



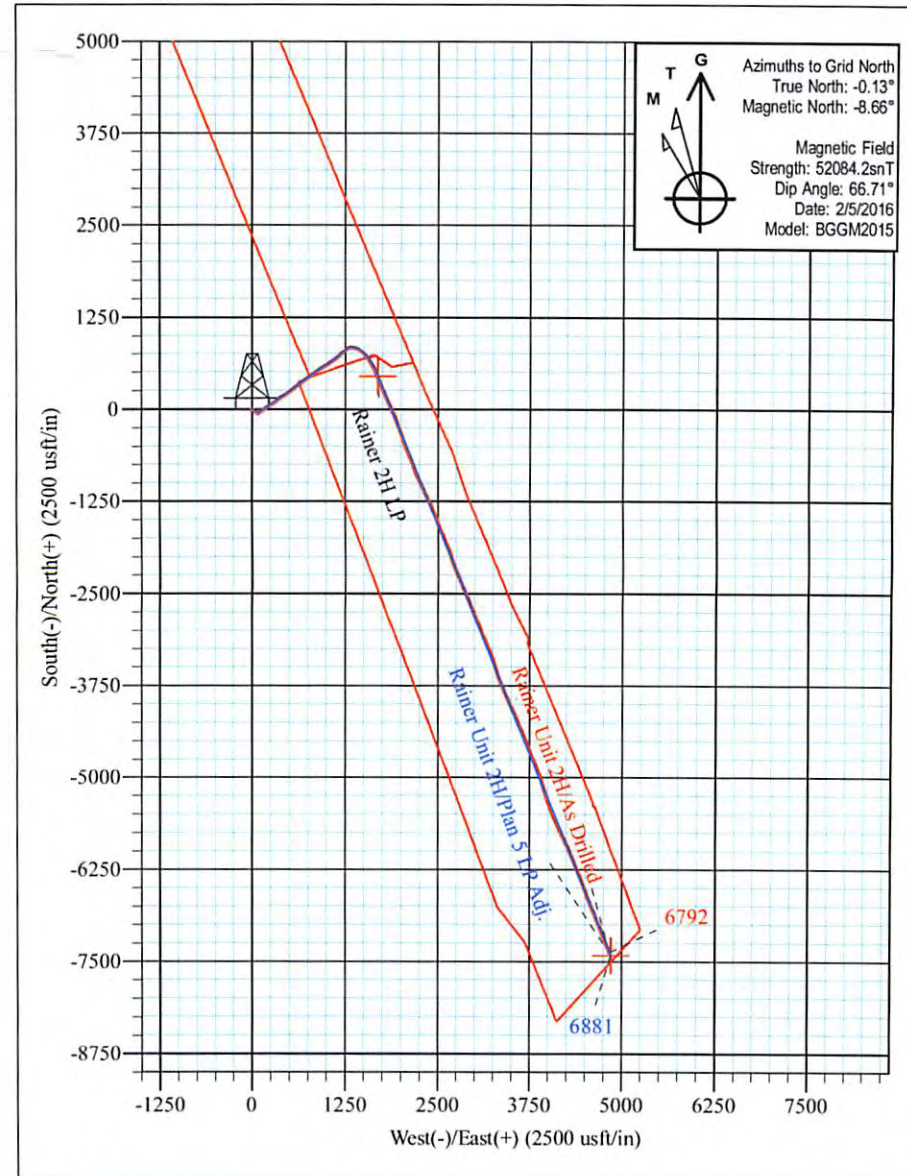
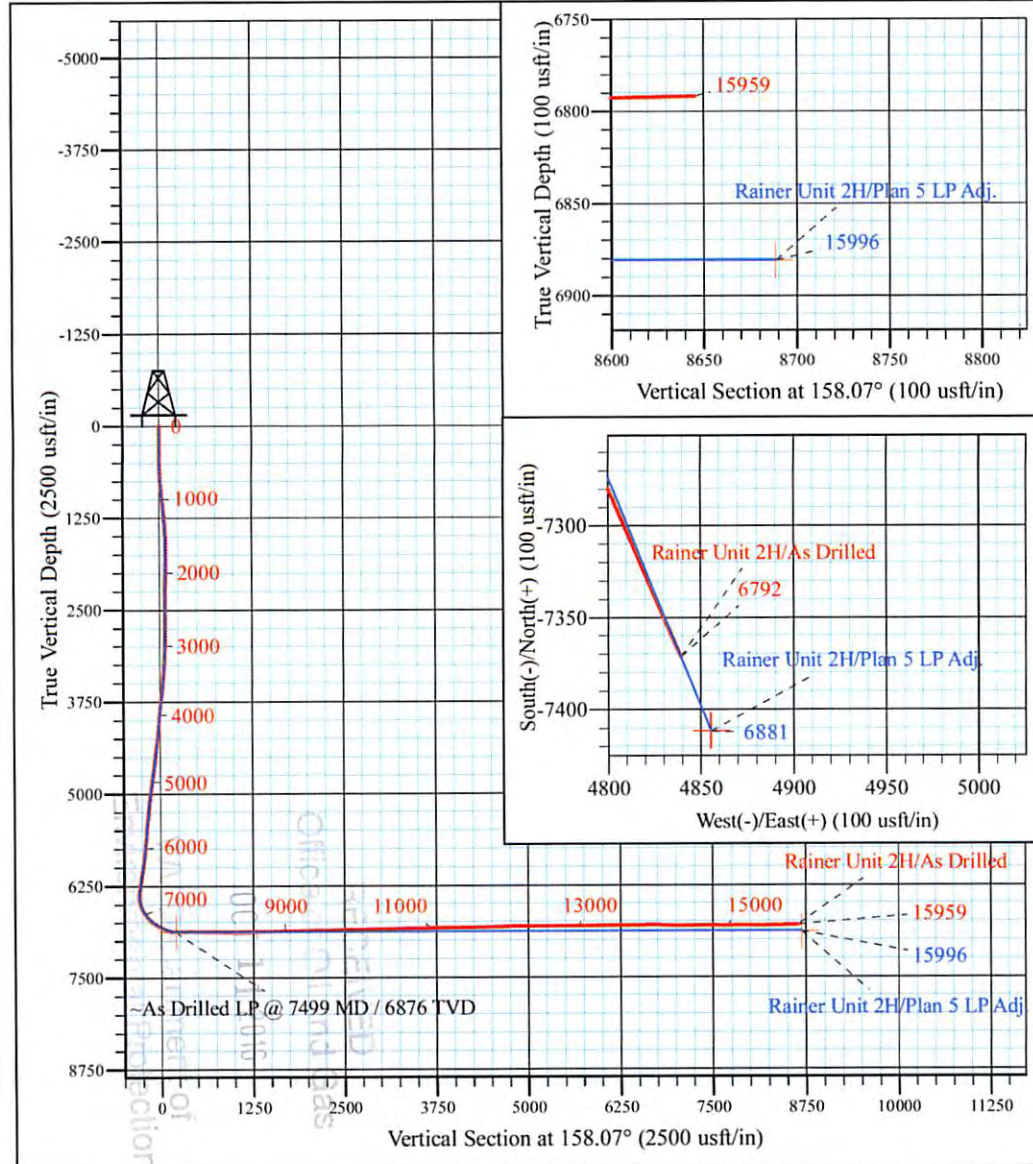
Cofor Pad: Outback Morton Nova Grape Rainer
 Rainer Unit 2H
 Plan 5 LP Adj.
 Patterson 347: 1189' GL + 25' KB @ 1214.0usft
 Doddridge County WV

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: **Rainer Unit 2H SHL**

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	14270944.36	1696929.73	39° 17' 57.190 N	80° 48' 0.852 W



Rainer Unit 2H
Approx. BHL
 39° 16' 44.193 N 80° 46' 59.493 W

Shane Rhodes
 10:11, February 23 2016
 Scientific Drilling International
 124 Vista Drive
 Charleroi, PA 15022



Antero Resources

**Doddridge County WV
Cofor Pad: Outback Morton Nova Grape Rainer
Rainer Unit 2H**

Original Wellpath

Design: As Drilled

Standard Survey Report

24 February, 2016



www.scientificdrilling.com

12/09/2016



Scientific Drilling International
Survey Report



Company:	Antero Resources	Local Co-ordinate Reference:	Well Rainer Unit 2H
Project:	Doddridge County WV	TVD Reference:	Patterson 347: 1189' GL + 25' KB @ 1214.0usft
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	MD Reference:	Patterson 347: 1189' GL + 25' KB @ 1214.0usft
Well:	Rainer Unit 2H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Antero NE

Project	Doddridge County WV, McClellan District		
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	Cofor Pad: Outback Morton Nova Grape Rainer, Site Center: Outback Unit 1H				
Site Position:		Northing:	14,271,032.41 usft	Latitude:	39° 17' 58.061 N
From:	Map	Easting:	1,696,909.68 usft	Longitude:	80° 48' 1.105 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.13 °

Well	Rainer Unit 2H, Marcellus					
Well Position	+N/-S	0.0 usft	Northing:	14,270,944.36 usft	Latitude:	39° 17' 57.190 N
	+E/-W	0.0 usft	Easting:	1,696,929.72 usft	Longitude:	80° 48' 0.852 W
Position Uncertainty		2.0 usft	Wellhead Elevation:	1,214.0 usft	Ground Level:	1,189.0 usft

Wellbore	Original Wellpath				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2015	2/5/2016	-8.53	66.71	52,084

Design	As Drilled				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	158.07	

Survey Program	Date 2/24/2016			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	6,450.0	Survey #6 Def. Tan. Gyros (Original Wellp	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4
6,502.0	15,959.0	Survey #7 - MWD Curve Lateral (Original W	SDI MWD	Scientific Drilling Intl. MWD - Standard ver 1.0.1

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)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
100.0	0.31	242.73	100.0	-0.1	-0.2	0.0	0.31	0.31	0.00	
First Gyro @ 100										
125.0	0.26	174.98	125.0	-0.2	-0.3	0.1	1.28	-0.20	-271.00	
150.0	0.23	222.25	150.0	-0.3	-0.3	0.2	0.79	-0.12	189.08	
175.0	0.23	210.55	175.0	-0.4	-0.4	0.2	0.19	0.00	-46.80	
200.0	0.21	220.85	200.0	-0.5	-0.4	0.3	0.18	-0.08	41.20	
225.0	0.11	248.11	225.0	-0.5	-0.5	0.3	0.49	-0.40	109.04	
250.0	0.14	237.64	250.0	-0.5	-0.5	0.3	0.15	0.12	-41.88	
275.0	0.24	238.09	275.0	-0.6	-0.6	0.3	0.40	0.40	1.80	



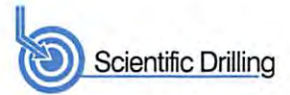
Company:	Antero Resources	Local Co-ordinate Reference:	Well Rainer Unit 2H
Project:	Doddridge County WV	TVD Reference:	Patterson 347: 1189' GL + 25' KB @ 1214.0usft
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	MD Reference:	Patterson 347: 1189' GL + 25' KB @ 1214.0usft
Well:	Rainer Unit 2H	North Reference:	Grid
Wellbore:	Original Wellpath	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)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
300.0	0.24	246.00	300.0	-0.6	-0.7	0.3	0.13	0.00	31.64
325.0	0.28	231.41	325.0	-0.7	-0.8	0.3	0.31	0.16	-58.36
350.0	0.19	167.52	350.0	-0.8	-0.8	0.4	1.04	-0.36	-255.56
375.0	0.29	225.27	375.0	-0.8	-0.9	0.5	0.99	0.40	231.00
400.0	0.36	193.79	400.0	-1.0	-0.9	0.5	0.76	0.28	-125.92
425.0	0.43	169.93	425.0	-1.1	-0.9	0.7	0.71	0.28	-95.44
450.0	0.84	133.86	450.0	-1.4	-0.8	1.0	2.21	1.64	-144.28
475.0	1.31	135.09	475.0	-1.7	-0.5	1.4	1.88	1.88	4.92
500.0	1.79	134.78	500.0	-2.2	0.0	2.0	1.92	1.92	-1.24
525.0	2.19	130.92	525.0	-2.8	0.7	2.8	1.69	1.60	-15.44
550.0	2.39	131.28	549.9	-3.4	1.4	3.7	0.80	0.80	1.44
575.0	2.86	129.15	574.9	-4.1	2.3	4.7	1.92	1.88	-8.52
600.0	3.18	122.13	599.9	-4.9	3.4	5.8	1.95	1.28	-28.08
625.0	3.42	120.09	624.8	-5.7	4.6	7.0	1.07	0.96	-8.16
650.0	3.70	121.07	649.8	-6.4	5.9	8.2	1.15	1.12	3.92
675.0	4.41	122.22	674.7	-7.4	7.4	9.6	2.86	2.84	4.60
700.0	5.10	121.01	699.6	-8.5	9.2	11.3	2.79	2.76	-4.84
725.0	5.84	121.28	724.5	-9.7	11.2	13.2	2.96	2.96	1.08
750.0	6.00	121.95	749.4	-11.0	13.4	15.3	0.70	0.64	2.68
775.0	6.13	121.78	774.3	-12.4	15.7	17.4	0.52	0.52	-0.68
800.0	6.24	121.90	799.1	-13.9	18.0	19.6	0.44	0.44	0.48
825.0	6.25	121.86	824.0	-15.3	20.3	21.8	0.04	0.04	-0.16
850.0	6.20	121.29	848.8	-16.7	22.6	23.9	0.32	-0.20	-2.28
875.0	6.26	120.59	873.7	-18.1	24.9	26.1	0.39	0.24	-2.80
900.0	6.26	121.91	898.5	-19.5	27.2	28.3	0.58	0.00	5.28
925.0	6.39	121.68	923.4	-21.0	29.6	30.5	0.53	0.52	-0.92
950.0	6.45	122.11	948.2	-22.4	32.0	32.8	0.31	0.24	1.72
975.0	6.78	122.92	973.0	-24.0	34.4	35.1	1.37	1.32	3.24
1,000.0	7.10	124.56	997.9	-25.7	36.9	37.6	1.51	1.28	6.56
1,025.0	7.00	123.15	1,022.7	-27.4	39.4	40.1	0.80	-0.40	-5.64
1,050.0	6.84	123.37	1,047.5	-29.0	42.0	42.6	0.65	-0.64	0.88
1,075.0	7.08	123.70	1,072.3	-30.7	44.5	45.1	0.97	0.96	1.32
1,100.0	7.17	123.67	1,097.1	-32.4	47.1	47.7	0.36	0.36	-0.12
1,125.0	7.33	123.18	1,121.9	-34.2	49.7	50.3	0.69	0.64	-1.96
1,150.0	7.39	123.39	1,146.7	-35.9	52.4	52.9	0.26	0.24	0.84
1,175.0	7.25	121.91	1,171.5	-37.6	55.1	55.5	0.94	-0.56	-5.92
1,200.0	7.31	122.20	1,196.3	-39.3	57.7	58.0	0.28	0.24	1.16
1,225.0	6.74	121.35	1,221.1	-40.9	60.3	60.5	2.32	-2.28	-3.40
1,250.0	5.93	121.27	1,246.0	-42.4	62.7	62.7	3.24	-3.24	-0.32
1,275.0	5.35	123.84	1,270.8	-43.7	64.8	64.7	2.53	-2.32	10.28
1,300.0	5.33	124.08	1,295.7	-45.0	66.7	66.6	0.12	-0.08	0.96
1,325.0	5.14	124.91	1,320.6	-46.3	68.6	68.5	0.82	-0.76	3.32
1,350.0	5.10	125.03	1,345.5	-47.6	70.4	70.4	0.17	-0.16	0.48



Company:	Antero Resources	Local Co-ordinate Reference:	Well Rainer Unit 2H
Project:	Doddridge County WV	TVD Reference:	Patterson 347: 1189' GL + 25' KB @ 1214.0usft
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	MD Reference:	Patterson 347: 1189' GL + 25' KB @ 1214.0usft
Well:	Rainer Unit 2H	North Reference:	Grid
Wellbore:	Original Wellpath	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)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,375.0	5.12	125.59	1,370.4	-48.8	72.2	72.3	0.21	0.08	2.24
1,400.0	5.03	124.88	1,395.3	-50.1	74.0	74.1	0.44	-0.36	-2.84
1,425.0	4.49	123.54	1,420.2	-51.3	75.7	75.9	2.21	-2.16	-5.36
1,450.0	3.59	124.56	1,445.2	-52.3	77.2	77.3	3.61	-3.60	4.08
1,475.0	3.59	124.14	1,470.1	-53.2	78.5	78.6	0.11	0.00	-1.68
1,500.0	3.30	124.19	1,495.1	-54.0	79.7	79.9	1.16	-1.16	0.20
1,525.0	2.45	118.78	1,520.1	-54.7	80.8	80.9	3.57	-3.40	-21.64
1,550.0	2.06	115.80	1,545.0	-55.1	81.7	81.6	1.63	-1.56	-11.92
1,575.0	1.93	115.36	1,570.0	-55.5	82.5	82.3	0.52	-0.52	-1.76
1,600.0	1.57	109.92	1,595.0	-55.8	83.2	82.8	1.58	-1.44	-21.76
1,625.0	0.53	62.37	1,620.0	-55.9	83.6	83.0	5.10	-4.16	-190.20
1,650.0	0.62	15.70	1,645.0	-55.7	83.7	82.9	1.85	0.36	-186.68
1,675.0	0.56	9.18	1,670.0	-55.4	83.8	82.7	0.36	-0.24	-26.08
1,700.0	0.63	10.40	1,695.0	-55.2	83.8	82.5	0.28	0.28	4.88
1,725.0	0.61	15.34	1,720.0	-54.9	83.9	82.3	0.23	-0.08	19.76
1,750.0	0.80	17.82	1,745.0	-54.6	84.0	82.0	0.77	0.76	9.92
1,775.0	0.78	11.51	1,770.0	-54.3	84.1	81.7	0.36	-0.08	-25.24
1,800.0	0.68	14.04	1,795.0	-54.0	84.1	81.5	0.42	-0.40	10.12
1,825.0	0.72	16.16	1,820.0	-53.7	84.2	81.2	0.19	0.16	8.48
1,850.0	0.75	23.08	1,845.0	-53.4	84.3	81.0	0.37	0.12	27.68
1,875.0	0.75	19.99	1,870.0	-53.1	84.4	80.8	0.16	0.00	-12.36
1,900.0	0.65	12.89	1,895.0	-52.8	84.5	80.5	0.53	-0.40	-28.40
1,925.0	0.72	19.86	1,920.0	-52.5	84.6	80.3	0.43	0.28	27.88
1,950.0	0.65	31.42	1,945.0	-52.2	84.7	80.1	0.62	-0.28	46.24
1,975.0	0.66	32.63	1,970.0	-52.0	84.9	79.9	0.07	0.04	4.84
2,000.0	0.63	36.26	1,995.0	-51.7	85.1	79.8	0.20	-0.12	14.52
2,025.0	0.78	38.22	2,020.0	-51.5	85.2	79.6	0.61	0.60	7.84
2,050.0	0.77	40.75	2,045.0	-51.2	85.5	79.4	0.14	-0.04	10.12
2,075.0	0.77	46.91	2,070.0	-51.0	85.7	79.3	0.33	0.00	24.64
2,100.0	0.88	46.64	2,095.0	-50.7	85.9	79.2	0.44	0.44	-1.08
2,125.0	0.92	44.50	2,120.0	-50.5	86.2	79.0	0.21	0.16	-8.56
2,150.0	1.03	43.14	2,145.0	-50.2	86.5	78.8	0.45	0.44	-5.44
2,175.0	1.01	42.17	2,170.0	-49.8	86.8	78.7	0.11	-0.08	-3.88
2,200.0	1.07	39.05	2,195.0	-49.5	87.1	78.4	0.33	0.24	-12.48
2,225.0	1.19	37.76	2,220.0	-49.1	87.4	78.2	0.49	0.48	-5.16
2,250.0	1.13	47.10	2,244.9	-48.7	87.8	78.0	0.79	-0.24	37.36
2,275.0	1.04	44.57	2,269.9	-48.4	88.1	77.8	0.41	-0.36	-10.12
2,300.0	1.10	52.01	2,294.9	-48.1	88.5	77.6	0.60	0.24	29.76
2,325.0	0.95	56.69	2,319.9	-47.8	88.8	77.5	0.69	-0.60	18.72
2,350.0	0.86	52.90	2,344.9	-47.6	89.1	77.4	0.43	-0.36	-15.16
2,375.0	0.79	63.87	2,369.9	-47.4	89.4	77.4	0.69	-0.28	43.88
2,400.0	0.67	61.66	2,394.9	-47.3	89.7	77.4	0.49	-0.48	-8.84
2,425.0	0.69	61.73	2,419.9	-47.1	90.0	77.3	0.08	0.08	0.28



Company:	Antero Resources	Local Co-ordinate Reference:	Well Rainer Unit 2H
Project:	Doddridge County WV	TVD Reference:	Patterson 347: 1189' GL + 25' KB @ 1214.0usft
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	MD Reference:	Patterson 347: 1189' GL + 25' KB @ 1214.0usft
Well:	Rainer Unit 2H	North Reference:	Grid
Wellbore:	Original Wellpath	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)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
2,450.0	0.64	54.71	2,444.9	-47.0	90.2	77.3	0.38	-0.20	-28.08
2,475.0	0.54	59.60	2,469.9	-46.8	90.5	77.2	0.45	-0.40	19.56
2,500.0	0.49	39.58	2,494.9	-46.7	90.6	77.2	0.74	-0.20	-80.08
2,525.0	0.42	49.16	2,519.9	-46.6	90.8	77.1	0.41	-0.28	38.32
2,550.0	0.46	42.96	2,544.9	-46.4	90.9	77.0	0.25	0.16	-24.80
2,575.0	0.42	42.87	2,569.9	-46.3	91.0	76.9	0.16	-0.16	-0.36
2,600.0	0.49	36.72	2,594.9	-46.1	91.2	76.8	0.34	0.28	-24.60
2,625.0	0.51	42.19	2,619.9	-46.0	91.3	76.7	0.21	0.08	21.88
2,650.0	0.55	33.71	2,644.9	-45.8	91.4	76.6	0.35	0.16	-33.92
2,675.0	0.68	33.30	2,669.9	-45.6	91.6	76.5	0.52	0.52	-1.64
2,700.0	2.18	57.54	2,694.9	-45.2	92.1	76.3	6.34	6.00	96.96
2,725.0	3.40	58.65	2,719.9	-44.5	93.1	76.1	4.88	4.88	4.44
2,750.0	3.65	57.86	2,744.8	-43.7	94.4	75.8	1.02	1.00	-3.16
2,775.0	3.57	58.46	2,769.8	-42.9	95.7	75.5	0.35	-0.32	2.40
2,800.0	3.63	57.30	2,794.7	-42.1	97.1	75.3	0.38	0.24	-4.64
2,825.0	4.63	57.08	2,819.7	-41.1	98.6	74.9	4.00	4.00	-0.88
2,850.0	5.32	56.15	2,844.6	-39.9	100.4	74.5	2.78	2.76	-3.72
2,875.0	5.50	55.61	2,869.5	-38.6	102.3	74.0	0.75	0.72	-2.16
2,900.0	5.64	56.73	2,894.3	-37.2	104.4	73.5	0.71	0.56	4.48
2,925.0	6.57	57.34	2,919.2	-35.8	106.6	73.0	3.73	3.72	2.44
2,950.0	6.69	56.18	2,944.0	-34.2	109.0	72.4	0.72	0.48	-4.64
2,975.0	7.09	56.04	2,968.9	-32.5	111.5	71.8	1.60	1.60	-0.56
3,000.0	7.52	57.20	2,993.6	-30.8	114.2	71.2	1.82	1.72	4.64
3,025.0	8.65	55.75	3,018.4	-28.8	117.1	70.5	4.59	4.52	-5.80
3,050.0	8.73	56.22	3,043.1	-26.7	120.2	69.7	0.43	0.32	1.88
3,075.0	9.09	54.74	3,067.8	-24.5	123.4	68.8	1.71	1.44	-5.92
3,100.0	9.74	56.49	3,092.5	-22.2	126.8	67.9	2.84	2.60	7.00
3,125.0	11.43	54.53	3,117.0	-19.6	130.6	66.9	6.91	6.76	-7.84
3,150.0	11.87	54.86	3,141.5	-16.7	134.7	65.8	1.78	1.76	1.32
3,175.0	11.88	55.41	3,166.0	-13.7	138.9	64.6	0.45	0.04	2.20
3,200.0	13.34	54.79	3,190.4	-10.6	143.4	63.4	5.86	5.84	-2.48
3,225.0	14.18	53.95	3,214.7	-7.2	148.2	62.0	3.45	3.36	-3.36
3,250.0	15.19	53.80	3,238.9	-3.4	153.3	60.4	4.04	4.04	-0.60
3,275.0	15.40	53.68	3,263.0	0.5	158.6	58.8	0.85	0.84	-0.48
3,300.0	16.82	53.65	3,287.0	4.6	164.2	57.1	5.68	5.68	-0.12
3,325.0	17.56	53.66	3,310.9	9.0	170.2	55.2	2.96	2.96	0.04
3,350.0	18.12	53.24	3,334.7	13.5	176.3	53.3	2.30	2.24	-1.68
3,375.0	18.53	53.71	3,358.4	18.2	182.6	51.3	1.74	1.64	1.88
3,400.0	19.72	56.19	3,382.0	22.9	189.4	49.5	5.76	4.76	9.92
3,425.0	19.77	56.78	3,405.6	27.6	196.4	47.8	0.82	0.20	2.36
3,450.0	19.20	57.68	3,429.1	32.1	203.4	46.2	2.58	-2.28	3.60
3,475.0	20.22	57.26	3,452.7	36.6	210.5	44.6	4.12	4.08	-1.68
3,500.0	21.53	57.61	3,476.0	41.4	218.0	43.0	5.26	5.24	1.40
3,525.0	23.09	57.10	3,499.1	46.5	226.0	41.2	6.29	6.24	-2.04



Company:	Antero Resources	Local Co-ordinate Reference:	Well Rainer Unit 2H
Project:	Doddridge County WV	TVD Reference:	Patterson 347: 1189' GL + 25' KB @ 1214.0usft
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	MD Reference:	Patterson 347: 1189' GL + 25' KB @ 1214.0usft
Well:	Rainer Unit 2H	North Reference:	Grid
Wellbore:	Original Wellpath	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)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
3,550.0	23.10	57.10	3,522.1	51.9	234.2	39.4	0.04	0.04	0.00
3,575.0	24.20	56.54	3,545.0	57.4	242.6	37.4	4.49	4.40	-2.24
3,600.0	25.66	55.38	3,567.7	63.3	251.4	35.2	6.16	5.84	-4.64
3,625.0	26.46	55.14	3,590.2	69.5	260.4	32.8	3.23	3.20	-0.96
3,650.0	25.90	54.70	3,612.6	75.9	269.4	30.3	2.37	-2.24	-1.76
3,675.0	25.44	54.26	3,635.1	82.1	278.2	27.7	1.99	-1.84	-1.76
3,700.0	24.86	53.75	3,657.8	88.4	286.8	25.1	2.48	-2.32	-2.04
3,725.0	25.25	53.29	3,680.4	94.7	295.3	22.5	1.74	1.56	-1.84
3,750.0	25.29	53.23	3,703.0	101.1	303.9	19.7	0.19	0.16	-0.24
3,775.0	25.70	53.39	3,725.6	107.5	312.5	17.0	1.66	1.64	0.64
3,800.0	25.86	53.56	3,748.1	114.0	321.3	14.3	0.71	0.64	0.68
3,825.0	25.14	53.33	3,770.7	120.4	329.9	11.5	2.91	-2.88	-0.92
3,850.0	25.12	52.61	3,793.3	126.8	338.4	8.8	1.23	-0.08	-2.88
3,875.0	24.39	52.21	3,816.0	133.2	346.7	6.0	3.00	-2.92	-1.60
3,900.0	24.21	51.06	3,838.8	139.5	354.7	3.0	2.03	-0.72	-4.60
3,925.0	24.25	50.55	3,861.6	146.0	362.7	0.0	0.85	0.16	-2.04
3,950.0	23.52	53.50	3,884.4	152.3	370.7	-2.8	5.60	-2.92	11.80
3,975.0	24.15	55.69	3,907.3	158.1	378.9	-5.2	4.34	2.52	8.76
4,000.0	23.87	58.46	3,930.1	163.6	387.4	-7.1	4.65	-1.12	11.08
4,025.0	24.07	57.79	3,953.0	169.0	396.1	-8.8	1.35	0.80	-2.68
4,050.0	24.58	58.66	3,975.8	174.4	404.8	-10.6	2.49	2.04	3.48
4,075.0	25.89	58.34	3,998.4	180.0	413.9	-12.4	5.27	5.24	-1.28
4,100.0	26.42	58.19	4,020.8	185.8	423.3	-14.3	2.14	2.12	-0.60
4,125.0	26.72	57.58	4,043.2	191.7	432.8	-16.2	1.62	1.20	-2.44
4,150.0	27.23	57.82	4,065.5	197.8	442.3	-18.3	2.09	2.04	0.96
4,175.0	26.55	57.61	4,087.8	203.8	451.9	-20.3	2.75	-2.72	-0.84
4,200.0	26.21	56.24	4,110.2	209.9	461.2	-22.5	2.79	-1.36	-5.48
4,225.0	25.77	55.06	4,132.6	216.1	470.3	-24.8	2.72	-1.76	-4.72
4,250.0	24.83	54.78	4,155.2	222.2	479.0	-27.2	3.79	-3.76	-1.12
4,275.0	23.48	53.74	4,178.0	228.2	487.3	-29.7	5.66	-5.40	-4.16
4,300.0	22.31	52.99	4,201.1	234.0	495.1	-32.1	4.82	-4.68	-3.00
4,325.0	22.73	52.32	4,224.2	239.8	502.7	-34.7	1.97	1.68	-2.68
4,350.0	23.03	52.23	4,247.2	245.7	510.4	-37.3	1.21	1.20	-0.36
4,375.0	23.00	51.30	4,270.2	251.8	518.1	-40.1	1.46	-0.12	-3.72
4,400.0	21.87	50.17	4,293.3	257.8	525.5	-42.9	4.84	-4.52	-4.52
4,425.0	22.38	50.60	4,316.5	263.8	532.7	-45.8	2.14	2.04	1.72
4,450.0	22.93	51.98	4,339.5	269.8	540.2	-48.6	3.06	2.20	5.52
4,475.0	22.99	52.10	4,362.6	275.8	547.9	-51.3	0.30	0.24	0.48
4,500.0	22.78	51.18	4,385.6	281.9	555.5	-54.0	1.66	-0.84	-3.68
4,525.0	23.28	51.98	4,408.6	288.0	563.2	-56.8	2.36	2.00	3.20
4,550.0	23.71	53.15	4,431.5	294.0	571.1	-59.4	2.54	1.72	4.68
4,575.0	23.64	51.85	4,454.4	300.1	579.1	-62.1	2.11	-0.28	-5.20
4,600.0	23.91	51.49	4,477.3	306.4	587.0	-65.0	1.23	1.08	-1.44



Company:	Antero Resources	Local Co-ordinate Reference:	Well Rainer Unit 2H
Project:	Doddridge County WW	TVD Reference:	Patterson 347: 1189' GL + 25' KB @ 1214.0usft
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	MD Reference:	Patterson 347: 1189' GL + 25' KB @ 1214.0usft
Well:	Rainer Unit 2H	North Reference:	Grid
Wellbore:	Original Wellpath	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)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,625.0	24.43	52.31	4,500.1	312.7	595.1	-67.8	2.48	2.08	3.28
4,650.0	25.72	53.17	4,522.8	319.1	603.5	-70.6	5.36	5.16	3.44
4,675.0	25.65	53.76	4,545.3	325.6	612.2	-73.4	1.06	-0.28	2.36
4,700.0	26.47	53.35	4,567.7	332.1	621.0	-76.1	3.36	3.28	-1.64
4,725.0	26.45	52.42	4,590.1	338.8	629.9	-79.0	1.66	-0.08	-3.72
4,750.0	25.21	51.39	4,612.6	345.5	638.5	-82.1	5.27	-4.96	-4.12
4,775.0	23.59	49.74	4,635.4	352.1	646.5	-85.2	7.03	-6.48	-6.60
4,800.0	23.82	50.99	4,658.3	358.5	654.2	-88.2	2.21	0.92	5.00
4,825.0	25.19	52.00	4,681.0	364.9	662.3	-91.2	5.73	5.48	4.04
4,850.0	26.36	54.03	4,703.5	371.5	671.0	-94.0	5.86	4.68	8.12
4,875.0	27.20	53.93	4,725.9	378.1	680.1	-96.7	3.36	3.36	-0.40
4,900.0	28.12	55.95	4,748.0	384.8	689.6	-99.4	5.25	3.68	8.08
4,925.0	28.30	56.53	4,770.0	391.3	699.4	-101.8	1.31	0.72	2.32
4,950.0	27.85	55.80	4,792.1	397.9	709.2	-104.2	2.26	-1.80	-2.92
4,975.0	27.73	54.54	4,814.2	404.5	718.8	-106.8	2.40	-0.48	-5.04
5,000.0	26.57	53.04	4,836.5	411.3	728.0	-109.6	5.39	-4.64	-6.00
5,025.0	25.12	51.86	4,859.0	417.9	736.6	-112.6	6.15	-5.80	-4.72
5,050.0	24.61	51.43	4,881.6	424.4	744.9	-115.5	2.16	-2.04	-1.72
5,075.0	25.37	50.73	4,904.3	431.1	753.1	-118.6	3.26	3.04	-2.80
5,100.0	26.53	51.11	4,926.8	438.0	761.6	-121.8	4.69	4.64	1.52
5,125.0	26.78	50.83	4,949.1	445.0	770.3	-125.1	1.12	1.00	-1.12
5,150.0	26.55	50.20	4,971.5	452.2	778.9	-128.5	1.46	-0.92	-2.52
5,175.0	26.59	51.17	4,993.8	459.2	787.6	-131.9	1.74	0.16	3.88
5,200.0	27.34	51.78	5,016.1	466.3	796.5	-135.1	3.20	3.00	2.44
5,225.0	27.37	51.72	5,038.3	473.4	805.5	-138.3	0.16	0.12	-0.24
5,250.0	26.61	51.85	5,060.6	480.4	814.4	-141.5	3.05	-3.04	0.52
5,275.0	26.48	54.61	5,083.0	487.1	823.3	-144.4	4.96	-0.52	11.04
5,300.0	26.39	55.65	5,105.3	493.5	832.5	-146.9	1.89	-0.36	4.16
5,325.0	26.15	55.52	5,127.8	499.7	841.6	-149.3	0.99	-0.96	-0.52
5,350.0	25.64	55.93	5,150.2	505.9	850.6	-151.6	2.16	-2.04	1.64
5,375.0	25.86	57.54	5,172.8	511.8	859.7	-153.7	2.93	0.88	6.44
5,400.0	25.64	58.09	5,195.3	517.6	868.9	-155.7	1.30	-0.88	2.20
5,425.0	25.39	57.81	5,217.8	523.3	878.0	-157.6	1.11	-1.00	-1.12
5,450.0	25.87	58.00	5,240.4	529.1	887.2	-159.5	1.95	1.92	0.76
5,475.0	26.59	57.62	5,262.8	535.0	896.5	-161.4	2.96	2.88	-1.52
5,500.0	26.74	57.09	5,285.2	541.0	906.0	-163.5	1.12	0.60	-2.12
5,525.0	26.20	56.23	5,307.5	547.2	915.3	-165.7	2.65	-2.16	-3.44
5,550.0	25.54	54.81	5,330.0	553.3	924.3	-168.1	3.62	-2.64	-5.68
5,575.0	24.89	53.51	5,352.6	559.6	932.9	-170.6	3.42	-2.60	-5.20
5,600.0	24.41	52.18	5,375.4	565.9	941.2	-173.4	2.93	-1.92	-5.32
5,625.0	24.17	51.59	5,398.2	572.2	949.3	-176.3	1.37	-0.96	-2.36
5,650.0	24.59	53.15	5,420.9	578.5	957.5	-179.0	3.08	1.68	6.24
5,675.0	24.89	56.24	5,443.6	584.5	966.0	-181.5	5.31	1.20	12.36



Company:	Antero Resources	Local Co-ordinate Reference:	Well Rainer Unit 2H
Project:	Doddridge County WW	TVD Reference:	Patterson 347: 1189' GL + 25' KB @ 1214.0usft
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	MD Reference:	Patterson 347: 1189' GL + 25' KB @ 1214.0usft
Well:	Rainer Unit 2H	North Reference:	Grid
Wellbore:	Original Wellpath	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)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
5,700.0	24.91	56.85	5,466.3	590.4	974.8	-183.6	1.03	0.08	2.44	
5,725.0	24.65	58.03	5,489.0	596.0	983.6	-185.5	2.23	-1.04	4.72	
5,750.0	24.94	59.54	5,511.7	601.4	992.6	-187.2	2.79	1.16	6.04	
5,775.0	25.28	59.91	5,534.3	606.8	1,001.8	-188.7	1.50	1.36	1.48	
5,800.0	24.97	59.43	5,557.0	612.1	1,010.9	-190.3	1.48	-1.24	-1.92	
5,825.0	24.22	58.60	5,579.7	617.5	1,019.9	-191.9	3.30	-3.00	-3.32	
5,850.0	23.49	57.49	5,602.6	622.8	1,028.4	-193.7	3.43	-2.92	-4.44	
5,875.0	22.69	56.04	5,625.6	628.2	1,036.6	-195.6	3.93	-3.20	-5.80	
5,900.0	22.37	54.62	5,648.7	633.7	1,044.5	-197.7	2.52	-1.28	-5.68	
5,925.0	22.81	55.04	5,671.7	639.2	1,052.4	-199.9	1.87	1.76	1.68	
5,950.0	23.45	56.13	5,694.7	644.7	1,060.5	-202.0	3.08	2.56	4.36	
5,975.0	23.71	56.25	5,717.6	650.3	1,068.8	-204.1	1.06	1.04	0.48	
6,000.0	23.70	55.79	5,740.5	655.9	1,077.1	-206.2	0.74	-0.04	-1.84	
6,025.0	24.11	55.96	5,763.4	661.6	1,085.5	-208.3	1.66	1.64	0.68	
6,050.0	24.64	55.25	5,786.2	667.4	1,094.0	-210.6	2.42	2.12	-2.84	
6,075.0	24.25	54.40	5,808.9	673.4	1,102.5	-212.9	2.10	-1.56	-3.40	
6,100.0	23.87	53.29	5,831.7	679.4	1,110.7	-215.4	2.36	-1.52	-4.44	
6,125.0	24.32	52.46	5,854.6	685.6	1,118.8	-218.1	2.25	1.80	-3.32	
6,150.0	23.93	51.80	5,877.4	691.8	1,126.9	-220.9	1.90	-1.56	-2.64	
6,175.0	23.58	49.83	5,900.3	698.2	1,134.7	-223.9	3.47	-1.40	-7.88	
6,200.0	23.90	49.26	5,923.2	704.7	1,142.4	-227.1	1.58	1.28	-2.28	
6,225.0	24.36	48.87	5,946.0	711.4	1,150.1	-230.4	1.95	1.84	-1.56	
6,250.0	24.14	48.10	5,968.8	718.2	1,157.8	-233.9	1.54	-0.88	-3.08	
6,275.0	23.32	47.54	5,991.6	725.0	1,165.2	-237.3	3.40	-3.28	-2.24	
6,300.0	24.57	47.51	6,014.5	731.8	1,172.7	-240.9	5.00	5.00	-0.12	
6,325.0	24.63	48.35	6,037.2	738.8	1,180.4	-244.5	1.42	0.24	3.36	
6,350.0	24.62	46.78	6,060.0	745.8	1,188.1	-248.1	2.62	-0.04	-6.28	
6,375.0	23.41	46.32	6,082.8	752.8	1,195.5	-251.9	4.90	-4.84	-1.84	
6,400.0	23.48	48.31	6,105.7	759.6	1,202.8	-255.4	3.18	0.28	7.96	
6,425.0	23.66	51.84	6,128.6	766.0	1,210.5	-258.5	5.69	0.72	14.12	
6,450.0	24.45	53.36	6,151.5	772.2	1,218.6	-261.2	4.02	3.16	6.08	
Last Gyro @ 6450										
6,502.0	24.86	52.03	6,198.7	785.3	1,235.8	-266.9	1.33	0.79	-2.56	
First SDI MWD @ 6502										
6,533.0	23.92	46.87	6,227.0	793.6	1,245.6	-271.0	7.51	-3.03	-16.65	
6,565.0	23.82	44.92	6,256.2	802.6	1,254.9	-275.9	2.49	-0.31	-6.09	
6,596.0	23.47	43.48	6,284.6	811.6	1,263.5	-280.9	2.18	-1.13	-4.65	
6,628.0	23.36	45.55	6,314.0	820.6	1,272.4	-286.0	2.59	-0.34	6.47	
6,659.0	23.37	49.58	6,342.5	828.9	1,281.5	-290.3	5.15	0.03	13.00	
6,690.0	23.66	56.34	6,370.9	836.3	1,291.4	-293.5	8.75	0.94	21.81	
6,722.0	25.31	69.40	6,400.0	842.3	1,303.1	-294.7	17.65	5.16	40.81	
6,753.0	28.42	81.02	6,427.7	845.8	1,316.6	-292.9	19.64	10.03	37.48	
6,784.0	30.90	90.89	6,454.6	846.8	1,331.9	-288.1	17.65	8.00	31.85	
6,815.0	31.64	95.48	6,481.1	845.9	1,347.9	-281.3	8.05	2.39	14.81	

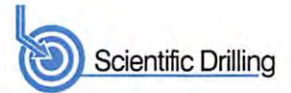


Company:	Antero Resources	Local Co-ordinate Reference:	Well Rainer Unit 2H
Project:	Doddridge County WV	TVD Reference:	Patterson 347: 1189' GL + 25' KB @ 1214.0usft
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	MD Reference:	Patterson 347: 1189' GL + 25' KB @ 1214.0usft
Well:	Rainer Unit 2H	North Reference:	Grid
Wellbore:	Original Wellpath	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)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
6,847.0	31.82	99.58	6,508.4	843.7	1,364.6	-273.0	6.76	0.56	12.81	
6,878.0	31.92	102.85	6,534.7	840.5	1,380.7	-264.1	5.58	0.32	10.55	
6,909.0	32.92	107.40	6,560.9	836.2	1,396.7	-254.1	8.50	3.23	14.68	
6,941.0	33.88	113.90	6,587.6	830.0	1,413.1	-242.2	11.57	3.00	20.31	
6,972.0	35.88	122.07	6,613.0	821.7	1,428.8	-228.6	16.38	6.45	26.35	
7,000.0	37.95	127.54	6,635.4	812.0	1,442.5	-214.5	13.86	7.41	19.52	
Middlesex @ 7000										
7,003.0	38.19	128.09	6,637.8	810.9	1,444.0	-212.9	13.86	7.88	18.49	
7,034.0	40.10	131.22	6,661.8	798.4	1,459.1	-195.7	8.86	6.16	10.10	
7,066.0	42.46	133.72	6,685.9	784.2	1,474.6	-176.7	9.00	7.38	7.81	
7,097.0	45.45	136.21	6,708.2	768.9	1,489.8	-156.9	11.14	9.65	8.03	
7,128.0	50.40	138.01	6,729.0	752.1	1,505.5	-135.4	16.54	15.97	5.81	
7,159.0	55.11	139.61	6,747.7	733.5	1,521.7	-112.1	15.74	15.19	5.16	
7,191.0	57.81	139.92	6,765.4	713.2	1,538.9	-86.8	8.48	8.44	0.97	
7,200.0	58.58	140.15	6,770.1	707.3	1,543.9	-79.5	8.77	8.51	2.50	
Burket @ 7200										
7,222.0	60.45	140.68	6,781.3	692.7	1,555.9	-61.5	8.77	8.52	2.43	
7,253.0	61.36	141.70	6,796.4	671.6	1,572.9	-35.5	4.11	2.94	3.29	
7,257.0	61.58	142.14	6,798.3	668.8	1,575.1	-32.2	10.95	5.37	10.86	
Tully @ 7257										
7,284.0	63.06	145.02	6,810.8	649.6	1,589.3	-9.0	10.95	5.50	10.69	
7,316.0	63.57	148.59	6,825.2	625.6	1,604.9	19.0	10.09	1.59	11.15	
7,347.0	64.00	151.91	6,838.9	601.5	1,618.7	46.6	9.71	1.39	10.71	
7,351.0	64.39	152.16	6,840.6	598.3	1,620.4	50.2	11.37	9.87	6.26	
Marcellus @ 7351										
7,378.0	67.07	153.81	6,851.7	576.4	1,631.6	74.7	11.37	9.91	6.11	
7,409.0	72.63	155.63	6,862.4	550.1	1,644.0	103.7	18.76	17.94	5.87	
7,441.0	77.99	157.29	6,870.5	521.7	1,656.3	134.6	17.48	16.75	5.19	
7,462.0	81.83	157.45	6,874.2	502.6	1,664.3	155.3	18.30	18.29	0.76	
7,499.0	89.66	158.51	6,876.9	468.5	1,678.1	192.2	21.35	21.16	2.86	
~As Drilled LP @ 7499 MD / 6876 TVD										
7,530.0	92.15	159.72	6,876.5	439.5	1,689.2	223.2	8.93	8.03	3.90	
7,624.0	90.87	159.61	6,874.0	351.4	1,721.8	317.1	1.37	-1.36	-0.12	
7,718.0	89.13	155.73	6,874.0	264.5	1,757.5	411.1	4.52	-1.85	-4.13	
7,812.0	88.22	154.27	6,876.2	179.3	1,797.2	504.9	1.83	-0.97	-1.55	
7,906.0	89.53	158.56	6,878.0	93.2	1,834.8	598.8	4.77	1.39	4.56	
7,999.0	89.53	157.08	6,878.8	7.1	1,869.9	691.8	1.59	0.00	-1.59	
8,093.0	89.36	155.89	6,879.7	-79.1	1,907.5	785.8	1.28	-0.18	-1.27	
8,187.0	89.80	159.25	6,880.4	-166.0	1,943.3	879.8	3.60	0.47	3.57	
8,281.0	89.00	158.30	6,881.3	-253.6	1,977.3	973.7	1.32	-0.85	-1.01	
8,375.0	91.51	163.24	6,880.9	-342.3	2,008.3	1,067.6	5.89	2.67	5.26	
8,468.0	91.00	161.07	6,878.9	-430.8	2,036.8	1,160.3	2.40	-0.55	-2.33	
8,562.0	90.67	157.42	6,877.5	-518.7	2,070.1	1,254.3	3.90	-0.35	-3.88	
8,656.0	90.44	156.34	6,876.6	-605.2	2,107.0	1,348.3	1.17	-0.24	-1.15	



Scientific Drilling International
Survey Report

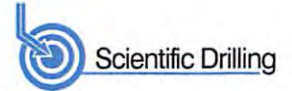


Company:	Antero Resources	Local Co-ordinate Reference:	Well Rainer Unit 2H
Project:	Doddridge County WV	TVD Reference:	Patterson 347: 1189' GL + 25' KB @ 1214.0usft
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	MD Reference:	Patterson 347: 1189' GL + 25' KB @ 1214.0usft
Well:	Rainer Unit 2H	North Reference:	Grid
Wellbore:	Original Wellpath	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)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
8,750.0	91.44	159.09	6,875.1	-692.1	2,142.6	1,442.2	3.11	1.06	2.93	
8,844.0	91.71	160.13	6,872.5	-780.2	2,175.4	1,536.2	1.14	0.29	1.11	
8,937.0	90.87	156.57	6,870.4	-866.6	2,209.7	1,629.1	3.93	-0.90	-3.83	
9,031.0	91.34	156.18	6,868.6	-952.7	2,247.3	1,723.1	0.65	0.50	-0.41	
9,125.0	90.74	156.10	6,866.9	-1,038.6	2,285.3	1,817.0	0.64	-0.64	-0.09	
9,219.0	91.11	156.00	6,865.4	-1,124.5	2,323.5	1,910.9	0.41	0.39	-0.11	
9,312.0	91.64	156.10	6,863.1	-1,209.5	2,361.2	2,003.8	0.58	0.57	0.11	
9,406.0	91.98	155.16	6,860.2	-1,295.1	2,400.0	2,097.7	1.06	0.36	-1.00	
9,500.0	90.44	156.67	6,858.2	-1,380.9	2,438.4	2,191.6	2.29	-1.64	1.61	
9,594.0	91.31	159.87	6,856.7	-1,468.2	2,473.1	2,285.6	3.53	0.93	3.40	
9,688.0	91.44	160.26	6,854.5	-1,556.5	2,505.2	2,379.5	0.44	0.14	0.41	
9,782.0	91.27	157.84	6,852.3	-1,644.3	2,538.8	2,473.5	2.58	-0.18	-2.57	
9,876.0	90.77	155.37	6,850.6	-1,730.5	2,576.1	2,567.4	2.68	-0.53	-2.63	
9,970.0	89.33	158.30	6,850.5	-1,816.9	2,613.1	2,661.4	3.47	-1.53	3.12	
10,064.0	91.58	160.59	6,849.8	-1,904.9	2,646.1	2,755.3	3.42	2.39	2.44	
10,158.0	92.31	161.48	6,846.6	-1,993.8	2,676.6	2,849.2	1.22	0.78	0.95	
10,253.0	91.71	160.91	6,843.2	-2,083.7	2,707.2	2,944.0	0.87	-0.63	-0.60	
10,347.0	91.27	157.34	6,840.8	-2,171.4	2,740.7	3,037.9	3.83	-0.47	-3.80	
10,441.0	91.04	156.56	6,838.9	-2,257.9	2,777.5	3,131.9	0.86	-0.24	-0.83	
10,535.0	91.21	157.07	6,837.0	-2,344.3	2,814.5	3,225.8	0.57	0.18	0.54	
10,629.0	91.64	157.67	6,834.7	-2,431.0	2,850.6	3,319.8	0.79	0.46	0.64	
10,724.0	91.07	156.52	6,832.5	-2,518.5	2,887.6	3,414.7	1.35	-0.60	-1.21	
10,817.0	89.87	155.48	6,831.7	-2,603.5	2,925.4	3,507.7	1.71	-1.29	-1.12	
10,912.0	91.07	158.13	6,830.9	-2,690.8	2,962.8	3,602.6	3.06	1.26	2.79	
11,006.0	91.07	157.39	6,829.2	-2,777.8	2,998.4	3,696.6	0.79	0.00	-0.79	
11,100.0	90.57	155.50	6,827.8	-2,863.9	3,036.0	3,790.6	2.08	-0.53	-2.01	
11,194.0	90.57	158.21	6,826.9	-2,950.4	3,072.9	3,884.5	2.88	0.00	2.88	
11,288.0	91.28	158.77	6,825.4	-3,037.8	3,107.4	3,978.5	0.96	0.76	0.60	
11,382.0	91.41	158.60	6,823.2	-3,125.3	3,141.5	4,072.5	0.23	0.14	-0.18	
11,476.0	90.87	157.19	6,821.3	-3,212.4	3,176.9	4,166.5	1.61	-0.57	-1.50	
11,570.0	90.40	157.46	6,820.2	-3,299.1	3,213.1	4,260.4	0.58	-0.50	0.29	
11,664.0	90.60	159.67	6,819.4	-3,386.6	3,247.5	4,354.4	2.36	0.21	2.35	
11,759.0	91.04	162.00	6,818.1	-3,476.4	3,278.7	4,449.3	2.50	0.46	2.45	
11,852.0	93.19	162.92	6,814.6	-3,565.0	3,306.7	4,542.0	2.51	2.31	0.99	
11,947.0	91.68	158.29	6,810.6	-3,654.5	3,338.2	4,636.8	5.12	-1.59	-4.87	
12,041.0	91.54	158.96	6,808.0	-3,742.0	3,372.4	4,730.7	0.73	-0.15	0.71	
12,135.0	90.40	156.75	6,806.4	-3,829.0	3,407.9	4,824.7	2.65	-1.21	-2.35	
12,229.0	90.00	155.66	6,806.0	-3,915.0	3,445.8	4,918.6	1.24	-0.43	-1.16	
12,323.0	90.10	155.45	6,806.0	-4,000.6	3,484.7	5,012.5	0.25	0.11	-0.22	
12,417.0	90.00	155.52	6,805.9	-4,086.1	3,523.7	5,106.4	0.13	-0.11	0.07	
12,511.0	90.30	156.94	6,805.6	-4,172.1	3,561.6	5,200.4	1.54	0.32	1.51	
12,606.0	90.80	156.39	6,804.7	-4,259.4	3,599.2	5,295.4	0.78	0.53	-0.58	
12,700.0	90.40	157.10	6,803.7	-4,345.7	3,636.3	5,389.3	0.87	-0.43	0.76	
12,794.0	90.20	159.09	6,803.2	-4,432.9	3,671.4	5,483.3	2.13	-0.21	2.12	



Scientific Drilling International
Survey Report



Company:	Antero Resources	Local Co-ordinate Reference:	Well Rainer Unit 2H
Project:	Doddridge County WV	TVD Reference:	Patterson 347: 1189' GL + 25' KB @ 1214.0usft
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	MD Reference:	Patterson 347: 1189' GL + 25' KB @ 1214.0usft
Well:	Rainer Unit 2H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Antero NE

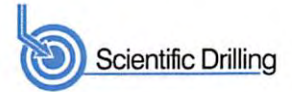
Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
12,888.0	89.80	157.48	6,803.2	-4,520.3	3,706.1	5,577.3	1.76	-0.43	-1.71
12,982.0	89.56	159.58	6,803.8	-4,607.7	3,740.6	5,671.3	2.25	-0.26	2.23
13,077.0	91.21	158.31	6,803.1	-4,696.4	3,774.7	5,766.3	2.19	1.74	-1.34
13,171.0	91.11	157.31	6,801.2	-4,783.4	3,810.2	5,860.3	1.07	-0.11	-1.06
13,265.0	90.84	157.39	6,799.6	-4,870.1	3,846.4	5,954.3	0.30	-0.29	0.09
13,359.0	90.70	160.97	6,798.4	-4,958.0	3,879.8	6,048.2	3.81	-0.15	3.81
13,453.0	90.54	162.03	6,797.3	-5,047.1	3,909.6	6,142.0	1.14	-0.17	1.13
13,547.0	90.44	162.85	6,796.5	-5,136.7	3,938.0	6,235.8	0.88	-0.11	0.87
13,641.0	90.54	161.82	6,795.7	-5,226.3	3,966.5	6,329.5	1.10	0.11	-1.10
13,736.0	89.83	160.20	6,795.4	-5,316.1	3,997.4	6,424.4	1.86	-0.75	-1.71
13,830.0	90.27	162.56	6,795.3	-5,405.2	4,027.4	6,518.2	2.55	0.47	2.51
13,924.0	91.14	158.89	6,794.2	-5,493.9	4,058.4	6,612.1	4.01	0.93	-3.90
14,018.0	89.56	154.16	6,793.6	-5,580.1	4,095.9	6,706.0	5.30	-1.68	-5.03
14,112.0	88.83	153.01	6,794.9	-5,664.3	4,137.7	6,799.7	1.45	-0.78	-1.22
14,206.0	87.18	154.75	6,798.2	-5,748.6	4,179.0	6,893.4	2.55	-1.76	1.85
14,299.0	89.23	156.60	6,801.1	-5,833.3	4,217.3	6,986.3	2.97	2.20	1.99
14,393.0	89.13	155.46	6,802.5	-5,919.2	4,255.5	7,080.2	1.22	-0.11	-1.21
14,488.0	91.21	157.77	6,802.2	-6,006.4	4,293.2	7,175.1	3.27	2.19	2.43
14,582.0	91.17	156.80	6,800.2	-6,093.1	4,329.5	7,269.1	1.03	-0.04	-1.03
14,676.0	90.50	158.89	6,798.9	-6,180.1	4,364.9	7,363.1	2.33	-0.71	2.22
14,770.0	89.56	157.89	6,798.8	-6,267.5	4,399.5	7,457.1	1.46	-1.00	-1.06
14,864.0	88.86	156.36	6,800.1	-6,354.1	4,436.1	7,551.1	1.79	-0.74	-1.63
14,958.0	88.96	159.63	6,801.9	-6,441.2	4,471.3	7,645.0	3.48	0.11	3.48
15,053.0	91.11	160.86	6,801.8	-6,530.6	4,503.4	7,740.0	2.61	2.26	1.29
15,147.0	91.51	160.49	6,799.7	-6,619.3	4,534.5	7,833.8	0.58	0.43	-0.39
15,241.0	89.30	157.10	6,799.0	-6,706.9	4,568.5	7,927.8	4.30	-2.35	-3.61
15,335.0	89.46	156.42	6,800.0	-6,793.3	4,605.6	8,021.8	0.74	0.17	-0.72
15,429.0	89.23	157.78	6,801.1	-6,879.9	4,642.1	8,115.8	1.47	-0.24	1.45
15,523.0	91.17	159.35	6,800.8	-6,967.3	4,676.5	8,209.7	2.66	2.06	1.67
15,617.0	92.01	159.38	6,798.2	-7,055.3	4,709.6	8,303.7	0.89	0.89	0.03
15,711.0	90.60	158.05	6,796.0	-7,142.8	4,743.7	8,397.6	2.06	-1.50	-1.41
15,805.0	91.11	157.69	6,794.6	-7,229.9	4,779.1	8,491.6	0.66	0.54	-0.38
15,898.0	91.04	156.56	6,792.9	-7,315.6	4,815.3	8,584.6	1.22	-0.08	-1.21
Last SDI MWD @ 15898									
15,959.0	91.04	156.56	6,791.8	-7,371.5	4,839.5	8,645.5	0.00	0.00	0.00
Projection To Bit @ 15959 MD / 6791 TVD									

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Company:	Antero Resources	Local Co-ordinate Reference:	Well Rainer Unit 2H
Project:	Doddridge County WV	TVD Reference:	Patterson 347: 1189' GL + 25' KB @ 1214.0usft
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	MD Reference:	Patterson 347: 1189' GL + 25' KB @ 1214.0usft
Well:	Rainer Unit 2H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Antero NE

Design Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
- Shape									
~As Drilled LP Rainer 2H - actual wellpath hits target center - Point	0.00	0.00	6,876.9	468.5	1,678.1	14,271,412.81	1,698,607.85	39° 18' 1.784 N	80° 47' 39.484 W

Formations						
Measured Depth	Vertical Depth	Name	Lithology	Dip	Dip Direction	
(usft)	(usft)			(°)	(°)	
7,000.0	6,635.4	Middlesex @ 7000		0.00		
7,200.0	6,770.1	Burket @ 7200		0.00		
7,257.0	6,798.3	Tully @ 7257		0.00		
7,351.0	6,840.6	Marcellus @ 7351		0.00		

Design Annotations					
Measured Depth	Vertical Depth	Local Coordinates		Comment	
(usft)	(usft)	+N/-S	+E/-W		
		(usft)	(usft)		
100.0	100.0	-0.1	-0.2	First Gyro @ 100	
6,450.0	6,151.5	772.2	1,218.6	Last Gyro @ 6450	
6,502.0	6,198.7	785.3	1,235.8	First SDI MWD @ 6502	
7,499.0	6,876.9	468.5	1,678.1	~As Drilled LP @ 7499 MD / 6876 TVD	
15,898.0	6,792.9	-7,315.6	4,815.3	Last SDI MWD @ 15898	
15,959.0	6,791.8	-7,371.5	4,839.5	Projection To Bit @ 15959 MD / 6791 TVD	

Checked By: _____ Approved By: _____ Date: _____