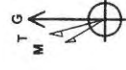




**Duckworth Unit 3H**  
**Ritchie County WW**  
**Northing: 14236693.67**  
**Easting: 1663157.25**  
**As Drilled**



To convert Magnetic North to Grid, Subtract 8.42°  
 To convert True North to Grid, Subtract 0.65°

Azimuths to Grid North  
 True North: -0.05°  
 Magnetic North: -8.42°  
 Magnetic Field  
 Strength: 52191.5nT  
 Dip Angle: 66.80°  
 Date: 10/15/2014  
 Model: BGGM2014

Frontier 23 GL 1025' KB 23' @ 1048.0usft  
 Gr: 1025.0

**WELL DETAILS** Duckworth Unit 3H  
 Ground Level: 1025.0  
 Easting: 1663157.2589° 12' 19.044 160° 55' 11.004 W  
 Northing: 14236693.67  
 Latitude: 30° 00' 00.000 100° 55' 11.004 W  
 Longitude: 1025.0

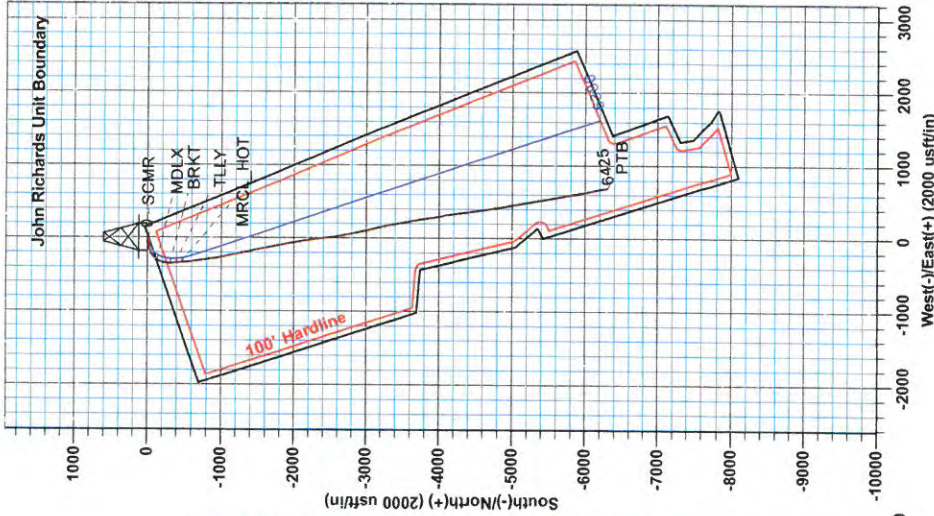
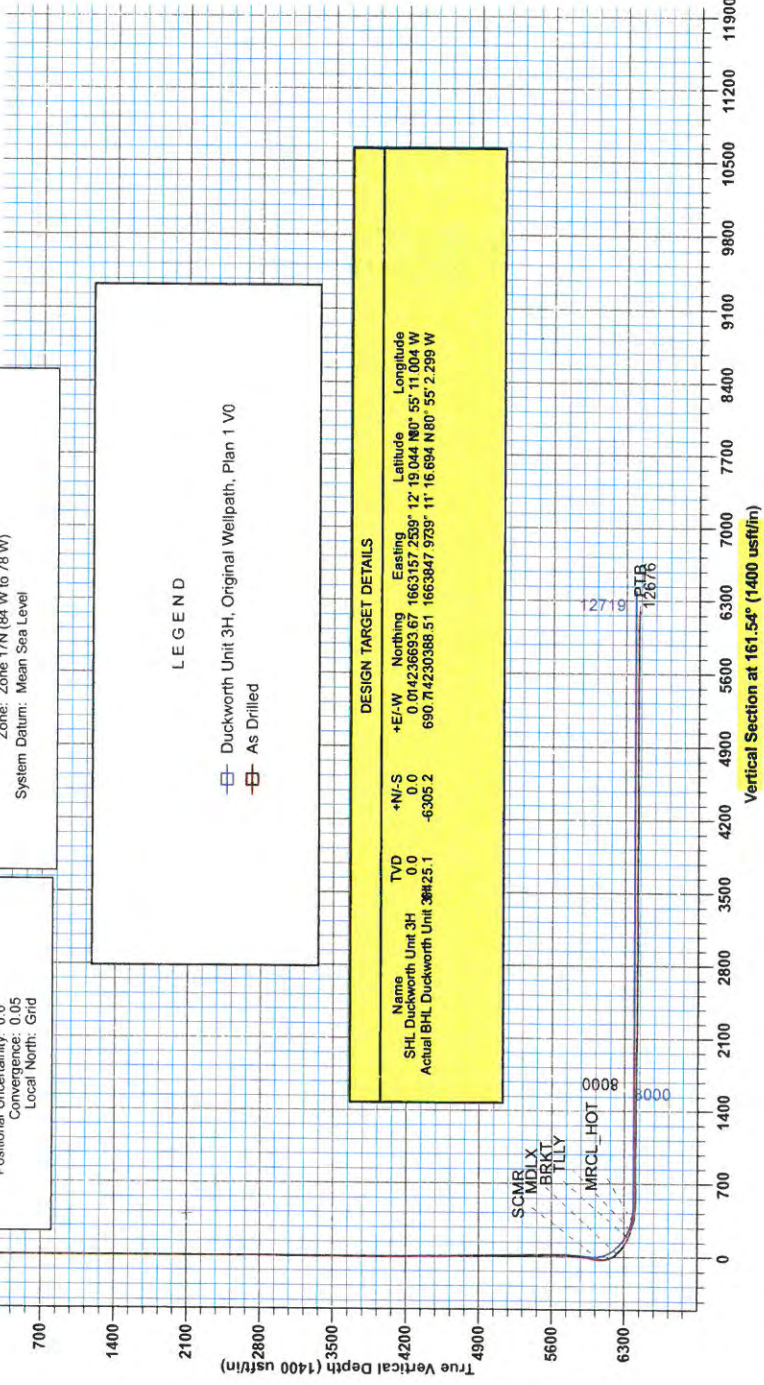
Genie Lightfoot  
 13.46, July 13 2015  
 Scientific Drilling, Inter  
 11220 NW 10th Street  
 Yukon, OK 73099

**SITE DETAILS:** John Richards Part: Duckworth/Stairh  
 Site Centre Northing: 14236693.67  
 Easting: 1663157.25  
 Positional Uncertainty: 0.0  
 Convergence: 0.05  
 Local North: Grid

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

**LEGEND**  
 □ Duckworth Unit 3H, Original Wellpath, Plan 1 V0  
 □ As Drilled

DESIGN TARGET DETAILS							
Name	TVD	+N-S	+E-W	Northing	Eastng	Latitude	Longitude
SHL Duckworth Unit 3H	0.0	0	0	0 014236693.67	1663157.2339° 12' 19.044 160° 55' 11.004 W	30° 00' 00.000	1025.0
Actual BHL Duckworth Unit 3H	364.25	1	-6305.2	690 71423693.68	1663847.9239° 11' 16.694 N80° 55' 2.299 W	29° 59' 59.999	-6305.2





# **Antero**

**Ritchie County WV  
John Richards Pad: Duckworth/Stalnaker  
Duckworth Unit 3H  
Original Wellpath**

**Design: As Drilled**

## **EOW Completion Report**

**13 July, 2015**





**Company:** Antero  
**Project:** Ritchie County WV  
**Site:** John Richards Pad: Duckworth/Stalnaker  
**Well:** Duckworth Unit 3H  
**Wellbore:** Original Wellpath  
**Design:** As Drilled

**Local Co-ordinate Reference:** Well Duckworth Unit 3H  
**TVD Reference:** Frontier 23 GL 1025' KB 23' @ 1048.0usft  
**MD Reference:** Frontier 23 GL 1025' KB 23' @ 1048.0usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** Antero NE

<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)		

**Site** John Richards Pad: Duckworth/Stalnaker

**Site Position:**  
**From:** Map  
**Position Uncertainty:** 0.0 usft  
**Northing:** 14,236,693.67 usft  
**Easting:** 1,663,157.25 usft  
**Slot Radius:** 13-3/16"  
**Latitude:** 39° 12' 19.044 N  
**Longitude:** 80° 55' 11.004 W  
**Grid Convergence:** 0.05 °

**Well** Duckworth Unit 3H, Marcellus

**Well Position** +N/-S 0.0 usft  
 +E/-W 0.0 usft  
**Position Uncertainty** 2.0 usft  
**Wellhead Elevation:** 1,048.0 usft  
**Ground Level:** 1,025.0 usft  
**Northing:** 14,236,693.67 usft  
**Easting:** 1,663,157.25 usft  
**Latitude:** 39° 12' 19.044 N  
**Longitude:** 80° 55' 11.004 W

**Wellbore** Original Wellpath

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2014	10/15/2014	-8.37	66.80	52,191

**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	161.54

**Survey Program** Date 7/13/2015

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
25.0	5,525.0	Survey #1 Def Gyro Survey to KOP (Origir	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4
5,560.0	12,676.0	Survey #3 Corrected (Original Wellpath)	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
25.0	0.03	283.44	25.0	0.0	0.0	0.0	0.12
50.0	0.05	283.44	50.0	0.0	0.0	0.0	0.08
75.0	0.08	283.44	75.0	0.0	-0.1	0.0	0.12
100.0	0.10	283.44	100.0	0.0	-0.1	0.0	0.08
125.0	0.07	333.93	125.0	0.0	-0.1	-0.1	0.31
150.0	0.24	235.53	150.0	0.0	-0.2	-0.1	1.04
175.0	0.19	253.66	175.0	0.0	-0.2	-0.1	0.34
200.0	0.26	322.91	200.0	0.0	-0.3	-0.1	1.05
225.0	0.19	262.84	225.0	0.1	-0.4	-0.2	0.93
250.0	0.07	263.08	250.0	0.0	-0.5	-0.2	0.48



**Company:** Antero  
**Project:** Ritchie County WV  
**Site:** John Richards Pad: Duckworth/Stalnaker  
**Well:** Duckworth Unit 3H  
**Wellbore:** Original Wellpath  
**Design:** As Drilled

**Local Co-ordinate Reference:** Well Duckworth Unit 3H  
**TVD Reference:** Frontier 23 GL 1025' KB 23' @ 1048.0usft  
**MD Reference:** Frontier 23 GL 1025' KB 23' @ 1048.0usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** Antero NE

**Survey**

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
275.0	0.08	247.14	275.0	0.0	-0.5	-0.2	0.09
300.0	0.20	210.70	300.0	0.0	-0.5	-0.2	0.57
325.0	0.21	214.95	325.0	-0.1	-0.6	-0.1	0.07
350.0	0.03	356.95	350.0	-0.1	-0.6	-0.1	0.94
375.0	0.18	219.30	375.0	-0.1	-0.6	-0.1	0.81
400.0	0.22	246.11	400.0	-0.2	-0.7	0.0	0.40
425.0	0.19	322.21	425.0	-0.2	-0.8	-0.1	1.02
450.0	0.14	261.38	450.0	-0.1	-0.8	-0.1	0.69
475.0	0.17	340.11	475.0	-0.1	-0.9	-0.2	0.79
500.0	0.16	220.03	500.0	-0.1	-0.9	-0.2	1.14
525.0	0.05	270.45	525.0	-0.1	-0.9	-0.2	0.54
550.0	0.18	213.58	550.0	-0.2	-1.0	-0.2	0.63
575.0	0.15	225.63	575.0	-0.2	-1.0	-0.1	0.18
600.0	0.08	256.51	600.0	-0.2	-1.0	-0.1	0.36
625.0	0.15	206.68	625.0	-0.3	-1.1	-0.1	0.46
650.0	0.05	253.74	650.0	-0.3	-1.1	-0.1	0.49
675.0	0.11	237.20	675.0	-0.3	-1.1	0.0	0.25
700.0	0.23	228.47	700.0	-0.4	-1.2	0.0	0.49
725.0	0.19	259.49	725.0	-0.4	-1.3	0.0	0.47
750.0	0.20	218.50	750.0	-0.5	-1.3	0.0	0.55
775.0	0.09	209.50	775.0	-0.5	-1.4	0.0	0.45
800.0	0.15	198.94	800.0	-0.6	-1.4	0.1	0.25
825.0	0.13	196.36	825.0	-0.6	-1.4	0.1	0.08
850.0	0.18	188.82	850.0	-0.7	-1.4	0.2	0.22
875.0	0.16	198.25	875.0	-0.8	-1.4	0.3	0.14
900.0	0.27	188.09	900.0	-0.8	-1.5	0.3	0.46
925.0	0.25	185.16	925.0	-1.0	-1.5	0.4	0.10
950.0	0.24	180.92	950.0	-1.1	-1.5	0.5	0.08
975.0	0.29	211.22	975.0	-1.2	-1.5	0.6	0.59
1,000.0	0.21	192.51	1,000.0	-1.3	-1.6	0.7	0.45
1,025.0	0.30	185.84	1,025.0	-1.4	-1.6	0.8	0.38
1,050.0	0.22	184.28	1,050.0	-1.5	-1.6	0.9	0.32
1,075.0	0.14	193.80	1,075.0	-1.6	-1.6	1.0	0.34
1,100.0	0.25	196.72	1,100.0	-1.6	-1.6	1.1	0.44
1,125.0	0.14	218.60	1,125.0	-1.7	-1.7	1.1	0.52
1,150.0	0.10	208.70	1,150.0	-1.8	-1.7	1.1	0.18
1,175.0	0.18	238.81	1,175.0	-1.8	-1.7	1.2	0.42
1,200.0	0.12	227.00	1,200.0	-1.8	-1.8	1.2	0.27
1,225.0	0.14	205.80	1,225.0	-1.9	-1.8	1.2	0.21
1,250.0	0.11	194.15	1,250.0	-1.9	-1.8	1.3	0.16
1,275.0	0.03	177.49	1,275.0	-2.0	-1.8	1.3	0.33
1,300.0	0.07	175.63	1,300.0	-2.0	-1.8	1.3	0.16
1,325.0	0.03	222.52	1,325.0	-2.0	-1.8	1.3	0.22
1,350.0	0.14	168.21	1,350.0	-2.0	-1.8	1.4	0.50

**Company:** Antero  
**Project:** Ritchie County WV  
**Site:** John Richards Pad: Duckworth/Stalnaker  
**Well:** Duckworth Unit 3H  
**Wellbore:** Original Wellpath  
**Design:** As Drilled

**Local Co-ordinate Reference:** Well Duckworth Unit 3H  
**TVD Reference:** Frontier 23 GL 1025' KB 23' @ 1048.0usft  
**MD Reference:** Frontier 23 GL 1025' KB 23' @ 1048.0usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** Antero NE

**Survey**

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
1,375.0	0.04	137.49	1,375.0	-2.1	-1.8	1.4	0.43
1,400.0	0.10	142.71	1,400.0	-2.1	-1.8	1.4	0.24
1,425.0	0.07	60.73	1,425.0	-2.1	-1.8	1.4	0.46
1,450.0	0.14	20.21	1,450.0	-2.1	-1.8	1.4	0.39
1,475.0	0.08	270.31	1,475.0	-2.1	-1.8	1.4	0.73
1,500.0	0.05	279.83	1,500.0	-2.1	-1.8	1.4	0.13
1,525.0	0.14	327.17	1,525.0	-2.0	-1.8	1.3	0.45
1,550.0	0.10	261.83	1,550.0	-2.0	-1.9	1.3	0.54
1,575.0	0.19	274.77	1,575.0	-2.0	-1.9	1.3	0.38
1,600.0	0.26	269.93	1,600.0	-2.0	-2.0	1.3	0.29
1,625.0	0.22	278.50	1,625.0	-2.0	-2.1	1.2	0.21
1,650.0	0.32	284.53	1,650.0	-2.0	-2.2	1.2	0.42
1,675.0	0.29	288.83	1,675.0	-1.9	-2.4	1.1	0.15
1,700.0	0.34	283.97	1,700.0	-1.9	-2.5	1.0	0.23
1,725.0	0.31	269.65	1,725.0	-1.9	-2.6	0.9	0.35
1,750.0	0.29	278.62	1,750.0	-1.9	-2.8	0.9	0.20
1,775.0	0.28	269.79	1,775.0	-1.9	-2.9	0.8	0.18
1,800.0	0.24	288.14	1,800.0	-1.8	-3.0	0.8	0.37
1,825.0	0.33	276.08	1,825.0	-1.8	-3.1	0.7	0.43
1,850.0	0.31	269.51	1,850.0	-1.8	-3.3	0.7	0.17
1,875.0	0.24	284.63	1,875.0	-1.8	-3.4	0.6	0.40
1,900.0	0.29	277.28	1,900.0	-1.8	-3.5	0.6	0.24
1,925.0	0.28	277.20	1,925.0	-1.8	-3.6	0.5	0.04
1,950.0	0.30	270.98	1,950.0	-1.7	-3.7	0.5	0.15
1,975.0	0.17	263.15	1,975.0	-1.8	-3.8	0.4	0.53
2,000.0	0.33	260.60	2,000.0	-1.8	-4.0	0.4	0.64
2,025.0	0.26	265.02	2,025.0	-1.8	-4.1	0.4	0.29
2,050.0	0.21	274.38	2,050.0	-1.8	-4.2	0.4	0.25
2,075.0	0.20	274.64	2,075.0	-1.8	-4.3	0.3	0.04
2,100.0	0.20	273.84	2,100.0	-1.8	-4.4	0.3	0.01
2,125.0	0.21	256.54	2,125.0	-1.8	-4.4	0.3	0.25
2,150.0	0.16	256.45	2,150.0	-1.8	-4.5	0.3	0.20
2,175.0	0.17	262.55	2,175.0	-1.8	-4.6	0.3	0.08
2,200.0	0.15	269.09	2,200.0	-1.8	-4.7	0.2	0.11
2,225.0	0.22	284.69	2,225.0	-1.8	-4.7	0.2	0.34
2,250.0	0.23	257.84	2,250.0	-1.8	-4.8	0.2	0.42
2,275.0	0.16	292.20	2,275.0	-1.8	-4.9	0.2	0.53
2,300.0	0.28	284.00	2,300.0	-1.8	-5.0	0.1	0.50
2,325.0	0.11	251.11	2,325.0	-1.8	-5.1	0.1	0.79
2,350.0	0.14	239.47	2,350.0	-1.8	-5.1	0.1	0.16
2,375.0	0.27	237.82	2,375.0	-1.8	-5.2	0.1	0.52
2,400.0	0.26	250.34	2,400.0	-1.9	-5.3	0.1	0.23
2,425.0	0.27	247.91	2,425.0	-1.9	-5.4	0.1	0.06
2,450.0	0.32	262.03	2,450.0	-2.0	-5.6	0.1	0.35
2,475.0	0.30	252.30	2,475.0	-2.0	-5.7	0.1	0.22



**Company:** Antero  
**Project:** Ritchie County WV  
**Site:** John Richards Pad: Duckworth/Stalnaker  
**Well:** Duckworth Unit 3H  
**Wellbore:** Original Wellpath  
**Design:** As Drilled

**Local Co-ordinate Reference:** Well Duckworth Unit 3H  
**TVD Reference:** Frontier 23 GL 1025' KB 23' @ 1048.0usft  
**MD Reference:** Frontier 23 GL 1025' KB 23' @ 1048.0usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** Antero NE

**Survey**

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
2,500.0	0.32	240.51	2,500.0	-2.0	-5.8	0.1	0.27
2,525.0	0.38	262.49	2,525.0	-2.1	-6.0	0.1	0.58
2,550.0	0.23	255.47	2,550.0	-2.1	-6.1	0.1	0.62
2,575.0	0.29	264.34	2,575.0	-2.1	-6.2	0.1	0.29
2,600.0	0.35	265.74	2,600.0	-2.1	-6.3	0.0	0.24
2,625.0	0.31	268.54	2,625.0	-2.2	-6.5	0.0	0.17
2,650.0	0.25	257.24	2,650.0	-2.2	-6.6	0.0	0.33
2,675.0	0.31	263.43	2,675.0	-2.2	-6.7	-0.1	0.27
2,700.0	0.43	265.68	2,700.0	-2.2	-6.9	-0.1	0.48
2,725.0	0.51	270.66	2,725.0	-2.2	-7.1	-0.2	0.36
2,750.0	0.43	266.94	2,750.0	-2.2	-7.3	-0.2	0.34
2,775.0	0.54	266.72	2,775.0	-2.2	-7.5	-0.3	0.44
2,800.0	0.51	262.70	2,800.0	-2.2	-7.7	-0.3	0.19
2,825.0	0.47	264.28	2,825.0	-2.3	-7.9	-0.4	0.17
2,850.0	0.55	265.62	2,850.0	-2.3	-8.2	-0.4	0.32
2,875.0	0.48	269.58	2,875.0	-2.3	-8.4	-0.5	0.31
2,900.0	0.63	265.58	2,900.0	-2.3	-8.6	-0.5	0.62
2,925.0	0.58	263.04	2,925.0	-2.3	-8.9	-0.6	0.23
2,950.0	0.54	266.97	2,950.0	-2.4	-9.1	-0.7	0.22
2,975.0	0.44	262.55	2,975.0	-2.4	-9.3	-0.7	0.43
3,000.0	0.57	255.06	3,000.0	-2.4	-9.6	-0.7	0.58
3,025.0	0.62	260.98	3,025.0	-2.5	-9.8	-0.8	0.32
3,050.0	0.45	258.02	3,050.0	-2.5	-10.0	-0.8	0.69
3,075.0	0.52	267.39	3,075.0	-2.5	-10.3	-0.8	0.42
3,100.0	0.50	270.05	3,100.0	-2.5	-10.5	-0.9	0.12
3,125.0	0.50	252.84	3,125.0	-2.6	-10.7	-0.9	0.60
3,150.0	0.48	267.43	3,150.0	-2.6	-10.9	-1.0	0.50
3,175.0	0.37	261.53	3,175.0	-2.6	-11.1	-1.0	0.47
3,200.0	0.47	273.46	3,200.0	-2.6	-11.3	-1.1	0.53
3,225.0	0.40	267.61	3,225.0	-2.6	-11.5	-1.1	0.33
3,250.0	0.46	270.15	3,250.0	-2.6	-11.6	-1.2	0.25
3,275.0	0.23	262.29	3,275.0	-2.6	-11.8	-1.2	0.94
3,300.0	0.22	246.34	3,300.0	-2.7	-11.9	-1.2	0.25
3,325.0	0.31	234.07	3,325.0	-2.7	-12.0	-1.2	0.42
3,350.0	0.30	242.91	3,350.0	-2.8	-12.1	-1.2	0.19
3,375.0	0.26	229.75	3,375.0	-2.9	-12.2	-1.1	0.30
3,400.0	0.29	237.04	3,400.0	-2.9	-12.3	-1.1	0.18
3,425.0	0.41	247.82	3,425.0	-3.0	-12.4	-1.1	0.55
3,450.0	0.40	251.97	3,450.0	-3.1	-12.6	-1.1	0.12
3,475.0	0.42	256.14	3,475.0	-3.1	-12.8	-1.1	0.14
3,500.0	0.46	258.83	3,500.0	-3.2	-13.0	-1.1	0.18
3,525.0	0.46	251.46	3,525.0	-3.2	-13.2	-1.1	0.24
3,550.0	0.50	251.92	3,550.0	-3.3	-13.4	-1.1	0.16
3,575.0	0.53	254.81	3,575.0	-3.3	-13.6	-1.1	0.16



**Company:** Antero  
**Project:** Ritchie County WV  
**Site:** John Richards Pad: Duckworth/Stalnaker  
**Well:** Duckworth Unit 3H  
**Wellbore:** Original Wellpath  
**Design:** As Drilled

**Local Co-ordinate Reference:** Well Duckworth Unit 3H  
**TVD Reference:** Frontier 23 GL 1025' KB 23' @ 1048.0usft  
**MD Reference:** Frontier 23 GL 1025' KB 23' @ 1048.0usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** Antero NE

**Survey**

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
3,600.0	0.29	251.56	3,600.0	-3.4	-13.7	-1.1	0.96
3,625.0	0.43	249.96	3,625.0	-3.4	-13.9	-1.1	0.56
3,650.0	0.31	257.75	3,650.0	-3.5	-14.0	-1.1	0.52
3,675.0	0.13	218.97	3,675.0	-3.5	-14.1	-1.1	0.90
3,700.0	0.16	178.23	3,700.0	-3.6	-14.1	-1.1	0.42
3,725.0	0.18	167.67	3,725.0	-3.6	-14.1	-1.0	0.15
3,750.0	0.15	163.49	3,750.0	-3.7	-14.1	-0.9	0.13
3,775.0	0.31	90.98	3,775.0	-3.8	-14.0	-0.9	1.20
3,800.0	0.16	113.60	3,800.0	-3.8	-13.9	-0.8	0.69
3,825.0	0.39	111.53	3,825.0	-3.8	-13.8	-0.8	0.92
3,850.0	0.33	118.60	3,850.0	-3.9	-13.7	-0.7	0.30
3,875.0	0.37	103.03	3,875.0	-3.9	-13.5	-0.6	0.41
3,900.0	0.33	97.50	3,900.0	-4.0	-13.4	-0.5	0.21
3,925.0	0.40	94.83	3,924.9	-4.0	-13.2	-0.4	0.29
3,950.0	0.43	97.25	3,949.9	-4.0	-13.1	-0.3	0.14
3,975.0	0.37	88.91	3,974.9	-4.0	-12.9	-0.3	0.33
4,000.0	0.51	85.58	3,999.9	-4.0	-12.7	-0.2	0.57
4,050.0	0.67	87.47	4,049.9	-4.0	-12.2	-0.1	0.32
4,100.0	0.63	74.75	4,099.9	-3.9	-11.6	0.0	0.30
4,150.0	0.64	74.80	4,149.9	-3.7	-11.1	0.0	0.02
4,200.0	0.78	86.52	4,199.9	-3.6	-10.5	0.1	0.40
4,250.0	0.80	86.37	4,249.9	-3.6	-9.8	0.3	0.04
4,300.0	0.88	89.31	4,299.9	-3.6	-9.1	0.5	0.18
4,350.0	0.95	88.42	4,349.9	-3.6	-8.3	0.8	0.14
4,400.0	1.03	89.16	4,399.9	-3.5	-7.4	1.0	0.16
4,450.0	0.98	95.80	4,449.9	-3.6	-6.5	1.3	0.25
4,500.0	0.95	101.25	4,499.9	-3.7	-5.7	1.7	0.19
4,550.0	0.91	97.94	4,549.9	-3.8	-4.9	2.1	0.13
4,600.0	0.92	102.28	4,599.9	-4.0	-4.1	2.5	0.14
4,650.0	0.94	107.71	4,649.9	-4.2	-3.3	2.9	0.18
4,700.0	1.11	102.08	4,699.9	-4.4	-2.5	3.4	0.39
4,750.0	1.16	104.20	4,749.9	-4.6	-1.5	3.9	0.13
4,800.0	1.07	107.35	4,799.8	-4.9	-0.6	4.5	0.22
4,850.0	1.31	114.59	4,849.8	-5.3	0.4	5.1	0.57
4,900.0	1.36	107.48	4,899.8	-5.7	1.5	5.9	0.35
4,950.0	1.35	112.87	4,949.8	-6.1	2.6	6.6	0.26
5,000.0	1.60	112.61	4,999.8	-6.6	3.8	7.5	0.50
5,050.0	1.71	110.55	5,049.8	-7.1	5.1	8.4	0.25
5,100.0	1.77	106.84	5,099.8	-7.6	6.6	9.3	0.26
5,150.0	1.95	113.16	5,149.7	-8.2	8.1	10.3	0.55
5,200.0	1.78	109.00	5,199.7	-8.8	9.6	11.3	0.43
5,250.0	1.90	110.81	5,249.7	-9.3	11.1	12.3	0.27
5,300.0	1.80	114.24	5,299.6	-9.9	12.6	13.4	0.30
5,350.0	1.90	109.44	5,349.6	-10.5	14.1	14.4	0.37

**Company:** Antero  
**Project:** Ritchie County WV  
**Site:** John Richards Pad: Duckworth/Stalaker  
**Well:** Duckworth Unit 3H  
**Wellbore:** Original Wellpath  
**Design:** As Drilled

**Local Co-ordinate Reference:** Well Duckworth Unit 3H  
**TVD Reference:** Frontier 23 GL 1025' KB 23' @ 1048.0usft  
**MD Reference:** Frontier 23 GL 1025' KB 23' @ 1048.0usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** Antero NE

**Survey**

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
5,400.0	1.91	109.99	5,399.6	-11.1	15.7	15.5	0.04
5,450.0	1.92	112.47	5,449.6	-11.7	17.2	16.5	0.17
5,500.0	1.88	113.84	5,499.5	-12.3	18.8	17.6	0.12
5,525.0	1.84	114.19	5,524.5	-12.7	19.5	18.2	0.17
5,560.0	1.77	127.44	5,559.5	-13.2	20.4	19.0	1.21
5,593.0	1.58	112.25	5,592.5	-13.7	21.3	19.7	1.46
5,625.0	1.01	225.34	5,624.5	-14.1	21.5	20.1	6.82
5,657.0	3.61	249.80	5,656.5	-14.6	20.3	20.3	8.51
5,689.0	6.10	261.99	5,688.4	-15.2	17.7	20.0	8.38
5,720.0	8.61	268.55	5,719.1	-15.5	13.7	19.0	8.53
5,752.0	11.47	268.93	5,750.6	-15.6	8.2	17.4	8.94
5,784.0	14.42	266.98	5,781.8	-15.9	1.0	15.4	9.32
5,817.0	18.17	266.47	5,813.5	-16.4	-8.2	13.0	11.37
5,849.0	20.76	265.65	5,843.6	-17.2	-18.9	10.3	8.14
5,881.0	23.04	266.46	5,873.3	-18.0	-30.8	7.3	7.19
5,912.0	25.77	269.40	5,901.5	-18.4	-43.6	3.7	9.64
5,944.0	28.85	271.62	5,930.0	-18.3	-58.3	-1.1	10.14
5,976.0	32.10	271.90	5,957.5	-17.8	-74.5	-6.7	10.17
6,009.0	34.97	271.36	5,985.1	-17.3	-92.7	-13.0	8.74
6,041.0	37.48	267.85	6,010.9	-17.4	-111.6	-18.8	10.17
6,071.0	39.41	263.08	6,034.4	-18.9	-130.2	-23.3	11.79
6,103.0	40.48	257.34	6,058.9	-22.4	-150.4	-26.4	11.99
6,123.0	41.57	252.74	6,074.0	-25.8	-163.1	-27.2	16.05
<b>SCMR</b>							
6,135.0	42.31	250.08	6,082.9	-28.3	-170.7	-27.2	16.05
6,167.0	44.53	245.83	6,106.2	-36.6	-191.0	-25.8	11.46
6,199.0	47.19	241.02	6,128.5	-46.9	-211.6	-22.5	13.61
6,231.0	49.03	234.85	6,149.8	-59.5	-231.7	-16.9	15.46
6,263.0	51.85	230.80	6,170.2	-74.5	-251.4	-9.0	13.15
6,295.0	53.46	225.16	6,189.6	-91.5	-270.2	1.2	14.88
6,328.0	54.84	219.07	6,209.0	-111.3	-288.1	14.4	15.53
6,359.0	55.79	214.32	6,226.6	-131.8	-303.4	28.9	12.97
6,367.0	55.76	212.71	6,231.1	-137.3	-307.0	33.0	16.64
<b>MDLX</b>							
6,391.0	55.81	207.89	6,244.6	-154.4	-317.0	46.1	16.61
6,422.0	55.83	200.97	6,262.1	-177.7	-327.6	64.8	18.46
6,454.0	57.39	196.47	6,279.7	-203.0	-336.2	86.1	12.71
6,486.0	59.44	191.22	6,296.4	-229.5	-342.7	109.2	15.37
6,518.0	62.75	187.70	6,311.9	-257.1	-347.3	133.9	14.13
6,550.0	65.43	183.53	6,325.9	-285.7	-350.1	160.2	14.40
6,579.0	66.39	179.79	6,337.7	-312.2	-350.8	185.0	12.23
<b>BRKT</b>							
6,582.0	66.49	179.41	6,338.9	-314.9	-350.8	187.6	12.08
6,614.0	67.92	177.33	6,351.3	-344.4	-350.0	215.9	7.47
6,646.0	70.46	175.81	6,362.7	-374.3	-348.2	244.8	9.09





**Company:** Antero  
**Project:** Ritchie County WV  
**Site:** John Richards Pad: Duckworth/Stalaker  
**Well:** Duckworth Unit 3H  
**Wellbore:** Original Wellpath  
**Design:** As Drilled

**Local Co-ordinate Reference:** Well Duckworth Unit 3H  
**TVD Reference:** Frontier 23 GL 1025' KB 23' @ 1048.0usft  
**MD Reference:** Frontier 23 GL 1025' KB 23' @ 1048.0usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** Antero NE

**Survey**

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
6,660.0	71.25	175.68	6,367.3	-387.5	-347.2	257.6	5.71
<b>TLLY</b>							
6,678.0	72.26	175.52	6,372.9	-404.5	-345.9	274.2	5.67
6,710.0	74.44	174.91	6,382.1	-435.1	-343.3	304.0	7.05
6,735.0	76.89	174.82	6,388.3	-459.2	-341.2	327.5	9.81
<b>MRCL_HOT</b>							
6,742.0	77.57	174.80	6,389.8	-466.0	-340.6	334.2	9.72
6,773.0	80.78	175.01	6,395.7	-496.3	-337.9	363.8	10.38
6,805.0	82.92	174.45	6,400.2	-527.9	-334.9	394.6	6.91
6,816.2	84.11	174.17	6,401.5	-538.9	-333.8	405.5	10.92
6,861.0	88.90	173.07	6,404.2	-583.4	-328.9	449.2	10.97
6,883.0	89.25	172.46	6,404.5	-605.2	-326.1	470.8	3.20
6,974.0	88.99	172.02	6,405.9	-695.3	-313.8	560.2	0.56
7,065.0	89.16	170.44	6,407.4	-785.2	-299.9	649.9	1.75
7,156.0	91.54	172.11	6,406.9	-875.2	-286.1	739.5	3.19
7,246.0	90.57	168.77	6,405.2	-963.9	-271.2	828.4	3.86
7,337.0	90.04	168.15	6,404.7	-1,053.1	-253.0	918.8	0.90
7,428.0	88.99	167.01	6,405.5	-1,141.9	-233.4	1,009.3	1.70
7,519.0	88.81	167.27	6,407.2	-1,230.6	-213.2	1,099.8	0.35
7,609.0	89.60	167.19	6,408.5	-1,318.4	-193.3	1,189.4	0.88
7,700.0	90.13	167.10	6,408.7	-1,407.1	-173.0	1,279.9	0.59
7,790.0	89.60	168.77	6,408.9	-1,495.1	-154.2	1,369.4	1.95
7,881.0	89.78	169.12	6,409.4	-1,584.4	-136.8	1,459.6	0.43
7,972.0	89.96	169.47	6,409.6	-1,673.9	-119.9	1,549.8	0.43
8,068.0	89.87	169.47	6,409.7	-1,768.2	-102.3	1,644.9	0.09
8,165.0	89.87	170.24	6,410.0	-1,863.7	-85.2	1,740.8	0.79
8,261.0	90.04	169.47	6,410.0	-1,958.2	-68.3	1,835.8	0.82
8,357.0	88.55	171.14	6,411.2	-2,052.8	-52.2	1,930.7	2.33
8,453.0	87.58	170.17	6,414.5	-2,147.5	-36.6	2,025.4	1.43
8,549.0	88.55	170.79	6,417.7	-2,242.1	-20.7	2,120.2	1.20
8,646.0	89.96	172.02	6,419.0	-2,338.0	-6.2	2,215.8	1.93
8,742.0	90.31	174.13	6,418.7	-2,433.3	5.4	2,309.8	2.23
8,838.0	90.13	173.87	6,418.4	-2,528.8	15.4	2,403.5	0.33
8,934.0	89.69	169.82	6,418.5	-2,623.8	29.0	2,498.0	4.24
9,030.0	90.04	169.91	6,418.8	-2,718.3	45.9	2,593.0	0.38
9,126.0	89.96	169.65	6,418.8	-2,812.8	62.9	2,688.0	0.28
9,222.0	89.60	166.92	6,419.1	-2,906.8	82.4	2,783.3	2.87
9,319.0	89.08	165.96	6,420.2	-3,001.1	105.2	2,879.9	1.13
9,415.0	90.13	167.89	6,420.9	-3,094.6	126.9	2,975.5	2.29
9,511.0	90.04	166.57	6,420.8	-3,188.2	148.1	3,071.0	1.38
9,607.0	90.40	169.65	6,420.4	-3,282.1	167.9	3,166.4	3.23
9,703.0	90.48	169.29	6,419.7	-3,376.5	185.4	3,261.5	0.38
9,799.0	91.54	170.35	6,418.0	-3,471.0	202.4	3,356.4	1.56
9,896.0	88.81	167.36	6,417.7	-3,566.1	221.1	3,452.6	4.17
9,992.0	91.01	171.05	6,417.8	-3,660.4	239.1	3,547.8	4.47



**Company:** Antero  
**Project:** Ritchie County WV  
**Site:** John Richards Pad: Duckworth/Stalnakar  
**Well:** Duckworth Unit 3H  
**Wellbore:** Original Wellpath  
**Design:** As Drilled

**Local Co-ordinate Reference:** Well Duckworth Unit 3H  
**TVD Reference:** Frontier 23 GL 1025' KB 23' @ 1048.0usft  
**MD Reference:** Frontier 23 GL 1025' KB 23' @ 1048.0usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** Antero NE

**Survey**

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
10,088.0	89.78	170.88	6,417.2	-3,755.2	254.2	3,642.5	1.29
10,185.0	89.52	170.61	6,417.7	-3,850.9	269.8	3,738.2	0.39
10,280.0	91.19	171.40	6,417.2	-3,944.8	284.6	3,831.9	1.94
10,376.0	88.29	168.50	6,417.6	-4,039.3	301.4	3,926.9	4.27
10,473.0	89.25	170.35	6,419.7	-4,134.6	319.2	4,022.9	2.15
10,569.0	89.43	172.28	6,420.8	-4,229.5	333.7	4,117.5	2.02
10,665.0	89.25	172.72	6,421.9	-4,324.7	346.2	4,211.7	0.50
10,761.0	90.84	172.37	6,421.8	-4,419.8	358.6	4,306.0	1.70
10,857.0	90.66	172.28	6,420.6	-4,515.0	371.5	4,400.3	0.21
10,952.0	90.13	172.02	6,419.9	-4,609.1	384.4	4,493.6	0.62
11,048.0	90.84	170.35	6,419.1	-4,703.9	399.2	4,588.3	1.89
11,145.0	90.75	171.05	6,417.7	-4,799.7	414.8	4,684.0	0.73
11,241.0	90.48	169.47	6,416.7	-4,894.3	431.1	4,778.9	1.67
11,337.0	88.72	167.10	6,417.4	-4,988.2	450.6	4,874.2	3.07
11,434.0	89.69	168.86	6,418.7	-5,083.1	470.8	4,970.6	2.07
11,530.0	89.78	169.65	6,419.2	-5,177.4	488.7	5,065.7	0.83
11,627.0	90.13	170.44	6,419.2	-5,273.0	505.4	5,161.7	0.89
11,723.0	90.13	171.23	6,419.0	-5,367.7	520.7	5,256.4	0.82
11,819.0	90.31	171.76	6,418.7	-5,462.7	534.9	5,351.0	0.58
11,916.0	89.25	169.03	6,419.0	-5,558.3	551.1	5,446.8	3.02
12,012.0	89.43	168.24	6,420.1	-5,652.4	570.0	5,542.1	0.84
12,108.0	89.96	169.82	6,420.6	-5,746.7	588.3	5,637.2	1.74
12,205.0	90.22	170.09	6,420.5	-5,842.2	605.2	5,733.2	0.39
12,301.0	90.84	172.11	6,419.6	-5,937.0	620.0	5,827.8	2.20
12,397.0	88.90	167.89	6,419.8	-6,031.5	636.7	5,922.8	4.84
12,493.0	88.90	168.68	6,421.7	-6,125.5	656.2	6,018.1	0.82
12,589.0	88.81	169.29	6,423.6	-6,219.7	674.5	6,113.3	0.64
12,614.0	88.72	169.21	6,424.1	-6,244.3	679.2	6,138.0	0.48
12,676.0	89.40	169.37	6,425.1	-6,305.2	690.7	6,199.4	1.13

PTB

**Design Annotations**

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
6,123.0	6,074.0	-25.8	-163.1	SCMR
6,367.0	6,231.1	-137.3	-307.0	MDLX
6,579.0	6,337.7	-312.2	-350.8	BRKT
6,660.0	6,367.3	-387.5	-347.2	TLLY
6,735.0	6,388.3	-459.2	-341.2	MRCL_HOT
12,676.0	6,425.1	-6,305.2	690.7	PTB

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