

Natural Gamma Ray Rate Of Penetration



1 : 1200

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	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	
Company	: Shell Exploration Production Co	Other Services	
Rig	: Nabors 102	Directional	
Well	: Lockwood Farms 3307 14-1H		
Field	: Wildcat		
County	: Harper		
API Number	: 15-077-21772		
Permanent Datum	: Ground Level	Elevation:	1350.40 ft
Log Measured From	: Drill Floor	31.70 ft	Above Permanent Datum
Drilling Measured From	: Drill Floor	TVD LOG	
Depth Logged	: 90.00 ft	To	4,725.55 ft
Date Logged	: 01-Feb-12	To	20-Mar-12
Total Depth MD	: 9,450.00 ft	TVD:	4,725.55 ft
Spud Date	: 01-Feb-12	Plot Type	: Final
		Plot Date	: 11-Apr-12
Unit No.	: PP46	Job No.	: OK-XX-0009199477
Run No.	Size	Borehole Record (TVD)	Run No.
	From	To	From
	To	From	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
	Size	Casing Record (TVD)	Weight
	From	From	To
	To	From	To
	36.00 in	36.00 lbpf	90.00 ft
	9.625 in	36.00 lbpf	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	

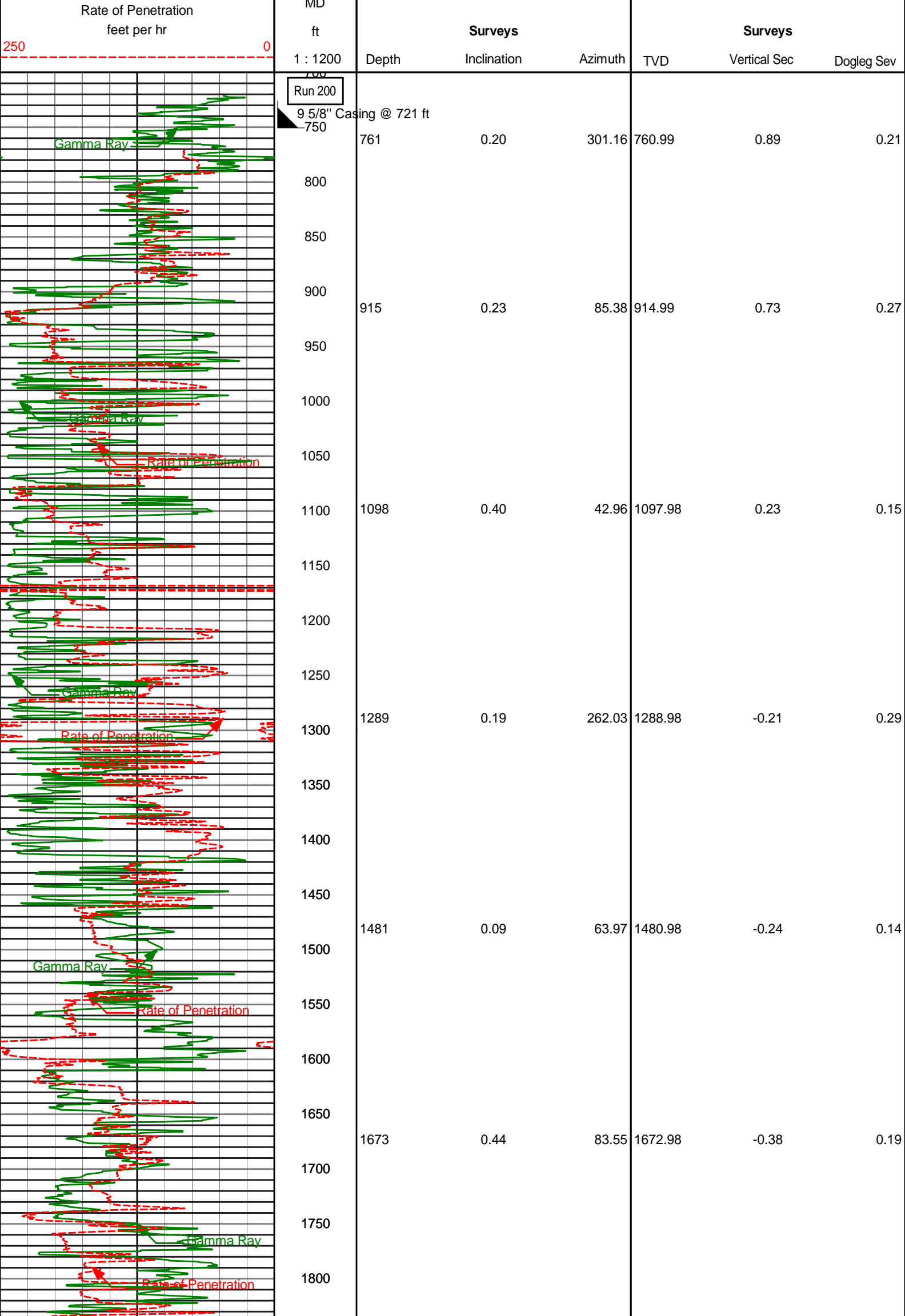
REMARKS

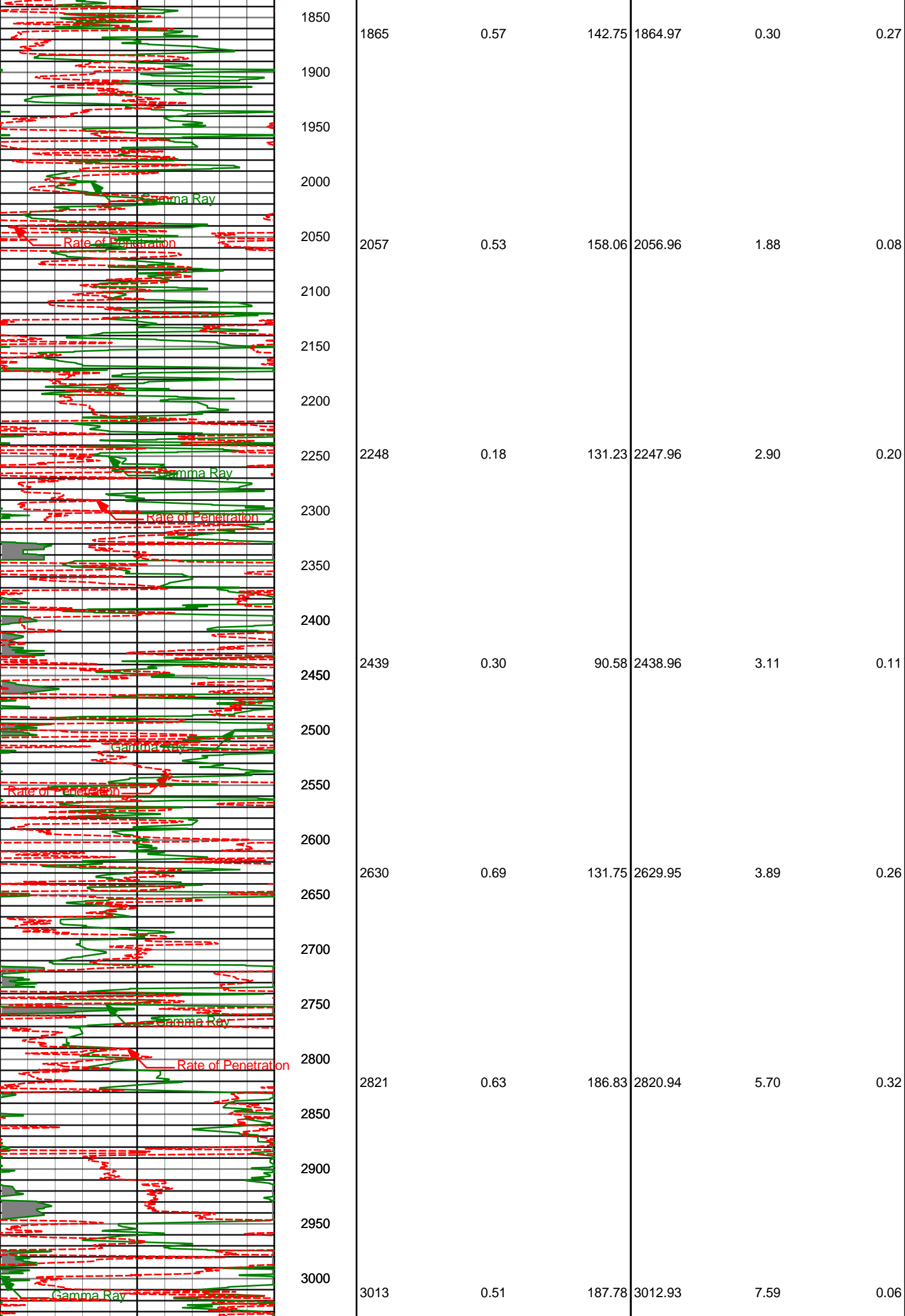
1. All depths are calibrated to the driller's pipe tally and are measured from the rotary table.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
4. The following smoothing parameters have been applied to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

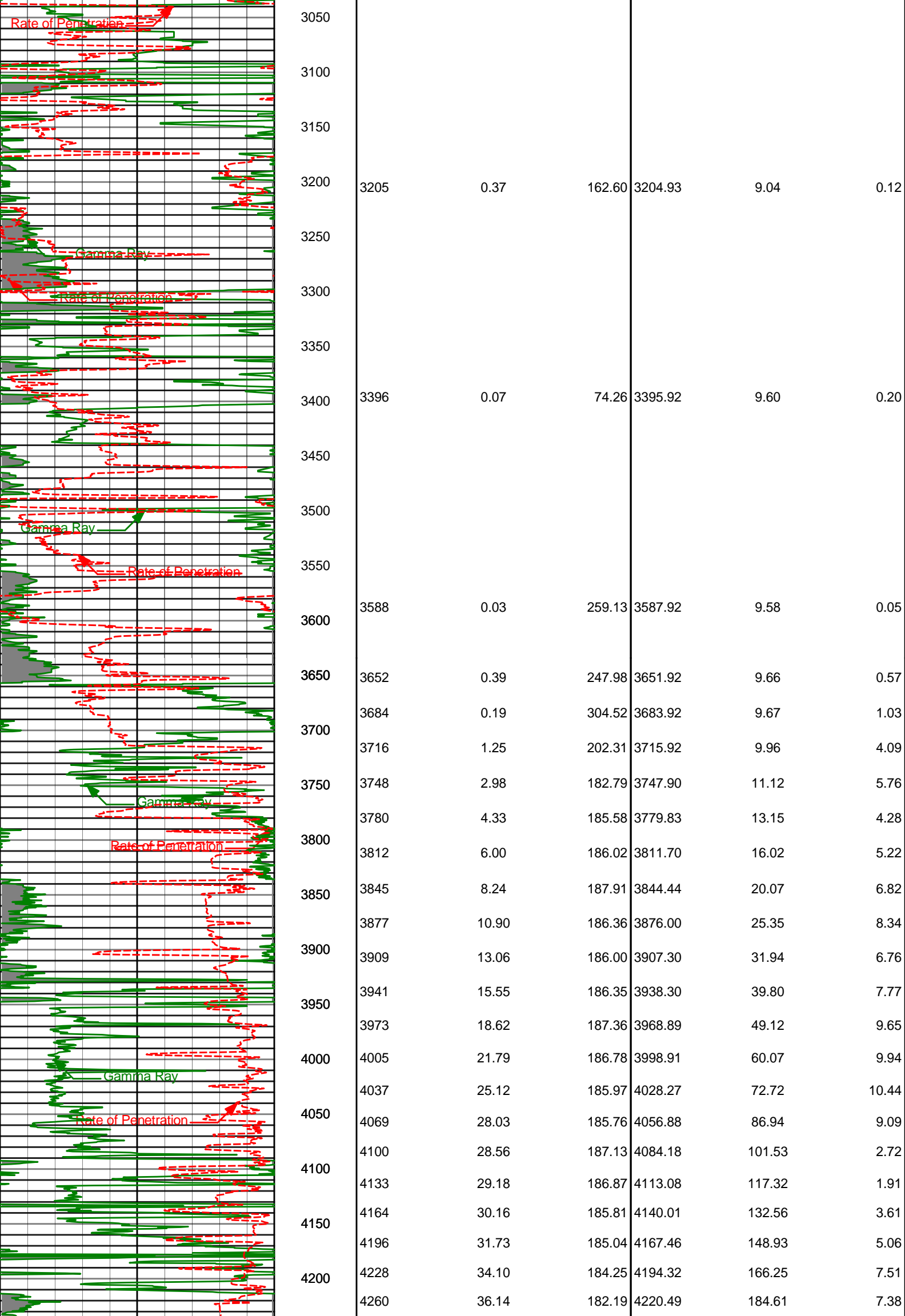
WARRANTY

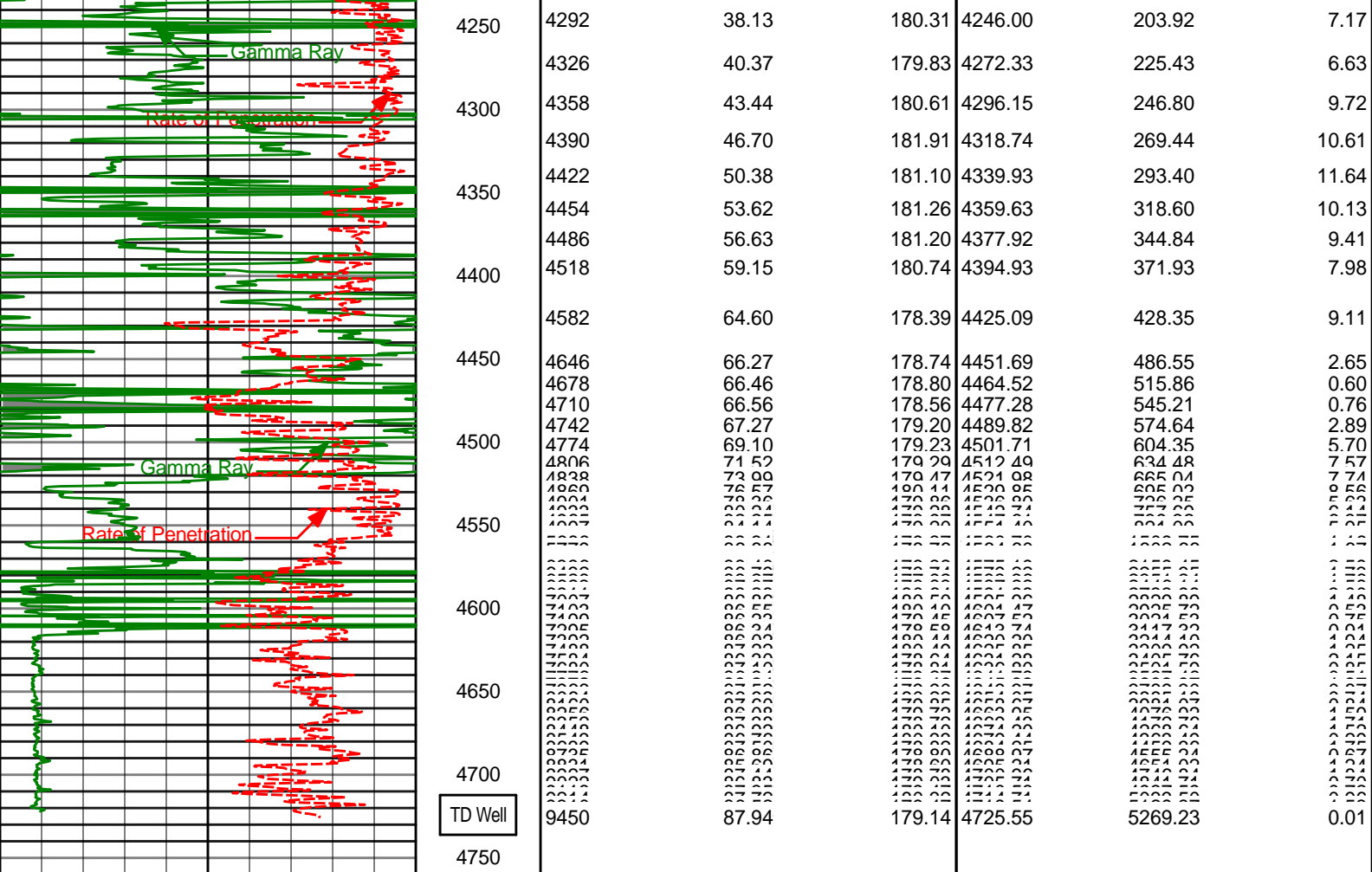
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Gamma Ray api	0	150			
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Rate of Penetration feet per hr		MD	Surveys			Surveys	
250	0	ft	Depth	Inclination	Azimuth	TVD	Vertical Sec
Gamma Ray api		1 : 1200				Dogleg Sev	
0	150						



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 F	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)**