

**PCGC : Pressure Case Gamma**  
**PCDC: Pressure Case Directional**



**1 : 600 / 1 : 240**

[illegible]

## WELL INFORMATION

<b>MWD Run Number</b>	100	200	300	400	
<b>Date run completed</b>	20-Apr-13	21-Apr-13	23-Apr-13	25-Apr-13	
<b>Rig Bit Number</b>	2	3	4	5	
<b>Bit Size (in)</b>	8.750	8.750	6.125	6.125	
<b>Tool Nominal OD (in)</b>	6.750	6.750	4.750	4.750	
<b>Log Start Depth (MD, ft)</b>	640.00	5,790.00	6,979.00	9,398.00	
<b>Log End Depth (MD, ft)</b>	5,790.00	6,979.00	9,398.00	10,992.00	
<b>Drill or Wipe</b>	Drill	Drill	Drill	Drill	
<b>Drill/Wipe Start Date and Time</b>	19-Apr-13 15:45	20-Apr-13 17:00	22-Apr-13 13:45	24-Apr-13 03:40	
<b>Drill/Wipe End Date and Time</b>	20-Apr-13 07:30	21-Apr-13 08:05	22-Apr-13 16:30	24-Apr-13 21:20	
<b>Min Inc (deg) @ Depth (MD, ft)</b>	.10 @ 5,257.00	.48 @ 5,791.00	87.91 @ 9,028.00	88.30 @ 10,263.00	
<b>Max Inc (deg) @ Depth (MD, ft)</b>	10.91 @ 2,411.00	87.02 @ 6,979.00	92.28 @ 8,174.00	93.52 @ 10,453.00	
<b>Bit TFA(in2) / Bit Type</b>	.75 / PDC	.75 / PDC	.46 / PDC	.46 / PDC	
<b>Flow Rate (gpm)</b>	588.32	583.28	283.21	273.82	
<b>Max AV (fpm) / CV (fpm) @ MWD</b>	N/A / N/A	N/A / N/A	N/A / N/A	N/A / N/A	
<b>Fluid Type</b>	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel	
<b>Density (ppg) / Viscosity (spqt)</b>	9.25 / 31.00	10.50 / 37.00	9.30 / 31.00	9.30 / 33.00	
<b>Filtrate CL (ppm)</b>	1,000.00	1,000.00	1,000.00	1,100.00	
<b>pH / Fluid Loss (mptm)</b>	9.80 / 0	9.30 / 0	9.20 / 10	9.00 / 8	
<b>PV (cP) / YP (lbf2)</b>	7 / 6.00	13 / 11.00	6 / 7.00	9 / 8.00	
<b>% Solids / % Sand</b>	6.7 / 0.35	12.1 / .3	5.7 / 0.20	5.2 / 0.25	
<b>% Oil / Oil:Water Ratio</b>	N/A / N/A	N/A / N/A	N/A / N/A	N/A / N/A	
<b>Rm @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	
<b>Rmf @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	
<b>Rmc @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	
<b>Max Tool Temp (in) @ Temp (degF)</b>	115.00 / 200M	175.00 / 200M	215.50 / 200M	201.40 / 200M	

Max Tool Temp (degF) / Source	145.90 / PCM	175.21 / PCM	215.51 / PCM	231.42 / PCM	
Rm @ Max Tool Temp (degF)	N/A @ 145.90	N/A @ 175.21	N/A @ 215.51	N/A @ 231.42	
Lead MWD Engineer	Paul Kock	Paul Kock	Paul Kock	Paul Kock	
Customer Representative	Martin Suarez	Martin Suarez	Martin Suarez	Bryant Dear	

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	PCM	PCM	PCM	PCM	
Software Version	5.76	5.76	5.76	5.76	
Sub Serial Number	246473	246473	11750419	11750419	
Insert Serial Number	11680801	11680801	11619973	11680801	
Date and Time Initialized	19-Apr-13 07:40	19-Apr-13 07:40	21-Apr-13 19:11	23-Apr-13 20:31	
Date and Time Read	21-Apr-13 15:25	21-Apr-13 16:15	23-Apr-13 22:26	25-Apr-13 06:44	
ECMB SW Version	N/A	N/A	N/A	N/A	

### Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC	PCDC	
Distance From Bit (ft)	55.88	52.46	59.01	59.14	
Software Version	6.21	6.21	6.21	6.21	
Sub Serial Number	246473	246473	11750419	11750419	
Sonde Serial Number	11833052	11833052	11062040	11833052	
Sensor ID Number	N/A	N/A	N/A	N/A	
Toolface Offset (deg)	128.00	30.98	116.43	231.16	

### Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG	PCG	
Distance From Bit (ft)	50.88	47.46	54.03	54.16	
Recorded Sample Period (sec)	10	10	10	10	
Software Version	8.15	8.15	8.15	8.15	
Sub Serial Number	246473	246473	11750419	11750419	
Insert/Sonde Serial Number	11579806	11579806	11680907	11579806	

## 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 7.4.20
6. End of Run 200. Gap between build and lateral section is due to Gamma sensor measure point to bit distance during the build run. Last Gamma datapoint is at 6931 ft. MD. Gamma cannot be measured within cased hole, and collection resumes after drilling through cement at 6979 ft MD.

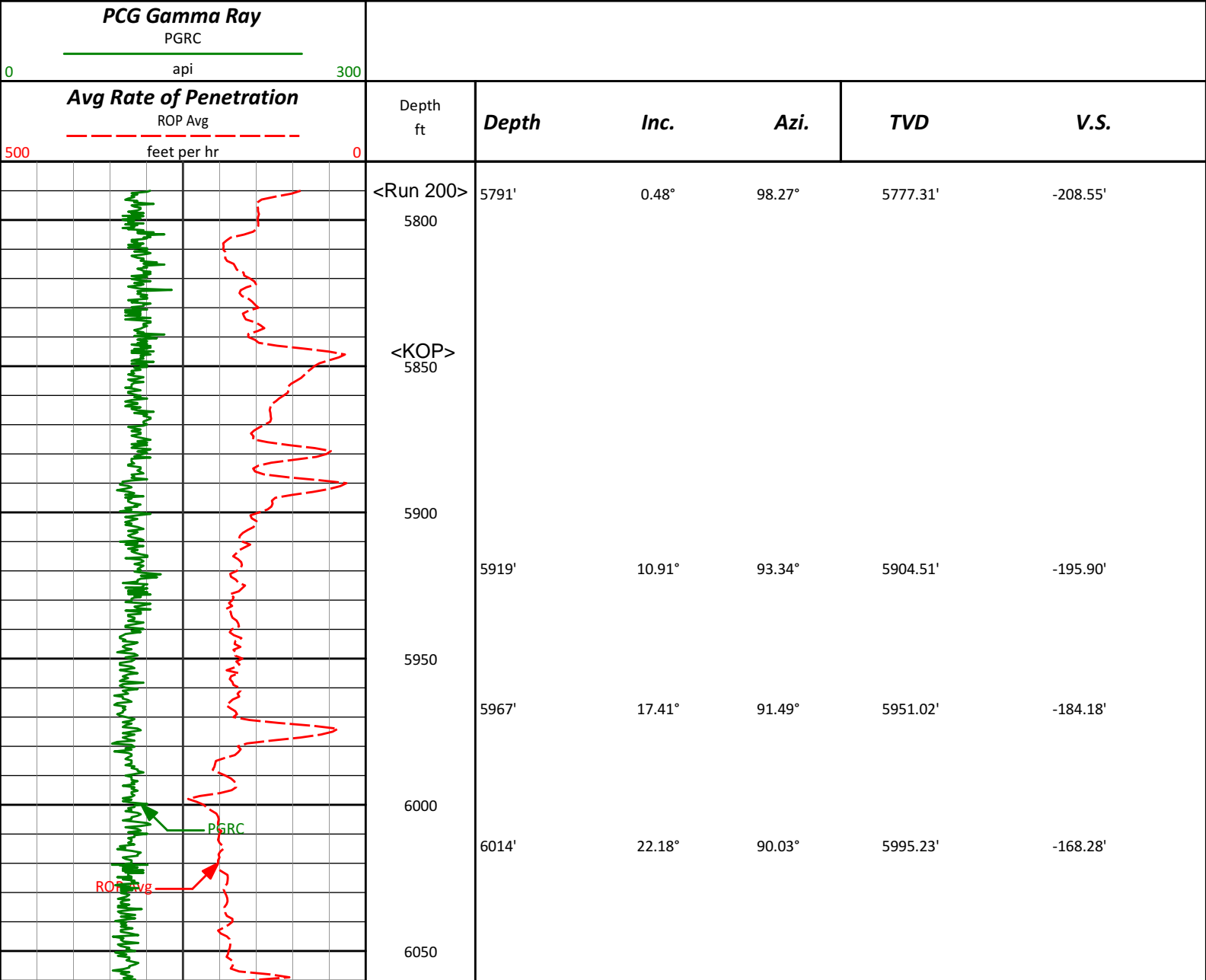
WARRANTY

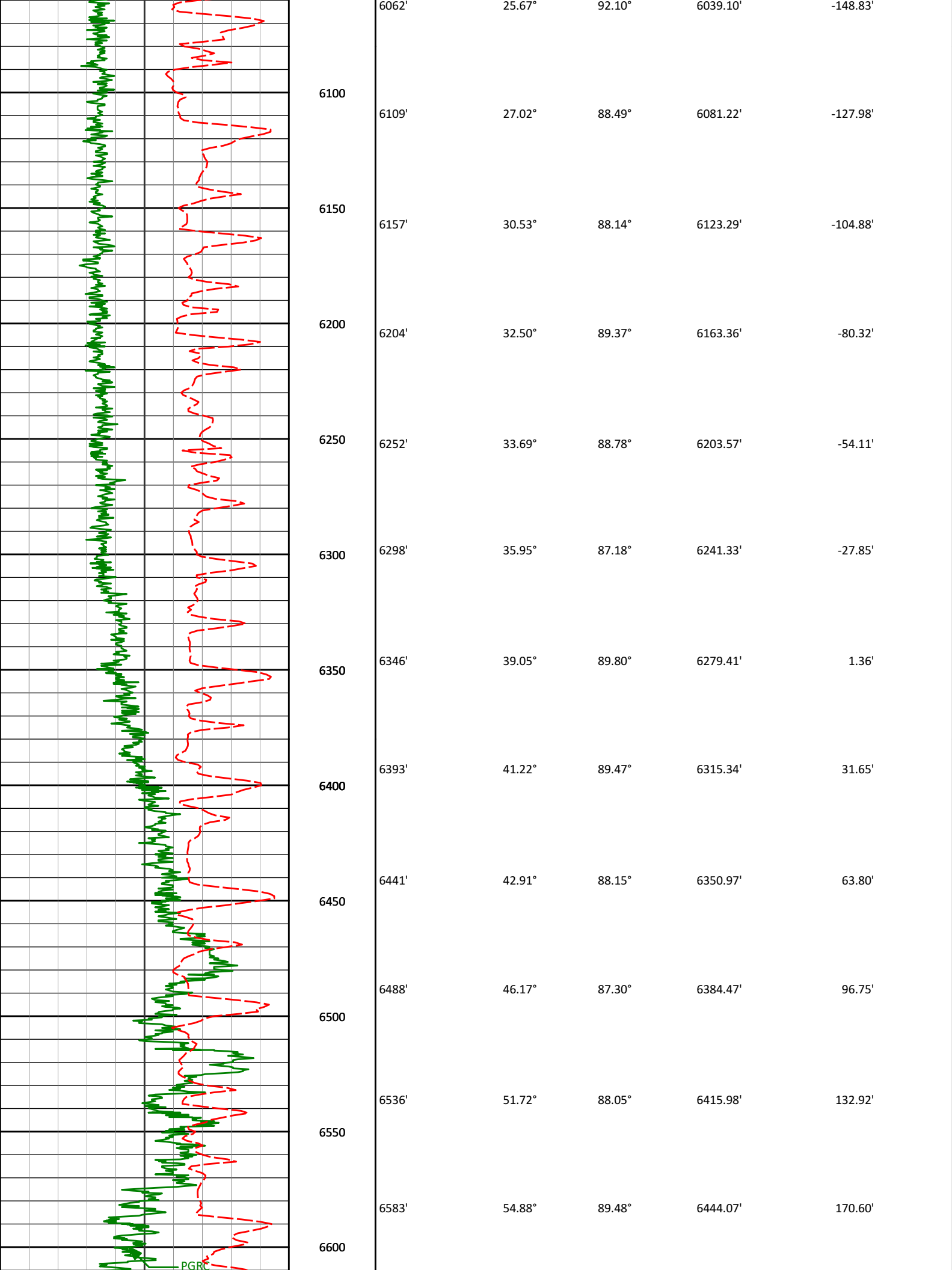
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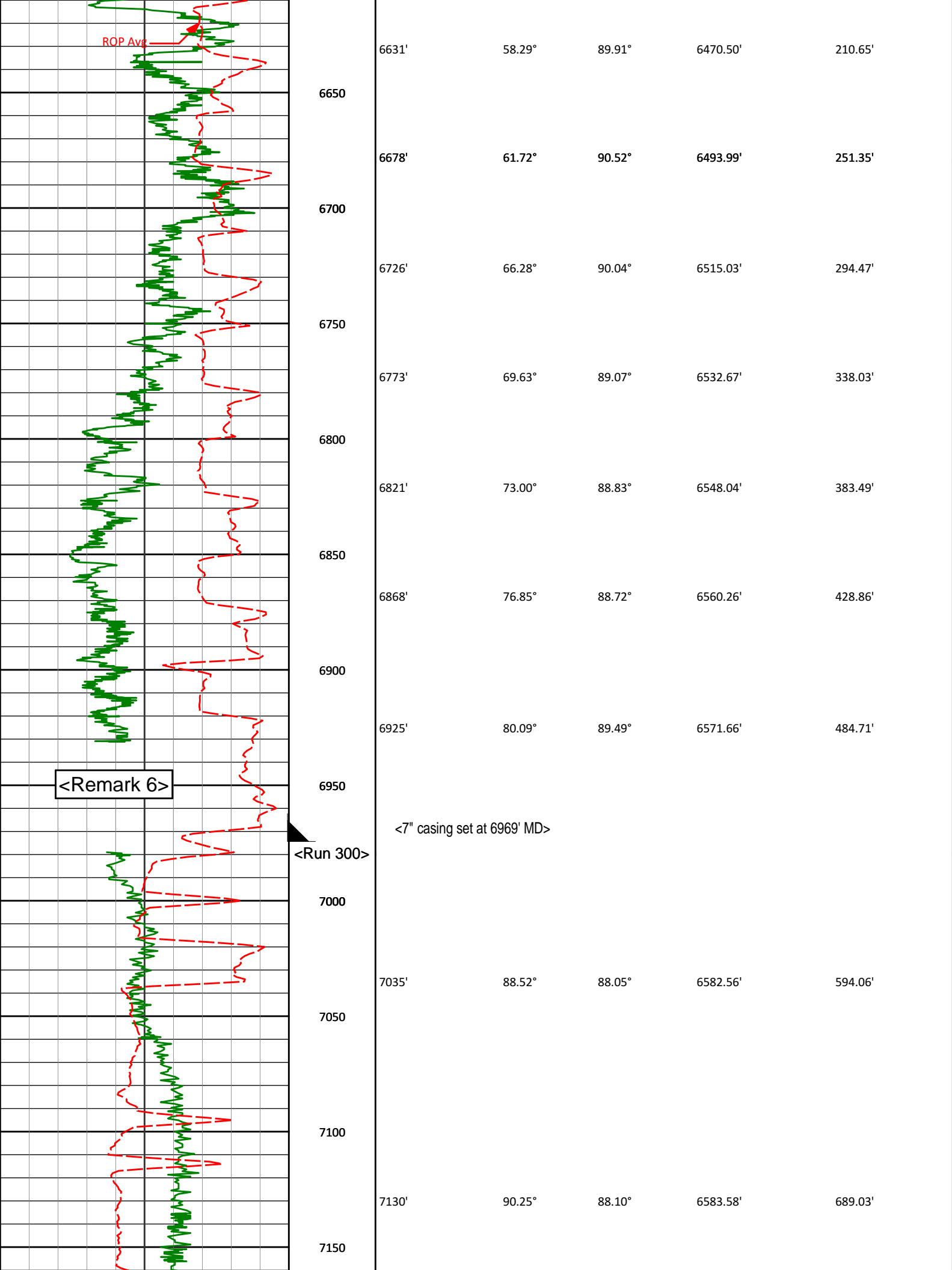
HALLIBURTON  
Sperry Drilling Services

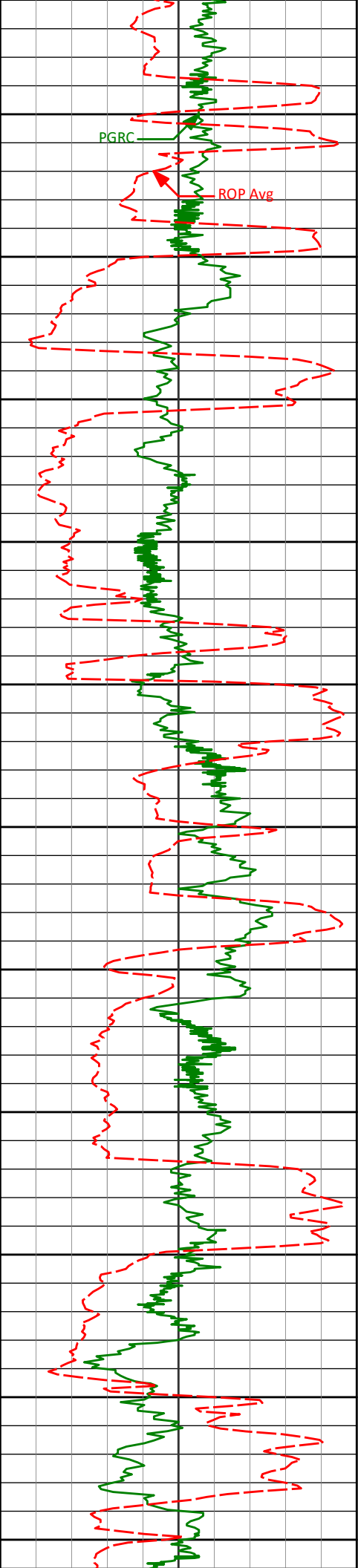
MD Main Log 1:600

Noble Energy, Inc  
SLW Ranch State B12-65HN  
H&P 315  
T5N R64W









7200

7225'

90.86°

87.96°

6582.66'

784.00'

7250

7300

7320'

88.68°

87.79°

6583.04'

878.97'

7350

7400

7415'

88.09°

88.50°

6585.72'

973.91'

7450

7500

7510'

88.80°

89.58°

6588.30'

1068.87'

7550

7600

7605'

88.86°

90.32°

6590.24'

1163.84'

7650

7700

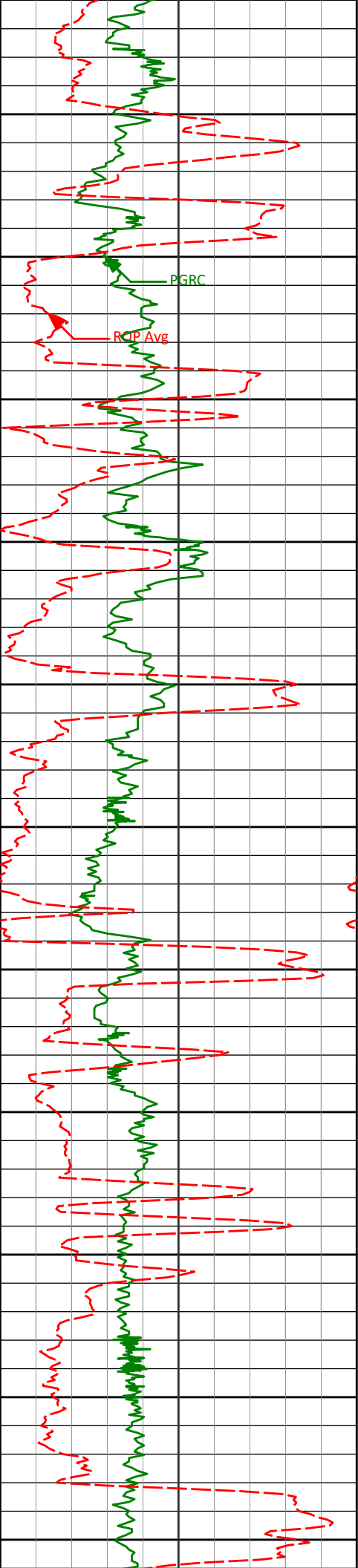
7699'

90.09°

90.30°

6591.10'

1257.82'



7750

7800

7850

7900

7950

8000

8050

8100

8150

8200

8250

7794'

90.71°

90.37°

6590.44'

1352.80'

7889'

90.06°

89.70°

6589.80'

1447.79'

7984'

90.34°

89.97°

6589.47'

1542.79'

8079'

90.46°

90.09°

6588.80'

1637.77'

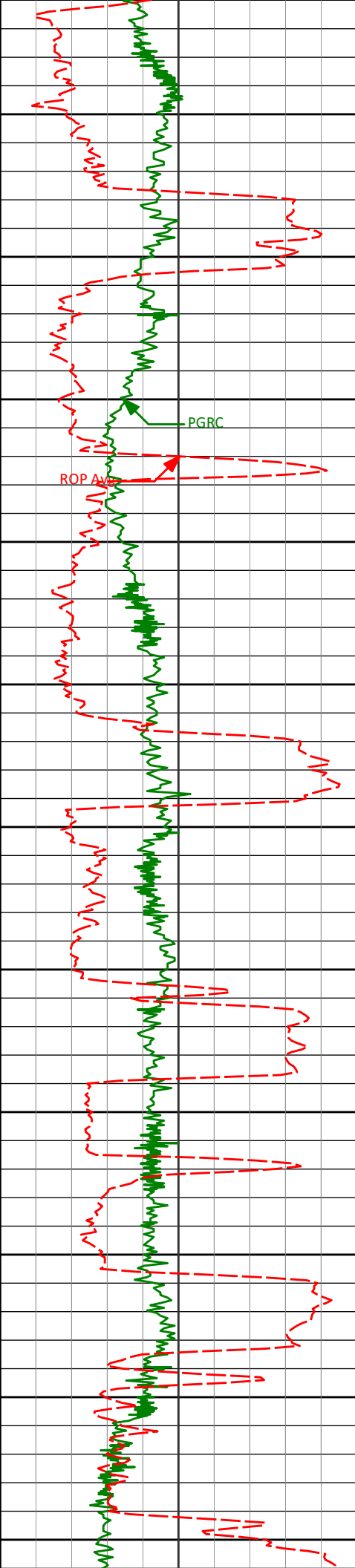
8174'

92.28°

89.92°

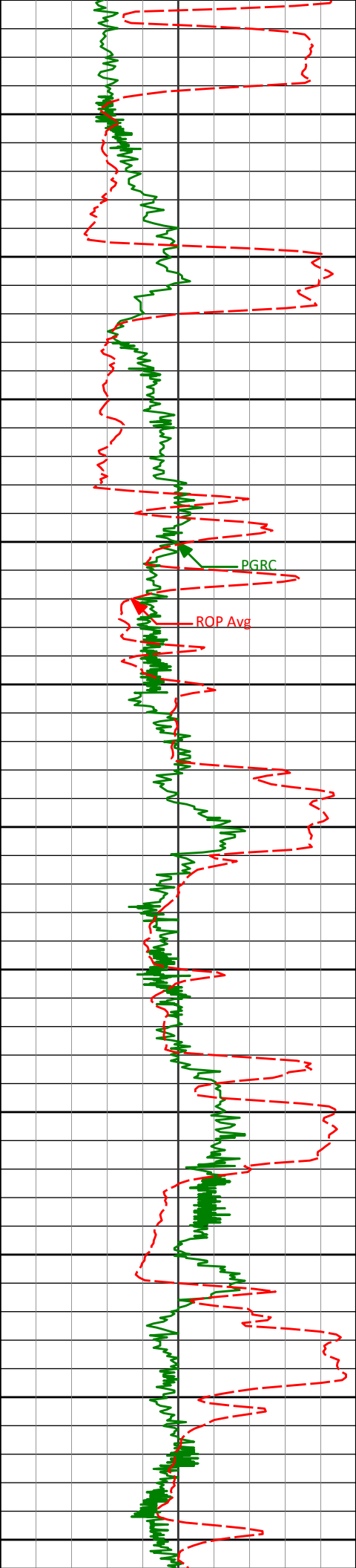
6586.53'

1732.74'

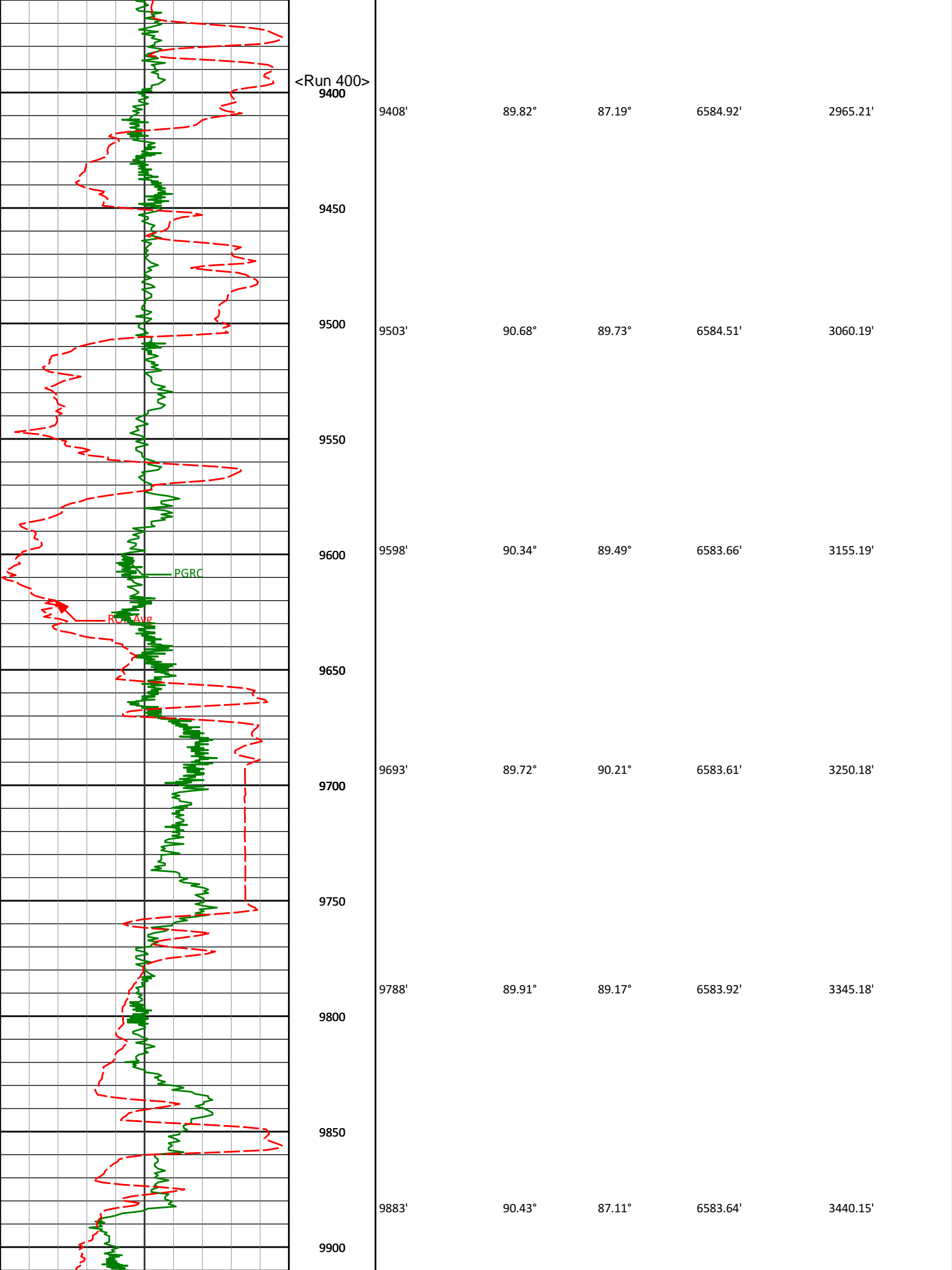


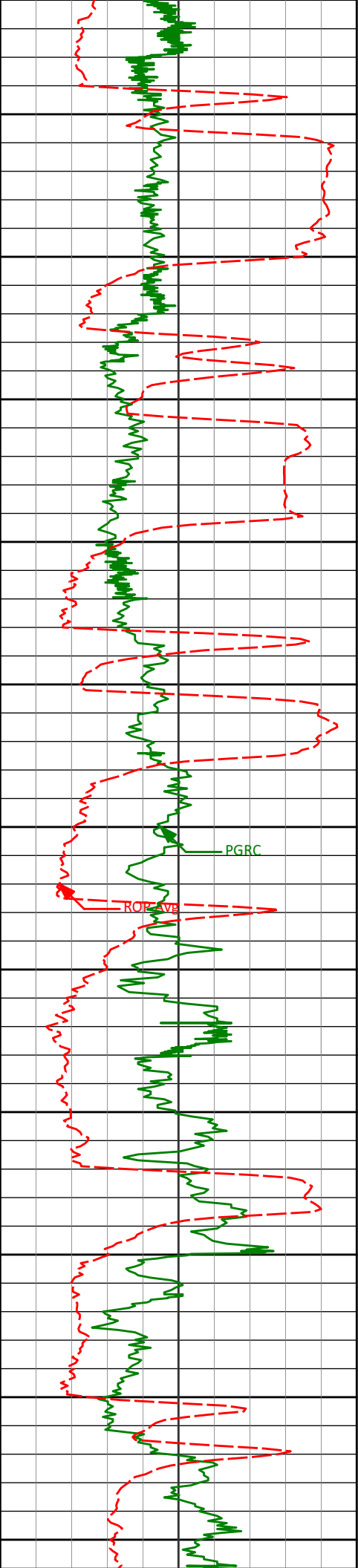
8269'	91.78°	91.35°	6583.17'	1827.65'
8300				
8350				
8364'	90.43°	92.65°	6581.33'	1922.52'
8400				
8450				
8459'	90.92°	92.16°	6580.22'	2017.36'
8500				
8550				
8553'	90.83°	91.60°	6578.78'	2111.26'
8600				
8650				
8648'	91.42°	92.52°	6576.92'	2206.12'
8700				
8750				
8743'	90.52°	91.24°	6575.31'	2301.01'
8800				





8838'	90.74°	88.01°	6574.26'	2395.99'
8850				
8900				
8933'	88.46°	86.76°	6574.93'	2490.92'
8950				
9000				
9028'	87.91°	86.04°	6577.93'	2585.76'
9050				
9100				
9123'	88.74°	86.31°	6580.71'	2680.58'
9150				
9200				
9218'	88.98°	86.24°	6582.60'	2775.43'
9250				
9300				
9313'	89.20°	86.53°	6584.11'	2870.30'
9350				





9950

9978'

91.17°

88.00°

6582.31'

3535.10'

10000

10050

10073'

91.64°

90.29°

6579.98'

3630.06'

10100

10150

10168'

89.51°

91.89°

6579.03'

3725.00'

10200

PGRC

ROP-Ave

10250

10263'

88.30°

92.36°

6580.84'

3819.86'

10300

10350

10358'

91.05°

90.94°

6581.38'

3914.77'

10400

10450

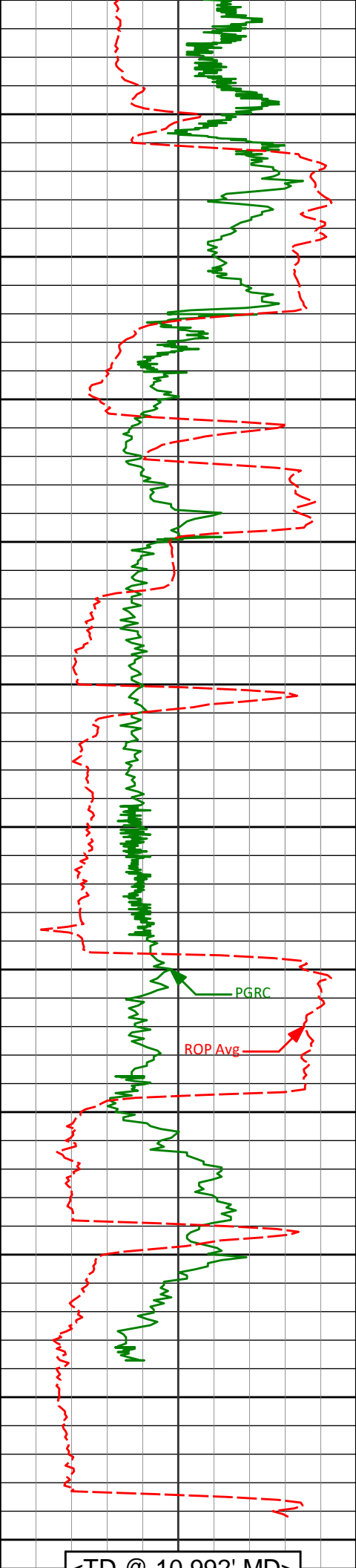
10453'

93.52°

90.27°

6577.60'

4009.66'



10500

10550

10600

10650

10700

10750

10800

10850

10900

10950

11000

10548'

92.84°

91.09°

6572.33'

4104.48'

10643'

90.59°

91.10°

6569.48'

4199.38'

10737'

91.82°

90.75°

6567.51'

4293.32'

10832'

88.71°

91.11°

6567.07'

4388.27'

10931'

89.23°

90.53°

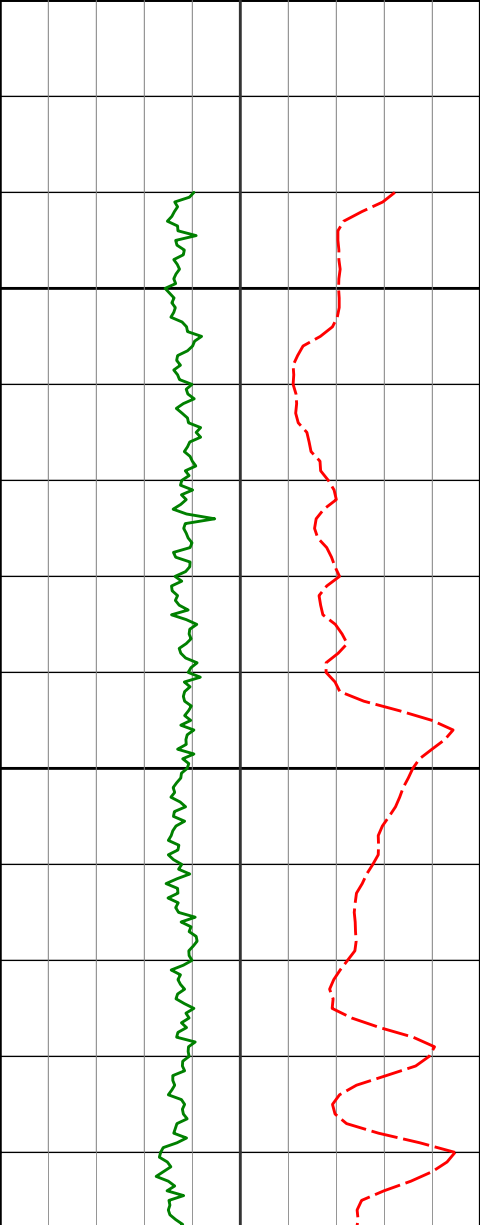
6568.85'

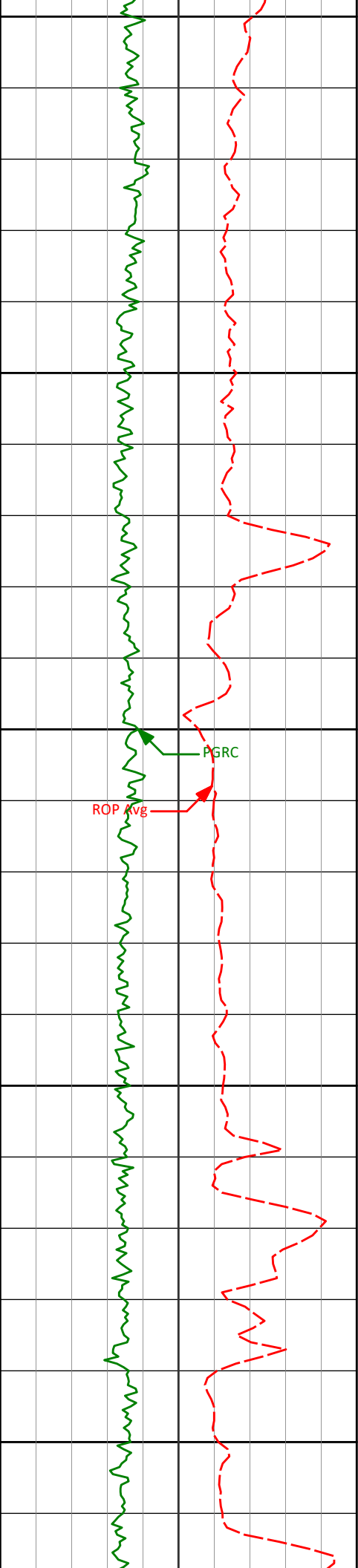
4487.22'

PGRC

ROP Avg

<TD @ 10 992' MD>

<TD @ 10,992 MD>										
<div><div>Avg Rate of Penetration</div><div>ROP Avg</div><div>500</div><div>feet per hr</div><div>0</div></div>					Depth ft	DepthInc.Azi.			TVDV.S.	
<div><div>PCG Gamma Ray</div><div>PGRC</div><div>0</div><div>api</div><div>300</div></div>										
<div><div>HALLIBURTON</div><div>Sperry Drilling Services</div><div>MD Detail Log 1:240</div><div><div>Noble Energy, Inc</div><div>SLW Ranch State B12-65HN</div><div>H&amp;P 315</div><div>T5N R64W</div></div></div>										
<div><div>PCG Gamma Ray</div><div>PGRC</div><div>0</div><div>api</div><div>300</div></div>										
<div><div>Avg Rate of Penetration</div><div>ROP Avg</div><div>500</div><div>feet per hr</div><div>0</div></div>					Depth ft	DepthInc.Azi.			TVDV.S.	
					<div><div>&lt;Run 200&gt;</div><div>5791'</div><div>0.48°</div><div>98.27°</div><div>5777.31'</div><div>-208.55'</div></div>					
					5800					
					<KOP>					
					5850					



5900

5919'

10.91°

93.34°

5904.51'

-195.90'

5950

5967'

17.41°

91.49°

5951.02'

-184.18'

6000

ROP Avg

PGRC

6014'

22.18°

90.03°

5995.23'

-168.28'

6050

6062'

25.67°

92.10°

6039.10'

-148.83'

6100

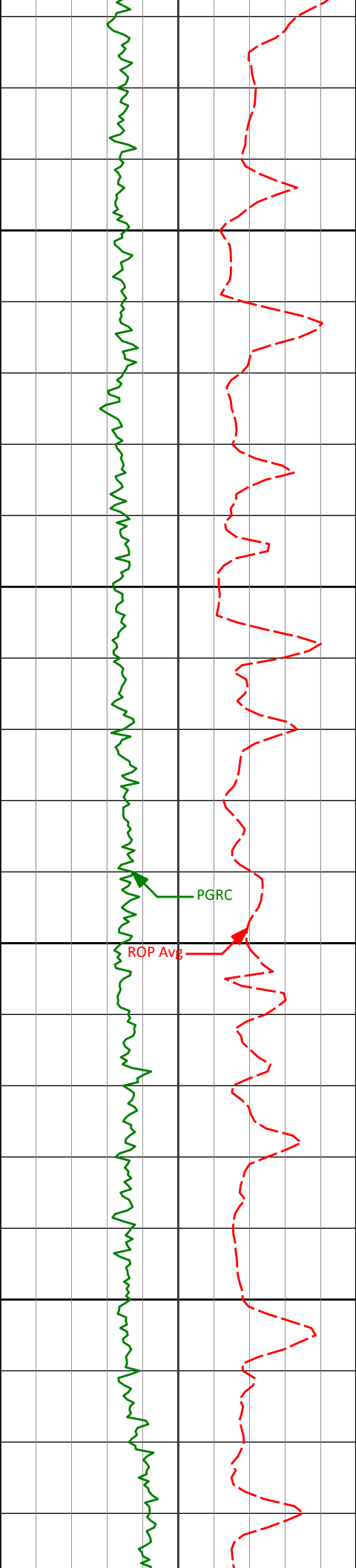
6109'

27.02°

88.49°

6081.22'

-127.98'



6150

6157'

30.53°

88.14°

6123.29'

-104.88'

6200

6204'

32.50°

89.37°

6163.36'

-80.32'

6250

6252'

33.69°

88.78°

6203.57'

-54.11'

6300

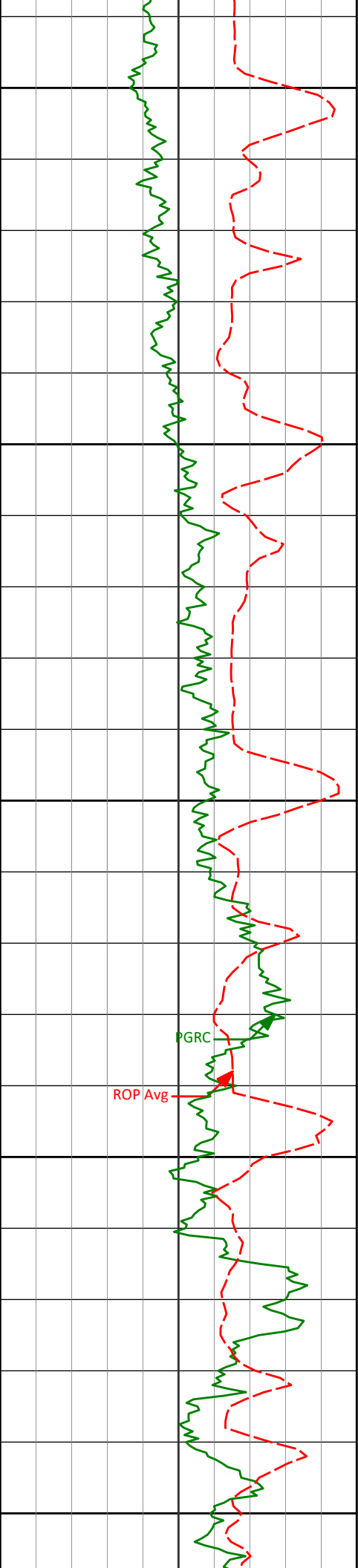
6298'

35.95°

87.18°

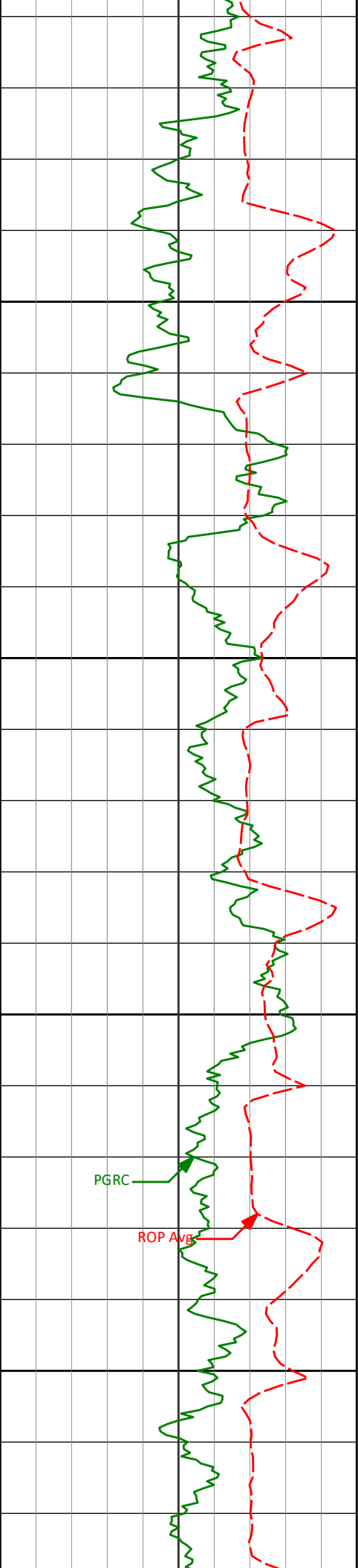
6241.33'

-27.85'



6350	6346'	39.05°	89.80°	6279.41'	1.36'
6400	6393'	41.22°	89.47°	6315.34'	31.65'
6450	6441'	42.91°	88.15°	6350.97'	63.80'
6500	6488'	46.17°	87.30°	6384.47'	96.75'
6550	6536'	51.72°	88.05°	6415.98'	132.92'





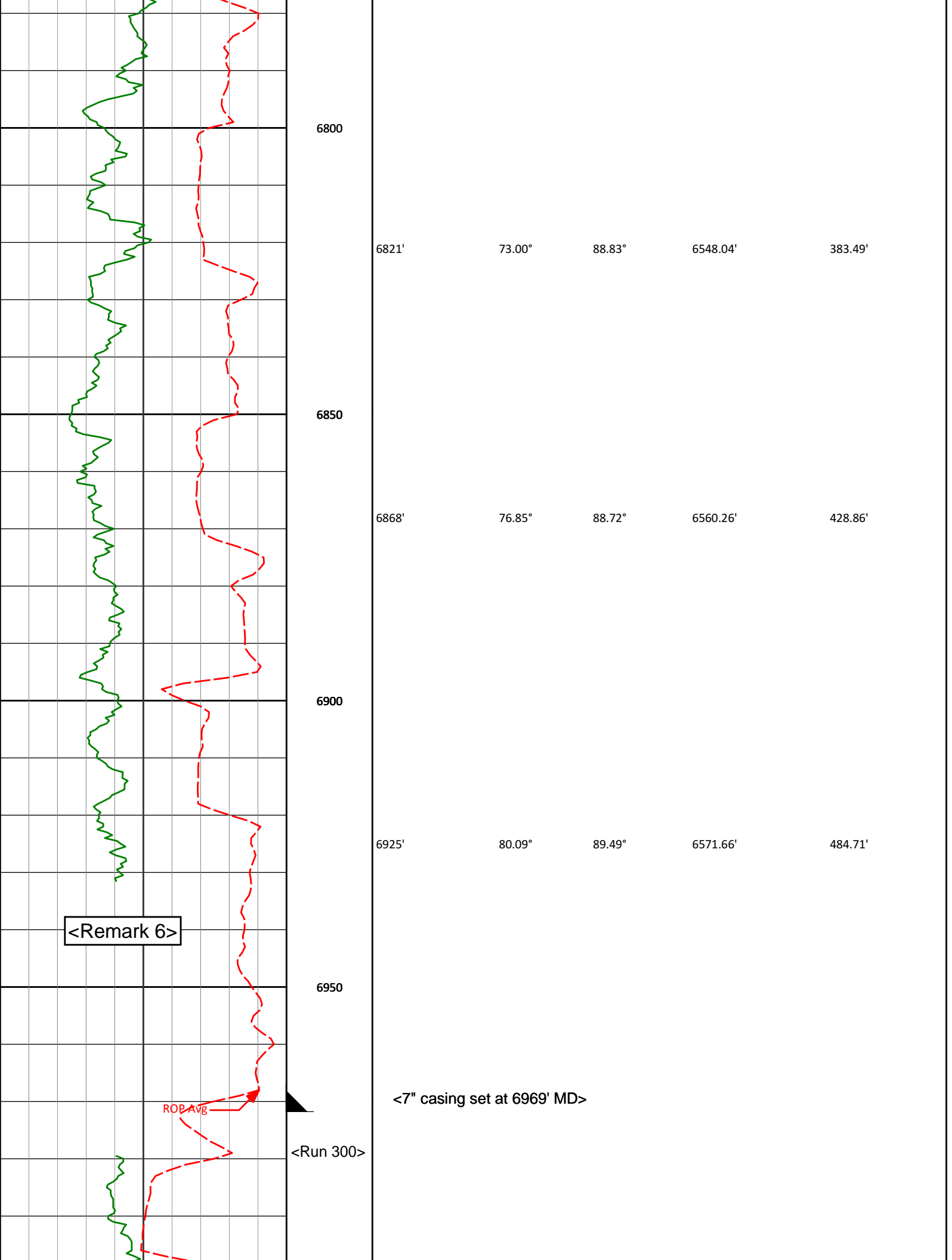
6600

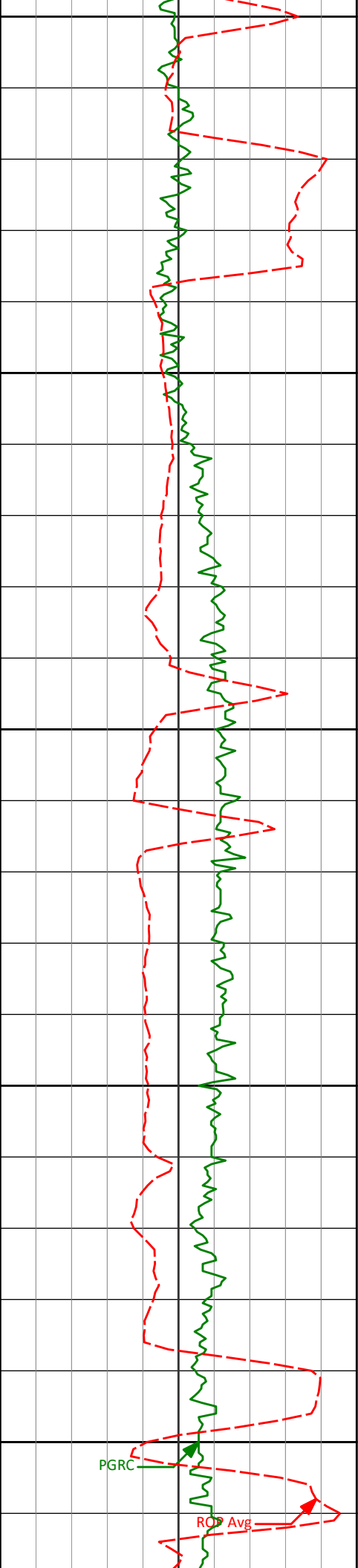
6650

6700

6750

6583'	54.88°	89.48°	6444.07'	170.60'
6631'	58.29°	89.91°	6470.50'	210.65'
6678'	61.72°	90.52°	6493.99'	251.35'
6726'	66.28°	90.04°	6515.03'	294.47'
6773'	69.63°	89.07°	6532.67'	338.03'





7035'

88.52°

88.05°

6582.56'

594.06'

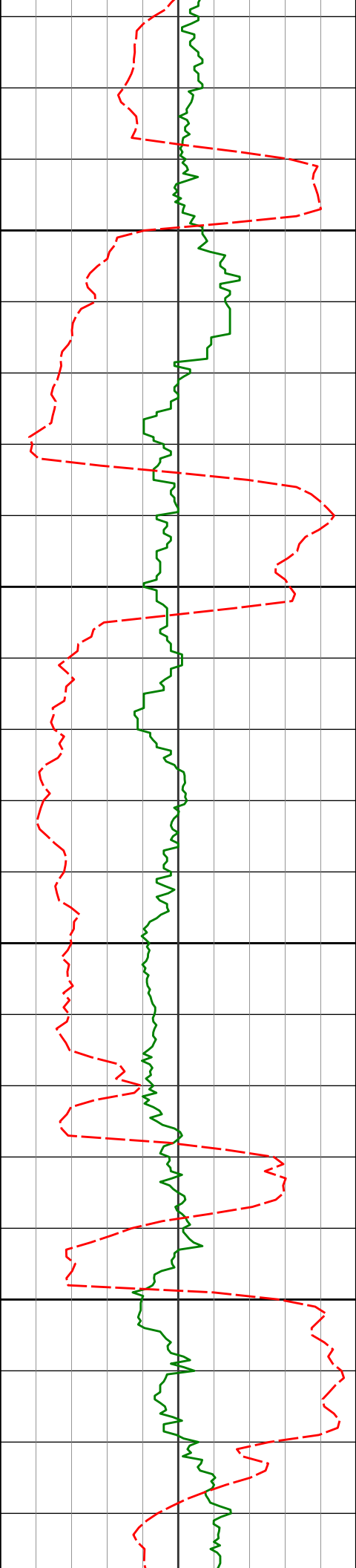
7130'

90.25°

88.10°

6583.58'

689.03'



7225'

90.86°

87.96°

6582.66'

784.00'

7250

7300

7320'

88.68°

87.79°

6583.04'

878.97'

7350

7400

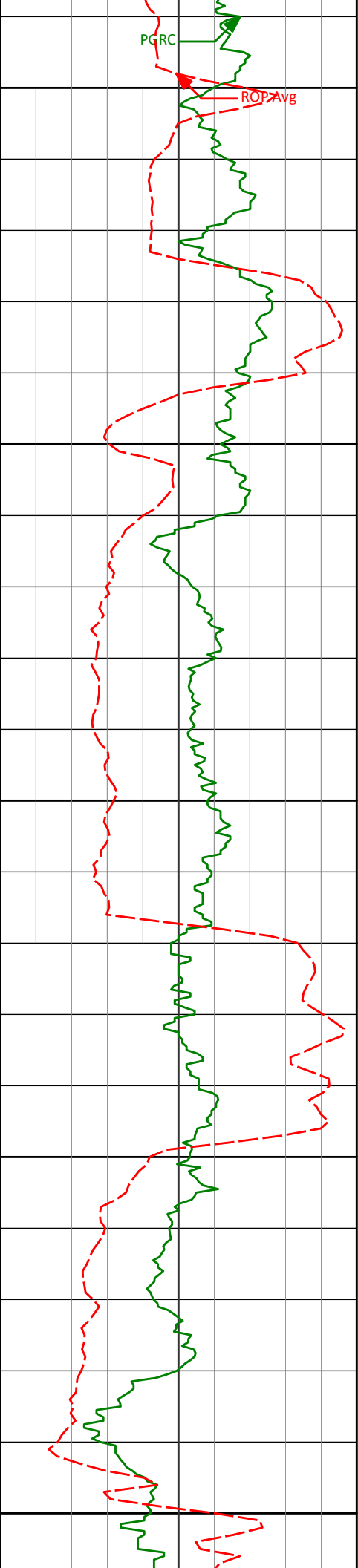
7415'

88.09°

88.50°

6585.72'

973.91'



7450

7500

7550

7600

7650

7510'

88.80°

89.58°

6588.30'

1068.87'

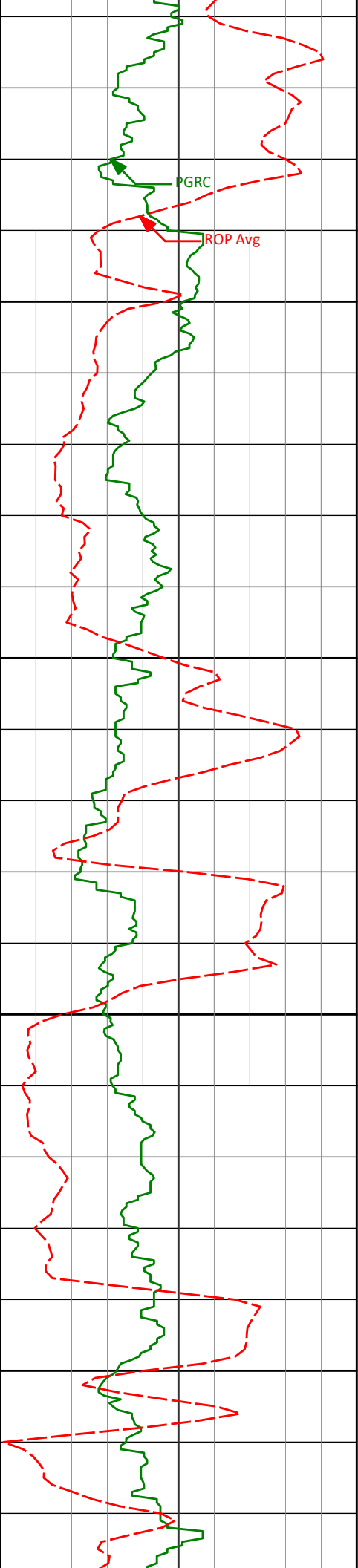
7605'

88.86°

90.32°

6590.24'

1163.84'



7700

7699'

90.09°

90.30°

6591.10'

1257.82'

7750

7800

7794'

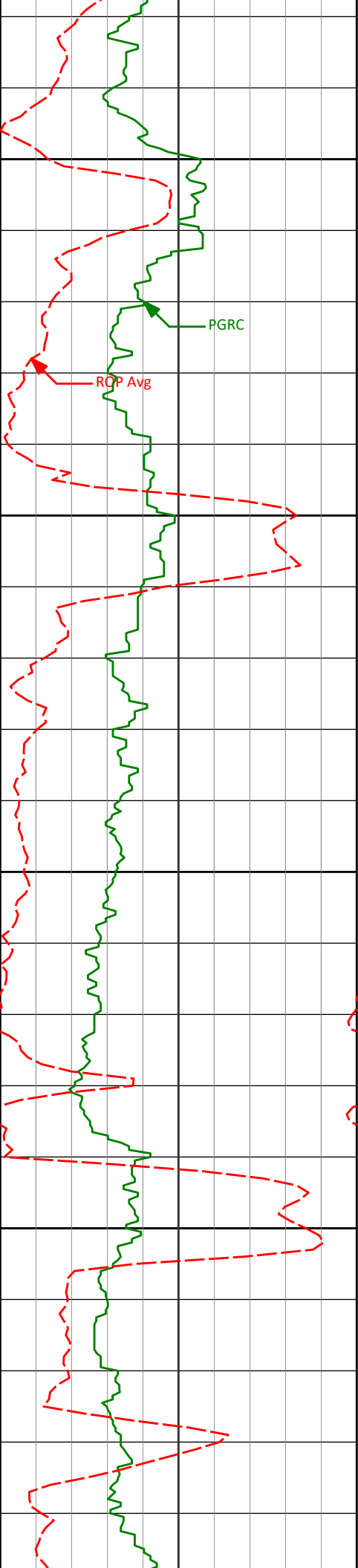
90.71°

90.37°

6590.44'

1352.80'

7850



7900

7950

8000

8050

7889'

90.06°

89.70°

6589.80'

1447.79'

7984'

90.34°

89.97°

6589.47'

1542.79'

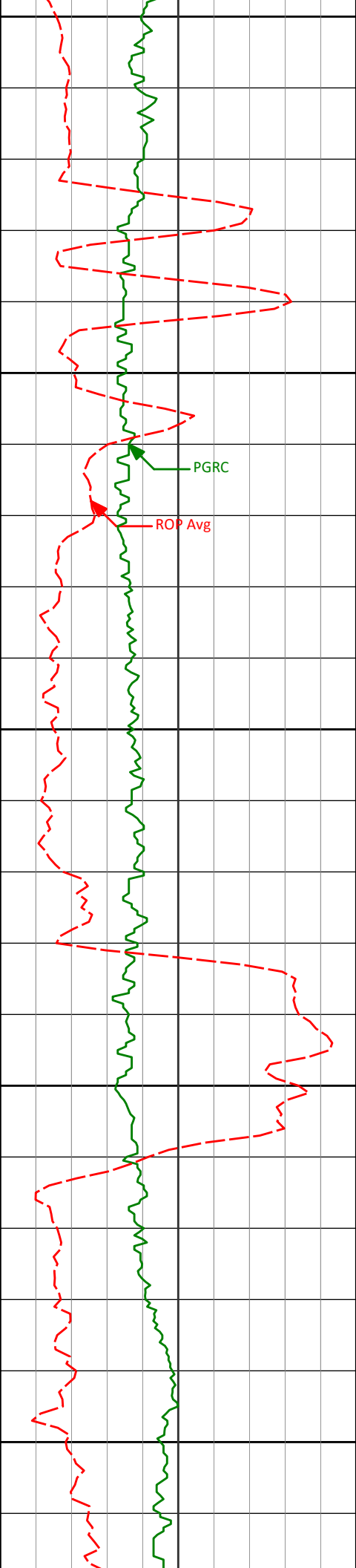
8079'

90.46°

90.09°

6588.80'

1637.77'



8100

8150

8200

8250

8300

PGRC

ROP Avg

8174'

92.28°

89.92°

6586.53'

1732.74'

8269'

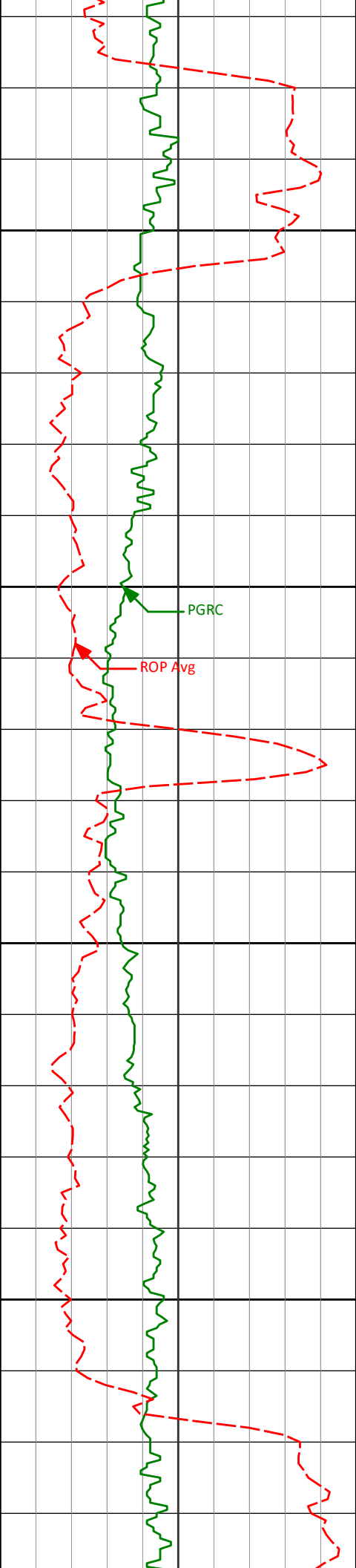
91.78°

91.35°

6583.17'

1827.65'





8350

8364'

90.43°

92.65°

6581.33'

1922.52'

8400

8450

8459'

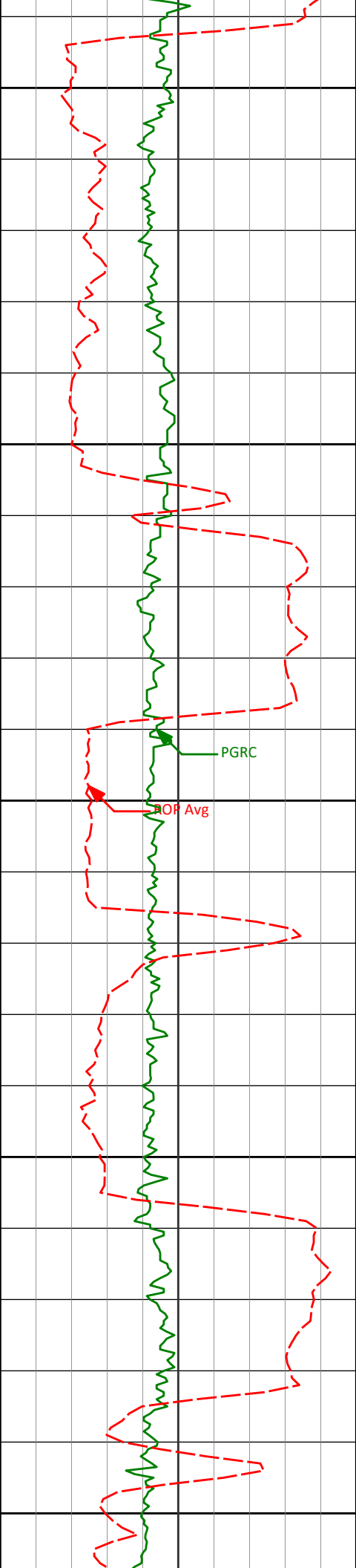
90.92°

92.16°

6580.22'

2017.36'

8500



8550

8553'

90.83°

91.60°

6578.78'

2111.26'

8600

8650

8648'

91.42°

92.52°

6576.92'

2206.12'

8700

8750

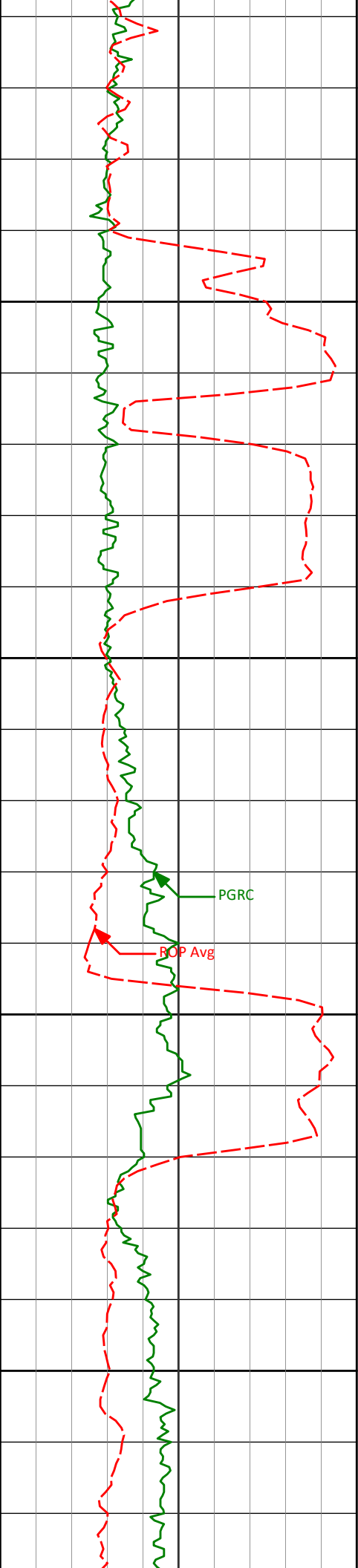
8743'

90.52°

91.24°

6575.31'

2301.01'



8800

8850

8900

8950

8838'

90.74°

88.01°

6574.26'

2395.99'

PGRC

ROP Avg

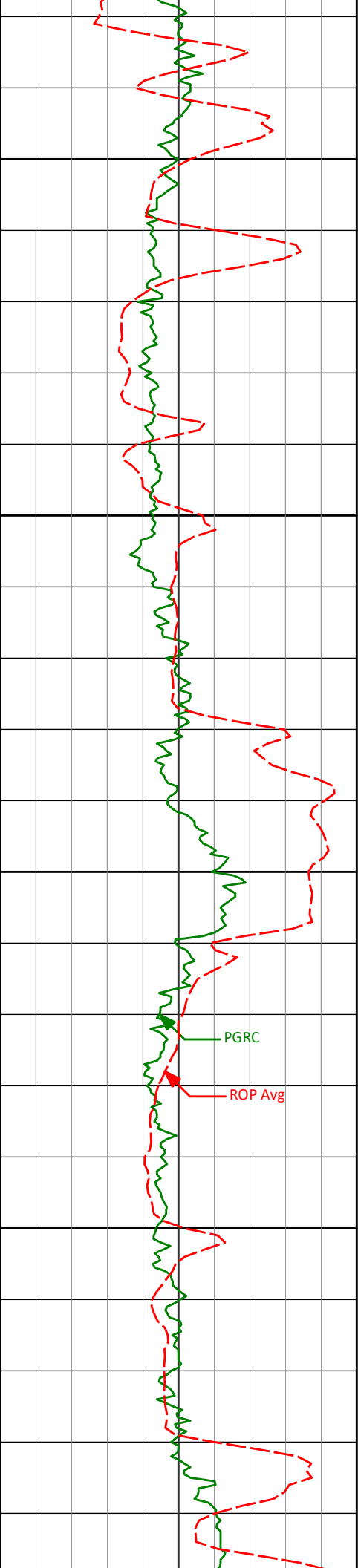
8933'

88.46°

86.76°

6574.93'

2490.92'



9000

9028'

87.91°

86.04°

6577.93'

2585.76'

9050

9100

9123'

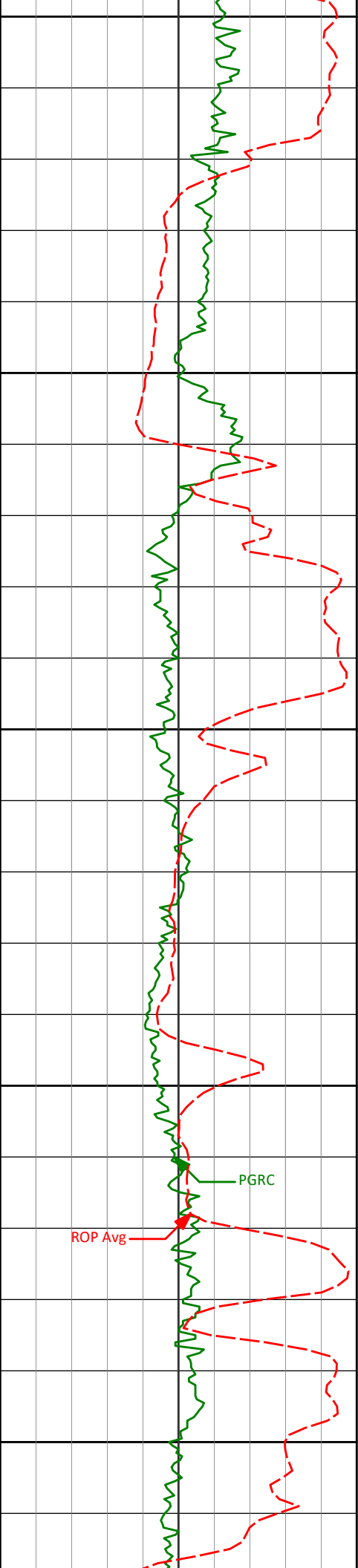
88.74°

86.31°

6580.71'

2680.58'

9150



9200

9218'

88.98°

86.24°

6582.60'

2775.43'

9250

9300

9313'

89.20°

86.53°

6584.11'

2870.30'

9350

PGRC

ROP Avg

<Run 400>

9400

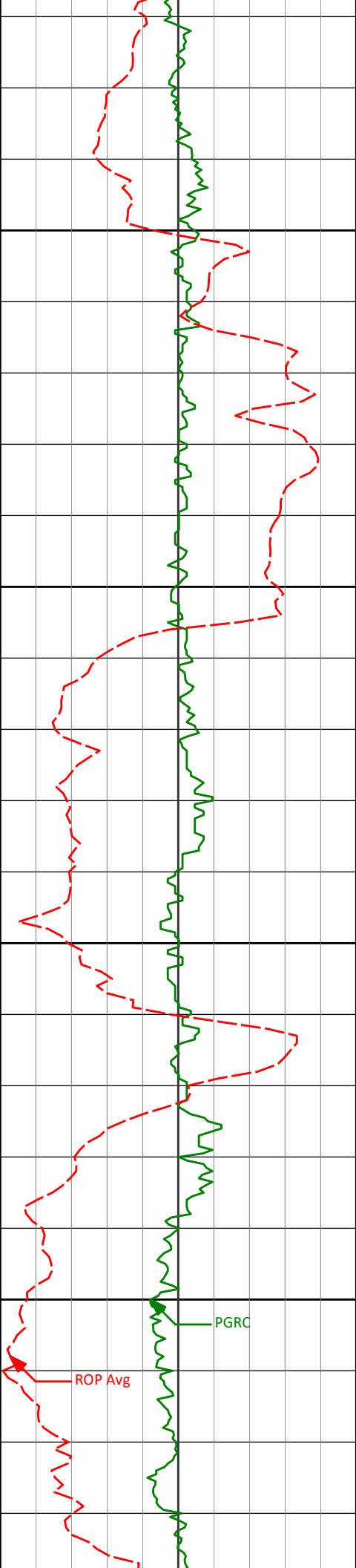
9408'

89.82°

87.19°

6584.92'

2965.21'



9450

9500

9550

9600

9503'

90.68°

89.73°

6584.51'

3060.19'

9598'

90.34°

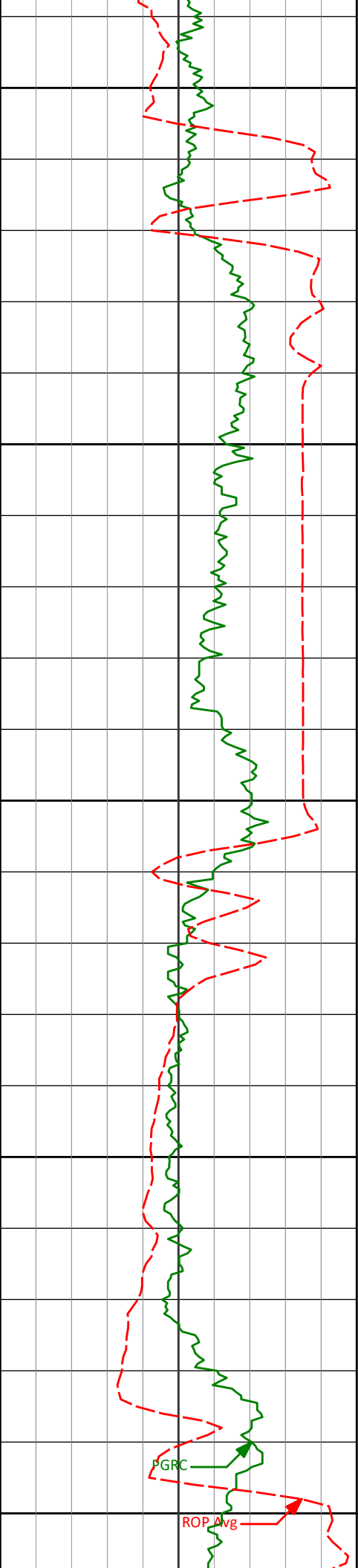
89.49°

6583.66'

3155.19'

PGRC

ROP Avg



9650

9693'

89.72°

90.21°

6583.61'

3250.18'

9700

9750

9788'

89.91°

89.17°

6583.92'

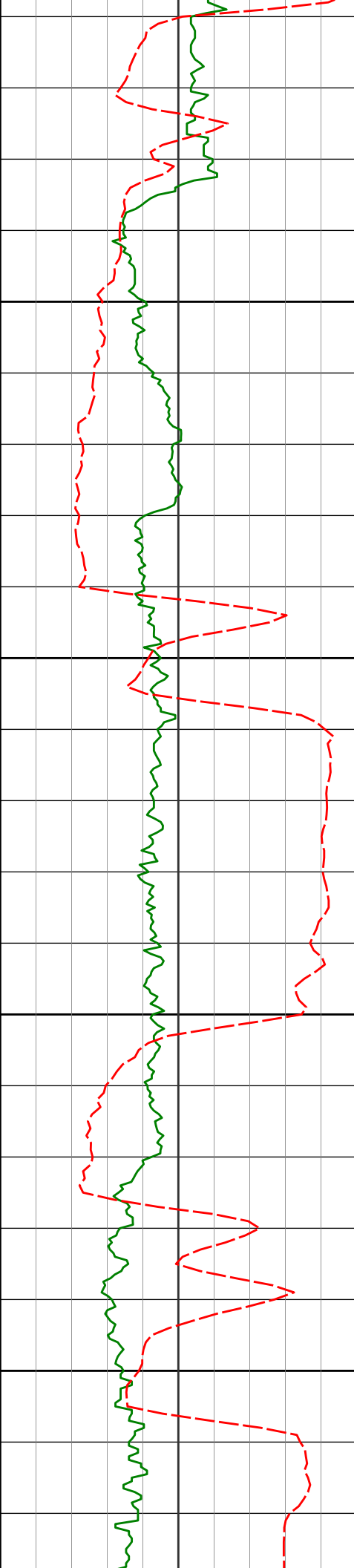
3345.18'

9800

9850

PGRC

ROP Avg



9900

9950

10000

10050

9883'

90.43°

87.11°

6583.64'

3440.15'

9978'

91.17°

88.00°

6582.31'

3535.10'

10073'

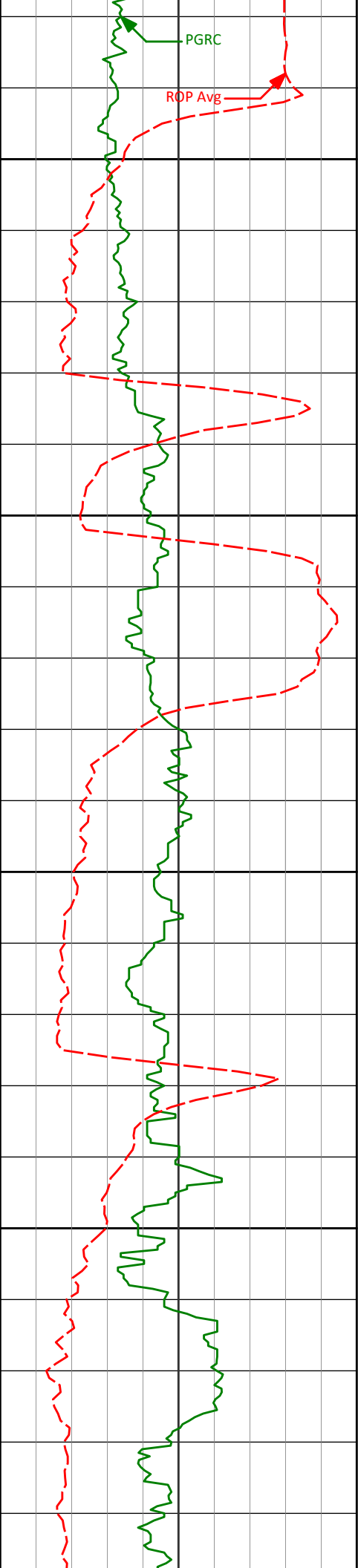
91.64°

90.29°

6579.98'

3630.06'





10100

10150

10200

10250

10168'

89.51°

91.89°

6579.03'

3725.00'

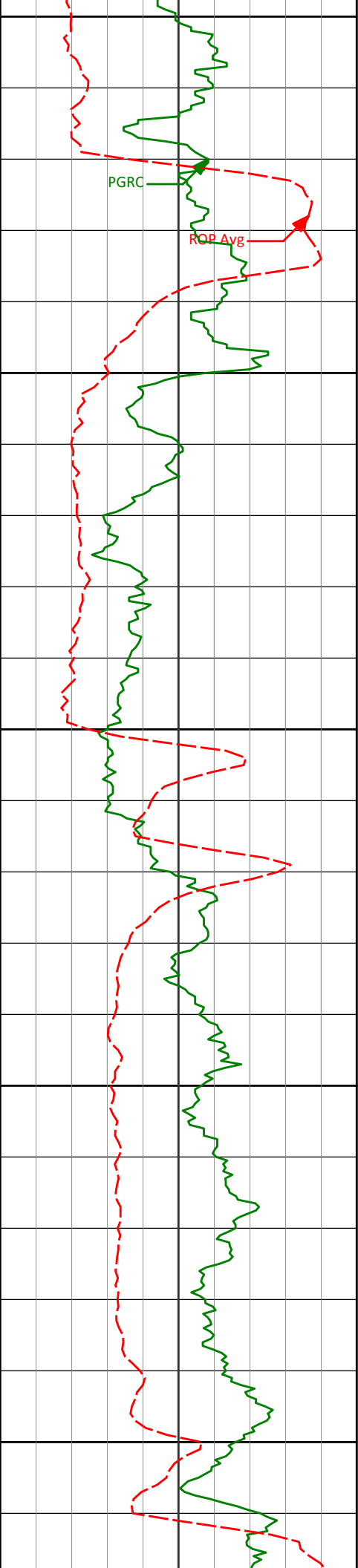
10263'

88.30°

92.36°

6580.84'

3819.86'



10300

PGRC

ROP Avg

10350

10358'

91.05°

90.94°

6581.38'

3914.77'

10400

10450

10453'

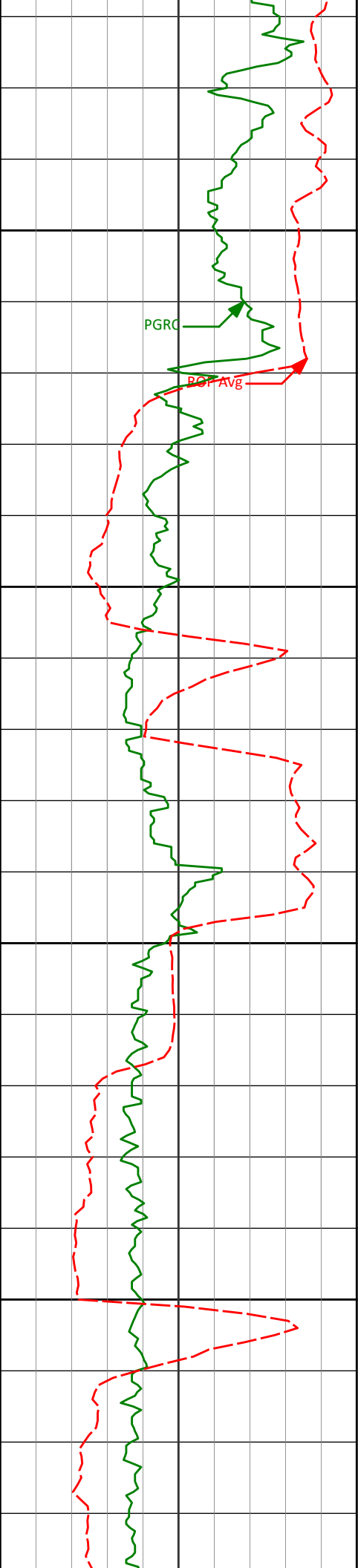
93.52°

90.27°

6577.60'

4009.66'

10500



10550

10600

10650

10700

10548'

10643'

10737'

92.84°

90.59°

91.82°

91.09°

91.10°

90.75°

6572.33'

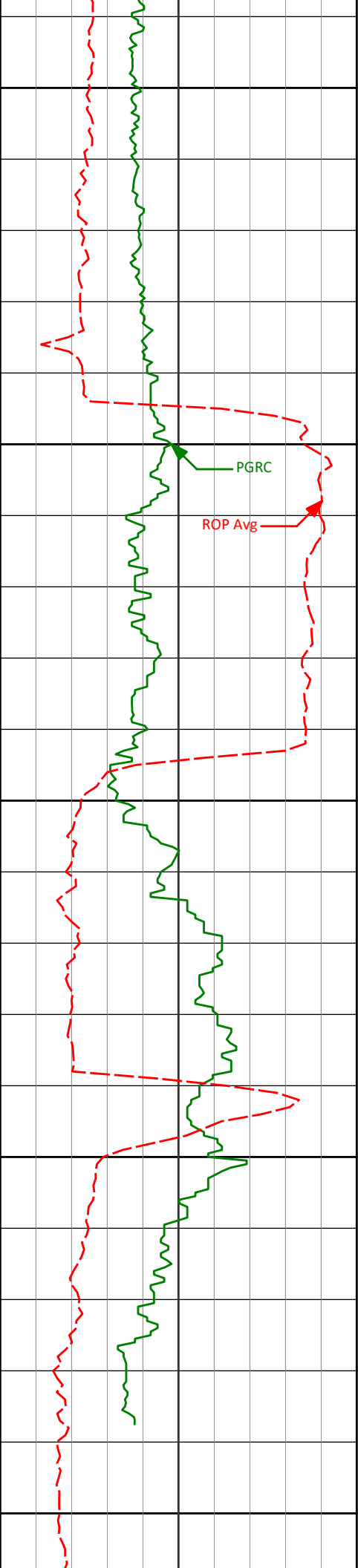
6569.48'

6567.51'

4104.48'

4199.38'

4293.32'



10750

10800

10850

10900

10950

PGRC

ROP Avg

10832'

88.71°

91.11°

6567.07'

4388.27'

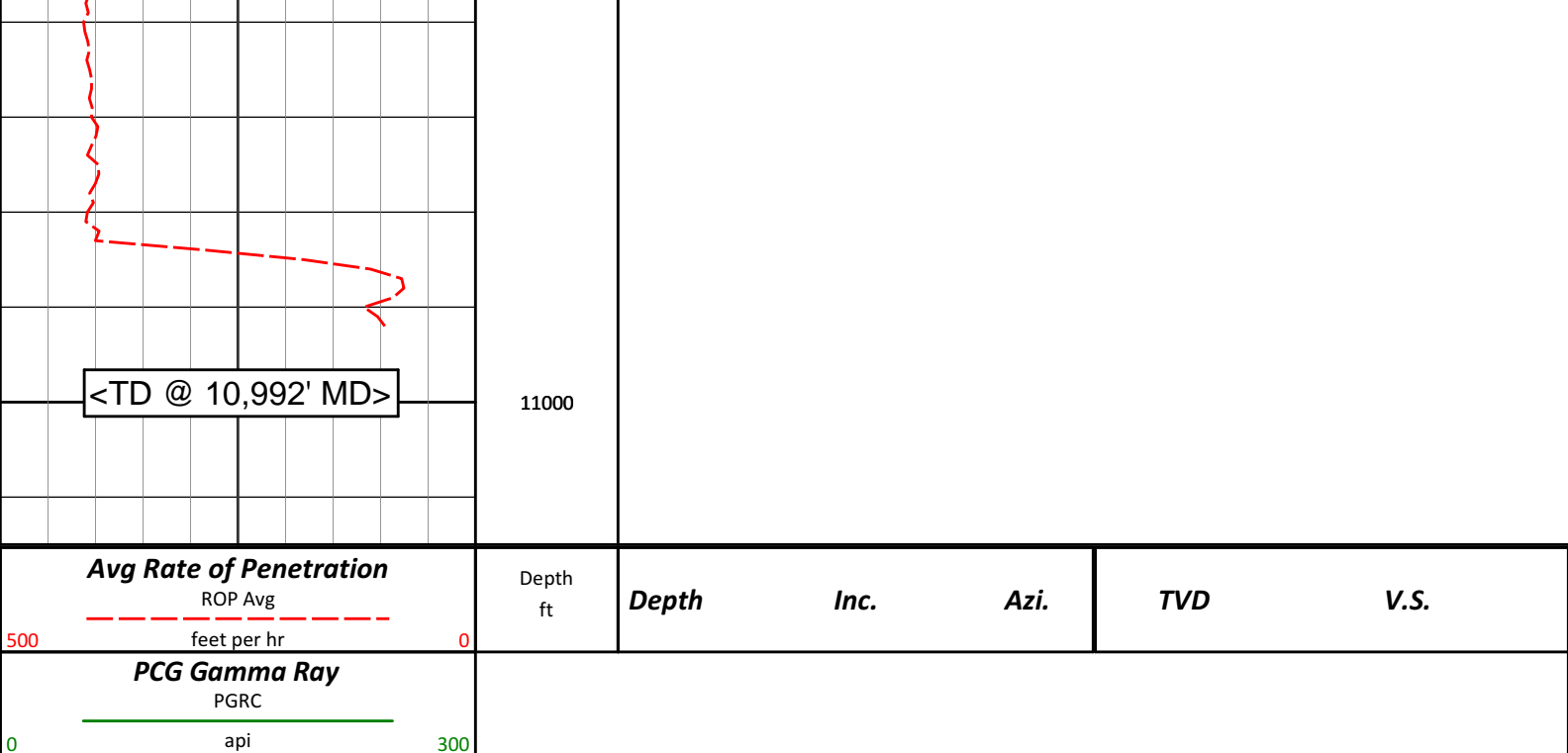
10931'

89.23°

90.53°

6568.85'

4487.22'



## HALLIBURTON

### DIRECTIONAL SURVEY REPORT

Noble Energy  
SLW Ranch State B12-65HN  
Wattenberg  
Weld Colorado  
USA  
CA-XX-0900240634

Surface surveys at 351 ft and 598 ft have had azimuths corrected to grid north, but were not taken by Halliburton.

Last survey is a projection from 10931 ft MD to TD at 10992 ft MD.

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
351.00	0.30	312.09	351.00	0.62 N	0.68 W	-0.67	0.09
598.00	0.30	10.39	598.00	1.69 N	1.05 W	-1.02	0.12
720.00	0.62	69.70	719.99	2.23 N	0.37 W	-0.34	0.44
812.00	0.50	150.41	811.99	2.05 N	0.30 E	0.32	0.79
905.00	0.66	97.26	904.98	1.63 N	1.03 E	1.05	0.58
1089.00	0.34	76.58	1088.98	1.62 N	2.61 E	2.63	0.20
1183.00	0.65	117.63	1182.97	1.44 N	3.35 E	3.37	0.48
1275.00	0.50	74.68	1274.97	1.31 N	4.20 E	4.22	0.48
1367.00	0.69	111.06	1366.97	1.21 N	5.11 E	5.12	0.45
1462.00	0.50	72.16	1461.96	1.13 N	6.04 E	6.05	0.46
1557.00	0.51	92.28	1556.96	1.24 N	6.85 E	6.87	0.19
1652.00	1.11	263.65	1651.95	1.13 N	6.36 E	6.38	1.70
1747.00	0.58	244.01	1746.94	0.81 N	5.01 E	5.02	0.63
1841.00	2.90	268.33	1840.89	0.54 N	2.21 E	2.22	2.54
1936.00	2.95	252.03	1935.77	0.29 S	2.52 W	-2.52	0.87
2031.00	4.80	265.92	2030.55	1.33 S	8.81 W	-8.82	2.17
2126.00	5.27	267.79	2125.18	1.78 S	17.13 W	-17.15	0.52
2221.00	7.96	265.48	2219.54	2.46 S	28.05 W	-28.08	2.84
2316.00	8.43	281.30	2313.59	1.62 S	41.44 W	-41.46	2.42
2411.00	10.91	278.75	2407.23	1.12 N	57.16 W	-57.14	2.65
2506.00	10.51	274.46	2500.58	3.16 N	74.68 W	-74.63	0.94
2601.00	9.07	277.23	2594.19	4.77 N	90.75 W	-90.68	1.59
2696.00	10.53	273.05	2687.80	6.18 N	106.85 W	-106.76	1.71
2790.00	10.19	273.97	2780.27	7.21 N	123.72 W	-123.61	0.40

2885.00	8.52	271.40	2874.00	7.96 N	139.14 W	-139.02	1.81
2980.00	7.78	274.92	2968.04	8.69 N	152.58 W	-152.45	0.94
3075.00	5.70	274.61	3062.38	9.62 N	163.69 W	-163.55	2.19
3170.00	4.59	272.40	3157.00	10.16 N	172.19 W	-172.04	1.19
3265.00	3.09	265.17	3251.78	10.10 N	178.54 W	-178.39	1.66
3360.00	2.07	271.46	3346.69	9.93 N	182.81 W	-182.66	1.11
3455.00	1.44	271.43	3441.64	10.00 N	185.71 W	-185.57	0.66
3550.00	1.24	267.49	3536.61	9.99 N	187.93 W	-187.79	0.23
3645.00	1.47	285.58	3631.59	10.27 N	190.14 W	-189.99	0.51
3739.00	1.91	281.51	3725.55	10.90 N	192.83 W	-192.67	0.48
3834.00	0.44	307.87	3820.52	11.44 N	194.67 W	-194.51	1.61
3929.00	0.34	261.35	3915.52	11.63 N	195.24 W	-195.07	0.34
4024.00	0.66	236.82	4010.52	11.28 N	195.97 W	-195.81	0.40
4119.00	0.50	235.80	4105.51	10.75 N	196.78 W	-196.62	0.17
4214.00	1.05	246.50	4200.50	10.17 N	197.92 W	-197.77	0.60
4309.00	1.45	241.03	4295.48	9.24 N	199.77 W	-199.63	0.44
4404.00	0.37	338.02	4390.47	8.94 N	200.93 W	-200.80	1.62
4498.00	1.79	333.25	4484.45	10.54 N	201.71 W	-201.55	1.51
4593.00	0.59	351.12	4579.43	12.35 N	202.45 W	-202.27	1.31
4688.00	0.77	111.50	4674.43	12.59 N	201.93 W	-201.75	1.25
4783.00	0.70	236.21	4769.42	12.04 N	201.82 W	-201.65	1.37
4878.00	0.73	224.31	4864.42	11.28 N	202.73 W	-202.56	0.16
4972.00	0.35	184.66	4958.41	10.57 N	203.17 W	-203.01	0.54
5067.00	0.39	234.61	5053.41	10.09 N	203.45 W	-203.31	0.33
5162.00	0.63	107.83	5148.41	9.74 N	203.22 W	-203.08	0.97
5257.00	0.10	103.28	5243.41	9.57 N	202.64 W	-202.50	0.56
5352.00	0.72	303.82	5338.40	9.88 N	203.06 W	-202.91	0.86
5447.00	1.22	230.66	5433.39	9.57 N	204.34 W	-204.20	1.29
5541.00	1.40	243.68	5527.37	8.43 N	206.14 W	-206.01	0.37
5636.00	1.83	239.38	5622.33	7.14 N	208.48 W	-208.38	0.47
5730.00	0.65	85.09	5716.32	6.42 N	209.25 W	-209.14	2.59
5791.00	0.48	98.27	5777.31	6.41 N	208.65 W	-208.55	0.35
5919.00	10.91	93.34	5904.51	5.63 N	195.99 W	-195.90	8.15
5967.00	17.41	91.49	5951.02	5.18 N	184.26 W	-184.18	13.57
6014.00	22.18	90.03	5995.23	4.99 N	168.35 W	-168.28	10.20
6062.00	25.67	92.10	6039.10	4.60 N	148.90 W	-148.83	7.48
6109.00	27.02	88.49	6081.22	4.51 N	128.05 W	-127.98	4.46
6157.00	30.53	88.14	6123.29	5.19 N	104.96 W	-104.88	7.32
6204.00	32.50	89.37	6163.36	5.72 N	80.40 W	-80.32	4.41
6252.00	33.69	88.78	6203.57	6.15 N	54.19 W	-54.11	2.57
6298.00	35.95	87.18	6241.33	7.08 N	27.95 W	-27.85	5.30
6346.00	39.05	89.80	6279.41	7.83 N	1.25 E	1.36	7.26
6393.00	41.22	89.47	6315.34	8.02 N	31.55 E	31.65	4.64
6441.00	42.91	88.15	6350.97	8.70 N	63.70 E	63.80	3.97
6488.00	46.17	87.30	6384.47	10.01 N	96.63 E	96.75	7.05
6536.00	51.72	88.05	6415.98	11.47 N	132.78 E	132.92	11.62
6583.00	54.88	89.48	6444.07	12.27 N	170.45 E	170.60	7.15
6631.00	58.29	89.91	6470.50	12.48 N	210.51 E	210.65	7.14
6678.00	61.72	90.52	6493.99	12.33 N	251.21 E	251.35	7.38
6726.00	66.28	90.04	6515.03	12.12 N	294.34 E	294.47	9.54
6773.00	69.63	89.07	6532.67	12.46 N	337.90 E	338.03	7.38
6821.00	73.00	88.83	6548.04	13.30 N	383.35 E	383.49	7.04
6868.00	76.85	88.72	6560.26	14.27 N	428.71 E	428.86	8.19
6925.00	80.09	89.49	6571.66	15.14 N	484.55 E	484.71	5.84
7035.00	88.52	88.05	6582.56	17.49 N	593.88 E	594.06	7.77
7130.00	90.25	88.10	6583.58	20.68 N	688.82 E	689.03	1.82
7225.00	90.86	87.96	6582.66	23.95 N	783.76 E	784.00	0.66
7320.00	88.68	87.79	6583.04	27.47 N	878.68 E	878.97	2.30
7415.00	88.09	88.50	6585.72	30.55 N	973.60 E	973.91	0.97
7510.00	88.80	89.58	6588.30	32.14 N	1068.55 E	1068.87	1.36
7605.00	88.86	90.32	6590.24	32.22 N	1163.53 E	1163.84	0.78
7699.00	90.09	90.30	6591.10	31.71 N	1257.52 E	1257.82	1.31
7794.00	90.71	90.37	6590.44	31.16 N	1352.51 E	1352.80	0.66
7889.00	90.06	89.70	6589.80	31.10 N	1447.51 E	1447.79	0.98
7984.00	90.34	89.97	6589.47	31.37 N	1542.51 E	1542.79	0.41
8079.00	90.46	90.09	6588.80	31.32 N	1637.51 E	1637.77	0.18
8174.00	92.28	89.92	6586.53	31.31 N	1732.48 E	1732.74	1.92
8269.00	91.78	91.35	6583.17	30.26 N	1827.41 E	1827.65	1.59
8364.00	90.43	92.65	6581.33	26.95 N	1922.33 E	1922.52	1.97
8459.00	90.92	92.16	6580.22	22.96 N	2017.24 E	2017.36	0.73
8553.00	90.83	91.60	6578.78	19.88 N	2111.17 E	2111.26	0.60

8648.00	91.42	92.52	6576.92	16.46 N	2206.09 E	2206.12	1.15
8743.00	90.52	91.24	6575.31	13.35 N	2301.03 E	2301.01	1.65
8838.00	90.74	88.01	6574.26	13.97 N	2396.01 E	2395.99	3.41
8933.00	88.46	86.76	6574.93	18.30 N	2490.90 E	2490.92	2.74
9028.00	87.91	86.04	6577.93	24.26 N	2585.66 E	2585.76	0.95
9123.00	88.74	86.31	6580.71	30.60 N	2680.41 E	2680.58	0.92
9218.00	88.98	86.24	6582.60	36.77 N	2775.19 E	2775.43	0.26
9313.00	89.20	86.53	6584.11	42.76 N	2869.99 E	2870.30	0.38
9408.00	89.82	87.19	6584.92	47.96 N	2964.84 E	2965.21	0.95
9503.00	90.68	89.73	6584.51	50.52 N	3059.80 E	3060.19	2.82
9598.00	90.34	89.49	6583.66	51.16 N	3154.79 E	3155.19	0.44
9693.00	89.72	90.21	6583.61	51.41 N	3249.79 E	3250.18	1.00
9788.00	89.91	89.17	6583.92	51.93 N	3344.78 E	3345.18	1.11
9883.00	90.43	87.11	6583.64	55.01 N	3439.73 E	3440.15	2.24
9978.00	91.17	88.00	6582.31	59.06 N	3534.63 E	3535.10	1.22
10073.00	91.64	90.29	6579.98	60.48 N	3629.59 E	3630.06	2.46
10168.00	89.51	91.89	6579.03	58.67 N	3724.56 E	3725.00	2.80
10263.00	88.30	92.36	6580.84	55.15 N	3819.47 E	3819.86	1.37
10358.00	91.05	90.94	6581.38	52.41 N	3914.42 E	3914.77	3.26
10453.00	93.52	90.27	6577.60	51.41 N	4009.33 E	4009.66	2.69
10548.00	92.84	91.09	6572.33	50.29 N	4104.17 E	4104.48	1.12
10643.00	90.59	91.10	6569.48	48.47 N	4199.11 E	4199.38	2.37
10737.00	91.82	90.75	6567.51	46.95 N	4293.07 E	4293.32	1.36
10832.00	88.71	91.11	6567.07	45.41 N	4388.05 E	4388.27	3.30
10931.00	89.23	90.53	6568.85	44.00 N	4487.02 E	4487.22	0.79
10992.00	89.23	90.53	6569.67	43.43 N	4548.01 E	4548.20	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 89.26 DEGREES (GRID)  
A TOTAL CORRECTION OF 7.89 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 10992.00 FEET  
IS 4548.22 FEET ALONG 89.45 DEGREES (GRID)**