

**Company : NORTHEAST NATURAL ENERGY LLC**

**Well : BOGGESS 17H ST01**

**Field : MARCELLUS SHALE**

**Date : 28-Jun-2019**

**Time : 11:36**



GAMMA-RAY

5" = 100'  
FEET TVD

COMPANY : NORTHEAST NATURAL ENERGY LLC  
 WELL : BOGGESS 17H ST01  
 FIELD : MARCELLUS SHALE  
 COUNTY : MONONGALIA  
 STATE : WV  
 COUNTRY : USA  
 API No. : 47-061-01812

COMPANY : NORTHEAST NATURAL ENERGY LLC  
 WELL : BOGGESS 17H ST01  
 FIELD : MARCELLUS SHALE  
 COUNTY : MONONGALIA  
 STATE : WV  
 COUNTRY : USA  
 API WELL No. : 47-061-01812

WELL LOCATION  
 LAT: 39°40'13"N LON: 80°05'35"W  
 X: 1,801,561 Y: 426,810 MAD83  
 SEC: TWP: RANGE:

OTHER SERVICES  
 DIRECTIONAL  
 ROP

DEPTH REF. : ROTARY TABLE  
 ELEVATION : 25.00 ft (ROTARY TABLE - GROUND LEVEL)  
 ALTITUDE : 1268.00 ft (GROUND LEVEL - MEAN SEA LEVEL)

BOREHOLE RECORD				DEVIATION RECORD			
HOLE SIZE in	FROM ft	TO ft	INCLINATION deg	FROM ft	TO ft	TO ft	TO ft
8 1/2	5236	19055	00 - 00	25	5290	5290	5290
			00 - 56	5290	6143	6143	6143
			56 +/--1	6143	9081	9081	9081
			56 - 87	9081	10408	10408	10408
			87 +/--4	10408	19055	19055	19055
CASING RECORD							
CASING SIZE in	FROM ft	TO ft					
9 5/8	25	2438					

DRILLING Co. : PATTERSON  
 RIG : 334  
 LMD UNIT No. : TRAILER DISTRICT : NBB  
 SPUD DATE : 21-JUN-19  
 LMD START DATE : 21-JUN-19 DEPTH : 5213 ft  
 LMD END DATE : 29-JUN-19 DEPTH : 19032 ft  
 TOTAL DEPTH : 19055 ft

RUN DATA	
RUN NUMBER	1
START DATE	20-JUN-19
START TIME	22:00
END DATE	28-JUN-19
END TIME	09:00
DEPTH IN ft	5236
DEPTH OUT ft	19055
LOG TOP ft	5213
LOG BOTTOM ft	19032
HOLE SIZE in	8 1/2
MUD DATA @ ft	19055
MUD TYPE	OIL BASED
DENSITY lb/gal	12.00
VISCOSITY s/qt	67
pH	
FLUID LOSS cm3/30	12.5
SALINITY ppm	34000
Rm ohmm @ deg F	@
Rmf ohmm @ deg F	@

MAX REC TEMP deg F	231				
Rm @ MAX TEMP ohmm					
LWD ENGINEER #1	M.KHALIL				
LWD ENGINEER #2					
LWD ENGINEER #3					

REMARKS

NORTHEAST NATURAL ENERGY LLC, AFE#: 100430-603

SCHLUMBERGER JOB#: 19NEB1089

ALL LOGGING DATA IS MEMORY UNLESS STATED OTHERWISE.

ALL REFERENCES TO LOG TOP, LOG BOTTOM OR LOGGING TOOL DEPTH REFER TO THE GAMMA-RAY SENSO UNLESS STATED OTHERWISE.

ALL ANNOTATIONS IN THE DEPTH TRACK ARE REFERENCED TO BIT DEPTH.

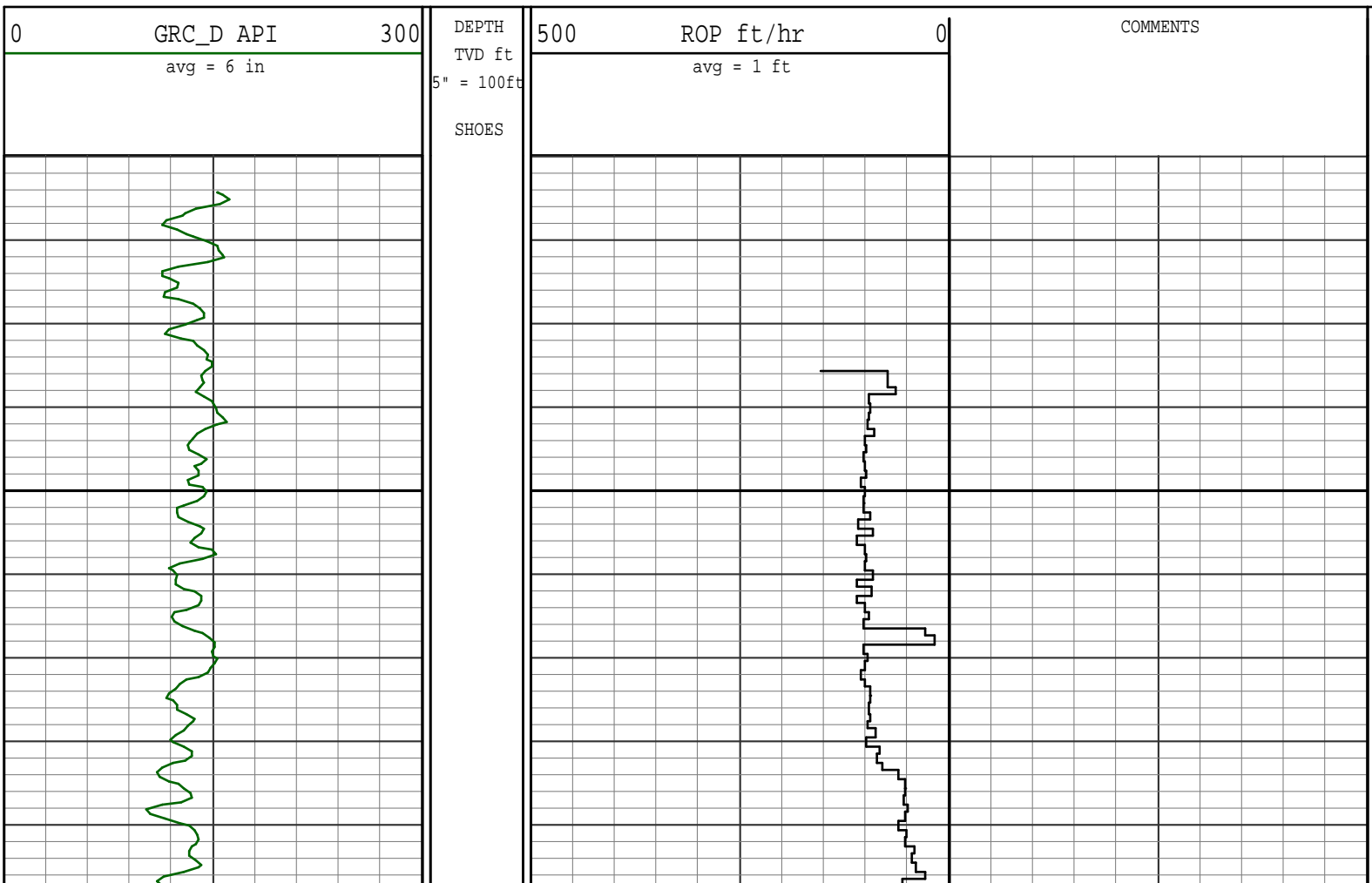
THIRD PARTY DEPTH TRACKING SERVICES PROVIDED BY PASON.

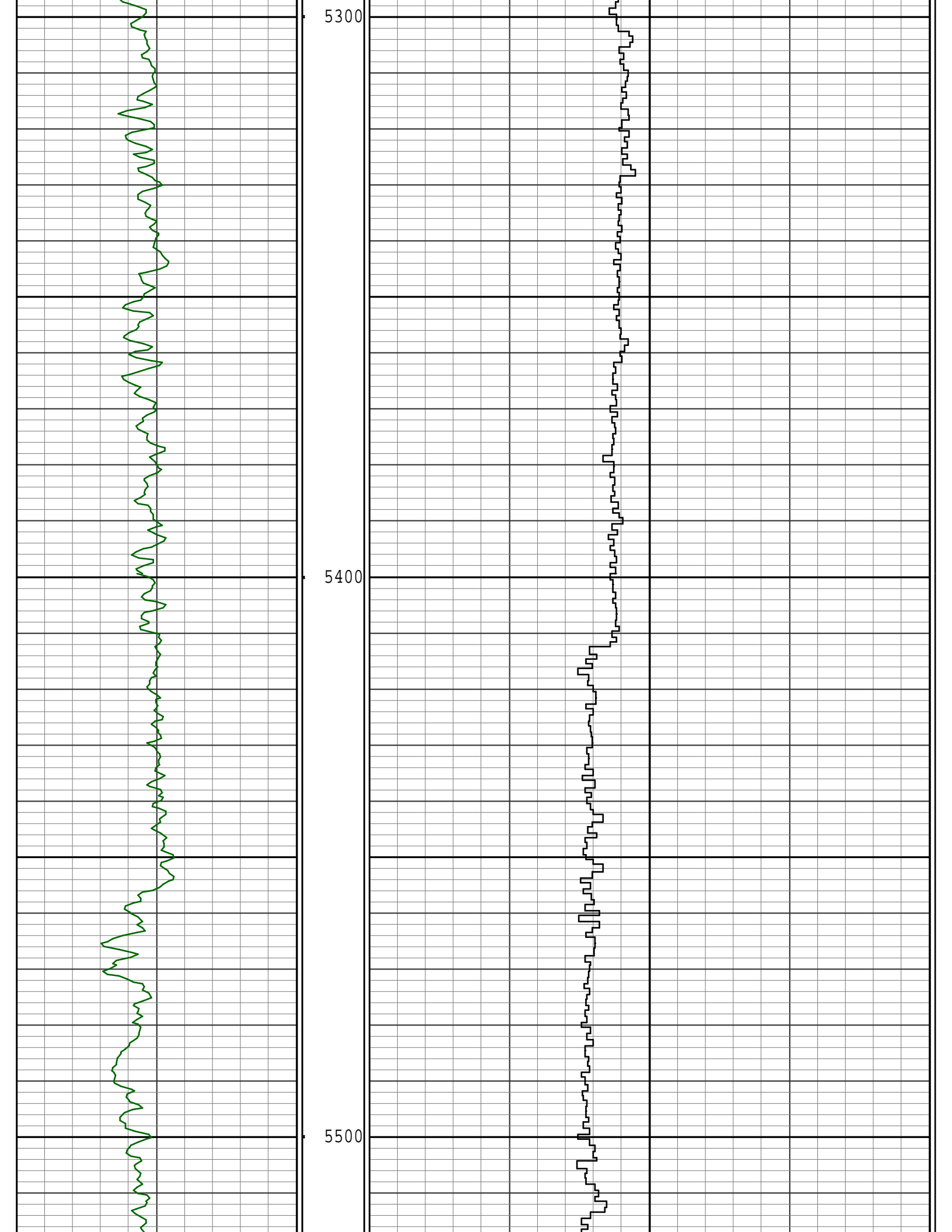
RUN #1: 6 3/4" XBOLT/AGR LOGGING RUN.

THE USE OF AND RELIANCE UPON THIS RECORDED-DATA BY THE HEREIN NAMED COMPANY (AND ANY OF ITS AFFILIATES, PARTNERS, REPRESENTATIVES, AGENTS, CONSULTANTS AND EMPLOYEES) IS SUBJECT TO THE TERMS AND CONDITIONS AGREED UPON BETWEEN SCHLUMBERGER AND THE COMPANY, INCLUDING: (a) RESTRICTIONS ON USE OF THE RECORDED-DATA; (b) DISCLAIMERS AND WAIVERS OF WARRANTIES AND REPRESENTATIONS REGARDING COMPANY'S USE AND RELIANCE UPON THE RECORDED-DATA; AND (c) CUSTOMER'S FULL AND SOLE RESPONSIBILITY FOR ANY INFERENCE DRAWN OR DECISION MADE IN CONNECTION WITH THE USE OF THIS RECORDED-DATA

Version No : RX6 V7.02B Release 18Sep2017

Plot Time : 28-Jun-2019 11:35

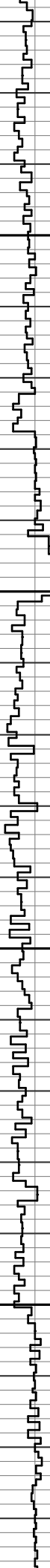






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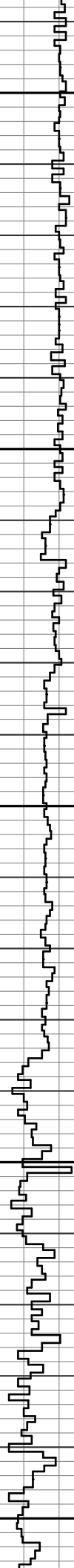
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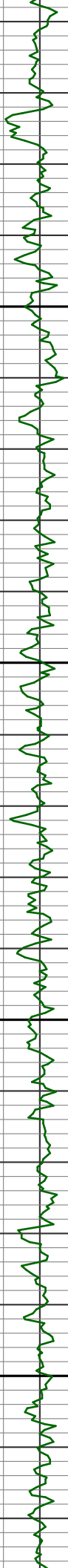




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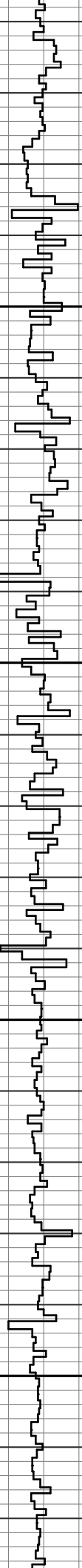
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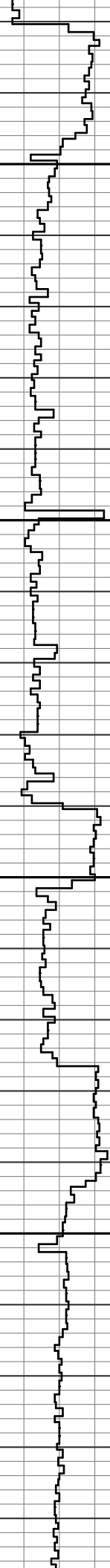
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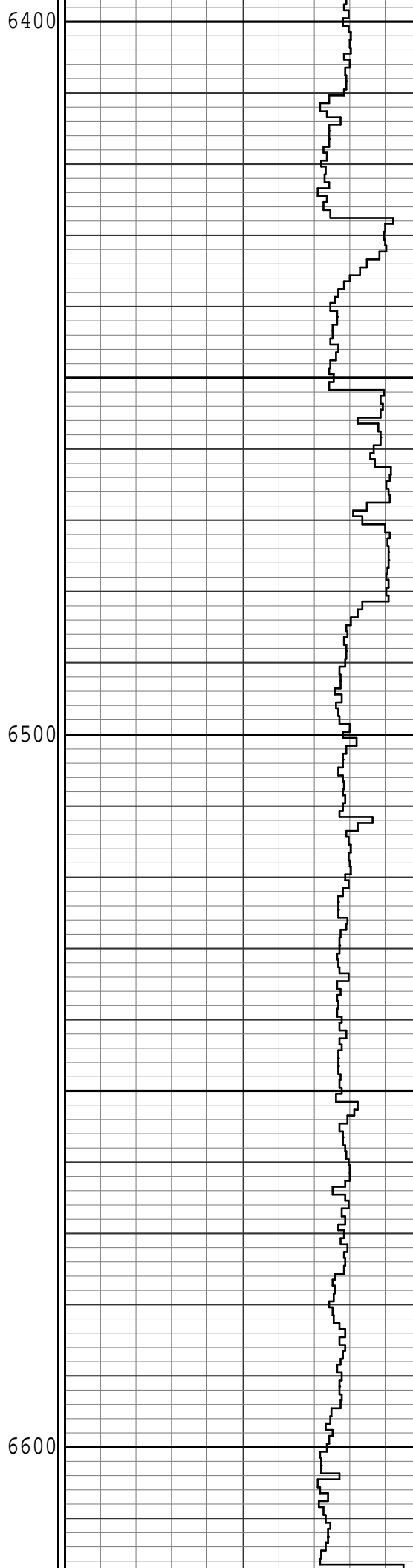
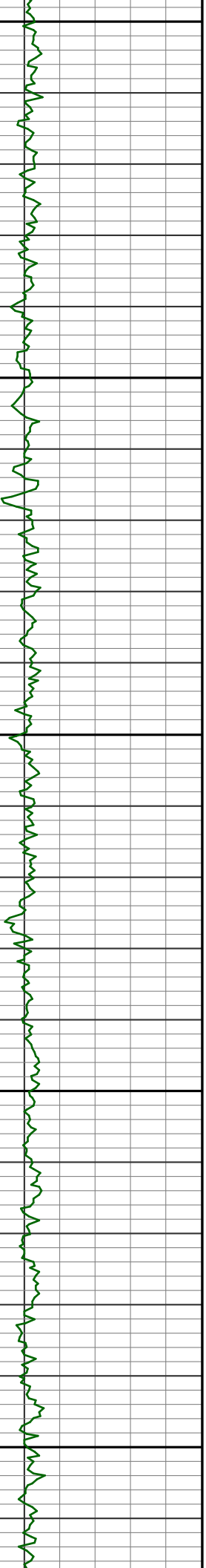


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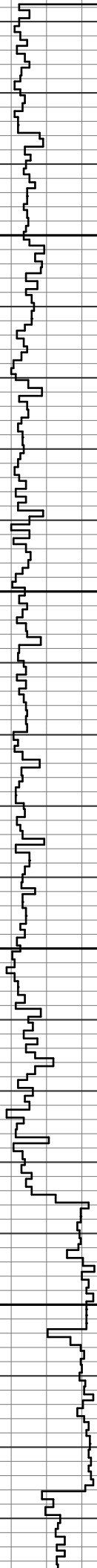






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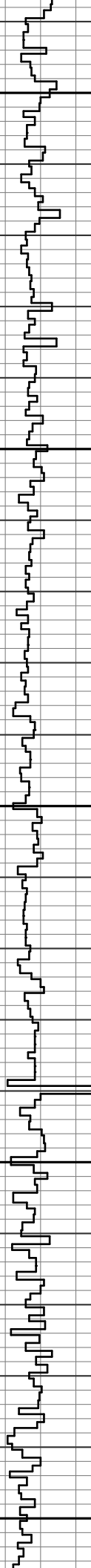
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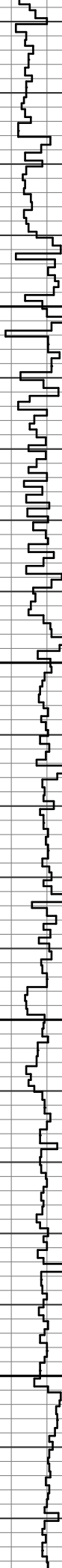
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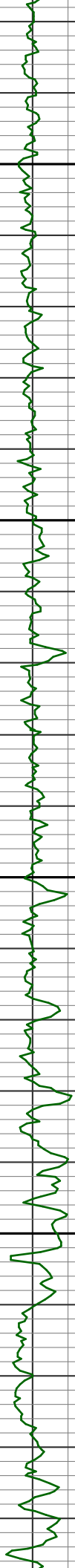




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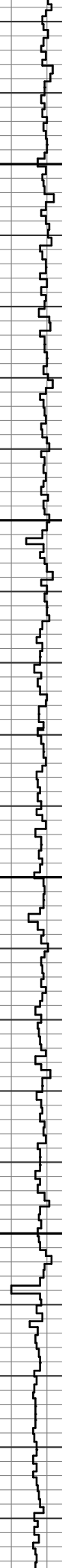
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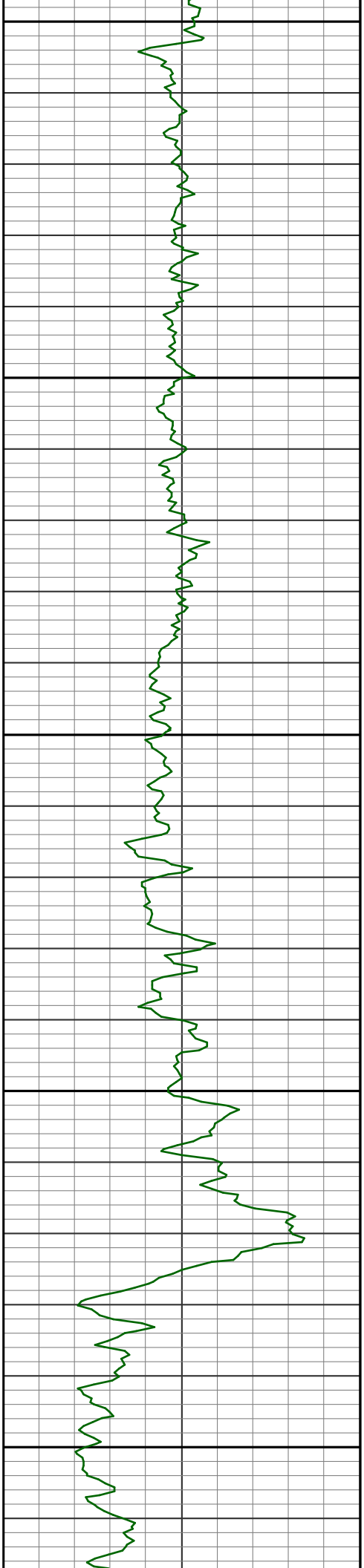




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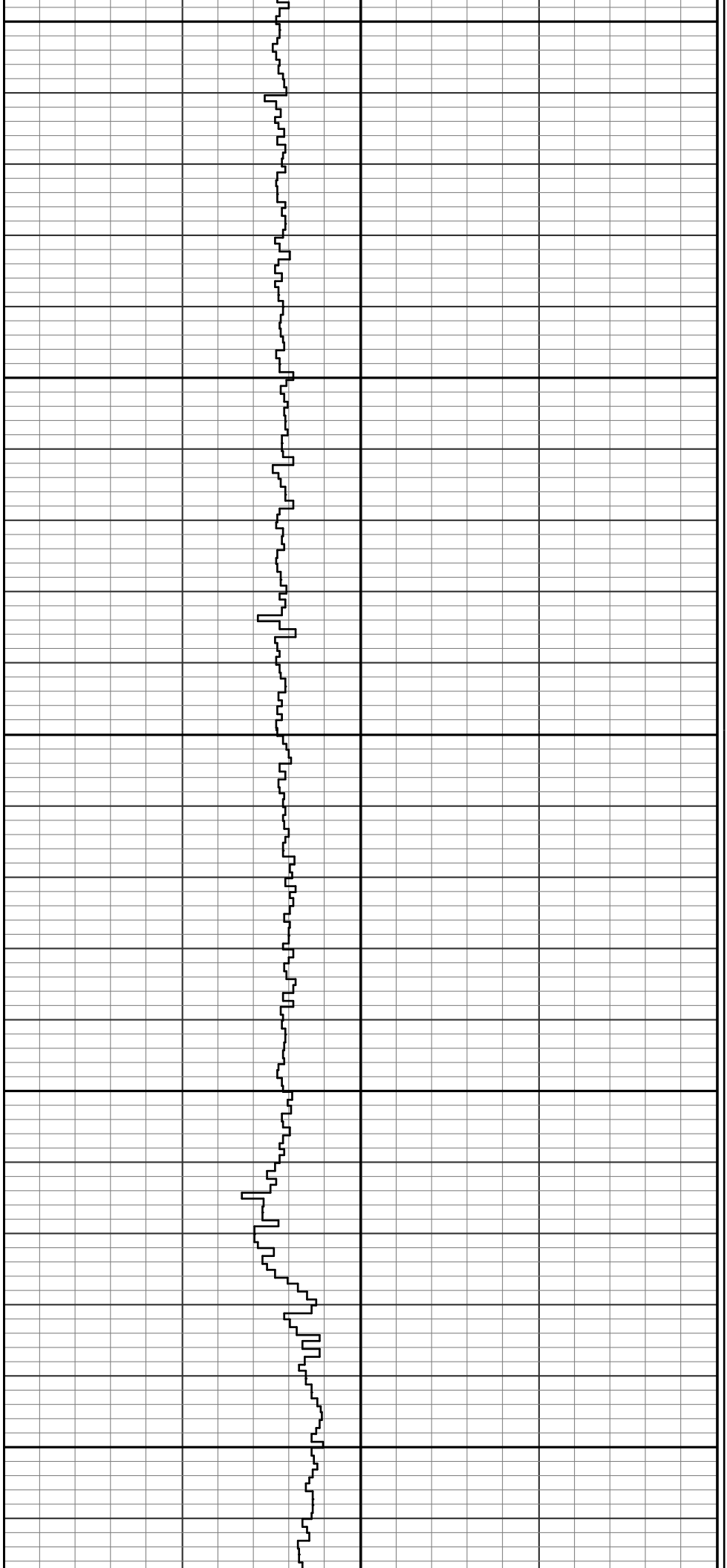


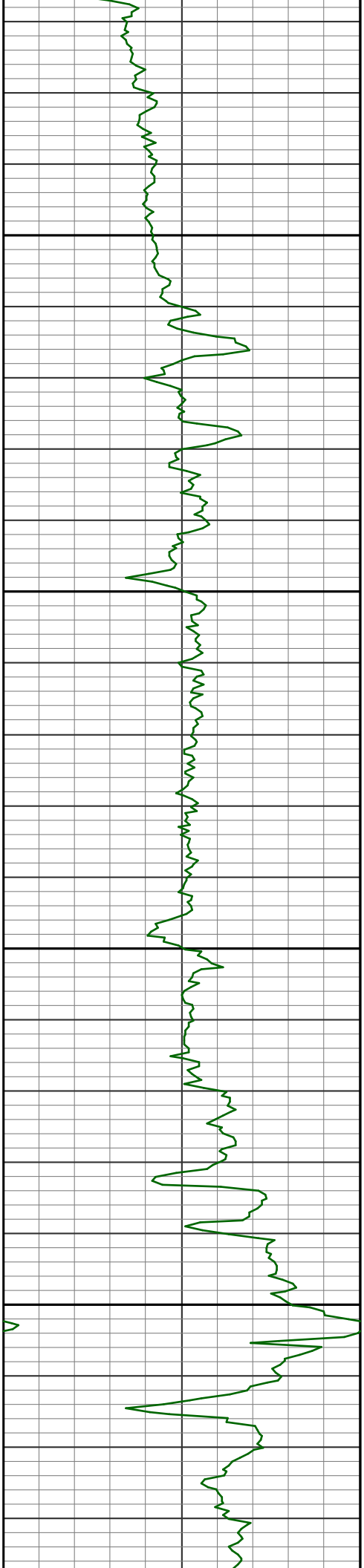


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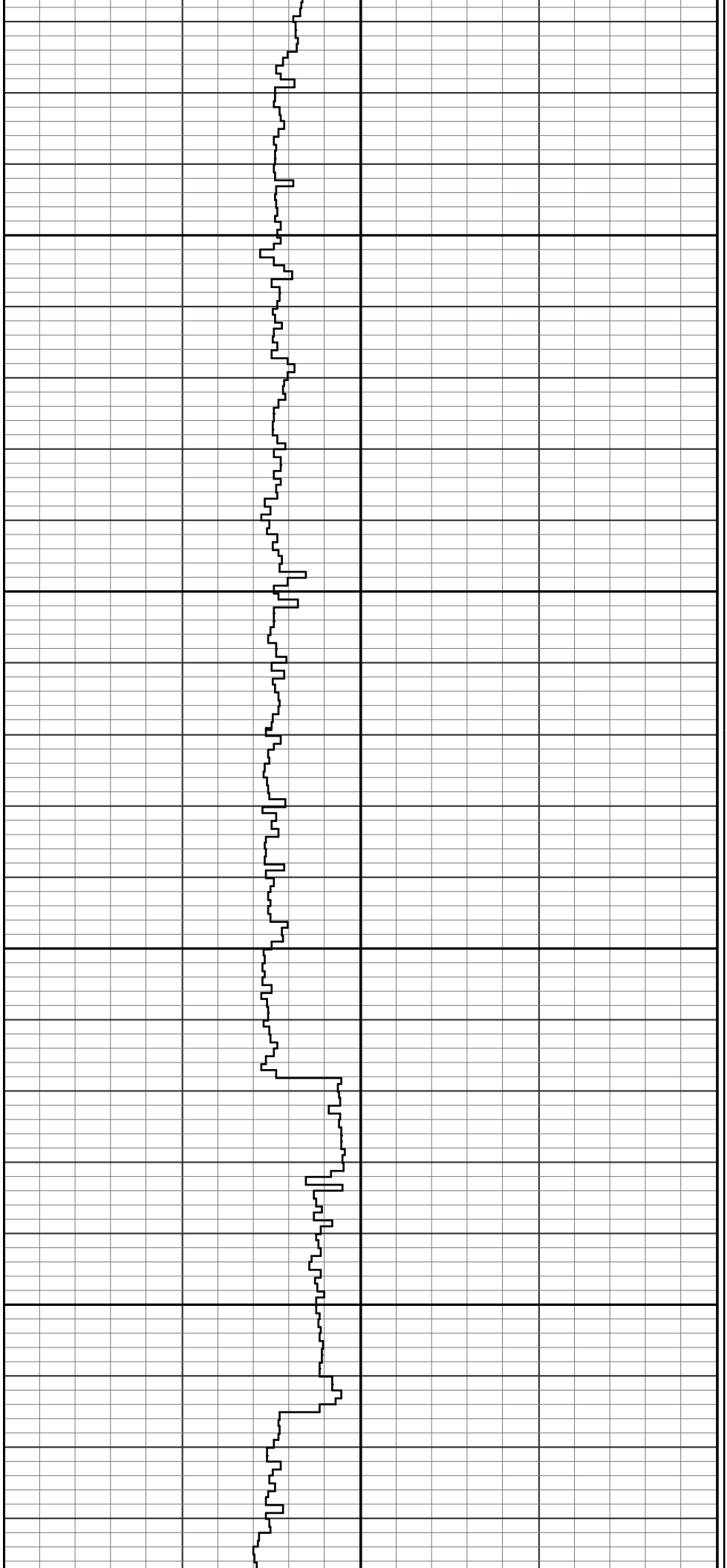
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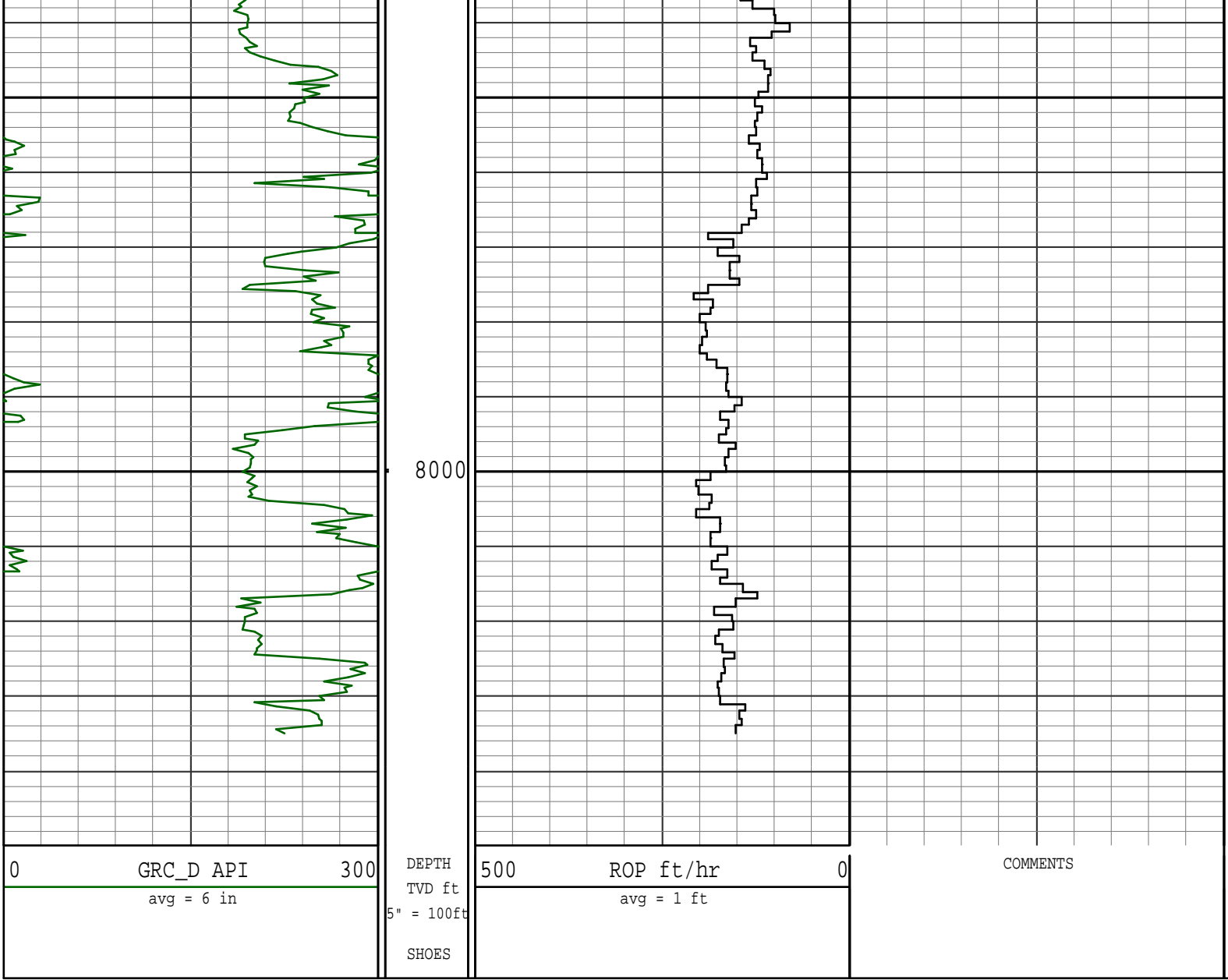




7800

7900





### Survey Report

Vertical Section Plane: 329.66°	Total Correction: 9.27° West to True
Calculation Method: Minimum Curvature	Survey Reference: Wellhead
North Aligned to: True North	Well: BOGGESS 17H ST01
RT: 25' ROTARY TABLE TO GROUND LEVEL	FIELD: MARCELLUS SHALE

Measured Depth (ft)	Inclination (deg)	Azimuth (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	Rect Co-ord North (ft)	Rect Co-ord East (ft)	Closure Distance (ft)	Closure Direction (deg)	Dog-leg Severity (dg/hft)	Temp (deg F)
ORIGIN OF WELL AT SURFACE											
0.00	0.00	0.00	0.00		0.00	0.00 N	0.00 E	0.00	0.00		
THE FOLLOWING ARE MULTISHOT SURVEYS											
110.00	0.16	266.21	110.00	110.00	0.07	0.01 S	0.15 W	0.15	266.21	0.14	
210.00	0.15	259.79	210.00	100.00	0.18	0.04 S	0.42 W	0.42	264.23	0.02	
310.00	0.16	259.84	310.00	100.00	0.27	0.09 S	0.69 W	0.69	262.51	0.01	
410.00	0.17	250.98	410.00	100.00	0.35	0.16 S	0.97 W	0.98	260.39	0.03	
510.00	0.16	258.86	510.00	100.00	0.42	0.24 S	1.24 W	1.27	259.13	0.02	
610.00	0.15	93.36	610.00	100.00	0.39	0.27 S	1.25 W	1.28	257.65	0.31	
710.00	0.19	77.78	710.00	100.00	0.27	0.25 S	0.96 W	0.99	255.58	0.06	
810.00	0.16	77.09	810.00	100.00	0.18	0.18 S	0.66 W	0.68	254.73	0.03	
910.00	0.12	56.80	910.00	100.00	0.14	0.09 S	0.43 W	0.44	258.15	0.06	
1010.00	0.22	319.13	1010.00	100.00	0.33	0.11 N	0.47 W	0.49	283.26	0.26	
1110.00	0.22	324.63	1110.00	100.00	0.71	0.41 N	0.71 W	0.82	300.22	0.02	
1210.00	0.17	74.03	1210.00	100.00	0.87	0.61 N	0.68 W	0.91	312.01	0.32	
1310.00	0.36	91.78	1309.99	100.00	0.67	0.64 N	0.22 W	0.68	340.98	0.20	
1410.00	0.36	98.88	1409.99	100.00	0.30	0.58 N	0.40 E	0.71	34.66	0.05	
1510.00	0.38	103.44	1509.99	100.00	-0.13	0.46 N	1.04 E	1.13	66.16	0.03	
1610.00	0.43	111.91	1609.99	100.00	-0.65	0.24 N	1.71 E	1.72	81.97	0.08	
1710.00	0.47	117.31	1709.98	100.00	-1.30	0.09 S	2.42 E	2.42	92.07	0.06	
1810.00	0.48	119.63	1809.98	100.00	-2.01	0.48 S	3.15 E	3.18	98.72	0.02	
1910.00	0.58	128.60	1909.98	100.00	-2.84	1.01 S	3.91 E	4.03	104.43	0.13	



2010.00	0.58	136.87	2009.97	100.00	-3.81	1.69 S	4.65 E	4.95	109.99	0.08	
2110.00	0.57	134.85	2109.97	100.00	-4.78	2.41 S	5.35 E	5.87	114.27	0.02	
2210.00	0.59	134.53	2209.96	100.00	-5.76	3.12 S	6.07 E	6.82	117.23	0.02	
2310.00	0.56	139.11	2309.96	100.00	-6.74	3.85 S	6.75 E	7.78	119.70	0.05	
2410.00	0.46	140.69	2409.95	100.00	-7.61	4.53 S	7.33 E	8.62	121.74	0.10	
2510.00	0.47	137.61	2509.95	100.00	-8.41	5.15 S	7.86 E	9.39	123.22	0.03	
2610.00	0.49	139.22	2609.95	100.00	-9.23	5.77 S	8.42 E	10.21	124.45	0.02	
2710.00	0.54	135.94	2709.94	100.00	-10.11	6.44 S	9.02 E	11.08	125.50	0.06	
2810.00	0.57	134.87	2809.94	100.00	-11.05	7.13 S	9.70 E	12.04	126.29	0.03	
2910.00	0.57	139.68	2909.93	100.00	-12.02	7.86 S	10.38 E	13.02	127.13	0.05	
3010.00	0.56	141.26	3009.93	100.00	-12.99	8.62 S	11.00 E	13.98	128.06	0.02	
3110.00	0.52	146.54	3109.92	100.00	-13.93	9.38 S	11.56 E	14.88	129.04	0.06	
3210.00	0.52	145.87	3209.92	100.00	-14.84	10.13 S	12.07 E	15.75	130.02	0.01	
3310.00	0.55	134.35	3309.91	100.00	-15.75	10.84 S	12.66 E	16.67	130.57	0.11	
3410.00	0.67	125.51	3409.91	100.00	-16.75	11.52 S	13.48 E	17.73	130.50	0.15	
3510.00	0.66	125.35	3509.90	100.00	-17.81	12.19 S	14.43 E	18.89	130.19	0.01	
3610.00	0.62	122.70	3609.90	100.00	-18.81	12.81 S	15.35 E	20.00	129.85	0.05	
3710.00	0.54	116.16	3709.89	100.00	-19.69	13.31 S	16.23 E	20.99	129.36	0.10	
3810.00	0.50	115.15	3809.89	100.00	-20.44	13.71 S	17.05 E	21.88	128.80	0.04	
3910.00	0.51	119.11	3909.88	100.00	-21.19	14.11 S	17.83 E	22.74	128.35	0.04	
4010.00	0.49	138.77	4009.88	100.00	-21.99	14.65 S	18.50 E	23.60	128.37	0.17	
4110.00	0.46	141.40	4109.88	100.00	-22.81	15.28 S	19.04 E	24.41	128.76	0.04	
4210.00	0.45	138.38	4209.87	100.00	-23.59	15.89 S	19.55 E	25.19	129.11	0.03	
4310.00	0.44	145.10	4309.87	100.00	-24.36	16.50 S	20.03 E	25.95	129.48	0.05	
4410.00	0.43	144.34	4409.87	100.00	-25.11	17.12 S	20.47 E	26.68	129.91	0.01	
4510.00	0.38	173.10	4509.86	100.00	-25.79	17.75 S	20.72 E	27.29	130.58	0.21	
4610.00	0.41	173.21	4609.86	100.00	-26.42	18.44 S	20.81 E	27.80	131.54	0.03	
4710.00	0.66	213.04	4709.86	100.00	-27.01	19.28 S	20.54 E	28.16	133.19	0.43	
4810.00	0.71	229.84	4809.85	100.00	-27.37	20.16 S	19.75 E	28.22	135.59	0.21	
4910.00	0.73	240.96	4909.84	100.00	-27.46	20.87 S	18.72 E	28.03	138.11	0.14	
5010.00	0.64	245.75	5009.84	100.00	-27.39	21.41 S	17.65 E	27.74	140.49	0.11	
5110.00	0.49	247.03	5109.83	100.00	-27.28	21.80 S	16.75 E	27.49	142.47	0.15	
THE FOLLOWING ARE SCHLUMBERGER MWD SURVEYS											
5290.00	0.90	295.10	5289.82	180.00	-26.01	21.50 S	14.76 E	26.08	145.53	0.38	129.94
5385.00	12.48	0.89	5384.04	95.00	-16.59	10.88 S	14.24 E	17.92	127.39	12.78	140.78
5480.00	16.24	36.18	5476.23	95.00	-2.48	10.15 N	22.26 E	24.46	65.49	9.83	140.78
5575.00	22.89	44.32	5565.71	95.00	7.71	34.12 N	43.04 E	54.92	51.59	7.55	144.39
5670.00	29.26	33.04	5651.05	95.00	23.02	66.86 N	68.65 E	95.82	45.76	8.47	144.39
5764.00	36.99	28.56	5729.73	94.00	47.97	111.03 N	94.73 E	145.95	40.47	8.62	144.39
5859.00	46.17	29.29	5800.71	95.00	80.12	166.13 N	125.23 E	208.04	37.01	9.68	148.01
5953.00	54.05	32.58	5860.96	94.00	114.65	227.87 N	162.37 E	279.80	35.47	8.80	148.01
6048.00	55.69	33.95	5915.62	95.00	149.17	292.82 N	204.99 E	357.45	34.99	2.09	151.62
6143.00	56.44	35.90	5968.66	95.00	182.15	357.44 N	250.11 E	436.26	34.98	1.88	151.62
6238.00	56.44	38.30	6021.18	95.00	212.51	420.57 N	297.86 E	515.37	35.31	2.10	151.62
6333.00	56.44	38.42	6073.70	95.00	241.27	482.65 N	346.99 E	594.43	35.71	0.10	155.24
6428.00	56.31	38.37	6126.31	95.00	269.96	544.65 N	396.12 E	673.46	36.03	0.14	155.24
6523.00	56.46	38.12	6178.90	95.00	298.85	606.78 N	445.09 E	752.52	36.26	0.27	155.24
6618.00	56.49	40.42	6231.37	95.00	326.44	668.08 N	495.22 E	831.61	36.55	2.02	158.85
6712.00	56.54	40.33	6283.24	94.00	352.33	727.81 N	546.00 E	909.85	36.88	0.10	155.24

## Survey Report

Vertical Section Plane: 329.66°

Total Correction: 9.27° West to True

Calculation Method: Minimum Curvature

Survey Reference: Wellhead

North Aligned to: True North

Well: BOGESS 17H ST01

RT: 25' ROTARY TABLE TO GROUND LEVEL

FIELD: MARCELLUS SHALE

Measured Depth (ft)	Inclination (deg)	Azimuth (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	Rect Co-ord North (ft)	Rect Co-ord East (ft)	Closure Distance (ft)	Closure Direction (deg)	Dog-leg Severity (dg/hft)	Temp (deg F)
6806.00	55.85	40.46	6335.53	94.00	378.10	787.30 N	596.62 E	987.82	37.16	0.74	158.85
6902.00	55.89	40.94	6389.40	96.00	403.92	847.54 N	648.44 E	1067.15	37.42	0.42	158.85
6996.00	56.36	40.73	6441.79	94.00	429.10	906.59 N	699.47 E	1145.06	37.65	0.53	158.85
7091.00	56.44	40.77	6494.36	95.00	454.75	966.53 N	751.12 E	1224.08	37.85	0.09	158.85
7187.00	56.53	39.01	6547.37	96.00	481.82	1027.94 N	802.45 E	1304.07	37.98	1.53	158.85
7282.00	56.60	37.64	6599.72	95.00	510.66	1090.13 N	851.61 E	1383.34	38.00	1.20	162.46
7376.00	56.44	38.27	6651.57	94.00	539.66	1151.95 N	899.83 E	1461.74	37.99	0.59	162.46
7471.00	56.47	38.44	6704.07	95.00	568.42	1214.04 N	948.96 E	1540.92	38.01	0.15	162.46
7566.00	56.48	38.17	6756.54	95.00	597.26	1276.19 N	998.05 E	1620.11	38.03	0.24	162.46
7660.00	55.36	38.11	6809.21	94.00	625.82	1337.42 N	1046.13 E	1697.97	38.03	1.19	162.46
7755.00	55.29	40.94	6863.27	95.00	652.71	1397.68 N	1095.85 E	1776.06	38.10	2.45	166.08
7849.00	55.44	40.80	6916.69	94.00	677.62	1456.16 N	1146.46 E	1853.31	38.21	0.20	166.08
7944.00	55.85	41.03	6970.30	95.00	702.83	1515.43 N	1197.82 E	1931.66	38.32	0.48	166.08
8039.00	56.47	40.56	7023.20	95.00	728.34	1575.17 N	1249.37 E	2010.49	38.42	0.77	166.08
8134.00	56.48	40.63	7075.67	95.00	754.21	1635.30 N	1300.91 E	2089.63	38.50	0.06	169.69
8229.00	56.31	38.55	7128.25	95.00	781.36	1696.27 N	1351.33 E	2168.74	38.54	1.83	166.08
8324.00	56.43	38.16	7180.87	95.00	810.10	1758.30 N	1400.41 E	2247.84	38.54	0.36	169.69
8418.00	56.36	38.42	7232.90	94.00	838.63	1819.75 N	1448.92 E	2326.13	38.53	0.24	169.69
8513.00	56.56	38.25	7285.38	95.00	867.42	1881.86 N	1498.04 E	2405.31	38.52	0.26	169.69
8608.00	56.53	38.13	7337.76	95.00	896.43	1944.15 N	1547.04 E	2484.57	38.51	0.11	169.69
8703.00	56.54	38.24	7390.14	95.00	925.45	2006.45 N	1596.03 E	2563.82	38.50	0.10	173.31
8798.00	56.37	38.06	7442.64	95.00	954.48	2068.71 N	1644.94 E	2642.99	38.49	0.24	169.69
8891.00	56.51	38.25	7494.05	93.00	982.89	2129.65 N	1692.82 E	2720.49	38.48	0.23	173.31
8986.00	56.47	37.85	7546.50	95.00	1012.06	2192.03 N	1741.64 E	2799.70	38.47	0.35	173.31
9081.00	56.48	38.04	7598.97	95.00	1041.36	2254.48 N	1790.34 E	2878.89	38.45	0.17	176.92

9176.00	58.33	28.34	7650.23	95.00	1077.03	2321.37 N	1834.01 E	2958.44	38.31	8.82	176.92
9270.00	61.39	20.30	7697.48	94.00	1124.06	2395.38 N	1867.36 E	3037.25	37.94	8.08	180.54
9365.00	65.00	12.59	7740.36	95.00	1182.11	2476.63 N	1891.25 E	3116.17	37.37	8.18	184.15
9460.00	68.76	6.27	7777.69	95.00	1249.26	2562.76 N	1905.49 E	3193.53	36.63	7.29	180.54
9554.00	71.65	1.46	7809.54	94.00	1322.39	2650.97 N	1911.41 E	3268.20	35.79	5.71	180.54
9649.00	74.18	356.53	7837.46	95.00	1401.53	2741.72 N	1909.79 E	3341.31	34.86	5.63	184.15
9743.00	74.87	350.89	7862.56	94.00	1484.22	2831.72 N	1899.87 E	3410.01	33.86	5.83	184.15
9839.00	75.23	344.94	7887.35	96.00	1572.26	2922.37 N	1880.45 E	3475.11	32.76	6.00	184.15
9933.00	77.76	341.04	7909.30	94.00	1661.18	3009.74 N	1853.71 E	3534.80	31.63	4.85	184.15
10028.00	79.70	339.41	7927.87	95.00	1752.76	3097.41 N	1822.18 E	3593.65	30.47	2.65	187.76
10123.00	83.44	336.56	7941.80	95.00	1845.72	3184.50 N	1786.96 E	3651.61	29.30	4.93	187.76
10218.00	85.35	332.55	7951.08	95.00	1939.89	3269.85 N	1746.34 E	3706.97	28.11	4.66	187.76
10313.00	85.69	331.11	7958.50	95.00	2034.53	3353.34 N	1701.63 E	3760.38	26.91	1.55	187.76
10408.00	87.03	330.30	7964.53	95.00	2129.32	3436.02 N	1655.24 E	3813.93	25.72	1.65	187.76
10502.00	88.71	330.26	7968.03	94.00	2223.25	3517.60 N	1608.68 E	3867.99	24.58	1.79	191.38
10597.00	88.15	328.07	7970.63	95.00	2318.20	3599.13 N	1560.00 E	3922.67	23.43	2.38	194.99
10692.00	87.48	329.46	7974.25	95.00	2413.12	3680.30 N	1510.78 E	3978.32	22.32	1.62	198.61
10787.00	87.65	329.38	7978.29	95.00	2508.03	3762.01 N	1462.49 E	4036.29	21.24	0.20	198.61
10881.00	87.54	329.64	7982.23	94.00	2601.95	3842.94 N	1414.84 E	4095.12	20.21	0.30	198.61
10976.00	87.59	328.94	7986.27	95.00	2696.86	3924.55 N	1366.37 E	4155.60	19.20	0.74	202.22
11071.00	87.65	328.83	7990.21	95.00	2791.77	4005.81 N	1317.32 E	4216.85	18.20	0.13	202.22
11165.00	87.65	329.30	7994.07	94.00	2885.69	4086.37 N	1269.04 E	4278.89	17.25	0.50	198.61
11259.00	87.76	327.70	7997.83	94.00	2979.59	4166.45 N	1219.96 E	4341.38	16.32	1.70	202.22
11354.00	88.32	328.64	8001.08	95.00	3074.50	4247.12 N	1169.89 E	4405.30	15.40	1.15	198.61
11449.00	88.43	329.55	8003.78	95.00	3169.46	4328.59 N	1121.12 E	4471.42	14.52	0.96	202.22
11544.00	88.66	329.68	8006.19	95.00	3264.42	4410.52 N	1073.08 E	4539.18	13.67	0.28	202.22
11639.00	89.10	330.97	8008.05	95.00	3359.40	4493.04 N	1026.06 E	4608.71	12.86	1.43	202.22
11734.00	88.71	328.25	8009.86	95.00	3454.37	4574.97 N	978.01 E	4678.34	12.07	2.89	202.22
11828.00	88.77	330.18	8011.93	94.00	3548.34	4655.70 N	929.91 E	4747.66	11.30	2.05	205.83
11922.00	88.21	328.90	8014.41	94.00	3642.31	4736.69 N	882.28 E	4818.16	10.55	1.49	205.83
12017.00	87.82	330.32	8017.70	95.00	3737.25	4818.59 N	834.25 E	4890.27	9.82	1.55	205.83
12112.00	88.99	329.25	8020.34	95.00	3832.21	4900.65 N	786.46 E	4963.35	9.12	1.67	205.83
12206.00	89.50	331.21	8021.58	94.00	3926.19	4982.23 N	739.80 E	5036.86	8.45	2.16	205.83
12301.00	89.10	327.58	8022.74	95.00	4021.16	5063.98 N	691.44 E	5110.97	7.78	3.84	209.45
12396.00	89.50	329.49	8023.90	95.00	4116.13	5145.00 N	641.86 E	5184.88	7.11	2.05	209.45
12491.00	89.55	329.58	8024.69	95.00	4211.13	5226.88 N	593.70 E	5260.49	6.48	0.11	205.83
12586.00	89.78	329.37	8025.24	95.00	4306.13	5308.71 N	545.45 E	5336.66	5.87	0.33	205.83
12681.00	89.16	328.95	8026.12	95.00	4401.12	5390.28 N	496.75 E	5413.12	5.27	0.79	205.83
12776.00	89.10	330.63	8027.57	95.00	4496.11	5472.36 N	448.95 E	5490.75	4.69	1.77	205.83
12870.00	89.66	331.31	8028.58	94.00	4590.07	5554.55 N	403.34 E	5569.17	4.15	0.94	205.83
12964.00	89.83	330.65	8029.00	94.00	4684.05	5636.74 N	357.74 E	5648.08	3.63	0.72	209.45
13059.00	89.61	330.44	8029.46	95.00	4779.04	5719.46 N	311.03 E	5727.91	3.11	0.32	209.45
13154.00	89.44	330.30	8030.25	95.00	4874.03	5802.04 N	264.06 E	5808.04	2.61	0.23	209.45
13248.00	89.78	328.65	8030.89	94.00	4968.02	5883.00 N	216.32 E	5886.98	2.11	1.79	213.06
13342.00	89.66	329.71	8031.35	94.00	5062.01	5963.73 N	168.16 E	5966.10	1.62	1.14	213.06
13437.00	90.28	330.15	8031.40	95.00	5157.01	6045.94 N	120.56 E	6047.14	1.14	0.80	213.06

## Survey Report

Vertical Section Plane: 329.66°	Total Correction: 9.27° West to True
Calculation Method: Minimum Curvature	Survey Reference: Wellhead
North Aligned to: True North	Well: BOGGESS 17H ST01
RT: 25' ROTARY TABLE TO GROUND LEVEL	FIELD: MARCELLUS SHALE

Measured Depth (ft)	Inclination (deg)	Azimuth (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	Rect Co-ord North (ft)	Rect Co-ord East (ft)	Closure Distance (ft)	Closure Direction (deg)	Dog-leg Severity (dg/hft)	Temp (deg F)
13532.00	89.89	330.27	8031.26	95.00	5252.01	6128.39 N	73.36 E	6128.83	0.69	0.43	213.06
13627.00	90.00	329.02	8031.35	95.00	5347.01	6210.36 N	25.35 E	6210.41	0.23	1.32	216.68
13722.00	89.94	328.71	8031.40	95.00	5442.00	6291.68 N	23.77 W	6291.72	359.78	0.33	216.68
13817.00	90.22	330.17	8031.27	95.00	5536.99	6373.48 N	72.07 W	6373.89	359.35	1.56	216.68
13911.00	90.39	330.83	8030.77	94.00	5630.98	6455.29 N	118.35 W	6456.38	358.95	0.72	216.68
14007.00	90.45	329.21	8030.06	96.00	5726.97	6538.44 N	166.32 W	6540.56	358.54	1.69	216.68
14102.00	90.11	330.42	8029.60	95.00	5821.97	6620.56 N	214.09 W	6624.02	358.15	1.32	216.68
14197.00	89.89	328.44	8029.60	95.00	5916.96	6702.35 N	262.40 W	6707.48	357.76	2.10	220.29
14292.00	90.11	329.73	8029.60	95.00	6011.96	6783.85 N	311.21 W	6790.99	357.37	1.38	220.29
14386.00	89.55	327.31	8029.88	94.00	6105.93	6864.01 N	360.29 W	6873.46	357.00	2.64	202.22
14481.00	90.00	329.15	8030.25	95.00	6200.90	6944.77 N	410.30 W	6956.88	356.62	1.99	209.45
14576.00	90.11	329.44	8030.16	95.00	6295.89	7026.45 N	458.81 W	7041.42	356.26	0.33	213.06
14671.00	90.67	329.31	8029.51	95.00	6390.89	7108.20 N	507.21 W	7126.27	355.92	0.61	216.68
14765.00	91.29	331.64	8027.91	94.00	6484.86	7189.98 N	553.52 W	7211.25	355.60	2.57	216.68
14860.00	90.62	328.52	8026.32	95.00	6579.83	7272.29 N	600.89 W	7297.07	355.28	3.36	216.68
14955.00	90.28	329.69	8025.58	95.00	6674.82	7353.81 N	649.67 W	7382.45	354.95	1.28	216.68
15050.00	89.78	329.16	8025.53	95.00	6769.82	7435.60 N	697.99 W	7468.29	354.64	0.77	216.68
15144.00	89.83	331.13	8025.85	94.00	6863.81	7517.12 N	744.78 W	7553.93	354.34	2.10	216.68
15239.00	90.56	328.98	8025.52	95.00	6958.80	7599.43 N	792.20 W	7640.61	354.05	2.39	220.29
15334.00	90.06	329.91	8025.01	95.00	7053.80	7681.24 N	840.49 W	7727.09	353.76	1.11	220.29
15429.00	90.00	330.39	8024.96	95.00	7148.80	7763.63 N	887.78 W	7814.23	353.48	0.51	220.29
15524.00	89.66	328.81	8025.24	95.00	7243.79	7845.57 N	935.85 W	7901.19	353.20	1.70	220.29
15618.00	89.94	330.48	8025.57	94.00	7337.79	7926.68 N	983.35 W	7987.44	352.93	1.80	220.29
15713.00	90.45	330.70	8025.25	95.00	7432.78	8009.44 N	1030.00 W	8075.39	352.67	0.59	220.29
15807.00	90.50	331.56	8024.47	94.00	7526.74	8091.75 N	1075.39 W	8162.90	352.43	0.92	220.29
15903.00	90.95	333.77	8023.25	96.00	7622.60	8177.02 N	1119.46 W	8253.29	352.20	2.35	220.29
15998.00	90.56	329.36	8022.00	95.00	7717.51	8260.53 N	1164.68 W	8342.23	351.97	4.66	220.29
16092.00	90.06	329.42	8021.49	94.00	7811.51	8341.43 N	1212.55 W	8429.10	351.73	0.54	220.29

16186.00	90.00	329.40	8021.44	94.00	7905.51	8422.35 N	1260.38 W	8516.13	351.49	0.07	220.29
16280.00	89.66	328.92	8021.72	94.00	7999.50	8503.06 N	1308.57 W	8603.16	351.25	0.63	220.29
16374.00	89.89	328.81	8022.09	94.00	8093.49	8583.51 N	1357.17 W	8690.14	351.02	0.27	223.91
16469.00	90.56	331.15	8021.72	95.00	8188.48	8665.76 N	1404.70 W	8778.87	350.79	2.56	223.91
16563.00	91.06	331.47	8020.39	94.00	8282.43	8748.21 N	1449.82 W	8867.54	350.59	0.63	223.91
16658.00	89.94	328.61	8019.56	95.00	8377.42	8830.51 N	1497.25 W	8956.54	350.38	3.23	223.91
16753.00	90.34	331.09	8019.33	95.00	8472.41	8912.65 N	1544.96 W	9045.56	350.17	2.64	223.91
16849.00	90.22	328.70	8018.86	96.00	8568.40	8995.69 N	1593.11 W	9135.67	349.96	2.49	223.91
16942.00	90.22	329.73	8018.50	93.00	8661.39	9075.58 N	1640.71 W	9222.70	349.75	1.11	223.91
17037.00	90.00	329.69	8018.32	95.00	8756.39	9157.62 N	1688.63 W	9312.00	349.55	0.24	227.52
17132.00	89.78	328.72	8018.50	95.00	8851.39	9239.22 N	1737.26 W	9401.13	349.35	1.05	223.91
17226.00	89.89	329.14	8018.77	94.00	8945.38	9319.73 N	1785.77 W	9489.28	349.15	0.46	227.52
17321.00	89.78	327.53	8019.04	95.00	9040.35	9400.59 N	1835.64 W	9578.13	348.95	1.70	227.52
17416.00	89.16	329.01	8019.92	95.00	9135.32	9481.38 N	1885.60 W	9667.06	348.75	1.69	33.80
17512.00	89.33	328.33	8021.19	96.00	9231.30	9563.38 N	1935.51 W	9757.27	348.56	0.73	227.52
17606.00	89.50	329.28	8022.15	94.00	9325.28	9643.78 N	1984.20 W	9845.79	348.37	1.03	223.91
17700.00	88.99	328.30	8023.39	94.00	9419.26	9724.17 N	2032.90 W	9934.39	348.19	1.18	223.91
17795.00	89.05	329.00	8025.01	95.00	9514.23	9805.29 N	2082.32 W	10023.96	348.01	0.74	227.52
17890.00	89.38	328.45	8026.31	95.00	9609.21	9886.47 N	2131.63 W	10113.66	347.83	0.68	227.52
17985.00	89.38	328.97	8027.34	95.00	9704.19	9967.65 N	2180.97 W	10203.46	347.66	0.55	227.52
18080.00	89.50	329.05	8028.27	95.00	9799.18	10049.09 N	2229.88 W	10293.52	347.49	0.15	227.52
18174.00	89.22	328.58	8029.32	94.00	9893.16	10129.50 N	2278.55 W	10382.61	347.32	0.58	227.52
18269.00	89.10	328.73	8030.71	95.00	9988.14	10210.62 N	2327.97 W	10472.64	347.16	0.20	231.13
18364.00	89.22	330.25	8032.11	95.00	10083.12	10292.46 N	2376.19 W	10563.19	347.00	1.60	227.52
18459.00	89.66	330.86	8033.03	95.00	10178.11	10375.18 N	2422.89 W	10654.33	346.86	0.79	231.13
18553.00	89.94	328.84	8033.36	94.00	10272.10	10456.46 N	2470.10 W	10744.25	346.71	2.17	231.13
18647.00	89.38	329.95	8033.92	94.00	10366.09	10537.36 N	2517.95 W	10834.03	346.56	1.32	231.13
18741.00	89.22	329.60	8035.07	94.00	10460.09	10618.58 N	2565.27 W	10924.05	346.42	0.41	223.91
18836.00	90.39	332.07	8035.39	95.00	10555.06	10701.53 N	2611.56 W	11015.58	346.29	2.88	227.52
18931.00	90.00	328.88	8035.07	95.00	10650.04	10784.18 N	2658.37 W	11107.00	346.15	3.38	227.52
19026.00	89.44	328.06	8035.53	95.00	10745.01	10865.15 N	2708.05 W	11197.55	346.00	1.05	231.13
STRAIGHT LINE PROJECTION TO BIT DEPTH AT 19055'MD											
19055.00	89.44	328.06	8035.82	29.00	10774.00	10889.76 N	2723.39 W	11225.14	345.96	0.00	

**BOTTOM HOLE ASSEMBLY RECORD**

RUN #1	ft										
8 1/2" PDC BIT	1.33										
PD COPIBANA	12.32										
NM HHOP SUB	5.84										
XBOLT DIR/GR	23.23										
NM X/O SUB	3.57										
FRAC ID SUB	2.64										
NM FLEX DC	15.14										
0° MUD MOTOR	38.62										
DIFFUSER SUB	7.33										
TOTAL BHA:	110.02										
SENSOR OFFSETS:											
GAMMA-RAY	23.16										
DIRECTIONAL	26.47										

GAMMA-RAY



