

# RECEIVED

AUG 31 2015

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WR-35  
Rev. 8/23/13

WV GEOLOGICAL SURVEY  
MORGANTOWN, WV

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

API 47 - 017 - 06432 County Doddridge District Central  
 Quad West Union 7.5' Pad Name Dotson-Holland Field/Pool Name ---  
 Farm name Holland, Robert L., Jr. Well Number Amanda Unit 2H  
 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 4347134m Easting 510967m  
 Landing Point of Curve Northing 4346940.43m Easting 511076.10m  
 Bottom Hole Northing 4345403m Easting 511810m

Elevation (ft) 989' 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 1/28/2014 Date drilling commenced 7/21/2014 Date drilling ceased 9/11/2014  
 Date completion activities began 10/9/2014 Date completion activities ceased 12/23/2014  
 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 56' Open mine(s) (Y/N) depths No  
 Salt water depth(s) ft 1527' Void(s) encountered (Y/N) depths No  
 Coal depth(s) ft 381' Cavern(s) encountered (Y/N) depths No  
 Is coal being mined in area (Y/N) No

Reviewed by:

\_\_\_\_\_

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API 47-017 - 06432 Farm name Holland, Robert L., Jr. Well number Amanda 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	28"	20"	40'	New	133# J-55	N/A	Y
Surface	17- 1/2"	13- 3/8"	346'	New	48# H-40	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2493'	New	36# J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4" & 8-1/2"	5-1/2"	12639'	New	20# P-110	N/A	Y
Tubing		2-3/8"	6511'		4.7# N-80	N/A	
Packer type and depth set	N/A						

Comment Details \_\_\_\_\_

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor	Class A	185 sx	15.6	1.18	38	0'	8 Hrs.
Surface	Class A	410 sx	15.6	1.18	240	0'	8 Hrs.
Coal							
Intermediate 1	Class A	928 sx	15.6	1.18	781	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	968 sx (Lead) 958 sx (Tail)	14.5 Lead 15.2 Tail	1.30 Lead 1.86 Tail	2439	-500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 12640' MD, 6535' TVD Loggers TD (ft) 12591'  
 Deepest formation penetrated Marcellus Plug back to (ft) N/A  
 Plug back procedure N/A

Kick off depth (ft) 5979'

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

\*\* This is a subsequent well. Antero only runs wireline logs on one well on a multi-well pad (Amanda Unit 1H API #47-017-06431). Please reference the wireline logs submitted with Form WR-35 for Amanda Unit 1H. A Cement Bond Log has been included with this submittal.

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 47-017-06432 Farm Name Holland, Robert L., Jr. Well Number Amanda Unit 2H

**EXHIBIT 1**

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	9-Oct-14	12,379	12,548	60	Marcellus
2	11-Nov-14	12,178	12,347	60	Marcellus
3	11-Nov-14	11,978	12,147	60	Marcellus
4	12-Nov-14	11,777	11,946	60	Marcellus
5	12-Nov-14	11,577	11,746	60	Marcellus
6	12-Nov-14	11,376	11,545	60	Marcellus
7	13-Nov-14	11,176	11,345	60	Marcellus
8	22-Nov-14	10,975	11,144	60	Marcellus
9	23-Nov-14	10,775	10,944	60	Marcellus
10	23-Nov-14	10,574	10,743	60	Marcellus
11	23-Nov-14	10,374	10,543	60	Marcellus
12	24-Nov-14	10,173	10,343	60	Marcellus
13	24-Nov-14	9,973	10,142	60	Marcellus
14	24-Nov-14	9,773	9,942	60	Marcellus
15	24-Nov-14	9,572	9,741	60	Marcellus
16	25-Nov-14	9,372	9,541	60	Marcellus
17	25-Nov-14	9,171	9,340	60	Marcellus
18	25-Nov-14	8,971	9,140	60	Marcellus
19	25-Nov-14	8,770	8,939	60	Marcellus
20	26-Nov-14	8,570	8,739	60	Marcellus
21	26-Nov-14	8,369	8,538	60	Marcellus
22	26-Nov-14	8,169	8,338	60	Marcellus
23	26-Nov-14	7,968	8,137	60	Marcellus
24	27-Nov-14	7,768	7,937	60	Marcellus
25	27-Nov-14	7,568	7,737	60	Marcellus
26	27-Nov-14	7,367	7,536	60	Marcellus
27	27-Nov-14	7,167	7,336	60	Marcellus
28	28-Nov-14	6,966	7,135	60	Marcellus
29	28-Nov-14	6,766	6,935	60	Marcellus
30	28-Nov-14	6,565	6,734	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	11-Nov-14	64.1	6,426	6,173	5,722	253,990	6,773	N/A
2	11-Nov-14	63.0	6,407	5,701	5,028	238,000	6,540	N/A
3	12-Nov-14	61.0	6,271	5,794	4,982	258,000	6,722	N/A
4	12-Nov-14	63.2	6,239	5,490	6,491	253,500	6,702	N/A
5	12-Nov-14	70.0	6,422	5,686	5,157	256,600	6,682	N/A
6	12-Nov-14	61.0	6,512	5,661	5,128	255,650	6,654	N/A
7	22-Nov-14	63.0	6,678	6,140	5,282	259,440	6,639	N/A
8	22-Nov-14	63.0	6,669	5,826	4,685	235,000	7,044	N/A
9	23-Nov-14	63.0	6,479	5,550	5,018	256,090	6,600	N/A
10	23-Nov-14	64.0	6,362	5,808	4,839	252,470	6,582	N/A
11	23-Nov-14	63.0	6,351	5,733	5,357	255,400	6,567	N/A
12	24-Nov-14	63.0	6,332	5,690	5,100	246,390	6,425	N/A
13	24-Nov-14	62.0	6,301	5,536	5,114	259,450	6,524	N/A
14	24-Nov-14	65.1	6,331	5,718	6,573	243,525	6,400	N/A
15	25-Nov-14	62.9	6,202	5,561	6,573	256,650	6,499	N/A
16	25-Nov-14	60.0	6,047	5,490	5,078	193,340	6,806	N/A
17	25-Nov-14	64.0	6,034	5,379	4,932	253,050	6,728	N/A
18	25-Nov-14	65.9	6,282	5,708	6,663	255,025	6,440	N/A
19	25-Nov-14	66.8	6,365	5,583	5,994	254,305	6,425	N/A
20	26-Nov-14	65.6	6,504	5,890	6,073	235,430	6,964	N/A
21	26-Nov-14	63.0	6,093	5,318	5,482	256,221	6,386	N/A
22	26-Nov-14	65.0	6,366	5,583	5,404	255,856	6,398	N/A
23	27-Nov-14	66.0	6,289	5,554	5,139	220,617	6,486	N/A
24	27-Nov-14	64.0	6,217	5,668	5,229	258,930	6,360	N/A
25	27-Nov-14	62.0	6,275	5,915	5,447	256,120	6,406	N/A
26	27-Nov-14	66.0	6,048	5,958	5,368	258,103	6,303	N/A
27	28-Nov-14	65.0	6,145	5,697	5,407	254,360	6,283	N/A
28	28-Nov-14	63.0	5,975	5,958	5,550	258,860	6,259	N/A
29	28-Nov-14	65.0	6,382	6,208	5,354	249,820	6,830	N/A
30	28-Nov-14	65.6	6,089	5,382	4,166	255,165	6,331	N/A
	AVG=	<b>63.9</b>	<b>6,303</b>	<b>5,712</b>	<b>5,411</b>	<b>7,495,357</b>	<b>196,758</b>	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	56'	N/A	56'	N/A
Shale/ Siltstone	0	221	0	221
Sandstone	221	241	221	241
Shale/ Siltstone	241	381	241	381
Coal	381	401	381	401
Siltstone	401	441	401	441
Shale/ Limestone	441	561	441	561
Sandstone/ Siltstone	561	621	561	621
Shale/ Siltstone	621	761	621	761
Limestone	761	941	761	941
Siltstone / Trace Coal/ Shale	941	1381	941	1381
Sandstone	1381	1401	1381	1401
Shale/ Siltstone/ Trace Coal	1401	1621	1401	1621
Sandstone/ Siltstone	1621	1701	1621	1701
Shale/ Siltstone/ Trace Coal	1701	1741	1701	1741
Shale/ Siltstone	1741	1959	1741	1959
Big Lime	1959	2045	1959	2045
Big Injun	2045	2427	2045	2427
Gantz Sand	2427	2533	2427	2533
Fifty Foot Sandstone	2533	2644	2533	2644
Gordon	2644	2999	2644	2999
Fifth Sandstone	2999	3104	2999	3104
Bayard	3104	3372	3104	3372
Speechley	3372	4072	3372	4072
Baltown	4072	4508	4072	4508
Bradford	4508	4947	4508	4948
Benson	4947	5201	4948	5202
Alexander	5201	5356	5202	5357
Elk	5356	5841	5357	5842
Rhinestreet	5841	6058	5842	6060
Sycamore	6058	6219	6060	6236
Middlesex	6219	6333	6236	6390
Burkett	6333	6367	6390	6448
Tully	6367	6397	6448	6520
Marcellus	6397	NA	6520	NA



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MORGANTOWN, WV

**Hydraulic Fracturing Fluid Product Component Information Disclosure**

Job Start Date:	11/11/2014
Job End Date:	11/25/2014
State:	West Virginia
County:	Doddridge
API Number:	47-017-06432-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Amanda Unit 2H
Longitude:	-80.87285800
Latitude:	39.27348600
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,535
Total Base Water Volume (gal):	8,263,863
Total Base Non Water Volume:	378,323



**Frac Focus**  
Chemical Disclosure Registry



**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	89.87346	
Sand	J.S. Well Services, LLC	Proppant	Crystalline Silica, quartz	14808-60-7	100.00000	9.77408	
LGC-15	J.S. Well Services, LLC	Gelling Agents	Guar Gum	9000-30-0	50.00000	0.06029	
			Petroleum Distillates	64742-47-8	60.00000	0.05710	
			Suspending agent (solid)	14808-60-7	3.00000	0.00922	
			Surfactant	68439-51-0	3.00000	0.00362	
HCL Acid (12.6%-18.0%)	J.S. Well Services, LLC	Bulk Acid	Water	7732-18-5	87.50000	0.08912	
			Hydrogen Chloride	7647-01-1	18.00000	0.02129	
WFRA-405	J.S. Well Services, LLC	Friction Reducer	Anionic Polyacrylamide	Proprietary	40.00000	0.02530	
			Water	7732-18-5	40.00000	0.02530	
			Petroleum Distillates	64742-47-8	40.00000	0.02037	
			Crystalline Salt	12125-02-9	5.00000	0.00316	



Product	Supplier	Scale Inhibitor	Chemical Name	Proprietary	Concentration	MSDS Number
SI-1100	U.S. Well Services	Scale Inhibitor	Ethoxylated alcohol blend		5.00000	0.00316
			Di Water	7732-18-5	80.00000	0.01043
			Ethylene Glycol	107-21-1	40.00000	0.00589
			Potassium salt of diethylene triamine penta (methylene phosphonic acid)	15827-60-8	10.00000	0.00176
			2-Phosphonobutane 1,2,4 tricarboxylic salt	37971-36-1	10.00000	0.00168
			hexamethylenediamine tetra (methylene phosphonic acid)	38820-59-6	10.00000	0.00163
			Copolymer of Maleic and Acrylic acid	26677-99-6	10.00000	0.00154
			bis (hexamethylene) tramine penta (methylene phosphonic acid) - phosphate acid	40623-75-4	10.00000	0.00150
			Acrylic polymer	52255-49-9	5.00000	0.00065
K-BAC 1020	U.S. Well Services, LLC	Anti-Bacterial Agent				
			2,2-dibromo-3-nitropropanamide	10222-01-2	20.00000	0.00424
			Deionized Water	7732-18-5	28.00000	0.00242
AP One	U.S. Well Services, LLC	Gel Breakers				
			Ammonium Persulfate	7727-54-0	100.00000	0.00225
AI-301	U.S. Well Services, LLC	Acid Corrosion Inhibitors				
			Diethylene Glycol	111-46-6	30.00000	0.00020
			Methenamine	100-97-0	20.00000	0.00016
			Hydrogen Chloride	7647-01-0	10.00000	0.00007
			Polyethylene polyamine	88603-67-8	10.00000	0.00006
			Coco amine	51791-14-8	5.00000	0.00003

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

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

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

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided. Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)

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LATITUDE 39°17'30"

11,238'

8,483' TO BOTTOM HOLE

LATITUDE 39°17'30"

LONGITUDE 80°50'00"

12,338' TO BOTTOM HOLE

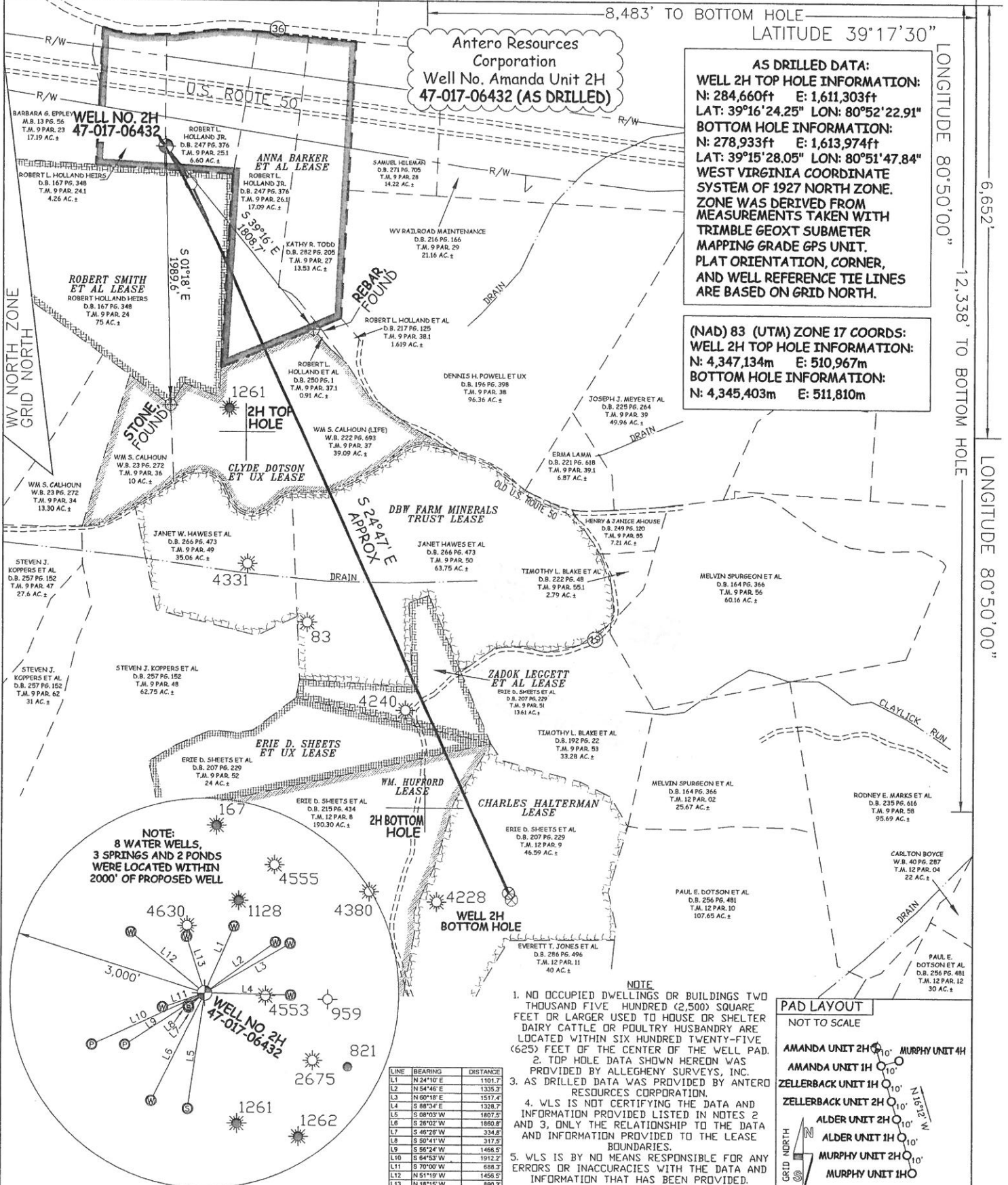
6,652'

LONGITUDE 80°50'00"

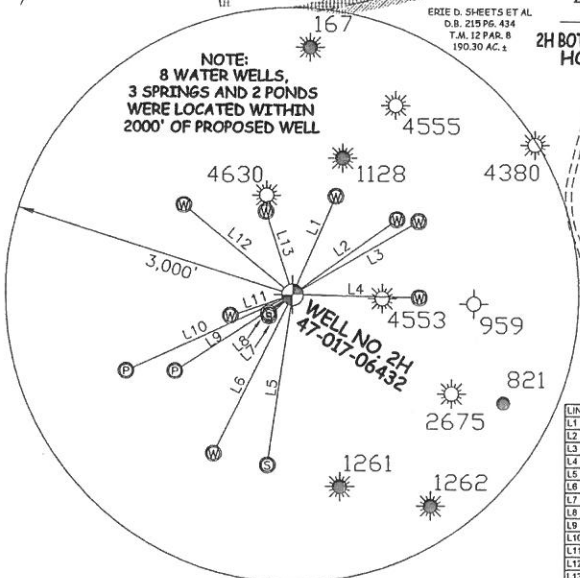
Antero Resources Corporation  
Well No. Amanda Unit 2H  
47-017-06432 (AS DRILLED)

**AS DRILLED DATA:**  
**WELL 2H TOP HOLE INFORMATION:**  
N: 284,660ft E: 1,611,303ft  
LAT: 39°16'24.25" LON: 80°52'22.91"  
**BOTTOM HOLE INFORMATION:**  
N: 278,933ft E: 1,613,974ft  
LAT: 39°15'28.05" LON: 80°51'47.84"  
**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: 4,347,134m E: 510,967m  
**BOTTOM HOLE INFORMATION:**  
N: 4,345,403m E: 511,810m

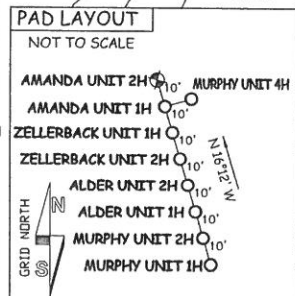


NOTE:  
8 WATER WELLS,  
3 SPRINGS AND 2 PONDS  
WERE LOCATED WITHIN  
2000' OF PROPOSED WELL

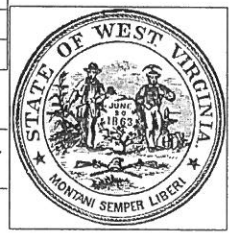


LINE	BEARING	DISTANCE
L1	N 24°10' E	1161.7'
L2	N 54°00' E	1335.3'
L3	N 60°18' E	1517.4'
L4	S 88°34' E	1328.7'
L5	S 08°03' W	1867.5'
L6	S 28°02' W	1860.8'
L7	S 46°23' W	334.8'
L8	S 50°41' W	317.5'
L9	S 56°24' W	1466.5'
L10	S 64°53' W	1912.2'
L11	S 70°00' W	688.2'
L12	N 51°19' W	1466.5'
L13	N 18°15' W	890.3'

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 # 13-061WA  
DRAWING # AMANDA2HAD  
SCALE 1" = 1000'  
MINIMUM DEGREE OF ACCURACY SUBMETER  
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS



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

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

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 990' ORIGINAL - 989' AS DRILLED WATERSHED NORTH FORK HUGHES RIVER  
QUADRANGLE WEST UNION 7.5' DISTRICT CENTRAL COUNTY DODDRIDGE

SURFACE OWNER ROBERT L. HOLLAND JR. ACREAGE 6.60 ACRES +/-  
OIL & GAS ROYALTY OWNER ANNA BARKER ET AL; ROBERT SMITH ET AL; CLYDE DOTSON ET UX; LEASE ACREAGE 127 ACRES +/-; 75 ACRES +/-; 50 ACRES +/-  
DBW FARM MINERALS TRUST; ZADOK LEGGETT ET AL; ERIE D. SHEETS ET UX; WILLIAM HUFFORD; CHARLES HALTERMAN 98 ACRES +/-; 13.61 ACRES +/-; 24 ACRES +/-; 141 ACRES +/-; 47.17 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 6,535' TVD 12,640' MD

WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER  
ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD  
FORM WW-6 DENVER, CO 80202 CHARLESTON, WV 25313

DATE 06/15/15  
OPERATOR'S WELL # AMANDA UNIT #2H  
API WELL # 47 - 017 - 06432  
STATE COUNTY PERMIT

COUNTY NAME PERMIT