

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

API 47 - 085 - 10015 County Ritchie District Clay
Quad Pennsboro 7.5' Pad Name Eddy Pad Field/Pool Name ---
Farm name Annie B. Haymond, et al Well Number Cairo-Anna Unit 3HRB
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 4,353,854m Easting 508,900m
Landing Point of Curve Northing 4,353,762.41m Easting 507,117.28m
Bottom Hole Northing 4,351,567m Easting 508,003m

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 1/31/2013 Date drilling commenced 3/1/2013 Date drilling ceased 9/23/2014
Date completion activities began 3/1/2015 Date completion activities ceased 5/4/2015
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', 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

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Reviewed by:

10/16/2015

API 47-085 - 10015 Farm name Annie B. Haymond, et al Well number Cairo-Anna Unit 3HRB

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"	377'	New	48#/AT-50	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2501'	New	36#/J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	14,692'	New	23#/P-110	N/A	Y
Tubing		2-3/8"	6516'		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	70 sx	15.6	1.88	38 Cu. Ft.	0'	8 Hrs.
Surface	Class A	467 sx	15.6	1.18	262 Cu. Ft.	0'	8 Hrs.
Coal							
Intermediate 1	Class A	982 sx	15.6	1.18	783 Cu. Ft.	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	783 sx (Lead), 1378 sx (Tail)	13.5 (Lead), 15.2 (Tail)	1.44 (Lead), 1.80 (Tail)	2908 Cu. Ft.	~500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 14,692' MD, 6323' TVD (BHL); 6337' TVD (Deepest Point Drilled) Loggers TD (ft) 14,637' MD
 Deepest formation penetrated Marcellus Shale Plug back to (ft) N/A
 Plug back procedure N/A

Kick off depth (ft) 5543'

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

** 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.

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 N/A

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API 47-085-10015 Farm Name Annie B. Haymond, et al Well Number Cairo-Anna Unit 3HRB

EXHIBIT 1

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	1-Mar-15	14,427	14,594	60	Marcellus
2	2-Mar-15	14,229	14,396	60	Marcellus
3	2-Mar-15	14,031	14,198	60	Marcellus
4	3-Mar-15	13,833	14,000	60	Marcellus
5	3-Mar-15	13,635	13,802	60	Marcellus
6	4-Mar-15	13,437	13,604	60	Marcellus
7	4-Mar-15	13,239	13,406	60	Marcellus
8	5-Mar-15	13,041	13,208	60	Marcellus
9	5-Mar-15	12,843	13,010	60	Marcellus
10	5-Mar-15	12,645	12,812	60	Marcellus
11	6-Mar-15	12,447	12,614	60	Marcellus
12	6-Mar-15	12,249	12,416	60	Marcellus
13	7-Mar-15	12,051	12,218	60	Marcellus
14	7-Mar-15	11,854	12,020	60	Marcellus
15	8-Mar-15	11,656	11,823	60	Marcellus
16	8-Mar-15	11,458	11,625	60	Marcellus
17	8-Mar-15	11,260	11,427	60	Marcellus
18	8-Mar-15	11,062	11,229	60	Marcellus
19	9-Mar-15	10,864	11,031	60	Marcellus
20	9-Mar-15	10,666	10,833	60	Marcellus
21	9-Mar-15	10,468	10,635	60	Marcellus
22	10-Mar-15	10,270	10,437	60	Marcellus
23	10-Mar-15	10,072	10,239	60	Marcellus
24	10-Mar-15	9,874	10,041	60	Marcellus
25	10-Mar-15	9,676	9,843	60	Marcellus
26	11-Mar-15	9,478	9,645	60	Marcellus
27	11-Mar-15	9,280	9,447	60	Marcellus
28	11-Mar-15	9,082	9,249	60	Marcellus
29	11-Mar-15	8,884	9,051	60	Marcellus
30	12-Mar-15	8,686	8,853	60	Marcellus
31	12-Mar-15	8,488	8,655	60	Marcellus
32	12-Mar-15	8,290	8,457	60	Marcellus
33	12-Mar-15	8,092	8,259	60	Marcellus
34	13-Mar-15	7,894	8,061	60	Marcellus
35	13-Mar-15	7,696	7,863	60	Marcellus
36	13-Mar-15	7,498	7,665	60	Marcellus
37	13-Mar-15	7,300	7,467	60	Marcellus
38	14-Mar-15	7,102	7,269	60	Marcellus
39	14-Mar-15	6,904	7,071	60	Marcellus
40	14-Mar-15	6,706	6,873	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 (bbbls)	Amount of Nitrogen/ other (units)
1	1-Mar-15	57.4	7,430	N/A	4,391	113,500	6,581	N/A
2	2-Mar-15	61.3	7,608	5,736	4,745	242,160	6,620	N/A
3	2-Mar-15	61.1	7,724	5,380	4,529	236,760	6,467	N/A
4	3-Mar-15	63.4	7,468	5,737	4,021	233,100	6,395	N/A
5	3-Mar-15	63.4	7,635	6,001	4,507	242,440	6,492	N/A
6	4-Mar-15	63.7	7,380	5,718	3,437	242,460	6,562	N/A
7	4-Mar-15	63.8	7,357	5,578	5,513	220,100	5,708	N/A
8	5-Mar-15	64.2	7,337	5,318	4,642	241,880	6,622	N/A
9	5-Mar-15	64.6	7,336	5,354	3,616	241,200	6,478	N/A
10	5-Mar-15	62.7	7,320	5,293	4,221	241,660	6,398	N/A
11	6-Mar-15	64.7	7,328	5,052	4,516	243,800	6,421	N/A
12	6-Mar-15	63.3	7,254	5,270	3,398	242,600	6,368	N/A
13	7-Mar-15	64.5	7,291	5,447	3,431	242,200	6,368	N/A
14	7-Mar-15	64.1	7,374	5,255	3,561	242,520	6,332	N/A
15	8-Mar-15	63.1	7,297	5,089	3,680	230,120	6,160	N/A
16	8-Mar-15	63.5	7,293	5,300	4,297	203,290	6,882	N/A
17	8-Mar-15	62.6	7,384	5,248	3,815	241,790	6,278	N/A
18	8-Mar-15	63.3	7,315	5,226	3,585	232,930	6,861	N/A
19	9-Mar-15	64.4	6,819	5,319	3,905	241,100	6,289	N/A
20	9-Mar-15	63.8	6,889	5,394	4,498	196,000	6,463	N/A
21	9-Mar-15	64.2	7,053	5,239	3,549	239,480	6,216	N/A
22	10-Mar-15	62.9	6,778	5,418	4,010	243,320	6,203	N/A
23	10-Mar-15	64.7	6,646	5,586	4,911	242,500	6,173	N/A
24	10-Mar-15	64.5	6,752	5,131	3,746	242,100	6,466	N/A
25	10-Mar-15	63.0	6,690	5,280	3,639	241,400	6,138	N/A
26	11-Mar-15	63.3	6,543	5,147	3,567	240,450	6,098	N/A
27	11-Mar-15	64.9	6,713	5,374	4,593	241,500	8,638	N/A
28	11-Mar-15	64.5	6,630	5,339	4,317	205,640	5,605	N/A
29	11-Mar-15	64.2	6,866	5,093	3,511	241,160	6,065	N/A
30	12-Mar-15	64.1	6,497	5,196	4,557	240,030	6,061	N/A
31	12-Mar-15	65.3	6,446	5,229	3,904	244,400	6,158	N/A
32	12-Mar-15	61.2	7,250	5,518	4,855	106,500	6,303	N/A
33	12-Mar-15	64.1	6,920	5,261	4,592	244,400	6,150	N/A
34	13-Mar-15	64.7	6,901	5,362	4,926	223,180	5,730	N/A
35	13-Mar-15	63.2	7,101	5,478	3,487	226,700	5,912	N/A
36	13-Mar-15	66.1	6,573	5,533	3,389	243,340	5,972	N/A
37	13-Mar-15	65.1	6,481	5,358	3,163	242,600	5,937	N/A
38	14-Mar-15	65.3	6,687	5,587	4,093	241,400	6,019	N/A
39	14-Mar-15	65.4	6,565	5,653	3,539	242,500	5,931	N/A
40	14-Mar-15	66.8	6,289	5,711	3,535	241,300	6,014	N/A
	AVG=	63.8	7,031	5,390	4,055	9,205,510	252,534	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	126	N/A	126	N/A
Fresh Water	307	N/A	307	N/A
Sandstone	0	256	0	256
Sandstone/Trace Coal	est. 256	316	est. 256	316
Sandstone/Siltstone	est. 316	596	est. 316	596
Limestone	est. 596	636	est. 596	636
Siltstone/Sandstone	est. 636	736	est. 636	736
Limestone/Siltstone	est. 736	796	est. 736	796
Siltstone	est. 796	896	est. 796	896
Limestone/Sandstone	est. 896	1,056	est. 896	1,056
Coal	est. 1056	1,076	est. 1056	1,076
Sandstone	est. 1076	1,136	est. 1076	1,136
Siltstone	est. 1136	1,196	est. 1136	1,196
Shale	est. 1196	1,256	est. 1196	1,256
Sandstone	est. 1256	1,316	est. 1256	1,316
Sandstone/Trace Coal	est. 1316	1,336	est. 1316	1,336
Sandstone	est. 1336	1,376	est. 1336	1,376
Siltstone	est. 1376	1,396	est. 1376	1,396
Sandstone/Trace Coal	est. 1396	1,696	est. 1396	1,696
Siltstone	est. 1696	1,824	est. 1696	1,824
Big Lime	1,824	1,987	1,824	1,987
Big Injun	1,987	2,369	1,987	2,369
Gantz Sand	2,369	2,761	2,369	2,761
Fifty Foot Sandstone	2,761	2,840	2,761	2,840
Gordon	2,840	3,197	2,840	3,197
Fifth Sandstone	3,197	3,261	3,197	3,261
Bayard	3,261	3,412	3,261	3,412
Warren	3,412	3,746	3,412	3,746
Speechley	3,746	3,992	3,746	3,992
Baltown	3,992	4,481	3,992	4,481
Bradford	4,481	4,855	4,481	4,855
Benson	4,855	5,086	4,855	5,086
Alexander	5,086	5,379	5,086	5,379
Elk	5,379	5,645	5,379	5,649
Rhinestreet	5,645	6,001	5,649	6,131
Sycamore	6,001	6,105	6,131	6,300
Middlesex	6,105	6,211	6,300	6,490
Burkett	6,211	6,245	6,490	6,578
Tully	6,245	6,270	6,578	6,662
Marcellus	6,270	NA	6,662	NA

*Please note Antero determines shallow 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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Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	3/2/2015
Job End Date:	3/14/2015
State:	West Virginia
County:	Ritchie
API Number:	47-085-10015-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Cairo-Anna Unit 3HRB
Longitude:	-80.91993900
Latitude:	39.33408100
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,337
Total Base Water Volume (gal):	10,606,428
Total Base Non Water Volume:	477,898



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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	90.16349	
Sand	U.S. Well Services, LLC	Proppant					
			Crystalline Silica, quartz	14808-60-7	100.00000	9.38304	
HCL Acid (12.6%-18.0%)	U.S. Well Services, LLC	Bulk Acid					
			Water	7732-18-5	87.50000	0.17462	
			Hydrogen Chloride	7641-01-1	18.00000	0.04171	
LGC-15	U.S. Well Services, LLC	Gelling Agents					
			Guar Gum	9000-30-0	50.00000	0.05282	
			Petroleum Distillates	64742-47-8	60.00000	0.05003	
			Suspending agent (solid)	14808-60-7	3.00000	0.00808	
			Surfactant	68439-51-0	3.00000	0.00317	
WFRA-405	U.S. Well Services, LLC	Friction Reducer					
			Water	7732-18-5	40.00000	0.02888	
			Anionic Polyacrylamide	Proprietary		0.02888	
			Petroleum Distillates	64742-47-8	22.00000	0.02325	
			Crystalline Salt	12125-02-9	5.00000	0.00361	

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			Ethoxylated alcohol blend	Proprietary	5.00000	0.00361
SI-1100	U.S. Well Services	Scale Inhibitor				
			Di Water	7732-18-5	80.00000	0.01065
			Ethylene Glycol	107-21-1	40.00000	0.00602
			Potassium salt of diethylene triamine penta (methylene phosphonic acid)	15827-60-8	10.00000	0.00180
			2-Phosphonobutane 1,2,4 tricarboxylic salt	37971-36-1	10.00000	0.00172
			hexamethylenediamine tetra (methylene phosphonic acid)	38820-59-6	10.00000	0.00166
			Copolymer of Maleic and Acrylic acid	26677-99-6	10.00000	0.00157
			bis (hexamethylene) tramine penta (methylene phosphonic acid) - phosphate acid	40623-75-4	10.00000	0.00153
			Acrylic polymer	52255-49-9	5.00000	0.00067
K-BAC 1020	U.S. Well Services, LLC	Anti-Bacterial Agent				
			2,2-dibromo-3-nitripropionamide	10222-01-2	20.00000	0.00449
			Deionized Water	7732-18-5	28.00000	0.00256
AP One	U.S. Well Services, LLC	Gel Breakers				
			Ammonium Persulfate	7727-54-0	100.00000	0.00180
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	0.00011
			Hydrogen Chloride	7647-01-0	10.00000	0.00005
			Polyethylene polyamine	68603-67-8	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)

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LATITUDE 39°22'30" -974-

LATITUDE 39°20'00"

LONGITUDE 80°55'00"

LONGITUDE 80°52'30"

14,932'

7,266' TO BOTTOM HOLE

Antero Resources Corporation Well No. Cairo-Anna Unit 3HRB 47-085-10015 (AS DRILLED)

NOTE

- 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.
- 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.

AS DRILLED DATA:

WELL 3HRB TOP HOLE INFORMATION:
N: 306,935ft E: 1,598,324ft
LAT: 39°20'02.41" LON: 80°55'12.40"

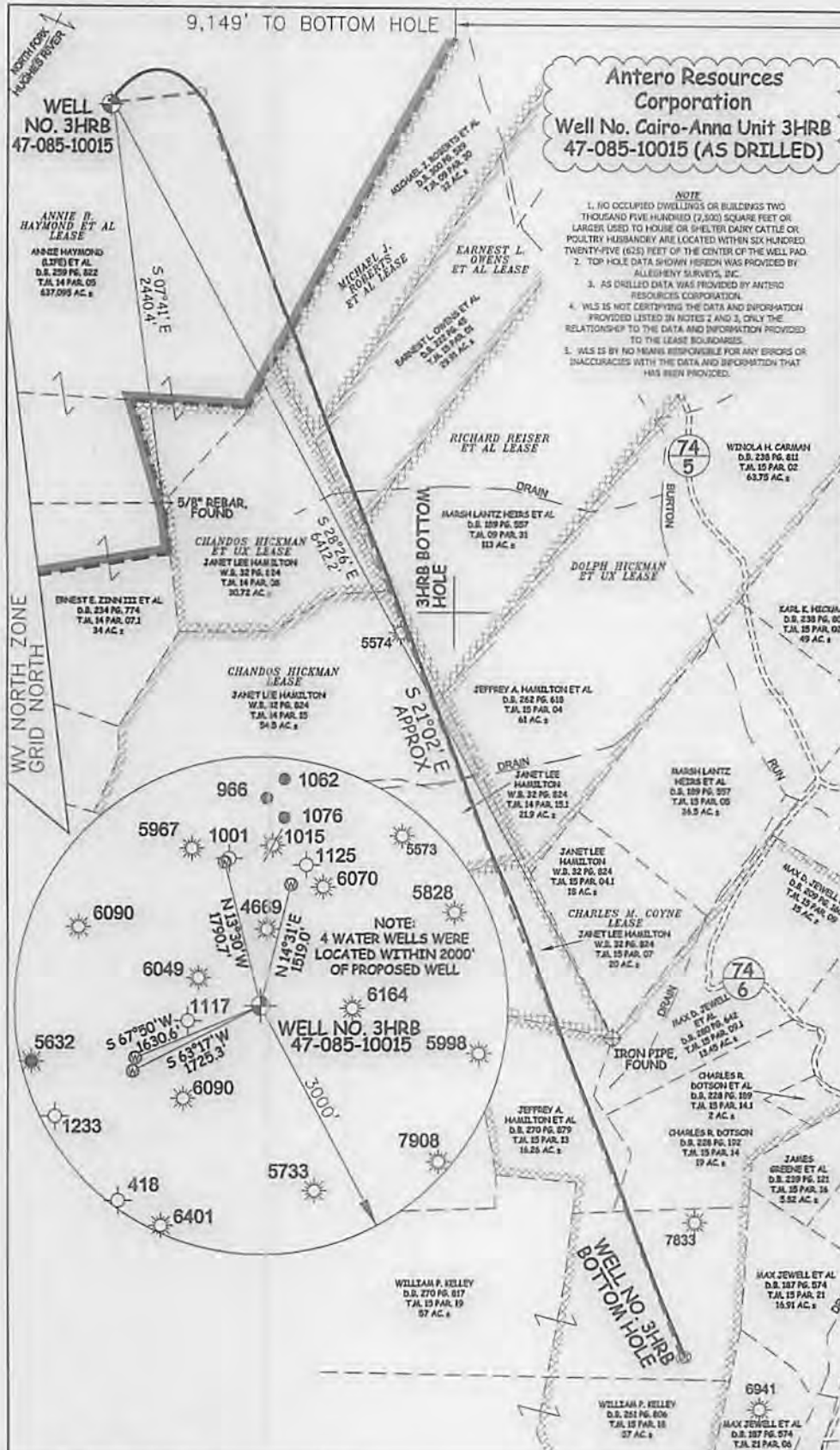
BOTTOM HOLE INFORMATION:
N: 299,370ft E: 1,601,820ft
LAT: 39°18'48.18" LON: 80°54'26.41"


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 3HRB TOP HOLE INFORMATION:
N: 4,353,854m E: 506,900m

BOTTOM HOLE INFORMATION:
N: 4,351,567m E: 508,003m



JOB # 12-127WA			STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS		LEGEND	
DRAWING # CAIRO-ANNA3HRBAD			WILLOW LAND SURVEYING PLLC		--- Surface Owner Boundary Lines +/-	
SCALE 1" = 1000'			266 HUSHERS RUN RD PENNSBORO WEST VIRGINIA 26415		- - - Interior Surface Tracts +/-	
MINIMUM DEGREE OF ACCURACY SUBMETER				- x - x - Existing Fence		
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS				⊕ Found monument, as noted		
STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS				⊙ Proposed Well Path		
WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___				⊙ As Drilled Well Path		
(IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X				DATE 07/27/15		
LOCATION: ELEVATION 992' ORIGINAL - 971' AS DRILLED				OPERATOR'S WELL# CAIRO-ANNA UNIT #3HRB		
QUADRANGLE PENNSBORO 7.5' DISTRICT CLAY COUNTY RITCHIE				API WELL # 47 - 085 - 10015		
SURFACE OWNER ANNIE B. HAYMOND, ET AL		ACREAGE 637.095 ACRES +/-		STATE COUNTY PERMIT		
OIL & GAS ROYALTY OWNER ANNIE B. HAYMOND, ET AL; MICHAEL J. ROBERTS ET AL; EARNEST L. OWENS ET AL;		LEASE ACREAGE 700 ACRES +/-; 34,638 ACRES +/-; 10/16/2015				
RICHARD REISER ET AL; CHANDOS HICKMAN ET UX; CHANDOS HICKMAN; CHARLES M. COYNE; CHARLES U. COSTLOW ET UX		113 ACRES +/-; 35 ACRES +/-; 75.5 ACRES +/-; 18.5 ACRES +/-; 200 ACRES +/-				
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 6,323' TVD 14,692' MD				
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				