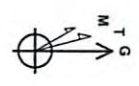




Duff Unit 1H
Doddridge County WV
Northing: 14295233.02
Easting: 1715888.89
As Drilled



WELL DETAILS Duff Unit 1H
 Ground Level: 996.0
 +N/-S 0.0 +E/-W 0.0
 Northing 14295233.02
 Easting 1715888.89
 Longitude 80° 43' 58.679 W
 Latitude 39° 21' 56.561 N

FORMATION TOP DETAILS
 No formation data is available

LEGEND
 * Costlow Unit 2H, Original Wellpath, As Drilled VO
 □ Duff Unit 1H, Original Wellpath, Plan 3 VO
 □ As Drilled

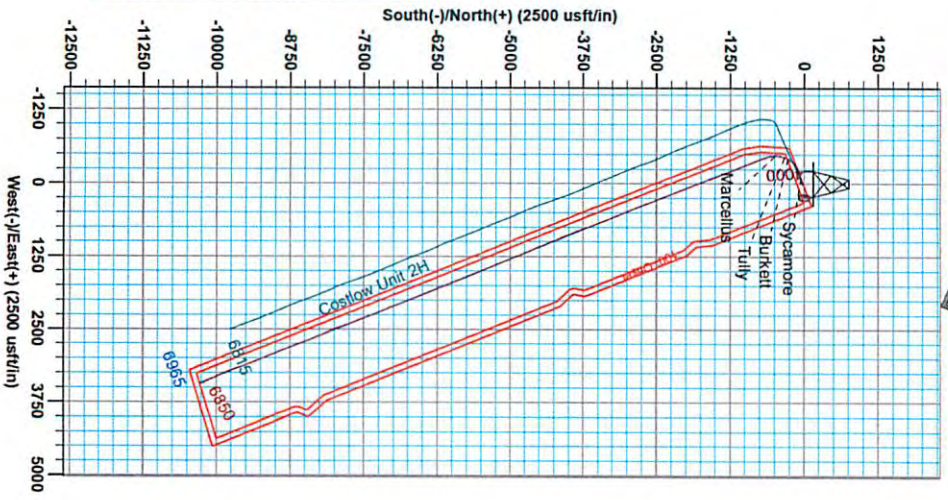
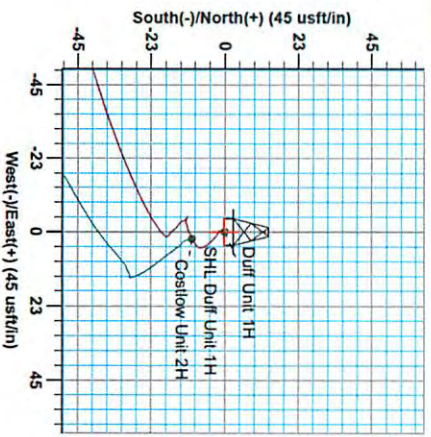
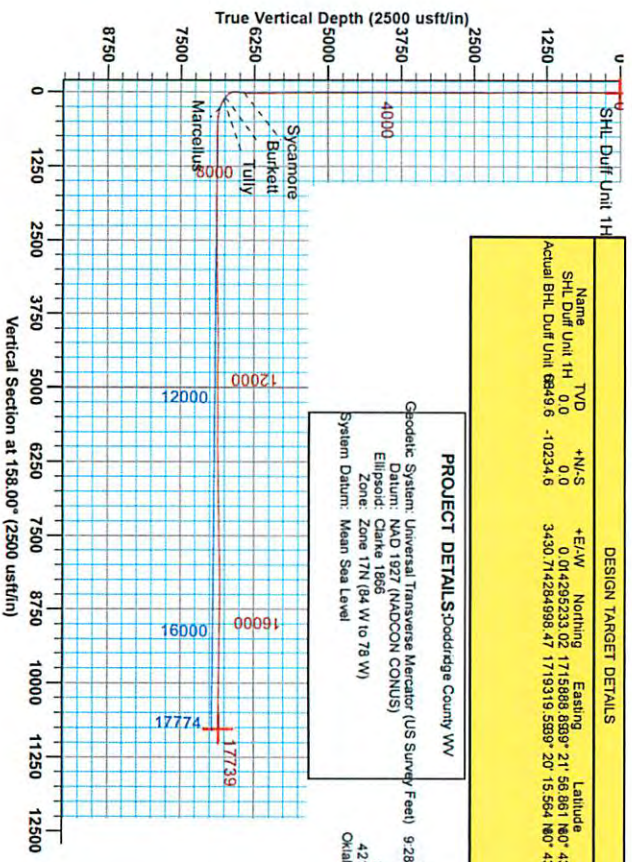
SITE DETAILS: Costlow/Duff/Marcellus
 Site Centre Northing: 14295233.06
 Easting: 1715889.05
 Positional Uncertainty: 0.0
 Conversion: UTM
 Control: Local North
 Grid: GCS

DESIGN TARGET DETAILS

Name	TYD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
SHL Duff Unit 1H	0.0	0.0	0.0	14295233.02	1715888.89	39° 21' 56.561 N	80° 43' 58.679 W
Actual BHL Duff Unit 9849.6	-10234.6	3430.7	714284.988	47.17	19319.5599	20° 15.564 N	80° 43' 15.384 W

PROJECT DETAILS: Doddridge County WV
 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

Game Lightfoot
 9.28, December 30 2013
 Scientific Drilling
 421 South Eagle Lane
 Oklahoma City, OK 73128



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 Magnetic Field
 Strength: 52402.3nT
 Dip Angle: 66.92°
 Date: 11/8/2013
 Model: IGRF2010
 To convert Magnetic North to Grid, Subtract 8.67°
 To convert True North to Grid, Subtract 0.17°
 Azimuths to Grid North: -0.17°
 True North: -0.17°
 Magnetic North: -8.67°
 06/05/2015



Antero Resources

Doddridge County WV
Costlow/Duff/Mishka
Duff Unit 1H
Original Wellpath

Design: As Drilled

EOW Completion Report

30 December, 2013



Scientific Drilling

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Environmental Protection



Company:	Antero Resources	Local Co-ordinate Reference:	Well Duff Unit 1H
Project:	Doddridge County WV	TVD Reference:	Duff 1H 996 GL + 19 KB @ 1015.0usft
Site:	Costlow/Duff/Mishka	MD Reference:	Duff 1H 996 GL + 19 KB @ 1015.0usft
Well:	Duff Unit 1H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Oklahoma District

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

Site	Costlow/Duff/Mishka				
Site Position:		Northing:	14,295,223.06 usft	Latitude:	39° 21' 56.762 N
From:	Map	Easting:	1,715,891.05 usft	Longitude:	80° 43' 58.652 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"	Grid Convergence:	0.17 °

Well	Duff Unit 1H					
Well Position	+N/-S	0.0 usft	Northing:	14,295,233.02 usft	Latitude:	39° 21' 56.861 N
	+E/-W	0.0 usft	Easting:	1,715,888.89 usft	Longitude:	80° 43' 58.679 W
Position Uncertainty	2.0 usft		Wellhead Elevation:	1,015.0 usft	Ground Level:	996.0 usft

Wellbore	Original Wellpath				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/8/2013	-8.50	66.92	52,402

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	158.00	

Survey Program	Date	12/30/2013			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	6,122.0	Survey #2 Def Gyro to KOP (Original Well	SDI Standard Keeper	Scientific Drilling Intl. Standard Wireline Keeper	
6,122.0	17,739.0	Survey #4 MWD (Original Wellpath)	SDI MWD	Scientific Drilling Intl. MWD - Standard ver 1.0.1	

Survey									
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)		
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00	
100.0	0.13	168.80	100.0	-0.1	0.0	0.1	0.13	0.13	
200.0	0.11	214.36	200.0	-0.3	0.0	0.3	0.09	0.09	
300.0	0.02	205.20	300.0	-0.4	-0.1	0.3	0.09	0.09	
400.0	0.14	208.93	400.0	-0.5	-0.1	0.4	0.12	0.12	
500.0	0.19	205.46	500.0	-0.8	-0.3	0.6	0.05	0.05	
600.0	0.10	194.54	600.0	-1.0	-0.4	0.8	0.09	0.09	
700.0	0.09	151.64	700.0	-1.2	-0.3	0.9	0.07	0.07	
800.0	0.19	175.30	800.0	-1.4	-0.3	1.2	0.11	0.11	
900.0	0.11	216.17	900.0	-1.6	-0.3	1.4	0.13	0.13	
1,000.0	0.03	152.07	1,000.0	-1.7	-0.4	1.5	0.10	0.10	

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Company:	Antero Resources	Local Co-ordinate Reference:	Well Duff Unit 1H
Project:	Doddridge County WV	TVD Reference:	Duff 1H 996 GL + 19 KB @ 1015.0usft
Site:	Costlow/Duff/Mishka	MD Reference:	Duff 1H 996 GL + 19 KB @ 1015.0usft
Well:	Duff Unit 1H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Oklahoma District

Survey									
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)		
1,100.0	0.04	115.80	1,100.0	-1.8	-0.3	1.5	0.02		
1,200.0	0.04	70.93	1,200.0	-1.8	-0.3	1.6	0.03		
1,300.0	0.11	27.65	1,300.0	-1.7	-0.2	1.5	0.09		
1,400.0	0.19	117.53	1,400.0	-1.7	0.0	1.6	0.22		
1,500.0	0.13	86.31	1,500.0	-1.7	0.3	1.7	0.10		
1,600.0	0.32	135.63	1,600.0	-1.9	0.6	2.0	0.26		
1,700.0	0.37	126.90	1,700.0	-2.3	1.0	2.5	0.07		
1,800.0	0.51	127.85	1,800.0	-2.8	1.6	3.2	0.14		
1,900.0	0.59	137.81	1,900.0	-3.5	2.3	4.1	0.12		
2,000.0	0.50	133.12	2,000.0	-4.1	3.0	5.0	0.10		
2,100.0	0.51	145.85	2,100.0	-4.8	3.6	5.8	0.11		
2,200.0	0.41	145.00	2,200.0	-5.5	4.0	6.6	0.10		
2,300.0	0.33	131.11	2,300.0	-5.9	4.4	7.2	0.12		
2,400.0	0.23	171.60	2,400.0	-6.3	4.7	7.6	0.22		
2,500.0	0.41	175.79	2,500.0	-6.9	4.7	8.2	0.18		
2,600.0	0.20	158.00	2,600.0	-7.4	4.8	8.7	0.23		
2,700.0	0.34	209.32	2,700.0	-7.8	4.7	9.0	0.27		
2,708.0	0.40	209.48	2,708.0	-7.9	4.7	9.1	0.75		
2,800.0	0.35	224.46	2,800.0	-8.4	4.4	9.4	0.12		
2,900.0	0.56	240.61	2,900.0	-8.8	3.7	9.6	0.24		
3,000.0	0.47	237.11	3,000.0	-9.3	3.0	9.7	0.10		
3,100.0	0.47	248.31	3,100.0	-9.6	2.2	9.8	0.09		
3,200.0	0.42	248.07	3,200.0	-9.9	1.5	9.8	0.05		
3,300.0	0.38	231.41	3,300.0	-10.3	0.9	9.9	0.12		
3,400.0	0.41	241.32	3,399.9	-10.7	0.3	10.0	0.07		
3,500.0	0.41	244.46	3,499.9	-11.0	-0.3	10.1	0.02		
3,600.0	0.40	254.69	3,599.9	-11.2	-1.0	10.1	0.07		
3,700.0	0.36	266.41	3,699.9	-11.3	-1.6	9.9	0.09		
3,800.0	0.36	250.36	3,799.9	-11.5	-2.2	9.8	0.10		
3,900.0	0.32	249.44	3,899.9	-11.7	-2.8	9.8	0.04		
4,000.0	0.28	267.28	3,999.9	-11.8	-3.3	9.7	0.10		
4,100.0	0.17	307.38	4,099.9	-11.7	-3.6	9.5	0.19		
4,200.0	0.08	305.54	4,199.9	-11.6	-3.8	9.3	0.09		
4,300.0	0.13	302.39	4,299.9	-11.5	-4.0	9.1	0.05		
4,400.0	0.38	272.14	4,399.9	-11.4	-4.4	8.9	0.28		
4,500.0	0.08	333.59	4,499.9	-11.3	-4.8	8.7	0.35		
4,600.0	0.08	24.79	4,599.9	-11.2	-4.8	8.6	0.07		
4,700.0	0.11	54.59	4,699.9	-11.1	-4.7	8.5	0.06		
4,800.0	0.19	138.93	4,799.9	-11.1	-4.7	8.7	0.21		
4,900.0	0.31	134.74	4,899.9	-11.5	-4.2	9.1	0.12		
5,000.0	0.40	145.88	4,999.9	-11.9	-3.8	9.7	0.11		
5,100.0	0.38	145.35	5,099.9	-12.5	-3.4	10.3	0.02		
5,200.0	0.34	161.57	5,199.9	-13.1	-3.1	10.9	0.11		
5,300.0	0.34	132.21	5,299.9	-13.5	-2.8	11.5	0.17		

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Company:	Antero Resources	Local Co-ordinate Reference:	Well Duff Unit 1H
Project:	Doddridge County WV	TVD Reference:	Duff 1H 996 GL + 19 KB @ 1015.0usft
Site:	Costlow/Duff/Mishka	MD Reference:	Duff 1H 996 GL + 19 KB @ 1015.0usft
Well:	Duff Unit 1H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Oklahoma District

Survey									
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)		
5,400.0	0.40	121.36	5,399.9	-13.9	-2.3	12.1	0.09		
5,500.0	0.27	138.52	5,499.9	-14.3	-1.8	12.6	0.16		
5,600.0	0.36	118.18	5,599.9	-14.6	-1.4	13.0	0.14		
5,700.0	0.33	151.67	5,699.9	-15.0	-1.0	13.5	0.20		
5,800.0	0.49	144.41	5,799.9	-15.6	-0.6	14.2	0.17		
5,900.0	0.54	117.95	5,899.9	-16.2	0.1	15.0	0.24		
6,000.0	0.50	135.18	5,999.9	-16.7	0.8	15.8	0.16		
6,100.0	0.62	147.32	6,099.9	-17.5	1.4	16.7	0.17		
6,122.0	0.53	137.31	6,121.9	-17.6	1.5	16.9	0.61		
6,161.0	2.97	224.23	6,160.9	-18.5	0.9	17.5	7.66		
6,205.0	9.12	236.01	6,204.6	-21.3	-2.7	18.7	14.19		
6,250.0	15.13	244.11	6,248.6	-25.8	-11.0	19.8	13.85		
6,294.0	19.93	248.02	6,290.5	-31.2	-23.1	20.2	11.23		
6,340.0	24.97	251.92	6,333.0	-37.1	-39.6	19.6	11.42		
6,384.0	29.50	252.59	6,372.2	-43.2	-58.8	18.1	10.32		
6,430.0	34.58	254.18	6,411.1	-50.2	-82.2	15.7	11.19		
6,455.0	37.56	254.40	6,431.3	-54.2	-96.4	14.1	11.94		
Sycamore									
6,474.0	39.83	254.54	6,446.2	-57.3	-107.8	12.8	11.94		
6,519.0	43.97	255.35	6,479.7	-65.1	-136.8	9.1	9.28		
6,563.0	48.32	255.94	6,510.1	-73.0	-167.6	4.9	9.93		
6,609.0	53.47	255.70	6,539.1	-81.7	-202.1	0.1	11.20		
6,653.0	54.79	252.62	6,564.9	-91.5	-236.4	-3.7	6.42		
6,699.0	53.32	244.93	6,592.0	-104.9	-271.1	-4.3	13.90		
6,742.0	53.11	237.13	6,617.7	-121.6	-301.2	-0.1	14.53		
6,788.0	54.98	230.62	6,644.8	-143.5	-331.2	9.0	12.15		
6,832.0	57.70	225.83	6,669.1	-167.9	-358.5	21.4	10.97		
6,878.0	58.21	219.84	6,693.6	-196.5	-385.0	38.0	11.09		
6,922.0	59.10	214.11	6,716.5	-226.5	-407.6	57.3	11.30		
6,968.0	61.29	208.15	6,739.4	-260.7	-428.2	81.3	12.21		
6,986.0	62.77	206.21	6,747.8	-274.8	-435.4	91.7	12.60		
Burkett									
7,011.0	64.87	203.59	6,758.8	-295.2	-444.9	107.0	12.60		
7,052.0	66.09	198.65	6,775.8	-329.9	-458.3	134.2	11.37		
Tully									
7,057.0	66.25	198.05	6,777.9	-334.3	-459.8	137.7	11.37		
7,101.0	67.74	193.20	6,795.1	-373.3	-470.6	169.8	10.70		
7,147.0	69.91	188.03	6,811.7	-415.4	-478.5	205.9	11.49		
7,191.0	73.03	183.76	6,825.7	-456.9	-482.8	242.8	11.62		
7,223.0	74.33	179.61	6,834.7	-487.6	-483.7	270.9	13.10		
Marcellus									
7,243.0	75.19	177.04	6,839.9	-506.9	-483.1	289.0	13.10		
7,289.0	78.08	170.18	6,850.6	-551.3	-478.1	332.1	15.81		
7,332.0	80.76	164.16	6,858.5	-592.5	-468.7	373.8	15.11		
7,378.0	82.29	161.50	6,865.3	-636.0	-455.3	419.1	6.62		

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Company:	Antero Resources	Local Co-ordinate Reference:	Well Duff Unit 1H
Project:	Doddridge County WV	TVD Reference:	Duff 1H 996 GL + 19 KB @ 1015.0usft
Site:	Costlow/Duff/Mishka	MD Reference:	Duff 1H 996 GL + 19 KB @ 1015.0usft
Well:	Duff Unit 1H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Oklahoma District

Survey								
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	
7,422.0	83.64	161.34	6,870.7	-677.4	-441.4	462.7	3.09	
7,465.0	87.75	160.83	6,873.9	-717.9	-427.5	505.5	9.63	
7,512.0	89.56	160.59	6,875.0	-762.3	-412.0	552.4	3.88	
7,601.0	90.50	158.40	6,874.9	-845.6	-380.8	641.4	2.68	
7,691.0	89.46	157.47	6,875.0	-929.0	-347.0	731.4	1.55	
7,781.0	90.13	155.66	6,875.3	-1,011.6	-311.2	821.4	2.14	
7,870.0	90.10	156.54	6,875.1	-1,093.0	-275.2	910.3	0.99	
7,960.0	88.76	157.99	6,876.0	-1,176.0	-240.4	1,000.3	2.19	
8,049.0	89.40	158.69	6,877.4	-1,258.7	-207.5	1,089.3	1.07	
8,139.0	88.72	158.51	6,878.9	-1,342.5	-174.7	1,179.3	0.78	
8,229.0	89.40	157.80	6,880.4	-1,426.0	-141.2	1,269.2	1.09	
8,318.0	89.53	157.41	6,881.2	-1,508.3	-107.3	1,358.2	0.46	
8,408.0	88.49	157.25	6,882.8	-1,591.3	-72.6	1,448.2	1.17	
8,497.0	88.66	158.92	6,885.0	-1,673.8	-39.4	1,537.2	1.89	
8,587.0	89.36	160.54	6,886.5	-1,758.2	-8.2	1,627.1	1.96	
8,677.0	90.27	159.44	6,886.8	-1,842.8	22.6	1,717.1	1.59	
8,766.0	89.40	157.12	6,887.1	-1,925.5	55.5	1,806.1	2.78	
8,856.0	89.87	157.35	6,887.7	-2,008.5	90.3	1,896.1	0.58	
8,946.0	91.04	157.95	6,886.9	-2,091.7	124.5	1,986.0	1.46	
9,035.0	90.54	158.00	6,885.7	-2,174.2	157.9	2,075.0	0.56	
9,125.0	91.18	157.10	6,884.4	-2,257.4	192.3	2,165.0	1.23	
9,214.0	90.47	158.50	6,883.1	-2,339.8	225.9	2,254.0	1.76	
9,304.0	89.90	157.84	6,882.8	-2,423.3	259.4	2,344.0	0.97	
9,394.0	90.10	159.48	6,882.8	-2,507.1	292.1	2,434.0	1.84	
9,483.0	91.21	160.52	6,881.8	-2,590.8	322.5	2,522.9	1.71	
9,573.0	90.84	160.09	6,880.2	-2,675.5	352.9	2,612.9	0.63	
9,663.0	91.24	159.02	6,878.5	-2,759.8	384.3	2,702.8	1.27	
9,752.0	90.70	157.52	6,877.0	-2,842.5	417.2	2,791.8	1.79	
9,842.0	91.28	156.66	6,875.5	-2,925.3	452.3	2,881.8	1.15	
9,931.0	89.90	157.23	6,874.6	-3,007.2	487.1	2,970.7	1.68	
10,021.0	90.00	156.13	6,874.6	-3,089.9	522.8	3,060.7	1.23	
10,111.0	90.70	157.83	6,874.1	-3,172.7	558.0	3,150.7	2.04	
10,200.0	91.18	158.16	6,872.6	-3,255.2	591.3	3,239.7	0.65	
10,290.0	92.45	157.45	6,869.8	-3,338.5	625.3	3,329.6	1.62	
10,379.0	92.02	158.22	6,866.3	-3,420.9	658.8	3,418.6	0.99	
10,469.0	91.14	159.97	6,863.8	-3,504.9	690.9	3,508.5	2.18	
10,559.0	91.28	159.23	6,861.9	-3,589.2	722.3	3,598.5	0.84	
10,649.0	90.94	160.54	6,860.2	-3,673.7	753.2	3,688.4	1.50	
10,738.0	89.90	158.78	6,859.5	-3,757.2	784.2	3,778.3	2.30	
10,828.0	90.50	157.97	6,859.2	-3,840.8	817.3	3,867.3	1.12	
10,917.0	91.48	157.89	6,857.7	-3,923.3	850.8	3,956.3	1.10	
11,007.0	91.24	158.44	6,855.5	-4,006.8	884.2	4,046.3	0.67	
11,097.0	90.71	157.79	6,854.0	-4,090.3	917.8	4,136.3	0.93	
11,186.0	90.07	158.04	6,853.4	-4,172.8	951.2	4,225.3	0.77	

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Company:	Antero Resources	Local Co-ordinate Reference:	Well Duff Unit 1H
Project:	Doddridge County WV	TVD Reference:	Duff 1H 996 GL + 19 KB @ 1015.0usft
Site:	Costlow/Duff/Mishka	MD Reference:	Duff 1H 996 GL + 19 KB @ 1015.0usft
Well:	Duff Unit 1H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Oklahoma District

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
11,276.0	88.73	157.72	6,854.3	-4,256.2	985.1	4,315.3	1.53
11,366.0	88.69	158.24	6,856.4	-4,339.6	1,018.9	4,405.2	0.58
11,455.0	88.12	157.75	6,858.8	-4,422.1	1,052.2	4,494.2	0.84
11,545.0	87.99	156.46	6,861.9	-4,504.9	1,087.2	4,584.1	1.44
11,635.0	89.23	156.62	6,864.1	-4,587.4	1,123.0	4,674.1	1.39
11,724.0	90.34	157.12	6,864.4	-4,669.3	1,158.0	4,763.1	1.37
11,819.0	90.57	156.95	6,863.7	-4,756.8	1,195.0	4,858.1	0.30
11,914.0	89.80	156.12	6,863.4	-4,843.9	1,232.9	4,953.0	1.19
11,977.0	90.24	156.32	6,863.3	-4,901.5	1,258.3	5,016.0	0.77
12,072.0	90.30	157.71	6,862.9	-4,989.0	1,295.4	5,111.0	1.46
12,167.0	90.97	159.18	6,861.8	-5,077.4	1,330.3	5,206.0	1.70
12,261.0	90.71	158.28	6,860.5	-5,164.9	1,364.3	5,299.9	1.00
12,356.0	89.50	157.78	6,860.3	-5,253.0	1,399.9	5,394.9	1.38
12,451.0	89.63	157.49	6,861.0	-5,340.9	1,436.0	5,489.9	0.33
12,546.0	89.30	157.38	6,861.9	-5,428.6	1,472.5	5,584.9	0.37
12,641.0	89.56	156.57	6,862.8	-5,516.0	1,509.6	5,679.9	0.90
12,672.0	90.00	157.57	6,863.0	-5,544.6	1,521.7	5,710.9	3.52
12,767.0	89.56	156.64	6,863.3	-5,632.1	1,558.7	5,805.9	1.08
12,857.0	89.50	158.85	6,864.1	-5,715.4	1,592.8	5,895.9	2.46
12,946.0	90.60	159.02	6,864.0	-5,798.4	1,624.8	5,984.9	1.25
13,036.0	92.15	158.64	6,861.8	-5,882.3	1,657.2	6,074.8	1.77
13,126.0	90.70	157.47	6,859.6	-5,965.8	1,690.9	6,164.8	2.07
13,215.0	90.44	157.12	6,858.7	-6,047.9	1,725.2	6,253.8	0.49
13,305.0	91.65	158.58	6,857.1	-6,131.2	1,759.1	6,343.8	2.11
13,394.0	90.34	157.98	6,855.5	-6,213.9	1,792.1	6,432.7	1.62
13,484.0	90.17	157.65	6,855.1	-6,297.2	1,826.1	6,522.7	0.41
13,574.0	91.38	157.24	6,853.9	-6,380.3	1,860.6	6,612.7	1.42
13,663.0	91.78	158.54	6,851.4	-6,462.8	1,894.1	6,701.7	1.53
13,753.0	90.67	158.69	6,849.5	-6,546.5	1,926.9	6,791.7	1.24
13,843.0	90.67	155.44	6,848.5	-6,629.4	1,961.9	6,881.6	3.61
13,932.0	90.34	157.35	6,847.7	-6,711.0	1,997.6	6,970.6	2.18
14,022.0	91.41	160.00	6,846.3	-6,794.8	2,030.3	7,060.6	3.18
14,112.0	90.97	160.23	6,844.4	-6,879.4	2,060.9	7,150.5	0.55
14,201.0	91.17	160.45	6,842.8	-6,963.2	2,090.8	7,239.4	0.33
14,291.0	90.37	157.82	6,841.6	-7,047.3	2,122.9	7,329.4	3.05
14,381.0	90.77	155.09	6,840.7	-7,129.8	2,158.8	7,419.3	3.07
14,470.0	90.60	156.47	6,839.6	-7,210.9	2,195.3	7,508.2	1.56
14,560.0	90.40	158.45	6,838.8	-7,294.0	2,229.8	7,598.2	2.21
14,650.0	91.34	158.06	6,837.5	-7,377.6	2,263.2	7,688.2	1.13
14,739.0	91.91	159.78	6,834.9	-7,460.6	2,295.2	7,777.2	2.04
14,829.0	91.61	160.26	6,832.2	-7,545.2	2,325.6	7,867.1	0.63
14,919.0	90.97	159.48	6,830.1	-7,629.7	2,356.9	7,957.0	1.12
15,008.0	90.40	159.76	6,829.1	-7,713.1	2,387.9	8,046.0	0.71
15,098.0	89.90	160.14	6,828.8	-7,797.6	2,418.7	8,135.9	0.70
15,188.0	90.60	159.39	6,828.4	-7,882.1	2,449.8	8,225.9	1.14

Company:	Antero Resources	Local Co-ordinate Reference:	Well Duff Unit 1H
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Site:	Costlow/Duff/Mishka	MD Reference:	Duff 1H 996 GL + 19 KB @ 1015.0usft
Well:	Duff Unit 1H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Oklahoma District

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
15,277.0	90.23	158.06	6,827.8	-7,965.0	2,482.1	8,314.8	1.55
15,367.0	89.03	155.63	6,828.4	-8,047.7	2,517.5	8,404.8	3.01
15,456.0	89.70	156.17	6,829.4	-8,129.0	2,553.9	8,493.7	0.97
15,546.0	90.97	154.96	6,828.8	-8,210.9	2,591.1	8,583.7	1.95
15,636.0	90.50	156.01	6,827.7	-8,292.8	2,628.4	8,673.6	1.28
15,725.0	89.90	156.13	6,827.4	-8,374.1	2,664.5	8,762.5	0.69
15,815.0	89.36	158.62	6,828.0	-8,457.2	2,699.1	8,852.5	2.83
15,905.0	90.64	162.27	6,828.0	-8,542.0	2,729.3	8,942.4	4.30
15,994.0	89.63	160.01	6,827.7	-8,626.2	2,758.0	9,031.3	2.78
16,084.0	88.46	158.80	6,829.2	-8,710.4	2,789.7	9,121.2	1.87
16,174.0	88.93	157.98	6,831.3	-8,794.1	2,822.8	9,211.2	1.05
16,263.0	88.37	157.70	6,833.4	-8,876.5	2,856.4	9,300.2	0.70
16,353.0	89.16	158.14	6,835.3	-8,959.9	2,890.2	9,390.1	1.00
16,443.0	88.89	157.02	6,836.9	-9,043.1	2,924.5	9,480.1	1.28
16,532.0	88.82	157.31	6,838.6	-9,125.1	2,959.1	9,569.1	0.34
16,622.0	89.30	156.47	6,840.1	-9,207.8	2,994.4	9,659.1	1.07
16,712.0	89.19	157.12	6,841.3	-9,290.5	3,029.8	9,749.0	0.73
16,801.0	89.63	158.82	6,842.2	-9,373.0	3,063.2	9,838.0	1.97
16,891.0	89.63	160.50	6,842.8	-9,457.4	3,094.5	9,928.0	1.87
16,981.0	89.19	160.07	6,843.7	-9,542.1	3,124.9	10,017.9	0.68
17,070.0	89.30	160.58	6,844.9	-9,625.9	3,154.8	10,106.8	0.59
17,160.0	88.36	157.92	6,846.7	-9,710.1	3,186.7	10,196.8	3.13
17,249.0	89.06	157.31	6,848.7	-9,792.3	3,220.6	10,285.8	1.04
17,339.0	90.13	157.35	6,849.4	-9,875.4	3,255.3	10,375.7	1.19
17,429.0	89.87	156.01	6,849.4	-9,958.0	3,290.9	10,465.7	1.52
17,519.0	90.07	154.38	6,849.4	-10,039.7	3,328.7	10,555.6	1.82
17,608.0	89.78	153.22	6,849.5	-10,119.6	3,367.9	10,644.4	1.34
17,680.0	90.04	150.67	6,849.7	-10,183.1	3,401.8	10,716.0	3.56
17,739.0	90.04	150.67	6,849.6	-10,234.6	3,430.7	10,774.5	0.00

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
6,455.0	6,431.3	-54.2	-96.4	Sycamore
6,986.0	6,747.8	-274.8	-435.4	Burkett
7,052.0	6,775.8	-329.9	-458.3	Tully
7,223.0	6,834.7	-487.6	-483.7	Marcellus

Checked By: _____ Approved By: _____ Date: _____

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