

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

API 47-095-02536 County Tyler District Meade
Quad Middlebourne 7.5' Pad Name Rush Fork Pad Field/Pool Name -----
Farm name Joseph R. Rymer Jr. Well Number Carse 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 4363047m Easting 502627m
Landing Point of Curve Northing 4362794.56m Easting 502139.99m
Bottom Hole Northing 4359458m Easting 503371m

Elevation (ft) 986' 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 RECEIVED
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Date permit issued 11/9/2018 Date drilling commenced 12/8/2019 Date drilling ceased 5/10/2019
Date completion activities began 8/13/2019 Date completion activities ceased 11/28/2019
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 30, 81 Open mine(s) (Y/N) depths No
Salt water depth(s) ft 1461, 1485, 1510 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:
ACB
9/17/2020

API 47-095 - 02536 Farm name Joseph R. Rymer Jr. Well number Carse 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"	80'	New	94#, H-40	N/A	Y	
Surface	17-1/2"	13-3/8"	380'	New	54.5#, J-55	N/A	Y	
Coal								
Intermediate 1	12-1/4"	9-5/8"	2616'	New	36#, J-55	N/A	Y	
Intermediate 2								
Intermediate 3								
Production	8-3/4"/8-1/2"	5-1/2"	18746'	New	23#, HCP-110	N/A	Y	
Tubing		2-3/8"	7148'		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	300 sx	15.6	1.18	241	0'	8 Hrs.
Surface	Class A	529 sx	15.6	1.20	635	0'	8 Hrs.
Coal							
Intermediate 1	Class A	911 sx	15.6	1.19	1082	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	792 sx (Lead) 1184sx (Tail)	14.5 (Lead), 15.2(Tail)	1.4 (Lead), 1.6 (Tail)	3003	-500' into intermediate casing	8 Hrs.
Tubing							

Drillers TD (ft) 18765 MD, 6287' TVD (BHL), 6289' (Deepest Point Drilled) Loggers TD (ft) 18765' MD
 Deepest formation penetrated Marcellus Plug back to (ft) N/A
 Plug back procedure N/A RECEIVED
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Kick off depth (ft) 5900'

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

Well cored Yes No Conventional Sidewall Sonic Temperature Induction Neutron Resistivity Gamma Ray Density Caliper Deviated/Directional Induction Temperature Sonic

Were cuttings collected Yes No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING _____

Conductor - 0
 Surface - 1 above guide shoes, 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 - 02536 Farm name Joseph R. Rymer Jr. Well number Carse Unit 1H

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
*PLEASE SEE ATTACHED EXHIBIT 1					

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbbls)	Amount of Nitrogen/other (units)
*PLEASE SEE ATTACHED EXHIBIT 2								

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Please insert additional pages as applicable.

API 47- 095 - 02536 Farm name Joseph R. Rymer Jr. Well number Carse Unit 1H

PRODUCING FORMATION(S)

DEPTHS

Marcellus 6137' (TOP) TVD 6680' (TOP) MD

Please insert additional pages as applicable.

GAS TEST [] Build up [] Drawdown [] Open Flow [] Flow [] Pump
SHUT-IN PRESSURE Surface 3000 psi Bottom Hole --- psi DURATION OF TEST --- hrs

OPEN FLOW Gas 10382 mcfpd 210 bpd Oil --- bpd NGL 179 bpd Water 179 bpd
GAS MEASURED BY [] Estimated [] Orifice [] Pilot

Table with columns: LITHOLOGY/FORMATION, TOP DEPTH IN FT, BOTTOM DEPTH IN FT, TVD, MD, TOP, BOTTOM, DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H2S, ETC)

*PLEASE SEE ATTACHED EXHIBIT 3

Table with multiple empty rows for data entry.

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Please insert additional pages as applicable.

Drilling Contractor Frontier Drilling LLC Address 562 Spring Run Road City Pennsylvania State WV Zip 26415

Logging Company KLX Energy Services Address 6072 W Veterans Memorial Hwy City Bridgeport State WV Zip 26330

Cementing Company Schlumberger Oilfield Services Address 300 Schlumberger Dr City Sugarland State TX Zip 77478

Stimulating Company CalFrac Well Services Address 171 17th Street, Suite 1445 City Denver State CO Zip 80202

Please insert additional pages as applicable.

Completed by Megan Griffith Signature Title Permitting Agent Telephone 303-357-7223 Date 4.9.20

API 47-095-02536 Farm Name Joseph R. Rymer Jr., Well Number Carse Unit 1H

EXHIBIT 1

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	8/14/2019	18146	17983.4323	60	Marcellus
2	8/15/2019	17948.51873	17785.951	60	Marcellus
3	8/15/2019	17751.03746	17588.4697	60	Marcellus
4	8/16/2019	17553.5562	17390.9885	60	Marcellus
5	8/16/2019	17356.07493	17193.5072	60	Marcellus
6	8/17/2019	17158.59366	16996.0259	60	Marcellus
7	8/18/2019	16961.11239	16798.5447	60	Marcellus
8	8/18/2019	16763.63112	16601.0634	60	Marcellus
9	8/19/2019	16566.14986	16403.5821	60	Marcellus
10	8/19/2019	16368.66859	16206.1009	60	Marcellus
11	8/20/2019	16171.18732	16008.6196	60	Marcellus
12	8/21/2019	15973.70605	15811.1383	60	Marcellus
13	8/22/2019	15776.22478	15613.6571	60	Marcellus
14	8/23/2019	15578.74352	15416.1758	60	Marcellus
15	8/24/2019	15381.26225	15218.6945	60	Marcellus
16	8/24/2019	15183.78098	15021.2133	60	Marcellus
17	8/24/2019	14986.29971	14823.732	60	Marcellus
18	8/25/2019	14788.81844	14626.2507	60	Marcellus
19	8/25/2019	14591.33718	14428.7695	60	Marcellus
20	8/26/2019	14393.85591	14231.2882	60	Marcellus
21	8/26/2019	14196.37464	14033.8069	60	Marcellus
22	8/27/2019	13998.89337	13836.3256	60	Marcellus
23	8/27/2019	13801.4121	13638.8444	60	Marcellus
24	8/28/2019	13603.93084	13441.3631	60	Marcellus
25	8/28/2019	13406.44957	13243.8818	60	Marcellus
26	8/28/2019	13208.9683	13046.4006	60	Marcellus
27	8/29/2019	13011.48703	12848.9193	60	Marcellus
28	8/29/2019	12814.00576	12651.438	60	Marcellus
29	8/30/2019	12616.5245	12453.9568	60	Marcellus
30	8/30/2019	12419.04323	12256.4755	60	Marcellus
31	8/31/2019	12221.56196	12058.9942	60	Marcellus
32	8/31/2019	12024.08069	11861.513	60	Marcellus
33	8/31/2019	11826.59942	11664.0317	60	Marcellus
34	9/1/2019	11629.11816	11466.5504	60	Marcellus
35	9/1/2019	11431.63689	11269.0692	60	Marcellus
36	9/2/2019	11234.15562	11071.5879	60	Marcellus
37	9/3/2019	11036.67435	10874.1066	60	Marcellus
38	9/3/2019	10839.19308	10676.6254	60	Marcellus
39	9/3/2019	10641.71182	10479.1441	60	Marcellus
40	9/4/2019	10444.23055	10281.6628	60	Marcellus
41	9/4/2019	10246.74928	10084.1816	60	Marcellus
42	9/4/2019	10049.26801	9886.70029	60	Marcellus
43	9/5/2019	9851.786744	9689.21902	60	Marcellus
44	9/5/2019	9654.305476	9491.73775	60	Marcellus
45	9/5/2019	9456.824207	9294.25648	60	Marcellus
46	9/6/2019	9259.342939	9096.77522	60	Marcellus
47	9/6/2019	9061.861671	8899.29395	60	Marcellus
48	9/7/2019	8864.380403	8701.81268	60	Marcellus
49	9/7/2019	8666.899135	8504.33141	60	Marcellus
50	9/7/2019	8469.417867	8306.85014	60	Marcellus
51	9/8/2019	8271.936599	8109.36888	60	Marcellus
52	9/8/2019	8074.455331	7911.88761	60	Marcellus
53	9/8/2019	7876.974063	7714.40634	60	Marcellus
54	9/9/2019	7679.492795	7516.92507	60	Marcellus
55	9/9/2019	7482.011527	7319.4438	60	Marcellus
56	9/9/2019	7284.530259	7121.96254	60	Marcellus
57	9/10/2019	7087.048991	6924.48127	60	Marcellus
58	9/10/2019	6889.567723	6727	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 (bbls)	Amount of Nitrogen/ other (units)
1	8/14/2019	70.42814	7991.848	4693	3890	400940	8869.846	N/A
2	8/15/2019	75.55122	7975.55	5864	3596	401400	8788.31	N/A
3	8/15/2019	74.36384	7850.176	5780	3446	399240	8774.48	N/A
4	8/16/2019	69.7957	8192.304	5958	3674	398860	8789.87	N/A
5	8/16/2019	69.42456	8009.634	5527	3368	405100	8976.76	N/A
6	8/17/2019	66.68798	8028.593	5781	3696	403742.7568	10340.04	N/A
7	8/18/2019	68.89797	8110.544	5655	3563	404040	8610.09	N/A
8	8/18/2019	64.20897	8141.612	5951	4650	401900	14517.85	N/A
9	8/19/2019	68.96485	8216.312	6743	3616	409860	8713.73	N/A
10	8/19/2019	77.209	8139.592	6237	3828	407820	8599.24	N/A
11	8/20/2019	74.18535	7756.196	6226	4235	405860	9743.21	N/A
12	8/21/2019	76.01124	7699.919	5777	3372	420140	8735.01	N/A
13	8/22/2019	72.9142	7960.533	6154	3428	404160	8712.97	N/A
14	8/23/2019	83.55089	8017.055	6082	3755	414020	8864.68	N/A
15	8/24/2019	82.18722	7995.833	6732	3430	401500	8503.82	N/A
16	8/24/2019	79.35798	7674.123	6901	3526	399700	8576.13	N/A
17	8/24/2019	78.49329	7882.663	6289	3287	400280	8548.65	N/A
18	8/25/2019	80.49305	7969.385	4640	3701	407680	8714.41	N/A
19	8/25/2019	81.25283	7604.586	6088	3399	397460	8617.65	N/A
20	8/26/2019	77.98859	7718.148	5569	3709	400460	8415.53	N/A
21	8/26/2019	80.20411	7937.724	5614	3433	401580	8372.86	N/A
22	8/27/2019	80.75505	7954.013	5320	3401	410460	8624.16	N/A
23	8/27/2019	83.35731	7978.758	6328	3238	401000	8367.72	N/A
24	8/28/2019	82.74861	7911.692	5191	3438	399740	8435.12	N/A
25	8/28/2019	85.70099	7927.152	5475	3554	402780	8491.78	N/A
26	8/28/2019	85.57823	7700.589	6540	3549	403840	8450.87	N/A
27	8/29/2019	87.97411	7684.969	5413	3639	401560	8486.29	N/A
28	8/29/2019	85.70492	7477.265	5556	4568	402280	8906.49	N/A
29	8/30/2019	87.67143	7644.231	5196	3771	401140	8373.35	N/A
30	8/30/2019	85.02194	7496.68	5266	3676	399620	8482.78	N/A
31	8/31/2019	84.19917	7493.741	4431	3418	403560	8539.68	N/A
32	8/31/2019	84.3115	7654.685	8746	4186	402900	8489.26	N/A
33	8/31/2019	86.33541	7650.625	5938	3198	400660	8419.21	N/A
34	9/1/2019	80.77859	7485.565	4640	3677	405420	8426.66	N/A
35	9/1/2019	70.93739	7438.763	4389	3184	403380	11355.23	N/A
36	9/2/2019	82.85379	7479.84	4800	4257	403640	8453.76	N/A
37	9/3/2019	82.81037	7560.147	3908	3500	402660	8373.3	N/A
38	9/3/2019	82.83417	7467.788	4808	4022	402820	8362.11	N/A
39	9/3/2019	87.62051	7502.026	5519	3341	402480	8247.57	N/A
40	9/4/2019	85.55085	7415.935	5543	3306	402760	8330.68	N/A
41	9/4/2019	85.57897	7398.698	3502	3726	401360	8309.75	N/A
42	9/4/2019	87.51028	7445.092	4182	3200	403800	8227.24	N/A
43	9/5/2019	83.25957	7443.369	5852	3591	402660	8388.77	N/A
44	9/5/2019	85.26015	7432.269	6266	3502	402360	8381.99	N/A
45	9/5/2019	85.47527	7540.242	5831	3297	403120	8286.22	N/A
46	9/6/2019	85.60333	7394.048	6272	3125	400960	8205.75	N/A
47	9/6/2019	83.97115	7346.558	6578	3464	399700	8246.65	N/A
48	9/7/2019	88.29858	7534.73	5914	3339	405400	8298.5	N/A
49	9/7/2019	84.37037	7274.568	6478	3103	401240	8195.64	N/A
50	9/7/2019	79.83931	7790.946	6027	3369	406680	9057.71	N/A
51	9/8/2019	85.15126	7503.841	5569	3569	403480	8271.62	N/A
52	9/8/2019	80.0241	7848.513	5573	4792	403380	9258.73	N/A
53	9/8/2019	84.52267	7778.044	5869	4207	404000	9092.5	N/A
54	9/9/2019	84.51748	7226.576	5313	3966	402720	8254.43	N/A
55	9/9/2019	84.60773	7531.307	5418	3351	405040	8204.67	N/A
56	9/9/2019	80.7841	7113.779	5269	5521	402180	8365.27	N/A
57	9/10/2019	84.45773	7328.864	5069	3486	401020	8198.12	N/A
58	9/10/2019	86.28894	6943.307	6318	3060	401980	8201.77	N/A
AVG=		79	7,862	5,869	3,644	13,315,283	292,852	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		215		0		215	
Sandy Siltstone	215		385		215		385	
Shaly Siltstone	385		585		385		585	
Silty sandstone	585		625		585		625	
Shaly Siltstone	625		745		625		745	
Silty sandstone	745		805		745		805	
Sandy Siltstone	805		865		805		865	
Shaly Siltstone	865		985		865		985	
Silty Shale	985		1,185		985		1,185	
Silty Sandstone	1,185		1,475		1,185		1,475	
Sandstone	1,475		1,645		1,475		1,645	
Sandy Siltstone	1,645		1,745		1,645		1,745	
Silty sandstone	1,745		1,783		1,745		1,844	
Big Lime	1,798		2,634		1,819		2,729	
Fifty Foot Sandstone	2,634		2,721		2,704		2,822	
Gordon	2,721		3,086		2,797		3,212	
Fifth Sandstone	3,086		3,364		3,187		3,510	
Bayard	3,364		3,967		3,485		4,154	
Speechley	3,967		4,264		4,129		4,471	
Balltown	4,264		4,421		4,446		4,640	
Bradford	4,421		4,645		4,615		4,878	
Benson	4,645		4,774		4,853		5,015	
Alexander	4,774		6,052		4,990		6,454	
Sycamore	5,935		6,027		6,285		6,429	
Middlesex	6,027		6,118		6,429		6,625	
Burkett	6,118		6,130		6,625		6,658	
Tully	6,130		6,137		6,658		6,680	
Marcellus	6,137		NA		6,680		NA	

*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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ANTERO RESOURCES CORPORATION

Location: Tyler County, WV
 Field: Tyler
 Facility: Rush Fork Pad

Well: Carse Unit 1H
 Wellbore: Carse Unit 1H PWB



Location Information			
Facility Name	Grid East (US Ft)	Grid North (US Ft)	Latitude
Rush Fork Pad	1649000.870	14313786.070	39°25'01.492"N
Slot	Local E (ft)	Local N (ft)	Longitude
H&P #09	-79.12	14313716.981	80°58'10.579"W
Mean Sea Level to Ground level (At Slot: Slot #09)			
H&P 317 (RKB) to Ground level (At Slot: Slot #09)		25.6ft	
Mean Sea Level to Ground level (At Slot: Slot #08)		-988ft	
Coordinates are in feet referenced to Slot			
Database: WA MPL Eastern US Data			
Created by: delset on 2018-05-13			
Mean Sea Level to Ground level (At Slot: Slot #08): -988 feet			
H&P 317 (RKB) to Mean Sea Level: 1011.5 feet			
Measured depths are referenced to H&P 317 (RKB)			
Scale: True distance			
Depths are in feet			
Created by: delset on 2018-05-13			
Database: WA MPL Eastern US Data			

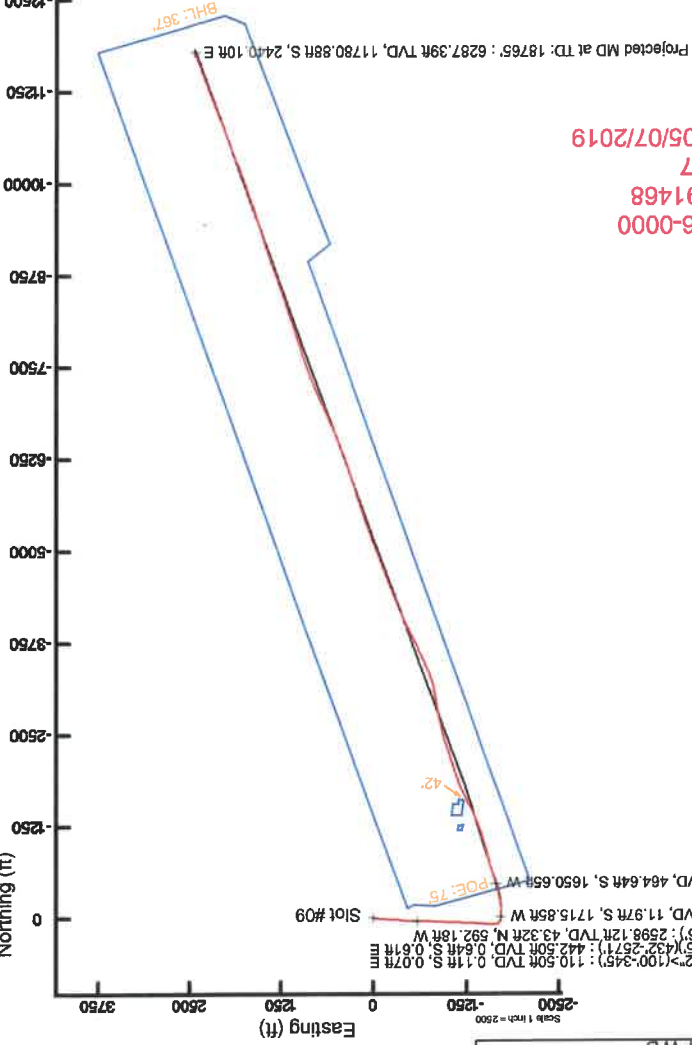
Well Data			
Slot	Wellbore	Well	Wellbore
Slot #09	Carse Unit 1H AWB	Carse Unit 1H	Carse Unit 1H PWB
Slot #08	Carse Unit 1H	Carse Unit 1H	Carse Unit 1H PWB Rev-A-0

Well Profile Data									
Design Comment	MD (ft)	Inc (?)	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	DLS (1/100ft)	VS (ft)	
The On	6046.50	27.230	192.060	5743.06	8.83	-1711.88	7.27	-697.85	
Prop. To Bottom	6118.50	30.880	188.910	5806.02	-24.60	-1717.82	6.38	-687.52	
End of 3D Arc	6504.38	68.637	170.000	6078.53	-291.06	-1700.77	7.75	-911.45	
POE	6670.48	70.459	162.492	6150.00	-436.16	-1684.75	8.25	-102.81	
Landing Pt.	6907.34	80.000	162.492	6190.00	-657.68	-1584.88	8.25	68.24	
IP #1	8005.18	90.000	162.492	6190.00	-1704.07	-1264.59	0.00	1165.95	
On Lateral Azimuth	8135.27	90.000	159.890	6190.00	-1827.80	-1222.85	2.00	1285.99	
BHL	18766.27	80.000	159.890	6190.00	-11810.87	2432.58	0.00	11927.00	

Gyrodata MS Gyro <17-1/2>(100-345) : 0.17° Inc, 110.50ft MD, 110.50ft TVD, 0.12ft VS
 WFT EM <12-1/4>(345)(432-2571) : 0.28° Inc, 442.50ft MD, 442.50ft TVD, 0.81ft VS

WFT EM <8-3/4>(2571)(2681-6036) : 19.39° Inc, 2691.50ft MD, 2598.12ft TVD, -244.28ft VS

BH AT Curve <8-1/2>(6046.5)(6094-18724) : 28.39° Inc, 6094.00ft MD, 5785.10ft TVD, -578.71ft VS
 Marcellus POE: 6705' MD : 70.73° Inc, 6705.00ft MD, 6162.39ft TVD, -131.22ft VS



API: 47-095-02536-0000
 BHI Job #: 109791468
 Rig: H&P 317
 Duration: 05/03/2019-05/07/2019

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User specified (HDGM) Dip: 88.49° Faid: 517.89°
 Magnetic North is 7.70 degrees West of True North (at 2019)
 GND North is 0.02 degrees East of True North (at 2019)
 To correct azimuth from True to Grid subtract 0.02 degrees
 To correct azimuth from Magnetic to Grid subtract 7.68 degrees



Scale 1 inch = 100'

Scale 1 inch = 100'

True Vertical Depth (ft)

Vertical Section (ft) with reference 0.00 N, 0.00 E
 Azimuth 159.89°

Projected MD at TD: 18765' : 90.06° Inc, 18765.00ft MD, 6287.39ft TVD, 11901.61ft VS

Scale 1 inch = 100'

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	8/14/2019
Job End Date:	9/10/2019
State:	West Virginia
County:	Tyler
API Number:	47-095-02536-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Carse Unit 1H
Latitude:	39.41686390
Longitude:	-80.96964720
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,288
Total Base Water Volume (gal):	21,859,412
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 (% by mass)**	Maximum Ingredient Concentration in HF Fluid** (% by mass)	Comments
Water	Supplied by Operator	Base Fluid					
Hydrochloric Acid	CWS	Clean	Perforations				
				Listed Below			
			Water	7732-18-5	100.00000	88.37663	

DAP-103	CWS	Iron Control	Listed Below				
Sand (Proppant)	CWS	Propping Agent	Listed Below				
CI-9100G	CWS	Corrosion Inhibitor	Listed Below				
SaniFrac 8844	CWS	Bioicide	Listed Below				
DynaRate 6525	CWS	Friction Reducer	Listed Below				
DWP-NE1	CWS	Non-Emulsifier	Listed Below				
DynaRate 6522	CWS	Friction Reducer	Listed Below				
EES1850	CWS	Friction Reducer	Listed Below				
Calbreak 5501	CWS	Breaker	Listed Below				

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			Listed Below				
DWP-641	CWS		Friction Reducer				
EES1450FRC	CWS		Friction Reducer				
CalGel 4000	CWS		Gel Slurry				
			Listed Below				
			Listed Below				
			Listed Below				
			Listed Below				
Other Chemical (s)	Listed Above	See Trade Name (s) List					
			Listed Below				
			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	11.33394	
			Calcite	471-34-1	1.00000	0.07897	
			Hydrochloric acid	7647-01-0	37.00000	0.05225	
			Illite	12173-60-3	1.00000	0.03435	
			Guar gum	9000-30-0	60.00000	0.02718	
			Distillates (petroleum), hydrotreated middle	64742-46-7	60.00000	0.02718	
			Goethite	1310-14-1	0.10000	0.01133	
			Apatite	64476-38-6	0.10000	0.01133	
			Biotite	1302-27-8	0.10000	0.01133	
			Copolymer of 2-propanamide	69418-26-4	30.00000	0.00956	
			Polyethylene glycol mixture	25322-68-3	54.50000	0.00598	
			Polymer	26100-47-0	45.00000	0.00381	
			Ammonium chloride	12125-02-9	11.00000	0.00348	

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	0.00343	0.10000	98072-94-7	Illmenite
	0.00226	5.00000	68953-58-2	Quaternary ammonium compounds, bis (hydrogenated tallow alkyl)dimethyl, salts with bentonite
	0.00219	20.00000	10222-01-2	2,2-Dibromo-3- Nitriopropionamide
	0.00102	100.00000	7727-54-0	Ammonium Persulfate
	0.00068	1.50000	37251-67-5	Oxirane, 2-methyl-, polymer with oxirane, monodecyl ether
	0.00064	2.00000	93-83-4	Oleic Acid Diethanolamide
	0.00047	60.00000	77-92-9	Citric acid
	0.00044	4.00000	7647-15-6	Sodium bromide
	0.00034	4.00000	1338-43-8	Sorbitan monooleate
	0.00033	3.00000	3252-43-5	Dibromoacetone
	0.00025	3.00000	9004-96-0	Polyethylene glycol monooleate
	0.00020	20.00000	25038-72-6	Vinylidene chloride- methyl acrylate copolymer
	0.00017	2.00000	61723-83-9	Sorbitol tetraoleate
	0.00008	1.00000	61791-26-2	Amines, tallow alkyl, ethoxylated
	0.00004	0.50000	84133-50-6	Alkylpolyoxyethyleneoxy ethanol
	0.00003	30.00000	67-63-0	Isopropanol
	0.00003	40.00000	107-21-1	Ethylene Glycol
	0.00002	20.00000	68607-28-3	Dimethylcocamine, bis (chloroethyl) ether, diquaternary ammonium salt
	0.00001	20.00000	34590-94-8	Diethylene glycol, monomethyl ether
	0.00001	5.00000	67-63-0	Isopropyl alcohol
	0.00001	10.00000	104-55-2	Cinnamaldehyde

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			64-18-6	10.00000	0.00001	Formic acid
			67-56-1	10.00000	0.00001	Methanol
			79-06-1	0.10000	0.00001	Acrylamide
			68131-39-5	10.00000	0.00001	Ethoxylated Alcohols
			61788-93-0	5.00000	0.00001	Amines, coco alkyl dimethyl
			72480-70-7	10.00000	0.00001	Tar bases, quinolone derivs, benzyl chloride- quatenized
			Proprietary	5.00000	0.00001	Substituted ammonium chloride
			78330-21-9			Alcohols, C11-14-iso-, C13-rich, ethoxylated
			9003-05-8			Cationic Polyacrylamide
			64742-47-8			Distillates (petroleum), hydrotreated light
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)

FORM MW-6 **DEWEY CO 28030** ADDRESS **2400 D BIG LATER ROAD** PERMIT
 WELL OPERATOR **WILCO RESOURCES CORP** DESIGNATED AGENCY **DIVISION 21 - CI CORROSION SYSTEM**
 TARGET FORMATION **WYBETTIN** WYBETTIN **8827 AD 18192 WD**
 (SPECIFY) AS DRILLED **BYC & ABANDON** STEIN OUT & BEYOND
 TYPE OF OLD FORMATION **BEKLOATE NEM FORMATION** OTHER PHYSICAL CHANGE IN WELL
 PROPOSED WORK: DRILL **CONVERT** DRIFT DEEPS **REDRILL** REACTURE OR DIMINUTE
 WELL LOG NUMBER OR A NUMBER IDENTIFY THE ST **WELL** WITH THE NUMBER OF TUBES TO BE DRILLED
 TYPE LOG NUMBER OF CORING **WELL** WITH THE NUMBER OF TUBES TO BE DRILLED
 OIL & GAS **WELL** WITH THE NUMBER OF TUBES TO BE DRILLED
 SURFACE OWNER **THOMAS SUMMERS** SURFACE OPERATOR **THOMAS SUMMERS**
 OPERATOR **THOMAS SUMMERS** DISTRICT **WEDE** COUNTY **LATER**
 LOCATION: ELEVATION **888 - 42 FT** WYBETTIN **OUTLET MIDDLE ISLAND CREEK** STATE **VA** COUNTY **PERMIT**
 (IE "GAS") PRODUCTION **X** STORAGE **DEEP** SHAFTOM **X** WASTE DISPOSAL **082**
 WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL **082**

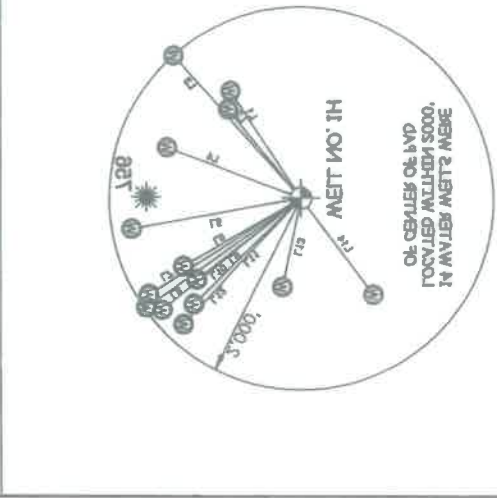
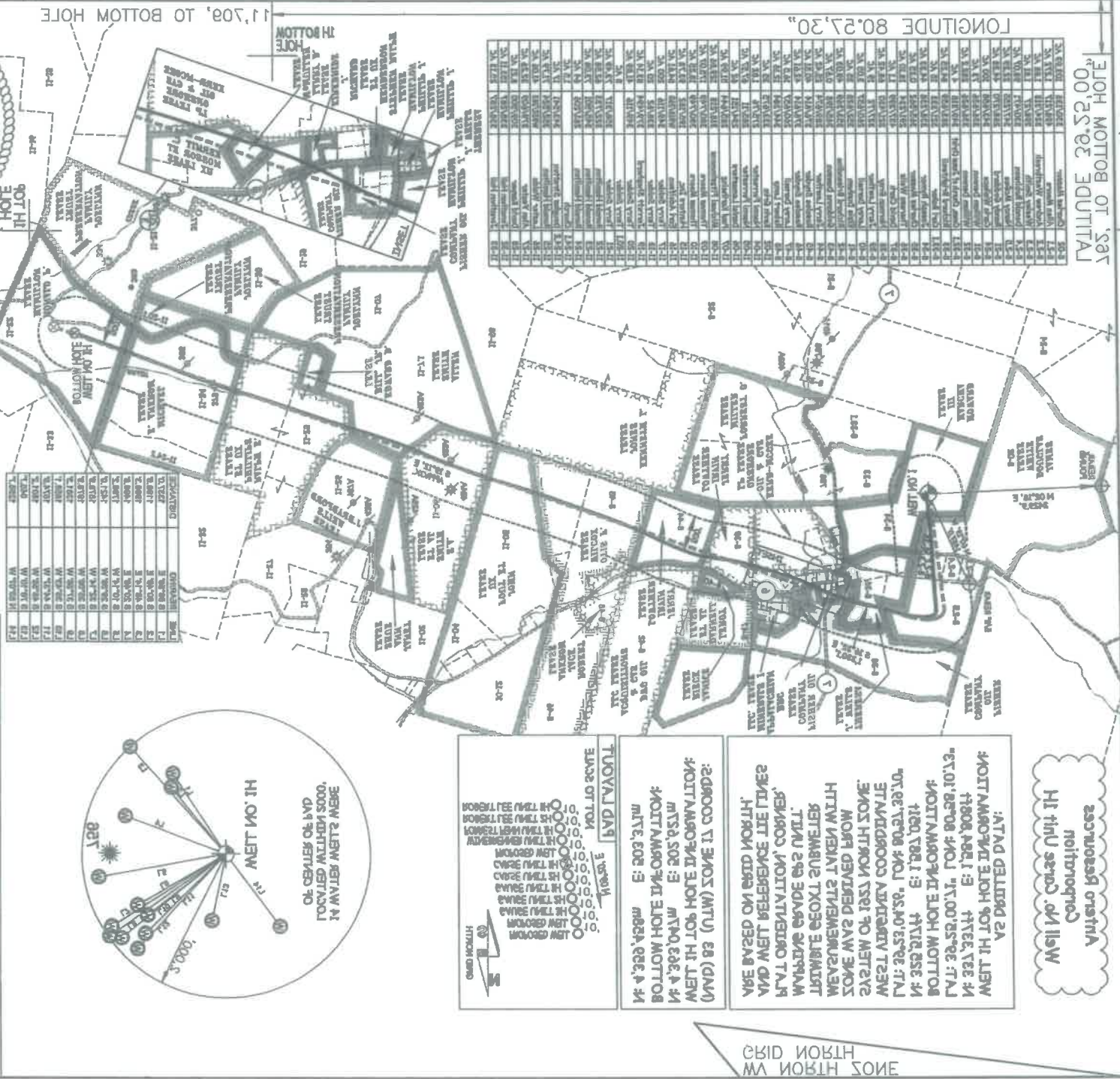
DIVISION OF OIL AND GAS DATE **03/08/10**
 DEPARTMENT OF ENERGY STATE OF WEST VIRGINIA
 SURVEY MAPPING BRANCH
 BLOWER SOURCE OF EGAL
 ACCURACY **SUMMERS**
 MINIMUM DEGREE OF **30**
 SCALE **1" = 3000'**
 DRAWING # **0382140**
 JOB # **11-03351**



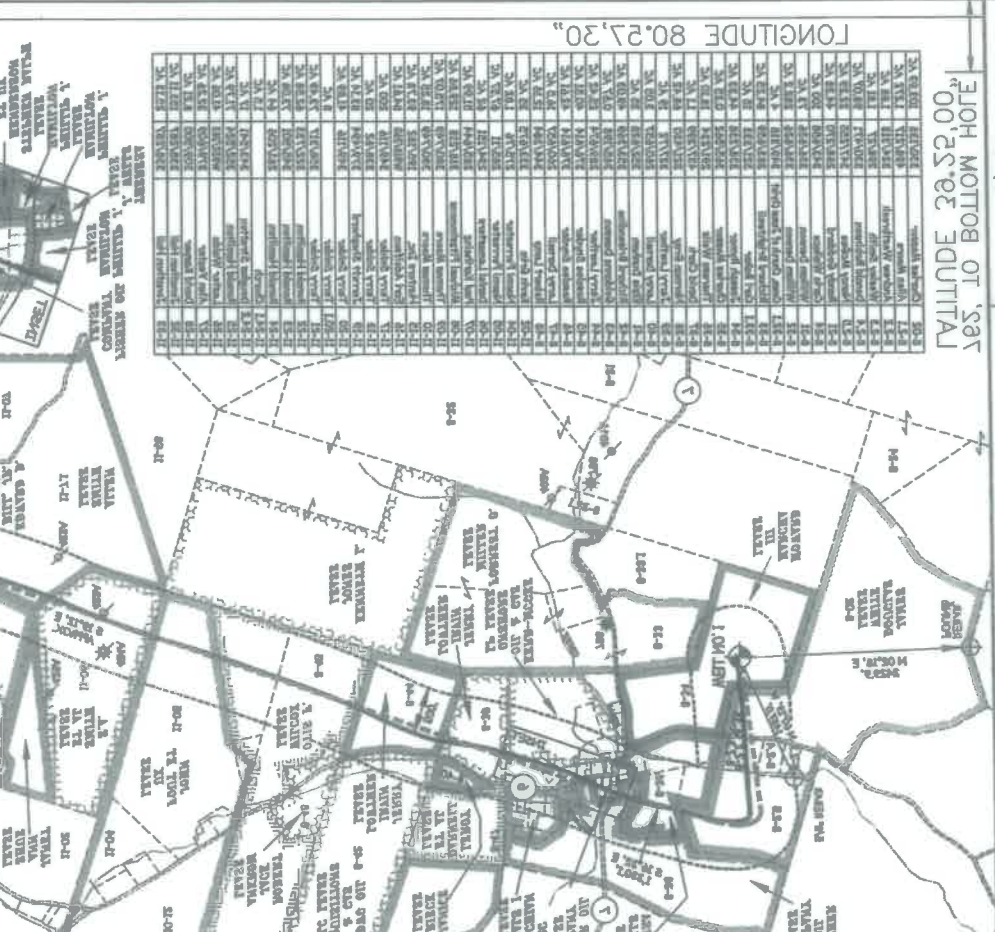
WEST VIRGINIA STATE
 550 WASHINGTON AVE. BEAVERBO
 CHARLOTTE, NC 28202
 OFFICE OF OIL AND GAS
 OF ENVIRONMENTAL PROTECTION
 STATE OF WEST VIRGINIA DIVISION

DESCRIBED BY THE DELINEATION OF ENVIRONMENTAL PROTECTION
 INFORMATION PROVIDED BY TWA AND THE WELLS IDENTIFIED AND
 TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS THAT THE
 I THE UNDERSIGNED HEREBY CERTIFY THAT THIS DRAWING IS CORRECT

PROFESSIONAL ENGINEER
STATE OF WEST VIRGINIA
8015 .01
THOMAS SUMMERS
 HOTEL JOB
 11'20s, TO BOTTOM HOLE
 LONGITUDE 80.21,30
 11'20s, TO BOTTOM HOLE
 LONGITUDE 80.21,30



WELL	DEPTH	DATE	STATUS
1	11-20	03/08/10	ACTIVE
2	11-20	03/08/10	ACTIVE
3	11-20	03/08/10	ACTIVE
4	11-20	03/08/10	ACTIVE
5	11-20	03/08/10	ACTIVE
6	11-20	03/08/10	ACTIVE
7	11-20	03/08/10	ACTIVE
8	11-20	03/08/10	ACTIVE
9	11-20	03/08/10	ACTIVE
10	11-20	03/08/10	ACTIVE
11	11-20	03/08/10	ACTIVE
12	11-20	03/08/10	ACTIVE
13	11-20	03/08/10	ACTIVE
14	11-20	03/08/10	ACTIVE
15	11-20	03/08/10	ACTIVE
16	11-20	03/08/10	ACTIVE
17	11-20	03/08/10	ACTIVE
18	11-20	03/08/10	ACTIVE
19	11-20	03/08/10	ACTIVE
20	11-20	03/08/10	ACTIVE
21	11-20	03/08/10	ACTIVE
22	11-20	03/08/10	ACTIVE
23	11-20	03/08/10	ACTIVE
24	11-20	03/08/10	ACTIVE
25	11-20	03/08/10	ACTIVE
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95	11-20	03/08/10	ACTIVE
96	11-20	03/08/10	ACTIVE
97	11-20	03/08/10	ACTIVE
98	11-20	03/08/10	ACTIVE
99	11-20	03/08/10	ACTIVE
100	11-20	03/08/10	ACTIVE



WELLS BASED ON GRID NORTH
 AND WELL REFERENCE ARE GIVEN
 BY THE OPERATOR'S COMPANY
 WHERE AVAILABLE. COPIES WILL
 BE MADE OF ALL SURVEYS
 AND MEASUREMENTS TAKEN WITH
 THIS SYSTEM OF WELL NORTH ZONE
 WEST VIRGINIA COORDINATE
 SYSTEM. THE NORTH ZONE
 WILL BE USED FOR ALL
 SURVEYS AND MEASUREMENTS
 TAKEN WITH THIS SYSTEM OF
 WELL NORTH ZONE WEST
 VIRGINIA COORDINATE SYSTEM.

WILCO RESOURCES Corporation
 28030 DEWEY COUNTY VA
 38.52,30
 28.52,30
 3' 10s, TO BOTTOM HOLE
 LONGITUDE 80.21,30
 3' 10s, TO BOTTOM HOLE
 LONGITUDE 80.21,30

LATITUDE 39°27'30"

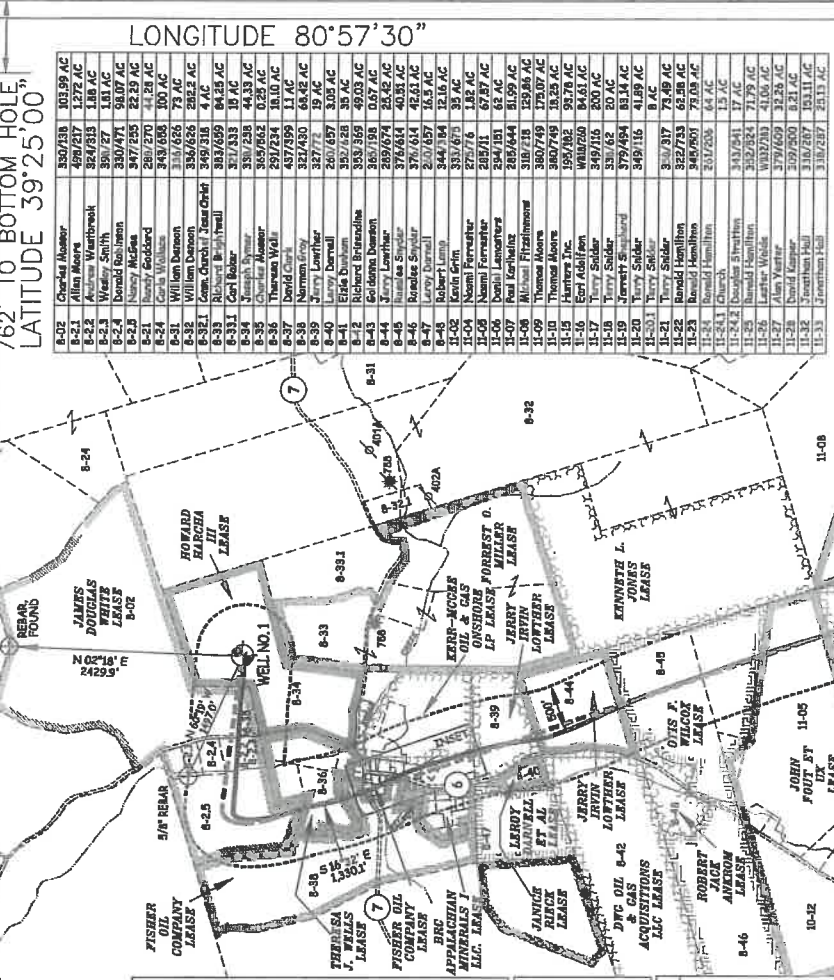
3,196'

762' TO BOTTOM HOLE,
LATITUDE 39°25'00"

LONGITUDE 80°57'30"

15,105'

LONGITUDE 80°57'30"



Antero Resources Corporation
Well No. Carse Unit 1H

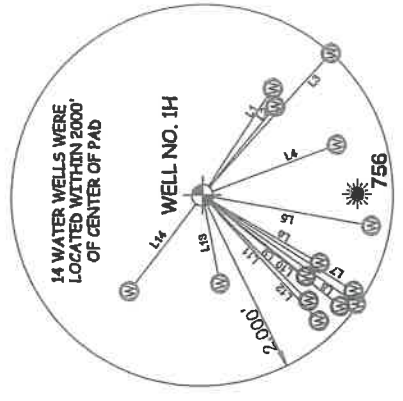
AS DRILLED DATA:
WELL 1H TOP HOLE INFORMATION:
N: 337,337ft E: 1,584,808ft
LAT: 39°25'00.71" N: 80°58'10.73"
BOTTOM HOLE INFORMATION:
N: 325,617ft E: 1,587,051ft
LAT: 39°23'04.26" N: 80°57'39.70"
WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOMX 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: 4,363,047m E: 502,627m
BOTTOM HOLE INFORMATION:
N: 4,359,458m E: 503,371m

PAD LAYOUT
N 09°20' E
NOT TO SCALE

14 WATER WELLS WERE LOCATED WITHIN 2000' OF CENTER OF PAD

GRID NORTH



THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAN 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.

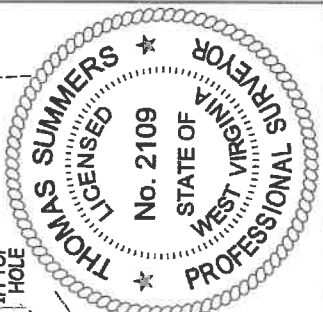


STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS

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

RECEIVED
Office of Oil and Gas
AUG 31 2020
WV Department of Environmental Protection

11,709' TO BOTTOM HOLE



JOB # 17-022WA
DRAWING # CARSEHAD
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
DATE 03/09/20
OPERATOR'S WELL # CARSE UNIT #H

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

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 ANTERO RESOURCES CORPORATION.
3. AS DRILLED DATA WAS PROVIDED BY ANTERO RESOURCES CORPORATION, THE DATA AND INFORMATION PROVIDED TO THE DATA AND ONLY THE RELATIONSHIP TO THE DATA AND INFORMATION PROVIDED TO THE LEASE BOUNDARIES.
4. WLS IS BY NO MEANS RESPONSIBLE FOR ANY ERRORS OR INACCURACIES WITH THE DATA AND INFORMATION THAT HAS BEEN PROVIDED.

WELL TYPE: OIL LIQUID INJECTION GAS STORAGE DEEP SHALLOW
(IF "GAS") PRODUCTION WASTE DISPOSAL WATERSHED OUTLET MIDDLE ISLAND CREEK
LOCATION: ELEVATION 986' - AS BUILT QUADRANGLE MIDDLEBOURNE 7.5

SURFACE OWNER JOSEPH R. RYMER JR.
OIL & GAS ROYALTY OWNER HOWARD HARGRA III, JAMES D. WHITE, THERESA J. WELLS, FISHER OIL COMPANY, PHILIP J. HAMILTON, FISHER OIL COMPANY, RICHARD J. KROBIDE, KERMIT C. MASSOR ET UX, LARRY D. MAULLEN, KERR-MCGEE OIL & GAS ONSHORE LP, HERRY IRVIN LOWTHER, JERRY IRVIN LOWTHER, OTIS F. WILCOX, JOHN FOUT ET UX, S.A. SMITH ET AL., ALLEN SMITH, RALPH PHILLIPS ET UX, MICHAEL E. ANGRIM, RONALD P. HAMILTON

PROPOSED WORK: DRILL CONVERT PERFORATE NEW FORMATION
PLUG OFF OLD FORMATION
(SPECIFY) AS DRILLED

TARGET FORMATION MARCELLUS
WELL OPERATOR ANTERO RESOURCES CORP.
ADDRESS 1615 WYNKOOP ST.
FORM WW-6 DENVER, CO 80202

ESTIMATED DEPTH PLUG & ABANDON
DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM.
ADDRESS 5400 D BIG TYLER ROAD CHARLESTON, WV 25313

WASTE DISPOSAL SHALLOW DEEP
WATERSHED OUTLET MIDDLE ISLAND CREEK
DISTRICT MEADE COUNTY TYLER
ACREAGE 44.33 ACRES +/-

STATE COUNTY PERMIT
47 095 02596