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WV GEOLOGICAL SURVEY

MORGANTOWN, WV



Marks Unit 1H
Doddridge County WV
Northing: 14262948.86
Easting: 1679334.38
As Drilled



Genie Lightfoot
11:30, August 25 2014
Scientific Drilling
421 South Eagle Lane
Oklahoma City, OK



Azimuths to Grid North
True North: -0.00°
Magnetic North: -8.48°
Magnetic Field
Strength: 52348.98nt
Dip Angle: 66.85°
Date: 1/13/2014
Model: IGRF2010

To convert Magnetic North to Grid, Subtract 8.48°
To convert True North to Grid, Subtract 0.00°

WELL DETAILS
Ground Level: 1109.0
Northing: 14262948.86
Easting: 1679334.38
Longitude: 80° 51' 44.913 W

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

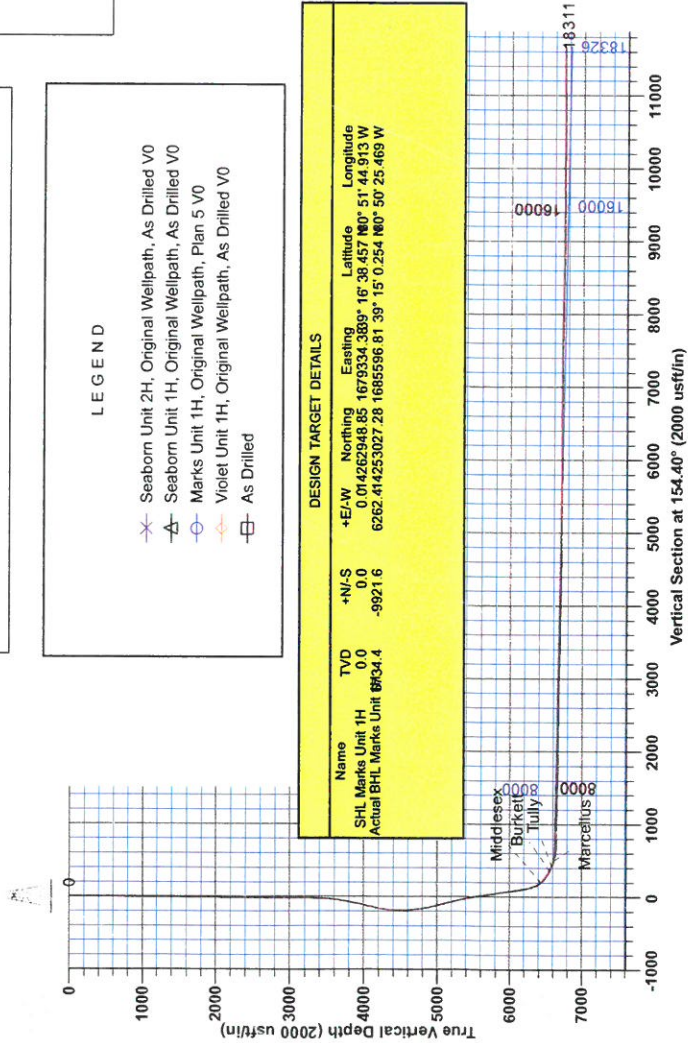
LEGEND

- ✕ Seaborn Unit 2H, Original Wellpath, As Drilled V0
- △ Seaborn Unit 1H, Original Wellpath, As Drilled V0
- Marks Unit 1H, Original Wellpath, Plan 5 V0
- ◇ Violet Unit 1H, Original Wellpath, As Drilled V0
- As Drilled

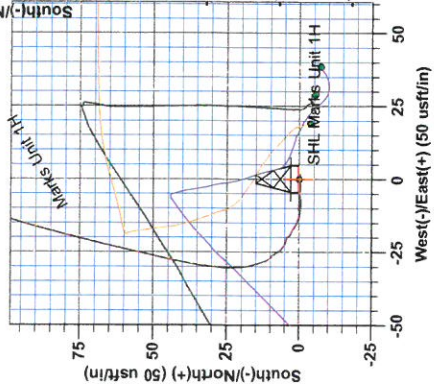
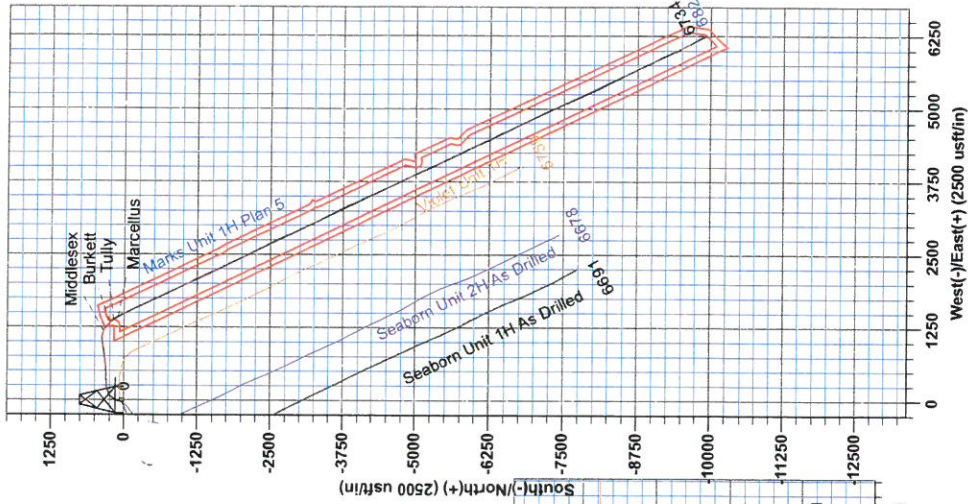
DESIGN TARGET DETAILS

Name	TVD	+N/S	+E/W	Northing	Easting	Latitude	Longitude
SHL Marks Unit 1H	0.0	0.0	0.0	14262948.86	1679334.38	16° 38' 45.7180"	80° 51' 44.913 W
Actual BHL Marks Unit 1H	6834.4	-9921.6	6262.4	44253027.28	1685596.81	39° 15' 0.254160"	50° 25' 46.9 W

Marks Unit 1H GL 1109.0, 27 BK @ 1131.0usft
Gr: 1109.0



SITE DETAILS: Seaborn/Violet/Tulip/Marks Pad
Site Centre Northing: 14262941.51
Easting: 1679373.00
Positional Uncertainty: 0.0
Convergence: 0.09
Local North: Grid





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Antero Resources

**Doddridge County WV
Seaborn/Violet/Tulip/Marks Pad
Marks Unit 1H
Original Wellpath**

Design: As Drilled

EOW Completion Report

22 August, 2014





WV GEOLOGICAL SURVEY
MORGANTOWN, WV

EOW Completion Report



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Company: Antero Resources	Local Co-ordinate Reference: Well Marks Unit 1H
Project: Doddridge County WV	TVD Reference: Marks Unit 1H GL 1109 + 22' RKB @ 1131.0usft
Site: Seaborn/Violet/Tulip/Marks Pad	MD Reference: Marks Unit 1H GL 1109 + 22' RKB @ 1131.0usft
Well: Marks Unit 1H	North Reference: Grid
Wellbore: Original Wellpath	Survey Calculation Method: Minimum Curvature
Design: As Drilled	Database: Oklahoma District

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

Site Seaborn/Violet/Tulip/Marks Pad

Site Position:		Northing:	14,262,941.51 usft	Latitude:	39° 16' 38.384 N
From:	Map	Easting:	1,679,373.00 usft	Longitude:	80° 51' 44.422 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"	Grid Convergence:	0.09 °

Well Marks Unit 1H, Marcellus

Well Position	+N/-S	0.0 usft	Northing:	14,262,948.86 usft	Latitude:	39° 16' 38.457 N
	+E/-W	0.0 usft	Easting:	1,679,334.38 usft	Longitude:	80° 51' 44.913 W
Position Uncertainty		2.0 usft	Wellhead Elevation:	1,131.0 usft	Ground Level:	1,109.0 usft

Wellbore	Original Wellpath				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	1/13/2014	-8.40	66.85	52,349

Design As Drilled

Audit Notes:

Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
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Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	154.40

Survey Program	Date	8/22/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
109.0	6,163.1	Survey #5 Corrected Gyro to KOP (Original Wellpath)	SDI Standard Keeper	Scientific Drilling Intl. Standard Wireline Keeper	
6,163.1	18,311.0	Survey #6 MWD (Original Wellpath)	SDI MWD	Scientific Drilling Intl. MWD - Standard ver 1.0.1	

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
109.0	0.47	246.21	109.0	-0.2	-0.4	0.0	0.43
159.0	0.44	264.56	159.0	-0.3	-0.8	-0.1	0.30
209.0	0.48	258.53	209.0	-0.3	-1.2	-0.2	0.13
259.0	0.48	263.54	259.0	-0.4	-1.6	-0.3	0.08
309.0	0.47	264.19	309.0	-0.5	-2.0	-0.5	0.02
359.0	0.48	274.43	359.0	-0.5	-2.4	-0.6	0.17
409.0	0.55	272.38	409.0	-0.4	-2.9	-0.9	0.14
459.0	0.52	270.92	459.0	-0.4	-3.3	-1.1	0.07
509.0	0.54	274.75	509.0	-0.4	-3.8	-1.3	0.08
559.0	0.59	276.02	559.0	-0.3	-4.3	-1.5	0.10

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EOW Completion Report



Company:	Antero Resources	Local Co-ordinate Reference:	Well Marks Unit 1H
Project:	Doddridge County WV	TVD Reference:	Marks Unit 1H GL 1109 + 22' RKB @ 1131.0usft
Site:	Seaborn/Violet/Tulip/Marks Pad	MD Reference:	Marks Unit 1H GL 1109 + 22' RKB @ 1131.0usft
Well:	Marks Unit 1H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Oklahoma District

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
609.0	0.58	270.83	609.0	-0.3	-4.8	-1.8	0.11
659.0	0.57	259.79	659.0	-0.4	-5.3	-2.0	0.22
709.0	0.63	266.07	709.0	-0.4	-5.8	-2.1	0.18
759.0	0.58	262.97	759.0	-0.5	-6.3	-2.3	0.12
809.0	0.57	260.62	809.0	-0.5	-6.8	-2.5	0.05
859.0	0.70	272.08	859.0	-0.6	-7.4	-2.7	0.36
909.0	0.71	272.74	909.0	-0.5	-8.0	-3.0	0.03
959.0	0.74	273.34	959.0	-0.5	-8.6	-3.3	0.06
1,009.0	0.77	272.82	1,009.0	-0.5	-9.3	-3.6	0.06
1,059.0	0.71	275.21	1,058.9	-0.4	-9.9	-3.9	0.13
1,109.0	0.80	276.64	1,108.9	-0.4	-10.6	-4.3	0.18
1,159.0	0.77	276.51	1,158.9	-0.3	-11.3	-4.6	0.06
1,209.0	0.75	275.59	1,208.9	-0.2	-11.9	-5.0	0.05
1,259.0	0.86	283.35	1,258.9	-0.1	-12.6	-5.4	0.31
1,309.0	0.87	282.11	1,308.9	0.1	-13.4	-5.8	0.04
1,359.0	0.91	293.48	1,358.9	0.3	-14.1	-6.4	0.36
1,409.0	0.83	293.77	1,408.9	0.6	-14.8	-6.9	0.16
1,459.0	0.79	298.55	1,458.9	0.9	-15.4	-7.5	0.16
1,509.0	0.72	301.87	1,508.9	1.3	-16.0	-8.0	0.17
1,559.0	0.63	303.99	1,558.9	1.6	-16.5	-8.5	0.19
1,609.0	0.68	305.26	1,608.9	1.9	-17.0	-9.0	0.10
1,659.0	0.53	302.58	1,658.9	2.2	-17.4	-9.5	0.31
1,709.0	0.54	296.94	1,708.9	2.4	-17.8	-9.9	0.11
1,759.0	0.45	295.35	1,758.9	2.6	-18.2	-10.2	0.18
1,809.0	0.53	289.28	1,808.9	2.8	-18.6	-10.5	0.19
1,859.0	0.51	295.05	1,858.9	2.9	-19.0	-10.9	0.11
1,909.0	0.47	311.11	1,908.9	3.2	-19.4	-11.2	0.29
1,959.0	0.34	326.07	1,958.9	3.4	-19.6	-11.6	0.33
2,009.0	0.38	333.02	2,008.9	3.7	-19.8	-11.9	0.12
2,059.0	0.27	321.07	2,058.9	3.9	-19.9	-12.2	0.26
2,109.0	0.12	293.50	2,108.9	4.1	-20.0	-12.3	0.35
2,159.0	0.17	318.95	2,158.9	4.1	-20.1	-12.4	0.16
2,209.0	0.17	290.33	2,208.9	4.2	-20.2	-12.5	0.17
2,259.0	0.17	302.49	2,258.9	4.3	-20.4	-12.7	0.07
2,309.0	0.22	269.32	2,308.9	4.3	-20.5	-12.8	0.24
2,359.0	0.26	286.52	2,358.9	4.4	-20.7	-12.9	0.16
2,409.0	0.19	300.13	2,408.9	4.4	-20.9	-13.0	0.18
2,459.0	0.15	286.47	2,458.9	4.5	-21.1	-13.1	0.11
2,509.0	0.32	279.53	2,508.9	4.5	-21.3	-13.3	0.34
2,559.0	0.39	284.99	2,558.9	4.6	-21.6	-13.5	0.16
2,609.0	0.40	287.42	2,608.9	4.7	-21.9	-13.7	0.04
2,659.0	0.55	299.75	2,658.9	4.9	-22.3	-14.0	0.36
2,709.0	0.65	303.41	2,708.9	5.1	-22.7	-14.4	0.21
2,759.0	0.63	301.62	2,758.9	5.4	-23.2	-14.9	0.06



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Company: Antero Resources
Project: Doddridge County WV
Site: Seaborn/Violet/Tulip/Marks Pad
Well: Marks Unit 1H
Wellbore: Original Wellpath
Design: As Drilled

Local Co-ordinate Reference: Well Marks Unit 1H
TVD Reference: Marks Unit 1H GL 1109 + 22' RKB @ 1131.0usft
MD Reference: Marks Unit 1H GL 1109 + 22' RKB @ 1131.0usft
North Reference: Grid
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)
2,809.0	0.72	306.56	2,808.9	5.8	-23.7	-15.4	0.21
2,859.0	0.82	311.86	2,858.9	6.2	-24.2	-16.0	0.25
2,909.0	0.73	327.30	2,908.9	6.7	-24.6	-16.7	0.45
2,959.0	0.71	326.38	2,958.9	7.2	-25.0	-17.3	0.05
3,009.0	0.63	331.24	3,008.8	7.7	-25.3	-17.9	0.20
3,059.0	0.62	328.43	3,058.8	8.2	-25.5	-18.4	0.06
3,109.0	0.55	328.50	3,108.8	8.6	-25.8	-18.9	0.14
3,159.0	0.45	322.52	3,158.8	9.0	-26.1	-19.4	0.23
3,209.0	0.45	308.03	3,208.8	9.3	-26.3	-19.7	0.23
3,259.0	0.52	299.29	3,258.8	9.5	-26.7	-20.1	0.20
3,309.0	0.51	317.48	3,308.8	9.8	-27.0	-20.5	0.33
3,359.0	0.51	317.98	3,358.8	10.1	-27.3	-20.9	0.01
3,409.0	1.45	338.92	3,408.8	10.9	-27.7	-21.8	1.98
3,459.0	3.06	338.80	3,458.8	12.7	-28.4	-23.7	3.22
3,509.0	4.47	343.94	3,508.7	15.8	-29.4	-27.0	2.90
3,559.0	5.96	354.62	3,558.5	20.3	-30.2	-31.3	3.54
3,609.0	7.56	2.14	3,608.1	26.1	-30.3	-36.7	3.65
3,659.0	9.60	8.93	3,657.6	33.5	-29.6	-43.0	4.55
3,709.0	10.97	11.79	3,706.8	42.3	-27.9	-50.2	2.92
3,759.0	12.73	14.06	3,755.7	52.3	-25.6	-58.3	3.64
3,809.0	14.54	12.75	3,804.3	63.8	-22.9	-67.4	3.67
3,859.0	15.41	13.51	3,852.6	76.4	-20.0	-77.5	1.78
3,909.0	16.21	16.05	3,900.7	89.5	-16.5	-87.9	2.12
3,959.0	17.12	17.47	3,948.6	103.3	-12.4	-98.5	1.99
4,009.0	18.43	19.84	3,996.2	117.7	-7.5	-109.4	2.99
4,059.0	19.32	21.57	4,043.5	132.9	-1.7	-120.6	2.10
4,109.0	20.55	23.98	4,090.5	148.6	4.9	-131.9	2.96
4,159.0	21.68	27.11	4,137.2	164.8	12.6	-143.2	3.19
4,209.0	22.92	31.96	4,183.4	181.3	22.0	-154.0	4.44
4,259.0	23.15	37.93	4,229.4	197.3	33.2	-163.6	4.69
4,309.0	22.06	42.52	4,275.6	212.0	45.6	-171.5	4.15
4,359.0	21.10	48.64	4,322.1	224.8	58.7	-177.4	4.89
4,409.0	20.51	53.47	4,368.8	236.0	72.5	-181.5	3.63
4,459.0	20.71	56.78	4,415.7	246.1	86.9	-184.4	2.36
4,509.0	20.76	60.98	4,462.4	255.2	102.1	-186.1	2.98
4,559.0	20.83	65.72	4,509.2	263.2	117.9	-186.4	3.37
4,609.0	21.03	71.15	4,555.9	269.7	134.5	-185.1	3.90
4,659.0	22.64	71.27	4,602.3	275.7	152.1	-182.9	3.22
4,709.0	24.15	71.65	4,648.2	282.0	170.9	-180.5	3.04
4,759.0	25.36	74.08	4,693.6	288.2	191.0	-177.4	3.16
4,809.0	26.70	76.38	4,738.5	293.8	212.2	-173.2	3.35
4,859.0	27.50	80.62	4,783.0	298.3	234.5	-167.7	4.18
4,909.0	28.88	83.10	4,827.1	301.6	257.9	-160.6	3.62
4,959.0	30.56	85.56	4,870.5	304.1	282.5	-152.1	4.15
5,009.0	31.44	86.77	4,913.4	305.8	308.2	-142.6	2.16

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EOW Completion Report



Company: Antero Resources
Project: Doddridge County WV
Site: Seaborn/Violet/Tulip/Marks Pad
Well: Marks Unit 1H
Wellbore: Original Wellpath
Design: As Drilled

Local Co-ordinate Reference: Well Marks Unit 1H
TVD Reference: Marks Unit 1H GL 1109 + 22' RKB @ 1131.0usft
MD Reference: Marks Unit 1H GL 1109 + 22' RKB @ 1131.0usft
North Reference: Grid
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)
5,059.0	32.09	87.89	4,955.9	307.0	334.5	-132.3	1.76
5,109.0	32.31	88.27	4,998.2	307.9	361.1	-121.6	0.60
5,159.0	32.02	88.23	5,040.5	308.7	387.7	-110.9	0.58
5,209.0	31.58	87.89	5,083.0	309.6	414.1	-100.3	0.95
5,259.0	30.98	87.46	5,125.7	310.6	440.0	-90.0	1.28
5,309.0	31.94	87.86	5,168.4	311.7	466.1	-79.7	1.96
5,359.0	31.78	87.94	5,210.9	312.7	492.5	-69.2	0.33
5,409.0	31.68	87.68	5,253.4	313.7	518.7	-58.7	0.34
5,459.0	31.58	87.31	5,296.0	314.8	544.9	-48.5	0.44
5,509.0	31.29	87.04	5,338.6	316.1	571.0	-38.4	0.64
5,559.0	31.24	86.47	5,381.4	317.6	596.9	-28.5	0.60
5,609.0	31.30	86.32	5,424.1	319.2	622.8	-18.8	0.20
5,659.0	30.95	85.13	5,466.9	321.1	648.6	-9.4	1.42
5,709.0	30.41	83.31	5,509.9	323.7	673.9	-0.7	2.15
5,759.0	29.56	82.71	5,553.2	326.7	698.7	7.3	1.80
5,809.0	28.75	82.10	5,596.9	330.0	722.9	14.8	1.73
5,859.0	27.99	81.77	5,640.9	333.3	746.4	21.9	1.55
5,909.0	28.02	81.44	5,685.0	336.7	769.6	28.9	0.32
5,959.0	27.65	81.03	5,729.2	340.3	792.7	35.6	0.83
6,009.0	27.07	80.36	5,773.6	344.0	815.4	42.1	1.31
6,059.0	27.06	81.88	5,818.2	347.5	837.9	48.6	1.38
6,109.0	26.71	82.40	5,862.8	350.6	860.3	55.5	0.84
6,159.0	26.86	82.62	5,907.4	353.5	882.6	62.5	0.36
6,163.1	26.83	82.62	5,911.0	353.8	884.4	63.1	0.74
6,252.0	26.30	79.76	5,990.6	359.8	923.7	74.6	1.56
6,348.0	25.48	78.76	6,076.9	367.7	964.9	85.4	0.97
6,444.0	26.10	85.23	6,163.4	373.4	1,006.2	98.0	3.00
6,508.0	25.71	85.54	6,221.0	375.7	1,034.1	108.0	0.65
6,540.0	27.58	87.59	6,249.6	376.5	1,048.4	113.4	6.51
6,573.0	29.70	89.89	6,278.5	376.9	1,064.2	120.0	7.24
6,605.0	32.29	94.45	6,305.9	376.2	1,080.7	127.6	10.92
6,637.0	34.97	98.83	6,332.6	374.2	1,098.2	137.1	11.29
6,669.0	37.96	102.67	6,358.3	370.6	1,116.9	148.4	11.75
6,701.0	41.15	106.12	6,383.0	365.5	1,136.6	161.5	12.10
6,733.0	44.59	108.97	6,406.5	358.9	1,157.4	176.4	12.34
6,766.0	48.45	111.83	6,429.2	350.6	1,179.8	193.6	13.28
6,773.0	49.33	112.46	6,433.8	348.6	1,184.7	197.5	14.35
Middlesex							
6,798.0	52.52	114.59	6,449.5	340.8	1,202.5	212.2	14.35
6,830.0	54.19	118.88	6,468.6	329.3	1,225.4	232.5	11.95
6,862.0	54.98	123.82	6,487.2	315.7	1,247.7	254.4	12.82
6,894.0	57.01	128.39	6,505.1	300.1	1,269.1	277.7	13.43
6,928.0	57.59	133.11	6,523.4	281.4	1,290.7	303.9	11.80
6,958.0	58.21	138.11	6,539.4	263.2	1,308.5	328.0	14.27

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WV GEOLOGICAL SURVEY EOW Completion Report
MORGANTOWN, WV



Company: Antero Resources	Local Co-ordinate Reference: Well Marks Unit 1H
Project: Doddridge County WV	TVD Reference: Marks Unit 1H GL 1109 + 22' RKB @ 1131.0usft
Site: Seaborn/Violet/Tulip/Marks Pad	MD Reference: Marks Unit 1H GL 1109 + 22' RKB @ 1131.0usft
Well: Marks Unit 1H	North Reference: Grid
Wellbore: Original Wellpath	Survey Calculation Method: Minimum Curvature
Design: As Drilled	Database: Oklahoma District

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
6,990.0	60.51	141.11	6,555.7	242.3	1,326.3	354.6	10.80
6,993.0	60.80	141.26	6,557.2	240.2	1,328.0	357.1	10.75
Burkett							
7,022.0	63.65	142.70	6,570.7	220.0	1,343.8	382.2	10.75
7,054.0	66.22	145.20	6,584.2	196.6	1,360.8	410.7	10.70
7,060.0	66.74	145.41	6,586.6	192.1	1,364.0	416.1	9.25
Tully							
7,087.0	69.09	146.32	6,596.8	171.4	1,378.0	440.9	9.25
7,119.0	71.60	147.10	6,607.6	146.2	1,394.5	470.7	8.17
7,151.0	74.20	147.65	6,617.0	120.4	1,411.0	501.1	8.29
7,159.0	74.90	147.83	6,619.1	113.9	1,415.1	508.8	9.05
Marcellus							
7,183.0	77.01	148.38	6,624.9	94.1	1,427.4	531.9	9.05
7,214.0	79.40	148.84	6,631.3	68.2	1,443.2	562.1	7.85
7,246.0	82.08	149.91	6,636.4	41.0	1,459.3	593.5	9.00
7,299.0	85.47	151.65	6,642.1	-4.9	1,485.0	646.1	7.18
7,394.0	88.64	154.64	6,647.0	-89.6	1,527.9	740.9	4.58
7,490.0	89.34	154.37	6,648.7	-176.2	1,569.2	836.9	0.78
7,585.0	90.13	153.23	6,649.2	-261.4	1,611.1	931.9	1.46
7,681.0	89.69	153.14	6,649.3	-347.1	1,654.4	1,027.9	0.47
7,776.0	88.37	153.58	6,650.9	-432.0	1,697.0	1,122.9	1.46
7,872.0	88.72	155.51	6,653.4	-518.7	1,738.3	1,218.8	2.04
7,969.0	89.08	154.72	6,655.2	-606.6	1,779.1	1,315.8	0.89
8,066.0	89.16	153.05	6,656.7	-693.7	1,821.8	1,412.8	1.72
8,166.0	88.20	155.51	6,659.0	-783.8	1,865.2	1,512.7	2.64
8,259.0	87.58	155.69	6,662.4	-868.4	1,903.5	1,605.7	0.69
8,355.0	88.72	156.39	6,665.5	-956.1	1,942.5	1,701.6	1.39
8,452.0	89.25	156.83	6,667.3	-1,045.1	1,981.0	1,798.5	0.71
8,548.0	89.34	155.43	6,668.4	-1,132.9	2,019.9	1,894.4	1.46
8,644.0	89.78	155.16	6,669.2	-1,220.1	2,060.0	1,990.4	0.54
8,740.0	89.52	153.76	6,669.8	-1,306.7	2,101.4	2,086.4	1.48
8,836.0	89.60	154.46	6,670.5	-1,393.1	2,143.3	2,182.4	0.73
8,932.0	89.52	154.64	6,671.2	-1,479.8	2,184.5	2,278.4	0.21
9,029.0	89.87	153.67	6,671.8	-1,567.1	2,226.8	2,375.4	1.06
9,125.0	90.57	152.88	6,671.4	-1,652.8	2,270.0	2,471.4	1.10
9,221.0	88.90	155.16	6,671.8	-1,739.1	2,312.0	2,567.4	2.94
9,317.0	88.72	155.16	6,673.8	-1,826.2	2,352.4	2,663.3	0.19
9,413.0	89.69	154.46	6,675.2	-1,913.0	2,393.2	2,759.3	1.25
9,509.0	89.43	153.93	6,675.9	-1,999.5	2,435.0	2,855.3	0.61
9,606.0	88.46	152.61	6,677.7	-2,086.1	2,478.6	2,952.3	1.69
9,701.0	88.37	152.35	6,680.3	-2,170.3	2,522.5	3,047.2	0.29
9,798.0	88.96	152.79	6,682.6	-2,256.4	2,567.2	3,144.1	0.76
9,894.0	89.34	151.30	6,684.0	-2,341.2	2,612.2	3,240.0	1.60
9,991.0	88.29	154.11	6,686.0	-2,427.3	2,656.6	3,336.9	3.09
10,087.0	88.20	154.46	6,688.9	-2,513.8	2,698.3	3,432.9	0.38

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Well: Marks Unit 1H
Wellbore: Original Wellpath
Design: As Drilled

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MD Reference: Marks Unit 1H GL 1109 + 22' RKB @ 1131.0usft
North Reference: Grid
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)
10,183.0	88.20	154.64	6,692.0	-2,600.4	2,739.5	3,528.9	0.19
10,280.0	90.04	153.93	6,693.4	-2,687.8	2,781.6	3,625.8	2.03
10,375.0	89.34	156.22	6,694.0	-2,774.0	2,821.6	3,720.8	2.52
10,472.0	89.52	154.99	6,694.9	-2,862.3	2,861.7	3,817.8	1.28
10,568.0	89.08	154.81	6,696.1	-2,949.2	2,902.4	3,913.8	0.50
10,664.0	88.90	153.40	6,697.8	-3,035.6	2,944.3	4,009.8	1.48
10,761.0	88.99	156.13	6,699.6	-3,123.3	2,985.7	4,106.7	2.82
10,857.0	89.96	157.18	6,700.5	-3,211.4	3,023.7	4,202.7	1.49
10,953.0	89.87	154.02	6,700.6	-3,298.8	3,063.4	4,298.6	3.29
11,050.0	89.25	151.12	6,701.3	-3,384.9	3,108.0	4,395.6	3.06
11,146.0	89.34	152.17	6,702.5	-3,469.4	3,153.6	4,491.4	1.10
11,243.0	89.69	154.99	6,703.3	-3,556.2	3,196.8	4,588.4	2.93
11,339.0	90.04	152.17	6,703.6	-3,642.2	3,239.5	4,684.4	2.96
11,435.0	89.69	154.72	6,703.8	-3,728.1	3,282.4	4,780.4	2.68
11,532.0	90.22	154.72	6,703.9	-3,815.8	3,323.8	4,877.4	0.55
11,628.0	89.96	155.34	6,703.7	-3,902.8	3,364.3	4,973.4	0.70
11,725.0	89.34	154.90	6,704.3	-3,990.8	3,405.2	5,070.4	0.78
11,821.0	90.04	154.81	6,704.8	-4,077.7	3,445.9	5,166.3	0.74
11,918.0	90.75	154.99	6,704.2	-4,165.5	3,487.1	5,263.3	0.76
12,014.0	88.99	155.95	6,704.4	-4,252.9	3,526.9	5,359.3	2.09
12,110.0	88.46	154.99	6,706.5	-4,340.2	3,566.8	5,455.3	1.14
12,206.0	88.20	153.84	6,709.3	-4,426.7	3,608.2	5,551.2	1.23
12,302.0	88.72	156.04	6,711.9	-4,513.7	3,648.9	5,647.2	2.35
12,398.0	88.20	155.78	6,714.5	-4,601.3	3,688.0	5,743.1	0.61
12,495.0	90.04	154.81	6,716.0	-4,689.4	3,728.6	5,840.1	2.14
12,591.0	91.19	155.69	6,714.9	-4,776.5	3,768.8	5,936.1	1.51
12,688.0	89.87	155.87	6,714.0	-4,865.0	3,808.6	6,033.0	1.37
12,784.0	89.16	154.37	6,714.8	-4,952.1	3,848.9	6,129.0	1.73
12,880.0	90.13	155.25	6,715.4	-5,039.0	3,889.8	6,225.0	1.36
12,977.0	90.66	155.43	6,714.8	-5,127.1	3,930.3	6,322.0	0.58
13,073.0	90.92	154.81	6,713.5	-5,214.2	3,970.7	6,418.0	0.70
13,170.0	91.80	154.46	6,711.1	-5,301.8	4,012.2	6,515.0	0.98
13,266.0	89.43	155.25	6,710.1	-5,388.7	4,053.0	6,610.9	2.60
13,362.0	88.90	153.76	6,711.5	-5,475.3	4,094.3	6,706.9	1.65
13,452.0	88.64	152.88	6,713.4	-5,555.7	4,134.7	6,796.9	1.02
13,543.0	89.34	154.72	6,715.1	-5,637.4	4,174.9	6,887.9	2.16
13,634.0	89.78	153.76	6,715.8	-5,719.3	4,214.4	6,978.9	1.16
13,725.0	90.04	153.67	6,715.9	-5,800.9	4,254.7	7,069.9	0.30
13,815.0	90.17	152.94	6,715.7	-5,881.3	4,295.1	7,159.8	0.82
13,906.0	90.22	155.25	6,715.4	-5,963.2	4,334.9	7,250.8	2.54
13,997.0	89.52	155.95	6,715.6	-6,046.0	4,372.5	7,341.8	1.09
14,088.0	90.04	155.95	6,716.0	-6,129.1	4,409.6	7,432.8	0.57
14,179.0	89.96	156.13	6,716.0	-6,212.3	4,446.5	7,523.7	0.22
14,271.0	89.25	153.67	6,716.6	-6,295.6	4,485.6	7,615.7	2.78
14,362.0	88.64	153.23	6,718.3	-6,377.0	4,526.2	7,706.7	0.83



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Well: Marks Unit 1H
Wellbore: Original Wellpath
Design: As Drilled

Local Co-ordinate Reference: Well Marks Unit 1H
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Survey

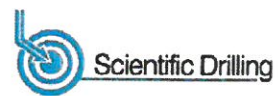
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
14,453.0	89.34	152.53	6,719.9	-6,458.0	4,567.7	7,797.6	1.09
14,548.0	89.87	152.53	6,720.5	-6,542.3	4,611.5	7,892.6	0.56
14,644.0	89.52	152.09	6,721.1	-6,627.3	4,656.1	7,988.5	0.59
14,740.0	89.43	151.38	6,721.9	-6,711.8	4,701.6	8,084.4	0.75
14,836.0	88.20	154.02	6,723.9	-6,797.1	4,745.6	8,180.3	3.03
14,933.0	88.11	154.20	6,727.0	-6,884.3	4,787.9	8,277.3	0.21
15,030.0	88.64	154.46	6,729.8	-6,971.7	4,829.9	8,374.3	0.61
15,126.0	89.25	154.02	6,731.6	-7,058.1	4,871.7	8,470.2	0.78
15,222.0	89.69	153.32	6,732.5	-7,144.2	4,914.2	8,566.2	0.86
15,318.0	89.08	154.02	6,733.5	-7,230.2	4,956.8	8,662.2	0.97
15,415.0	88.90	156.48	6,735.2	-7,318.3	4,997.4	8,759.2	2.54
15,509.0	89.08	156.48	6,736.8	-7,404.5	5,034.9	8,853.1	0.19
15,606.0	89.52	157.01	6,738.0	-7,493.6	5,073.2	8,950.0	0.71
15,702.0	90.04	157.97	6,738.4	-7,582.3	5,110.0	9,045.9	1.14
15,798.0	91.19	156.74	6,737.4	-7,670.9	5,146.9	9,141.7	1.75
15,893.0	88.99	154.90	6,737.2	-7,757.5	5,185.8	9,236.7	3.02
15,989.0	88.90	154.90	6,739.0	-7,844.4	5,226.5	9,332.7	0.09
16,085.0	89.34	154.20	6,740.5	-7,931.1	5,267.8	9,428.7	0.86
16,181.0	90.13	154.81	6,740.9	-8,017.8	5,309.1	9,524.7	1.04
16,278.0	90.92	155.16	6,740.0	-8,105.6	5,350.1	9,621.7	0.89
16,374.0	89.78	154.28	6,739.4	-8,192.5	5,391.1	9,717.6	1.50
16,470.0	89.87	153.49	6,739.7	-8,278.6	5,433.4	9,813.6	0.83
16,566.0	90.92	153.58	6,739.1	-8,364.6	5,476.2	9,909.6	1.10
16,662.0	90.22	152.61	6,738.1	-8,450.2	5,519.6	10,005.6	1.25
16,759.0	90.04	151.47	6,737.9	-8,535.9	5,565.1	10,102.5	1.19
16,855.0	89.87	153.67	6,738.0	-8,621.1	5,609.3	10,198.5	2.30
16,951.0	89.87	153.05	6,738.2	-8,706.9	5,652.3	10,294.4	0.65
17,048.0	89.43	153.32	6,738.8	-8,793.4	5,696.1	10,391.4	0.53
17,144.0	88.81	155.07	6,740.3	-8,879.9	5,737.9	10,487.4	1.93
17,241.0	89.34	155.87	6,741.8	-8,968.1	5,778.1	10,584.4	0.99
17,336.0	89.43	155.25	6,742.8	-9,054.6	5,817.5	10,679.3	0.66
17,431.0	90.13	155.07	6,743.2	-9,140.8	5,857.4	10,774.3	0.76
17,526.0	91.19	154.37	6,742.1	-9,226.7	5,897.9	10,869.3	1.34
17,621.0	91.19	153.67	6,740.1	-9,312.1	5,939.5	10,964.3	0.74
17,717.0	91.36	153.40	6,738.0	-9,398.0	5,982.3	11,060.3	0.33
17,812.0	90.13	153.40	6,736.8	-9,482.9	6,024.8	11,155.2	1.29
17,907.0	90.13	153.23	6,736.5	-9,567.8	6,067.5	11,250.2	0.18
18,004.0	89.96	152.00	6,736.5	-9,653.9	6,112.1	11,347.2	1.28
18,100.0	90.13	150.85	6,736.4	-9,738.2	6,158.0	11,443.0	1.21
18,196.0	90.48	150.24	6,735.9	-9,821.8	6,205.2	11,538.8	0.73
18,254.0	90.84	150.15	6,735.2	-9,872.1	6,234.1	11,596.7	0.64
18,311.0	90.84	150.15	6,734.4	-9,921.6	6,262.4	11,653.5	0.00

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Wellbore: Original Wellpath
Design: As Drilled

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North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Oklahoma District

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
6,773.0	6,433.8	348.6	1,184.7	Middlesex
6,993.0	6,557.2	240.2	1,328.0	Burkett
7,060.0	6,586.6	192.1	1,364.0	Tully
7,159.0	6,619.1	113.9	1,415.1	Marcellus

Checked By: _____ Approved By: _____ Date: _____