



**Penns Park Unit 1H**  
**Ritchie County WV**  
**Northing: 14270759.74**  
**Easting: 1646547.13**  
**As Drilled**



**Scientific Drilling**

Genie Lightfoot  
 13:33, June 15, 2015  
 Scientific Drilling  
 11220 NW 10th Street  
 Yukon OK 73098

WELL DETAILS			
Ground Level: 1143.0			
+N/-S	+E/-W	Northing	Longitude
0.0	0.0	14270759.74	80° 58' 41.988 W
		Easting	Latitude
		1646547.13	39° 17' 55.974 N

**PROJECT DETAILS: Ritchie 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

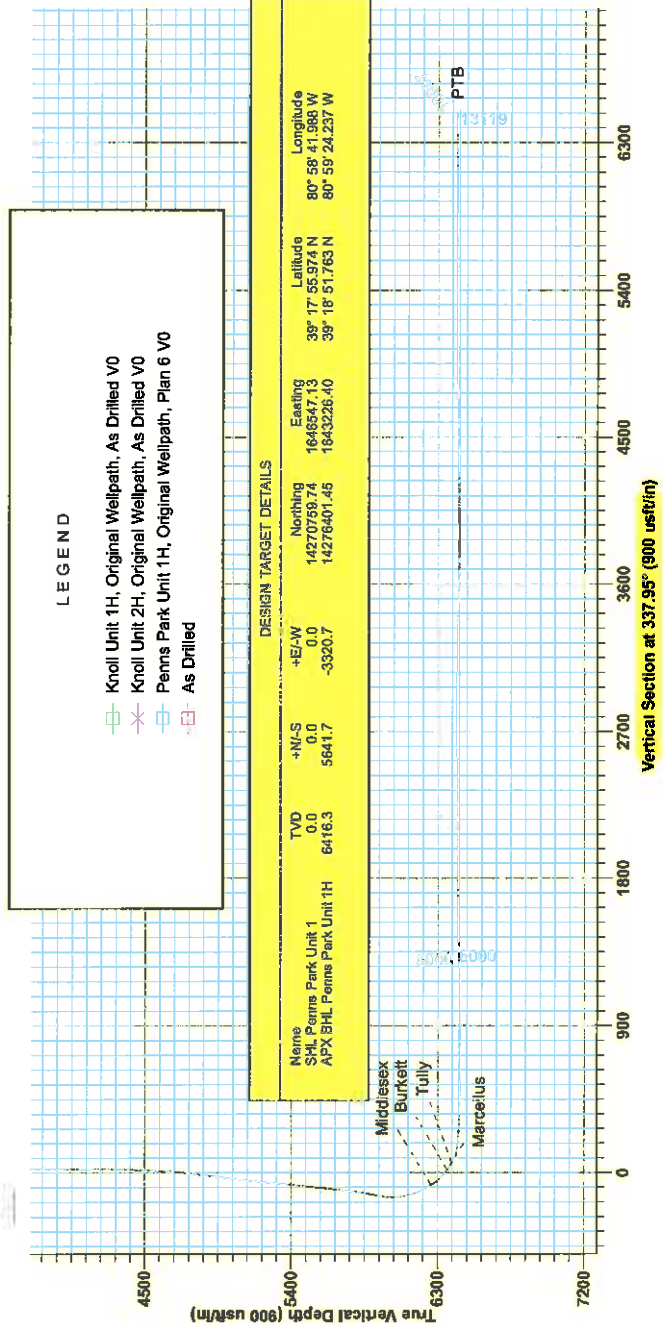
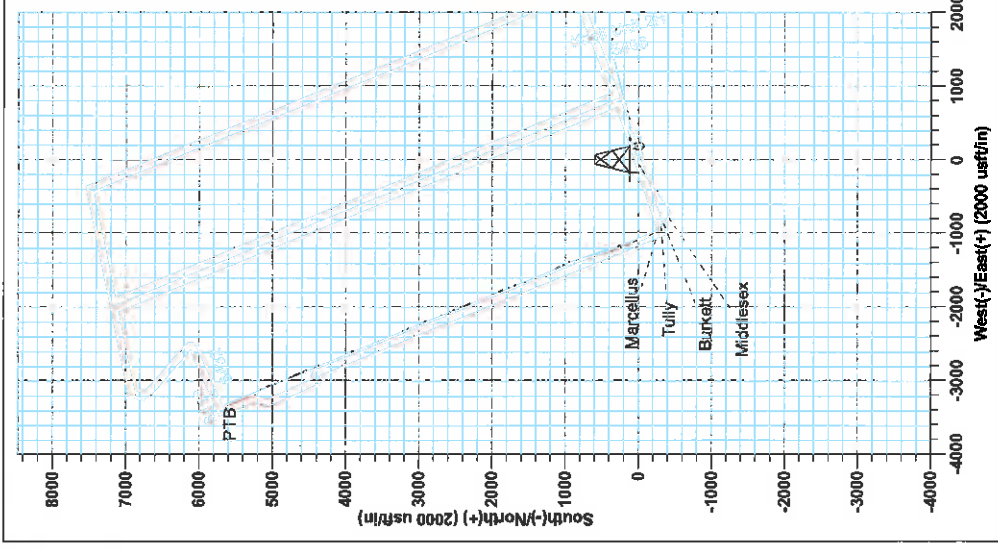
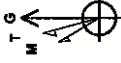
**SITE DETAILS: Noland Pad, Penns Park/KnoilPiper/Western**

Site Centre Northing: 14270759.74  
 Easting: 1646547.13  
 Positional Uncertainty: 0.0  
 Convergence: 0.01  
 Local North: Grid

Frontier 25: 6L 1143.0 \* KB 26" @ 1189.0usft  
 Cr: 1143.0

Azimuths to Grid North  
 True North: 0.37°  
 Magnetic North: -0.37°  
 Magnetic Field  
 Strength: 52192.5nT  
 Dip Angle: 66.84°  
 Date: 5/11/2015  
 Model: BGGM2014

To convert Magnetic North to Grid, Subtract 8.37°  
 To convert True North to Grid, Subtract 0.01°





# **Antero**

**Ritchie County WV**

**Noland Pad: Penns Park/Knoll/Piper/Western**

**Penns Park Unit 1H**

**Original Wellpath**

**Design: As Drilled**

## **EOW Completion Report**

**15 June, 2015**



JUL 18 2016

WV Department of  
Environmental Protection



<b>Company:</b>	Antero	<b>Local Co-ordinate Reference:</b>	Well Penns Park Unit 1H
<b>Project:</b>	Ritchie County WV	<b>TVD Reference:</b>	Frontier 22: GL 1143' + KB 25' @ 1168 0usft
<b>Site:</b>	Noland Pad Penns Park/Knoll/Piper/Western	<b>MD Reference:</b>	Frontier 22: GL 1143' + KB 25' @ 1168 0usft
<b>Well:</b>	Penns Park Unit 1H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Wellpath	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Oklahoma District

<b>Project</b>	Ritchie County WV, Ritchie County WV, WV North		
<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>	Noland Pad Penns Park/Knoll/Piper/Western		
-------------	---	--	--

<b>Site Position:</b>		<b>Northing:</b>	14,270,759.74 usft	<b>Latitude:</b>	39° 17' 55.974 N
<b>From:</b>	Map	<b>Easting:</b>	1,646,547.13 usft	<b>Longitude:</b>	80° 58' 41.988 W
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16"	<b>Grid Convergence:</b>	0.01 °

<b>Well</b>	Penns Park Unit 1H, Marcellus					
<b>Well Position</b>	<b>+N/-S</b>	0.0 usft	<b>Northing:</b>	14,270,759.74 usft	<b>Latitude:</b>	39° 17' 55.974 N
	<b>+E/-W</b>	0.0 usft	<b>Easting:</b>	1,646,547.13 usft	<b>Longitude:</b>	80° 58' 41.988 W
<b>Position Uncertainty</b>	2.0 usft		<b>Wellhead Elevation:</b>	1,168.0 usft	<b>Ground Level:</b>	1,143.0 usft

<b>Wellbore</b>	Original Wellpath				
-----------------	-------------------	--	--	--	--

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2014	3/11/2015	-8.36	66.84	52,192

<b>Design</b>	As Drilled				
---------------	------------	--	--	--	--

<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.0	0.0	0.0	337.95	

<b>Survey Program</b>	<b>Date</b>	6/15/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
112.0	5,866.7	Survey #4 Def to KOP (Original Wellpath)	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4	
5,976.0	13,097.0	Survey #5 SDI MWD (Original Wellpath)	MWD SDI	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
112.0	0.35	10.48	112.0	0.3	0.1	0.3	0.31
137.0	0.25	4.61	137.0	0.5	0.1	0.4	0.42
162.0	0.21	45.90	162.0	0.6	0.1	0.5	0.67
187.0	0.23	46.39	187.0	0.6	0.2	0.5	0.08
212.0	0.22	52.73	212.0	0.7	0.3	0.5	0.11
237.0	0.17	71.24	237.0	0.7	0.3	0.5	0.32
262.0	0.19	94.49	262.0	0.7	0.4	0.5	0.30
287.0	0.15	92.60	287.0	0.7	0.5	0.5	0.16
312.0	0.13	104.07	312.0	0.7	0.5	0.5	0.14
337.0	0.14	97.23	337.0	0.7	0.6	0.4	0.08



<b>Company:</b>	Antero	<b>Local Co-ordinate Reference:</b>	Well Penns Park Unit 1H
<b>Project:</b>	Ritchie County WV	<b>TVD Reference:</b>	Frontier 22 GL 1143' + KB 25' @ 1168 0usft
<b>Site:</b>	Noland Pad Penns Park/Knoll/Piper/Western	<b>MD Reference:</b>	Frontier 22 GL 1143' + KB 25' @ 1168 0usft
<b>Well:</b>	Penns Park Unit 1H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Wellpath	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Oklahoma District

**Survey**

MD (usft)	Inc (°)	Azl (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
362.0	0.13	90.50	362.0	0.7	0.7	0.4	0.07
387.0	0.06	76.12	387.0	0.7	0.7	0.4	0.29
412.0	0.11	71.00	412.0	0.7	0.7	0.4	0.20
437.0	0.09	63.99	437.0	0.7	0.8	0.4	0.09
462.0	0.20	69.95	462.0	0.8	0.8	0.4	0.44
487.0	0.18	58.04	487.0	0.8	0.9	0.4	0.18
512.0	0.23	74.86	512.0	0.8	1.0	0.4	0.31
537.0	0.23	74.03	537.0	0.9	1.1	0.4	0.01
562.0	0.03	33.32	562.0	0.9	1.1	0.4	0.83
587.0	0.23	267.68	587.0	0.9	1.1	0.4	0.99
612.0	0.97	250.77	612.0	0.8	0.8	0.4	3.01
637.0	1.47	251.24	637.0	0.6	0.3	0.5	2.00
662.0	2.00	251.88	662.0	0.4	-0.4	0.5	2.12
687.0	2.44	256.70	687.0	0.1	-1.3	0.6	1.91
712.0	3.03	266.02	711.9	0.0	-2.5	0.9	2.95
737.0	3.70	270.38	736.9	-0.1	-4.0	1.4	2.87
762.0	4.19	271.77	761.8	0.0	-5.7	2.1	2.00
787.0	4.58	271.31	786.8	0.0	-7.6	2.9	1.57
812.0	4.59	271.15	811.7	0.1	-9.6	3.6	0.06
837.0	4.56	271.40	836.6	0.1	-11.6	4.4	0.14
862.0	4.67	271.43	861.5	0.1	-13.6	5.2	0.44
887.0	4.65	269.77	886.4	0.2	-15.6	6.0	0.55
912.0	4.70	270.14	911.3	0.2	-17.7	6.8	0.23
937.0	4.77	270.14	936.3	0.2	-19.7	7.6	0.28
962.0	4.70	270.01	961.2	0.2	-21.8	8.3	0.28
987.0	4.77	270.24	986.1	0.2	-23.8	9.1	0.29
1,012.0	4.81	270.18	1,011.0	0.2	-25.9	9.9	0.16
1,037.0	4.72	269.94	1,035.9	0.2	-28.0	10.7	0.37
1,062.0	3.95	267.53	1,060.8	0.2	-29.9	11.4	3.16
1,087.0	3.83	267.45	1,085.8	0.1	-31.6	11.9	0.48
1,112.0	3.73	268.02	1,110.7	0.0	-33.2	12.5	0.43
1,137.0	3.24	268.28	1,135.7	0.0	-34.8	13.0	1.96
1,162.0	2.72	267.54	1,160.7	-0.1	-36.1	13.5	2.09
1,187.0	2.57	267.93	1,185.6	-0.1	-37.2	13.8	0.60
1,212.0	2.32	267.57	1,210.6	-0.2	-38.3	14.2	1.00
1,237.0	2.06	269.93	1,235.6	-0.2	-39.2	14.5	1.10
1,262.0	1.76	269.66	1,260.6	-0.2	-40.1	14.9	1.20
1,287.0	1.68	269.44	1,285.6	-0.2	-40.8	15.1	0.32
1,312.0	1.40	270.78	1,310.6	-0.2	-41.5	15.4	1.13
1,337.0	1.22	270.54	1,335.5	-0.2	-42.1	15.6	0.72
1,362.0	1.01	270.78	1,360.5	-0.2	-42.5	15.8	0.84
1,387.0	0.93	270.13	1,385.5	-0.2	-43.0	16.0	0.32
1,412.0	0.87	269.98	1,410.5	-0.2	-43.4	16.1	0.24
1,437.0	0.81	270.64	1,435.5	-0.2	-43.7	16.2	0.24



<b>Company:</b>	Antero	<b>Local Co-ordinate Reference:</b>	Well Penns Park Unit 1H
<b>Project:</b>	Ritchie County WV	<b>TVD Reference:</b>	Frontier 22 GL 1143' + KB 25' @ 1168 0usft
<b>Site:</b>	Noland Pad Penns Park/Knoll/Piper/Western	<b>MD Reference:</b>	Frontier 22 GL 1143' + KB 25' @ 1168 0usft
<b>Well:</b>	Penns Park Unit 1H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Wellpath	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Oklahoma District

Survey									
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)		
1,462.0	0.80	271.05	1,460.5	-0.2	-44.1	16.4	0.05		
1,487.0	0.69	271.65	1,485.5	-0.2	-44.4	16.5	0.44		
1,512.0	0.72	274.43	1,510.5	-0.2	-44.7	16.6	0.18		
1,537.0	0.50	284.79	1,535.5	-0.1	-45.0	16.8	0.98		
1,562.0	0.45	282.75	1,560.5	-0.1	-45.2	16.9	0.21		
1,587.0	0.43	284.70	1,585.5	0.0	-45.4	17.0	0.10		
1,612.0	0.38	277.67	1,610.5	0.0	-45.5	17.1	0.28		
1,637.0	0.36	278.38	1,635.5	0.0	-45.7	17.2	0.08		
1,662.0	0.23	270.51	1,660.5	0.1	-45.8	17.2	0.54		
1,687.0	0.15	280.74	1,685.5	0.1	-45.9	17.3	0.35		
1,712.0	0.12	256.44	1,710.5	0.1	-46.0	17.3	0.26		
1,737.0	0.08	310.64	1,735.5	0.1	-46.0	17.3	0.39		
1,762.0	0.05	22.76	1,760.5	0.1	-46.0	17.3	0.32		
1,787.0	0.09	75.89	1,785.5	0.1	-46.0	17.4	0.29		
1,812.0	0.20	57.16	1,810.5	0.1	-45.9	17.4	0.47		
1,837.0	0.18	85.33	1,835.5	0.2	-45.9	17.4	0.38		
1,862.0	0.22	64.07	1,860.5	0.2	-45.8	17.3	0.33		
1,887.0	0.17	60.93	1,885.5	0.2	-45.7	17.4	0.20		
1,912.0	0.26	66.05	1,910.5	0.3	-45.6	17.4	0.37		
1,937.0	0.21	79.03	1,935.5	0.3	-45.5	17.4	0.29		
1,962.0	0.28	81.21	1,960.5	0.3	-45.4	17.3	0.28		
1,987.0	0.20	70.20	1,985.5	0.3	-45.3	17.3	0.37		
2,012.0	0.01	147.37	2,010.5	0.3	-45.3	17.3	0.79		
2,037.0	0.20	72.85	2,035.5	0.4	-45.2	17.3	0.79		
2,062.0	0.20	76.87	2,060.5	0.4	-45.1	17.3	0.06		
2,087.0	0.23	74.80	2,085.5	0.4	-45.0	17.3	0.12		
2,112.0	0.22	74.60	2,110.5	0.4	-45.0	17.3	0.04		
2,137.0	0.24	89.18	2,135.5	0.4	-44.9	17.2	0.25		
2,162.0	0.22	79.00	2,160.5	0.5	-44.8	17.2	0.18		
2,187.0	0.28	83.69	2,185.5	0.5	-44.6	17.2	0.25		
2,212.0	0.23	69.63	2,210.5	0.5	-44.5	17.2	0.32		
2,237.0	0.19	74.94	2,235.5	0.5	-44.4	17.2	0.18		
2,262.0	0.19	54.44	2,260.5	0.6	-44.4	17.2	0.27		
2,287.0	0.25	60.16	2,285.5	0.6	-44.3	17.2	0.26		
2,312.0	0.14	78.32	2,310.5	0.6	-44.2	17.2	0.50		
2,337.0	0.19	76.35	2,335.5	0.7	-44.1	17.2	0.20		
2,362.0	0.18	109.59	2,360.5	0.7	-44.1	17.1	0.43		
2,387.0	0.19	70.65	2,385.5	0.7	-44.0	17.1	0.49		
2,412.0	0.19	69.88	2,410.5	0.7	-43.9	17.1	0.01		
2,437.0	0.17	74.88	2,435.5	0.7	-43.8	17.1	0.10		
2,462.0	0.15	86.11	2,460.5	0.7	-43.8	17.1	0.15		
2,487.0	0.14	96.74	2,485.5	0.7	-43.7	17.1	0.11		
2,512.0	0.12	65.03	2,510.5	0.7	-43.7	17.1	0.29		
2,537.0	0.15	99.02	2,535.5	0.7	-43.6	17.0	0.34		
2,562.0	0.11	99.49	2,560.5	0.7	-43.5	17.0	0.16		

RECEIVED  
 Office of Oil and Gas  
 JUL 18 2016  
 WV Department of Environmental Protection  
 COMPASS 5000-1 (Rev. 7)



<b>Company:</b>	Antero	<b>Local Co-ordinate Reference:</b>	Well Penns Park Unit 1H
<b>Project:</b>	Ritchie County WV	<b>TVD Reference:</b>	Frontier 22 GL 1143' + KB 25' @ 1168 0usft
<b>Site:</b>	Noland Pad Penns Park/Knoll/Piper/Western	<b>MD Reference:</b>	Frontier 22 GL 1143' + KB 25' @ 1168 0usft
<b>Well:</b>	Penns Park Unit 1H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Wellpath	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Oklahoma District

**Survey**

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
2,587.0	0.12	93.08	2,585.5	0.7	-43.5	17.0	0.07
2,612.0	0.10	147.29	2,610.5	0.7	-43.5	17.0	0.41
2,637.0	0.11	110.55	2,635.5	0.7	-43.4	16.9	0.27
2,662.0	0.07	87.79	2,660.5	0.7	-43.4	16.9	0.21
2,687.0	0.02	110.23	2,685.5	0.7	-43.4	16.9	0.21
2,712.0	0.11	348.71	2,710.5	0.7	-43.4	16.9	0.49
2,737.0	0.09	300.64	2,735.5	0.7	-43.4	16.9	0.33
2,762.0	0.07	335.16	2,760.5	0.7	-43.4	17.0	0.20
2,787.0	0.11	332.45	2,785.5	0.8	-43.4	17.0	0.16
2,812.0	0.07	317.03	2,810.5	0.8	-43.4	17.1	0.19
2,837.0	0.03	342.98	2,835.5	0.8	-43.5	17.1	0.18
2,862.0	0.08	330.24	2,860.5	0.8	-43.5	17.1	0.20
2,887.0	0.14	293.49	2,885.5	0.9	-43.5	17.1	0.36
2,912.0	0.11	322.03	2,910.5	0.9	-43.6	17.2	0.27
2,937.0	0.06	320.25	2,935.5	0.9	-43.6	17.2	0.20
2,962.0	0.11	305.22	2,960.5	1.0	-43.6	17.3	0.22
2,987.0	0.16	314.30	2,985.5	1.0	-43.6	17.3	0.22
3,012.0	0.14	340.40	3,010.5	1.0	-43.7	17.4	0.28
3,037.0	0.14	306.46	3,035.5	1.1	-43.7	17.4	0.33
3,062.0	0.10	305.25	3,060.5	1.1	-43.8	17.5	0.16
3,087.0	0.11	332.98	3,085.5	1.2	-43.8	17.5	0.21
3,112.0	0.11	322.14	3,110.5	1.2	-43.8	17.6	0.08
3,137.0	0.12	322.10	3,135.5	1.2	-43.8	17.6	0.04
3,162.0	0.09	323.00	3,160.5	1.3	-43.9	17.7	0.12
3,187.0	0.08	33.22	3,185.5	1.3	-43.9	17.7	0.39
3,212.0	0.20	349.78	3,210.5	1.4	-43.9	17.7	0.61
3,237.0	0.10	317.28	3,235.5	1.4	-43.9	17.8	0.51
3,262.0	0.14	354.94	3,260.5	1.5	-43.9	17.8	0.34
3,287.0	0.18	344.64	3,285.5	1.5	-43.9	17.9	0.20
3,312.0	0.20	351.51	3,310.5	1.6	-43.9	18.0	0.12
3,337.0	0.14	345.22	3,335.5	1.7	-44.0	18.1	0.25
3,362.0	0.14	343.23	3,360.5	1.7	-44.0	18.1	0.02
3,387.0	0.25	330.80	3,385.5	1.8	-44.0	18.2	0.47
3,412.0	0.21	324.72	3,410.5	1.9	-44.1	18.3	0.19
3,437.0	0.18	318.18	3,435.5	2.0	-44.1	18.4	0.15
3,462.0	0.20	298.83	3,460.5	2.0	-44.2	18.5	0.27
3,487.0	0.13	335.33	3,485.5	2.1	-44.2	18.5	0.49
3,512.0	0.22	291.20	3,510.5	2.1	-44.3	18.6	0.62
3,537.0	0.16	293.81	3,535.5	2.1	-44.4	18.6	0.24
3,562.0	0.09	344.08	3,560.5	2.2	-44.4	18.7	0.49
3,587.0	0.13	318.93	3,585.5	2.2	-44.4	18.7	0.25
3,612.0	0.17	276.42	3,610.5	2.2	-44.5	18.8	0.46
3,637.0	0.14	347.92	3,635.5	2.3	-44.5	18.8	0.73
3,662.0	0.09	272.62	3,660.5	2.3	-44.5	18.9	0.58



<b>Company:</b>	Antero	<b>Local Co-ordinate Reference:</b>	Well Penns Park Unit 1H
<b>Project:</b>	Ritchie County WV	<b>TVD Reference:</b>	Frontier 22 GL 1143' + KB 25' @ 1168.0usft
<b>Site:</b>	Noland Pad Penns Park/Knoll/Piper/Western	<b>MD Reference:</b>	Frontier 22 GL 1143' + KB 25' @ 1168.0usft
<b>Well:</b>	Penns Park Unit 1H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Wellpath	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Oklahoma District

**Survey**

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
3,687.0	0.23	298.42	3,685.5	2.3	-44.6	18.9	0.62
3,712.0	0.25	306.02	3,710.5	2.4	-44.7	19.0	0.15
3,737.0	0.20	312.60	3,735.5	2.5	-44.8	19.1	0.22
3,762.0	0.17	304.06	3,760.5	2.5	-44.8	19.2	0.16
3,787.0	0.33	280.28	3,785.5	2.5	-44.9	19.2	0.75
3,812.0	0.30	307.20	3,810.5	2.6	-45.1	19.3	0.60
3,837.0	0.23	300.51	3,835.5	2.7	-45.2	19.4	0.31
3,862.0	0.34	282.92	3,860.5	2.7	-45.3	19.5	0.56
3,887.0	0.31	251.00	3,885.5	2.7	-45.4	19.5	0.72
3,912.0	0.38	263.67	3,910.5	2.7	-45.6	19.6	0.41
3,937.0	0.48	263.67	3,935.5	2.6	-45.7	19.6	0.40
3,962.0	0.37	273.14	3,960.5	2.6	-45.9	19.7	0.52
3,987.0	0.28	290.28	3,985.5	2.7	-46.1	19.8	0.53
4,012.0	0.66	267.42	4,010.5	2.7	-46.3	19.8	1.67
4,037.0	1.88	258.35	4,035.5	2.6	-46.8	20.0	4.93
4,062.0	3.13	255.46	4,060.5	2.3	-47.9	20.1	5.02
4,087.0	4.06	252.19	4,085.4	1.9	-49.4	20.3	3.81
4,112.0	5.21	251.80	4,110.3	1.3	-51.3	20.4	4.60
4,137.0	6.10	251.74	4,135.2	0.5	-53.6	20.6	3.56
4,162.0	6.87	252.67	4,160.1	-0.4	-56.3	20.8	3.11
4,187.0	7.69	253.37	4,184.9	-1.3	-59.4	21.1	3.30
4,212.0	8.33	253.05	4,209.6	-2.3	-62.7	21.4	2.57
4,237.0	8.48	252.23	4,234.3	-3.4	-66.2	21.7	0.77
4,262.0	8.81	252.32	4,259.1	-4.5	-69.8	22.0	1.32
4,287.0	9.00	249.65	4,283.8	-5.8	-73.4	22.2	1.82
4,312.0	9.12	245.87	4,308.5	-7.3	-77.1	22.2	2.43
4,337.0	9.48	238.68	4,333.1	-9.2	-80.6	21.8	4.86
4,362.0	10.02	233.66	4,357.8	-11.5	-84.1	20.9	4.03
4,387.0	10.61	231.21	4,382.4	-14.3	-87.7	19.7	2.94
4,412.0	11.03	230.99	4,406.9	-17.2	-91.3	18.3	1.69
4,437.0	11.52	231.71	4,431.4	-20.3	-95.2	16.9	2.04
4,462.0	11.82	232.98	4,455.9	-23.3	-99.2	15.6	1.58
4,487.0	12.40	234.58	4,480.4	-26.4	-103.4	14.3	2.68
4,512.0	12.86	235.42	4,504.8	-29.6	-107.9	13.1	1.98
4,537.0	13.38	236.16	4,529.1	-32.8	-112.6	11.9	2.19
4,562.0	14.05	236.29	4,553.4	-36.1	-117.5	10.7	2.68
4,587.0	14.68	235.84	4,577.6	-39.5	-122.6	9.4	2.56
4,612.0	15.57	236.01	4,601.7	-43.2	-128.0	8.0	3.56
4,637.0	16.56	235.99	4,625.8	-47.0	-133.8	6.6	3.96
4,662.0	17.60	236.18	4,649.7	-51.1	-139.9	5.1	4.17
4,687.0	18.37	236.60	4,673.4	-55.4	-146.3	3.12	3.12
4,712.0	19.44	236.36	4,697.1	-59.9	-153.0	2.29	4.29
4,737.0	20.62	235.84	4,720.6	-64.7	-160.2	0.2	4.77
4,762.0	21.80	234.93	4,743.9	-69.8	-167.6	0.2	4.90

RECEIVED  
Office of Oil and Gas  
JUL 18 2016



<b>Company:</b>	Antero	<b>Local Co-ordinate Reference:</b>	Well Penns Park Unit 1H
<b>Project:</b>	Ritchie County WV	<b>TVD Reference:</b>	Frontier 22 GL 1143' + KB 25' @ 1168.0usft
<b>Site:</b>	Noland Pad Penns Park/Knoll/Piper/Western	<b>MD Reference:</b>	Frontier 22 GL 1143' + KB 25' @ 1168.0usft
<b>Well:</b>	Penns Park Unit 1H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Wellpath	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Oklahoma District

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
4,787.0	22.90	233.88	4,767.0	-75.3	-175.3	-4.0	4.68
4,812.0	23.95	233.50	4,789.9	-81.2	-183.3	-6.5	4.24
4,837.0	24.29	233.36	4,812.8	-87.3	-191.5	-9.0	1.38
4,862.0	25.06	233.28	4,835.5	-93.5	-199.9	-11.7	3.08
4,887.0	24.94	232.84	4,858.1	-99.9	-208.4	-14.4	0.89
4,912.0	24.62	231.49	4,880.8	-106.3	-216.6	-17.2	2.60
4,937.0	24.31	230.32	4,903.6	-112.9	-224.7	-20.3	2.30
4,962.0	24.84	229.93	4,926.3	-119.5	-232.6	-23.4	2.22
4,987.0	25.13	229.79	4,949.0	-126.3	-240.7	-26.7	1.18
5,012.0	25.59	230.11	4,971.6	-133.2	-248.9	-30.0	1.92
5,037.0	25.80	231.61	4,994.1	-140.1	-257.3	-33.2	2.73
5,062.0	25.00	234.10	5,016.7	-146.5	-265.9	-36.0	5.34
5,087.0	24.52	234.88	5,039.4	-152.6	-274.4	-38.4	2.32
5,112.0	24.31	234.76	5,062.2	-158.6	-282.8	-40.8	0.86
5,137.0	24.13	234.36	5,085.0	-164.5	-291.2	-43.2	0.97
5,162.0	24.46	234.37	5,107.7	-170.5	-299.5	-45.6	1.32
5,187.0	24.74	234.51	5,130.5	-176.6	-308.0	-48.0	1.14
5,212.0	25.05	234.75	5,153.1	-182.7	-316.6	-50.4	1.30
5,237.0	24.74	234.19	5,175.8	-188.8	-325.2	-52.9	1.56
5,262.0	24.43	233.48	5,198.6	-194.9	-333.6	-55.4	1.71
5,287.0	24.05	232.71	5,221.4	-201.1	-341.8	-58.1	1.98
5,312.0	24.07	232.75	5,244.2	-207.2	-349.9	-60.7	0.10
5,337.0	24.63	234.03	5,267.0	-213.4	-358.1	-63.3	3.08
5,362.0	24.79	235.50	5,289.7	-219.4	-366.7	-65.7	2.54
5,387.0	24.69	235.56	5,312.4	-225.3	-375.3	-68.0	0.41
5,412.0	24.32	234.91	5,335.1	-231.2	-383.8	-70.2	1.83
5,437.0	24.19	235.05	5,357.9	-237.1	-392.2	-72.5	0.57
5,462.0	24.35	236.33	5,380.7	-242.9	-400.7	-74.7	2.20
5,487.0	24.52	238.46	5,403.5	-248.5	-409.4	-76.6	3.59
5,512.0	24.49	239.11	5,426.2	-253.9	-418.3	-78.3	1.09
5,537.0	24.37	238.26	5,449.0	-259.3	-427.1	-79.9	1.49
5,562.0	24.02	236.94	5,471.8	-264.7	-435.8	-81.8	2.58
5,587.0	24.25	236.21	5,494.6	-270.4	-444.3	-83.8	1.51
5,612.0	24.92	236.44	5,517.3	-276.1	-453.0	-85.9	2.71
5,637.0	24.95	235.61	5,540.0	-282.0	-461.7	-88.1	1.40
5,662.0	24.09	234.48	5,562.7	-288.0	-470.2	-90.4	3.92
5,687.0	24.22	233.60	5,585.6	-294.0	-478.5	-92.8	1.53
5,712.0	24.76	233.78	5,608.3	-300.1	-486.9	-95.4	2.18
5,737.0	25.23	234.45	5,631.0	-306.3	-495.4	-97.9	2.19
5,762.0	25.31	234.35	5,653.6	-312.5	-504.1	-100.4	0.36
5,787.0	24.97	233.98	5,676.2	-318.7	-512.7	-102.8	0.80
5,812.0	24.93	233.49	5,698.9	-325.0	-521.2	-105.5	0.84
5,837.0	25.65	233.57	5,721.5	-331.3	-529.8	-108.2	2.88
5,862.0	26.24	234.14	5,744.0	-337.8	-538.6	-110.9	2.56

RECEIVED  
Office of Oil and Gas  
JUL 18 2016





<b>Company:</b>	Antero	<b>Local Co-ordinate Reference:</b>	Well Penns Park Unit 1H
<b>Project:</b>	Ritchie County WV	<b>TVD Reference:</b>	Frontier 22. GL 1143' + KB 25' @ 1168 0usft
<b>Site:</b>	Noland Pad. Penns Park/Knoll/Piper/Western	<b>MD Reference:</b>	Frontier 22. GL 1143' + KB 25' @ 1168 0usft
<b>Well:</b>	Penns Park Unit 1H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Wellpath	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Oklahoma District

**Survey**

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
5,866.7	26.22	234.15	5,748.2	-339.0	-540.3	-111.4	0.43
5,976.0	24.69	227.68	5,846.9	-368.5	-576.8	-125.0	2.90
6,008.0	24.36	225.03	5,876.0	-377.7	-586.4	-129.9	3.59
6,039.0	25.47	220.98	5,904.1	-387.2	-595.3	-135.4	6.56
6,071.0	27.06	221.06	5,932.8	-397.9	-604.6	-141.8	4.97
6,104.0	28.31	229.55	5,962.0	-408.6	-615.5	-147.7	12.53
6,136.0	28.51	237.60	5,990.2	-417.7	-627.7	-151.5	11.98
6,168.0	28.31	245.02	6,018.3	-425.0	-641.0	-153.2	11.04
6,200.0	28.24	254.91	6,046.5	-430.1	-655.2	-152.7	14.63
6,231.0	28.23	263.83	6,073.9	-432.8	-669.6	-149.8	13.60
6,263.0	28.42	271.21	6,102.0	-433.5	-684.7	-144.7	10.95
6,295.0	29.55	279.56	6,130.1	-432.0	-700.1	-137.6	13.12
6,327.0	30.56	285.71	6,157.8	-428.5	-715.7	-128.5	10.13
6,359.0	31.57	292.09	6,185.2	-423.2	-731.3	-117.6	10.76
6,391.0	33.24	296.70	6,212.2	-416.1	-746.9	-105.2	9.32
6,423.0	35.53	299.51	6,238.6	-407.5	-762.9	-91.3	8.71
6,451.0	37.79	301.28	6,261.1	-399.1	-777.3	-78.1	8.93
<b>Middlesex</b>							
6,455.0	38.12	301.52	6,264.2	-397.8	-779.4	-76.1	8.93
6,486.0	41.68	303.41	6,288.0	-387.1	-796.2	-59.9	12.13
6,518.0	46.17	305.99	6,311.0	-374.5	-814.4	-41.3	15.10
6,550.0	50.97	308.07	6,332.2	-360.0	-833.5	-20.8	15.77
6,582.0	56.07	309.87	6,351.2	-343.8	-853.5	1.7	16.57
6,598.0	57.84	310.46	6,360.0	-335.2	-863.8	13.6	11.50
<b>Burkett</b>							
6,614.0	59.62	311.02	6,368.3	-326.2	-874.1	25.8	11.50
6,645.0	62.61	311.80	6,383.2	-308.3	-894.5	50.1	9.89
6,653.0	63.39	312.28	6,386.9	-303.5	-899.8	56.5	11.08
<b>Tully</b>							
6,677.0	65.73	313.67	6,397.2	-288.7	-915.6	76.1	11.08
6,688.0	67.66	314.16	6,401.5	-281.7	-922.9	85.3	17.99
<b>Marcellus</b>							
6,709.0	71.34	315.06	6,408.9	-267.9	-936.9	103.4	17.99
6,741.0	78.04	315.70	6,417.3	-246.0	-958.6	131.9	21.03
6,773.0	83.30	319.32	6,422.5	-222.7	-979.9	161.5	19.87
6,805.0	85.29	326.00	6,425.7	-197.4	-999.2	192.2	21.68
6,862.0	87.45	335.94	6,429.3	-147.7	-1,026.7	248.5	17.81
6,893.0	87.18	336.00	6,430.8	-119.4	-1,039.3	279.5	0.89
6,990.0	89.10	338.31	6,433.9	-30.1	-1,077.0	376.4	3.10
7,085.0	87.52	335.40	6,436.7	57.2	-1,114.3	471.3	3.48
7,182.0	89.93	336.91	6,438.9	145.9	-1,153.5	568.3	2.93
7,277.0	90.64	340.35	6,438.4	234.4	-1,188.1	663.2	3.70
7,373.0	88.26	337.95	6,439.3	324.0	-1,222.3	759.2	3.52
7,470.0	90.74	342.93	6,440.2	415.4	-1,254.7	856.1	5.73
7,565.0	91.34	349.16	6,438.4	507.5	-1,277.6	950.1	6.59



EOW Completion Report



<b>Company:</b>	Antero	<b>Local Co-ordinate Reference:</b>	Well Penns Park Unit 1H
<b>Project:</b>	Ritchie County WV	<b>TVD Reference:</b>	Frontier 22: GL 1143' + KB 25' @ 1168.0usft
<b>Site:</b>	Noland Pad Penns Park/Knoll/Piper/Western	<b>MD Reference:</b>	Frontier 22: GL 1143' + KB 25' @ 1168.0usft
<b>Well:</b>	Penns Park Unit 1H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Wellpath	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Oklahoma District

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
7,661.0	90.94	350.89	6,436.5	602.1	-1,294.3	1,043.9	1.85
7,758.0	90.50	345.92	6,435.3	697.1	-1,313.7	1,139.3	5.14
7,853.0	92.25	344.62	6,433.0	788.9	-1,337.9	1,233.5	2.29
7,948.0	92.89	338.06	6,428.8	878.8	-1,368.2	1,328.1	6.93
8,044.0	92.35	336.88	6,424.4	967.3	-1,405.0	1,424.0	1.35
8,140.0	89.23	334.27	6,423.1	1,054.7	-1,444.7	1,519.9	4.24
8,236.0	90.84	335.33	6,423.0	1,141.6	-1,485.5	1,615.8	2.01
8,333.0	90.54	335.32	6,421.8	1,229.7	-1,526.0	1,712.7	0.31
8,429.0	90.17	335.28	6,421.2	1,316.9	-1,566.1	1,808.6	0.39
8,525.0	89.93	338.56	6,421.2	1,405.2	-1,603.8	1,904.5	3.43
8,621.0	89.43	338.70	6,421.7	1,494.6	-1,638.8	2,000.5	0.54
8,717.0	90.94	338.89	6,421.4	1,584.1	-1,673.5	2,096.5	1.59
8,814.0	90.57	339.24	6,420.1	1,674.7	-1,708.1	2,193.5	0.53
8,910.0	90.20	339.05	6,419.5	1,764.4	-1,742.3	2,289.5	0.43
9,005.0	90.34	338.55	6,419.0	1,853.0	-1,776.7	2,384.5	0.55
9,100.0	89.77	338.51	6,418.9	1,941.4	-1,811.4	2,479.4	0.60
9,195.0	90.10	337.95	6,419.0	2,029.6	-1,846.7	2,574.4	0.68
9,291.0	90.13	337.46	6,418.8	2,118.5	-1,883.1	2,670.4	0.51
9,386.0	89.66	337.46	6,419.0	2,206.2	-1,919.5	2,765.4	0.49
9,482.0	90.97	337.48	6,418.5	2,294.9	-1,956.3	2,861.4	1.36
9,578.0	90.17	338.49	6,417.5	2,383.9	-1,992.3	2,957.4	1.34
9,675.0	89.73	338.72	6,417.6	2,474.2	-2,027.7	3,054.4	0.51
9,771.0	88.63	337.91	6,419.0	2,563.4	-2,063.1	3,150.4	1.42
9,866.0	89.60	338.57	6,420.4	2,651.6	-2,098.3	3,245.4	1.23
9,961.0	89.26	338.40	6,421.4	2,740.0	-2,133.2	3,340.4	0.40
10,058.0	88.69	337.92	6,423.1	2,830.0	-2,169.3	3,437.4	0.77
10,154.0	89.73	337.95	6,424.5	2,919.0	-2,205.3	3,533.4	1.08
10,250.0	89.40	337.24	6,425.2	3,007.7	-2,241.9	3,629.4	0.82
10,347.0	88.83	336.67	6,426.7	3,096.9	-2,279.9	3,726.3	0.83
10,443.0	89.63	336.84	6,428.0	3,185.1	-2,317.7	3,822.3	0.85
10,539.0	89.66	338.86	6,428.6	3,274.1	-2,353.9	3,918.3	2.10
10,635.0	91.34	339.44	6,427.7	3,363.8	-2,388.1	4,014.3	1.85
10,731.0	90.44	338.96	6,426.2	3,453.5	-2,422.2	4,110.2	1.06
10,827.0	90.03	338.64	6,425.8	3,543.0	-2,456.9	4,206.2	0.54
10,924.0	90.67	338.28	6,425.2	3,633.2	-2,492.5	4,303.2	0.76
11,019.0	90.74	338.46	6,424.1	3,721.5	-2,527.5	4,398.2	0.20
11,115.0	90.37	337.20	6,423.1	3,810.4	-2,563.8	4,494.2	1.37
11,211.0	89.66	335.59	6,423.1	3,898.4	-2,602.2	4,590.1	1.83
11,307.0	90.60	336.20	6,422.9	3,986.0	-2,641.4	4,686.1	1.17
11,402.0	90.94	336.56	6,421.6	4,073.0	-2,679.5	4,781.0	0.52
11,498.0	90.64	337.33	6,420.3	4,161.4	-2,717.1	4,877.0	0.86
11,594.0	89.90	339.49	6,419.9	4,250.6	-2,752.4	4,973.0	2.38
11,691.0	90.47	338.19	6,419.5	4,341.1	-2,787.4	5,070.0	1.46
11,787.0	90.37	337.39	6,418.8	4,430.0	-2,823.7	5,166.0	0.84

RECEIVED  
Office of Oil and Gas  
JUL 18 2016  
WV Department of Environmental Protection  
Office of Oil and Gas  
RECEIVED  
JUL 18 2016



<b>Company:</b>	Antero	<b>Local Co-ordinate Reference:</b>	Well Penns Park Unit 1H
<b>Project:</b>	Ritchie County WV	<b>TVD Reference:</b>	Frontier 22. GL 1143' + KB 25' @ 1168.0usft
<b>Site:</b>	Noland Pad Penns Park/Knoll/Piper/Western	<b>MD Reference:</b>	Frontier 22. GL 1143' + KB 25' @ 1168.0usft
<b>Well:</b>	Penns Park Unit 1H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Wellpath	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Oklahoma District

**Survey**

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
11,884.0	90.71	337.41	6,417.9	4,519.5	-2,861.0	5,263.0	0.35
11,979.0	89.97	336.16	6,417.4	4,606.8	-2,898.4	5,358.0	1.53
12,076.0	89.97	337.93	6,417.4	4,696.1	-2,936.2	5,454.9	1.82
12,171.0	89.80	336.97	6,417.6	4,783.9	-2,972.7	5,549.9	1.03
12,267.0	90.20	339.79	6,417.6	4,873.1	-3,008.0	5,645.9	2.97
12,363.0	89.93	339.00	6,417.5	4,963.0	-3,041.8	5,741.9	0.87
12,459.0	90.87	338.91	6,416.8	5,052.5	-3,076.3	5,837.9	0.98
12,554.0	90.57	338.65	6,415.6	5,141.1	-3,110.7	5,932.9	0.42
12,650.0	89.93	337.18	6,415.2	5,230.1	-3,146.8	6,028.8	1.67
12,746.0	89.90	334.50	6,415.4	5,317.6	-3,186.0	6,124.8	2.79
12,842.0	89.33	337.67	6,416.0	5,405.4	-3,225.0	6,220.7	3.35
12,937.0	89.90	338.16	6,416.6	5,493.4	-3,260.7	6,315.7	0.79
13,039.0	90.24	337.86	6,416.5	5,588.0	-3,298.9	6,417.7	0.44
13,097.0	90.24	337.86	6,416.3	5,641.7	-3,320.7	6,475.7	0.00

PTB



<b>Company:</b>	Antero	<b>Local Co-ordinate Reference:</b>	Well Penns Park Unit 1H
<b>Project:</b>	Ritchie County WV	<b>TVD Reference:</b>	Frontier 22 GL 1143' + KB 25' @ 1168.0usft
<b>Site:</b>	Noland Pad Penns Park/Knoll/Piper/Western	<b>MD Reference:</b>	Frontier 22 GL 1143' + KB 25' @ 1168.0usft
<b>Well:</b>	Penns Park Unit 1H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Wellpath	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Oklahoma District

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
6,674.2	6,396.0	Marcellus		0.00	337.95
4,458.0	4,452.0	Bradford		0.00	337.95
3,111.5	3,110.0	Fifty foot SS		0.00	337.95
3,314.5	3,313.0	Bayard		0.00	337.95
2,011.5	2,010.0	Big Lime		0.00	337.95
3,934.5	3,933.0	Balltown		0.00	337.95
5,371.2	5,298.0	Alexander		0.00	337.95
1,671.5	1,670.0	salt water flow		0.00	337.95
6,462.4	6,270.0	Middlesex		0.00	337.95
5,043.5	5,000.0	Benson		0.00	337.95
6,607.6	6,365.0	Burkett		0.00	337.95
2,961.5	2,960.0	Gordon		0.00	337.95
6,347.1	6,175.0	Sycamore		0.00	337.95
6,897.9	6,431.0	Landing Point		0.00	337.95
3,163.5	3,162.0	Fifth Sand		0.00	337.95
6,646.7	6,384.0	Tully		0.00	337.95
3,556.5	3,555.0	Speechly		0.00	337.95

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
6,451.0	6,261.1	-399.1	-777.3	Middlesex
6,598.0	6,360.0	-335.2	-863.8	Burkett
6,653.0	6,386.9	-303.5	-899.8	Tully
6,688.0	6,401.5	-281.7	-922.9	Marcellus
13,097.0	6,416.3	5,641.7	-3,320.7	PTB

Checked By: _____	Approved By: _____	Date: _____
-------------------	--------------------	-------------

Gas