Company :	**NORTHEAST NATURAL ENERGY LLC**
Well :	**BOGGESS 1H**
Field :	**MARCELLUS SHALE**
Date :	**26-Apr-2019**
Time :	**23:02**

GAMMA-RAY

Schlumberger

1" = 100'
FEET TVD

COMPANY : NORTHEAST NATURAL ENERGY LLC
WELL : BOGGESS 1H
FIELD : MARCELLUS SHALE
COUNTY : MOMOMGALIA
STATE : WV
COUNTRY : USA
API No.: 47-061-01811

COMPANY : NORTHEAST NATURAL ENERGY LLC
WELL : BOGGESS 1H
FIELD : MARCELLUS SHALE
COUNTY : MOMOMGALIA
STATE : WV
COUNTRY : USA
API WELL No.: 47-061-01811

WELL LOCATION

LAT:39°40'12"N LON:80°05'36"W
X:1,801,481' Y:426,750' NAD83

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

HOLE SIZE in	FROM ft	TO ft
8 1/2	6350	20898

DEVIATION RECORD

INCLINATION deg	FROM ft	TO ft
00 - 00	25	6322
00 - 90	6322	8452
90 +/-4	8452	20898

CASING RECORD

CASING SIZE in	FROM ft	TO ft
9 5/8	25	2491

DRILLING Co.: PATTERSON
RIG : 334
LWD UNIT No.: TRAILER DISTRICT : NEB
SPUD DATE : 19-APR-19
LWD START DATE : 19-APR-19 DEPTH : 6383 ft
LWD END DATE : 26-APR-19 DEPTH : 20876 ft
TOTAL DEPTH : 20898 ft

RUN DATA

RUN NUMBER	1	2
START DATE	18-APR-19	20-APR-19
START TIME	22:30	18:00
END DATE	20-APR-19	26-APR-19
END TIME	15:30	05:00
DEPTH IN ft	6350	8388
DEPTH OUT ft	8388	20898
LOG TOP ft	6383	8366
LOG BOTTOM ft	8366	20876
HOLE SIZE in	8 1/2	8 1/2
MUD DATA @ ft	888	20898
MUD TYPE	OIL BASED	OIL BASED
DENSITY lb/gal	12.10	12.30
VISCOSITY s/qt	61	72
pH		
FLUID LOSS cm3/30	7.4	7.0
SALINITY ppm	44000	36000
Rm ohmm @ deg F	@	@
Rmf ohmm @ deg F	@	@

MAX REC TEMP deg F	163	224				
Rm @ MAX TEMP ohmm						
LWD ENGINEER #1	M.KHALIL	M.KHALIL				
LWD ENGINEER #2	G.REESE	G.REESE				
LWD ENGINEER #3						

REMARKS

NORTHEAST NATURAL ENERGY AFE#: 100343-603
SCHLUMBERGER JOB#: 19NEB1005

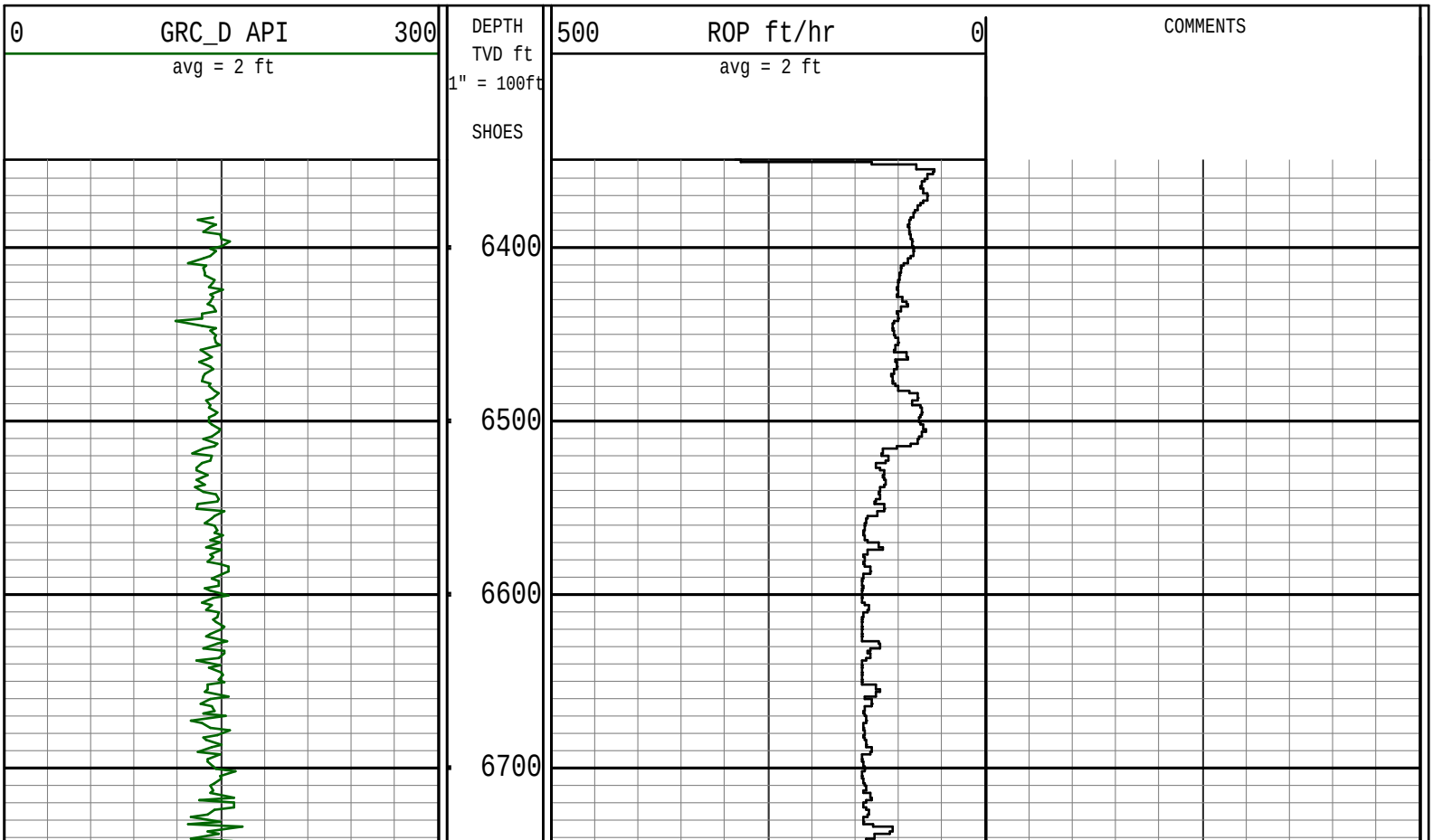
ALL LOGGING DATA IS MEMORY UNLESS STATED OTHERWISE.
ALL REFERENCES TO LOG TOP, LOG BOTTOM OR LOGGING TOOL DEPTH REFER TO THE GAMMA-RAY SENSOR UNLESS STATED OTHERWISE.
ALL ANNOTATIONS IN THE DEPTH TRACK ARE REFERENCED TO BIT DEPTH.

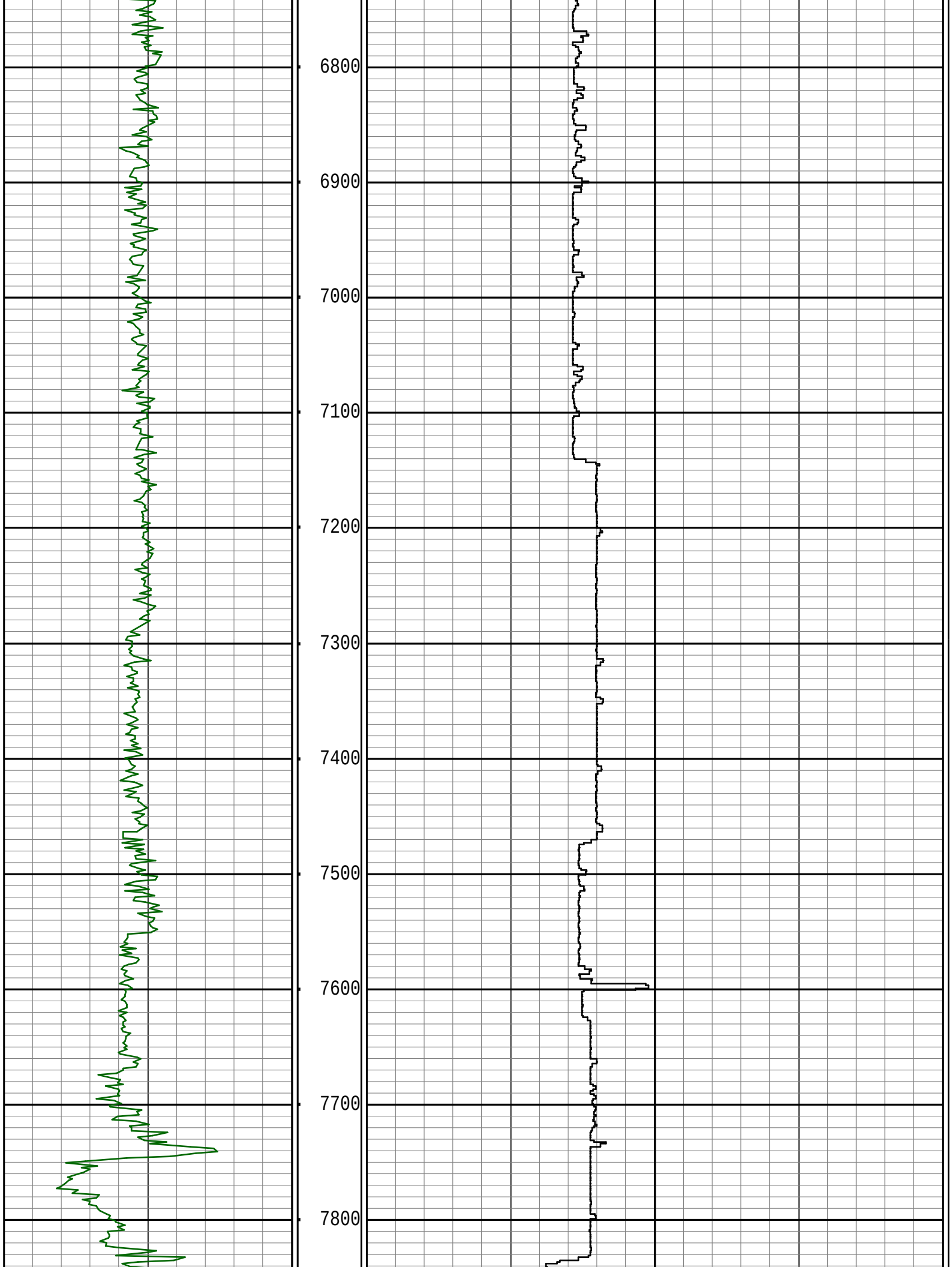
THIRD PARTY DEPTH TRACKING SERVICES PROVIDED BY PASON.

RUN #1: 6 3/4" XBOLT/AGR LOGGING RUN.
RUN #2: 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 : 26-Apr-2019 23:01

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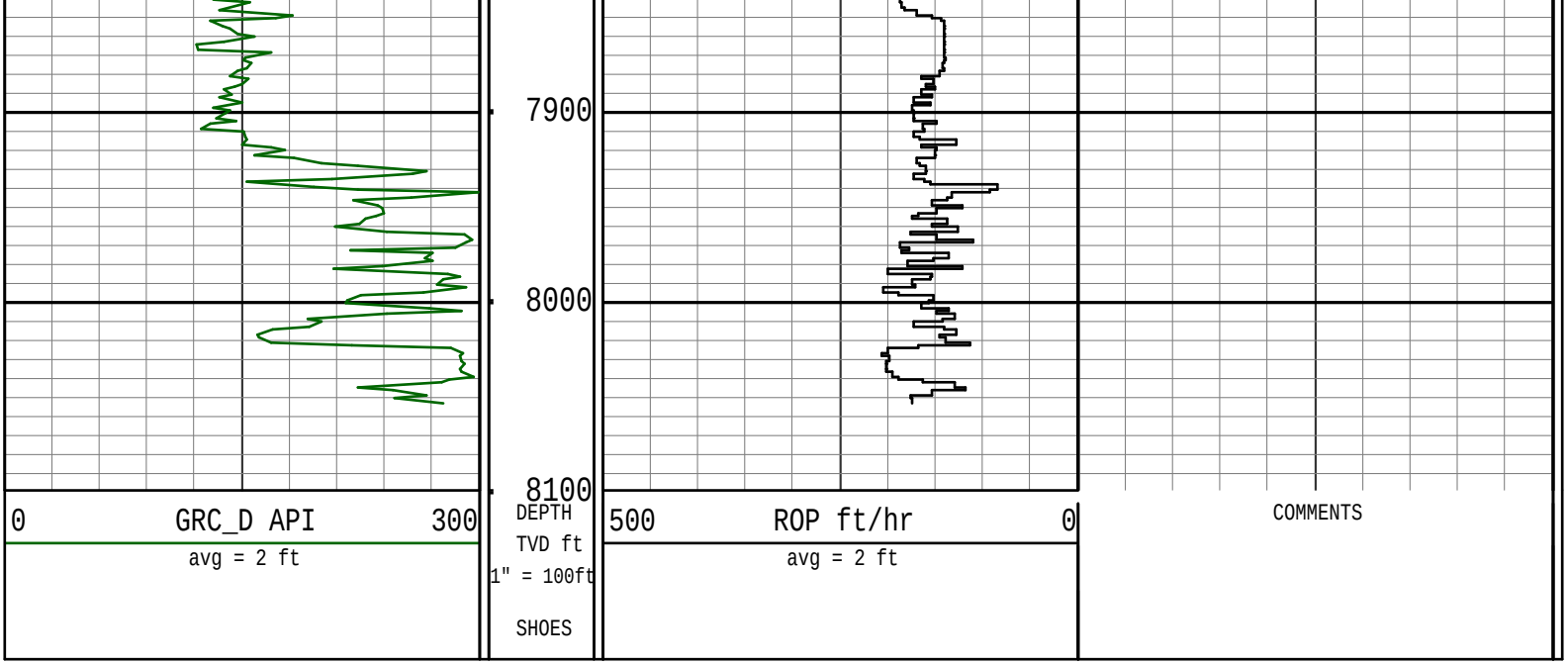

Survey Report

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 1H
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	0.25	218.67	110.00	110.00	-0.09	0.19 S	0.15 W	0.24	218.67	0.23	
210.00	0.21	171.45	210.00	100.00	-0.33	0.54 S	0.26 W	0.60	205.67	0.19	
310.00	0.34	174.03	310.00	100.00	-0.77	1.02 S	0.20 W	1.03	191.19	0.13	
410.00	0.39	171.33	410.00	100.00	-1.36	1.65 S	0.12 W	1.65	184.12	0.05	
510.00	0.38	164.57	509.99	100.00	-2.00	2.30 S	0.02 E	2.30	179.48	0.05	
610.00	0.35	162.45	609.99	100.00	-2.62	2.91 S	0.20 E	2.92	176.05	0.03	
710.00	0.39	104.29	709.99	100.00	-3.15	3.29 S	0.62 E	3.35	169.27	0.36	
810.00	0.41	105.64	809.99	100.00	-3.65	3.47 S	1.30 E	3.70	159.50	0.02	
910.00	0.17	95.94	909.99	100.00	-3.99	3.58 S	1.79 E	4.00	153.45	0.24	
1010.00	0.17	332.16	1009.99	100.00	-3.93	3.47 S	1.87 E	3.94	151.68	0.30	
1110.00	0.18	2.95	1109.99	100.00	-3.65	3.18 S	1.81 E	3.66	150.38	0.09	
1210.00	0.16	52.16	1209.98	100.00	-3.51	2.93 S	1.92 E	3.51	146.74	0.14	
1310.00	0.32	76.01	1309.98	100.00	-3.57	2.78 S	2.31 E	3.61	140.34	0.19	
1410.00	0.43	72.72	1409.98	100.00	-3.73	2.60 S	2.94 E	3.92	131.56	0.11	
1510.00	0.52	66.24	1509.98	100.00	-3.87	2.31 S	3.71 E	4.37	121.90	0.10	
1610.00	0.60	70.76	1609.97	100.00	-4.02	1.95 S	4.62 E	5.01	112.92	0.09	
1710.00	0.71	69.25	1709.97	100.00	-4.22	1.56 S	5.69 E	5.90	105.33	0.11	
1810.00	0.96	70.83	1809.96	100.00	-4.49	1.07 S	7.06 E	7.14	98.58	0.25	
1910.00	1.32	75.49	1909.94	100.00	-4.96	0.50 S	8.97 E	8.98	93.21	0.37	
2010.00	1.70	74.24	2009.90	100.00	-5.65	0.19 N	11.51 E	11.51	89.06	0.38	
2110.00	2.08	73.54	2109.85	100.00	-6.46	1.11 N	14.68 E	14.72	85.69	0.38	
2210.00	2.39	75.69	2209.77	100.00	-7.47	2.14 N	18.44 E	18.56	83.39	0.32	
2310.00	2.71	76.86	2309.67	100.00	-8.75	3.19 N	22.76 E	22.99	82.03	0.32	
2410.00	2.91	76.63	2409.55	100.00	-10.19	4.31 N	27.54 E	27.87	81.10	0.20	
2510.00	3.02	75.68	2509.42	100.00	-11.65	5.55 N	32.56 E	33.03	80.32	0.12	
2610.00	2.77	77.55	2609.29	100.00	-13.12	6.72 N	37.47 E	38.07	79.83	0.27	
2710.00	2.34	82.34	2709.19	100.00	-14.65	7.52 N	41.85 E	42.52	79.82	0.48	
2810.00	1.95	90.99	2809.12	100.00	-16.33	7.76 N	45.58 E	46.23	80.34	0.51	
2910.00	1.47	99.90	2909.08	100.00	-18.04	7.51 N	48.54 E	49.12	81.21	0.55	
3010.00	1.32	106.49	3009.05	100.00	-19.71	6.96 N	50.91 E	51.38	82.21	0.22	
3110.00	1.07	113.71	3109.02	100.00	-21.30	6.26 N	52.87 E	53.24	83.25	0.29	
3210.00	0.98	117.65	3209.01	100.00	-22.78	5.49 N	54.48 E	54.76	84.25	0.11	
3310.00	0.81	123.82	3309.00	100.00	-24.15	4.70 N	55.83 E	56.02	85.19	0.20	
3410.00	0.78	130.01	3408.99	100.00	-25.42	3.87 N	56.93 E	57.06	86.12	0.09	
3510.00	0.80	129.43	3508.98	100.00	-26.72	2.99 N	57.99 E	58.07	87.05	0.02	
3610.00	0.78	126.77	3608.97	100.00	-28.00	2.13 N	59.08 E	59.12	87.93	0.04	
3710.00	0.77	123.98	3708.96	100.00	-29.23	1.35 N	60.18 E	60.20	88.71	0.04	
3810.00	0.76	119.42	3808.95	100.00	-30.41	0.65 N	61.32 E	61.32	89.39	0.06	
3910.00	0.69	119.03	3908.94	100.00	-31.50	0.03 N	62.42 E	62.42	89.97	0.07	
4010.00	0.59	123.75	4008.94	100.00	-32.48	0.55 S	63.38 E	63.38	90.49	0.11	
4110.00	0.50	129.30	4108.93	100.00	-33.36	1.11 S	64.14 E	64.15	90.99	0.10	
4210.00	0.53	132.89	4208.93	100.00	-34.21	1.70 S	64.82 E	64.84	91.50	0.04	
4310.00	0.55	136.36	4308.92	100.00	-35.12	2.36 S	65.49 E	65.53	92.07	0.04	
4410.00	0.63	142.28	4408.92	100.00	-36.13	3.14 S	66.15 E	66.23	92.72	0.10	
4510.00	0.61	160.44	4508.91	100.00	-37.20	4.08 S	66.67 E	66.79	93.50	0.20	

4610.00	0.61	163.19	4608.91	100.00	-38.24	5.09 S	67.00 E	67.19	94.35	0.03
4710.00	0.72	199.12	4708.90	100.00	-39.17	6.20 S	66.95 E	67.24	95.29	0.42
4810.00	0.79	215.36	4808.89	100.00	-39.86	7.35 S	66.35 E	66.75	96.32	0.22
4910.00	0.80	221.15	4908.88	100.00	-40.36	8.44 S	65.49 E	66.03	97.34	0.08
5010.00	0.70	216.11	5008.87	100.00	-40.83	9.46 S	64.67 E	65.36	98.32	0.12
5110.00	0.63	207.76	5108.87	100.00	-41.36	10.44 S	64.05 E	64.90	99.26	0.12
5210.00	0.61	197.00	5208.86	100.00	-42.01	11.43 S	63.64 E	64.66	100.19	0.12
5310.00	0.58	184.11	5308.85	100.00	-42.79	12.45 S	63.45 E	64.66	101.10	0.14
5410.00	0.59	167.43	5408.85	100.00	-43.70	13.45 S	63.52 E	64.93	101.96	0.17
5510.00	0.54	156.11	5508.84	100.00	-44.66	14.39 S	63.83 E	65.43	102.70	0.12
5610.00	0.58	153.23	5608.84	100.00	-45.63	15.27 S	64.25 E	66.04	103.37	0.05
5710.00	0.63	152.71	5708.83	100.00	-46.69	16.21 S	64.73 E	66.72	104.06	0.05
5810.00	0.39	167.70	5808.83	100.00	-47.56	17.03 S	65.05 E	67.24	104.67	0.27
5910.00	0.36	254.91	5908.83	100.00	-47.80	17.45 S	64.82 E	67.13	105.06	0.52
6010.00	0.47	258.40	6008.83	100.00	-47.59	17.61 S	64.11 E	66.49	105.36	0.11
6110.00	0.90	273.38	6108.82	100.00	-47.02	17.65 S	62.93 E	65.36	105.67	0.46
6210.00	1.11	262.24	6208.80	100.00	-46.21	17.73 S	61.18 E	63.70	106.16	0.29
6310.00	1.13	235.47	6308.78	100.00	-45.91	18.42 S	59.41 E	62.20	107.23	0.52
6322.00	1.12	234.19	6320.78	12.00	-45.93	18.56 S	59.22 E	62.06	107.40	0.23
THE FOLLOWING ARE SCHLUMBERGER MWD SURVEYS										
6367.00	4.24	185.88	6365.73	45.00	-47.31	20.47 S	58.69 E	62.16	109.23	7.99
6462.00	14.87	177.03	6459.28	95.00	-61.01	36.18 S	58.97 E	69.18	121.53	11.26
6556.00	24.45	178.49	6547.70	94.00	-88.83	67.75 S	60.11 E	90.57	138.42	10.20

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 1H
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)
6651.00	31.63	180.24	6631.50	95.00	-127.55	112.37 S	60.52 E	127.63	151.69	7.61	
6747.00	31.48	183.52	6713.31	96.00	-170.04	162.57 S	58.88 E	172.90	160.09	1.80	
6841.00	31.64	190.27	6793.43	94.00	-209.15	211.34 S	52.97 E	217.88	165.93	3.76	
6936.00	31.71	188.67	6874.28	95.00	-247.47	260.54 S	44.76 E	264.36	170.25	0.89	
7031.00	31.78	190.02	6955.07	95.00	-285.93	309.86 S	36.65 E	312.02	173.25	0.75	
7125.00	31.66	189.18	7035.03	94.00	-323.82	358.59 S	28.41 E	359.71	175.47	0.49	
7220.00	31.75	189.21	7115.85	95.00	-362.33	407.87 S	20.43 E	408.38	177.13	0.10	
7315.00	23.63	198.73	7199.94	95.00	-394.14	450.67 S	10.29 E	450.78	178.69	9.71	
7409.00	12.89	225.11	7289.22	94.00	-409.19	476.02 S	3.25 W	476.03	180.39	14.15	
7503.00	12.87	267.70	7381.05	94.00	-406.90	483.86 S	21.17 W	484.32	182.51	9.88	
7598.00	21.12	283.68	7471.87	95.00	-389.99	480.23 S	48.44 W	482.66	185.76	9.90	
7693.00	27.03	290.35	7558.59	95.00	-361.36	468.66 S	85.35 W	476.37	190.32	6.84	
7787.00	35.03	290.98	7639.07	94.00	-323.72	451.55 S	130.64 W	470.06	196.14	8.52	
7882.00	42.63	291.79	7713.02	95.00	-276.97	429.81 S	186.05 W	468.35	203.41	8.02	
7977.00	50.05	298.21	7778.60	95.00	-220.40	400.60 S	248.13 W	471.22	211.77	9.21	
8072.00	58.07	307.77	7834.40	95.00	-151.71	358.56 S	312.28 W	475.49	221.05	11.72	
8167.00	64.97	315.28	7879.72	95.00	-72.43	303.16 S	374.58 W	481.89	231.02	10.05	
8262.00	73.02	321.73	7913.78	95.00	14.48	236.74 S	433.15 W	493.63	241.34	10.58	
8357.00	79.24	326.26	7936.55	95.00	106.19	162.16 S	487.29 W	513.56	251.59	8.02	144.39
8452.00	90.17	328.43	7945.30	95.00	200.56	82.63 S	538.23 W	544.54	261.27	11.73	148.01
8547.00	89.61	328.60	7945.49	95.00	295.54	1.62 S	587.85 W	587.85	269.84	0.62	155.24
8642.00	89.44	328.35	7946.27	95.00	390.52	79.35 N	637.52 W	642.44	277.10	0.32	158.85
8736.00	89.16	328.32	7947.42	94.00	484.48	159.35 N	686.86 W	705.11	283.06	0.30	162.46
8831.00	89.10	327.52	7948.87	95.00	579.43	239.84 N	737.31 W	775.34	288.02	0.85	166.08
8926.00	89.16	328.13	7950.31	95.00	674.37	320.24 N	787.89 W	850.49	292.12	0.64	169.69
9021.00	88.71	331.77	7952.07	95.00	769.34	402.44 N	835.45 W	927.33	295.72	3.86	173.31
9116.00	88.04	329.30	7954.77	95.00	864.28	485.12 N	882.16 W	1006.75	298.81	2.69	173.31
9210.00	88.15	330.64	7957.89	94.00	958.22	566.45 N	929.17 W	1088.22	301.37	1.43	176.92
9305.00	87.65	330.82	7961.37	95.00	1053.14	649.26 N	975.59 W	1171.89	303.64	0.56	176.92
9400.00	87.20	330.03	7965.64	95.00	1148.04	731.80 N	1022.43 W	1257.34	305.59	0.96	180.54
9495.00	87.26	328.44	7970.23	95.00	1242.92	813.34 N	1070.96 W	1344.80	307.21	1.67	180.54
9590.00	86.98	330.53	7975.01	95.00	1337.79	895.07 N	1119.14 W	1433.05	308.65	2.22	184.15
9684.00	88.54	329.09	7978.68	94.00	1431.72	976.25 N	1166.37 W	1521.02	309.93	2.26	184.15
9779.00	88.99	330.73	7980.73	95.00	1526.69	1058.43 N	1213.99 W	1610.60	311.08	1.79	184.15
9874.00	88.10	329.81	7983.14	95.00	1621.65	1140.90 N	1261.08 W	1700.58	312.14	1.35	184.15
9969.00	88.10	330.22	7986.29	95.00	1716.60	1223.14 N	1308.53 W	1791.18	313.07	0.43	184.15
10064.00	88.94	329.26	7988.75	95.00	1811.56	1305.16 N	1356.39 W	1882.35	313.90	1.34	184.15
10159.00	88.54	328.87	7990.83	95.00	1906.54	1386.63 N	1405.21 W	1974.17	314.62	0.59	187.76
10253.00	88.77	331.19	7993.04	94.00	2000.50	1468.03 N	1452.16 W	2064.91	315.31	2.48	184.15
10348.00	88.71	328.75	7995.13	95.00	2095.47	1550.25 N	1499.68 W	2156.93	315.95	2.57	184.15
10443.00	88.66	331.37	7997.31	95.00	2190.43	1632.55 N	1547.08 W	2249.15	316.54	2.76	187.76
10538.00	88.71	330.73	7999.49	95.00	2285.38	1715.65 N	1593.05 W	2341.21	317.12	0.68	187.76
10633.00	88.04	328.70	8002.19	95.00	2380.34	1797.65 N	1640.94 W	2433.97	317.61	2.25	187.76
10728.00	88.10	329.94	8005.38	95.00	2475.28	1879.30 N	1689.38 W	2527.01	318.05	1.31	187.76
10822.00	87.59	330.33	8008.92	94.00	2569.21	1960.76 N	1736.16 W	2618.94	318.48	0.68	187.76
10917.00	88.15	330.04	8012.45	95.00	2664.14	2043.13 N	1783.36 W	2711.97	318.88	0.66	191.38
11011.00	88.21	330.70	8015.44	94.00	2758.08	2124.80 N	1829.81 W	2804.10	319.27	0.70	191.38
11106.00	88.94	330.62	8017.80	95.00	2853.04	2207.59 N	1876.34 W	2897.26	319.64	0.77	191.38
11201.00	88.82	329.33	8019.66	95.00	2948.02	2289.82 N	1923.87 W	2990.74	319.96	1.36	191.38
11296.00	88.88	328.92	8021.56	95.00	3042.99	2371.34 N	1972.61 W	3084.55	320.24	0.44	194.99
11391.00	89.89	330.79	8022.58	95.00	3137.98	2453.48 N	2020.31 W	3178.25	320.53	2.24	191.38

11486.00	89.55	329.66	8023.05	95.00	3232.98	2535.94 N	2067.49 W	3271.93	320.81	1.24	191.38
11580.00	88.88	328.46	8024.33	94.00	3326.96	2616.55 N	2115.81 W	3364.97	321.04	1.46	194.99
11675.00	88.43	329.65	8026.56	95.00	3421.93	2698.01 N	2164.65 W	3459.04	321.26	1.34	194.99
11770.00	88.54	329.04	8029.08	95.00	3516.89	2779.70 N	2213.07 W	3553.09	321.47	0.65	194.99
11865.00	88.49	329.70	8031.54	95.00	3611.86	2861.42 N	2261.45 W	3647.18	321.68	0.70	198.61
11960.00	88.37	330.36	8034.14	95.00	3706.82	2943.69 N	2308.89 W	3741.16	321.89	0.71	198.61
12055.00	88.43	331.16	8036.79	95.00	3801.76	3026.55 N	2355.28 W	3835.01	322.11	0.84	198.61
12150.00	88.21	328.78	8039.58	95.00	3896.72	3108.76 N	2402.80 W	3929.10	322.30	2.51	202.22
12245.00	88.82	331.00	8042.04	95.00	3991.68	3190.90 N	2450.44 W	4023.24	322.48	2.42	202.22
12339.00	88.77	330.32	8044.02	94.00	4085.64	3272.83 N	2496.48 W	4116.29	322.66	0.72	202.22
12434.00	88.38	330.90	8046.38	95.00	4180.60	3355.57 N	2543.09 W	4210.37	322.84	0.74	202.22
12529.00	89.05	330.57	8048.51	95.00	4275.56	3438.43 N	2589.52 W	4304.46	323.02	0.79	202.22
12624.00	89.61	330.50	8049.62	95.00	4370.54	3521.13 N	2636.25 W	4398.66	323.18	0.59	202.22
12719.00	89.44	332.41	8050.41	95.00	4465.48	3604.58 N	2681.64 W	4492.68	323.35	2.02	205.83
12814.00	89.33	329.52	8051.43	95.00	4560.44	3687.63 N	2727.74 W	4586.84	323.51	3.04	205.83
12908.00	89.27	331.20	8052.58	94.00	4654.43	3769.32 N	2774.22 W	4680.18	323.65	1.79	194.99
13003.00	89.33	331.96	8053.74	95.00	4749.37	3852.86 N	2819.43 W	4774.28	323.80	0.80	202.22
13098.00	90.11	329.51	8054.20	95.00	4844.34	3935.73 N	2865.87 W	4868.59	323.94	2.71	202.22
13194.00	90.22	330.26	8053.93	96.00	4940.34	4018.77 N	2914.03 W	4964.08	324.05	0.79	202.22
13288.00	90.28	330.41	8053.52	94.00	5034.33	4100.45 N	2960.56 W	5057.53	324.17	0.17	205.83

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 1H
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)
13383.00	90.62	331.93	8052.77	95.00	5129.29	4183.67 N	3006.36 W	5151.82	324.30	1.64	205.83
13478.00	90.50	327.52	8051.84	95.00	5224.26	4265.69 N	3054.24 W	5246.38	324.40	4.64	205.83
13573.00	90.17	331.28	8051.29	95.00	5319.24	4347.44 N	3102.59 W	5341.00	324.49	3.97	205.83
13668.00	90.00	326.88	8051.14	95.00	5414.21	4428.92 N	3151.40 W	5435.68	324.57	4.63	205.83
13762.00	89.94	329.16	8051.19	94.00	5508.17	4508.65 N	3201.18 W	5529.51	324.62	2.43	205.83
13857.00	89.83	328.93	8051.38	95.00	5603.16	4590.12 N	3250.04 W	5624.23	324.70	0.27	209.45
13953.00	89.78	327.76	8051.71	96.00	5699.14	4671.83 N	3300.42 W	5720.04	324.76	1.22	209.45
14048.00	89.89	330.56	8051.98	95.00	5794.12	4753.39 N	3349.12 W	5814.75	324.83	2.95	209.45
14143.00	90.39	327.17	8051.75	95.00	5889.10	4834.70 N	3398.23 W	5909.50	324.90	3.61	209.45
14238.00	90.11	330.90	8051.34	95.00	5984.08	4916.14 N	3447.10 W	6004.24	324.96	3.94	209.45
14333.00	90.78	329.98	8050.60	95.00	6079.06	4998.77 N	3493.96 W	6098.81	325.05	1.20	209.45
14428.00	90.34	328.28	8049.67	95.00	6174.05	5080.31 N	3542.70 W	6193.57	325.11	1.85	209.45
14523.00	90.11	330.20	8049.30	95.00	6269.04	5161.94 N	3591.29 W	6288.32	325.17	2.04	213.06
14618.00	90.90	328.34	8048.46	95.00	6364.03	5243.59 N	3639.83 W	6383.07	325.23	2.13	213.06
14713.00	90.50	329.00	8047.30	95.00	6459.01	5324.73 N	3689.22 W	6477.90	325.28	0.81	213.06
14807.00	91.29	328.46	8045.83	94.00	6552.98	5405.07 N	3738.01 W	6571.71	325.33	1.02	213.06
14902.00	91.29	328.77	8043.69	95.00	6647.94	5486.15 N	3787.47 W	6666.54	325.38	0.33	213.06
14998.00	91.34	328.14	8041.49	96.00	6743.90	5567.94 N	3837.68 W	6762.37	325.42	0.66	213.06
15092.00	91.12	329.35	8039.47	94.00	6837.86	5648.27 N	3886.44 W	6856.20	325.47	1.31	216.68
15186.00	91.79	329.05	8037.09	94.00	6931.83	5728.99 N	3934.56 W	6949.97	325.52	0.78	216.68
15282.00	92.02	328.05	8033.89	96.00	7027.76	5810.84 N	3984.62 W	7045.78	325.56	1.07	213.06
15377.00	92.41	329.65	8030.22	95.00	7122.67	5892.08 N	4033.72 W	7140.55	325.60	1.73	213.06
15473.00	90.67	327.16	8027.64	96.00	7218.60	5973.81 N	4083.99 W	7236.39	325.64	3.16	213.06
15568.00	90.95	329.79	8026.30	95.00	7313.57	6054.78 N	4133.65 W	7331.26	325.68	2.78	213.06
15663.00	90.17	329.65	8025.37	95.00	7408.56	6136.81 N	4181.55 W	7426.02	325.73	0.83	213.06
15758.00	90.39	327.75	8024.91	95.00	7503.54	6217.98 N	4230.90 W	7520.89	325.77	2.01	213.06
15851.00	89.89	329.55	8024.68	93.00	7596.52	6297.40 N	4279.29 W	7613.77	325.80	2.01	216.68
15946.00	90.00	329.79	8024.77	95.00	7691.52	6379.39 N	4327.26 W	7708.56	325.85	0.28	216.68
16041.00	90.06	329.13	8024.72	95.00	7786.52	6461.22 N	4375.53 W	7803.37	325.89	0.70	216.68
16135.00	90.73	329.76	8024.07	94.00	7880.52	6542.16 N	4423.32 W	7897.19	325.94	0.98	216.68
16231.00	91.12	328.71	8022.52	96.00	7976.50	6624.64 N	4472.42 W	7993.02	325.98	1.17	216.68
16325.00	90.90	328.98	8020.86	94.00	8070.48	6705.07 N	4521.04 W	8086.89	326.01	0.37	213.06
16420.00	90.39	331.54	8019.80	95.00	8165.46	6787.54 N	4568.16 W	8181.61	326.06	2.75	216.68
16516.00	90.22	328.42	8019.28	96.00	8261.44	6870.65 N	4616.18 W	8277.38	326.10	3.26	216.68
16611.00	90.28	330.78	8018.87	95.00	8356.43	6952.58 N	4664.25 W	8372.20	326.14	2.49	220.29
16706.00	90.56	329.46	8018.17	95.00	8451.43	7034.95 N	4711.58 W	8466.97	326.19	1.42	220.29
16801.00	90.50	330.37	8017.29	95.00	8546.42	7117.15 N	4759.20 W	8561.76	326.23	0.96	220.29
16896.00	90.67	330.98	8016.32	95.00	8641.40	7199.97 N	4805.72 W	8656.47	326.28	0.67	220.29
16990.00	89.78	329.40	8015.96	94.00	8735.39	7281.53 N	4852.45 W	8750.25	326.32	1.93	220.29
17085.00	90.22	329.62	8015.96	95.00	8830.39	7363.39 N	4900.65 W	8845.11	326.35	0.52	220.29
17180.00	89.66	328.81	8016.05	95.00	8925.39	7445.00 N	4949.27 W	8939.99	326.38	1.04	216.68
17275.00	89.44	328.87	8016.80	95.00	9020.37	7526.30 N	4998.43 W	9034.90	326.41	0.24	216.68
17370.00	89.72	329.30	8017.50	95.00	9115.37	7607.80 N	5047.23 W	9129.79	326.44	0.54	216.68
17464.00	90.73	331.83	8017.13	94.00	9209.35	7689.66 N	5093.42 W	9223.54	326.48	2.90	216.68
17559.00	90.45	328.81	8016.15	95.00	9304.32	7772.18 N	5140.45 W	9318.32	326.52	3.19	216.68
17654.00	90.28	328.94	8015.54	95.00	9399.31	7853.50 N	5189.56 W	9413.23	326.54	0.23	220.29
17748.00	90.45	328.69	8014.95	94.00	9493.30	7933.91 N	5238.23 W	9507.16	326.57	0.32	220.29
17842.00	90.78	331.40	8013.94	94.00	9587.28	8015.35 N	5285.16 W	9600.97	326.60	2.90	220.29
17937.00	89.22	329.12	8013.94	95.00	9682.27	8097.83 N	5332.28 W	9695.77	326.64	2.91	220.29
18031.00	90.06	328.51	8014.53	94.00	9776.25	8178.24 N	5380.95 W	9789.70	326.66	1.10	220.29
18126.00	90.06	330.10	8014.43	95.00	9871.25	8259.93 N	5429.45 W	9884.60	326.68	1.67	220.29
18221.00	89.94	330.88	8014.43	95.00	9966.24	8342.60 N	5476.24 W	9979.39	326.72	0.83	220.29
18315.00	89.38	328.56	8014.99	94.00	10060.23	8423.77 N	5523.63 W	10073.25	326.75	2.54	220.29
18410.00	88.77	330.00	8016.52	95.00	10155.21	8505.43 N	5572.16 W	10168.15	326.77	1.65	220.29

18505.00	89.50	329.60	8017.95	95.00	10250.20	8587.52 N	5619.94 W	10263.00	326.80	0.88	220.29
18599.00	89.66	329.80	8018.64	94.00	10344.20	8668.68 N	5667.36 W	10356.88	326.82	0.27	220.29
18694.00	89.83	329.40	8019.07	95.00	10439.20	8750.62 N	5715.43 W	10451.77	326.85	0.46	223.91
18788.00	89.94	330.14	8019.25	94.00	10533.20	8831.83 N	5762.76 W	10545.65	326.88	0.80	216.68
18883.00	89.89	330.18	8019.40	95.00	10628.19	8914.24 N	5810.03 W	10640.49	326.90	0.07	220.29
18978.00	89.72	331.58	8019.72	95.00	10723.17	8997.23 N	5856.26 W	10735.26	326.94	1.48	220.29
19073.00	90.17	328.27	8019.81	95.00	10818.15	9079.42 N	5903.86 W	10830.12	326.97	3.52	220.29
19167.00	90.34	332.46	8019.39	94.00	10912.12	9161.11 N	5950.33 W	10923.94	327.00	4.46	223.91
19262.00	90.22	329.27	8018.93	95.00	11007.09	9244.08 N	5996.58 W	11018.71	327.03	3.36	223.91
19356.00	89.94	330.05	8018.80	94.00	11101.09	9325.21 N	6044.06 W	11112.61	327.05	0.88	223.91
19451.00	89.83	330.50	8018.99	95.00	11196.08	9407.70 N	6091.16 W	11207.46	327.08	0.49	223.91
19546.00	90.39	330.61	8018.80	95.00	11291.07	9490.43 N	6137.86 W	11302.28	327.11	0.60	223.91
19641.00	88.99	328.26	8019.32	95.00	11386.06	9572.22 N	6186.17 W	11397.20	327.13	2.88	223.91
19735.00	89.78	331.96	8020.33	94.00	11480.04	9653.70 N	6233.00 W	11491.05	327.15	4.03	223.91
19830.00	89.27	330.24	8021.11	95.00	11575.00	9736.86 N	6278.91 W	11585.82	327.18	1.89	223.91
19924.00	89.22	331.38	8022.35	94.00	11668.97	9818.92 N	6324.75 W	11679.62	327.21	1.21	223.91
20019.00	89.61	331.68	8023.32	95.00	11763.91	9902.42 N	6370.03 W	11774.35	327.25	0.52	220.29

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 1H
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)
20114.00	90.11	329.66	8023.56	95.00	11858.89	9985.24 N	6416.56 W	11869.17	327.28	2.19	220.29
20209.00	89.83	328.40	8023.60	95.00	11953.88	10066.70 N	6465.45 W	11964.13	327.29	1.36	213.06
20304.00	89.78	328.63	8023.93	95.00	12048.87	10147.71 N	6515.06 W	12059.11	327.30	0.25	220.29
20399.00	89.66	329.74	8024.39	95.00	12143.86	10229.29 N	6563.73 W	12154.05	327.31	1.18	220.29
20494.00	90.34	328.93	8024.39	95.00	12238.86	10311.01 N	6612.18 W	12248.99	327.33	1.11	220.29
20589.00	90.22	328.78	8023.93	95.00	12333.85	10392.32 N	6661.31 W	12343.96	327.34	0.20	220.29
20683.00	90.22	328.10	8023.57	94.00	12427.82	10472.41 N	6710.51 W	12437.94	327.35	0.72	223.91
20778.00	90.22	330.05	8023.20	95.00	12522.81	10553.90 N	6759.33 W	12532.89	327.36	2.05	223.91
20872.00	90.39	327.81	8022.70	94.00	12616.80	10634.41 N	6807.84 W	12626.85	327.37	2.39	223.91
STRAIGHT LINE PROJECTION TO BIT DEPTH AT 20898'MD											
20898.00	90.39	327.81	8022.52	26.00	12642.79	10656.41 N	6821.69 W	12652.85	327.37	0.00	

BOTTOM HOLE ASSEMBLY RECORD

RUN #1	ft	RUN #2	ft				
8 1/2" PDC BIT	0.35	8 1/2" PDC BIT	0.35				
PD COPIBANA	13.53	PD COPIBANA	13.53				
NM HHOP SUB	3.60	NM HHOP SUB	3.60				
XBOLT DIR/GR	23.38	XBOLT DIR/GR	23.38				
NM X/O SUB	3.58	NM X/O SUB	3.58				
NM FLEX DC	14.63	NM FLEX DC	14.63				
0° MUD MOTOR	31.06	0° MUD MOTOR	31.06				
DIFFUSER SUB	5.55	DIFFUSER SUB	5.55				
X/O	4.50	X/O	4.50				
FRACVIEW SUB	5.09	FRACVIEW SUB	5.09				
DP	31.72	DP	31.72				
6 7/8" STAB	4.73	6 7/8" STAB	4.73				
TOTAL BHA:	141.72	TOTAL BHA:	141.72				

SENSOR OFFSETS:		SENSOR OFFSETS:					
GAMMA-RAY	21.59	GAMMA-RAY	21.59				
DIRECTIONAL	24.90	DIRECTIONAL	24.90				

Schlumberger

GAMMA-RAY

1" = 100'
FEET TVD