

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

RECEIVED
Office of Oil and Gas
APR 07 2023
WV Department of
Environmental Protection

API 47 - 095 - 02548 County Tyler District McElroy
Quad TH - Centerpoint 7.5' BH - Shirley 7.5' Pad Name Alta Pad Field/Pool Name ----
Farm name Stephen Grimm Well Number Lindsey 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 4360565m Easting 521820m
Landing Point of Curve Northing 4360532.62m Easting m
Bottom Hole Northing 4363424m Easting 520325m

Elevation (ft) 827' 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 11/29/2018 Date drilling commenced 12/2/2018 Date drilling ceased 3/21/2019
Date completion activities began 7/13/2019 Date completion activities ceased 8/26/2019
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 29, 66, 369' Open mine(s) (Y/N) depths No
Salt water depth(s) ft 1093, 1260, 1159' Void(s) encountered (Y/N) depths No
Coal depth(s) ft None Reported Cavern(s) encountered (Y/N) depths No
Is coal being mined in area (Y/N) No

Reviewed by:

05/11/2023

API 47-095 - 02548 Farm name Stephen Grimm Well number Lindsey 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"	98'	New	94#, H-40	N/A	Y
Surface	17-1/2"	13-3/8"	500'	New	54.5#, J-55	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2657'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	17454'	New	23#, HCP-110	N/A	Y
Tubing		2-3/8"	6930'		4.7#, P-110		
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	294 sx	15.6	1.20	353	0'	8 Hrs.
Surface	Class A	412 sx	15.8	1.17	482	0'	8 Hrs.
Coal							
Intermediate 1	Class A	905 sx	15.6	1.19	1077	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	793 sx (Lead) 2255 sx (Tail)	14.5 (Lead), 15.2(Tail)	1.4 (Lead), 1.26 (Tail)	2841	~500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 17454' MD, 6583' TVD (BHL), 6653' (Deepest Point Drilled) Loggers TD (ft) 17454' MD
 Deepest formation penetrated Marcellus Plug back to (ft) N/A
 Plug back procedure N/A

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Kick off depth (ft) ^{6165'} _____

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 N/A

API 47-095-02548 Farm Name Stephen Grimm Well Number Lindsey Unit 2H

Exhibit 1

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	7/13/2019	17286	N/A	60	Marcellus
2	7/13/2019	17083.26	17254.21	60	Marcellus
3	7/14/2019	16880.52	17051.47	60	Marcellus
4	7/14/2019	16677.78	16848.73	60	Marcellus
5	7/14/2019	16475.04	16645.99	60	Marcellus
6	7/15/2019	16272.3	16443.25	60	Marcellus
7	7/15/2019	16069.56	16240.51	60	Marcellus
8	7/16/2019	15866.82	16037.77	60	Marcellus
9	7/16/2019	15664.08	15835.03	60	Marcellus
10	7/16/2019	15461.34	15632.29	60	Marcellus
11	7/17/2019	15258.6	15429.55	60	Marcellus
12	7/17/2019	15055.86	15226.81	60	Marcellus
13	7/17/2019	14853.12	15024.07	60	Marcellus
14	7/18/2019	14650.38	14821.33	60	Marcellus
15	7/18/2019	14447.64	14618.59	60	Marcellus
16	7/18/2019	14244.9	14415.85	60	Marcellus
17	7/19/2019	14042.16	14213.11	60	Marcellus
18	7/19/2019	13839.42	14010.37	60	Marcellus
19	7/19/2019	13636.68	13807.63	60	Marcellus
20	7/19/2019	13433.94	13604.89	60	Marcellus
21	7/20/2019	13231.2	13402.15	60	Marcellus
22	7/20/2019	13028.46	13199.41	60	Marcellus
23	7/20/2019	12825.72	12996.67	60	Marcellus
24	7/20/2019	12622.98	12793.93	60	Marcellus
25	7/21/2019	12420.24	12591.19	60	Marcellus
26	7/21/2019	12217.5	12388.45	60	Marcellus
27	7/21/2019	12014.76	12185.71	60	Marcellus
28	7/22/2019	11812.02	11982.97	60	Marcellus
29	7/22/2019	11609.28	11780.23	60	Marcellus
30	7/22/2019	11406.54	11577.49	60	Marcellus
31	7/22/2019	11203.8	11374.75	60	Marcellus
32	7/23/2019	11001.06	11172.01	60	Marcellus
33	7/23/2019	10798.32	10969.27	60	Marcellus
34	7/23/2019	10595.58	10766.53	60	Marcellus
35	7/24/2019	10392.84	10563.79	60	Marcellus
36	7/24/2019	10190.1	10361.05	60	Marcellus
37	7/24/2019	9987.36	10158.31	60	Marcellus
38	7/24/2019	9784.62	9955.57	60	Marcellus
39	7/24/2019	9581.88	9752.83	60	Marcellus
40	7/25/2019	9379.14	9550.09	60	Marcellus
41	7/25/2019	9176.4	9347.35	60	Marcellus
42	7/25/2019	8973.66	9144.61	60	Marcellus
43	7/26/2019	8770.92	8941.87	60	Marcellus
44	7/26/2019	8568.18	8739.13	60	Marcellus
45	7/26/2019	8365.44	8536.39	60	Marcellus
46	7/26/2019	8162.7	8333.65	60	Marcellus
47	7/27/2019	7959.96	8130.91	60	Marcellus
48	7/27/2019	7757.22	7928.17	60	Marcellus
49	7/27/2019	7554.48	7725.43	60	Marcellus
50	7/27/2019	7351.74	7522.69	60	Marcellus
51	7/27/2019	7149	7319.95	60	Marcellus

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05/11/2023

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	7/13/2019	69.2	7927.3	7482	4712	173650	5069.0	N/A
2	7/13/2019	72.0	8038.1	5727	4796	403300	7380.6	N/A
3	7/14/2019	69.8	7706.9	5644	4826	403050	7429.8	N/A
4	7/14/2019	72.3	7780.4	5576	4585	403400	7104.6	N/A
5	7/14/2019	76.1	8039.7	5714	4502	403400	7071.0	N/A
6	7/15/2019	77.3	8212.9	5784	4692	403150	7087.6	N/A
7	7/15/2019	71.5	8248.5	5931	4696	403500	7151.6	N/A
8	7/16/2019	72.3	8185.0	6530	4604	403200	7148.2	N/A
9	7/16/2019	69.0	7739.5	4646.97	4600	402950	7155.4	N/A
10	7/16/2019	72.8	7925.3	5992	4524	403200	7072.9	N/A
11	7/17/2019	73.9	8115.1	7309	4507	403300	7092.8	N/A
12	7/17/2019	71.8	7989.7	5222	4569	402350	6996.2	N/A
13	7/17/2019	74.5	8137.4	5613	4795	403500	7057.1	N/A
14	7/18/2019	76.3	8113.6	5732	4670	403250	7222.1	N/A
15	7/18/2019	74.3	7849.4	5788	4526	402150	7711.3	N/A
16	7/18/2019	72.5	7837.5	5309	4519	403400	7027.6	N/A
17	7/19/2019	75.5	7893.5	5510	4631	402850	7007.2	N/A
18	7/19/2019	77.3	8051.0	5961	4886	402600	7058.8	N/A
19	7/19/2019	77.4	7907.8	5226	4798	403500	7076.3	N/A
20	7/19/2019	73.6	7827.1	5609	4864	403050	6979.9	N/A
21	7/20/2019	72.1	7893.2	5516	4970	403350	6912.4	N/A
22	7/20/2019	72.3	7908.4	5218	4939	403050	7119.4	N/A
23	7/20/2019	74.0	7928.3	5842	5325	402750	9281.2	N/A
24	7/20/2019	75.5	7879.0	5531	5192	402750	6948.6	N/A
25	7/21/2019	75.0	7855.9	5303	4939	403600	7129.2	N/A
26	7/21/2019	73.4	7767.2	5862	5063	402300	6970.0	N/A
27	7/21/2019	75.5	7934.1	5713	4838	402650	6858.5	N/A
28	7/22/2019	74.1	7986.0	5744	4825	402900	6895.5	N/A
29	7/22/2019	72.9	7978.9	5987	4957	402700	6994.6	N/A
30	7/22/2019	68.9	7868.6	6052	5352	402900	8533.0	N/A
31	7/22/2019	76.1	7890.9	5879	5255	402500	6788.7	N/A
32	7/23/2019	76.0	7852.4	5814	5173	403150	6900.7	N/A
33	7/23/2019	79.3	7817.7	5748	4662	402800	6976.8	N/A
34	7/23/2019	71.0	7644.9	5685	4915	402700	8246.0	N/A
35	7/24/2019	78.4	7934.4	5699	5255	402850	6788.2	N/A
36	7/24/2019	75.9	7538.0	5658	5060	402900	6899.7	N/A
37	7/24/2019	78.8	7698.0	5970	5217	403350	6886.2	N/A
38	7/24/2019	83.8	7788.1	5793	4881	402750	6877.2	N/A
39	7/24/2019	82.2	7738.2	5423	5130	403020	6836.7	N/A
40	7/25/2019	80.7	7608.4	5791	4619	403500	6830.0	N/A
41	7/25/2019	80.4	7549.5	5755	4687	403400	6843.5	N/A
42	7/25/2019	79.2	7415.1	5670	5158	402600	6845.5	N/A
43	7/26/2019	82.7	7636.3	5901	4930	402050	6726.8	N/A
44	7/26/2019	78.4	7268.1	6235	4438	401100	6832.8	N/A
45	7/26/2019	83.2	7604.1	5751	4409	401300	7264.5	N/A
46	7/26/2019	84.9	7590.9	5808	4714	402700	6788.2	N/A
47	7/27/2019	83.8	7675.2	5805	4721	402750	6663.9	N/A
48	7/27/2019	76.1	7055.6	5953	4600	403400	6627.4	N/A
49	7/27/2019	82.5	7272.1	5918	4512	403200	6700.1	N/A
50	7/27/2019	80.3	7340.3	5639	4909	402900	6711.3	N/A
51	7/27/2019	84.5	7409.0	5644	4312	404150	7236.4	N/A
AVERAGE		76	7,801	5,777	4,809	20,320,770	359,813	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
Shaly Sandstone	-25	155	-25	155
Sandy Shale	155	215	155	215
Shaly Sandstone	215	255	215	255
Sandstone	255	395	255	395
Shaly Sandstone	395	505	395	505
Sandstone	505	575	505	575
Carbonaceous shale	575	615	575	615
Sandstone	615	765	615	765
Shaly sandstone tr coal	765	1,025	765	1,025
Shaly Siltstone	1,025	1,305	1,025	1,305
Sandstone	1,305	1,455	1,305	1,455
Sandy siltstone	1,455	1,685	1,455	1,685
Sandstone	1,685	1,774	1,685	1,791
Big Lime	1,799	2,505	1,791	2,575
Fifty Foot Sandstone	2,505	2,606	2,550	2,679
Gordon	2,606	2,921	2,654	3,014
Fifth Sandstone	2,921	3,013	2,989	3,114
Bayard	3,013	3,622	3,089	3,767
Speechley	3,622	3,944	3,742	4,108
Balltown	3,944	4,458	4,083	4,655
Bradford	4,458	4,895	4,630	5,122
Benson	4,895	5,148	5,097	5,393
Alexander	5,148	6,369	5,368	6,722
Sycamore	6,168	6,339	6,489	6,692
Middlesex	6,339	6,471	6,697	6,896
Burkett	6,471	6,502	6,901	6,957
Tully	6,502	6,559	6,962	7,099
Marcellus	6,559	NA	7,099	NA

Marcellus

*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.

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LATITUDE 39°25'00"

10,864'

LATITUDE 39°27'30" 3,968' TO BOTTOM HOLE

LONGITUDE 80°45'00"

8,175'

13,955' TO BOTTOM HOLE

LONGITUDE 80°42'30"

Antero Resources Corporation Well No. Lindsey Unit 2H

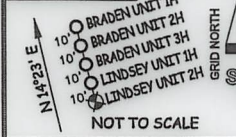
Table with 4 columns: TM-Par, Surface Owner, Book/Pg, Acreage. Lists various land parcels and owners.

AS DRILLED DATA: WELL 2H TOP HOLE INFORMATION: N: 328,139ft E: 1,647,653ft LAT: 39°23'39.20" LON: 80°44'48.39" BOTTOM HOLE INFORMATION: N: 337,603ft E: 1,642,904ft LAT: 39°25'12.07" LON: 80°45'50.57" 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: 4,360,565m E: 521,820m BOTTOM HOLE INFORMATION: N: 4,363,424m E: 520,325m

WV NORTH ZONE GRID NORTH

PAD LAYOUT



NOTE: 6 WATER WELLS WERE LOCATED WITHIN 2000' OF CENTER OF PAD

Table with 3 columns: LINE, BEARING, DISTANCE. Lists well locations relative to the pad center.

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

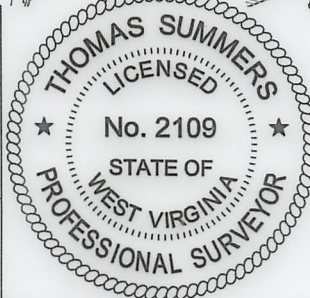


Table with 4 columns: TM-Par, Surface Owner, Book/Pg, Acreage. Lists additional land parcels and owners.

JOB # 18-017WA DRAWING # LINDSEY2HAD SCALE 1" = 2000' MINIMUM DEGREE OF ACCURACY SUBMETER PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS

LEGEND: Surface Owner Boundary Lines +/-, Interior Surface Tracts +/-, Proposed Well Path, As Drilled Well Path. Includes signature of Thomas Summers and date 11/19/19.

- 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... 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 02548 (IF "GAS") PRODUCTION X STORAGE DEEP SHALLOW X LOCATION: ELEVATION 827' AS BUILT WATERSHED McELROY CREEK QUADRANGLE TH - CENTERPOINT 7.5' BH - SHIRLEY 7.5' DISTRICT McELROY COUNTY Tyler PERMIT 05/11/2023 SURFACE OWNER STEPHEN GRIMM ACREAGE 44.38 ACRES +/- LEASE ACREAGE 300 AC±; 94 AC±; 14 AC±; 320.94 AC±; 86.25 AC±; 100 AC±; 100 AC± OIL & GAS ROYALTY OWNER M. V. B. GEORGE; MARY JO FOSTER LIVING TRUST; NELDA JUNE STUBBS; RANDI MICHAEL; PERRY W. DUCKWORTH; RICHARD GATRELL ET UX; DONALD LEE SWEENEY 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 6,583' TVD 17,454' MD WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM ADDRESS 1615 WYNKOOP ST. ADDRESS 5400 D BIG TYLER ROAD FORM WW-6 DENVER, CO 80202 CHARLESTON, WV 25313

LATITUDE 39°25'00"

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LATITUDE 39°27'30" 3,968' TO BOTTOM HOLE

LONGITUDE 80°45'00"

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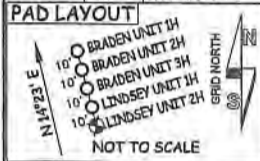
Antero Resources Corporation Well No. Lindsey Unit 2H

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WV NORTH ZONE GRID NORTH



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

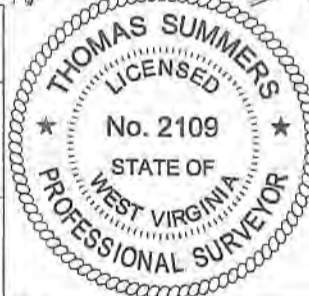


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LEGEND: Surface Owner Boundary Lines +/-, Interior Surface Tracts +/-, Proposed Well Path, As Drilled Well Path. Includes signature of Thomas Summers and date 11/19/19.

NOTE: 1. NO OCCUPIED DWELLINGS OR BUILDINGS... 2. TOP HOLE DATA SHOWN HEREON WAS PROVIDED BY WV Department of Energy and Gas... 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... 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 - 02548 (IF "GAS") PRODUCTION X STORAGE DEEP SHALLOW X STATE COUNTY PERMIT LOCATION: ELEVATION 827' AS BUILT WATERSHED McELROY CREEK QUADRANGLE TH-CENTERPOINT 7.5' BH-SHIRLEY 7.5' DISTRICT McELROY COUNTY TWP. SURFACE OWNER STEPHEN GRIMM ACREAGE 44.38 ACRES +/- OIL & GAS ROYALTY OWNER M. V. B. GEORGE; MARY JO FOSTER LIVING TRUST; NELDA JUNE STUBBS; RANDI MICHAEL; PERRY W. DUCKWORTH; RICHARD GATRELL ET UX; DONALD LEE SWEENEY LEASE ACREAGE 300 AC±; 94 AC±; 14 AC±; 320.94 AC±; 86.25 AC±; 100 AC±; 100 AC± 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 6,583' TVD 17,454' MD WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM ADDRESS 1615 WYNKOOP ST. ADDRESS 5400 D BIG TYLER ROAD DENVER, CO 80202 CHARLESTON, WV 25313

COUNTY NAME PERMIT

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	7/13/2019
Job End Date:	7/28/2019
State:	West Virginia
County:	Tyler
API Number:	47-095-02548-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Lindsey Unit 2H
Latitude:	39.39422200
Longitude:	-80.74677500
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,584
Total Base Water Volume (gal):	15,796,438
Total Base Non Water Volume:	0



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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	Supplied by Operator	Base Fluid					
			Water	7732-18-5	100.00000	86.34892	
Hydrochloric Acid	CWS	Clean Perforations					
				Listed Below			

DWP-641	CWS	Friction Reducer					
				Listed Below			
Calbreak 5501	CWS	Breaker					
				Listed Below			
Sand (Proppant)	CWS	Propping Agent					
				Listed Below			
DAP-103	CWS	Iron Control					
				Listed Below			
SaniFrac 8844	CWS	Biocide					
				Listed Below			
CalGel 4000	CWS	Gel Slurry					
				Listed Below			
DAP-902	CWS	Scale Inhibitor					
				Listed Below			
CI-9100G	CWS	Corrosion Inhibitor					
				Listed Below			
Other Chemical (s)	Listed Above	See Trade Name (s) List					

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				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	13.31250	
			Illite	12173-60-3	1.00000	0.13311	
			Hydrochloric acid	7647-01-0	37.00000	0.06303	
			Polymer	26100-47-0	45.00000	0.01906	
			Distillates (petroleum), hydrotreated middle	64742-46-7	60.00000	0.01765	
			Guar gum	9000-30-0	60.00000	0.01765	
			Apatite	64476-38-6	0.10000	0.01331	
			Goethite	1310-14-1	0.10000	0.01331	
			Ilmenite	98072-94-7	0.10000	0.01331	
			Biotite	1302-27-8	0.10000	0.01331	
			Distillates (petroleum), hydrotreated light	64742-47-8	30.00000	0.01271	
			Polyethylene glycol mixture	25322-68-3	54.50000	0.00655	
			Ammonium chloride	12125-02-9	11.00000	0.00466	
			2,2-Dibromo-3-Nitrilopropionamide	10222-01-2	20.00000	0.00240	
			Sorbitan monooleate	1338-43-8	4.00000	0.00169	
			Quaternary ammonium compounds, bis (hydrogenated tallow alkyl)dimethyl, salts with bentonite	68953-58-2	5.00000	0.00147	
			Polyethylene glycol monooleate	9004-96-0	3.00000	0.00127	
			Sorbitol tetraoleate	61723-83-9	2.00000	0.00085	
			Citric acid	77-92-9	60.00000	0.00057	
			Ammonium Persulfate	7727-54-0	100.00000	0.00050	
			Sodium bromide	7647-15-6	4.00000	0.00048	
			Oxirane, 2-methyl-, polymer with oxirane, monodecyl ether	37251-67-5	1.50000	0.00044	

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			Amines, tallow alkyl, ethoxylated	61791-26-2	1.00000	0.00042	
			Dibromoacetonitrile	3252-43-5	3.00000	0.00036	
			Alkyloxypolyethyleneoxy ethanol	84133-50-6	0.50000	0.00021	
			Vinylidene chloride-methyl acrylate copolymer	25038-72-6	20.00000	0.00010	
			Ethylene Glycol	107-21-1	40.00000	0.00004	
			Acrylamide	79-06-1	0.10000	0.00004	
			Diethylene glycol, monomethyl ether	34590-94-8	20.00000	0.00002	
			Ethoxylated Alcohols	68131-39-5	10.00000	0.00001	
			Isopropyl alcohol	67-63-0	5.00000	0.00001	
			Tar bases, quinolone derivs, benzyl chloride- quatenized	72480-70-7	10.00000	0.00001	
			Formic acid	64-18-6	10.00000	0.00001	
			Cinnamaldehyde	104-55-2	10.00000	0.00001	
			Organic Acid Salts	9003-04-7			Proprietary Additive Concentration
			Glycol	57-55-6			Proprietary Additive Concentration

* 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)

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