

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

API 47-085-10178 County Ritchie District Clay
Quad Pennsboro 7.5' Pad Name Buck Run Pad Field/Pool Name ----
Farm name Stephen C. Jackson, et al Well Number Jackknife Unit 1H
Operator (as registered with the OOG) Antero Resources Corporation
Address 1615 Wynkoop Street 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 4351841m Easting 504546m
Landing Point of Curve Northing 4351965.07m Easting 504370.22m
Bottom Hole Northing 4354540m Easting 503328m

Elevation (ft) 1127' 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 2/26/2015 Date drilling commenced 11/21/2015 Date drilling ceased 3/19/2016
Date completion activities began 6/28/2016 Date completion activities ceased 10/13/2016
Verbal plugging (Y/N) N/A Date permission granted N/A Granted by RECEIVED

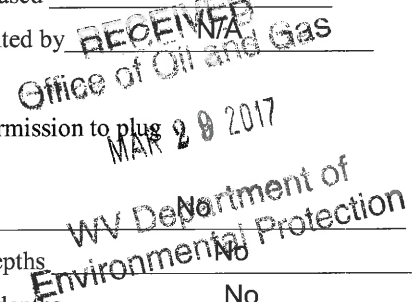
Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 55', 227', 439' Open mine(s) (Y/N) depths _____
Salt water depth(s) ft 1921' Void(s) encountered (Y/N) depths _____
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 Daff
DATE: 5/10/2017

Reviewed by: _____
05/26/2017



API 47- 085 - 10178 Farm name Stephen C. Jackson, et al Well number Jackknife 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	24"	20"	40'	New	94# K-55	N/A	Y
Surface	17-1/2"	13-3/8"	579'	New	48# H-40	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2510'	New	36# J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	16080'	New	23# P-110	N/A	Y
Tubing		2-3/8"	6537'		5.95# N-80		
Packer type and depth set		N/A					

Comment Details _____

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	200 sx	15.6	1.18	38	0'	8 Hrs.
Surface	Class A	684 sx	15.6	1.19	402	0'	8 Hrs.
Coal							
Intermediate 1	Class A	967 sx	15.6	1.18	786	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	814 sx (Lead) 1515 sx (Tail)	13.5 (Lead), 15.2 (Tail)	1.44 (Lead), 1.84 (Tail)	3223	~500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 16080' MD, 6417' TVD (BHL), 6439' (Deepest Point Drilled) Loggers TD (ft) 16080' MD
 Deepest formation penetrated Marcellus Plug back to (ft) N/A
 Plug back procedure N/A

Kick off depth (ft) 5776'

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 _____

API 47- 085 - 10178 Farm name Stephen C. Jackson, et al Well number Jackknife Unit 1H

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>	
<u>Marcellus</u>	<u>6381' (TOP)</u> TVD	<u>6615' (TOP)</u> 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 14105 mcfpd Oil 203 bpd NGL --- bpd Water 375 bpd GAS MEASURED BY Estimated Orifice Pilot

<u>LITHOLOGY/ FORMATION</u>	<u>TOP</u>	<u>BOTTOM</u>	<u>TOP</u>	<u>BOTTOM</u>	<u>DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H₂S, ETC)</u>
	<u>DEPTH IN FT NAME TVD</u>	<u>DEPTH IN FT TVD</u>	<u>DEPTH IN FT MD</u>	<u>DEPTH IN FT MD</u>	

***PLEASE SEE ATTACHED EXHIBIT 3**

Please insert additional pages as applicable.

Drilling Contractor Patterson - UTI Drilling Company, LLC
Address 207 Carlton Dr. City Eighty Four State PA Zip 15330

Logging Company Allied Horizontal Wireline Services
Address 381 Colonial Manor Rd. City North Huntingdon State PA Zip 15642

Cementing Company BJ Services
Address 1036 East Main St. City Bridgeport State WV Zip 26330

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  Title Permitting Agent Date 3/21/2017

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

05/26/2017

EXHIBIT 1

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	28-Jun-16	15,812	15,980	60	Marcellus
2	28-Jun-16	15,613	15,781	60	Marcellus
3	29-Jun-16	15,414	15,582	60	Marcellus
4	29-Jun-16	15,215	15,383	60	Marcellus
5	29-Jun-16	15,016	15,184	60	Marcellus
6	29-Jun-16	14,817	14,985	60	Marcellus
7	30-Jun-16	14,618	14,786	60	Marcellus
8	30-Jun-16	14,419	14,587	60	Marcellus
9	30-Jun-16	14,221	14,388	60	Marcellus
10	30-Jun-16	14,022	14,189	60	Marcellus
11	30-Jun-16	13,823	13,990	60	Marcellus
12	1-Jul-16	13,624	13,791	60	Marcellus
13	1-Jul-16	13,425	13,592	60	Marcellus
14	1-Jul-16	13,226	13,394	60	Marcellus
15	1-Jul-16	13,027	13,195	60	Marcellus
16	2-Jul-16	12,828	12,996	60	Marcellus
17	2-Jul-16	12,629	12,797	60	Marcellus
18	2-Jul-16	12,430	12,598	60	Marcellus
19	2-Jul-16	12,231	12,399	60	Marcellus
20	3-Jul-16	12,032	12,200	60	Marcellus
21	3-Jul-16	11,833	12,001	60	Marcellus
22	3-Jul-16	11,634	11,802	60	Marcellus
23	3-Jul-16	11,435	11,603	60	Marcellus
24	3-Jul-16	11,236	11,404	60	Marcellus
25	4-Jul-16	11,037	11,205	60	Marcellus
26	4-Jul-16	10,838	11,006	60	Marcellus
27	4-Jul-16	10,639	10,807	60	Marcellus
28	4-Jul-16	10,440	10,608	60	Marcellus
29	5-Jul-16	10,241	10,409	60	Marcellus
30	5-Jul-16	10,042	10,210	60	Marcellus
31	5-Jul-16	9,843	10,011	60	Marcellus
32	5-Jul-16	9,644	9,812	60	Marcellus
33	6-Jul-16	9,445	9,613	60	Marcellus
34	6-Jul-16	9,247	9,414	60	Marcellus
35	6-Jul-16	9,048	9,215	60	Marcellus
36	6-Jul-16	8,849	9,016	60	Marcellus
37	6-Jul-16	8,650	8,817	60	Marcellus
38	7-Jul-16	8,451	8,618	60	Marcellus
39	7-Jul-16	8,252	8,420	60	Marcellus
40	7-Jul-16	8,053	8,221	60	Marcellus
41	7-Jul-16	7,854	8,022	60	Marcellus
42	7-Jul-16	7,655	7,823	60	Marcellus
43	7-Jul-16	7,456	7,624	60	Marcellus
44	7-Jul-16	7,257	7,425	60	Marcellus
45	8-Jul-16	7,058	7,226	60	Marcellus
46	8-Jul-16	6,859	7,027	60	Marcellus
47	8-Jul-16	6,660	6,828	60	Marcellus

05/26/2017

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 (bbbls)	Amount of Nitrogen/ other (units)
1	28-Jun-16	63.9	7,005	0	4,781	286,215	9,604	N/A
2	28-Jun-16	72.5	7,371	5,819	4,077	302,700	8,134	N/A
3	29-Jun-16	73.1	7,377	5,822	4,449	303,200	8,095	N/A
4	29-Jun-16	72.6	7,297	5,703	3,819	299,585	8,069	N/A
5	29-Jun-16	75.4	7,538	6,081	4,737	288,440	8,739	N/A
6	29-Jun-16	74.4	7,519	5,518	3,834	244,000	9,228	N/A
7	30-Jun-16	74.2	7,515	5,718	3,891	243,000	9,166	N/A
8	30-Jun-16	72.7	7,109	5,894	4,451	302,415	8,111	N/A
9	30-Jun-16	74.2	7,227	5,648	4,527	301,965	8,233	N/A
10	30-Jun-16	73.7	7,259	5,482	4,320	301,475	8,058	N/A
11	30-Jun-16	73.2	7,229	5,711	3,698	301,800	7,974	N/A
12	1-Jul-16	74.1	7,290	6,001	4,420	301,700	7,965	N/A
13	1-Jul-16	74.8	7,432	5,512	4,518	280,420	9,095	N/A
14	1-Jul-16	69.1	6,976	5,369	4,421	301,200	7,932	N/A
15	1-Jul-16	75.1	7,268	5,776	4,420	300,100	9,098	N/A
16	2-Jul-16	75.2	7,107	5,529	4,642	302,000	7,920	N/A
17	2-Jul-16	74.3	7,028	5,711	4,861	255,890	8,093	N/A
18	2-Jul-16	72.6	7,065	5,401	4,011	302,590	8,590	N/A
19	2-Jul-16	75.6	7,077	5,375	3,794	301,200	8,884	N/A
20	3-Jul-16	73.9	6,906	5,640	4,030	282,900	8,029	N/A
21	3-Jul-16	74.4	6,826	5,803	4,403	301,040	9,203	N/A
22	3-Jul-16	75.3	6,821	5,427	4,056	301,005	7,816	N/A
23	3-Jul-16	75.1	6,931	5,704	4,220	301,300	7,839	N/A
24	3-Jul-16	74.0	7,033	5,940	4,399	299,700	9,057	N/A
25	4-Jul-16	76.8	6,812	5,350	3,994	301,400	7,815	N/A
26	4-Jul-16	77.1	6,862	5,708	4,131	301,815	7,765	N/A
27	4-Jul-16	79.7	7,230	5,937	4,731	293,560	9,312	N/A
28	4-Jul-16	77.2	7,105	5,764	4,377	283,700	8,485	N/A
29	5-Jul-16	74.9	7,097	5,759	4,259	292,100	8,568	N/A
30	5-Jul-16	78.1	6,861	6,003	4,567	301,085	7,714	N/A
31	5-Jul-16	76.2	6,737	5,717	4,367	301,865	7,702	N/A
32	5-Jul-16	76.2	7,012	5,965	4,184	299,100	7,725	N/A
33	6-Jul-16	76.0	6,883	5,858	3,902	300,300	7,678	N/A
34	6-Jul-16	75.8	6,629	5,769	4,526	301,525	7,666	N/A
35	6-Jul-16	74.9	6,724	5,602	4,574	301,995	8,916	N/A
36	6-Jul-16	77.6	6,789	6,017	4,551	301,960	7,670	N/A
37	6-Jul-16	75.5	6,664	5,833	4,245	302,800	7,635	N/A
38	7-Jul-16	77.0	6,916	5,904	4,088	301,500	7,719	N/A
39	7-Jul-16	76.4	6,770	6,155	4,521	301,790	7,611	N/A
40	7-Jul-16	77.7	7,052	6,073	4,227	302,100	9,005	N/A
41	7-Jul-16	78.1	6,734	6,079	4,303	302,600	7,567	N/A
42	7-Jul-16	76.2	6,653	5,976	4,746	303,100	7,638	N/A
43	7-Jul-16	76.4	6,615	6,012	4,381	304,850	7,592	N/A
44	7-Jul-16	78.2	6,730	6,366	4,352	303,000	7,575	N/A
45	8-Jul-16	77.0	6,692	6,153	3,748	302,165	7,547	N/A
46	8-Jul-16	76.8	6,717	6,617	4,278	303,310	7,666	N/A
47	8-Jul-16	76.7	6,750	6,709	4,356	304,190	7,572	N/A
AVG=		75.1	7,005	5,700	4,302	13,917,650	8,193	TOTAL

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	55'	N/A	55'	N/A
Fresh Water	227'	N/A	227'	N/A
Fresh Water	439'	N/A	439'	N/A
Siltstone	0	567	0	567
Shale	est. 567	627	est. 567	627
Sandstone	est. 627	647	est. 627	647
Siltstone	est. 647	867	est. 647	867
Shale	est. 867	987	est. 867	987
Sandstone	est. 987	1067	est. 987	1067
Shale	est. 1067	1247	est. 1067	1247
Sandstone	est. 1247	1387	est. 1247	1387
Coaly Sandstone	est. 1387	1647	est. 1387	1647
Shale	est. 1647	1867	est. 1647	1867
Sandstone	est. 1867	1907	est. 1867	1907
Shale	est. 1907	1998	est. 1907	1999
Big Lime	1998	2129	1999	2129
Big Injun	2129	2512	2129	2513
Gantz Sand	2512	2884	2513	2884
Fifty Foot Sandstone	2884	2981	2884	2981
Gordon	2981	2884	2981	2884
Fifth Sandstone	2884	3419	2884	3420
Bayard	3419	3562	3420	3562
Warren	3562	3959	3562	3960
Speechley	3959	4214	3960	4214
Baltown	4214	4609	4214	4609
Bradford	4609	4995	4609	4995
Benson	4995	5234	4995	5235
Alexander	5234	5550	5235	5550
Elk	5550	5817	5550	5819
Rhinstreet	5817	6131	5819	6181
Sycamore	6131	6225	6181	6305
Middlesex	6225	6331	6305	6480
Burkett	6331	6361	6480	6550
Tully	6361	6381	6550	6615
Marcellus	6381	NA	6615	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.

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	6/28/2016
Job End Date:	7/8/2016
State:	West Virginia
County:	Ritchie
API Number:	47-085-10178-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Jackknife 1H
Latitude:	39.31587800
Longitude:	-80.94743100
Datum:	NAD27
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,439
Total Base Water Volume (gal):	16,703,076
Total Base Non Water Volume:	0



Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Service Abstract 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	90.54076	
Sand	U.S. Well Services, LLC	Proppant	Crystalline Silica, quartz	14808-60-7	100.00000	9.04581	
HCL Acid (12.6%-18.0%)	U.S. Well Services, LLC	Bulk Acid	Water	7732-18-5	87.50000	0.12793	
LGC-15	U.S. Well Services	Gelling Agents	Hydrogen Chloride	7647-01-0	18.00000	0.03056	
WFRA-405	U.S. Well Services	Friction Reducer	Guar Gum	9000-30-0	50.00000	0.07085	
			Petroleum Distillates	64742-47-8	60.00000	0.06710	
			Suspending agent (solid)	14808-60-7	3.00000	0.01084	
			Surfactant	68439-51-0	3.00000	0.00425	
			Water	7732-18-5	60.00000	0.03823	
			2-Propenoic acid, polymer with propanamide	29003-06-9	30.00000	0.01912	
			Hydrated light distillate (petroleum)	64742-47-8	30.00000	0.01539	

SI-1100s	U.S. Well Services	Scale Inhibitor	Ethoxylated alcohol blend	58002-97-1	4.00000	0.00255
			Water	7732-18-5	80.00000	0.01027
			Copolymer of Maleic and Acrylic acid	52255-49-9	10.00000	0.00151
			Potassium salt of diethylene triamine penta (methylene phosphonic acid)	15827-60-8	7.50000	0.00130
			Phosphino carboxylic acid polymer	71050-62-9	5.00000	0.00083
			Hexamethylene triamine penta (methylene phosphonic acid)	34690-00-1	5.00000	0.00083
			Hexamethylene diamine penta (methylene phosphonic acid)	23605-74-5	2.00000	0.00033
BIOCLEAR 2000	U.S. Well Services	Anti-Bacterial Agent				
			2,2-dibromo-3-nitropropionamide	10222-01-2	30.00000	0.00655
			Deionized Water	7732-18-5	28.00000	0.00250
AP One	U.S. Well Services	Gel Breakers				
			Ammonium Persulfate	7727-54-0	100.00000	0.00215
AI-302	U.S. Well Services	Acid Corrosion Inhibitors				
			Water	7732-18-5	95.00000	0.00028
			2-Propyn-1-olcompound with methyloxirane	38172-91-7	15.00000	0.00004
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)

LATITUDE 39°20'00"

8,704'

911' TO BOTTOM HOLE
LATITUDE 39°22'30"

LONGITUDE 80°57'30" 12,675' TO BOTTOM HOLE
LONGITUDE 80°55'00"

6,358'

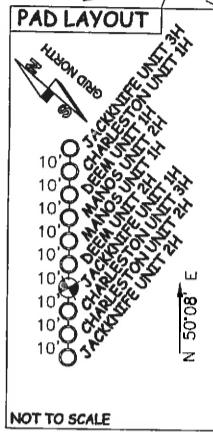
LONGITUDE 80°55'00"

Antero Resources Corporation
Well No. Jackknife Unit 1H
A.P.I. 47-085-10178

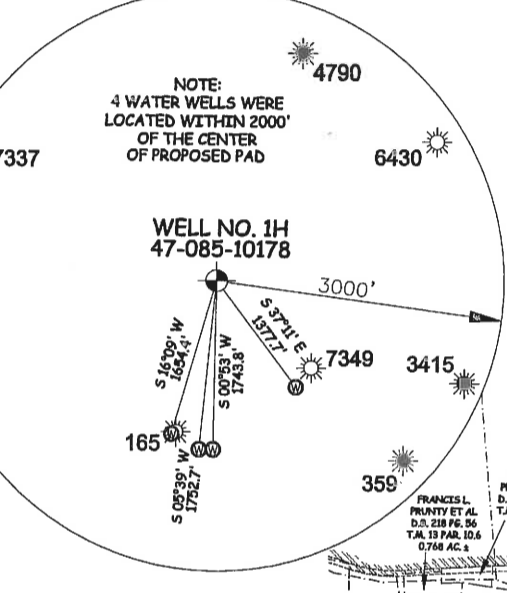
AS DRILLED DATA:
WELL 1H TOP HOLE INFORMATION:
N: 300,458ft E: 1,590,492ft
LAT: 39°18'57.16" LON: 80°56'50.75"
BOTTOM HOLE INFORMATION:
N: 309,381ft E: 1,586,640ft
LAT: 39°20'24.72" LON: 80°57'41.60"
WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE.
ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE 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: 4,351,841m E: 504,546m
BOTTOM HOLE INFORMATION:
N: 4,354,540m E: 503,328m

- 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 SURVY, 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.



WV NORTH ZONE
GRID NORTH



LEGEND

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

DATE 02/09/17

OPERATOR'S WELL# JACKKNIFE UNIT #1H

JOB # 14-008WA

DRAWING # JACKKNIFE1HAD

SCALE 1" = 1000'

MINIMUM DEGREE OF ACCURACY SUBMETER

PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

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



STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WILLOW LAND SURVEYING PLLC
P.O. BOX 17 PENNSBORO WEST VIRGINIA 26415

WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___
(IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X
LOCATION: ELEVATION 1,163' ORIGINAL - 1,127' AS BUILT WATERSHED NORTH FORK HUGHES RIVER

QUADRANGLE PENNSBORO 7.5' DISTRICT CLAY COUNTY RITCHIE

SURFACE OWNER STEPHEN C. JACKSON ET AL ACREAGE 40.835 ACRES +/-

OIL & GAS ROYALTY OWNER HARVEY WEIGLE HEIRS; STEVE JACKSON; MARY MAXINE WELCH; CLIFF WILSON ET UX; W.J. COLLINS ET UX; MARY MAXINE WELCH; WILLIAM DAVIS HEWITT LEASE ACREAGE 51 ACRES±; 117 ACRES±; 163 ACRES±; 413 ACRES±; 575 ACRES±; 76.43 ACRES±; 20 ACRES±

PROPOSED WORK: DRILL ___ CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION ___ PERFORATE NEW FORMATION ___

OTHER PHYSICAL CHANGE IN WELL (SPECIFY) (X) AS DRILLED

PLUG & ABANDON ___ CLEAN OUT & REPLUG ___ ESTIMATED DEPTH 6,417' TVD 16,080' MD

TARGET FORMATION MARCELLUS

WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER

ADDRESS 1615 WYNKOOP STREET DENVER, CO 80202 ADDRESS 5400 D BIG TYLER ROAD CHARLESTON, WV 25313

05/26/2017

LATITUDE 39°20'00"

8,704'

911' TO BOTTOM HOLE

LATITUDE 39°22'30"

LONGITUDE 80°57'30" 12,675' TO BOTTOM HOLE

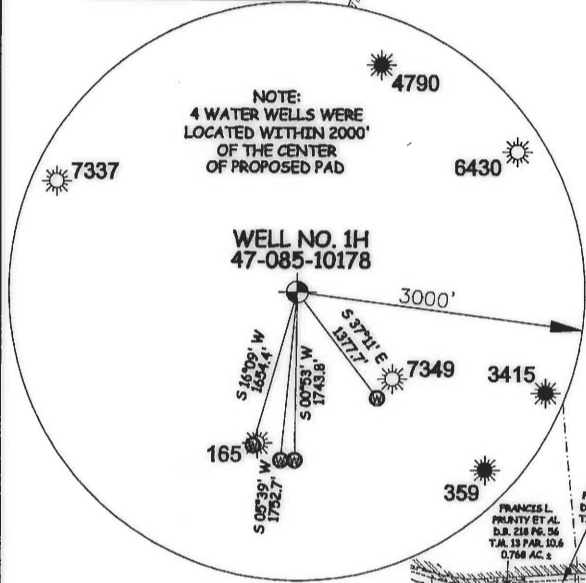
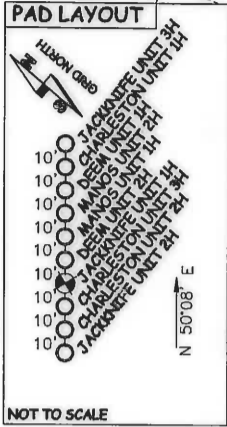
6,358' LONGITUDE 80°55'00"

Antero Resources Corporation
Well No. Jackknife Unit 1H
A.P.I. 47-085-10178

AS DRILLED DATA:
WELL 1H TOP HOLE INFORMATION:
N: 300,458ft E: 1,590,492ft
LAT: 39°18'57.16" LON: 80°56'50.75"
BOTTOM HOLE INFORMATION:
N: 309,381ft E: 1,586,640ft
LAT: 39°20'24.72" LON: 80°57'41.60"
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: 4,351,841m E: 504,546m
BOTTOM HOLE INFORMATION:
N: 4,354,540m E: 503,328m

- 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 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.



LEGEND

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

DATE 02/09/17

OPERATOR'S WELL# JACKKNIFE UNIT #1H

JOB # 14-008WA

DRAWING # JACKKNIFE1HAD

SCALE 1" = 1000'

MINIMUM DEGREE OF ACCURACY SUBMETER

PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

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

LOCATION: ELEVATION 1,183' ORIGINAL - 1,127' AS BUILT WATERSHED NORTH FORK HUGHES RIVER

QUADRANGLE PENNSBORO 7.5' DISTRICT CLAY COUNTY RITCHIE

API WELL # 47 - 085 - 10178

STATE COUNTY PERMIT

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

WILLOW LAND SURVEYING PLLC
P.O. BOX 17 PENNSBORO WEST VIRGINIA 26415

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CT CORPORATION SYSTEM

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DENVER, CO 80202 CHARLESTON, WV 25313

02/26/2017