

**Natural Gamma Ray
Rate Of Penetration**



1 : 600

County	: Barber
Field	: Arrowhead
Location	: Lat: 37° 2' 5.26" North Long: 98° 24' 44.15" West
Well	: Schupbach 3510 #4-1H
Company	: Shell Exploration and Productio
Rig	: Nabors 180
LOCATION	Company : Shell Exploration and Productio Rig : Nabors 180 Well : Schupbach 3510 #4-1H Field : Arrowhead County : Barber API Number : 15007238530100
Latitude	: 37° 2' 5.26" North
Longitude	: 98° 24' 44.15" West
UTM Easting	= 2,025,611.78 ft
UTM Northing	= 134,054.97 ft
Other Services	Directional Services

Permanent Datum	: Ground Level	Elevation	: 1309.00 ft
Log Measured From	: Drill Floor	23.80 ft	Above Permanent Datum
Drilling Measured From	: Drill Floor	TVD LOG	
Elev.	KB	N/A	
	DF	1332.80 ft	
	GL	1309.00 ft	
	WD	N/A	

Depth Logged	: 83.00 ft	To	4,794.26 ft
Date Logged	: 17-Aug-12	To	20-Sep-12
Total Depth MD	: 9,880.00 ft	TVD	: 4,794.26 ft
Spud Date	: 18-Aug-12	Plot Type	: Final
		Plot Date	: 20-Sep-12
Unit No.	: PP#40	Job No.	: OK-XX-0009504797

Run No.	Borehole Record (TVD)		Run No.	Borehole Record (TVD)	
	Size	From		Size	From
0100	12.250 in	83.00 ft			
0200	8.750 in	797.58 ft			
0300	8.750 in	4,314.44 ft			
0400	6.125 in	4,814.28 ft			
0500	6.125 in	4,804.14 ft			
0600	6.125 in	4,803.27 ft			
0700	6.125 in	4,794.26 ft			

WELL INFORMATION

MWD Run Number	200	300	400	500	600
Date run completed	05-Sep-12	08-Sep-12	12-Sep-12	14-Sep-12	16-Sep-12
Rig Bit Number	0200	0300	0400	0500	0600
Bit Size (in)	8.750	8.750	6.125	6.125	6.125
Tool Nominal OD (in)	8.000	6.750	4.750	4.750	4.750
Log Start Depth (TVD, ft)	797.58	4,314.44	4,814.28	4,804.14	4,803.27
Log End Depth (TVD, ft)	4,314.44	4,814.28	4,804.14	4,803.27	4,794.76
Drill or Wipe	Drill	Drill	Drill	Drill	Drill
Drill/Wipe Start Date and Time	02-Sep-12 09:13	05-Sep-12 13:11	10-Sep-12 04:45	12-Sep-12 08:44	14-Sep-12 01:35
Drill/Wipe End Date and Time	05-Sep-12 06:00	08-Sep-12 11:32	12-Sep-12 08:31	14-Sep-12 09:44	16-Sep-12 12:30
Min Inc (deg) @ Depth (TVD, ft)	.03 @ 2,880.22	6.89 @ 4,270.01	89.60 @ 4,804.02	89.38 @ 4,803.03	89.66 @ 4,795.59
Max Inc (deg) @ Depth (TVD, ft)	4.59 @ 801.57	86.28 @ 4,811.81	91.67 @ 4,806.15	90.62 @ 4,803.24	91.48 @ 4,797.72
Bit TFA(in2) / Bit Type	.66 / PDC	.45 / PDC	.55 / PDC	.55 / PDC	.52 / PDC
Flow Rate (gpm)	550.00	400.00	297.00	297.00	299.00
Max AV (fpm) / CV (fpm) @ MWD	286.0 / 322.0	332.0 / 420.0	479.0 / 520.0	484.0 / 520.0	484.0 / 520.0
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel
Density (ppg) / Viscosity (spqt)	9.10 / 55.00	9.10 / 60.00	8.40 / 27.00	8.40 / 27.00	8.40 / 28.00
Filtrate CL (ppm)	22,000.00	20,500.00	2,600.00	2,500.00	28,000.00
pH / Fluid Loss (mptm)	11.20 / 0	11.20 / 0	11.20 / 5	11.20 / 0	11.20 / 5
PV (cP) / YP (lbf2)	18 / 18.00	25 / 18.00	1 / 1.00	1 / 1.00	1 / 1.00
% Solids / % Sand	4.50 / 1.00	7.90 / 1.00	1.00 / 0.75	1.00 / 1.00	1.00 / 0.75
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	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	N/A @ N/A	N/A @ N/A
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	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	N/A @ N/A	N/A @ N/A

Max Tool Temp (degF) / Source	144.54 / PCM	139.96 / PCM	133.20 / PCM	133.20 / PCM	130.96 / PCM
Rm @ Max Tool Temp (degF)	N/A @ 144.54	N/A @ 139.96	N/A @ 133.20	N/A @ 133.20	N/A @ 130.96
Lead MWD Engineer	Fred Martin	Fred Martin	Fred Martin	Fred Martin	Fred Martin
Customer Representative	Jack Everett	Jack Everett	John Dyer	Jack Everett	Jack Everett

SENSOR INFORMATION

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC	PCDC	PCDC
Distance From Bit (ft)	60.16	54.22	50.29	51.20	51.24
Software Version	6.21	6.21	6.21	6.21	6.21
Sub Serial Number	11149805	11149805	11130241	11130241	11130421
Sonde Serial Number	400471	400261	400261	400471	400261
Sensor ID Number	N/A	N/A	N/A	N/A	N/A
Toolface Offset (deg)	39.40	358.40	234.52	101.36	38.01

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG	PCG	PCG
Distance From Bit (ft)	55.06	49.12	45.19	46.10	46.14
Recorded Sample Period (sec)	20	15	15	15	15
Software Version	8.15	8.15	8.15	8.15	8.15
Sub Serial Number	11149805	11149805	11130241	11130241	11130241
Insert/Sonde Serial Number	11293316	11293340	11293340	11293316	11293340

Pulser Controller Sensor Information

Tool Type	PCM	PCM	PCM	PCM	PCM
Software Version	5.28	5.28	5.28	5.28	5.28
PIC Software Version	1.40	1.40	1.40	1.40	1.40
Sub/HOC Serial Number	11149805	11149805	11130241	11130241	11130241
Insert/Probe/Module SN	11400905	10868851	10868851	11400905	10868851
Battery Serial Number	N/A	N/A	N/A	N/A	N/A
Valve Insert SN	N/A	N/A	N/A	N/A	N/A
DC Insert Serial Number	N/A	N/A	N/A	N/A	N/A
Choke Size (32nd)	N/A	N/A	N/A	N/A	N/A
Driver Current (amps)	N/A	N/A	N/A	N/A	N/A
Driver SMI Current (amps)	N/A	N/A	N/A	N/A	N/A
Boot Strap Version	4,130.00	4,130.00	4,130.00	4,130.00	4,130.00

WELL INFORMATION

MWD Run Number	700			
Date run completed	20-Sep-12			
Rig Bit Number	0700			
Bit Size (in)	6.125			
Tool Nominal OD (in)	4.750			
Log Start Depth (TVD, ft)	4,794.76			
Log End Depth (TVD, ft)	4,794.26			
Drill or Wipe	Drill			
Drill/Wipe Start Date and Time	16-Sep-12 21:13			
Drill/Wipe End Date and Time	19-Sep-12 12:42			
Min Inc (deg) @ Depth (TVD, ft)	88.37 @ 4,798.20			
Max Inc (deg) @ Depth (TVD, ft)	91.97 @ 4,797.19			
Bit TFA(in2) / Bit Type	.64 / PDC			
Flow Rate (gpm)	300.00			
Max AV (fpm) / CV (fpm) @ MWD	490.0 / 498.0			
Fluid Type	Fresh Water Gel			
Density (ppg) / Viscosity (spqt)	8.40 / 30.00			

Filtrate CL (ppm)	2,700.00				
pH / Fluid Loss (mptm)	11.20 / 5				
PV (cP) / YP (lhf2)	1 / 2.00				
% Solids / % Sand	1.00 / 1.00				
% Oil / Oil:Water Ratio	N/A / N/A				
Rm @ Measured Temp (degF)	N/A @ N/A				
Rmf @ Measured Temp (degF)	N/A @ N/A				
Rmc @ Measured Temp (degF)	N/A @ N/A				
Max Tool Temp (degF) / Source	142.25 / PCM				
Rm @ Max Tool Temp (degF)	N/A @ 142.25				
Lead MWD Engineer	Fred Martin				
Customer Representative	John Dyer				

SENSOR INFORMATION

Directional Sensor Information

Tool Type	PCDC				
Distance From Bit (ft)	57.17				
Software Version	6.21				
Sub Serial Number	11130241				
Sonde Serial Number	400471				
Sensor ID Number	N/A				
Toolface Offset (deg)	248.19				

Gamma Ray Sensor Information

Tool Type	PCG				
Distance From Bit (ft)	52.07				
Recorded Sample Period (sec)	15				
Software Version	8.15				
Sub Serial Number	11130241				
Insert/Sonde Serial Number	11293316				

Pulser Controller Sensor Information

Tool Type	PCM				
Software Version	5.28				
PIC Software Version	1.40				
Sub/HOC Serial Number	11130241				
Insert/Probe/Module SN	11400905				
Battery Serial Number	N/A				
Valve Insert SN	N/A				
DC Insert Serial Number	N/A				
Choke Size (32nd)	N/A				
Driver Current (amps)	N/A				
Driver SMI Current (amps)	N/A				
Boot Strap Version	4,130.00				

REMARKS

1. All depths are calibrated to the driller's pipe tally and are measured from the rotary table.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.

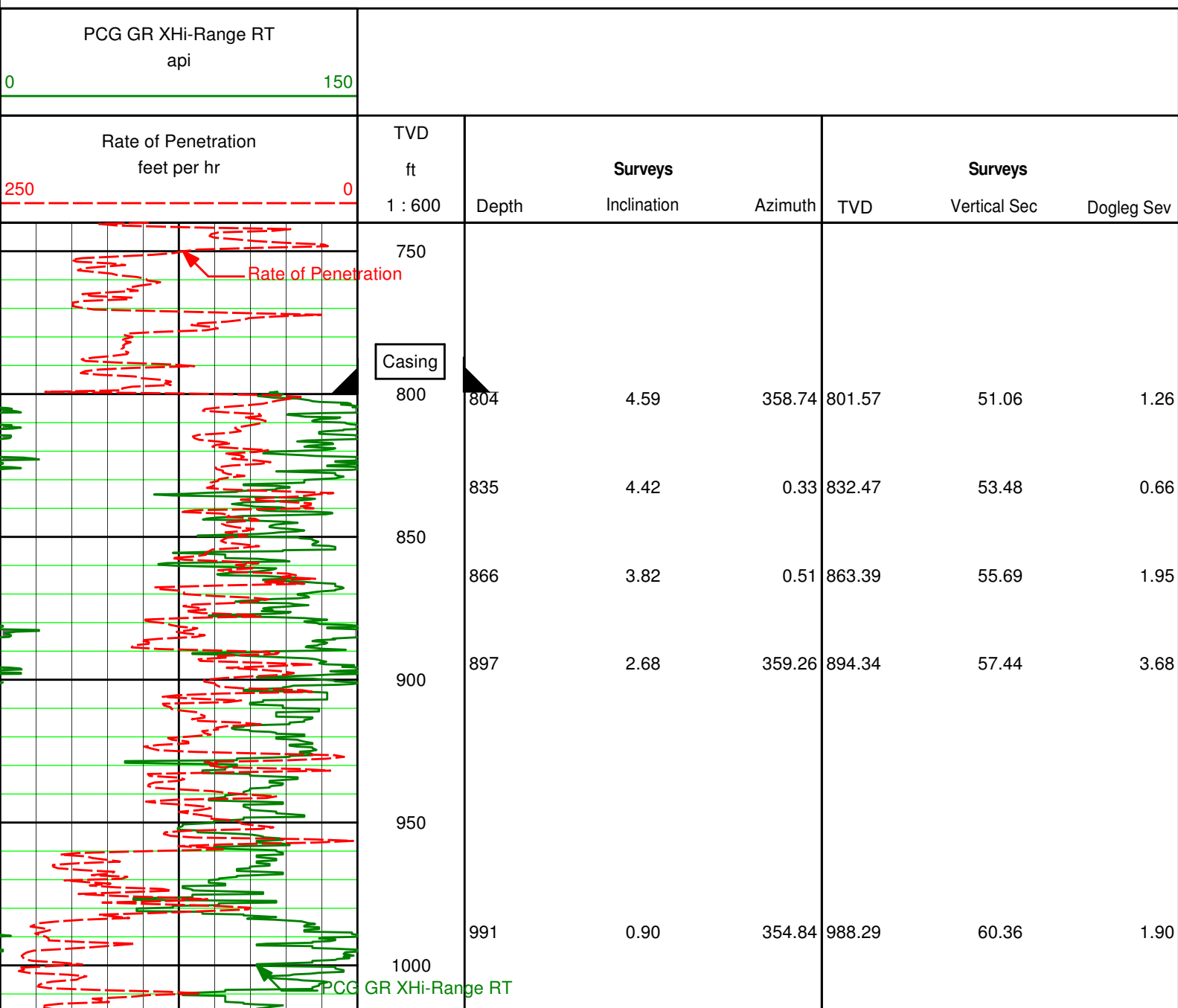
4. The following smoothing parameters have been applied to the data:

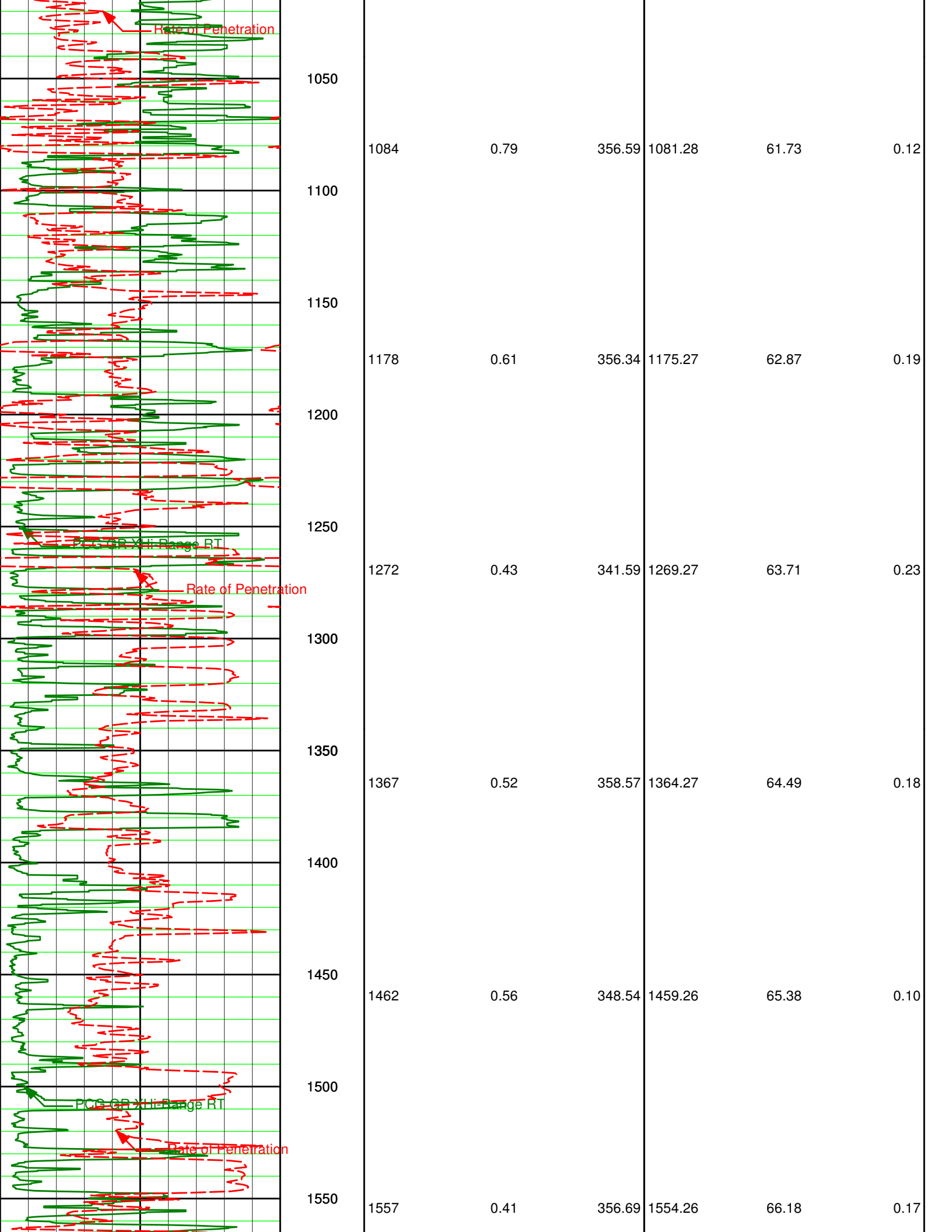
- ROP: 1.0 ft interval, 3.0 ft coercion distance.
- GAMMA: 0.5 ft interval, 0.6 ft coercion distance.

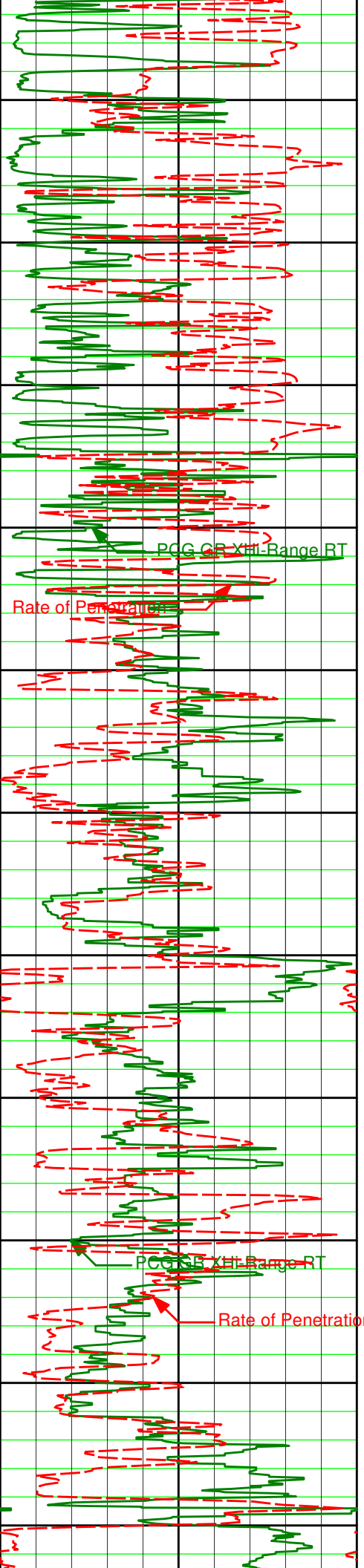
5. Run 100 was directional only.

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1600

1650

1700

1746

1800

1850

1900

1936

1950

2000

2050

2100

1746

0.53

354.07

1743.25

67.74

0.06

PCG CR XHI Range RT

Rate of Penetration

1936

0.56

342.18

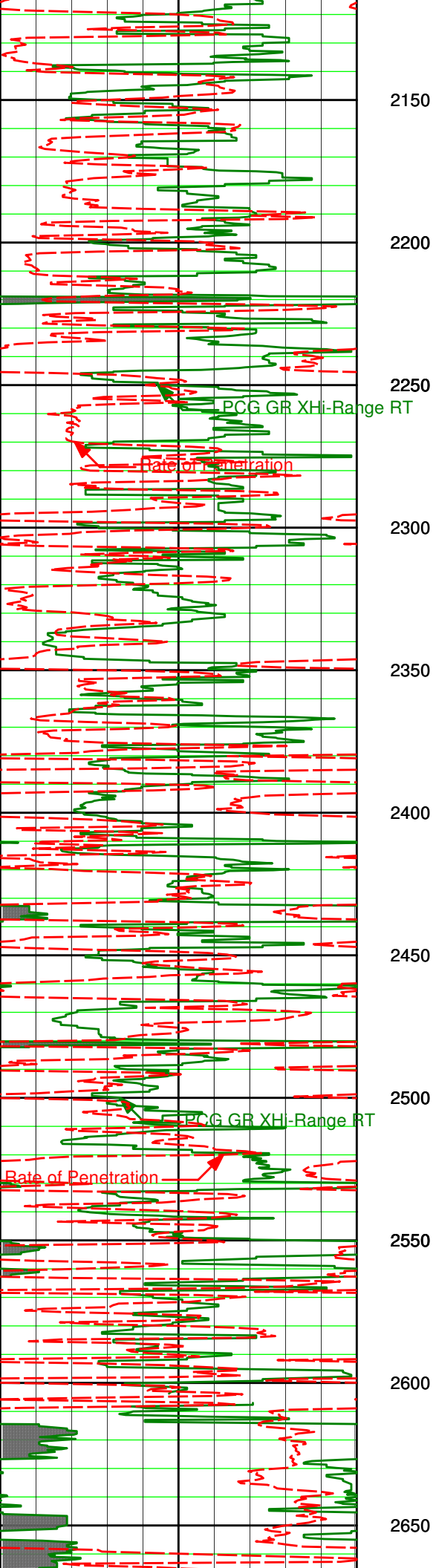
1933.25

69.53

0.06

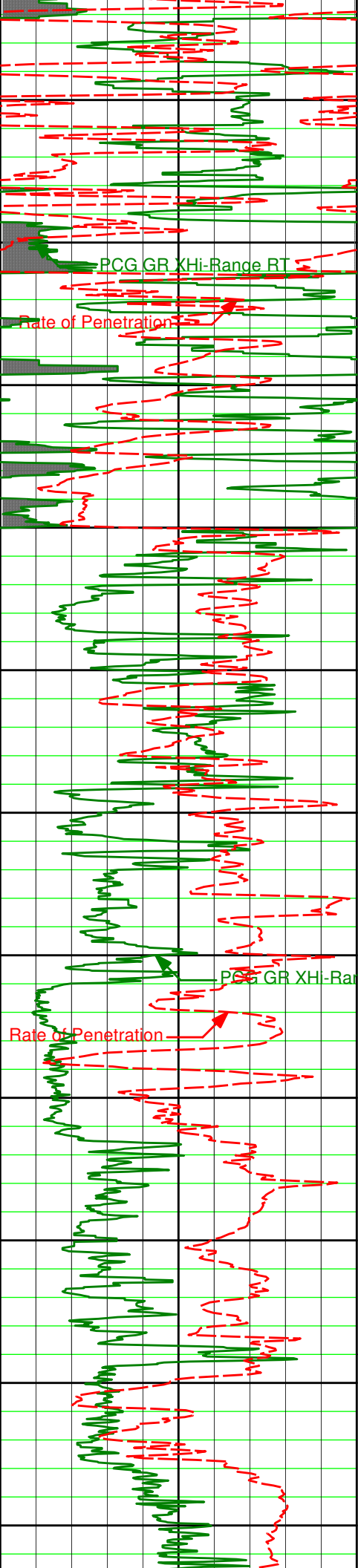
PCG CR XHI Range RT

Rate of Penetration

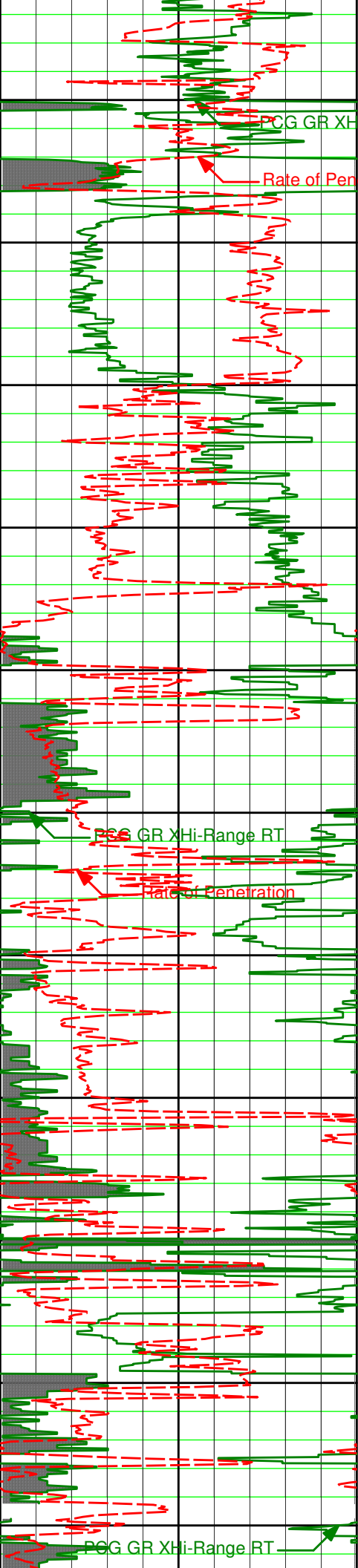


Depth (ft)	PCG GR XHi-Range RT	Rate of Penetration
2126	0.18	22.00
2150		
2200		
2250		
2300		
2315	0.65	313.71
2350		
2400		
2450		
2500	0.44	324.80
2505		
2550		
2600		
2650		

Depth (ft)	PCG GR XHi-Range RT	Rate of Penetration
2123.24	70.71	0.23
2312.24	71.79	0.32
2502.23	73.26	0.12



2694	0.34	334.23	2691.22	74.43	0.06
2700					
2750					
2800					
2850					
2883	0.03	108.38	2880.22	74.95	0.19
2900					
2950					
3000					
3073	0.67	349.08	3070.22	76.03	0.36
3100					
3150					
3200					



3250

PCG GR XHi-Range RT

Rate of Penetration

3300

3350

3400

3450

3500

PCG GR XHi-Range RT

Rate of Penetration

3550

3600

3650

3700

3750

PCG GR XHi-Range RT

3263

0.83

337.32

3260.20

78.46

0.12

3452

0.57

13.07

3449.19

80.66

0.26

3642

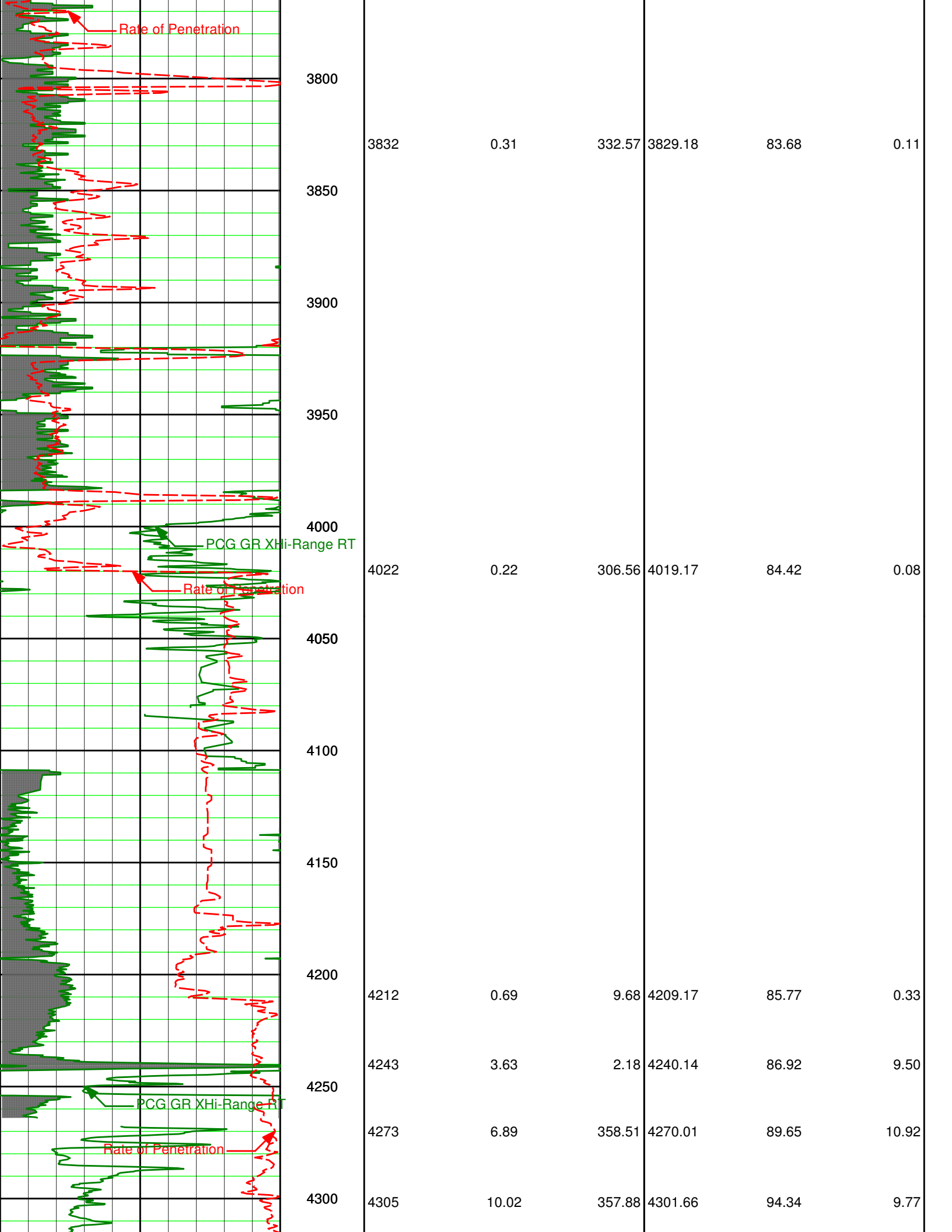
0.50

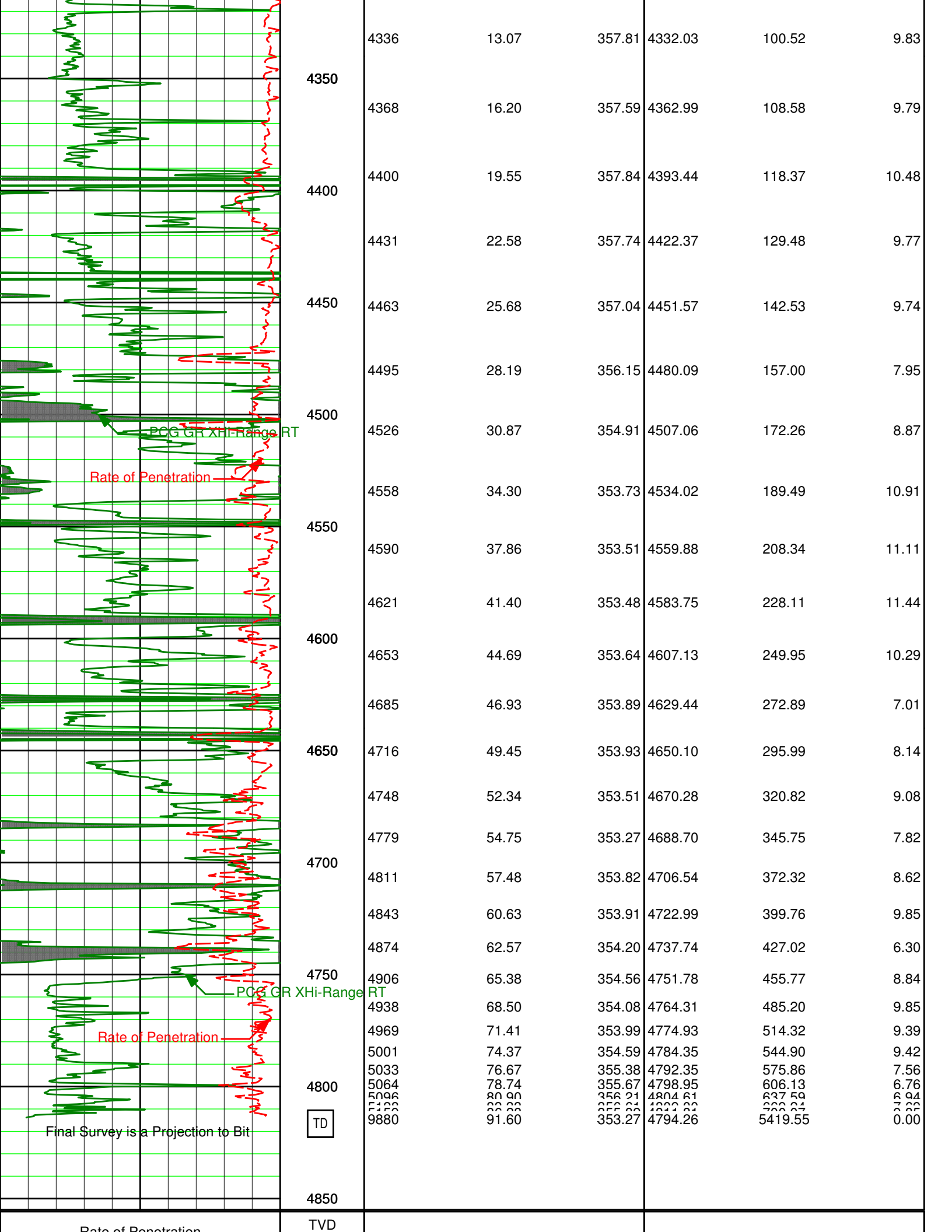
347.24

3639.18

82.37

0.13





Rate of Penetration feet per hr 250	ft 1 : 600	Surveys Depth	Surveys Inclination	Surveys Azimuth	TVD	Surveys Vertical Sec	Surveys Dogleg Sev
0							
PCG GR XHi-Range RT api							
0							



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Shell Exploration and Productio

Schubach 3510 #4-1H

Arrowhead

Barber KS

USA

OK-XX-0009504797

Surveys from 0' MD to 9,880' are provided by Halliburton Sperry Drilling Services.

Final Survey is a projection to the bit.

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
80.00	0.31	239.54	80.00	0.11 S	0.19 W	-0.09	0.39
142.00	0.51	111.31	142.00	0.29 S	0.07 W	-0.28	1.20
172.00	0.64	87.19	172.00	0.33 S	0.22 E	-0.36	0.92
202.00	0.86	43.88	201.99	0.16 S	0.54 E	-0.23	1.97
234.00	1.41	21.30	233.99	0.38 N	0.85 E	0.28	2.19
269.00	2.25	2.08	268.97	1.47 N	1.03 E	1.34	2.93
300.00	3.38	358.41	299.93	2.99 N	1.03 E	2.85	3.69
331.00	4.33	353.54	330.86	5.06 N	0.87 E	4.93	3.25
362.00	4.92	352.41	361.76	7.55 N	0.57 E	7.43	1.93
394.00	5.30	351.83	393.63	10.37 N	0.17 E	10.28	1.19
425.00	5.84	348.62	424.49	13.33 N	0.34 W	13.28	1.99
456.00	6.31	345.58	455.31	16.53 N	1.08 W	16.54	1.86
488.00	6.39	345.19	487.12	19.96 N	1.97 W	20.05	0.27
519.00	6.43	344.50	517.92	23.30 N	2.87 W	23.47	0.29
613.00	5.78	351.18	611.39	33.05 N	5.01 W	33.41	1.02
706.00	5.42	351.34	703.95	42.02 N	6.39 W	42.48	0.40
733.00	5.25	351.70	730.83	44.50 N	6.76 W	44.99	0.64
804.00	4.59	358.74	801.57	50.55 N	7.29 W	51.06	1.26
835.00	4.42	0.33	832.47	52.99 N	7.31 W	53.48	0.66
866.00	3.82	0.51	863.39	55.22 N	7.29 W	55.69	1.95
897.00	2.68	359.26	894.34	56.98 N	7.29 W	57.44	3.68
991.00	0.90	354.84	988.29	59.91 N	7.39 W	60.36	1.90
1084.00	0.79	356.59	1081.28	61.27 N	7.49 W	61.73	0.12
1178.00	0.61	356.34	1175.27	62.41 N	7.56 W	62.87	0.19
1272.00	0.43	341.59	1269.27	63.24 N	7.70 W	63.71	0.23
1367.00	0.52	358.57	1364.27	64.01 N	7.83 W	64.49	0.18
1462.00	0.56	348.54	1459.26	64.90 N	7.93 W	65.38	0.10
1557.00	0.41	356.69	1554.26	65.69 N	8.04 W	66.18	0.17
1746.00	0.53	354.07	1743.25	67.25 N	8.17 W	67.74	0.06
1936.00	0.56	342.18	1933.25	69.01 N	8.55 W	69.53	0.06
2126.00	0.18	22.00	2123.24	70.17 N	8.72 W	70.71	0.23
2315.00	0.65	313.71	2312.24	71.19 N	9.38 W	71.79	0.32
2505.00	0.44	324.80	2502.23	72.53 N	10.58 W	73.26	0.12
2694.00	0.34	334.23	2691.22	73.63 N	11.25 W	74.43	0.06
2883.00	0.03	108.38	2880.22	74.12 N	11.45 W	74.95	0.19
3073.00	0.67	349.08	3070.22	75.19 N	11.61 W	76.03	0.36
3263.00	0.83	337.32	3260.20	77.55 N	12.35 W	78.46	0.12
3452.00	0.57	13.07	3449.19	79.73 N	12.66 W	80.66	0.26
3642.00	0.50	347.24	3639.18	81.46 N	12.63 W	82.37	0.13
3832.00	0.31	332.57	3829.18	82.73 N	13.05 W	83.68	0.11
4022.00	0.22	306.56	4019.17	83.40 N	13.59 W	84.42	0.08
4212.00	0.69	9.68	4209.17	84.76 N	13.69 W	85.77	0.33

4243.00	3.63	2.18	4240.14	85.92 N	13.62 W	86.92	9.50
4273.00	6.89	358.51	4270.01	88.67 N	13.64 W	89.65	10.92
4305.00	10.02	357.88	4301.66	93.37 N	13.79 W	94.34	9.77
4336.00	13.07	357.81	4332.03	99.57 N	14.02 W	100.52	9.83
4368.00	16.20	357.59	4362.99	107.65 N	14.35 W	108.58	9.79
4400.00	19.55	357.84	4393.44	117.46 N	14.74 W	118.37	10.48
4431.00	22.58	357.74	4422.37	128.59 N	15.17 W	129.48	9.77
4463.00	25.68	357.04	4451.57	141.65 N	15.77 W	142.53	9.74
4495.00	28.19	356.15	4480.09	156.12 N	16.63 W	157.00	7.95
4526.00	30.87	354.91	4507.06	171.35 N	17.83 W	172.26	8.87
4558.00	34.30	353.73	4534.02	188.50 N	19.54 W	189.49	10.91
4590.00	37.86	353.51	4559.88	207.22 N	21.64 W	208.34	11.11
4621.00	41.40	353.48	4583.75	226.87 N	23.88 W	228.11	11.44
4653.00	44.69	353.64	4607.13	248.57 N	26.33 W	249.95	10.29
4685.00	46.93	353.89	4629.44	271.38 N	28.82 W	272.89	7.01
4716.00	49.45	353.93	4650.10	294.35 N	31.27 W	295.99	8.14
4748.00	52.34	353.51	4670.28	319.03 N	33.99 W	320.82	9.08
4779.00	54.75	353.27	4688.70	343.80 N	36.86 W	345.75	7.82
4811.00	57.48	353.82	4706.54	370.19 N	39.85 W	372.32	8.62
4843.00	60.63	353.91	4722.99	397.48 N	42.78 W	399.76	9.85
4874.00	62.57	354.20	4737.74	424.60 N	45.60 W	427.02	6.30
4906.00	65.38	354.56	4751.78	453.21 N	48.42 W	455.77	8.84
4938.00	68.50	354.08	4764.31	482.51 N	51.33 W	485.20	9.85
4969.00	71.41	353.99	4774.93	511.47 N	54.36 W	514.32	9.39
5001.00	74.37	354.59	4784.35	541.90 N	57.40 W	544.90	9.42
5033.00	76.67	355.38	4792.35	572.76 N	60.11 W	575.86	7.56
5064.00	78.74	355.67	4798.95	602.95 N	62.47 W	606.13	6.76
5096.00	80.90	356.21	4804.61	634.37 N	64.70 W	637.59	6.94
5128.00	83.33	356.61	4809.00	666.00 N	66.68 W	669.24	7.69
5159.00	86.28	355.82	4811.81	696.80 N	68.72 W	700.07	9.85
5254.00	90.40	355.94	4814.56	791.50 N	75.54 W	794.92	4.34
5347.00	91.11	355.95	4813.33	884.26 N	82.11 W	887.81	0.76
5440.00	89.97	355.54	4812.45	976.99 N	89.01 W	980.72	1.31
5535.00	91.11	354.32	4811.56	1071.61 N	97.40 W	1075.68	1.75
5630.00	91.87	354.62	4809.08	1166.14 N	106.55 W	1170.63	0.86
5725.00	91.67	352.83	4806.15	1260.52 N	116.92 W	1265.58	1.90
5820.00	90.22	352.98	4804.59	1354.78 N	128.65 W	1360.56	1.53
5915.00	90.43	352.89	4804.05	1449.06 N	140.34 W	1455.55	0.25
6010.00	89.60	352.40	4804.02	1543.27 N	152.50 W	1550.55	1.01
6105.00	89.97	353.24	4804.38	1637.53 N	164.37 W	1645.54	0.97
6201.00	90.40	353.93	4804.07	1732.93 N	175.09 W	1741.54	0.84
6295.00	90.62	353.60	4803.24	1826.37 N	185.30 W	1835.53	0.42
6390.00	90.12	352.08	4802.63	1920.62 N	197.15 W	1930.52	1.68
6485.00	89.38	351.51	4803.03	2014.65 N	210.70 W	2025.49	0.98
6579.00	90.06	352.26	4803.49	2107.70 N	223.97 W	2119.45	1.07
6674.00	90.06	351.84	4803.39	2201.79 N	237.12 W	2214.43	0.44
6769.00	90.55	351.68	4802.88	2295.81 N	250.73 W	2309.39	0.54
6864.00	91.08	351.75	4801.52	2389.80 N	264.42 W	2404.34	0.56
6959.00	90.83	352.13	4799.94	2483.85 N	277.74 W	2499.30	0.48
7054.00	90.18	353.88	4799.10	2578.14 N	289.32 W	2594.29	1.97
7149.00	90.00	354.35	4798.95	2672.64 N	299.06 W	2689.28	0.53
7244.00	91.48	354.82	4797.72	2767.20 N	308.02 W	2784.25	1.64
7339.00	90.71	355.07	4795.90	2861.81 N	316.39 W	2879.20	0.86
7434.00	89.66	354.37	4795.59	2956.41 N	325.13 W	2974.17	1.33
7529.00	90.03	354.66	4795.85	3050.97 N	334.21 W	3069.14	0.49
7624.00	90.77	354.35	4795.18	3145.53 N	343.31 W	3164.12	0.84
7719.00	90.06	353.63	4794.50	3240.01 N	353.26 W	3259.11	1.06
7814.00	89.29	353.29	4795.03	3334.39 N	364.08 W	3354.11	0.89
7909.00	89.91	353.65	4795.69	3428.77 N	374.88 W	3449.11	0.75
8004.00	89.35	353.01	4796.31	3523.12 N	385.91 W	3544.10	0.89
8099.00	88.37	354.33	4798.20	3617.52 N	396.38 W	3639.08	1.73
8193.00	90.43	353.91	4799.19	3711.02 N	406.01 W	3733.06	2.24
8288.00	91.97	354.78	4797.19	3805.53 N	415.37 W	3828.02	1.86
8383.00	91.39	354.13	4794.41	3900.04 N	424.55 W	3922.96	0.92
8478.00	89.91	352.30	4793.34	3994.36 N	435.77 W	4017.95	2.47
8573.00	90.09	352.10	4793.34	4088.49 N	448.66 W	4112.93	0.29
8667.00	90.37	351.88	4792.96	4181.57 N	461.75 W	4206.90	0.38
8762.00	90.40	351.60	4792.32	4275.58 N	475.40 W	4301.86	0.29
8857.00	90.12	351.74	4791.89	4369.58 N	489.17 W	4396.82	0.33
8952.00	89.10	351.17	4792.53	4463.52 N	503.29 W	4491.77	1.23
9047.00	89.97	352.05	4793.30	4557.50 N	517.15 W	4586.72	1.30

9142.00	90.74	352.25	4792.71	4651.60 N	530.12 W	4681.70	0.84
9237.00	91.29	354.06	4791.02	4745.91 N	541.45 W	4776.68	1.99
9332.00	87.96	352.72	4791.64	4840.26 N	552.39 W	4871.66	3.78
9427.00	88.70	353.01	4794.40	4934.48 N	564.19 W	4966.61	0.84
9522.00	89.51	353.51	4795.88	5028.81 N	575.34 W	5061.60	1.00
9617.00	89.63	353.37	4796.60	5123.19 N	586.19 W	5156.60	0.20
9712.00	89.57	352.48	4797.26	5217.46 N	597.88 W	5251.59	0.94
9807.00	91.60	353.27	4796.30	5311.72 N	609.66 W	5346.58	2.29
9880.00	91.60	353.27	4794.26	5384.18 N	618.21 W	5419.55	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 353.34 DEGREES (TRUE)
A TOTAL CORRECTION OF 4.88 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 9880.00 FEET
IS 5419.56 FEET ALONG 353.45 DEGREES (TRUE)**

Final Survey is a projection to the bit.