

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

API 47-085-10105 County Ritchie District Clay
Quad Pennsboro 7.5' Pad Name Eddy Field/Pool Name ---
Farm name Annie B. Haymond, et al Well Number Mulvay 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 4,353,853m Easting 506,906m
Landing Point of Curve Northing 4,353,885.44m Easting 507,281.09m
Bottom Hole Northing 4,351,640m Easting 508,186m

Elevation (ft) 971' GL Type of Well New Existing Type of Report Interim Final
Permit Type Deviated Horizontal Horizontal 6A Vertical Depth Type Deep Shallow
Type of Operation Convert Deepen Drill Plug Back Redrilling Rework Stimulate
Well Type Brine Disposal CBM Gas Oil Secondary Recovery Solution Mining Storage Other _____
Type of Completion Single Multiple Fluids Produced Brine Gas NGL Oil Other _____
Drilled with Cable Rotary

Drilling Media Surface hole Air Mud Fresh Water Intermediate hole Air Mud Fresh Water Brine
Production hole Air Mud Fresh Water Brine
Mud Type(s) and Additive(s)
Air - Foam & 4% KCL
Mud - Polymer

Date permit issued 6/27/2014 Date drilling commenced 10/17/2014 Date drilling ceased 11/18/2014
Date completion activities began 1/12/2015 Date completion activities ceased 6/17/2015
Verbal plugging (Y/N) N/A Date permission granted N/A Granted by N/A

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

Freshwater depth(s) ft 126', 307' Open mine(s) (Y/N) depths N
Salt water depth(s) ft 653', 1697', 1923', 2099' Void(s) encountered (Y/N) depths N
Coal depth(s) ft 1056' Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

Received
Office of Oil & Gas

SEP 14 2015

Reviewed by:

10/16/2015

API 47- 085 - 10105 Farm name Annie B. Haymond, et al Well number Mulvay 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"	408'	New	48#/H-40	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2655'	New	36#/J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	14,870'	New	23#/P-110	N/A	Y
Tubing		2-3/8"	6657'		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	150 sx	15.6	1.18	38 Cu. Ft.	0'	8 Hrs.
Surface	Class A	471 sx	15.6	1.18	283 Cu. Ft.	0'	8 Hrs.
Coal							
Intermediate 1	Class A	980 sx	15.6	1.18	832 Cu. Ft.	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	830 sx (Lead), 1348 sx (Tail)	13.5 (Lead), 15.2 (Tail)	1.44 (Lead), 1.80 (Tail)	2913 Cu. Ft.	~500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 14,870' MD, 6330' TVD (BHL); 6340' TVD (Deepest Point Drilled) Loggers TD (ft) 14,820' MD
 Deepest formation penetrated Marcellus Plug back to (ft) N/A
 Plug back procedure N/A

Kick off depth (ft) 6052'

** This is a subsequent well. Antero only runs wireline logs on one well on a multi-well pad (Anna Unit 2H API# 47-085-09963). Please reference the wireline logs submitted with Form WR-35 for the Anna Unit 2H. 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

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

Received
Office of Oil & Gas
 SEP 14 2015

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 N/A

API 47-085-10105 Farm Name Annie B. Haymond, et al Well Number Mulvay Unit 1H

EXHIBIT 1

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	12-Jan-15	14,612	14,782	60	Marcellus
2	14-Feb-15	14,410	14,580	60	Marcellus
3	14-Feb-15	14,209	14,379	60	Marcellus
4	20-Mar-15	14,007	14,177	60	Marcellus
5	21-Mar-15	13,806	13,976	60	Marcellus
6	1-Jun-15	13,605	13,774	60	Marcellus
7	1-Jun-15	13,403	13,573	60	Marcellus
8	1-Jun-15	13,202	13,372	60	Marcellus
9	1-Jun-15	13,000	13,170	60	Marcellus
10	1-Jun-15	12,799	12,969	60	Marcellus
11	2-Jun-15	12,597	12,767	60	Marcellus
12	2-Jun-15	12,396	12,566	60	Marcellus
13	2-Jun-15	12,194	12,364	60	Marcellus
14	2-Jun-15	11,993	12,163	60	Marcellus
15	3-Jun-15	11,792	11,961	60	Marcellus
16	3-Jun-15	11,590	11,760	60	Marcellus
17	3-Jun-15	11,389	11,558	60	Marcellus
18	3-Jun-15	11,187	11,357	60	Marcellus
19	3-Jun-15	10,986	11,156	60	Marcellus
20	4-Jun-15	10,784	10,954	60	Marcellus
21	4-Jun-15	10,583	10,753	60	Marcellus
22	4-Jun-15	10,381	10,551	60	Marcellus
23	4-Jun-15	10,180	10,350	60	Marcellus
24	4-Jun-15	9,978	10,148	60	Marcellus
25	5-Jun-15	9,777	9,947	60	Marcellus
26	5-Jun-15	9,576	9,745	60	Marcellus
27	5-Jun-15	9,374	9,544	60	Marcellus
28	5-Jun-15	9,173	9,343	60	Marcellus
29	5-Jun-15	8,971	9,141	60	Marcellus
30	6-Jun-15	8,770	8,940	60	Marcellus
31	6-Jun-15	8,568	8,738	60	Marcellus
32	6-Jun-15	8,367	8,537	60	Marcellus
33	6-Jun-15	8,165	8,335	60	Marcellus
34	7-Jun-15	7,964	8,134	60	Marcellus
35	7-Jun-15	7,763	7,932	60	Marcellus
36	7-Jun-15	7,561	7,731	60	Marcellus
37	7-Jun-15	7,360	7,529	60	Marcellus
38	7-Jun-15	7,158	7,328	60	Marcellus
39	7-Jun-15	6,957	7,127	60	Marcellus
40	8-Jun-15	6,755	6,925	60	Marcellus

Received
Office of Oil & Gas

SEP 14 2015

10/16/2015

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	14-Feb-15	55.0	7,473	N/A	5,063	182,920	6,454	N/A
2	14-Feb-15	57.2	7,246	5,672	4,932	227,180	6,949	N/A
3	20-Mar-15	62.7	7,898	6,189	4,282	162,900	6,994	N/A
4	21-Mar-15	63.8	7,634	5,644	4,317	250,900	6,811	N/A
5	21-Mar-15	64.5	7,778	5,487	3,417	250,200	6,759	N/A
6	1-Jun-15	66.0	6,407	5,473	3,683	219,830	7,086	N/A
7	1-Jun-15	64.0	6,684	5,859	3,561	247,950	6,534	N/A
8	1-Jun-15	64.0	6,932	5,489	3,843	240,950	6,415	N/A
9	1-Jun-15	64.2	6,850	5,323	3,564	231,730	6,902	N/A
10	1-Jun-15	67.5	6,693	5,295	3,712	246,450	6,555	N/A
11	2-Jun-15	64.0	6,469	5,900	3,829	247,750	6,513	N/A
12	2-Jun-15	64.0	6,564	5,668	3,632	249,550	6,616	N/A
13	2-Jun-15	64.0	6,564	6,040	3,492	249,200	6,503	N/A
14	2-Jun-15	64.8	6,633	5,476	3,493	249,970	6,529	N/A
15	3-Jun-15	64.8	7,248	5,967	3,672	242,230	6,379	N/A
16	3-Jun-15	64.0	6,485	5,701	3,573	246,500	6,483	N/A
17	3-Jun-15	64.0	6,259	6,008	3,592	248,250	6,432	N/A
18	3-Jun-15	66.8	6,381	6,267	3,415	249,530	6,395	N/A
19	3-Jun-15	66.2	6,366	5,474	3,668	249,140	6,348	N/A
20	4-Jun-15	67.1	6,533	5,421	3,570	248,170	6,329	N/A
21	4-Jun-15	65.0	6,465	5,835	3,375	248,050	6,410	N/A
22	4-Jun-15	64.0	6,426	5,713	3,530	247,150	6,326	N/A
23	4-Jun-15	63.9	6,926	6,160	4,091	78,200	6,287	N/A
24	4-Jun-15	62.6	6,859	5,499	3,467	152,840	6,859	N/A
25	5-Jun-15	64.0	6,482	5,410	3,372	247,350	6,267	N/A
26	5-Jun-15	66.0	6,349	5,696	3,302	247,650	6,252	N/A
27	5-Jun-15	64.0	6,414	5,371	3,679	218,100	6,839	N/A
28	5-Jun-15	63.3	6,323	6,897	3,341	247,850	6,235	N/A
29	5-Jun-15	63.5	6,697	5,872	3,639	247,890	6,292	N/A
30	6-Jun-15	64.0	6,249	5,148	3,558	247,600	6,221	N/A
31	6-Jun-15	65.0	6,274	5,763	3,576	246,900	6,186	N/A
32	6-Jun-15	65.1	6,236	5,872	3,400	243,830	6,172	N/A
33	6-Jun-15	63.8	6,037	5,488	3,413	244,450	6,176	N/A
34	7-Jun-15	64.5	6,002	5,998	3,656	246,060	6,148	N/A
35	7-Jun-15	64.0	6,171	5,882	3,412	247,550	6,136	N/A
36	7-Jun-15	61.0	6,296	5,785	3,751	248,100	6,163	N/A
37	7-Jun-15	63.0	6,696	5,398	5,175	189,800	6,004	N/A
38	7-Jun-15	64.6	6,277	5,359	3,413	245,930	6,094	N/A
39	7-Jun-15	64.5	5,910	5,691	3,394	249,290	6,083	N/A
40	8-Jun-15	64.5	6,071	6,133	3,221	248,730	6,083	N/A
	AVG=	64.0	6,606	5,726	3,702	9,334,620	257,219	TOTAL

Received
Office of Oil & Gas

SEP 14 2015

10/16/2015

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	126	N/A	126	N/A
Fresh Water	307	N/A	307	N/A
Sandstone	0	256	0	256
Sandstone/Trace Coal	256	316	256	316
Sandstone/Siltstone	316	596	316	596
Limestone	596	636	596	636
Siltstone/Sandstone	636	736	636	736
Limestone/Siltstone	736	796	736	796
Siltstone	796	896	796	896
Limestone/Sandstone	896	1,056	896	1,056
Coal	1,056	1,076	1,056	1,076
Sandstone	1,076	1,136	1,076	1,136
Siltstone	1,136	1,196	1,136	1,196
Shale	1,196	1,256	1,196	1,256
Sandstone	1,256	1,316	1,256	1,316
Sandstone/Trace Coal	1,316	1,336	1,316	1,336
Sandstone	1,336	1,376	1,336	1,376
Siltstone	1,376	1,396	1,376	1,396
Sandstone/Trace Coal	1,396	1,696	1,396	1,696
Siltstone	1,696	1,847	1,696	1,850
Big Lime	1,847	1,996	1,850	1,999
Big Injun	1,996	2,373	1,999	2,376
Gantz Sand	2,373	2,763	2,376	2,766
Fifty Foot Sandstone	2,763	2,836	2,766	2,839
Gordon	2,836	3,194	2,839	3,197
Fifth Sandstone	3,194	3,270	3,197	3,273
Bayard	3,270	3,408	3,273	3,411
Warren	3,408	3,744	3,411	3,752
Speechley	3,744	3,992	3,752	4,008
Baltown	3,992	4,481	4,008	4,530
Bradford	4,481	4,856	4,530	4,948
Benson	4,856	5,082	4,948	5,200
Alexander	5,082	5,371	5,200	5,522
Elk	5,371	5,682	5,522	5,867
Rhinestreet	5,682	6,007	5,867	6,240
Sycamore	6,007	6,113	6,240	6,377
Middlesex	6,113	6,221	6,377	6,555
Burkett	6,221	6,254	6,555	6,628
Tully	6,254	6,279	6,628	6,709
Marcellus	6,279	NA	6,709	NA

Received
Office of Oil & Gas
SEP 14 2015

10/16/2015

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	2/14/2015
Job End Date:	6/8/2015
State:	West Virginia
County:	Ritchie
API Number:	47-085-10105-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Mulvay Unit 1H
Longitude:	-80.91986900
Latitude:	39.33407200
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,340
Total Base Water Volume (gal):	11,266,268
Total Base Non Water Volume:	480,060



Received
 Office of Oil & Gas
 SEP 14 2015

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	90.59912	
Sand	U.S. Well Services, LLC	Proppant	Crystalline Silica, quartz	14808-60-7	100.00000	9.00066	
HCL Acid (12.6%-18.0%)	U.S. Well Services, LLC	Bulk Acid	Water	7732-18-5	87.50000	0.16519	
			Hydrogen Chloride	7641-01-1	18.00000	0.03946	
LGC-15	U.S. Well Services, LLC	Gelling Agents	Guar Gum	9000-30-0	50.00000	0.03889	
			Petroleum Distillates	64742-47-8	60.00000	0.03683	
			Suspending agent (solid)	14808-60-7	3.00000	0.00595	
			Surfactant	68439-51-0	3.00000	0.00233	
WFRA-405	U.S. Well Services, LLC	Friction Reducer	Anionic Polyacrylamide	Proprietary		0.02559	
			Water	7732-18-5	40.00000	0.02559	
			Petroleum Distillates	64742-47-8	22.00000	0.02060	
			Crystalline Salt	12125-02-9	5.00000	0.00320	

85-10105

			Ethoxylated alcohol blend	Proprietary	5.00000	0.00320
SI-1100	U.S. Well Services	Scale Inhibitor				
			Di Water	7732-18-5	80.00000	0.01015
			Ethylene Glycol	107-21-1	40.00000	0.00573
			Potassium salt of diethylene triamine penta (methylene phosphonic acid)	15827-60-8	10.00000	0.00171
			2-Phosphonobutane 1,2,4 tricarboxylic salt	37971-36-1	10.00000	0.00164
			hexamethylenediamine tetra (methylene phosphonic acid)	38820-59-6	10.00000	0.00159
			Copolymer of Maleic and Acrylic acid	26677-99-6	10.00000	0.00150
			bis (hexamethylene) tramine penta (methylene phosphonic acid) - phosphate acid	40623-75-4	10.00000	0.00146
			Acrylic polymer	52255-49-9	5.00000	0.00063
K-BAC 1020	U.S. Well Services, LLC	Anti-Bacterial Agent				
			2,2-dibromo-3-nitripropionamide	10222-01-2	20.00000	0.00445
			Deionized Water	7732-18-5	28.00000	0.00254
AP One	U.S. Well Services, LLC	Gel Breakers				
			Ammonium Persulfate	7727-54-0	100.00000	0.00167
AI-301	U.S. Well Services, LLC	Acid Corrosion Inhibitors				
			Diethylene Glycol	111-46-6	30.00000	0.00013
			Methenamine	100-97-0	20.00000	0.00010
			Polyethylene polyamine	68603-67-8	10.00000	0.00004
			Hydrogen Chloride	7647-01-0	10.00000	0.00004
			Coco amine	61791-14-8	5.00000	0.00002
Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.						

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

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

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

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

85-10105

Received
Office of Oil & Gas
SEP 14 2015

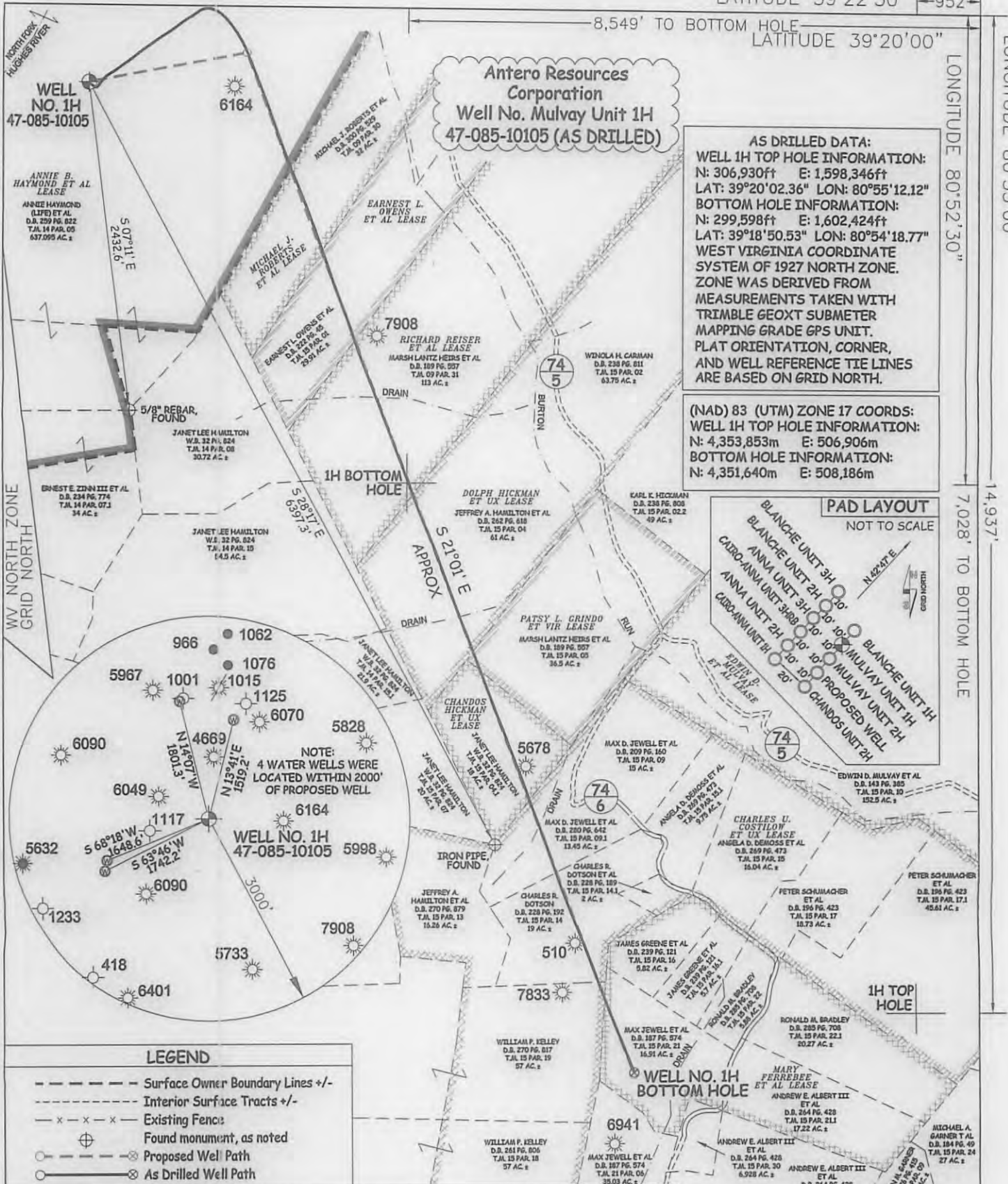
LATITUDE 39°22'30" -952'

LATITUDE 39°20'00"

LONGITUDE 80°55'00"

LONGITUDE 80°52'30"

7,028' TO BOTTOM HOLE



JOB # 12-130WA
DRAWING # MULVAY1HAD
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
266 HUSHERS RUN RD PENNSBORO WEST VIRGINIA 26415

- 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.

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 992' ORIGINAL - 971' AS DRILLED WATERSHED NORTH FORK HUGHES RIVER
QUADRANGLE PENNSBORO 7.5' DISTRICT CLAY COUNTY RITCHIE
SURFACE OWNER ANNIE B. HAYMOND, ET AL ACREAGE 637.095 ACRES +/-
OIL & GAS ROYALTY OWNER ANNIE B. HAYMOND, ET AL; MICHAEL J. ROBERTS ET AL; EARNEST L. OWENS ET AL; RICHARD REISER ET AL; LEASE ACREAGE 700 AC±; 34,638 AC±; 34,638 AC±; 113 AC±;
DOLPH HICKMAN ET UX; PATSY L. GRINDO Q ET VIR; CHANDOS HICKMAN ET UX; CHARLES U. COSTILOV ET UX; MARY FERREBEE ET AL 124 AC±; 36.5 AC±; 18 AC±; 200 AC±; 68 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
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,330' TVD 14,870' MD
WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER
ADDRESS 1615 WYNKOOP STREET ADDRESS CT CORPORATION SYSTEM
DENVER, CO 80202 CHARLESTON, WV 25313

DATE 07/27/15
OPERATOR'S WELL# MULVAY UNIT #1H
API WELL # 47-085-10105
STATE COUNTY PERMIT
COUNTY RITCHIE
NAME
PERMIT

10/16/2015