HALLIBURTON | Sperry Drilling

Natural Gamma Ray
Rate Of Penetration

Powered by INSITE™

1 : 240

County	: Barber
Field	: Arrowhead
Location	: Lat: 37° 2' 5.26" North Long: 98° 24' 44.15" West
Well	: Schubach 3510 #4-1H
Company	: Shell Exploration and Productio
Rig	: Nabors 180

Company : **Shell Exploration and Productio**
Rig : **Nabors 180**
Well : **Schubach 3510 #4-1H**
Field : **Arrowhead**
County : **Barber**
API Number : **15007238530100**

LOCATION
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**

Unit No. : **PP#40**
Job No. : **OK-XX-0009504797**
Plot Type : **Final**
Plot Date : **20-Sep-12**

Run No.	Borehole Record (TVD) Size	From	To
0100	12.250 in	83.00 ft	797.58 ft
0200	8.750 in	797.58 ft	4,314.44 ft
0300	8.750 in	4,314.44 ft	4,814.28 ft
0400	6.125 in	4,814.28 ft	4,804.14 ft
0500	6.125 in	4,804.14 ft	4,803.27 ft
0600	6.125 in	4,803.27 ft	4,794.76 ft
0700	6.125 in	4,794.76 ft	4,794.26 ft

Run No.	Borehole Record (TVD) Size	From	To

Casing Record (TVD)

Size	Weight	From	To
9.625 in	36.00 lbpf	SURFACE	745.77 ft
7.000 in	29.00 lbpf	SURFACE	4,813.46 ft

WELL INFORMATION

	200	300	400	500	600
MWD Run Number					
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 (lhf2)	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.

WARRANTY

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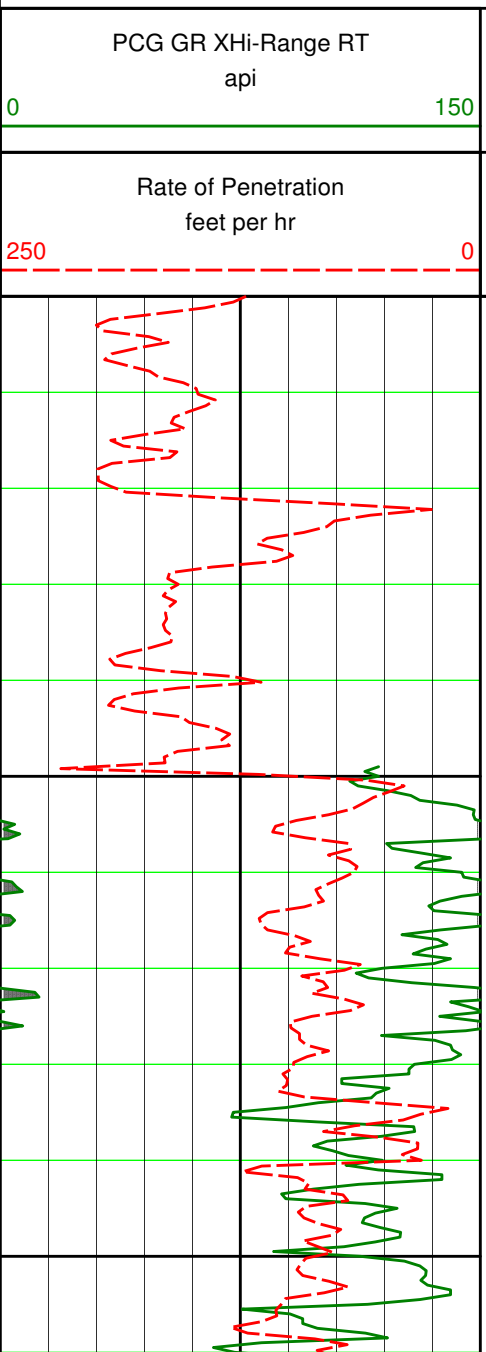
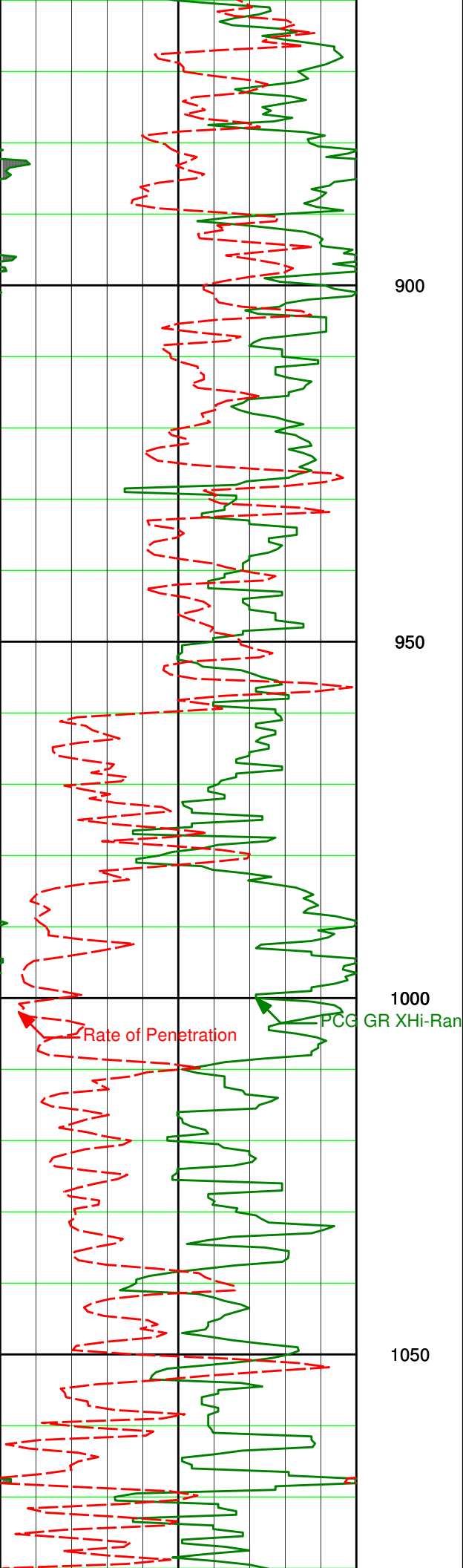
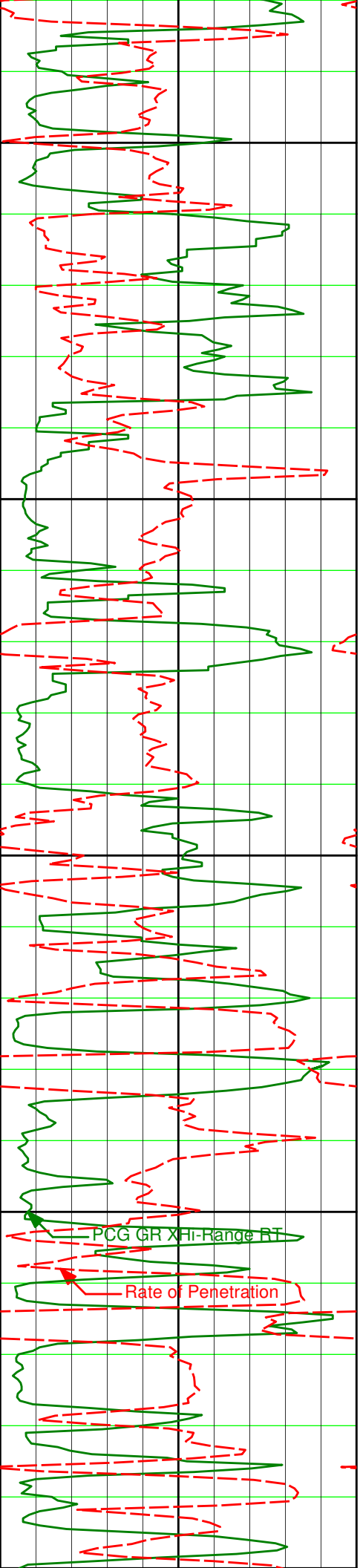


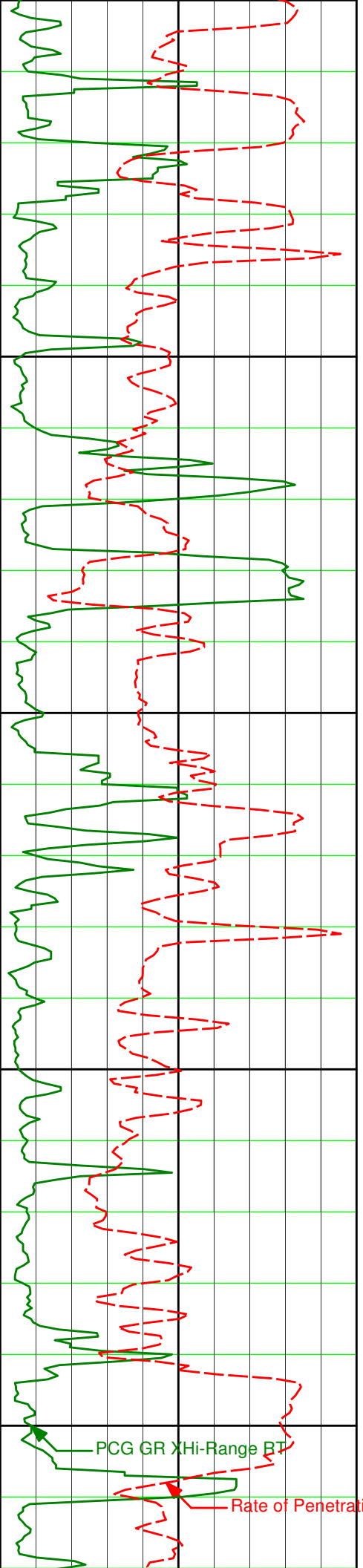
TVD ft 1 : 240	Surveys Depth	Inclination	Azimuth	Surveys TVD	Vertical Sec	Dogleg Sev
800	804	4.59	358.74	801.57	51.06	1.26
	835	4.42	0.33	832.47	53.48	0.66
850						



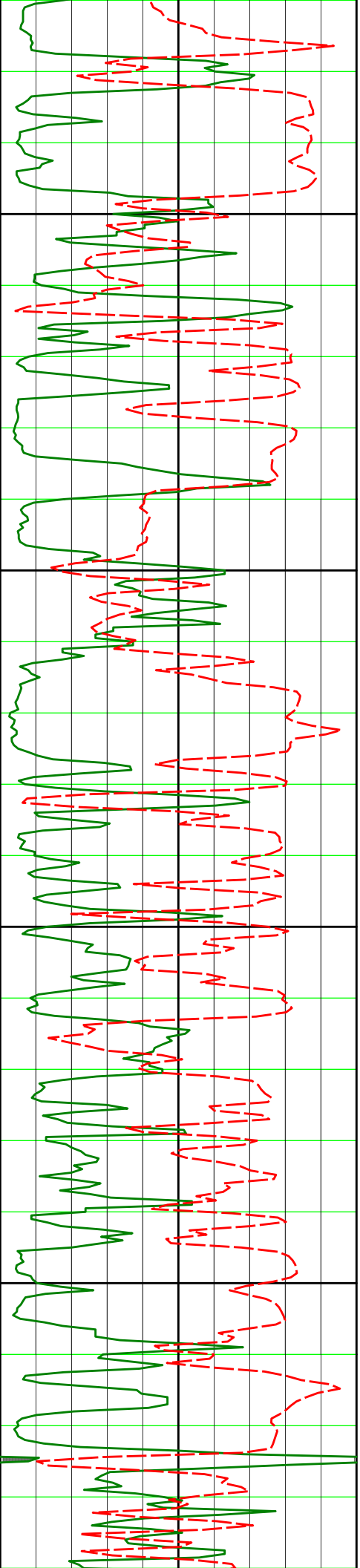
866	3.82	0.51	863.39	55.69	1.95
897	2.68	359.26	894.34	57.44	3.68
991	0.90	354.84	988.29	60.36	1.90



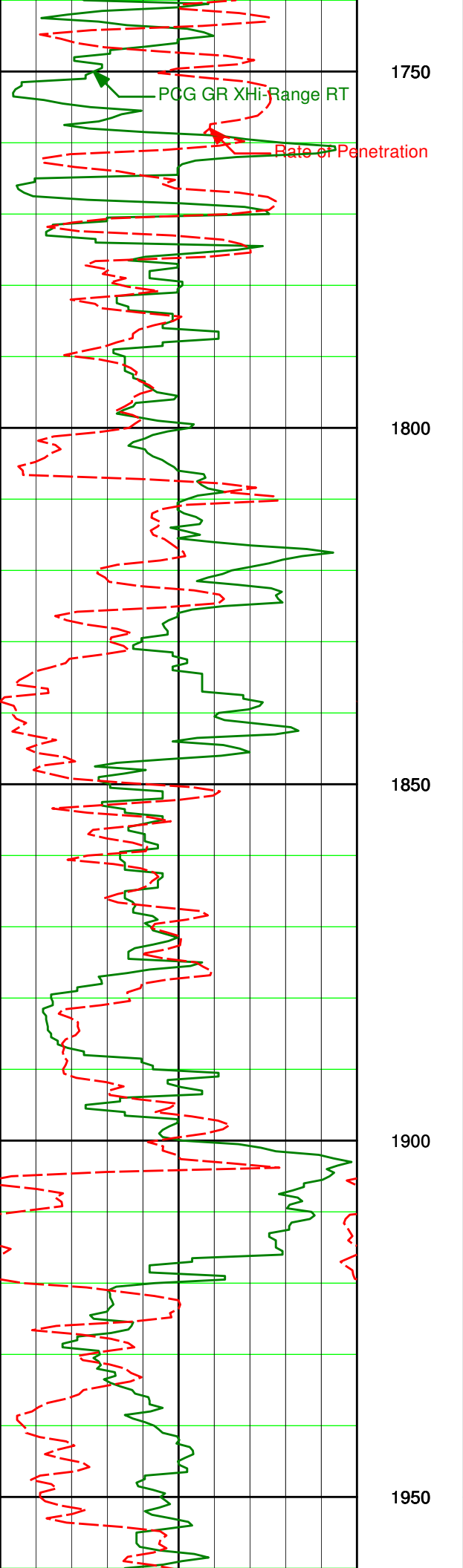
1084	0.79	356.59	1081.28	61.73	0.12
1100					
1150					
1178	0.61	356.34	1175.27	62.87	0.19
1200					
1250					
1272	0.43	341.59	1269.27	63.71	0.23



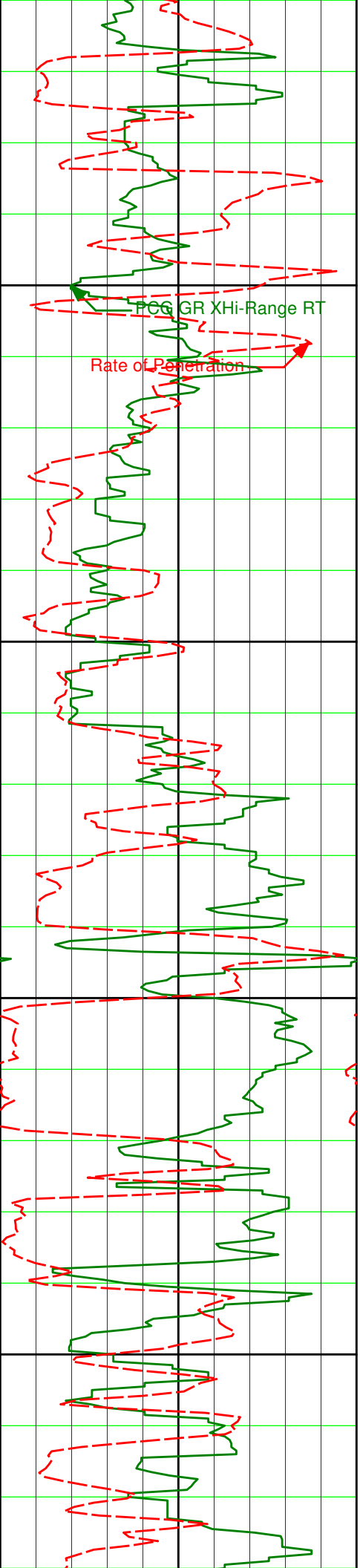
1300						
1350	1367	0.52	358.57	1364.27	64.49	0.18
1400						
1450	1462	0.56	348.54	1459.26	65.38	0.10
1500						



1557	0.41	356.69	1554.26	66.18	0.17



1746	0.53	354.07	1743.25	67.74	0.06
1936	0.56	342.18	1933.25	69.53	0.06



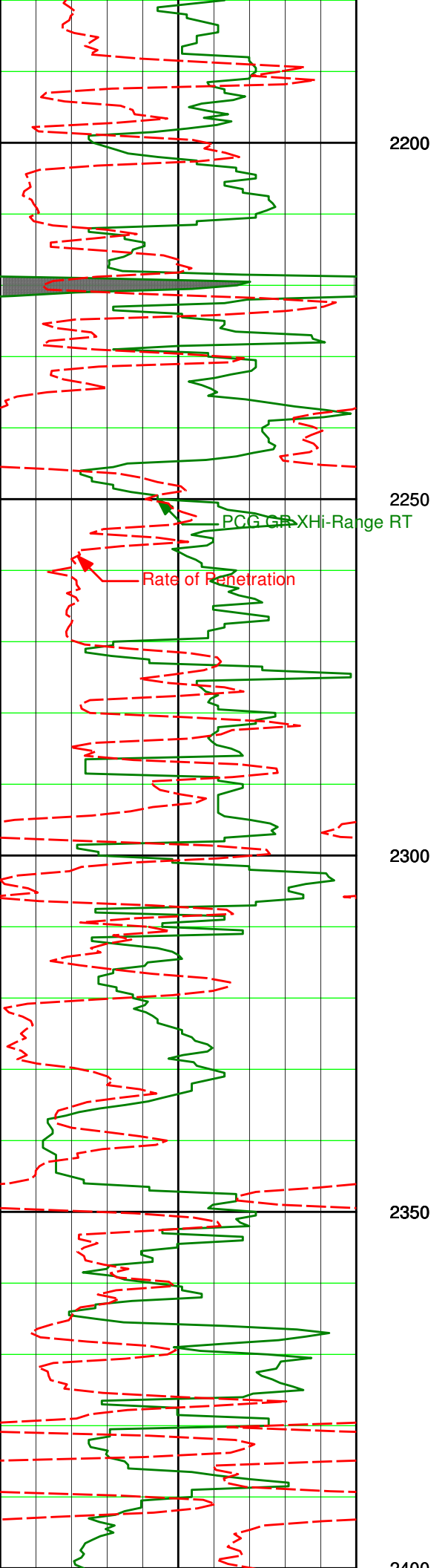
2000

2050

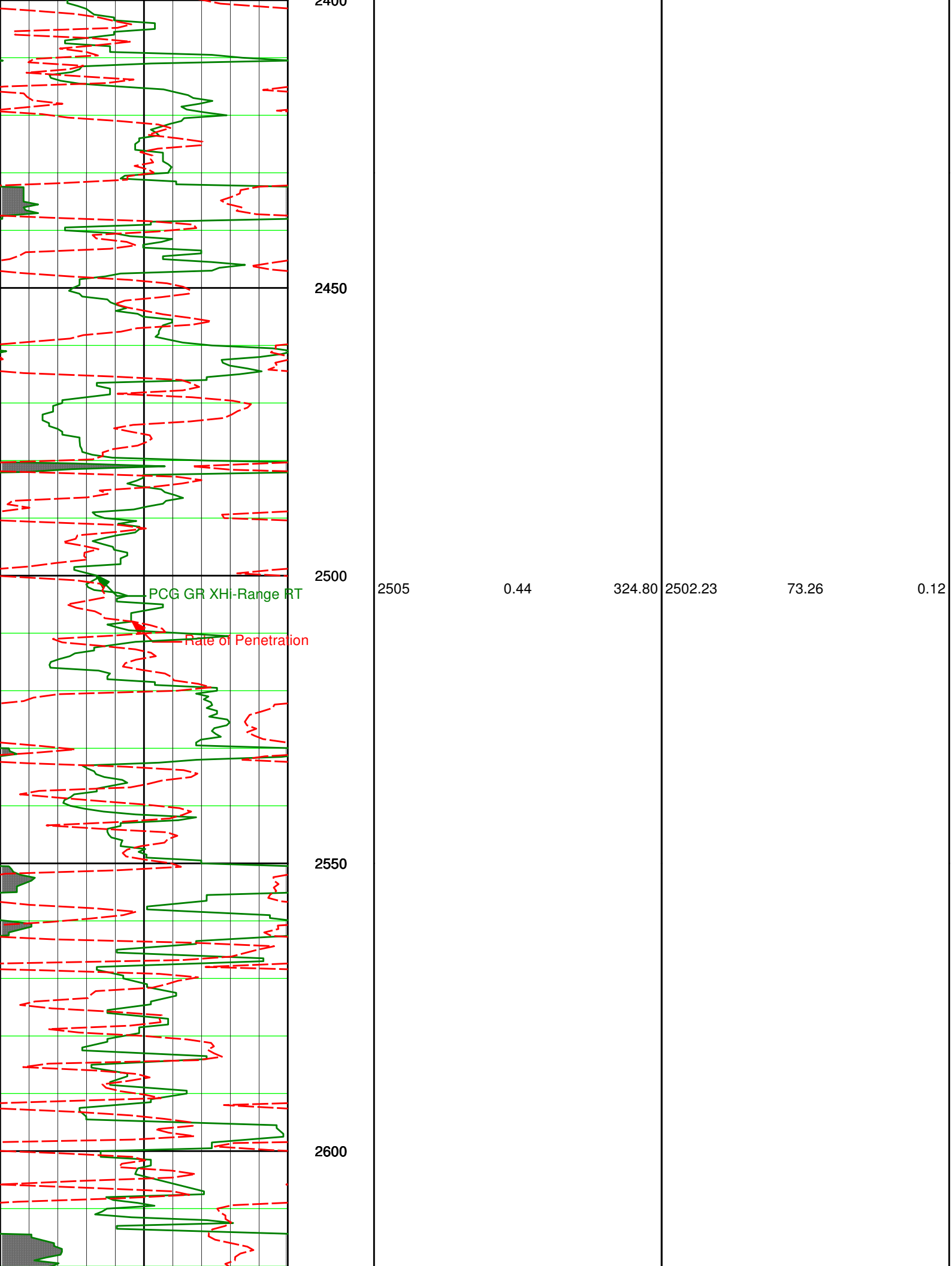
2100

2150

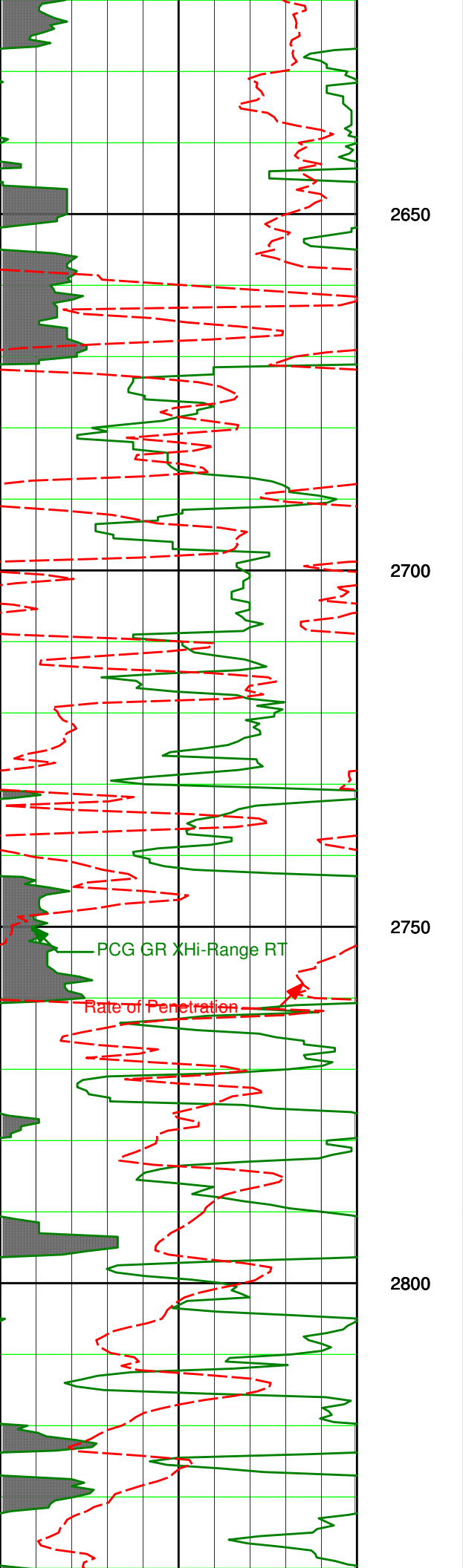
2126	0.18	22.00	2123.24	70.71	0.23



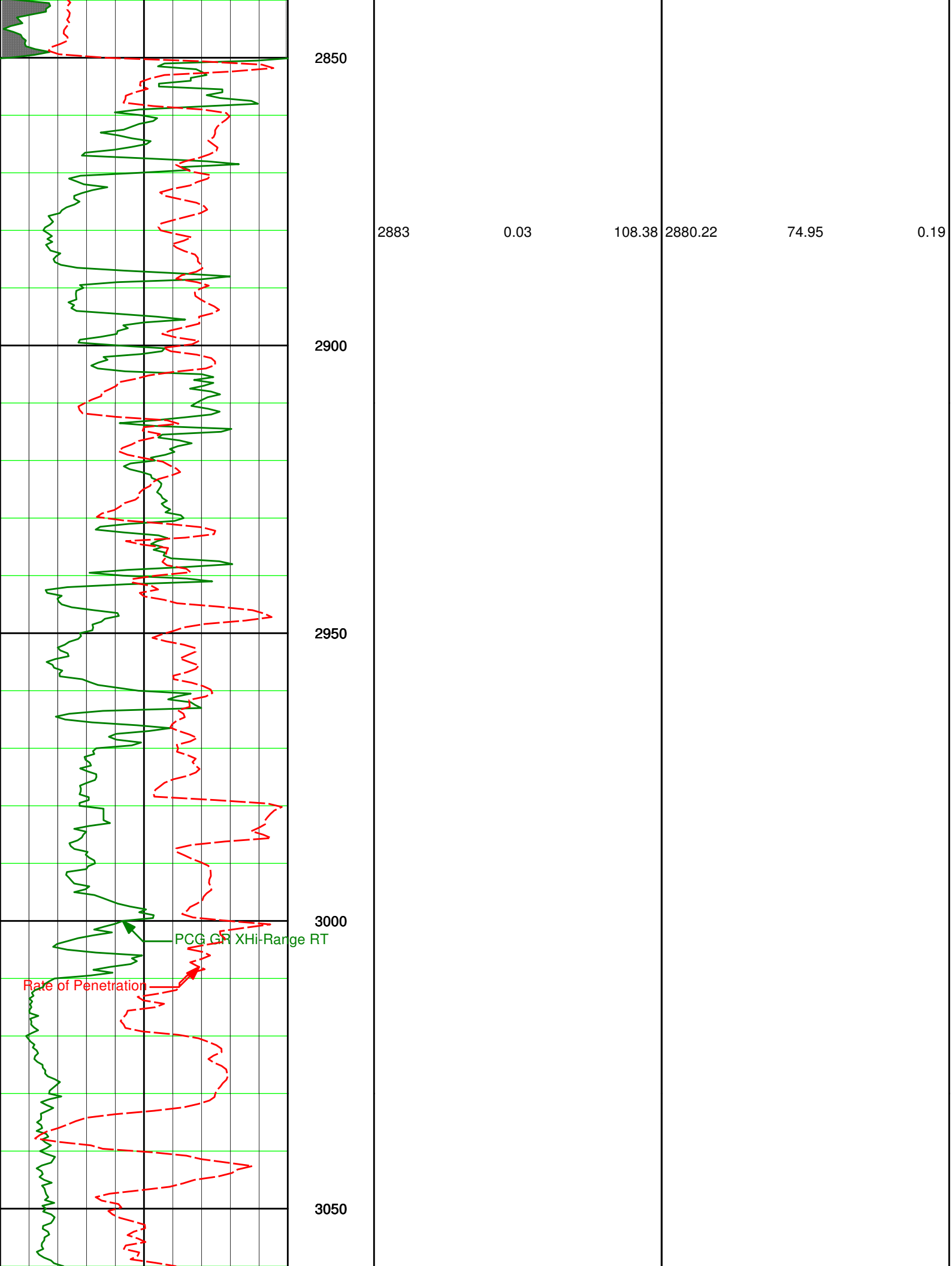
2315	0.65	313.71	2312.24	71.79	0.32



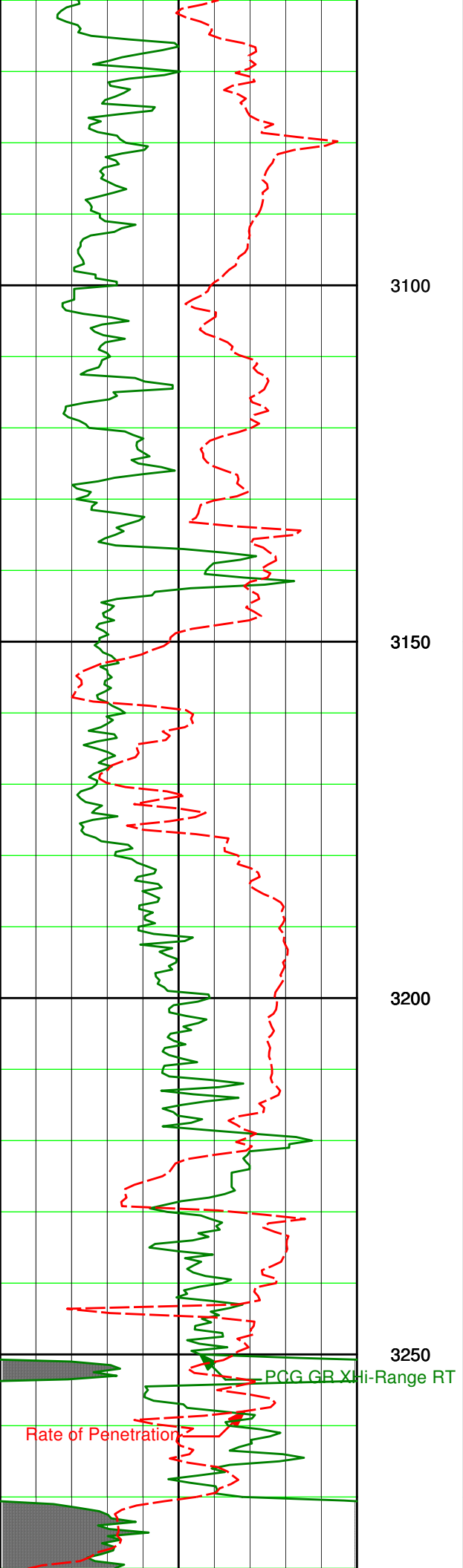
2505	0.44	324.80	2502.23	73.26	0.12



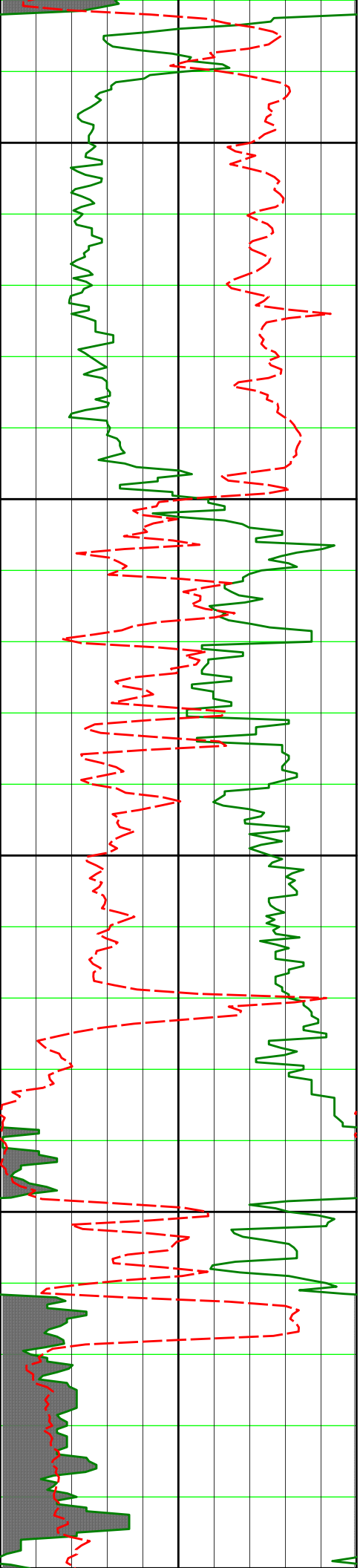
2694	0.34	334.23	2691.22	74.43	0.06



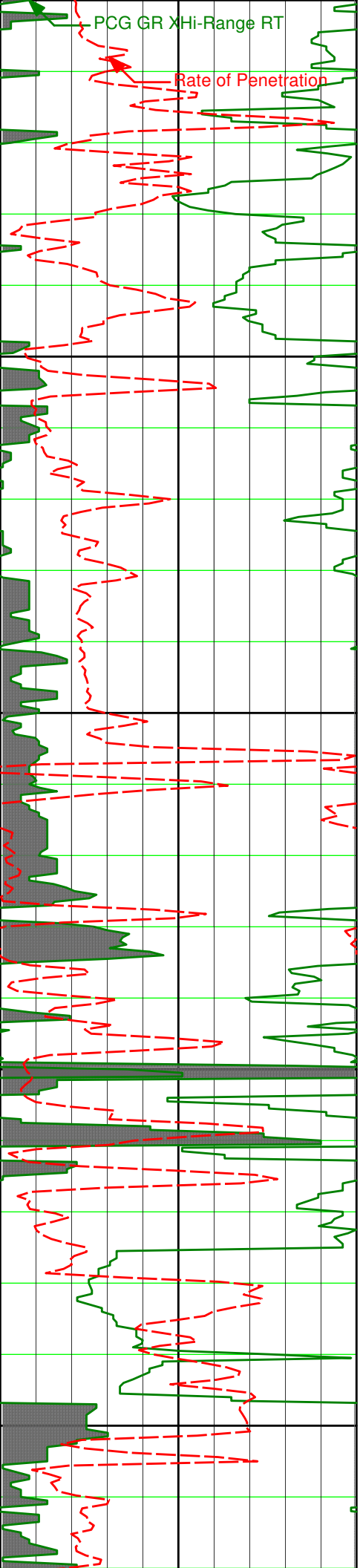
2883	0.03	108.38	2880.22	74.95	0.19



3073	0.67	349.08	3070.22	76.03	0.36
3263	0.83	337.32	3260.20	78.46	0.12



3452	0.57	13.07	3449.19	80.66	0.26



3500

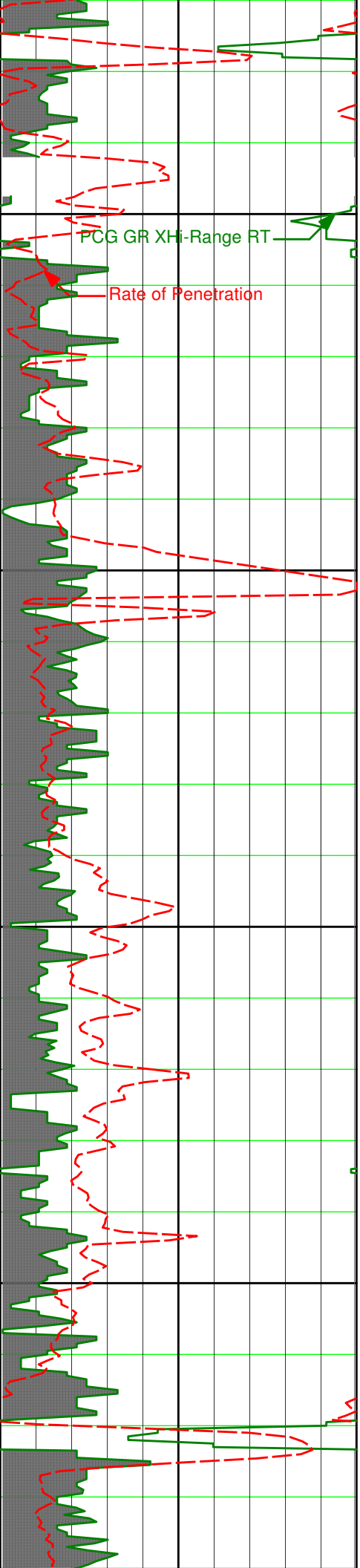
3550

3600

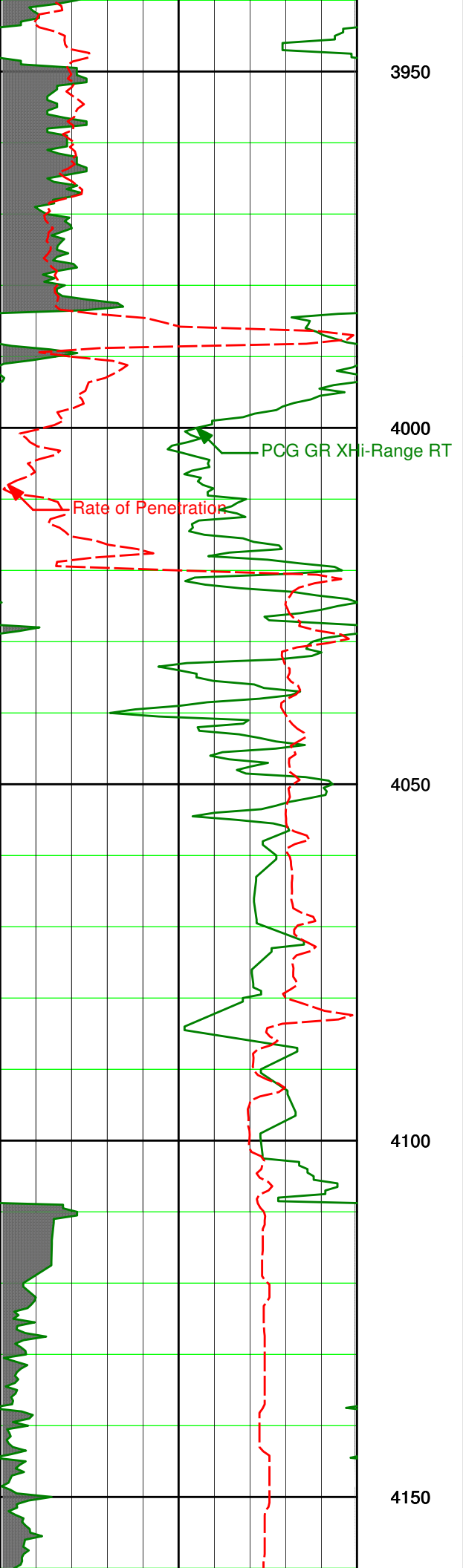
3642 0.50 347.24 3639.18 82.37 0.13

3650

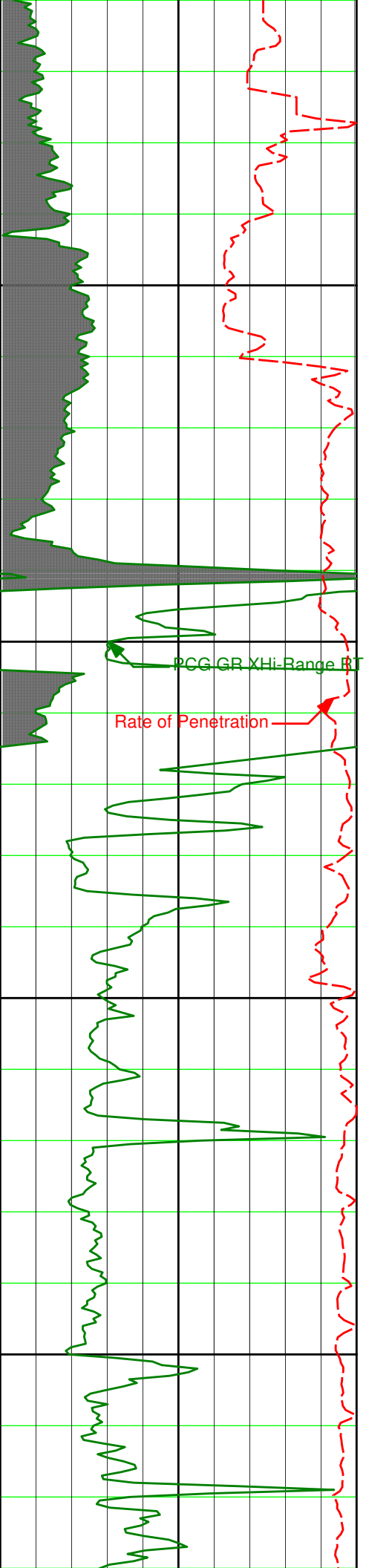
3700



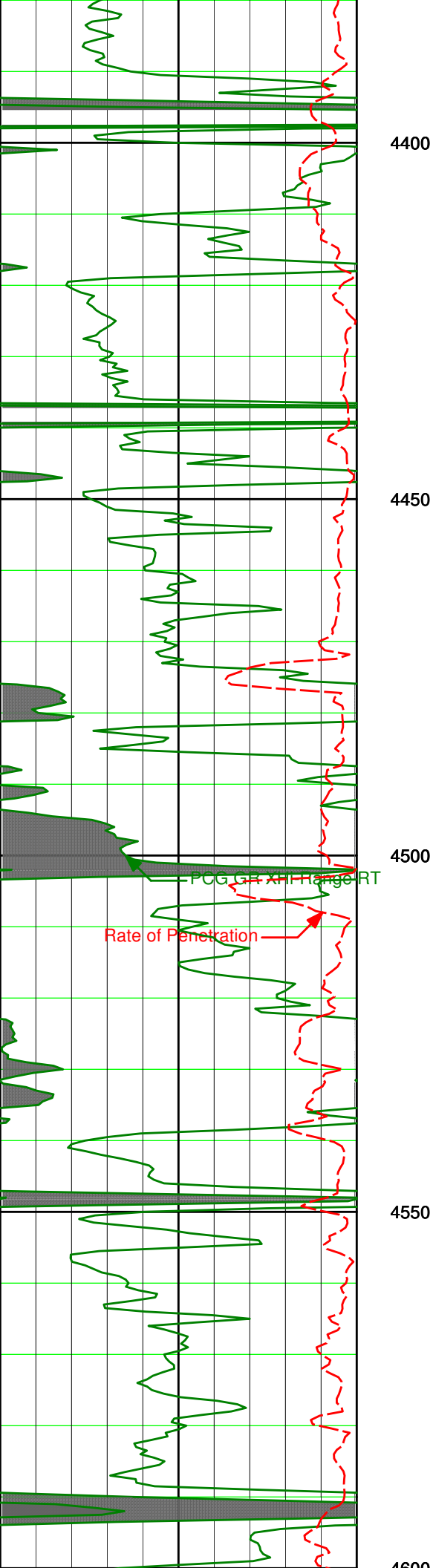
3750						
3800						
	3832	0.31	332.57	3829.18	83.68	0.11
3850						
3900						



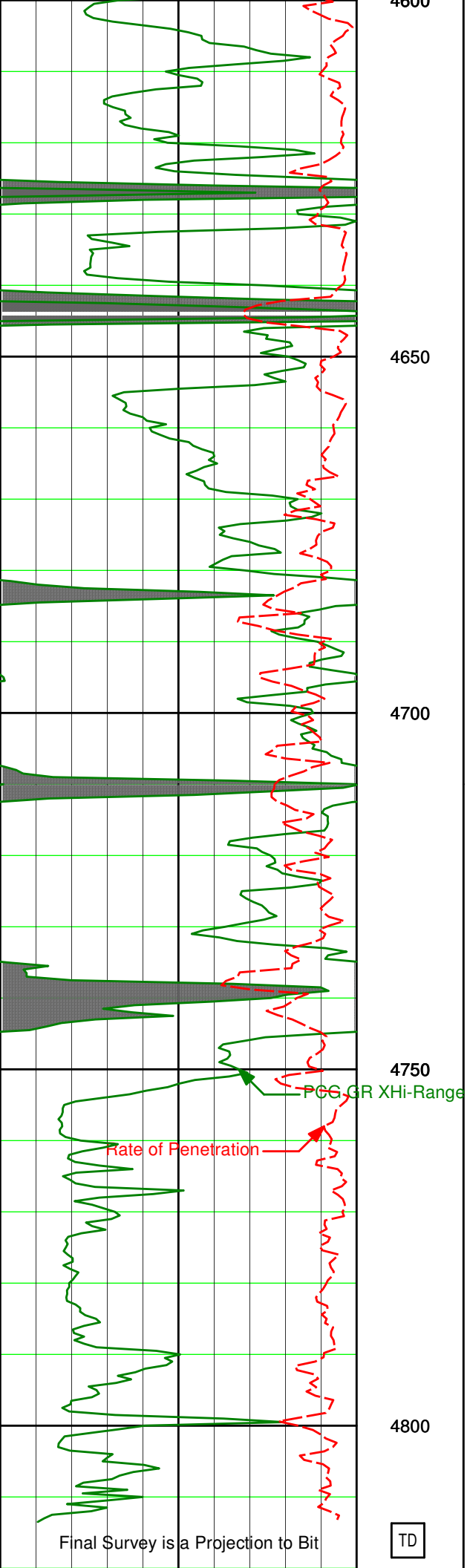
4022	0.22	306.56	4019.17	84.42	0.08



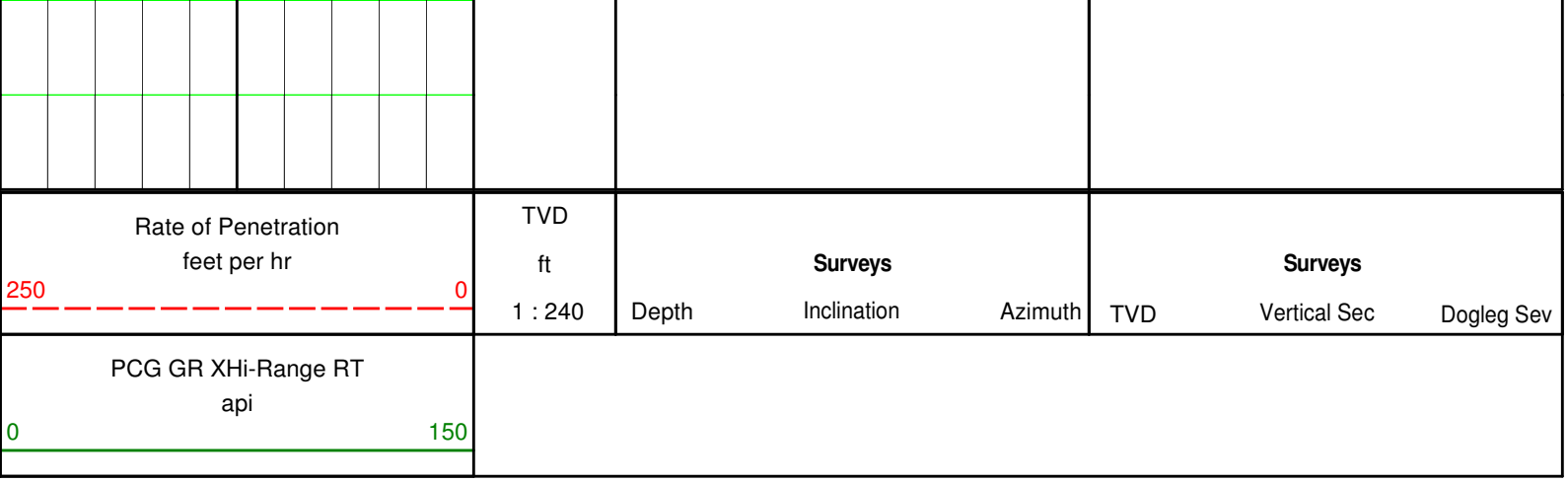
4212	0.69	9.68	4209.17	85.77	0.33
4243	3.63	2.18	4240.14	86.92	9.50
4273	6.89	358.51	4270.01	89.65	10.92
4305	10.02	357.88	4301.66	94.34	9.77
4336	13.07	357.81	4332.03	100.52	9.83
4368	16.20	357.59	4362.99	108.58	9.79



4400	19.55	357.84	4393.44	118.37	10.48
4431	22.58	357.74	4422.37	129.48	9.77
4463	25.68	357.04	4451.57	142.53	9.74
4495	28.19	356.15	4480.09	157.00	7.95
4526	30.87	354.91	4507.06	172.26	8.87
4558	34.30	353.73	4534.02	189.49	10.91
4590	37.86	353.51	4559.88	208.34	11.11
4621	41.40	353.48	4583.75	228.11	11.44



4653	44.69	353.64	4607.13	249.95	10.29
4685	46.93	353.89	4629.44	272.89	7.01
4716	49.45	353.93	4650.10	295.99	8.14
4748	52.34	353.51	4670.28	320.82	9.08
4779	54.75	353.27	4688.70	345.75	7.82
4811	57.48	353.82	4706.54	372.32	8.62
4843	60.63	353.91	4722.99	399.76	9.85
4874	62.57	354.20	4737.74	427.02	6.30
4906	65.38	354.56	4751.78	455.77	8.84
4938	68.50	354.08	4764.31	485.20	9.85
4969	71.41	353.99	4774.93	514.32	9.39
5001	74.37	354.59	4784.35	544.90	9.42
5033	76.67	355.38	4792.35	575.86	7.56
5064	78.74	355.67	4798.95	606.13	6.76
5096	80.90	356.21	4804.61	637.59	6.94
5128	83.33	356.61	4809.00	669.24	7.69
5159	86.28	355.82	4811.81	700.07	9.85
9880	91.60	353.27	4794.26	5419.55	0.00



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Shell Exploration and Productio
Schupbach 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.

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