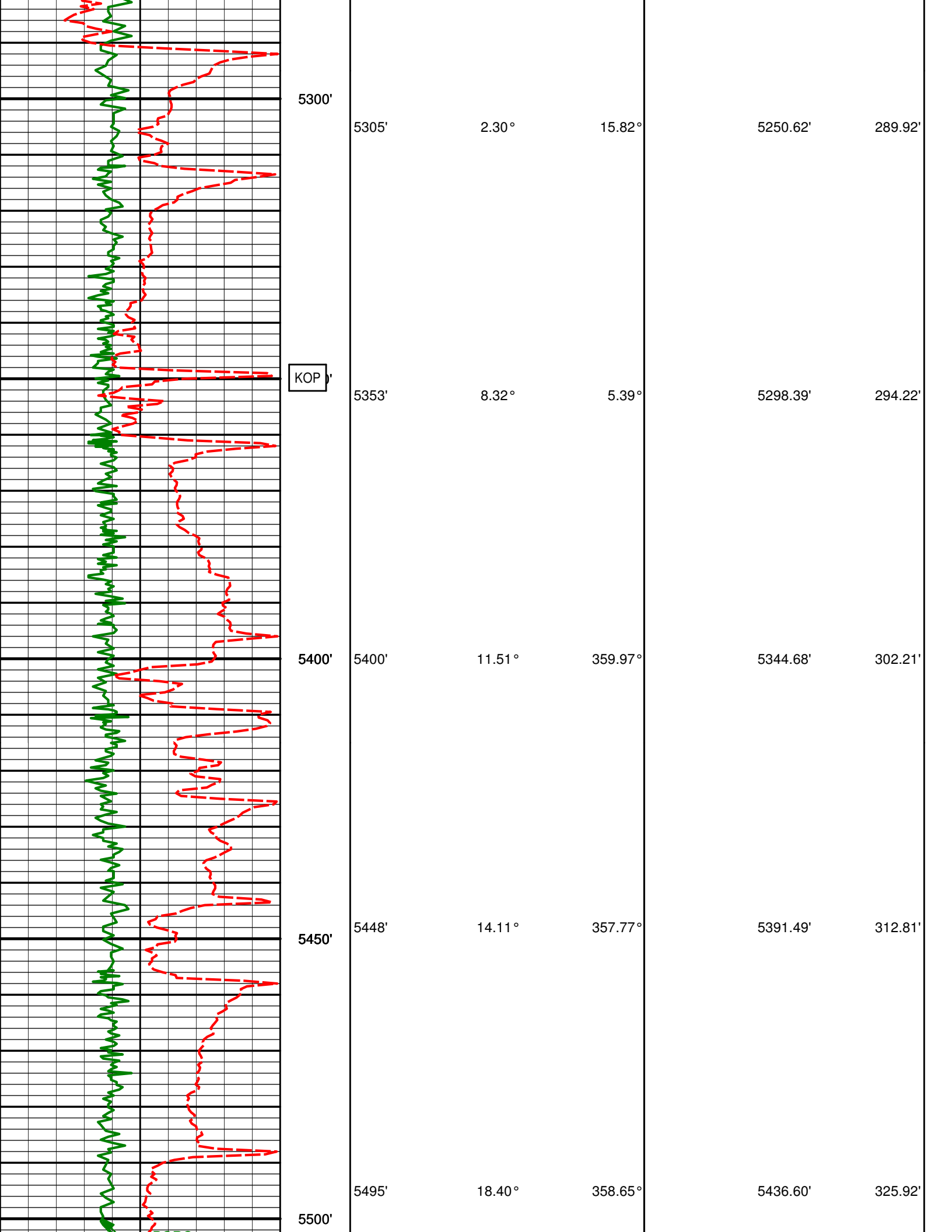
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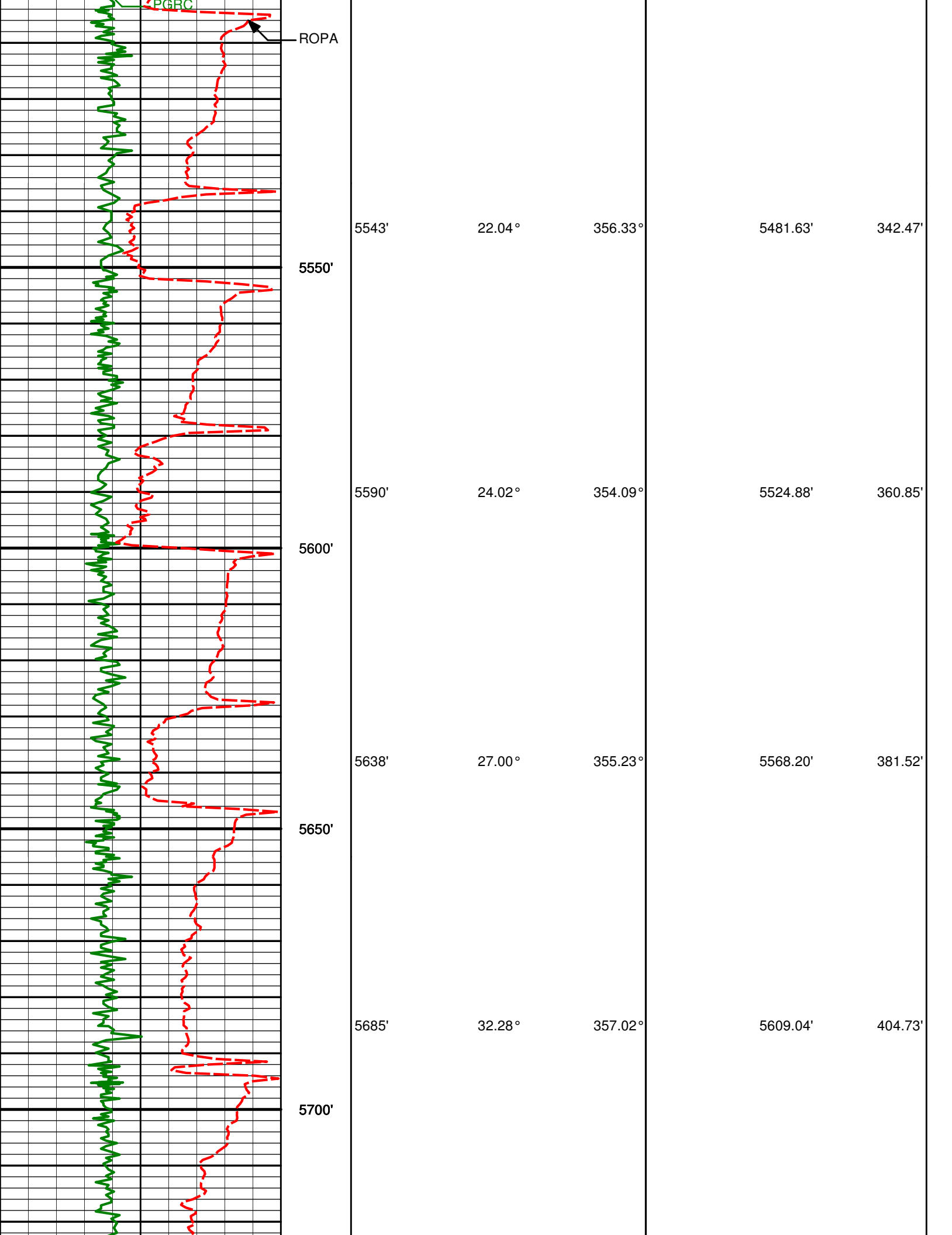
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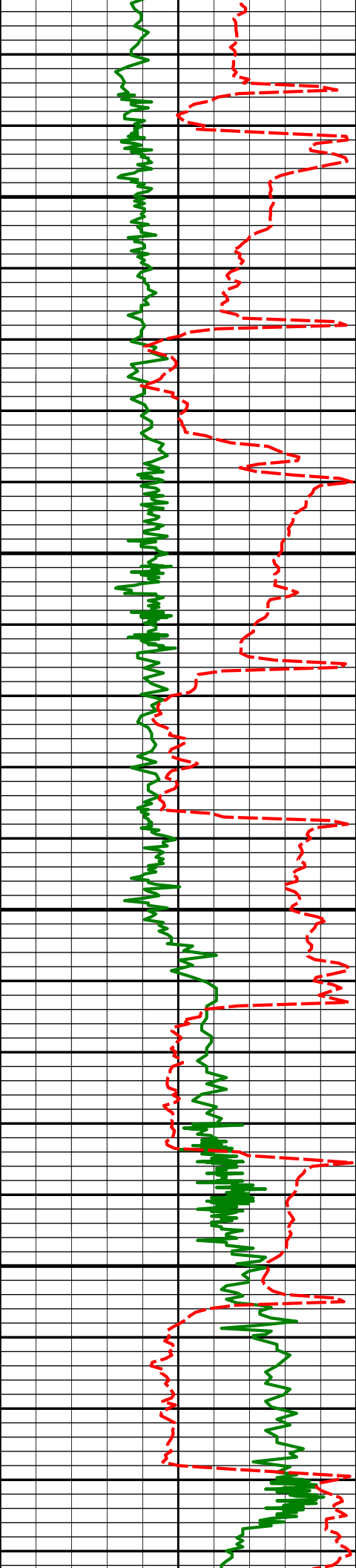
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MD Detail Log 1:240

Gamma Ray (PGCR) (Api)					
0300					
Avg Rate of Penetration feet per hr	Feet				
6000		Depth	Inc	Azm	TVDVsec
	5200'				
	Run 200				
	5250'				
	5258'				
	0.86°				
	140.12°				
	5203.63'				
	289.34'				







5733'

37.98°

356.58°

5648.28'

432.30'

5750'

5780'

41.32°

357.65°

5684.46'

462.23'

5800'

5827'

44.71°

358.22°

5718.82'

494.21'

5850'

5874'

47.26°

357.76°

5751.48'

527.92'

5900'

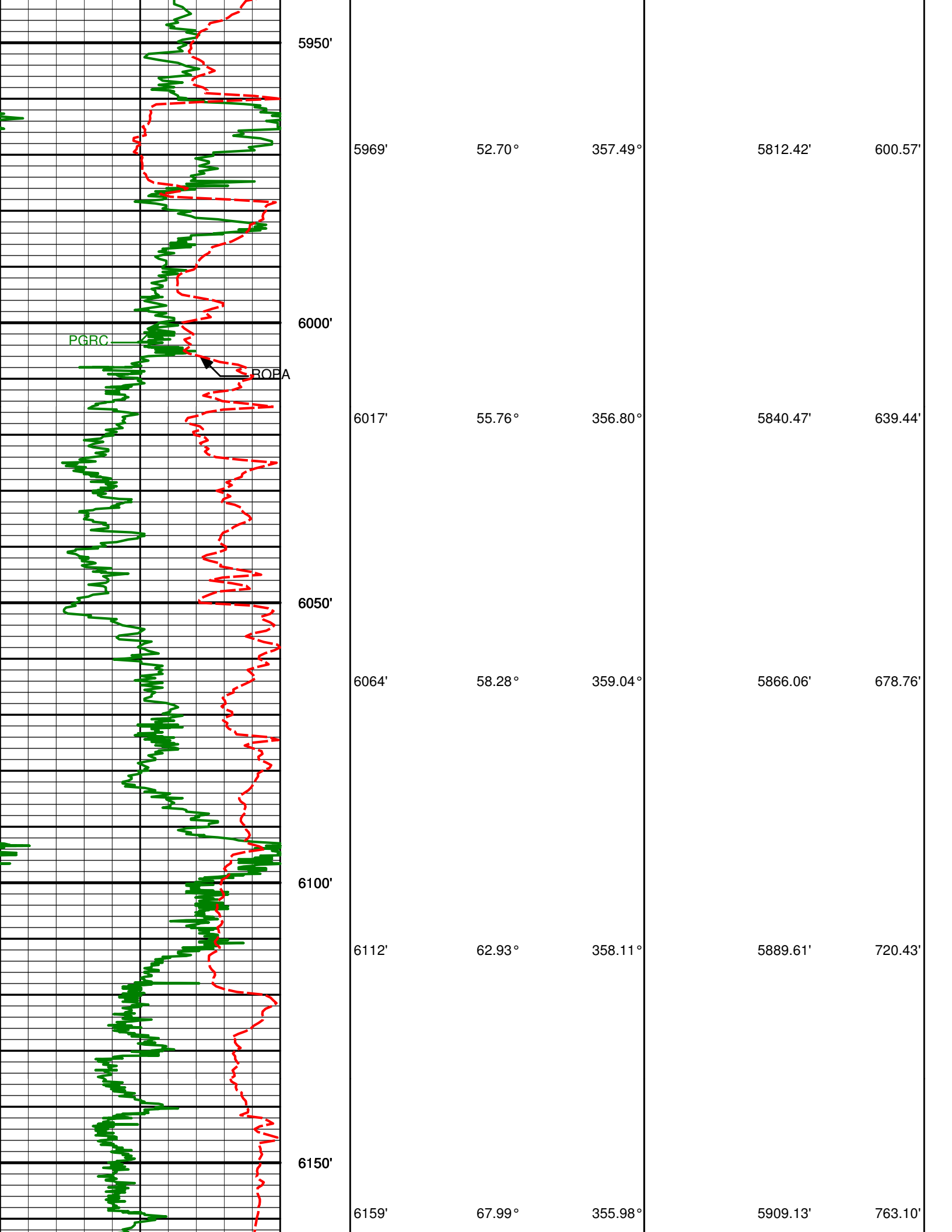
5922'

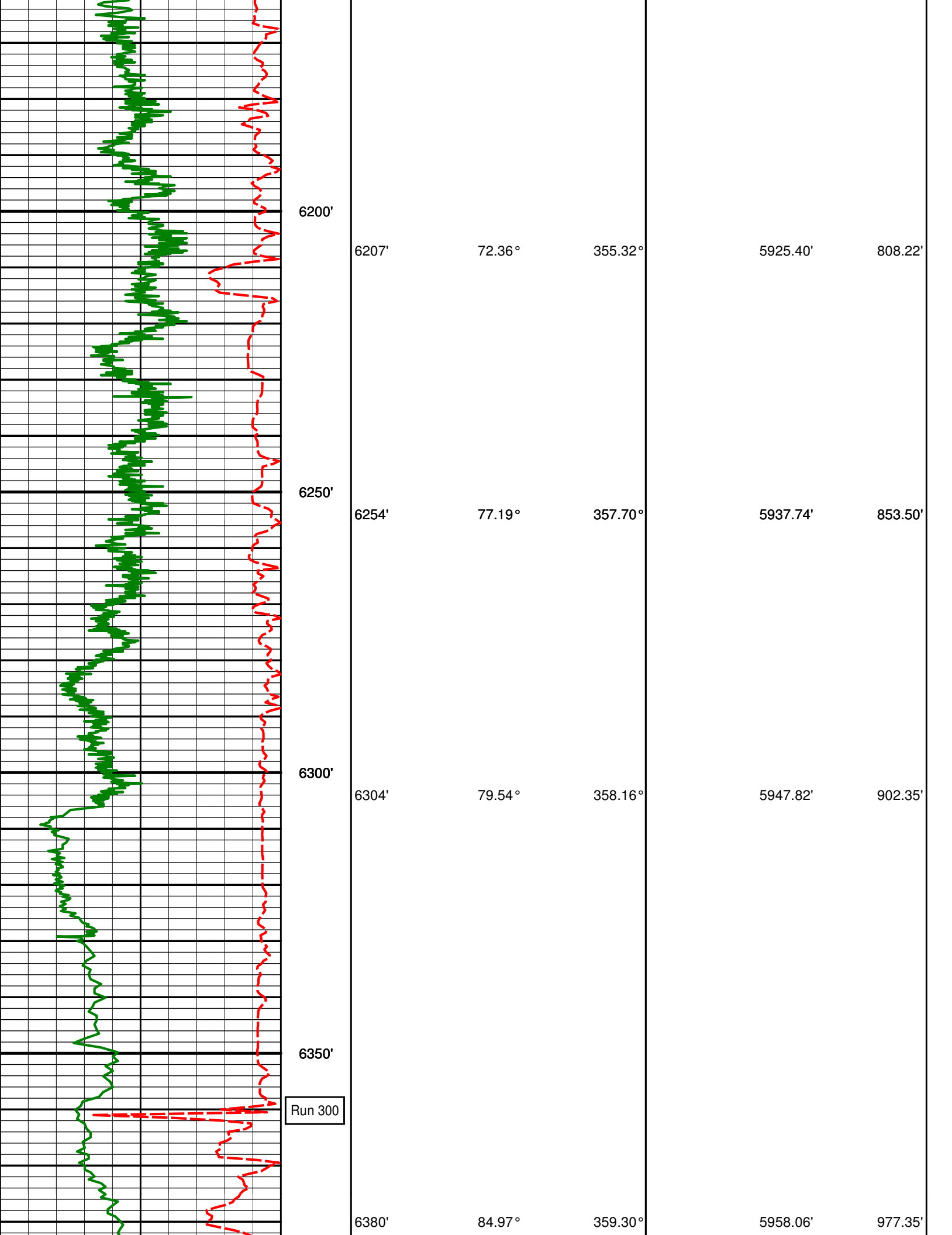
50.22°

358.21°

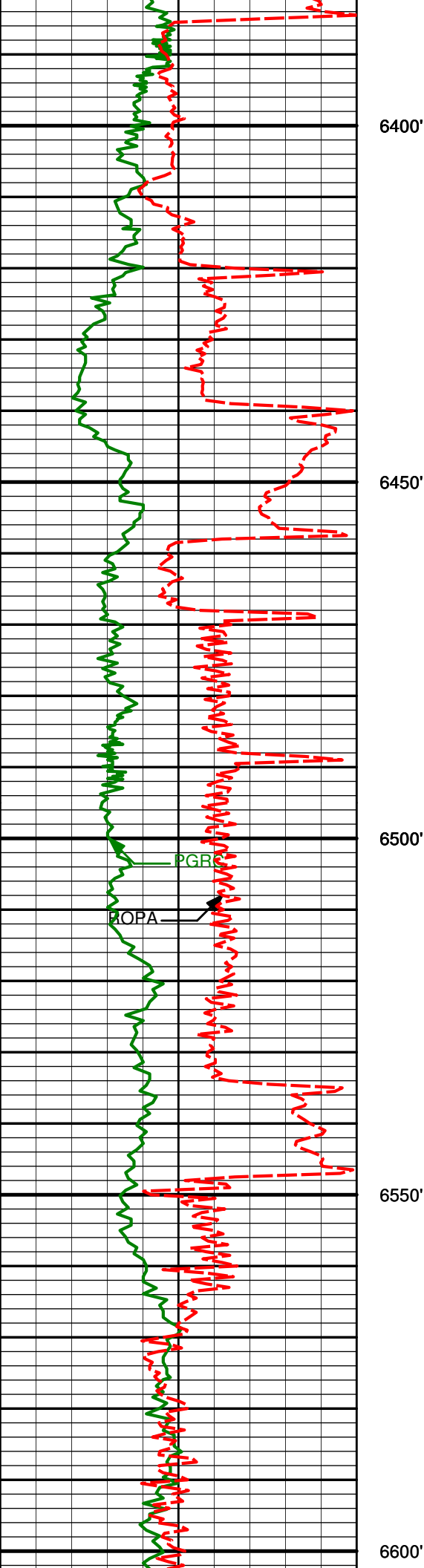
5783.14'

563.90'



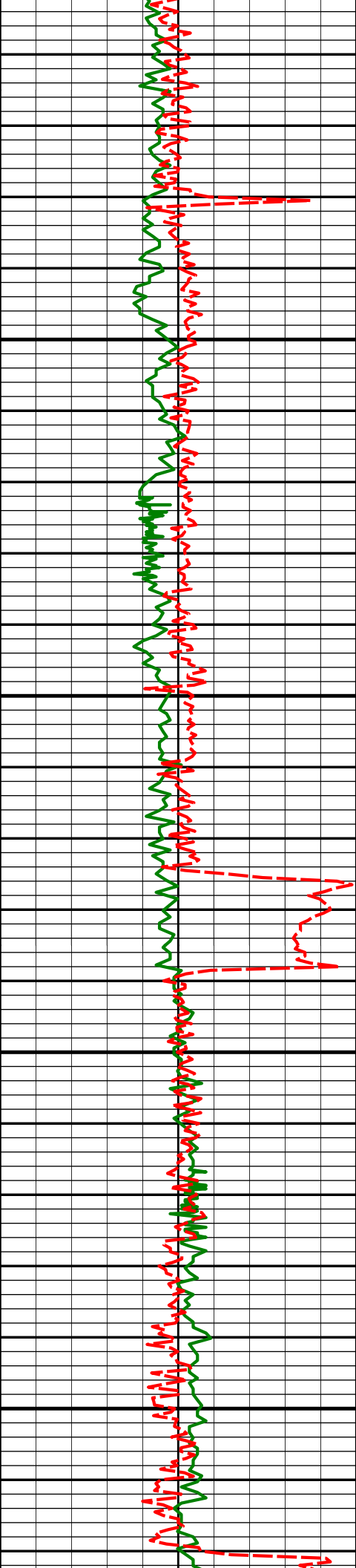






6472'	87.13°	358.58°	5964.40'	1068.76'
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6567'	88.71°	358.32°	5967.85'	1163.39'
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6650'

6661'

88.89°

358.46°

5969.82'

1257.07'

6700'

6750'

6756'

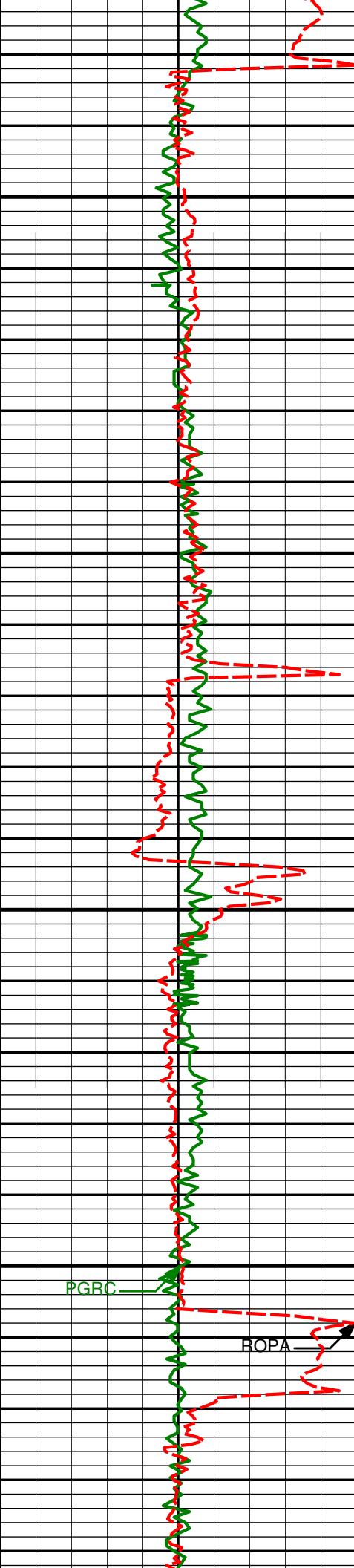
91.14°

357.43°

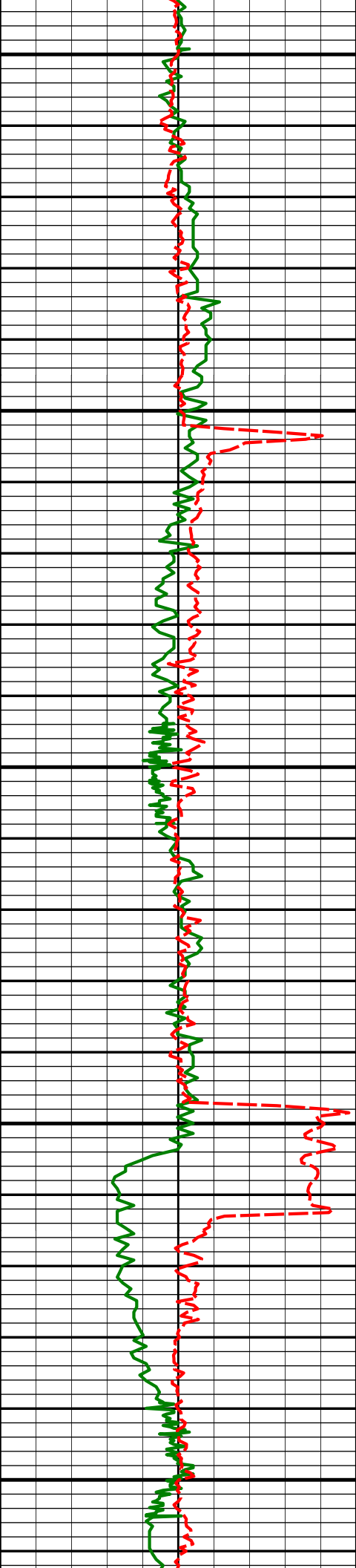
5969.80'

1351.82'

6800'



6850'	6851'	90.18°	358.48°	5968.70'	1446.57'
6900'					
6950'	6946'	91.05°	357.92°	5967.68'	1541.29'
7000'					
	7041'	89.48°	357.81°	5967.24'	1636.05'



7050'

7100'

7136'

89.78°

357.03°

5967.86'

1730.86'

7150'

7200'

7231'

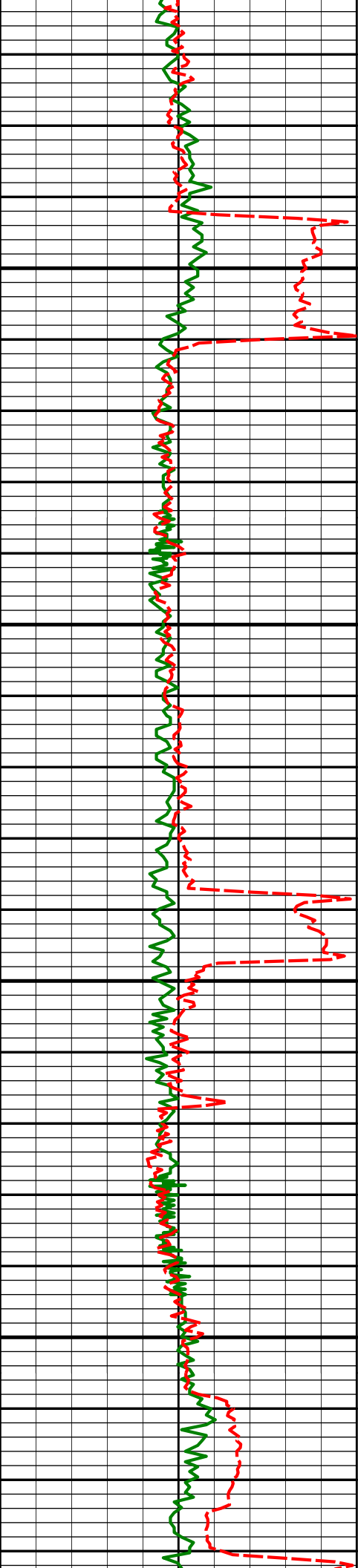
89.72°

357.84°

5968.27'

1825.67'

7250'



7300'

7326'

90.12°

358.51°

5968.39'

1920.40'

7350'

7400'

7420'

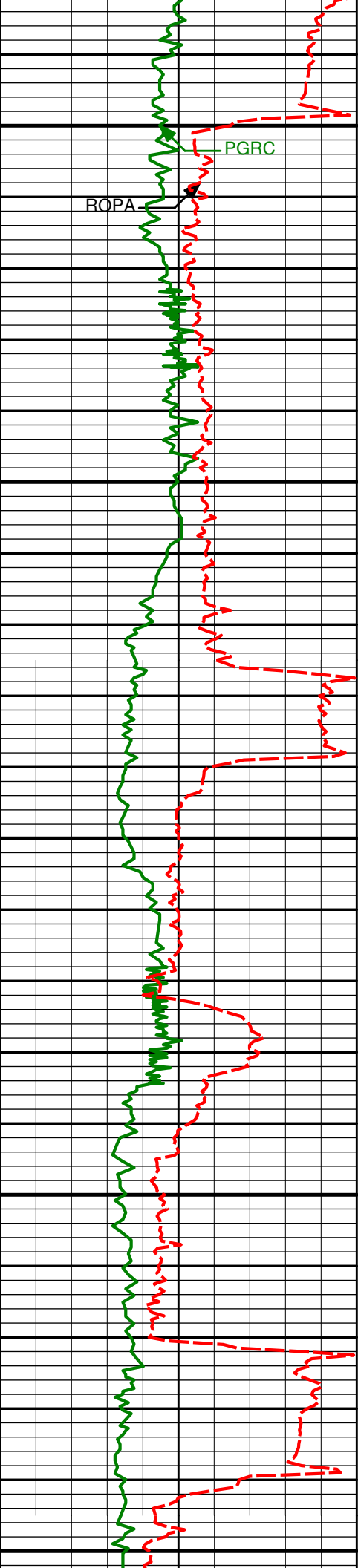
91.54°

357.27°

5967.03'

2014.15'

7450'



7500'

7550'

7600'

7650'

7700'

ROPAL

PGRC

7515'

90.68°

358.28°

5965.19'

2108.91'

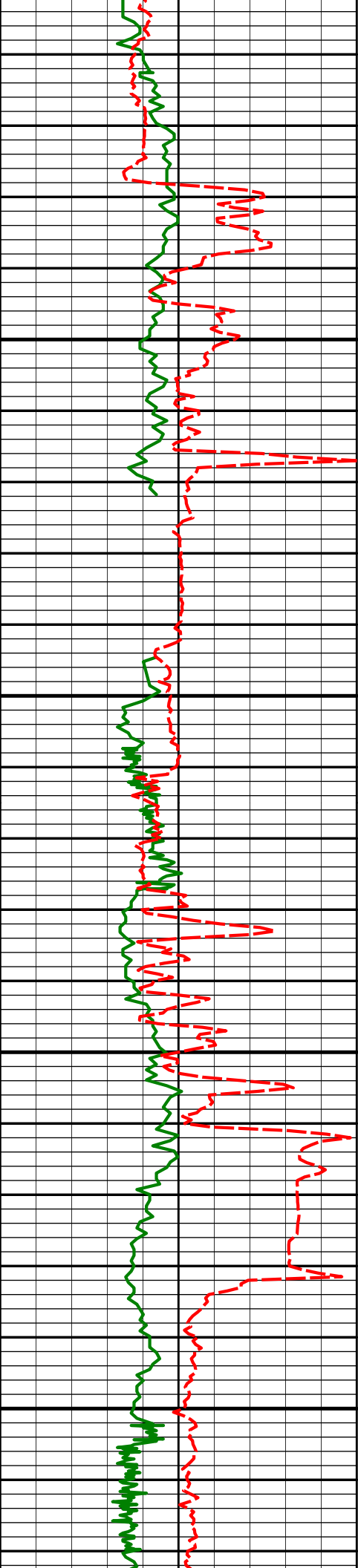
7610'

90.99°

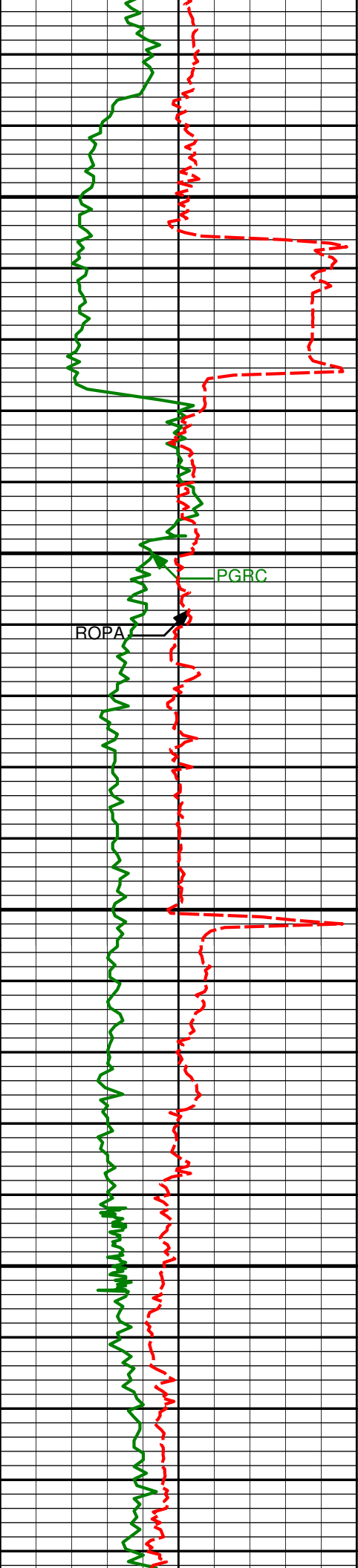
359.34°

5963.81'

2203.54'



	7705'	88.98°	359.65°		5963.83'	2298.07'
7750'						
7800'	7800'	90.49°	2.72°		5964.27'	2392.28'
7850'						
	7894'	89.97°	2.18°		5963.89'	2485.22'
7900'						



7950'

7989'

89.41°

358.05°

5964.40'

2579.63'

8000'

PGRC

ROPA

8050'

8084'

90.49°

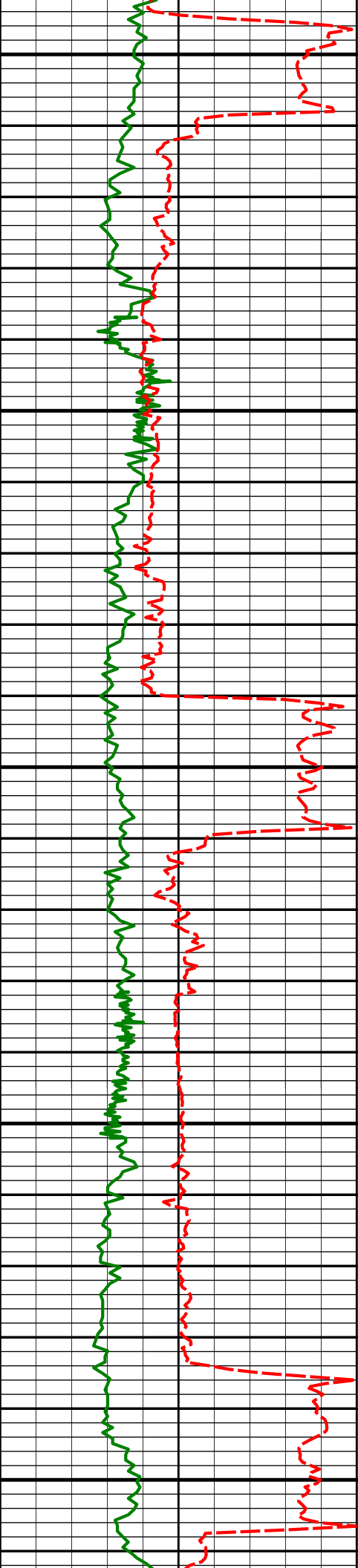
356.82°

5964.47'

2674.44'

8100'





8150'

8179'

90.09°

356.53°

5963.99'

2769.32'

8200'

8250'

8274'

90.99°

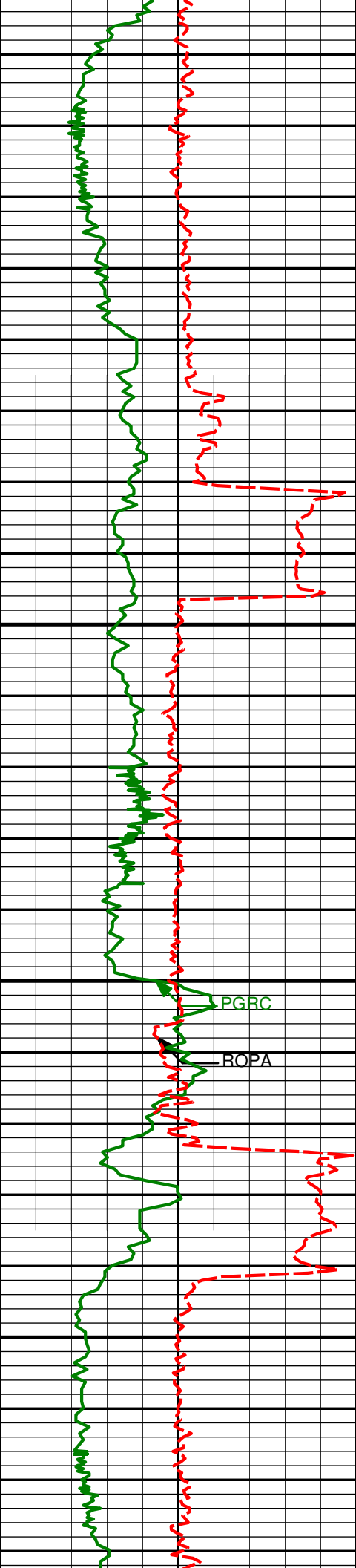
357.30°

5963.10'

2864.18'

8300'

8350'



8369'

90.62°

357.93°

5961.77'

2958.96'

8400'

8450'

8464'

90.22°

358.68°

5961.08'

3053.67'

8500'

PGRC

ROPA

8550'

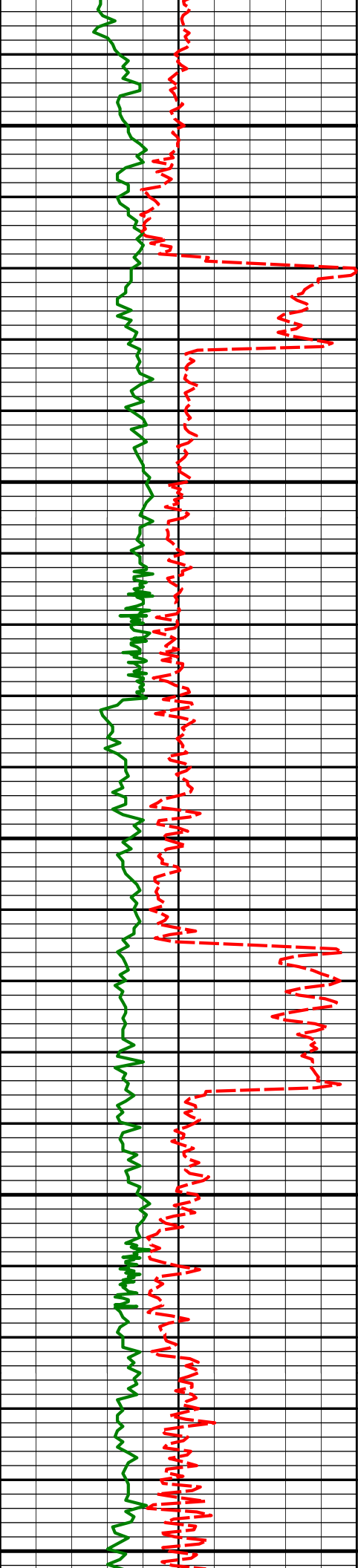
8559'

89.01°

357.73°

5961.72'

3148.39'



8600'

8650'

8700'

8750'

8800'

8654'

90.71°

358.56°

5961.95'

3243.11'

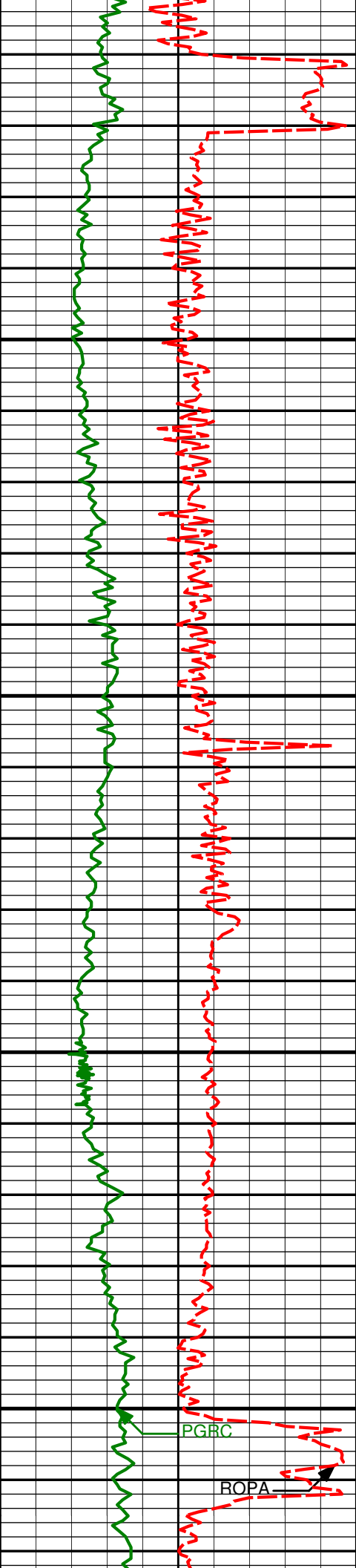
8749'

89.45°

359.11°

5961.82'

3337.75'



8843'

88.61°

358.40°

5963.41'

3431.39'

8850'

8900'

8938'

89.88°

357.90°

5964.66'

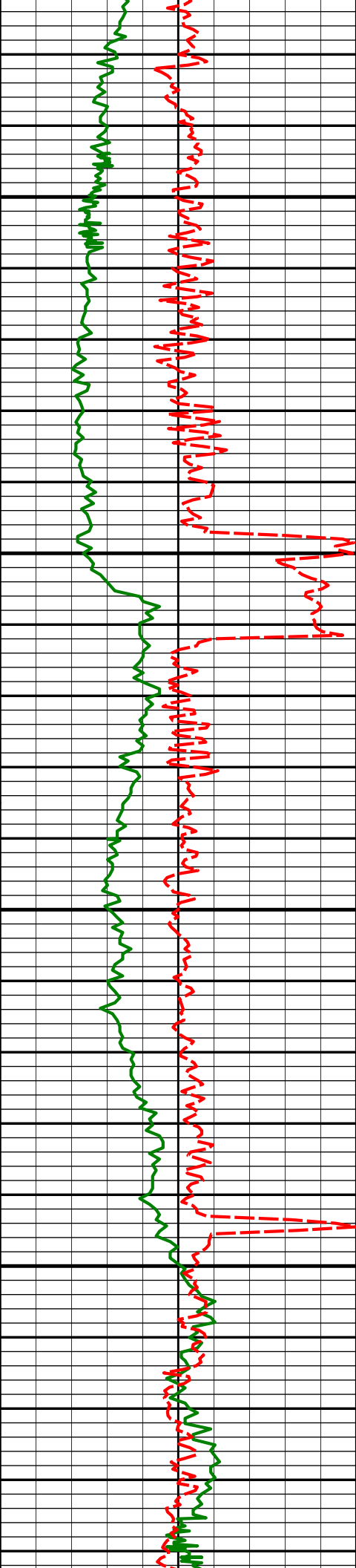
3526.11'

8950'

9000'

PGRC

ROPA



9050'

9100'

9150'

9200'

9033'

90.34°

358.04°

5964.48'

3620.86'

9128'

90.00°

358.21°

5964.20'

3715.60'

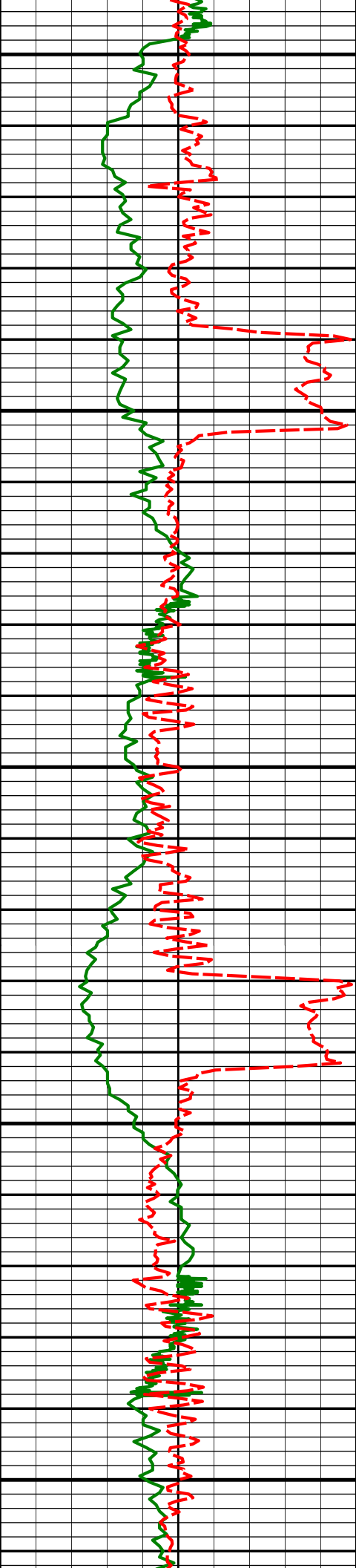
9223'

91.63°

358.01°

5962.85'

3810.32'



9250'

9300'

9350'

9400'

9450'

9317'

90.77°

356.83°

5960.88'

3904.11'

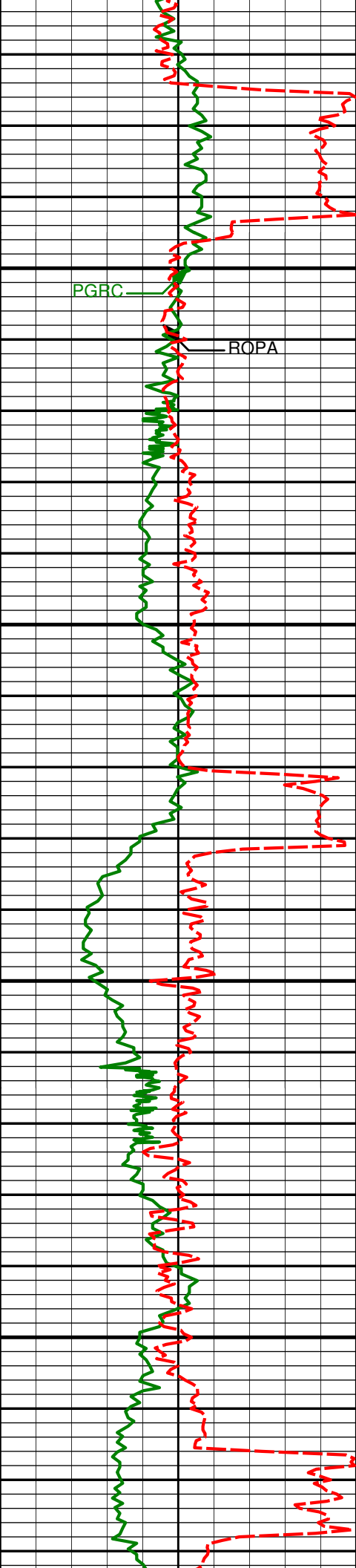
9412'

90.56°

357.57°

5959.78'

3998.94'



9500'

PGRC

ROPA

9507'

89.41 °

357.10 °

5959.80'

4093.76'

9550'

9600'

9602'

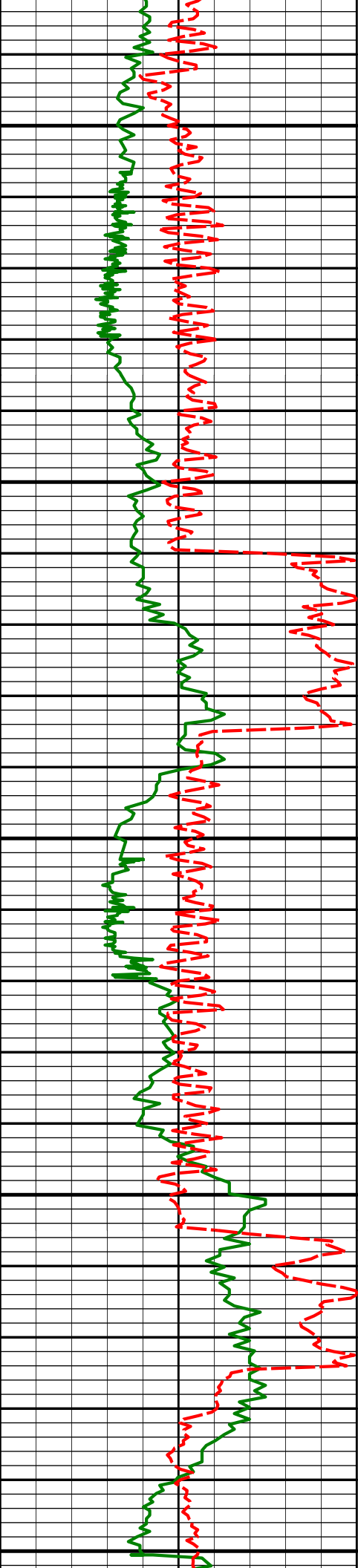
88.80 °

356.52 °

5961.28'

4188.62'

9650'



9700'

9697'

89.44 °

356.74 °

5962.74'

4283.50'

9750'

9792'

88.80 °

358.24 °

5964.20'

4378.29'

9800'

9850'

9887'

88.86 °

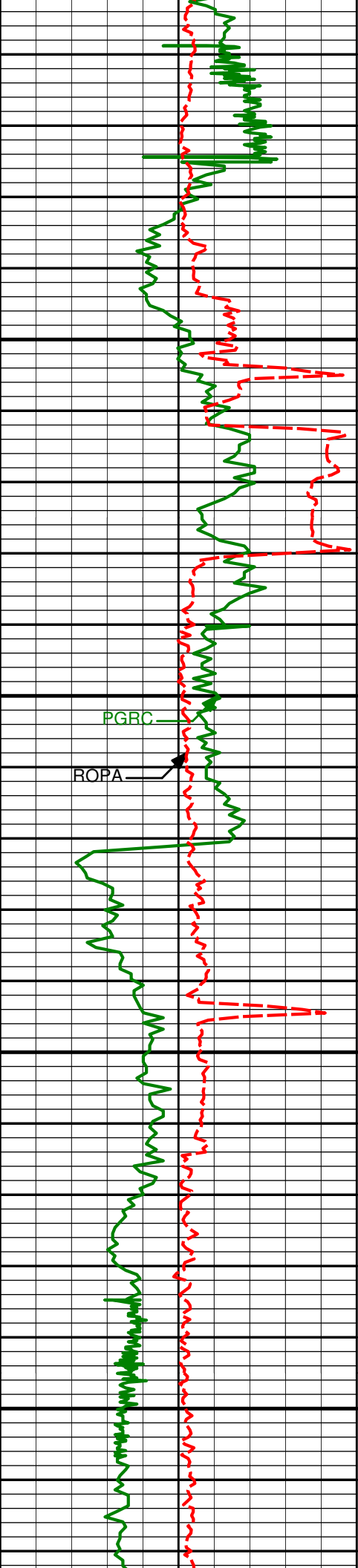
358.80 °

5966.14'

4472.96'

9900'





9950'

9982'

89.78°

359.46°

5967.27'

4567.54'

10000'

PGRC

ROPA

10050'

10077'

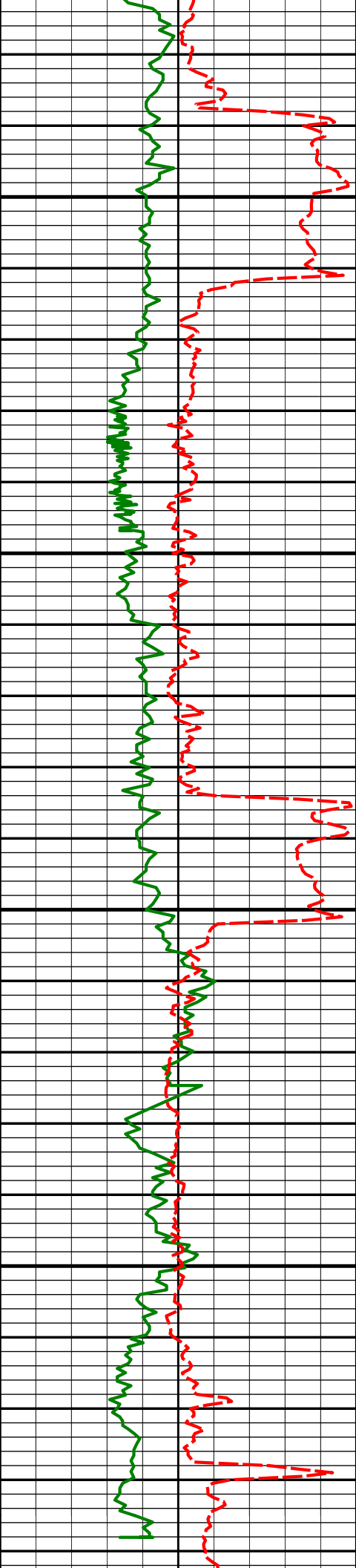
91.14°

358.48°

5966.50'

4662.16'

10100'



10150'

10171'

90.15°

359.34°

5965.43'

4755.78'

10200'

10250'

10266'

89.75°

359.11°

5965.51'

4850.36'

10300'

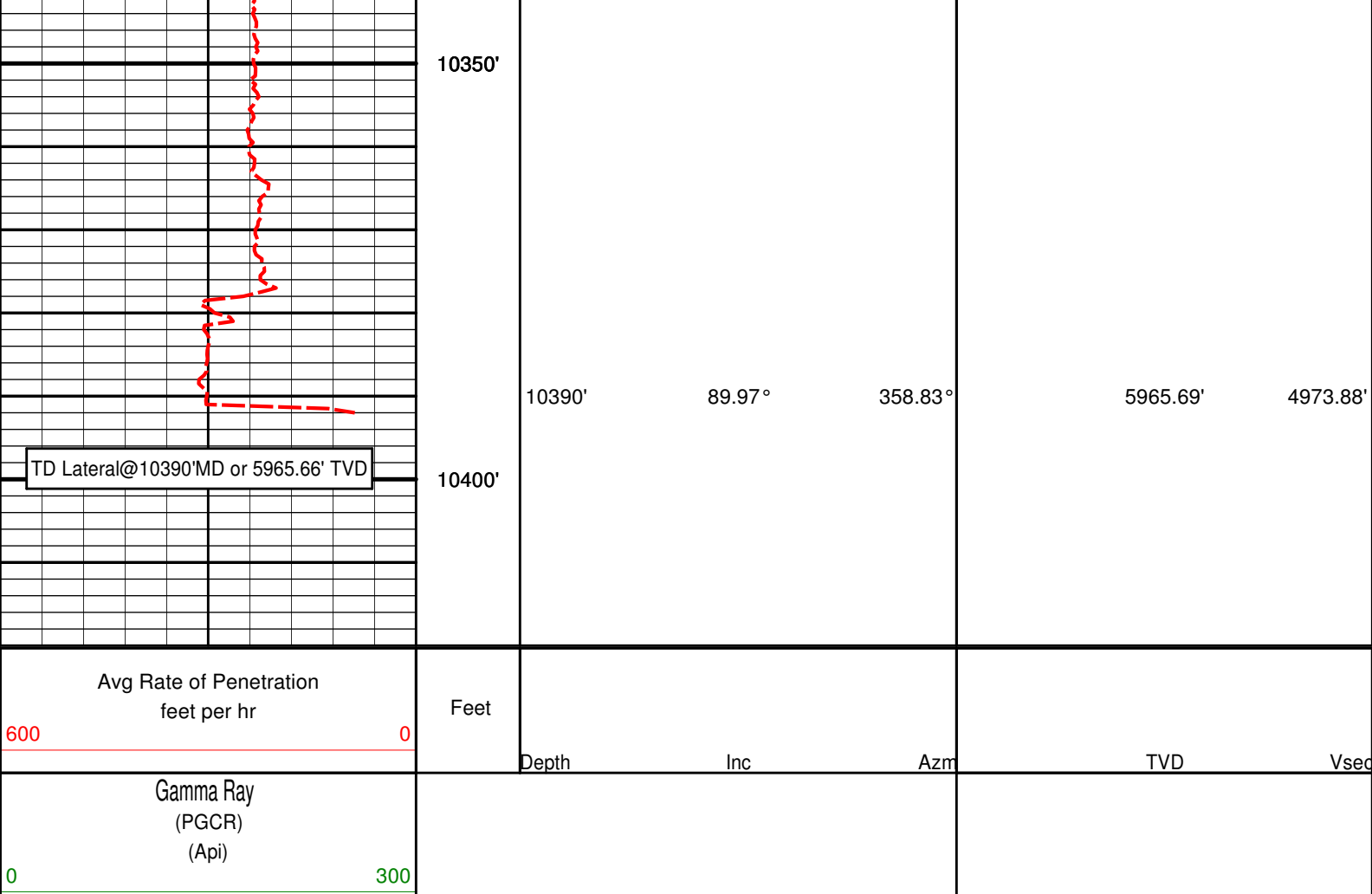
10329'

89.97°

358.83°

5965.66'

4913.11'



## HALLIBURTON

### DIRECTIONAL SURVEY REPORT

**Noble Energy**  
**Timbro LC13-75-1HN**  
**Wattenberg**  
**Weld Colorado**  
**USA**  
**CA-XX-0900343455**

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
300.00	0.02	12.60	300.00	0.05 N	0.01 E	0.05	0.01
629.00	0.30	353.40	629.00	0.96 N	0.08 W	0.97	0.09
723.00	0.48	27.98	723.00	1.56 N	0.08 E	1.54	0.31
816.00	0.62	24.75	815.99	2.36 N	0.48 E	2.29	0.15
909.00	0.48	25.49	908.99	3.17 N	0.85 E	3.06	0.15
1002.00	0.50	22.65	1001.98	3.89 N	1.18 E	3.74	0.04
1095.00	0.40	0.15	1094.98	4.59 N	1.34 E	4.42	0.22
1188.00	0.55	39.94	1187.98	5.26 N	1.62 E	5.06	0.38
1281.00	0.60	29.11	1280.97	6.03 N	2.15 E	5.76	0.13
1374.00	0.43	20.86	1373.97	6.78 N	2.51 E	6.47	0.19
1467.00	1.21	309.20	1466.96	7.73 N	1.87 E	7.49	1.24
1562.00	1.15	306.21	1561.94	8.93 N	0.32 E	8.85	0.09
1657.00	1.12	305.43	1656.92	10.03 N	1.21 W	10.11	0.04
1752.00	1.20	293.83	1751.90	10.97 N	2.87 W	11.22	0.26
1847.00	4.02	310.45	1846.80	13.53 N	6.32 W	14.13	3.04
1942.00	6.83	303.70	1941.36	18.83 N	13.55 W	20.17	3.03
2036.00	8.34	296.53	2034.54	24.97 N	24.30 W	27.44	1.90
2131.00	10.71	299.35	2128.22	32.38 N	38.17 W	36.29	2.54

2226.00	12.68	299.35	2221.24	41.82 N	54.95 W	47.48	2.07
2320.00	13.49	298.20	2312.80	52.06 N	73.61 W	59.66	0.90
2415.00	15.32	301.82	2404.82	63.91 N	94.04 W	73.63	2.15
2510.00	15.20	304.78	2496.47	77.64 N	114.93 W	89.52	0.83
2605.00	16.04	301.75	2587.96	91.65 N	136.33 W	105.75	1.23
2700.00	15.69	305.53	2679.34	106.02 N	157.94 W	122.36	1.15
2795.00	15.20	305.51	2770.91	120.72 N	178.53 W	139.18	0.52
2890.00	14.43	304.43	2862.75	134.64 N	198.43 W	155.16	0.85
2985.00	13.21	303.36	2955.00	147.31 N	217.26 W	169.77	1.31
3080.00	14.32	301.73	3047.27	159.46 N	236.32 W	183.90	1.23
3176.00	13.36	300.76	3140.48	171.37 N	255.95 W	197.85	1.02
3271.00	14.42	303.31	3232.70	183.49 N	275.27 W	211.96	1.29
3366.00	16.18	302.89	3324.33	197.17 N	296.27 W	227.83	1.86
3461.00	16.41	301.25	3415.52	211.32 N	318.86 W	244.32	0.54
3555.00	14.03	301.62	3506.21	224.19 N	339.91 W	259.37	2.53
3650.00	11.61	301.44	3598.84	235.21 N	357.88 W	272.26	2.55
3746.00	8.71	304.40	3693.32	244.36 N	372.13 W	282.88	3.08
3840.00	6.55	304.94	3786.48	251.45 N	382.40 W	291.04	2.29
3935.00	4.23	292.98	3881.06	255.93 N	390.07 W	296.31	2.70
4030.00	2.08	304.67	3975.91	258.28 N	394.71 W	299.14	2.35
4125.00	0.68	345.48	4070.88	259.80 N	396.27 W	300.82	1.71
4220.00	0.93	337.71	4165.87	261.06 N	396.70 W	302.12	0.29
4315.00	0.72	345.87	4260.86	262.35 N	397.14 W	303.45	0.25
4410.00	0.34	19.05	4355.86	263.20 N	397.19 W	304.30	0.49
4505.00	0.25	182.75	4450.86	263.26 N	397.11 W	304.35	0.62
4600.00	0.22	136.17	4545.86	262.92 N	396.99 W	304.01	0.20
4695.00	1.18	137.01	4640.85	262.08 N	396.20 W	303.08	1.01
4790.00	1.74	133.31	4735.82	260.38 N	394.49 W	301.20	0.60
4885.00	2.17	170.02	4830.77	257.61 N	393.12 W	298.31	1.37
4980.00	2.04	157.55	4925.70	254.28 N	392.17 W	294.89	0.50
5074.00	1.51	150.13	5019.66	251.66 N	390.91 W	292.16	0.61
5169.00	0.86	138.24	5114.64	250.05 N	389.82 W	290.43	0.72
5258.00	0.86	140.12	5203.63	249.04 N	388.94 W	289.34	0.03
5305.00	2.30	15.82	5250.62	249.68 N	388.46 W	289.92	6.11
5353.00	8.32	5.39	5298.39	254.06 N	387.87 W	294.22	12.65
5400.00	11.51	359.97	5344.68	262.14 N	387.56 W	302.21	7.06
5448.00	14.11	357.77	5391.49	272.77 N	387.79 W	312.81	5.52
5495.00	18.40	358.65	5436.60	285.92 N	388.18 W	325.92	9.14
5543.00	22.04	356.33	5481.63	302.48 N	388.94 W	342.47	7.77
5590.00	24.02	354.09	5524.88	320.80 N	390.49 W	360.85	4.60
5638.00	27.00	355.23	5568.20	341.38 N	392.40 W	381.52	6.29
5685.00	32.28	357.02	5609.04	364.56 N	393.94 W	404.73	11.39
5733.00	37.98	356.58	5648.28	392.12 N	395.49 W	432.30	11.89
5780.00	41.32	357.65	5684.46	422.07 N	396.98 W	462.23	7.26
5827.00	44.71	358.22	5718.82	454.11 N	398.14 W	494.21	7.25
5874.00	47.26	357.76	5751.48	487.88 N	399.32 W	527.92	5.47
5922.00	50.22	358.21	5783.14	523.94 N	400.59 W	563.90	6.21
5969.00	52.70	357.49	5812.42	560.67 N	401.97 W	600.57	5.40
6017.00	55.76	356.80	5840.47	599.56 N	403.92 W	639.44	6.49
6064.00	58.28	359.04	5866.06	638.96 N	405.34 W	678.76	6.69
6112.00	62.93	358.11	5889.61	680.75 N	406.38 W	720.43	9.84
6159.00	67.99	355.98	5909.13	723.43 N	408.60 W	763.10	11.53
6207.00	72.36	355.32	5925.40	768.44 N	412.03 W	808.22	9.20
6254.00	77.19	357.70	5937.74	813.69 N	414.78 W	853.50	11.36
6304.00	79.54	358.16	5947.82	862.63 N	416.55 W	902.35	4.80
6380.00	84.97	359.30	5958.06	937.89 N	418.21 W	977.35	7.29
6472.00	87.13	358.58	5964.40	1029.65 N	419.91 W	1068.76	2.48
6567.00	88.71	358.32	5967.85	1124.55 N	422.48 W	1163.39	1.68
6661.00	88.89	358.46	5969.82	1218.49 N	425.12 W	1257.07	0.25
6756.00	91.14	357.43	5969.80	1313.42 N	428.53 W	1351.82	2.61
6851.00	90.18	358.48	5968.70	1408.35 N	431.92 W	1446.57	1.50
6946.00	91.05	357.92	5967.68	1503.30 N	434.90 W	1541.29	1.08
7041.00	89.48	357.81	5967.24	1598.23 N	438.43 W	1636.05	1.66
7136.00	89.78	357.03	5967.86	1693.13 N	442.71 W	1730.86	0.89
7231.00	89.72	357.84	5968.27	1788.03 N	446.97 W	1825.67	0.86
7326.00	90.12	358.51	5968.39	1882.99 N	450.00 W	1920.40	0.83
7420.00	91.54	357.27	5967.03	1976.91 N	453.46 W	2014.15	2.01
7515.00	90.68	358.28	5965.19	2071.82 N	457.16 W	2108.91	1.40
7610.00	90.99	359.34	5963.81	2166.78 N	459.14 W	2203.54	1.16
7705.00	88.98	359.65	5963.83	2261.77 N	459.98 W	2298.07	2.13
7800.00	90.49	2.72	5964.27	2356.74 N	458.02 W	2392.28	3.60

<b>7894.00</b>	<b>89.97</b>	<b>2.18</b>	<b>5963.89</b>	<b>2450.65 N</b>	<b>454.00 W</b>	<b>2485.22</b>	<b>0.80</b>
<b>7989.00</b>	<b>89.41</b>	<b>358.05</b>	<b>5964.40</b>	<b>2545.63 N</b>	<b>453.80 W</b>	<b>2579.63</b>	<b>4.39</b>
<b>8084.00</b>	<b>90.49</b>	<b>356.82</b>	<b>5964.47</b>	<b>2640.53 N</b>	<b>458.05 W</b>	<b>2674.44</b>	<b>1.72</b>
<b>8179.00</b>	<b>90.09</b>	<b>356.53</b>	<b>5963.99</b>	<b>2735.37 N</b>	<b>463.56 W</b>	<b>2769.32</b>	<b>0.52</b>
<b>8274.00</b>	<b>90.99</b>	<b>357.30</b>	<b>5963.10</b>	<b>2830.23 N</b>	<b>468.67 W</b>	<b>2864.18</b>	<b>1.25</b>
<b>8369.00</b>	<b>90.62</b>	<b>357.93</b>	<b>5961.77</b>	<b>2925.13 N</b>	<b>472.62 W</b>	<b>2958.96</b>	<b>0.77</b>
<b>8464.00</b>	<b>90.22</b>	<b>358.68</b>	<b>5961.08</b>	<b>3020.09 N</b>	<b>475.43 W</b>	<b>3053.67</b>	<b>0.90</b>
<b>8559.00</b>	<b>89.01</b>	<b>357.73</b>	<b>5961.72</b>	<b>3115.04 N</b>	<b>478.40 W</b>	<b>3148.39</b>	<b>1.62</b>
<b>8654.00</b>	<b>90.71</b>	<b>358.56</b>	<b>5961.95</b>	<b>3209.98 N</b>	<b>481.48 W</b>	<b>3243.11</b>	<b>1.99</b>
<b>8749.00</b>	<b>89.45</b>	<b>359.11</b>	<b>5961.82</b>	<b>3304.96 N</b>	<b>483.41 W</b>	<b>3337.75</b>	<b>1.45</b>
<b>8843.00</b>	<b>88.61</b>	<b>358.40</b>	<b>5963.41</b>	<b>3398.92 N</b>	<b>485.46 W</b>	<b>3431.39</b>	<b>1.17</b>
<b>8938.00</b>	<b>89.88</b>	<b>357.90</b>	<b>5964.66</b>	<b>3493.86 N</b>	<b>488.52 W</b>	<b>3526.11</b>	<b>1.43</b>
<b>9033.00</b>	<b>90.34</b>	<b>358.04</b>	<b>5964.48</b>	<b>3588.80 N</b>	<b>491.89 W</b>	<b>3620.86</b>	<b>0.51</b>
<b>9128.00</b>	<b>90.00</b>	<b>358.21</b>	<b>5964.20</b>	<b>3683.75 N</b>	<b>494.99 W</b>	<b>3715.60</b>	<b>0.40</b>
<b>9223.00</b>	<b>91.63</b>	<b>358.01</b>	<b>5962.85</b>	<b>3778.69 N</b>	<b>498.12 W</b>	<b>3810.32</b>	<b>1.73</b>
<b>9317.00</b>	<b>90.77</b>	<b>356.83</b>	<b>5960.88</b>	<b>3872.57 N</b>	<b>502.34 W</b>	<b>3904.11</b>	<b>1.55</b>
<b>9412.00</b>	<b>90.56</b>	<b>357.57</b>	<b>5959.78</b>	<b>3967.45 N</b>	<b>506.98 W</b>	<b>3998.94</b>	<b>0.81</b>
<b>9507.00</b>	<b>89.41</b>	<b>357.10</b>	<b>5959.80</b>	<b>4062.35 N</b>	<b>511.39 W</b>	<b>4093.76</b>	<b>1.30</b>
<b>9602.00</b>	<b>88.80</b>	<b>356.52</b>	<b>5961.28</b>	<b>4157.19 N</b>	<b>516.67 W</b>	<b>4188.62</b>	<b>0.90</b>
<b>9697.00</b>	<b>89.44</b>	<b>356.74</b>	<b>5962.74</b>	<b>4252.01 N</b>	<b>522.26 W</b>	<b>4283.50</b>	<b>0.72</b>
<b>9792.00</b>	<b>88.80</b>	<b>358.24</b>	<b>5964.20</b>	<b>4346.90 N</b>	<b>526.42 W</b>	<b>4378.29</b>	<b>1.72</b>
<b>9887.00</b>	<b>88.86</b>	<b>358.80</b>	<b>5966.14</b>	<b>4441.85 N</b>	<b>528.88 W</b>	<b>4472.96</b>	<b>0.59</b>
<b>9982.00</b>	<b>89.78</b>	<b>359.46</b>	<b>5967.27</b>	<b>4536.83 N</b>	<b>530.32 W</b>	<b>4567.54</b>	<b>1.20</b>
<b>10077.00</b>	<b>91.14</b>	<b>358.48</b>	<b>5966.50</b>	<b>4631.81 N</b>	<b>532.03 W</b>	<b>4662.16</b>	<b>1.76</b>
<b>10171.00</b>	<b>90.15</b>	<b>359.34</b>	<b>5965.43</b>	<b>4725.79 N</b>	<b>533.81 W</b>	<b>4755.78</b>	<b>1.39</b>
<b>10266.00</b>	<b>89.75</b>	<b>359.11</b>	<b>5965.51</b>	<b>4820.78 N</b>	<b>535.10 W</b>	<b>4850.36</b>	<b>0.49</b>
<b>10329.00</b>	<b>89.97</b>	<b>358.83</b>	<b>5965.66</b>	<b>4883.77 N</b>	<b>536.23 W</b>	<b>4913.11</b>	<b>0.56</b>
<b>10390.00</b>	<b>89.97</b>	<b>358.83</b>	<b>5965.69</b>	<b>4944.75 N</b>	<b>537.48 W</b>	<b>4973.88</b>	<b>0.00</b>

**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 353.84 DEGREES (GRID)  
A TOTAL CORRECTION OF 7.22 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 10390.00 FEET  
IS 4973.88 FEET ALONG 353.80 DEGREES (GRID)**

Surveys at 300 ft and 629 ft were taken and provided by HP 322 while they were drilling the surface hole.

Casing is set at 6350 ft.

We have a gap between 7772 ft to 7792 ft, because my pulser shut off downhole, due to the drillers sweep.