



WELL INFORMATION					
MWD Run Number	100	200			
Date run completed	08-Sep-13	09-Sep-13			
Rig Bit Number	2	3			
Bit Size (in)	8.750	8.750			
Tool Nominal OD (in)	6.750	6.750			
Log Start Depth (TVD, ft)	971.99	5,797.85			
Log End Depth (TVD, ft)	5,797.85	6,608.57			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	07-Sep-13 03:15	08-Sep-13 08:15			
Drill/Wipe End Date and Time	08-Sep-13 00:15	09-Sep-13 01:15			
Min Inc (deg) @ Depth (TVD, ft)	.04 @ 1,363.98	10.82 @ 5,812.58			
Max Inc (deg) @ Depth (TVD, ft)	16.55 @ 3,860.91	82.63 @ 6,602.83			
Bit TFA(in2) / Bit Type	.86 / PDC	.86 / PDC			
Flow Rate (gpm)	595.51	542.86			
Max AV (fpm) / CV (fpm) @ MWD	417.4 / 400.0	380.0 / 400.0			
Fluid Type	Fresh Water Gel	Fresh Water Gel			
Density (ppg) / Viscosity (spqt)	8.75 / 27.00	9.90 / 36.00			
Filtrate CL (ppm)	2,400.00	2,600.00			
pH / Fluid Loss (mptm)	9.50 / 22	9.80 / 10			
PV (cP) / YP (Ihf2)	2 / 3.00	12 / 11.00			
% Solids / % Sand	3.2 / .25	8.50 / 0.20			
% Oil / Oil:Water Ratio	0 / 0:95	0 / 0:95			
Rm @ Measured Temp (degF)	NA @ NA	NA @ NA			
Rmf @ Measured Temp (degF)	NA @ NA	NA @ NA			
Rmc @ Measured Temp (degF)	NA @ NA	NA @ NA			
Max Tool Temp (deg F) / S	127.00 / PDM	170.70 / PDM			

Max Tool Temp (degF) / Source	167.00 / PCM	172.78 / PCM			
Rm @ Max Tool Temp (degF)	NA @ NA	NA @ NA			
Lead MWD Engineer	Brett Vandergon	Brett Vandergon			
Customer Representative	Johnny Sanchez	Johnny Sanchez			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.84	5.84			
Sub Serial Number	11341325	11341325			
Insert Serial Number	11400826	11400826			
Date and Time Initialized	06-Sep-13 17:34	06-Sep-13 17:34			
Date and Time Read	09-Sep-13 13:47	09-Sep-13 13:53			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	57.00	53.00			
Software Version	6.21	6.21			
Sub Serial Number	11341325	11341325			
Sonde Serial Number	11145627	11145627			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	272.26	247.80			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	49.82	46.64			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11341325	11341325			
Insert/Sonde Serial Number	11293298	11293298			

REMARKS

1. All depths are true vertical bit depths, referenced to the Driller's pipe tally and are measured from the Drill Floor, unless otherwise specified.
2. No depth corrections have been made for pipe stretch or compression.
3. Critical annual velocities are calculated using the "Power Law" model for water based fluids and the "Bingham Plastic" model for oil and synthetic based fluids.
4. All data presented is recorded data unless otherwise specified.
5. The following smoothing parameters have been applied to the data:

PGRC (Corrected Gamma Ray):
Interval Resolution: 0.5 ft
Interval Distance: 0.6 ft
Gap Fill: 3.0 ft

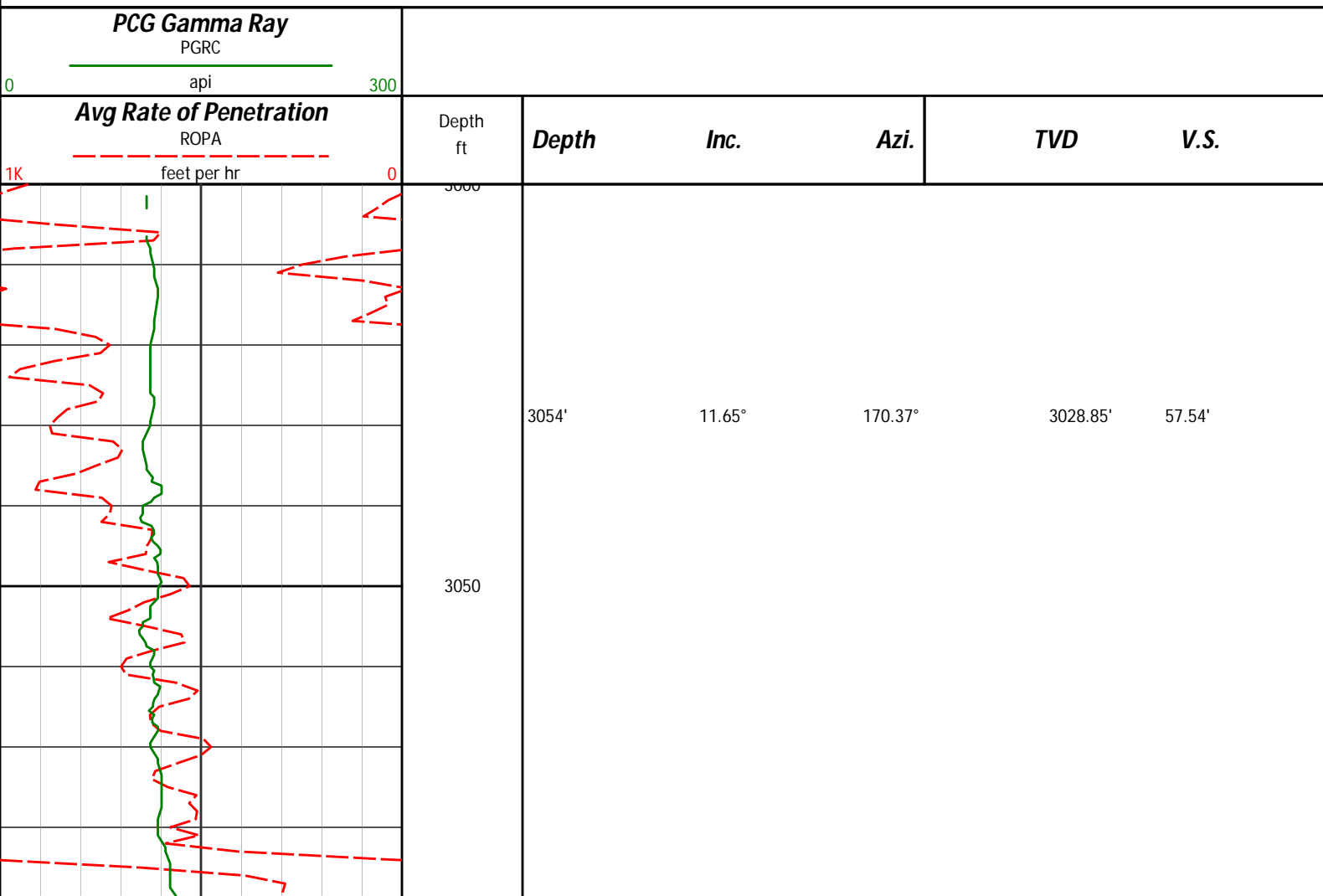
ROPA (Average Rate of Penetration)
Interval Resolution: 0.5 ft
Interval Distance: 1.2 ft
Gap Fill: 3.0 ft

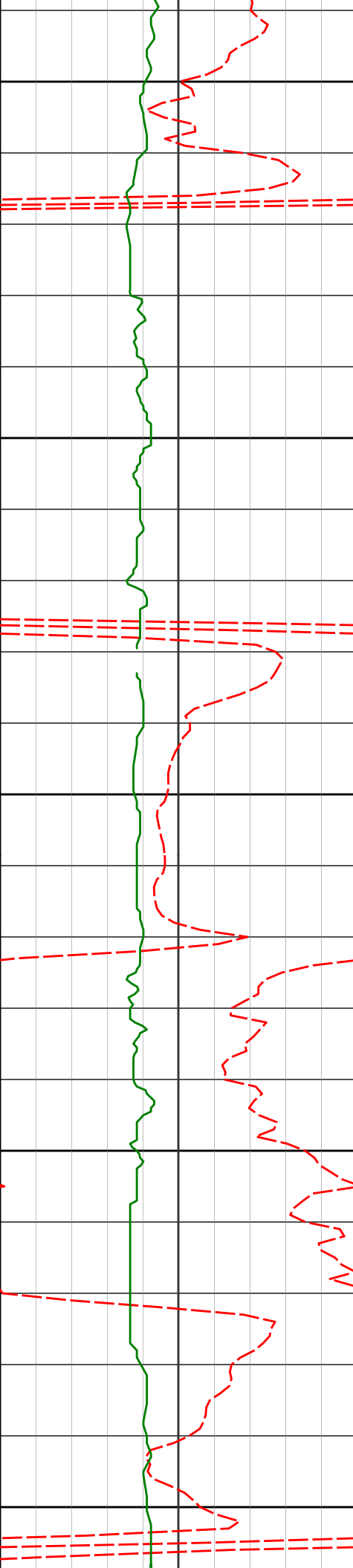
WARRANTY

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HALLIBURTONSperry Drilling Services**TVD Detail Log 1:240**

Noble Energy
Wells Ranch USX AE20-62-1HN
H&P 343
T6N-R62W





3100

3150

3200

3250

3300

3149'

9.90°

168.18°

3122.17'

64.90'

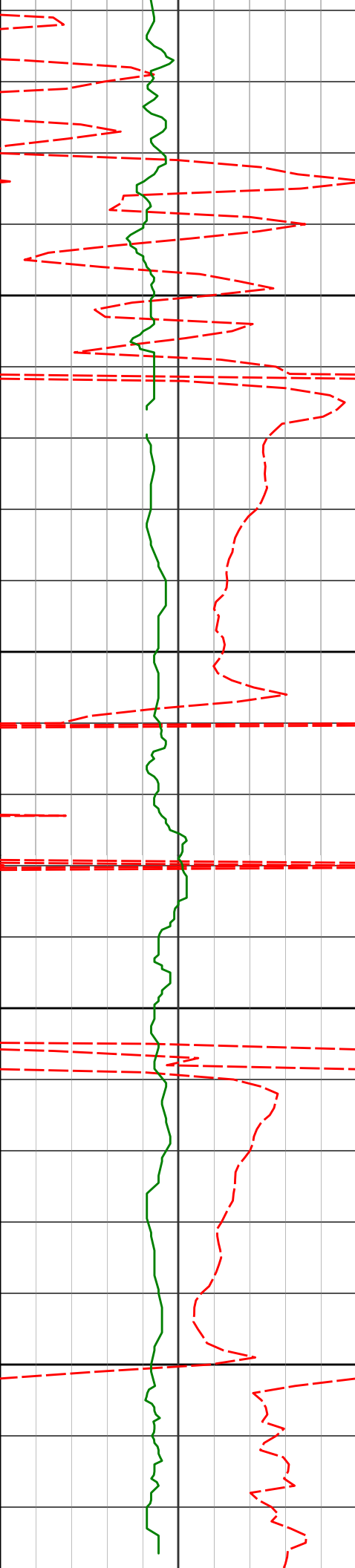
3244'

11.72°

166.95°

3215.48'

72.80'



3350

3400

3450

3500

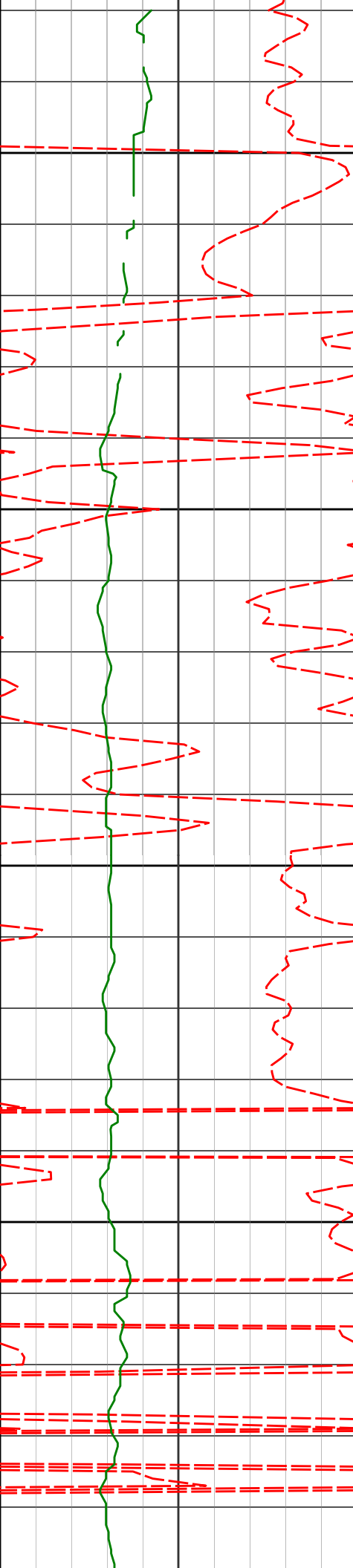
3529'

13.46°

182.05°

3493.69'

92.67'



3550

3624'

14.16°

176.38°

3585.95'

98.42'

3600

3650

3719'

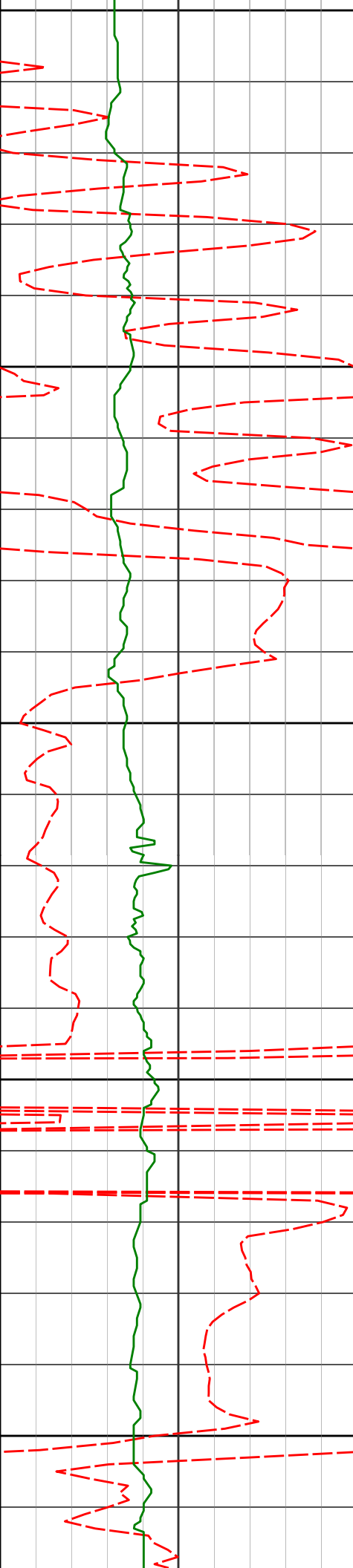
14.43°

178.29°

3678.01'

105.08'

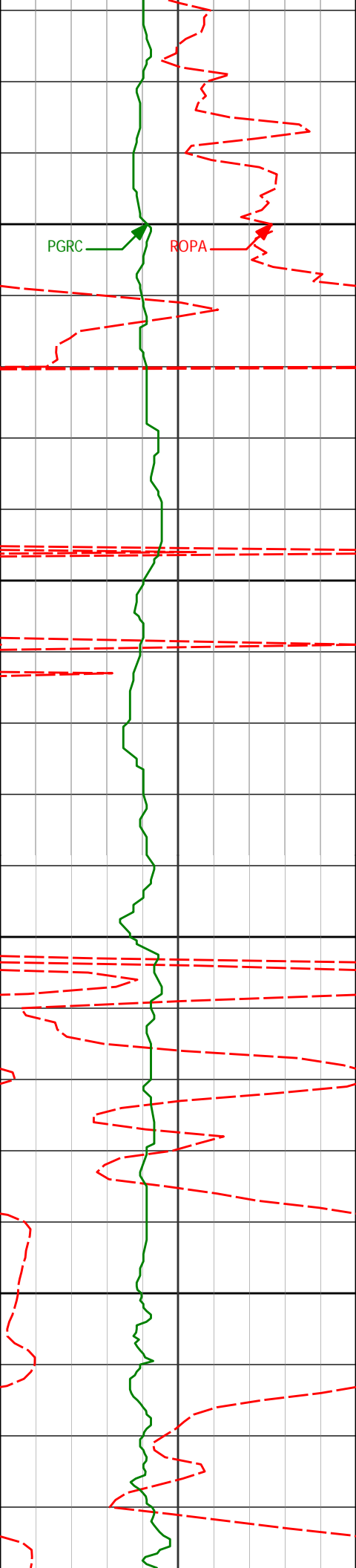
3700



3814'	15.90°	179.40°	3769.70'	111.50'
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3909'	16.55°	176.63°	3860.91'	118.75'
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4004'	13.90°	172.76°	3952.57'	126.86'
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4000

4050

4100

4150

4099'

11.37°

171.03°

4045.27'

134.59'

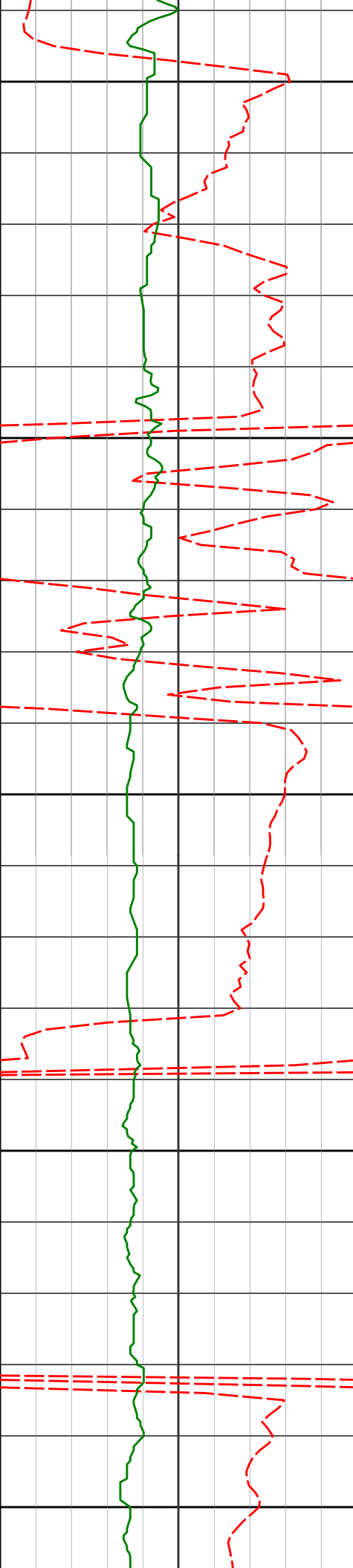
4194'

8.81°

172.06°

4138.79'

140.92'



4200

4289'

9.10°

175.06°

4232.63'

146.04'

4250

4300

4384'

10.74°

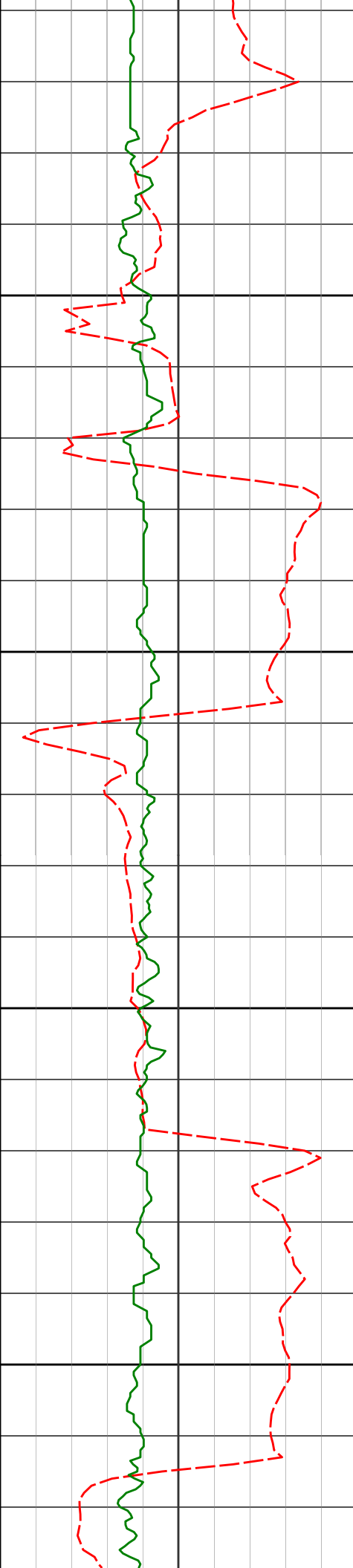
168.39°

4326.21'

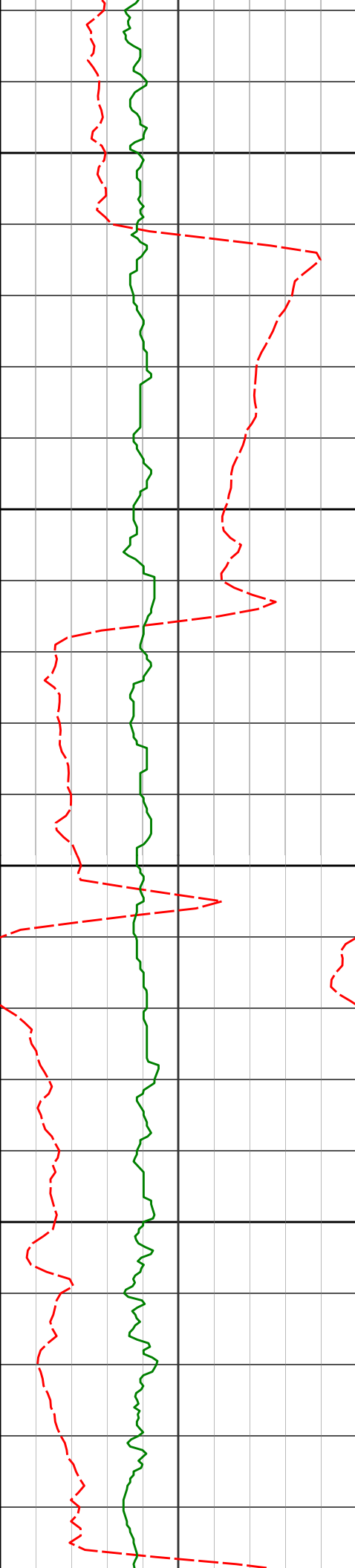
152.26'

4350

4400



4479'	11.04°	170.29°	4419.50'	159.70'
4450				
4500				
4574'	11.01°	172.77°	4512.75'	166.60'
4550				
4600				
4668'	11.39°	174.88°	4604.96'	172.84'



4650

4700

4750

4800

4763'

13.28°

178.34°

4697.76'

178.80'

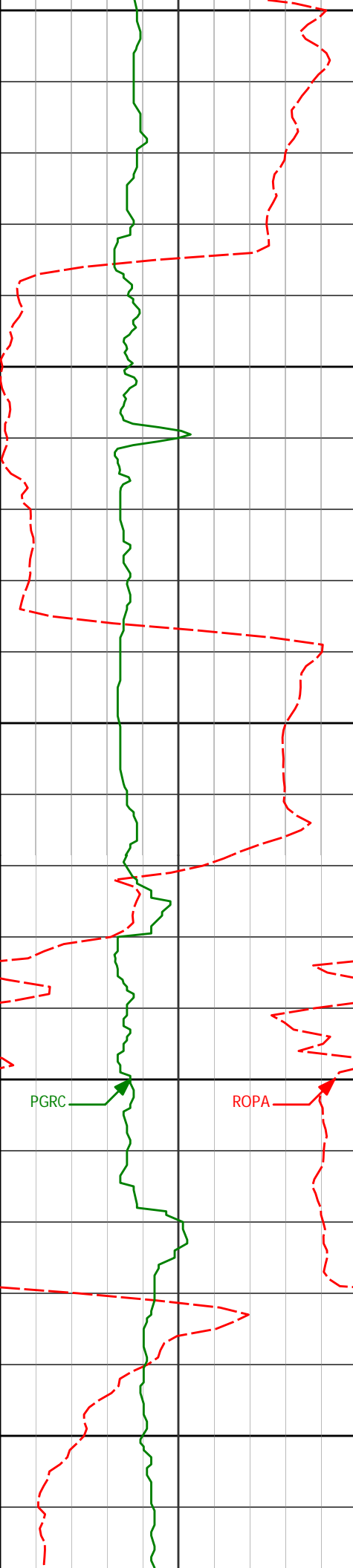
4858'

11.80°

176.83°

4790.49'

184.56'



4850

4900

4950

5000

5050

4953'

11.87°

180.28°

4883.47'

189.69'

5048'

12.96°

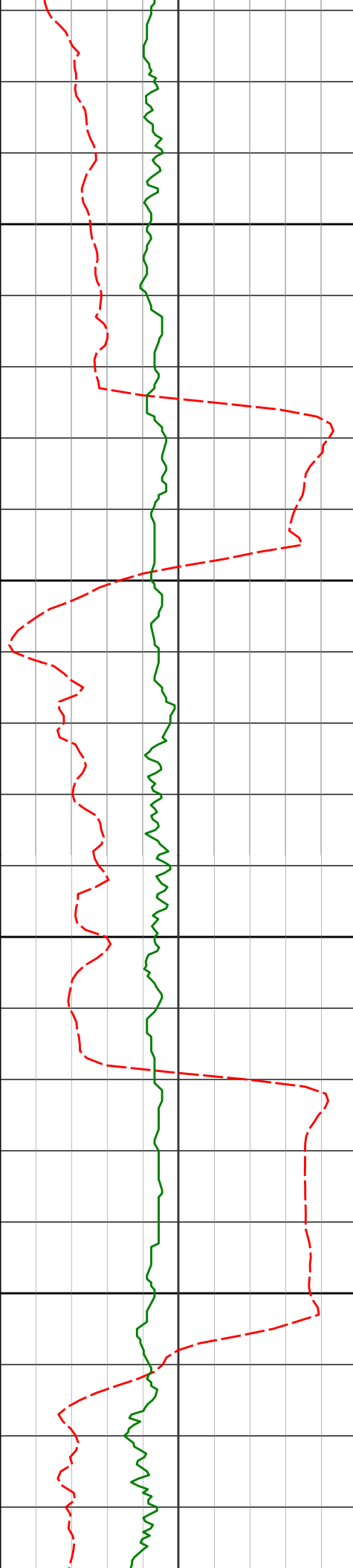
176.19°

4976.25'

195.21'

PGRC

ROPA



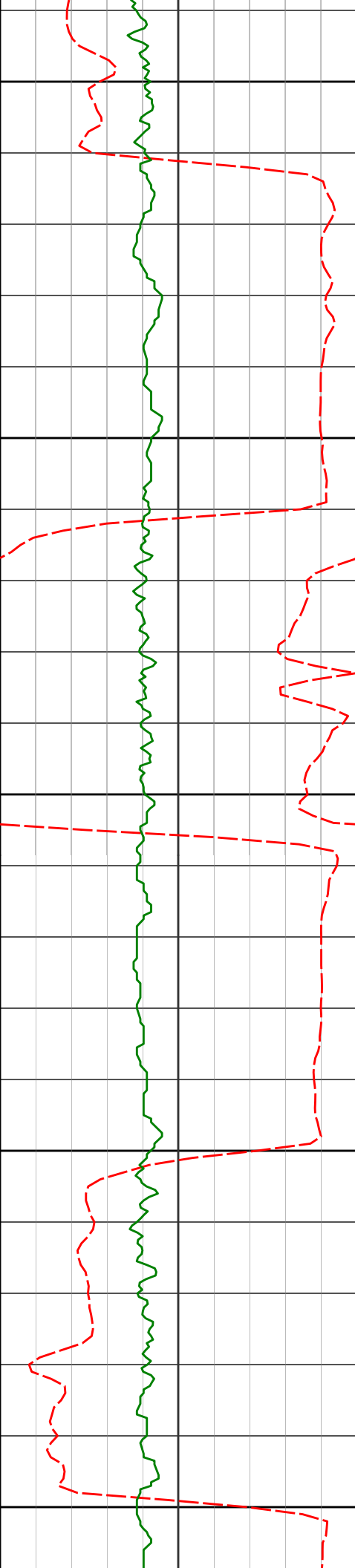
5100

5150

5200

5250

5143'	10.70°	174.37°	5069.23'	201.38'
5238'	8.61°	175.11°	5162.88'	206.61'
5333'	9.27°	180.67°	5256.73'	210.64'



5300

5350

5400

5450

5500

5428'

10.71°

177.45°

5350.28'

214.87'

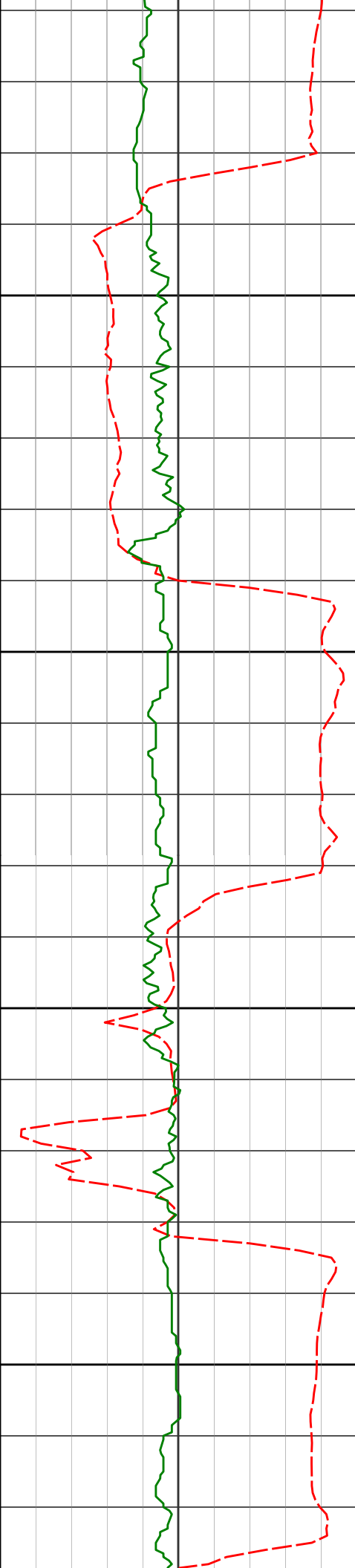
5523'

12.25°

173.44°

5443.38'

220.87'



5618'

12.12°

171.56°

5536.24'

228.17'

5550

5600

5713'

11.37°

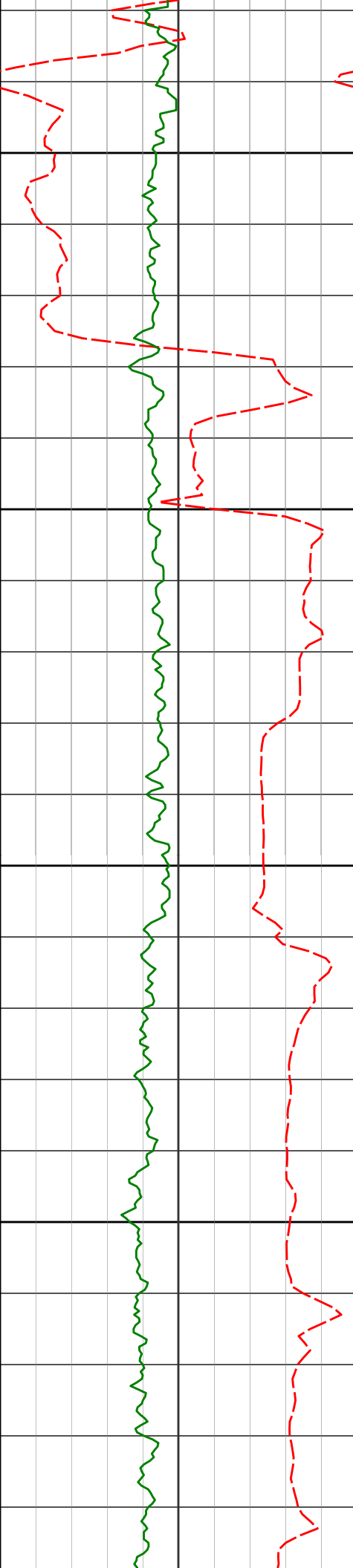
176.41°

5629.25'

234.75'

5650

5700



Run 200

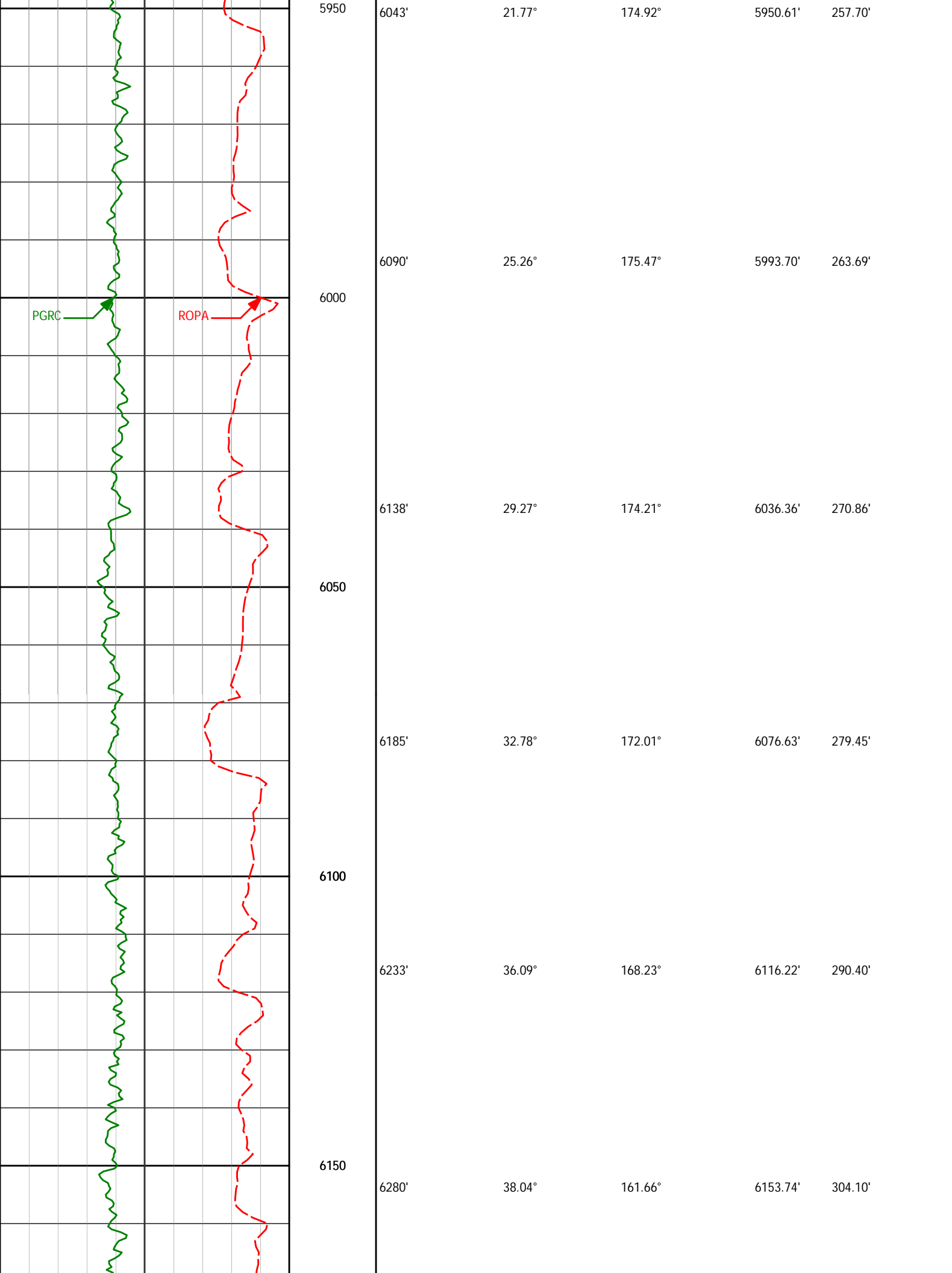
5800

5750

5850

5900

5828'	11.60°	178.09°	5741.95'	241.29'
5900'	10.82°	175.19°	5812.58'	245.41'
5948'	11.54°	172.28°	5859.67'	248.62'
5995'	16.38°	174.40°	5905.27'	252.56'





6200

6250

6300

6350

6328'

38.03°

152.38°

6191.58'

321.78'

6375'

37.67°

144.08°

6228.71'

342.35'

6423'

37.96°

136.86°

6266.65'

365.93'

6470'

38.25°

130.41°

6303.65'

391.07'

6518'

39.95°

124.09°

6340.91'

418.83'

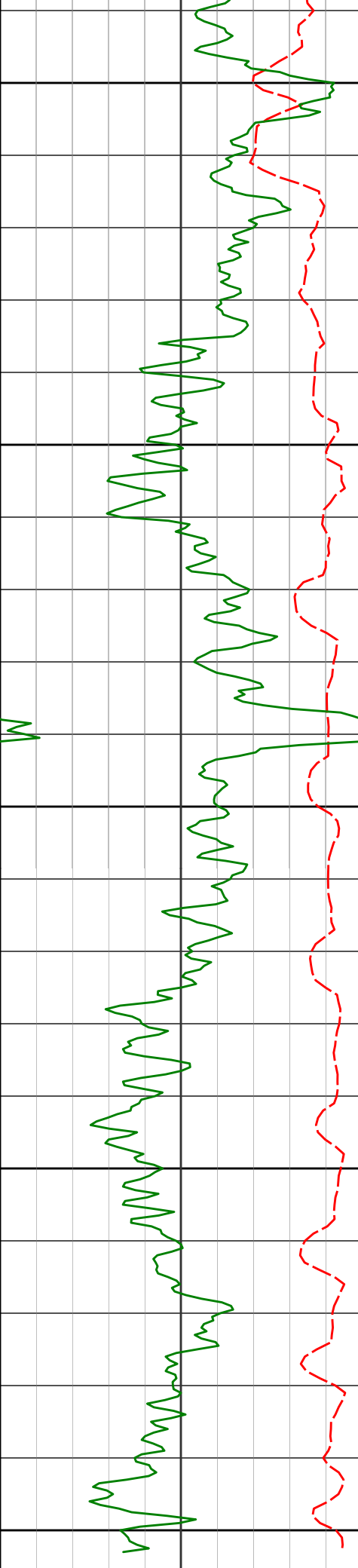
6565'

42.80°

120.78°

6376.18'

448.28'



6400

6450

6500

6550

6600

6613'	46.14°	115.95°	6410.44'	480.81'
6660'	49.24°	112.14°	6442.08'	515.01'
6708'	53.17°	108.51°	6472.16'	552.17'
6755'	57.30°	105.88°	6498.95'	590.70'
6803'	61.42°	103.88°	6523.41'	631.98'
6849'	65.65°	101.34°	6543.91'	673.13'
6897'	68.70°	99.79°	6562.53'	717.29'
6944'	72.54°	97.74°	6578.12'	761.45'
6992'	77.79°	95.48°	6590.41'	807.46'
7065'	82.63°	90.87°	6602.83'	878.10'

Casing set @ TVD 6.607'

TD @ TVD 6565'

[illegible]

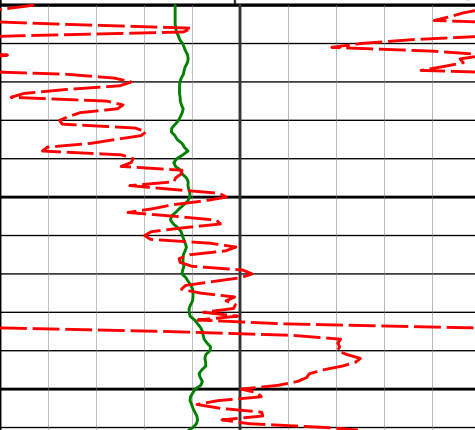
<div><div><div>Avg Rate of Penetration</div><div>ROPA</div><div>1K0</div></div><div><div>feet per hr</div></div></div>		Depth ft	Depth	Inc.	Azi.	TVD	V.S.
<div><div><div>PCG Gamma Ray</div><div>PGRC</div><div>0300</div></div><div><div>api</div></div></div>							

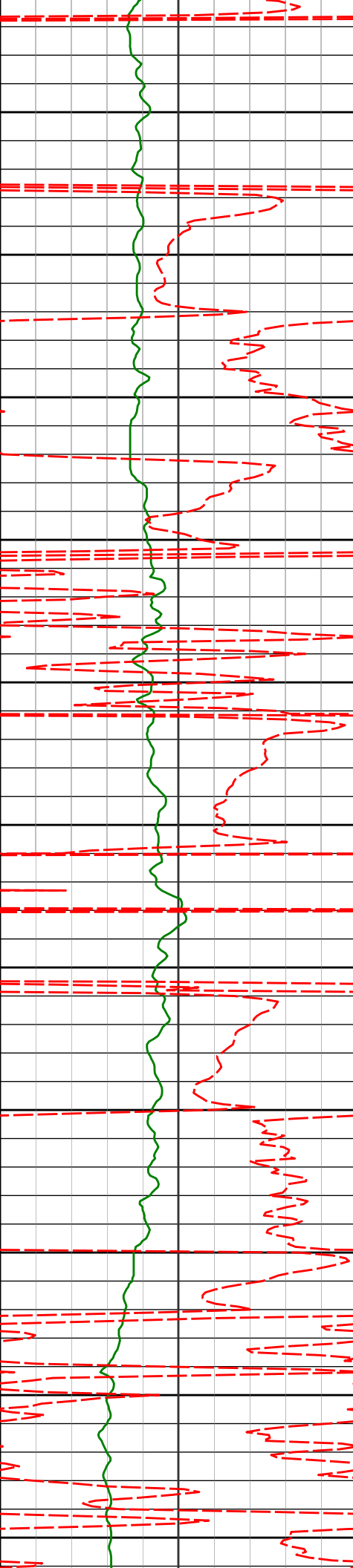
HALLIBURTON

Sperry Drilling Services

TVD Main Log 1:600

Noble Energy
Wells Ranch USX AE20-62-1HN
H&P 343
T6N-R62W

<div>PCG Gamma Ray</div> <div>PGRC</div> <div>0300</div>												
<div>Avg Rate of Penetration</div> <div>ROPA</div> <div>1K0</div> <div>feet per hr</div>		Depth ft	Depth	Inc.	Azi.	TVD	V.S.					
		3000										
		3054'						11.65°	170.37°	3028.85'	57.54'	
		3050										
		3100										



3149'

9.90°

168.18°

3122.17'

64.90'

3150

3200

3244'

11.72°

166.95°

3215.48'

72.80'

3250

3300

3350

3400

3450

3529'

13.46°

182.05°

3493.69'

92.67'

3500

3550

3624'

14.16°

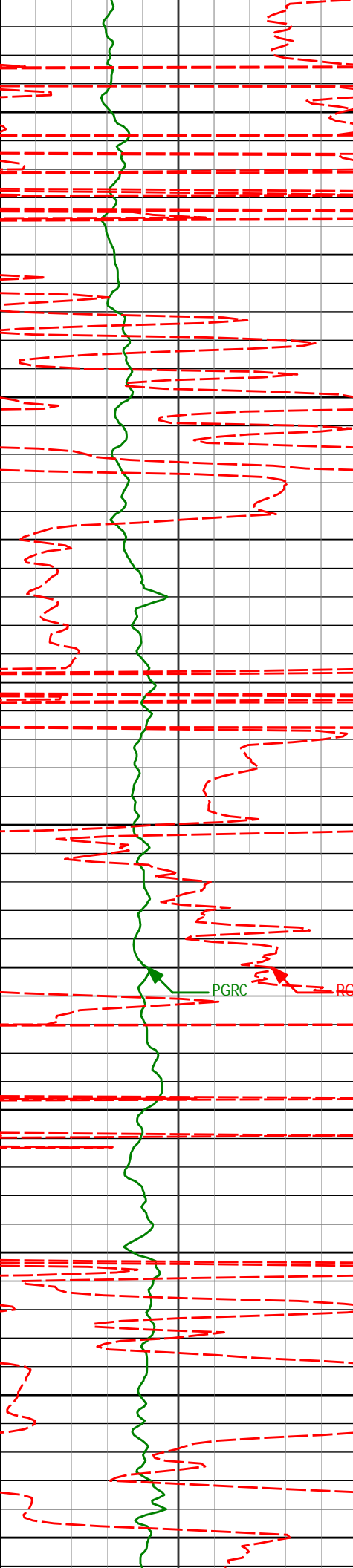
176.38°

3585.95'

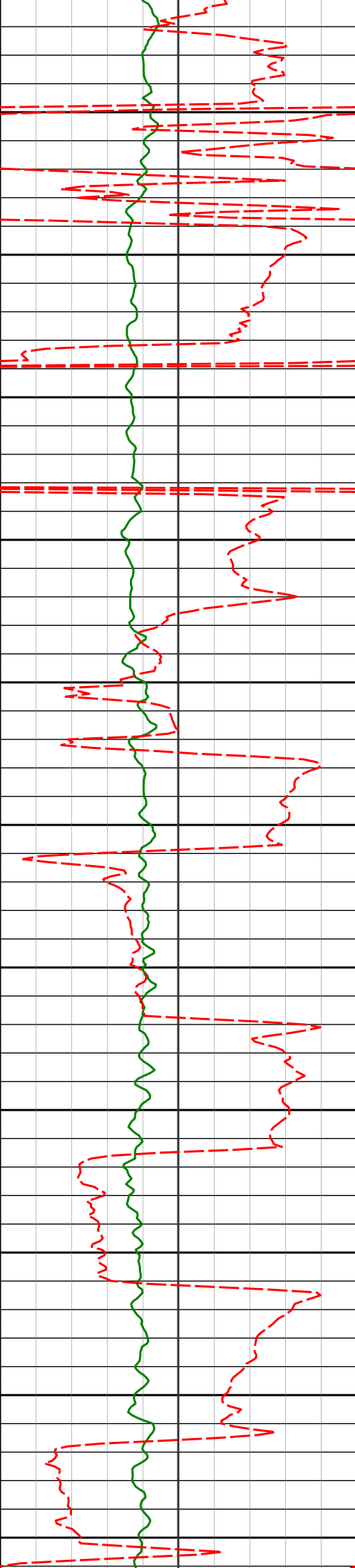
98.42'

3600

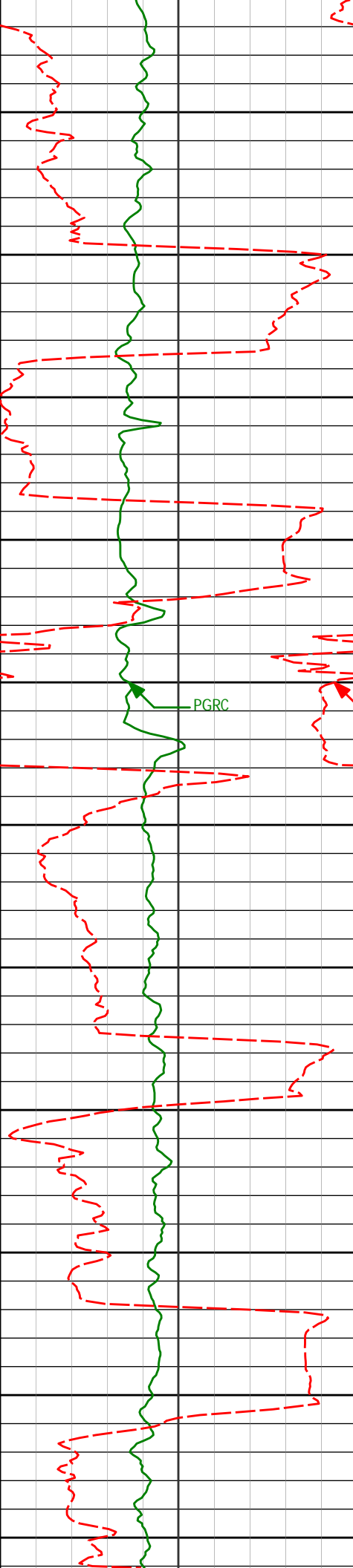
3650



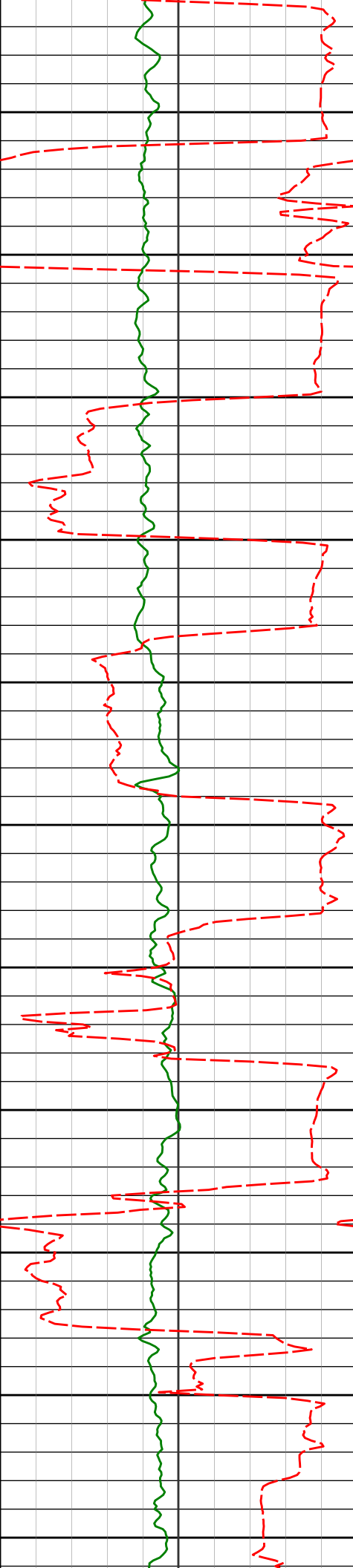
3719'	14.43°	178.29°	3678.01'	105.08'
3700				
3750				
3814'	15.90°	179.40°	3769.70'	111.50'
3800				
3850				
3909'	16.55°	176.63°	3860.91'	118.75'
3900				
3950				
4004'	13.90°	172.76°	3952.57'	126.86'
4000				
4099'	11.37°	171.03°	4045.27'	134.59'
4100				
4194'	8.81°	172.06°	4138.79'	140.92'
4150				
4200				



4289'	9.10°	175.06°	4232.63'	146.04'
4250				
4384'	10.74°	168.39°	4326.21'	152.26'
4350				
4479'	11.04°	170.29°	4419.50'	159.70'
4450				
4574'	11.01°	172.77°	4512.75'	166.60'
4550				
4668'	11.39°	174.88°	4604.96'	172.84'
4650				
4763'	13.28°	178.34°	4697.76'	178.80'
4750				

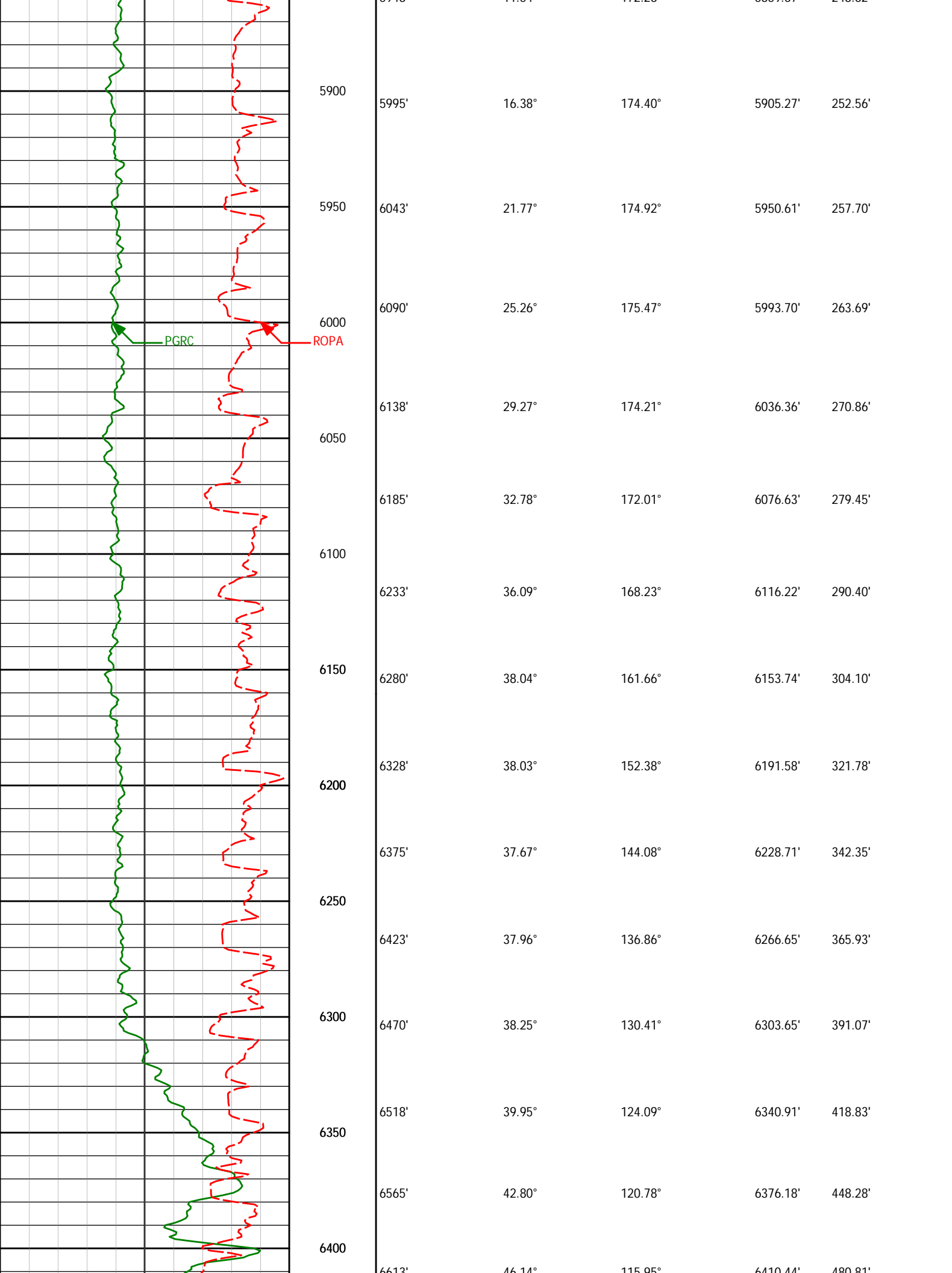


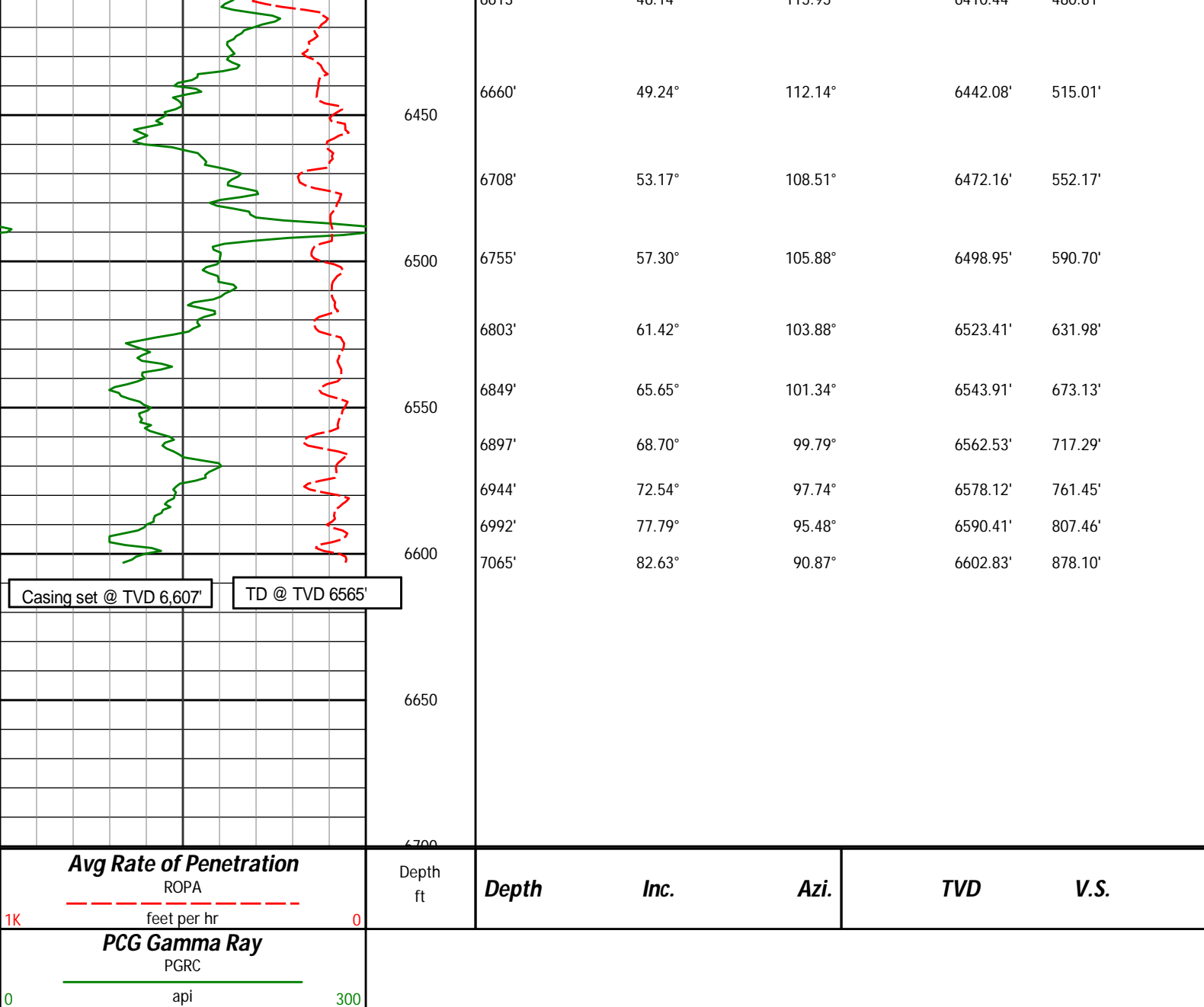
4800	4858'	11.80°	176.83°	4790.49'	184.56'
4850					
4900	4953'	11.87°	180.28°	4883.47'	189.69'
4950					
5000	5048'	12.96°	176.19°	4976.25'	195.21'
5050					
5100	5143'	10.70°	174.37°	5069.23'	201.38'
5150					
5200	5238'	8.61°	175.11°	5162.88'	206.61'
5250					
5300	5333'	9.27°	180.67°	5256.73'	210.64'



5350	5428'	10.71°	177.45°	5350.28'	214.87'
5400					
5450	5523'	12.25°	173.44°	5443.38'	220.87'
5500					
5550	5618'	12.12°	171.56°	5536.24'	228.17'
5600					
5650	5713'	11.37°	176.41°	5629.25'	234.75'
5700					
5750	5828'	11.60°	178.09°	5741.95'	241.29'
5800					
5850	5900'	10.82°	175.19°	5812.58'	245.41'
	5948'	11.54°	172.28°	5859.67'	248.62'

Run 200





HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch USX AE20-62-1HN
Wattenburg
Weld Colorado
USA
CA-XX-0900697472

Surveys are tied into three non-Halliburton surveys at MD 370', 647', and 970' taken with a gyro while drilling surface hole.

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
370.00	0.20	293.64	370.00	0.26 N	0.59 W	-0.64	0.05
647.00	0.50	12.64	646.99	1.63 N	0.77 W	-1.14	0.18
970.00	0.20	33.74	969.99	3.48 N	0.15 W	-0.98	0.10
1024.00	0.22	178.24	1023.99	3.45 N	0.09 W	-0.92	0.74
1086.00	0.46	73.26	1085.99	3.40 N	0.15 E	-0.67	0.90
1179.00	0.52	137.95	1178.98	3.20 N	0.79 E	0.00	0.57
1271.00	0.19	351.75	1270.98	3.04 N	1.05 E	0.29	0.75
1364.00	0.04	114.18	1363.98	3.18 N	1.05 E	0.26	0.23

1504.00	0.04	114.18	1503.98	3.18 N	1.03 E	0.28	0.23
1457.00	0.28	294.91	1456.98	3.26 N	0.88 E	0.07	0.34
1550.00	2.23	217.29	1549.96	1.92 N	0.42 W	-0.87	2.35
1641.00	3.65	211.35	1640.84	1.97 S	3.00 W	-2.45	1.59
1733.00	5.11	193.24	1732.57	8.46 S	5.47 W	-3.29	2.17
1826.00	7.15	184.72	1825.04	18.26 S	6.89 W	-2.32	2.40
1918.00	8.02	176.01	1916.23	30.37 S	6.92 W	0.55	1.56
2012.00	10.25	181.73	2009.04	45.27 S	6.71 W	4.31	2.56
2105.00	12.41	191.91	2100.23	63.32 S	9.02 W	6.38	3.16
2295.00	11.95	190.58	2285.95	102.63 S	16.85 W	8.19	0.28
2390.00	11.80	185.39	2378.92	121.97 S	19.57 W	10.18	1.13
2485.00	13.11	172.64	2471.70	142.33 S	19.10 W	15.50	3.20
2580.00	12.76	173.67	2564.29	163.45 S	16.56 W	23.02	0.44
2674.00	11.03	171.71	2656.27	182.66 S	14.12 W	29.98	1.89
2864.00	10.71	172.39	2842.86	218.15 S	9.16 W	43.29	0.18
2959.00	12.40	173.16	2935.93	237.03 S	6.78 W	50.12	1.79
3054.00	11.65	170.37	3028.85	256.61 S	3.96 W	57.54	1.00
3149.00	9.90	168.18	3122.17	274.06 S	0.68 W	64.90	1.89
3244.00	11.72	166.95	3215.48	291.46 S	3.17 E	72.80	1.93
3529.00	13.46	182.05	3493.69	352.83 S	8.52 E	92.67	1.30
3624.00	14.16	176.38	3585.95	375.47 S	8.86 E	98.42	1.60
3719.00	14.43	178.29	3678.01	398.90 S	9.95 E	105.08	0.57
3814.00	15.90	179.40	3769.70	423.75 S	10.44 E	111.50	1.58
3909.00	16.55	176.63	3860.91	450.27 S	11.37 E	118.75	1.06
4004.00	13.90	172.76	3952.57	475.10 S	13.60 E	126.86	2.99
4099.00	11.37	171.03	4045.27	495.67 S	16.50 E	134.59	2.69
4194.00	8.81	172.06	4138.79	512.13 S	18.97 E	140.92	2.70
4289.00	9.10	175.06	4232.63	526.82 S	20.62 E	146.04	0.58
4384.00	10.74	168.39	4326.21	542.98 S	23.05 E	152.26	2.11
4479.00	11.04	170.29	4419.50	560.61 S	26.36 E	159.70	0.49
4574.00	11.01	172.77	4512.75	578.58 S	29.04 E	166.60	0.50
4668.00	11.39	174.88	4604.96	596.73 S	30.99 E	172.84	0.59
4763.00	13.28	178.34	4697.76	616.98 S	32.15 E	178.80	2.14
4858.00	11.80	176.83	4790.49	637.59 S	33.00 E	184.56	1.60
4953.00	11.87	180.28	4883.47	657.06 S	33.49 E	189.69	0.75
5048.00	12.96	176.19	4976.25	677.46 S	34.15 E	195.21	1.47
5143.00	10.70	174.37	5069.23	696.86 S	35.72 E	201.38	2.41
5238.00	8.61	175.11	5162.88	712.73 S	37.20 E	206.61	2.20
5333.00	9.27	180.67	5256.73	727.47 S	37.71 E	210.64	1.14
5428.00	10.71	177.45	5350.28	743.94 S	38.02 E	214.87	1.63
5523.00	12.25	173.44	5443.38	762.77 S	39.56 E	220.87	1.82
5618.00	12.12	171.56	5536.24	782.65 S	42.18 E	228.17	0.44
5713.00	11.37	176.41	5629.25	801.86 S	44.23 E	234.75	1.30
5828.00	11.60	178.09	5741.95	824.73 S	45.32 E	241.29	0.35
5900.00	10.82	175.19	5812.58	838.70 S	46.13 E	245.41	1.34
5948.00	11.54	172.28	5859.67	847.94 S	47.15 E	248.62	1.91
5995.00	16.38	174.40	5905.27	859.20 S	48.43 E	252.56	10.35
6043.00	21.77	174.92	5950.61	874.82 S	49.88 E	257.70	11.23
6090.00	25.26	175.47	5993.70	893.50 S	51.44 E	263.69	7.44
6138.00	29.27	174.21	6036.36	915.40 S	53.44 E	270.86	8.44
6185.00	32.78	172.01	6076.63	939.43 S	56.37 E	279.45	7.85
6233.00	36.09	168.23	6116.22	966.15 S	61.06 E	290.40	8.21
6280.00	38.04	161.66	6153.74	993.46 S	68.44 E	304.10	9.39
6328.00	38.03	152.38	6191.58	1020.62 S	79.96 E	321.78	11.90
6375.00	37.67	144.08	6228.71	1045.10 S	95.11 E	342.35	10.86
6423.00	37.96	136.86	6266.65	1067.76 S	113.82 E	365.93	9.24
6470.00	38.25	130.41	6303.65	1087.75 S	134.79 E	391.07	8.49
6518.00	39.95	124.09	6340.91	1106.03 S	158.87 E	418.83	9.02
6565.00	42.80	120.78	6376.18	1122.66 S	185.10 E	448.28	7.64
6613.00	46.14	115.95	6410.44	1138.59 S	214.68 E	480.81	9.90
6660.00	49.24	112.14	6442.08	1152.71 S	246.42 E	515.01	8.91
6708.00	53.17	108.51	6472.16	1165.67 S	281.50 E	552.17	10.09
6755.00	57.30	105.88	6498.95	1177.06 S	318.37 E	590.70	9.92
6803.00	61.42	103.88	6523.41	1187.65 S	358.28 E	631.98	9.30
6849.00	65.65	101.34	6543.91	1196.62 S	398.46 E	673.13	10.44
6897.00	68.70	99.79	6562.53	1204.72 S	441.94 E	717.29	7.02
6944.00	72.54	97.74	6578.12	1211.47 S	485.75 E	761.45	9.15
6992.00	77.79	95.48	6590.41	1216.80 S	531.82 E	807.46	11.85
7065.00	82.63	90.87	6602.83	1220.76 S	603.61 E	878.10	9.09
7161.00	86.80	87.96	6611.67	1219.77 S	699.17 E	970.65	5.29
7253.00	88.92	89.82	6615.11	1217.99 S	791.08 E	1059.47	3.06
7346.00	89.35	90.33	6616.51	1218.11 S	884.06 E	1149.78	0.72
7439.00	90.96	91.56	6616.26	1219.65 S	977.05 E	1240.43	2.18
7531.00	89.44	88.40	6615.94	1219.62 S	1069.03 E	1329.74	3.81
7624.00	91.02	89.29	6615.56	1217.74 S	1162.01 E	1419.57	1.95

7718.00	89.44	86.38	6615.19	1214.19 S	1255.93 E	1509.91	3.52
7810.00	91.11	87.37	6614.74	1209.18 S	1347.78 E	1597.90	2.11
7902.00	89.63	86.08	6614.15	1203.92 S	1439.63 E	1685.82	2.13
7993.00	90.62	87.00	6613.95	1198.43 S	1530.46 E	1772.70	1.49
8086.00	90.34	85.79	6613.17	1192.58 S	1623.27 E	1861.42	1.34
8179.00	90.12	87.04	6612.80	1186.77 S	1716.09 E	1950.15	1.36
8272.00	91.60	87.70	6611.40	1182.50 S	1808.97 E	2039.32	1.74
8366.00	90.52	85.84	6609.66	1177.20 S	1902.80 E	2129.16	2.29
8461.00	89.78	85.35	6609.42	1169.91 S	1997.52 E	2219.38	0.93
8556.00	91.33	88.65	6608.50	1164.94 S	2092.37 E	2310.29	3.84
8650.00	93.27	89.21	6604.72	1163.18 S	2186.27 E	2401.05	2.15
8745.00	93.30	89.02	6599.28	1161.72 S	2281.11 E	2492.78	0.20
8840.00	92.16	89.32	6594.75	1160.34 S	2375.99 E	2584.57	1.24
8935.00	90.89	88.22	6592.23	1158.30 S	2470.93 E	2676.27	1.77
9030.00	92.75	88.65	6589.21	1155.71 S	2565.84 E	2767.81	2.01
9125.00	92.07	88.78	6585.21	1153.58 S	2660.73 E	2859.43	0.73
9219.00	88.86	88.22	6584.45	1151.12 S	2754.68 E	2950.07	3.47
9314.00	89.07	90.38	6586.17	1149.96 S	2849.66 E	3042.01	2.28
9409.00	90.37	89.79	6586.63	1150.10 S	2944.65 E	3134.28	1.50
9504.00	89.01	89.89	6587.15	1149.84 S	3039.65 E	3226.45	1.44
9599.00	89.54	88.80	6588.35	1148.75 S	3134.63 E	3318.42	1.28
9694.00	89.94	88.62	6588.78	1146.61 S	3229.61 E	3410.13	0.46
9789.00	90.28	87.90	6588.60	1143.73 S	3324.56 E	3501.63	0.84
9884.00	90.34	87.83	6588.08	1140.19 S	3419.49 E	3592.96	0.10
9979.00	90.37	87.27	6587.49	1136.13 S	3514.41 E	3684.15	0.59
10074.00	90.62	86.19	6586.67	1130.71 S	3609.25 E	3774.94	1.17
10169.00	91.45	87.44	6584.96	1125.43 S	3704.08 E	3865.76	1.58
10264.00	92.50	88.67	6581.68	1122.21 S	3798.97 E	3957.12	1.70
10359.00	91.88	89.09	6578.05	1120.35 S	3893.88 E	4048.83	0.79
10453.00	91.64	90.25	6575.17	1119.81 S	3987.83 E	4139.93	1.26
10548.00	88.27	88.15	6575.24	1118.49 S	4082.80 E	4231.82	4.18
10643.00	88.80	88.82	6577.67	1115.97 S	4177.74 E	4323.40	0.90
10738.00	90.65	88.52	6578.13	1113.77 S	4272.71 E	4415.09	1.97
10833.00	91.94	88.24	6575.98	1111.09 S	4367.64 E	4506.62	1.39
10940.00	94.32	87.14	6570.14	1106.78 S	4474.39 E	4609.24	2.45
11002.00	94.32	87.14	6565.47	1103.70 S	4536.13 E	4668.46	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 103.84 DEGREES (GRID)
A TOTAL CORRECTION OF 7.64 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11002.00 FEET
IS 4668.47 FEET ALONG 103.68 DEGREES (GRID)**