

Natural Gamma Ray Rate Of Penetration



1 : 600

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		Other Services	
	Rig : Nabors 102			
	Well : Lockwood Farms 3307 14-1H			
	Field : Wildcat			
	County : Harper			
	API Number : 15-077-21772			
	Latitude : 37° 10' 2.82" North	Directional		
	Longitude : 98° 3' 21.10" West			
	UTM Easting = 2,129,423.39 ft UTM Northing = 182,652.64 ft			
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.	Borehole Record (TVD)		Borehole Record (TVD)	
	Size	From	To	To
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	
Run No.	Casing Record (TVD)		Casing Record (TVD)	
	Size	Weight	From	To
	36.00 in	36.00 lb/ft	90.00 ft	720.99 ft
	36.00 in	36.00 lb/ft	720.99 ft	4,557.37 ft

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	

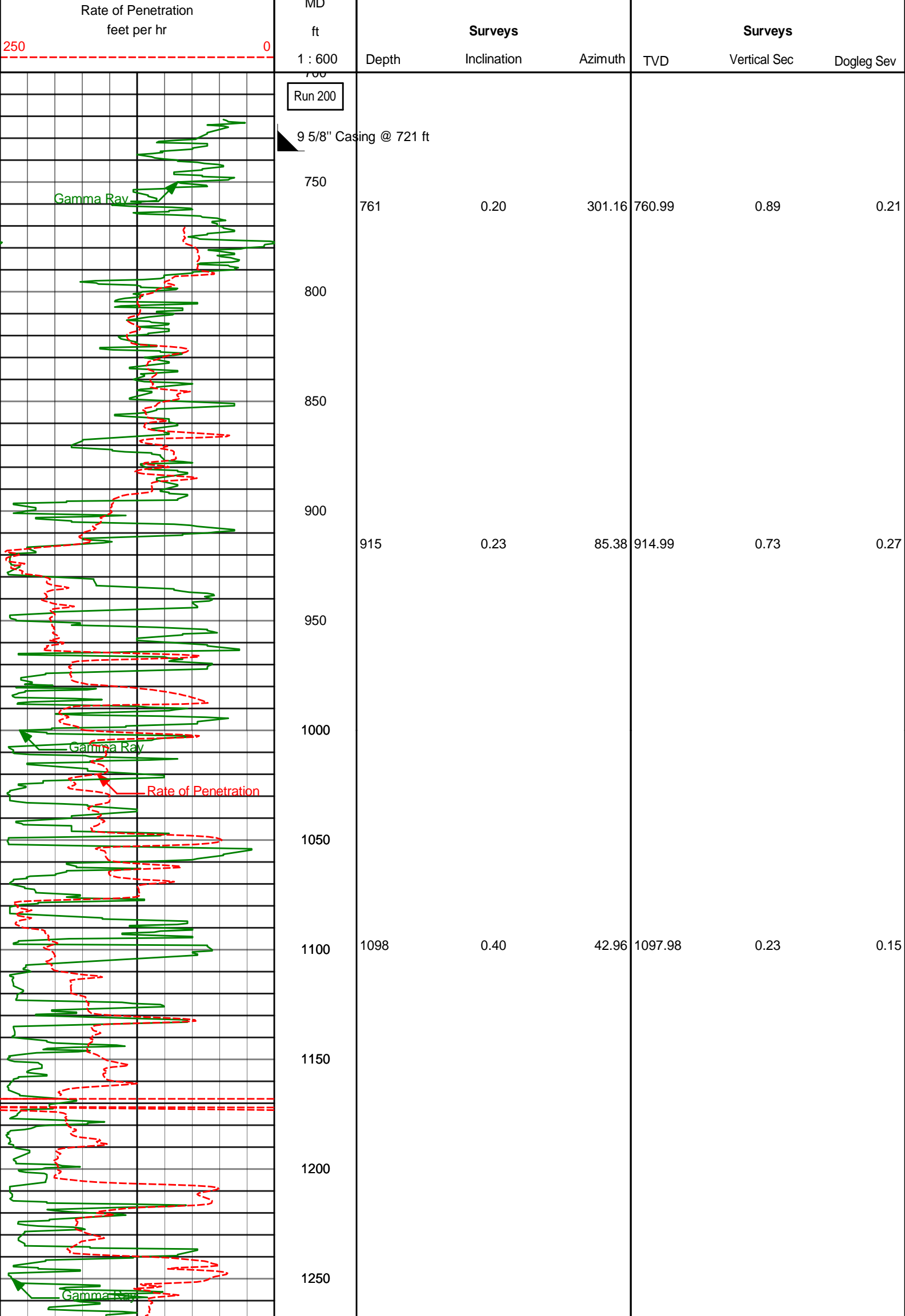
REMARKS

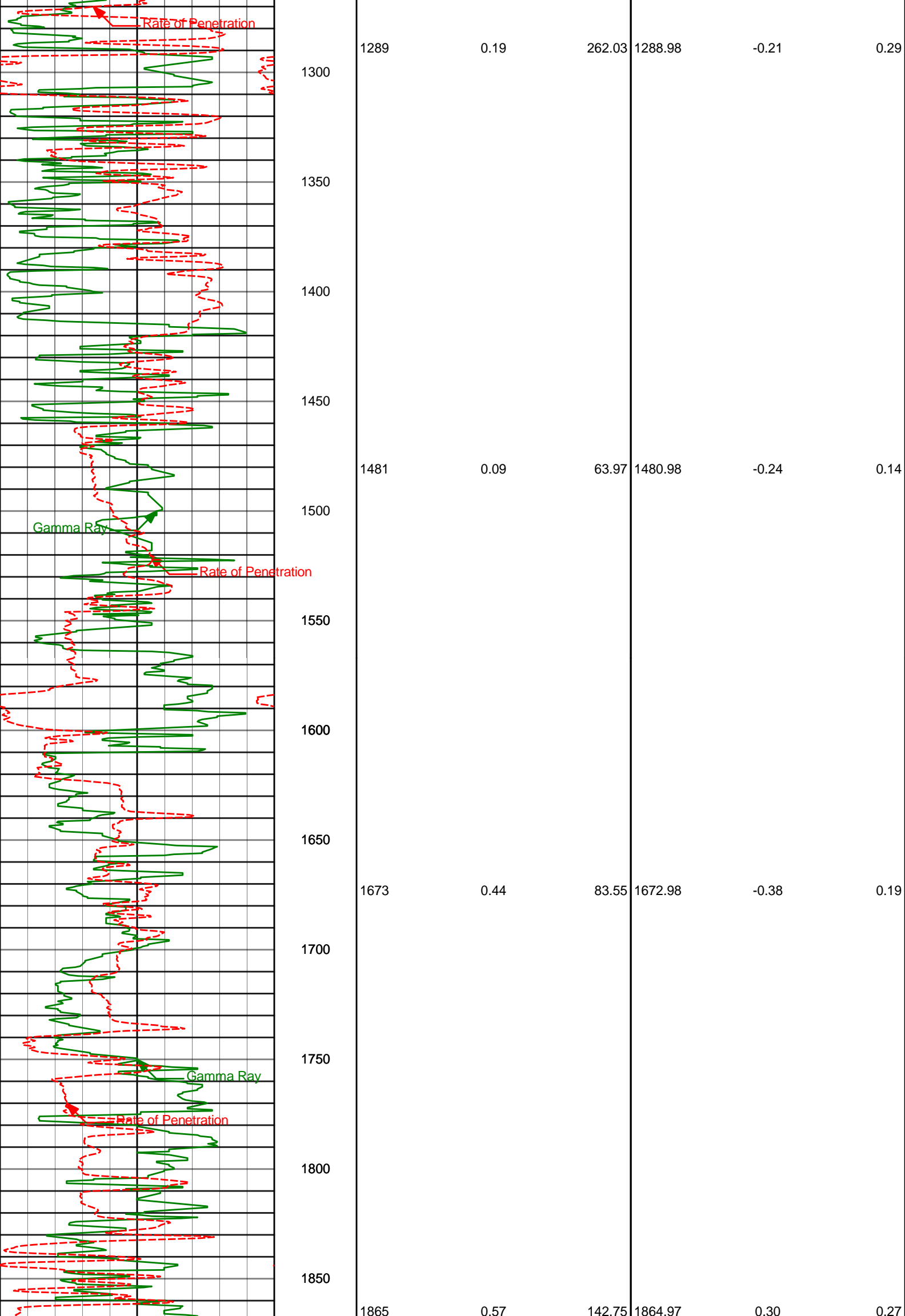
1. All depths are calibrated to the driller's pipe tally and are measured from the rotary table.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
4. The following smoothing parameters have been applied to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

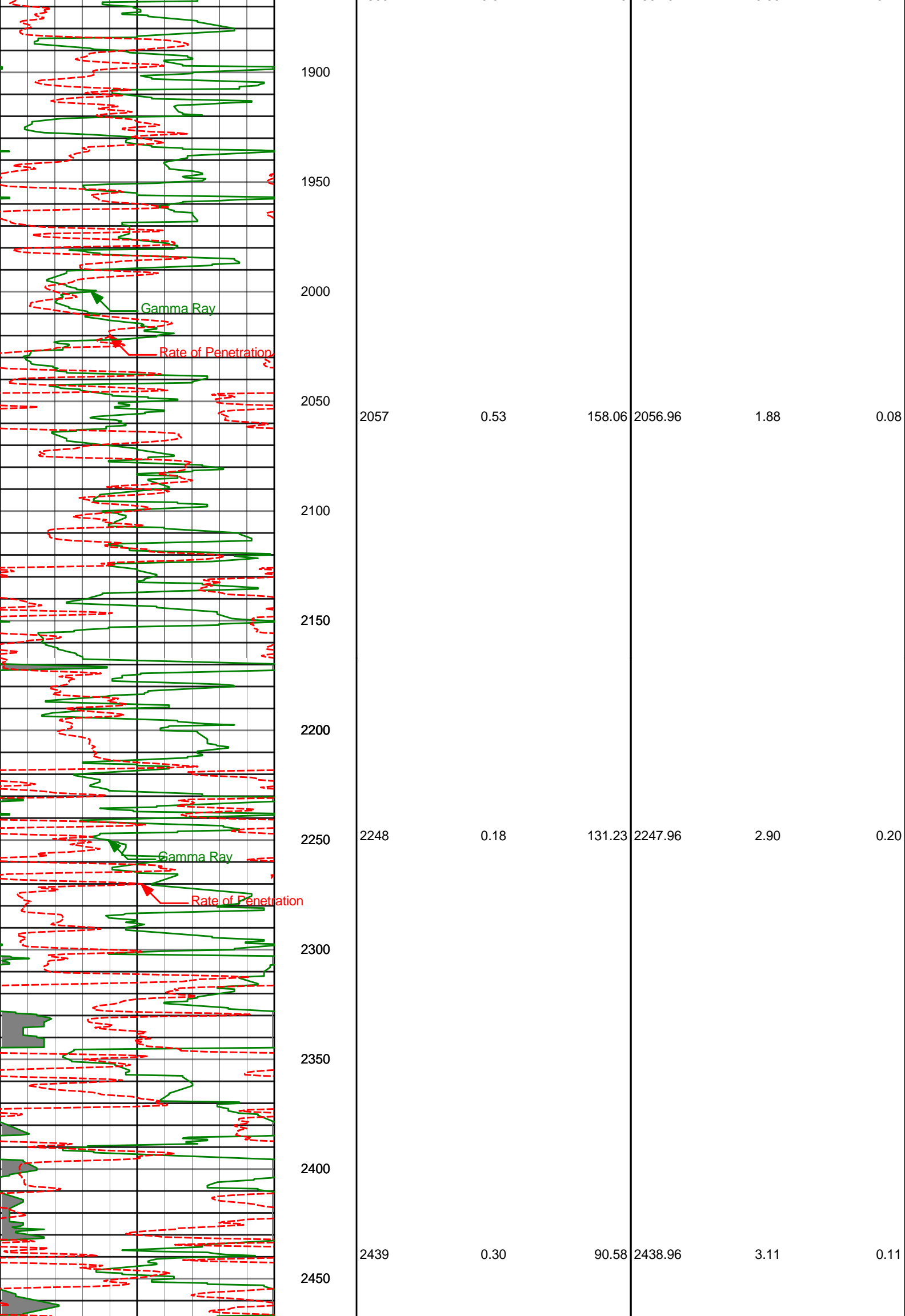
WARRANTY

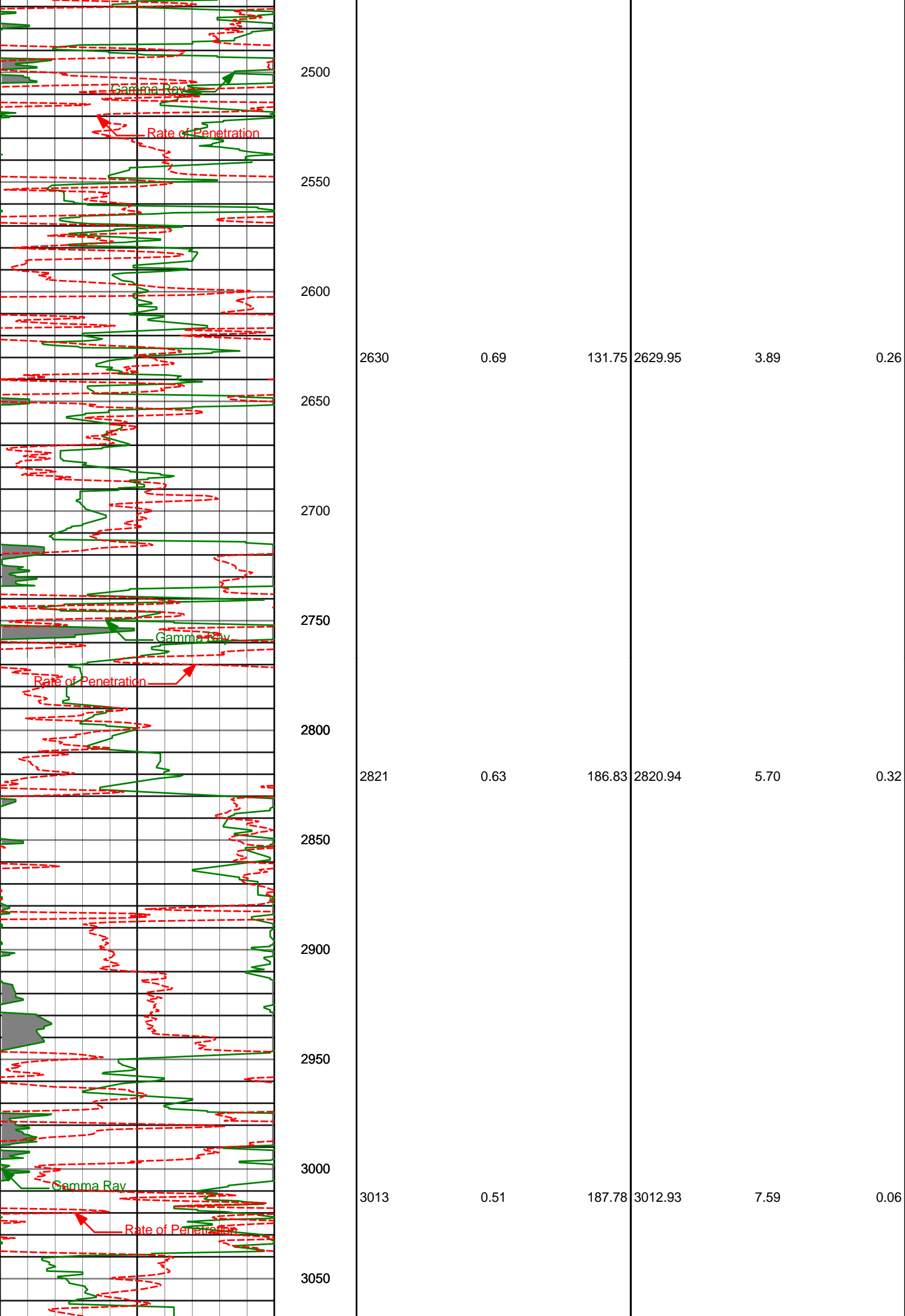
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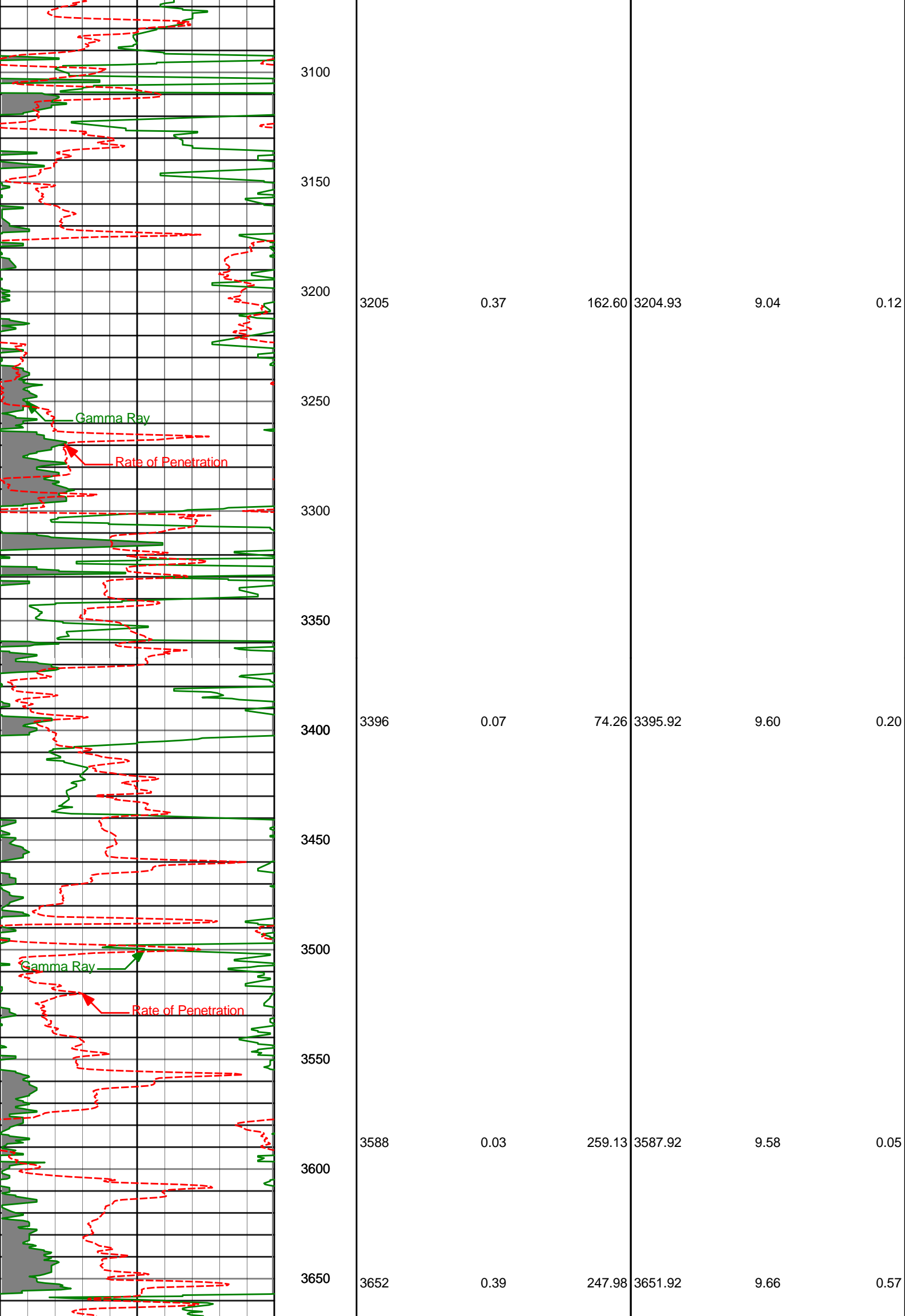
Gamma Ray api	0	150			
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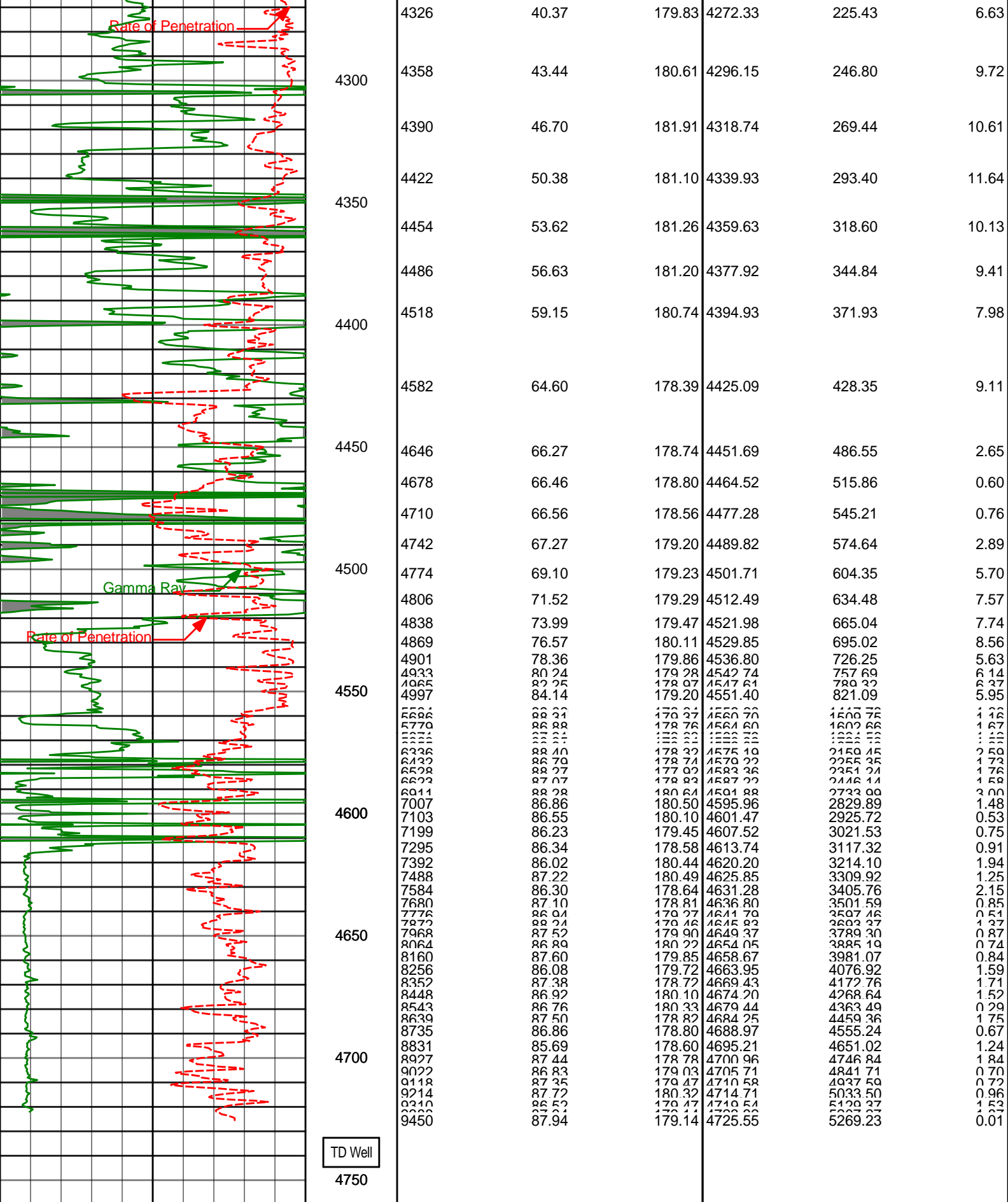














HALLIBURTON

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'.

<i>Measured Depth (feet)</i>	<i>Inclination (degrees)</i>	<i>Direction (degrees)</i>	<i>Vertical Depth (feet)</i>	<i>Latitude (feet)</i>	<i>Departure (feet)</i>	<i>Vertical Section (feet)</i>	<i>Dogleg (deg/100ft)</i>
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)**