

APPROVED

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WR-35
Rev. 8/23/13

NAME: [Signature]
DATE: 5/25/16 State of West Virginia
Department of Environmental Protection - Office of Oil and Gas
Well Operator's Report of Well Work

API 47-017-06565 County Doddridge District Grant
Quad Smithburg 7.5' Pad Name RJ Smith Field/Pool Name ---
Farm name Smith, Robert J. Well Number Vinola 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 4357405m Easting 523020m
Landing Point of Curve Northing 4357563.14m Easting 523131.34m
Bottom Hole Northing 4360034m Easting 522134m

Elevation (ft) 998' 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 10/29/2014 Date drilling commenced 1/19/2015 Date drilling ceased 5/25/2015
Date completion activities began 11/5/2015 Date completion activities ceased 1/14/2016
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.

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Freshwater depth(s) ft 181', 237'
Salt water depth(s) ft 804', 1267', 1350', 1431'
Coal depth(s) ft None Identified
Coal depth identified in area (Y/N) No

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Open mine(s) (Y/N) depths
Void(s) encountered (Y/N) depths No
Cavern(s) encountered (Y/N) depths No

Reviewed by:
AX 07/22/2016

API 47-017 - 06565 Farm name Smith, Robert J. Well number Vinola Unit 1H

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	30"	20"	40'	New	94# J-55	N/A	Y
Surface	17- 1/2"	13- 3/8"	362'	New	48# H-40	N/A	Y*
Coal							
Intermediate 1	12-1/4"	9-5/8"	2521'	New	36# J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4" & 8-1/2"	5-1/2"	16063'	New	23# P-110	N/A	Y
Tubing		2-3/8"	7103'		4.7# N-80	N/A	
Packer type and depth set		N/A					

Comment Details First attempt to cement Surface Casing with 490 sacks of Class A Cement was unsuccessful. DEP Inspector, Doug Newton, was notified on 2/12/2015 and gave instructions to cement the backside. 238 sacks of Class A cement were used down the backside of 13-3/8 casing to bring returns to surface.

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	193 sx	15.6	1.18	38	0'	8 Hrs.
Surface	Class A	728 sx*	15.6	1.18	251	0'	8 Hrs.
Coal							
Intermediate 1	Class A	927 sx	15.6	1.18	790	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	1036 sx (Lead) 1499 sx (Tail)	14.2 Lead 14.8 Tail	1.24 Lead 1.81 Tail	3217	-500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 16063' MD, 8626' TVD (BHL), 6895' (Deepest Point Drilled) Loggers TD (ft) 15796'
 Deepest formation penetrated Marcellus Plug back to (ft) N/A
 Plug back procedure N/A

Kick off depth (ft) 6010'

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- 017 - 06565 Farm name Smith, Robert J. Well number Vinola 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 (bbls)	Amount of Nitrogen/other (units)
*PLEASE SEE ATTACHED EXHIBIT 2								

Please insert additional pages as applicable.

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PRODUCING FORMATION(S)	DEPTHS		
	6834' (TOP)	TVD	7067' (TOP) MD
Marcellus			

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface 3550 psi Bottom Hole --- psi DURATION OF TEST --- hrs

OPEN FLOW Gas 14483 mcfpd Oil 18 bpd NGL --- bpd Water 6 bpd GAS MEASURED BY Estimated Orifice Pilot

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

Please insert additional pages as applicable.

Drilling Contractor Precision Drilling Company LP
Address 2640 Reach Rd. City Williamsport State PA Zip 17701

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

Cementing Company Allied Gas & Oil Services, LLC
Address 1036 East Main St. City Bridgeport State WV Zip 26330

Stimulating Company Baker Hughes
Address 837 Philippi Pike City Clarksburg State WV Zip 26301

Please insert additional pages as applicable.

Completed by Kara Quackenbush Telephone 303-357-7233
Signature *Kara Quackenbush* Title Permit Representative Date 3/17/2016

Submittal of Hydraulic Fracturing Chemical Disclosure Information

Attach copy of FRA FOCUS Registry

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EXHIBIT 1

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	5-Nov-15	15,804	15,971	60	Marcellus
2	21-Nov-15	15,606	15,773	60	Marcellus
3	21-Nov-15	15,409	15,575	60	Marcellus
4	21-Nov-15	15,211	15,378	60	Marcellus
5	21-Nov-15	15,013	15,180	60	Marcellus
6	22-Nov-15	14,816	14,982	60	Marcellus
7	22-Nov-15	14,618	14,785	60	Marcellus
8	22-Nov-15	14,420	14,587	60	Marcellus
9	22-Nov-15	14,222	14,389	60	Marcellus
10	23-Nov-15	14,025	14,192	60	Marcellus
11	23-Nov-15	13,827	13,994	60	Marcellus
12	23-Nov-15	13,629	13,796	60	Marcellus
13	23-Nov-15	13,432	13,598	60	Marcellus
14	24-Nov-15	13,234	13,401	60	Marcellus
15	24-Nov-15	13,036	13,203	60	Marcellus
16	24-Nov-15	12,839	13,005	60	Marcellus
17	25-Nov-15	12,641	12,808	60	Marcellus
18	25-Nov-15	12,443	12,610	60	Marcellus
19	27-Nov-15	12,245	12,412	60	Marcellus
20	27-Nov-15	12,048	12,214	60	Marcellus
21	27-Nov-15	11,850	12,017	60	Marcellus
22	28-Nov-15	11,652	11,819	60	Marcellus
23	28-Nov-15	11,455	11,621	60	Marcellus
24	28-Nov-15	11,257	11,424	60	Marcellus
25	28-Nov-15	11,059	11,226	60	Marcellus
26	28-Nov-15	10,862	11,028	60	Marcellus
27	29-Nov-15	10,664	10,831	60	Marcellus
28	29-Nov-15	10,466	10,633	60	Marcellus
29	29-Nov-15	10,268	10,435	60	Marcellus
30	29-Nov-15	10,071	10,237	60	Marcellus
31	29-Nov-15	9,873	10,040	60	Marcellus
32	29-Nov-15	9,675	9,842	60	Marcellus
33	30-Nov-15	9,478	9,644	60	Marcellus
34	30-Nov-15	9,280	9,447	60	Marcellus
35	30-Nov-15	9,082	9,249	60	Marcellus
36	30-Nov-15	8,885	9,051	60	Marcellus
37	30-Nov-15	8,687	8,854	60	Marcellus
38	1-Dec-15	8,489	8,656	60	Marcellus
39	1-Dec-15	8,291	8,458	60	Marcellus
40	1-Dec-15	8,094	8,260	60	Marcellus
41	1-Dec-15	7,896	8,063	60	Marcellus
42	1-Dec-15	7,698	7,865	60	Marcellus
43	2-Dec-15	7,501	7,667	60	Marcellus
44	2-Dec-15	7,303	7,470	60	Marcellus
45	2-Dec-15	7,105	7,272	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	21-Nov-15	69.0	7,319	0	5,164	249,575	6,424	N/A
2	21-Nov-15	68.4	7,079	5,763	5,345	250,150	6,635	N/A
3	21-Nov-15	68.0	6,843	5,985	5,177	248,085	6,566	N/A
4	21-Nov-15	68.0	7,040	5,714	5,509	249,173	6,568	N/A
5	21-Nov-15	69.0	6,910	5,587	5,100	249,112	6,753	N/A
6	22-Nov-15	71.0	7,194	5,773	5,251	246,886	6,550	N/A
7	22-Nov-15	67.0	7,076	5,741	4,951	251,345	6,444	N/A
8	22-Nov-15	70.0	6,895	5,784	5,349	250,828	6,390	N/A
9	22-Nov-15	68.0	6,941	6,355	5,043	248,642	6,311	N/A
10	23-Nov-15	74.0	7,395	6,273	5,020	253,851	6,349	N/A
11	23-Nov-15	74.0	7,266	5,631	5,184	252,295	6,364	N/A
12	23-Nov-15	70.4	6,921	6,024	5,349	249,930	6,367	N/A
13	23-Nov-15	69.1	6,833	5,584	5,182	250,039	6,401	N/A
14	24-Nov-15	77.0	7,342	6,203	5,258	247,875	6,285	N/A
15	24-Nov-15	77.0	7,348	5,678	5,271	249,936	6,445	N/A
16	24-Nov-15	76.5	6,982	5,477	5,058	249,293	6,218	N/A
17	25-Nov-15	78.0	7,212	5,586	5,151	252,948	6,269	N/A
18	25-Nov-15	78.0	7,060	5,324	5,244	248,927	6,284	N/A
19	27-Nov-15	77.0	7,183	5,398	5,141	249,855	6,243	N/A
20	27-Nov-15	77.0	7,273	5,516	5,756	249,733	6,194	N/A
21	27-Nov-15	77.0	6,848	5,353	4,480	249,680	6,208	N/A
22	28-Nov-15	78.0	6,869	5,387	4,564	249,769	6,216	N/A
23	28-Nov-15	76.0	7,275	5,489	5,024	249,589	6,207	N/A
24	28-Nov-15	77.0	7,035	5,528	4,961	249,663	6,297	N/A
25	28-Nov-15	77.0	6,955	5,859	5,230	249,827	6,116	N/A
26	28-Nov-15	78.0	6,726	5,648	5,095	222,596	6,767	N/A
27	29-Nov-15	77.0	7,235	5,903	5,014	250,483	6,141	N/A
28	29-Nov-15	78.0	7,164	5,576	5,072	249,541	6,262	N/A
29	29-Nov-15	78.0	7,058	5,751	5,067	252,226	6,127	N/A
30	29-Nov-15	78.0	7,112	5,746	4,964	251,187	6,115	N/A
31	29-Nov-15	78.6	6,793	5,851	4,870	249,842	6,044	N/A
32	29-Nov-15	76.1	6,652	5,622	5,702	250,210	6,141	N/A
33	30-Nov-15	72.2	6,700	5,511	4,668	249,048	6,289	N/A
34	30-Nov-15	80.0	6,929	5,391	5,023	251,107	6,017	N/A
35	30-Nov-15	78.0	6,901	5,032	5,168	249,652	5,969	N/A
36	30-Nov-15	80.0	6,886	5,819	5,423	249,101	6,001	N/A
37	30-Nov-15	75.8	6,518	5,376	5,022	250,203	6,025	N/A
38	1-Dec-15	77.6	6,509	5,807	5,733	249,146	6,037	N/A
39	1-Dec-15	79.0	7,065	5,532	5,488	250,008	6,035	N/A
40	1-Dec-15	79.0	6,933	6,827	5,282	248,838	6,014	N/A
41	1-Dec-15	79.0	6,790	6,013	4,884	249,304	5,957	N/A
42	1-Dec-15	78.0	6,843	5,250	5,216	219,059	6,518	N/A
43	2-Dec-15	76.4	6,767	5,607	4,865	142,567	8,994	N/A
44	2-Dec-15	77.3	6,723	5,620	4,481	249,009	5,926	N/A
45	2-Dec-15	79.0	6,658	5,467	4,775	249,717	5,948	N/A
AVG=		75.3	6,979	5,564	5,124	11,079,850	281,924	TOTAL

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EXHIBIT 3

LITHOLOGY/ FORMATION	TOP DEPTH (TVD)	BOTTOM DEPTH (TVD)	TOP DEPTH (MD)	BOTTOM DEPTH (MD)
	From Surface	From Surface	From Surface	From Surface
Fresh Water	181'	N/A	181'	N/A
Fresh Water	237'	N/A	237'	N/A
Siltstone	0	427	0	427
Sandstone	est. 427	597	est. 427	597
Dolostone/Sandstone/Siltstone	est. 597	637	est. 597	637
Sandstone and Siltstone w/trace coal	est. 637	697	est. 637	697
Siltstone	est. 697	877	est. 697	877
Shale	est. 877	1027	est. 877	1027
Sandstone	est. 1027	1107	est. 1027	1107
Sandstone w/trace coal	est. 1107	1197	est. 1107	1197
Sandstone	est. 1197	1527	est. 1197	1527
Siltstone	est. 1527	1587	est. 1527	1587
Sandstone	est. 1587	1647	est. 1587	1647
Shale	est. 1647	1707	est. 1647	1707
Sandstone	est. 1707	1737	est. 1707	1737
Shale	est. 1737	1867	est. 1737	1867
Siltstone	est. 1867	2008	est. 1867	2010
Big Lime	2008	2115	2010	2117
Big Injun	2115	2562	2117	2564
Gantz Sand	2562	2698	2564	2700
Fifty Foot Sandstone	2698	2784	2700	2786
Gordon	2784	3141	2786	3143
Fifth Sandstone	3141	3156	3143	3158
Bayard	3156	3502	3158	3504
Warren	3502	3892	3504	3894
Speechley	3892	4602	3894	4604
Bradford	4602	5079	4604	5081
Benson	5079	5356	5081	5358
Alexander	5356	5553	5358	5555
Elk	5553	6044	5555	6047
Rhinestreet	6044	6422	6047	6479
Sycamore	6422	6608	6479	6723
Middlesex	6608	6750	6723	6923
Burkett	6750	6779	6923	6969
Tully	6779	6834	6969	7067
Marcellus	6834	NA	7067	NA

*Please note Antero determines formation tops based on mud logs that are only run on one well on a multi-well pad. The measured Depth (MD) data on subsequent wells may be slightly different due to the well's unique departure.

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COMPANY: Antero
 COUNTY: Doddridge County WV
 SITE: R.J. Smith Pad
 WELL: Vinola Unit 1H
 WELLBORE: Original Hole
 DESIGN: Plan 5

7:49, May 21 2015

NAD 1987 (NADCON CONUS)
 Universal Transverse Mercator (US Survey Feet)
 Zone 17N (84 W to 78 W)



Azimuths to Grid North
 True North: -0.17°
 Magnetic North: -8.70°

Magnetic Field
 Strength: 52178.0nT
 Dip Angle: 66.84°
 Date: 5/6/2015
 Model: BGM2014

SURFACE DETAILS Ground Level: 998.0 KB Elevation @ 1016.0usft (Precision 522 (187))

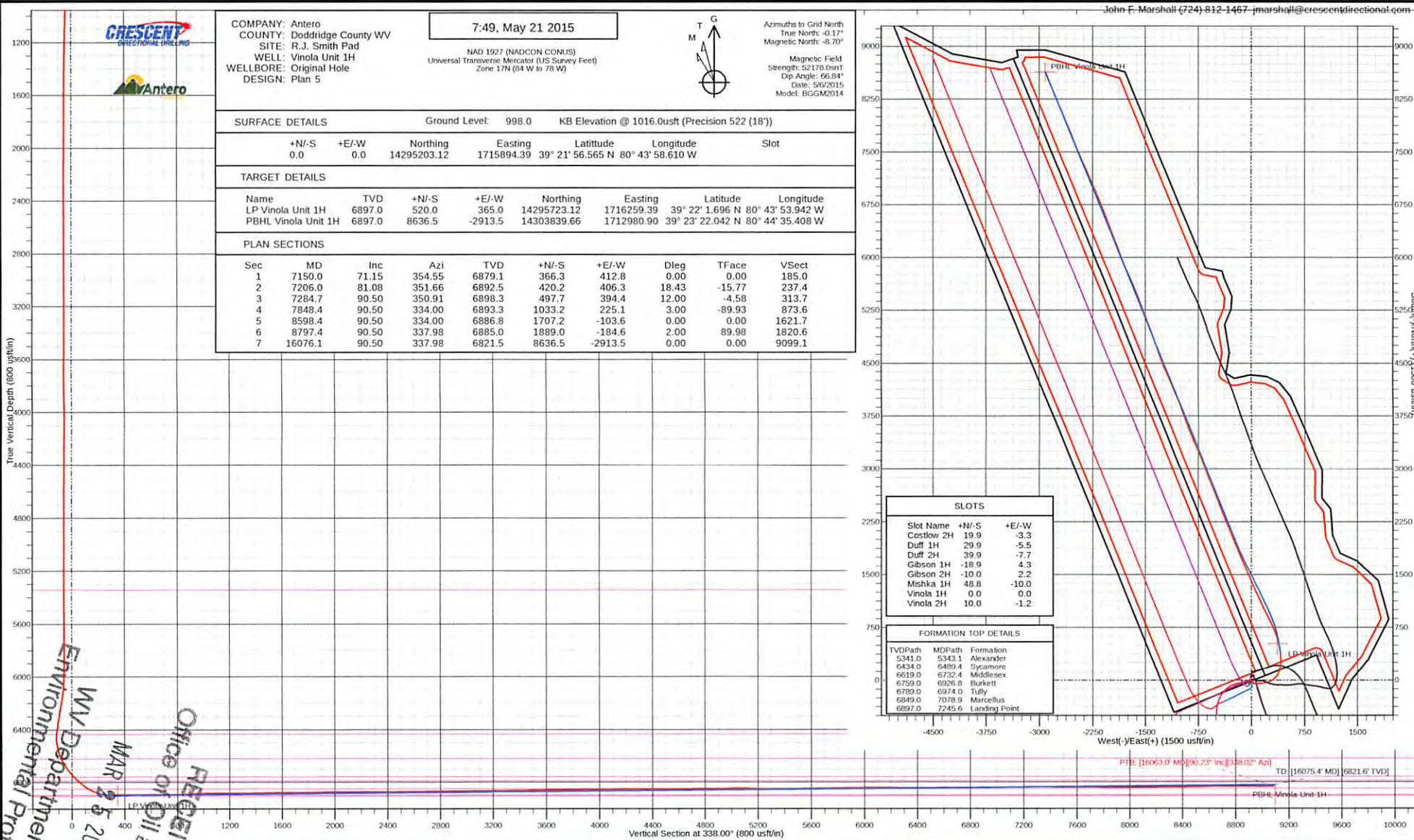
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	14295203.12	1715894.39	39° 21' 56.565 N	80° 43' 58.610 W	

TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
LP Vinola Unit 1H	6897.0	520.0	365.0	14295723.12	1716259.39	39° 22' 1.696 N	80° 43' 53.942 W
PBHL Vinola Unit 1H	6897.0	8636.5	-2913.5	14303839.66	1712980.90	39° 23' 22.042 N	80° 44' 35.408 W

PLAN SECTIONS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSECT
1	7150.0	71.15	354.55	6879.1	366.3	412.8	0.00	0.00	185.0
2	7206.0	81.08	351.66	6892.5	420.2	406.3	18.43	-15.77	237.4
3	7284.7	90.50	350.91	6898.3	497.7	394.4	12.00	-4.58	313.7
4	7848.4	90.50	334.00	6893.3	1033.2	225.1	3.00	-89.93	873.6
5	8598.4	90.50	334.00	6886.8	1707.2	-103.6	0.00	0.00	1621.7
6	8797.4	90.50	337.98	6885.0	1889.0	-184.6	2.00	89.98	1820.6
7	16076.1	90.50	337.98	6821.5	8636.5	-2913.5	0.00	0.00	9099.1



SLOTS

Slot Name	+N/-S	+E/-W
Costlow 2H	19.9	-3.3
Duff 1H	29.9	-5.5
Duff 2H	39.9	-7.7
Gibson 1H	-18.9	4.3
Gibson 2H	-10.0	2.2
Mishka 1H	48.8	-10.0
Vinola 1H	0.0	0.0
Vinola 2H	10.0	-1.2

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
5341.0	5343.1	Alexander
6434.0	6489.4	Sycamore
6619.0	6732.4	Middlesex
6759.0	6926.8	Burkett
6789.0	6974.0	Tully
6849.0	7078.9	Marcellus
6897.0	7245.6	Landing Point

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Antero

Doddridge County WV

R.J. Smith Pad: Costlow/Duff/Gibson/Mishka/Vinola

Vinola Unit 1H

Original Hole

Design: Surveys

Standard Survey Report

21 May, 2015

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Survey Report

Company: Antero	Local Co-ordinate Reference: Well Vinola Unit 1H	
Project: Doddridge County WV	TVD Reference: KB Elevation @ 1016.0usft (Precision 522 (18'))	
Site: R.J. Smith Pad: Costlow/Duff/Gibson/Mishka/Vinola	MD Reference: KB Elevation @ 1016.0usft (Precision 522 (18'))	
Well: Vinola Unit 1H	North Reference: Grid	
Wellbore: Original Hole	Survey Calculation Method: Minimum Curvature	
Design: Surveys	Database: North East R5000 Database	

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

Site	R.J. Smith Pad: Costlow/Duff/Gibson/Mishka/Vinola				
Site Position:		Northing:	14,295,223.06 usft	Latitude:	39° 21' 56.762 N
From:	Map	Easting:	1,715,891.05 usft	Longitude:	80° 43' 58.652 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.17 °

Well	Vinola Unit 1H, Marcellus					
Well Position	+N/-S	0.0 usft	Northing:	14,295,203.12 usft	Latitude:	39° 21' 56.565 N
	+E/-W	0.0 usft	Easting:	1,715,894.39 usft	Longitude:	80° 43' 58.610 W
Position Uncertainty		2.0 usft	Wellhead Elevation:	1,009.0 usft	Ground Level:	998.0 usft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	User Defined	5/6/2015	-8.53	66.84	52,178

Design	Surveys				
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	338.00	

Survey Program	Date	5/21/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
106.7	5,899.4	Gyro (Original Hole)	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4	
5,953.0	16,063.0	Crescent MWD (Original Hole)	MWD	MWD - Standard	

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
106.7	0.12	104.64	106.7	0.0	0.1	-0.1	0.11	0.11	0.00	
107.0	0.12	105.14	107.0	0.0	0.1	-0.1	0.39	0.00	185.19	
132.0	0.10	192.78	132.0	-0.1	0.1	-0.1	0.61	0.00	350.56	
157.0	0.04	19.31	157.0	-0.1	0.1	-0.1	0.56	-0.24	693.88	
182.0	0.03	296.70	182.0	-0.1	0.1	-0.1	0.19	-0.04	330.44	
207.0	0.16	291.97	207.0	0.0	0.1	-0.1	0.52	0.52	36.82	
232.0	0.04	270.05	232.0	0.0	0.0	0.0	0.50	0.00	-87.68	
257.0	0.05	81.26	257.0	0.0	0.0	0.0	0.86	0.04	684.84	

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Survey Report

Company:	Antero	Local Co-ordinate Reference:	Well Vinola Unit 1H
Project:	Doddridge County WV	TVD Reference:	KB Elevation @ 1016.0usft (Precision 522 (18'))
Site:	R.J. Smith Pad: Costlow/Duff/Gibson/Mishka/Vinola	MD Reference:	KB Elevation @ 1016.0usft (Precision 522 (18'))
Well:	Vinola Unit 1H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	North East R5000 Database

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
282.0	0.11	221.43	282.0	0.0	0.0	-0.1	0.61	0.24	560.68	
307.0	0.14	270.65	307.0	-0.1	0.0	-0.1	0.43	0.12	196.88	
332.0	0.18	111.37	332.0	-0.1	0.0	-0.1	1.26	0.16	-637.12	
357.0	0.37	114.03	357.0	-0.1	0.1	-0.2	0.76	0.76	10.64	
382.0	0.77	123.85	382.0	-0.2	0.3	-0.4	1.64	1.60	39.28	
407.0	1.42	127.35	407.0	-0.5	0.7	-0.8	2.61	2.60	14.00	
432.0	2.04	130.10	432.0	-1.0	1.3	-1.4	2.50	2.48	11.00	
457.0	2.53	132.70	457.0	-1.7	2.0	-2.3	2.00	1.96	10.40	
482.0	3.18	136.55	481.9	-2.5	2.9	-3.5	2.71	2.60	15.40	
507.0	3.76	138.11	506.9	-3.7	3.9	-4.9	2.35	2.32	6.24	
532.0	4.37	137.39	531.8	-5.0	5.1	-6.5	2.45	2.44	-2.88	
557.0	4.61	138.96	556.7	-6.4	6.4	-8.4	1.08	0.96	6.28	
582.0	5.31	143.35	581.7	-8.1	7.8	-10.4	3.18	2.80	17.56	
607.0	5.60	144.43	606.5	-10.0	9.2	-12.7	1.23	1.16	4.32	
632.0	5.67	145.53	631.4	-12.0	10.6	-15.1	0.51	0.28	4.40	
657.0	5.71	145.25	656.3	-14.1	12.0	-17.6	0.19	0.16	-1.12	
682.0	5.76	145.20	681.2	-16.1	13.4	-20.0	0.20	0.20	-0.20	
707.0	5.83	145.99	706.0	-18.2	14.9	-22.5	0.42	0.28	3.16	
732.0	5.89	144.66	730.9	-20.3	16.3	-25.0	0.59	0.24	-5.32	
757.0	5.79	145.54	755.8	-22.4	17.8	-27.4	0.54	-0.40	3.52	
782.0	5.74	143.61	780.7	-24.4	19.2	-29.9	0.80	-0.20	-7.72	
807.0	4.92	142.99	805.5	-26.3	20.6	-32.1	3.29	-3.28	-2.48	
832.0	4.84	142.06	830.5	-28.0	21.9	-34.2	0.45	-0.32	-3.72	
857.0	4.65	142.67	855.4	-29.6	23.2	-36.2	0.79	-0.76	2.44	
882.0	4.37	143.67	880.3	-31.2	24.3	-38.1	1.16	-1.12	4.00	
907.0	4.05	143.88	905.2	-32.7	25.4	-39.8	1.28	-1.28	0.84	
932.0	3.80	144.47	930.2	-34.1	26.4	-41.5	1.01	-1.00	2.36	
957.0	3.35	144.69	955.1	-35.3	27.3	-43.0	1.80	-1.80	0.88	
982.0	2.97	143.52	980.1	-36.5	28.1	-44.4	1.54	-1.52	-4.68	
1,007.0	2.61	144.79	1,005.0	-37.5	28.9	-45.5	1.46	-1.44	5.08	
1,032.0	2.35	145.10	1,030.0	-38.3	29.5	-46.6	1.04	-1.04	1.24	
1,057.0	2.13	142.86	1,055.0	-39.1	30.1	-47.5	0.95	-0.88	-8.96	
1,082.0	1.86	143.98	1,080.0	-39.8	30.6	-48.4	1.09	-1.08	4.48	
1,107.0	1.64	144.79	1,105.0	-40.4	31.0	-49.1	0.89	-0.88	3.24	
1,132.0	1.48	145.09	1,130.0	-41.0	31.4	-49.8	0.64	-0.64	1.20	
1,157.0	1.39	144.97	1,155.0	-41.5	31.8	-50.4	0.36	-0.36	-0.48	
1,182.0	1.12	141.54	1,180.0	-42.0	32.1	-50.9	1.12	-1.08	-13.72	
1,207.0	1.02	139.44	1,205.0	-42.3	32.4	-51.4	0.43	-0.40	-8.40	
1,232.0	0.81	142.24	1,229.9	-42.6	32.6	-51.8	0.86	0.64	11.20	
1,257.0	0.68	139.81	1,254.9	-42.9	32.8	-52.1	0.54	-0.52	-7.72	
1,282.0	0.55	136.48	1,279.9	-43.1	33.0	-52.3	0.54	-0.52	-13.32	
1,307.0	0.59	134.01	1,304.9	-43.3	33.2	-52.5	0.19	0.16	0.16	

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 COMPLIANCE 5000.1 Build 73
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Survey Report

Company:	Antero	Local Co-ordinate Reference:	Well Vinola Unit 1H
Project:	Doddridge County WV	TVD Reference:	KB Elevation @ 1016.0usft (Precision 522 (18'))
Site:	R.J. Smith Pad: Costlow/Duff/Gibson/Mishka/Vinola	MD Reference:	KB Elevation @ 1016.0usft (Precision 522 (18'))
Well:	Vinola Unit 1H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	North East R5000 Database

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
1,332.0	0.63	140.07	1,329.9	-43.4	33.4	-52.8	0.30	0.16	24.24	
1,357.0	0.60	137.82	1,354.9	-43.7	33.6	-53.0	0.15	-0.12	-9.00	
1,382.0	0.55	136.30	1,379.9	-43.8	33.7	-53.3	0.21	-0.20	-6.08	
1,407.0	0.45	138.73	1,404.9	-44.0	33.9	-53.5	0.41	-0.40	9.72	
1,432.0	0.48	143.53	1,429.9	-44.2	34.0	-53.7	0.20	0.12	19.20	
1,457.0	0.41	141.61	1,454.9	-44.3	34.1	-53.9	0.29	-0.28	-7.68	
1,482.0	0.46	139.25	1,479.9	-44.5	34.2	-54.0	0.21	0.20	-9.44	
1,507.0	0.52	141.19	1,504.9	-44.6	34.4	-54.2	0.25	0.24	7.76	
1,532.0	0.39	139.90	1,529.9	-44.8	34.5	-54.4	0.52	-0.52	-5.16	
1,557.0	0.39	145.08	1,554.9	-44.9	34.6	-54.6	0.14	0.00	20.72	
1,582.0	0.42	143.75	1,579.9	-45.1	34.7	-54.8	0.13	0.12	-5.32	
1,607.0	0.37	140.32	1,604.9	-45.2	34.8	-54.9	0.22	-0.20	-13.72	
1,632.0	0.34	133.93	1,629.9	-45.3	34.9	-55.1	0.20	-0.12	-25.56	
1,657.0	0.29	126.78	1,654.9	-45.4	35.0	-55.2	0.25	-0.20	-28.60	
1,682.0	0.33	146.95	1,679.9	-45.5	35.1	-55.3	0.46	0.16	80.68	
1,707.0	0.26	152.97	1,704.9	-45.6	35.2	-55.5	0.31	-0.28	24.08	
1,732.0	0.30	148.27	1,729.9	-45.7	35.2	-55.6	0.18	0.16	-18.80	
1,757.0	0.28	149.46	1,754.9	-45.8	35.3	-55.7	0.08	-0.08	4.76	
1,782.0	0.24	166.10	1,779.9	-45.9	35.4	-55.8	0.34	-0.16	66.56	
1,807.0	0.25	177.62	1,804.9	-46.0	35.4	-55.9	0.20	0.04	46.08	
1,832.0	0.22	166.84	1,829.9	-46.1	35.4	-56.0	0.21	-0.12	-43.12	
1,857.0	0.26	147.35	1,854.9	-46.2	35.4	-56.1	0.36	0.16	-77.96	
1,882.0	0.15	143.42	1,879.9	-46.3	35.5	-56.2	0.44	-0.44	-15.72	
1,907.0	0.12	150.97	1,904.9	-46.3	35.5	-56.3	0.14	-0.12	30.20	
1,932.0	0.11	169.40	1,929.9	-46.4	35.5	-56.3	0.15	-0.04	73.72	
1,957.0	0.14	181.94	1,954.9	-46.4	35.5	-56.4	0.16	0.12	50.16	
1,982.0	0.16	121.16	1,979.9	-46.5	35.6	-56.4	0.61	0.08	-243.12	
2,007.0	0.12	161.72	2,004.9	-46.5	35.6	-56.5	0.42	-0.16	162.24	
2,032.0	0.14	154.66	2,029.9	-46.6	35.6	-56.5	0.10	0.08	-28.24	
2,057.0	0.05	142.90	2,054.9	-46.6	35.6	-56.6	0.37	-0.36	-47.04	
2,082.0	0.18	151.07	2,079.9	-46.7	35.7	-56.6	0.52	0.52	32.68	
2,107.0	0.06	175.14	2,104.9	-46.7	35.7	-56.7	0.51	-0.48	96.28	
2,132.0	0.02	206.84	2,129.9	-46.7	35.7	-56.7	0.18	-0.16	126.80	
2,157.0	0.13	187.62	2,154.9	-46.8	35.7	-56.7	0.45	0.44	-76.88	
2,182.0	0.05	244.29	2,179.9	-46.8	35.7	-56.7	0.44	-0.32	226.68	
2,207.0	0.09	301.01	2,204.9	-46.8	35.6	-56.7	0.30	0.16	226.88	
2,232.0	0.06	204.34	2,229.9	-46.8	35.6	-56.7	0.46	-0.12	-386.68	
2,257.0	0.08	222.58	2,254.9	-46.8	35.6	-56.7	0.12	0.08	72.96	
2,282.0	0.11	11.95	2,279.9	-46.8	35.6	-56.7	0.73	0.08	697.48	
2,307.0	0.06	340.69	2,304.9	-46.8	35.6	-56.7	0.27	-0.20	125.04	
2,332.0	0.14	299.62	2,329.9	-46.7	35.6	-56.7	0.41	-0.36	-164.28	
2,357.0	0.05	71.87	2,354.9	-46.7	35.5	-56.6	0.71	-0.36	529.00	
2,382.0	0.09	172.92	2,379.9	-46.7	35.6	-56.7	0.44	0.16	404.20	

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Survey Report

Company:	Antero	Local Co-ordinate Reference:	Well Vinola Unit 1H
Project:	Doddridge County WV	TVD Reference:	KB Elevation @ 1016.0usft (Precision 522 (18'))
Site:	R.J. Smith Pad: Costlow/Duff/Gibson/Mishka/Vinola	MD Reference:	KB Elevation @ 1016.0usft (Precision 522 (18'))
Well:	Vinola Unit 1H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	North East R5000 Database

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
2,407.0	0.06	229.97	2,404.9	-46.8	35.5	-56.7	0.31	-0.12	228.20	
2,432.0	0.08	263.29	2,429.9	-46.8	35.5	-56.7	0.18	0.08	133.28	
2,457.0	0.08	297.85	2,454.9	-46.8	35.5	-56.7	0.19	0.00	138.24	
2,482.0	0.24	280.99	2,479.9	-46.8	35.4	-56.6	0.66	0.64	-67.44	
2,507.0	0.29	302.92	2,504.9	-46.7	35.3	-56.5	0.45	0.20	87.72	
2,532.0	0.10	239.98	2,529.9	-46.7	35.2	-56.5	1.04	-0.76	-251.76	
2,557.0	0.15	245.11	2,554.9	-46.7	35.2	-56.5	0.20	0.20	20.52	
2,582.0	0.17	225.53	2,579.9	-46.8	35.1	-56.5	0.23	0.08	-78.32	
2,607.0	0.15	239.52	2,604.9	-46.8	35.1	-56.5	0.17	-0.08	55.96	
2,632.0	0.18	249.28	2,629.9	-46.8	35.0	-56.5	0.16	0.12	39.04	
2,657.0	0.19	238.55	2,654.9	-46.9	34.9	-56.5	0.14	0.04	-42.92	
2,682.0	0.20	243.48	2,679.9	-46.9	34.9	-56.5	0.08	0.04	19.72	
2,707.0	0.22	237.80	2,704.9	-46.9	34.8	-56.6	0.12	0.08	-22.72	
2,732.0	0.21	227.34	2,729.9	-47.0	34.7	-56.6	0.16	-0.04	-41.84	
2,757.0	0.19	216.24	2,754.9	-47.1	34.7	-56.6	0.17	-0.08	-44.40	
2,782.0	0.27	232.36	2,779.9	-47.1	34.6	-56.7	0.41	0.32	64.48	
2,807.0	0.25	211.09	2,804.9	-47.2	34.5	-56.7	0.39	-0.08	-85.08	
2,832.0	0.20	212.83	2,829.9	-47.3	34.5	-56.8	0.20	-0.20	6.96	
2,857.0	0.22	232.20	2,854.9	-47.4	34.4	-56.8	0.29	0.08	77.48	
2,882.0	0.20	219.24	2,879.9	-47.4	34.3	-56.8	0.21	-0.08	-51.84	
2,907.0	0.16	196.96	2,904.9	-47.5	34.3	-56.9	0.32	-0.16	-89.12	
2,932.0	0.14	229.66	2,929.9	-47.6	34.3	-56.9	0.35	-0.08	130.80	
2,957.0	0.14	226.49	2,954.9	-47.6	34.2	-56.9	0.03	0.00	-12.68	
2,982.0	0.23	227.97	2,979.9	-47.6	34.2	-57.0	0.36	0.36	5.92	
3,007.0	0.17	222.32	3,004.9	-47.7	34.1	-57.0	0.25	-0.24	-22.60	
3,032.0	0.15	214.52	3,029.9	-47.8	34.0	-57.0	0.12	-0.08	-31.20	
3,057.0	0.26	221.46	3,054.9	-47.8	34.0	-57.1	0.45	0.44	27.76	
3,082.0	0.11	208.31	3,079.9	-47.9	33.9	-57.1	0.62	-0.60	-52.60	
3,107.0	0.16	195.26	3,104.9	-48.0	33.9	-57.2	0.23	0.20	-52.20	
3,132.0	0.24	236.96	3,129.9	-48.0	33.9	-57.2	0.64	0.32	166.80	
3,157.0	0.23	238.86	3,154.9	-48.1	33.8	-57.2	0.05	-0.04	7.60	
3,182.0	0.23	233.77	3,179.9	-48.1	33.7	-57.2	0.08	0.00	-20.36	
3,207.0	0.24	234.24	3,204.9	-48.2	33.6	-57.3	0.04	0.04	1.88	
3,232.0	0.23	209.47	3,229.9	-48.3	33.6	-57.3	0.41	-0.04	-99.08	
3,257.0	0.28	233.33	3,254.9	-48.3	33.5	-57.4	0.46	0.20	95.44	
3,282.0	0.27	223.15	3,279.9	-48.4	33.4	-57.4	0.20	-0.04	-40.72	
3,307.0	0.26	243.65	3,304.9	-48.5	33.3	-57.4	0.38	-0.04	82.00	
3,332.0	0.25	250.38	3,329.9	-48.5	33.2	-57.4	0.13	0.00	26.92	
3,357.0	0.19	244.15	3,354.9	-48.6	33.1	-57.4	0.26	-0.24	-34.92	
3,382.0	0.15	243.95	3,379.9	-48.6	33.0	-57.4	0.16	-0.16	-0.88	
3,407.0	0.19	227.85	3,404.9	-48.6	33.0	-57.5	0.25	0.14	-64.40	
3,432.0	0.10	250.58	3,429.9	-48.7	32.9	-57.5	0.42	-0.36	90.92	

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 COMPASS System Build 73
 07/22/2016

Survey Report

Company:	Antero	Local Co-ordinate Reference:	Well Vinola Unit 1H
Project:	Doddridge County WV	TVD Reference:	KB Elevation @ 1016.0usft (Precision 522 (18'))
Site:	R.J. Smith Pad: Costlow/Duff/Gibson/Mishka/Vinola	MD Reference:	KB Elevation @ 1016.0usft (Precision 522 (18'))
Well:	Vinola Unit 1H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	North East R5000 Database

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
3,457.0	0.15	253.65	3,454.9	-48.7	32.9	-57.5	0.20	0.20	12.28
3,482.0	0.16	214.67	3,479.9	-48.7	32.8	-57.5	0.42	0.04	-155.92
3,507.0	0.14	241.07	3,504.9	-48.8	32.8	-57.5	0.28	-0.08	105.60
3,532.0	0.20	218.88	3,529.9	-48.8	32.7	-57.5	0.35	0.24	-88.76
3,557.0	0.17	227.82	3,554.9	-48.9	32.7	-57.6	0.17	-0.12	35.76
3,582.0	0.16	206.83	3,579.9	-48.9	32.6	-57.6	0.24	-0.04	-83.96
3,607.0	0.23	211.43	3,604.9	-49.0	32.6	-57.6	0.29	0.28	18.40
3,632.0	0.13	205.28	3,629.9	-49.1	32.5	-57.7	0.41	-0.40	-24.60
3,657.0	0.26	231.99	3,654.9	-49.1	32.5	-57.7	0.62	0.52	106.84
3,682.0	0.23	218.60	3,679.9	-49.2	32.4	-57.8	0.26	-0.12	-53.56
3,707.0	0.26	223.90	3,704.9	-49.3	32.3	-57.8	0.15	0.12	21.20
3,732.0	0.22	221.12	3,729.9	-49.4	32.3	-57.9	0.17	-0.16	-11.12
3,757.0	0.25	222.44	3,754.9	-49.4	32.2	-57.9	0.12	0.12	5.28
3,782.0	0.27	220.49	3,779.9	-49.5	32.1	-58.0	0.09	0.08	-7.80
3,807.0	0.30	247.40	3,804.9	-49.6	32.0	-58.0	0.54	0.12	107.64
3,832.0	0.31	236.70	3,829.9	-49.7	31.9	-58.0	0.23	0.04	-42.80
3,857.0	0.29	224.54	3,854.9	-49.7	31.8	-58.0	0.27	-0.08	-48.64
3,882.0	0.29	228.85	3,879.9	-49.8	31.7	-58.1	0.09	0.00	17.24
3,907.0	0.28	230.91	3,904.9	-49.9	31.6	-58.1	0.06	-0.04	8.24
3,932.0	0.31	235.98	3,929.9	-50.0	31.5	-58.2	0.16	0.12	20.28
3,957.0	0.31	238.52	3,954.9	-50.1	31.4	-58.2	0.05	0.00	10.16
3,982.0	0.23	245.02	3,979.9	-50.1	31.3	-58.2	0.34	-0.32	26.00
4,007.0	0.27	243.30	4,004.9	-50.2	31.2	-58.2	0.16	0.16	-6.88
4,032.0	0.26	237.83	4,029.9	-50.2	31.1	-58.2	0.11	-0.04	-21.88
4,057.0	0.21	235.91	4,054.9	-50.3	31.0	-58.2	0.20	-0.20	-7.68
4,082.0	0.18	237.45	4,079.9	-50.3	30.9	-58.3	0.12	-0.12	6.16
4,107.0	0.19	224.77	4,104.9	-50.4	30.9	-58.3	0.17	0.04	-50.72
4,132.0	0.17	225.92	4,129.9	-50.4	30.8	-58.3	0.08	-0.08	4.60
4,157.0	0.18	224.49	4,154.9	-50.5	30.8	-58.3	0.04	0.04	-5.72
4,182.0	0.21	229.33	4,179.9	-50.5	30.7	-58.4	0.14	0.12	19.36
4,207.0	0.05	265.71	4,204.9	-50.6	30.7	-58.4	0.69	-0.64	145.52
4,232.0	0.15	252.17	4,229.9	-50.6	30.6	-58.4	0.41	0.40	-54.16
4,257.0	0.12	238.85	4,254.9	-50.6	30.6	-58.4	0.17	-0.12	-53.28
4,282.0	0.11	241.99	4,279.9	-50.6	30.5	-58.4	0.05	-0.04	12.56
4,307.0	0.16	199.22	4,304.9	-50.7	30.5	-58.4	0.44	0.20	-171.08
4,332.0	0.11	244.23	4,329.9	-50.7	30.5	-58.4	0.45	-0.20	180.04
4,357.0	0.13	201.72	4,354.9	-50.8	30.4	-58.5	0.36	0.08	-170.04
4,382.0	0.21	206.65	4,379.9	-50.8	30.4	-58.5	0.33	0.12	18.12
4,407.0	0.08	201.55	4,404.9	-50.9	30.4	-58.6	0.52	-0.52	-29.40
4,432.0	0.12	178.64	4,429.9	-50.9	30.4	-58.6	0.22	0.19	-91.64
4,457.0	0.18	154.59	4,454.9	-51.0	30.4	-58.7	0.34	0.24	56.20
4,482.0	0.08	134.10	4,479.9	-51.0	30.4	-58.7	0.43	0.40	-81.96
4,507.0	0.09	121.28	4,504.9	-51.1	30.4	-58.7	0.09	0.09	-51.28

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Survey Report

Company:	Antero	Local Co-ordinate Reference:	Well Vinola Unit 1H
Project:	Doddridge County WV	TVD Reference:	KB Elevation @ 1016.0usft (Precision 522 (18'))
Site:	R.J. Smith Pad: Costlow/Duff/Gibson/Mishka/Vinola	MD Reference:	KB Elevation @ 1016.0usft (Precision 522 (18'))
Well:	Vinola Unit 1H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	North East R5000 Database

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,532.0	0.03	142.45	4,529.9	-51.1	30.5	-58.8	0.25	-0.24	84.68
4,557.0	0.04	61.21	4,554.9	-51.1	30.5	-58.8	0.18	0.04	-324.96
4,582.0	0.08	89.00	4,579.9	-51.1	30.5	-58.8	0.19	0.16	111.16
4,607.0	0.05	179.76	4,604.9	-51.1	30.5	-58.8	0.38	-0.12	363.04
4,632.0	0.03	105.95	4,629.9	-51.1	30.5	-58.8	0.20	-0.08	-295.24
4,657.0	0.03	104.72	4,654.9	-51.1	30.5	-58.8	0.00	0.00	-4.92
4,682.0	0.09	185.95	4,679.9	-51.1	30.5	-58.8	0.36	0.24	324.92
4,707.0	0.05	170.25	4,704.9	-51.1	30.5	-58.9	0.18	-0.16	-62.80
4,732.0	0.12	50.18	4,729.9	-51.1	30.6	-58.9	0.61	0.28	-480.28
4,757.0	0.05	73.18	4,754.9	-51.1	30.6	-58.9	0.31	-0.28	92.00
4,782.0	0.04	232.22	4,779.9	-51.1	30.6	-58.9	0.35	-0.04	636.16
4,807.0	0.02	31.77	4,804.9	-51.1	30.6	-58.9	0.24	-0.08	638.20
4,832.0	0.06	25.82	4,829.9	-51.1	30.6	-58.9	0.16	0.16	-23.80
4,857.0	0.06	199.88	4,854.9	-51.1	30.6	-58.9	0.48	0.00	696.24
4,882.0	0.02	183.02	4,879.9	-51.1	30.6	-58.9	0.17	-0.16	-67.44
4,907.0	0.08	236.48	4,904.9	-51.1	30.6	-58.9	0.28	0.24	213.84
4,932.0	0.11	171.26	4,929.9	-51.2	30.6	-58.9	0.42	0.12	-260.88
4,957.0	0.06	193.95	4,954.9	-51.2	30.6	-58.9	0.24	-0.20	90.76
4,982.0	0.04	202.63	4,979.9	-51.2	30.6	-59.0	0.09	-0.08	34.72
5,007.0	0.03	160.44	5,004.9	-51.2	30.6	-59.0	0.11	-0.04	-168.76
5,032.0	0.16	223.20	5,029.9	-51.3	30.5	-59.0	0.59	0.52	251.04
5,057.0	0.07	196.13	5,054.9	-51.3	30.5	-59.0	0.41	-0.36	-108.28
5,082.0	0.08	22.28	5,079.9	-51.3	30.5	-59.0	0.60	0.04	-695.40
5,107.0	0.13	60.96	5,104.9	-51.3	30.5	-59.0	0.34	0.20	154.72
5,132.0	0.10	323.43	5,129.9	-51.3	30.6	-59.0	0.70	-0.12	-390.12
5,157.0	0.07	327.93	5,154.9	-51.2	30.5	-58.9	0.12	-0.12	18.00
5,182.0	0.13	312.30	5,179.9	-51.2	30.5	-58.9	0.26	0.24	-62.52
5,207.0	0.18	307.29	5,204.9	-51.1	30.5	-58.8	0.21	0.20	-20.04
5,232.0	0.15	338.94	5,229.9	-51.1	30.4	-58.8	0.38	-0.12	126.60
5,257.0	0.21	323.76	5,254.9	-51.0	30.4	-58.7	0.30	0.24	-60.72
5,282.0	0.15	348.58	5,279.9	-51.0	30.3	-58.6	0.39	-0.24	99.28
5,307.0	0.21	321.43	5,304.9	-50.9	30.3	-58.5	0.41	0.24	-108.60
5,332.0	0.28	334.48	5,329.9	-50.8	30.3	-58.4	0.36	0.28	52.20
5,357.0	0.26	313.93	5,354.9	-50.7	30.2	-58.3	0.39	-0.08	-82.20
5,382.0	0.28	304.07	5,379.9	-50.6	30.1	-58.2	0.20	0.08	-39.44
5,407.0	0.22	325.99	5,404.9	-50.6	30.0	-58.1	0.45	-0.24	87.68
5,432.0	0.23	320.71	5,429.9	-50.5	30.0	-58.0	0.09	0.04	21.12
5,457.0	0.24	329.11	5,454.9	-50.4	29.9	-57.9	0.14	0.04	36.00
5,482.0	0.34	334.67	5,479.9	-50.3	29.8	-57.8	0.42	0.40	22.24
5,507.0	0.33	328.84	5,504.9	-50.2	29.8	-57.7	0.14	-0.04	-23.32
5,532.0	0.25	333.97	5,529.9	-50.0	29.7	-57.5	0.34	0.04	20.52
5,557.0	0.37	340.00	5,554.9	-49.9	29.7	-57.4	0.50	0.48	24.12

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Survey Report

Company:	Antero	Local Co-ordinate Reference:	Well Vinola Unit 1H
Project:	Doddridge County WV	TVD Reference:	KB Elevation @ 1016.0usft (Precision 522 (18'))
Site:	R. J. Smith Pad: Costlow/Duff/Gibson/Mishka/Vinola	MD Reference:	KB Elevation @ 1016.0usft (Precision 522 (18'))
Well:	Vinola Unit 1H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	North East R5000 Database

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,582.0	0.30	339.05	5,579.9	-49.8	29.6	-57.2	0.28	-0.28	-3.80
5,607.0	0.30	340.53	5,604.9	-49.7	29.6	-57.1	0.03	0.00	5.92
5,632.0	0.35	310.90	5,629.9	-49.5	29.5	-57.0	0.69	0.20	-118.52
5,657.0	0.22	320.74	5,654.9	-49.5	29.4	-56.9	0.55	-0.52	39.36
5,682.0	0.12	317.48	5,679.9	-49.4	29.3	-56.8	0.40	-0.40	-13.04
5,707.0	0.21	330.07	5,704.9	-49.3	29.3	-56.7	0.39	0.36	50.36
5,732.0	0.18	16.95	5,729.9	-49.3	29.3	-56.7	0.63	-0.12	187.52
5,757.0	0.21	296.10	5,754.9	-49.2	29.3	-56.6	1.02	0.12	-323.40
5,782.0	0.14	342.84	5,779.9	-49.2	29.2	-56.5	0.61	-0.28	186.96
5,807.0	0.06	3.15	5,804.9	-49.1	29.2	-56.5	0.35	-0.32	81.24
5,832.0	0.13	15.54	5,829.9	-49.1	29.2	-56.4	0.29	0.28	49.56
5,857.0	0.14	295.02	5,854.9	-49.0	29.2	-56.4	0.70	0.04	-322.08
5,882.0	0.05	168.53	5,879.9	-49.0	29.2	-56.4	0.70	-0.36	-505.96
5,899.4	0.22	141.97	5,897.3	-49.1	29.2	-56.4	1.01	0.98	-152.56
5,979.0	0.37	30.66	5,976.9	-49.0	29.4	-56.4	0.62	0.19	-139.85
6,010.0	4.99	92.79	6,007.9	-48.9	30.8	-56.9	15.57	14.90	200.42
6,041.0	8.80	97.64	6,038.6	-49.3	34.5	-58.7	12.42	12.29	15.65
6,072.0	11.23	95.01	6,069.2	-49.9	39.9	-61.2	7.97	7.84	-8.48
6,103.0	14.69	92.60	6,099.4	-50.3	46.8	-64.2	11.29	11.16	-7.77
6,134.0	17.97	92.45	6,129.1	-50.7	55.5	-67.8	10.58	10.58	-0.48
6,164.0	20.51	92.02	6,157.4	-51.1	65.4	-71.9	8.48	8.47	-1.43
6,195.0	22.65	91.57	6,186.3	-51.5	76.8	-76.5	6.92	6.90	-1.45
6,226.0	24.49	89.96	6,214.7	-51.6	89.2	-81.3	6.29	5.94	-5.19
6,257.0	25.74	87.74	6,242.7	-51.4	102.3	-86.0	5.05	4.03	-7.16
6,288.0	27.37	85.72	6,270.5	-50.6	116.2	-90.4	6.01	5.26	-6.52
6,319.0	29.80	84.25	6,297.7	-49.3	130.9	-94.7	8.16	7.84	-4.74
6,349.0	32.43	83.15	6,323.4	-47.6	146.3	-98.9	8.97	8.77	-3.67
6,380.0	35.31	81.66	6,349.1	-45.3	163.5	-103.2	9.67	9.29	-4.81
6,411.0	37.43	80.42	6,374.1	-42.4	181.6	-107.3	7.24	6.84	-4.00
6,442.0	39.35	77.61	6,398.4	-38.7	200.5	-111.0	8.37	6.19	-9.06
6,473.0	42.02	75.28	6,421.9	-34.0	220.2	-114.0	9.91	8.61	-7.52
6,504.0	43.00	71.24	6,444.7	-27.9	240.2	-115.9	9.35	3.16	-13.03
6,534.0	42.43	67.92	6,466.8	-20.8	259.3	-116.4	7.74	-1.90	-11.07
6,565.0	41.94	61.59	6,489.8	-12.0	278.1	-115.3	13.80	-1.58	-20.42
6,596.0	40.74	56.54	6,513.0	-1.5	295.6	-112.1	11.43	-3.87	-16.29
6,627.0	39.38	51.93	6,536.8	10.2	311.8	-107.4	10.53	-4.39	-14.87
6,658.0	38.70	47.64	6,560.9	22.8	326.7	-101.3	8.99	-2.19	-13.84
6,689.0	38.29	42.90	6,585.1	36.3	340.4	-93.8	9.61	0.22	-15.29
6,719.0	38.70	38.40	6,608.6	50.5	352.6	-85.3	9.43	1.37	-15.00
6,750.0	40.07	33.02	6,632.6	66.5	364.0	-74.7	11.86	4.42	-17.35
6,781.0	41.26	28.68	6,656.1	83.8	374.4	-62.5	9.90	3.84	-14.00
6,812.0	42.74	24.87	6,679.1	102.3	383.7	-48.9	9.51	4.77	-12.20
6,843.0	44.13	20.16	6,701.7	122.0	391.9	-33.7	11.37	4.48	-15.19

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Survey Report

Company:	Antero	Local Co-ordinate Reference:	Well Vinola Unit 1H
Project:	Doddridge County WV	TVD Reference:	KB Elevation @ 1016.0usft (Precision 522 (18'))
Site:	R.J. Smith Pad: Costlow/Duff/Gibson/Mishka/Vinola	MD Reference:	KB Elevation @ 1016.0usft (Precision 522 (18'))
Well:	Vinola Unit 1H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	North East R5000 Database

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
6,874.0	46.34	16.78	6,723.5	142.9	398.8	-16.9	10.52	7.13	-10.90	
6,905.0	47.92	14.97	6,744.6	164.7	405.0	1.0	6.65	5.10	-5.84	
6,935.0	49.48	11.98	6,764.4	186.6	410.3	19.4	9.12	5.20	-9.97	
6,966.0	51.72	8.87	6,784.1	210.2	414.6	39.6	10.60	7.23	-10.03	
6,997.0	53.57	5.46	6,802.9	234.6	417.7	61.1	10.58	5.97	-11.00	
7,028.0	54.64	0.42	6,821.0	259.7	418.9	83.9	13.61	3.45	-16.26	
7,057.0	56.73	357.14	6,837.4	283.7	418.4	106.3	11.80	7.21	-11.31	
7,088.0	60.41	356.57	6,853.6	310.1	417.0	131.3	11.97	11.87	-1.84	
7,119.0	65.56	356.08	6,867.6	337.6	415.2	157.5	16.67	16.61	-1.58	
7,150.0	71.15	354.55	6,879.1	366.3	412.8	185.0	18.61	18.03	-4.94	
7,176.0	76.53	353.95	6,886.3	391.2	410.3	209.0	20.81	20.69	-2.31	
7,211.0	82.76	353.46	6,892.6	425.4	406.6	242.1	17.85	17.80	-1.40	
7,242.0	88.69	352.66	6,894.9	456.0	402.8	271.9	19.30	19.13	-2.58	
7,282.0	90.34	346.58	6,895.2	495.4	395.6	311.1	15.75	4.13	-15.20	
7,374.0	89.97	342.87	6,895.0	584.1	371.4	402.4	4.05	-0.40	-4.03	
7,467.0	90.20	338.75	6,894.9	671.9	340.8	495.3	4.44	0.25	-4.43	
7,559.0	91.01	336.23	6,893.9	756.9	305.6	587.3	2.88	0.88	-2.74	
7,652.0	90.56	333.99	6,892.6	841.2	266.5	680.1	2.46	-0.48	-2.41	
7,744.0	89.86	332.07	6,892.3	923.2	224.8	771.8	2.22	-0.76	-2.09	
7,837.0	92.91	334.58	6,890.0	1,006.3	183.0	864.4	4.25	3.28	2.70	
7,929.0	92.38	335.91	6,885.8	1,089.7	144.5	956.2	1.55	-0.58	1.45	
8,022.0	91.23	336.31	6,882.8	1,174.7	106.9	1,049.1	1.31	-1.24	0.43	
8,114.0	88.94	335.22	6,882.7	1,258.6	69.1	1,141.1	2.76	-2.49	-1.18	
8,207.0	89.80	335.17	6,883.7	1,343.0	30.1	1,233.9	0.93	0.92	-0.05	
8,300.0	91.12	337.54	6,883.0	1,428.2	-7.2	1,326.9	2.92	1.42	2.55	
8,392.0	90.39	337.87	6,881.8	1,513.3	-42.1	1,418.9	0.87	-0.79	0.36	
8,485.0	91.48	337.01	6,880.3	1,599.2	-77.7	1,511.9	1.49	1.17	-0.92	
8,577.0	91.26	336.39	6,878.1	1,683.7	-114.1	1,603.8	0.71	-0.24	-0.67	
8,670.0	89.92	335.31	6,877.1	1,768.5	-152.2	1,696.7	1.85	-1.44	-1.16	
8,762.0	90.00	336.45	6,877.2	1,852.5	-189.8	1,788.7	1.24	0.09	1.24	
8,855.0	90.98	338.04	6,876.4	1,938.2	-225.7	1,881.7	2.01	1.05	1.71	
8,947.0	90.56	338.71	6,875.1	2,023.7	-259.6	1,973.6	0.86	-0.46	0.73	
9,040.0	90.11	338.25	6,874.6	2,110.3	-293.7	2,066.6	0.69	-0.48	-0.49	
9,133.0	90.62	337.29	6,874.0	2,196.3	-328.9	2,159.6	1.17	0.55	-1.03	
9,225.0	89.64	338.25	6,873.8	2,281.5	-363.7	2,251.6	1.49	-1.07	1.04	
9,318.0	90.40	338.72	6,873.8	2,368.0	-397.8	2,344.6	0.96	0.82	0.51	
9,410.0	90.09	338.13	6,873.4	2,453.6	-431.7	2,436.6	0.72	0.34	-0.64	
9,503.0	91.38	340.27	6,872.2	2,540.5	-464.7	2,529.6	2.69	-0.39	-2.39	
9,596.0	90.56	340.13	6,870.6	2,628.0	-496.2	2,622.5	0.89	-0.88	-0.15	
9,688.0	90.28	338.59	6,869.9	2,714.1	-528.6	2,714.5	1.70	-0.30	-1.67	
9,781.0	89.72	337.03	6,869.9	2,800.2	-563.7	2,807.5	1.78	-0.60	-1.68	
9,873.0	90.14	336.64	6,870.0	2,884.8	-599.9	2,899.5	0.62	0.46	-0.42	

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Survey Report

Company:	Antero	Local Co-ordinate Reference:	Well Vinola Unit 1H
Project:	Doddridge County WV	TVD Reference:	KB Elevation @ 1016.0usft (Precision 522 (18'))
Site:	R.J. Smith Pad: Costlow/Duff/Gibson/Mishka/Vinola	MD Reference:	KB Elevation @ 1016.0usft (Precision 522 (18'))
Well:	Vinola Unit 1H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	North East R5000 Database

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,966.0	90.67	338.65	6,869.4	2,970.8	-635.3	2,992.4	2.24	0.57	2.16
10,058.0	91.23	339.12	6,867.8	3,056.6	-668.4	3,084.4	0.79	0.61	0.51
10,151.0	90.90	338.14	6,866.1	3,143.2	-702.3	3,177.4	1.11	-0.35	-1.05
10,243.0	90.56	337.08	6,864.9	3,228.2	-737.4	3,269.4	1.21	-0.37	-1.15
10,336.0	90.95	336.20	6,863.7	3,313.6	-774.2	3,362.4	1.03	0.42	-0.95
10,428.0	90.23	336.10	6,862.8	3,397.7	-811.4	3,454.3	0.79	-0.78	-0.11
10,521.0	90.73	337.04	6,862.0	3,483.1	-848.4	3,547.3	1.14	0.54	1.01
10,614.0	90.53	338.37	6,861.0	3,569.1	-883.7	3,640.3	1.45	-0.22	1.43
10,706.0	91.57	339.52	6,859.3	3,655.0	-916.7	3,732.2	1.69	1.13	1.25
10,799.0	90.79	340.30	6,857.4	3,742.3	-948.7	3,825.2	1.19	-0.84	0.84
10,891.0	91.57	341.05	6,855.5	3,829.1	-979.1	3,917.0	1.18	0.85	0.82
10,984.0	90.84	339.77	6,853.5	3,916.7	-1,010.3	4,009.9	1.58	-0.78	-1.38
11,076.0	90.42	338.50	6,852.5	4,002.6	-1,043.0	4,101.9	1.45	-0.46	-1.38
11,169.0	90.23	337.30	6,852.0	4,088.8	-1,078.0	4,194.9	1.31	-0.20	-1.29
11,261.0	89.75	337.38	6,852.0	4,173.7	-1,113.5	4,286.9	0.53	-0.52	0.09
11,354.0	90.34	336.12	6,851.9	4,259.1	-1,150.2	4,379.9	1.50	0.63	-1.35
11,447.0	90.03	335.35	6,851.6	4,343.9	-1,188.4	4,472.8	0.89	-0.33	-0.83
11,539.0	89.89	336.29	6,851.7	4,427.8	-1,226.1	4,564.7	1.03	-0.15	1.02
11,632.0	90.60	338.75	6,851.3	4,513.8	-1,261.6	4,657.7	2.75	0.76	2.65
11,724.0	90.02	342.20	6,850.8	4,600.5	-1,292.4	4,749.6	3.80	-0.63	3.75
11,817.0	90.57	341.51	6,850.3	4,688.8	-1,321.3	4,842.4	0.95	0.59	-0.74
11,909.0	91.20	340.35	6,848.9	4,775.8	-1,351.4	4,934.3	1.43	0.68	-1.26
12,002.0	90.62	339.95	6,847.4	4,863.2	-1,383.0	5,027.2	0.76	-0.62	-0.43
12,094.0	88.69	338.66	6,848.0	4,949.3	-1,415.5	5,119.2	2.52	-2.10	-1.40
12,187.0	89.14	338.04	6,849.7	5,035.7	-1,449.8	5,212.1	0.82	0.48	-0.67
12,279.0	89.89	338.22	6,850.5	5,121.1	-1,484.1	5,304.1	0.84	0.82	0.20
12,372.0	91.01	339.05	6,849.8	5,207.7	-1,517.9	5,397.1	1.50	1.20	0.89
12,464.0	89.78	338.90	6,849.1	5,293.6	-1,550.9	5,489.1	1.35	-1.34	-0.16
12,557.0	91.23	339.82	6,848.3	5,380.6	-1,583.7	5,582.1	1.85	1.56	0.99
12,649.0	91.07	339.42	6,846.5	5,466.8	-1,615.8	5,674.0	0.47	-0.17	-0.43
12,742.0	89.95	337.46	6,845.7	5,553.3	-1,649.9	5,767.0	2.43	-1.20	-2.11
12,834.0	90.56	336.79	6,845.2	5,638.1	-1,685.7	5,859.0	0.98	0.66	-0.73
12,927.0	90.64	335.49	6,844.3	5,723.1	-1,723.3	5,951.9	1.40	0.09	-1.40
13,019.0	90.42	336.69	6,843.4	5,807.2	-1,760.6	6,043.9	1.33	-0.24	1.30
13,112.0	89.33	337.79	6,843.6	5,893.0	-1,796.6	6,136.9	1.67	-1.17	1.18
13,204.0	89.39	337.62	6,844.6	5,978.1	-1,831.5	6,228.9	0.20	0.07	-0.18
13,297.0	90.95	339.21	6,844.4	6,064.6	-1,865.7	6,321.8	2.40	1.68	1.71
13,389.0	89.86	338.82	6,843.7	6,150.4	-1,898.6	6,413.8	1.26	0.18	0.42
13,482.0	91.06	340.16	6,843.0	6,237.5	-1,931.2	6,506.8	1.93	-1.44	-1.44
13,574.0	89.78	340.35	6,842.3	6,324.1	-1,962.3	6,598.7	1.41	-1.39	0.21
13,667.0	89.30	338.99	6,843.0	6,411.3	-1,994.6	6,691.7	1.55	-0.82	-1.46
13,760.0	90.34	338.71	6,843.3	6,498.1	-2,028.2	6,784.7	1.16	1.12	-0.20
13,852.0	91.20	338.12	6,842.1	6,583.6	-2,062.0	6,876.6	1.19	0.93	-0.64

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Survey Report

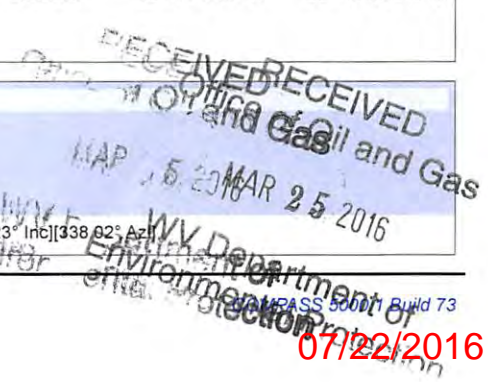
Company:	Antero	Local Co-ordinate Reference:	Well Vinola Unit 1H
Project:	Doddridge County WV	TVD Reference:	KB Elevation @ 1016.0usft (Precision 522 (18'))
Site:	R.J. Smith Pad: Costlow/Duff/Gibson/Mishka/Vinola	MD Reference:	KB Elevation @ 1016.0usft (Precision 522 (18'))
Well:	Vinola Unit 1H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	North East R5000 Database

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
13,945.0	90.48	337.52	6,840.7	6,669.7	-2,097.1	6,969.6	1.01	-0.77	-0.65
14,037.0	91.23	338.41	6,839.4	6,755.0	-2,131.6	7,061.6	1.26	0.82	0.97
14,130.0	91.32	337.85	6,837.3	6,841.3	-2,166.2	7,154.6	0.61	0.10	-0.60
14,222.0	89.89	337.13	6,836.3	6,926.3	-2,201.5	7,246.6	1.74	-1.55	-0.78
14,315.0	89.22	337.09	6,837.0	7,011.9	-2,237.6	7,339.6	0.72	-0.72	-0.04
14,407.0	90.31	336.40	6,837.4	7,096.4	-2,274.0	7,431.6	1.40	1.18	-0.75
14,500.0	89.36	336.38	6,837.7	7,181.7	-2,311.2	7,524.5	1.02	-1.02	-0.02
14,593.0	90.59	336.16	6,837.7	7,266.8	-2,348.6	7,617.5	1.34	1.32	-0.24
14,685.0	88.91	336.70	6,838.1	7,351.1	-2,385.4	7,709.4	1.92	-1.83	0.59
14,778.0	89.72	336.95	6,839.2	7,436.6	-2,422.0	7,802.4	0.91	0.87	0.27
14,870.0	89.92	337.40	6,839.5	7,521.4	-2,457.7	7,894.4	0.54	0.22	0.49
14,963.0	89.11	338.59	6,840.3	7,607.6	-2,492.5	7,987.4	1.55	-0.87	1.28
15,056.0	91.60	339.89	6,839.7	7,694.6	-2,525.5	8,080.4	3.02	2.68	1.40
15,148.0	90.28	338.07	6,838.2	7,780.4	-2,558.5	8,172.3	2.44	-1.43	-1.98
15,241.0	89.69	335.15	6,838.3	7,865.8	-2,595.4	8,265.3	3.20	-0.63	-3.14
15,333.0	90.37	335.95	6,838.2	7,949.5	-2,633.5	8,357.2	1.14	0.74	0.87
15,426.0	90.64	336.59	6,837.4	8,034.7	-2,670.9	8,450.2	0.75	0.29	0.69
15,518.0	91.88	338.12	6,835.4	8,119.5	-2,706.3	8,542.1	2.14	1.35	1.66
15,611.0	90.56	338.37	6,833.4	8,205.9	-2,740.8	8,635.1	1.44	-1.42	0.27
15,704.0	90.45	338.29	6,832.6	8,292.3	-2,775.1	8,728.1	0.15	-0.12	-0.09
15,796.0	89.39	339.30	6,832.7	8,378.1	-2,808.4	8,820.1	1.59	-1.15	1.10
15,889.0	89.56	337.97	6,833.6	8,464.7	-2,842.3	8,913.1	1.44	0.18	-1.43
15,981.0	90.23	338.02	6,833.7	8,550.0	-2,876.8	9,005.1	0.73	0.73	0.05
16,063.0	90.23	338.02	6,833.4	8,626.0	-2,907.4	9,087.1	0.00	0.00	0.00

PTB: [16063.0' MD][90.23° Inc][338.02° Azi]

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL Vinola Unit 1H - hit/miss target - Shape - Point	0.00	0.01	6,897.0	8,636.5	-2,913.5	14,303,839.66	1,712,980.90	39° 23' 22.042 N	80° 44' 35.408 W
- actual wellpath misses target center by 64.8usft at 16063.0usft MD (6833.4 TVD, 8626.0 N, -2907.4 E)									
LP Vinola Unit 1H - hit/miss target - Shape - Point	0.00	0.01	6,897.0	520.0	365.0	14,295,723.12	1,716,259.39	39° 22' 1.696 N	80° 43' 53.942 W
- actual wellpath misses target center by 23.8usft at 7313.8usft MD (6895.1 TVD, 526.2 N, 387.9 E)									

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment
16,063.0	6,833.4	8,626.0	-2,907.4	PTB: [16063.0' MD][90.23° Inc][338.02° Azi]



07/22/2016

Survey Report

Company:	Antero	Local Co-ordinate Reference:	Well Vinola Unit 1H
Project:	Doddridge County WV	TVD Reference:	KB Elevation @ 1016.0usft (Precision 522 (18'))
Site:	R. J. Smith Pad: Costlow/Duff/Gibson/Mishka/Vinola	MD Reference:	KB Elevation @ 1016.0usft (Precision 522 (18'))
Well:	Vinola Unit 1H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	North East R5000 Database

Checked By: _____ Approved By: _____ Date: _____

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COMPASS 5000.1 Build 73
04/22/2016

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	11/21/2015
Job End Date:	12/2/2015
State:	West Virginia
County:	Doddridge
API Number:	47-017-06565-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Vinola Unit 1H
Longitude:	-80.74331000
Latitude:	39.38974000
Datum:	NAD27
Federal/Tribal Well:	NO
True Vertical Depth:	6,895
Total Base Water Volume (gal):	12,346,950
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	Operator	Carrier					
			Water	7732-18-5	100.00000	89.88825	
Sand, White	Baker Hughes	Proppant					
			Listed with Other Chemicals	NA		9.67447	
HCl, 20.1 - 28%	Baker Hughes	Acidizing					
			Listed with Other Chemicals	NA		0.21620	
GW-3LDF	Baker Hughes	Gelling Agent					
			Listed with Other Chemicals	NA		0.12460	
Calcium Chloride	Baker Hughes	Salts					
			Listed with Other Chemicals	NA		0.04800	
FRW-18	Baker Hughes	Friction Reducer					
			Listed with Other Chemicals	NA		0.01791	
Alpha 1427	Baker Hughes	Biocide					
			Listed with Other Chemicals	NA		0.00445	
Enzyme G-NE	Baker Hughes	Breaker					
			Listed with Other Chemicals	NA		0.00071	
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.							
		Other Chemicals					
			Crystalline Silica (Quartz)	14808-60-7		9.67909	

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		Hydrochloric Acid	7647-01-0		0.06054
		Guar Gum	9000-30-0		0.05538
		Petroleum Distillates	64742-47-8		0.04560
		Paraffinic Petroleum Distillate	64742-55-8		0.02769
		Poly (acrylamide-co-acrylic acid) partial sodium salt	62649-23-4		0.01791
		Ethylene Glycol	107-21-1		0.00484
		Isotridecanol, ethoxylated	9043-30-5		0.00461
		2-propenoic, polymer with sodium phosphinate, sodium salt	71050-62-9		0.00323
		Sodium Chloride	7647-14-5		0.00315
		Glutaraldehyde	111-30-8		0.00267
		Ammonium Chloride	12125-02-9		0.00179
		Calcium Chloride	10043-52-4		0.00128
		Oleamide DEA	93-83-4		0.00119
		Ethoxylated Alcohol	68551-12-2		0.00119
		Didecyl Dimethyl Ammonium Chloride	7173-51-5		0.00089
		Ethanol	64-17-5		0.00044
		Quaternary Ammonium Compound	68424-85-1		0.00044
		Polyoxyethylene Sorbitan Monooleate	9005-65-6		0.00030
		Sorbitan Monooleate	1338-43-8		0.00030
		Potassium Chloride	7447-40-7		0.00016
		2-Butoxy-1-Propanol	15821-83-7		0.00009
		Hemicellulase Enzyme Concentrate	9025-56-3		0.00004

* 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°22'30"

6,958'

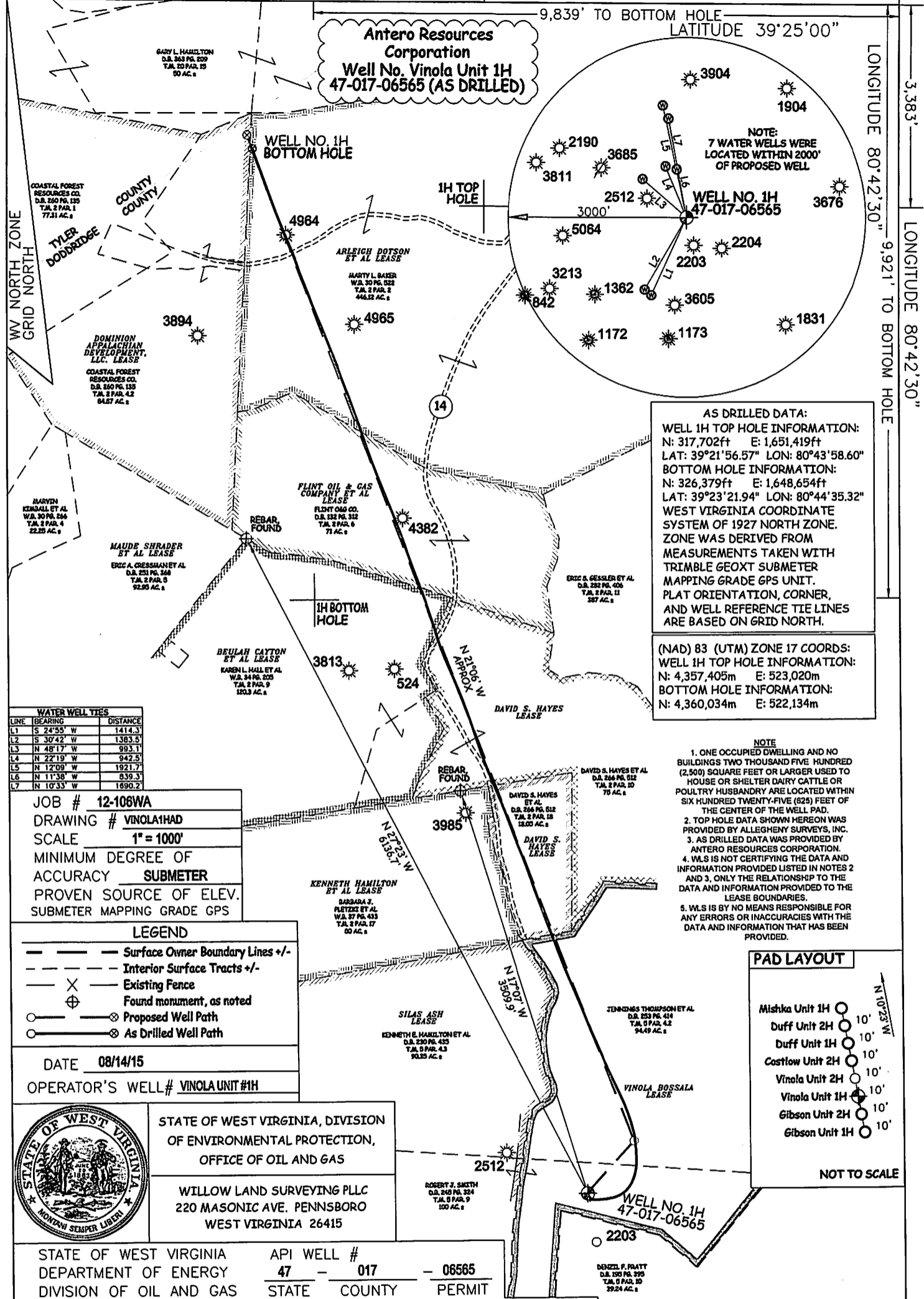
9,839' TO BOTTOM HOLE

LATITUDE 39°25'00"

LONGITUDE 80°42'30"

LONGITUDE 80°42'30"

Antero Resources Corporation
Well No. Vinola Unit 1H
47-017-06565 (AS DRILLED)



AS DRILLED DATA:
WELL 1H TOP HOLE INFORMATION:
N: 317,702ft E: 1,651,419ft
LAT: 39°21'56.57" LON: 80°43'58.60"
BOTTOM HOLE INFORMATION:
N: 326,379ft E: 1,648,654ft
LAT: 39°23'21.94" LON: 80°44'35.32"
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: 4,357,405m E: 523,020m
BOTTOM HOLE INFORMATION:
N: 4,360,034m E: 522,134m

- NOTE
- 1. ONE OCCUPIED DWELLING AND NO 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 INFORMATION 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.

WATER WELL TIES

LINE	BEARING	DISTANCE
L1	S 24°55' W	1414.3
L2	S 30°42' W	1383.9
L3	N 48°17' W	993.1
L4	N 22°19' W	942.5
L5	N 12°09' W	1921.7
L6	N 11°38' W	839.3
L7	N 10°33' W	1690.2

JOB # 12-106WA
DRAWING # VINOLA1HAD
SCALE 1" = 1000'
MINIMUM DEGREE OF ACCURACY SUBMETER
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

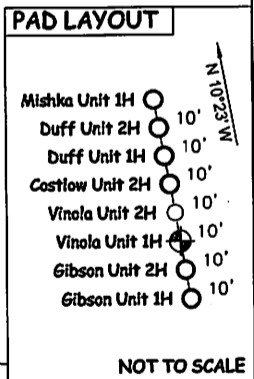
LEGEND

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

DATE 08/14/15
OPERATOR'S WELL # VINOLA UNIT #1H



STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WILLOW LAND SURVEYING PLLC
220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415



STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS

API WELL # 47 - 017 - 06565

STATE COUNTY PERMIT

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL

(IF "GAS") PRODUCTION STORAGE DEEP SHALLOW

LOCATION: ELEVATION 1,004' ORIGINAL - 998' AS DRILLED WATERSHED MCELROY CREEK

QUADRANGLE SMITHBURG (N) CENTERPOINT (N) DISTRICT GRANT COUNTY DODDRIDGE

SURFACE OWNER ROBERT J. SMITH ACREAGE 100 ACRES +/-

OIL & GAS ROYALTY OWNER VINOLA BOSSALA; DAVID S. HAYES; DAVID S. HAYES; BEULAH CAYTON ET AL; FLINT OIL & GAS COMPANY ET AL; ARLEIGH DOTSON ET AL; DOMINION APPALACHIAN DEVELOPMENT, LLC

LEASE ACREAGE 120 ACRES±; 18 ACRES±; 75 ACRES±; 123.5 ACRES±; 70 ACRES±; 446.5 ACRES±; 167.29 ACRES±

PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE

PLUG OFF OLD FORMATION PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL

(SPECIFY) AS DRILLED PLUG & ABANDON CLEAN OUT & REPLUG

TARGET FORMATION MARCELLUS ESTIMATED DEPTH 16,063' MD

WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNE STAMBER

ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TREE ROAD

DENVER, CO 80202 CHARLESTON, WV 25302

07/22/2016

RECEIVED
Office of Oil and Gas
Map 25 2016
V. B. 23-TVD 16,063' MD
Environmental System
Department of
Charleston, WV 25302

LATITUDE 39°22'30"

6,958'

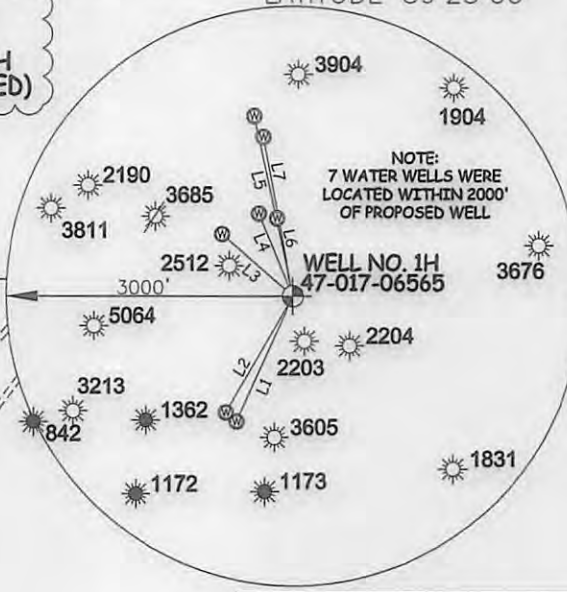
9,839' TO BOTTOM HOLE

LATITUDE 39°25'00"

LONGITUDE 80°42'30"

LONGITUDE 80°42'30"

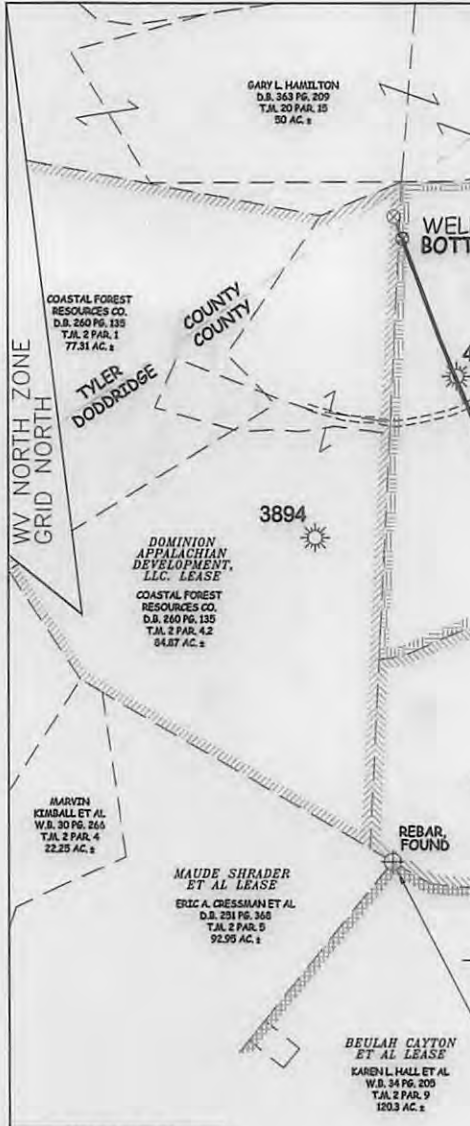
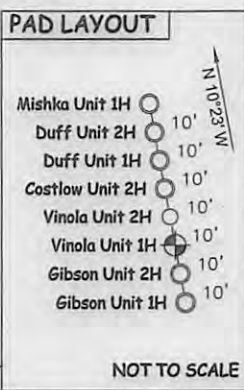
Antero Resources Corporation
Well No. Vinola Unit 1H
47-017-06565 (AS DRILLED)



AS DRILLED DATA:
WELL 1H TOP HOLE INFORMATION:
N: 317,702ft E: 1,651,419ft
LAT: 39°21'56.57" LON: 80°43'58.60"
BOTTOM HOLE INFORMATION:
N: 326,379ft E: 1,648,654ft
LAT: 39°23'21.94" LON: 80°44'35.32"
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: 4,357,405m E: 523,020m
BOTTOM HOLE INFORMATION:
N: 4,360,034m E: 522,134m

- NOTE
- ONE OCCUPIED DWELLING AND NO 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.
 - TOP HOLE DATA SHOWN HEREON WAS PROVIDED BY ALLEGHENY SURVEYS, INC.
 - AS DRILLED DATA WAS PROVIDED BY ANTERO RESOURCES CORPORATION.
 - WLS IS NOT CERTIFYING THE DATA AND INFORMATION PROVIDED LISTED IN NOTES 2 AND 3. ONLY THE RELATIONSHIP TO THE DATA AND INFORMATION PROVIDED TO THE LEASE BOUNDARIES.
 - WLS IS BY NO MEANS RESPONSIBLE FOR ANY ERRORS OR INACCURACIES WITH THE DATA AND INFORMATION THAT HAS BEEN PROVIDED.



WATER WELL TIES

LINE	BEARING	DISTANCE
L1	S 24°55' W	1414.3
L2	S 30°42' W	1383.5
L3	N 48°17' W	993.1
L4	N 22°19' W	942.5
L5	N 12°09' W	1921.7
L6	N 11°38' W	839.3
L7	N 10°33' W	1690.2

JOB # 12-106WA
DRAWING # VINOLA1HAD
SCALE 1" = 1000'
MINIMUM DEGREE OF ACCURACY SUBMETER
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

LEGEND

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

DATE 08/14/15
OPERATOR'S WELL# VINOLA UNIT #1H



STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WILLOW LAND SURVEYING PLLC
220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415

STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS

API WELL # 47 - 017 - 06565

STATE COUNTY PERMIT

WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___
(IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X

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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 6,833' TVD 16,063' MD

DIANNA STAMPER
WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT CT CORPORATION SYSTEM
ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD
DENVER, CO 80202 CHARLESTON, WV 25313

07/22/2016