



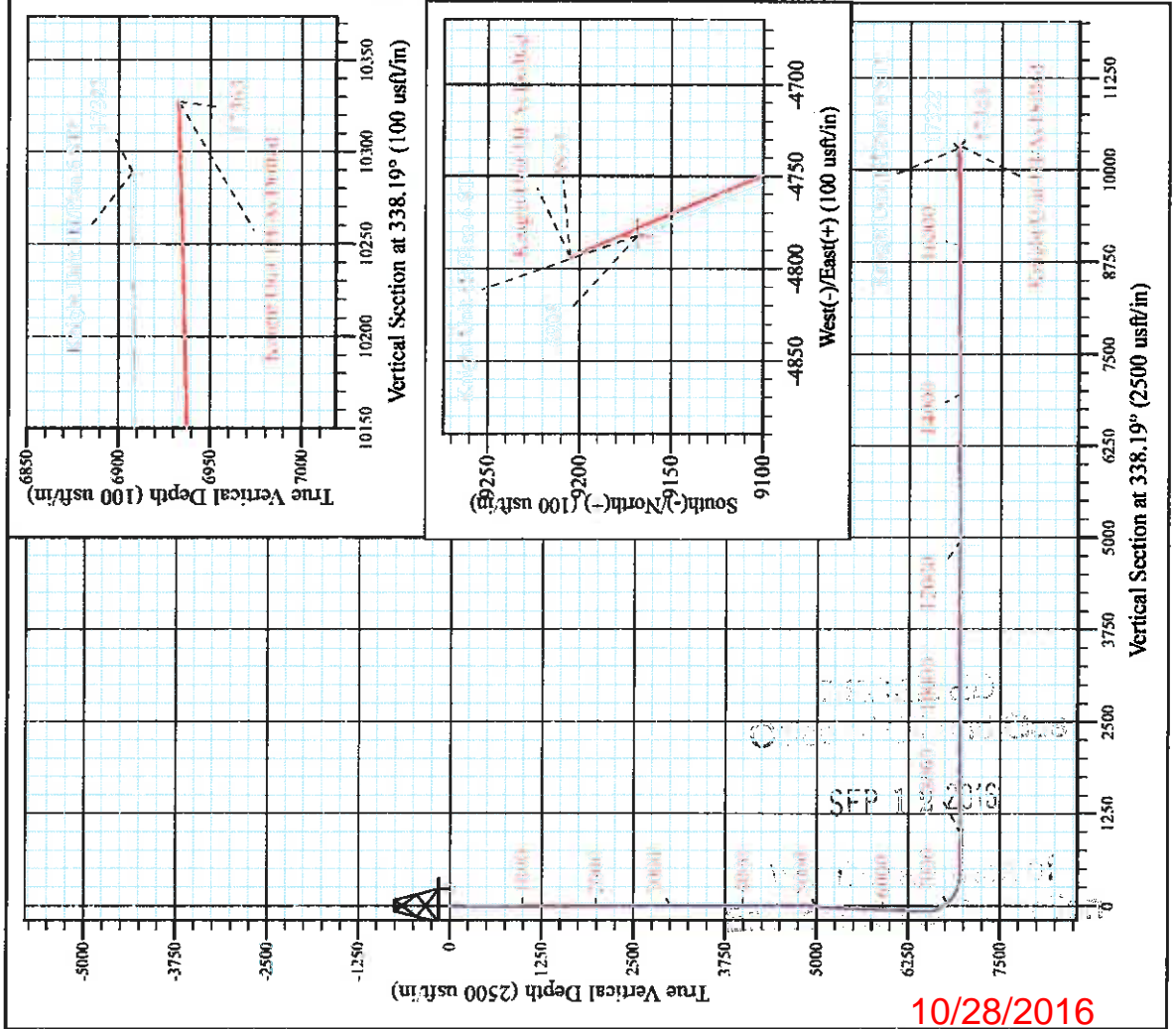
Hamilton Pad: Costlow/Caskins/Hoskins/Knight  
 Knight Unit 1H  
 Plan 6 STT  
 PD 525 GL 1159 + 19' RKB @ 1178.0usft  
 Doddridge County WV

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

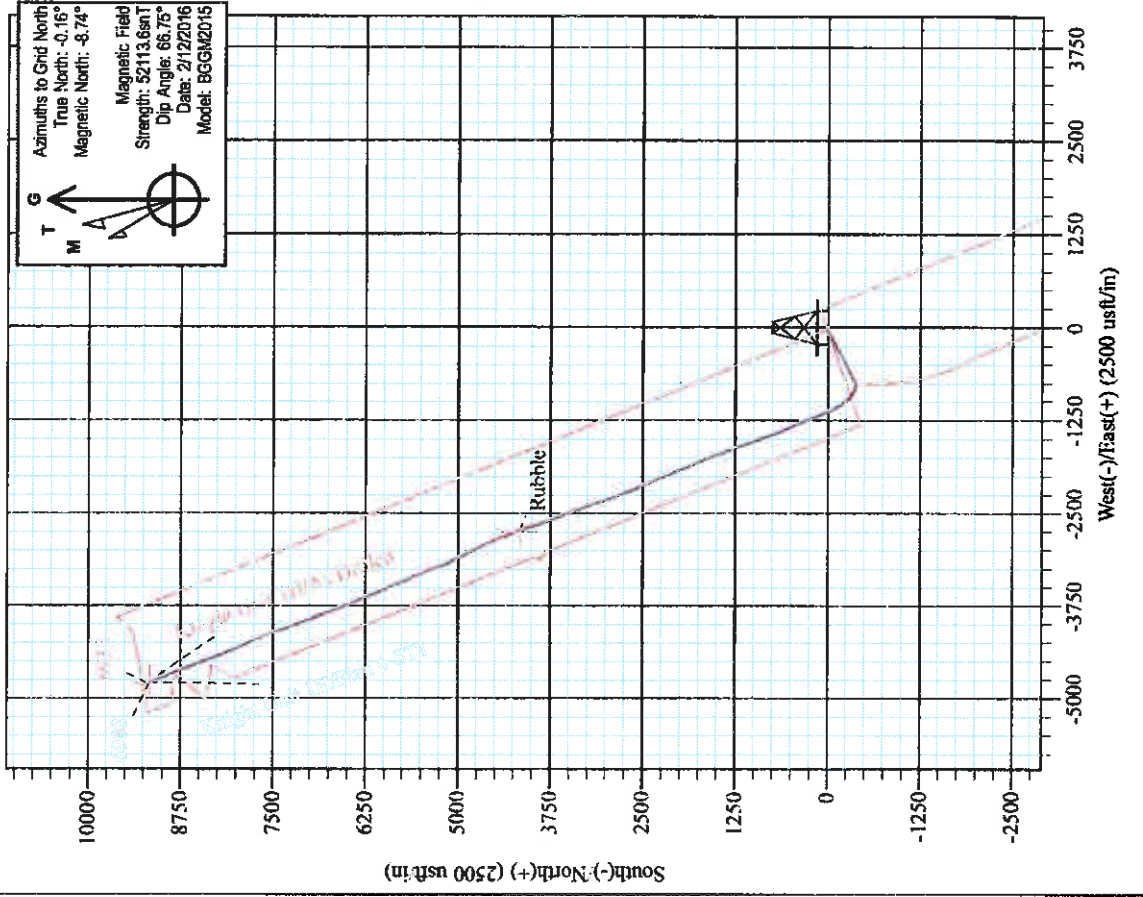


**WELL DETAILS: Knight Unit 1H SHL**

+N/-S	+E/-W	Northing	Eastings	Latitude	Longitude
0.0	0.0	14295885.72	1712822.63	39° 23' 34.02 N	80° 44' 37.712 W



10/28/2016



**Knight Unit 1H**  
**Approx. BHL**  
**39° 23' 34.548 N 80° 45' 38.460 W**

Shane Rhodes  
 8:35, March 09 2016  
 Scientific Drilling International  
 124 Vista Drive  
 Charleroi, PA 15022



# **Antero Resources**

**Doddridge County WV**

**Hamilton Pad: Costlow/Gaskins/Hoskins/Knight**

**Knight Unit 1H**

**ST 1**

**Design: As Drilled**

## **Standard Survey Report**

**09 March, 2016**



**Scientific Drilling**

[www.scientificdrilling.com](http://www.scientificdrilling.com)

10/28/2016



<b>Company:</b>	Antero Resources	<b>Local Co-ordinate Reference:</b>	Well Knight Unit 1H
<b>Project:</b>	Doddridge County WV	<b>TVD Reference:</b>	PD 525 GL 1159 + 19' RKB @ 1178.0usft
<b>Site:</b>	Hamilton Pad: Costlow/Gaskins/Hoskins/Knight	<b>MD Reference:</b>	PD 525 GL 1159 + 19' RKB @ 1178.0usft
<b>Well:</b>	Knight Unit 1H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	ST 1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Antero NE

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

<b>Site</b>	Hamilton Pad: Costlow/Gaskins/Hoskins/Knight, Site Center: Hoskins 2H				
<b>Site Position:</b>	<b>Northing:</b>	14,295,911.01 usft	<b>Latitude:</b>	39° 22' 3.652 N	
<b>From:</b>	<b>Easting:</b>	1,712,840.20 usft	<b>Longitude:</b>	80° 44' 37.487 W	
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	0.16 °

<b>Well</b>	Knight Unit 1H, Marcellus				
<b>Well Position</b>	<b>+N/-S</b>	0.0 usft	<b>Northing:</b>	14,295,885.72 usft	
	<b>+E/-W</b>	0.0 usft	<b>Easting:</b>	1,712,822.63 usft	
<b>Position Uncertainty</b>	2.0 usft	<b>Wellhead Elevation:</b>	1,182.0 usft	<b>Ground Level:</b>	1,178.0 usft

<b>Wellbore</b>	ST 1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination</b>	<b>Dip Angle</b>	<b>Field Strength</b>
	BGGM2015	2/12/2016	(°)	(°)	(nT)
			-8.58	66.75	52,114

<b>Design</b>	As Drilled				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	10,589.0
<b>Vertical Section:</b>	<b>Depth From (TVD)</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Direction</b>	
	(usft)	(usft)	(usft)	(°)	
	0.0	0.0	0.0		338.19

<b>Survey Program</b>	<b>Date</b>	3/9/2016			
<b>From</b>	<b>To</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
(usft)	(usft)				
108.0	4,028.8	Survey #4 Def Gyro to KOP (Original Well)	SDI Standard Keeper	Scientific Drilling Intl. Standard Wireline Keeper	
4,053.0	6,494.0	Survey #6 Final Gyro 4020-6414 (Original)	SDI Standard Keeper	Scientific Drilling Intl. Standard Wireline Keeper	
6,528.0	10,589.0	Survey #7 - SDI MWD (Original Wellpath)	SDI MWD	Scientific Drilling Intl. MWD - Standard ver 1.0.1	
10,678.0	17,363.0	Survey #10 - SDI MWD (ST 1)	SDI MWD	Scientific Drilling Intl. MWD - Standard ver 1.0.1	

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	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
108.0	0.13	144.73	108.0	-0.1	0.1	-0.1	0.12	0.12	0.00
133.0	0.13	178.20	133.0	-0.2	0.1	-0.2	0.30	0.00	133.88
158.0	0.13	224.31	158.0	-0.2	0.1	-0.2	0.41	0.00	184.44
183.0	0.06	244.42	183.0	-0.2	0.0	-0.2	0.31	-0.28	80.44
208.0	0.04	14.69	208.0	-0.2	0.0	-0.2	0.36	0.88	521.08
233.0	0.10	352.25	233.0	-0.2	0.0	-0.2	0.26	0.24	-89.76
258.0	0.10	31.03	258.0	-0.2	0.0	-0.2	0.27	0.00	155.12



Company: Antero Resources  
 Project: Doddridge County WV  
 Site: Hamilton Pad. Costlow/Gaskins/Hoskins/Knight  
 Well: Knight Unit 1H  
 Wellbore: ST 1  
 Design: As Drilled

Local Co-ordinate Reference: Well Knight Unit 1H  
 TVD Reference: PD 525 GL 1159 + 19' RKB @ 1178.0usft  
 MD Reference: PD 525 GL 1159 + 19' RKB @ 1178.0usft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature  
 Database: Antero NE

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
283.0	0.08	47.37	283.0	-0.1	0.1	-0.1	0.13	-0.08	65.36
308.0	0.06	61.92	308.0	-0.1	0.1	-0.1	0.18	-0.08	138.20
333.0	0.04	270.00	333.0	-0.1	0.1	-0.1	0.40	-0.08	-687.68
358.0	0.07	303.24	358.0	-0.1	0.1	-0.1	0.17	0.12	132.96
383.0	0.09	321.33	383.0	-0.1	0.0	-0.1	0.13	0.08	72.36
408.0	0.11	331.72	408.0	0.0	0.0	0.0	0.11	0.08	41.56
433.0	0.16	335.59	433.0	0.0	0.0	0.0	0.20	0.20	15.48
458.0	0.14	329.87	458.0	0.1	0.0	0.1	0.10	-0.08	-22.88
483.0	0.17	347.56	483.0	0.1	-0.1	0.1	0.22	0.12	70.76
508.0	0.08	6.80	508.0	0.2	-0.1	0.2	0.39	-0.36	76.96
533.0	0.01	12.50	533.0	0.2	-0.1	0.2	0.28	-0.28	22.80
558.0	0.03	317.15	558.0	0.2	-0.1	0.2	0.10	0.08	-221.40
583.0	0.13	311.48	583.0	0.2	-0.1	0.3	0.40	0.40	-22.68
608.0	0.13	321.34	608.0	0.3	-0.1	0.3	0.09	0.00	39.44
633.0	0.10	345.52	633.0	0.3	-0.2	0.4	0.23	-0.12	96.72
658.0	0.01	25.42	658.0	0.3	-0.2	0.4	0.37	-0.36	159.60
683.0	0.09	259.66	683.0	0.3	-0.2	0.4	0.38	0.32	-503.04
708.0	0.15	276.71	708.0	0.3	-0.2	0.4	0.28	0.24	68.20
733.0	0.15	295.36	733.0	0.4	-0.3	0.4	0.19	0.00	74.60
758.0	0.10	295.88	758.0	0.4	-0.3	0.5	0.20	-0.20	2.08
783.0	0.11	325.18	783.0	0.4	-0.4	0.5	0.22	0.04	117.20
808.0	0.06	67.15	808.0	0.4	-0.4	0.5	0.54	-0.20	407.88
833.0	0.15	269.61	833.0	0.4	-0.4	0.6	0.83	0.36	-630.16
858.0	0.12	250.44	858.0	0.4	-0.5	0.6	0.22	-0.12	-76.68
883.0	0.12	275.56	883.0	0.4	-0.5	0.6	0.21	0.00	100.48
908.0	0.14	280.14	908.0	0.4	-0.6	0.6	0.09	0.08	18.32
933.0	0.13	302.41	933.0	0.5	-0.6	0.7	0.21	-0.04	89.08
958.0	0.09	292.83	958.0	0.5	-0.7	0.7	0.18	-0.16	-38.32
983.0	0.10	285.79	983.0	0.5	-0.7	0.7	0.06	0.04	-28.16
1,008.0	0.26	269.41	1,008.0	0.5	-0.8	0.8	0.67	0.64	-65.52
1,033.0	0.22	293.27	1,033.0	0.5	-0.9	0.8	0.43	-0.16	95.44
1,058.0	0.15	298.08	1,058.0	0.6	-0.9	0.9	0.29	-0.28	19.24
1,083.0	0.09	275.57	1,083.0	0.6	-1.0	0.9	0.30	-0.24	-90.04
1,108.0	0.14	258.27	1,108.0	0.6	-1.0	0.9	0.24	0.20	-69.20
1,133.0	0.22	260.13	1,133.0	0.6	-1.1	0.9	0.32	0.32	7.44
1,158.0	0.21	270.29	1,158.0	0.5	-1.2	1.0	0.16	-0.04	40.64
1,183.0	0.18	281.12	1,183.0	0.6	-1.3	1.0	0.19	-0.12	43.32
1,208.0	0.15	303.43	1,208.0	0.6	-1.4	1.0	0.28	-0.12	89.24
1,233.0	0.15	266.07	1,233.0	0.6	-1.4	1.1	0.38	0.00	-149.44
1,258.0	0.31	260.13	1,258.0	0.6	-1.5	1.1	0.65	0.64	-23.76
1,283.0	0.29	258.16	1,283.0	0.6	-1.7	1.1	0.09	-0.08	-7.88
1,308.0	0.28	272.62	1,308.0	0.5	-1.8	1.2	0.29	-0.04	57.84
1,333.0	0.22	285.76	1,333.0	0.6	-1.9	1.2	0.33	-0.24	52.56



<b>Company:</b>	Antero Resources	<b>Local Co-ordinate Reference:</b>	Well Knight Unit 1H
<b>Project:</b>	Doddridge County WV	<b>TVD Reference:</b>	PD 525 GL 1159 + 19' RKB @ 1178.0usft
<b>Site:</b>	Hamilton Pad: Costlow/Gaskins/Hoskins/Knight	<b>MD Reference:</b>	PD 525 GL 1159 + 19' RKB @ 1178.0usft
<b>Well:</b>	Knight Unit 1H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	ST 1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Antero NE

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,358.0	0.20	255.12	1,358.0	0.6	-2.0	1.3	0.45	-0.08	-122.56
1,383.0	0.29	262.60	1,383.0	0.5	-2.1	1.3	0.38	0.36	29.92
1,408.0	0.27	276.71	1,408.0	0.5	-2.2	1.3	0.29	-0.08	56.44
1,433.0	0.20	275.05	1,433.0	0.6	-2.3	1.4	0.28	-0.28	-6.64
1,458.0	0.21	244.07	1,458.0	0.5	-2.4	1.4	0.44	0.04	-123.92
1,483.0	0.24	248.93	1,483.0	0.5	-2.5	1.4	0.14	0.12	19.44
1,508.0	0.28	239.42	1,508.0	0.4	-2.6	1.4	0.23	0.16	-38.04
1,533.0	0.32	252.32	1,533.0	0.4	-2.7	1.4	0.31	0.16	51.60
1,558.0	0.37	251.75	1,558.0	0.3	-2.8	1.4	0.20	0.20	-2.28
1,583.0	0.26	272.73	1,583.0	0.3	-3.0	1.4	0.63	-0.44	83.92
1,608.0	0.23	275.86	1,608.0	0.3	-3.1	1.5	0.13	-0.12	12.52
1,633.0	0.21	235.52	1,633.0	0.3	-3.2	1.5	0.61	-0.08	-161.36
1,658.0	0.34	234.62	1,658.0	0.2	-3.3	1.4	0.52	0.52	-3.60
1,683.0	0.34	266.80	1,683.0	0.2	-3.4	1.4	0.75	0.00	128.72
1,708.0	0.30	260.49	1,708.0	0.2	-3.5	1.5	0.21	-0.16	-25.24
1,733.0	0.25	260.44	1,733.0	0.2	-3.7	1.5	0.20	-0.20	-0.20
1,758.0	0.20	254.88	1,758.0	0.1	-3.8	1.5	0.22	-0.20	-22.24
1,783.0	0.21	236.13	1,783.0	0.1	-3.8	1.5	0.27	0.04	-75.00
1,808.0	0.29	235.62	1,808.0	0.0	-3.9	1.5	0.32	0.32	-2.04
1,833.0	0.34	253.05	1,833.0	0.0	-4.0	1.5	0.43	0.20	69.72
1,858.0	0.22	255.42	1,858.0	0.0	-4.2	1.5	0.48	-0.48	9.48
1,883.0	0.18	260.80	1,883.0	-0.1	-4.2	1.5	0.18	-0.16	21.52
1,908.0	0.16	241.74	1,908.0	-0.1	-4.3	1.5	0.24	-0.08	-76.24
1,933.0	0.29	236.79	1,933.0	-0.1	-4.4	1.5	0.53	0.52	-19.80
1,958.0	0.28	255.27	1,958.0	-0.2	-4.5	1.5	0.37	-0.04	73.92
1,983.0	0.22	274.28	1,983.0	-0.2	-4.6	1.5	0.41	-0.24	76.04
2,008.0	0.22	205.24	2,008.0	-0.2	-4.7	1.5	1.00	0.00	-276.16
2,033.0	0.22	234.70	2,033.0	-0.3	-4.7	1.5	0.45	0.00	117.84
2,058.0	0.35	239.91	2,058.0	-0.4	-4.9	1.5	0.53	0.52	20.84
2,083.0	0.36	264.80	2,083.0	-0.4	-5.0	1.5	0.61	0.04	99.56
2,108.0	0.25	283.41	2,108.0	-0.4	-5.1	1.5	0.59	-0.44	74.44
2,133.0	0.22	262.23	2,133.0	-0.4	-5.2	1.6	0.37	-0.12	-84.72
2,158.0	0.26	253.52	2,158.0	-0.4	-5.3	1.6	0.22	0.16	-34.84
2,183.0	0.32	264.28	2,183.0	-0.5	-5.5	1.6	0.32	0.24	43.04
2,208.0	0.33	268.96	2,208.0	-0.5	-5.6	1.6	0.11	0.04	18.72
2,233.0	0.26	289.23	2,233.0	-0.4	-5.7	1.7	0.50	-0.28	81.08
2,258.0	0.22	281.32	2,258.0	-0.4	-5.8	1.8	0.21	-0.16	-31.64
2,283.0	0.16	254.15	2,283.0	-0.4	-5.9	1.8	0.43	-0.24	-108.68
2,308.0	0.32	264.97	2,308.0	-0.4	-6.0	1.8	0.66	0.64	43.28
2,333.0	0.24	280.23	2,333.0	-0.4	-6.1	1.9	0.43	-0.32	61.04
2,358.0	0.20	291.91	2,358.0	-0.4	-6.2	1.9	0.24	-0.16	46.72
2,383.0	0.21	287.35	2,383.0	-0.4	-6.3	2.0	0.08	0.04	-18.24
2,408.0	0.29	264.70	2,408.0	-0.4	-6.4	2.0	0.50	0.32	-90.60
2,433.0	0.30	283.58	2,433.0	-0.4	-6.5	2.1	0.39	0.04	75.52



<b>Company:</b>	Antero Resources	<b>Local Co-ordinate Reference:</b>	Well Knight Unit 1H
<b>Project:</b>	Doddridge County WV	<b>TVD Reference:</b>	PD 525 GL 1159 + 19' RKB @ 1178.0usft
<b>Site:</b>	Hamilton Pad. Costlow/Gaskins/Hoskins/Knight	<b>MD Reference:</b>	PD 525 GL 1159 + 19' RKB @ 1178.0usft
<b>Well:</b>	Knight Unit 1H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	ST 1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	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)
2,458.0	0.27	285.97	2,458.0	-0.3	-6.7	2.2	0.13	-0.12	9.56
2,483.0	0.18	291.38	2,483.0	-0.3	-6.8	2.2	0.37	-0.36	21.64
2,508.0	0.25	261.56	2,508.0	-0.3	-6.8	2.3	0.52	0.28	-119.28
2,533.0	0.29	269.51	2,533.0	-0.3	-7.0	2.3	0.22	0.16	31.80
2,558.0	0.33	266.37	2,558.0	-0.3	-7.1	2.4	0.17	0.16	-12.56
2,583.0	0.29	276.64	2,583.0	-0.3	-7.2	2.4	0.27	-0.16	41.08
2,608.0	0.39	278.39	2,608.0	-0.3	-7.4	2.5	0.40	0.40	7.00
2,633.0	0.27	296.49	2,633.0	-0.2	-7.5	2.6	0.63	-0.48	72.40
2,658.0	0.21	285.71	2,658.0	-0.2	-7.6	2.6	0.30	-0.24	-43.12
2,683.0	0.28	240.89	2,683.0	-0.2	-7.7	2.7	0.79	0.28	-179.28
2,708.0	0.38	276.76	2,708.0	-0.2	-7.8	2.7	0.90	0.40	143.48
2,733.0	0.37	283.86	2,733.0	-0.2	-8.0	2.8	0.19	-0.04	28.40
2,758.0	0.29	288.86	2,758.0	-0.2	-8.1	2.9	0.34	-0.32	20.00
2,783.0	0.23	279.50	2,783.0	-0.1	-8.3	2.9	0.29	-0.24	-37.44
2,808.0	0.36	263.37	2,808.0	-0.1	-8.4	3.0	0.61	0.52	-64.52
2,833.0	0.38	276.38	2,833.0	-0.1	-8.5	3.0	0.34	0.08	52.04
2,858.0	0.28	295.02	2,858.0	-0.1	-8.7	3.1	0.58	-0.40	74.56
2,883.0	0.28	279.70	2,883.0	-0.1	-8.8	3.2	0.30	0.00	-61.28
2,908.0	0.30	264.50	2,908.0	-0.1	-8.9	3.2	0.32	0.08	-60.80
2,933.0	0.35	266.99	2,933.0	-0.1	-9.1	3.3	0.21	0.20	9.96
2,958.0	0.41	285.89	2,958.0	-0.1	-9.2	3.4	0.55	0.24	75.60
2,983.0	0.34	286.70	2,983.0	0.0	-9.4	3.5	0.28	-0.28	3.24
3,008.0	0.30	279.78	3,008.0	0.0	-9.5	3.5	0.22	-0.16	-27.68
3,033.0	0.35	265.85	3,033.0	0.0	-9.7	3.6	0.37	0.20	-55.72
3,058.0	0.40	280.90	3,058.0	0.0	-9.8	3.7	0.44	0.20	60.20
3,083.0	0.41	286.95	3,083.0	0.1	-10.0	3.8	0.18	0.04	24.20
3,108.0	0.36	295.83	3,108.0	0.1	-10.1	3.9	0.31	-0.20	35.52
3,133.0	0.25	276.74	3,133.0	0.2	-10.3	4.0	0.59	-0.44	-76.36
3,158.0	0.38	274.94	3,158.0	0.2	-10.4	4.0	0.52	0.52	-7.20
3,183.0	0.43	290.00	3,183.0	0.2	-10.6	4.1	0.47	0.20	60.24
3,208.0	0.36	293.77	3,208.0	0.3	-10.7	4.3	0.30	-0.28	15.08
3,233.0	0.33	287.30	3,233.0	0.3	-10.9	4.4	0.20	-0.12	-25.88
3,258.0	0.35	285.02	3,258.0	0.4	-11.0	4.5	0.10	0.08	-9.12
3,283.0	0.41	296.20	3,283.0	0.4	-11.2	4.6	0.38	0.24	44.72
3,308.0	0.41	297.82	3,308.0	0.5	-11.3	4.7	0.05	0.00	6.48
3,333.0	0.37	295.70	3,333.0	0.6	-11.5	4.8	0.17	-0.16	-8.48
3,358.0	0.32	287.57	3,358.0	0.7	-11.6	4.9	0.28	-0.20	-32.52
3,383.0	0.43	285.58	3,383.0	0.7	-11.8	5.0	0.44	0.44	-7.96
3,408.0	0.43	295.05	3,408.0	0.8	-12.0	5.2	0.28	0.00	37.88
3,433.0	0.44	302.09	3,433.0	0.9	-12.1	5.3	0.22	0.04	28.16
3,458.0	0.35	300.76	3,458.0	1.0	-12.3	5.4	0.36	-0.36	-5.32
3,483.0	0.36	280.29	3,483.0	1.0	-12.4	5.5	0.51	0.04	-81.88
3,508.0	0.43	288.01	3,508.0	1.0	-12.6	5.6	0.35	0.28	30.88



Company: Antero Resources  
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 Site: Hamilton Pad. Costlow/Gaskins/Hoskins/Knight  
 Well: Knight Unit 1H  
 Wellbore: ST 1  
 Design: As Drilled

Local Co-ordinate Reference: Well Knight Unit 1H  
 TVD Reference: PD 525 GL 1159 + 19' RKB @ 1178.0usft  
 MD Reference: PD 525 GL 1159 + 19' RKB @ 1178.0usft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature  
 Database: Antero NE

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
3,533.0	0.39	298.53	3,533.0	1.1	-12.7	5.8	0.34	-0.16	42.08
3,558.0	0.41	308.34	3,558.0	1.2	-12.9	5.9	0.28	0.08	39.24
3,583.0	0.41	271.95	3,583.0	1.3	-13.0	6.0	1.02	0.00	-145.56
3,608.0	0.44	269.93	3,608.0	1.3	-13.2	6.1	0.13	0.12	-8.08
3,633.0	0.34	298.88	3,633.0	1.3	-13.4	6.2	0.87	-0.40	115.80
3,658.0	0.40	292.97	3,658.0	1.4	-13.5	6.3	0.28	0.24	-23.64
3,683.0	0.34	299.74	3,683.0	1.5	-13.7	6.4	0.30	-0.24	27.08
3,708.0	0.35	291.33	3,708.0	1.5	-13.8	6.5	0.21	0.04	-33.64
3,733.0	0.47	275.90	3,733.0	1.6	-14.0	6.6	0.65	0.48	-61.72
3,758.0	0.49	297.71	3,758.0	1.6	-14.2	6.8	0.73	0.08	87.24
3,783.0	0.38	307.74	3,783.0	1.7	-14.3	6.9	0.53	-0.44	40.12
3,808.0	0.24	262.08	3,808.0	1.8	-14.5	7.0	1.09	-0.56	-182.64
3,833.0	0.38	275.93	3,833.0	1.8	-14.6	7.1	0.63	0.56	55.40
3,858.0	0.42	282.56	3,858.0	1.8	-14.8	7.1	0.24	0.16	26.52
3,883.0	0.58	283.98	3,883.0	1.8	-15.0	7.3	0.64	0.64	5.68
3,908.0	0.41	312.58	3,908.0	1.9	-15.2	7.4	1.18	-0.68	114.40
3,933.0	0.41	277.54	3,933.0	2.0	-15.3	7.6	0.99	0.00	-140.16
3,958.0	0.42	280.46	3,958.0	2.0	-15.5	7.6	0.09	0.04	11.68
3,983.0	0.40	294.01	3,983.0	2.1	-15.7	7.8	0.40	-0.08	54.20
4,008.0	0.27	290.71	4,008.0	2.1	-15.8	7.9	0.53	-0.52	-13.20
4,028.8	0.40	250.39	4,028.8	2.1	-15.9	7.9	1.25	0.62	-193.47
4,062.0	0.49	281.81	4,062.0	2.1	-16.2	8.0	0.77	0.27	94.75
4,093.0	0.62	269.34	4,093.0	2.1	-16.5	8.1	0.57	0.42	-40.23
4,125.0	0.62	274.81	4,124.9	2.2	-16.8	8.3	0.18	0.00	17.09
4,156.0	0.71	273.53	4,155.9	2.2	-17.2	8.4	0.29	0.29	-4.13
4,188.0	0.80	262.33	4,187.9	2.2	-17.6	8.6	0.54	0.28	-35.00
4,220.0	0.71	274.32	4,219.9	2.2	-18.0	8.7	0.57	-0.28	37.47
4,251.0	0.88	269.91	4,250.9	2.2	-18.4	8.9	0.58	0.55	-14.23
4,283.0	1.19	257.93	4,282.9	2.1	-19.0	9.0	1.18	0.97	-37.44
4,314.0	1.68	255.81	4,313.9	1.9	-19.8	9.1	1.59	1.58	-6.84
4,346.0	2.52	255.02	4,345.9	1.6	-20.9	9.3	2.63	2.63	-2.47
4,377.0	3.40	252.33	4,376.9	1.2	-22.4	9.4	2.87	2.84	-8.68
4,409.0	4.02	251.63	4,408.8	0.5	-24.4	9.6	1.94	1.94	-2.19
4,441.0	4.68	251.71	4,440.7	-0.2	-26.7	9.7	2.06	2.06	0.25
4,472.0	5.48	250.13	4,471.6	-1.1	-29.3	9.8	2.62	2.58	-5.10
4,504.0	6.41	249.33	4,503.4	-2.3	-32.4	9.9	2.92	2.91	-2.50
4,536.0	7.11	248.01	4,535.2	-3.7	-35.9	9.9	2.24	2.19	-4.13
4,567.0	8.00	247.62	4,566.9	-5.2	-39.7	9.9	2.88	2.87	-1.26
4,599.0	8.88	247.31	4,597.6	-7.0	-44.0	9.9	2.75	2.75	-0.97
4,630.0	9.59	246.34	4,628.2	-9.0	-48.6	9.7	2.34	2.29	-3.13
4,662.0	10.21	244.84	4,659.7	-11.2	-53.6	9.5	2.10	1.94	-4.69
4,694.0	11.00	244.62	4,691.1	-13.7	-58.9	9.1	2.47	2.47	-0.69
4,725.0	11.80	243.91	4,721.5	-16.4	-64.5	8.7	2.62	2.58	-2.29



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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)
4,757.0	12.68	243.74	4,752.8	-19.4	-70.5	8.2	2.75	2.75	-0.53
4,789.0	13.79	243.79	4,784.0	-22.6	-77.1	7.6	3.47	3.47	0.16
4,820.0	14.98	243.12	4,814.0	-26.1	-84.0	7.0	3.88	3.84	-2.16
4,852.0	15.91	240.92	4,844.8	-30.1	-91.5	6.1	3.43	2.91	-6.88
4,883.0	16.00	239.20	4,874.6	-34.3	-98.9	4.9	1.55	0.29	-5.55
4,915.0	14.89	234.13	4,905.5	-39.0	-106.0	3.2	5.46	-3.47	-15.84
4,946.0	15.38	232.63	4,935.4	-43.8	-112.5	1.1	2.02	1.58	-4.84
4,978.0	16.31	231.84	4,966.2	-49.2	-119.4	-1.3	2.98	2.91	-2.47
5,010.0	16.62	230.74	4,996.9	-54.9	-126.5	-3.9	1.37	0.97	-3.44
5,041.0	17.01	232.50	5,026.5	-60.4	-133.5	-6.5	2.07	1.26	5.68
5,073.0	17.19	234.53	5,057.1	-66.0	-141.1	-8.9	1.95	0.56	6.34
5,104.0	17.90	236.11	5,086.7	-71.3	-148.8	-10.9	2.76	2.29	5.10
5,136.0	18.60	237.13	5,117.1	-76.8	-157.2	-13.0	2.40	2.19	3.19
5,168.0	19.40	238.01	5,147.3	-82.4	-166.0	-14.9	2.66	2.50	2.75
5,199.0	20.19	239.33	5,176.5	-87.9	-174.9	-16.6	2.93	2.55	4.26
5,231.0	21.39	240.30	5,206.4	-93.6	-184.7	-18.3	3.90	3.75	3.03
5,262.0	22.80	241.80	5,235.1	-99.2	-194.9	-19.7	4.90	4.55	4.84
5,294.0	23.99	242.64	5,264.5	-105.2	-206.2	-21.0	3.86	3.72	2.63
5,326.0	25.32	243.74	5,293.6	-111.2	-218.1	-22.2	4.40	4.16	3.44
5,357.0	25.59	243.91	5,321.6	-117.1	-230.1	-23.2	0.90	0.87	0.55
5,389.0	25.59	243.74	5,350.4	-123.1	-242.5	-24.3	0.23	0.00	-0.53
5,421.0	25.50	243.12	5,379.3	-129.3	-254.8	-25.4	0.88	-0.28	-1.94
5,452.0	25.19	243.03	5,407.3	-135.3	-266.6	-26.6	1.01	-1.00	-0.29
5,484.0	25.32	243.12	5,436.3	-141.5	-278.8	-27.8	0.42	0.41	0.28
5,515.0	25.50	243.03	5,464.3	-147.5	-290.7	-29.0	0.59	0.58	-0.29
5,547.0	25.98	243.21	5,493.1	-153.8	-303.1	-30.2	1.52	1.50	0.56
5,578.0	26.12	243.52	5,521.0	-159.9	-315.2	-31.4	0.63	0.45	1.00
5,610.0	26.20	243.91	5,549.7	-166.2	-327.9	-32.5	0.59	0.25	1.22
5,641.0	25.81	243.81	5,577.5	-172.2	-340.1	-33.5	1.33	-1.26	-0.97
5,673.0	25.72	243.34	5,606.4	-178.4	-352.5	-34.6	0.46	-0.28	-0.84
5,704.0	25.81	243.52	5,634.3	-184.4	-364.6	-35.8	0.38	0.29	0.58
5,736.0	25.50	243.12	5,663.1	-190.6	-376.9	-36.9	1.11	-0.97	-1.25
5,767.0	25.19	241.93	5,691.1	-196.8	-388.7	-38.3	1.92	-1.00	-3.84
5,799.0	25.10	242.90	5,720.1	-203.1	-400.8	-39.6	1.32	-0.28	3.03
5,862.0	25.01	244.13	5,777.2	-215.0	-424.7	-41.8	0.84	-0.14	1.95
5,894.0	24.88	244.40	5,806.2	-220.8	-436.8	-42.7	0.54	-0.41	0.84
5,925.0	25.19	245.10	5,834.3	-226.4	-448.7	-43.5	1.38	1.00	2.26
5,957.0	25.10	245.10	5,863.2	-232.1	-461.0	-44.2	0.28	-0.28	0.00
5,989.0	25.72	245.10	5,892.1	-237.9	-473.5	-45.0	1.94	1.94	0.00
6,020.0	25.50	245.50	5,920.1	-243.5	-485.6	-45.7	0.90	-0.71	1.29
6,052.0	26.29	245.10	5,948.9	-249.4	-498.3	-46.4	2.53	2.47	-1.25
6,083.0	26.51	244.93	5,976.7	-255.2	-510.8	-47.1	0.75	0.71	-0.55
6,115.0	26.69	244.13	6,005.3	-261.3	-523.8	-48.0	1.25	0.56	-2.50
6,146.0	26.51	243.61	6,033.0	-267.5	-536.2	-49.1	0.95	-0.58	-1.68





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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)
6,178.0	27.00	242.90	6,061.6	-273.9	-549.1	-50.3	1.83	1.53	-2.22
6,210.0	26.60	243.12	6,090.1	-280.5	-561.9	-51.6	1.29	-1.25	0.69
6,241.0	26.38	242.72	6,117.9	-286.8	-574.3	-52.9	0.91	-0.71	-1.29
6,273.0	26.20	243.21	6,146.6	-293.2	-586.9	-54.2	0.88	-0.56	1.53
6,304.0	25.59	243.21	6,174.4	-299.3	-599.0	-55.4	1.97	-1.97	0.00
6,336.0	25.10	242.11	6,203.4	-305.6	-611.1	-56.7	2.12	-1.53	-3.44
6,367.0	24.48	240.52	6,231.5	-311.8	-622.5	-58.2	2.94	-2.00	-5.13
6,399.0	24.88	241.53	6,260.6	-318.3	-634.2	-59.9	1.82	1.25	3.16
6,431.0	25.10	242.72	6,289.6	-324.6	-646.2	-61.3	1.71	0.69	3.72
6,462.0	25.01	242.50	6,317.7	-330.7	-657.8	-62.6	0.42	-0.29	-0.71
6,494.0	25.10	243.83	6,346.7	-336.8	-669.9	-63.8	1.78	0.28	4.16
6,528.0	24.49	244.63	6,377.5	-343.0	-682.8	-64.8	2.05	-1.79	2.35
6,573.0	24.31	243.56	6,418.5	-351.1	-699.5	-66.1	1.06	-0.40	-2.38
6,618.0	24.15	242.48	6,459.5	-359.5	-715.9	-67.8	1.05	-0.36	-2.40
6,662.0	24.33	246.73	6,499.7	-367.2	-732.3	-68.9	3.99	0.41	9.66
6,707.0	25.58	258.53	6,540.5	-372.8	-750.3	-67.4	11.39	2.78	26.22
6,708.0	25.63	258.83	6,541.4	-372.9	-750.7	-67.3	14.13	5.16	30.43
<b>SCMR @ 6708</b>									
6,752.0	28.47	271.03	6,580.6	-374.6	-770.6	-61.5	14.13	6.45	27.72
6,797.0	31.14	279.72	6,619.7	-372.4	-792.8	-51.2	11.27	5.93	19.31
6,842.0	32.79	287.48	6,657.9	-366.8	-815.9	-37.4	9.83	3.67	17.24
6,887.0	34.73	294.03	6,695.3	-357.9	-839.2	-20.5	9.16	4.31	14.56
6,915.0	36.74	298.36	6,718.0	-350.7	-853.9	-8.3	11.54	7.19	15.46
<b>MDLX @ 6915</b>									
6,931.0	37.96	300.65	6,730.7	-345.9	-862.3	-0.8	11.54	7.60	14.32
6,976.0	42.06	305.64	6,765.2	-330.0	-886.5	22.9	11.56	9.11	11.09
7,021.0	45.18	310.91	6,797.8	-310.8	-910.8	49.8	10.84	6.93	11.71
7,066.0	48.70	314.64	6,828.5	-288.5	-934.9	79.5	9.89	7.82	8.29
7,100.0	51.96	318.06	6,850.2	-269.5	-953.0	103.8	12.33	9.60	10.06
<b>BRKT @ 7100</b>									
7,111.0	53.04	319.10	6,856.9	-263.0	-958.7	112.1	12.33	9.78	9.46
7,149.0	57.60	321.19	6,878.5	-239.0	-978.7	141.8	12.81	11.99	5.50
<b>TLLY @ 7148</b>									
7,158.0	58.44	321.55	6,882.2	-234.3	-982.4	147.4	12.81	12.04	5.16
7,201.0	62.85	323.74	6,904.3	-203.2	-1,006.2	185.2	10.68	9.80	4.87
7,238.0	66.17	325.59	6,920.2	-175.9	-1,025.5	217.7	10.04	8.97	5.00
<b>HMLN @ 7238</b>									
7,245.0	66.80	325.93	6,923.0	-170.6	-1,029.1	224.0	10.04	9.01	4.85
7,264.0	68.74	327.08	6,930.2	-165.9	-1,038.8	241.2	11.66	10.22	6.06
<b>MRCL_HOT @ 7264</b>									
7,290.0	71.41	328.61	6,939.1	-135.3	-1,051.9	265.2	11.66	10.26	5.88
7,335.0	75.59	331.09	6,951.8	-98.0	-1,073.5	307.9	10.69	9.29	5.51
7,380.0	78.19	332.77	6,962.0	-59.3	-1,094.1	351.5	6.83	5.78	3.73
7,424.0	83.50	334.97	6,969.0	-20.3	-1,113.2	394.8	13.04	12.07	5.00



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 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)
7,452.0	87.25	336.35	6,971.3	5.1	-1,124.7	422.6	14.27	13.39	4.93
7,497.0	90.27	337.64	6,972.3	46.5	-1,142.3	467.6	7.30	6.71	2.87
7,541.0	89.77	336.57	6,972.3	87.1	-1,159.4	511.6	2.68	-1.14	-2.43
7,586.0	90.47	338.45	6,972.2	128.6	-1,176.7	556.6	4.46	1.56	4.18
7,631.0	90.45	340.32	6,971.8	170.8	-1,192.5	601.6	4.16	-0.04	4.16
7,720.0	89.60	338.79	6,971.8	254.1	-1,223.6	690.6	1.97	-0.96	-1.72
7,810.0	90.03	338.96	6,972.1	338.1	-1,256.0	780.5	0.51	0.48	0.19
7,900.0	90.63	337.88	6,971.5	421.8	-1,289.1	870.5	1.37	0.67	-1.20
7,990.0	90.19	335.23	6,970.9	504.3	-1,324.9	960.5	2.98	-0.49	-2.94
8,079.0	91.40	337.65	6,969.7	585.9	-1,360.5	1,049.4	3.04	1.36	2.72
8,169.0	89.42	336.99	6,969.0	668.9	-1,395.2	1,139.4	2.32	-2.20	-0.73
8,259.0	90.56	338.59	6,969.0	752.3	-1,429.2	1,229.4	2.18	1.27	1.78
8,348.0	91.01	341.04	6,967.8	835.8	-1,459.9	1,318.4	2.80	0.51	2.75
8,438.0	91.74	341.52	6,965.7	921.0	-1,488.8	1,408.2	0.97	0.81	0.53
8,528.0	91.10	340.59	6,963.4	1,006.1	-1,518.0	1,498.1	1.25	-0.71	-1.03
8,617.0	91.21	340.14	6,961.6	1,089.9	-1,547.9	1,587.0	0.52	0.12	-0.51
8,707.0	90.23	340.40	6,960.5	1,174.6	-1,578.3	1,676.9	1.13	-1.09	0.29
8,797.0	90.30	338.62	6,960.1	1,258.9	-1,609.8	1,766.9	1.98	0.08	-1.98
8,886.0	89.86	339.34	6,960.0	1,342.0	-1,641.7	1,855.9	0.95	-0.49	0.81
8,976.0	89.87	338.62	6,960.2	1,426.0	-1,674.0	1,945.9	0.80	0.01	-0.80
9,065.0	89.93	338.78	6,960.3	1,508.9	-1,706.3	2,034.9	0.19	0.07	0.18
9,155.0	91.07	340.08	6,959.5	1,593.2	-1,737.9	2,124.8	1.92	1.27	1.44
9,245.0	91.00	338.57	6,957.9	1,677.4	-1,769.7	2,214.8	1.68	-0.08	-1.68
9,334.0	89.65	337.04	6,957.4	1,759.8	-1,803.3	2,303.8	2.29	-1.52	-1.72
9,424.0	89.17	337.20	6,958.3	1,842.7	-1,838.3	2,393.8	0.56	-0.53	0.18
9,514.0	90.45	337.24	6,958.6	1,925.7	-1,873.2	2,483.8	1.42	1.42	0.04
9,603.0	90.51	338.06	6,957.9	2,008.0	-1,907.0	2,572.7	0.92	0.07	0.92
9,693.0	88.39	336.98	6,958.7	2,091.1	-1,941.4	2,662.7	2.84	-2.36	-1.20
9,782.0	90.21	338.86	6,959.8	2,173.6	-1,974.9	2,751.7	2.94	2.04	2.11
9,872.0	90.34	338.55	6,959.4	2,257.4	-2,007.5	2,841.7	0.37	0.14	-0.34
9,961.0	89.60	337.39	6,959.5	2,339.9	-2,040.9	2,930.7	1.55	-0.83	-1.30
10,051.0	90.14	336.55	6,959.7	2,422.8	-2,076.1	3,020.7	1.11	0.60	-0.93
10,141.0	90.85	335.46	6,958.9	2,505.0	-2,112.7	3,110.6	1.45	0.79	-1.21
10,231.0	91.82	338.15	6,956.8	2,587.7	-2,148.2	3,200.6	3.18	1.08	2.99
10,320.0	89.60	336.38	6,955.7	2,669.7	-2,182.6	3,289.5	3.19	-2.49	-1.99
10,410.0	90.21	337.71	6,955.8	2,752.6	-2,217.7	3,379.5	1.63	0.68	1.48
10,499.0	90.75	341.04	6,955.1	2,835.9	-2,249.0	3,468.5	3.79	0.61	3.74
10,589.0	88.27	338.61	6,955.9	2,920.4	-2,280.0	3,558.4	3.86	-2.76	-2.70
10,678.0	89.22	341.52	6,957.8	3,004.0	-2,310.4	3,647.3	3.44	1.07	3.27
10,768.0	91.60	341.28	6,957.2	3,089.3	-2,339.1	3,737.2	2.66	2.64	-0.27
10,857.0	90.16	341.11	6,955.8	3,173.5	-2,367.8	3,826.1	1.63	-1.62	-0.19
10,947.0	90.79	339.46	6,955.0	3,258.2	-2,398.1	3,916.0	1.96	0.70	-1.83
11,037.0	90.60	341.08	6,954.0	3,342.9	-2,428.5	4,005.9	1.81	-0.21	1.80



<b>Company:</b>	Antero Resources	<b>Local Co-ordinate Reference:</b>	Well Knight Unit 1H
<b>Project:</b>	Doddridge County WV	<b>TVD Reference:</b>	PD 525 GL 1159 + 19' RKB @ 1178.0usft
<b>Site:</b>	Hamilton Pad: Costlow/Gaskins/Hoskins/Knight	<b>MD Reference:</b>	PD 525 GL 1159 + 19' RKB @ 1178.0usft
<b>Well:</b>	Knight Unit 1H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	ST 1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	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)	
11,126.0	89.81	341.26	6,953.6	3,427.2	-2,457.2	4,094.8	0.91	-0.89	0.20	
11,218.0	88.73	339.23	6,954.8	3,511.9	-2,487.6	4,184.7	2.55	-1.20	-2.26	
11,305.0	89.71	339.03	6,956.0	3,595.0	-2,519.3	4,273.7	1.12	1.10	-0.22	
11,395.0	90.78	339.86	6,955.6	3,679.3	-2,550.9	4,363.7	1.50	1.19	0.92	
11,484.0	90.65	341.70	6,954.5	3,763.3	-2,580.2	4,452.6	2.07	-0.15	2.07	
11,574.0	90.31	340.77	6,953.7	3,848.5	-2,609.2	4,542.4	1.10	-0.38	-1.03	
11,664.0	90.01	340.69	6,953.5	3,933.5	-2,638.9	4,632.4	0.34	-0.33	-0.09	
11,754.0	89.82	340.17	6,953.6	4,018.3	-2,669.0	4,722.3	0.62	-0.21	-0.58	
11,843.0	89.85	340.01	6,953.9	4,102.0	-2,699.3	4,811.2	0.18	0.03	-0.18	
11,933.0	89.72	340.26	6,954.2	4,186.6	-2,729.9	4,901.2	0.31	-0.14	0.28	
12,022.0	90.12	341.12	6,954.3	4,270.6	-2,759.4	4,990.1	1.07	0.45	0.97	
12,112.0	90.16	339.29	6,954.1	4,355.3	-2,789.8	5,080.0	2.03	0.04	-2.03	
12,202.0	90.90	337.88	6,953.3	4,439.1	-2,822.7	5,170.0	1.77	0.82	-1.57	
12,291.0	89.14	335.41	6,953.3	4,520.8	-2,858.0	5,259.0	3.41	-1.98	-2.78	
12,381.0	91.13	336.09	6,953.0	4,602.8	-2,894.9	5,348.9	2.34	2.21	0.76	
12,471.0	89.32	332.95	6,952.7	4,684.0	-2,933.6	5,438.7	4.03	-2.01	-3.49	
12,561.0	90.96	334.31	6,952.5	4,764.7	-2,973.6	5,528.4	2.37	1.82	1.51	
12,650.0	90.83	333.03	6,951.1	4,844.4	-3,013.1	5,617.1	1.45	-0.15	-1.44	
12,740.0	91.36	331.98	6,949.4	4,924.2	-3,054.6	5,706.7	1.31	0.59	-1.17	
12,829.0	90.96	333.96	6,947.6	5,003.5	-3,095.1	5,795.3	2.27	-0.45	2.22	
12,919.0	91.16	334.29	6,945.9	5,084.5	-3,134.3	5,885.0	0.43	0.22	0.37	
13,009.0	91.47	337.39	6,943.8	5,166.6	-3,171.2	5,974.9	3.46	0.34	3.44	
13,098.0	89.96	338.33	6,942.7	5,249.0	-3,204.7	6,063.9	2.00	-1.70	1.06	
13,188.0	89.76	341.71	6,942.9	5,333.6	-3,235.4	6,153.8	3.76	-0.22	3.76	
13,278.0	87.92	336.84	6,944.8	5,417.7	-3,267.3	6,243.8	5.78	-2.04	-5.41	
13,367.0	88.73	336.25	6,947.4	5,499.3	-3,302.7	6,332.7	1.13	0.91	-0.66	
13,457.0	90.34	337.52	6,948.1	5,582.1	-3,338.0	6,422.7	2.28	1.79	1.41	
13,546.0	89.70	336.49	6,948.1	5,664.0	-3,372.8	6,511.7	1.36	-0.72	-1.16	
13,636.0	90.37	337.89	6,948.0	5,746.9	-3,407.7	6,601.6	1.72	0.74	1.56	
13,726.0	90.10	337.92	6,947.6	5,830.3	-3,441.5	6,691.6	0.30	-0.30	0.03	
13,815.0	89.63	336.72	6,947.9	5,912.5	-3,475.8	6,780.6	1.45	-0.53	-1.35	
13,905.0	88.55	336.69	6,949.3	5,995.1	-3,511.4	6,870.6	1.20	-1.20	-0.03	
13,994.0	90.08	338.38	6,950.4	6,076.7	-3,546.9	6,959.5	1.73	1.70	-0.35	
14,084.0	91.41	339.19	6,949.2	6,160.0	-3,580.9	7,049.5	3.46	1.50	3.12	
14,173.0	89.02	337.25	6,948.9	6,242.7	-3,613.9	7,138.5	3.46	-2.69	-2.18	
14,263.0	89.73	337.64	6,949.9	6,325.8	-3,648.4	7,228.5	0.90	0.79	0.43	
14,353.0	91.77	337.97	6,948.7	6,409.1	-3,682.4	7,318.5	2.30	2.27	0.37	
14,442.0	90.70	338.60	6,948.8	6,491.8	-3,715.3	7,407.4	1.40	-1.20	0.71	
14,532.0	89.15	335.44	6,946.9	6,574.6	-3,750.5	7,497.4	3.91	-1.72	-3.51	
14,621.0	91.81	337.99	6,946.1	6,656.3	-3,785.6	7,586.4	4.14	2.99	2.87	
14,711.0	92.19	339.86	6,943.0	6,740.3	-3,818.0	7,676.3	2.12	0.42	2.08	
14,801.0	91.82	339.46	6,939.8	6,824.6	-3,849.2	7,766.2	0.61	-0.41	-0.44	
14,890.0	90.74	340.82	6,937.8	6,908.3	-3,879.5	7,855.1	1.95	-1.21	1.53	
14,980.0	90.24	338.18	6,937.1	6,992.6	-3,911.0	7,945.1	2.99	-0.56	-2.93	



<b>Company:</b>	Antero Resources	<b>Local Co-ordinate Reference:</b>	Well Knight Unit 1H
<b>Project:</b>	Doddridge County WV	<b>TVD Reference:</b>	PD 525 GL 1159 + 19' RKB @ 1178.0usft
<b>Site:</b>	Hamilton Pad. Costlow/Gaskins/Hoskins/Knight	<b>MD Reference:</b>	PD 525 GL 1159 + 19' RKB @ 1178.0usft
<b>Well:</b>	Knight Unit 1H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	ST 1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Antero NE

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
15,069.0	88.86	336.86	6,937.8	7,074.8	-3,945.0	8,034.1	2.15	-1.55	-1.48
15,159.0	89.70	339.54	6,938.9	7,158.4	-3,978.4	8,124.1	3.12	0.93	2.98
15,249.0	88.63	339.19	6,940.2	7,242.6	-4,010.1	8,214.0	1.25	-1.19	-0.39
15,338.0	89.16	340.23	6,941.9	7,326.0	-4,041.0	8,303.0	1.31	0.60	1.17
15,428.0	90.77	341.33	6,942.0	7,411.0	-4,070.6	8,392.9	2.17	1.79	1.22
15,518.0	90.57	339.06	6,940.9	7,495.7	-4,101.1	8,482.8	2.53	-0.22	-2.52
15,608.0	89.33	339.29	6,941.0	7,579.8	-4,133.1	8,572.8	1.40	-1.38	0.26
15,697.0	89.06	336.71	6,942.3	7,662.3	-4,166.4	8,661.8	2.91	-0.30	-2.90
15,787.0	90.78	336.93	6,942.4	7,745.0	-4,201.9	8,751.8	1.93	1.91	0.24
15,877.0	90.41	335.99	6,941.5	7,827.5	-4,237.8	8,841.7	1.12	-0.41	-1.04
15,966.0	90.27	336.63	6,940.9	7,909.0	-4,273.6	8,930.7	0.74	-0.16	0.72
16,056.0	89.13	337.64	6,941.4	7,992.0	-4,308.5	9,020.7	1.69	-1.27	1.12
16,146.0	89.80	337.80	6,942.2	8,075.2	-4,342.7	9,110.6	0.77	0.74	0.18
16,235.0	90.67	337.77	6,941.9	8,157.6	-4,376.3	9,199.6	0.98	0.98	-0.03
16,325.0	89.22	337.26	6,942.0	8,240.8	-4,410.7	9,289.6	1.71	-1.61	-0.57
16,414.0	90.13	337.40	6,942.5	8,322.9	-4,445.0	9,378.6	1.03	1.02	0.16
16,504.0	91.14	339.76	6,941.5	8,406.7	-4,477.9	9,468.6	2.85	1.12	2.62
16,594.0	90.90	341.10	6,939.9	8,491.5	-4,508.0	9,558.5	1.51	-0.27	1.49
16,683.0	89.53	339.77	6,939.5	8,575.3	-4,537.8	9,647.4	2.15	-1.54	-1.49
16,773.0	90.67	339.06	6,939.4	8,659.5	-4,569.5	9,737.4	1.49	1.27	-0.79
16,863.0	90.03	338.72	6,938.8	8,743.5	-4,601.9	9,827.4	0.81	-0.71	-0.38
16,953.0	90.60	338.03	6,938.3	8,827.2	-4,635.0	9,917.4	0.99	0.63	-0.77
17,042.0	89.06	336.30	6,938.6	8,909.2	-4,669.6	10,008.4	2.80	-1.73	-1.94
17,132.0	90.97	337.73	6,938.6	8,992.0	-4,704.7	10,096.3	2.65	2.12	1.59
17,222.0	91.37	337.64	6,936.7	9,075.3	-4,738.9	10,186.3	0.46	0.44	-0.10
17,300.0	91.64	337.00	6,934.7	9,147.2	-4,769.0	10,264.3	0.89	0.35	-0.82
<b>Last SDI MWD @ 17300</b>									
17,363.0	91.64	337.00	6,932.9	9,205.2	-4,793.6	10,327.2	0.00	0.00	0.00
<b>Projection To Bit @ 17363 MD / 8932 TVD</b>									

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
6,708.0	6,541.4	SCMR @ 6708		0.00	
6,915.0	6,718.0	MDLX @ 6915		0.00	
7,100.0	6,850.2	BRKT @ 7100		0.00	
7,149.0	6,878.5	TLLY @ 7149		0.00	
7,238.0	6,920.2	HMLN @ 7238		0.00	
7,264.0	6,930.2	MRCL_HOT @ 7264		0.00	



<b>Company:</b>	Antero Resources	<b>Local Co-ordinate Reference:</b>	Well Knight Unit 1H
<b>Project:</b>	Doddridge County WV	<b>TVD Reference:</b>	PD 525 GL 1159 + 19' RKB @ 1178.0usft
<b>Site:</b>	Hamilton Pad: Costlow/Gaskins/Hoskins/Knight	<b>MD Reference:</b>	PD 525 GL 1159 + 19' RKB @ 1178.0usft
<b>Well:</b>	Knight Unit 1H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	ST 1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Antero NE

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
17,300.0	6,934.7	9,147.2	-4,769.0	Last SDI MWD @ 17300
17,363.0	6,932.9	9,205.2	-4,793.6	Projection To Bit @ 17363 MD / 6932 TVD

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_