

Gamma Ray
Rate of Penetration



1 : 240

County : Harper	
Field : Hibbord	
Location :	Lat: 37° 3' 52.48" North Long: 98° 17' 50.97" West
Well : Leann 21-34-9 1H	
Company : Tapstone Energy	
Rig : Unit 303	
LOCATION	Company : Tapstone Energy Rig : Unit 303 Well : Leann 21-34-9 1H Field : Hibbord County : Harper API Number : 15-077-22093-01-00
Latitude : 37° 3' 52.48" North Longitude : 98° 17' 50.97" West UTM Easting = 2,059,093.061 ft UTM Northing = 144,951.760 ft	Other Services Directional

Permanent Datum : Ground Level	Elevation : 1270.00 ft	Elev. KB N/A
Log Measured From : Drill Floor	20.00 ft Above Permanent Datum	DF 1290.00 ft GL 1270.00 ft WD N/A
MD LOG		

Depth Logged : 857.00 ft To 9,581.00 ft	Unit No. : PP 41	Job No. : OK-XX-0901677326
Date Logged : 26-Sep-14 To 12-Oct-14	Plot Type : Final	
Total Depth MD : 9,581.00 ft TVD : 4,633.60 ft	Plot Date : 19-Oct-14	
Spud Date : 26-Sep-14		

Run No.	Borehole Record (MD)		Run No.	Borehole Record (MD)	
	Size	From To		Size	From To
0100	8.750 in	857.00 ft To 5,077.00 ft			
0200	6.125 in	5,077.00 ft To 7,021.00 ft			
0300	6.125 in	7,021.00 ft To 8,596.00 ft			
0400	6.125 in	8,596.00 ft To 9,192.00 ft			
0500	6.125 in	9,192.00 ft To 9,581.00 ft			

WELL INFORMATION

MWD Run Number	100	200	300	400	500
Date run completed	02-Oct-14	06-Oct-14	08-Oct-14	10-Oct-14	12-Oct-14
Rig Bit Number	0100	0200	0300	0400	0500
Bit Size (in)	8.750	6.125	6.125	6.125	6.125
Tool Nominal OD (in)	6.563	4.500	4.500	4.500	4.500
Log Start Depth (MD, ft)	857.00	5,077.00	7,021.00	8,596.00	9,192.00
Log End Depth (MD, ft)	5,077.00	7,021.00	8,596.00	9,192.00	9,581.00
Drill or Wipe	Drill	Drill	Drill	Drill	Drill
Drill/Wipe Start Date and Time	28-Sep-14 08:15	04-Oct-14 03:50	06-Oct-14 17:10	08-Oct-14 23:15	11-Oct-14 09:15
Drill/Wipe End Date and Time	02-Oct-14 08:45	06-Oct-14 05:00	08-Oct-14 06:25	10-Oct-14 08:00	12-Oct-14 01:00
Min Inc (deg) @ Depth (MD, ft)	0.06 @ 2,217.00	85.62 @ 5,100.00	88.43 @ 7,809.00	86.97 @ 8,545.00	88.46 @ 9,375.00
Max Inc (deg) @ Depth (MD, ft)	79.41 @ 5,011.00	91.91 @ 5,289.00	94.40 @ 8,178.00	93.36 @ 9,055.00	93.15 @ 9,311.00
Bit TFA(in2) / Bit Type	0.56 / PDC	0.46 / PDC	0.46 / PDC	0.46 / PDC	0.56 / PDC
Flow Rate (gpm)	550.00	240.00	240.00	240.00	230.00
Max AV (fpm) / CV (fpm) @ MWD	435.0 / 494.0	393.0 / 66.0	393.0 / 127.0	393.0 / 150.0	377.0 / 149.0
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel
Density (ppg) / Viscosity (spqt)	9.40 / 60.00	8.40 / 26.00	8.60 / 26.00	8.60 / 26.00	8.70 / 26.00
Filtrate CL (ppm)	11,000.00	1,100.00	1,300.00	3,000.00	1,000.00
pH / Fluid Loss (mptm)	10.50 / 6	7.50 / 1	8.00 / 1	8.00 / 1	8.00 / 1
PV (cP) / YP (lhf2)	25 / 23.00	1 / 1.00	1 / 4.00	1 / 4.00	1 / 4.00
% Solids / % Sand	8 / 0.01	0.6 / 0.01	2 / 0.15	2 / 0.01	3 / .25
% 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	167.00 / PCG	150.00 / PCG	158.00 / PCG	158.00 / PCG	162.00 / PCG
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A
Lead MWD Engineer	Blake Baker	Blake Baker	Blake Baker	Blake Baker	Blake Baker
Customer Representative	Daniel Miller	Daniel Miller	Dale James	Dale James	Dale James

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCG	PCG	PCG	PCG	PCG
Software Version	8.15	8.15	8.15	8.15	8.15
Sub Serial Number	11619281	11232126	11232126	11232126	11232126
Insert Serial Number	10986758	11145728	10986758	11145728	10986758
Date and Time Initialized	26-Sep-14 04:04	02-Oct-14 11:32	06-Oct-14 06:03	08-Oct-14 07:17	10-Oct-14 11:45
Date and Time Read	02-Oct-14 17:27	06-Oct-14 12:44	08-Oct-14 14:04	10-Oct-14 15:19	12-Oct-14 18:19
ECMB SW Version	N/A	N/A	N/A	N/A	N/A

Directional Sensor Information

Tool Type	PCD	PCD	PCD	PCD	PCD
Distance From Bit (ft)	56.44	49.35	50.30	49.33	49.33
Software Version	3.32	3.32	3.42	3.32	3.42
Sub Serial Number	11619281	11232126	11232126	11232126	11232126
Sonde Serial Number	10607960	10809457	10607960	10809457	10607960
Sensor ID Number	N/A	N/A	N/A	N/A	N/A
Toolface Offset (deg)	229.42	291.75	258.09	72.31	356.07

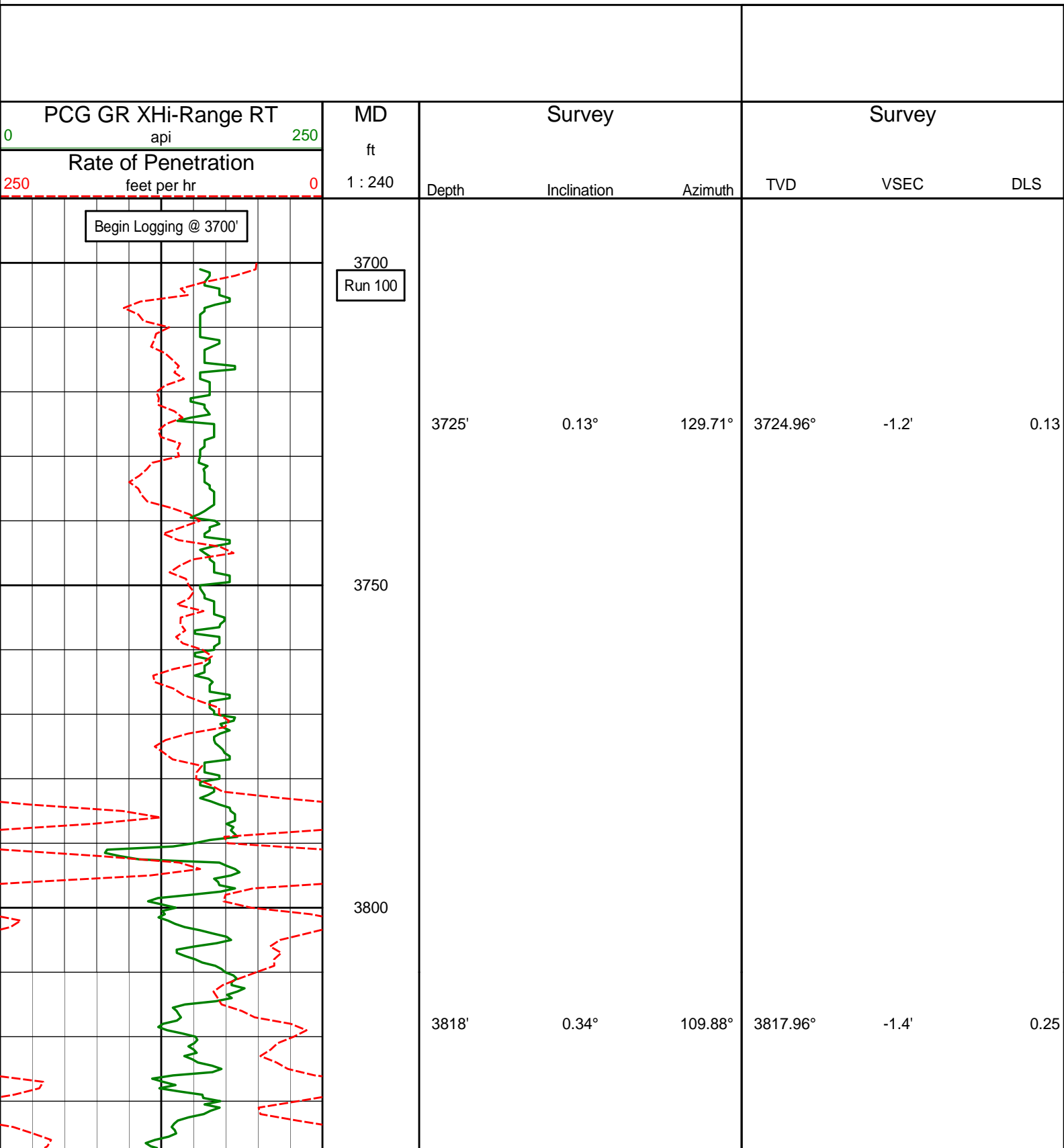
Gamma Ray Sensor Information

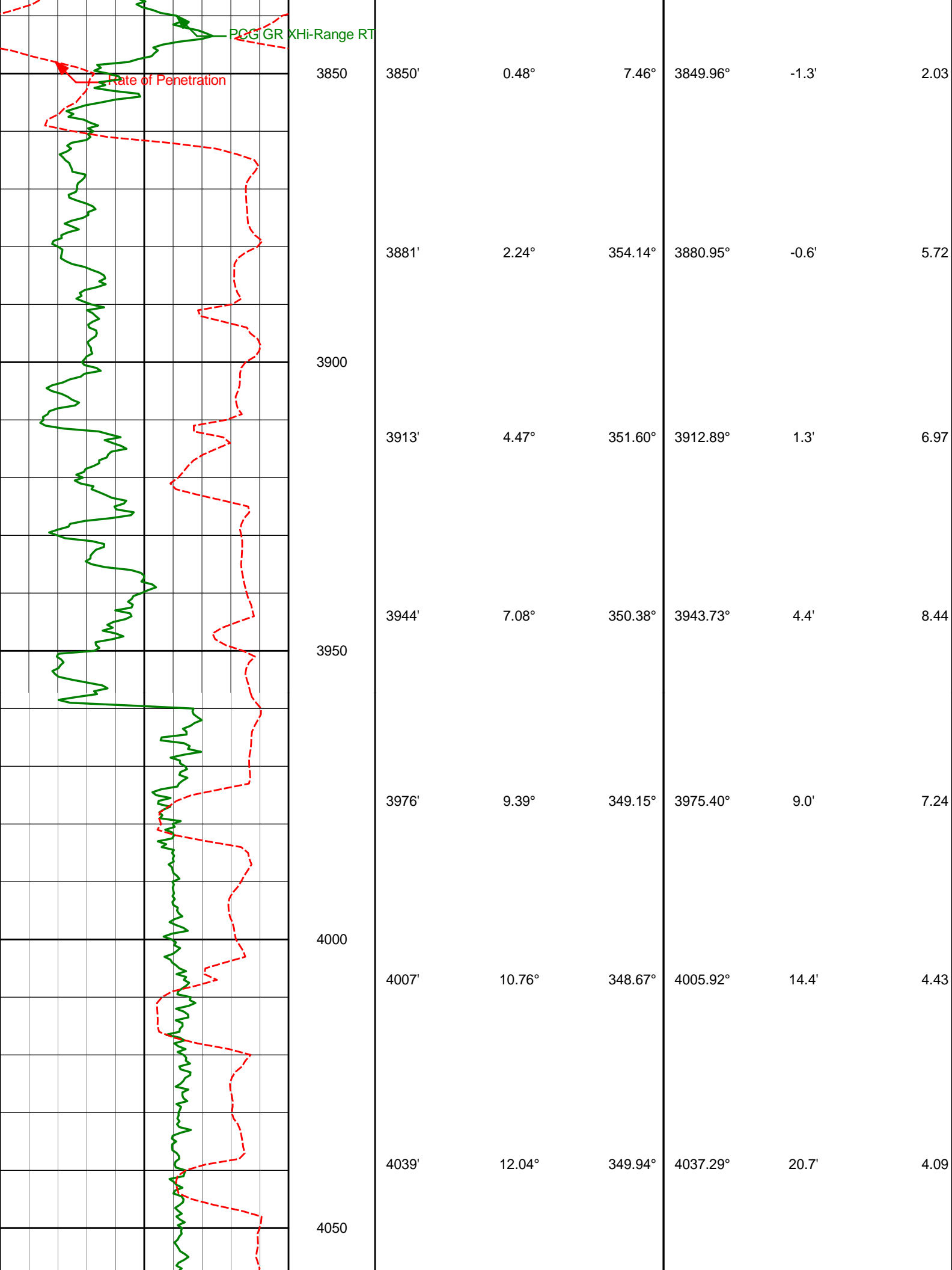
Tool Type	PCG	PCG	PCG	PCG	PCG
Distance From Bit (ft)	61.94	54.85	55.80	54.83	54.83
Recorded Sample Period (sec)	15	15	15	15	15
Software Version	8.15	8.15	8.15	8.15	8.15
Sub Serial Number	11619281	11232126	11232126	11232126	11232126
Insert/Sonde Serial Number	10986758	11145728	10986758	11145728	10986758

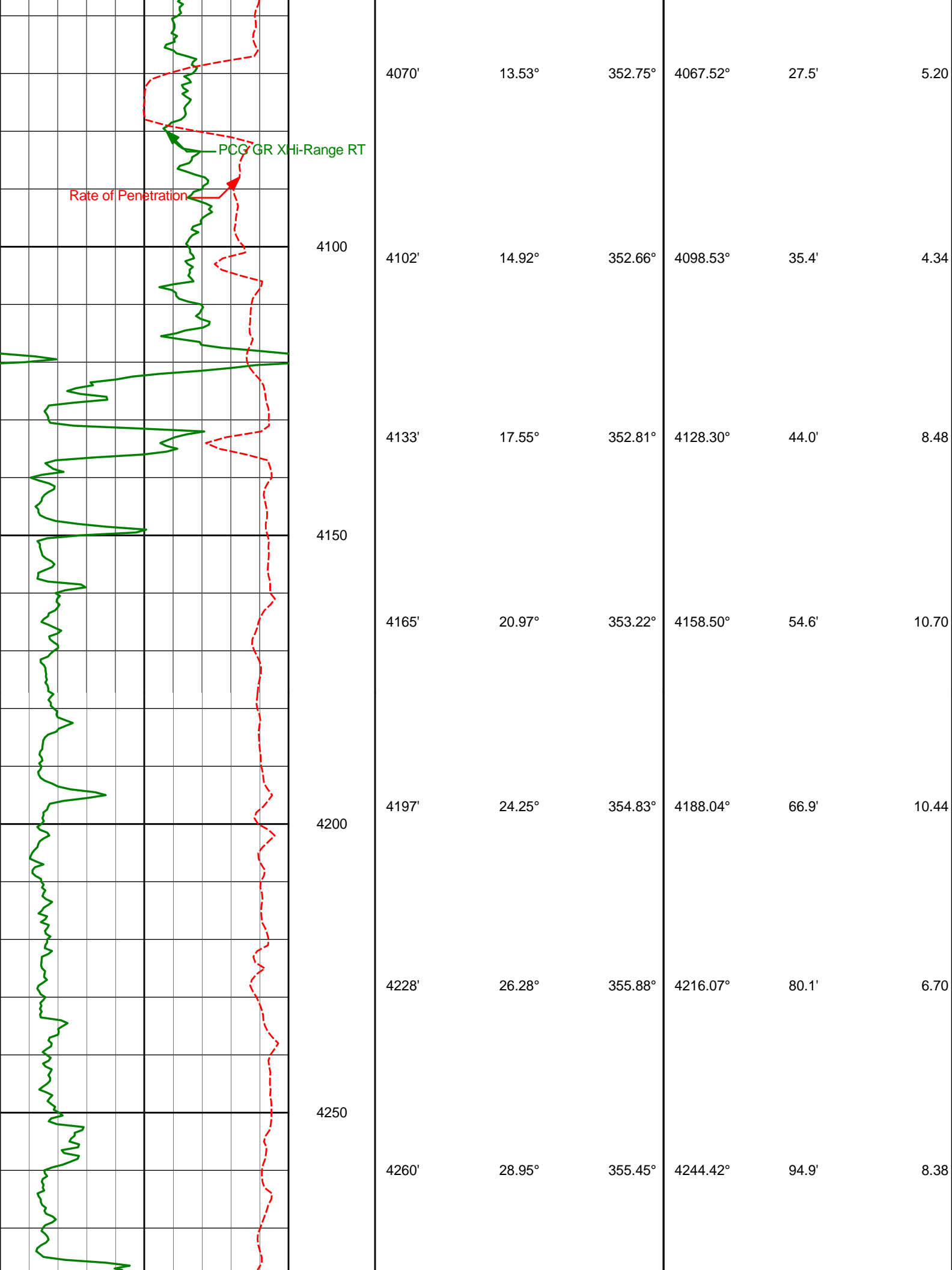
REMARKS

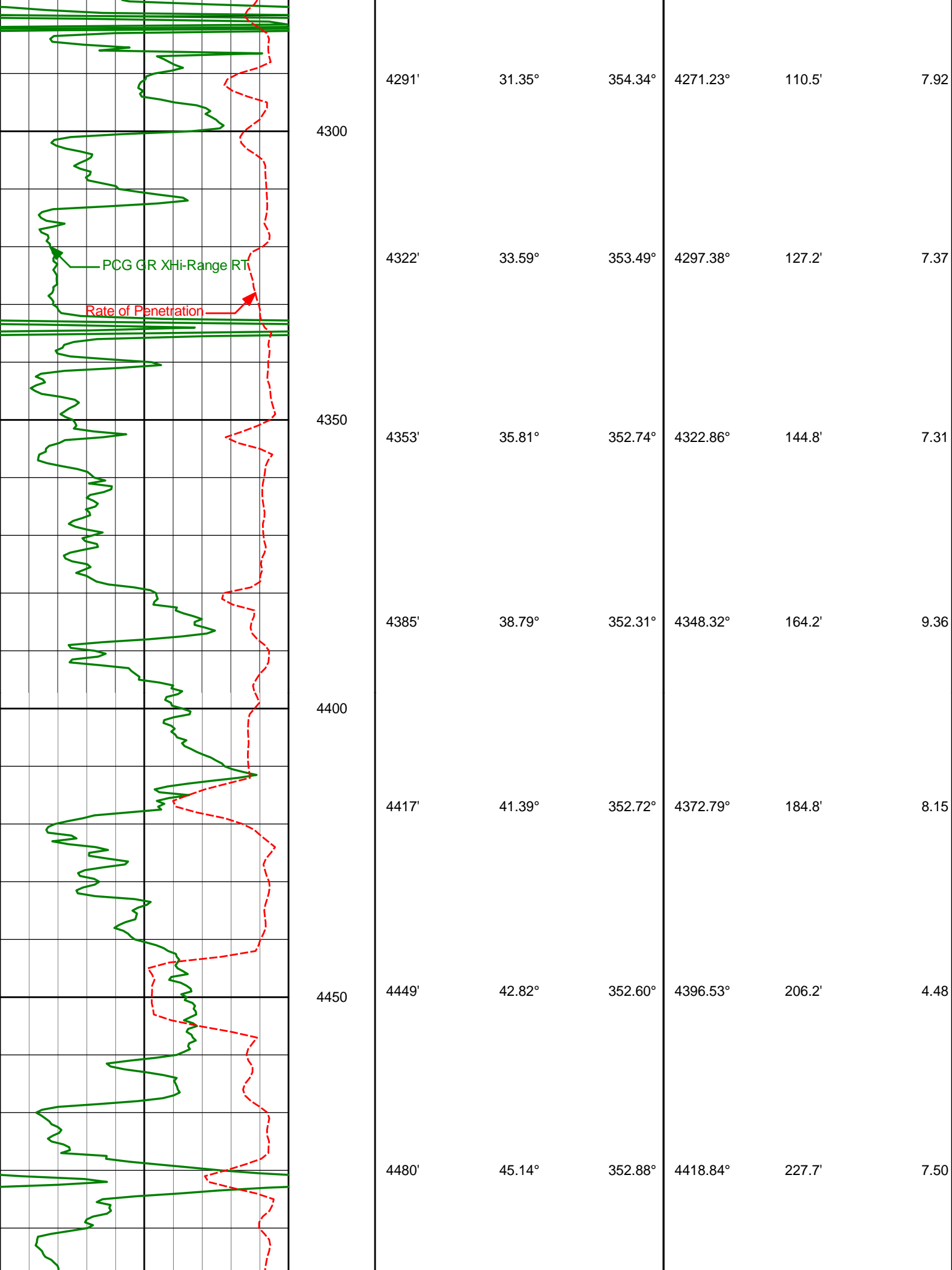
1. All depths are calibrated to the driller's pipe tally and are measured from the rotary table.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
4. Following smoothing parameters have been applied the data.
 ROP 1.0 ft interval, 2.0 ft coercion distance
 Gamma 0.5 ft interval, 0.6 ft coercion distance
5. The following mnemonic are used in the logs:
 SRP: Smoothed Rate of Penetration.
 SGRC: Smoothed Gamma Ray Combined.

HALLIBURTON WILL USE ITS BEST EFFORTS TO FURNISH CUSTOMERS WITH ACCURATE INFORMATION AND INTERPRETATIONS THAT ARE PART OF, AND INCIDENT TO, THE SERVICES PROVIDED. HOWEVER, HALLIBURTON CANNOT AND DOES NOT WARRANT THE ACCURACY OR CORRECTNESS OF SUCH INFORMATION AND INTERPRETATIONS. UNDER NO CIRCUMSTANCES SHOULD ANY SUCH INFORMATION OR INTERPRETATION BE RELIED UPON AS THE SOLE BASIS FOR ANY DRILLING, COMPLETION, PRODUCTION, OR FINANCIAL DECISION OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING VENTURE, DRILLING RIG OR ITS CREW OR ANY OTHER THIRD PARTY. THE CUSTOMER HAS FULL RESPONSIBILITY FOR ALL DRILLING, COMPLETION AND PRODUCTION OPERATION. HALLIBURTON MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE SERVICES RENDERED. IN NO EVENT WILL HALLIBURTON BE LIABLE FOR FAILURE TO OBTAIN ANY PARTICULAR RESULTS OR FOR ANY DAMAGES, INCLUDING, BUT NOT LIMITED TO, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, RESULTING FROM THE USE OF ANY INFORMATION OR INTERPRETATION PROVIDED BY HALLIBURTON.



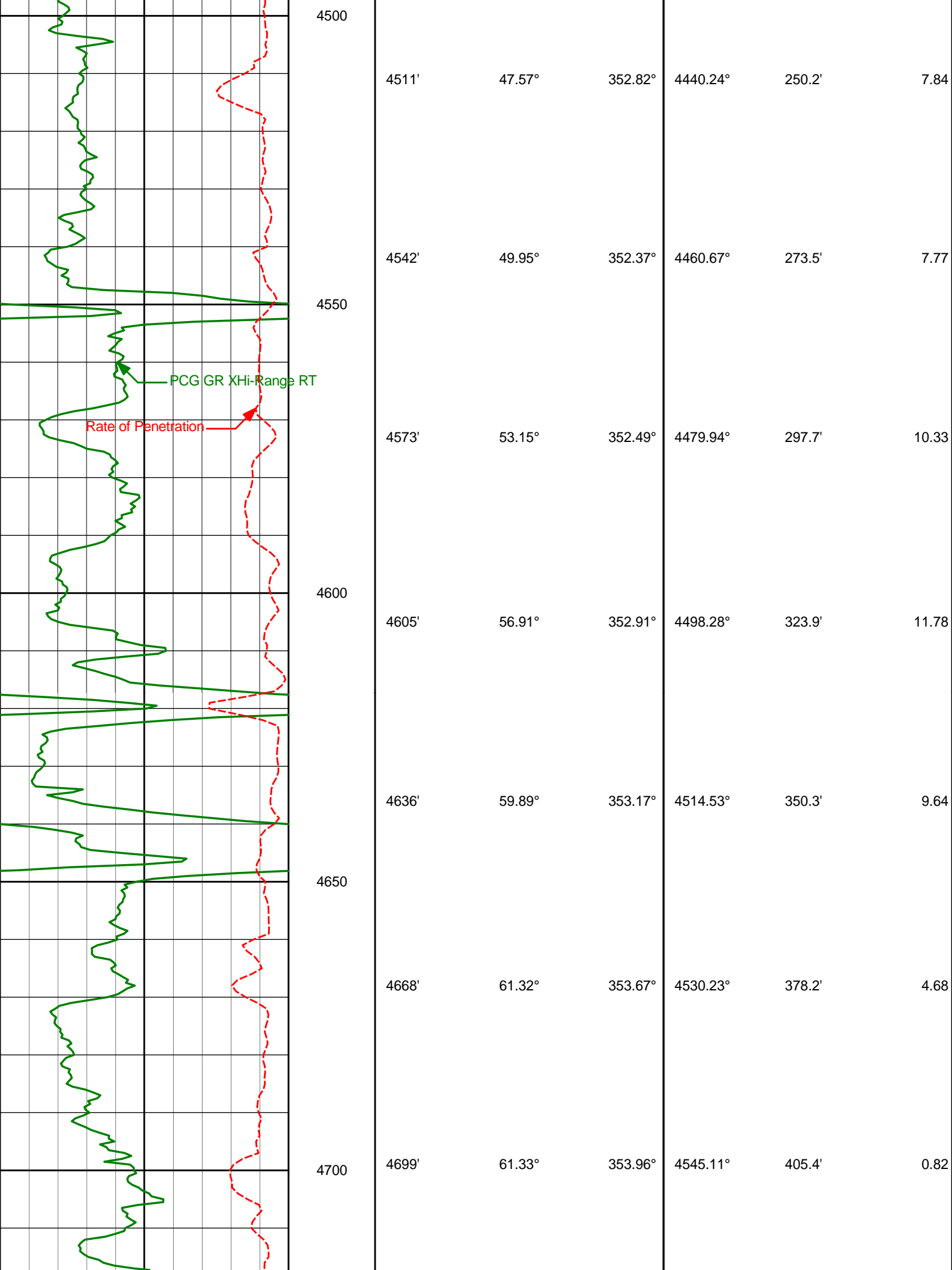






PCG GR XHi-Range RT

Rate of Penetration



4500

4511' 47.57° 352.82° 4440.24° 250.2' 7.84

4542' 49.95° 352.37° 4460.67° 273.5' 7.77

4550

PCG GR XHi-Range RT

Rate of Penetration

4573' 53.15° 352.49° 4479.94° 297.7' 10.33

4600

4605' 56.91° 352.91° 4498.28° 323.9' 11.78

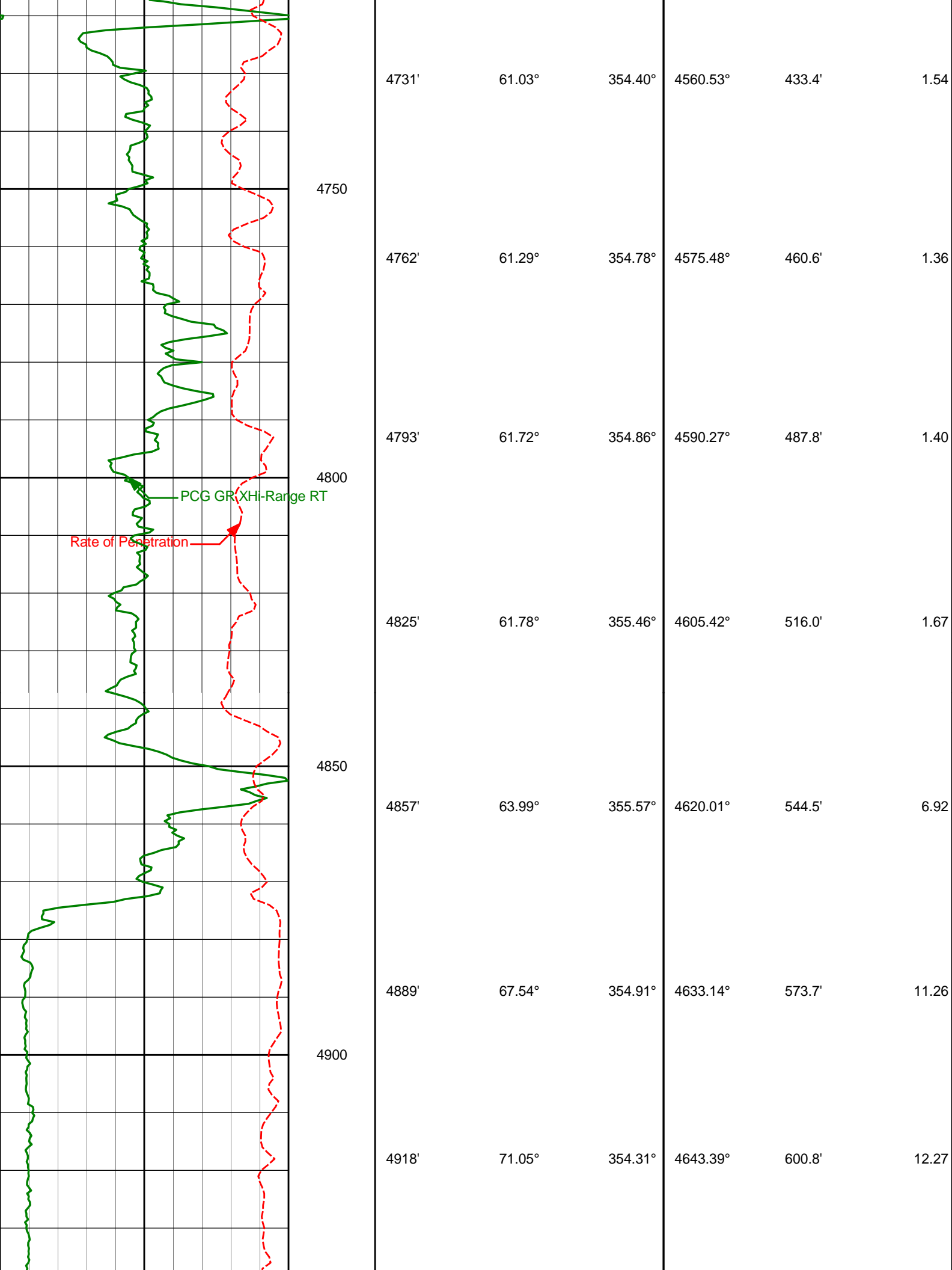
4636' 59.89° 353.17° 4514.53° 350.3' 9.64

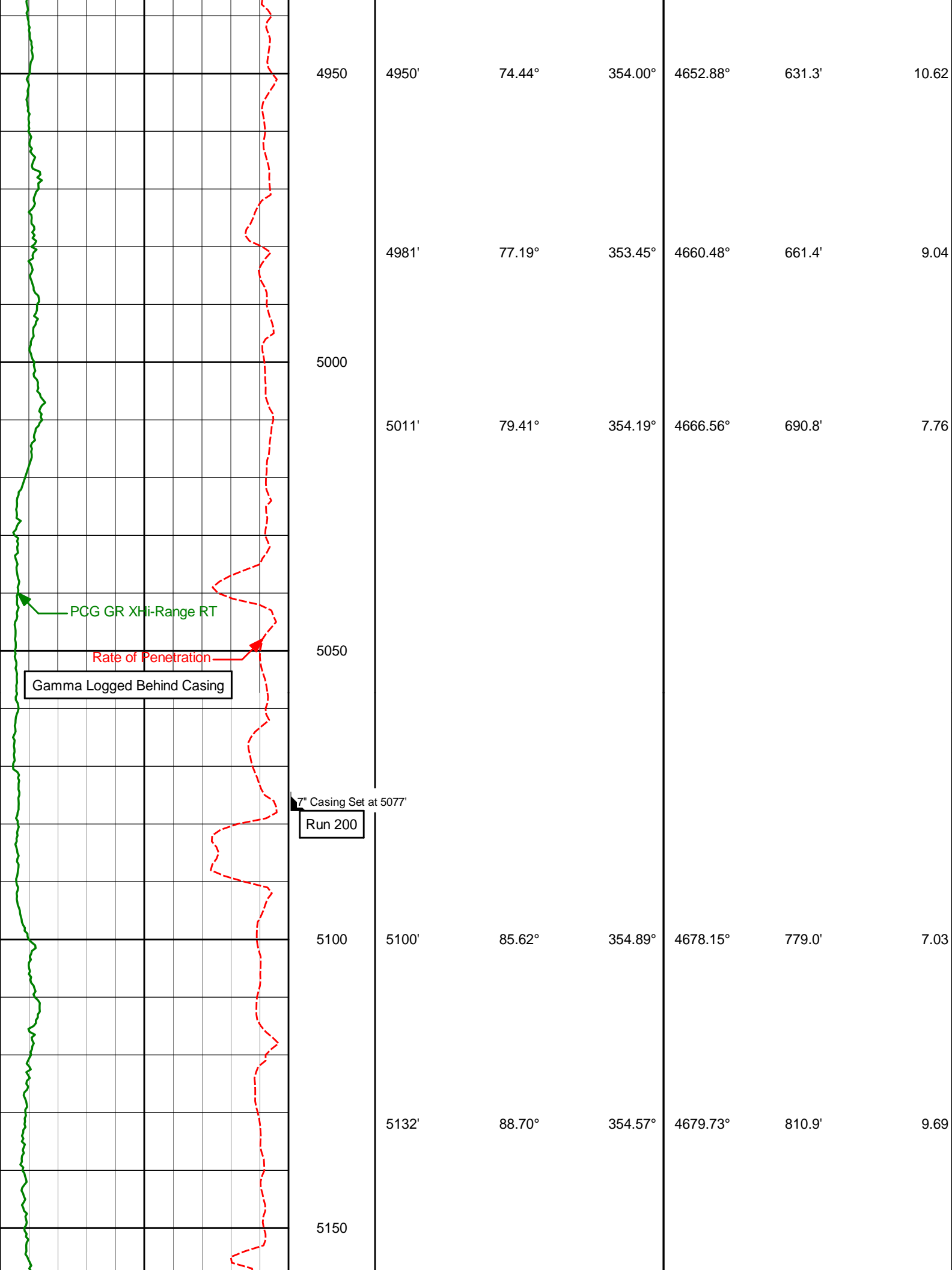
4650

4668' 61.32° 353.67° 4530.23° 378.2' 4.68

4700

4699' 61.33° 353.96° 4545.11° 405.4' 0.82





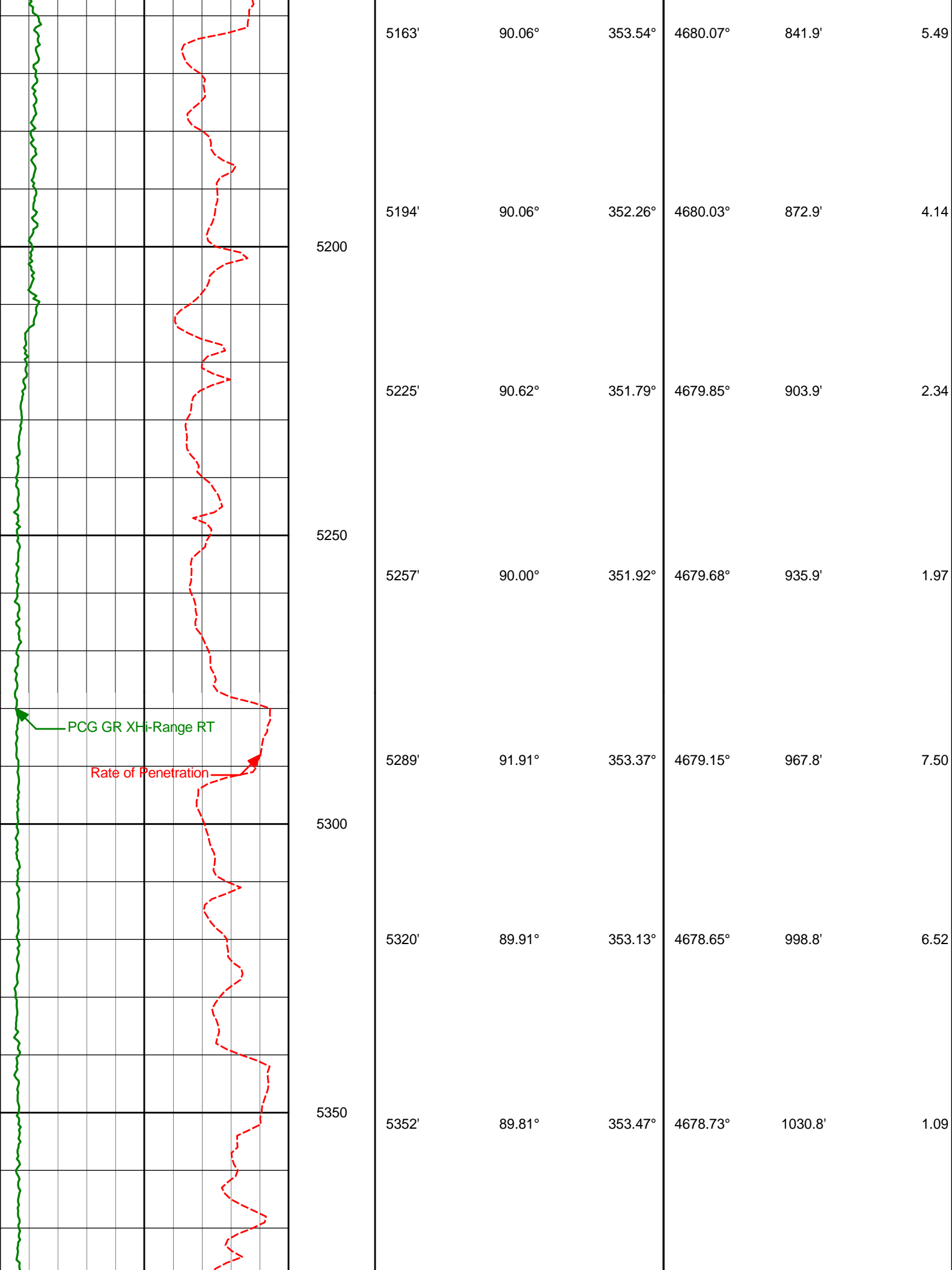
PCG GR XHi-Range RT

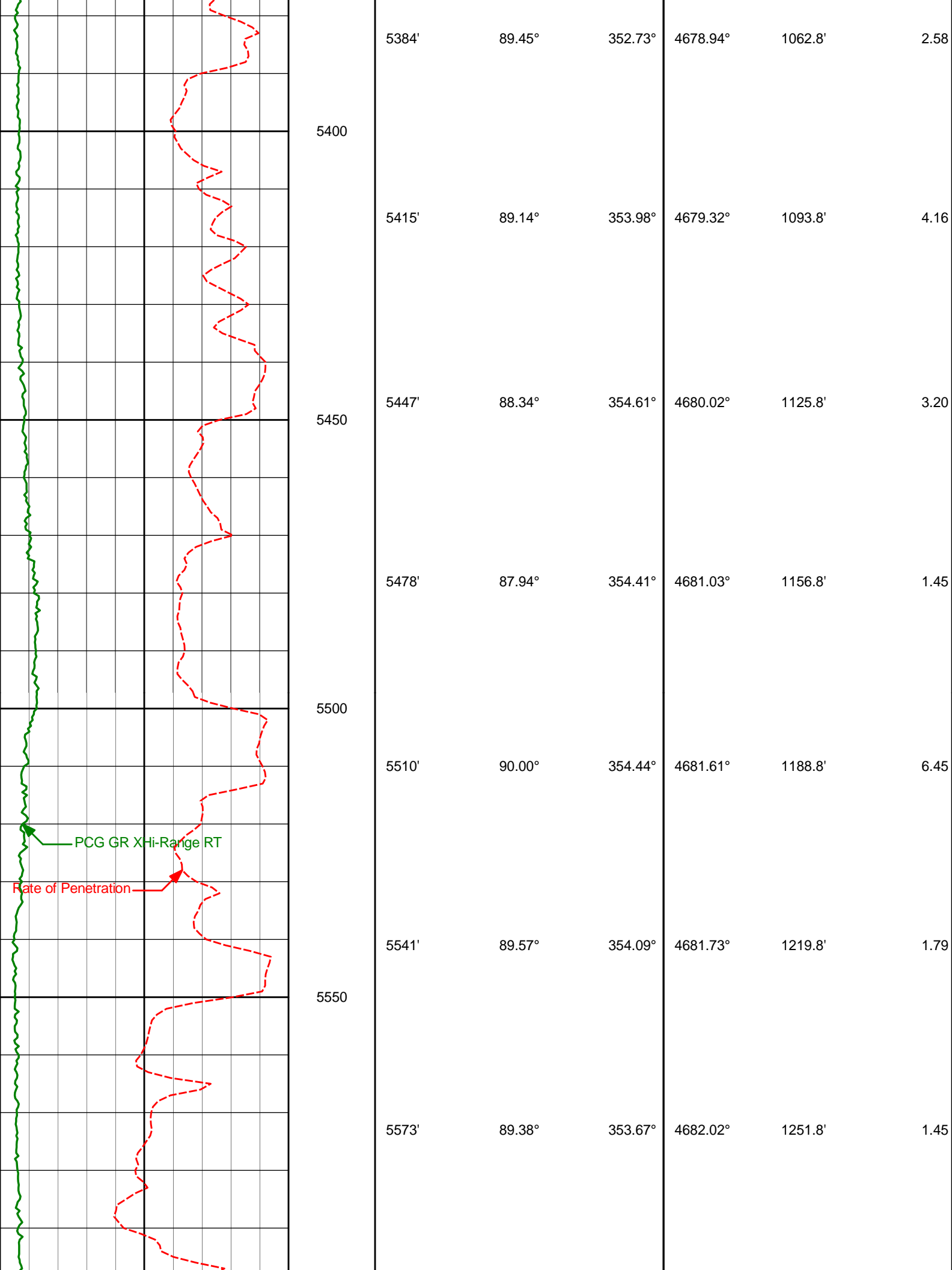
Rate of Penetration

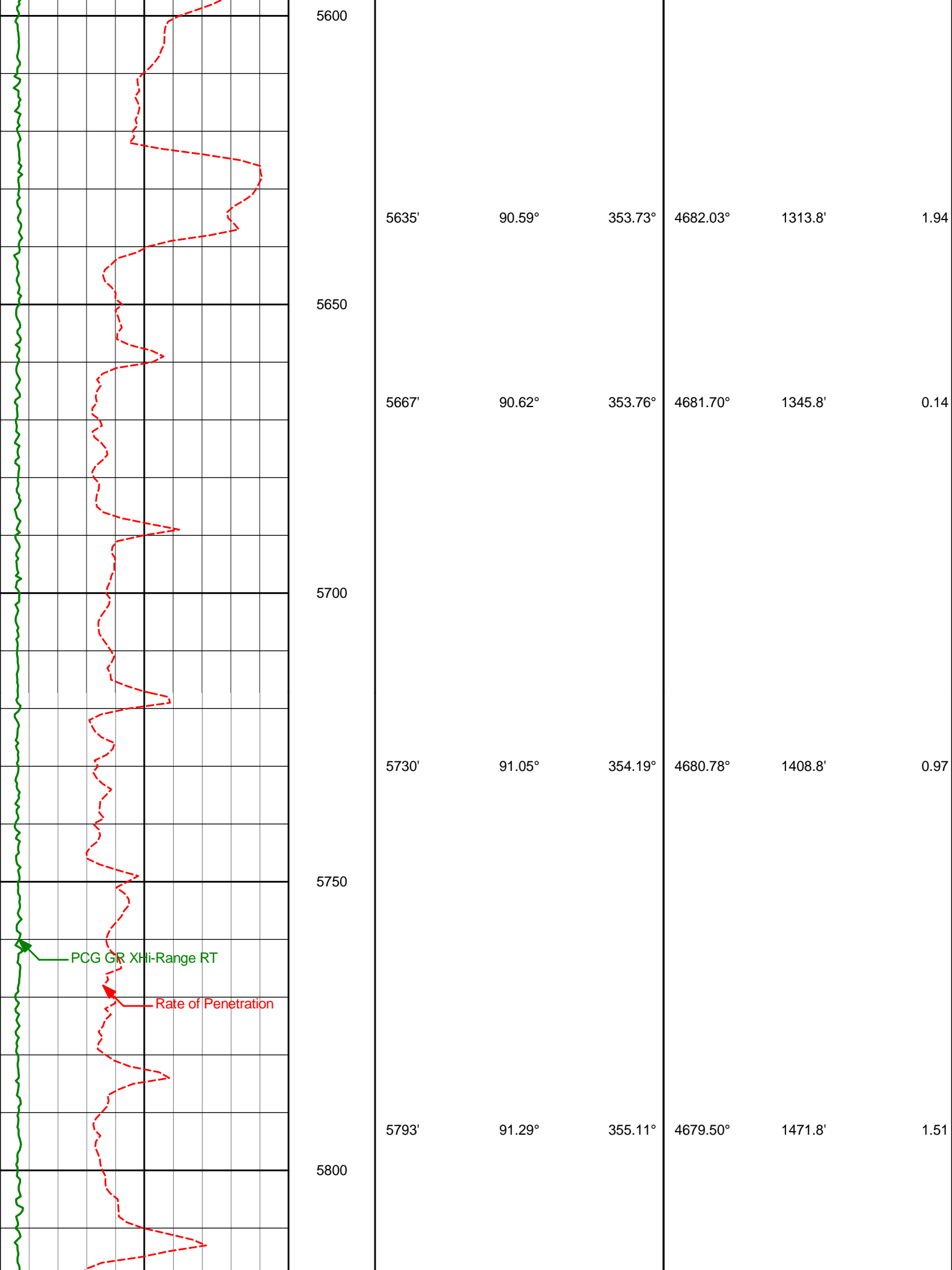
Gamma Logged Behind Casing

7" Casing Set at 5077'

Run 200







5600

5635'

90.59°

353.73°

4682.03°

1313.8'

1.94

5650

5667'

90.62°

353.76°

4681.70°

1345.8'

0.14

5700

5730'

91.05°

354.19°

4680.78°

1408.8'

0.97

5750

PCG GR XHi-Range RT

Rate of Penetration

5793'

91.29°

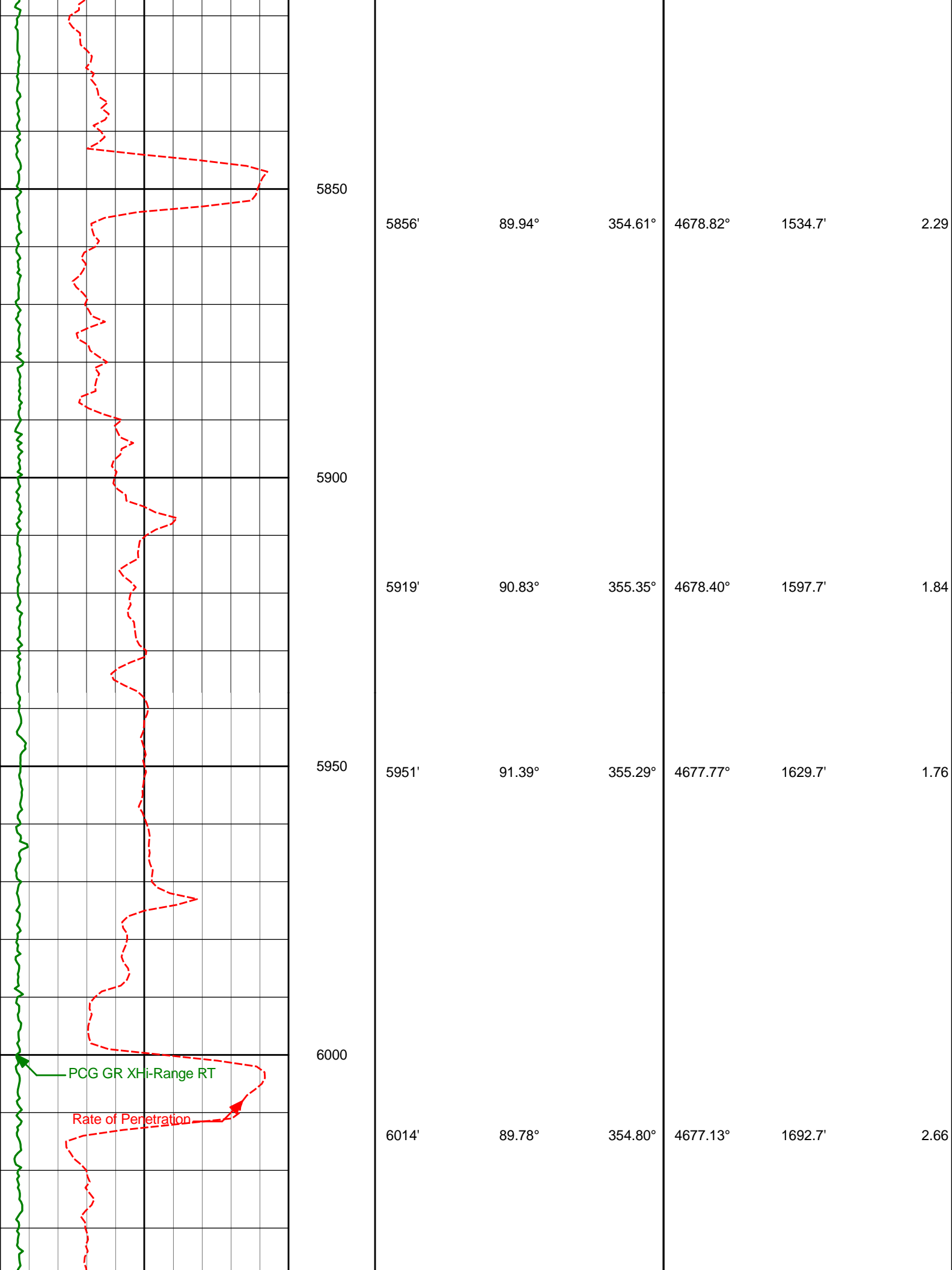
355.11°

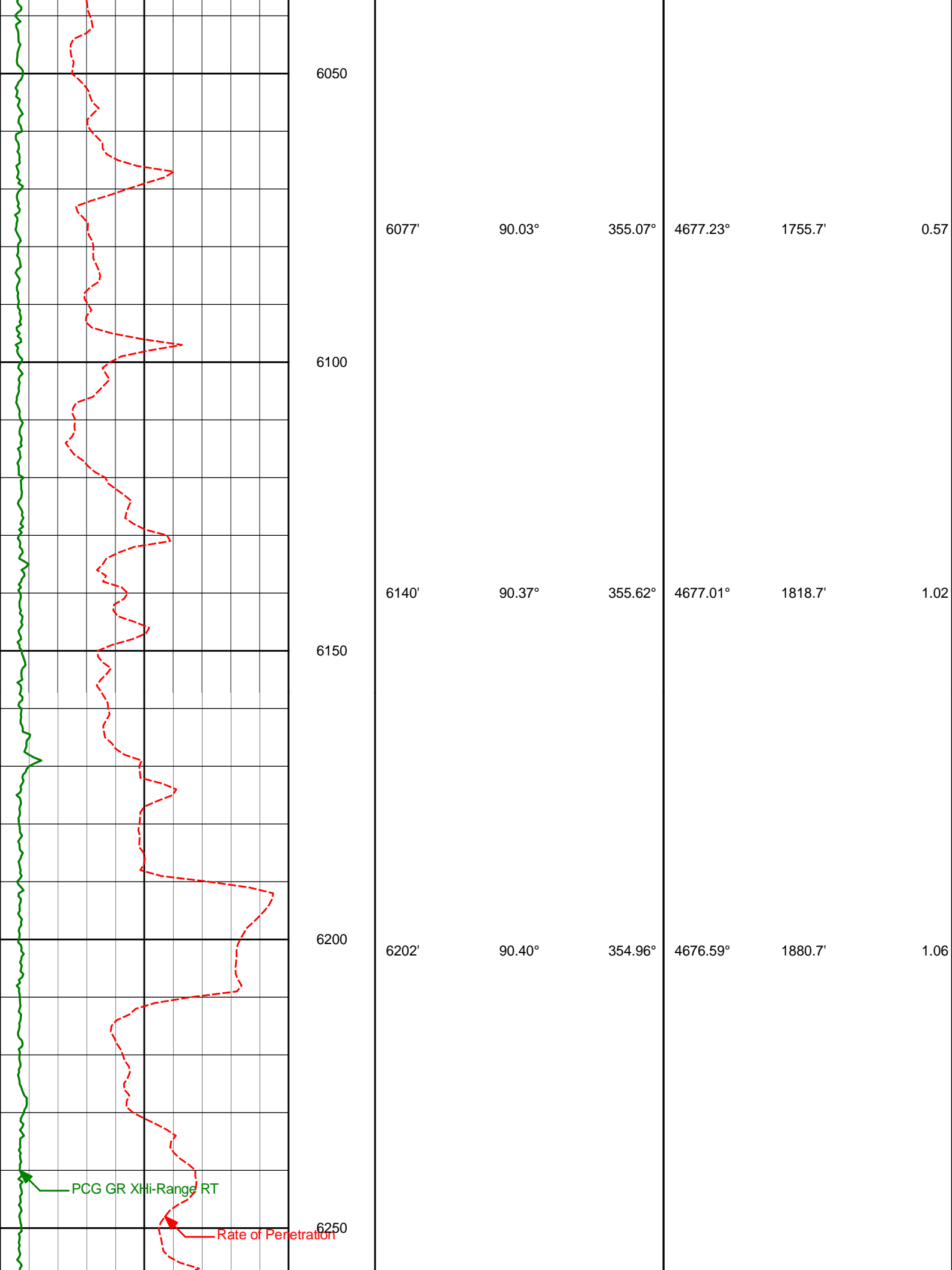
4679.50°

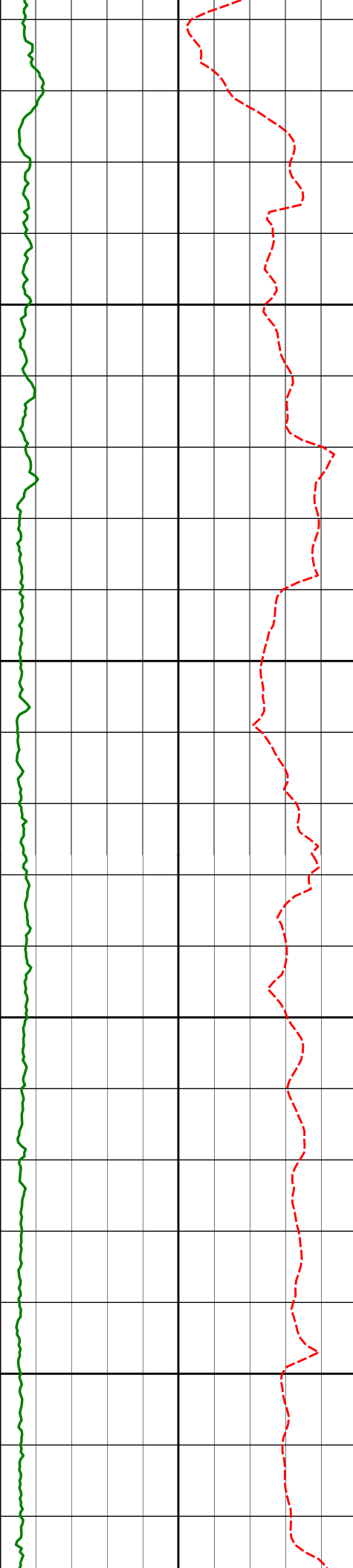
1471.8'

1.51

5800







6300

6350

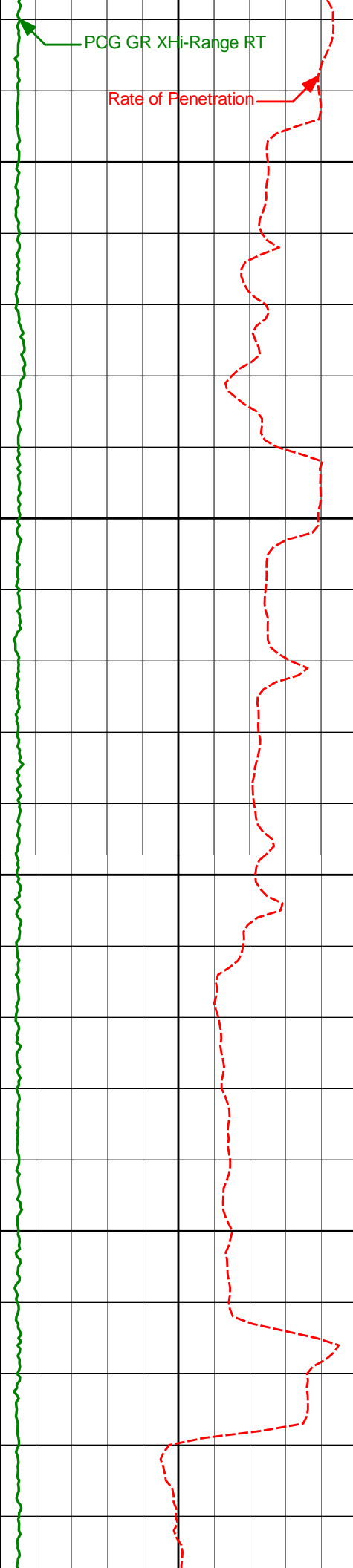
6400

6450

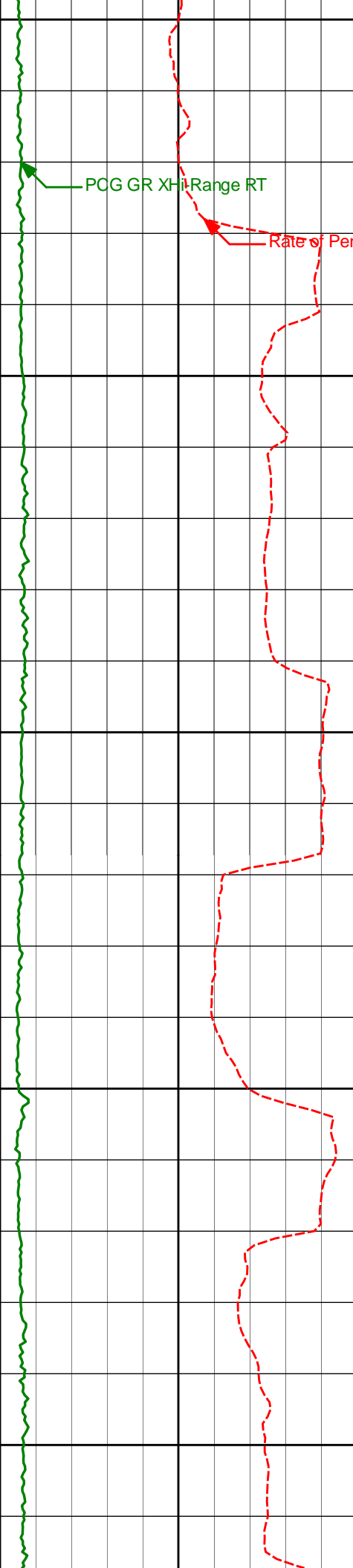
6265' 90.77° 355.27° 4675.95° 1943.7' 0.77

6329' 90.03° 353.76° 4675.50° 2007.7' 2.62

6392' 89.75° 353.82° 4675.62° 2070.7' 0.45



6486'	89.38°	351.97°	4676.33°	2164.6'	2.01	
6550	6549'	90.43°	352.02°	4676.43°	2227.6'	1.67
6612'	90.86°	352.69°	4675.72°	2290.5'	1.27	
6675'	90.99°	351.83°	4674.70°	2353.5'	1.38	



6700

PCG GR XHI Range RT

Rate of Penetration

6750

6800

6850

6900

6738'

90.68°

351.58°

4673.79°

2416.4'

0.63

6801'

90.62°

351.05°

4673.07°

2479.4'

0.84

6865'

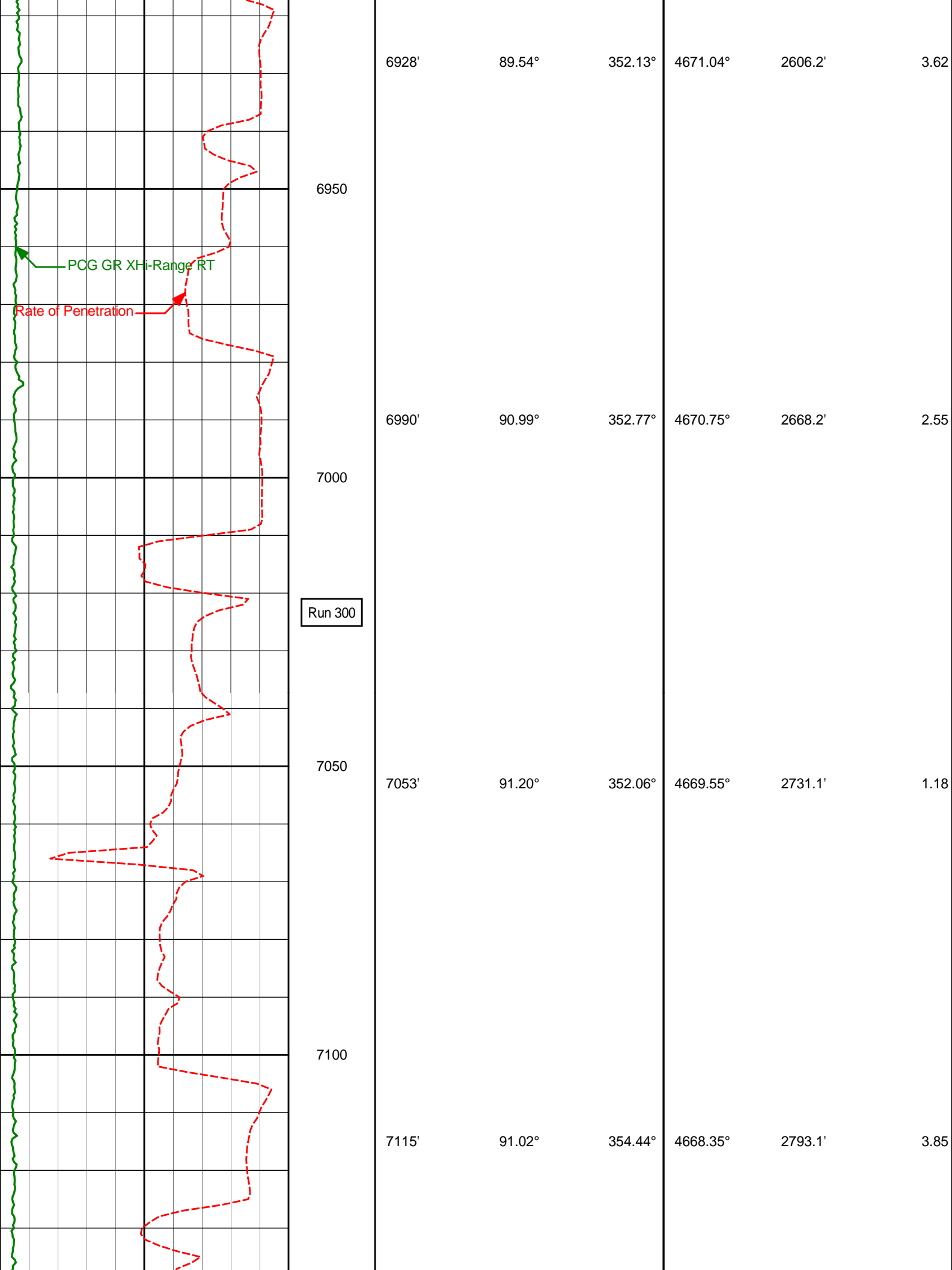
91.75°

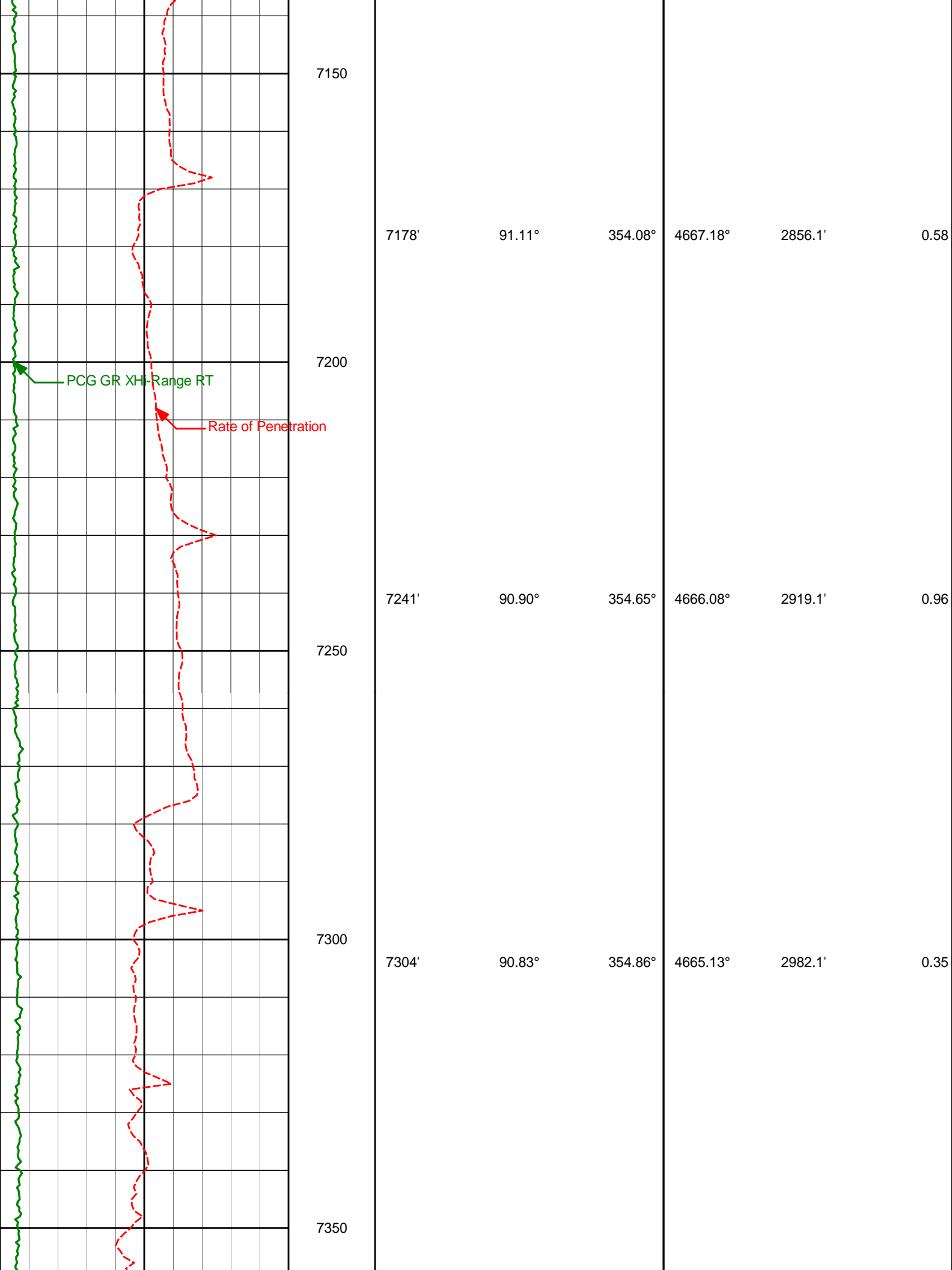
351.58°

4671.75°

2543.3'

1.96





7150

7178'

91.11°

354.08°

4667.18°

2856.1'

0.58

7200

PCG GR XH-Range RT

Rate of Penetration

7241'

90.90°

354.65°

4666.08°

2919.1'

0.96

7250

7300

7304'

90.83°

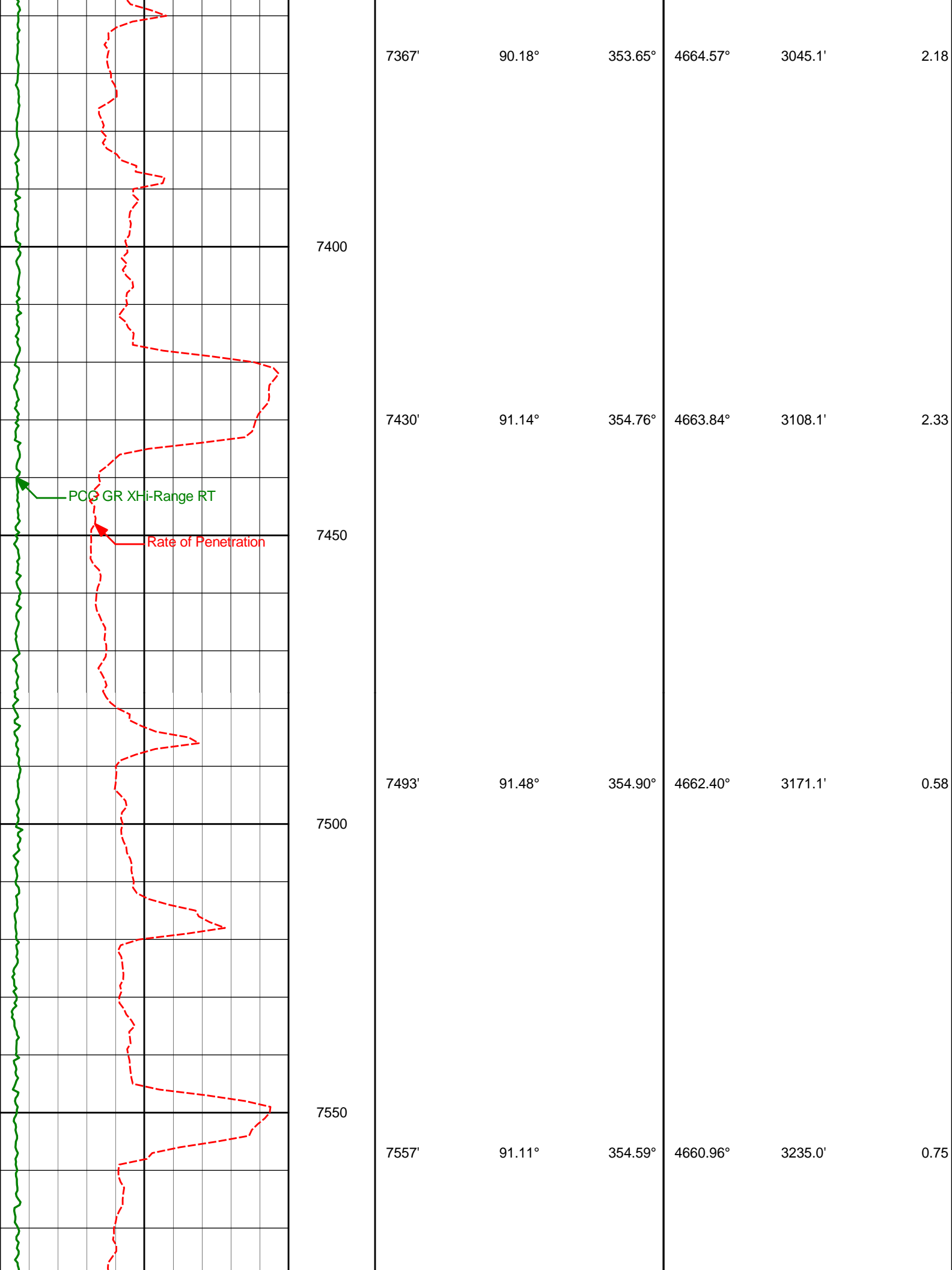
354.86°

4665.13°

2982.1'

0.35

7350



7367' 90.18° 353.65° 4664.57° 3045.1' 2.18

7400

7430' 91.14° 354.76° 4663.84° 3108.1' 2.33

7450

PCG GR XHi-Range RT

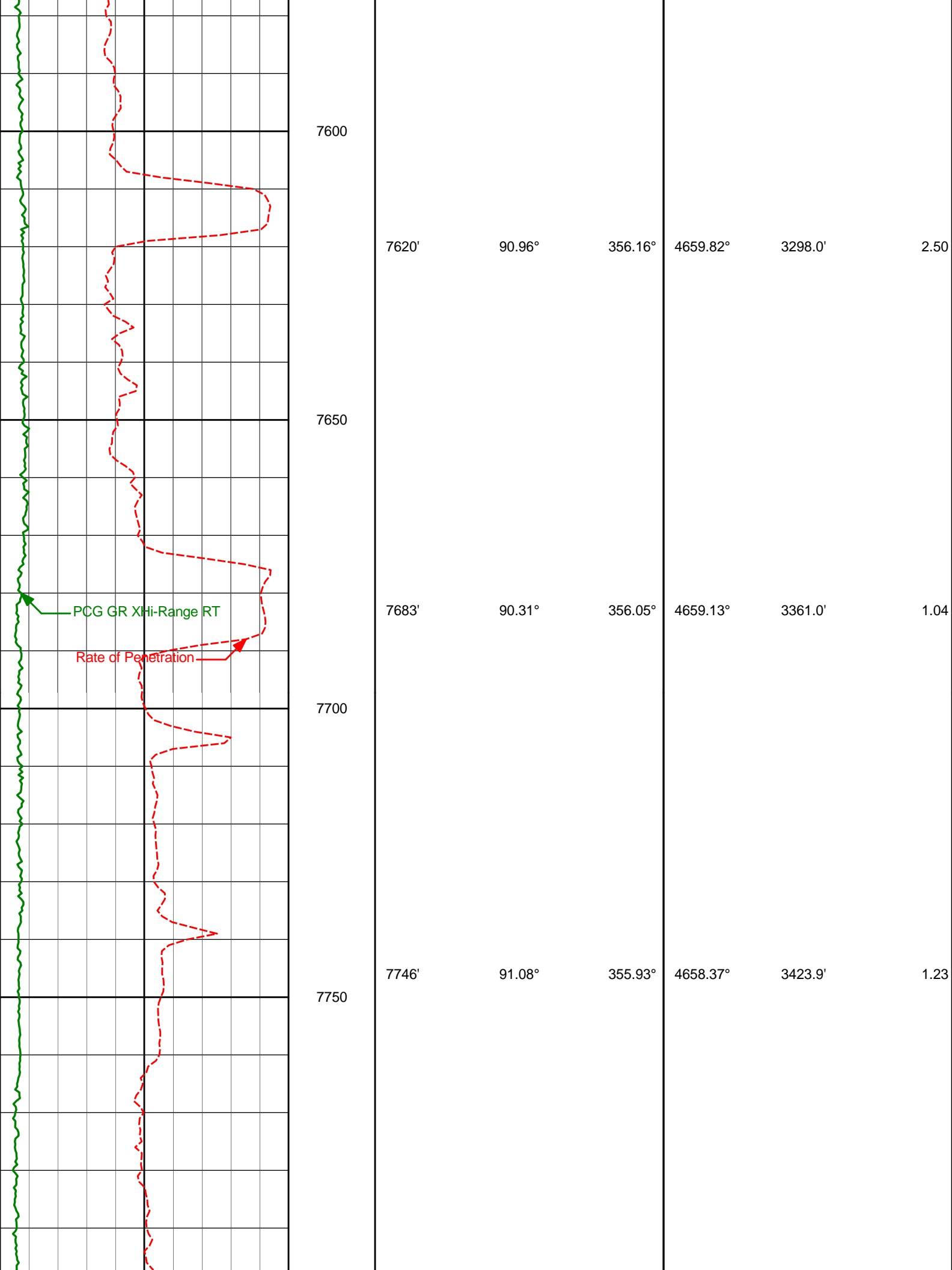
Rate of Penetration

7500

7493' 91.48° 354.90° 4662.40° 3171.1' 0.58

7550

7557' 91.11° 354.59° 4660.96° 3235.0' 0.75



7600

7620'

90.96°

356.16°

4659.82°

3298.0'

2.50

7650

7683'

90.31°

356.05°

4659.13°

3361.0'

1.04

7700

7746'

91.08°

355.93°

4658.37°

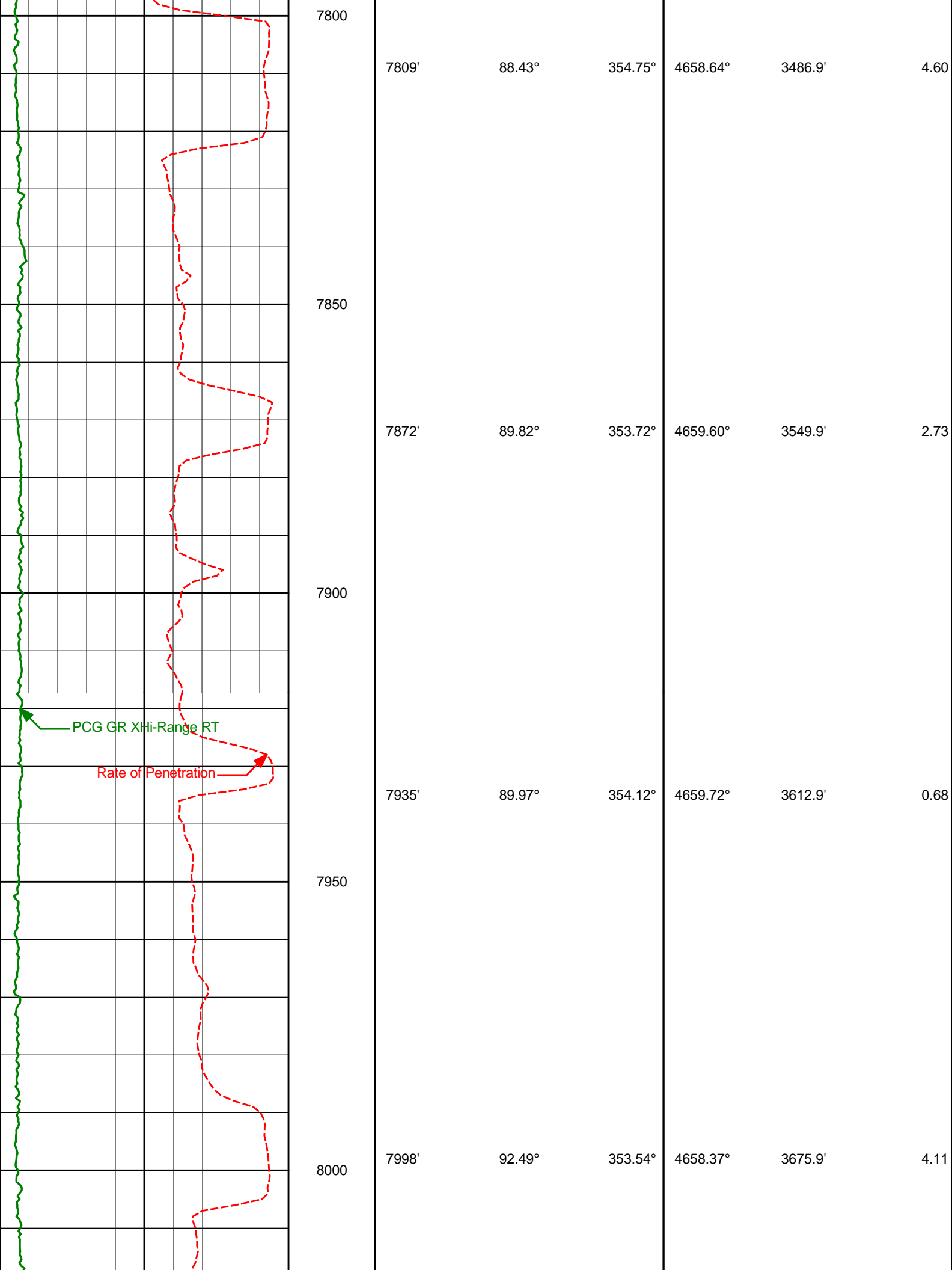
3423.9'

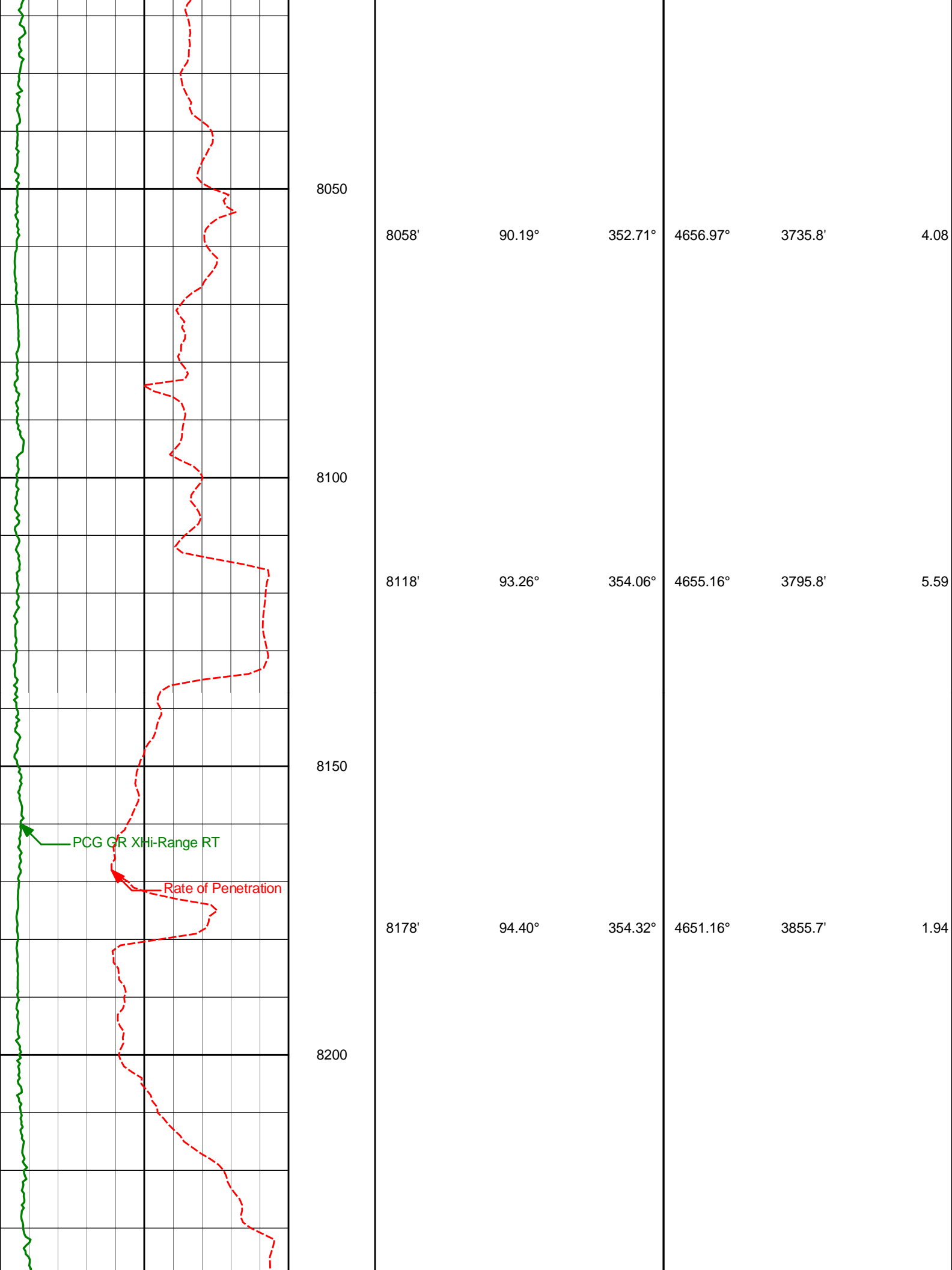
1.23

7750

PCG GR XHi-Range RT

Rate of Penetration





8050

8058'

90.19°

352.71°

4656.97°

3735.8'

4.08

8100

8118'

93.26°

354.06°

4655.16°

3795.8'

5.59

8150

PCG GR XHi-Range RT

Rate of Penetration

8178'

94.40°

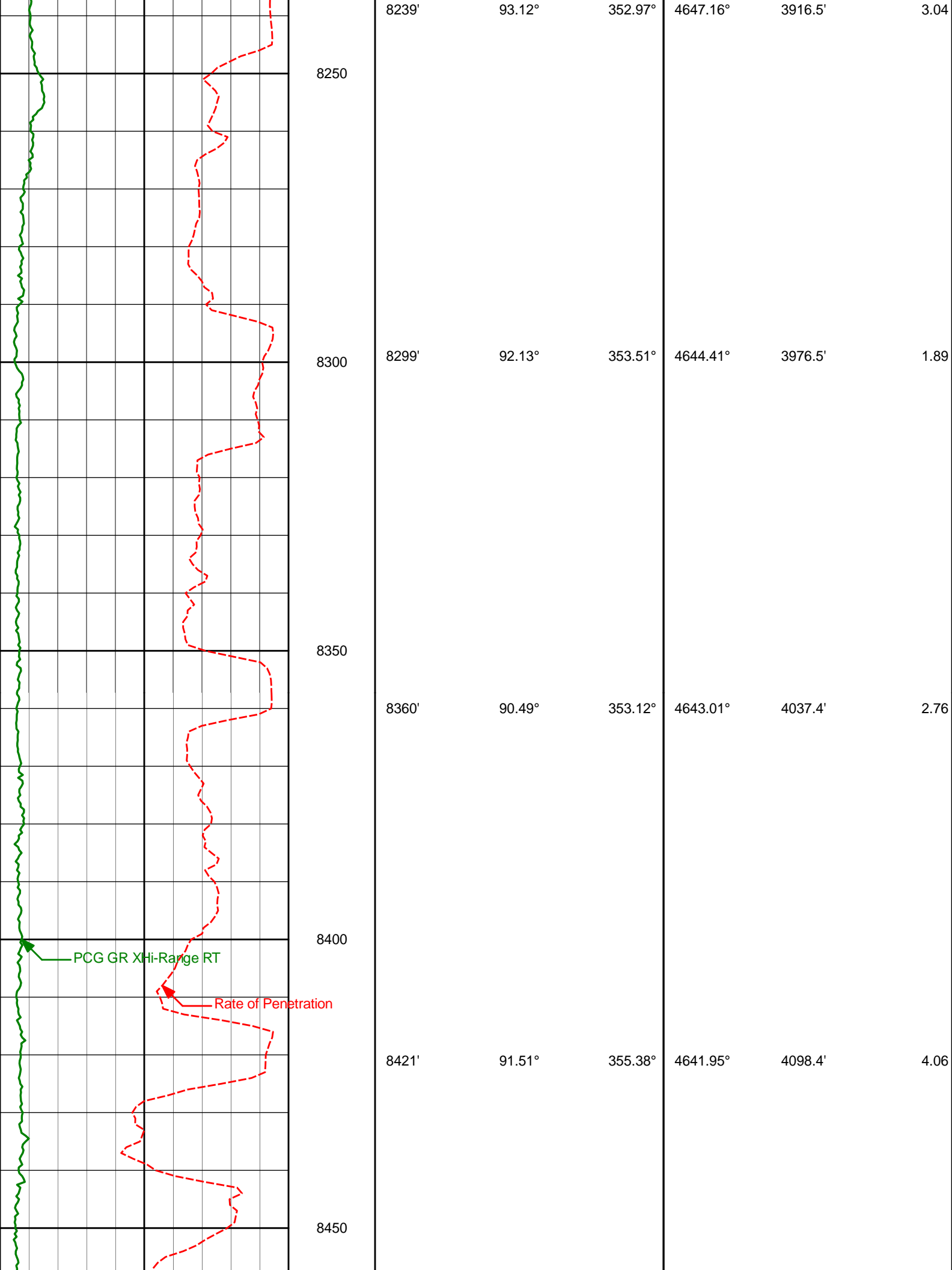
354.32°

4651.16°

3855.7'

1.94

8200



8250

8300

8350

8400

8450

8239'

93.12°

352.97°

4647.16°

3916.5'

3.04

8299'

92.13°

353.51°

4644.41°

3976.5'

1.89

8360'

90.49°

353.12°

4643.01°

4037.4'

2.76

8421'

91.51°

355.38°

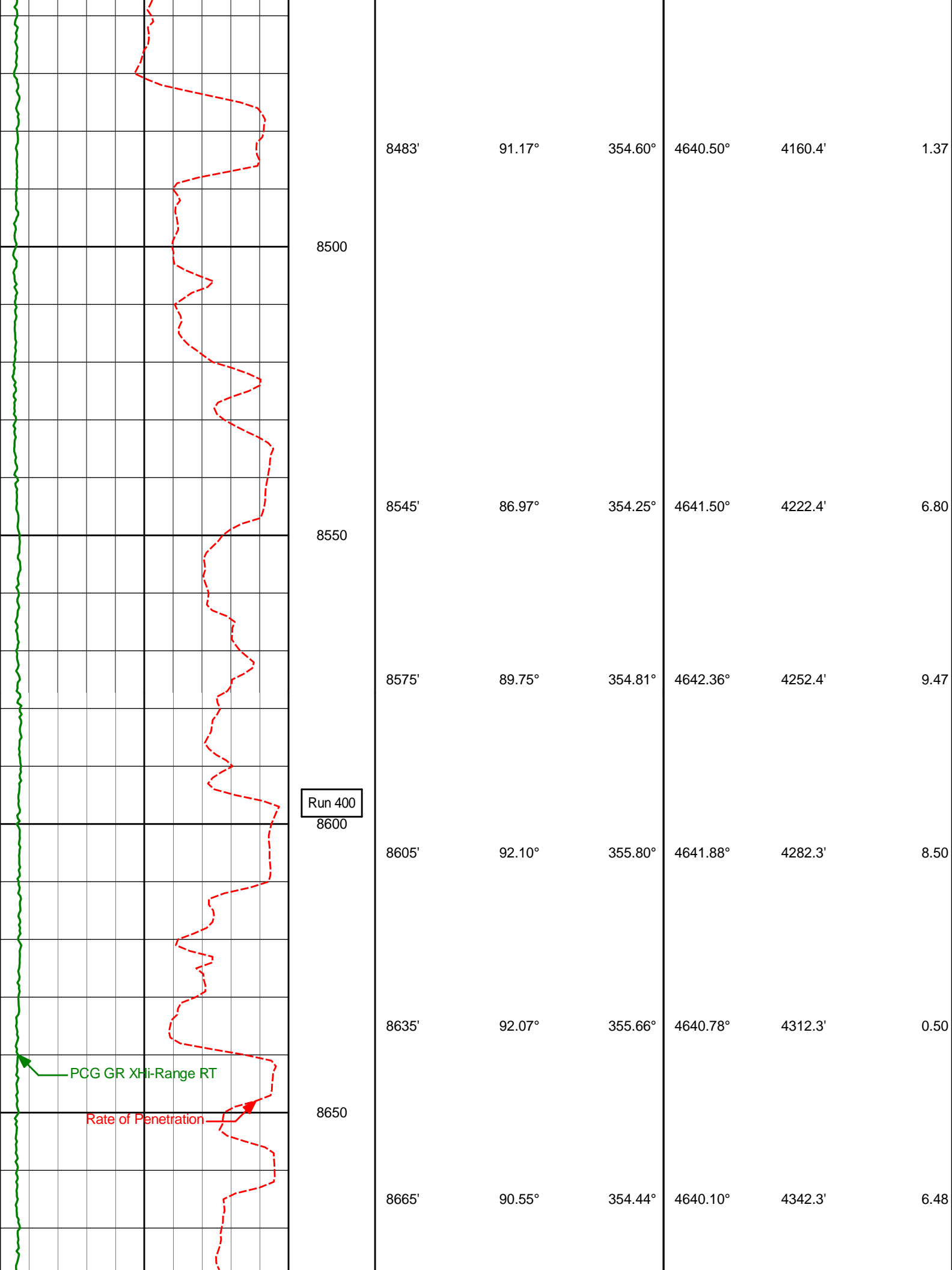
4641.95°

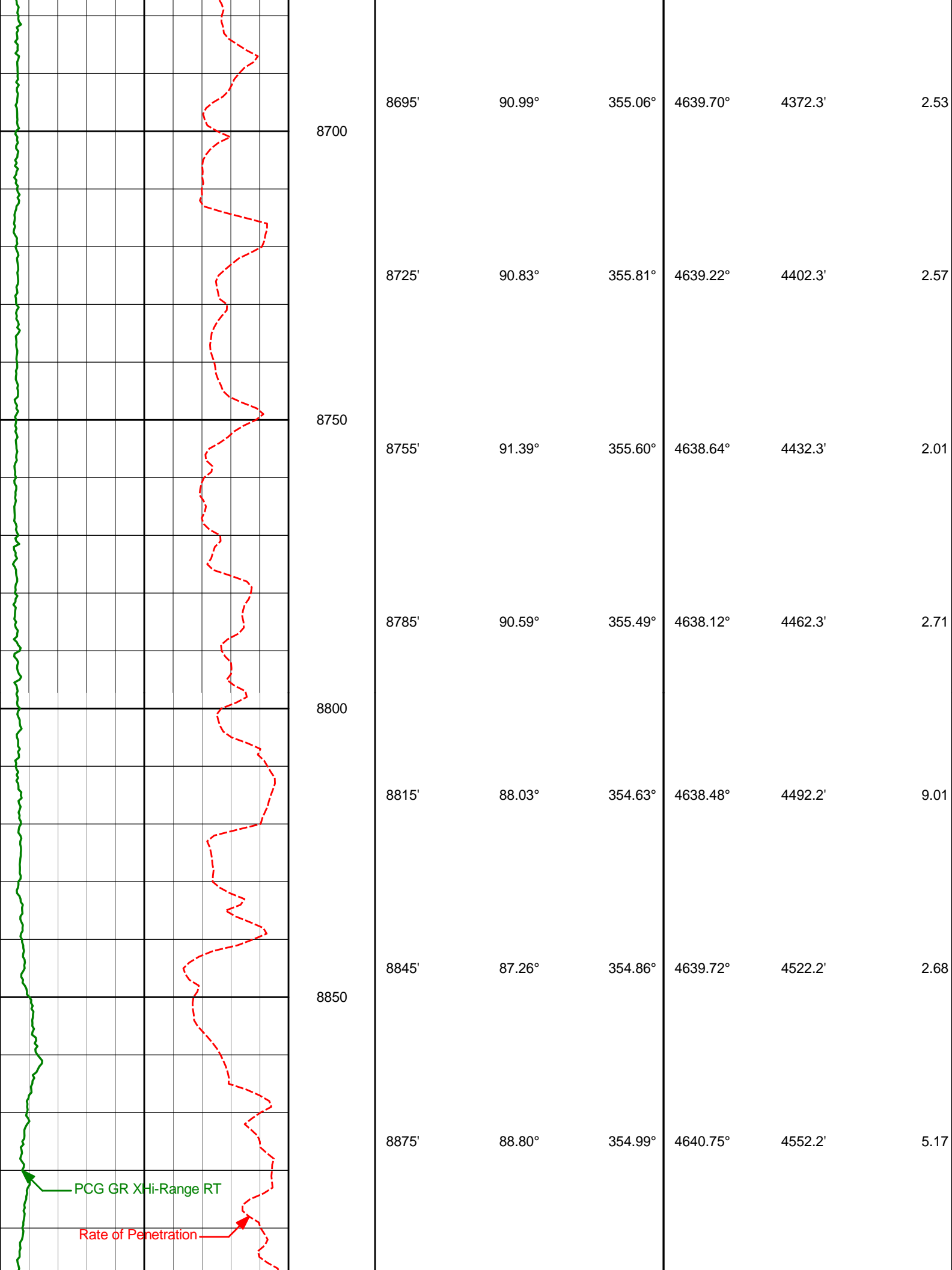
4098.4'

4.06

PCG GR XHi-Range RT

Rate of Penetration





8700

8750

8800

8850

8695'

90.99°

355.06°

4639.70°

4372.3'

2.53

8725'

90.83°

355.81°

4639.22°

4402.3'

2.57

8755'

91.39°

355.60°

4638.64°

4432.3'

2.01

8785'

90.59°

355.49°

4638.12°

4462.3'

2.71

8815'

88.03°

354.63°

4638.48°

4492.2'

9.01

8845'

87.26°

354.86°

4639.72°

4522.2'

2.68

8875'

88.80°

354.99°

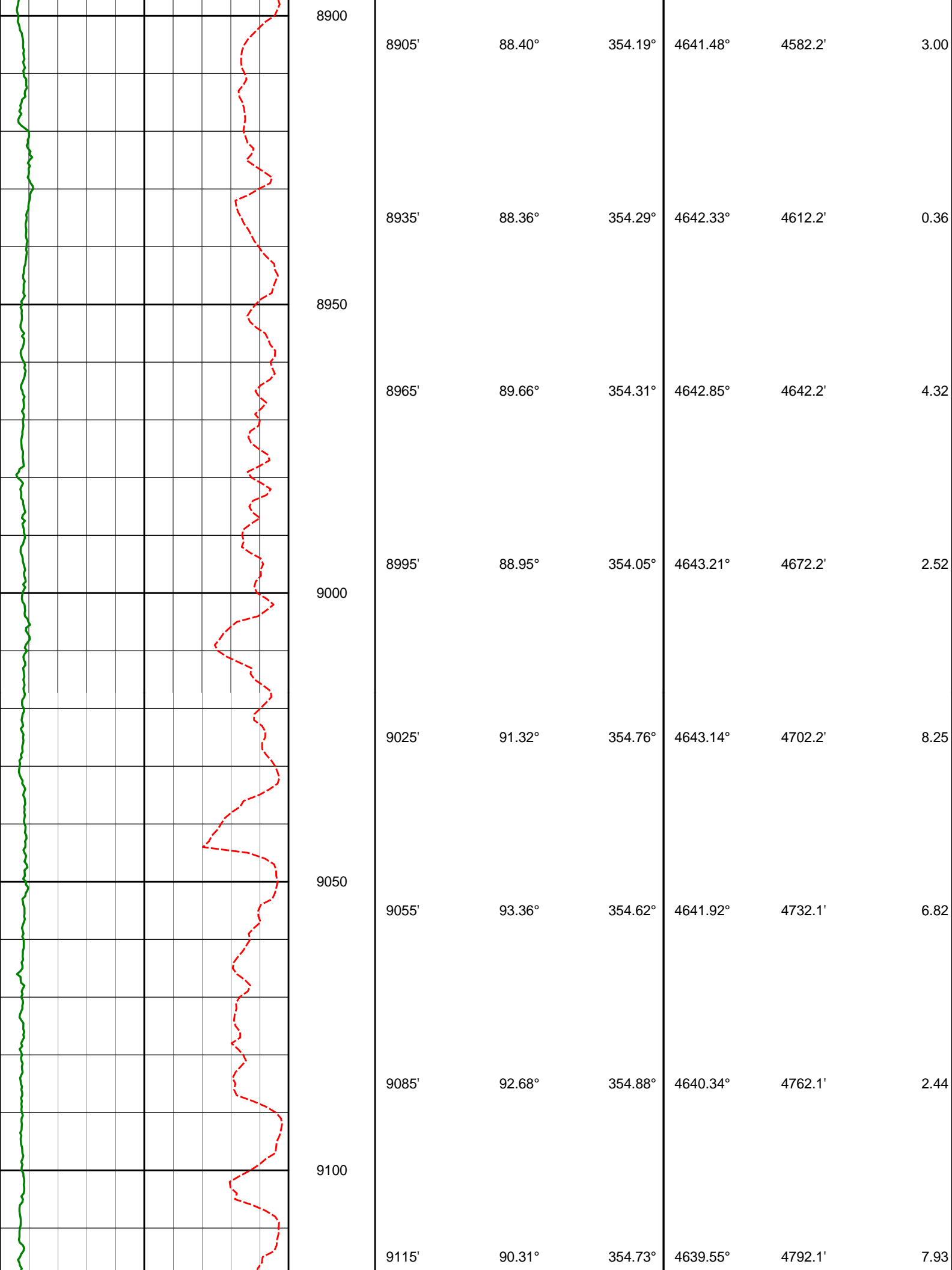
4640.75°

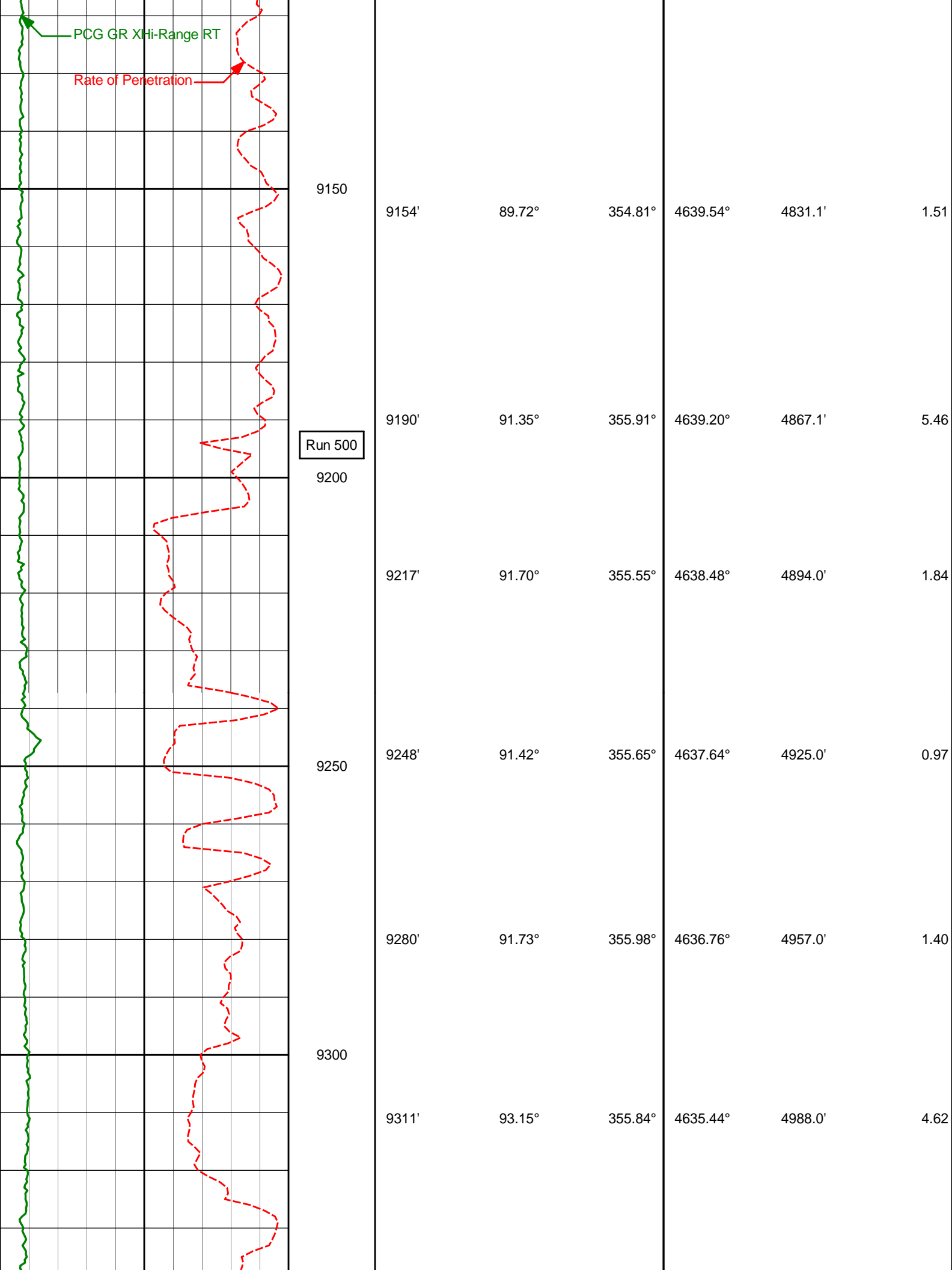
4552.2'

5.17

PCG GR XHi-Range RT

Rate of Penetration





PCG GR XHi-Range RT

Rate of Penetration

Run 500

9150

9190'

9200

9217'

9250

9280'

9300

9311'

9154'

89.72°

354.81°

4639.54°

4831.1'

1.51

9190'

91.35°

355.91°

4639.20°

4867.1'

5.46

9217'

91.70°

355.55°

4638.48°

4894.0'

1.84

9248'

91.42°

355.65°

4637.64°

4925.0'

0.97

9280'

91.73°

355.98°

4636.76°

4957.0'

1.40

9311'

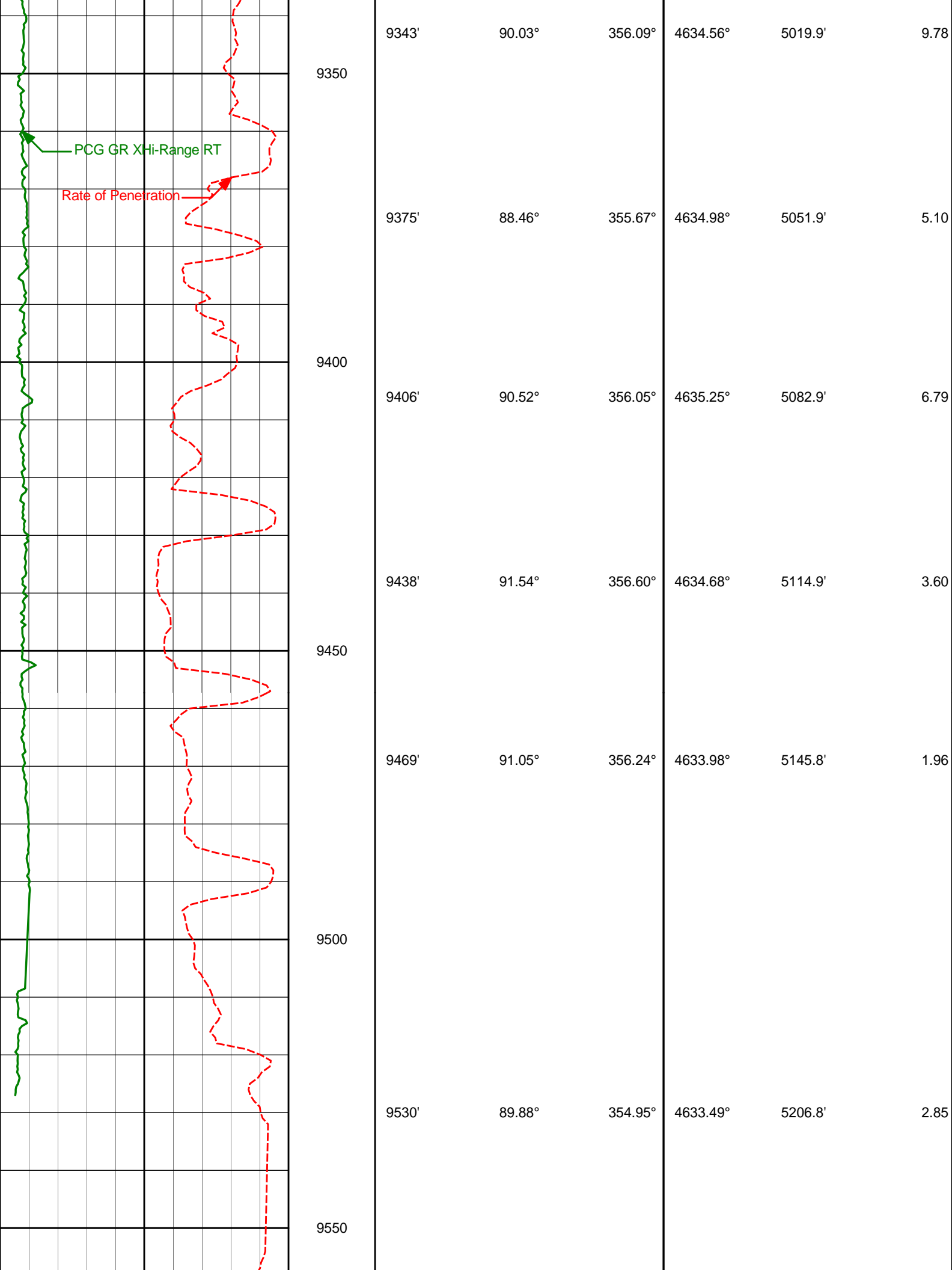
93.15°

355.84°

4635.44°

4988.0'

4.62



			9581'	89.88°	354.95°	4633.60°	5257.8'	0.01	
TD Well @ 9581' MD / 4633' TVD									
9600									
Rate of Penetration feet per hr			MD	Survey			Survey		
250			ft						
PCG GR XHi-Range RT api			1 : 240	Depth	Inclination	Azimuth	TVD	VSEC	DLS
0	250								

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Tapstone Energy
Leann 21-34-9 1H
Hibbord
Harper Kansas
USA

OK-XX-0901677326

Surveys from 892' MD to 9530' MD provided by Sperry Drilling Services. Final survey is a straight line projection to the bit at 9581' 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
892.00	0.48	110.38	891.99	1.30 S	3.50 E	-1.65	0.05
1082.00	0.39	72.45	1081.98	1.38 S	4.86 E	-1.87	0.16
1271.00	0.31	58.57	1270.98	0.92 S	5.91 E	-1.52	0.06
1461.00	0.22	82.10	1460.98	0.60 S	6.71 E	-1.29	0.07
1650.00	0.29	84.57	1649.98	0.51 S	7.55 E	-1.28	0.04
1839.00	0.33	99.41	1838.97	0.55 S	8.57 E	-1.43	0.05
2028.00	0.15	50.70	2027.97	0.48 S	9.31 E	-1.43	0.14
2217.00	0.06	226.42	2216.97	0.39 S	9.43 E	-1.36	0.11
2405.00	0.46	5.72	2404.97	0.30 N	9.44 E	-0.67	0.27
2593.00	0.20	104.91	2592.97	0.97 N	9.82 E	-0.04	0.28
2783.00	0.32	108.35	2782.97	0.72 N	10.63 E	-0.37	0.06
2972.00	0.27	150.05	2971.96	0.18 N	11.35 E	-0.99	0.11
3161.00	0.33	79.27	3160.96	0.10 S	12.10 E	-1.34	0.18
3349.00	0.17	64.99	3348.96	0.12 N	12.88 E	-1.20	0.09
3537.00	0.32	82.44	3536.96	0.31 N	13.66 E	-1.09	0.09
3725.00	0.13	129.71	3724.96	0.24 N	14.33 E	-1.23	0.13
3818.00	0.34	109.88	3817.96	0.08 N	14.67 E	-1.42	0.25
3850.00	0.48	7.46	3849.96	0.18 N	14.78 E	-1.33	2.03
3881.00	2.24	354.14	3880.95	0.91 N	14.74 E	-0.60	5.72
3913.00	4.47	351.60	3912.89	2.77 N	14.49 E	1.27	6.97
3944.00	7.08	350.38	3943.73	5.85 N	14.00 E	4.38	8.44
3976.00	9.39	349.15	3975.40	10.36 N	13.18 E	8.95	7.24
4007.00	10.76	348.67	4005.92	15.68 N	12.13 E	14.35	4.43
4039.00	12.04	349.94	4037.29	21.90 N	10.96 E	20.66	4.09
4070.00	13.53	352.75	4067.52	28.68 N	9.94 E	27.51	5.20
4102.00	14.92	352.66	4098.53	36.48 N	8.94 E	35.37	4.34

4133.00	17.55	352.81	4128.30	45.08 N	7.84 E	44.04	8.48
4165.00	20.97	353.22	4158.50	55.55 N	6.56 E	54.59	10.70
4197.00	24.25	354.83	4188.04	67.79 N	5.30 E	66.89	10.44
4228.00	26.28	355.88	4216.07	80.98 N	4.23 E	80.12	6.70
4260.00	28.95	355.45	4244.42	95.77 N	3.11 E	94.94	8.38
4291.00	31.35	354.34	4271.23	111.27 N	1.71 E	110.51	7.92
4322.00	33.59	353.49	4297.38	127.82 N	0.05 W	127.15	7.37
4353.00	35.81	352.74	4322.86	145.34 N	2.17 W	144.79	7.31
4385.00	38.79	352.31	4348.32	164.56 N	4.70 W	164.18	9.36
4417.00	41.39	352.72	4372.79	184.99 N	7.38 W	184.77	8.15
4449.00	42.82	352.60	4396.53	206.27 N	10.12 W	206.22	4.48
4480.00	45.14	352.88	4418.84	227.62 N	12.84 W	227.74	7.50
4511.00	47.57	352.82	4440.24	249.88 N	15.63 W	250.17	7.84
4542.00	49.95	352.37	4460.67	272.99 N	18.64 W	273.47	7.77
4573.00	53.15	352.49	4479.94	297.06 N	21.84 W	297.73	10.33
4605.00	56.91	352.91	4498.28	323.06 N	25.17 W	323.94	11.78
4636.00	59.89	353.17	4514.53	349.27 N	28.37 W	350.33	9.64
4668.00	61.32	353.67	4530.23	376.96 N	31.56 W	378.21	4.68
4699.00	61.33	353.96	4545.11	404.00 N	34.49 W	405.41	0.82
4731.00	61.03	354.40	4560.53	431.89 N	37.34 W	433.45	1.54
4762.00	61.29	354.78	4575.48	458.93 N	39.90 W	460.60	1.36
4793.00	61.72	354.86	4590.27	486.06 N	42.36 W	487.84	1.40
4825.00	61.78	355.46	4605.42	514.15 N	44.74 W	516.03	1.67
4857.00	63.99	355.57	4620.01	542.54 N	46.96 W	544.50	6.92
4889.00	67.54	354.91	4633.14	571.62 N	49.38 W	573.67	11.26
4918.00	71.05	354.31	4643.39	598.62 N	51.93 W	600.79	12.27
4950.00	74.44	354.00	4652.88	629.02 N	55.05 W	631.35	10.62
4981.00	77.19	353.45	4660.48	658.89 N	58.33 W	661.40	9.04
5011.00	79.41	354.19	4666.56	688.09 N	61.50 W	690.77	7.76
5100.00	85.62	354.89	4678.15	775.89 N	69.89 W	778.97	7.03
5132.00	88.70	354.57	4679.73	807.71 N	72.82 W	810.92	9.69
5163.00	90.06	353.54	4680.07	838.54 N	76.03 W	841.92	5.49
5194.00	90.06	352.26	4680.03	869.30 N	79.86 W	872.91	4.14
5225.00	90.62	351.79	4679.85	900.00 N	84.16 W	903.89	2.34
5257.00	90.00	351.92	4679.68	931.68 N	88.70 W	935.86	1.97
5289.00	91.91	353.37	4679.15	963.41 N	92.79 W	967.85	7.50
5320.00	89.91	353.13	4678.65	994.19 N	96.43 W	998.84	6.52
5352.00	89.81	353.47	4678.73	1025.97 N	100.17 W	1030.83	1.09
5384.00	89.45	352.73	4678.94	1057.74 N	104.01 W	1062.83	2.58
5415.00	89.14	353.98	4679.32	1088.53 N	107.60 W	1093.82	4.16
5447.00	88.34	354.61	4680.02	1120.36 N	110.78 W	1125.81	3.20
5478.00	87.94	354.41	4681.03	1151.20 N	113.74 W	1156.80	1.45
5510.00	90.00	354.44	4681.61	1183.04 N	116.85 W	1188.79	6.45
5541.00	89.57	354.09	4681.73	1213.89 N	119.95 W	1219.79	1.79
5573.00	89.38	353.67	4682.02	1245.70 N	123.36 W	1251.79	1.45
5635.00	90.59	353.73	4682.03	1307.33 N	130.16 W	1313.78	1.94
5667.00	90.62	353.76	4681.70	1339.14 N	133.64 W	1345.78	0.14
5730.00	91.05	354.19	4680.78	1401.78 N	140.25 W	1408.77	0.97
5793.00	91.29	355.11	4679.50	1464.49 N	146.12 W	1471.76	1.51
5856.00	89.94	354.61	4678.82	1527.23 N	151.77 W	1534.75	2.29
5919.00	90.83	355.35	4678.40	1589.99 N	157.28 W	1597.74	1.84
5951.00	91.39	355.29	4677.77	1621.88 N	159.89 W	1629.72	1.76
6014.00	89.78	354.80	4677.13	1684.64 N	165.33 W	1692.71	2.66
6077.00	90.03	355.07	4677.23	1747.39 N	170.89 W	1755.70	0.57
6140.00	90.37	355.62	4677.01	1810.18 N	176.01 W	1818.69	1.02
6202.00	90.40	354.96	4676.59	1871.97 N	181.10 W	1880.67	1.06
6265.00	90.77	355.27	4675.95	1934.74 N	186.46 W	1943.66	0.77
6329.00	90.03	353.76	4675.50	1998.44 N	192.58 W	2007.66	2.62
6392.00	89.75	353.82	4675.62	2061.07 N	199.39 W	2070.65	0.45
6486.00	89.38	351.97	4676.33	2154.34 N	211.02 W	2164.63	2.01
6549.00	90.43	352.02	4676.43	2216.73 N	219.79 W	2227.58	1.67
6612.00	90.86	352.69	4675.72	2279.16 N	228.17 W	2290.55	1.27
6675.00	90.99	351.83	4674.70	2341.58 N	236.66 W	2353.51	1.38
6738.00	90.68	351.58	4673.79	2403.92 N	245.75 W	2416.44	0.63
6801.00	90.62	351.05	4673.07	2466.19 N	255.26 W	2479.36	0.84
6865.00	91.75	351.58	4671.75	2529.44 N	264.92 W	2543.27	1.96
6928.00	89.54	352.13	4671.04	2591.80 N	273.84 W	2606.21	3.62
6990.00	90.99	352.77	4670.75	2653.26 N	281.99 W	2668.19	2.55
7053.00	91.20	352.06	4669.55	2715.69 N	290.30 W	2731.15	1.18
7115.00	91.02	354.44	4668.35	2777.25 N	297.59 W	2793.12	3.85
7178.00	91.11	354.08	4667.18	2839.92 N	303.89 W	2856.11	0.58
7241.00	90.90	354.65	4666.08	2902.61 N	310.08 W	2919.10	0.96
7304.00	90.83	354.86	4665.13	2965.33 N	315.84 W	2982.09	0.35
7367.00	90.18	353.65	4664.57	3028.01 N	322.15 W	3045.09	2.18

7430.00	91.14	354.76	4663.84	3090.69 N	328.52 W	3108.08	2.33
7493.00	91.48	354.90	4662.40	3153.41 N	334.19 W	3171.06	0.58
7557.00	91.11	354.59	4660.96	3217.13 N	340.05 W	3235.04	0.75
7620.00	90.96	356.16	4659.82	3279.91 N	345.14 W	3298.01	2.50
7683.00	90.31	356.05	4659.13	3342.76 N	349.42 W	3360.97	1.04
7746.00	91.08	355.93	4658.37	3405.60 N	353.82 W	3423.93	1.23
7809.00	88.43	354.75	4658.64	3468.38 N	358.94 W	3486.91	4.60
7872.00	89.82	353.72	4659.60	3531.06 N	365.27 W	3549.90	2.73
7935.00	89.97	354.12	4659.72	3593.70 N	371.94 W	3612.90	0.68
7998.00	92.49	353.54	4658.37	3656.32 N	378.70 W	3675.88	4.11
8058.00	90.19	352.71	4656.97	3715.87 N	385.88 W	3735.85	4.08
8118.00	93.26	354.06	4655.16	3775.43 N	392.79 W	3795.81	5.59
8178.00	94.40	354.32	4651.16	3834.99 N	398.85 W	3855.67	1.94
8239.00	93.12	352.97	4647.16	3895.48 N	405.60 W	3916.54	3.04
8299.00	92.13	353.51	4644.41	3955.00 N	412.65 W	3976.46	1.89
8360.00	90.49	353.12	4643.01	4015.57 N	419.75 W	4037.44	2.76
8421.00	91.51	355.38	4641.95	4076.24 N	425.86 W	4098.43	4.06
8483.00	91.17	354.60	4640.50	4137.99 N	431.27 W	4160.40	1.37
8545.00	86.97	354.25	4641.50	4199.68 N	437.29 W	4222.38	6.80
8575.00	89.75	354.81	4642.36	4229.52 N	440.15 W	4252.36	9.47
8605.00	92.10	355.80	4641.88	4259.42 N	442.60 W	4282.35	8.50
8635.00	92.07	355.66	4640.78	4289.31 N	444.84 W	4312.32	0.50
8665.00	90.55	354.44	4640.10	4319.19 N	447.43 W	4342.30	6.48
8695.00	90.99	355.06	4639.70	4349.06 N	450.17 W	4372.30	2.53
8725.00	90.83	355.81	4639.22	4378.96 N	452.56 W	4402.29	2.57
8755.00	91.39	355.60	4638.64	4408.87 N	454.80 W	4432.27	2.01
8785.00	90.59	355.49	4638.12	4438.78 N	457.13 W	4462.26	2.71
8815.00	88.03	354.63	4638.48	4468.66 N	459.72 W	4492.25	9.01
8845.00	87.26	354.86	4639.72	4498.51 N	462.47 W	4522.22	2.68
8875.00	88.80	354.99	4640.75	4528.37 N	465.12 W	4552.20	5.17
8905.00	88.40	354.19	4641.48	4558.23 N	467.94 W	4582.19	3.00
8935.00	88.36	354.29	4642.33	4588.07 N	470.95 W	4612.18	0.36
8965.00	89.66	354.31	4642.85	4617.91 N	473.93 W	4642.17	4.32
8995.00	88.95	354.05	4643.21	4647.76 N	476.97 W	4672.17	2.52
9025.00	91.32	354.76	4643.14	4677.61 N	479.90 W	4702.17	8.25
9055.00	93.36	354.62	4641.92	4707.46 N	482.67 W	4732.14	6.82
9085.00	92.68	354.88	4640.34	4737.29 N	485.41 W	4762.09	2.44
9115.00	90.31	354.73	4639.55	4767.15 N	488.13 W	4792.08	7.93
9154.00	89.72	354.81	4639.54	4805.99 N	491.68 W	4831.08	1.51
9190.00	91.35	355.91	4639.20	4841.87 N	494.60 W	4867.06	5.46
9217.00	91.70	355.55	4638.48	4868.79 N	496.61 W	4894.04	1.84
9248.00	91.42	355.65	4637.64	4899.68 N	498.98 W	4925.02	0.97
9280.00	91.73	355.98	4636.76	4931.59 N	501.32 W	4957.00	1.40
9311.00	93.15	355.84	4635.44	4962.48 N	503.52 W	4987.95	4.62
9343.00	90.03	356.09	4634.56	4994.38 N	505.77 W	5019.92	9.78
9375.00	88.46	355.67	4634.98	5026.30 N	508.07 W	5051.90	5.10
9406.00	90.52	356.05	4635.25	5057.21 N	510.31 W	5082.88	6.79
9438.00	91.54	356.60	4634.68	5089.14 N	512.36 W	5114.85	3.60
9469.00	91.05	356.24	4633.98	5120.07 N	514.30 W	5145.82	1.96
9530.00	89.88	354.95	4633.49	5180.89 N	518.99 W	5206.80	2.85
9581.00	89.88	354.95	4633.60	5231.69 N	523.48 W	5257.79	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 DIRECTION OF 354.12 DEGREES (GRID)
A TOTAL CORRECTION OF 4.54 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 9581.00 FEET
IS 5257.81 FEET ALONG 354.29 DEGREES (GRID)**

Surveys from 892' MD to 9530' MD provided by Sperry Drilling Services. Final survey is a straight line projection to the bit at 9581' MD.