



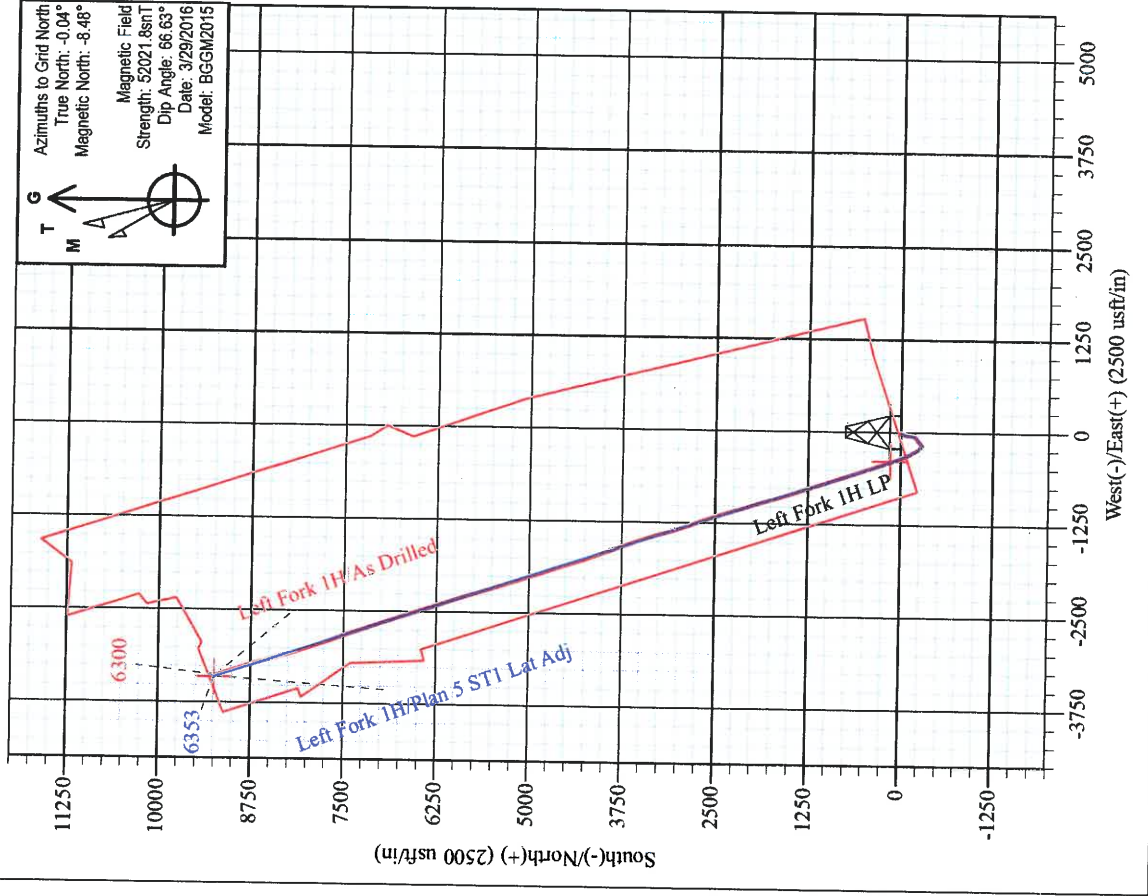
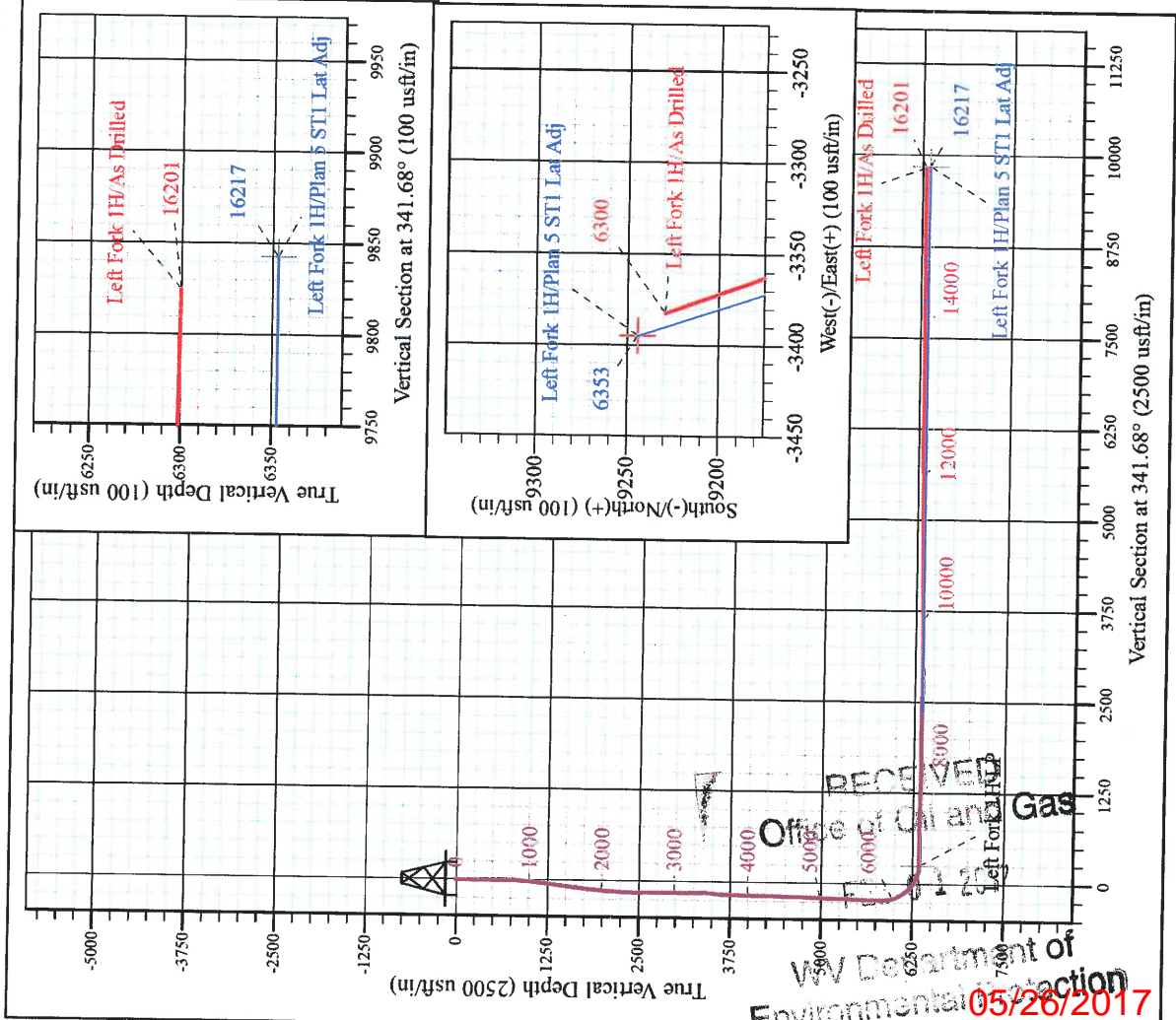
Lockhart Heirs West Pad: Left Fork/Harris
 Left Fork 1H
 Plan 5 ST1 Lat Adj
 Patterson 347: 1021' GL + 25' KB @ 1046.0usft
 Ritchie County WV

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: **Left Fork 1H SHL**

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	14230960.12	1660769.52	39° 11' 22.372 N	80° 55' 41.406 W



Azimuths to Grid North
 True North: -0.04°
 Magnetic North: -8.48°
 Magnetic Field
 Strength: 52021.8snT
 Dip Angle: 66.63°
 Date: 3/29/2016
 Model: BGGM2015

Shane Rhodes
 9:56, April 20 2016
 Scientific Drilling International
 124 Vista Drive
 Charleroi, PA 15022

Left Fork 1H
Approx. BHL
39° 12' 53.655 N 80° 56' 24.301 W

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 Office of Oil and Gas
 WV Department of Environmental Protection
 05/26/2017



Antero Resources

Ritchie County WV

**Lockhart Heirs West Pad: Left Fork/Harris
Left Fork 1H**

ST1

Design: As Drilled

Survey Report - Geographic

20 April, 2016



www.scientificdrilling.com

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Office of Oil and Gas

FEB 03 2017

WV Department of
Environmental Protection
05/26/2017



Scientific Drilling International
Survey Report - Geographic



Company:	Antero Resources	Local Co-ordinate Reference:	Well Left Fork 1H
Project:	Ritchie County WV	TVD Reference:	Patterson 347: 1021' GL + 25' KB @ 1046.0usft
Site:	Lockhart Heirs West Pad: Left Fork/Harris	MD Reference:	Patterson 347: 1021' GL + 25' KB @ 1046.0usft
Well:	Left Fork 1H	North Reference:	Grid
Wellbore:	ST1	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Antero NE

Project	Ritchie County WV, Ritchie County WV, WV North		
Map System:	Universal Transverse Mercator (US Survey Feet)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	Zone 17N (84 W to 78 W)		

Site	Lockhart Heirs West Pad: Left Fork/Harris, Site Center: Left Fork 1H				
Site Position:		Northing:	14,230,960.12 usft	Latitude:	39° 11' 22.372 N
From:	Map	Easting:	1,660,769.52 usft	Longitude:	80° 55' 41.406 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.05 °

Well	Left Fork 1H, Marcellus					
Well Position	+N/-S	0.0 usft	Northing:	14,230,960.12 usft	Latitude:	39° 11' 22.372 N
	+E/-W	0.0 usft	Easting:	1,660,769.52 usft	Longitude:	80° 55' 41.406 W
Position Uncertainty		2.0 usft	Wellhead Elevation:	1,046.0 usft	Ground Level:	1,021.0 usft

Wellbore	ST1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2015	3/29/2016	-8.44	66.63	52,022

Design	As Drilled				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	3,225.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	341.68	

Survey Program	Date	4/20/2016			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	3,225.0	Survey #7 - Final KOP Gyro (Original Well)	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4	
3,250.0	5,748.0	Survey #10 - Def Final Gyro Tangent (ST1)	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4	
5,622.0	16,201.0	Survey #11 - SDI MWD (ST1)	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)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.0	0.00	0.00	0.0	0.0	0.0	14,230,960.12	1,660,769.52	39° 11' 22.372 N	80° 55' 41.406 W
100.0	1.21	240.02	100.0	-0.5	-0.9	14,230,959.59	1,660,768.60	39° 11' 22.366 N	80° 55' 41.418 W
125.0	1.42	247.74	125.0	-0.8	-1.4	14,230,959.34	1,660,768.09	39° 11' 22.364 N	80° 55' 41.424 W
150.0	1.38	247.05	150.0	-1.0	-2.0	14,230,959.11	1,660,767.52	39° 11' 22.362 N	80° 55' 41.431 W
175.0	1.31	248.39	175.0	-1.2	-2.5	14,230,958.88	1,660,766.98	39° 11' 22.359 N	80° 55' 41.438 W
200.0	0.99	241.73	200.0	-1.4	-3.0	14,230,958.68	1,660,766.52	39° 11' 22.357 N	80° 55' 41.444 W
225.0	0.85	240.03	225.0	-1.6	-3.3	14,230,958.48	1,660,766.17	39° 11' 22.355 N	80° 55' 41.448 W
250.0	0.88	248.13	250.0	-1.8	-3.7	14,230,958.32	1,660,765.83	39° 11' 22.354 N	80° 55' 41.453 W
275.0	0.65	248.13	275.0	-1.9	-4.0	14,230,958.19	1,660,765.52	39° 11' 22.353 N	80° 55' 41.457 W
300.0	0.65	252.78	300.0	-2.0	-4.3	14,230,958.10	1,660,765.26	39° 11' 22.352 N	80° 55' 41.460 W



Scientific Drilling International
Survey Report - Geographic



Company: Antero Resources
Project: Ritchie County WV
Site: Lockhart Heirs West Pad: Left Fork/Harris
Well: Left Fork 1H
Wellbore: ST1
Design: As Drilled

Local Co-ordinate Reference: Well Left Fork 1H
TVD Reference: Patterson 347: 1021' GL + 25' KB @ 1046.0usft
MD Reference: Patterson 347: 1021' GL + 25' KB @ 1046.0usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Antero NE

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
325.0	0.63	258.01	325.0	-2.1	-4.5	14,230,958.03	1,660,764.99	39° 11' 22.351 N	80° 55' 41.463 W
350.0	0.64	251.88	350.0	-2.2	-4.8	14,230,957.96	1,660,764.72	39° 11' 22.350 N	80° 55' 41.467 W
375.0	0.35	247.40	375.0	-2.2	-5.0	14,230,957.88	1,660,764.52	39° 11' 22.350 N	80° 55' 41.469 W
400.0	0.33	243.62	400.0	-2.3	-5.1	14,230,957.82	1,660,764.38	39° 11' 22.349 N	80° 55' 41.471 W
425.0	0.20	238.89	425.0	-2.4	-5.2	14,230,957.77	1,660,764.28	39° 11' 22.348 N	80° 55' 41.472 W
450.0	0.20	227.80	450.0	-2.4	-5.3	14,230,957.72	1,660,764.21	39° 11' 22.348 N	80° 55' 41.473 W
475.0	0.20	235.91	475.0	-2.5	-5.4	14,230,957.66	1,660,764.14	39° 11' 22.347 N	80° 55' 41.474 W
500.0	0.21	231.44	500.0	-2.5	-5.4	14,230,957.61	1,660,764.07	39° 11' 22.347 N	80° 55' 41.475 W
525.0	0.20	240.52	525.0	-2.6	-5.5	14,230,957.56	1,660,764.00	39° 11' 22.346 N	80° 55' 41.476 W
550.0	0.19	233.21	550.0	-2.6	-5.6	14,230,957.51	1,660,763.92	39° 11' 22.346 N	80° 55' 41.477 W
575.0	0.19	226.75	575.0	-2.7	-5.7	14,230,957.46	1,660,763.86	39° 11' 22.345 N	80° 55' 41.478 W
600.0	0.20	241.41	600.0	-2.7	-5.7	14,230,957.41	1,660,763.79	39° 11' 22.345 N	80° 55' 41.479 W
625.0	0.21	227.35	625.0	-2.8	-5.8	14,230,957.36	1,660,763.72	39° 11' 22.344 N	80° 55' 41.480 W
650.0	0.44	211.76	650.0	-2.9	-5.9	14,230,957.24	1,660,763.64	39° 11' 22.343 N	80° 55' 41.481 W
675.0	1.02	213.86	674.9	-3.1	-6.1	14,230,956.98	1,660,763.46	39° 11' 22.341 N	80° 55' 41.483 W
700.0	1.25	208.35	699.9	-3.6	-6.3	14,230,956.55	1,660,763.21	39° 11' 22.336 N	80° 55' 41.486 W
725.0	1.40	210.28	724.9	-4.1	-6.6	14,230,956.05	1,660,762.93	39° 11' 22.331 N	80° 55' 41.490 W
750.0	1.95	208.79	749.9	-4.7	-6.9	14,230,955.41	1,660,762.57	39° 11' 22.325 N	80° 55' 41.494 W
775.0	2.47	209.21	774.9	-5.5	-7.4	14,230,954.57	1,660,762.10	39° 11' 22.317 N	80° 55' 41.500 W
800.0	2.68	209.71	799.9	-6.5	-8.0	14,230,953.59	1,660,761.55	39° 11' 22.307 N	80° 55' 41.507 W
825.0	3.14	205.43	824.8	-7.7	-8.6	14,230,952.47	1,660,760.96	39° 11' 22.296 N	80° 55' 41.515 W
850.0	3.47	205.98	849.8	-8.9	-9.2	14,230,951.17	1,660,760.34	39° 11' 22.283 N	80° 55' 41.523 W
875.0	4.16	203.63	874.8	-10.5	-9.9	14,230,949.66	1,660,759.64	39° 11' 22.268 N	80° 55' 41.531 W
900.0	4.87	200.96	899.7	-12.3	-10.6	14,230,947.84	1,660,758.90	39° 11' 22.250 N	80° 55' 41.541 W
925.0	5.16	200.34	924.6	-14.3	-11.4	14,230,945.79	1,660,758.13	39° 11' 22.230 N	80° 55' 41.551 W
950.0	5.86	198.15	949.5	-16.6	-12.2	14,230,943.52	1,660,757.34	39° 11' 22.208 N	80° 55' 41.561 W
975.0	6.43	196.91	974.3	-19.1	-13.0	14,230,940.97	1,660,756.54	39° 11' 22.182 N	80° 55' 41.571 W
1,000.0	6.48	196.71	999.2	-21.8	-13.8	14,230,938.28	1,660,755.72	39° 11' 22.156 N	80° 55' 41.581 W
1,025.0	6.74	196.44	1,024.0	-24.6	-14.6	14,230,935.52	1,660,754.90	39° 11' 22.129 N	80° 55' 41.592 W
1,050.0	7.33	197.78	1,048.8	-27.5	-15.5	14,230,932.60	1,660,754.00	39° 11' 22.100 N	80° 55' 41.603 W
1,075.0	7.53	197.29	1,073.6	-30.6	-16.5	14,230,929.51	1,660,753.03	39° 11' 22.069 N	80° 55' 41.616 W
1,100.0	7.59	196.77	1,098.4	-33.7	-17.5	14,230,926.37	1,660,752.06	39° 11' 22.038 N	80° 55' 41.628 W
1,125.0	7.71	197.54	1,123.2	-36.9	-18.4	14,230,923.19	1,660,751.08	39° 11' 22.007 N	80° 55' 41.641 W
1,150.0	7.90	196.85	1,147.9	-40.2	-19.4	14,230,919.95	1,660,750.08	39° 11' 21.975 N	80° 55' 41.653 W
1,175.0	7.96	196.56	1,172.7	-43.5	-20.4	14,230,916.64	1,660,749.09	39° 11' 21.942 N	80° 55' 41.666 W
1,200.0	7.98	196.53	1,197.4	-46.8	-21.4	14,230,913.32	1,660,748.10	39° 11' 21.909 N	80° 55' 41.679 W
1,225.0	8.06	196.12	1,222.2	-50.1	-22.4	14,230,909.97	1,660,747.12	39° 11' 21.876 N	80° 55' 41.691 W
1,250.0	8.04	196.24	1,247.0	-53.5	-23.4	14,230,906.61	1,660,746.14	39° 11' 21.843 N	80° 55' 41.703 W
1,275.0	7.91	195.03	1,271.7	-56.8	-24.3	14,230,903.27	1,660,745.21	39° 11' 21.810 N	80° 55' 41.715 W
1,300.0	8.03	192.64	1,296.5	-60.2	-25.1	14,230,899.91	1,660,744.38	39° 11' 21.776 N	80° 55' 41.726 W
1,325.0	8.07	192.27	1,321.2	-63.6	-25.9	14,230,896.49	1,660,743.62	39° 11' 21.743 N	80° 55' 41.736 W
1,350.0	8.07	191.71	1,346.0	-67.1	-26.6	14,230,893.05	1,660,742.90	39° 11' 21.709 N	80° 55' 41.745 W
1,375.0	8.11	191.66	1,370.7	-70.5	-27.3	14,230,889.61	1,660,742.18	39° 11' 21.675 N	80° 55' 41.754 W
1,400.0	8.11	191.36	1,395.5	-74.0	-28.0	14,230,886.15	1,660,741.48	39° 11' 21.640 N	80° 55' 41.763 W
1,425.0	8.06	190.47	1,420.2	-77.4	-28.7	14,230,882.70	1,660,740.81	39° 11' 21.606 N	80° 55' 41.771 W
1,450.0	7.89	190.79	1,445.0	-80.8	-29.3	14,230,879.29	1,660,740.17	39° 11' 21.573 N	80° 55' 41.780 W
1,475.0	7.72	190.53	1,469.8	-84.2	-30.0	14,230,875.95	1,660,739.55	39° 11' 21.540 N	80° 55' 41.788 W
1,500.0	7.78	190.26	1,494.5	-87.5	-30.6	14,230,872.64	1,660,738.94	39° 11' 21.507 N	80° 55' 41.795 W
1,525.0	7.91	190.23	1,519.3	-90.8	-31.2	14,230,869.28	1,660,738.33	39° 11' 21.474 N	80° 55' 41.803 W
1,550.0	8.11	189.91	1,544.0	-94.3	-31.8	14,230,865.85	1,660,737.72	39° 11' 21.440 N	80° 55' 41.811 W
1,575.0	8.01	188.99	1,568.8	-97.7	-32.4	14,230,862.39	1,660,737.15	39° 11' 21.406 N	80° 55' 41.818 W
1,600.0	7.65	184.63	1,593.6	-101.1	-32.8	14,230,859.01	1,660,736.74	39° 11' 21.372 N	80° 55' 41.823 W
1,625.0	7.36	182.43	1,618.4	-104.4	-33.0	14,230,855.76	1,660,736.54	39° 11' 21.340 N	80° 55' 41.826 W
1,650.0	7.10	179.40	1,643.2	-107.5	-33.0	14,230,852.61	1,660,736.49	39° 11' 21.309 N	80° 55' 41.827 W
1,675.0	6.86	174.86	1,668.0	-110.5	-32.9	14,230,849.58	1,660,736.64	39° 11' 21.279 N	80° 55' 41.825 W



Scientific Drilling International
Survey Report - Geographic



Company:	Antero Resources	Local Co-ordinate Reference:	Well Left Fork 1H
Project:	Ritchie County WV	TVD Reference:	Patterson 347: 1021' GL + 25' KB @ 1046.0usft
Site:	Lockhart Heirs West Pad: Left Fork/Harris	MD Reference:	Patterson 347: 1021' GL + 25' KB @ 1046.0usft
Well:	Left Fork 1H	North Reference:	Grid
Wellbore:	ST1	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Antero NE

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,700.0	6.65	169.89	1,692.8	-113.5	-32.5	14,230,846.67	1,660,737.02	39° 11' 21.250 N	80° 55' 41.820 W
1,725.0	6.46	166.70	1,717.6	-116.2	-31.9	14,230,843.87	1,660,737.60	39° 11' 21.222 N	80° 55' 41.813 W
1,750.0	6.55	166.67	1,742.5	-119.0	-31.3	14,230,841.12	1,660,738.25	39° 11' 21.195 N	80° 55' 41.804 W
1,775.0	6.39	171.39	1,767.3	-121.8	-30.7	14,230,838.35	1,660,738.79	39° 11' 21.168 N	80° 55' 41.798 W
1,800.0	6.24	175.99	1,792.2	-124.5	-30.4	14,230,835.62	1,660,739.09	39° 11' 21.141 N	80° 55' 41.794 W
1,825.0	6.34	176.08	1,817.0	-127.2	-30.2	14,230,832.89	1,660,739.28	39° 11' 21.114 N	80° 55' 41.791 W
1,850.0	6.28	181.01	1,841.9	-130.0	-30.2	14,230,830.15	1,660,739.35	39° 11' 21.087 N	80° 55' 41.790 W
1,875.0	5.87	191.48	1,866.7	-132.6	-30.4	14,230,827.53	1,660,739.07	39° 11' 21.061 N	80° 55' 41.794 W
1,900.0	5.97	195.34	1,891.6	-135.1	-31.0	14,230,825.02	1,660,738.48	39° 11' 21.036 N	80° 55' 41.802 W
1,925.0	5.87	197.25	1,916.5	-137.6	-31.8	14,230,822.55	1,660,737.75	39° 11' 21.012 N	80° 55' 41.811 W
1,950.0	6.05	199.10	1,941.3	-140.0	-32.6	14,230,820.08	1,660,736.94	39° 11' 20.987 N	80° 55' 41.821 W
1,975.0	6.24	198.32	1,966.2	-142.6	-33.4	14,230,817.54	1,660,736.09	39° 11' 20.962 N	80° 55' 41.832 W
2,000.0	6.34	198.71	1,991.0	-145.2	-34.3	14,230,814.95	1,660,735.22	39° 11' 20.936 N	80° 55' 41.843 W
2,025.0	6.28	199.42	2,015.9	-147.8	-35.2	14,230,812.35	1,660,734.32	39° 11' 20.911 N	80° 55' 41.855 W
2,050.0	5.84	199.76	2,040.7	-150.3	-36.1	14,230,809.86	1,660,733.43	39° 11' 20.886 N	80° 55' 41.866 W
2,075.0	5.07	198.18	2,065.6	-152.5	-36.9	14,230,807.62	1,660,732.66	39° 11' 20.864 N	80° 55' 41.876 W
2,100.0	4.62	196.26	2,090.5	-154.5	-37.5	14,230,805.60	1,660,732.03	39° 11' 20.844 N	80° 55' 41.884 W
2,125.0	4.26	193.74	2,115.5	-156.4	-38.0	14,230,803.73	1,660,731.53	39° 11' 20.826 N	80° 55' 41.890 W
2,150.0	4.06	192.07	2,140.4	-158.2	-38.4	14,230,801.97	1,660,731.12	39° 11' 20.808 N	80° 55' 41.895 W
2,175.0	3.89	191.39	2,165.3	-159.8	-38.7	14,230,800.27	1,660,730.77	39° 11' 20.791 N	80° 55' 41.900 W
2,200.0	3.90	190.26	2,190.3	-161.5	-39.1	14,230,798.60	1,660,730.45	39° 11' 20.775 N	80° 55' 41.904 W
2,225.0	3.51	190.49	2,215.2	-163.1	-39.4	14,230,797.01	1,660,730.16	39° 11' 20.759 N	80° 55' 41.908 W
2,250.0	3.46	191.05	2,240.2	-164.6	-39.6	14,230,795.52	1,660,729.88	39° 11' 20.744 N	80° 55' 41.911 W
2,275.0	3.47	189.89	2,265.1	-166.1	-39.9	14,230,794.03	1,660,729.60	39° 11' 20.730 N	80° 55' 41.915 W
2,300.0	2.84	190.90	2,290.1	-167.4	-40.2	14,230,792.68	1,660,729.36	39° 11' 20.716 N	80° 55' 41.918 W
2,325.0	2.62	190.87	2,315.1	-168.6	-40.4	14,230,791.51	1,660,729.13	39° 11' 20.705 N	80° 55' 41.921 W
2,350.0	2.14	195.04	2,340.0	-169.6	-40.6	14,230,790.50	1,660,728.90	39° 11' 20.695 N	80° 55' 41.924 W
2,375.0	1.73	196.53	2,365.0	-170.4	-40.8	14,230,789.69	1,660,728.67	39° 11' 20.687 N	80° 55' 41.927 W
2,400.0	1.63	197.74	2,390.0	-171.1	-41.1	14,230,788.99	1,660,728.46	39° 11' 20.680 N	80° 55' 41.929 W
2,425.0	0.70	183.80	2,415.0	-171.6	-41.2	14,230,788.49	1,660,728.34	39° 11' 20.675 N	80° 55' 41.931 W
2,450.0	0.34	114.02	2,440.0	-171.8	-41.1	14,230,788.31	1,660,728.40	39° 11' 20.673 N	80° 55' 41.930 W
2,475.0	0.59	44.94	2,465.0	-171.7	-41.0	14,230,788.37	1,660,728.56	39° 11' 20.674 N	80° 55' 41.928 W
2,500.0	0.72	45.97	2,490.0	-171.5	-40.8	14,230,788.57	1,660,728.76	39° 11' 20.676 N	80° 55' 41.925 W
2,525.0	0.81	28.21	2,515.0	-171.3	-40.6	14,230,788.84	1,660,728.96	39° 11' 20.678 N	80° 55' 41.923 W
2,550.0	1.04	20.63	2,540.0	-170.9	-40.4	14,230,789.21	1,660,729.12	39° 11' 20.682 N	80° 55' 41.921 W
2,575.0	1.14	20.64	2,565.0	-170.5	-40.2	14,230,789.65	1,660,729.29	39° 11' 20.686 N	80° 55' 41.919 W
2,600.0	1.07	31.27	2,590.0	-170.0	-40.0	14,230,790.08	1,660,729.50	39° 11' 20.691 N	80° 55' 41.916 W
2,625.0	1.00	26.71	2,615.0	-169.6	-39.8	14,230,790.48	1,660,729.72	39° 11' 20.695 N	80° 55' 41.913 W
2,650.0	0.66	21.77	2,640.0	-169.3	-39.6	14,230,790.81	1,660,729.87	39° 11' 20.698 N	80° 55' 41.911 W
2,675.0	0.22	265.37	2,665.0	-169.2	-39.6	14,230,790.94	1,660,729.87	39° 11' 20.699 N	80° 55' 41.911 W
2,700.0	0.26	254.75	2,690.0	-169.2	-39.7	14,230,790.92	1,660,729.77	39° 11' 20.699 N	80° 55' 41.913 W
2,725.0	0.24	219.29	2,715.0	-169.3	-39.8	14,230,790.86	1,660,729.68	39° 11' 20.698 N	80° 55' 41.914 W
2,750.0	0.24	220.55	2,740.0	-169.3	-39.9	14,230,790.78	1,660,729.61	39° 11' 20.698 N	80° 55' 41.915 W
2,775.0	0.19	294.35	2,765.0	-169.4	-40.0	14,230,790.76	1,660,729.54	39° 11' 20.697 N	80° 55' 41.916 W
2,800.0	0.32	328.57	2,790.0	-169.3	-40.0	14,230,790.84	1,660,729.47	39° 11' 20.698 N	80° 55' 41.916 W
2,825.0	0.29	333.34	2,815.0	-169.2	-40.1	14,230,790.95	1,660,729.40	39° 11' 20.699 N	80° 55' 41.917 W
2,850.0	0.38	346.55	2,840.0	-169.0	-40.2	14,230,791.09	1,660,729.36	39° 11' 20.701 N	80° 55' 41.918 W
2,875.0	0.26	348.31	2,865.0	-168.9	-40.2	14,230,791.22	1,660,729.33	39° 11' 20.702 N	80° 55' 41.918 W
2,900.0	0.41	335.06	2,890.0	-168.8	-40.2	14,230,791.36	1,660,729.28	39° 11' 20.703 N	80° 55' 41.919 W
2,925.0	0.36	338.08	2,915.0	-168.6	-40.3	14,230,791.52	1,660,729.21	39° 11' 20.705 N	80° 55' 41.920 W
2,950.0	0.36	335.16	2,940.0	-168.5	-40.4	14,230,791.66	1,660,729.15	39° 11' 20.706 N	80° 55' 41.921 W
2,975.0	0.33	337.37	2,965.0	-168.3	-40.4	14,230,791.80	1,660,729.09	39° 11' 20.708 N	80° 55' 41.921 W
3,000.0	0.30	337.96	2,990.0	-168.2	-40.5	14,230,791.92	1,660,729.03	39° 11' 20.709 N	80° 55' 41.922 W
3,025.0	0.26	338.66	3,015.0	-168.1	-40.5	14,230,792.04	1,660,728.99	39° 11' 20.710 N	80° 55' 41.923 W
3,050.0	0.33	347.13	3,040.0	-168.0	-40.6	14,230,792.16	1,660,728.95	39° 11' 20.711 N	80° 55' 41.923 W



Scientific Drilling International
Survey Report - Geographic



Company:	Antero Resources	Local Co-ordinate Reference:	Well Left Fork 1H
Project:	Ritchie County WV	TVD Reference:	Patterson 347: 1021' GL + 25' KB @ 1046.0usft
Site:	Lockhart Heirs West Pad: Left Fork/Harris	MD Reference:	Patterson 347: 1021' GL + 25' KB @ 1046.0usft
Well:	Left Fork 1H	North Reference:	Grid
Wellbore:	ST1	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Antero NE

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
3,075.0	0.34	11.46	3,065.0	-167.8	-40.6	14,230,792.30	1,660,728.95	39° 11' 20.713 N	80° 55' 41.923 W
3,100.0	0.42	22.52	3,090.0	-167.7	-40.5	14,230,792.46	1,660,729.00	39° 11' 20.714 N	80° 55' 41.922 W
3,125.0	0.61	25.73	3,115.0	-167.5	-40.4	14,230,792.67	1,660,729.09	39° 11' 20.716 N	80° 55' 41.921 W
3,150.0	0.68	26.29	3,140.0	-167.2	-40.3	14,230,792.92	1,660,729.22	39° 11' 20.719 N	80° 55' 41.920 W
3,175.0	0.77	28.99	3,165.0	-166.9	-40.2	14,230,793.20	1,660,729.36	39° 11' 20.721 N	80° 55' 41.918 W
3,200.0	0.84	23.86	3,190.0	-166.6	-40.0	14,230,793.51	1,660,729.52	39° 11' 20.725 N	80° 55' 41.916 W
3,225.0	0.85	23.19	3,215.0	-166.3	-39.8	14,230,793.85	1,660,729.67	39° 11' 20.728 N	80° 55' 41.914 W
3,250.0	0.81	21.13	3,240.0	-165.9	-39.7	14,230,794.19	1,660,729.80	39° 11' 20.731 N	80° 55' 41.912 W
3,275.0	0.93	25.76	3,265.0	-165.6	-39.6	14,230,794.53	1,660,729.96	39° 11' 20.735 N	80° 55' 41.910 W
3,300.0	0.82	20.17	3,290.0	-165.2	-39.4	14,230,794.88	1,660,730.11	39° 11' 20.738 N	80° 55' 41.908 W
3,325.0	0.74	19.10	3,315.0	-164.9	-39.3	14,230,795.20	1,660,730.22	39° 11' 20.741 N	80° 55' 41.907 W
3,350.0	0.44	36.61	3,340.0	-164.7	-39.2	14,230,795.43	1,660,730.33	39° 11' 20.744 N	80° 55' 41.905 W
3,375.0	0.10	118.60	3,365.0	-164.6	-39.1	14,230,795.50	1,660,730.41	39° 11' 20.744 N	80° 55' 41.904 W
3,400.0	0.16	142.89	3,390.0	-164.7	-39.1	14,230,795.46	1,660,730.45	39° 11' 20.744 N	80° 55' 41.904 W
3,425.0	1.45	188.62	3,415.0	-165.0	-39.1	14,230,795.12	1,660,730.42	39° 11' 20.740 N	80° 55' 41.904 W
3,450.0	6.57	208.49	3,439.9	-166.6	-39.8	14,230,793.55	1,660,729.69	39° 11' 20.725 N	80° 55' 41.914 W
3,475.0	9.66	212.62	3,464.6	-169.6	-41.6	14,230,790.53	1,660,727.88	39° 11' 20.695 N	80° 55' 41.937 W
3,500.0	9.99	211.94	3,489.3	-173.2	-43.9	14,230,786.92	1,660,725.60	39° 11' 20.659 N	80° 55' 41.966 W
3,525.0	9.88	211.44	3,513.9	-176.9	-46.2	14,230,783.25	1,660,723.33	39° 11' 20.623 N	80° 55' 41.994 W
3,550.0	9.29	210.10	3,538.5	-180.4	-48.3	14,230,779.67	1,660,721.20	39° 11' 20.588 N	80° 55' 42.022 W
3,575.0	7.87	208.52	3,563.3	-183.7	-50.1	14,230,776.42	1,660,719.37	39° 11' 20.556 N	80° 55' 42.045 W
3,600.0	6.82	207.84	3,588.1	-186.5	-51.7	14,230,773.61	1,660,717.86	39° 11' 20.528 N	80° 55' 42.064 W
3,625.0	5.24	210.16	3,612.9	-188.8	-52.9	14,230,771.31	1,660,716.60	39° 11' 20.505 N	80° 55' 42.080 W
3,650.0	4.31	212.22	3,637.8	-190.6	-54.0	14,230,769.53	1,660,715.52	39° 11' 20.488 N	80° 55' 42.094 W
3,675.0	3.52	213.40	3,662.8	-192.0	-54.9	14,230,768.09	1,660,714.60	39° 11' 20.473 N	80° 55' 42.106 W
3,700.0	2.98	215.14	3,687.7	-193.2	-55.7	14,230,766.92	1,660,713.80	39° 11' 20.462 N	80° 55' 42.116 W
3,725.0	2.64	215.01	3,712.7	-194.2	-56.4	14,230,765.92	1,660,713.10	39° 11' 20.452 N	80° 55' 42.125 W
3,750.0	2.43	214.37	3,737.7	-195.1	-57.0	14,230,765.01	1,660,712.47	39° 11' 20.443 N	80° 55' 42.133 W
3,775.0	2.28	215.69	3,762.7	-196.0	-57.6	14,230,764.17	1,660,711.88	39° 11' 20.435 N	80° 55' 42.140 W
3,800.0	2.12	212.55	3,787.6	-196.7	-58.2	14,230,763.37	1,660,711.34	39° 11' 20.427 N	80° 55' 42.147 W
3,825.0	1.83	212.60	3,812.6	-197.5	-58.6	14,230,762.65	1,660,710.88	39° 11' 20.420 N	80° 55' 42.153 W
3,850.0	1.69	212.49	3,837.6	-198.1	-59.1	14,230,762.00	1,660,710.46	39° 11' 20.413 N	80° 55' 42.158 W
3,875.0	1.66	214.89	3,862.6	-198.7	-59.5	14,230,761.39	1,660,710.06	39° 11' 20.407 N	80° 55' 42.163 W
3,900.0	1.91	225.19	3,887.6	-199.3	-60.0	14,230,760.80	1,660,709.55	39° 11' 20.401 N	80° 55' 42.170 W
3,925.0	2.11	228.40	3,912.6	-199.9	-60.6	14,230,760.20	1,660,708.91	39° 11' 20.395 N	80° 55' 42.178 W
3,950.0	2.15	227.07	3,937.6	-200.5	-61.3	14,230,759.58	1,660,708.23	39° 11' 20.389 N	80° 55' 42.187 W
3,975.0	2.38	226.21	3,962.5	-201.2	-62.0	14,230,758.90	1,660,707.51	39° 11' 20.382 N	80° 55' 42.196 W
4,000.0	3.17	231.04	3,987.5	-202.0	-62.9	14,230,758.10	1,660,706.60	39° 11' 20.375 N	80° 55' 42.207 W
4,025.0	3.67	231.89	4,012.5	-202.9	-64.1	14,230,757.17	1,660,705.43	39° 11' 20.365 N	80° 55' 42.222 W
4,050.0	3.68	230.07	4,037.4	-204.0	-65.3	14,230,756.17	1,660,704.18	39° 11' 20.355 N	80° 55' 42.238 W
4,075.0	3.50	230.31	4,062.4	-205.0	-66.5	14,230,755.16	1,660,702.98	39° 11' 20.346 N	80° 55' 42.253 W
4,100.0	3.21	228.80	4,087.3	-205.9	-67.6	14,230,754.22	1,660,701.87	39° 11' 20.336 N	80° 55' 42.267 W
4,125.0	2.91	225.55	4,112.3	-206.8	-68.6	14,230,753.31	1,660,700.89	39° 11' 20.327 N	80° 55' 42.280 W
4,150.0	2.78	224.14	4,137.3	-207.7	-69.5	14,230,752.43	1,660,700.01	39° 11' 20.319 N	80° 55' 42.291 W
4,175.0	3.17	232.05	4,162.2	-208.5	-70.5	14,230,751.57	1,660,699.05	39° 11' 20.310 N	80° 55' 42.303 W
4,200.0	4.10	237.36	4,187.2	-209.5	-71.8	14,230,750.66	1,660,697.75	39° 11' 20.301 N	80° 55' 42.320 W
4,225.0	4.71	240.28	4,212.1	-210.4	-73.4	14,230,749.67	1,660,696.10	39° 11' 20.291 N	80° 55' 42.341 W
4,250.0	4.61	239.56	4,237.0	-211.5	-75.2	14,230,748.65	1,660,694.35	39° 11' 20.281 N	80° 55' 42.363 W
4,275.0	4.22	239.09	4,261.9	-212.4	-76.8	14,230,747.67	1,660,692.69	39° 11' 20.272 N	80° 55' 42.384 W
4,300.0	3.78	237.81	4,286.9	-213.4	-78.3	14,230,746.76	1,660,691.21	39° 11' 20.263 N	80° 55' 42.403 W
4,325.0	3.61	235.81	4,311.8	-214.2	-79.7	14,230,745.88	1,660,689.86	39° 11' 20.254 N	80° 55' 42.420 W
4,350.0	3.71	235.55	4,336.8	-215.1	-81.0	14,230,744.98	1,660,688.54	39° 11' 20.245 N	80° 55' 42.437 W
4,375.0	4.52	235.37	4,361.7	-216.2	-82.5	14,230,743.96	1,660,687.06	39° 11' 20.235 N	80° 55' 42.456 W
4,400.0	5.36	232.64	4,386.6	-217.4	-84.2	14,230,742.69	1,660,685.32	39° 11' 20.222 N	80° 55' 42.478 W
4,425.0	5.31	231.84	4,411.5	-218.8	-86.0	14,230,741.27	1,660,683.48	39° 11' 20.208 N	80° 55' 42.501 W



Scientific Drilling International
Survey Report - Geographic



Company: Antero Resources
Project: Ritchie County WV
Site: Lockhart Heirs West Pad: Left Fork/Harris
Well: Left Fork 1H
Wellbore: ST1
Design: As Drilled

Local Co-ordinate Reference: Well Left Fork 1H
TVD Reference: Patterson 347: 1021' GL + 25' KB @ 1046.0usft
MD Reference: Patterson 347: 1021' GL + 25' KB @ 1046.0usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Antero NE

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
4,450.0	5.03	230.63	4,436.4	-220.3	-87.8	14,230,739.86	1,660,681.73	39° 11' 20.194 N	80° 55' 42.524 W
4,475.0	4.53	230.53	4,461.3	-221.6	-89.4	14,230,738.54	1,660,680.12	39° 11' 20.181 N	80° 55' 42.544 W
4,500.0	4.06	231.48	4,486.2	-222.8	-90.9	14,230,737.36	1,660,678.66	39° 11' 20.170 N	80° 55' 42.562 W
4,525.0	3.80	233.63	4,511.2	-223.8	-92.2	14,230,736.32	1,660,677.30	39° 11' 20.159 N	80° 55' 42.580 W
4,550.0	4.07	233.64	4,536.1	-224.8	-93.6	14,230,735.30	1,660,675.92	39° 11' 20.149 N	80° 55' 42.597 W
4,575.0	4.58	238.04	4,561.1	-225.9	-95.2	14,230,734.25	1,660,674.36	39° 11' 20.139 N	80° 55' 42.617 W
4,600.0	5.14	240.48	4,586.0	-227.0	-97.0	14,230,733.17	1,660,672.54	39° 11' 20.128 N	80° 55' 42.640 W
4,625.0	5.06	239.36	4,610.9	-228.1	-98.9	14,230,732.05	1,660,670.62	39° 11' 20.117 N	80° 55' 42.665 W
4,650.0	4.61	239.77	4,635.8	-229.1	-100.7	14,230,730.98	1,660,668.80	39° 11' 20.107 N	80° 55' 42.688 W
4,675.0	4.14	238.03	4,660.7	-230.1	-102.3	14,230,730.00	1,660,667.17	39° 11' 20.097 N	80° 55' 42.709 W
4,700.0	3.83	237.01	4,685.6	-231.0	-103.8	14,230,729.07	1,660,665.70	39° 11' 20.088 N	80° 55' 42.727 W
4,725.0	3.62	237.35	4,710.6	-231.9	-105.2	14,230,728.19	1,660,664.34	39° 11' 20.079 N	80° 55' 42.745 W
4,750.0	3.84	232.88	4,735.5	-232.9	-106.5	14,230,727.26	1,660,663.00	39° 11' 20.070 N	80° 55' 42.762 W
4,775.0	4.51	225.70	4,760.5	-234.1	-107.9	14,230,726.06	1,660,661.63	39° 11' 20.058 N	80° 55' 42.779 W
4,800.0	4.59	221.55	4,785.4	-235.5	-109.2	14,230,724.63	1,660,660.27	39° 11' 20.044 N	80° 55' 42.796 W
4,825.0	4.31	218.92	4,810.3	-237.0	-110.5	14,230,723.15	1,660,659.01	39° 11' 20.029 N	80° 55' 42.812 W
4,850.0	3.94	219.58	4,835.3	-238.4	-111.6	14,230,721.76	1,660,657.88	39° 11' 20.016 N	80° 55' 42.827 W
4,875.0	3.81	218.77	4,860.2	-239.7	-112.7	14,230,720.45	1,660,656.81	39° 11' 20.003 N	80° 55' 42.840 W
4,900.0	3.39	216.61	4,885.1	-240.9	-113.7	14,230,719.21	1,660,655.85	39° 11' 19.990 N	80° 55' 42.853 W
4,925.0	3.43	219.79	4,910.1	-242.1	-114.6	14,230,718.04	1,660,654.93	39° 11' 19.979 N	80° 55' 42.864 W
4,950.0	4.17	222.58	4,935.1	-243.3	-115.7	14,230,716.80	1,660,653.83	39° 11' 19.967 N	80° 55' 42.878 W
4,975.0	4.49	226.10	4,960.0	-244.7	-117.0	14,230,715.45	1,660,652.51	39° 11' 19.953 N	80° 55' 42.895 W
5,000.0	4.50	226.33	4,984.9	-246.0	-118.4	14,230,714.09	1,660,651.10	39° 11' 19.940 N	80° 55' 42.913 W
5,025.0	4.20	227.33	5,009.8	-247.3	-119.8	14,230,712.79	1,660,649.72	39° 11' 19.927 N	80° 55' 42.931 W
5,050.0	3.79	231.17	5,034.8	-248.5	-121.1	14,230,711.66	1,660,648.40	39° 11' 19.916 N	80° 55' 42.947 W
5,075.0	3.57	231.94	5,059.7	-249.5	-122.4	14,230,710.66	1,660,647.14	39° 11' 19.906 N	80° 55' 42.963 W
5,100.0	3.65	232.72	5,084.7	-250.4	-123.6	14,230,709.70	1,660,645.90	39° 11' 19.896 N	80° 55' 42.979 W
5,125.0	4.56	236.29	5,109.6	-251.5	-125.1	14,230,708.66	1,660,644.44	39° 11' 19.886 N	80° 55' 42.998 W
5,150.0	5.99	239.95	5,134.5	-252.7	-127.0	14,230,707.46	1,660,642.48	39° 11' 19.874 N	80° 55' 43.023 W
5,175.0	6.67	240.29	5,159.3	-254.0	-129.4	14,230,706.08	1,660,640.09	39° 11' 19.861 N	80° 55' 43.053 W
5,200.0	6.63	238.92	5,184.2	-255.5	-131.9	14,230,704.62	1,660,637.59	39° 11' 19.846 N	80° 55' 43.085 W
5,225.0	6.27	237.67	5,209.0	-257.0	-134.3	14,230,703.14	1,660,635.20	39° 11' 19.832 N	80° 55' 43.115 W
5,250.0	5.67	237.99	5,233.9	-258.4	-136.5	14,230,701.76	1,660,633.00	39° 11' 19.818 N	80° 55' 43.143 W
5,275.0	5.16	238.71	5,258.8	-259.6	-138.5	14,230,700.52	1,660,631.00	39° 11' 19.806 N	80° 55' 43.168 W
5,300.0	4.77	235.64	5,283.7	-260.8	-140.3	14,230,699.35	1,660,629.18	39° 11' 19.794 N	80° 55' 43.192 W
5,325.0	4.82	232.67	5,308.6	-262.0	-142.0	14,230,698.13	1,660,627.48	39° 11' 19.782 N	80° 55' 43.213 W
5,350.0	4.67	228.68	5,333.5	-263.3	-143.6	14,230,696.82	1,660,625.88	39° 11' 19.769 N	80° 55' 43.233 W
5,375.0	4.28	229.42	5,358.4	-264.6	-145.1	14,230,695.54	1,660,624.41	39° 11' 19.757 N	80° 55' 43.252 W
5,400.0	4.55	226.02	5,383.4	-265.9	-146.5	14,230,694.24	1,660,622.99	39° 11' 19.744 N	80° 55' 43.270 W
5,425.0	5.82	225.80	5,408.3	-267.4	-148.1	14,230,692.67	1,660,621.37	39° 11' 19.728 N	80° 55' 43.291 W
5,450.0	6.35	226.54	5,433.1	-269.3	-150.1	14,230,690.84	1,660,619.46	39° 11' 19.710 N	80° 55' 43.315 W
5,475.0	6.20	226.57	5,458.0	-271.2	-152.0	14,230,688.96	1,660,617.47	39° 11' 19.692 N	80° 55' 43.340 W
5,500.0	5.52	225.98	5,482.8	-272.9	-153.9	14,230,687.19	1,660,615.63	39° 11' 19.674 N	80° 55' 43.364 W
5,525.0	4.68	226.36	5,507.7	-274.5	-155.5	14,230,685.65	1,660,614.02	39° 11' 19.659 N	80° 55' 43.384 W
5,550.0	3.98	226.21	5,532.7	-275.8	-156.9	14,230,684.35	1,660,612.66	39° 11' 19.646 N	80° 55' 43.402 W
5,575.0	3.59	224.16	5,557.6	-276.9	-158.0	14,230,683.19	1,660,611.49	39° 11' 19.635 N	80° 55' 43.417 W
5,600.0	4.32	221.19	5,582.5	-278.2	-159.2	14,230,681.92	1,660,610.32	39° 11' 19.622 N	80° 55' 43.431 W
5,622.0	4.34	225.63	5,604.5	-279.4	-160.3	14,230,680.71	1,660,609.18	39° 11' 19.610 N	80° 55' 43.446 W
First SDI MWD @ 5622									
5,717.0	3.41	230.25	5,699.3	-283.7	-165.1	14,230,676.39	1,660,604.44	39° 11' 19.567 N	80° 55' 43.506 W
5,777.0	2.71	240.99	5,759.2	-285.6	-167.7	14,230,674.56	1,660,601.83	39° 11' 19.549 N	80° 55' 43.539 W
5,808.0	2.79	239.53	5,790.1	-286.3	-169.0	14,230,673.83	1,660,600.54	39° 11' 19.542 N	80° 55' 43.556 W
5,839.0	2.64	247.45	5,821.1	-286.9	-170.3	14,230,673.17	1,660,599.23	39° 11' 19.536 N	80° 55' 43.572 W
5,871.0	3.21	284.68	5,853.1	-287.0	-171.8	14,230,673.11	1,660,597.68	39° 11' 19.535 N	80° 55' 43.592 W
5,903.0	4.60	307.25	5,885.0	-286.0	-173.7	14,230,674.12	1,660,595.79	39° 11' 19.545 N	80° 55' 43.616 W



Scientific Drilling International
Survey Report - Geographic



Company: Antero Resources
Project: Ritchie County WV
Site: Lockhart Heirs West Pad: Left Fork/Harris
Well: Left Fork 1H
Wellbore: ST1
Design: As Drilled

Local Co-ordinate Reference: Well Left Fork 1H
TVD Reference: Patterson 347: 1021' GL + 25' KB @ 1046.0usft
MD Reference: Patterson 347: 1021' GL + 25' KB @ 1046.0usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Antero NE

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	→E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,934.0	8.24	309.38	5,915.8	-283.8	-176.4	14,230,676.28	1,660,593.08	39° 11' 19.566 N	80° 55' 43.650 W
5,965.0	13.10	308.39	5,946.3	-280.2	-180.9	14,230,679.87	1,660,588.61	39° 11' 19.602 N	80° 55' 43.707 W
5,997.0	17.42	314.35	5,977.1	-274.6	-187.2	14,230,685.48	1,660,582.34	39° 11' 19.657 N	80° 55' 43.787 W
6,028.0	21.65	319.80	6,006.3	-267.0	-194.2	14,230,693.09	1,660,575.33	39° 11' 19.733 N	80° 55' 43.876 W
6,060.0	25.69	321.16	6,035.6	-257.1	-202.4	14,230,703.01	1,660,567.16	39° 11' 19.831 N	80° 55' 43.980 W
6,091.0	29.55	322.25	6,063.1	-245.8	-211.3	14,230,714.29	1,660,558.26	39° 11' 19.943 N	80° 55' 44.092 W
6,123.0	33.39	322.72	6,090.4	-232.6	-221.4	14,230,727.54	1,660,548.10	39° 11' 20.074 N	80° 55' 44.222 W
6,154.0	35.38	323.89	6,116.0	-218.5	-231.9	14,230,741.58	1,660,537.64	39° 11' 20.213 N	80° 55' 44.354 W
6,185.0	35.76	327.60	6,141.2	-203.6	-242.0	14,230,756.48	1,660,527.50	39° 11' 20.360 N	80° 55' 44.483 W
6,217.0	37.20	329.90	6,166.9	-187.4	-251.9	14,230,772.75	1,660,517.63	39° 11' 20.521 N	80° 55' 44.608 W
6,220.0	37.45	330.05	6,169.3	-185.8	-252.8	14,230,774.32	1,660,516.72	39° 11' 20.536 N	80° 55' 44.620 W
Middlesex @ 6220									
6,248.0	39.78	331.34	6,191.2	-170.6	-261.3	14,230,789.56	1,660,508.17	39° 11' 20.687 N	80° 55' 44.728 W
6,279.0	44.27	332.60	6,214.2	-152.2	-271.1	14,230,807.88	1,660,498.43	39° 11' 20.868 N	80° 55' 44.852 W
6,310.0	49.10	333.62	6,235.5	-132.1	-281.3	14,230,827.99	1,660,488.24	39° 11' 21.067 N	80° 55' 44.981 W
6,342.0	54.22	334.29	6,255.3	-109.6	-292.3	14,230,850.54	1,660,477.23	39° 11' 21.290 N	80° 55' 45.121 W
6,373.0	58.88	335.13	6,272.4	-86.2	-303.3	14,230,873.92	1,660,466.19	39° 11' 21.522 N	80° 55' 45.261 W
6,380.0	59.60	335.48	6,276.0	-80.7	-305.8	14,230,879.38	1,660,463.68	39° 11' 21.576 N	80° 55' 45.293 W
Burket @ 6380									
6,405.0	62.20	336.67	6,288.1	-60.8	-314.7	14,230,899.35	1,660,454.82	39° 11' 21.773 N	80° 55' 45.405 W
6,436.0	65.17	338.27	6,301.9	-35.1	-325.3	14,230,925.01	1,660,444.18	39° 11' 22.027 N	80° 55' 45.540 W
6,450.0	66.53	338.60	6,307.6	-23.2	-330.0	14,230,936.89	1,660,439.48	39° 11' 22.145 N	80° 55' 45.599 W
Tully @ 6450									
6,467.0	68.19	338.99	6,314.1	-8.6	-335.7	14,230,951.52	1,660,433.81	39° 11' 22.289 N	80° 55' 45.671 W
6,499.0	72.70	339.11	6,324.8	19.6	-346.5	14,230,979.67	1,660,423.03	39° 11' 22.568 N	80° 55' 45.808 W
6,501.0	72.99	339.14	6,325.4	21.3	-347.2	14,230,981.46	1,660,422.35	39° 11' 22.585 N	80° 55' 45.817 W
Marcellus @ 6501									
6,530.0	77.14	339.60	6,332.9	47.6	-357.0	14,231,007.68	1,660,412.48	39° 11' 22.845 N	80° 55' 45.942 W
6,561.0	81.89	339.93	6,338.5	76.2	-367.6	14,231,036.27	1,660,401.94	39° 11' 23.127 N	80° 55' 46.075 W
6,593.0	86.03	339.89	6,341.9	106.0	-378.5	14,231,066.15	1,660,391.01	39° 11' 23.423 N	80° 55' 46.214 W
6,625.0	89.36	339.54	6,343.2	136.0	-389.6	14,231,096.14	1,660,379.93	39° 11' 23.720 N	80° 55' 46.355 W
6,687.0	90.47	339.66	6,343.3	194.1	-411.2	14,231,154.25	1,660,358.32	39° 11' 24.294 N	80° 55' 46.629 W
6,781.0	90.30	340.85	6,342.7	282.6	-443.0	14,231,242.72	1,660,326.56	39° 11' 25.169 N	80° 55' 47.031 W
6,875.0	90.27	341.80	6,342.2	371.6	-473.1	14,231,331.77	1,660,296.46	39° 11' 26.050 N	80° 55' 47.413 W
6,969.0	90.54	342.51	6,341.5	461.1	-501.9	14,231,421.24	1,660,267.66	39° 11' 26.935 N	80° 55' 47.778 W
7,063.0	89.66	340.96	6,341.4	550.4	-531.3	14,231,510.50	1,660,238.20	39° 11' 27.818 N	80° 55' 48.151 W
7,158.0	89.19	341.98	6,342.3	640.5	-561.5	14,231,600.57	1,660,208.01	39° 11' 28.709 N	80° 55' 48.534 W
7,252.0	88.52	341.41	6,344.2	729.7	-591.0	14,231,689.80	1,660,178.49	39° 11' 29.591 N	80° 55' 48.908 W
7,346.0	89.39	341.59	6,345.9	818.8	-620.8	14,231,778.92	1,660,148.67	39° 11' 30.473 N	80° 55' 49.286 W
7,440.0	89.03	342.22	6,347.2	908.1	-650.0	14,231,868.26	1,660,119.48	39° 11' 31.356 N	80° 55' 49.656 W
7,534.0	89.20	342.07	6,348.7	997.6	-678.9	14,231,957.73	1,660,090.66	39° 11' 32.241 N	80° 55' 50.021 W
7,628.0	88.76	341.80	6,350.3	1,087.0	-708.0	14,232,047.08	1,660,061.52	39° 11' 33.125 N	80° 55' 50.391 W
7,722.0	89.73	342.55	6,351.6	1,176.4	-736.8	14,232,136.56	1,660,032.75	39° 11' 34.010 N	80° 55' 50.756 W
7,816.0	89.50	341.88	6,352.2	1,265.9	-765.5	14,232,226.06	1,660,004.04	39° 11' 34.895 N	80° 55' 51.120 W
7,910.0	89.93	341.53	6,352.7	1,355.2	-795.0	14,232,315.31	1,659,974.53	39° 11' 35.778 N	80° 55' 51.494 W
8,004.0	90.67	341.10	6,352.2	1,444.2	-825.1	14,232,404.35	1,659,944.42	39° 11' 36.658 N	80° 55' 51.875 W
8,099.0	90.30	343.21	6,351.4	1,534.7	-854.2	14,232,494.77	1,659,915.31	39° 11' 37.553 N	80° 55' 52.244 W
8,193.0	89.73	343.06	6,351.3	1,624.6	-881.5	14,232,584.73	1,659,888.04	39° 11' 38.442 N	80° 55' 52.590 W
8,286.0	89.50	342.32	6,352.0	1,713.4	-909.2	14,232,673.51	1,659,860.36	39° 11' 39.320 N	80° 55' 52.941 W
8,380.0	90.10	343.04	6,352.3	1,803.1	-937.1	14,232,763.25	1,659,832.38	39° 11' 40.208 N	80° 55' 53.295 W
8,474.0	90.10	343.46	6,352.1	1,893.1	-964.2	14,232,853.26	1,659,805.29	39° 11' 41.098 N	80° 55' 53.639 W
8,568.0	90.10	342.96	6,352.0	1,983.1	-991.4	14,232,943.25	1,659,778.14	39° 11' 41.988 N	80° 55' 53.983 W
8,662.0	90.07	342.51	6,351.8	2,072.9	-1,019.3	14,233,033.02	1,659,750.24	39° 11' 42.876 N	80° 55' 54.337 W
8,756.0	89.83	342.78	6,351.9	2,162.6	-1,047.3	14,233,122.74	1,659,722.20	39° 11' 43.763 N	80° 55' 54.692 W

Company: Antero Resources
Project: Ritchie County WV
Site: Lockhart Heirs West Pad: Left Fork/Harris
Well: Left Fork 1H
Wellbore: ST1
Design: As Drilled

Local Co-ordinate Reference: Well Left Fork 1H
TVD Reference: Patterson 347: 1021' GL + 25' KB @ 1046.0usft
MD Reference: Patterson 347: 1021' GL + 25' KB @ 1046.0usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Antero NE

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
8,850.0	89.83	343.06	6,352.2	2,252.5	-1,074.9	14,233,212.59	1,659,694.59	39° 11' 44.652 N	80° 55' 55.042 W
8,944.0	89.80	342.56	6,352.5	2,342.3	-1,102.7	14,233,302.39	1,659,666.81	39° 11' 45.540 N	80° 55' 55.394 W
9,038.0	89.16	341.92	6,353.3	2,431.8	-1,131.4	14,233,391.91	1,659,638.14	39° 11' 46.425 N	80° 55' 55.758 W
9,133.0	90.07	341.64	6,354.0	2,522.0	-1,161.1	14,233,482.14	1,659,608.44	39° 11' 47.318 N	80° 55' 56.134 W
9,227.0	89.70	340.58	6,354.2	2,611.0	-1,191.5	14,233,571.08	1,659,578.00	39° 11' 48.197 N	80° 55' 56.520 W
9,321.0	91.17	340.94	6,353.5	2,699.7	-1,222.5	14,233,659.82	1,659,547.03	39° 11' 49.075 N	80° 55' 56.913 W
9,415.0	91.27	340.37	6,351.5	2,788.4	-1,253.6	14,233,748.50	1,659,515.90	39° 11' 49.952 N	80° 55' 57.307 W
9,509.0	89.43	338.79	6,350.9	2,876.5	-1,286.4	14,233,836.58	1,659,483.11	39° 11' 50.823 N	80° 55' 57.723 W
9,603.0	89.63	341.63	6,351.7	2,964.9	-1,318.2	14,233,925.02	1,659,451.29	39° 11' 51.698 N	80° 55' 58.127 W
9,697.0	90.87	343.83	6,351.2	3,054.7	-1,346.1	14,234,014.77	1,659,423.38	39° 11' 52.586 N	80° 55' 58.481 W
9,791.0	90.94	343.36	6,349.8	3,144.8	-1,372.7	14,234,104.93	1,659,396.84	39° 11' 53.477 N	80° 55' 58.817 W
9,885.0	90.30	344.50	6,348.7	3,235.1	-1,398.7	14,234,195.25	1,659,370.82	39° 11' 54.371 N	80° 55' 59.147 W
9,980.0	91.34	341.75	6,347.4	3,326.0	-1,426.3	14,234,286.14	1,659,343.25	39° 11' 55.270 N	80° 55' 59.496 W
10,073.0	91.58	341.99	6,345.0	3,414.4	-1,455.2	14,234,374.50	1,659,314.32	39° 11' 56.143 N	80° 55' 59.863 W
10,168.0	91.55	342.29	6,342.4	3,504.8	-1,484.3	14,234,464.88	1,659,285.19	39° 11' 57.037 N	80° 56' 0.232 W
10,262.0	91.44	340.71	6,340.0	3,593.9	-1,514.1	14,234,553.99	1,659,255.38	39° 11' 57.919 N	80° 56' 0.610 W
10,356.0	90.91	340.33	6,338.0	3,682.5	-1,545.5	14,234,642.59	1,659,224.04	39° 11' 58.795 N	80° 56' 1.008 W
10,450.0	90.64	339.42	6,336.8	3,770.7	-1,577.8	14,234,730.84	1,659,191.70	39° 11' 59.668 N	80° 56' 1.418 W
10,544.0	90.20	338.94	6,336.1	3,858.6	-1,611.2	14,234,818.70	1,659,158.29	39° 12' 0.537 N	80° 56' 1.842 W
10,638.0	89.63	339.77	6,336.2	3,946.5	-1,644.4	14,234,906.67	1,659,125.15	39° 12' 1.407 N	80° 56' 2.262 W
10,732.0	89.87	340.62	6,336.6	4,035.0	-1,676.2	14,234,995.10	1,659,093.30	39° 12' 2.282 N	80° 56' 2.666 W
10,826.0	91.08	340.51	6,335.9	4,123.6	-1,707.5	14,235,083.74	1,659,062.02	39° 12' 3.158 N	80° 56' 3.063 W
10,920.0	90.70	339.43	6,334.4	4,211.9	-1,739.7	14,235,172.05	1,659,029.83	39° 12' 4.032 N	80° 56' 3.471 W
11,014.0	90.03	340.98	6,333.8	4,300.4	-1,771.5	14,235,260.49	1,658,998.00	39° 12' 4.906 N	80° 56' 3.874 W
11,108.0	91.04	343.42	6,332.9	4,389.9	-1,800.2	14,235,349.97	1,658,969.27	39° 12' 5.791 N	80° 56' 4.239 W
11,202.0	91.74	342.70	6,330.6	4,479.8	-1,827.6	14,235,439.87	1,658,941.89	39° 12' 6.680 N	80° 56' 4.586 W
11,296.0	92.29	343.03	6,327.3	4,569.5	-1,855.3	14,235,529.64	1,658,914.21	39° 12' 7.568 N	80° 56' 4.937 W
11,390.0	89.83	340.70	6,325.6	4,658.8	-1,884.6	14,235,618.94	1,658,884.96	39° 12' 8.451 N	80° 56' 5.308 W
11,485.0	89.16	339.78	6,326.4	4,748.2	-1,916.7	14,235,708.34	1,658,852.84	39° 12' 9.336 N	80° 56' 5.715 W
11,579.0	90.47	341.83	6,326.7	4,837.0	-1,947.6	14,235,797.11	1,658,821.94	39° 12' 10.214 N	80° 56' 6.107 W
11,673.0	90.10	341.36	6,326.3	4,926.2	-1,977.3	14,235,886.30	1,658,792.26	39° 12' 11.096 N	80° 56' 6.483 W
11,767.0	90.61	342.62	6,325.7	5,015.6	-2,006.3	14,235,975.69	1,658,763.20	39° 12' 11.980 N	80° 56' 6.852 W
11,861.0	91.21	342.05	6,324.2	5,105.1	-2,034.8	14,236,065.25	1,658,734.68	39° 12' 12.866 N	80° 56' 7.213 W
11,955.0	90.77	342.02	6,322.6	5,194.5	-2,063.8	14,236,154.65	1,658,705.69	39° 12' 13.750 N	80° 56' 7.581 W
12,049.0	91.88	343.26	6,320.4	5,284.2	-2,091.9	14,236,244.34	1,658,677.65	39° 12' 14.637 N	80° 56' 7.936 W
12,143.0	91.58	341.88	6,317.6	5,373.9	-2,120.0	14,236,333.98	1,658,649.51	39° 12' 15.523 N	80° 56' 8.293 W
12,237.0	91.78	342.25	6,314.8	5,463.3	-2,148.9	14,236,423.38	1,658,620.58	39° 12' 16.407 N	80° 56' 8.660 W
12,332.0	90.44	342.11	6,313.0	5,553.7	-2,178.0	14,236,513.80	1,658,591.51	39° 12' 17.302 N	80° 56' 9.029 W
12,426.0	90.50	342.25	6,312.2	5,643.2	-2,206.8	14,236,603.29	1,658,562.74	39° 12' 18.187 N	80° 56' 9.394 W
12,520.0	88.89	342.45	6,312.7	5,732.7	-2,235.3	14,236,692.86	1,658,534.24	39° 12' 19.073 N	80° 56' 9.755 W
12,615.0	89.09	343.29	6,314.4	5,823.5	-2,263.2	14,236,783.63	1,658,506.27	39° 12' 19.970 N	80° 56' 10.110 W
12,709.0	88.65	342.23	6,316.2	5,913.3	-2,291.1	14,236,873.39	1,658,478.41	39° 12' 20.858 N	80° 56' 10.463 W
12,803.0	88.92	342.07	6,318.2	6,002.7	-2,319.9	14,236,962.84	1,658,449.61	39° 12' 21.743 N	80° 56' 10.828 W
12,897.0	90.27	341.84	6,318.9	6,092.1	-2,349.0	14,237,052.21	1,658,420.49	39° 12' 22.627 N	80° 56' 11.197 W
12,991.0	90.20	340.96	6,318.5	6,181.2	-2,379.0	14,237,141.30	1,658,390.51	39° 12' 23.508 N	80° 56' 11.578 W
13,085.0	90.00	340.64	6,318.3	6,270.0	-2,409.9	14,237,230.07	1,658,359.60	39° 12' 24.386 N	80° 56' 11.970 W
13,179.0	91.15	342.52	6,317.4	6,359.1	-2,439.6	14,237,319.25	1,658,329.90	39° 12' 25.268 N	80° 56' 12.346 W
13,273.0	91.78	342.04	6,315.0	6,448.6	-2,468.2	14,237,408.76	1,658,301.30	39° 12' 26.153 N	80° 56' 12.709 W
13,367.0	90.34	341.97	6,313.2	6,538.0	-2,497.3	14,237,498.14	1,658,272.26	39° 12' 27.037 N	80° 56' 13.077 W
13,462.0	89.83	341.85	6,313.1	6,628.3	-2,526.8	14,237,588.44	1,658,242.76	39° 12' 27.930 N	80° 56' 13.451 W
13,556.0	90.13	342.58	6,313.1	6,717.8	-2,555.5	14,237,677.95	1,658,214.05	39° 12' 28.815 N	80° 56' 13.815 W
13,650.0	89.70	341.67	6,313.3	6,807.3	-2,584.3	14,237,767.41	1,658,185.20	39° 12' 29.700 N	80° 56' 14.181 W
13,744.0	90.27	341.53	6,313.3	6,896.5	-2,614.0	14,237,856.61	1,658,155.53	39° 12' 30.582 N	80° 56' 14.558 W
13,838.0	90.14	340.83	6,313.0	6,985.5	-2,644.3	14,237,945.58	1,658,125.20	39° 12' 31.462 N	80° 56' 14.942 W
13,932.0	89.77	340.81	6,313.0	7,074.2	-2,675.2	14,238,034.36	1,658,094.32	39° 12' 32.340 N	80° 56' 15.334 W

Company:	Antero Resources	Local Co-ordinate Reference:	Well Left Fork 1H
Project:	Ritchie County WV	TVD Reference:	Patterson 347: 1021' GL + 25' KB @ 1046.0usft
Site:	Lockhart Heirs West Pad: Left Fork/Harris	MD Reference:	Patterson 347: 1021' GL + 25' KB @ 1046.0usft
Well:	Left Fork 1H	North Reference:	Grid
Wellbore:	ST1	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Antero NE

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
14,026.0	90.03	341.64	6,313.2	7,163.2	-2,705.4	14,238,123.36	1,658,064.07	39° 12' 33.220 N	80° 56' 15.718 W
14,121.0	89.63	341.33	6,313.5	7,253.3	-2,735.6	14,238,213.44	1,658,033.90	39° 12' 34.111 N	80° 56' 16.100 W
14,215.0	90.97	341.62	6,313.0	7,342.4	-2,765.5	14,238,302.57	1,658,004.04	39° 12' 34.993 N	80° 56' 16.479 W
14,309.0	91.04	341.27	6,311.3	7,431.5	-2,795.4	14,238,391.67	1,657,974.13	39° 12' 35.874 N	80° 56' 16.858 W
14,403.0	91.01	340.63	6,309.7	7,520.4	-2,826.1	14,238,480.50	1,657,943.45	39° 12' 36.753 N	80° 56' 17.247 W
14,497.0	90.87	339.50	6,308.1	7,608.7	-2,858.1	14,238,568.86	1,657,911.41	39° 12' 37.627 N	80° 56' 17.654 W
14,591.0	90.60	339.15	6,306.9	7,696.7	-2,891.3	14,238,656.80	1,657,878.22	39° 12' 38.496 N	80° 56' 18.075 W
14,686.0	90.27	341.31	6,306.2	7,786.1	-2,923.4	14,238,746.19	1,657,846.09	39° 12' 39.380 N	80° 56' 18.482 W
14,780.0	89.93	339.97	6,306.0	7,874.8	-2,954.6	14,238,834.87	1,657,814.93	39° 12' 40.257 N	80° 56' 18.878 W
14,874.0	89.83	341.62	6,306.2	7,963.5	-2,985.5	14,238,923.64	1,657,784.01	39° 12' 41.135 N	80° 56' 19.270 W
14,968.0	90.60	341.68	6,305.9	8,052.7	-3,015.1	14,239,012.86	1,657,754.42	39° 12' 42.018 N	80° 56' 19.645 W
15,062.0	90.40	343.75	6,305.0	8,142.5	-3,043.0	14,239,102.60	1,657,726.49	39° 12' 42.905 N	80° 56' 19.999 W
15,156.0	90.27	343.82	6,304.5	8,232.7	-3,069.3	14,239,192.86	1,657,700.24	39° 12' 43.798 N	80° 56' 20.332 W
15,251.0	89.93	343.50	6,304.3	8,323.9	-3,096.0	14,239,284.02	1,657,673.52	39° 12' 44.700 N	80° 56' 20.671 W
15,345.0	90.81	343.84	6,303.7	8,414.1	-3,122.4	14,239,374.23	1,657,647.09	39° 12' 45.592 N	80° 56' 21.006 W
15,439.0	90.71	343.12	6,302.5	8,504.2	-3,149.2	14,239,464.34	1,657,620.36	39° 12' 46.483 N	80° 56' 21.345 W
15,533.0	90.50	344.11	6,301.5	8,594.4	-3,175.7	14,239,554.52	1,657,593.85	39° 12' 47.375 N	80° 56' 21.681 W
15,628.0	90.17	343.97	6,300.9	8,685.7	-3,201.8	14,239,645.85	1,657,567.73	39° 12' 48.278 N	80° 56' 22.013 W
15,722.0	90.70	342.69	6,300.2	8,775.7	-3,228.7	14,239,735.87	1,657,540.77	39° 12' 49.168 N	80° 56' 22.355 W
15,816.0	90.67	342.47	6,299.1	8,865.4	-3,256.9	14,239,825.55	1,657,512.63	39° 12' 50.055 N	80° 56' 22.711 W
15,910.0	90.20	341.11	6,298.4	8,954.7	-3,286.3	14,239,914.84	1,657,483.26	39° 12' 50.938 N	80° 56' 23.084 W
16,004.0	89.87	340.97	6,298.3	9,043.6	-3,316.8	14,240,003.74	1,657,452.72	39° 12' 51.817 N	80° 56' 23.471 W
16,098.0	89.56	340.98	6,298.8	9,132.5	-3,347.4	14,240,092.60	1,657,422.08	39° 12' 52.696 N	80° 56' 23.860 W
16,144.0	89.36	340.07	6,299.2	9,175.9	-3,362.8	14,240,136.00	1,657,406.73	39° 12' 53.125 N	80° 56' 24.055 W
Last SDI MWD @ 16144									
16,201.0	89.36	340.07	6,299.9	9,229.4	-3,382.2	14,240,189.55	1,657,387.31	39° 12' 53.655 N	80° 56' 24.301 W

Projection To Bit @ 16201 MD / 6299 TVD

Target Name	- hit/miss target	- Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
testtarget	- actual wellpath hits target center	- Point	0.00	0.00	0.0	0.0	0.0	14,230,960.12	1,660,769.52	39° 11' 22.372 N	80° 55' 41.406 W

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
6,220.0	6,169.3	Middlesex @ 6220		0.00	
6,380.0	6,276.0	Burket @ 6380		0.00	
6,450.0	6,307.6	Tully @ 6450		0.00	
6,501.0	6,325.4	Marcellus @ 6501		0.00	



Company:	Antero Resources	Local Co-ordinate Reference:	Well Left Fork 1H
Project:	Ritchie County WV	TVD Reference:	Patterson 347: 1021' GL + 25' KB @ 1046.0usft
Site:	Lockhart Heirs West Pad: Left Fork/Harris	MD Reference:	Patterson 347: 1021' GL + 25' KB @ 1046.0usft
Well:	Left Fork 1H	North Reference:	Grid
Wellbore:	ST1	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Antero NE

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,622.0	5,604.5	-279.4	-160.3	First SDI MWD @ 5622
16,144.0	6,299.2	9,175.9	-3,362.8	Last SDI MWD @ 16144
16,201.0	6,299.9	9,229.4	-3,382.2	Projection To Bit @ 16201 MD / 6299 TVD

Checked By: _____ Approved By: _____ Date: _____