



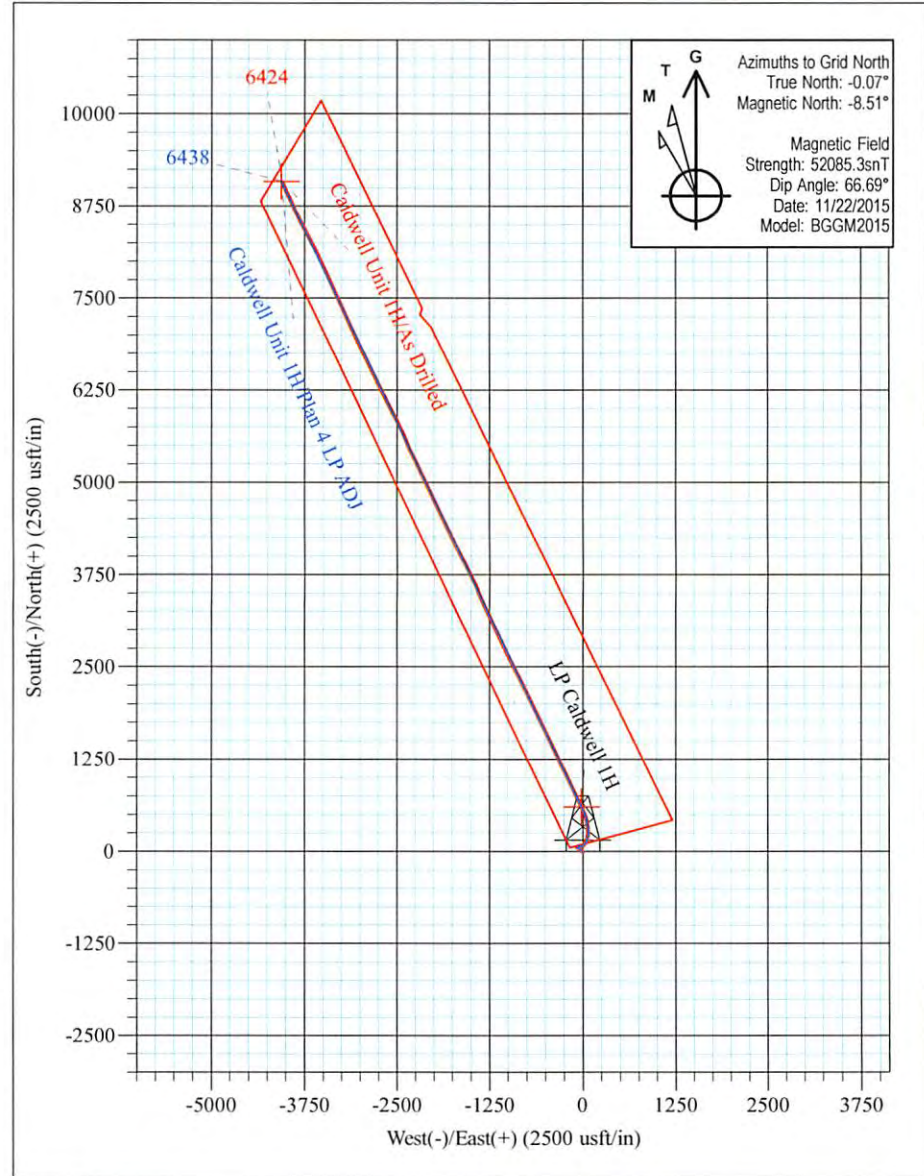
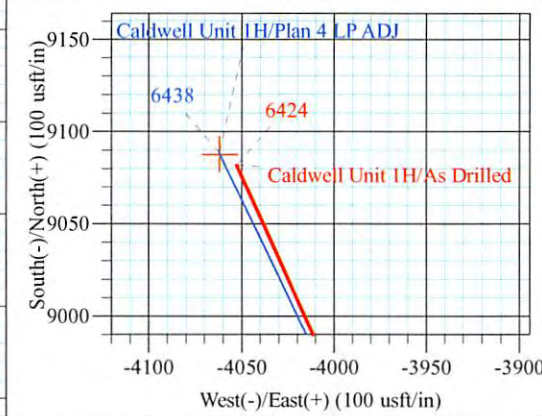
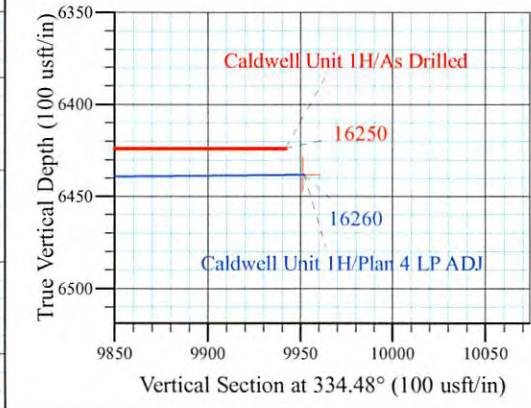
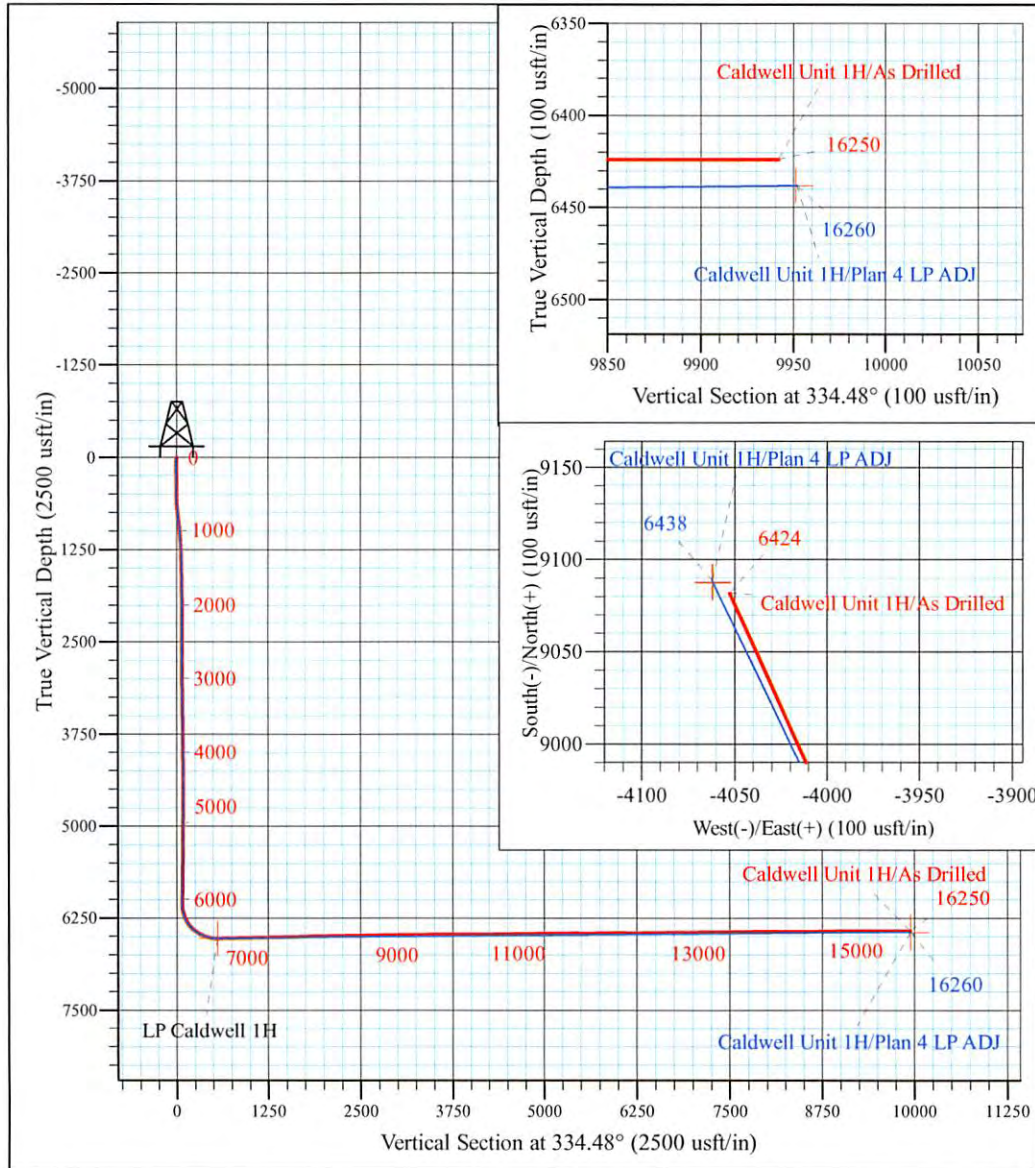
Mackay Pad - Caldwell/Greenback/McNabb
 Caldwell Unit 1H
 Plan 4 LP ADJ
 Precision 523: GL 1099' + KB 19 @ 1118.0usft
 Ritchie County WV

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: **Caldwell Unit 1H SHL**

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	14248714.78	1669496.15	39° 14' 17.843 N	80° 53' 50.274 W



Caldwell Unit 1H
Approx. BHL
 39° 15' 47.685 N 80° 54' 41.689 W

Shane Rhodes
 12:11, December 07 2015
 Scientific Drilling International
 124 Vista Drive
 Charleroi, PA 15022



Company:	Antero Resources	Local Co-ordinate Reference:	Well Caldwell Unit 1H - Slot Caldwell Unit 1H
Project:	Ritchie County WV	TVD Reference:	Precision 523: GL 1099' + KB 19 @ 1118.0usft
Site:	Mackay Pad - Caldwell/Greenback/McNabb	MD Reference:	Precision 523: GL 1099' + KB 19 @ 1118.0usft
Well:	Caldwell Unit 1H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Antero NE

Project	Ritchie County WV, Ritchie County WV, WV North		
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	Mackay Pad - Caldwell/Greenback/McNabb				
Site Position:		Northing:	14,248,714.78 usft	Latitude:	39° 14' 17.843 N
From:	Map	Easting:	1,669,496.15 usft	Longitude:	80° 53' 50.274 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.06 °

Well	Caldwell Unit 1H - Slot Caldwell Unit 1H, Marcellus					
Well Position	+N/-S	0.0 usft	Northing:	14,248,714.78 usft	Latitude:	39° 14' 17.843 N
	+E/-W	0.0 usft	Easting:	1,669,496.15 usft	Longitude:	80° 53' 50.274 W
Position Uncertainty		2.0 usft	Wellhead Elevation:	1,118.0 usft	Ground Level:	1,099.0 usft

Wellbore	Original Wellpath				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2014	4/28/2015	-8.40	66.77	52,136
	BGGM2015	11/22/2015	-8.45	66.69	52,085

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	334.48	

Survey Program	Date	12/7/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
106.0	5,749.3	Survey #2 Def KOP Gyro (Original Wellpa	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4	
5,772.0	16,250.0	Survey #3 - Raw 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	
106.0	0.20	101.69	106.0	0.0	0.2	-0.1	0.19	0.19	0.00	
First SDI Gyro @ 106										
131.0	0.16	128.52	131.0	-0.1	0.3	-0.2	0.37	-0.16	107.32	
156.0	0.11	108.02	156.0	-0.1	0.3	-0.2	0.28	-0.20	-82.00	
181.0	0.03	65.31	181.0	-0.1	0.3	-0.2	0.36	-0.32	-170.84	
206.0	0.05	316.29	206.0	-0.1	0.3	-0.2	0.26	0.08	-436.08	
231.0	0.23	9.89	231.0	0.0	0.3	-0.2	0.82	0.72	214.40	



Scientific Drilling International
Survey Report



Company:	Antero Resources	Local Co-ordinate Reference:	Well Caldwell Unit 1H - Slot Caldwell Unit 1H
Project:	Ritchie County WV	TVD Reference:	Precision 523: GL 1099' + KB 19 @ 1118.0usft
Site:	Mackay Pad - Caldwell/Greenback/McNabb	MD Reference:	Precision 523: GL 1099' + KB 19 @ 1118.0usft
Well:	Caldwell 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)	
256.0	0.18	346.63	256.0	0.1	0.3	-0.1	0.38	-0.20	-93.04	
281.0	0.13	348.98	281.0	0.1	0.3	0.0	0.20	-0.20	9.40	
306.0	0.08	95.63	306.0	0.1	0.3	0.0	0.68	-0.20	426.60	
331.0	0.06	130.48	331.0	0.1	0.4	0.0	0.18	-0.08	139.40	
356.0	0.12	265.43	356.0	0.1	0.3	0.0	0.67	0.24	539.80	
381.0	0.12	248.33	381.0	0.1	0.3	0.0	0.14	0.00	-68.40	
406.0	0.24	271.97	406.0	0.1	0.2	0.0	0.55	0.48	94.56	
431.0	0.16	298.46	431.0	0.1	0.1	0.1	0.48	-0.32	105.96	
456.0	0.29	304.03	456.0	0.2	0.0	0.1	0.53	0.52	22.28	
481.0	0.24	286.02	481.0	0.2	-0.1	0.2	0.39	-0.20	-72.04	
506.0	0.56	287.85	506.0	0.3	-0.2	0.3	1.28	1.28	7.32	
531.0	0.97	291.18	531.0	0.4	-0.5	0.6	1.65	1.64	13.32	
556.0	1.86	299.11	556.0	0.7	-1.1	1.1	3.64	3.56	31.72	
581.0	2.80	303.39	581.0	1.2	-2.0	1.9	3.82	3.76	17.12	
606.0	3.57	305.15	605.9	2.0	-3.1	3.1	3.10	3.08	7.04	
631.0	4.07	306.68	630.9	3.0	-4.4	4.6	2.04	2.00	6.12	
656.0	4.56	306.89	655.8	4.1	-6.0	6.3	1.96	1.96	0.84	
681.0	5.34	307.79	680.7	5.4	-7.7	8.2	3.14	3.12	3.60	
706.0	6.04	307.76	705.6	6.9	-9.6	10.4	2.80	2.80	-0.12	
731.0	6.23	307.87	730.4	8.6	-11.7	12.8	0.76	0.76	0.44	
756.0	6.45	308.96	755.3	10.3	-13.9	15.3	1.00	0.88	4.36	
781.0	6.90	312.57	780.1	12.2	-16.1	17.9	2.46	1.80	14.44	
806.0	7.30	315.08	804.9	14.3	-18.3	20.8	2.02	1.60	10.04	
831.0	7.29	315.45	829.7	16.6	-20.6	23.8	0.19	-0.04	1.48	
856.0	7.31	316.21	854.5	18.8	-22.8	26.8	0.39	0.08	3.04	
881.0	7.18	316.85	879.3	21.1	-24.9	29.8	0.61	-0.52	2.56	
906.0	6.82	318.33	904.1	23.4	-27.0	32.7	1.61	-1.44	5.92	
931.0	6.36	319.52	929.0	25.5	-28.9	35.5	1.92	-1.84	4.76	
956.0	6.21	319.91	953.8	27.6	-30.7	38.1	0.62	-0.60	1.56	
981.0	5.97	319.85	978.7	29.7	-32.4	40.7	0.96	-0.96	-0.24	
1,006.0	5.70	320.06	1,003.6	31.6	-34.0	43.2	1.08	-1.08	0.84	
1,031.0	5.34	321.39	1,028.4	33.5	-35.5	45.5	1.53	-1.44	5.32	
1,056.0	5.10	321.50	1,053.3	35.2	-36.9	47.7	0.96	-0.96	0.44	
1,081.0	4.88	320.90	1,078.2	36.9	-38.3	49.8	0.90	-0.88	-2.40	
1,106.0	4.58	320.08	1,103.2	38.5	-39.6	51.8	1.23	-1.20	-3.28	
1,131.0	4.18	319.77	1,128.1	40.0	-40.8	53.7	1.60	-1.60	-1.24	
1,156.0	3.90	320.67	1,153.0	41.3	-42.0	55.4	1.15	-1.12	3.60	
1,181.0	3.67	322.10	1,178.0	42.6	-43.0	57.0	0.99	-0.92	5.72	
1,206.0	3.41	323.06	1,202.9	43.9	-43.9	58.5	1.07	-1.04	3.84	
1,231.0	3.10	324.58	1,227.9	45.0	-44.8	59.9	1.29	-1.24	6.08	
1,256.0	2.83	325.41	1,252.8	46.1	-45.5	61.2	1.09	-1.08	3.32	
1,281.0	2.58	323.39	1,277.8	47.0	-46.2	62.3	1.07	-1.00	-8.08	
1,306.0	2.34	323.98	1,302.8	47.9	-46.8	63.4	0.97	-0.96	2.36	



Scientific Drilling International
Survey Report



Company:	Antero Resources	Local Co-ordinate Reference:	Well Caldwell Unit 1H - Slot Caldwell Unit 1H
Project:	Ritchie County WV	TVD Reference:	Precision 523: GL 1099' + KB 19 @ 1118.0usft
Site:	Mackay Pad - Caldwell/Greenback/McNabb	MD Reference:	Precision 523: GL 1099' + KB 19 @ 1118.0usft
Well:	Caldwell 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)	
1,331.0	2.12	323.94	1,327.8	48.7	-47.4	64.3	0.88	-0.88	-0.16	
1,356.0	1.94	323.08	1,352.8	49.4	-47.9	65.2	0.73	-0.72	-3.44	
1,381.0	1.81	323.87	1,377.7	50.0	-48.4	66.0	0.53	-0.52	3.16	
1,406.0	1.67	323.27	1,402.7	50.7	-48.9	66.8	0.56	-0.56	-2.40	
1,431.0	1.54	323.05	1,427.7	51.2	-49.3	67.5	0.52	-0.52	-0.88	
1,456.0	1.35	320.76	1,452.7	51.7	-49.7	68.1	0.79	-0.76	-9.16	
1,481.0	1.15	317.65	1,477.7	52.1	-50.0	68.6	0.84	-0.80	-12.44	
1,506.0	1.08	316.55	1,502.7	52.5	-50.4	69.1	0.29	-0.28	-4.40	
1,531.0	1.05	315.10	1,527.7	52.8	-50.7	69.5	0.16	-0.12	-5.80	
1,556.0	1.09	316.91	1,552.7	53.1	-51.0	69.9	0.21	0.16	7.24	
1,581.0	1.09	321.71	1,577.7	53.5	-51.3	70.4	0.37	0.00	19.20	
1,606.0	0.92	325.77	1,602.7	53.9	-51.6	70.8	0.74	-0.68	16.24	
1,631.0	0.66	323.08	1,627.7	54.1	-51.8	71.2	1.05	-1.04	-10.76	
1,656.0	0.57	325.41	1,652.7	54.4	-51.9	71.4	0.37	-0.36	9.32	
1,681.0	0.53	322.25	1,677.7	54.6	-52.1	71.7	0.20	-0.16	-12.64	
1,706.0	0.56	317.15	1,702.7	54.7	-52.2	71.9	0.23	0.12	-20.40	
1,731.0	0.62	315.13	1,727.7	54.9	-52.4	72.1	0.25	0.24	-8.08	
1,756.0	0.60	315.56	1,752.7	55.1	-52.6	72.4	0.08	-0.08	1.72	
1,781.0	0.48	318.75	1,777.7	55.3	-52.8	72.6	0.49	-0.48	12.76	
1,806.0	0.37	313.58	1,802.7	55.4	-52.9	72.8	0.47	-0.44	-20.68	
1,831.0	0.33	294.33	1,827.7	55.5	-53.0	72.9	0.49	-0.16	-77.00	
1,856.0	0.30	287.59	1,852.7	55.5	-53.1	73.0	0.19	-0.12	-26.96	
1,881.0	0.30	280.17	1,877.7	55.6	-53.3	73.1	0.16	0.00	-29.68	
1,906.0	0.34	266.30	1,902.7	55.6	-53.4	73.2	0.35	0.16	-55.48	
1,931.0	0.32	258.20	1,927.7	55.6	-53.6	73.2	0.20	-0.08	-32.40	
1,956.0	0.39	251.27	1,952.7	55.5	-53.7	73.2	0.33	0.28	-27.72	
1,981.0	0.36	249.31	1,977.7	55.5	-53.9	73.3	0.13	-0.12	-7.84	
2,006.0	0.43	258.78	2,002.7	55.4	-54.0	73.3	0.38	0.28	37.88	
2,031.0	0.49	266.64	2,027.7	55.4	-54.2	73.4	0.35	0.24	31.44	
2,056.0	0.45	266.83	2,052.7	55.4	-54.4	73.4	0.16	-0.16	0.76	
2,081.0	0.47	261.88	2,077.7	55.4	-54.6	73.5	0.18	0.08	-19.80	
2,106.0	0.49	256.62	2,102.7	55.3	-54.8	73.6	0.19	0.08	-21.04	
2,131.0	0.42	251.20	2,127.7	55.3	-55.0	73.6	0.33	-0.28	-21.68	
2,156.0	0.41	248.64	2,152.7	55.2	-55.2	73.6	0.08	-0.04	-10.24	
2,181.0	0.50	248.00	2,177.7	55.1	-55.4	73.6	0.36	0.36	-2.56	
2,206.0	0.53	253.83	2,202.7	55.1	-55.6	73.6	0.24	0.12	23.32	
2,231.0	0.54	257.17	2,227.7	55.0	-55.8	73.7	0.13	0.04	13.36	
2,256.0	0.51	261.09	2,252.7	55.0	-56.0	73.7	0.19	-0.12	15.68	
2,281.0	0.43	256.71	2,277.7	54.9	-56.2	73.8	0.35	-0.32	-17.52	
2,306.0	0.48	251.60	2,302.7	54.9	-56.4	73.8	0.26	0.20	-20.44	
2,331.0	0.55	251.06	2,327.7	54.8	-56.6	73.9	0.28	0.28	-2.16	
2,356.0	0.58	254.22	2,352.7	54.7	-56.9	73.9	0.17	0.12	12.64	
2,381.0	0.59	260.41	2,377.7	54.7	-57.1	73.9	0.26	0.04	24.76	
2,406.0	0.53	262.06	2,402.7	54.6	-57.4	74.0	0.25	-0.24	6.60	



Company:	Antero Resources	Local Co-ordinate Reference:	Well Caldwell Unit 1H - Slot Caldwell Unit 1H
Project:	Ritchie County WV	TVD Reference:	Precision 523: GL 1099' + KB 19 @ 1118.0usft
Site:	Mackay Pad - Caldwell/Greenback/McNabb	MD Reference:	Precision 523: GL 1099' + KB 19 @ 1118.0usft
Well:	Caldwell 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)
2,431.0	0.50	258.53	2,427.7	54.6	-57.6	74.1	0.17	-0.12	-14.12
2,456.0	0.55	255.85	2,452.7	54.5	-57.8	74.1	0.22	0.20	-10.72
2,481.0	0.61	263.18	2,477.7	54.5	-58.1	74.2	0.38	0.24	29.32
2,506.0	0.59	270.76	2,502.6	54.5	-58.3	74.3	0.33	-0.08	30.32
2,531.0	0.51	267.45	2,527.6	54.5	-58.6	74.4	0.34	-0.32	-13.24
2,556.0	0.54	263.57	2,552.6	54.5	-58.8	74.5	0.19	0.12	-15.52
2,581.0	0.55	263.67	2,577.6	54.4	-59.0	74.6	0.04	0.04	0.40
2,606.0	0.53	262.89	2,602.6	54.4	-59.3	74.6	0.09	-0.08	-3.12
2,631.0	0.60	266.78	2,627.6	54.4	-59.5	74.7	0.32	0.28	15.56
2,656.0	0.65	273.50	2,652.6	54.4	-59.8	74.8	0.35	0.20	26.88
2,681.0	0.61	279.81	2,677.6	54.4	-60.1	75.0	0.32	-0.16	25.24
2,706.0	0.54	281.80	2,702.6	54.5	-60.3	75.1	0.29	-0.28	7.96
2,731.0	0.51	285.48	2,727.6	54.5	-60.5	75.3	0.18	-0.12	14.72
2,756.0	0.50	290.27	2,752.6	54.6	-60.7	75.4	0.17	-0.04	19.16
2,781.0	0.51	288.80	2,777.6	54.7	-60.9	75.6	0.07	0.04	-5.88
2,806.0	0.54	281.56	2,802.6	54.7	-61.2	75.7	0.29	0.12	-28.96
2,831.0	0.59	279.29	2,827.6	54.8	-61.4	75.9	0.22	0.20	-9.08
2,856.0	0.68	282.41	2,852.6	54.8	-61.7	76.0	0.39	0.36	12.48
2,881.0	0.64	282.47	2,877.6	54.9	-62.0	76.2	0.16	-0.16	0.24
2,906.0	0.60	282.09	2,902.6	54.9	-62.2	76.4	0.16	-0.16	-1.52
2,931.0	0.60	281.16	2,927.6	55.0	-62.5	76.5	0.04	0.00	-3.72
2,956.0	0.70	280.91	2,952.6	55.0	-62.8	76.7	0.40	0.40	-1.00
2,981.0	0.67	286.10	2,977.6	55.1	-63.0	76.9	0.28	-0.12	20.76
3,006.0	0.66	286.97	3,002.6	55.2	-63.3	77.1	0.06	-0.04	3.48
3,031.0	0.68	287.54	3,027.6	55.3	-63.6	77.3	0.08	0.08	2.28
3,056.0	0.81	283.56	3,052.6	55.4	-63.9	77.5	0.56	0.52	-15.92
3,081.0	0.73	286.95	3,077.6	55.5	-64.2	77.7	0.37	-0.32	13.56
3,106.0	0.56	294.05	3,102.6	55.6	-64.5	77.9	0.75	-0.68	28.40
3,131.0	0.55	293.17	3,127.6	55.7	-64.7	78.1	0.05	-0.04	-3.52
3,156.0	0.63	286.57	3,152.6	55.7	-65.0	78.3	0.42	0.32	-26.40
3,181.0	0.63	285.76	3,177.6	55.8	-65.2	78.5	0.04	0.00	-3.24
3,206.0	0.66	288.04	3,202.6	55.9	-65.5	78.7	0.16	0.12	9.12
3,231.0	0.60	282.44	3,227.6	56.0	-65.8	78.8	0.34	-0.24	-22.40
3,256.0	0.59	279.50	3,252.6	56.0	-66.0	79.0	0.13	-0.04	-11.76
3,281.0	0.61	278.69	3,277.6	56.1	-66.3	79.1	0.09	0.08	-3.24
3,306.0	0.66	281.16	3,302.6	56.1	-66.6	79.3	0.23	0.20	9.88
3,331.0	0.65	285.86	3,327.6	56.2	-66.8	79.5	0.22	-0.04	18.80
3,356.0	0.65	291.71	3,352.6	56.3	-67.1	79.7	0.27	0.00	23.40
3,381.0	0.52	295.95	3,377.6	56.4	-67.3	79.9	0.55	-0.52	16.96
3,406.0	0.56	290.04	3,402.6	56.5	-67.5	80.1	0.27	0.16	-23.64
3,431.0	0.56	288.70	3,427.6	56.5	-67.8	80.2	0.05	0.00	-5.36
3,456.0	0.56	280.93	3,452.6	56.6	-68.0	80.4	0.30	0.00	-31.08
3,481.0	0.58	282.88	3,477.6	56.7	-68.3	80.5	0.11	0.08	7.80



Company:	Antero Resources	Local Co-ordinate Reference:	Well Caldwell Unit 1H - Slot Caldwell Unit 1H
Project:	Ritchie County WV	TVD Reference:	Precision 523: GL 1099' + KB 19 @ 1118.0usft
Site:	Mackay Pad - Caldwell/Greenback/McNabb	MD Reference:	Precision 523: GL 1099' + KB 19 @ 1118.0usft
Well:	Caldwell 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)	
3,506.0	0.64	277.27	3,502.6	56.7	-68.5	80.7	0.34	0.24	-22.44	
3,531.0	0.65	279.27	3,527.6	56.7	-68.8	80.8	0.10	0.04	8.00	
3,556.0	0.71	279.66	3,552.6	56.8	-69.1	81.0	0.24	0.24	1.56	
3,581.0	0.68	285.42	3,577.6	56.9	-69.4	81.2	0.30	-0.12	23.04	
3,606.0	0.74	287.87	3,602.6	56.9	-69.7	81.4	0.27	0.24	9.80	
3,631.0	0.71	289.01	3,627.6	57.0	-70.0	81.6	0.13	-0.12	4.56	
3,656.0	0.64	289.16	3,652.6	57.1	-70.3	81.8	0.28	-0.28	0.60	
3,681.0	0.59	285.89	3,677.6	57.2	-70.5	82.0	0.24	-0.20	-13.08	
3,706.0	0.64	282.48	3,702.6	57.3	-70.8	82.2	0.25	0.20	-13.64	
3,731.0	0.62	279.31	3,727.6	57.3	-71.0	82.4	0.16	-0.08	-12.68	
3,756.0	0.64	281.87	3,752.6	57.4	-71.3	82.5	0.14	0.08	10.24	
3,781.0	0.69	280.30	3,777.6	57.4	-71.6	82.7	0.21	0.20	-6.28	
3,806.0	0.76	285.12	3,802.6	57.5	-71.9	82.9	0.37	0.28	19.28	
3,831.0	0.74	288.73	3,827.6	57.6	-72.2	83.1	0.21	-0.08	14.44	
3,856.0	0.64	293.75	3,852.6	57.7	-72.5	83.3	0.47	-0.40	20.08	
3,881.0	0.57	296.03	3,877.6	57.8	-72.7	83.5	0.30	-0.28	9.12	
3,906.0	0.55	289.14	3,902.6	57.9	-73.0	83.7	0.28	-0.08	-27.56	
3,931.0	0.53	281.30	3,927.6	58.0	-73.2	83.9	0.31	-0.08	-31.36	
3,956.0	0.51	281.79	3,952.6	58.0	-73.4	84.0	0.08	-0.08	1.96	
3,981.0	0.52	282.62	3,977.6	58.1	-73.6	84.1	0.05	0.04	3.32	
4,006.0	0.56	282.56	4,002.6	58.1	-73.9	84.3	0.16	0.16	-0.24	
4,031.0	0.54	290.46	4,027.6	58.2	-74.1	84.4	0.31	-0.08	31.60	
4,056.0	0.50	293.75	4,052.6	58.3	-74.3	84.6	0.20	-0.16	13.16	
4,081.0	0.40	299.24	4,077.6	58.4	-74.5	84.8	0.44	-0.40	21.96	
4,106.0	0.33	307.60	4,102.6	58.5	-74.6	84.9	0.35	-0.28	33.44	
4,131.0	0.28	304.33	4,127.6	58.5	-74.7	85.0	0.21	-0.20	-13.08	
4,156.0	0.26	305.07	4,152.6	58.6	-74.8	85.1	0.08	-0.08	2.96	
4,181.0	0.24	309.75	4,177.6	58.7	-74.9	85.2	0.11	-0.08	18.72	
4,206.0	0.20	325.09	4,202.6	58.7	-75.0	85.3	0.28	-0.16	61.36	
4,231.0	0.15	320.89	4,227.6	58.8	-75.0	85.4	0.21	-0.20	-16.80	
4,256.0	0.12	0.93	4,252.6	58.8	-75.0	85.4	0.39	-0.12	160.16	
4,281.0	0.13	345.09	4,277.6	58.9	-75.0	85.5	0.14	0.04	-63.36	
4,306.0	0.07	1.50	4,302.6	58.9	-75.1	85.5	0.26	-0.24	65.64	
4,331.0	0.08	12.11	4,327.6	59.0	-75.0	85.6	0.07	0.04	42.44	
4,356.0	0.08	305.96	4,352.6	59.0	-75.1	85.6	0.35	0.00	-264.60	
4,381.0	0.08	305.01	4,377.6	59.0	-75.1	85.6	0.01	0.00	-3.80	
4,406.0	0.17	334.03	4,402.6	59.1	-75.1	85.7	0.43	0.36	116.08	
4,431.0	0.13	338.76	4,427.6	59.1	-75.1	85.7	0.17	-0.16	18.92	
4,456.0	0.16	29.75	4,452.6	59.2	-75.1	85.8	0.51	0.12	203.96	
4,481.0	0.17	56.04	4,477.6	59.2	-75.1	85.8	0.30	0.04	105.16	
4,506.0	0.13	64.27	4,502.6	59.3	-75.0	85.8	0.18	-0.16	32.92	
4,531.0	0.14	58.42	4,527.6	59.3	-75.0	85.8	0.07	0.04	-23.40	
4,556.0	0.12	84.08	4,552.6	59.3	-74.9	85.8	0.24	-0.08	102.64	



Company:	Antero Resources	Local Co-ordinate Reference:	Well Caldwell Unit 1H - Slot Caldwell Unit 1H
Project:	Ritchie County WV	TVD Reference:	Precision 523: GL 1099' + KB 19 @ 1118.0usft
Site:	Mackay Pad - Caldwell/Greenback/McNabb	MD Reference:	Precision 523: GL 1099' + KB 19 @ 1118.0usft
Well:	Caldwell Unit 1H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Antero NE

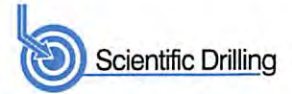
Survey

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)
4,581.0	0.22	86.91	4,577.6	59.3	-74.9	85.8	0.40	0.40	11.32
4,606.0	0.30	102.56	4,602.6	59.3	-74.7	85.7	0.43	0.32	62.60
4,631.0	0.29	111.20	4,627.6	59.3	-74.6	85.6	0.18	-0.04	34.56
4,656.0	0.20	139.66	4,652.6	59.2	-74.5	85.5	0.59	-0.36	113.84
4,681.0	0.19	104.27	4,677.6	59.2	-74.5	85.5	0.48	-0.04	-141.56
4,706.0	0.19	98.55	4,702.6	59.2	-74.4	85.4	0.08	0.00	-22.88
4,731.0	0.23	92.32	4,727.6	59.1	-74.3	85.4	0.18	0.16	-24.92
4,756.0	0.17	93.87	4,752.6	59.1	-74.2	85.3	0.24	-0.24	6.20
4,781.0	0.19	106.18	4,777.6	59.1	-74.1	85.3	0.17	0.08	49.24
4,806.0	0.27	85.76	4,802.6	59.1	-74.0	85.2	0.45	0.32	-81.68
4,831.0	0.23	90.44	4,827.6	59.1	-73.9	85.2	0.18	-0.16	18.72
4,856.0	0.16	121.28	4,852.6	59.1	-73.8	85.2	0.49	-0.28	123.36
4,881.0	0.19	110.98	4,877.6	59.1	-73.8	85.1	0.17	0.12	-41.20
4,906.0	0.32	115.25	4,902.6	59.0	-73.7	85.0	0.53	0.52	17.08
4,931.0	0.31	107.62	4,927.6	59.0	-73.5	84.9	0.17	-0.04	-30.52
4,956.0	0.30	117.99	4,952.6	58.9	-73.4	84.8	0.22	-0.04	41.48
4,981.0	0.28	124.53	4,977.6	58.9	-73.3	84.7	0.15	-0.08	26.16
5,006.0	0.26	124.32	5,002.6	58.8	-73.2	84.6	0.08	-0.08	-0.84
5,031.0	0.27	116.69	5,027.6	58.7	-73.1	84.5	0.15	0.04	-30.52
5,056.0	0.30	121.54	5,052.6	58.7	-73.0	84.4	0.15	0.12	19.40
5,081.0	0.24	125.11	5,077.6	58.6	-72.9	84.3	0.25	-0.24	14.28
5,106.0	0.22	120.97	5,102.6	58.6	-72.8	84.2	0.10	-0.08	-16.56
5,131.0	0.35	109.81	5,127.6	58.5	-72.7	84.1	0.56	0.52	-44.64
5,156.0	0.32	99.95	5,152.6	58.5	-72.6	84.0	0.26	-0.12	-39.44
5,181.0	0.28	106.20	5,177.6	58.4	-72.4	84.0	0.21	-0.16	25.00
5,206.0	0.32	114.28	5,202.6	58.4	-72.3	83.9	0.23	0.16	32.32
5,231.0	0.42	102.56	5,227.5	58.3	-72.2	83.7	0.50	0.40	-46.88
5,256.0	0.24	90.39	5,252.5	58.3	-72.0	83.7	0.77	-0.72	-48.68
5,281.0	0.20	97.26	5,277.5	58.3	-71.9	83.6	0.19	-0.16	27.48
5,306.0	0.22	91.65	5,302.5	58.3	-71.8	83.6	0.11	0.08	-22.44
5,331.0	0.26	131.44	5,327.5	58.3	-71.7	83.5	0.67	0.16	159.16
5,356.0	0.19	103.76	5,352.5	58.2	-71.7	83.4	0.51	-0.28	-110.72
5,381.0	0.23	123.91	5,377.5	58.2	-71.6	83.4	0.33	0.16	80.60
5,406.0	0.30	103.43	5,402.5	58.1	-71.5	83.3	0.47	0.28	-81.92
5,431.0	0.24	116.77	5,427.5	58.1	-71.4	83.2	0.35	-0.24	53.36
5,456.0	0.22	132.72	5,452.5	58.1	-71.3	83.1	0.27	-0.08	63.80
5,481.0	0.19	171.91	5,477.5	58.0	-71.2	83.0	0.56	-0.12	156.76
5,506.0	0.33	145.36	5,502.5	57.9	-71.2	82.9	0.72	0.56	-106.20
5,531.0	0.43	124.05	5,527.5	57.8	-71.1	82.8	0.69	0.40	-85.24
5,556.0	0.34	113.75	5,552.5	57.7	-70.9	82.6	0.45	-0.36	-41.20
5,581.0	0.49	105.04	5,577.5	57.6	-70.8	82.5	0.65	0.60	-34.84
5,606.0	0.81	107.15	5,602.5	57.5	-70.5	82.3	1.28	1.28	8.44
5,631.0	0.65	112.29	5,627.5	57.4	-70.2	82.1	0.69	-0.64	20.56
5,656.0	0.42	128.41	5,652.5	57.3	-70.0	81.9	1.09	-0.92	64.48



Company:	Antero Resources	Local Co-ordinate Reference:	Well Caldwell Unit 1H - Slot Caldwell Unit 1H
Project:	Ritchie County WV	TVD Reference:	Precision 523: GL 1099' + KB 19 @ 1118.0usft
Site:	Mackay Pad - Caldwell/Greenback/McNabb	MD Reference:	Precision 523: GL 1099' + KB 19 @ 1118.0usft
Well:	Caldwell 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)	
5,681.0	0.41	141.03	5,677.5	57.2	-69.9	81.7	0.37	-0.04	50.48	
5,706.0	0.48	140.40	5,702.5	57.1	-69.7	81.5	0.28	0.28	-2.52	
5,731.0	0.55	126.40	5,727.5	56.9	-69.6	81.3	0.57	0.28	-56.00	
5,749.0	0.42	135.02	5,745.5	56.8	-69.5	81.2	0.82	-0.71	47.88	
Last SDI Gyro @ 5749										
5,749.3	0.42	135.18	5,745.8	56.8	-69.5	81.2	0.82	-0.68	62.46	
5,772.0	0.51	147.66	5,768.5	56.7	-69.3	81.0	0.59	0.40	54.88	
First SDI MWD @ 5772										
5,802.0	0.43	150.81	5,798.5	56.4	-69.2	80.8	0.28	-0.27	10.50	
5,832.0	0.28	72.97	5,828.5	56.4	-69.1	80.6	1.54	-0.50	-259.47	
5,862.0	3.29	59.43	5,858.5	56.8	-68.3	80.7	10.06	10.03	-45.13	
5,892.0	7.57	66.69	5,888.4	58.0	-65.7	80.7	14.42	14.27	24.20	
5,921.0	10.96	69.81	5,917.0	59.8	-61.4	80.4	11.81	11.69	10.76	
5,951.0	14.93	68.85	5,946.2	62.1	-55.1	79.8	13.25	13.23	-3.20	
5,981.0	18.08	68.24	5,975.0	65.3	-47.2	79.2	10.52	10.50	-2.03	
6,011.0	21.10	68.38	6,003.2	69.0	-37.8	78.5	10.07	10.07	0.47	
6,041.0	24.09	70.00	6,030.9	73.1	-27.0	77.6	10.18	9.97	5.40	
6,071.0	24.40	71.01	6,058.3	77.2	-15.4	76.3	1.73	1.03	3.37	
6,100.0	24.30	66.73	6,084.7	81.5	-4.3	75.4	6.09	-0.34	-14.76	
6,130.0	24.99	55.89	6,112.0	87.5	6.6	76.1	15.22	2.30	-36.13	
6,160.0	25.93	44.83	6,139.1	95.7	16.5	79.2	16.13	3.13	-36.87	
6,190.0	27.55	37.04	6,165.9	105.9	25.3	84.6	12.86	5.40	-25.97	
6,216.0	28.94	32.51	6,188.8	116.0	32.3	90.7	9.83	5.36	-17.42	
Sycamore @ 6216										
6,220.0	29.17	31.85	6,192.3	117.6	33.4	91.8	9.83	5.68	-16.52	
6,250.0	30.40	28.05	6,218.3	130.5	40.8	100.2	7.51	4.10	-12.67	
6,279.0	31.95	23.84	6,243.2	144.0	47.3	109.6	9.22	5.34	-14.52	
6,309.0	34.17	19.32	6,268.3	159.2	53.3	120.7	11.06	7.40	-15.07	
6,339.0	36.57	15.25	6,292.8	175.8	58.5	133.5	11.21	8.00	-13.57	
6,369.0	38.75	11.26	6,316.5	193.7	62.7	147.8	10.90	7.27	-13.30	
6,399.0	41.92	8.03	6,339.4	212.8	65.9	163.6	12.65	10.57	-10.77	
6,410.0	43.19	6.90	6,347.5	220.2	66.9	169.9	13.49	11.55	-10.30	
Middlesex @ 6410										
6,429.0	45.41	5.06	6,361.1	233.4	68.2	181.2	13.49	11.68	-9.67	
6,458.0	48.81	2.48	6,380.8	254.6	69.6	199.7	13.41	11.72	-8.90	
6,488.0	51.98	0.05	6,399.9	277.7	70.1	220.4	12.27	10.57	-8.10	
6,518.0	54.88	357.94	6,417.8	301.8	69.7	242.3	11.20	9.67	-7.03	
6,548.0	57.54	355.88	6,434.5	326.6	68.3	265.3	10.54	8.87	-6.87	
6,578.0	60.32	353.42	6,450.0	352.2	65.9	289.5	11.63	9.27	-8.20	
6,587.0	61.07	352.65	6,454.4	360.0	65.0	296.9	11.21	8.38	-8.54	
Burkett @ 6587										
6,608.0	62.85	350.90	6,464.3	378.4	62.3	314.6	11.21	8.46	-8.34	
6,638.0	65.49	348.02	6,477.3	404.9	57.4	340.7	12.33	8.80	-9.60	
6,656.0	67.13	346.08	6,484.6	421.0	53.7	356.8	13.42	9.09	-10.79	



Company:	Antero Resources	Local Co-ordinate Reference:	Well Caldwell Unit 1H - Slot Caldwell Unit 1H
Project:	Ritchie County WV	TVD Reference:	Precision 523: GL 1099' + KB 19 @ 1118.0usft
Site:	Mackay Pad - Caldwell/Greenback/McNabb	MD Reference:	Precision 523: GL 1099' + KB 19 @ 1118.0usft
Well:	Caldwell 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)
Tully @ 6656									
6,668.0	68.23	344.81	6,489.1	431.7	50.9	367.7	13.42	9.20	-10.57
6,698.0	71.80	341.23	6,499.4	458.7	42.7	395.5	16.35	11.90	-11.93
6,723.0	74.88	339.32	6,506.5	481.2	34.6	419.3	14.32	12.31	-7.64
MRCL_HOT @ 6723									
6,727.0	75.37	339.02	6,507.6	484.8	33.2	423.2	14.32	12.34	-7.50
6,757.0	78.10	338.49	6,514.5	512.0	22.6	452.3	9.26	9.10	-1.77
6,787.0	81.03	338.13	6,519.9	539.4	11.7	481.8	9.84	9.77	-1.20
6,818.0	85.36	336.31	6,523.6	567.8	-0.2	512.5	15.13	13.97	-5.87
6,848.0	90.51	334.39	6,524.6	595.0	-12.7	542.5	18.32	17.17	-6.40
6,864.0	91.65	333.84	6,524.3	609.4	-19.7	558.5	7.91	7.13	-3.44
6,908.0	92.29	333.68	6,522.8	648.9	-39.1	602.4	1.50	1.45	-0.36
6,997.0	90.88	335.81	6,520.4	729.3	-77.1	691.4	2.87	-1.58	2.39
7,087.0	90.78	335.90	6,519.1	811.4	-113.9	781.3	0.15	-0.11	0.10
7,176.0	91.52	335.30	6,517.3	892.5	-150.6	870.3	1.07	0.83	-0.67
7,266.0	91.82	334.99	6,514.7	974.1	-188.5	960.3	0.48	0.33	-0.34
7,355.0	90.64	334.29	6,512.7	1,054.5	-226.6	1,049.2	1.54	-1.33	-0.79
7,445.0	90.74	334.36	6,511.7	1,135.6	-265.6	1,139.2	0.14	0.11	0.08
7,534.0	91.36	334.68	6,510.0	1,216.0	-303.8	1,228.2	0.78	0.70	0.36
7,624.0	91.29	333.76	6,507.9	1,297.0	-343.0	1,318.2	1.02	-0.08	-1.02
7,713.0	91.22	333.69	6,506.0	1,376.8	-382.4	1,407.2	0.11	-0.08	-0.08
7,803.0	91.13	333.63	6,504.2	1,457.4	-422.3	1,497.1	0.12	-0.10	-0.07
7,893.0	90.96	335.04	6,502.5	1,538.5	-461.3	1,587.1	1.58	-0.19	1.57
7,982.0	91.26	335.37	6,500.8	1,619.3	-498.6	1,676.1	0.50	0.34	0.37
8,072.0	91.19	335.26	6,498.9	1,701.0	-536.2	1,766.1	0.14	-0.08	-0.12
8,161.0	90.86	334.99	6,497.3	1,781.8	-573.6	1,855.0	0.48	-0.37	-0.30
8,251.0	90.69	335.29	6,496.1	1,863.4	-611.4	1,945.0	0.38	-0.19	0.33
8,341.0	90.65	335.52	6,495.0	1,945.2	-648.9	2,035.0	0.26	-0.04	0.26
8,430.0	91.72	335.78	6,493.2	2,026.3	-685.6	2,124.0	1.24	1.20	0.29
8,520.0	91.62	332.71	6,490.5	2,107.3	-724.6	2,213.9	3.41	-0.11	-3.41
8,609.0	91.62	334.11	6,488.0	2,186.9	-764.5	2,302.9	1.57	0.00	1.57
8,699.0	90.07	333.29	6,486.7	2,267.6	-804.3	2,392.8	1.95	-1.72	-0.91
8,788.0	90.24	332.28	6,486.5	2,346.7	-845.0	2,481.8	1.15	0.19	-1.13
8,878.0	90.34	334.14	6,486.0	2,427.0	-885.6	2,571.8	2.07	0.11	2.07
8,967.0	90.57	334.97	6,485.3	2,507.4	-923.8	2,660.8	0.97	0.26	0.93
9,057.0	90.60	334.44	6,484.4	2,588.8	-962.3	2,750.8	0.59	0.03	-0.59
9,146.0	90.57	333.59	6,483.5	2,668.8	-1,001.3	2,839.8	0.96	-0.03	-0.96
9,236.0	91.11	334.13	6,482.1	2,749.5	-1,040.9	2,929.7	0.85	0.60	0.60
9,325.0	90.81	333.45	6,480.7	2,829.4	-1,080.2	3,018.7	0.83	-0.34	-0.76
9,415.0	91.81	334.79	6,478.6	2,910.3	-1,119.5	3,108.7	1.86	1.11	1.49
9,504.0	90.87	334.91	6,476.5	2,990.9	-1,157.3	3,197.7	1.06	-1.06	0.13
9,594.0	91.27	334.54	6,474.8	3,072.2	-1,195.7	3,287.7	0.61	0.44	-0.41
9,683.0	91.71	334.90	6,472.5	3,152.7	-1,233.7	3,376.6	0.64	0.49	0.40
9,773.0	89.83	335.27	6,471.3	3,234.3	-1,271.6	3,466.6	2.13	-2.09	0.41



Scientific Drilling International
Survey Report



Company:	Antero Resources	Local Co-ordinate Reference:	Well Caldwell Unit 1H - Slot Caldwell Unit 1H
Project:	Ritchie County WV	TVD Reference:	Precision 523: GL 1099' + KB 19 @ 1118.0usft
Site:	Mackay Pad - Caldwell/Greenback/McNabb	MD Reference:	Precision 523: GL 1099' + KB 19 @ 1118.0usft
Well:	Caldwell 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)	
9,863.0	90.13	335.98	6,471.3	3,316.3	-1,308.8	3,556.6	0.86	0.33	0.79	
9,952.0	89.99	334.46	6,471.2	3,397.1	-1,346.1	3,645.6	1.72	-0.16	-1.71	
10,042.0	90.70	335.97	6,470.7	3,478.8	-1,383.8	3,735.6	1.85	0.79	1.68	
10,131.0	90.53	336.94	6,469.8	3,560.4	-1,419.4	3,824.5	1.11	-0.19	1.09	
10,221.0	90.39	335.30	6,469.0	3,642.7	-1,455.8	3,914.5	1.83	-0.16	-1.82	
10,310.0	90.19	333.66	6,468.6	3,723.0	-1,494.1	4,003.5	1.86	-0.22	-1.84	
10,400.0	89.92	333.02	6,468.5	3,803.4	-1,534.5	4,093.4	0.77	-0.30	-0.71	
10,489.0	91.00	333.00	6,467.8	3,882.7	-1,574.9	4,182.4	1.21	1.21	-0.02	
10,579.0	90.80	332.56	6,466.4	3,962.7	-1,616.1	4,272.4	0.54	-0.22	-0.49	
10,668.0	91.03	334.50	6,464.9	4,042.4	-1,655.7	4,361.3	2.19	0.26	2.18	
10,758.0	90.83	334.10	6,463.5	4,123.5	-1,694.8	4,451.3	0.50	-0.22	-0.44	
10,847.0	90.42	334.07	6,462.5	4,203.5	-1,733.7	4,540.3	0.46	-0.46	-0.03	
10,937.0	90.52	335.52	6,461.8	4,284.9	-1,772.0	4,630.3	1.61	0.11	1.61	
11,026.0	90.89	335.56	6,460.7	4,366.0	-1,808.8	4,719.3	0.42	0.42	0.04	
11,116.0	90.96	334.96	6,459.2	4,447.7	-1,846.5	4,809.3	0.67	0.08	-0.67	
11,206.0	90.62	335.19	6,458.0	4,529.3	-1,884.4	4,899.2	0.46	-0.38	0.26	
11,295.0	90.66	334.84	6,457.0	4,610.0	-1,922.0	4,988.2	0.40	0.04	-0.39	
11,385.0	90.69	334.30	6,455.9	4,691.2	-1,960.6	5,078.2	0.60	0.03	-0.60	
11,474.0	90.89	333.65	6,454.7	4,771.2	-1,999.7	5,167.2	0.76	0.22	-0.73	
11,564.0	90.32	334.17	6,453.8	4,852.0	-2,039.3	5,257.2	0.86	-0.63	0.58	
11,653.0	90.69	334.78	6,453.0	4,932.3	-2,077.6	5,346.2	0.80	0.42	0.69	
11,743.0	90.05	334.25	6,452.4	5,013.6	-2,116.3	5,436.2	0.92	-0.71	-0.59	
11,832.0	88.98	335.38	6,453.1	5,094.1	-2,154.2	5,525.2	1.75	-1.20	1.27	
11,921.0	89.75	334.36	6,454.1	5,174.7	-2,192.0	5,614.2	1.44	0.87	-1.15	
12,011.0	90.66	333.72	6,453.8	5,255.6	-2,231.4	5,704.2	1.24	1.01	-0.71	
12,100.0	90.69	333.76	6,452.8	5,335.4	-2,270.8	5,793.2	0.06	0.03	0.04	
12,190.0	90.55	334.55	6,451.8	5,416.4	-2,310.0	5,883.2	0.89	-0.16	0.88	
12,279.0	89.85	335.92	6,451.5	5,497.2	-2,347.3	5,972.1	1.73	-0.79	1.54	
12,369.0	90.59	336.56	6,451.1	5,579.6	-2,383.5	6,062.1	1.09	0.82	0.71	
12,458.0	89.85	336.57	6,450.8	5,661.2	-2,418.9	6,151.0	0.83	-0.83	0.01	
12,548.0	89.21	333.14	6,451.5	5,742.7	-2,457.2	6,241.0	3.88	-0.71	-3.81	
12,638.0	90.79	332.56	6,451.5	5,822.8	-2,498.2	6,331.0	1.87	1.76	-0.64	
12,727.0	90.89	332.11	6,450.2	5,901.6	-2,539.6	6,419.9	0.52	0.11	-0.51	
12,817.0	90.96	333.15	6,448.8	5,981.5	-2,580.9	6,509.9	1.16	0.08	1.16	
12,906.0	91.46	334.11	6,446.9	6,061.2	-2,620.5	6,598.8	1.22	0.56	1.08	
12,996.0	91.59	333.90	6,444.5	6,142.1	-2,659.9	6,688.8	0.27	0.14	-0.23	
13,085.0	90.25	332.81	6,443.1	6,221.6	-2,699.8	6,777.8	1.94	-1.51	-1.22	
13,175.0	89.41	333.16	6,443.3	6,301.8	-2,740.7	6,867.7	1.01	-0.93	0.39	
13,264.0	90.55	334.63	6,443.4	6,381.7	-2,779.8	6,956.7	2.09	1.28	1.65	
13,354.0	89.48	333.89	6,443.3	6,462.8	-2,818.9	7,046.7	1.45	-1.19	-0.82	
13,443.0	90.29	333.38	6,443.5	6,542.5	-2,858.4	7,135.7	1.08	0.91	-0.57	
13,533.0	90.05	335.70	6,443.2	6,623.8	-2,897.1	7,225.7	2.59	-0.27	2.58	
13,622.0	91.60	336.06	6,442.0	6,705.0	-2,933.5	7,314.7	1.79	1.74	0.40	



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Site:	Mackay Pad - Caldwell/Greenback/McNabb	MD Reference:	Precision 523: GL 1099' + KB 19 @ 1118.0usft
Well:	Caldwell 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)	
13,711.0	91.59	335.11	6,439.5	6,786.0	-2,970.3	7,403.6	1.07	-0.01	-1.07	
13,801.0	92.03	335.17	6,436.6	6,867.6	-3,008.1	7,493.6	0.49	0.49	0.07	
13,891.0	90.42	334.51	6,434.7	6,949.1	-3,046.3	7,583.5	1.93	-1.79	-0.73	
13,980.0	90.35	333.99	6,434.1	7,029.2	-3,085.0	7,672.5	0.59	-0.08	-0.58	
14,070.0	90.15	333.67	6,433.7	7,110.0	-3,124.7	7,762.5	0.42	-0.22	-0.36	
14,159.0	90.02	335.94	6,433.6	7,190.5	-3,162.6	7,851.5	2.55	-0.15	2.55	
14,249.0	89.95	335.67	6,433.6	7,272.6	-3,199.5	7,941.5	0.31	-0.08	-0.30	
14,339.0	90.89	335.73	6,433.0	7,354.6	-3,236.5	8,031.5	1.05	1.04	0.07	
14,428.0	90.99	336.05	6,431.5	7,435.9	-3,272.8	8,120.4	0.38	0.11	0.36	
14,517.0	89.85	335.38	6,430.8	7,517.0	-3,309.5	8,209.4	1.49	-1.28	-0.75	
14,607.0	90.86	335.46	6,430.3	7,598.8	-3,346.9	8,299.4	1.13	1.12	0.09	
14,696.0	90.65	335.64	6,429.1	7,679.8	-3,383.7	8,388.4	0.31	-0.24	0.20	
14,786.0	90.08	335.00	6,428.5	7,761.6	-3,421.3	8,478.3	0.95	-0.63	-0.71	
14,875.0	89.81	334.99	6,428.6	7,842.3	-3,458.9	8,567.3	0.30	-0.30	-0.01	
14,964.0	90.75	335.77	6,428.2	7,923.2	-3,496.0	8,656.3	1.37	1.06	0.88	
15,054.0	90.55	334.26	6,427.2	8,004.8	-3,534.0	8,746.3	1.69	-0.22	-1.68	
15,143.0	90.79	334.72	6,426.1	8,085.1	-3,572.3	8,835.3	0.58	0.27	0.52	
15,233.0	90.65	331.92	6,425.0	8,165.5	-3,612.7	8,925.3	3.11	-0.16	-3.11	
15,322.0	90.58	331.32	6,424.0	8,243.8	-3,655.0	9,014.2	0.68	-0.08	-0.67	
15,412.0	89.98	331.71	6,423.6	8,322.9	-3,698.0	9,104.0	0.80	-0.67	0.43	
15,502.0	90.22	332.70	6,423.5	8,402.5	-3,739.9	9,194.0	1.13	0.27	1.10	
15,591.0	90.82	335.21	6,422.6	8,482.4	-3,779.0	9,282.9	2.90	0.67	2.82	
15,681.0	90.48	335.32	6,421.6	8,564.2	-3,816.7	9,372.9	0.40	-0.38	0.12	
15,770.0	90.52	335.46	6,420.8	8,645.1	-3,853.7	9,461.9	0.16	0.04	0.16	
15,860.0	88.33	334.38	6,421.7	8,726.6	-3,891.9	9,551.9	2.71	-2.43	-1.20	
15,949.0	89.34	335.43	6,423.6	8,807.2	-3,929.6	9,640.9	1.64	1.13	1.18	
16,039.0	90.11	336.06	6,424.0	8,889.2	-3,966.6	9,730.9	1.11	0.86	0.70	
16,128.0	89.94	335.91	6,424.0	8,970.5	-4,002.8	9,819.8	0.25	-0.19	-0.17	
16,186.0	90.15	335.81	6,423.9	9,023.5	-4,026.5	9,877.8	0.40	0.36	-0.17	
Last SDI MWD @ 16186										
16,250.0	90.15	335.81	6,423.7	9,081.8	-4,052.7	9,941.8	0.00	0.00	0.00	
Projection To Bit @ 16250 MD / 6423 TVD										

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
6,216.0	6,188.8	Sycamore @ 6216		0.00	
6,410.0	6,347.5	Middlesex @ 6410		0.00	
6,587.0	6,454.4	Burkett @ 6587		0.00	
6,656.0	6,484.6	Tully @ 6656		0.00	
6,723.0	6,506.5	MRCL_HOT @ 6723		0.00	



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Site:	Mackay Pad - Caldwell/Greenback/McNabb	MD Reference:	Precision 523: GL 1099' + KB 19 @ 1118.0usft
Well:	Caldwell Unit 1H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Antero NE

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
106.0	106.0	0.0	0.2	First SDI Gyro @ 106
5,749.0	5,745.5	56.8	-69.5	Last SDI Gyro @ 5749
5,772.0	5,768.5	56.7	-69.3	First SDI MWD @ 5772
16,186.0	6,423.9	9,023.5	-4,026.5	Last SDI MWD @ 16186
16,250.0	6,423.7	9,081.8	-4,052.7	Projection To Bit @ 16250 MD / 6423 TVD

Checked By: _____ Approved By: _____ Date: _____