



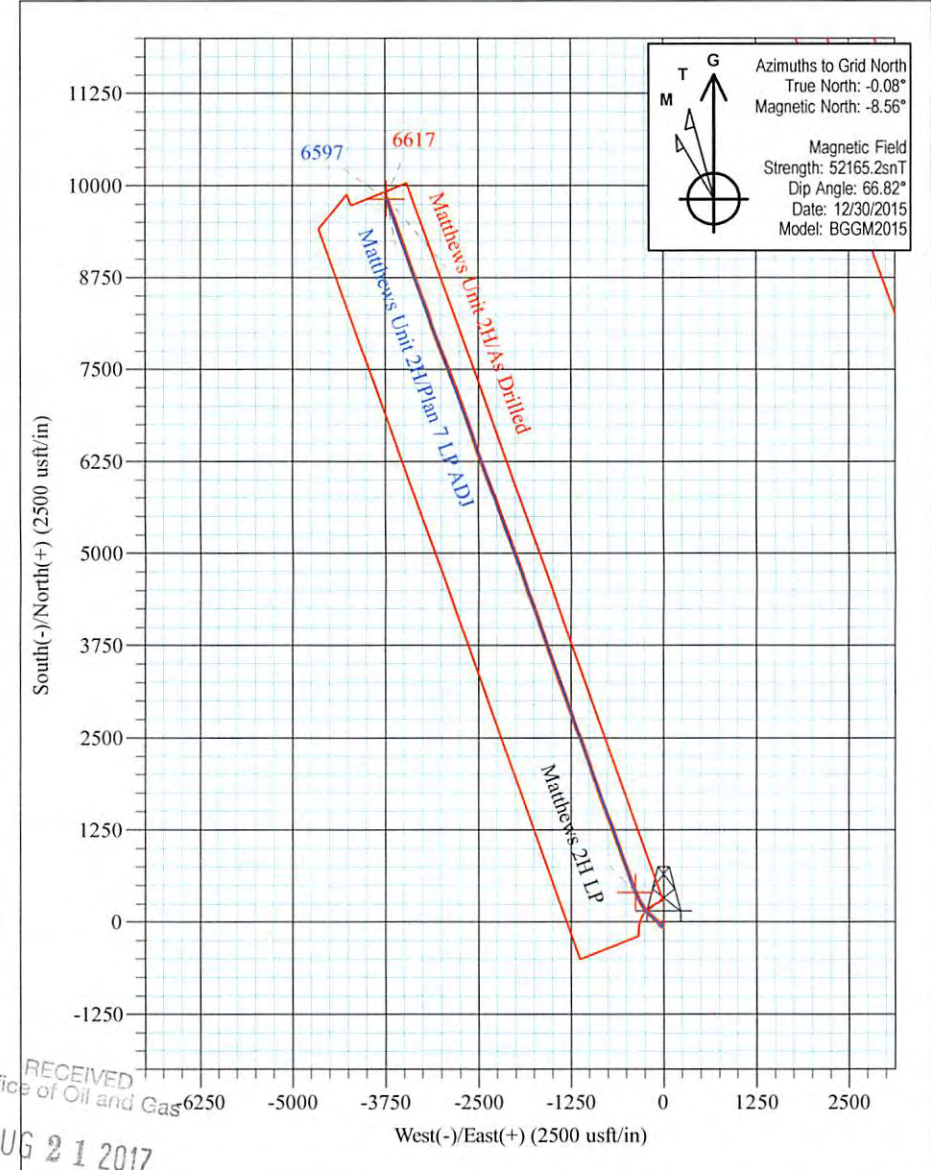
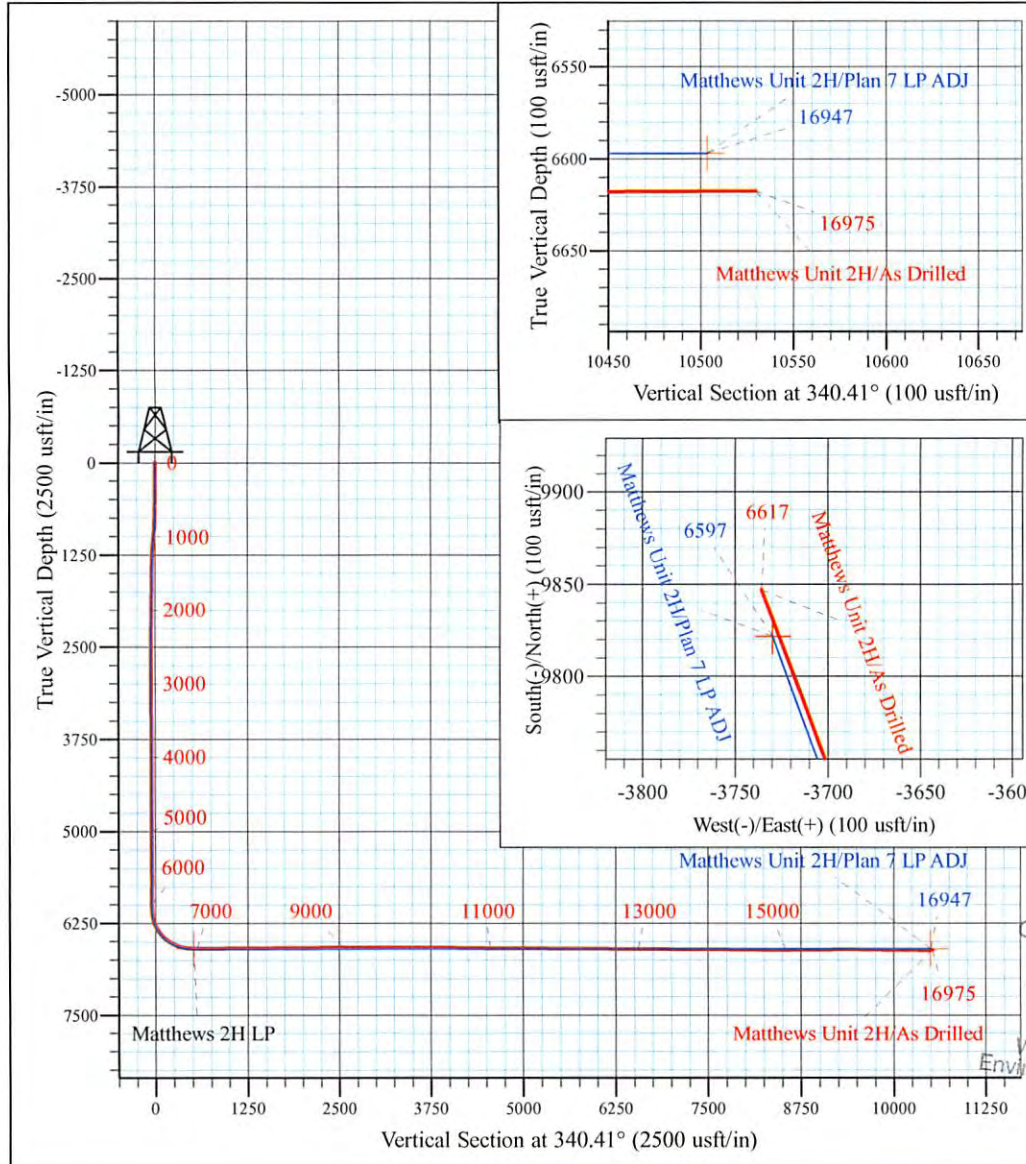
Estlack Pad: Hare/Jujubee/Lucy/Matthews/Melvin  
 Matthews Unit 2H  
 Plan 7 LP ADJ  
 Frontier 32: 1141' GL + 32' KB @ 1173.0usft  
 Tyler County WV

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: **Matthews Unit 2H SHL**

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	14312850.48	1674794.32	39° 24' 51.927 N	80° 52' 41.813 W





Scientific Drilling International  
Survey Report



<b>Company:</b>	Antero Resources	<b>Local Co-ordinate Reference:</b>	Well Matthews Unit 2H
<b>Project:</b>	Tyler County WV	<b>TVD Reference:</b>	Frontier 32: 1141' GL + 32' KB @ 1173.0usft
<b>Site:</b>	Estlack Pad: Hare/Jujubee/Lucy/Matthews/Melvin	<b>MD Reference:</b>	Frontier 32: 1141' GL + 32' KB @ 1173.0usft
<b>Well:</b>	Matthews Unit 2H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Wellpath	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Antero NE

<b>Project</b>	Tyler County WV, Tyler Co West Virginia		
<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>	Estlack Pad: Hare/Jujubee/Lucy/Matthews/Melvin, Site Center: Hare Unit 1H, Lucy 2H				
<b>Site Position:</b>		<b>Northing:</b>	14,312,858.39 usft	<b>Latitude:</b>	39° 24' 52.006 N
<b>From:</b>	Map	<b>Easting:</b>	1,674,789.19 usft	<b>Longitude:</b>	80° 52' 41.879 W
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	0.08 °

<b>Well</b>	Matthews Unit 2H, Marcellus					
<b>Well Position</b>	<b>+N/-S</b>	0.0 usft	<b>Northing:</b>	14,312,850.48 usft	<b>Latitude:</b>	39° 24' 51.927 N
	<b>+E/-W</b>	0.0 usft	<b>Easting:</b>	1,674,794.32 usft	<b>Longitude:</b>	80° 52' 41.813 W
<b>Position Uncertainty</b>		2.0 usft	<b>Wellhead Elevation:</b>	1,173.0 usft	<b>Ground Level:</b>	1,141.0 usft

<b>Wellbore</b>	Original Wellpath				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	BGGM2015	11/12/2015	-8.48	66.83	52,180
	BGGM2015	12/30/2015	-8.49	66.82	52,165

<b>Design</b>	As Drilled				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
<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		340.41

<b>Survey Program</b>	<b>Date</b>	1/12/2016			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
25.0	5,702.0	Survey #7 - Final Def Gyro (Original Wellp	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4	
5,743.0	16,975.0	Survey #8 - SDI MWD (Original Wellpath)	SDI MWD	Scientific Drilling Intl. MWD - Standard ver 1.0.1	

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)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
25.0	0.11	44.99	25.0	0.0	0.0	0.0	0.44	0.44	0.00
<b>First Gyro @ 25</b>									
50.0	0.22	44.99	50.0	0.1	0.1	0.0	0.44	0.44	0.00
75.0	0.33	44.99	75.0	0.2	0.2	0.1	0.44	0.44	0.00
100.0	0.43	46.33	100.0	0.3	0.3	0.2	0.40	0.40	5.36
125.0	0.34	95.58	125.0	0.3	0.4	0.2	1.32	-0.36	197.00
150.0	0.31	110.94	150.0	0.3	0.6	0.1	0.37	-0.12	61.44

RECEIVED  
Office of Oil and Gas  
AUG 21 2017

WV Department of  
Environmental Protection



Scientific Drilling International  
Survey Report



<b>Company:</b>	Antero Resources	<b>Local Co-ordinate Reference:</b>	Well Matthews Unit 2H
<b>Project:</b>	Tyler County WV	<b>TVD Reference:</b>	Frontier 32: 1141' GL + 32' KB @ 1173.0usft
<b>Site:</b>	Estlack Pad: Hare/Jujubee/Lucy/Matthews/Melvin	<b>MD Reference:</b>	Frontier 32: 1141' GL + 32' KB @ 1173.0usft
<b>Well:</b>	Matthews Unit 2H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Wellpath	<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)	
175.0	0.33	96.78	175.0	0.3	0.7	0.0	0.33	0.08	-56.64	
200.0	0.34	91.87	200.0	0.3	0.8	0.0	0.12	0.04	-19.64	
225.0	0.26	103.47	225.0	0.2	1.0	-0.1	0.40	-0.32	46.40	
250.0	0.29	98.37	250.0	0.2	1.1	-0.2	0.15	0.12	-20.40	
275.0	0.37	98.50	275.0	0.2	1.2	-0.2	0.32	0.32	0.52	
300.0	0.36	93.31	300.0	0.2	1.4	-0.3	0.14	-0.04	-20.76	
325.0	0.30	103.60	325.0	0.2	1.5	-0.4	0.34	-0.24	41.16	
350.0	0.33	98.83	350.0	0.1	1.7	-0.4	0.16	0.12	-19.08	
375.0	0.21	110.34	375.0	0.1	1.8	-0.5	0.52	-0.48	46.04	
400.0	0.28	105.97	400.0	0.1	1.9	-0.6	0.29	0.28	-17.48	
425.0	0.17	111.50	425.0	0.0	2.0	-0.6	0.45	-0.44	22.12	
450.0	0.11	291.41	450.0	0.0	2.0	-0.6	1.12	-0.24	719.64	
475.0	0.28	309.21	475.0	0.1	1.9	-0.6	0.71	0.68	71.20	
500.0	0.45	300.60	500.0	0.2	1.8	-0.4	0.71	0.68	-34.44	
525.0	0.58	294.44	525.0	0.3	1.6	-0.3	0.56	0.52	-24.64	
550.0	0.86	284.37	550.0	0.4	1.3	-0.1	1.22	1.12	-40.28	
575.0	1.17	262.82	575.0	0.4	0.8	0.1	1.95	1.24	-86.20	
600.0	1.28	260.45	600.0	0.3	0.3	0.2	0.48	0.44	-9.48	
625.0	1.41	255.65	625.0	0.2	-0.3	0.3	0.69	0.52	-19.20	
650.0	1.69	243.97	650.0	-0.1	-0.9	0.2	1.68	1.12	-46.72	
675.0	1.84	234.21	675.0	-0.4	-1.5	0.1	1.34	0.60	-39.04	
700.0	1.97	226.61	699.9	-1.0	-2.2	-0.2	1.14	0.52	-30.40	
725.0	2.01	218.55	724.9	-1.6	-2.8	-0.6	1.13	0.16	-32.24	
750.0	2.61	209.76	749.9	-2.5	-3.3	-1.2	2.78	2.40	-35.16	
775.0	2.86	204.36	774.9	-3.5	-3.9	-2.0	1.44	1.00	-21.60	
800.0	3.28	198.47	799.8	-4.8	-4.3	-3.0	2.10	1.68	-23.56	
825.0	3.84	195.83	824.8	-6.2	-4.8	-4.3	2.33	2.24	-10.56	
850.0	4.44	192.19	849.7	-8.0	-5.2	-5.8	2.62	2.40	-14.56	
875.0	5.17	188.62	874.6	-10.1	-5.6	-7.6	3.15	2.92	-14.28	
900.0	5.62	186.87	899.5	-12.4	-5.9	-9.7	1.92	1.80	-7.00	
925.0	6.01	186.50	924.4	-14.9	-6.2	-12.0	1.57	1.56	-1.48	
950.0	6.03	186.07	949.3	-17.5	-6.5	-14.3	0.20	0.08	-1.72	
975.0	6.13	185.73	974.1	-20.1	-6.8	-16.7	0.43	0.40	-1.36	
1,000.0	6.28	185.92	999.0	-22.8	-7.1	-19.1	0.61	0.60	0.76	
1,025.0	6.08	185.43	1,023.8	-25.5	-7.3	-21.6	0.83	-0.80	-1.96	
1,050.0	6.02	184.83	1,048.7	-28.1	-7.6	-24.0	0.35	-0.24	-2.40	
1,075.0	5.76	186.01	1,073.6	-30.7	-7.8	-26.3	1.15	-1.04	4.72	
1,100.0	5.49	186.66	1,098.4	-33.1	-8.1	-28.5	1.11	-1.08	2.60	
1,125.0	5.14	186.22	1,123.3	-35.4	-8.3	-30.6	1.41	-1.40	-1.76	
1,150.0	4.37	185.21	1,148.2	-37.5	-8.5	-32.5	3.10	-3.08	-4.04	
1,175.0	4.25	185.63	1,173.2	-39.4	-8.7	-34.2	0.50	-0.48	1.68	
1,200.0	3.98	186.28	1,198.1	-41.1	-8.9	-35.8	1.10	-1.08	2.60	
1,225.0	3.79	186.10	1,223.1	-42.8	-9.1	-37.3	0.76	-0.76	-0.72	

RECEIVED  
Office of Oil and Gas

AUG 21 2017

WV Department of  
Environmental Protection



Scientific Drilling International  
Survey Report



<b>Company:</b>	Antero Resources	<b>Local Co-ordinate Reference:</b>	Well Matthews Unit 2H
<b>Project:</b>	Tyler County WV	<b>TVD Reference:</b>	Frontier 32: 1141' GL + 32' KB @ 1173.0usft
<b>Site:</b>	Estlack Pad: Hare/Jubee/Lucy/Matthews/Melvin	<b>MD Reference:</b>	Frontier 32: 1141' GL + 32' KB @ 1173.0usft
<b>Well:</b>	Matthews Unit 2H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Wellpath	<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)
1,250.0	3.39	186.23	1,248.0	-44.4	-9.2	-38.7	1.60	-1.60	0.52
1,275.0	3.31	188.83	1,273.0	-45.8	-9.4	-40.0	0.69	-0.32	10.40
1,300.0	2.98	187.56	1,297.9	-47.2	-9.6	-41.2	1.35	-1.32	-5.08
1,325.0	2.72	187.23	1,322.9	-48.4	-9.8	-42.3	1.04	-1.04	-1.32
1,350.0	2.41	188.91	1,347.9	-49.5	-10.0	-43.3	1.28	-1.24	6.72
1,375.0	2.27	186.82	1,372.8	-50.5	-10.1	-44.2	0.66	-0.56	-8.36
1,400.0	2.07	185.77	1,397.8	-51.5	-10.2	-45.1	0.82	-0.80	-4.20
1,425.0	1.88	185.98	1,422.8	-52.3	-10.3	-45.9	0.76	-0.76	0.84
1,450.0	1.74	188.10	1,447.8	-53.1	-10.4	-46.6	0.62	-0.56	8.48
1,475.0	1.58	189.00	1,472.8	-53.8	-10.5	-47.2	0.65	-0.64	3.60
1,500.0	1.43	187.86	1,497.8	-54.5	-10.6	-47.8	0.61	-0.60	-4.56
1,525.0	1.09	186.97	1,522.8	-55.0	-10.7	-48.3	1.36	-1.36	-3.56
1,550.0	1.00	189.48	1,547.8	-55.5	-10.7	-48.7	0.40	-0.36	10.04
1,575.0	0.90	192.97	1,572.8	-55.9	-10.8	-49.0	0.46	-0.40	13.96
1,600.0	0.95	190.45	1,597.8	-56.3	-10.9	-49.4	0.26	0.20	-10.08
1,625.0	0.83	186.12	1,622.8	-56.7	-10.9	-49.7	0.55	-0.48	-17.32
1,650.0	0.58	185.34	1,647.8	-57.0	-11.0	-50.0	1.00	-1.00	-3.12
1,675.0	0.50	188.16	1,672.8	-57.2	-11.0	-50.2	0.34	-0.32	11.28
1,700.0	0.48	172.43	1,697.8	-57.4	-11.0	-50.4	0.54	-0.08	-62.92
1,725.0	0.47	182.25	1,722.8	-57.6	-11.0	-50.6	0.33	-0.04	39.28
1,750.0	0.59	173.15	1,747.8	-57.9	-11.0	-50.8	0.58	0.48	-36.40
1,775.0	0.45	176.82	1,772.8	-58.1	-11.0	-51.0	0.58	-0.56	14.68
1,800.0	0.43	179.40	1,797.8	-58.3	-11.0	-51.2	0.11	-0.08	10.32
1,825.0	0.48	173.36	1,822.8	-58.5	-10.9	-51.4	0.28	0.20	-24.16
1,850.0	0.49	176.72	1,847.8	-58.7	-10.9	-51.6	0.12	0.04	13.44
1,875.0	0.42	175.64	1,872.7	-58.9	-10.9	-51.8	0.28	-0.28	-4.32
1,900.0	0.37	184.81	1,897.7	-59.1	-10.9	-52.0	0.32	-0.20	36.68
1,925.0	0.38	173.95	1,922.7	-59.2	-10.9	-52.1	0.29	0.04	-43.44
1,950.0	0.27	170.31	1,947.7	-59.4	-10.9	-52.3	0.45	-0.44	-14.56
1,975.0	0.24	186.80	1,972.7	-59.5	-10.9	-52.4	0.32	-0.12	65.96
2,000.0	0.33	189.35	1,997.7	-59.6	-10.9	-52.5	0.36	0.36	10.20
2,025.0	0.29	159.37	2,022.7	-59.7	-10.9	-52.6	0.66	-0.16	-119.92
2,050.0	0.15	150.88	2,047.7	-59.8	-10.9	-52.7	0.57	-0.56	-33.96
2,075.0	0.09	184.50	2,072.7	-59.9	-10.8	-52.8	0.36	-0.24	134.48
2,100.0	0.21	150.64	2,097.7	-59.9	-10.8	-52.8	0.58	0.48	-135.44
2,125.0	0.16	143.66	2,122.7	-60.0	-10.8	-52.9	0.22	-0.20	-27.92
2,150.0	0.08	162.90	2,147.7	-60.0	-10.7	-52.9	0.35	-0.32	76.96
2,175.0	0.14	162.10	2,172.7	-60.1	-10.7	-53.0	0.24	0.24	-3.20
2,200.0	0.16	147.69	2,197.7	-60.1	-10.7	-53.1	0.17	0.08	-57.64
2,225.0	0.15	153.20	2,222.7	-60.2	-10.7	-53.1	0.07	-0.04	22.04
2,250.0	0.14	199.56	2,247.7	-60.2	-10.7	-53.2	0.46	-0.04	185.44
2,275.0	0.12	199.06	2,272.7	-60.3	-10.7	-53.2	0.08	-0.08	-2.00

Office of Oil and Gas

AUG 21 2017

WV Department of Environmental Protection



Scientific Drilling International  
Survey Report



<b>Company:</b>	Antero Resources	<b>Local Co-ordinate Reference:</b>	Well Matthews Unit 2H
<b>Project:</b>	Tyler County WV	<b>TVD Reference:</b>	Frontier 32: 1141' GL + 32' KB @ 1173.0usft
<b>Site:</b>	Estlack Pad: Hare/Jujubee/Lucy/Matthews/Melvin	<b>MD Reference:</b>	Frontier 32: 1141' GL + 32' KB @ 1173.0usft
<b>Well:</b>	Matthews Unit 2H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Wellpath	<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)
2,300.0	0.14	182.38	2,297.7	-60.4	-10.7	-53.3	0.17	0.08	-66.72
2,325.0	0.03	292.44	2,322.7	-60.4	-10.7	-53.3	0.61	-0.44	440.24
2,350.0	0.04	311.19	2,347.7	-60.4	-10.7	-53.3	0.06	0.04	75.00
2,375.0	0.13	174.59	2,372.7	-60.4	-10.7	-53.3	0.65	0.36	-546.40
2,400.0	0.03	216.42	2,397.7	-60.4	-10.7	-53.3	0.44	-0.40	167.32
2,425.0	0.13	161.57	2,422.7	-60.5	-10.7	-53.4	0.46	0.40	-219.40
2,450.0	0.16	166.37	2,447.7	-60.5	-10.7	-53.4	0.13	0.12	19.20
2,475.0	0.11	196.14	2,472.7	-60.6	-10.7	-53.5	0.34	-0.20	119.08
2,500.0	0.11	240.86	2,497.7	-60.6	-10.7	-53.5	0.33	0.00	178.88
2,525.0	0.11	227.29	2,522.7	-60.6	-10.8	-53.5	0.10	0.00	-54.28
2,550.0	0.10	211.50	2,547.7	-60.7	-10.8	-53.5	0.12	-0.04	-63.16
2,575.0	0.11	213.37	2,572.7	-60.7	-10.8	-53.6	0.04	0.04	7.48
2,600.0	0.12	273.04	2,597.7	-60.7	-10.9	-53.6	0.46	0.04	238.68
2,625.0	0.23	249.88	2,622.7	-60.8	-10.9	-53.6	0.51	0.44	-92.64
2,650.0	0.13	236.74	2,647.7	-60.8	-11.0	-53.6	0.43	-0.40	-52.56
2,675.0	0.11	282.53	2,672.7	-60.8	-11.0	-53.6	0.38	-0.08	183.16
2,700.0	0.20	257.11	2,697.7	-60.8	-11.1	-53.6	0.44	0.36	-101.68
2,725.0	0.23	258.05	2,722.7	-60.8	-11.2	-53.5	0.12	0.12	3.76
2,750.0	0.20	245.93	2,747.7	-60.8	-11.3	-53.5	0.22	-0.12	-48.48
2,775.0	0.13	255.42	2,772.7	-60.9	-11.4	-53.5	0.30	-0.28	37.96
2,800.0	0.15	247.99	2,797.7	-60.9	-11.4	-53.5	0.11	0.08	-29.72
2,825.0	0.15	241.45	2,822.7	-60.9	-11.5	-53.5	0.07	0.00	-26.16
2,850.0	0.28	257.70	2,847.7	-60.9	-11.6	-53.5	0.57	0.52	65.00
2,875.0	0.24	266.50	2,872.7	-61.0	-11.7	-53.5	0.23	-0.16	35.20
2,900.0	0.24	264.09	2,897.7	-61.0	-11.8	-53.5	0.04	0.00	-9.64
2,925.0	0.34	254.75	2,922.7	-61.0	-11.9	-53.5	0.44	0.40	-37.36
2,950.0	0.31	256.74	2,947.7	-61.0	-12.0	-53.5	0.13	-0.12	7.96
2,975.0	0.21	270.56	2,972.7	-61.0	-12.2	-53.4	0.47	-0.40	55.28
3,000.0	0.31	261.55	2,997.7	-61.1	-12.3	-53.4	0.43	0.40	-36.04
3,025.0	0.31	267.23	3,022.7	-61.1	-12.4	-53.4	0.12	0.00	22.72
3,050.0	0.31	264.84	3,047.7	-61.1	-12.5	-53.3	0.05	0.00	-9.56
3,075.0	0.42	262.62	3,072.7	-61.1	-12.7	-53.3	0.44	0.44	-8.88
3,100.0	0.34	256.83	3,097.7	-61.1	-12.9	-53.3	0.35	-0.32	-23.16
3,125.0	0.37	256.36	3,122.7	-61.2	-13.0	-53.3	0.12	0.12	-1.88
3,150.0	0.42	263.31	3,147.7	-61.2	-13.2	-53.2	0.28	0.20	27.80
3,175.0	0.41	261.08	3,172.7	-61.2	-13.4	-53.2	0.08	-0.04	-8.92
3,200.0	0.43	262.52	3,197.7	-61.2	-13.5	-53.2	0.09	0.08	5.76
3,225.0	0.48	256.89	3,222.7	-61.3	-13.7	-53.1	0.27	0.20	-22.52
3,250.0	0.42	262.80	3,247.7	-61.3	-13.9	-53.1	0.30	-0.24	23.64
3,275.0	0.47	263.99	3,272.7	-61.3	-14.1	-53.1	0.20	0.20	4.76
3,300.0	0.43	265.32	3,297.7	-61.4	-14.3	-53.0	0.17	-0.16	5.32
3,325.0	0.43	258.11	3,322.7	-61.4	-14.5	-53.0	0.22	0.00	-28.84
3,350.0	0.37	255.30	3,347.7	-61.4	-14.7	-52.9	0.25	-0.24	-11.24

AUG 21 2017  
 WV Department of Environmental Protection  
 Office of Oil and Gas



Scientific Drilling International  
Survey Report



<b>Company:</b>	Antero Resources	<b>Local Co-ordinate Reference:</b>	Well Matthews Unit 2H
<b>Project:</b>	Tyler County WV	<b>TVD Reference:</b>	Frontier 32: 1141' GL + 32' KB @ 1173.0usft
<b>Site:</b>	Estlack Pad: Hare/Jujubee/Lucy/Matthews/Melvin	<b>MD Reference:</b>	Frontier 32: 1141' GL + 32' KB @ 1173.0usft
<b>Well:</b>	Matthews Unit 2H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Wellpath	<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)	
3,375.0	0.35	261.32	3,372.7	-61.5	-14.8	-52.9	0.17	-0.08	24.08	
3,400.0	0.38	267.15	3,397.7	-61.5	-15.0	-52.9	0.19	0.12	23.32	
3,425.0	0.32	261.49	3,422.7	-61.5	-15.1	-52.9	0.28	-0.24	-22.64	
3,450.0	0.33	269.16	3,447.7	-61.5	-15.3	-52.8	0.18	0.04	30.68	
3,475.0	0.32	270.80	3,472.7	-61.5	-15.4	-52.8	0.05	-0.04	6.56	
3,500.0	0.30	275.09	3,497.7	-61.5	-15.6	-52.7	0.12	-0.08	17.16	
3,525.0	0.28	270.46	3,522.7	-61.5	-15.7	-52.7	0.12	-0.08	-18.52	
3,550.0	0.28	281.58	3,547.7	-61.5	-15.8	-52.6	0.22	0.00	44.48	
3,575.0	0.27	270.38	3,572.7	-61.5	-15.9	-52.6	0.22	-0.04	-44.80	
3,600.0	0.22	271.62	3,597.7	-61.5	-16.0	-52.5	0.20	-0.20	4.96	
3,625.0	0.28	289.99	3,622.7	-61.4	-16.1	-52.5	0.40	0.24	73.48	
3,650.0	0.30	269.90	3,647.7	-61.4	-16.3	-52.4	0.41	0.08	-80.36	
3,675.0	0.29	287.38	3,672.7	-61.4	-16.4	-52.3	0.36	-0.04	69.92	
3,700.0	0.33	278.56	3,697.7	-61.4	-16.5	-52.3	0.25	0.16	-35.28	
3,725.0	0.30	301.51	3,722.7	-61.3	-16.6	-52.2	0.51	-0.12	91.80	
3,750.0	0.35	285.08	3,747.7	-61.3	-16.8	-52.1	0.42	0.20	-65.72	
3,775.0	0.34	289.70	3,772.7	-61.2	-16.9	-52.0	0.12	-0.04	18.48	
3,800.0	0.36	283.43	3,797.7	-61.2	-17.1	-51.9	0.17	0.08	-25.08	
3,825.0	0.37	293.30	3,822.7	-61.1	-17.2	-51.8	0.25	0.04	39.48	
3,850.0	0.39	279.42	3,847.7	-61.1	-17.4	-51.7	0.38	0.08	-55.52	
3,875.0	0.34	287.48	3,872.7	-61.0	-17.5	-51.6	0.29	-0.20	32.24	
3,900.0	0.36	289.79	3,897.7	-61.0	-17.7	-51.5	0.10	0.08	9.24	
3,925.0	0.37	280.40	3,922.7	-61.0	-17.8	-51.5	0.24	0.04	-37.56	
3,950.0	0.33	291.67	3,947.7	-60.9	-18.0	-51.4	0.32	-0.16	45.08	
3,975.0	0.35	288.42	3,972.7	-60.9	-18.1	-51.3	0.11	0.08	-13.00	
4,000.0	0.37	284.67	3,997.7	-60.8	-18.3	-51.2	0.12	0.08	-15.00	
4,025.0	0.36	280.32	4,022.7	-60.8	-18.4	-51.1	0.12	-0.04	-17.40	
4,050.0	0.32	290.20	4,047.7	-60.7	-18.6	-51.0	0.28	-0.16	39.52	
4,075.0	0.34	278.81	4,072.7	-60.7	-18.7	-50.9	0.27	0.08	-45.56	
4,100.0	0.37	287.42	4,097.7	-60.7	-18.8	-50.8	0.24	0.12	34.44	
4,125.0	0.38	297.00	4,122.7	-60.6	-19.0	-50.7	0.25	0.04	38.32	
4,150.0	0.34	287.28	4,147.7	-60.6	-19.1	-50.6	0.29	-0.16	-38.88	
4,175.0	0.36	285.55	4,172.7	-60.5	-19.3	-50.5	0.09	0.08	-6.92	
4,200.0	0.37	276.01	4,197.7	-60.5	-19.4	-50.5	0.25	0.04	-38.16	
4,225.0	0.36	284.22	4,222.7	-60.5	-19.6	-50.4	0.21	-0.04	32.84	
4,250.0	0.45	282.90	4,247.7	-60.4	-19.8	-50.3	0.36	0.36	-5.28	
4,275.0	0.40	284.25	4,272.7	-60.4	-19.9	-50.2	0.20	-0.20	5.40	
4,300.0	0.43	274.27	4,297.7	-60.3	-20.1	-50.1	0.31	0.12	-39.92	
4,325.0	0.33	291.89	4,322.7	-60.3	-20.3	-50.0	0.61	-0.40	70.48	
4,350.0	0.33	289.63	4,347.7	-60.3	-20.4	-49.9	0.05	0.00	-9.04	
4,375.0	0.30	282.22	4,372.7	-60.2	-20.6	-49.8	0.20	-0.12	-29.64	
4,400.0	0.21	275.16	4,397.7	-60.2	-20.7	-49.8	0.38	-0.36	-28.24	

RECEIVED  
Office of Oil and Gas

AUG 21 2017

WV Department of  
Environmental Protection



Scientific Drilling International  
Survey Report



<b>Company:</b>	Antero Resources	<b>Local Co-ordinate Reference:</b>	Well Matthews Unit 2H
<b>Project:</b>	Tyler County WV	<b>TVD Reference:</b>	Frontier 32: 1141' GL + 32' KB @ 1173.0usft
<b>Site:</b>	Estlack Pad: Hare/Jujubee/Lucy/Matthews/Melvin	<b>MD Reference:</b>	Frontier 32: 1141' GL + 32' KB @ 1173.0usft
<b>Well:</b>	Matthews Unit 2H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Wellpath	<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)
4,425.0	0.23	250.93	4,422.7	-60.2	-20.8	-49.8	0.38	0.08	-96.92
4,450.0	0.30	248.68	4,447.7	-60.3	-20.9	-49.8	0.28	0.28	-9.00
4,475.0	0.20	232.12	4,472.7	-60.3	-21.0	-49.8	0.49	-0.40	-66.24
4,500.0	0.25	237.64	4,497.7	-60.4	-21.0	-49.8	0.22	0.20	22.08
4,525.0	0.19	223.28	4,522.7	-60.4	-21.1	-49.8	0.32	-0.24	-57.44
4,550.0	0.34	228.06	4,547.7	-60.5	-21.2	-49.9	0.61	0.60	19.12
4,575.0	0.29	227.06	4,572.7	-60.6	-21.3	-49.9	0.20	-0.20	-4.00
4,600.0	0.26	228.42	4,597.7	-60.7	-21.4	-50.0	0.12	-0.12	5.44
4,625.0	0.30	232.63	4,622.7	-60.7	-21.5	-50.0	0.18	0.16	16.84
4,650.0	0.28	238.39	4,647.7	-60.8	-21.6	-50.1	0.14	-0.08	23.04
4,675.0	0.26	232.92	4,672.7	-60.9	-21.7	-50.1	0.13	-0.08	-21.88
4,700.0	0.26	246.67	4,697.7	-60.9	-21.8	-50.1	0.25	0.00	55.00
4,725.0	0.22	249.91	4,722.7	-61.0	-21.9	-50.1	0.17	-0.16	12.96
4,750.0	0.18	245.90	4,747.7	-61.0	-22.0	-50.1	0.17	-0.16	-16.04
4,775.0	0.24	246.01	4,772.7	-61.1	-22.0	-50.1	0.24	0.24	0.44
4,800.0	0.31	247.02	4,797.7	-61.1	-22.2	-50.1	0.28	0.28	4.04
4,825.0	0.18	253.82	4,822.7	-61.1	-22.3	-50.1	0.53	-0.52	27.20
4,850.0	0.38	254.09	4,847.7	-61.2	-22.4	-50.1	0.80	0.80	1.08
4,875.0	0.30	251.52	4,872.7	-61.2	-22.5	-50.1	0.33	-0.32	-10.28
4,900.0	0.17	254.45	4,897.7	-61.2	-22.6	-50.1	0.52	-0.52	11.72
4,925.0	0.26	251.47	4,922.7	-61.3	-22.7	-50.1	0.36	0.36	-11.92
4,950.0	0.26	240.65	4,947.7	-61.3	-22.8	-50.1	0.20	0.00	-43.28
4,975.0	0.18	258.98	4,972.7	-61.4	-22.9	-50.1	0.42	-0.32	73.32
5,000.0	0.20	254.18	4,997.7	-61.4	-23.0	-50.1	0.10	0.08	-19.20
5,025.0	0.14	243.81	5,022.7	-61.4	-23.0	-50.1	0.27	-0.24	-41.48
5,050.0	0.22	246.12	5,047.7	-61.4	-23.1	-50.1	0.32	0.32	9.24
5,075.0	0.28	263.22	5,072.7	-61.5	-23.2	-50.1	0.38	0.24	68.40
5,100.0	0.29	266.65	5,097.7	-61.5	-23.3	-50.1	0.08	0.04	13.72
5,125.0	0.31	238.60	5,122.7	-61.5	-23.5	-50.1	0.59	0.08	-112.20
5,150.0	0.27	249.22	5,147.7	-61.6	-23.6	-50.1	0.27	-0.16	42.48
5,175.0	0.32	251.02	5,172.7	-61.6	-23.7	-50.1	0.20	0.20	7.20
5,200.0	0.25	255.92	5,197.7	-61.6	-23.8	-50.1	0.30	-0.28	19.60
5,225.0	0.20	273.57	5,222.7	-61.7	-23.9	-50.1	0.34	-0.20	70.60
5,250.0	0.25	271.64	5,247.7	-61.6	-24.0	-50.0	0.20	0.20	-7.72
5,275.0	0.17	266.17	5,272.7	-61.6	-24.1	-50.0	0.33	-0.32	-21.88
5,300.0	0.31	284.63	5,297.7	-61.6	-24.2	-50.0	0.63	0.56	73.84
5,325.0	0.30	273.91	5,322.7	-61.6	-24.3	-49.9	0.23	-0.04	-42.88
5,350.0	0.18	279.70	5,347.7	-61.6	-24.4	-49.8	0.49	-0.48	23.16
5,375.0	0.29	294.75	5,372.7	-61.6	-24.5	-49.8	0.50	0.44	60.20
5,400.0	0.27	284.66	5,397.7	-61.5	-24.6	-49.7	0.21	-0.08	-40.36
5,425.0	0.34	271.50	5,422.7	-61.5	-24.8	-49.6	0.39	0.28	-52.64
5,450.0	0.32	275.97	5,447.7	-61.5	-24.9	-49.6	0.13	-0.08	17.88
5,475.0	0.32	276.23	5,472.7	-61.5	-25.1	-49.5	0.01	0.00	1.04

RECEIVED  
Office of Oil and Gas

AUG 21 2017

WV Department of  
Environmental Protection



Scientific Drilling International  
Survey Report



<b>Company:</b>	Antero Resources	<b>Local Co-ordinate Reference:</b>	Well Matthews Unit 2H
<b>Project:</b>	Tyler County WV	<b>TVD Reference:</b>	Frontier 32: 1141' GL + 32' KB @ 1173.0usft
<b>Site:</b>	Hare/Jubee/Lucy/Matthews/Melvin	<b>MD Reference:</b>	Frontier 32: 1141' GL + 32' KB @ 1173.0usft
<b>Well:</b>	Matthews Unit 2H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Wellpath	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Antero NE

REC'D  
 Office of Oil and Gas  
 AUG 21 2017

WV Department of  
 Environmental Protection

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)
5,500.0	0.41	269.94	5,497.7	-61.5	-25.2	-49.5	0.39	0.36	-25.16
5,525.0	0.09	245.80	5,522.7	-61.5	-25.3	-49.4	1.32	-1.28	-96.56
5,550.0	0.19	272.30	5,547.7	-61.5	-25.4	-49.4	0.47	0.40	106.00
5,575.0	0.22	242.33	5,572.7	-61.5	-25.5	-49.4	0.44	0.12	-119.88
5,600.0	0.37	243.56	5,597.7	-61.6	-25.6	-49.4	0.60	0.60	4.92
5,625.0	0.44	248.08	5,622.7	-61.6	-25.7	-49.4	0.31	0.28	18.08
5,650.0	0.28	252.46	5,647.7	-61.7	-25.9	-49.4	0.65	-0.64	17.52
5,675.0	0.31	266.72	5,672.7	-61.7	-26.0	-49.4	0.32	0.12	57.04
5,702.0	0.38	277.81	5,699.7	-61.7	-26.2	-49.4	0.36	0.26	41.07
<b>Last Gyro @ 5702</b>									
5,743.0	0.58	243.16	5,740.7	-61.8	-26.5	-49.3	0.84	0.49	-84.51
<b>First SDI MWD @ 5743</b>									
5,838.0	0.62	266.09	5,835.7	-62.0	-27.4	-49.2	0.25	0.04	24.14
5,913.0	0.63	272.77	5,910.7	-62.0	-28.3	-49.0	0.10	0.01	8.91
<b>RNST @ 5913</b>									
5,934.0	0.63	274.61	5,931.7	-62.0	-28.5	-48.9	0.10	0.02	8.75
6,028.0	0.75	297.16	6,025.7	-61.7	-29.5	-48.2	0.31	0.13	23.99
6,060.0	0.88	275.87	6,057.7	-61.6	-30.0	-48.0	1.02	0.41	-66.53
6,092.0	2.07	302.12	6,089.7	-61.3	-30.7	-47.4	4.18	3.72	82.03
6,123.0	5.82	320.53	6,120.6	-59.7	-32.2	-45.5	12.62	12.10	59.39
6,155.0	8.81	321.21	6,152.3	-56.6	-34.8	-41.7	9.35	9.34	2.13
6,187.0	11.74	322.42	6,183.8	-52.1	-38.3	-36.2	9.18	9.16	3.78
6,219.0	15.49	324.65	6,214.9	-46.0	-42.7	-29.0	11.83	11.72	6.97
6,250.0	19.35	323.40	6,244.5	-38.5	-48.2	-20.1	12.51	12.45	-4.03
6,252.0	19.60	323.49	6,246.4	-38.0	-48.6	-19.5	12.76	12.67	4.44
<b>SCMR @ 6252</b>									
6,282.0	23.41	324.60	6,274.3	-29.1	-55.0	-8.9	12.76	12.69	3.70
6,313.0	27.44	324.14	6,302.3	-18.3	-62.8	3.8	13.02	13.00	-1.48
6,345.0	31.50	320.35	6,330.1	-5.8	-72.5	18.8	13.96	12.69	-11.84
6,377.0	35.22	318.31	6,356.8	7.5	-83.9	35.2	12.14	11.63	-6.38
6,408.0	38.62	315.42	6,381.6	21.1	-96.7	52.2	12.31	10.97	-9.32
6,440.0	41.89	314.18	6,406.0	35.6	-111.3	70.9	10.52	10.22	-3.88
6,452.0	43.47	313.25	6,414.9	41.2	-117.2	78.2	14.18	13.18	-7.73
<b>MDLX @ 6452</b>									
6,471.0	45.99	311.89	6,428.4	50.3	-127.1	90.0	14.18	13.25	-7.17
6,503.0	50.62	310.85	6,449.6	66.1	-145.0	110.9	14.67	14.47	-3.25
6,535.0	54.69	311.32	6,469.0	82.8	-164.2	133.0	12.77	12.72	1.47
6,566.0	57.68	313.58	6,486.3	100.2	-183.2	155.8	11.39	9.65	7.29
6,598.0	59.70	315.79	6,502.9	119.4	-202.6	180.4	8.64	6.31	6.91
6,618.0	60.74	317.72	6,512.9	132.0	-214.5	196.3	9.84	5.19	9.63
<b>BRKT @ 6618</b>									
6,629.0	61.32	318.76	6,518.2	139.2	-220.9	205.2	9.84	5.29	9.48
6,661.0	63.88	322.64	6,532.9	161.2	-238.9	232.0	13.41	8.00	12.13





Scientific Drilling International  
Survey Report



**Company:** Antero Resources  
**Project:** Tyler County WV  
**Site:** Estlack Pad:  
 Hare/Jujubee/Lucy/Matthews/Melvin  
**Well:** Matthews Unit 2H  
**Wellbore:** Original Wellpath  
**Design:** As Drilled

**Local Co-ordinate Reference:** Well Matthews Unit 2H  
**TVD Reference:** Frontier 32: 1141' GL + 32' KB @ 1173.0usft  
**MD Reference:** Frontier 32: 1141' GL + 32' KB @ 1173.0usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** Antero NE

RECEIVED  
Office of Oil and Gas  
AUG 21 2017

WV Department of  
Environmental Protection

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)	
6,682.0	64.80	323.83	6,542.0	176.4	-250.2	250.0	6.73	4.36	5.68	
<b>TLLY @ 6682</b>										
6,693.0	65.28	324.45	6,546.7	184.4	-256.1	259.6	6.73	4.40	5.61	
6,725.0	68.12	328.34	6,559.3	208.9	-272.3	288.1	14.26	8.88	12.16	
6,756.0	71.71	329.50	6,570.0	233.9	-287.3	316.7	12.10	11.58	3.74	
6,762.0	72.60	329.53	6,571.8	238.8	-290.2	322.3	14.85	14.84	0.48	
<b>MRCL_HOT @ 6762</b>										
6,788.0	76.46	329.65	6,578.7	260.4	-302.9	346.9	14.85	14.84	0.47	
6,820.0	81.06	332.09	6,585.0	287.8	-318.2	377.8	16.20	14.38	7.63	
6,851.0	83.55	333.24	6,589.1	315.1	-332.3	408.3	8.83	8.03	3.71	
6,883.0	85.42	335.00	6,592.2	343.7	-346.2	439.9	8.01	5.84	5.50	
6,915.0	86.40	335.17	6,594.5	372.7	-359.6	471.7	3.11	3.06	0.53	
6,947.0	87.24	335.77	6,596.3	401.7	-372.9	503.5	3.22	2.63	1.88	
6,973.0	88.46	337.90	6,597.2	425.6	-383.1	529.4	9.44	4.69	8.19	
7,004.0	90.38	339.51	6,597.5	454.5	-394.4	560.4	8.08	6.19	5.19	
7,036.0	90.38	339.44	6,597.3	484.5	-405.6	592.4	0.22	0.00	-0.22	
7,068.0	90.34	341.02	6,597.1	514.6	-416.4	624.4	4.94	-0.13	4.94	
7,099.0	90.58	341.53	6,596.9	544.0	-426.4	655.4	1.82	0.77	1.65	
7,195.0	89.90	339.27	6,596.5	634.4	-458.6	751.4	2.46	-0.71	-2.35	
7,290.0	90.20	339.36	6,596.4	723.3	-492.1	846.4	0.33	0.32	0.09	
7,386.0	90.58	339.05	6,595.7	813.0	-526.2	942.4	0.51	0.40	-0.32	
7,480.0	89.34	340.83	6,595.8	901.3	-558.4	1,036.4	2.31	-1.32	1.89	
7,575.0	88.93	340.90	6,597.2	991.0	-589.6	1,131.3	0.44	-0.43	0.07	
7,670.0	91.05	341.37	6,597.3	1,080.9	-620.3	1,226.3	2.29	2.23	0.49	
7,766.0	90.50	340.79	6,596.0	1,171.7	-651.4	1,322.3	0.83	-0.57	-0.60	
7,861.0	90.64	340.22	6,595.0	1,261.3	-683.1	1,417.3	0.62	0.15	-0.60	
7,955.0	90.91	339.49	6,593.7	1,349.5	-715.5	1,511.3	0.83	0.29	-0.78	
8,049.0	90.37	338.33	6,592.7	1,437.2	-749.3	1,605.3	1.36	-0.57	-1.23	
8,145.0	90.11	340.16	6,592.3	1,527.0	-783.3	1,701.2	1.93	-0.27	1.91	
8,240.0	90.07	339.90	6,592.1	1,616.3	-815.8	1,796.2	0.28	-0.04	-0.27	
8,335.0	90.47	340.69	6,591.7	1,705.7	-847.8	1,891.2	0.93	0.42	0.83	
8,429.0	89.97	341.61	6,591.3	1,794.7	-878.2	1,985.2	1.11	-0.53	0.98	
8,523.0	90.17	340.42	6,591.2	1,883.5	-908.8	2,079.2	1.28	0.21	-1.27	
8,617.0	91.04	340.64	6,590.2	1,972.2	-940.1	2,173.2	0.95	0.93	0.23	
8,712.0	90.71	342.28	6,588.8	2,062.2	-970.3	2,268.2	1.76	-0.35	1.73	
8,807.0	90.98	341.94	6,587.4	2,152.6	-999.5	2,363.1	0.46	0.28	-0.36	
8,903.0	90.54	340.98	6,586.1	2,243.6	-1,030.0	2,459.1	1.10	-0.46	-1.00	
8,997.0	90.71	340.58	6,585.1	2,332.4	-1,060.9	2,553.1	0.46	0.18	-0.43	
9,092.0	91.08	341.13	6,583.6	2,422.1	-1,092.1	2,648.1	0.70	0.39	0.58	
9,186.0	89.57	338.30	6,583.1	2,510.3	-1,124.7	2,742.1	3.41	-1.61	-3.01	
9,281.0	90.07	337.75	6,583.4	2,598.4	-1,160.2	2,837.0	0.78	0.53	-0.58	
9,377.0	90.34	339.63	6,583.0	2,687.8	-1,195.1	2,932.9	1.98	0.28	1.96	
9,471.0	89.97	341.72	6,582.8	2,776.5	-1,226.2	3,026.9	2.26	-0.39	2.22	



Scientific Drilling International  
Survey Report



RECEIVED  
Office of Oil and  
AUG 21 2016

WV Department of  
Environmental Protection

<b>Company:</b>	Antero Resources	<b>Local Co-ordinate Reference:</b>	Well Matthews Unit 2H
<b>Project:</b>	Tyler County WV	<b>TVD Reference:</b>	Frontier 32: 1141' GL + 32' KB @ 1173.0usft
<b>Site:</b>	Estlack Pad: Hare/Jujubee/Lucy/Matthews/Melvin	<b>MD Reference:</b>	Frontier 32: 1141' GL + 32' KB @ 1173.0usft
<b>Well:</b>	Matthews Unit 2H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Wellpath	<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)
9,566.0	89.36	340.68	6,583.3	2,866.4	-1,256.8	3,121.9	1.27	-0.64	-1.09
9,661.0	89.56	341.91	6,584.2	2,956.4	-1,287.3	3,216.9	1.31	0.21	1.29
9,757.0	89.83	339.39	6,584.7	3,047.0	-1,319.1	3,312.9	2.64	0.28	-2.63
9,853.0	90.20	339.83	6,584.7	3,137.0	-1,352.5	3,408.9	0.60	0.39	0.46
9,948.0	89.63	339.39	6,584.8	3,226.0	-1,385.6	3,503.9	0.76	-0.60	-0.46
10,043.0	89.46	341.25	6,585.6	3,315.4	-1,417.6	3,598.8	1.97	-0.18	1.96
10,139.0	90.03	340.11	6,586.0	3,406.0	-1,449.4	3,694.8	1.33	0.59	-1.19
10,233.0	89.90	340.68	6,586.1	3,494.6	-1,480.9	3,788.8	0.62	-0.14	0.61
10,329.0	89.77	339.53	6,586.4	3,584.9	-1,513.6	3,884.8	1.21	-0.14	-1.20
10,423.0	90.00	341.15	6,586.5	3,673.4	-1,545.2	3,978.8	1.74	0.24	1.72
10,518.0	89.26	342.31	6,587.2	3,763.6	-1,575.0	4,073.8	1.45	-0.78	1.22
10,613.0	89.47	341.90	6,588.2	3,854.0	-1,604.2	4,168.8	0.48	0.22	-0.43
10,707.0	89.70	341.09	6,588.9	3,943.1	-1,634.0	4,262.7	0.90	0.24	-0.86
10,803.0	89.80	340.38	6,589.3	4,033.7	-1,665.7	4,358.7	0.75	0.10	-0.74
10,897.0	89.53	340.20	6,589.9	4,122.2	-1,697.4	4,452.7	0.35	-0.29	-0.19
10,992.0	89.77	338.93	6,590.4	4,211.2	-1,730.6	4,547.7	1.36	0.25	-1.34
11,086.0	90.14	339.10	6,590.5	4,299.0	-1,764.2	4,641.7	0.43	0.39	0.18
11,181.0	89.16	338.93	6,591.1	4,387.7	-1,798.2	4,736.7	1.05	-1.03	-0.18
11,275.0	89.83	341.96	6,591.9	4,476.3	-1,829.7	4,830.6	3.30	0.71	3.22
11,369.0	90.10	340.94	6,592.0	4,565.4	-1,859.6	4,924.6	1.12	0.29	-1.09
11,463.0	89.30	341.64	6,592.5	4,654.4	-1,889.8	5,018.6	1.13	-0.85	0.74
11,558.0	89.40	342.28	6,593.5	4,744.7	-1,919.2	5,113.6	0.68	0.11	0.67
11,652.0	89.10	340.33	6,594.8	4,833.8	-1,949.3	5,207.6	2.10	-0.32	-2.07
11,747.0	89.13	340.00	6,596.2	4,923.1	-1,981.5	5,302.5	0.35	0.03	-0.35
11,842.0	89.63	340.25	6,597.3	5,012.5	-2,013.8	5,397.5	0.59	0.53	0.26
11,937.0	89.90	340.30	6,597.7	5,101.9	-2,045.9	5,492.5	0.29	0.28	0.05
12,031.0	90.04	339.95	6,597.7	5,190.3	-2,077.9	5,586.5	0.40	0.15	-0.37
12,125.0	89.57	339.80	6,598.0	5,278.5	-2,110.2	5,680.5	0.52	-0.50	-0.16
12,219.0	89.60	339.20	6,598.7	5,366.6	-2,143.1	5,774.5	0.64	0.03	-0.64
12,314.0	89.70	341.41	6,599.3	5,456.0	-2,175.1	5,869.5	2.33	0.11	2.33
12,409.0	89.97	341.24	6,599.6	5,546.0	-2,205.5	5,964.5	0.34	0.28	-0.18
12,504.0	89.60	341.46	6,599.9	5,636.0	-2,235.9	6,059.5	0.45	-0.39	0.23
12,598.0	89.43	341.33	6,600.7	5,725.1	-2,265.9	6,153.5	0.23	-0.18	-0.14
12,693.0	89.36	339.32	6,601.7	5,814.6	-2,297.9	6,248.4	2.12	-0.07	-2.12
12,788.0	89.60	338.83	6,602.6	5,903.3	-2,331.8	6,343.4	0.57	0.25	-0.52
12,882.0	89.90	338.27	6,603.0	5,990.8	-2,366.2	6,437.4	0.68	0.32	-0.60
12,977.0	90.30	340.13	6,602.8	6,079.6	-2,399.9	6,532.3	2.00	0.42	1.96
13,070.0	89.83	339.00	6,602.7	6,166.7	-2,432.4	6,625.3	1.32	-0.51	-1.22
13,166.0	89.16	339.42	6,603.6	6,256.5	-2,466.5	6,721.3	0.82	-0.70	0.44
13,261.0	89.33	341.16	6,604.8	6,345.9	-2,498.5	6,816.3	1.84	0.18	1.83
13,355.0	89.59	341.35	6,605.7	6,434.9	-2,528.7	6,910.3	0.34	0.28	0.20
13,449.0	89.93	342.85	6,606.1	6,524.4	-2,557.6	7,004.2	1.64	0.36	1.60



Scientific Drilling International  
Survey Report



<b>Company:</b>	Antero Resources	<b>Local Co-ordinate Reference:</b>	Well Matthews Unit 2H
<b>Project:</b>	Tyler County WV	<b>TVD Reference:</b>	Frontier 32: 1141' GL + 32' KB @ 1173.0usft
<b>Site:</b>	Estlack Pad: Hare/Jujubee/Lucy/Matthews/Melvin	<b>MD Reference:</b>	Frontier 32: 1141' GL + 32' KB @ 1173.0usft
<b>Well:</b>	Matthews Unit 2H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Wellpath	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Antero NE

RECEIVED  
 Office of Oil and Gas  
 AUG 21 2017

WV Department of  
 Environmental Protection

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)	
13,543.0	89.02	341.11	6,607.0	6,613.7	-2,586.7	7,098.2	2.09	-0.97	-1.85	
13,639.0	89.39	341.30	6,608.3	6,704.6	-2,617.6	7,194.2	0.43	0.39	0.20	
13,733.0	89.80	341.02	6,609.0	6,793.6	-2,648.0	7,288.2	0.53	0.44	-0.30	
13,828.0	90.17	340.89	6,609.0	6,883.4	-2,679.0	7,383.2	0.41	0.39	-0.14	
13,922.0	89.83	340.59	6,609.0	6,972.1	-2,710.0	7,477.2	0.48	-0.36	-0.32	
14,016.0	89.40	339.74	6,609.6	7,060.5	-2,741.9	7,571.1	1.01	-0.46	-0.90	
14,111.0	90.00	339.81	6,610.1	7,149.7	-2,774.7	7,666.1	0.64	0.63	0.07	
14,205.0	89.16	339.39	6,610.8	7,237.8	-2,807.5	7,760.1	1.00	-0.89	-0.45	
14,299.0	89.46	339.10	6,611.9	7,325.7	-2,840.8	7,854.1	0.44	0.32	-0.31	
14,394.0	90.37	339.91	6,612.1	7,414.6	-2,874.0	7,949.1	1.28	0.96	0.85	
14,488.0	88.92	339.82	6,612.7	7,502.9	-2,906.4	8,043.1	1.55	-1.54	-0.10	
14,582.0	89.43	340.49	6,614.0	7,591.3	-2,938.3	8,137.1	0.90	0.54	0.71	
14,677.0	88.92	338.44	6,615.4	7,680.3	-2,971.6	8,232.0	2.22	-0.54	-2.16	
14,772.0	90.03	339.17	6,616.3	7,768.8	-3,006.0	8,327.0	1.40	1.17	0.77	
14,866.0	90.27	339.55	6,616.0	7,856.8	-3,039.1	8,421.0	0.48	0.26	0.40	
14,960.0	89.26	339.72	6,616.4	7,944.9	-3,071.8	8,515.0	1.09	-1.07	0.18	
15,054.0	90.64	341.35	6,616.5	8,033.5	-3,103.1	8,609.0	2.27	1.47	1.73	
15,148.0	91.31	342.54	6,614.9	8,122.9	-3,132.3	8,702.9	1.45	0.71	1.27	
15,243.0	90.60	342.34	6,613.3	8,213.5	-3,160.9	8,797.8	0.78	-0.75	-0.21	
15,337.0	89.76	340.31	6,613.0	8,302.5	-3,191.0	8,891.8	2.34	-0.89	-2.16	
15,431.0	89.93	339.24	6,613.2	8,390.7	-3,223.5	8,985.8	1.15	0.18	-1.14	
15,526.0	89.33	339.90	6,613.9	8,479.7	-3,256.7	9,080.8	0.94	-0.63	0.69	
15,620.0	90.33	341.90	6,614.1	8,568.5	-3,287.4	9,174.8	2.38	1.06	2.13	
15,714.0	89.96	341.12	6,613.9	8,657.7	-3,317.2	9,268.8	0.92	-0.39	-0.83	
15,808.0	90.00	339.95	6,613.9	8,746.3	-3,348.6	9,362.8	1.25	0.04	-1.24	
15,903.0	89.90	341.03	6,614.0	8,835.9	-3,380.3	9,457.8	1.14	-0.11	1.14	
15,998.0	89.93	340.52	6,614.2	8,925.6	-3,411.6	9,552.8	0.54	0.03	-0.54	
16,093.0	90.06	339.88	6,614.2	9,014.9	-3,443.8	9,647.8	0.69	0.14	-0.67	
16,188.0	89.59	341.20	6,614.5	9,104.5	-3,475.4	9,742.8	1.47	-0.49	1.39	
16,282.0	89.80	339.95	6,615.0	9,193.2	-3,506.7	9,836.8	1.35	0.22	-1.33	
16,376.0	89.46	340.45	6,615.6	9,281.6	-3,538.5	9,930.8	0.64	-0.36	0.53	
16,470.0	89.63	339.73	6,616.3	9,370.0	-3,570.5	10,024.8	0.79	0.18	-0.77	
16,564.0	89.49	342.03	6,617.0	9,458.8	-3,601.3	10,118.7	2.45	-0.15	2.45	
16,660.0	90.20	342.36	6,617.3	9,550.2	-3,630.7	10,214.7	0.82	0.74	0.34	
16,754.0	89.46	340.51	6,617.6	9,639.3	-3,660.6	10,308.7	2.12	-0.79	-1.97	
16,848.0	90.17	340.55	6,617.9	9,727.9	-3,691.9	10,402.7	0.76	0.76	0.04	
16,912.0	90.17	339.62	6,617.7	9,788.1	-3,713.7	10,466.7	1.45	0.00	-1.45	
<b>Last SDI MWD @ 16912</b>										
16,975.0	90.17	339.62	6,617.5	9,847.1	-3,735.6	10,529.7	0.00	0.00	0.00	
<b>Projection To Bit @ 16975 MD / 6617 TVD</b>										



Scientific Drilling International  
Survey Report



<b>Company:</b>	Antero Resources	<b>Local Co-ordinate Reference:</b>	Well Matthews Unit 2H
<b>Project:</b>	Tyler County WV	<b>TVD Reference:</b>	Frontier 32: 1141' GL + 32' KB @ 1173.0usft
<b>Site:</b>	Estlack Pad: Hare/Jujubee/Lucy/Matthews/Melvin	<b>MD Reference:</b>	Frontier 32: 1141' GL + 32' KB @ 1173.0usft
<b>Well:</b>	Matthews Unit 2H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Wellpath	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Antero NE

RECEIVED  
Office of Oil and Gas  
AUG 21 2017

WV Department of  
Environmental Protection

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
5,913.0	5,910.7	RNST @ 5913		0.00		
6,252.0	6,246.4	SCMR @ 6252		0.00		
6,452.0	6,414.9	MDLX @ 6452		0.00		
6,618.0	6,512.9	BRKT @ 6618		0.00		
6,682.0	6,542.0	TLLY @ 6682		0.00		
6,762.0	6,571.8	MRCL_HOT @ 6762		0.00		

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
25.0	25.0	0.0	0.0	First Gyro @ 25	
5,702.0	5,699.7	-61.7	-26.2	Last Gyro @ 5702	
5,743.0	5,740.7	-61.8	-26.5	First SDI MWD @ 5743	
16,912.0	6,617.7	9,788.1	-3,713.7	Last SDI MWD @ 16912	
16,975.0	6,617.5	9,847.1	-3,735.6	Projection To Bit @ 16975 MD / 6617 TVD	

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