

Natural Gamma Ray Rate Of Penetration



1 : 240

County	: Harper		
Field	: Wildcat		
Location	: Lat: 37° 10' 2.82" North Long: 98° 3' 21.10" West		
Well	: Lockwood Farms 3307 14-1H		
Company	: Shell Exploration Production Co		
Rig	: Nabors 102		
LOCATION	Company : Shell Exploration Production Co Rig : Nabors 102 Well : Lockwood Farms 3307 14-1H Field : Wildcat County : Harper API Number : 15-077-21772		
	Latitude : 37° 10' 2.82" North Longitude : 98° 3' 21.10" West UTM Easting = 2,129,423.39 ft UTM Northing = 182,652.64 ft	Other Services Directional	
Permanent Datum	: Ground Level	Elevation : 1350.40 ft	Elev. KB N/A
Log Measured From	: Drill Floor	31.70 ft Above Permanent Datum	DF 1382.10 ft GL 1350.40 ft WD N/A
Drilling Measured From	: Drill Floor	TVD LOG	
Depth Logged	: 90.00 ft To 4,725.55 ft	Unit No. : PP46	Job No. : OK-XX-0009199477
Date Logged	: 01-Feb-12 To 20-Mar-12	Plot Type : Final	
Total Depth MD	: 9,450.00 ft TVD : 4,725.55 ft	Plot Date : 11-Apr-12	
Spud Date	: 01-Feb-12		
Run No.	Size	Borehole Record (TVD)	
	From	To	From
	From	To	From
	From	To	From
	From	To	From
1	12.250 in	90.00 ft	720.99 ft
2	8.750 in	720.99 ft	4,300.48 ft
3	8.750 in	4,300.48 ft	4,557.26 ft
4	6.125 in	4,557.26 ft	4,591.43 ft
5	6.125 in	4,591.43 ft	4,725.55 ft
		Size	Casing Record (TVD)
		From	From
		From	To
		Weight	From
		36.00 lbpf	720.99 ft
		9.625 in	4,557.37 ft
		36.00 lbpf	
		9.625 in	

WELL INFORMATION

MWD Run Number	200	300	400	500
Date run completed	09-Mar-12	12-Mar-12	17-Mar-12	20-Mar-12
Rig Bit Number	2	3	4	5
Bit Size (in)	8.750	8.750	6.125	6.125
Tool Nominal OD (in)	6.750	6.750	4.750	4.750
Log Start Depth (TVD, ft)	720.99	4,300.48	4,557.26	4,591.43
Log End Depth (TVD, ft)	4,300.48	4,557.26	4,591.43	4,725.55
Drill or Wipe	Drill	Drill	Drill	Drill
Drill/Wipe Start Date and Time	06-Mar-12 17:30	10-Mar-12 06:00	15-Mar-12 23:00	18-Mar-12 03:20
Drill/Wipe End Date and Time	09-Mar-12 15:00	11-Mar-12 19:30	17-Mar-12 14:00	20-Mar-12 10:30
Min Inc (deg) @ Depth (TVD, ft)	.03 @ 3,587.92	46.70 @ 4,318.74	86.79 @ 4,579.22	86.02 @ 4,620.20
Max Inc (deg) @ Depth (TVD, ft)	38.54 @ 4,253.83	90.49 @ 4,557.77	91.11 @ 4,591.37	88.28 @ 4,591.88
Bit TFA(in2) / Bit Type	.56 / PDC	.46 / PDC	.38 / PDC	0 / PDC
Flow Rate (gpm)	500.00	550.00	250.00	250.00
Max AV (fpm) / CV (fpm) @ MWD	35.0 / 57.0	59.0 / 120.0	123.0 / 132.0	90.0 / 220.0
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel
Density (ppg) / Viscosity (spqt)	8.85 / 32.00	9.10 / 47.00	8.60 / 32.00	8.50 / 52.00
Filtrate CL (ppm)	600.00	1,300.00	600.00	440.00
pH / Fluid Loss (mptm)	8.50 / 1	10.00 / 68	8.60 / 1	8.50 / 1
PV (cP) / YP (Ihf2)	3 / 1.00	16 / 15.00	3 / 1.00	6 / 6.00
% Solids / % Sand	1.20 / 0.50	4.80 / 0.50	1.20 / 0.50	1.20 / 0.50
% Oil / Oil:Water Ratio	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
Rmf @ Measured Temp (degF)	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
Max Tool Temp (degF) / Source	107.00 / PCM	150.00 / PCM	137.50 / PCM	139.96 / PCM
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A
Lead MWD Engineer	RJ Pike	RJ Pike	RJ Pike	RJ Pike
Customer Representative	Josh Kirk	Josh Kirk	Josh Kirk	Josh Kirk

SENSOR INFORMATION

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC	PCDC	
Distance From Bit (ft)	57.96	51.26	59.17	59.17	
Software Version	6.21	6.21	6.21	6.21	
Sub Serial Number	11254964	11254964	11595279	11595279	
Sonde Serial Number	400830	11638596	400880	400880	
Sensor ID Number	N/A	N/A	N/A	N/A	
Toolface Offset (deg)	277.45	192.28	234.94	144.89	

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG	PCG	
Distance From Bit (ft)	63.46	57.48	52.95	52.95	
Recorded Sample Period (sec)	25	25	25	25	
Software Version	8.15	8.15	8.15	8.15	
Sub Serial Number	11254964	11254964	11595279	11595279	
Insert/Sonde Serial Number	11293350	11293350	11680935	11680935	

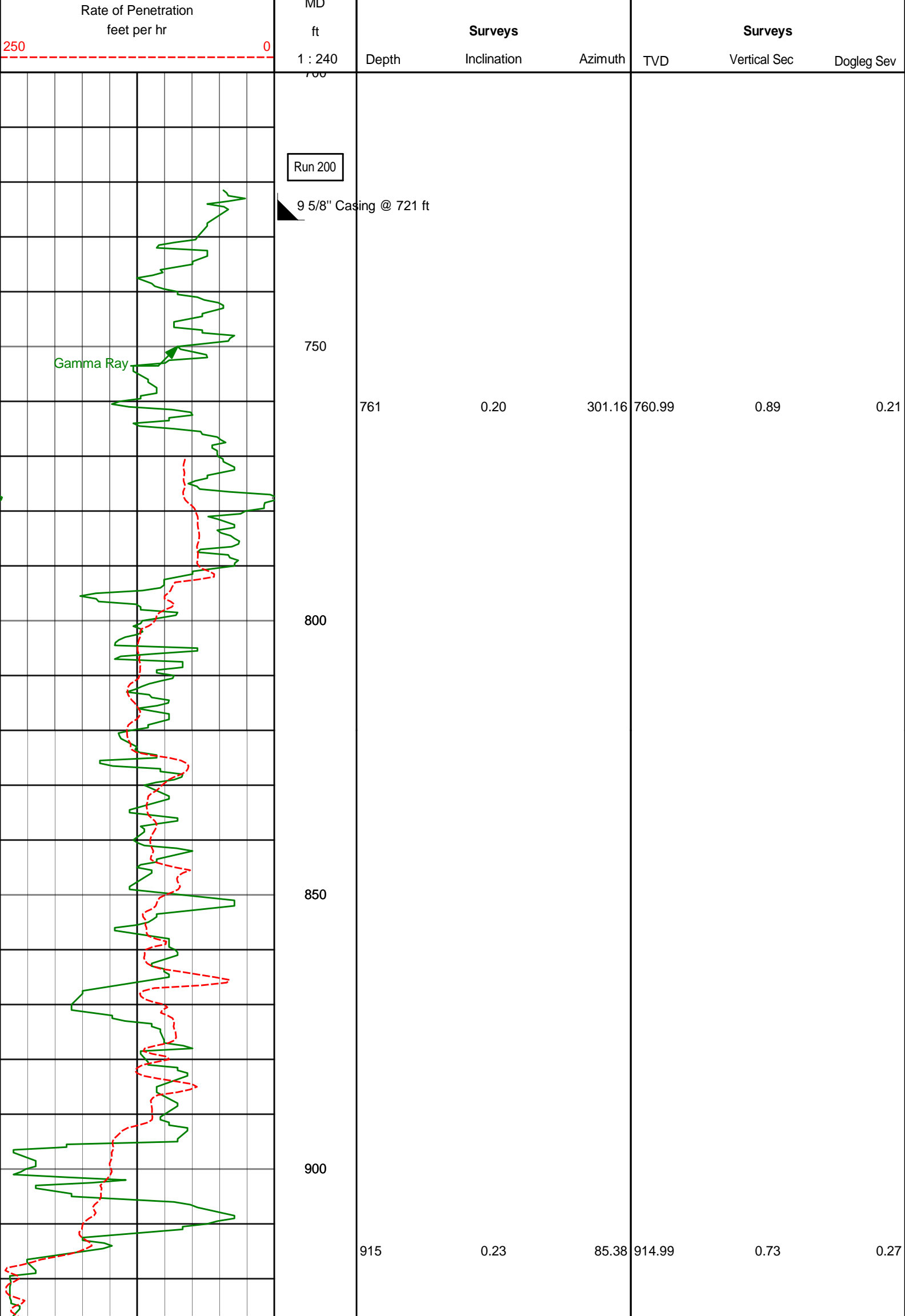
REMARKS

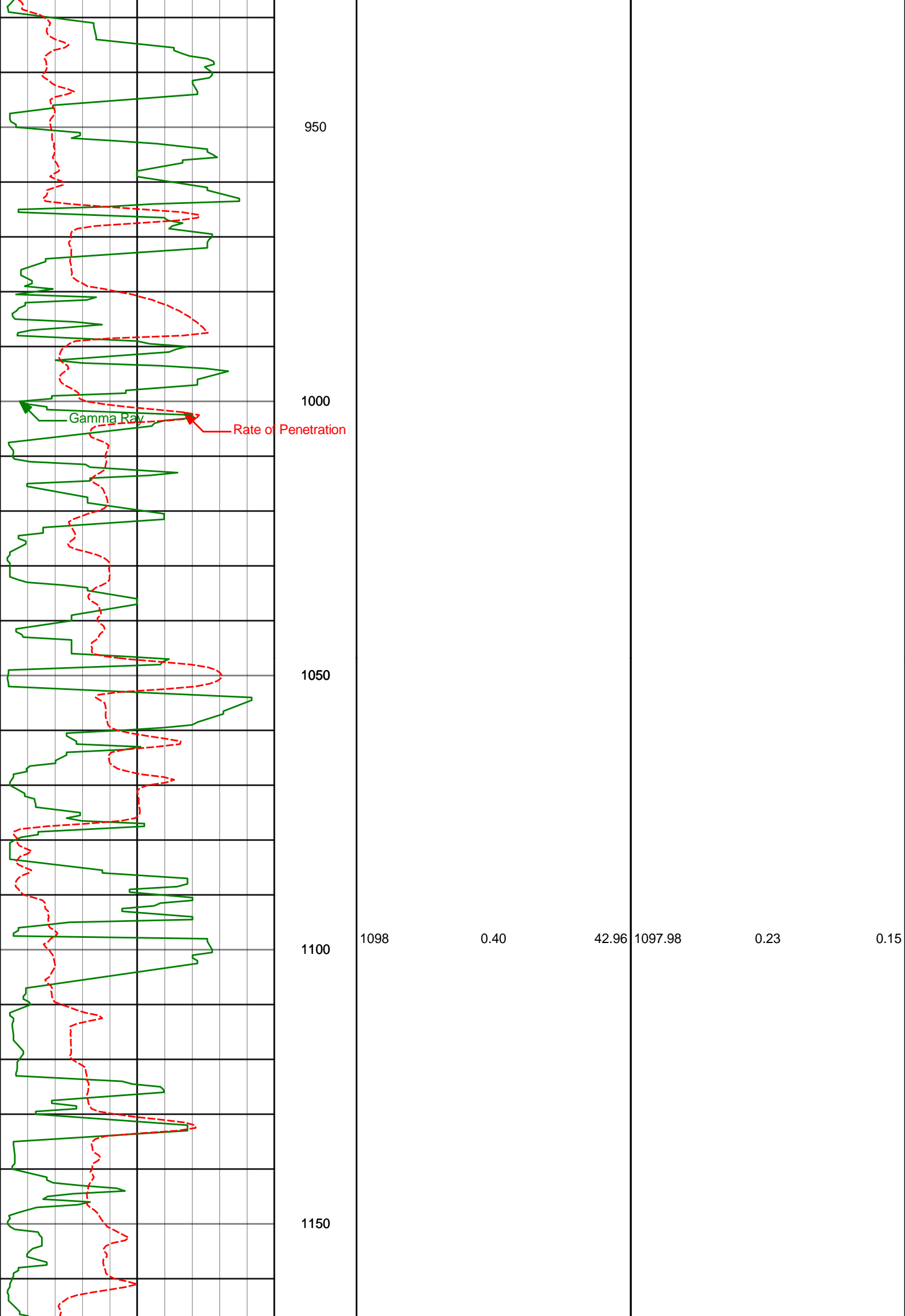
1. All depths are calibrated to the driller's pipe tally and are measured from the rotary table.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
4. The following smoothing parameters have been applied to the data:
 - ROP: 1.0 ft interval, 3.0 ft coercion distance.
 - GAMMA: 0.5 ft interval, 0.6 ft coercion distance.

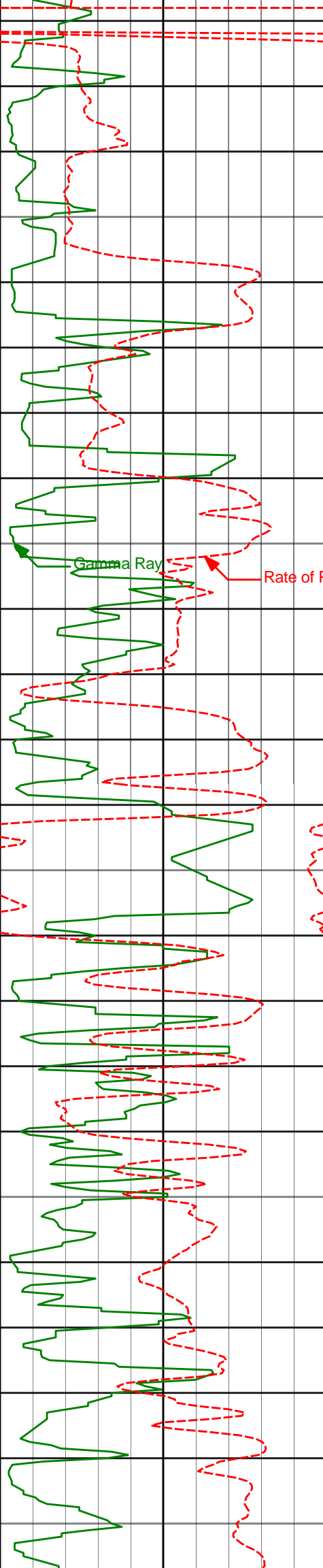
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Gamma Ray api	0	150			
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1200

1250

1300

1350

1400

Gamma Ray

Rate of Penetration

1289

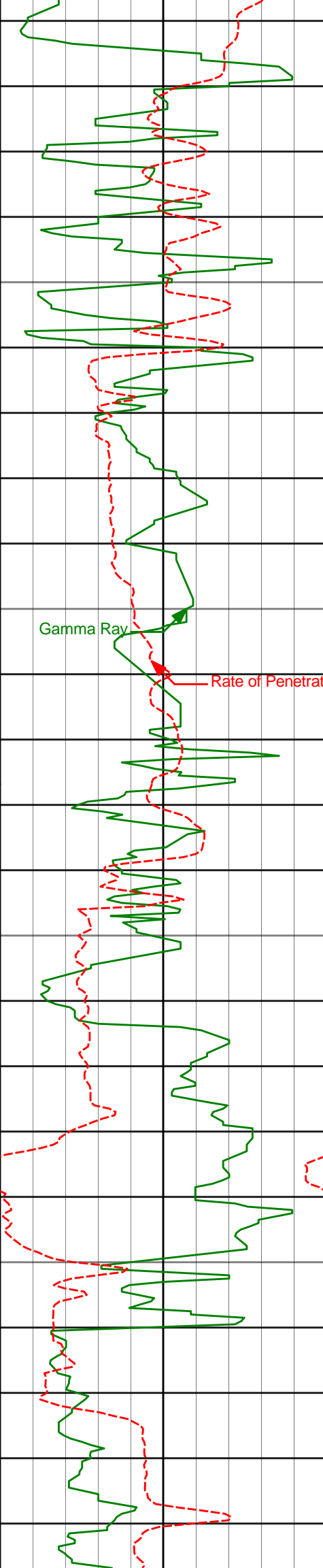
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262.03

1288.98

-0.21

0.29



1450

1500

1550

1600

1481

0.09

63.97

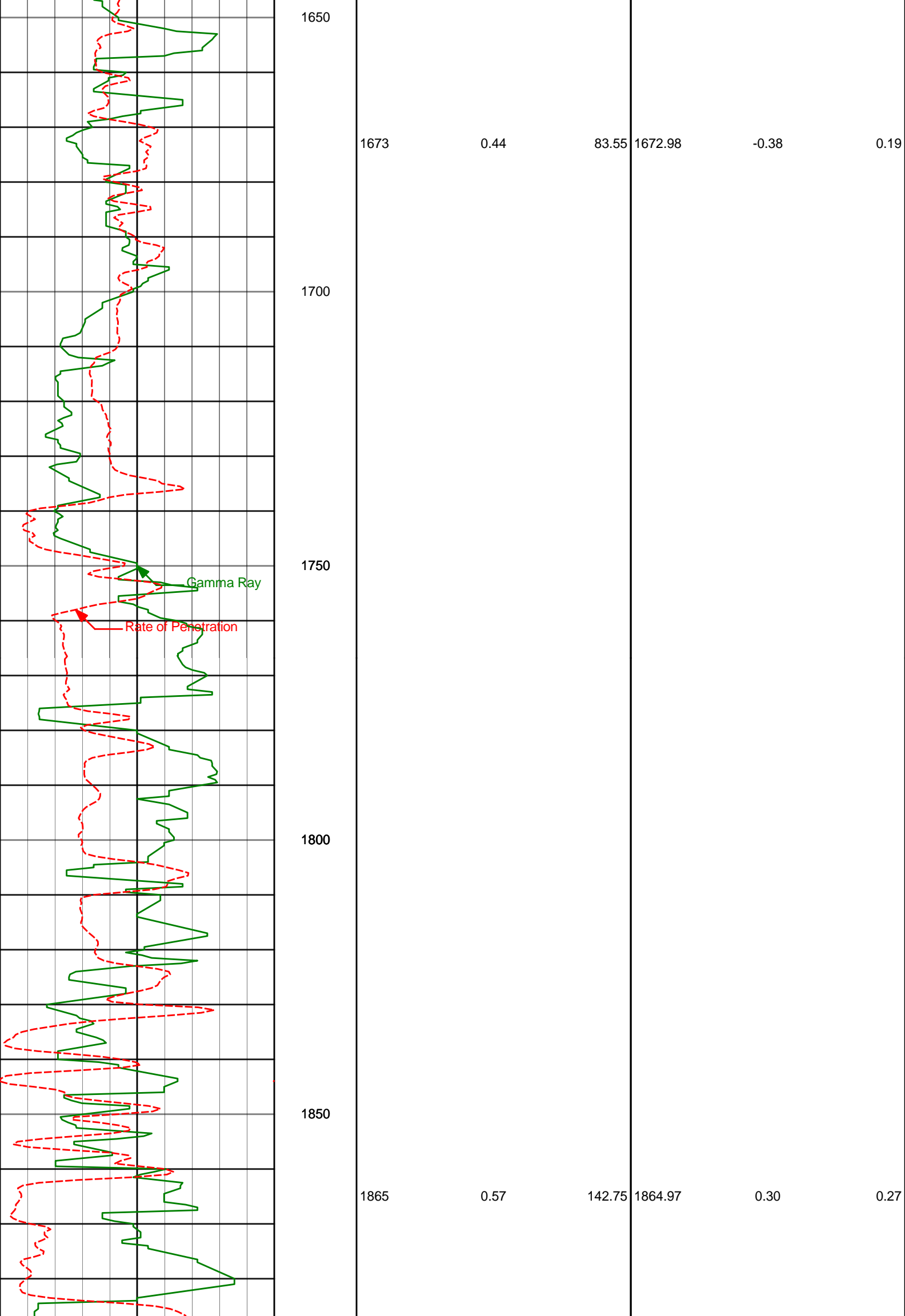
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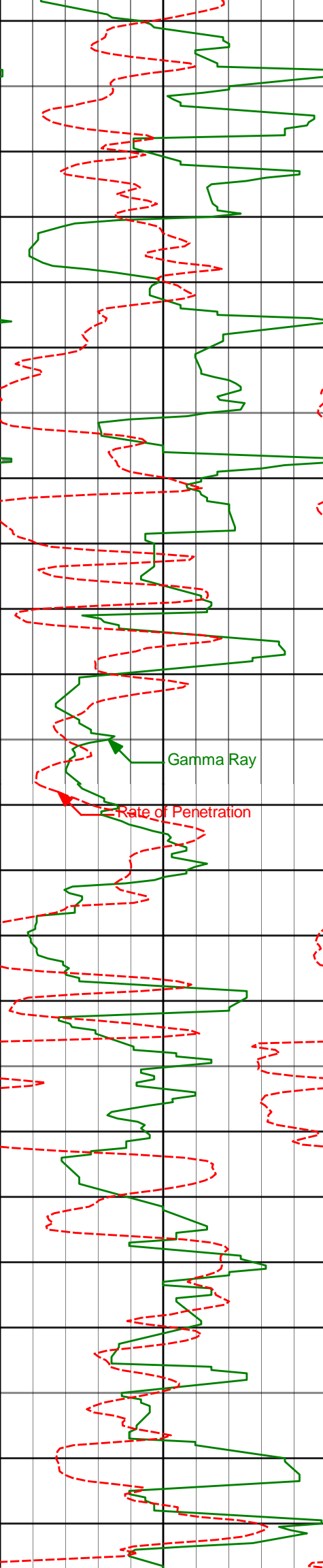
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0.14

Gamma Ray

Rate of Penetration





1900

1950

2000

2050

2100

Gamma Ray

Rate of Penetration

2057

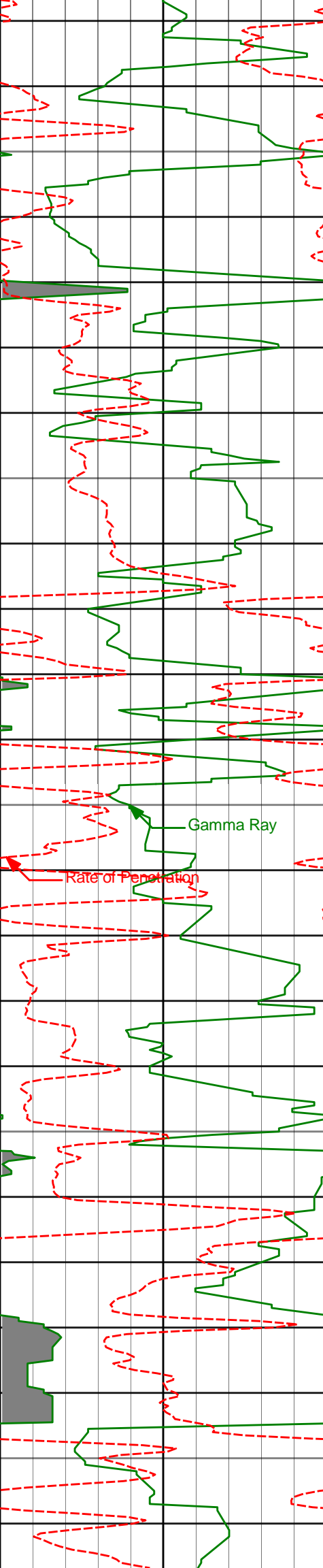
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158.06

2056.96

1.88

0.08



2150

2200

2250

2300

2350

Gamma Ray

Rate of Penetration

2248

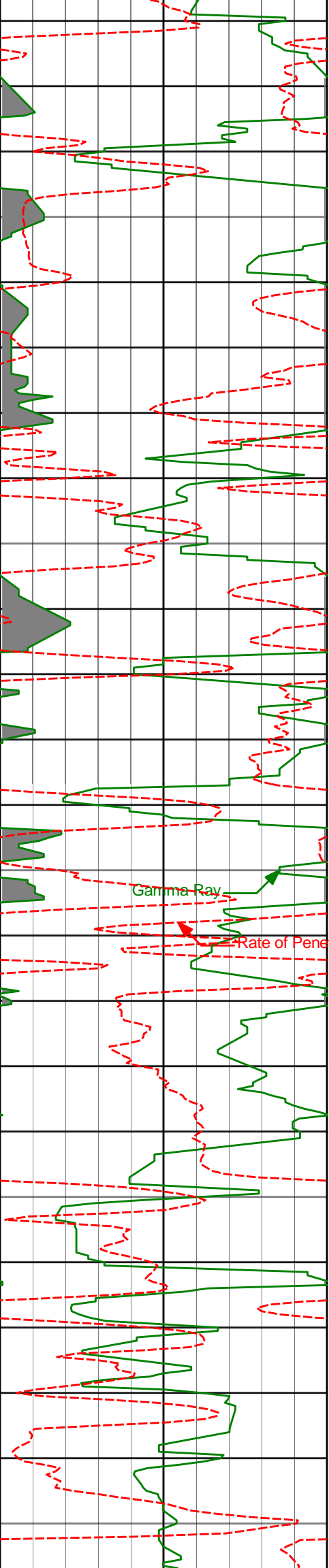
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131.23

2247.96

2.90

0.20



2400

2439

0.30

90.58

2438.96

3.11

0.11

2450

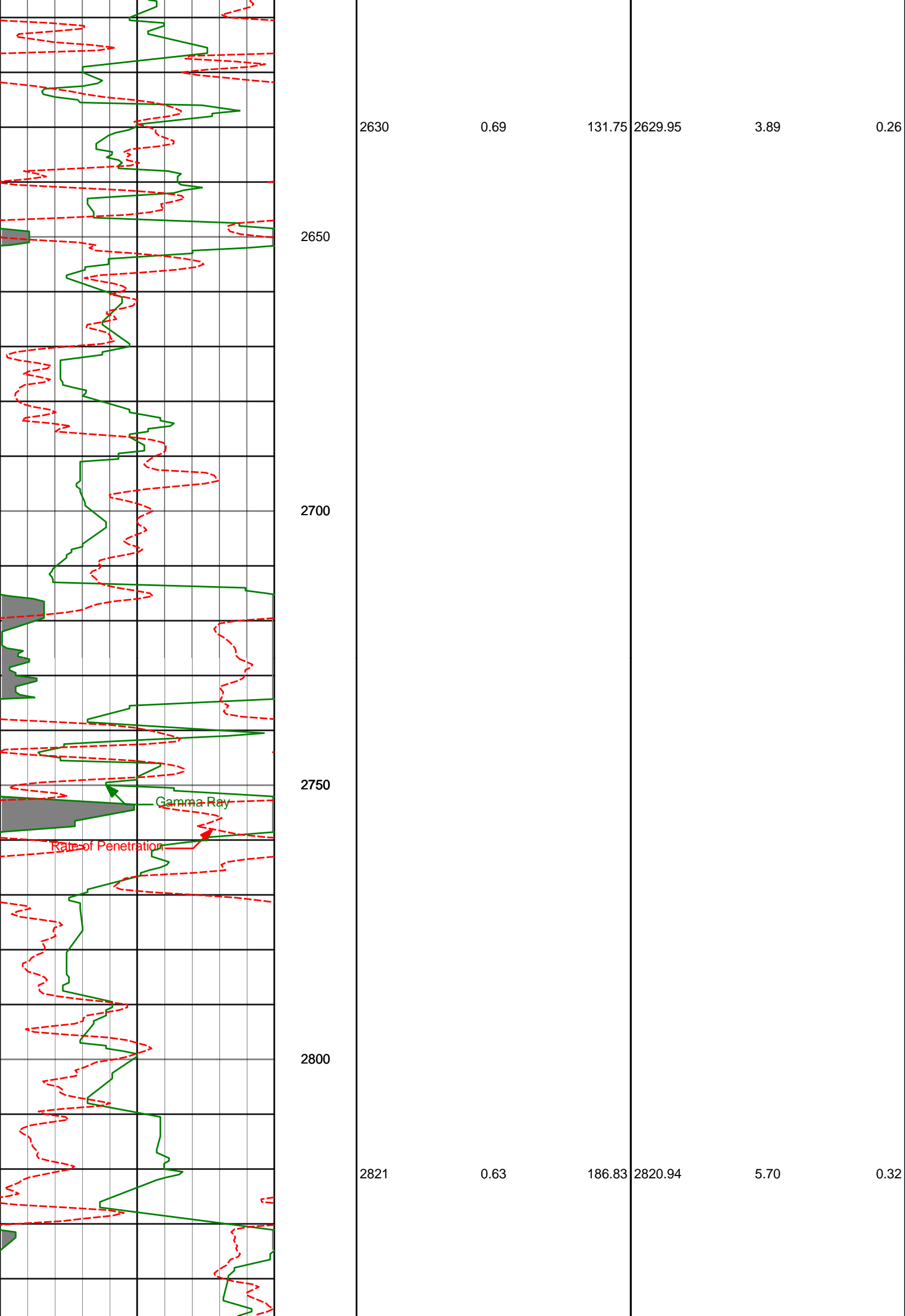
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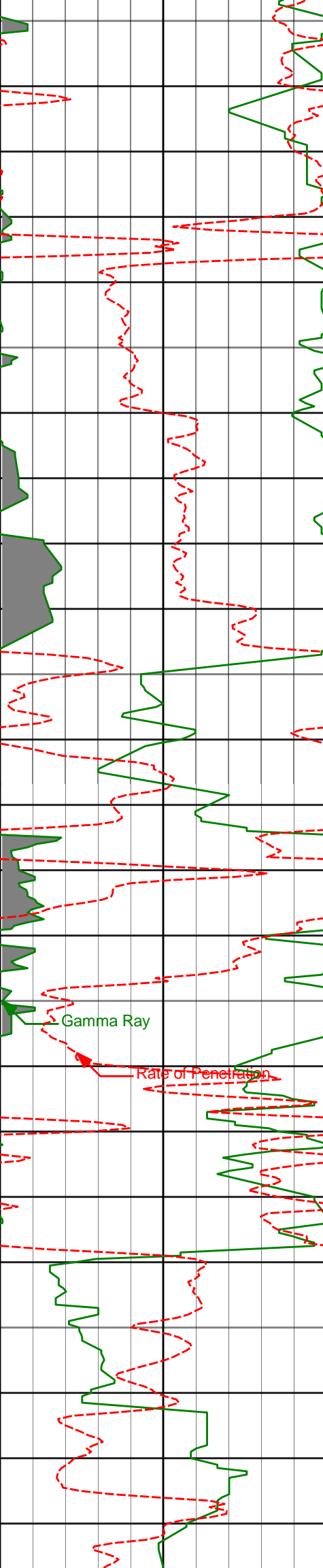
Gamma Ray

Rate of Penetration

2550

2600





2850

2900

2950

3000

3050

Gamma Ray

Rate of Penetration

3013

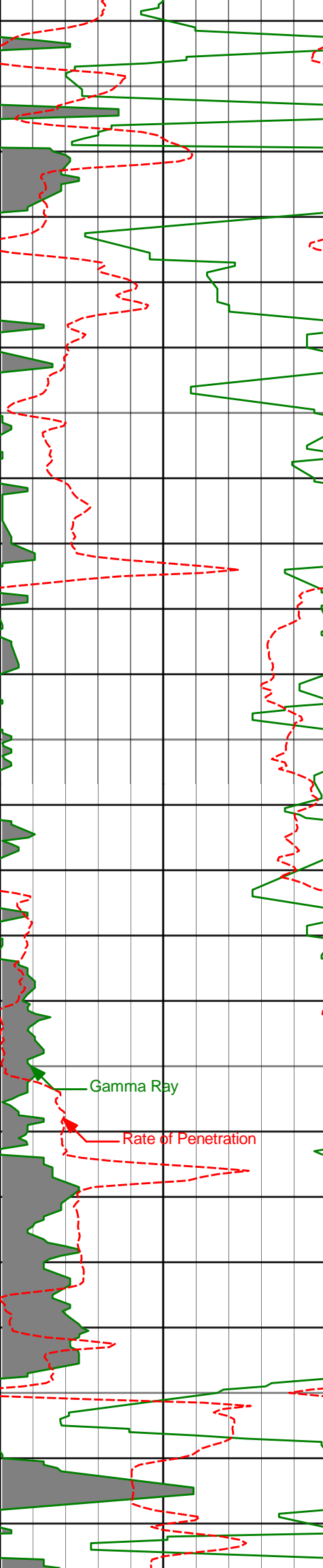
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187.78

3012.93

7.59

0.06



3100

3150

3200

3250

3300

3205

0.37

162.60

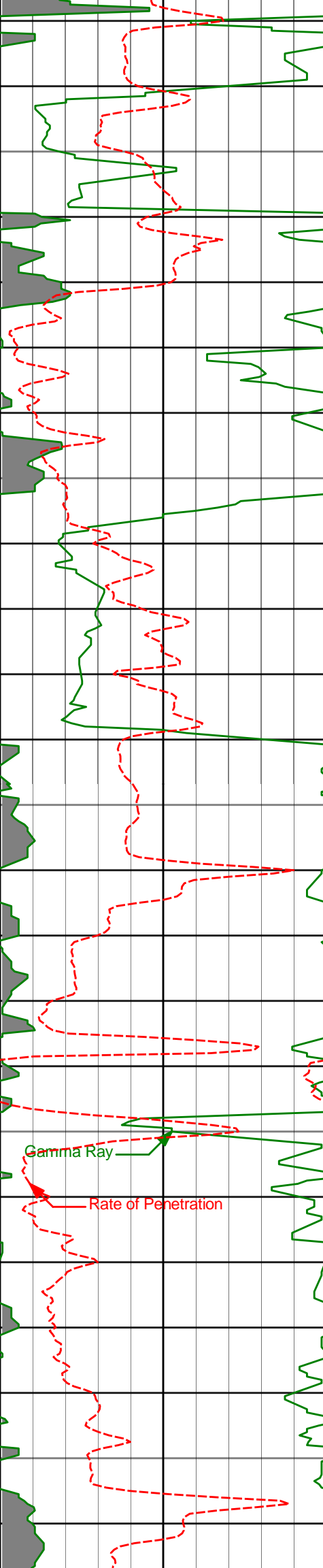
3204.93

9.04

0.12

Gamma Ray

Rate of Penetration



3350

3400

3450

3500

3550

3396

0.07

74.26

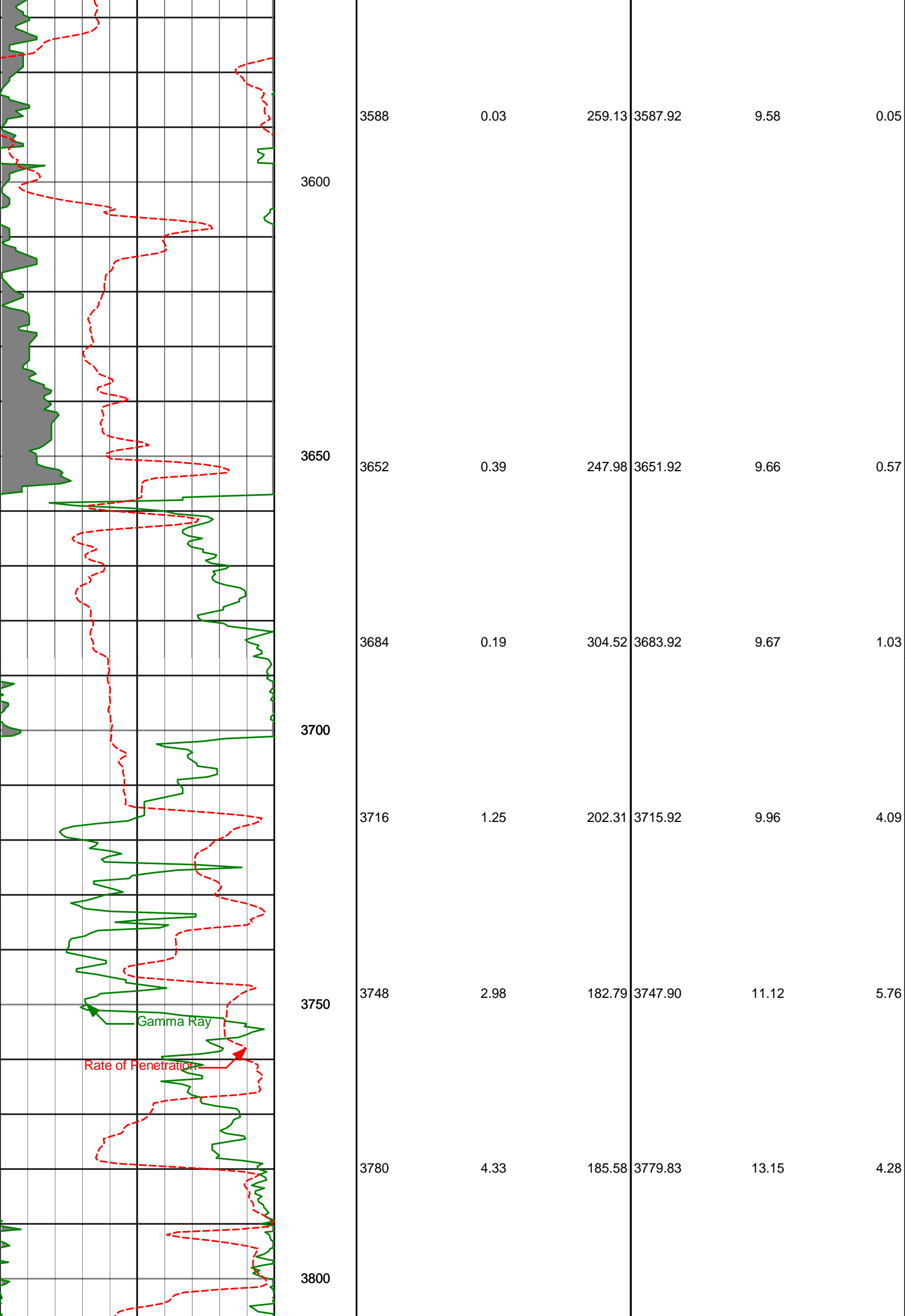
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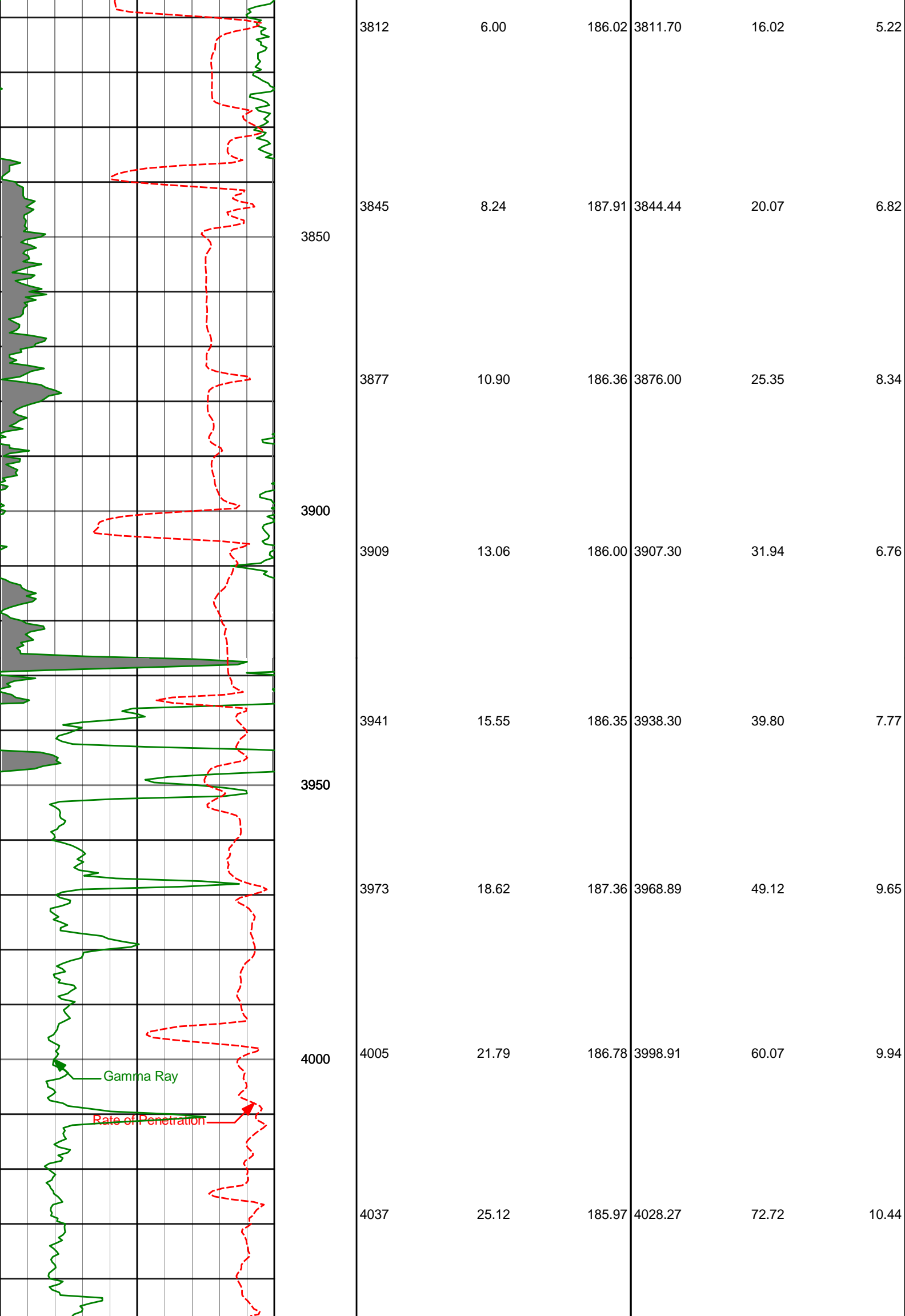
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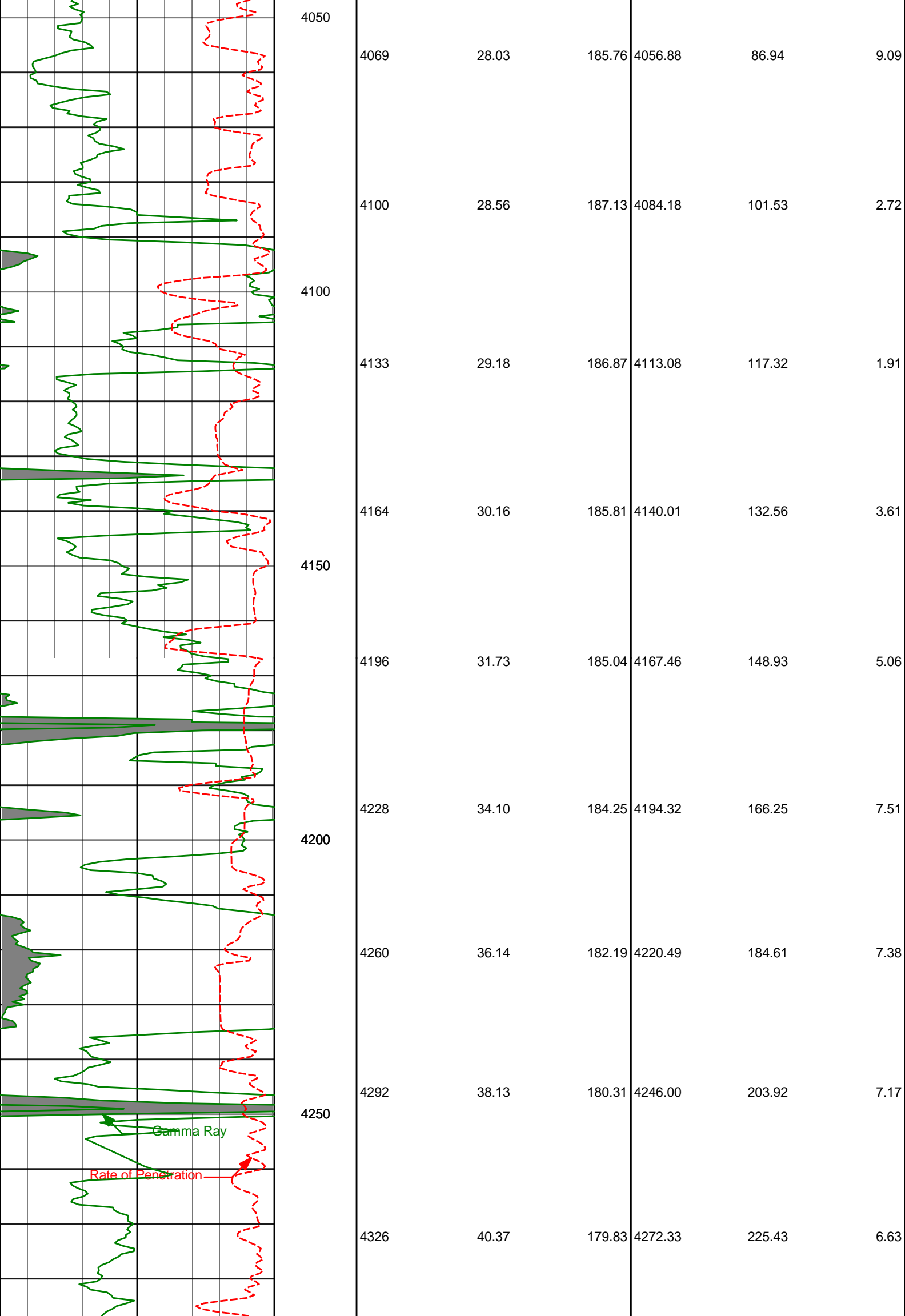
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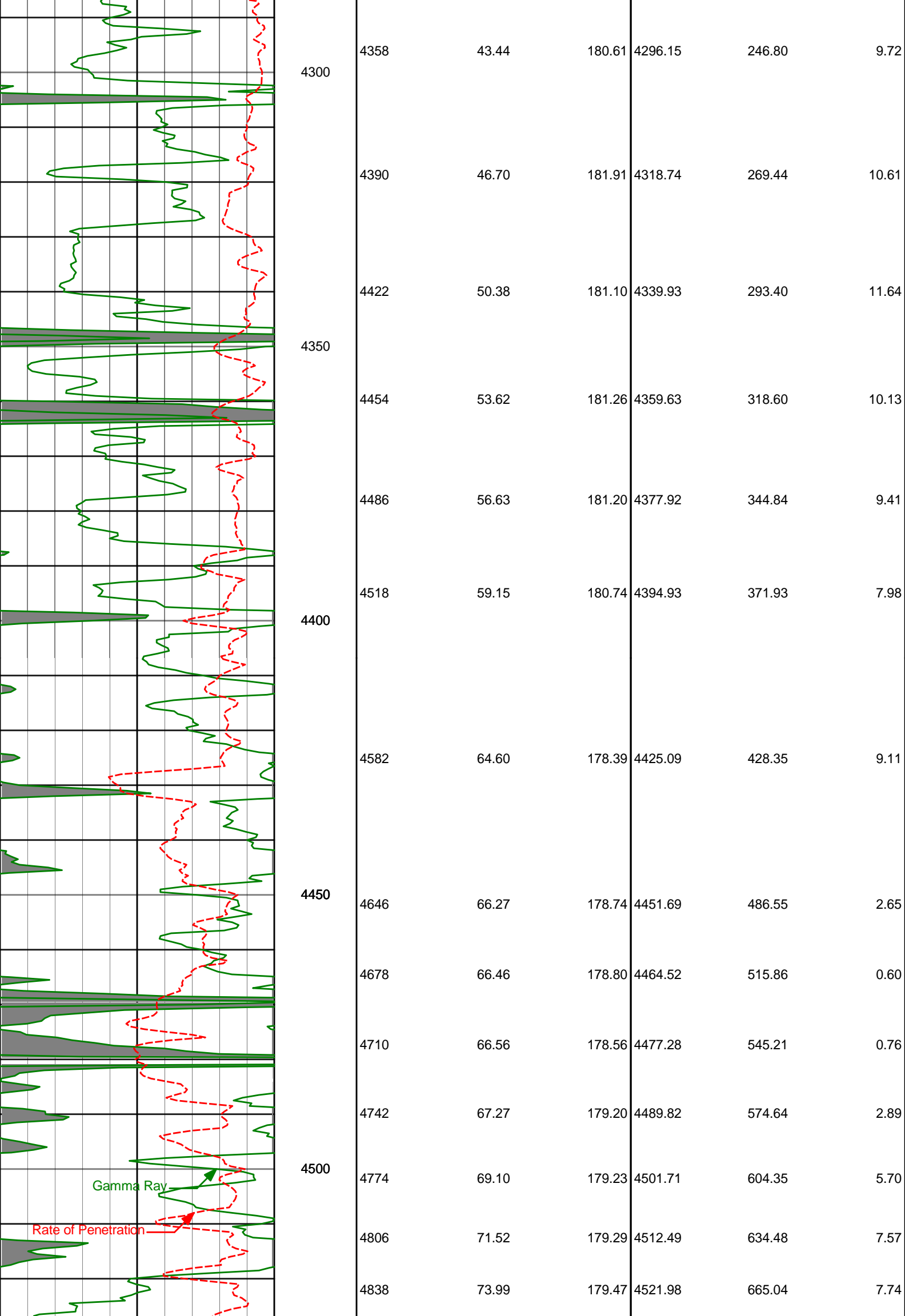
Gamma Ray

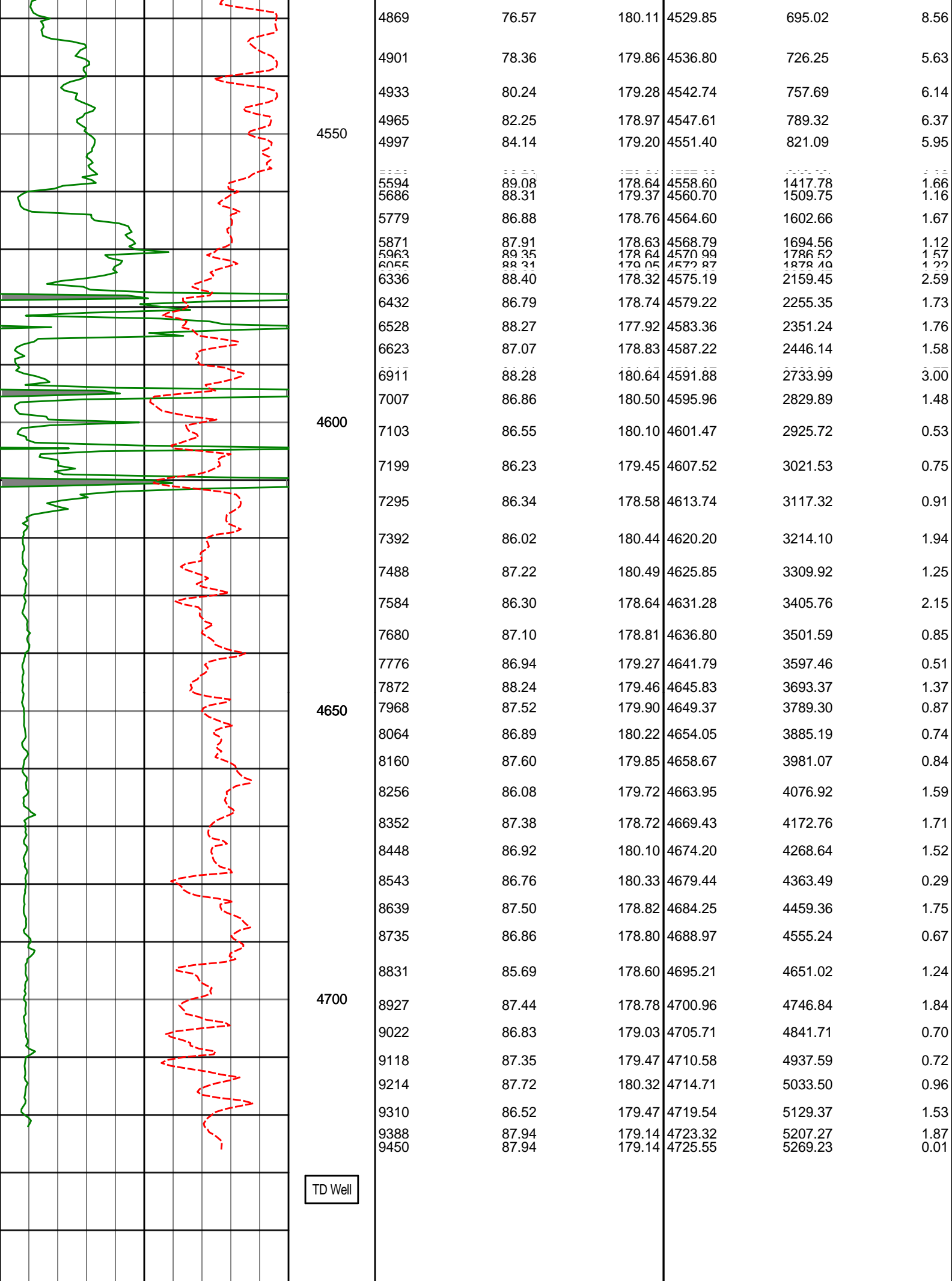
Rate of Penetration











TD Well

Rate of Penetration feet per hr	MD ft	Surveys			Surveys		
	1 : 240	Depth	Inclination	Azimuth	TVD	Vertical Sec	Dogleg Sev
250	0						



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Shell Exploration Production Co
Lockwood Farms 3307 14-1H
Wildcat
Harper Kansas
USA
OK-XX-0009199477

Surveys from 200' to 9388' are MWD surveys. Final survey is a straight line projection to the bit @ 9450'.

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
200.00	0.73	244.47	199.99	0.55 S	1.15 W	0.54	0.36
265.00	0.26	258.25	264.99	0.76 S	1.67 W	0.74	0.74
355.00	0.54	257.68	354.99	0.89 S	2.28 W	0.87	0.31
416.00	0.33	244.51	415.99	1.03 S	2.72 W	1.00	0.38
508.00	0.03	63.04	507.99	1.13 S	2.94 W	1.11	0.39
601.00	0.30	304.76	600.99	0.98 S	3.12 W	0.95	0.34
654.00	0.09	207.04	653.99	0.94 S	3.25 W	0.91	0.61
761.00	0.20	301.16	760.99	0.92 S	3.45 W	0.89	0.21
915.00	0.23	85.38	914.99	0.75 S	3.36 W	0.73	0.27
1098.00	0.40	42.96	1097.98	0.26 S	2.55 W	0.23	0.15
1289.00	0.19	262.03	1288.98	0.19 N	2.40 W	-0.21	0.29
1481.00	0.09	63.97	1480.98	0.21 N	2.58 W	-0.24	0.14
1673.00	0.44	83.55	1672.98	0.37 N	1.70 W	-0.38	0.19
1865.00	0.57	142.75	1864.97	0.31 S	0.38 W	0.30	0.27
2057.00	0.53	158.06	2056.96	1.88 S	0.52 E	1.88	0.08
2248.00	0.18	131.23	2247.96	2.89 S	1.07 E	2.90	0.20
2439.00	0.30	90.58	2438.96	3.09 S	1.81 E	3.11	0.11
2630.00	0.69	131.75	2629.95	3.86 S	3.16 E	3.89	0.26
2821.00	0.63	186.83	2820.94	5.67 S	3.89 E	5.70	0.32
3013.00	0.51	187.78	3012.93	7.56 S	3.65 E	7.59	0.06
3205.00	0.37	162.60	3204.93	9.01 S	3.72 E	9.04	0.12
3396.00	0.07	74.26	3395.92	9.57 S	4.02 E	9.60	0.20
3588.00	0.03	259.13	3587.92	9.55 S	4.08 E	9.58	0.05
3652.00	0.39	247.98	3651.92	9.63 S	3.85 E	9.66	0.57
3684.00	0.19	304.52	3683.92	9.64 S	3.71 E	9.67	1.03
3716.00	1.25	202.31	3715.92	9.94 S	3.53 E	9.96	4.09
3748.00	2.98	182.79	3747.90	11.09 S	3.36 E	11.12	5.76
3780.00	4.33	185.58	3779.83	13.12 S	3.20 E	13.15	4.28
3812.00	6.00	186.02	3811.70	15.99 S	2.91 E	16.02	5.22
3845.00	8.24	187.91	3844.44	20.05 S	2.40 E	20.07	6.82
3877.00	10.90	186.36	3876.00	25.33 S	1.75 E	25.35	8.34
3909.00	13.06	186.00	3907.30	31.94 S	1.03 E	31.94	6.76
3941.00	15.55	186.35	3938.30	39.80 S	0.18 E	39.80	7.77
3973.00	18.62	187.36	3968.89	49.13 S	0.95 W	49.12	9.65
4005.00	21.79	186.78	3998.91	60.09 S	2.30 W	60.07	9.94
4037.00	25.12	185.97	4028.27	72.75 S	3.71 W	72.72	10.44
4069.00	28.03	185.76	4056.88	86.99 S	5.17 W	86.94	9.09
4100.00	28.56	187.13	4084.18	101.59 S	6.82 W	101.53	2.72
4133.00	29.18	186.87	4113.08	117.40 S	8.76 W	117.32	1.91
4164.00	30.16	185.81	4140.01	132.65 S	10.46 W	132.56	3.61
4196.00	31.73	185.04	4167.46	149.03 S	12.01 W	148.93	5.06
4228.00	34.10	184.25	4194.32	166.36 S	13.41 W	166.25	7.51
4260.00	36.14	182.19	4220.49	184.74 S	14.44 W	184.61	7.38
4292.00	38.13	180.31	4246.00	204.05 S	14.85 W	203.92	7.17
4326.00	40.37	179.83	4272.33	225.56 S	14.88 W	225.43	6.63
4358.00	43.44	180.61	4296.15	246.93 S	14.97 W	246.80	9.72
4390.00	46.70	181.91	4318.74	269.58 S	15.47 W	269.44	10.61
4422.00	50.38	181.10	4339.93	293.55 S	16.10 W	293.40	11.64
4454.00	53.62	181.26	4359.63	318.75 S	16.62 W	318.60	10.13
4486.00	56.63	181.20	4377.92	345.00 S	17.18 W	344.84	9.41
4518.00	59.15	180.74	4394.93	372.10 S	17.64 W	371.93	7.98
4582.00	64.60	178.39	4425.09	428.51 S	17.18 W	428.35	9.11
4646.00	66.27	178.74	4451.69	486.70 S	15.72 W	486.55	2.65
4678.00	66.46	178.80	4464.52	516.01 S	15.09 W	515.86	0.60
4710.00	66.56	178.56	4477.28	545.35 S	14.41 W	545.21	0.76
4742.00	67.27	179.20	4489.82	574.78 S	13.83 W	574.64	2.89

4774.00	69.10	179.23	4501.71	604.48 S	13.42 W	604.35	5.70
4806.00	71.52	179.29	4512.49	634.61 S	13.03 W	634.48	7.57
4838.00	73.99	179.47	4521.98	665.17 S	12.70 W	665.04	7.74
4869.00	76.57	180.11	4529.85	695.15 S	12.59 W	695.02	8.56
4901.00	78.36	179.86	4536.80	726.38 S	12.58 W	726.25	5.63
4933.00	80.24	179.28	4542.74	757.82 S	12.35 W	757.69	6.14
4965.00	82.25	178.97	4547.61	789.44 S	11.86 W	789.32	6.37
4997.00	84.14	179.20	4551.40	821.21 S	11.36 W	821.09	5.95
5093.00	88.89	178.84	4557.23	917.00 S	9.71 W	916.88	4.96
5193.00	90.49	178.54	4557.77	1016.96 S	7.43 W	1016.87	1.63
5287.00	90.55	177.81	4556.91	1110.91 S	4.44 W	1110.84	0.78
5379.00	88.74	178.59	4557.48	1202.86 S	1.55 W	1202.81	2.15
5502.00	90.52	179.12	4558.28	1325.83 S	0.91 E	1325.79	1.52
5594.00	89.08	178.64	4558.60	1417.81 S	2.71 E	1417.78	1.66
5686.00	88.31	179.37	4560.70	1509.77 S	4.30 E	1509.75	1.16
5779.00	86.88	178.76	4564.60	1602.67 S	5.81 E	1602.66	1.67
5871.00	87.91	178.63	4568.79	1694.55 S	7.91 E	1694.56	1.12
5963.00	89.35	178.64	4570.99	1786.50 S	10.10 E	1786.52	1.57
6055.00	88.31	179.05	4572.87	1878.46 S	11.95 E	1878.49	1.22
6147.00	89.54	179.39	4574.60	1970.43 S	13.20 E	1970.47	1.39
6240.00	90.68	179.30	4574.42	2063.42 S	14.27 E	2063.47	1.23
6336.00	88.40	178.32	4575.19	2159.39 S	16.26 E	2159.45	2.59
6432.00	86.79	178.74	4579.22	2255.27 S	18.72 E	2255.35	1.73
6528.00	88.27	177.92	4583.36	2351.14 S	21.52 E	2351.24	1.76
6623.00	87.07	178.83	4587.22	2446.02 S	24.21 E	2446.14	1.58
6719.00	88.43	178.72	4590.98	2541.92 S	26.27 E	2542.05	1.42
6815.00	91.11	181.15	4591.37	2637.90 S	26.37 E	2638.03	3.77
6911.00	88.28	180.64	4591.88	2733.88 S	24.87 E	2733.99	3.00
7007.00	86.86	180.50	4595.96	2829.79 S	23.91 E	2829.89	1.48
7103.00	86.55	180.10	4601.47	2925.63 S	23.41 E	2925.72	0.53
7199.00	86.23	179.45	4607.52	3021.43 S	23.79 E	3021.53	0.75
7295.00	86.34	178.58	4613.74	3117.22 S	25.43 E	3117.32	0.91
7392.00	86.02	180.44	4620.20	3213.99 S	26.26 E	3214.10	1.94
7488.00	87.22	180.49	4625.85	3309.82 S	25.49 E	3309.92	1.25
7584.00	86.30	178.64	4631.28	3405.66 S	26.22 E	3405.76	2.15
7680.00	87.10	178.81	4636.80	3501.48 S	28.35 E	3501.59	0.85
7776.00	86.94	179.27	4641.79	3597.33 S	29.96 E	3597.46	0.51
7872.00	88.24	179.46	4645.83	3693.24 S	31.02 E	3693.37	1.37
7968.00	87.52	179.90	4649.37	3789.17 S	31.56 E	3789.30	0.87
8064.00	86.89	180.22	4654.05	3885.06 S	31.46 E	3885.19	0.74
8160.00	87.60	179.85	4658.67	3980.95 S	31.40 E	3981.07	0.84
8256.00	86.08	179.72	4663.95	4076.80 S	31.77 E	4076.92	1.59
8352.00	87.38	178.72	4669.43	4172.63 S	33.08 E	4172.76	1.71
8448.00	86.92	180.10	4674.20	4268.50 S	34.07 E	4268.64	1.52
8543.00	86.76	180.33	4679.44	4363.36 S	33.72 E	4363.49	0.29
8639.00	87.50	178.82	4684.25	4459.23 S	34.43 E	4459.36	1.75
8735.00	86.86	178.80	4688.97	4555.09 S	36.41 E	4555.24	0.67
8831.00	85.69	178.60	4695.21	4650.86 S	38.58 E	4651.02	1.24
8927.00	87.44	178.78	4700.96	4746.66 S	40.77 E	4746.84	1.84
9022.00	86.83	179.03	4705.71	4841.53 S	42.59 E	4841.71	0.70
9118.00	87.35	179.47	4710.58	4937.39 S	43.84 E	4937.59	0.72
9214.00	87.72	180.32	4714.71	5033.30 S	44.01 E	5033.50	0.96
9310.00	86.52	179.47	4719.54	5129.18 S	44.19 E	5129.37	1.53
9388.00	87.94	179.14	4723.32	5207.08 S	45.13 E	5207.27	1.87
9450.00	87.94	179.14	4725.55	5269.03 S	46.06 E	5269.23	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 179.52 DEGREES (TRUE)
A TOTAL CORRECTION OF 4.74 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 9450.00 FEET
IS 5269.23 FEET ALONG 179.50 DEGREES (TRUE)**