





# **Antero Resources**

**Doddridge County WV  
Pennington South/Anchor/Porter/Lincoln  
Pennington South Unit 1H  
Sidetrack 1**

**Design: As Drilled ST 1**

## **EOW Completion Report**

**25 September, 2014**





**Company:** Antero Resources  
**Project:** Doddridge County WV  
**Site:** Pennington South/Anchor/Porter/Lincoln  
**Well:** Pennington South Unit 1H  
**Wellbore:** Sidetrack 1  
**Design:** As Drilled ST 1

**Local Co-ordinate Reference:** Well Pennington South Unit 1H  
**TVD Reference:** Frontier 23: GL 1060' + 22' KB @ 1082.0usft  
**MD Reference:** Frontier 23: GL 1060' + 22' KB @ 1082.0usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** Oklahoma District

<b>Project</b>	Doddridge County WV, McClellan District		
<b>Map System:</b>	Universal Transverse Mercator (US Survey Fee	<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>	Pennington South/Anchor/Porter/Lincoln				
<b>Site Position:</b>		<b>Northing:</b>	14,235,778.90usft	<b>Latitude:</b>	39° 12' 9.064 N
<b>From:</b>	Map	<b>Easting:</b>	1,713,742.09usft	<b>Longitude:</b>	80° 44' 28.190 W
<b>Position Uncertainty:</b>	2.0 usft	<b>Slot Radius:</b>	13-3/16"	<b>Grid Convergence:</b>	0.16 °

<b>Well</b>	Pennington South Unit 1H					
<b>Well Position</b>	<b>+N/-S</b>	0.0 usft	<b>Northing:</b>	14,235,778.90 usf	<b>Latitude:</b>	39° 12' 9.064 N
	<b>+E/-W</b>	0.0 usft	<b>Easting:</b>	1,713,742.09 usf	<b>Longitude:</b>	80° 44' 28.190 W
<b>Position Uncertainty</b>	2.0 usft		<b>Wellhead Elevation:</b>	1,082.0 usft	<b>Ground Level:</b>	1,060.0 usft

**Wellbore** Sidetrack 1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2014	9/6/2014	-8.49	66.78	52,182

**Design** As Drilled ST 1

**Audit Notes:**

**Version:** 1.0      **Phase:** ACTUAL      **Tie On Depth:** 10,673.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	161.05

Survey Program	Date	From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
	9/17/2014	34.0	5,972.0	Survey #3 Final Gyro (Original Wellpath)	SDI Standard Keeper	Scientific Drilling Intl. Standard Wireline Keeper
		6,041.0	10,673.0	Survey #4 MWD (Original Wellpath)	MWD SDI	MWD - Standard ver 1.0.1
		10,735.0	18,392.0	Survey #1 ST 1 (Sidetrack 1)	MWD SDI	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	0.00
	34.0	0.05	307.06	34.0	0.0	0.0	0.0	0.15
	59.0	0.09	307.06	59.0	0.0	0.0	0.0	0.16
	84.0	0.14	307.06	84.0	0.1	-0.1	-0.1	0.20
	109.0	0.19	307.06	109.0	0.1	-0.1	-0.1	0.20
	134.0	0.17	304.26	134.0	0.1	-0.2	-0.2	0.09
	159.0	0.20	298.89	159.0	0.2	-0.3	-0.3	0.14
	184.0	0.20	296.15	184.0	0.2	-0.3	-0.3	0.04
	209.0	0.20	289.86	209.0	0.3	-0.4	-0.4	0.09
	234.0	0.21	298.54	234.0	0.3	-0.5	-0.4	0.13



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Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
259.0	0.19	313.00	259.0	0.4	-0.6	-0.5	0.22
284.0	0.21	307.14	284.0	0.4	-0.6	-0.6	0.11
309.0	0.27	296.07	309.0	0.5	-0.7	-0.7	0.30
334.0	0.28	296.69	334.0	0.5	-0.8	-0.8	0.04
359.0	0.34	287.52	359.0	0.6	-1.0	-0.8	0.31
384.0	0.36	285.75	384.0	0.6	-1.1	-0.9	0.09
409.0	0.31	291.96	409.0	0.7	-1.2	-1.0	0.25
434.0	0.31	295.13	434.0	0.7	-1.4	-1.1	0.07
459.0	0.26	285.08	459.0	0.8	-1.5	-1.2	0.28
484.0	0.31	287.84	484.0	0.8	-1.6	-1.3	0.21
509.0	0.31	293.99	509.0	0.8	-1.7	-1.4	0.13
534.0	0.33	295.27	534.0	0.9	-1.9	-1.4	0.08
559.0	0.35	301.01	559.0	1.0	-2.0	-1.6	0.16
584.0	0.37	302.02	584.0	1.0	-2.1	-1.7	0.08
609.0	0.38	294.57	609.0	1.1	-2.3	-1.8	0.20
634.0	0.36	303.49	634.0	1.2	-2.4	-1.9	0.24
659.0	0.38	294.31	659.0	1.3	-2.6	-2.0	0.25
684.0	0.38	297.50	684.0	1.3	-2.7	-2.2	0.08
709.0	0.40	305.64	709.0	1.4	-2.8	-2.3	0.24
734.0	0.45	314.63	734.0	1.6	-3.0	-2.4	0.33
759.0	0.46	313.82	759.0	1.7	-3.1	-2.6	0.05
784.0	0.57	313.36	784.0	1.9	-3.3	-2.8	0.44
809.0	0.59	310.83	809.0	2.0	-3.5	-3.0	0.13
834.0	0.65	310.19	834.0	2.2	-3.7	-3.3	0.24
859.0	0.63	308.28	859.0	2.4	-3.9	-3.5	0.12
884.0	0.64	308.07	884.0	2.5	-4.1	-3.7	0.04
909.0	0.68	305.61	909.0	2.7	-4.3	-4.0	0.20
934.0	0.70	304.56	934.0	2.9	-4.6	-4.2	0.09
959.0	0.74	303.92	959.0	3.1	-4.9	-4.5	0.16
984.0	0.75	300.66	984.0	3.2	-5.1	-4.7	0.17
1,009.0	0.76	299.66	1,009.0	3.4	-5.4	-5.0	0.07
1,034.0	0.80	301.17	1,034.0	3.6	-5.7	-5.2	0.18
1,059.0	0.82	293.27	1,059.0	3.7	-6.0	-5.5	0.45
1,084.0	0.82	294.02	1,084.0	3.9	-6.3	-5.7	0.04
1,109.0	0.83	294.83	1,109.0	4.0	-6.7	-6.0	0.06
1,134.0	0.78	289.62	1,134.0	4.2	-7.0	-6.2	0.35
1,159.0	0.76	289.33	1,159.0	4.3	-7.3	-6.4	0.08
1,184.0	0.73	294.61	1,184.0	4.4	-7.6	-6.6	0.30
1,209.0	0.73	292.40	1,209.0	4.5	-7.9	-6.8	0.11
1,234.0	0.71	293.18	1,234.0	4.6	-8.2	-7.1	0.09
1,259.0	0.76	287.98	1,259.0	4.8	-8.5	-7.3	0.33
1,284.0	0.75	289.89	1,283.9	4.9	-8.8	-7.5	0.11
1,309.0	0.77	297.14	1,308.9	5.0	-9.1	-7.7	0.39
1,334.0	0.67	292.66	1,333.9	5.1	-9.4	-7.9	0.46
1,359.0	0.69	291.26	1,358.9	5.2	-9.7	-8.1	0.10



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**Survey Calculation Method:** Minimum Curvature  
**Database:** Oklahoma District

**Survey**

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
1,384.0	0.71	289.79	1,383.9	5.3	-10.0	-8.3	0.11
1,409.0	0.72	291.19	1,408.9	5.5	-10.3	-8.5	0.08
1,434.0	0.65	301.13	1,433.9	5.6	-10.5	-8.7	0.55
1,459.0	0.63	295.20	1,458.9	5.7	-10.8	-8.9	0.28
1,484.0	0.65	294.46	1,483.9	5.8	-11.0	-9.1	0.09
1,509.0	0.63	295.58	1,508.9	6.0	-11.3	-9.3	0.09
1,534.0	0.61	295.75	1,533.9	6.1	-11.5	-9.5	0.08
1,559.0	0.63	296.41	1,558.9	6.2	-11.8	-9.7	0.08
1,584.0	0.59	302.37	1,583.9	6.3	-12.0	-9.9	0.30
1,609.0	0.61	298.20	1,608.9	6.5	-12.2	-10.1	0.19
1,634.0	0.59	299.58	1,633.9	6.6	-12.4	-10.3	0.10
1,659.0	0.60	293.40	1,658.9	6.7	-12.7	-10.5	0.26
1,684.0	0.59	301.89	1,683.9	6.8	-12.9	-10.6	0.35
1,709.0	0.61	298.23	1,708.9	6.9	-13.1	-10.8	0.17
1,734.0	0.62	296.42	1,733.9	7.1	-13.4	-11.0	0.09
1,759.0	0.54	295.72	1,758.9	7.2	-13.6	-11.2	0.32
1,784.0	0.59	291.44	1,783.9	7.3	-13.8	-11.4	0.26
1,809.0	0.59	285.68	1,808.9	7.4	-14.1	-11.5	0.24
1,834.0	0.58	282.61	1,833.9	7.4	-14.3	-11.7	0.13
1,859.0	0.60	288.35	1,858.9	7.5	-14.6	-11.8	0.25
1,884.0	0.55	289.99	1,883.9	7.6	-14.8	-12.0	0.21
1,909.0	0.55	295.92	1,908.9	7.7	-15.0	-12.1	0.23
1,934.0	0.62	284.58	1,933.9	7.8	-15.3	-12.3	0.54
1,959.0	0.61	291.39	1,958.9	7.8	-15.5	-12.5	0.29
1,984.0	0.62	290.16	1,983.9	7.9	-15.8	-12.6	0.07
2,009.0	0.63	284.10	2,008.9	8.0	-16.0	-12.8	0.27
2,034.0	0.64	288.53	2,033.9	8.1	-16.3	-12.9	0.20
2,059.0	0.68	290.31	2,058.9	8.2	-16.6	-13.1	0.18
2,084.0	0.72	288.37	2,083.9	8.3	-16.9	-13.3	0.19
2,109.0	0.72	293.73	2,108.9	8.4	-17.1	-13.5	0.27
2,134.0	0.83	294.13	2,133.9	8.5	-17.5	-13.7	0.44
2,159.0	0.87	293.67	2,158.9	8.7	-17.8	-14.0	0.16
2,184.0	0.95	292.38	2,183.9	8.8	-18.2	-14.3	0.33
2,209.0	0.98	292.32	2,208.9	9.0	-18.6	-14.5	0.12
2,234.0	1.00	295.04	2,233.9	9.2	-18.9	-14.8	0.20
2,259.0	0.98	296.47	2,258.9	9.4	-19.3	-15.1	0.13
2,284.0	0.91	292.97	2,283.9	9.5	-19.7	-15.4	0.36
2,309.0	1.06	293.79	2,308.9	9.7	-20.1	-15.7	0.60
2,334.0	1.08	294.15	2,333.9	9.9	-20.5	-16.0	0.08
2,359.0	1.11	295.82	2,358.9	10.1	-21.0	-16.4	0.18
2,384.0	1.09	294.17	2,383.9	10.3	-21.4	-16.7	0.15
2,409.0	1.08	294.23	2,408.9	10.5	-21.8	-17.0	0.04
2,434.0	1.13	291.36	2,433.8	10.7	-22.3	-17.3	0.30
2,459.0	1.12	291.42	2,458.8	10.9	-22.7	-17.7	0.04



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**Survey**

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	EW (usft)	V. Sec (usft)	DLeg (°/100usft)
2,484.0	1.18	287.40	2,483.8	11.0	-23.2	-18.0	0.40
2,509.0	1.23	287.06	2,508.8	11.2	-23.7	-18.3	0.20
2,534.0	1.19	290.51	2,533.8	11.4	-24.2	-18.6	0.33
2,559.0	1.31	294.98	2,558.8	11.6	-24.7	-19.0	0.62
2,584.0	1.40	291.68	2,583.8	11.8	-25.3	-19.4	0.48
2,609.0	1.39	293.91	2,608.8	12.0	-25.8	-19.8	0.22
2,634.0	1.44	287.91	2,633.8	12.3	-26.4	-20.2	0.63
2,659.0	1.26	294.87	2,658.8	12.5	-26.9	-20.5	0.97
2,684.0	1.32	295.82	2,683.8	12.7	-27.4	-20.9	0.25
2,709.0	1.21	293.53	2,708.8	12.9	-27.9	-21.3	0.48
2,734.0	1.70	302.37	2,733.8	13.2	-28.5	-21.8	2.15
2,759.0	1.43	298.09	2,758.8	13.6	-29.1	-22.3	1.18
2,784.0	1.38	295.29	2,783.8	13.9	-29.6	-22.7	0.34
2,809.0	1.41	296.52	2,808.7	14.1	-30.2	-23.2	0.17
2,834.0	1.39	294.51	2,833.7	14.4	-30.7	-23.6	0.21
2,859.0	1.40	293.10	2,858.7	14.6	-31.3	-24.0	0.14
2,884.0	1.33	290.71	2,883.7	14.9	-31.8	-24.4	0.36
2,909.0	1.42	294.03	2,908.7	15.1	-32.4	-24.8	0.48
2,934.0	1.40	295.13	2,933.7	15.3	-33.0	-25.2	0.13
2,959.0	1.49	291.13	2,958.7	15.6	-33.5	-25.6	0.54
2,984.0	1.49	293.82	2,983.7	15.8	-34.1	-26.1	0.28
3,009.0	1.49	297.80	3,008.7	16.1	-34.7	-26.5	0.41
3,034.0	1.53	296.55	3,033.7	16.4	-35.3	-27.0	0.21
3,059.0	1.47	297.88	3,058.7	16.7	-35.9	-27.5	0.28
3,084.0	1.51	297.36	3,083.7	17.0	-36.5	-27.9	0.17
3,109.0	1.55	300.29	3,108.7	17.3	-37.1	-28.4	0.35
3,134.0	1.60	300.82	3,133.6	17.7	-37.6	-29.0	0.21
3,159.0	1.61	299.50	3,158.6	18.0	-38.2	-29.5	0.15
3,184.0	1.65	301.81	3,183.6	18.4	-38.9	-30.0	0.31
3,209.0	1.61	301.26	3,208.6	18.8	-39.5	-30.6	0.17
3,234.0	1.57	301.50	3,233.6	19.1	-40.1	-31.1	0.16
3,259.0	1.52	300.13	3,258.6	19.5	-40.6	-31.6	0.25
3,284.0	1.56	298.89	3,283.6	19.8	-41.2	-32.1	0.21
3,309.0	1.53	300.89	3,308.6	20.2	-41.8	-32.6	0.25
3,334.0	1.62	306.42	3,333.6	20.5	-42.4	-33.2	0.71
3,359.0	1.49	304.84	3,358.6	20.9	-42.9	-33.7	0.55
3,384.0	1.53	302.27	3,383.5	21.3	-43.5	-34.3	0.31
3,409.0	1.51	305.40	3,408.5	21.7	-44.0	-34.8	0.34
3,434.0	1.55	300.37	3,433.5	22.0	-44.6	-35.3	0.56
3,459.0	1.45	300.01	3,458.5	22.4	-45.2	-35.8	0.40
3,484.0	1.31	302.58	3,483.5	22.7	-45.7	-36.3	0.61
3,509.0	1.36	305.76	3,508.5	23.0	-46.2	-36.7	0.36
3,534.0	1.37	305.77	3,533.5	23.3	-46.6	-37.2	0.04
3,559.0	1.30	304.66	3,558.5	23.7	-47.1	-37.7	0.30



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MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
3,584.0	1.41	308.78	3,583.5	24.0	-47.6	-38.2	0.59
3,609.0	1.44	311.51	3,608.5	24.4	-48.1	-38.7	0.30
3,634.0	1.48	311.08	3,633.5	24.9	-48.5	-39.3	0.17
3,659.0	1.50	313.63	3,658.5	25.3	-49.0	-39.8	0.28
3,684.0	1.45	311.65	3,683.5	25.7	-49.5	-40.4	0.29
3,709.0	1.41	310.97	3,708.4	26.1	-50.0	-40.9	0.17
3,734.0	1.48	304.56	3,733.4	26.5	-50.5	-41.5	0.70
3,759.0	1.52	315.18	3,758.4	26.9	-51.0	-42.0	1.12
3,784.0	1.44	305.91	3,783.4	27.4	-51.4	-42.6	1.01
3,809.0	1.48	307.18	3,808.4	27.7	-52.0	-43.1	0.21
3,834.0	1.42	309.13	3,833.4	28.1	-52.5	-43.6	0.31
3,859.0	1.37	310.29	3,858.4	28.5	-52.9	-44.2	0.23
3,884.0	1.32	303.86	3,883.4	28.9	-53.4	-44.6	0.64
3,909.0	1.44	311.28	3,908.4	29.2	-53.9	-45.1	0.86
3,934.0	1.21	316.53	3,933.4	29.6	-54.3	-45.7	1.04
3,959.0	1.09	317.04	3,958.4	30.0	-54.6	-46.1	0.48
3,984.0	0.98	318.51	3,983.4	30.3	-54.9	-46.5	0.45
4,009.0	0.91	323.73	4,008.4	30.7	-55.2	-46.9	0.44
4,034.0	0.88	329.99	4,033.4	31.0	-55.4	-47.3	0.41
4,059.0	0.89	330.90	4,058.4	31.3	-55.6	-47.7	0.07
4,084.0	0.89	331.13	4,083.4	31.7	-55.8	-48.1	0.01
4,109.0	0.90	323.91	4,108.4	32.0	-56.0	-48.4	0.45
4,134.0	0.87	315.77	4,133.4	32.3	-56.2	-48.8	0.52
4,159.0	0.79	313.51	4,158.3	32.5	-56.5	-49.1	0.35
4,184.0	0.72	314.42	4,183.3	32.8	-56.7	-49.4	0.28
4,209.0	0.54	318.80	4,208.3	33.0	-56.9	-49.7	0.74
4,234.0	0.57	331.99	4,233.3	33.2	-57.1	-49.9	0.52
4,259.0	0.60	331.17	4,258.3	33.4	-57.2	-50.1	0.12
4,284.0	0.64	326.56	4,283.3	33.6	-57.3	-50.4	0.26
4,309.0	0.56	315.02	4,308.3	33.8	-57.5	-50.7	0.58
4,334.0	0.53	312.35	4,333.3	34.0	-57.7	-50.9	0.16
4,359.0	0.56	313.60	4,358.3	34.1	-57.8	-51.1	0.13
4,384.0	0.36	301.71	4,383.3	34.3	-58.0	-51.2	0.88
4,409.0	1.10	210.92	4,408.3	34.1	-58.2	-51.2	4.65
4,434.0	2.28	207.94	4,433.3	33.5	-58.5	-50.7	4.73
4,459.0	3.00	214.67	4,458.3	32.5	-59.1	-49.9	3.13
4,484.0	4.26	218.06	4,483.2	31.2	-60.1	-49.0	5.11
4,509.0	5.17	219.00	4,508.2	29.6	-61.4	-47.9	3.65
4,534.0	6.27	216.36	4,533.0	27.6	-62.9	-46.6	4.52
4,559.0	7.34	215.39	4,557.9	25.2	-64.6	-44.9	4.30
4,584.0	7.79	214.89	4,582.6	22.5	-66.5	-42.9	1.82
4,609.0	7.92	214.66	4,607.4	19.7	-68.5	-40.9	0.53
4,634.0	7.43	218.67	4,632.2	17.1	-70.4	-39.0	2.90
4,659.0	7.21	224.03	4,657.0	14.7	-72.5	-37.4	2.87



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**Database:** Oklahoma District

Survey

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4,684.0	7.37	230.95	4,681.8	12.5	-74.9	-36.2	3.57
4,709.0	7.77	236.60	4,706.6	10.6	-77.5	-35.2	3.38
4,734.0	9.10	239.34	4,731.3	8.7	-80.7	-34.4	5.56
4,759.0	10.31	241.88	4,755.9	6.6	-84.3	-33.6	5.13
4,784.0	11.39	243.16	4,780.5	4.4	-88.5	-32.9	4.43
4,809.0	12.68	242.67	4,804.9	2.0	-93.1	-32.2	5.18
4,834.0	14.06	240.50	4,829.3	-0.7	-98.2	-31.2	5.87
4,859.0	14.89	240.63	4,853.5	-3.8	-103.7	-30.1	3.32
4,884.0	15.49	241.86	4,877.6	-6.9	-109.4	-29.0	2.72
4,909.0	16.11	245.65	4,901.6	-9.9	-115.5	-28.1	4.81
4,934.0	17.14	248.67	4,925.6	-12.7	-122.1	-27.6	5.38
4,959.0	18.48	248.43	4,949.4	-15.5	-129.2	-27.3	5.37
4,984.0	19.51	247.64	4,973.0	-18.5	-136.8	-26.9	4.25
5,009.0	19.61	249.35	4,996.6	-21.6	-144.6	-26.5	2.32
5,034.0	19.45	252.20	5,020.2	-24.4	-152.4	-26.5	3.86
5,059.0	19.05	256.23	5,043.8	-26.6	-160.4	-26.9	5.55
5,084.0	19.43	257.23	5,067.4	-28.5	-168.4	-27.7	2.01
5,109.0	20.37	257.25	5,090.9	-30.4	-176.7	-28.6	3.76
5,134.0	20.78	256.97	5,114.3	-32.3	-185.2	-29.6	1.69
5,159.0	20.91	256.90	5,137.6	-34.4	-193.9	-30.5	0.53
5,184.0	21.04	257.21	5,161.0	-36.4	-202.6	-31.4	0.68
5,209.0	20.43	260.57	5,184.4	-38.1	-211.3	-32.6	5.35
5,234.0	20.56	261.43	5,207.8	-39.4	-220.0	-34.1	1.31
5,259.0	21.10	262.05	5,231.2	-40.7	-228.8	-35.8	2.33
5,284.0	21.52	263.21	5,254.4	-41.9	-237.8	-37.6	2.38
5,309.0	21.34	265.84	5,277.7	-42.7	-246.9	-39.7	3.91
5,334.0	21.22	266.50	5,301.0	-43.4	-255.9	-42.1	1.07
5,359.0	21.01	266.98	5,324.3	-43.9	-264.9	-44.5	1.09
5,384.0	20.45	268.73	5,347.7	-44.2	-273.7	-47.1	3.34
5,409.0	18.62	272.73	5,371.3	-44.1	-282.1	-49.9	9.06
5,434.0	17.48	277.38	5,395.0	-43.4	-289.8	-53.0	7.35
5,459.0	16.98	281.17	5,418.9	-42.2	-297.1	-56.5	4.91
5,484.0	17.85	281.25	5,442.8	-40.8	-304.5	-60.3	3.48
5,509.0	19.09	280.82	5,466.5	-39.3	-312.2	-64.3	4.99
5,534.0	19.58	280.73	5,490.1	-37.7	-320.4	-68.4	1.96
5,559.0	19.58	279.95	5,513.6	-36.2	-328.6	-72.5	1.05
5,584.0	20.24	277.59	5,537.1	-34.9	-337.0	-76.4	4.16
5,609.0	21.43	275.43	5,560.5	-33.9	-345.8	-80.2	5.67
5,634.0	22.41	275.48	5,583.7	-33.0	-355.1	-84.1	3.92
5,659.0	22.14	274.59	5,606.8	-32.2	-364.6	-87.9	1.73
5,684.0	20.00	270.83	5,630.2	-31.8	-373.5	-91.3	10.12
5,709.0	18.65	265.33	5,653.8	-32.0	-381.8	-93.7	9.06
5,734.0	17.21	258.86	5,677.5	-33.1	-389.4	-95.2	9.82
5,759.0	16.36	255.16	5,701.5	-34.7	-396.5	-95.9	5.46





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**Survey**

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5,784.0	15.78	256.23	5,725.5	-36.4	-403.2	-96.5	2.60
5,809.0	16.40	261.49	5,749.5	-37.7	-410.0	-97.4	6.33
5,834.0	17.45	265.03	5,773.4	-38.6	-417.2	-99.0	5.88
5,859.0	19.20	265.62	5,797.2	-39.2	-425.0	-100.9	7.04
5,884.0	20.67	266.34	5,820.7	-39.8	-433.5	-103.1	5.96
5,909.0	21.19	265.39	5,844.0	-40.5	-442.4	-105.4	2.48
5,934.0	22.77	265.17	5,867.2	-41.2	-451.7	-107.7	6.33
5,959.0	24.45	263.78	5,890.1	-42.2	-461.7	-110.0	7.08
5,972.0	25.09	263.46	5,901.9	-42.8	-467.1	-111.2	5.03
6,041.0	26.36	259.41	5,964.1	-47.3	-496.7	-116.6	3.14
6,157.0	25.84	259.25	6,068.2	-56.7	-546.9	-123.9	0.45
6,189.0	25.15	259.42	6,097.1	-59.3	-560.4	-125.9	2.17
6,221.0	24.53	259.56	6,126.2	-61.7	-573.6	-127.9	1.95
6,253.0	25.88	258.88	6,155.1	-64.3	-587.0	-129.8	4.31
6,285.0	28.84	258.09	6,183.5	-67.2	-601.4	-131.7	9.32
6,317.0	31.88	255.87	6,211.2	-70.9	-617.1	-133.4	9.54
6,349.0	32.70	250.65	6,238.3	-75.8	-633.4	-134.0	9.25
6,381.0	32.50	243.34	6,265.2	-82.5	-649.3	-132.8	12.32
6,413.0	31.87	236.15	6,292.3	-91.1	-664.0	-129.5	12.12
6,445.0	32.14	230.52	6,319.5	-101.2	-677.6	-124.3	9.36
6,477.0	32.46	225.06	6,346.5	-112.7	-690.2	-117.6	9.17
6,509.0	33.44	220.07	6,373.4	-125.5	-702.0	-109.3	9.01
6,541.0	34.58	218.24	6,399.9	-139.4	-713.3	-99.8	4.79
6,574.0	35.18	215.30	6,427.0	-154.5	-724.6	-89.2	5.41
6,605.0	37.37	210.72	6,452.0	-169.9	-734.5	-77.9	11.24
6,638.0	40.26	206.30	6,477.7	-188.0	-744.4	-63.9	12.13
6,670.0	43.70	203.34	6,501.5	-207.5	-753.3	-48.4	12.40
6,702.0	46.69	203.25	6,524.0	-228.3	-762.3	-31.6	9.35
6,734.0	49.45	204.22	6,545.4	-250.1	-771.9	-14.1	8.91
6,766.0	52.49	202.91	6,565.6	-272.9	-781.8	4.2	10.02
6,798.0	54.43	198.16	6,584.6	-297.0	-790.8	24.0	13.38
6,830.0	56.51	192.96	6,602.8	-322.3	-797.9	45.8	14.88
6,862.0	58.76	188.13	6,619.9	-348.9	-802.8	69.3	14.56
6,894.0	60.33	183.13	6,636.1	-376.3	-805.5	94.4	14.33
6,926.0	61.78	178.62	6,651.6	-404.3	-805.9	120.7	13.14
6,958.0	64.17	174.86	6,666.2	-432.8	-804.3	148.1	12.86
6,990.0	67.80	172.59	6,679.2	-461.8	-801.1	176.6	13.06
7,022.0	69.98	170.39	6,690.7	-491.3	-796.7	206.0	9.36
7,054.0	70.96	167.75	6,701.4	-521.0	-791.0	235.9	8.36
7,087.0	73.37	166.79	6,711.5	-551.6	-784.0	267.1	7.81
7,119.0	75.29	166.48	6,720.2	-581.6	-776.9	297.8	6.07
7,151.0	76.34	165.37	6,728.0	-611.7	-769.4	328.7	4.70
7,182.0	77.56	164.06	6,735.0	-640.8	-761.4	358.8	5.70
7,215.0	79.66	163.29	6,741.5	-671.8	-752.3	391.1	6.76



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7,230.0	81.34	162.82	6,744.0	-686.0	-748.0	405.9	11.62
7,289.0	87.58	160.98	6,749.7	-741.8	-729.8	464.6	11.02
7,306.0	87.93	160.63	6,750.3	-757.8	-724.2	481.6	2.91
7,402.0	86.88	159.22	6,754.7	-847.9	-691.3	577.5	1.83
7,498.0	86.44	158.52	6,760.3	-937.3	-656.7	673.2	0.86
7,594.0	87.41	160.01	6,765.4	-1,026.9	-622.8	769.0	1.85
7,690.0	89.43	159.46	6,768.1	-1,116.9	-589.5	865.0	2.18
7,787.0	88.81	160.41	6,769.6	-1,208.0	-556.3	961.9	1.17
7,883.0	88.37	160.01	6,771.9	-1,298.3	-523.8	1,057.9	0.62
7,979.0	87.67	159.40	6,775.3	-1,388.3	-490.5	1,153.8	0.97
8,075.0	88.46	159.32	6,778.5	-1,478.1	-456.7	1,249.7	0.83
8,172.0	87.76	158.61	6,781.7	-1,568.6	-421.9	1,346.6	1.03
8,268.0	87.55	160.91	6,785.6	-1,658.6	-388.7	1,442.5	2.40
8,364.0	87.85	159.75	6,789.5	-1,748.9	-356.4	1,538.4	1.25
8,459.0	88.99	162.21	6,792.1	-1,838.7	-325.5	1,633.3	2.85
8,555.0	88.55	161.33	6,794.2	-1,929.9	-295.4	1,729.3	1.02
8,651.0	87.76	160.36	6,797.2	-2,020.5	-264.0	1,825.3	1.30
8,748.0	88.02	162.74	6,800.8	-2,112.4	-233.3	1,922.2	2.47
8,844.0	87.93	162.56	6,804.2	-2,204.0	-204.7	2,018.1	0.21
8,940.0	87.76	162.47	6,807.8	-2,295.5	-175.8	2,114.0	0.20
9,037.0	88.29	163.62	6,811.2	-2,388.2	-147.6	2,210.9	1.30
9,133.0	88.37	163.35	6,814.0	-2,480.2	-120.3	2,306.7	0.29
9,229.0	88.90	162.39	6,816.3	-2,571.9	-92.0	2,402.7	1.14
9,326.0	86.88	159.22	6,819.8	-2,663.5	-60.2	2,499.6	3.87
9,422.0	86.35	161.15	6,825.5	-2,753.6	-27.7	2,595.4	2.08
9,518.0	87.32	161.07	6,830.8	-2,844.3	3.3	2,691.3	1.01
9,614.0	86.70	160.54	6,835.8	-2,934.9	34.9	2,787.1	0.85
9,711.0	87.49	161.51	6,840.7	-3,026.5	66.4	2,884.0	1.29
9,807.0	87.58	161.24	6,844.8	-3,117.4	97.0	2,979.9	0.30
9,903.0	87.23	161.42	6,849.2	-3,208.2	127.7	3,075.8	0.41
9,999.0	88.37	160.54	6,852.9	-3,298.9	159.0	3,171.7	1.50
10,096.0	87.67	160.01	6,856.2	-3,390.2	191.7	3,268.7	0.90
10,192.0	87.23	159.40	6,860.5	-3,480.1	224.9	3,364.5	0.78
10,288.0	87.67	160.72	6,864.8	-3,570.3	257.6	3,460.4	1.45
10,385.0	86.97	159.92	6,869.3	-3,661.5	290.3	3,557.3	1.10
10,481.0	88.72	161.59	6,872.9	-3,752.1	321.9	3,653.2	2.52
10,577.0	87.93	161.07	6,875.7	-3,843.0	352.6	3,749.2	0.99
10,673.0	86.88	159.92	6,880.1	-3,933.4	384.6	3,845.1	1.62
10,735.0	85.12	159.31	6,884.4	-3,991.3	406.2	3,906.9	3.00
10,767.0	85.74	159.05	6,886.9	-4,021.1	417.5	3,938.8	2.10
10,864.0	88.29	156.67	6,892.0	-4,110.9	454.0	4,035.5	3.59
10,960.0	88.99	156.50	6,894.3	-4,198.9	492.2	4,131.2	0.75
11,056.0	89.34	157.73	6,895.7	-4,287.4	529.5	4,226.9	1.33
11,152.0	90.48	160.54	6,895.8	-4,377.1	563.7	4,322.9	3.16
11,249.0	89.69	160.98	6,895.7	-4,468.6	595.6	4,419.9	0.93



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11,345.0	90.40	160.80	6,895.6	-4,559.3	627.1	4,515.9	0.76
11,441.0	90.75	160.28	6,894.6	-4,649.9	659.0	4,611.9	0.65
11,537.0	89.96	161.68	6,894.0	-4,740.6	690.3	4,707.9	1.67
11,633.0	90.84	161.59	6,893.4	-4,831.7	720.6	4,803.9	0.92
11,730.0	88.64	161.77	6,893.8	-4,923.8	751.1	4,900.8	2.28
11,826.0	89.69	162.12	6,895.2	-5,015.1	780.8	4,996.8	1.15
11,922.0	87.14	162.56	6,897.9	-5,106.5	809.9	5,092.7	2.70
12,018.0	87.58	162.12	6,902.3	-5,197.9	839.0	5,188.6	0.65
12,115.0	87.49	161.42	6,906.5	-5,289.9	869.3	5,285.5	0.73
12,211.0	88.81	161.86	6,909.6	-5,381.0	899.6	5,381.5	1.45
12,307.0	89.25	161.59	6,911.2	-5,472.1	929.7	5,477.4	0.54
12,403.0	89.60	161.15	6,912.2	-5,563.1	960.3	5,573.4	0.59
12,494.0	89.43	161.68	6,912.9	-5,649.3	989.3	5,664.4	0.61
12,584.0	90.04	160.63	6,913.3	-5,734.5	1,018.4	5,754.4	1.35
12,677.0	89.69	161.77	6,913.6	-5,822.5	1,048.4	5,847.4	1.28
12,769.0	88.37	161.33	6,915.1	-5,909.8	1,077.5	5,939.4	1.51
12,859.0	88.72	160.63	6,917.4	-5,994.9	1,106.8	6,029.4	0.87
13,040.0	88.99	160.01	6,921.0	-6,165.3	1,167.7	6,210.3	0.37
13,131.0	88.81	162.12	6,922.8	-6,251.3	1,197.3	6,301.3	2.33
13,221.0	90.31	162.56	6,923.5	-6,337.1	1,224.6	6,391.3	1.74
13,312.0	90.57	163.00	6,922.8	-6,424.0	1,251.5	6,482.2	0.56
13,403.0	90.40	161.42	6,922.0	-6,510.6	1,279.3	6,573.2	1.75
13,494.0	91.01	161.24	6,920.9	-6,596.8	1,308.4	6,664.2	0.70
13,590.0	90.57	161.42	6,919.5	-6,687.8	1,339.2	6,760.2	0.50
13,686.0	89.96	162.12	6,919.1	-6,778.9	1,369.2	6,856.2	0.97
13,783.0	90.31	161.33	6,918.9	-6,871.1	1,399.6	6,953.2	0.89
13,879.0	91.36	161.15	6,917.5	-6,961.9	1,430.5	7,049.2	1.11
13,975.0	89.52	160.54	6,916.7	-7,052.6	1,462.0	7,145.1	2.02
14,071.0	89.78	160.45	6,917.3	-7,143.1	1,494.0	7,241.1	0.29
14,167.0	90.31	160.19	6,917.2	-7,233.5	1,526.4	7,337.1	0.61
14,263.0	90.22	162.65	6,916.8	-7,324.5	1,556.9	7,433.1	2.56
14,359.0	91.01	163.26	6,915.8	-7,416.3	1,585.1	7,529.1	1.04
14,455.0	91.63	162.82	6,913.6	-7,508.1	1,613.1	7,625.0	0.79
14,551.0	91.89	162.65	6,910.6	-7,599.7	1,641.5	7,720.9	0.32
14,647.0	91.71	162.91	6,907.6	-7,691.3	1,670.0	7,816.8	0.33
14,743.0	88.99	160.72	6,907.0	-7,782.5	1,699.9	7,912.8	3.64
14,839.0	89.08	160.01	6,908.6	-7,872.9	1,732.2	8,008.8	0.75
14,934.0	89.34	159.84	6,909.9	-7,962.2	1,764.8	8,103.7	0.33
15,031.0	90.22	161.68	6,910.3	-8,053.7	1,796.7	8,200.7	2.10
15,127.0	91.10	161.07	6,909.2	-8,144.7	1,827.4	8,296.7	1.12
15,223.0	90.04	160.89	6,908.2	-8,235.5	1,858.7	8,392.7	1.12
15,318.0	90.40	160.45	6,907.9	-8,325.1	1,890.1	8,487.7	0.60
15,415.0	89.16	158.87	6,908.3	-8,416.0	1,923.8	8,584.7	2.07
15,511.0	89.87	158.61	6,909.1	-8,505.5	1,958.6	8,680.6	0.79



**Company:** Antero Resources  
**Project:** Doddridge County WV  
**Site:** Pennington South/Anchor/Porter/Lincoln  
**Well:** Pennington South Unit 1H  
**Wellbore:** Sidetrack 1  
**Design:** As Drilled ST 1

**Local Co-ordinate Reference:** Well Pennington South Unit 1H  
**TVD Reference:** Frontier 23: GL 1060' + 22' KB @ 1082.0usft  
**MD Reference:** Frontier 23: GL 1060' + 22' KB @ 1082.0usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** Oklahoma District

**Survey**

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	EW (usft)	V. Sec (usft)	DLeg (°/100usft)
15,607.0	89.87	159.75	6,909.3	-8,595.2	1,992.8	8,776.5	1.19
15,704.0	89.96	161.59	6,909.4	-8,686.8	2,024.9	8,873.5	1.90
15,800.0	89.25	159.66	6,910.1	-8,777.3	2,056.7	8,969.5	2.14
15,896.0	88.99	160.10	6,911.6	-8,867.5	2,089.7	9,065.5	0.53
15,992.0	86.88	157.11	6,915.0	-8,956.8	2,124.7	9,161.3	3.81
16,089.0	89.69	162.12	6,917.9	-9,047.6	2,158.5	9,258.2	5.92
16,185.0	90.66	163.00	6,917.6	-9,139.2	2,187.2	9,354.2	1.36
16,282.0	87.93	161.95	6,918.8	-9,231.7	2,216.5	9,451.1	3.02
16,378.0	88.29	161.42	6,922.0	-9,322.8	2,246.6	9,547.1	0.67
16,474.0	89.69	162.12	6,923.7	-9,413.9	2,276.6	9,643.0	1.63
16,570.0	91.10	162.30	6,923.0	-9,505.3	2,306.0	9,739.0	1.48
16,667.0	91.98	162.03	6,920.4	-9,597.6	2,335.7	9,836.0	0.95
16,763.0	90.48	161.86	6,918.4	-9,688.9	2,365.4	9,931.9	1.57
16,859.0	90.84	161.59	6,917.3	-9,780.0	2,395.5	10,027.9	0.47
16,956.0	91.71	161.59	6,915.1	-9,872.1	2,426.1	10,124.9	0.90
17,052.0	92.24	160.45	6,911.8	-9,962.8	2,457.3	10,220.8	1.31
17,148.0	90.57	161.86	6,909.4	-10,053.6	2,488.3	10,316.8	2.28
17,244.0	89.34	160.01	6,909.5	-10,144.3	2,519.7	10,412.8	2.31
17,340.0	88.72	158.87	6,911.1	-10,234.2	2,553.4	10,508.7	1.35
17,437.0	90.31	160.54	6,912.0	-10,325.2	2,587.0	10,605.7	2.38
17,531.0	90.57	160.19	6,911.2	-10,413.7	2,618.6	10,699.7	0.46
17,628.0	88.20	162.39	6,912.3	-10,505.6	2,649.7	10,796.7	3.33
17,724.0	88.29	162.65	6,915.2	-10,597.1	2,678.6	10,892.6	0.29
17,819.0	88.90	163.09	6,917.5	-10,687.8	2,706.5	10,987.5	0.79
17,915.0	90.13	164.49	6,918.4	-10,780.0	2,733.3	11,083.4	1.94
18,012.0	90.22	164.06	6,918.1	-10,873.4	2,759.6	11,180.2	0.45
18,108.0	89.52	161.51	6,918.3	-10,965.1	2,788.0	11,276.2	2.75
18,204.0	90.13	161.68	6,918.6	-11,056.2	2,818.3	11,372.2	0.66
18,300.0	89.34	158.25	6,919.0	-11,146.3	2,851.2	11,468.1	3.67
18,331.0	89.34	157.90	6,919.4	-11,175.1	2,862.8	11,499.1	1.13
18,392.0	89.34	157.90	6,920.1	-11,231.6	2,885.7	11,560.0	0.00

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