Antero Resources

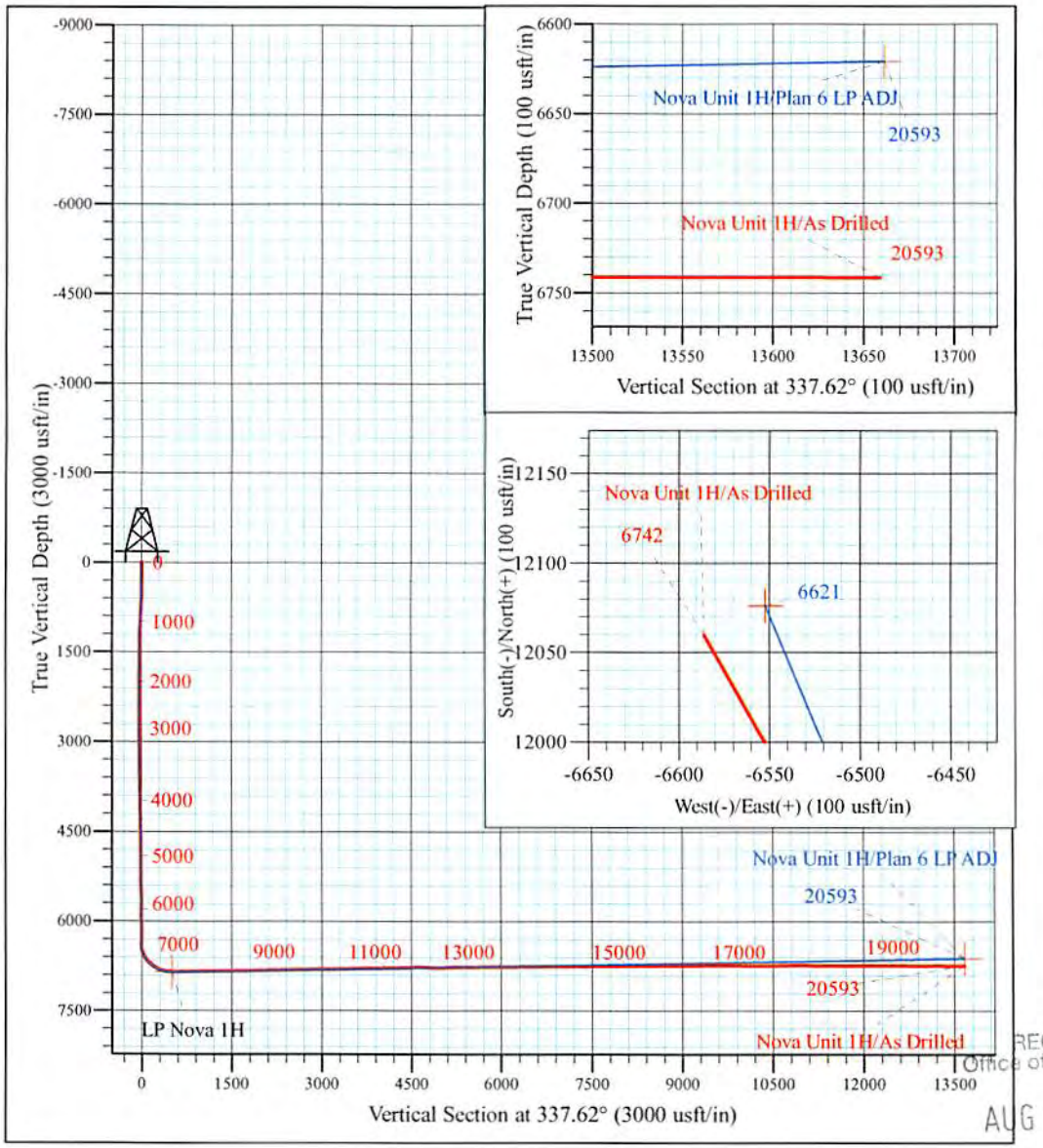
Cofor Pad: Outback Morton Nova Grape Rainer
Nova Unit 1H
Plan 6 LP ADJ
Paterson 347: 1189' GL + 25' KB @ 1214.0usft
Doddridge County WV

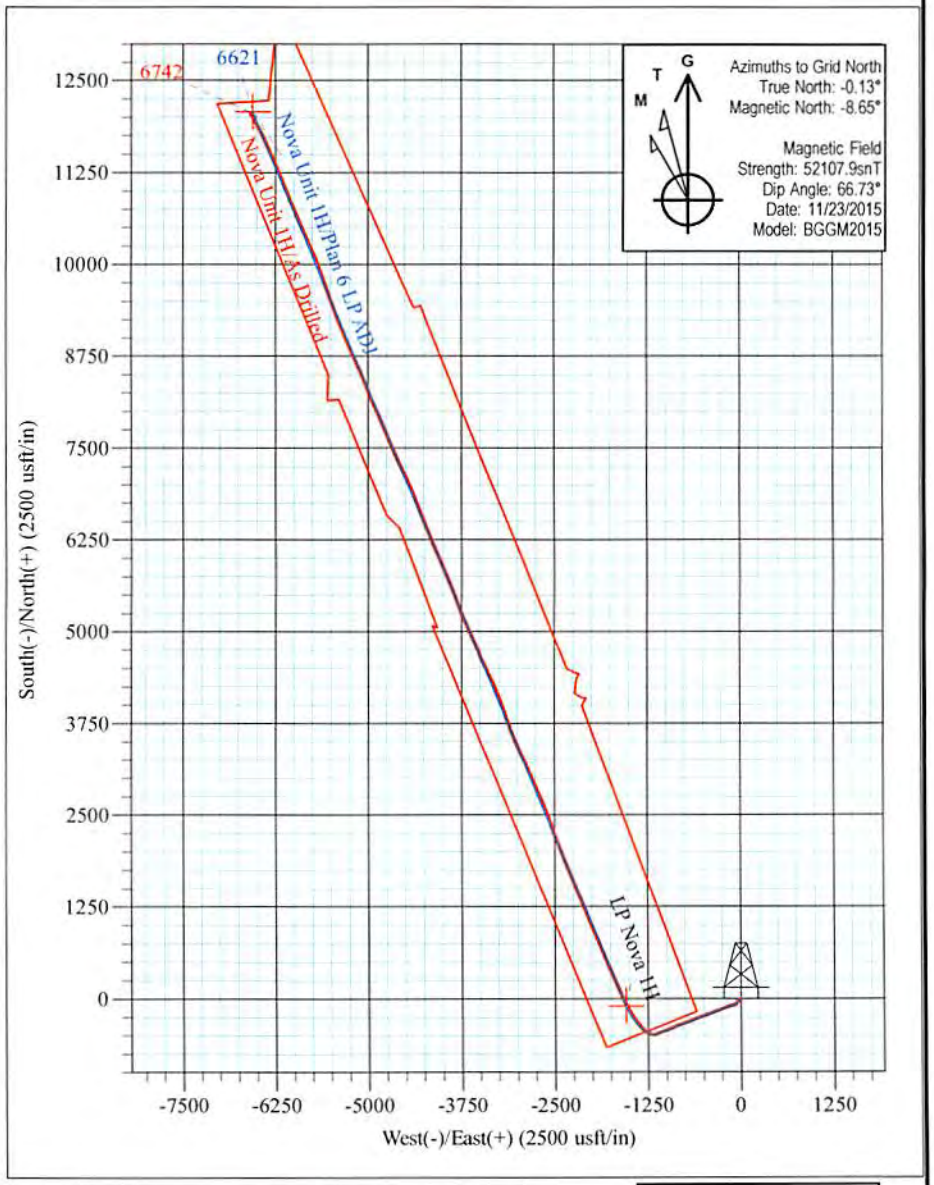
PROJECT DETAILS:
Geodetic System: Universal Transverse Mercator (US Survey Feet)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: Zone 17N (84 W to 78 W)
System Datum: Mean Sea Level

Scientific Drilling

WELL DETAILS: Nova Unit 1H SHL

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	14270993.57	1696918.33	39° 17' 57.676 N	80° 48' 0.996 W





Nova Unit 1H
Approx. BHL
39° 19' 57.053 N80° 49 24.505 W

Shane Rhodes
13:31, December 18 2015

Scientific Drilling International
124 Vista Drive
Charleroi, PA 15022

Scientific Drilling International
Survey Report

Antero Resources

Scientific Drilling

Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Nova Unit 1H
Project:	Doddridge County WV	**TVD Reference:**	Paterson 347: 1189' GL + 25' KB @ 1214.0usft
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	**MD Reference:**	Paterson 347: 1189' GL + 25' KB @ 1214.0usft
Well:	Nova Unit 1H	**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, Nova 2H

Site Position:		**Northing:**	14,270,983.37 usft	**Latitude:**	39° 17' 57.576 N
From:	Map	**Easting:**	1,696,920.97 usft	**Longitude:**	80° 48' 0.962 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.13 °

Well Nova Unit 1H, Marcellus

Well Position	**+N/-S**	0.0 usft	**Northing:**	14,270,993.57 usft	**Latitude:**	39° 17' 57.676 N
	+E/-W	0.0 usft	**Easting:**	1,696,918.32 usft	**Longitude:**	80° 48' 0.996 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	10/4/2015	-8.52	66.74	52,124
	BGGM2015	11/23/2015	-8.52	66.73	52,108

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	337.62

Survey Program **Date** 12/18/2015

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
112.0	6,387.0	Survey #6 Final Def Gyro (Original Wellpa	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4
6,413.0	20,593.0	Survey #7 - 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
112.0	0.22	166.61	112.0	-0.2	0.0	-0.2	0.20	0.20	0.00
First SDI Gyro @ 100 MD									
137.0	0.20	154.44	137.0	-0.3	0.1	-0.3	0.20	-0.08	-48.68
162.0	0.20	170.74	162.0	-0.4	0.1	-0.4	0.23	0.00	65.20
187.0	0.27	166.43	187.0	-0.5	0.1	-0.5	0.29	0.28	-17.24
212.0	0.32	170.30	212.0	-0.6	0.2	-0.6	0.22	0.20	15.48
237.0	0.38	180.24	237.0	-0.8	0.2	-0.8	0.34	0.24	39.76

01/05/2018

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Well:	Nova Unit 1H	**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)
262.0	0.38	180.84	262.0	-0.9	0.2	-0.9	0.02	0.00	2.40
287.0	0.32	188.98	287.0	-1.1	0.1	-1.0	0.31	-0.24	32.56
312.0	0.23	183.88	312.0	-1.2	0.1	-1.2	0.37	-0.36	-20.40
337.0	0.24	188.83	337.0	-1.3	0.1	-1.2	0.09	0.04	19.80
362.0	0.21	163.27	362.0	-1.4	0.1	-1.3	0.42	-0.12	-102.24
387.0	0.61	211.96	387.0	-1.5	0.1	-1.5	1.99	1.60	194.76
412.0	1.36	224.77	412.0	-1.9	-0.2	-1.7	3.11	3.00	51.24
437.0	2.62	228.79	437.0	-2.5	-0.8	-1.9	5.07	5.04	16.08
462.0	3.24	230.77	461.9	-3.3	-1.8	-2.3	2.51	2.48	7.92
487.0	4.08	232.50	486.9	-4.3	-3.1	-2.8	3.39	3.36	6.92
512.0	4.43	234.69	511.8	-5.4	-4.6	-3.2	1.54	1.40	8.76
537.0	4.46	234.71	536.7	-6.5	-6.2	-3.7	0.12	0.12	0.08
562.0	4.89	233.07	561.7	-7.7	-7.8	-4.1	1.80	1.72	-6.56
587.0	5.83	228.83	586.6	-9.2	-9.6	-4.8	4.08	3.76	-16.96
612.0	6.05	227.38	611.4	-10.9	-11.5	-5.7	1.07	0.88	-5.80
637.0	6.32	226.07	636.3	-12.7	-13.5	-6.6	1.22	1.08	-5.24
662.0	6.66	225.92	661.1	-14.7	-15.5	-7.7	1.36	1.36	-0.60
687.0	6.83	226.24	685.9	-16.7	-17.6	-8.8	0.70	0.68	1.28
712.0	6.94	226.06	710.8	-18.8	-19.8	-9.9	0.45	0.44	-0.72
737.0	7.10	226.53	735.6	-20.9	-22.0	-11.0	0.68	0.64	1.88
762.0	7.33	225.30	760.4	-23.1	-24.3	-12.1	1.11	0.92	-4.92
787.0	7.55	224.49	785.2	-25.4	-26.5	-13.4	0.97	0.88	-3.24
812.0	7.61	224.51	809.9	-27.8	-28.9	-14.7	0.24	0.24	0.08
837.0	7.70	223.60	834.7	-30.2	-31.2	-16.0	0.60	0.36	-3.64
862.0	7.80	223.53	859.5	-32.6	-33.5	-17.4	0.40	0.40	-0.28
887.0	7.99	223.43	884.3	-35.1	-35.9	-18.8	0.76	0.76	-0.40
912.0	8.03	223.44	909.0	-37.6	-38.3	-20.2	0 16	0.16	0.04
937.0	8.07	224.33	933.8	-40.1	-40.7	-21.6	0.52	0.16	3.56
962.0	8.01	223.69	958.5	-42.7	-43.1	-23.0	0.43	-0.24	-2.56
987.0	7.11	221.57	983.3	-45.1	-45.3	-24.4	3.77	-3.60	-8.48
1,012.0	6.60	221.09	1,008.1	-47.3	-47.3	-25.7	2.05	-2.04	-1.92
1,037.0	6.26	222.16	1,033.0	-49.4	-49.2	-27.0	1.44	-1.36	4.28
1,062.0	5.98	222.17	1,057.8	-51.4	-51.0	-28.1	1.12	-1.12	0.04
1,087.0	5.88	218.59	1,082.7	-53.3	-52.6	-29.3	1.53	-0.40	-14.32
1,112.0	5.79	219.99	1,107.6	-55.3	-54.2	-30.5	0.67	-0.36	5.60
1,137.0	5.54	221.97	1,132.4	-57.2	-55.9	-31.6	1.27	-1.00	7.92
1,162.0	5.13	222.25	1,157.3	-58.9	-57.4	-32.6	1.64	-1.64	1.12
1,187.0	4.85	221.61	1,182.2	-60.5	-58.9	-33.5	1.14	-1.12	-2.56
1,212.0	4.74	220.67	1,207.2	-62.1	-60.2	-34.5	0.54	-0.44	-3.76
1,237.0	4.64	221.66	1,232.1	-63.6	-61.6	-35.4	0.51	-0.40	3.96
1,262.0	4.40	221.44	1,257.0	-65.1	-62.9	-36.3	0.96	-0.96	-0.88
1,287.0	4.01	220.48	1,281.9	-66.5	-64.1	-37.1	1.59	-1.56	-3.84
1,312.0	3.90	221.45	1,306.9	-67.8	-65.2	-37.8	0.51	-0.44	3.88

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Well:	Nova Unit 1H	**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)
1,337.0	3.67	220.18	1,331.8	-69.0	-66.3	-38.6	0.98	-0.92	-5.08
1,362.0	3.42	218.63	1,356.8	-70.2	-67.3	-39.3	1.07	-1.00	-6.20
1,387.0	3.13	221.15	1,381.7	-71.3	-68.2	-40.0	1.29	-1.16	10.08
1,412.0	2.99	221.00	1,406.7	-72.3	-69.1	-40.6	0.56	-0.56	-0.60
1,437.0	2.94	221.92	1,431.7	-73.3	-69.9	-41.2	0.28	-0.20	3.68
1,462.0	2.78	221.45	1,456.6	-74.2	-70.8	-41.7	0.65	-0.64	-1.88
1,487.0	2.52	223.38	1,481.6	-75.1	-71.5	-42.2	1.10	-1.04	7.72
1,512.0	2.23	221.65	1,506.6	-75.9	-72.2	-42.6	1.19	-1.16	-6.92
1,537.0	2.03	222.18	1,531.6	-76.5	-72.9	-43.0	0.80	-0.80	2.12
1,562.0	1.75	224.92	1,556.5	-77.1	-73.4	-43.4	1.18	-1.12	10.96
1,587.0	1.60	224.55	1,581.5	-77.7	-74.0	-43.7	0.60	-0.60	-1.48
1,612.0	1.53	226.00	1,606.5	-78.1	-74.4	-43.9	0.32	-0.28	5.80
1,637.0	1.48	219.99	1,631.5	-78.6	-74.9	-44.2	0.66	-0.20	-24.04
1,662.0	1.42	221.37	1,656.5	-79.1	-75.3	-44.5	0.28	-0.24	5.52
1,687.0	1.23	221.06	1,681.5	-79.5	-75.7	-44.7	0.76	-0.76	-1.24
1,712.0	0.99	224.41	1,706.5	-79.9	-76.0	-44.9	0.99	-0.96	13.40
1,737.0	0.76	226.13	1,731.5	-80.2	-76.3	-45.1	0.93	-0.92	6.88
1,762.0	0.56	220.90	1,756.5	-80.4	-76.5	-45.2	0.83	-0.80	-20.92
1,787.0	0.48	208.62	1,781.5	-80.6	-76.6	-45.3	0.55	-0.32	-49.12
1,812.0	0.45	211.33	1,806.5	-80.7	-76.7	-45.4	0.15	-0.12	10.84
1,837.0	0.44	219.85	1,831.5	-80.9	-76.8	-45.5	0.27	-0.04	34.08
1,862.0	0.45	198.70	1,856.5	-81.1	-76.9	-45.7	0.65	0.04	-84.60
1,887.0	0.36	179.83	1,881.5	-81.2	-76.9	-45.8	0.64	-0.36	-75.48
1,912.0	0.38	178.56	1,906.5	-81.4	-76.9	-46.0	0.09	0.08	-5.08
1,937.0	0.32	160.94	1,931.5	-81.5	-76.9	-46.1	0.49	-0.24	-70.48
1,962.0	0.33	140.04	1,956.5	-81.7	-76.8	-46.2	0.47	0.04	-83.60
1,987.0	0.27	154.39	1,981.5	-81.8	-76.8	-46.4	0.38	-0.24	57.40
2,012.0	0.23	157.62	2,006.5	-81.9	-76.7	-46.5	0.17	-0.16	12.92
2,037.0	0.21	156.98	2,031.5	-82.0	-76.7	-46.6	0.08	-0.08	-2.56
2,062.0	0.20	144.88	2,056.5	-82.0	-76.6	-46.7	0.18	-0.04	-48.40
2,087.0	0.36	129.84	2,081.5	-82.1	-76.6	-46.8	0.70	0.64	-60.16
2,112.0	0.19	122.44	2,106.5	-82.2	-76.5	-46.9	0.69	-0.68	-29.60
2,137.0	0.21	120.04	2,131.5	-82.2	-76.4	-47.0	0.09	0.08	-9.60
2,162.0	0.28	134.05	2,156.5	-82.3	-76.3	-47.0	0.37	0.28	56.04
2,187.0	0.26	147.51	2,181.5	-82.4	-76.2	-47.2	0.27	-0.08	53.84
2,212.0	0.11	162.27	2,206.5	-82.5	-76.2	-47.2	0.62	-0.60	59.04
2,237.0	0.13	167.04	2,231.5	-82.5	-76.2	-47.3	0.09	0.08	19.08
2,262.0	0.11	197.14	2,256.5	-82.6	-76.2	-47.3	0.26	-0.08	120.40
2,287.0	0.16	72.89	2,281.5	-82.6	-76.2	-47.4	0.96	0.20	-497.00
2,312.0	0.10	120.11	2,306.5	-82.6	-76.1	-47.4	0.47	-0.24	188.88
2,337.0	0.11	327.86	2,331.5	-82.6	-76.1	-47.4	0.82	0.04	-609.00
2,362.0	0.06	357.56	2,356.5	-82.5	-76.1	-47.3	0.26	-0.20	118.80
2,387.0	0.11	7.02	2,381.5	-82.5	-76.1	-47.3	0.21	0.20	37.84
2,412.0	0.28	326.80	2,406.5	-82.4	-76.1	-47.2	0.83	0.68	-160.88

01/05/2018

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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)
2,437.0	0.17	97.55	2,431.5	-82.4	-76.1	-47.2	1.65	-0.44	523.00
2,462.0	0.09	84.38	2,456.5	-82.4	-76.1	-47.2	0.34	-0.32	-52.68
2,487.0	0.04	23.10	2,481.5	-82.4	-76.1	-47.2	0.32	-0.20	-245.12
2,512.0	0.09	321.05	2,506.5	-82.3	-76.1	-47.2	0.32	0.20	-248.20
2,537.0	0.17	308.43	2,531.5	-82.3	-76.1	-47.1	0.34	0.32	-50.48
2,562.0	0.22	326.63	2,556.5	-82.2	-76.2	-47.0	0.32	0.20	72.80
2,587.0	0.17	351.20	2,581.5	-82.2	-76.2	-47.0	0.39	-0.20	98.28
2,612.0	0.09	323.18	2,606.5	-82.1	-76.2	-46.9	0.40	-0.32	-112.08
2,637.0	0.13	286.64	2,631.5	-82.1	-76.3	-46.9	0.31	0.16	-146.16
2,662.0	0.14	319.80	2,656.5	-82.1	-76.3	-46.8	0.31	0.04	132.64
2,687.0	0.20	307.65	2,681.5	-82.0	-76.4	-46.8	0.28	0.24	-48.60
2,712.0	0.20	337.71	2,706.5	-81.9	-76.4	-46.7	0.41	0.00	120.24
2,737.0	0.19	322.41	2,731.5	-81.9	-76.4	-46.6	0.21	-0.04	-61.20
2,762.0	0.16	339.88	2,756.5	-81.8	-76.5	-46.5	0.24	-0.12	69.88
2,787.0	0.12	359.74	2,781.5	-81.7	-76.5	-46.5	0.25	-0.16	79.44
2,812.0	0.10	355.24	2,806.5	-81.7	-76.5	-46.4	0.09	-0.08	-18.00
2,837.0	0.12	295.51	2,831.5	-81.7	-76.5	-46.4	0.44	0.08	-238.92
2,862.0	0.20	288.49	2,856.5	-81.6	-76.6	-46.3	0.33	0.32	-28.08
2,887.0	0.24	276.96	2,881.5	-81.6	-76.7	-46.3	0.24	0.16	-46.12
2,912.0	0.22	281.89	2,906.5	-81.6	-76.8	-46.2	0.11	-0.08	19.72
2,937.0	0.23	284.79	2,931.5	-81.6	-76.9	-46.2	0.06	0.04	11.60
2,962.0	0.23	313.40	2,956.5	-81.5	-77.0	-46.1	0.45	0.00	114.44
2,987.0	0.22	323.79	2,981.5	-81.5	-77.0	-46.0	0.17	-0.04	41.56
3,012.0	0.23	321.14	3,006.5	-81.4	-77.1	-45.9	0.06	0.04	-10.60
3,037.0	0.19	321.70	3,031.5	-81.3	-77.1	-45.8	0.16	-0.16	2.24
3,062.0	0.17	316.17	3,056.5	-81.2	-77.2	-45.7	0.11	-0.08	-22.12
3,087.0	0.17	302.68	3,081.5	-81.2	-77.3	-45.7	0.16	0.00	-53.96
3,112.0	0.10	294.60	3,106.5	-81.2	-77.3	-45.6	0.29	-0.28	-32.32
3,137.0	0.13	296.63	3,131.5	-81.2	-77.3	-45.6	0.12	0.12	8.12
3,162.0	0.22	290.83	3,156.5	-81.1	-77.4	-45.5	0.37	0.36	-23.20
3,187.0	0.17	294.62	3,181.5	-81.1	-77.5	-45.5	0.21	-0.20	15.16
3,212.0	0.30	286.92	3,206.5	-81.1	-77.6	-45.4	0.53	0.52	-30.80
3,237.0	0.27	302.75	3,231.5	-81.0	-77.7	-45.3	0.34	-0.12	63.32
3,262.0	0.24	316.73	3,256.5	-80.9	-77.8	-45.2	0.28	-0.12	55.92
3,287.0	0.28	311.81	3,281.5	-80.9	-77.9	-45.1	0.18	0.16	-19.68
3,312.0	0.21	343.10	3,306.5	-80.8	-77.9	-45.0	0.59	-0.28	125.16
3,337.0	0.21	313.98	3,331.5	-80.7	-78.0	-44.9	0.42	0.00	-116.48
3,362.0	0.19	341.53	3,356.5	-80.6	-78.0	-44.8	0.39	-0.08	110.20
3,387.0	0.17	308.53	3,381.5	-80.6	-78.1	-44.8	0.42	-0.08	-132.00
3,412.0	0.28	277.80	3,406.5	-80.5	-78.2	-44.7	0.64	0.44	-122.92
3,437.0	1.35	256.19	3,431.5	-80.6	-78.5	-44.6	4.38	4.28	-86.44
3,462.0	2.52	258.07	3,456.5	-80.8	-79.3	-44.5	4.69	4.68	7.52
3,487.0	3.43	256.80	3,481.4	-81.1	-80.6	-44.3	3.65	3.64	-5.08

01/05/2018

Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Nova Unit 1H
Project:	Doddridge County WV	**TVD Reference:**	Paterson 347: 1189' GL + 25' KB @ 1214.0usft
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	**MD Reference:**	Paterson 347: 1189' GL + 25' KB @ 1214.0usft
Well:	Nova Unit 1H	**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)
3,512.0	4.11	256.53	3,506.4	-81.4	-82.2	-44.0	2.72	2.72	-1.08
3,537.0	4.54	257.70	3,531.3	-81.9	-84.0	-43.7	1.76	1.72	4.68
3,562.0	4.65	258.05	3,556.2	-82.3	-86.0	-43.3	0.45	0.44	1.40
3,587.0	5.32	259.29	3,581.1	-82.7	-88.1	-42.9	2.71	2.68	4.96
3,612.0	5.92	259.69	3,606.0	-83.2	-90.5	-42.4	2.41	2.40	1.60
3,637.0	6.57	259.86	3,630.9	-83.6	-93.2	-41.8	2.60	2.60	0.68
3,662.0	7.06	259.74	3,655.7	-84.2	-96.1	-41.2	1.96	1.96	-0.48
3,687.0	7.83	257.74	3,680.5	-84.8	-99.3	-40.6	3.25	3.08	-8.00
3,712.0	8.93	255.89	3,705.2	-85.6	-102.8	-40.0	4.53	4.40	-7.40
3,737.0	9.81	255.94	3,729.9	-86.6	-106.8	-39.4	3.52	3.52	0.20
3,762.0	10.74	255.42	3,754.5	-87.7	-111.1	-38.8	3.74	3.72	-2.08
3,787.0	10.98	255.79	3,779.0	-88.9	-115.7	-38.2	1.00	0.96	1.48
3,812.0	11.62	255.48	3,803.5	-90.1	-120.4	-37.5	2.57	2.56	-1.24
3,837.0	12.37	254.06	3,828.0	-91.5	-125.4	-36.8	3.22	3.00	-5.68
3,862.0	12.95	252.79	3,852.4	-93.0	-130.7	-36.3	2.57	2.32	-5.08
3,887.0	13.08	252.39	3,876.7	-94.7	-136.1	-35.8	0.63	0.52	-1.60
3,912.0	13.14	252.18	3,901.1	-96.5	-141.5	-35.3	0.31	0.24	-0.84
3,937.0	13.62	252.21	3,925.4	-98.2	-147.0	-34.9	1.92	1.92	0.12
3,962.0	13.80	252.12	3,949.7	-100.0	-152.6	-34.4	0.73	0.72	-0.36
3,987.0	14.21	252.24	3,973.9	-101.9	-158.4	-33.9	1.64	1.64	0.48
4,012.0	14.66	252.66	3,998.2	-103.8	-164.3	-33.4	1.85	1.80	1.68
4,037.0	15.23	252.85	4,022.3	-105.7	-170.5	-32.8	2.29	2.28	0.76
4,062.0	15.92	252.97	4,046.4	-107.6	-176.9	-32.2	2.76	2.76	0.48
4,087.0	16.69	252.73	4,070.4	-109.7	-183.6	-31.6	3.09	3.08	-0.96
4,112.0	17.43	252.29	4,094.3	-111.9	-190.6	-30.9	3.00	2.96	-1.76
4,137.0	18.12	251.71	4,118.1	-114.3	-197.8	-30.3	2.85	2.76	-2.32
4,162.0	18.93	250.79	4,141.8	-116.8	-205.4	-29.8	3.44	3.24	-3.68
4,187.0	19.61	250.30	4,165.4	-119.6	-213.1	-29.4	2.80	2.72	-1.96
4,212.0	20.12	250.01	4,188.9	-122.5	-221.1	-29.1	2.08	2.04	-1.16
4,237.0	20.77	249.73	4,212.3	-125.5	-229.3	-28.7	2.63	2.60	-1.12
4,262.0	21.66	249.59	4,235.6	-128.6	-237.8	-28.4	3.57	3.56	-0.56
4,287.0	22.04	249.73	4,258.8	-131.9	-246.5	-28.1	1.53	1.52	0.56
4,312.0	23.07	249.97	4,281.9	-135.2	-255.5	-27.7	4.14	4.12	0.96
4,337.0	23.38	250.05	4,304.9	-138.5	-264.8	-27.3	1.25	1.24	0.32
4,362.0	23.66	250.13	4,327.8	-141.9	-274.2	-26.8	1.13	1.12	0.32
4,387.0	23.76	249.72	4,350.7	-145.4	-283.6	-26.4	0.77	0.40	-1.64
4,412.0	23.89	249.65	4,373.6	-148.9	-293.1	-26.1	0.53	0.52	-0.28
4,437.0	23.88	248.81	4,396.5	-152.5	-302.6	-25.8	1.36	-0.04	-3.36
4,462.0	24.05	248.51	4,419.3	-156.2	-312.0	-25.6	0.84	0.68	-1.20
4,487.0	24.06	248.31	4,442.1	-159.9	-321.5	-25.5	0.33	0.04	-0.80
4,512.0	24.36	247.94	4,464.9	-163.7	-331.0	-25.4	1.34	1.20	-1.48
4,537.0	24.45	247.62	4,487.7	-167.6	-340.6	-25.3	0.64	0.36	-1.28
4,562.0	24.61	247.39	4,510.4	-171.6	-350.2	-25.4	0.75	0.64	-0.92

01/05/2018

Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Nova Unit 1H
Project:	Doddridge County WV	**TVD Reference:**	Paterson 347: 1189' GL + 25' KB @ 1214.0usft
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	**MD Reference:**	Paterson 347: 1189' GL + 25' KB @ 1214.0usft
Well:	Nova Unit 1H	**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)
4,587.0	24.84	247.50	4,533.1	-175.6	-359.8	-25.4	0.94	0.92	0.44
4,612.0	24.75	247.80	4,555.8	-179.6	-369.5	-25.4	0.62	-0.36	1.20
4,637.0	23.98	247.57	4,578.6	-183.5	-379.1	-25.4	3.10	-3.08	-0.92
4,662.0	23.98	247.58	4,601.5	-187.4	-388.4	-25.4	0.02	0.00	0.04
4,687.0	24.25	247.59	4,624.3	-191.3	-397.9	-25.4	1.08	1.08	0.04
4,712.0	23.91	247.87	4,647.1	-195.2	-407.3	-25.4	1.43	-1.36	1.12
4,737.0	23.46	248.12	4,670.0	-198.9	-416.6	-25.3	1.84	-1.80	1.00
4,762.0	23.71	249.13	4,692.9	-202.6	-426.0	-25.1	1.90	1.00	4.04
4,787.0	24.03	250.04	4,715.8	-206.1	-435.4	-24.8	1.95	1.28	3.64
4,812.0	24.02	250.27	4,738.6	-209.6	-445.0	-24.3	0.38	-0.04	0.92
4,837.0	24.11	250.15	4,761.4	-213.0	-454.6	-23.9	0.41	0.36	-0.48
4,862.0	24.40	250.19	4,784.2	-216.5	-464.3	-23.4	1.16	1.16	0.16
4,887.0	24.57	250.13	4,807.0	-220.0	-474.0	-23.0	0.69	0.68	-0.24
4,912.0	24.37	249.88	4,829.7	-223.5	-483.7	-22.5	0.90	-0.80	-1.00
4,937.0	25.02	249.56	4,852.4	-227.2	-493.5	-22.1	2.65	2.60	-1.28
4,962.0	25.13	249.66	4,875.1	-230.9	-503.5	-21.8	0.47	0.44	0.40
4,987.0	25.31	249.51	4,897.7	-234.6	-513.5	-21.4	0.76	0.72	-0.60
5,012.0	24.76	249.41	4,920.4	-238.3	-523.4	-21.1	2.21	-2.20	-0.40
5,037.0	24.75	249.50	4,943.1	-242.0	-533.2	-20.7	0.16	-0.04	0.36
5,062.0	24.88	249.80	4,965.7	-245.6	-543.0	-20.4	0.72	0.52	1.20
5,087.0	24.55	250.00	4,988.5	-249.2	-552.8	-19.9	1.36	-1.32	0.80
5,112.0	23.92	249.46	5,011.3	-252.8	-562.4	-19.6	2.67	-2.52	-2.16
5,137.0	23.97	249.48	5,034.1	-256.3	-571.9	-19.2	0.20	0.20	0.08
5,162.0	24.06	249.50	5,056.9	-259.9	-581.5	-18.9	0.36	0.36	0.08
5,187.0	23.98	249.08	5,079.8	-263.5	-591.0	-18.6	0.76	-0.32	-1.68
5,212.0	23.52	248.34	5,102.7	-267.1	-600.4	-18.4	2.19	-1.84	-2.96
5,237.0	23.77	248.36	5,125.6	-270.8	-609.7	-18.3	1.00	1.00	0.08
5,262.0	24.11	247.84	5,148.4	-274.6	-619.1	-18.2	1.60	1.36	-2.08
5,287.0	24.31	247.80	5,171.2	-278.5	-628.6	-18.2	0.80	0.80	-0.16
5,312.0	24.23	247.50	5,194.0	-282.4	-638.1	-18.2	0.59	-0.32	-1.20
5,337.0	24.16	247.53	5,216.8	-286.3	-647.6	-18.2	0.28	-0.28	0.12
5,362.0	24.12	247.76	5,239.6	-290.2	-657.0	-18.2	0.41	-0.16	0.92
5,387.0	23.78	247.50	5,262.5	-294.1	-666.4	-18.2	1.42	-1.36	-1.04
5,412.0	23.80	247.46	5,285.3	-297.9	-675.7	-18.2	0.10	0.08	-0.16
5,437.0	24.20	247.32	5,308.2	-301.8	-685.1	-18.2	1.62	1.60	-0.56
5,462.0	23.76	247.57	5,331.0	-305.7	-694.5	-18.3	1.81	-1.76	1.00
5,487.0	23.66	247.81	5,353.9	-309.5	-703.8	-18.3	0.56	-0.40	0.96
5,512.0	23.94	247.96	5,376.8	-313.3	-713.1	-18.2	1.15	1.12	0.60
5,537.0	24.25	248.89	5,399.6	-317.1	-722.6	-18.1	1.96	1.24	3.72
5,562.0	24.58	250.99	5,422.4	-320.6	-732.3	-17.7	3.71	1.32	8.40
5,587.0	24.88	252.85	5,445.1	-323.9	-742.3	-16.9	3.34	1.20	7.44
5,612.0	24.62	253.71	5,467.8	-326.9	-752.3	-15.8	1.78	-1.04	3.44
5,637.0	25.04	253.56	5,490.5	-329.9	-762.4	-14.7	1.70	1.68	-0.60
5,662.0	24.81	252.49	5,513.1	-332.9	-772.5	-13.7	2.02	-0.92	-4.28

Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Nova Unit 1H
Project:	Doddridge County WV	**TVD Reference:**	Paterson 347: 1189' GL + 25' KB @ 1214.0usft
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	**MD Reference:**	Paterson 347: 1189' GL + 25' KB @ 1214.0usft
Well:	Nova Unit 1H	**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)
5,687.0	24.51	250.78	5,535.9	-336.2	-782.4	-13.0	3.10	-1.20	-6.84
5,712.0	24.90	249.07	5,558.6	-339.8	-792.2	-12.6	3.26	1.56	-6.84
5,737.0	24.50	247.89	5,581.3	-343.6	-801.9	-12.4	2.54	-1.60	-4.72
5,762.0	24.59	247.38	5,604.0	-347.6	-811.5	-12.4	0.92	0.36	-2.04
5,787.0	25.15	247.61	5,626.7	-351.6	-821.2	-12.5	2.27	2.24	0.92
5,812.0	24.54	248.63	5,649.4	-355.5	-830.9	-12.4	2.98	-2.44	4.08
5,837.0	24.50	249.51	5,672.1	-359.2	-840.6	-12.1	1.47	-0.16	3.52
5,862.0	23.95	249.42	5,694.9	-362.8	-850.2	-11.8	2.20	-2.20	-0.36
5,887.0	23.41	249.21	5,717.8	-366.4	-859.6	-11.5	2.19	-2.16	-0.84
5,912.0	24.18	249.10	5,740.7	-370.0	-869.1	-11.2	3.09	3.08	-0.44
5,937.0	23.78	248.48	5,763.5	-373.6	-878.5	-11.0	1.89	-1.60	-2.48
5,962.0	23.77	246.90	5,786.4	-377.5	-887.9	-11.0	2.55	-0.04	-6.32
5,987.0	23.22	246.35	5,809.4	-381.4	-897.0	-11.2	2.37	-2.20	-2.20
6,012.0	23.83	246.07	5,832.3	-385.4	-906.1	-11.4	2.48	2.44	-1.12
6,037.0	23.95	245.68	5,855.1	-389.6	-915.4	-11.7	0.79	0.48	-1.56
6,062.0	23.39	244.86	5,878.0	-393.8	-924.5	-12.1	2.60	-2.24	-3.28
6,087.0	23.70	245.82	5,901.0	-397.9	-933.6	-12.5	1.97	1.24	3.84
6,112.0	23.32	246.53	5,923.9	-402.0	-942.7	-12.8	1.90	-1.52	2.84
6,137.0	23.71	247.10	5,946.8	-405.9	-951.9	-12.9	1.81	1.56	2.28
6,162.0	23.07	247.60	5,969.7	-409.7	-961.0	-13.0	2.68	-2.56	2.00
6,187.0	23.42	249.72	5,992.7	-413.3	-970.2	-12.8	3.63	1.40	8.48
6,212.0	23.69	250.61	6,015.6	-416.7	-979.6	-12.3	1.79	1.08	3.56
6,237.0	24.29	250.91	6,038.5	-420.1	-989.2	-11.8	2.45	2.40	1.20
6,262.0	24.35	250.75	6,061.3	-423.4	-998.9	-11.2	0.36	0.24	-0.64
6,287.0	23.93	250.10	6,084.1	-426.9	-1,008.6	-10.7	1.99	-1.68	-2.60
6,312.0	24.29	250.12	6,106.9	-430.3	-1,018.2	-10.3	1.44	1.44	0.08
6,337.0	23.81	249.85	6,129.7	-433.8	-1,027.7	-9.8	1.97	-1.92	-1.08
6,362.0	24.49	249.89	6,152.5	-437.3	-1,037.3	-9.4	2.72	2.72	0.16
6,387.0	25.54	250.05	6,175.2	-441.0	-1,047.3	-9.0	4.21	4.20	0.64
Last SDI Gyro @ 6375 MD									
6,413.0	26.22	249.24	6,198.6	-444.9	-1,057.9	-8.6	2.95	2.62	-3.12
First SDI MWD @ 6413									
6,445.0	25.35	247.53	6,227.4	-450.0	-1,070.9	-8.4	3.58	-2.72	-5.34
6,476.0	25.33	247.06	6,255.4	-455.2	-1,083.1	-8.5	0.65	-0.06	-1.52
6,507.0	25.42	245.83	6,283.4	-460.5	-1,095.3	-8.8	1.72	0.29	-3.97
6,539.0	25.44	244.79	6,312.3	-466.2	-1,107.8	-9.3	1.40	0.06	-3.25
6,570.0	25.03	242.65	6,340.4	-472.1	-1,119.6	-10.2	3.23	-1.32	-6.90
6,602.0	24.46	241.75	6,369.4	-478.3	-1,131.5	-11.5	2.14	-1.78	-2.81
6,633.0	23.61	244.82	6,397.7	-484.0	-1,142.7	-12.4	4.88	-2.74	9.90
6,664.0	23.18	254.88	6,426.2	-488.2	-1,154.2	-12.0	12.95	-1.39	32.45
6,696.0	24.05	265.66	6,455.5	-490.3	-1,166.8	-9.2	13.75	2.72	33.69
6,727.0	26.01	274.76	6,483.6	-490.3	-1,179.9	-4.1	13.92	6.32	29.35
6,759.0	28.22	281.11	6,512.1	-488.2	-1,194.3	3.3	11.37	6.91	19.84

Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Nova Unit 1H
Project:	Doddridge County WV	**TVD Reference:**	Paterson 347: 1189' GL + 25' KB @ 1214.0usft
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	**MD Reference:**	Paterson 347: 1189' GL + 25' KB @ 1214.0usft
Well:	Nova Unit 1H	**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)
6,790.0	30.76	286.28	6,539.1	-484.6	-1,209.1	12.3	11.59	8.19	16.68
6,821.0	33.31	291.08	6,565.4	-479.3	-1,224.7	23.1	11.62	8.23	15.48
6,852.0	35.93	296.14	6,590.9	-472.2	-1,240.8	35.8	12.54	8.45	16.32
6,883.0	38.26	301.23	6,615.6	-463.2	-1,257.2	50.3	12.44	7.52	16.43
Middlesex @ 6883									
6,884.0	38.34	301.39	6,616.4	-462.9	-1,257.7	50.8	12.44	7.87	15.54
6,915.0	41.49	305.38	6,640.2	-452.0	-1,274.3	67.3	13.09	10.16	12.87
6,947.0	44.65	309.49	6,663.6	-438.7	-1,291.6	86.2	13.20	9.88	12.84
6,978.0	47.74	311.95	6,685.0	-424.1	-1,308.6	106.1	11.49	9.97	7.94
7,009.0	50.03	314.88	6,705.4	-408.0	-1,325.5	127.4	10.26	7.39	9.45
7,041.0	52.40	317.67	6,725.5	-390.0	-1,342.8	150.6	10.05	7.41	8.72
7,070.0	54.47	320.04	6,742.7	-372.4	-1,358.1	172.7	9.69	7.12	8.18
Burket @ 7070									
7,072.0	54.61	320.20	6,743.9	-371.2	-1,359.1	174.2	9.69	7.21	7.95
7,103.0	57.27	323.12	6,761.3	-351.0	-1,375.0	198.9	11.60	8.58	9.42
7,123.0	58.95	324.35	6,771.8	-337.4	-1,385.1	215.4	9.87	8.39	6.13
Tully @ 7123									
7,135.0	59.96	325.06	6,777.9	-328.9	-1,391.0	225.5	9.87	8.43	5.95
7,166.0	63.49	326.70	6,792.6	-306.3	-1,406.4	252.2	12.30	11.39	5.29
7,197.0	67.20	326.68	6,805.5	-282.8	-1,421.8	279.9	11.97	11.97	-0.06
7,212.0	68.71	326.66	6,811.2	-271.2	-1,429.5	293.5	10.06	10.06	-0.13
Marcellus @ 7212									
7,229.0	70.42	326.64	6,817.1	-257.9	-1,438.2	309.2	10.06	10.06	-0.12
7,260.0	73.75	326.69	6,826.6	-233.2	-1,454.4	338.1	10.74	10.74	0.16
7,292.0	77.11	327.15	6,834.7	-207.3	-1,471.3	368.5	10.59	10.50	1.44
7,323.0	80.74	328.21	6,840.6	-181.6	-1,487.6	398.5	12.18	11.71	3.42
7,354.0	83.15	329.84	6,845.0	-155.2	-1,503.4	428.9	9.36	7.77	5.26
7,386.0	85.09	331.16	6,848.3	-127.5	-1,519.1	460.4	7.32	6.06	4.13
7,429.0	89.36	334.09	6,850.3	-89.4	-1,538.8	503.2	12.04	9.93	6.81
7,461.0	90.77	335.07	6,850.3	-60.5	-1,552.5	535.2	5.37	4.41	3.06
7,523.0	90.50	333.66	6,849.6	-4.6	-1,579.4	597.1	2.32	-0.44	-2.27
7,617.0	91.24	337.06	6,848.2	80.8	-1,618.5	691.0	3.70	0.79	3.62
7,712.0	90.67	337.72	6,846.6	168.5	-1,655.0	785.9	0.92	-0.60	0.69
7,805.0	90.77	337.69	6,845.4	254.5	-1,690.3	878.9	0.11	0.11	-0.03
7,900.0	89.90	336.82	6,844.9	342.1	-1,727.1	973.9	1.30	-0.92	-0.92
7,994.0	91.31	336.59	6,843.9	428.5	-1,764.2	1,067.9	1.52	1.50	-0.24
8,088.0	90.50	334.38	6,842.4	514.0	-1,803.2	1,161.8	2.50	-0.86	-2.35
8,182.0	91.04	338.17	6,841.1	600.0	-1,841.0	1,255.8	4.07	0.57	4.03
8,276.0	91.71	339.84	6,838.9	687.7	-1,874.7	1,349.7	1.91	0.71	1.78
8,371.0	90.47	335.62	6,837.1	775.6	-1,910.7	1,444.7	4.63	-1.31	-4.44
8,465.0	92.18	337.82	6,834.9	861.9	-1,947.8	1,538.6	2.96	1.82	2.34
8,559.0	91.68	337.84	6,831.7	948.9	-1,983.3	1,632.6	0.53	-0.53	0.02
8,653.0	91.88	338.62	6,828.8	1,036.2	-2,018.1	1,726.5	0.86	0.21	0.83
8,747.0	92.21	339.01	6,825.5	1,123.8	-2,052.1	1,820.4	0.54	0.35	0.41

01/05/2018

Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Nova Unit 1H
Project:	Doddridge County WV	**TVD Reference:**	Paterson 347: 1189' GL + 25' KB @ 1214.0usft
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	**MD Reference:**	Paterson 347: 1189' GL + 25' KB @ 1214.0usft
Well:	Nova Unit 1H	**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)
8,841.0	91.81	338.97	6,822.2	1,211.5	-2,085.8	1,914.4	0.43	-0.43	-0.04
8,935.0	90.37	336.66	6,820.4	1,298.5	-2,121.2	2,008.3	2.90	-1.53	-2.46
9,029.0	90.47	335.57	6,819.7	1,384.4	-2,159.3	2,102.3	1.16	0.11	-1.16
9,124.0	91.04	338.71	6,818.4	1,471.9	-2,196.2	2,197.3	3.36	0.60	3.31
9,218.0	90.91	337.75	6,816.8	1,559.2	-2,231.1	2,291.3	1.03	-0.14	-1.02
9,312.0	90.84	337.56	6,815.4	1,646.2	-2,266.8	2,385.2	0.22	-0.07	-0.20
9,406.0	90.74	336.03	6,814.1	1,732.5	-2,303.8	2,479.2	1.63	-0.11	-1.63
9,500.0	90.97	337.63	6,812.7	1,818.9	-2,340.8	2,573.2	1.72	0.24	1.70
9,594.0	92.85	339.81	6,809.6	1,906.5	-2,374.9	2,667.1	3.06	2.00	2.32
9,688.0	93.39	339.70	6,804.5	1,994.5	-2,407.4	2,760.9	0.59	0.57	-0.12
9,782.0	89.33	338.28	6,802.2	2,082.2	-2,441.1	2,854.8	4.58	-4.32	-1.51
9,876.0	89.60	337.88	6,803.1	2,169.4	-2,476.1	2,948.8	0.51	0.29	-0.43
9,970.0	90.84	342.66	6,802.7	2,257.9	-2,507.9	3,042.7	5.25	1.32	5.09
10,064.0	89.77	341.62	6,802.2	2,347.4	-2,536.7	3,136.4	1.59	-1.14	-1.11
10,158.0	89.23	338.36	6,803.1	2,435.7	-2,568.9	3,230.3	3.52	-0.57	-3.47
10,253.0	91.64	338.73	6,802.3	2,524.1	-2,603.6	3,325.3	2.57	2.54	0.39
10,347.0	91.68	337.16	6,799.6	2,611.2	-2,638.9	3,419.2	1.67	0.04	-1.67
10,441.0	91.88	336.11	6,796.7	2,697.4	-2,676.1	3,513.2	1.14	0.21	-1.12
10,535.0	92.62	340.14	6,793.0	2,784.6	-2,711.1	3,607.1	4.36	0.79	4.29
10,629.0	90.64	336.17	6,790.3	2,871.8	-2,746.1	3,701.0	4.72	-2.11	-4.22
10,724.0	90.27	335.62	6,789.6	2,958.5	-2,784.9	3,796.0	0.70	-0.39	-0.58
10,818.0	90.50	336.06	6,788.9	3,044.2	-2,823.4	3,889.9	0.53	0.24	0.47
10,912.0	90.94	336.01	6,787.8	3,130.1	-2,861.5	3,983.9	0.47	0.47	-0.05
11,006.0	91.61	335.80	6,785.7	3,215.9	-2,899.9	4,077.8	0.75	0.71	-0.22
11,100.0	91.31	337.23	6,783.3	3,302.1	-2,937.3	4,171.8	1.55	-0.32	1.52
11,195.0	91.14	336.00	6,781.2	3,389.3	-2,975.0	4,266.7	1.31	-0.18	-1.29
11,289.0	91.24	338.27	6,779.3	3,475.9	-3,011.6	4,360.7	2.42	0.11	2.41
11,383.0	90.87	336.33	6,777.6	3,562.6	-3,047.8	4,454.7	2.10	-0.39	-2.06
11,477.0	91.18	336.79	6,775.9	3,648.8	-3,085.2	4,548.6	0.59	0.33	0.49
11,571.0	91.27	341.18	6,773.9	3,736.5	-3,118.9	4,642.6	4.67	0.10	4.67
11,665.0	89.09	341.04	6,773.6	3,825.4	-3,149.3	4,736.4	2.32	-2.32	-0.15
11,759.0	88.66	340.64	6,775.4	3,914.2	-3,180.2	4,830.2	0.62	-0.46	-0.43
11,853.0	90.81	339.54	6,775.9	4,002.6	-3,212.2	4,924.1	2.57	2.29	-1.17
11,947.0	91.31	339.06	6,774.1	4,090.5	-3,245.4	5,018.1	0.74	0.53	-0.51
12,041.0	90.77	338.10	6,772.4	4,178.0	-3,279.7	5,112.0	1.17	-0.57	-1.02
12,135.0	91.61	338.80	6,770.5	4,265.4	-3,314.3	5,206.0	1.16	0.89	0.74
12,229.0	89.80	332.89	6,769.3	4,351.1	-3,352.7	5,299.9	6.57	-1.93	-6.29
12,323.0	91.11	333.84	6,768.6	4,435.1	-3,394.8	5,393.6	1.72	1.39	1.01
12,417.0	91.17	337.06	6,766.7	4,520.6	-3,433.9	5,487.5	3.43	0.06	3.43
12,512.0	90.30	337.47	6,765.5	4,608.2	-3,470.6	5,582.5	1.01	-0.92	0.43
12,605.0	90.94	338.23	6,764.5	4,694.3	-3,505.6	5,675.5	1.07	0.69	0.82
12,700.0	90.27	336.51	6,763.5	4,782.0	-3,542.2	5,770.5	1.94	-0.71	-1.81
12,794.0	90.77	335.48	6,762.6	4,867.9	-3,580.4	5,864.5	1.22	0.53	-1.10
12,888.0	89.80	337.14	6,762.1	4,954.0	-3,618.2	5,958.4	2.05	-1.03	1.77

01/05/2018

Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Nova Unit 1H
Project:	Doddridge County WV	**TVD Reference:**	Paterson 347: 1189' GL + 25' KB @ 1214.0usft
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	**MD Reference:**	Paterson 347: 1189' GL + 25' KB @ 1214.0usft
Well:	Nova Unit 1H	**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)
12,982.0	90.23	336.43	6,762.1	5,040.3	-3,655.3	6,052.4	0.88	0.46	-0.76
13,076.0	90.70	335.46	6,761.3	5,126.2	-3,693.6	6,146.4	1.15	0.50	-1.03
13,171.0	91.34	338.69	6,759.7	5,213.7	-3,730.6	6,241.4	3.47	0.67	3.40
13,264.0	90.37	339.46	6,758.3	5,300.5	-3,763.8	6,334.3	1.33	-1.04	0.83
13,359.0	90.57	338.81	6,757.5	5,389.3	-3,797.6	6,429.3	0.72	0.21	-0.68
13,452.0	90.50	338.02	6,756.6	5,475.7	-3,831.8	6,522.3	0.85	-0.08	-0.85
13,547.0	90.67	336.44	6,755.7	5,563.3	-3,868.6	6,617.3	1.67	0.18	-1.66
13,641.0	90.67	338.93	6,754.6	5,650.3	-3,904.3	6,711.2	2.65	0.00	2.65
13,735.0	90.70	338.30	6,753.4	5,737.8	-3,938.5	6,805.2	0.67	0.03	-0.67
13,829.0	90.77	336.94	6,752.2	5,824.7	-3,974.3	6,899.2	1.45	0.07	-1.45
13,923.0	89.93	337.64	6,751.6	5,911.4	-4,010.6	6,993.2	1.16	-0.89	0.74
14,017.0	90.07	338.20	6,751.6	5,998.5	-4,046.0	7,087.2	0.61	0.15	0.60
14,111.0	90.44	337.04	6,751.2	6,085.4	-4,081.7	7,181.2	1.30	0.39	-1.23
14,206.0	90.74	336.73	6,750.3	6,172.8	-4,119.0	7,276.2	0.45	0.32	-0.33
14,300.0	90.97	336.73	6,748.8	6,259.2	-4,156.2	7,370.2	0.24	0.24	0.00
14,394.0	89.93	337.28	6,748.1	6,345.7	-4,192.9	7,464.2	1.25	-1.11	0.59
14,488.0	89.97	336.33	6,748.2	6,432.1	-4,229.9	7,558.1	1.01	0.04	-1.01
14,582.0	90.37	340.17	6,747.9	6,519.4	-4,264.7	7,652.1	4.11	0.43	4.09
14,676.0	90.87	339.40	6,746.9	6,607.6	-4,297.2	7,746.0	0.98	0.53	-0.82
14,770.0	91.41	339.20	6,745.0	6,695.5	-4,330.4	7,840.0	0.61	0.57	-0.21
14,865.0	89.93	338.50	6,743.9	6,784.1	-4,364.7	7,935.0	1.72	-1.56	-0.74
14,959.0	90.27	338.97	6,743.8	6,871.7	-4,398.8	8,028.9	0.62	0.36	0.50
15,053.0	91.01	338.59	6,742.7	6,959.3	-4,432.8	8,122.9	0.88	0.79	-0.40
15,147.0	91.81	337.08	6,740.4	7,046.3	-4,468.3	8,216.9	1.82	0.85	-1.61
15,241.0	87.41	334.02	6,741.0	7,131.9	-4,507.2	8,310.8	5.70	-4.68	-3.26
15,335.0	89.77	335.60	6,743.3	7,216.9	-4,547.2	8,404.6	3.02	2.51	1.68
15,430.0	90.13	335.28	6,743.4	7,303.3	-4,586.6	8,499.6	0.51	0.38	-0.34
15,524.0	90.00	335.86	6,743.3	7,388.9	-4,625.5	8,593.5	0.63	-0.14	0.62
15,618.0	89.93	336.73	6,743.4	7,475.0	-4,663.3	8,687.5	0.93	-0.07	0.93
15,712.0	90.87	338.81	6,742.7	7,562.0	-4,698.9	8,781.5	2.43	1.00	2.21
15,806.0	91.41	338.48	6,740.8	7,649.5	-4,733.1	8,875.4	0.67	0.57	-0.35
15,900.0	91.04	338.60	6,738.8	7,737.0	-4,767.5	8,969.4	0.41	-0.39	0.13
15,994.0	89.36	335.70	6,738.5	7,823.6	-4,804.0	9,063.4	3.57	-1.79	-3.09
16,088.0	90.10	337.49	6,739.0	7,909.8	-4,841.3	9,157.4	2.06	0.79	1.90
16,182.0	90.23	336.87	6,738.7	7,996.5	-4,877.8	9,251.4	0.67	0.14	-0.66
16,275.0	90.17	335.76	6,738.4	8,081.6	-4,915.1	9,344.3	1.20	-0.06	-1.19
16,369.0	89.93	335.91	6,738.3	8,167.4	-4,953.6	9,438.3	0.30	-0.26	0.16
16,463.0	90.60	339.58	6,737.8	8,254.4	-4,989.2	9,532.3	3.97	0.71	3.90
16,557.0	89.73	337.41	6,737.6	8,341.8	-5,023.7	9,626.2	2.49	-0.93	-2.31
16,651.0	89.53	337.45	6,738.2	8,428.6	-5,059.7	9,720.2	0.22	-0.21	0.04
16,745.0	90.77	337.30	6,737.9	8,515.4	-5,095.9	9,814.2	1.33	1.32	-0.16
16,839.0	89.63	334.93	6,737.6	8,601.3	-5,133.9	9,908.2	2.80	-1.21	-2.52
16,934.0	89.73	337.88	6,738.1	8,688.4	-5,172.0	10,003.2	3.11	0.11	3.11

Company:	Antero Resources	**Local Co-ordinate Reference:**	Well Nova Unit 1H
Project:	Doddridge County WV	**TVD Reference:**	Paterson 347: 1189' GL + 25' KB @ 1214.0usft
Site:	Cofor Pad: Outback Morton Nova Grape Rainer	**MD Reference:**	Paterson 347: 1189' GL + 25' KB @ 1214.0usft
Well:	Nova Unit 1H	**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)
17,027.0	90.00	338.56	6,738.4	8,774.7	-5,206.5	10,096.2	0.79	0.29	0.73
17,122.0	89.30	335.56	6,738.9	8,862.2	-5,243.5	10,191.1	3.24	-0.74	-3.16
17,216.0	89.46	336.68	6,739.9	8,948.2	-5,281.5	10,285.1	1.20	0.17	1.19
17,310.0	90.87	340.48	6,739.7	9,035.6	-5,315.9	10,379.1	4.31	1.50	4.04
17,404.0	89.36	336.51	6,739.5	9,123.1	-5,350.3	10,473.0	4.52	-1.61	-4.22
17,498.0	89.87	339.11	6,740.1	9,210.1	-5,385.8	10,567.0	2.82	0.54	2.77
17,592.0	91.64	339.17	6,738.9	9,297.9	-5,419.3	10,661.0	1.88	1.88	0.06
17,686.0	90.91	337.04	6,736.8	9,385.1	-5,454.3	10,755.0	2.39	-0.78	-2.27
17,780.0	92.01	339.80	6,734.4	9,472.5	-5,488.9	10,848.9	3.16	1.17	2.94
17,875.0	90.94	340.37	6,732.0	9,561.8	-5,521.2	10,943.8	1.28	-1.13	0.60
17,969.0	89.56	341.04	6,731.5	9,650.5	-5,552.3	11,037.6	1.63	-1.47	0.71
18,063.0	90.00	340.94	6,731.9	9,739.4	-5,582.9	11,131.5	0.48	0.47	-0.11
18,157.0	88.86	339.69	6,732.8	9,827.9	-5,614.6	11,225.4	1.80	-1.21	-1.33
18,251.0	90.37	340.51	6,733.5	9,916.3	-5,646.6	11,319.3	1.83	1.61	0.87
18,345.0	89.36	338.74	6,733.7	10,004.4	-5,679.3	11,413.2	2.17	-1.07	-1.88
18,439.0	89.97	337.16	6,734.2	10,091.5	-5,714.6	11,507.2	1.80	0.65	-1.68
18,534.0	89.70	336.25	6,734.5	10,178.7	-5,752.1	11,602.2	1.00	-0.28	-0.96
18,628.0	90.37	335.79	6,734.5	10,264.6	-5,790.4	11,696.2	0.86	0.71	-0.49
18,722.0	90.87	336.06	6,733.4	10,350.4	-5,828.7	11,790.1	0.60	0.53	0.29
18,816.0	90.00	337.34	6,732.7	10,436.8	-5,865.9	11,884.1	1.65	-0.93	1.36
18,910.0	90.50	336.62	6,732.3	10,523.3	-5,902.6	11,978.1	0.93	0.53	-0.77
19,004.0	89.03	337.65	6,732.7	10,609.9	-5,939.2	12,072.1	1.91	-1.56	1.10
19,098.0	89.26	337.45	6,734.1	10,696.8	-5,975.0	12,166.1	0.32	0.24	-0.21
19,193.0	90.13	338.28	6,734.6	10,784.8	-6,010.8	12,261.1	1.27	0.92	0.87
19,287.0	90.80	338.15	6,733.8	10,872.0	-6,045.7	12,355.0	0.73	0.71	-0.14
19,381.0	88.72	337.19	6,734.2	10,959.0	-6,081.4	12,449.0	2.44	-2.21	-1.02
19,475.0	89.16	336.81	6,736.0	11,045.5	-6,118.2	12,543.0	0.62	0.47	-0.40
19,569.0	89.66	336.07	6,736.9	11,131.7	-6,155.7	12,637.0	0.95	0.53	-0.79
19,663.0	88.35	337.25	6,738.6	11,218.0	-6,193.0	12,731.0	1.88	-1.39	1.26
19,757.0	88.93	337.71	6,740.8	11,304.8	-6,229.0	12,824.9	0.79	0.62	0.49
19,852.0	90.13	338.34	6,741.6	11,392.9	-6,264.5	12,919.9	1.43	1.26	0.66
19,946.0	90.84	337.98	6,740.8	11,480.1	-6,299.5	13,013.9	0.85	0.76	-0.38
20,040.0	90.03	336.91	6,740.1	11,566.9	-6,335.5	13,107.9	1.43	-0.86	-1.14
20,134.0	89.70	334.96	6,740.3	11,652.7	-6,373.9	13,201.9	2.10	-0.35	-2.07
20,228.0	89.70	333.71	6,740.8	11,737.5	-6,414.6	13,295.7	1.33	0.00	-1.33
20,322.0	89.77	332.74	6,741.2	11,821.4	-6,456.9	13,389.4	1.03	0.07	-1.03
20,417.0	90.20	331.76	6,741.3	11,905.4	-6,501.1	13,484.0	1.13	0.45	-1.03
20,511.0	89.83	331.16	6,741.2	11,988.0	-6,546.1	13,577.5	0.75	-0.39	-0.64
20,532.0	89.80	330.83	6,741.3	12,006.4	-6,556.2	13,598.3	1.58	-0.14	-1.57
Last SDI MWD @ 20532									
20,593.0	89.80	330.83	6,741.5	12,059.7	-6,586.0	13,658.9	0.00	0.00	0.00
Projection To Bit @ 20593 MD / 6741 TVD									