Antero Resources

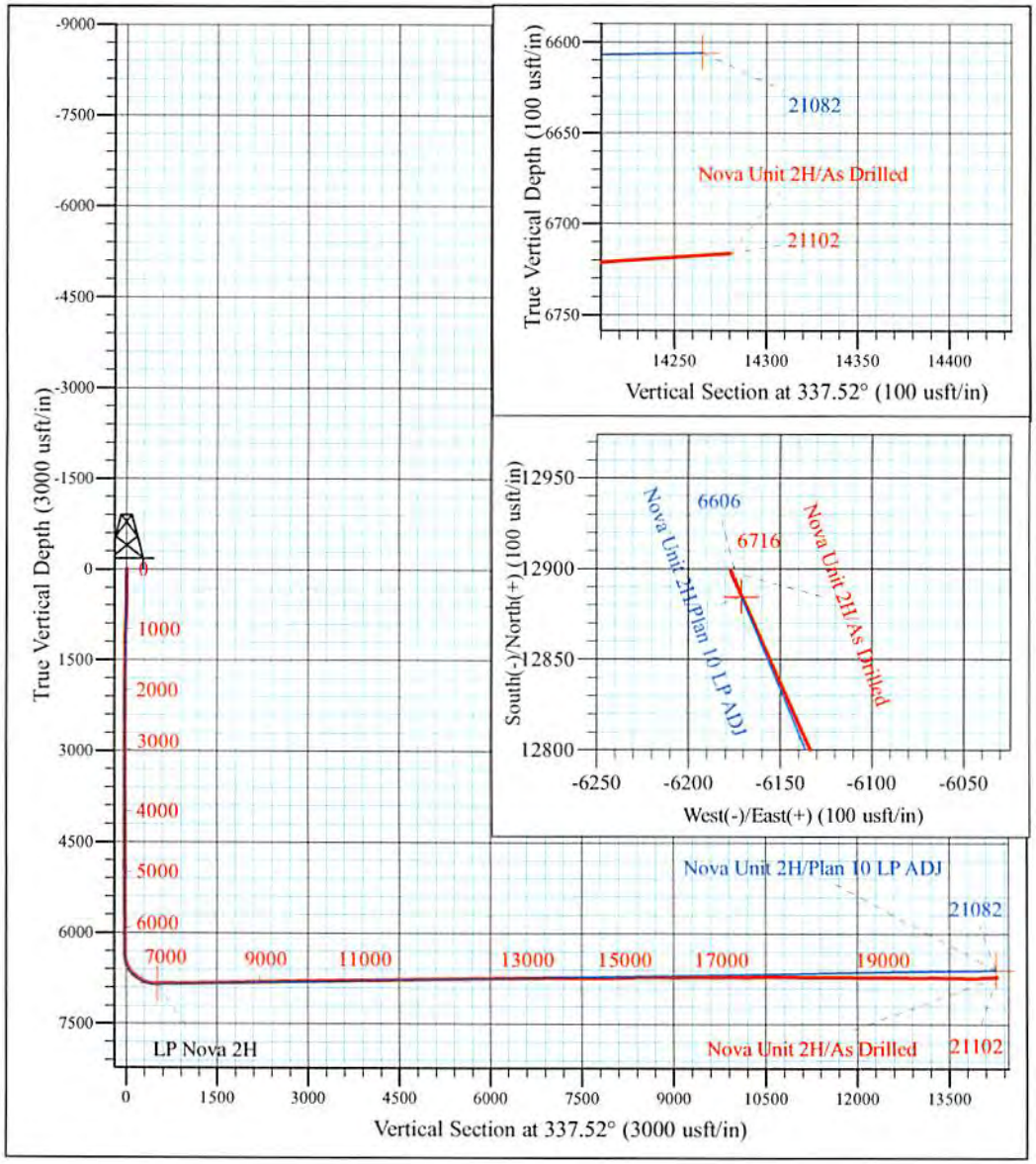
Cofor Pad: Outback Morton Nova Grape Rainer
Nova Unit 2H
Plan 10 LP ADJ
1189' GL + 25' KB @ 1214.0usft (Patterson 347)
Doddridge County WV

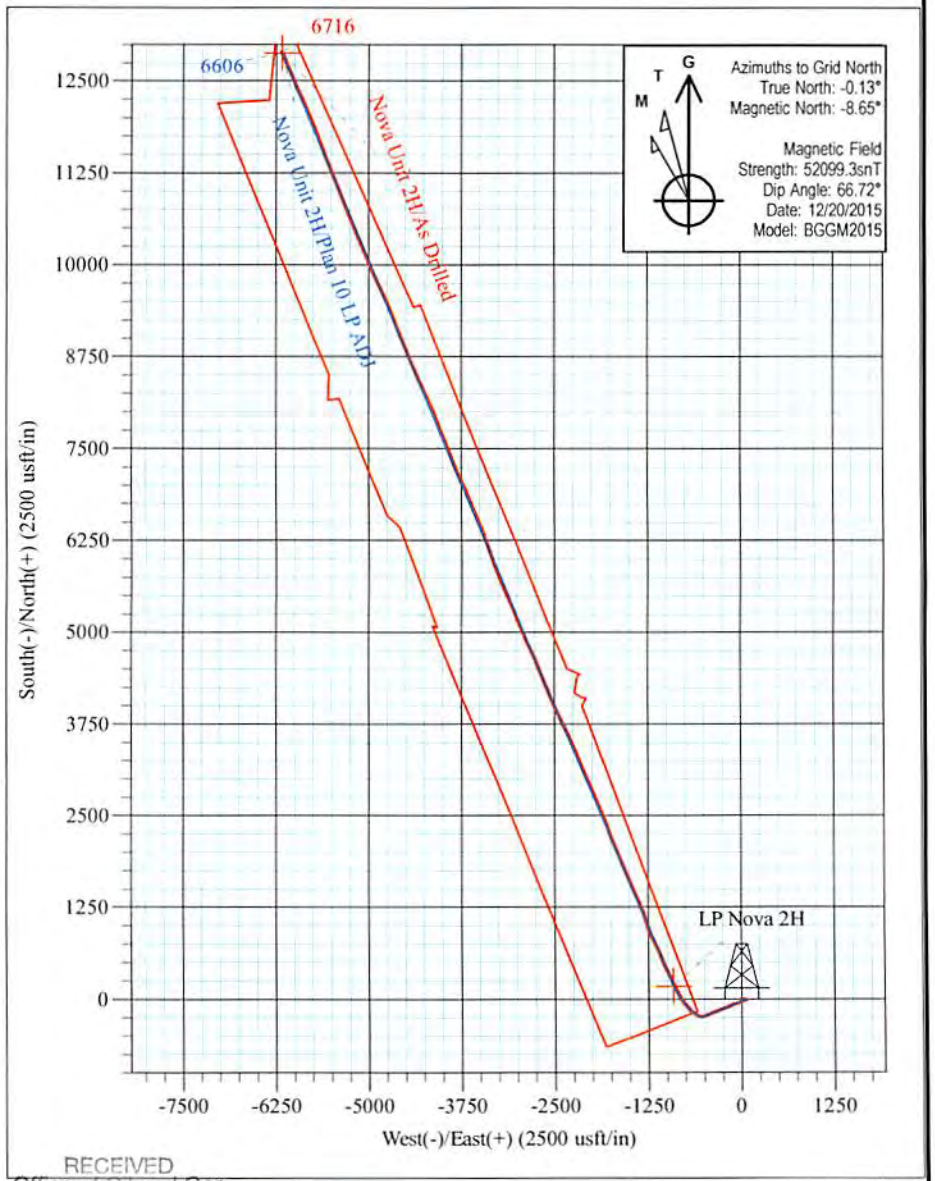
PROJECT DETAILS:
Geodetic System: Universal Transverse Mercator (US Survey Feet)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: Zone 17N (84 W to 78 W)
System Datum: Mean Sea Level

Scientific Drilling

WELL DETAILS: Nova Unit 2H SHL

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	14270983.37	1696920.98	39° 17' 57.576 N	80° 48' 0.962 W





RECEIVED
Office of Oil and Gas
AUG 21 2017

Nova Unit 2H
Approx. BHL
39° 20' 5.239 N 80° 49' 19.244 W

Shane Rhodes
10:26, January 08 2016

Scientific Drilling International
124 Vista Drive
Charleroi, PA 15022

Scientific Drilling International
Survey Report

Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Nova Unit 2H
Project:	Doddridge County WV	**TVD Reference:**	1189' GL + 25' KB @ 1214.0usft (Patterson 347)
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	**MD Reference:**	1189' GL + 25' KB @ 1214.0usft (Patterson 347)
Well:	Nova 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	Nova Unit 2H, Marcellus					
Well Position	**+N/-S**	0.0 usft	**Northing:**	14,270,983.37 usft	**Latitude:**	39° 17' 57.576 N
	+E/-W	0.0 usft	**Easting:**	1,696,920.97 usft	**Longitude:**	80° 48' 0.962 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	10/8/2015	-8.52	66.74	52,123
	BGGM2015	12/20/2015	-8.53	66.72	52,099

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	337.52	

Survey Program	**Date** 1/8/2016			
From (usft)	**To (usft)**	**Survey (Wellbore)**	**Tool Name**	**Description**
112.5	6,242.1	Survey #9 Def Fin Gyro (Original Wellpath	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4
6,371.0	21,102.0	Survey #10 - SDI MWD (Original Wellpath	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
112.5	0.14	165.26	112.5	-0.1	0.0	-0.1	0.12	0.12	0.00
136.6	0.06	70.24	136.6	-0.2	0.1	-0.2	0.65	-0.33	-395.42
160.6	0.08	217.18	160.6	-0.2	0.1	-0.2	0.56	0.08	611.23
186.2	0.08	225.93	186.2	-0.2	0.0	-0.2	0.05	0.00	34.23
211.7	0.07	164.70	211.7	-0.2	0.0	-0.2	0.30	-0.04	-239.55
236.9	0.04	159.19	236.9	-0.2	0.0	-0.2	0.12	-0.12	-21.89
261.0	0.09	230.15	261.0	-0.3	0.0	-0.3	0.36	0.21	294.81
285.4	0.21	203.45	285.4	-0.3	0.0	-0.3	0.56	0.49	-109.43

Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Nova Unit 2H
Project:	Doddridge County WV	**TVD Reference:**	1189' GL + 25' KB @ 1214.0usft (Patterson 347)
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	**MD Reference:**	1189' GL + 25' KB @ 1214.0usft (Patterson 347)
Well:	Nova 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)
310.9	0.21	215.78	310.9	-0.4	-0.1	-0.3	0.18	0.00	48.37
336.6	0.23	223.48	336.6	-0.5	-0.1	-0.4	0.14	0.08	29.90
361.2	0.06	147.99	361.2	-0.5	-0.1	-0.4	0.90	-0.69	-306.50
385.3	0.22	132.28	385.3	-0.6	-0.1	-0.5	0.68	0.67	-65.40
411.2	0.74	103.98	411.2	-0.6	0.1	-0.6	2.15	2.01	-109.27
435.4	1.65	88.95	435.4	-0.7	0.6	-0.8	3.94	3.75	-61.98
461.5	2.07	89.89	461.5	-0.7	1.4	-1.2	1.61	1.61	3.60
485.2	2.50	91.74	485.2	-0.7	2.4	-1.5	1.84	1.82	7.82
511.4	2.67	92.46	511.3	-0.7	3.6	-2.0	0.66	0.65	2.75
535.0	2.82	93.21	534.9	-0.8	4.7	-2.5	0.65	0.63	3.17
560.7	3.13	93.40	560.6	-0.9	6.0	-3.1	1.21	1.21	0.74
585.0	3.90	93.42	584.9	-0.9	7.5	-3.7	3.17	3.17	0.08
610.9	4.11	94.93	610.6	-1.1	9.3	-4.6	0.91	0.81	5.85
636.7	4.14	95.86	636.4	-1.2	11.2	-5.4	0.28	0.12	3.60
659.6	4.36	95.51	659.2	-1.4	12.8	-6.2	0.97	0.96	-1.53
685.2	4.67	95.93	684.8	-1.6	14.9	-7.2	1.21	1.21	1.64
711.4	4.77	96.46	710.9	-1.8	17.0	-8.2	0.42	0.38	2.02
734.8	4.83	95.79	734.2	-2.1	18.9	-9.1	0.35	0.26	-2.87
760.8	4.81	95.14	760.1	-2.3	21.1	-10.2	0.22	-0.08	-2.50
786.8	4.99	95.09	786.0	-2.5	23.3	-11.2	0.69	0.69	-0.19
809.7	4.98	95.52	808.8	-2.6	25.3	-12.1	0.17	-0.04	1.88
834.8	5.00	95.19	833.8	-2.9	27.5	-13.1	0.14	0.08	-1.32
860.0	4.97	94.64	858.9	-3.0	29.7	-14.2	0.22	-0.12	-2.18
885.7	4.93	96.42	884.5	-3.3	31.9	-15.2	0.62	-0.16	6.93
910.9	4.48	96.92	909.6	-3.5	33.9	-16.2	1.79	-1.78	1.98
936.2	4.15	96.04	934.9	-3.7	35.8	-17.1	1.33	-1.30	-3.47
961.7	3.72	96.60	960.3	-3.9	37.6	-18.0	1.69	-1.69	2.20
986.8	3.58	96.80	985.4	-4.1	39.1	-18.7	0.56	-0.56	0.80
1,009.6	3.45	98.80	1,008.1	-4.3	40.5	-19.4	0.79	-0.57	8.79
1,034.7	3.22	96.99	1,033.2	-4.5	42.0	-20.2	1.01	-0.92	-7.21
1,059.8	2.96	98.10	1,058.2	-4.7	43.3	-20.9	1.06	-1.04	4.42
1,085.4	2.73	99.87	1,083.8	-4.9	44.6	-21.5	0.96	-0.90	6.91
1,110.7	2.54	97.39	1,109.0	-5.0	45.7	-22.1	0.88	-0.75	-9.82
1,135.8	2.26	98.65	1,134.2	-5.2	46.8	-22.7	1.13	-1.11	5.01
1,160.9	2.12	98.99	1,159.3	-5.3	47.7	-23.2	0.56	-0.56	1.35
1,186.4	2.03	98.72	1,184.7	-5.5	48.6	-23.6	0.36	-0.35	-1.06
1,211.6	1.96	100.04	1,209.9	-5.6	49.5	-24.1	0.33	-0.28	5.23
1,234.3	1.77	95.31	1,232.6	-5.7	50.2	-24.5	1.08	-0.84	-20.88
1,259.3	1.61	96.48	1,257.6	-5.8	51.0	-24.8	0.65	-0.64	4.68
1,285.0	1.37	97.61	1,283.2	-5.9	51.6	-25.2	0.94	-0.93	4.40
1,310.1	1.31	95.57	1,308.4	-5.9	52.2	-25.4	0.30	-0.24	-8.10
1,335.3	1.23	97.68	1,333.5	-6.0	52.8	-25.7	0.37	-0.32	8.39
1,360.4	1.14	97.82	1,358.6	-6.1	53.3	-26.0	0.36	-0.36	0.56

01/05/2018

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Well:	Nova 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)
1,385.9	0.99	104.84	1,384.2	-6.2	53.7	-26.2	0.78	-0.59	27.49
1,411.1	0.90	101.69	1,409.3	-6.2	54.1	-26.5	0.41	-0.36	-12.52
1,436.7	0.86	95.50	1,434.9	-6.3	54.5	-26.7	0.40	-0.16	-24.15
1,461.9	0.80	87.99	1,460.2	-6.3	54.9	-26.8	0.49	-0.24	-29.75
1,486.9	0.86	102.55	1,485.2	-6.4	55.2	-27.0	0.87	0.24	58.26
1,509.6	0.72	102.20	1,507.9	-6.4	55.6	-27.2	0.62	-0.62	-1.54
1,534.9	0.78	117.02	1,533.1	-6.5	55.9	-27.4	0.80	0.24	58.74
1,559.9	0.64	101.56	1,558.1	-6.6	56.2	-27.6	0.94	-0.56	-61.74
1,584.6	0.64	104.87	1,582.8	-6.7	56.4	-27.8	0.15	0.00	13.42
1,611.7	0.50	96.02	1,610.0	-6.8	56.7	-27.9	0.61	-0.52	-32.57
1,636.4	0.55	111.64	1,634.6	-6.8	56.9	-28.0	0.61	0.20	63.34
1,661.0	0.52	104.30	1,659.2	-6.9	57.1	-28.2	0.30	-0.12	-29.83
1,686.1	0.48	105.26	1,684.4	-6.9	57.3	-28.3	0.16	-0.16	3.82
1,711.0	0.50	102.70	1,709.3	-7.0	57.5	-28.5	0.12	0.08	-10.28
1,735.6	0.41	85.14	1,733.8	-7.0	57.7	-28.5	0.67	-0.37	-71.59
1,760.2	0.40	90.33	1,758.5	-7.0	57.9	-28.6	0.15	-0.04	21.04
1,784.8	0.27	90.66	1,783.1	-7.0	58.0	-28.7	0.53	-0.53	1.34
1,809.4	0.41	93.17	1,807.6	-7.0	58.2	-28.7	0.57	0.57	10.24
1,836.8	0.40	107.98	1,835.0	-7.0	58.4	-28.8	0.38	-0.04	54.05
1,861.4	0.35	79.56	1,859.6	-7.1	58.5	-28.9	0.77	-0.20	-115.48
1,885.9	0.53	107.68	1,884.1	-7.1	58.7	-29.0	1.13	0.73	114.64
1,910.5	0.46	70.64	1,908.7	-7.1	58.9	-29.1	1.31	-0.28	-150.57
1,935.2	0.41	102.72	1,933.4	-7.1	59.1	-29.1	0.99	-0.20	130.04
1,961.0	0.42	104.87	1,959.2	-7.1	59.3	-29.2	0.07	0.04	8.32
1,985.9	0.38	93.98	1,984.1	-7.1	59.5	-29.3	0.34	-0.16	-43.75
2,010.4	0.34	91.68	2,008.6	-7.1	59.6	-29.4	0.17	-0.16	-9.38
2,035.0	0.37	78.88	2,033.2	-7.1	59.8	-29.4	0.34	0.12	-52.05
2,059.7	0.36	94.80	2,057.9	-7.1	59.9	-29.5	0.41	-0.04	64.56
2,084.2	0.30	85.03	2,082.4	-7.1	60.1	-29.5	0.33	-0.24	-39.83
2,111.6	0.16	74.45	2,109.9	-7.1	60.2	-29.6	0.53	-0.51	-38.53
2,136.2	0.12	84.29	2,134.4	-7.1	60.2	-29.6	0.19	-0.16	40.11
2,160.7	0.18	107.55	2,158.9	-7.1	60.3	-29.6	0.34	0.24	94.78
2,185.3	0.15	68.63	2,183.6	-7.1	60.3	-29.6	0.46	-0.12	-158.02
2,211.9	0.04	98.40	2,210.1	-7.1	60.4	-29.6	0.44	-0.41	112.30
2,236.9	0.15	95.26	2,235.1	-7.1	60.4	-29.7	0.44	0.44	-12.54
2,261.8	0.03	10.80	2,260.0	-7.1	60.5	-29.7	0.60	-0.48	-339.33
2,286.0	0.13	103.83	2,284.2	-7.1	60.5	-29.7	0.56	0.41	384.74
2,311.3	0.18	38.93	2,309.5	-7.1	60.5	-29.7	0.68	0.20	-255.81
2,336.8	0.08	79.72	2,335.1	-7.0	60.6	-29.7	0.51	-0.39	159.84
2,361.5	0.14	63.99	2,359.8	-7.0	60.6	-29.7	0.27	0.24	-63.71
2,386.4	0.09	39.55	2,384.6	-7.0	60.7	-29.7	0.28	-0.20	-98.47
2,411.0	0.20	107.70	2,409.3	-7.0	60.7	-29.7	0.75	0.45	276.02
2,435.6	0.16	12.50	2,433.9	-7.0	60.8	-29.7	1.09	-0.16	-386.99

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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)
2,460.2	0.13	40.54	2,458.4	-6.9	60.8	-29.6	0.31	-0.12	114.08
2,485.3	0.13	53.32	2,483.5	-6.9	60.8	-29.6	0.12	0.00	50.96
2,511.4	0.04	239.22	2,509.6	-6.9	60.9	-29.6	0.65	-0.34	-667.31
2,536.8	0.06	310.79	2,535.0	-6.9	60.8	-29.6	0.24	0.08	281.66
2,560.2	0.13	300.06	2,558.4	-6.8	60.8	-29.6	0.31	0.30	-45.87
2,585.6	0.06	289.84	2,583.8	-6.8	60.8	-29.5	0.28	-0.28	-40.24
2,611.2	0.17	312.66	2,609.4	-6.8	60.7	-29.5	0.46	0.43	89.11
2,636.5	0.08	295.60	2,634.7	-6.8	60.7	-29.4	0.38	-0.36	-67.48
2,661.5	0.19	332.73	2,659.7	-6.7	60.7	-29.4	0.54	0.44	148.28
2,685.5	0.12	335.10	2,683.7	-6.6	60.6	-29.3	0.29	-0.29	9.89
2,711.1	0.19	336.05	2,709.3	-6.6	60.6	-29.3	0.27	0.27	3.72
2,736.4	0.14	317.16	2,734.7	-6.5	60.6	-29.2	0.29	-0.20	-74.43
2,761.5	0.16	314.36	2,759.7	-6.5	60.5	-29.1	0.09	0.08	-11.19
2,786.8	0.14	312.91	2,785.0	-6.4	60.5	-29.1	0.08	-0.08	-5.72
2,810.5	0.11	341.42	2,808.7	-6.4	60.4	-29.0	0.29	-0.13	120.60
2,836.0	0.17	326.78	2,834.2	-6.3	60.4	-29.0	0.27	0.23	-57.30
2,861.1	0.23	321.48	2,859.4	-6.3	60.4	-28.9	0.25	0.24	-21.09
2,886.9	0.21	303.54	2,885.2	-6.2	60.3	-28.8	0.28	-0.08	-69.56
2,910.4	0.16	291.21	2,908.6	-6.2	60.2	-28.7	0.27	-0.21	-52.56
2,934.8	0.21	300.72	2,933.0	-6.1	60.1	-28.7	0.24	0.21	38.99
2,961.5	0.28	284.57	2,959.7	-6.1	60.0	-28.6	0.37	0.26	-60.55
2,985.4	0.28	298.84	2,983.6	-6.0	59.9	-28.5	0.29	0.00	59.56
3,009.5	0.28	283.10	3,007.7	-6.0	59.8	-28.4	0.32	0.00	-65.28
3,036.1	0.29	275.39	3,034.4	-6.0	59.7	-28.4	0.15	0.04	-28.96
3,060.2	0.34	313.97	3,058.4	-5.9	59.6	-28.3	0.89	0.21	160.28
3,084.4	0.32	300.26	3,082.6	-5.8	59.5	-28.1	0.34	-0.08	-56.61
3,109.5	0.31	293.33	3,107.7	-5.8	59.3	-28.0	0.16	-0.04	-27.70
3,133.9	0.32	295.53	3,132.2	-5.7	59.2	-27.9	0.06	0.04	8.98
3,161.0	0.32	304.64	3,159.2	-5.6	59.1	-27.8	0.19	0.00	33.68
3,186.5	0.27	296.54	3,184.7	-5.6	59.0	-27.7	0.26	-0.20	-31.81
3,211.2	0.28	312.16	3,209.4	-5.5	58.9	-27.6	0.30	0.04	63.16
3,235.7	0.29	305.83	3,233.9	-5.4	58.8	-27.5	0.13	0.04	-25.86
3,260.1	0.33	309.93	3,258.3	-5.4	58.7	-27.4	0.19	0.16	16.80
3,284.9	0.31	314.42	3,283.2	-5.3	58.6	-27.3	0.13	-0.08	18.05
3,311.6	0.25	286.96	3,309.8	-5.2	58.5	-27.2	0.54	-0.22	-102.96
3,335.9	0.29	312.96	3,334.1	-5.1	58.4	-27.1	0.53	0.16	107.17
3,360.8	0.27	305.19	3,359.0	-5.1	58.3	-27.0	0.17	-0.08	-31.15
3,385.1	0.31	322.39	3,383.4	-5.0	58.2	-26.9	0.39	0.16	70.69
3,409.6	0.23	295.71	3,407.8	-4.9	58.1	-26.8	0.60	-0.33	-108.94
3,436.6	0.29	310.26	3,434.8	-4.8	58.0	-26.7	0.33	0.22	53.93
3,461.0	0.32	317.63	3,459.2	-4.7	57.9	-26.5	0.20	0.12	30.20
3,485.3	0.15	297.50	3,483.5	-4.7	57.8	-26.4	0.77	-0.70	-82.77
3,509.8	0.19	287.24	3,508.0	-4.7	57.8	-26.4	0.20	0.16	-41.91
3,534.2	0.21	296.02	3,532.4	-4.6	57.7	-26.3	0.15	0.08	36.00

01/05/2018

Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Nova Unit 2H
Project:	Doddridge County WV	**TVD Reference:**	1189' GL + 25' KB @ 1214.0usft (Patterson 347)
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	**MD Reference:**	1189' GL + 25' KB @ 1214.0usft (Patterson 347)
Well:	Nova 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)
3,559.4	0.21	300.05	3,557.6	-4.6	57.6	-26.3	0.06	0.00	16.00
3,586.6	0.22	307.84	3,584.8	-4.5	57.5	-26.2	0.11	0.04	28.61
3,611.0	0.20	281.09	3,609.2	-4.5	57.5	-26.1	0.41	-0.08	-109.59
3,635.4	0.22	278.24	3,633.6	-4.5	57.4	-26.1	0.09	0.08	-11.68
3,660.2	0.30	286.15	3,658.4	-4.4	57.3	-26.0	0.35	0.32	31.91
3,684.6	0.21	292.84	3,682.8	-4.4	57.2	-25.9	0.39	-0.37	27.42
3,711.8	0.19	287.76	3,710.0	-4.4	57.1	-25.9	0.10	-0.07	-18.68
3,736.1	0.23	279.11	3,734.3	-4.4	57.0	-25.8	0.21	0.16	-35.64
3,760.7	0.20	289.90	3,758.9	-4.3	56.9	-25.8	0.20	-0.12	43.88
3,785.4	0.23	276.94	3,783.6	-4.3	56.8	-25.7	0.23	0.12	-52.38
3,809.9	0.26	285.90	3,808.1	-4.3	56.7	-25.6	0.20	0.12	36.57
3,837.0	0.28	297.74	3,835.2	-4.2	56.6	-25.6	0.22	0.07	43.79
3,861.4	0.27	294.49	3,859.6	-4.2	56.5	-25.5	0.08	-0.04	-13.32
3,885.2	0.24	267.42	3,883.4	-4.2	56.4	-25.4	0.52	-0.13	-113.74
3,911.7	0.26	300.06	3,909.9	-4.1	56.3	-25.3	0.53	0.08	122.98
3,936.6	0.23	271.97	3,934.8	-4.1	56.2	-25.3	0.49	-0.12	-112.77
3,960.5	0.23	287.59	3,958.7	-4.1	56.1	-25.2	0.26	0.00	65.33
3,984.4	0.20	264.25	3,982.6	-4.1	56.0	-25.2	0.38	-0.13	-97.66
4,011.4	0.22	283.97	4,009.6	-4.1	55.9	-25.1	0.28	0.07	73.06
4,035.1	0.19	273.24	4,033.4	-4.1	55.8	-25.1	0.20	-0.13	-45.20
4,059.5	0.23	297.62	4,057.7	-4.0	55.7	-25.0	0.40	0.16	100.12
4,087.0	0.22	275.90	4,085.2	-4.0	55.6	-25.0	0.31	-0.04	-78.98
4,110.7	0.22	268.72	4,108.9	-4.0	55.5	-24.9	0.12	0.00	-30.28
4,134.7	0.19	281.86	4,132.9	-4.0	55.4	-24.9	0.23	-0.12	54.68
4,161.6	0.14	283.62	4,159.8	-4.0	55.4	-24.9	0.19	-0.19	6.56
4,185.4	0.12	304.76	4,183.6	-4.0	55.3	-24.8	0.22	-0.08	88.56
4,212.0	0.13	281.19	4,210.2	-3.9	55.3	-24.8	0.20	0.04	-88.71
4,235.7	0.16	301.59	4,233.9	-3.9	55.2	-24.7	0.25	0.13	85.97
4,259.6	0.13	297.52	4,257.8	-3.9	55.2	-24.7	0.13	-0.13	-17.05
4,286.2	0.34	339.17	4,284.4	-3.8	55.1	-24.6	0.97	0.79	156.70
4,310.1	0.16	274.23	4,308.3	-3.7	55.1	-24.5	1.29	-0.75	-271.94
4,334.5	0.11	251.62	4,332.7	-3.7	55.0	-24.5	0.30	-0.20	-92.59
4,360.2	0.24	311.49	4,358.4	-3.7	54.9	-24.4	0.81	0.51	232.96
4,384.9	0.26	324.07	4,383.1	-3.6	54.9	-24.3	0.24	0.08	50.81
4,410.7	0.24	268.41	4,408.9	-3.6	54.8	-24.3	0.91	-0.08	-216.41
4,460.9	0.31	272.01	4,459.1	-3.6	54.5	-24.2	0.14	0.14	7.16
4,486.7	0.08	299.74	4,484.9	-3.6	54.4	-24.1	0.94	-0.89	107.65
4,511.7	0.17	267.41	4,509.9	-3.6	54.4	-24.1	0.44	0.36	-128.91
4,536.5	0.34	260.37	4,534.7	-3.6	54.3	-24.1	0.70	0.69	-28.49
4,561.5	0.31	247.22	4,559.7	-3.6	54.1	-24.0	0.32	-0.12	-52.43
4,586.6	0.73	233.44	4,584.8	-3.7	54.0	-24.1	1.74	1.68	-55.03
4,611.7	1.47	222.61	4,609.9	-4.1	53.6	-24.3	3.04	2.94	-43.06
4,636.9	2.10	218.46	4,635.1	-4.7	53.1	-24.6	2.56	2.50	-16.50

01/05/2018

Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Nova Unit 2H
Project:	Doddridge County WV	**TVD Reference:**	1189' GL + 25' KB @ 1214.0usft (Patterson 347)
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	**MD Reference:**	1189' GL + 25' KB @ 1214.0usft (Patterson 347)
Well:	Nova 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)
4,661.4	2.04	219.94	4,659.6	-5.4	52.5	-25.0	0.33	-0.24	6.02
4,686.3	3.21	225.66	4,684.4	-6.2	51.8	-25.5	4.82	4.71	23.04
4,711.4	4.15	225.88	4,709.5	-7.3	50.6	-26.1	3.74	3.74	0.87
4,736.6	4.54	226.67	4,734.6	-8.6	49.2	-26.8	1.57	1.55	3.14
4,761.8	5.30	226.87	4,759.8	-10.1	47.7	-27.6	3.01	3.01	0.79
4,786.3	5.45	227.13	4,784.2	-11.7	46.0	-28.4	0.62	0.61	1.06
4,811.2	6.04	230.37	4,808.9	-13.3	44.1	-29.2	2.70	2.37	13.01
4,836.7	6.60	233.93	4,834.3	-15.0	41.9	-29.9	2.68	2.20	13.96
4,861.6	6.89	238.40	4,859.0	-16.7	39.5	-30.5	2.41	1.17	17.99
4,886.9	6.80	238.99	4,884.0	-18.2	36.9	-30.9	0.45	-0.36	2.34
4,911.3	6.86	239.23	4,908.4	-19.7	34.4	-31.4	0.27	0.24	0.98
4,936.2	6.97	242.74	4,933.0	-21.2	31.8	-31.7	1.76	0.44	14.12
4,961.8	7.20	247.58	4,958.4	-22.5	28.9	-31.8	2.50	0.90	18.94
4,986.3	7.39	248.25	4,982.7	-23.7	26.0	-31.8	0.85	0.78	2.73
5,011.5	8.29	249.79	5,007.7	-24.9	22.8	-31.7	3.66	3.57	6.11
5,035.8	9.00	250.53	5,031.7	-26.1	19.4	-31.5	2.96	2.93	3.05
5,061.1	10.07	250.29	5,056.7	-27.5	15.4	-31.3	4.22	4.22	-0.95
5,086.4	11.23	250.30	5,081.5	-29.1	11.0	-31.1	4.59	4.59	0.04
5,111.7	12.14	251.25	5,106.3	-30.8	6.2	-30.8	3.67	3.60	3.75
5,136.2	12.59	251.16	5,130.2	-32.5	1.2	-30.5	1.84	1.84	-0.37
5,160.9	13.30	251.63	5,154.3	-34.2	-4.0	-30.1	2.91	2.87	1.90
5,186.6	14.04	252.14	5,179.3	-36.1	-9.8	-29.6	2.91	2.87	1.98
5,212.0	15.03	251.80	5,203.8	-38.1	-15.9	-29.1	3.92	3.90	-1.34
5,236.1	16.32	250.98	5,227.1	-40.2	-22.0	-28.7	5.42	5.35	-3.40
5,261.8	17.21	251.29	5,251.7	-42.6	-29.1	-28.2	3.48	3.46	1.20
5,286.0	18.07	251.17	5,274.8	-44.9	-36.0	-27.8	3.56	3.55	-0.50
5,311.3	19.08	251.34	5,298.7	-47.5	-43.6	-27.2	4.00	4.00	0.67
5,336.8	20.09	250.76	5,322.8	-50.3	-51.7	-26.7	4.03	3.96	-2.27
5,361.7	21.14	250.08	5,346.1	-53.2	-60.0	-26.3	4.33	4.22	-2.73
5,385.7	22.27	249.55	5,368.4	-56.3	-68.3	-25.9	4.78	4.71	-2.21
5,410.2	23.59	248.75	5,390.9	-59.7	-77.2	-25.6	5.54	5.39	-3.27
5,436.8	24.41	248.13	5,415.2	-63.7	-87.3	-25.5	3.23	3.08	-2.33
5,460.8	25.31	247.32	5,437.0	-67.5	-96.6	-25.4	4.00	3.74	-3.37
5,486.0	25.73	246.74	5,459.8	-71.8	-106.6	-25.5	1.94	1.67	-2.30
5,510.8	25.97	246.11	5,482.0	-76.1	-116.5	-25.7	1.48	0.97	-2.55
5,535.4	26.30	246.11	5,504.2	-80.5	-126.4	-26.0	1.34	1.34	0.00
5,561.7	26.91	246.11	5,527.7	-85.2	-137.2	-26.3	2.32	2.32	0.00
5,586.8	27.20	246.17	5,550.0	-89.8	-147.6	-26.6	1.16	1.16	0.24
5,610.8	27.08	246.55	5,571.4	-94.2	-157.7	-26.8	0.88	-0.50	1.58
5,635.6	26.76	246.83	5,593.5	-98.7	-168.0	-27.0	1.39	-1.29	1.13
5,661.8	26.70	247.35	5,616.8	-103.3	-178.8	-27.0	0.92	-0.23	1.99
5,686.4	26.13	247.67	5,638.9	-107.5	-189.0	-27.0	2.38	-2.31	1.30
5,711.5	25.89	248.49	5,661.5	-111.6	-199.2	-26.9	1.72	-0.96	3.26

01/05/2018

Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Nova Unit 2H
Project:	Doddridge County WV	**TVD Reference:**	1189' GL + 25' KB @ 1214.0usft (Patterson 347)
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	**MD Reference:**	1189' GL + 25' KB @ 1214.0usft (Patterson 347)
Well:	Nova 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)
5,736.7	25.24	249.47	5,684.2	-115.5	-209.3	-26.7	3.09	-2.59	3.90
5,761.9	24.95	250.53	5,707.0	-119.1	-219.3	-26.2	2.12	-1.15	4.21
5,786.5	25.29	250.97	5,729.3	-122.6	-229.2	-25.6	1.57	1.38	1.78
5,811.2	24.31	251.28	5,751.7	-125.9	-239.0	-25.0	4.02	-3.98	1.26
5,836.3	24.35	251.23	5,774.6	-129.2	-248.8	-24.3	0.18	0.16	-0.20
5,861.3	24.08	250.22	5,797.4	-132.6	-258.5	-23.7	1.98	-1.08	-4.05
5,886.1	24.47	249.74	5,820.0	-136.1	-268.1	-23.3	1.76	1.57	-1.93
5,911.0	24.48	249.23	5,842.7	-139.7	-277.7	-22.9	0.85	0.04	-2.05
5,935.6	24.40	248.14	5,865.1	-143.4	-287.2	-22.7	1.86	-0.33	-4.43
5,961.9	24.26	247.73	5,889.0	-147.5	-297.2	-22.6	0.84	-0.53	-1.56
5,987.0	24.82	247.71	5,911.8	-151.4	-306.9	-22.6	2.23	2.23	-0.08
6,010.9	24.81	246.92	5,933.6	-155.3	-316.2	-22.6	1.38	-0.04	-3.29
6,036.9	24.01	245.80	5,957.2	-159.6	-326.0	-22.9	3.56	-3.08	-4.32
6,061.1	24.90	245.59	5,979.2	-163.7	-335.1	-23.2	3.70	3.68	-0.87
6,086.7	23.95	246.05	6,002.5	-168.1	-344.8	-23.5	3.78	-3.71	1.80
6,110.8	24.31	245.98	6,024.6	-172.1	-353.8	-23.7	1.50	1.49	-0.29
6,136.4	22.82	247.05	6,048.0	-176.2	-363.2	-23.9	6.06	-5.82	4.18
6,160.9	24.17	248.97	6,070.5	-179.8	-372.2	-23.8	6.33	5.50	7.83
6,186.4	24.12	249.88	6,093.8	-183.5	-382.0	-23.5	1.47	-0.20	3.57
6,211.9	24.63	250.76	6,117.0	-187.0	-391.9	-23.0	2.46	2.00	3.46
6,236.4	24.95	251.67	6,139.2	-190.3	-401.6	-22.3	2.03	1.31	3.72
6,242.0	25.36	251.75	6,144.3	-191.1	-403.9	-22.1	7.34	7.32	1.39
Last Gyro @ 6242									
6,242.1	25.37	251.75	6,144.4	-191.1	-403.9	-22.1	7.34	7.32	1.37
6,371.0	25.54	246.71	6,260.8	-210.7	-455.7	-20.5	1.69	0.13	-3.91
First SDI MWD @ 6371									
6,403.0	25.16	244.83	6,289.7	-216.4	-468.2	-20.9	2.78	-1.19	-5.88
6,434.0	24.53	242.15	6,317.8	-222.2	-479.8	-21.8	4.16	-2.03	-8.65
6,465.0	24.11	245.18	6,346.1	-227.8	-491.3	-22.7	4.25	-1.35	9.77
6,528.0	22.99	249.80	6,403.8	-237.5	-514.5	-22.7	3.43	-1.78	7.33
6,559.0	22.82	261.12	6,432.4	-240.5	-526.1	-21.1	14.20	-0.55	36.52
6,590.0	24.04	272.72	6,460.9	-241.1	-538.4	-17.0	15.37	3.94	37.42
6,621.0	26.15	282.69	6,489.0	-239.3	-551.3	-10.3	15.22	6.81	32.16
6,653.0	28.21	290.94	6,517.4	-235.1	-565.3	-1.1	13.41	6.44	25.78
6,684.0	30.44	294.42	6,544.5	-229.2	-579.3	9.7	9.05	7.19	11.23
6,715.0	32.77	298.60	6,570.9	-221.9	-593.8	22.0	10.31	7.52	13.48
6,747.0	35.63	301.88	6,597.3	-212.9	-609.3	36.3	10.63	8.94	10.25
6,766.0	37.43	304.09	6,612.6	-206.7	-618.8	45.6	11.71	9.45	11.62
Middlesex @ 6766									
6,778.0	38.58	305.39	6,622.0	-202.5	-624.9	51.8	11.71	9.62	10.85
6,809.0	41.50	308.24	6,645.8	-190.5	-640.8	69.0	11.12	9.42	9.19
6,840.0	44.54	310.77	6,668.4	-177.1	-657.1	87.6	11.28	9.81	8.16
6,872.0	48.15	313.41	6,690.5	-161.6	-674.3	108.5	12.76	11.28	8.25
6,903.0	50.73	315.05	6,710.7	-145.1	-691.2	130.2	9.24	8.32	5.29

01/05/2018

Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Nova Unit 2H
Project:	Doddridge County WV	**TVD Reference:**	1189' GL + 25' KB @ 1214.0usft (Patterson 347)
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	**MD Reference:**	1189' GL + 25' KB @ 1214.0usft (Patterson 347)
Well:	Nova 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)
6,934.0	53.44	316.27	6,729.7	-127.6	-708.3	152.9	9.28	8.74	3.94
6,945.0	54.62	316.92	6,736.2	-121.2	-714.4	161.2	11.77	10.75	5.93
Burket @ 6945									
6,965.0	56.78	318.06	6,747.5	-109.0	-725.5	176.7	11.77	10.79	5.69
6,997.0	59.62	320.09	6,764.3	-88.4	-743.3	202.5	10.38	8.88	6.34
6,999.0	59.77	320.17	6,765.3	-87.1	-744.5	204.2	8.40	7.73	3.83
Tully @ 6999									
7,028.0	62.02	321.25	6,779.4	-67.5	-760.5	228.4	8.40	7.74	3.74
7,059.0	64.69	322.89	6,793.3	-45.7	-777.5	255.1	9.83	8.61	5.29
7,088.0	67.54	325.23	6,805.1	-24.2	-793.1	280.9	12.30	9.83	8.08
Marcellus @ 7088									
7,090.0	67.74	325.39	6,805.8	-22.7	-794.1	282.7	12.30	9.90	7.89
7,121.0	71.03	327.71	6,816.8	1.5	-810.1	311.2	12.72	10.61	7.48
7,153.0	74.62	329.59	6,826.2	27.7	-826.0	341.4	12.54	11.22	5.88
7,184.0	77.73	331.25	6,833.6	53.8	-840.9	371.3	11.30	10.03	5.35
7,215.0	81.03	332.45	6,839.3	80.7	-855.2	401.6	11.30	10.65	3.87
7,234.0	84.16	333.60	6,841.8	97.5	-863.8	420.4	17.53	16.47	6.05
7,273.0	89.77	334.95	6,843.8	132.6	-880.7	459.2	14.79	14.38	3.46
7,295.0	91.41	336.60	6,843.6	152.6	-889.7	481.2	10.57	7.45	7.50
7,335.0	91.91	336.47	6,842.5	189.3	-905.6	521.2	1.29	1.25	-0.33
7,429.0	92.15	334.39	6,839.1	274.7	-944.7	615.1	2.23	0.26	-2.21
7,523.0	90.37	333.46	6,837.1	359.1	-986.0	708.8	2.14	-1.89	-0.99
7,617.0	89.43	336.98	6,837.2	444.5	-1,025.4	802.7	3.88	-1.00	3.74
7,711.0	90.80	337.44	6,837.0	531.1	-1,061.8	896.7	1.54	1.46	0.49
7,805.0	91.47	337.22	6,835.2	617.8	-1,098.0	990.7	0.75	0.71	-0.23
7,899.0	91.81	336.92	6,832.5	704.4	-1,134.6	1,084.7	0.48	0.36	-0.32
7,993.0	89.38	332.41	6,831.5	789.3	-1,174.8	1,178.5	5.45	-2.59	-4.80
8,088.0	90.45	336.98	6,831.6	875.2	-1,215.4	1,273.4	4.94	1.13	4.81
8,182.0	91.20	342.87	6,830.3	963.4	-1,247.7	1,367.3	6.32	0.80	6.27
8,276.0	91.31	341.85	6,828.2	1,053.0	-1,276.2	1,460.9	1.09	0.12	-1.09
8,370.0	90.50	339.44	6,826.7	1,141.6	-1,307.3	1,554.7	2.70	-0.86	-2.56
8,464.0	90.95	338.30	6,825.6	1,229.3	-1,341.2	1,648.7	1.30	0.48	-1.21
8,559.0	91.27	336.87	6,823.7	1,317.1	-1,377.4	1,743.7	1.54	0.34	-1.51
8,653.0	90.06	337.59	6,822.6	1,403.8	-1,413.8	1,837.7	1.50	-1.29	0.77
8,747.0	90.92	338.47	6,821.8	1,490.9	-1,448.9	1,931.7	1.31	0.91	0.94
8,841.0	91.65	339.49	6,819.7	1,578.7	-1,482.7	2,025.6	1.33	0.78	1.09
8,935.0	91.08	336.24	6,817.5	1,665.7	-1,518.1	2,119.6	3.51	-0.61	-3.46
9,029.0	90.86	334.98	6,815.9	1,751.3	-1,556.9	2,213.5	1.36	-0.23	-1.34
9,123.0	91.63	338.05	6,813.8	1,837.5	-1,594.3	2,307.4	3.37	0.82	3.27
9,217.0	91.70	337.55	6,811.1	1,924.5	-1,629.8	2,401.4	0.54	0.07	-0.53
9,311.0	91.45	338.38	6,808.5	2,011.6	-1,665.1	2,495.4	0.92	-0.27	0.88
9,405.0	91.66	338.43	6,806.0	2,098.9	-1,699.7	2,589.3	0.23	0.22	0.05
9,499.0	90.62	336.01	6,804.1	2,185.6	-1,736.0	2,683.3	2.80	-1.11	-2.57
9,594.0	91.52	340.85	6,802.3	2,273.9	-1,770.9	2,778.2	5.18	0.95	5.09

01/05/2018

Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Nova Unit 2H
Project:	Doddridge County WV	**TVD Reference:**	1189' GL + 25' KB @ 1214.0usft (Patterson 347)
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	**MD Reference:**	1189' GL + 25' KB @ 1214.0usft (Patterson 347)
Well:	Nova 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)
9,688.0	90.90	339.63	6,800.3	2,362.3	-1,802.7	2,872.1	1.46	-0.66	-1.30
9,782.0	90.51	338.16	6,799.2	2,450.0	-1,836.6	2,966.1	1.62	-0.41	-1.56
9,876.0	90.47	337.49	6,798.4	2,537.1	-1,872.0	3,060.1	0.71	-0.04	-0.71
9,970.0	90.67	336.68	6,797.5	2,623.6	-1,908.6	3,154.1	0.89	0.21	-0.86
10,064.0	91.62	337.77	6,795.6	2,710.3	-1,945.0	3,248.0	1.54	1.01	1.16
10,158.0	92.14	336.97	6,792.5	2,797.0	-1,981.2	3,342.0	1.01	0.55	-0.85
10,252.0	90.28	337.26	6,790.5	2,883.6	-2,017.7	3,436.0	2.00	-1.98	0.31
10,346.0	90.49	335.44	6,789.9	2,969.7	-2,055.4	3,529.9	1.95	0.22	-1.94
10,441.0	90.46	336.62	6,789.1	3,056.5	-2,094.0	3,624.9	1.24	-0.03	1.24
10,535.0	92.12	338.54	6,787.0	3,143.3	-2,129.8	3,718.9	2.70	1.77	2.04
10,629.0	90.54	338.05	6,784.8	3,230.7	-2,164.6	3,812.8	1.76	-1.68	-0.52
10,723.0	91.17	340.01	6,783.4	3,318.4	-2,198.2	3,906.8	2.19	0.67	2.09
10,817.0	90.44	336.67	6,782.1	3,405.8	-2,232.9	4,000.7	3.64	-0.78	-3.55
10,912.0	90.56	336.29	6,781.2	3,492.9	-2,270.8	4,095.7	0.42	0.13	-0.40
11,006.0	90.80	335.46	6,780.1	3,578.6	-2,309.3	4,189.7	0.92	0.26	-0.88
11,100.0	91.34	334.36	6,778.4	3,663.8	-2,349.1	4,283.6	1.30	0.57	-1.17
11,194.0	91.10	335.91	6,776.4	3,749.0	-2,388.6	4,377.5	1.67	-0.26	1.65
11,288.0	91.37	335.33	6,774.3	3,834.6	-2,427.4	4,471.4	0.68	0.29	-0.62
11,382.0	90.86	336.05	6,772.5	3,920.3	-2,466.1	4,565.3	0.94	-0.54	0.77
11,476.0	90.96	334.15	6,771.0	4,005.5	-2,505.7	4,659.2	2.02	0.11	-2.02
11,571.0	90.42	336.62	6,769.9	4,091.9	-2,545.2	4,754.1	2.66	-0.57	2.60
11,665.0	91.69	340.29	6,768.1	4,179.3	-2,579.7	4,848.1	4.13	1.35	3.90
11,759.0	90.61	338.60	6,766.3	4,267.3	-2,612.7	4,942.0	2.13	-1.15	-1.80
11,853.0	91.18	338.30	6,764.8	4,354.7	-2,647.3	5,036.0	0.69	0.61	-0.32
11,947.0	91.45	336.76	6,762.6	4,441.5	-2,683.2	5,130.0	1.66	0.29	-1.64
12,041.0	91.72	339.32	6,760.0	4,528.7	-2,718.3	5,223.9	2.74	0.29	2.72
12,135.0	89.10	335.59	6,759.4	4,615.4	-2,754.3	5,317.9	4.85	-2.79	-3.97
12,229.0	90.18	336.57	6,759.9	4,701.4	-2,792.5	5,411.8	1.55	1.15	1.04
12,323.0	89.88	336.31	6,759.9	4,787.5	-2,830.0	5,505.8	0.42	-0.32	-0.28
12,417.0	91.13	335.35	6,759.1	4,873.3	-2,868.5	5,599.8	1.68	1.33	-1.02
12,511.0	91.45	337.84	6,756.9	4,959.5	-2,905.8	5,693.7	2.67	0.34	2.65
12,605.0	91.37	337.47	6,754.6	5,046.4	-2,941.6	5,787.7	0.40	-0.09	-0.39
12,699.0	92.14	338.33	6,751.8	5,133.5	-2,976.9	5,881.7	1.23	0.82	0.91
12,794.0	91.15	337.44	6,749.0	5,221.5	-3,012.7	5,976.6	1.40	-1.04	-0.94
12,888.0	90.58	335.79	6,747.6	5,307.7	-3,050.0	6,070.6	1.86	-0.61	-1.76
12,982.0	91.02	337.21	6,746.3	5,393.9	-3,087.4	6,164.6	1.58	0.47	1.51
13,076.0	90.29	335.19	6,745.2	5,479.9	-3,125.4	6,258.5	2.28	-0.78	-2.15
13,170.0	90.48	336.74	6,744.6	5,565.8	-3,163.7	6,352.5	1.66	0.20	1.65
13,264.0	90.88	337.32	6,743.5	5,652.3	-3,200.3	6,446.5	0.75	0.43	0.62
13,358.0	90.57	337.56	6,742.3	5,739.1	-3,236.4	6,540.5	0.42	-0.33	0.26
13,452.0	89.32	339.88	6,742.4	5,826.7	-3,270.5	6,634.4	2.80	-1.33	2.47
13,546.0	90.42	341.15	6,742.6	5,915.3	-3,301.9	6,728.3	1.79	1.17	1.35
13,641.0	91.46	342.32	6,741.0	6,005.5	-3,331.6	6,823.0	1.65	1.09	1.23

Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Nova Unit 2H
Project:	Doddridge County WV	**TVD Reference:**	1189' GL + 25' KB @ 1214.0usft (Patterson 347)
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	**MD Reference:**	1189' GL + 25' KB @ 1214.0usft (Patterson 347)
Well:	Nova 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)
13,735.0	90.21	339.58	6,739.7	6,094.3	-3,362.3	6,916.9	3.20	-1.33	-2.91
13,829.0	90.82	338.85	6,738.8	6,182.2	-3,395.7	7,010.8	1.01	0.65	-0.78
13,923.0	89.55	337.90	6,738.5	6,269.6	-3,430.3	7,104.8	1.69	-1.35	-1.01
14,017.0	91.16	341.13	6,737.9	6,357.6	-3,463.2	7,198.7	3.84	1.71	3.44
14,111.0	89.77	338.92	6,737.2	6,446.0	-3,495.3	7,292.6	2.78	-1.48	-2.35
14,205.0	89.79	338.86	6,737.5	6,533.6	-3,529.2	7,386.6	0.07	0.02	-0.06
14,300.0	89.74	337.35	6,737.9	6,621.8	-3,564.6	7,481.6	1.59	-0.05	-1.59
14,394.0	89.13	336.50	6,738.8	6,708.3	-3,601.4	7,575.6	1.11	-0.65	-0.90
14,488.0	90.53	337.32	6,739.1	6,794.7	-3,638.3	7,669.6	1.73	1.49	0.87
14,582.0	91.39	338.53	6,737.5	6,881.8	-3,673.6	7,763.5	1.58	0.91	1.29
14,676.0	89.61	333.71	6,736.7	6,967.7	-3,711.6	7,857.5	5.47	-1.89	-5.13
14,770.0	89.70	335.90	6,737.3	7,052.8	-3,751.7	7,951.4	2.33	0.10	2.33
14,864.0	92.42	339.65	6,735.6	7,139.8	-3,787.2	8,045.3	4.93	2.89	3.99
14,958.0	92.02	337.88	6,731.9	7,227.3	-3,821.2	8,139.2	1.93	-0.43	-1.88
15,053.0	91.68	338.64	6,728.8	7,315.5	-3,856.4	8,234.2	0.88	-0.36	0.80
15,147.0	92.36	337.91	6,725.5	7,402.8	-3,891.2	8,328.1	1.06	0.72	-0.78
15,241.0	92.29	337.24	6,721.7	7,489.6	-3,927.0	8,422.0	0.72	-0.07	-0.71
15,335.0	90.58	337.11	6,719.4	7,576.2	-3,963.4	8,516.0	1.82	-1.82	-0.14
15,429.0	89.83	338.11	6,719.0	7,663.1	-3,999.2	8,610.0	1.33	-0.80	1.06
15,523.0	90.08	341.27	6,719.1	7,751.3	-4,031.9	8,703.9	3.37	0.27	3.36
15,617.0	88.12	337.56	6,720.6	7,839.2	-4,064.9	8,797.8	4.46	-2.09	-3.95
15,711.0	88.42	338.41	6,723.4	7,926.3	-4,100.1	8,891.8	0.96	0.32	0.90
15,805.0	89.57	335.14	6,725.1	8,012.7	-4,137.2	8,985.7	3.69	1.22	-3.48
15,899.0	90.12	335.83	6,725.3	8,098.2	-4,176.2	9,079.7	0.94	0.59	0.73
15,994.0	90.47	335.75	6,724.8	8,184.9	-4,215.1	9,174.6	0.38	0.37	-0.08
16,087.0	90.80	333.91	6,723.8	8,269.0	-4,254.7	9,267.5	2.01	0.35	-1.98
16,181.0	90.41	337.17	6,722.8	8,354.6	-4,293.6	9,361.4	3.49	-0.41	3.47
16,275.0	90.81	336.06	6,721.8	8,440.9	-4,330.9	9,455.4	1.26	0.43	-1.18
16,369.0	88.78	336.71	6,722.1	8,527.0	-4,368.6	9,549.4	2.27	-2.16	0.69
16,463.0	89.39	339.10	6,723.6	8,614.1	-4,403.9	9,643.4	2.62	0.65	2.54
16,557.0	90.33	339.76	6,723.9	8,702.1	-4,436.9	9,737.3	1.22	1.00	0.70
16,651.0	90.67	338.51	6,723.1	8,789.9	-4,470.4	9,831.3	1.38	0.36	-1.33
16,745.0	91.03	337.89	6,721.7	8,877.2	-4,505.3	9,925.3	0.76	0.38	-0.66
16,839.0	89.10	336.11	6,721.6	8,963.7	-4,542.0	10,019.3	2.79	-2.05	-1.89
16,933.0	88.79	338.02	6,723.3	9,050.2	-4,578.7	10,113.2	2.06	-0.33	2.03
17,027.0	91.39	339.55	6,723.1	9,137.8	-4,612.7	10,207.2	3.21	2.77	1.63
17,121.0	92.14	338.14	6,720.2	9,225.5	-4,646.6	10,301.1	1.70	0.80	-1.50
17,215.0	90.42	337.65	6,718.1	9,312.5	-4,682.0	10,395.1	1.90	-1.83	-0.52
17,309.0	90.10	337.26	6,717.7	9,399.3	-4,718.0	10,489.1	0.54	-0.34	-0.41
17,403.0	90.05	336.19	6,717.6	9,485.7	-4,755.1	10,583.1	1.14	-0.05	-1.14
17,497.0	90.03	336.00	6,717.5	9,571.6	-4,793.2	10,677.1	0.20	-0.02	-0.20
17,591.0	90.54	336.23	6,717.1	9,657.6	-4,831.3	10,771.0	0.60	0.54	0.24
17,685.0	89.93	333.87	6,716.7	9,742.8	-4,870.9	10,864.9	2.59	-0.65	-2.51
17,779.0	89.80	336.68	6,716.9	9,828.2	-4,910.2	10,958.8	2.99	-0.14	2.99

01/05/2018

Scientific Drilling International
Survey Report

Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Nova Unit 2H
Project:	Doddridge County WV	**TVD Reference:**	1189' GL + 25' KB @ 1214.0usft (Patterson 347)
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	**MD Reference:**	1189' GL + 25' KB @ 1214.0usft (Patterson 347)
Well:	Nova 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)
17,873.0	88.89	335.04	6,718.0	9,913.9	-4,948.7	11,052.8	2.00	-0.97	-1.74
17,967.0	90.50	337.61	6,718.5	10,000.0	-4,986.4	11,146.8	3.23	1.71	2.73
18,061.0	90.44	336.19	6,717.7	10,086.5	-5,023.3	11,240.8	1.51	-0.06	-1.51
18,155.0	88.25	335.70	6,718.8	10,172.3	-5,061.6	11,334.7	2.39	-2.33	-0.52
18,249.0	88.76	338.40	6,721.2	10,258.8	-5,098.3	11,428.7	2.92	0.54	2.87
18,342.0	89.16	338.16	6,722.9	10,345.2	-5,132.7	11,521.6	0.50	0.43	-0.26
18,436.0	89.90	337.84	6,723.7	10,432.4	-5,167.9	11,615.6	0.86	0.79	-0.34
18,530.0	90.60	338.10	6,723.3	10,519.5	-5,203.1	11,709.6	0.79	0.74	0.28
18,624.0	88.76	337.77	6,723.8	10,606.6	-5,238.4	11,803.6	1.99	-1.96	-0.35
18,718.0	88.76	338.43	6,725.8	10,693.8	-5,273.5	11,897.6	0.70	0.00	0.70
18,813.0	89.50	338.61	6,727.3	10,782.2	-5,308.3	11,992.6	0.80	0.78	0.19
18,907.0	90.74	339.42	6,727.1	10,870.0	-5,341.9	12,086.5	1.58	1.32	0.86
19,001.0	89.26	337.65	6,727.1	10,957.4	-5,376.3	12,180.5	2.45	-1.57	-1.88
19,094.0	90.13	336.93	6,727.6	11,043.2	-5,412.2	12,273.5	1.21	0.94	-0.77
19,189.0	89.76	337.69	6,727.7	11,130.9	-5,448.9	12,368.5	0.89	-0.39	0.80
19,283.0	90.40	336.98	6,727.5	11,217.6	-5,485.1	12,462.5	1.02	0.68	-0.76
19,377.0	90.37	339.07	6,726.9	11,304.8	-5,520.3	12,556.5	2.22	-0.03	2.22
19,471.0	89.26	338.60	6,727.2	11,392.4	-5,554.2	12,650.5	1.28	-1.18	-0.50
19,565.0	90.50	340.57	6,727.4	11,480.5	-5,587.0	12,744.4	2.48	1.32	2.10
19,659.0	88.69	339.15	6,728.1	11,568.8	-5,619.4	12,838.3	2.45	-1.93	-1.51
19,753.0	89.06	339.34	6,729.9	11,656.6	-5,652.7	12,932.2	0.44	0.39	0.20
19,848.0	89.93	340.38	6,730.8	11,745.8	-5,685.4	13,027.2	1.43	0.92	1.09
19,943.0	89.70	338.73	6,731.1	11,834.8	-5,718.6	13,122.1	1.75	-0.24	-1.74
20,037.0	89.73	337.09	6,731.5	11,921.9	-5,753.9	13,216.1	1.74	0.03	-1.74
20,131.0	90.54	336.21	6,731.3	12,008.2	-5,791.2	13,310.1	1.27	0.86	-0.94
20,225.0	89.63	336.57	6,731.2	12,094.4	-5,828.8	13,404.1	1.04	-0.97	0.38
20,319.0	90.71	336.67	6,730.9	12,180.6	-5,866.1	13,498.0	1.15	1.15	0.11
20,413.0	88.59	334.95	6,731.5	12,266.4	-5,904.6	13,592.0	2.90	-2.26	-1.83
20,508.0	89.09	334.40	6,733.4	12,352.2	-5,945.3	13,686.9	0.78	0.53	-0.58
20,602.0	89.33	336.77	6,734.7	12,437.8	-5,984.1	13,780.8	2.53	0.26	2.52
20,696.0	90.91	338.06	6,734.5	12,524.6	-6,020.2	13,874.8	2.17	1.68	1.37
20,791.0	91.78	338.06	6,732.3	12,612.7	-6,055.7	13,969.8	0.92	0.92	0.00
20,885.0	92.42	337.61	6,728.8	12,699.7	-6,091.1	14,063.7	0.83	0.68	-0.48
20,979.0	92.99	336.45	6,724.4	12,786.1	-6,127.8	14,157.6	1.37	0.61	-1.23
21,044.0	93.93	336.30	6,720.4	12,845.6	-6,153.8	14,222.4	1.46	1.45	-0.23
Last SDI MWD @ 21044									
21,102.0	93.93	336.30	6,716.5	12,898.6	-6,177.0	14,280.3	0.00	0.00	0.00
Projection To Bit @ 21102 MD / 6716 TVD									

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

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
6,766.0	6,612.6	Middlesex @ 6766		0.00	
6,945.0	6,736.2	Burket @ 6945		0.00	
6,999.0	6,765.3	Tully @ 6999		0.00	
7,088.0	6,805.1	Marcellus @ 7088		0.00	

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
6,242.0	6,144.3	-191.1	-403.9	Last Gyro @ 6242
6,371.0	6,260.8	-210.7	-455.7	First SDI MWD @ 6371
21,044.0	6,720.4	12,845.6	-6,153.8	Last SDI MWD @ 21044
21,102.0	6,716.5	12,898.6	-6,177.0	Projection To Bit @ 21102 MD / 6716 TVD

Checked By: _____ Approved By: _____ Date: _____