

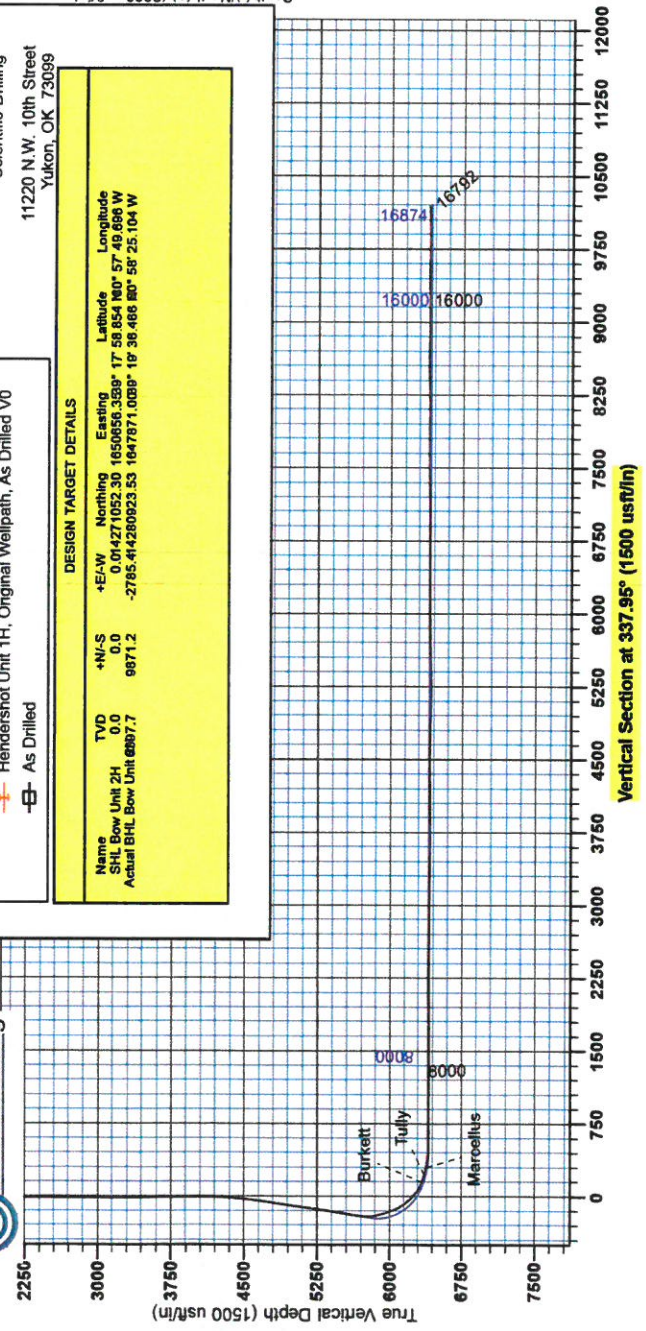
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WV GEOLOGICAL SURVEY
MORGANTOWN, WV



Antero
Bow Unit 2H
Ritchie County WV
Northing: 14271052.30
Easting: 1650656.35
As Drilled



WELL DETAILS: Bow Unit 2H
Ground Level: 1118.0
Northing: 14271052.30
Easting: 1650656.35
Longitude: 80° 57' 49.896 W
Latitude: 37° 58' 55.339 N

PROJECT DETAILS: Ritchie County WV
Geoside Station: 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

REFERENCE INFORMATION
Coordinate System: NAD 1927 (NADCON CONUS)
Wellhead (WV) Reference: 1118.0
Magnetic Declination Method: Minimum Correction

LEGEND

- Hendershot Unit 2H, Original Wellpath, As Drilled V0
- Bow Unit 2H, Original Wellpath, Plan 5 V0
- Bow Unit 1H, Original Wellpath, As Drilled V0
- Hendershot Unit 1H, Original Wellpath, As Drilled V0
- As Drilled

DESIGN TARGET DETAILS

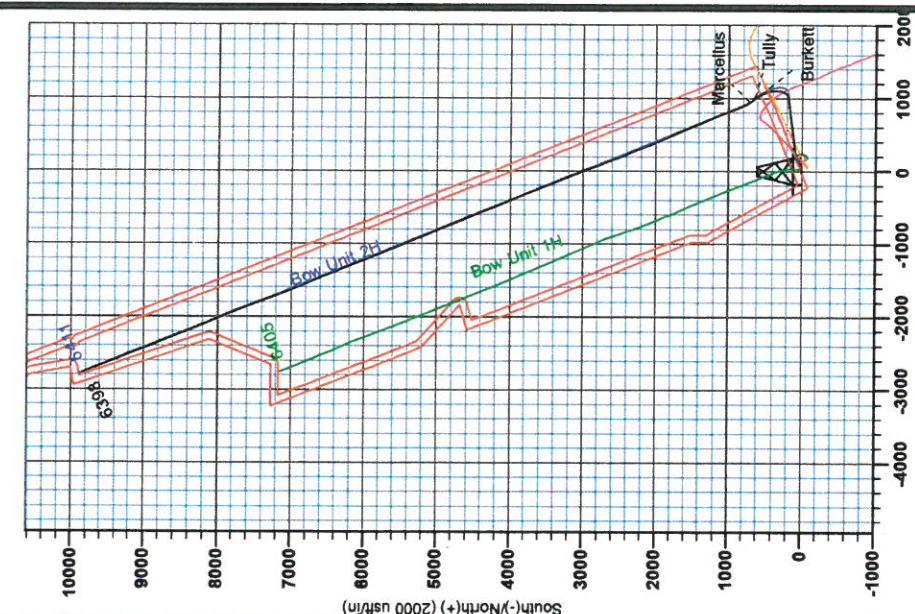
Name	TVD	+N/S	+E/W	Northing	Easting	Latitude	Longitude
SHL Bow Unit 2H	0.0	0.0	0.0	14271052.30	1650656.35	37° 58' 55.339 N	80° 57' 49.896 W
Actual BHL Bow Unit 2H	6997.7	9871.2	-2785.4	14260923.53	1647671.008	37° 56' 46.800 N	80° 58' 25.104 W

Scientific Drilling
Genie Lightfoot
11-15, January 06 2015
Scientific Drilling
11220 N.W. 10th Street
Yukon, OK, 73099

To convert Magnetic North to Grid, Subtract 6.39°
To convert True North to Grid, Subtract 0.02°

Admiralty to Grid North
True North: -0.02°
Magnetic North: -5.35°

Magnetic Field
Strength: 52238.8nT
Dip Angle: 86.87°
Date: 10/24/2014
Model: BIGM2014





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WV GEOLOGICAL SURVEY
MORGANTOWN, WV

Antero

Ritchie County WV

Charlene Pad: Hendershot/Paige/Eppard/Brook/Bow

Bow Unit 2H

Original Wellpath

Design: As Drilled

EOW Completion Report

06 January, 2015



AUG 10 2015



EOW Completion Report



Company:	Antero	Local Co-ordinate Reference:	Well Bow Unit 2H
Project:	Ritchie County WV	TVD Reference:	Patterson 325: GL 1118' + KB 24' @ 1142.0usft
Site:	Charlene Pad: Hendershot/Paige/Eppard/Brook/E	MD Reference:	Patterson 325: GL 1118' + KB 24' @ 1142.0usft
Well:	Bow Unit 2H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Oklahoma District

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	Charlene Pad: Hendershot/Paige/Eppard/Brook/Bow, SHL Hendershot Unit 1H				
Site Position:		Northing:	14,270,988.12 usft	Latitude:	39° 17' 58.219 N
From:	Map	Easting:	1,650,704.41 usft	Longitude:	80° 57' 49.084 W
Position Uncertainty:	2.0 usft	Slot Radius:	13-3/16"	Grid Convergence:	0.02 °

Well	Bow Unit 2H, Marcellus					
Well Position	+N/-S	0.0 usft	Northing:	14,271,052.30 usft	Latitude:	39° 17' 58.854 N
	+E/-W	0.0 usft	Easting:	1,650,656.35 usft	Longitude:	80° 57' 49.696 W
Position Uncertainty	2.0 usft		Wellhead Elevation:	1,142.0 usft	Ground Level:	1,118.0 usft

Wellbore	Original Wellpath
-----------------	-------------------

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2014	10/24/2014	-8.36	66.87	52,240

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	337.95

Survey Program	Date 1/6/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
111.0	5,800.0	Survey #5 Def Gyro to KOP (Original Well)	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4
5,908.0	16,792.0	Survey #6 SDI 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
111.0	0.16	11.21	111.0	0.2	0.0	0.1	0.14
136.0	0.11	5.51	136.0	0.2	0.0	0.2	0.21
161.0	0.25	30.67	161.0	0.3	0.1	0.2	0.63
186.0	0.25	359.34	186.0	0.4	0.1	0.3	0.54
211.0	0.13	51.06	211.0	0.5	0.1	0.4	0.79
236.0	0.25	119.55	236.0	0.4	0.2	0.3	0.94
261.0	0.21	109.77	261.0	0.4	0.3	0.3	0.22
286.0	0.20	148.81	286.0	0.4	0.3	0.2	0.55
311.0	0.19	153.36	311.0	0.3	0.4	0.1	0.07
336.0	0.11	118.78	336.0	0.2	0.4	0.1	0.47

AUG 10 2015



WV GEOLOGICAL SURVEY EOW Completion Report
MORGANTOWN, WV



Company:	Antero	Local Co-ordinate Reference:	Well Bow Unit 2H
Project:	Ritchie County WV	TVD Reference:	Patterson 325: GL 1118' + KB 24' @ 1142.0usft
Site:	Charlene Pad: Hendershot/Paige/Eppard/Brook/E	MD Reference:	Patterson 325: GL 1118' + KB 24' @ 1142.0usft
Well:	Bow Unit 2H	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)	EW (usft)	V. Sec (usft)	DLeg (%/100usft)
361.0	0.27	162.17	361.0	0.2	0.5	0.0	0.82
386.0	0.26	143.99	386.0	0.1	0.5	-0.1	0.34
411.0	0.45	157.73	411.0	-0.1	0.6	-0.3	0.83
436.0	0.35	154.94	436.0	-0.2	0.7	-0.5	0.41
461.0	0.20	158.83	461.0	-0.3	0.7	-0.6	0.60
486.0	0.48	96.99	486.0	-0.4	0.8	-0.7	1.70
511.0	1.03	89.34	511.0	-0.4	1.2	-0.8	2.23
536.0	1.75	83.40	536.0	-0.4	1.8	-1.0	2.93
561.0	2.54	84.40	561.0	-0.3	2.7	-1.3	3.16
586.0	3.00	83.92	585.9	-0.1	3.9	-1.6	1.84
611.0	3.17	83.05	610.9	0.0	5.2	-2.0	0.71
636.0	3.51	81.52	635.9	0.2	6.7	-2.3	1.41
661.0	4.01	80.29	660.8	0.5	8.3	-2.7	2.03
686.0	4.44	79.12	685.7	0.8	10.1	-3.1	1.75
711.0	4.83	77.68	710.7	1.2	12.1	-3.4	1.63
736.0	5.00	76.88	735.6	1.7	14.2	-3.8	0.73
761.0	5.02	77.65	760.5	2.2	16.3	-4.1	0.28
786.0	5.02	78.08	785.4	2.6	18.4	-4.5	0.15
811.0	4.95	77.52	810.3	3.1	20.6	-4.9	0.34
836.0	4.95	76.98	835.2	3.6	22.7	-5.2	0.19
861.0	4.87	76.29	860.1	4.0	24.7	-5.5	0.40
886.0	4.74	76.36	885.0	4.5	26.8	-5.8	0.52
911.0	4.63	76.63	909.9	5.0	28.8	-6.1	0.45
936.0	4.51	77.19	934.8	5.5	30.7	-6.5	0.51
961.0	4.32	76.72	959.8	5.9	32.6	-6.8	0.77
986.0	4.21	77.31	984.7	6.3	34.4	-7.1	0.47
1,011.0	3.99	76.90	1,009.6	6.7	36.1	-7.3	0.89
1,036.0	3.82	77.19	1,034.6	7.1	37.8	-7.6	0.68
1,061.0	3.77	77.65	1,059.5	7.5	39.4	-7.9	0.23
1,086.0	3.61	76.85	1,084.5	7.8	41.0	-8.1	0.67
1,111.0	3.44	77.35	1,109.4	8.2	42.5	-8.4	0.69
1,136.0	3.41	77.10	1,134.4	8.5	43.9	-8.6	0.13
1,161.0	3.26	77.09	1,159.3	8.8	45.3	-8.9	0.60
1,186.0	2.98	76.99	1,184.3	9.1	46.7	-9.1	1.12
1,211.0	2.88	77.27	1,209.3	9.4	47.9	-9.3	0.40
1,236.0	2.68	76.51	1,234.2	9.7	49.1	-9.5	0.81
1,261.0	2.59	77.55	1,259.2	9.9	50.2	-9.6	0.41
1,286.0	2.44	76.71	1,284.2	10.2	51.3	-9.8	0.62
1,311.0	2.36	76.69	1,309.2	10.4	52.3	-10.0	0.32
1,336.0	2.22	76.78	1,334.1	10.7	53.3	-10.1	0.56
1,361.0	2.09	77.27	1,359.1	10.9	54.2	-10.3	0.53
1,386.0	1.89	77.42	1,384.1	11.1	55.0	-10.4	0.80
1,411.0	1.71	77.23	1,409.1	11.2	55.8	-10.5	0.72
1,436.0	1.66	76.62	1,434.1	11.4	56.5	-10.7	0.21

AUG 10 2015



WV GEOLOGICAL SURVEY
MORGANTOWN, WV

EOW Completion Report



Company:	Antero	Local Co-ordinate Reference:	Well Bow Unit 2H
Project:	Ritchie County WV	TVD Reference:	Patterson 325: GL 1118' + KB 24' @ 1142.0usft
Site:	Charlene Pad: Hendershot/Paige/Eppard/Brook/E	MD Reference:	Patterson 325: GL 1118' + KB 24' @ 1142.0usft
Well:	Bow Unit 2H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Oklahoma District

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
1,461.0	1.58	76.24	1,459.1	11.6	57.2	-10.8	0.32
1,486.0	1.60	75.70	1,484.1	11.7	57.9	-10.9	0.10
1,511.0	1.56	78.52	1,509.1	11.9	58.6	-11.0	0.35
1,536.0	1.54	78.66	1,534.1	12.0	59.2	-11.1	0.08
1,561.0	1.45	79.49	1,559.0	12.1	59.9	-11.2	0.37
1,586.0	1.31	80.25	1,584.0	12.2	60.5	-11.3	0.56
1,611.0	1.23	77.75	1,609.0	12.3	61.0	-11.5	0.39
1,636.0	1.30	79.89	1,634.0	12.5	61.5	-11.6	0.34
1,661.0	1.06	80.65	1,659.0	12.5	62.0	-11.7	0.96
1,686.0	0.81	75.48	1,684.0	12.6	62.4	-11.7	1.05
1,711.0	0.90	79.70	1,709.0	12.7	62.8	-11.8	0.44
1,736.0	0.71	83.52	1,734.0	12.8	63.2	-11.9	0.79
1,761.0	0.67	82.63	1,759.0	12.8	63.5	-12.0	0.17
1,786.0	0.71	84.37	1,784.0	12.8	63.8	-12.0	0.18
1,811.0	0.63	87.53	1,809.0	12.8	64.0	-12.1	0.35
1,836.0	0.51	86.47	1,834.0	12.9	64.3	-12.2	0.48
1,861.0	0.54	87.13	1,859.0	12.9	64.5	-12.3	0.12
1,886.0	0.52	81.77	1,884.0	12.9	64.8	-12.4	0.21
1,911.0	0.45	91.31	1,909.0	12.9	65.0	-12.4	0.43
1,936.0	0.45	81.26	1,934.0	12.9	65.2	-12.5	0.32
1,961.0	0.49	83.13	1,959.0	12.9	65.4	-12.5	0.17
1,986.0	0.39	81.15	1,984.0	13.0	65.6	-12.6	0.40
2,011.0	0.60	76.81	2,009.0	13.0	65.8	-12.6	0.85
2,036.0	0.46	84.51	2,034.0	13.1	66.0	-12.7	0.63
2,061.0	0.28	84.34	2,059.0	13.1	66.2	-12.7	0.72
2,086.0	0.40	83.61	2,084.0	13.1	66.3	-12.8	0.48
2,111.0	0.40	84.69	2,109.0	13.1	66.5	-12.8	0.03
2,136.0	0.46	82.87	2,134.0	13.1	66.7	-12.9	0.25
2,161.0	0.45	88.51	2,159.0	13.1	66.9	-12.9	0.18
2,186.0	0.40	84.03	2,184.0	13.2	67.0	-13.0	0.24
2,211.0	0.43	77.67	2,209.0	13.2	67.2	-13.0	0.22
2,236.0	0.41	78.93	2,234.0	13.2	67.4	-13.0	0.09
2,261.0	0.42	73.77	2,259.0	13.3	67.6	-13.1	0.15
2,286.0	0.42	81.36	2,284.0	13.3	67.8	-13.1	0.22
2,311.0	0.35	86.78	2,309.0	13.3	67.9	-13.2	0.32
2,336.0	0.29	79.31	2,334.0	13.3	68.1	-13.2	0.29
2,361.0	0.27	88.65	2,359.0	13.3	68.2	-13.2	0.20
2,386.0	0.45	97.15	2,384.0	13.3	68.3	-13.3	0.75
2,411.0	0.43	93.64	2,409.0	13.3	68.5	-13.4	0.13
2,436.0	0.51	83.73	2,434.0	13.3	68.7	-13.5	0.46
2,461.0	0.45	94.20	2,459.0	13.3	68.9	-13.5	0.42
2,486.0	0.45	100.86	2,484.0	13.3	69.1	-13.6	0.21
2,511.0	0.45	98.19	2,509.0	13.3	69.3	-13.7	0.08
2,536.0	0.45	103.92	2,534.0	13.2	69.5	-13.8	0.18
2,561.0	0.44	112.96	2,559.0	13.2	69.7	-14.0	0.28

AUG 10 2015



EOW Completion Report



Company:	Antero	Local Co-ordinate Reference:	Well Bow Unit 2H
Project:	Ritchie County WV	TVD Reference:	Patterson 325: GL 1118' + KB 24' @ 1142.0usft
Site:	Charlene Pad: Hendershot/Paige/Eppard/Brook/E	MD Reference:	Patterson 325: GL 1118' + KB 24' @ 1142.0usft
Well:	Bow Unit 2H	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)
2,586.0	0.36	114.16	2,584.0	13.1	69.9	-14.1	0.32
2,611.0	0.40	107.88	2,609.0	13.0	70.0	-14.2	0.23
2,636.0	0.38	112.06	2,634.0	13.0	70.2	-14.3	0.14
2,661.0	0.45	118.43	2,659.0	12.9	70.3	-14.4	0.33
2,686.0	0.49	125.84	2,684.0	12.8	70.5	-14.6	0.29
2,711.0	0.28	97.01	2,709.0	12.7	70.7	-14.7	1.12
2,736.0	0.44	121.75	2,734.0	12.7	70.8	-14.8	0.88
2,761.0	0.39	102.67	2,759.0	12.6	71.0	-15.0	0.58
2,786.0	0.27	134.10	2,784.0	12.5	71.1	-15.1	0.85
2,811.0	0.32	105.75	2,809.0	12.5	71.2	-15.2	0.61
2,836.0	0.25	92.91	2,834.0	12.5	71.3	-15.2	0.38
2,861.0	0.33	123.49	2,859.0	12.4	71.4	-15.3	0.69
2,886.0	0.26	103.10	2,884.0	12.4	71.6	-15.4	0.50
2,911.0	0.31	114.47	2,909.0	12.3	71.7	-15.5	0.30
2,936.0	0.18	124.30	2,934.0	12.3	71.8	-15.6	0.54
2,961.0	0.23	124.15	2,959.0	12.2	71.8	-15.6	0.20
2,986.0	0.16	105.63	2,984.0	12.2	71.9	-15.7	0.37
3,011.0	0.30	154.65	3,009.0	12.1	72.0	-15.8	0.92
3,036.0	0.20	145.04	3,034.0	12.0	72.0	-15.9	0.43
3,061.0	0.39	125.07	3,059.0	11.9	72.1	-16.0	0.85
3,086.0	0.36	129.08	3,084.0	11.8	72.3	-16.1	0.16
3,111.0	0.39	115.97	3,109.0	11.8	72.4	-16.3	0.36
3,136.0	0.41	113.32	3,134.0	11.7	72.6	-16.4	0.11
3,161.0	0.36	114.96	3,159.0	11.6	72.7	-16.5	0.20
3,186.0	0.37	105.03	3,184.0	11.6	72.9	-16.6	0.26
3,211.0	0.97	79.03	3,209.0	11.6	73.1	-16.7	2.63
3,236.0	1.66	67.94	3,234.0	11.8	73.7	-16.8	2.93
3,261.0	2.65	62.82	3,258.9	12.2	74.5	-16.7	4.03
3,286.0	3.50	59.70	3,283.9	12.8	75.7	-16.6	3.46
3,311.0	4.05	60.12	3,308.9	13.6	77.1	-16.3	2.20
3,336.0	4.74	58.67	3,333.8	14.6	78.8	-16.0	2.80
3,361.0	5.38	57.17	3,358.7	15.8	80.6	-15.7	2.61
3,386.0	6.07	56.35	3,383.6	17.1	82.7	-15.2	2.78
3,411.0	7.14	55.63	3,408.4	18.8	85.1	-14.6	4.29
3,436.0	7.85	55.94	3,433.2	20.6	87.8	-13.9	2.84
3,461.0	8.39	58.06	3,457.9	22.5	90.8	-13.2	2.47
3,486.0	8.80	59.51	3,482.6	24.4	94.0	-12.6	1.85
3,511.0	9.27	60.98	3,507.3	26.4	97.4	-12.1	2.09
3,536.0	9.59	62.87	3,532.0	28.3	101.0	-11.7	1.78
3,561.0	9.74	63.12	3,556.6	30.2	104.7	-11.3	0.62
3,586.0	9.90	63.07	3,581.3	32.2	108.5	-10.9	0.64
3,611.0	9.96	63.16	3,605.9	34.1	112.4	-10.6	0.25
3,636.0	9.96	63.08	3,630.5	36.1	116.2	-10.2	0.06
3,661.0	9.45	61.73	3,655.2	38.0	120.0	-9.8	2.23

AUG 10 2015



GEOLOGICAL SURVEY
MORGANTOWN, WV

EOW Completion Report



Company: Antero
Project: Ritchie County WV
Site: Charlene Pad: Hendershot/Paige/Eppard/Brook/E
Well: Bow Unit 2H
Wellbore: Original Wellpath
Design: As Drilled

Local Co-ordinate Reference: Well Bow Unit 2H
TVD Reference: Patterson 325: GL 1118' + KB 24' @ 1142.0usft
MD Reference: Patterson 325: GL 1118' + KB 24' @ 1142.0usft
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)
3,686.0	9.47	61.83	3,679.8	40.0	123.6	-9.4	0.10
3,711.0	9.48	62.46	3,704.5	41.9	127.2	-9.0	0.42
3,736.0	9.65	63.78	3,729.1	43.8	130.9	-8.6	1.11
3,761.0	9.91	64.23	3,753.8	45.6	134.8	-8.3	1.08
3,786.0	10.04	64.80	3,778.4	47.5	138.7	-8.1	0.65
3,811.0	10.20	65.00	3,803.0	49.3	142.6	-7.8	0.66
3,836.0	10.25	64.84	3,827.6	51.2	146.7	-7.6	0.23
3,861.0	10.25	64.14	3,852.2	53.1	150.7	-7.3	0.50
3,886.0	10.30	63.00	3,876.8	55.1	154.7	-7.0	0.84
3,911.0	10.14	62.59	3,901.4	57.2	158.6	-6.6	0.70
3,936.0	10.25	63.84	3,926.0	59.1	162.6	-6.2	0.99
3,961.0	10.48	65.02	3,950.6	61.1	166.6	-5.9	1.25
3,986.0	10.94	66.22	3,975.2	63.0	170.9	-5.7	2.04
4,011.0	11.60	67.39	3,999.7	64.9	175.3	-5.6	2.79
4,036.0	12.02	68.68	4,024.2	66.8	180.1	-5.7	1.98
4,061.0	12.52	69.80	4,048.6	68.7	185.1	-5.8	2.21
4,086.0	12.87	70.17	4,073.0	70.6	190.2	-6.0	1.44
4,111.0	13.39	69.71	4,097.3	72.5	195.6	-6.2	2.12
4,136.0	13.53	70.00	4,121.6	74.6	201.0	-6.4	0.62
4,161.0	13.71	69.82	4,145.9	76.6	206.5	-6.6	0.74
4,186.0	13.69	70.31	4,170.2	78.6	212.1	-6.8	0.47
4,211.0	13.34	71.58	4,194.5	80.5	217.6	-7.1	1.84
4,236.0	12.98	73.02	4,218.9	82.2	223.1	-7.5	1.95
4,261.0	13.06	74.73	4,243.2	83.8	228.5	-8.1	1.57
4,286.0	13.45	77.45	4,267.6	85.2	234.0	-8.9	2.94
4,311.0	13.84	78.79	4,291.9	86.4	239.8	-10.0	2.01
4,336.0	15.16	80.72	4,316.1	87.5	246.0	-11.2	5.62
4,361.0	16.14	81.57	4,340.1	88.5	252.6	-12.8	4.03
4,386.0	17.22	82.63	4,364.1	89.5	259.7	-14.5	4.49
4,411.0	18.28	83.20	4,387.9	90.5	267.3	-16.5	4.30
4,436.0	18.72	83.39	4,411.6	91.4	275.2	-18.6	1.78
4,461.0	20.39	83.57	4,435.2	92.3	283.5	-20.8	6.68
4,486.0	20.52	83.21	4,458.6	93.3	292.2	-23.2	0.72
4,511.0	21.43	82.42	4,481.9	94.5	301.0	-25.5	3.81
4,536.0	22.31	82.33	4,505.1	95.7	310.3	-27.8	3.52
4,561.0	23.39	82.60	4,528.2	97.0	319.9	-30.2	4.34
4,586.0	23.91	82.90	4,551.1	98.2	329.8	-32.8	2.13
4,611.0	24.58	83.04	4,573.9	99.5	340.0	-35.4	2.69
4,636.0	25.04	83.28	4,596.6	100.7	350.4	-38.2	1.88
4,661.0	25.71	83.38	4,619.1	102.0	361.1	-41.0	2.69
4,686.0	26.72	83.24	4,641.6	103.3	372.1	-44.0	4.05
4,711.0	27.66	83.07	4,663.8	104.6	383.4	-47.0	3.77
4,736.0	28.19	83.12	4,685.9	106.0	395.0	-50.0	2.12
4,761.0	29.07	83.01	4,707.8	107.5	406.9	-53.1	3.53

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GEOLOGICAL SURVEY
MORGANTOWN, WV

EOW Completion Report



Scientific Drilling

Company:	Antero	Local Co-ordinate Reference:	Well Bow Unit 2H
Project:	Ritchie County WV	TVD Reference:	Patterson 325: GL 1118' + KB 24' @ 1142.0usft
Site:	Charlene Pad: Hendershot/Paige/Eppard/Brook/E	MD Reference:	Patterson 325: GL 1118' + KB 24' @ 1142.0usft
Well:	Bow Unit 2H	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)
4,786.0	29.57	83.23	4,729.6	108.9	419.1	-56.3	2.05
4,811.0	29.90	83.12	4,751.3	110.4	431.4	-59.6	1.34
4,836.0	30.20	83.16	4,773.0	111.9	443.8	-62.9	1.20
4,861.0	29.59	82.95	4,794.7	113.4	456.2	-66.1	2.48
4,886.0	29.80	82.88	4,816.4	115.0	468.5	-69.3	0.85
4,911.0	30.10	82.87	4,838.0	116.5	480.9	-72.5	1.20
4,936.0	30.37	82.89	4,859.6	118.1	493.3	-75.8	1.08
4,961.0	30.13	82.88	4,881.2	119.6	505.8	-79.0	0.96
4,986.0	30.19	82.97	4,902.9	121.2	518.3	-82.3	0.30
5,011.0	30.10	82.72	4,924.5	122.7	530.8	-85.5	0.62
5,036.0	30.21	82.60	4,946.1	124.3	543.2	-88.7	0.50
5,061.0	30.48	82.63	4,967.7	126.0	555.7	-91.9	1.08
5,086.0	30.45	82.44	4,989.2	127.6	568.3	-95.1	0.40
5,111.0	30.85	82.32	5,010.7	129.3	580.9	-98.3	1.62
5,136.0	31.02	82.34	5,032.2	131.0	593.7	-101.4	0.68
5,161.0	30.89	82.18	5,053.6	132.7	606.4	-104.6	0.62
5,186.0	30.06	81.58	5,075.1	134.5	619.0	-107.7	3.54
5,211.0	30.23	81.33	5,096.8	136.4	631.4	-110.6	0.85
5,236.0	30.03	81.11	5,118.4	138.3	643.8	-113.5	0.91
5,261.0	30.13	81.07	5,140.0	140.3	656.2	-116.3	0.41
5,286.0	30.40	81.00	5,161.6	142.2	668.6	-119.2	1.09
5,311.0	30.30	81.14	5,183.2	144.2	681.1	-122.1	0.49
5,336.0	30.54	81.31	5,204.7	146.1	693.6	-125.0	1.02
5,361.0	30.21	81.55	5,226.3	148.0	706.1	-127.9	1.41
5,386.0	30.47	81.65	5,247.9	149.8	718.6	-130.9	1.06
5,411.0	30.68	81.24	5,269.4	151.7	731.2	-133.9	1.18
5,436.0	31.16	81.99	5,290.9	153.6	743.9	-136.9	2.46
5,461.0	31.80	82.02	5,312.2	155.4	756.8	-140.1	2.56
5,486.0	32.22	82.02	5,333.4	157.3	769.9	-143.3	1.68
5,511.0	32.23	82.15	5,354.5	159.1	783.1	-146.5	0.28
5,536.0	32.22	82.38	5,375.7	160.9	796.3	-149.8	0.49
5,561.0	32.34	82.91	5,396.8	162.6	809.6	-153.2	1.23
5,586.0	32.12	83.47	5,418.0	164.2	822.8	-156.7	1.48
5,611.0	31.68	84.07	5,439.2	165.6	836.0	-160.3	2.17
5,636.0	31.60	84.40	5,460.5	166.9	849.0	-164.0	0.76
5,661.0	31.12	84.53	5,481.8	168.2	862.0	-167.7	1.94
5,686.0	31.14	84.63	5,503.2	169.4	874.8	-171.4	0.22
5,711.0	31.34	84.71	5,524.6	170.6	887.7	-175.1	0.82
5,736.0	31.88	84.87	5,545.9	171.8	900.8	-178.9	2.19
5,761.0	31.24	84.79	5,567.2	173.0	913.8	-182.7	2.57
5,786.0	30.76	84.66	5,588.6	174.2	926.6	-186.5	1.94
5,908.0	28.23	80.30	5,694.8	181.9	986.2	-201.6	2.72
5,937.0	27.52	79.63	5,720.4	184.3	999.5	-204.4	2.68
5,968.0	27.31	75.46	5,748.0	187.4	1,013.4	-206.8	6.23

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Company: Antero
Project: Ritchie County WV
Site: Charlene Pad: Hendershot/Paige/Eppard/Brook/E
Well: Bow Unit 2H
Wellbore: Original Wellpath
Design: As Drilled

Local Co-ordinate Reference: Well Bow Unit 2H
TVD Reference: Patterson 325: GL 1118' + KB 24' @ 1142.0usft
MD Reference: Patterson 325: GL 1118' + KB 24' @ 1142.0usft
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)
5,999.0	27.16	68.59	5,775.5	191.7	1,026.9	-207.8	10.15
6,031.0	27.21	59.91	5,804.0	198.1	1,040.0	-206.9	12.38
6,062.0	26.37	50.63	5,831.7	206.0	1,051.5	-203.8	13.75
6,094.0	25.84	42.58	5,860.4	215.6	1,061.7	-198.7	11.18
6,125.0	25.48	35.90	5,888.4	226.0	1,070.2	-192.3	9.40
6,156.0	25.56	29.04	5,916.4	237.3	1,077.4	-184.5	9.53
6,188.0	25.61	22.77	5,945.2	249.7	1,083.4	-175.3	8.46
6,219.0	24.89	21.50	5,973.3	261.9	1,088.4	-165.8	2.91
6,251.0	24.07	21.28	6,002.4	274.3	1,093.2	-156.2	2.58
6,282.0	24.53	17.37	6,030.7	286.3	1,097.4	-146.6	5.40
6,313.0	27.36	10.85	6,058.5	299.5	1,100.7	-135.7	12.95
6,345.0	30.56	5.51	6,086.5	314.8	1,102.9	-122.3	12.85
6,376.0	33.81	2.46	6,112.8	331.2	1,104.0	-107.4	11.72
6,407.0	36.69	359.77	6,138.1	349.1	1,104.3	-91.0	10.55
6,439.0	39.44	358.02	6,163.3	368.9	1,103.9	-72.6	9.23
6,470.0	40.76	357.19	6,187.0	388.8	1,103.1	-53.8	4.59
6,502.0	42.51	352.48	6,210.9	410.0	1,101.2	-33.4	11.20
6,533.0	44.51	346.42	6,233.4	430.9	1,097.2	-12.5	14.92
6,564.0	47.15	341.74	6,255.0	452.3	1,091.1	9.6	13.77
6,596.0	50.23	339.11	6,276.1	474.9	1,083.1	33.6	11.43
6,627.0	54.21	335.80	6,295.1	497.5	1,073.7	58.1	15.36
6,659.0	58.65	333.91	6,312.8	521.7	1,062.3	84.7	14.72
6,690.0	62.95	331.92	6,327.9	545.7	1,050.0	111.6	14.96
6,721.0	67.52	329.33	6,340.9	570.2	1,036.2	139.5	16.58
6,729.0	68.27	328.89	6,343.9	576.6	1,032.4	146.9	10.67
Burkett							
6,753.0	70.52	327.58	6,352.4	595.7	1,020.5	169.0	10.67
6,784.0	72.73	325.91	6,362.1	620.3	1,004.4	197.9	8.77
6,813.0	72.90	325.57	6,370.7	643.2	988.8	224.9	1.25
Tully							
6,816.0	72.92	325.54	6,371.6	645.6	987.2	227.7	1.25
6,847.0	75.55	324.60	6,380.0	670.0	970.1	256.8	8.97
6,878.0	79.15	327.52	6,386.8	695.1	953.2	286.4	14.81
6,891.0	79.79	328.21	6,389.2	705.9	946.4	299.0	7.19
Marcellus							
6,910.0	80.74	329.21	6,392.4	721.9	936.7	317.5	7.19
6,941.0	81.94	331.04	6,397.1	748.5	921.4	347.8	7.00
6,972.0	82.21	330.58	6,401.3	775.3	906.5	378.3	1.71
7,004.0	83.91	332.58	6,405.2	803.3	891.4	409.9	8.17
7,029.0	85.69	334.51	6,407.5	825.5	880.3	434.7	10.48
7,041.0	86.23	335.12	6,408.3	836.4	875.2	446.6	6.78
7,085.0	89.70	338.42	6,409.9	876.8	857.8	490.6	10.88
7,135.0	90.37	339.40	6,409.8	923.4	839.8	540.6	2.37
7,229.0	90.13	340.16	6,409.4	1,011.6	807.4	634.5	0.85
7,324.0	90.00	339.16	6,409.3	1,100.7	774.3	729.5	1.06

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WV GEOLOGICAL SURVEY
MORGANTOWN, WV

EOW Completion Report



Company: Antero
Project: Ritchie County WV
Site: Charlene Pad: Hendershot/Paige/Eppard/Brook/E
Well: Bow Unit 2H
Wellbore: Original Wellpath
Design: As Drilled

Local Co-ordinate Reference: Well Bow Unit 2H
TVD Reference: Patterson 325: GL 1118' + KB 24' @ 1142.0usft
MD Reference: Patterson 325: GL 1118' + KB 24' @ 1142.0usft
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)
7,418.0	89.90	336.23	6,409.4	1,187.7	738.7	823.5	3.12
7,512.0	89.63	335.29	6,409.8	1,273.4	700.1	917.4	1.04
7,607.0	89.60	336.75	6,410.4	1,360.2	661.5	1,012.4	1.54
7,701.0	90.10	337.92	6,410.7	1,446.9	625.2	1,106.3	1.35
7,795.0	89.70	337.73	6,410.8	1,533.9	589.8	1,200.3	0.47
7,889.0	90.27	336.39	6,410.9	1,620.5	553.1	1,294.3	1.55
7,983.0	90.40	336.30	6,410.3	1,706.6	515.4	1,388.3	0.17
8,077.0	90.07	337.08	6,409.9	1,792.9	478.2	1,482.3	0.90
8,172.0	89.83	335.69	6,410.0	1,880.0	440.2	1,577.2	1.48
8,266.0	90.27	336.96	6,409.9	1,966.1	402.4	1,671.2	1.43
8,360.0	90.47	337.45	6,409.3	2,052.7	366.0	1,765.2	0.56
8,454.0	90.00	339.72	6,408.9	2,140.2	331.7	1,859.2	2.47
8,548.0	90.84	339.00	6,408.3	2,228.2	298.5	1,953.1	1.18
8,642.0	90.37	338.78	6,407.3	2,315.9	264.7	2,047.1	0.55
8,736.0	90.47	337.54	6,406.6	2,403.1	229.7	2,141.1	1.32
8,831.0	89.93	338.79	6,406.2	2,491.3	194.4	2,236.1	1.43
8,925.0	89.97	335.92	6,406.3	2,578.1	158.2	2,330.1	3.05
9,019.0	89.70	339.38	6,406.6	2,665.0	122.5	2,424.1	3.69
9,113.0	89.80	339.85	6,407.0	2,753.1	89.7	2,518.0	0.51
9,207.0	89.66	339.67	6,407.4	2,841.3	57.2	2,612.0	0.24
9,301.0	89.73	339.36	6,407.9	2,929.3	24.3	2,706.0	0.34
9,395.0	88.89	337.97	6,409.1	3,016.9	-9.9	2,799.9	1.73
9,489.0	88.39	338.71	6,411.3	3,104.2	-44.6	2,893.9	0.95
9,584.0	87.89	338.31	6,414.4	3,192.6	-79.4	2,988.8	0.67
9,678.0	89.70	337.93	6,416.4	3,279.8	-114.4	3,082.8	1.97
9,772.0	90.27	337.84	6,416.4	3,366.9	-149.8	3,176.8	0.61
9,866.0	88.86	337.83	6,417.1	3,453.9	-185.2	3,270.8	1.50
9,960.0	89.63	338.13	6,418.3	3,541.0	-220.5	3,364.8	0.88
10,054.0	90.13	339.21	6,418.5	3,628.6	-254.7	3,458.8	1.27
10,148.0	89.23	338.10	6,419.1	3,716.2	-288.9	3,552.8	1.52
10,242.0	89.43	337.46	6,420.2	3,803.2	-324.4	3,646.8	0.71
10,335.0	89.53	337.37	6,421.0	3,889.0	-360.1	3,739.8	0.14
10,429.0	90.71	338.52	6,420.8	3,976.1	-395.4	3,833.8	1.75
10,523.0	90.91	336.88	6,419.5	4,063.1	-431.1	3,927.8	1.76
10,617.0	89.90	337.00	6,418.8	4,149.6	-467.9	4,021.7	1.08
10,710.0	90.80	337.37	6,418.3	4,235.3	-504.0	4,114.7	1.05
10,804.0	89.76	338.73	6,417.8	4,322.5	-539.1	4,208.7	1.82
10,899.0	90.57	338.19	6,417.5	4,410.9	-574.0	4,303.7	1.02
10,994.0	90.30	337.45	6,416.8	4,498.8	-609.8	4,398.7	0.83
11,088.0	89.40	337.65	6,417.0	4,585.7	-645.7	4,492.7	0.98
11,182.0	90.40	337.39	6,417.2	4,672.6	-681.7	4,586.7	1.10
11,276.0	89.63	337.59	6,417.2	4,759.4	-717.7	4,680.7	0.85
11,390.0	89.90	337.25	6,417.7	4,864.7	-761.4	4,794.7	0.38
11,464.0	88.49	337.58	6,418.7	4,933.0	-789.9	4,868.7	1.96

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EOW Completion Report



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Project: Ritchie County WV	TVD Reference: Patterson 325: GL 1118' + KB 24' @ 1142.0usft
Site: Charlene Pad: Hendershot/Paige/Eppard/Brook/E	MD Reference: Patterson 325: GL 1118' + KB 24' @ 1142.0usft
Well: Bow Unit 2H	North Reference: Grid
Wellbore: Original Wellpath	Survey Calculation Method: Minimum Curvature
Design: As Drilled	Database: Oklahoma District

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
11,558.0	87.72	337.28	6,421.8	5,019.7	-825.9	4,962.6	0.88
11,653.0	88.05	337.77	6,425.3	5,107.4	-862.2	5,057.6	0.62
11,746.0	88.42	337.31	6,428.2	5,193.4	-897.7	5,150.5	0.63
11,840.0	91.44	339.01	6,428.3	5,280.6	-932.7	5,244.5	3.69
11,934.0	90.47	337.13	6,426.7	5,367.8	-967.8	5,338.5	2.25
12,028.0	90.70	336.78	6,425.8	5,454.3	-1,004.6	5,432.5	0.45
12,119.0	93.09	337.02	6,422.7	5,537.9	-1,040.3	5,523.4	2.64
12,210.0	91.44	338.37	6,419.2	5,622.0	-1,074.8	5,614.3	2.34
12,301.0	89.09	339.16	6,418.7	5,706.9	-1,107.7	5,705.3	2.72
12,392.0	90.57	339.23	6,419.0	5,791.9	-1,140.0	5,796.3	1.63
12,482.0	91.68	339.05	6,417.2	5,876.0	-1,172.1	5,886.2	1.25
12,573.0	91.44	338.83	6,414.8	5,960.9	-1,204.8	5,977.2	0.36
12,663.0	91.11	338.36	6,412.8	6,044.7	-1,237.6	6,067.2	0.64
12,753.0	89.90	337.69	6,412.0	6,128.1	-1,271.3	6,157.1	1.54
12,844.0	89.63	337.09	6,412.3	6,212.1	-1,306.3	6,248.1	0.72
12,935.0	91.55	337.09	6,411.4	6,295.9	-1,341.7	6,339.1	2.11
13,025.0	90.13	338.42	6,410.1	6,379.2	-1,375.8	6,429.1	2.16
13,116.0	90.80	338.72	6,409.3	6,463.9	-1,409.0	6,520.1	0.81
13,210.0	90.57	337.68	6,408.2	6,551.2	-1,443.9	6,614.1	1.13
13,304.0	89.23	337.47	6,408.4	6,638.1	-1,479.8	6,708.1	1.44
13,398.0	90.23	337.44	6,408.8	6,724.9	-1,515.8	6,802.1	1.06
13,493.0	89.23	336.18	6,409.3	6,812.2	-1,553.2	6,897.1	1.69
13,587.0	89.56	336.10	6,410.3	6,898.2	-1,591.2	6,991.0	0.36
13,681.0	90.84	339.02	6,409.9	6,985.1	-1,627.1	7,085.0	3.39
13,775.0	91.61	339.42	6,407.9	7,072.9	-1,660.5	7,178.9	0.92
13,869.0	90.87	339.84	6,405.9	7,161.0	-1,693.2	7,272.9	0.91
13,963.0	91.51	339.33	6,403.9	7,249.1	-1,726.0	7,366.8	0.87
14,057.0	90.07	339.17	6,402.6	7,337.0	-1,759.3	7,460.8	1.54
14,151.0	90.57	339.67	6,402.1	7,425.0	-1,792.3	7,554.8	0.75
14,245.0	91.31	339.59	6,400.6	7,513.1	-1,825.0	7,648.7	0.79
14,339.0	89.76	339.61	6,399.7	7,601.2	-1,857.8	7,742.7	1.65
14,433.0	89.30	338.78	6,400.5	7,689.1	-1,891.2	7,836.6	1.01
14,527.0	89.03	338.39	6,401.8	7,776.6	-1,925.5	7,930.6	0.50
14,621.0	88.62	337.88	6,403.8	7,863.8	-1,960.5	8,024.6	0.70
14,716.0	90.67	337.98	6,404.4	7,951.8	-1,996.2	8,119.6	2.16
14,810.0	91.18	335.24	6,402.8	8,038.1	-2,033.5	8,213.5	2.96
14,903.0	90.81	336.20	6,401.2	8,122.8	-2,071.7	8,306.5	1.11
14,997.0	91.88	334.95	6,399.0	8,208.4	-2,110.6	8,400.3	1.75
15,091.0	90.50	337.31	6,397.1	8,294.3	-2,148.6	8,494.3	2.91
15,185.0	91.25	337.71	6,395.6	8,381.2	-2,184.5	8,588.3	0.90
15,278.0	87.08	338.32	6,397.0	8,467.4	-2,219.4	8,681.2	4.53
15,372.0	89.76	338.05	6,399.6	8,554.6	-2,254.3	8,775.2	2.87
15,466.0	90.74	337.50	6,399.2	8,641.6	-2,289.8	8,869.2	1.20
15,560.0	88.29	337.42	6,400.0	8,728.4	-2,325.8	8,963.2	2.61

AUG 10 2015



Company: Antero	Local Co-ordinate Reference: Well Bow Unit 2H
Project: Ritchie County WV	TVD Reference: Patterson 325: GL 1118' + KB 24' @ 1142.0usft
Site: Charlene Pad: Hendershot/Paige/Eppard/Brook/E	MD Reference: Patterson 325: GL 1118' + KB 24' @ 1142.0usft
Well: Bow Unit 2H	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)
15,653.0	89.87	337.98	6,401.5	8,814.5	-2,361.1	9,056.1	1.80
15,747.0	90.10	338.45	6,401.5	8,901.7	-2,396.0	9,150.1	0.56
15,841.0	91.24	338.48	6,400.4	8,989.2	-2,430.5	9,244.1	1.21
15,935.0	90.13	337.78	6,399.3	9,076.4	-2,465.5	9,338.1	1.40
16,028.0	90.34	337.51	6,398.9	9,162.4	-2,500.9	9,431.1	0.37
16,122.0	90.34	339.11	6,398.3	9,249.7	-2,535.6	9,525.1	1.70
16,217.0	89.70	339.44	6,398.3	9,338.6	-2,569.3	9,620.1	0.76
16,311.0	88.39	339.14	6,399.8	9,426.5	-2,602.5	9,714.0	1.43
16,405.0	89.83	338.83	6,401.3	9,514.2	-2,636.2	9,808.0	1.57
16,500.0	89.40	338.05	6,401.9	9,602.6	-2,671.1	9,903.0	0.94
16,594.0	91.11	338.06	6,401.5	9,689.8	-2,706.2	9,997.0	1.82
16,688.0	90.67	336.20	6,400.1	9,776.4	-2,742.8	10,091.0	2.03
16,735.0	91.48	335.71	6,399.2	9,819.3	-2,761.9	10,137.9	2.01
16,792.0	91.48	335.71	6,397.7	9,871.2	-2,785.4	10,194.9	0.00
PTB							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
6,729.0	6,343.9	576.6	1,032.4	Burkett
6,813.0	6,370.7	643.2	988.8	Tully
6,891.0	6,389.2	705.9	946.4	Marcellus
16,792.0	6,397.7	9,871.2	-2,785.4	PTB

Checked By: _____ Approved By: _____ Date: _____