

State of West Virginia
Department of Environmental Protection - Office of Oil and Gas
Well Operator's Report of Well Work

API 47-085-10102 County Ritchie District Union
Quad Pullman 7.5' Pad Name John Richards Pad Field/Pool Name ----
Farm name Richards, John Wayne Well Number Duckworth Unit 1H
Operator (as registered with the OOG) Antero Resources Corporation
Address 1615 Wynkoop St. City Denver State CO Zip 80202

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 4339576m Easting 506949m
Landing Point of Curve Northing 4339301.34m Easting 506548.39m
Bottom Hole Northing 4337106m Easting 506939m

Elevation (ft) 1025' GL Type of Well New Existing Type of Report Interim Final
Permit Type Deviated Horizontal Horizontal 6A Vertical Depth Type Deep Shallow
Type of Operation Convert Deepen Drill Plug Back Redrilling Rework Stimulate
Well Type Brine Disposal CBM Gas Oil Secondary Recovery Solution Mining Storage Other _____
Type of Completion Single Multiple Fluids Produced Brine Gas NGL Oil Other _____
Drilled with Cable Rotary

Drilling Media Surface hole Air Mud Fresh Water Intermediate hole Air Mud Fresh Water Brine
Production hole Air Mud Fresh Water Brine

Mud Type(s) and Additive(s)
Air- Foam & 4% KCL

Mud- Polymer

Date permit issued 6/25/2014 Date drilling commenced 9/30/2014 Date drilling ceased 12/*10/2014
Date completion activities began 9/3/2015 Date completion activities ceased 11/18/2015
Verbal plugging (Y/N) N/A Date permission granted N/A Granted by N/A

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 42', 52', 172' Open mine(s) (Y/N) depths No
Salt water depth(s) ft None Identified Void(s) encountered (Y/N) depths No
Coal depth(s) ft None Identified Cavern(s) encountered (Y/N) depths No
Is coal being mined in area (Y/N) No

APPROVED

NAME: Michael Gaff

DATE: 6/13/16

Reviewed by: _____

A-081812/2016

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API 47-085 - 10102 Farm name Richards, John Wayne Well number Duckworth Unit 1H

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade w/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	30"	20"	40'	New	94# K-55	N/A	Y
Surface	17- 1/2"	13- 3/8"	396'	New	48# H-40	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2523'	New	36# J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4" & 8-1/2"	5-1/2"	14553'	New	23# P-110	N/A	Y
Tubing		2-3/8"	6743'		4.7# N-80	N/A	
Packer type and depth set		N/A					

Comment Details First attempt to cement Surface Casing with 423 sacks of Class A Cement was unsuccessful. A top-job was performed with 273 sacks of cement, successfully bring returns to the surface. WVDEP Inspector, Dave Cowan, was notified on 11/16/2014 of cement top job.

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft ³ /sks)	Volume (ft ³)	Cement Top (MD)	WOC (hrs)
Conductor	Class A	150 sx	15.6	1.18	38	0'	8 Hrs.
Surface	Class A	696 sx*	15.6	1.18	283	0'	8 Hrs.
Coal							
Intermediate 1	Class A	982 sx	15.6	1.00	790	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	997 sx (Lead) 1225 sx (Tail)	14.5 Lead 15.2 Tail	1.30 Lead 1.86 Tail	2871	-500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 14553' MD, 6357' TVD (BHL), 6389' (Deepest Point Drilled) Loggers TD (ft) 14506'
 Deepest formation penetrated Marcellus Plug back to (ft) N/A
 Plug back procedure N/A

Kick off depth (ft) 6514'

** This is a subsequent well. Antero only runs wireline logs on one well on a multi-well pad (Duckworth Unit 3H API #47-085-10103). Please reference the wireline logs submitted with Form WR-35 for Duckworth Unit 3H. A Cement Bond Log has been included with this submittal.

Check all wireline logs run caliper density deviated/directional induction neutron resistivity gamma ray temperature sonic

Well cored Yes No Conventional Sidewall Were cuttings collected Yes No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING _____
 Conductor- 0
 Surface- 1 above guide shoe, 1 above insert float, 1 every 4th joint to surface
 Intermediate- 1 above float joint, 1 above float collar, 1 every 4th joint to surface
 Production- 1 above float joint, 1 below float collar, 1 every 3rd joint to top of cement

WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS _____

WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

WERE TRACERS USED Yes No TYPE OF TRACER(S) USED _____

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API 47-085 - 10102 Farm name Richards, John Wayne Well number Duckworth Unit 1H

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
*PLEASE SEE ATTACHED EXHIBIT 1					

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbbls)	Amount of Nitrogen/other (units)
*PLEASE SEE ATTACHED EXHIBIT 2								

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Please insert additional pages as applicable.

API 47- 085 - 10102 Farm name Richards, John Wayne Well number Duckworth Unit 1H

PRODUCING FORMATION(S)	DEPTHS	
Marcellus	6336' (TOP) TVD	6766' (TOP) MD

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump
 SHUT-IN PRESSURE Surface 3000 psi Bottom Hole --- psi DURATION OF TEST --- hrs
 OPEN FLOW Gas 8449 mcfpd Oil 63 bpd NGL --- bpd Water --- bpd GAS MEASURED BY Estimated Orifice Pilot

LITHOLOGY/ FORMATION	TOP DEPTH IN FT NAME TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H ₂ S, ETC)
	0		0		
*PLEASE SEE ATTACHED EXHIBIT 3					

Please insert additional pages as applicable.

Drilling Contractor Frontier Drilling LLC
 Address 562 Spring Run Rd. City Pennsboro State WV Zip 26415

Logging Company Rush Wellsite Services
 Address 600 Alpha Drive City Canonsburg State PA Zip 15317

Cementing Company Nabors Completion & Production Services, Co.
 Address 1650 Hackers Creek City Jane Lew State WV Zip 26378

Stimulating Company US Well Services
 Address 533 Industrial Park Dr. City Jane Lew State WV Zip 26378

Please insert additional pages as applicable.

Completed by Kara Quackenbush Telephone 303-357-7233
 Signature *Kara Quackenbush* Title Permit Representative Date 1/15/2016

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Submission of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

08/12/2016

EXHIBIT 1

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	3-Sep-15	14,296	14,462	60	Marcellus
2	6-Oct-15	14,099	14,265	60	Marcellus
3	6-Oct-15	13,902	14,068	60	Marcellus
4	7-Oct-15	13,705	13,871	60	Marcellus
5	7-Oct-15	13,508	13,674	60	Marcellus
6	7-Oct-15	13,311	13,477	60	Marcellus
7	7-Oct-15	13,114	13,280	60	Marcellus
8	8-Oct-15	12,917	13,083	60	Marcellus
9	8-Oct-15	12,720	12,886	60	Marcellus
10	8-Oct-15	12,523	12,689	60	Marcellus
11	8-Oct-15	12,326	12,492	60	Marcellus
12	9-Oct-15	12,129	12,295	60	Marcellus
13	9-Oct-15	11,932	12,098	60	Marcellus
14	9-Oct-15	11,735	11,901	60	Marcellus
15	9-Oct-15	11,538	11,704	60	Marcellus
16	10-Oct-15	11,341	11,507	60	Marcellus
17	10-Oct-15	11,144	11,310	60	Marcellus
18	10-Oct-15	10,947	11,113	60	Marcellus
19	10-Oct-15	10,750	10,916	60	Marcellus
20	10-Oct-15	10,553	10,719	60	Marcellus
21	11-Oct-15	10,356	10,522	60	Marcellus
22	11-Oct-15	10,159	10,325	60	Marcellus
23	11-Oct-15	9,962	10,128	60	Marcellus
24	12-Oct-15	9,764	9,931	60	Marcellus
25	12-Oct-15	9,567	9,734	60	Marcellus
26	13-Oct-15	9,370	9,537	60	Marcellus
27	14-Oct-15	9,173	9,340	60	Marcellus
28	14-Oct-15	8,976	9,143	60	Marcellus
29	14-Oct-15	8,779	8,946	60	Marcellus
30	14-Oct-15	8,582	8,749	60	Marcellus
31	14-Oct-15	8,385	8,552	60	Marcellus
32	15-Oct-15	8,188	8,355	60	Marcellus
33	15-Oct-15	7,991	8,158	60	Marcellus
34	15-Oct-15	7,794	7,961	60	Marcellus
35	15-Oct-15	7,597	7,764	60	Marcellus
36	15-Oct-15	7,400	7,567	60	Marcellus
37	16-Oct-15	7,203	7,370	60	Marcellus
38	16-Oct-15	7,006	7,173	60	Marcellus
39	16-Oct-15	6,809	6,976	60	Marcellus

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EXHIBIT 2

Stage No.	Stimulations Date	Avg Pump Rate	Avg Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/ other (units)
1	5-Oct-15	63.9	6,829	N/A	3,223	109,568	6,729	N/A
2	6-Oct-15	63.0	7,377	6,596	5,063	30,260	6,492	N/A
3	6-Oct-15	65.0	7,076	5,779	4,872	97,460	6,844	N/A
4	7-Oct-15	60.6	7,078	5,976	3,067	107,518	6,973	N/A
5	7-Oct-15	63.5	6,935	5,926	4,181	57,514	6,382	N/A
6	7-Oct-15	64.0	6,964	5,716	4,727	94,840	6,800	N/A
7	7-Oct-15	67.0	6,763	5,838	5,334	103,000	6,319	N/A
8	8-Oct-15	65.5	6,751	5,542	4,699	107,964	6,349	N/A
9	8-Oct-15	61.5	6,372	5,598	4,903	96,444	6,731	N/A
10	8-Oct-15	62.0	6,551	5,375	5,312	98,380	6,784	N/A
11	8-Oct-15	65.5	6,952	5,492	5,295	93,760	6,166	N/A
12	9-Oct-15	66.0	6,841	5,668	4,581	75,080	6,297	N/A
13	9-Oct-15	63.4	6,958	6,339	3,949	75,980	6,456	N/A
14	9-Oct-15	71.0	7,305	5,497	4,906	60,280	6,780	N/A
15	9-Oct-15	77.5	6,798	5,597	4,474	76,840	6,823	N/A
16	10-Oct-15	75.3	6,799	5,393	4,296	112,890	6,347	N/A
17	10-Oct-15	75.3	6,864	5,940	4,683	90,160	6,175	N/A
18	10-Oct-15	76.2	6,838	5,852	4,918	82,820	5,960	N/A
19	10-Oct-15	77.0	6,894	6,003	5,139	106,400	6,344	N/A
20	10-Oct-15	77.0	7,020	5,751	5,384	86,160	6,111	N/A
21	11-Oct-15	76.2	6,882	5,633	4,987	98,170	6,118	N/A
22	11-Oct-15	75.0	7,271	5,614	4,774	79,160	6,768	N/A
23	11-Oct-15	41.0	8,167	6,560	4,337	3,400	6,745	N/A
24	12-Oct-15	73.7	7,117	6,254	4,655	97,390	6,361	N/A
25	12-Oct-15	75.0	7,306	6,261	3,708	87,890	6,229	N/A
26	13-Oct-15	73.0	7,449	6,462	4,366	64,090	6,316	N/A
27	14-Oct-15	71.2	6,988	6,285	3,977	98,690	6,678	N/A
28	14-Oct-15	74.8	7,072	5,988	4,959	79,740	6,658	N/A
29	14-Oct-15	74.0	7,030	5,948	4,559	68,090	6,641	N/A
30	14-Oct-15	73.0	6,774	6,110	4,668	110,060	6,059	N/A
31	14-Oct-15	72.0	6,898	7,198	4,878	90,770	5,937	N/A
32	15-Oct-15	73.3	6,472	5,651	5,064	111,154	6,079	N/A
33	15-Oct-15	72.9	6,662	5,815	5,394	110,374	6,108	N/A
34	15-Oct-15	72.0	6,976	6,178	4,257	98,600	6,408	N/A
35	15-Oct-15	73.0	6,361	5,755	4,096	112,570	6,051	N/A
36	15-Oct-15	73.0	6,594	6,275	4,510	112,370	6,120	N/A
37	16-Oct-15	73.2	6,160	6,351	5,171	110,381	6,534	N/A
38	16-Oct-15	74.7	6,229	5,717	5,195	116,946	6,079	N/A
39	16-Oct-15	73.0	6,362	6,331	4,192	114,300	6,016	N/A
AVG=		69.9	6,891	5,954	4,635	3,527,463	249,767	TOTAL

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EXHIBIT 3

LITHOLOGY/ FORMATION	TOP DEPTH (TVD) From Surface	BOTTOM DEPTH (TVD) From Surface	TOP DEPTH (MD) From Surface	BOTTOM DEPTH (MD) From Surface
Fresh Water	42'	N/A	42'	N/A
Fresh Water	52'	N/A	52'	N/A
Fresh Water	172'	N/A	172'	N/A
Silt	0	37	0	37
Sandstone	37	97	37	97
Silty Shale	97	417	97	417
Silty Sandstone	417	657	417	657
Sandy siltstone	657	737	657	737
Limey Shale	737	817	737	817
Silty Shale	817	1317	817	1317
Sandstone	1317	1357	1317	1357
Sandy shale	1357	1417	1357	1417
Sandstone	1417	1497	1417	1497
Sandy shale	1497	1577	1497	1577
Shale / Coal	1577	1637	1577	1637
Sandstone (Tr Coal)	1637	1817	1637	1817
Shale	1817	1897	1817	1897
Limey Siltstone	1897	1947	1897	1966
Big Lime	1943	2034	1966	2036
Big Injun	2034	2289	2036	2291
Gantz Sand	2289	2455	2291	2457
Fifty Foot Sandstone	2455	2660	2457	2662
Gordon	2660	2933	2662	2935
Fifth Sandstone	2933	3046	2935	3048
Bayard	3046	3247	3048	3432
Warren	3247	3833	3432	3852
Speechley	3833	3950	3852	3976
Baltown	3950	4503	3976	4599
Bradford	4503	4886	4599	5026
Benson	4886	5116	5026	5291
Alexander	5116	5314	5291	5513
Elk	5314	5726	5513	5962
Rhinestreet	5726	6025	5962	6295
Sycamore	6025	6179	6295	6481
Middlesex	6179	6288	6481	6648
Burkett	6288	6316	6648	6708
Tully	6316	6336	6708	6766
Marcellus	6336	NA	6766	NA

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Duckworth Unit 1H
Ritchie County WV
 Northing: 14236711.81
 Easting: 1663165.95
 As Drilled



To convert Magnetic North to Grid, Subtract 8.42°
 To convert True North to Grid, Subtract 0.05°

Azimuths to Grid North
 True North: -0.05°
 Magnetic North: -8.42°

Magnetic Field
 Strength: 52184.8snT
 Dip Angle: 66.79°
 Date: 11/3/2014
 Model: BGGM2014

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

WELL DETAILS Duckworth Unit 1H						
Ground Level: 1025.0						
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	
0.0	0.0	14236711.81	1663165.9539	12° 19.224' N	0° 55' 10.893	W

Genie Lightfoot
 11:34, July 13 2015

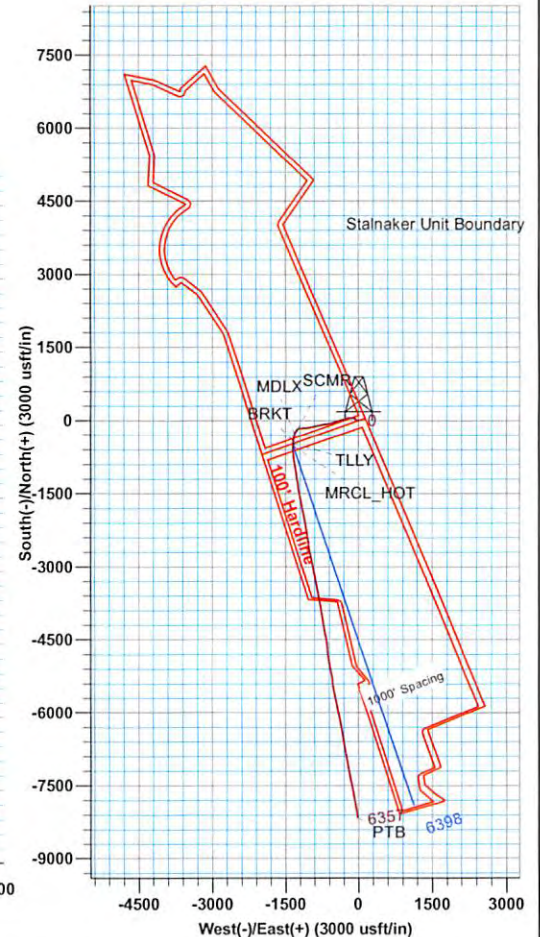
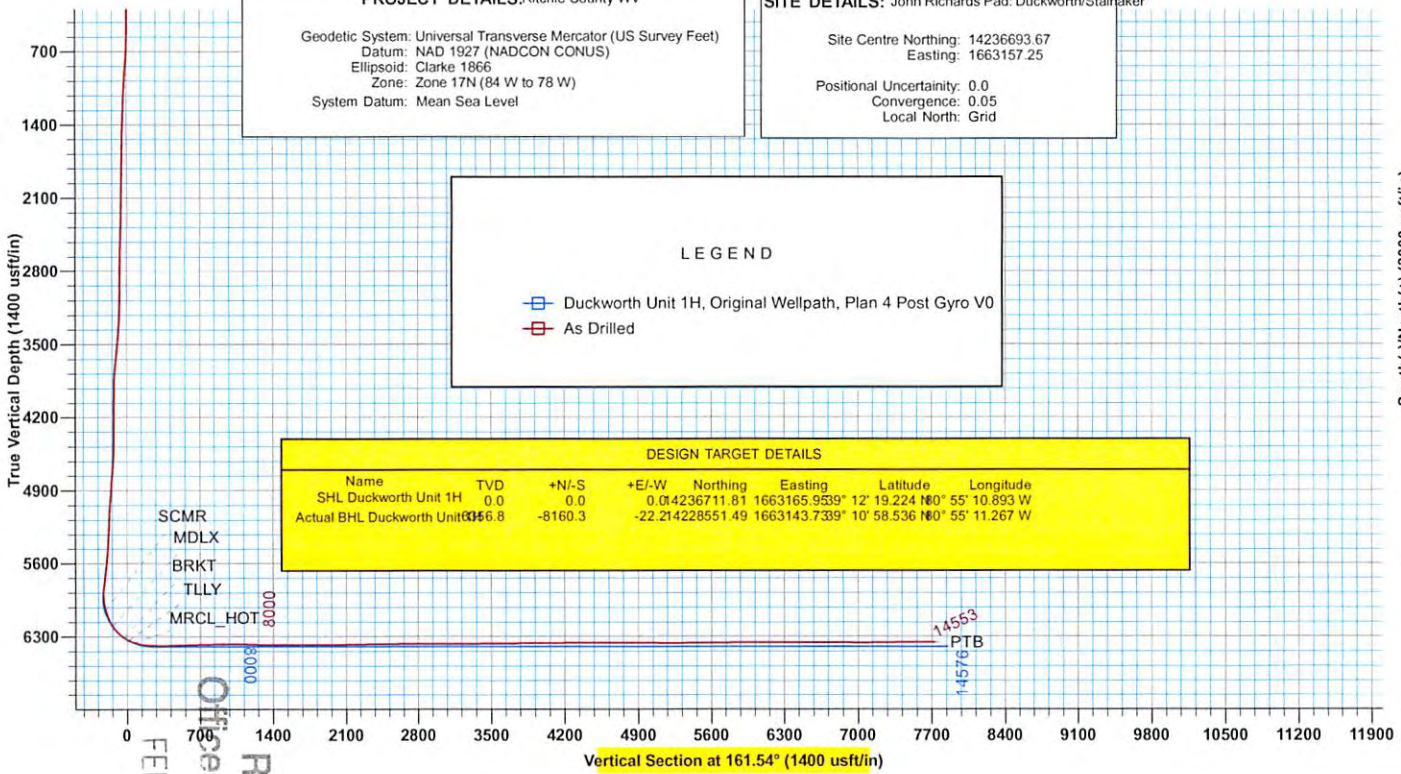
Scientific Drilling
 11220 N.W. 10th Street
 Yukon, OK 73099

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: John Richards Pad: Duckworth/Stalnaker	
Site Centre Northing:	14236693.67
Easting:	1663157.25
Positional Uncertainty:	0.0
Convergence:	0.05
Local North:	Grid

LEGEND	
	Duckworth Unit 1H, Original Wellpath, Plan 4 Post Gyro V0
	As Drilled

DESIGN TARGET DETAILS							
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
SHL Duckworth Unit 1H	0.0	0.0	0.0	14236711.81	1663165.9539	12° 19.224' N	0° 55' 10.893' W
Actual BHL Duckworth Unit 1H	6356.8	-8160.3	-22.21	4228551.49	1663143.7339	10° 58.536' N	0° 55' 11.267' W



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Ritchie County WV
John Richards Pad: Duckworth/Stalnaker
Duckworth Unit 1H
Original Wellpath

Design: As Drilled

EOW Completion Report

13 July, 2015

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EOW Completion Report



Company:	Antero	Local Co-ordinate Reference:	Well Duckworth Unit 1H
Project:	Ritchie County WV	TVD Reference:	Frontier 23: GL 1025' + KB 23' @ 1048.0usft
Site:	John Richards Pad: Duckworth/Stalaker	MD Reference:	Frontier 23: GL 1025' + KB 23' @ 1048.0usft
Well:	Duckworth Unit 1H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Antero NE

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

Well	Duckworth Unit 1H, Marcellu					
Well Position	+N/-S	0.0 usft	Northing:	14,236,711.81 usft	Latitude:	39° 12' 19.224 N
	+E/-W	0.0 usft	Easting:	1,663,165.95 usft	Longitude:	80° 55' 10.893 W
Position Uncertainty	2.0 usft	Wellhead Elevation:	1,048.0 usft	Ground Level:	1,025.0 usft	

Wellbore	Original Wellpath				
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2014	11/3/2014	-8.37	66.79	52,185

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	
49.3	5,992.9	Survey #6 Final Gyro (Original Wellpath)	SDI Standard Keeper	Scientific Drilling Intl. Standard Wireline Keeper	
6,066.0	14,553.0	Survey #8 Corrected (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
49.3	0.40	283.07	49.3	0.0	-0.2	-0.1	0.81
73.9	0.29	258.77	73.9	0.0	-0.3	-0.1	0.74
96.6	0.35	270.42	96.6	0.0	-0.4	-0.2	0.39
122.4	0.36	235.49	122.4	0.0	-0.6	-0.2	0.83
147.4	0.30	245.76	147.4	-0.1	-0.7	-0.1	0.34
172.4	0.32	228.92	172.4	-0.2	-0.8	-0.1	0.37
196.8	0.36	228.14	196.8	-0.2	-0.9	-0.1	0.16
222.0	0.33	248.58	222.0	-0.3	-1.1	0.0	0.50
247.0	0.35	243.76	247.0	-0.4	-1.2	0.0	0.14
272.0	0.34	251.30	272.0	-0.4	-1.3	0.0	0.19

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Company:	Antero	Local Co-ordinate Reference:	Well Duckworth Unit 1H
Project:	Ritchie County WV	TVD Reference:	Frontier 23: GL 1025' + KB 23' @ 1048.0usft
Site:	John Richards Pad: Duckworth/Stalnaker	MD Reference:	Frontier 23: GL 1025' + KB 23' @ 1048.0usft
Well:	Duckworth Unit 1H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Antero NE

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
297.0	0.31	248.91	297.0	-0.5	-1.5	0.0	0.13
322.8	0.32	232.75	322.8	-0.6	-1.6	0.0	0.35
347.7	0.37	234.48	347.7	-0.7	-1.7	0.1	0.20
372.5	0.39	246.61	372.5	-0.7	-1.8	0.1	0.33
397.5	0.39	231.90	397.5	-0.8	-2.0	0.1	0.40
421.7	0.44	230.01	421.7	-0.9	-2.1	0.2	0.21
447.5	0.50	225.99	447.5	-1.1	-2.3	0.3	0.27
472.5	0.53	233.54	472.5	-1.2	-2.5	0.4	0.30
497.5	0.54	238.30	497.4	-1.3	-2.7	0.4	0.18
523.7	0.55	260.30	523.7	-1.4	-2.9	0.4	0.79
548.7	1.27	281.26	548.7	-1.4	-3.3	0.3	3.13
573.7	1.86	286.94	573.7	-1.2	-3.9	-0.1	2.44
598.7	2.23	290.68	598.7	-0.9	-4.8	-0.6	1.57
623.7	2.61	293.13	623.6	-0.5	-5.7	-1.3	1.58
647.8	2.61	291.52	647.7	-0.1	-6.8	-2.0	0.30
672.9	3.13	296.77	672.8	0.4	-7.9	-2.9	2.32
697.8	3.55	299.15	697.6	1.1	-9.2	-3.9	1.77
723.0	3.93	301.31	722.8	1.9	-10.6	-5.2	1.61
747.5	4.52	303.14	747.2	2.9	-12.1	-6.6	2.47
772.3	5.03	301.37	771.9	4.0	-13.9	-8.2	2.14
797.4	5.25	302.06	797.0	5.2	-15.8	-9.9	0.91
821.3	5.36	302.12	820.7	6.3	-17.7	-11.6	0.46
849.1	5.33	302.67	848.4	7.7	-19.9	-13.6	0.21
874.3	5.39	302.51	873.5	9.0	-21.8	-15.4	0.25
899.3	5.31	302.29	898.4	10.2	-23.8	-17.2	0.33
923.2	5.23	301.36	922.2	11.4	-25.7	-18.9	0.49
948.3	5.13	300.81	947.2	12.6	-27.6	-20.7	0.45
973.5	5.08	300.42	972.3	13.7	-29.5	-22.4	0.24
999.3	4.96	300.56	998.0	14.8	-31.5	-24.0	0.47
1,024.3	4.82	299.24	1,022.9	15.9	-33.3	-25.6	0.72
1,049.9	4.18	295.55	1,048.4	16.8	-35.1	-27.1	2.75
1,072.0	3.49	290.35	1,070.5	17.4	-36.5	-28.1	3.49
1,096.4	3.43	290.70	1,094.9	17.9	-37.9	-29.0	0.26
1,122.4	3.26	291.10	1,120.7	18.5	-39.3	-30.0	0.66
1,148.7	3.15	290.99	1,147.1	19.0	-40.6	-30.9	0.42
1,174.3	2.84	289.80	1,172.6	19.5	-41.9	-31.7	1.24
1,197.2	2.95	288.98	1,195.4	19.9	-43.0	-32.4	0.51
1,223.8	2.95	293.23	1,222.0	20.3	-44.3	-33.3	0.82
1,245.7	2.78	294.33	1,243.9	20.8	-45.3	-34.0	0.82
1,272.2	2.62	294.19	1,270.4	21.3	-46.4	-34.9	0.60
1,297.9	2.56	294.78	1,296.1	21.8	-47.5	-35.7	0.26
1,349.2	2.58	294.48	1,347.4	22.7	-49.5	-37.3	0.05
1,371.5	2.77	298.62	1,369.6	23.2	-50.5	-38.0	1.22
1,397.5	2.35	298.11	1,395.5	23.8	-51.5	-38.8	1.62

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EOW Completion Report



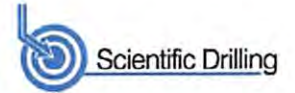
Company:	Antero	Local Co-ordinate Reference:	Well Duckworth Unit 1H
Project:	Ritchie County WV	TVD Reference:	Frontier 23: GL 1025' + KB 23' @ 1048.0usft
Site:	John Richards Pad: Duckworth/Stalnakcer	MD Reference:	Frontier 23: GL 1025' + KB 23' @ 1048.0usft
Well:	Duckworth Unit 1H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Antero NE

Survey								
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	
1,423.5	2.26	297.04	1,421.5	24.2	-52.4	-39.6	0.38	
1,449.3	2.42	298.16	1,447.3	24.7	-53.4	-40.4	0.64	
1,474.1	1.97	296.21	1,472.1	25.2	-54.2	-41.0	1.84	
1,496.4	2.04	298.49	1,494.4	25.5	-54.9	-41.6	0.47	
1,521.8	2.00	296.40	1,519.8	25.9	-55.7	-42.2	0.33	
1,547.2	1.85	293.84	1,545.1	26.3	-56.5	-42.8	0.68	
1,573.2	2.03	298.61	1,571.1	26.7	-57.2	-43.4	0.93	
1,597.9	2.21	306.01	1,595.8	27.2	-58.0	-44.2	1.32	
1,624.0	2.01	301.10	1,621.9	27.7	-58.8	-44.9	1.03	
1,649.8	1.88	300.59	1,647.7	28.2	-59.6	-45.6	0.51	
1,672.2	1.94	302.49	1,670.1	28.6	-60.2	-46.1	0.39	
1,697.7	1.52	302.15	1,695.6	29.0	-60.9	-46.7	1.65	
1,723.1	1.60	305.99	1,720.9	29.3	-61.4	-47.3	0.52	
1,749.4	1.57	299.77	1,747.3	29.7	-62.0	-47.9	0.66	
1,771.7	1.95	305.29	1,769.6	30.1	-62.6	-48.4	1.86	
1,798.5	1.56	302.91	1,796.3	30.6	-63.3	-49.0	1.48	
1,823.8	1.54	300.75	1,821.6	30.9	-63.9	-49.6	0.24	
1,846.3	1.59	304.12	1,844.1	31.3	-64.4	-50.0	0.47	
1,873.0	1.48	301.02	1,870.8	31.7	-65.0	-50.6	0.52	
1,899.7	1.56	302.45	1,897.5	32.0	-65.6	-51.1	0.33	
1,922.1	1.67	310.86	1,919.9	32.4	-66.1	-51.7	1.17	
1,948.8	1.54	311.83	1,946.6	32.9	-66.7	-52.3	0.50	
1,974.6	1.38	310.90	1,972.4	33.3	-67.2	-52.9	0.63	
1,996.6	1.29	316.37	1,994.3	33.7	-67.5	-53.3	0.71	
2,022.8	1.36	310.39	2,020.5	34.1	-68.0	-53.9	0.59	
2,049.0	1.19	307.80	2,046.7	34.5	-68.4	-54.4	0.68	
2,074.9	1.14	308.11	2,072.7	34.8	-68.8	-54.8	0.19	
2,099.7	1.37	308.41	2,097.4	35.1	-69.3	-55.3	0.93	
2,122.4	1.25	306.59	2,120.1	35.4	-69.7	-55.7	0.56	
2,148.6	1.16	308.69	2,146.3	35.8	-70.1	-56.1	0.38	
2,174.7	1.34	308.92	2,172.4	36.1	-70.6	-56.6	0.69	
2,196.5	1.15	308.90	2,194.2	36.4	-70.9	-57.0	0.87	
2,221.9	1.17	312.04	2,219.6	36.8	-71.3	-57.5	0.26	
2,247.5	1.15	311.79	2,245.2	37.1	-71.7	-57.9	0.08	
2,273.7	1.21	310.33	2,271.4	37.5	-72.1	-58.4	0.26	
2,299.2	1.15	317.26	2,296.9	37.8	-72.5	-58.8	0.61	
2,321.6	1.19	317.82	2,319.3	38.2	-72.8	-59.3	0.19	
2,347.1	1.23	319.89	2,344.7	38.6	-73.1	-59.7	0.23	
2,373.4	1.14	321.02	2,371.0	39.0	-73.5	-60.3	0.35	
2,398.9	1.26	312.91	2,396.6	39.4	-73.9	-60.7	0.81	
2,424.2	1.29	321.53	2,421.9	39.8	-74.2	-61.3	0.77	
2,446.9	1.17	322.45	2,444.5	40.2	-74.5	-61.7	0.54	
2,491.3	1.00	313.48	2,489.0	40.8	-75.1	-62.5	0.54	
2,524.1	1.04	317.16	2,521.7	41.2	-75.5	-63.0	0.23	
2,549.8	1.12	310.35	2,547.4	41.6	-75.9	-63.4	0.59	

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EOW Completion Report



Company:	Antero	Local Co-ordinate Reference:	Well Duckworth Unit 1H
Project:	Ritchie County WV	TVD Reference:	Frontier 23: GL 1025' + KB 23' @ 1048.0usft
Site:	John Richards Pad: Duckworth/Stalnakar	MD Reference:	Frontier 23: GL 1025' + KB 23' @ 1048.0usft
Well:	Duckworth Unit 1H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Antero NE

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
2,573.2	0.76	320.66	2,570.9	41.8	-76.1	-63.8	1.69
2,597.7	0.90	320.38	2,595.3	42.1	-76.4	-64.1	0.57
2,622.4	0.98	315.07	2,620.0	42.4	-76.6	-64.5	0.48
2,649.1	0.84	317.90	2,646.7	42.7	-76.9	-64.9	0.55
2,673.2	0.85	313.55	2,670.8	43.0	-77.2	-65.2	0.27
2,697.3	0.84	316.62	2,695.0	43.2	-77.4	-65.5	0.19
2,724.8	0.70	312.16	2,722.4	43.5	-77.7	-65.8	0.55
2,748.9	0.76	303.20	2,746.5	43.7	-77.9	-66.1	0.53
2,772.4	0.80	300.22	2,770.0	43.8	-78.2	-66.3	0.24
2,800.0	0.77	293.43	2,797.6	44.0	-78.5	-66.6	0.35
2,824.1	0.76	295.27	2,821.7	44.1	-78.8	-66.8	0.11
2,848.2	0.79	307.57	2,845.8	44.3	-79.1	-67.1	0.70
2,871.1	0.64	297.57	2,868.7	44.4	-79.3	-67.3	0.85
2,898.7	0.66	302.68	2,896.3	44.6	-79.6	-67.5	0.22
2,922.8	0.73	297.21	2,920.4	44.7	-79.9	-67.7	0.40
2,970.7	0.68	289.65	2,968.3	45.0	-80.4	-68.1	0.22
2,999.3	0.74	297.24	2,996.9	45.1	-80.7	-68.4	0.39
3,024.4	0.84	283.21	3,022.0	45.2	-81.1	-68.6	0.86
3,050.7	1.34	280.43	3,048.2	45.3	-81.5	-68.8	1.92
3,074.1	1.84	277.96	3,071.7	45.4	-82.2	-69.1	2.15
3,099.8	2.35	278.40	3,097.4	45.6	-83.1	-69.5	1.99
3,123.8	3.02	277.07	3,121.4	45.7	-84.2	-70.0	2.80
3,149.0	3.45	276.14	3,146.5	45.9	-85.6	-70.6	1.72
3,174.1	4.07	274.81	3,171.5	46.0	-87.3	-71.3	2.50
3,199.9	4.57	274.91	3,197.3	46.2	-89.2	-72.1	1.93
3,224.3	5.15	275.17	3,221.6	46.4	-91.3	-72.9	2.38
3,249.5	5.82	275.46	3,246.7	46.6	-93.7	-73.9	2.66
3,274.7	6.29	275.69	3,271.7	46.9	-96.3	-75.0	1.87
3,299.0	6.71	276.45	3,295.9	47.2	-99.1	-76.1	1.76
3,324.5	7.52	276.50	3,321.1	47.5	-102.2	-77.4	3.18
3,348.9	8.13	276.90	3,345.3	47.9	-105.5	-78.8	2.51
3,374.1	8.90	276.91	3,370.2	48.4	-109.2	-80.4	3.06
3,398.8	9.72	276.88	3,394.7	48.8	-113.2	-82.2	3.31
3,424.4	10.32	276.60	3,419.9	49.4	-117.6	-84.1	2.35
3,449.7	10.71	276.29	3,444.7	49.9	-122.2	-86.0	1.56
3,474.5	11.44	276.50	3,469.0	50.4	-126.9	-88.0	2.95
3,499.6	12.02	276.97	3,493.6	51.0	-132.0	-90.2	2.34
3,523.9	12.46	276.08	3,517.4	51.6	-137.1	-92.3	1.97
3,549.0	12.64	275.58	3,541.8	52.1	-142.5	-94.6	0.84
3,574.5	13.09	275.19	3,566.7	52.7	-148.2	-96.9	1.79
3,599.0	13.19	274.47	3,590.6	53.1	-153.7	-99.1	0.78
3,624.9	13.94	273.98	3,615.8	53.6	-159.8	-101.4	2.93
3,649.3	14.66	273.24	3,639.4	54.0	-165.8	-103.7	3.05
3,675.3	15.15	272.88	3,664.5	54.3	-172.5	-106.1	1.92

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EOW Completion Report



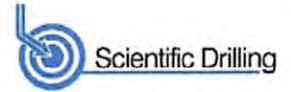
Company:	Antero	Local Co-ordinate Reference:	Well Duckworth Unit 1H
Project:	Ritchie County WV	TVD Reference:	Frontier 23: GL 1025' + KB 23' @ 1048.0usft
Site:	John Richards Pad: Duckworth/Stalnakcer	MD Reference:	Frontier 23: GL 1025' + KB 23' @ 1048.0usft
Well:	Duckworth Unit 1H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Antero NE

Survey								
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	
3,699.6	15.84	273.02	3,687.9	54.7	-179.0	-108.5	2.84	
3,724.6	16.50	273.08	3,712.0	55.0	-185.9	-111.1	2.64	
3,749.7	17.24	271.97	3,736.0	55.4	-193.2	-113.7	3.21	
3,774.5	17.74	268.63	3,759.6	55.4	-200.6	-116.1	4.53	
3,799.8	17.98	264.80	3,783.8	54.9	-208.4	-118.1	4.72	
3,824.8	18.21	261.55	3,807.5	54.0	-216.1	-119.7	4.15	
3,849.1	18.48	256.73	3,830.6	52.6	-223.6	-120.7	6.33	
3,874.8	19.15	252.92	3,854.9	50.4	-231.6	-121.1	5.45	
3,899.5	19.87	251.12	3,878.2	47.9	-239.4	-121.2	3.79	
3,924.2	20.49	251.14	3,901.4	45.1	-247.5	-121.1	2.51	
3,949.2	21.19	251.66	3,924.7	42.3	-255.9	-121.1	2.90	
3,974.2	22.16	252.12	3,947.9	39.4	-264.7	-121.2	3.94	
3,999.3	23.35	252.40	3,971.1	36.4	-273.9	-121.3	4.77	
4,024.4	24.43	252.93	3,994.1	33.4	-283.7	-121.5	4.38	
4,048.7	25.60	253.67	4,016.1	30.5	-293.5	-121.8	4.98	
4,074.9	26.28	254.14	4,039.6	27.3	-304.5	-122.3	2.71	
4,099.1	26.60	253.67	4,061.3	24.3	-314.9	-122.7	1.58	
4,124.7	27.12	253.27	4,084.1	21.0	-325.9	-123.1	2.15	
4,149.0	27.45	253.21	4,105.7	17.8	-336.6	-123.5	1.36	
4,174.8	28.65	253.03	4,128.5	14.3	-348.2	-123.8	4.67	
4,199.5	29.72	253.15	4,150.1	10.8	-359.7	-124.1	4.33	
4,224.6	30.57	253.05	4,171.7	7.1	-371.8	-124.5	3.40	
4,248.9	30.75	253.00	4,192.7	3.5	-383.7	-124.8	0.75	
4,274.0	30.45	252.48	4,214.3	-0.3	-395.9	-125.1	1.60	
4,299.5	29.54	251.60	4,236.4	-4.2	-408.0	-125.2	3.96	
4,324.1	29.67	251.97	4,257.7	-8.0	-419.5	-125.2	0.91	
4,348.8	28.54	252.51	4,279.3	-11.7	-431.0	-125.4	4.70	
4,373.4	28.27	252.28	4,301.0	-15.2	-442.1	-125.5	1.18	
4,399.4	27.58	251.85	4,323.9	-19.0	-453.7	-125.6	2.77	
4,424.1	27.05	251.10	4,345.9	-22.6	-464.4	-125.6	2.55	
4,449.9	26.75	250.26	4,368.9	-26.5	-475.5	-125.5	1.87	
4,474.3	26.14	249.88	4,390.7	-30.2	-485.7	-125.2	2.60	
4,499.2	26.10	251.42	4,413.1	-33.8	-496.0	-125.0	2.72	
4,523.9	25.42	251.59	4,435.3	-37.2	-506.2	-125.0	2.77	
4,549.0	25.05	251.33	4,458.1	-40.6	-516.4	-125.0	1.54	
4,574.0	25.38	252.05	4,480.7	-43.9	-526.5	-125.0	1.81	
4,599.1	25.00	254.22	4,503.4	-47.0	-536.7	-125.3	3.98	
4,624.8	25.26	256.87	4,526.6	-49.8	-547.2	-126.1	4.50	
4,648.7	25.20	258.24	4,548.3	-52.0	-557.2	-127.7	4.45	
4,673.4	25.56	259.16	4,570.6	-54.0	-567.6	-128.5	2.16	
4,699.4	25.86	259.66	4,594.0	-56.1	-578.7	-130.0	1.42	
4,724.0	25.83	259.65	4,616.1	-58.0	-589.2	-131.5	0.12	
4,749.9	25.45	259.24	4,639.5	-60.1	-600.2	-133.1	1.62	
4,774.4	25.78	259.77	4,661.6	-62.0	-610.7	-134.5	1.64	

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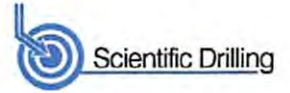
EOW Completion Report



Company:	Antero	Local Co-ordinate Reference:	Well Duckworth Unit 1H
Project:	Ritchie County WV	TVD Reference:	Frontier 23: GL 1025' + KB 23' @ 1048.0usft
Site:	John Richards Pad: Duckworth/Stalnaker	MD Reference:	Frontier 23: GL 1025' + KB 23' @ 1048.0usft
Well:	Duckworth Unit 1H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Antero NE

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
4,799.6	25.88	260.22	4,684.2	-63.9	-621.4	-136.1	0.87
4,823.7	26.21	260.47	4,706.0	-65.7	-631.9	-137.8	1.44
4,848.9	25.97	259.97	4,728.6	-67.6	-642.8	-139.4	1.29
4,873.7	26.26	259.98	4,750.8	-69.5	-653.5	-141.0	1.17
4,899.9	26.72	259.71	4,774.2	-71.5	-665.0	-142.7	1.82
4,924.5	27.22	259.67	4,796.2	-73.5	-676.1	-144.3	2.03
4,949.4	27.43	259.39	4,818.3	-75.6	-687.3	-145.9	0.99
4,974.6	28.10	259.39	4,840.7	-77.8	-698.8	-147.5	2.65
4,999.1	28.78	259.42	4,862.2	-79.9	-710.3	-149.1	2.78
5,024.3	28.64	259.22	4,884.2	-82.2	-722.2	-150.7	0.67
5,049.2	29.30	259.20	4,906.0	-84.4	-734.0	-152.3	2.65
5,074.2	30.29	259.70	4,927.7	-86.7	-746.2	-154.1	4.08
5,099.1	30.46	260.09	4,949.3	-88.9	-758.7	-155.9	1.04
5,124.1	30.70	259.90	4,970.7	-91.1	-771.1	-157.8	1.04
5,149.3	30.48	259.74	4,992.4	-93.4	-783.8	-159.6	0.93
5,174.9	30.14	259.13	5,014.6	-95.7	-796.5	-161.4	1.79
5,206.4	29.73	258.35	5,041.8	-98.8	-811.9	-163.4	1.80
5,224.8	29.05	257.86	5,057.9	-100.7	-820.8	-164.4	3.91
5,248.7	29.11	257.34	5,078.8	-103.2	-832.1	-165.6	1.09
5,274.7	28.97	256.86	5,101.4	-106.0	-844.4	-166.8	1.05
5,299.5	28.61	256.45	5,123.3	-108.7	-856.0	-167.9	1.65
5,324.4	28.01	256.32	5,145.1	-111.5	-867.5	-168.9	2.43
5,349.4	27.84	256.05	5,167.3	-114.3	-878.9	-169.8	0.85
5,374.0	27.66	255.70	5,189.0	-117.1	-890.0	-170.7	0.99
5,399.6	27.22	255.18	5,211.7	-120.1	-901.4	-171.5	1.96
5,425.0	26.70	255.00	5,234.3	-123.0	-912.5	-172.2	2.07
5,448.4	26.01	257.02	5,255.3	-125.6	-922.6	-173.0	4.83
5,473.9	24.56	258.92	5,278.4	-127.8	-933.2	-174.2	6.52
5,499.5	24.37	259.63	5,301.7	-129.8	-943.6	-175.7	1.37
5,524.2	23.63	259.55	5,324.2	-131.6	-953.5	-177.1	3.00
5,548.9	23.52	259.72	5,346.9	-133.4	-963.3	-178.5	0.52
5,574.4	23.11	258.75	5,370.3	-135.3	-973.2	-179.8	2.21
5,599.6	22.72	257.59	5,393.5	-137.3	-982.8	-181.0	2.37
5,624.4	22.63	257.93	5,416.4	-139.3	-992.1	-182.0	0.64
5,649.8	22.79	261.19	5,439.8	-141.1	-1,001.8	-183.4	4.99
5,674.9	23.11	263.11	5,463.0	-142.4	-1,011.4	-185.2	3.24
5,699.6	23.08	263.67	5,485.7	-143.5	-1,021.1	-187.2	0.90
5,724.7	22.91	263.90	5,508.7	-144.6	-1,030.8	-189.2	0.77
5,749.0	23.30	263.72	5,531.1	-145.6	-1,040.3	-191.3	1.63
5,773.5	23.12	263.73	5,553.7	-146.7	-1,049.9	-193.3	0.73
5,799.4	22.91	262.67	5,577.5	-147.9	-1,060.0	-195.4	1.79
5,823.6	23.28	262.98	5,599.7	-149.1	-1,069.4	-197.2	1.61
5,848.9	23.44	264.26	5,622.9	-150.2	-1,079.3	-199.3	2.10
5,874.1	23.75	265.50	5,646.1	-151.1	-1,089.4	-201.6	2.32

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Office of Oil & Gas
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Company:	Antero	Local Co-ordinate Reference:	Well Duckworth Unit 1H
Project:	Ritchie County WV	TVD Reference:	Frontier 23: GL 1025' + KB 23' @ 1048.0usft
Site:	John Richards Pad: Duckworth/Stalnakcer	MD Reference:	Frontier 23: GL 1025' + KB 23' @ 1048.0usft
Well:	Duckworth Unit 1H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Antero NE

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
5,898.9	23.70	266.26	5,668.8	-151.8	-1,099.4	-204.1	1.25
5,924.9	24.01	266.46	5,692.5	-152.5	-1,109.8	-206.8	1.24
5,949.0	25.31	267.07	5,714.5	-153.0	-1,119.9	-209.4	5.48
5,974.4	25.60	266.93	5,737.3	-153.6	-1,130.7	-212.3	1.17
5,992.9	25.60	266.93	5,754.0	-154.0	-1,138.7	-214.5	0.00
6,066.0	26.29	266.47	5,819.8	-155.9	-1,170.7	-222.8	0.98
6,098.0	25.91	266.80	5,848.5	-156.7	-1,184.7	-226.5	1.27
6,130.0	24.79	261.57	5,877.5	-158.1	-1,198.4	-229.5	7.82
6,162.0	23.15	250.92	5,906.7	-161.1	-1,210.9	-230.6	14.44
6,194.0	22.95	242.27	5,936.2	-166.1	-1,222.4	-229.5	10.59
6,227.0	24.07	233.41	5,966.4	-173.1	-1,233.5	-226.4	11.22
6,259.0	26.44	227.43	5,995.4	-181.8	-1,244.0	-221.5	10.87
6,291.0	28.07	223.36	6,023.8	-192.1	-1,254.4	-215.0	7.74
6,318.0	28.75	220.10	6,047.6	-201.7	-1,263.0	-208.6	6.27
SCMR							
6,323.0	28.89	219.51	6,052.0	-203.5	-1,264.5	-207.3	6.34
6,354.0	30.44	214.42	6,078.9	-215.8	-1,273.7	-198.6	9.54
6,386.0	32.36	212.47	6,106.2	-229.7	-1,282.9	-188.3	6.79
6,418.0	33.75	211.34	6,133.0	-244.5	-1,292.1	-177.2	4.75
6,449.0	35.59	209.00	6,158.5	-259.8	-1,301.0	-165.5	7.32
6,481.0	38.07	204.71	6,184.1	-276.9	-1,309.6	-152.0	11.16
6,504.0	39.85	200.73	6,202.0	-290.2	-1,315.2	-141.2	13.35
MDLX							
6,514.0	40.67	199.09	6,209.7	-296.3	-1,317.4	-136.1	13.40
6,546.0	44.37	194.81	6,233.3	-317.0	-1,323.7	-118.5	14.67
6,578.0	48.56	191.72	6,255.3	-339.6	-1,329.0	-98.7	14.84
6,609.0	52.12	190.35	6,275.1	-363.0	-1,333.5	-78.0	11.98
6,641.0	54.76	189.40	6,294.1	-388.3	-1,337.9	-55.3	8.59
6,671.0	58.11	187.77	6,310.7	-413.0	-1,341.6	-33.1	12.05
BRKT							
6,673.0	58.33	187.67	6,311.8	-414.7	-1,341.9	-31.5	11.79
6,705.0	62.39	186.26	6,327.6	-442.3	-1,345.2	-6.4	13.25
6,731.0	66.46	184.68	6,338.8	-465.6	-1,347.5	15.0	16.59
TLLY							
6,736.0	67.24	184.39	6,340.8	-470.2	-1,347.8	19.2	16.49
6,768.0	70.43	182.47	6,352.3	-500.0	-1,349.6	46.9	11.43
6,789.0	71.82	182.01	6,359.1	-519.8	-1,350.4	65.5	6.94
MRCL_HOT							
6,799.0	72.48	181.79	6,362.2	-529.4	-1,350.7	74.4	6.92
6,831.0	75.11	180.68	6,371.1	-560.1	-1,351.4	103.4	8.87
6,863.0	79.19	178.69	6,378.2	-591.3	-1,351.2	133.0	14.12
6,894.0	83.34	177.32	6,382.9	-621.9	-1,350.1	162.4	14.08
6,907.0	85.03	176.48	6,384.3	-634.8	-1,349.4	174.9	14.50
6,947.2	87.33	173.49	6,386.9	-674.8	-1,345.9	213.9	9.37
6,964.0	88.29	172.25	6,387.6	-691.4	-1,343.8	230.3	9.38

Received
Office of Oil & Gas
FEB 11 2016



EOW Completion Report



Company:	Antero	Local Co-ordinate Reference:	Well Duckworth Unit 1H
Project:	Ritchie County WV	TVD Reference:	Frontier 23: GL 1025' + KB 23' @ 1048.0usft
Site:	John Richards Pad: Duckworth/Stalnaker	MD Reference:	Frontier 23: GL 1025' + KB 23' @ 1048.0usft
Well:	Duckworth Unit 1H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Antero NE

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
6,984.0	88.52	172.00	6,388.1	-711.2	-1,341.1	250.0	1.70
7,080.0	89.97	171.47	6,389.4	-806.2	-1,327.3	344.4	1.61
7,176.0	92.11	171.01	6,387.7	-901.1	-1,312.7	439.1	2.28
7,273.0	92.62	171.50	6,383.7	-996.9	-1,297.9	534.6	0.73
7,369.0	91.41	170.50	6,380.3	-1,091.6	-1,282.9	629.2	1.63
7,465.0	91.34	170.32	6,378.0	-1,186.2	-1,266.9	724.0	0.20
7,561.0	90.54	171.06	6,376.4	-1,281.0	-1,251.4	818.8	1.13
7,658.0	90.87	174.29	6,375.2	-1,377.2	-1,239.0	914.0	3.35
7,754.0	89.13	171.23	6,375.2	-1,472.4	-1,227.0	1,008.1	3.67
7,850.0	88.32	169.37	6,377.3	-1,567.0	-1,210.8	1,103.0	2.11
7,946.0	89.16	168.01	6,379.5	-1,661.1	-1,192.0	1,198.2	1.66
8,042.0	89.26	167.20	6,380.8	-1,754.8	-1,171.4	1,293.6	0.85
8,138.0	89.19	166.50	6,382.1	-1,848.3	-1,149.5	1,389.2	0.73
8,233.0	90.67	168.19	6,382.2	-1,941.0	-1,128.7	1,483.7	2.36
8,329.0	90.61	168.40	6,381.1	-2,035.0	-1,109.2	1,579.1	0.23
8,425.0	90.03	171.36	6,380.6	-2,129.5	-1,092.4	1,674.0	3.14
8,521.0	89.66	171.02	6,380.8	-2,224.4	-1,077.7	1,768.7	0.52
8,617.0	89.56	170.88	6,381.5	-2,319.2	-1,062.6	1,863.4	0.18
8,713.0	89.43	171.08	6,382.3	-2,414.0	-1,047.5	1,958.1	0.25
8,809.0	91.48	171.29	6,381.6	-2,508.8	-1,032.8	2,052.7	2.15
8,904.0	92.05	170.39	6,378.7	-2,602.6	-1,017.7	2,146.4	1.12
9,000.0	90.97	169.11	6,376.1	-2,697.0	-1,000.6	2,241.4	1.74
9,096.0	90.57	169.06	6,374.8	-2,791.3	-982.4	2,336.6	0.42
9,191.0	90.07	168.51	6,374.3	-2,884.4	-964.0	2,430.8	0.78
9,287.0	89.73	167.68	6,374.5	-2,978.4	-944.2	2,526.2	0.93
9,383.0	90.67	168.14	6,374.1	-3,072.2	-924.0	2,621.6	1.09
9,479.0	91.18	169.09	6,372.6	-3,166.3	-905.1	2,716.8	1.12
9,574.0	89.66	169.25	6,371.9	-3,259.6	-887.3	2,811.0	1.61
9,665.0	90.07	169.71	6,372.1	-3,349.1	-870.6	2,901.1	0.68
9,756.0	91.04	170.30	6,371.2	-3,438.7	-854.8	2,991.1	1.25
9,847.0	89.76	167.76	6,370.6	-3,528.1	-837.5	3,081.3	3.13
9,937.0	88.76	168.23	6,371.8	-3,616.1	-818.8	3,170.7	1.23
10,028.0	90.07	170.31	6,372.7	-3,705.5	-801.9	3,260.9	2.70
10,119.0	90.54	170.54	6,372.2	-3,795.2	-786.7	3,350.8	0.58
10,210.0	90.84	170.28	6,371.1	-3,884.9	-771.6	3,440.7	0.44
10,300.0	90.30	170.04	6,370.2	-3,973.6	-756.2	3,529.7	0.66
10,391.0	90.07	170.14	6,369.9	-4,063.2	-740.5	3,619.7	0.28
10,482.0	90.97	171.13	6,369.1	-4,153.0	-725.7	3,709.5	1.47
10,572.0	90.61	170.24	6,367.8	-4,241.8	-711.2	3,798.4	1.07
10,663.0	90.17	169.77	6,367.2	-4,331.4	-695.4	3,888.4	0.71
10,759.0	91.14	168.67	6,366.1	-4,425.7	-677.4	3,983.5	1.53
10,855.0	91.50	172.16	6,363.9	-4,520.4	-661.4	4,078.3	3.65
10,951.0	89.70	173.86	6,362.9	-4,615.6	-649.8	4,172.4	2.58
11,048.0	89.66	174.20	6,363.5	-4,712.1	-639.7	4,267.1	0.35

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Office of Oil & Gas
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EOW Completion Report



Company:	Antero	Local Co-ordinate Reference:	Well Duckworth Unit 1H
Project:	Ritchie County WV	TVD Reference:	Frontier 23: GL 1025' + KB 23' @ 1048.0usft
Site:	John Richards Pad: Duckworth/Stalnaker	MD Reference:	Frontier 23: GL 1025' + KB 23' @ 1048.0usft
Well:	Duckworth Unit 1H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Antero NE

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
11,144.0	89.66	173.38	6,364.0	-4,807.5	-629.3	4,360.9	0.85
11,240.0	90.24	171.85	6,364.1	-4,902.7	-616.9	4,455.1	1.70
11,336.0	90.47	168.32	6,363.5	-4,997.3	-600.4	4,550.0	3.68
11,431.0	90.10	168.25	6,363.0	-5,090.3	-581.1	4,644.4	0.40
11,528.0	90.00	168.83	6,363.0	-5,185.4	-561.9	4,740.7	0.61
11,624.0	90.44	170.80	6,362.6	-5,279.9	-544.9	4,835.6	2.10
11,720.0	90.97	173.37	6,361.4	-5,374.9	-531.7	4,930.0	2.73
11,816.0	89.23	172.44	6,361.2	-5,470.2	-519.8	5,024.1	2.06
11,911.0	89.13	168.51	6,362.6	-5,563.8	-504.1	5,117.9	4.14
12,007.0	88.76	168.32	6,364.4	-5,657.9	-484.8	5,213.2	0.43
12,102.0	90.24	168.15	6,365.2	-5,750.9	-465.4	5,307.6	1.57
12,197.0	90.34	168.03	6,364.7	-5,843.8	-445.8	5,402.0	0.16
12,292.0	89.76	167.06	6,364.6	-5,936.6	-425.4	5,496.4	1.19
12,388.0	90.07	167.98	6,364.8	-6,030.3	-404.6	5,591.9	1.01
12,484.0	90.74	168.10	6,364.1	-6,124.2	-384.7	5,687.3	0.71
12,580.0	90.84	170.04	6,362.8	-6,218.5	-366.5	5,782.5	2.02
12,677.0	90.40	169.31	6,361.7	-6,313.9	-349.1	5,878.5	0.88
12,773.0	90.91	171.22	6,360.6	-6,408.5	-332.9	5,973.4	2.06
12,869.0	90.20	172.40	6,359.7	-6,503.5	-319.2	6,067.8	1.43
12,965.0	90.40	172.45	6,359.2	-6,598.7	-306.6	6,162.1	0.21
13,060.0	89.53	169.92	6,359.3	-6,692.6	-292.0	6,255.7	2.82
13,157.0	89.40	169.83	6,360.2	-6,788.0	-275.0	6,351.7	0.16
13,252.0	89.06	170.49	6,361.4	-6,881.6	-258.7	6,445.6	0.78
13,348.0	90.30	170.07	6,362.0	-6,976.3	-242.5	6,540.5	1.36
13,444.0	90.13	169.59	6,361.6	-7,070.8	-225.6	6,635.5	0.53
13,540.0	89.90	169.25	6,361.6	-7,165.1	-207.9	6,730.6	0.43
13,636.0	89.66	168.09	6,362.0	-7,259.2	-189.1	6,825.9	1.23
13,732.0	89.60	167.43	6,362.6	-7,353.1	-168.7	6,921.3	0.69
13,828.0	89.13	166.95	6,363.6	-7,446.7	-147.4	7,016.8	0.70
13,924.0	91.07	168.13	6,363.5	-7,540.4	-126.7	7,112.3	2.37
14,020.0	91.85	168.19	6,361.0	-7,634.3	-107.0	7,207.6	0.81
14,116.0	90.77	168.89	6,358.8	-7,728.4	-88.0	7,302.9	1.34
14,212.0	90.77	171.75	6,357.5	-7,823.0	-71.8	7,397.7	2.98
14,308.0	90.74	171.43	6,356.3	-7,918.0	-57.8	7,492.2	0.33
14,405.0	89.73	171.36	6,355.9	-8,013.9	-43.3	7,587.8	1.04
14,497.0	89.60	172.02	6,356.4	-8,104.9	-30.0	7,678.4	0.73
14,553.0	89.60	172.02	6,356.8	-8,160.3	-22.2	7,733.4	0.00

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Project:	Ritchie County WV	TVD Reference:	Frontier 23: GL 1025' + KB 23' @ 1048.0usft
Site:	John Richards Pad: Duckworth/Stalnaker	MD Reference:	Frontier 23: GL 1025' + KB 23' @ 1048.0usft
Well:	Duckworth Unit 1H	North Reference:	Grid
Wellbore:	Original Wellpath	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	Antero NE

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
6,318.0	6,047.6	-201.7	-1,263.0	SCMR
6,504.0	6,202.0	-290.2	-1,315.2	MDLX
6,671.0	6,310.7	-413.0	-1,341.6	BRKT
6,731.0	6,338.8	-465.6	-1,347.5	TLLY
6,789.0	6,359.1	-519.8	-1,350.4	MRCL_HOT
14,553.0	6,356.8	-8,160.3	-22.2	PTB

Checked By: _____	Approved By: _____	Date: _____
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Office of Oil & Gas
FEB 11 2016

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	10/5/2015
Job End Date:	10/16/2015
State:	West Virginia
County:	Ritchie
API Number:	47-085-10102-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Duckworth 1H
Longitude:	-80.91951700
Latitude:	39.20542200
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,389
Total Base Water Volume (gal):	11,011,728
Total Base Non Water Volume:	0



Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Water	Antero Resources	Base Fluid	Water	7732-18-5	100.00000	91.23321	
Sand	U.S. Well Services, LLC	Proppant	Crystalline Silica, quartz	14808-60-7	100.00000	8.27377	
HCL Acid (12.6%-18.0%)	U.S. Well Services, LLC	Bulk Acid	Water	7732-18-5	87.50000	0.16331	
			Hydrogen Chloride	7647-01-0	18.00000	0.03901	
LGC-15	U.S. Well Services	Gelling Agents	Guar Gum	9000-30-0	50.00000	0.08599	
			Petroleum Distillates	64742-47-8	60.00000	0.08143	
			Suspending agent (solid)	14808-60-7	3.00000	0.01315	
			Surfactant	68439-51-0	3.00000	0.00516	
WFRA-405	U.S. Well Services	Friction Reducer	Water	7732-18-5	40.00000	0.03093	
			2-Propenoic acid, polymer with 2 propenamide	9003-06-9	30.00000	0.03093	
			Petroleum Distillates	64742-47-8	20.00000	0.01245	
			Ethoxylated alcohol blend	68002-97-1	4.00000	0.00387	
SI-1100	U.S. Well Services	Scale Inhibitor					

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			Water	7732-18-5	80.00000	0.00974
			Ethylene Glycol	107-21-1	25.00000	0.00344
			Copolymer of Maleic and Acrylic acid	52255-49-9	10.00000	0.00144
			Potassium salt of diethylene triamine penta (methylene phosphonic acid)	15827-60-8	7.50000	0.00123
			Phosphino carboxylic acid polymer	71050-62-9	5.00000	0.00079
			Hexamethylene triamine penta (methylene phosphonic acid)	34690-00-1	5.00000	0.00079
			Hexamethylene diamine penta (methylene phosphonic acid)	23605-74-5	2.00000	0.00032
K-BAC 1020	J.S. Well Services	Anti-Bacterial Agent				
			2,2-dibromo-3-nitrilopropionamide	10222-01-2	20.00000	0.00413
			Deionized Water	7732-18-5	28.00000	0.00236
AP One	J.S. Well Services	Gel Breakers				
			Ammonium Persulfate	7727-54-0	100.00000	0.00223
AI-301	J.S. Well Services	Acid Corrosion Inhibitors				
			Diethylene Glycol	111-46-6	30.00000	0.00013
			Methenamine	100-97-0	20.00000	0.00010
			Hydrogen Chloride	7647-01-0	10.00000	0.00004
			Polyethylene polyamine	68603-67-8	10.00000	0.00004
			Coco amine	61791-14-8	5.00000	0.00002

Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.

* Total Water Volume sources may include fresh water, produced water, and/or recycled water

** Information is based on the maximum potential for concentration and thus the total may be over 100%

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided.

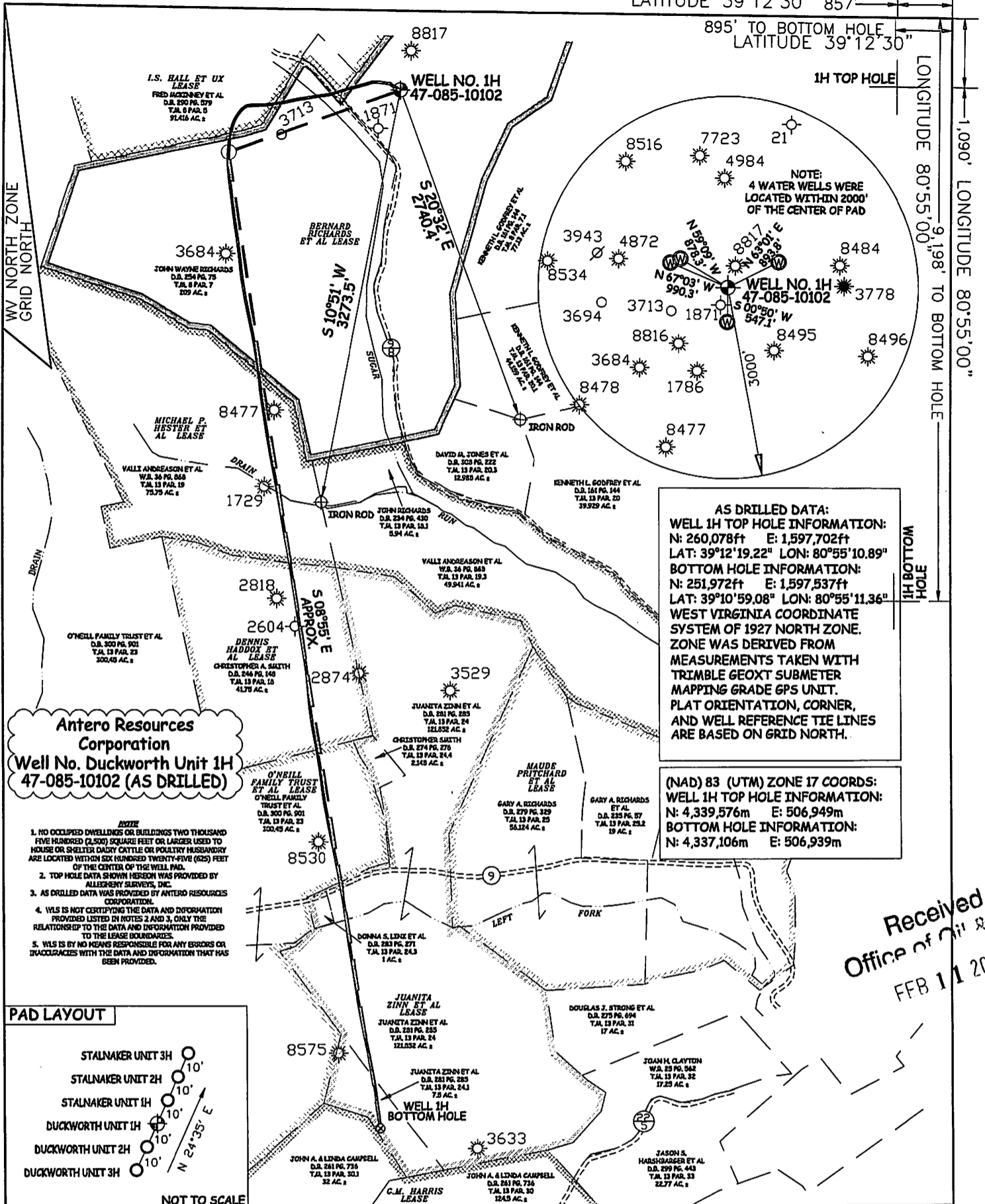
Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)

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LATITUDE 39°12'30" 857'

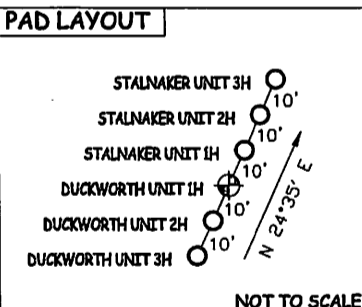
895' TO BOTTOM HOLE
LATITUDE 39°12'30"

LONGITUDE 80°55'00"
9,198' TO BOTTOM HOLE
LONGITUDE 80°55'00"



Antero Resources Corporation
Well No. Duckworth Unit 1H
47-085-10102 (AS DRILLED)

- NOTE**
1. NO OCCUPIED DWELLINGS OR BUILDINGS TWO THOUSAND FIVE HUNDRED (2,500) SQUARE FEET OR LARGER USED TO HOUSE OR SHELTER DAIRY CATTLE OR POULTRY HUSBANDRY ARE LOCATED WITHIN SIX HUNDRED TWENTY-FIVE (625) FEET OF THE CENTER OF THE WELL PAD.
 2. TOP HOLE DATA SHOWN HEREON WAS PROVIDED BY ALLEGHENY SURVEYS, INC.
 3. AS DRILLED DATA WAS PROVIDED BY ANTERO RESOURCES CORPORATION.
 4. WLS IS NOT CERTIFYING THE DATA AND DISFORMATION PROVIDED LISTED IN NOTES 2 AND 3, ONLY THE RELATIONSHIP TO THE DATA AND INFORMATION PROVIDED TO THE LEASE BOUNDARIES.
 5. WLS IS BY NO MEANS RESPONSIBLE FOR ANY ERRORS OR INACCURACIES WITH THE DATA AND INFORMATION THAT HAS BEEN PROVIDED.



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JOB # **14-023 WA**
DRAWING # **DUCKWORTH1HADR**
SCALE **1" = 1000'**
MINIMUM DEGREE OF ACCURACY **SUBMETER**
PROVEN SOURCE OF ELEV. **SUBMETER MAPPING GRADE GPS**



STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS

WILLOW LAND SURVEYING PLLC
220 MASONIC AVE. PENNSBORO
WEST VIRGINIA 26415

LEGEND

- — — Surface Owner Boundary Lines +/-
- - - Interior Surface Tracts +/-
- X Existing Fence
- ⊕ Found monument, as noted
- Proposed Well Path
- ⊙ As Drilled Well Path

DATE **07/13/15**
OPERATOR'S WELL# **DUCKWORTH UNIT #1H**
API WELL #

STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS
WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
(IF "GAS") PRODUCTION STORAGE DEEP SHALLOW STATE COUNTY PERMIT
LOCATION: ELEVATION **1,035' ORIGINAL - 1,025' AS DRILLED** WATERSHED **SOUTH FORK HUGHES RIVER**
QUADRANGLE **PULLMAN 7.5'** DISTRICT **UNION** COUNTY **RITCHIE**

SURFACE OWNER **JOHN WAYNE RICHARDS** ACREAGE **209 ACRES +/-**
OIL & GAS ROYALTY OWNER **BERNARD RICHARDS ET AL; I.S. HALL ET UX; MICHAEL P. HEASTER ET AL; DENNIS HADDOX ET AL; O'NEILL FAMILY TRUST ET AL; JUANITA ZINN ET AL** LEASE ACREAGE **214 ACRES+; 100 ACRES+; 234.5 ACRES+; 45.5 ACRES+; 517.83 ACRES+; 132.5 ACRES+**

PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE
PLUG OFF OLD FORMATION PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL (SPECIFY) **(X) AS DRILLED** PLUG & ABANDON CLEAN OUT & REPLUG
TARGET FORMATION **MARCELLUS** ESTIMATED DEPTH **6,356' TVD 14,553' MD**

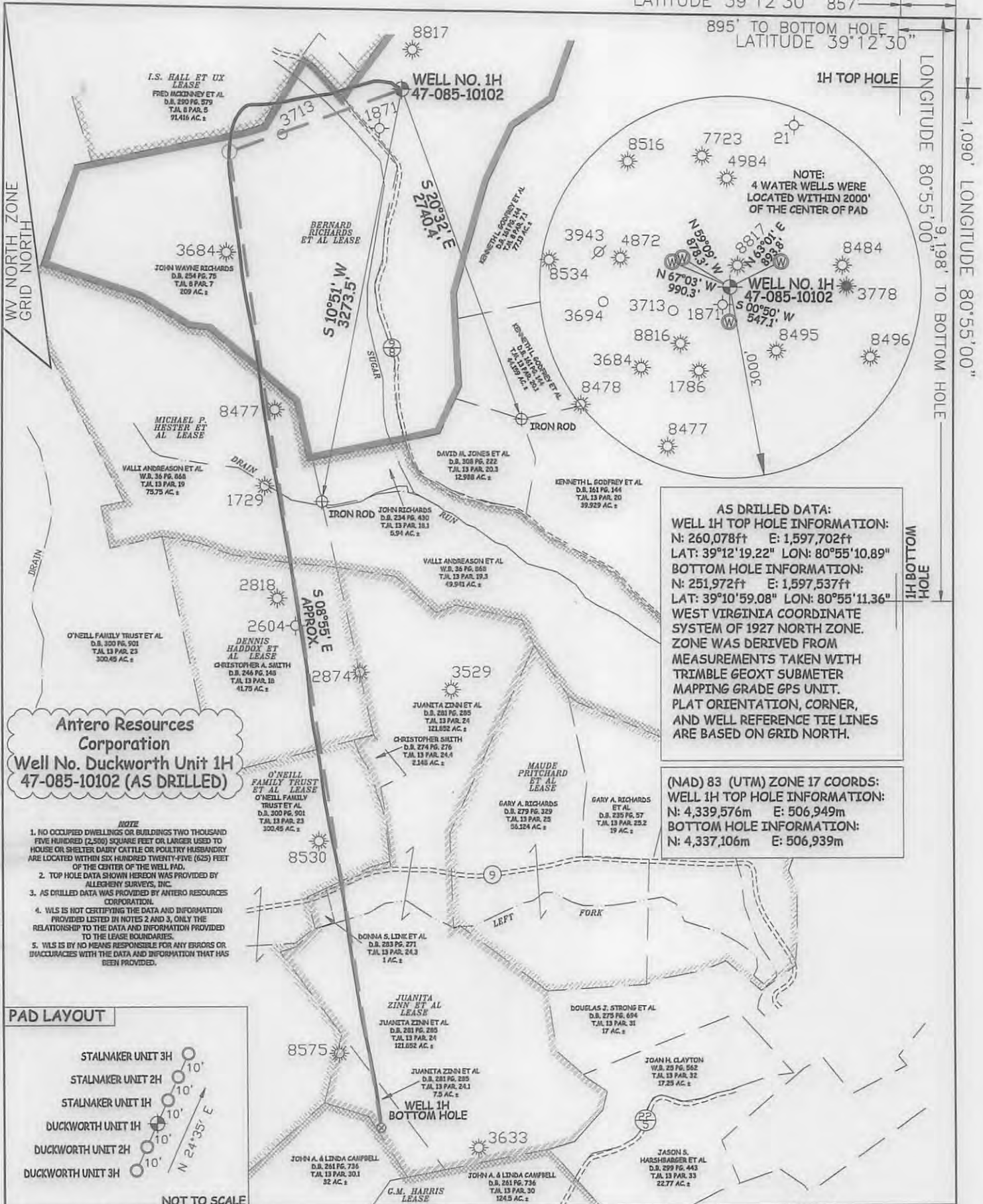
WELL OPERATOR **ANTERO RESOURCES CORP.** DESIGNATED AGENT **DIANNA STAMPER**
ADDRESS **1815 WYNKOOP STREET** ADDRESS **5400 D BIG TYLER ROAD**
DENVER, CO 80202 **CHARLESTON, WV 25313**

08/12/2016

LATITUDE 39°12'30" 857'

895' TO BOTTOM HOLE
LATITUDE 39°12'30"

LONGITUDE 80°55'00" 1.090'
LONGITUDE 80°55'00" 9.198' TO BOTTOM HOLE

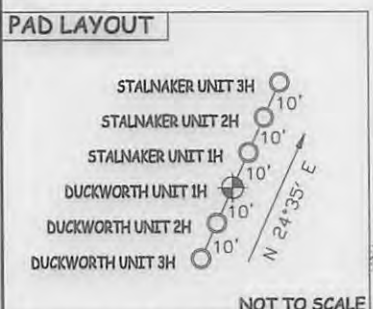


AS DRILLED DATA:
WELL 1H TOP HOLE INFORMATION:
 N: 260,078ft E: 1,597,702ft
 LAT: 39°12'19.22" LON: 80°55'10.89"
BOTTOM HOLE INFORMATION:
 N: 251,972ft E: 1,597,537ft
 LAT: 39°10'59.08" LON: 80°55'11.36"
 WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE. ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER MAPPING GRADE GPS UNIT. PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES ARE BASED ON GRID NORTH.

(NAD) 83 (UTM) ZONE 17 COORDS:
WELL 1H TOP HOLE INFORMATION:
 N: 4,339,576m E: 506,949m
BOTTOM HOLE INFORMATION:
 N: 4,337,106m E: 506,939m

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 DENVER, CO 80202 CHARLESTON, WV 25313

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WILLOW LAND SURVEYING PLLC
 220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415

DATE 07/13/15
 OPERATOR'S WELL# DUCKWORTH UNIT #1H
 API WELL # 47 - 085 - 10102
 STATE COUNTY PERMIT

DATE 08/12/2016

LEGEND

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COUNTY NAME PERMIT