

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

API 47 - 095 - 02525 County Tyler District McElroy  
Quad Shirley 7.5' Pad Name Colorado East Pad Field/Pool Name ----  
Farm name Antero Resources Corporation Well Number Avalanche 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 4361521m Easting 518252m  
Landing Point of Curve Northing 4361455.97m Easting 518288.50m  
Bottom Hole Northing 4358336m Easting 519495m

Elevation (ft) 743' 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 4/30/2019 Date drilling commenced 11/17/2019 Date drilling ceased 1/1/2020  
Date completion activities began 4/9/2020 Date completion activities ceased 6/3/2020  
Verbal plugging (Y/N) N/A Date permission granted N/A Granted by N/A RECEIVED  
Office of Oil and Gas

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug JAN 04 2020

Freshwater depth(s) ft 235', 241', 298' Open mine(s) (Y/N) depths NO WV Department of Environmental Protection  
Salt water depth(s) ft 970' 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:  
OCB  
1/27/2021

API 47-095 - 02525 Farm name Antero Resources Corporation Well number Avalanche 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	24"	20"	105'	New	94#, H-40	N/A	Y
Surface	17-1/2"	13-3/8"	431'	New	54.5#, J-55	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2571'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	18015'	New	23#, HCP-110	N/A	Y
Tubing		2-3/8"	6727'		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 <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor	Class A	284 sx	15.6	1.18	241	0'	8 Hrs.
Surface	Class A	372 sx	15.6	1.20	635	0'	8 Hrs.
Coal							
Intermediate 1	Class A	899 sx	15.6	1.19	1082	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	792 sx (Lead) 2747 sx (Tail)	14.5 (Lead), 15.2(Tail)	1.4 (Lead), 1.6 (Tail)	3003	~500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 18035' MD, 6425' TVD (BHL), 6442' (Deepest Point Drilled)      Loggers TD (ft) 18035' MD  
 Deepest formation penetrated Marcellus      Plug back to (ft) N/A  
 Plug back procedure N/A

Kick off depth (ft) 5665'

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 47-095-02525 Farm Name Antero Resources Corporation Well Number Avalanche Unit 2H

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	4/9/2020	17909.3	17865.6	60	Marcellus
2	4/9/2020	17828.09818	17662.5891	60	Marcellus
3	4/9/2020	17627.08727	17461.5782	60	Marcellus
4	4/10/2020	17426.07636	17260.5673	60	Marcellus
5	4/10/2020	17225.06545	17059.5564	60	Marcellus
6	4/10/2020	17024.05455	16858.5455	60	Marcellus
7	4/11/2020	16823.04364	16657.5345	60	Marcellus
8	4/11/2020	16622.03273	16456.5236	60	Marcellus
9	4/11/2020	16421.02182	16255.5127	60	Marcellus
10	4/12/2020	16220.01091	16054.5018	60	Marcellus
11	4/12/2020	16019	15853.4909	60	Marcellus
12	4/12/2020	15817.98909	15652.48	60	Marcellus
13	4/13/2020	15616.97818	15451.4691	60	Marcellus
14	4/13/2020	15415.96727	15250.4582	60	Marcellus
15	4/14/2020	15214.95636	15049.4473	60	Marcellus
16	4/14/2020	15013.94545	14848.4364	60	Marcellus
17	4/14/2020	14812.93455	14647.4255	60	Marcellus
18	4/15/2020	14611.92364	14446.4145	60	Marcellus
19	4/15/2020	14410.91273	14245.4036	60	Marcellus
20	4/15/2020	14209.90182	14044.3927	60	Marcellus
21	4/15/2020	14008.89091	13843.3818	60	Marcellus
22	4/16/2020	13807.88	13642.3709	60	Marcellus
23	4/16/2020	13606.86909	13441.36	60	Marcellus
24	4/16/2020	13405.85818	13240.3491	60	Marcellus
25	4/17/2020	13204.84727	13039.3382	60	Marcellus
26	4/17/2020	13003.83636	12838.3273	60	Marcellus
27	4/17/2020	12802.82545	12637.3164	60	Marcellus
28	4/18/2020	12601.81455	12436.3055	60	Marcellus
29	4/18/2020	12400.80364	12235.2945	60	Marcellus
30	4/18/2020	12199.79273	12034.2836	60	Marcellus
31	4/19/2020	11998.78182	11833.2727	60	Marcellus
32	4/19/2020	11797.77091	11632.2618	60	Marcellus
33	4/19/2020	11596.76	11431.2509	60	Marcellus
34	4/19/2020	11395.74909	11230.24	60	Marcellus
35	4/20/2020	11194.73818	11029.2291	60	Marcellus
36	4/20/2020	10993.72727	10828.2182	60	Marcellus
37	4/20/2020	10792.71636	10627.2073	60	Marcellus
38	4/21/2020	10591.70545	10426.1964	60	Marcellus
39	4/21/2020	10390.69455	10225.1855	60	Marcellus
40	4/21/2020	10189.68364	10024.1745	60	Marcellus
41	4/21/2020	9988.672727	9823.16364	60	Marcellus
42	4/22/2020	9787.661818	9622.15273	60	Marcellus
43	4/22/2020	9586.650909	9421.14182	61	Marcellus
44	4/22/2020	9385.64	9220.13091	62	Marcellus
45	4/23/2020	9184.629091	9019.12	63	Marcellus
46	4/23/2020	8983.618182	8818.10909	64	Marcellus
47	4/23/2020	8782.607273	8617.09818	65	Marcellus
48	4/23/2020	8581.596364	8416.08727	66	Marcellus
49	4/23/2020	8380.585455	8215.07636	67	Marcellus
50	4/24/2020	8179.574545	8014.06545	68	Marcellus
51	4/24/2020	7978.563636	7813.05455	69	Marcellus
52	4/24/2020	7777.552727	7612.04364	70	Marcellus
53	4/25/2020	7576.541818	7411.03273	71	Marcellus
54	4/25/2020	7375.530909	7210.02182	72	Marcellus
55	4/25/2020	7174.52	7009.01091	73	Marcellus
56	4/25/2020	6973.509091	6808	74	Marcellus

## 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	4/9/2020	80.68	8030	7311	3653	160420	4975.405	N/A
2	4/9/2020	85.79	8484	6791	4264	405260	7350.905	N/A
3	4/9/2020	84.39	8314	6296	4668	406220	7329.071	N/A
4	4/10/2020	85.46	8302	5976	4613	405420	7279.643	N/A
5	4/10/2020	85.94	8499	6710	4508	405140	7279.429	N/A
6	4/10/2020	85.8	8349	6527	4696	405440	7275.429	N/A
7	4/11/2020	85.93	8317	6380	4537	404100	7180.143	N/A
8	4/11/2020	85	8507	6014	4780	409020	7370.81	N/A
9	4/11/2020	85.26	8675	6712	4228	403460	7159.119	N/A
10	4/12/2020	85.31	8656	5916	4081	406340	7189.357	N/A
11	4/12/2020	83.86	8557	6737	4262	405500	7176.714	N/A
12	4/12/2020	85.85	8702	6057	4091	407820	7167.071	N/A
13	4/13/2020	82.13	8567	7301	4132	401380	7144.429	N/A
14	4/13/2020	83.93	8762	4449	4532	406440	7098.929	N/A
15	4/14/2020	85.52	8749	5664	4301	407360	7169.048	N/A
16	4/14/2020	83.49	8856	8902	3644	406660	7079.929	N/A
17	4/14/2020	85.69	8647	6870	3976	402680	6951.262	N/A
18	4/15/2020	85.69	8707	6423	3904	407780	6950.429	N/A
19	4/15/2020	85.91	8648	6159	4119	405640	7070.857	N/A
20	4/15/2020	85.85	8643	5999	3873	407300	6992.429	N/A
21	4/15/2020	85.74	8732	6234	4176	405660	6921.524	N/A
22	4/16/2020	85.33	8728	6611	4070	407380	6970.5	N/A
23	4/16/2020	96.02	8729	6108	4165	406500	7060.905	N/A
24	4/16/2020	85.84	8513	7616	4012	406080	6894.333	N/A
25	4/17/2020	85.86	8777	6797	3961	407660	6924.119	N/A
26	4/17/2020	85.79	8685	6486	3985	402080	6910.571	N/A
27	4/17/2020	95.14	8752	6332	4246	407820	6898.905	N/A
28	4/18/2020	95.68	8714	6125	4085	408800	6841.357	N/A
29	4/18/2020	95.39	8730	6799	4237	408560	7047.905	N/A
30	4/18/2020	95.59	8760	6090	3982	403620	6932.452	N/A
31	4/19/2020	95.27	8736	6076	4221	409420	6876.976	N/A
32	4/19/2020	95.91	8422	6304	4292	409160	7033.262	N/A
33	4/19/2020	95.91	8728	7664	4348	408780	7025.833	N/A
34	4/19/2020	95.6	8802	6260	4285	407280	6865.286	N/A
35	4/20/2020	95.78	8778	5973	4200	407020	6850.643	N/A
36	4/20/2020	95.94	8332	5813	4323	406860	6904.619	N/A
37	4/20/2020	95.79	8605	6322	4172	408000	6886.667	N/A
38	4/21/2020	95.19	8626	6102	4142	405020	6842.952	N/A
39	4/21/2020	93.72	8489	6496	4391	405000	6921.024	N/A
40	4/21/2020	95.05	8509	6179	4409	407820	6949.262	N/A
41	4/21/2020	95.84	8336	5734	4055	408540	6825.167	N/A
42	4/22/2020	95.67	8625	6036	3952	405960	6796.5	N/A
43	4/22/2020	96	8242	6093	4178	406800	6830.952	N/A
44	4/22/2020	92.8	8249	6566	4299	403640	6795.238	N/A
45	4/23/2020	95.76	8427	6071	4358	409300	6799.31	N/A
46	4/23/2020	95.04	8340	6196	4447	407580	6902.5	N/A
47	4/23/2020	95.91	8160	6019	4511	408320	6826.024	N/A
48	4/23/2020	95.94	8249	6711	4361	404840	6727.643	N/A
49	4/23/2020	95.94	8074	6928	4244	404340	6688.786	N/A
50	4/24/2020	95.9	8004	6570	4720	407120	6758.738	N/A
51	4/24/2020	94.79	7716	6430	4445	405800	6804.5	N/A
52	4/24/2020	95.62	8003	6316	4321	407000	6788.905	N/A
53	4/25/2020	95.86	7688	6276	4262	410240	6816.952	N/A
54	4/25/2020	94.4	7747	5792	4220	405720	6811.952	N/A
55	4/25/2020	95.92	7504	5412	3919	406820	6817.667	N/A
56	4/25/2020	95.62	8042	6509	4035	408340	6770.952	N/A
	AVG=	91	8,456	6,379	4,230	22,518,260	388,511	TOTAL

## EXHIBIT 3

LITHOLOGY/ FORMATION	TOP DEPTH (TVD)	BOTTOM DEPTH (TVD)	TOP DEPTH (MD)	BOTTOM DEPTH (MD)
	From Surface	From Surface	From Surface	From Surface
Shale	0	310	0	310
Silty sandstone	310	460	310	460
Shale	460	700	460	700
Silty Shale	700	820	700	820
Shale with interbedded limestone	820	850	820	850
Shale	850	880	850	880
Shale w/ trace coal	880	910	880	910
Shaley Sandstone	910	1,180	910	1,180
Shale	1,180	1,240	1,180	1,240
Sandstone w/ interbedded coals	1,240	1,330	1,240	1,330
Sandstone w/ trace coal	1,330	1,480	1,330	1,480
Sandstone	1,480	1,510	1,480	1,510
Shale	1,510	1,629	1,510	1,630
Big Lime	1,629	2,337	1,630	2,337
Fifty Foot Sandstone	2,337	2,437	2,337	2,437
Gordon	2,437	2,744	2,437	2,745
Fifth Sandstone	2,744	2,792	2,745	2,792
Bayard	2,792	3,554	2,792	3,568
Speechley	3,554	3,770	3,568	3,793
Balltown	3,770	4,301	3,793	4,346
Bradford	4,301	4,699	4,346	4,761
Benson	4,699	4,955	4,761	5,029
Alexander	4,955	6,186	5,029	6,336
Sycamore	5,998	6,161	6,141	6,311
Middlesex	6,161	6,295	6,336	6,531
Burkett	6,295	6,324	6,556	6,602
Tully	6,324	6,373	6,627	6,761
Marcellus	6,373	NA	6,761	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.

State of West Virginia  
Department of Environmental Protection - Office of Oil and Gas  
Discharge Monitoring Report  
Oil and Gas General Permit

Company Name: Antero Resources Corporation  
API No: 47-095-02525 County: Tyler  
District: McElroy Well No: Avalanche Unit 2H  
Farm Name: Antero Resources Corporation  
Discharge Date/s From:(MMDDYY) 07/01/20 To: (MMDDYY) 07/31/20  
Discharge Times. From: 0:00 To: 24:00  
Total Volume to be Disposed from this facility (gallons): 609,484

Disposal Option(s) Utilized (write volumes in gallons):

- (1) Land Application: \_\_\_\_\_ (Include a topographical map of the Area.)  
(2) UIC: 2,537 Permit No. 3400923821, 3400923823, 3400923824  
(3) Offsite Disposal: \_\_\_\_\_ Site Location: \_\_\_\_\_  
(4) Reuse: 606,947 Alternate Permit Number: \_\_\_\_\_  
(5) Centralized Facility: \_\_\_\_\_ Permit No. \_\_\_\_\_  
(6) Other method: \_\_\_\_\_ (Include an explanation)

Follow Instructions below to determine your treatment category:

Optional Pretreatment test: N/A Cl- mg/l N/A DO mg/l

1. Do you have permission to use expedited treatment from the Director or his representative?  
(Y/N) N/A If yes, who? \_\_\_\_\_ and place a four (4) on line 7.  
If not go to line 2
2. Was Frac Fluid or flowback put into the pit? (Y/N) N/A If yes, go to line 5. If not, go to line 3.
3. Do you have a chloride value pretreatment (see above)? (Y/N) N/A If yes, go to line 4  
If not, go to line 5.
4. Is the Chloride level less than 5000 mg/l? (Y/N) N/A If yes, then enter a one (1) on line 7.
5. Do you have a pretreatment value for DO? (See above) (Y/N) N/A If yes, go to line 6  
If not, enter a three (3) in line 7.
6. Is the DO level greater than 2.5 mg/l?(Y/N) N/A If yes, enter a two (2) on line 7. If not, enter a three (3) on line 7.
7. N/A is the category of your pit. Use the Appropriate section.
8. Comments on Pit condition: N/A No pit on site

Name of Principal Exec. Officer: Gretchen Kohler  
Title of Officer: Senior Environmental and Regulatory Manager  
Date Completed: 9/22/2020

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this document and all the attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

\_\_\_\_\_  
Signature of a Principal Exec. Officer or Authorized agent.



Category 1  
Sampling Results  
API No : \_\_\_\_\_

Parameter	Predischarge		Discharge		Units
	Limits	Reported	Limits	Reported	
pH	6-10	_____	6-10	_____	S.U
Settling Time	5	_____	N/A	N/A	Days
Fe	6	_____	6	_____	mg/l
D.O.	2.5	_____	2.5	_____	mg/l
Settleable Sol.	0.5	_____	0.5	_____	mg/l
Cl	5,000	_____	5,000	_____	mg/l
Oil	Trace	_____	Trace	_____	Obs.
TOC**		_____	Monitor	_____	mg/l
Oil and Grease		_____	Monitor	_____	mg/l
Total Al***		_____	Monitor	_____	mg/l
TSS		_____	Monitor	_____	mg/l
Total Mn	Monitor	_____	Monitor	_____	mg/l
Volume		_____	Monitor	_____	Gal
Flow		_____	Monitor	_____	Gal/min
Disposal Area		_____	Monitor	_____	Acres

\*\*\* Al is only reported if the pH is above 9.0

Category 2  
Sampling Results  
API No : \_\_\_\_\_

Parameter	Predischarge		Discharge		Units
	Limits	Reported	Limits	Reported	
pH	6-10	_____	6-10	_____	S.U
Settling Time	10	_____	N/A	N/A	Days
Fe	6	_____	6	_____	mg/l
D.O.	2.5	_____	2.5	_____	mg/l
Settleable Sol.	0.5	_____	0.5	_____	mg/l
Cl*	12,500	_____	12,500	_____	mg/l
Oil	Trace	_____	Trace	_____	Obs.
TOC**		_____	Monitor	_____	mg/l
Oil and Grease		_____	Monitor	_____	mg/l
Total Al***		_____	Monitor	_____	mg/l
TSS		_____	Monitor	_____	mg/l
Total Mn	Monitor	_____	Monitor	_____	mg/l
Volume		_____	Monitor	_____	Gal
Flow		_____	Monitor	_____	Gal/min
Disposal Area		_____	Monitor	_____	Acres

\* Can be 25,000 with inspector's approval,

(Inspector's signature): \_\_\_\_\_

Date: \_\_\_\_\_

\*\* Include a description of your aeration technique.

Aeration Code: \_\_\_\_\_

\*\*\* Al is only reported if the pH is above 9.0

Category 3  
Sampling Results  
API No : \_\_\_\_\_

Parameter	Predischarge		Discharge		Units
	Limits	Reported	Limits	Reported	
pH	6-10	_____	6-10	_____	S.U
Settling Time	20	_____	N/A	N/A	Days
Fe	6	_____	6	_____	mg/l
D.O.	2.5	_____	2.5	_____	mg/l
Settleable Sol.	0.5	_____	0.5	_____	mg/l
Cl*	12,500	_____	12,500	_____	mg/l
Oil	Trace	_____	Trace	_____	Obs.
TOC**		_____	Monitor	_____	mg/l
Oil and Grease		_____	Monitor	_____	mg/l
Total Al***		_____	Monitor	_____	mg/l
TSS		_____	Monitor	_____	mg/l
Total Mn	Monitor	_____	Monitor	_____	mg/l
Volume		_____	Monitor	_____	Gal
Flow		_____	Monitor	_____	Gal/min
Disposal Area		_____	Monitor	_____	Acres

\* Can be 25,000 with inspector's approval,

(Inspector's signature): \_\_\_\_\_

Date: \_\_\_\_\_

\*\* Include a description of your aeration technique.

Aeration Code: \_\_\_\_\_

\*\*\* Al is only reported if the pH is above 9.0.

Category 4  
Sampling Results  
API No: \_\_\_\_\_

Parameter	Predischarge		Discharge		Units
	Limits	Reported	Limits	Reported	
pH	6-10	_____	6-10	_____	S.U
Settling Time	1	_____	N/A	N/A	Days
Fe	Monitor	_____	Monitor	_____	mg/l
D.O.	Monitor	_____	Monitor	_____	mg/l
Settleable Sol.	Monitor	_____	Monitor	_____	mg/l
Cl*	12,500	_____	12,500	_____	mg/l
Oil	Trace	_____	Trace	_____	Obs.
TOC**		_____	Monitor	_____	mg/l
Oil and Grease		_____	Monitor	_____	mg/l
TSS		_____	Monitor	_____	mg/l
Total Mn	Monitor	_____	Monitor	_____	mg/l
Volume		_____	Monitor	_____	Gal
Flow		_____	Monitor	_____	Gal/min
Activated Carbon (0.175)		_____	N/A	N/A	lb/Bt
Date Site Reclaimed	N/A	N/A			10 days from dis.
Disposal Area		_____	Monitor	_____	Acres

\* Can be 25,000 with inspector's approval,

(Inspector's signature): \_\_\_\_\_

Date: \_\_\_\_\_

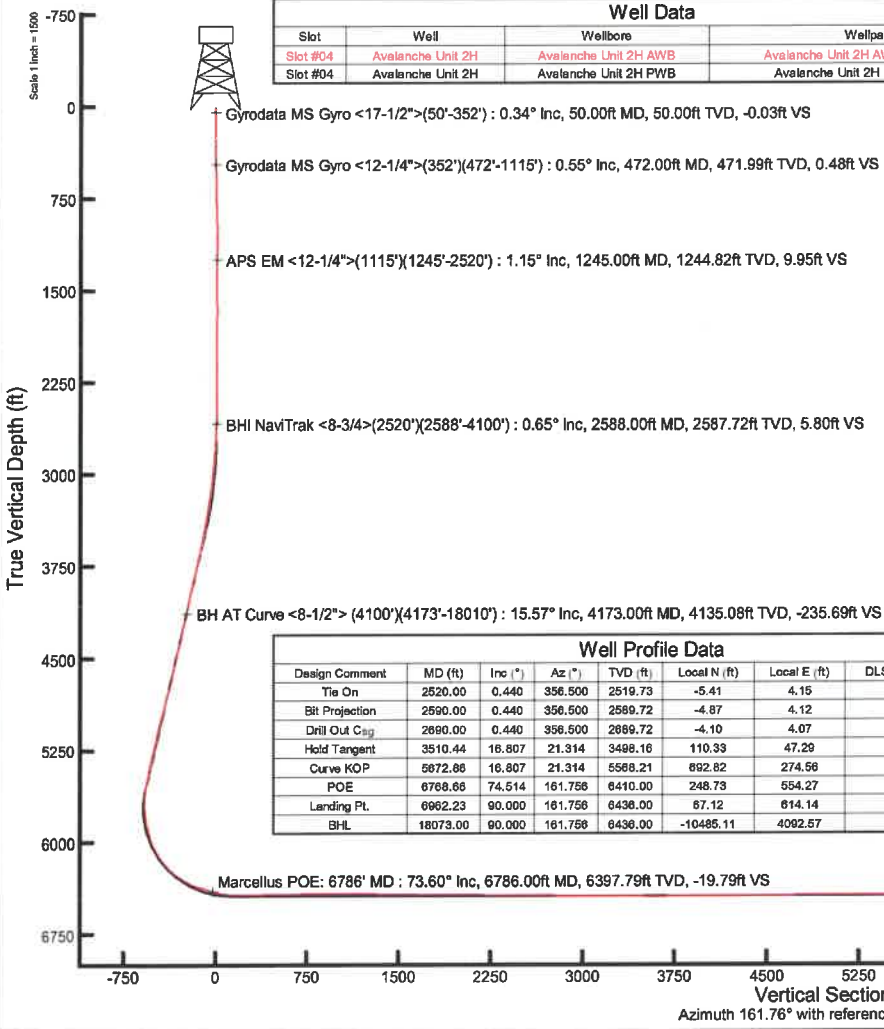
# ANTERO RESOURCES CORPORATION

Location: Tyler County, WV Slot: Slot #04  
 Field: Tyler Well: Avalanche Unit 2H  
 Facility: Colorado East Pad Wellbore: Avalanche Unit 2H PWB

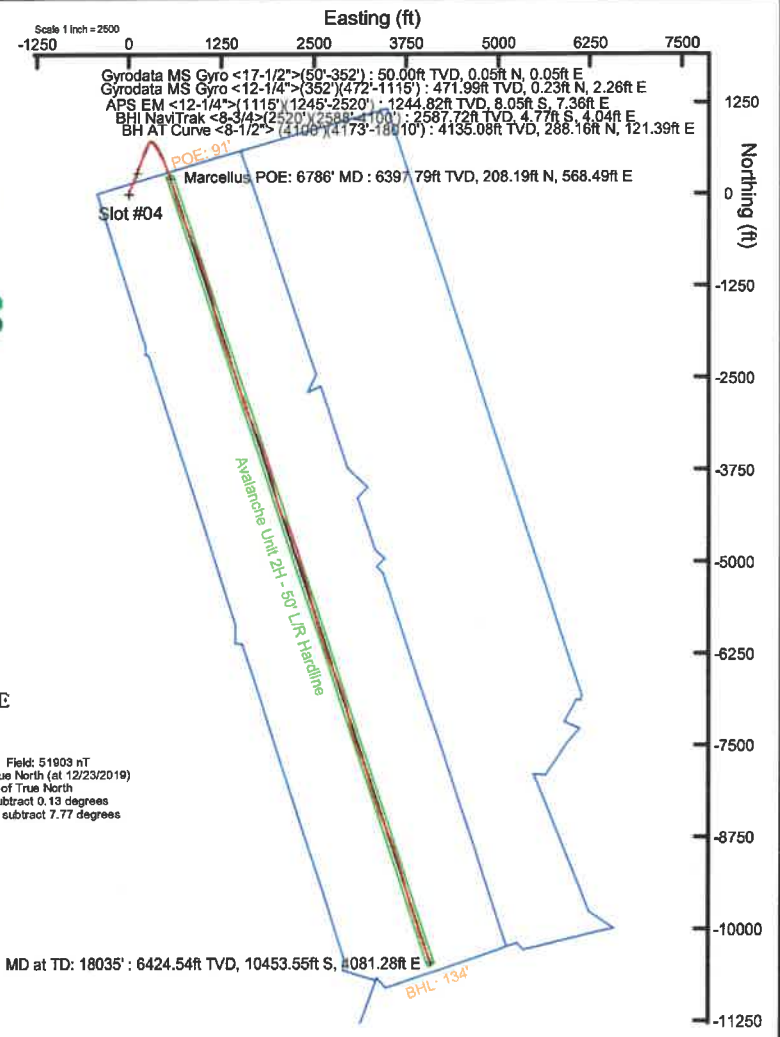
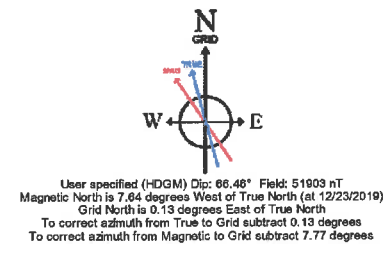
Plot reference wellpath is Avalanche Unit 2H PWP Rev-B.0	Grid System: NAD27 / UTM Zone 17 North, US feet
True vertical depths are referenced to Patterson 342 (RKB)	North Reference: Grid north
Reference wellpath measured depths are referenced to Patterson 342 (RKB)	Scale: True distance
Patterson 342 (RKB) to Mean Sea Level: 788 feet	Coordinates are in feet referenced to Slot
Mean Sea Level to Ground level (At Slot: Slot #04): -743 feet	Depths are in feet
Offset wellpath MDs are referenced to each path's default MD datum	Created by: dolaset on 2020-01-03; Database: WA_MPL_EasternUS_Defn

Location Information					
Facility Name	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude	
Colorado East Pad	1700256.680	14308700.560	39°24'10.4301"N	80°47'17.3894"W	
Slot	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)	Latitude
Slot #04	6.47	-5.33	1700251.350	14308700.030	39°24'10.5140"N
Patterson 342 (RKB) to Ground level (At Slot: Slot #04)	25ft				
Mean Sea Level to Ground level (At Slot: Slot #04)	-743ft				
Patterson 342 (RKB) to Mean Sea Level	788ft				

Well Data			
Slot	Well	Wellbore	Wellpath
Slot #04	Avalanche Unit 2H	Avalanche Unit 2H AWB	Avalanche Unit 2H AWP Proj; 18035'
Slot #04	Avalanche Unit 2H	Avalanche Unit 2H PWB	Avalanche Unit 2H PWP Rev-B.0



Well Profile Data							
Design Comment	MD (ft)	Inc (°)	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	VS (ft)
Tie On	2520.00	0.440	356.500	2519.73	-5.41	4.15	6.43
Bit Projection	2590.00	0.440	356.500	2589.72	-4.87	4.12	5.91
Drill Out Casp	2690.00	0.440	356.500	2689.72	-4.10	4.07	5.17
Hold Tangent	3510.44	16.807	21.314	3498.16	110.39	47.29	-89.98
Curve KOP	5672.86	16.807	21.314	5588.21	892.82	274.56	-572.08
POE	6768.66	74.514	161.766	6410.00	248.73	554.27	-62.75
Landing PL	6962.23	90.000	161.756	6436.00	67.12	614.14	126.47
BHL	18073.00	90.000	161.766	6436.00	-10485.11	4092.57	0.00



API: 47-095-02525-0000  
 BHI Job #: 110086792B  
 Rig: Patterson 342  
 Duration: 11/08/2019-12/30/2019



# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	4/9/2020
Job End Date:	4/25/2020
State:	West Virginia
County:	Tyler
API Number:	47-095-02525-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Avalanche 2H
Latitude:	39.40292000
Longitude:	-80.78818000
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,441
Total Base Water Volume (gal):	17,002,764
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
Produced Mixture	Halliburton	Base Fluid					
			Water	7732-18-5	100.00000	86.35971	Density = 8.50
Ingredients	Listed Above	Listed Above					
			Water	7732-18-5	100.00000	0.16480	

WG-36 GELLING AGENT	Halliburton	Gelling Agent					
				Listed Below			
HAI-501	Halliburton	Acid Corrosion Inhibitor					
				Listed Below			
Legend LD-2990	MultiChem	Friction Reducer					
				Listed Below			
MC B-8614	Halliburton	Biocide					
				Listed Below			
HYDROCHLORIC ACID, 22 BAUME	Halliburton	Solvent					
				Listed Below			
Legend LD-2555	MultiChem	Additive					
				Listed Below			
Sand-Common White-100 Mesh, SSA-2	Halliburton	Proppant					
				Listed Below			
LD-2950	MultiChem	Friction Reducer					
				Listed Below			

OPTIFLO-II DELAYED RELEASE BREAKER	Halliburton	Breaker					
				Listed Below			
Excelerate LX-15	Halliburton	Friction Reducer					
				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	13.45575	
			Hydrochloric acid	7647-01-0	30.00000	0.03911	
			Complex Amine Compound	Proprietary	60.00000	0.01930	
			Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.01234	
			Complex Amine Compound	Proprietary	60.00000	0.00456	
			Guar gum	9000-30-0	100.00000	0.00293	
			Glutaraldehyde	111-30-8	30.00000	0.00246	
			Ethoxylated alcohols	Proprietary	5.00000	0.00161	
			Complex Amine Compound	Proprietary	60.00000	0.00081	
			Polyethoxylated fatty amine salt	61791-26-2	30.00000	0.00046	
			Sorbitan, mono-9- octadecenoate, (Z)	1338-43-8	5.00000	0.00045	
			Quaternary ammonium compounds, benzyl-C12- 16-alkyldimethyl chlorides	68424-85-1	5.00000	0.00041	
			Surfactant	Proprietary	5.00000	0.00038	
			Methanol	67-56-1	100.00000	0.00033	
			Poly(oxy-1,2-ethanediyl), alpha-tridecyl-omega- hydroxy-, branched	69011-36-5	1.00000	0.00032	
			Adipic acid	124-04-9	1.00000	0.00032	

			Ammonium persulfate	7727-54-0	100.00000	0.00013
			Ethanol	64-17-5	1.00000	0.00008
			Organic chloride compound	Proprietary	1.00000	0.00008
			Alkoxyated polyhydric alcohol	Proprietary	1.00000	0.00008
			Ethoxylated alcohols	Proprietary	1.00000	0.00008
			Modified thiourea polymer	Proprietary	30.00000	0.00007
			Mixture of dimer and trimer fatty acids of indefinite composition derived from tall oil	61790-12-3	30.00000	0.00007
			Surfactant	Proprietary	5.00000	0.00007
			Oxylated phenolic resin	Proprietary	30.00000	0.00004
			Ethoxylated alcohols	Proprietary	5.00000	0.00003
			Alkoxyated polyhydric alcohol	Proprietary	1.00000	0.00001
			Organic chloride compound	Proprietary	1.00000	0.00001
			Hexadecene	629-73-2	5.00000	0.00001
			Propargyl alcohol	107-19-7	5.00000	0.00001
			Phosphoric acid	7664-38-2	0.10000	0.00001
			Acrylamide	79-06-1	0.10000	0.00001
			Organic salt #1	Proprietary	0.10000	0.00001
			C.I. pigment Orange 5	3468-63-1	1.00000	0.00000
			Sodium hydroxide	1310-73-2	0.01000	0.00000
			Formaldehyde	50-00-0	0.01000	0.00000
			Organic salt #3	Proprietary	0.01000	0.00000
			Sodium glycolate	2836-32-0	0.01000	0.00000
			Nitrated acetate salt	Proprietary	0.01000	0.00000
			Organic salt #2	Proprietary	0.01000	0.00000
			Ethylene oxide	75-21-8	0.01000	0.00000
			Nitrated acetate salt	Proprietary	0.01000	0.00000
			Sodium glycolate	2836-32-0	0.01000	0.00000

			Organic salt #2	Proprietary	0.01000	0.00000	
			Organic salt #1	Proprietary	0.01000	0.00000	

\* 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)



LATITUDE 39°25'00"

10,790'

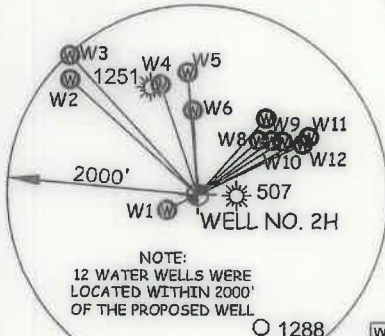
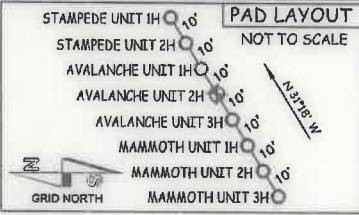
LATITUDE 39°22'30"

294' TO BOTTOM HOLE  
5.007'  
LONGITUDE 80°45'00"

Antero Resources Corporation  
Well No. Avalanche Unit 2H

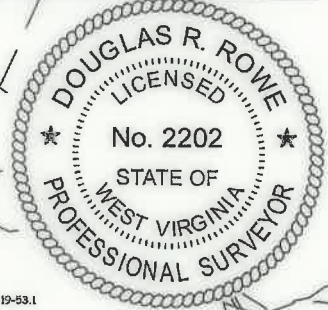
AS DRILLED DATA:  
WELL 2H TOP HOLE INFORMATION:  
N: 331,472ft E: 1,635,997ft  
LAT: 39°24'10.51" LON: 80°47'17.46"  
BOTTOM HOLE INFORMATION:  
N: 320,952ft E: 1,639,903ft  
LAT: 39°22'27.10" LON: 80°46'25.80"  
WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE. ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER MAPPING GRADE GPS UNIT. PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES

ARE BASED ON GRID NORTH.  
2H TOP HOLE  
(NAD) 83 (UTM) ZONE 17 COORDS:  
WELL 2H TOP HOLE INFORMATION:  
N: 4,361,521m E: 518,252m  
BOTTOM HOLE INFORMATION:  
N: 4,358,336m E: 519,495m



W1	S 63°23' W	359.2'
W2	N 47°45' W	1801.9'
W3	N 42°23' W	1993.8'
W4	N 18°18' W	1224.0'
W5	N 04°30' W	1295.6'
W6	N 02°57' W	893.2'
W7	N 41°39' E	1085.6'
W8	N 48°02' E	866.0'
W9	N 53°22' E	966.3'
W10	N 57°24' E	1057.8'
W11	N 62°09' E	1320.5'
W12	N 63°56' E	1228.5'

TM-Par	Surface Owner	Book/Pg	Acres
16-07	Robert Kocher	432/591	97.659 AC
16-7.2	Donna Brumbaugh	360/71	1.86 AC
16-7.3	Mary Blatter	WB45/477	4.47 AC
16-7.4	Donald Moore	387/168	6.974 AC
16-7.5	Robert Kocher	432/591	63.066 AC
16-08	June Griffin	231/41	233.49 AC
16-8.1	Roger Griffin	219/454	1.45 AC
16-8.2	Roger Griffin	352/609	0.481 AC
16-18	Albert Bebee	292/450	208.66 AC
16-19	Todd Orr	205/175	2 AC
19-02	Lloyd Talkington	326/774	127.86 AC
19-03	Larry Stevens	344/431	2.98 AC
19-04	John Owens	296/279	1.08 AC
19-05	Paul Weekley	419/401	0.21 AC
19-06	Paul Weekley	419/401	0.866 AC
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19-08	John Lewis Jr.	336/631	116.5 AC
19-09	Robert Walsh	335/839	140 AC
19-45	Terrence Fraser	252/430	7.16 AC
19-46	Terrence Fraser	292/430	59.62 AC
19-47	Ronnie Wilson Jr.	358/414	50 AC
19-52	Harald Yost	344/242	32 AC
19-53.1	Larry Marable	368/722	66.38 AC
19-66	Matthew March	415/642	73.952 AC
19-67	Smith Morris Trust	149/274	18 AC
19-68	Randall Clouston	458/666	35.53 AC
19-69	Randall Clouston	458/666	38.5 AC
22-05	William Middleton	353/471	102.29 AC
22-06	Thomas Allen	269/448	53 AC
22-07	Thomas Allen	125/425	50 AC
22-10	Thomas Allen	269/448	23 AC
22-12	Terry Dotson	544/784	48.754 AC
22-12.1	Margaret Dotson	415/599	2.996 AC
01-01	Steven Reed	WB54/21	158 AC



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 # 17-038WA  
DRAWING # AVALANCHE2HAD  
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  
DOUGLAS R. ROWE P.S. 2202  
DATE 08/12/20  
OPERATOR'S WELL# AVALANCHE UNIT #2H

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 ANTERO RESOURCES CORPORATION.  
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 - 02525  
(IF "GAS") PRODUCTION X STORAGE \_\_\_ DEEP \_\_\_ SHALLOW X STATE COUNTY PERMIT  
LOCATION: ELEVATION 743' - AS BUILT WATERSHED McELROY CREEK  
QUADRANGLE TH - SHIRLEY 7.5' BH - WEST UNION 7.5' DISTRICT McELROY COUNTY TYLER  
SURFACE OWNER ANTERO RESOURCES CORPORATION ACREAGE 127.86 ACRES +/-  
OIL & GAS ROYALTY OWNER B.F. REED ET UX; K & D HOLDINGS, LLC; MARK A. BURNETT; LEASE ACREAGE 130 AC.±; 219.39 AC.±; 256 AC.±;  
R.E. SMITH ET UX; GLENN D. SMITH; FANNY D. DAVIS ET AL; UNION NATIONAL BANK OF W.V.; 50.5 AC.±; 32 AC.±; 74 AC.±; 25.5 AC.±;  
EDWARD LEWIS CASE; LINDA J. DESCHER; W.S. WRIGHT ET AL 50 AC.±; 76 AC.±; 48.754 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 6,425' TVD 18,035' 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

COUNTY NAME PERMIT



LATITUDE 39°25'00"

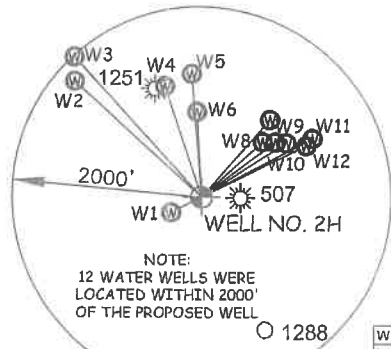
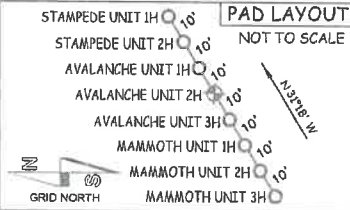
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Well No. Avalanche Unit 2H

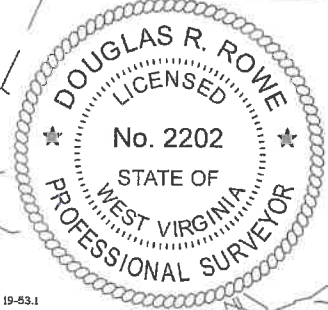
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○ Proposed Well Path  
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PROPOSED WORK: DRILL \_\_\_ CONVERT \_\_\_ DRILL DEEPER \_\_\_ REDRILL \_\_\_ FRACTURE OR STIMULATE \_\_\_  
PLUG OFF OLD FORMATION \_\_\_ PERFORATE NEW FORMATION \_\_\_ OTHER PHYSICAL CHANGE IN WELL \_\_\_  
(SPECIFY) AS DRILLED PLUG & ABANDON CLEAN OUT & REPLUG  
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6,425' TVD 18,035' 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

294' TO BOTTOM HOLE  
5,007'  
LONGITUDE 80°45'00"