

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

API 47 - 095 - 02374 County Tyler District Meade
Quad Pennsboro 7.5' Pad Name Terry Snider Pad Field/Pool Name -----
Farm name Terry L. Snider Well Number Edwards 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 4357644m Easting 503092m
Landing Point of Curve Northing 4357505.61m Easting 502689.58m
Bottom Hole Northing 4359996m Easting 501698m

Elevation (ft) 1146.5' 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

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Date permit issued 5/6/2016 Date drilling commenced 8/5/2016 Date drilling ceased 9/11/2016
Date completion activities began 10/29/2017 Date completion activities ceased 4/3/2018
Verbal plugging (Y/N) N/A Date permission granted N/A Granted by N/A

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

Freshwater depth(s) ft N/A Open mine(s) (Y/N) depths No
Salt water depth(s) ft N/A Void(s) encountered (Y/N) depths No
Coal depth(s) ft None Identified Cavern(s) encountered (Y/N) depths No
Is coal being mined in area (Y/N) No

Reviewed by:
REVIEWED *JCB*
9/12/2018

API 47- 095 - 02374 Farm name Terry L. Snider Well number Edwards Unit 1H

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade w/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	24"	20"	65'	New	94#, H-40	N/A	Y
Surface	17-1/2"	13-3/8"	546'	New	48#, H-40	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2662'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	15829'	New	23#, P-110	N/A	Y
Tubing		2-3/8"	6442'		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	102 sx	15.6	1.18	120	0'	8 Hrs.
Surface	Class A	658 sx	15.6	1.18	826	0'	8 Hrs.
Coal							
Intermediate 1	Class A	990 sx	15.6	1.18	1181	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	804 sx (Lead) 1303 sx (Tail)	13.5 (Lead), 15.2 (Tail)	1.44 (Lead), 1.87 (Tail)	3774	-500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 15829' MD, 6405' TVD (BHL), 6418' (Deepest Point Drilled) Loggers TD (ft) 15829' MD

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

Plug back procedure N/A

Kick off depth (ft) 5992

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

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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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PRODUCING FORMATION(S)	DEPTHS		
Marcellus	6388' (TOP)	TVD	6774' (TOP) MD

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface 2800 psi Bottom Hole --- psi DURATION OF TEST --- hrs

OPEN FLOW Gas 9777 mcfpd Oil 104 bpd NGL --- bpd Water 285 bpd GAS MEASURED BY Estimated Orifice Pilot

LITHOLOGY/ FORMATION	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 Patterson - UTI Drilling Company LLC
Address 207 Carlton Drive City Eighty Four State PA Zip 15330

Logging Company Kodiak Services Int'l
Address 2219 Sawdust Road, Unit 1604-1605 City The Woodlands State TX Zip 77380

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

Stimulating Company Baker Hughes
Address 837 Phillipi Pike City Clarksburg State WV Zip 26301

Please insert additional pages as applicable.

Completed by Megan Griffith Telephone 303-357-7223
Signature  Title Permitting Agent Date 8/20/2018

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

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API 47-095-02374 Farm Name Terry L. Snider Well Number Edwards Unit 1H

EXHIBIT 1

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	10/29/2017	15559	15727	60	Marcellus
2	10/30/2017	15360	15528	60	Marcellus
3	10/31/2017	15161	15329	60	Marcellus
4	10/31/2017	14961	15129	60	Marcellus
5	11/1/2017	14762	14930	60	Marcellus
6	11/2/2017	14563	14731	60	Marcellus
7	11/3/2017	14364	14532	60	Marcellus
8	11/3/2017	14165	14333	60	Marcellus
9	2/22/2018	13965	14133	60	Marcellus
10	2/23/2018	13766	13934	60	Marcellus
11	2/23/2018	13567	13735	60	Marcellus
12	2/23/2018	13368	13536	60	Marcellus
13	2/24/2018	13169	13337	60	Marcellus
14	2/24/2018	12969	13137	60	Marcellus
15	2/25/2018	12770	12938	60	Marcellus
16	2/26/2018	12571	12739	60	Marcellus
17	2/26/2018	12372	12540	60	Marcellus
18	2/26/2018	12173	12341	60	Marcellus
19	2/27/2018	11973	12141	60	Marcellus
20	2/28/2018	11774	11942	60	Marcellus
21	3/1/2018	11575	11743	60	Marcellus
22	3/1/2018	11376	11544	60	Marcellus
23	3/2/2018	11177	11345	60	Marcellus
24	3/2/2018	10977	11145	60	Marcellus
25	3/3/2018	10778	10946	60	Marcellus
26	3/4/2018	10579	10747	60	Marcellus
27	3/8/2018	10380	10548	60	Marcellus
28	3/9/2018	10181	10349	60	Marcellus
29	3/10/2018	9981	10149	60	Marcellus
30	3/10/2018	9782	9950	60	Marcellus
31	3/11/2018	9583	9751	60	Marcellus
32	3/11/2018	9384	9552	60	Marcellus
33	3/12/2018	9185	9353	60	Marcellus
34	3/12/2018	8985	9153	60	Marcellus
35	3/13/2018	8786	8954	60	Marcellus
36	3/14/2018	8587	8755	60	Marcellus
37	3/14/2018	8388	8556	60	Marcellus
38	3/15/2018	8189	8357	60	Marcellus
39	3/16/2018	7989	8157	60	Marcellus
40	3/16/2018	7790	7958	60	Marcellus
41	3/17/2018	7591	7759	60	Marcellus
42	3/17/2018	7392	7560	60	Marcellus
43	3/18/2018	7193	7361	60	Marcellus
44	3/19/2018	6993	7161	60	Marcellus
45	3/19/2018	6794	6962	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	10/29/2017	77.8	7153	6713	2864	16730	10337	N/A
2	10/30/2017	69.7	7197	5318	2994	15509	10210	N/A
3	10/31/2017	69.03	7672	5346	3342	16360	12709	N/A
4	10/31/2017	76.3	7268	5367	3292	15927	10427	N/A
5	11/1/2017	74.7	7514	5659	3457	16630	11053	N/A
6	11/2/2017	71.8	7652	5722	3212	16586	14299	N/A
7	11/3/2017	71.4	7357	5824	4378	17559	10419	N/A
8	11/3/2017	67.5	7624	5984	4890	18498	9345	N/A
9	2/22/2018	75.1	7161	5463	3926	16550	10771	N/A
10	2/23/2018	76.05	7454	5374	3940	16768	11229	N/A
11	2/23/2018	73.3	7462	5544	5510	18516	11178	N/A
12	2/23/2018	64.7	7648	5929	4157	17734	13821	N/A
13	2/24/2018	72	7844	5454	5345	18643	15211	N/A
14	2/24/2018	77	7529	5306	5082	17917	12708	N/A
15	2/25/2018	73.8	7301	5622	4111	17034	10821	N/A
16	2/26/2018	73.7	6990	5543	4295	16828	10889	N/A
17	2/26/2018	75.6	6855	5243	4038	16136	10932	N/A
18	2/26/2018	78.4	6775	5219	3765	15759	11039	N/A
19	2/27/2018	74.2	6741	5753	4058	16552	10687	N/A
20	2/28/2018	72.6	7260	6058	4371	17689	10675	N/A
21	3/1/2018	75.8	6951	5957	4414	17322	11084	N/A
22	3/1/2018	75.2	6825	5661	4234	16720	10752	N/A
23	3/2/2018	74.8	6958	5997	4187	17142	10621	N/A
24	3/2/2018	74.7	7123	5848	4344	17315	11386	N/A
25	3/3/2018	75.5	6703	5712	3785	16200	10930	N/A
26	3/4/2018	75.6	6818	5324	4043	16185	11016	N/A
27	3/8/2018	74.2	7013	5487	3876	16376	12011	N/A
28	3/9/2018	76.8	6845	5131	3986	15962	10704	N/A
29	3/10/2018	76.3	6680	5006	4743	16429	10314	N/A
30	3/10/2018	71.9	6832	4938	3608	15378	11317	N/A
31	3/11/2018	71.1	6955	5061	4036	16052	13711	N/A
32	3/11/2018	74.6	7041	4777	3915	15733	10934	N/A
33	3/12/2018	73.5	7187	5214	3188	15589	14089	N/A
34	3/12/2018	75.6	7137	5073	6232	18442	11038	N/A
35	3/13/2018	73.5	6818	5154	3606	15578	13384	N/A
36	3/14/2018	75.2	6857	5814	4309	16980	12246	N/A
37	3/14/2018	72.5	7001	5509	3949	16459	13138	N/A
38	3/15/2018	73.5	6741	5951	3495	16187	12350	N/A
39	3/16/2018	64.5	5827	6143	5037	17007	12535	N/A
40	3/16/2018	79.1	6505	5640	4659	16804	10691	N/A
41	3/17/2018	76.1	6228	5641	4273	16142	10572	N/A
42	3/17/2018	77.5	6597	5821	4671	17089	10810	N/A
43	3/18/2018	76.2	6570	5864	5138	17572	10789	N/A
44	3/19/2018	79.4	6622	5480	5218	17320	11108	N/A
45	3/19/2018	74.4	6062	5232	3465	14759	11401	N/A
	AVG=	74.0	7,008	5,553	4,165	752,667	517,691	TOTAL

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LITHOLOGY/ FORMATION	TOP DEPTH (TVD)	BOTTOM DEPTH (TVD)	TOP DEPTH (MD)	BOTTOM DEPTH (MD)
	From Surface	From Surface	From Surface	From Surface
Sandstone	0	N/A	0	N/A
Silty Sandstone	260	N/A	260	N/A
Shale w/trace Coal	560	N/A	560	N/A
Silty Sandstone	740	N/A	740	N/A
Limey Shale	880	N/A	880	N/A
Silty Shale w/trace Coal	1,080	N/A	1,080	N/A
Silty Sandstone	1,240	N/A	1,240	N/A
Silty Shale w/trace Coal	1,380	N/A	1,380	N/A
Silty Sandstone	1,520	N/A	1,520	N/A
Sandstone w/trace Coal	1,600	N/A	1,600	N/A
Silty Sandstone	1,680	N/A	1,680	N/A
Shale w/trace Coal	1,740	N/A	1,740	N/A
Silty Sandstone	1,840	N/A	1,840	N/A
Big Lime	2,008	N/A	2,017	N/A
Big Injun	2,147	N/A	2,163	N/A
Gantz Sand	2,599	N/A	2,637	N/A
Fifty Foot Sandstone	2,847	N/A	2,898	N/A
Gordon	2,928	N/A	2,983	N/A
Fifth Sandstone	3,188	N/A	3,257	N/A
Bayard	3,263	N/A	3,336	N/A
Warren	3,670	N/A	3,767	N/A
Speechley	4,027	N/A	4,144	N/A
Balltown	4,298	N/A	4,428	N/A
Bradford	4,676	N/A	4,826	N/A
Benson	5,067	N/A	5,236	N/A
Alexander	5,297	N/A	5,477	N/A
Rhinestreet	5,838	N/A	6,046	N/A
Sycamore	6,176	N/A	6,412	N/A
Middlesex	6,269	N/A	6,532	N/A
Burkett	6,358	N/A	6,688	N/A
Tully	6,379	N/A	6,746	N/A
Marcellus	6,388	N/A	6,774	N/A

*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.

Gas

3 2018

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LATITUDE 39°22'30" 1,678'

LATITUDE 39°25'00"

LONGITUDE 80°57'30"

2,487'

LONGITUDE 80°57'30"

9,943 TO BOTTOM HOLE

Antero Resources Corporation
Well No. Edwards Unit 1H

AS DRILLED DATA:
WELL 1H TOP HOLE INFORMATION:
N: 319,579ft E: 1,586,038ft
LAT: 39°22'05.42" LON: 80°57'51.37"
BOTTOM HOLE INFORMATION:
N: 327,374ft E: 1,581,590ft
LAT: 39°23'21.73" LON: 80°58'49.64"

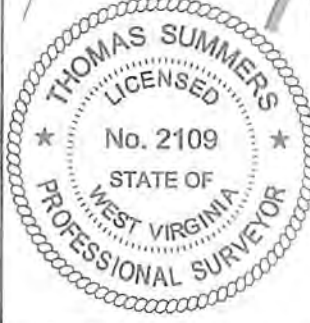
WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE. ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER MAPPING GRADE GPS UNIT. PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES ARE BASED ON GRID NORTH.

(NAD) 83 (UTM) ZONE 17 COORDS:
WELL 1H TOP HOLE INFORMATION:
N: 4,357,644m E: 503,092m
BOTTOM HOLE INFORMATION:
N: 4,359,996m E: 501,698m

WV NORTH ZONE GRID NORTH

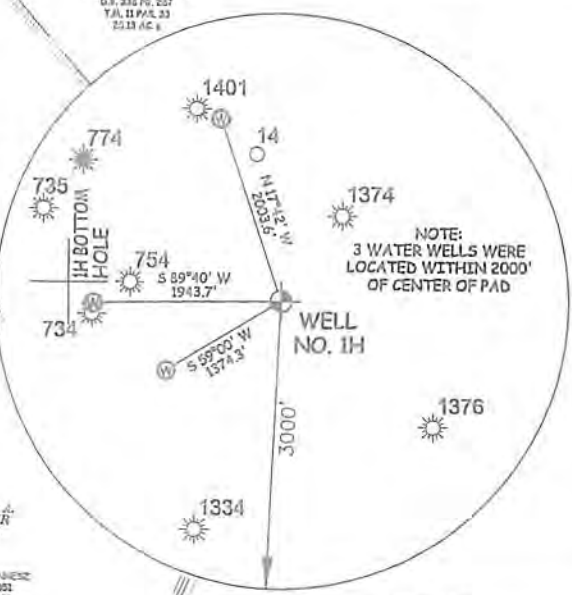
WELL NO. 1H BOTTOM HOLE

500'



PAD LAYOUT NOT TO SCALE

- EDWARDS UNIT 1H
- MARKLE UNIT 1H
- EDWARDS UNIT 3H
- MARKLE UNIT 2H
- EDWARDS UNIT 2H
- MARKLE UNIT 3H
- TINKER UNIT 3H
- DILLON UNIT 2H
- TINKER UNIT 2H
- DILLON UNIT 3H
- TINKER UNIT 1H
- DILLON UNIT 1H



NOTE: 3 WATER WELLS WERE LOCATED WITHIN 2000' OF CENTER OF PAD

LEGEND
- - - Surface Owner Boundary Lines +/-
- - - Interior Surface Tracts +/-
○ Proposed Well Path
⊙ As Drilled Well Path

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PERSCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.



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

WILLOW LAND SURVEYING PLLC
220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415

JOB # 16-009WA
DRAWING # EDWARDS1HAD
SCALE 1" = 1000'
MINIMUM DEGREE OF ACCURACY SUBMETER
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

THOMAS SUMMERS P.S. 2109

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

DATE 08/01/18 OPERATOR'S WELL# EDWARDS UNIT #1H

- 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.

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL 47 - 095 - 02374
 (IF "GAS") PRODUCTION STORAGE DEEP SHALLOW STATE COUNTY PERMIT
 LOCATION: ELEVATION 1,146.5' AS-BUILT WATERSHED OUTLET MIDDLE ISLAND CREEK
 QUADRANGLE PENNSBORO 7.5' - SHL MIDDLEBOURNE 7.5' - BHL DISTRICT MEADE COUNTY TYLER
 SURFACE OWNER RITCHIE PETROLEUM INC. ACREAGE 30.92 ACRES +/-
 OIL & GAS ROYALTY OWNER ASHFORD BROADWATER; TERRY L. SNIDER; ROBERT A. LOWTHER; LEASE ACREAGE 593.712 ACRES +/-; 67 ACRES +/-; 250 ACRES +/-
 CHARLES O. CONAWAY; BERYLE GARNETT MAYFIELD; ELIZABETH M. LATHEY 44.5 ACRES +/-; 155.33 ACRES +/-; 127.85 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
 TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,405' TVD 15,829' MD
 WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM
 ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD
 DENVER, CO 80202 CHARLESTON, WV 25313

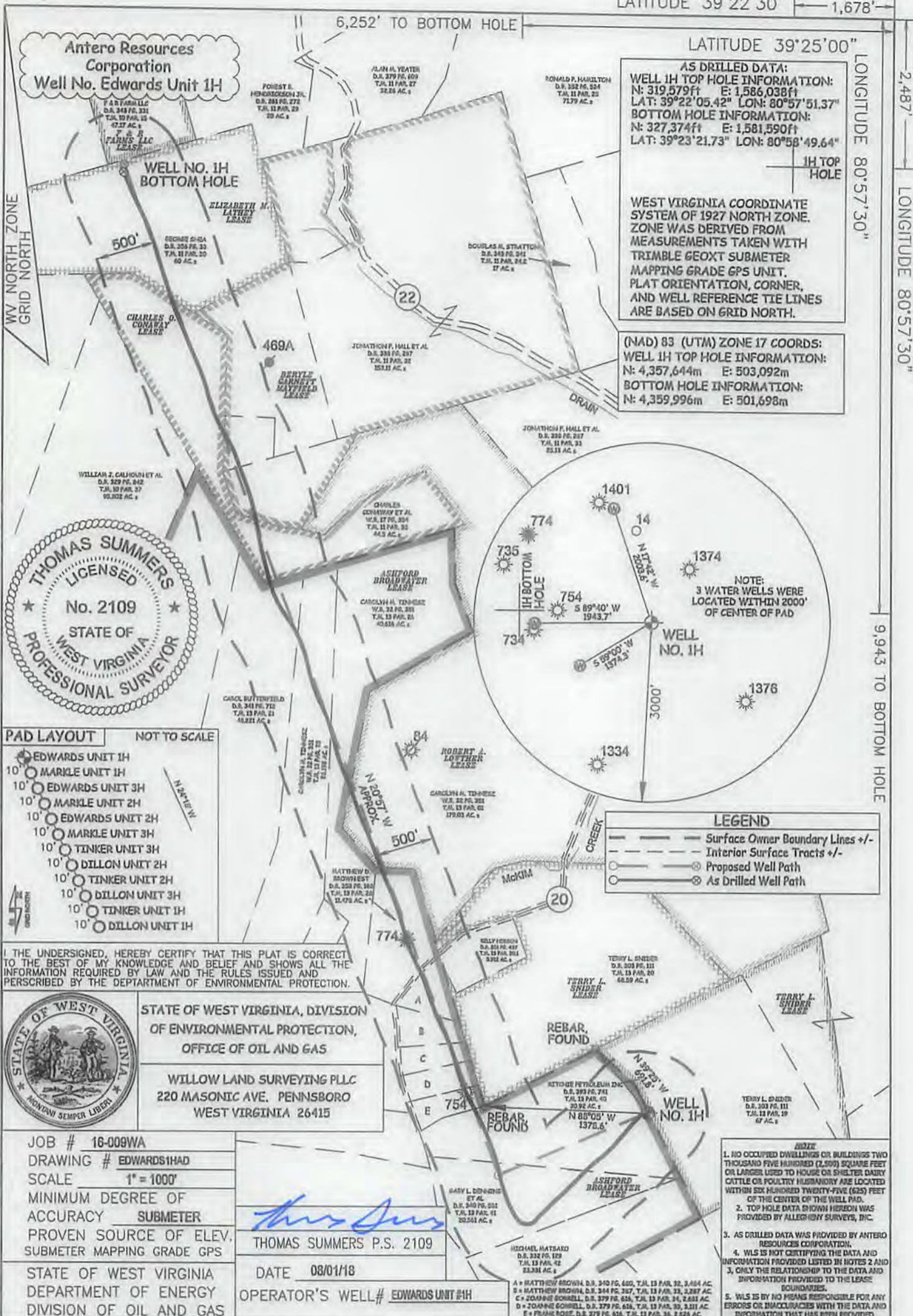
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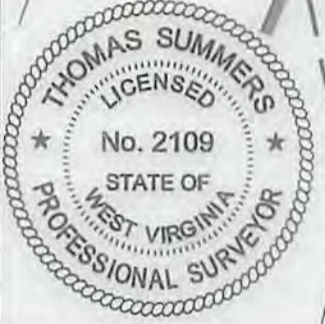
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THOMAS SUMMERS P.S. 2109
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 2. TOP HOLE DATA FROM HEREON WAS PROVIDED BY ALLEGHENY SURVEYS, INC.
 3. AS DRILLED DATA WAS PROVIDED BY ANTERO RESOURCES CORPORATION.
 4. WLS IS NOT CERTIFYING THE DATA 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.

WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___ 47 - 095 - 02374
 (IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X STATE COUNTY PERMIT
 LOCATION: ELEVATION 1,146.5' AS-BUILT WATERSHED OUTLET MIDDLE ISLAND CREEK
 QUADRANGLE PENNSBORO 7.5 - SHL MIDDLEBOURNE 7.5 - BHL DISTRICT MEADE COUNTY TYLER
 SURFACE OWNER RITCHIE PETROLEUM INC. ACREAGE 30.92 ACRES +/-
 OIL & GAS ROYALTY OWNER ASHFORD BROADWATER; TERRY L. SNIDER; ROBERT A. LOWTHER; LEASE ACREAGE 583.712 ACRES +/- 67 ACRES +/- 250 ACRES +/-
 CHARLES O. CONAWAY; BERYLE GARNETT MAYFIELD; ELIZABETH M. LATHEY 44.5 ACRES +/- 155.33 ACRES +/- 127.85 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 6,405' TVD 15,829' MD
 WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - GT CORPORATION SYSTEM
 ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD
 DENVER, CO 80202 CHARLESTON, WV 25313

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	10/29/2017
Job End Date:	3/19/2018
State:	West Virginia
County:	Tyler
API Number:	47-095-02374-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Edwards Unit 1H
Latitude:	39.36817222
Longitude:	-80.96426944
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,642
Total Base Water Volume (gal):	22,244,503
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
Fresh Water	Operator	Base Fluid					
			Water	7732-18-5	100.00000	88.92103	Density = 8.340
Ingredients	Listed Above	Listed Above					
			Water	7732-18-5	100.00000	0.26387	

HYDROCHLORIC ACID	Halliburton	Solvent					
				Listed Below			
MC B-8614	Halliburton	Biocide					
				Listed Below			
SP BREAKER	Halliburton	Breaker					
				Listed Below			
SAND-COMMON WHITE - 100 MESH, 3307 LB BAG	Halliburton	Proppant					
				Listed Below			
WG-36 GELLING AGENT	Halliburton	Gelling Agent					
				Listed Below			
FR-76	Halliburton	Friction Reducer					
				Listed Below			
LD-2900	MultiChem	Friction Reducer					
				Listed Below			
SAND-PREMIUM WHITE-40/70, BULK	Halliburton	Proppant					
				Listed Below			

SCALECHEK LP-70	Halliburton	Scale Inhibitor					
				Listed Below			
HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor					
				Listed Below			
SAND-PREMIUM WHITE-30/50, BULK	Halliburton	Proppant					
				Listed Below			

Items above are Trade Names with the exception of Base Water . Items below are the individual ingredients.

			Crystalline silica, quartz	14808-60-7	100.00000	10.76192	
			Acrylamide acrylate copolymer	Proprietary	30.00000	0.01591	Denise Tuck, Halliburton, 3000 N. Sam Houston Pkwy E., Houston, TX 77032, 281-871-6226
			Inorganic salt	Proprietary	30.00000	0.01591	
			Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.01591	
			Guar gum	9000-30-0	100.00000	0.01299	
			Ethylene glycol	107-21-1	60.00000	0.00836	
			Acrylamide, sodium acrylate polymer	25987-30-8	30.00000	0.00330	
			Glutaraldehyde	111-30-8	30.00000	0.00260	
			Telmer	Proprietary	10.00000	0.00139	
			Sodium persulfate	7775-27-1	100.00000	0.00073	
			Poly(oxy-1,2-ethanediyl), .alpha.-tridecyl-.omega.-hydroxy-,branched	69011-36-5	5.00000	0.00055	
			Sobitan, mono-9-octadecenoate, (Z)	1338-43-8	5.00000	0.00055	

			Quaternary ammonium compounds, benzyl-C12-16-alkyldimethyl chlorides	68424-85-1	5.00000	0.00043	
			Sodium polyacrylate	9003-04-7	1.00000	0.00014	
			Methanol	67-56-1	60.00000	0.00013	
			Ethanol	64-17-5	1.00000	0.00009	
			Fatty acids, tall oil	Proprietary	30.00000	0.00006	
			Ethoxylated alcohols	Proprietary	30.00000	0.00006	
			Modified thiourea polymer	Proprietary	30.00000	0.00006	
			Olefins	Proprietary	5.00000	0.00002	
			Propargyl alcohol	107-19-7	10.00000	0.00002	
			Phosphoric acid	7664-38-2	0.10000	0.00001	
			Acrylic acid	79-10-7	0.01000	0.00000	
			Sodium sulfate	7757-82-6	0.10000	0.00000	
			Hydrochloric acid	7647-01-0			

* Total Water Volume sources may include various types of water including fresh water, produced water, and recycled water

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

*** If you are calculating a percentage of total ingredients do not add the water volume below the green line to the water volume above the green line

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)