



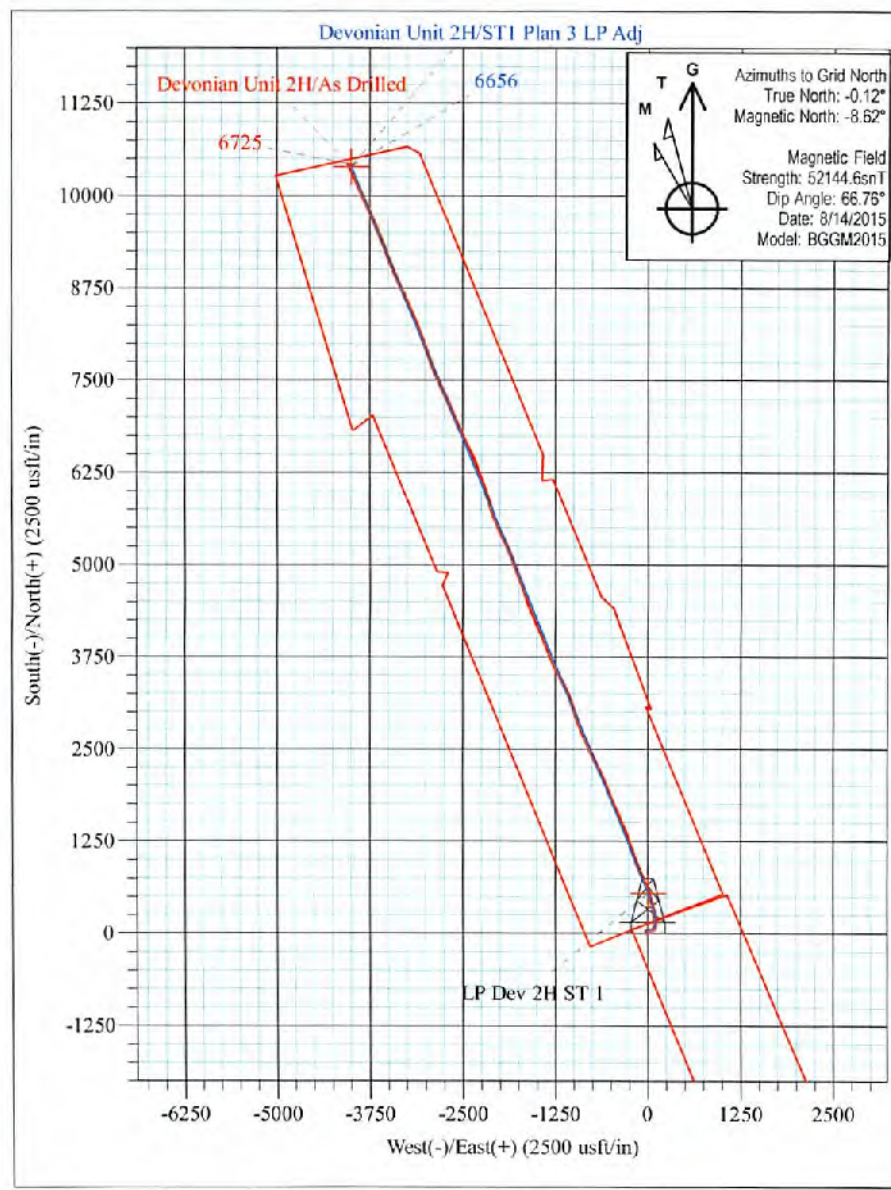
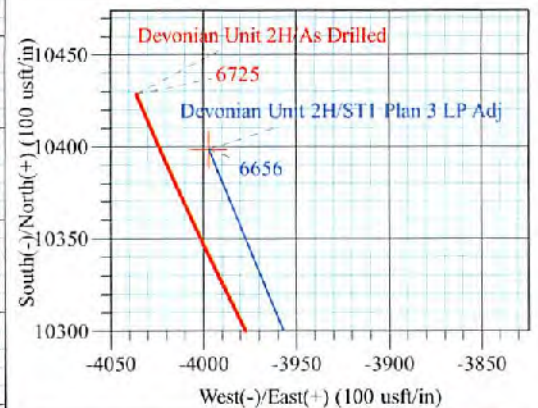
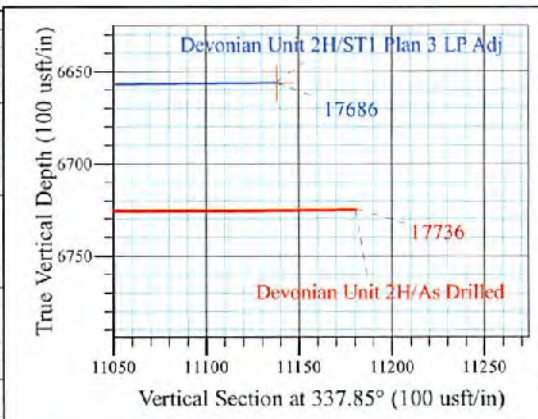
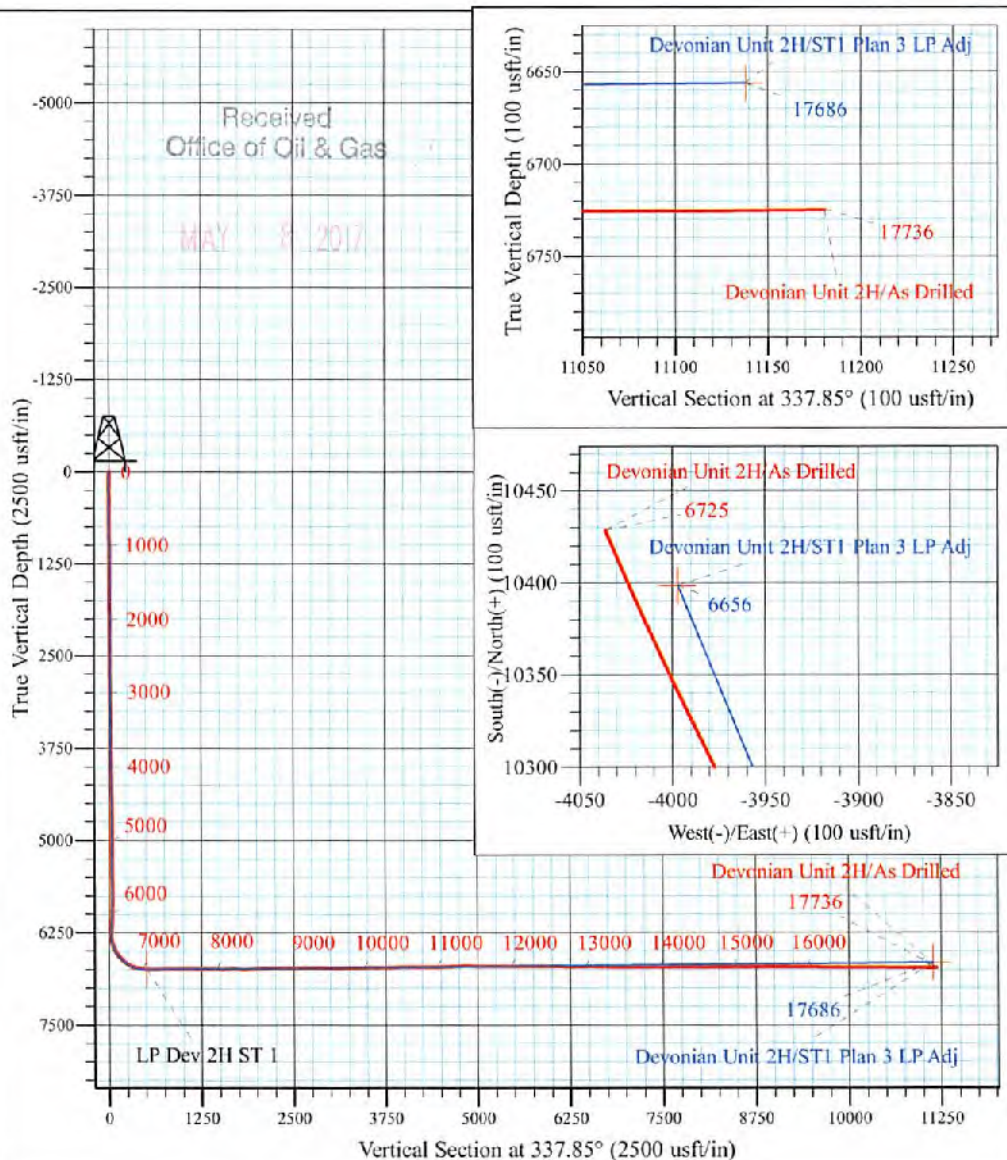
Rock Run Pad: Wentz/Twyford/Devonian  
 Devonian Unit 2H  
 ST1 Plan 3 LP Adj  
 Patterson 347: GL 1171' + KB 25' @ 1196.0usft  
 Doddridge County WV

PROJECT DETAILS:  
 Geodetic System: Universal Transverse Mercator (US Survey Feet)  
 Datum: NAD 1927 (NADCON CONUS)  
 Ellipsoid: Clarke 1866  
 Zone: Zone 17N (84 W to 78 W)  
 System Datum: Mean Sea Level



WELL DETAILS: **Devonian Unit 2H SHL**

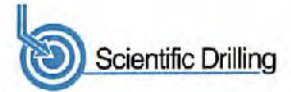
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	14272993.48	1692803.83	39° 18' 17.537 N	80° 48' 53.302 W



**Devonian Unit 2H**  
 Approx. BHL  
**39° 20' 0.727 N 80° 49' 44.415 W**

Shane Rhodes  
 8:51, September 11 2015  
 Scientific Drilling International  
 124 Vista Drive  
 Charleroi, PA 15022





<b>Company:</b>	Antero	<b>Local Co-ordinate Reference:</b>	Well Devonian Unit 2H
<b>Project:</b>	Doddridge County WV	<b>TVD Reference:</b>	Patterson 347: GL 1171' + KB 25' @ 1196.0usft
<b>Site:</b>	Rock Run Pad:Wentz/Twyford/Devonian	<b>MD Reference:</b>	Patterson 347: GL 1171' + KB 25' @ 1196.0usft
<b>Well:</b>	Devonian Unit 2H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	ST 1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Antero NE

<b>Project</b>	Doddridge County WV, McClellan District		
<b>Map System:</b>	Universal Transverse Mercator (US Survey Feet)	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	NAD 1927 (NADCON CONUS)		
<b>Map Zone:</b>	Zone 17N (84 W to 78 W)		

<b>Site</b>	Rock Run Pad:Wentz/Twyford/Devonian				
<b>Site Position:</b>		<b>Northing:</b>	14,272,993.14 usft	<b>Latitude:</b>	39° 18' 17.534 N
<b>From:</b>	Map	<b>Easting:</b>	1,692,783.84 usft	<b>Longitude:</b>	80° 48' 53.556 W
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	0.12 °

<b>Well</b>	Devonian Unit 2H, Marcellus					
<b>Well Position</b>	<b>+N/-S</b>	0.0 usft	<b>Northing:</b>	14,272,993.48 usft	<b>Latitude:</b>	39° 18' 17.537 N
	<b>+E/-W</b>	0.0 usft	<b>Easting:</b>	1,692,803.83 usft	<b>Longitude:</b>	80° 48' 53.302 W
<b>Position Uncertainty</b>		2.0 usft	<b>Wellhead Elevation:</b>	1,196.0 usft	<b>Ground Level:</b>	1,171.0 usft

<b>Wellbore</b>	ST 1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	BGGM2015	8/14/2015	-8.50	66.76	52,145

<b>Design</b>	As Drilled				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	5,480.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.0	0.0	0.0	339.95	

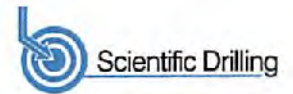
<b>Survey Program</b>	<b>Date</b>	9/11/2015			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
25.0	2,505.7	Survey #4 Def Int Gyro (Original Wellpath)	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4	
2,567.0	5,480.0	Survey #6 Gyro SS (Original Wellpath)	Gyro MWD 105	Gyro MWD Error Model Ver 1.0.5	
5,690.0	17,736.0	ST Survey #7 SDI MWD (ST 1)	SDI MWD	Scientific Drilling Intl. MWD - Standard ver 1.0.1	

<b>Survey</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00
25.0	0.31	230.32	25.0	0.0	-0.1	0.0	1.24	1.24	0.00	
50.0	0.27	237.27	50.0	-0.1	-0.2	-0.1	0.21	-0.16	27.80	
75.0	0.57	253.36	75.0	-0.2	-0.3	-0.1	1.26	1.20	64.36	
100.0	0.33	273.12	100.0	-0.2	-0.5	0.0	1.13	-0.96	79.04	
125.0	0.39	270.93	125.0	-0.2	-0.7	0.0	0.25	0.24	-8.76	
150.0	0.43	281.53	150.0	-0.2	-0.8	0.1	0.34	0.16	42.40	
175.0	0.62	277.97	175.0	-0.2	-1.1	0.2	0.77	0.76	-14.24	
200.0	0.65	281.69	200.0	-0.1	-1.3	0.4	0.20	0.12	14.88	





Scientific Drilling International  
Survey Report



<b>Company:</b>	Antero	<b>Local Co-ordinate Reference:</b>	Well Devonian Unit 2H
<b>Project:</b>	Doddridge County WV	<b>TVD Reference:</b>	Patterson 347: GL 1171' + KB 25' @ 1196.0usft
<b>Site:</b>	Rock Run Pad:Wentz/Twyford/Devonian	<b>MD Reference:</b>	Patterson 347: GL 1171' + KB 25' @ 1198.0usft
<b>Well:</b>	Devonian Unit 2H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	ST 1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Antero NE

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
225.0	0.54	283.94	225.0	0.0	-1.6	0.5	0.45	-0.44	9.00
250.0	0.67	282.63	250.0	0.0	-1.9	0.6	0.52	0.52	-5.24
275.0	0.62	283.70	275.0	0.1	-2.1	0.8	0.21	-0.20	4.28
300.0	0.68	281.45	300.0	0.1	-2.4	1.0	0.26	0.24	-9.00
325.0	0.75	281.61	325.0	0.2	-2.7	1.1	0.28	0.28	0.64
350.0	0.68	286.55	350.0	0.3	-3.0	1.3	0.37	-0.28	19.76
375.0	0.67	287.13	375.0	0.4	-3.3	1.5	0.05	-0.04	2.32
400.0	0.59	289.55	400.0	0.4	-3.6	1.6	0.34	-0.32	9.68
425.0	0.62	294.38	425.0	0.5	-3.8	1.8	0.24	0.12	19.32
450.0	0.64	292.18	450.0	0.7	-4.1	2.0	0.13	0.08	-8.80
475.0	0.68	297.01	475.0	0.8	-4.3	2.2	0.27	0.16	19.32
500.0	0.64	305.78	500.0	0.9	-4.6	2.4	0.43	-0.16	35.08
525.0	0.58	296.73	525.0	1.1	-4.8	2.6	0.45	-0.24	-36.20
550.0	0.64	308.75	550.0	1.2	-5.0	2.8	0.56	0.24	48.08
575.0	0.64	305.93	575.0	1.4	-5.2	3.1	0.13	0.00	-11.28
600.0	0.68	306.98	600.0	1.5	-5.5	3.3	0.09	0.08	4.20
625.0	0.70	307.88	625.0	1.7	-5.7	3.6	0.16	0.16	2.80
650.0	0.68	313.01	650.0	1.9	-5.9	3.8	0.27	-0.08	21.32
675.0	0.69	315.18	675.0	2.1	-6.1	4.1	0.11	0.04	8.68
700.0	0.68	313.08	700.0	2.3	-6.4	4.4	0.11	-0.04	-8.48
725.0	0.68	313.21	725.0	2.5	-6.6	4.6	0.08	-0.08	0.60
750.0	0.62	315.14	750.0	2.7	-6.8	4.9	0.18	-0.16	7.72
775.0	0.58	321.76	775.0	2.9	-6.9	5.1	0.36	-0.24	26.48
800.0	0.54	328.56	800.0	3.1	-7.1	5.4	0.27	-0.08	27.20
825.0	0.56	328.73	825.0	3.3	-7.2	5.6	0.08	0.08	0.68
850.0	0.55	330.89	850.0	3.5	-7.3	5.8	0.09	-0.04	8.64
875.0	0.56	326.49	875.0	3.7	-7.4	6.1	0.18	0.04	-17.60
900.0	0.51	328.04	900.0	3.9	-7.6	6.3	0.21	-0.20	6.20
925.0	0.59	327.19	925.0	4.1	-7.7	6.5	0.32	0.32	-3.40
950.0	0.36	337.45	949.9	4.3	-7.8	6.7	0.98	-0.92	41.04
975.0	0.40	329.88	974.9	4.5	-7.9	6.9	0.26	0.16	-30.28
1,000.0	0.39	321.65	999.9	4.6	-8.0	7.1	0.23	-0.04	-32.92
1,025.0	0.37	314.00	1,024.9	4.7	-8.1	7.2	0.22	-0.08	-30.60
1,050.0	0.32	337.42	1,049.9	4.8	-8.2	7.4	0.59	-0.20	93.68
1,075.0	0.24	351.02	1,074.9	5.0	-8.2	7.5	0.41	-0.32	54.40
1,100.0	0.13	29.59	1,099.9	5.0	-8.2	7.5	0.64	-0.44	154.28
1,125.0	0.16	7.45	1,124.9	5.1	-8.2	7.6	0.25	0.12	-88.56
1,150.0	0.21	8.26	1,149.9	5.2	-8.2	7.7	0.20	0.20	3.24
1,175.0	0.19	18.77	1,174.9	5.3	-8.1	7.7	0.17	-0.08	42.04
1,200.0	0.16	30.88	1,199.9	5.3	-8.1	7.8	0.19	-0.12	48.44
1,225.0	0.20	3.32	1,224.9	5.4	-8.1	7.9	0.38	0.16	-110.24
1,250.0	0.13	30.96	1,249.9	5.5	-8.1	7.9	0.42	-0.28	110.56
1,275.0	0.10	317.34	1,274.9	5.5	-8.1	8.0	0.56	-0.12	-294.48



# Scientific Drilling International

## Survey Report



<b>Company:</b>	Antero	<b>Local Co-ordinate Reference:</b>	Well Devonian Unit 2H
<b>Project:</b>	Doddridge County WV	<b>TVD Reference:</b>	Patterson 347: GL 1171' + KB 25' @ 1196.0usft
<b>Site:</b>	Rock Run Pad:Wentz/Twyford/Devonian	<b>MD Reference:</b>	Patterson 347: GL 1171' + KB 25' @ 1196.0usft
<b>Well:</b>	Devonian Unit 2H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	ST 1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Antero NE

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,300.0	0.06	319.85	1,299.9	5.5	-8.1	8.0	0.16	-0.16	10.04
1,325.0	0.13	299.96	1,324.9	5.6	-8.1	8.0	0.31	0.28	-79.56
1,350.0	0.10	0.44	1,349.9	5.6	-8.2	8.1	0.47	-0.12	241.92
1,375.0	0.09	334.20	1,374.9	5.6	-8.2	8.1	0.18	-0.04	-104.96
1,400.0	0.05	346.28	1,399.9	5.7	-8.2	8.1	0.17	-0.16	46.32
1,425.0	0.19	321.02	1,424.9	5.7	-8.2	8.2	0.58	0.56	-101.04
1,450.0	0.12	4.90	1,449.9	5.8	-8.2	8.2	0.53	-0.28	175.52
1,475.0	0.09	329.13	1,474.9	5.8	-8.2	8.3	0.28	-0.12	-143.08
1,500.0	0.10	307.26	1,499.9	5.8	-8.3	8.3	0.15	0.04	-87.48
1,525.0	0.08	332.66	1,524.9	5.9	-8.3	8.4	0.18	-0.08	101.60
1,550.0	0.11	308.65	1,549.9	5.9	-8.3	8.4	0.20	0.12	-96.04
1,575.0	0.07	296.63	1,574.9	5.9	-8.4	8.4	0.18	-0.16	-48.08
1,600.0	0.05	328.35	1,599.9	5.9	-8.4	8.5	0.15	-0.08	126.88
1,625.0	0.13	353.30	1,624.9	6.0	-8.4	8.5	0.35	0.32	99.60
1,650.0	0.10	333.21	1,649.9	6.0	-8.4	8.5	0.20	-0.12	-80.36
1,675.0	0.06	324.57	1,674.9	6.1	-8.4	8.6	0.17	-0.16	-34.56
1,700.0	0.11	354.22	1,699.9	6.1	-8.4	8.6	0.26	0.20	118.60
1,725.0	0.20	325.14	1,724.9	6.2	-8.4	8.7	0.47	0.36	-116.32
1,750.0	0.17	296.00	1,749.9	6.2	-8.5	8.7	0.39	-0.12	-116.56
1,775.0	0.22	331.95	1,774.9	6.3	-8.6	8.8	0.52	0.20	143.80
1,800.0	0.19	326.83	1,799.9	6.3	-8.6	8.9	0.14	-0.12	-20.48
1,825.0	0.18	315.93	1,824.9	6.4	-8.7	9.0	0.15	-0.04	-43.60
1,850.0	0.23	321.91	1,849.9	6.5	-8.7	9.1	0.22	0.20	23.92
1,875.0	0.25	328.71	1,874.9	6.6	-8.8	9.2	0.14	0.08	27.20
1,900.0	0.19	325.40	1,899.9	6.6	-8.8	9.3	0.25	-0.24	-13.24
1,925.0	0.26	327.50	1,924.9	6.7	-8.9	9.4	0.28	0.28	8.40
1,950.0	0.29	322.86	1,949.9	6.8	-9.0	9.5	0.15	0.12	-18.56
1,975.0	0.23	332.46	1,974.9	6.9	-9.0	9.6	0.30	-0.24	38.40
2,000.0	0.22	337.39	1,999.9	7.0	-9.1	9.7	0.09	-0.04	19.72
2,025.0	0.23	357.83	2,024.9	7.1	-9.1	9.8	0.32	0.04	81.76
2,050.0	0.15	309.04	2,049.9	7.2	-9.1	9.9	0.69	-0.32	-195.16
2,075.0	0.17	345.99	2,074.9	7.2	-9.1	9.9	0.41	0.08	147.80
2,100.0	0.20	334.41	2,099.9	7.3	-9.2	10.0	0.19	0.12	-46.32
2,125.0	0.20	330.34	2,124.9	7.4	-9.2	10.1	0.06	0.00	-16.28
2,150.0	0.29	321.02	2,149.9	7.5	-9.3	10.2	0.39	0.36	-37.28
2,175.0	0.20	347.98	2,174.9	7.6	-9.3	10.3	0.58	-0.36	107.84
2,200.0	0.23	344.41	2,199.9	7.6	-9.3	10.4	0.13	0.12	-14.28
2,225.0	0.30	334.47	2,224.9	7.8	-9.4	10.5	0.33	0.28	-39.76
2,250.0	0.32	330.59	2,249.9	7.9	-9.4	10.6	0.12	0.08	-15.52
2,275.0	0.26	338.92	2,274.9	8.0	-9.5	10.8	0.29	-0.24	33.32
2,300.0	0.24	339.33	2,299.9	8.1	-9.5	10.9	0.08	-0.08	1.64
2,325.0	0.33	335.37	2,324.9	8.2	-9.6	11.0	0.37	0.36	-15.84
2,350.0	0.27	340.87	2,349.9	8.3	-9.6	11.1	0.27	-0.24	22.00





Scientific Drilling International  
Survey Report

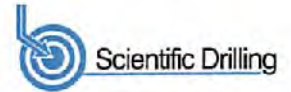


<b>Company:</b>	Antero	<b>Local Co-ordinate Reference:</b>	Well Devonian Unit 2H
<b>Project:</b>	Doddridge County WV	<b>TVD Reference:</b>	Patterson 347: GL 1171' + KB 25' @ 1199.0usft
<b>Site:</b>	Rock Run Pad:Wentz/Twyford/Devonian	<b>MD Reference:</b>	Patterson 347: GL 1171' + KB 25' @ 1199.0usft
<b>Well:</b>	Devonian Unit 2H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	ST 1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Antero NE

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
2,375.0	0.38	331.64	2,374.9	8.5	-9.7	11.3	0.49	0.44	-36.92
2,400.0	0.34	355.62	2,399.9	8.6	-9.7	11.4	0.62	-0.16	95.92
2,425.0	0.36	325.67	2,424.9	8.7	-9.8	11.6	0.73	0.06	-119.80
2,450.0	0.47	343.78	2,449.9	8.9	-9.9	11.7	0.68	0.44	72.44
2,475.0	0.53	338.68	2,474.9	9.1	-9.9	12.0	0.30	0.24	-20.40
2,500.0	0.60	344.18	2,499.9	9.3	-10.0	12.2	0.35	0.28	22.00
2,505.7	0.62	345.25	2,505.6	9.4	-10.0	12.3	0.41	0.35	18.87
2,567.0	0.43	322.23	2,566.9	9.9	-10.2	12.8	0.46	-0.31	-37.53
2,755.0	0.53	314.98	2,754.9	11.1	-11.3	14.3	0.06	0.05	-3.86
3,067.0	0.59	319.16	3,066.9	13.3	-13.4	17.1	0.02	0.02	1.34
3,350.0	0.79	334.13	3,349.9	16.2	-15.2	20.4	0.09	0.07	5.29
3,630.0	0.65	339.61	3,629.9	19.4	-16.6	23.9	0.08	-0.05	1.96
3,915.0	0.75	329.01	3,914.8	22.5	-18.1	27.3	0.06	0.04	-3.72
4,205.0	0.91	6.75	4,204.8	26.4	-18.8	31.3	0.19	0.06	13.01
4,540.0	0.78	22.58	4,539.8	31.2	-17.6	35.3	0.08	-0.04	4.73
4,825.0	0.64	28.94	4,824.8	34.4	-16.1	37.8	0.08	-0.05	2.23
5,105.0	0.30	53.95	5,104.8	36.2	-14.7	39.0	0.14	-0.12	8.93
5,480.0	0.55	61.09	5,479.7	37.6	-12.4	39.6	0.07	0.07	1.90
5,690.0	1.96	0.92	5,689.7	41.7	-11.4	43.1	0.83	0.87	-28.65
5,722.0	3.00	49.32	5,721.7	42.8	-10.8	43.9	7.01	3.25	151.25
5,753.0	5.08	62.96	5,752.6	43.9	-9.0	44.3	7.35	6.71	44.00
5,764.0	5.68	66.10	5,763.4	45.2	-6.3	44.6	2.16	1.94	10.13
5,816.0	5.53	81.60	5,815.3	46.0	-3.4	44.4	4.74	-0.47	48.44
5,847.0	5.22	86.76	5,846.2	46.3	-0.5	43.7	1.85	-1.00	16.65
5,878.0	5.26	81.99	5,877.0	46.6	2.3	43.0	1.41	0.13	-15.39
5,910.0	4.97	78.43	5,908.9	47.1	5.2	42.5	1.34	-0.91	-11.13
5,941.0	4.50	77.62	5,939.8	47.6	7.7	42.1	1.53	-1.52	-2.61
5,973.0	4.33	72.97	5,971.7	48.2	10.0	41.9	1.24	-0.53	-14.53
6,004.0	4.27	71.56	6,002.6	49.0	12.3	41.8	0.39	-0.19	-4.55
6,036.0	4.34	67.20	6,034.5	49.8	14.5	41.8	1.05	0.22	-13.63
6,067.0	5.35	81.97	6,065.4	50.5	17.0	41.6	5.15	3.26	47.65
6,099.0	5.92	83.66	6,097.3	50.8	20.1	40.9	1.86	1.78	5.28
6,130.0	8.49	83.94	6,128.0	51.3	24.0	39.9	8.29	8.29	0.90
6,162.0	13.34	67.38	6,159.4	51.7	30.0	38.3	15.29	15.16	10.75
6,193.0	17.72	90.54	6,189.3	51.8	38.3	35.5	14.39	14.13	10.19
6,224.0	20.23	91.94	6,218.6	51.6	48.4	31.9	8.23	8.10	4.52
6,256.0	17.14	90.37	6,248.9	51.4	53.7	28.1	9.78	-9.66	-4.91
6,287.0	14.61	74.05	6,278.7	52.4	67.0	26.3	16.47	-8.16	-52.65
6,319.0	16.17	54.73	6,309.6	56.1	74.5	27.1	16.66	4.88	-60.38
6,350.0	18.78	42.13	6,339.2	62.3	81.4	30.6	14.78	8.42	-40.65
6,381.0	20.95	34.56	6,368.4	70.6	87.9	36.1	10.84	7.00	-24.42
6,413.0	22.70	27.32	6,398.1	80.8	94.0	43.6	10.02	5.47	-22.63
6,444.0	23.97	18.31	6,426.5	92.1	98.7	52.6	12.21	4.10	-29.08
6,476.0	25.14	11.90	6,455.6	104.9	102.1	63.5	9.09	3.66	-20.03



Scientific Drilling International  
Survey Report



<b>Company:</b>	Antero	<b>Local Co-ordinate Reference:</b>	Well Devonian Unit 2H
<b>Project:</b>	Doddridge County WV	<b>TVD Reference:</b>	Patterson 347: GL 1171' + KB 25' @ 1196.0usft
<b>Site:</b>	Rock Run Pad:Wentz/Twyford/Devonian	<b>MD Reference:</b>	Patterson 347: GL 1171' + KB 25' @ 1196.0usft
<b>Well:</b>	Devonian Unit 2H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	ST 1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Antero NE

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
6,507.0	27.27	7.02	6,483.5	118.4	104.4	75.4	9.77	6.87	-15.74
6,538.0	30.94	2.18	6,510.5	133.4	105.5	89.1	14.06	11.84	-15.61
6,557.0	33.21	0.70	6,526.6	143.5	105.8	98.5	12.64	11.94	-7.81
<b>Middlesex @ 6557 MD</b>									
6,569.0	34.65	359.85	6,536.6	150.2	105.8	104.8	12.64	12.01	-7.06
6,601.0	38.46	358.26	6,562.3	169.2	105.5	122.8	12.27	11.91	-4.97
6,632.0	41.51	357.24	6,586.1	189.1	104.7	141.8	10.06	9.84	-3.29
6,663.0	44.74	354.82	6,608.7	210.3	103.2	162.1	11.70	10.42	-7.81
6,695.0	49.13	352.29	6,630.5	233.5	100.6	184.8	14.88	13.72	-7.91
6,726.0	53.68	349.33	6,649.9	257.4	98.7	208.6	16.46	14.68	-9.55
6,728.0	53.96	349.24	6,651.0	259.0	98.4	210.2	14.47	14.04	-4.31
<b>Burket @ 6728 MD</b>									
6,758.0	58.18	348.02	6,667.8	283.4	91.5	234.8	14.47	14.06	-4.08
6,781.0	61.30	346.78	6,679.4	302.7	87.1	254.5	14.35	13.57	-5.38
<b>Tully @ 6781 MD</b>									
6,789.0	62.39	348.37	6,683.1	309.6	85.5	261.5	14.35	13.60	-5.16
6,820.0	66.17	346.14	6,696.6	336.7	78.9	289.3	12.21	12.19	-0.74
6,852.0	69.40	345.14	6,708.7	365.4	71.5	318.7	10.50	10.09	-3.13
6,881.0	73.06	345.77	6,718.0	392.0	64.6	346.1	12.78	12.61	2.16
<b>Marcellus @ 6881 MD</b>									
6,883.0	73.31	345.81	6,716.6	393.9	64.2	346.0	12.78	12.62	2.12
6,914.0	76.33	344.71	6,726.7	422.8	56.5	377.6	10.33	9.74	-3.55
6,945.0	78.43	345.24	6,733.5	452.0	48.7	407.9	6.98	6.77	1.71
6,977.0	79.34	343.96	6,739.7	482.3	40.4	439.2	4.85	2.84	-4.00
7,008.0	83.01	343.42	6,744.4	511.7	31.8	469.6	11.96	11.84	-1.74
7,040.0	86.51	341.72	6,747.3	542.1	22.2	501.6	12.15	10.94	-5.31
7,066.0	89.16	341.07	6,748.3	566.7	13.9	527.6	10.49	10.19	-2.50
7,097.0	89.30	337.98	6,748.7	595.7	3.1	558.5	9.96	0.45	-9.97
7,160.0	90.17	336.87	6,749.0	653.9	-21.1	621.5	2.24	1.38	-1.76
7,254.0	90.47	336.58	6,748.5	740.2	-58.2	715.3	0.44	0.32	-0.31
7,346.0	90.24	336.06	6,747.9	824.5	-95.2	807.1	0.62	-0.25	-0.57
7,442.0	90.60	335.04	6,747.2	911.9	-134.9	902.9	1.13	0.38	-1.06
7,536.0	89.77	339.06	6,746.9	988.4	-171.6	996.7	4.37	-0.88	4.28
7,630.0	91.31	344.04	6,746.0	1,067.6	-201.3	1,090.6	5.55	1.64	5.30
7,724.0	89.97	339.09	6,745.0	1,176.7	-231.0	1,184.6	5.46	-1.43	-5.27
7,818.0	90.77	342.25	6,744.4	1,265.4	-262.1	1,278.5	3.47	0.85	3.36
7,912.0	90.20	339.23	6,743.6	1,354.1	-293.1	1,372.5	3.27	-0.61	-3.21
8,006.0	88.62	336.50	6,744.6	1,441.2	-328.5	1,466.4	3.36	-1.68	-2.90
8,100.0	89.83	338.18	6,745.8	1,527.9	-364.8	1,560.3	2.20	1.29	1.79
8,194.0	91.21	335.46	6,745.0	1,614.3	-401.8	1,654.2	3.24	1.47	-2.89
8,288.0	89.40	333.55	6,744.5	1,699.1	-442.2	1,747.7	2.80	-1.93	-2.03
8,382.0	88.69	336.92	6,746.0	1,784.5	-481.6	1,841.4	3.66	-0.76	3.59
8,476.0	93.87	340.71	6,743.9	1,872.0	-515.5	1,935.3	6.83	5.51	4.03
8,571.0	92.65	339.30	6,738.5	1,961.2	-548.0	2,030.2	1.96	-1.28	-1.48





Scientific Drilling International  
Survey Report



<b>Company:</b>	Antero	<b>Local Co-ordinate Reference:</b>	Well Devonian Unit 2H
<b>Project:</b>	Doddridge County WV	<b>TVD Reference:</b>	Patterson 347: GL 1171' + KB 25' @ 1196.0usft
<b>Site:</b>	Rock Run Pad:Wentz/Twyford/Devonian	<b>MD Reference:</b>	Patterson 347: GL 1171' + KB 25' @ 1196.0usft
<b>Well:</b>	Devonian Unit 2H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	ST 1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Antero NE

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,665.0	90.84	337.41	6,735.7	2,048.5	-582.6	2,124.1	2.78	-1.93	-2.01
8,759.0	90.50	334.63	6,734.6	2,134.4	-620.8	2,217.8	2.98	-0.36	-2.96
8,853.0	90.97	335.38	6,733.4	2,219.5	-660.5	2,311.5	0.94	0.50	0.80
8,947.0	90.33	334.35	6,732.3	2,304.6	-700.4	2,405.1	1.29	-0.68	-1.10
9,042.0	91.47	337.16	6,730.8	2,381.2	-739.4	2,498.8	3.19	1.20	2.96
9,136.0	89.53	334.83	6,730.0	2,477.1	-777.7	2,593.6	3.23	-2.06	-2.48
9,230.0	91.54	337.85	6,729.1	2,563.2	-815.4	2,687.4	3.86	2.14	3.21
9,324.0	89.97	336.17	6,727.9	2,649.7	-852.1	2,781.2	2.45	-1.67	-1.79
9,418.0	89.03	337.46	6,728.7	2,736.1	-889.1	2,875.1	1.70	-1.00	1.37
9,512.0	89.30	340.02	6,730.1	2,823.7	-923.2	2,969.0	2.74	0.29	2.72
9,607.0	89.60	339.14	6,731.0	2,912.7	-958.3	3,064.0	0.98	0.32	-0.93
9,701.0	91.04	339.01	6,730.4	3,000.5	-989.9	3,158.0	1.54	1.53	-0.14
9,795.0	91.44	341.87	6,728.4	3,089.1	-1,021.4	3,252.0	3.07	0.43	3.04
9,889.0	91.41	340.14	6,726.1	3,177.9	-1,051.9	3,345.9	1.84	-0.03	-1.84
9,983.0	89.73	335.25	6,725.1	3,264.8	-1,087.6	3,439.8	5.50	-1.79	-5.20
10,078.0	91.38	334.75	6,724.2	3,350.9	-1,127.8	3,534.5	1.81	1.74	-0.53
10,172.0	89.77	333.61	6,723.3	3,435.5	-1,168.7	3,628.0	2.10	-1.71	-1.21
10,266.0	91.61	335.77	6,722.1	3,520.5	-1,208.9	3,721.6	3.02	1.96	2.30
10,360.0	88.93	332.74	6,721.7	3,605.1	-1,249.7	3,815.1	4.30	-2.85	-3.22
10,454.0	93.59	337.59	6,719.6	3,690.4	-1,289.1	3,908.7	7.15	4.96	5.16
10,548.0	92.25	338.70	6,714.8	3,777.5	-1,324.1	4,002.5	1.85	-1.43	1.18
10,642.0	90.27	338.38	6,712.8	3,865.0	-1,358.5	4,096.5	2.13	-2.11	-0.34
10,737.0	90.20	338.72	6,712.4	3,953.4	-1,393.2	4,191.4	0.37	-0.07	0.36
10,831.0	90.54	335.83	6,711.8	4,040.1	-1,429.5	4,285.3	3.10	0.36	-3.07
10,925.0	89.53	336.44	6,711.7	4,126.0	-1,467.5	4,379.1	1.26	-1.07	0.65
11,019.0	90.64	335.29	6,711.6	4,211.8	-1,506.0	4,472.9	1.70	1.18	-1.22
11,113.0	91.47	337.84	6,709.9	4,298.0	-1,543.4	4,566.7	2.85	0.88	2.71
11,207.0	89.19	335.25	6,709.3	4,384.3	-1,580.8	4,660.5	3.67	-2.43	-2.76
11,301.0	92.75	343.14	6,707.7	4,472.0	-1,614.1	4,754.4	9.21	3.79	8.39
11,395.0	91.04	342.43	6,704.6	4,561.8	-1,641.9	4,848.2	1.97	-1.82	-0.76
11,489.0	89.63	339.59	6,704.1	4,650.6	-1,672.5	4,942.2	3.37	-1.50	-3.02
11,583.0	88.49	337.22	6,705.6	4,738.0	-1,707.1	5,036.1	2.80	-1.21	-2.52
11,677.0	91.44	339.15	6,705.7	4,825.3	-1,742.0	5,130.1	3.75	3.14	2.05
11,771.0	90.20	339.81	6,704.3	4,913.3	-1,775.0	5,224.1	1.49	-1.32	0.70
11,865.0	89.87	339.17	6,704.3	5,001.3	-1,807.9	5,318.1	0.77	-0.35	-0.68
11,959.0	89.73	338.73	6,704.6	5,089.1	-1,841.7	5,412.0	0.49	-0.15	-0.47
12,054.0	90.13	338.75	6,704.7	5,177.6	-1,876.1	5,507.0	0.42	0.42	0.02
12,148.0	88.99	336.35	6,705.4	5,264.5	-1,912.0	5,600.9	2.83	-1.21	-2.55
12,211.0	89.90	334.86	6,706.0	5,321.8	-1,938.0	5,663.7	2.77	1.44	-2.37
12,242.0	89.80	335.03	6,706.1	5,349.9	-1,951.1	5,694.6	0.64	-0.32	0.55
12,337.0	90.60	335.72	6,705.8	5,436.3	-1,990.7	5,789.3	1.11	0.84	0.73
12,431.0	90.23	339.13	6,705.1	5,523.1	-2,026.8	5,883.2	3.65	-0.39	3.63
12,525.0	89.26	335.77	6,705.5	5,609.9	-2,062.9	5,977.1	3.72	-1.03	-3.57

MAY 5 2017





# Scientific Drilling International

## Survey Report



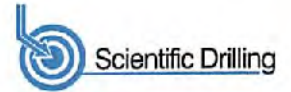
<b>Company:</b>	Antero	<b>Local Co-ordinate Reference:</b>	Well Devonian Unit 2H
<b>Project:</b>	Doddridge County WV	<b>TVD Reference:</b>	Patterson 347: GL 1171' + KB 25' @ 1196.0usft
<b>Site:</b>	Rock Run Pad:Wentz/Twyford/Devonian	<b>MD Reference:</b>	Patterson 347: GL 1171' + KB 25' @ 1196.0usft
<b>Well:</b>	Devonian Unit 2H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	ST 1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Antero NE

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
12,619.0	89.66	340.70	6,706.4	5,697.1	-2,097.7	6,071.0	5.26	0.43	5.24
12,713.0	89.10	341.87	6,707.4	5,786.2	-2,127.9	6,165.0	1.38	-0.60	1.24
12,807.0	90.40	342.30	6,707.8	5,875.6	-2,156.8	6,258.9	1.46	1.38	0.46
12,902.0	89.77	341.52	6,707.7	5,965.9	-2,186.3	6,353.9	1.06	-0.66	-0.82
12,996.0	90.30	342.39	6,707.6	6,055.3	-2,215.4	6,447.8	1.08	0.56	0.93
13,090.0	90.07	341.14	6,707.3	6,144.6	-2,244.8	6,541.8	1.35	-0.24	-1.33
13,184.0	89.06	338.68	6,708.0	6,232.8	-2,277.1	6,635.7	2.83	-1.07	-2.62
13,279.0	89.93	342.43	6,708.9	6,322.4	-2,308.7	6,730.7	4.05	0.92	3.95
13,373.0	88.46	337.23	6,710.2	6,410.8	-2,341.1	6,824.7	5.75	-1.56	-5.53
13,467.0	89.56	332.47	6,711.8	6,495.6	-2,381.0	6,918.3	5.20	1.17	-5.06
13,561.0	90.50	333.18	6,711.8	6,579.2	-2,424.0	7,011.5	1.25	1.00	0.76
13,656.0	88.59	334.45	6,712.5	6,664.5	-2,465.9	7,106.0	2.41	-2.01	1.34
13,750.0	88.76	334.69	6,714.7	6,749.4	-2,506.2	7,199.5	0.31	0.18	0.26
13,844.0	89.70	336.46	6,716.0	6,835.6	-2,543.6	7,293.4	4.13	1.00	4.01
13,939.0	90.30	336.09	6,716.0	6,923.8	-2,578.8	7,388.3	0.74	0.63	-0.39
14,033.0	90.27	336.93	6,715.5	7,010.7	-2,614.7	7,482.2	1.23	-0.03	-1.23
14,127.0	90.87	336.53	6,714.6	7,097.0	-2,651.8	7,576.1	0.77	0.64	-0.43
14,221.0	91.07	336.31	6,713.0	7,183.2	-2,689.4	7,669.9	0.32	0.21	-0.23
14,315.0	91.34	335.94	6,711.0	7,269.1	-2,727.5	7,763.7	0.49	0.29	-0.39
14,409.0	88.89	335.16	6,710.8	7,354.7	-2,766.4	7,857.4	2.74	-2.61	-0.83
14,504.0	90.03	339.19	6,711.7	7,442.2	-2,803.2	7,952.2	4.41	1.20	4.24
14,598.0	90.23	337.04	6,711.5	7,529.4	-2,838.3	8,046.2	2.30	0.21	-2.29
14,692.0	90.34	336.37	6,711.0	7,615.8	-2,875.4	8,140.0	0.72	0.12	-0.71
14,786.0	89.67	340.38	6,711.0	7,703.1	-2,910.1	8,234.0	4.33	-0.71	4.27
14,880.0	90.30	339.55	6,711.0	7,791.4	-2,942.3	8,328.0	1.11	0.67	-0.88
14,974.0	88.93	339.32	6,711.7	7,879.5	-2,975.3	8,422.0	1.48	-1.48	-0.24
15,068.0	90.40	341.54	6,712.2	7,968.0	-3,006.8	8,515.9	2.83	1.56	2.36
15,162.0	89.73	338.91	6,712.1	8,056.5	-3,038.6	8,609.9	2.69	-0.71	-2.80
15,256.0	88.89	338.68	6,713.3	8,144.1	-3,072.6	8,703.9	0.93	-0.89	-0.24
15,350.0	90.17	340.02	6,714.0	8,232.0	-3,105.7	8,797.9	1.97	1.36	1.43
15,444.0	88.83	337.56	6,714.8	8,319.7	-3,139.7	8,891.9	2.98	-1.43	-2.62
15,538.0	88.83	335.63	6,716.9	8,405.9	-3,177.0	8,985.7	2.06	-0.21	-2.05
15,632.0	89.70	335.95	6,718.3	8,491.6	-3,215.6	9,079.4	1.19	1.14	0.34
15,726.0	89.70	336.68	6,718.8	8,577.7	-3,253.3	9,173.2	0.78	0.00	0.78
15,821.0	90.80	337.98	6,718.4	8,665.4	-3,290.0	9,268.1	1.79	1.16	1.37
15,915.0	90.50	336.45	6,717.3	8,752.0	-3,326.4	9,362.0	1.66	-0.32	-1.63
16,009.0	89.90	336.86	6,717.0	8,838.3	-3,363.6	9,455.9	0.77	-0.64	0.44
16,103.0	88.66	336.24	6,718.2	8,924.5	-3,401.0	9,549.7	1.47	-1.32	-0.66
16,197.0	90.03	336.70	6,719.2	9,010.7	-3,438.5	9,643.5	1.54	1.46	0.49
16,292.0	89.77	338.89	6,719.4	9,096.7	-3,474.4	9,738.4	2.32	-0.27	2.31
16,386.0	89.40	339.44	6,720.1	9,186.5	-3,507.9	9,832.4	0.71	-0.39	0.59
16,480.0	89.30	338.78	6,721.1	9,274.3	-3,541.4	9,926.4	0.71	-0.11	-0.70
16,574.0	90.03	339.39	6,721.7	9,362.1	-3,574.9	10,020.4	1.01	0.78	0.65





**Scientific Drilling International**  
Survey Report



<b>Company:</b>	Antero	<b>Local Co-ordinate Reference:</b>	Well Devonian Unit 2H
<b>Project:</b>	Doddridge County WV	<b>TVD Reference:</b>	Patterson 347: GL 1171' + KB 25' @ 1196.0usft
<b>Site:</b>	Rock Run Pad:Wentz/Twyford/Devonian	<b>MD Reference:</b>	Patterson 347: GL 1171' + KB 25' @ 1196.0usft
<b>Well:</b>	Devonian Unit 2H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	ST 1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Antero NE

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
16,668.0	89.70	339.17	6,721.9	9,450.1	-3,608.2	10,114.4	0.42	-0.35	-0.23	
16,762.0	89.83	337.63	6,722.3	9,537.5	-3,642.8	10,208.3	1.64	0.14	-1.64	
16,857.0	90.71	336.36	6,721.9	9,624.9	-3,679.9	10,303.2	1.63	0.93	-1.34	
16,951.0	89.63	335.95	6,721.6	9,710.9	-3,717.9	10,397.0	1.23	-1.15	-0.44	
17,045.0	90.90	336.96	6,721.1	9,797.0	-3,755.5	10,490.8	1.73	1.35	1.07	
17,140.0	89.90	335.64	6,720.5	9,884.0	-3,793.7	10,585.6	1.74	-1.05	-1.39	
17,234.0	88.22	336.55	6,722.0	9,969.9	-3,831.7	10,679.4	2.03	-1.79	0.97	
17,328.0	89.60	337.15	6,723.8	10,056.4	-3,868.7	10,773.2	1.60	1.47	0.64	
17,422.0	89.36	336.21	6,724.7	10,142.7	-3,905.9	10,867.1	1.03	-0.28	-1.00	
17,517.0	90.44	335.64	6,724.8	10,229.5	-3,944.5	10,961.9	1.20	1.14	-0.39	
17,611.0	89.06	333.82	6,725.2	10,314.5	-3,984.5	11,055.5	2.60	-1.47	-2.16	
17,677.0	90.97	335.68	6,725.2	10,374.3	-4,012.5	11,121.2	4.26	2.89	3.12	
<b>Last SDI MWD @ 17677 MD</b>										
17,736.0	89.95	337.02	6,724.8	10,428.4	-4,036.1	11,180.1	2.59	-1.73	1.93	
<b>Projection To Bit @ 17736 MD / 6724 TVD</b>										

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
6,557.0	6,334.6	Middlesex @ 6557 MD		0.00	
6,728.0	6,459.0	Burket @ 6728 MD		0.00	
6,781.0	6,487.4	Tully @ 6781 MD		0.00	
6,881.0	6,526.0	Marcellus @ 6881 MD		0.00	

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
17,677.0	6,725.2	10,374.3	-4,012.5	Last SDI MWD @ 17677 MD
17,736.0	6,724.8	10,428.4	-4,036.1	Projection To Bit @ 17736 MD / 6724 TVD

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_

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Environmental Protection