

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

API 47 - 085 - 10156 County Ritchie District Clay
Quad Pullman 7.5' Pad Name Mackay Pad Field/Pool Name ----
Farm name Jack D. Mackay, et al Well Number Greenback Unit 2H
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 4343237m Easting 508887m
Landing Point of Curve Northing 4343522.24m Easting 509481.05m
Bottom Hole Northing 4346318m Easting 508167m

Elevation (ft) 1100' 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

RECEIVED
Office of Oil and Gas
MAR 28 2017

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

WV Department of
Environmental Protection

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

Date permit issued 9/26/2014 Date drilling commenced 5/16/2015 Date drilling ceased 10/27/2015
Date completion activities began 1/30/2016 Date completion activities ceased 9/26/2016
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

Freshwater depth(s) ft 434' Open mine(s) (Y/N) depths No
Salt water depth(s) ft 1966' Void(s) encountered (Y/N) depths No
Coal depth(s) ft 301' Cavern(s) encountered (Y/N) depths No
Is coal being mined in area (Y/N) No

APPROVED

NAME: Michael Goff
DATE: 5/10/2017

Reviewed by:
AK RDS
6/26/2017
5/23/17

API 47-085 - 10156 Farm name Jack D. Mackay, et al Well number Greenback Unit 2H

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# H-40	N/A	Y
Surface	17-1/2"	13-3/8"	558'	New	48# H-40	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2524'	New	36# J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	17425'	New	23# P-110	N/A	Y
Tubing		2-3/8"	7085'		4.7# 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	100 sx	15.6	1.18	38	0'	8 Hrs.
Surface	Class A	664 sx	15.6	1.18	388	0'	8 Hrs.
Coal							
Intermediate 1	Class A	974 sx	15.6	1.18	791	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	936 sx (Lead) 1675 sx (Tail)	13.5 (Lead), 15.2 (Tail)	1.44 (Lead), 1.81 (Tail)	3528	-500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 17425' MD, 6453' TVD (BHL); 6562' TVD (Deepest Point Drilled) Loggers TD (ft) 17375' MD

Deepest formation penetrated Marcellus Plug back to (ft) N/A

Plug back procedure N/A

Kick off depth (ft) 6724'

** This is a subsequent well. Antero only runs wireline logs on one well on a multi-well pad (McNabb Unit 1H API #47-085-10196). Please reference the wireline logs submitted with Form WR-35 for McNabb Unit 1H. 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 _____

API 47- 085 - 10156

Farm name Jack D. Mackay, et al

Well number Greenback Unit 2H

PRODUCING FORMATION(S)

DEPTHS

Marcellus 6548' (Top) TVD 7216' (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 14028 mcfpd Oil 87 bpd NGL --- bpd Water 557 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	

***PLEASE SEE ATTACHED EXHIBIT 3**

Please insert additional pages as applicable.

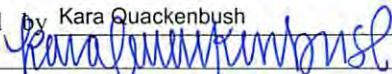
Drilling Contractor Precision Drilling Company, LP
Address 2640 Reach Rd. City Williamsport State PA Zip 17701

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

Cementing Company C & J Energy
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  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	30-Jan-16	17,171	17,339	60	Marcellus
2	14-Apr-16	16,973	17,140	60	Marcellus
3	14-Apr-16	16,774	16,942	60	Marcellus
4	15-Apr-16	16,575	16,743	60	Marcellus
5	15-Apr-16	16,377	16,544	60	Marcellus
6	15-Apr-16	16,178	16,345	60	Marcellus
7	15-Apr-16	15,979	16,147	60	Marcellus
8	16-Apr-16	15,780	15,948	60	Marcellus
9	16-Apr-16	15,582	15,749	60	Marcellus
10	16-Apr-16	15,383	15,551	60	Marcellus
11	17-Apr-16	15,184	15,352	60	Marcellus
12	18-Apr-16	14,986	15,153	60	Marcellus
13	18-Apr-16	14,787	14,954	60	Marcellus
14	18-Apr-16	14,588	14,756	60	Marcellus
15	19-Apr-16	14,389	14,557	60	Marcellus
16	19-Apr-16	14,191	14,358	60	Marcellus
17	19-Apr-16	13,992	14,160	60	Marcellus
18	19-Apr-16	13,793	13,961	60	Marcellus
19	19-Apr-16	13,595	13,762	60	Marcellus
20	20-Apr-16	13,396	13,563	60	Marcellus
21	20-Apr-16	13,197	13,365	60	Marcellus
22	20-Apr-16	12,998	13,166	60	Marcellus
23	21-Apr-16	12,800	12,967	60	Marcellus
24	21-Apr-16	12,601	12,769	60	Marcellus
25	21-Apr-16	12,402	12,570	60	Marcellus
26	21-Apr-16	12,204	12,371	60	Marcellus
27	22-Apr-16	12,005	12,172	60	Marcellus
28	22-Apr-16	11,806	11,974	60	Marcellus
29	22-Apr-16	11,607	11,775	60	Marcellus
30	22-Apr-16	11,409	11,576	60	Marcellus
31	23-Apr-16	11,210	11,378	60	Marcellus
32	23-Apr-16	11,011	11,179	60	Marcellus
33	23-Apr-16	10,813	10,980	60	Marcellus
34	23-Apr-16	10,614	10,781	60	Marcellus
35	24-Apr-16	10,415	10,583	60	Marcellus
36	24-Apr-16	10,216	10,384	60	Marcellus
37	24-Apr-16	10,018	10,185	60	Marcellus
38	24-Apr-16	9,819	9,987	60	Marcellus
39	24-Apr-16	9,620	9,788	60	Marcellus
40	25-Apr-16	9,422	9,589	60	Marcellus
41	25-Apr-16	9,223	9,390	60	Marcellus
42	25-Apr-16	9,024	9,192	60	Marcellus
43	25-Apr-16	8,825	8,993	60	Marcellus
44	25-Apr-16	8,627	8,794	60	Marcellus
45	26-Apr-16	8,428	8,596	60	Marcellus
46	26-Apr-16	8,229	8,397	60	Marcellus
47	26-Apr-16	8,031	8,198	60	Marcellus
48	27-Apr-16	7,832	7,999	60	Marcellus
49	27-Apr-16	7,633	7,801	60	Marcellus
50	27-Apr-16	7,434	7,602	60	Marcellus
51	27-Apr-16	7,236	7,403	60	Marcellus

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	13-Apr-16	64.7	7,401	5,383	4,155	304,550	8,217	N/A
2	14-Apr-16	66.6	7,243	5,974	5,131	307,160	8,650	N/A
3	14-Apr-16	67.3	6,987	5,591	5,074	306,070	7,981	N/A
4	15-Apr-16	65.2	6,868	5,729	5,313	308,530	8,101	N/A
5	15-Apr-16	66.7	6,981	5,133	5,126	309,450	7,903	N/A
6	15-Apr-16	67.5	6,951	5,399	5,004	308,580	7,957	N/A
7	15-Apr-16	67.4	6,995	6,267	4,558	310,490	7,910	N/A
8	16-Apr-16	68.1	7,002	5,432	5,083	311,300	7,876	N/A
9	16-Apr-16	67.5	7,010	5,379	5,375	309,720	7,839	N/A
10	16-Apr-16	67.4	6,972	5,684	4,621	309,180	7,848	N/A
11	17-Apr-16	65.6	6,874	5,353	4,879	180,600	8,106	N/A
12	18-Apr-16	67.0	6,882	5,323	4,724	308,890	7,818	N/A
13	18-Apr-16	67.3	7,383	5,445	4,059	275,630	8,710	N/A
14	18-Apr-16	67.7	6,952	5,462	4,967	313,325	7,848	N/A
15	19-Apr-16	67.5	6,907	5,823	5,088	309,670	7,826	N/A
16	19-Apr-16	66.0	7,110	5,567	4,779	311,030	7,761	N/A
17	19-Apr-16	68.0	6,998	5,599	4,751	310,000	7,754	N/A
18	19-Apr-16	67.6	6,998	5,677	5,472	308,880	7,761	N/A
19	19-Apr-16	67.7	6,799	5,664	4,248	307,510	7,737	N/A
20	20-Apr-16	68.2	6,918	5,546	4,943	311,800	7,732	N/A
21	20-Apr-16	67.5	6,865	5,672	5,122	309,400	7,699	N/A
22	20-Apr-16	67.6	6,774	5,903	4,692	309,560	7,701	N/A
23	21-Apr-16	67.7	6,644	5,994	4,526	308,720	7,666	N/A
24	21-Apr-16	64.0	6,562	6,076	3,396	309,920	7,675	N/A
25	21-Apr-16	66.0	6,838	6,023	3,743	309,550	7,704	N/A
26	21-Apr-16	71.7	7,305	5,699	5,112	300,180	7,539	N/A
27	22-Apr-16	69.6	6,811	5,726	4,511	309,360	7,687	N/A
28	22-Apr-16	65.4	6,561	5,368	5,279	310,180	8,933	N/A
29	22-Apr-16	64.0	6,781	5,920	3,684	311,000	7,736	N/A
30	22-Apr-16	69.9	6,740	5,567	5,146	310,320	7,625	N/A
31	23-Apr-16	70.1	6,937	5,430	4,329	312,630	9,074	N/A
32	23-Apr-16	66.0	6,537	5,581	4,305	309,940	7,618	N/A
33	23-Apr-16	65.0	6,691	5,612	4,398	308,300	7,521	N/A
34	23-Apr-16	70.7	6,855	5,246	4,978	312,170	7,553	N/A
35	24-Apr-16	70.6	6,619	5,361	5,079	312,210	7,533	N/A
36	24-Apr-16	65.0	6,395	5,290	4,415	310,040	7,538	N/A
37	24-Apr-16	66.0	6,618	5,471	4,810	309,935	7,469	N/A
38	24-Apr-16	66.5	6,654	5,931	4,544	310,650	7,510	N/A
39	24-Apr-16	70.5	6,594	5,330	4,349	296,370	7,813	N/A
40	25-Apr-16	70.5	6,544	5,334	3,922	310,840	7,586	N/A
41	25-Apr-16	67.0	6,511	5,831	4,036	309,670	7,474	N/A
42	25-Apr-16	65.0	6,202	5,148	5,417	310,440	7,450	N/A
43	25-Apr-16	66.0	6,235	5,600	5,059	310,940	7,425	N/A
44	25-Apr-16	71.0	6,486	5,834	4,606	309,480	8,377	N/A
45	26-Apr-16	70.0	6,368	5,577	3,748	308,820	7,402	N/A
46	26-Apr-16	66.0	6,384	6,059	5,246	309,350	8,752	N/A
47	26-Apr-16	70.9	6,198	5,738	5,054	308,660	7,368	N/A
48	27-Apr-16	70.0	6,212	5,750	4,824	298,610	7,275	N/A
49	27-Apr-16	70.7	6,131	5,682	4,913	305,340	7,382	N/A
50	27-Apr-16	70.0	6,057	5,608	4,820	309,160	7,396	N/A
51	27-Apr-16	66.0	5,795	5,502	3,645	309,500	7,383	N/A
AVG=		67.6	6,728	5,614	4,687	15,593,610	7,808	TOTAL

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	434'	N/A	434'	N/A
Shale	0	201	0	201
Sandstone	est. 201	281	est. 201	281
Siltstone	est. 281	301	est. 281	301
Coal "Washington Coal"	est. 301	361	est. 301	361
Sandstone	est. 361	581	est. 361	581
Shale	est. 581	1241	est. 581	1241
Sandstone	est. 1241	1321	est. 1241	1321
Siltstone/ sandstone	est. 1321	1401	est. 1321	1401
Sandstone	est. 1401	1721	est. 1401	1721
Shale	est. 1721	1821	est. 1721	1821
Siltstone	est. 1821	1981	est. 1821	1981
Limestone	est. 1981	2073	est. 1981	2094
Big Lime	2073	2746	2094	2780
Fifty Foot Sandstone	2746	2818	2780	2854
Gordon	2818	2988	2854	3034
Fifth Sandstone	2988	3104	3034	3162
Bayard	3104	3935	3162	4093
Speechley	3935	4194	4093	4385
Baltown	4194	4642	4385	4890
Bradford	4642	5051	4890	5349
Benson	5051	5297	5349	5632
Alexander	5297	6226	5632	6674
Sycamore	6226	6385	6674	6875
Middlesex	6385	6493	6875	7058
Burkett	6493	6525	7058	7137
Tully	6525	6548	7137	7216
Marcellus	6548	NA	7216	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:	4/13/2016
Job End Date:	4/27/2016
State:	West Virginia
County:	Ritchie
API Number:	47-085-10156-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Greenback 2H
Latitude:	39.14179100
Longitude:	-80.53499000
Datum:	NAD27
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,562
Total Base Water Volume (gal):	17,479,246
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	89.93695	
Sand	U.S. Well Services, LLC	Proppant					
			Crystalline Silica, quartz	14808-60-7	100.00000	9.62047	
LGC-15	U.S. Well Services	Gelling Agents					
			Guar Gum	9000-30-0	50.00000	0.07582	
			Petroleum Distillates	64742-47-8	60.00000	0.07181	
			Suspending agent (solid)	14808-60-7	3.00000	0.01160	
			Surfactant	68439-51-0	3.00000	0.00455	
HCL Acid (12.6%-18.0%)	U.S. Well Services, LLC	Bulk Acid					
			Water	7732-18-5	87.50000	0.13043	
			Hydrogen Chloride	7647-01-0	18.00000	0.03116	
WFRA-405	U.S. Well Services	Friction Reducer					
			Water	7732-18-5	60.00000	0.04581	
			2-Propenoic acid, polymer with 2-propenamides	9003-06-9	30.00000	0.02291	
			Hydrated light distillate (petroleum)	64742-47-8	30.00000	0.01844	

			Ethoxylated alcohol blend	68002-97-1	4.00000	0.00305
SI-1100	U.S. Well Services	Scale Inhibitor				
			Water	7732-18-5	80.00000	0.01003
			Ethylene Glycol	107-21-1	25.00000	0.00354
			Copolymer of Maleic and Acrylic acid	52255-49-9	10.00000	0.00148
			Potassium salt of diethylene triamine penta (methylene phosphonic acid)	15827-60-8	7.50000	0.00127
			Hexamethylene tramine penta (methylene phosphonic acid)	34690-00-1	5.00000	0.00081
			Phosphino carboxylic acid polymer	71050-62-9	5.00000	0.00081
			Hexamethylene diamine penta (methylene phosphonic acid)	23605-74-5	2.00000	0.00033
K-BAC 1020	U.S. Well Services	Anti-Bacterial Agent				
			2,2-dibromo-3-nitrilopropionamide	10222-01-2	20.00000	0.00411
			Deionized Water	7732-18-5	28.00000	0.00235
AP One	U.S. Well Services	Gel Breakers				
			Ammonium Persulfate	7727-54-0	100.00000	0.00195
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°15'00"

6,287'

8,637' TO BOTTOM HOLE

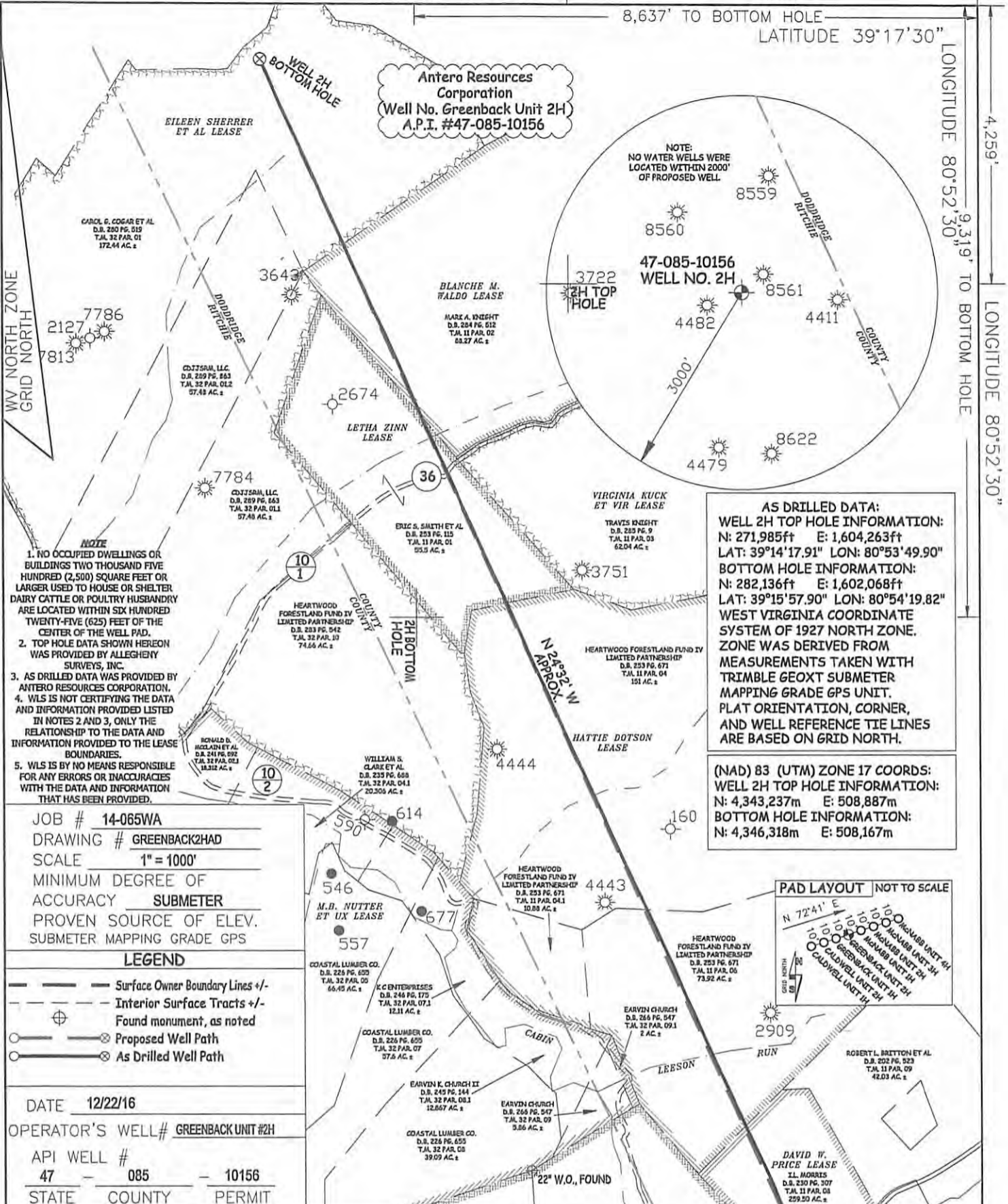
LATITUDE 39°17'30"

LONGITUDE 80°52'30"

4,259'

9,319' TO BOTTOM HOLE

LONGITUDE 80°52'30"



- 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.

AS DRILLED DATA:

WELL 2H TOP HOLE INFORMATION:
 N: 271,985ft E: 1,604,263ft
 LAT: 39°14'17.91" LON: 80°53'49.90"

BOTTOM HOLE INFORMATION:
 N: 282,136ft E: 1,602,068ft
 LAT: 39°15'57.90" LON: 80°54'19.82"

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 2H TOP HOLE INFORMATION:
 N: 4,343,237m E: 508,887m

BOTTOM HOLE INFORMATION:
 N: 4,346,318m E: 508,167m

JOB # 14-065WA
 DRAWING # GREENBACK2HAD
 SCALE 1" = 1000'
 MINIMUM DEGREE OF ACCURACY SUBMETER
 PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

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

DATE 12/22/16
 OPERATOR'S WELL # GREENBACK UNIT #2H
 API WELL # 47 - 085 - 10156
 STATE COUNTY PERMIT



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 DEPT. OF ENERGY DIVISION OF OIL AND GAS
 WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL
 (IF "GAS") PRODUCTION STORAGE X DEEP SHALLOW X

LOCATION: ELEVATION 1,100' (AS DRILLED) WATERSHED NORTH FORK HUGHES RIVER

QUADRANGLE PULLMAN 7.5' (TH) PENNSBORO 7.5' (BH) DISTRICT CLAY COUNTY ITCHIE PERMIT 05/26/2017

SURFACE OWNER JACK D. MACKAY ET AL ACREAGE 235.03 ACRES +/-

OIL & GAS ROYALTY OWNER WM. VANCAMPEN; ANN BATTA ET AL; DAVID W. PRICE; LEASE ACREAGE 312 AC±; 111 AC±; 105 AC±; HATTIE DOTSON; LETHA ZINN; VIRGINIA KUCK ET VIR; BLANCHE M. WALDO; EILEEN SHERRER ET AL 240 AC±; 55.5 AC±; 56 AC±; 95 AC±; 500 AC±

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 6,453' TVD 17,425' MD

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

LATITUDE 39°15'00"

8,637' TO BOTTOM HOLE

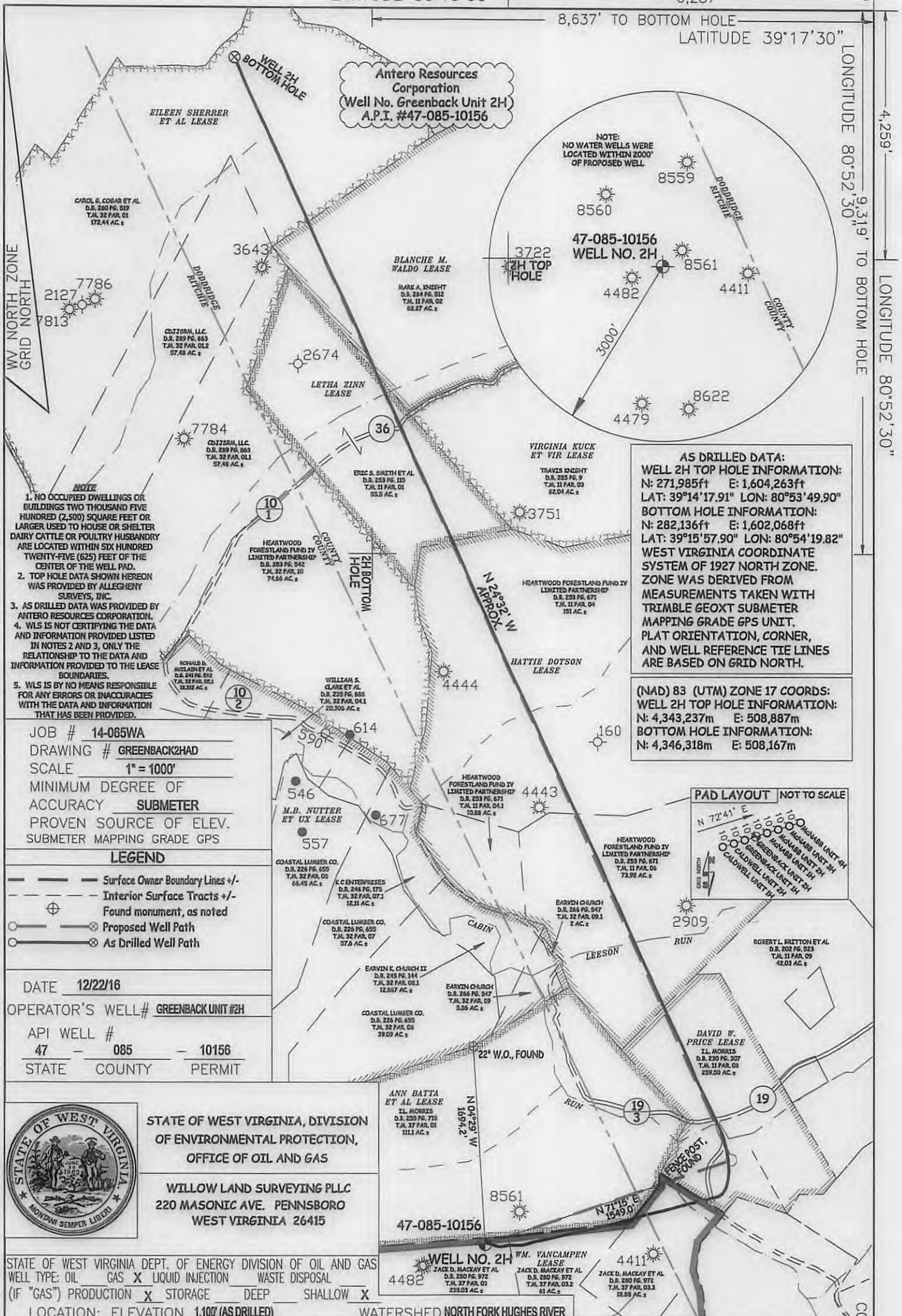
LATITUDE 39°17'30"

LONGITUDE 80°52'30"

4,259'

9,319' TO BOTTOM HOLE

LONGITUDE 80°52'30"



AS DRILLED DATA:
WELL 2H TOP HOLE INFORMATION:
 N: 271,985ft E: 1,604,263ft
 LAT: 39°14'17.91" LON: 80°53'49.90"
BOTTOM HOLE INFORMATION:
 N: 282,136ft E: 1,602,068ft
 LAT: 39°15'57.90" LON: 80°54'19.82"
 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 2H TOP HOLE INFORMATION:
 N: 4,343,237m E: 508,887m
BOTTOM HOLE INFORMATION:
 N: 4,346,318m E: 508,167m

- 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.

JOB # 14-065WA
 DRAWING # GREENBACK2HAD
 SCALE 1" = 1000'
 MINIMUM DEGREE OF ACCURACY SUBMETER
 PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

LEGEND

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

DATE 12/22/16
 OPERATOR'S WELL # GREENBACK UNIT #2H
 API WELL # 47 - 085 - 10156
 STATE COUNTY PERMIT

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 DEPT. OF ENERGY DIVISION OF OIL AND GAS
 WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
 (IF "GAS") PRODUCTION STORAGE DEEP SHALLOW

LOCATION: ELEVATION 1,100' (AS DRILLED) WATERSHED NORTH FORK HUGHES RIVER

QUADRANGLE PULLMAN 7.5' (TH) PENNSBORO 7.5' (BH) DISTRICT CLAY COUNTY RITCHIE

SURFACE OWNER JACK D. MACKAY ET AL ACREAGE 235.03 ACRES +/-

OIL & GAS ROYALTY OWNER WM. VANCAMPEN; ANN BATT A ET AL; DAVID W. PRICE; LEASE ACREAGE 312 AC±; 111 AC±; 105 AC±;

HATTIE DOTSON; LETHA ZINN; VIRGINIA KUCK ET VIR; BLANCHE M. WALDO; EILEEN SHERRER ET AL 240 AC±; 55.5 AC±; 56 AC±; 95 AC±; 500 AC±

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 6,453' TVD 17,425' MD

WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT CT CORPORATION SYSTEM

ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD

FORM WW-6 DENVER, CO 80202 CHARLESTON, WV 25313

05/26/2017

COUNTY NAME PERMIT