

PCGK : Pressure Case Gamma
PCDC: Pressure Case Directional

1 : 600 / 1 : 240

Country		: USA				
Field		: Wildcat				
Location		: Lat: 40° 41' 7.01" North Long: 103° 58' 22.51" West				
Well		: Bulleit Federal PC LG04-62HN				
Company		: Noble Energy				
Rig		: H&P 315				
LOCATION		Latitude : 40° 41' 7.01" North Longitude : 103° 58' 22.51" West		Other Services Directional Drilling		
		UTM Easting = 3,423,496,870 ft UTM Northing = 1,496,137,310 ft				
Permanent Datum		: Ground Level		Elev. KB N/A		
Log Measured From		: Drill Floor		24.00 ft Above Permanent Datum DF 4838.00 ft GL 4814.00 ft WD N/A		
Drilling Measured From		: Drill Floor		MD LOG		
Depth Logged		: 1,522.00 ft To 10,307.00 ft		Unit No. : 11610113		
Date Logged		: 18-Feb-14 To 26-Feb-14		Job No. : CA-XX-0901058466		
Total Depth MD		: 10,307.00 ft TVD: 6,052.05 ft		Plot Type : Final		
Spud Date		: 15-Feb-14		Plot Date : 27-Feb-14		
Run No.	Borehole Record (MD)		Run No.	Borehole Record (MD)		
	Size	From		To	Size	From
2	8,750 in	1,522.00 ft	5,403.00 ft			
3	8,750 in	5,403.00 ft	6,425.00 ft			
4	6,125 in	6,425.00 ft	9,888.00 ft			
5	6,125 in	9,888.00 ft	9,905.00 ft			
6	6,125 in	9,905.00 ft	10,307.00 ft			
				Size	Casing Record (MD)	
				7,000 in	Weight 26.00 lbpf	SURFACE
						6,420.00 ft
						</

Max Tool Temp (degF) / Source	153.79 / PCM	153.79 / PCM	220.77 / PCM	220.77 / PCM	213.49 / PCM
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	Paul Kock	Paul Kock	Paul Kock	Paul Kock	Paul Kock
Customer Representative	Martin Suarez	Martin Suarez	Martin Suarez	Martin Suarez	Martin Suarez

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM	PCM	PCM
Software Version	5.84	5.84	5.84	5.84	5.84
Sub Serial Number	11382329	11382329	12310754	12310754	12310754
Insert Serial Number	12230081	10868872	12230081	10868872	10868872
Date and Time Initialized	17-Feb-14 00:27	20-Feb-14 02:26	22-Feb-14 22:01	25-Feb-14 08:59	25-Feb-14 08:59
Date and Time Read	20-Feb-14 03:06	22-Feb-14 17:42	25-Feb-14 17:02	27-Feb-14 05:09	27-Feb-14 05:07
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)	54.02	51.96	61.03	61.24	62.23
Software Version	6.21	6.21	6.21	6.21	6.21
Sub Serial Number	11382329	11382329	12310754	12310754	12310754
Sonde Serial Number	11833237	11638625	11833237	11638625	11638625
Sensor ID Number	N/A	N/A	N/A	N/A	N/A
Toolface Offset (deg)	32.49	251.89	186.48	170.81	68.71

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG	PCG	PCG
Distance From Bit (ft)	49.02	46.96	56.05	56.26	57.25
Recorded Sample Period (sec)	10	10	10	10	10
Software Version	8.15	8.15	8.15	8.15	8.15
Sub Serial Number	11382329	11382329	12310754	12310754	12310754
Insert/Sonde Serial Number	12071277	12037424	12071277	12037424	12037424

REMARKS

1. All depths are calibrated to the driller's pipe tally and are measured from the rig 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.
 - ROPA: Average Rate of Penetration is real time data.
 - PGRC: Smooth Pressure Case Gamma Ray Borehole corrected is recorded data.
4. The following smoothing parameters have been applied to the data:
 - All 2" (1:600) logs - 1 ft. interval, 3 ft. coercion distance.
 - All 5" (1:240) logs - .5 ft. interval, .6 ft. coercion distance.
5. INSITE version 8.0.0
6. Gamma presented inside casing/cement from 6378 ft. MD to 6425 ft. MD.

WARRANTY

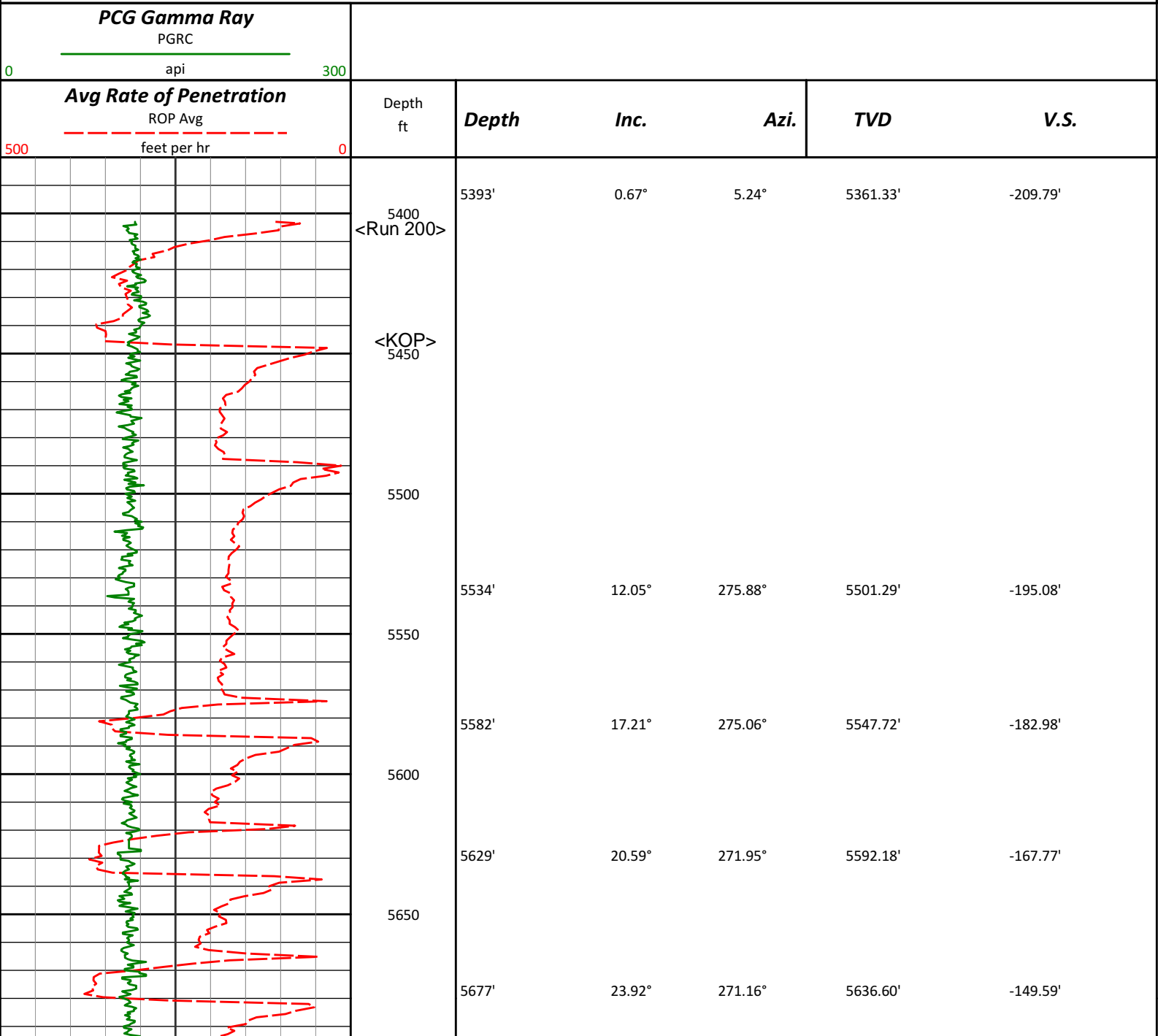
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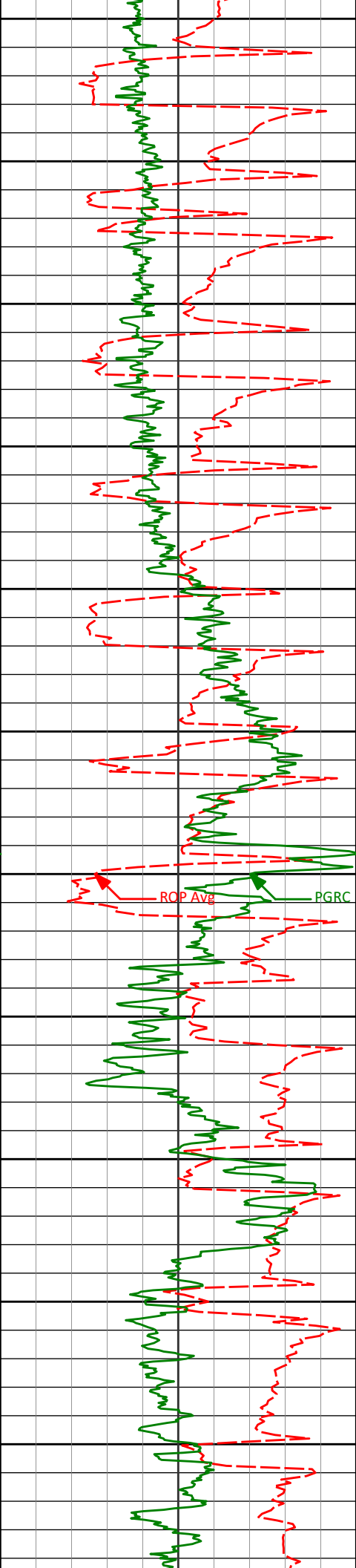
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HALLIBURTON
Sperry Drilling Services

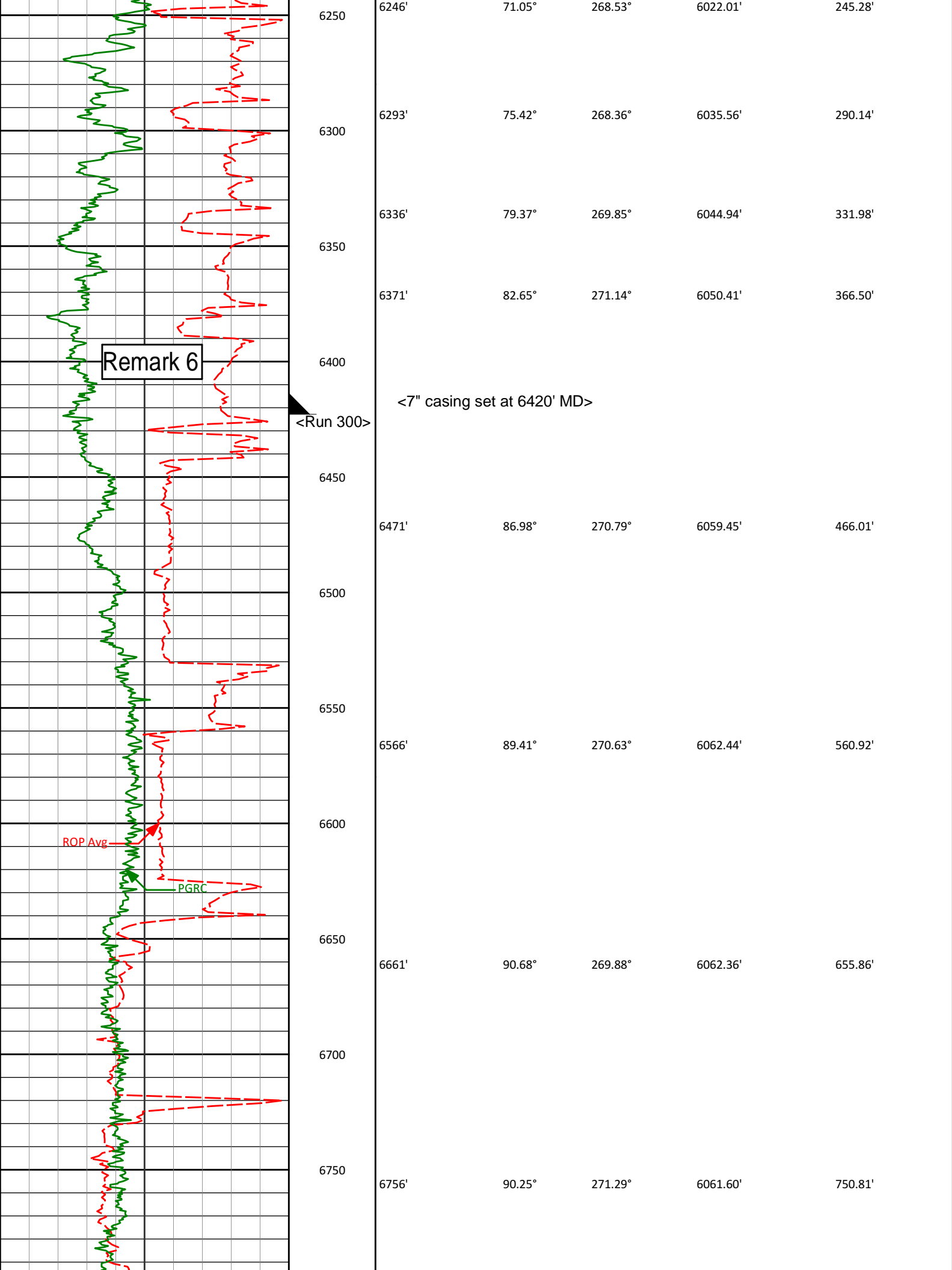
MD Main Log 1:600

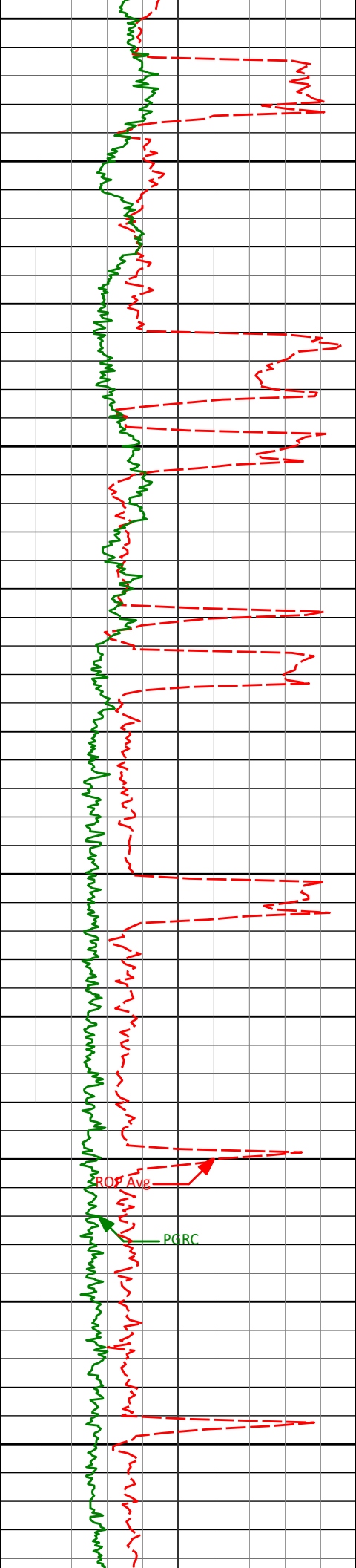
Noble Energy, Inc
Bulleit Federal PC LG04-62HN
H&P 315
T8N R59W



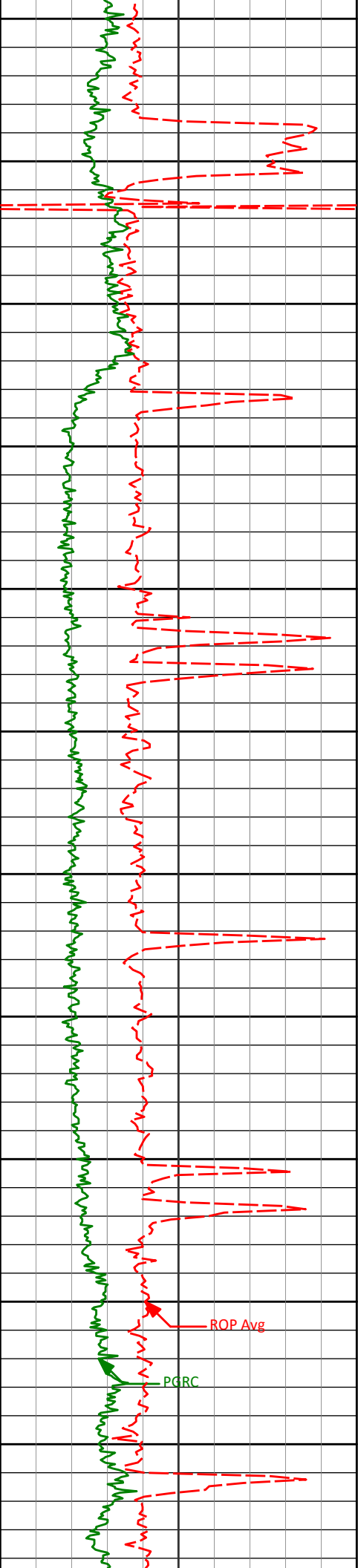


5700				
5724'	27.09°	271.29°	5679.01'	-129.36'
5750				
5772'	29.75°	268.50°	5721.23'	-106.54'
5800				
5819'	33.73°	267.13°	5761.19'	-81.90'
5850				
5867'	37.95°	265.53°	5800.09'	-53.95'
5900				
5914'	41.77°	264.44°	5836.17'	-24.08'
5950				
5962'	46.17°	264.19°	5870.71'	8.92'
6000				
6008'	50.07°	264.94°	5901.41'	42.85'
6050				
6056'	52.87°	265.47°	5931.31'	80.12'
6100				
6103'	56.30°	266.26°	5958.54'	118.18'
6150				
6151'	60.81°	266.22°	5983.57'	158.90'
6200				
6198'	66.22°	267.33°	6004.53'	200.75'

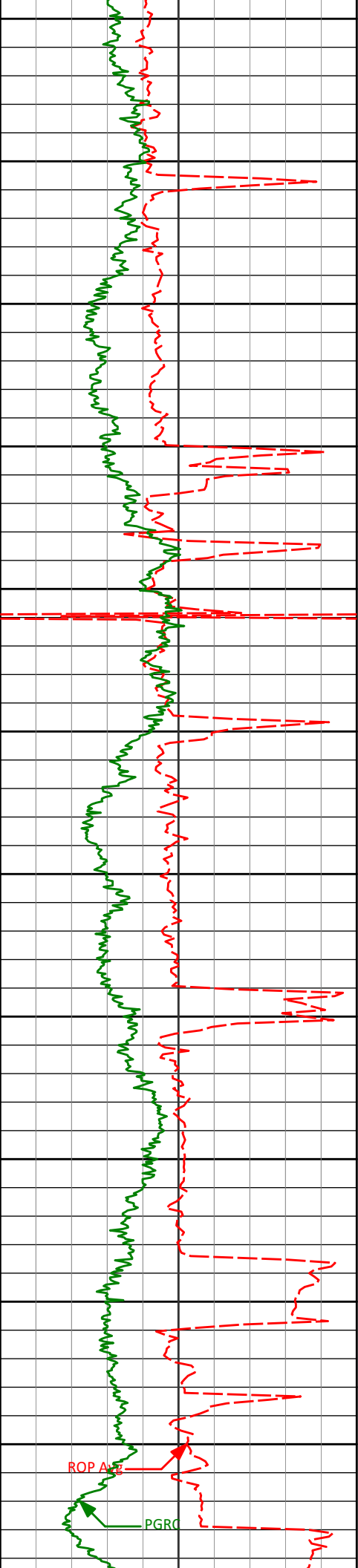




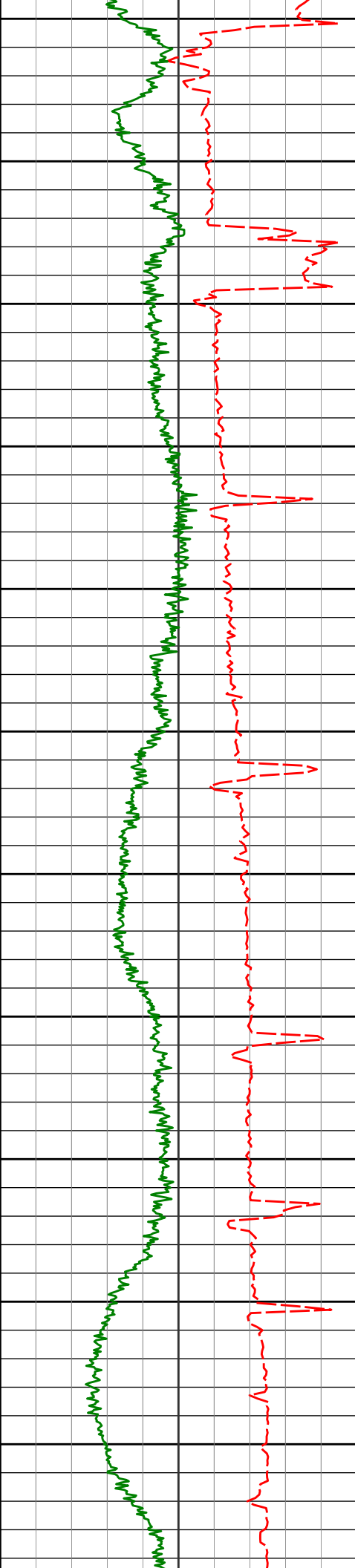
6800					
6850	6851'	90.99°	271.84°	6060.57'	845.80'
6900					
6950	6946'	91.82°	268.61°	6058.25'	940.70'
7000					
7050	7041'	91.26°	267.92°	6055.69'	1035.44'
7100					
7150	7135'	90.18°	267.02°	6054.51'	1129.10'
7200					
7250	7230'	89.97°	266.50°	6054.38'	1223.67'
7300					
	7325'	89.41°	265.35°	6054.89'	1318.09'



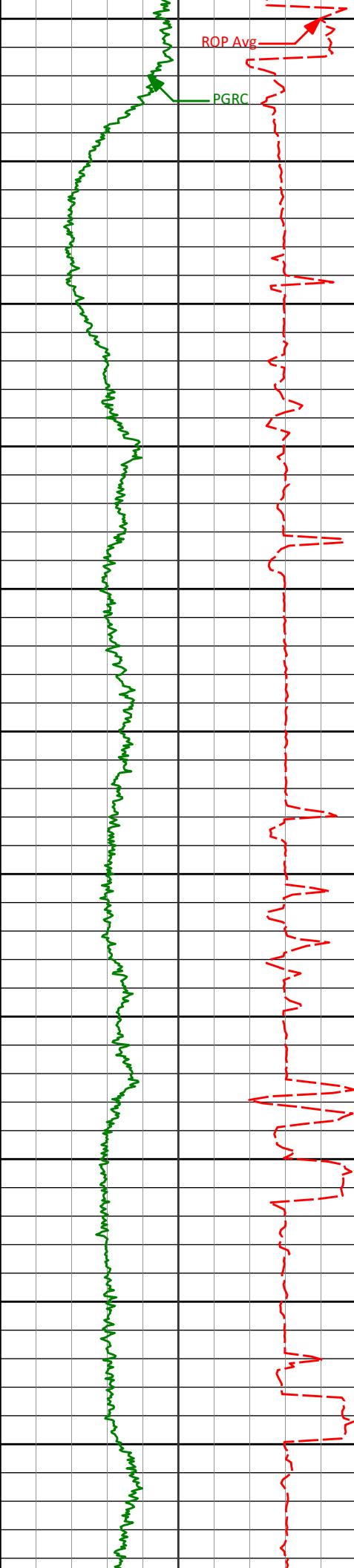
7350				
7400				
7420'	90.31°	267.74°	6055.12'	1412.62'
7450				
7500				
7515'	89.97°	267.51°	6054.89'	1507.31'
7550				
7600	7609'	90.12°	267.81°	6054.81'
7650				
7700	7704'	90.12°	267.83°	6054.61'
7750				
7800	7799'	90.31°	267.98°	6054.25'
7850				



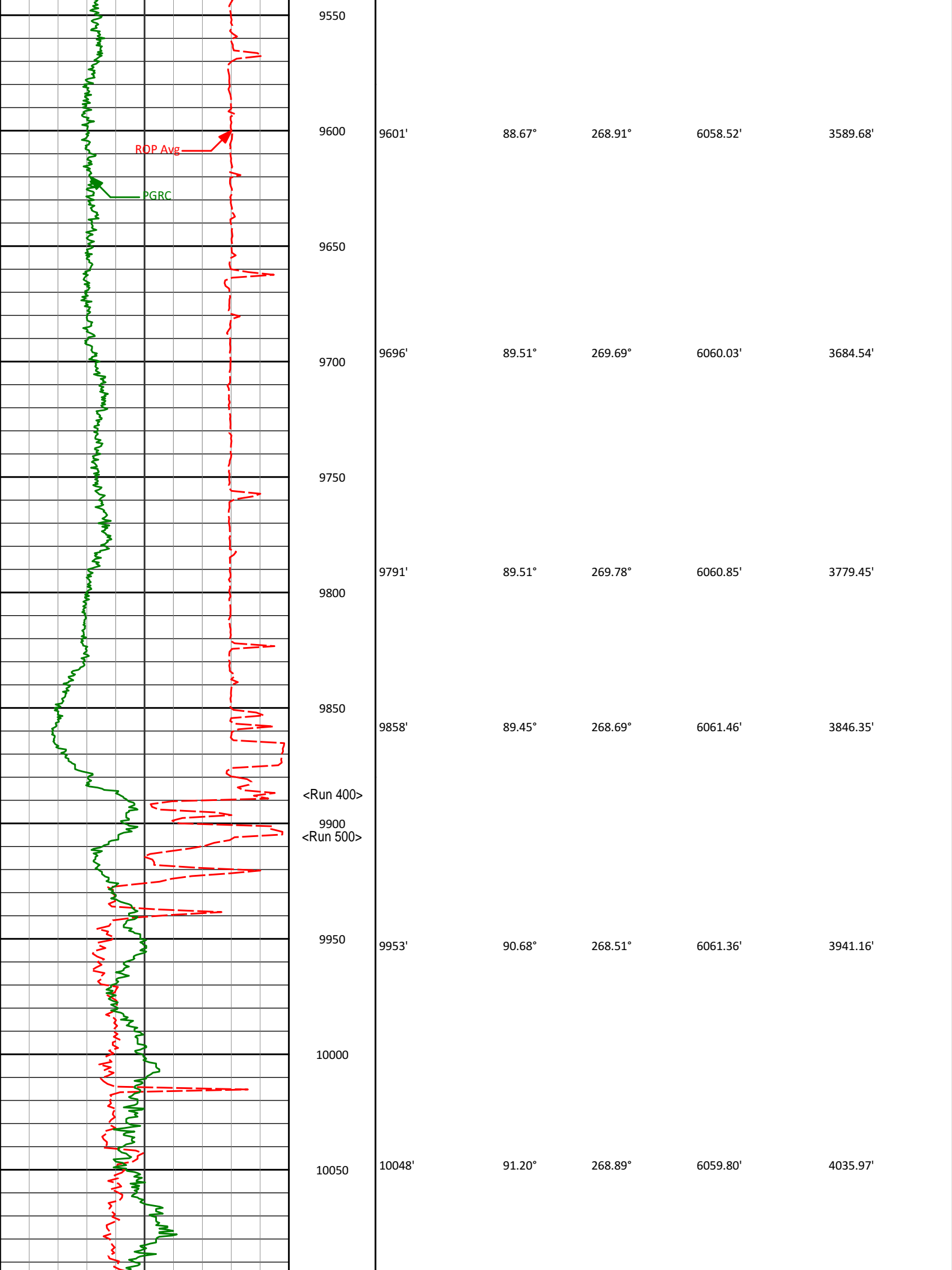
7900	7894'	90.59°	268.54°	6053.51'	1885.23'
7950					
8000	7989'	90.65°	268.51°	6052.49'	1980.02'
8050					
8100	8083'	90.89°	268.64°	6051.22'	2073.82'
8150					
8200	8178'	91.39°	268.73°	6049.33'	2168.62'
8250					
8300	8273'	91.66°	268.20°	6046.80'	2263.39'
8350					
8400	8368'	90.80°	267.70°	6044.76'	2358.10'

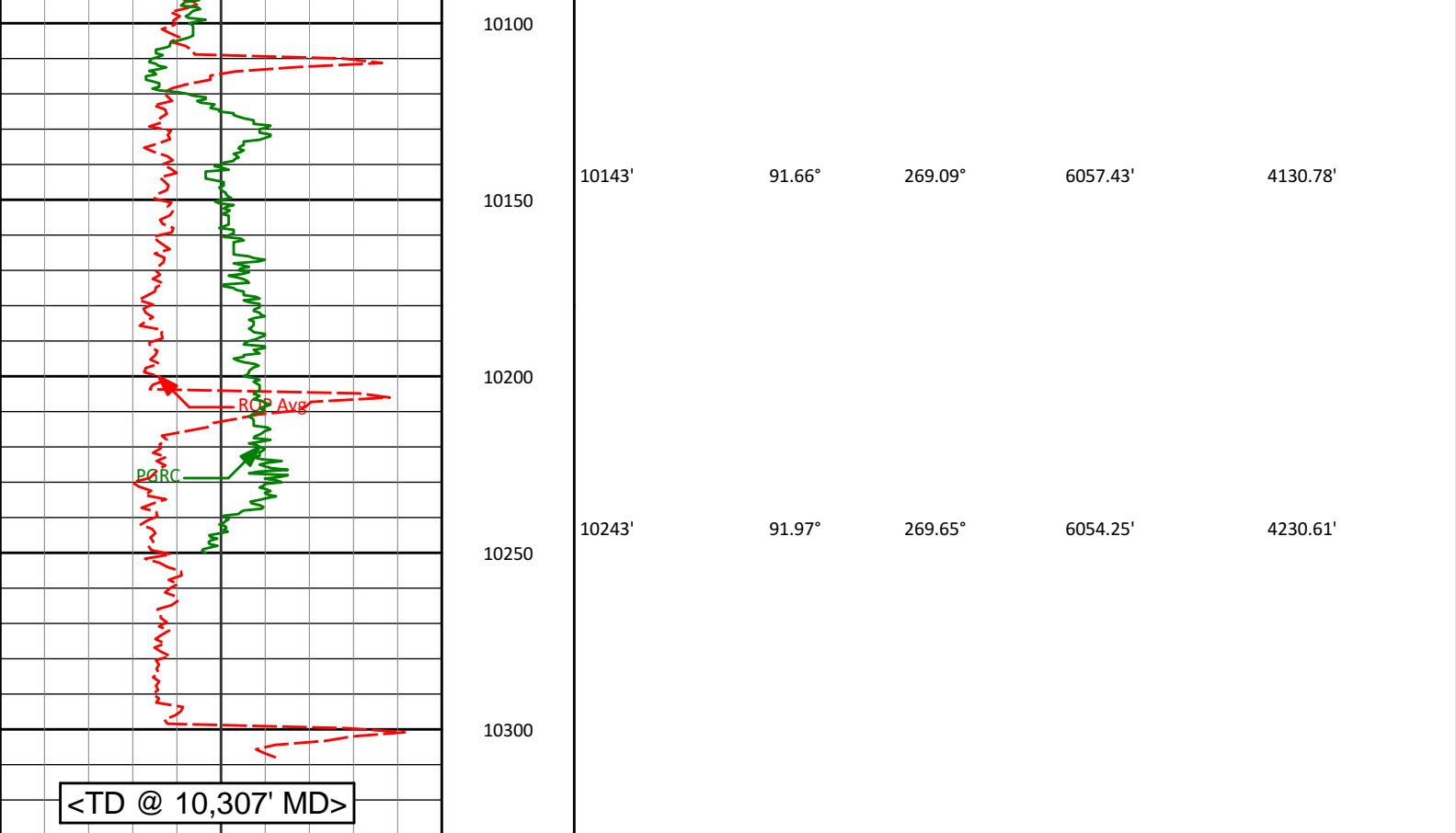


8450				
8462'	89.97°	268.82°	6044.13'	2451.87'
8500				
8550	8557'	88.89°	269.31°	6045.07'
8600				
8650	8652'	88.98°	269.07°	6046.84'
8700				
8750	8747'	89.29°	269.18°	6048.27'
8800				
8850	8842'	89.04°	268.70°	6049.65'
8900				
8937'	89.91°	269.41°	6050.52'	2926.10'
8950				



9032'	88.64°	270.73°	6051.72'	3021.02'
9127'	88.67°	270.90°	6053.94'	3115.96'
9221'	89.01°	271.14°	6055.84'	3209.92'
9316'	90.62°	272.35°	6056.15'	3304.91'
9411'	89.91°	271.28°	6055.71'	3399.91'
9506'	89.01°	269.25°	6056.61'	3494.84'



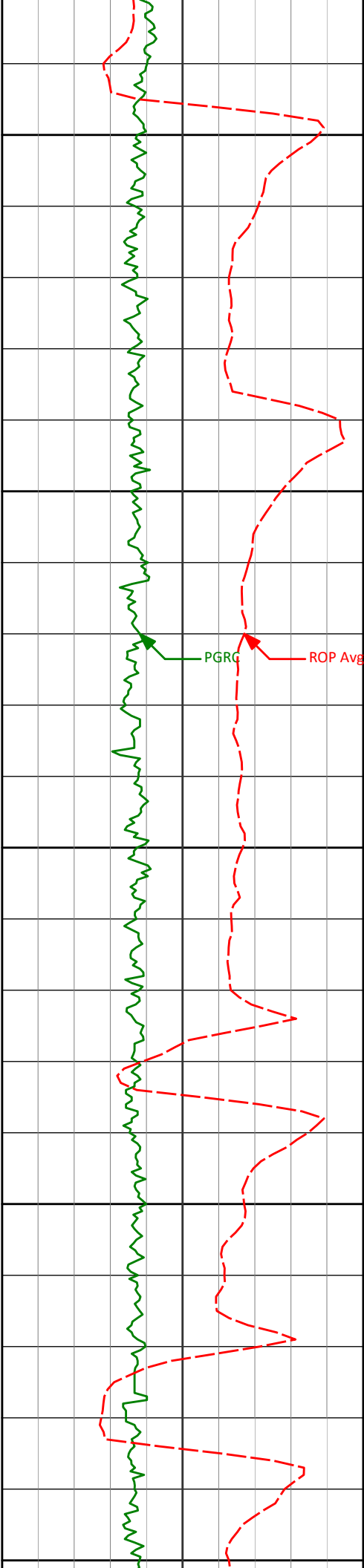


<div><div>Avg Rate of Penetration</div><div>ROP Avg</div><div>feet per hr</div></div> <div><div>PCG Gamma Ray</div><div>PGRC</div><div>api</div></div>	Depth ft	Depth	Inc.	Azi.	TVD	V.S.
5000						

HALLIBURTON
Sperry Drilling Services
MD Detail Log 1:240

Noble Energy, Inc
Bulleit Federal PC LG04-62HN
H&P 315
T8N R59W

<div><div>PCG Gamma Ray</div><div>PGRC</div><div>api</div></div> <div><div>Avg Rate of Penetration</div><div>ROP Avg</div><div>feet per hr</div></div>	Depth ft	Depth	Inc.	Azi.	TVD	V.S.
5400		5393'	0.67°	5.24°	5361.33'	-209.79'
<Run 200>						



<KOP>
5450

5500

5550

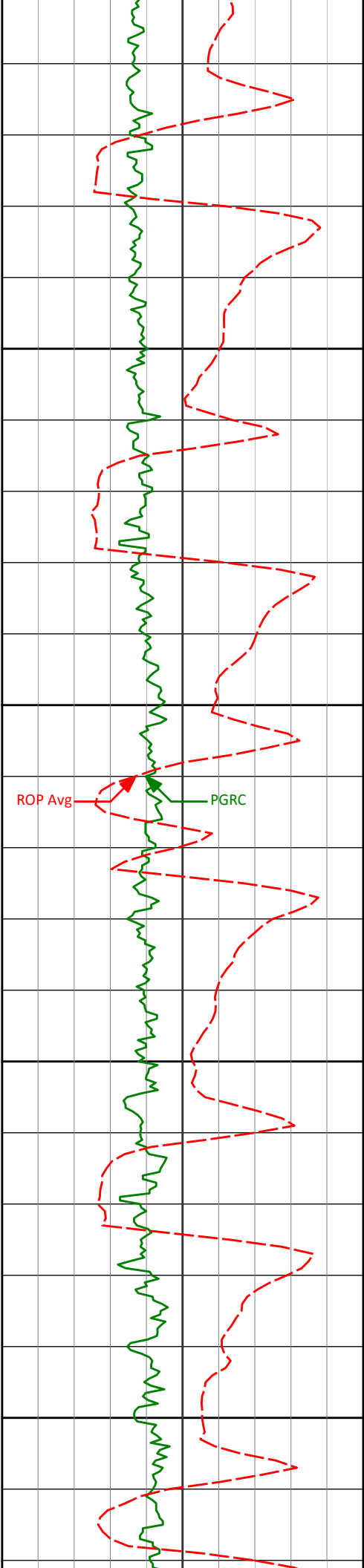
5600

5650

PGRG

ROP Avg

5534'	12.05°	275.88°	5501.29'	-195.08'
5582'	17.21°	275.06°	5547.72'	-182.98'
5629'	20.59°	271.95°	5592.18'	-167.77'



5677'	23.92°	271.16°	5636.60'	-149.59'
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5700

5724'	27.09°	271.29°	5679.01'	-129.36'
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5750

ROP Avg

PGRC

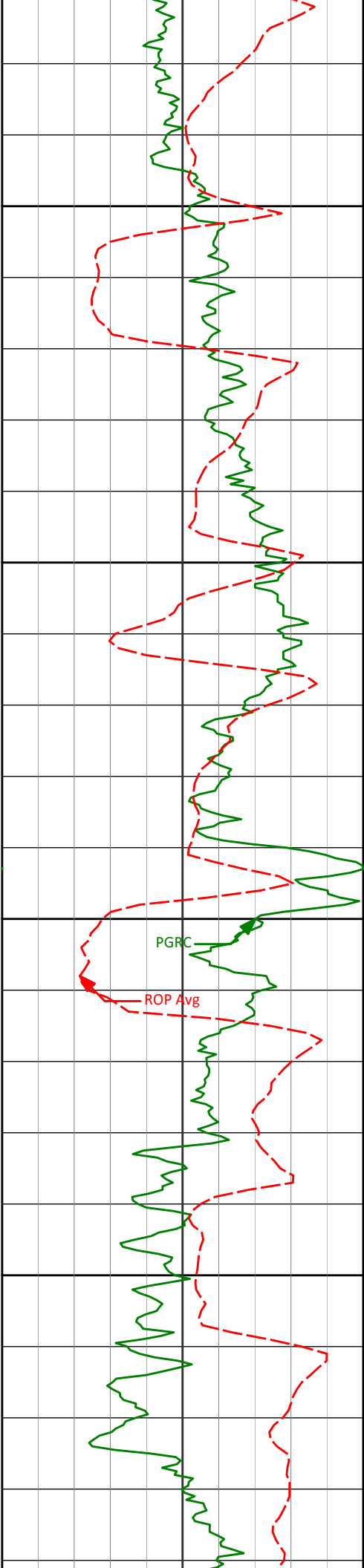
5772'	29.75°	268.50°	5721.23'	-106.54'
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5800

5819'	33.73°	267.13°	5761.19'	-81.90'
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5850

5867'	37.95°	265.53°	5800.09'	-53.95'
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5900

5914'

41.77°

264.44°

5836.17'

-24.08'

5950

5962'

46.17°

264.19°

5870.71'

8.92'

6000

6008'

50.07°

264.94°

5901.41'

42.85'

6050

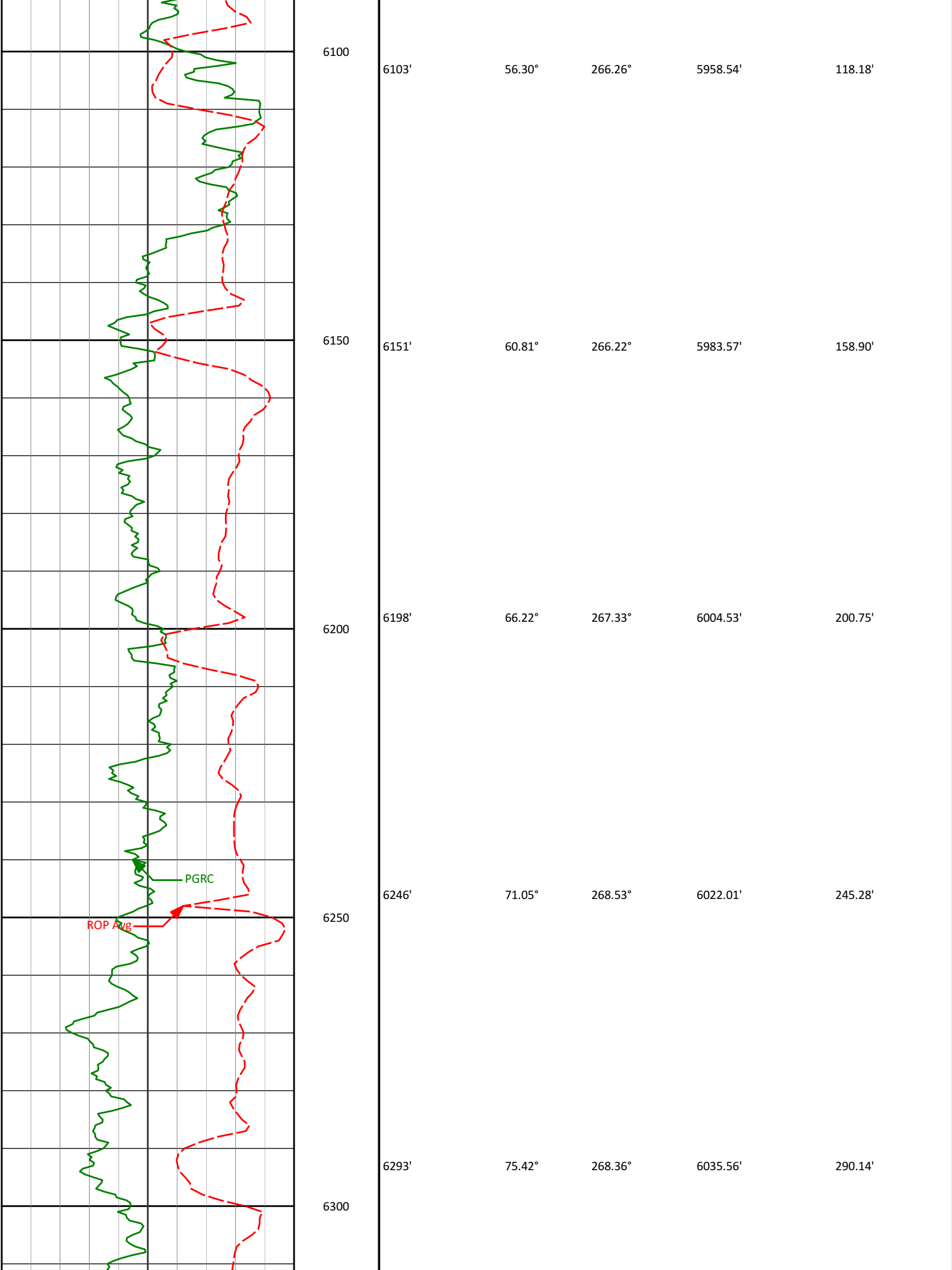
6056'

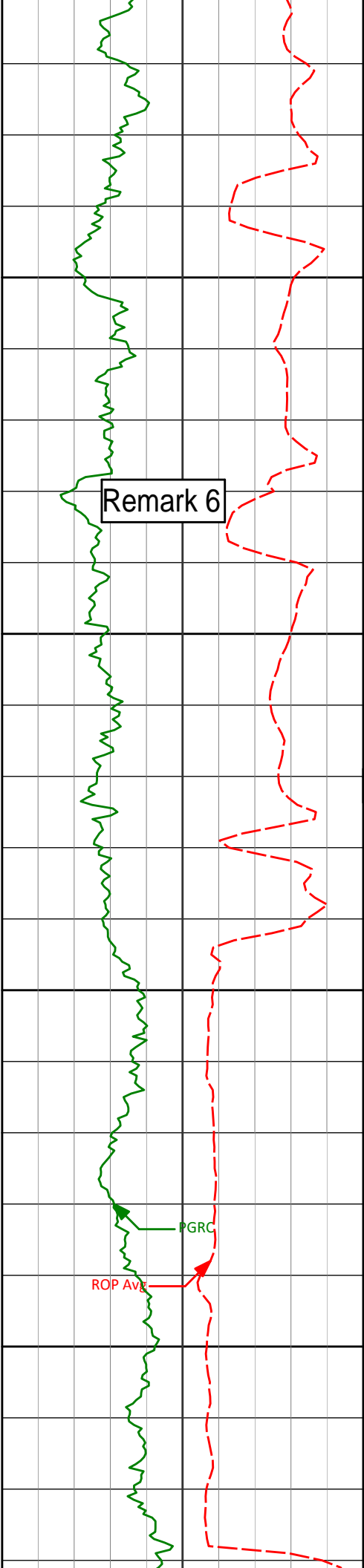
52.87°

265.47°

5931.31'

80.12'





6336' 79.37° 269.85° 6044.94' 331.98'

6350

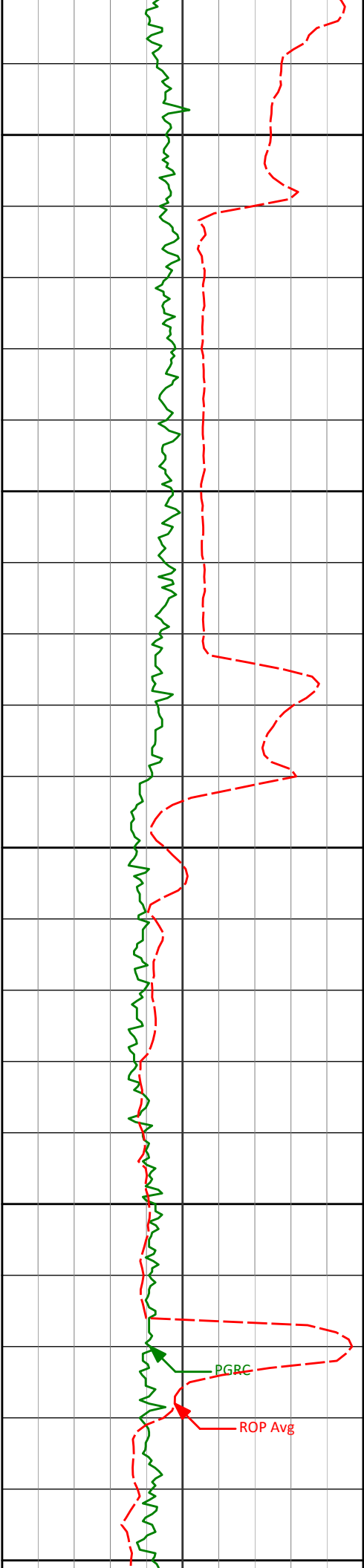
6371' 82.65° 271.14° 6050.41' 366.50'

6400

6450

6471' 86.98° 270.79° 6059.45' 466.01'

6500



6550

6566'

89.41°

270.63°

6062.44'

560.92'

6600

6650

6661'

90.68°

269.88°

6062.36'

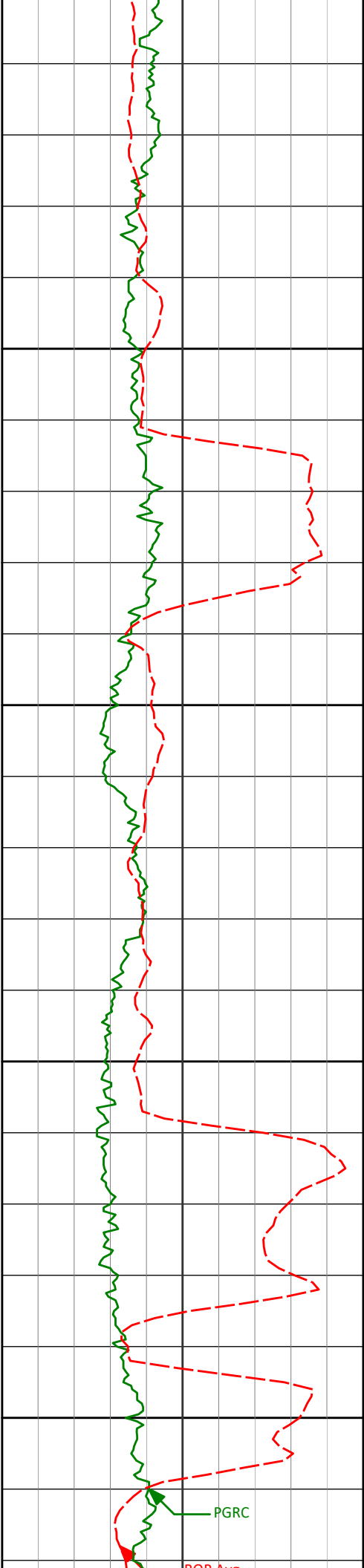
655.86'

6700

6750

PGRC

ROP Avg



6800

6850

6900

6950

6756'

90.25°

271.29°

6061.60'

750.81'

6851'

90.99°

271.84°

6060.57'

845.80'

6946'

91.82°

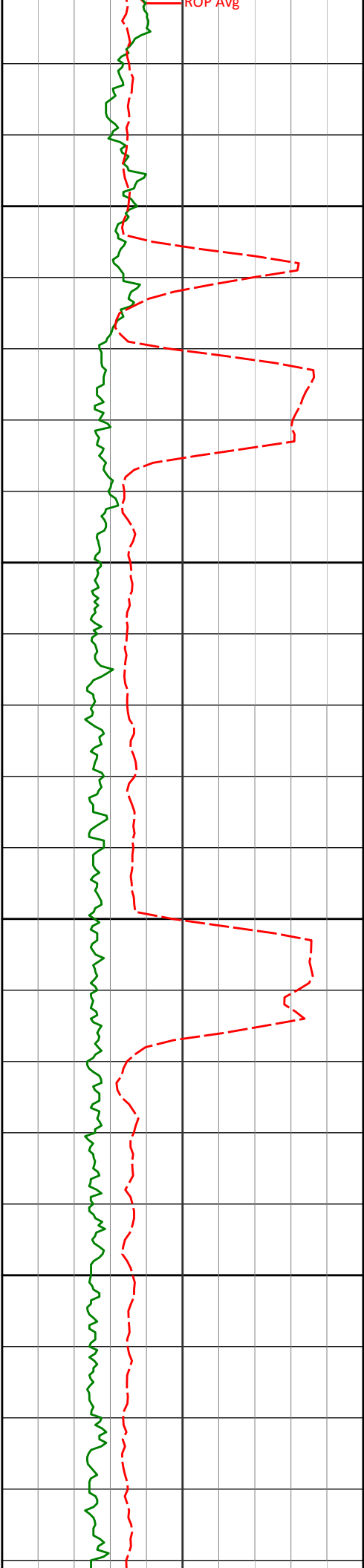
268.61°

6058.25'

940.70'

PGRC

POB Ave



ROP Avg

7000

7050

7100

7150

7041'

91.26°

267.92°

6055.69'

1035.44'

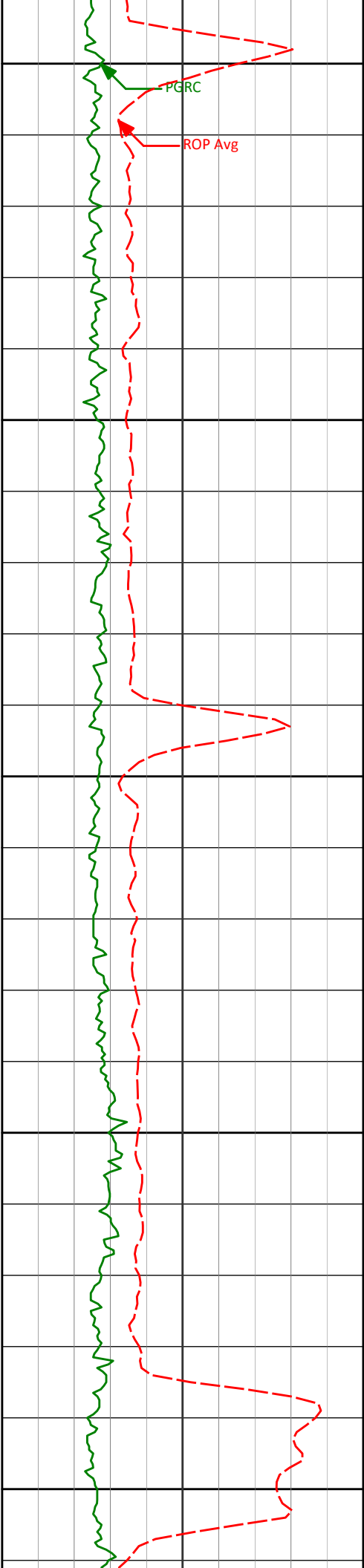
7135'

90.18°

267.02°

6054.51'

1129.10'



7200

7230'

89.97°

266.50°

6054.38'

1223.67'

7250

7300

7325'

89.41°

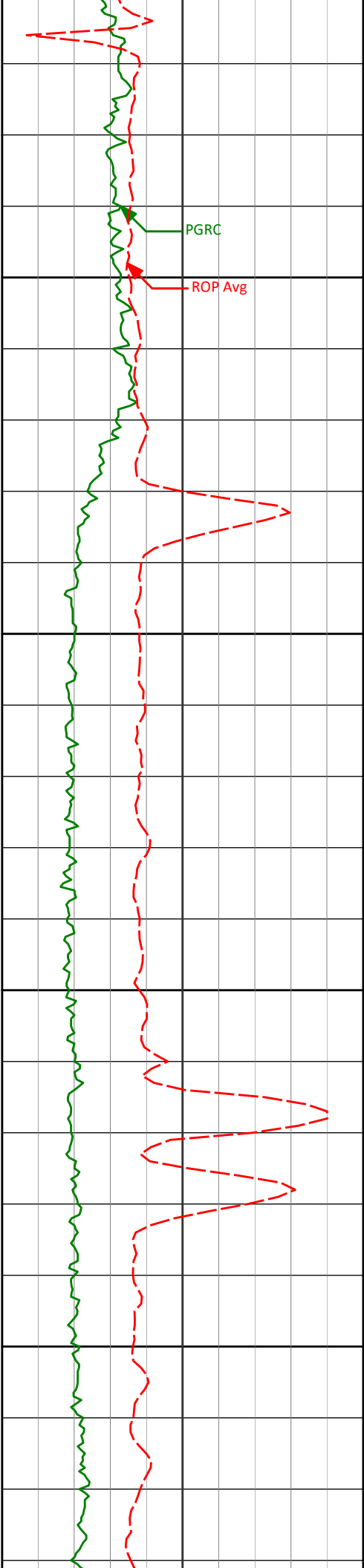
265.35°

6054.89'

1318.09'

7350

7400



7420'

90.31°

267.74°

6055.12'

1412.62'

7450

7515'

89.97°

267.51°

6054.89'

1507.31'

7550

7600

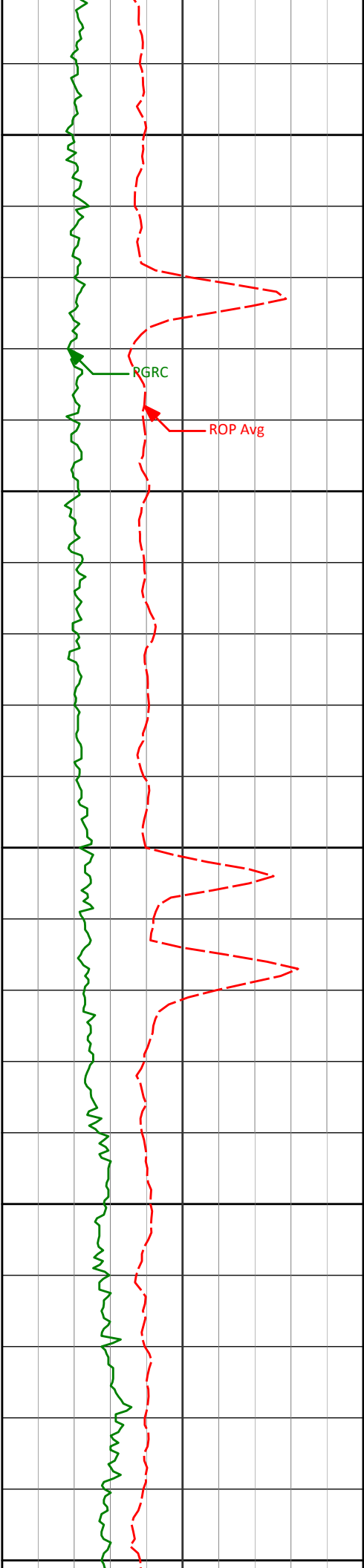
7609'

90.12°

267.81°

6054.81'

1601.01'



7650

7700

7750

7800

7850

7704'

90.12°

267.83°

6054.61'

1695.73'

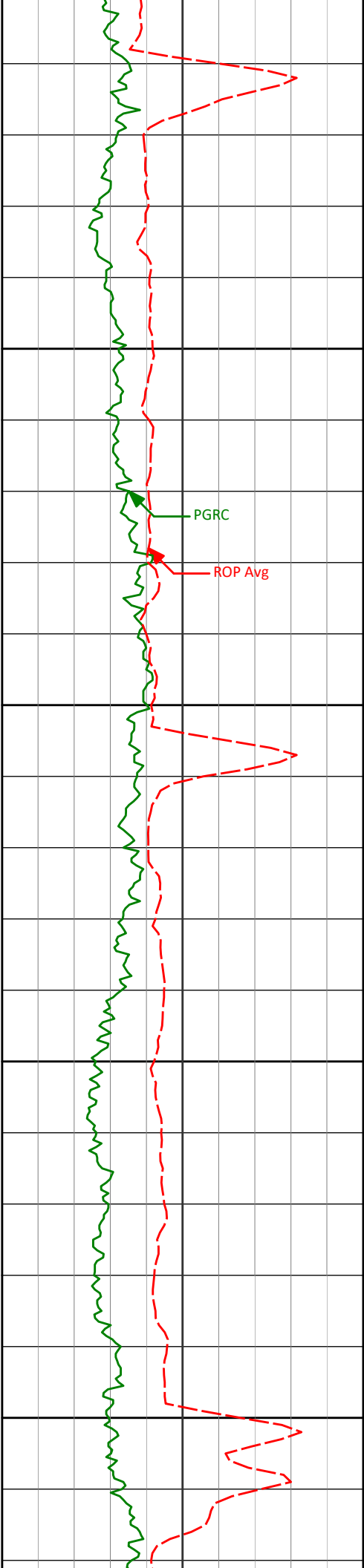
7799'

90.31°

267.98°

6054.25'

1790.46'



7900

7950

8000

8050

7894'

90.59°

268.54°

6053.51'

1885.23'

PGRC

ROP Avg

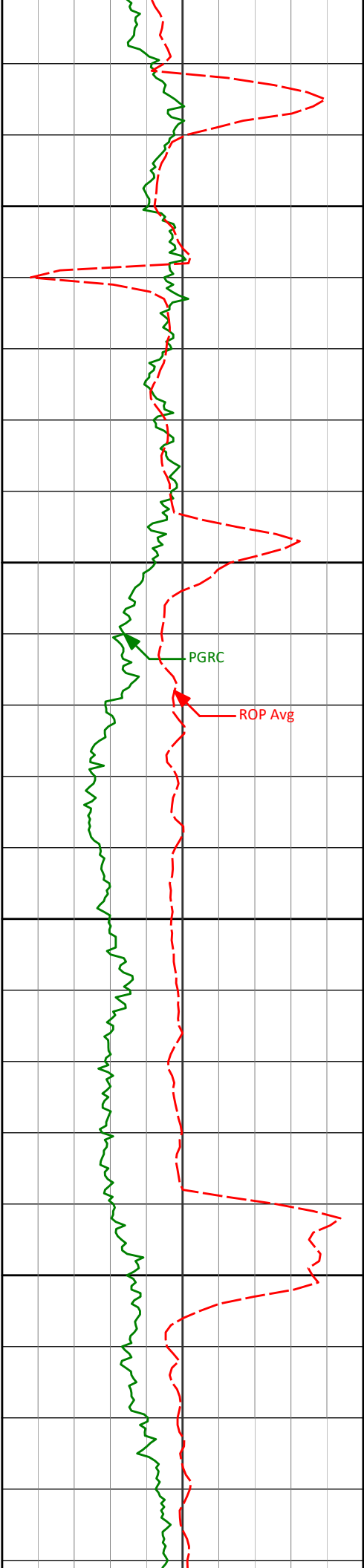
7989'

90.65°

268.51°

6052.49'

1980.02'



8100

8150

8200

8250

8083'

90.89°

268.64°

6051.22'

2073.82'

8178'

91.39°

268.73°

6049.33'

2168.62'

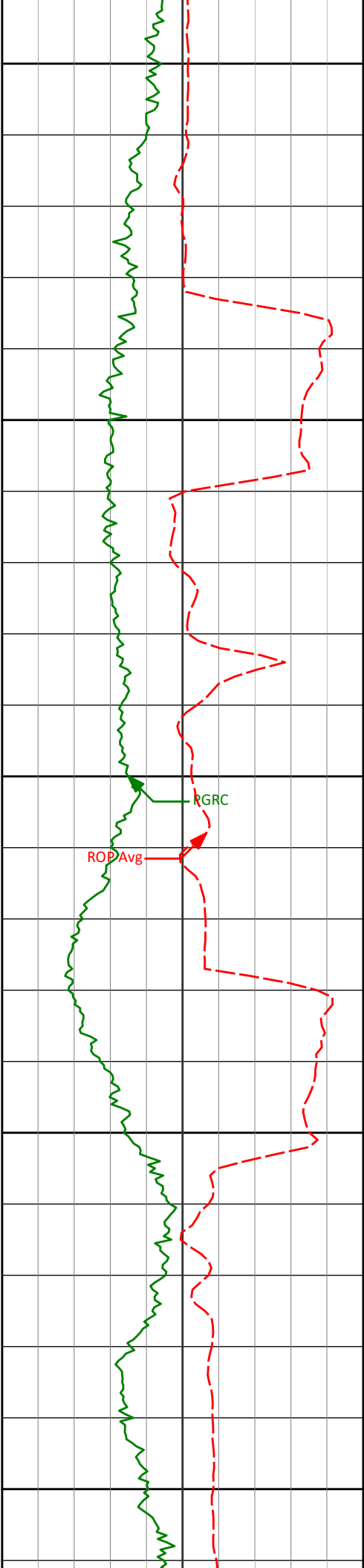
8273'

91.66°

268.20°

6046.80'

2263.39'



8300

8350

8400

8450

8500

8368'

90.80°

267.70°

6044.76'

2358.10'

ROD Avg

RGRC

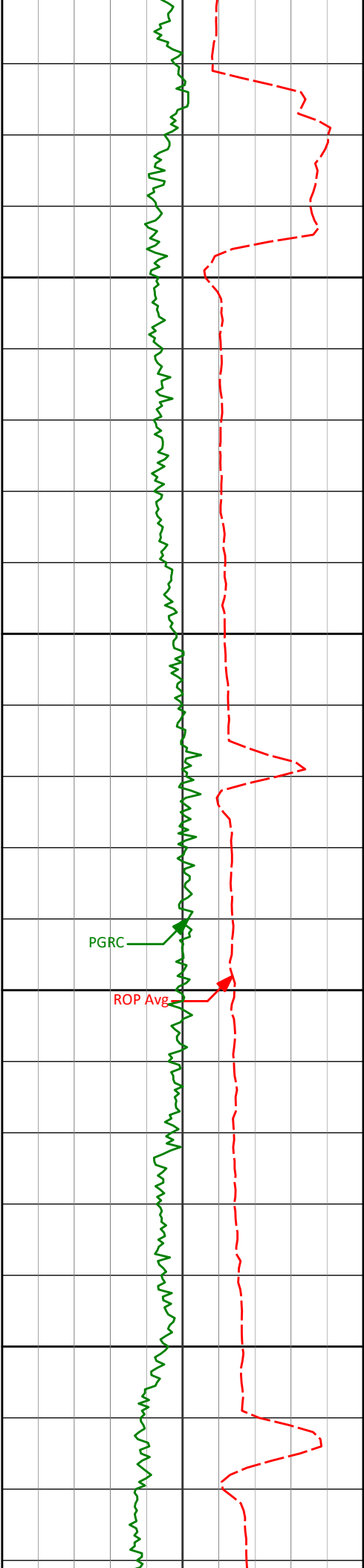
8462'

89.97°

268.82°

6044.13'

2451.87'



8550

8600

8650

8700

PGRC

ROP Avg

8557'

88.89°

269.31°

6045.07'

2546.72'

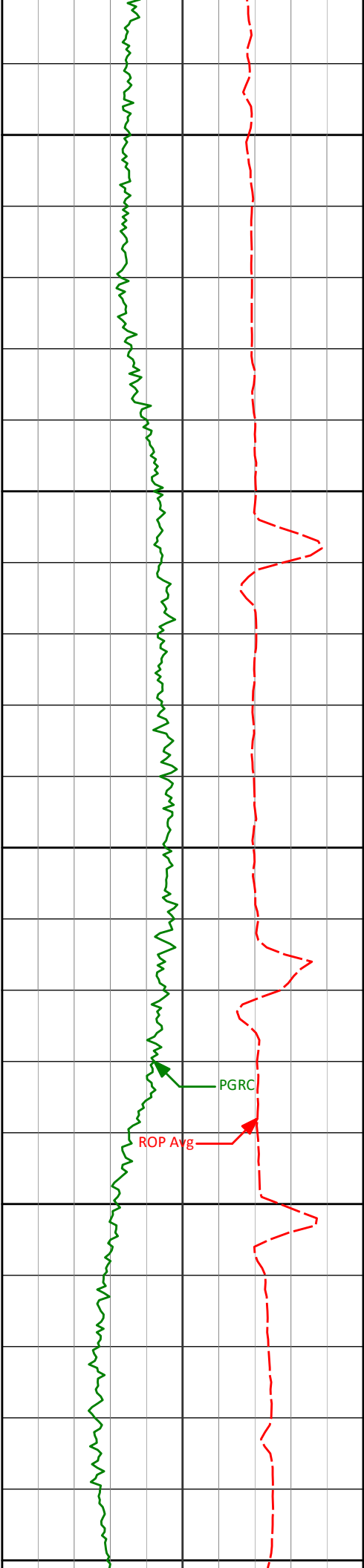
8652'

88.98°

269.07°

6046.84'

2641.57'



8750

8800

8850

8900

8950

8747'

89.29°

269.18°

6048.27'

2736.41'

8842'

89.04°

268.70°

6049.65'

2831.25'

8937'

89.91°

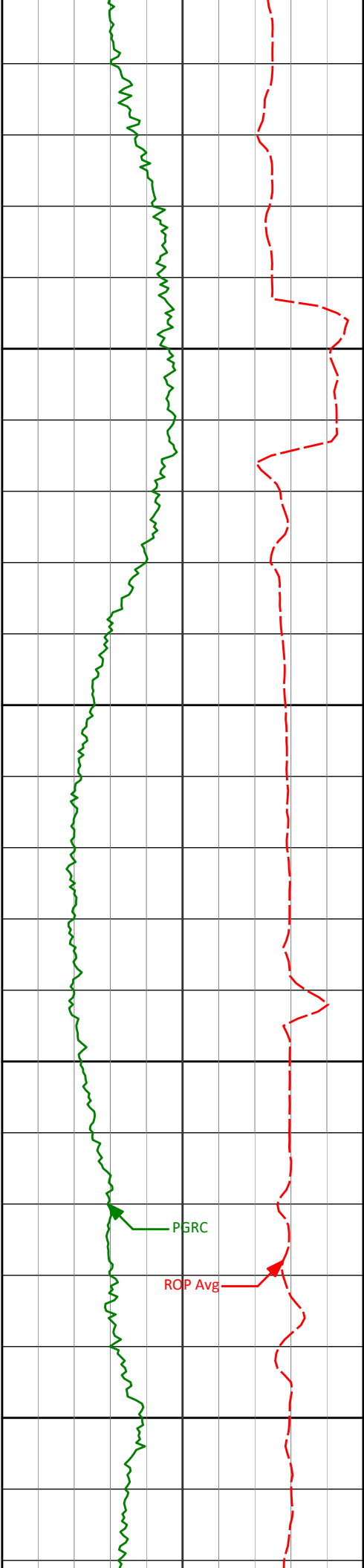
269.41°

6050.52'

2926.10'

PGRC

ROP Avg



9000

9050

9100

9150

9032'

88.64°

270.73°

6051.72'

3021.02'

9127'

88.67°

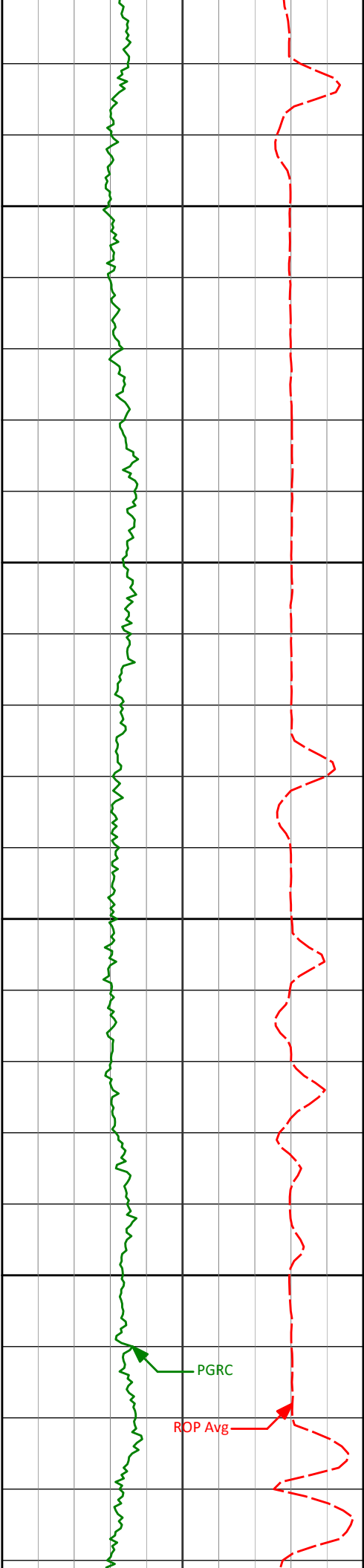
270.90°

6053.94'

3115.96'

PGRC

ROP Avg



9200

9221'

89.01°

271.14°

6055.84'

3209.92'

9250

9300

9316'

90.62°

272.35°

6056.15'

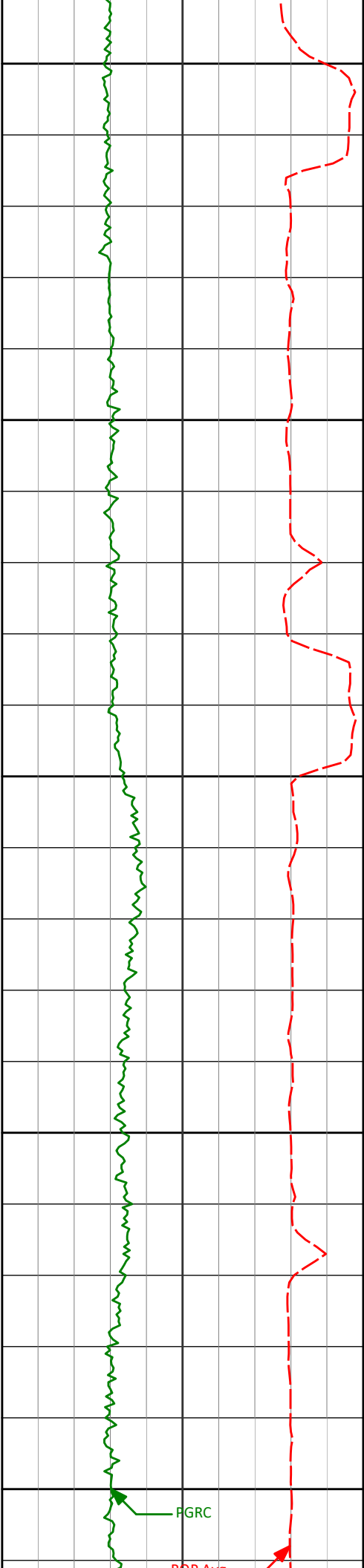
3304.91'

9350

PGRC

ROP Avg





9400

9411'

89.91°

271.28°

6055.71'

3399.91'

9450

9500

9506'

89.01°

269.25°

6056.61'

3494.84'

9550

9600

9601'

88.67°

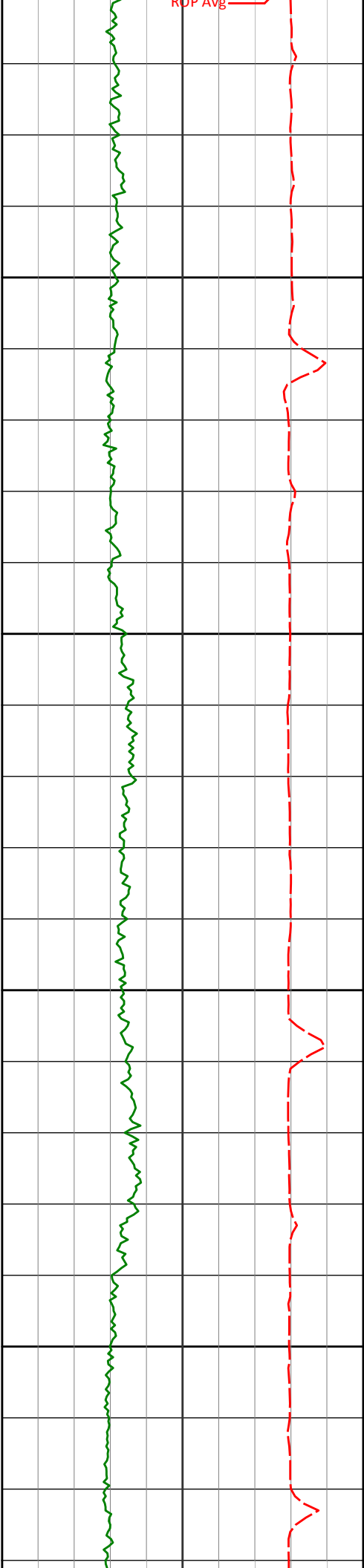
268.91°

6058.52'

3589.68'

PGRC

PDR Arc



9650

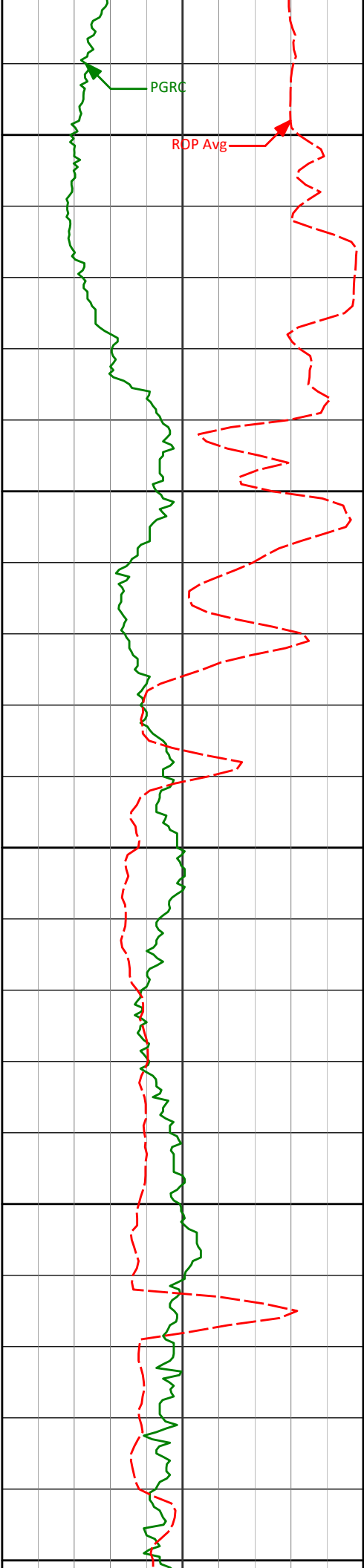
9700

9750

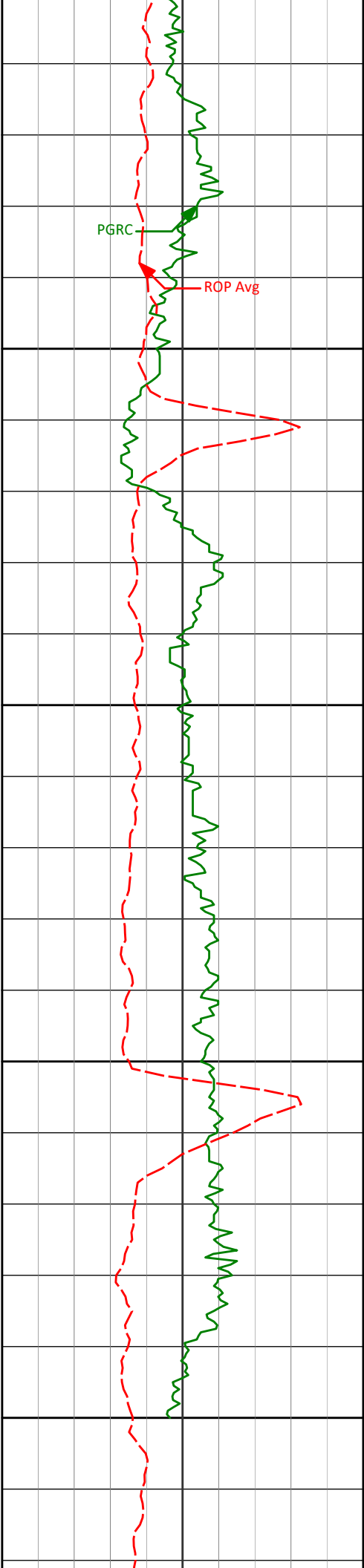
9800

9696'	89.51°	269.69°	6060.03'	3684.54'
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9791'	89.51°	269.78°	6060.85'	3779.45'
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9850				
9858'	89.45°	268.69°	6061.46'	3846.35'
<Run 400>				
9900				
<Run 500>				
9950				
9953'	90.68°	268.51°	6061.36'	3941.16'
10000				
10050				
10048'	91.20°	268.89°	6059.80'	4035.97'



10100

10143'

91.66°

269.09°

6057.43'

4130.78'

10150

10200

10243'

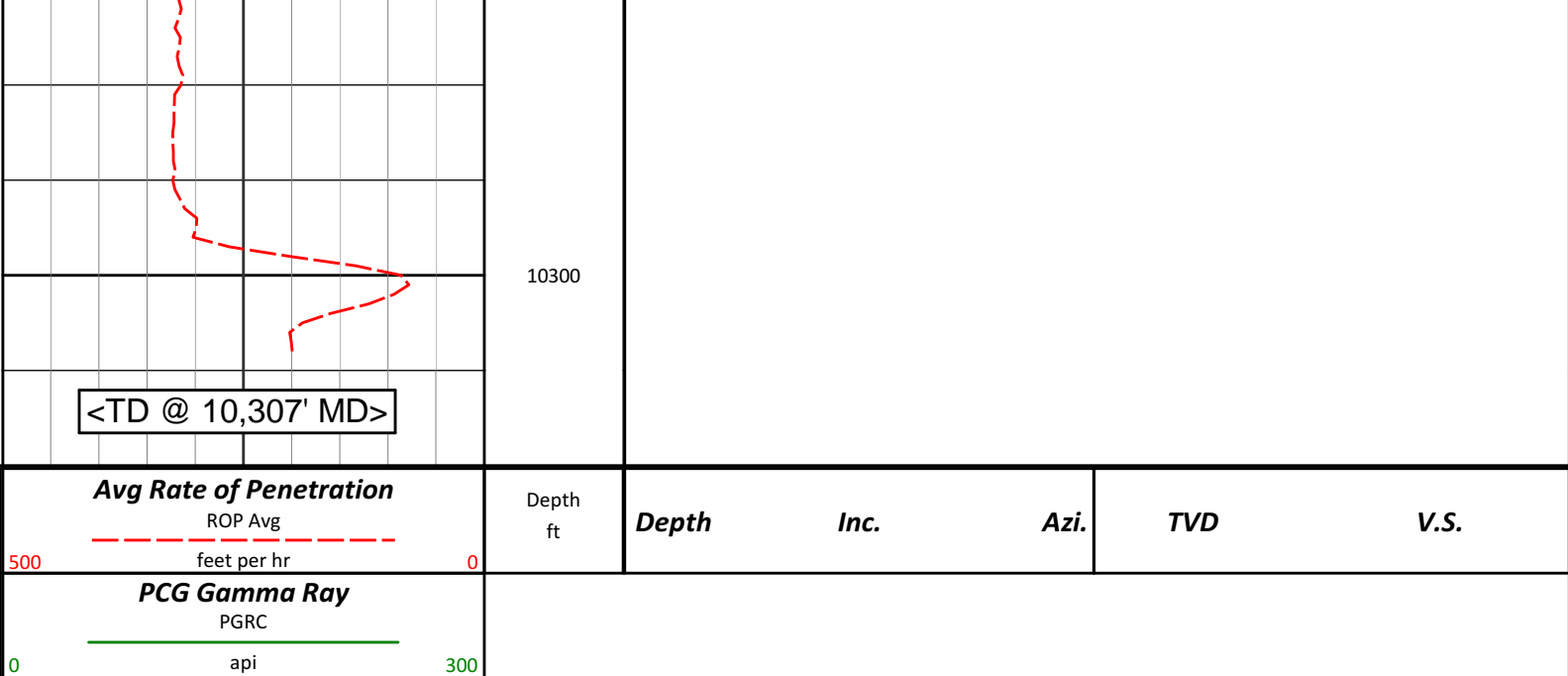
91.97°

269.65°

6054.25'

4230.61'

10250



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Bulleit Federal PC LG04-62HN
Wildcat
Weld Colorado
USA
CA-XX-0901058466

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
252.00	1.00	2.24	251.99	2.20 N	0.09 E	-0.00	0.40
515.00	0.50	129.14	514.97	3.77 N	1.07 E	-0.92	0.52
832.00	0.20	29.64	831.97	3.37 N	2.41 E	-2.28	0.18
1046.00	0.30	54.14	1045.97	4.03 N	3.05 E	-2.89	0.07
1292.00	0.60	311.24	1291.96	5.25 N	2.60 E	-2.40	0.30
1474.00	0.40	166.54	1473.96	5.26 N	2.04 E	-1.83	0.52
1554.00	0.31	195.29	1553.96	4.78 N	2.04 E	-1.86	0.25
1649.00	0.46	199.38	1648.96	4.18 N	1.85 E	-1.69	0.16
1743.00	0.44	184.43	1742.95	3.46 N	1.70 E	-1.56	0.13
1838.00	0.47	192.51	1837.95	2.72 N	1.58 E	-1.48	0.07
1933.00	0.50	190.35	1932.95	1.93 N	1.43 E	-1.35	0.04
2028.00	0.47	219.26	2027.94	1.22 N	1.10 E	-1.06	0.26
2123.00	0.52	216.06	2122.94	0.57 N	0.60 E	-0.58	0.06
2218.00	0.60	191.85	2217.94	0.27 S	0.24 E	-0.25	0.26
2313.00	0.50	203.04	2312.93	1.14 S	0.02 W	-0.02	0.15
2407.00	0.50	202.17	2406.93	1.89 S	0.33 W	0.26	0.01
2502.00	1.55	74.08	2501.92	1.92 S	0.75 E	-0.82	1.99
2597.00	3.38	38.54	2596.83	0.62 N	3.72 E	-3.70	2.42
2692.00	4.60	26.76	2691.60	6.21 N	7.18 E	-6.93	1.54
2787.00	6.38	34.72	2786.16	13.96 N	11.91 E	-11.35	2.04
2882.00	7.38	38.90	2880.48	23.05 N	18.75 E	-17.84	1.18
2977.00	8.85	39.13	2974.52	33.47 N	27.19 E	-25.87	1.55
3072.00	9.56	43.61	3068.30	44.85 N	37.25 E	-35.48	1.06
3167.00	11.16	40.54	3161.75	57.55 N	48.67 E	-46.39	1.78
3261.00	12.49	40.91	3253.75	72.14 N	61.23 E	-58.38	1.42
3356.00	12.73	39.94	3346.46	87.93 N	74.68 E	-71.20	0.34
3451.00	12.64	39.14	3439.14	104.02 N	87.96 E	-83.85	0.21
3546.00	13.01	38.26	3531.77	120.48 N	101.14 E	-96.38	0.44
3640.00	13.22	37.76	3623.32	137.28 N	114.27 E	-108.84	0.25

3735.00	13.03	43.79	3715.84	153.59 N	128.33 E	-122.26	1.45
3830.00	12.96	43.35	3808.41	169.07 N	143.05 E	-136.37	0.13
3925.00	12.30	45.40	3901.11	183.92 N	157.57 E	-150.29	0.83
4020.00	10.99	47.03	3994.16	197.20 N	171.40 E	-163.60	1.43
4115.00	10.94	42.09	4087.43	210.06 N	184.07 E	-175.75	0.99
4210.00	9.52	35.78	4180.92	223.12 N	194.70 E	-185.87	1.90
4305.00	7.49	35.62	4274.87	234.52 N	202.90 E	-193.62	2.14
4400.00	5.72	36.28	4369.23	243.37 N	209.31 E	-199.68	1.86
4495.00	4.92	38.38	4463.82	250.38 N	214.64 E	-204.73	0.87
4589.00	3.15	27.05	4557.59	255.83 N	218.31 E	-208.19	2.06
4684.00	2.35	12.95	4652.48	260.05 N	219.93 E	-209.65	1.10
4779.00	1.51	357.99	4747.43	263.20 N	220.32 E	-209.92	1.02
4874.00	1.21	357.10	4842.40	265.45 N	220.23 E	-209.73	0.32
4969.00	1.09	346.65	4937.38	267.33 N	219.97 E	-209.40	0.25
5064.00	0.98	1.75	5032.37	269.02 N	219.79 E	-209.15	0.31
5158.00	0.95	14.59	5126.35	270.58 N	220.01 E	-209.31	0.23
5253.00	0.70	9.84	5221.34	271.92 N	220.31 E	-209.56	0.28
5347.00	0.49	15.41	5315.34	272.88 N	220.51 E	-209.73	0.23
5393.00	0.67	5.24	5361.33	273.34 N	220.59 E	-209.79	0.45
5534.00	12.05	275.88	5501.29	275.68 N	205.97 E	-195.08	8.56
5582.00	17.21	275.06	5547.72	276.82 N	193.90 E	-182.98	10.76
5629.00	20.59	271.95	5592.18	277.71 N	178.71 E	-167.77	7.49
5677.00	23.92	271.16	5636.60	278.20 N	160.54 E	-149.59	6.96
5724.00	27.09	271.29	5679.01	278.63 N	140.31 E	-129.36	6.76
5772.00	29.75	268.50	5721.23	278.57 N	117.47 E	-106.54	6.19
5819.00	33.73	267.13	5761.19	277.61 N	92.77 E	-81.90	8.60
5867.00	37.95	265.53	5800.09	275.79 N	64.73 E	-53.95	9.00
5914.00	41.77	264.44	5836.17	273.15 N	34.74 E	-24.08	8.26
5962.00	46.17	264.19	5870.71	269.85 N	1.58 E	8.92	9.18
6008.00	50.07	264.94	5901.41	266.61 N	32.50 W	42.85	8.57
6056.00	52.87	265.47	5931.31	263.48 N	69.92 W	80.12	5.90
6103.00	56.30	266.26	5958.54	260.72 N	108.12 W	118.18	7.42
6151.00	60.81	266.22	5983.57	258.03 N	148.97 W	158.90	9.41
6198.00	66.22	266.99	6004.53	255.55 N	190.95 W	200.75	11.59
6246.00	71.05	267.99	6022.01	253.60 N	235.59 W	245.28	10.25
6293.00	75.42	267.58	6035.56	251.86 N	280.55 W	290.14	9.34
6336.00	79.37	268.60	6044.94	250.46 N	322.48 W	331.98	9.47
6371.00	82.65	269.74	6050.41	249.96 N	357.04 W	366.50	9.91
6471.00	86.98	270.79	6059.45	250.43 N	456.61 W	466.01	4.45
6566.00	89.41	270.63	6062.44	251.62 N	551.55 W	560.92	2.57
6661.00	90.68	269.88	6062.36	252.04 N	646.54 W	655.86	1.55
6756.00	90.25	271.29	6061.60	253.01 N	741.53 W	750.81	1.55
6851.00	90.99	271.84	6060.57	255.60 N	836.49 W	845.80	0.98
6946.00	91.82	268.61	6058.25	255.98 N	931.45 W	940.70	3.51
7041.00	91.26	267.92	6055.69	253.10 N	1026.37 W	1035.44	0.93
7135.00	90.18	267.02	6054.51	248.96 N	1120.27 W	1129.10	1.49
7230.00	89.97	266.50	6054.38	243.59 N	1215.11 W	1223.67	0.59
7325.00	89.41	265.35	6054.89	236.84 N	1309.87 W	1318.09	1.34
7420.00	90.31	267.74	6055.12	231.11 N	1404.69 W	1412.62	2.68
7515.00	89.97	267.51	6054.89	227.17 N	1499.61 W	1507.31	0.43
7609.00	90.12	267.81	6054.81	223.34 N	1593.53 W	1601.01	0.36
7704.00	90.12	267.83	6054.61	219.72 N	1688.46 W	1695.73	0.02
7799.00	90.31	267.98	6054.25	216.24 N	1783.40 W	1790.46	0.25
7894.00	90.59	268.54	6053.51	213.36 N	1878.35 W	1885.23	0.66
7989.00	90.65	268.51	6052.49	210.92 N	1973.31 W	1980.02	0.07
8083.00	90.89	268.64	6051.22	208.58 N	2067.27 W	2073.82	0.30
8178.00	91.39	268.73	6049.33	206.41 N	2162.23 W	2168.62	0.53
8273.00	91.66	268.20	6046.80	203.87 N	2257.16 W	2263.39	0.63
8368.00	90.80	267.70	6044.76	200.47 N	2352.08 W	2358.10	1.05
8462.00	89.97	268.82	6044.13	197.61 N	2446.03 W	2451.87	1.48
8557.00	88.89	269.31	6045.07	196.06 N	2541.01 W	2546.72	1.25
8652.00	88.98	269.07	6046.84	194.72 N	2635.98 W	2641.57	0.27
8747.00	89.29	269.18	6048.27	193.27 N	2730.96 W	2736.41	0.35
8842.00	89.04	268.70	6049.65	191.51 N	2825.94 W	2831.25	0.57
8937.00	89.91	269.41	6050.52	189.94 N	2920.92 W	2926.10	1.18
9032.00	88.64	270.73	6051.72	190.06 N	3015.91 W	3021.02	1.92
9127.00	88.67	270.90	6053.94	191.42 N	3110.87 W	3115.96	0.18
9221.00	89.01	271.14	6055.84	193.09 N	3204.84 W	3209.92	0.44
9316.00	90.62	272.35	6056.15	195.99 N	3299.79 W	3304.91	2.12
9411.00	89.91	271.28	6055.71	199.00 N	3394.74 W	3399.91	1.35
9506.00	89.01	269.25	6056.61	199.44 N	3489.72 W	3494.84	2.34
9601.00	88.67	268.01	6058.52	197.00 N	3584.60 W	3589.68	0.50

9601.00	88.97	268.91	6058.32	197.90 N	3584.89 W	3589.88	0.50
9696.00	89.51	269.69	6060.03	196.74 N	3679.67 W	3684.54	1.20
9791.00	89.51	269.78	6060.85	196.30 N	3774.67 W	3779.45	0.10
9858.00	89.45	268.69	6061.46	195.40 N	3841.66 W	3846.35	1.64
9953.00	90.68	268.51	6061.36	193.08 N	3936.63 W	3941.16	1.31
10048.00	91.20	268.89	6059.80	190.93 N	4031.59 W	4035.97	0.68
10143.00	91.66	269.09	6057.43	189.25 N	4126.54 W	4130.78	0.53
10243.00	91.97	269.65	6054.25	188.16 N	4226.49 W	4230.61	0.64
10307.00	91.97	269.65	6052.05	187.77 N	4290.45 W	4294.51	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 272.23 DEGREES (GRID)
A TOTAL CORRECTION OF 7.14 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 10307.00 FEET
IS 4294.56 FEET ALONG 272.51 DEGREES (GRID)**

Surface surveys from 252 ft - 1474 ft have had azimuths corrected to grid north, but were not taken by Halliburton.

Last survey is a projection from 10243 ft MD to TD at 10307 ft MD.

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