HALLIBURTON | Sperry Drilling

PCGK : Pressure Case Gamma
PCDC: Pressure Case Directional

Powered by INSITE™

1 : 600 / 1 : 240

Country : USA
Field : Wattenberg
Location : Lat: 40°28' 57.90" North Long: 104°22' 28.70" West
Well : Wells Ranch AE18-62-1HN
Company : Noble Energy
Rig : H&P 315

Company : **Noble Energy**
Rig : **H&P 315**
Well : **Wells Ranch AE18-62-1HN**
Field : **Wattenberg**
Country : **USA**
API Number : **0512335649**

LOCATION
Latitude : **40°28' 57.90" North**
Longitude : **104°22' 28.70" West**
UTM Easting = **3,313,033.74 ft**
UTM Northing = **1,420,692.60 ft**

Other Services
Directional Drilling

Permanent Datum : **Ground Level** Elevation : **4831.00 ft**
Log Measured From : **Drill Floor** **24.00 ft** Above Permanent Datum
Drilling Measured From : **Drill Floor**

MD LOG

Elev. KB **N/A**
DF **4855.00 ft**
GL **4831.00 ft**
WD **N/A**

Depth Logged : **643.00 ft** To **11,212.00 ft**
Date Logged : **11-Dec-12** To **16-Dec-12**
Total Depth MD : **11,212.00 ft** TVD : **6,614.05 ft**
Spud Date : **11-Dec-12**

Unit No. : **11610113** Job No. : **CA-XX-0900062163**

Plot Type : **Final**
Plot Date : **17-Dec-12**

Run No.	Borehole Record (MD) Size	From	To
2	8.750 in	643.00 ft	5,873.00 ft
3	8.750 in	5,873.00 ft	7,105.00 ft
4	6.125 in	7,105.00 ft	11,212.00 ft

Run No.	Borehole Record (MD) Size	From	To

Casing Record (MD)

Size	Weight	From	To
7.000 in	26.00 lbpf	SURFACE	7,094.00 ft

WELL INFORMATION

MWD Run Number	100	200	300
Date run completed	12-Dec-12	14-Dec-12	16-Dec-12
Rig Bit Number	2	3	4
Bit Size (in)	8.750	8.750	6.125
Tool Nominal OD (in)	6.750	6.750	4.750
Log Start Depth (MD, ft)	643.00	5,873.00	7,105.00
Log End Depth (MD, ft)	5,873.00	7,105.00	11,212.00
Drill or Wipe	Drill	Drill	Drill
Drill/Wipe Start Date and Time	11-Dec-12 20:25	13-Dec-12 00:15	15-Dec-12 00:00
Drill/Wipe End Date and Time	12-Dec-12 16:00	13-Dec-12 19:40	16-Dec-12 05:50
Min Inc (deg) @ Depth (MD, ft)	.04 @ 1,361.00	13.65 @ 5,862.00	87.72 @ 7,158.00
Max Inc (deg) @ Depth (MD, ft)	14.77 @ 3,730.00	88.05 @ 7,105.00	94.35 @ 7,506.00
Bit TFA(in2) / Bit Type	.75 / PDC	.75 / PDC	.46 / PDC
Flow Rate (gpm)	590.48	590.00	250.00
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	N/A / N/A
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel
Density (ppg) / Viscosity (spqt)	8.95 / 30.00	10.00 / 13.00	9.60 / 33.00
Filtrate CL (ppm)	1,400.00	1,350.00	1,300.00
pH / Fluid Loss (mptm)	9.70 / 12	9.40 / 7	9.60 / 9
PV (cP) / YP (lhf2)	4 / 4.00	13 / 14.00	8 / 9.00
% Solids / % Sand	4.1 / 0.25	8.0 / 0.25	4.9 / 0.20
% 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	144.54 / PCM	170.37 / PCM	223.41 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ 144.54	N/A @ 170.37	N/A @ 223.41		
Lead MWD Engineer	Paul Kock	Paul Kock	Paul Kock		
Customer Representative	Dave Nielsen	Dave Nielsen	Dave Nielsen		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.76	5.76	5.76		
Sub Serial Number	11404299	11404299	11750419		
Insert Serial Number	11619985	11680751	11620311		
Date and Time Initialized	11-Dec-12 14:30	12-Dec-12 17:24	14-Dec-12 08:21		
Date and Time Read	12-Dec-12 21:25	14-Dec-12 03:01	16-Dec-12 23:30		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	54.52	50.98	62.41		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11404299	11404299	11750419		
Sonde Serial Number	11297517	11638497	11638536		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	226.65	61.24	329.08		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	49.72	45.88	57.33		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11404299	11404299	11750419		
Insert/Sonde Serial Number	11293301	11680975	11293307		

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 7.3.5

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 7060 ft MD. Gamma cannot be measured within cased hole, and collection resumes after drilling through cement at 7105 ft MD.

WARRANTY

HALLIBURTON

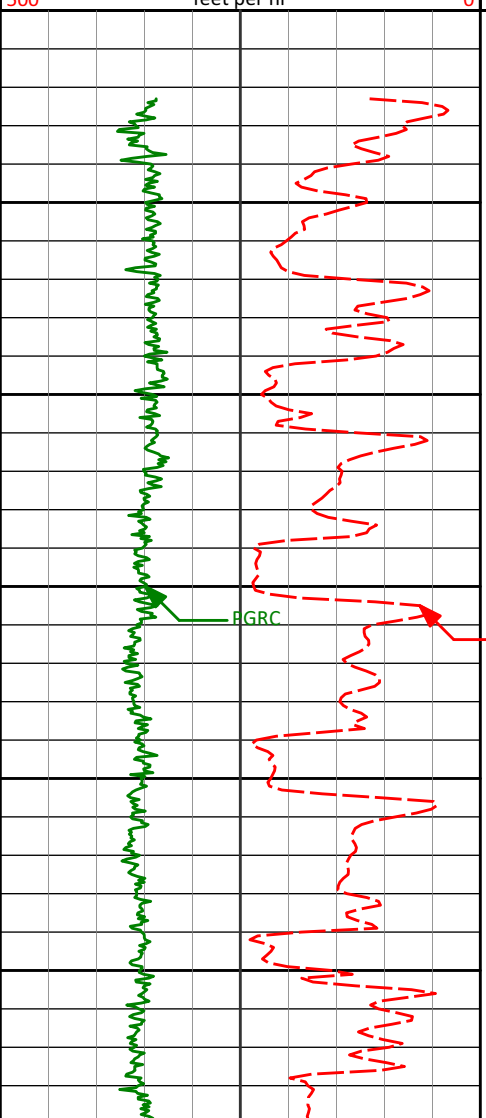
Sperry Drilling Services

MD Main Log 1:600

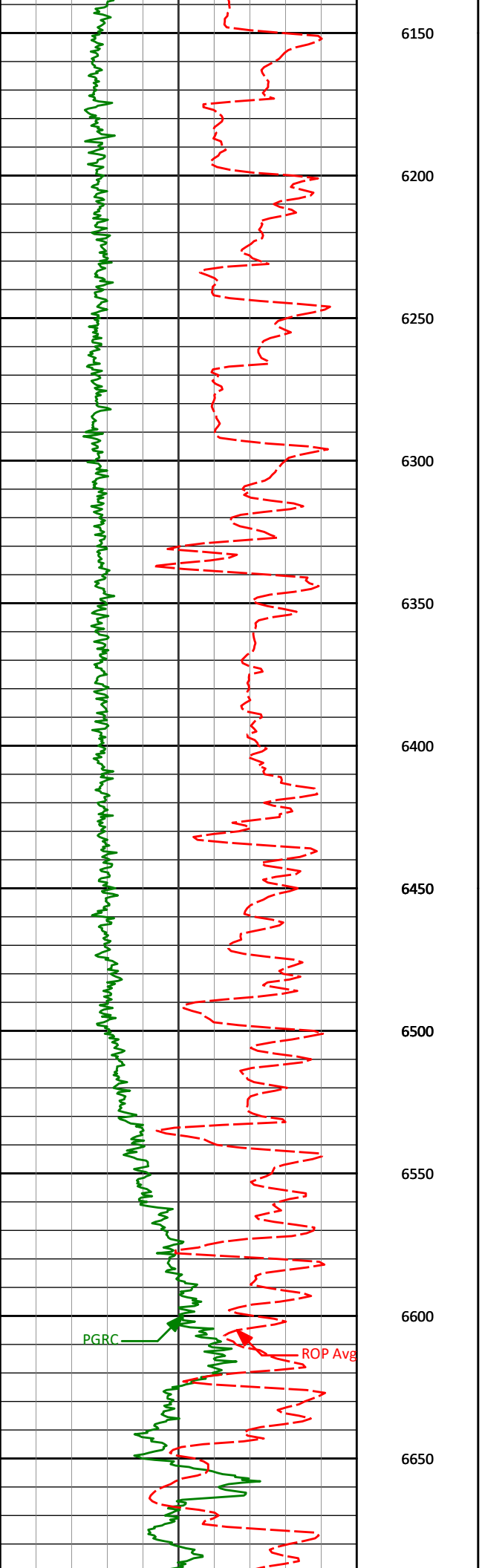
Noble Energy, Inc
Wells Ranch AE18-62-1HN
H&P 315
T6N R62W

PCG Gamma Ray
PGRC
0 api 300

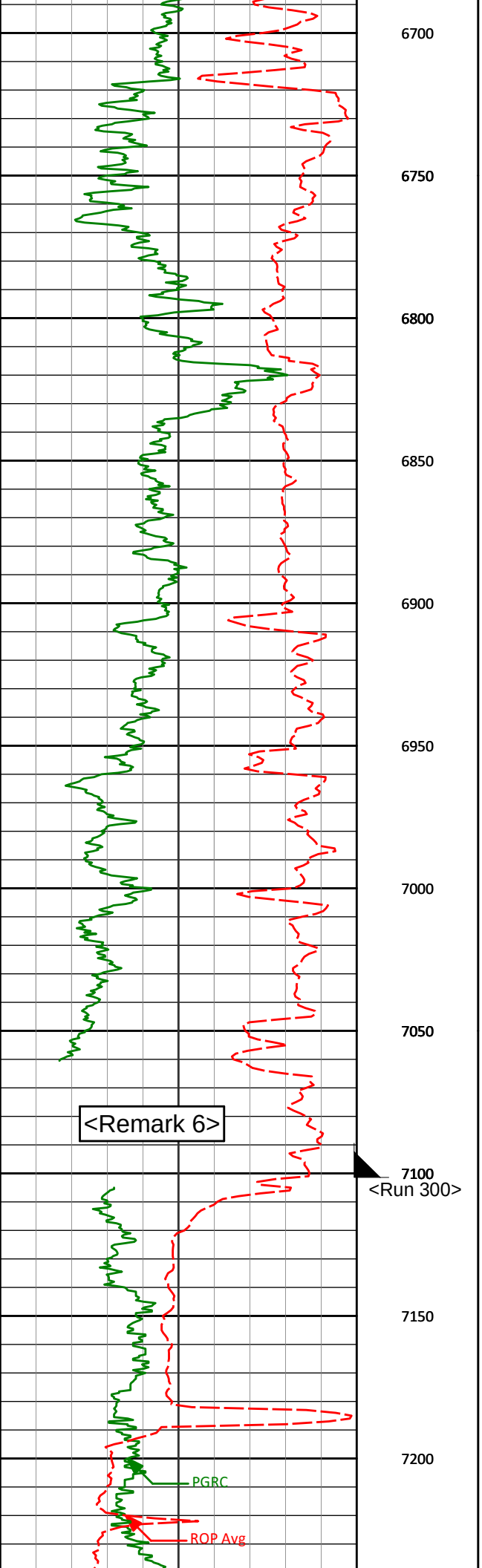
Avg Rate of Penetration
ROP Avg
500 feet per hr 0



Depth ft	Depth	Inc.	Azi.	TVD	V.S.
	5862'	13.65°	186.54°	5804.26'	31.81'
<Run 200>					
5900	5909'	14.88°	178.84°	5849.81'	33.25'
5950	5957'	16.22°	168.73°	5896.06'	36.80'
6000	6004'	18.33°	161.66°	5940.95'	42.62'
6050 <KOP>	6052'	21.51°	157.13°	5986.07'	50.91'
6100	6099'	24.07°	155.33°	6029.40'	60.95'



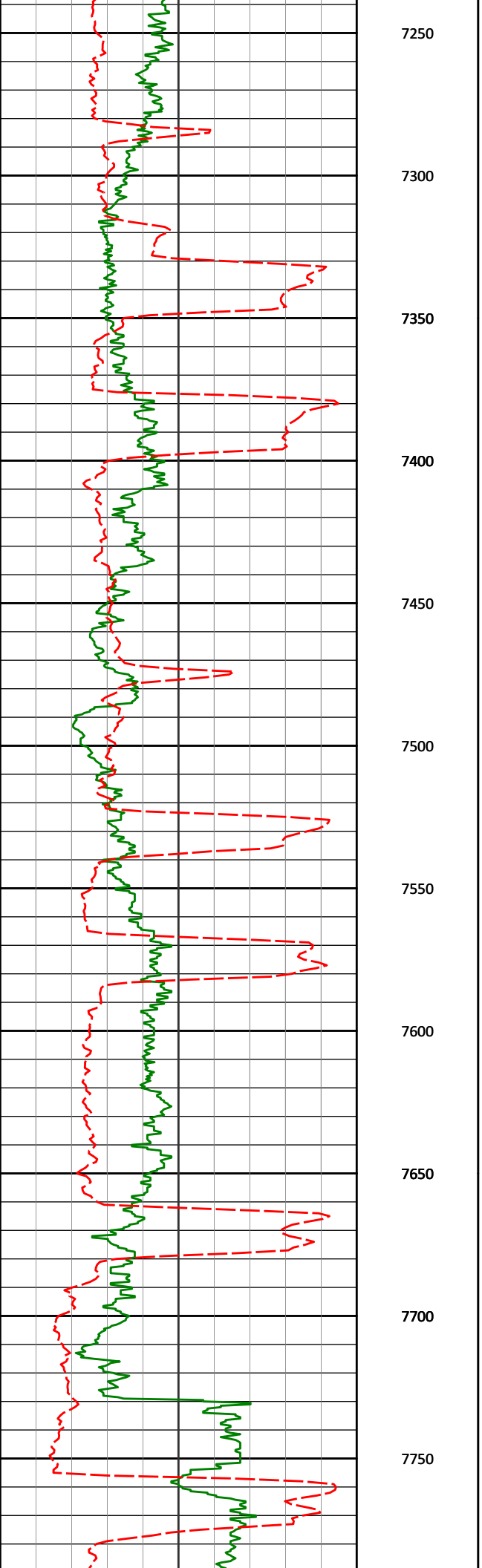
6147'	25.25°	152.00°	6073.02'	72.73'
6194'	26.28°	148.94°	6115.35'	85.65'
6242'	28.62°	143.67°	6157.95'	100.86'
6289'	29.50°	141.32°	6199.03'	117.61'
6337'	32.22°	138.94°	6240.23'	136.36'
6384'	36.61°	136.93°	6279.00'	157.23'
6432'	40.64°	134.76°	6316.49'	181.42'
6479'	44.61°	132.52°	6351.07'	207.83'
6527'	46.68°	129.70°	6384.63'	237.11'
6574'	48.78°	125.33°	6416.25'	267.86'
6622'	50.60°	119.87°	6447.31'	301.56'
6669'	51.55°	116.52°	6476.85'	336.22'



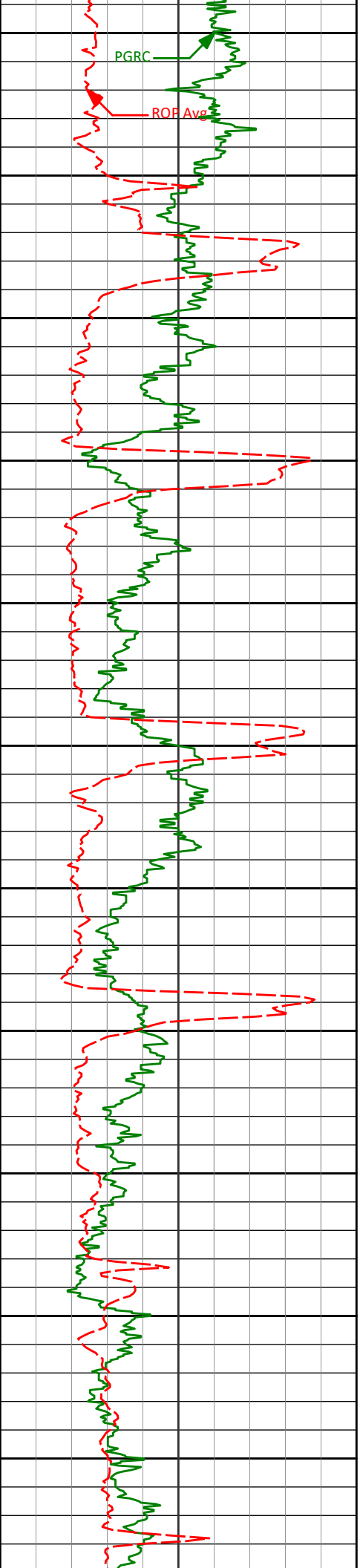
6717'	54.89°	112.18°	6505.60'	373.40'
6764'	58.82°	110.57°	6531.29'	411.93'
6812'	65.11°	109.45°	6553.83'	453.59'
6858'	69.28°	104.47°	6571.67'	495.63'
6906'	74.59°	101.12°	6586.55'	541.17'
6953'	76.38°	96.05°	6598.34'	586.65'
7001'	79.80°	92.56°	6608.25'	633.39'
7052'	83.51°	89.35°	6615.65'	683.25'

<7" casing set at 7094' MD>

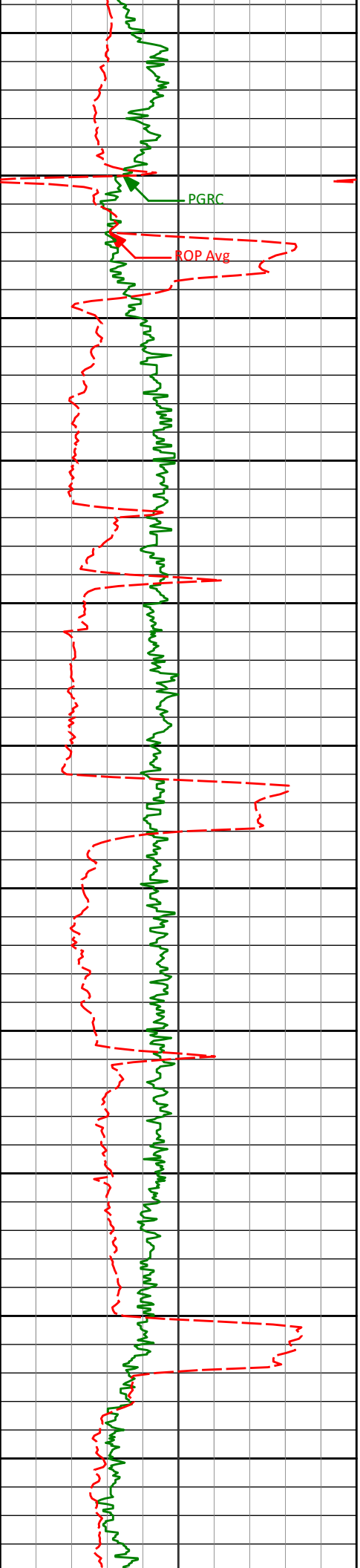
7158'	87.72°	86.27°	6623.75'	786.64'
7221'	88.46°	85.87°	6625.86'	847.84'



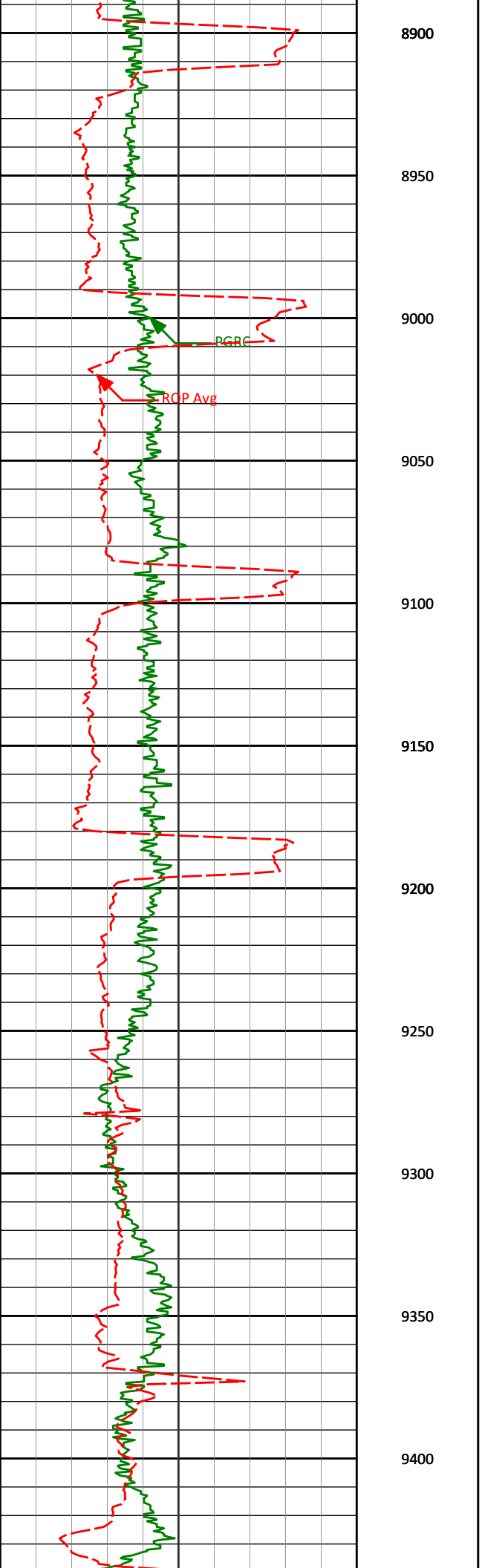
7316'	88.43°	85.52°	6628.44'	939.99'
7411'	93.45°	85.07°	6626.89'	1031.97'
7506'	94.35°	84.68°	6620.42'	1123.60'
7601'	93.36°	86.00°	6614.04'	1215.43'
7696'	91.94°	86.26°	6609.65'	1307.69'



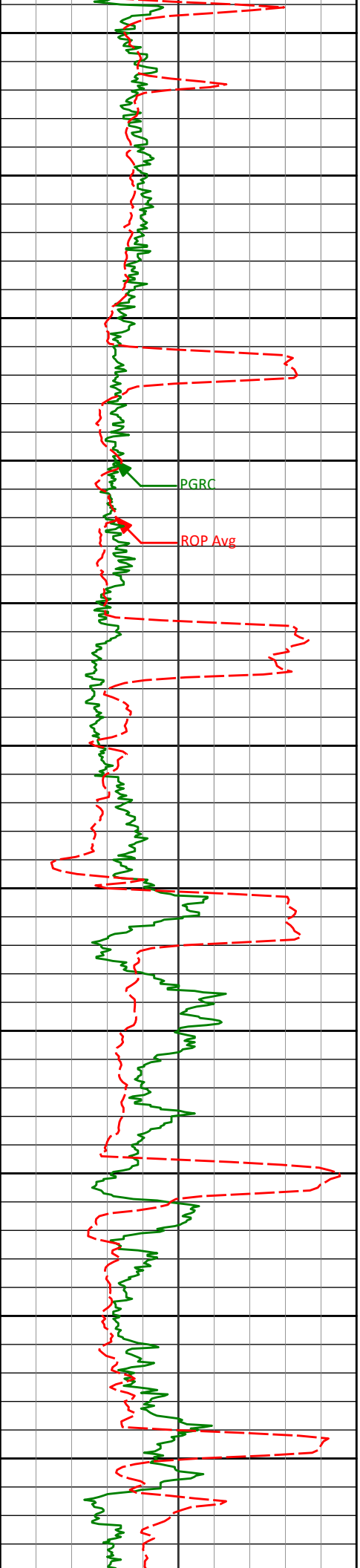
7791'	89.88°	86.47°	6608.14'	1400.12'
7886'	88.73°	86.30°	6609.29'	1492.57'
7981'	88.12°	87.38°	6611.90'	1585.15'
8076'	88.83°	88.67°	6614.43'	1678.16'
8170'	88.31°	88.67°	6616.78'	1770.40'
8265'	88.12°	88.66°	6619.74'	1863.60'



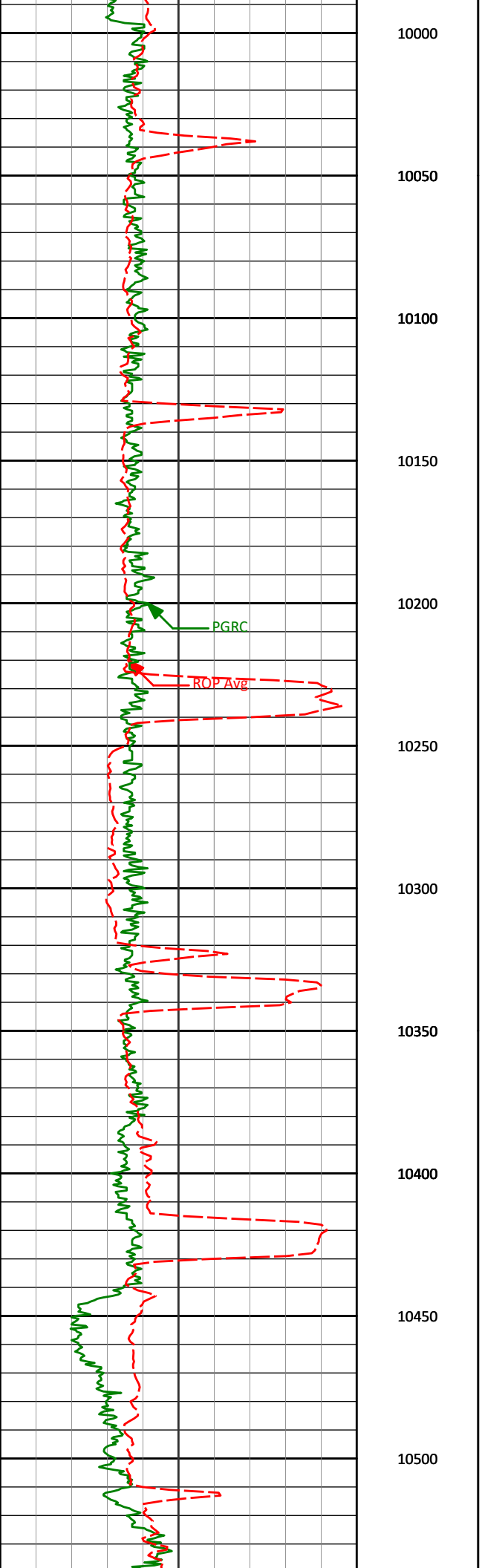
8350				
8360'	88.31°	88.47°	6622.70'	1956.78'
8400				
8450				
8455'	90.09°	87.99°	6624.03'	2049.87'
8500				
8550				
8550'	**90.46°**	**86.94°**	**6623.57'**	**2142.72'**
8600				
8645'	90.40°	88.06°	6622.85'	2235.57'
8650				
8700				
8740'	90.19°	85.73°	6622.37'	2328.21'
8750				
8800				
8835'	91.42°	86.98°	6621.04'	2420.64'
8850				



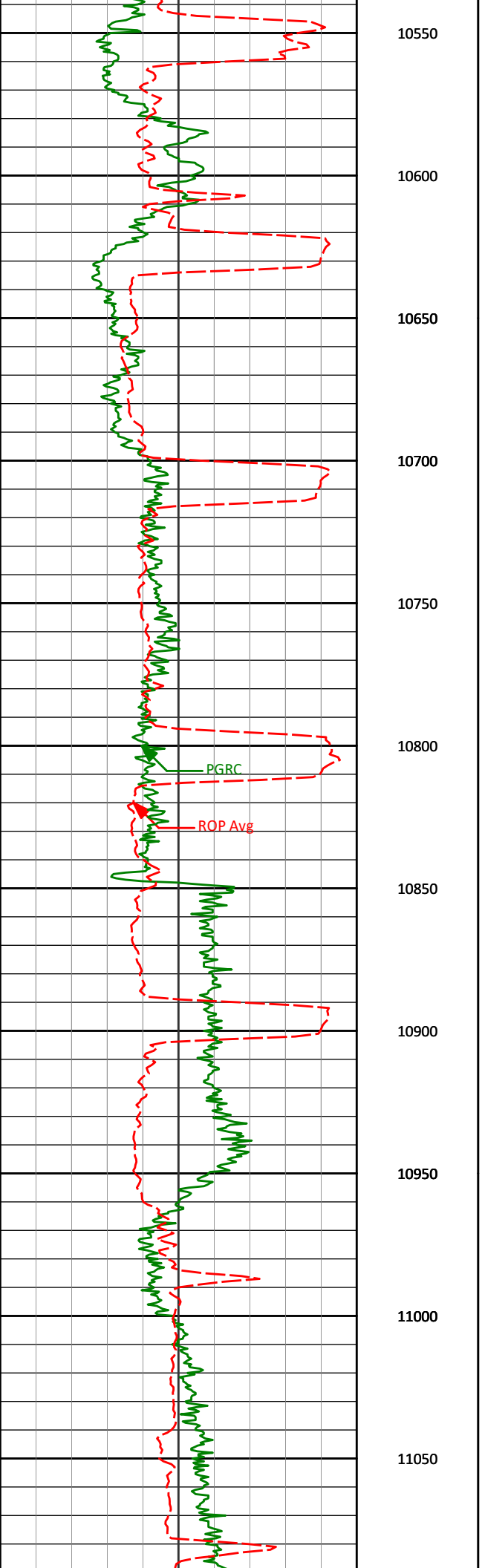
8930'	90.31°	87.36°	6619.61'	2513.37'
9025'	90.89°	89.17°	6618.61'	2606.48'
9120'	90.25°	89.16°	6617.66'	2699.88'
9215'	88.83°	89.80°	6618.43'	2793.37'
9310'	89.02°	89.77°	6620.22'	2886.94'
9405'	89.78°	90.01°	6621.21'	2980.55'



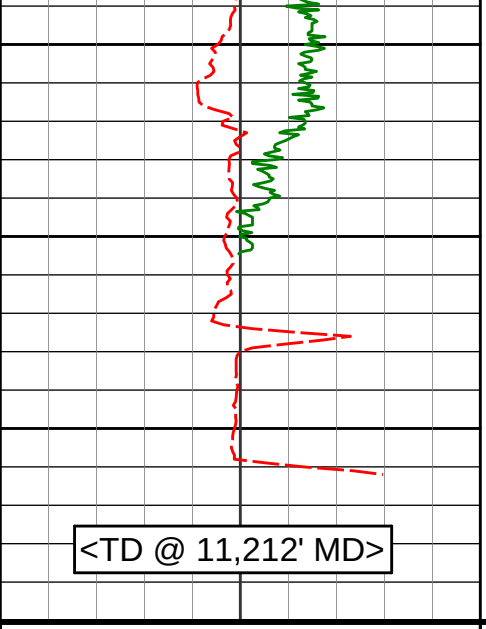
9500'	91.05°	89.52°	6620.52'	3074.13'
9595'	91.51°	89.58°	6618.41'	3167.62'
9689'	90.68°	90.44°	6616.61'	3260.27'
9784'	90.18°	90.15°	6615.90'	3354.00'
9879'	90.31°	89.63°	6615.49'	3447.61'
9974'	89.66°	88.66°	6615.51'	3541.01'



10069'	90.15°	88.03°	6615.67'	3634.16'
10164'	90.71°	87.75°	6614.95'	3727.15'
10259'	89.17°	87.67°	6615.05'	3820.08'
10354'	89.02°	88.31°	6616.56'	3913.10'
10449'	92.16°	88.91°	6615.59'	4006.31'



10544'	92.95°	88.95°	6611.35'	4099.55'
10639'	91.20°	88.90°	6607.91'	4192.82'
10734'	90.59°	89.30°	6606.43'	4286.19'
10829'	89.69°	87.85°	6606.20'	4379.41'
10924'	88.43°	88.45°	6607.75'	4472.48'
11018'	88.68°	88.15°	6610.12'	4564.60'



Depth ft	Depth	Inc.	Azi.	TVD	V.S.
11100					
11150	11148'	88.92°	87.45°	6612.85'	4691.78'
11200					

Avg Rate of Penetration
ROP Avg
500 feet per hr 0

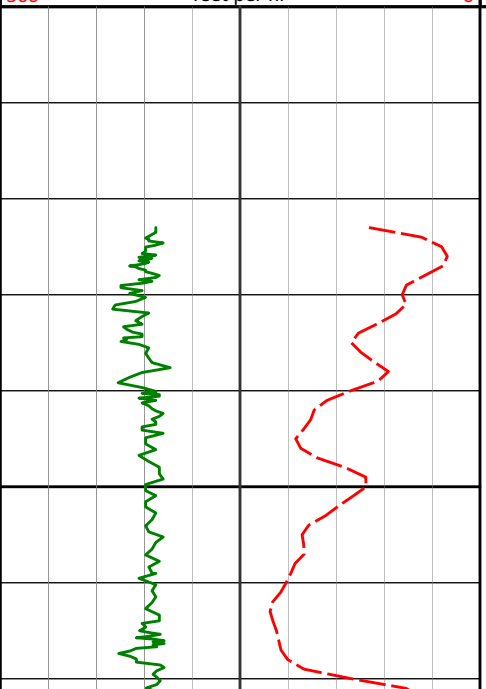
PCG Gamma Ray
PGRC
0 api 300

HALLIBURTON
Sperry Drilling Services
MD Detail Log 1:240

Noble Energy, Inc
Wells Ranch AE18-62-1HN
H&P 315
T6N R62W

PCG Gamma Ray
PGRC
0 api 300

Avg Rate of Penetration
ROP Avg
500 feet per hr 0



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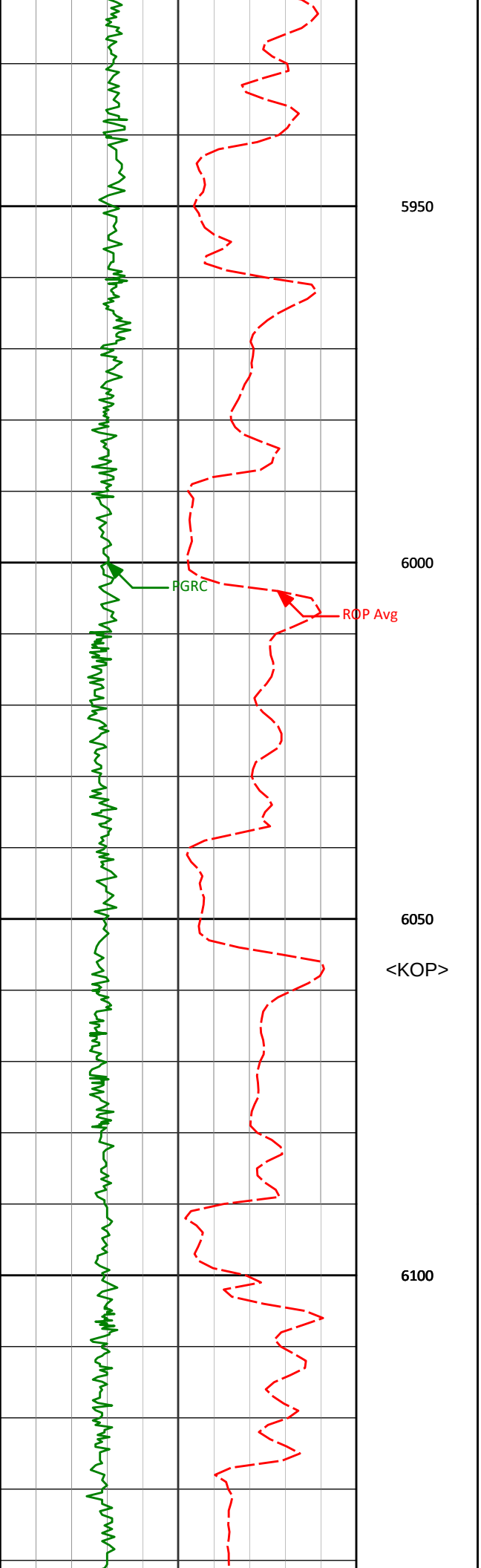
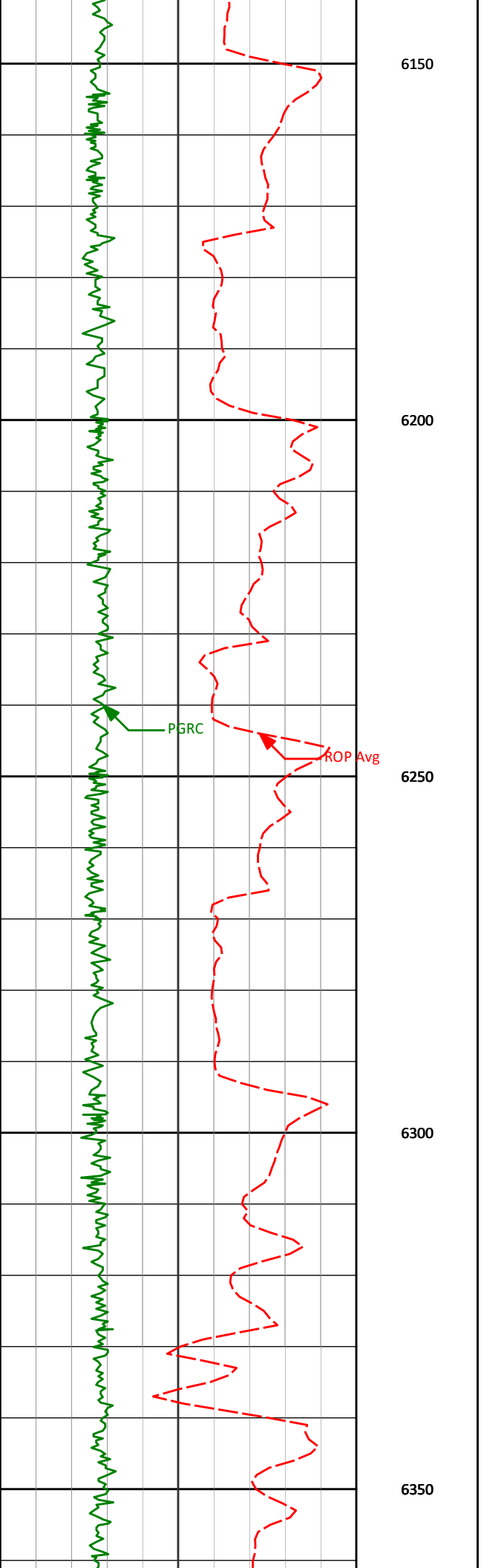
	5862'	13.65°	186.54°	5804.26'	31.81'
<Run 200>					
5900					
	5909'	14.88°	178.84°	5849.81'	33.25'



	5957'	16.22°	168.73°	5896.06'	36.80'
	6004'	18.33°	161.66°	5940.95'	42.62'
<KOP>	6052'	21.51°	157.13°	5986.07'	50.91'
	6099'	24.07°	155.33°	6029.40'	60.95'



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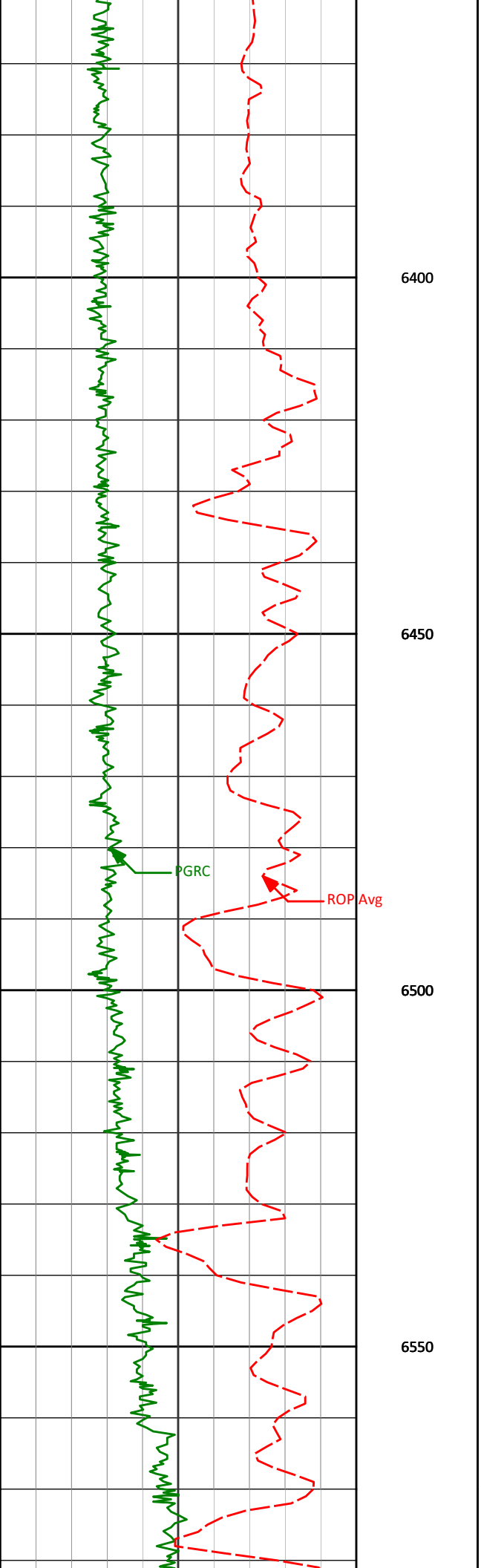

6384'	36.61°	136.93°	6279.00'	157.23'
6432'	40.64°	134.76°	6316.49'	181.42'
6479'	44.61°	132.52°	6351.07'	207.83'
6527'	46.68°	129.70°	6384.63'	237.11'
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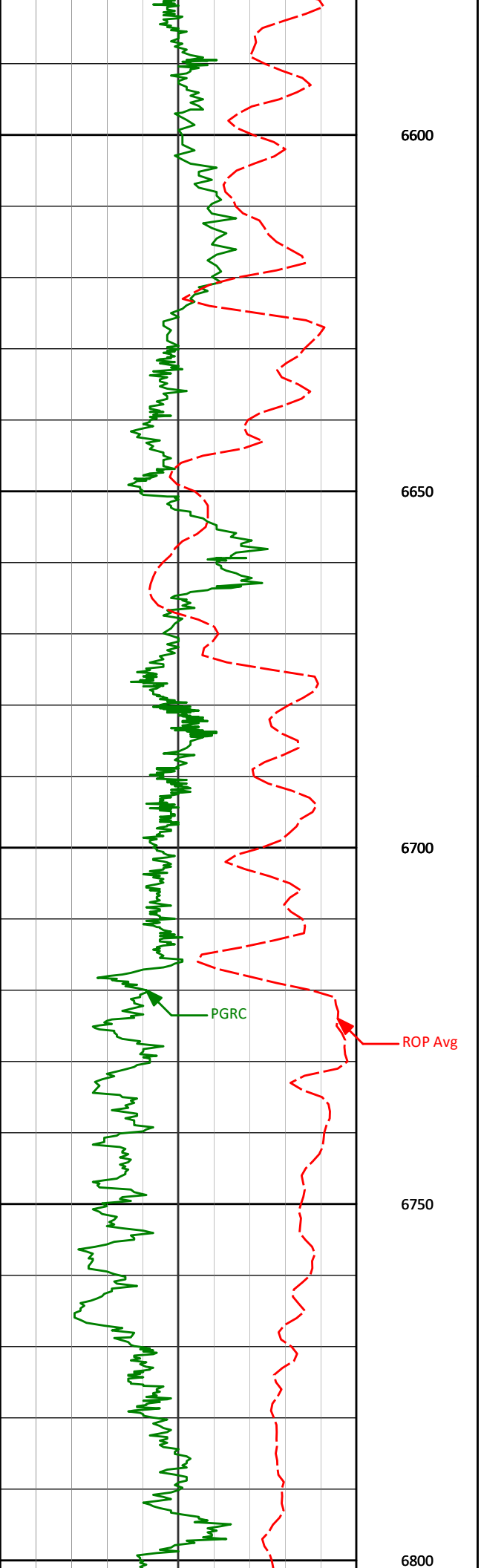
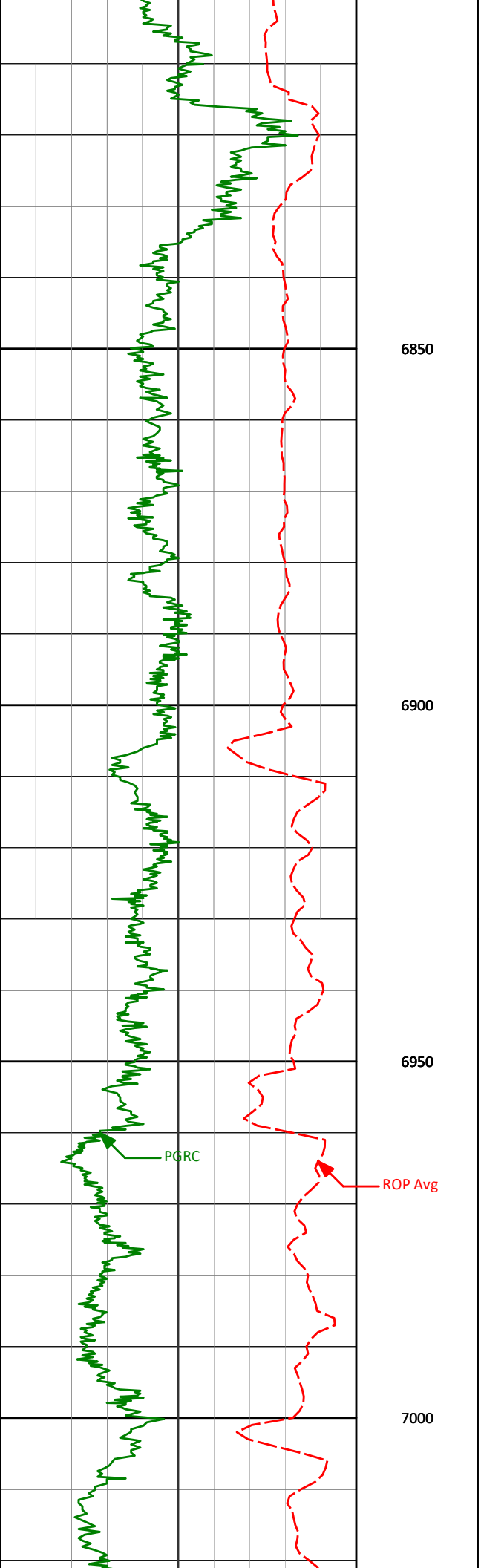


6622'	50.60°	119.87°	6447.31'	301.56'
6669'	51.55°	116.52°	6476.85'	336.22'
6717'	54.89°	112.18°	6505.60'	373.40'
6764'	58.82°	110.57°	6531.29'	411.93'



6812'	65.11°	109.45°	6553.83'	453.59'
6858'	69.28°	104.47°	6571.67'	495.63'
6906'	74.59°	101.12°	6586.55'	541.17'
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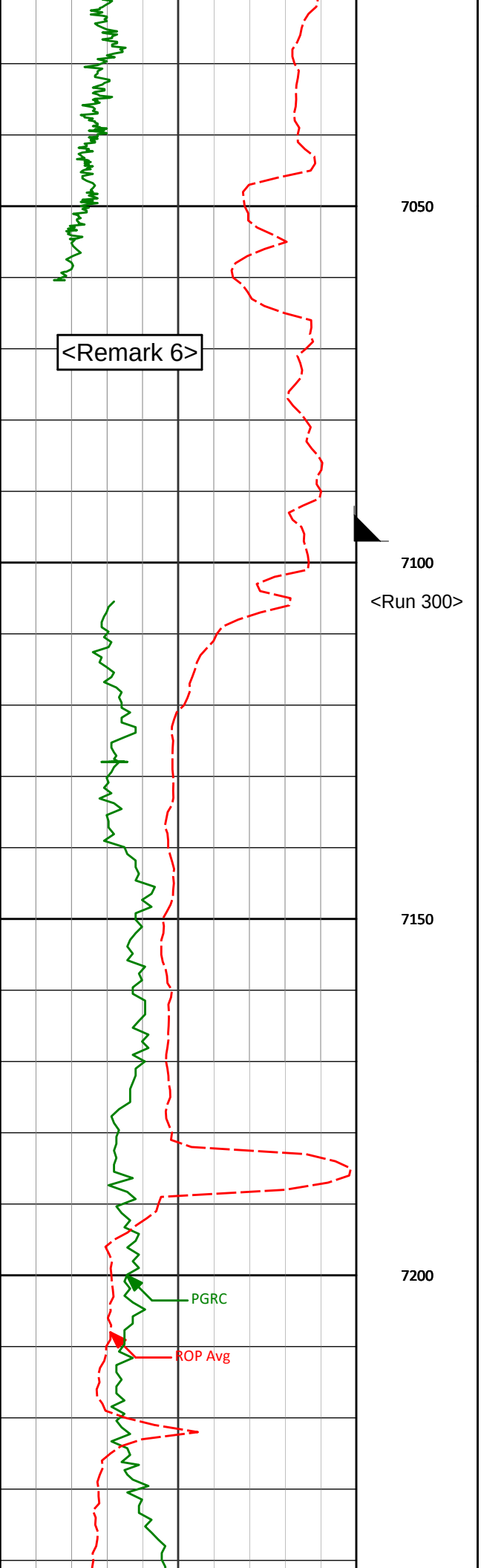
7001'	79.80°	92.56°	6608.25'	633.39'



7052'	83.51°	89.35°	6615.65'	683.25'

<7" casing set at 7094' MD>

7158'	87.72°	86.27°	6623.75'	786.64'
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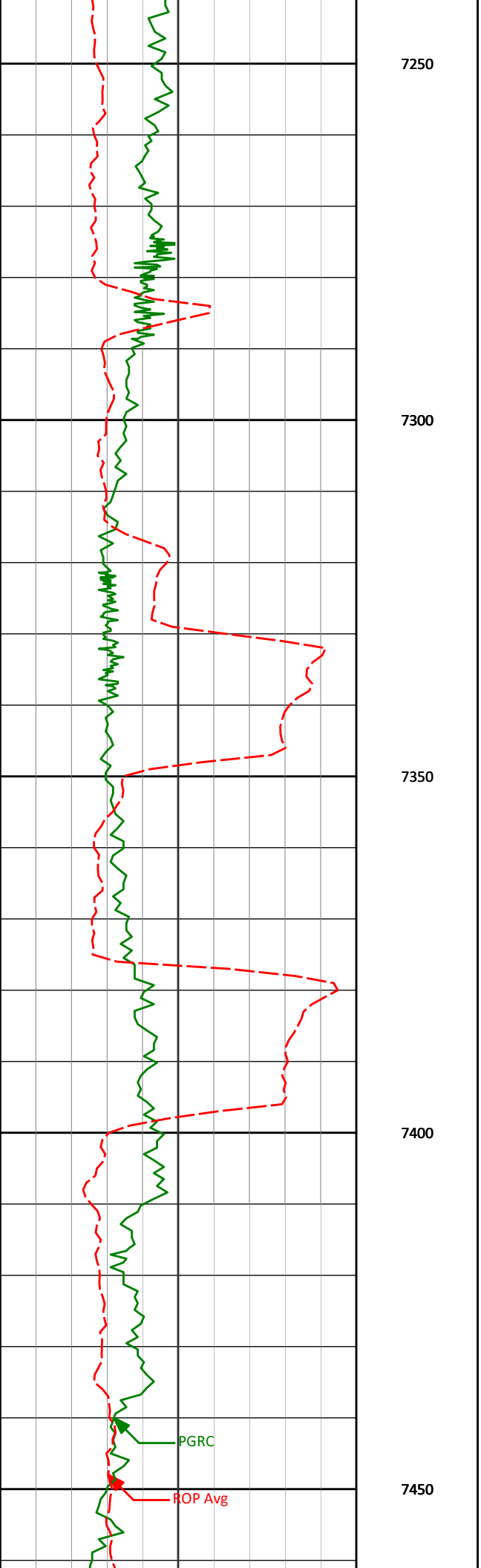
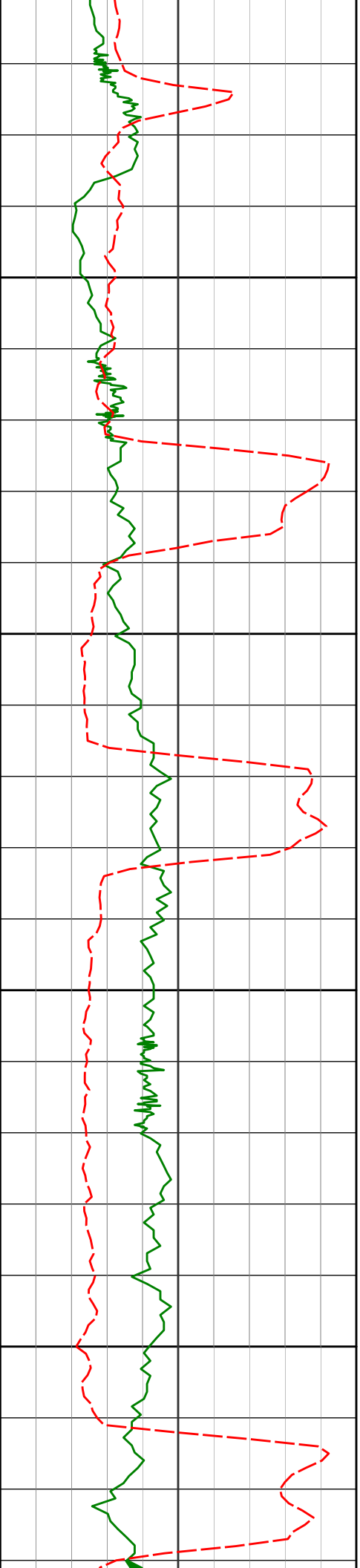
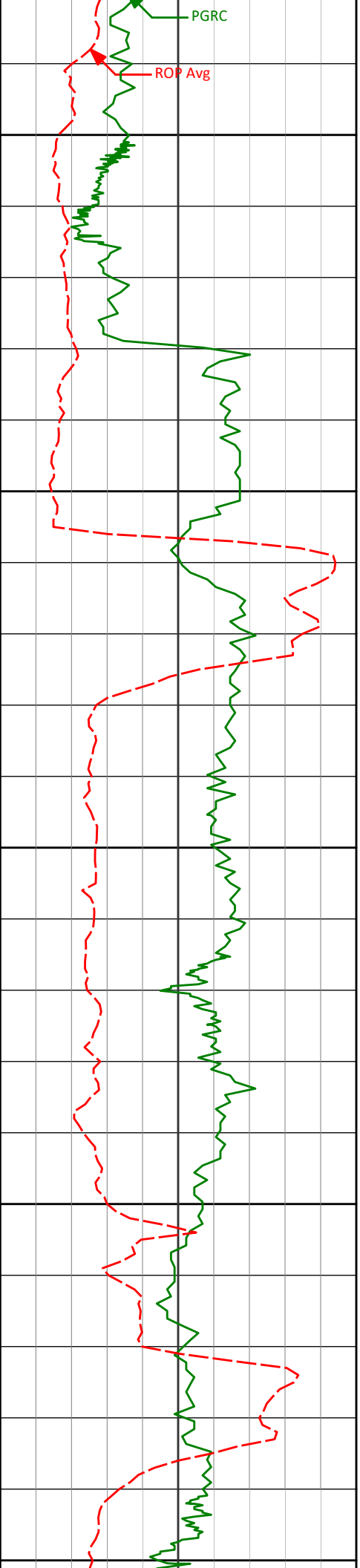


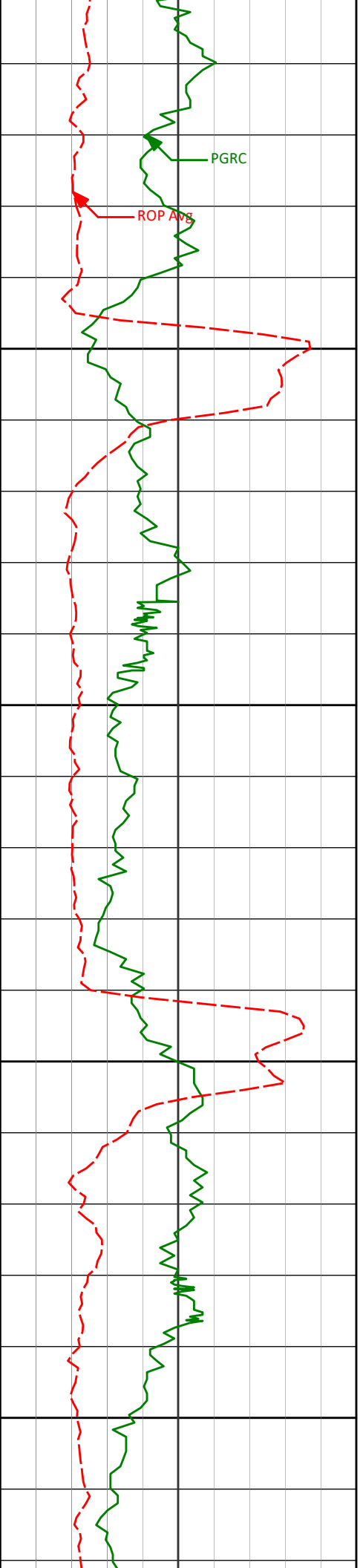
7316'	88.43°	85.52°	6628.44'	939.99'
7411'	93.45°	85.07°	6626.89'	1031.97'



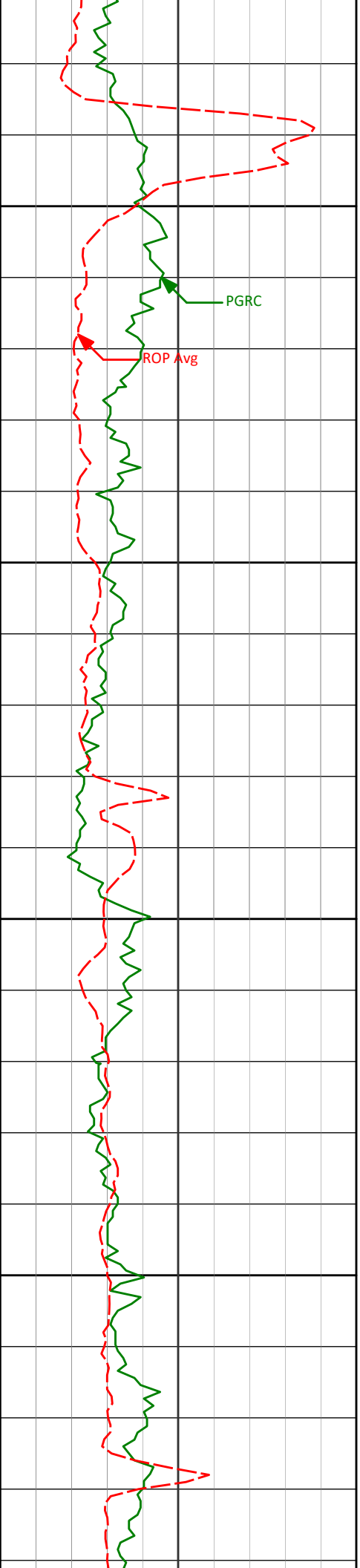
7506'	94.35°	84.68°	6620.42'	1123.60'
7601'	93.36°	86.00°	6614.04'	1215.43'



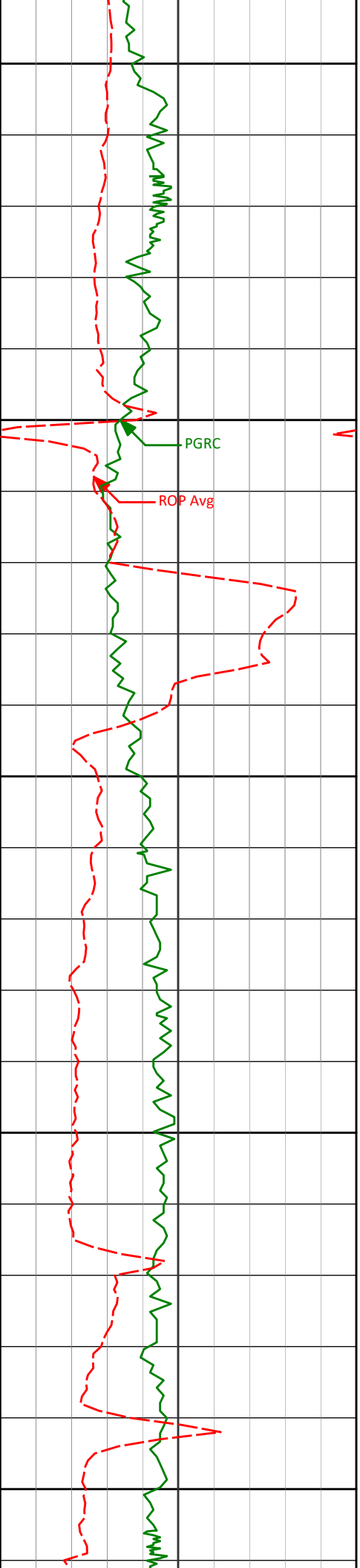
7696'	91.94°	86.26°	6609.65'	1307.69'
7791'	89.88°	86.47°	6608.14'	1400.12'
7886'	88.73°	86.30°	6609.29'	1492.57'



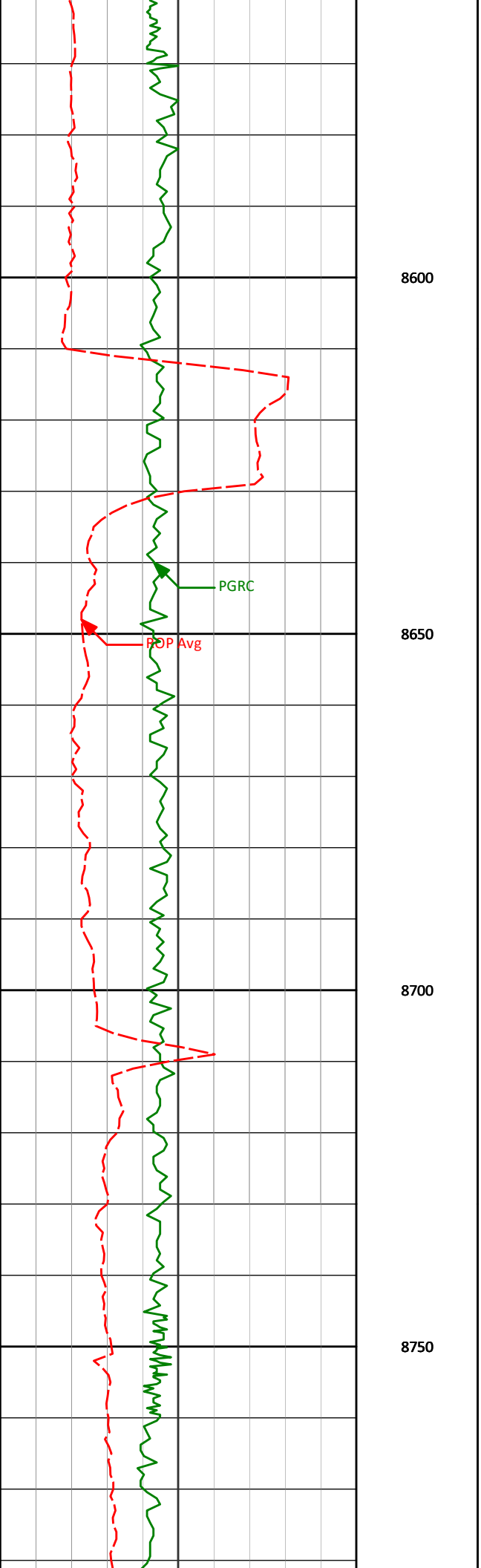
7981'	88.12°	87.38°	6611.90'	1585.15'
8076'	88.83°	88.67°	6614.43'	1678.16'



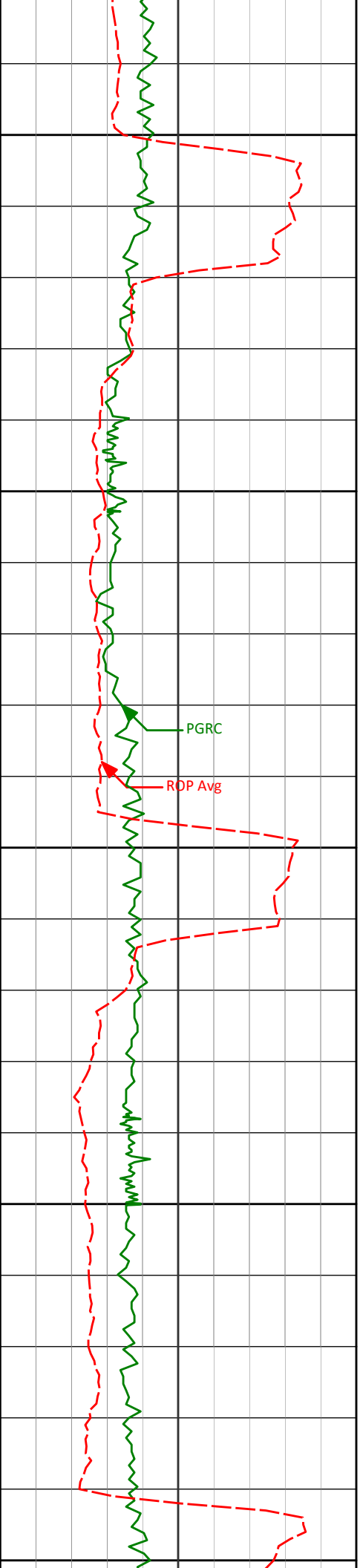
8170'	88.31°	88.67°	6616.78'	1770.40'
8265'	88.12°	88.66°	6619.74'	1863.60'



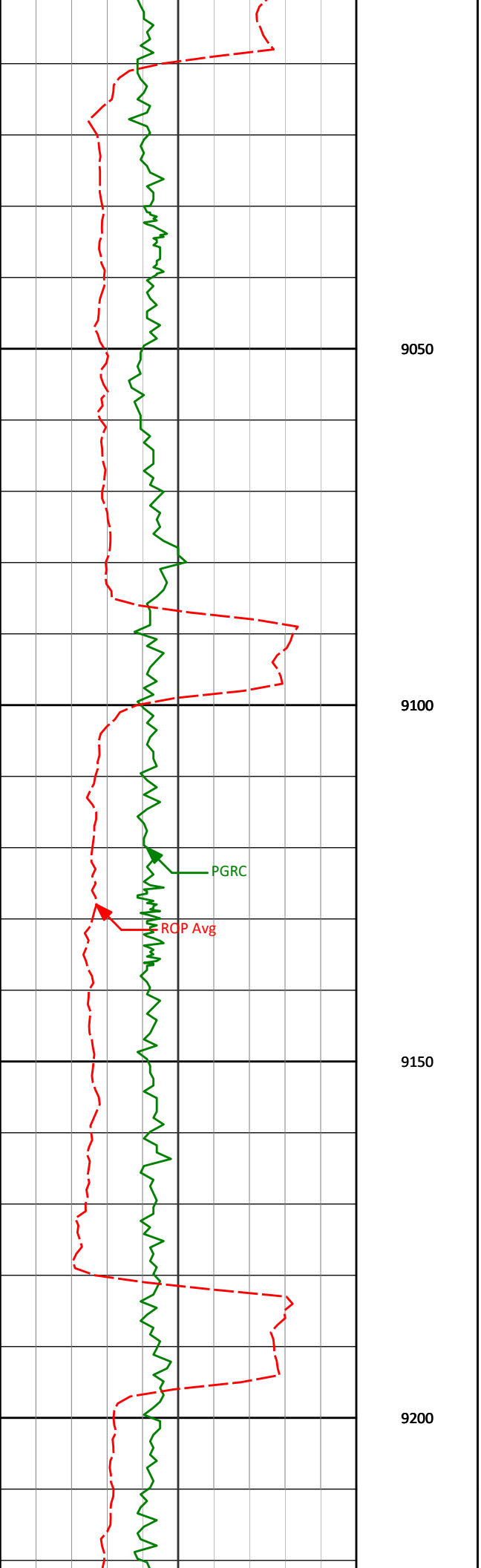
8360'	88.31°	88.47°	6622.70'	1956.78'
8455'	90.09°	87.99°	6624.03'	2049.87'
8550'	90.46°	86.94°	6623.57'	2142.72'



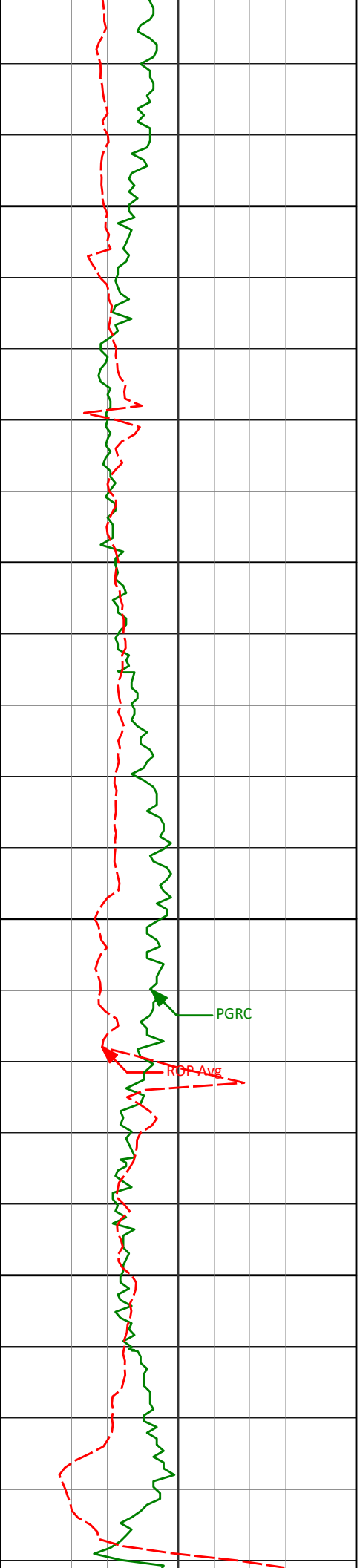
8645'	90.40°	88.06°	6622.85'	2235.57'
8740'	90.19°	85.73°	6622.37'	2328.21'



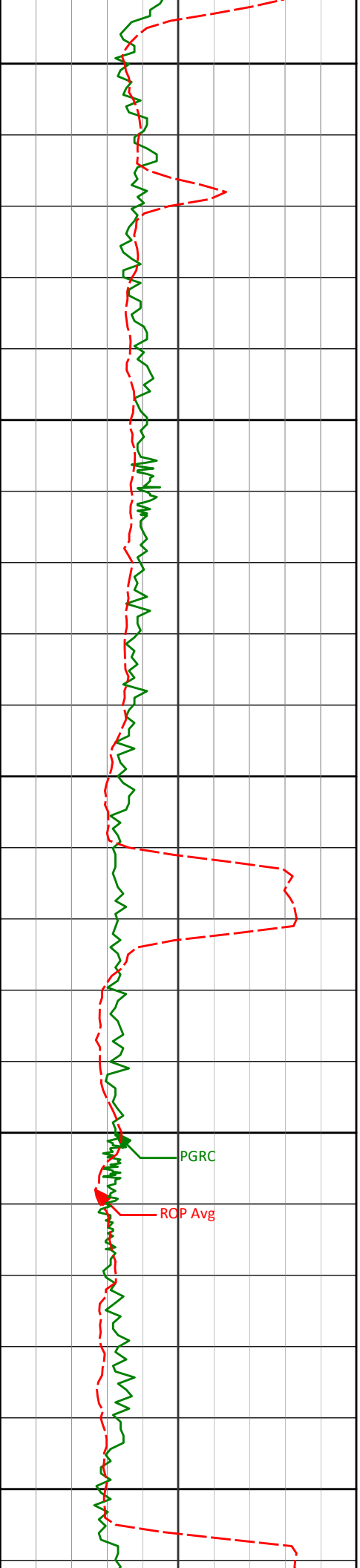
8835'	91.42°	86.98°	6621.04'	2420.64'
8930'	90.31°	87.36°	6619.61'	2513.37'



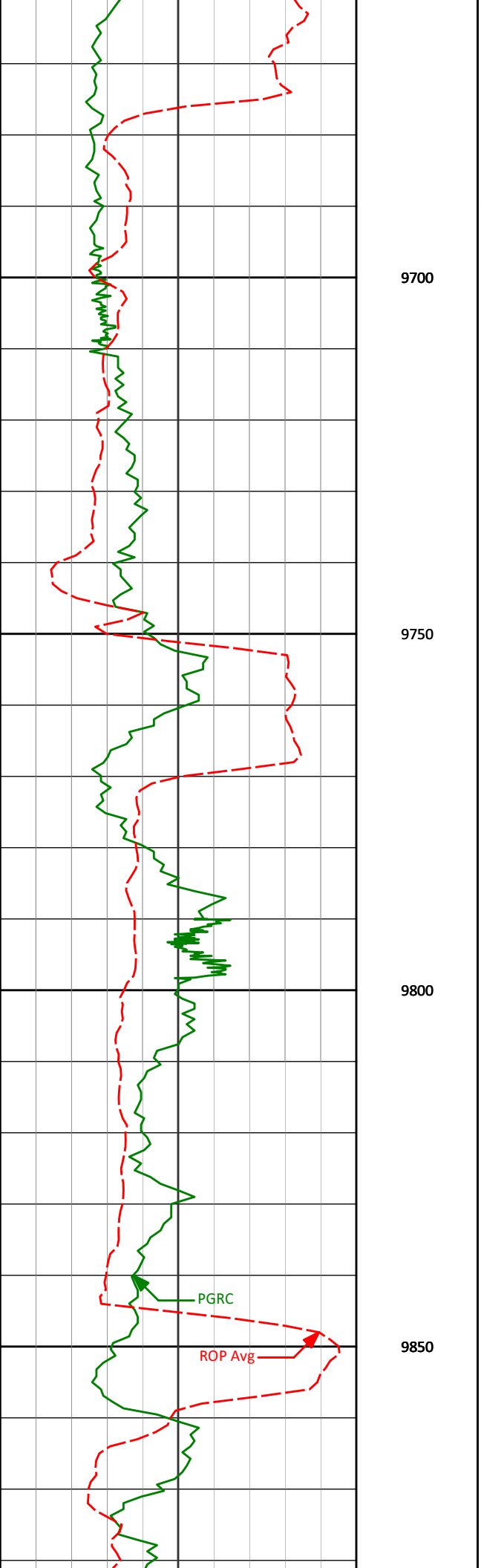
9025'	90.89°	89.17°	6618.61'	2606.48'
9120'	90.25°	89.16°	6617.66'	2699.88'
9215'	88.83°	89.80°	6618.43'	2793.37'



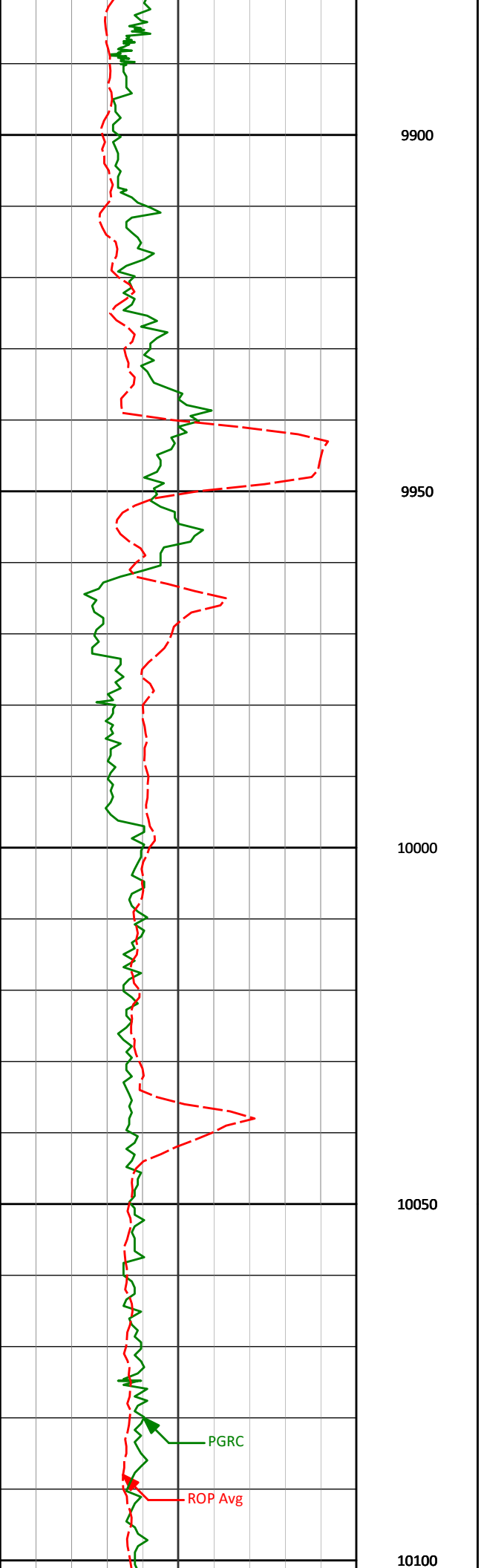
9310'	89.02°	89.77°	6620.22'	2886.94'
9405'	89.78°	90.01°	6621.21'	2980.55'



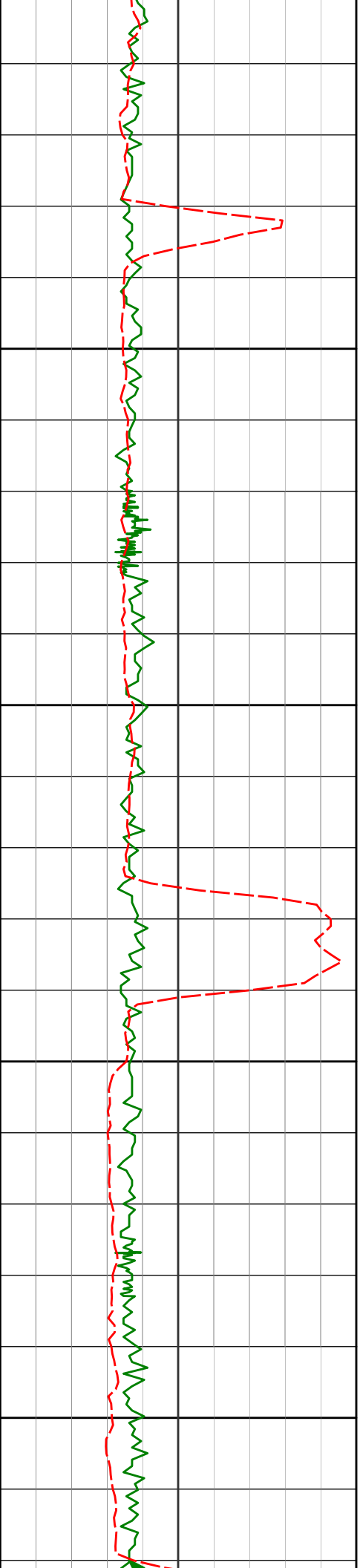
9500'	91.05°	89.52°	6620.52'	3074.13'
9595'	91.51°	89.58°	6618.41'	3167.62'



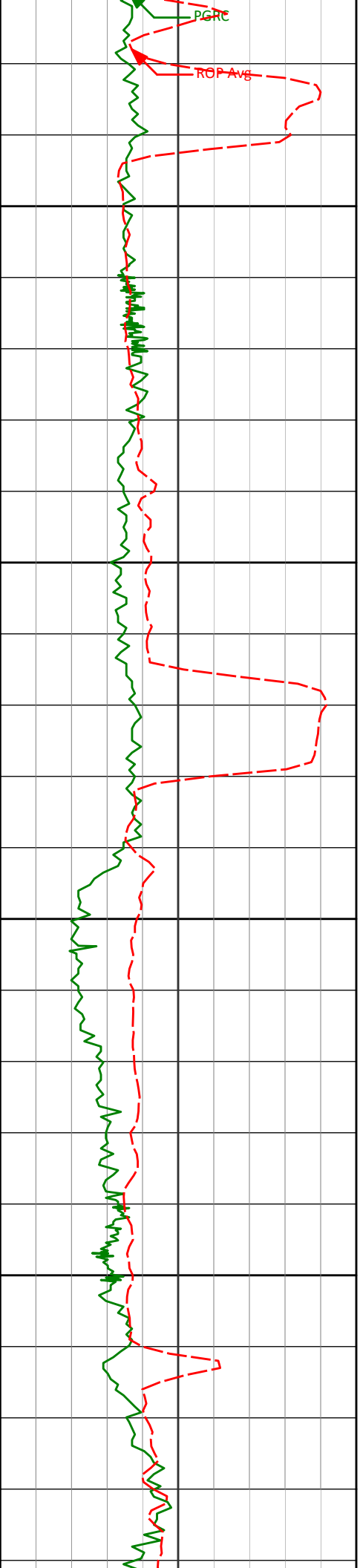
9689'	90.68°	90.44°	6616.61'	3260.27'
9784'	90.18°	90.15°	6615.90'	3354.00'
9879'	90.31°	89.63°	6615.49'	3447.61'



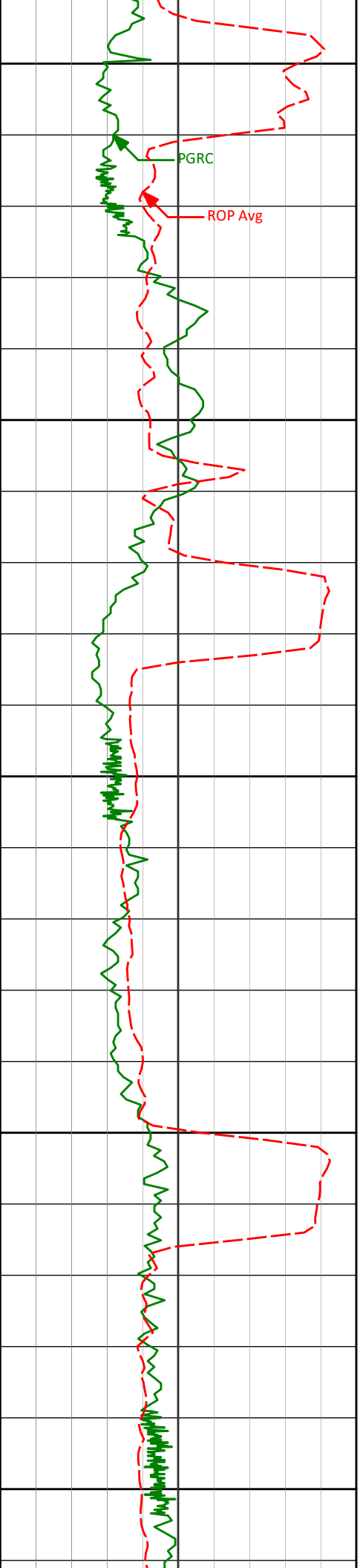
9974'	89.66°	88.66°	6615.51'	3541.01'
10069'	90.15°	88.03°	6615.67'	3634.16'



10164'	90.71°	87.75°	6614.95'	3727.15'
10259'	89.17°	87.67°	6615.05'	3820.08'

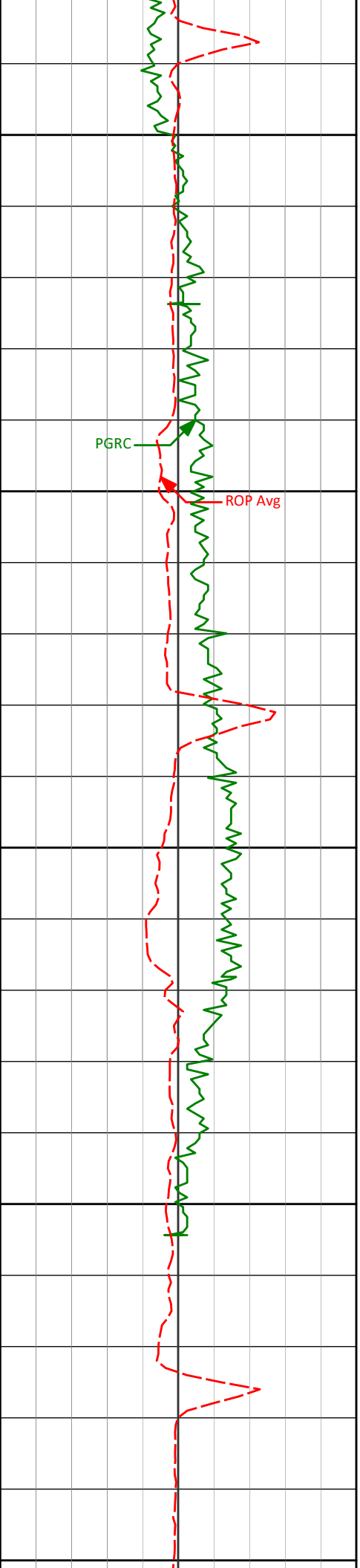


10354'	89.02°	88.31°	6616.56'	3913.10'
10449'	92.16°	88.91°	6615.59'	4006.31'

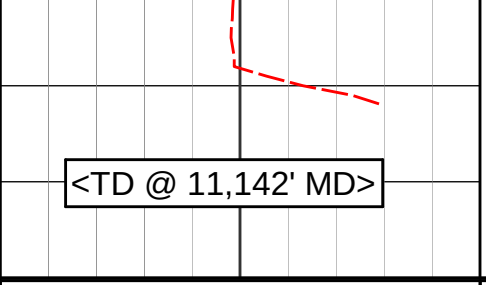


10544'	92.95°	88.95°	6611.35'	4099.55'
10639'	91.20°	88.90°	6607.91'	4192.82'
10734'	90.59°	89.30°	6606.43'	4286.19'

10829'	89.69°	87.85°	6606.20'	4379.41'
10924'	88.43°	88.45°	6607.75'	4472.48'



11018'	88.68°	88.15°	6610.12'	4564.60'
11148'	88.92°	87.45°	6612.85'	4691.78'



Avg Rate of Penetration ROP Avg 500 feet per hr 0	Depth ft	Depth	Inc.	Azi.	TVD	V.S.
PCG Gamma Ray PGRC 0 api 300						

HALLIBURTON

INSITE

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch AE18-62-1HN
Wattenberg
Weld Colorado
USA
CA-XX-0900062163

Survey depth 633 ft created to tie surveys onto bottom of the surface casing shoe.

Last survey is a projection from 11148 ft MD to TD at 11212 ft MD.

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
633.00	0.00	0.00	633.00	0.00 N	0.00 E	0.00	TIE-IN
713.00	0.44	219.10	713.00	0.24 S	0.19 W	-0.15	0.54
806.00	0.16	132.41	806.00	0.60 S	0.32 W	-0.22	0.49
899.00	0.62	222.93	899.00	1.05 S	0.57 W	-0.38	0.69
991.00	0.83	301.89	990.99	1.06 S	1.47 W	-1.27	1.01
1083.00	0.68	278.61	1082.98	0.63 S	2.57 W	-2.43	0.37
1176.00	0.25	201.74	1175.98	0.74 S	3.19 W	-3.02	0.71
1269.00	0.34	264.47	1268.98	0.95 S	3.53 W	-3.32	0.34
1361.00	0.04	320.81	1360.98	0.95 S	3.83 W	-3.61	0.35
1456.00	0.56	324.49	1455.98	0.55 S	4.12 W	-3.97	0.54
1551.00	0.14	357.93	1550.98	0.06 S	4.39 W	-4.32	0.47
1645.00	0.38	344.50	1644.97	0.35 N	4.48 W	-4.47	0.26
1740.00	0.17	233.86	1739.97	0.57 N	4.67 W	-4.70	0.49
1835.00	0.36	288.12	1834.97	0.58 N	5.06 W	-5.09	0.31
1930.00	0.63	278.38	1929.97	0.75 N	5.87 W	-5.91	0.30
2025.00	0.37	53.86	2024.97	1.01 N	6.14 W	-6.22	0.99
2120.00	0.40	12.20	2119.97	1.52 N	5.82 W	-5.99	0.29
2215.00	0.74	229.99	2214.96	1.45 N	6.22 W	-6.38	1.15
2309.00	0.35	274.11	2308.96	1.08 N	6.98 W	-7.06	0.58
2404.00	2.83	183.11	2403.92	1.25 S	7.39 W	-7.08	3.01
2499.00	0.97	115.05	2498.87	3.93 S	6.80 W	-6.04	2.76
2593.00	1.05	133.73	2592.86	4.86 S	5.46 W	-4.56	0.36
2688.00	0.99	150.82	2687.84	6.17 S	4.43 W	-3.33	0.32
2783.00	1.25	165.74	2782.82	7.89 S	3.78 W	-2.40	0.41
2877.00	0.51	156.23	2876.81	9.26 S	3.36 W	-1.75	0.80
2972.00	0.63	171.41	2971.81	10.16 S	3.11 W	-1.36	0.20
3066.00	3.50	190.12	3065.74	13.50 S	3.54 W	-1.22	3.10
3161.00	5.26	193.14	3160.46	20.59 S	5.04 W	-1.50	1.86
3256.00	7.26	179.06	3254.89	30.84 S	5.93 W	-0.66	2.64
3351.00	7.25	182.76	3349.13	42.83 S	6.12 W	1.17	0.49
3446.00	8.55	183.44	3443.23	55.87 S	6.83 W	2.66	1.37
3541.00	10.66	188.68	3536.89	71.60 S	8.58 W	3.58	2.40
3635.00	12.77	185.38	3628.93	90.54 S	10.87 W	4.51	2.36
3730.00	14.77	188.55	3721.20	112.97 S	13.65 W	5.54	2.24
3825.00	13.77	185.50	3813.27	136.20 S	16.54 W	6.60	1.31

3920.00	12.84	184.20	3905.72	157.98 S	18.39 W	8.43	1.03
4015.00	13.31	181.62	3998.25	179.44 S	19.47 W	10.98	0.79
4110.00	11.71	185.16	4091.00	199.98 S	20.65 W	13.27	1.86
4205.00	11.30	182.08	4184.09	218.88 S	21.85 W	15.26	0.78
4299.00	11.67	174.88	4276.21	237.55 S	21.34 W	18.91	1.57
4394.00	12.17	184.45	4369.17	257.10 S	21.26 W	22.27	2.14
4489.00	11.14	181.68	4462.21	276.26 S	22.31 W	24.46	1.23
4584.00	11.74	183.63	4555.33	295.07 S	23.19 W	26.76	0.75
4679.00	12.38	188.54	4648.23	314.79 S	25.31 W	27.98	1.27
4773.00	10.55	190.49	4740.35	333.22 S	28.37 W	28.06	1.99
4868.00	11.27	185.06	4833.64	351.02 S	30.78 W	28.68	1.32
4963.00	12.20	181.26	4926.65	370.30 S	31.82 W	30.90	1.28
5058.00	11.87	182.14	5019.56	390.10 S	32.40 W	33.65	0.40
5153.00	11.70	185.10	5112.56	409.46 S	33.62 W	35.70	0.66
5248.00	12.55	191.31	5205.44	429.18 S	36.50 W	36.18	1.63
5343.00	11.15	191.05	5298.42	448.32 S	40.29 W	35.67	1.47
5438.00	12.77	196.02	5391.35	467.43 S	44.95 W	34.29	2.02
5533.00	11.98	192.61	5484.15	487.15 S	50.00 W	32.62	1.14
5628.00	12.98	189.89	5576.90	507.28 S	53.99 W	32.08	1.22
5723.00	13.23	190.18	5669.43	528.49 S	57.74 W	31.95	0.27
5817.00	14.76	190.77	5760.63	550.84 S	61.88 W	31.62	1.64
5862.00	13.65	186.54	5804.26	561.75 S	63.55 W	31.81	3.38
5909.00	14.88	178.84	5849.81	573.29 S	64.06 W	33.25	4.80
5957.00	16.22	168.73	5896.06	586.03 S	62.63 W	36.80	6.29
6004.00	18.33	161.66	5940.95	599.49 S	59.02 W	42.62	6.33
6052.00	21.51	157.13	5986.07	614.77 S	53.22 W	50.91	7.36
6099.00	24.07	155.33	6029.40	631.42 S	45.87 W	60.95	5.63
6147.00	25.25	152.00	6073.02	649.36 S	36.98 W	72.73	3.80
6194.00	26.28	148.94	6115.35	667.12 S	26.91 W	85.65	3.58
6242.00	28.62	143.67	6157.95	685.49 S	14.61 W	100.86	7.03
6289.00	29.50	141.32	6199.03	703.60 S	0.71 W	117.61	3.07
6337.00	32.22	138.94	6240.23	722.48 S	15.09 E	136.36	6.21
6384.00	36.61	136.93	6279.00	742.18 S	32.90 E	157.23	9.65
6432.00	40.64	134.76	6316.49	763.65 S	53.78 E	181.42	8.86
6479.00	44.61	132.52	6351.07	785.59 S	76.83 E	207.83	9.03
6527.00	46.68	129.70	6384.63	808.14 S	102.69 E	237.11	6.03
6574.00	48.78	125.33	6416.25	829.29 S	130.28 E	267.86	8.19
6622.00	50.60	119.87	6447.31	848.97 S	161.10 E	301.56	9.47
6669.00	51.55	116.52	6476.85	866.24 S	193.32 E	336.22	5.89
6717.00	54.89	112.18	6505.60	882.05 S	228.34 E	373.40	10.06
6764.00	58.82	110.57	6531.29	896.38 S	264.98 E	411.93	8.84
6812.00	65.11	109.45	6553.83	910.86 S	304.78 E	453.59	13.26
6858.00	69.28	104.47	6571.67	923.19 S	345.32 E	495.63	13.48
6906.00	74.59	101.12	6586.55	933.27 S	389.80 E	541.17	12.90
6953.00	76.38	96.05	6598.34	940.06 S	434.77 E	586.65	11.12
7001.00	79.80	92.56	6608.25	943.57 S	481.59 E	633.39	10.07
7052.00	83.51	89.35	6615.65	944.40 S	532.03 E	683.25	9.58
7158.00	87.72	86.27	6623.75	940.36 S	637.61 E	786.64	4.92
7221.00	88.46	85.87	6625.86	936.04 S	700.42 E	847.84	1.33
7316.00	88.43	85.52	6628.44	928.91 S	795.12 E	939.99	0.37
7411.00	93.45	85.07	6626.89	921.13 S	889.76 E	1031.97	5.30
7506.00	94.35	84.68	6620.42	912.66 S	984.16 E	1123.60	1.04
7601.00	93.36	86.00	6614.04	904.97 S	1078.62 E	1215.43	1.74
7696.00	91.94	86.26	6609.65	898.57 S	1173.30 E	1307.69	1.51
7791.00	89.88	86.47	6608.14	892.55 S	1268.10 E	1400.12	2.19
7886.00	88.73	86.30	6609.29	886.56 S	1362.90 E	1492.57	1.22
7981.00	88.12	87.38	6611.90	881.32 S	1457.72 E	1585.15	1.31
8076.00	88.83	88.67	6614.43	878.05 S	1552.62 E	1678.16	1.55
8170.00	88.31	88.67	6616.78	875.87 S	1646.57 E	1770.40	0.55
8265.00	88.12	88.66	6619.74	873.66 S	1741.50 E	1863.60	0.20
8360.00	88.31	88.47	6622.70	871.28 S	1836.42 E	1956.78	0.28
8455.00	90.09	87.99	6624.03	868.34 S	1931.36 E	2049.87	1.95
8550.00	90.46	86.94	6623.57	864.13 S	2026.27 E	2142.72	1.17
8645.00	90.40	88.06	6622.85	859.99 S	2121.17 E	2235.57	1.18
8740.00	90.19	85.73	6622.37	854.85 S	2216.02 E	2328.21	2.47
8835.00	91.42	86.98	6621.04	848.80 S	2310.82 E	2420.64	1.85
8930.00	90.31	87.36	6619.61	844.11 S	2405.69 E	2513.37	1.23
9025.00	90.89	89.17	6618.61	841.23 S	2500.64 E	2606.48	2.00
9120.00	90.25	89.16	6617.66	839.84 S	2595.62 E	2699.88	0.68
9215.00	88.83	89.80	6618.43	838.97 S	2690.61 E	2793.37	1.64

9310.00	89.02	89.77	6620.22	838.61 S	2785.59 E	2886.94	0.20
9405.00	89.78	90.01	6621.21	838.42 S	2880.59 E	2980.55	0.85
9500.00	91.05	89.52	6620.52	838.03 S	2975.58 E	3074.13	1.42
9595.00	91.51	89.58	6618.41	837.29 S	3070.56 E	3167.62	0.49
9689.00	90.68	90.44	6616.61	837.30 S	3164.54 E	3260.27	1.27
9784.00	90.18	90.15	6615.90	837.80 S	3259.53 E	3354.00	0.60
9879.00	90.31	89.63	6615.49	837.62 S	3354.53 E	3447.61	0.56
9974.00	89.66	88.66	6615.51	836.20 S	3449.52 E	3541.01	1.23
10069.00	90.15	88.03	6615.67	833.46 S	3544.48 E	3634.16	0.84
10164.00	90.71	87.75	6614.95	829.96 S	3639.41 E	3727.15	0.65
10259.00	89.17	87.67	6615.05	826.17 S	3734.33 E	3820.08	1.62
10354.00	89.02	88.31	6616.56	822.84 S	3829.26 E	3913.10	0.70
10449.00	92.16	88.91	6615.59	820.54 S	3924.22 E	4006.31	3.37
10544.00	92.95	88.95	6611.35	818.76 S	4019.10 E	4099.55	0.84
10639.00	91.20	88.90	6607.91	816.98 S	4114.02 E	4192.82	1.84
10734.00	90.59	89.30	6606.43	815.49 S	4209.00 E	4286.19	0.77
10829.00	89.69	87.85	6606.20	813.13 S	4303.96 E	4379.41	1.79
10924.00	88.43	88.45	6607.75	810.06 S	4398.90 E	4472.48	1.47
11018.00	88.68	88.15	6610.12	807.27 S	4492.83 E	4564.60	0.42
11148.00	88.92	87.45	6612.85	802.27 S	4622.70 E	4691.78	0.57
11212.00	88.92	87.45	6614.05	799.43 S	4686.63 E	4754.32	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 CLOSURE OF 99.68 DEGREES (GRID)
A TOTAL CORRECTION OF 7.78 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11212.00 FEET
IS 4754.32 FEET ALONG 99.68 DEGREES (GRID)

Date Printed:16 December 2012